

09/08/09

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

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

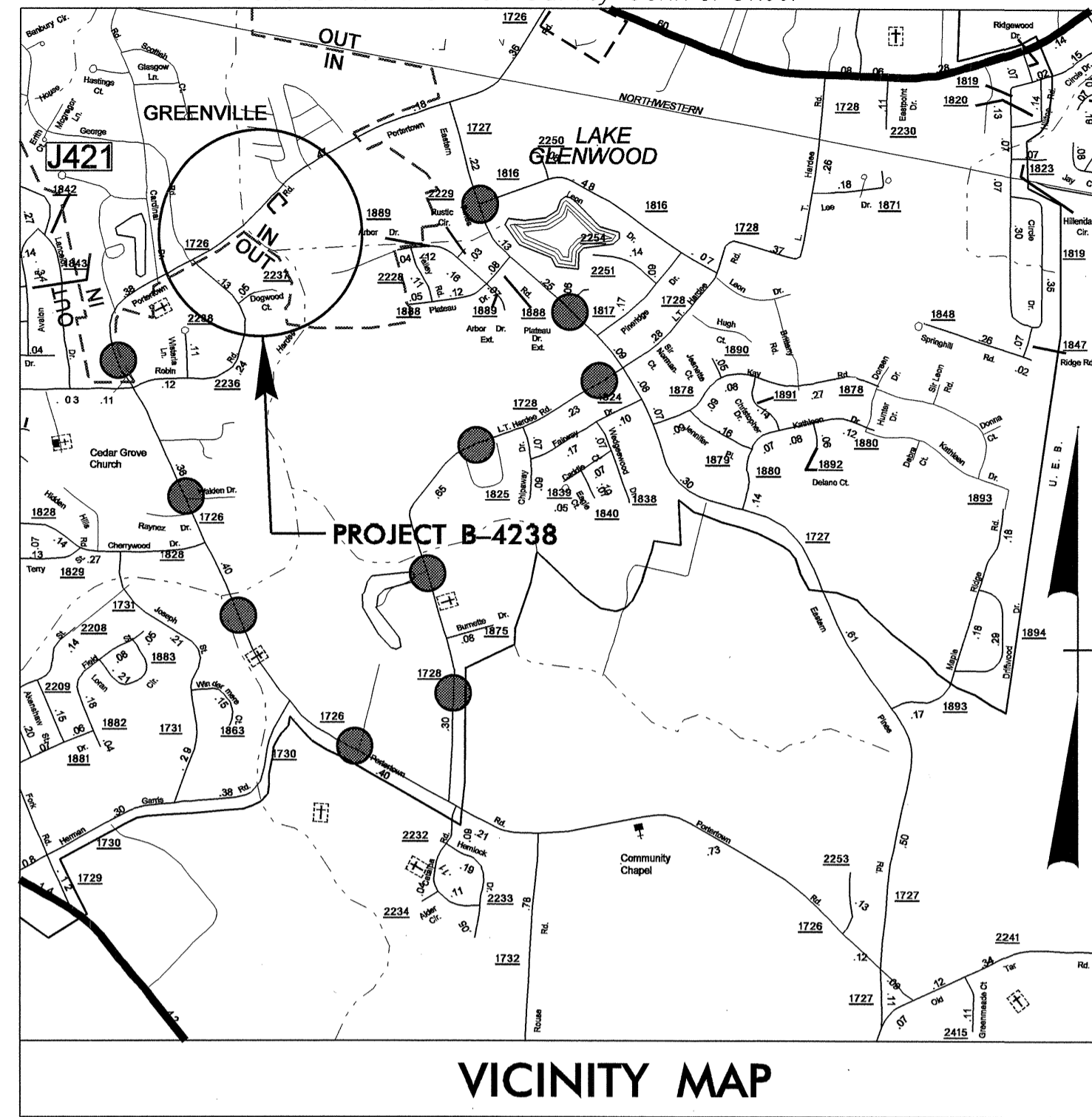
|                 |                             |                  |              |
|-----------------|-----------------------------|------------------|--------------|
| STATE           | STATE PROJECT REFERENCE NO. | SHEET NO.        | TOTAL SHEETS |
| N.C.            | B-4238                      | 1                |              |
| STATE PROJ. NO. | F.A. PROJ. NO.              | DESCRIPTION      |              |
| 33581.1.1       | BRSTP-1726(1)               | P.E.             |              |
| 33581.2.1       | BRSTP-1726(1)               | R /W & UTILITIES |              |
| 33581.3.1       | BRSTP-1726(1)               | CONST.           |              |

# PITT COUNTY

LOCATION: BRIDGE NO. 219 OVER HARDEE CREEK ON SR 1726  
(PORTERTOWN ROAD) IN GREENVILLE

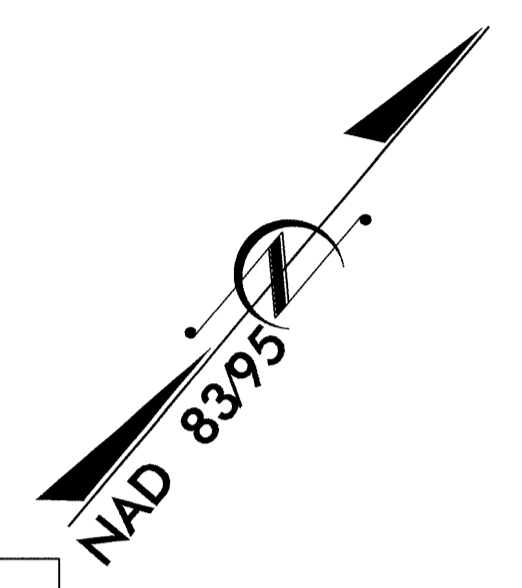
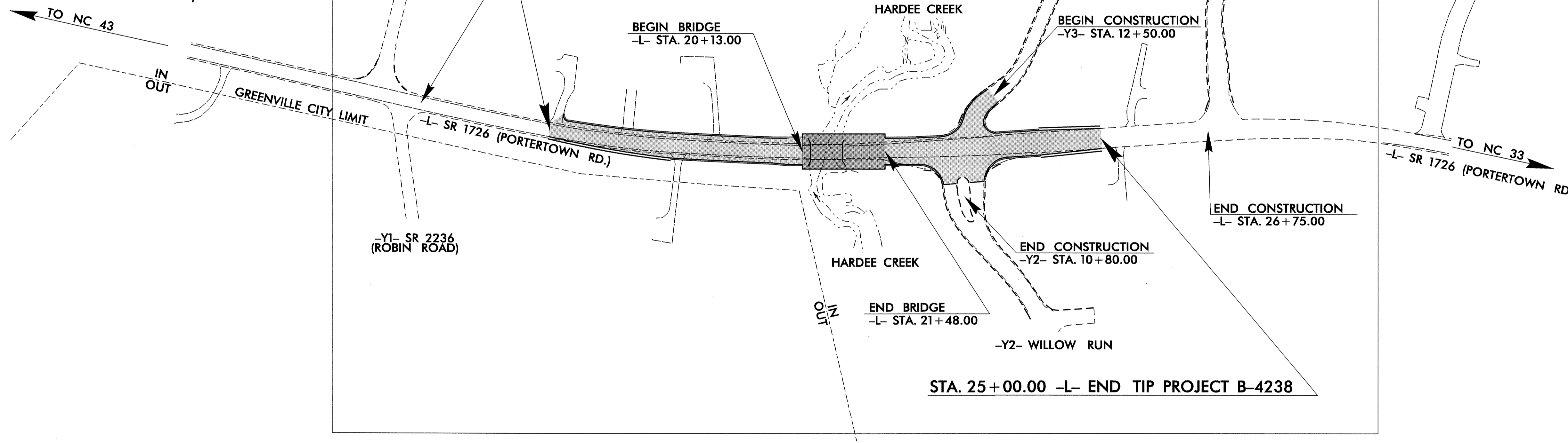
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

TIP PROJECT: B-4238



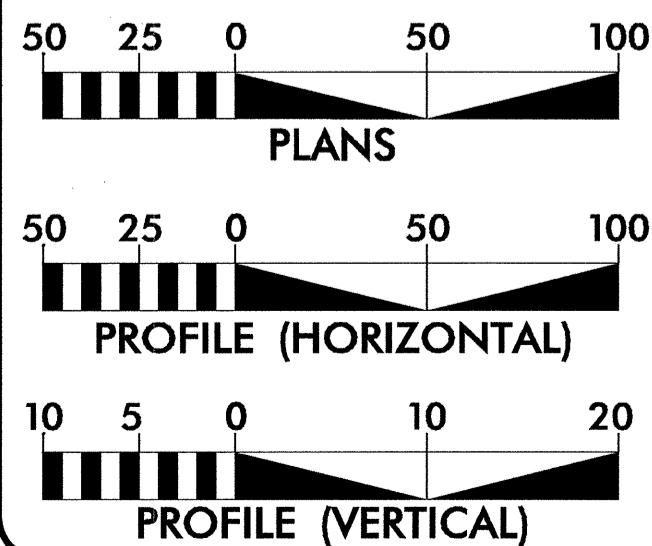
VICINITY MAP

DETOUR ROUTE  
(SEE SHEET 2-A FOR DETOUR IMPROVEMENTS)



CONTRACT: C202375

### GRAPHIC SCALES



### DESIGN DATA

ADT 2010 = 10580  
 ADT 2025 = 15600  
 DHV = 10 %  
 D = 60 %  
 T = 5 % \*  
 V = 40 MPH  
 \* TTST 2% DUAL 3%  
 "SUB-REGIONAL TIER"

### PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4238 = 0.145 MILES  
 LENGTH STRUCTURE TIP PROJECT B-4238 = 0.026 MILES  
 TOTAL LENGTH OF TIP PROJECT B-4238 = 0.171 MILES

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
 APRIL 7, 2009

LETTING DATE:  
 APRIL 20, 2010

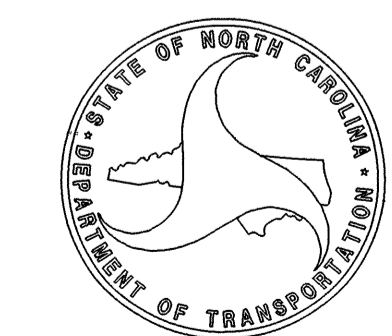
JAMES A. SPEER, PE  
 PROJECT ENGINEER

DANIEL W. GARDNER, PE  
 PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: Daniel W. Gardner  
 ROADWAY DESIGN ENGINEER

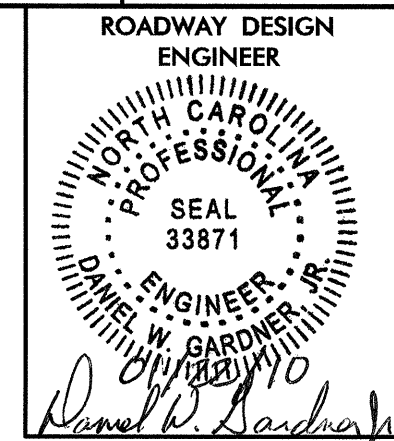
DIVISION OF HIGHWAYS  
 STATE OF NORTH CAROLINA



STATE HIGHWAY DESIGN ENGINEER

24-FEB-2010 07:20  
 T:\COCOA\WORK\PROJECTS\B4238\_rdy\_tsh.dgn  
 \$\$\$USERNAME\$\$\$

8/17/99



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

| SHEET NUMBER     | SHEET  |
|------------------|--|
| 1                | TITLE SHEET  |
| 1-A              | INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS              |
| 1-B              | CONVENTIONAL SYMBOLS   |
| 1-C              | SURVEY CONTROL SHEET   |
| 2 THRU 2-A       | PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS                   |
| 2-B              | BICYCLE SAFE STEEL GRATE AND FRAME DETAIL                                  |
| 2-C THRU 2-D     | METHOD OF PIPE INSTALLATION DETAIL   |
| 2-E              | ANCHORAGE FOR FRAMES DETAIL  |
| 3                | SUMMARY OF QUANTITIES  |
| 3-A              | DRAINAGE SUMMARY   |
| 3-B              | GUARDRAIL SUMMARY, ASPHALT PAVEMENT REMOVAL SUMMARY, AND EARTHWORK SUMMARY |
| 4                | PLAN SHEET   |
| 5                | PROFILE SHEET  |
| TCP-1 THRU TCP-6 | TRAFFIC CONTROL PLANS  |
| PMP-1 THRU PMP-2 | PAVEMENT MARKING PLANS   |
| EC-1 THRU EC-5   | EROSION CONTROL PLANS  |
| RF-1             | REFORESTATION PLANS  |
| UC-1 THRU UC-4   | UTILITY CONSTRUCTION PLANS   |
| UD-1 THRU UD-2   | UTILITIES BY OTHERS  |
| X-1              | CROSS SECTION SUMMARY  |
| X-2 THRU X-11    | CROSS SECTIONS   |
| S-1 THRU S-27    | STRUCTURE 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 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.

**DRIVEWAYS:**  
DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3' RADII OR RADII 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 RADII 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 CENTURYLINK-TELEPHONE  
GREENVILLE UTILITIES COMMISSION-WATER, SEWER, POWER, AND GAS  
EASTERN PINES WATER CORPORATION-WATER  
TIME WARNER-CABLE TELEVISION  
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.

**WHEELCHAIR RAMPS:**  
WHEELCHAIR RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. THE CONSTRUCTION OF ALL WHEELCHAIR RAMPS SHALL BE IN ACCORDANCE WITH STD. NO. 848.06

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   |
| 225.02                                     | Guide for Grading Subgrade - Secondary and Local                              |
| 225.04                                     | Method of Obtaining Superelevation - Two Lane Pavement                        |
| 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 6 - ASPHALT BASES AND PAVEMENTS   |   |
| 654.01                                     | Pavement Repairs  |
| DIVISION 8 - INCIDENTALS                   |   |
| 815.03                                     | Pipe Underdrain and Blind Drain   |
| 816.04                                     | Markers for Drainage Structure and Concrete Pad                               |
| 840.00                                     | Concrete Base Pad for Drainage Structures                                     |
| 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                      |
| 840.13                                     | Concrete Bridge Approach Drop Inlet - 12" thru 24" Pipe                       |
| 840.34                                     | Traffic Bearing Junction Box - for Use with Pipes 42" and Under               |
| 840.45                                     | Precast Drainage Structure  |
| 840.46                                     | Traffic Bearing Precast Drainage Structure                                    |
| 840.51                                     | Brick Manhole - 12" thru 36" Pipe   |
| 840.53                                     | Precast Manhole with Masonry Base - 12" thru 42" Pipe                         |
| 840.54                                     | Manhole Frame and Cover   |
| 840.66                                     | Drainage Structure Steps  |
| 846.01                                     | Concrete Curb, Gutter and Curb & Gutter                                       |
| 848.01                                     | Concrete Sidewalk   |
| 848.02                                     | Driveway Turnout - Radius Type  |
| 848.04                                     | Street Turnout  |
| 848.05                                     | Wheelchair Ramp - Curb Cut  |
| 862.01                                     | Guardrail Placement   |
| 862.02                                     | Guardrail Installation  |
| 862.03                                     | Structure Anchor Units  |

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09/06/09

Note: Not to Scale

\*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

Table listing symbols for boundaries and property: State Line, County Line, Township Line, City Line, Reservation Line, Property Line, Existing Iron Pin, Property Corner, Property Monument, Parcel/Sequence Number, Existing Fence Line, Proposed Woven Wire Fence, Proposed Chain Link Fence, Proposed Barbed Wire Fence, Existing Wetland Boundary, Proposed Wetland Boundary, Existing Endangered Animal Boundary, Existing Endangered Plant Boundary.

BUILDINGS AND OTHER CULTURE:

Table listing symbols for buildings and other culture: Gas Pump Vent or U/G Tank Cap, Sign, Well, Small Mine, Foundation, Area Outline, Cemetery, Building, School, Church, Dam.

HYDROLOGY:

Table listing symbols for hydrology: Stream or Body of Water, Hydro, Pool or Reservoir, Jurisdictional Stream, Buffer Zone 1, Buffer Zone 2, Flow Arrow, Disappearing Stream, Spring, Wetland, Proposed Lateral, Tail, Head Ditch, False Sump.

RAILROADS:

Table listing symbols for railroads: Standard Gauge, RR Signal Milepost, Switch, RR Abandoned, RR Dismantled.

RIGHT OF WAY:

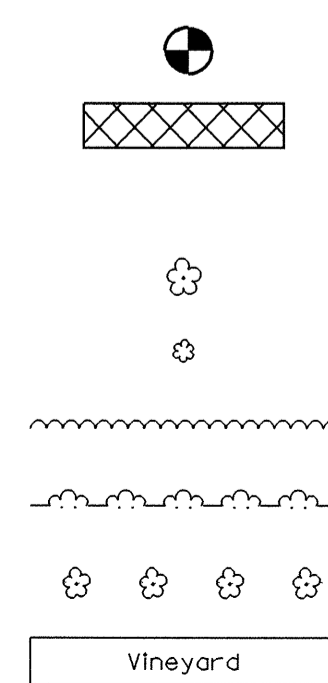
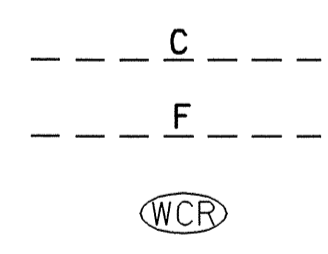
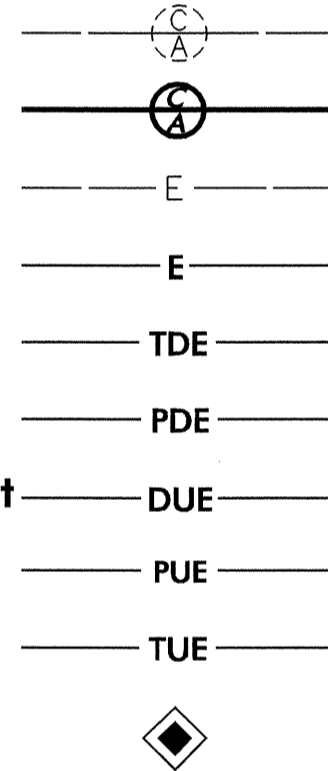
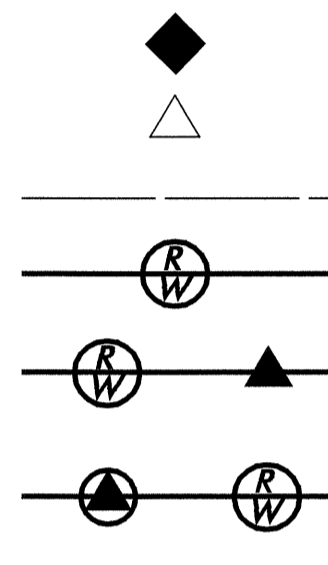
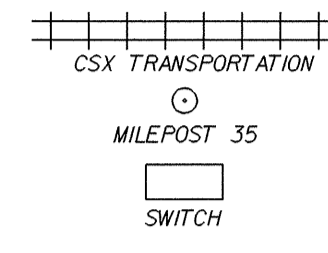
Table listing symbols for right of way: Baseline Control Point, Existing Right of Way Marker, Existing Right of Way Line, Proposed Right of Way Line, Proposed Right of Way Line with Iron Pin and Cap Marker, Proposed Right of Way Line with Concrete or Granite Marker, Existing Control of Access, Proposed Control of Access, Existing Easement Line, Proposed Temporary Construction Easement, Proposed Temporary Drainage Easement, Proposed Permanent Drainage Easement, Proposed Permanent Drainage / Utility Easement, Proposed Permanent Utility Easement, Proposed Temporary Utility Easement, Proposed Permanent Easement with Iron Pin and Cap Marker.

ROADS AND RELATED FEATURES:

Table listing symbols for roads and related features: Existing Edge of Pavement, Existing Curb, Proposed Slope Stakes Cut, Proposed Slope Stakes Fill, Proposed Wheel Chair Ramp, Existing Metal Guardrail, Proposed Guardrail, Existing Cable Guiderail, Proposed Cable Guiderail, Equality Symbol, Pavement Removal.

VEGETATION:

Table listing symbols for vegetation: Single Tree, Single Shrub, Hedge, Woods Line, Orchard, Vineyard.



EXISTING STRUCTURES:

Table listing symbols for existing structures: Bridge, Tunnel or Box Culvert, Bridge Wing Wall, Head Wall and End Wall, Head and End Wall, Pipe Culvert, Footbridge, Drainage Box: Catch Basin, DI or JB, Paved Ditch Gutter, Storm Sewer Manhole, Storm Sewer.

UTILITIES:

Table listing symbols for utilities: Existing Power Pole, Proposed Power Pole, Existing Joint Use Pole, Proposed Joint Use Pole, Power Manhole, Power Line Tower, Power Transformer, U/G Power Cable Hand Hole, H-Frame Pole, Recorded U/G Power Line, Designated U/G Power Line (S.U.E.\*).

TELEPHONE:

Table listing symbols for telephone: Existing Telephone Pole, Proposed Telephone Pole, Telephone Manhole, Telephone Booth, Telephone Pedestal, Telephone Cell Tower, U/G Telephone Cable Hand Hole, Recorded U/G Telephone Cable, Designated U/G Telephone Cable (S.U.E.\*), Recorded U/G Telephone Conduit, Designated U/G Telephone Conduit (S.U.E.\*), Recorded U/G Fiber Optics Cable, Designated U/G Fiber Optics Cable (S.U.E.\*).

WATER:

Table listing symbols for water: Water Manhole, Water Meter, Water Valve, Water Hydrant, Recorded U/G Water Line, Designated U/G Water Line (S.U.E.\*), Above Ground Water Line.

TV:

Table listing symbols for TV: TV Satellite Dish, TV Pedestal, TV Tower, U/G TV Cable Hand Hole, Recorded U/G TV Cable, Designated U/G TV Cable (S.U.E.\*), Recorded U/G Fiber Optic Cable, Designated U/G Fiber Optic Cable (S.U.E.\*).

GAS:

Table listing symbols for gas: Gas Valve, Gas Meter, Recorded U/G Gas Line, Designated U/G Gas Line (S.U.E.\*), Above Ground Gas Line.

SANITARY SEWER:

Table listing symbols for sanitary sewer: Sanitary Sewer Manhole, Sanitary Sewer Cleanout, U/G Sanitary Sewer Line, Above Ground Sanitary Sewer, Recorded SS Forced Main Line, Designated SS Forced Main Line (S.U.E.\*).

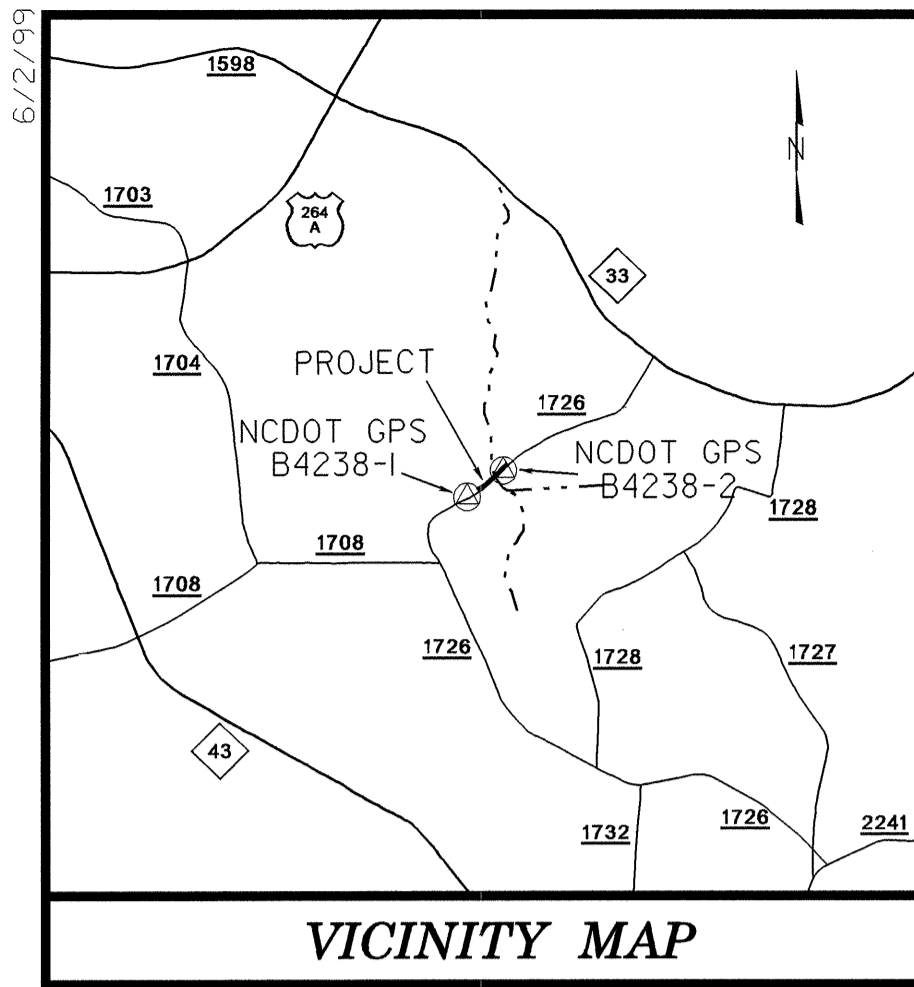
MISCELLANEOUS:

Table listing symbols for miscellaneous: Utility Pole, Utility Pole with Base, Utility Located Object, Utility Traffic Signal Box, Utility Unknown U/G Line, U/G Tank; Water, Gas, Oil, A/G Tank; Water, Gas, Oil, U/G Test Hole (S.U.E.\*), Abandoned According to Utility Records, End of Information.



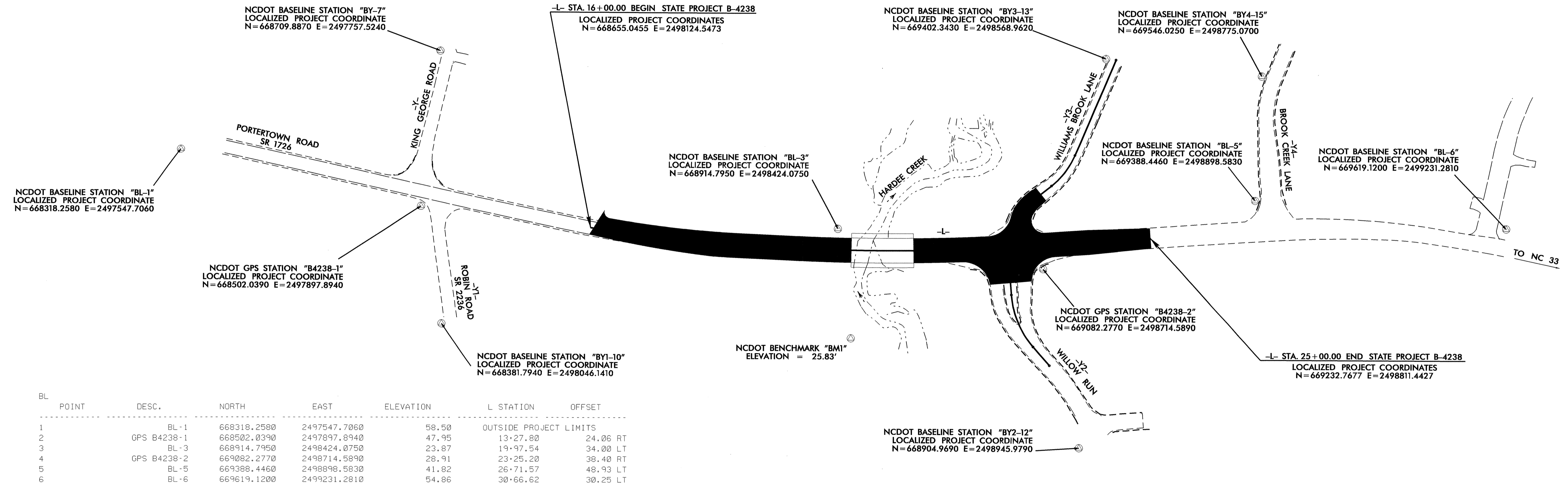
# SURVEY CONTROL SHEET B-4238

|                                 |                  |
|---------------------------------|------------------|
| PROJECT REFERENCE NO.<br>B-4238 | SHEET NO.<br>1-C |
| Location and Surveys            |                  |



**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4238-1" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF  
 NORTHING: 668502.0390(ft) EASTING: 2497897.8946(ft)  
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988619  
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4238-1" TO -L- STATION 16+00.00 IS  
 N 55°58'40.7" E 273.46 (FT)  
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
 VERTICAL DATUM USED IS NAVD 88



| BL POINT | DESC.       | NORTH       | EAST         | ELEVATION | L STATION              | OFFSET   |
|----------|-------------|-------------|--------------|-----------|------------------------|----------|
| 1        | BL-1        | 668318.2580 | 2497547.7060 | 58.50     | OUTSIDE PROJECT LIMITS |          |
| 2        | GPS B4238-1 | 668502.0390 | 2497897.8940 | 47.95     | 13+27.80               | 24.06 RT |
| 3        | BL-3        | 668914.7950 | 2498424.0750 | 23.87     | 19+97.54               | 34.00 LT |
| 4        | GPS B4238-2 | 669082.2770 | 2498714.5890 | 28.91     | 23+25.20               | 38.40 RT |
| 5        | BL-5        | 669388.4460 | 2498898.5830 | 41.82     | 26+71.57               | 48.93 LT |
| 6        | BL-6        | 669619.1200 | 2499231.2810 | 54.86     | 30+66.62               | 30.25 LT |

| BY POINT | DESC.       | NORTH       | EAST         | ELEVATION | Y STATION              | OFFSET |
|----------|-------------|-------------|--------------|-----------|------------------------|--------|
| 7        | BY-7        | 668709.8870 | 2497757.5240 | 46.69     | OUTSIDE PROJECT LIMITS |        |
| 8        | GPS B4238-1 | 668502.0390 | 2497897.8940 | 47.95     | OUTSIDE PROJECT LIMITS |        |

| BY1 POINT | DESC.       | NORTH       | EAST         | ELEVATION | Y1 STATION             | OFFSET   |
|-----------|-------------|-------------|--------------|-----------|------------------------|----------|
| 9         | GPS B4238-1 | 668502.0390 | 2497897.8940 | 47.95     | 10+17.30               | 22.47 RT |
| 10        | BY1-10      | 668381.7940 | 2498046.1410 | 47.12     | OUTSIDE PROJECT LIMITS |          |

| BY2 POINT | DESC.       | NORTH       | EAST         | ELEVATION | Y2 STATION             | OFFSET   |
|-----------|-------------|-------------|--------------|-----------|------------------------|----------|
| 11        | GPS B4238-2 | 669082.2770 | 2498714.5890 | 28.91     | 10+39.24               | 53.79 LT |
| 12        | BY2-12      | 668904.9690 | 2498945.9790 | 32.03     | OUTSIDE PROJECT LIMITS |          |

| BY3 POINT | DESC.       | NORTH       | EAST         | ELEVATION | Y3 STATION             | OFFSET   |
|-----------|-------------|-------------|--------------|-----------|------------------------|----------|
| 13        | BY3-13      | 669402.3430 | 2498568.9620 | 33.90     | 10+04.80               | 15.15 RT |
| 14        | GPS B4238-2 | 669082.2770 | 2498714.5890 | 28.91     | OUTSIDE PROJECT LIMITS |          |

| BY4 POINT | DESC.  | NORTH       | EAST         | ELEVATION | Y4 STATION | OFFSET   |
|-----------|--------|-------------|--------------|-----------|------------|----------|
| 15        | BY4-15 | 669546.0250 | 2498775.0700 | 35.58     | 10+59.41   | 19.69 RT |
| 16        | BL-5   | 669388.4460 | 2498898.5830 | 41.81     | 12+51.91   | 26.61 RT |

**NOTES:**

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.org/doh/preconstruct/highway/location/project/)

THE FILES TO BE FOUND ARE AS FOLLOWS:  
 B4238\_LS\_CONTROL\_071119.TXT

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

⊕ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.  
 PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.  
 NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

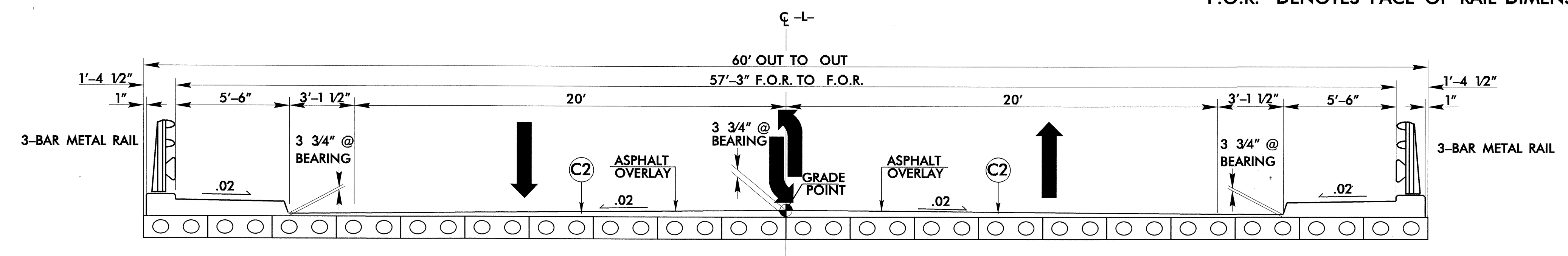
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6/2/99

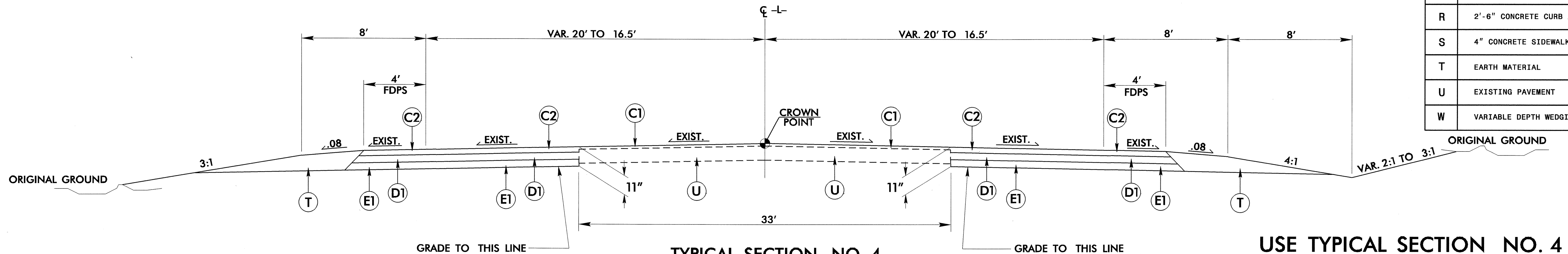
"F.O.R." DENOTES FACE OF RAIL DIMENSION



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3

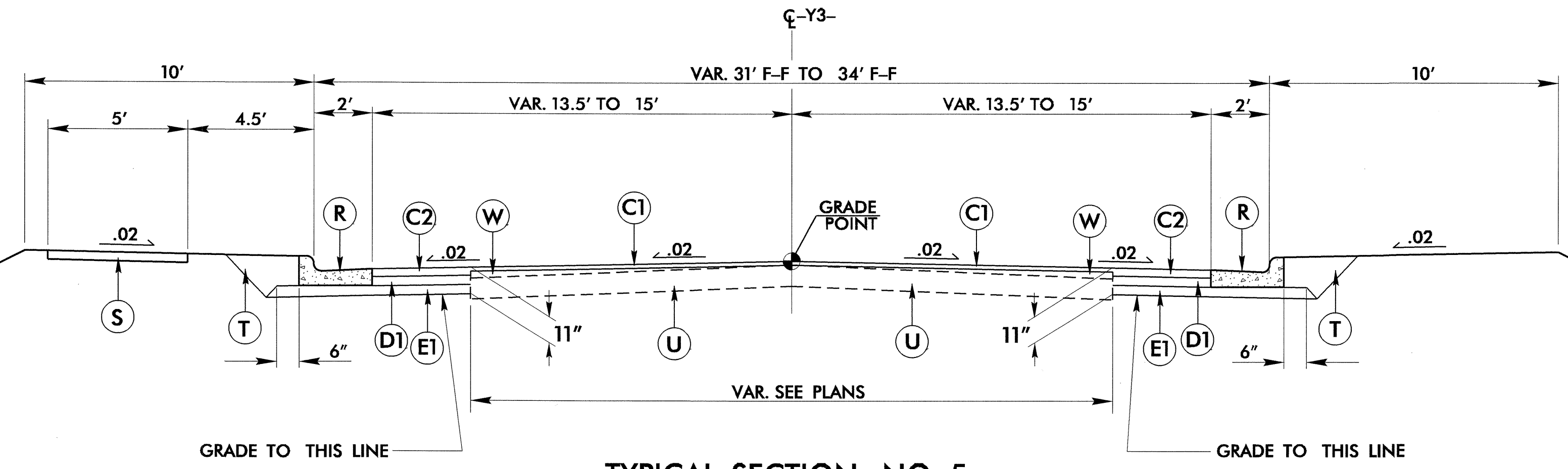
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TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4

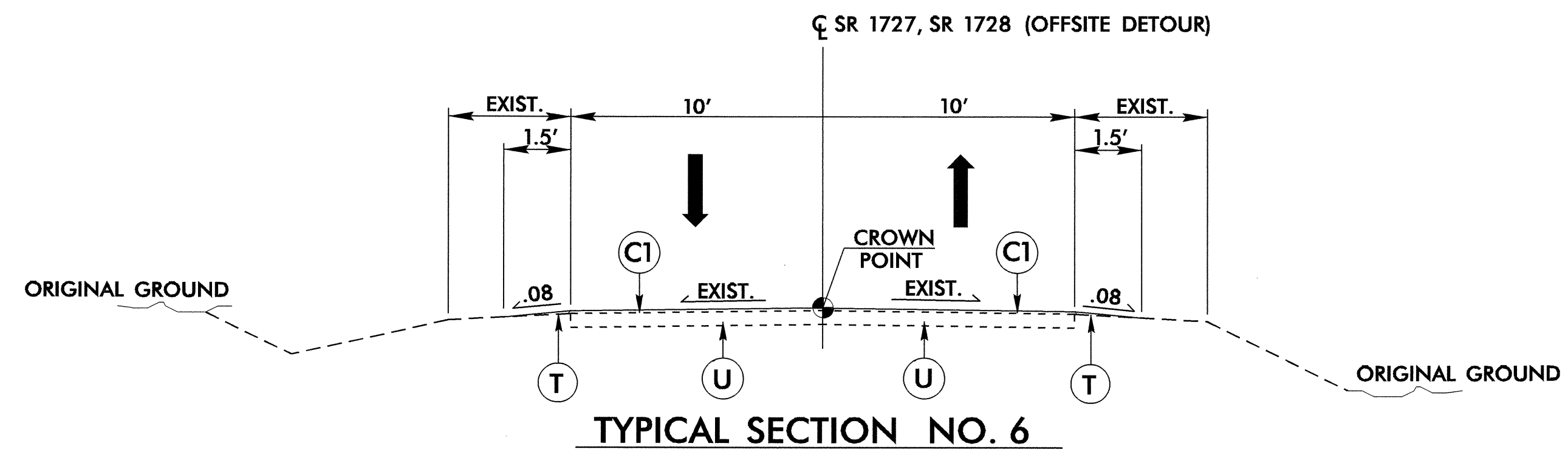
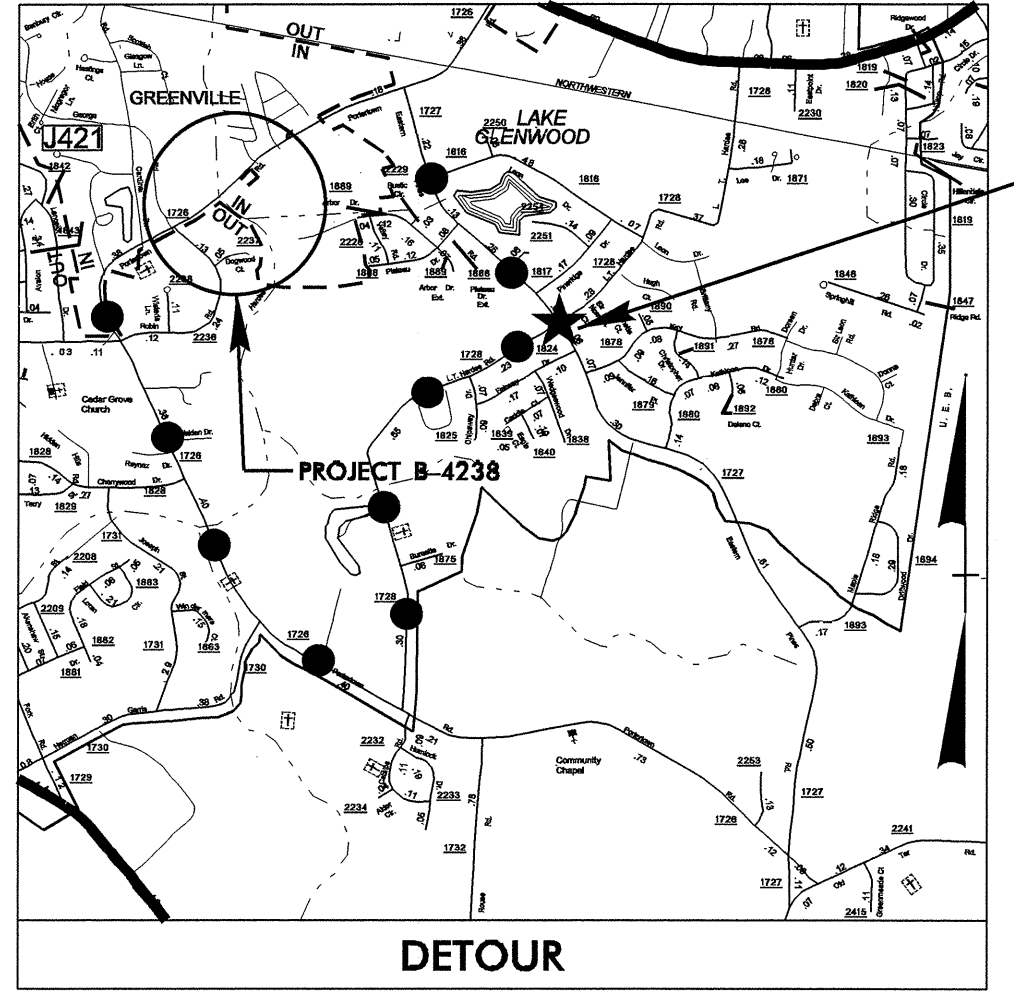
-L- STA. 24+00.00 TO STA. 25+00.00



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5

-Y3- STA. 12+50.00 TO STA. 12+79.31



TYPICAL SECTION NO. 6

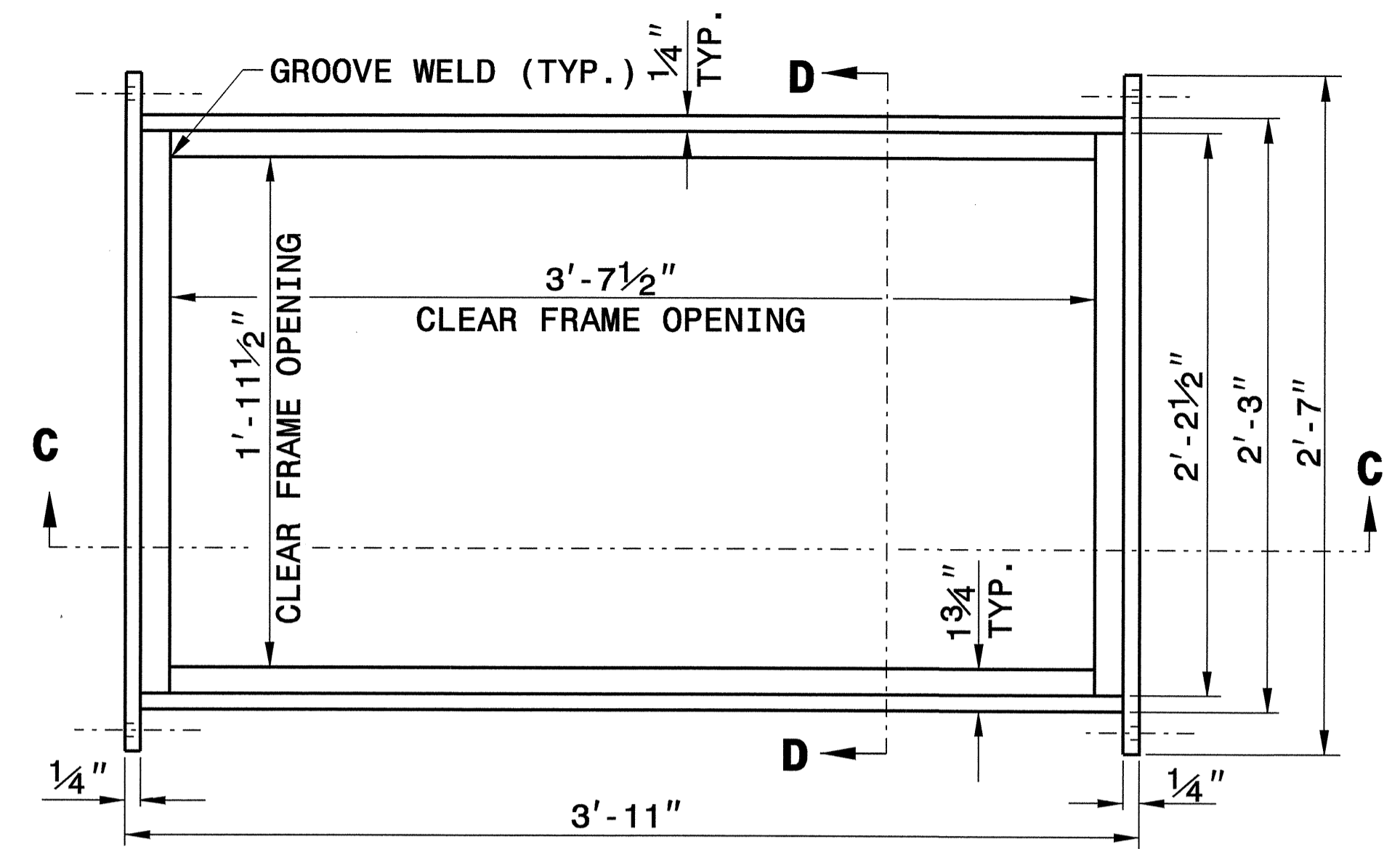
USE TYPICAL SECTION NO. 6

1.15 MILES SR 1728 (LT HARDEE ROAD)  
0.70 MILES SR 1727 (EASTERN PINES ROAD)

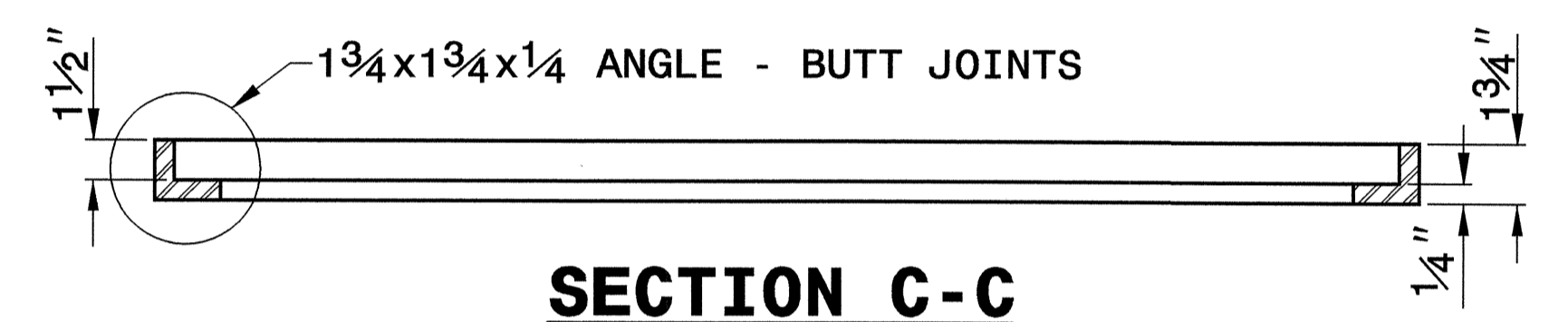
|   |  |
|---|--|
| PROJECT REFERENCE NO.<br>B-4238   | SHEET NO.<br>2-A   |
| ROADWAY DESIGN<br>ENGINEER<br>NORTH CAROLINA<br>PROFESSIONAL<br>SEAL<br>33871<br>W. GARDNER<br>01/22/10 | PAVEMENT DESIGN<br>ENGINEER<br>NORTH CAROLINA<br>PROFESSIONAL<br>SEAL<br>13368<br>CHI CHEN<br>01/22/10 |
| PAVEMENT SCHEDULE   |  |
| C1  | 1 1/2" S9.5B   |
| C2  | 3" S9.5B   |
| C3  | VAR. DEPTH S9.5B   |
| D1  | 4" I19.0B  |
| D2  | VAR. DEPTH I19.0B  |
| E1  | 4" B25.0B  |
| E2  | VAR. DEPTH B25.0B  |
| R   | 2'-6" CONCRETE CURB AND GUTTER   |
| S   | 4" CONCRETE SIDEWALK   |
| T   | EARTH MATERIAL   |
| U   | EXISTING PAVEMENT  |
| W   | VARIABLE DEPTH WEDGING   |

05-JAN-2010 09:57  
B:\PROJECTS\B-4238\rdy\_typ.dgn  
1:4:38:33

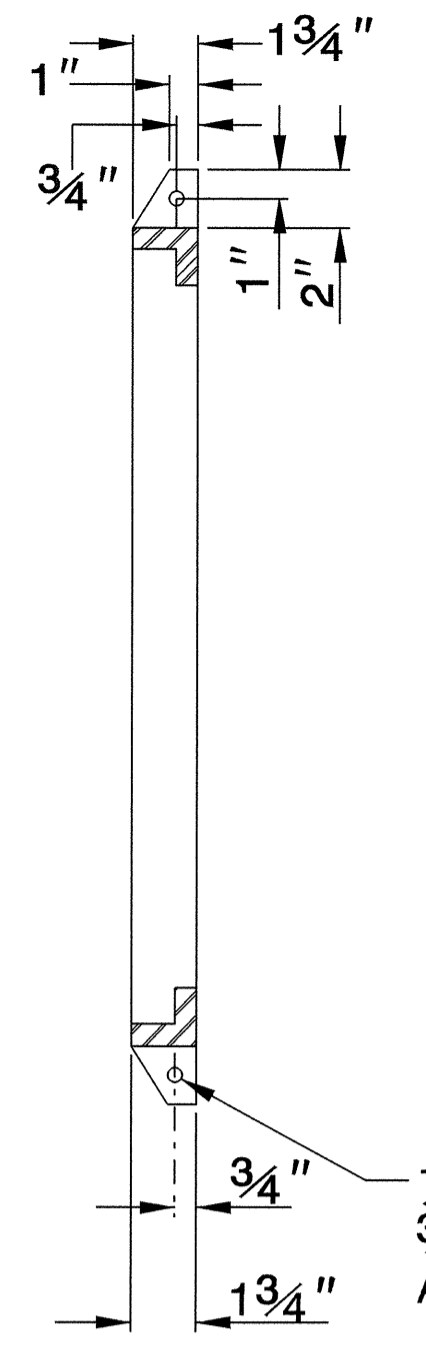




**PLAN VIEW**



**SECTION C-C  
FRAME**

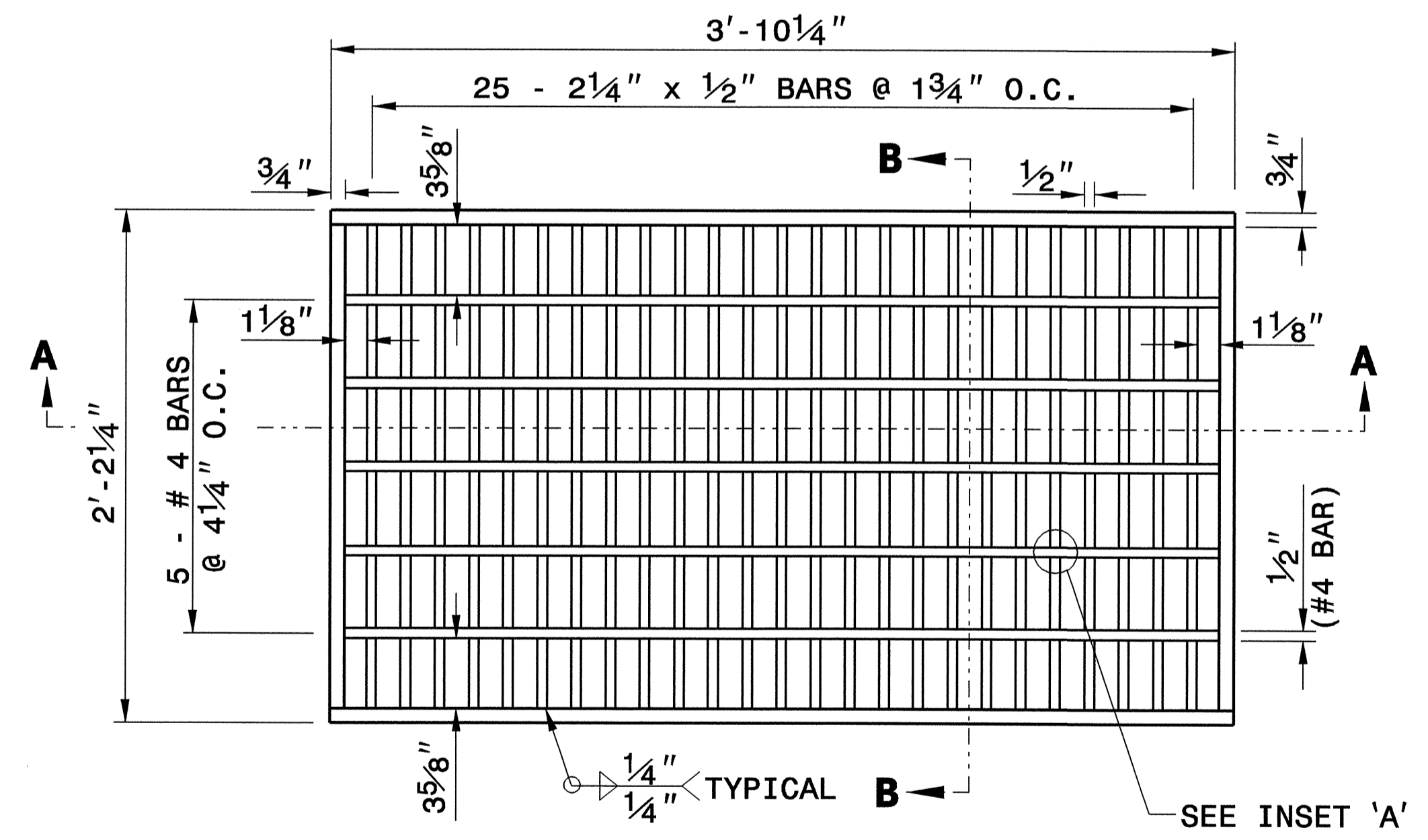


**SECTION 'D-D'**

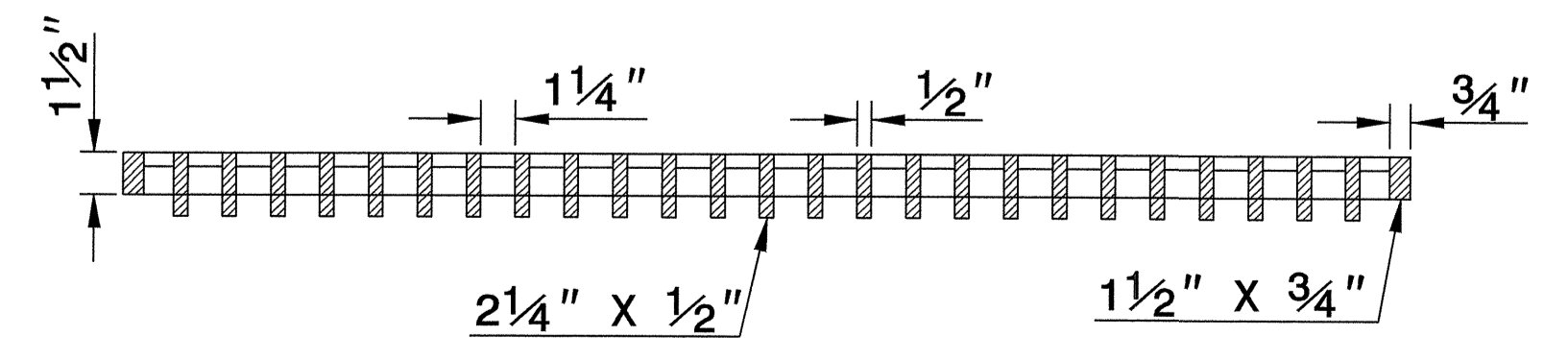
1/2" DIA. HOLE FOR  
3/8" DIA. CONCRETE  
ANCHOR (4 REQUIRED)  
(SEE STANDARD 840.25  
FOR FRAME ANCHORAGE)

**NOTES:**

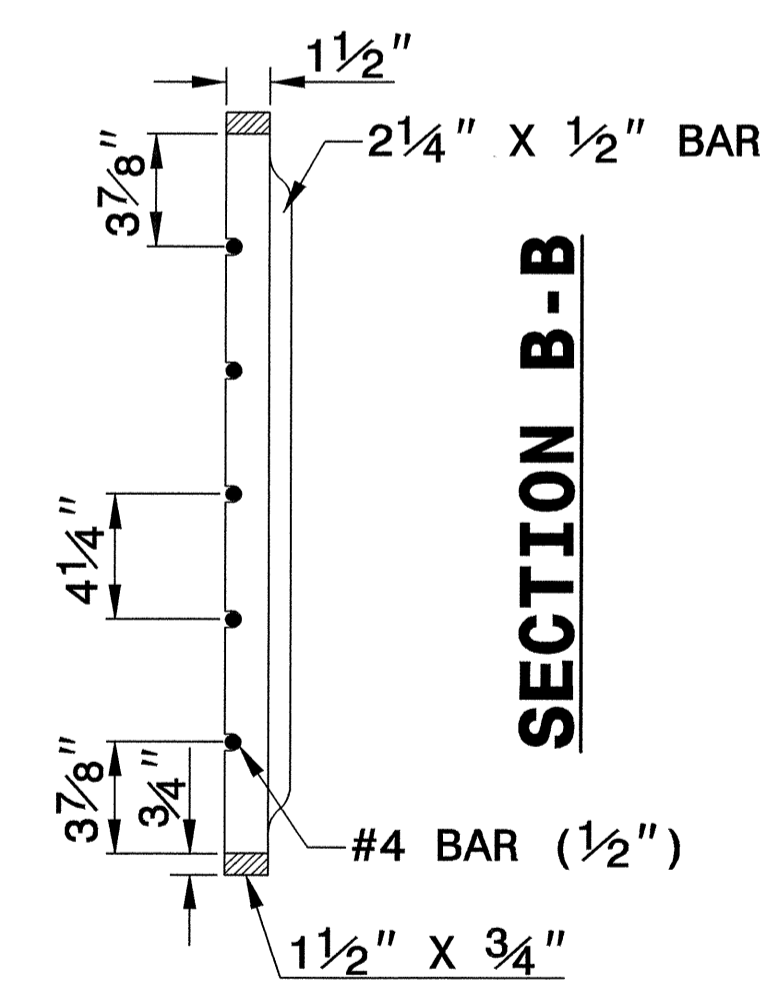
1. HOT DIP GALVANIZE FRAME AND GRATE IN ACCORDANCE WITH ASTM DESIGNATION A-123 AND AASHTO M-111.
2. GRATE SHOULD MEET HS-20 LOADING.
3. PROVIDE STEEL CONFORMING TO THE REQUIREMENTS OF A.S.T.M. DESIGNATION A-36.
4. WELD IN ACCORDANCE WITH THE ANSI/AASHTO/AWS D1.5 WELDING CODE. SEAL WELD ALL CONNECTIONS ALONG TOP AND BOTTOM HORIZONTAL SEAMS OF CONNECTIONS IN ADDITION TO ANY REQUIRED STRUCTURAL WELDS.
5. SEE DETAIL DRAWING 840D25 FOR FRAME ANCHORAGE.



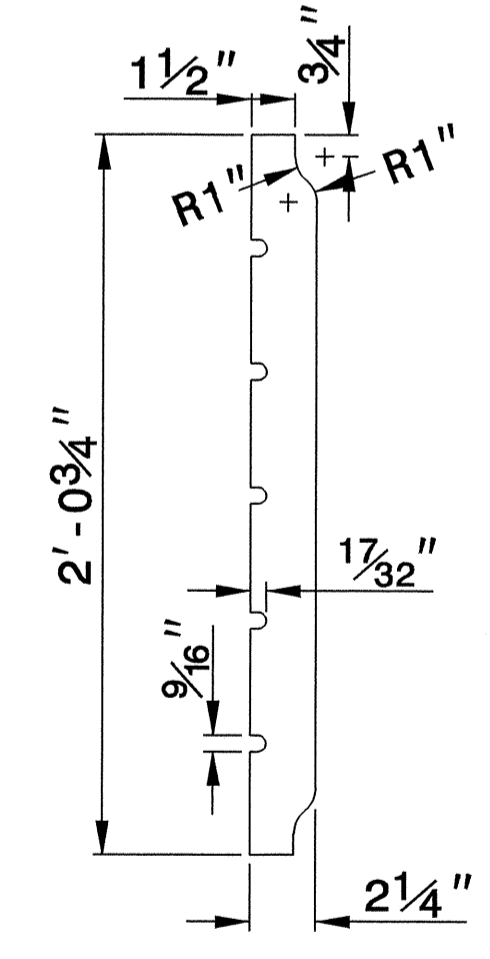
**PLAN VIEW**



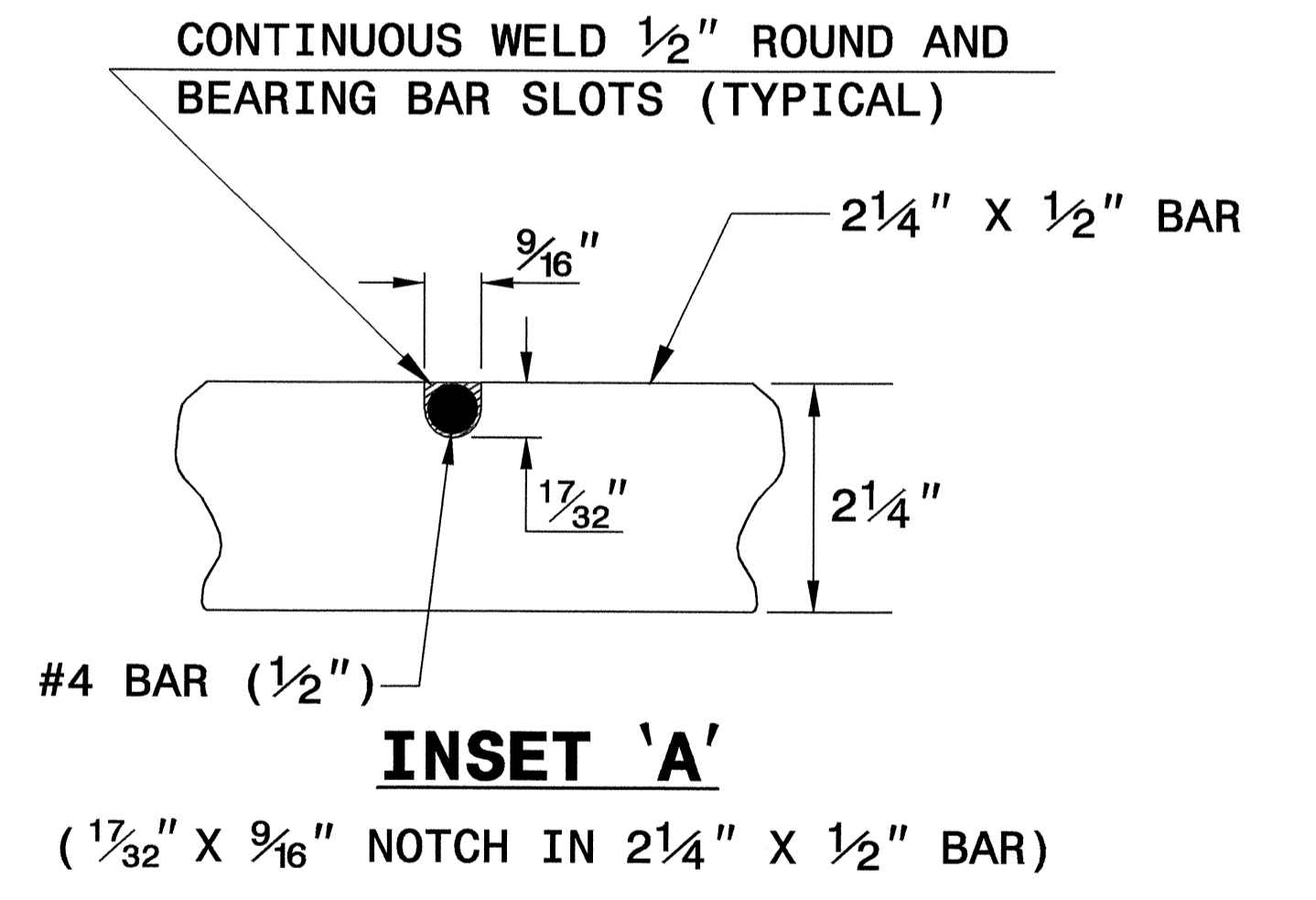
**SECTION A-A  
GRATE**



**SECTION B-B**



**DETAIL OF BEARING BAR**



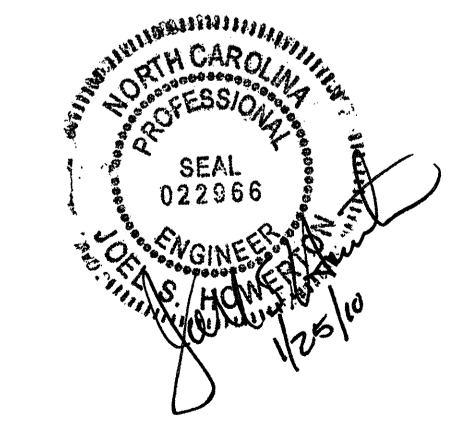
**INSET 'A'**

REVISED 10-10-02  
FOR HS-20 LOADING

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

**BICYCLE SAFE  
STEEL GRATE AND FRAME**

ORIGINAL BY: E.E. WARD DATE: 11-12-98  
MODIFIED BY: E.E. WARD DATE: 10-10-02  
CHECKED BY: DATE:  
FILE SPEC.: /usr/stand/details/bicyclesafe.dgn



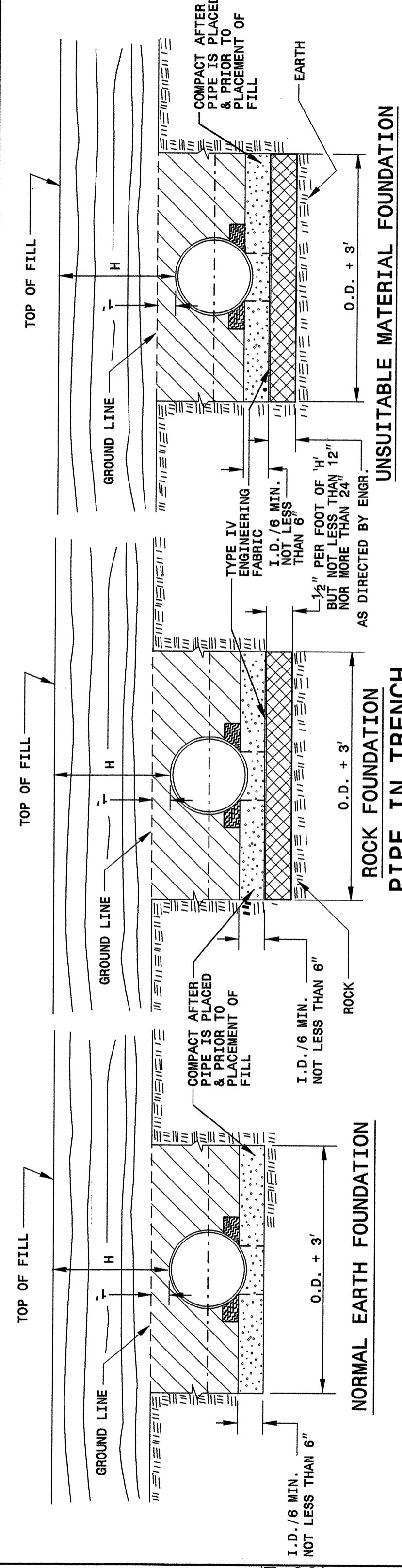
26-AUG-2009 14:11 c:\projects\special\details\stand\bicyclesafe.dgn jhewerton AT P5237501

5/14/99

30-JUL-2009 08:48  
 s:\projects\special details\vertical\stds\06\stds to special details\30001\0300d01.dgn  
 jhowerston  
 7/23/09

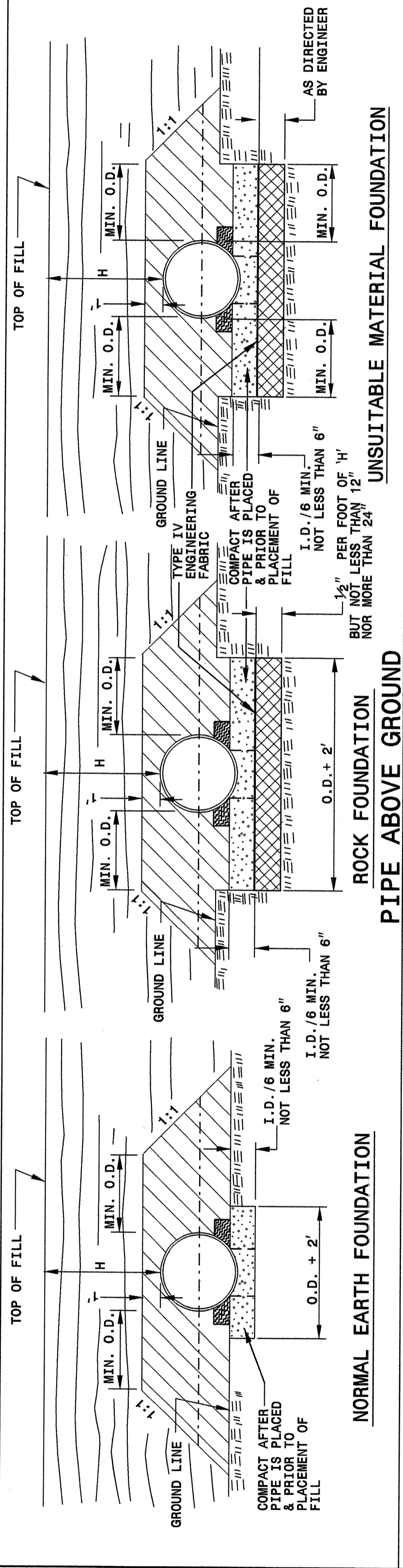
5/14/99

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

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



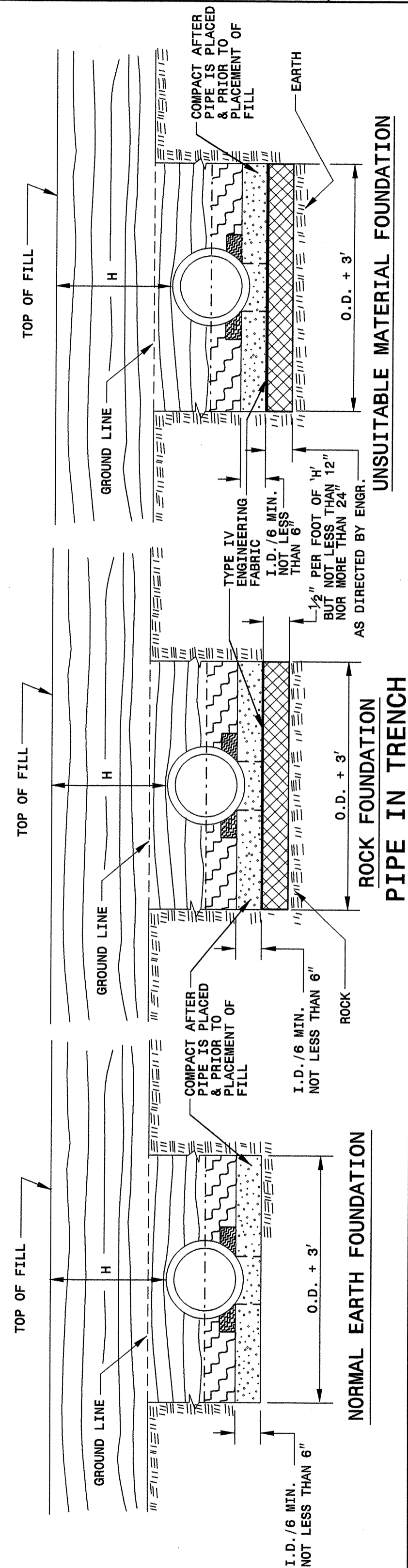
ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 FLEXIBLE PIPE

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 EMBANKMENT AT THAT POINT.  
 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.

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.

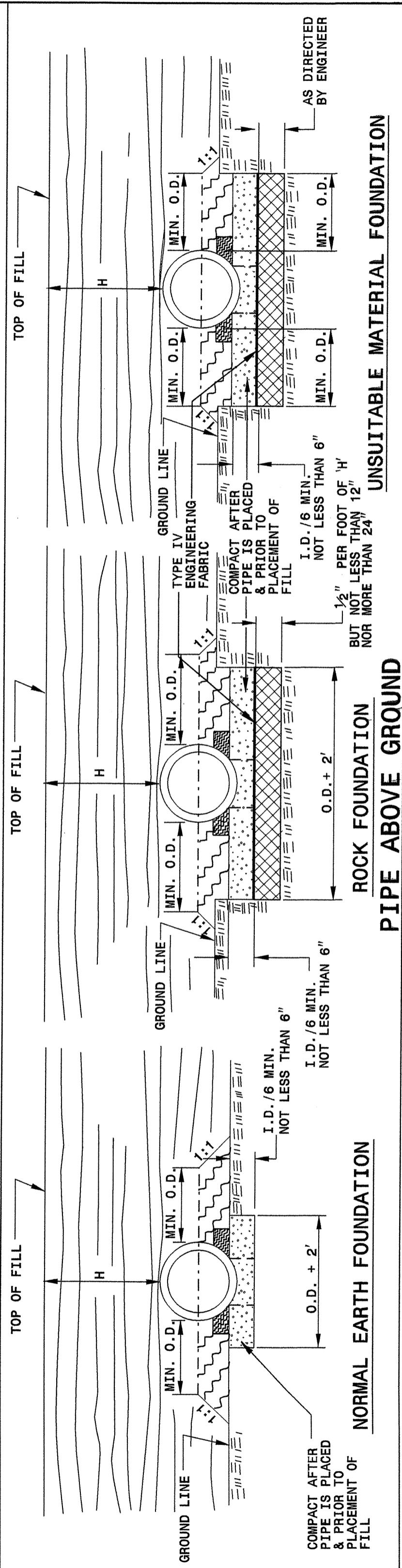
SHEET 1 OF 3  
**300D01**

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



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

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



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 EMBANKMENT AT THAT POINT.  
 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.

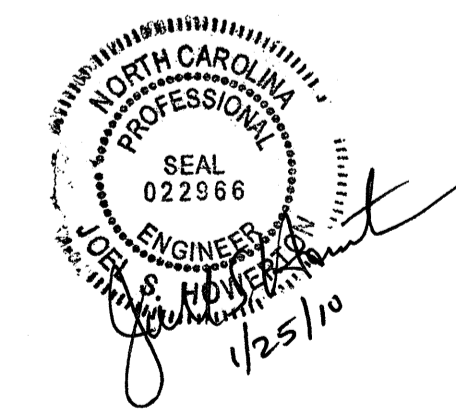
DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.  
 SPRINGLINE OF PIPE  
 SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.  
 APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.  
 UNDISTURBED EARTH MATERIAL  
 SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

SHEET 2 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: 7/20/09  
 FILE SPEC: ericward/stds/stdstodetails/30001/0300d01.dgn





**FLEXIBLE PIPE**

| Round Corrugated Steel Pipe<br>2 2/3 x 1/2 corrugation ** |                        |         |     |     |     |     |
|---|------------------------|---------|-----|-----|-----|-----|
| Diameter (inches)   | Minimum cover (inches) | (Ga) 16 | 14  | 12  | 10  | 8   |
| 12  | 12                     | 204     | 256 |     |     |     |
| 15  | 12                     | 182     | 204 |     |     |     |
| 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 | 152 |     |
| 42  | 12                     | 55      | 70  | 100 | 130 | 160 |
| 48  | 12                     | 48      | 61  | 87  | 113 | 139 |
| 54  | 12                     |         | 54  | 77  | 100 | 123 |
| 60  | 12                     |         |     | 69  | 90  | 111 |
| 66  | 12                     |         |     |     | 81  | 100 |
| 72  | 12                     |         |     |     | 74  | 91  |
| 78  | 12                     |         |     |     | 78  | 91  |
| 84  | 12                     |         |     |     |     | 69  |

| Round Corrugated Aluminum Pipe<br>2 2/3 x 1/2 corrugation ** |                        |         |     |     |     |     |
|--|------------------------|---------|-----|-----|-----|-----|
| Diameter (inches)  | Minimum cover (inches) | (Ga) 16 | 14  | 12  | 10  | 8   |
| 12   | 12                     | 123     | 155 | 216 | 281 | 344 |
| 15   | 12                     | 98      | 123 | 174 | 224 | 275 |
| 18   | 12                     | 81      | 102 | 144 | 187 | 228 |
| 21   | 12                     | 69      | 87  | 123 | 160 | 195 |
| 24   | 12                     | 60      | 76  | 108 | 139 | 171 |
| 27   | 12                     |         | 67  | 95  | 123 | 151 |
| 30   | 12                     |         |     | 80  | 85  | 111 |
| 36   | 12                     |         |     | 50  | 71  | 92  |
| 42   | 12                     |         |     | 60  | 60  | 78  |
| 48   | 12                     |         |     | 52  | 68  | 84  |
| 54   | 12                     |         |     | 46  | 50  | 74  |
| 60   | 12                     |         |     |     | 50  | 62  |
| 66   | 12                     |         |     |     |     | 51  |
| 72   | 12                     |         |     |     |     | 41  |

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7-06

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

FILL HEIGHT TABLES

ENGLISH DETAIL DRAWING FOR  
 METHOD OF PIPE INSTALLATION  
 FILL HEIGHT TABLES

SHEET 3 OF 3  
**300D01**

SHEET 3 OF 3  
**300D01**

\*\* 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

**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)

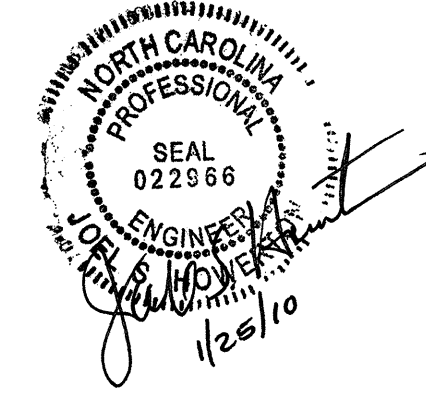
\* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

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



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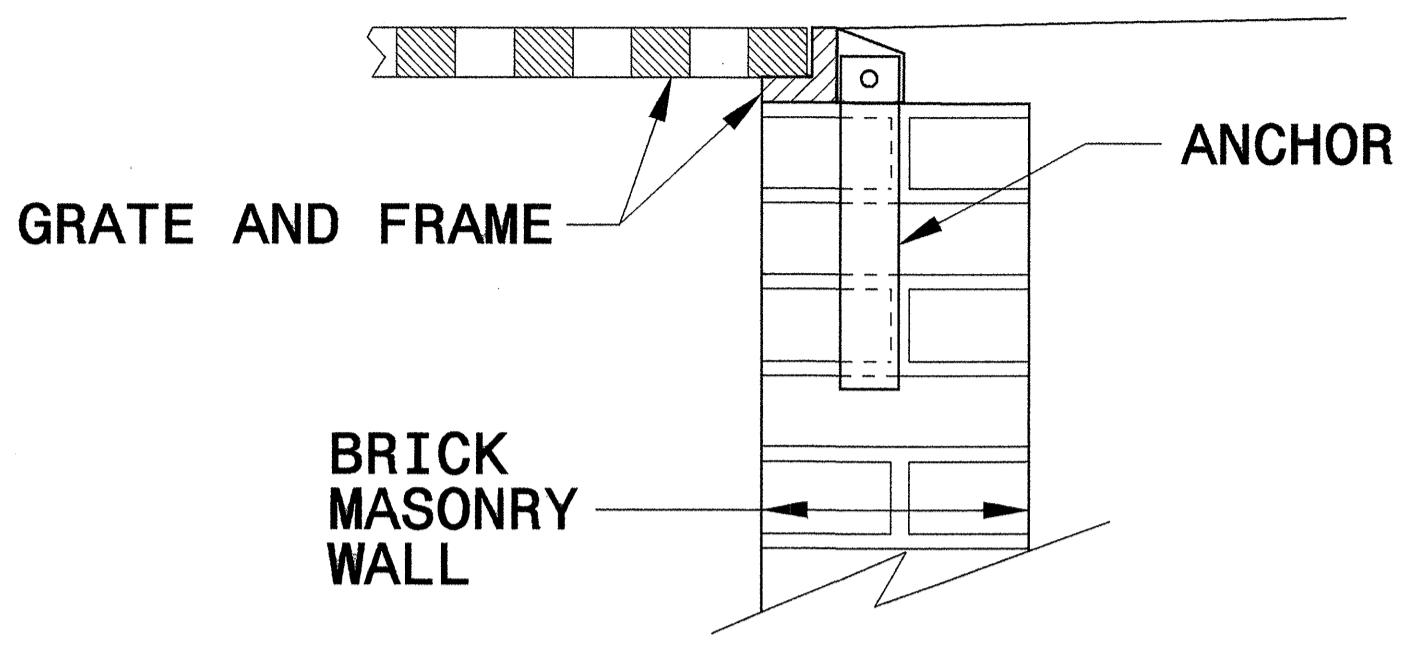
**SEE PLATE FOR TITLE**

ORIGINAL BY: K Kempf DATE: 5-15-09  
 MODIFIED BY: [Signature] DATE: [Signature]  
 CHECKED BY: [Signature] DATE: 7/28/09  
 FILE SPEC/standard/stds/stdstdetails/30001/0300d01.dgn

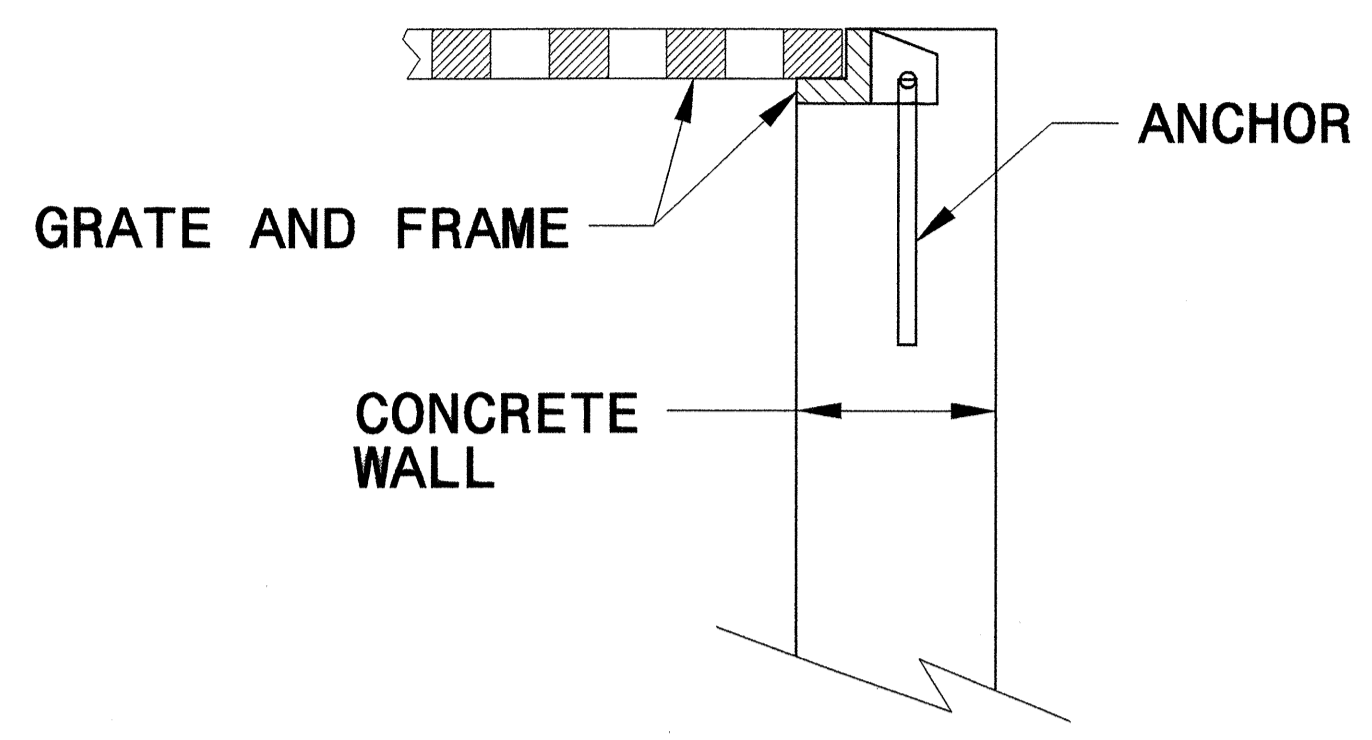
STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

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

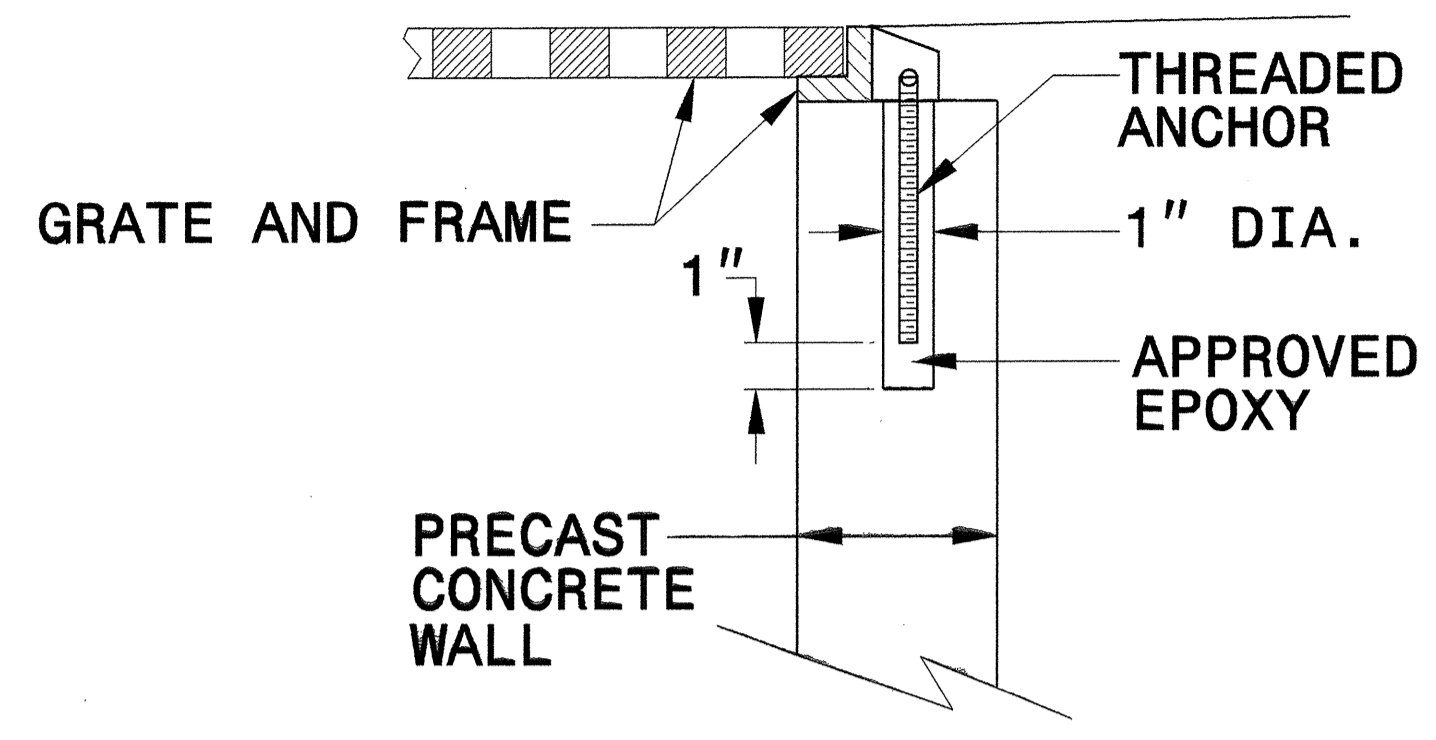
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY CONSTRUCTION**



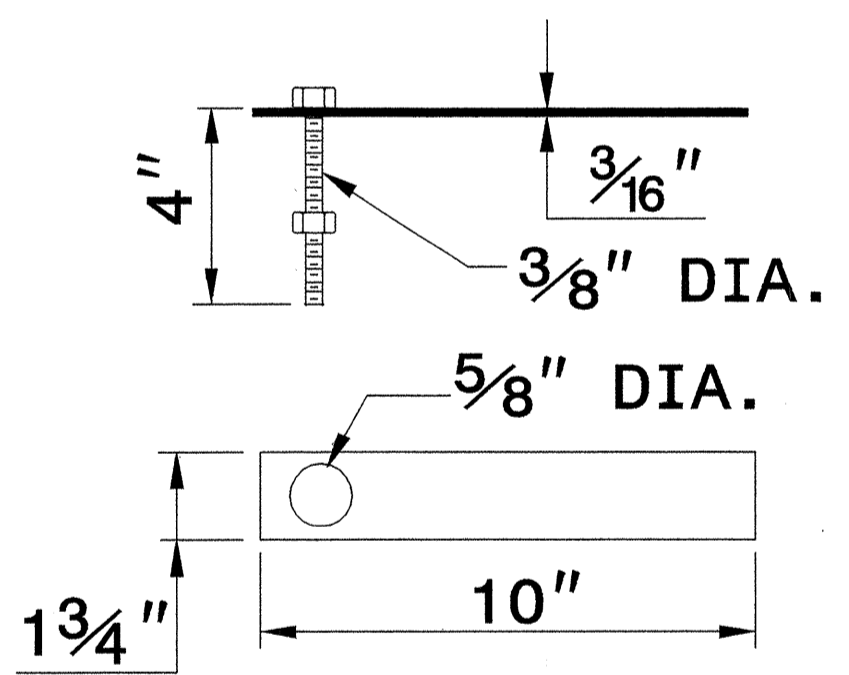
**CONCRETE CONSTRUCTION**



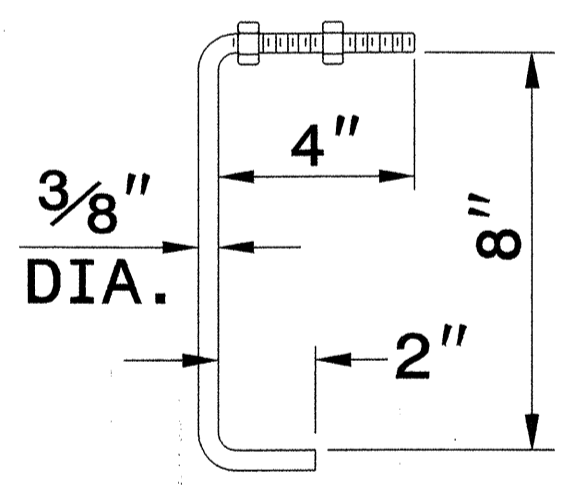
**PRECAST CONCRETE CONSTRUCTION**

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

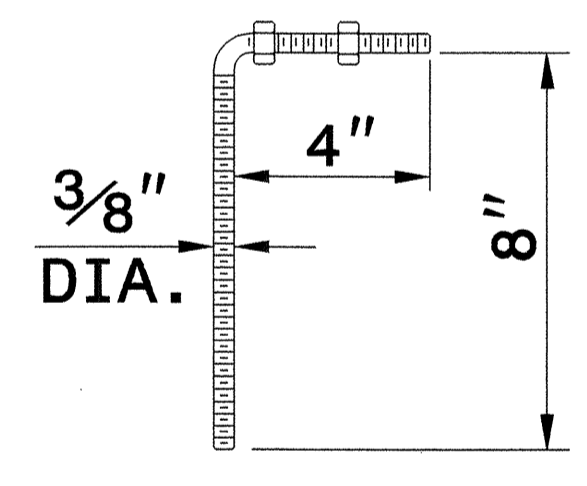
NOTE:  
 CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



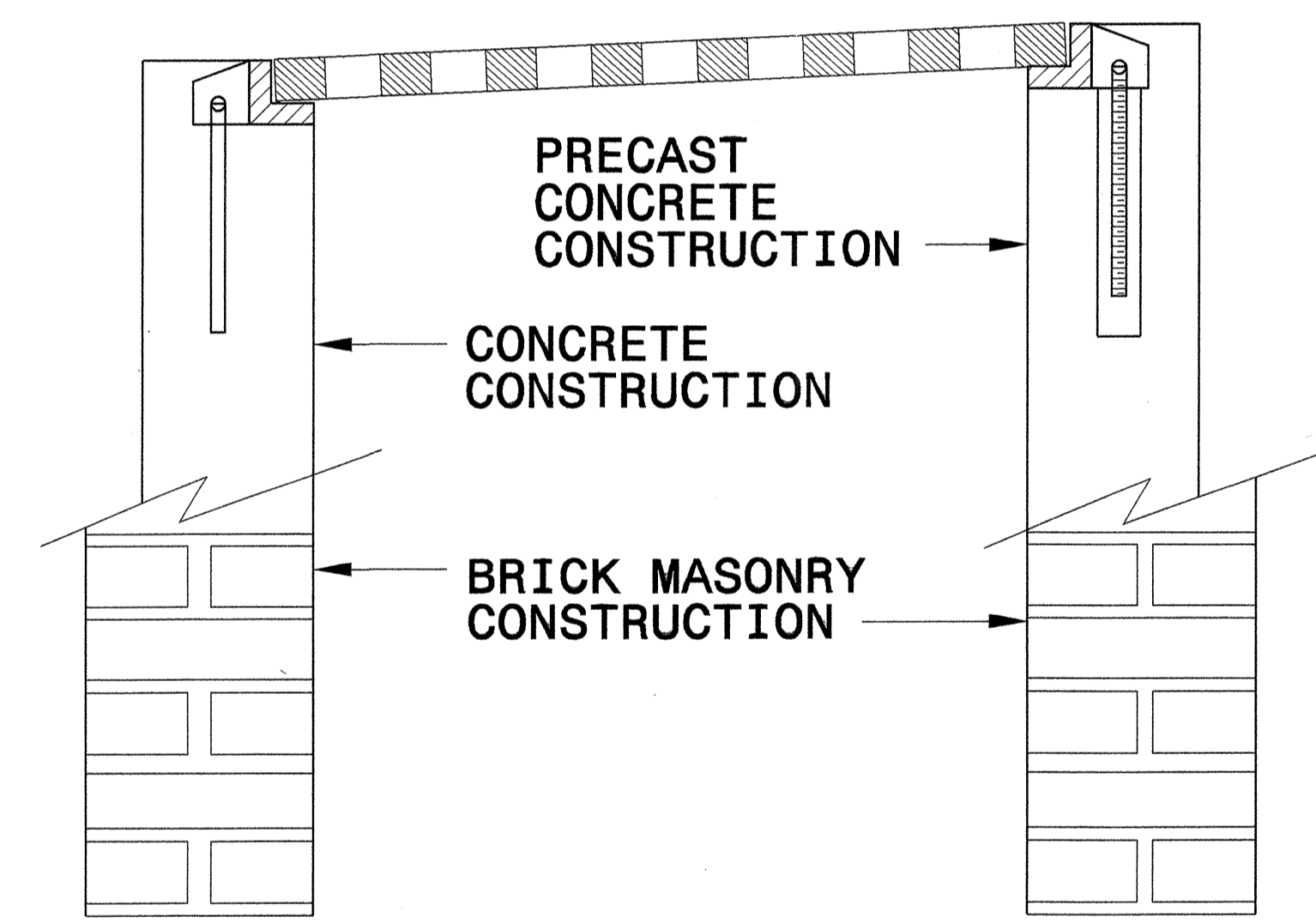
**MASONRY ANCHOR**  
 3/8" DIA. BOLT WITH PLATE



**CONCRETE ANCHOR**  
 3/8" DIA. BENT BAR



**PRECAST CONCRETE ANCHOR**  
 3/8" DIA. BENT BAR



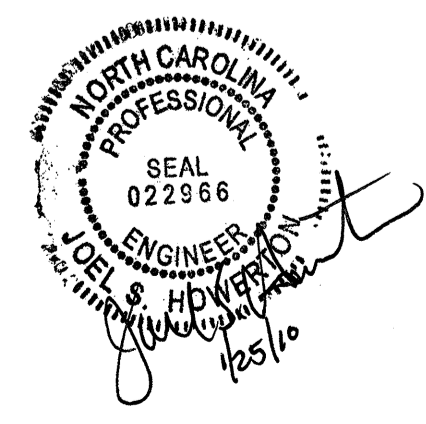
**FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS**

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

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

SHEET 1 OF 1  
**840D25**

SYSTEMS  
 DON  
 USER



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

**SEE PLATE FOR TITLE**

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06  
 MODIFIED BY: E.E. WARD DATE: 9/25/06  
 CHECKED BY: [Signature] DATE: 11/13/06  
 FILE SPEC: [Signature]



STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202375

Table with columns: ItemNumber, Sec #, Quantity, Unit, Description. Rows include items like MOBILIZATION, CONSTRUCTION SURVEYING, REINFORCED BRIDGE APPROACH, GRADING, etc.

Table with columns: ItemNumber, Sec #, Quantity, Unit, Description. Rows include items like 6" PERFORATED SUBDRAIN PIPE, 6" SUBDRAIN PIPE WYES, TEES, & ELBOWS, CONCRETE PAD FOR SUBDRAIN PIPE, etc.

Table with columns: ItemNumber, Sec #, Quantity, Unit, Description. Rows include items like GUARDRAIL ANCHOR UNITS, TYPE III, GUARDRAIL ANCHOR UNITS, TYPE 350, FILTER FABRIC FOR DRAINAGE, etc.









| -L-                      |                          |                          |                           | -Y2-                      |                           | -Y3-                      |                           | -Y4-                      |  |
|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--|
| PI Sta 15+35.47          | PI Sta 17+25.83          | PI Sta 21+13.05          | PI Sta 28+83.47           | PI Sta 11+23.33           | PI Sta 11+97.79           | PI Sta 12+78.05           | PI Sta 13+00.18           | PI Sta 10+96.43           |  |
| $\Delta = 2'17.26"$ (LT) | $\Delta = 7'35.46"$ (LT) | $\Delta = 6'31.43"$ (LT) | $\Delta = 16'01.14"$ (RT) | $\Delta = 36'29.57"$ (LT) | $\Delta = 28'24.24"$ (RT) | $\Delta = 20'52.03"$ (LT) | $\Delta = 25'50.29"$ (LT) | $\Delta = 26'28.49"$ (LT) |  |
| D = 1'34'48.3"           | D = 3'13'35.8"           | D = 1'46'18.3"           | D = 4'12'20.7"            | D = 39'56'28.6"           | D = 45'34'03.7"           | D = 80'17'41.2"           | D = 141'41'27.9"          | D = 40'25'05.3"           |  |
| L = 144.97'              | L = 235.42'              | L = 368.49'              | L = 380.92'               | L = 9.38'                 | L = 62.34'                | L = 25.99'                | L = 18.24'                | L = 65.52'                |  |
| T = 72.49'               | T = 117.88'              | T = 184.44'              | T = 191.71'               | T = 47.30'                | T = 31.82'                | T = 13.14'                | T = 9.28'                 | T = 33.35'                |  |
| R = 3,626.10'            | R = 1,775.72'            | R = 3,233.85'            | R = 1,362.32'             | R = 143.45'               | R = 125.74'               | R = 71.36'                | R = 40.44'                | R = 141.76'               |  |
| SE = SEE PLANS           |                          |                          |                           | SE = SEE PLANS            |                           | SE = SEE PLANS            |                           | SE = SEE PLANS            |  |

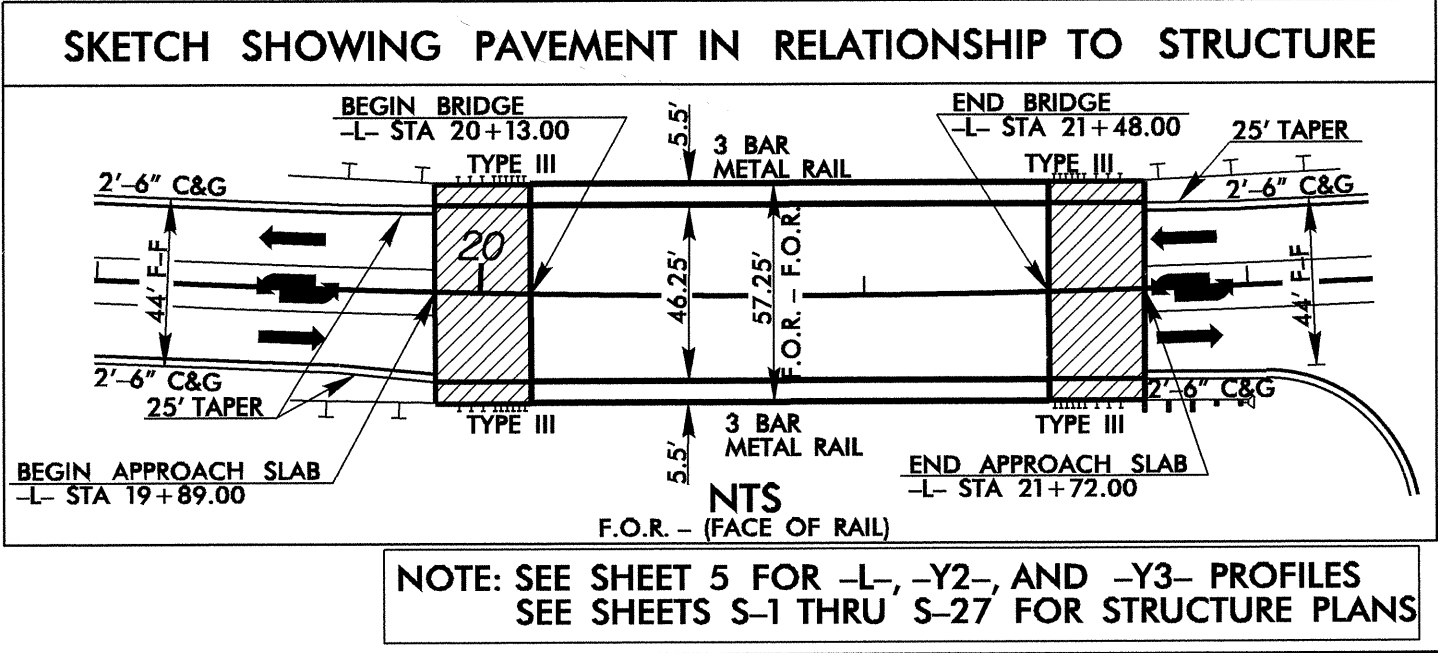
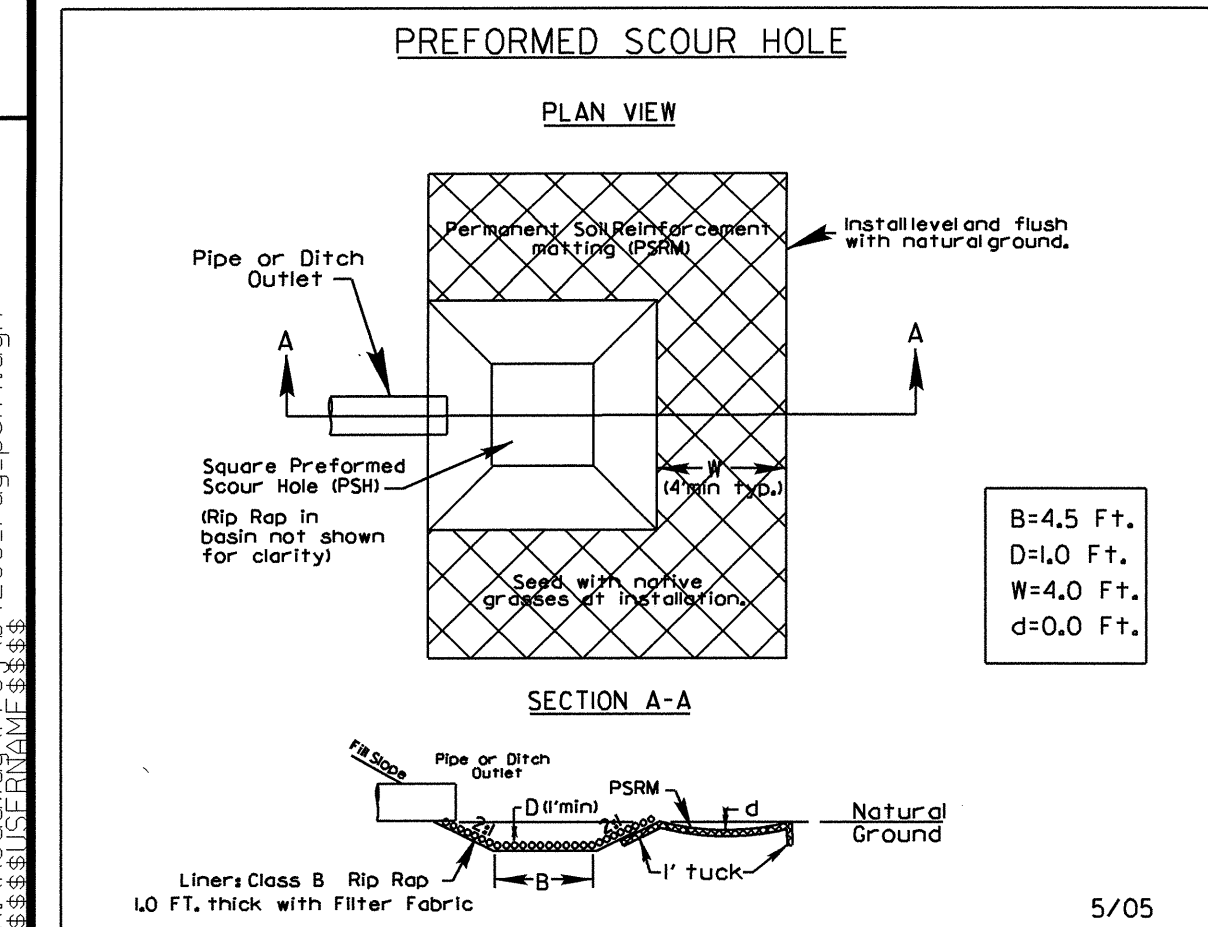
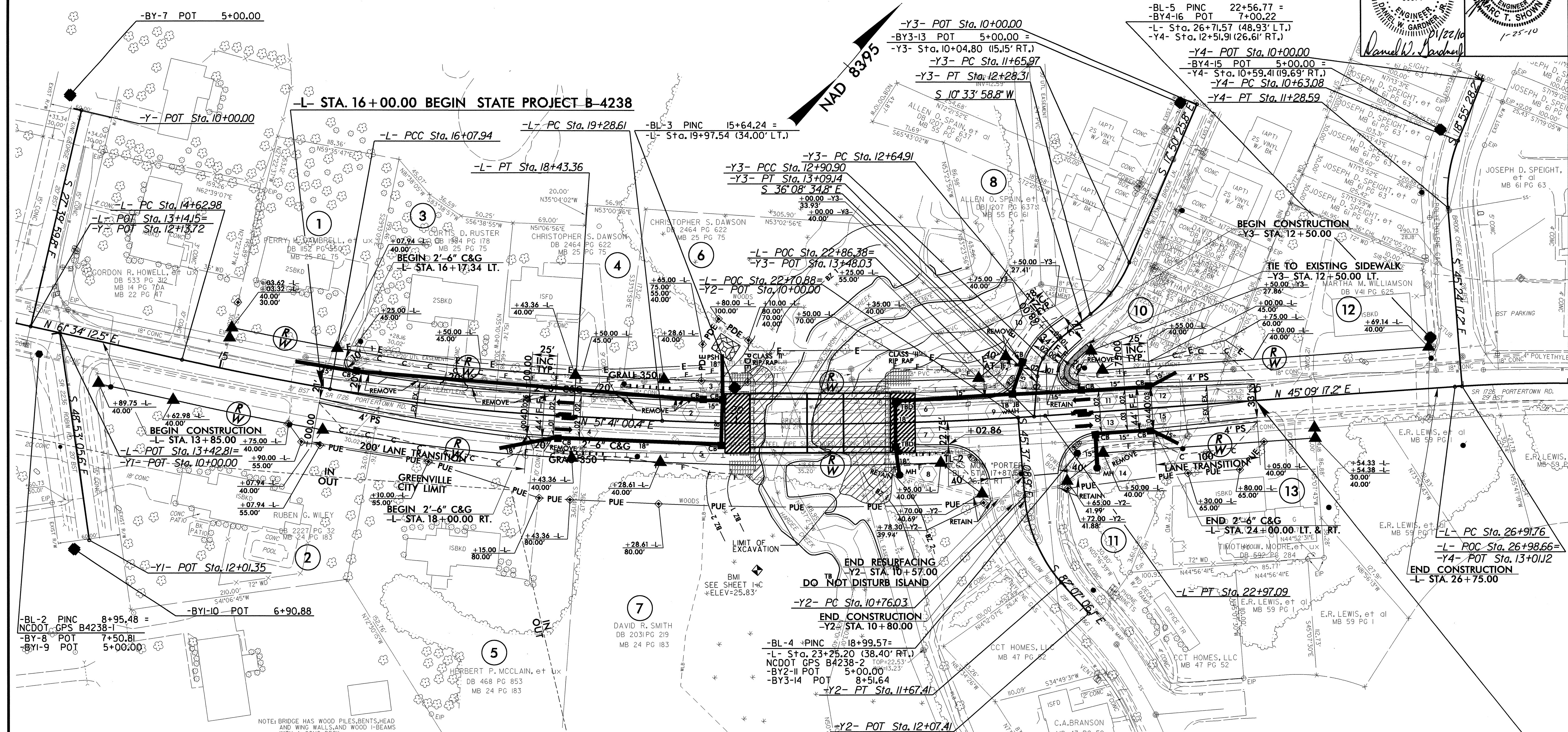
PROJECT REFERENCE NO. B-4238  
SHEET NO. 4

RW SHEET NO.

ROADWAY DESIGN  
ENGINEER  
NORTH CAROLINA  
PROFESSIONAL SEAL  
33871  
DANIEL W. GARDNER

HYDRAULICS  
ENGINEER  
NORTH CAROLINA  
PROFESSIONAL SEAL  
33871  
MARC T. SHOWN

1/22/10  
1-25-10



8/17/99

REVISIONS

1/1/2000 14:44 B:\4238\_rdy\_psh4.dgn

5/05



5/28/99

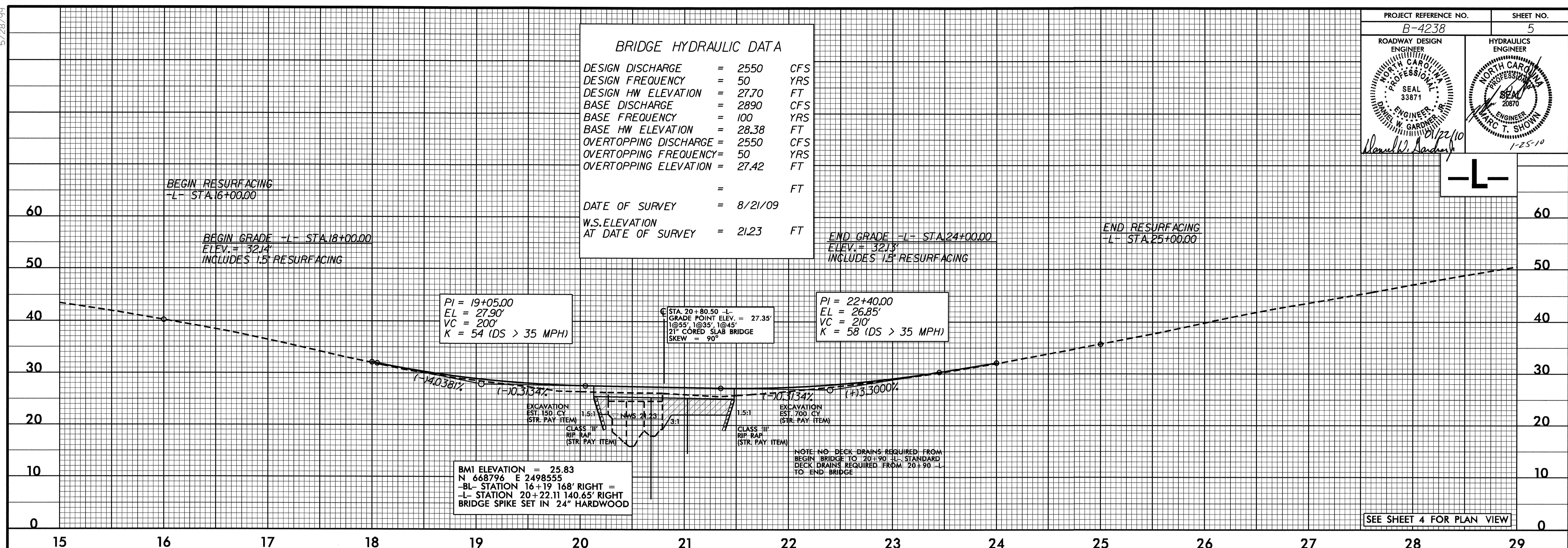
|  |  |
|--|--|
| PROJECT REFERENCE NO.<br>B-4238  | SHEET NO.<br>5   |
| ROADWAY DESIGN ENGINEER<br>DANIEL W. GARDNER<br>NORTH CAROLINA PROFESSIONAL ENGINEER<br>SEAL 33871 | HYDRAULICS ENGINEER<br>MARC T. SHOWN<br>NORTH CAROLINA PROFESSIONAL ENGINEER<br>SEAL 20870 |

1/22/10  
1-25-10

**BRIDGE HYDRAULIC DATA**

DESIGN DISCHARGE = 2550 CFS  
 DESIGN FREQUENCY = 50 YRS  
 DESIGN HW ELEVATION = 27.70 FT  
 BASE DISCHARGE = 2890 CFS  
 BASE FREQUENCY = 100 YRS  
 BASE HW ELEVATION = 28.38 FT  
 OVERTOPPING DISCHARGE = 2550 CFS  
 OVERTOPPING FREQUENCY = 50 YRS  
 OVERTOPPING ELEVATION = 27.42 FT

DATE OF SURVEY = 8/21/09  
 W.S. ELEVATION AT DATE OF SURVEY = 21.23 FT



PI = 19+05.00  
 EL = 27.90'  
 VC = 200'  
 K = 54 (DS > 35 MPH)

STA. 20+80.50 -L-  
 GRADE POINT ELEV. = 27.35'  
 1@25', 1@35', 1@45'  
 21' CORED SLAB BRIDGE  
 SKEW = 90°

PI = 22+40.00  
 EL = 26.85'  
 VC = 210'  
 K = 58 (DS > 35 MPH)

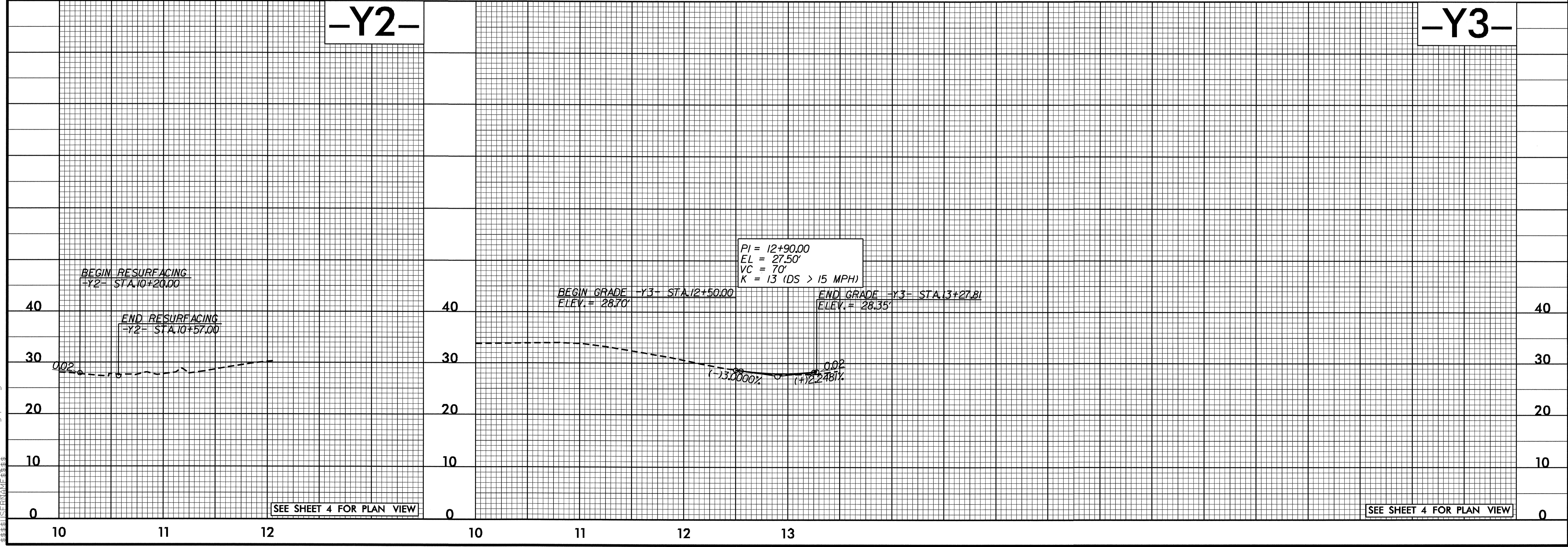
BMI ELEVATION = 25.83  
 N 668796 E 2498555  
 -BL- STATION 16+19 168' RIGHT =  
 -L- STATION 20+22.11 140.65' RIGHT  
 BRIDGE SPIKE SET IN 24" HARDWOOD

NOTE: NO DECK DRAINS REQUIRED FROM  
 BEGIN BRIDGE TO 20+90 -L- STANDARD  
 DECK DRAINS REQUIRED FROM 20+90 -L-  
 TO END BRIDGE

SEE SHEET 4 FOR PLAN VIEW

-Y2-

-Y3-



PI = 12+90.00  
 EL = 27.50'  
 VC = 70'  
 K = 13 (DS > 15 MPH)

BEGIN GRADE -Y3- STA. 12+50.00  
 ELEV. = 28.70'

END GRADE -Y3- STA. 13+27.81  
 ELEV. = 28.35'

SEE SHEET 4 FOR PLAN VIEW

SEE SHEET 4 FOR PLAN VIEW

05-JAN-2010 10:04 B-4238-rdy-pl.dgn