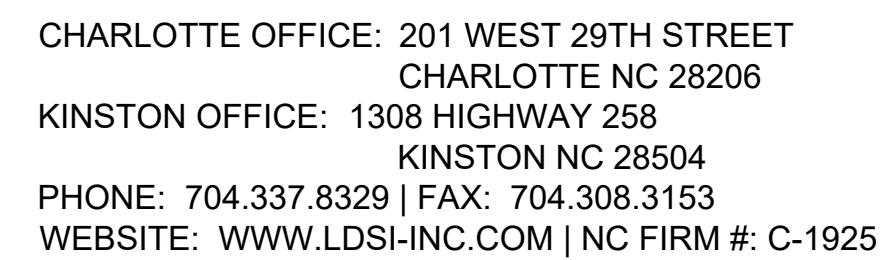


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FOR



# THE CITY OF BOILING SPRING LAKES

THIS PROJECT IS AN NRCS EMERGENCY WATERSHED PROTECTION PROJECT THAT FALLS UNDER 7 CFR PART 624. THE GOAL OF THIS PROJECT IS TO AVOID AND MINIMIZE ADVERSE EFFECTS TO THE WATERS OF THE UNITED STATES. THIS WILL BE ACHIEVED THROUGH DEBRIS REMOVAL, BANK STABILIZATION, STREAM RESTORATION, DAM REPAIR, AND POND BERM STABILIZATION ACROSS 9 SITES WITHIN BOILING SPRING LAKES. ALL 9 SITES WITHIN THIS PROJECT SHOULD EXPERIENCE POSITIVE ENVIRONMENTAL EFFECTS VIA WATER QUALITY ENHANCEMENTS, REDUCTION IN SEDIMENT TRANSPORT, FLOODPLAIN STABILIZATION, FLOOD ATTENUATION, STORMWATER STORAGE, AND IMPROVEMENTS IN THE HYDRAULIC PERFORMANCE OF CHANNELS AND STREAMS.

Sheet List Table	
SHEET #	DESCRIPTION
	COVER SHEET
2	GENERAL NOTES 1
3	GENERAL NOTES 2
4	GENERAL NOTES 3
5	E&S&C DETAILS
6	080 - DAM ROAD E&S&C LAYOUT
7	081 - CHERRY ROAD E&S&C LAYOUT
8	082 - EAST BOILING SPRING ROAD AT PATRICIA LAKE E&S&C LAYOUT
9	083 - HUNTERS ROAD E&S&C LAYOUT
10	084 - N SHORE DRIVE E&S&C LAYOUT
11	085 - PINE LAKE ROAD E&S&C LAYOUT
12	191 - N SHORE DRIVE AT PATRICIA LAKE E&S&C LAYOUT
13	192 - ALLEN CREEK E&S&C LAYOUT
14	080 - MIDDLE DAM REPAIRS P&P
15	081 - CHERRY ROAD P&P 0+00.00 - 7+50.00
16	081 - CHERRY ROAD P&P 7+50.00 - 12+76.46
17	082 - SHORELINE STABILIZATION PLAN VIEW
18	083 - HUNTERS ROAD P&P 0+00.00 - 8+90.00
19	083 - HUNTERS ROAD P&P 8+90.00 - 16+03.08
20	084 - N SHORE DRIVE RISER BOX P&P
21	085 - PINE LAKE ROAD P&P
22	190 - RIVER ROAD CLEARING AND SNAGGING
23	191 - N SHORE DRIVE AT PATRICIA LAKE P&P
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25	192 - ALLEN CREEK DOWNSTREAM P&P
26	LOG V-DROP
27	LOG SILL
28	TYPICAL CROSS SECTIONS
29	FLASHBOARD RISER
30	SHORELINE STABILIZATION

BRUNSWICK  
COUNTY



**North Carolina 811**  
www.nc811.org







**GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT**

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

**SECTION E: GROUND STABILIZATION**

Required Ground Stabilization Timeframes		
Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

**GROUND STABILIZATION SPECIFICATION**

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
<ul style="list-style-type: none"><li>Temporary grass seed covered with straw or other mulches and tackifiers</li><li>Hydroseeding</li><li>Rolled erosion products with or without temporary grass seed</li><li>Appropriately applied straw or other mulch</li><li>Plastic sheeting</li></ul>	<ul style="list-style-type: none"><li>Permanent grass seed covered with straw or other tackifiers</li><li>Geotextile fabrics such as permanent soil reinforcement matting</li><li>Hydroseeding</li><li>Shrubs or other permanent plantings covered with mulch</li><li>Uniform and evenly distributed ground cover sufficient to restrain erosion</li><li>Structural methods such as concrete, asphalt or retaining walls</li><li>Rolled erosion control products with grass seed</li></ul>

**POLYACRYLAMIDES (PAMS) AND FLOCCULANTS**

- Select flocculants that are appropriate for the soils being exposed during construction, selecting from the NC DWR List of Approved PAMS/Flocculants.
- Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
- Apply flocculants at the concentrations specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions.
- Provide ponding area for containment of treated Stormwater before discharging offsite.
- Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

**HAZARDOUS AND TOXIC WASTE**

- Create designated hazardous waste collection areas on-site.
- Place hazardous waste containers under cover or in secondary containment.
- Do not store hazardous chemicals, drums or bagged materials directly on the ground.

**EQUIPMENT AND VEHICLE MAINTENANCE**

- Maintain vehicles and equipment to prevent discharge of fluids.
- Provide drip pans under any stored equipment.
- Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
- Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
- Remove leaking vehicles and construction equipment from service until the problem has been corrected.
- Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

**LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE**

- Never bury or burn waste. Place litter and debris in approved waste containers.
- Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
- Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
- Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
- Anchor all lightweight items in waste containers during times of high winds.
- Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
- Dispose waste off-site at an approved disposal facility.
- On business days, clean up and dispose of waste in designated waste containers.

**PAINT AND OTHER LIQUID WASTE**

- Do not dump paint and other liquid waste into storm drains, streams or wetlands.
- Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Contain liquid wastes in a controlled area.
- Containment must be labeled, sized and placed appropriately for the needs of site.
- Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

**PORTABLE TOILETS**

- Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
- Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
- Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

**EARTHEN STOCKPILE MANAGEMENT**

- Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
- Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
- Provide stable stone access point when feasible.
- Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

**HERBICIDES, PESTICIDES AND RODENTICIDES**

- Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
- Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
- Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
- Do not stockpile these materials onsite.

**CONCRETE WASHOUTS**


- Do not discharge concrete or cement slurry from the site.
- Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
- Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
- Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
- Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
- Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
- Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
- Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
- Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
- At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

**ABBREVIATIONS / ACRONYMS**

STA =	STATION	BH =	SOIL BORE HOLE
BM =	BENCHMARK	DBKF =	DEPTH AT BANKFULL
TBM =	TEMPORARY BENCHMARK	NTS =	NOT TO SCALE
IP =	IRON PIN (FOUND OR SET)	WCS =	WATER CONTROL STRUCTURE
ELEV / EL=	ELEVATION	WTS =	WATER TRANSFER STRUCTURE
INV =	INVERT ELEVATION	SL =	SLOUGH
H =	HEIGHT	PC =	POINT OF CURVATURE
HDPE =	HIGH-DENSITY POLYETHYLENE	PT =	POINT OF TANGENT
LF =	LINEAR FOOT	PVI =	POINT OF VERTICAL INTERSECTION
MAX =	MAXIMUM	PVE =	POINT OF VERTICAL INTERSECTION EL
MIN =	MINIMUM	R 20 =	RADIUS OF 20.0'
No. / # =	NUMBER	TYP. =	TYPICAL
TOB =	TOP OF BANK	ESMT =	EASEMENT
TOS =	TOE OF SLOPE	I.D. =	INSIDE DIMENSION
DBT =	DITCH BOTTOM	TH =	SOIL BORING TEST HOLE
RCP =	REINFORCED CONCRETE PIPE	MS =	MAIN STEM
CMP =	CORRUGATED METAL PIPE	LS =	LOG SILL
GALV =	GALVANIZED	CL =	COVER LOG
SF =	SILT FENCE	LV =	LOG VANE
LOD =	LIMITS OF DISTURBANCE	CV =	LOG CROSS VANE
WRP =	WETLAND RESERVE PROGRAM	RW =	ROOT WAD
WRE =	WETLAND RESERVE EASEMENT	HB =	HABITAT STRUCTURE
CONC =	CONCRETE	BMA =	BRUSH MATTRESS
W/ =	WITH	LJ =	LOG 'J' VANE
W/o/ =	WITHOUT	LR =	LOG ROLL
NCDOT =	NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	LP =	LEAF PACK
RI =	RESOURCE INSTITUTE	RP =	RIFFLE PLANTINGS
JE =	JENNINGS ENVIRONMENTAL	BLDR =	BOULDER
USDA =	UNITED STATES	LLDPE =	LINEAR LOW-DENSITY POLYETHYLENE
LDSI =	LDSI INC.	PVC =	POLYVINYL CHLORIDE
S&WCD =	SOIL AND WATER CONSERVATION DISTRICT	TC =	TURBIDITY CURTAIN

ISSUED FOR: REVIEW & PERMITTING

HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE	NOT FOR CONSTRUCTION	DESCRIPTION	BY	APVD	SEAL
		No.	DATE		
		DATE			
		DATE			
GENERAL NOTES 2	DATE: 7/9/2020	DSGN	JDH	CHK	JDH
		DR	NAE		
		APVD	JDH		



**LDSI**  
SUSTAINING SOLUTIONS FOR A CHANGING WORLD

CHARLOTTE OFFICE: 201 W 29TH STREET, CHARLOTTE NC 28206  
KINSTON OFFICE: 1308 HWY 258 N., KINSTON NC 28504  
PHONE: 704.337.8328 | FAX: 704.386.3163 | WEBSITE: WWW.LDSINC.COM NC PRN # C-1625

SCALE AS SHOWN	
VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING	
0	1"
DATE:	7/9/2020
PROJ:	4519049
DWG:	GENERAL
SHEET:	3 of 30



PART III SELF-INSPECTION, RECORDKEEPING AND REPORTING		
SECTION A: SELF-INSPECTION		
Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.		
Inspect	Frequency (during normal business hours)	Inspection records must include
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those un-attended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event $\geq 1.0$ inch in 24 hours	1. Identification of measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event $\geq 1.0$ inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event $\geq 1.0$ inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event $\geq 1.0$ inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

**PART III**  
**SELF-INSPECTION, RECORDKEEPING AND REPORTING**

**SECTION B: RECORDKEEPING**

**1. E&SC Plan Documentation**  

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be documented in the manner described:

Item to Document	Documentation Requirements
(a) Each E&SC Measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC Plan.	Initial and date each E&SC Measure on a copy of the approved E&SC Plan or complete, date and sign an inspection report that lists each E&SC Measure shown on the approved E&SC Plan. This documentation is required upon the initial installation of the E&SC Measures or if the E&SC Measures are modified after initial installation
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC Plan.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC Measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC Measures.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate the completion of the corrective action

**2. Additional Documentation**  

*In addition to the E&SC Plan documents above, the following items shall be kept on the site and available for agency inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:*

- (a) This general permit as well as the certificate of coverage, after it is received.
- (b) Records of inspections made during the previous 30 days. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.
- (c) All data used to complete the Notice of Intent and older inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

**PART III**  
**SELF-INSPECTION, RECORDKEEPING AND REPORTING**

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### SECTION C: REPORTING

#### 1. Occurrences that must be reported

Permittees shall report the following occurrences:

- Visible sediment deposition in a stream or wetland.
- Oil spills if:
  - They are 25 gallons or more,
  - They are less than 25 gallons but cannot be cleaned up within 24 hours,
  - They cause sheen on surface waters (regardless of volume), or
  - They are within 100 feet of surface waters (regardless of volume).
- Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.
- Anticipated bypasses and unanticipated bypasses.
- Noncompliance with the conditions of this permit that may endanger health or the environment.

#### 2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Division's Emergency Response personnel at (800) 662-7956, (800) 858-0368 or (919) 733-3300.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	<ul style="list-style-type: none"> <li><b>Within 24 hours</b>, an oral or electronic notification.</li> <li><b>Within 7 calendar days</b>, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis.</li> <li>If the stream is named on the NC 303(d) list as impaired for sediment related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.</li> </ul>
(b) Oil spills and release of hazardous substances per item 1(b)-(c) above	<ul style="list-style-type: none"> <li><b>Within 24 hours</b>, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.</li> </ul>
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> <li><b>A report at least ten days before the date of the bypass, if possible.</b> The report shall include an evaluation of the anticipated quality and effect of the bypass.</li> </ul>
(d) Unanticipated bypasses [40CFR 122.41(m)(3)]	<ul style="list-style-type: none"> <li><b>Within 24 hours</b>, an oral or electronic notification</li> <li><b>Within 7 calendar days</b>, a report that includes an evaluation of the quality and effect of the bypass.</li> </ul>
(e) Noncompliance with the conditions of this permit that may endanger health or the environment [40 CFR 122.41(l)(7)]	<ul style="list-style-type: none"> <li><b>Within 24 hours</b>, an oral or electronic notification.</li> <li><b>Within 7 calendar days</b>, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6)].</li> <li>Division staff may waive the requirement for a written report on a case-by-case basis.</li> </ul>



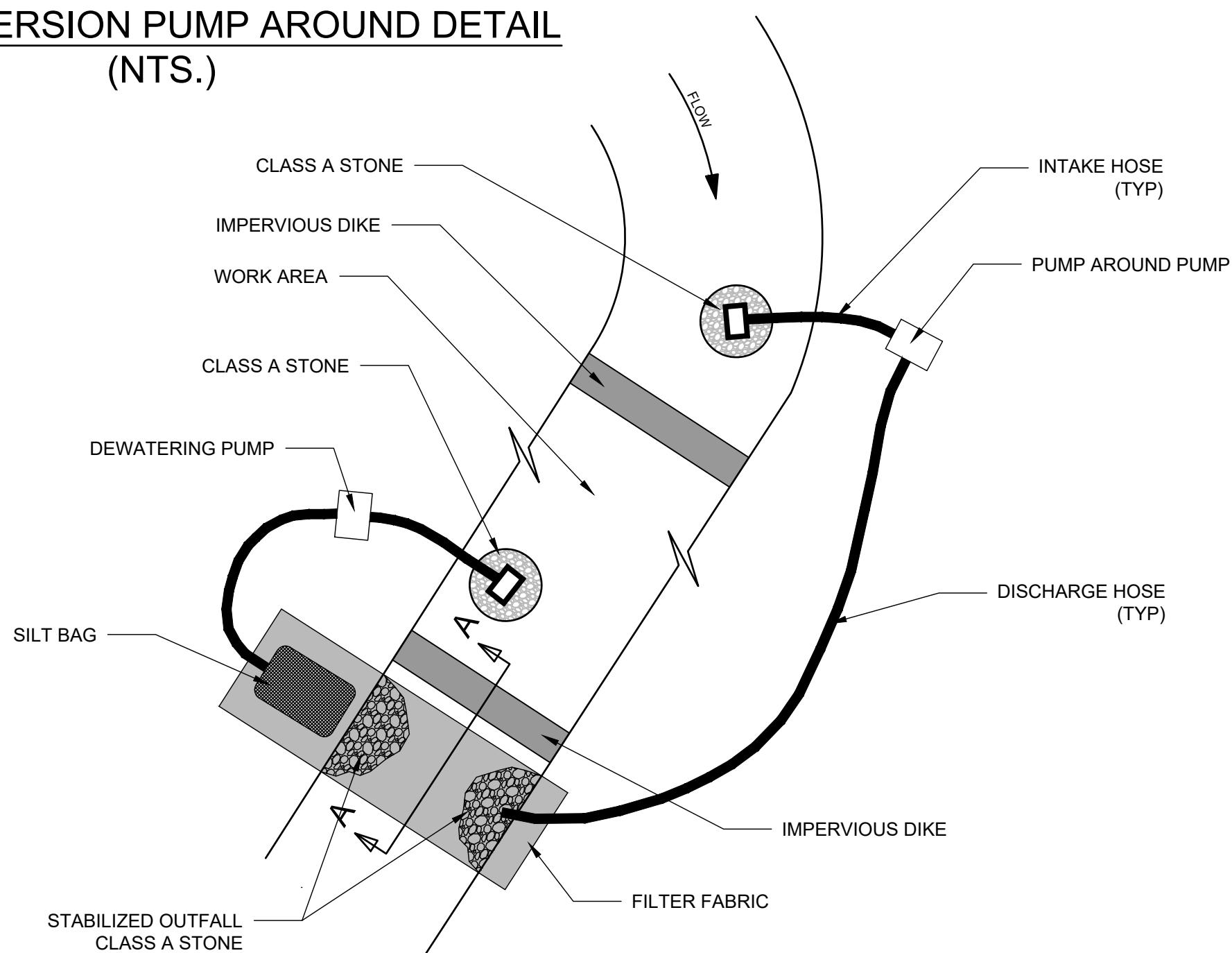
NOTES:

1. CONTRACTOR SHALL SUBMIT DE-WATERING PLAN TO PROJECT ENGINEER TWO (2) WEEKS PRIOR TO COMMENCING WORK.
2. EXCAVATION SHALL BE PERFORMED ONLY IN DRY AND / OR ISOLATED SECTIONS OF CHANNEL.
3. IMPERVIOUS DIKES SHOULD BE USED TO ISOLATE WORK AREAS FROM STREAM FLOW.
4. THE CONTRACTOR SHALL NOT DISTURB MORE AREA THAN CAN BE STABILIZED IN ONE (1) WORK WEEK. A MAXIMUM OF 1000 FEET MAY BE DISTURBED AT ANY ONE TIME.
5. THE PUMP-AROUND PUMP SHOULD ADEQUATELY CONVEY A MINIMUM OF 450 GALLONS / MINUTE.
6. PERFORMANCE q=450 GPM ONLY.
7. DISCHARGE SHALL BE KEPT OUTSIDE OF WORK AREA

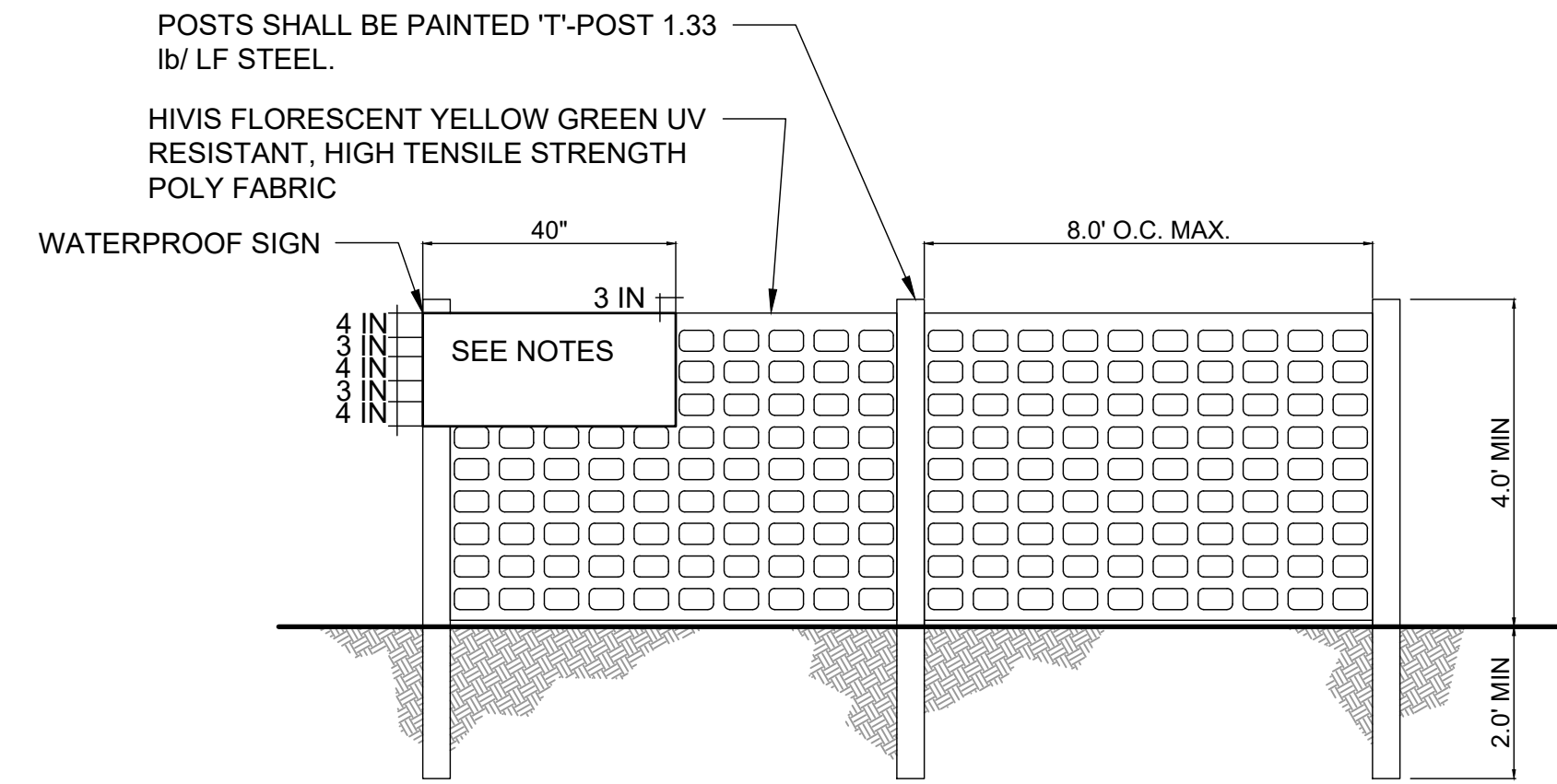
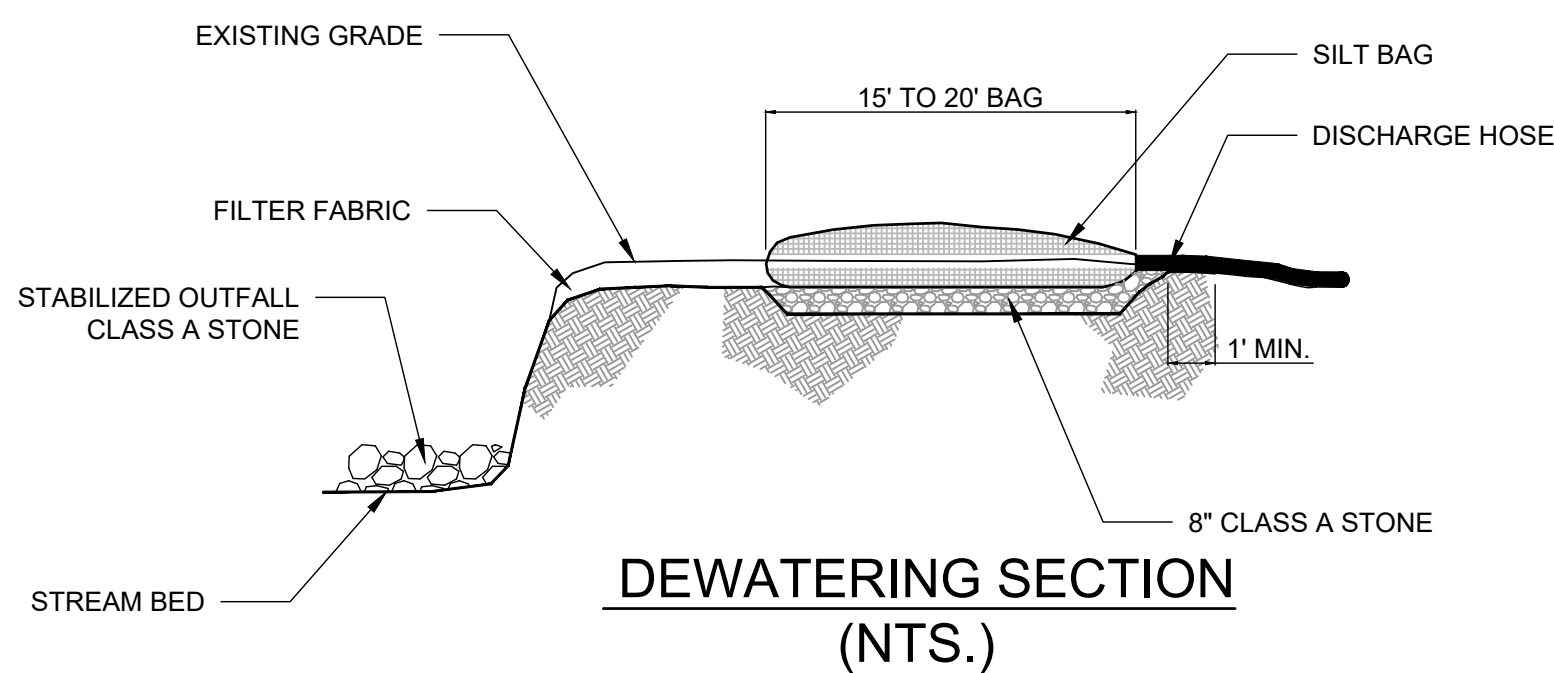
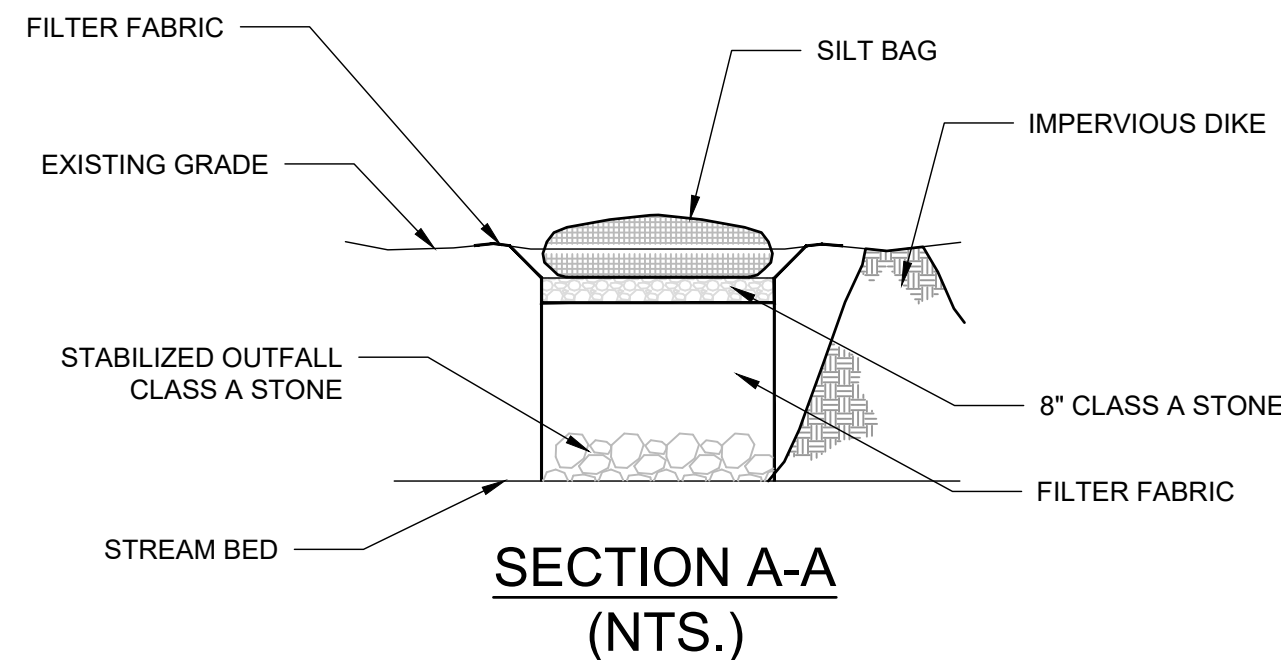
SEQUENCE OF CONSTRUCTION FOR TYPICAL PUMP AROUND:

1. INSTALL STILLING BASIN AND STABILIZED OUTFALL USING CLASS A RIP-RAP AT THE DOWNSTREAM END OF THE DESIGNATED PROJECT WORKING AREA.
2. THE CONTRACTOR WILL INSTALL THE PUMP AROUND PUMP AND THE TEMPORARY PIPING THAT WILL CONVEY THE BASE FLOW FROM UPSTREAM OF THE WORK AREA TO THE STABILIZED OUTFALL.
3. INSTALL UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. INSTALL THE DOWNSTREAM IMPERVIOUS DIKE AND DEWATERING PUMPING APPARATUS IF NEEDED TO DEWATER THE ENTRAPPED AREA. THE PUMP AND HOSE FOR THIS PURPOSE SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA. THIS WATER WILL ALSO BE PUMPED TO AN OUTFALL STABILIZED WITH CLASS A RIP-RAP.
5. THE CONTRACTOR WILL PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLANS AND FOLLOW THE GENERAL CONSTRUCTION SEQUENCE.
6. THE CONTRACTOR WILL EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF THE IMPERVIOUS DIKE. WHEN DEWATERING AREA, ALL DIRTY WATER MUST BE PUMPED THROUGH A SILT BAG. REMOVE IMPERVIOUS DIKES, PUMPS AND TEMPORARY FLEXIBLE HOSE / PIPING STARTING WIT THE DOWNSTREAM DIKE FIRST.
7. ONCE THE WORKING AREA IS COMPLETED, REMOVE ALL RIP-RAP AND IMPERVIOUS DIKES AND STABILIZE DISTURBED AREAS WITH SEED AND MULCH.

STREAM DIVERSION PUMP AROUND DETAIL (NTS.)



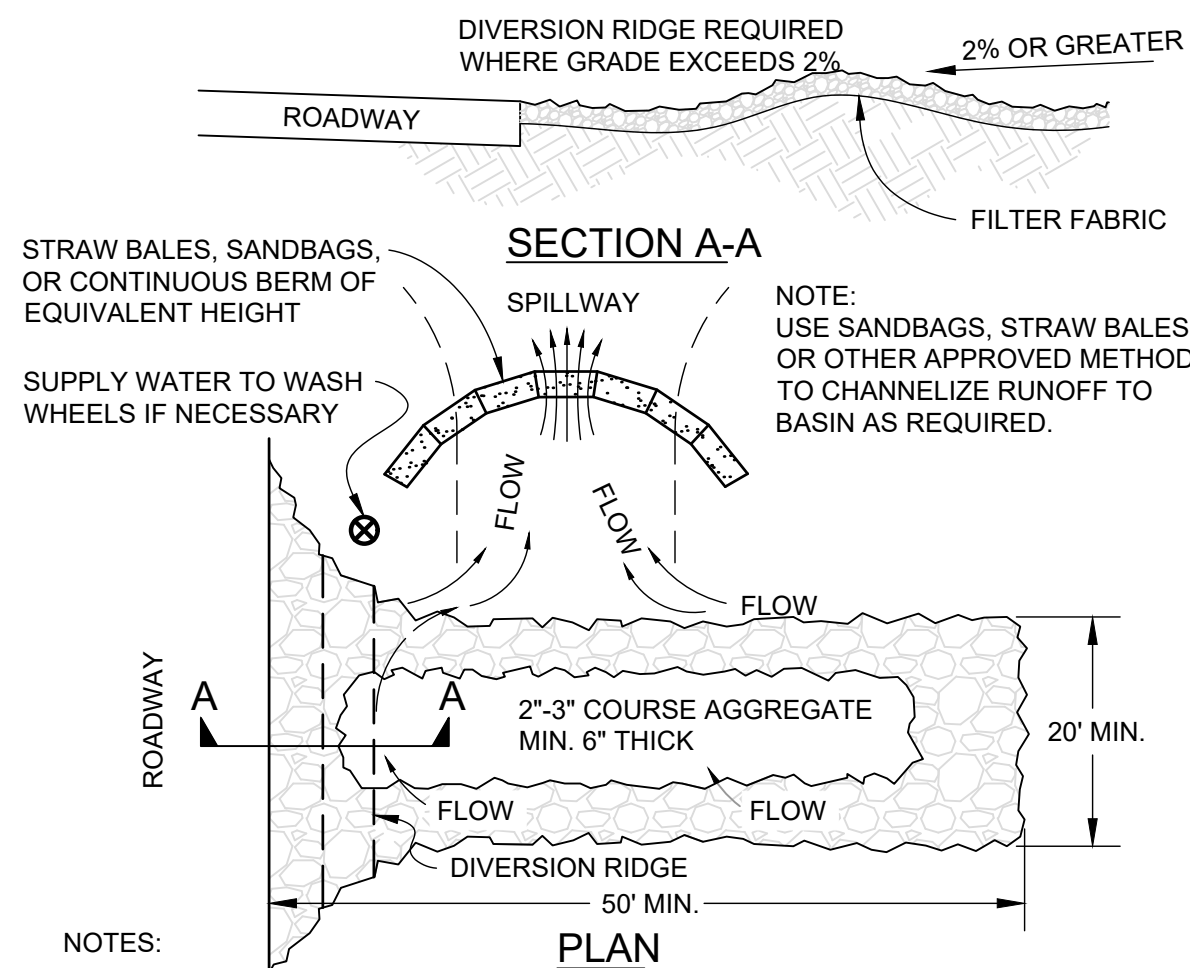
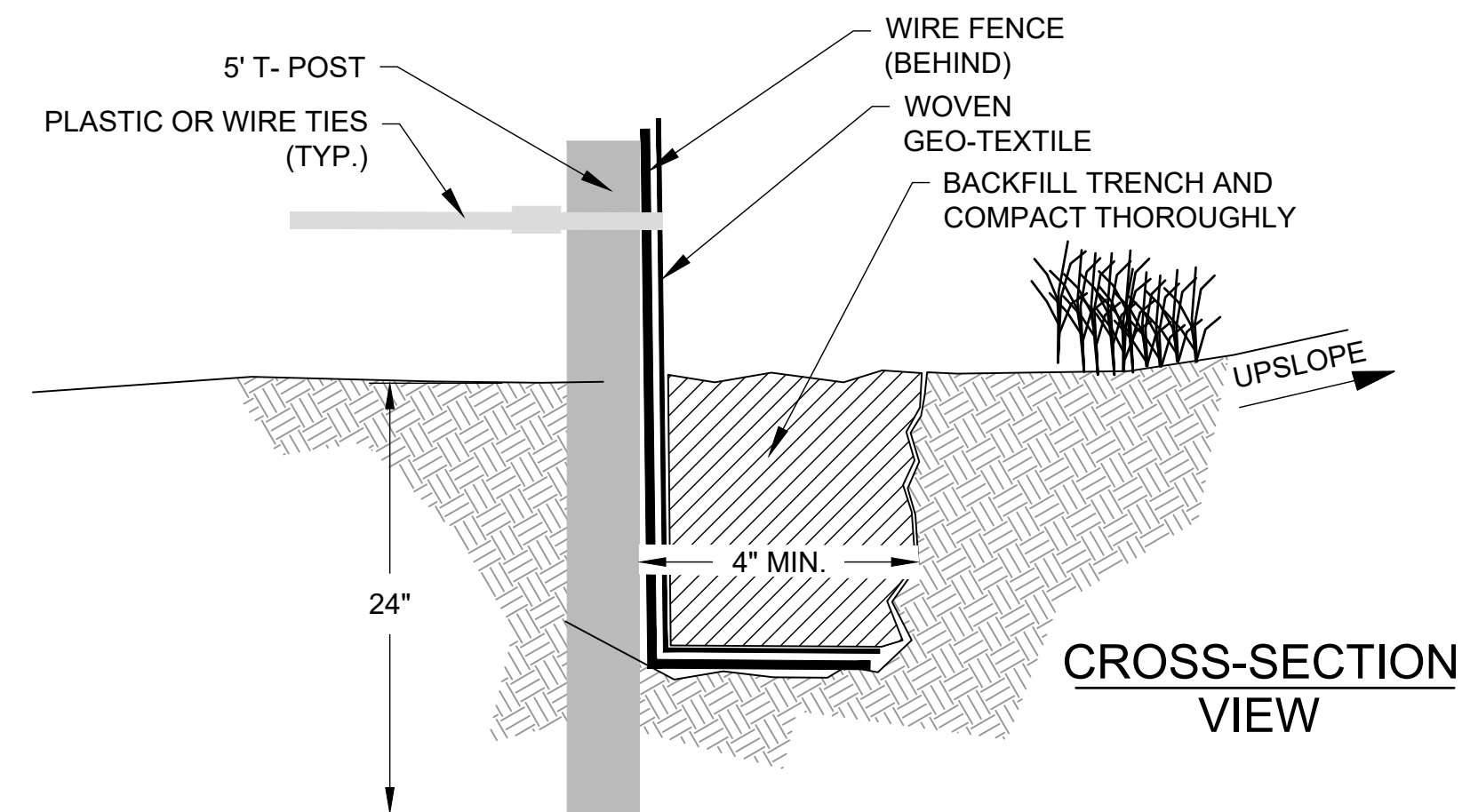
PUMP AROUND (NTS.)



NOTES:

1. WARNING SIGNS TO BE MADE OF DURABLE, WEATHERPROOF MATERIAL
2. LETTERS TO BE 3 IN. MIN. CLEARLY LEGIBLE AND SPACED AS DETAILED. SEE LETTERING DETAIL FOR PROPER SIGNAGE.
3. SIGNS TO BE PLACED 200 FT. O.C. MAX.
4. SIGNS TO BE PLACED AT EACH END AND 200 FT. O.C. THEREAFTER.
5. ATTACH SIGNS SECURELY TO FENCE POSTS AND FABRIC.
6. MAINTAIN FENCE THROUGHOUT DURATION OF PROJECT.
7. FOR SAFETY FENCE SIGN AS FOLLOWS: TREE PROTECTION AREA - DO NOT ENTER.

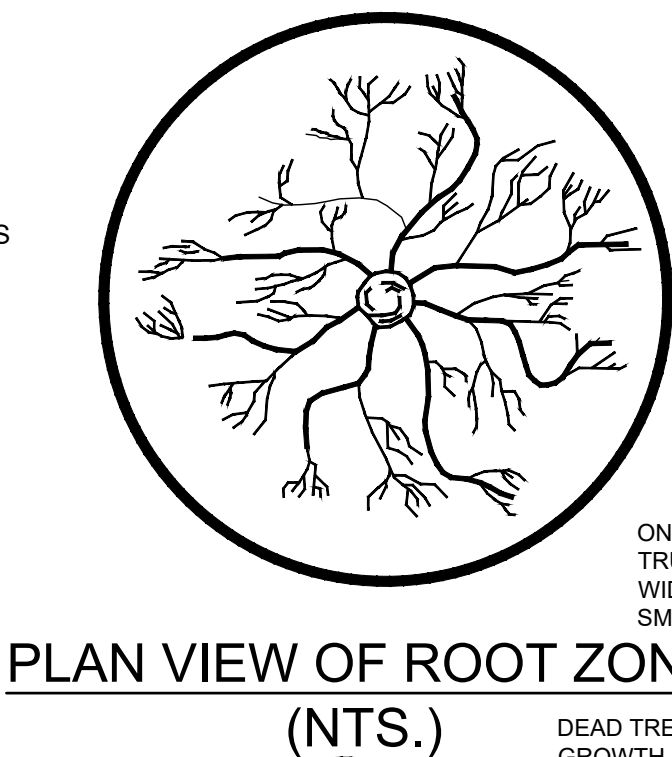
CONSTRUCTION FENCING (NTS.)



NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT NTS



PLAN VIEW OF ROOT ZONE (NTS.)

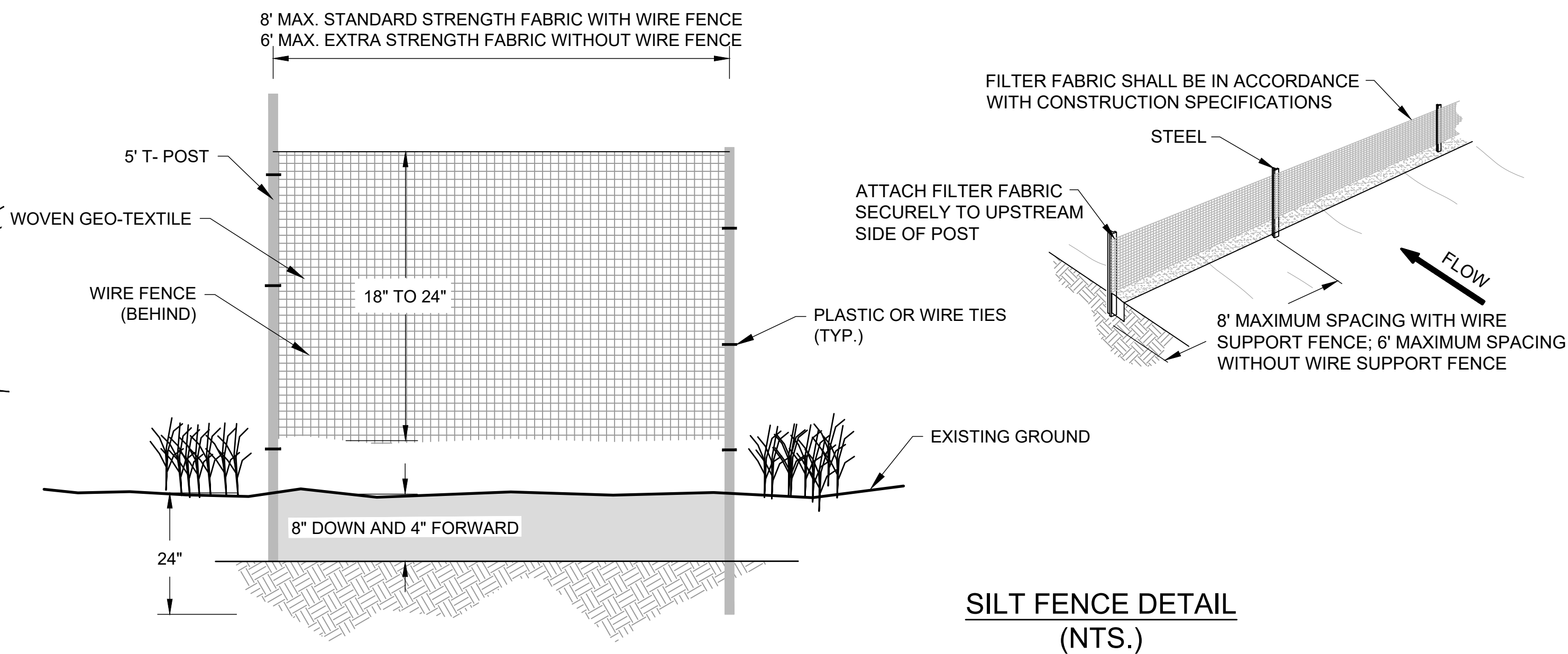
ONE FOOT FOR EACH INCH OF TRUNK DIAMETER (DBH). 6 FT. MIN. WIDTH FOR 2 IN. CAL. TREES OR SMALLER

DEAD TREES AND SCRUB OR INDER GROWTH SHALL BE CUT FLUSH WITH ADJACENT GRADE. NO GRUBBING ALLOWED UNDER DRIP LINE.

NOTES:

1. REMOVE ALL BARRIERS UPON COMPLETION OF PROJECT.
2. SEDIMENT AND EROSION CONTROL PLAN SHALL SHOW THE LOCATION OF ALL TREE PROTECTION FENCES.
3. REFER TO PLANTING SPECIFICATION FOR PLANTING DIRECTION.

TREE PROTECTION FENCE DETAIL (NTS.)



SILT FENCE DETAIL (NTS.)

ISSUED FOR: REVIEW & PERMITTING

HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

E&SC DETAILS



SCALE AS SHOWN  
VERIFY SCALE  
DATE: 7/9/2020  
PROJ: 4519049  
DWG: GENERAL  
SHEET: 5 of 30









PROJECT SUMMARY

LAND OWNER	CITY OF BOILING SPRING LAKES	
PROPERTY ADDRESS	36 CHERRY ROAD SOUTHPORT NC 28461	
COORDINATES	LAT: 34.052316	LONG: -78.042848
PROPERTY SIZE (ACRES)	DRAINAGE EASEMENT	
LOD (ACRES)	0.87	
EXISTING STREAM (L. FT)	1,276	
PROPOSED STREAM (L. FT)	1,276	
EXISTING STREAM IMPACTS (L. FT)	NA	
PROPOSED STREAM IMPACTS (L. FT)	NA	
CUT/FILL (YRD*3)	APPROX 600 (C)	
TYPICAL CROSS SECTIONS	SEE SHEET 27	
STREAM BANKFULL WIDTH (FT)	9	

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO STABILIZE THE BANKS OF AND RESTORE THE STREAM LOCATED AT CHERRY ROAD. THIS WILL BE ACCOMPLISHED THROUGH REGRADING TO INCLUDE A POOL-RIFLE SEQUENCE THAT IMPROVES WATER QUALITY AND STREAM HABITAT. IT WILL ALSO BE ACCOMPLISHED VIA THE INSTALLATION OF 27 LOG V-DROPS TO HOLD STREAM GRADE AND PROMOTE BENEFICIAL POOL SCOUR. 7 LOG SILL STRUCTURES WILL BE INSTALLED TO MAINTAIN GRADE WITHIN THE STEEPEST PORTION OF THE STREAM REACH. THE LARGE HOLE ON THE DOWNSTREAM END OF THE STREAM REACH WILL BE BACKFILLED.

SITE ACCESS AND STAGING

PRIMARY SITE ACCESS WILL OCCUR THROUGH ELM ROAD. ACCESS WITHIN THE PROJECT WILL UTILIZE A DESIGNATED ACCESS PATH FROM THE ACCESS POINT UP THROUGH THE PROJECT AREA. SILT FENCE WILL BE PLACED ON THE SIDE OF THE ACCESS PATH WITH ACTIVE STREAM FLOW.

SILT FENCE

PRIOR TO ANY SOIL DISTURBANCE AND HAULING, APPROXIMATELY 250 FEET SILT FENCE WILL BE INSTALLED ON THE SITE AS INDICATED IN THE CONSTRUCTION DOCUMENTS. SILT FENCE WILL BE LOCATED ALONG THE DOWNSTREAM SIDE OF THE ACCESS AND STAGING AREAS. AT THE END OF THE PROJECT, WHEN ALL DISTURBED AREAS HAVE BEEN STABILIZED, ALL SILT FENCE WILL BE REMOVED. MATERIAL SPECIFICATIONS, INSTALLATION PROCEDURES, AND MAINTENANCE SHALL CONFORM TO SECTION 6.82 OF THE NORTH CAROLINA SEDIMENT CONTROL PLANNING AND DESIGN MANUAL, INCLUDING THE CONSTRUCTION DETAIL BELOW.

PLAN VIEW  
(1" = 40' HORIZ.)

ISSUED FOR: REVIEW & PERMITTING

No.

DATE

DESCRIPTION

BY

APVD

SEAL

NOT FOR CONSTRUCTION

DSGN

JDH

DR

NAE

CHK

JDH

APVD

JDH

DATE

7/9/2020

LDSI

LAND DESIGN SOLUTIONS INC.

1000 W. 25TH STREET, SUITE 200

CHARLOTTE, NC 28206

PHONE: 704.337.8281 FAX: 704.337.8153

WWW.LDSINC.COM NC PRN # C-1625

SCALE AS SHOWN

VERIFY SCALE

0 1"

DATE: 7/9/2020

PROJ: 4519049

DWG: Cherry\_Road

SHEET: 7 of 30

HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

081 - CHERRY ROAD E&SC LAYOUT



PROJECT SUMMARY

LAND OWNER	CITY OF BOILING SPRING LAKES	
PROPERTY ADDRESS	987 NORTH SHORE DRIVE	
COORDINATES	LAT: 34.041408	LONG: -78.052959
PROPERTY SIZE (ACRES)	0.17	
LOD (ACRES)	0.17	
CUT/FILL (YRD^3)	APPROX 2500 (F)	
PROJECT DESCRIPTION	THE PURPOSE OF THE PROJECT IS TO REPAIR THE BANK LOCATED AT EAST BOILING SPRING ROAD. THIS WILL BE ACCOMPLISHED BY REGRADING THE BANK AND STABILIZING IT WITH TURF REINFORCEMENT MATTING, SEEDING, AND PLANTING. ADDITIONALLY, A RIPRAP WILL BE USED TO ARMOR PORTIONS OF THE BANK THAT EXPERIENCE HIGH FLOW FROM STORMWATER DRAINAGE AND SHOREJAX WILL BE USED TO STABILIZE AND ARMOR THE BANK NEAR THE RETAINING WALL.	

SITE ACCESS AND STAGING

PRIMARY SITE ACCESS WILL OCCUR THROUGH EAST BOILING SPRING ROAD. ACCESS WITHIN THE PROJECT WILL UTILIZE A DESIGNATED ACCESS PATH FROM THE ACCESS POINT UP THROUGH THE PROJECT AREA. SILT FENCE WILL BE PLACED ON THE SIDE OF THE ACCESS PATH WITH ACTIVE STREAM FLOW.

SILT FENCE

PRIOR TO ANY SOIL DISTURBANCE AND HAULING, APPROXIMATELY 250 FEET SILT FENCE WILL BE INSTALLED ON THE SITE AS INDICATED IN THE CONSTRUCTION DOCUMENTS. SILT FENCE WILL BE LOCATED ALONG THE DOWNSTREAM SIDE OF THE ACCESS AND STAGING AREAS. AT THE END OF THE PROJECT, WHEN ALL DISTURBED AREAS HAVE BEEN STABILIZED, ALL SILT FENCE WILL BE REMOVED. MATERIAL SPECIFICATIONS, INSTALLATION PROCEDURES, AND MAINTENANCE SHALL CONFORM TO SECTION 6.62 OF THE NORTH CAROLINA SEDIMENT CONTROL PLANNING AND DESIGN MANUAL, INCLUDING THE CONSTRUCTION DETAIL BELOW.



PLAN VIEW  
(1" = 40' HORIZ.)

No.

DATE

DESCRIPTION

BY

APVD

SEAL

NOT FOR CONSTRUCTION

DSGN: JDH

DR: NAE

CHK: JDH

APVD: JDH

DATE: 7/9/2020

HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

082 - EAST BOILING SPRING ROAD AT PATRICIA LAKE E&SC LAYOUT

LDSI

LAND DESIGN SOLUTIONS FOR A CHANGING WORLD

STATE

CITY

COUNTY

CHARLOTTE OFFICE: 201 W 29TH STREET, CHARLOTTE NC 28206  
KINSTON OFFICE: 1308 HWY 258 N, KINSTON NC 28504  
PHONE: 704.337.8328 | FAX: 704.308.3153 | WEBSITE: WWW.LDSINC.COM NC PRN # C-1625

SCALE AS SHOWN

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1"

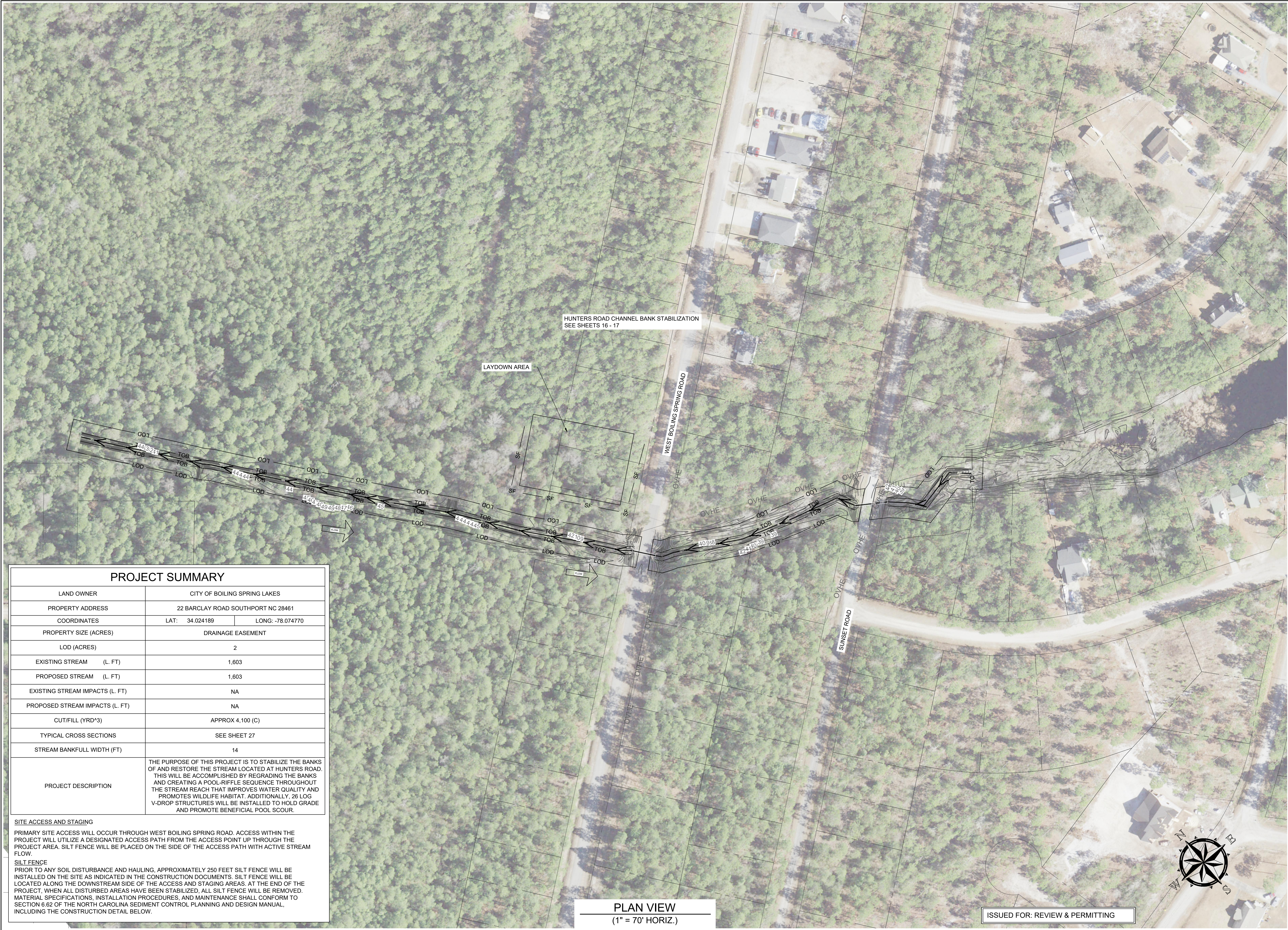
DATE: 7/9/2020

PROJ: 4519049

DWG: 082 - East Boiling Spring Road At Patricia Lake, E

SHEET: 8 of 30





PROJECT SUMMARY

LAND OWNER	CITY OF BOILING SPRING LAKES	
PROPERTY ADDRESS	22 BARCLAY ROAD SOUTHPORT NC 28461	
COORDINATES	LAT: 34.024189	LONG: -78.074770
PROPERTY SIZE (ACRES)	DRAINAGE EASEMENT	
LOD (ACRES)	2	
EXISTING STREAM (L. FT)	1,603	
PROPOSED STREAM (L. FT)	1,603	
EXISTING STREAM IMPACTS (L. FT)	NA	
PROPOSED STREAM IMPACTS (L. FT)	NA	
CUT/FILL (YRD*3)	APPROX 4,100 (C)	
TYPICAL CROSS SECTIONS	SEE SHEET 27	
STREAM BANKFULL WIDTH (FT)	14	
PROJECT DESCRIPTION	THE PURPOSE OF THIS PROJECT IS TO STABILIZE THE BANKS OF AND RESTORE THE STREAM LOCATED AT HUNTERS ROAD. THIS WILL BE ACCOMPLISHED BY REGRADING THE BANKS AND CREATING A POOL-RIFFLE SEQUENCE THROUGHOUT THE STREAM REACH THAT IMPROVES WATER QUALITY AND PROMOTES WILDLIFE HABITAT. ADDITIONALLY, 26 LOG V-DROP STRUCTURES WILL BE INSTALLED TO HOLD GRADE AND PROMOTE BENEFICIAL POOL SCOUR.	

SITE ACCESS AND STAGING

PRIMARY SITE ACCESS WILL OCCUR THROUGH WEST BOILING SPRING ROAD. ACCESS WITHIN THE PROJECT WILL UTILIZE A DESIGNATED ACCESS PATH FROM THE ACCESS POINT UP THROUGH THE PROJECT AREA. SILT FENCE WILL BE PLACED ON THE SIDE OF THE ACCESS PATH WITH ACTIVE STREAM FLOW.

SILT FENCE

PRIOR TO ANY SOIL DISTURBANCE AND HAULING, APPROXIMATELY 250 FEET SILT FENCE WILL BE INSTALLED ON THE SITE AS INDICATED IN THE CONSTRUCTION DOCUMENTS. SILT FENCE WILL BE LOCATED ALONG THE DOWNSTREAM SIDE OF THE ACCESS AND STAGING AREAS. AT THE END OF THE PROJECT, WHEN ALL DISTURBED AREAS HAVE BEEN STABILIZED, ALL SILT FENCE WILL BE REMOVED. MATERIAL SPECIFICATIONS, INSTALLATION PROCEDURES, AND MAINTENANCE SHALL CONFORM TO SECTION 6.62 OF THE NORTH CAROLINA SEDIMENT CONTROL PLANNING AND DESIGN MANUAL, INCLUDING THE CONSTRUCTION DETAIL BELOW.

PLAN VIEW  
(1" = 70' HORIZ.)

ISSUED FOR: REVIEW & PERMITTING

No.

DATE

DESCRIPTION

BY

APVD

SEAL

NOT FOR CONSTRUCTION

DSGN

JDH

DR

NAE

CHK

JDH

APVD

JDH

DATE

7/9/2020

HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

083 - HUNTERS ROAD E&SC LAYOUT

LDSI

SURVEYING SOLUTIONS FOR A CHANGING WORLD

STATE

GIS

SURVEYING

CHARLOTTE OFFICE: 201 W 26TH STREET, CHARLOTTE NC 28206

KINSTON OFFICE: 1308 HWY 258 N, KINSTON NC 28504

PHONE: 704.337.8328 | FAX: 704.306.3163 | WEBSITE: WWW.LDSINC.COM NC PRN # C-1625

SCALE AS SHOWN

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1"

DATE: 7/9/2020

PROJ: 4519049

DWG: 083 - Hunters Road\_E

SHEET: 9 of 30





PROJECT SUMMARY

LAND OWNER	CITY OF BOILING SPRING LAKES	
PROPERTY ADDRESS	147 FOREST LANE SOUTHPORT NC 28461	
COORDINATES	LAT: 34.047758	LONG: -78.042902
PROPERTY SIZE (ACRES)	0.6	
LOD (ACRES)	0.6	
CUT/FILL (YRD^3)	APPROX 300 (F)	
PROJECT DESCRIPTION	THE PURPOSE OF THIS PROJECT IS TO REPAIR AND ENHANCE THE BERM SEPARATING A SMALL POND FROM PATRICIA LAKE AND TO RESTORE THE WATER LEVEL OF THE POND. THIS WILL BE ACCOMPLISHED BY BACKFILLING THE WASHED OUT SECTION OF THE BERM, REGRADING AND PLANTING THE BERM TO ENHANCE STABILITY, ADDING AN ARMORED EMERGENCY SPILLWAY FOR HIGH-FLOW EVENTS, AND ADDING A RISER STRUCTURE TO REGULATE THE WATER LEVEL OF THE POND.	

SITE ACCESS AND STAGING

PRIMARY SITE ACCESS WILL OCCUR THROUGH N SHORE DRIVE. ACCESS WITHIN THE PROJECT WILL UTILIZE A DESIGNATED ACCESS PATH FROM THE ACCESS POINT UP THROUGH THE PROJECT AREA. SILT FENCE WILL BE PLACED ON THE SIDE OF THE ACCESS PATH WITH ACTIVE STREAM FLOW.

SILT FENCE

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PLAN VIEW  
(1" = 30' HORIZ.)

ISSUED FOR: REVIEW & PERMITTING

HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

084 - N SHORE DRIVE E&SC LAYOUT

LDSI

LAND DESIGN SOLUTIONS FOR A CHANGING WORLD

CHARLOTTE OFFICE: 201 W 29TH STREET, CHARLOTTE NC 28206  
KINSTON OFFICE: 1308 HWY 258 N, KINSTON NC 28504  
PHONE: 704.337.8281 | FAX: 704.306.3163 | WEBSITE: WWW.LDSINC.COM | NC PRN # C-1825

SCALE AS SHOWN

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1"

DATE: 7/9/2020

PROJ: 4519049

DWG: 084 - N SHORE DRIVE

SHEET: 10 of 30

DESCRIPTION

NOT FOR CONSTRUCTION

DR: NAE

CHK: JDH

APVD: JDH

DATE: 7/9/2020

BY: APVD: SEAL

DATE: 7/9/2020

C:\2019\0819049\03 Construction Drawings\084 - N Shore Drive.dwg, 10/20/2024, 4:16:56 PM, AutoCAD PDF (General Documentation).pl









PROJECT SUMMARY

LAND OWNER	CITY OF BOILING SPRING LAKES	
PROPERTY ADDRESS	1460 N SHORE DRIVE SOUTHPORT NC 28461	
COORDINATES	LAT: 34.046473	LONG: -78.041761
PROPERTY SIZE (ACRES)	1	
LOD (ACRES)	1	
CUT/FILL (YRD^3)	APPROX 2000 (F)	
PROJECT DESCRIPTION	THE PURPOSE OF THIS PROJECT IS TO STABILIZE THE BANK LOCATED AT NORTH SHORE DRIVE. THIS WILL BE ACCOMPLISHED BY ESTABLISHING A TOE OF SLOPE AND GRADING BACK TO DAYLIGHT IN THE DAMAGED YARD. THE SLOPE WILL THEN BE STABILIZED VIA PLANTING UNTIL THE WATER LEVEL OF PATRICIA LAKE IS RE-ESTABLISHED.	

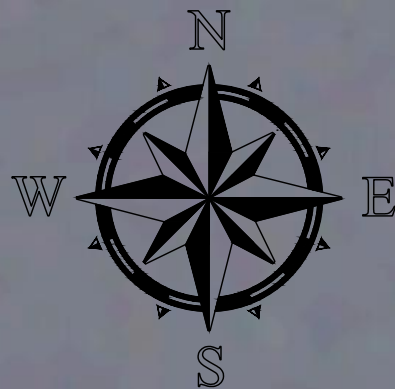
SITE ACCESS AND STAGING

PRIMARY SITE ACCESS WILL OCCUR THROUGH N SHORE DRIVE. ACCESS WITHIN THE PROJECT WILL UTILIZE A DESIGNATED ACCESS PATH FROM THE ACCESS POINT UP THROUGH THE PROJECT AREA. SILT FENCE WILL BE PLACED ON THE SIDE OF THE ACCESS PATH WITH ACTIVE STREAM FLOW.

SILT FENCE

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PLAN VIEW  
(1" = 30' HORIZ.)



ISSUED FOR: REVIEW & PERMITTING



HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

191 - N SHORE DRIVE AT PATRICIA LAKE E&SC LAYOUT

No.	DATE	DESCRIPTION		BY	APVD	SEAL
		NOT FOR CONSTRUCTION				
Dsgn:	JDH	DR:	NAE	CHK:	JDH	APVD:
						DATE: 7/9/2020

SCALE AS SHOWN	
VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING	
0 1'	
DATE:	7/9/2020
PROJ:	4519049
DWG:	4519049 - 191_E
SHEET:	12 of 30





PROJECT SUMMARY

LAND OWNER	CITY OF BOILING SPRING LAKES	
PROPERTY ADDRESS	22 BARCLAY ROAD SOUTHPORT NC 28461	
COORDINATES	LAT: 34.024189	LONG: -78.074770
PROPERTY SIZE (ACRES)	DRAINAGE EASEMENT	
LOD (ACRES)	SR1: 0.26	SR2: 0.26
EXISTING STREAM (L. FT)	SR1: 461	SR2: 455
PROPOSED STREAM (L. FT)	SR1: 461	SR2: 455
EXISTING STREAM IMPACTS (L. FT)	NA	
PROPOSED STREAM IMPACTS (L. FT)	NA	
CUT/FILL (YRD*3)	APPROX 500 (C)	APPROX 500 (C)
TYPICAL CROSS SECTIONS	SEE SHEET 27	
STREAM BANKFULL WIDTH (FT)	SR1: 5	SR2: 6
PROJECT DESCRIPTION	THE PURPOSE OF THIS PROJECT IS TO STABILIZE THE BANKS OF AND RESTORE THE STREAM LOCATED AT EAST BOILING SPRING ROAD. THIS WILL BE ACCOMPLISHED BY REGRADING THE STREAM AND CREATING A POOL-RIFLE SEQUENCE THAT ENHANCES WATER QUALITY AND PROMOTES WILDLIFE HABITAT. ADDITIONALLY, 21 LOG V-DROPS WILL BE INSTALLED THROUGHOUT BOTH THE UPPER AND LOWER REACHES OF THE STREAM TO HOLD GRADE AND PROMOTE BENEFICIAL POOL SCOUR. A SERIES OF 7 LOG SILLS WILL BE INSTALLED AT THE START OF THE DOWNSTREAM REACH TO HOLD GRADE AS FLOW ENTERS FROM THE CULVERT THAT RUNS UNDERNEATH LUMBERTON ROAD.	

SITE ACCESS AND STAGING

PRIMARY SITE ACCESS WILL OCCUR THROUGH OAKDALE DRIVE. ACCESS WITHIN THE PROJECT WILL UTILIZE A DESIGNATED ACCESS PATH FROM THE ACCESS POINT UP THROUGH THE PROJECT AREA. SILT FENCE WILL BE PLACED ON THE SIDE OF THE ACCESS PATH WITH ACTIVE STREAM FLOW.

SILT FENCE

PRIOR TO ANY SOIL DISTURBANCE AND HAULING, APPROXIMATELY 250 FEET SILT FENCE WILL BE INSTALLED ON THE SITE AS INDICATED IN THE CONSTRUCTION DOCUMENTS. SILT FENCE WILL BE LOCATED ALONG THE DOWNSTREAM SIDE OF THE ACCESS AND STAGING AREAS. AT THE END OF THE PROJECT, WHEN ALL DISTURBED AREAS HAVE BEEN STABILIZED, ALL SILT FENCE WILL BE REMOVED. MATERIAL SPECIFICATIONS, INSTALLATION PROCEDURES, AND MAINTENANCE SHALL CONFORM TO SECTION 6.62 OF THE NORTH CAROLINA SEDIMENT CONTROL PLANNING AND DESIGN MANUAL, INCLUDING THE CONSTRUCTION DETAIL BELOW.

PLAN VIEW  
(1" = 40' HORIZ.)

ISSUED FOR: REVIEW & PERMITTING

HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

192 - ALLEN CREEK E&SC LAYOUT

LDSI

SUSTAINING SOLUTIONS FOR A CHANGING WORLD

SCALE AS SHOWN

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING

0

1"

DATE: 7/9/2020

PROJ: 4519049

DWG: Allen Creek

SHEET: 13 of 30

No.

DATE

DESCRIPTION

BY

APVD

SEAL

NOT FOR CONSTRUCTION

DSGN

JDH

DR

NAE

CHK

JDH

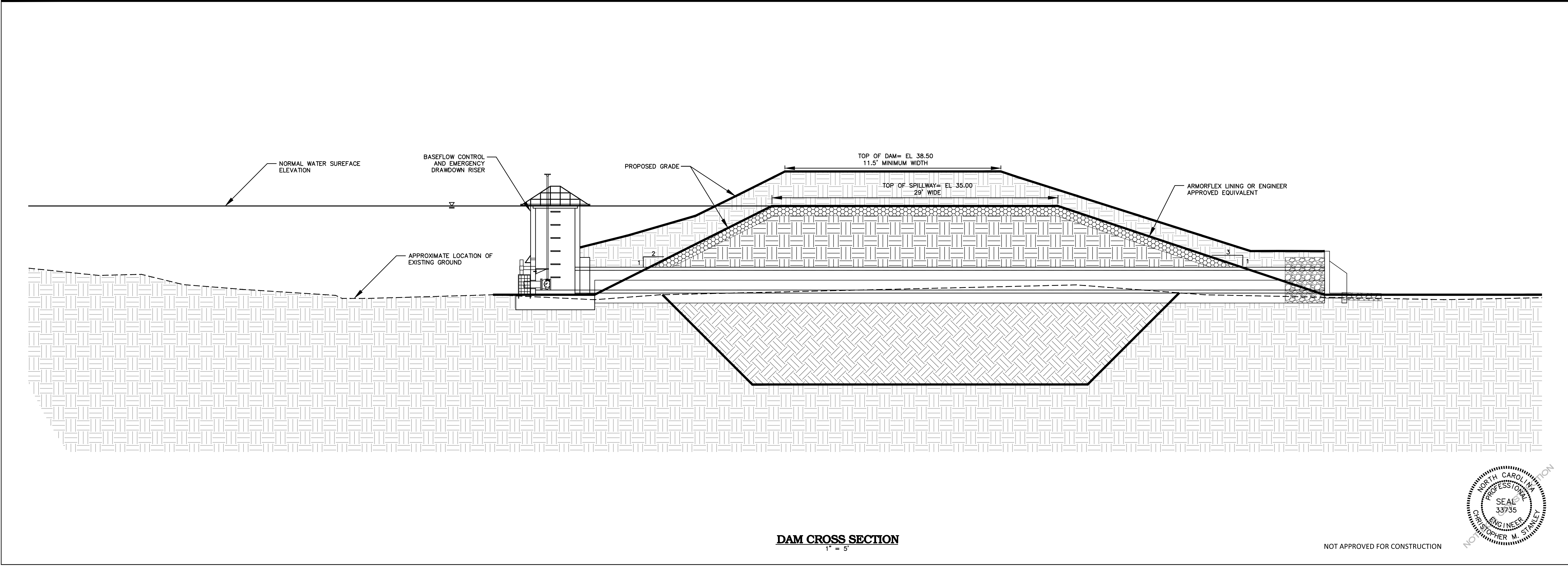
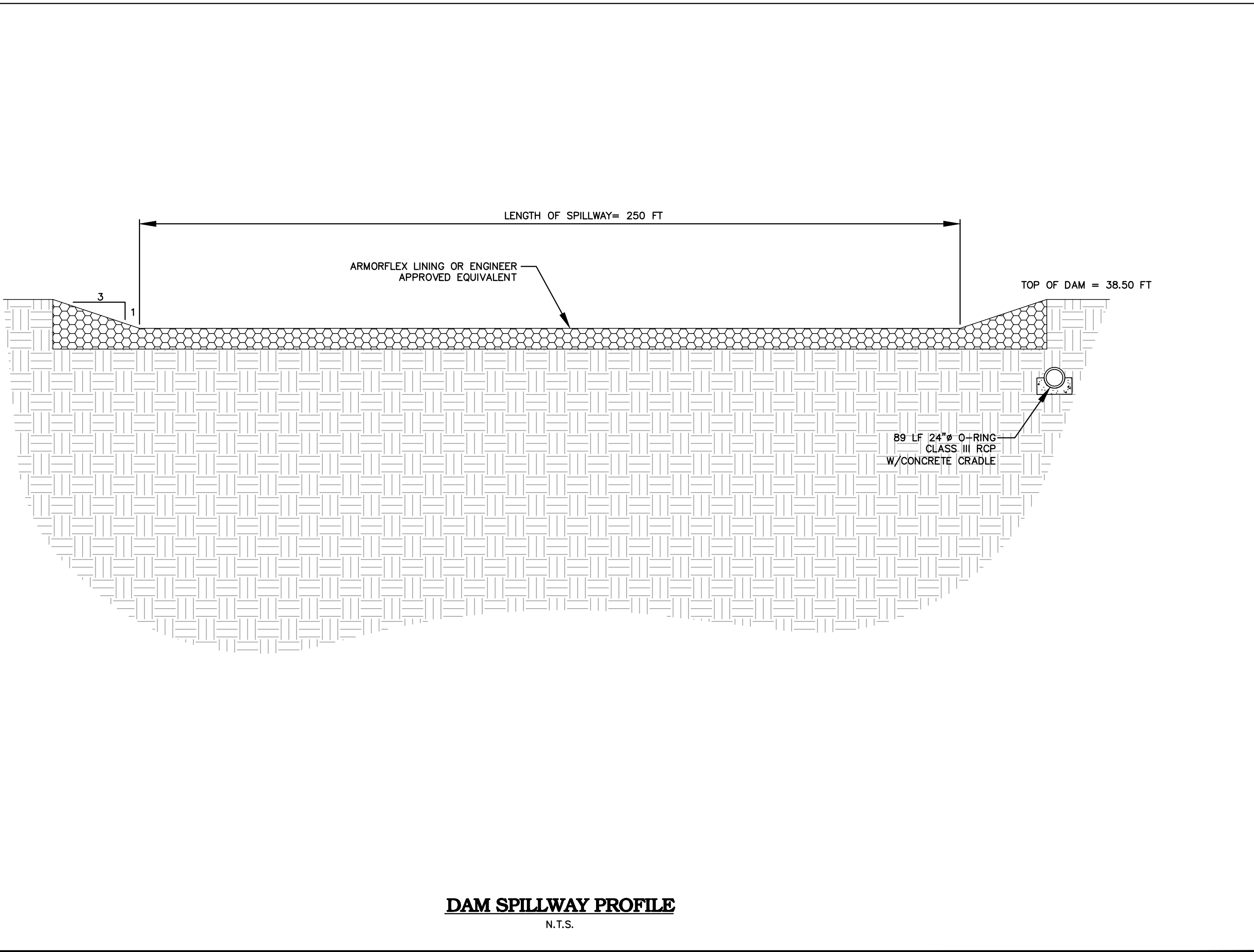
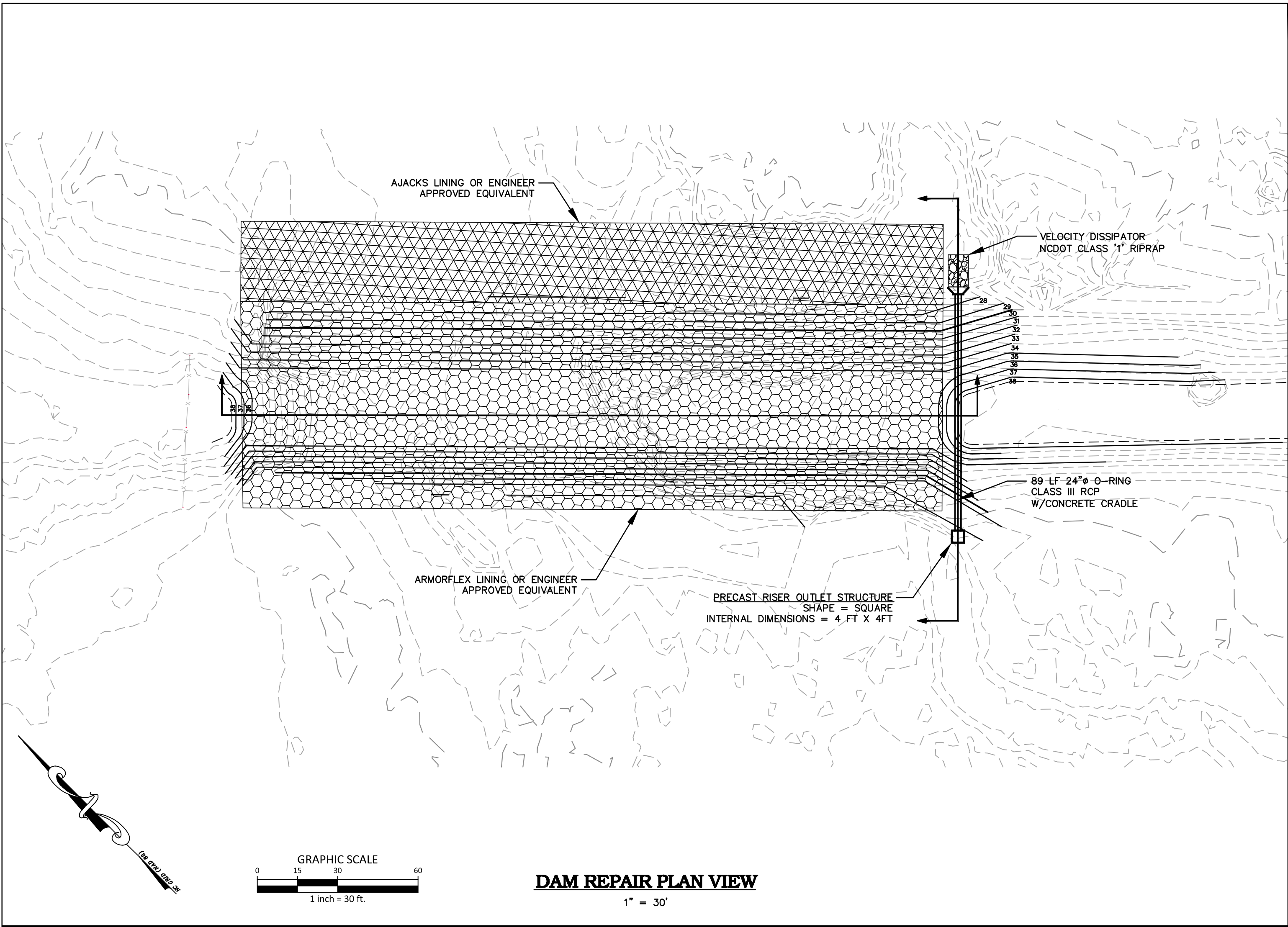
APVD

JDH

DATE

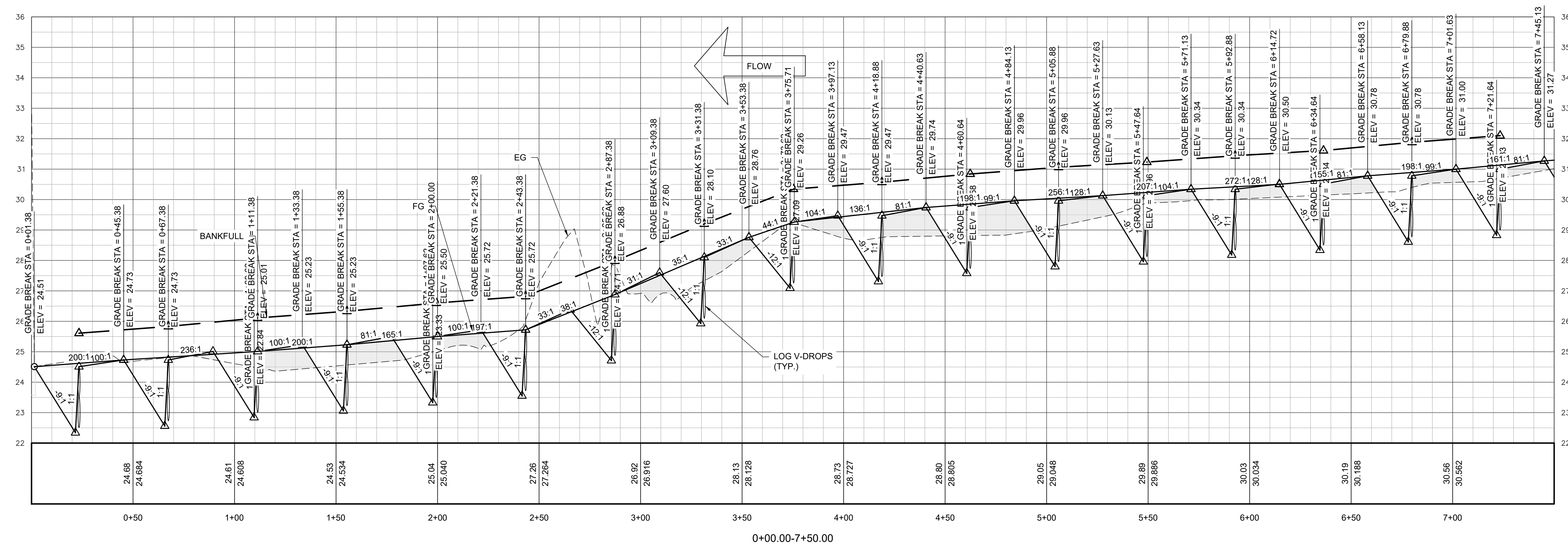
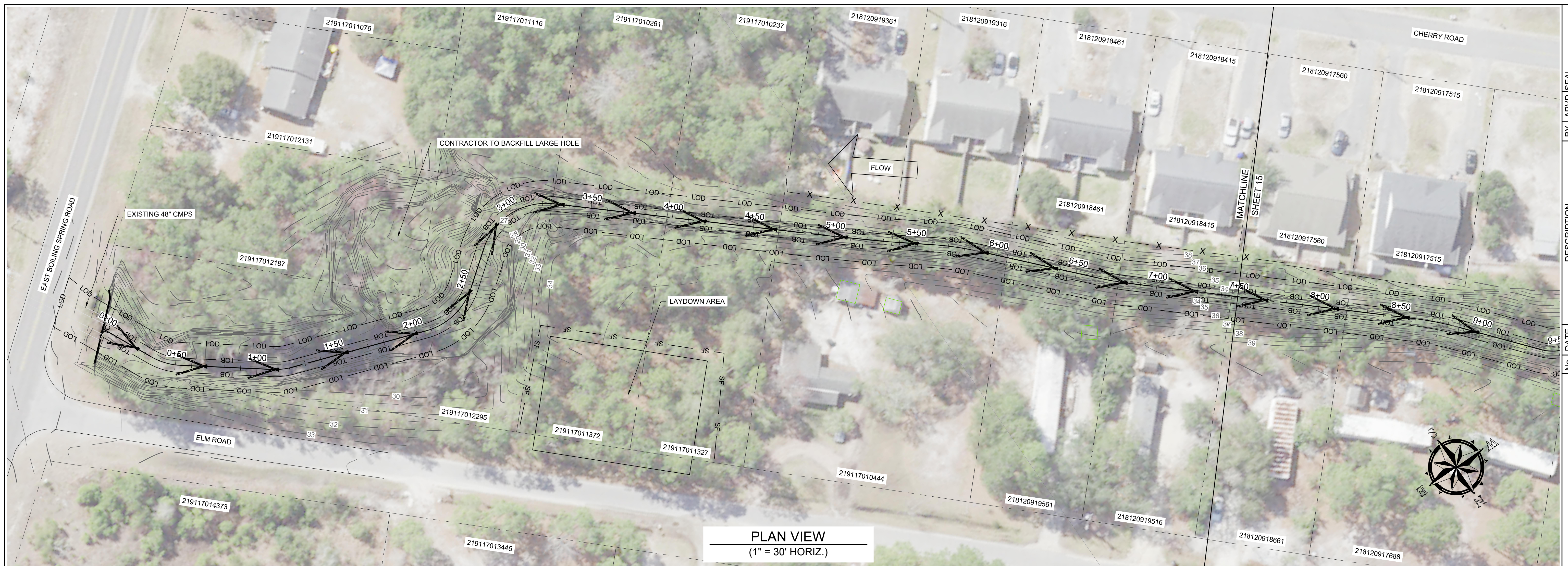
7/9/2020



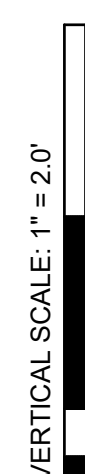
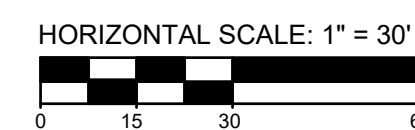


NOT FOR CONSTRUCTION	
BOILING SPRING LAKES - DAM REPAIR	
194 N. SHORE DRIVE, SOUTHPORT, NC 28461	
CHARLOTTE OFFICE: 281 V. 2801 STREET, CHARLOTTE, NC 28206 KINSTON OFFICE: 1308 HWY 258 N, KINSTON, NC 28504 PHONE: 704-337-8529   FAX: 704-308-3153 WEBSITE: WWW.LDSI-INC.COM   NC FIRM # C-11821	DATE: 10-20-2020 PROJ: SPEC-19260 DWG: DAM REPAIR






ISSUED FOR: REVIEW & PERMITTING



HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

081 - CHERRY ROAD P&amp;P 0+00.00 - 7+50.00

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SURVEILLING SOLUTIONS FOR A CHANGING WORLD	
CHARLOTTE OFFICE: 1308 W. 39TH STREET, CHARLOTTE NC 28206 KINSTON OFFICE: 1308 HWY 258 N., KINSTON NC 28504 PHONE: 704.337.8329 FAX: 704.308.3153 1 WEBSTE: WWW.LDSINC.COM OR TOLL FREE: 1-800-355-1925	
<b>SCALE AS SHOWN</b>	
<b>VERIFY SCALE</b>	
BAR IS ONE INCH ON ORIGINAL DRAWING 	
DATE:	7/9/2020
PROJ:	4519049
DWG:	Cherry, Road
SHEET:	15 of 30

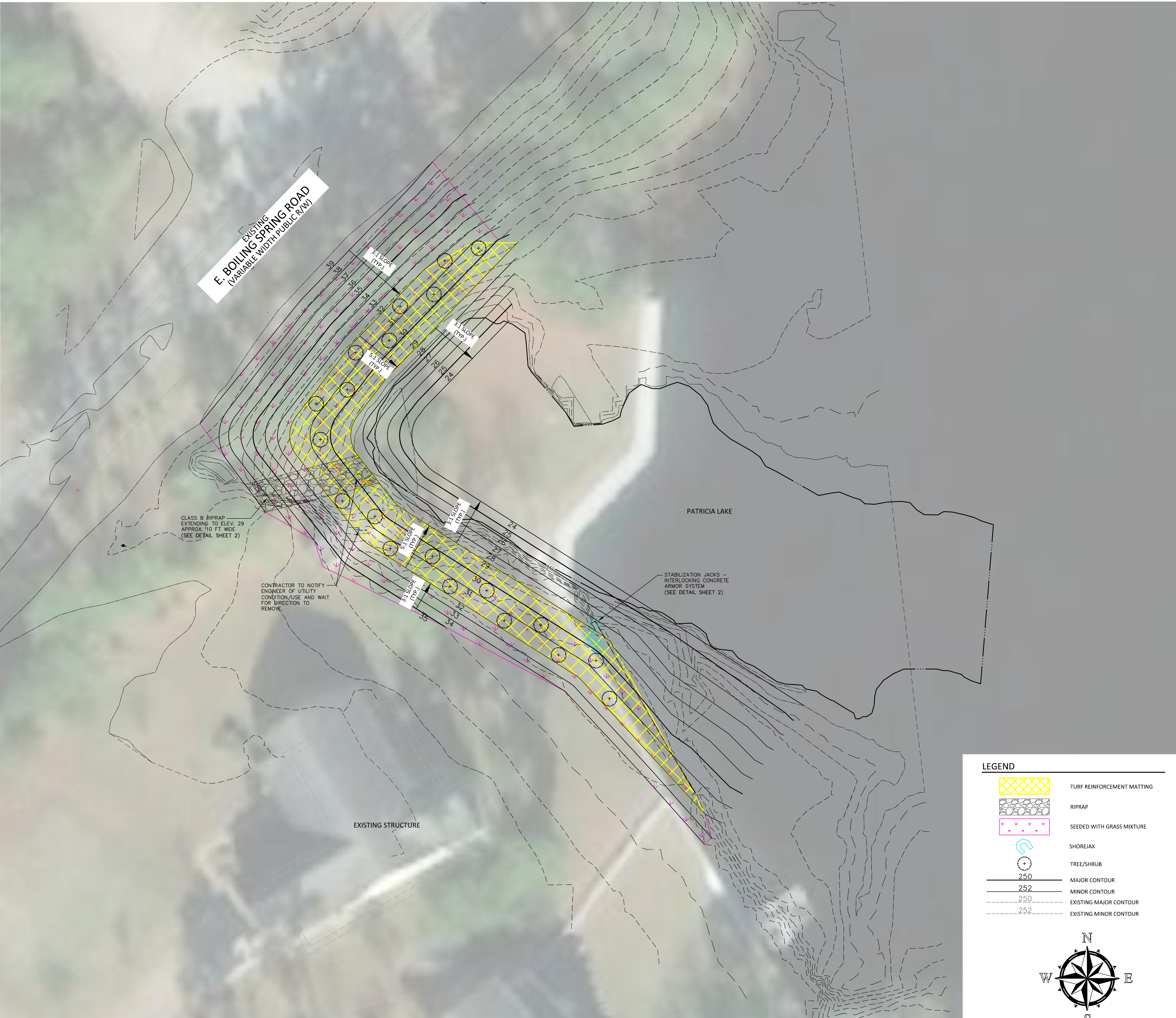




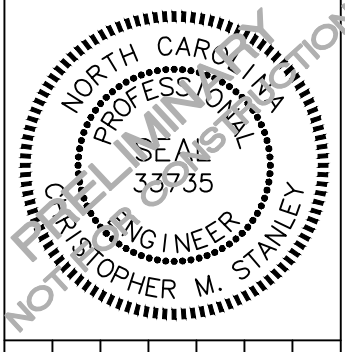
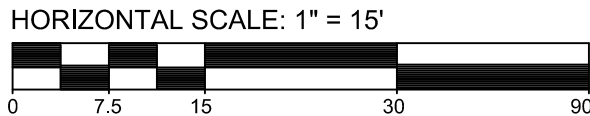


GENERAL NOTES

1. PRIOR TO CONSTRUCTION, ANY DISCREPANCIES IN THE PLANS AND NOTES SHALL BE BROUGHT TO THE DESIGN ENGINEER'S ATTENTION IMMEDIATELY.
2. IT IS ANTICIPATED THAT DEWATERING MAY BE NECESSARY IN THE EXCAVATION AREAS (E.G. - EMBANKMENT SUB GRADE, ETC.). THEREFORE, THE CONTRACTOR SHALL FURNISH, INSTALL, OPERATE, AND MAINTAIN ANY PUMPING EQUIPMENT, ETC. NEEDED FOR REMOVAL OF WATER FROM VARIOUS PARTS OF THE SITE. DURING PLACEMENT OF FILL WITHIN THESE AREAS, THE CONTRACTOR SHALL KEEP THE WATER LEVEL BELOW THE BOTTOM OF THE EXCAVATION / CONSTRUCTION AREAS. THE MANNER IN WHICH THE WATER IS REMOVED SHALL BE SUCH THAT THE EXCAVATION BOTTOM AND SIDE SLOPES ARE STABLE, WITH NO SEDIMENT DISCHARGED FROM THE SITE (I.E. PUMPED WATER MAY NEED TO BE DIRECTED TO AN APPROVED EROSION CONTROL DEVICE SUCH AS A DIRT BAG (ACF ENVIRONMENTAL), OR ENGINEER APPROVED EQUIVALENT, PRIOR TO DISCHARGE).
3. THE GRADES SHOWN ON THIS PLAN ARE FINISHED GRADES. IF THE EXISTING SOIL LAYER AFTER CONSTRUCTION / COMPACTION IS NOT DETERMINED SUITABLE BY A LANDSCAPE PROFESSIONAL FOR THE PLANTINGS, THEN THE CONTRACTOR SHALL AMEND THE PLANTING AREA AS DIRECTED BY A LANDSCAPE PROFESSIONAL.
4. PRIOR TO CONSTRUCTION, THE OWNER SHALL OBTAIN A LAND DISTURBING (GRADING) PERMIT AND AN "APPROVAL TO CONSTRUCT" FROM THE TOWN OF BOILING SPRING LAKES AND ALL OTHER NECESSARY PERMITS FROM APPLICABLE AGENCIES (E.G. 404 / 401 PERMITS).
5. INSTALL ALL SEDIMENT AND EROSION CONTROL MEASURES PER THE APPROVED SEDIMENT AND EROSION CONTROL PLAN. THE CONTRACTOR SHALL MAINTAIN ALL APPROVED SEDIMENT AND EROSION CONTROL MEASURES THROUGHOUT THE ENTIRE PROJECT, AS REQUIRED. THE CONTRACTOR SHALL RECEIVE APPROVAL FROM THE EROSION CONTROL INSPECTOR, AS REQUIRED BY GOVERNING AGENCIES, PRIOR TO ANY CLEARING.
6. UPON COMPLETION OF EMBANKMENT, PROMPTLY STABILIZE AND SEED DAM EMBANKMENT PER SEEDING SCHEDULE. PERMANENT GROUND COVER SHALL BE ESTABLISHED PER THE PERMANENT SEEDING SCHEDULE FOUND ON SHEET 2.
7. SCHEDULE A FINAL AS-BUILT INSPECTION AND AS-BUILT SURVEY WITH THE ENGINEER AND SURVEYOR. AN AS-BUILT INSPECTION AND SURVEY SHALL BE SCHEDULED BEFORE IMPOUNDING WATER IN THE FACILITY AND A MINIMUM OF 60 DAYS PRIOR TO THE ANTICIPATED DATE OF CERTIFICATION APPROVAL. ANY COMMENTS OR DEFICIENCIES IN THE SCM CONSTRUCTION MUST BE CORRECTED TO THE SATISFACTION OF THE ENGINEER AND OWNER BEFORE CERTIFICATION SHALL BE GRANTED.
8. PRIOR TO CONSTRUCTION, THE ON-SITE GEOTECHNICAL ENGINEER SHALL IDENTIFY BORROW / FILL AREAS AND VERIFY THEIR SUITABILITY FOR USE WITHIN THE EMBANKMENT. ALSO, THE ON-SITE GEOTECHNICAL ENGINEER SHALL PERFORM STANDARD PROCTORS ON THE PROPOSED BORROW MATERIAL TO ENSURE THAT OPTIMUM MOISTURE CONTENT AND COMPACTION CAN BE ACHIEVED / CONTROLLED DURING CONSTRUCTION.
9. ALL FILL MATERIALS TO BE USED FOR THE EMBANKMENT SHALL BE TAKEN FROM BORROW AREAS APPROVED BY THE ON-SITE GEOTECHNICAL ENGINEER. THE FILL MATERIAL SHALL BE FREE FROM ROOTS, STUMPS, WOOD, STONES GREATER THAN 6", AND FROZEN OR OTHER OBJECTIONABLE MATERIAL. THE FOLLOWING SOIL TYPES ARE SUITABLE FOR USE AS FILL WITHIN THE EMBANKMENT: TBD. ALL FILL MATERIALS SHALL BE APPROVED BY THE ON-SITE GEOTECHNICAL ENGINEER FOR THE INTENDED USE.
10. FILL PLACEMENT FOR THE EMBANKMENT SHALL NOT EXCEED A MAXIMUM 8" LIFT (UNCOMPACTED). EACH LIFT SHALL BE CONTINUOUS FOR THE ENTIRE LENGTH OF EMBANKMENT. BEFORE PLACEMENT OF FILL, ALL UNSUITABLE MATERIAL SHALL BE REMOVED AND THE SURFACE PROPERLY PREPARED FOR FILL PLACEMENT.
11. ALL FILL SOILS USED IN THE EMBANKMENT CONSTRUCTION SHALL BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-998). THE FILL SOILS SHALL BE COMPACTED AT A MOISTURE CONTENT WITHIN -1 TO +3 PERCENT OF ITS OPTIMUM MOISTURE CONTENT. COMPACTION TESTS SHALL BE PERFORMED BY THE ON-SITE GEOTECHNICAL ENGINEER DURING CONSTRUCTION TO VERIFY THAT THE PROPER COMPACTION LEVEL HAS BEEN REACHED. THE FILL SHOULD BE COMPACTED USING A SHEEPSFOOT TYPE COMPACTOR.
12. THE DESIGN ENGINEER SHALL BE PROVIDED WITH REPORTS AND CERTIFICATION, BY THE ON-SITE GEOTECHNICAL ENGINEER, THAT THE GEOTECHNICAL ASPECTS OF THE FACILITY HAVE BEEN CONSTRUCTED PER PLAN. THIS CERTIFICATION MUST ADDRESS THE TESTING FOR MATERIALS AND COMPACTION OF THE EMBANKMENT. THESE REPORTS AND CERTIFICATION WILL BE NEEDED DURING THE AS-BUILT CERTIFICATION PROCESS FOR THIS SHORE STABILIZATION. THEREFORE, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE TESTING AND OBSERVATION WITH THE ON-SITE GEOTECHNICAL ENGINEER.
13. TESTING OF THE NEW FILL MATERIALS SHALL BE PERFORMED TO VERIFY THAT THE RECOMMENDED LEVEL OF COMPACTION IS ACHIEVED DURING CONSTRUCTION. THEREFORE, ONE DENSITY TEST SHALL BE PERFORMED FOR EVERY 2,500 SQUARE FEET OF AREA FOR EVERY LIFT OF FILL OR AS RECOMMENDED BY THE ON-SITE GEOTECHNICAL ENGINEER.



PLAN VIEW  
(1" = 15' HORIZ.)



NOT FOR  
CONSTRUCTION

BOILING SPRING LAKES - SHORE STABILIZATION

194 N. SHORE DRIVE, SOUTHPORT, NC 28461

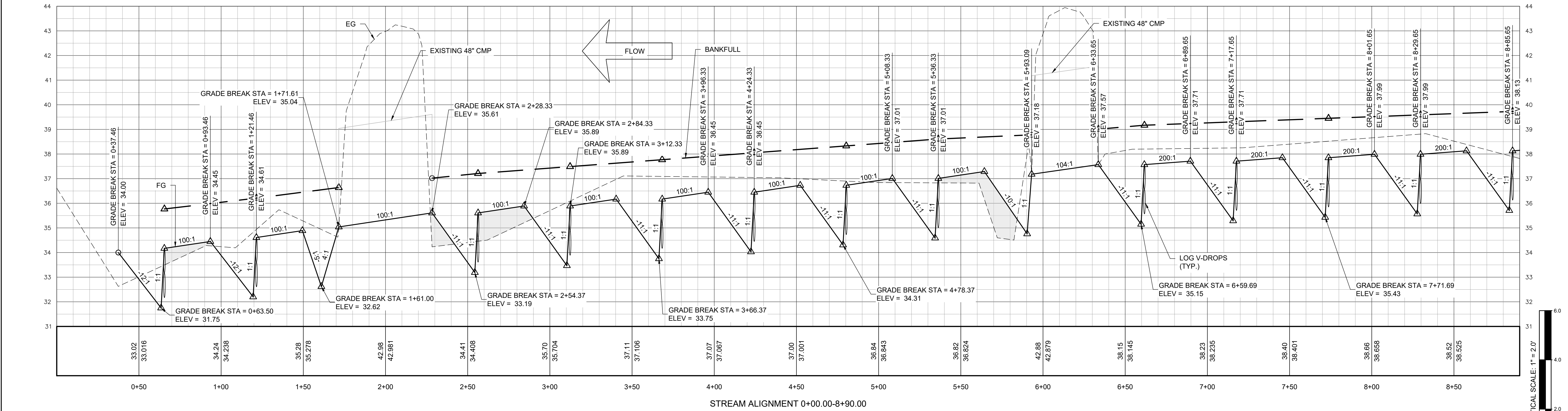
CHARLOTTE OFFICE: 201 W 29TH STREET,  
CHARLOTTE NC 28206  
KINSTON OFFICE: KINSTON NC 28504  
PHONE: 704.337.8529 FAX: 704.208.5153  
WEBSITE: WWW.LDSINC.COM (NC PROJ # C-1025)



SCALE AS SHOWN

DATE: 10-22-2020  
PROJ: SPEC-19260  
DWG: SHORE STABILIZATION  
SHEET: 1 of 2





PROFILE VIEW  
(1" = 30' HORIZ., 1" = 2.0' VERT.)

ISSUED FOR: REVIEW & PERMITTING

HORIZONTAL SCALE: 1" = 30'

VERTICAL SCALE: 1" = 2.0'

BY

APVD

SEAL

DESCRIPTION

NOT FOR CONSTRUCTION

No.

DATE

DATE

7/9/2020

APVD:

JDH

CHK:

JDH

DR:

NAE

DSGN:

JDH

HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

083 - HUNTERS ROAD P&P 0+00.00 - 8+90.00

LDSI

STATE OF NORTH CAROLINA

REGISTERED PROFESSIONAL ENGINEER

NO. 10000

REGISTERED PROFESSIONAL SURVEYOR

NO. 10000

SURVEYING SOLUTIONS FOR A CHANGING WORLD

CHARLOTTE OFFICE: 201 W 29TH STREET, CHARLOTTE NC 28206

KINSTON OFFICE: 1308 HWY 258 N., KINSTON NC 28504

PHONE: 704.337.8328 | FAX: 704.338.3163 | WEBSITE: WWW.LDSINC.COM NC PRN # C-1925

SCALE AS SHOWN

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING

DATE: 7/9/2020

PROJ: 4519049

DWG: 083 - Hunters Road\_E

SHEET: 18 of 30











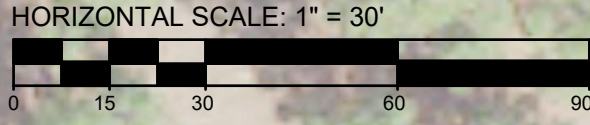






PLAN VIEW  
(1" = 30' HORIZ.)

ISSUED FOR: REVIEW & PERMITTING



HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE	No.		DATE		DESCRIPTION		BY	APVD	SEAL
					NOT FOR CONSTRUCTION				
190 - RIVER ROAD CLEARING AND SNAGGING	DGSN:		JDH		DR:	NAE	CHK:	JDH	APVD:
									DATE:
									7/9/2020



**LDSI**  
SURVEYING SOLUTIONS FOR A CHANGING WORLD

CHARLOTTE OFFICE: 201 W 26TH STREET, CHARLOTTE NC 28206  
KINSTON OFFICE: 1308 HWY 258 N., KINSTON NC 28504  
PHONE: 704.337.8328 | FAX: 704.308.3153 | WEBSITE: WWW.LDSINC.COM NC PRN # C-1825

SCALE AS SHOWN  
VERIFY SCALE  
BAR IS ONE INCH ON ORIGINAL DRAWING  
0 15 30 60 90  
1"

DATE: 7/9/2020  
PROJ: 4519049  
DWG: 190 - RIVER ROAD CLEARING AND SNAGGING  
SHEET: 22 of 30

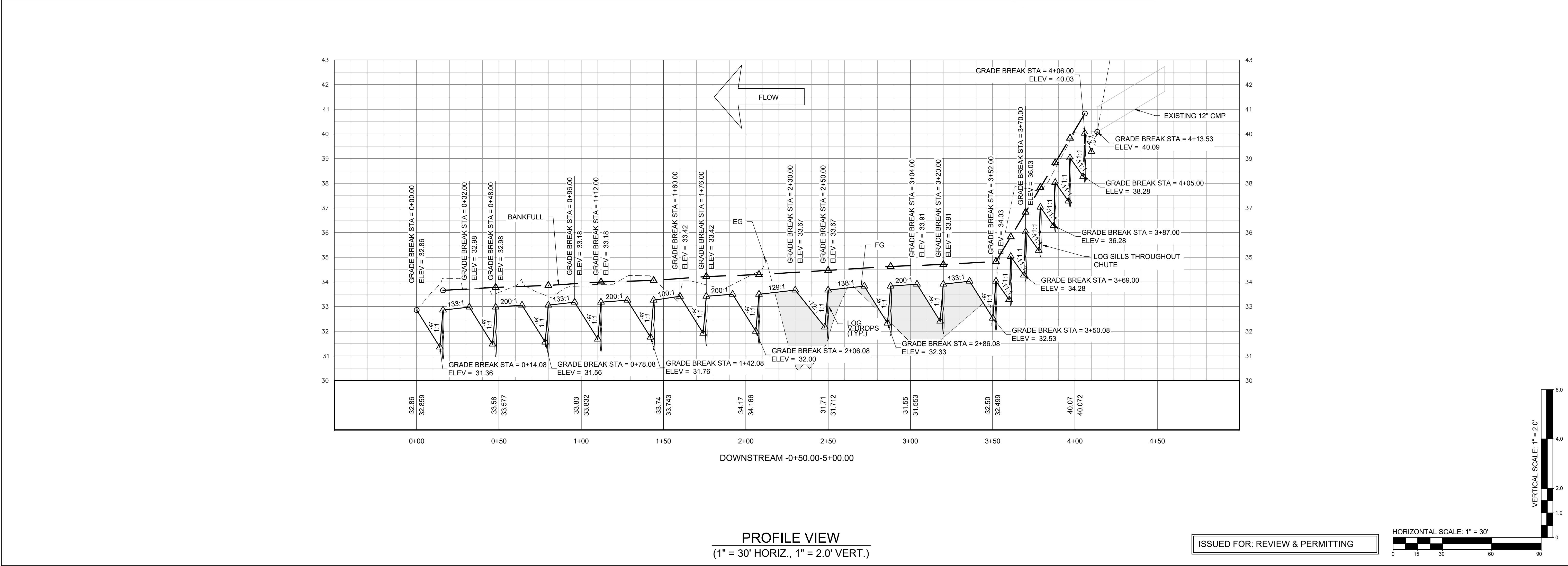













No.	DATE	DESCRIPTION	BY	APVD	SEAL
		<b>NOT FOR CONSTRUCTION</b>			

DSGN	JDH	DR	NAE	CHK	JDH	APVD	JDH	DATE
								7/9/2020

**HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE**

**192 - ALLEN CREEK DOWNSTREAM P&P**



**LDSI**  
SURVEYING SOLUTIONS FOR A CHANGING WORLD

CHARLOTTE OFFICE: 201 W 29TH STREET, CHARLOTTE NC 28206  
KINSTON OFFICE: 1308 HWY 258 N, KINSTON NC 28504  
PHONE: 704.337.8281 | FAX: 704.336.3153 | WEBSITE: WWW.LDSINC.COM NC PRN # C-1625

**SCALE AS SHOWN**

**VERIFY SCALE**






BAR IS ONE INCH ON ORIGINAL DRAWING

DATE: 7/9/2020  
PROJ: 4519049  
DWG: Allen Creek  
SHEET: 25 of 30



BANK STABILIZATION PLANTING NOTES:

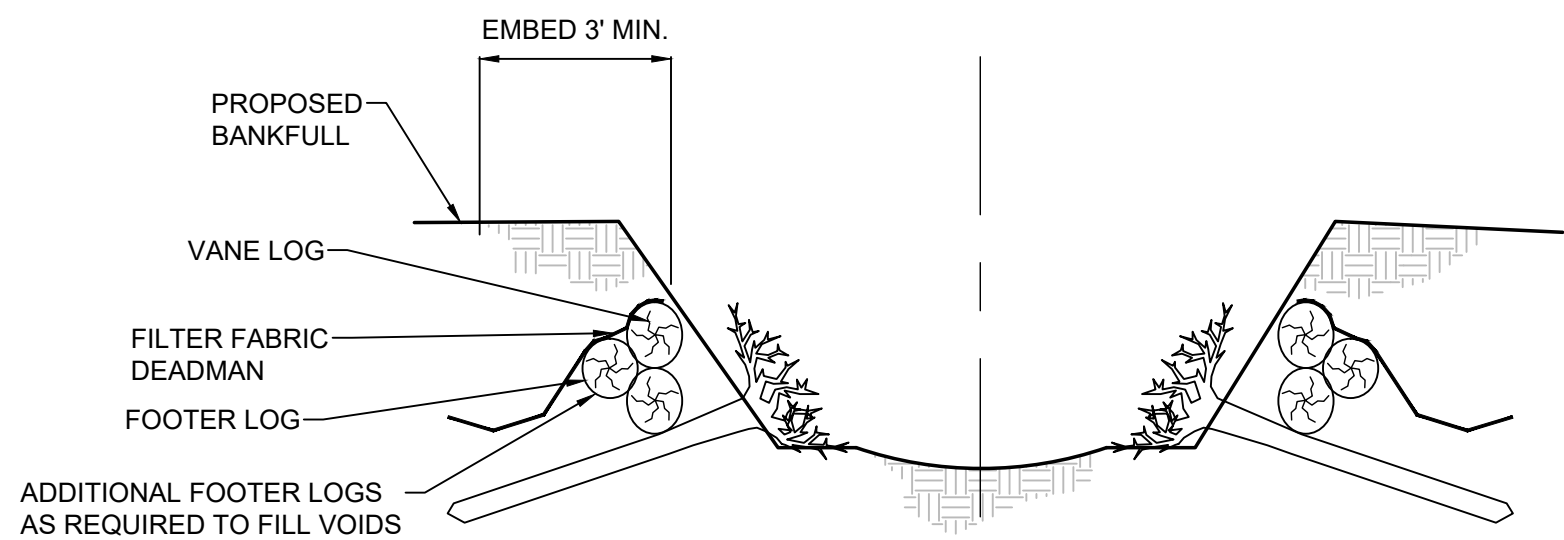
1. PLANTINGS SHALL BE INSTALLED FROM THE TOE OF SLOPE TO THE OUTSIDE EDGE OF THE BANKFULL BENCH.
2. JUNCUS PLUGS AND CONTAINERIZED TREES SHALL BE A SUBSIDIARY ITEM TO THIS BID ITEM, AND SHALL BE INCLUDED IN THE PAYMENT.
3. JUNCUS SHALL BE PLANTED 1' (ONE) O.C. OFFSET ROWS FROM THE TOE OF SLOPE TO THE OUTSIDE EDGE OF THE BANKFULL BENCH.
4. (4) CONTAINERIZED TREES (1 1/2" - 2" CALIPER) SHALL BE (2) BALD CYPRESS (*Taxodium distichum*) (1) SWAMP CHESTNUT OAK (*Quercus michauxii*), OR (1) SWAMP WHITE OAK (*Quercus bicolor*) AND (1) BLACK GUM (*Nyssa sylvatica*) TREES SHALL BE EVENLY SPACED ALONG LOG, BUT NO CLOSER THAN 5' O.C.
5. CONTRACTOR SHALL INSURE THAT JUNCUS REMAINS 6 INCHES OFF LOG STRUCTURE AND TREE STOCK IN NOT PLANTED ANY CLOSER THAT 3 FOOT FROM LOG STRUCTURE.

BANK STABILIZATION PLANTS	
	OAK SWAMP CHESTNUT ( <i>Quercus michauxii</i> ).
	SWAMP WHITE OAK ( <i>Quercus bicolor</i> ).
	BLACKGUM / SWAMP TUPELO ( <i>Nyssa sylvatica</i> var <i>biflora</i> ).
	BALD CYPRESS ( <i>Taxodium distichum</i> )
	SOFT RUSH / JUNCUS ( <i>Juncus effusus</i> )

NOTES:

1. LOGS SHALL BE SIZED PER LOG CROSS VANE CHART, AND RELATIVELY STRAIGHT.
2. LOGS SHALL NOT BE SALVAGED FROM PROJECT AREA, CONTRACTOR SHALL SUBMIT TO ENGINEER PROPOSED HARVEST LOCATIONS FOR VIEWING. SPECIES PER CONSTRUCTION SPECIFICATIONS.
3. NAIL FILTER FABRIC USING 3" ROOFING NAILS AT 4 INCH INTERVALS ALONG LOG.
4. FILTER FABRIC USED SHALL BE NON-WOVEN GEOTEXTILE FABRIC PER CONSTRUCTION SPECIFICATIONS.
5. SECURING BOLDER SHALL BE A MINIMUM OF 2' WIDE X 3' LONG X 1.5' THICK.
6. LOGS SHALL NOT BE DE-BARKED, ALL LOGS SHALL HAVE BARK ATTACHED.

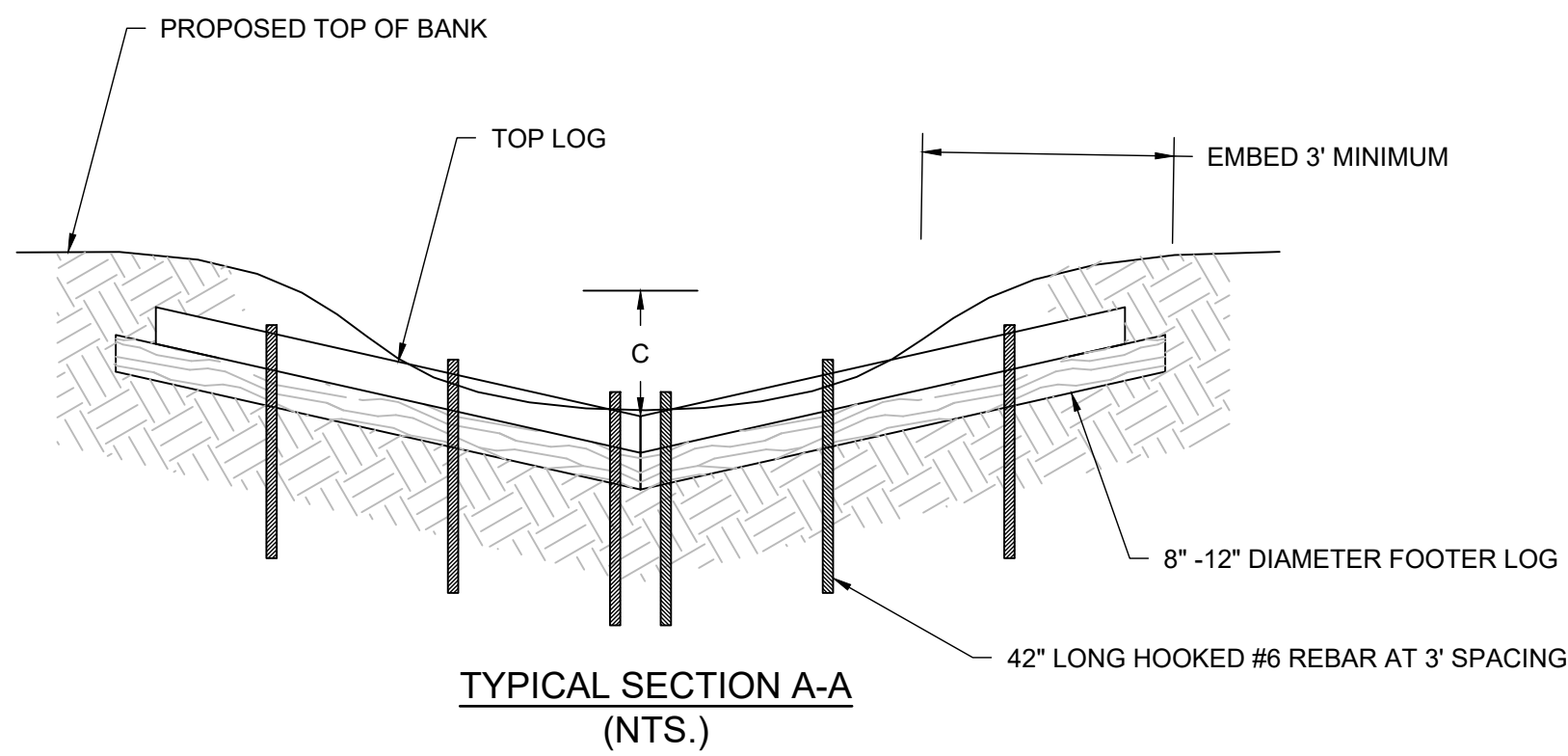
NOTE:  
TACK FILTER FABRIC FROM  
UPSTREAM FACE OF LOG VANE ARMS  
TO BOTTOM OF FOOTER LOGS



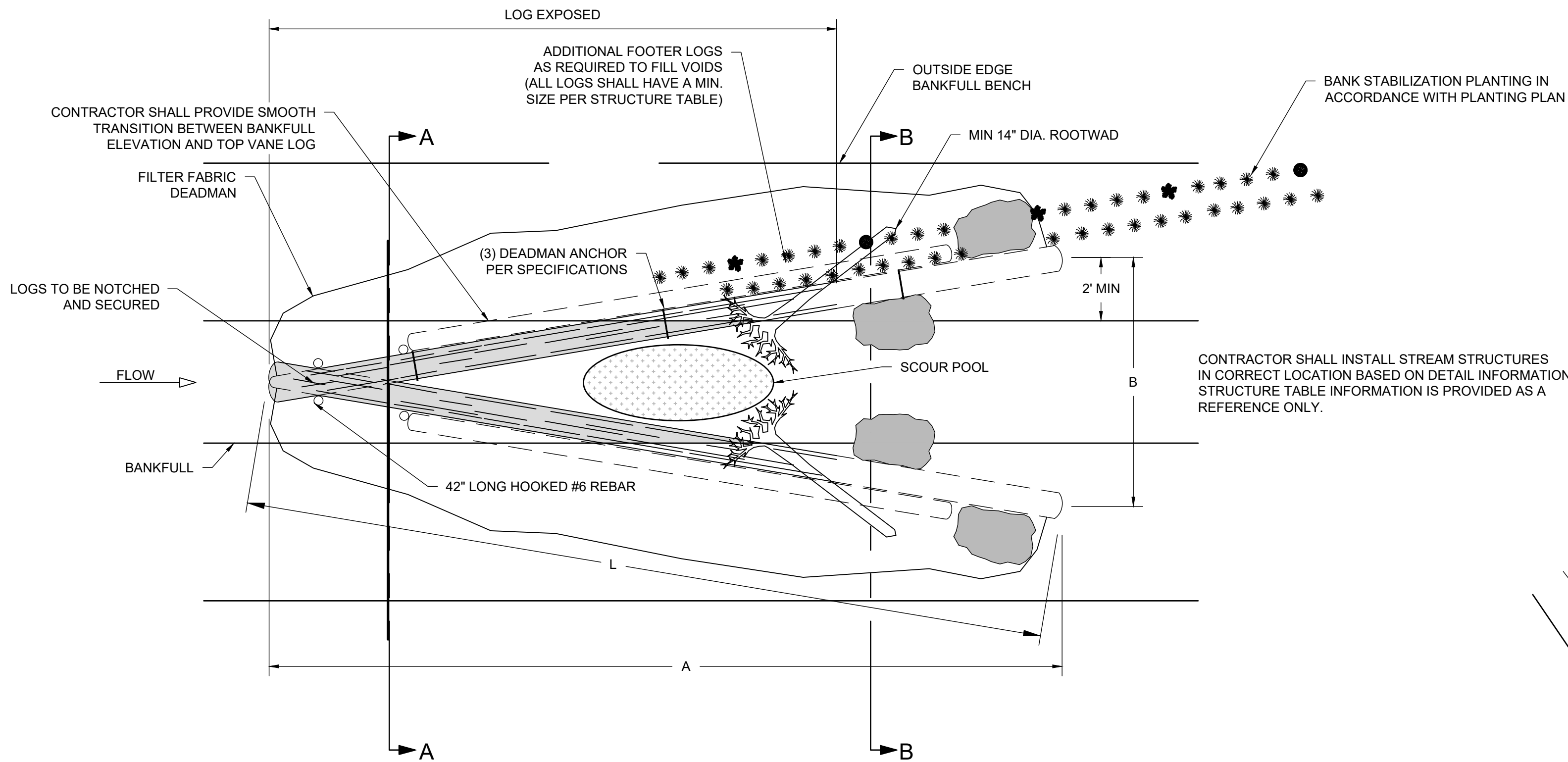
NOTE:  
ALL LOGS ARE TO BE SIZED ACCORDING  
TO THEIR AVERAGE DIAMETER MEASUREMENT.  
THIS IS NOT TO BE CONFUSED WITH THE LOGS DBH.

TYPICAL SECTION B-B  
(NTS.)

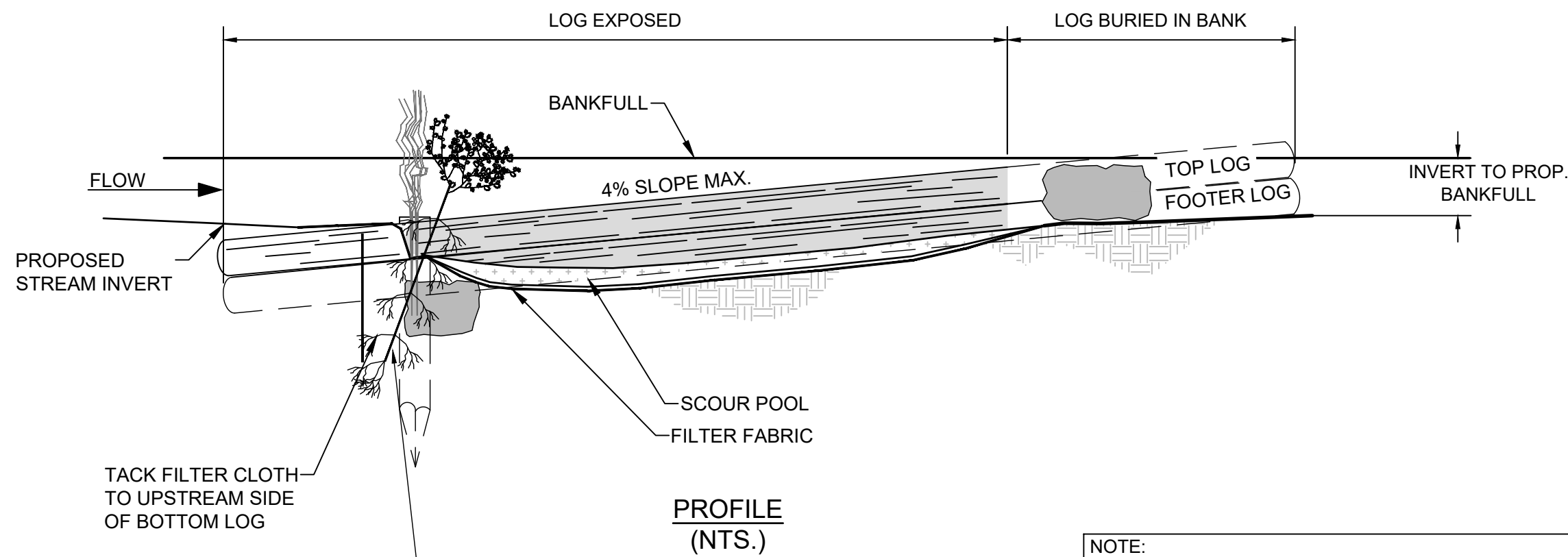
LOG V-DROP  
(NTS.)



TYPICAL SECTION A-A  
(NTS.)



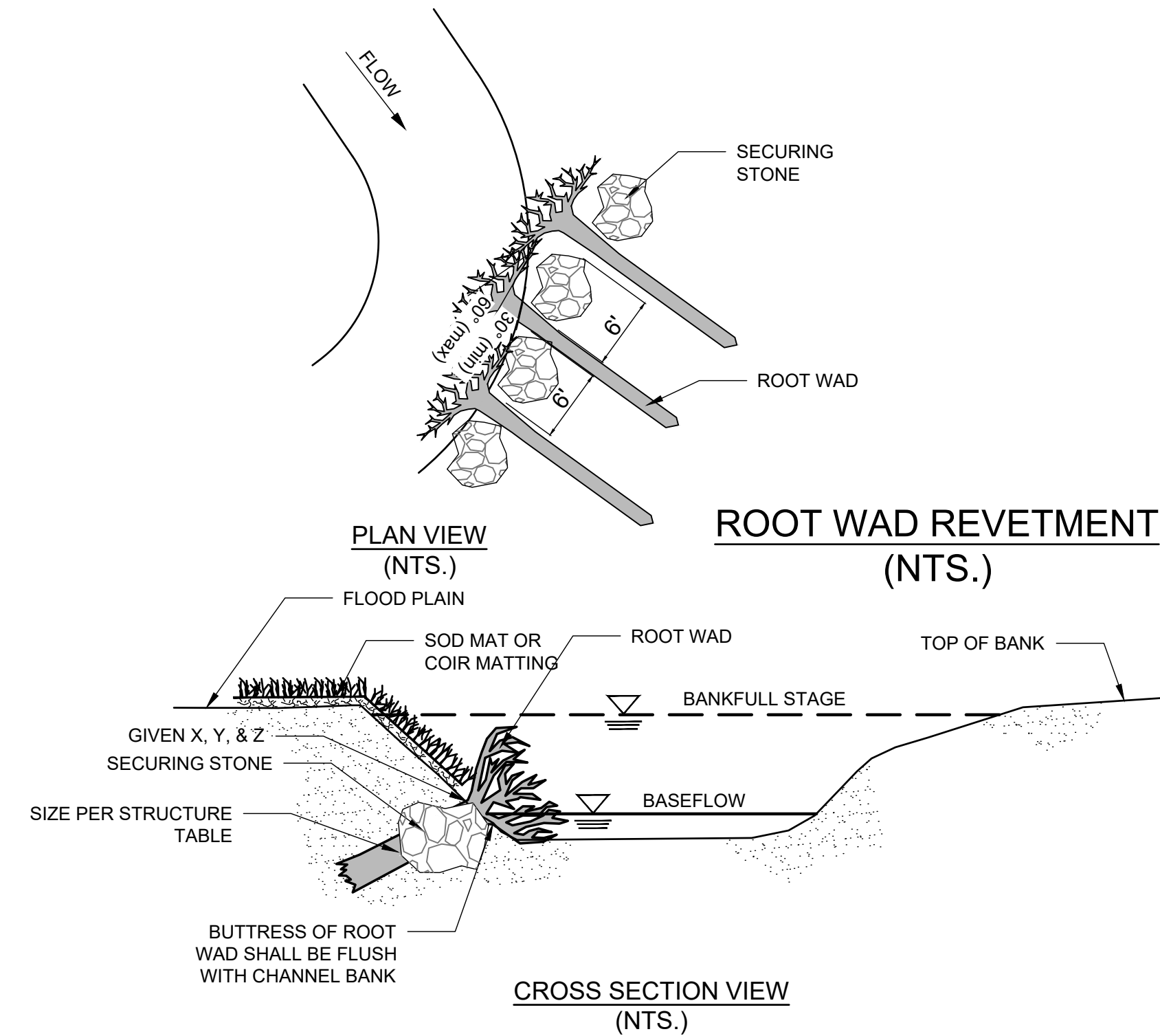
PLAN VIEW  
(NTS.)



PROFILE  
(NTS.)

PROPOSED VEGETATION 50% LIVE AND 50% DEAD  
TREE TOPS AND LIVE WHIPS (SAME SPECIES AS  
SPECIFIED WITHIN LIVE STAKE SPECIFICATION)  
SHALL BE INSTALLED 2/3 OF THE TOP OF BANK WIDTH.

NOTE:  
ALL LOGS ARE TO BE SIZED ACCORDING  
TO THEIR AVERAGE DIAMETER MEASUREMENT.  
THIS IS NOT TO BE CONFUSED WITH THE LOGS DBH.



ROOT WAD REVETMENT  
(NTS.)

CROSS SECTION VIEW  
(NTS.)

DRIVE POINT METHOD:

SHARPEN THE END OF THE LOG WITH A CHAINSAW BEFORE "DRIVING" IT INTO THE BANK. ORIENT ROOT WADS UPSTREAM SO THAT THE STREAM FLOW MEETS THE ROOT WAD AT A 90° ANGLE, DEFLECTING THE WATER AWAY FROM THE BANK.

TRENCHING METHOD:

IF THE ROOT WAD CANNOT BE DRIVEN INTO THE BANK OR THE BANK NEEDS TO BE RECONSTRUCTED, THE TRENCHING METHOD SHALL BE USED. THIS METHOD REQUIRES THAT A TRENCH BE EXCAVATED PARALLEL TO THE BANK AND WELL BELOW THE STREAMBED FOR THE LOG PORTION OF THE ROOT WAD. ONE-THIRD OF THE ROOT WAD SHALL REMAIN BELOW NORMAL BASE FLOW CONDITIONS.


NOTES:

1. WHEN CUTTING TRENCH FOR ROOTWAD, THE CUT END SHOULD BE DUG DEEPER THAN THE ROOTWAD END FOR INCREASED STABILIZATION AND ANCHORING.
2. RE-COMPACT ANY FILL AREAS TO THE DENSITY OF ORIGINAL SUBSTRATE.
3. SECURING STONE SHALL BE BOLDER OF SIZE 2ft X 3ft X 1.5ft.

DESIGNATION	A (ft)	B (ft)	C (ft)	L (ft)	TOP LOG DIA	FOOTER LOG DIA	ELEV X MSL	ELEV Y MSL	ELEV Z1 MSL	ELEV Z2 MSL
V-DROP 1					12"	12"				
V-DROP 2					12"	12"				
V-DROP 3					12"	12"				
V-DROP 4					12"	12"				
V-DROP 5					12"	12"				
V-DROP 6					12"	12"				
V-DROP 8					12"	12"				
V-DROP 9					12"	12"				
V-DROP 10					12"	12"				
V-DROP 11					12"	12"				






ISSUED FOR: REVIEW &  
PERMITTING

BY	APVD	SEAL
NOT FOR CONSTRUCTION		
DESCRIPTION	DATE	No.
HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE		
LOG V-DROP		
DR:	NAE	CHK:
JDH	JDH	JDH
APVD:	DATE: 7/9/2020	



SCALE AS SHOWN  
VERIFY SCALE  
BAR IS ONE INCH ON ORIGINAL DRAWING  
DATE: 7/9/2020  
PROJ: 4519049  
DWG: LOG V-DROP  
SHEET: 26 of 30



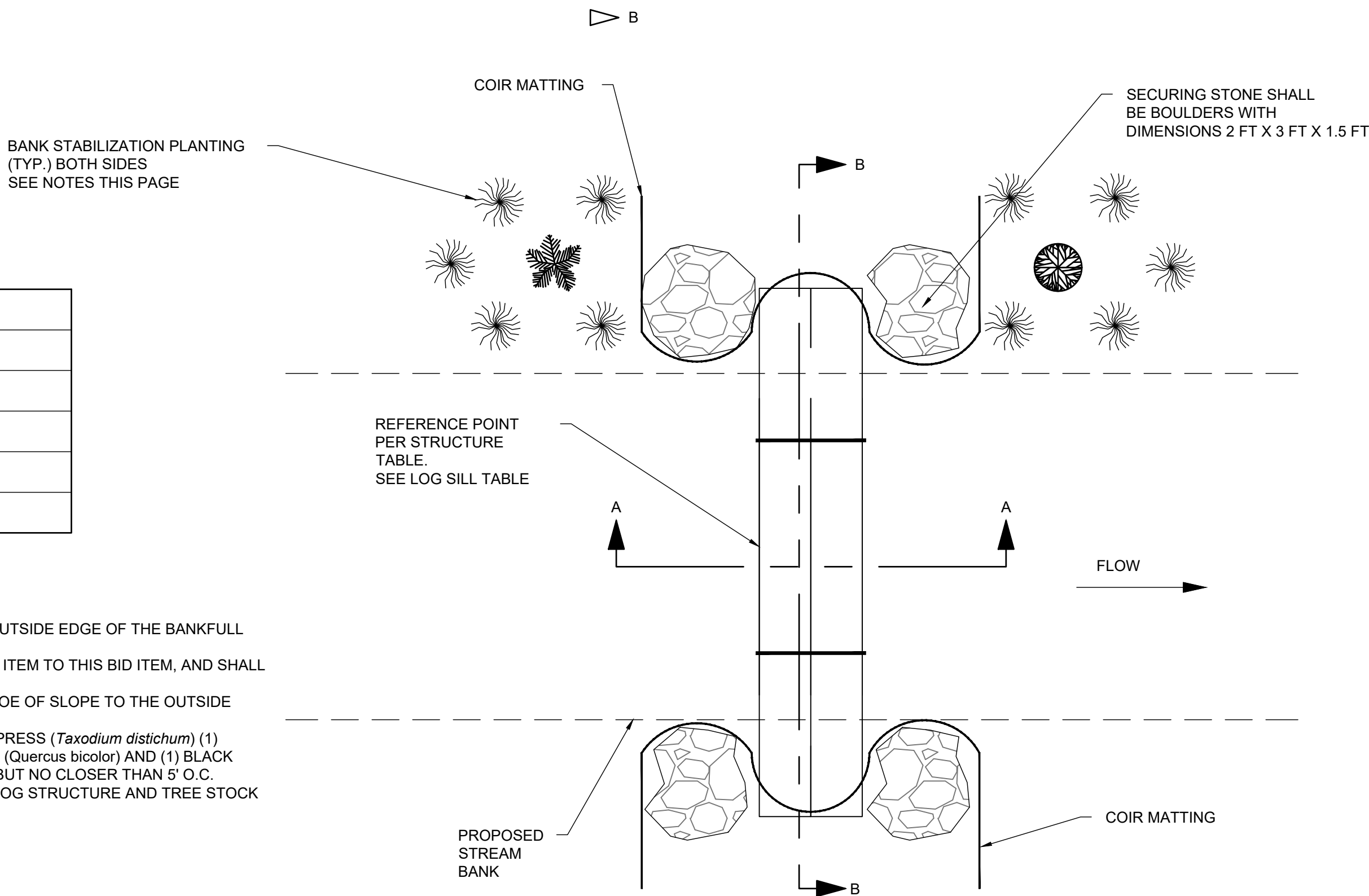
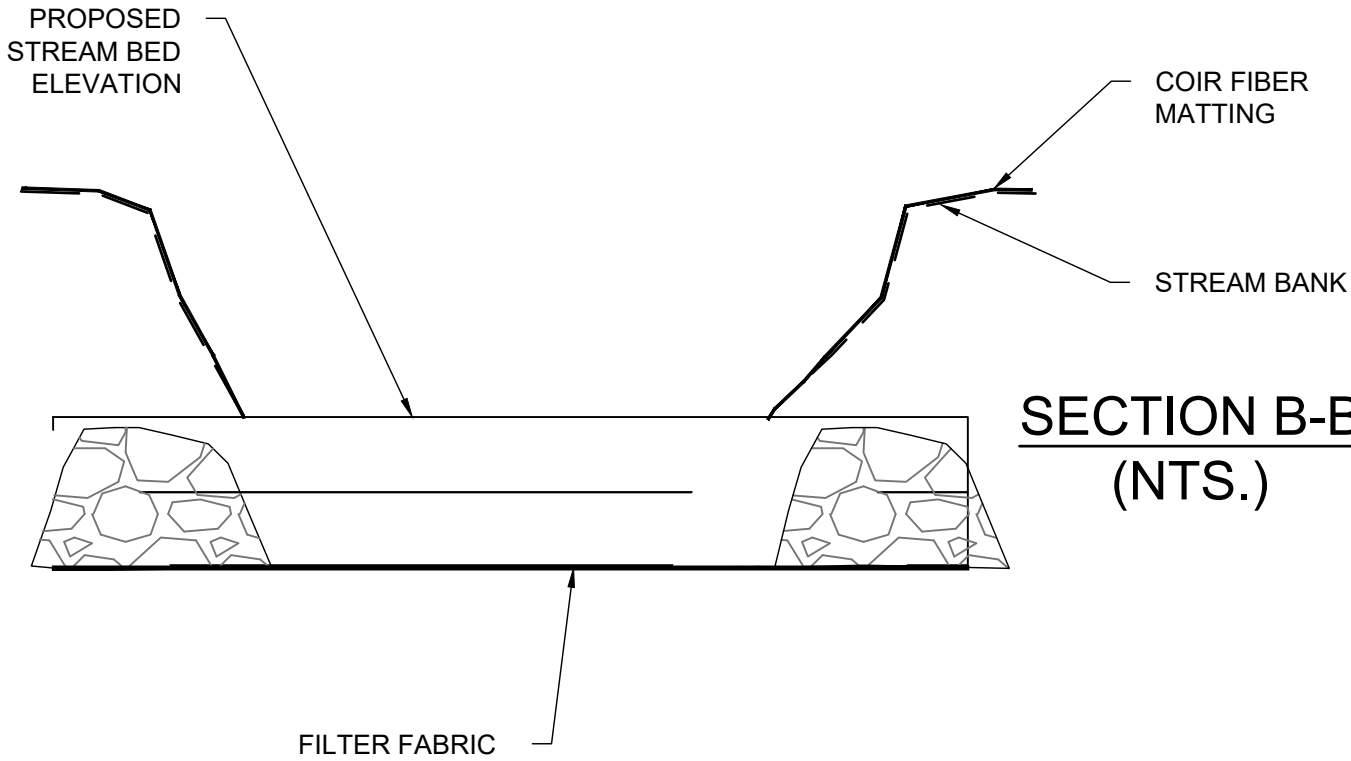
BANK STABILIZATION PLANTS	
	OAK SWAMP CHESTNUT ( <i>Quercus michauxii</i> ).
	SWAMP WHITE OAK ( <i>Quercus bicolor</i> ).
	BLACKGUM / SWAMP TUPELO ( <i>Nyssa sylvatica</i> var <i>biflora</i> ).
	BALD CYPRESS ( <i>Taxodium distichum</i> )
	SOFT RUSH / JUNCUS ( <i>Juncus effusus</i> )

**BANK STABILIZATION PLANTING NOTES:**

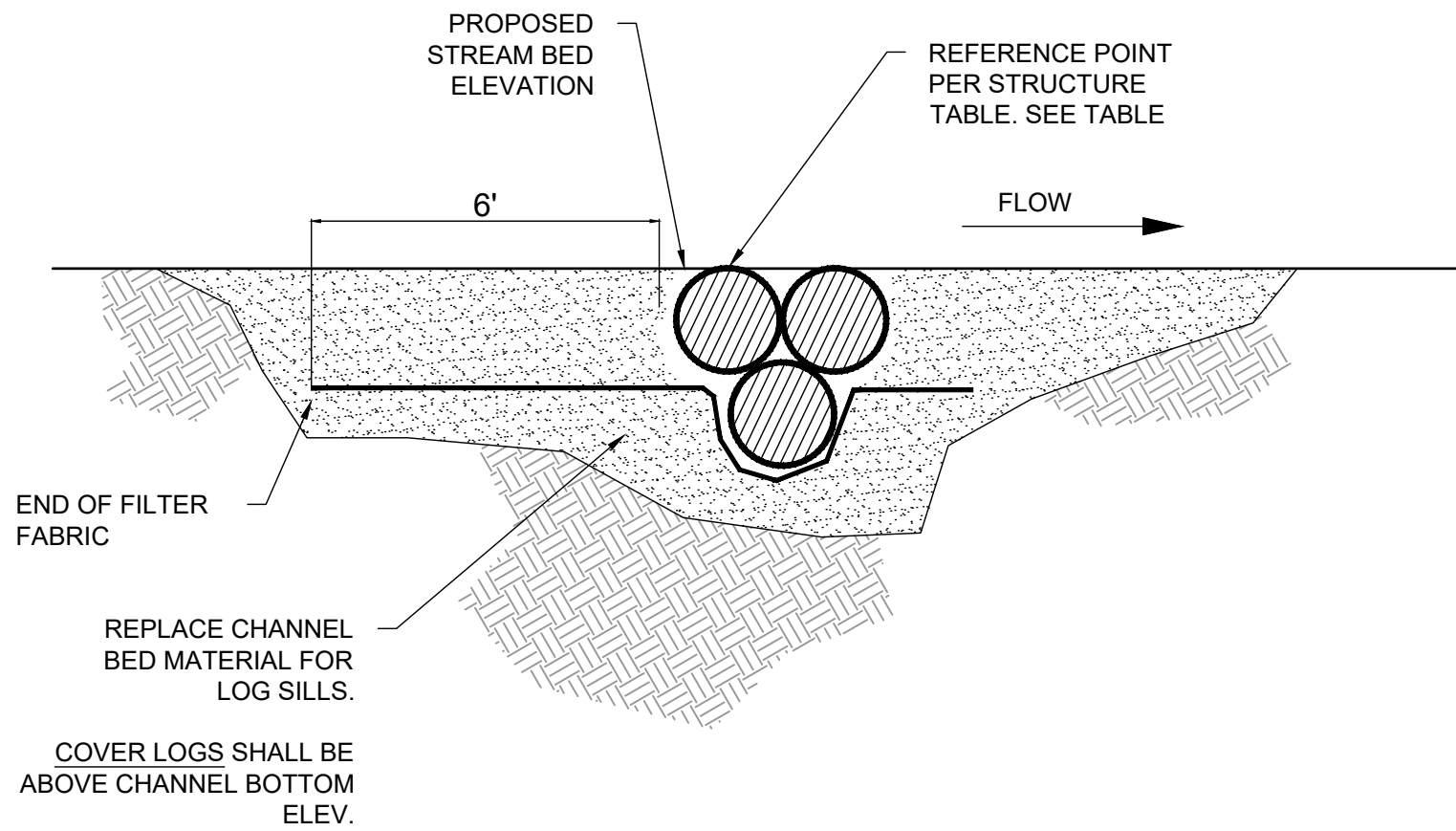
1. PLANTINGS SHALL BE INSTALLED FROM THE TOE OF SLOPE TO THE OUTSIDE EDGE OF THE BANKFULL BENCH.
2. JUNCUS PLUGS AND CONTAINERIZED TREES SHALL BE A SUBSIDIARY ITEM TO THIS BID ITEM, AND SHALL BE INCLUDED IN THE PAYMENT.
3. JUNCUS SHALL BE PLANTED 1' (ONE) O.C. OFFSET ROWS FROM THE TOE OF SLOPE TO THE OUTSIDE EDGE OF THE BANKFULL BENCH
4. (4) CONTAINERIZED TREES (1 1/2" - 2" CALIPER) SHALL BE (2) BALD CYPRESS (*Taxodium distichum*) (1) SWAMP CHESTNUT OAK (*Quercus michauxii*), OR (1) SWAMP WHITE OAK (*Quercus bicolor*) AND (1) BLACK GUM (*Nyssa sylvatica*) TREES SHALL BE EVENLY SPACED ALONG LOG, BUT NO CLOSER THAN 5' O.C.
5. CONTRACTOR SHALL INSURE THAT JUNCUS REMAINS 6 INCHES OFF LOG STRUCTURE AND TREE STOCK IN NOT PLANTED ANY CLOSER THAT 3 FOOT FROM LOG STRUCTURE.

**NOTES:**

COIR MATTING AS SPECIFIED IN SECTION 404 OF THE SPECIFICATIONS AND SHALL BE FOLDED 3 TIMES (THEREFORE) 4 PLY AND PLACED UNDER UPSTREAM SECURING STONE, WRAPPED OVER LOG STRUCTURE THEN UNDER DOWN STREAM SECURING STONES.



**PLAN VIEW  
(NTS.)**



**SECTION A-A  
(NTS.)**

**NOTES:**

1. LOGS SHALL BE SIZED PER LOG SILL CHART, AND RELATIVELY STRAIGHT.
2. LOGS SHALL NOT BE SALVAGED FROM PROJECT AREA, CONTRACTOR SHALL SUBMIT TO ENGINEER PROPOSED HARVEST LOCATIONS FOR VIEWING. SPECIES PER CONSTRUCTION SPECIFICATIONS.
3. NAIL FILTER FABRIC USING 3" ROOFING NAILS AT 4 INCH INTERVALS ALONG LOG.
4. FILTER FABRIC USED SHALL BE NON-WOVEN GEOTEXTILE FABRIC PER CONSTRUCTION SPECIFICATIONS.
5. COVER LOGS SHALL BE A SINGLE LOG INSTEAD OF THE THREE AS SHOWN IN SECTION A-A.

LOG SILLS									
STRUCTURE	ALIGNMENT	STATION	OFFSET	SIDE	X1	Y1	Z1 ELEV	LOG DIA (IN)	APPROX. LOG LENGTH (FT)

**LOG SILL STRUCTURE  
(NTS.)**

ISSUED FOR: REVIEW & PERMITTING

DESCRIPTION

BY

APVD

SEAL

DATE

DR

NAE

CHK

JDH

APVD

JDH

DATE

7/9/2020

NOT FOR CONSTRUCTION

HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE

LOG SILL

LDSI

SURVEYING SOLUTIONS FOR A CHANGING WORLD

STATE

GIS

ENGINEERING

CHARLOTTE OFFICE : 201 W 29TH STREET, CHARLOTTE NC 28206

KINSTON OFFICE : 1308 HWY 258 N., KINSTON NC 28504

PHONE: 704.337.8328 | FAX: 704.308.3153 | WEBSITE: WWW.LDSINC.COM NC PRN # C-1925

SCALE AS SHOWN

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1"

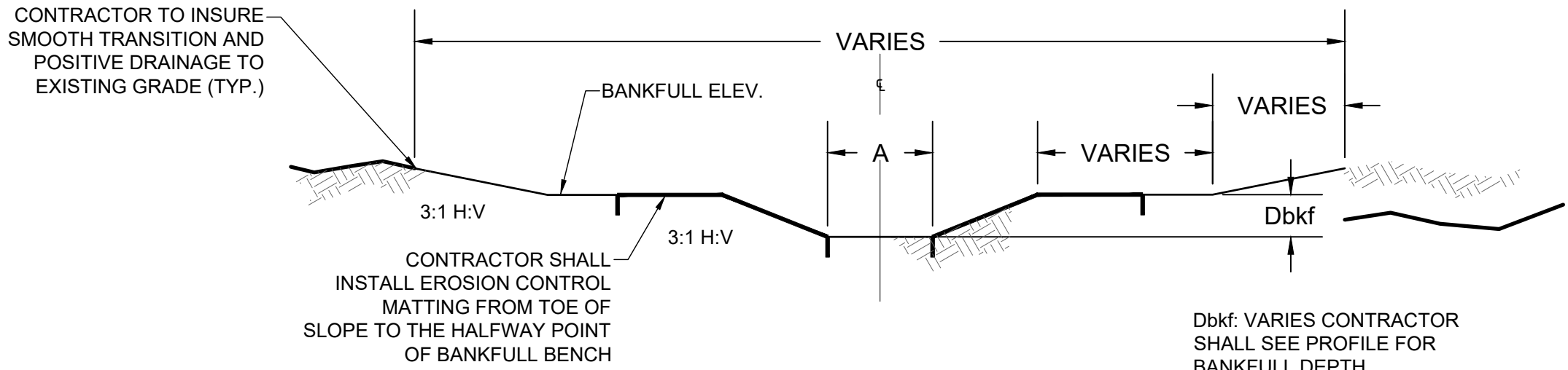
DATE: 7/9/2020

PROJ: 4519049

DWG: LOG SILL

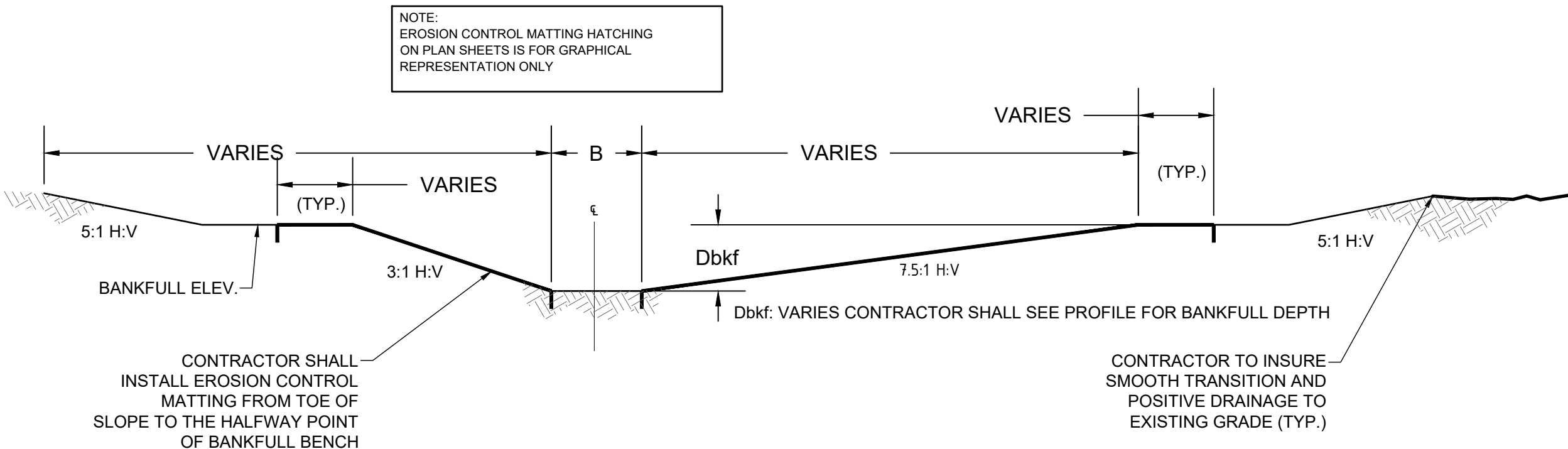
SHEET: 27 of 30



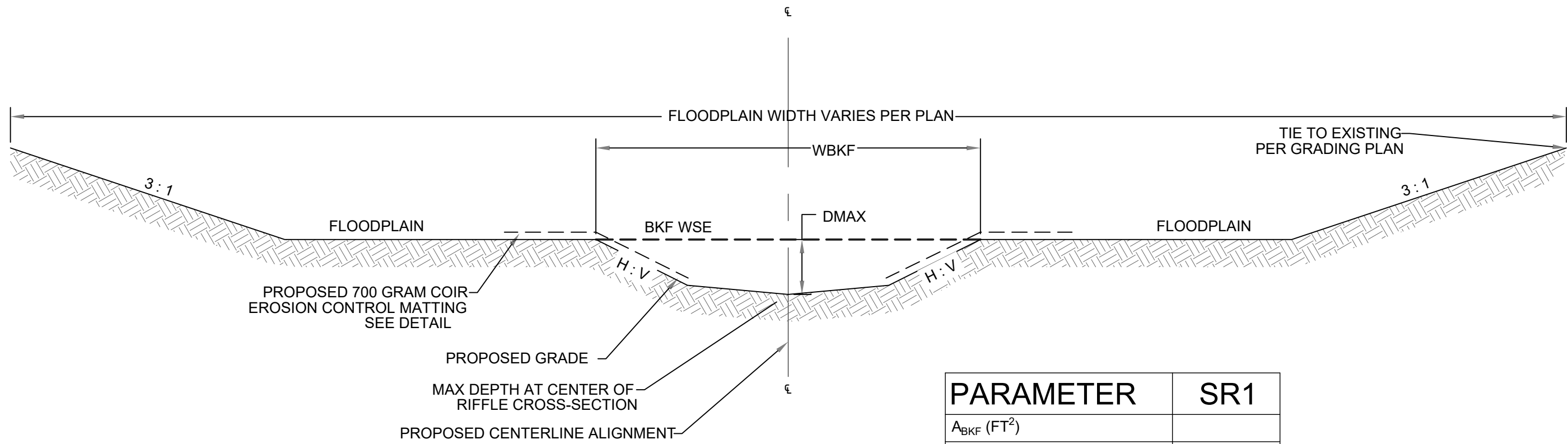


TYPICAL CROSS SECTION RIFFLE  
(NTS.)

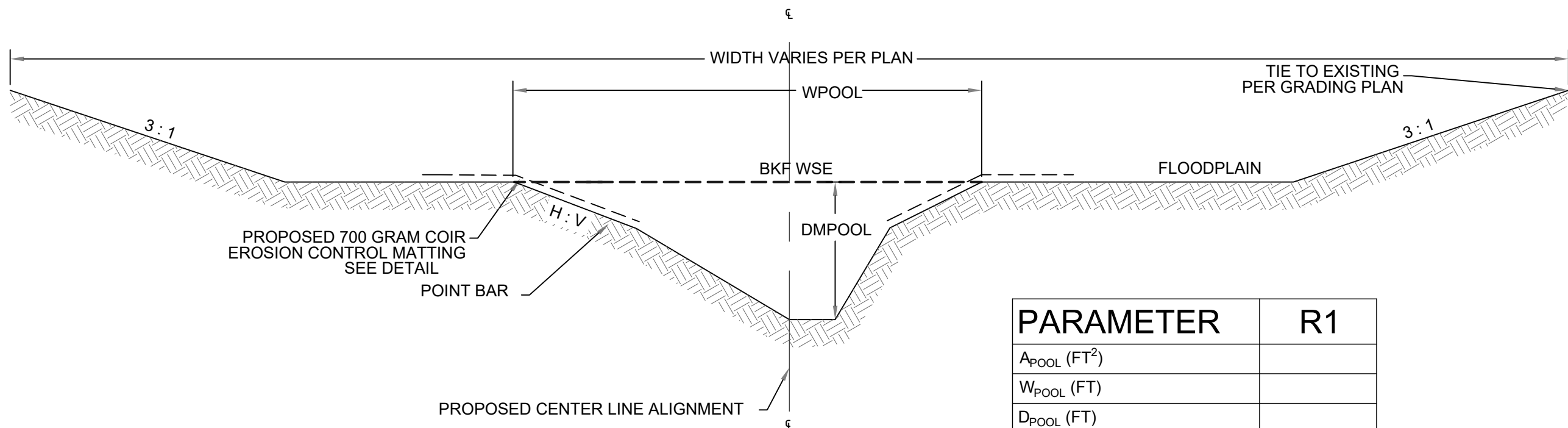
PARAMETER	R1
A	
B	



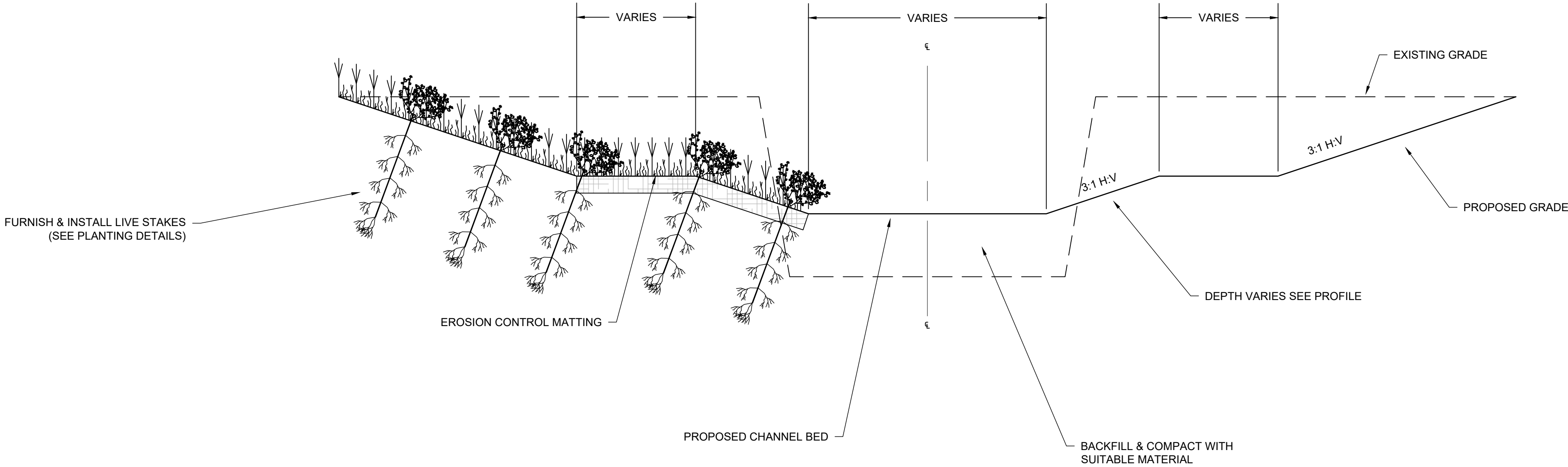
TYPICAL CROSS SECTION POOL LEFT BEND  
(NTS.)



PARAMETER	SR1
A <sub>BKF</sub> (FT <sup>2</sup> )	
W <sub>BKF</sub> (FT)	
D <sub>BKF</sub> (FT)	
D <sub>MAX</sub> (FT)	
W/D (FT)	
D <sub>MAX</sub> /D <sub>BKF</sub>	
S <sub>1</sub> (FT/FT)	



PARAMETER	R1
A <sub>POOL</sub> (FT <sup>2</sup> )	
W <sub>POOL</sub> (FT)	
D <sub>POOL</sub> (FT)	
D <sub>MPOOL</sub> (FT)	
A <sub>POOL</sub> /A <sub>BKF</sub>	
W <sub>POOL</sub> /W <sub>BKF</sub>	
D <sub>MAX</sub> /D <sub>BKF</sub>	



ISSUED FOR: REVIEW &  
PERMITTING

No.	DATE	DESCRIPTION	BY	APVD	SEAL					
HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE			DR:	NAE	CHK:	JDH	APVD:	JDH	DATE:	7/9/2020
TYPICAL CROSS SECTIONS			DSGN:	JDH						

CHARLOTTE OFFICE: 201 W 29TH STREET, CHARLOTTE NC 28206  
KINSTON OFFICE: 1308 HWY 258 N, KINSTON NC 28504  
PHONE: 704.337.8328 | FAX: 704.306.3153 | WEBSITE: WWW.LDSINC.COM NC PRN # C-1625

SCALE AS SHOWN

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1"

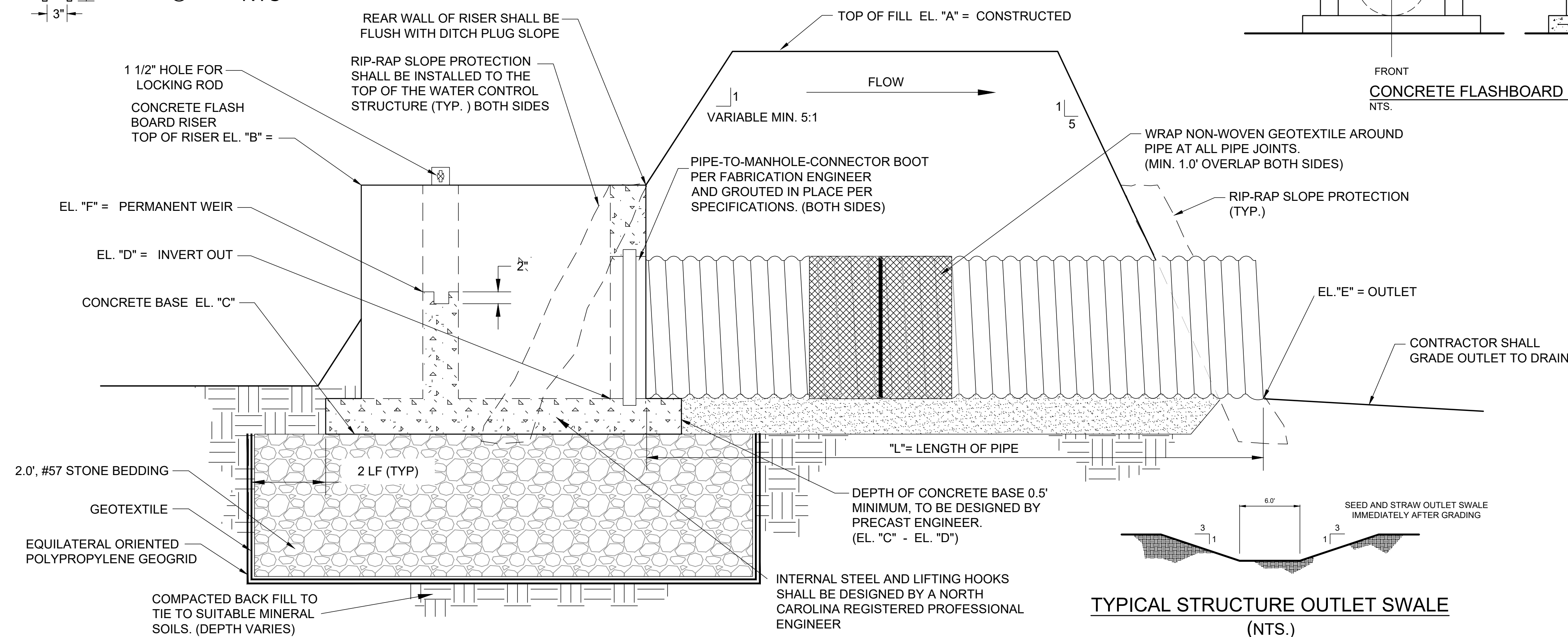
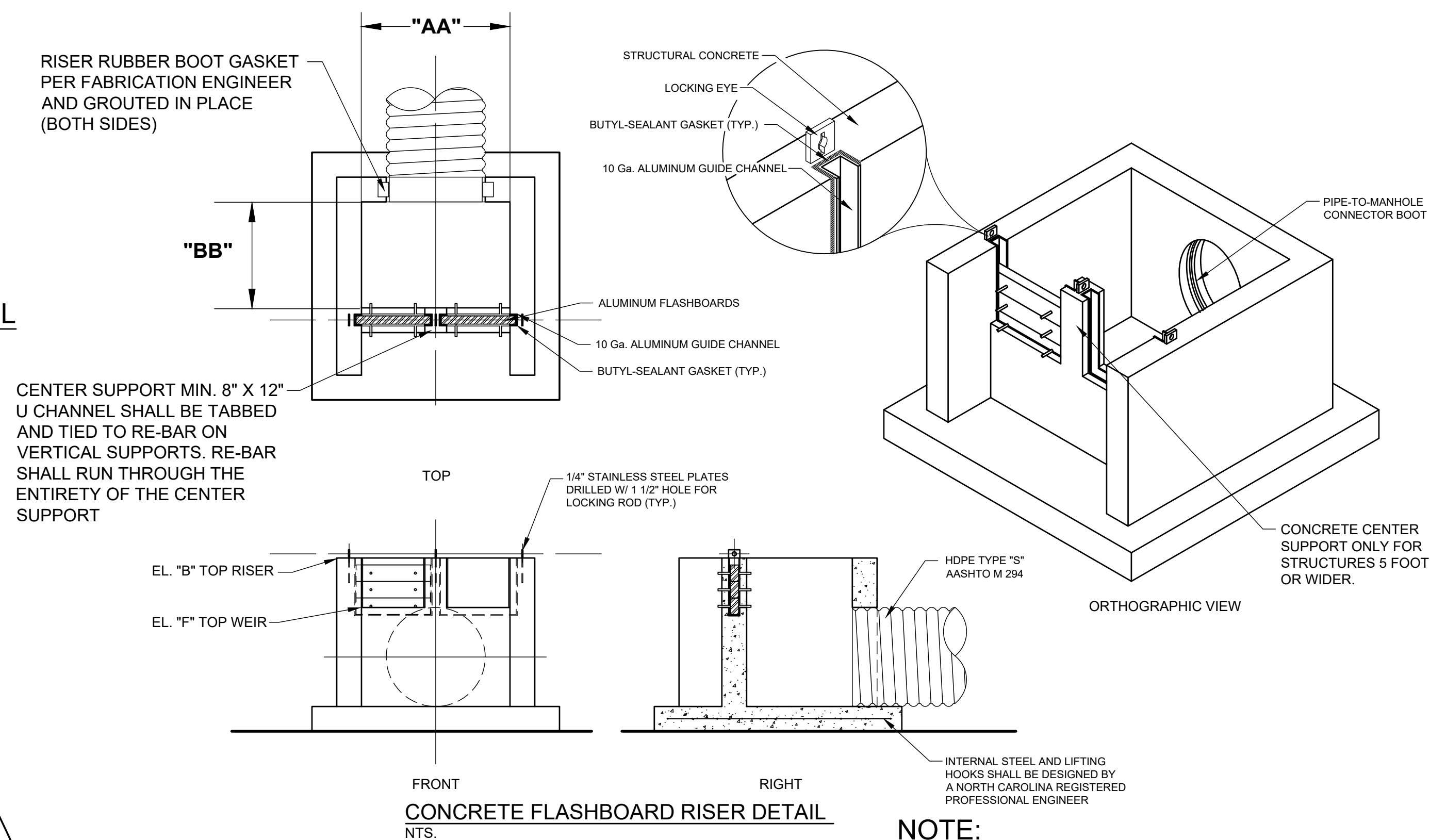
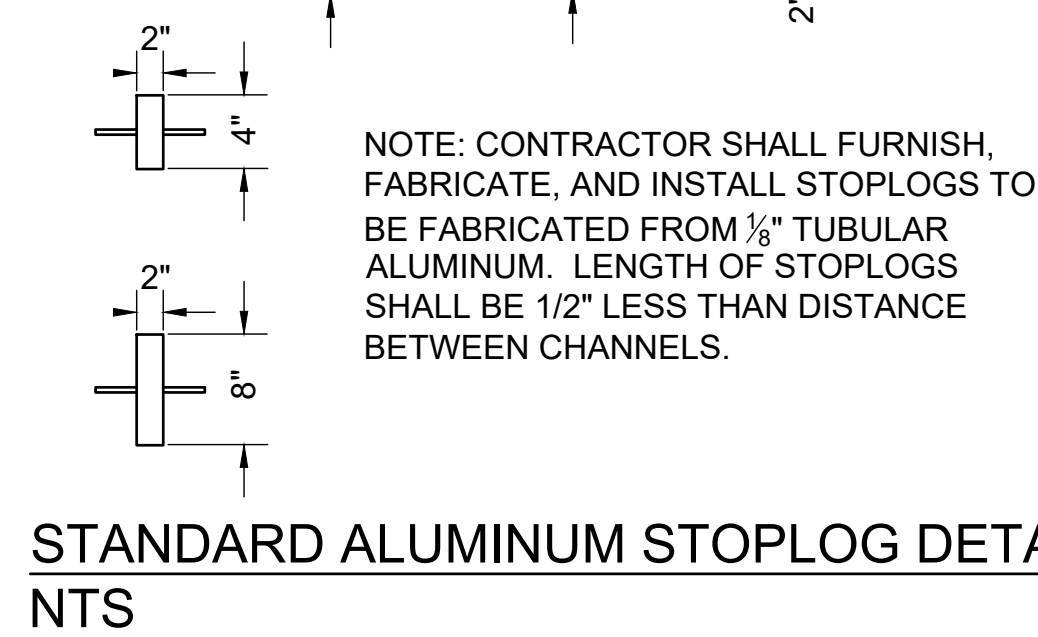
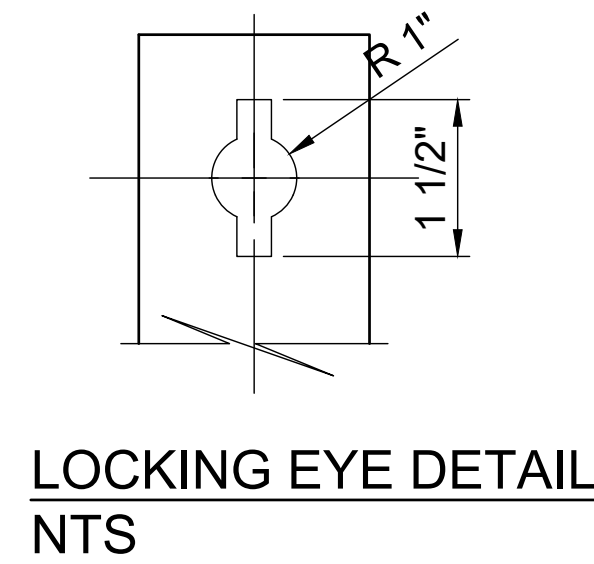
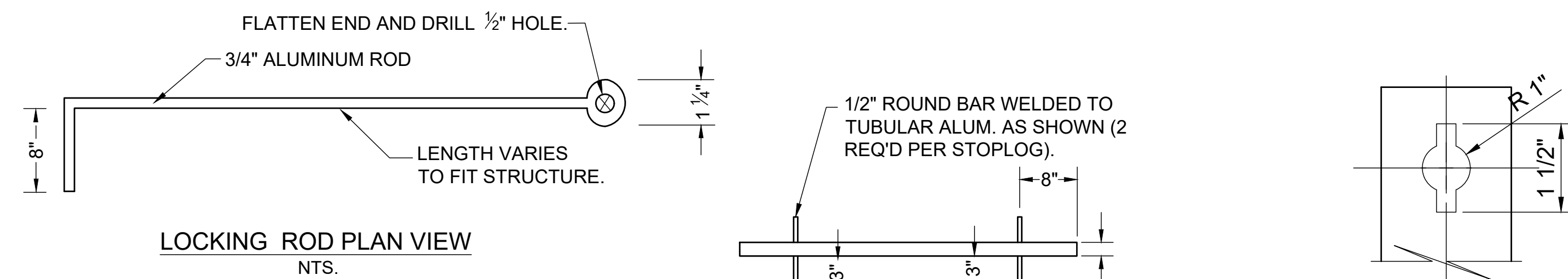
DATE: 7/9/2020

PROJ: 4519049

DWG: TYPICAL CROSS SECTIONS

SHEET: 28 of 30





**NOTE:**  
ALL DIMENSIONS SHOWN ARE MINIMUM. FABRICATION  
ENGINEER SHALL SIZE STRUCTURES IN ACCORDANCE  
WITH THEIR CALCULATIONS, MAINTAINING THE WEIR  
LENGTH SPECIFIED WITHIN THE TABLE BELOW.



**FABRICATION NOTES:**

1. THE PLANS (SHOP DRAWINGS) FOR PRECAST UNITS SHALL BE DRAWINGS FURNISHED BY THE CONTRACTOR FOR APPROVAL BY THE NRCS PROJECT ENGINEER. THESE DRAWINGS SHALL SHOW COMPLETE DESIGN, INSTALLATION, STRUCTURAL LOADING, AND CONSTRUCTION INFORMATION IN SUCH DETAIL AS TO ENABLE THE PROJECT ENGINEER TO DETERMINE THE ADEQUACY OF THE PROPOSED UNITS FOR THE INTENDED PURPOSE. DETAILS OF THE STEEL REINFORCEMENT SIZE AND PLACEMENT SHALL BE INCLUDED. THE DRAWINGS SHALL INCLUDE A SCHEDULE WHICH WILL LIST THE SIZE AND TYPE OF PRECAST UNIT AT EACH LOCATION WHERE THE UNITS ARE TO BE USED. DRAWINGS SHALL BE CERTIFIED BY A NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER. THESE DRAWINGS SHALL BE SUBMITTED TO THE NRCS PROJECT ENGINEER SIX (6) WEEKS PRIOR TO THE UNITS BEING INSTALLED FOR APPROVAL. THE PRECAST UNITS SHALL BE PRODUCED IN ACCORDANCE WITH THE APPROVED DRAWINGS.
2. TOLERANCE SHALL BE  $\pm 1/4"$  FROM APPROVED SHOP DRAWINGS.
3. THE FABRICATION ENGINEER IS TO CERTIFY THAT UNITS ARE BUILT IN ACCORDANCE WITH SHOP DRAWINGS. FABRICATION ENGINEER, REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF NORTH CAROLINA, SHALL SEND A SEALED CERTIFICATION LETTER TO NRCS UPON PRODUCT DELIVERY ONSITE THAT PRECAST UNITS MEET OR EXCEED THE APPROVED SHOP DRAWINGS.

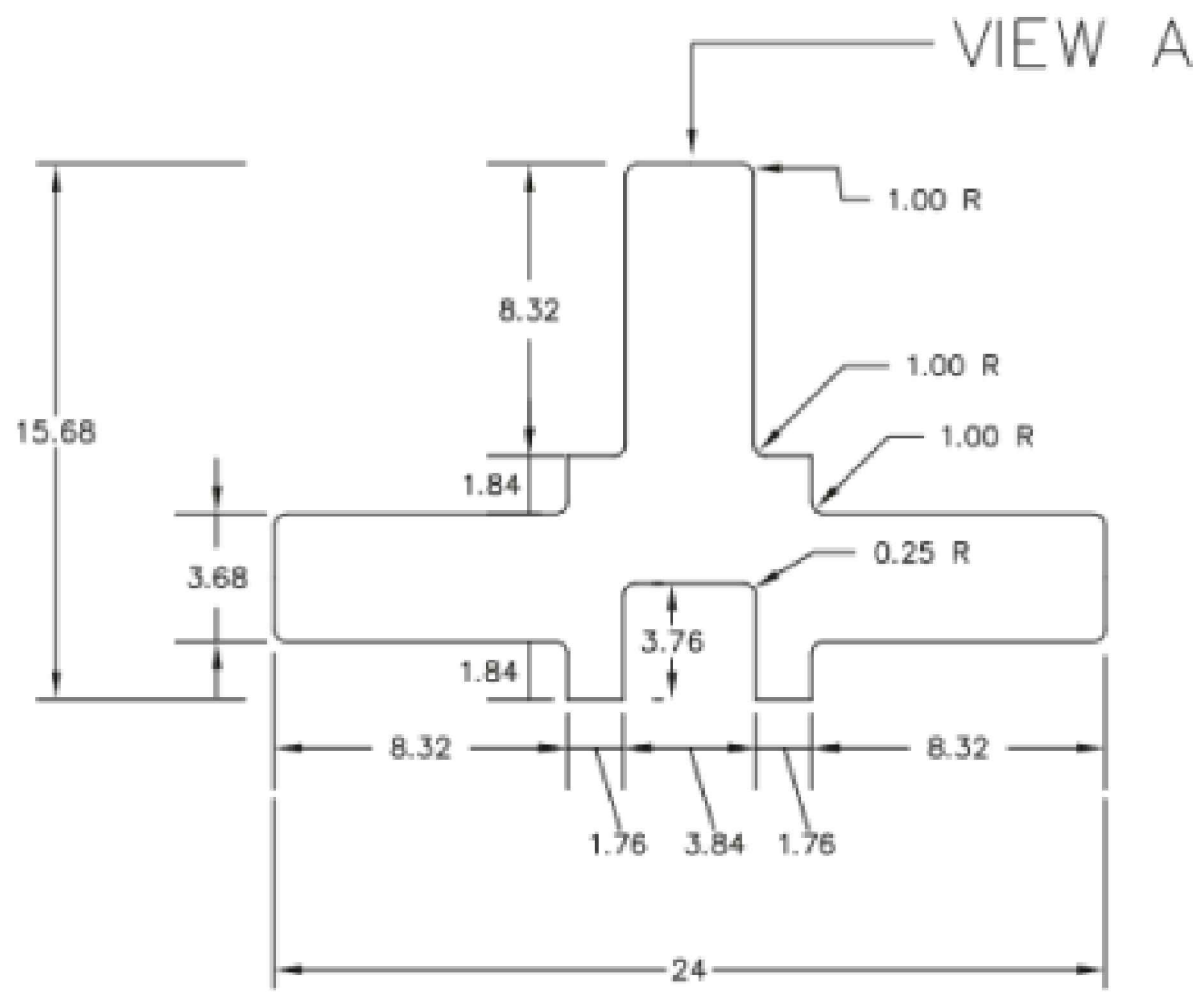
### LEGEND OF TABLE

DIM. "AA" = INSIDE RISER WIDTH  
DIM. "BB" = INSIDE RISER LENGTH  
EL. "A" = TOP OF FILL OVER STRUCTURE  
EL. "B" = TOP OF RISER  
EL. "C" = BOTTOM OF CONCRETE  
EL. "D" = UPPER INVERT OF PIPE  
EL. "E" = LOWER INVERT OF PIPE  
EL. "F" = PERMANENT WEIR  
L = LENGTH OF PIPE

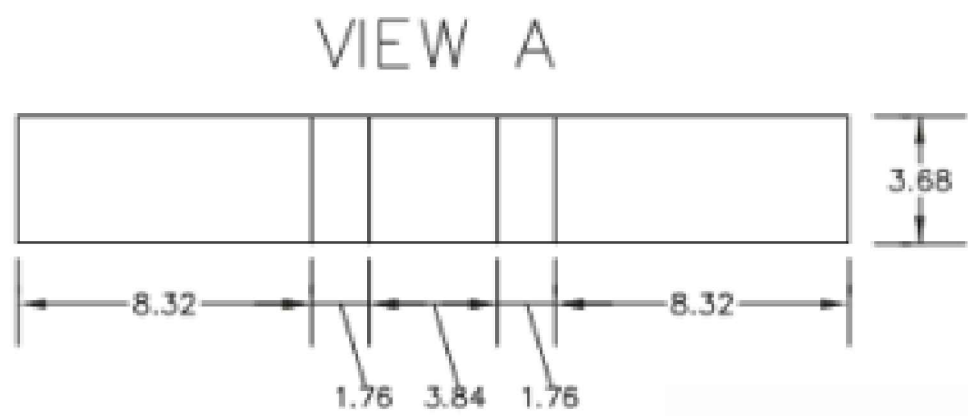
TYPICAL SECTION OF WATER CONTROL  
STRUCTURE LOCATION  
NTS

 <p><b>LDSI</b> SURVEYING SOLUTIONS FOR A CHANGING WORLD</p>		<p><b>HURRICANE FLORENCE EWP - ENGINEERING ASSISTANCE</b></p>		<p><b>FLASHBOARD RISER</b></p>	
<p>SCALE AS SHOWN</p>		<p>DATE: 7/9/2020</p>			
<p>VERIFY SCALE</p>		<p>PROJ: 4519049</p>			
<p>BAR IS ONE INCH ON ORIGINAL DRAWING</p> <p>0"  1"</p>		<p>DWG: FLASHBOARD RISER</p>			
<p>SHEET: 29 OF 30</p>		<p>DATE: 7/9/2020</p>			





ALL DIMENSIONS IN INCHES



## PRODUCT SPECIFICATIONS

UNIT	LENGTH (in)	VOLUME (ft³)	WEIGHT (lbs)	LINEAR COVERAGE (in)*
SJ-24	24	0.56	78	12
SJ-48	48	4.49	630	24
SJ-72	72	15.14	2120	36

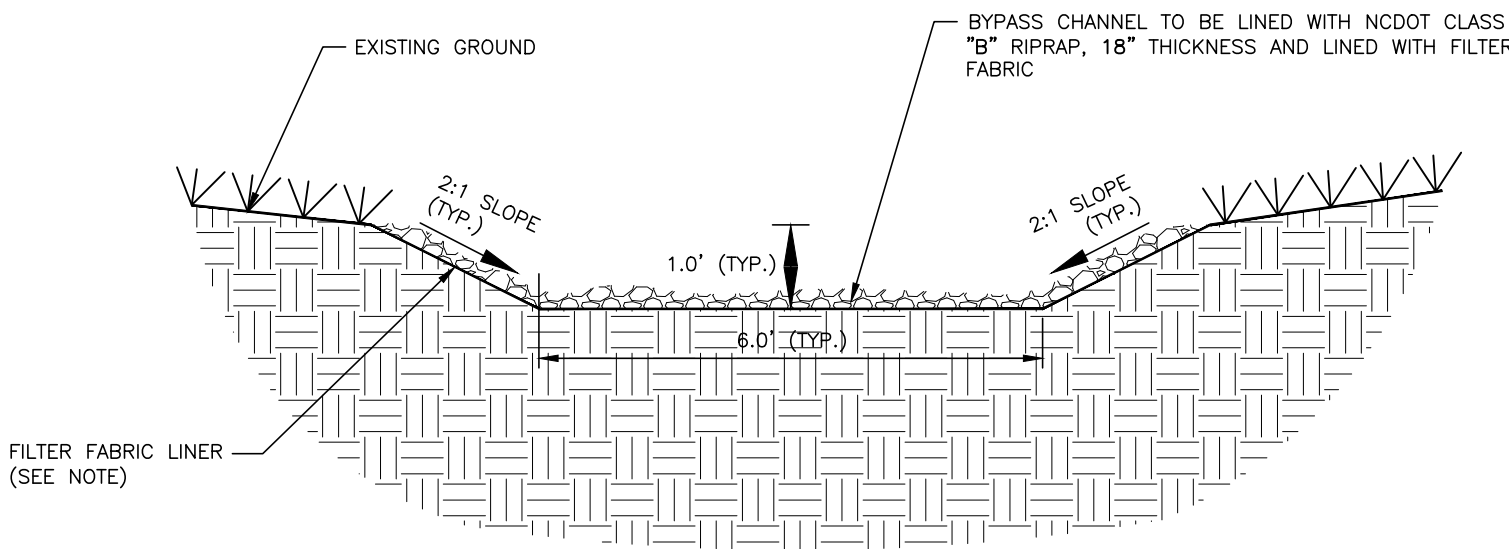
\*Assumed concrete density 140 lbs/ft³

## STABILIZATION JACKS DETAILS

N.T.S.

### NOTES:

- CHANNEL DIMENSION (1.0' DEEP, 6' 0" BOTTOM WIDTH) ARE TO TOP OF RIP-RAP IN CHANNEL. ACTUAL CHANNEL EXCAVATION MUST CONSIDER THICKNESS OF THE RIPRAP AND FILTER FABRIC LINER. BYPASS CHANNEL TO STOP AT TOP OF BANK.
- A FILTER BLANKET IS TO BE INSTALLED BETWEEN THE RIPRAP AND SOIL FOUNDATION. THE FILTER BLANKET WILL CONSIST OF A MINIMUM 4" THICK LAYER OF STONE (MCDOT #57) UNDERLAIN WITH MIRAFI FILTER WEAVE 700 OR ENGINEER-APPROVED EQUIVALENT.
- RIPRAP TO EXTEND TO TOP OF CHANNEL WITH 2:1 SIDE SLOPES THROUGHOUT THE EXTENT OF CHANNEL.

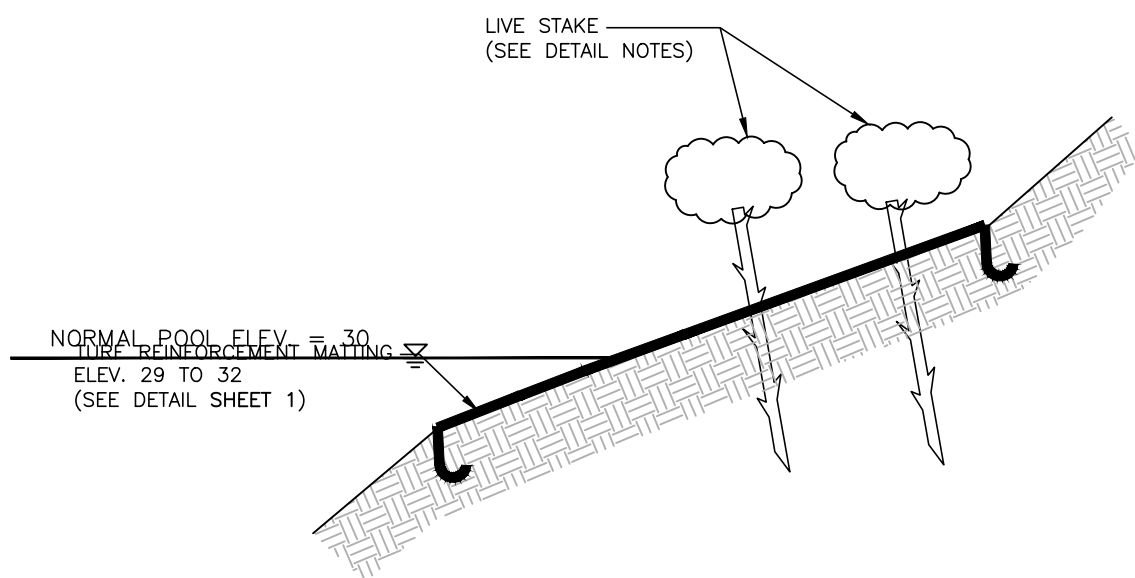


## RIPRAP CHANNEL DETAIL

N.T.S.

### NOTES:

- AREAS NOTED AS LIVE STAKES WITHIN THE PLANTING ZONE SHALL BE PLANTED WITH RIVER BIRCH (BETULA NIGRA) AND BUTTONBUSH (CEPHALANTHUS OCCIDENTALIS).
- ONE LIVE STAKE SPECIES PER LIVE STAKE AREA. STAKES SHOULD BE PLACED EVERY 10 FT, ALTERNATING SPECIES AND ELEVATION.
- ALL LIVE STAKES SHALL BE DORMANT AT TIME OF ACQUISITION AND PLANTING.
- LIVE STAKES SHALL BE 1/2-2" IN DIAMETER. LIVE STAKES SHALL ALSO BE 2 - 4 FEET IN LENGTH.
- DURING PREPARATION, THE BASAL ENDS OF THE LIVE STAKES SHALL BE CLEANLY CUT AT AN ANGLE TO FACILITATE EASY INSERTION INTO THE SOIL, WHILE THE TOPS SHALL BE CUT SQUARE OR BLUNT FOR TAMPING. ALL LIMBS SHALL BE REMOVED FROM THE SIDES OF THE LIVE CUTTING PRIOR TO INSTALLATION.
- CUTTINGS FOR LIVE STAKES SHALL BE HARVESTED IN A MANNER SUCH THAT THEY ARE CUT, IMMEDIATELY PUT INTO WATER TO BE SOAKED FOR 10 DAYS, AND THEN PLANTED IMMEDIATELY AFTER THE 10 DAYS ARE COMPLETED. CUTTINGS SHALL REMAIN WET UNTIL THEY ARE PLANTED. OUTSIDE STORAGE LOCATIONS SHOULD BE CONTINUALLY SHADED AND PROTECTED FROM WIND AND DIRECT SUNLIGHT.
- LIVE STAKES SHALL BE TAMPED AT AN ANGLE INTO THE GROUND SURFACE WITH A DEAD BLOW HAMMER, WITH BUDS ORIENTED IN AN UPWARD DIRECTION. STAKES SHOULD BE TAMPED UNTIL APPROXIMATELY 3/4 OF THE STAKE LENGTH IS WITHIN THE GROUND. ANY STAKES THAT ARE SPLIT OR DAMAGED DURING INSTALLATION SHALL BE REMOVED AND REPLACED.
- THE AREA AROUND EACH LIVE STAKE SHALL BE COMPACTED BY FOOT AFTER THE LIVE STAKE HAS BEEN INSTALLED.
- ONE TO TWO INCHES SHALL BE CUT CLEANLY OFF OF THE TOP OF EACH LIVE STAKE (WITH LOPPERS) AT AN ANGLE OF APPROXIMATELY 15 DEGREES FOLLOWING INSTALLATION.



## LIVE STAKE DETAIL

N.T.S.

## SEEDBED PREPARATION

- CHISEL COMPACTED AREAS AND SPREAD TOPSOIL 3-4 INCHES DEEP OVER ADVERSE SOIL CONDITIONS. TOPSOIL SHOULD BE INCORPORATED INTO THE FINAL GRADING OF THE BASIN SIDE SLOPES AND AQUATIC SHELF. CONTRACTOR SHOULD SCARIFY THE TOP 3-4 INCHES OF THE COMPACTED FILL TO PROMOTE BONDING WITH TOPSOIL.
- RIP THE ENTIRE AREA TO 6 INCHES DEPTH.
- REMOVE ALL LOOSE ROCK, ROOTS, AND OTHER OBSTRUCTIONS LEAVING SURFACE REASONABLY SMOOTH AND UNIFORM.
- PER ONE TIME ONLY, APPLY AGRICULTURAL LIME, FERTILIZER, AND SUPERPHOSPHATE UNIFORMLY AND MIX WITH SOIL.
- CONTINUE TILLAGE UNTIL A WELL-PULVERIZED, FIRM REASONABLY UNIFORM SEEDBED IS PREPARED 4 TO 6 INCHES DEEP.
- SEED ON A FRESHLY PREPARED SEEDBED AND COVER.
- MULCH IMMEDIATELY AFTER SEEDING AND ANCHOR MULCH.
- INSPECT ALL SEEDED AREAS AND MAKE NECESSARY REPAIRS OR RESEEDINGS WITHIN THE PLANTING SEASON, IF POSSIBLE. AFTER PERMANENT COVER IS ESTABLISHED.
- CONSULT CONSERVATION INSPECTOR ON MAINTENANCE TREATMENT.

## TEMPORARY SEEDING SCHEDULE

SEEDING DATE	SEEDING MIXTURE	APPLICATION RATE
JAN 1 - MAY 1	RYE (GRAIN)	120 LBS/AC
	KOBE LESPEDEZA	50 LBS/AC
MAY 1 - AUG 15	GERMAN MILLET	40 LBS/AC
AUG 15 - DEC 30	RYE (GRAIN)	120 LBS/AC

### SOIL AMENDMENTS

FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/AC GROUND AGRICULTURE LIMESTONE AND 750 LB/AC 10-10-10 FERTILIZER (FROM AUG 15 - DEC 30, INCREASE 10-10-10 FERTILIZER TO 1000 LB/AC).

### MULCH

APPLY 4000 LB/AC STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL.

### MAINTENANCE

JAN 1 - AUG 15: REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, REFERTILIZE, AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE.

AUG 15 - DEC 30: REPAIR AND REFERTILIZE DAMAGED AREAS IMMEDIATELY. TOP DRESS WITH 50 LB/AC OF NITROGEN IN MARCH. IF IT IS NECESSARY TO EXTEND TEMPORARY COVER BEYOND JUNE 15, OVERSEED WITH 50 LB/AC KOBE LESPEDEZA IN LATE FEBRUARY OR EARLY MARCH.

NOTE: USE THE TEMPORARY SEEDING SCHEDULE ONLY WHEN DATE IS NOT CORRECT TO USE THE PERMANENT SEEDING SCHEDULE.

## PERMANENT SEEDING SCHEDULE (DAM EMBANKMENTS)

SEEDING DATE	SEEDING MIXTURE OPTIONS (CHOOSE ONE)	APPLICATION RATE
TBD	TBD	TBD

### SOIL AMENDMENTS

FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 4,000 LB/AC GROUND AGRICULTURE LIMESTONE AND 1000 LB/AC 10-10-10 FERTILIZER.

### MULCH

APPLY 4000 LB/AC STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL.

### MAINTENANCE

INSPECT AND REPAIR MULCH FREQUENTLY. REFERTILIZE IN LATE WINTER OF THE FOLLOWING YEAR; USE SOIL TESTS OR APPLY 150 LB/AC 10-10-10 FERTILIZER. MOW REGULARLY TO A HEIGHT OF 2-4 INCHES.

NOTE: PERMANENT SEEDING SCHEDULE IS FOR SLOPES OF THE BASIN AND TOP OF BERM.

## PLANTING INSTRUCTIONS

### PLANTING TECHNIQUES

- INSURE THAT ROOTS, ONCE REMOVED FROM POT, ARE STRAIGHTENED AND FACE DOWNWARD.
- CREATE PLANTING AREA FOR EACH PLANT AND EXCAVATE PIT.
- PLACE PLANTS IN PIT INSURING ROOTS ARE FACING COMPLETELY DOWNWARD.
- HEEL IN SOIL AROUND PLANT AND PROCEED TO NEXT PLANTING LOCATION.
- NEWLY PLANTED PLANTS NEED TO BE FASTENED TO THE SUBSTRATE FOR THE ESTABLISHMENT OF NEW ROOTS.
- ROOTS SHALL BE SPREAD IN THEIR NORMAL POSITION. ALL BROKEN OR FRAYED ROOTS SHALL BE CUT OFF CLEANLY.
- THE DIAMETER OF THE PITS FOR ALL VEGETATIVE STOCK SHALL BE AT LEAST THREE TIMES THE DIAMETER OF THE ROOT MASS. PLANT PIT WALL SHALL BE SCARIFIED PRIOR TO PLANT INSTALLATION.
- SET THE PLANTS UPRIGHT, IN THE CENTER OF THE PIT. THE BOTTOM OF THE ROOT MASS SHOULD BE RESTING ON UNDISTURBED SOIL.
- PLACE THE BACKFILL AROUND THE BASE AND SIDES OF THE ROOT MASS, AND WORK EACH LAYER TO SETTLE BACKFILL AND TO ELIMINATE VOIDS AND AIR POCKETS. WHEN PIT IS APPROXIMATELY 2/3 FULL, WATER THOROUGHLY BEFORE PLACING REMAINDER OF THE BACKFILL. WATER AGAIN AFTER PLACING FINAL LAYER OF BACKFILL.
- BROKEN OR DAMAGED PARTS WILL BE CUT BACK TO UNDAUNAGED TISSUE, LEAVING AS MUCH GREEN BASAL TISSUE AS POSSIBLE ABOVE THE ROOTS. IF MORE THAN FIFTY PERCENT (50%) OF THE PLANT IS DAMAGED THEN CONTRACTOR SHALL REPLACE THE PLANT.

### CONTAINER STOCK / BARE ROOT

- STOCK SHALL HAVE BEEN GROWN IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL TOGETHER ONCE REMOVED FROM THE CONTAINER.
- CONTAINER PLANTS WILL NEED TO BE WATERED REGULARLY AND PLACED IN SHADY CONDITIONS UNTIL PLANTING OCCURS.
- BARE ROOT PLANTS ARE FOR IMMEDIATE PLANTING, OTHERWISE SEE D) BELOW.
- IF BARE ROOTS SPECIMENS ARE NOT TO BE PLANTED WITHIN FOUR (4) DAYS, TEMPORARY HOLDING OF BARE ROOT SPECIMENS ARE TO BE COVERED ENTIRELY BY A SUITABLE MEDIUM (ETC. SOIL, SAWDUST, MULCH OR THE LIKE) AND WATERED REGULARLY SO AS TO NOT DRY OUT.

### PLANT LOCATIONS

- NEW PLANTINGS SHALL BE LOCATED WHERE SHOWN ON PLAN EXCEPT WHERE CHANGES HAVE BEEN MADE IN PROPOSED CONSTRUCTION.
- NECESSARY ADJUSTMENTS SHALL BE MADE ONLY AFTER APPROVAL BY THE OWNER OR THE OWNER'S REPRESENTATIVE.

### WATER

WATER SHALL BE POTABLE AND SHALL NOT CONTAIN ELEMENTS TOXIC TO PLANT LIFE.

## PLANTING SCHEDULE

- ONCE THE GRADING IS COMPLETE, THE CONTRACTOR SHALL REQUEST AN ON-SITE INSPECTION AND AN AS-BUILT SURVEY PRIOR TO INSTALLATION OF THE STORMWATER MANAGEMENT FACILITY PLANTS. IF THE CONTRACTOR PLANTS THE PROPOSED VEGETATION PRIOR TO AN AS-BUILT SURVEY (AND SUBSEQUENT APPROVAL), ANY CHANGES TO THE GRADING / RE-PLANTING OF PLANTS WILL BE AT THE CONTRACTOR'S EXPENSE.
- ONCE THE ENGINEER HAS APPROVED THE AS-BUILT GRADING, THE CONTRACTOR SHALL PLANT THE PROPOSED STORMWATER MANAGEMENT FACILITY PLANTS SHOWN ON THE LANDSCAPE PLAN FOR THE FACILITY. AFTER COMPLETION OF THE PLANTING, THE LANDSCAPE CONTRACTOR SHALL PROVIDE A LETTER TO THE ENGINEER CERTIFYING THAT THE PLANTS HAVE BEEN INSTALLED PER THE APPROVED STORMWATER MANAGEMENT FACILITY PLANTING PLAN.
- OPTIMAL PLANTING PERIODS RANGE APPROXIMATELY FROM APRIL 15TH THRU JUNE 30TH AND SEPTEMBER 1ST THRU OCTOBER 31ST. FOR FINAL DETERMINATION OF THE SITE'S PLANTING PERIOD, THE CONTRACTOR SHALL COORDINATE WITH A LANDSCAPE PROFESSIONAL REGARDING SCHEDULING FOR PLANT INSTALLATION.
- IT IS RECOMMENDED THAT THE CONTRACTOR TAKE MEASURES TO PREVENT WILDLIFE FROM DAMAGING OR CONSUMING WETLAND PLANTINGS.

SEAL

NOTARY PUBLIC

STATE OF NORTH CAROLINA

PROFESSIONAL SEAL

3935

ENGINEER

OPHER M. STANLEY

BY

APVD

DATE

DR: ###

CHK: DCW

APVD: ###

DATE: 08-28-2020

DESCRIPTION

NOT FOR CONSTRUCTION

DATE

DR: ###

CHK: DCW

APVD: ###

DATE: 08-28-2020

BOILING SPRING LAKES - SHORE STABILIZATION

194 N. SHORE DRIVE, SOUTHPORT, NC 28461

CHARLOTTE OFFICE: 301 W 26TH STREET, CHARLOTTE NC 28208

KINSTON OFFICE: 143 N KINSTON NC 28644

PHONE: 704.337.8529 FAX: 704.308.9153

WEBSITE: WWW.LDSINC.COM INC FRM # C-1025

SCALE AS SHOWN

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1"

DATE: 10-22-2020

PROJ: SPEC-19260

DWG: SHORE STABILIZATION

SHEET: 2 of 2