

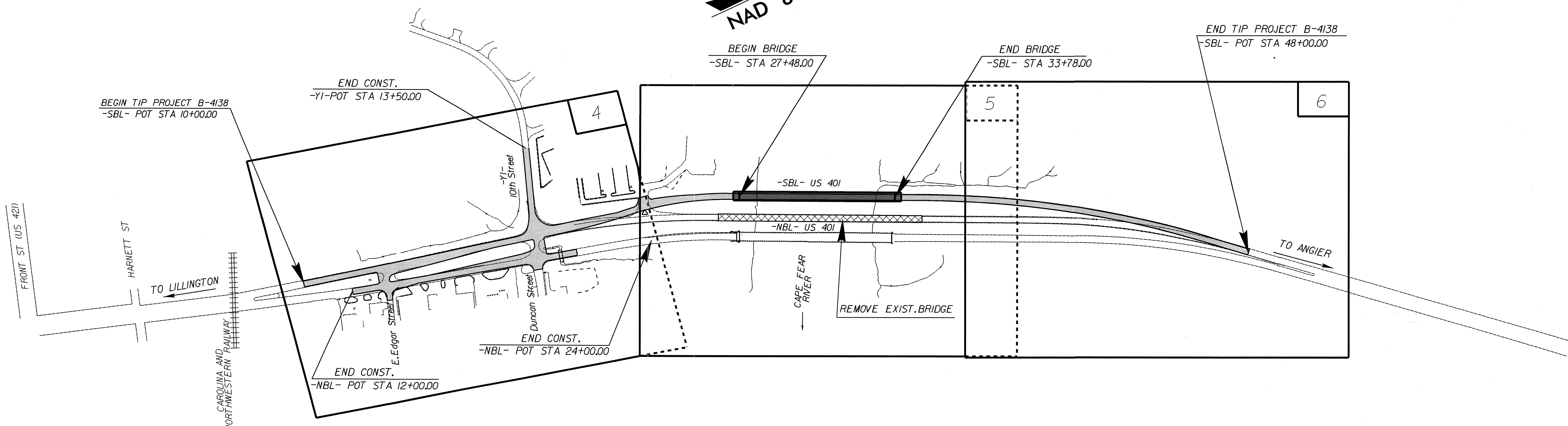
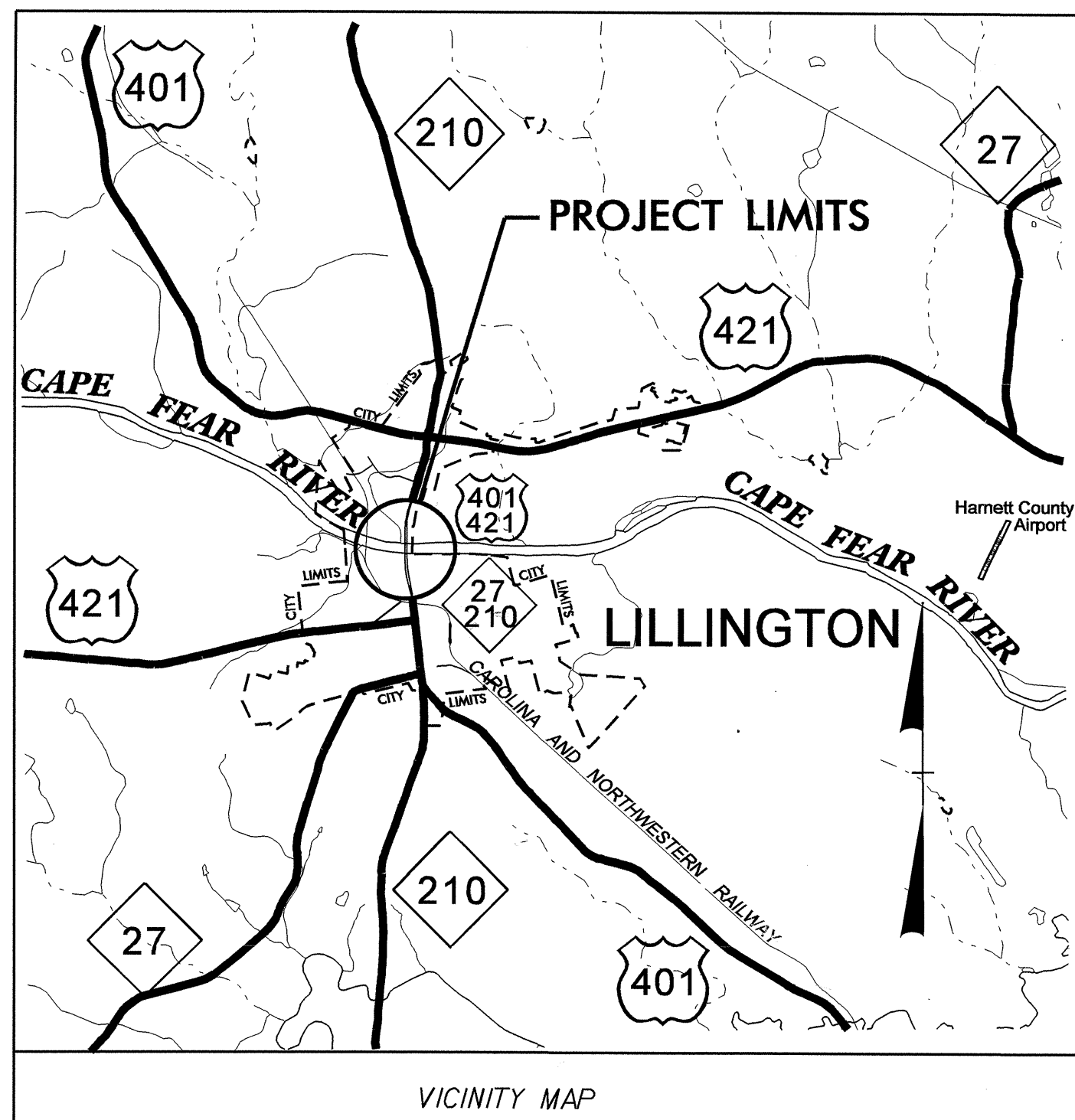
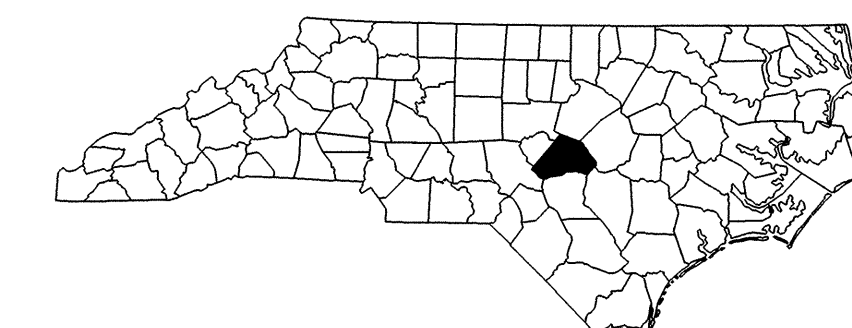
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HARNETT COUNTY**

**LOCATION: BRIDGE 46 OVER CAPE FEAR RIVER  
ON US 401**

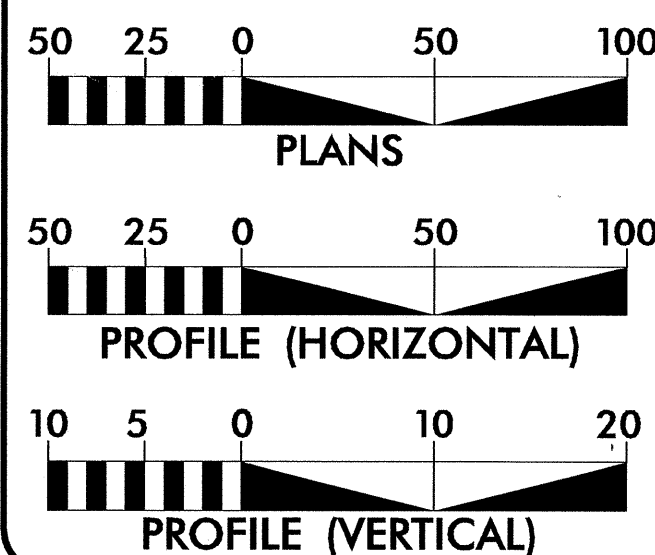
**TYPE OF WORK: GRADING, DRAINAGE, STRUCTURE, AND PAVING**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4138	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33490.1.1	BRSTP-401(146)	PE	
33490.2.1	BRSTP-040(146)	RW /UTIL.	
33490.3.1	BRSTP-040(195)	CONST.	



Notes:  
SEE SHEET 7 FOR DETOUR  
SEE TRAFFIC CONTROL PLANS FOR ADDITIONAL PAVING LIMITS.

**GRAPHIC SCALES**



**DESIGN DATA**

ADT 2010 = 29427  
ADT 2035 = 52600  
DHV = 10 %  
D = 55 %  
T = 8 % \*  
V = 50 MPH  
STATEWIDE TIER  
\* TTST 4 DUAL 4

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4138 = 0.600 MILES  
LENGTH STRUCTURE TIP PROJECT B-4138 = 0.119 MILES  
TOTAL LENGTH OF TIP PROJECT B-4138 = 0.719 MILES

Prepared In the Office of:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

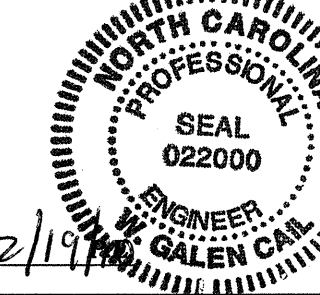
**RIGHT OF WAY DATE:**  
MARCH 20, 2009

**LETTING DATE:**  
JULY 20, 2011

**JASON MOORE, P. E.**  
PROJECT ENGINEER

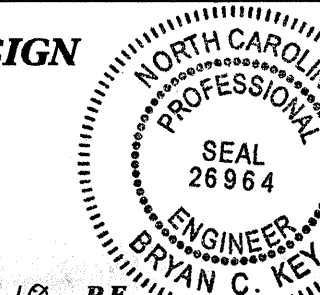
**BRYAN KEY, P. E.**  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**



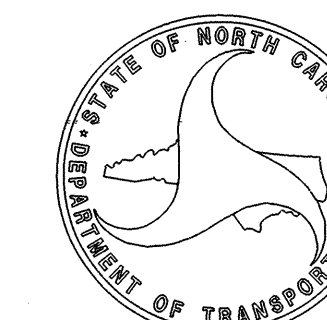
Signature: *Jason Moore* 2/19/11

**ROADWAY DESIGN ENGINEER**



Signature: *Bryan Key* 3-2-10 P.E.

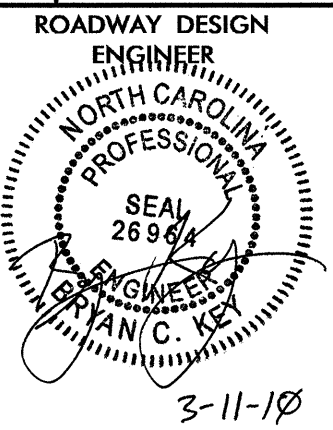
**DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA**



Signature: *Out Millen* P.E.  
STATE HIGHWAY DESIGN ENGINEER

TIP PROJECT: B-4138

CONTRACT: C202335



EFF. 07-18-06  
REV. 01-02-07

SHEET NUMBER	SHEET	INDEX OF SHEETS
1	TITLE SHEET	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL SHEET	SURVEY CONTROL SHEET
2 THRU 2-B	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-C	DETAIL OF DIRECTIONAL CROSSEVER	DETAIL OF DIRECTIONAL CROSSEVER
2-D THRU 2-E	DETAIL OF STREAM RELOCATION	DETAIL OF STREAM RELOCATION
2-F	DETAIL OF 72" TRAFFIC BEARING JUNCTION BOX STA 19+58 -SBL- RT	DETAIL OF 72" TRAFFIC BEARING JUNCTION BOX STA 19+58 -SBL- RT
2-G	DETAIL OF 72" 2 GRATE INLET	DETAIL OF 72" 2 GRATE INLET
2-H	DETAIL OF CONCRETE ENDWALL FOR TRIPLE THRU QUADRUPLE PIPE CULVERTS	DETAIL OF CONCRETE ENDWALL FOR TRIPLE THRU QUADRUPLE PIPE CULVERTS
2-I	DETAIL OF ANCHORAGE FOR FRAMES	DETAIL OF ANCHORAGE FOR FRAMES
2-J THRU 2-K	DETAIL OF METHOD OF PIPE INSTALLATION	DETAIL OF METHOD OF PIPE INSTALLATION
3	SUMMARY OF QUANTITIES	SUMMARY OF QUANTITIES
3A THRU 3-C	SUMMARY OF DRAINAGE QUANTITIES SUMMARY OF GUARDRAIL, EARTHWORK SUMMARY, ASPHALT PAVEMENT REMOVAL SUMMARY, AND SHOULDER BERM GUTTER SUMMARY	SUMMARY OF DRAINAGE QUANTITIES SUMMARY OF GUARDRAIL, EARTHWORK SUMMARY, ASPHALT PAVEMENT REMOVAL SUMMARY, AND SHOULDER BERM GUTTER SUMMARY
4 THRU 6	PLAN SHEETS	PLAN SHEETS
7	DETOUR PLAN SHEET	DETOUR PLAN SHEET
8 THRU 12	PROFILE SHEETS	PROFILE SHEETS
TCP-1 THRU TCP-15	TRAFFIC CONTROL PLANS	TRAFFIC CONTROL PLANS
PMP-1 THRU PMP-6	PAVEMENT MARKING PLANS	PAVEMENT MARKING PLANS
RF-1 THRU RF-3	REFORESTATION PLANS	REFORESTATION PLANS
EC-1 THRU EC-10	EROSION CONTROL PLANS	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-11	SIGNING PLANS	SIGNING PLANS
UC-1 THRU UC-7	UTILITY CONSTRUCTION PLANS	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-4	UTILITIES BY OTHERS PLANS	UTILITIES BY OTHERS PLANS
X	CROSS-SECTION SUMMARY	CROSS-SECTION SUMMARY
X-1 THRU X-27	CROSS-SECTIONS	CROSS-SECTIONS
S-1 THRU S-58	STRUCTURE PLANS	STRUCTURE PLANS
SU-1 THRU SU-10	STRUCTURE UTILITY PLANS	STRUCTURE UTILITY PLANS

**GENERAL NOTES:** 2006 SPECIFICATIONS  
EFFECTIVE: 07-18-06  
REVISED: 07-30-08

**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 AND 225.05 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.

**DRIVEWAYS:**  
DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3' RADIUS OR RADIUS AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS 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.

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

**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 PROGRESS ENERGY, CENTURY LINK, PIEDMONT NATURAL GAS, HARNETT COUNTY, TIME WARNER CABLE AND TOWN OF LILLINGTON. ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

**RIGHT-OF-WAY MARKERS:**  
ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

**2006 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 July 18, 2006 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
225.01	Guide for Grading Subgrade - Interstate and Freeway
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superlevation - Two Lane Pavement
225.05	Method of Obtaining Superlevation - Divided Highways
225.06	Method of Grading Sight Distance at Intersections
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
838.39	Reinforced Concrete Endwall - for Single 72" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.69	Reinforced Brick Endwall - for Single 72" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.22	Frames and Wide Slot Sag Grates
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.36	Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates
840.37	Steel Grate and Frame
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
852.01	Concrete Islands
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets



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	○ EP
Property Corner	→
Property Monument	□ ECM
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 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	□
Jurisdictional Stream	--- JS
Buffer Zone 1	--- BZ 1
Buffer Zone 2	--- BZ 2
Flow Arrow	←
Disappearing Stream	→
Spring	○
Wetland	☆
Proposed Lateral, Tail, Head Ditch	← FLOW
False Sump	◇

**RAILROADS:**

Standard Gauge	-----
RR Signal Milepost	CSX TRANSPORTATION 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	○ R W
Proposed Right of Way Line with Iron Pin and Cap Marker	○ R W ▲
Proposed Right of Way Line with Concrete or Granite Marker	▲ R W
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 Drainage / Utility Easement	--- DUE
Proposed Permanent Utility Easement	--- PUE
Proposed Temporary Utility Easement	--- TUE
Proposed Permanent Easement with Iron Pin and Cap Marker	◆

**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
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	-----

**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	--- ?UTL
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.



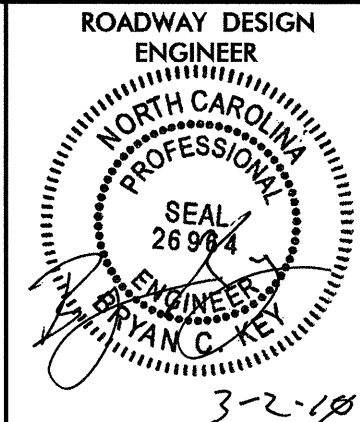










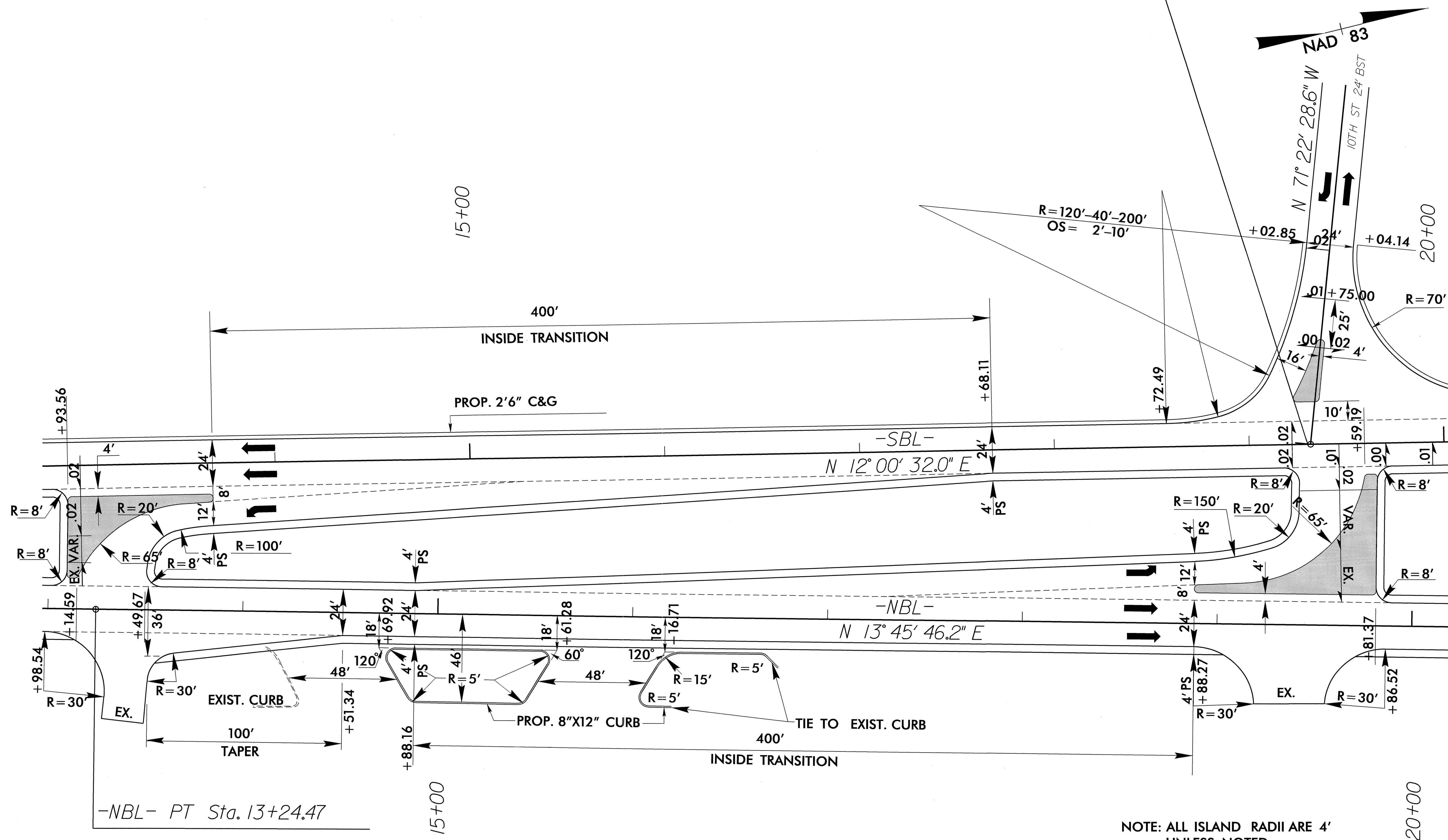


# DETAIL OF DIRECTIONAL CROSSOVER

(SEE PLANS SHEET 4 FOR PLANS VIEW)

-SBL- POT Sta. 19+30.06

-YI- POT Sta. 10+00.00



REVISIONS

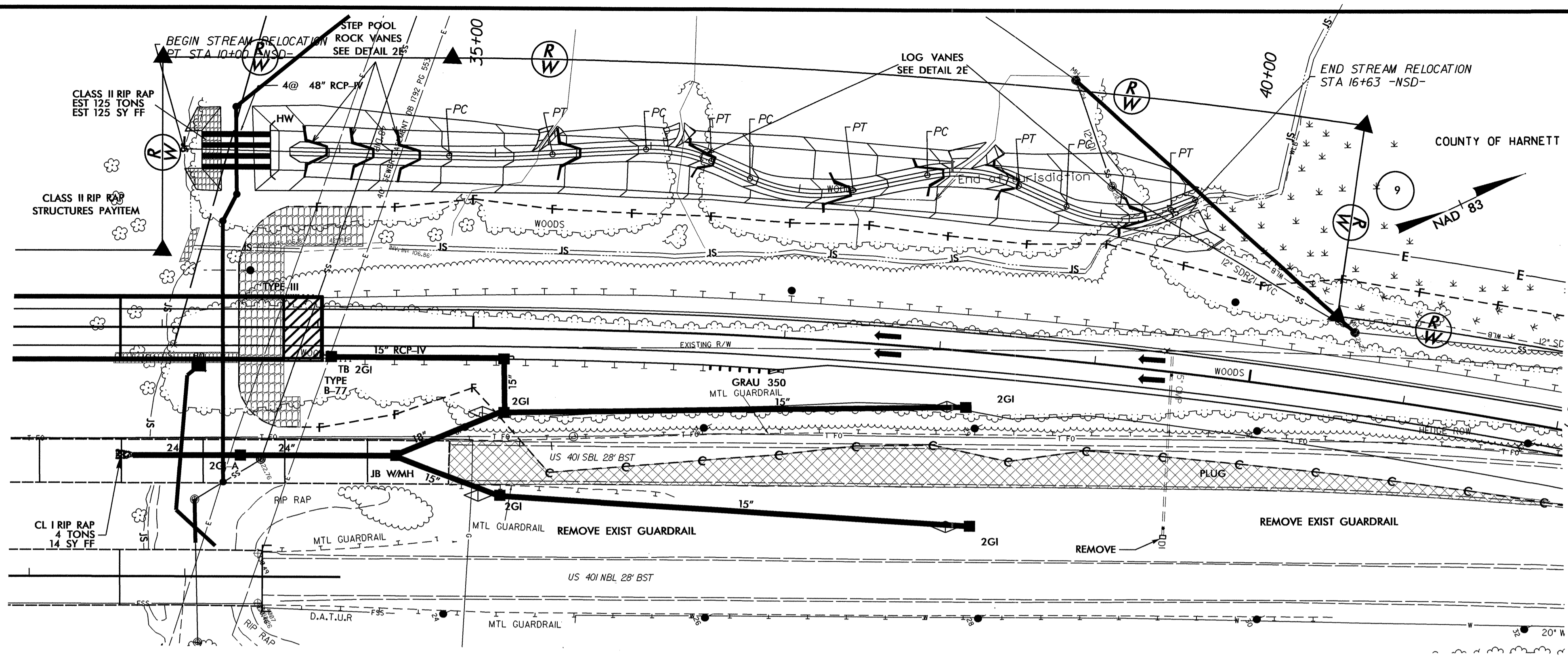
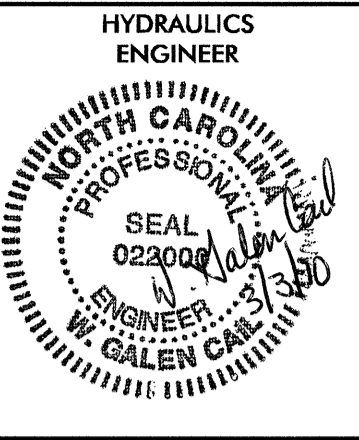
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3-2-10

-NBL- PT Sta. 13+24.47

NOTE: ALL ISLAND RADII ARE 4' UNLESS NOTED

20+00



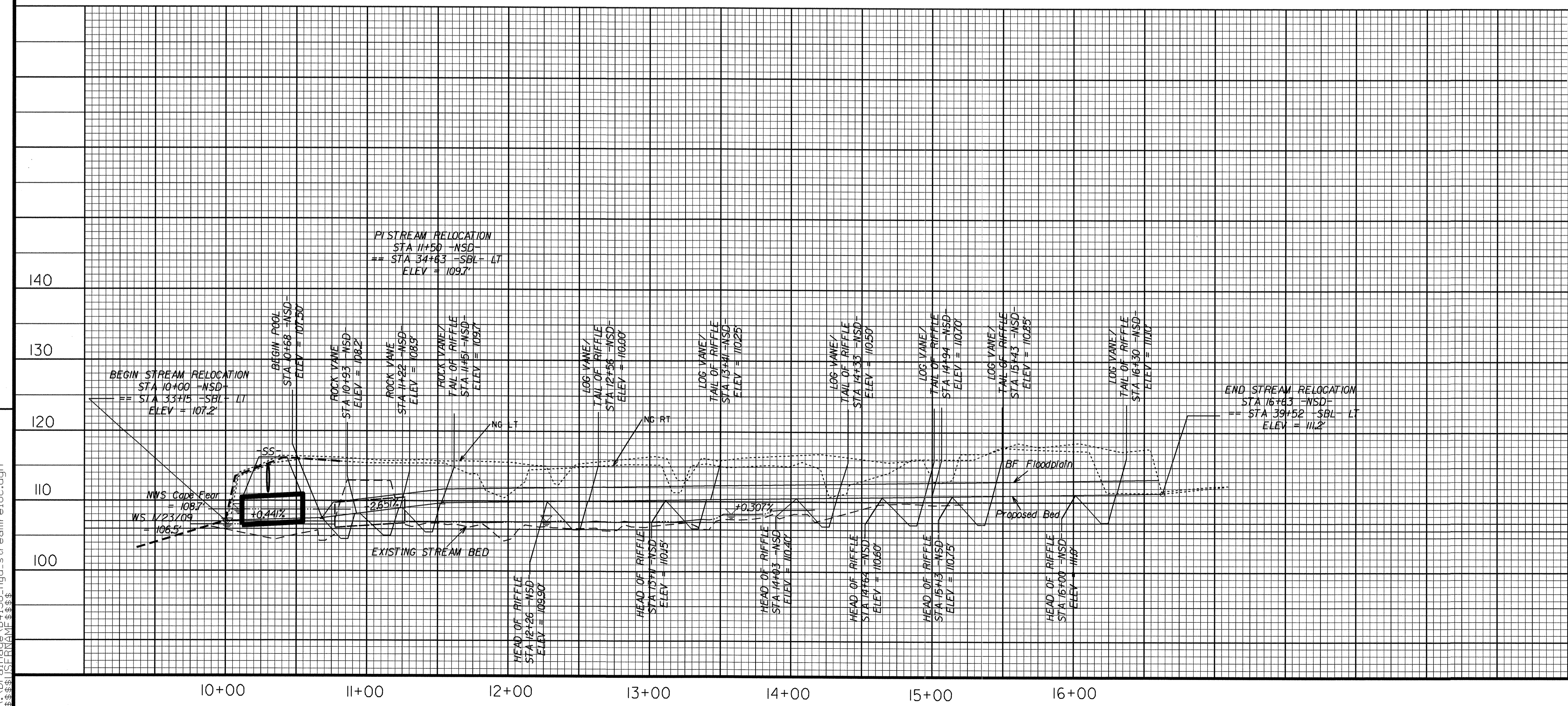


STREAM RELOCATION  
 STA 10+00 -NSD- (STA 33+15 -SBL- LT  
 TO  
 STA 16+63 -NSD- (STA 39+52 -SBL- LT)

Quantities:

- Boulders/Header/Footer Rock = 80 Tons
- Log Vanes = 40 Logs ; 12 Rootwads
- #57 Stone = 170 Tons
- Filter Fabric = 390 SY
- Excavation = 4400 CY

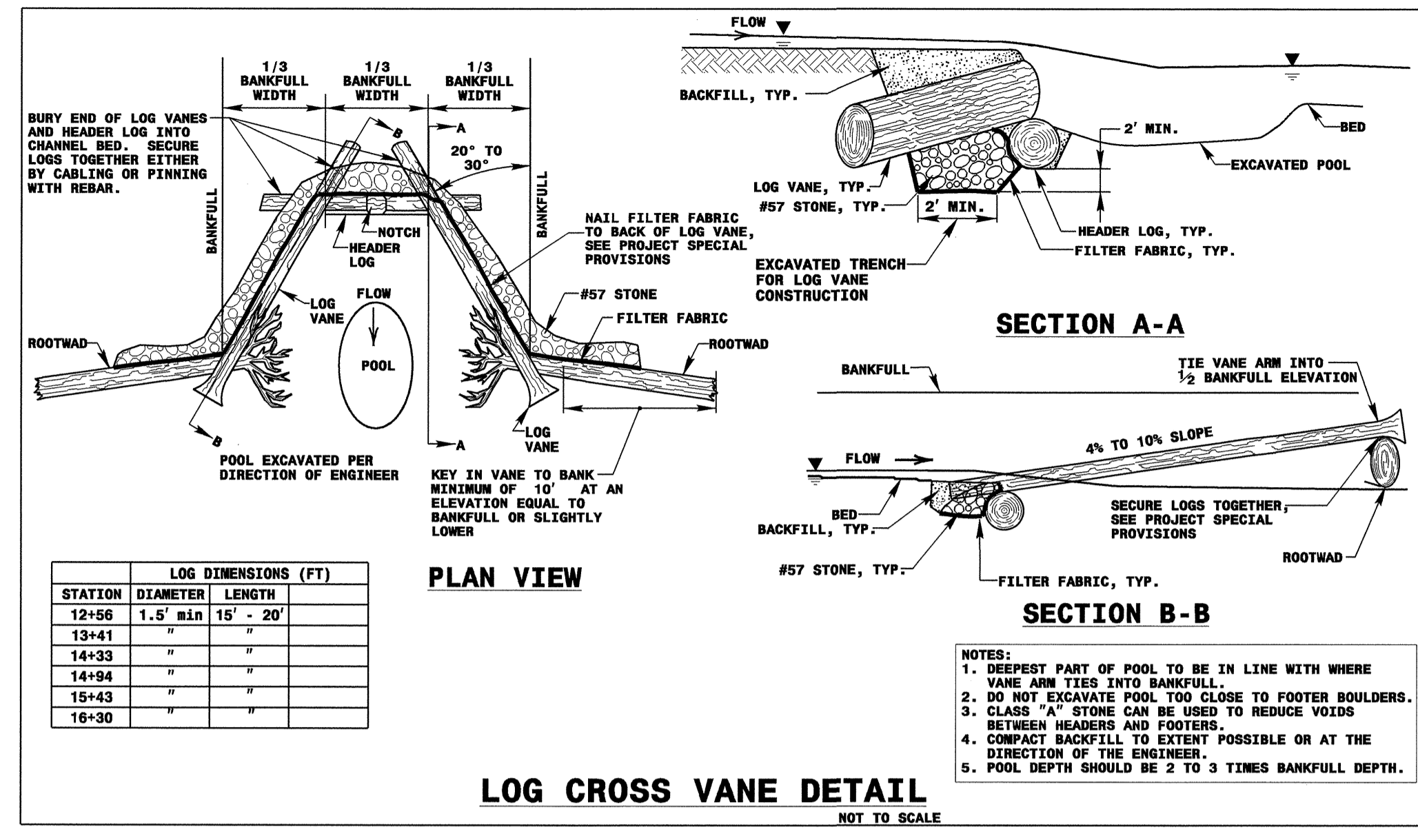
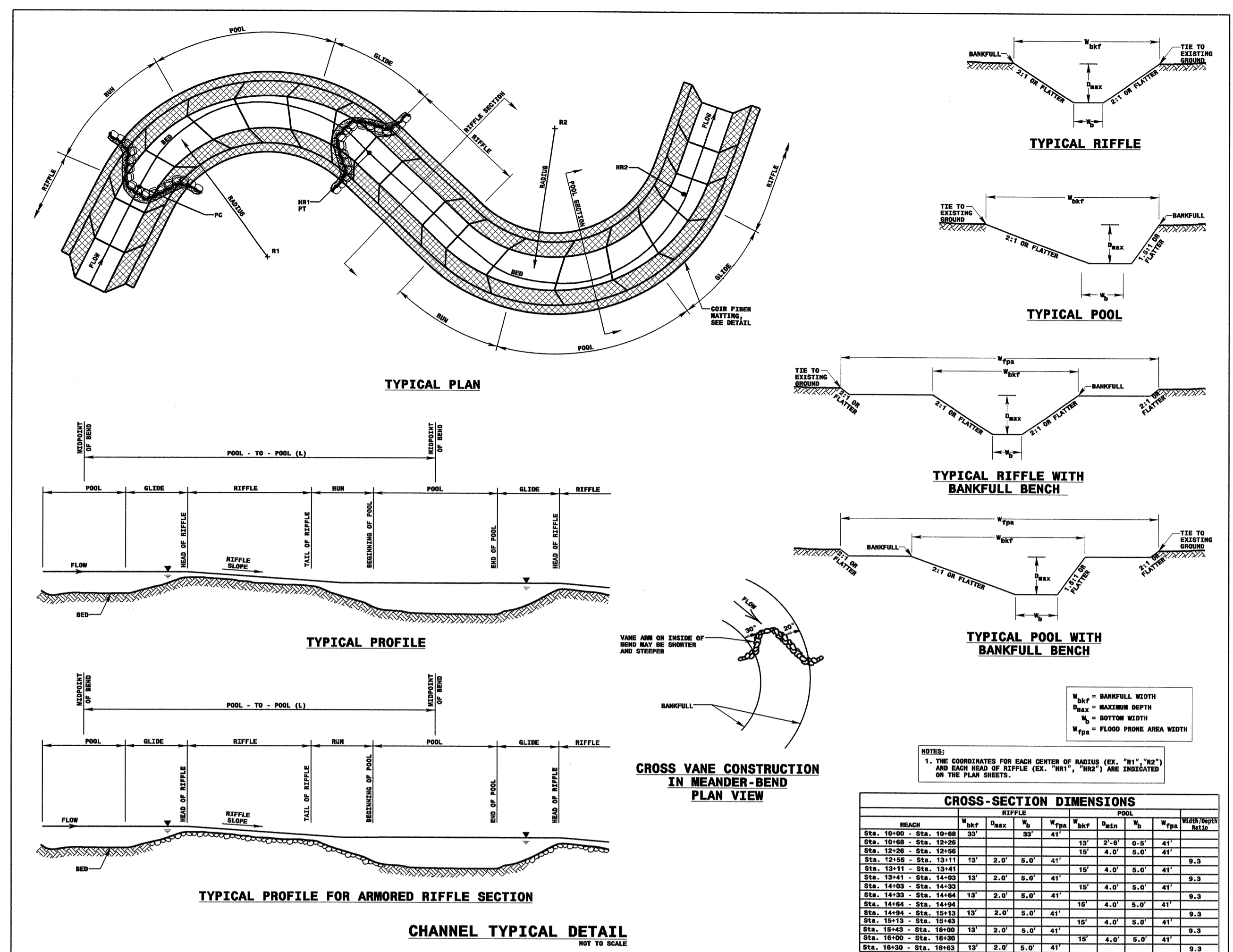
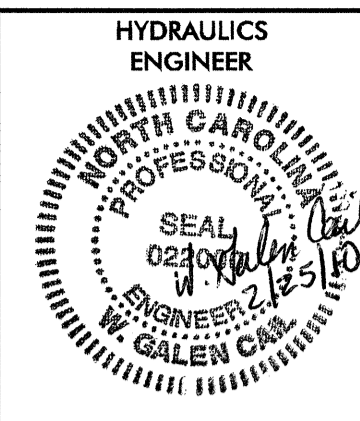
REVISIONS



CURVE DATA

PT Sta 10+00 N 25° 44' 22.5" E	PI Sta 12+03.67 Δ = 4' 28" 51.5" (LT) D = 6' 44' 26.4" L = 66.48' T = 33.26' R = 850.00'
PC Sta 11+70.41 PT Sta 12+36.89	
N 21° 15' 31.0" E	PI Sta 13+18.90 Δ = 26' 30" 03.6" (RT) D = 67' 36' 30.1" L = 43.02' T = 21.90' R = 93.00'
PC Sta 12+97.00 PT Sta 13+40.02	
N 47° 45' 34.6" E	PI Sta 14+02.09 Δ = 34' 38" 10.8" (LT) D = 51' 09" 25.0" L = 67.71' T = 34.92' R = 112.00'
PC Sta 13+67.77 PT Sta 14+34.88	
N 13° 07' 23.8" E	PI Sta 15+14.60 Δ = 44' 51" 25.0" (RT) D = 57' 52" 28.3" L = 60.23' T = 31.08' R = 99.00'
PC Sta 14+83.52 PT Sta 15+43.75	
N 47° 58' 48.8" E	PI Sta 16+13.24 Δ = 44' 22" 34.3" (LT) D = 64' 22" 38.2" L = 68.93' T = 36.30' R = 89.00'
PC Sta 15+76.94 PT Sta 16+45.87	
N 3° 36' 14.6" E	





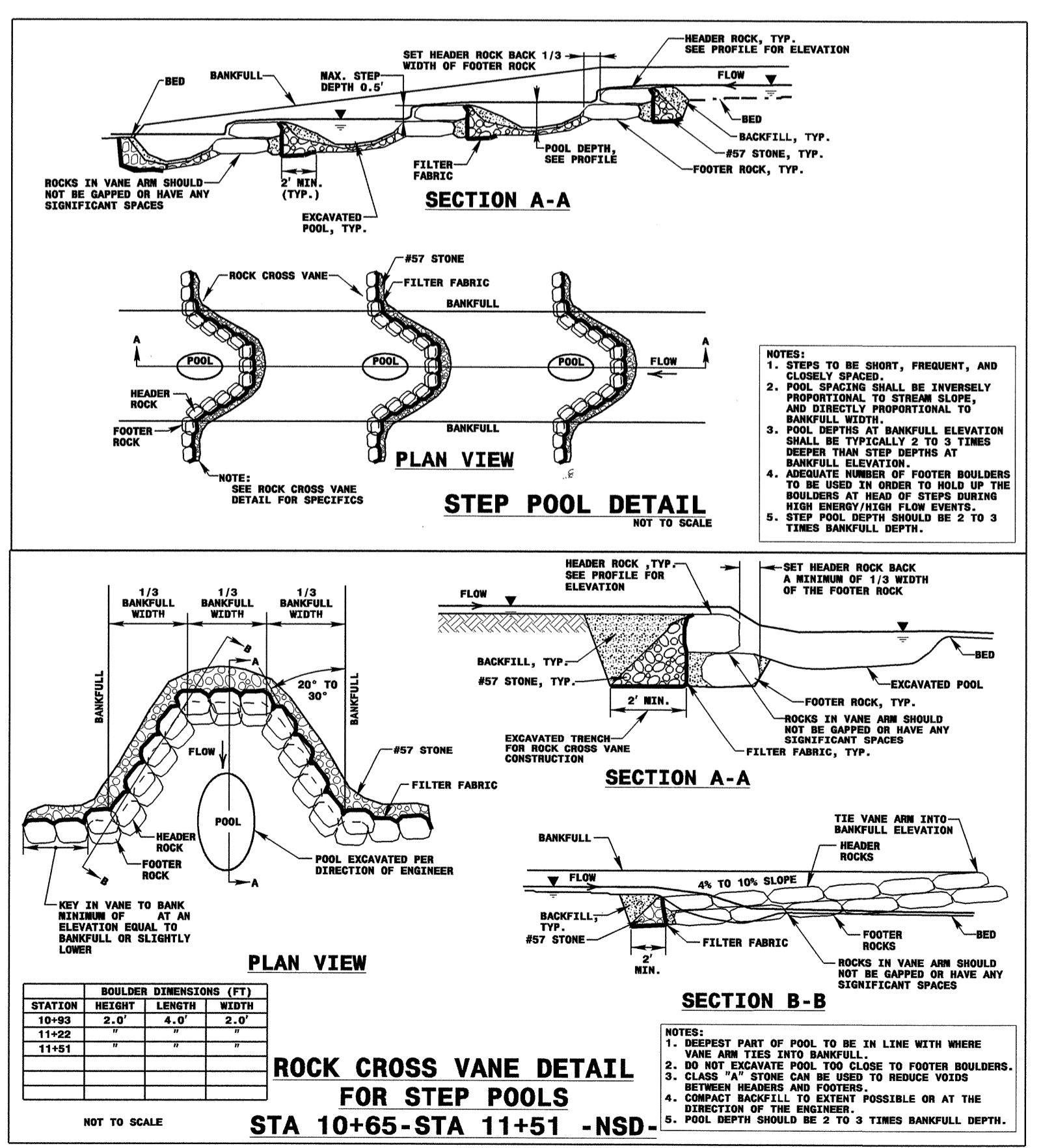
**LOG DIMENSIONS (FT)**

STATION	DIAMETER	LENGTH
12+56	1.5" MIN	15' - 20'
13+41	"	"
14+33	"	"
14+54	"	"
15+43	"	"
16+30	"	"

**MORPHOLOGICAL MEASUREMENTS TABLE**

UT to Cape Fear River — Harnett County — B-4138  
 —UT to Cape Fear River— Sta. In + nn.nn to Sta. nn + nn.nn

Variables	Existing Channel	Proposed Reach	USGS Station	Reference Reach
1. Stream type	Trib to Cape Fear - C6	Trib to Cape Fear - C6		Muddy Creek - E5/C5
2. Drainage area	0.7 sq mi (450 ac)	0.7 sq mi (450 ac)		0.85 sq mi (545 ac)
3. Bankfull width (ft)	Mean: 9 Range: 9-10	Mean: 13 Range: 13--		Mean: 11.2 Range: 11.2
4. Bankfull mean depth (ft)	Mean: 2.2 Range: 2.5-3.2	Mean: 1.4 Range: 1.4		Mean: 1.0 Range: 1.0
5. Width/depth ratio	Mean: 3.5 Range: 3.2-4.0	Mean: 9.3 Range: 9.3		Mean: 10.8 Range: 10.8
6. Bankfull cross-sectional area (sq ft)	Mean: 19.3 Range: 17.9-20.3	Mean: 18 Range: 18		Mean: 11.5 Range: 11.5
7. Bankfull mean velocity (ft/s)	Mean: 4.1 Range: 2.8 - 5.9	Mean: 3.4 Range: 3.2 - 3.5		Mean: 1.0 Range: 1.0
8. Bankfull discharge (cfs)	Mean: 69 Range: 69	Mean: 69 Range: 69		Mean: 11.0 Range: 11.0
9. Bankfull max depth (ft)	Mean: 2.8 Range: 2.5-3.2	Mean: 2.0 Range: 2.0		Mean: 1.7 Range: 1.7
10. Width of floodprone area (ft)	Mean: 17.7 Range: 12-21	Mean: 41 Range: 41		Mean: 245 Range: 245
11. Entrenchment ratio	Mean: 8.0 Range: 8.0	Mean: 29.3 Range: 29.3		Mean: 22.0 Range: 22.0
12. Meander length (ft)	Mean: N/A Range: N/A	Mean: 175 Range: 155 - 195		Mean: 76 Range: 55 - 97
13. Ratio of meander length to bankfull width	Mean: N/A Range: N/A	Mean: 13.5 Range: 11.9 - 15		Mean: 6.8 Range: 4.9 - 8.7
14. Radius of curvature (ft)	Mean: N/A Range: N/A	Mean: 100 Range: 100		Mean: 16.2 Range: 10.4 - 21.9
15. Ratio of radius of curvature to bankfull width	Mean: N/A Range: N/A	Mean: 7.7 Range: 7.7		Mean: 1.4 Range: 0.9 - 2.0
16. Belt width (ft)	Mean: N/A Range: N/A	Mean: 33 Range: 33		Mean: 39.5 Range: 39.5
17. Meander width ratio	Mean: N/A Range: N/A	Mean: 2.5 Range: 2.5		Mean: 3.5 Range: 2.7 - 4.4
18. Sinuosity (stream length/valley length)	Mean: 1.00 Range: 1.00	Mean: 1.02 Range: 1.02		Mean: 1.1 Range: 1.1
19. Valley slope (%)	Mean: 0.003 Range: 0.003	Mean: 0.003 Range: 0.003		Mean: 0.0047 Range: 0.0047
20. Average slope (%)	Mean: 0.005 Range: 0.003-0.012	Mean: 0.003 Range: 0.003		Mean: 0.002 Range: 0.002
21. Pool slope (%)	Mean: 0.005 Range: 0.005	Mean: 0.003 Range: 0.003		Mean: 0.0019 Range: 0.0019
22. Ratio of pool slope to average slope	Mean: 0.1 Range: 0.1	Mean: 1.0 Range: 1.0		Mean: 1.0 Range: 1.0
23. Maximum pool depth (ft)	Mean: 2.8 Range: 2.8	Mean: 4.0 Range: 4.0		Mean: 1.8 Range: 1.8
24. Ratio of pool depth to average bankfull depth	Mean: 1.0 Range: 1.0	Mean: 2.9 Range: 2.9		Mean: 1.7 Range: 1.7
25. Pool width (ft)	Mean: 7 Range: 6-8	Mean: 15 Range: 15		Mean: 17.2 Range: 17.2
26. Ratio of pool width to bankfull width	Mean: 0.8 Range: 0.8	Mean: 1.2 Range: 1.2		Mean: 1.5 Range: 1.5
27. Pool to pool spacing (ft)	Mean: 73 Range: 66-78	Mean: 95 Range: 90 - 100		Mean: 37 Range: 18 - 68
28. Ratio of pool to pool spacing to bankfull width	Mean: 7.2 Range: 7.2	Mean: 7.3 Range: 6.9 - 7.7		Mean: 3.3 Range: 1.6 - 6.1
29. Ratio of lowest bank height to bankfull height (or max bankfull depth)	Mean: 1.4 Range: 1.4	Mean: 1.0 Range: 1.0		Mean: 37 Range: 18 - 68



**BOULDER DIMENSIONS (FT)**

STATION	HEIGHT	LENGTH	WIDTH
10+93	2'-0"	4'-0"	2'-0"
11+22	"	"	"
11+51	"	"	"

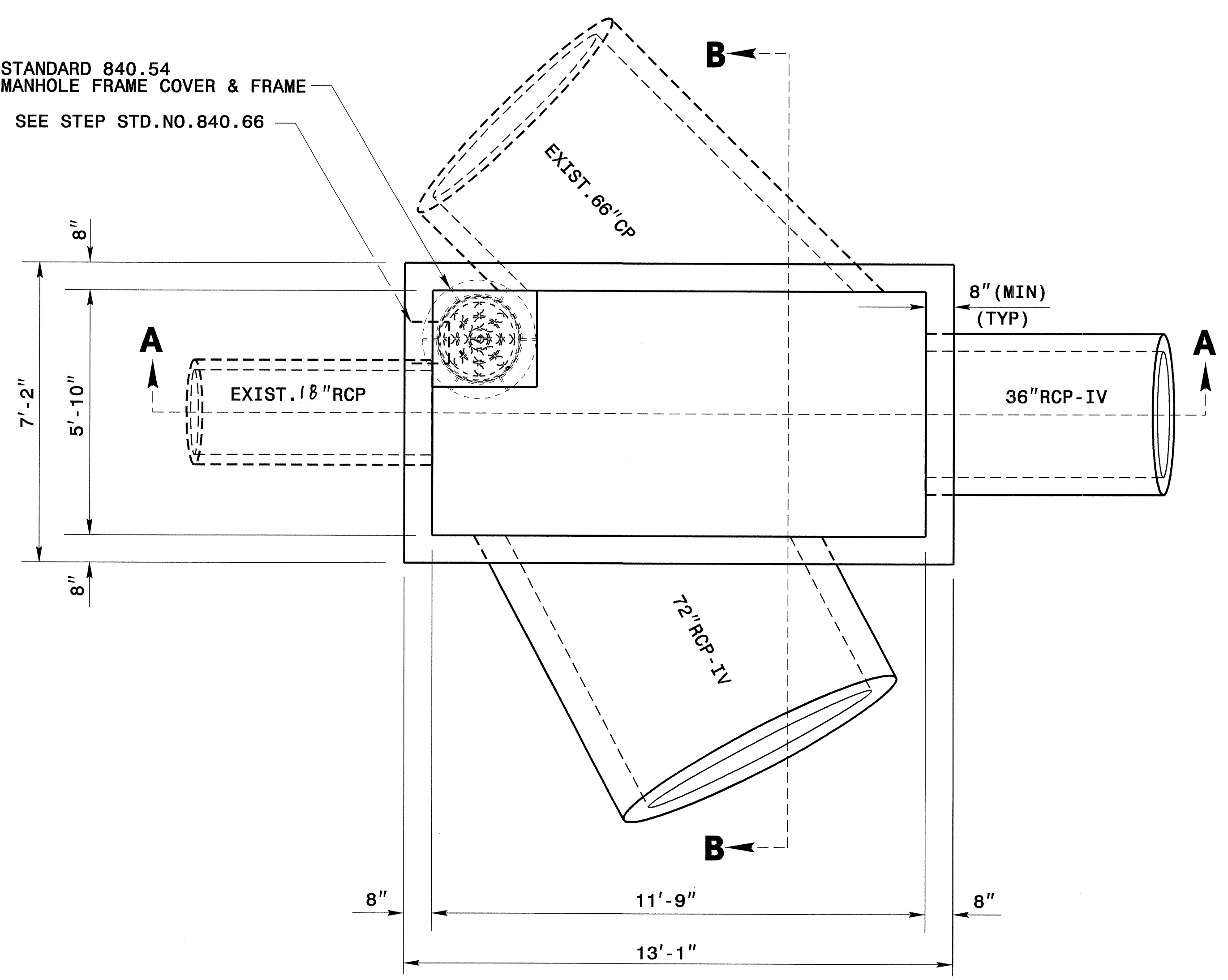
REVISIONS

8/17/99

25-FEB-2010 07:52:03 c:\p2\hyd\_stream\loc.dgn



SEE STANDARD 840.54  
FOR MANHOLE FRAME COVER & FRAME  
SEE STEP STD.NO.840.66

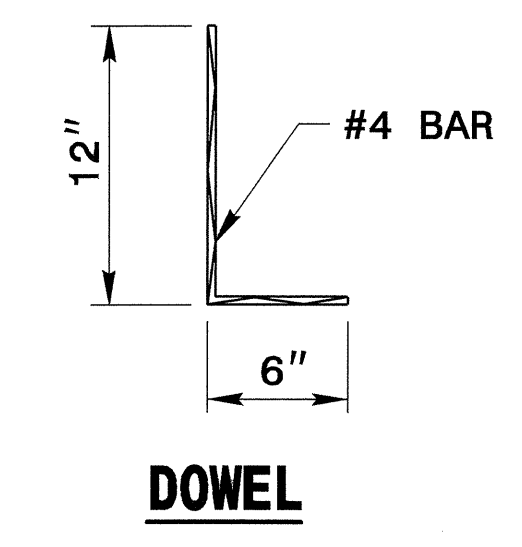


**GENERAL NOTES:**  
 USE CLASS "B" CONCRETE THROUGHOUT.  
 PROVIDE ALL JUNCTION BOXES OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.  
 OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.  
 USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB, SEE STD. DRAWING 840.00.  
 INSTALL MANHOLE IN POSITION AS DIRECTED BY THE ENGINEER. CUT AND BEND ALL REBAR CROSSING THIS OPENING TO ALLOW 2" MINIMUM CONCRETE COVERAGE.  
 CHAMFER ALL EXPOSED CORNERS 1".  
 2" MINIMUM CONCRETE COVERAGE ON ALL REBAR.  
 HEIGHT DIMENSIONS MAY BE ADJUSTED DOWN FOR SMALLER PIPES AS DIRECTED BY THE ENGINEER.

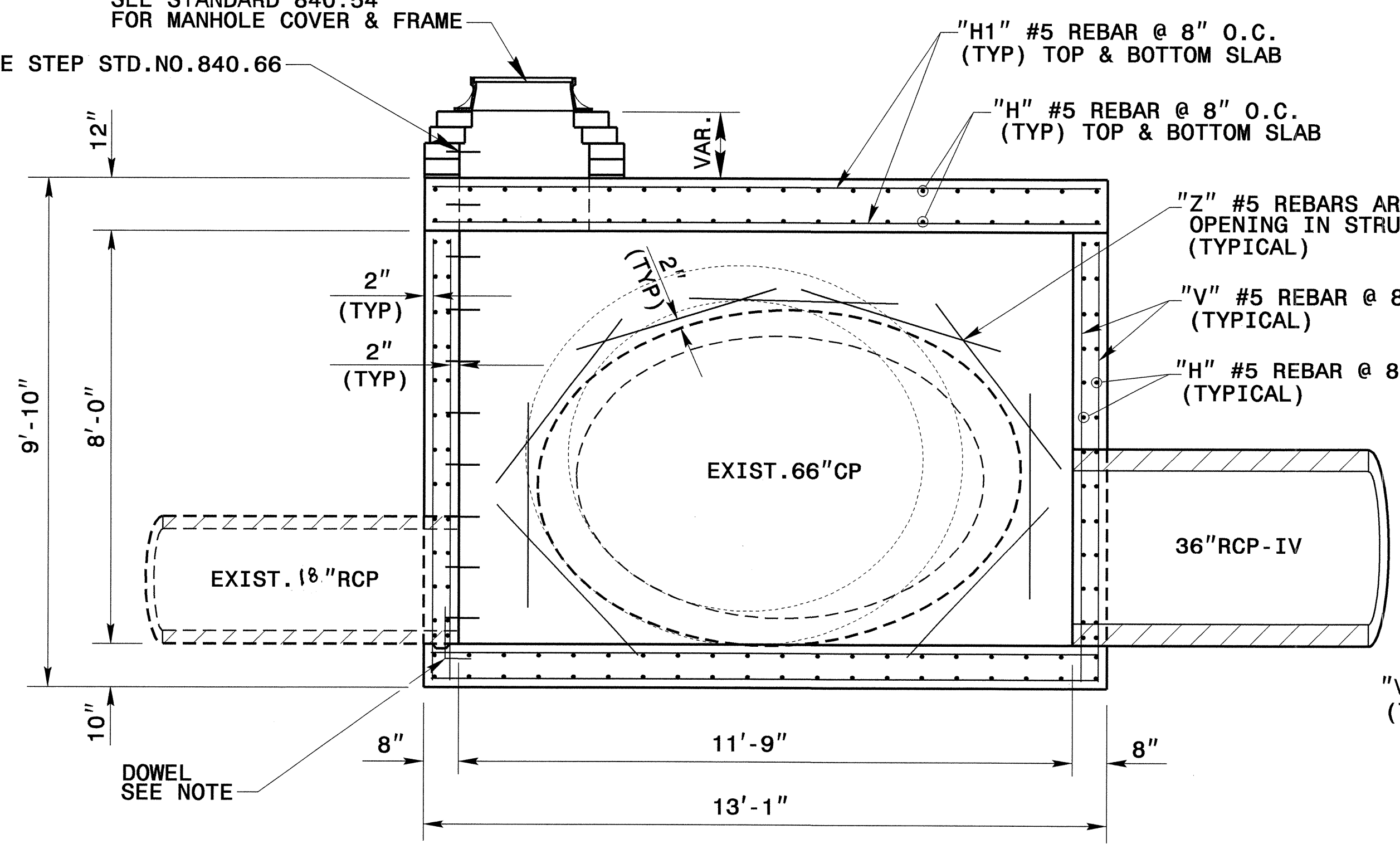
**BILL OF MATERIALS**

BAR	NO.	SIZE	LENGTH	WEIGHT
H	132	#5	6'-10"	941
H1	96	#5	12'-9"	1277
V	116	#5	8'-6"	1028
Z	18	#5	4'-0"	75
TOTAL REINF. STEEL (LBS.)				3321
TOTAL CONC. (CU. YDS.)				13.8

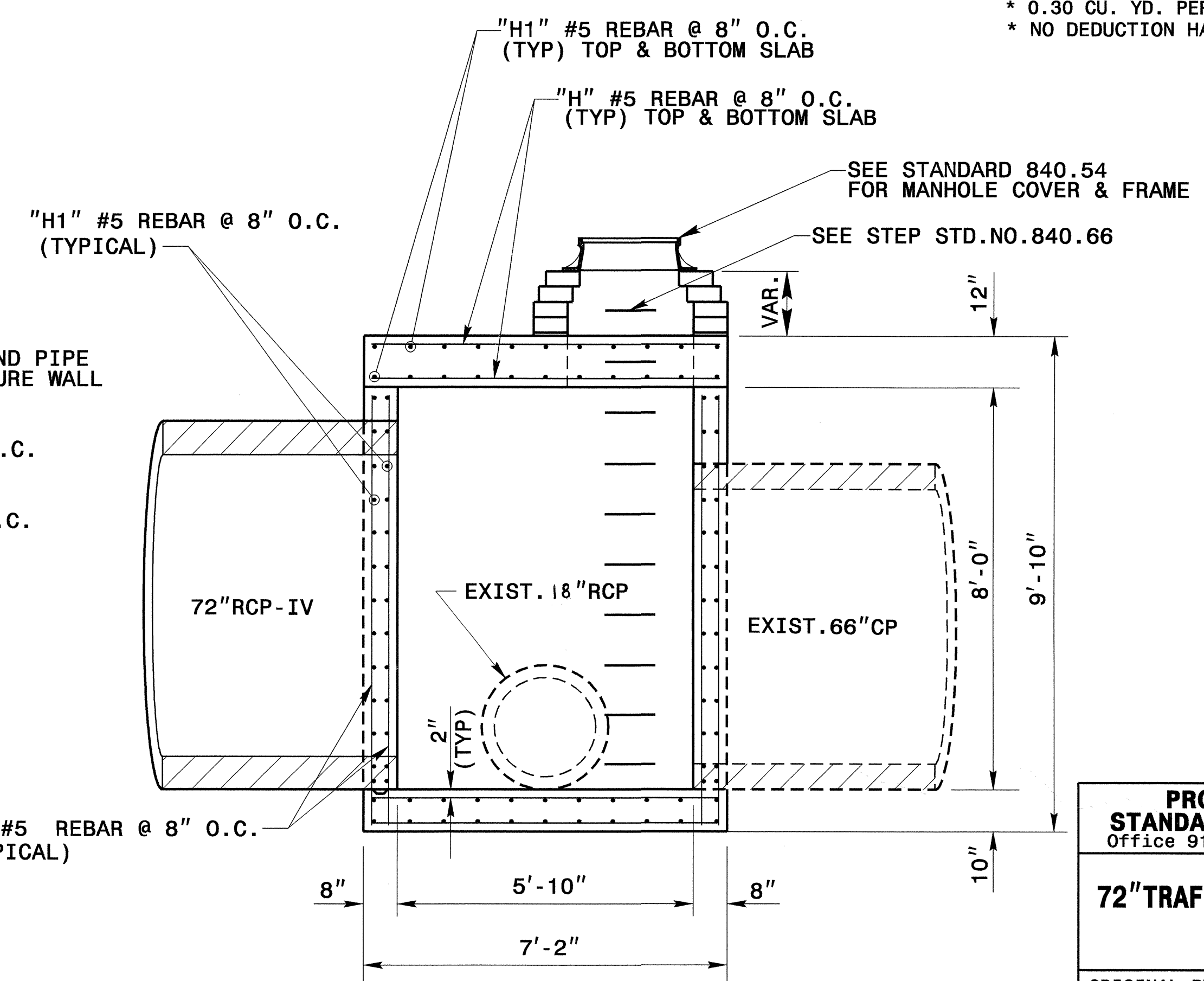
- \* 1.19 CU. YD. DEDUCTION FOR 72" RC PIPE
- \* 1.17 CU. YD. DEDUCTION FOR EXISTING 66" CP
- \* 0.12 CU. YD. DEDUCTION FOR EXISTING 24" RC PIPE
- \* 0.29 CU. YD. DEDUCTION FOR 36" RC PIPE
- \* 0.30 CU. YD. PER FOOT OF RISER HEIGHT
- \* NO DEDUCTION HAS BEEN MADE FOR PIPES



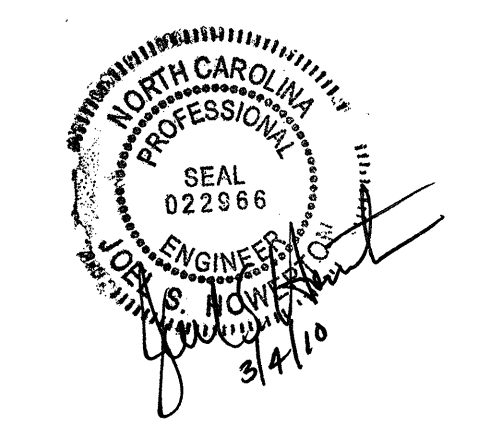
SEE STANDARD 840.54  
FOR MANHOLE COVER & FRAME  
SEE STEP STD.NO.840.66



**SECTION A-A**



**SECTION B-B**

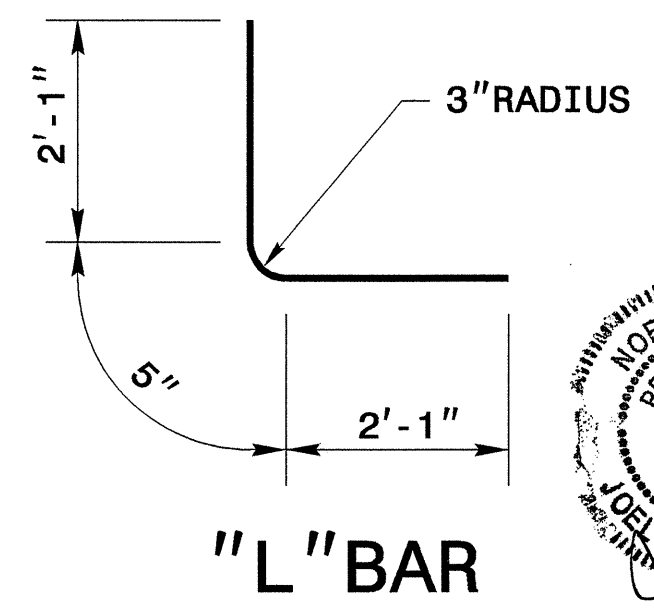
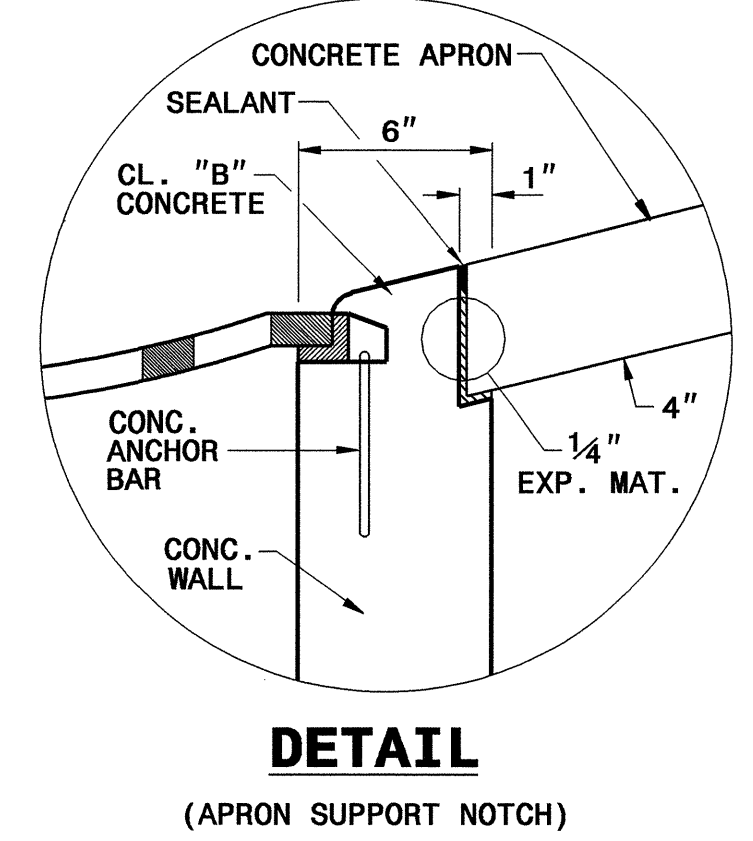
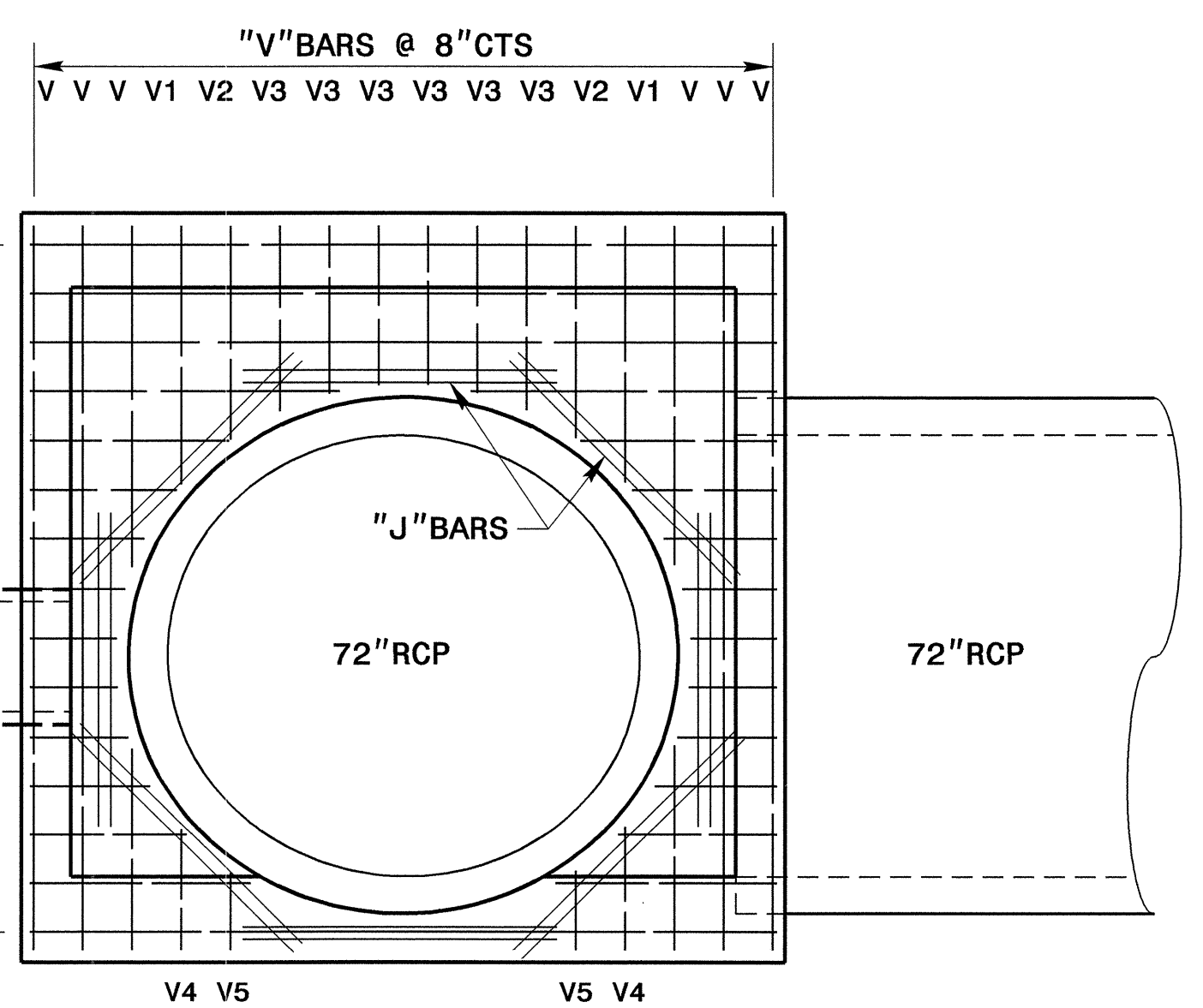
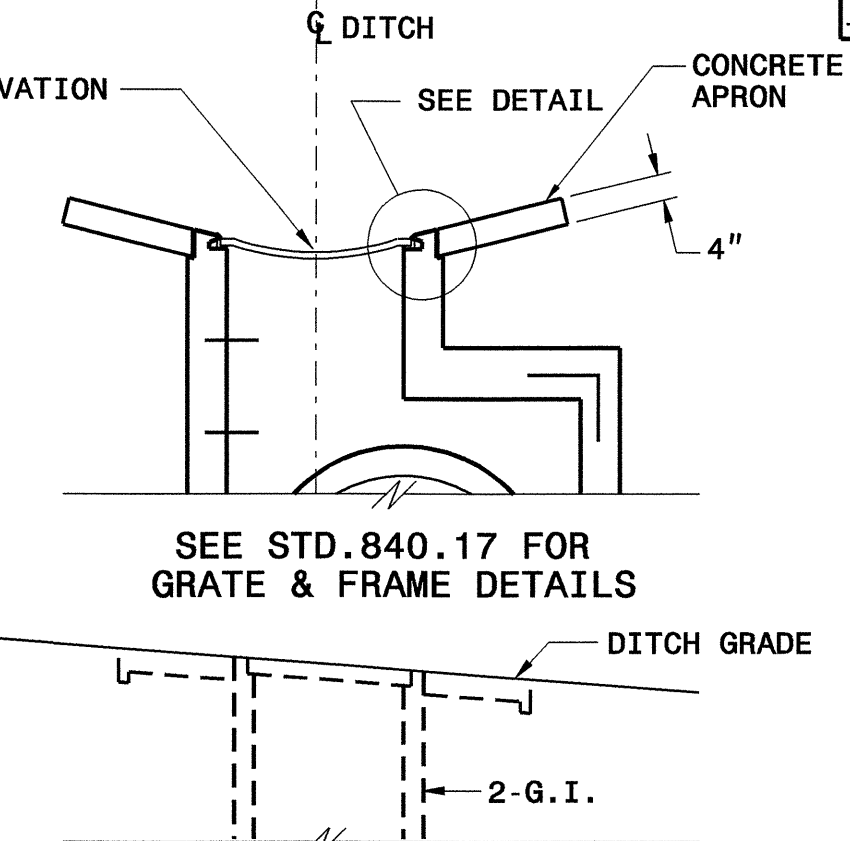
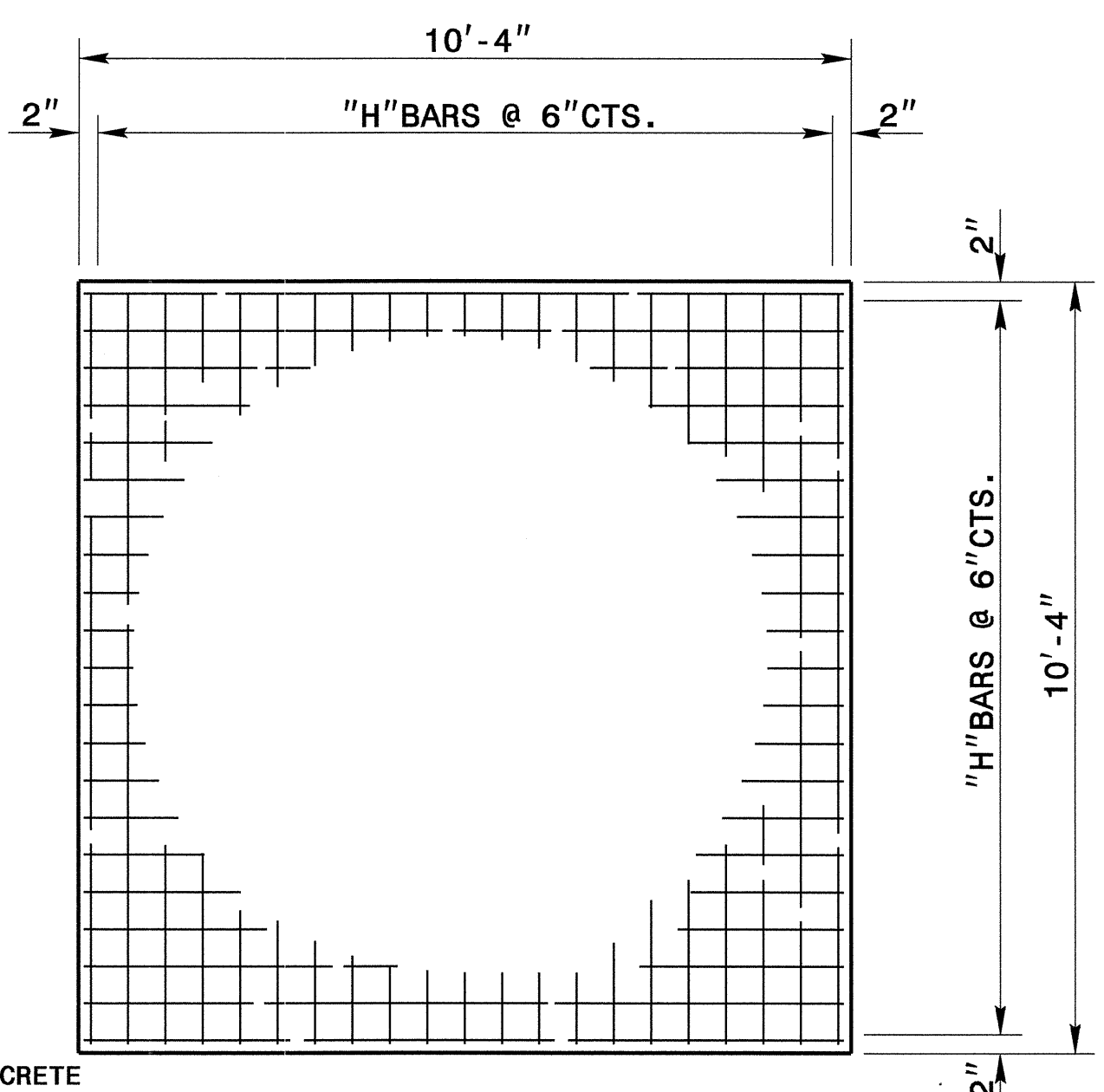
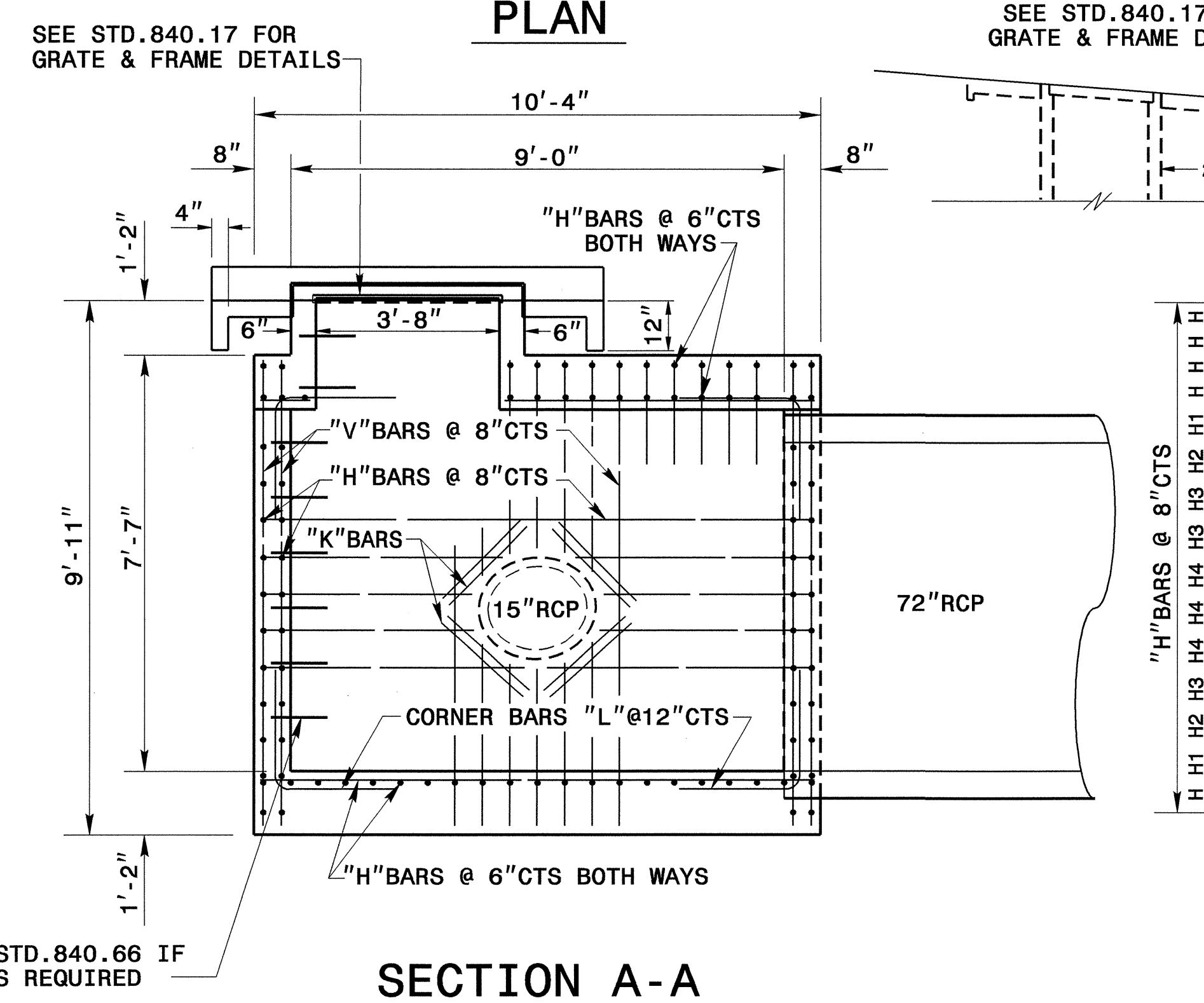
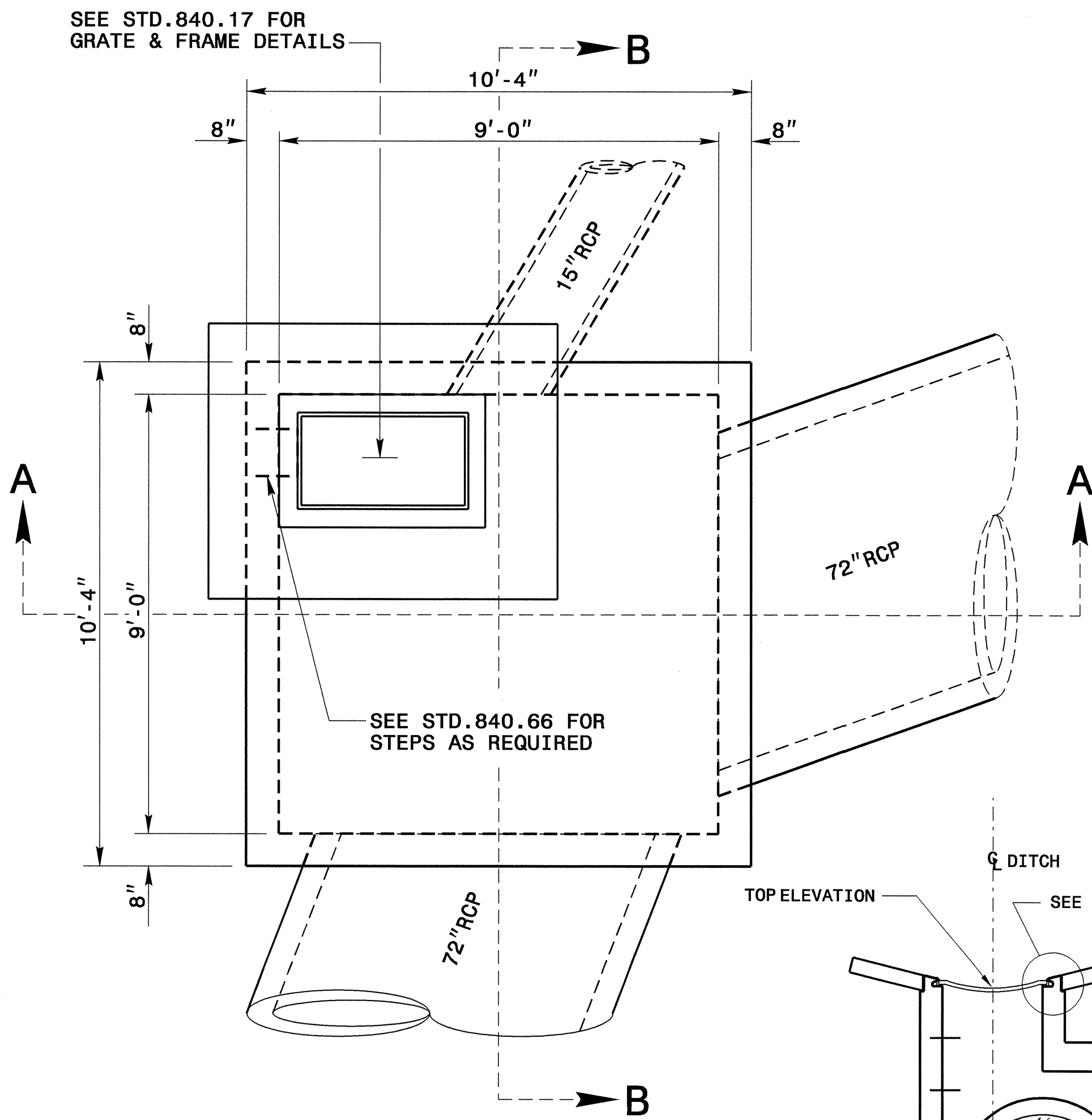


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**72" TRAFFIC BEARING JUNCTION BOX  
STA. 19+58-SBL-RT.**

ORIGINAL BY: nbritt DATE: 01/22/10  
 MODIFIED BY: *gnb* DATE: 1/25/10  
 CHECKED BY: *gnb* DATE: 1/25/10  
 FILE SPEC.: detail/nbritt/english/hydro/72tbib.dgn

22-JAN-2010 08:56  
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 #USERNAME##



- GENERAL NOTES:**
- THE BASE SLAB SHALL BE CONSTRUCTED BY FORMING.
  - SEE STD. DWG. 840.00 FOR CONSTRUCTION OF BASE SLAB
  - IF PIPE IS SET INTO BASE SLAB, CLASS 'B' CONCRETE SHALL BE USED THROUGHOUT.
  - CONSTRUCTION OPTIONS: MONOLITHIC POUR; CONSTRUCTION JOINTS AT UNION OF WALLS WITH FLOOR AND/OR TOP SLAB.
  - REINFORCING STEEL SHALL BE CUT, BENT OR RELOCATED TO POSITION PIPE AS DIRECTED BY THE ENGINEER.
  - ALL EXPOSED CORNERS SHALL BE CHAMFERED 1".
  - SEE STD. DRAWING 840.17 FOR CONSTRUCTION OF RISER AND FRAME AND GRATES.
  - USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24 (SHOWN) 840.20 (NOT SHOWN) OR 840.29 (NOT SHOWN).
  - SEE DETAIL SHEET 2-I 840D25 FOR ATTACHMENT OF FRAME AND GRATES.
  - BOXES OVER 3'-6" IN DEPTH WITH MANHOLES WILL REQUIRE STEPS TO BE PLACED ON 12" CTRS. REFERENCE STD. NO. 840.66.
  - CONSTRUCT WITH PIPE CROWNS MATCHING.
  - NOT ALL BARS ARE SHOWN IN DETAILS
  - DRAWING NOT TO SCALE.

**BILL OF MATERIAL**

CODE	BAR#	LENGTH	LBS/FT.	QTY.	LBS/ST.
H	4	10'-0"	0.668	164	1095.9
H1	4	2'-6"	0.668	16	26.7
H2	4	2'-0"	0.668	16	21.4
H3	4	1'-6"	0.668	24	24.0
H4	4	1'-2"	0.668	24	18.7
V	4	9'-10"	0.668	108	601.4
V1	4	3'-6"	0.668	8	18.7
V2	4	2'-9"	0.668	8	14.7
V3	4	2'-2"	0.668	24	34.7
V4	4	1'-6"	0.668	8	8.0
V5	4	1'-2"	0.668	8	6.2
J	4	4'-3"	0.668	64	181.7
K	4	2'-0"	0.668	16	21.4
L	4	4'-7"	0.668	80	244.9
<b>TOTAL WEIGHT STEEL</b>					<b>2318.4</b>
<b>MASONRY QUANTITIES</b>					
CLASS "A" CONCRETE					15.9 CU.YDS.
PIPE DEDUCTIONS					
1-15' RCP					-0.1 CU.YD.
2-72" RCP					-2.0 CU.YDS.
<b>TOTAL CLASS "A" CONCRETE</b>					<b>13.8 CU.YDS.</b>

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**DETAIL OF  
72" 2 GRATE INLET**

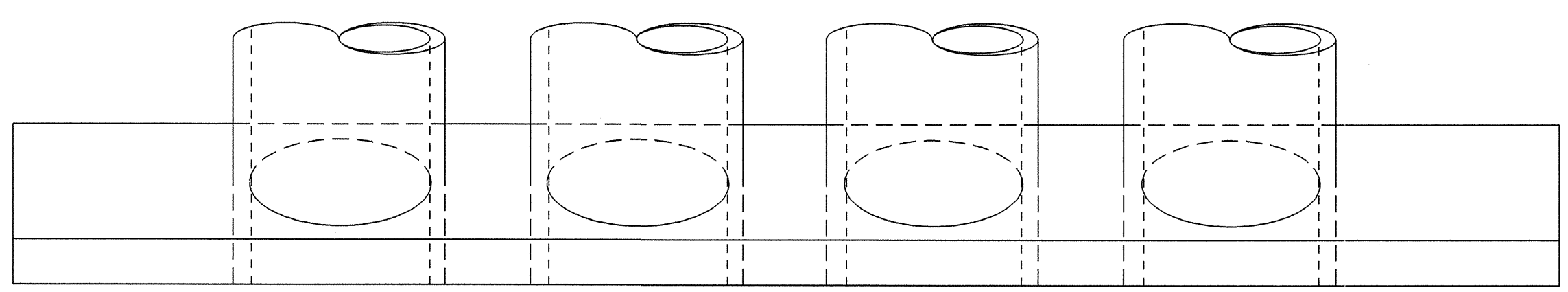
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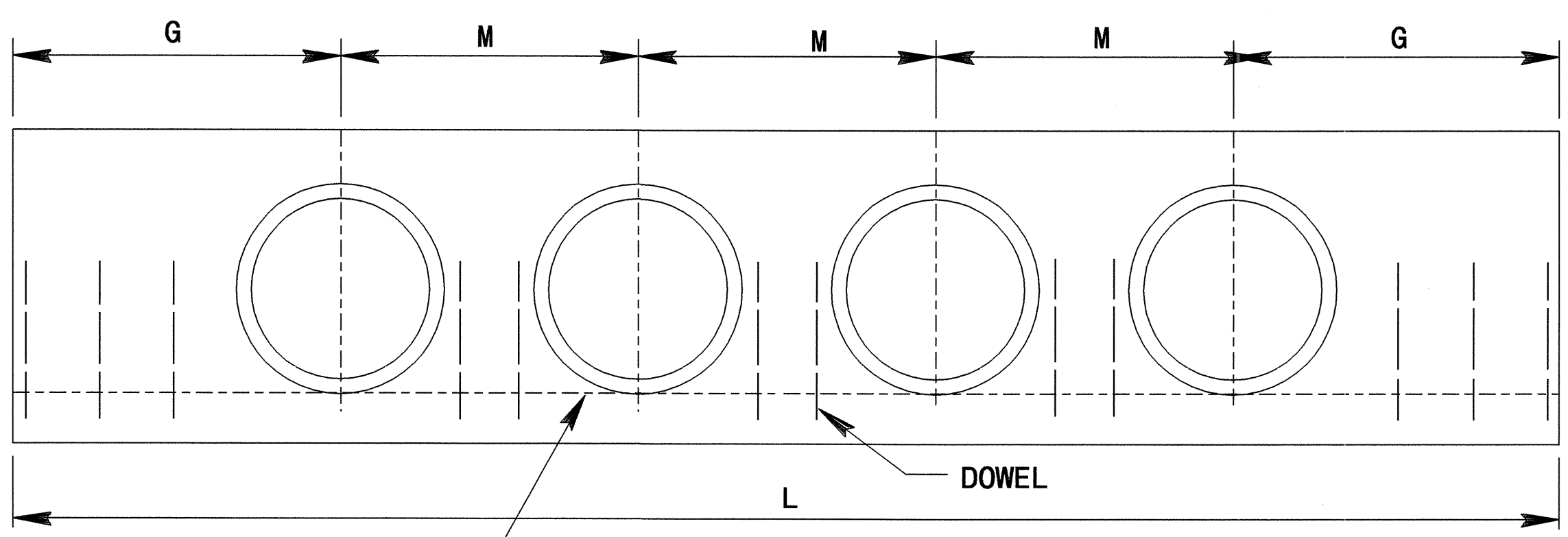
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR  
**CONCRETE ENDWALL FOR TRIPLE THRU  
QUADRUPLE PIPE CULVERTS**  
15" THRU 48" PIPE - 90° SKEW

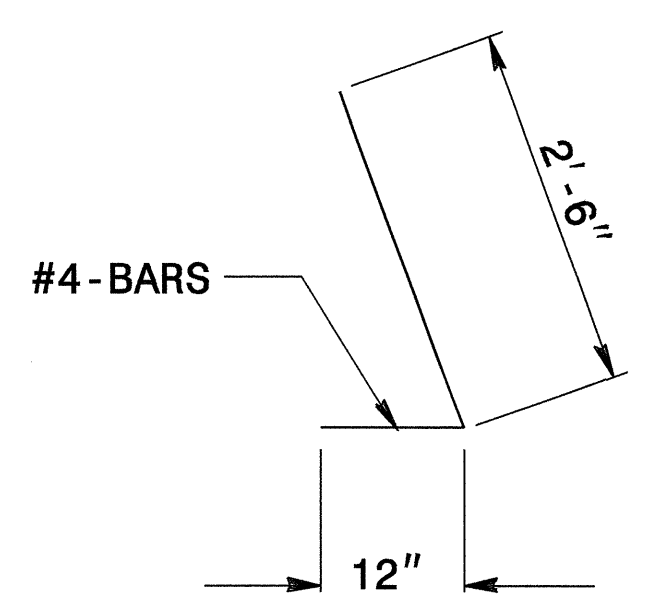
SHEET 1 OF 1  
**838D01**



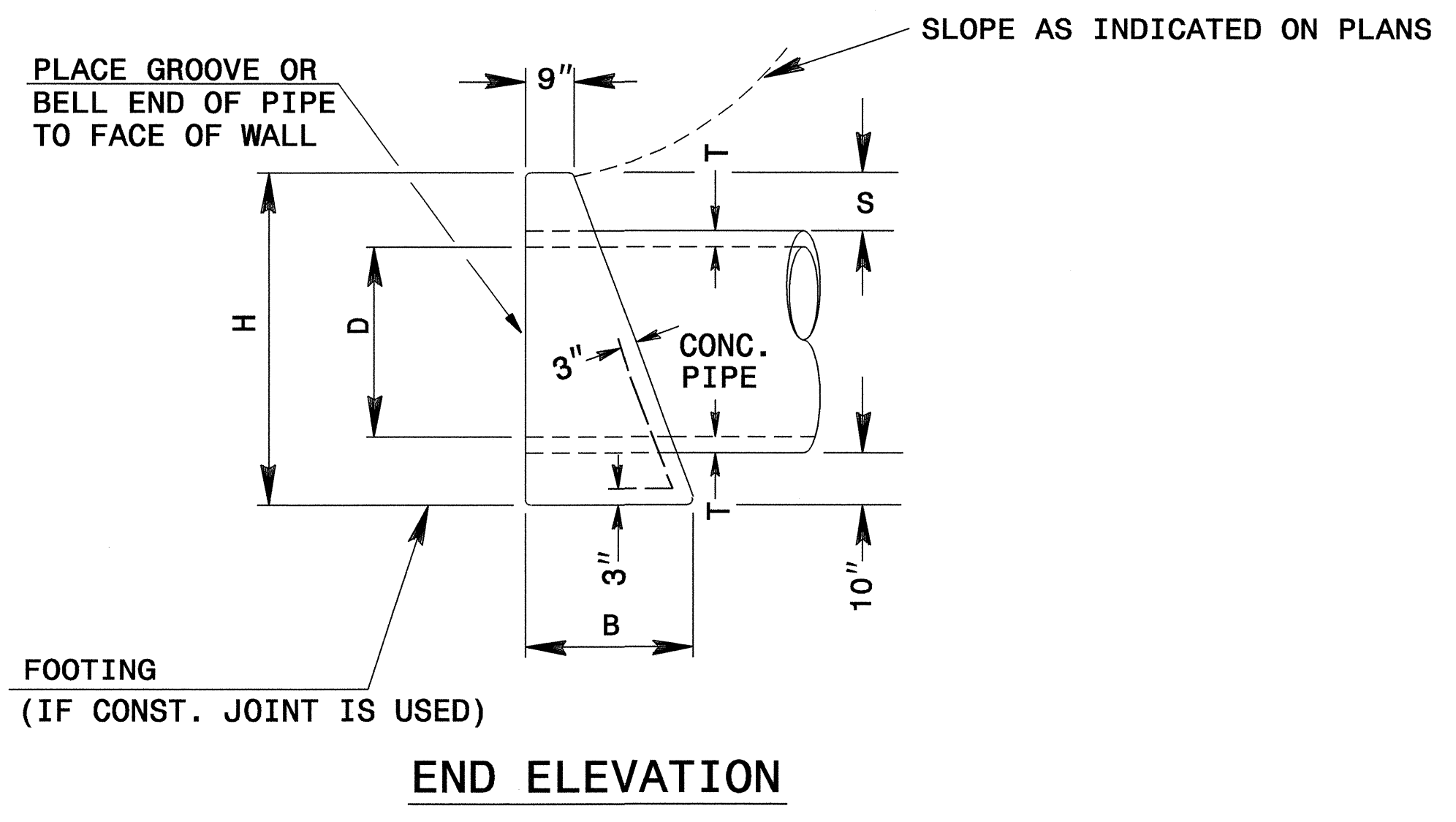
PLAN



ELEVATION



DOWEL  
BAR - "X"



END ELEVATION

DIMENSIONS AND CONCRETE QUANTITIES									
USING CONCRETE PIPE									
D	COMMON DIMENSIONS					TRIPLE PIPE		QUADRUPLE PIPE	
	H	B	G	T	S	L	YD <sup>3</sup>	L	YD <sup>3</sup>
15"	3'-3"	1'-8"	2'-9"	2 1/4"	9 1/2"	9'-10"	1.3	12'-0"	1.6
18"	3'-7"	1'-10"	3'-2"	2 1/2"	10"	11'-6"	1.6	14'-1"	1.9
24"	4'-2"	2'-1"	4'-0"	3"	10"	14'-10"	2.5	18'-3"	3.0
30"	5'-0"	2'-6"	4'-7"	4 1/4"	11 1/2"	17'-8"	3.9	21'-11"	4.7
36"	5'-8"	2'-8"	5'-6"	4 3/4"	12 1/2"	21'-0"	5.6	26'-0"	6.7
42"	6'-2"	3'-1"	6'-4"	5 1/4"	11 1/2"	24'-4"	7.5	30'-2"	9.0
48"	6'-9"	3'-5"	7'-2"	5 3/4"	11 1/2"	27'-8"	10.0	34'-4"	12.0

\* NOTE: SEE ROADWAY STANDARD DRAWING 838.01 SHEET 3 OF 3 FOR GENERAL NOTES

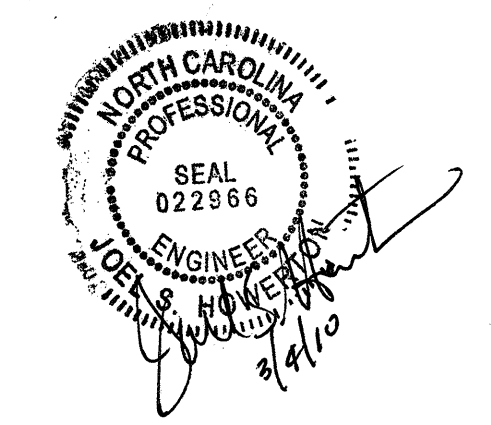
DOWELS IN ENDWALL WITH REINFORCED CONCRETE PIPE																	
LOC.	PIPE DIA.	TRIPLE PIPE						QUADRUPLE PIPE									
		15"	18"	24"	30"	36"	42"	48"	15"	18"	24"	30"	36"	42"	48"		
	BARS	"X"	"X"	"X"	"X"	"X"	Y*	"X"	Y*	"X"	"X"	"X"	"X"	"X"	Y*	"X"	Y*
G	QTY.	2	2	3	3	4	4	5	2	2	3	3	4	4	5	5	2
M(s)	QTY.	2	2	4	4	4	2	6	2	3	3	6	6	6	2	9	2
G	QTY.	2	2	3	3	4	4	5	2	2	3	3	4	4	5	5	2
TOTAL LBS.		14	14	23	23	28	100	119	17	17	28	28	33	122	147		

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

ENGLISH DETAIL DRAWING FOR  
**CONCRETE ENDWALL FOR TRIPLE THRU  
QUADRUPLE PIPE CULVERTS**  
15" THRU 48" PIPE - 90° SKEW

SHEET 1 OF 1  
**838D01**

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jhower-ton  
AT P5237501



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Office 919-250-4128 FAX 919-250-4119

**SEE PLATE FOR TITLE**

ORIGINAL BY: E.E. WARD DATE: \_\_\_\_\_  
 MODIFIED BY: K.A. Kempf DATE: \_\_\_\_\_  
 CHECKED BY: *Julie* DATE: 1/20/10  
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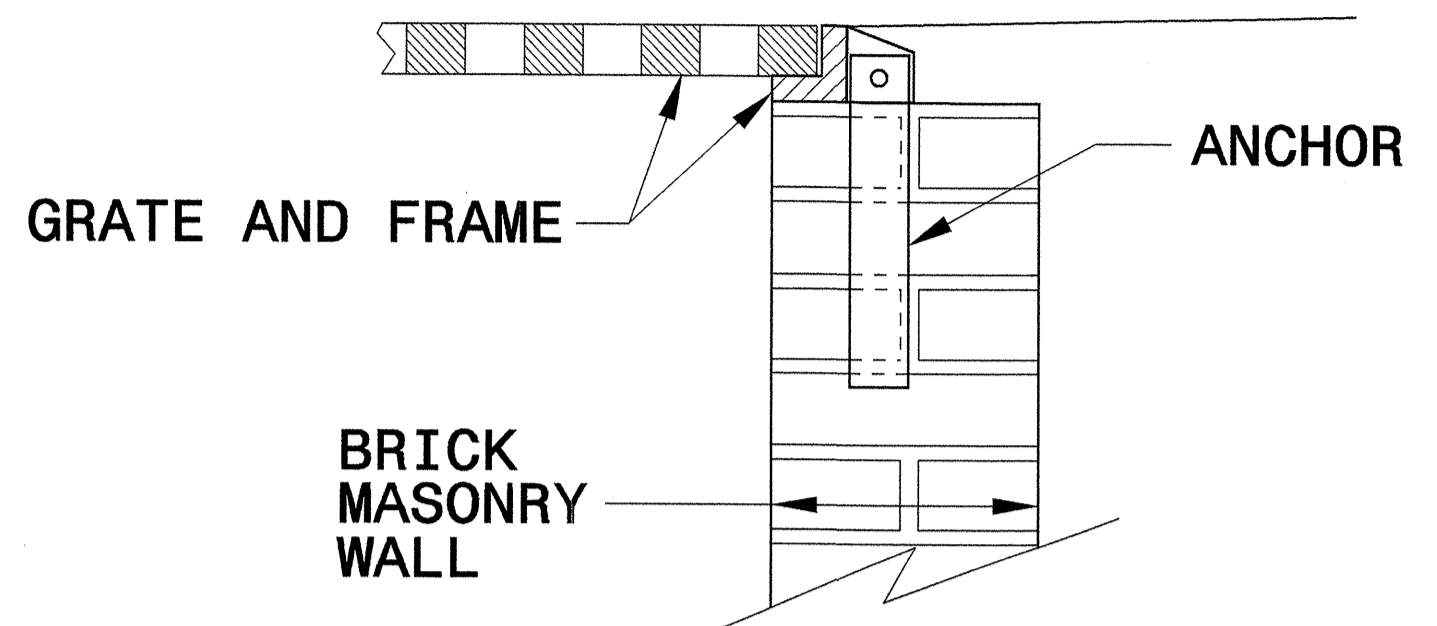


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DEPT. OF TRANSPORTATION  
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RALEIGH, N.C.

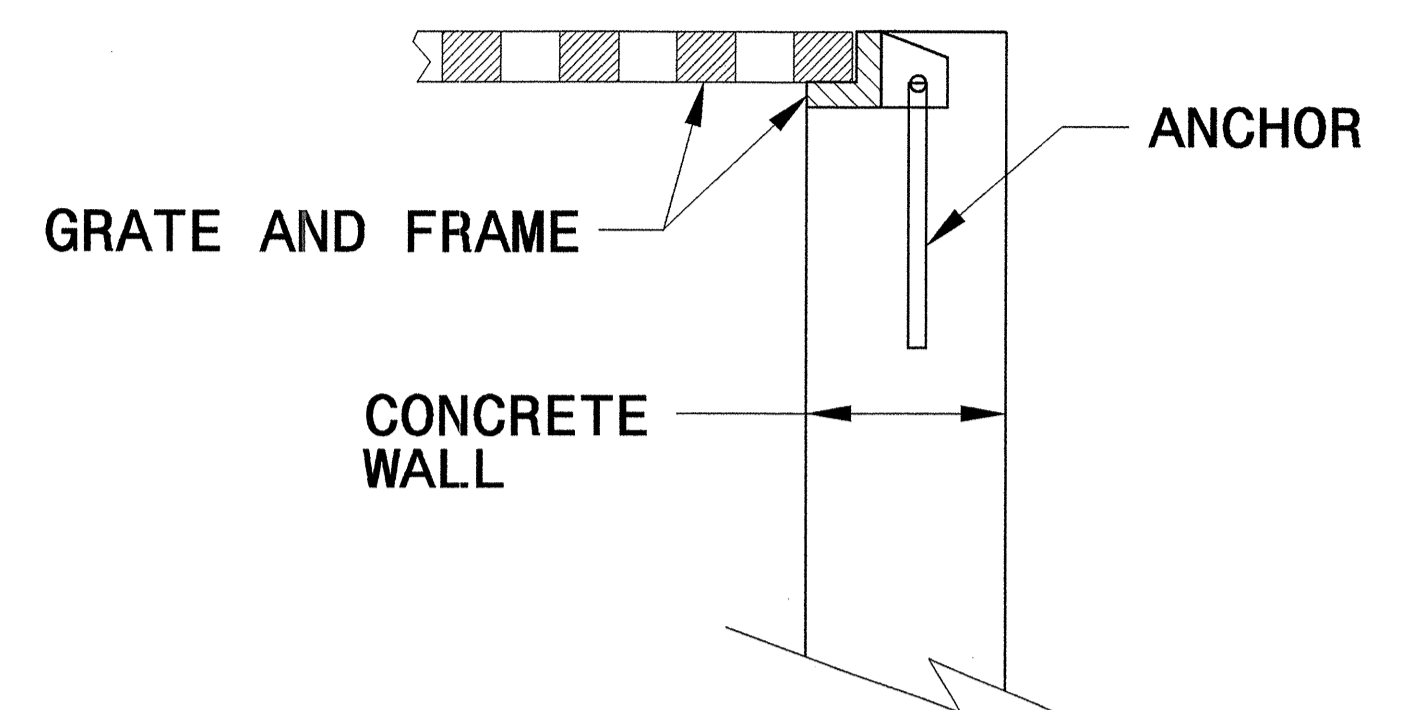
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**ANCHORAGE FOR FRAMES**  
BRICK/CONCRETE/PRECAST CONCRETE

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DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

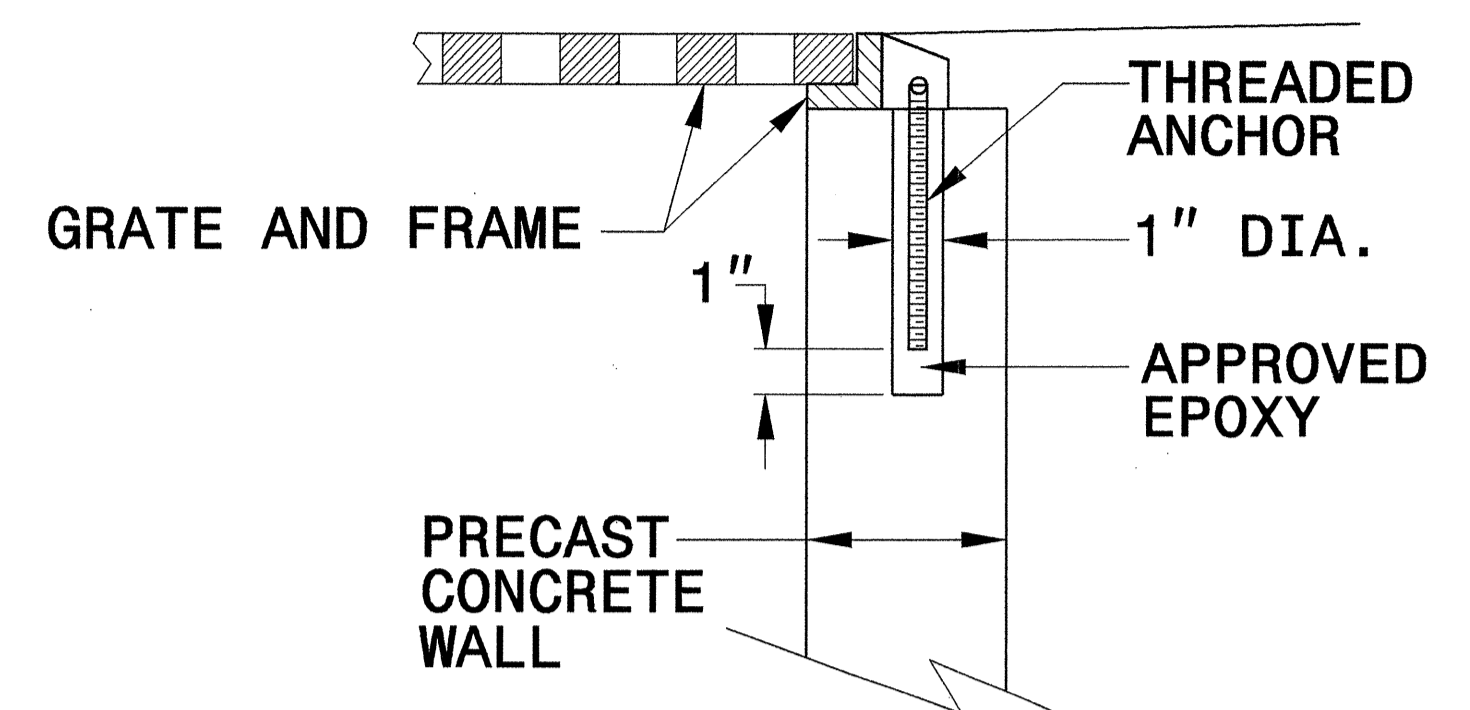
ENGLISH DETAIL DRAWING FOR  
**ANCHORAGE FOR FRAMES**  
BRICK/CONCRETE/PRECAST CONCRETE



**BRICK MASONRY CONSTRUCTION**



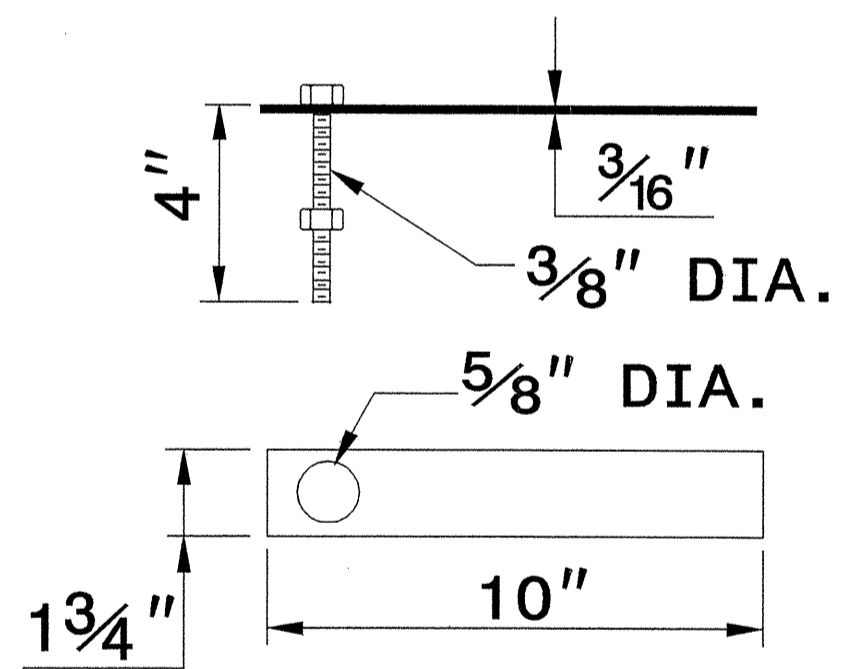
**CONCRETE CONSTRUCTION**



**PRECAST CONCRETE CONSTRUCTION**

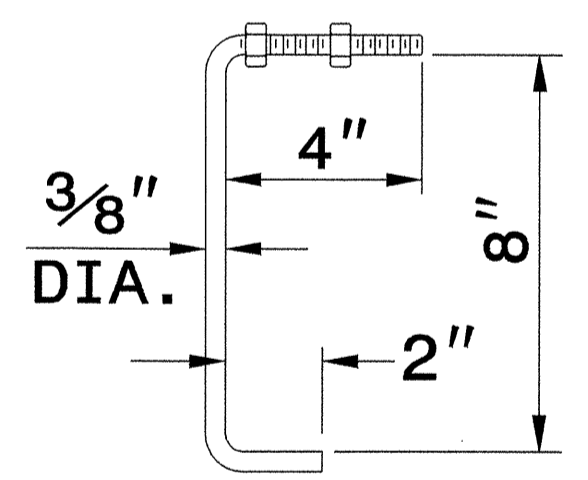
**DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET**

NOTE:  
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



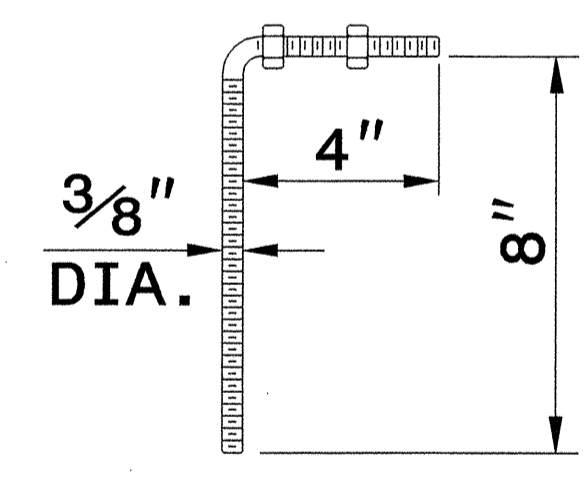
**MASONRY ANCHOR**

3/8" DIA. BOLT WITH PLATE



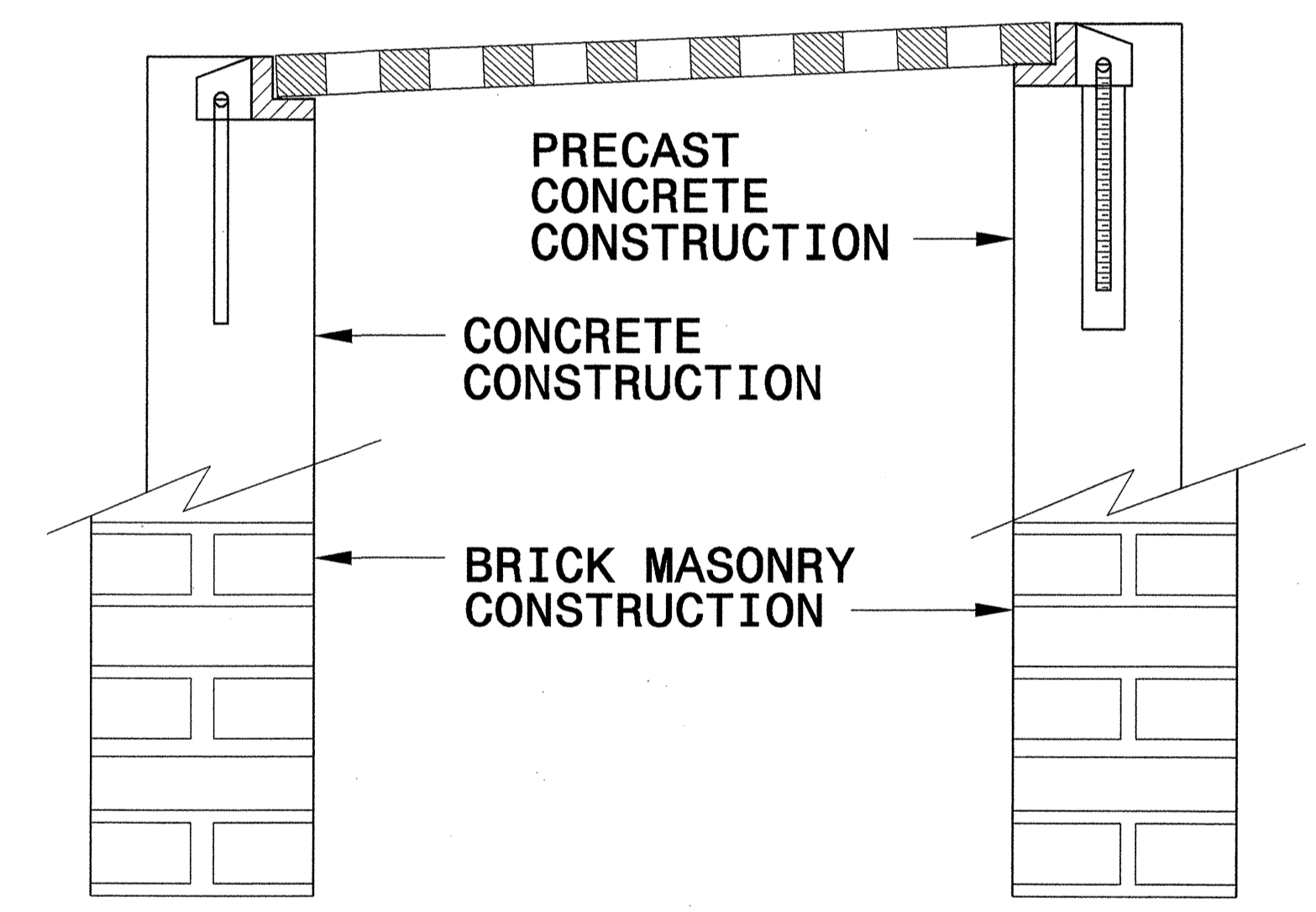
**CONCRETE ANCHOR**

3/8" DIA. BENT BAR

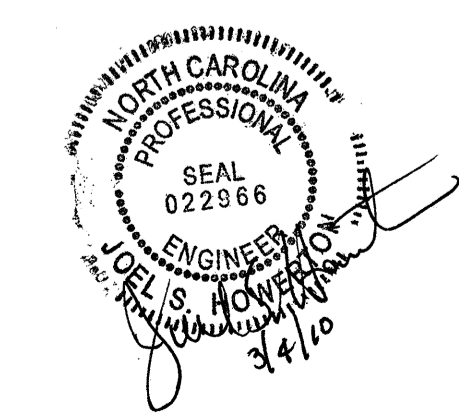


**PRECAST CONCRETE ANCHOR**

3/8" DIA. BENT BAR



**FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS**



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**SEE PLATE FOR TITLE**

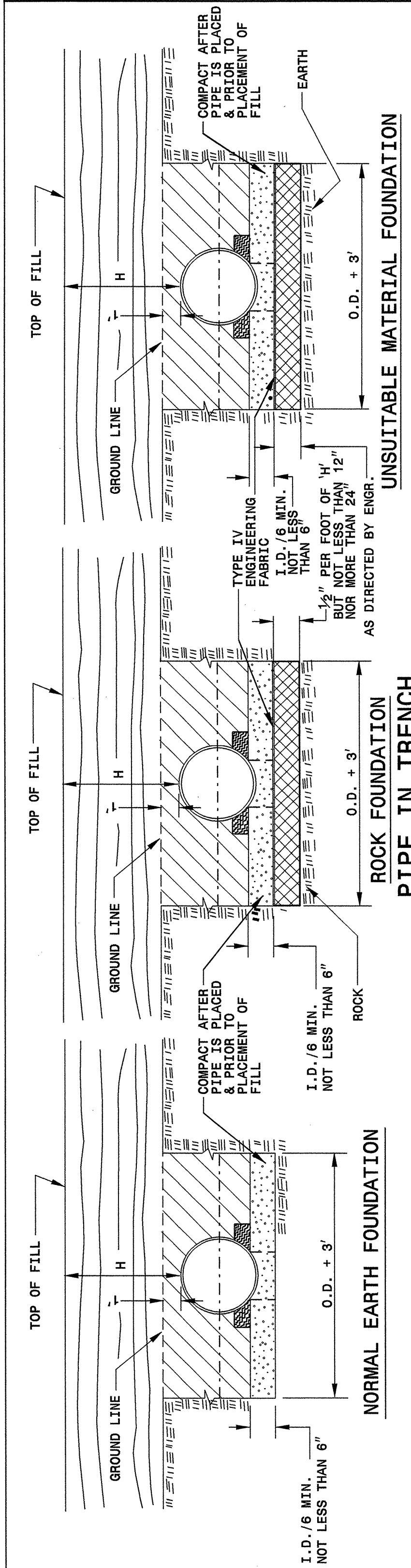
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11/17/06  
 JOEL S. MONCRIEF  
 PROFESSIONAL ENGINEER  
 NO. 022966  
 STATE OF NORTH CAROLINA

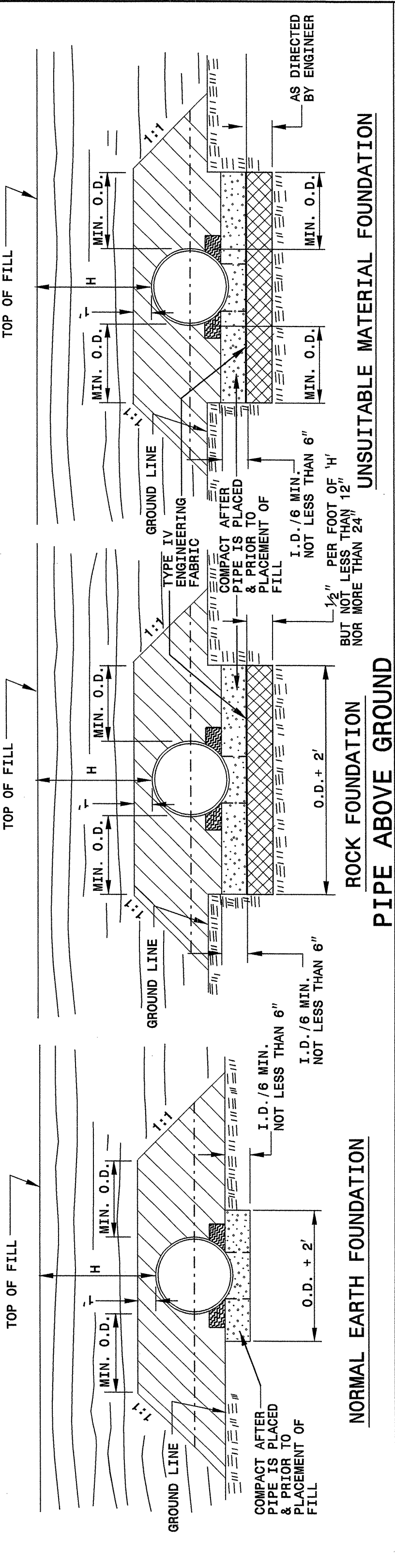
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5/14/99

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



ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 FLEXIBLE PIPE



GENERAL NOTES:  
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.  
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.  
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE ENBANKMENT AT THAT POINT.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

----- SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

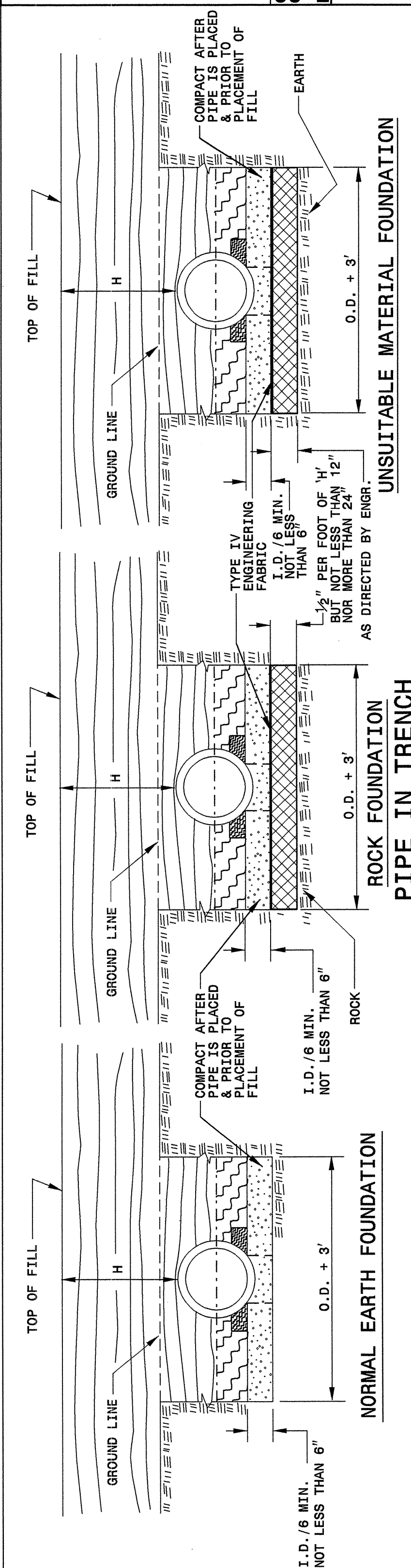
SHEET 1 OF 3  
**300D01**

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 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

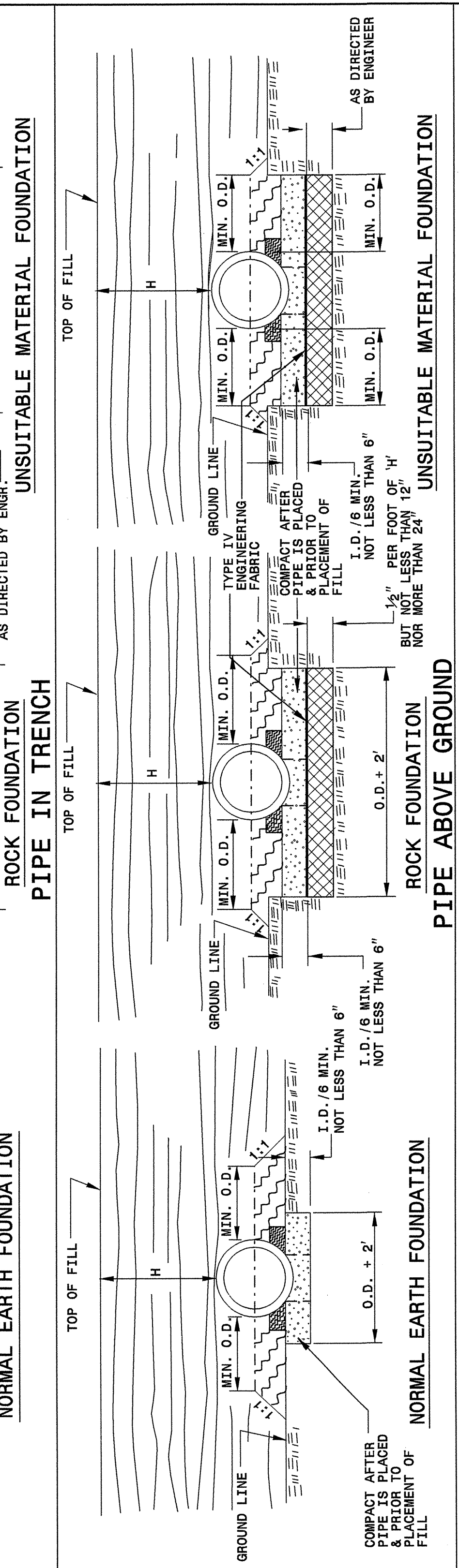
ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 FLEXIBLE PIPE

SHEET 1 OF 3  
**300D01**

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



ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 RIGID PIPE



GENERAL NOTES:  
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.  
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.  
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE ENBANKMENT AT THAT POINT.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

----- SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

SHEET 2 OF 3  
**300D01**

STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
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ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 RIGID PIPE

SHEET 2 OF 3  
**300D01**

PROJECT SERVICES UNIT  
 STANDARDS AND SPECIAL DESIGN  
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**SEE PLATE FOR TITLE**

ORIGINAL BY: K Kempf DATE: 5-15-09  
 MODIFIED BY: gaus Date: 7/20/09  
 CHECKED BY: gaus Date: 7/20/09  
 FILE SPEC: erickward/stds/stdstodetails/30001/0300d01.dgn





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

7-06

ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**

FILL HEIGHT TABLES

SHEET 3 OF 3  
**300D01**

**FLEXIBLE PIPE**

Round Corrugated Steel Pipe 2 2/3 x 1/2 corrugation **				
Diameter (inches)	Minimum cover (inches)	Maximum cover (Ga)	Height of Cover (feet)	Height of Cover (feet)
12	12	204	14	8
15	12	162	204	10
18	12	135	169	239
21	12	115	145	204
24	12	100	126	178
30	12	79	100	142
36	12	65	83	117
42	12	55	70	100
48	12	48	61	87
54	12	42	54	77
60	12	36	48	69
66	12	30	42	61
72	12	24	36	54
78	12	18	30	48
84	12	12	24	42

Round Corrugated Aluminum Pipe 2 2/3 x 1/2 corrugation **				
Diameter (inches)	Minimum cover (inches)	Maximum cover (Ga)	Height of Cover (feet)	Height of Cover (feet)
12	12	123	14	8
15	12	98	123	281
18	12	81	102	224
21	12	69	87	187
24	12	60	76	160
27	12	54	67	139
30	12	48	60	123
36	12	42	50	111
42	12	36	42	92
48	12	30	36	78
54	12	24	30	68
60	12	18	24	60
66	12	12	18	50
72	12	12	12	41

\*\* FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

- CSP - AASHTO M36
- CAAP - AASHTO M196
- HDPE - AASHTO M294
- PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

\* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

**RIGID PIPE**

- RCP - \* (Minimum fill) 1' for Class IV & CLASS V  
 2' for Class III & Class II
- \* (Maximum fill) 10' - Class II pipe  
 20' - Class III pipe  
 30' - Class IV pipe  
 40' - Class V pipe

(For fills > 40' & < 80' use LRFD Direct Design Method)

\* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

- RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

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

7-06

ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**

FILL HEIGHT TABLES

SHEET 3 OF 3  
**300D01**

**PROJECT SERVICES UNIT  
 STANDARDS AND SPECIAL DESIGN**  
 Office 919-250-4128 FAX 919-250-4119

**SEE PLATE FOR TITLE**

ORIGINAL BY: KKempf DATE: 5-15-09  
 MODIFIED BY: DATE:   
 CHECKED BY: DATE: 7/30/09  
 FILE SPEC: ericward/stds/stdstodetails/30001/0300d01.dgn





STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202335

STATE OF NORTH CAROLINA  
SUMMARY OF QUANTITIES

ItemNumber	Sec #	Quantity	Unit	Description
000100000-N	800	Lump Sum		MOBILIZATION
000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
000910000-N	SP	6	HR	GENERIC MISCELLANEOUS ITEM EXPLORATORY EXCAVATION - STANDARD
000910000-N	SP	6	HR	GENERIC MISCELLANEOUS ITEM EXPLORATORY EXCAVATION - VACUUM
002900000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (30+63.00)
005000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
005700000-E	226	1,400	CY	UNDERCUT EXCAVATION
006300000-N	SP	Lump Sum		GRADING
010600000-E	230	69,000	CY	BORROW EXCAVATION
013400000-E	240	4,462	CY	DRAINAGE DITCH EXCAVATION
019500000-E	SP	1,200	CY	SELECT GRANULAR MATERIAL
019600000-E	270	1,200	SY	FABRIC FOR SOIL STABILIZATION
031800000-E	SP	572	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
032000000-E	SP	1,814	SY	FOUNDATION CONDITIONING FABRIC
034200000-E	SP	60	LF	*** SIDE DRAIN PIPE (72")
034300000-E	SP	1,092	LF	15" SIDE DRAIN PIPE
034400000-E	SP	72	LF	18" SIDE DRAIN PIPE
034500000-E	SP	188	LF	24" SIDE DRAIN PIPE
034800000-E	SP	2	EA	*** SIDE DRAIN PIPE ELBOWS (15")
037200000-E	SP	64	LF	18" RC PIPE CULVERTS, CLASS III
044800000-E	SP	192	LF	**** RC PIPE CULVERTS, CLASS IV (48")
044800000-E	SP	80	LF	**** RC PIPE CULVERTS, CLASS IV (72")
044820000-E	SP	732	LF	15" RC PIPE CULVERTS, CLASS IV
044840000-E	SP	28	LF	24" RC PIPE CULVERTS, CLASS IV
044860000-E	SP	12	LF	36" RC PIPE CULVERTS, CLASS IV
099500000-E	340	211	LF	PIPE REMOVAL
107700000-E	SP	170	TON	#57 STONE
130800000-E	607	2,250	SY	MILLING ASPHALT PAVEMENT, **** TO ***** DEPTH (0" TO 1-1/2")
149100000-E	610	4,600	TON	ASPHALT CONC BASE COURSE, TYPE B25.0C
150300000-E	610	2,850	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C
152300000-E	610	4,260	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5C
156000000-E	620	335	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
156500000-E	620	260	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 70-22
169300000-E	654	54	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
220900000-E	838	12	CY	ENDWALLS
222000000-E	838	7.5	CY	REINFORCED ENDWALLS
225300000-E	840	0.399	CY	PIPE COLLARS
226400000-E	840	0.09	CY	PIPE PLUGS
228600000-N	840	25	EA	MASONRY DRAINAGE STRUCTURES
229700000-E	840	27.6	CY	MASONRY DRAINAGE STRUCTURES
230800000-E	840	5.52	LF	MASONRY DRAINAGE STRUCTURES
236400000-N	840	2	EA	FRAME WITH TWO GRATES, STD 840.16
236500000-N	840	10	EA	FRAME WITH TWO GRATES, STD 840.22
237400000-N	840	2	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
237400000-N	840	2	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
237400000-N	840	2	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)

ItemNumber	Sec #	Quantity	Unit	Description
239600000-N	840	5	EA	FRAME WITH COVER, STD 840.54
240700000-N	840	4	EA	STEEL FRAME WITH TWO GRATES, STD 840.37
253500000-E	846	320	LF	***X *** CONCRETE CURB (8" x 12")
254900000-E	846	3,250	LF	2'-6" CONCRETE CURB & GUTTER
255600000-E	846	205	LF	SHOULDER BERM GUTTER
261200000-E	848	11	SY	6" CONCRETE DRIVEWAY
264700000-E	852	350	SY	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)
281500000-N	858	1	EA	ADJUSTMENT OF DROP INLETS
283000000-N	858	4	EA	ADJUSTMENT OF MANHOLES
303000000-E	862	2,175	LF	STEEL BM GUARDRAIL
315000000-N	862	10	EA	ADDITIONAL GUARDRAIL POSTS
321000000-N	862	1	EA	GUARDRAIL ANCHOR UNITS, TYPE CAT-1
321500000-N	862	2	EA	GUARDRAIL ANCHOR UNITS, TYPE III
327000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
331700000-N	862	2	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77
336000000-E	863	1,870	LF	REMOVE EXISTING GUARDRAIL
362800000-E	876	255	TON	RIP RAP, CLASS I
363500000-E	876	130	TON	RIP RAP, CLASS II
364900000-E	876	10	TON	RIP RAP, CLASS B
365100000-E	SP	80	TON	BOULDERS
365600000-E	876	4,105	SY	FILTER FABRIC FOR DRAINAGE
407200000-E	903	768	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
409600000-N	904	6	EA	SIGN ERECTION, TYPE D
410200000-N	904	33	EA	SIGN ERECTION, TYPE E
415500000-N	907	31	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
415800000-N	907	2	EA	DISPOSAL OF SIGN SYSTEM, WOOD
440000000-E	1110	525	SF	WORK ZONE SIGNS (STATIONARY)
440500000-E	1110	288	SF	WORK ZONE SIGNS (PORTABLE)
441000000-E	1110	115	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
441500000-N	1115	2	EA	FLASHING ARROW PANELS, TYPE C
442000000-N	1120	4	EA	CHANGEABLE MESSAGE SIGN
443000000-N	1130	200	EA	DRUMS
444500000-E	1145	80	LF	BARRICADES (TYPE III)
445500000-N	1150	60	MD	FLAGGER
448000000-N	1165	2	EA	TMA
451000000-N	SP	80	HR	LAW ENFORCEMENT
451600000-N	1180	200	EA	SKINNY DRUM
465000000-N	1251	320	EA	TEMPORARY RAISED PAVEMENT MARKERS
468500000-E	1205	7,181	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
468600000-E	1205	6,210	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
469500000-E	1205	1,002	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
471000000-E	1205	100	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
472500000-E	1205	5	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
477000000-E	1205	788	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (III)
477000000-E	1205	4,314	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)
481000000-E	1205	78,858	LF	PAINT PAVEMENT MARKING LINES (4")
482000000-E	1205	1,848	LF	PAINT PAVEMENT MARKING LINES (8")
483500000-E	1205	64	LF	PAINT PAVEMENT MARKING LINES (24")
484500000-N	1205	120	EA	PAINT PAVEMENT MARKING SYMBOL

ItemNumber	Sec #	Quantity	Unit	Description
485000000-E	1205	21,120	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
486000000-E	1205	1,000	LF	REMOVAL OF PAVEMENT MARKING LINES (8")
487500000-N	1205	10	EA	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS
490000000-N	1251	97	EA	PERMANENT RAISED PAVEMENT MARKERS
532560000-E	1510	1,603	LF	6" WATER LINE
532700000-E	1510	1,142	LF	20" WATER LINE
554000000-E	1515	3	EA	6" VALVE
555900000-E	1515	8	EA	20" VALVE
560680000-E	1515	1	EA	8" BLOW OFF
564800000-N	1515	3	EA	RELOCATE WATER METER
564900000-N	1515	3	EA	RECONNECT WATER METER
569100000-E	1520	443	LF	*** SANITARY GRAVITY SEWER (48")
569150000-E	1520	243	LF	12" SANITARY GRAVITY SEWER
577600000-E	1525	3	EA	5' DIA UTILITY MANHOLE
577700000-E	1525	2	EA	6' DIA UTILITY MANHOLE
578100000-E	1525	30	LF	UTILITY MANHOLE WALL, 4' DIA
578200000-E	1525	16.9	LF	UTILITY MANHOLE WALL, 5' DIA
578300000-E	1525	11.5	LF	UTILITY MANHOLE WALL, 6' DIA
579800000-E	1530	384	LF	ABANDON *** UTILITY PIPE (48")
580400000-E	1530	255	LF	ABANDON 12" UTILITY PIPE
581200000-E	1530	943	LF	ABANDON 20" UTILITY PIPE
582800000-N	1530	1	EA	REMOVE UTILITY MANHOLE
588200000-N	SP	1	EA	GENERIC UTILITY ITEM BREAKDOWN AND REBUILD MANHOLE
588200000-N	SP	5	EA	GENERIC UTILITY ITEM STEEL PILE PIER
600000000-E	1605	15,000	LF	TEMPORARY SILT FENCE
600600000-E	1610	705	TON	STONE FOR EROSION CONTROL, CLASS A
600900000-E	1610	1,350	TON	STONE FOR EROSION CONTROL, CLASS B
601200000-E	1610	1,630	TON	SEDIMENT CONTROL STONE
601500000-E	1615	16	ACR	TEMPORARY MULCHING
601800000-E	1620	350	LB	SEED FOR TEMPORARY SEEDING
602100000-E	1620	2.25	TON	FERTILIZER FOR TEMPORARY SEEDING
602400000-E	1622	2,070	LF	TEMPORARY SLOPE DRAINS
602700000-N	1622	11	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
602900000-E	SP	6,650	LF	SAFETY FENCE
603000000-E	1630	1,115	CY	SILT EXCAVATION
603600000-E	1631	15,500	SY	MATTING FOR EROSION CONTROL
603700000-E	SP	70	SY	COIR FIBER MAT
603800000-E	SP	4,000	SY	PERMANENT SOIL REINFORCEMENT MAT
604200000-E	1632	1,630	LF	1/4" HARDWARE CLOTH
604800000-E	SP	400	SY	FLOATING TURBIDITY CURTAIN
607000000-N	SP	20	EA	SPECIAL STILLING BASINS
6071010000-E	SP	255	LF	WATTLE
6071020000-E	SP	126	LB	POLYACRYLAMIDE (PAM)
6071030000-E	SP	2,485	LF	COIR FIBER BAFFLES
6071050000-E	SP	3	EA	*** SKIMMER (1'-1/2")
608400000-E	1660	15	ACR	SEEDING & MULCHING
608700000-E	1660	15	ACR	MOWING
609000000-E	1661	150	LB	SEED FOR REPAIR SEEDING
609300000-E	1661	0.5	TON	FERTILIZER FOR REPAIR SEEDING
609600000-E	1662	350	LB	SEED FOR SUPPLEMENTAL SEEDING
610800000-E	1665	10	TON	FERTILIZER TOPDRESSING
611450000-N	SP	50	MHR	SPECIALIZED HAND MOWING
611700000-N	SP	27	EA	RESPONSE FOR EROSION CONTROL
611800000-N	SP	12	EA	ROOTWADS
612300000-E	1670	0.75	ACR	REFORESTATION
612600000-E	SP	1.27	ACR	STREAMBANK REFORESTATION
613200000-N	SP	40	EA	GENERIC EROSION CONTROL ITEM LOG
613800000-E	SP	6,800	CY	GENERIC EROSION CONTROL ITEM BORROW PIT DEWATERING BASIN
798000000-N	SP	2	EA	GENERIC SIGNAL ITEM PORTABLE TRAFFIC SIGNAL SYSTEM

PROJECT REFERENCE No. B-4138	SHEET No. 3
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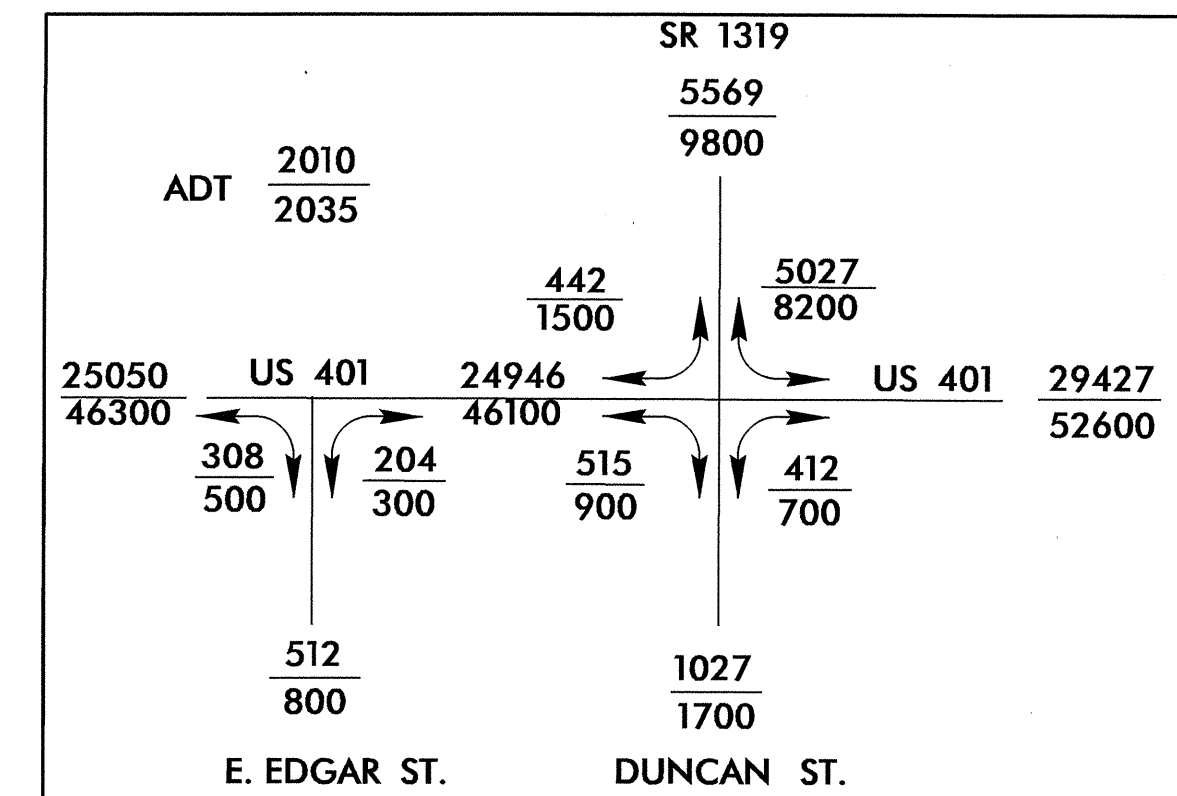








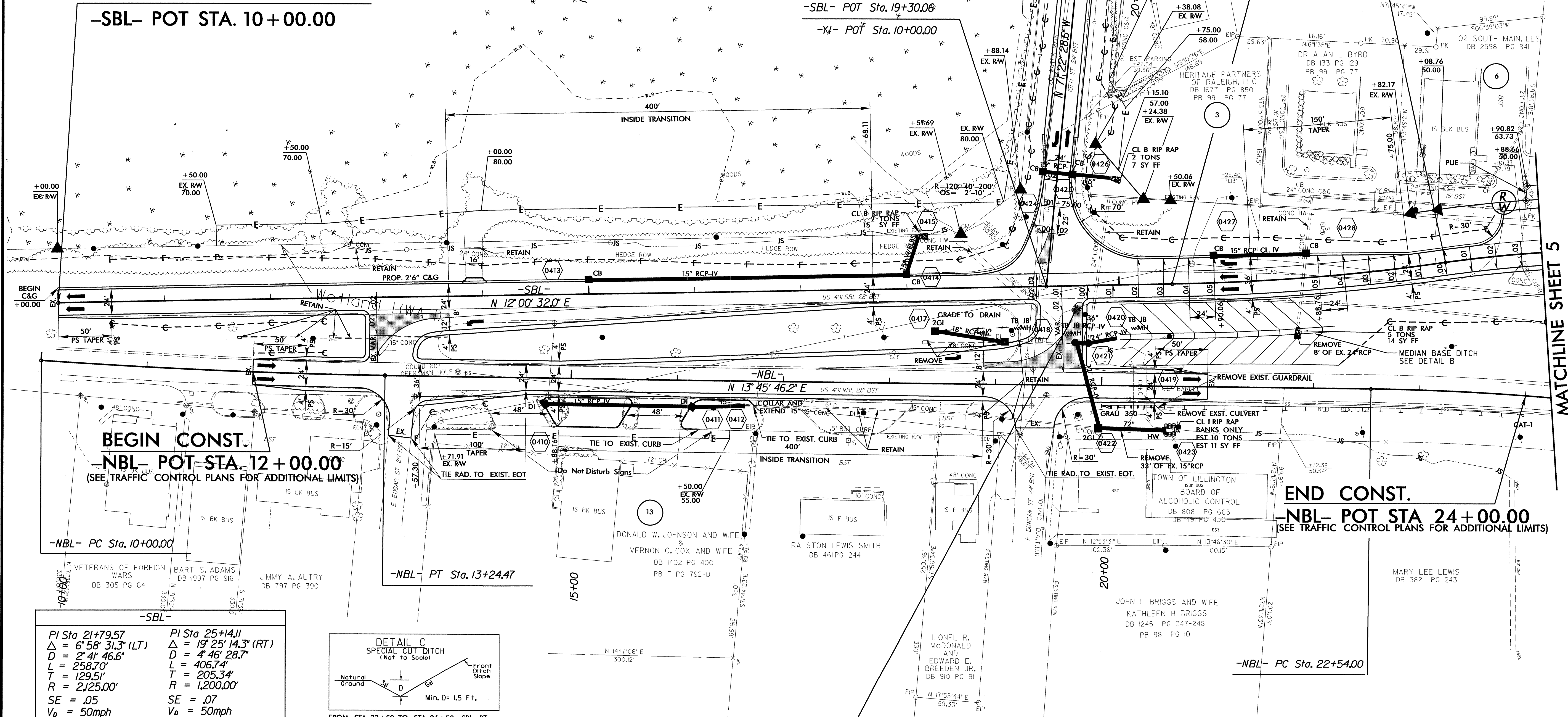




**BEGIN TIP PROJECT B-4138**  
**-SBL- POT STA. 10+00.00**

**END CONST.**  
**-YI- POT STA 13+50.00**

**-SBL- PRC Sta. 23+08.76**  
**-SBL- PC Sta. 20+50.06**

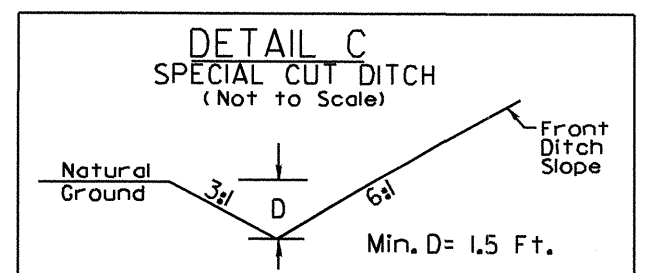


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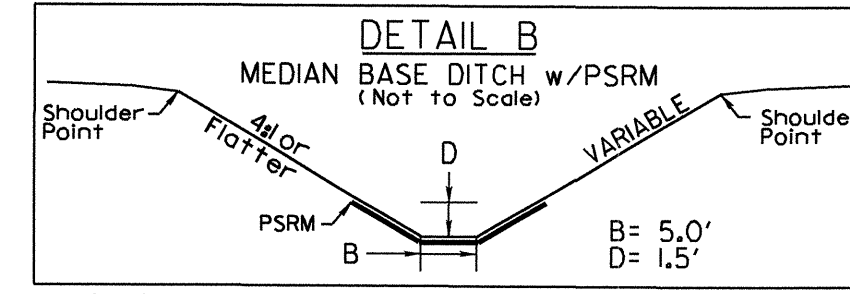
PI Sta 21+79.57 Δ = 6° 58' 31.3" (LT) D = 2' 41' 46.6" L = 258.70' T = 129.51' R = 2,125.00' SE = .05 V <sub>o</sub> = 50mph	PI Sta 25+14.11 Δ = 19° 25' 14.3" (RT) D = 4' 46' 28.7" L = 406.74' T = 205.34' R = 1,200.00' SE = .07 V <sub>o</sub> = 50mph
---	--

**-NBL-**

PI Sta 11+62.28 Δ = 3° 24' 49.0" (LT) D = 1' 03' 07.5" L = 324.47' T = 162.28' R = 5,446.00' SE = EXIST.	PI Sta 24+72.23 Δ = 10° 50' 24.5" (RT) D = 2' 29' 28.0" L = 435.15' T = 218.23' R = 2,300.00' SE = EXIST.
--	---



FROM STA. 22+50 TO STA. 26+50 -SBL- RT  
 FROM STA. 24+30 TO STA. 26+43 -NBL- LT  
 FROM STA. 35+20 TO STA. 45+00 -SBL- RT  
 FROM STA. 35+00 TO STA. 39+30 -NBL- LT



-BL- 1 POT 5+00.00  
 -BY- 8 POT 15+50.00  
 -SBL- POT Sta. 19+59.40  
 Offset 22.25' (RT)

**END CONST.**  
**-NBL- POT STA 24+00.00**  
 (SEE TRAFFIC CONTROL PLANS FOR ADDITIONAL LIMITS)

SEE SHEET 7 FOR -DET-  
 SEE SHEET 8 FOR -SBL- PROFILE  
 SEE SHEET 11 FOR -YI- PROFILE

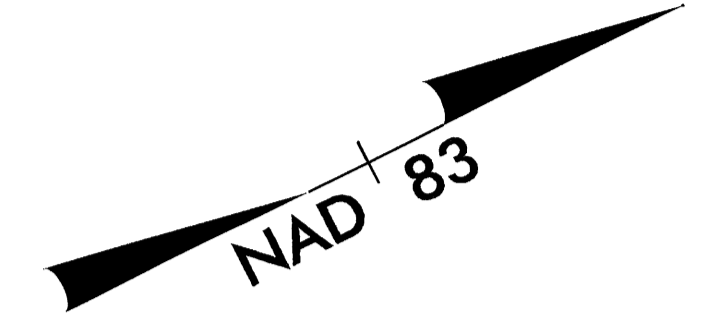
PROP. MONOLITHIC ISLAND  
 SEE SHEET 2-D FOR DIRECTIONAL CROSSOVER DETAIL

8/17/99  
 REVISIONS  
 11-MAR-2010 11:53  
 At: P:\Roadway\Projects\B-4138-rdy\_4psh.dgn







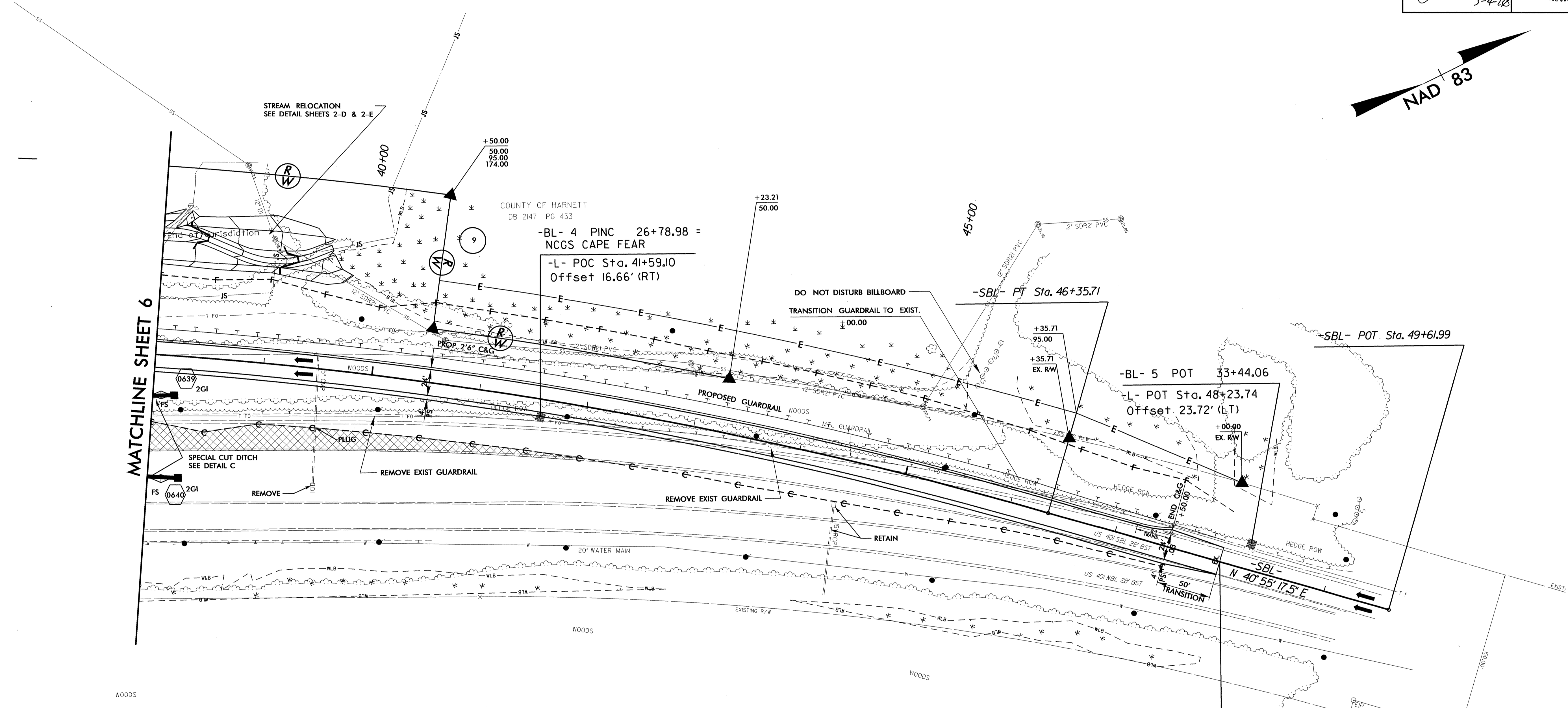


8/17/99

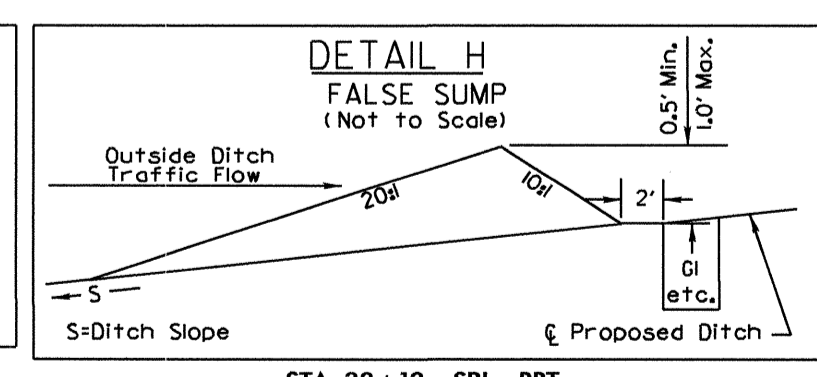
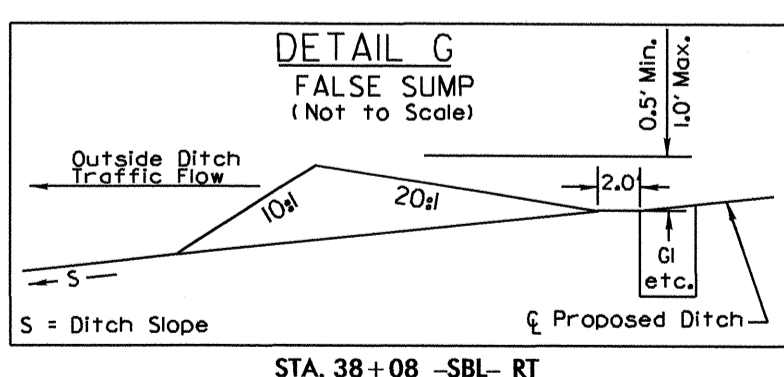
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REVISIONS

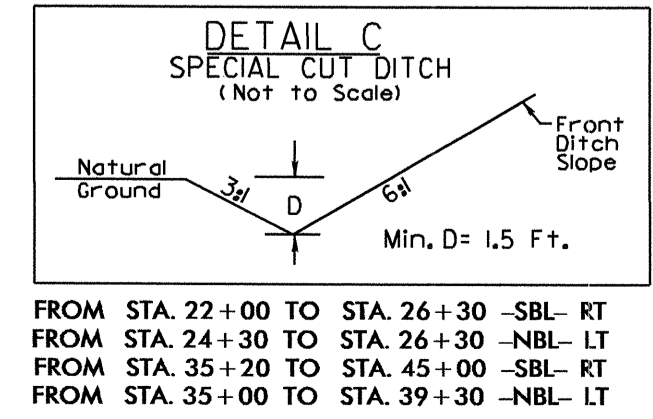
MATCHLINE SHEET 6



H. LEIGH BALANCE  
DB 2285 PG 896



**-SBL-**  
 PI Sta 40+64.88  
 $\Delta = 16' 28' 02.4''$  (RT)  
 $D = 1' 25' 56.6''$   
 $L = 1,149.64'$   
 $T = 578.81'$   
 $R = 4,000.00'$   
 $SE = .03$   
 $V_0 = 50\text{mph}$



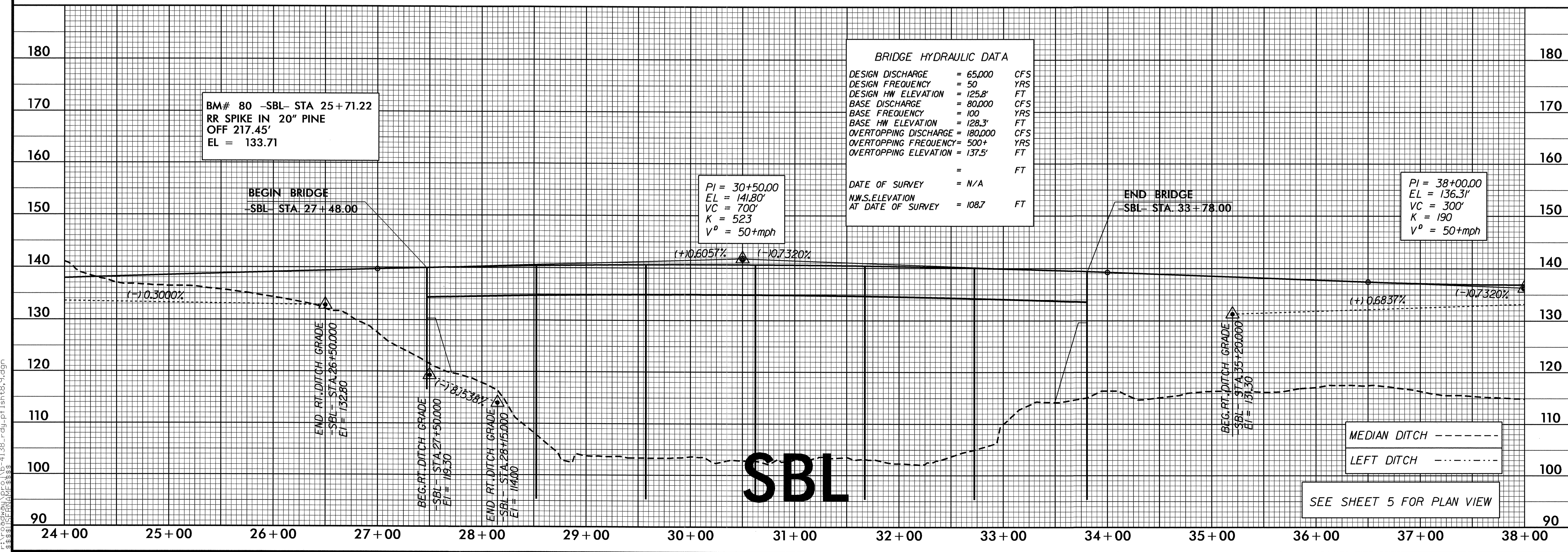
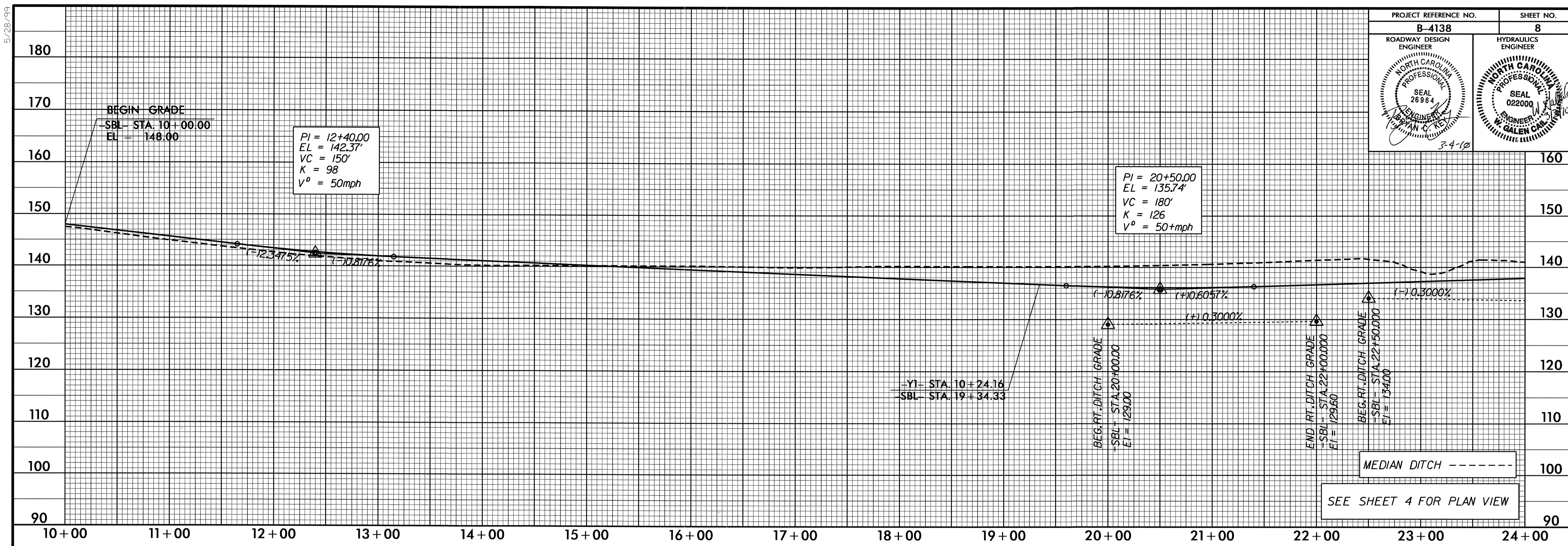
FROM STA. 22+00 TO STA. 26+30 -SBL- RT  
 FROM STA. 24+30 TO STA. 26+30 -NBL- LT  
 FROM STA. 35+20 TO STA. 45+00 -SBL- RT  
 FROM STA. 35+00 TO STA. 39+30 -NBL- LT

**END TIP PROJECT B-4138**  
**-SBL- POT 48+00.00**  
 (SEE TRAFFIC CONTROL PLANS FOR ADDITIONAL LIMITS)

SEE SHEETS 2-D THRU 2-E FOR STREAM RELOCATION  
 PAVEMENT REMOVAL   
 SEE SHEET 9 FOR -SBL- PROFILE





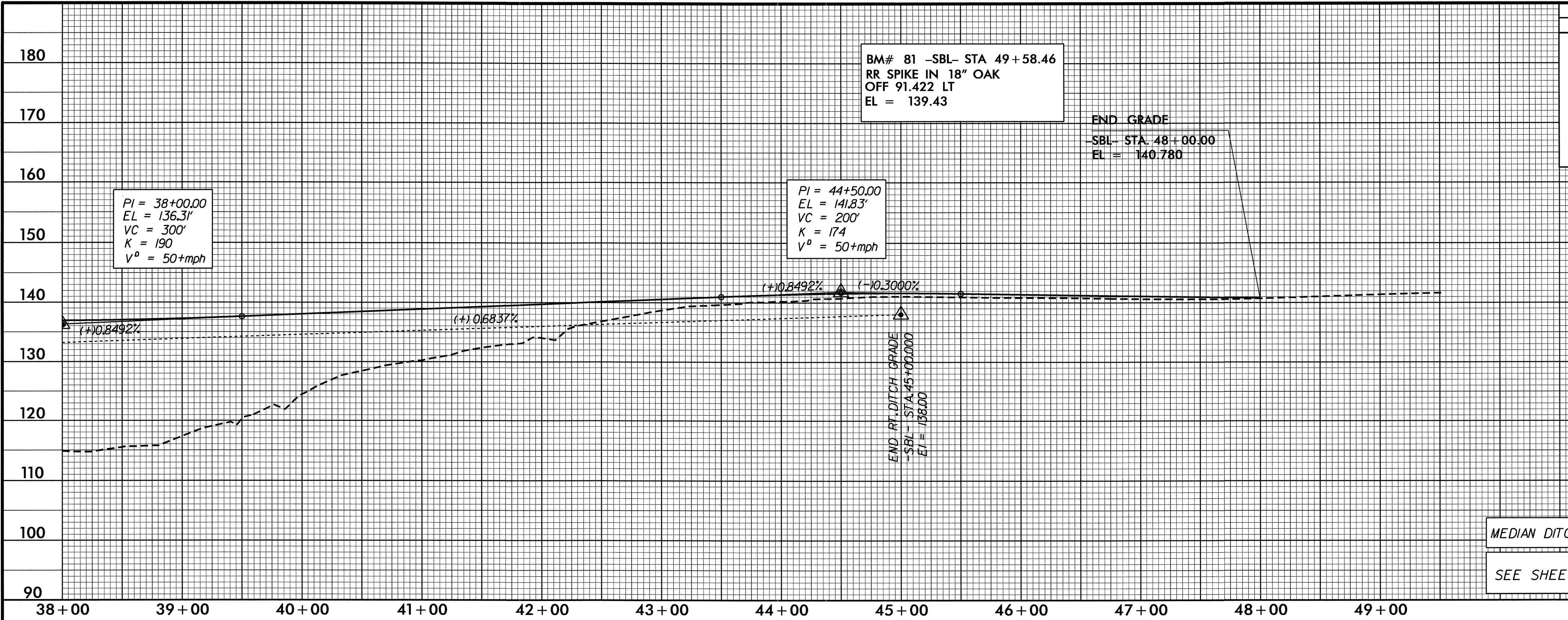


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5/28/99

PROJECT REFERENCE NO. <b>B-4138</b>	SHEET NO. <b>9</b>
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 26984 BRYAN C. JEE	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 022000 W. GALEN CARROLL



$PI = 38+00.00$   
 $EL = 136.31'$   
 $VC = 300'$   
 $K = 190$   
 $V^D = 50+mph$

$PI = 44+50.00$   
 $EL = 141.83'$   
 $VC = 200'$   
 $K = 174$   
 $V^D = 50+mph$

BM# 81 -SBL- STA 49+58.46  
 RR SPIKE IN 18" OAK  
 OFF 91.422 LT  
 EL = 139.43

END GRADE  
 -SBL- STA. 48+00.00  
 EL = 140.780

END RT. DITCH GRADE  
 -SBL- STA. 45+00.00  
 EL = 138.00

MEDIAN DITCH - - - - -  
 SEE SHEET 6 FOR PLAN VIEW

**SBL**

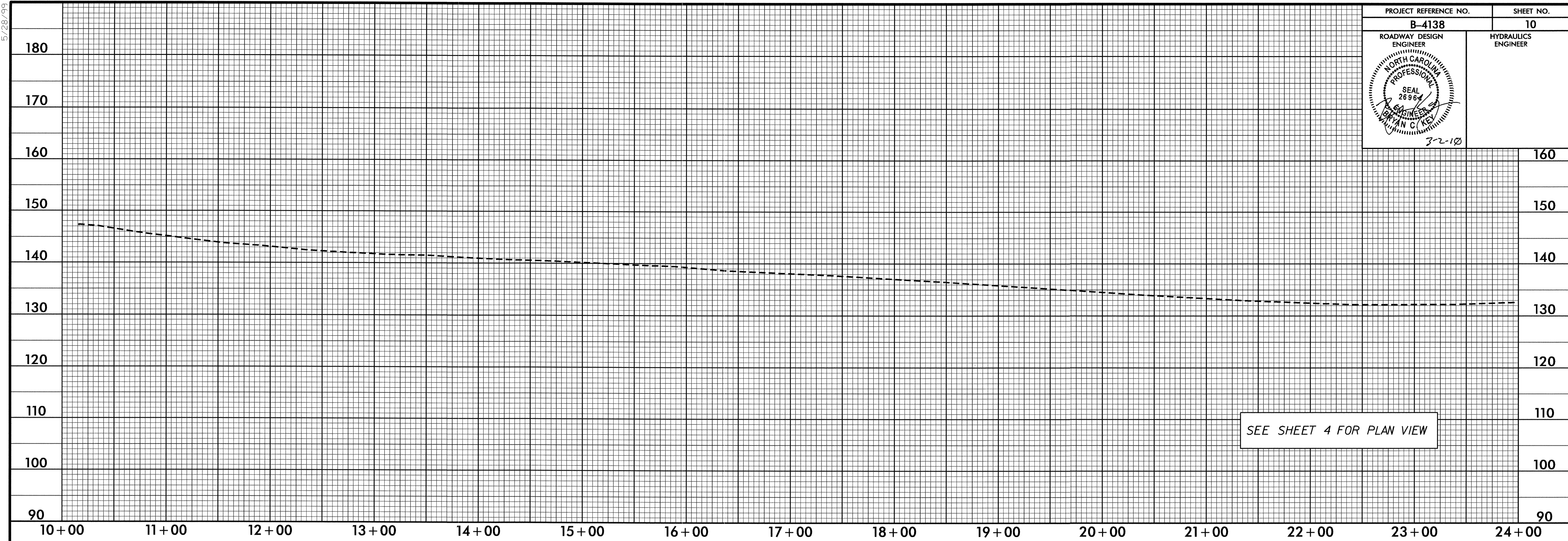
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5/28/99

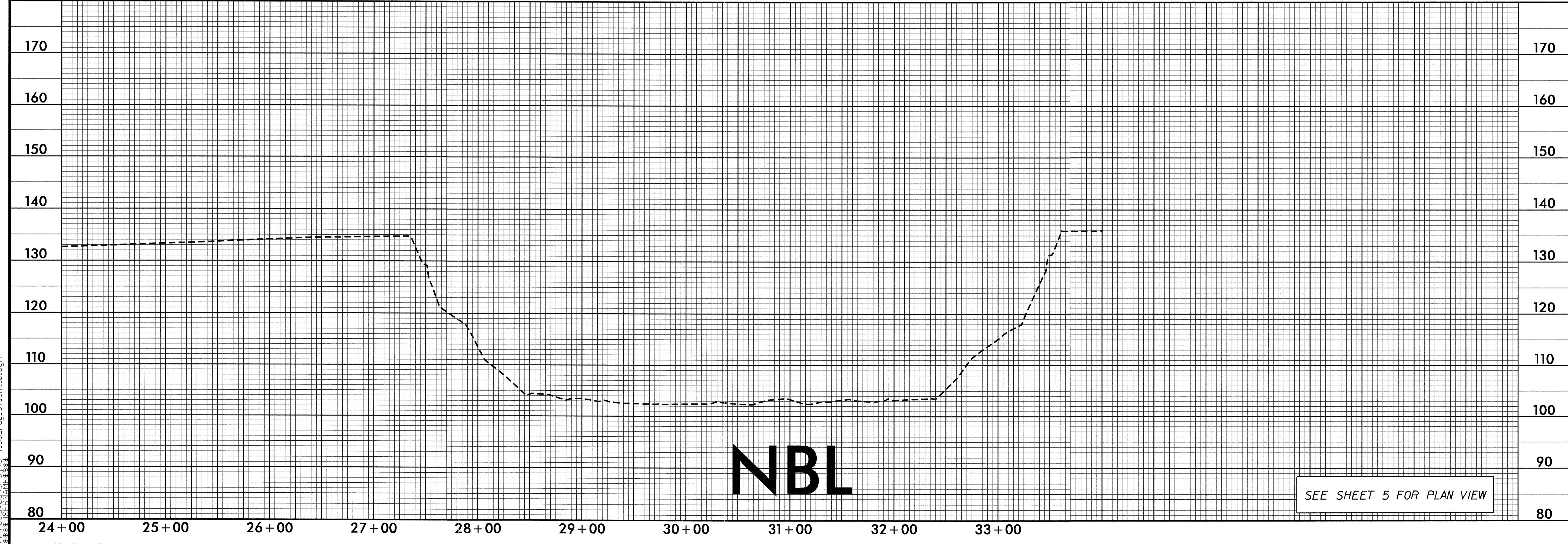
PROJECT REFERENCE NO. <b>B-4138</b>	SHEET NO. <b>10</b>
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 26967 BRYAN C. KEY	HYDRAULICS ENGINEER

3-2-10



SEE SHEET 4 FOR PLAN VIEW

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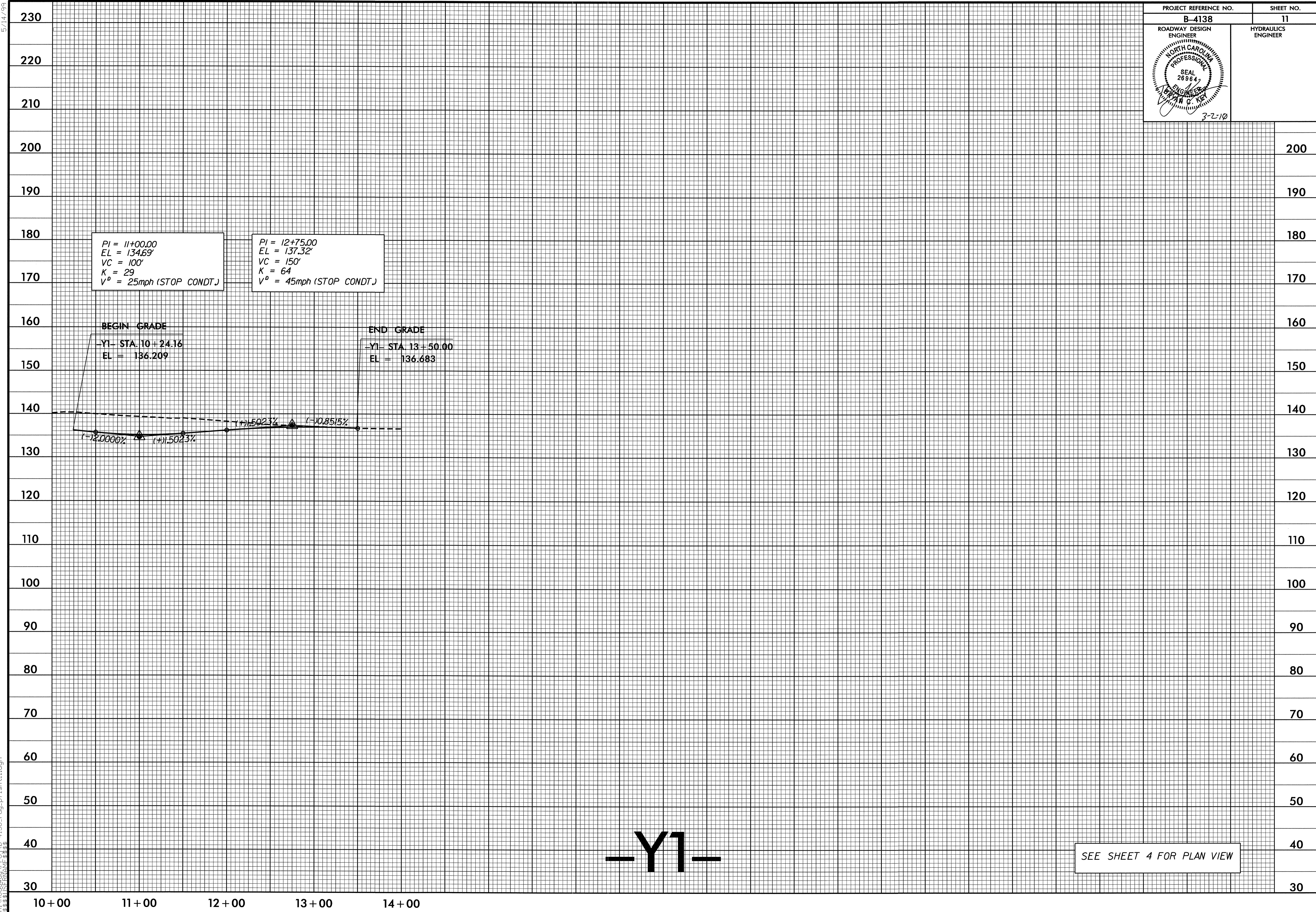
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SEE SHEET 5 FOR PLAN VIEW



5/14/99

PROJECT REFERENCE NO. <b>B-4138</b>	SHEET NO. <b>11</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER




**-Y1-**

SEE SHEET 4 FOR PLAN VIEW

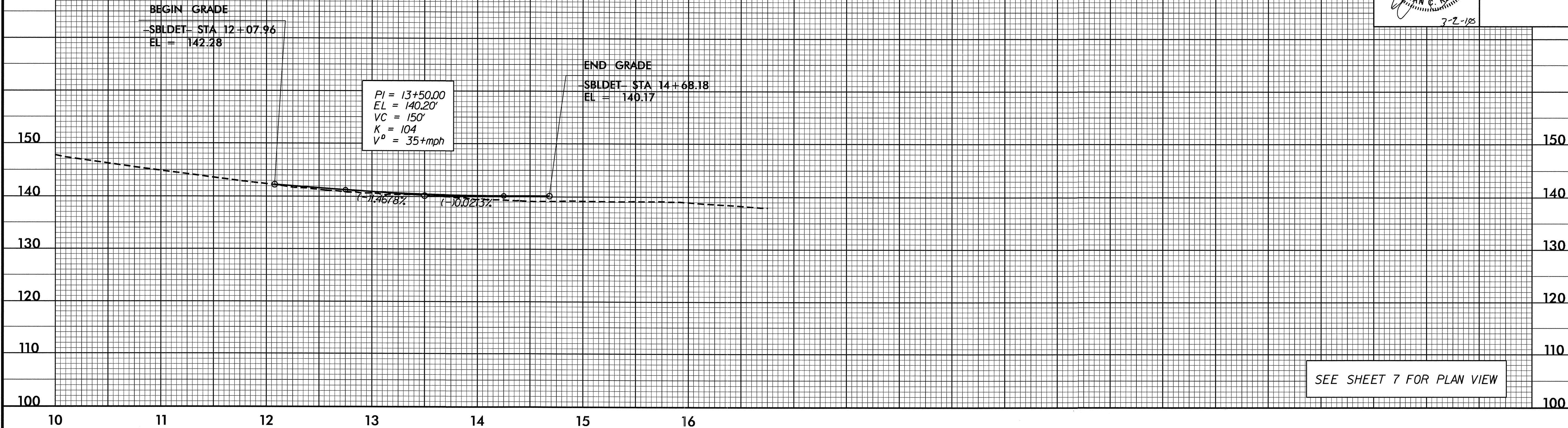
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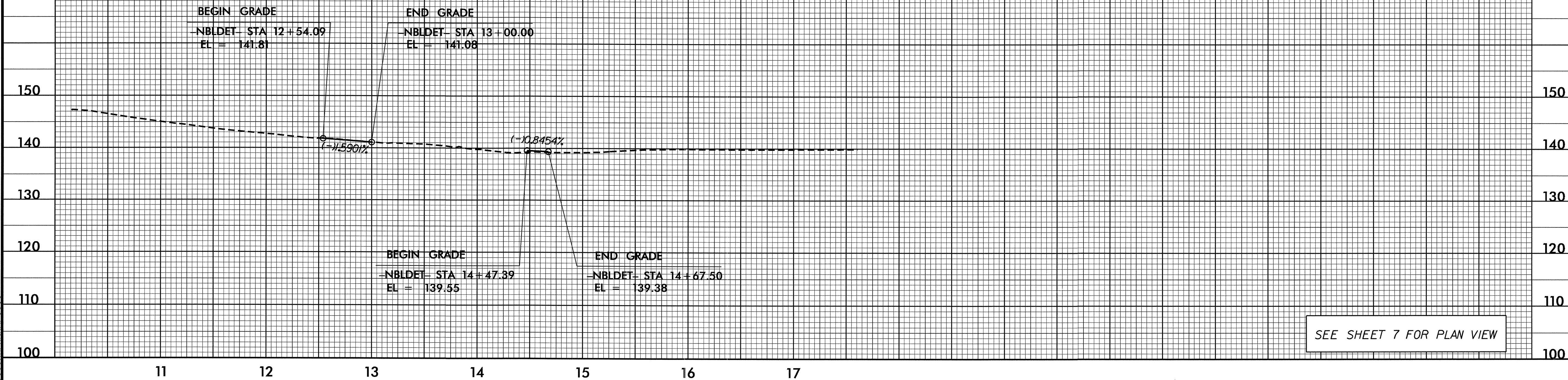
5/28/99

PROJECT REFERENCE NO. B-4138	SHEET NO. 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	
3-2-18	

# -SBLDET-



# -NBLDET-



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