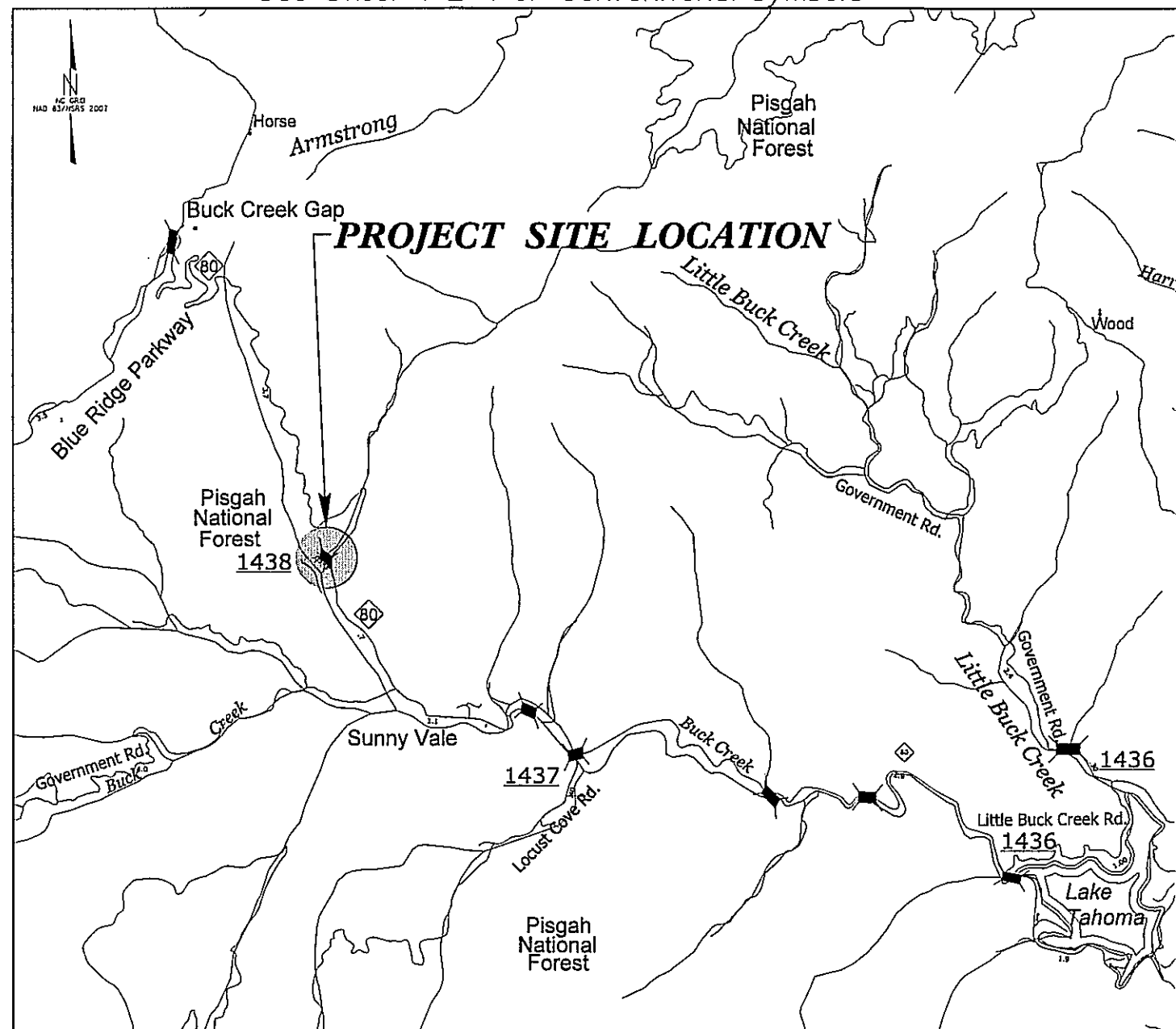


8/26/2013

PROJECT: 17BP.13.R.60

CONTRACT: DM00086

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



VICINITY MAP

N.T.S.

FINAL PLANS

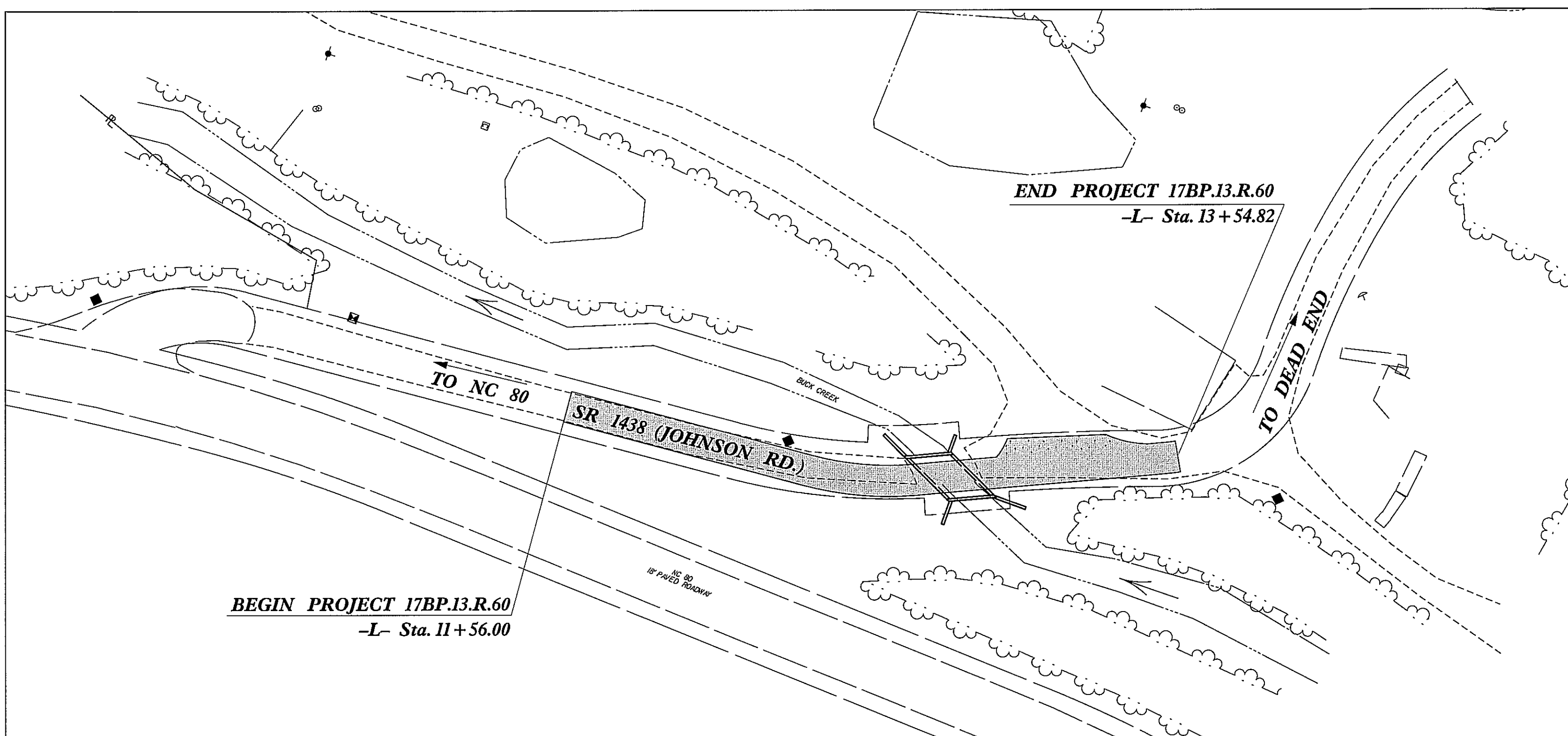
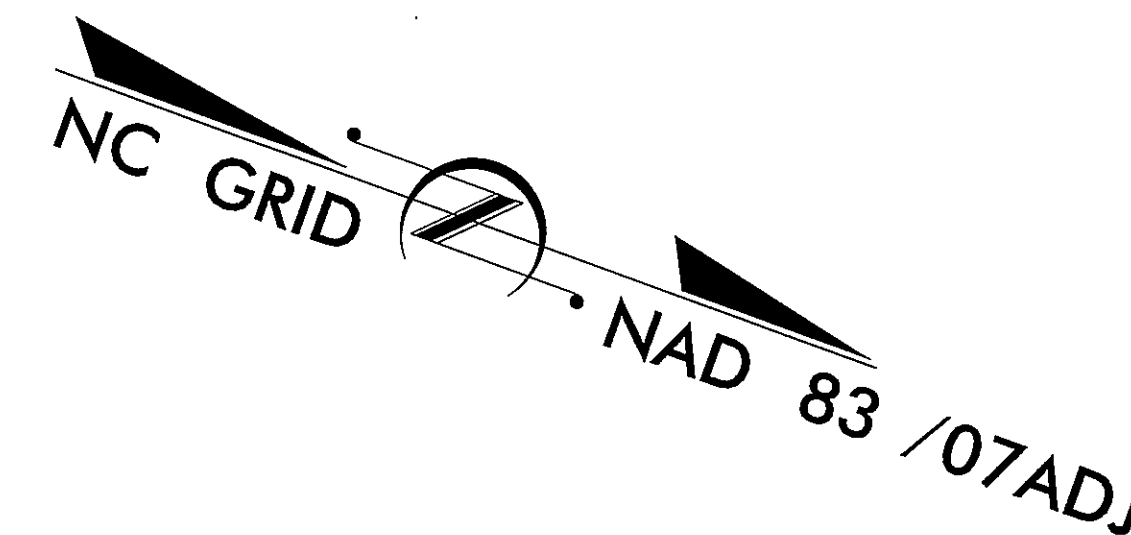
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MCDOWELL COUNTY

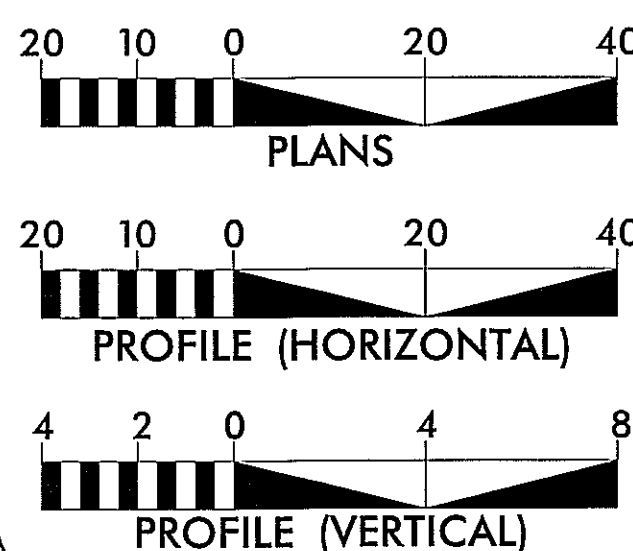
LOCATION: BRIDGE NO. 580291 ON SR 1438 (JOHNSON ROAD) OVER BUCK CREEK

TYPE OF WORK: GRADING, DRAINAGE AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.13.R.60	1	
MCDOWELL COUNTY #580291			
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.13.R.60		PE	
17BP.13.R.60		RW & UTILITIES	
17BP.13.R.60		CONST.	



GRAPHIC SCALES



DESIGN DATA

ADT 2010	=	40
ADT 2025	=	80
DHV	=	N/A %
D	=	N/A %
T	=	N/A % *
V	=	10 MPH

FUNCTIONAL CLASSIFICATION:
RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY PROJECT 17BP.13.R.60	=	0.035 mi
LENGTH STRUCTURE PROJECT 17BP.13.R.60	=	0.003 mi
TOTAL LENGTH OF PROJECT 17BP.13.R.60	=	0.038 mi

PLANS PREPARED BY:

CH ENGINEERING
3920 GLEN ROYAL RD. RALEIGH, NC 27617
TELE 919.788.0224 FAX 919.788.0232
NC LICENSE #P-0189

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
7-2-12

LETTING DATE:
10-16-13

NCDOT CONTACT:

PLANS PREPARED FOR:

DIVISION OF HIGHWAYS
20 Old 74
Asheville, NC 28803

THOMAS R. HEPLER, PE, PLS
PROJECT ENGINEER

ERIC M. TWEED, PE
PROJECT DESIGN ENGINEER

PAUL SPROUSE, PE
DIVISION 13 BRIDGE PROGRAM MANAGER

HYDRAULICS ENGINEER

STATE OF NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
032616/19/11
DANIEL H. WOODS
P.E.

SIGNATURE: *Daniel H. Woods*

ROADWAY DESIGN ENGINEER

STATE OF NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
10359
THOMAS R. HEPLER
P.E.

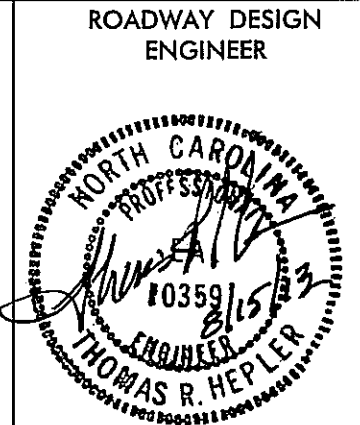
SIGNATURE: *Thomas R. Hepler*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



STATE HIGHWAY DESIGN ENGINEER

P.E.



INDEX OF SHEETS

1	Title Sheet
1-A	Index of Sheets, Roadway Standards, General Notes
1-B	Conventional Symbols
2	Typical Sections
3	Pipe Data Sheet/ Summary of Quantities
4	Plan and Profile Sheets
TCP-1	Traffic Control Plans
EC-1 thru EC-4	Erosion Control Plans
X-1 thru X-3	-L- line Cross Sections
C-1 thru C-5	Structure Plans

GENERAL NOTES: 2012 SPECIFICATIONS
EFFECTIVE: 01-17-12

GRADING AND SURFACING:
THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED 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 II.

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.

SIDE ROADS:
THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

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

STREET TURNOUT:
STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADIUS NOTED ON PLANS.

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

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

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 STRUCTURE.

UTILITIES:
UTILITY OWNERS ON THIS PROJECT ARE Duke Power and Frontier Communications. ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:
RIGHT-OF-WAY POINTS INDICATED IN THESE PLANS HAVE BEEN PLACED. AT THE END OF CONSTRUCTION CONTRACTOR IS RESPONSIBLE FOR PLACING CONCRETE MONUMENTS AT POINTS INDICATED ON PLANS. ANY RIGHT-OF-WAY POINTS DESTROYED DURING CONSTRUCTION SHALL BE ACCURATELY RESET BY CONTRACTOR.

2012 ROADWAY STANDARD DRAWINGS EFF. 01-17-12

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated Jan 17, 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 II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
840.00	Concrete Base Pad for Drainage Structures
840.14	Concrete Grated Drop Inlet - 12" thru 30" Pipe
840.15	Brick Grated Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame & Grate
840.45	Precast Drainage Structure
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap
DIVISION 11 - WORK ZONE TRAFFIC CONTROL	
1101.01	Work Zone Advance Warning Signs
1101.03	Temporary Road Closures
1110.01	Stationary Work Zone Signs
1145.01	Barricades - Type III

B/17/99

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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	-----
Property Monument	◻ EGM
Parcel/Sequence Number	(23)
Existing Fence Line	-----
Proposed Woven Wire Fence	-----
Proposed Chain Link Fence	-----
Proposed Barbed Wire Fence	-----
Existing Wetland Boundary	----- WLB
Proposed Wetland Boundary	----- WLB
Existing High Quality Wetland Boundary	----- HQ WLB
Existing Endangered Animal Boundary	----- EAB
Existing Endangered Plant Boundary	----- EPB

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	-----
River Basin Buffer	----- RBB
Flow Arrow	-----
Disappearing Stream	-----
Spring	○
Swamp Marsh	-----
Proposed Lateral, Tail, Head Ditch	-----
False Sump	-----

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ MILEPOST 35
Switch	◻ 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 Marker	-----
Existing Control of Access	○ CA
Proposed Control of Access	○ CA
Existing Easement Line	----- E
Proposed Temporary Construction Easement	----- E
Proposed Temporary Drainage Easement	----- TDE
Proposed Permanent Drainage Easement	----- PDE
Proposed Permanent Utility Easement	----- PUE

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	----- C
Proposed Slope Stakes Fill	----- F
Proposed Wheel Chair Ramp	----- WCR
Curb Cut for Future Wheel Chair Ramp	----- CCFR
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	-----

VEGETATION:

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

EXISTING STRUCTURES:

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

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	----- P
Designated U/G Power Line (S.U.E.*)	----- P

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	----- T
Designated U/G Telephone Cable (S.U.E.*)	----- T
Recorded U/G Telephone Conduit	----- TC
Designated U/G Telephone Conduit (S.U.E.*)	----- TC
Recorded U/G Fiber Optics Cable	----- T FO
Designated U/G Fiber Optics Cable (S.U.E.*)	----- T FO

WATER:

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

TV:

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

GAS:

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

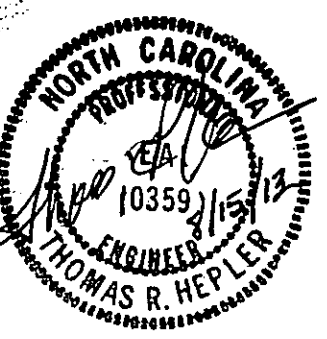

SANITARY SEWER:

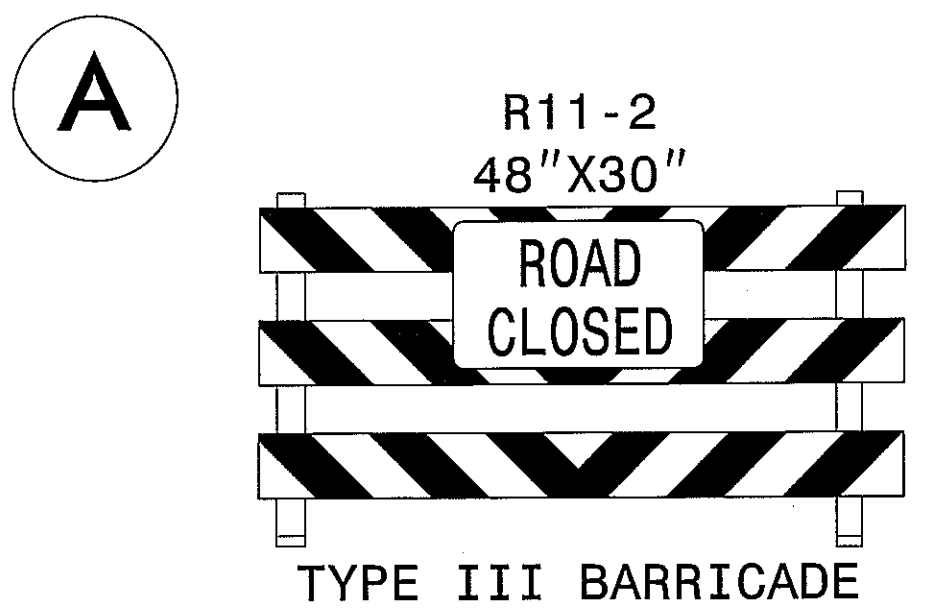
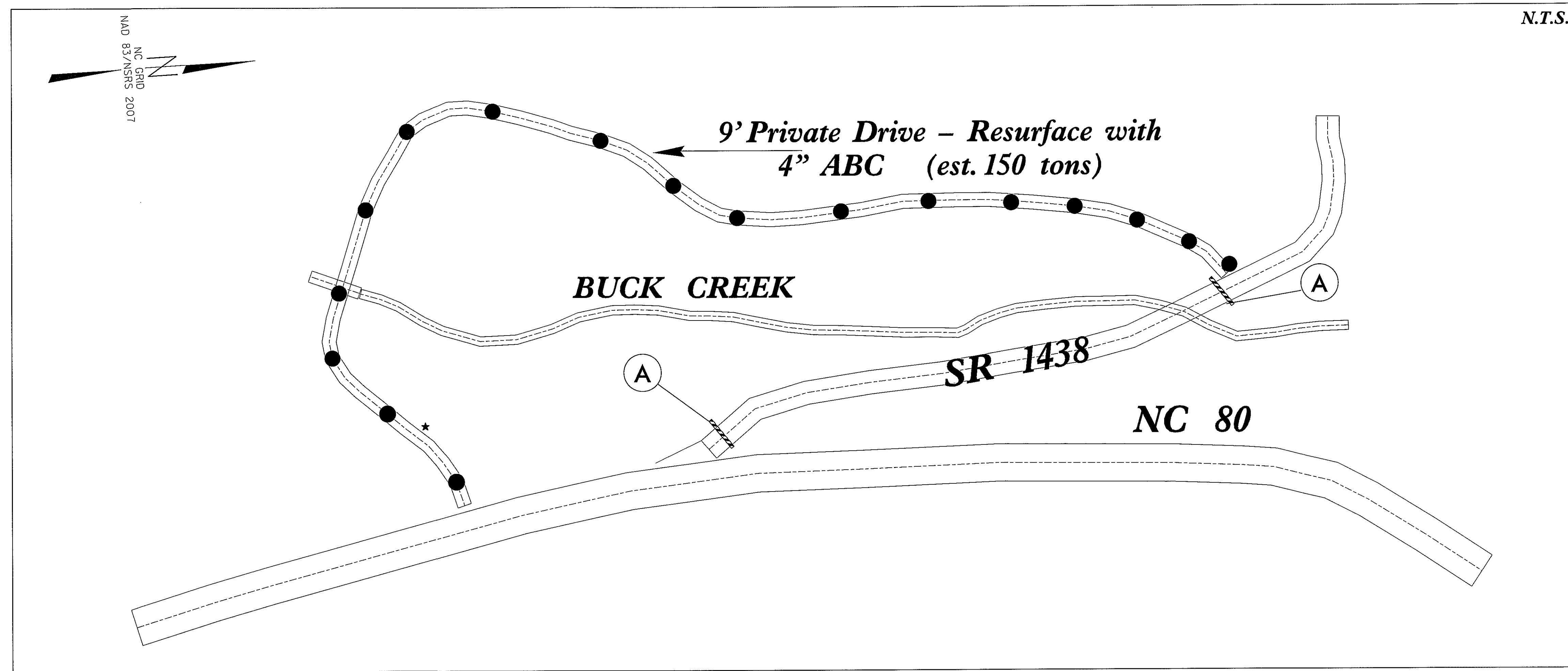
Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	----- SS
Above Ground Sanitary Sewer	----- A/G Sanitary Sewer
Recorded SS Forced Main Line	----- FSS
Designated SS Forced Main Line (S.U.E.*)	----- FSS

MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	⊕
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line	----- TUTL
U/G Tank; Water, Gas, Oil	◻
A/G Tank; Water, Gas, Oil	◻
U/G Test Hole (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

JOHNSON ROAD (SR 1438) TEMPORARY ROAD CLOSURE

PROJECT REFERENCE NO. 17BP.13.R.60	SHEET NO. TCP-1
BRIDGE NO. 580291	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	
	
3220 GLEN ROYAL RD. RALEIGH, NC 27617 TELE 919.788.0224 FAX 919.788.0232 NC LICENSE #P-0189	



***NOTE: PRIVATE DRIVE ACCESS IN PROXIMITY OF STRUCTURE SHALL BE MAINTAINED**

PROPOSED DETOUR

DETOUR ROUTE ●—●—●—●—●

DETOUR LENGTH 0.15 MILES

PHASING PLAN

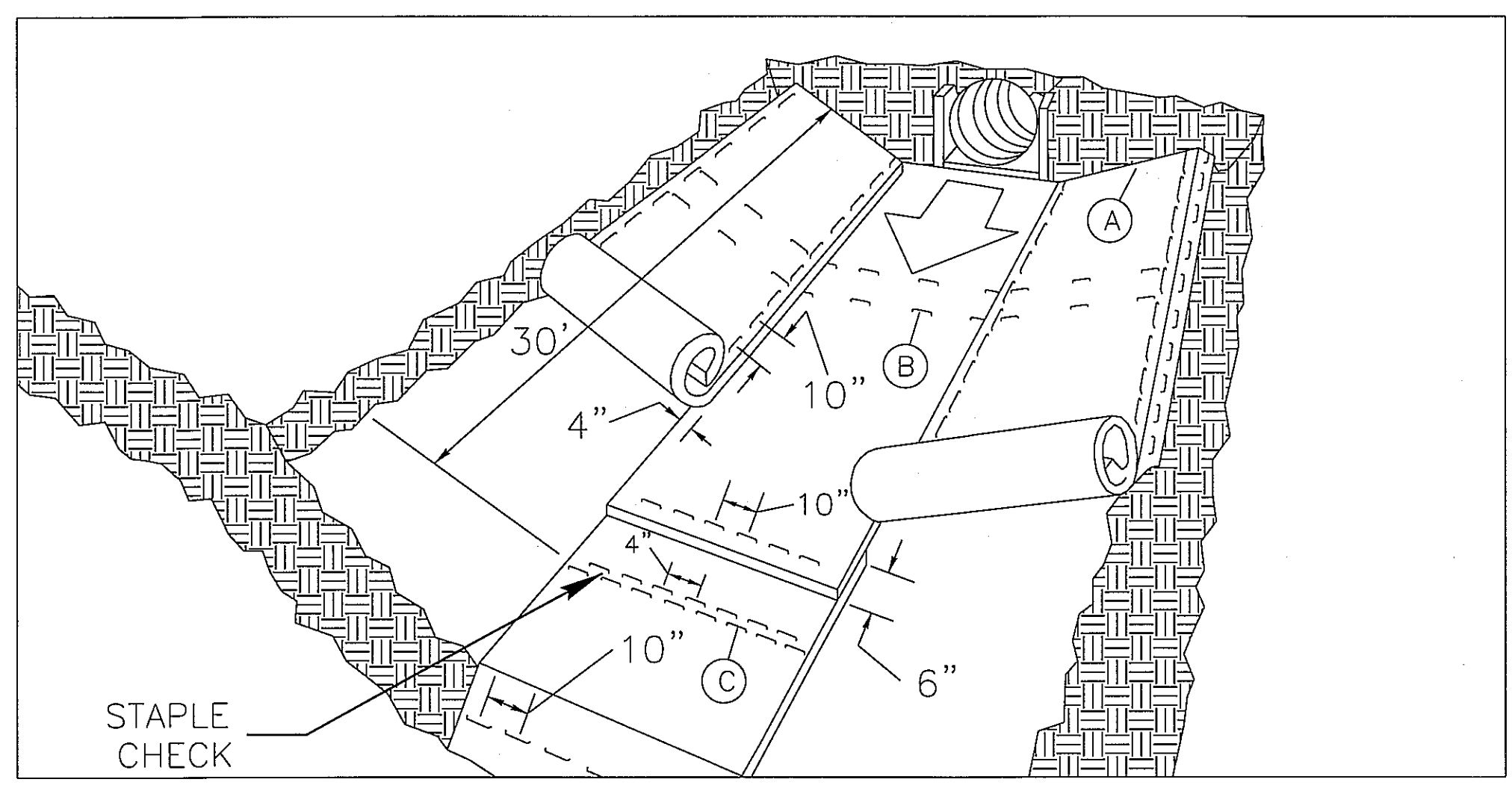
- PHASE 1**
- STEP 1.** PLACED WORK ZONE ADVANCE WARNING SIGNS ON NC 80
 - STEP 2.** COORDINATE WITH PROPERTY OWNER AND IMPROVE DESIGNATED DETOUR ROUTE. REFER TO AGREEMENT FOR ENTRY.
 - STEP 3.** UPON COMPLETION OF IMPROVEMENTS INSTALL BARRICADES AND CLOSE SR 1438. CONTRACTOR SHALL USE SR 1438 FOR CONSTRUCTION ACCESS.
- PHASE 2**
- STEP 1.** WITH TRAFFIC DETOURED CONSTRUCT NEW STRUCTURE.
 - STEP 2.** UPON COMPLETION REOPEN SR 1438 TO TRAFFIC

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 JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCED WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES - TYPE III

MATTING INSTALLATION DETAIL



MATTING IN DITCHES

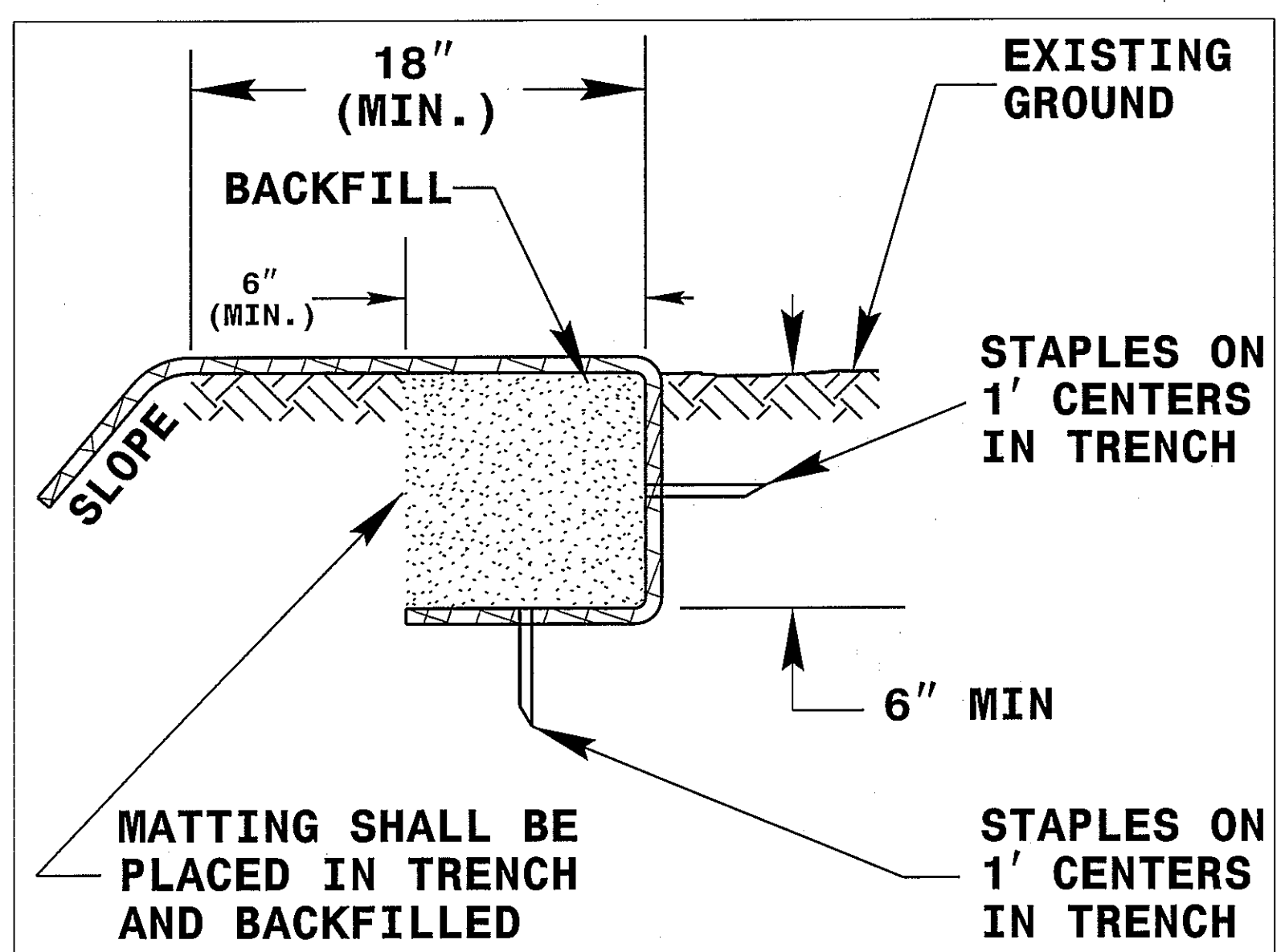
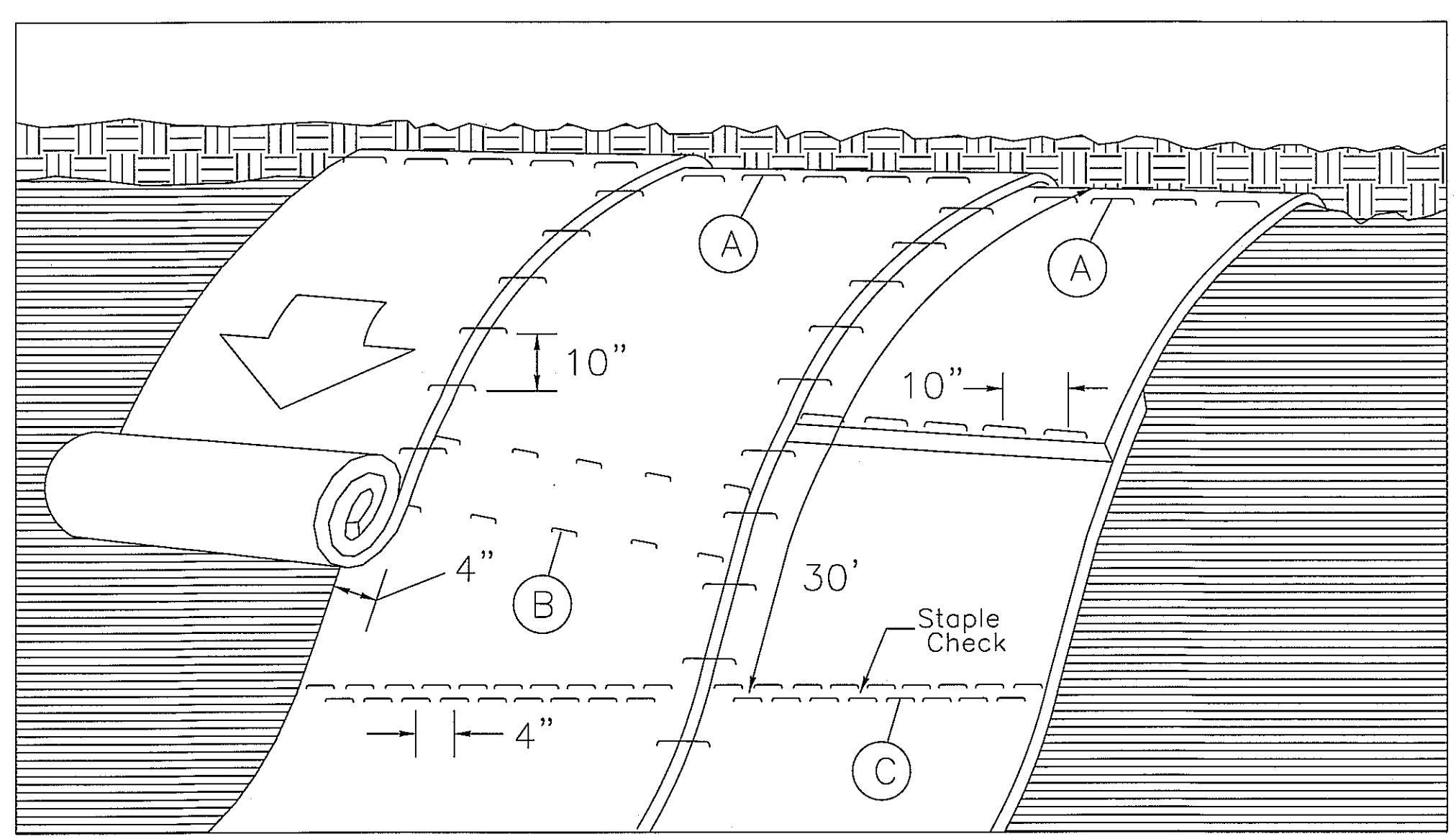


DIAGRAM (A)



MATTING ON SLOPES

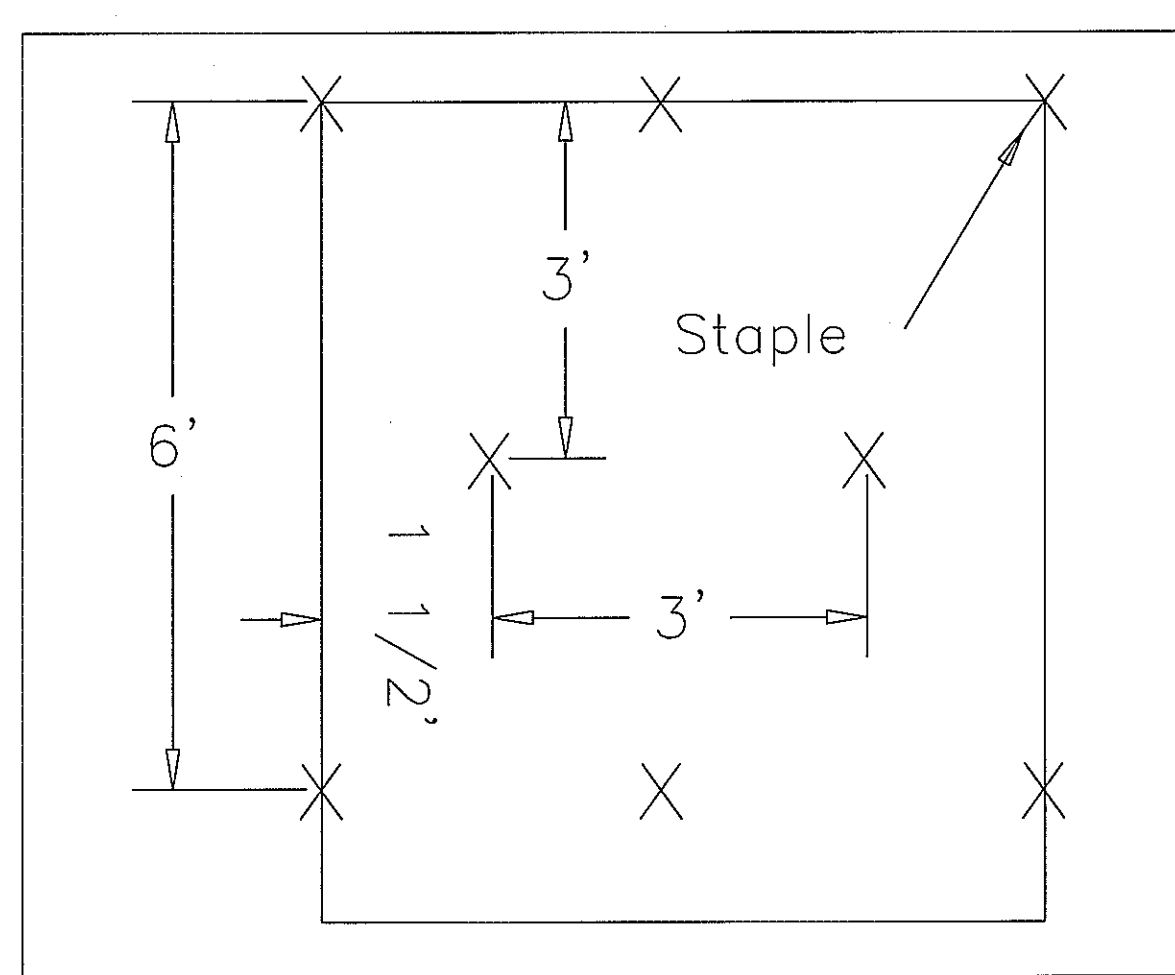


DIAGRAM (B)

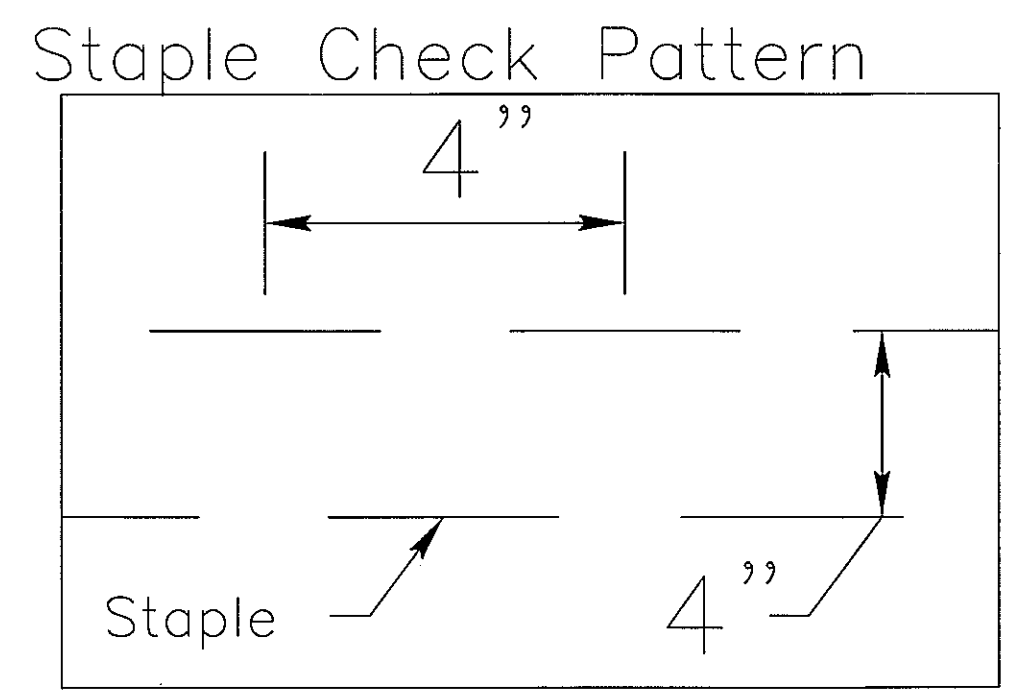


DIAGRAM (C)

NOT TO SCALE

NOTES:

THIS DETAIL APPLIES TO STRAW, EXCELSIOR, AND PERMANENT SOIL REINFORCEMENT MAT (PSRM) INSTALLATION.

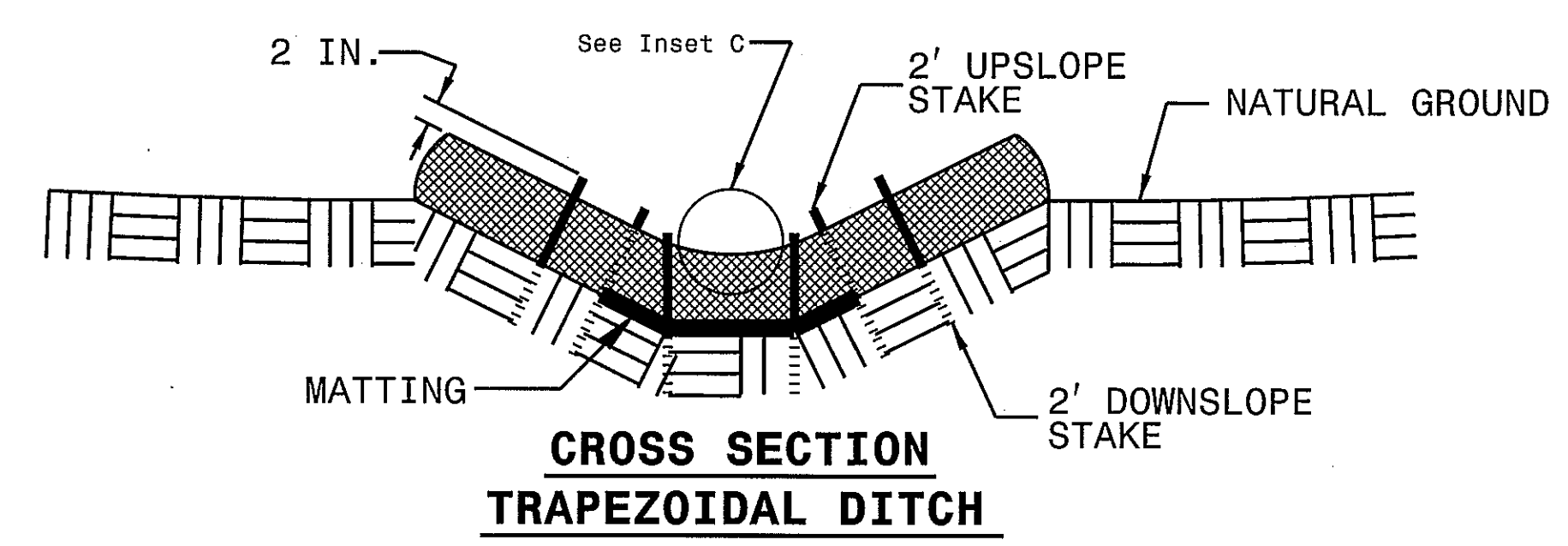
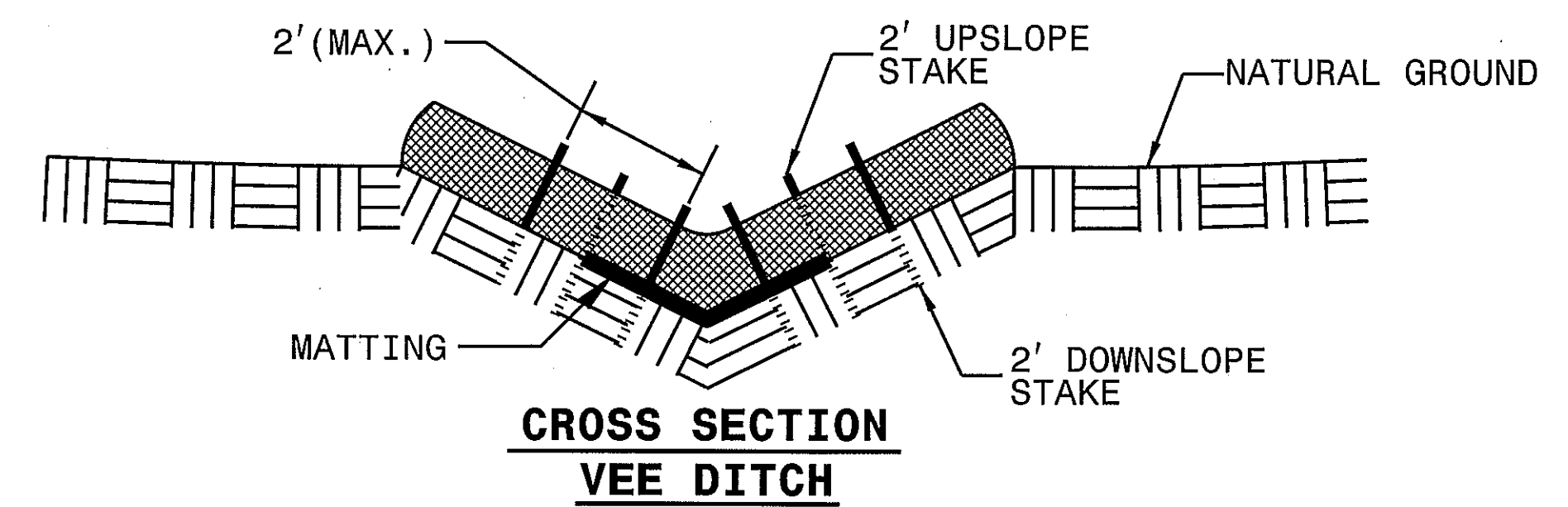
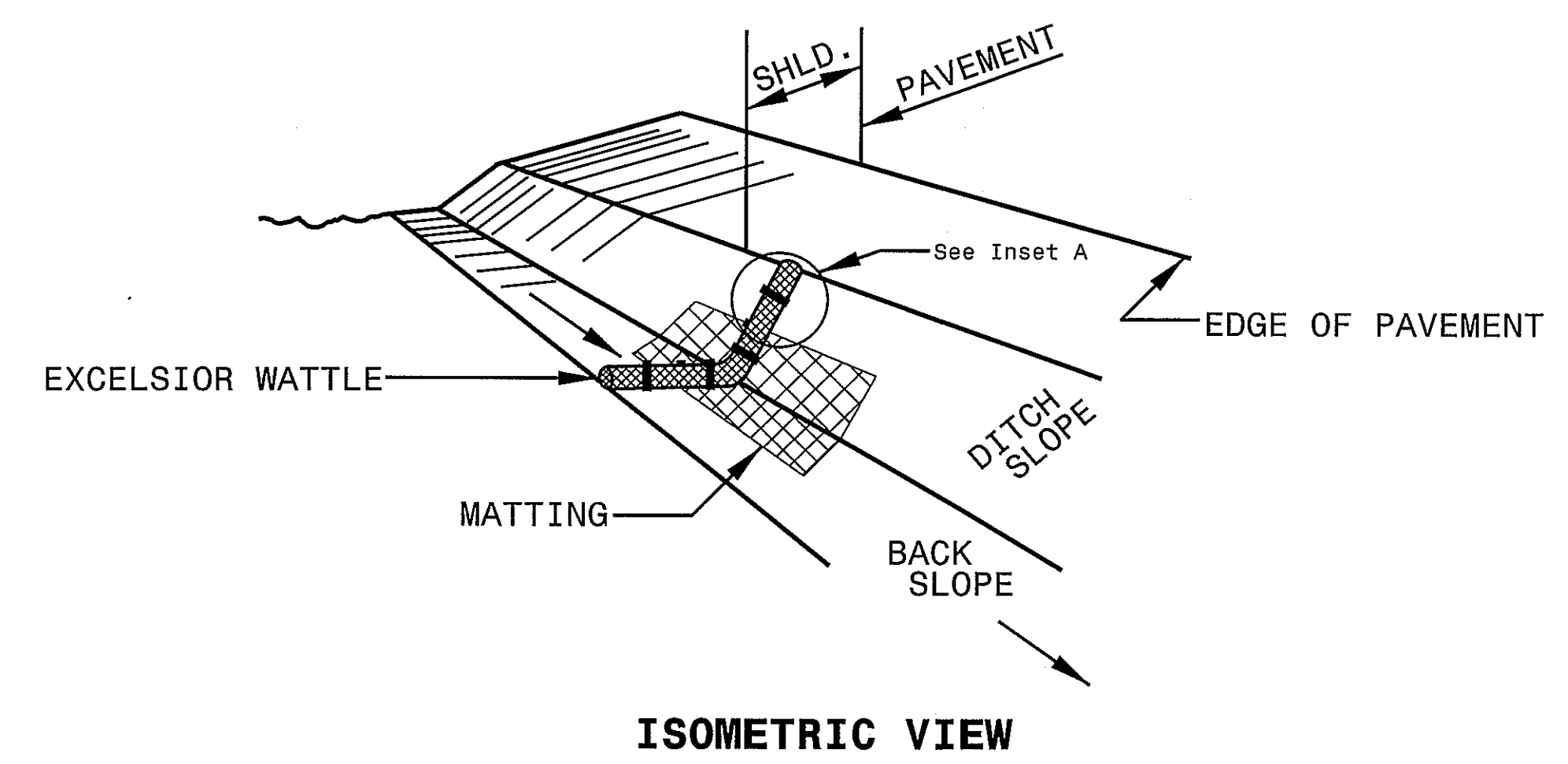
STAPLES SHALL BE NO. 11 GAUGE STEEL WIRE FORMED INTO A "U" SHAPE WITH A MINIMUM THROAT WIDTH OF 1 INCH AND NOT LESS THAN 6 INCHES IN LENGTH.



ALPHA & OMEGA GROUP
 CIVIL & STRUCTURAL ENGINEERS
 4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
 Phone 919 981 0310 Fax 919 981 0451
 Firm License No. C-1684 www.aogroup.com

PROJECT NO. 17.BP.13.R.60					
MCDOWELL COUNTY					
STATION: 12+88.20 -L-					
SHEET _ OF _					
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
CULVERT NO. 580291 ON SR 1438 OVER BUCK CREEK					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					SHEET NO.

WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



NOTES:

USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

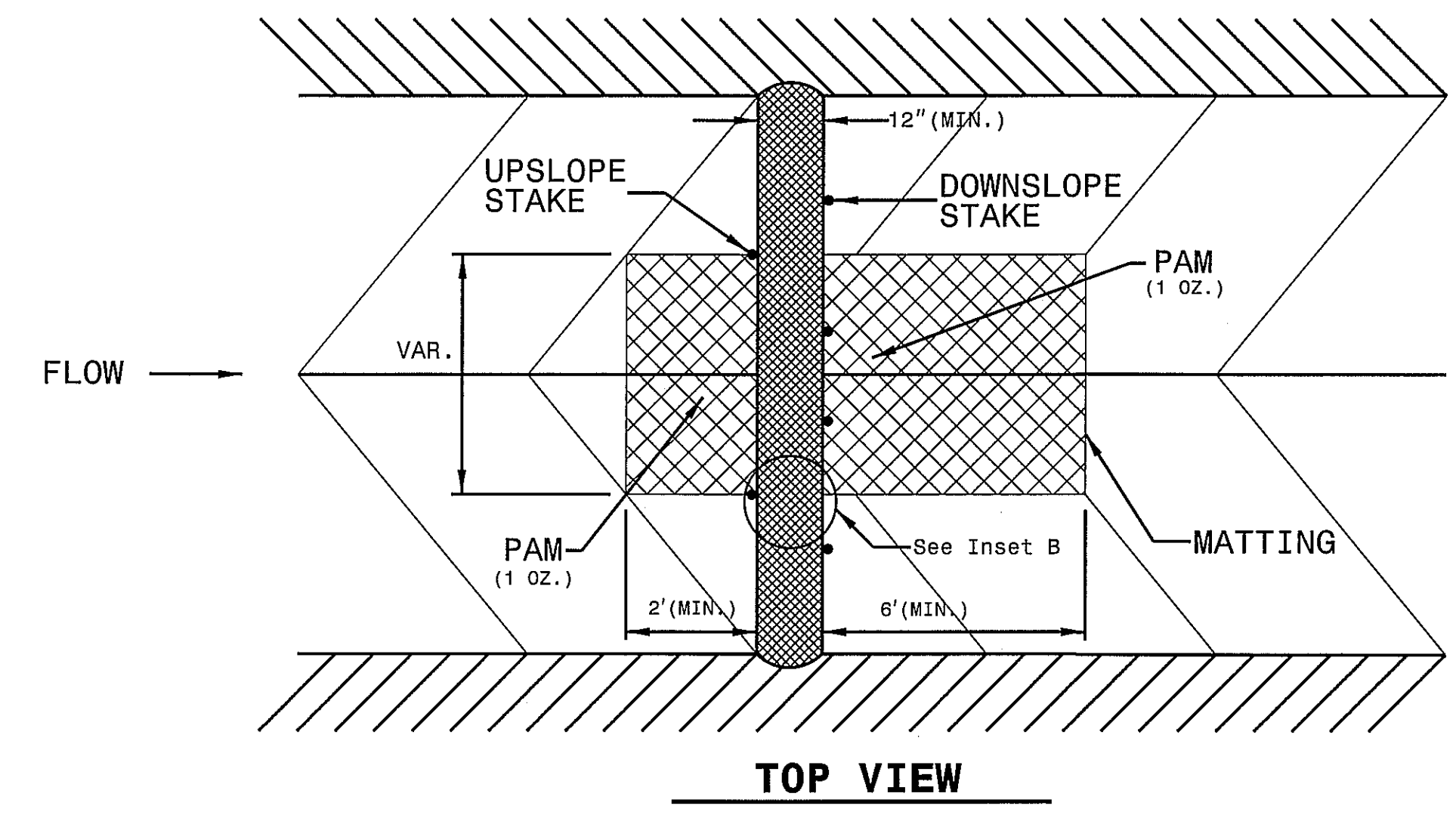
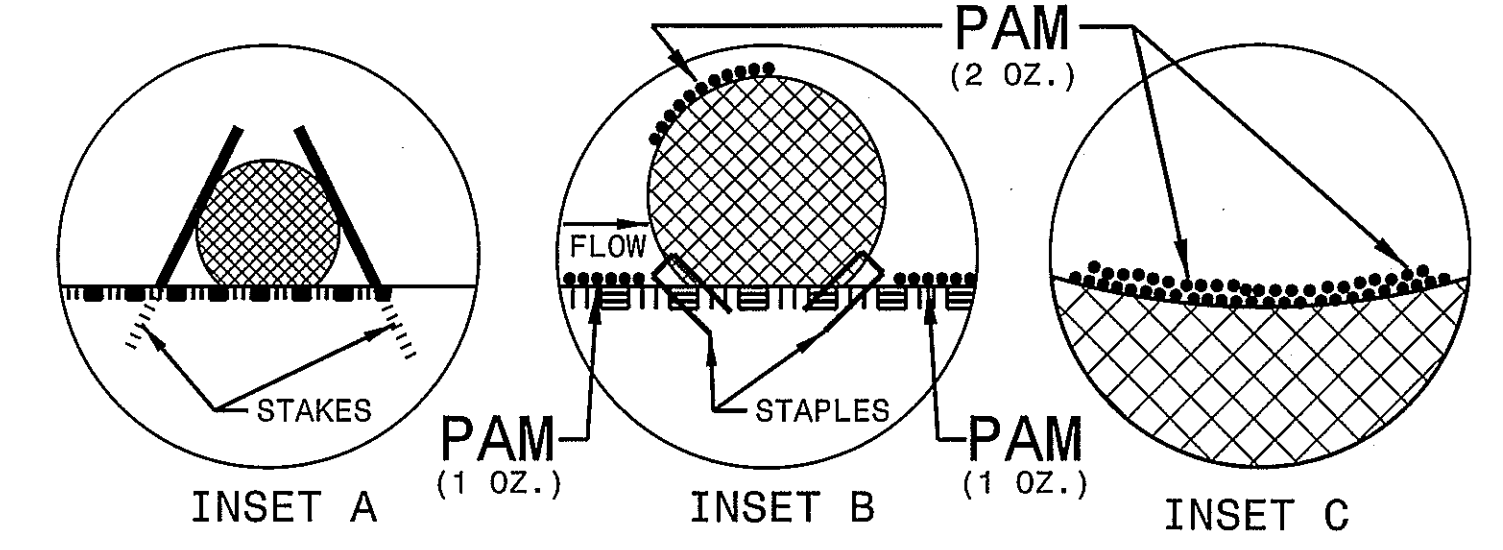
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.



PROJECT NO. 17.BP.13.R.60
MCDOWELL COUNTY
STATION: 12+88.20 -L-
SHEET _ OF _

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CULVERT NO. 580291
ON SR 1438 OVER
BUCK CREEK

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

TOTAL SHEETS



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DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

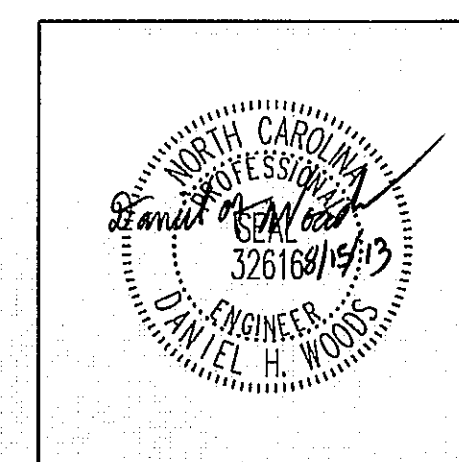
PROJECT REFERENCE NO. <i>17BP.13.R.60</i>	SHEET NO. <i>EC-3A</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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.

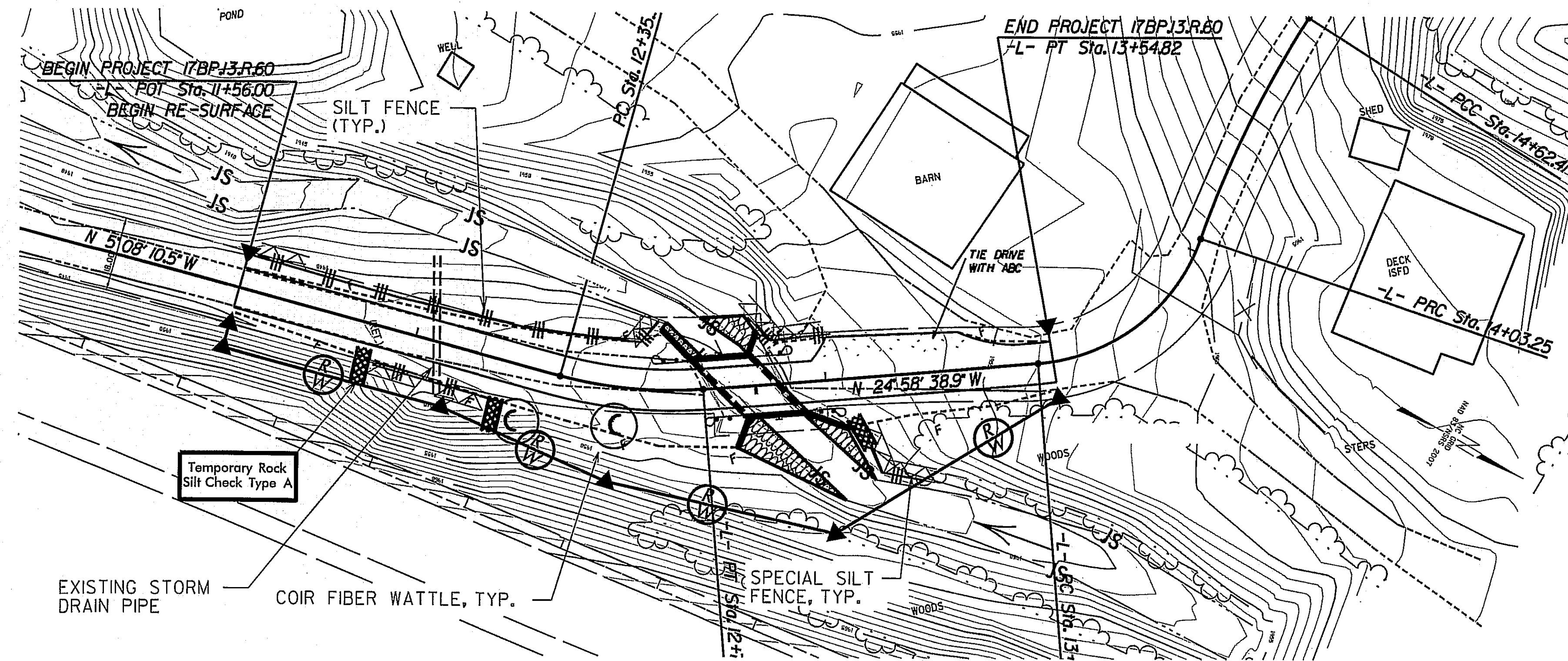


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PROJECT NO. <u>17.BP.13.R.60</u>					
MCDOWELL COUNTY					
STATION: <u>12+88.20 -L-</u>					
SHEET <u> </u> OF <u> </u>					
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
CULVERT NO. 580291 ON SR 1438 OVER BUCK CREEK					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. TOTAL SHEETS

PROJECT REFERENCE NO. 17BP13.R.60	SHEET NO. EC-04/CONST
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



CLEARING AND GRUBBING AND EROSION CONTROL

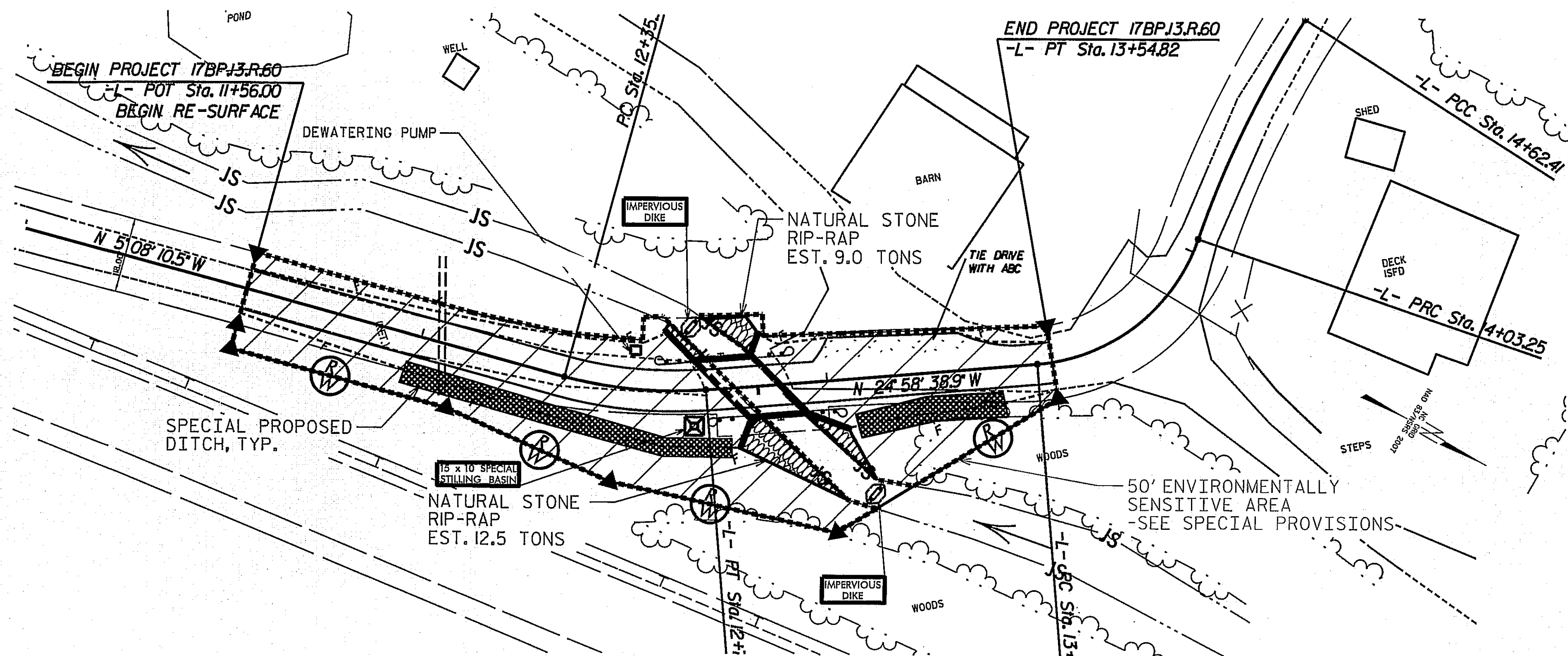
NOTES:

1. CULVERT CONSTRUCTION SHALL BE PERFORMED ONLY IN DRY OR ISOLATED SECTIONS OF CHANNEL.
2. IMPERVIOUS DIKES ARE TO BE USED TO ISOLATE WORK FROM STREAM FLOW AS NECESSARY.
3. ALL GRADED AREAS SHALL BE STABILIZED WITHIN 24 HOURS.
4. MAINTENANCE OF STREAM FLOW OPERATIONS SHALL BE INCIDENTAL TO THE WORK. THIS INCLUDES POLYETHYLENE SHEETING, DIVERSION PIPES, PUMPS, AND HOSES.
5. PUMPS AND HOSES SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA.
6. THE CONTRACTOR SHALL NOT PUMP SEDIMENT-LADEN WATER DIRECTLY INTO THE STREAM.
7. ALL EROSION CONTROL MEASURES SHOWN ARE TO BE PLACED WITHIN EXISTING / PROPOSED RIGHT OF WAY OR EASEMENT.

**CULVERT CONSTRUCTION SEQUENCE
STA. 12+88.20**

(ROAD CLOSURE - MAINTENANCE OF TRAFFIC VIA OFFSITE DETOUR.)

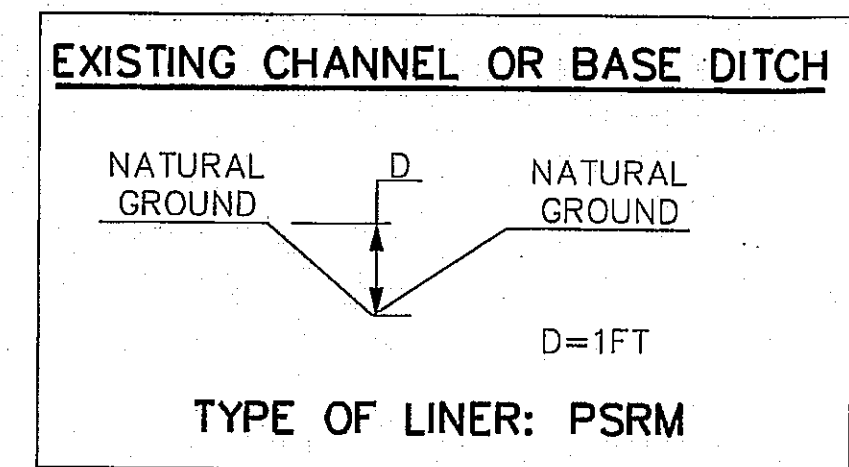
1. CONSTRUCT STILLING BASIN FOR FOR PUMPED EFFLUENT (10' X 15' MIN.) FROM DEWATERED SITE.
2. INSTALL IMPREVIOUS DIKES.
3. DIVERT CHANNEL FLOW AROUND CONSTRUCTION VIA BYPASS PUMP.
4. REMOVE EXISTING BRIDGE.
5. INSTALL CULVERT AND HEADWALLS. BACKFILL CULVERT.
6. STABILIZE CHANNEL BANKS.
7. REMOVE IMPREVIOUS DIKES, STILLING BASIN, AND PUMP DIVERSION.
8. COMPLETE ROADWAY.



CONSTRUCTION SEQUENCE

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 4

ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS



PROJECT NO. **17.BP.13.R.60**
MCDOWELL COUNTY
STATION: **12+88.20 -L-**
SHEET **4** OF **4**

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**CULVERT NO. 580291
ON SR 1438 OVER
BUCK CREEK**

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

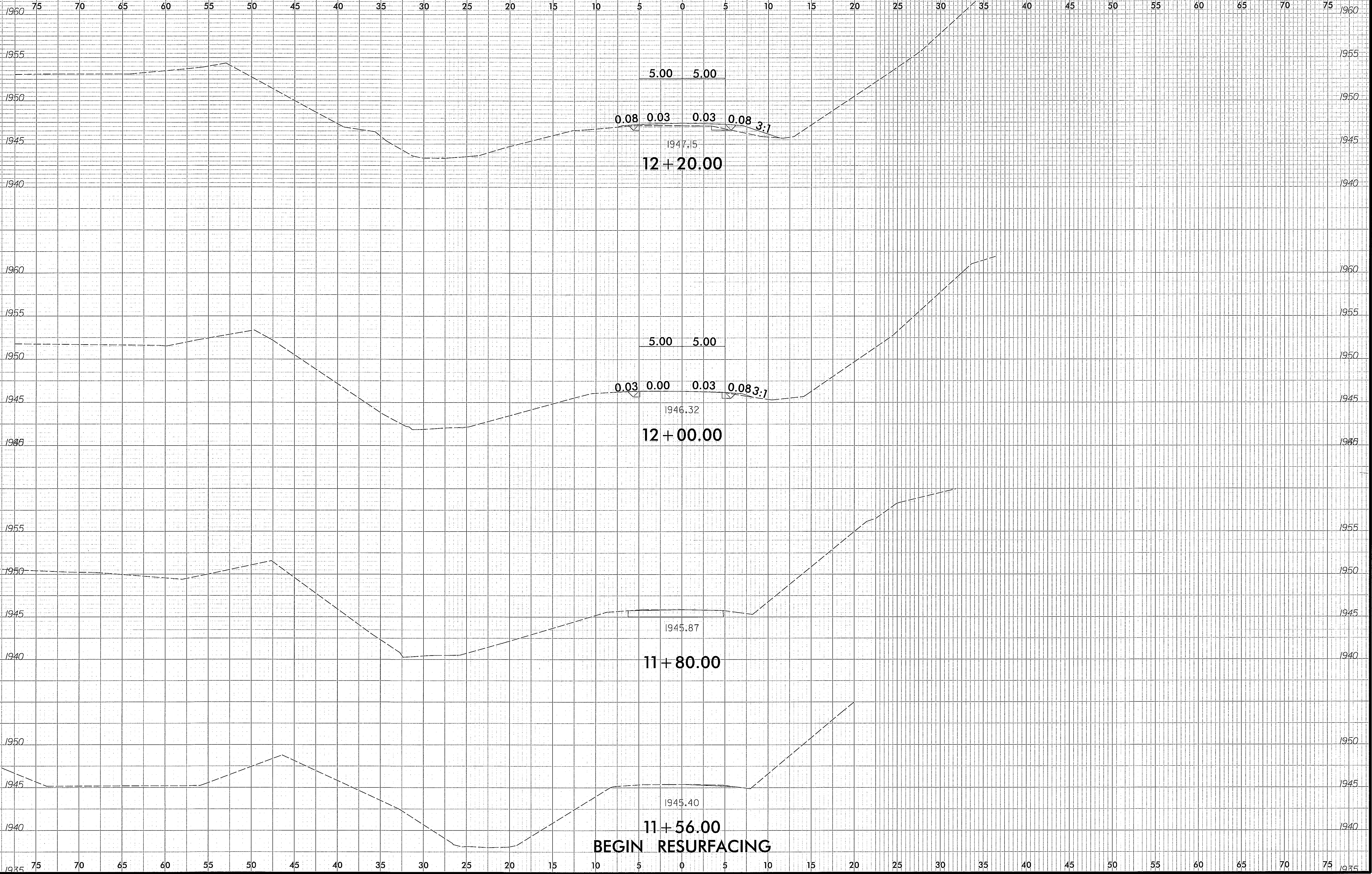
ALPHA & OMEGA GROUP
CIVIL & STRUCTURAL ENGINEERS
4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
Firm License No. C-1684 www.aogroup.com

8/23/99



PROJ. REFERENCE NO.
17BP.13.R.60

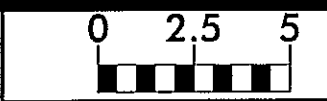
SHEET NO.
X-1



BEGIN RESURFACING

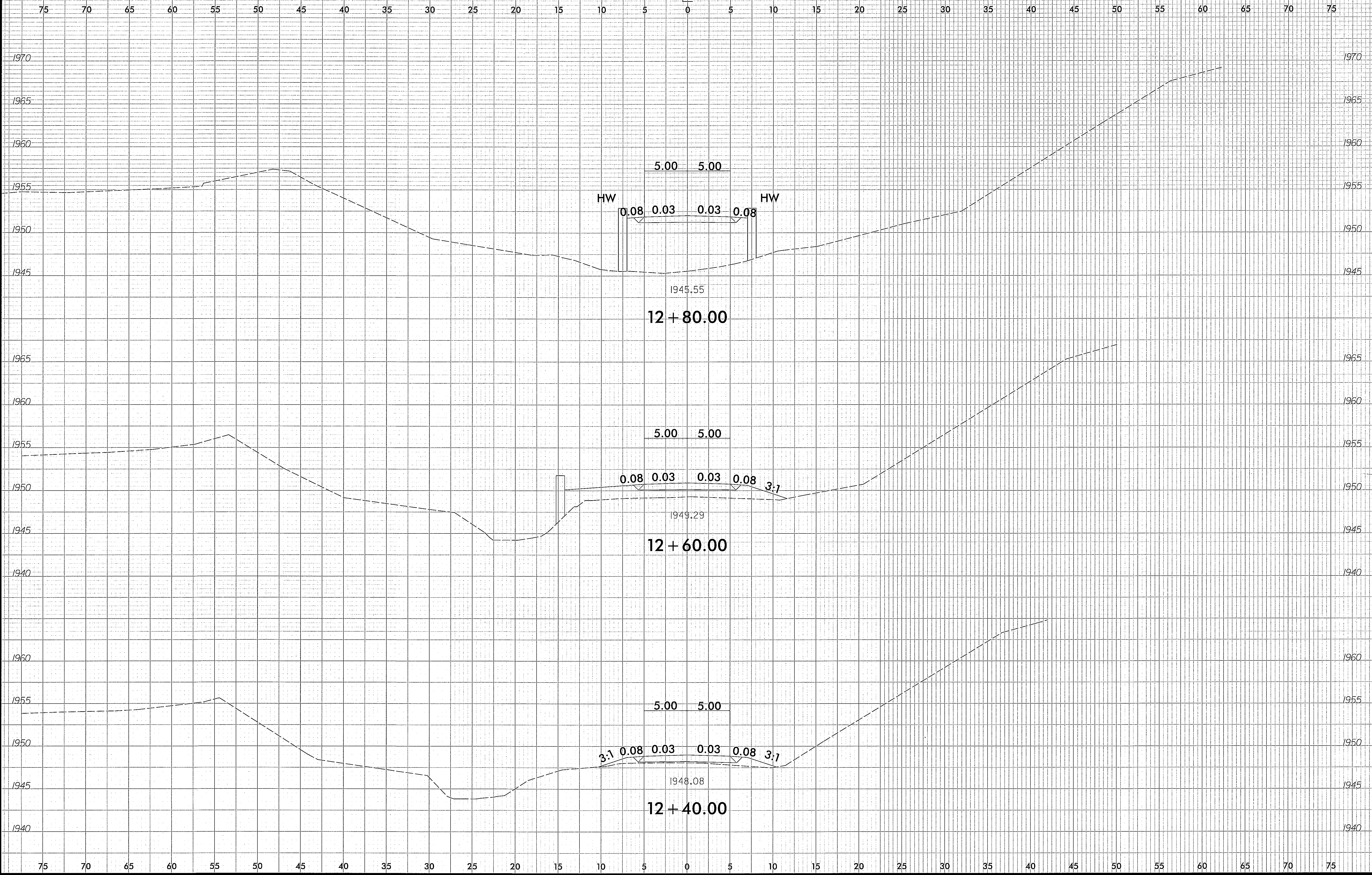
8/13/2013 9:09:11 AM
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8/23/99

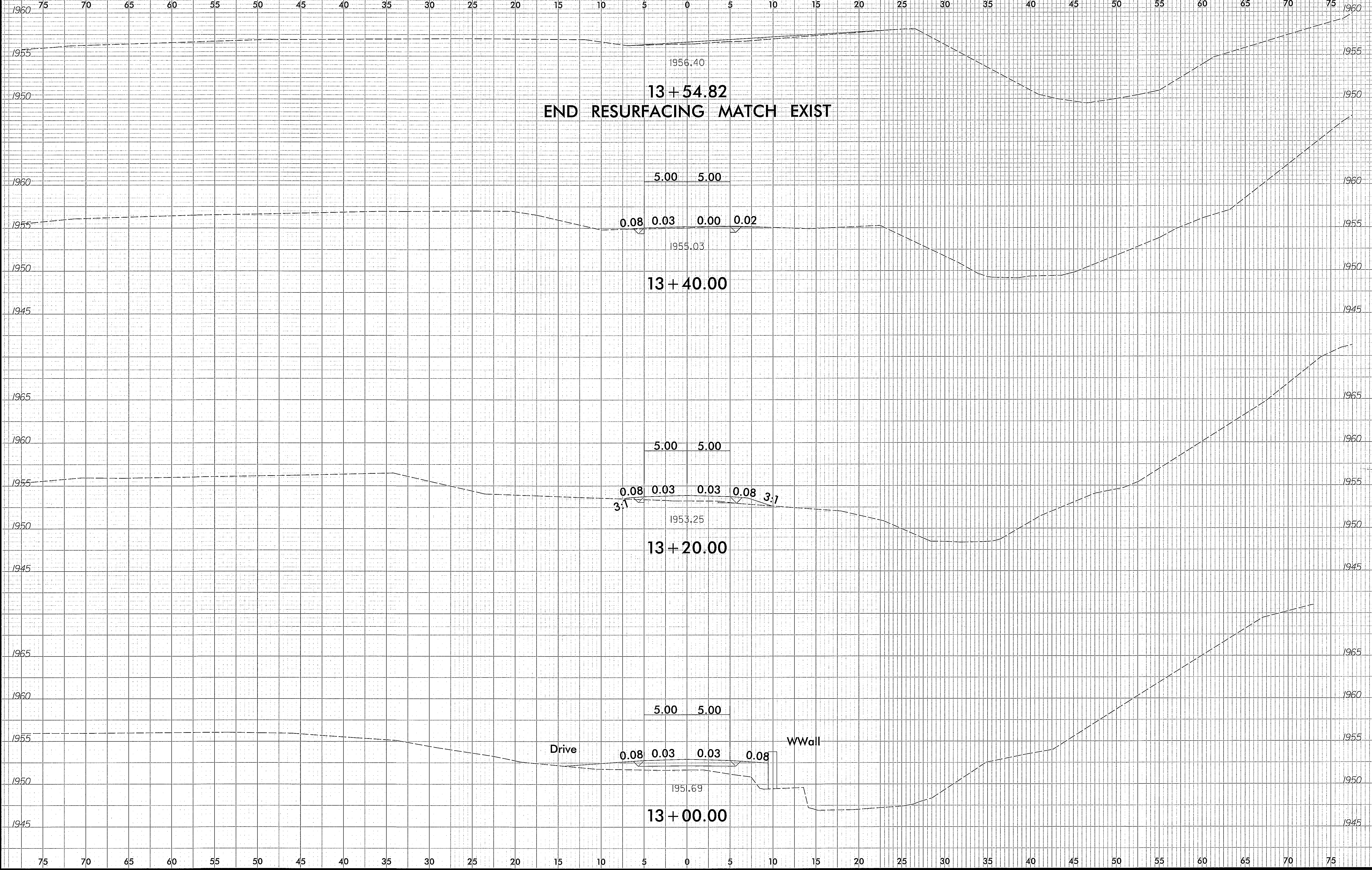


PROJ. REFERENCE NO.
17BP.13.R.60

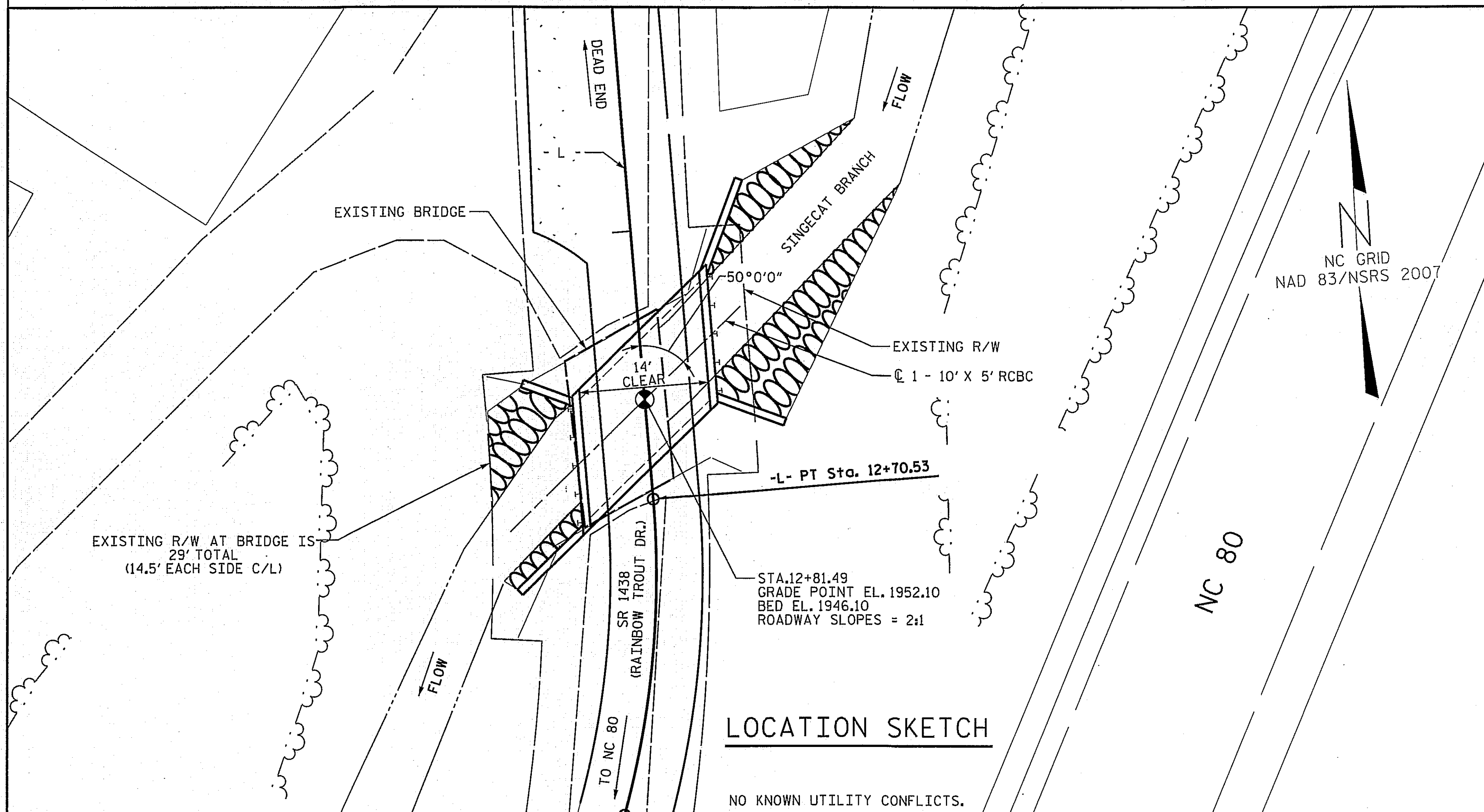
SHEET NO.
X-2



8/13/2013 5:02:11 PM JBY_XPL.dgn
JBY_XPL.dwg



BM#1 ELEVATION = 1945.61 N 741956 E 1065277 BL STATION 5+82.00 11' LEFT RR SPIKE IN 18" MAPLE



NOTES:

- ASSUMED LIVE LOAD HL93 OR ALTERNATE LOADING
- DESIGN FILL 1'-6" (MAX)
- FOR BORING INFORMATION, SEE GEOTECHNICAL REPORT.
- SEE ROADWAY PLANS FOR RIP RAP REQUIREMENTS AT CULVERT ENDS.
- FOR ADDITIONAL INFORMATION REGARDING DRAINAGE, GRADING, AND ROADWAY, SEE ROADWAY PLANS.
- FOR ANCHORAGE OF GUARDRAIL TO HEADWALL, SEE SHEET 3 OF 5. MAXIMUM POST SPACING ON THE HEAD WALL TO BE 3'-1/2'.
- MINIMUM CONCRETE COMPRESSIVE STRENGTH = 3000 PSI
- ALL REINFORCING STEEL SHALL BE GRADE 60.
- 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.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.
- CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTING AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALL.
- THE EXISTING STRUCTURE CONSISTING OF A SINGLE 18'-6", 13'-0" WIDE TIMBER DECK, (6) 6" X 12" TIMBER JOISTS, 10" X 12" TIMBER CAPS, 10" X 12" TIMBER POSTS, TIMBER LAGGING ABUTMENTS, AND LOCATED AT THE SAME LOCATION AS THE PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING STRUCTURE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE STRUCTURE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORKS, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

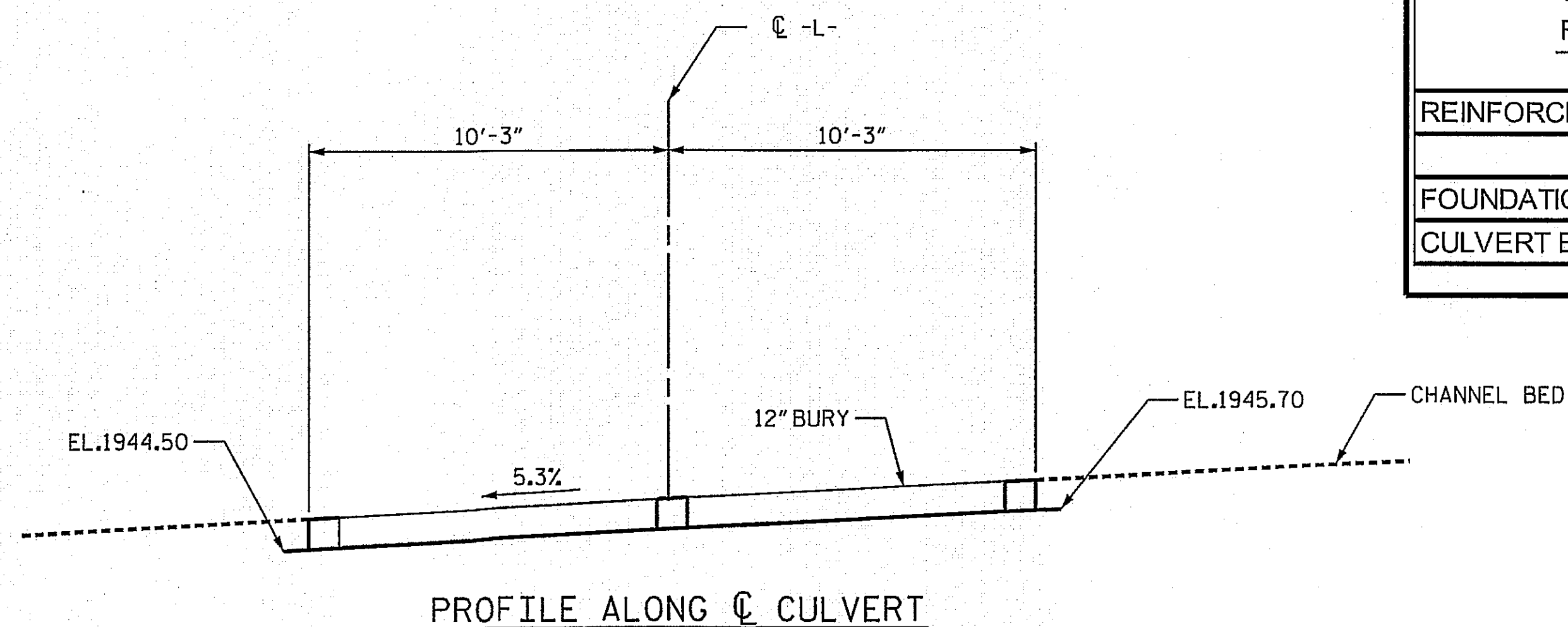
TOTAL STRUCTURE QUANTITIES		
CLASS 'A' CONCRETE		
BARREL	=	24.0 CY
WINGS ETC.	=	11.7 CY
FOOTINGS	=	5.8 CY
TOTAL	=	41.5 CY
REINFORCING STEEL	=	4893 LBS.
FOUNDATION CONDITIONING MATERIAL TOTAL = 18 TONS		
CULVERT EXCAVATION LUMP SUM		

HYDRAULIC DATA

DESIGN DISCHARGE 470 CFS
 FREQUENCY OF DESIGN FLOOD 25 YR
 DESIGN HIGH WATER 1950.0 FT
 DRAINAGE AREA 0.90 SQ MI
 BASIC DISCHARGE (Q100) 770 CFS
 BASIC HIGH WATER ELEVATION 1950.86 FT

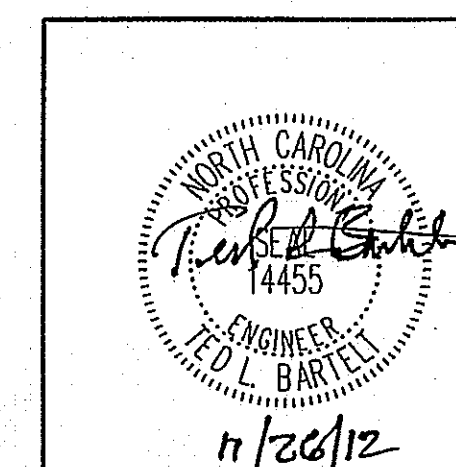
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE 1300 CFS
 FREQUENCY OF OVERTOPPING FLOOD 500+-YR
 OVERTOPPING FLOOD ELEVATION 1952.1 FT



DRAWN BY : JD GOODIN DATE : 07/30/12
 CHECKED BY : TL BARTELT DATE : 09/04/12

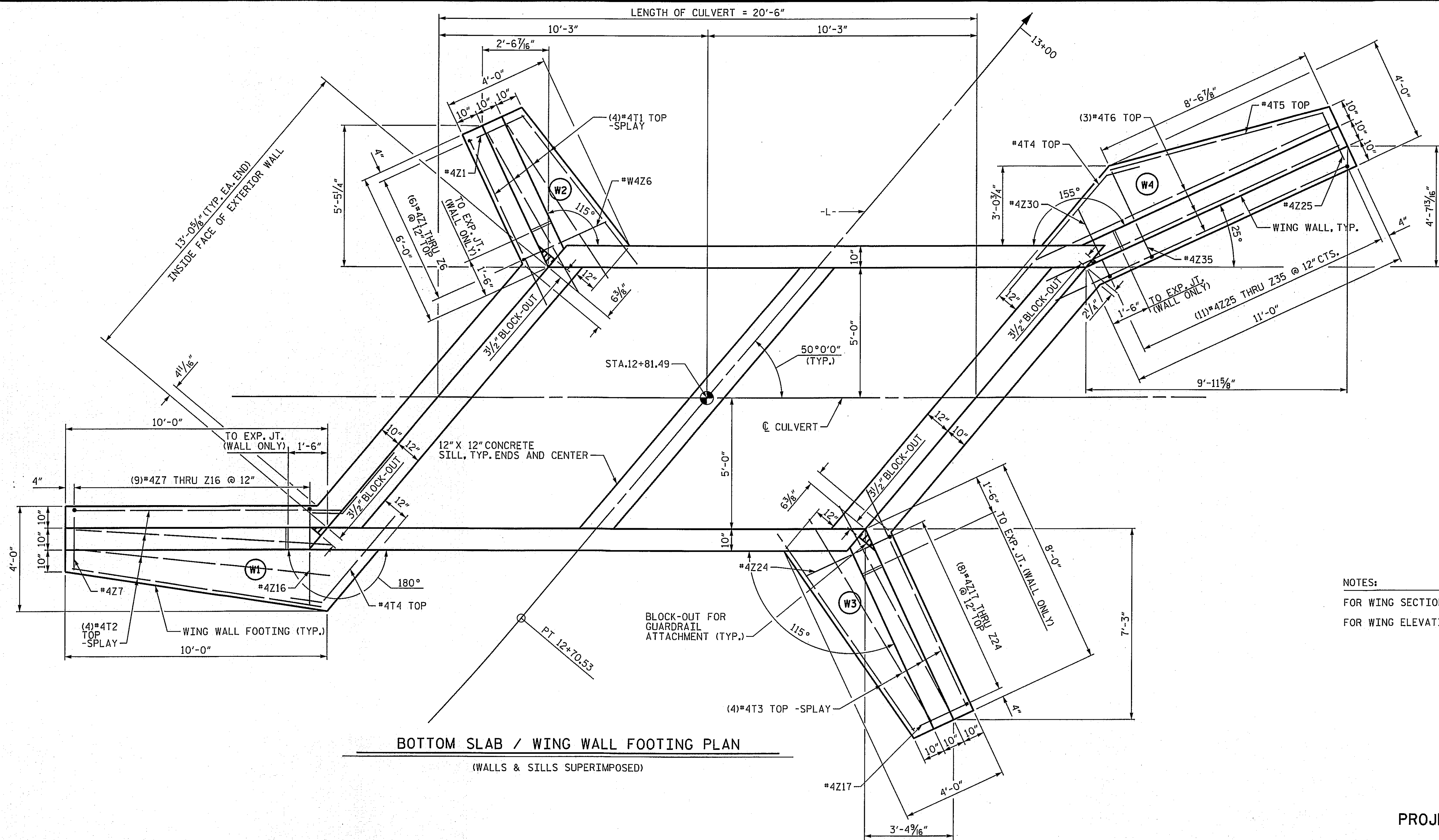
ALPHA & OMEGA GROUP
 CIVIL & STRUCTURAL ENGINEERS
 4601 Lake Boone Trail, Ste. 3C Raleigh, NC 27607
 Phone 919 981 0310 Fax 919 981 0451
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 A&O PROJECT NO. 2011.040



PROJECT NO. 17BP.13.R.60
 MCDOWELL COUNTY
 STATION: 12+81.49 -L-
 SHEET 1 OF 5 REPLACES BRIDGE NO. 291

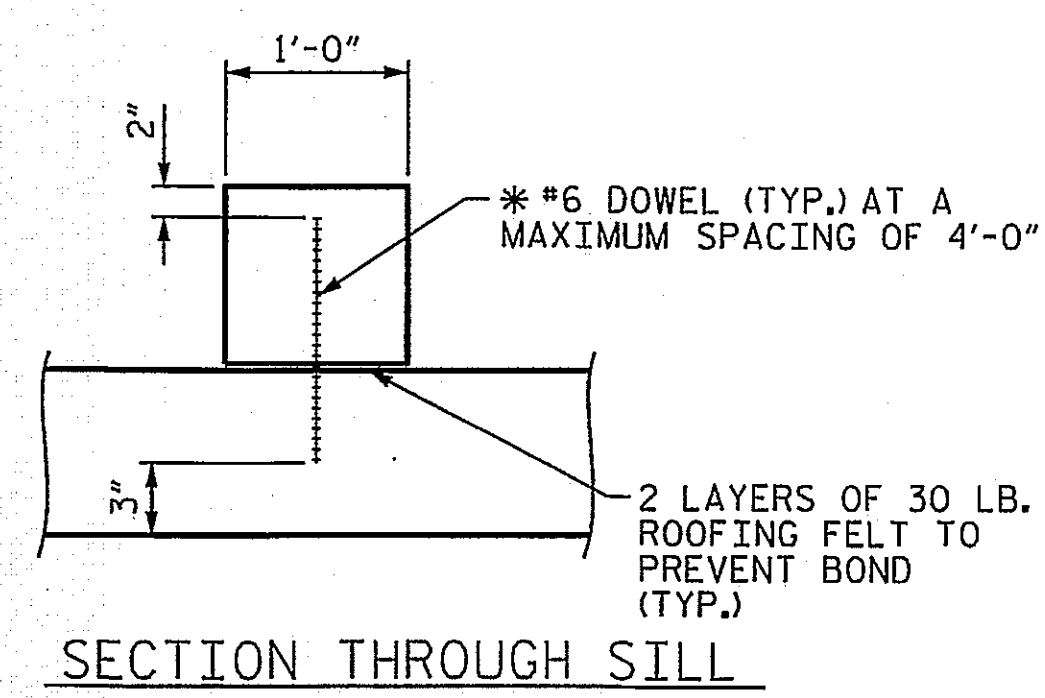
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**SINGLE BARREL
 10 FT. X 5 FT.
 CONCRETE BOX CULVERT
 50° SKEW**

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



NOTES:
 FOR WING SECTION, SEE SEET 3 OF 5.
 FOR WING ELEVATION VIEWS, SEE SHEET 4 OF 5.

BOTTOM SLAB / WING WALL FOOTING PLAN
 (WALLS & SILLS SUPERIMPOSED)



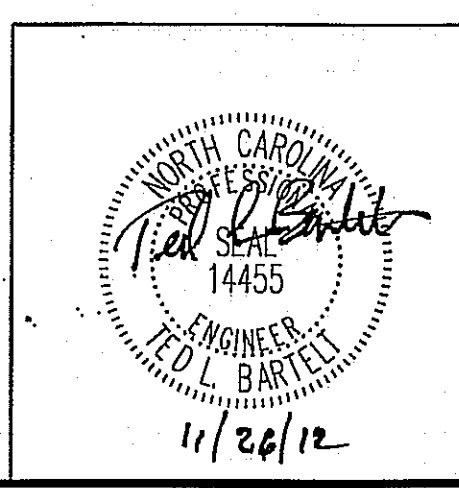
SECTION THROUGH SILL
 * DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

PROJECT NO. 17BP.13.R.60
MCDOWELL COUNTY
 STATION: 12+81.49 -L-

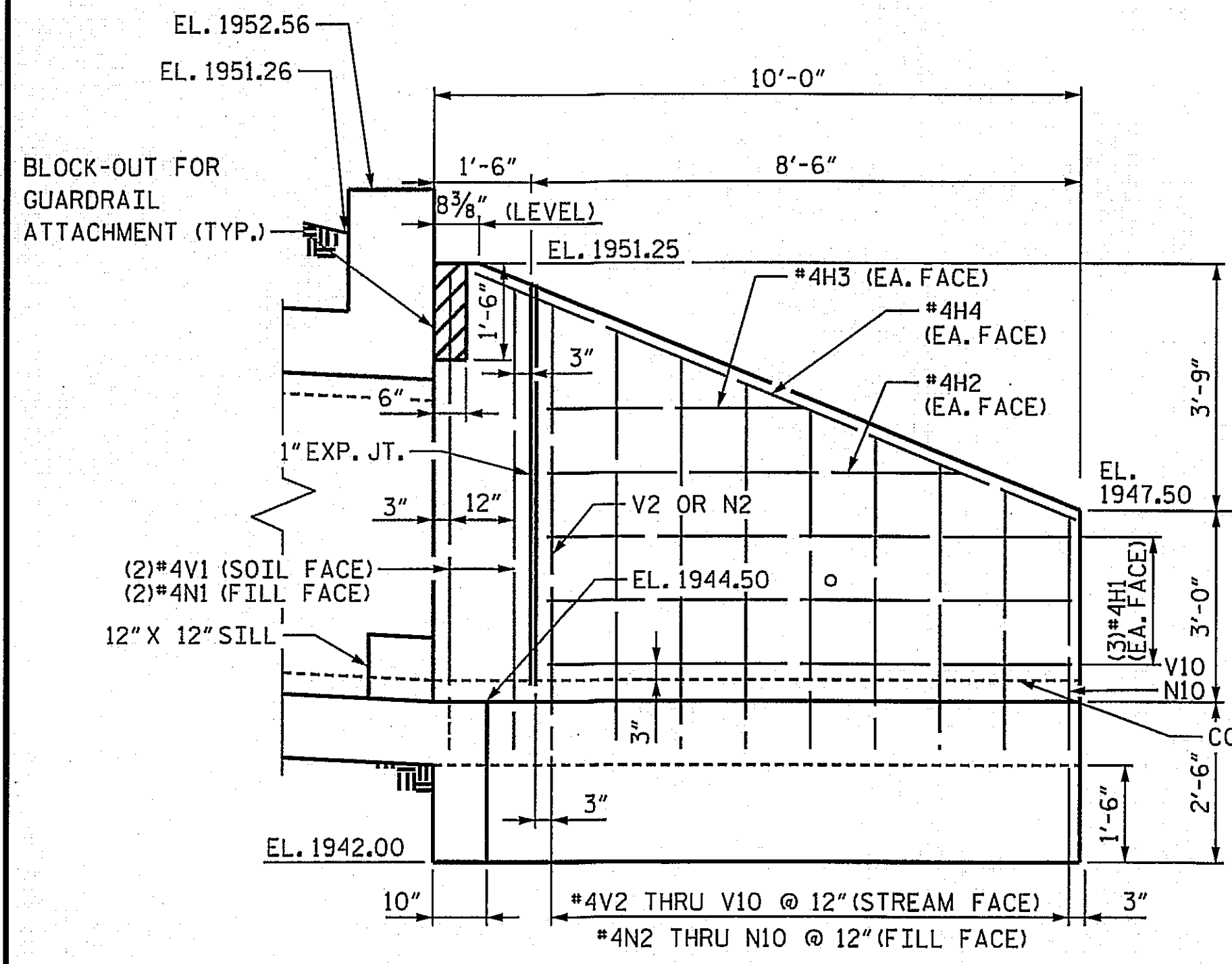
SHEET 2 OF 5
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**SINGLE BARREL
 10 FT. X 5 FT.
 CONCRETE BOX CULVERT
 50° SKEW**

DRAWN BY: JD GOODIN DATE: 06-29-12
 CHECKED BY: TL BARTELT DATE: 09-06-12

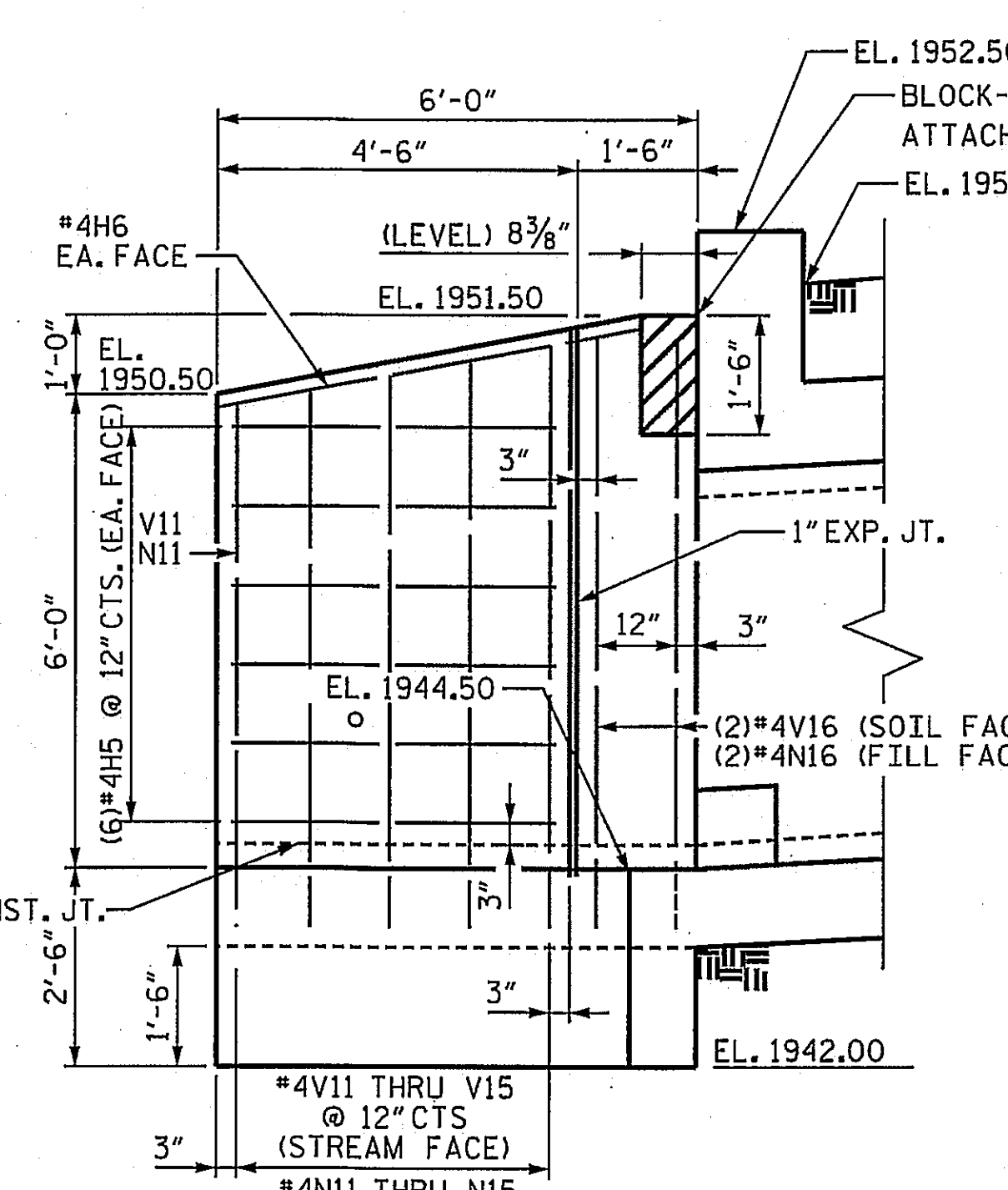
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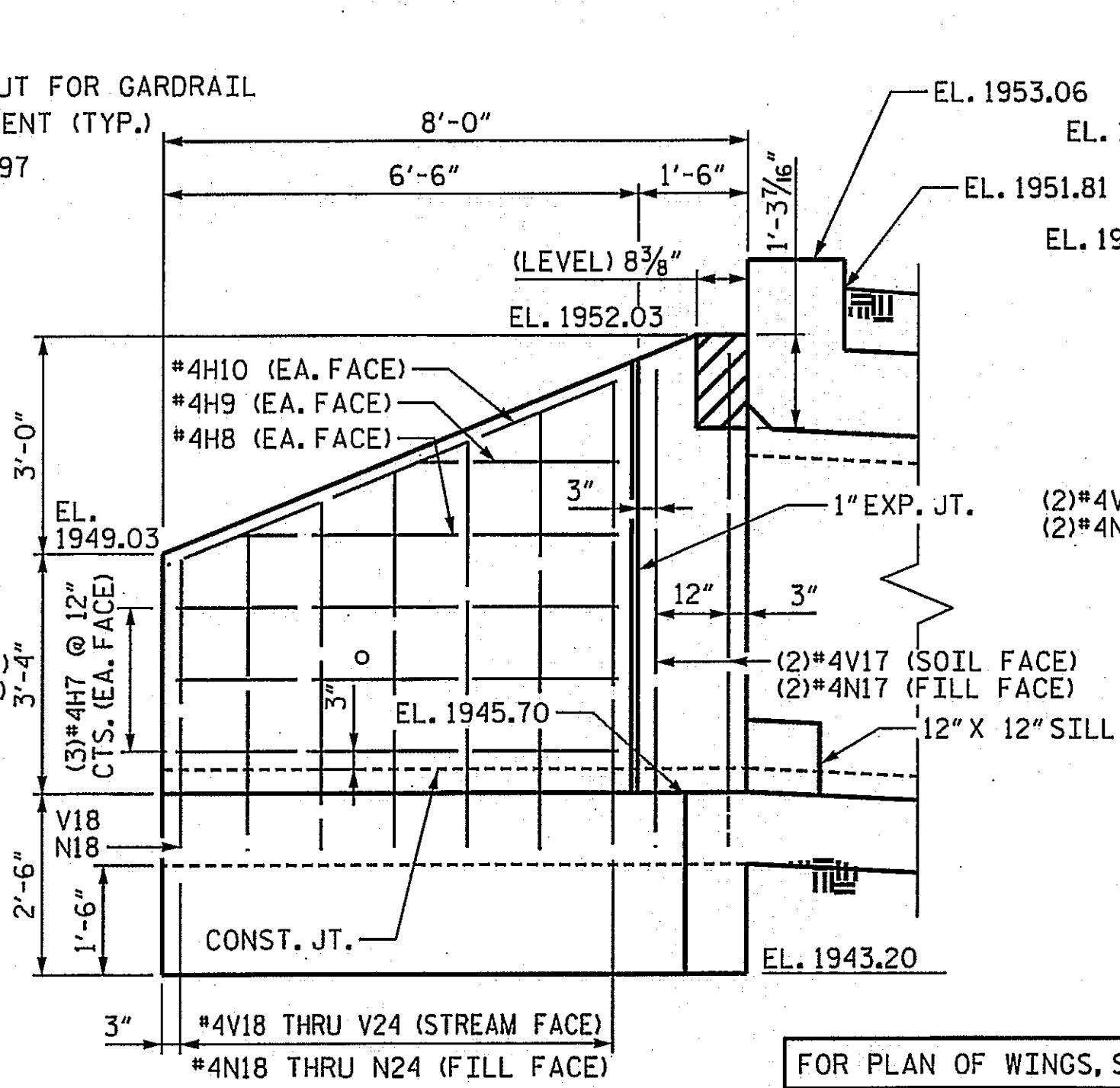
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	C-2
1			3			TOTAL SHEETS
2			4			5



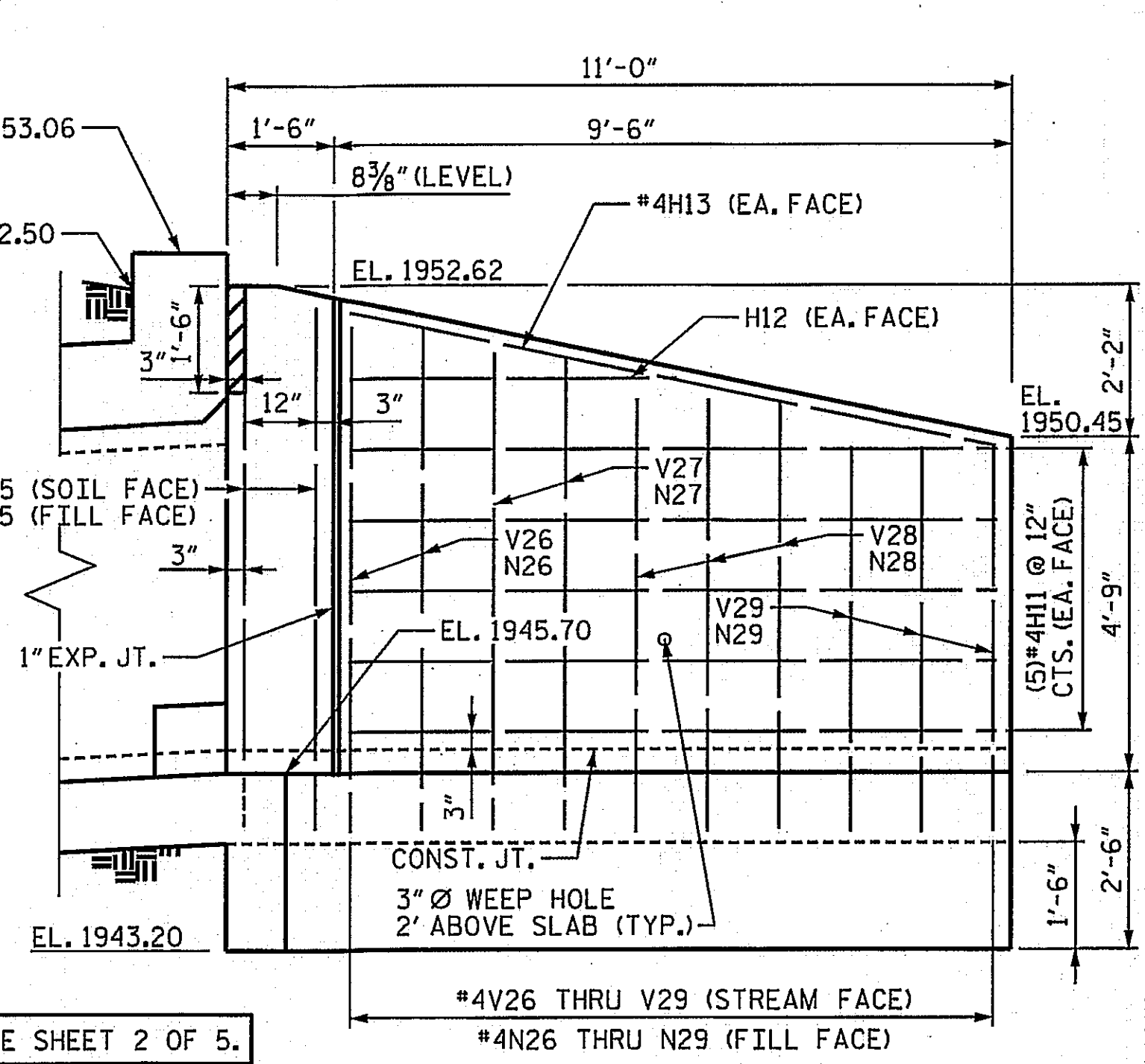
WING WALL NO. (W1) ELEVATION



WING WALL NO. (W2) ELEVATION



WING WALL NO. (W3) ELEVATION



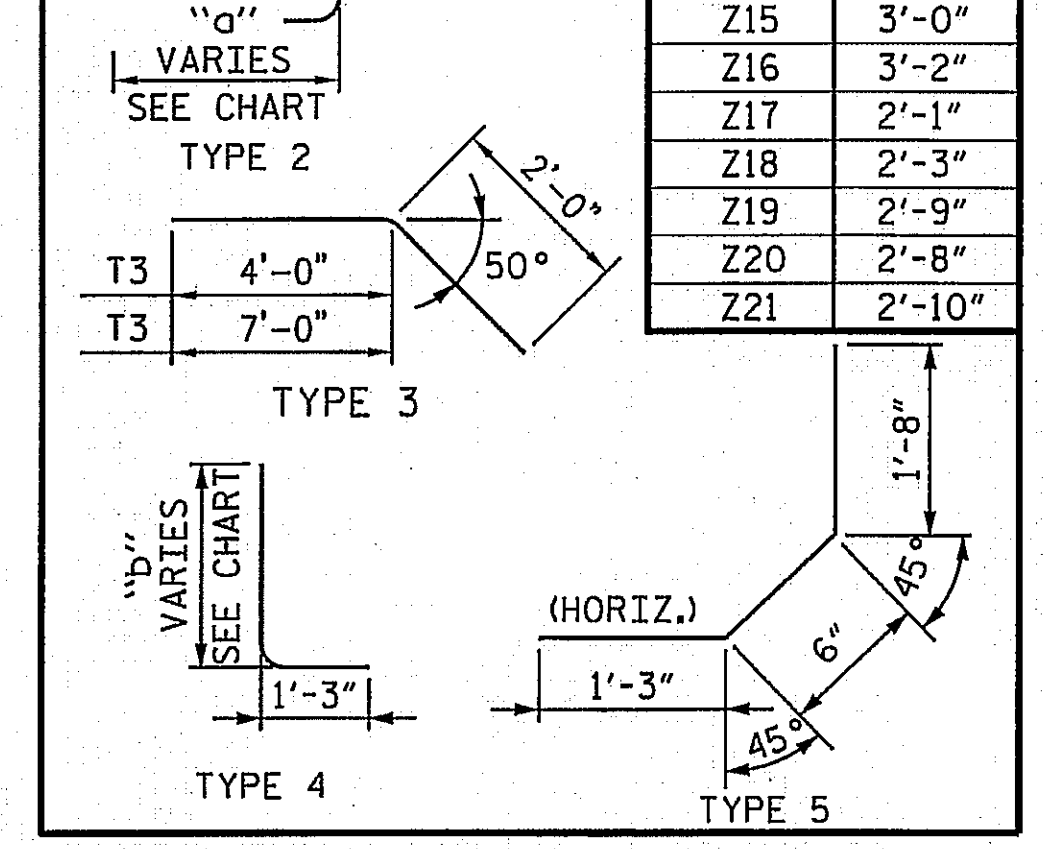
WING WALL NO. (W4) ELEVATION

BILL OF MATERIAL

BAR	NO	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO	SIZE	TYPE	LENGTH	WEIGHT
A1	94	5	1	8'-4"	817	Z1	1	4	2	2'-7"	2	N7	1	4	4	6'-10"	4	H1	6	4	STR.	8'-2"	33
A2	2	5	1	6'-6"	14	Z2	1	4	2	2'-9"	2	N8	1	4	4	5'-5"	4	H2	2	4	STR.	5'-8"	8
A3	4	5	1	5'-8"	24	Z3	1	4	2	3'-0"	2	N9	1	4	4	3'-2"	3	H3	2	4	STR.	3'-2"	4
A4	4	5	1	7'-5"	31	Z4	1	4	2	3'-2"	2	N10	1	4	4	4'-7"	3	H4	2	4	STR.	9'-8"	13
A100	14	6	STR.	11'-4"	238	Z5	1	4	2	3'-5"	2	N11	1	4	4	7'-7"	5	H5	12	4	STR.	4'-2"	33
A101	2	6	STR.	10'-5"	31	Z6	1	4	2	3'-7"	2	N12	1	4	4	7'-10"	5	H6	2	4	STR.	4'-7"	6
A102	2	6	STR.	9'-6"	29	Z7	1	4	2	2'-7"	2	N13	1	4	4	8'-1"	5	H7	6	4	STR.	6'-2"	25
A103	2	6	STR.	8'-7"	26	Z8	1	4	2	2'-8"	2	N14	1	4	4	8'-4"	6	H8	2	4	STR.	6'-10"	8
A104	2	6	STR.	7'-8"	23	Z9	1	4	2	2'-10"	2	N15	1	4	4	8'-7"	6	H9	2	4	STR.	3'-8"	5
A105	2	6	STR.	6'-9"	20	Z10	1	4	2	2'-11"	2	N16	2	4	4	8'-10"	12	H10	2	4	STR.	7'-0"	9
A106	2	6	STR.	5'-10"	18	Z11	1	4	2	3'-0"	2	N17	1	4	4	8'-0"	5	H11	10	4	STR.	9'-2"	61
A107	2	6	STR.	4'-11"	15	Z12	1	4	2	3'-2"	2	N18	1	4	4	5'-1"	3	H12	2	4	STR.	5'-1"	7
A108	2	6	STR.	4'-0"	12	Z13	1	4	2	3'-3"	2	N19	2	4	4	5'-6"	7	H13	2	4	STR.	9'-3"	12
A109	2	6	STR.	3'-1"	9	Z14	1	4	2	3'-4"	2	N20	1	4	4	5'-11"	4	C1	24	4	STR.	23'-8"	379
A200	16	5	STR.	11'-4"	189	Z15	1	4	2	3'-6"	2	N21	1	4	4	6'-4"	4	C2	40	4	STR.	20'-0"	534
A201	2	5	STR.	11'-0"	23	Z16	1	4	2	3'-8"	2	N22	1	4	4	6'-9"	5	C3	52	6	5	3'-5"	267
A202	2	5	STR.	9'-10"	21	Z17	1	4	2	2'-7"	2	N23	1	4	4	7'-2"	5	C4	52	6	4	3'-11"	308
A203	2	5	STR.	8'-11"	19	Z18	1	4	2	2'-9"	2	N24	1	4	4	7'-7"	5						
A204	2	5	STR.	8'-0"	17	Z19	1	4	2	2'-11"	2	N25	1	4	4	8'-6"	6						
A205	2	5	STR.	7'-1"	15	Z20	1	4	2	3'-0"	2	N26	1	4	4	8'-0"	5						
A206	2	5	STR.	6'-2"	13	Z21	1	4	2	3'-2"	2	N27	2	4	4	7'-6"	10						
A207	2	5	STR.	5'-3"	11	Z22	1	4	2	3'-4"	2	N28	3	4	4	7'-0"	14						
A208	2	5	STR.	4'-4"	9	Z23	1	4	2	3'-8"	2	N29	3	4	4	6'-8"	13						
A209	2	5	STR.	3'-5"	7	Z24	1	4	2	3'-11"	3	V1	2	4	STR.	7'-5"	10						
A210	2	5	STR.	2'-6"	5	Z25	1	4	2	2'-7"	2	V2	1	4	STR.	6'-7"	4						
A300	30	4	STR.	8'-10"	177	Z26	1	4	2	2'-9"	2	V3	1	4	STR.	6'-2"	4						
A301	1	4	STR.	7'-11"	5	Z27	1	4	2	3'-0"	2	V4	1	4	STR.	5'-10"	4						
A302	1	4	STR.	7'-1"	5	Z28	1	4	2	3'-2"	2	V5	1	4	STR.	5'-5"	4						
A303	1	4	STR.	6'-2"	4	Z29	1	4	2	3'-4"	2	V6	1	4	STR.	5'-0"	3						
A304	1	4	STR.	5'-4"	4	Z30	1	4	2	3'-6"	2	V7	1	4	STR.	4'-9"	3						
A305	1	4	STR.	4'-5"	3	Z31	1	4	2	3'-8"	2	V8	1	4	STR.	4'-2"	3						
A306	1	4	STR.	3'-7"	2	Z32	1	4	2	3'-10"	3	V9	1	4	STR.	3'-9"	3						
A307	1	4	STR.	2'-8"	2	Z33	1	4	2	4'-1"	3	V10	1	4	STR.	3'-4"	2						
A308	1	4	STR.	2'-9"	2	Z34	1	4	2	4'-1"	3	V11	1	4	STR.	6'-4"	4						
A309	1	4	STR.	3'-7"	3	Z35	1	4	2	3'-8"	2	V12	1	4	STR.	6'-7"	4						
A310	1	4	STR.	4'-6"	4	T1	4	4	STR.	7'-0"	19	V13	1	4	STR.	6'-10"	5						
A311	1	4	STR.	5'-4"	4	T2	4	4	STR.	9'-2"	24	V14	1	4	STR.	7'-1"	5						
A312	1	4	STR.	6'-3"	5	T3	4	4	3	6'-0"	16	V15	1	4	STR.	7'-1"	5						
A313	1	4	STR.	7'-1"	5	T4	2	4	3	9'-0"	12	V16	2	4	STR.	7'-4"	5						
A314	1	4	STR.	8'-0"	4	T5	1	4	STR.	8'-3"	6	V17	2	4	STR.	7'-7"	10						
B1	54	4	STR.	6'-7"	532	T6	3	4	STR.	13'-0"	28	V18	1	4	STR.	6'-9"	9						
S1	10	4	STR.	14'-9"	99	N1	2	4	4	8'-8"	12	V19	1	4	STR.	3'-10"	3						
S2	6	7	STR.	14'-9"	181	N2	1	4	4	7'-10"	5	V20	1	4	STR.	4'-3"	3						
						N3	1	4	4	7'-5"	5	V21	1	4	STR.	5'-1"	3						
						N4	1	4	4	7'-1"	5	V22	1	4	STR.	5'-8"	4						
						N5	1	4	4	6'-8"	4	V23	1	4	STR.	5'-11"	4						
						N6	1	4	4	6'-3"	4	V24	1	4	STR.	8'-4"	4						
											V25	2	4	STR.	7'-3"	10							
											V26	2	4	STR.	6'-9"	9							
											V27	2	4	STR.	6'-3"	8							
											V28	3	4	STR.	5'-9"	12							
											V29	3	4	STR.	5'-3"	11							

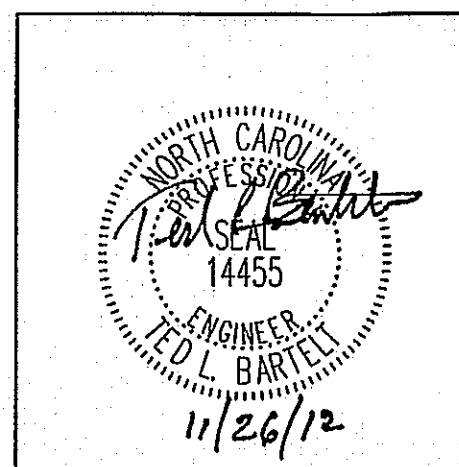
DRAWN BY: JD GOODIN DATE: 09-06-12
 CHECKED BY: TL BARTELT DATE: 09-06-12

BAR TYPES		Z BARS		N BARS	
NO.	SIZE	NO.	SIZE	NO.	SIZE
A1	4'-2"	Z1	2'-1"	N1	7'-5"
A2	1'-6"	Z2	2'-3"	N2	6'-7"
A3	2'-4"	Z3	2'-6"	N3	6'-2"
A4	3'-3"	Z4	3'-5"	N4	5'-10"
		Z5	2'-1"	N5	5'-5"
		Z6	2'-3"	N6	5'-0"
		Z7	2'-5"	N7	4'-9"
		Z8	2'-8"	N8	4'-2"
		Z9	2'-10"	N9	3'-9"
		Z10	2'-6"	N10	3'-4"
		Z11	2'-8"	N11	6'-4"
		Z12	3'-4"	N12	6'-7"
		Z13	2'-9"	N13	6'-10"
		Z14	3'-2"	N14	7'-1"
		Z15	2'-10"	N15	7'-4"
		Z16	3'-0"	N16	7'-7"
		Z17	3'-2"	N17	6'-9"
		Z18	2'-1"	N18	3'-10"
		Z19	2'-3"	N19	4'-3"
		Z20	2'-8"	N20	4'-8"
		Z21	2'-10"	N21	5'-1"
		Z22	2'-6"	N22	5'-6"
		Z23	3'-7"	N23	5'-11"
		Z24	3'-5"	N24	6'-4"
		Z25	2'-1"	N25	7'-3"
		Z26	2'-3"	N26	6'-9"
		Z27	2'-5"	N27	6'-3"
		Z28	2'-8"	N28	5'-9"
		Z29	2'-10"	N29	5'-3"
		Z30	2'-6"		
		Z31	3'-2"		
		Z32	3'-4"		
		Z33	3'-7"		
		Z34	3'-2"		
		Z35	2'-5"		



ALL BAR DIMENSIONS ARE OUT TO OUT.

ALPHA & OMEGA GROUP
 CIVIL & STRUCTURAL ENGINEERS
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 A&O PROJECT NO. 2011.040



PROJECT NO. 17.BP.13.R.60
 MCDOWELL COUNTY
 STATION: 12+81.49 -L-
 SHEET 4 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SINGLE BARREL
 10 FT. X 5 FT.
 CONCRETE BOX CULVERT
 50° SKEW**

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

**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		
						MOMENT				SHEAR						
						LIVE-LOAD FACTORS (%LD)	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	1.05	--	1.75	1.05	1	BOTTOM SLAB	5.00	1.11	1	ROOF SLAB	0.00	.	
	HL-93 (OPERATING)	N/A	.	1.36	--	1.35	1.36	1	BOTTOM SLAB	5.00	1.44	1	ROOF SLAB	0.00	.	
	HS-20 (INVENTORY)	36.000	⊕2	1.30	46.87	1.75	1.30	1	ROOF SLAB	5.00	1.38	1	ROOF SLAB	0.00	.	
	HS-20 (OPERATING)	36.000	.	1.69	60.76	1.35	1.69	1	ROOF SLAB	5.00	1.78	1	ROOF SLAB	0.00	.	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	.	2.37	31.95	1.40	2.37	1	ROOF SLAB	5.00	2.97	1	ROOF SLAB	0.00	.
		SNGARBS2	20.000	.	2.22	44.31	1.40	2.22	1	ROOF SLAB	5.00	2.71	1	ROOF SLAB	0.00	.
		SNAGRIS2	22.000	.	2.37	52.06	1.40	2.37	1	ROOF SLAB	5.00	2.97	1	ROOF SLAB	0.00	.
		SNCOTTS3	27.250	.	1.31	35.65	1.40	1.31	1	BOTTOM SLAB	5.00	1.39	1	ROOF SLAB	0.00	.
		SNAGGRS4	34.925	⊕3	1.29	44.88	1.40	1.29	1	BOTTOM SLAB	5.00	2.04	1	ROOF SLAB	0.00	.
		SNS5A	35.550	.	1.35	47.84	1.40	1.35	1	BOTTOM SLAB	5.00	1.79	1	ROOF SLAB	0.00	.
		SNS6A	39.950	.	1.34	53.68	1.40	1.34	1	BOTTOM SLAB	5.00	1.82	1	ROOF SLAB	0.00	.
		SNS7B	42.000	.	1.34	56.43	1.40	1.34	1	BOTTOM SLAB	5.00	1.82	1	ROOF SLAB	0.00	.
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	.	1.73	57.20	1.40	1.73	1	BOTTOM SLAB	5.00	2.80	1	BOTTOM SLAB	0.00	.
		TNT4A	33.075	.	1.56	51.50	1.40	1.56	1	BOTTOM SLAB	5.00	1.82	1	ROOF SLAB	0.00	.
		TNT6A	41.600	.	1.35	56.27	1.40	1.35	1	BOTTOM SLAB	5.00	1.79	1	ROOF SLAB	0.00	.
		TNT7A	42.000	.	1.45	61.06	1.40	1.45	1	BOTTOM SLAB	5.00	1.81	1	ROOF SLAB	0.00	.
		TNT7B	42.000	.	1.35	56.57	1.40	1.35	1	BOTTOM SLAB	5.00	1.80	1	ROOF SLAB	0.00	.
		TNAGRIT4	43.000	.	1.56	66.95	1.40	1.56	1	BOTTOM SLAB	5.00	1.83	1	ROOF SLAB	0.00	.
TNAGT5A	45.000	.	1.56	70.06	1.40	1.56	1	BOTTOM SLAB	5.00	1.80	1	ROOF SLAB	0.00	.		
TNAGT5B	45.000	.	1.56	70.06	1.40	1.56	1	BOTTOM SLAB	5.00	1.80	1	ROOF SLAB	0.00	.		

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	--

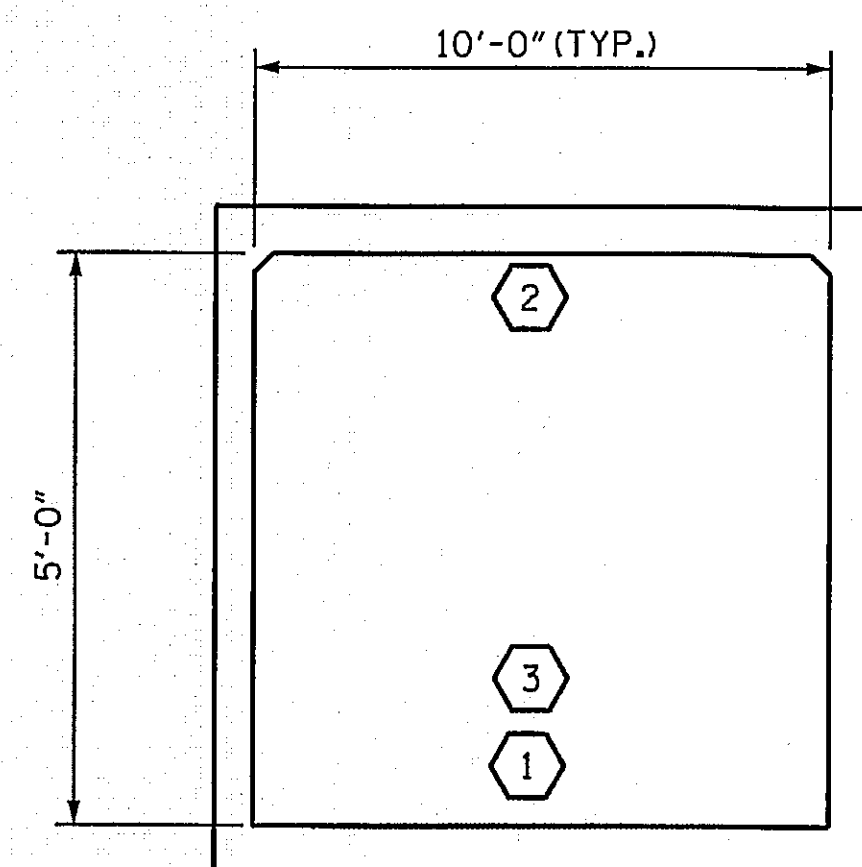
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:


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

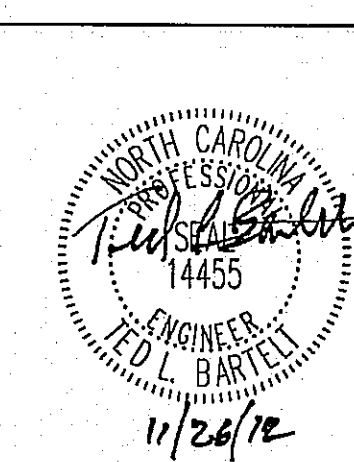
⊕	CONTROLLING LOAD RATING
⊕1	DESIGN LOAD RATING (HL-93)
⊕2	DESIGN LOAD RATING (HS-20)
⊕3	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



BOX 1
LRFR SUMMARY
(LOOKING DOWNSTREAM)

ASSEMBLED BY : JD GOODIN DATE :09-06-12
 CHECKED BY : TL BARTELT DATE :09-06-12
 DRAWN BY : WMC 7/II
 CHECKED BY : GM 7/II
 REV. 10/1/II MAA/GM


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 A&O PROJECT NO. 2011.040



PROJECT NO. 17BP.13.R.60
MCDOWELL COUNTY
 STATION: 12+81.49 -L-
 SHEET 5 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. C-5
STANDARD LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC)						TOTAL SHEETS 5
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			