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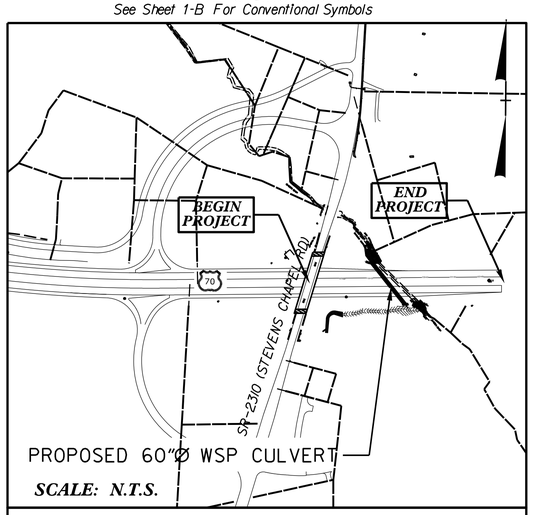
09/08/99

**TIP PROJECT: W5107A**

**CONTRACT: DD00294**



See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols




*VICINITY MAP*

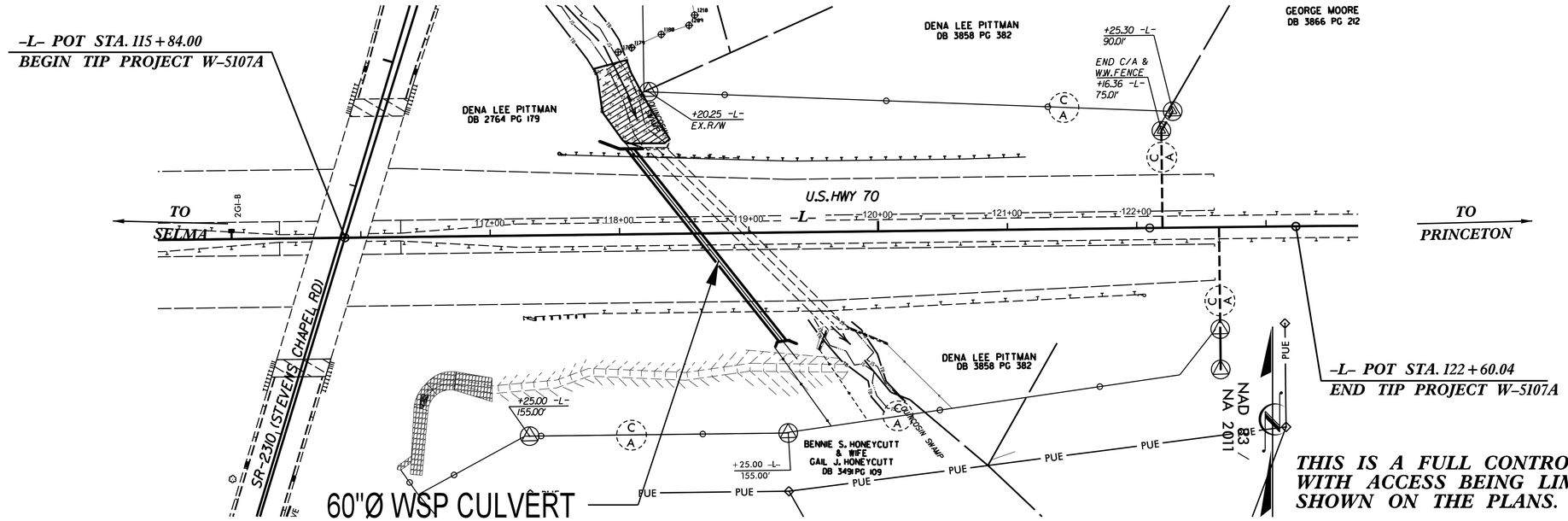
# STATE OF NORTH CAROLINA
# DIVISION OF HIGHWAYS

# JOHNSTON COUNTY

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | W-5107A | 1 | |
| STATE PROJ. NO. | F. A. PROJ. NO. | DESCRIPTION | |
| 41871.3.2 | HSIP-0070(232) | | |

***LOCATION: ALONG US HWY 70 0.06 MILES EAST OF INTERSECTION WITH SR 2310 (DAVIS MILL RD. – STEVENS CHAPEL RD.)***

***TYPE OF WORK: TRENCHLESS PIPE INSTALLATION, GRADING, & EROSION CONTROL***




***THIS IS A FULL CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS SHOWN ON THE PLANS.***

## *GRAPHIC SCALES*

PLANS
PROFILE (HORIZONTAL)
PROFILE (VERTICAL)

## *DESIGN DATA*

ADT 2015 = 29,538
ADT 2035 = 45,000
DHV = 9 %
D = 60 %
T = 10 % *
V = 60 MPH
FUNCTIONAL CLASS = RURAL PRINCIPAL ARTERIAL
STATEWIDE TIER DESIGN
*TTST = 6% DUALS = 4%

## *PROJECT LENGTH*

LENGTH ROADWAY PROJECT = 0.128 MILES
TOTAL LENGTH STATE PROJECT = 0.128 MILES

*Prepared In the Office of:*
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
Founded 1998
*for the North Carolina Department of Transportation*

| *2018 STANDARD SPECIFICATIONS* | *ALPHA & OMEGA GROUP CONTACT* |
|---|---|
| *RIGHT OF WAY DATE:* N/A | TED L. BARTELT, P.E. *PROJECT ENGINEER* |
| | *NCDOT CONTACT* |
| *LETTING DATE:* JULY 23, 2019 | MATTHEW CLARKE, P.E. *PROJECT ENGINEER* |

*HYDRAULICS ENGINEER*
DocuSigned by:
D794597C456A4F7...
TED L. BARTELT, P.E. *P.E.* 5/30/2019
*SIGNATURE:*

*ROADWAY DESIGN ENGINEER*
DocuSigned by:
D794597C456A4F7...
TED L. BARTELT, P.E. *P.E.* 5/30/2019
*SIGNATURE:*

*DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA*

8/17/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A | 1A |

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTELT

Docusigned by: Ted L. Bartelt 7/15/2019

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

# INDEX OF SHEETS



# GENERAL NOTES:

2018 SPECIFICATIONS
EFFECTIVE: 01–16–2018
REVISED:

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104–7.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE AT&T

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

# 2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch – N. C. Department of Transportation – Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

| STD.NO. | TITLE |
|---|---|
| DIVISION 8 – INCIDENTALS | |
| 862.01 | Guardrail Placement |
| 862.02 | Guardrail Installation |
| 866.02 | Woven Wire Fence – with Wood Post |
| 876.02 | Guide for Rip Rap at Pipe Outlets |

# PROJECT NOTES:

GRADING:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL GRADING ON THIS PROJECT INCLUDING BUT NOT LIMITIED TO BORE PITS, ENDWALLS AND WING WALLS, TEMPORARY DITCHES, STREAM CHANNELS AND FINAL RESTORATION. GRADING WILL BE PAID AS A LUMP SUM UNDER THE LINE ITEM GRADING.

$$$$SYSTIME$$$$ $$$$ $$$$ $$$$ $$$$ $$$$ $$$$ $$$$ $$$$ $$$$
$$$$SYSTIME$$$$ $$$$ $$$$ $$$$ $$$$ $$$$ $$$$ $$$$ $$$$ $$$$
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12/2/2016

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A___ | 1-B |

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

*Note: Not to Scale* **S.U.E. = Subsurface Utility Engineering*

## BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Computed Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- Contaminated Site: Known or Potential

## BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

## HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

## RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

## RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easement Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — RW
- New Right of Way Line with Pin and Cap — RW
- New Right of Way Line with Concrete or Granite R/W Marker — RW
- New Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- New Control of Access — CA
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New Aerial Utility Easement — AUE

## ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

## VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

## EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

## UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

6/2/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A | 1C |
| Location and Surveys | |

# SURVEY CONTROL SHEET W5107A

L

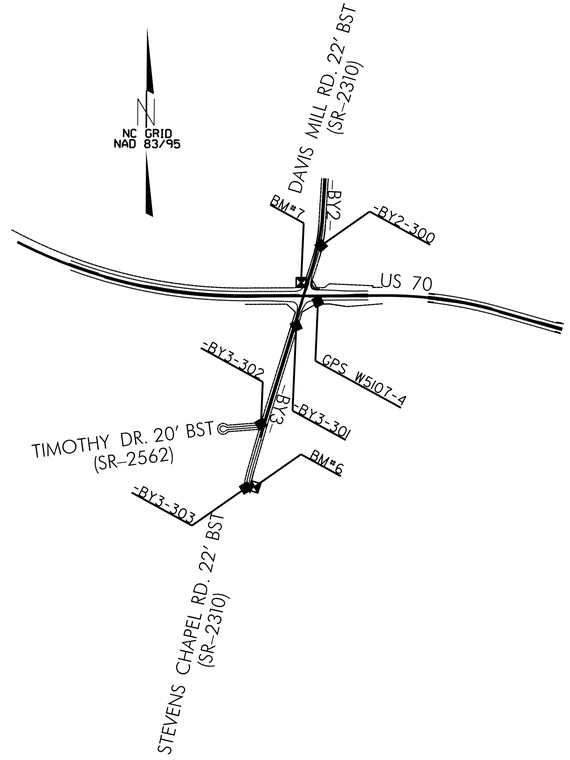
| TYPE | STATION | NORTH | EAST |
|---|---|---|---|
| PC | 10+00.00 | 636030.1801 | 2215342.8834 |
| CS | 30+18.76 | 634754.6878 | 2216894.1804 |
| ST | 32+18.76 | 634658.7457 | 2217069.6627 |
| POT | 64+63.00 | 633119.0126 | 2219925.2448 |
| TS | 86+82.33 | 632080.5537 | 2221886.6226 |
| SC | 88+82.33 | 631988.2722 | 2222064.0554 |
| CS | 109+48.88 | 631506.4690 | 2224055.3675 |
| ST | 111+48.88 | 631507.4313 | 2224255.3608 |
| PC | 123+26.12 | 631521.7357 | 2225432.5124 |
| PT | 133+78.43 | 631387.2187 | 2226472.6903 |
| POT | 139+93.20 | 631223.6176 | 2227065.2852 |

Y6

| TYPE | STATION | NORTH | EAST |
|---|---|---|---|
| POT | 10+00.00 | 630210.6598 | 2224303.1778 |
| PC | 11+10.63 | 630317.2047 | 2224332.9732 |
| PT | 12+03.35 | 630406.2617 | 2224358.7706 |
| PC | 26+33.74 | 631776.4155 | 2224769.4757 |
| PT | 31+90.11 | 632323.2221 | 2224864.9441 |
| POT | 34+59.28 | 632591.9852 | 2224879.5988 |

```
*****************************************
BM #6       ELEVATION = 160.45
N 629759        E 2224255
Y6 STATION 10+00.00
 S 06°06'16.09" W  DIST     454.04
RR SPIKE IN BASE OF 18" PINE
*****************************************

*****************************************
BM #7       ELEVATION = 148.87
N 631636        E 2224668
L STATION 115+63.00 124 LEFT
RR SPIKE IN BASE OF 14" SWEET GUM
*****************************************
```




BY2

| POINT | DESC. | NORTH | EAST | ELEVATION | Y6 STATION | OFFSET |
|---|---|---|---|---|---|---|
| 300 | BY2-300 | 631974.8660 | 2224848.4900 | 148.51 | 28+44.27 | 28.24 RT |
| A4 | GPS W5107-4 | 631462.4040 | 2224823.9410 | 149.45 | 23+48.59 | 142.33 RT |

BY3

| POINT | DESC. | NORTH | EAST | ELEVATION | Y6 STATION | OFFSET |
|---|---|---|---|---|---|---|
| B4 | GPS W5107-4 | 631462.4040 | 2224823.9410 | 149.45 | 23+48.59 | 142.33 RT |
| 301 | BY3-301 | 631236.6000 | 2224625.9240 | 152.85 | 20+75.43 | 17.49 RT |
| 302 | BY3-303 | 630335.8660 | 2224308.9700 | 162.71 | 11+22.08 | 28.16 LT |
| 303 | BY3-303 | 629747.1830 | 2224172.4310 | 160.88 | OUTSIDE PROJECT LIMITS | |

## DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "GPS W5107" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 635986.295(ft) EASTING: 2215284.671(ft) ELEVATION: 165.68(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987889
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS W5107-1" TO -L- STATION 10+00.00 IS N52°59'17"E 72.90
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

*NOTES:*

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/*

   *THE FILES TO BE FOUND ARE AS FOLLOWS: W5107_LS_CONTROL.TXT*

   *SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.*

◆ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
*PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.*

*NOTE: DRAWING NOT TO SCALE*

CONTROL ACCESS MARKER CONCRETE-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|---|---|---|---|---|
| L | 14+00.00 | 125.00 | 635647.6484 | 2215523.7669 |
| L | 14+00.00 | 140.00 | 635637.1387 | 2215513.0642 |
| L | 32+75.00 | -125.00 | 634742.0784 | 2217178.4910 |
| L | 43+00.00 | 100.00 | 634057.5608 | 2217973.9070 |
| L | 45+90.25 | 100.00 | 633919.8066 | 2218229.3839 |
| L | 46+90.25 | 85.00 | 633885.5491 | 2218324.5229 |
| L | 49+67.25 | -85.00 | 633903.7171 | 2218649.0217 |
| L | 49+67.25 | -110.00 | 633925.7263 | 2218660.8891 |
| L | 49+67.25 | 85.00 | 633754.0832 | 2218568.3390 |
| L | 94+00.00 | -74.62 | 631853.0967 | 2222564.6457 |
| L | 98+00.00 | -74.62 | 631734.2818 | 2222939.5701 |
| L | 98+00.00 | -120.00 | 631778.1049 | 2222951.3617 |
| L | 101+50.00 | 105.00 | 631481.1998 | 2223241.9345 |
| L | 101+50.00 | 75.38 | 631510.3088 | 2223247.4054 |
| L | 102+52.73 | -86.01 | 631651.4277 | 2223376.4719 |
| L | 102+52.73 | -120.00 | 631684.9670 | 2223381.9930 |
| L | 118+20.25 | -110.00 | 631625.5795 | 2224925.3415 |
| L | 119+25.00 | 155.00 | 631361.8732 | 2225033.3046 |
| L | 122+60.00 | -75.01 | 631595.9324 | 2225365.4851 |
| L | 122+60.00 | 110.00 | 631410.9404 | 2225367.7331 |
| L | 122+60.00 | 78.80 | 631442.1390 | 2225367.3540 |

ROW MARKER PERMANENT EASEMENT-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|---|---|---|---|---|
| L | 41+00.00 | 150.00 | 634108.4752 | 2217774.1392 |
| L | 43+50.00 | 130.00 | 634007.4280 | 2218003.6811 |
| L | 45+90.25 | 130.00 | 633893.4048 | 2218215.1480 |
| L | 46+90.25 | 115.00 | 633859.1474 | 2218310.2870 |
| L | 49+95.00 | -120.00 | 633921.3580 | 2218690.0607 |
| L | 49+95.00 | -85.00 | 633890.5510 | 2218673.4496 |
| L | 50+20.00 | 115.00 | 633702.6461 | 2218600.5337 |
| L | 50+20.00 | 85.00 | 633729.0478 | 2218614.7695 |
| L | 98+00.00 | -165.00 | 631821.5593 | 2222963.0540 |
| L | 101+00.00 | 145.00 | 631451.6975 | 2223183.8910 |
| L | 101+00.00 | 75.38 | 631519.9723 | 2223197.5028 |
| L | 108+50.00 | 145.00 | 631363.5937 | 2223951.9211 |
| L | 119+25.00 | 185.00 | 631331.8754 | 2225033.6691 |
| L | 123+10.00 | 145.00 | 631376.5505 | 2225418.1547 |
| L | 123+10.08 | 75.00 | 631446.5431 | 2225417.3876 |

ROW MARKER IRON PIN AND CAP-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|---|---|---|---|---|
| Y6 | 12+69.00 | -50.00 | 630483.5017 | 2224329.7254 |
| Y6 | 12+69.00 | -30.00 | 630477.7591 | 2224348.8833 |
| Y6 | 12+75.00 | 30.00 | 630466.2787 | 2224408.0796 |
| Y6 | 12+75.00 | 45.00 | 630461.9718 | 2224422.4479 |
| Y6 | 19+75.15 | 185.50 | 631092.2970 | 2224758.0600 |
| Y6 | 30+75.00 | 105.00 | 632197.6353 | 2224960.3032 |
| Y6 | 31+90.11 | 55.00 | 632320.2276 | 2224919.8626 |
| Y6 | 32+15.00 | -50.00 | 632350.7941 | 2224816.3733 |
| Y6 | 34+25.00 | -50.00 | 632560.4826 | 2224827.8068 |
| Y6 | 34+25.00 | -30.00 | 632559.3937 | 2224847.7771 |
| Y6 | 34+50.00 | 50.00 | 632580.0010 | 2224929.0196 |
| Y6 | 34+50.00 | 30.00 | 632581.0899 | 2224909.0493 |

CONTROL ACCESS MARKER CONCRETE-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|---|---|---|---|---|
| Y6 | 14+00.00 | -50.00 | 630608.9855 | 2224367.3394 |
| Y6 | 14+00.00 | 45.00 | 630581.7083 | 2224458.3391 |
| Y6 | 15+60.00 | -70.00 | 630767.9908 | 2224394.1222 |
| Y6 | 15+87.01 | 45.00 | 630760.8461 | 2224512.0358 |
| Y6 | 17+75.00 | 65.00 | 630935.1751 | 2224585.1704 |
| Y6 | 19+72.16 | 90.00 | 631116.8574 | 2224665.7288 |
| Y6 | 22+39.21 | 137.94 | 631358.8962 | 2224788.3227 |
| Y6 | 27+00.00 | 140.00 | 631803.7471 | 2224922.7894 |
| Y6 | 29+25.00 | 80.00 | 632046.5558 | 2224914.5075 |
| Y6 | 30+45.00 | -70.00 | 632186.7772 | 2224783.0483 |

ROW MARKER PERMANENT EASEMENT-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|---|---|---|---|---|
| Y6 | 12+75.00 | 65.00 | 630456.2292 | 2224441.6058 |
| Y6 | 13+50.00 | -50.00 | 630561.0909 | 2224352.9829 |
| Y6 | 13+50.00 | -90.00 | 630572.5761 | 2224314.6672 |
| Y6 | 14+00.00 | -90.00 | 630620.4707 | 2224329.0237 |
| Y6 | 15+40.00 | -110.00 | 630760.3181 | 2224350.0639 |
| Y6 | 15+98.10 | 65.00 | 630765.7214 | 2224534.3764 |
| Y6 | 19+72.94 | 115.00 | 631110.4276 | 2224689.9004 |
| Y6 | 22+15.06 | 161.21 | 631329.0807 | 2224803.6861 |

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A | 2 |

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

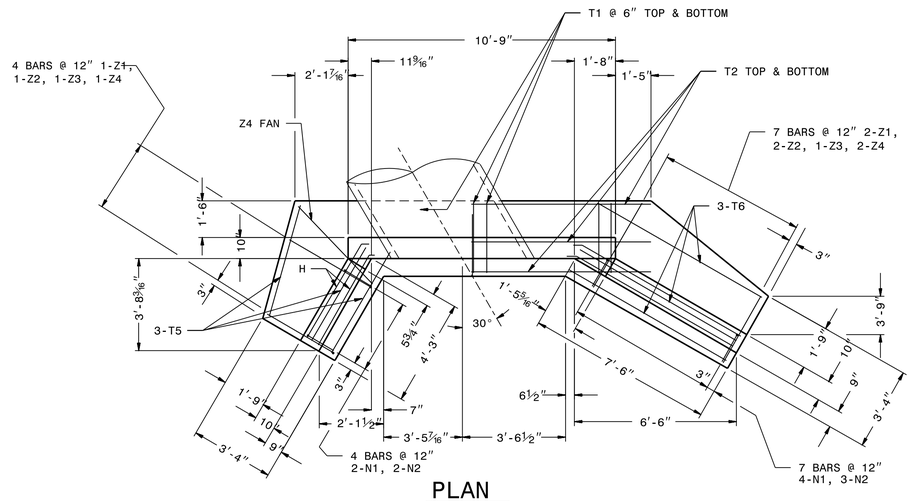
ENGLISH DETAIL DRAWING FOR

# REINFORCED CONCRETE ENDWALL

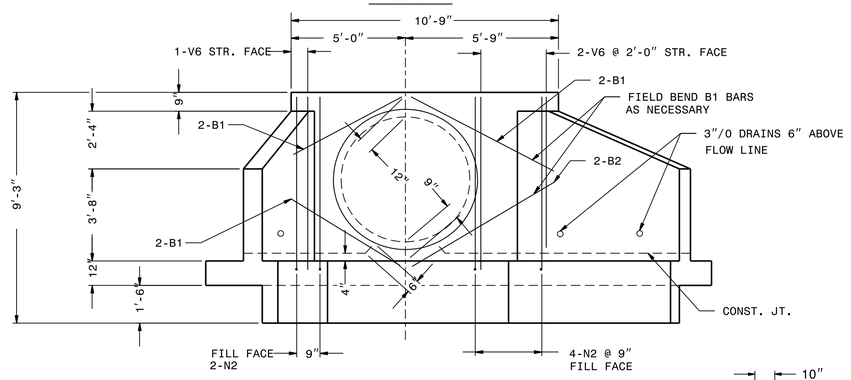
FOR SINGLE 60" PIPE 60° OR 120° SKEW

SHEET OF

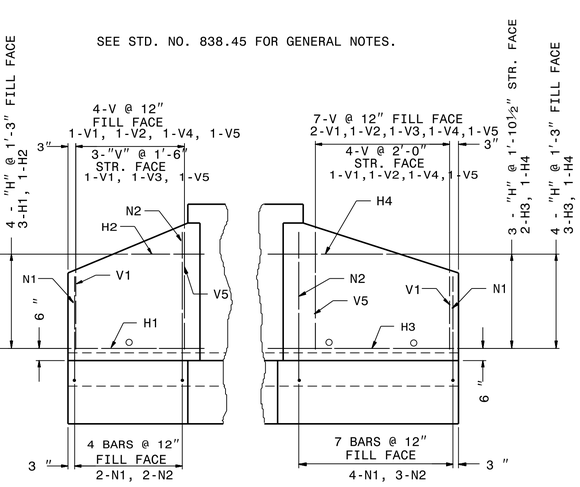
**838d27**




PLAN



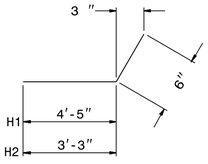

ELEVATION



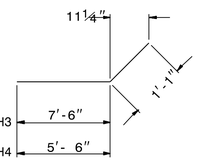

WING ELEVATION

| BILL OF MATERIAL FOR ENDWALLS | | | | |
|---|---|---|---|---|
| REINF. STEEL | | | | 1 - PIPES |
| BAR | SIZE | LENGTH | NO. | WEIGHT |
| Z1 | #4 | 3'-4" | 3 | 7 |
| Z2 | #4 | 3'-7" | 3 | 7 |
| Z3 | #5 | 4'-1" | 2 | 9 |
| Z4 | #5 | 4'-4" | 4 | 18 |
| N1 | #4 | 3'-5" | 6 | 14 |
| N2 | #4 | 3'-11" | 11 | 45 |
| V1 | #4 | 3'-3" | 5 | 11 |
| V2 | #4 | 3'-11" | 3 | 8 |
| V3 | #4 | 4'-3" | 2 | 6 |
| V4 | #4 | 4'-6" | 3 | 9 |
| V5 | #4 | 5'-1" | 5 | 17 |
| V6 | #4 | 6'-3" | 9 | 38 |
| | | | | |
| H1 | #4 | 4'-11" | 5 | 16 |
| H2 | #4 | 3'-9" | 2 | 5 |
| H3 | #4 | 8'-7" | 5 | 29 |
| H4 | #4 | 6'-7" | 2 | 9 |
| G1 | #7 | 10'-5" | 2 | 43 |
| | | | | |
| T1 | #4 | 2'-6" | 42 | 70 |
| T2 | #4 | 13'-11" | 6 | 56 |
| T5 | #4 | 4'-6" | 3 | 9 |
| T6 | #4 | 7'-0" | 3 | 14 |
| | | | | |
| B1 | #4 | 5'-0" | 6 | 20 |
| B2 | #4 | 6'-6" | 2 | 9 |
| | | | | |
| | | | | |
| REINF. STEEL LBS. | | | | 469 |
| CONC/C.M. CU. YDS. | | | | 6.7 |
| CONC/R.C. CU. YDS. | | | | 6.4 |

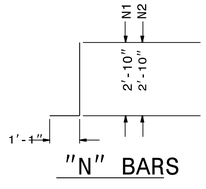
"H", "N", & "Z" BAR DIMENSIONS ARE OUT TO OUT.



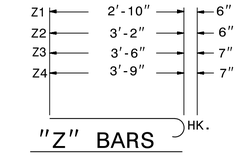

"H" BARS



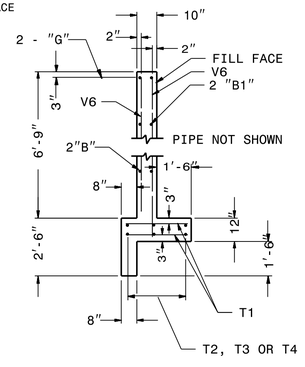

"H" BARS



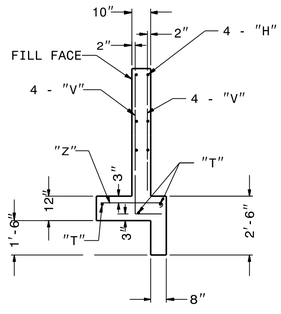

"N" BARS




"Z" BARS




SECTION - BB




SECTION - AA

7/25/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**CONTRACT STANDARDS & DEVELOPMENT UNIT**
**STANDARDS AND SPECIAL DESIGN**
Office 919-707-6950 FAX 919-250-4119

## SEE PLATE FOR TITLE

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: rnbritt DATE: 05-08-06
CHECKED BY: _____ DATE: _____
FILE SPEC.: s:nbritt/english/hydro/838d24_54_endwall_60sk.dgn

02-MAY-2018 08:34
S:\Contracts\Contracts\Special Details\nbritt\english\hydro\endwalls.dgn
jhowerton
AT CSD-292695

COMPUTED BY: TLB DATE: 1/31/19
CHECKED BY: TGZ DATE: 1/31/19

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A____ | 3 |

NOTE: Invert Elevations are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300–5".

# LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 54" & OVER)

| STATION | LOCATION (LT,RT, OR CL) | STRUCTURE NO. | | TOP ELEVATION | INVERT ELEVATION | INVERT ELEVATION | SLOPE CRITICAL (%) | CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) | | | | | | | | C.S. PIPE | | | | | | | | | | | | STRUCTURAL PLATE PIPE | | | | | | | | | | | | REINFORCED ENDWALLS | | MASONARY DRAINAGE STRUCTURES CUBIC YARDS | C.B. STD. 840.01 OR STD. 840.02 | FRAME, GRATES AND HOOD STANDARD 840.03 | | | | CONCRETE TRANSITIONAL SECTION | | | 60" WELDED STEEL TRENCHLESS INSTALLATION | | | | | REINF. CONC. FLARED END SECTIONS NO. & SIZE | CORR. STEEL FLARED END SECTIONS NO. & SIZE | REINF. CONC. ELBOWS NO. & SIZE | CORR. STEEL ELBOWS NO. & SIZE | CONC. COLLARS CL. "B" C.Y. STD 840.72 | PIPE REMOVAL LIN.FT. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | | | | | | | 54" | 60" | 66" | 72" | 78" | 84" | | | 54" | | | | | 60" | | 66" | | 72" | | | 60" | | | 66" | | | 72" | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | SHOP ELON–GATED | | | | | | | | | | | | | | | | | | | | | | | | | TYPE OF GRATE | | | | | | | | | | | | | | | | | | |
| THICKNESS OR GAUGE | | FROM | TO | | | | | | | | | | | | | .109 | .138 | .168 | .138 | .168 | .138 | .168 | .138 | .168 | .138 | .168 | | 12 | 10 | | 12 | 10 | | 12 | 10 | | | | | WITH R.C. – C.Y. | WITH W.S. – C.Y. | | | E | F | G | | CATCH BASIN | DROP INLET | | | | | | | | | | | | | |
| 118+10 -L- | LT | 1 | | 147.80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 16.9 | | | | | | | | | | | | | | | | | | | | | CIP HEADWALL AND WING |
| | | 1 | 2 | | 141.09 | 140.55 | 0.273 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 200′ | | | | | | | | | | | |
| 119+32 -L- | RT | 2 | | 147.30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6.7 | | | | | | | | | | | | | | | | | | | | | STD. ENDWALL 838d27, 60°SKEW |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 23.6 | | | | | | | | | | 200′ | | | | | | | | | | | |

ABBREVIATIONS

| | |
|---|---|
| C.B. | CATCH BASIN |
| N.D.I. | NARROW DROP INLET |
| D.I. | DROP INLET |
| G.D.I. | GRATED DROP INLET |
| G.D.I. (N.S.) | GRATED DROP INLET (NARROW SLOT) |
| J.B. | JUNCTION BOX |
| M.H. | MANHOLE |
| T.B.D.I. | TRAFFIC BEARING DROP INLET |
| T.B.J.B. | TRAFFIC BEARING JUNCTION BOX |

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON–GATING IMPACT ATTENUATOR TYPE 350

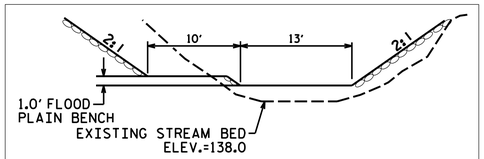
# GUARDRAIL SUMMARY

| SURVEY LINE | BEG. STA. | END STA. | LOCATION | LENGTH | | | WARRANT POINT | | "N" DIST. FROM E.O.L. | TOTAL SHOUL. WIDTH | FLARE LENGTH | | W | | ANCHORS | | | | | | | | | IMPACT ATTENUATOR TYPE 350 | | | SINGLE FACED GUARDRAIL | REMOVE EXISTING GUARDRAIL | REMOVE AND STOCKPILE EXISTING GUARDRAIL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | STRAIGHT | SHOP CURVED | DOUBLE FACED | APPROACH END | TRAILING END | | | APPROACH END | TRAILING END | APPROACH END | TRAILING END | XI MOD | XI | GRAU 350 | GREU TL–3 | XIII | CAT–1 | VI MOD | BIC | AT–1 | EA | G | NG | | | | |
| -L- | 117+85 | 120+60 | LT | 275 | | | 118+35.00 | | 14′ | 15′ | 50′ | | 1′ | | | | | 1 | | 1 | | | | | | | | 100 FT. | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -L- | 117+50 | 119+50 | LT | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | TEMPORARY |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

NOTE:

UNCLASSIFIED EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING WILL BE PAID FOR AT THE LUMP SUM PRICE OF "GRADING."

5/14/99




INLET DETAIL LOOKING UPSTREAM

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A | 4 |
| R/W SHEET NO. | |

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042161 TED L BARTEL

DocuSigned by: D794597C456A4F7

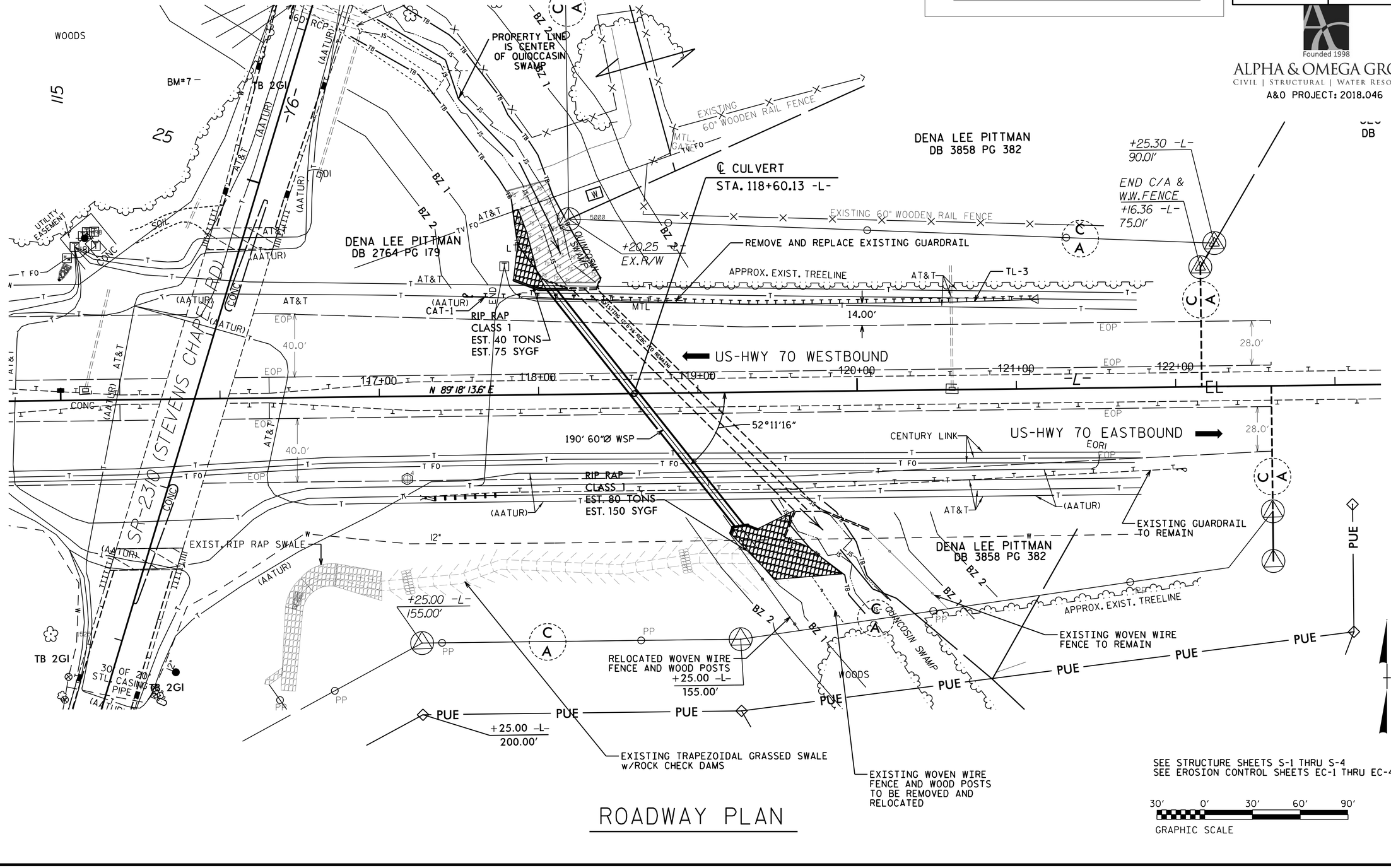
5/30/2019

Founded 1998

ALPHA & OMEGA GROUP

CIVIL | STRUCTURAL | WATER RESOURCES

A&O PROJECT: 2018.046




ROADWAY PLAN

SEE STRUCTURE SHEETS S-1 THRU S-4

SEE EROSION CONTROL SHEETS EC-1 THRU EC-4

30' 0' 30' 60' 90'

GRAPHIC SCALE

DocuSign Envelope ID: 54CFD634-1D8A-4931-9D56-10B7C5423D8C

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A | 4A |

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DocuSigned by:
Ted L. Bartelt
D794597C456A4F7...
SEAL 14455
TED L. BARTELT
5/30/2019

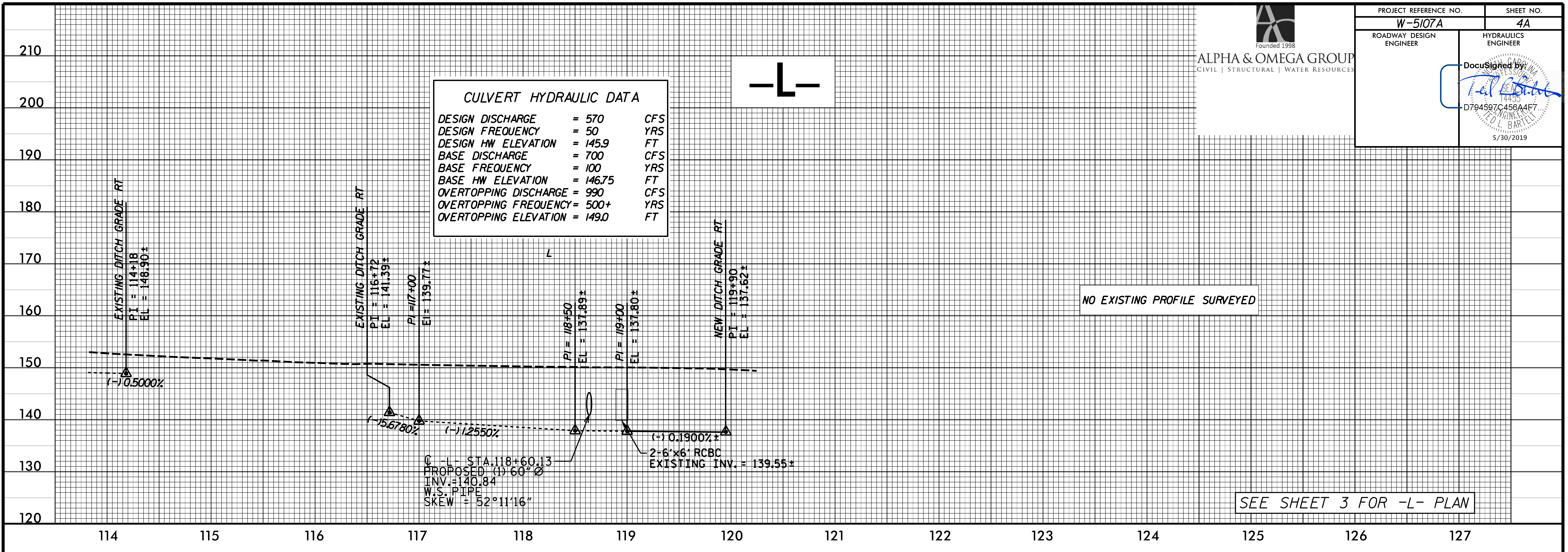
ALPHA & OMEGA GROUP
Founded 1998
CIVIL | STRUCTURAL | WATER RESOURCES

5/28/99

# -L-

## CULVERT HYDRAULIC DATA

| | | | |
|---|---|---|---|
| DESIGN DISCHARGE | = | 570 | CFS |
| DESIGN FREQUENCY | = | 50 | YRS |
| DESIGN HW ELEVATION | = | 145.9 | FT |
| BASE DISCHARGE | = | 700 | CFS |
| BASE FREQUENCY | = | 100 | YRS |
| BASE HW ELEVATION | = | 146.75 | FT |
| OVERTOPPING DISCHARGE | = | 990 | CFS |
| OVERTOPPING FREQUENCY | = | 500+ | YRS |
| OVERTOPPING ELEVATION | = | 149.0 | FT |



$$$$$$$$SYSTIME$$$$$$$$
$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$USERNAME$$$$

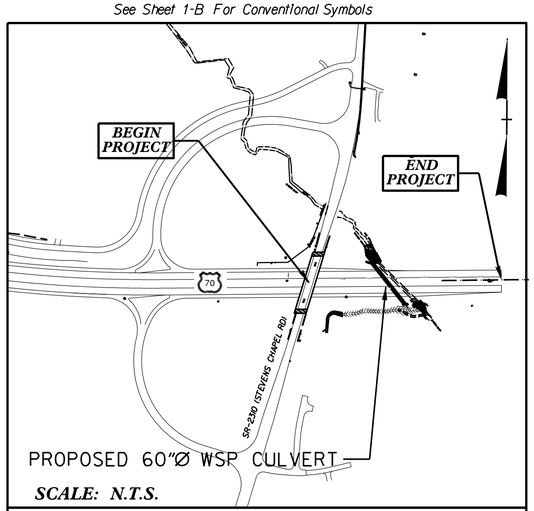
09/08/99

**TIP PROJECT: W5107A**

**CONTRACT: DD00294**

$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$$$

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols




SCALE: N.T.S.

VICINITY MAP

# STATE OF NORTH CAROLINA
# DIVISION OF HIGHWAYS

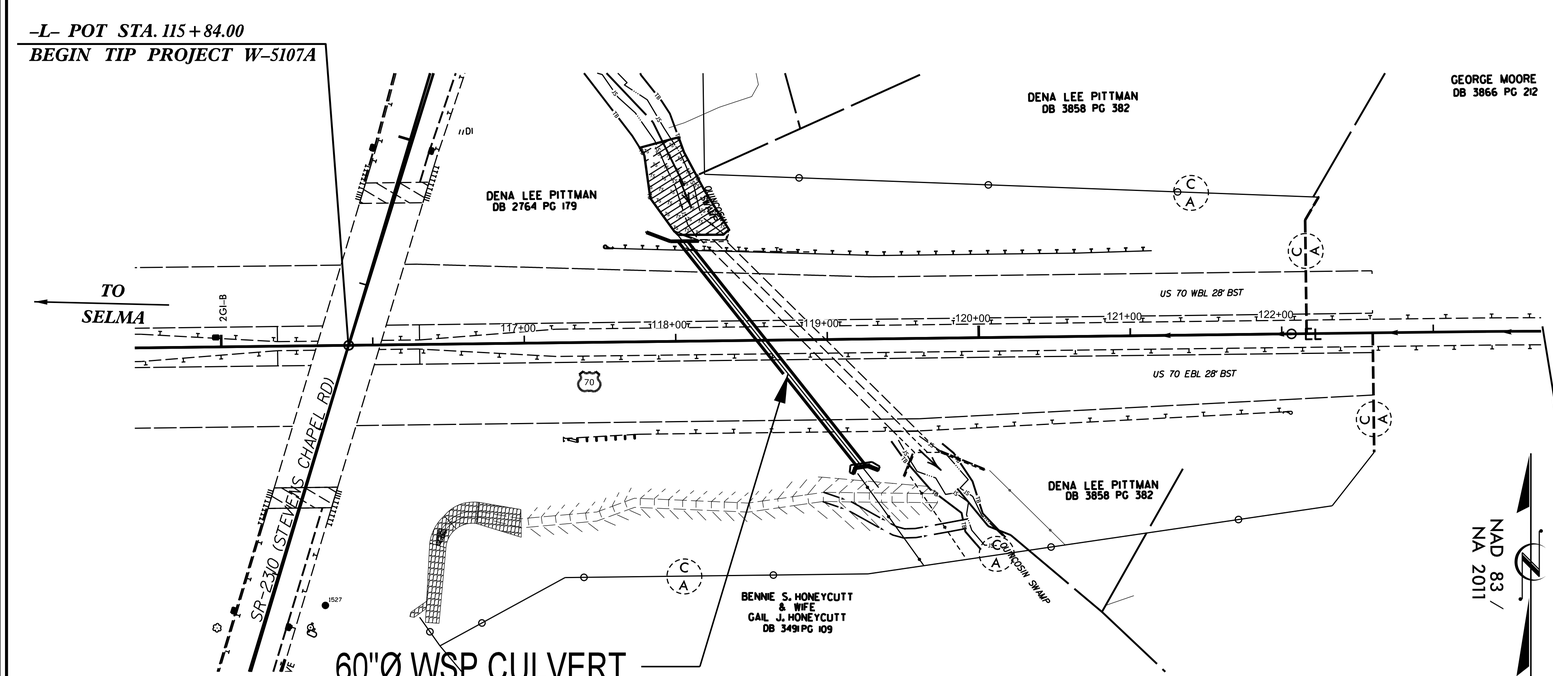
## PLAN FOR PROPOSED
## HIGHWAY EROSION CONTROL

# JOHNSTON COUNTY

**LOCATION: ALONG US HWY 70 0.06 MILES EAST OF INTERSECTION WITH SR 2310 (DAVIS MILL RD. – STEVENS CHAPEL RD.)**

**TYPE OF WORK: TRENCHLESS PIPE INSTALLATION, GRADING, & EROSION CONTROL**

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | W-5107A | EC-1 | |
| STATE PROJ. NO. | F. A. PROJ. NO. | DESCRIPTION | |
| 41871.3.2 | HSIP-0070(232) | | |




## EROSION AND SEDIMENT CONTROL MEASURES

| Std. # | Description | Symbol |
|---|---|---|
| 1630.03 | Temporary Silt Ditch | TSD |
| 1630.05 | Temporary Diversion | TD |
| 1605.01 | Temporary Silt Fence | |
| 1606.01 | Special Sediment Control Fence | |
| 1622.01 | Temporary Berms and Slope Drains | |
| 1630.02 | Silt Basin Type B | |
| 1633.01 | Temporary Rock Silt Check Type-A | |
| | Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM) | |
| 1633.02 | Temporary Rock Silt Check Type-B | |
| | Wattle / Coir Fiber Wattle | |
| | Wattle / Coir Fiber Wattle with Polyacrylamide (PAM) | |
| 1634.01 | Temporary Rock Sediment Dam Type-A | |
| 1634.02 | Temporary Rock Sediment Dam Type-B | |
| 1635.01 | Rock Pipe Inlet Sediment Trap Type-A | |
| 1635.02 | Rock Pipe Inlet Sediment Trap Type-B | |
| 1630.04 | Stilling Basin | |
| 1630.06 | Special Stilling Basin | |
| | Rock Inlet Sediment Trap: | |
| 1632.01 | Type A | A |
| 1632.02 | Type B | B |
| 1632.03 | Type C | C |
| | Skimmer Basin | |
| | Tiered Skimmer Basin | |
| | Infiltration Basin | |

**THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.**

**THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.**

**GRAPHIC SCALES**

50 25 0 50 100
PLANS

**ROADSIDE ENVIRONMENTAL UNIT**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**
RALEIGH, N.C.

*THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.*

*Prepared In the Office of:*

ALPHA & OMEGA GROUP
CIVIL & STRUCTURAL ENGINEERS
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0431
Firm License No. C-1084 www.aogroup.com
A&O PROJECT: 2018046

*Designed by:*

*Jeffrey D. Goodin* 3023
NAME LEVEL III CERTIFICATION NO.

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2018 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

| | | | |
|---|---|---|---|
| 1604.01 | Railroad Erosion Control Detail | 1632.01 | Rock Inlet Sediment Trap Type A |
| 1605.01 | Temporary Silt Fence | 1632.02 | Rock Inlet Sediment Trap Type B |
| 1606.01 | Special Sediment Control Fence | 1632.03 | Rock Inlet Sediment Trap Type C |
| 1607.01 | Gravel Construction Entrance | 1633.01 | Temporary Rock Silt Check Type A |
| 1622.01 | Temporary Berms and Slope Drains | 1633.02 | Temporary Rock Silt Check Type B |
| 1630.01 | Riser Basin | 1634.01 | Temporary Rock Sediment Dam Type A |
| 1630.02 | Silt Basin Type B | 1634.02 | Temporary Rock Sediment Dam Type B |
| 1630.03 | Temporary Silt Ditch | 1635.01 | Rock Pipe Inlet Sediment Trap Type A |
| 1630.04 | Stilling Basin | 1635.02 | Rock Pipe Inlet Sediment Trap Type B |
| 1630.05 | Temporary Diversion | 1640.01 | Coir Fiber Baffle |
| 1630.06 | Special Stilling Basin | 1645.01 | Temporary Stream Crossing |
| 1631.01 | Matting Installation | | |

5/14/99

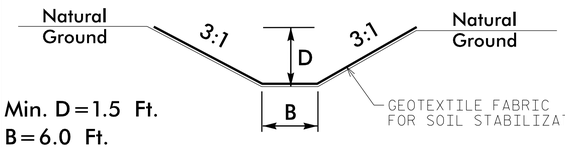
# EROSION CONTROL PLAN

NOTE:
SOIL SPOILS SHALL BE OUTSIDE OF BUFFER ZONE

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A | EC-2 |
| R/W SHEET NO. | 4 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

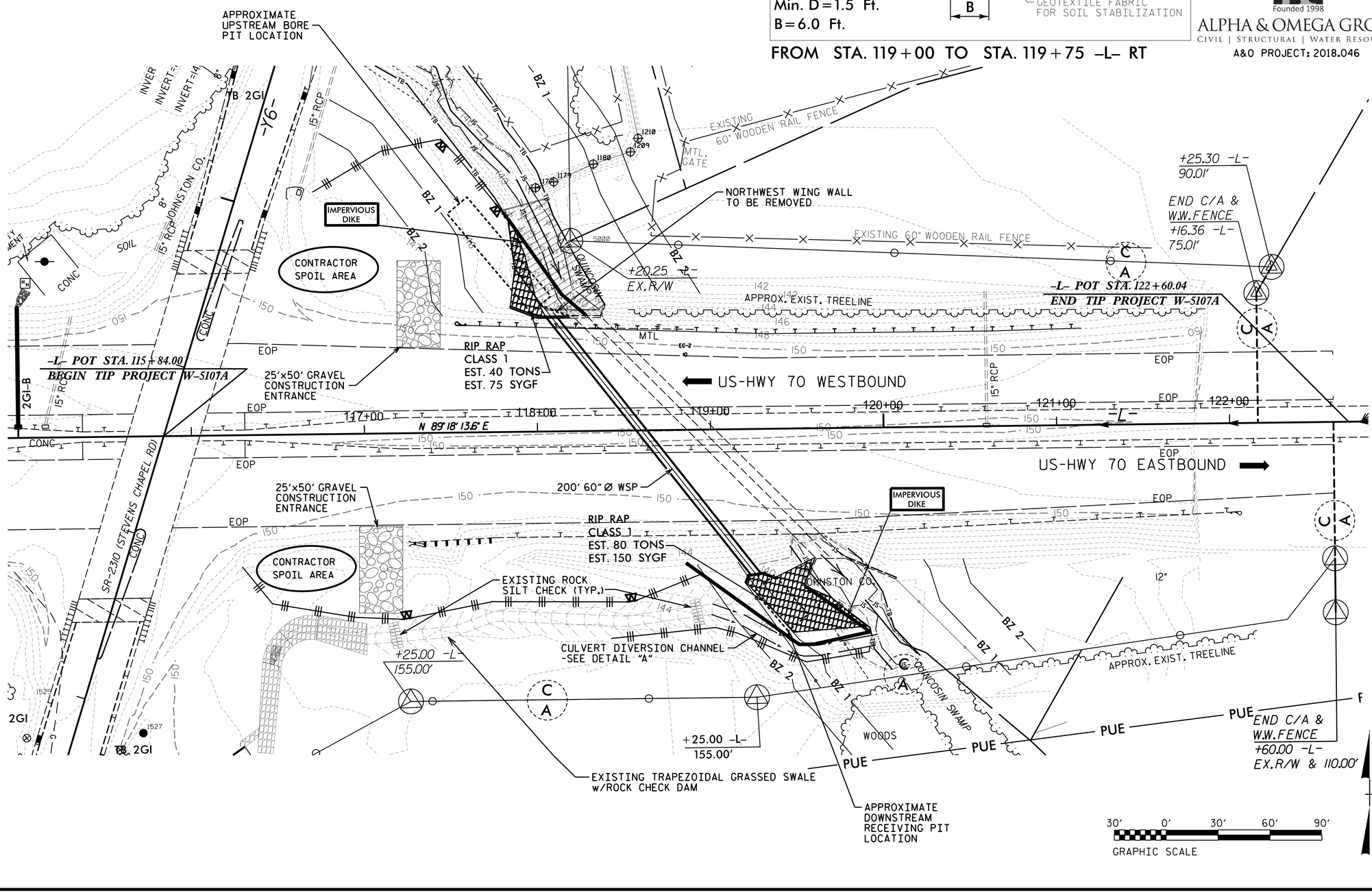
Founded 1998
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
A&O PROJECT: 2018.046

## DETAIL A
### CULVERT DIVERSION CHANNEL
( Not to Scale)




Min. D = 1.5 Ft.
B = 6.0 Ft.

FROM STA. 119+00 TO STA. 119+75 –L– RT

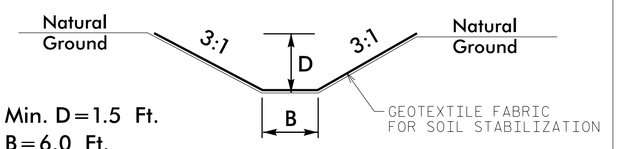


5/14/99

# EROSION CONTROL PLAN

NOTE:
SOIL SPOILS SHALL BE OUTSIDE OF BUFFER ZONE

## DETAIL A
CULVERT DIVERSION CHANNEL
( Not to Scale)




Min. D = 1.5 Ft.
B = 6.0 Ft.

FROM STA. 119+00 TO STA. 119+75 -L- RT

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A | EC-3 |
| R/W SHEET NO. | 4 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

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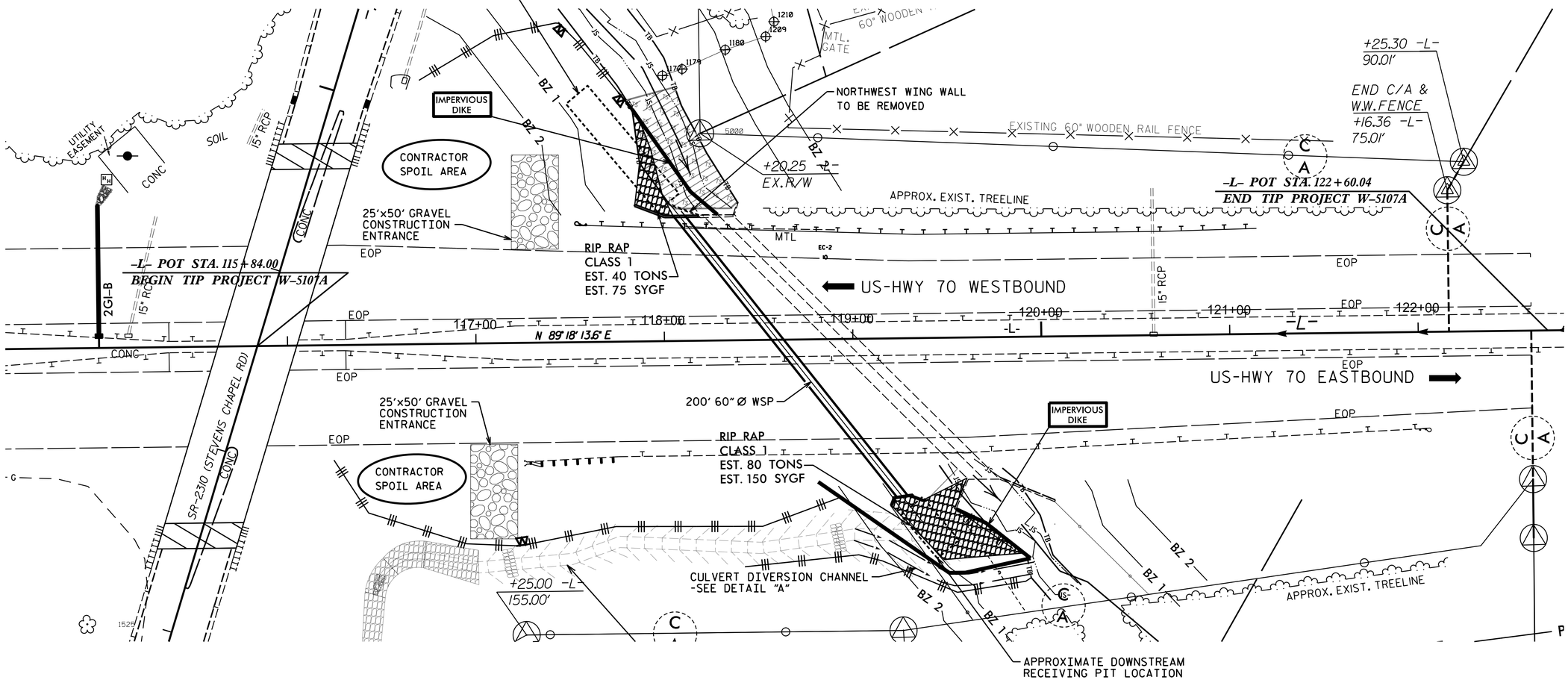
CIVIL | STRUCTURAL | WATER RESOURCES
A&O PROJECT: 2018.046




## STAGE I

### CONSTRUCTION SEQUENCE

60" Ø WSP CULVERT

1. UTILIZE SPECIAL STILLING BASIN(S) AS NECESSARY.
2. CONSTRUCT TEMP. IMPERVIOUS DIKE UPSTREAM.
3. CONSTRUCT TEMP. IMPERVIOUS DIKE DOWNSTREAM.
4. INSTALL CULVERT DIVERSION CHANNEL DOWNSTREAM.
5. INSTALL SILT FENCE AND SPECIAL SILT FENCE OUTLETS AS SHOWN.
6. DEMOLISH AND REMOVE NORTHWEST WING WALL.
7. INSTALL UPSTREAM BORE PIT AND STAGE BORING EQUIPMENT AND PIPE SECIONS.
8. INSTALL DOWNSTREAM RECEIVING PIT.

## CONSTRUCTION SEQUENCE

NOTE: THE CONTRACTOR SHALL FILTER ALL SEDIMENT-LADEN WATER THROUGH SPECIAL STILLING BASIN.

## STAGE II

### CONSTRUCTION SEQUENCE

60" Ø WSP CULVERT

1. BORE AND JACK NEW 60"Ø WELDED STEEL PIPE CULVERT.
2. FORM AND POUR NEW HEADWALL AND WING WALLS PER STRUCTURAL PLANS.
3. REMOVE TEMP. IMPERVIOUS DIKES, CULVERT DIVERSION CHANNEL, AND SPECIAL STILLING BASIN(S).
4. GRADE WORK SITE TO MATCH SURROUNDING EXISTING GROUND, PLATE WITH TOPSOIL AS NEEDED TO ESTABLISH VEGETATION AND STABILIZE AS DIRECTED BY ENGINEER.
5. RETURN EXISTING BASE DITCH TO EXISTING CONDITION AND ARMOR WITH CLASS 1 RIP RAP AS SHOWN.
6. INSTALL REMAINING CLASS I RIP RAP.

30' 0' 30' 60' 90'
GRAPHIC SCALE

SYSTIME 5/7/2019 11:55:46 AM
USER NAME = Unknown

5/14/99

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5107A | EC-4 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

Founded 1998
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

# *SOIL STABILIZATION TIMEFRAMES*

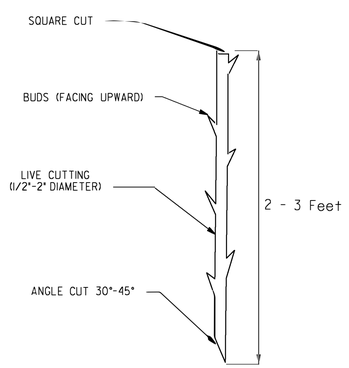
| *SITE DESCRIPTION* | *STABILIZATION TIME* | *TIMEFRAME EXCEPTIONS* |
|---|---|---|
| PERIMETER DIKES, SWALES, DITCHES AND SLOPES | 7 DAYS | NONE |
| HIGH QUALITY WATER (HQW) ZONES | 7 DAYS | NONE |
| SLOPES STEEPER THAN 3:1 | 7 DAYS | IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED. |
| SLOPES 3:1 OR FLATTER | 14 DAYS | 7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH. |
| ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1 | 14 DAYS | NONE, EXCEPT FOR PERIMETERS AND HQW ZONES. |

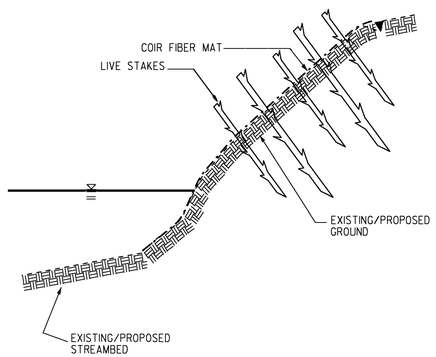
NOTE: ALL EXPOSED AREAS SHALL BE SEEDED AND MULCHED.

# PLANTING DETAILS

## LIVE STAKES PLANTING DETAIL

### LIVE STAKE

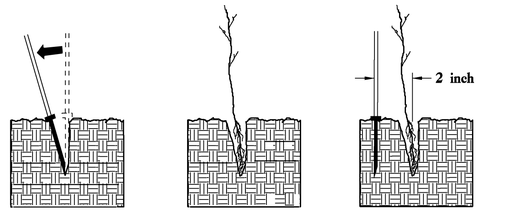


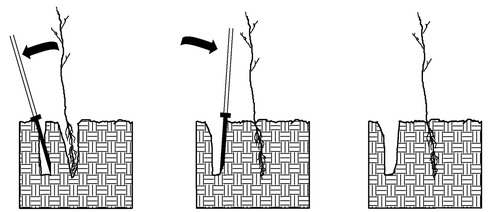

BANK STABILIZATION WITH LIVE STAKES

NOTE:
LIVE STAKES SHALL BE SPACED APPROXIMATELY 4 FEET ON CENTER
LIVE STAKES SHALL BE DRIVEN UNTIL APPROXIMATELY ¾ OF LIVE STAKE IS WITHIN GROUND

## BAREROOT PLANTING DETAIL
## DIBBLE PLANTING METHOD
### USING THE KBC PLANTING BAR




1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

## PLANTING NOTES:

**PLANTING BAG**
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

**KBC PLANTING BAR**
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

**ROOT PRUNING**
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

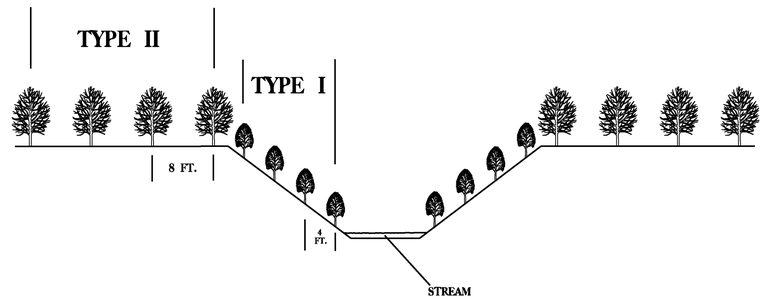
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| | |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

☐ TYPE 1 STREAMBANK REFORESTATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 2724 PLANTS PER ACRE.

☐ TYPE 2 STREAMBANK REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

☐ NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"

## STREAMBANK REFORESTATION TYPICAL




**STREAMBANK REFORESTATION**

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

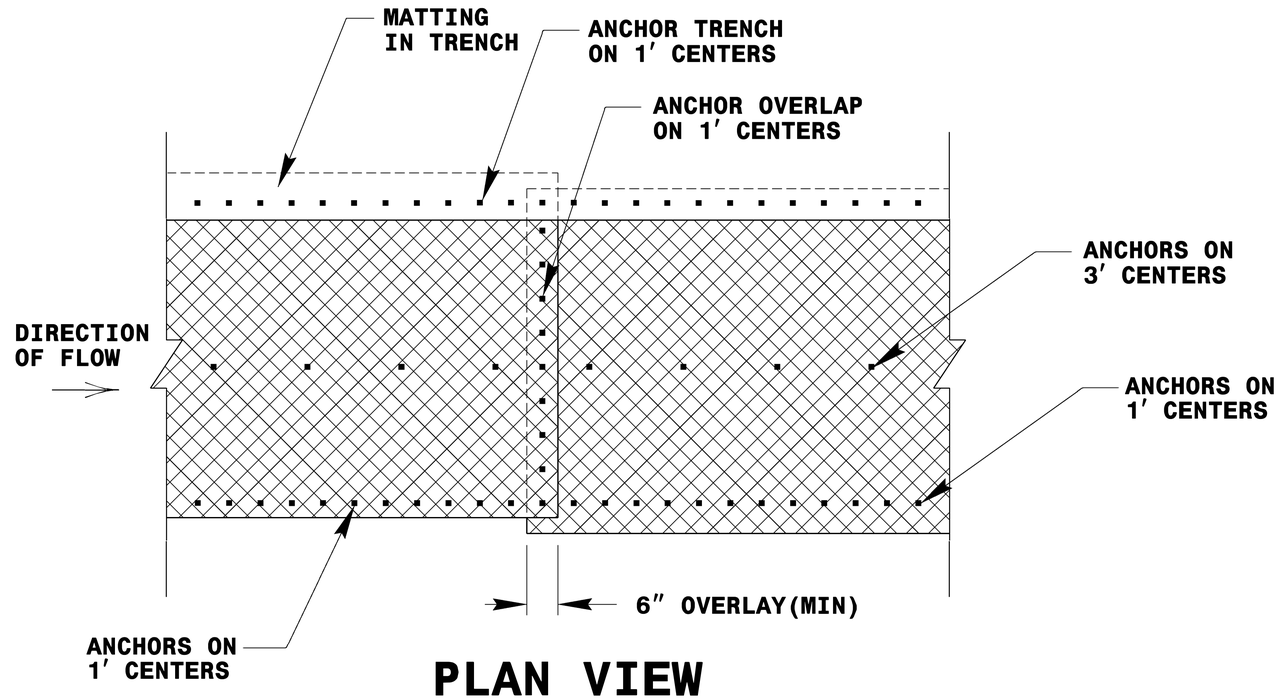
| | | | |
|---|---|---|---|
| **TYPE 1** | | | |
| 50% | SALIX NIGRA | BLACK WILLOW | 2 ft – 3 ft LIVE STAKES |
| 50% | CORNUS AMOMUM | SILKY DOGWOOD | 2 ft – 3 ft LIVE STAKES |
| **TYPE 2** | | | |
| 25% | QUERCUS PHELLOS | WILLOW OAK | 12 in – 18 in BR |
| 25% | PLATANUS OCCIDENTALIS | SYCAMORE | 12 in – 18 in BR |
| 25% | FRAXINUS PENNSYLVANICA | GREEN ASH | 12 in – 18 in BR |
| 25% | BETULA NIGRA | RIVER BIRCH | 12 in – 18 in BR |

☐ SEE PLAN SHEETS FOR AREAS TO BE PLANTED

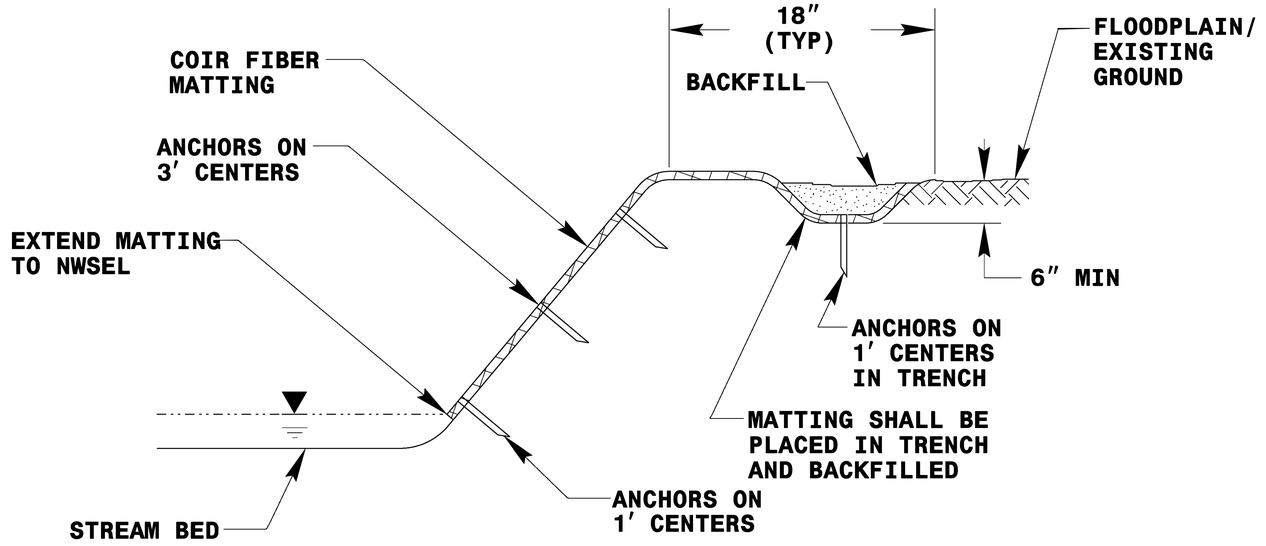
# STREAMBANK REFORESTATION
# DETAIL SHEET 1 OF 2

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

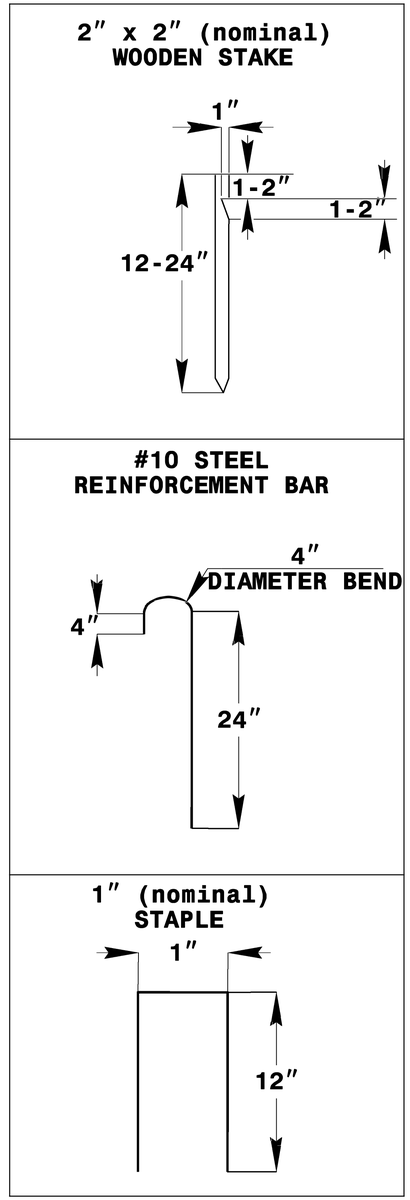
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| | |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |




## PLAN VIEW




## TYPICAL CROSS SECTION



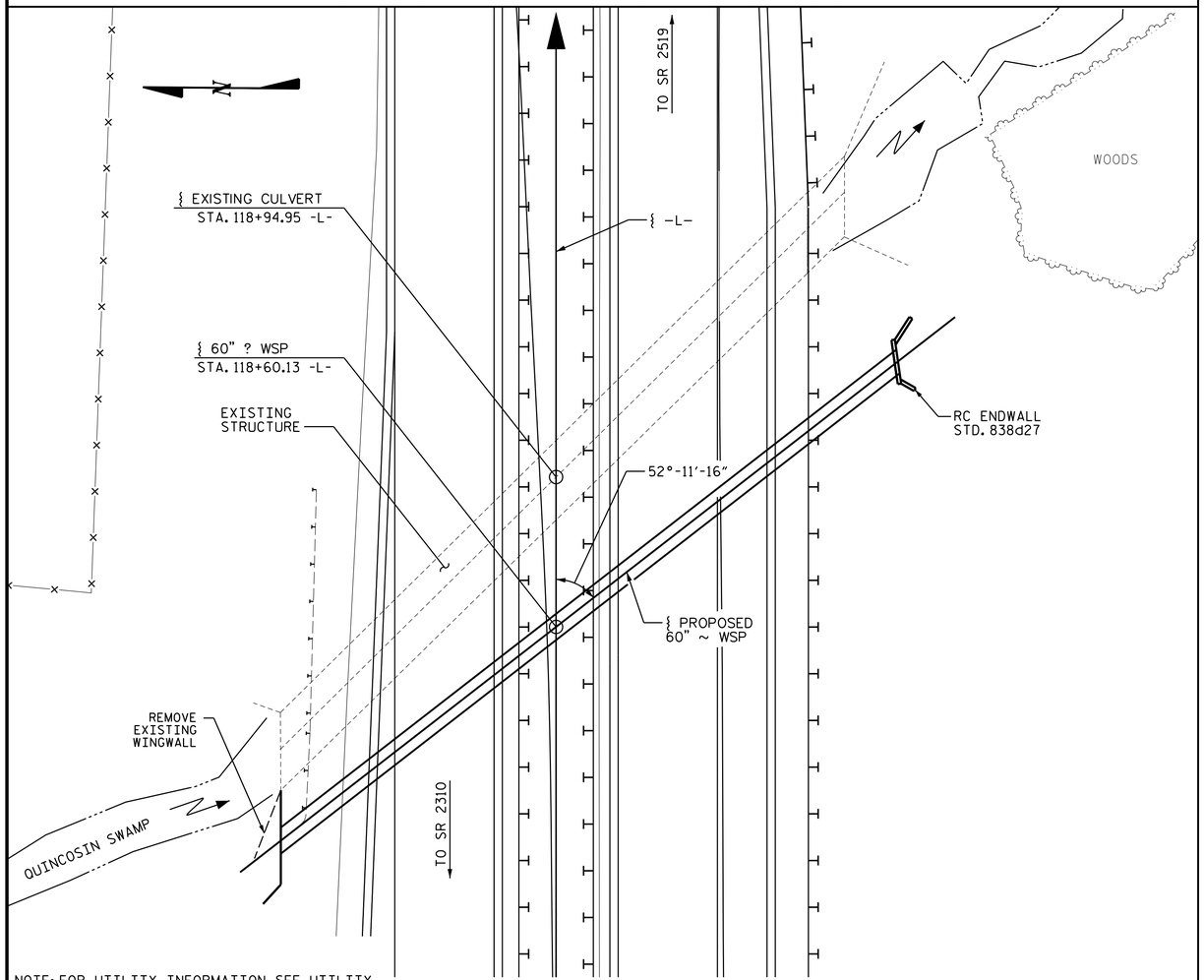

## ANCHOR OPTIONS

# COIR FIBER MATTING DETAIL

NOT TO SCALE

**STREAMBANK REFORESTATION**
**DETAIL SHEET 2 OF 2**
N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

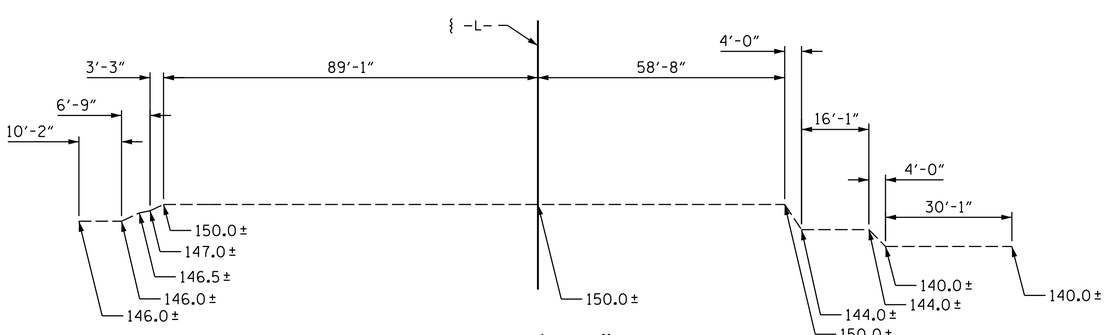
BM #7: 174.88' LT. OF STA. 111+15.12 -BL-, EL. 148.87




NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

## LOCATION SKETCH

GRADE POINT ELEVATION @ 118+94.95 -L- = 150.05
BED ELEVATION @ 118+94.95 -L- = 139.84
ROADWAY SLOPES = 3:1




## PROFILE ALONG ℄ 60" PIPE

## NOTES

ASSUMED LIVE LOAD ----------HL-93 OR ALTERNATE LOADING.

DESIGN FILL----------3.74 FT.

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY HEADWALLS.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

EXCAVATE 1 FT. BELOW CULVERT AND FOOTINGS AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH SECTION 414 OF THE STANDARD SPECIFICATIONS.

SCOUR PROTECTIONS ARE REQUIRED AT THE OUTLET OF THE CULVERT. DO NOT PLACE RIP RAP ABOVE THE STREAM BED.

THE SCOUR CRITICAL ELEVATIONS ARE THE AS-BUILT BOTTOM OF BOX CULVERT ELEVATIONS. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR JACK AND BORE, SEE SPECIAL PROVISIONS.

CONTRACTOR SHALL VERIFY EXISTING ELEVATIONS IN THE FIELD. PRIOR TO STAKING OUT CULVERT FOR CONSTRUCTION, CONTRACTOR SHALL SUBMIT LAYOUT CALCULATIONS FOR PROPOSED LENGTH, ELEVATION, AND ALIGNMENT OF CULVERT TO THE RESIDENT ENGINEER FOR APPROVAL.

## HYDROGRAPHIC DATA FOR STA. 118+94.95 -L-

DESIGN DISCHARGE ..... = 570 CFS
FREQUENCY OF DESIGN FLOOD ..... = 50 YRS.
DESIGN HIGH WATER ELEVATION ..... = 145.9 FT.
DRAINAGE AREA ..... = 2.76 SQ. MI.
BASE DISCHARGE (Q100) ..... = 700 CFS
BASE HIGH WATER ELEVATION ..... = 146.75 FT.

## OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ..... = 990 CFS
FREQUENCY OF OVERTOPPING FLOOD ..... = 500+ YRS.
OVERTOPPING FLOOD ELEVATION ..... = 149.0 FT.

## -L- PROFILE DATA

PVI STA. 119+50.00 -L-
PVI EL. = 150.94
GRADE = 0.4148%
PVI STA. 120+00.00 -L-
PVI EL. = 151.15

| TOTAL STRUCTURE QUANTITIES | |
|---|---|
| CLASS A CONCRETE | |
| WING ETC. | 16.9 C.Y. |
| REINFORCING STEEL | |
| WINGS ETC. | 1005 LBS. |
| FOUNDATION CONDITIONING MATERIAL | |
| TOTAL | 8 TONS |

CONCRETE AND REINFORCING STEEL INCLUDED IN REINFORCED ENDWALL QUANTITIES

PROJECT NO. W-5107A
JOHNSTON COUNTY
STATION: 118+60.13 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# 60"Ø WELDED STEEL PIPE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 ENGINEER TED L BARTLETT
7/15/2019

Founded 1998
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
PROJECT No. 2018.046

DRAWN BY : S.G.S. DATE : 6/15/17
CHECKED BY : S.K.C. DATE : 1/24/19
DESIGN ENGINEER OF RECORD : T.L.B. DATE : 1/28/19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

| REVISIONS | | | | | | SHEET NO. |
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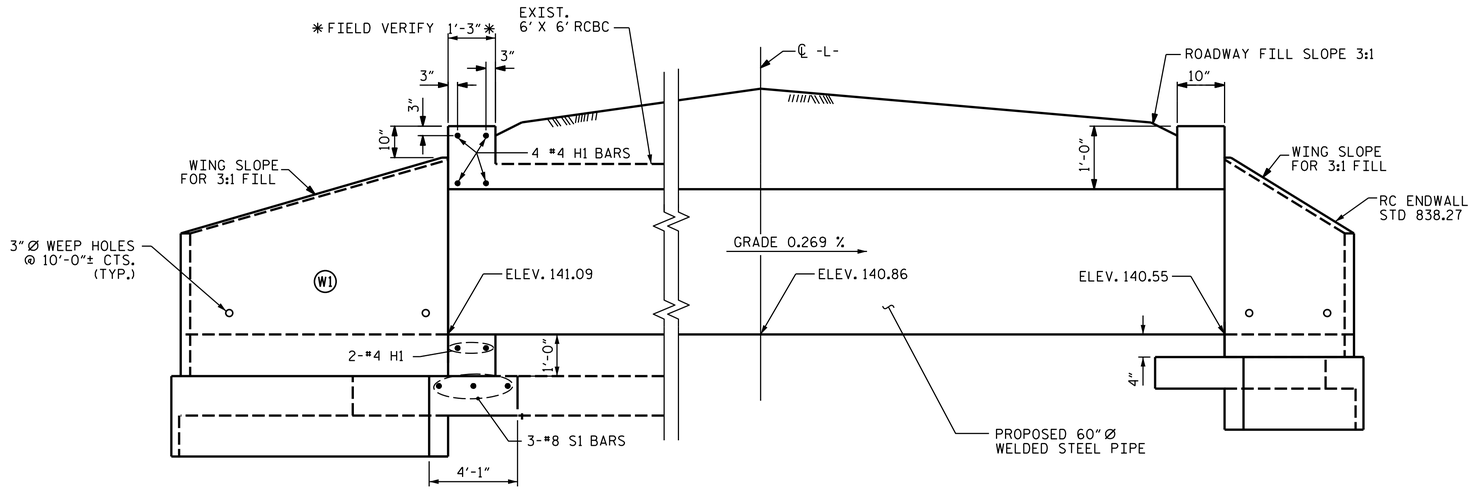
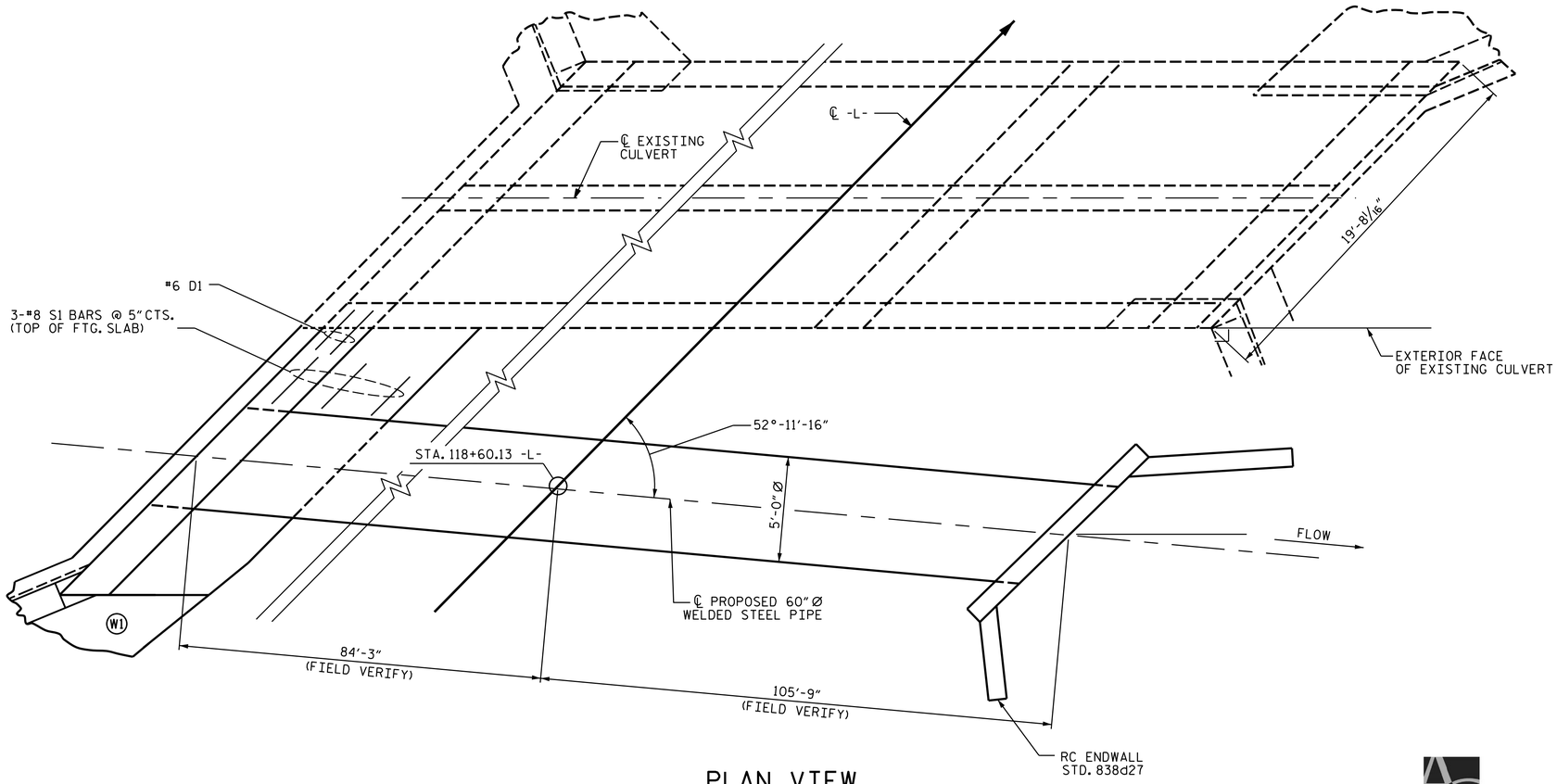



## CULVERT SECTION NORMAL TO ROADWAY




## PLAN VIEW

PROJECT NO. W-5107A
JOHNSTON COUNTY
STATION: 118+60.13 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# 60"Ø WELDED STEEL PIPE

DRAWN BY : S.G.S. DATE : 6/15/17
CHECKED BY : S.K.C. DATE : 1/24/19
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 1/28/19

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PROJECT No. 2018.046

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NORTH CAROLINA PROFESSIONAL SEAL 14455 ENGINEER TODD L. BARTELL
DocuSigned by: D794387C456A4F7...
5/30/2019

| REVISIONS | | | | | | SHEET NO. |
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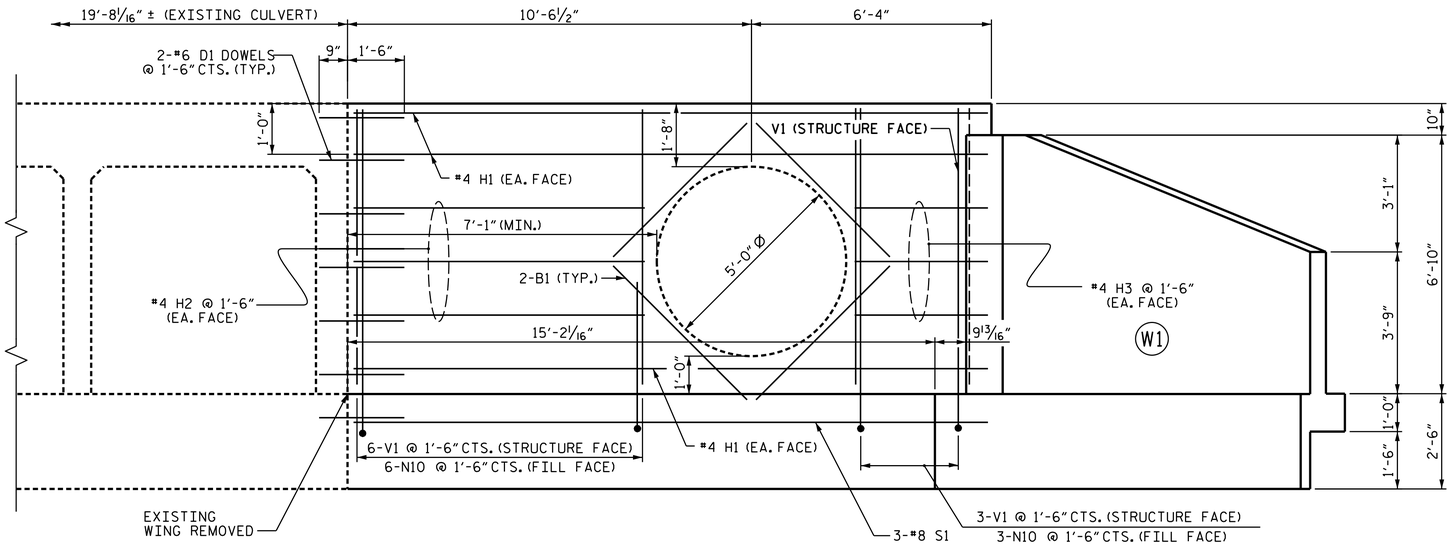
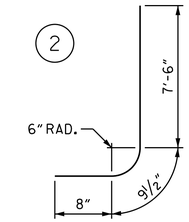



## INLET END ELEVATION NORMAL TO SKEW

| BILL OF MATERIAL | | | | | |
|---|---|---|---|---|---|
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 8 | #4 | STR | 5′-6″ | 29 |
| D1 | 12 | #6 | STR | 2′-3″ | 41 |
| H1 | 6 | #4 | STR | 16′-7″ | 66 |
| H2 | 6 | #4 | STR | 6′-9″ | 27 |
| H3 | 6 | #4 | STR | 3′-6″ | 14 |
| N10 | 9 | #5 | 2 | 8′-11″ | 84 |
| S1 | 3 | #8 | STR | 16′-7″ | 133 |
| V1 | 9 | #4 | STR | 7′-2″ | 43 |
| REINFORCING STEEL | | | | | 437 LBS. |
| CLASS A CONCTETE | | | | | 7.5 C. Y. |

## BAR TYPES




ALL BAR DIMENSIONS ARE OUT TO OUT

DRAWN BY : S.G.S. DATE : 6/15/17
CHECKED BY : S.K.C. DATE : 1/24/19
DESIGN ENGINEER OF RECORD: T.L.B. DATE : 1/28/19

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PROJECT No. 2018.046

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 ENGINEER T. L. BARTELL
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5/30/2019

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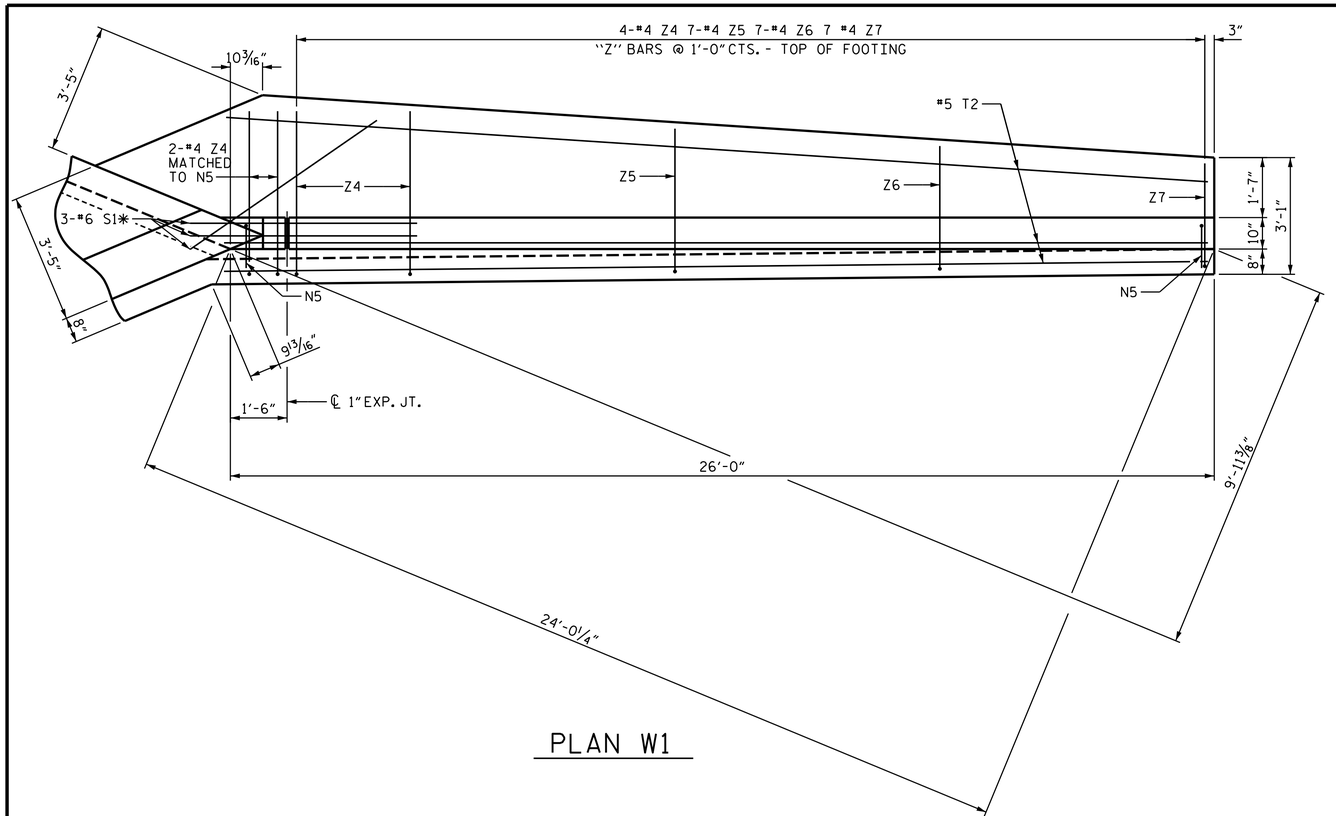
PROJECT NO. W-5107A
JOHNSTON COUNTY
STATION: 118+60.13 -L-

SHEET 3 OF 4

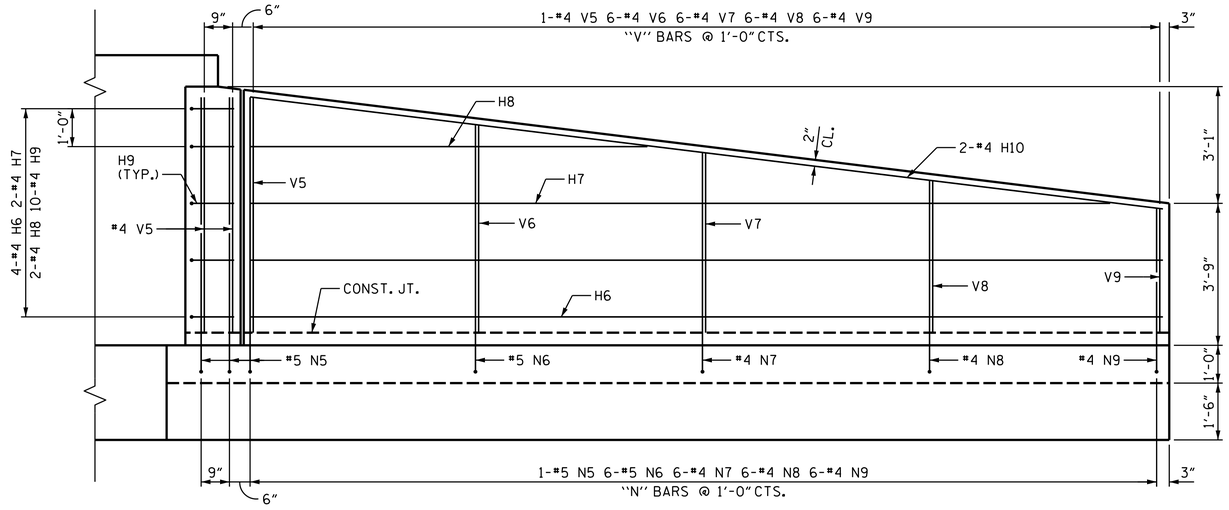
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# 60″ Ø WELDED STEEL PIPE

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-03 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 04 |




PLAN W1




ELEVATION W1

## BILL OF MATERIAL

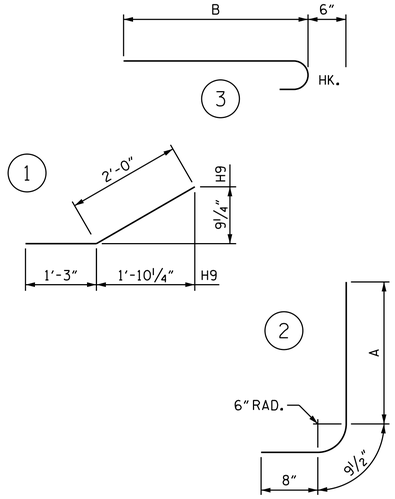
### WING 1

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| H6 | 4 | #4 | STR | 24'-1" | 64 |
| H7 | 2 | #4 | STR | 22'-8" | 30 |
| H8 | 2 | #4 | STR | 10'-6" | 14 |
| H9 | 10 | #4 | 1 | 3'-3" | 22 |
| H10 | 2 | #4 | STR | 24'-3" | 32 |
| N5 | 3 | #5 | 2 | 8'-2" | 26 |
| N6 | 6 | #5 | 2 | 7'-5" | 46 |
| N7 | 6 | #4 | 2 | 6'-8" | 27 |
| N8 | 6 | #4 | 2 | 6'-0" | 24 |
| N9 | 6 | #4 | 2 | 5'-3" | 21 |
| S1 | 3 | #6 | STR | 6'-0" | 27 |
| T2 | 3 | #5 | STR | 26'-0" | 81 |
| V5 | 3 | #4 | STR | 6'-2" | 12 |
| V6 | 6 | #4 | STR | 5'-5" | 22 |
| V7 | 6 | #4 | STR | 4'-9" | 19 |
| V8 | 6 | #4 | STR | 4'-0" | 16 |
| V9 | 6 | #4 | STR | 3'-3" | 13 |
| Z4 | 6 | #4 | 3 | 4'-9" | 19 |
| Z5 | 7 | #4 | 3 | 4'-3" | 20 |
| Z6 | 7 | #4 | 3 | 3'-9" | 18 |
| Z7 | 7 | #4 | 3 | 3'-2" | 15 |

REINFORCING STEEL 568 LBS

CLASS A CONCRETE 9.39 CY

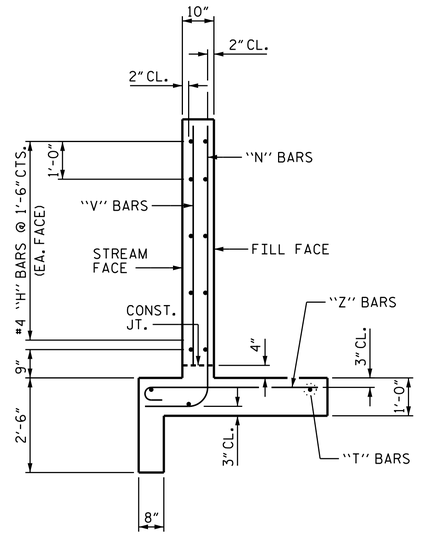
## BAR TYPES




| DIMENSION B | |
|---|---|
| BAR | LENGTH |
| Z4 | 4'-3" |
| Z5 | 3'-9" |
| Z6 | 3'-3" |
| Z7 | 2'-8" |

| DIMENSION A | |
|---|---|
| BAR | LENGTH |
| N5 | 6'-8 1/2" |
| N6 | 5'-11 1/2" |
| N7 | 5'-2 1/2" |
| N8 | 4'-6 1/2" |
| N9 | 3'-9 1/2" |

ALL BAR DIMENSIONS ARE OUT TO OUT.




TYPICAL WING SECTION

PROJECT NO. W-5107A

JOHNSTON COUNTY

STATION: 118+60.13 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# WINGS FOR CONCRETE BOX CULVERT

H = 6'-0" SLOPE = 3:1

Documents Prepared By:
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTELL
D794597C456A4E7...
5/30/2019

Founded 1998
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
PROJECT No. 2018.046

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| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S-04 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 4 |

DRAWN BY : S.C.S. DATE : 6/15/17
CHECKED BY : S.K.C. DATE : 6/15/17
DESIGN ENGINEER OF RECORD : T.L.B. DATE : 6/15/17

$DATE$
$TIME$
$NAME$
Filename: $FILE$

# STANDARD NOTES

## DESIGN DATA:

| | |
|---|---|
| SPECIFICATIONS - - - - - - - - - - - - - - - - - | A.A.S.H.T.O. (CURRENT) |
| LIVE LOAD - - - - - - - - - - - - - - - - - - - - | SEE PLANS |
| IMPACT ALLOWANCE - - - - - - - - - - - - - - - - | SEE A.A.S.H.T.O. |
| STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36 - - | 20,000 LBS. PER SQ. IN. |
| - AASHTO M270 GRADE 50W - - | 27,000 LBS. PER SQ. IN. |
| - AASHTO M270 GRADE 50 - - | 27,000 LBS. PER SQ. IN. |
| REINFORCING STEEL IN TENSION - GRADE 60 - - - | 24,000 LBS. PER SQ. IN. |
| CONCRETE IN COMPRESSION - - - - - - - - - - - - | 1,200 LBS. PER SQ. IN. |
| CONCRETE IN SHEAR - - - - - - - - - - - - - - - | SEE A.A.S.H.T.O. |
| STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS - - - | 1,800 LBS. PER SQ. IN. |
| COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER - - - - - | 375 LBS. PER SQ. IN. |
| EQUIVALENT FLUID PRESSURE OF EARTH - - - - - | 30 LBS. PER CU. FT. (MINIMUM) |

## MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

## CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

## CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

## DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

## ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

## REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

## STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

## HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

## SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (/) RGW
REV. 8-16-99 RWW (/) LES
REV. 5-7-03 RWW (/) JTE
REV. 5-1-06 TLA (/) GM
REV. 10-1-11 MAA (/) GM
REV. 12-17 MAA (/) THC

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