

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology Sheet

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

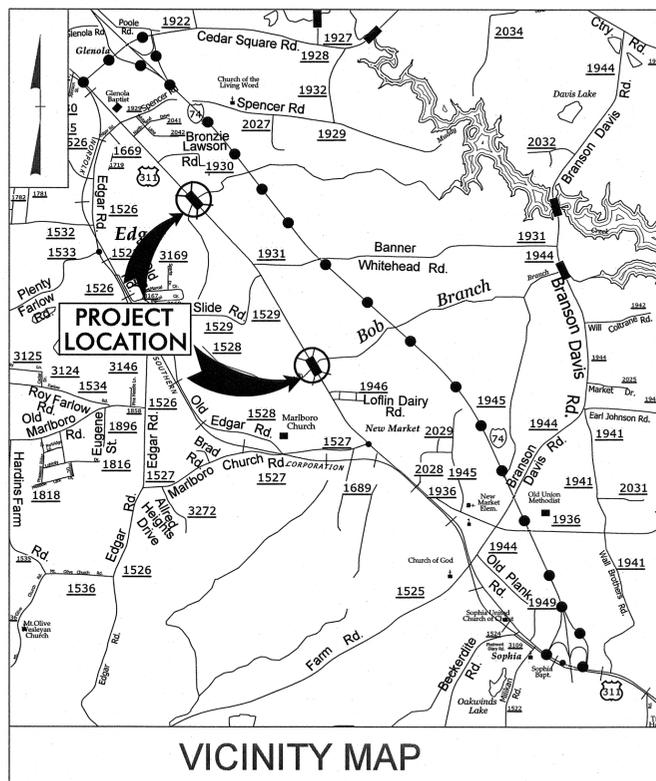
RANDOLPH COUNTY

**LOCATION: REPLACE EXISTING CULVERTS NO. 97 & NO. 31
US HWY 311**

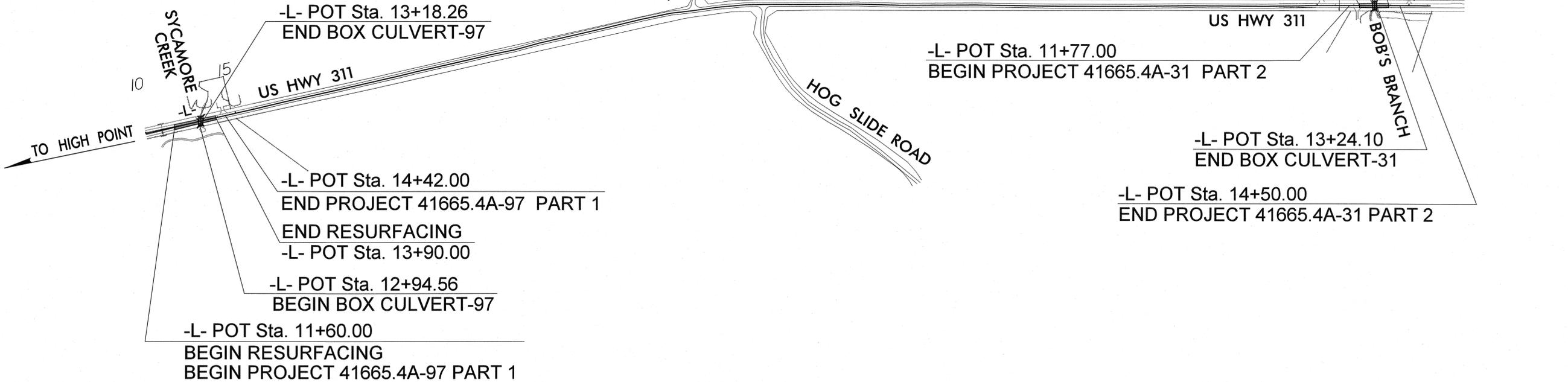
**TYPE OF WORK: GRADING, DRAINAGE, PAVING, BOX
CULVERT AND PAVEMENT MARKINGS**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	41665.4A	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
41665.4A	N/A	PE	
41665.4A	N/A	R/W, UTILITIES	
41665.4A	N/A	CONSTR.	

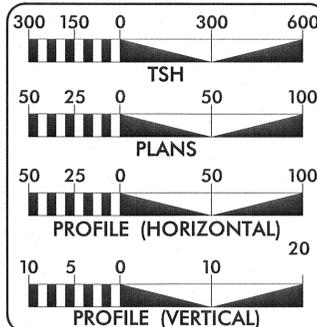
PROJECT: 41665.4A



●-●-●-●- DETOUR ROUTE



CONTRACT: DH00171



DESIGN DATA

ADT 2011	=	14,000
V	=	55 MPH

PROJECT LENGTH

LENGTH ROADWAY PROJECT 41665.4A	=	0.097 MI
LENGTH STRUCTURE PROJECT 41665.4A	=	0.008 MI
TOTAL LENGTH PROJECT 41665.4A	=	0.105 MI

PLANS PREPARED BY: PARSONS BRINCKERHOFF 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 LICENSE NO. E-0165	PLANS PREPARED FOR: DIVISION OF HIGHWAYS 1000 Birch Ridge Dr. Raleigh NC, 27610
2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE: AUGUST 20, 2014	DAVID KEISER, PE PROJECT ENGINEER
LETTING DATE: JUNE 9, 2015	LAUREN WILSON, EI PROJECT DESIGN ENGINEER
NCDOT CONTACT:	TIM WELCH, PE DIVISION BRIDGE - PROGRAM MANAGER

HYDRAULICS ENGINEER

David Keiser 5/12/15
SIGNATURE: [Signature]

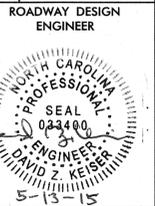
ROADWAY DESIGN ENGINEER

David Keiser 5/13/15
SIGNATURE: [Signature]

Professional Engineer Seals for David Z. Keiser (Seal 022000 and Seal 033400).

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

STATE HIGHWAY DESIGN ENGINEER



INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
PART 1	
1	TITLE SHEET (CULVERT-97)
1-C	SURVEY CONTROL SHEET
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
3	SUMMARY OF GUARDRAIL, EARTHWORK, AND ASPHALT PAVEMENT REMOVAL
4	PLAN AND PROFILE SHEET
TCP-1 THRU TCP-4	TRAFFIC CONTROL PLANS
EC-1 THRU EC-4	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL SHEET
X-1 THRU X-3	CROSS-SECTIONS
C-1 THRU C-6	STRUCTURE PLANS
PART 2	
1	TITLE SHEET (CULVERT-31)
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C-1 THRU C-7	STRUCTURE PLANS

2012 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, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets

GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-12
REVISED: 11/01/11

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

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.

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE: YADKIN VALLEY TELEPHONE.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

02/03/15

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Property Corner	-----x
Property Monument	□ EDM
Parcel/Sequence Number	②③
Existing Fence Line	-x-x-x-
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 Soil Contamination: Area or Site	☠ ☠
Potential Soil Contamination: Area or Site	?? ??

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○
Well	○
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	-----
False Sump	-----

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	-----
Switch	-----
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite R/W Marker	-----
Proposed Control of Access Line with Concrete C/A Marker	-----
Existing Control of Access	-----
Proposed Control of Access	-----
Existing Easement Line	-----
Proposed Temporary Construction Easement	-----
Proposed Temporary Drainage Easement	-----
Proposed Permanent Drainage Easement	-----
Proposed Permanent Drainage / Utility Easement	-----
Proposed Permanent Utility Easement	-----
Proposed Temporary Utility Easement	-----
Proposed Aerial Utility Easement	-----
Proposed Permanent Easement with Iron Pin and Cap Marker	-----

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-----
Proposed Slope Stakes Fill	-----
Proposed Curb Ramp	-----
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	-----
Pavement Removal	-----
Single Tree	-----
Single Shrub	-----
Hedge	-----
Woods Line	-----

VEGETATION:

Orchard	-----
Vineyard	-----

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	-----
Bridge Wing Wall, Head Wall and End Wall	-----
MINOR:	
Head and End Wall	-----
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	-----
Paved Ditch Gutter	-----
Storm Sewer Manhole	-----
Storm Sewer	-----

UTILITIES:

POWER:	
Existing Power Pole	-----
Proposed Power Pole	-----
Existing Joint Use Pole	-----
Proposed Joint Use Pole	-----
Power Manhole	-----
Power Line Tower	-----
Power Transformer	-----
U/G Power Cable Hand Hole	-----
H-Frame Pole	-----
Recorded U/G Power Line	-----
Designated U/G Power Line (S.U.E.*)	-----

TELEPHONE:

Existing Telephone Pole	-----
Proposed Telephone Pole	-----
Telephone Manhole	-----
Telephone Booth	-----
Telephone Pedestal	-----
Telephone Cell Tower	-----
U/G Telephone Cable Hand Hole	-----
Recorded U/G Telephone Cable	-----
Designated U/G Telephone Cable (S.U.E.*)	-----
Recorded U/G Telephone Conduit	-----
Designated U/G Telephone Conduit (S.U.E.*)	-----
Recorded U/G Fiber Optics Cable	-----
Designated U/G Fiber Optics Cable (S.U.E.*)	-----

WATER:

Water Manhole	-----
Water Meter	-----
Water Valve	-----
Water Hydrant	-----
Recorded U/G Water Line	-----
Designated U/G Water Line (S.U.E.*)	-----
Above Ground Water Line	-----

TV:

TV Satellite Dish	-----
TV Pedestal	-----
TV Tower	-----
U/G TV Cable Hand Hole	-----
Recorded U/G TV Cable	-----
Designated U/G TV Cable (S.U.E.*)	-----
Recorded U/G Fiber Optic Cable	-----
Designated U/G Fiber Optic Cable (S.U.E.*)	-----

GAS:

Gas Valve	-----
Gas Meter	-----
Recorded U/G Gas Line	-----
Designated U/G Gas Line (S.U.E.*)	-----
Above Ground Gas Line	-----

SANITARY SEWER:

Sanitary Sewer Manhole	-----
Sanitary Sewer Cleanout	-----
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
Recorded SS Forced Main Line	-----
Designated SS Forced Main Line (S.U.E.*)	-----

MISCELLANEOUS:

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

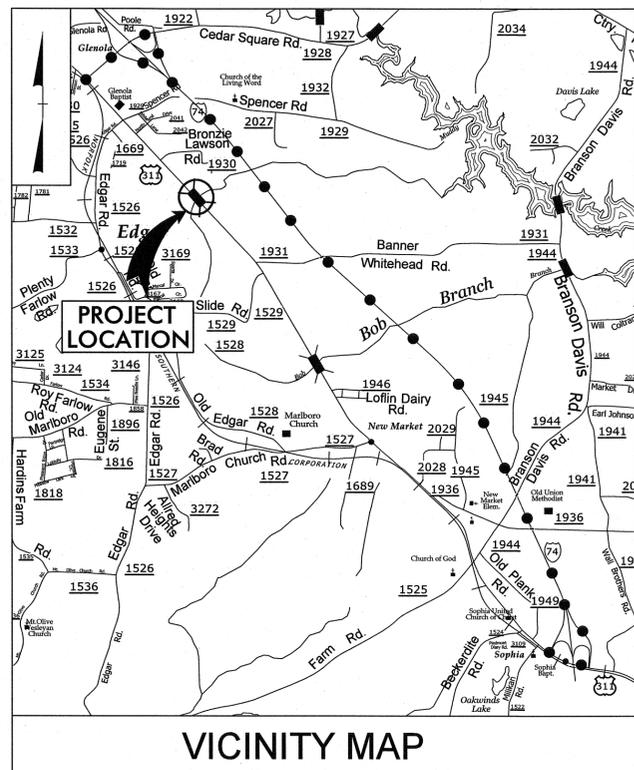
09/28/15

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology Sheet

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	41665.4A-97	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
41665.4A	N/A	PE	
41665.4A	N/A	R/W, UTILITIES	
41665.4A	N/A	CONSTR.	

PROJECT: 41665.4A-97

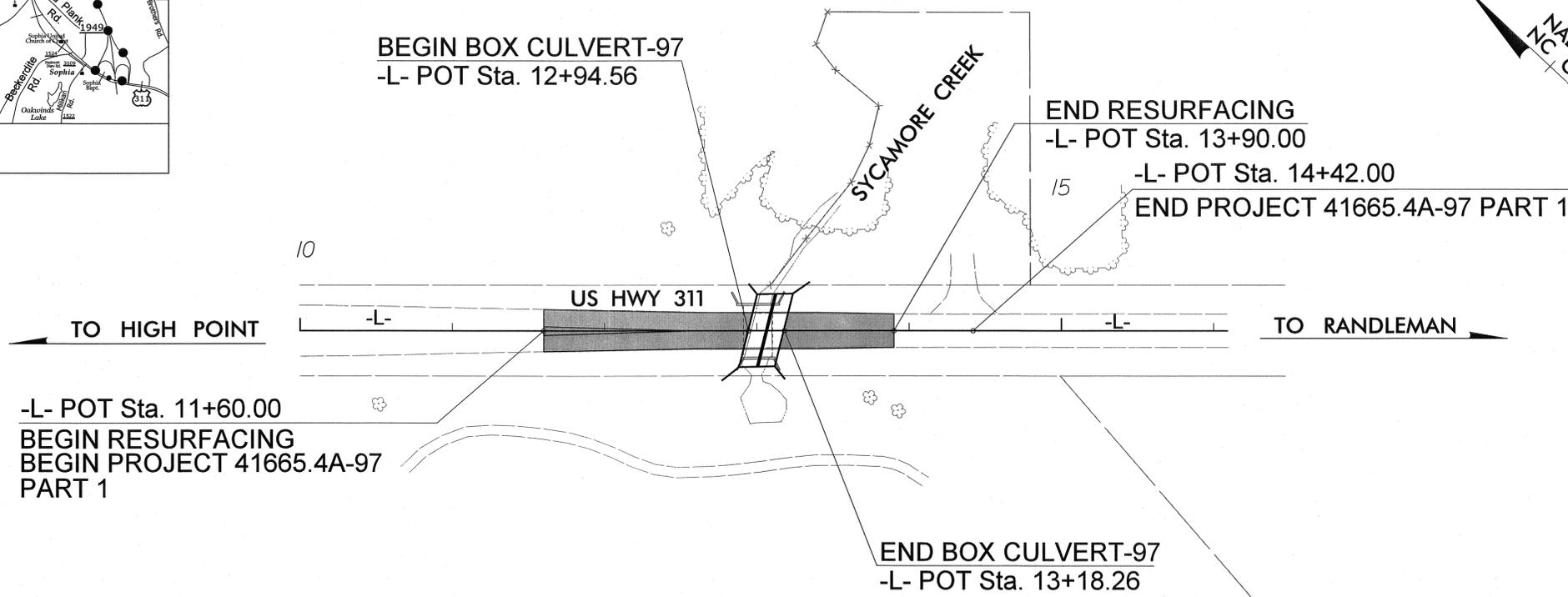


●-●-●- DETOUR ROUTE

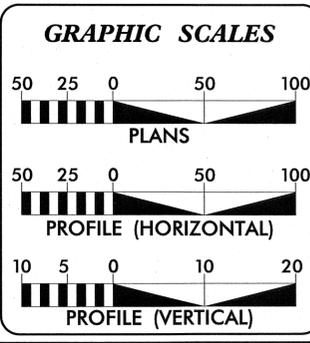
RANDOLPH COUNTY

LOCATION: REPLACE EXISTING CULVERT NO. 97
US HWY 311

TYPE OF WORK: GRADING, DRAINAGE, PAVING, BOX
CULVERT, AND PAVEMENT MARKINGS



CONTRACT: DH00171



DESIGN DATA

ADT 2011 = 14,000
V = 55 MPH

PROJECT LENGTH

LENGTH ROADWAY PROJECT 41665.4A-97	= 0.049 MI
LENGTH STRUCTURE PROJECT 41665.4A-97	= 0.004 MI
TOTAL LENGTH PROJECT 41665.4A-97	= 0.053 MI

PLANS PREPARED BY: PARSONS BRINCKERHOFF 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 LICENSE NO. E-0165	PLANS PREPARED FOR: DIVISION OF HIGHWAYS 1000 Birch Ridge Dr. Raleigh NC, 27610
2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE: AUGUST 20, 2014	DAVID KEISER, PE PROJECT ENGINEER
LETTING DATE: JUNE 9, 2015	LAUREN WILSON, EI PROJECT DESIGN ENGINEER
NCDOT CONTACT:	TIM WELCH, PE DIVISION BRIDGE - PROGRAM MANAGER

HYDRAULICS ENGINEER

W. Stalen Cad 5/12/15
SIGNATURE

ROADWAY DESIGN ENGINEER

David Z. Keiser 5/13/15
SIGNATURE

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

STATE HIGHWAY DESIGN ENGINEER

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5/12/2015

SURVEY CONTROL SHEET 41665.4A-97

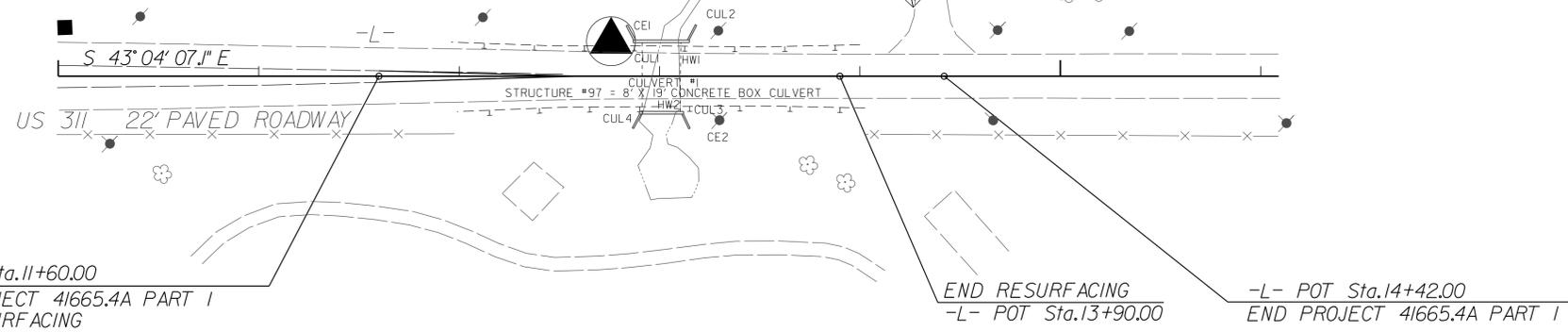
WBS 41665.4A



-BL- 101
N=769629.3930
E=1734499.5220
ELEV.=737.86'

BMI ELEVATION = 735.60'
N 769484 E 1734692
EL STATION 12+41.00 66' LEFT
RR SPIKE IN BASE OF 24" ASH

RAN97-1
N=769425.6660
E=1734680.6510
ELEV.=736.216'



-L- POT Sta.11+60.00
BEGIN PROJECT 41665.4A PART I
BEGIN RESURFACING

END RESURFACING
-L- POT Sta.13+90.00

-L- POT Sta.14+42.00
END PROJECT 41665.4A PART I

RAN97-2
N=768865.9230
E=1735154.4490
ELEV.=754.480'

CULVERT #1
ONE BARREL

	NORTH	EAST	ELEV.
CUL1	769411.11	1734687.79	725.69
CUL2	769397.06	1734700.96	725.70
CE1	769407.71	1734698.46	734.06
HW1	769407.31	1734697.87	736.54
CUL3	769377.81	1734679.91	725.87
CUL4	769389.59	1734664.77	725.90
CE2	769381.96	1734671.60	734.09
HW2	769381.97	1734671.85	736.58

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/](https://connect.ncdot.gov/resources/location/)

THE FILES TO BE FOUND ARE AS FOLLOWS:
41665.4A_97_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.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "RAN97-1"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 769425.666(±ft) EASTING: 1734680.651(±ft)
ELEVATION: 736.216(±ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99989860
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "RAN97-1" TO -L- 10+00.00 STATION IS
N 46° 40' 55.62" W 276.35'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BMI ELEVATION = 735.60'
N 769484 E 1734692
EL STATION 12+41.00 66' LEFT
RR SPIKE IN BASE OF 24" ASH

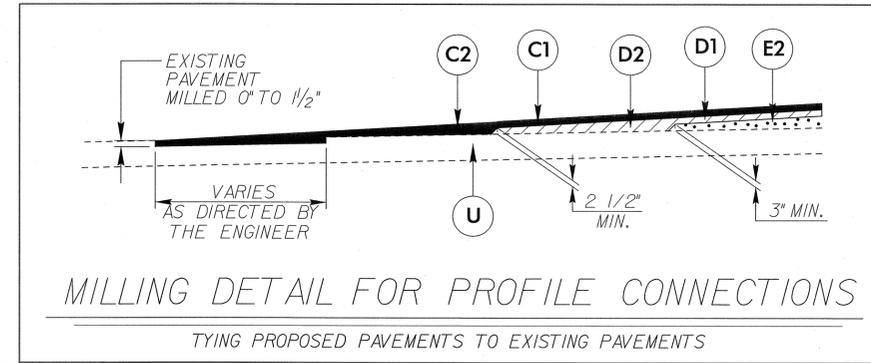
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6/2/99

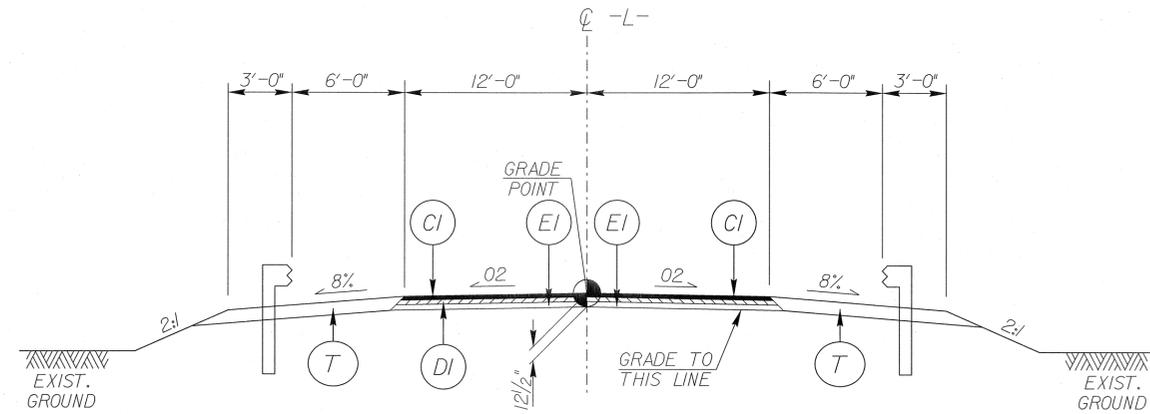
PAVEMENT SCHEDULE	
C1	PROPOSED APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD, IN EACH OF TWO LAYERS.
C2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" OR GREATER THAN 2" IN DEPTH.
D1	PROPOSED APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.
D2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.
E1	PROPOSED APPROXIMATE 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YARD.
E2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5 1/2" IN DEPTH.
T	EARTH MATERIAL

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE SHOWN.



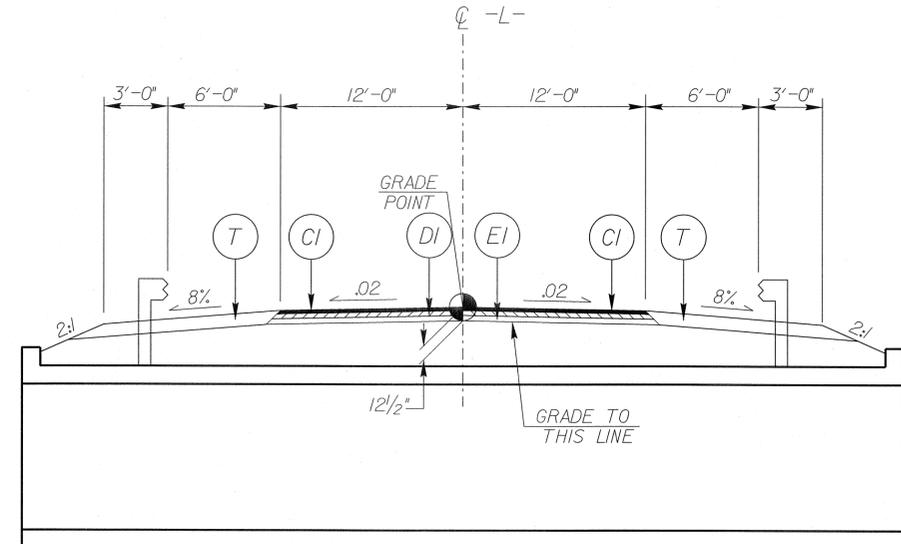
ROADWAY DESIGN ENGINEER

PLANS PREPARED BY:
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601



TYPICAL SECTION No. 1

USE TYPICAL SECTION No. 1 AS FOLLOWS:
 TRANSITION FROM EXISTING TO T.S. NO. J FROM -L- STA. 11+60.00 TO -L- STA. 12+60.00
 FROM -L- STA. 12+60.00 TO -L- STA. 12+94.56 (BEGIN CULVERT)
 FROM -L- STA. 13+18.26 (END CULVERT) TO -L- STA. 13+40.00
 TRANSITION FROM T.S. NO. J TO EXISTING FROM -L- STA. 13+40.00 TO -L- STA. 13+90.00



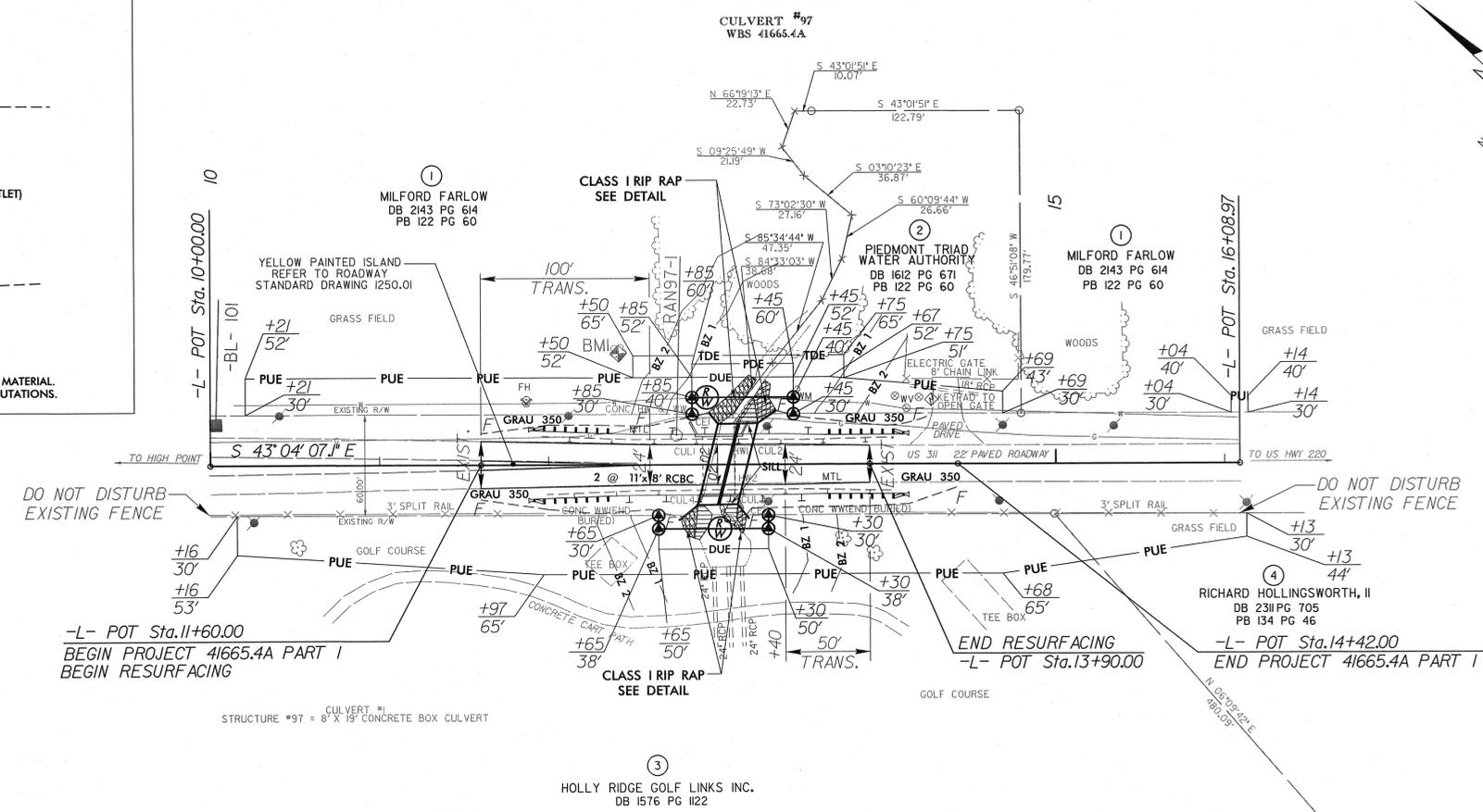
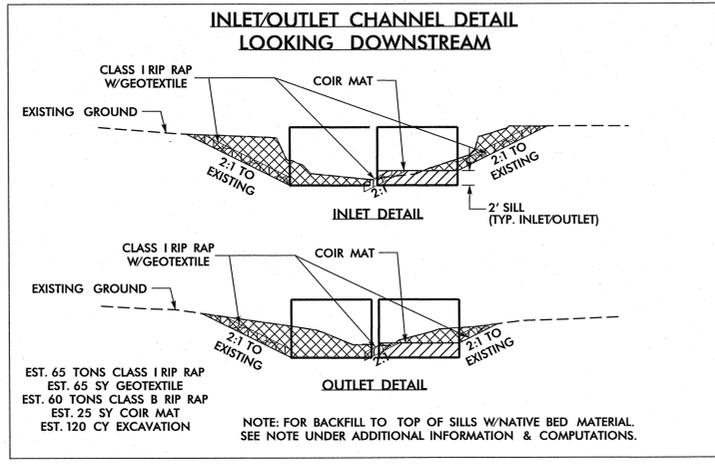
TYPICAL SECTION No. 2

USE TYPICAL SECTION No. 2 AS FOLLOWS:
 FROM -L- STA. 12+94.56 (BEGIN CULVERT) TO -L- STA. 13+18.26 (END CULVERT)

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2/16/99 4:16:54 PM
5/12/2015
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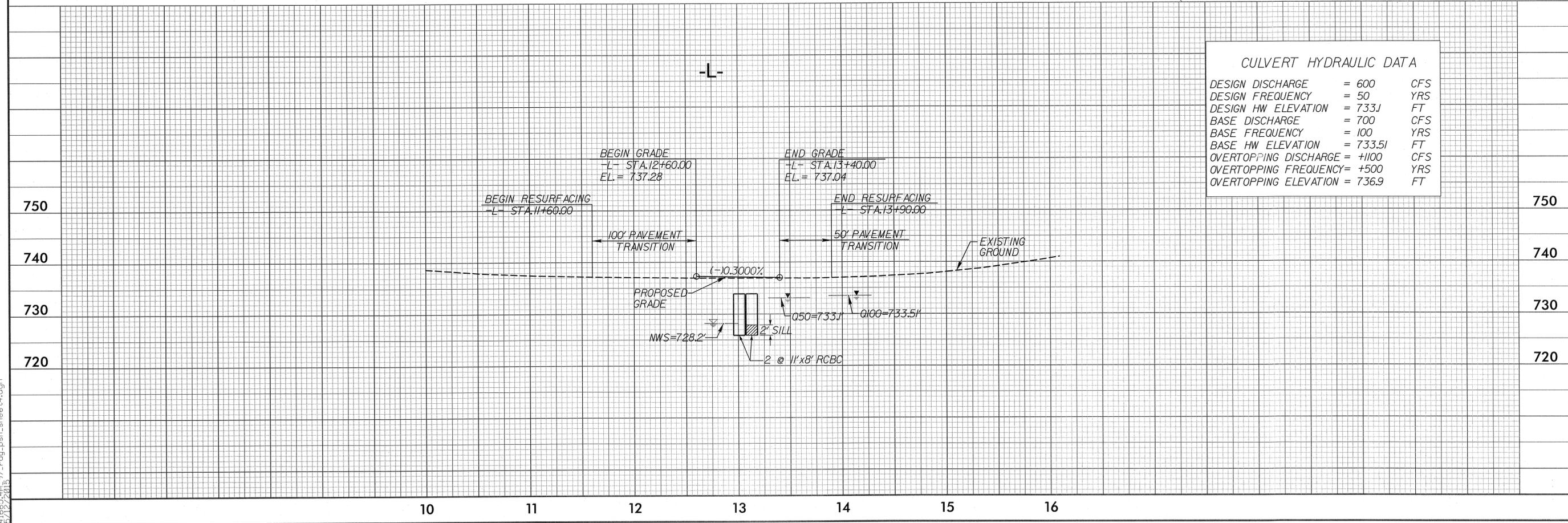
RANDOLPH COUNTY
LOW IMPACT BRIDGE

PROJECT REFERENCE NO. 41665.4A-97	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER DAVID Z. KEESER SEAL 033400 5-13-15	HYDRAULICS ENGINEER W. GALEN CARROLL SEAL 022000 5-13-15
PLANS PREPARED BY: PARSONS BRINCKERHOFF 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 LICENSE NO. E-0465	



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 600	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 733J	FT
BASE DISCHARGE	= 700	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 733.5I	FT
OVERTOPPING DISCHARGE	= +100	CFS
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING ELEVATION	= 736.9	FT



B/17/99
 4/14/30 PM
 41665.4A-97_rdy_psh_sheet4.dgn
 5/12/2015

PROJECT: 41665.4A - 97

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE PROJECT REFERENCE NO.	SHEET NO.
41665.4A - 97	TCP-1

**PLAN FOR PROPOSED
TRAFFIC CONTROL, MARKING & DELINEATION
RANDOLPH COUNTY**

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JULY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES & OFFSETS
1205.02	PAVEMENT MARKINGS - 2 LANE & MULTILANE ROADWAYS
1261.01	GUARDRAIL & BARRIER DELINEATOR SPACING
1261.02	GUARDRAIL & BARRIER DELINEATOR TYPE
1262.01	GUARDRAIL END DELINEATION

INDEX OF SHEETS

SHEET NO.	TITLE
TCP-1	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, LEGEND AND INDEX OF SHEETS
TCP-2	GENERAL NOTES, PHASING AND DETOUR SIGNING
TCP-3 THRU TCP-4	SPECIAL DETOUR SIGNING

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- NORTH ARROW
- PROPOSED PVMT. EXIST. PVMT.
- WORK AREA
- MILL AND WEDGE
- REMOVAL OF EXISTING PAVEMENT

TRAFFIC CONTROL DEVICES

- TYPE I BARRICADE
- TYPE II BARRICADE
- TYPE III BARRICADE
- CONE
- DRUM SKINNY DRUM
- FLASHING ARROW PANEL (TYPE C)
- STATIONARY SIGN
- PORTABLE SIGN
- STATIONARY OR PORTABLE SIGN
- CRASH CUSHION
- CHANGEABLE MESSAGE SIGN
- TRUCK MOUNTED IMPACT ATTENUATOR (TMIA)
- POLICE
- FLAGGER

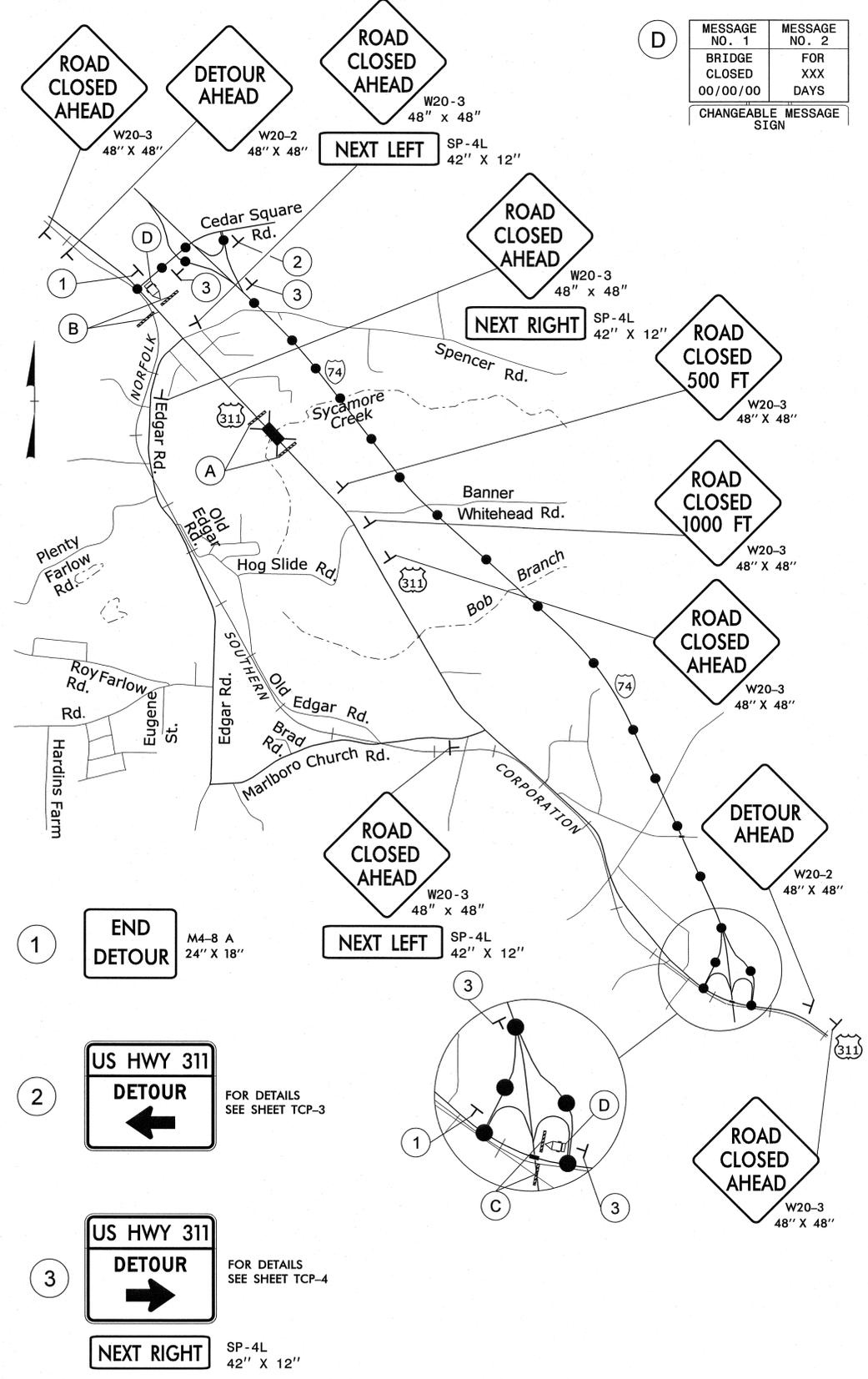
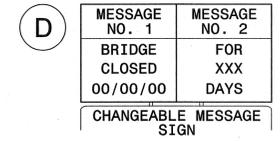
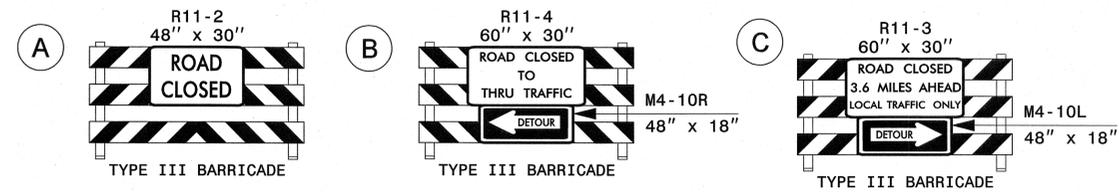
PAVEMENT MARKINGS

- CRYSTAL/CRYSTAL PAVEMENT MARKER
- YELLOW/YELLOW PAVEMENT MARKER
- CRYSTAL/RED PAVEMENT MARKER
- PAVEMENT MARKING SYMBOLS

APPROVED: DATE: 5-13-15	PARSONS BRINCKERHOFF <small>434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 LICENSE NO. F-0165</small>
SEAL	DAVID KEISER, PE PROJECT ENGINEER LAUREN WILSON, EI PROJECT DESIGN

TRAFFIC CONTROL PART 1 CULVERT 97

GENERAL NOTES



CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRABLE OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

- A) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.
- B) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

TRAFFIC PATTERN ALTERATIONS

- C) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

- D) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- E) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN ON THIS SHEET.
- F) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.
- G) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.
- H) INSTALL AND ACTIVATE CMS SIGNS 2 WEEKS PRIOR TO ROAD CLOSURE.

TRAFFIC CONTROL DEVICES

- I) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

- J) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING
US HWY 311	THERMOPLASTIC
- K) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.
- L) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS.
- M) PASSING ZONE WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

PHASING

PART 1 - CULVERT 97 (PART 1 PHASE III MUST BE COMPLETED BEFORE PART 2 PHASE IV CAN BEGIN.)

PHASE I

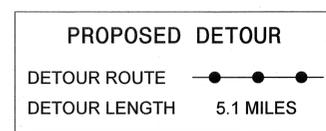
PRIOR TO ANY CONSTRUCTION OPERATIONS, PLACE AND COVER OFF-SITE DETOUR SIGNING AS SHOWN ON TCP-2 (PART 1) AND IN ACCORDANCE WITH RSD 1101.03 (SHEET 1 OF 9). OPTIONAL SIGN USE MUST BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT. PLACE CMS AND ACTIVATE.

PHASE II

USING OFF-SITE DETOUR, UNCOVER DETOUR SIGNS, CLOSE -L- (US HWY 311) TO TRAFFIC, AND EXCAVATE AND CONSTRUCT NEW CULVERT AND ROADWAY UP TO AND INCLUDING FINAL LAYER OF SURFACE COURSE.

PHASE III

UPON COMPLETION OF CULVERT AND ROADWAY, PLACE FINAL PAVEMENT MARKING IN ACCORDANCE WITH RSD 1205.01.

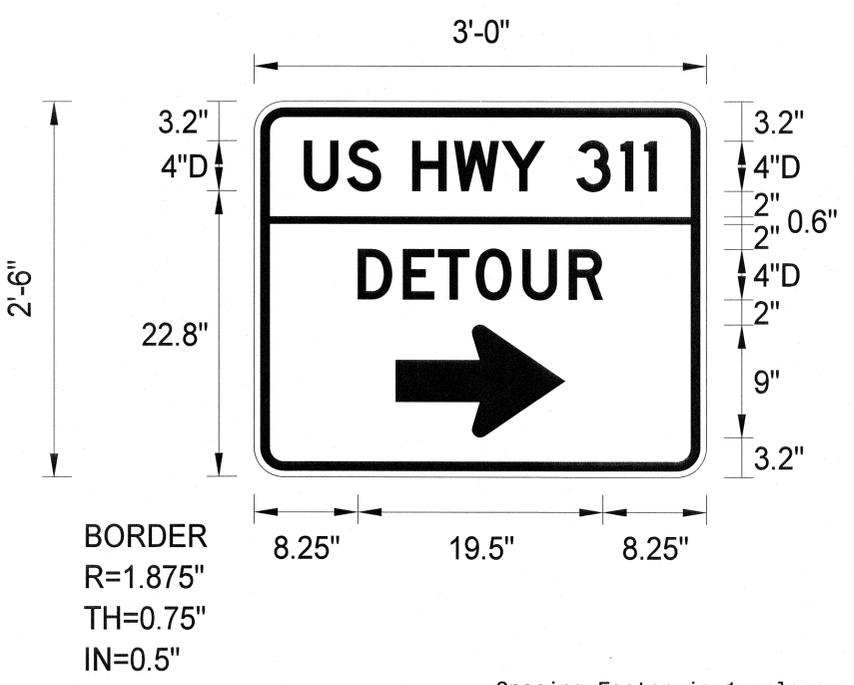


APPROVED:	DATE: 5-13-15	GENERAL NOTES, PHASING AND DETOUR SIGNING						
	SCALE: NONE							
	DATE: 09/16/13							
	DWG. BY: RGK							
	DESIGN BY: LJW							
REVIEWED BY: EDM	<table border="1" style="width: 100%;"> <tr> <th colspan="2">REVISIONS</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		REVISIONS					
REVISIONS								

SIGN NUMBER: 002 TYPE: STATIONARY QUANTITY: SEE PLANS SIGN WIDTH: 3'-0" HEIGHT: 2'-6" TOTAL AREA: 7.5 Sq.Ft. BORDER TYPE: INSET RECESS: 0.5" WIDTH: 0.75" RADII: 1.875" NO. Z BARS: LENGTH:	BACKG COLOR: Orange/Orange COPY COLOR: Black <table border="1"> <thead> <tr> <th>SYMBOL</th> <th>X</th> <th>Y</th> <th>WID</th> <th>HT</th> </tr> </thead> <tbody> <tr> <td>AR_Type D</td> <td>11.3</td> <td>3.2</td> <td>9</td> <td>13.5</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> MAT'L: 0.080" (2.0 mm) ALUMINUM	SYMBOL	X	Y	WID	HT	AR_Type D	11.3	3.2	9	13.5																																				DESIGN BY: K. Dixon PROJECT ID: 41665.4A_97 CHECKED BY: D. Keiser DIV: 8 DATE: Jan 23, 2015
SYMBOL	X	Y	WID	HT																																											
AR_Type D	11.3	3.2	9	13.5																																											

USE NOTES: 1,2

- Legend and border shall be direct applied black non-reflective sheeting.
- Background shall be Type VII, VIII, or IX (prismatic) fluorescent orange retroreflective sheeting.



LETTER POSITIONS

Letter spacings are to start of next letter

	U	S	H	W	Y	3	1	1													Series/Size	
	4	3.4	2.7	2.5	3.3	3.8	3.4	2.5	3.5	1.9	1	4									D 2000	
																						28.1
																						D 2000
	8.2	3.6	2.8	3	3.7	3.7	2.7	8.2														19.5

FILENAME: US HWY 311 Special Detour Signs NORTH CAROLINA D.O.T. SIGN DETAIL

10:02:13 AM
US HWY 311 Special Detour Signs.dgn
5/12/2015

APPROVED: <i>[Signature]</i> DATE: 5-13-15 	SPECIAL DETOUR SIGNING SCALE: NONE DATE: 01/23/15 DWG. BY: KD DESIGN BY: KD REVIEWED BY: DZK	<table border="1"> <tr> <th>REVISIONS</th> </tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	REVISIONS				
REVISIONS							

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	41665.4A-97	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

PROJECT: 41665.4A-97

EROSION AND SEDIMENT CONTROL MEASURES

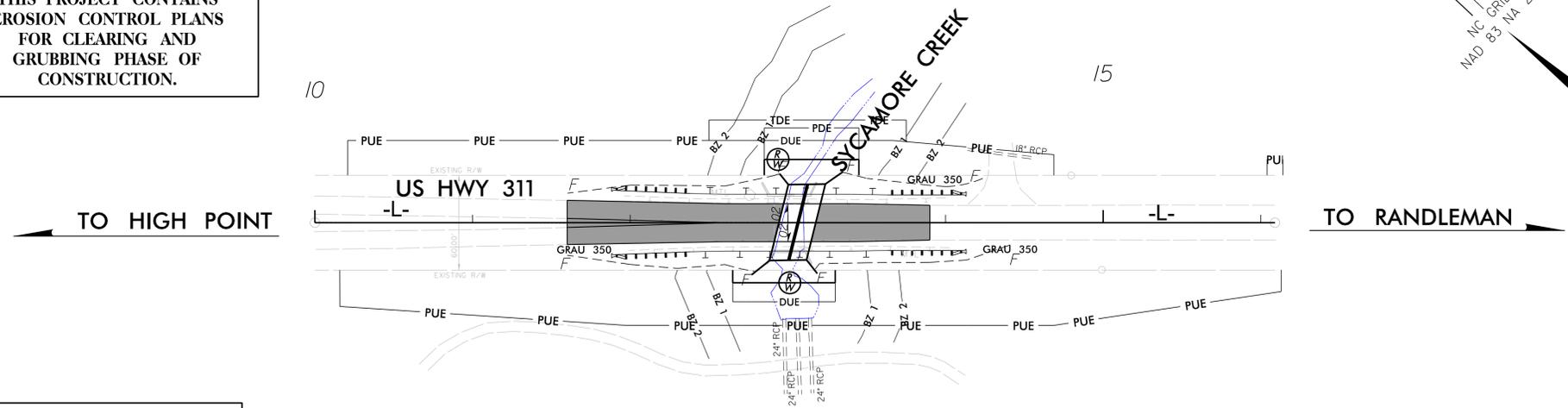
Std. #	Description	Symbol
1630.05	Temporary Silt Ditch	
1630.05	Temporary Diversion	
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with 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	
1632.02	Type B	
1632.05	Type C	
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

RANDOLPH COUNTY
LOCATION: REPLACE EXISTING CULVERT NO. 97
US HWY 311

TYPE OF WORK: GRADING, DRAINAGE, BOX CULVERT AND PAVEMENT MARKINGS

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



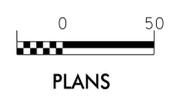
CHARLES HEAFNER
LEVEL III NAME

3440
LEVEL III CERTIFICATION NO.

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT
Refer To E. C. Special Provisions for Special Considerations.

GRAPHIC SCALE



ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

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.

PLANS PREPARED BY: PARSONS BRINCKERHOFF 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 LICENSE NO. F-0165	PLANS PREPARED FOR: DIVISION OF HIGHWAYS 1000 Birch Ridge Dr. Raleigh NC, 27610
2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE:	DAVID KEISER, PE PROJECT ENGINEER
LETTING DATE:	LAUREN WILSON, EI PROJECT DESIGN ENGINEER
NCDOT CONTACT:	TIM WELCH, PE DIVISION BRIDGE - PROGRAM MANAGER

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 2012 and the latest revision 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	

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PROJECT REFERENCE NO.	SHEET NO.
41665.4A-97	EC-2

**PARSONS
BRINCKERHOFF**
434 FAYETTEVILLE STREET
SUITE 500
RALEIGH, NC 27601
LICENSE NO. E-4065

SOIL STABILIZATION TIMEFRAMES

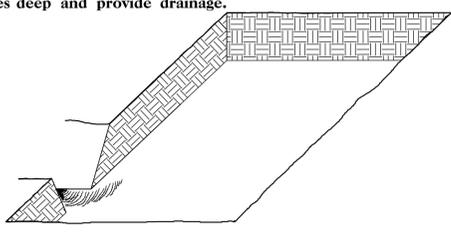
<i>SITE DESCRIPTION</i>	<i>STABILIZATION TIME</i>	<i>TIMEFRAME EXCEPTIONS</i>
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 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.

PLANTING DETAILS

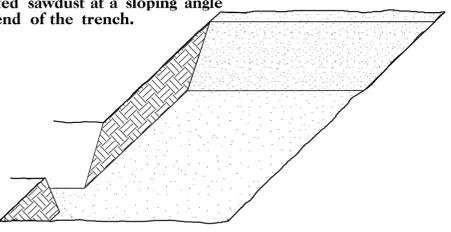
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

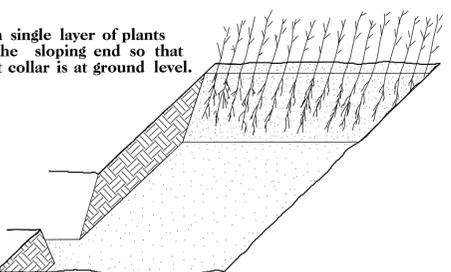
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



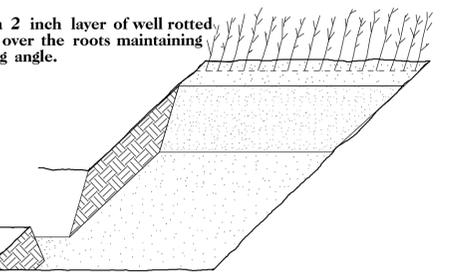
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

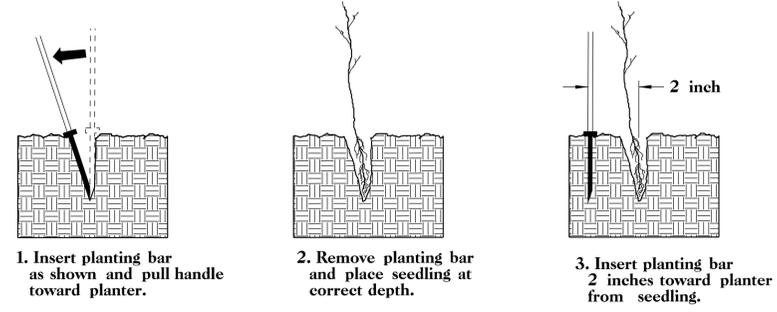


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

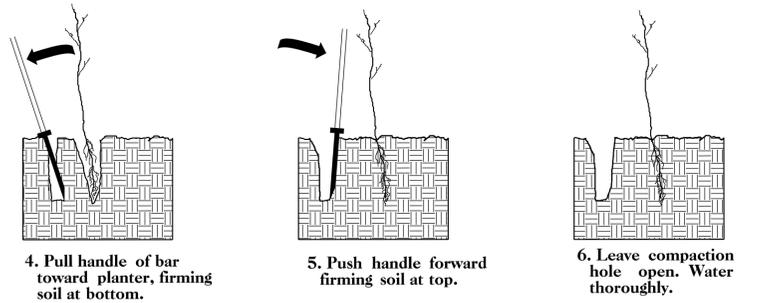


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

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.

REFORESTATION

- TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

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

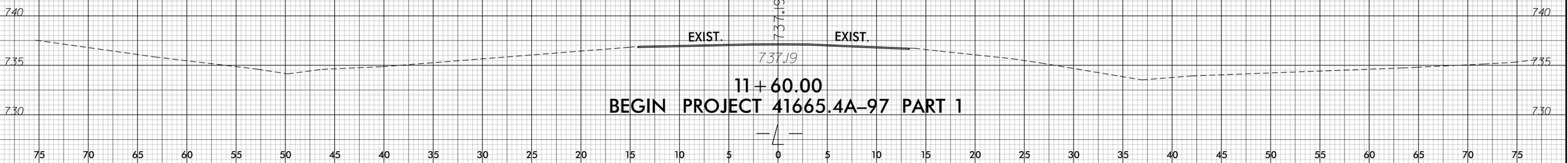
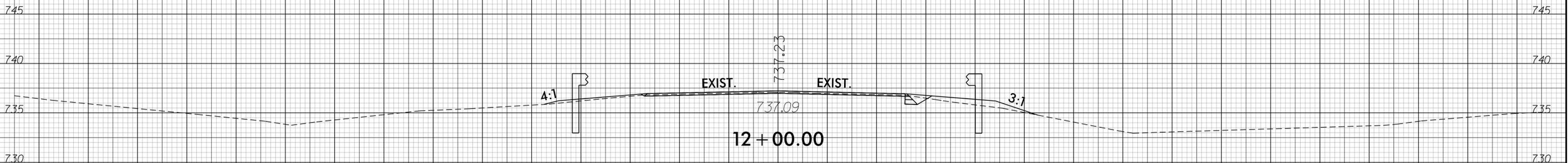
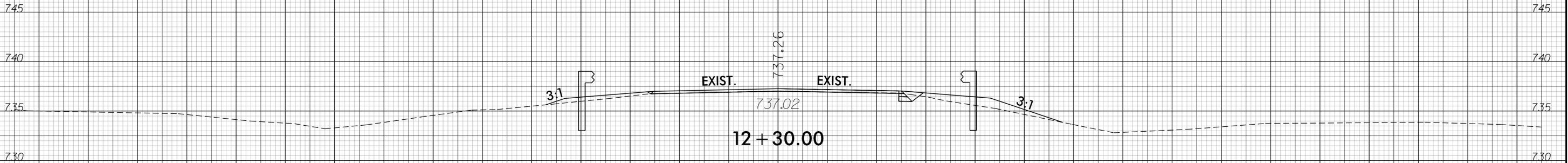
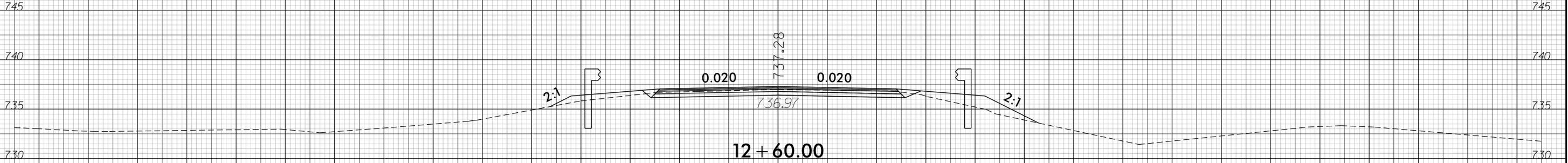
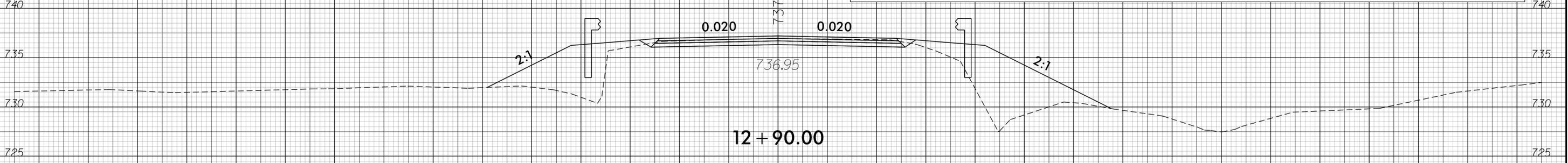
25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25% PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
25% FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR
25% BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

REFORESTATION DETAIL SHEET

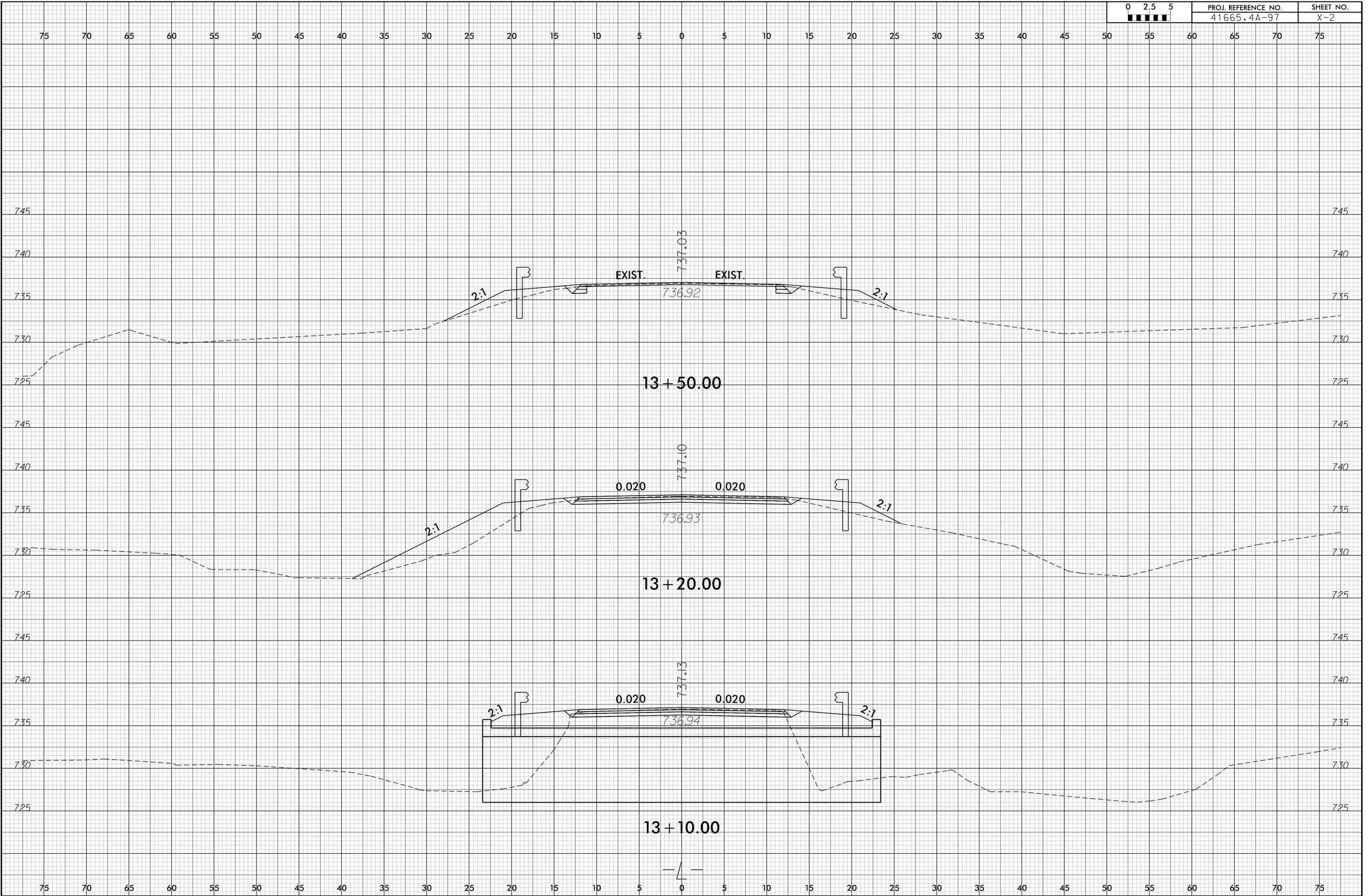
N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

745 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 745

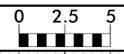
NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, BREAKING OF EXISTING PAVEMENT, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING."



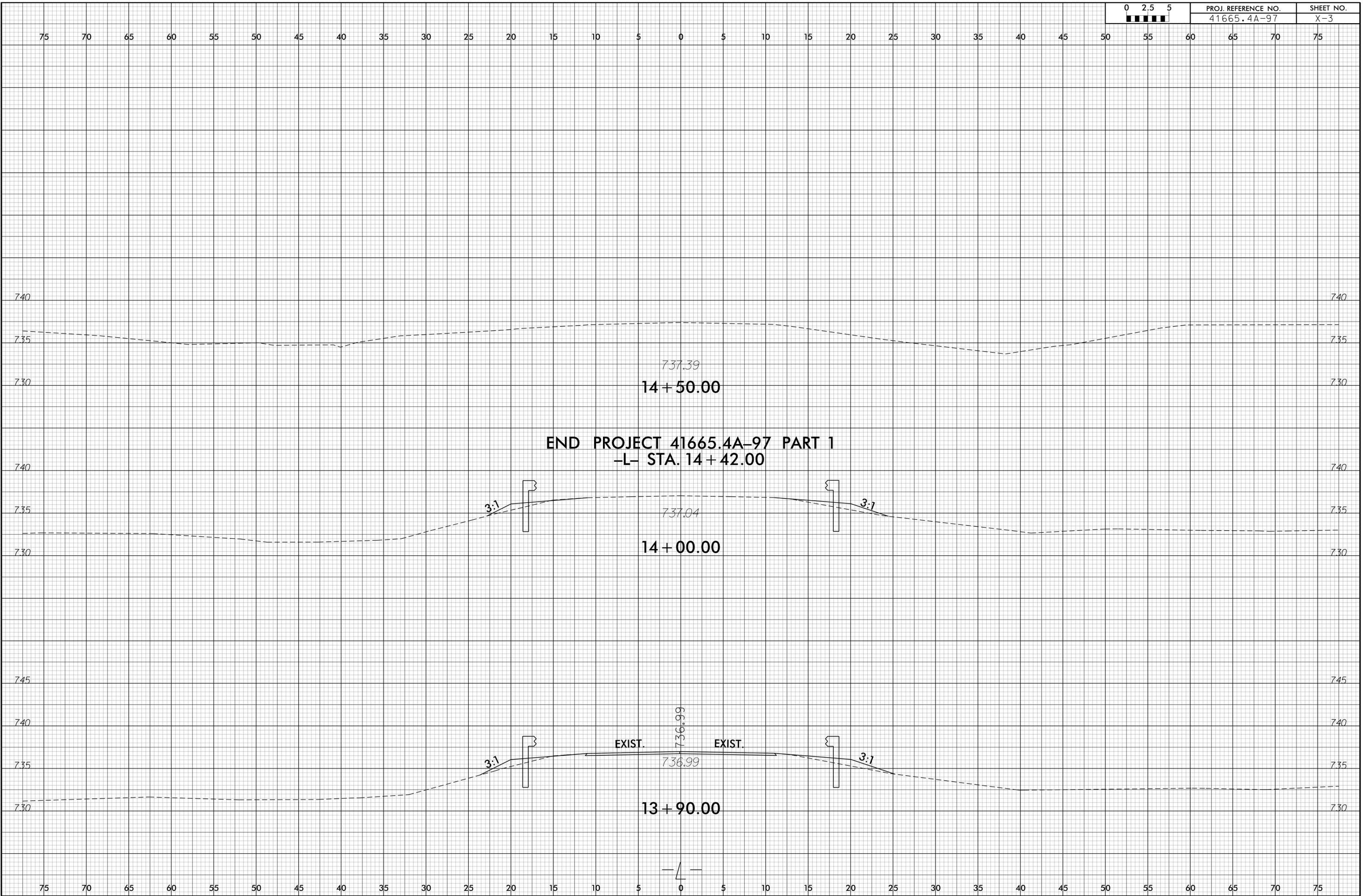
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 745



8/23/99



PROJ. REFERENCE NO.	SHEET NO.
41665.4A-97	X-3



END PROJECT 41665.4A-97 PART 1
-L- STA. 14+42.00

737.39
14+50.00

737.04
14+00.00

736.99
13+90.00

EXIST.

EXIST.

3:1

3:1

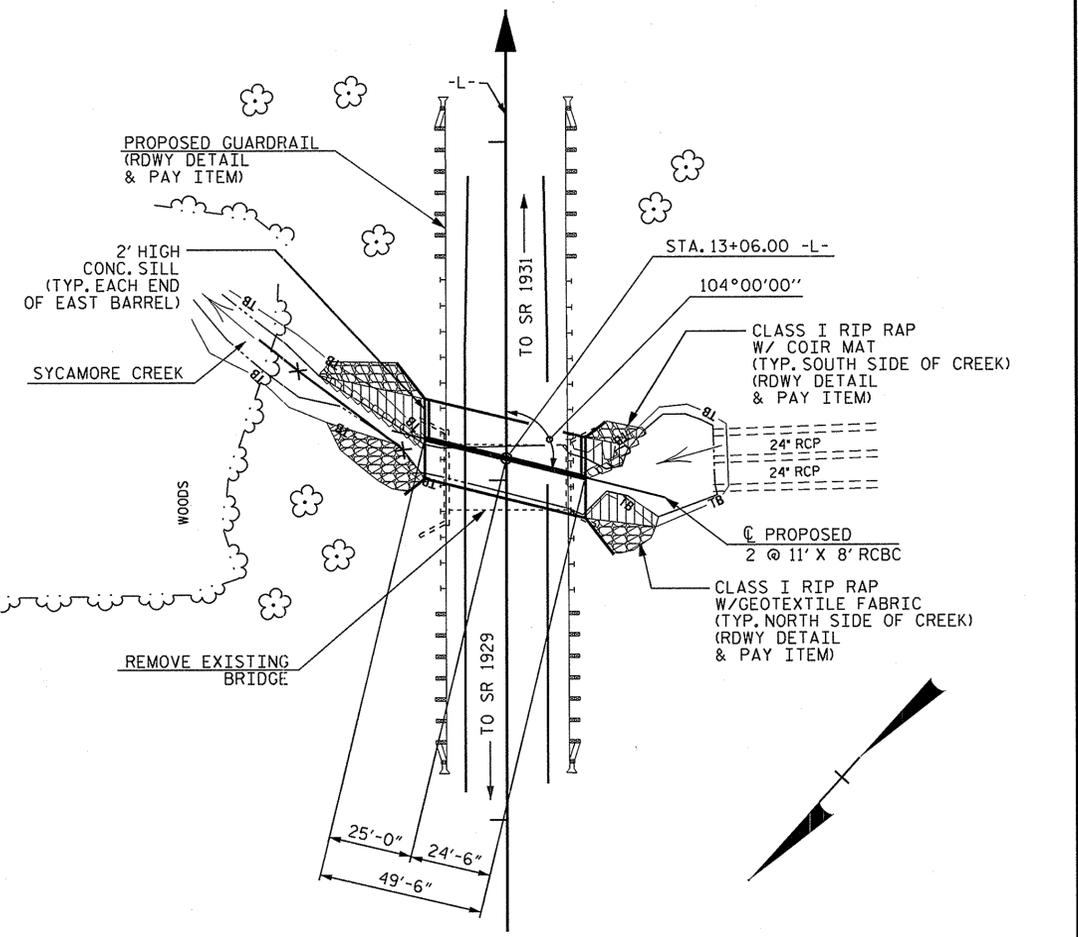
3:1

3:1



8/23/99
41665.4A-97
X-3

BM: #1: R/R SPIKE IN BASE OF 24" ASH TREE 66' LEFT OF STA. 12+41 -L-, EL. 735.60



FOR UTILITY INFORMATION, SEE UTILITY PLAN AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
DESIGN FILL-----3.37'
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:
PHASE I
1. WING FOOTINGS AND FLOOR SLAB OF EAST BARREL INCLUDING 4" OF ALL VERTICAL WALLS, AND PORTION OF CURTAIN WALLS.
2. THE REMAINING PORTIONS OF WALLS, SILLS, AND WINGS FULL HEIGHT.
PHASE II
1. WING FOOTINGS AND FLOOR SLAB OF WEST BARREL INCLUDING 4" OF EXTERIOR WALL, AND REMAINING PORTION OF CURTAIN WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT.
3. ROOF SLAB INCLUDING REMAINING PORTION OF WALLS FOLLOWED BY THE HEADWALLS.
PHASE II SHALL NOT BE STARTED UNTIL PHASE I IS COMPLETE.
FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.
FOR MAINTENANCE OF TRAFFIC SEE TRAFFIC CONTROL PLANS.
THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.
THE CONTRACTOR SHALL REMOVE THE EXISTING BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
NO WORK SHALL BE DONE ON THE CULVERT AT STA. 13+06 -L- UNTIL THE AREA OF THE CULVERT HAS BEEN EXCAVATED TO COMPETENT MATERIAL AT THE DISCRETION OF THE ENGINEER AND UNSUITABLE MATERIAL REPLACED WITH FOUNDATION CONDITIONING MATERIAL AND PROPERLY COMPACTED TO THE ELEVATION OF THE BOTTOM OF THE PROPOSED CULVERT FLOOR SLAB AND WING FOOTINGS AS REQUIRED TO CONSTRUCT THE PROPOSED CULVERT. PAYMENT FOR EXCAVATION DOWN TO ONE FOOT BELOW THE BOTTOM OF THE CULVERT FLOOR SLAB AND WING FOOTINGS WILL BE FOR ALL WORK INCLUDING FOUNDATION CONDITIONING MATERIAL DOWN TO ONE FOOT BELOW THE CULVERT AND SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION. PAYMENT FOR EXCAVATION BEYOND ONE FOOT BELOW THE BOTTOM OF THE CULVERT FLOOR SLAB AND WING FOOTINGS WILL BE FOR ALL WORK INCLUDING EXCAVATION, ANY TEMPORARY SHEETING, FOUNDATION CONDITIONING MATERIAL, AND ANY OTHER MISCELLANEOUS ITEMS, AND SHALL BE INCLUDED IN THE PRICE PER CUBIC YARD FOR FOUNDATION CONDITIONING MATERIAL.
THE ESTIMATED QUANTITY FOR THE FOUNDATION CONDITIONING MATERIAL THAT IS INCLUDED IN THE LUMP SUM PAYMENT FOR CULVERT EXCAVATION IS 85 TONS, THE ESTIMATED QUANTITY THAT IS FOR THE FOUNDATION CONDITIONING MATERIAL THAT IS PLACED BEYOND ONE FOOT BELOW THE BOTTOM OF THE CULVERT FLOOR SLAB AND WING FOOTINGS IS 200 TONS. THESE QUANTITIES ARE ESTIMATES ONLY.

THE EXISTING STRUCTURE CONSISTING OF ONE SPAN @ 22'-0" WITH A CLEAR ROADWAY WIDTH OF 20'-0" AND REINFORCED CONCRETE DECK WITH CONCRETE BULKHEADS LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COSTS INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL IN THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATION.

NO SEPARATE PAYMENT SHALL BE MADE FOR REMOVAL OF EXISTING STRUCTURE. COST FOR REMOVAL OF EXISTING STRUCTURE SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR CULVERT EXCAVATION.

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. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

BACKFILL TO TOP OF SILLS WITH NATIVE BED MATERIAL. NATIVE BED MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED IN THE LOW FLOW CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE BED MATERIAL IN THE HIGH FLOW CULVERT BARREL. IF RIP RAP IS USED IN THE HIGH FLOW BARREL IT SHOULD BE PLACED IN THE BOTTOM PORTION OF THE BARREL WITH NATIVE BED MATERIAL PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

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.

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

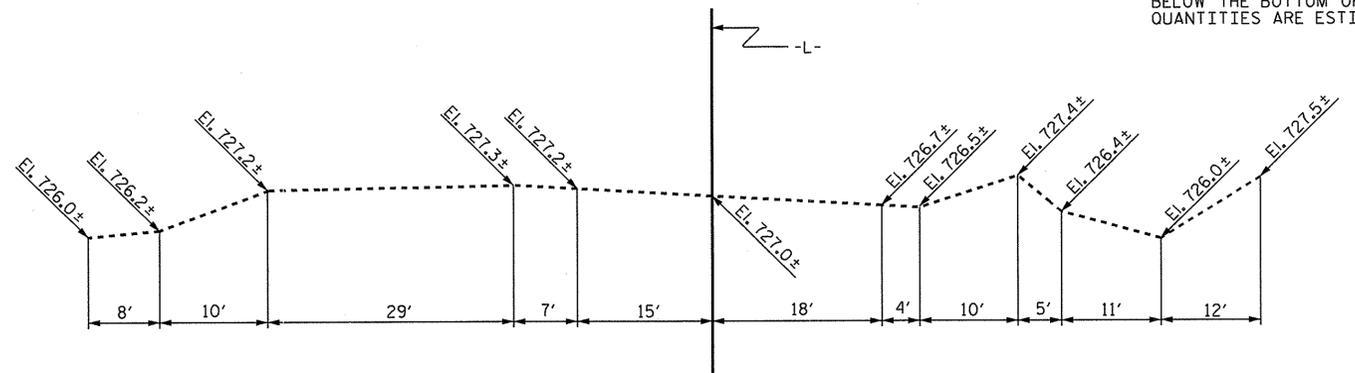
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS

TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
PHASE I	54.8 C.Y.
PHASE II	87.0 C.Y.
TOTAL	141.8 C.Y.
REINFORCING STEEL	
PHASE I	7,042 LBS.
PHASE II	10,545 LBS.
TOTAL	17,587 LBS.
FOUNDATION CONDITIONING MAT'L	200 TONS
CULVERT EXCAVATION	LUMP SUM
REMOVAL OF EXISTING STRUCTURE	LUMP SUM



PROFILE ALONG CULVERT

ROADWAY DATA	
GRADE PT. EL. @ STA. 13+06.00 -L-	= 737.14'
BED ELEV. @ STA. 13+06.00 -L-	= 725.80'
ROADWAY SLOPE	= 2 : 1
HYDRAULIC DATA	
DESIGN DISCHARGE	= 600 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 733.1'
DRAINAGE AREA	= 0.7 SQ. MI.
BASE DISCHARGE (Q100)	= 700 CFS
BASE HIGH WATER ELEVATION	= 733.51'
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 1100 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 736.9'

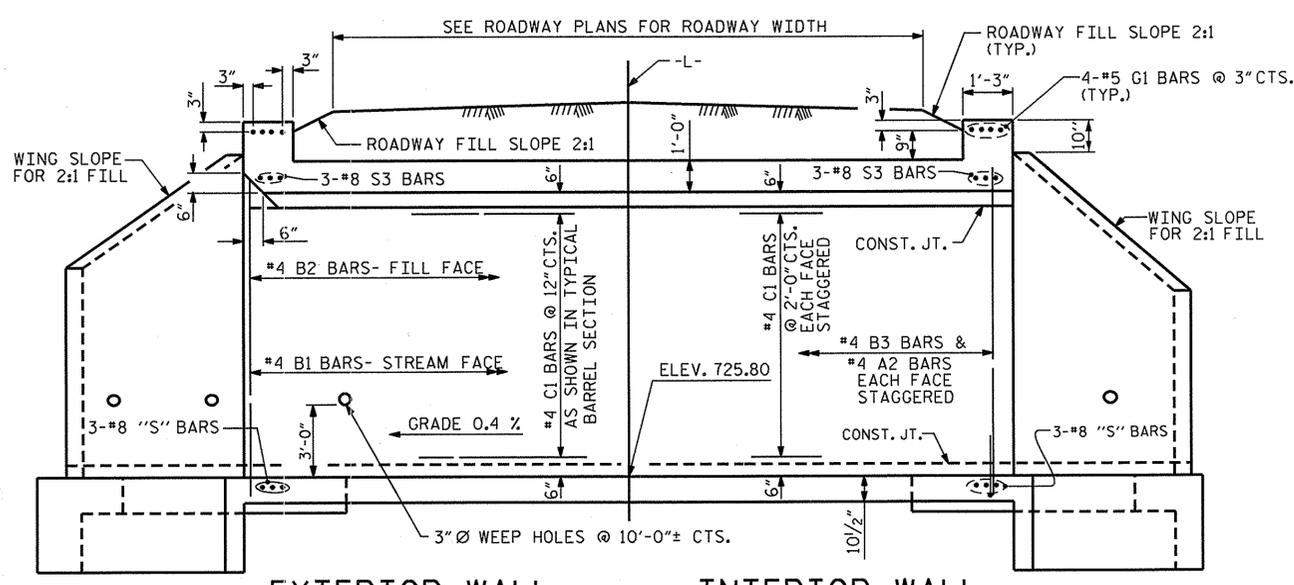


PROJECT NO. 41665.4A-97
RANDOLPH COUNTY
STATION: 13+06.00 -L-
SHEET 1 OF 6 REPLACES BRIDGE No. 97

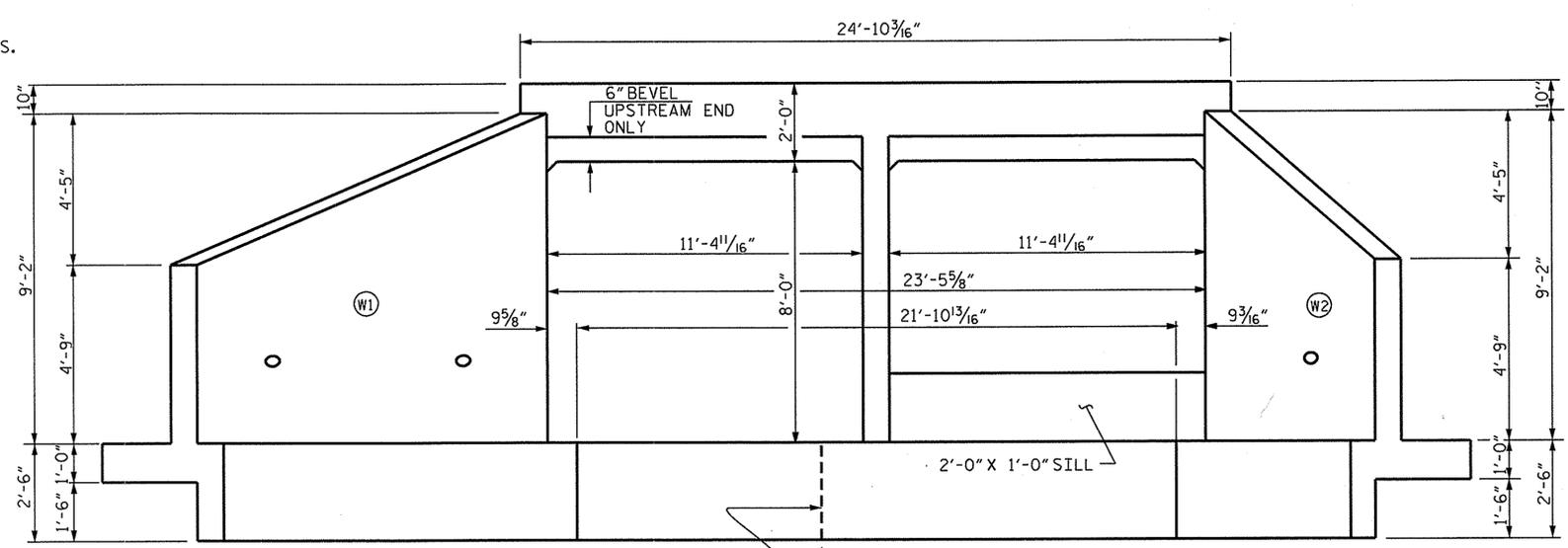
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
BARREL STANDARD
DOUBLE 11 FT. X 8 FT.
CONCRETE BOX CULVERT
104° SKEW

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	DATE:	
1			3		C-1
2			4		TOTAL SHEETS 6

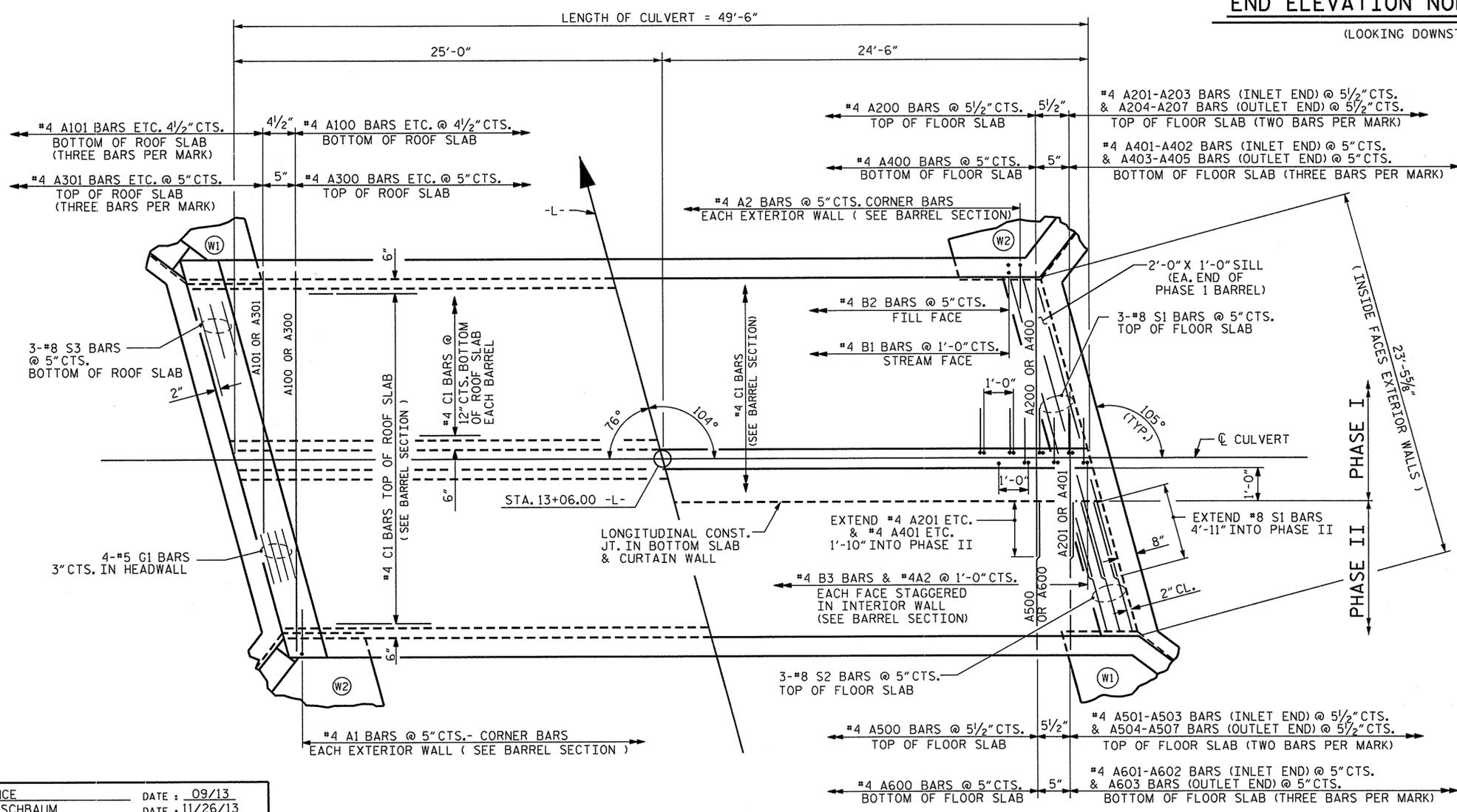
ADDED NOV. 1990
DRAWN BY: S. WANCE DATE: 09/13
CHECKED BY: T. KIRSCHBAUM DATE: 11/26/13
DESIGN ENGINEER OF RECORD: S. WANCE DATE: 09/13
DRAWN BY: R.W. WRIGHT DATE: OCT. 1989
CHECKED BY: C.R.K. DATE: OCT. 1989
STANDARD



EXTERIOR WALL INTERIOR WALL
 CULVERT SECTION NORMAL TO ROADWAY

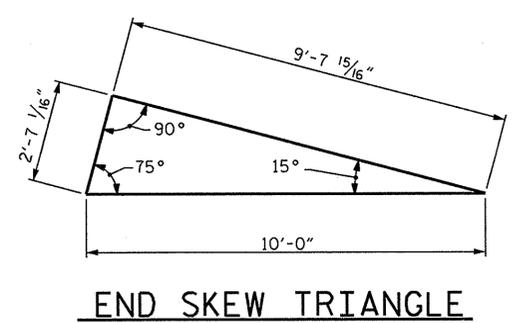


END ELEVATION NORMAL TO END SKEW
 (LOOKING DOWNSTREAM)



PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB



END SKEW TRIANGLE

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
 REVISION 8-26-92 BY E.L.R. CHECKED BY G.R.P.
 REDRAWN 11-30 BY A.M.B. CHECKED BY C.A.R.

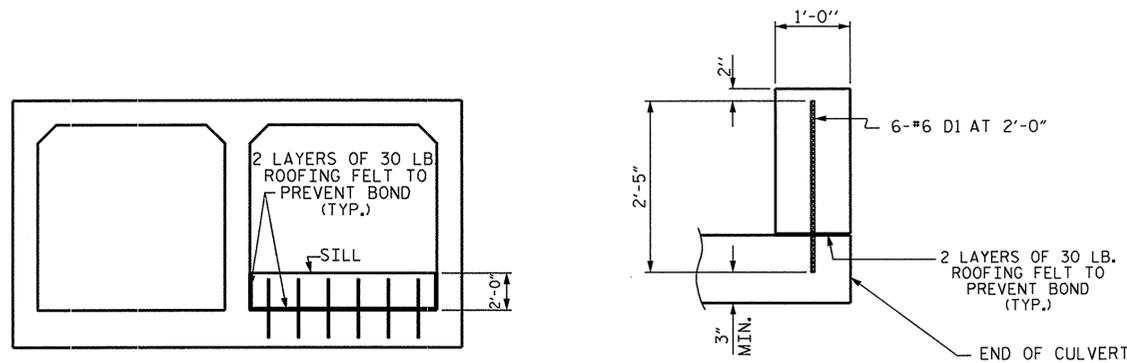
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 CHECKED BY: T. KIRSCHBAUM DATE: 11/26/13
 DESIGN ENGINEER OF RECORD: S. WANCE DATE: 09/13
 DRAWN BY: W. BRYAN STANLEY II DATE: NOV. 1971
 CHECKED BY: JOEL A. JOHNSON DATE: DEC. 1971

STANDARD



PROJECT NO. 41665.4A-97
 RANDOLPH COUNTY
 STATION: 13+06.00 -L-
 SHEET 2 OF 6

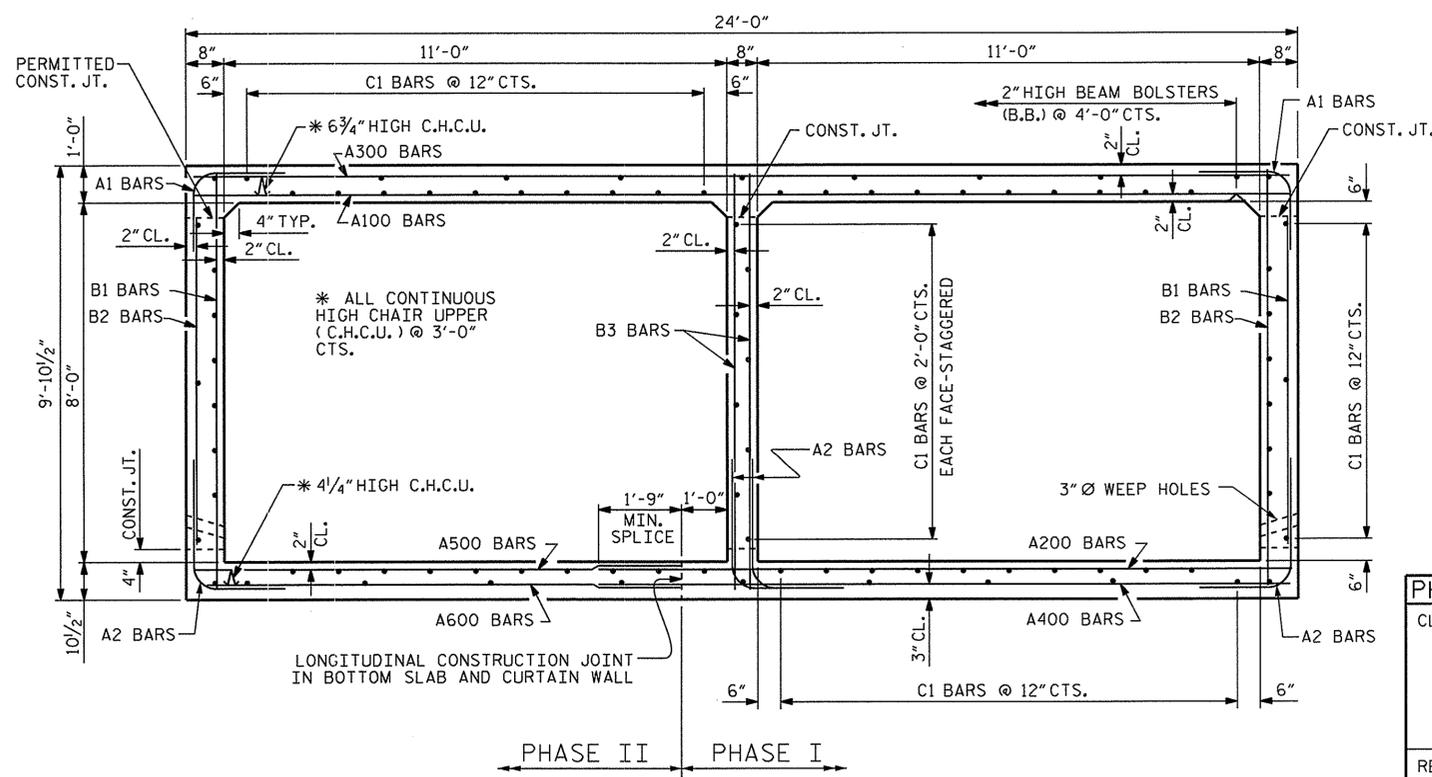
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
DOUBLE 11 FT. X 8 FT. CONCRETE BOX CULVERT 104° SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. C-2
					TOTAL SHEETS 6



ELEVATION
ONE SILL AT INLET AND OUTLET FACE (LOOKING DOWNSTREAM)

SECTION THROUGH SILL
* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

CULVERT SILL DETAILS



RIGHT ANGLE SECTION OF BARREL
(LOOKING DOWNSTREAM)
THERE ARE 88 "C" BARS IN SECTION OF BARREL.

BAR TYPE	PHASE I					PHASE II					
	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
A1	119	#4	3	5'-3"	417	A1	119	#4	3	5'-3"	417
A2	219	#4	3	4'-8"	683	A2	119	#4	3	4'-8"	371
A200	94	#4	STR	15'-0"	942	A100	115	#4	STR	23'-7"	1812
A201	2	#4	STR	11'-2"	15	A101	6	#4	STR	18'-11"	76
A202	2	#4	STR	7'-9"	10	A102	6	#4	STR	14'-9"	59
A203	2	#4	STR	4'-4"	6	A103	6	#4	STR	10'-7"	42
A204	2	#4	STR	12'-11"	17	A104	6	#4	STR	6'-4"	25
A205	2	#4	STR	9'-6"	13	A105	6	#4	STR	2'-2"	9
A206	2	#4	STR	6'-1"	8						
A207	2	#4	STR	2'-7"	3	A300	104	#4	STR	23'-7"	1638
						A301	6	#4	STR	18'-6"	74
A400	104	#4	STR	15'-0"	1042	A302	6	#4	STR	13'-10"	55
A401	3	#4	STR	9'-11"	20	A303	6	#4	STR	9'-2"	37
A402	3	#4	STR	5'-3"	11	A304	6	#4	STR	4'-6"	18
A403	3	#4	STR	13'-10"	28						
A404	3	#4	STR	9'-2"	18	A500	106	#4	STR	10'-5"	738
A405	3	#4	STR	4'-6"	9	A501	2	#4	STR	9'-6"	13
						A502	2	#4	STR	6'-1"	8
B1	50	#4	STR	9'-4"	312	A503	2	#4	STR	2'-7"	3
B2	119	#4	STR	7'-4"	583	A504	2	#4	STR	6'-7"	9
B3	100	#4	STR	9'-4"	623	A505	2	#4	STR	3'-2"	4
C1	68	#4	STR	25'-8"	1166	A600	116	#4	STR	10'-5"	807
						A601	3	#4	STR	9'-2"	37
D1	12	#6	STR	2'-5"	44	A602	3	#4	STR	4'-6"	18
						A603	3	#4	STR	5'-4"	11
S1	6	#8	STR	18'-7"	298						
						B1	50	#4	STR	9'-4"	312
						B2	119	#4	STR	7'-4"	583
						C1	108	#4	STR	25'-8"	1852
						G1	8	#5	STR	24'-6"	204
						S2	6	#8	STR	10'-11"	175
						S3	6	#8	STR	24'-6"	392

SPLICE LENGTHS CHART

BAR	SIZE	SPLICE LENGTH
A100	#4	1'-9"
A200	#4	1'-9"
A300	#4	1'-9"
A400	#4	1'-9"
B1	#4	1'-9"
B3	#4	1'-9"
C1	#4	1'-11"
S1	#8	4'-11"

REINFORCING STEEL	LBS.	REINFORCING STEEL	LBS.
CLASS A CONCRETE		CLASS A CONCRETE	
BARREL @ 0.811 CY/FT	40.2 CY	BARREL @ 1.457 CY/FT	72.1 CY
SILLS	1.7 CY		
TOTAL	41.9 CY	TOTAL	72.1 CY
FOUNDATION COND. MAT'L	47 TONS	FOUNDATION COND. MAT'L	38 TONS

PHASE I STRUCTURE QUANTITIES		PHASE II STRUCTURE QUANTITIES	
CLASS A CONCRETE		CLASS A CONCRETE	
BARREL	40.2 C.Y.	BARREL	72.1 C.Y.
SILLS	1.7 C.Y.	WINGS ETC.	14.9 C.Y.
WINGS ETC.	12.9 C.Y.	TOTAL	87.0 C.Y.
TOTAL	54.8 C.Y.		
REINFORCING STEEL		REINFORCING STEEL	
BARREL & SILLS	6,268 LBS.	BARREL	9,771 LBS.
WINGS ETC.	774 LBS.	WINGS ETC.	774 LBS.
TOTAL	7,042 LBS.	TOTAL	10,545 LBS.
FOUNDATION CONDITIONING MAT'L	47 TONS	FOUNDATION CONDITIONING MAT'L	38 TONS
CULVERT EXCAVATION	LUMP SUM	CULVERT EXCAVATION	LUMP SUM

PROJECT NO. 41665.4A-97
RANDOLPH COUNTY
STATION: 13+06.00 -L-
SHEET 3 OF 6

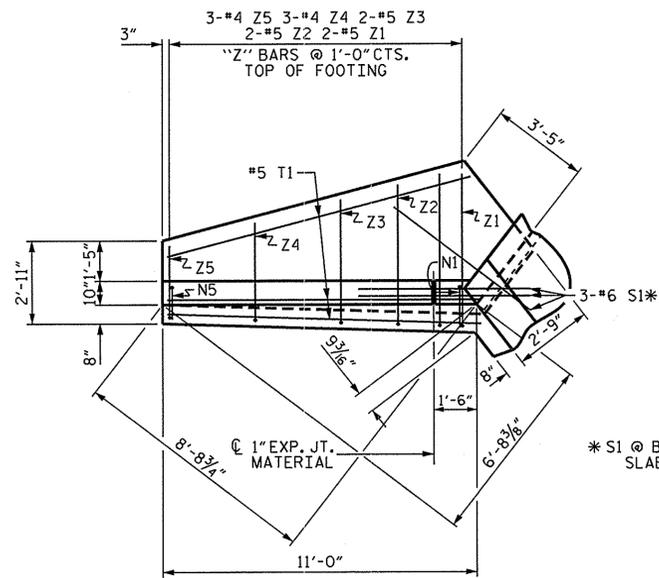


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

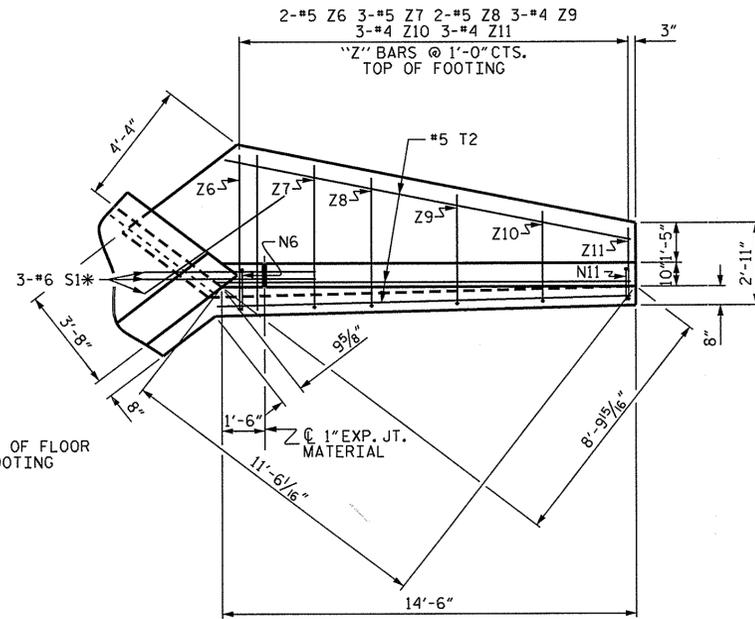
DOUBLE 11 FT. X 8 FT. CONCRETE BOX CULVERT 104° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3
1			3			TOTAL SHEETS
2			4			6

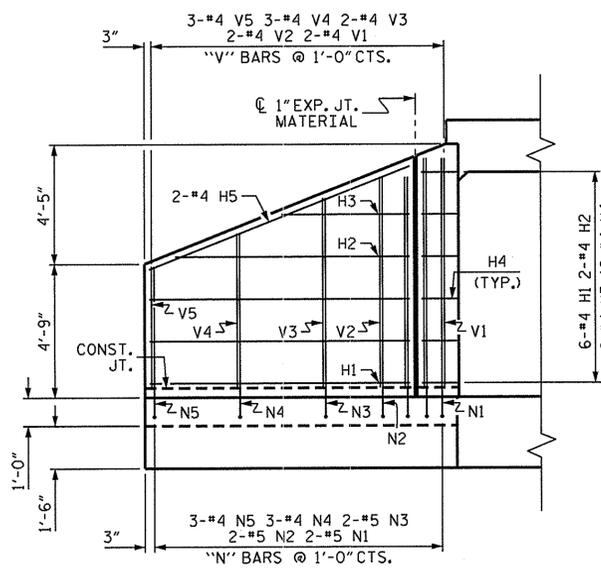
DRAWN BY: S. WANCE DATE: 09/13
CHECKED BY: T. KIRSCHBAUM DATE: 11/26/13
DESIGN ENGINEER OF RECORD: S. WANCE DATE: 09/13



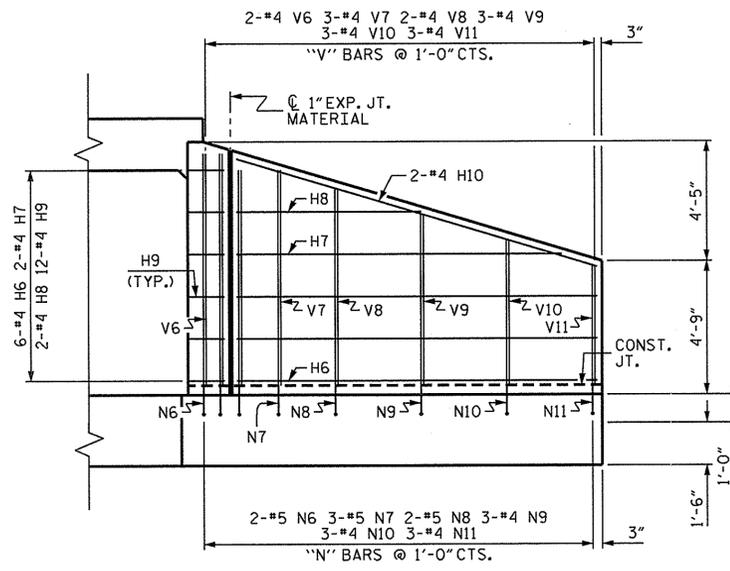
PLAN W2



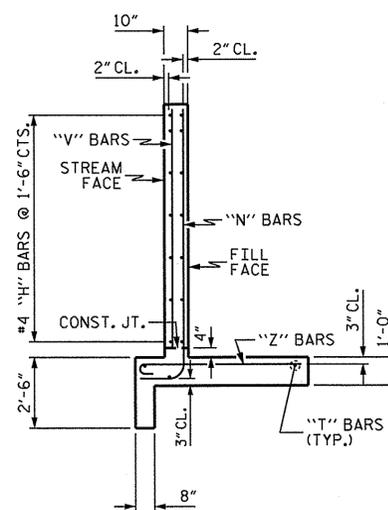
PLAN W1



ELEVATION W2



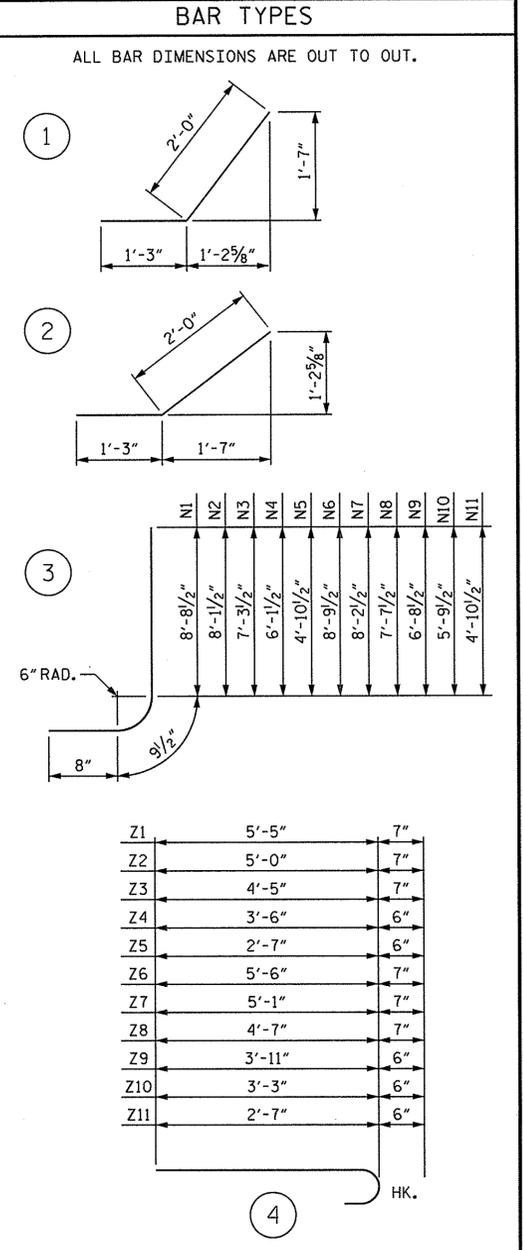
ELEVATION W1



TYPICAL WING SECTION

PHASE I WING QUANTITIES	
REINFORCING STEEL FOR 2 WINGS	774 LBS.
CLASS A CONCRETE	
PHASE I WINGS	11.3 CY
2 PARTIAL END CURTAIN WALLS	1.6 CY
TOTAL	12.9 CY
PHASE II WING QUANTITIES	
REINFORCING STEEL FOR 2 WINGS	774 LBS.
CLASS A CONCRETE	
PHASE II WINGS	11.3 CY
2 PARTIAL END CURTAIN WALLS	1.3 CY
2 HEADWALLS	2.3 CY
TOTAL	14.9 CY

BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	9'-1"	36
H2	2	#4	STR	8'-2"	11
H3	2	#4	STR	4'-5"	6
H4	12	#4	1	3'-3"	26
H5	2	#4	STR	9'-10"	13
H6	6	#4	STR	12'-7"	50
H7	2	#4	STR	11'-4"	15
H8	2	#4	STR	6'-5"	9
H9	12	#4	2	3'-3"	26
H10	2	#4	STR	13'-2"	18
N1	2	#5	3	10'-2"	21
N2	2	#5	3	9'-7"	20
N3	2	#5	3	8'-9"	18
N4	3	#4	3	7'-7"	15
N5	3	#4	3	6'-4"	13
N6	2	#5	3	10'-3"	21
N7	3	#5	3	9'-8"	30
N8	2	#5	3	9'-1"	19
N9	3	#4	3	8'-2"	16
N10	3	#4	3	7'-3"	15
N11	3	#4	3	6'-4"	13
S1	6	#6	STR	6'-0"	54
T1	3	#5	STR	11'-0"	34
T2	3	#5	STR	14'-6"	45
V1	2	#4	STR	8'-2"	11
V2	2	#4	STR	7'-6"	10
V3	2	#4	STR	6'-9"	9
V4	3	#4	STR	5'-6"	11
V5	3	#4	STR	4'-4"	9
V6	2	#4	STR	8'-3"	11
V7	3	#4	STR	7'-8"	15
V8	2	#4	STR	7'-0"	9
V9	3	#4	STR	6'-1"	12
V10	3	#4	STR	5'-2"	10
V11	3	#4	STR	4'-3"	9
Z1	2	#5	4	6'-0"	13
Z2	2	#5	4	5'-7"	12
Z3	2	#5	4	5'-0"	10
Z4	3	#4	4	4'-0"	8
Z5	3	#4	4	3'-1"	6
Z6	2	#5	4	6'-1"	13
Z7	3	#5	4	5'-8"	18
Z8	2	#5	4	5'-2"	11
Z9	3	#4	4	4'-5"	9
Z10	3	#4	4	3'-9"	8
Z11	3	#4	4	3'-1"	6
REINFORCING STEEL FOR 2 WINGS	774 LBS				



ASSEMBLED BY : S. WANCE DATE : 09/13
 CHECKED BY : T. KIRSCHBAUM DATE : 11/26/13
 DRAWN BY : CCJ 01/00
 CHECKED BY : RWW 03/00

PROJECT NO. 41665.4A-97
 RANDOLPH COUNTY
 STATION: 13+06.00 -L-
 SHEET 4 OF 6

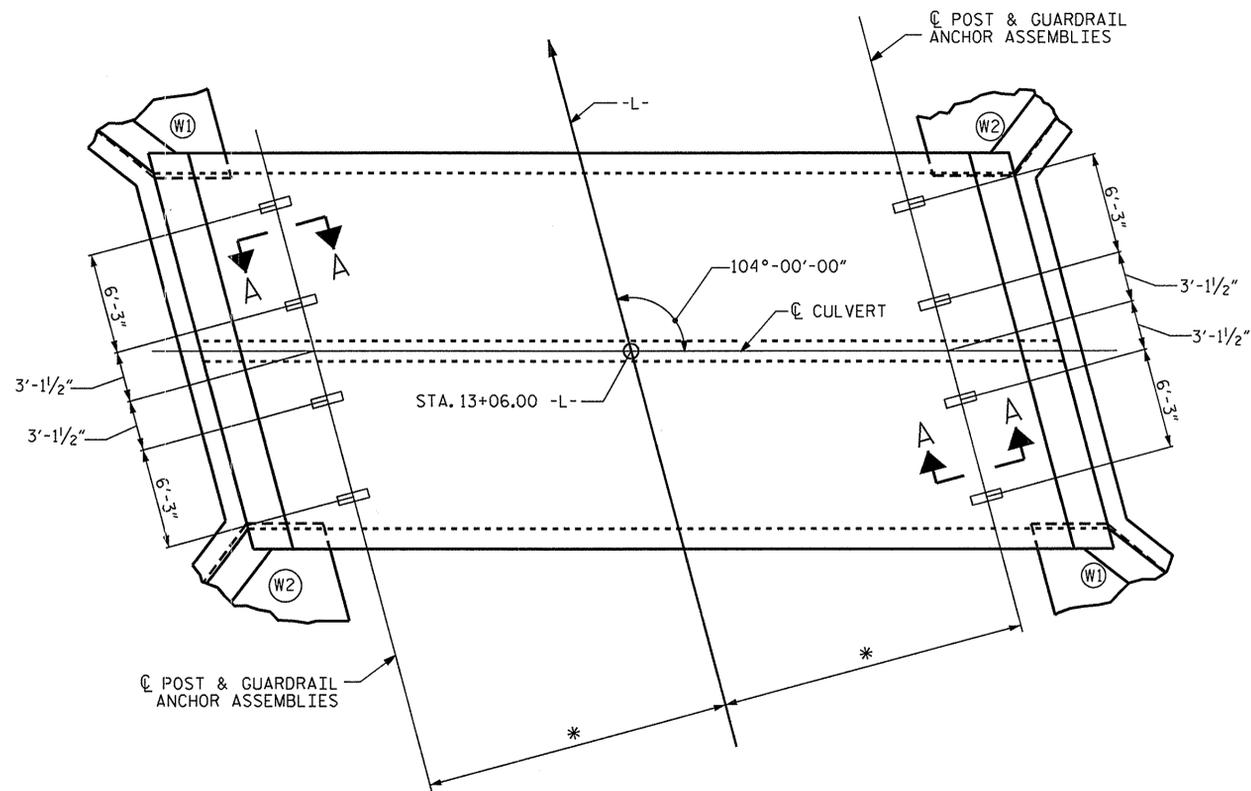


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD WINGS
 FOR
CONCRETE BOX CULVERT
 H = 8'-0" SLOPE = 2:1
 105° HEADWALL SKEW

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

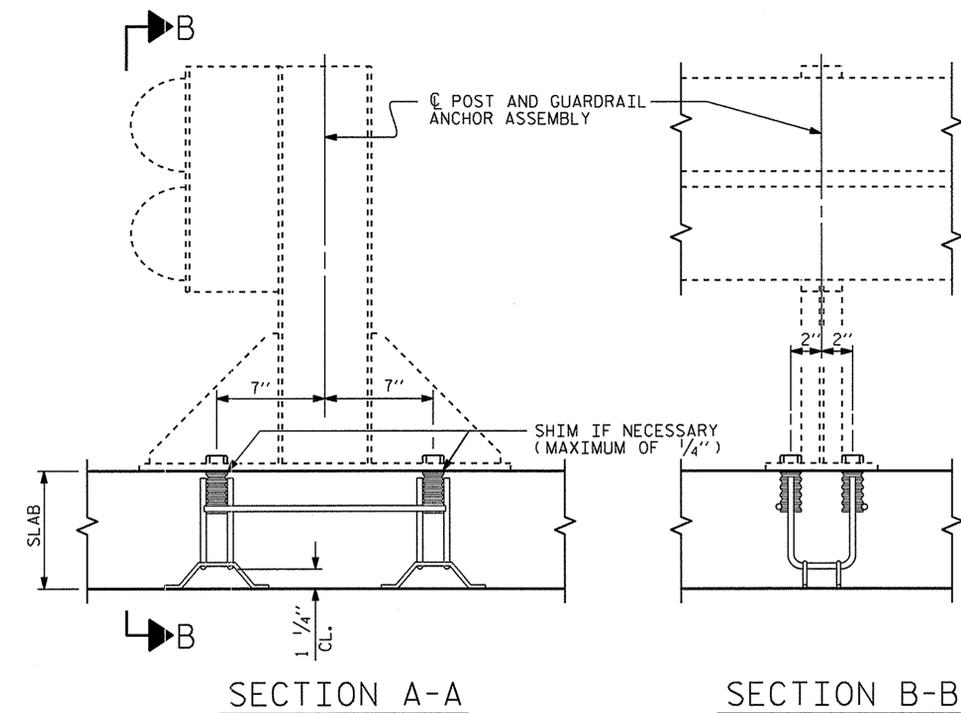
C-4
 TOTAL SHEETS 6

STD. NO. CW7508



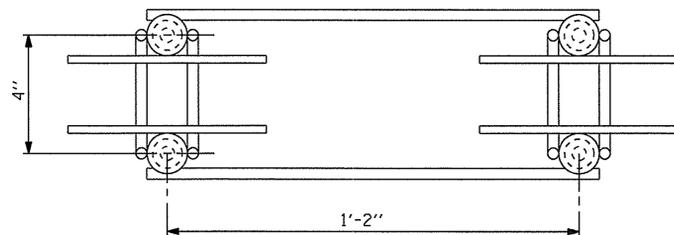
PLAN

SHOWING GUARDRAIL ANCHOR ASSEMBLY SPACING.
 * THIS DIMENSION TO BE FURNISHED BY THE ENGINEER.

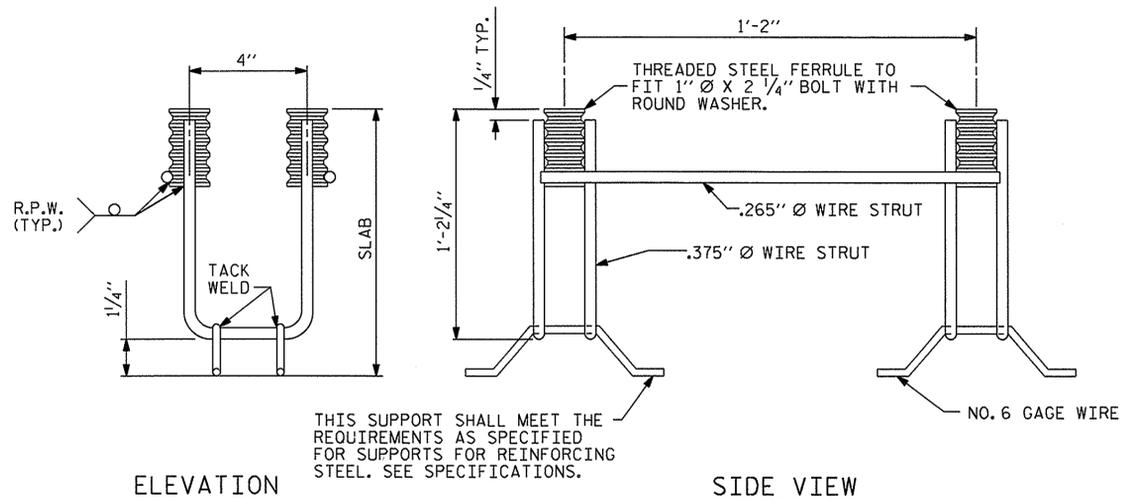


SECTION A-A

SECTION B-B



PLAN



ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2 1/2".
- B. 4 - 1" Ø X 2 1/4" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.



PROJECT NO. 41665.4A-97
 RANDOLPH COUNTY
 STATION: 13+06.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 ANCHORAGE DETAILS FOR
 GUARDRAIL ANCHOR ASSEMBLY
 FOR CULVERT

DRAWN BY : S. WANCE DATE : 09/13
 CHECKED BY : T. KIRSCHBAUM DATE : 11/26/13
 DESIGN ENGINEER OF RECORD : S. WANCE DATE : 09/13

DRAWN BY : FCJ 6/88 REV. 5/7/03 RWW/JTE
 CHECKED BY : ARB 6/88 REV. 5/1/06R KMM/GM
 REV. 10/1/11 MAA/GM

STANDARD

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			6

**LOAD AND RESISTANCE FACTOR RATING (LRFR)
SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS**

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (LL)	MOMENT				SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (FT)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.04	--	1.75	1.04	1	TOP SLAB	4.96	1.13	1	TOP SLAB	10.60		
	HL-93 (OPERATING)	N/A		1.35	--	1.35	1.35	1	TOP SLAB	4.96	1.46	1	TOP SLAB	10.60		
	HS-20 (INVENTORY)	36,000	②	1.15	41.24	1.75	1.18	1	BOTTOM SLAB	10.79	1.15	1	BOTTOM SLAB	10.70		
	HS-20 (OPERATING)	36,000		1.48	53.46	1.35	1.53	1	BOTTOM SLAB	10.79	1.48	1	BOTTOM SLAB	10.70		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		2.17	29.32	1.40	2.17	1	TOP SLAB	4.96	2.52	1	TOP SLAB	10.60	
		SNGARBS2	20,000		2.03	40.70	1.40	2.03	1	TOP SLAB	4.96	2.28	1	BOTTOM SLAB	10.70	
		SNAGRIS2	22,000		2.08	45.79	1.40	2.16	1	BOTTOM SLAB	10.79	2.08	1	BOTTOM SLAB	10.70	
		SNCOTTS3	27,250		1.30	35.50	1.40	1.30	1	TOP SLAB	4.96	1.40	1	TOP SLAB	10.60	
		SNAGGRS4	34,925		1.31	45.92	1.40	1.31	1	BOTTOM SLAB	10.79	1.32	1	BOTTOM SLAB	10.70	
		SNS5A	35,550		1.33	47.36	1.40	1.33	1	BOTTOM SLAB	10.79	1.35	1	BOTTOM SLAB	10.70	
		SNS6A	39,950		1.31	52.25	1.40	1.35	1	BOTTOM SLAB	10.79	1.31	1	BOTTOM SLAB	10.70	
		SNS7B	42,000		1.23	51.73	1.40	1.30	1	BOTTOM SLAB	10.79	1.23	1	BOTTOM SLAB	10.70	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		1.41	46.39	1.40	1.48	1	BOTTOM SLAB	10.79	1.41	1	BOTTOM SLAB	10.70	
		TNT4A	33,075		1.55	51.36	1.40	1.55	1	TOP SLAB	4.96	1.60	1	BOTTOM SLAB	10.70	
		TNT6A	41,600		1.35	56.24	1.40	1.42	1	BOTTOM SLAB	10.79	1.35	1	BOTTOM SLAB	10.70	
		TNT7A	42,000		1.30	54.47	1.40	1.39	1	BOTTOM SLAB	10.79	1.30	1	BOTTOM SLAB	10.70	
		TNT7B	42,000		1.38	57.78	1.40	1.38	1	BOTTOM SLAB	10.79	1.40	1	BOTTOM SLAB	10.70	
		TNAGRIT4	43,000		1.27	54.60	1.40	1.30	1	BOTTOM SLAB	10.79	1.27	1	BOTTOM SLAB	10.70	
TNAGT5A	45,000		1.19	53.74	1.40	1.23	1	BOTTOM SLAB	10.79	1.19	1	BOTTOM SLAB	10.70			
TNAGT5B	45,000		③	1.10	49.41	1.40	1.15	1	BOTTOM SLAB	10.79	1.10	1	BOTTOM SLAB	10.70		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS		
LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

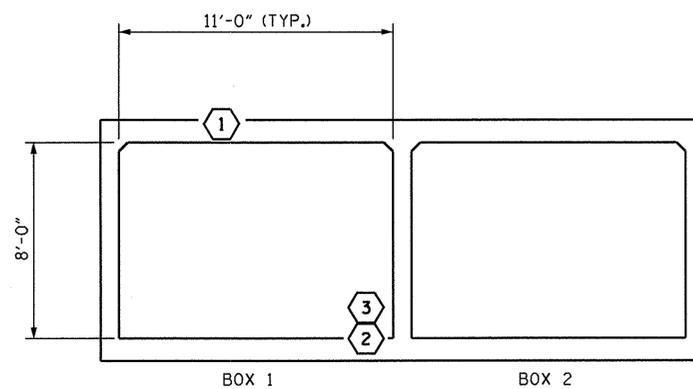
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. 41665.4A-97
RANDOLPH COUNTY
 STATION: 13+06.00 -L-

SHEET 6 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

DRAWN BY: S. WANCE DATE: 09/13
 CHECKED BY: T. KIRSCHBAUM DATE: 11/26/13
 DESIGN ENGINEER OF RECORD: S. WANCE DATE: 09/13

DRAWN BY: WMC 7/11 REV. 10/1/11 MAA/GM
 CHECKED BY: GM 7/11

STANDARD

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS 6
2			4			

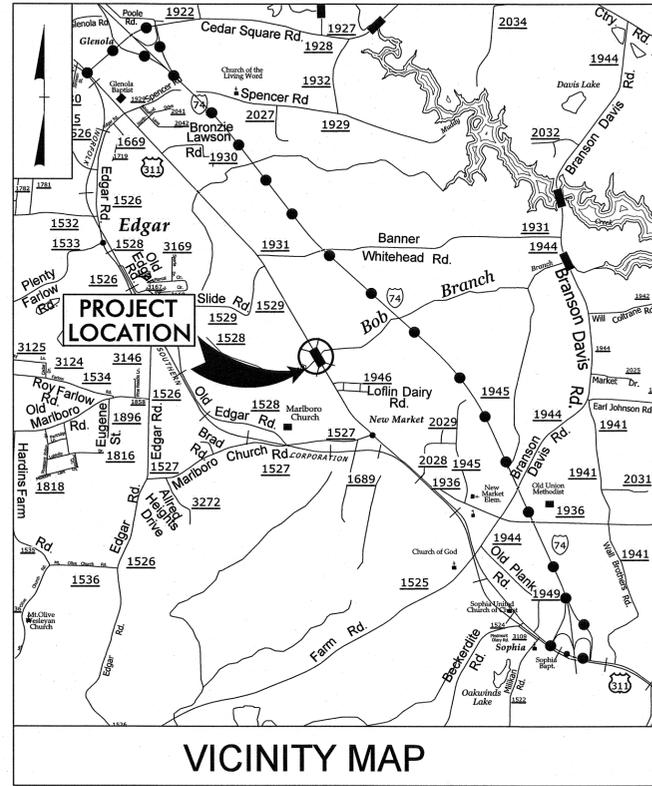
09/08/15

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology Sheet

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	41665.4A-31	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
41665.4A	N/A	PE	
41665.4A	N/A	R/W, UTILITIES	
41665.4A	N/A	CONSTR.	

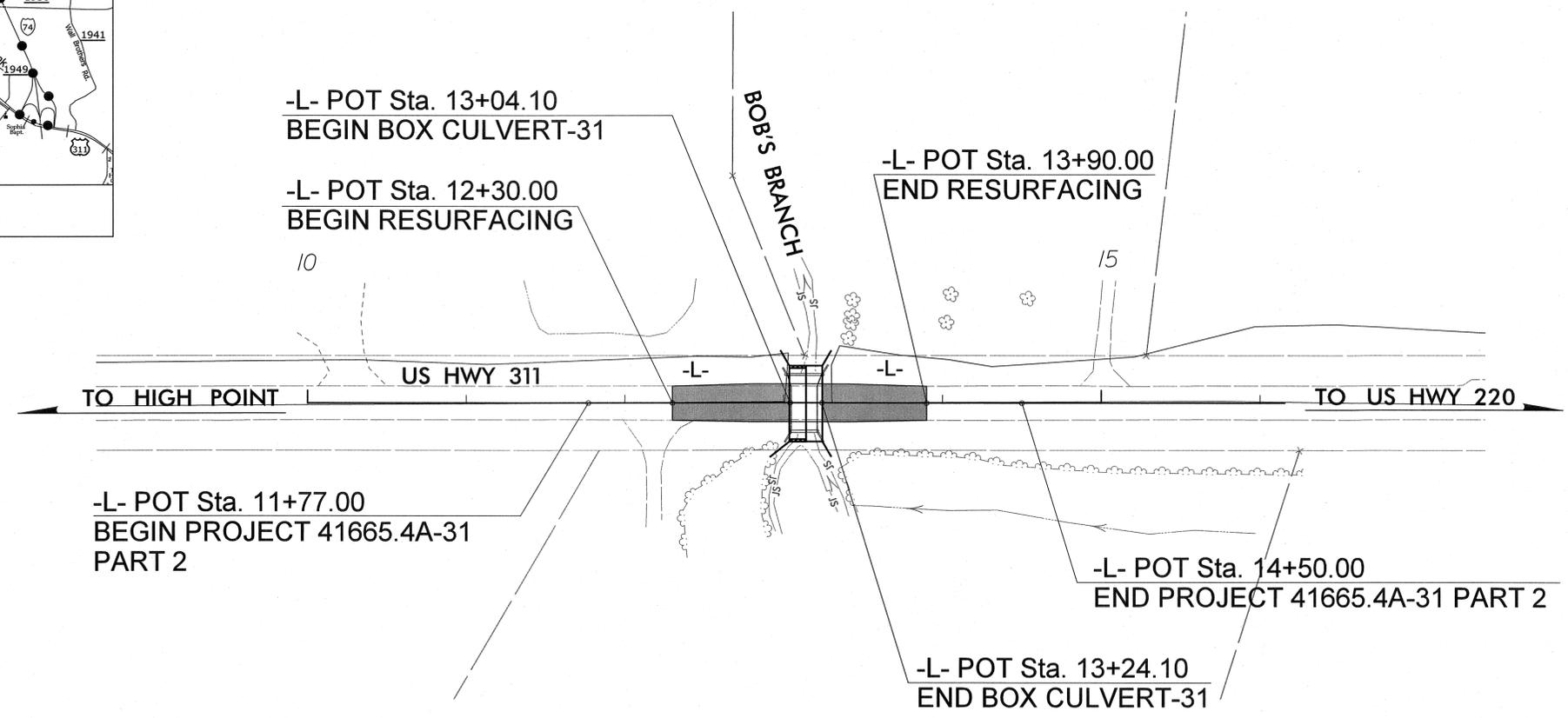
PROJECT: 41665.4A-31



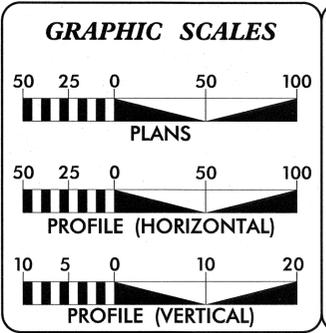
RANDOLPH COUNTY

**LOCATION: REPLACE EXISTING CULVERT NO. 31
US HWY 311**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, BOX
CULVERT, AND PAVEMENT MARKINGS**



CONTRACT: DH00171



DESIGN DATA

ADT 2011 = 14,000
V = 55 MPH

PROJECT LENGTH

LENGTH ROADWAY PROJECT 41665.4A-31	=	0.048 MI
LENGTH STRUCTURE PROJECT 41665.4A-31	=	0.004 MI
TOTAL LENGTH PROJECT 41665.4A-31	=	0.052 MI

PLANS PREPARED BY: PARSONS BRINCKERHOFF 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 LICENSE NO. E-0165	PLANS PREPARED FOR: DIVISION OF HIGHWAYS 1000 Birch Ridge Dr. Raleigh NC, 27610
RIGHT OF WAY DATE: AUGUST 20, 2014	DAVID KEISER, PE PROJECT ENGINEER
LETTING DATE: JUNE 9, 2015	LAUREN WILSON, EI PROJECT DESIGN ENGINEER
NCDOT CONTACT:	TIM WELCH, PE DIVISION BRIDGE - PROGRAM MANAGER

HYDRAULICS ENGINEER

W. Helen Caid 5/12/15
SIGNATURE

ROADWAY DESIGN ENGINEER

David Z. Keiser 5/13/15
SIGNATURE

Professional Engineer Seals for W. Helen Caid and David Z. Keiser.

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

Professional Engineer Seal for David Z. Keiser.

STATE HIGHWAY DESIGN ENGINEER

9:44:00 AM
41665.4A-31.Rdy - fsh.dgn
5/12/2015

SURVEY CONTROL SHEET 41665.4A-31

WBS 41665.4A

PROJECT REFERENCE NO. 41665.4A-31	SHEET NO. 1-C
Location and Surveys	

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

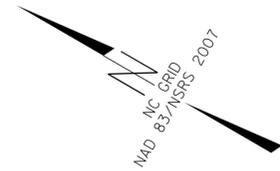
NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION](https://connect.ncdot.gov/resources/location)

THE FILES TO BE FOUND ARE AS FOLLOWS:
41665.4A_31_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.



-BL- 1 (RAN31-1) GPS
N=764633.8950
E=1738222.9290
ELEV.=745.682'



-L- POT Sta.11+77.00
BEGIN PROJECT 41665.4A
PART 2 BMI 
BMI ELEVATION = 736.87'
N 764407 E 1738409
EL STATION 11+00.00 77' LEFT
RR SPIKE IN BASE OF 24" PINE

-L- POT Sta.13+90.00
END RESURFACING

-BL- 102
N=763932.3110
E=1738622.1240
ELEV.=741.32'

-BL- 101
N=764196.963
E=1738422.1410
ELEV.=735.93'

-L- POT Sta.14+50.00
END PROJECT 41665.4A
PART 2

S 30° 08' 15.3" E
US HWY 311 22' PAVED ROADWAY

STRUCTURE #31 = 6.6'X16' CONC CULVERT

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "RAN31-1"

WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 764633.895(ft) EASTING: 1738222.929(ft)
ELEVATION: 745.682(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998957454

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "RAN31-1" TO -L- 10+00.00 STATION IS
S 21° 03' 03.98" E 191.92'

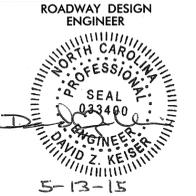
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

BMI ELEVATION = 736.87'
N 764407 E 1738409
EL STATION 11+00.00 77' LEFT
RR SPIKE IN BASE OF 24" PINE

CULVERT #1
ONE BARREL

	NORTH	EAST	ELEV.
CUL1	764200.23	1738460.97	727.95
CUL2	764186.43	1738469.11	727.87
CE1	764190.45	1738466.66	734.52
HW1	764190.48	1738466.66	736.75
CUL3	764167.99	1738436.96	727.85
CUL4	764181.82	1738428.89	727.87
CE2	764174.96	1738433.46	734.49
HW2	764175.04	1738433.42	736.72

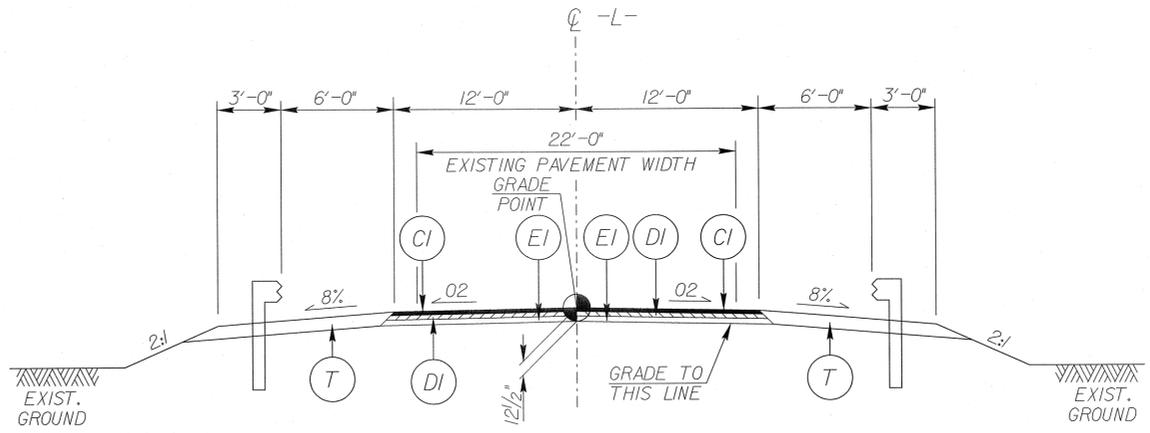
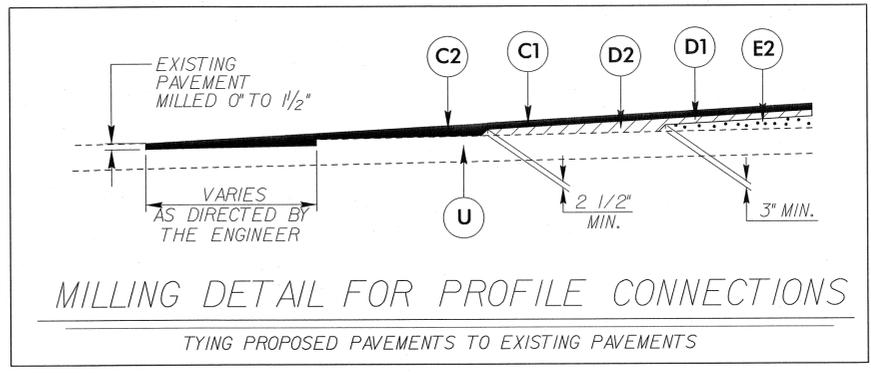
NOTE: DRAWING NOT TO SCALE



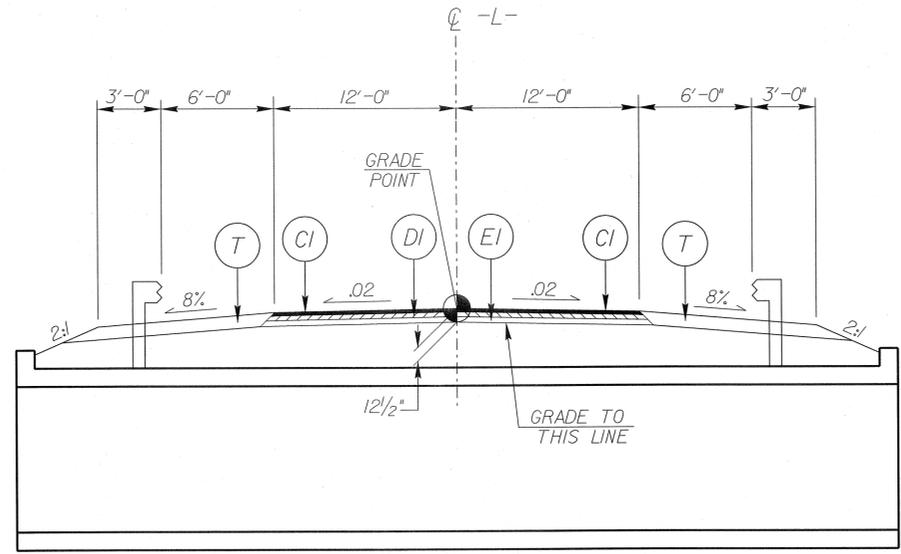
PLANS PREPARED BY:
PARSONS BRINCKERHOFF
 434 FAYETTEVILLE STREET
 SUITE 1500
 RALEIGH, NC 27601

PAVEMENT SCHEDULE	
C1	PROPOSED APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD, IN EACH OF TWO LAYERS.
C2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" OR GREATER THAN 2" IN DEPTH.
D1	PROPOSED APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I9.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.
D2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I9.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.
E1	PROPOSED APPROXIMATE 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YARD.
E2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5 1/2" IN DEPTH.
T	EARTH MATERIAL

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE SHOWN.



USE TYPICAL SECTION No. 1 AS FOLLOWS:
 TRANSITION FROM EXISTING TO T.S. NO. 1 FROM -L- STA. 12+30.00 TO -L- STA. 12+80.00
 FROM -L- STA. 12+80.00 TO -L- STA. 13+04.10 (BEGIN CULVERT)
 FROM -L- STA. 13+24.10 (END CULVERT) TO -L- STA. 13+40.00
 TRANSITION FROM T.S. NO. 1 TO EXISTING FROM -L- STA. 13+40.00 TO -L- STA. 13+90.00

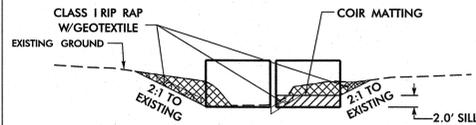


USE TYPICAL SECTION No. 2 AS FOLLOWS:
 FROM -L- STA. 13+04.10 (BEGIN CULVERT) TO -L- STA. 13+24.10 (END CULVERT)

6/2/99 9:44:35 AM 41665.4A-31.Rdy_typ.dgn 5/17/2015

8/17/99

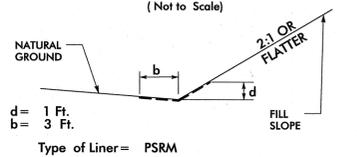
INLET/OUTLET CHANNEL DETAIL (Not to Scale)



EST. 55 TONS CLASS I RIP RAP
EST. 55 SY GEOTEXTILE
EST. 20 SY COIR MAT
EST. 55 TONS CLASS B RIP RAP
EST. 230 CY EXCAVATION

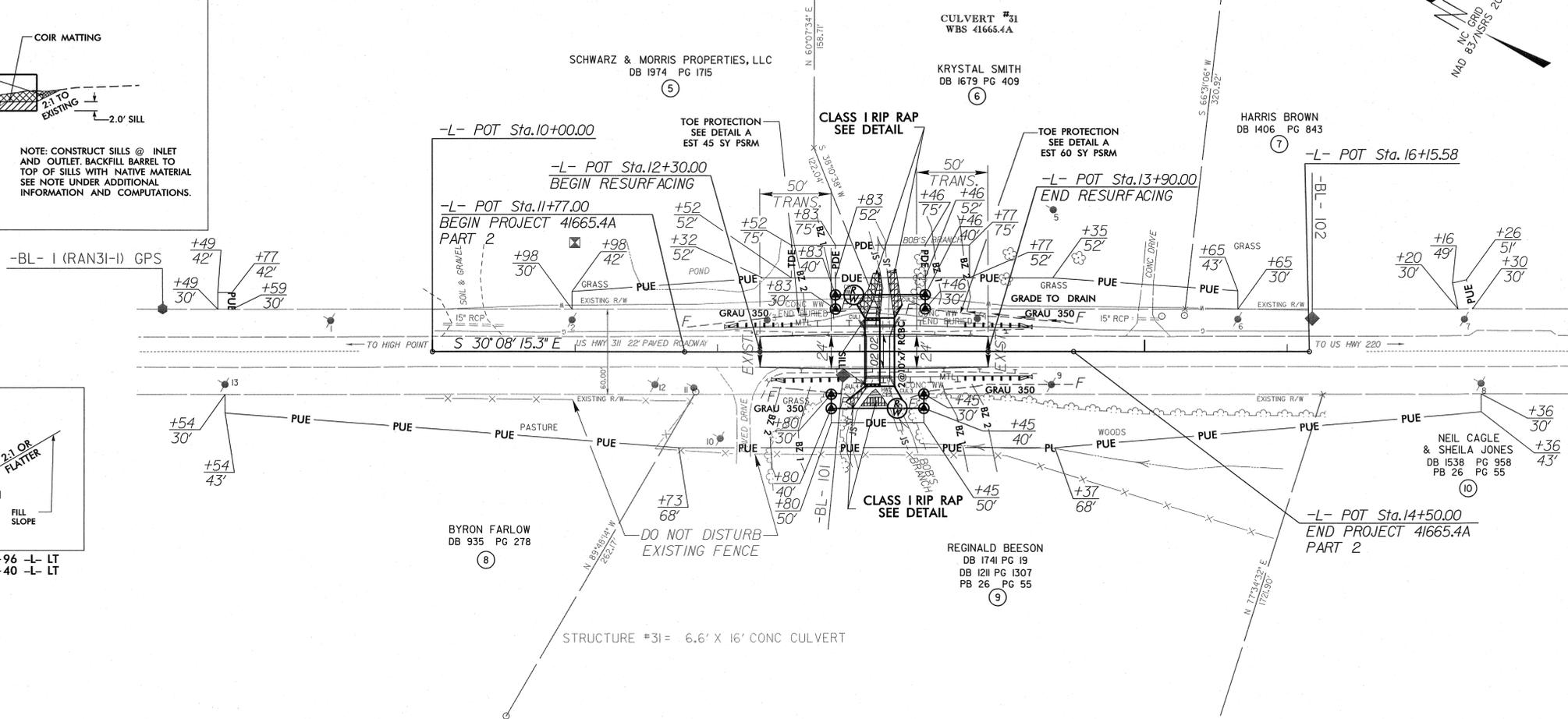
NOTE: CONSTRUCT SILLS @ INLET AND OUTLET. BACKFILL BARREL TO TOP OF SILLS WITH NATIVE MATERIAL. SEE NOTE UNDER ADDITIONAL INFORMATION AND COMPUTATIONS.

DETAIL A TOE PROTECTION (Not to Scale)

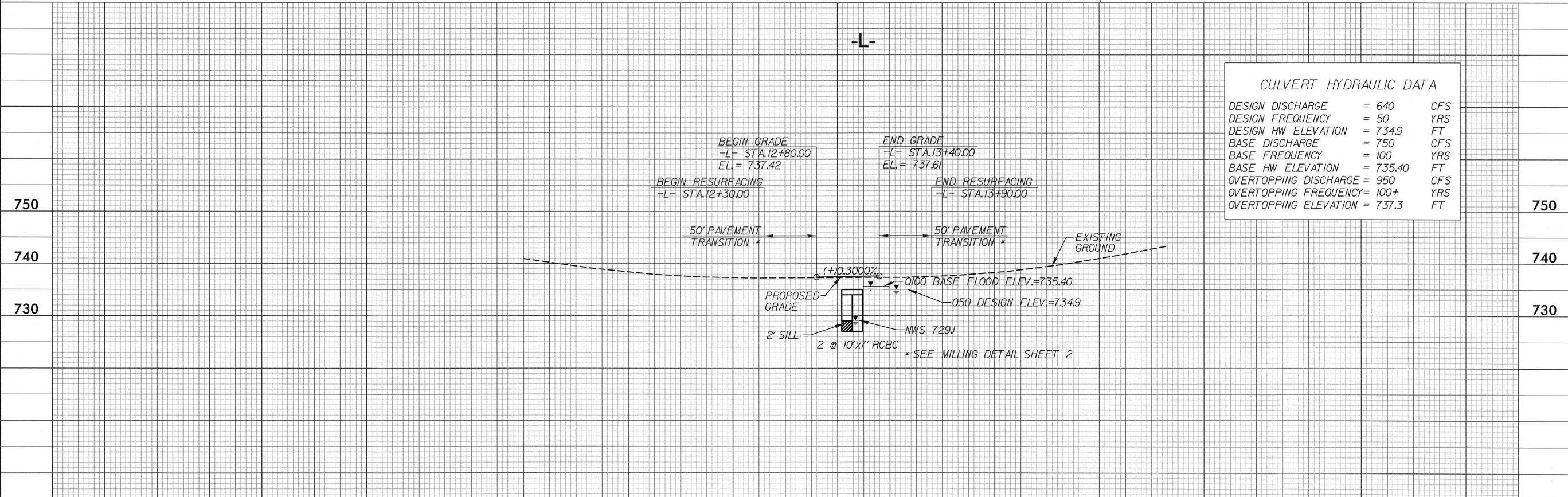


FROM STA. 12+20 TO STA. 12+96 -L- LT
FROM STA. 13+35 TO STA. 14+40 -L- LT

RANDOLPH COUNTY LOW IMPACT BRIDGE



PROJECT REFERENCE NO. 41665.4A-31	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PLANS PREPARED BY: PARSONS BRINCKERHOFF 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 LICENSE NO. E-0165	



DESIGN DISCHARGE	= 640	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 734.9	FT
BASE DISCHARGE	= 750	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 735.40	FT
OVERTOPPING DISCHARGE	= 950	CFS
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING ELEVATION	= 737.3	FT

4:05:54 PM
41665.4A-31_rdy_psh_sheet4.dgn
5/15/2015

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE PROJECT REFERENCE NO.	SHEET NO.
41665.4A - 31	TCP-1

**PLAN FOR PROPOSED
TRAFFIC CONTROL, MARKING & DELINEATION
RANDOLPH COUNTY**

PROJECT: 41665.4A - 31

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JULY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES & OFFSETS
1205.02	PAVEMENT MARKINGS - 2 LANE & MULTILANE ROADWAYS
1261.01	GUARDRAIL & BARRIER DELINEATOR SPACING
1261.02	GUARDRAIL & BARRIER DELINEATOR TYPE
1262.01	GUARDRAIL END DELINEATION

INDEX OF SHEETS

SHEET NO.	TITLE
TCP-1	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, LEGEND AND INDEX OF SHEETS
TCP-2	GENERAL NOTES, PHASING AND DETOUR SIGNING
TCP-3 THRU TCP-4	SPECIAL DETOUR SIGNING

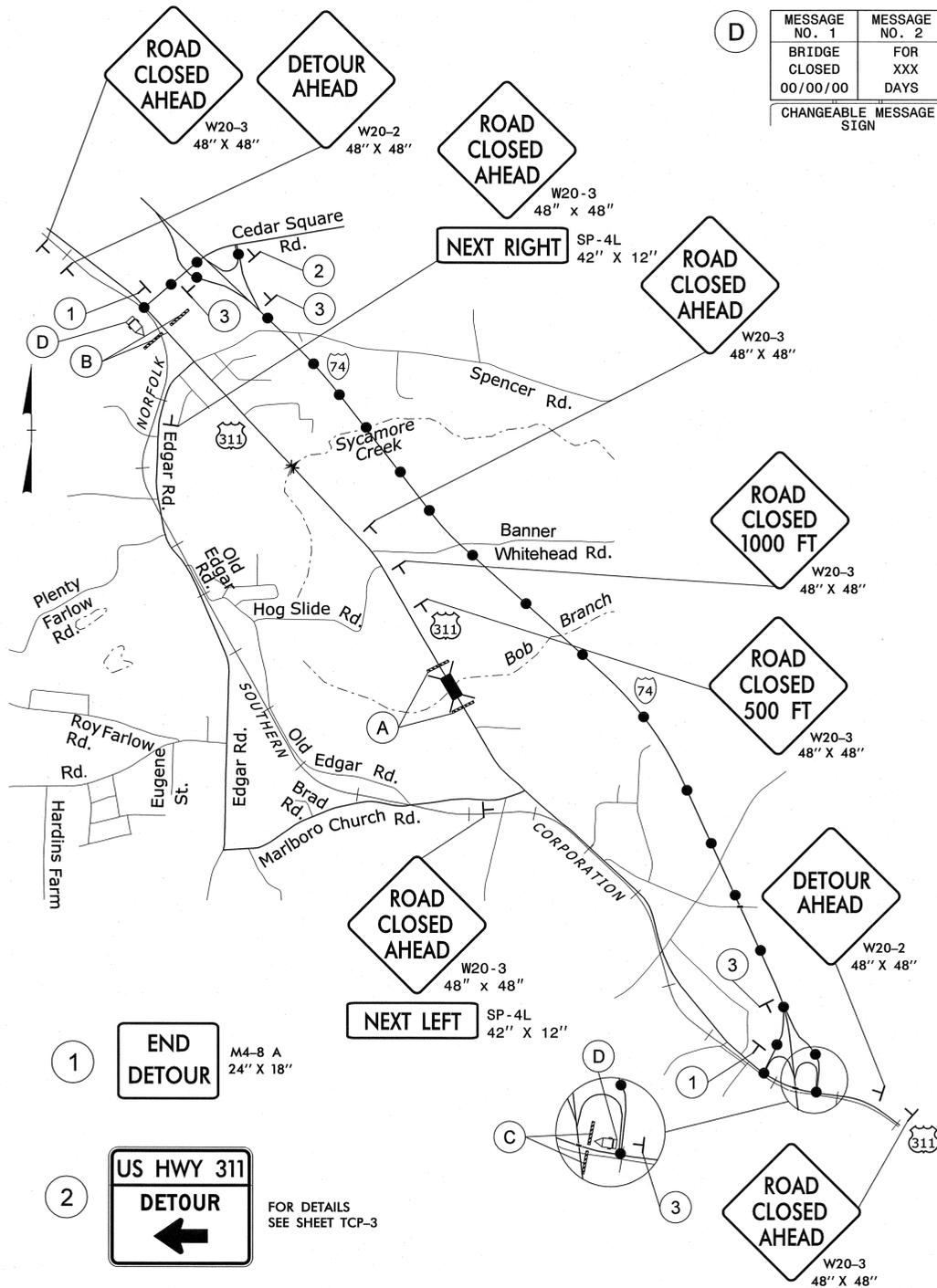
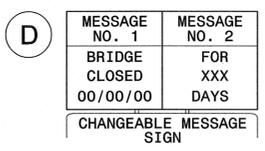
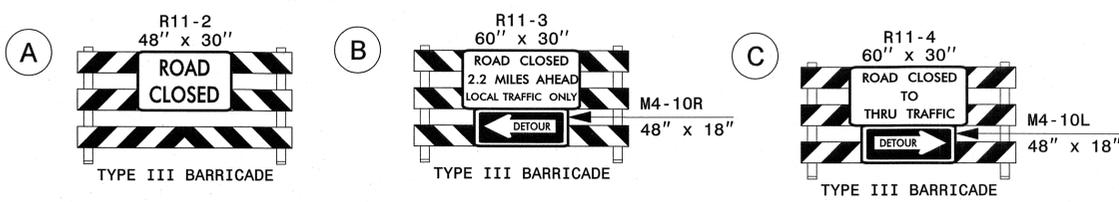
LEGEND

- GENERAL**
- DIRECTION OF TRAFFIC FLOW
 - NORTH ARROW
 - PROPOSED PVMT. EXIST. PVMT.
 - WORK AREA
 - MILL AND WEDGE
 - REMOVAL OF EXISTING PAVEMENT
- TRAFFIC CONTROL DEVICES**
- TYPE I BARRICADE
 - TYPE II BARRICADE
 - TYPE III BARRICADE
 - CONE
 - DRUM SKINNY DRUM
 - FLASHING ARROW PANEL (TYPE C)
 - STATIONARY SIGN
 - PORTABLE SIGN
 - STATIONARY OR PORTABLE SIGN
 - CRASH CUSHION
 - CHANGEABLE MESSAGE SIGN
 - TRUCK MOUNTED IMPACT ATTENUATOR (TMIA)
 - POLICE
 - FLAGGER
- PAVEMENT MARKINGS**
- CRYSTAL/CRYSTAL PAVEMENT MARKER
 - YELLOW/YELLOW PAVEMENT MARKER
 - CRYSTAL/RED PAVEMENT MARKER
 - PAVEMENT MARKING SYMBOLS

<p>APPROVED: </p> <p>DATE: 5-13-15</p>	<p>PARSONS BRINCKERHOFF 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 LICENSE NO. F-0165</p>
<p>SEAL</p>	<p>DAVID KEISER, PE PROJECT ENGINEER</p> <p>LAUREN WILSON, EI PROJECT DESIGN</p>

TRAFFIC CONTROL PART 2 CULVERT 31

GENERAL NOTES



CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRABLE OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

- A) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.
- B) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

TRAFFIC PATTERN ALTERATIONS

- C) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

- D) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- E) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN ON THIS SHEET.
- F) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.
- G) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.
- H) INSTALL AND ACTIVATE CMS SIGNS 2 WEEKS PRIOR TO ROAD CLOSURE.

TRAFFIC CONTROL DEVICES

- I) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

- J) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME US HWY 311	MARKING THERMOPLASTIC
-------------------------	--------------------------
- K) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.
- L) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS.
- M) PASSING ZONE WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

PHASING

PART 2 - CULVERT 31 - (PART 1 PHASE III MUST BE COMPLETED BEFORE PART 2 PHASE IV CAN BEGIN.)

PHASE IV

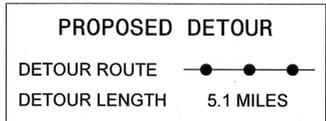
PRIOR TO ANY CONSTRUCTION OPERATIONS, MOVE DETOUR SIGNING ALONG -L- (US HWY 311) TO PREPARE FOR PART 2 AS SHOWN ON TCP-2 (PART 2) AND IN ACCORDANCE WITH RSD 1101.03 (SHEET 1 OF 9). OPTIONAL SIGN USE MUST BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT. PLACE CMS AND ACTIVATE.

PHASE V

USING OFF-SITE DETOUR, EXCAVATE AND CONSTRUCT NEW CULVERT AND ROADWAY UP TO AND INCLUDING FINAL LAYER OF SURFACE COURSE.

PHASE VI

UPON COMPLETION OF CULVERT AND ROADWAY, PLACE FINAL PAVEMENT MARKING IN ACCORDANCE WITH RSD 1205.01. REMOVE CMS, BARRICADES AND DETOUR SIGNS AND OPEN -L- (US HWY 311) TO TRAFFIC.



APPROVED: [Signature] DATE: 5-13-15

SEAL: [Professional Engineer Seal for David Z. Keiser, License No. 033400]

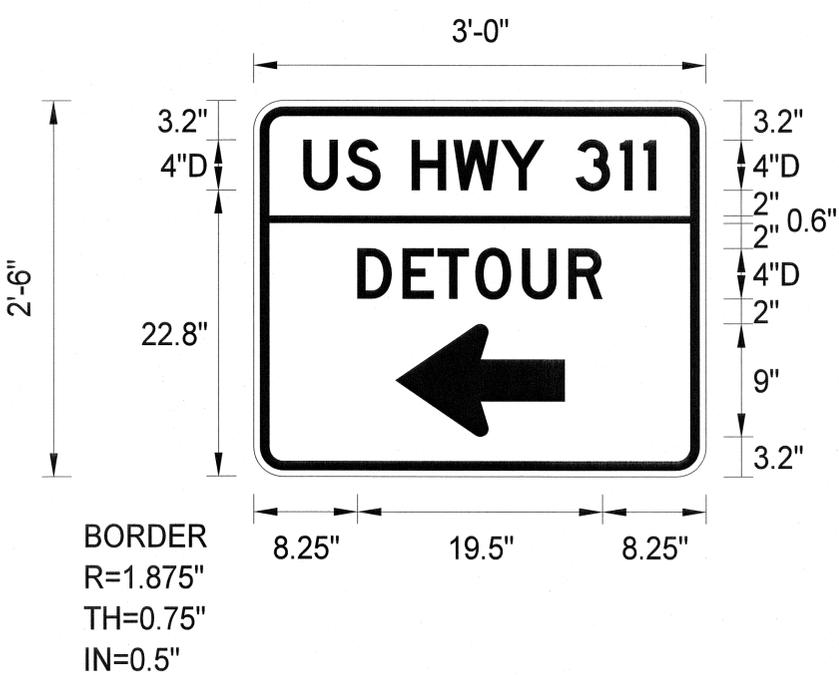
GENERAL NOTES, PHASING AND DETOUR SIGNING

SCALE: NONE	REVISIONS
DATE: 09/16/13	
DWG. BY: RGK	
DESIGN BY: LJW	
REVIEWED BY: EDM	

SIGN NUMBER: 001 TYPE: STATIONARY QUANTITY: SEE PLANS SIGN WIDTH: 3'-0" HEIGHT: 2'-6" TOTAL AREA: 7.5 Sq.Ft. BORDER TYPE: INSET RECESS: 0.5" WIDTH: 0.75" RADII: 1.875" NO. Z BARS: LENGTH:	BACKG COLOR: Orange/Orange COPY COLOR: Black <table border="1"> <tr> <th>SYMBOL</th> <th>X</th> <th>Y</th> <th>WID</th> <th>HT</th> </tr> <tr> <td>AR_Type D</td> <td>11.3</td> <td>3.2</td> <td>9</td> <td>13.5</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table> MAT'L: 0.080" (2.0 mm) ALUMINUM	SYMBOL	X	Y	WID	HT	AR_Type D	11.3	3.2	9	13.5																															DESIGN BY: K. Dixon PROJECT ID: 41665.4A_31 CHECKED BY: D. Keiser DIV: 8 DATE: Jan 23, 2015
SYMBOL	X	Y	WID	HT																																						
AR_Type D	11.3	3.2	9	13.5																																						

USE NOTES: 1,2

- Legend and border shall be direct applied black non-reflective sheeting.
- Background shall be Type VII, VIII, or IX (prismatic) fluorescent orange retroreflective sheeting.



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	U	S	H	W	Y	3	1	1													Series/Size Text Length	
	4	3.4	2.7	2.5	3.3	3.8	3.4	2.5	3.5	1.9	1	4									D 2000 28.1	
		D	E	T	O	U	R														D 2000 19.5	
	8.2	3.6	2.8	3	3.7	3.7	2.7	8.2														

FILENAME: US HWY 311 Special Detour Signs NORTH CAROLINA D.O.T. SIGN DETAIL

9:47:01 AM
US HWY 311 Special Detour Signs.dgn
5/12/2015

APPROVED:  DATE: 5-13-15	SPECIAL DETOUR SIGNING	
	SCALE: NONE	
	DATE: 01/23/15	
	DWG. BY: KD	
	DESIGN BY: KD	
REVIEWED BY: DZK	REVISIONS	

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	41665.4A-31	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

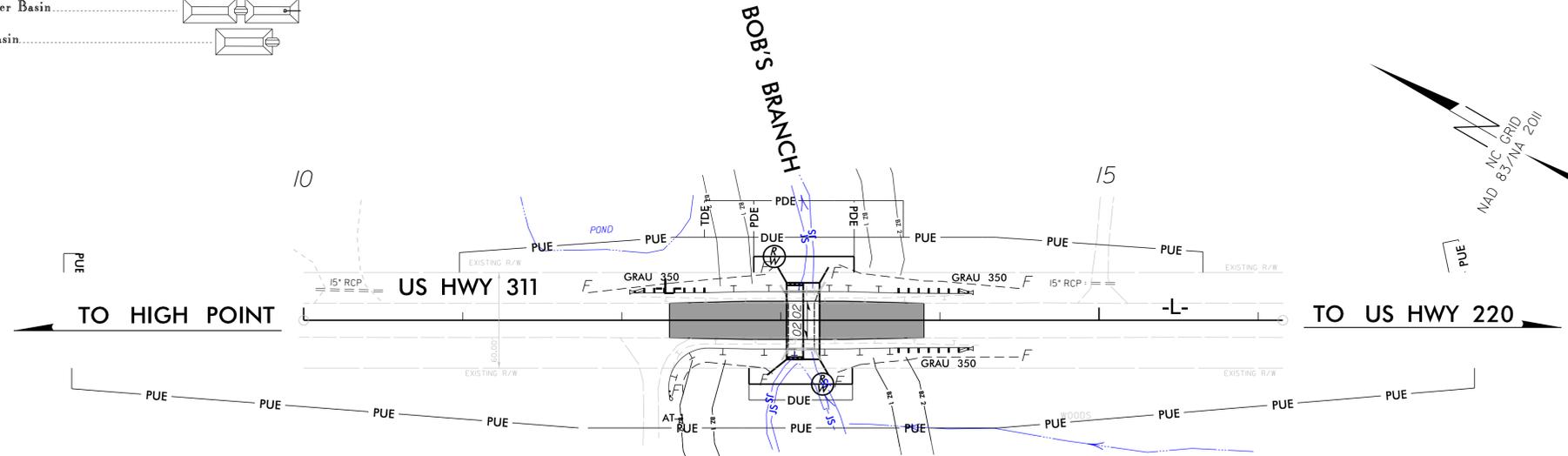
PROJECT: 41665.4A-31

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1650.05	Temporary Silt Ditch	
1650.05	Temporary Diversion	
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1650.02	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)	
1654.01	Temporary Rock Sediment Dam Type-A	
1654.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1650.04	Stilling Basin	
1650.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	
1632.02	Type B	
1632.05	Type C	
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

RANDOLPH COUNTY
LOCATION: REPLACE EXISTING CULVERT NO. 31
US HWY 311
TYPE OF WORK: GRADING, DRAINAGE, BOX CULVERT
AND PAVEMENT MARKINGS



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

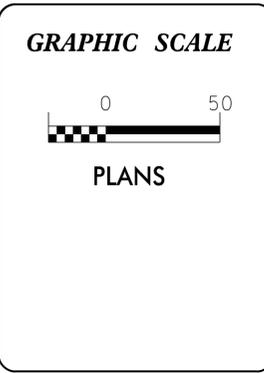
THIS PROJECT HAS
BEEN DESIGNED TO
SENSITIVE WATERSHED
STANDARDS.

CHARLES HEAFNER
LEVEL III NAME

3440
LEVEL III CERTIFICATION NO.

ENVIRONMENTALLY
SENSITIVE AREA(S) EXIST
ON THIS PROJECT

Refer To E. C. Special Provisions
for Special Considerations.



ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

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.

PLANS PREPARED BY: PARSONS BRINCKERHOFF 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 LICENSE NO. E-0168	PLANS PREPARED FOR: DIVISION OF HIGHWAYS 1000 Birch Ridge Dr. Raleigh NC, 27610
2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE:	DAVID KEISER, PE PROJECT ENGINEER
LETTING DATE:	LAUREN WILSON, EI PROJECT DESIGN ENGINEER
NCDOT CONTACT:	TIM WELCH, PE DIVISION BRIDGE - PROGRAM MANAGER

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 2012 and the latest revision 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	

*****STANDARD DRAWINGS*****

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

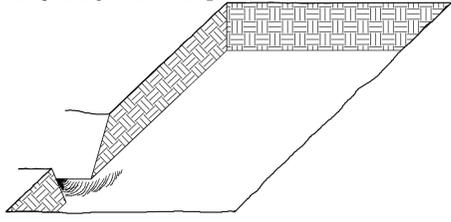
<i>SITE DESCRIPTION</i>	<i>STABILIZATION TIME</i>	<i>TIMEFRAME EXCEPTIONS</i>
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 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.

PLANTING DETAILS

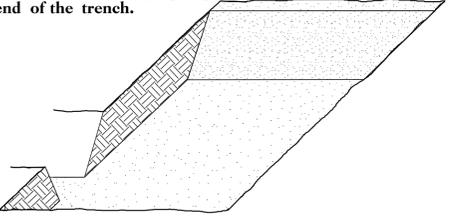
SEEDLING / LINER BARERoot PLANTING DETAIL

HEALING IN

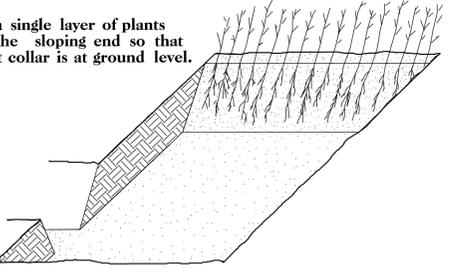
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



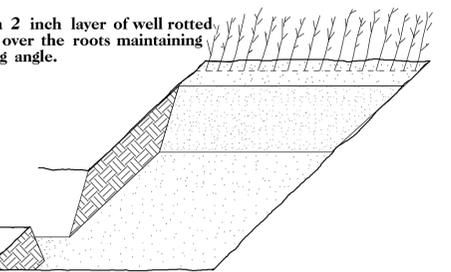
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

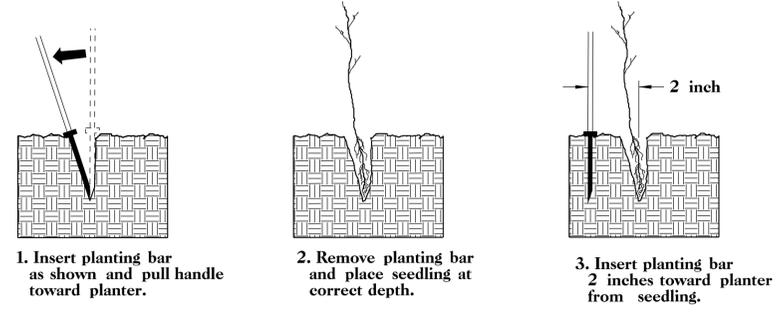


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

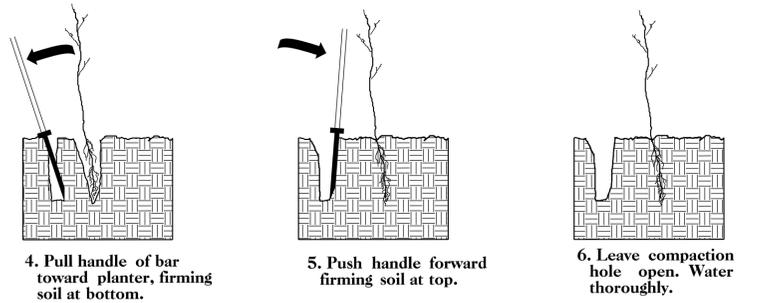


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

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.

REFORESTATION

- TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

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

25% LIRIODENDRON TULIPIFERA	TULIP POPLAR	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

REFORESTATION DETAIL SHEET

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

8/23/99

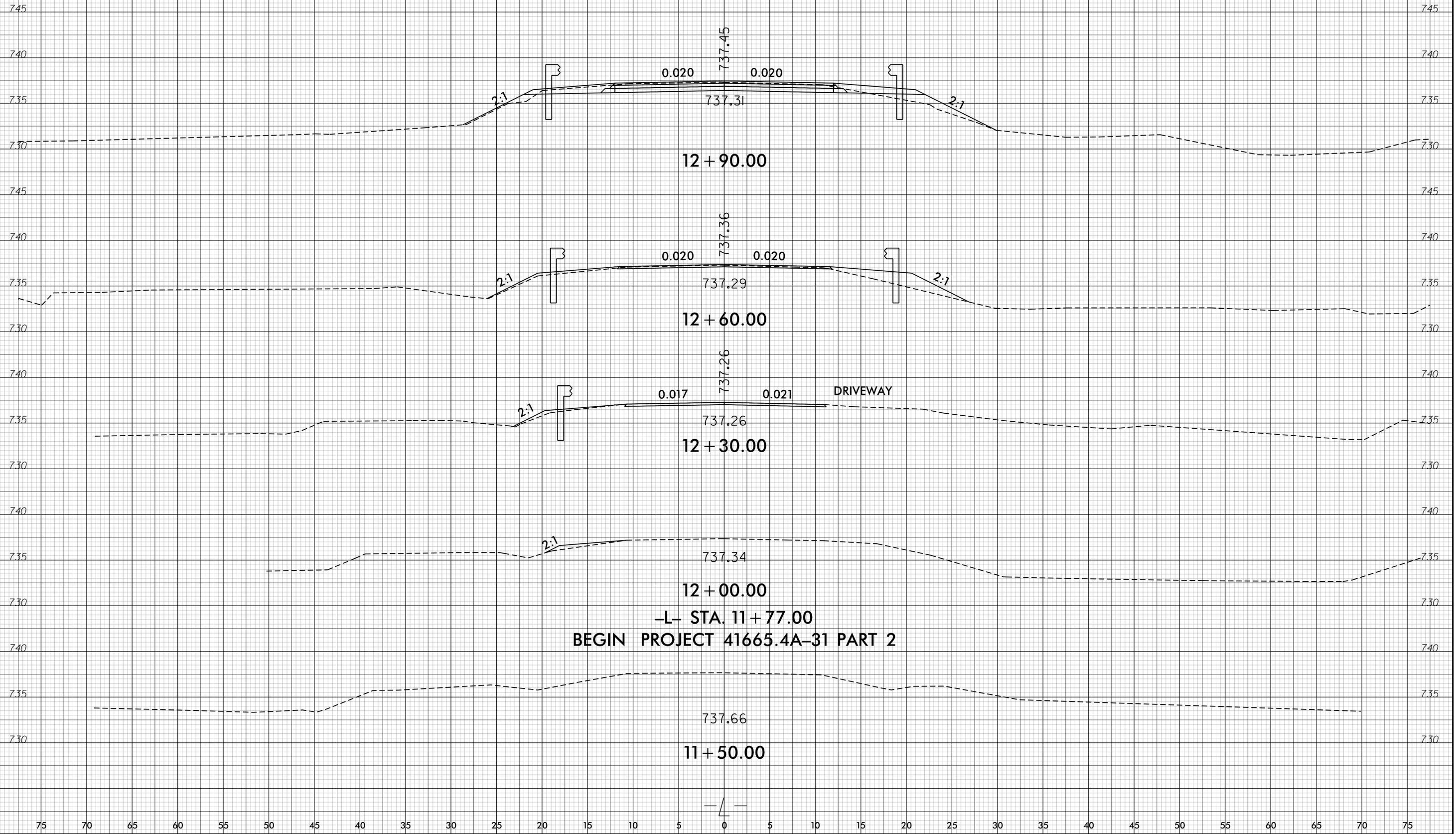


PROJ. REFERENCE NO.
41665.4A-31

SHEET NO.
X-1

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, BREAKING OF EXISTING PAVEMENT, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING."



-L- STA. 11+77.00
BEGIN PROJECT 41665.4A-31 PART 2

8/23/99
C:\T\M\89\8901\DWG\8901\PLAN\8901\PLAN.DWG
8/23/99

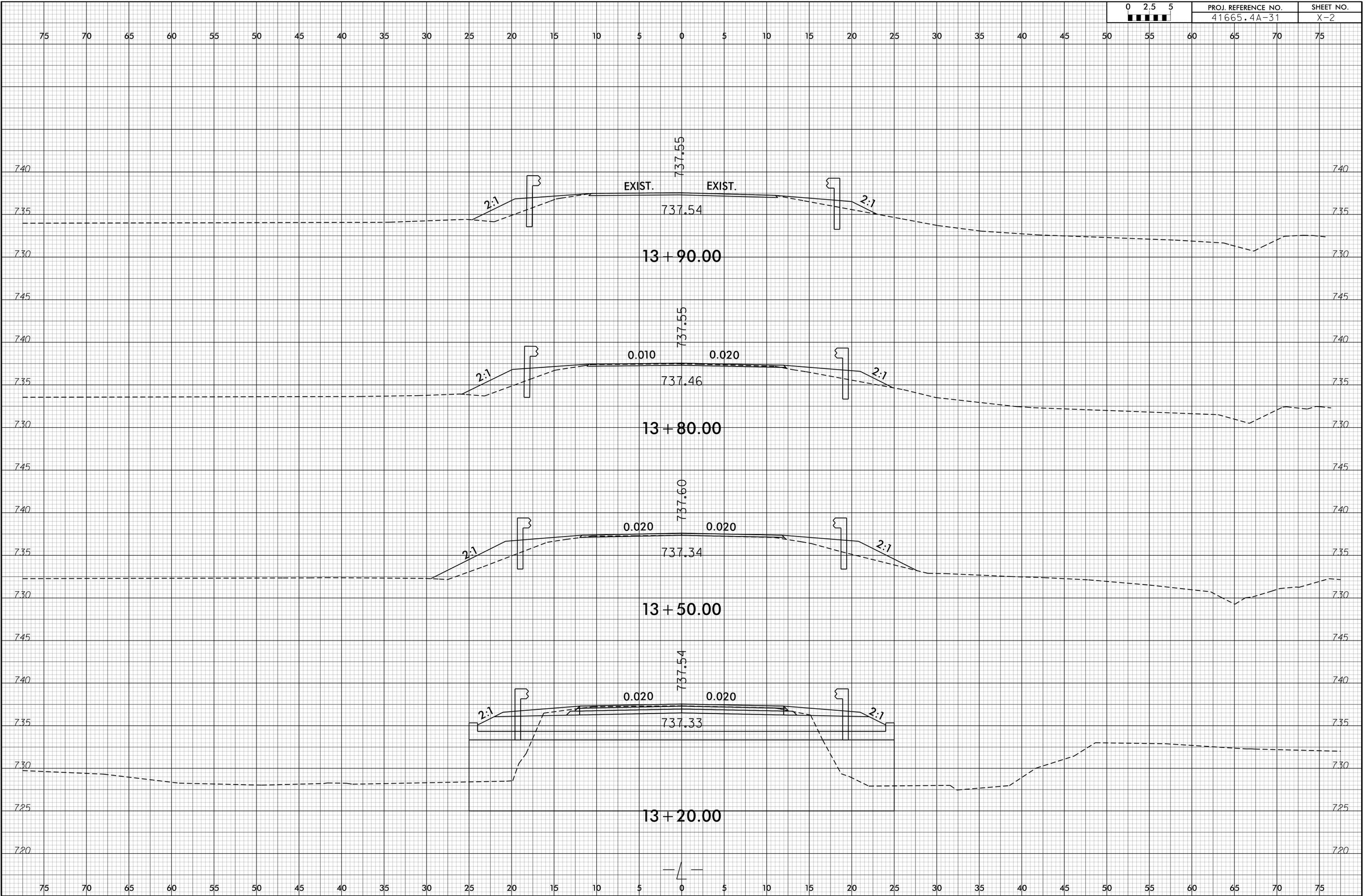
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

8/23/99

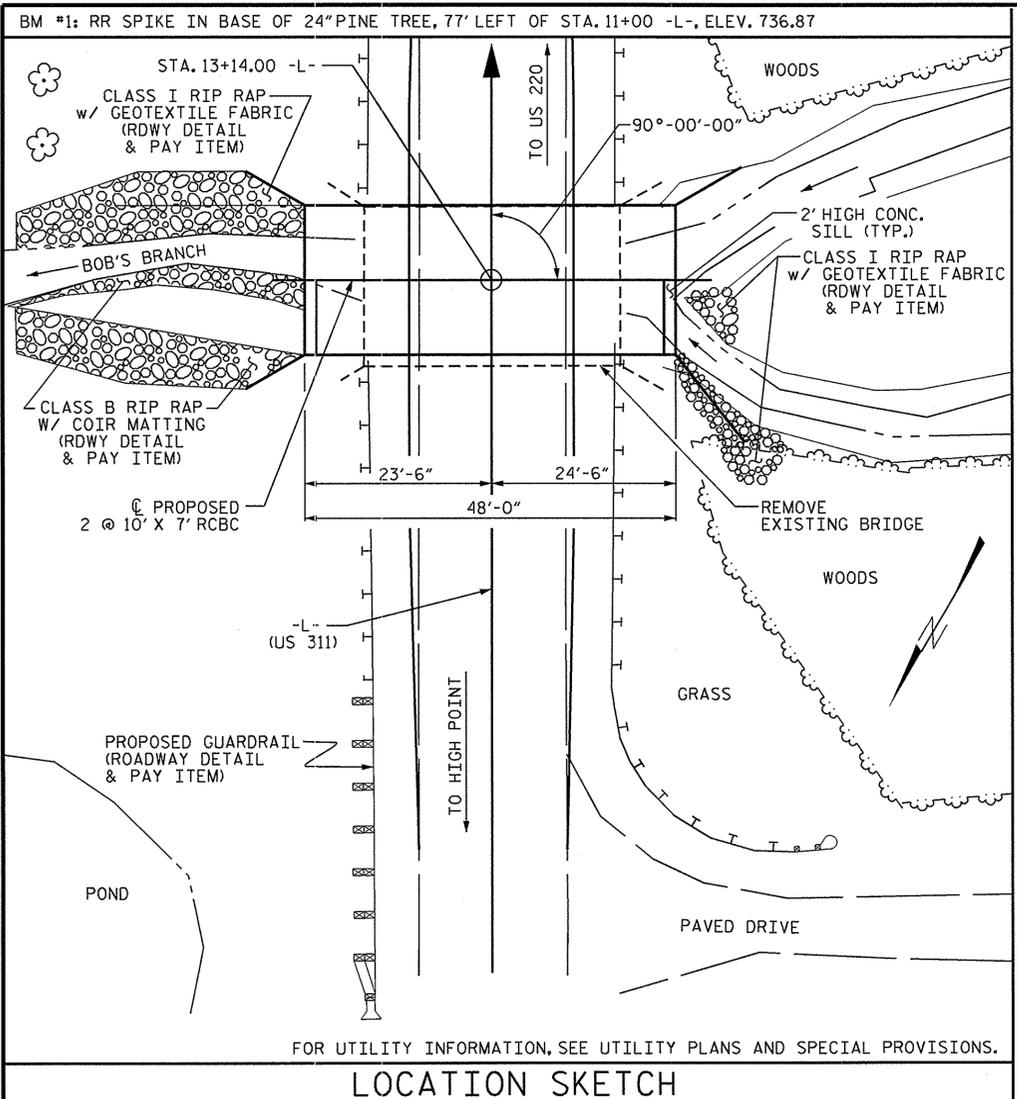


PROJ. REFERENCE NO.
41665.4A-31

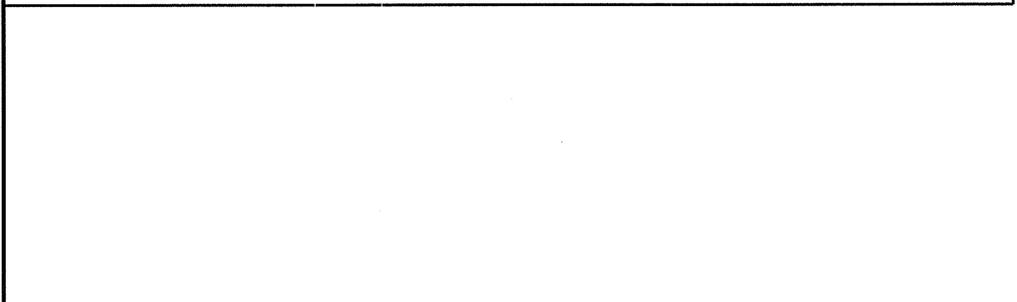
SHEET NO.
X-2



8/23/99
C:\T\M\8905\DWG\8905.X-2.DWG
8/23/99



LOCATION SKETCH



PROFILE ALONG CULVERT

DRAWN BY :	S. WANCE	DATE :	12-13
CHECKED BY :	W. F. PARKER	DATE :	12-13
DESIGN ENGINEER OF RECORD :	S. WANCE	DATE :	12-13
DRAWN BY :	R.W. WRIGHT	DATE :	JULY, 1990
CHECKED BY :	D.A. GLADDEN	DATE :	JULY, 1990

NOTES

ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
 DESIGN FILL-----3.31'
 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:
 PHASE I
 1. WING FOOTINGS AND FLOOR SLAB OF WEST BARREL INCLUDING 4" OF ALL VERTICAL WALLS, AND PORTION OF CURTAIN WALLS.
 2. THE REMAINING PORTIONS OF WALLS, SILLS, AND WINGS FULL HEIGHT.
 PHASE II
 1. WING FOOTINGS AND FLOOR SLAB OF EAST BARREL INCLUDING 4" OF EXTERIOR WALL, AND REMAINING PORTION OF CURTAIN WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT.
 3. ROOF SLAB INCLUDING REMAINING PORTION OF WALLS FOLLOWED BY THE HEADWALLS.
 PHASE II SHALL NOT BE STARTED UNTIL PHASE I IS COMPLETE.
 FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.
 FOR MAINTENANCE OF TRAFFIC SEE TRAFFIC CONTROL PLANS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
 DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
 AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
 AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.
 THE CONTRACTOR SHALL REMOVE THE EXISTING BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
 NO WORK SHALL BE DONE ON THE CULVERT AT STA. 13+14 -L- UNTIL THE AREA OF THE CULVERT HAS BEEN EXCAVATED TO COMPETENT MATERIAL AT THE DISCRETION OF THE ENGINEER AND UNSUITABLE MATERIAL REPLACED WITH FOUNDATION CONDITIONING MATERIAL AND PROPERLY COMPACTED TO THE ELEVATION OF THE BOTTOM OF THE PROPOSED CULVERT FLOOR SLAB AND WING FOOTINGS AS REQUIRED TO CONSTRUCT THE PROPOSED CULVERT. PAYMENT FOR EXCAVATION DOWN TO ONE FOOT BELOW THE BOTTOM OF THE CULVERT FLOOR SLAB AND WING FOOTINGS WILL BE FOR ALL WORK INCLUDING FOUNDATION CONDITIONING MATERIAL DOWN TO ONE FOOT BELOW THE CULVERT AND SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION. PAYMENT FOR EXCAVATION BEYOND ONE FOOT BELOW THE BOTTOM OF THE CULVERT FLOOR SLAB AND WING FOOTINGS WILL BE FOR ALL WORK INCLUDING EXCAVATION, ANY TEMPORARY SHEETING, FOUNDATION CONDITIONING MATERIAL, AND ANY OTHER MISCELLANEOUS ITEMS, AND SHALL BE INCLUDED IN THE PRICE PER CUBIC YARD FOR FOUNDATION CONDITIONING MATERIAL.

THE ESTIMATED QUANTITY FOR THE FOUNDATION CONDITIONING MATERIAL THAT IS INCLUDED IN THE LUMP SUM PAYMENT FOR CULVERT EXCAVATION IS 75 TONS. THE ESTIMATED QUANTITY THAT IS FOR THE FOUNDATION CONDITIONING MATERIAL THAT IS PLACED BEYOND ONE FOOT BELOW THE BOTTOM OF THE CULVERT FLOOR SLAB AND WING FOOTINGS IS 170 TONS. THESE QUANTITIES ARE ESTIMATES ONLY.

THE EXISTING STRUCTURE CONSISTING OF ONE SPAN @ 19'-0" WITH A CLEAR ROADWAY WIDTH OF 37'-10" AND A 17/8" REINFORCED CONCRETE DECK WITH FULL HEIGHT CONCRETE BULKHEADS LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COSTS INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL IN THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICAL 402-2 OF THE STANDARD SPECIFICATION.

NO SEPARATE PAYMENT SHALL BE MADE FOR REMOVAL OF EXISTING STRUCTURE. COST FOR REMOVAL OF EXISTING STRUCTURE SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR CULVERT EXCAVATION.

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. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

BACKFILL TO TOP OF SILLS WITH NATIVE BED MATERIAL. NATIVE BED MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED IN THE LOW FLOW CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE BED MATERIAL IN THE HIGH FLOW CULVERT BARREL. IF RIP RAP IS USED IN THE HIGH FLOW BARREL IT SHOULD BE PLACED IN THE BOTTOM PORTION OF THE BARREL WITH NATIVE BED MATERIAL PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

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.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

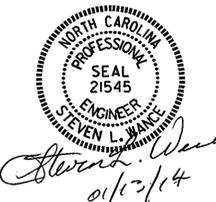
FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS

TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
PHASE I	47.8 C.Y.
PHASE II	73.8 C.Y.
TOTAL	121.6 C.Y.
REINFORCING STEEL	
PHASE I	5,836 LBS.
PHASE II	8,388 LBS.
TOTAL	14,224 LBS.
FOUNDATION CONDITIONING MAT'L	170 TONS
CULVERT EXCAVATION	LUMP SUM
REMOVAL OF EXISTING STRUCTURE	LUMP SUM

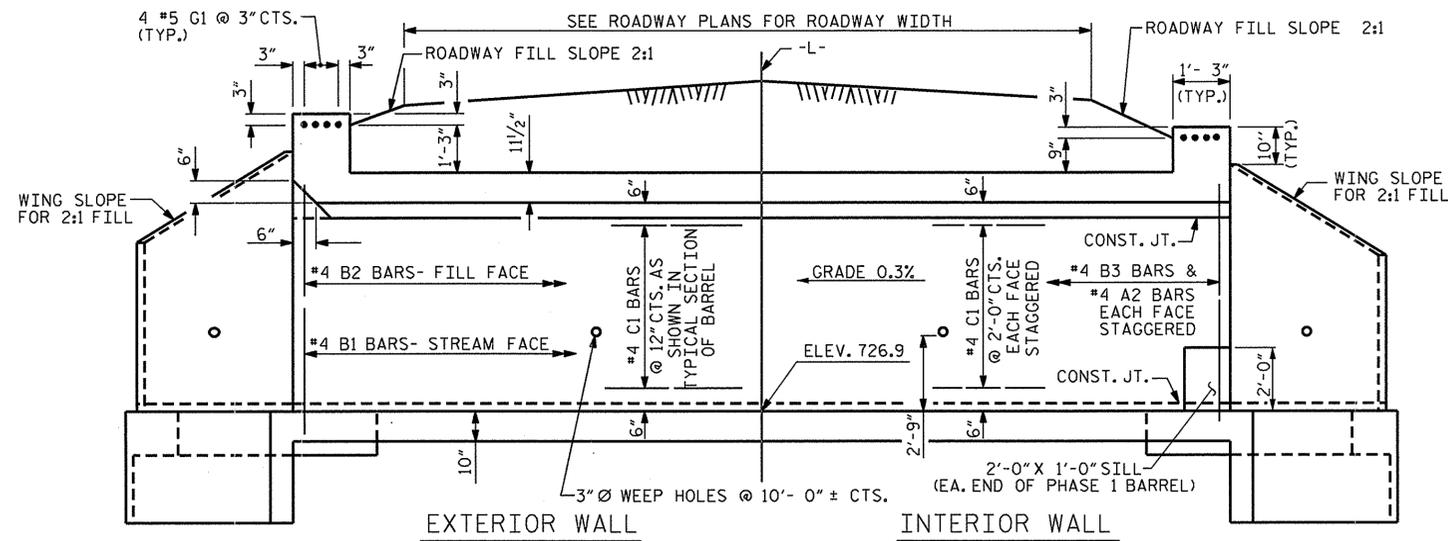
ROADWAY DATA	
GRADE POINT ELEV. @ STA. 13+14.00 -L- =	737.52
BED ELEV. @ STA. 13+14.00 =	726.90
ROADWAY SLOPE =	2:1
HYDROGRAPHIC DATA	
DESIGN DISCHARGE	640 CFS
FREQUENCY OF DESIGN FLOOD	50 YRS.
DESIGN HIGH WATER ELEVATION	734.9
DRAINAGE AREA	0.8 SQ. MI.
BASIC DISCHARGE (Q100)	750 CFS
BASIC HIGH WATER ELEVATION	735.40
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	950 CFS
FREQUENCY OVERTOPPING FLOOD	100+ YR.
OVERTOPPING FLOOD ELEVATION	737.3



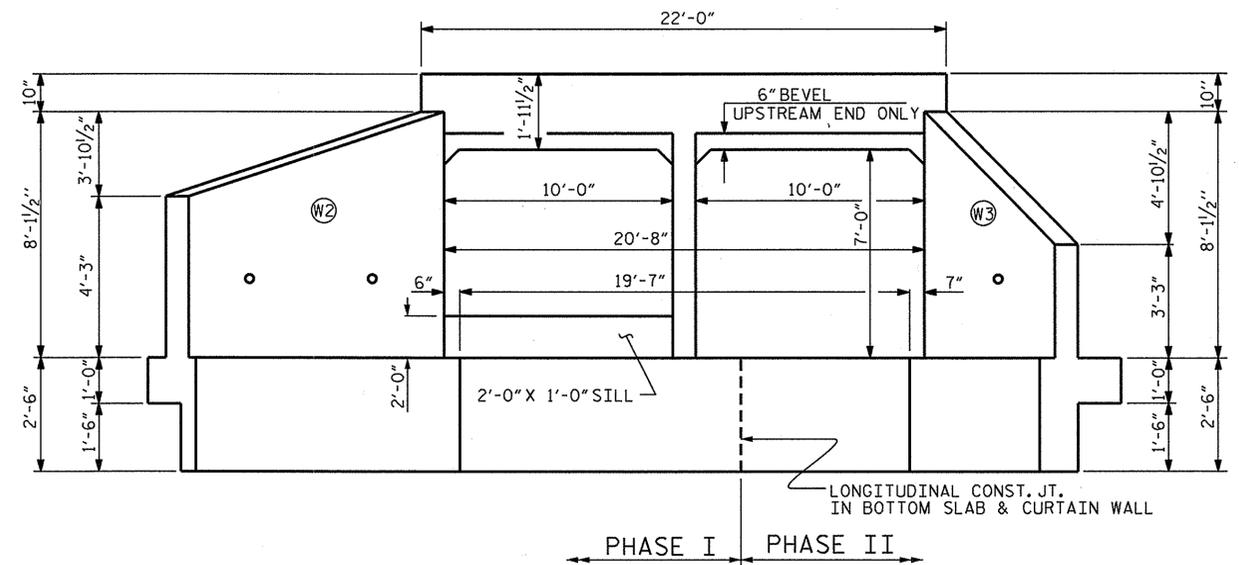
PROJECT NO. 41665.4A-31
 RANDOLPH COUNTY
 STATION: 13+14.00 -L-
 SHEET 1 OF 8 REPLACES BRIDGE NO. 31

STATE OF NORTH CAROLINA					SHEET NO. C-1
DEPARTMENT OF TRANSPORTATION RALEIGH					
DOUBLE 10 FT. X 7 FT. CONCRETE BOX CULVERT 90° SKEW					TOTAL SHEETS 7
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

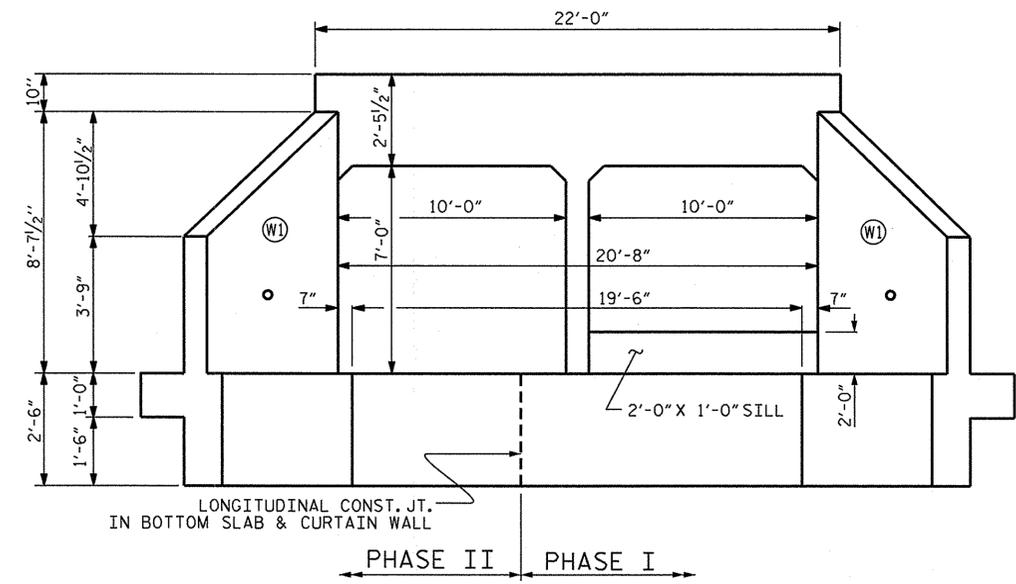
ADDED NOV. 1, 1990



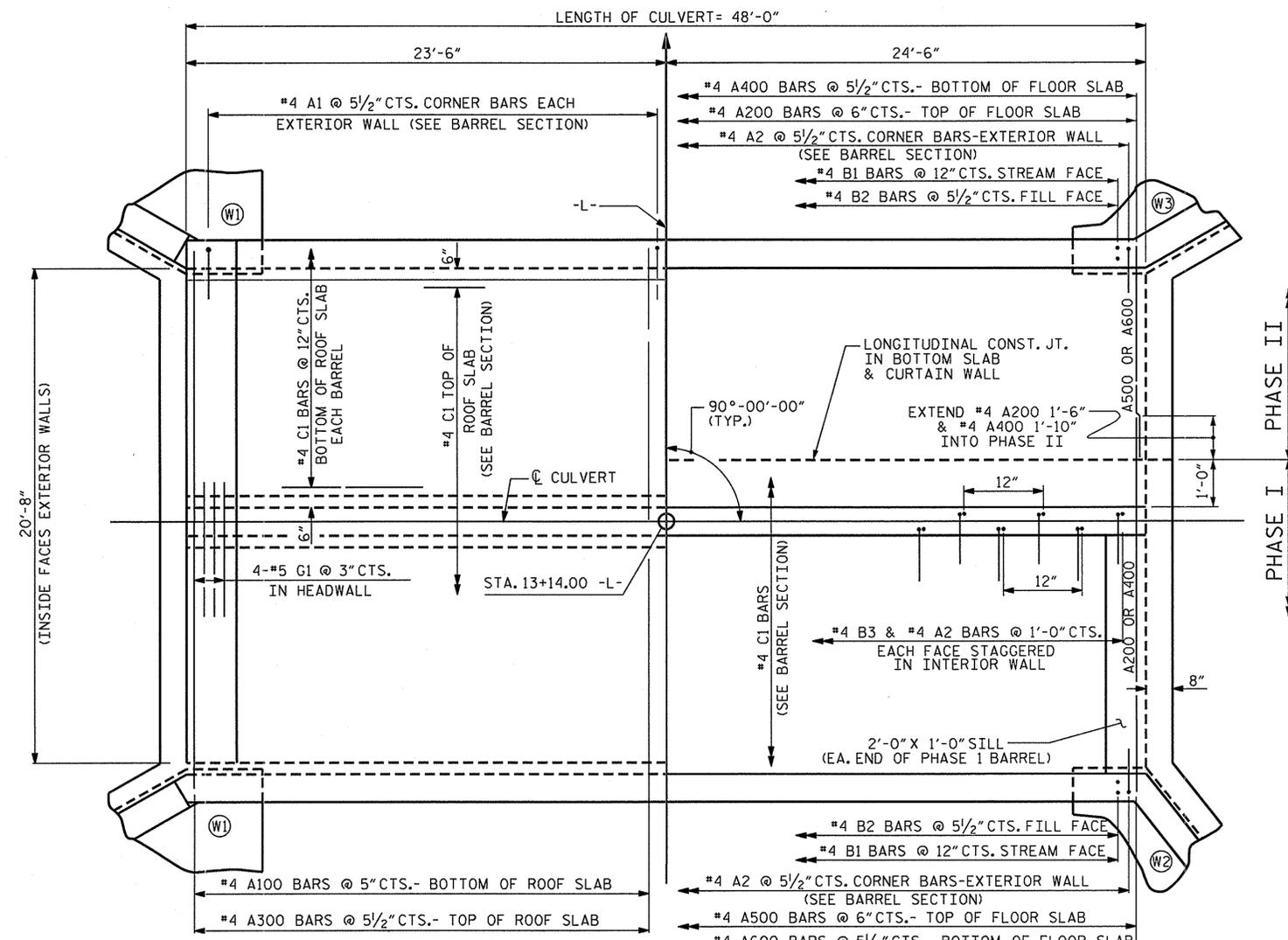
EXTERIOR WALL INTERIOR WALL
CULVERT SECTION NORMAL TO ROADWAY



INLET END ELEVATION
 (LOOKING DOWNSTREAM)



OUTLET END ELEVATION
 (LOOKING UPSTREAM)

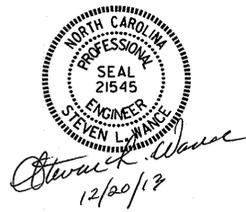


PART PLAN-ROOF SLAB

PART PLAN-FLOOR SLAB

PROJECT NO. 41665.4A-31
 RANDOLPH COUNTY
 STATION: 13+14.00 -L-

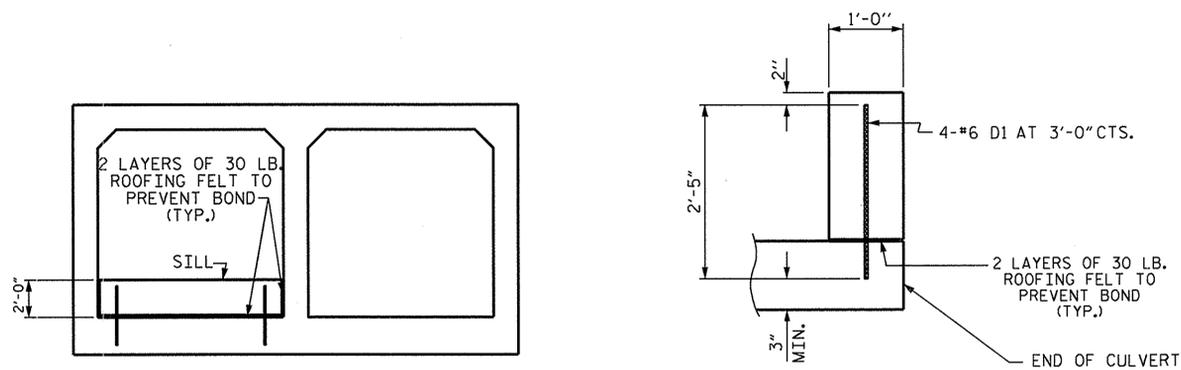
SHEET 2 OF 7
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 10 FT. X 7 FT.
 CONCRETE BOX CULVERT
 90° SKEW



REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
 REDRAWN NOV. 1990 BY TSS. CHECKED BY ARB

DRAWN BY :	S. WANCE	DATE :	12-13
CHECKED BY :	W.F. PARKER	DATE :	12-13
DESIGN ENGINEER OF RECORD :	S. WANCE	DATE :	12-13
DRAWN BY :	RALPH D. UNDERWOOD	DATE :	MAY 1971
CHECKED BY :	JOEL A. JOHNSON	DATE :	JULY 1971

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			TOTAL SHEETS
2			4			7



ELEVATION
ONE SILL AT INLET AND OUTLET FACE (LOOKING DOWNSTREAM)

SECTION THROUGH SILL
*DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

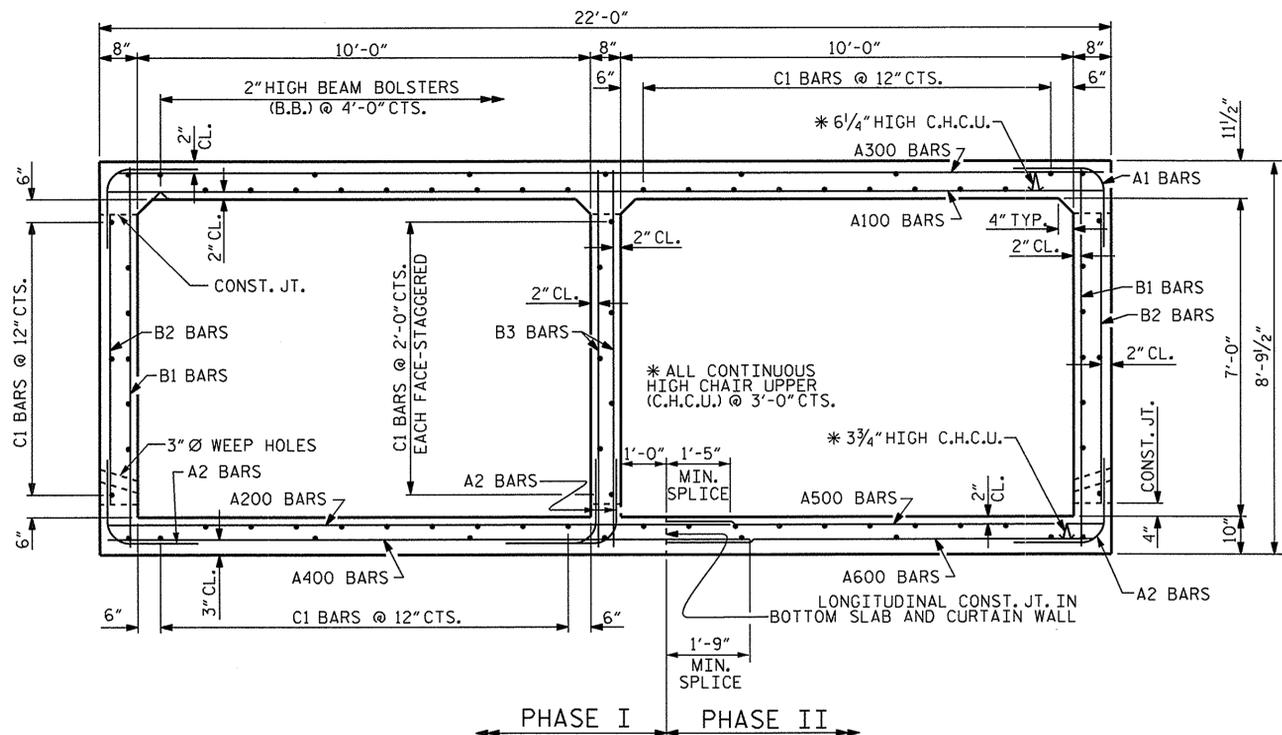
CULVERT SILL DETAILS

BAR TYPE		PHASE I					PHASE II				
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
A1	#4	1	5'-2"	362		A1	#4	1	5'-2"	562	
A2	#4	1	4'-8"	627		A2	#4	1	4'-8"	327	
A200	#4	STR	13'-8"	876		A100	#4	STR	21'-7"	1672	
A400	#4	STR	14'-0"	982		A300	#4	STR	21'-7"	1514	
B1	#4	STR	8'-3"	265		A500	#4	STR	9'-5"	604	
B2	#4	STR	6'-4"	444		A600	#4	STR	9'-5"	660	
B3	#4	STR	8'-3"	529		B1	#4	STR	8'-3"	265	
C1	#4	STR	24'-11"	999		B2	#4	STR	6'-4"	444	
D1	#6	STR	2'-5"	29		C1	#4	STR	24'-11"	1565	
						G1	#5	STR	21'-8"	181	
REINFORCING STEEL LBS. 5,113					REINFORCING STEEL LBS. 7,794						
CLASS A CONCRETE BARREL @ 0.710 CY/FT 34.1 CY					CLASS A CONCRETE BARREL @ 1.277 CY/FT 61.3 CY						
SILLS 1.5 CY											
TOTAL 35.6 CY					TOTAL 61.3 CY						
FOUNDATION COND. MAT'L 42 TONS					FOUNDATION COND. MAT'L 33 TONS						

SPLICE LENGTHS CHART

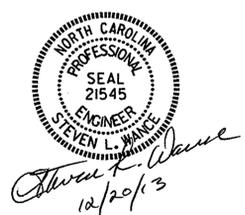
BAR	SIZE	SPLICE LENGTH
A200	#4	1'-5"
A400	#4	1'-9"
B1	#4	1'-5"
B3	#4	1'-5"
C1	#4	1'-11"

PHASE I STRUCTURE QUANTITIES		PHASE II STRUCTURE QUANTITIES	
CLASS A CONCRETE		CLASS A CONCRETE	
BARREL	34.1 C.Y.	BARREL	61.3 C.Y.
SILLS	1.5 C.Y.	WINGS ETC.	12.5 C.Y.
WINGS ETC.	12.2 C.Y.	TOTAL	73.8 C.Y.
TOTAL	47.8 C.Y.		
REINFORCING STEEL		REINFORCING STEEL	
BARREL & SILLS	5,113 LBS.	BARREL	7,794 LBS.
WINGS ETC.	723 LBS.	WINGS ETC.	594 LBS.
TOTAL	5,836 LBS.	TOTAL	8,388 LBS.
FOUNDATION CONDITIONING MAT'L	42 TONS	FOUNDATION CONDITIONING MAT'L	33 TONS
CULVERT EXCAVATION	LUMP SUM	CULVERT EXCAVATION	LUMP SUM



RIGHT ANGLE SECTION OF BARREL
(LOOKING DOWNSTREAM)
THERE ARE 77 "C" BARS IN SECTION OF BARREL.

PROJECT NO. 41665.4A-31
RANDOLPH COUNTY
STATION: 13+14.00 -L-



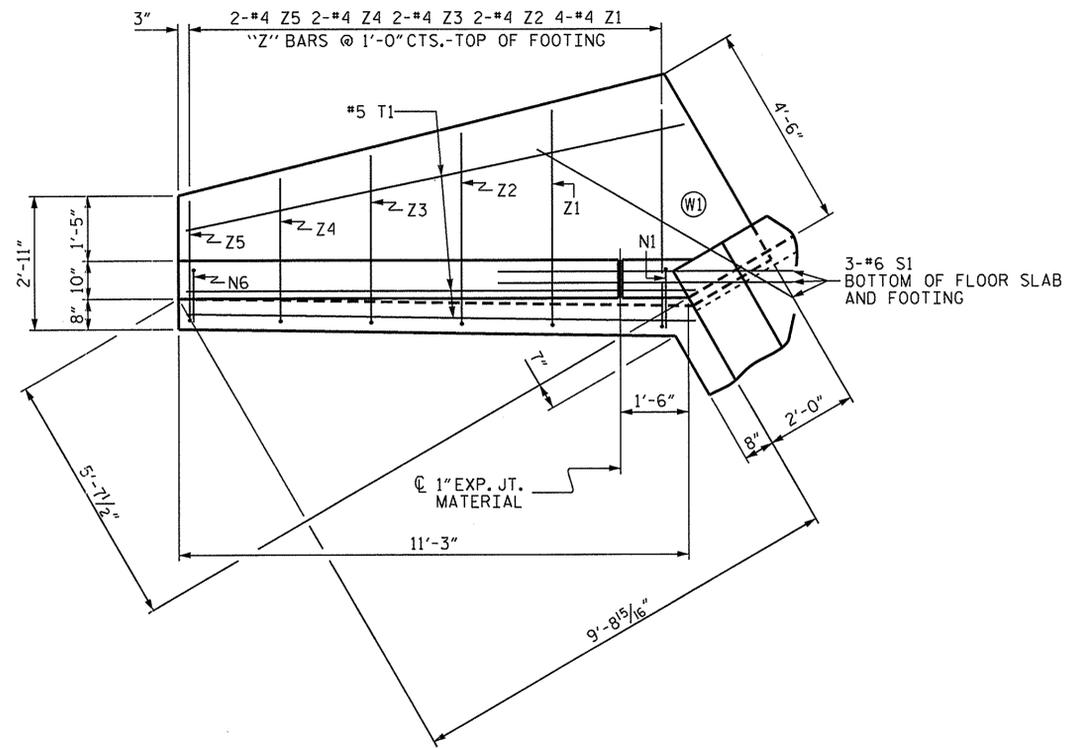
SHEET 3 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

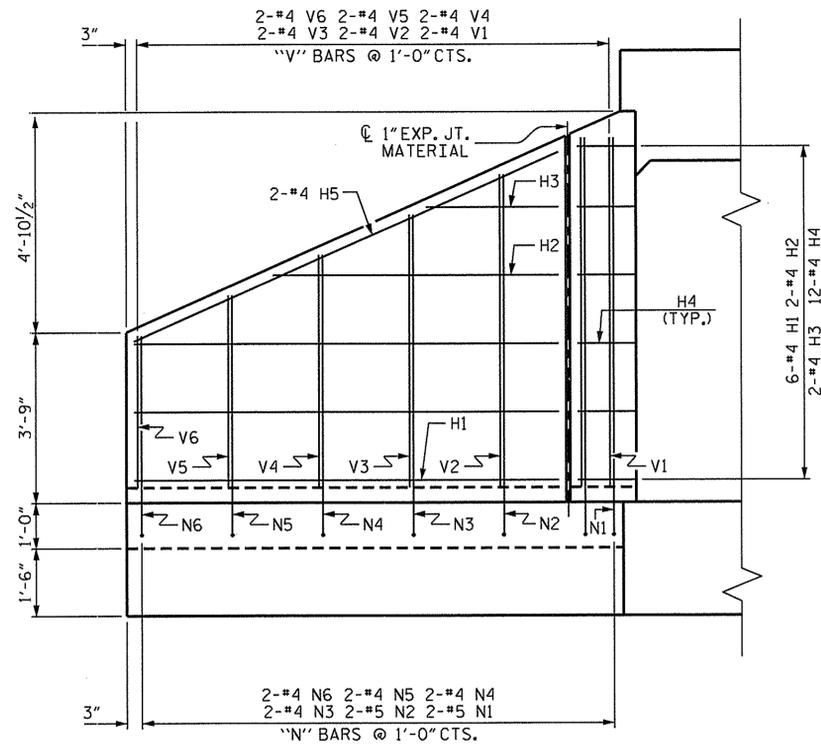
DOUBLE 10 FT. X 7 FT. CONCRETE BOX CULVERT 90° SKEW

DRAWN BY: S. WANCE DATE: 12-13
CHECKED BY: W. F. PARKER DATE: 12-13
DESIGN ENGINEER OF RECORD: S. WANCE DATE: 12-13

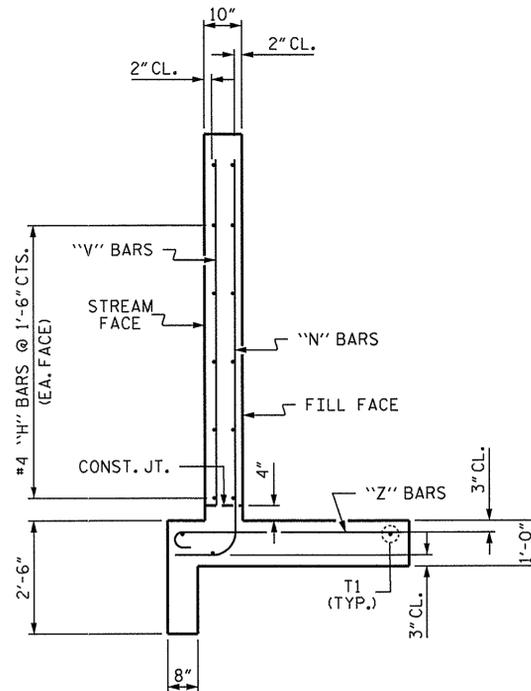
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3
1			3			TOTAL SHEETS 7
2			4			



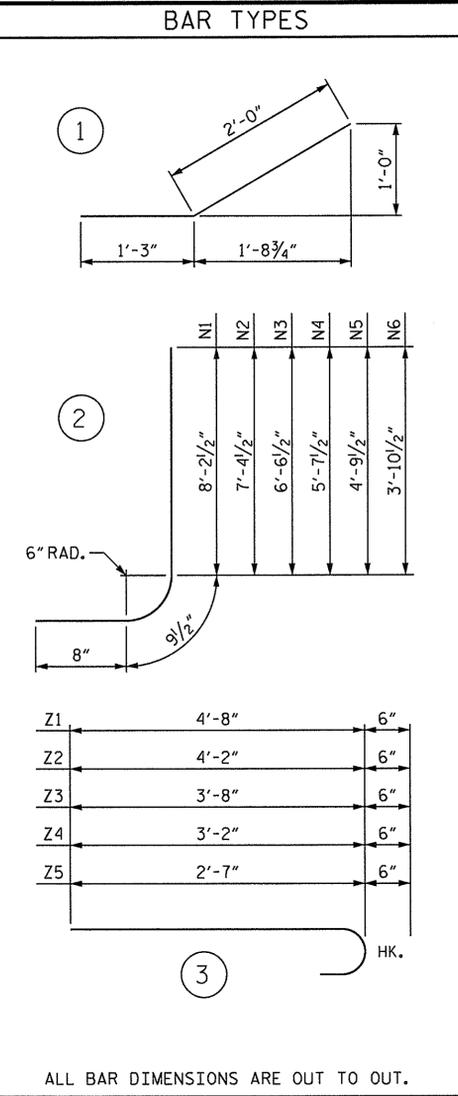
PLAN W1



ELEVATION W1



TYPICAL WING SECTION



BILL OF MATERIAL					
FOR 1 OUTLET WING 2 REQUIRED					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	9'-4"	37
H2	2	#4	STR	6'-3"	8
H3	2	#4	STR	2'-11"	4
H4	12	#4	1	3'-3"	26
H5	2	#4	STR	10'-3"	14
N1	2	#5	2	9'-8"	20
N2	2	#5	2	8'-10"	18
N3	2	#4	2	8'-0"	11
N4	2	#4	2	7'-1"	9
N5	2	#4	2	6'-3"	8
N6	2	#4	2	5'-4"	7
S1	3	#6	STR	6'-6"	29
T1	3	#5	STR	11'-3"	35
V1	2	#4	STR	7'-8"	10
V2	2	#4	STR	6'-10"	9
V3	2	#4	STR	6'-0"	8
V4	2	#4	STR	5'-1"	7
V5	2	#4	STR	4'-2"	5
V6	2	#4	STR	3'-4"	4
Z1	4	#4	3	5'-2"	14
Z2	2	#4	3	4'-8"	6
Z3	2	#4	3	4'-2"	6
Z4	2	#4	3	3'-8"	5
Z5	2	#4	3	3'-1"	4
TOTAL REINFORCING STEEL FOR 1 WING				304	LBS.
PHASE I OUTLET WING QUANTITIES					
REINFORCING STEEL FOR 1 WING				304	LBS.
CLASS A CONCRETE					
1 WING				4.5	CY
1 PARTIAL END CURTAIN WALL				0.7	CY
TOTAL				5.2	CY
PHASE II OUTLET WING QUANTITIES					
REINFORCING STEEL FOR 1 WING				304	LBS.
CLASS A CONCRETE					
1 WING				4.5	CY
1 PARTIAL END CURTAIN WALL				0.6	CY
1 HEADWALL				1.5	CY
TOTAL				6.6	CY

PROJECT NO. 41665.4A-31
 RANDOLPH COUNTY
 STATION: 13+14.00 -L-

SHEET 4 OF 7

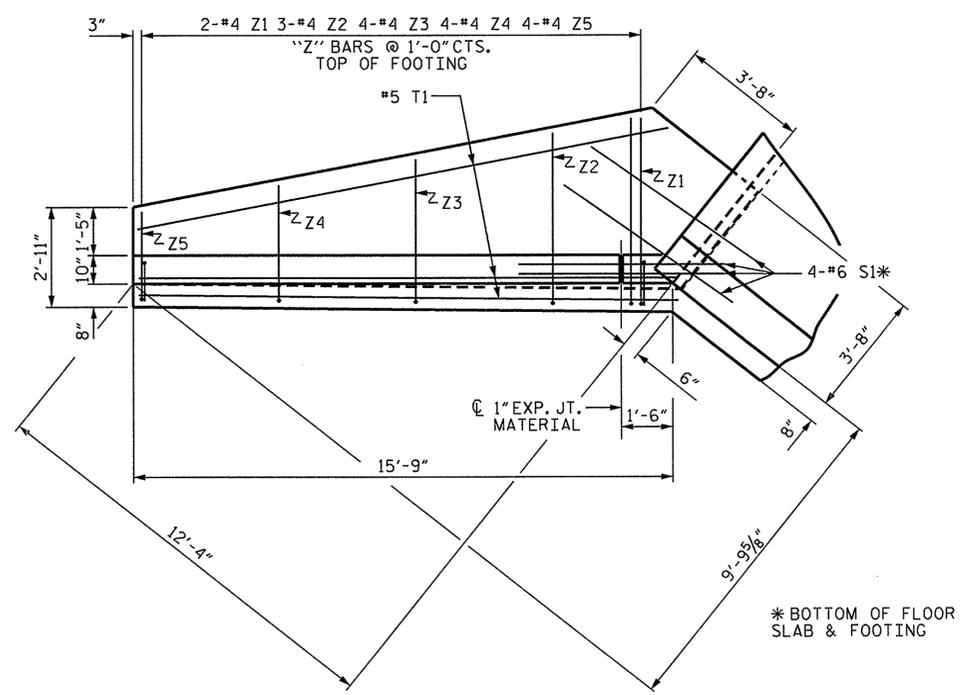
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

OUTLET WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 7'-0" SLOPE = 2:1
 90° SKEW

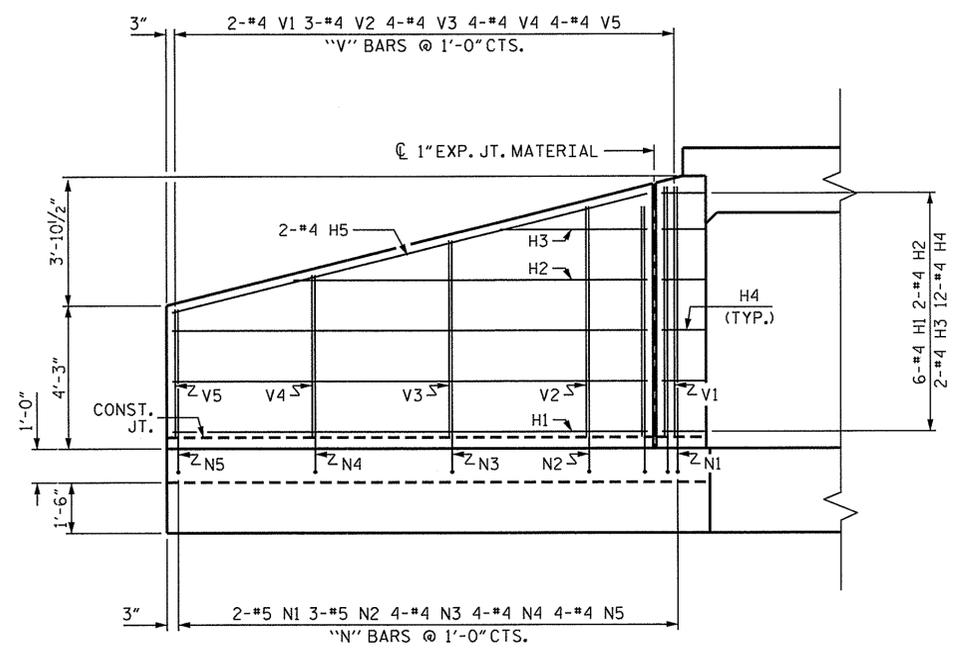


DRAWN BY : S. WANCE	DATE : 12-13	SPECIAL
CHECKED BY : W. F. PARKER	DATE : 12-13	
DESIGN ENGINEER OF RECORD : S. WANCE	DATE : 12-13	STANDARD
DRAWN BY : CCJ	DATE : 10/99	
CHECKED BY : RWW	DATE : 3/00	

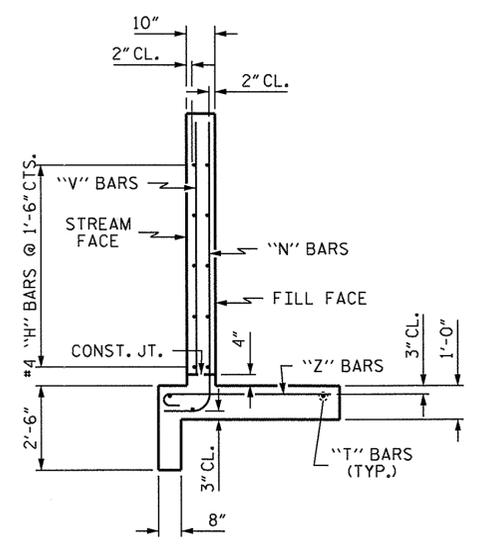
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
1			3			TOTAL SHEETS
2			4			7



PLAN W2

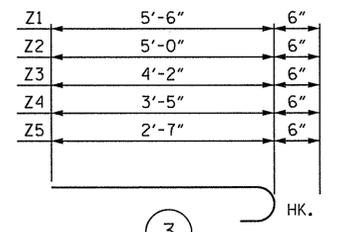
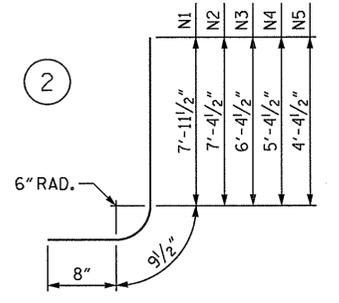
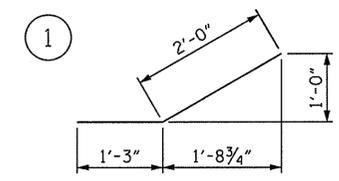


ELEVATION W2



TYPICAL WING SECTION

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR PHASE I INLET WING 1 REQUIRED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	13'-10"	55
H2	2	#4	STR	10'-4"	14
H3	2	#4	STR	4'-3"	6
H4	12	#4		3'-3"	26
H5	2	#4	STR	14'-3"	19
N1	2	#5	2	9'-5"	20
N2	3	#5	2	8'-10"	28
N3	4	#4	2	7'-10"	21
N4	4	#4	2	6'-10"	18
N5	4	#4	2	5'-10"	16
S1	4	#6	STR	6'-0"	36
T1	3	#5	STR	15'-9"	49
V1	2	#4	STR	7'-5"	10
V2	3	#4	STR	6'-9"	14
V3	4	#4	STR	5'-9"	15
V4	4	#4	STR	4'-9"	13
V5	4	#4	STR	3'-9"	10
Z1	2	#4	3	6'-0"	8
Z2	3	#4	3	5'-6"	11
Z3	4	#4	3	4'-8"	12
Z4	4	#4	3	3'-11"	10
Z5	4	#4	3	3'-1"	8

TOTAL REINFORCING STEEL FOR 1 WING 419 LBS

CLASS A CONCRETE		
1 WING		6.3 CY
1 PARTIAL END CURTAIN WALL		0.7 CY
TOTAL		7.0 CY

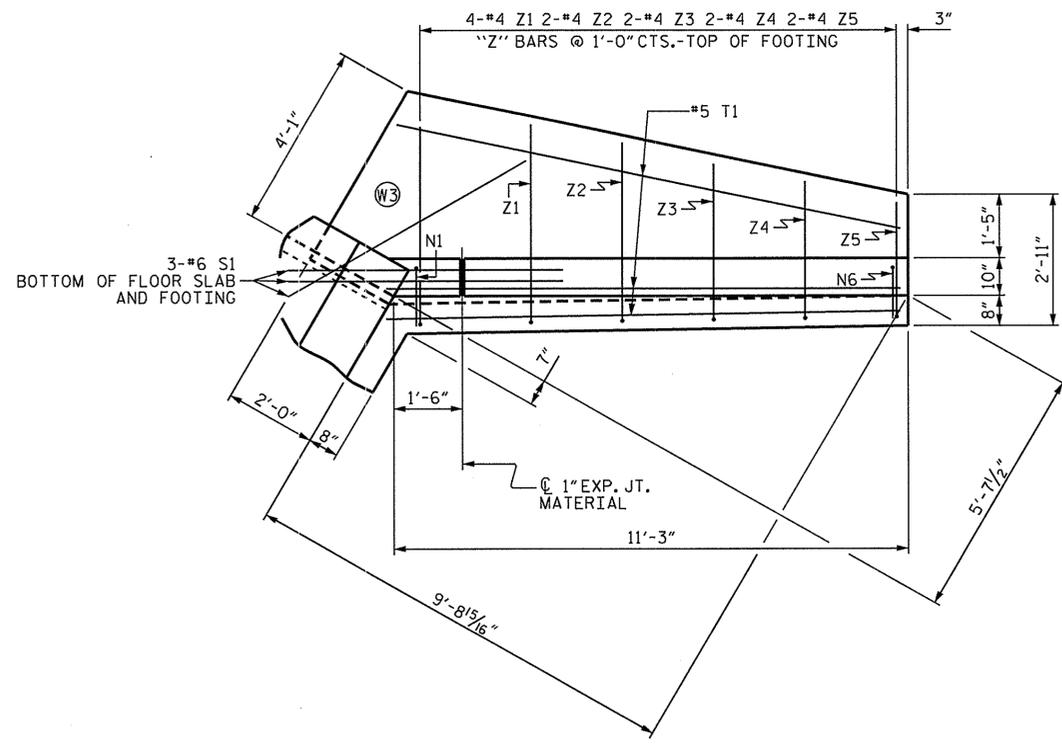
PROJECT NO. 41665.4A-31
 RANDOLPH COUNTY
 STATION: 13+14.00 -L-
 SHEET 5 OF 7



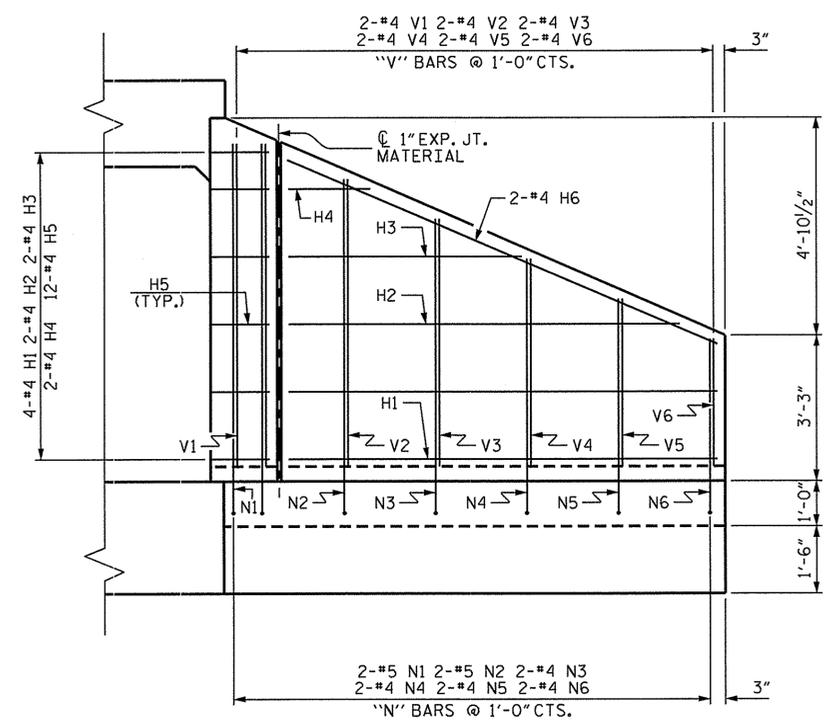
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 PHASE I INLET WING FOR CONCRETE BOX CULVERT
 H = 7'-0" SLOPE = 2:1
 90° SKEW

ASSEMBLED BY : S. WANCE	DATE : 12/13
CHECKED BY : W. F. PARKER	DATE : 12/13
DESIGN ENGINEER OF RECORD : S. WANCE	DATE : 12/13
DRAWN BY : CCJ 11/99	
CHECKED BY : RWW 03/00	

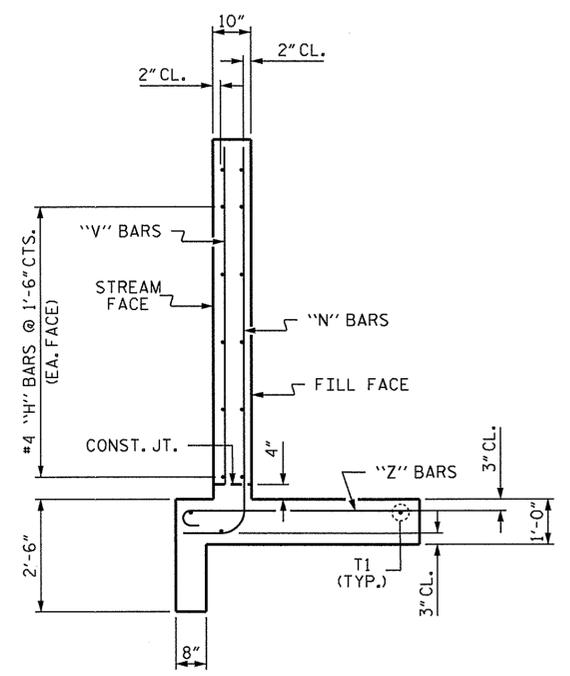
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			7



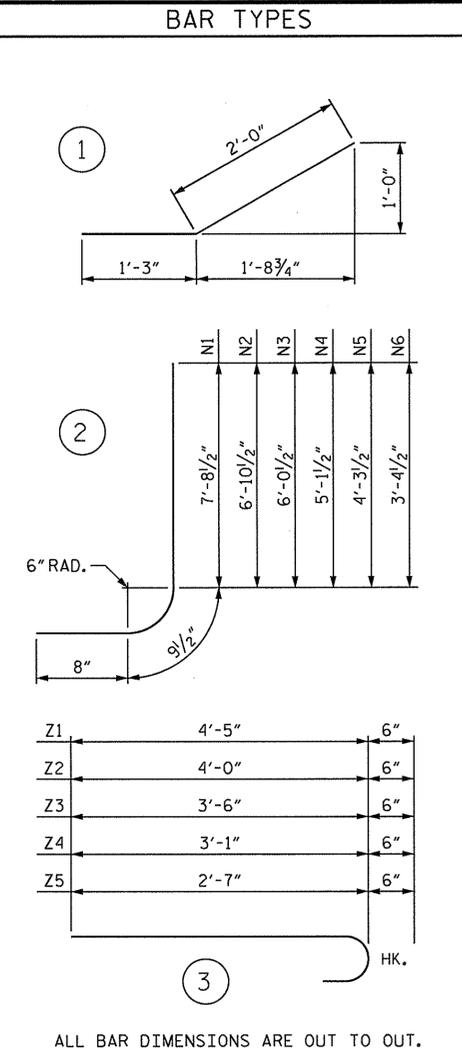
PLAN W3



ELEVATION W3



TYPICAL WING SECTION



BILL OF MATERIAL					
FOR PHASE II INLET WING 1 REQUIRED					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	4	#4	STR	9'-4"	50
H2	2	#4	STR	8'-6"	11
H3	2	#4	STR	5'-1"	7
H4	2	#4	STR	1'-9"	2
H5	12	#4	1	3'-3"	26
H6	2	#4	STR	10'-3"	14
N1	2	#5	2	9'-2"	19
N2	2	#5	2	8'-4"	17
N3	2	#4	2	7'-6"	10
N4	2	#4	2	6'-7"	9
N5	2	#4	2	5'-9"	8
N6	2	#4	2	4'-10"	7
S1	3	#6	STR	6'-0"	27
T1	3	#5	STR	11'-3"	35
V1	2	#4	STR	7'-2"	10
V2	2	#4	STR	6'-4"	8
V3	2	#4	STR	5'-6"	7
V4	2	#4	STR	4'-7"	6
V5	2	#4	STR	3'-8"	5
V6	2	#4	STR	2'-10"	4
Z1	4	#4	3	4'-11"	13
Z2	2	#4	3	4'-6"	6
Z3	2	#4	3	4'-0"	5
Z4	2	#4	3	3'-7"	5
Z5	2	#4	3	3'-1"	4
TOTAL REINFORCING STEEL FOR 1 WING				290 LBS.	
CLASS A CONCRETE					
1 WING				4.3	CY
1 PARTIAL END CURTAIN WALL				0.6	CY
1 HEADWALL				1.0	CY
TOTAL				5.9	CY

DRAWN BY : S. WANCE	DATE : 12/13	SPECIAL
CHECKED BY : W. F. PARKER	DATE : 12/13	
DESIGN ENGINEER OF RECORD: S. WANCE	DATE : 12/13	STANDARD
DRAWN BY : CCJ	DATE : 10/99	
CHECKED BY : RWW	DATE : 3/00	



PROJECT NO. 41665.4A-31
 RANDOLPH COUNTY
 STATION: 13+14.00 -L-
 SHEET 6 OF 7

STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
PHASE II INLET WING					
FOR					
CONCRETE BOX CULVERT					
H = 7'-0" SLOPE = 2:1					
90° SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. C-6					TOTAL SHEETS 7

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (%LL)	MOMENT				1 SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.07	--	1.75	1.07	1	TOP SLAB	4.53	1.13	1	BOTTOM SLAB	9.73		
	HL-93 (OPERATING)	N/A		1.39	--	1.35	1.39	1	TOP SLAB	4.53	1.46	1	BOTTOM SLAB	9.73		
	HS-20 (INVENTORY)	36.000	②	1.13	40.52	1.75	1.17	1	BOTTOM SLAB	9.87	1.13	1	BOTTOM SLAB	9.73		
	HS-20 (OPERATING)	36.000		1.46	52.52	1.35	1.51	1	BOTTOM SLAB	9.87	1.46	1	BOTTOM SLAB	9.73		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		2.15	29.08	1.40	2.15	1	TOP SLAB	4.53	2.46	1	TOP SLAB	9.64		
		SNGARBS2	20.000		2.02	40.34	1.40	2.02	1	TOP SLAB	4.53	2.25	1	BOTTOM SLAB	9.73	
		SNAGRIS2	22.000		2.05	45.08	1.40	2.13	1	BOTTOM SLAB	9.87	2.05	1	BOTTOM SLAB	9.73	
		SNCOTTS3	27.250		1.35	36.68	1.40	1.35	1	TOP SLAB	4.53	1.44	1	TOP SLAB	9.64	
		SNAGGRS4	34.925		1.30	45.33	1.40	1.32	1	BOTTOM SLAB	9.87	1.30	1	BOTTOM SLAB	9.73	
		SNS5A	35.550		1.43	50.92	1.40	1.43	1	BOTTOM SLAB	9.87	1.44	1	BOTTOM SLAB	9.73	
		SNS6A	39.950		1.29	51.56	1.40	1.39	1	BOTTOM SLAB	9.87	1.29	1	BOTTOM SLAB	9.73	
		SNS7B	42.000		1.29	54.36	1.40	1.38	1	BOTTOM SLAB	9.87	1.29	1	BOTTOM SLAB	9.73	
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	TNAGRIT3	33.000		1.43	47.22	1.40	1.54	1	BOTTOM SLAB	9.87	1.43	1	BOTTOM SLAB	9.73	
		TNT4A	33.075		1.60	53.02	1.40	1.60	1	TOP SLAB	4.53	1.66	1	BOTTOM SLAB	9.73	
		TNT6A	41.600		1.42	59.19	1.40	1.42	1	BOTTOM SLAB	9.87	1.43	1	BOTTOM SLAB	9.73	
		TNT7A	42.000		1.42	59.58	1.40	1.55	1	BOTTOM SLAB	9.87	1.42	1	BOTTOM SLAB	9.73	
		TNT7B	42.000		1.51	63.47	1.40	1.51	1	BOTTOM SLAB	9.87	1.53	1	BOTTOM SLAB	9.73	
		TNAGRIT4	43.000		1.39	59.64	1.40	1.41	1	BOTTOM SLAB	9.87	1.39	1	BOTTOM SLAB	9.73	
		TNAGT5A	45.000		1.18	52.95	1.40	1.23	1	BOTTOM SLAB	9.87	1.18	1	BOTTOM SLAB	9.73	
TNAGT5B	45.000		③	1.08	48.67	1.40	1.15	1	BOTTOM SLAB	9.87	1.08	1	BOTTOM SLAB	9.73		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS		
LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

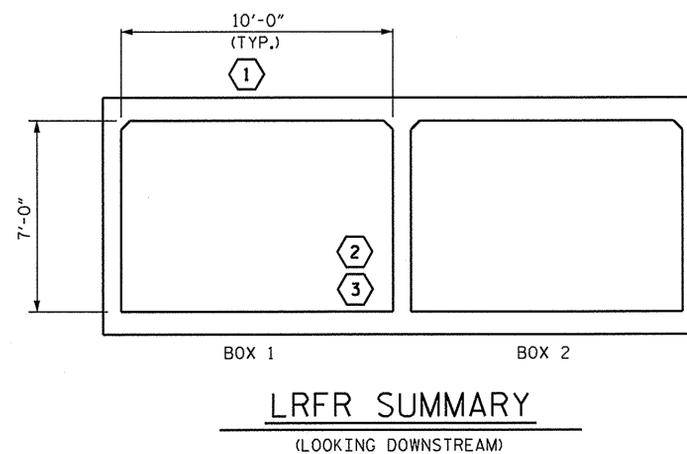
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

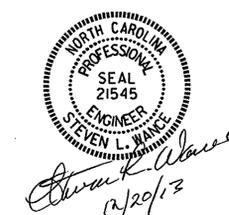
- 1.
- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



PROJECT NO. 41665.4A-31
RANDOLPH COUNTY
 STATION: 14+13.00 -L-

SHEET 7 OF 7



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : S. WANCE	DATE : 12/13
CHECKED BY : W. F. PARKER	DATE : 12/13
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			7