

09/08/14

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C-1 To 1C-4 For Survey Control Sheets

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

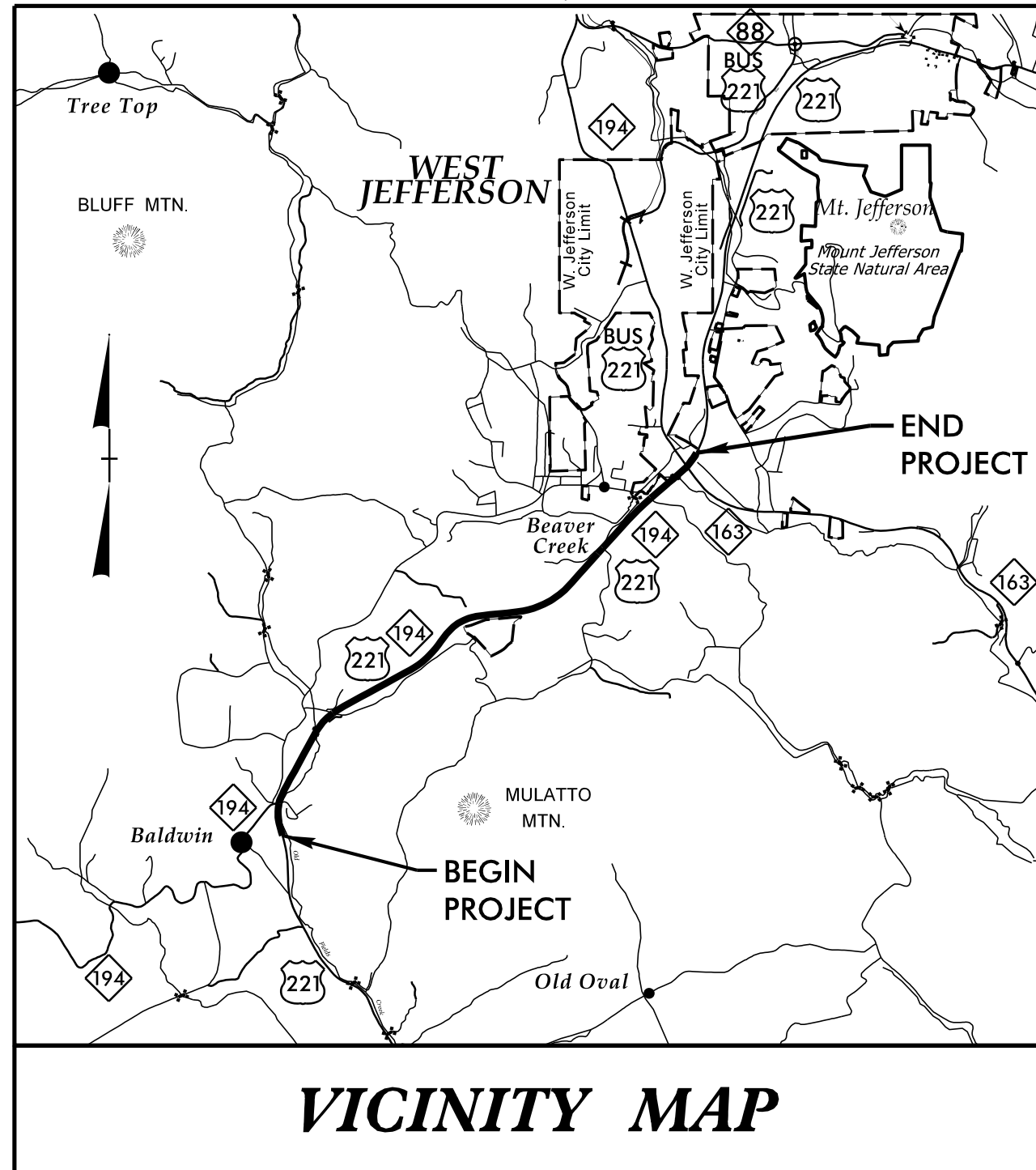
ASHE COUNTY

LOCATION: US 221 FROM SOUTH OF NC 194 TO US 221 BYPASS

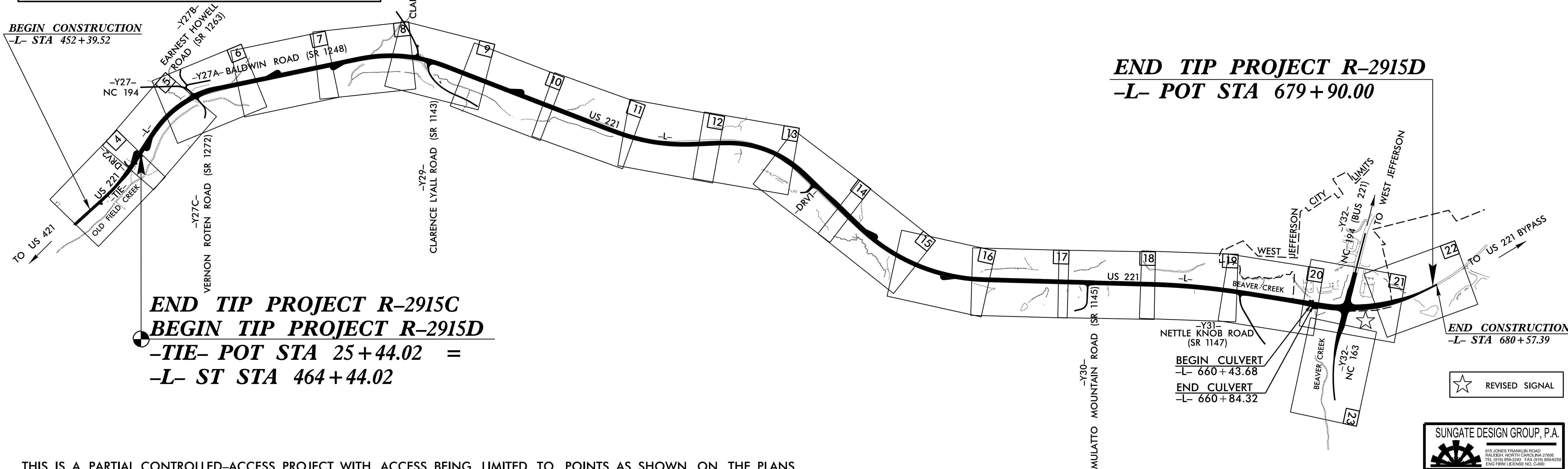
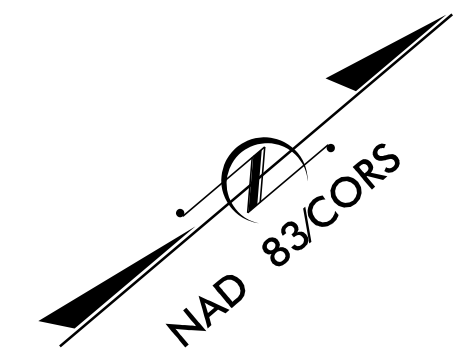
TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNAL, AND CULVERT

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C. | R-2915D | 1 | |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 34518.1.5 | STP-0221(42) | P.E. | |
| 34518.2.4 | STP-0221(42) | R/W | |
| 34518.2.U4 | STP-0221(42) | UTIL. | |
| 34518.3.FR4 | STP-0221(42) | CONST. | |

TIP PROJECT: R-2915D



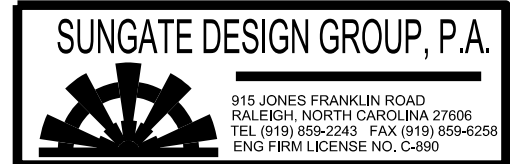
VICINITY MAP



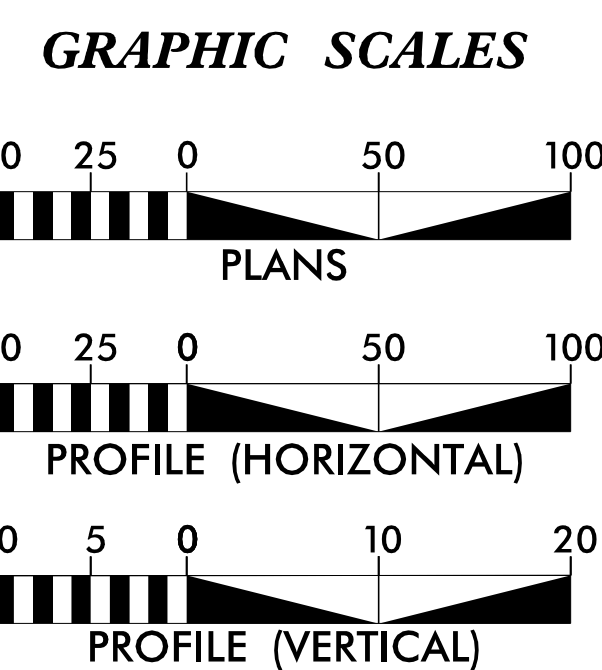
END TIP PROJECT R-2915D
-L- POT STA 679 + 90.00

END TIP PROJECT R-2915C
BEGIN TIP PROJECT R-2915D
-TIE- POT STA 25 + 44.02 =
-L- ST STA 464 + 44.02

★ REVISED SIGNAL



THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.



DESIGN DATA

| | |
|--------------|-----------------|
| ADT 2015 = | 14715 |
| ADT 2035 = | 25000 |
| K = | 9 % |
| D = | 55 % |
| T = | 9 % * |
| V = | 60 MPH |
| * TTST = | 2 DUAL 7 |
| FUNC CLASS = | Major Collector |
| | Statewide Tier |

PROJECT LENGTH

| | | |
|-------------------------------------|---|----------|
| LENGTH OF ROADWAY PROJECT R-2915D | = | 4.074 MI |
| LENGTH OF STRUCTURE PROJECT R-2915D | = | 0.007 MI |
| TOTAL LENGTH OF PROJECT R-2915D | = | 4.081 MI |

Prepared in the Office of:
KCI Associates of N.C., P.A.
4601 Six Forks Road
Landmark Center II, Suite 220
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh, NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 30, 2013

LETTING DATE:
FEBRUARY 17, 2015

NCDOT CONTACT: **BRENDA MOORE, PE**
PROJECT ENGINEER - ROADWAY DESIGN

BARRY C. SMITH, P.E.
PROJECT ENGINEER

BRYAN E. HOUGH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

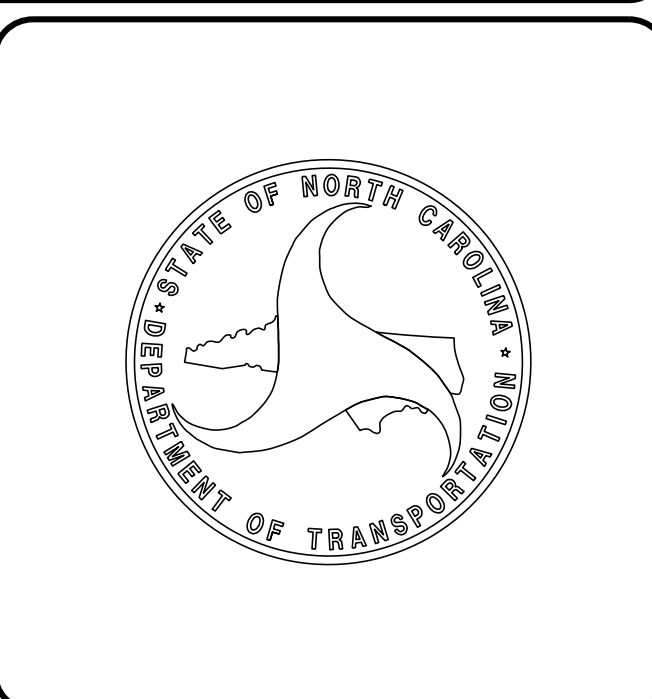
12/16/2014

DocuSigned by:
Henry Wells Jr.
SEAL
9334

ROADWAY DESIGN ENGINEER

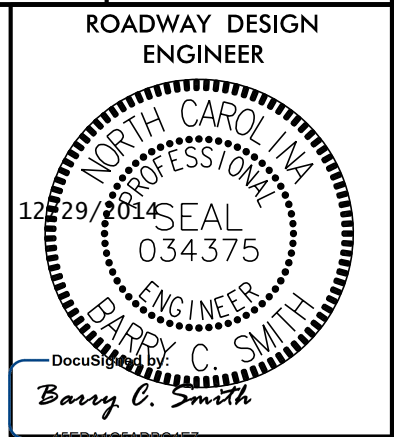
12/16/2014

DocuSigned by:
Bryan E. Hough
SEAL
034375



26-NOV-2014 09:31
M:\2011\241105-R2915D-Roadway\Proj\R2915D_Rdy_t.sh.dgn
\$\$\$\$\$SERVNAME\$\$\$\$\$

CONTRACT: C203536



EFF. 01-17-2012
REV. 10-30-2012

| SHEET NUMBER | SHEET |
|----------------------|---|
| 1 | TITLE SHEET |
| 1A | INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS |
| 1B | CONVENTIONAL SYMBOLS |
| 1C-1 THRU 1C-4 | SURVEY CONTROL SHEETS |
| 2A-1 THRU 2A-7 | TYPICAL SECTIONS, PAVEMENT SCHEDULE, WEDGING DETAILS GEOTEXTILE FOR PAVEMENT STABILIZATION DETAILS, AND MILLING DETAIL |
| 2C-1 | DETAIL OF REINFORCED CONCRETE ENDWALL FOR 84" DIAMETER PIPE - 90DEG SKEW |
| 2C-2 | DETAIL OF PIPE COLLAR |
| 2C-3 | DETAIL OF 2'-9" CONCRETE CURB AND GUTTER |
| 2C-4 | DETAIL OF GUIDE FOR BERM DRAINAGE OUTLET - 36" PIPE |
| 2C-5 | DETAIL TO CONVERT EXISTING DI, CB, DTCB OR GI TO JUNCTION BOX |
| 2C-6 | DETAIL OF TRAFFIC BEARING DROP INLET UP TO 36" RCPS |
| 2C-7 | DETAIL OF 2'-9" TO FRAME AND GRATE |
| 2C-8 | DETAIL OF DROP INLETS IN MONOLITHIC ISLANDS |
| 2C-9 | DETAIL OF SPECIAL JUNCTION BOX |
| 2C-10 | DETAIL OF TEMPORARY STEEL COVER |
| 2D-1 | DRAINAGE DETAIL SHEET |
| 2G-1 | STANDARD TEMPORARY SHORING DETAIL |
| 2G-2 THRU 2G-3 | STANDARD REINFORCED SOIL SLOPE |
| 3B-1 | SUMMARY OF GUARDRAIL |
| 3B-2 | SUMMARIES OF PAVEMENT REMOVAL, EXPRESSWAY GUTTER, SHOULDER BERM GUTTER, AND FENCE |
| 3B-3 | SUMMARY OF EARTHWORK |
| 3D-1 THRU 3D-9 | DRAINAGE SUMMARIES |
| 3G-1 | GEOTECHNICAL SUMMARIES |
| 3P-1 | PARCEL INDEX SHEET |
| 4 THRU 23 | PLAN SHEETS |
| 24 THRU 35 | PROFILE SHEETS |
| TMP-1 THRU TMP-81 | TRANSPORTATION MANAGEMENT PLANS |
| PMP-1 THRU PMP-19 | PAVEMENT MARKING PLANS |
| EC-1 THRU EC-43 | EROSION CONTROL PLANS |
| RF-1 THRU RF-3 | REFORESTATION PLANS |
| SIGN-1 THRU SIGN-22 | SIGNING PLANS |
| SIG-1.0 THRU SIG-6.2 | SIGNAL PLANS |
| SIG-MI THRU SIG-M9 | METAL POLE STANDARD DRAWINGS |
| UC-1 THRU UC-12 | UTILITIES CONSTRUCTION PLANS |
| UO-1 THRU UO-16 | UTILITIES BY OTHERS PLANS |
| X-1A | INDEX OF CROSS-SECTIONS |
| X-1B THRU X-1E | CROSS-SECTION SUMMARY SHEET |
| X-1 THRU X-215 | CROSS-SECTIONS |
| C-1 THRU C-6 | CULVERT PLANS |

GENERAL NOTES: 2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 07-30-2012

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 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.

BERM DITCHES:
BERM DITCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 240.01 AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

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

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

TEMPORARY SHORING:
SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

UTILITIES:
UTILITY OWNERS ON THIS PROJECT ARE BREMCO, SKYLINE SKYBEST, MORRIS BROADBAND, FRONTIER NATURAL GAS, AND CENTURY LINK.
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.

ROCK
ROCK IS ANTICIPATED BETWEEN -L- 456+00 TO 460+00, -L- 558+50 TO 559+50, -L- 601+00 TO 604+50, -L- 630+50 TO 632+00. BLASTING MAY BE REQUIRED FOR EXCAVATION ON THE PROJECT. SEE SECTION 220 OF THE STANDARD SPECIFICATIONS AND IF APPLICABLE, ROCK BLASTING PROVISION.

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

| STD. NO. | TITLE |
|--|--|
| DIVISION 2 - EARTHWORK | |
| 200.03 | Method of Clearing - Method III |
| 225.02 | Guide for Grading Subgrade - Secondary and Local |
| 225.04 | Method of Obtaining Super-elevation - Two Lane Pavement |
| 225.06 | Method of Grading Sight Distance at Intersections |
| 240.01 | Guide for Berm Ditch Construction |
| DIVISION 3 - PIPE CULVERTS | |
| 300.01 | Method of Pipe Installation |
| 310.10 | Driveway Pipe Construction |
| 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 |
| 838.01 | Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew |
| 838.11 | Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew |
| 838.27 | Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew |
| 838.45 | Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40 |
| 838.57 | Reinforced Brick Endwall - 60" Pipe 90 Skew |
| 838.75 | Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70 |
| 838.80 | Precast Endwalls - 12" thru 72" Pipe 90 Skew |
| 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 |
| 840.04 | Concrete Open Throat Catch Basin - 12" thru 48" Pipe |
| 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 |
| 840.19 | Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe |
| 840.20 | Frames and Wide Slot Flat Grates |
| 840.22 | Frames and Wide Slot Sag Grates |
| 840.24 | Frames and Narrow Slot Sag Grates |
| 840.25 | Anchorage for Frames - Brick or Concrete or Precast |
| 840.26 | Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe |
| 840.27 | Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe |
| 840.28 | Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe |
| 840.29 | Frames and Narrow Slot Flat Grates |
| 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 |
| 840.35 | Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates |
| 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 |
| 846.01 | Concrete Curb, Gutter and Curb & Gutter |
| 846.04 | Drop Inlet Installation in Shoulder Berm Gutter |
| 850.01 | Concrete Paved Ditches |
| 850.10 | Guide for Berm Drainage Outlet - 15" and 18" Pipe |
| 850.11 | Guide for Berm Drainage Outlet - 24" and 30" Pipe |
| 852.01 | Concrete Islands |
| 852.06 | Method for Placement of Drop Inlets in Concrete Islands |
| 852.10 | Median Construction - with Curb and Gutter |
| 862.01 | Guardrail Placement |
| 862.02 | Guardrail Installation |
| 866.02 | Woven Wire Fence - with Wood Post |
| 866.04 | Barbed Wire Fence with Wood Posts (2 - 7 Strands) |
| 876.01 | Rip Rap in Channels |
| 876.02 | Guide for Rip Rap at Pipe Outlets |
| 876.04 | Drainage Ditches with Class 'B' Rip Rap |

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

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

BOUNDARIES AND PROPERTY:

| | |
|--|---------|
| State Line | ----- |
| County Line | ----- |
| Township Line | ----- |
| City Line | ----- |
| Reservation Line | ----- |
| Property Line | ----- |
| Existing Iron Pin | ○ EP |
| Property Corner | ----- |
| Property Monument | □ ECM |
| Parcel/Sequence Number | ⑫③ |
| Existing Fence Line | -x-x-x- |
| Proposed Woven Wire Fence | ○ |
| Proposed Chain Link Fence | □ |
| Proposed Barbed Wire Fence | ◇ |
| Existing Wetland Boundary | -WLB- |
| Proposed Wetland Boundary | -WLB- |
| Existing Endangered Animal Boundary | -EAB- |
| Existing Endangered Plant Boundary | -EPB- |
| Known Soil Contamination: Area or Site | ☠ ☠ |
| Potential Soil Contamination: Area or Site | ☠ ? |

BUILDINGS AND OTHER CULTURE:

| | |
|-------------------------------|-----|
| Gas Pump Vent or U/G Tank Cap | ○ |
| Sign | ○ 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 | ----- |
| 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 | ----- |
| Proposed Right of Way Line with Iron Pin and Cap Marker | ○ RW |
| Proposed Right of Way Line with Concrete or Granite RW Marker | ○ RW |
| Proposed Control of Access Line with Concrete CA Marker | ○ CA |
| 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 Aerial Utility Easement | -AUE- |
| 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 Curb Ramp | ○ CR |
| Existing Metal Guardrail | ----- |
| Proposed Guardrail | ----- |
| Existing Cable Guiderail | ----- |
| Proposed Cable Guiderail | ----- |
| Equality Symbol | ⊕ |
| Pavement Removal | ⊗ |
| VEGETATION: | |
| Single Tree | ☼ |
| Single Shrub | ☼ |
| Hedge | ----- |
| Woods Line | ----- |

| | |
|----------|-------|
| Orchard | ----- |
| Vineyard | ----- |

EXISTING STRUCTURES:

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

UTILITIES:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

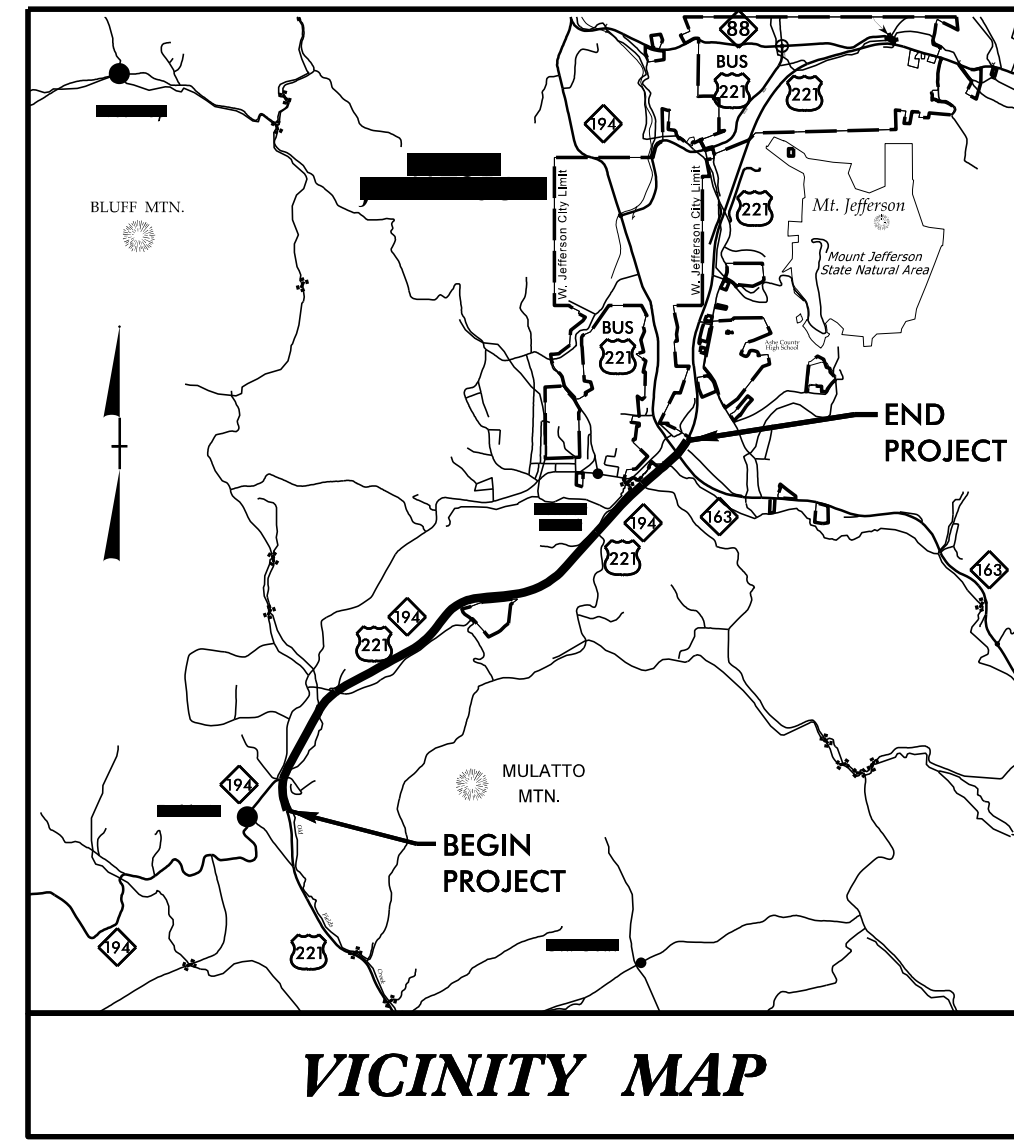
SANITARY SEWER:

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

MISCELLANEOUS:

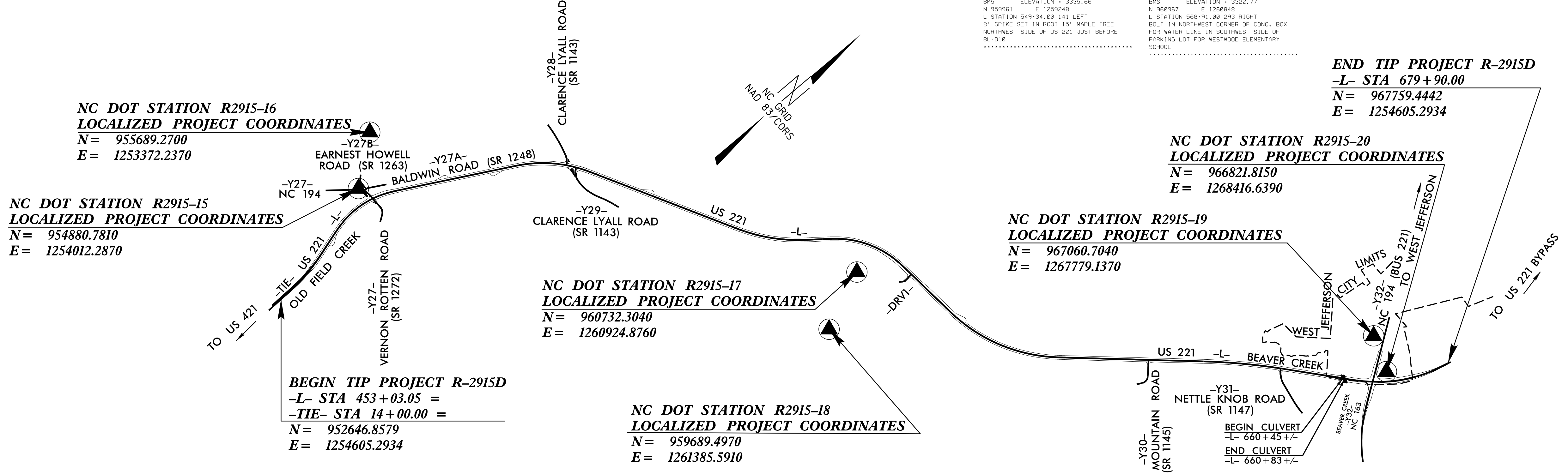
| | |
|--|--------|
| Utility Pole | ● |
| Utility Pole with Base | □ |
| Utility Located Object | ○ |
| Utility Traffic Signal Box | ⊕ |
| Utility Unknown U/G Line | ----- |
| U/G Tank; Water, Gas, Oil | □ |
| Underground Storage Tank, Approx. Loc. | ⊕ |
| A/G Tank; Water, Gas, Oil | □ |
| Geoenvironmental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

SURVEY CONTROL SHEET R-2915D



| BL POINT | DESC. | NORTH | EAST | ELEVATION | L STATION | OFFSET | BY1 POINT | DESC. | NORTH | EAST | ELEVATION | Y27 STATION | OFFSET | BY5 POINT | DESC. | NORTH | EAST | ELEVATION | Y30 STATION | OFFSET |
|----------|--------|-------------|--------------|-----------|-----------|----------|-----------|---------|-------------|--------------|-----------|-------------|------------|-----------|---------|-------------|--------------|-----------|-------------|----------|
| BLD03 | BL-D03 | 953979.2026 | 1254459.6825 | 3079.40 | 465+41.23 | 56.04 RT | BYD128 | BY-D128 | 953956.6524 | 1253196.4464 | 3155.10 | 22+87.90 | 1786.61 RT | BYD540 | BY-D540 | 963727.9230 | 1265531.2200 | 3051.28 | 18+84.85 | 36.69 LT |

VICINITY MAP



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2915-15"

WITH NAD 83/CORS STATE PLANE GRID COORDINATES OF
 NORTHING: 954880.7810(±) EASTING: 1254012.2870(±)
 ELEVATION: 3097.5210(±)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99991292

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2915-15" TO -L- STATION 453+03.05 IS
 S 14°52'00" E 2311.2917

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

NOTE: DRAWING NOT TO SCALE

NOTES:

- THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/RS ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.
- 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:
 R2915D_LS_GPSCALIB.HTML
 R2915D_LS_WGS84.TXT
 R2915D_LS_LOCAL.TXT
 R2915D_LS_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. 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 EXISTING HARN MONUMENTATION
 SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

6/2/09 8:53:45 AM 11c-1.dgn

SURVEY CONTROL SHEET R-2915D

| | |
|----------------------------------|-------------------|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 1C-2 |
| Location and Surveys | |

GPS Calibration Report

Project : r2915abcde

| | | | |
|-------------------|---------------------|-------------|----------------------|
| TIP Number | r2915abcde | Date & Time | 8:15:20 AM 3/29/2010 |
| User name | rhwagoner | Zone | North Carolina 3200 |
| Coordinate System | US State Plane 1983 | | |
| Horizontal Datum | NAD 1983 (Comus) | Geoid Model | G03NC |
| Vertical Datum | | | |
| Coordinate Units | US survey feet | | |
| Distance Units | US survey feet | | |
| Height Units | US survey feet | | |

LOCAL SITE INFORMATION

| | |
|-------------------|-----|
| Localized around | |
| Latitude | N/A |
| Longitude | N/A |
| Site Scale Factor | N/A |
| Height | N/A |

The North Carolina Department of Transportation uses a **Localized Coordinate System** which is very similar to North Carolina Zone 3200 from which it is derived. **Please take care in utilizing these coordinates to eliminate confusion of the two systems.** This file is to aid in the use of Real Time Kinematic (RTK) GPS during construction layout.

Datum Transformation Parameters

Datum Transformation computation not requested

Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

Horizontal Adjustment Parameters

| | |
|--|-----------------|
| Northing coordinate of rotation center | 947934.1223sft |
| Easting coordinate of rotation center | 1262471.3754sft |
| Rotation about the center point | 0°00'00" |
| Translation north | -0.6128sft |
| Translation east | 0.7058sft |
| Scale factor | 1.00008668 |

Vertical Adjustment Parameters

| | |
|-------------------------------------|-----------------|
| Northing coordinate of origin point | 916355.6589sft |
| Easting coordinate of origin point | 1255522.7706sft |
| Vertical separation at origin | 0.0728sft |
| Slope north | 2.018ppm |
| Slope east | -3.981ppm |

Geoid Model Definition

G03NC

Residual Differences Between GPS (WGS84) And Local Coordinates

| Summary | | | |
|-------------------|---------------|------------------------|----------------|
| | Maximum error | Root Mean Square error | Point |
| Horizontal | 0.037sft | 0.006 | R2915-23_WGS84 |
| Vertical | 0.080sft | 0.010 | R2915-23_WGS84 |
| Three-dimensional | 0.088sft | 0.011 | R2915-23_WGS84 |

| Point Residuals | | | | | |
|-------------------|------------------|-----------------------------------|-----------------|---------------------|-----------------|
| WGS84 Coordinates | | Calculated point FOR DISPLAY ONLY | | Local Coordinates | |
| Point | R2915-1_WGS84 | Northing | 916355.6589sft | Point R2915-1 Local | |
| Latitude | 36°14'30.16499"N | Easting | 1255522.7706sft | Northing | 916355.6590sft |
| Longitude | 81°31'28.80325"W | Elevation | 3142.3037sft | Easting | 1255522.7760sft |
| Height | 3038.5989sft | Horz error | 0.005sft | Elevation | 3142.2840sft |
| | | Vert error | 0.020sft | Utilized | Horz and Vert |
| | | 3D error | 0.020sft | Quality | Survey quality |
| Point | R2915-2_WGS84 | Northing | 915243.5295sft | Point R2915-2 Local | |
| Latitude | 36°14'19.87328"N | Easting | 1258316.3057sft | Northing | 915243.5260sft |
| Longitude | 81°30'54.37263"W | Elevation | 3035.6772sft | Easting | 1258316.3100sft |
| Height | 2931.8298sft | Horz error | 0.006sft | Elevation | 3035.6720sft |
| | | Vert error | 0.005sft | Utilized | Horz and Vert |
| | | 3D error | 0.008sft | Quality | Survey quality |
| Point | R2915-3_WGS84 | Northing | 919149.7074sft | Point R2915-3 Local | |
| Latitude | 36°14'59.39661"N | Easting | 1261969.9588sft | Northing | 919149.7040sft |
| Longitude | 81°30'10.99416"W | Elevation | 2977.4067sft | Easting | 1261969.9680sft |
| Height | 2873.5914sft | Horz error | 0.010sft | Elevation | 2977.4070sft |
| | | Vert error | 0.000sft | Utilized | Horz and Vert |
| | | 3D error | 0.010sft | Quality | Survey quality |
| Point | R2915-4_WGS84 | Northing | 920506.4892sft | Point R2915-4 Local | |
| Latitude | 36°15'13.02239"N | Easting | 1262832.0488sft | Northing | 920506.4880sft |
| Longitude | 81°30'00.89092"W | Elevation | 2956.9814sft | Easting | 1262832.0570sft |
| Height | 2853.1869sft | Horz error | 0.008sft | Elevation | 2956.9900sft |
| | | Vert error | 0.009sft | Utilized | Horz and Vert |
| | | 3D error | 0.012sft | Quality | Survey quality |
| Point | R2915-5_WGS84 | Northing | 927532.5716sft | Point R2915-5 Local | |
| Latitude | 36°16'22.33517"N | Easting | 1262287.7805sft | Northing | 927532.5780sft |
| Longitude | 81°30'09.69521"W | Elevation | 2902.2729sft | Easting | 1262287.7910sft |
| Height | 2798.7405sft | Horz error | 0.012sft | Elevation | 2902.2770sft |
| | | Vert error | 0.004sft | Utilized | Horz and Vert |
| | | 3D error | 0.013sft | Quality | Survey quality |
| Point | R2915-6_WGS84 | Northing | 929551.4461sft | Point R2915-6 Local | |
| Latitude | 36°16'43.05751"N | Easting | 1265372.0745sft | Northing | 929551.4520sft |

| | | | | | |
|-----------|------------------|------------|-----------------|----------------------|-----------------|
| Longitude | 81°29'32.66468"W | Elevation | 3037.6229sft | Easting | 1265372.0870sft |
| Height | 2934.0460sft | Horz error | 0.014sft | Elevation | 3037.6360sft |
| | | Vert error | 0.013sft | Utilized | Horz and Vert |
| | | 3D error | 0.019sft | Quality | Survey quality |
| Point | R2915-7_WGS84 | Northing | 934301.5436sft | Point R2915-7 Local | |
| Latitude | 36°17'29.48965"N | Easting | 1263283.7338sft | Northing | 934301.5570sft |
| Longitude | 81°29'59.61899"W | Elevation | 2870.4241sft | Easting | 1263283.7320sft |
| Height | 2767.0788sft | Horz error | 0.014sft | Elevation | 2870.4170sft |
| | | Vert error | 0.007sft | Utilized | Horz and Vert |
| | | 3D error | 0.015sft | Quality | Survey quality |
| Point | R2915-8_WGS84 | Northing | 935627.2416sft | Point R2915-8 Local | |
| Latitude | 36°17'42.92890"N | Easting | 1264633.5337sft | Northing | 935627.2530sft |
| Longitude | 81°29'43.54539"W | Elevation | 2872.3172sft | Easting | 1264633.5310sft |
| Height | 2768.9685sft | Horz error | 0.012sft | Elevation | 2872.3310sft |
| | | Vert error | 0.014sft | Utilized | Horz and Vert |
| | | 3D error | 0.018sft | Quality | Survey quality |
| Point | R2915-9_WGS84 | Northing | 940641.1693sft | Point R2915-9 Local | |
| Latitude | 36°18'31.45715"N | Easting | 1260499.6148sft | Northing | 940641.1850sft |
| Longitude | 81°30'35.56934"W | Elevation | 2893.9308sft | Easting | 1260499.6170sft |
| Height | 2790.8934sft | Horz error | 0.016sft | Elevation | 2893.9060sft |
| | | Vert error | 0.025sft | Utilized | Horz and Vert |
| | | 3D error | 0.029sft | Quality | Survey quality |
| Point | R2915-10_WGS84 | Northing | 941223.4149sft | Point R2915-10 Local | |
| Latitude | 36°18'37.24430"N | Easting | 1260628.2994sft | Northing | 941223.4310sft |
| Longitude | 81°30'34.17760"W | Elevation | 2992.8526sft | Easting | 1260628.3040sft |
| Height | 2889.8302sft | Horz error | 0.017sft | Elevation | 2992.8370sft |
| | | Vert error | 0.016sft | Utilized | Horz and Vert |
| | | 3D error | 0.023sft | Quality | Survey quality |
| Point | R2915-11_WGS84 | Northing | 946476.2925sft | Point R2915-11 Local | |
| Latitude | 36°19'28.64133"N | Easting | 1258539.4421sft | Northing | 946476.3110sft |
| Longitude | 81°31'01.31448"W | Elevation | 2961.5603sft | Easting | 1258539.4520sft |
| Height | 2858.7761sft | Horz error | 0.021sft | Elevation | 2961.5280sft |
| | | Vert error | 0.032sft | Utilized | Horz and Vert |
| | | 3D error | 0.039sft | Quality | Survey quality |
| Point | R2915-12_WGS84 | Northing | 947042.3574sft | Point R2915-12 Local | |
| Latitude | 36°19'34.13447"N | Easting | 1258133.1858sft | Northing | 947042.3510sft |
| Longitude | 81°31'06.45218"W | Elevation | 2976.4319sft | Easting | 1258133.1700sft |
| Height | 2873.6799sft | Horz error | 0.017sft | Elevation | 2976.4580sft |
| | | Vert error | 0.026sft | Utilized | Horz and Vert |
| | | 3D error | 0.031sft | Quality | Survey quality |
| Point | R2915-13_WGS84 | Northing | 951569.5121sft | Point R2915-13 Local | |
| Latitude | 36°20'18.04952"N | Easting | 1254826.4800sft | Northing | 951569.5120sft |
| Longitude | 81°31'48.25253"W | Elevation | 3052.2178sft | Easting | 1254826.4650sft |
| Height | 2949.7070sft | Horz error | 0.015sft | Elevation | 3052.2240sft |
| | | Vert error | 0.006sft | Utilized | Horz and Vert |
| | | 3D error | 0.016sft | Quality | Survey quality |
| Point | R2915-14_WGS84 | Northing | 952360.7067sft | Point R2915-14 Local | |
| Latitude | 36°20'25.72331"N | Easting | 1254245.9924sft | Northing | 952360.7080sft |

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2915-15" WITH NAD 83/CORS STATE PLANE GRID COORDINATES OF NORTHING: 954880.7810(±) EASTING: 1254012.2870(±) ELEVATION: 3097.5210(±) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99991292 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2915-15" TO -L- STATION 453+03.05 IS S 14°52'00" E 2311.2917 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTES:

- THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.
 - THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: [HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCTION/LOCATION/PROJECT/](http://www.ncdot.org/doh/preconstruction/location/project/) THE FILES TO BE FOUND ARE AS FOLLOWS:
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R2915_LS_WGS84.TXT
R2915_LS_LOCAL.TXT
R2915_LS_CONTROL.TXT
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- © 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 EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

6/2/09

8:53:37 AM 3/29/2010 1c-2.dgn

SURVEY CONTROL SHEET R-2915D

| | | | | | |
|------------------|------------------|-------------------|-----------------|-----------------------------|-----------------|
| Longitude | 81°31'55.59073"W | Elevation | 3078.5171sft | Easting | 1254245.9770sft |
| Height | 2976.0465sft | Horz error | 0.015sft | Elevation | 3078.5190sft |
| | | Vert error | 0.002sft | Utilized | Horz and Vert |
| | | 3D error | 0.016sft | Quality | Survey quality |
| Point | R2915-15 WGS84 | Northing | 954880.7882sft | Point R2915-15 Local | |
| Latitude | 36°20'50.57260"N | Easting | 1254012.3126sft | Northing | 954880.7810sft |
| Longitude | 81°31'59.23136"W | Elevation | 3097.5370sft | Easting | 1254012.2870sft |
| Height | 2995.1423sft | Horz error | 0.027sft | Elevation | 3097.5210sft |
| | | Vert error | 0.016sft | Utilized | Horz and Vert |
| | | 3D error | 0.031sft | Quality | Survey quality |
| Point | R2915-16 WGS84 | Northing | 955689.2599sft | Point R2915-16 Local | |
| Latitude | 36°20'58.40190"N | Easting | 1253372.2604sft | Northing | 955689.2700sft |
| Longitude | 81°32'07.30385"W | Elevation | 3139.7336sft | Easting | 1253372.2370sft |
| Height | 3037.3781sft | Horz error | 0.025sft | Elevation | 3139.6930sft |
| | | Vert error | 0.041sft | Utilized | Horz and Vert |
| | | 3D error | 0.048sft | Quality | Survey quality |
| Point | R2915-17 WGS84 | Northing | 960732.3214sft | Point R2915-17 Local | |
| Latitude | 36°21'50.14423"N | Easting | 1260924.8880sft | Northing | 960732.3040sft |
| Longitude | 81°30'36.58112"W | Elevation | 3355.9956sft | Easting | 1260924.8760sft |
| Height | 3253.5217sft | Horz error | 0.021sft | Elevation | 3356.0160sft |
| | | Vert error | 0.020sft | Utilized | Horz and Vert |
| | | 3D error | 0.029sft | Quality | Survey quality |
| Point | R2915-18 WGS84 | Northing | 959689.5169sft | Point R2915-18 Local | |
| Latitude | 36°21'39.95242"N | Easting | 1261385.6028sft | Northing | 959689.4970sft |
| Longitude | 81°30'30.62882"W | Elevation | 3396.5313sft | Easting | 1261385.5910sft |
| Height | 3294.0193sft | Horz error | 0.023sft | Elevation | 3396.5580sft |
| | | Vert error | 0.027sft | Utilized | Horz and Vert |
| | | 3D error | 0.035sft | Quality | Survey quality |
| Point | R2915-19 WGS84 | Northing | 967060.7220sft | Point R2915-19 Local | |
| Latitude | 36°22'54.39872"N | Easting | 1267779.1405sft | Northing | 967060.7040sft |
| Longitude | 81°29'14.75578"W | Elevation | 3005.2191sft | Easting | 1267779.1370sft |
| Height | 2902.6651sft | Horz error | 0.018sft | Elevation | 3005.2590sft |
| | | Vert error | 0.040sft | Utilized | Horz and Vert |
| | | 3D error | 0.044sft | Quality | Survey quality |
| Point | R2915-20 WGS84 | Northing | 966821.8373sft | Point R2915-20 Local | |
| Latitude | 36°22'52.19547"N | Easting | 1268416.6439sft | Northing | 966821.8150sft |
| Longitude | 81°29'06.89021"W | Elevation | 3001.8897sft | Easting | 1268416.6390sft |
| Height | 2899.3121sft | Horz error | 0.023sft | Elevation | 3001.9300sft |
| | | Vert error | 0.040sft | Utilized | Horz and Vert |
| | | 3D error | 0.046sft | Quality | Survey quality |
| Point | R2915-21 WGS84 | Northing | 972084.6876sft | Point R2915-21 Local | |
| Latitude | 36°23'44.52005"N | Easting | 1269660.6108sft | Northing | 972084.6700sft |
| Longitude | 81°28'53.29316"W | Elevation | 3132.4940sft | Easting | 1269660.6140sft |
| Height | 3029.9808sft | Horz error | 0.018sft | Elevation | 3132.5390sft |
| | | Vert error | 0.045sft | Utilized | Horz and Vert |
| | | 3D error | 0.048sft | Quality | Survey quality |
| Point | R2915-22 WGS84 | Northing | 973156.5253sft | Point R2915-22 Local | |
| Latitude | 36°23'55.25041"N | Easting | 1270213.4941sft | Northing | 973156.5140sft |

| | | | | | |
|------------------|------------------|-------------------|-----------------|-----------------------------|-----------------|
| Longitude | 81°28'46.86125"W | Elevation | 3163.2767sft | Easting | 1270213.5010sft |
| Height | 3060.7659sft | Horz error | 0.013sft | Elevation | 3163.3260sft |
| | | Vert error | 0.049sft | Utilized | Horz and Vert |
| | | 3D error | 0.051sft | Quality | Survey quality |
| Point | R2915-23 WGS84 | Northing | 981712.8608sft | Point R2915-23 Local | |
| Latitude | 36°25'21.32188"N | Easting | 1276325.1593sft | Northing | 981712.8790sft |
| Longitude | 81°27'34.73217"W | Elevation | 2903.7232sft | Easting | 1276325.1910sft |
| Height | 2801.1821sft | Horz error | 0.037sft | Elevation | 2903.6430sft |
| | | Vert error | 0.080sft | Utilized | Horz and Vert |
| | | 3D error | 0.088sft | Quality | Survey quality |
| Point | R2915-24 WGS84 | Northing | 980994.0668sft | Point R2915-24 Local | |
| Latitude | 36°25'14.17430"N | Easting | 1276148.6155sft | Northing | 980994.0780sft |
| Longitude | 81°27'36.67335"W | Elevation | 2878.9461sft | Easting | 1276148.6390sft |
| Height | 2776.3983sft | Horz error | 0.026sft | Elevation | 2878.8920sft |
| | | Vert error | 0.054sft | Utilized | Horz and Vert |
| | | 3D error | 0.060sft | Quality | Survey quality |

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2915-15"

WITH NAD 83/CORS STATE PLANE GRID COORDINATES OF
 NORTHING: 954880.7810(±) EASTING: 1254012.2870(±)
 ELEVATION: 3097.5210(±)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99991292

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2915-15" TO -L- STATION 453+03.05 IS
 S 14°52'00" E 2311.2917

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

NOTES:

- THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/85 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VBS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.
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[HTTP://WWW.NCDOT.ORG/DOHPRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.org/dohpreconstruct/highway/location/project/)
 THE FILES TO BE FOUND ARE AS FOLLOWS:
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 R2915D_LS_WGS84.TXT
 R2915D_LS_LOCAL.TXT
 R2915D_LS_CONTROL.TXT
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 NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.
 SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

6/2/09

8:54:47 AM 6/2/09 11:1c-3.dgn

SURVEY CONTROL SHEET R-2915D

ROW MARKER IRON PIN AND CAP-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|-------|-----------|---------|-------------|--------------|
| L | 452+39.52 | 85.00 | 952586.2297 | 1254692.3869 |
| L | 452+40.76 | 73.50 | 952587.0850 | 1254680.8515 |
| L | 456+07.64 | 85.00 | 952956.3683 | 1254677.9486 |
| L | 464+70.00 | 225.26 | 953859.4506 | 1254641.4653 |
| L | 467+50.00 | 235.61 | 954127.7635 | 1254572.3070 |
| L | 467+50.00 | -165.07 | 954017.7364 | 1254187.0286 |
| L | 469+05.00 | -136.96 | 954183.1235 | 1254173.2887 |
| L | 470+30.00 | -160.00 | 954312.7476 | 1254126.7313 |
| L | 471+00.00 | -135.00 | 954391.6943 | 1254141.1024 |
| L | 472+65.00 | -135.00 | 954570.3111 | 1254132.1179 |
| L | 472+65.00 | -111.02 | 954570.2798 | 1254156.0988 |
| L | 488+00.00 | -141.69 | 956052.0426 | 1254686.8933 |
| L | 488+00.00 | 222.50 | 955878.6024 | 1255007.1332 |
| L | 488+80.00 | -141.43 | 956122.2653 | 1254725.2187 |
| L | 490+00.00 | -185.00 | 956248.5333 | 1254744.0536 |
| L | 490+85.00 | 222.75 | 956129.0894 | 1255143.0792 |
| L | 490+85.00 | -141.56 | 956302.5859 | 1254822.7353 |
| L | 495+40.00 | -175.00 | 956718.6033 | 1255010.0134 |
| L | 496+20.00 | -141.63 | 956773.0587 | 1255077.4517 |
| L | 497+90.00 | 210.58 | 956754.8049 | 1255468.1227 |
| L | 497+90.00 | -156.44 | 956929.5922 | 1255145.3954 |
| L | 500+75.00 | -136.22 | 957170.5721 | 1255298.8954 |
| L | 500+75.00 | 210.31 | 957005.5432 | 1255603.6047 |
| L | 502+10.00 | -97.62 | 957271.0467 | 1255397.2516 |
| L | 505+30.00 | -115.00 | 957563.8400 | 1255551.3827 |
| L | 509+50.00 | -115.00 | 957904.3410 | 1255830.2667 |
| L | 511+25.00 | -105.00 | 958022.8833 | 1255970.3263 |
| L | 527+00.00 | 206.59 | 958565.8199 | 1257489.7614 |
| L | 527+00.00 | -183.75 | 958908.3921 | 1257302.6437 |
| L | 528+70.00 | -166.79 | 958975.0014 | 1257459.9675 |
| L | 529+00.00 | -185.00 | 959005.3595 | 1257477.5690 |
| L | 529+45.00 | -159.31 | 959004.3879 | 1257529.3750 |
| L | 529+75.00 | -156.32 | 959016.1424 | 1257557.1380 |
| L | 529+75.00 | 207.20 | 958697.1069 | 1257731.3997 |
| L | 530+70.00 | -146.84 | 959053.3653 | 1257645.0543 |
| L | 531+50.00 | -165.00 | 959107.6487 | 1257706.5601 |
| L | 532+50.00 | -165.00 | 959155.5852 | 1257794.3216 |
| L | 533+75.00 | -124.20 | 959179.6955 | 1257923.5837 |
| L | 535+75.00 | -109.75 | 959262.8937 | 1258106.0300 |
| L | 535+75.00 | -125.00 | 959276.2745 | 1258098.7212 |
| L | 537+91.81 | -140.00 | 959393.3691 | 1258281.8048 |
| L | 538+24.05 | -91.77 | 959366.4971 | 1258333.2229 |
| L | 539+35.00 | -91.64 | 959419.5711 | 1258430.6531 |
| L | 539+35.00 | -110.00 | 959435.6819 | 1258421.8531 |
| L | 540+45.00 | -145.00 | 959519.1287 | 1258501.6130 |
| L | 541+10.00 | -155.00 | 959559.0636 | 1258553.8644 |
| L | 542+00.00 | -120.00 | 959571.4900 | 1258649.6275 |
| L | 543+50.00 | -110.00 | 959634.6166 | 1258786.0594 |
| L | 545+25.00 | -115.00 | 959722.8407 | 1258934.6021 |
| L | 545+25.00 | -102.30 | 959711.8180 | 1258940.9177 |
| L | 585+10.00 | -101.86 | 961622.4532 | 1262275.7710 |
| L | 587+00.00 | -120.00 | 961659.5632 | 1262462.7449 |
| L | 588+50.00 | 229.21 | 961329.6862 | 1262653.1834 |
| L | 588+50.00 | -96.91 | 961653.1654 | 1262611.7557 |
| L | 590+19.59 | 213.99 | 961372.6526 | 1262830.5639 |
| L | 590+19.99 | 243.99 | 961343.2357 | 1262836.4499 |
| L | 590+50.00 | -135.00 | 961721.2463 | 1262795.5390 |
| L | 591+35.00 | 212.13 | 961399.4438 | 1262951.5281 |
| L | 591+35.00 | -99.25 | 961703.1217 | 1262882.7301 |
| L | 602+25.00 | -265.96 | 962258.6816 | 1263748.2604 |
| L | 602+25.00 | 303.38 | 961788.3517 | 1264069.0997 |
| L | 604+33.99 | 370.82 | 961872.3734 | 1264296.8722 |
| L | 605+00.00 | 343.87 | 961940.0344 | 1264337.4334 |
| L | 605+00.00 | -199.67 | 962358.0287 | 1263989.9962 |

ROW MARKER IRON PIN AND CAP-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|-------|----------|--------|-------------|--------------|
| Y27 | 14+65.00 | -40.00 | 954797.7012 | 1253918.5987 |
| Y27 | 14+65.00 | -19.97 | 954785.1597 | 1253934.2223 |
| Y27 | 15+62.71 | -40.00 | 954873.9019 | 1253979.7673 |
| Y27 | 16+28.09 | -40.00 | 954926.1926 | 1254032.0545 |

ROW MARKER IRON PIN AND CAP-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|-------|----------|--------|-------------|--------------|
| Y27B | 10+90.00 | -24.01 | 955028.2211 | 1253924.5295 |
| Y27B | 11+65.77 | -35.00 | 955019.8805 | 1253981.0749 |
| Y27B | 12+64.12 | -35.00 | 955018.4412 | 1254079.4206 |

ROW MARKER IRON PIN AND CAP-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|-------|----------|--------|-------------|--------------|
| Y28 | 15+95.00 | 29.60 | 958082.4738 | 1255907.5912 |

ROW MARKER PERMANENT EASEMENT-E

| ALIGN | STATION | OFFSET | NORTH | EAST |
|-------|-----------|---------|-------------|--------------|
| L | 452+55.00 | 100.00 | 952602.2066 | 1254706.8565 |
| L | 452+55.00 | 84.92 | 952601.6982 | 1254691.7836 |
| L | 452+95.00 | 100.00 | 952642.1839 | 1254705.5079 |
| L | 452+95.00 | 84.71 | 952641.6683 | 1254690.2244 |
| L | 506+30.00 | -122.00 | 957653.5609 | 1255606.5233 |
| L | 506+30.00 | -115.00 | 957649.3859 | 1255612.1420 |
| L | 506+70.00 | -122.00 | 957687.1318 | 1255631.9180 |
| L | 506+70.00 | -115.00 | 957682.8610 | 1255637.4642 |

L

| TYPE | STATION | NORTH | EAST |
|------|-----------|-------------|--------------|
| POT | 431+00.00 | 950559.2874 | 1255176.5279 |
| TS | 435+12.21 | 950921.2667 | 1254979.3217 |
| SC | 437+82.21 | 951160.7101 | 1254854.6367 |
| CS | 446+28.50 | 951972.9508 | 1254633.0909 |
| ST | 448+98.50 | 952242.5413 | 1254618.9324 |
| TS | 453+95.83 | 952739.5820 | 1254602.1655 |
| SC | 456+70.83 | 953014.2263 | 1254588.6976 |
| CS | 461+69.02 | 953505.2823 | 1254508.1477 |
| ST | 464+44.02 | 953769.8368 | 1254433.1688 |
| TS | 466+31.59 | 953949.4990 | 1254379.2712 |
| SC | 469+61.59 | 954268.5033 | 1254295.4061 |
| CS | 478+92.10 | 955181.1431 | 1254389.2419 |
| ST | 482+22.10 | 955476.4080 | 1254536.2649 |
| TS | 501+60.09 | 957180.5172 | 1255459.2012 |
| SC | 504+35.09 | 957419.6701 | 1255594.8755 |
| CS | 514+98.67 | 958166.5493 | 1256339.0970 |
| ST | 517+73.67 | 958303.0753 | 1256577.7647 |
| TS | 543+41.68 | 959534.0941 | 1258831.4944 |
| SC | 546+16.68 | 959669.5786 | 1259070.7742 |
| CS | 555+85.02 | 960295.9562 | 1259803.7274 |
| ST | 558+60.02 | 960511.1973 | 1259974.8478 |
| TS | 560+24.61 | 960641.5812 | 1260075.2931 |
| SC | 563+54.61 | 960896.2443 | 1260284.9489 |
| CS | 574+08.37 | 961400.1069 | 1261191.2803 |
| ST | 577+38.37 | 961443.7678 | 1261518.2399 |
| TS | 586+42.57 | 961534.3974 | 1262417.8863 |
| SC | 589+17.57 | 961566.2786 | 1262691.0044 |
| CS | 607+89.54 | 962400.3510 | 1264330.6891 |
| ST | 610+64.54 | 962602.3180 | 1264517.2882 |
| PC | 635+27.76 | 964437.7405 | 1266160.0519 |
| PT | 649+94.93 | 965463.5408 | 1267207.5363 |
| TS | 660+78.27 | 966168.9995 | 1268029.7042 |
| SC | 663+53.27 | 966351.3900 | 1268235.4785 |
| PCC | 668+25.00 | 966702.3075 | 1268549.9278 |
| CS | 677+05.77 | 967484.0953 | 1268945.2161 |
| ST | 679+85.77 | 967755.3314 | 1269014.5575 |
| POT | 680+64.35 | 967831.8104 | 1269032.5647 |

TIE

| TYPE | STATION | NORTH | EAST |
|------|----------|-------------|--------------|
| POT | 10+00.00 | 952247.8728 | 1254642.2660 |
| TS | 14+03.63 | 952651.2722 | 1254628.6578 |
| SC | 16+78.63 | 952925.9165 | 1254615.1900 |
| CS | 21+76.82 | 953416.9726 | 1254534.6401 |
| ST | 24+51.82 | 953681.5270 | 1254459.6611 |
| POT | 27+31.59 | 953949.4990 | 1254379.2712 |

Y27

| TYPE | STATION | NORTH | EAST |
|------|----------|-------------|--------------|
| POT | 10+00.00 | 954410.0408 | 1253658.7057 |
| PC | 15+62.71 | 954848.8623 | 1254010.9604 |
| PT | 18+27.05 | 954961.0383 | 1254240.9254 |
| POT | 19+02.51 | 954962.0405 | 1254316.3846 |

Y27A

| TYPE | STATION | NORTH | EAST |
|------|----------|-------------|--------------|
| POT | 10+00.00 | 954934.5687 | 1254121.6390 |
| PC | 10+18.14 | 954951.1105 | 1254114.1835 |
| PT | 10+87.87 | 955018.2988 | 1254116.9685 |
| POT | 14+24.60 | 955312.7780 | 1254280.2594 |

Y27B

| TYPE | STATION | NORTH | EAST |
|------|----------|-------------|--------------|
| POT | 10+00.00 | 955074.1896 | 1253848.1277 |
| PC | 10+67.44 | 955024.2400 | 1253893.4447 |
| PT | 11+65.77 | 954984.8842 | 1253980.5628 |
| POT | 12+92.78 | 954983.0256 | 1254107.5675 |

Y27C

| TYPE | STATION | NORTH | EAST |
|------|----------|-------------|--------------|
| POT | 10+00.00 | 954968.8211 | 1254318.1232 |
| PC | 12+00.69 | 954971.4863 | 1254518.7997 |
| PT | 12+77.06 | 954948.9455 | 1254590.4201 |
| PC | 12+98.39 | 954936.5003 | 1254607.7387 |
| PT | 13+53.89 | 954897.5670 | 1254646.9634 |
| POT | 13+97.64 | 954862.2224 | 1254672.7640 |

Y28

| TYPE | STATION | NORTH | EAST |
|------|----------|-------------|--------------|
| POT | 10+00.00 | 958210.8830 | 1255329.6910 |
| PC | 10+83.39 | 958204.0245 | 1255412.7993 |
| PT | 12+58.40 | 958182.0232 | 1255586.3618 |
| PC | 13+45.13 | 958167.3628 | 1255671.8484 |
| PT | 15+24.13 | 958129.2595 | 1255846.6773 |
| PC | 16+26.61 | 958102.9784 | 1255945.7344 |
| PT | 17+41.07 | 958049.7542 | 1256045.9392 |
| POT | 18+18.71 | 957998.7219 | 1256104.4567 |

Y29

| TYPE | STATION | NORTH | EAST |
|------|----------|-------------|--------------|
| POT | 10+00.00 | 958101.0869 | 1256240.1349 |
| PC | 10+71.47 | 958050.3137 | 1256290.4278 |
| PCC | 12+33.83 | 957978.7187 | 1256432.9847 |
| PT | 15+68.13 | 958011.1481 | 1256762.5268 |
| PC | 16+15.62 | 958026.8439 | 1256807.3426 |
| PT | 17+03.49 | 958061.0118 | 1256888.2376 |
| PC | 18+20.87 | 958113.3753 | 1256993.2891 |
| PT | 20+40.37 | 958196.6006 | 1257196.1939 |
| POT | 21+30.25 | 958224.5375 | 1257281.6180 |


Y30

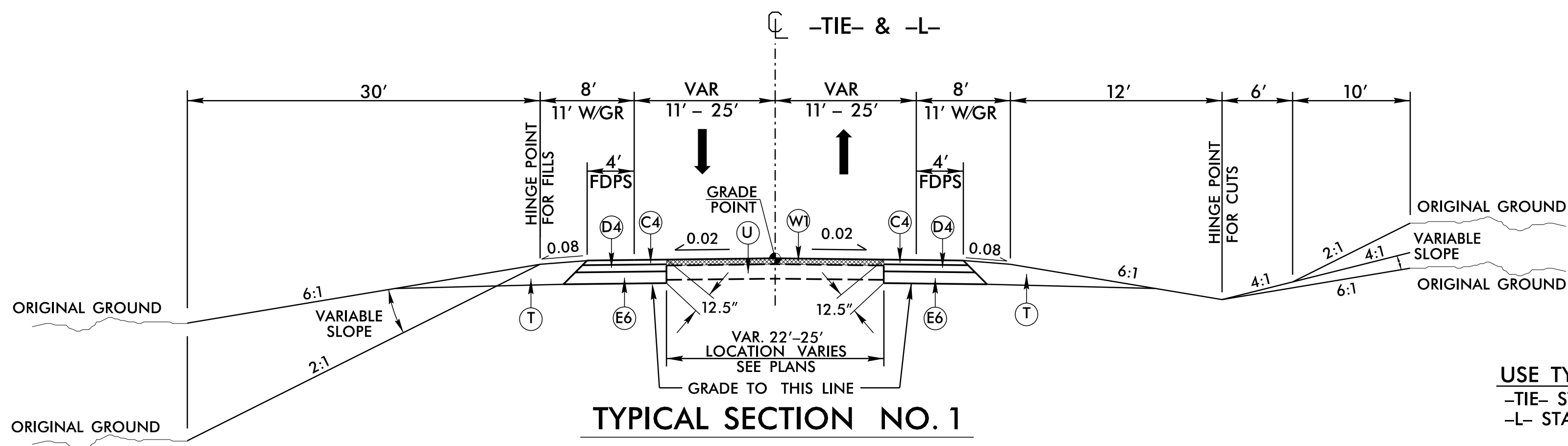
| TYPE | STATION | NORTH | EAST |
|------|----------|-------------|--------------|
| POT | 10+00.00 | 963703.8759 | 1265503.2189 |
| PC | 12+98.42 | 963500.2004 | 1265721.3232 |
| PT | 14+59.38 | 963352.4428 | 1265747.5618 |
| POT | 15+64.85 | 963258.3152 | 1265699.9729 |

Y31

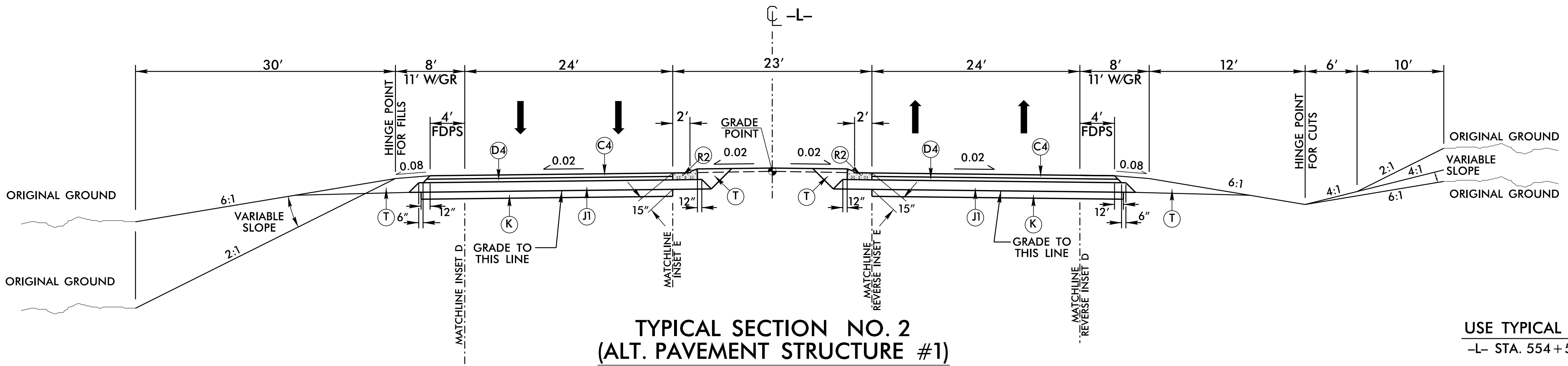
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| PAVEMENT SCHEDULE | |
|-----------------------|------------------------|
| FINAL PAVEMENT DESIGN | |
| C1 | 3" S9.5B |
| C2 | VAR. S9.5B |
| C3 | 1.5" S9.5C |
| C4 | 3" S9.5C |
| C5 | VAR. S9.5C |
| C6 | 1.5" S9.5B |
| C7 | 3" S9.5B |
| D1 | 2.5" I19.0B |
| D2 | 4" I19.0B |
| D3 | VAR. I19.0B |
| D4 | 4" I19.0C |
| D5 | VAR. I19.0C |
| E1 | 4" B25.0B |
| E2 | 5" B25.0B |
| E3 | 5.5" B25.0B |
| E4 | VAR. B25.0B |
| E5 | 3" B25.0C |
| E6 | 5.5" B25.0C |
| E7 | VAR. B25.0C |
| J1 | 8" ABC |
| K | SUBGRADE STABILIZATION |
| N | GEOTEXTILE |
| R1 | 2'-6" C & G |
| R2 | 2'-9" C & G |
| R3 | 5" MONO. ISLAND |
| R4 | EXPR. GUTTER |
| T | EARTH MATERIAL |
| U | EXIST. PAVEMENT |
| V | 3" MILLING |
| W1 | WEDGING DETAIL 1 |
| W2 | WEDGING DETAIL 2 |
| W3 | WEDGING DETAIL 3 |
| W4 | WEDGING DETAIL 4 |

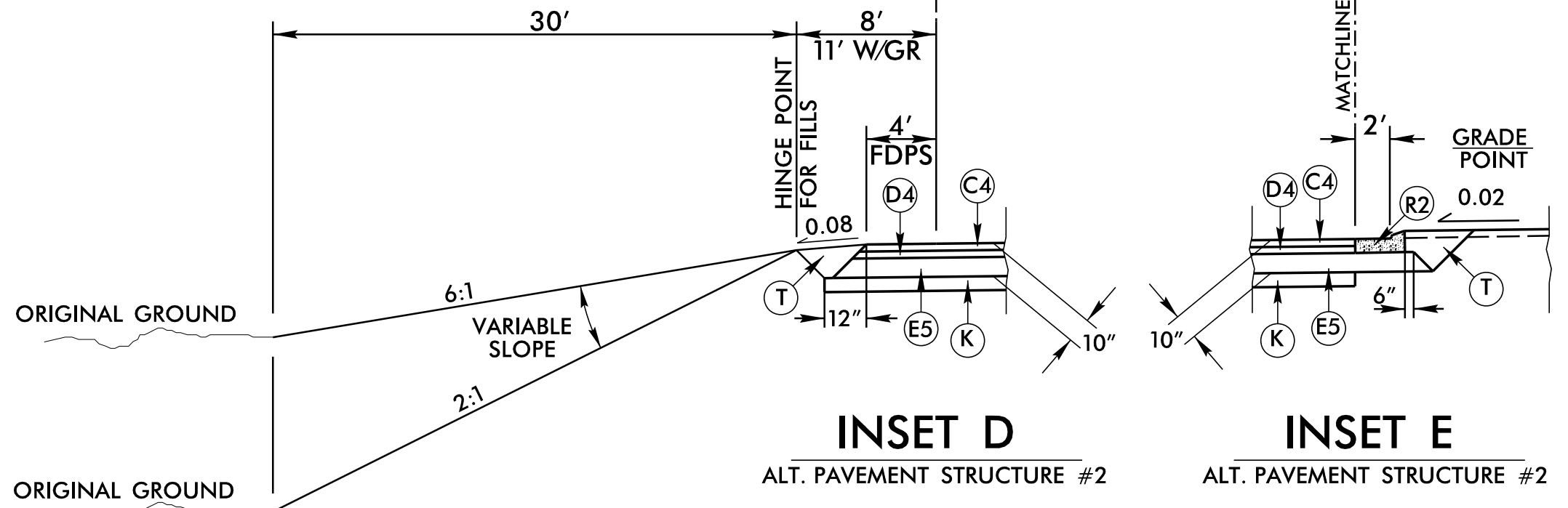
| | |
|--|--|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 2A-2 |
| ROADWAY DESIGN ENGINEER Barry C. Smith 12/26/2018 NORTH CAROLINA PROFESSIONAL SEAL 034375 ENGINEER | PAVEMENT DESIGN ENGINEER Don-Chi Chen 12/29/2018 NORTH CAROLINA PROFESSIONAL SEAL 013368 ENGINEER |
|  KCI <small>Engineers • Planners • Scientists • Construction Managers</small> <small>4601 Six Forks Road, Landmark Center II, Suite 220</small> <small>Raleigh, NC 27609-5210</small> <small>Phone (919) 783-9214 • Fax (919) 783-9266</small> | |



USE TYPICAL SECTION NO. 1 AS FOLLOWS:
 -TIE- STA. 14+00.00 TO -TIE- STA. 17+91.00
 -L- STA. 676+29.00 TO -L- STA. 679+90.00

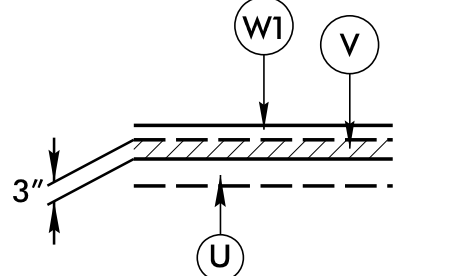


USE TYPICAL SECTION NO. 2 AS FOLLOWS:
 -L- STA. 554+50.00 TO -L- STA. 562+50.00

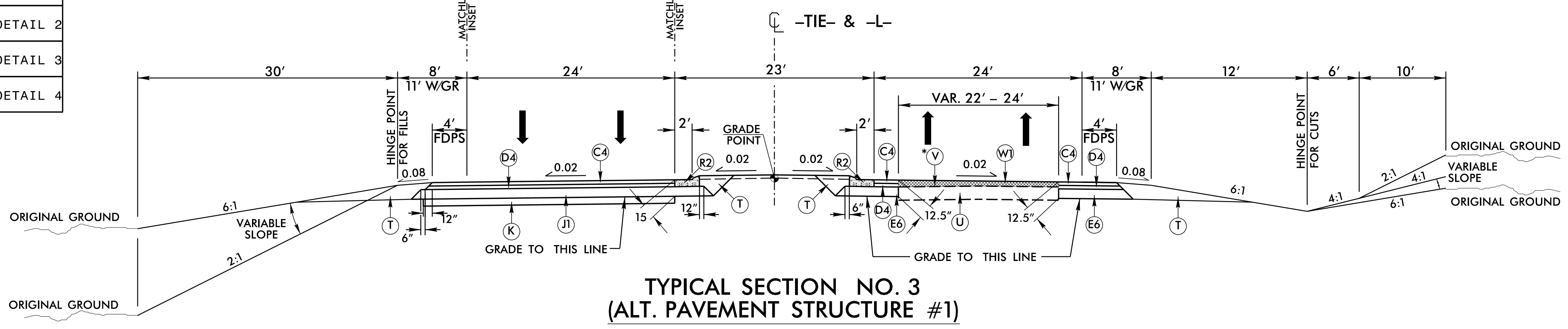


*** MILLING DETAIL**

-L- STA. 585+00.00 TO -L- STA. 625+00.00



MILL DEPTH = 3"
 REPLACE WITH 3" I19.0C AT A RATE
 OF 342 LBS PER SQ. YD.

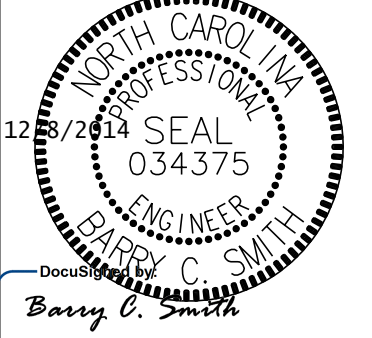
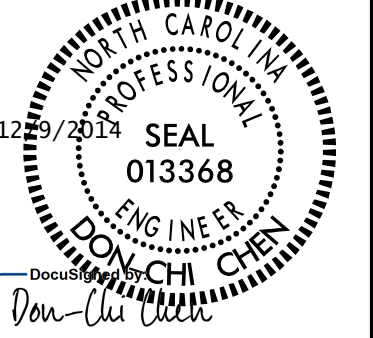



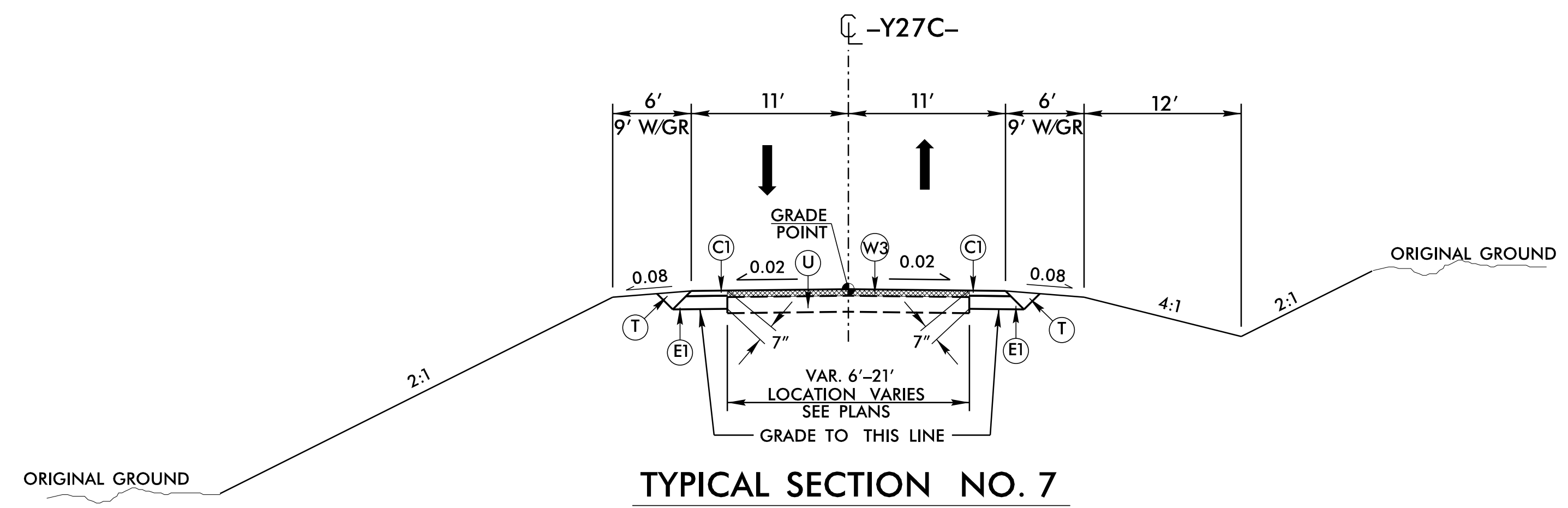
USE TYPICAL SECTION NO. 3 AS FOLLOWS:
 -TIE- STA. 17+91.00 TO -TIE- STA. 25+44.02
 -L- STA. 464+44.02 TO -L- STA. 548+50.00
 -L- STA. 570+50.00 TO -L- STA. 600+00.00

USE REVERSE OF TYPICAL SECTION NO. 3 AS FOLLOWS:
 -L- STA. 548+50.00 TO -L- STA. 554+50.00
 -L- STA. 562+50.00 TO -L- STA. 570+50.00
 -L- STA. 600+00.00 TO -L- STA. 660+09.00
 -L- STA. 672+10.00 TO -L- STA. 676+29.00

6/2/09
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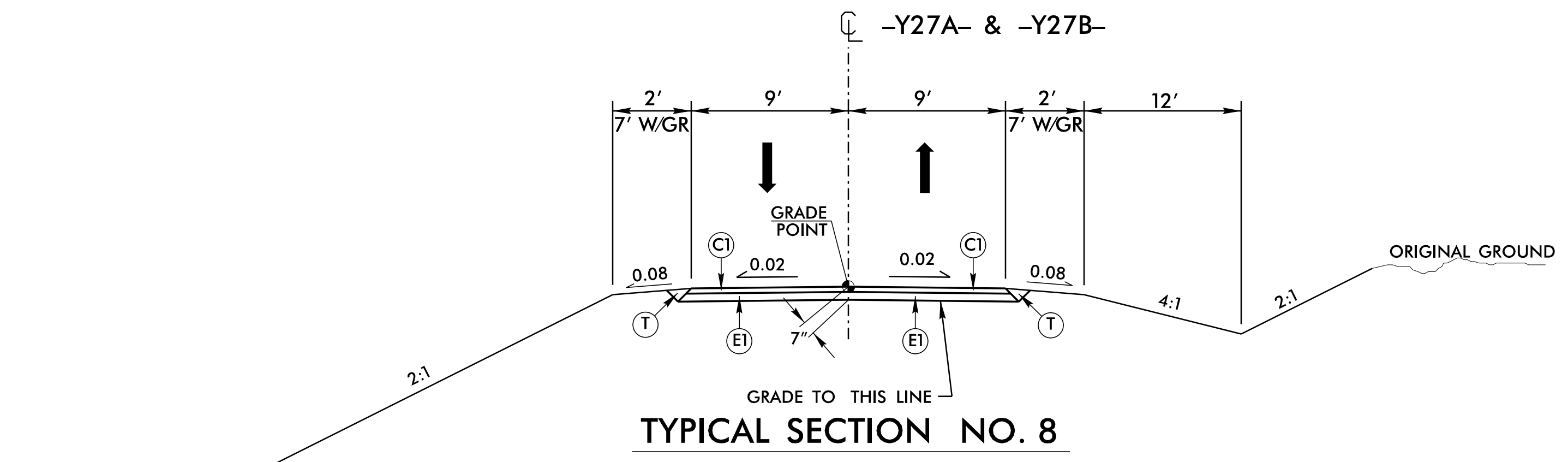
| PAVEMENT SCHEDULE | |
|-----------------------|------------------------|
| FINAL PAVEMENT DESIGN | |
| C1 | 3" S9.5B |
| C2 | VAR. S9.5B |
| C3 | 1.5" S9.5C |
| C4 | 3" S9.5C |
| C5 | VAR. S9.5C |
| C6 | 1.5" S9.5B |
| C7 | 3" S9.5B |
| D1 | 2.5" I19.0B |
| D2 | 4" I19.0B |
| D3 | VAR. I19.0B |
| D4 | 4" I19.0C |
| D5 | VAR. I19.0C |
| E1 | 4" B25.0B |
| E2 | 5" B25.0B |
| E3 | 5.5" B25.0B |
| E4 | VAR. B25.0B |
| E5 | 3" B25.0C |
| E6 | 5.5" B25.0C |
| E7 | VAR. B25.0C |
| J1 | 8" ABC |
| K | SUBGRADE STABILIZATION |
| N | GEOTEXTILE |
| R1 | 2'-6" C & G |
| R2 | 2'-9" C & G |
| R3 | 5" MONO. ISLAND |
| R4 | EXPR. GUTTER |
| T | EARTH MATERIAL |
| U | EXIST. PAVEMENT |
| V | 3" MILLING |
| W1 | WEDGING DETAIL 1 |
| W2 | WEDGING DETAIL 2 |
| W3 | WEDGING DETAIL 3 |
| W4 | WEDGING DETAIL 4 |

| | |
|--|---|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 2A-4 |
| ROADWAY DESIGN ENGINEER  | PAVEMENT DESIGN ENGINEER  |
|  Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |



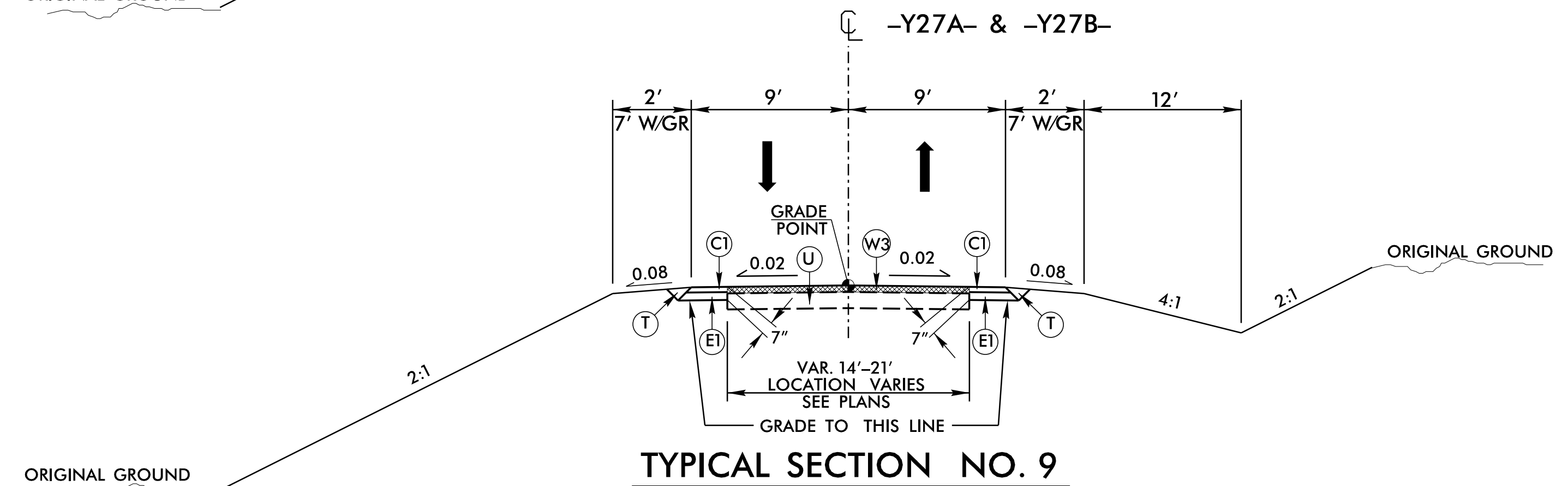
TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7 AS FOLLOWS:
 -Y27C- STA. 10+36.83 TO -Y27C- STA. 12+00.00



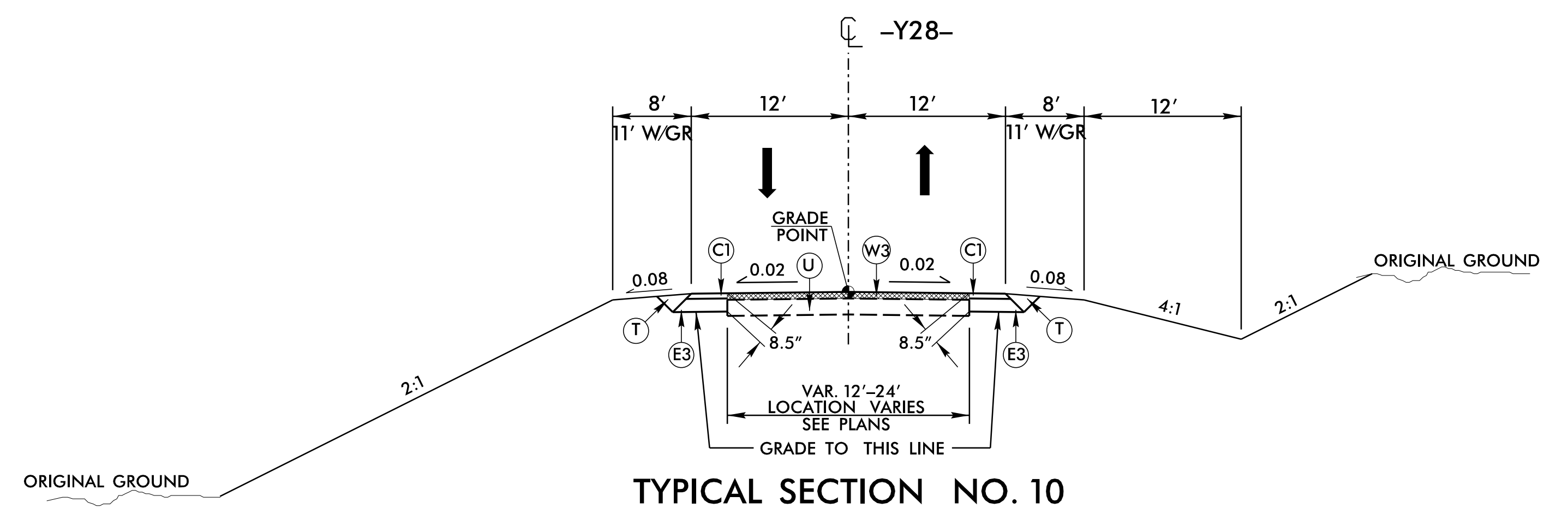
TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8 AS FOLLOWS:
 -Y27A- STA. 10+12.00 TO -Y27A- STA. 11+25.00
 -Y27B- STA. 11+45.00 TO -Y27B- STA. 12+83.78



TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9 AS FOLLOWS:
 -Y27A- STA. 11+25.00 TO -Y27A- STA. 11+70.00
 -Y27B- STA. 10+90.00 TO -Y27B- STA. 11+45.00



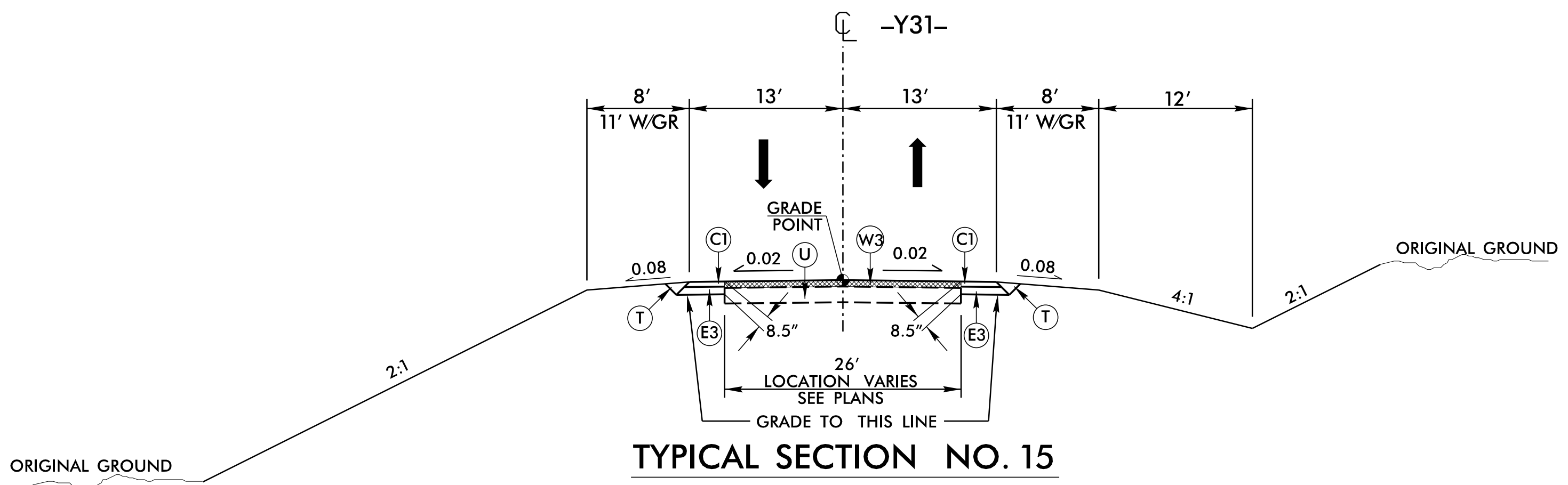
TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10 AS FOLLOWS:
 -Y28- STA. 16+15.00 TO -Y28- STA. 17+08.00

6/2/2014
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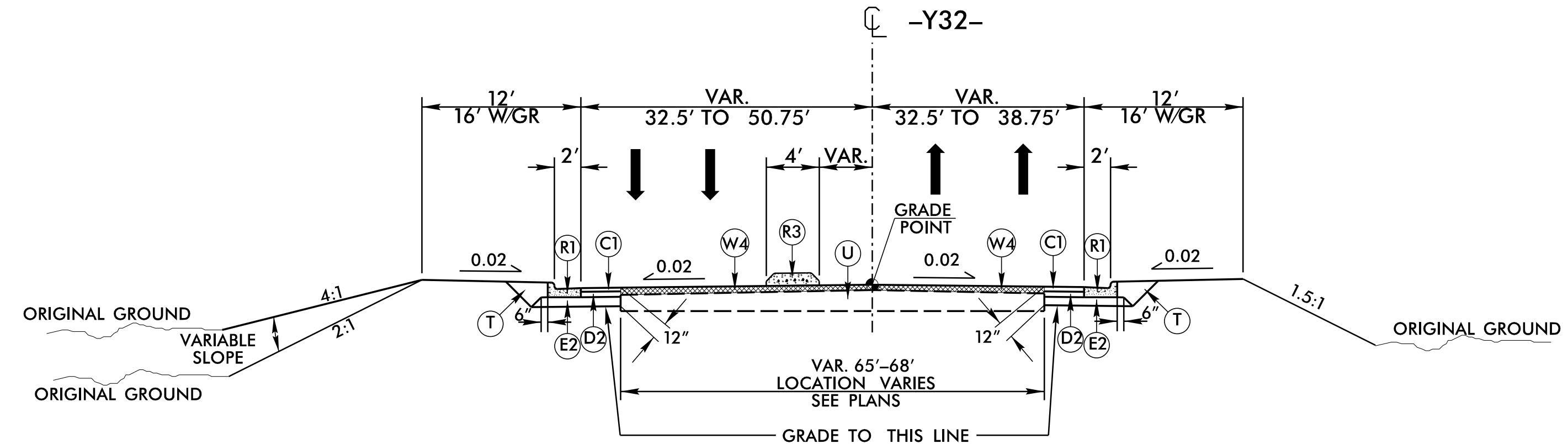
| PAVEMENT SCHEDULE | |
|-----------------------|------------------------|
| FINAL PAVEMENT DESIGN | |
| C1 | 3" S9.5B |
| C2 | VAR. S9.5B |
| C3 | 1.5" S9.5C |
| C4 | 3" S9.5C |
| C5 | VAR. S9.5C |
| C6 | 1.5" S9.5B |
| C7 | 3" S9.5B |
| D1 | 2.5" I19.0B |
| D2 | 4" I19.0B |
| D3 | VAR. I19.0B |
| D4 | 4" I19.0C |
| D5 | VAR. I19.0C |
| E1 | 4" B25.0B |
| E2 | 5" B25.0B |
| E3 | 5.5" B25.0B |
| E4 | VAR. B25.0B |
| E5 | 3" B25.0C |
| E6 | 5.5" B25.0C |
| E7 | VAR. B25.0C |
| J1 | 8" ABC |
| K | SUBGRADE STABILIZATION |
| N | GEOTEXTILE |
| R1 | 2'-6" C & G |
| R2 | 2'-9" C & G |
| R3 | 5" MONO. ISLAND |
| R4 | EXPR. GUTTER |
| T | EARTH MATERIAL |
| U | EXIST. PAVEMENT |
| V | 3" MILLING |
| W1 | WEDGING DETAIL 1 |
| W2 | WEDGING DETAIL 2 |
| W3 | WEDGING DETAIL 3 |
| W4 | WEDGING DETAIL 4 |

| | |
|---|---|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 2A-6 |
| ROADWAY DESIGN ENGINEER Barry C. Smith | PAVEMENT DESIGN ENGINEER Don-Chi Chen |
| | |
| | |
| <small>Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266</small> | |



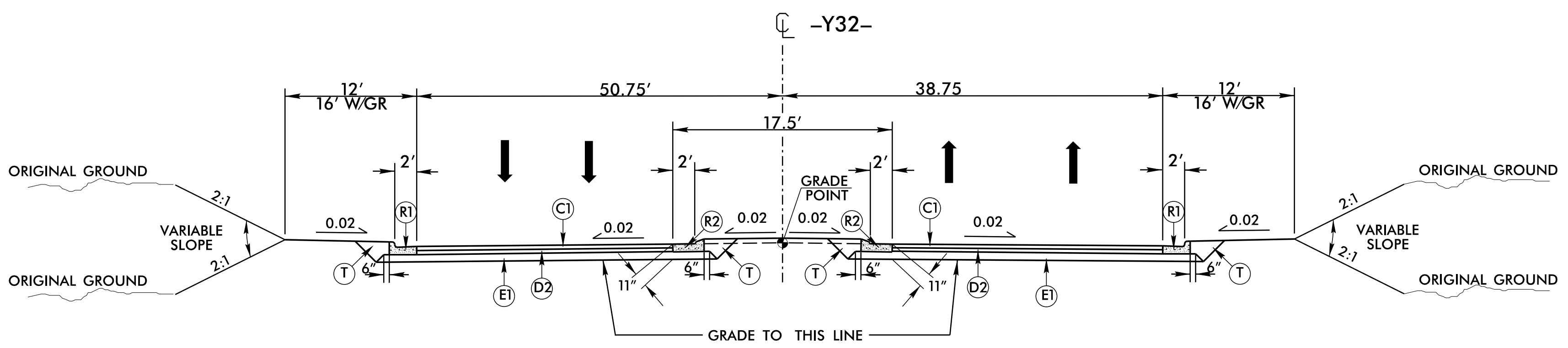
TYPICAL SECTION NO. 15

USE TYPICAL SECTION NO. 15 AS FOLLOWS:
 -Y31- STA. 10+35.98 TO -Y31- STA. 11+65.00



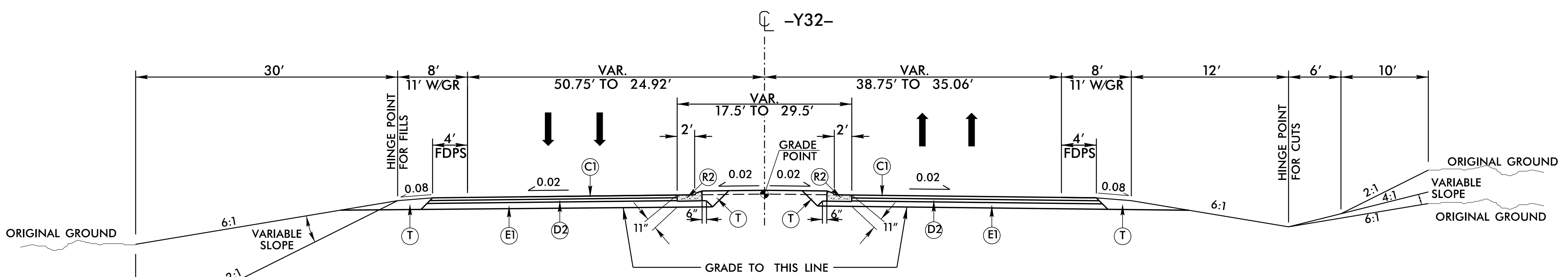
TYPICAL SECTION NO. 16

USE TYPICAL SECTION NO. 16 AS FOLLOWS:
 -Y32- STA. 16+30.00 TO -Y32- STA. 21+46.70



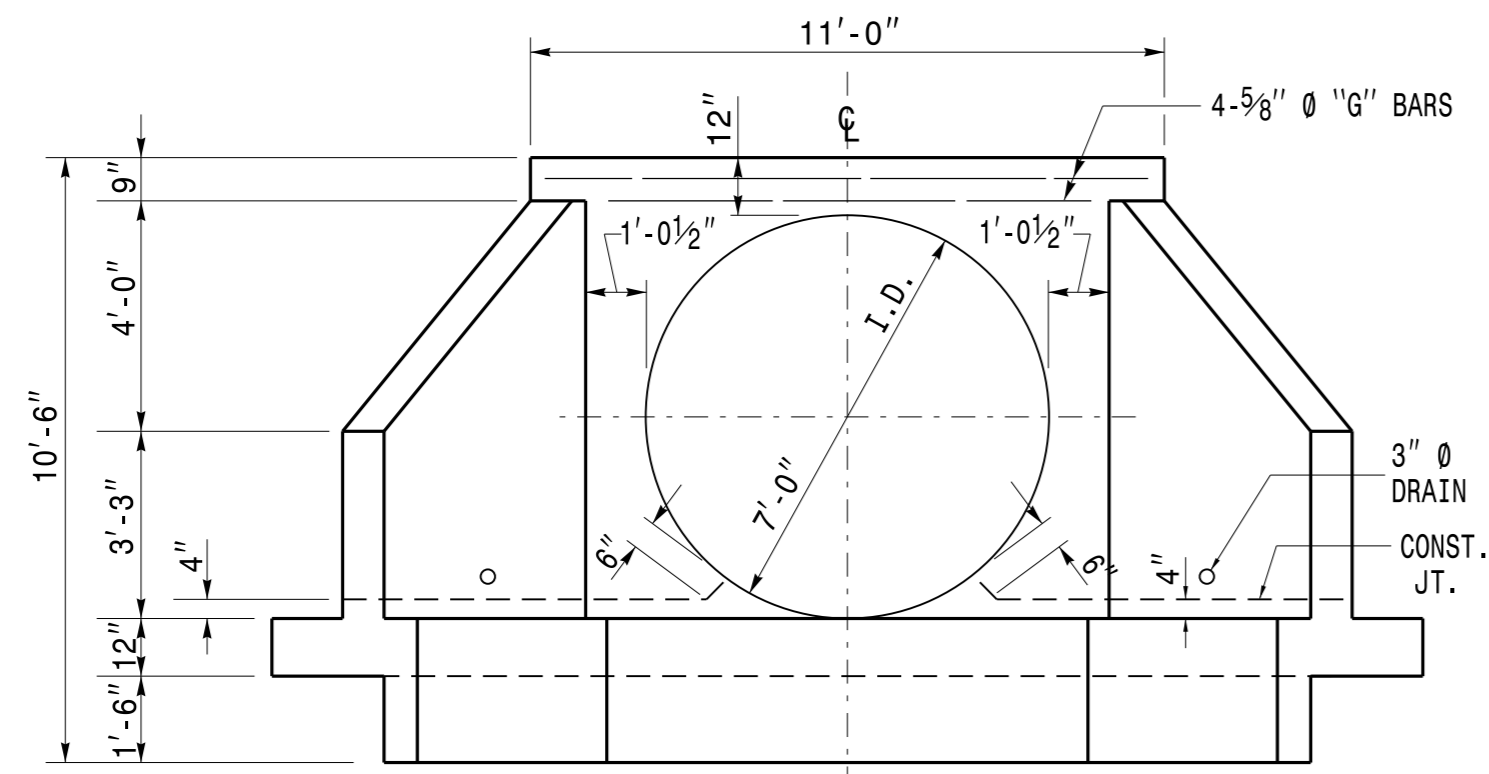
TYPICAL SECTION NO. 17

USE TYPICAL SECTION NO. 17 AS FOLLOWS:
 -Y32- STA. 22+52.07 TO -Y32- STA. 25+00.00

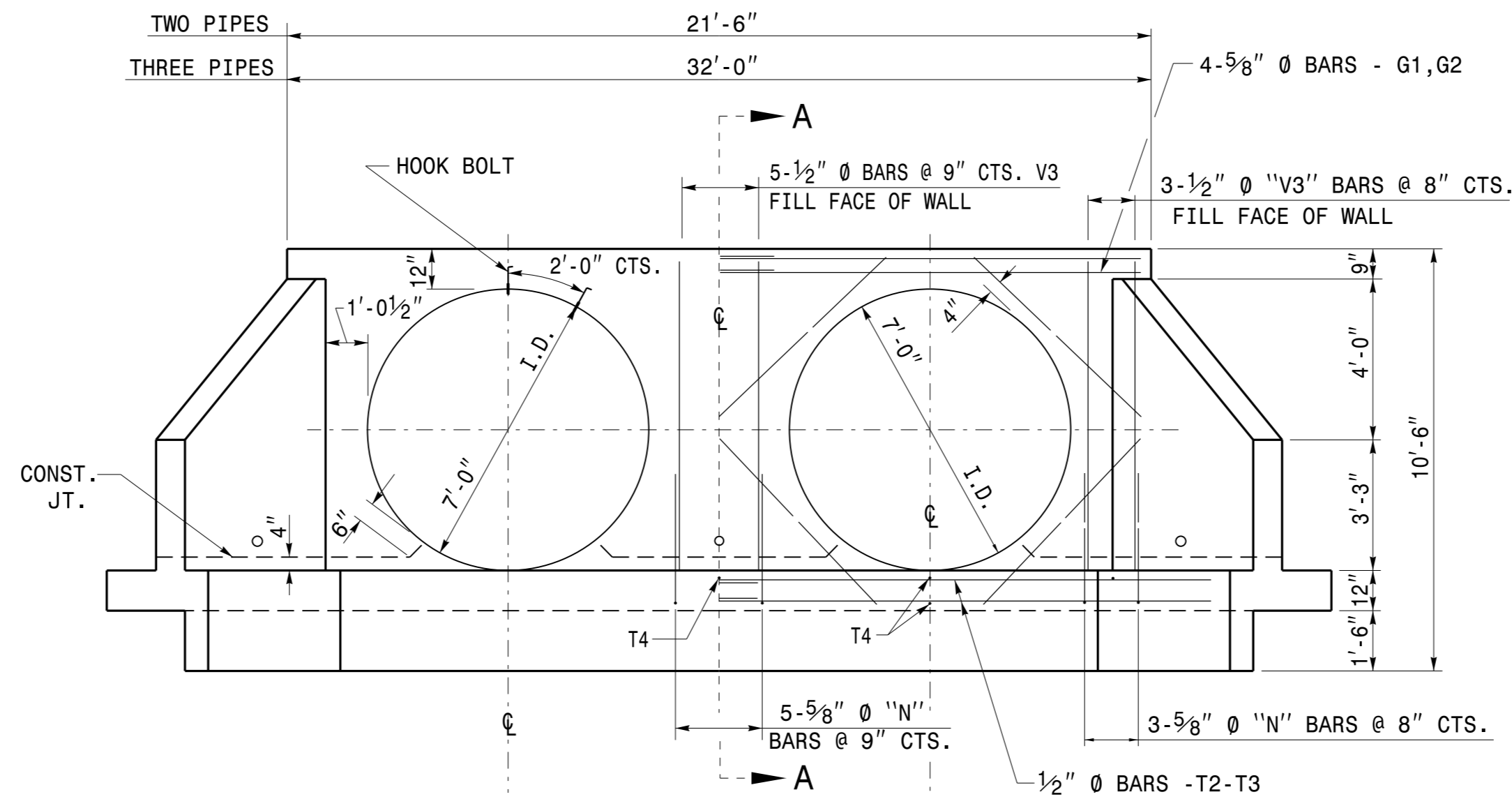


TYPICAL SECTION NO. 18

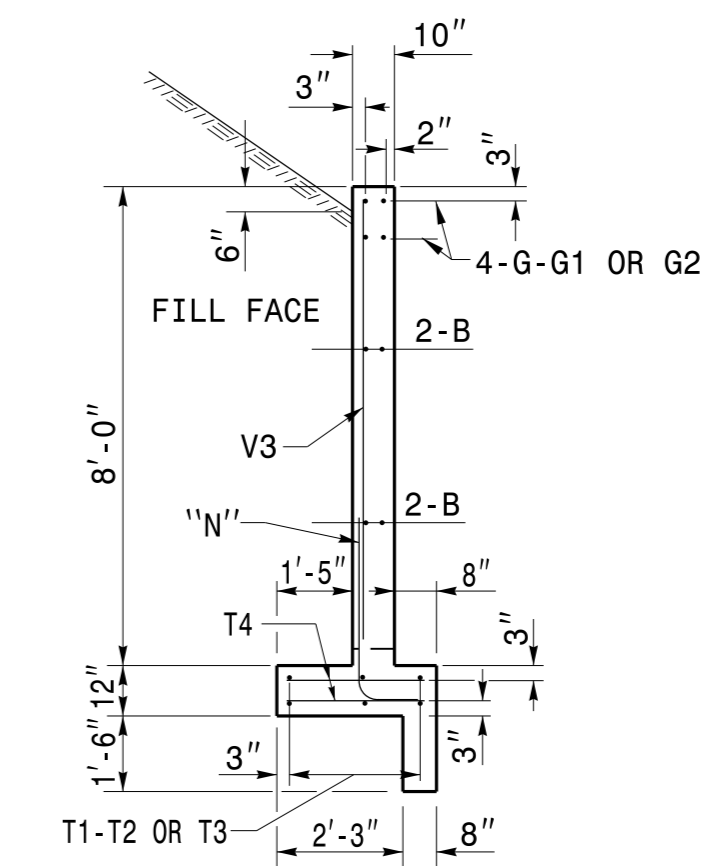
USE TYPICAL SECTION NO. 18 AS FOLLOWS:
 -Y32- STA. 25+00.00 TO -Y32- STA. 27+00.00



END ELEVATION



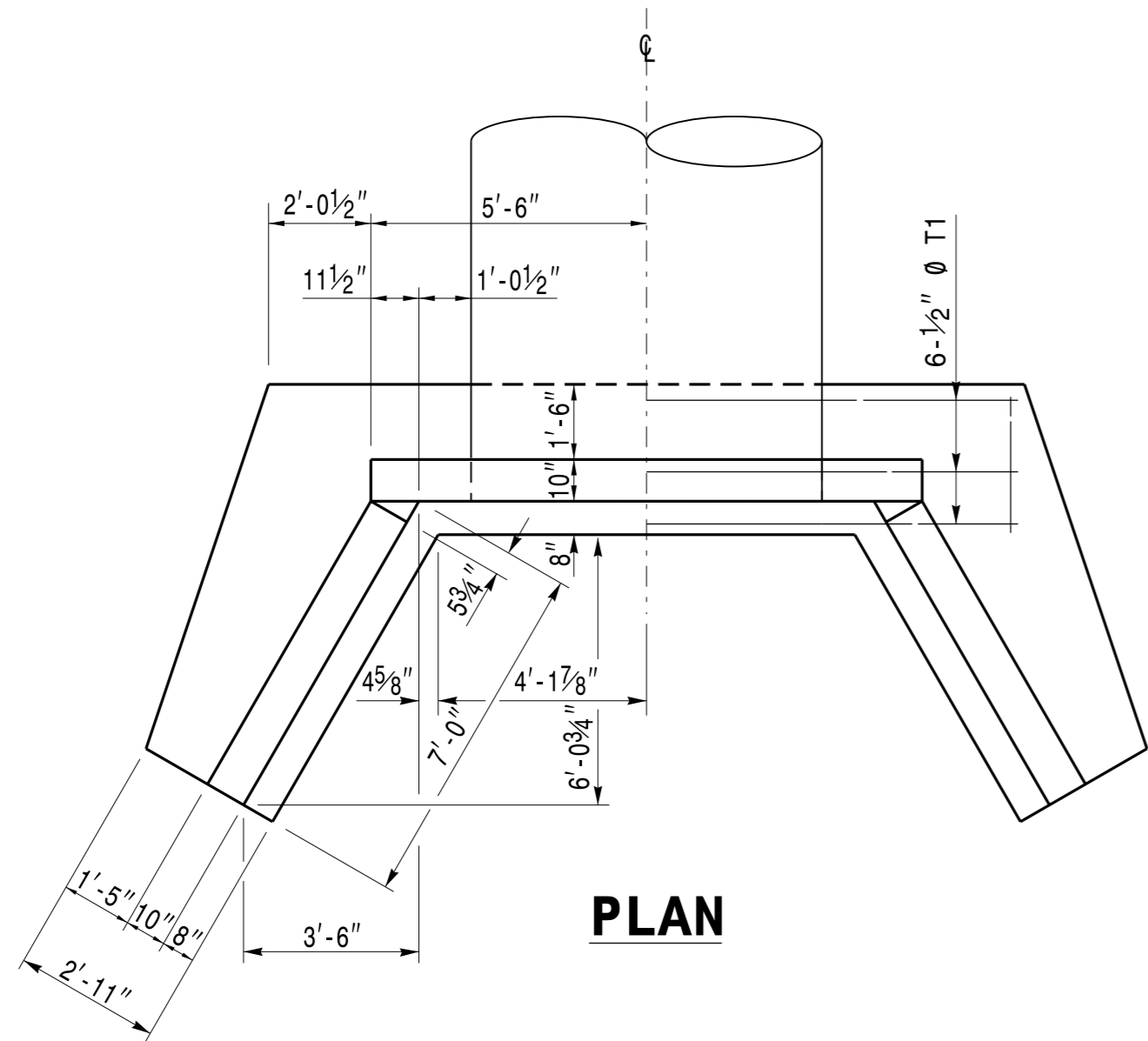
END ELEVATION



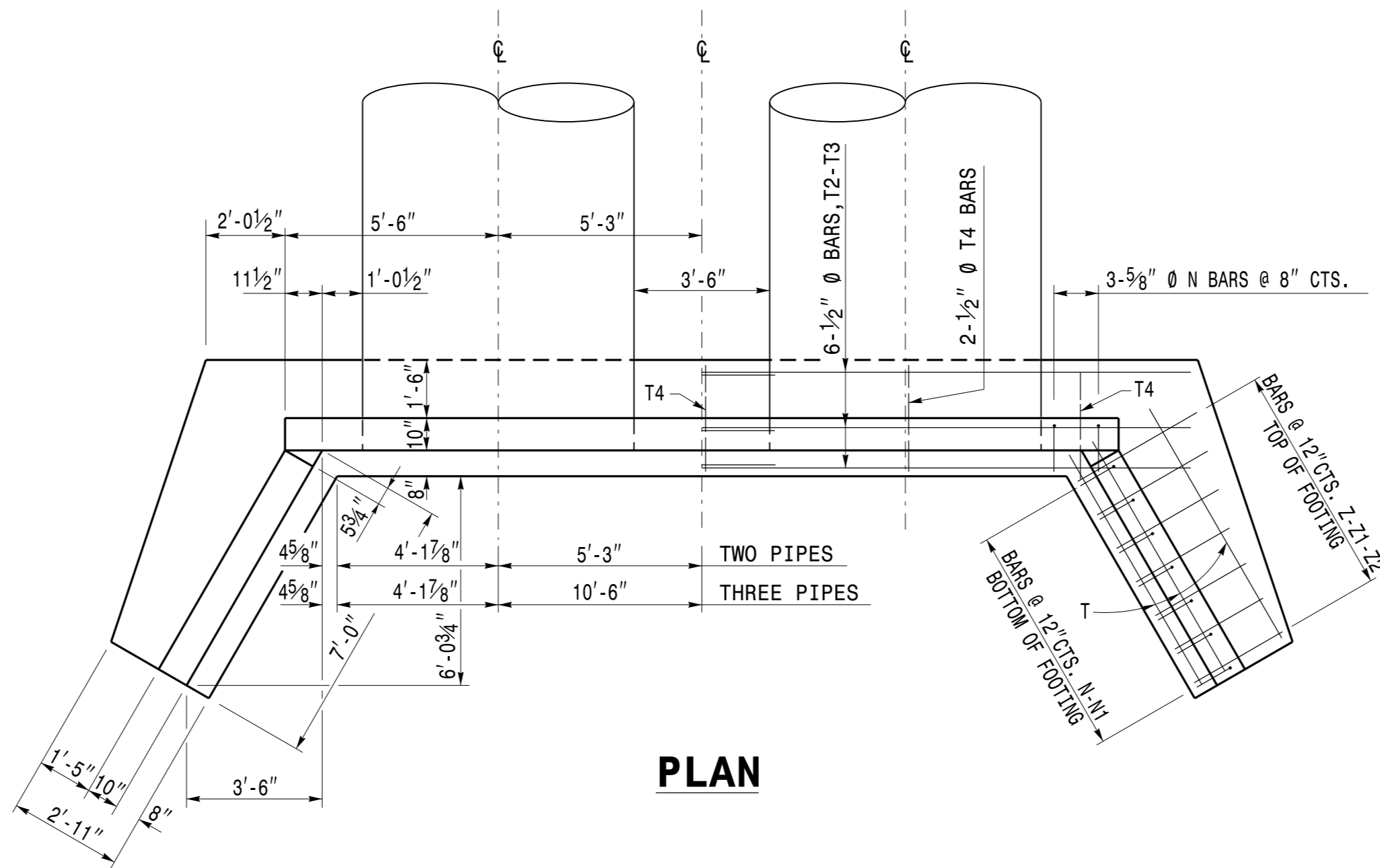
SECTION A-A FOR ALL ENDWALLS

NOTES:

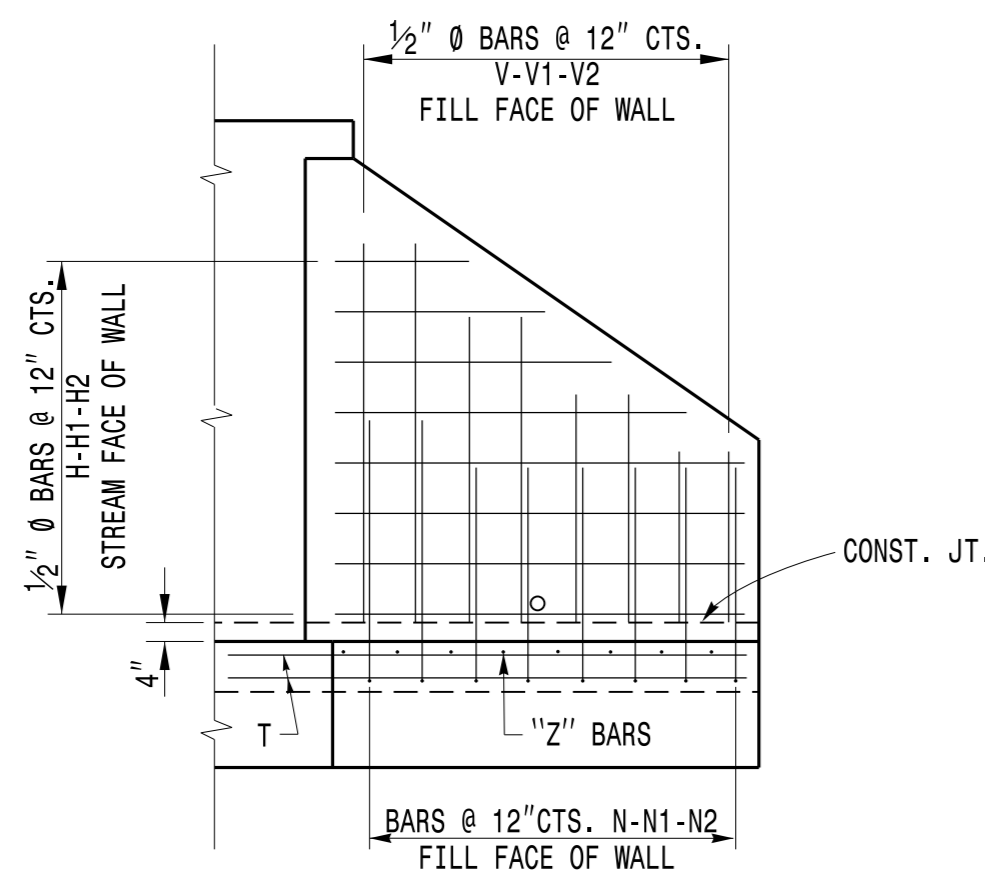
- ALL CONCRETE TO BE CLASS "A".
- ALL REINFORCING STEEL SHALL BE ASTM A615-GRADE 60.
- ALL REINFORCING STEEL SHALL BE DEFORMED BARS. WHERE SPLICING OF REINFORCEMENT IS NECESSARY, BARS ARE TO BE LAPPED 45 DIAMETERS. ALL DIMENSIONS RELATIVE TO REINFORCEMENT ARE TO CENTERS OF BARS.
- THE FOOTING, CURTAIN WALL AND 4" OF WALL ARE TO BE POURED IN ONE OPERATION ALLOWING NO TIME FOR INITIAL SET TO TAKE PLACE BETWEEN THEM. THE REMAINING WALL SHALL THEN BE POURED IN ONE OPERATION.
- ALL EXPOSED CORNERS ARE TO BE CHAMFERED 1".
- 3" DIAMETER DRAINS SHALL BE PLACED IN WALL AS SHOWN AND BE 6" ABOVE NORMAL FLOW LINE.
- ALL MATERIAL AND WORKMANSHIP AS PER N.C. DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.



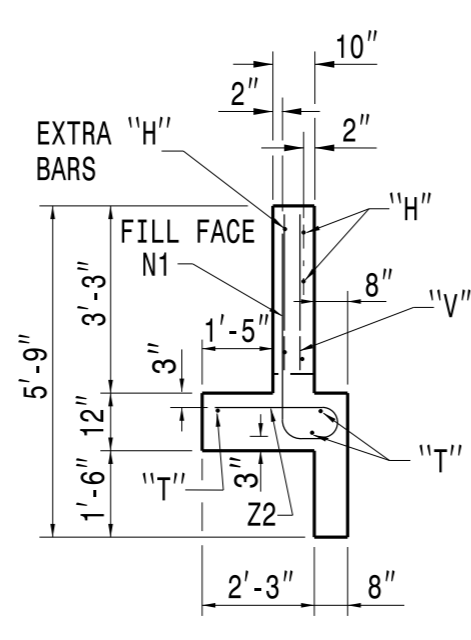
PLAN



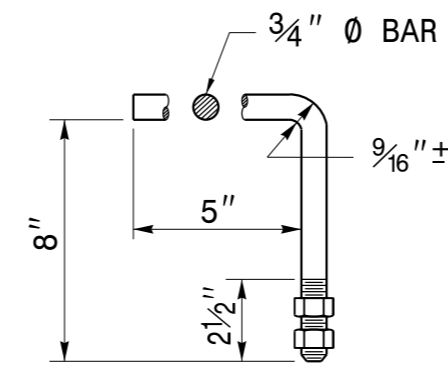
PLAN



ELEVATION OF WING SHOWING REINFORCEMENT

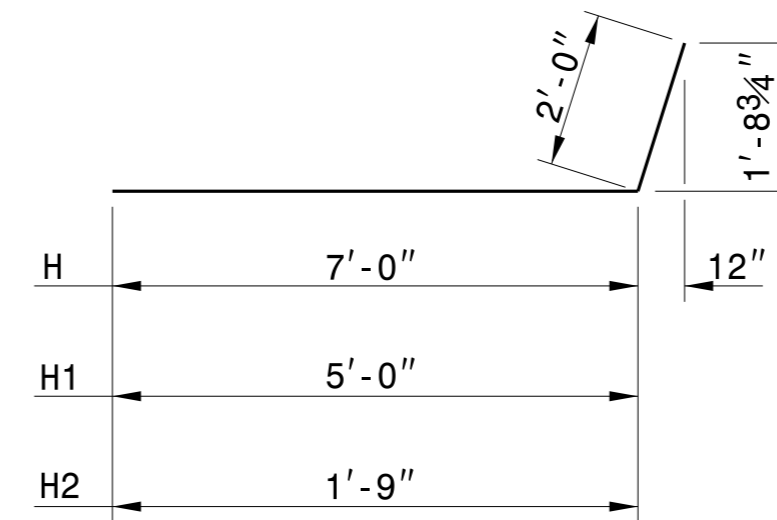


END OF WING

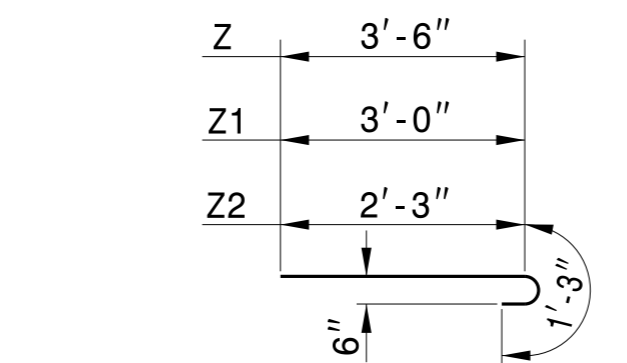


HOOK BOLT

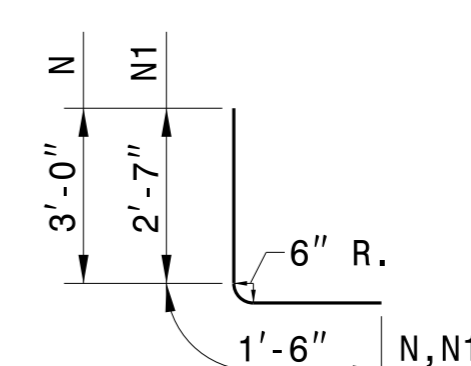
HOOK BOLTS (ANCHORS SHALL BE CONSTRUCTED AT 2'-0" CTS. ALONG THE CIRCUMFERENCE OF THE 7'-0" CSPA. THE HOOK BOLTS SHALL BE EMBEDDED IN THE CONCRETE ENDWALL 8" IN DEPTH. THE GALVANIZED 3/4" DIA. HOOK BOLTS MUST MEET ASTM A-307 OR ASTM A-836. BOTH BOLTS AND NUTS MUST BE IN ACCORDANCE WITH ASTM A-153 FOR GALVANIZING.



BARS H-H1-H2



BARS Z-Z1-Z2



BARS N-N1

BILL OF MATERIAL FOR ONE ENDWALL

| REINFORCING STEEL | 1 PIPE | 2 PIPES | 3 PIPES |
|----------------------------|--------|---------|---------|
| BAR SIZE | NO. | NO. | NO. |
| B #4 | 8 | 16 | 24 |
| G #5 | 4 | - | - |
| G1 #5 | - | 8 | - |
| G2 #5 | - | - | 8 |
| H #4 | 10 | 10 | 10 |
| H1 #4 | 6 | 6 | 6 |
| H2 #4 | 4 | 4 | 4 |
| N #5 | 10 | 15 | 20 |
| N1 #4 | 10 | 10 | 10 |
| T #4 | 6 | 6 | 6 |
| T1 #4 | 6 | - | - |
| T2 #4 | - | 12 | - |
| T3 #4 | - | - | 12 |
| T4 #4 | 4 | 7 | 13 |
| V #4 | 6 | 6 | 6 |
| V1 #4 | 6 | 6 | 6 |
| V2 #4 | 8 | 8 | 8 |
| V3 #4 | 6 | 11 | 16 |
| Z #5 | 4 | 4 | 4 |
| Z1 #4 | 4 | 4 | 4 |
| Z2 #4 | 4 | 6 | 6 |
| TOTAL REINF. STEEL (lbs.) | 473 | 662 | 834 |
| CLASS "A" CONC. (cu. yds.) | 7.9 | 10.8 | 13.8 |

12/10/2014



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DETAIL OF REINFORCED CONCRETE ENDWALL FOR 84" DIAMETER PIPE - 90° SKEW

ORIGINAL BY: R.S.WICKER DATE: 6-46
MODIFIED BY: R.E.D.&T.S.S. DATE: 6-96 & 5-00
CHECKED BY: DATE:
FILE SPEC.: details/nbritt/english/hydro/endwall190sk.dgn

\$\$\$\$\$C:\TIME\$\$\$\$\$
\$\$\$\$\$USER\$\$\$\$\$

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

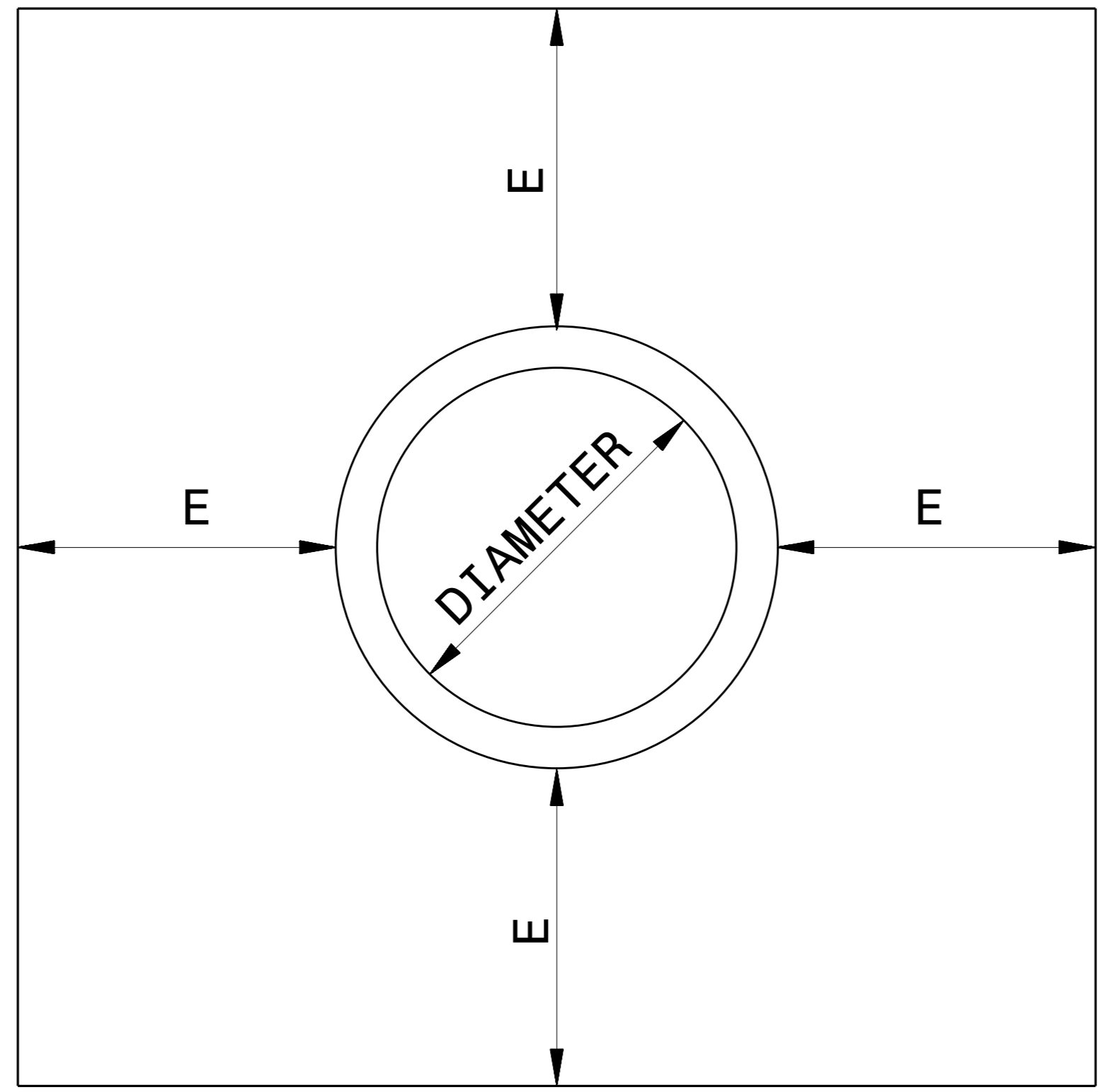
ENGLISH DETAIL DRAWING FOR
PIPE COLLAR

SHEET 1 OF 1
840D72

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

ENGLISH DETAIL DRAWING FOR
PIPE COLLAR

SHEET 1 OF 1
840D72



ELEVATION

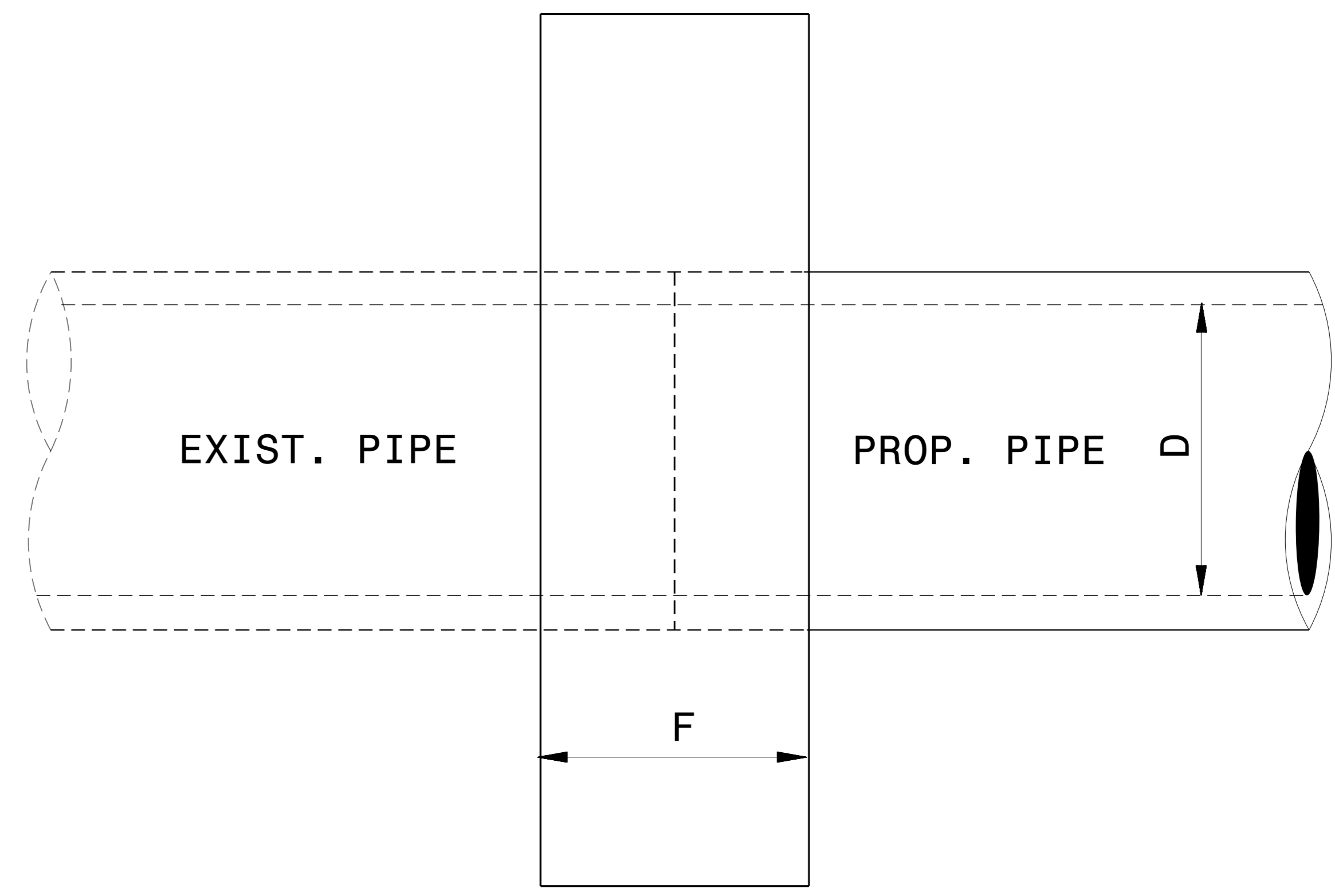
GENERAL NOTES:

USE PIPE COLLAR FOR EXTENDING EXISTING CONCRETE PIPE CULVERTS AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. THIS INCLUDES EXTENDING EXISTING PIPES WITH PIPES OF DIFFERENT MATERIALS.

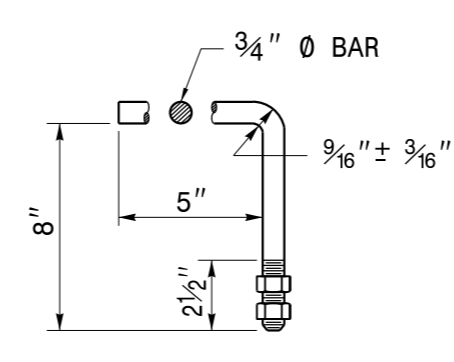
CONSTRUCT THE PIPE COLLAR WITH CLASS "B" OR BETTER CONCRETE.

OBSERVE ALL REQUIREMENTS OF SECTION 840 OF THE STANDARD SPECIFICATIONS.

USE HOOK BOLTS TO ANCHOR CSP TO THE CONCRETE COLLAR.



SIDE ELEVATION



HOOK BOLT

HOOB BOLTS (INSTALL ANCHORS AT 2'-0" CTS. ALONG THE CIRCUMFERENCE OF THE CSP). EMBED THE HOOK BOLTS IN THE CONCRETE COLLAR 8" IN DEPTH. THE GALVANIZED 3/4" DIA. HOOK BOLTS MUST MEET ASTM A-307 OR ASTM A-836. BOTH BOLTS AND NUTS MUST BE IN ACCORDANCE WITH ASTM A-153 FOR GALVANIZING.

| DIA. | E | F | CU. YD. |
|------|-----|-----|---------|
| 12" | 12" | 12" | 0.3528 |
| 15" | 12" | 12" | 0.3990 |
| 18" | 12" | 12" | 0.4465 |
| 24" | 12" | 12" | 0.5526 |
| 30" | 12" | 12" | 0.6560 |
| 36" | 12" | 12" | 0.7640 |
| 42" | 12" | 12" | 0.8856 |
| 48" | 12" | 12" | 1.0126 |
| 54" | 18" | 18" | 2.5793 |
| 60" | 18" | 18" | 2.8506 |
| 66" | 18" | 18" | 3.1307 |
| 72" | 18" | 18" | 3.4176 |
| 84" | 18" | 18" | 3.9914 |
| 96" | 18" | 18" | 4.5652 |

5/14/99
C:\TIME\840D72\CON\CON\USER\NAME.DGN
840D72

12/10/2014
Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966
DocuSigned by: *Joel Howerton*
873F3D17DCD46F

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SEE PLATE FOR TITLE

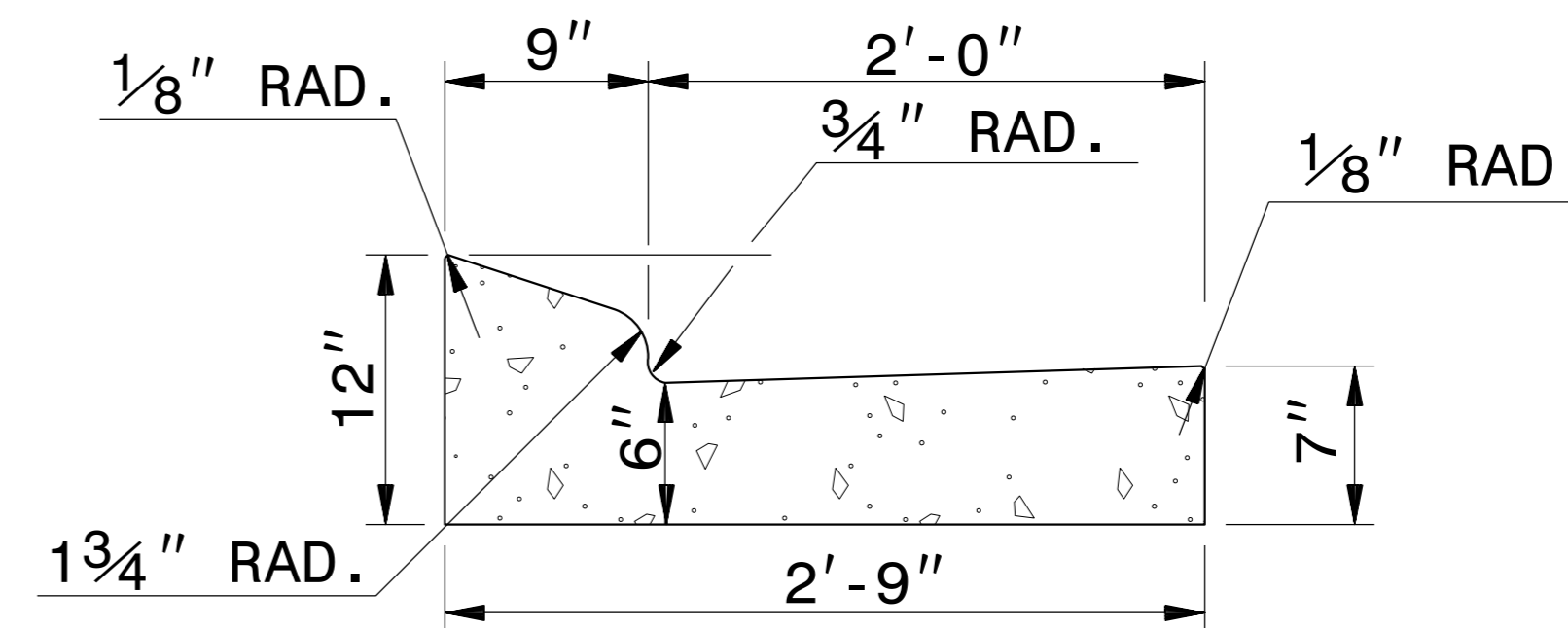
ORIGINAL BY: _____ DATE: _____
MODIFIED BY: nbritt DATE: 03-29-04
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/nbritt/english/urban/u3612pipecollar.dgn

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

ENGLISH DETAIL DRAWING FOR
2'-9" CONCRETE CURB & GUTTER

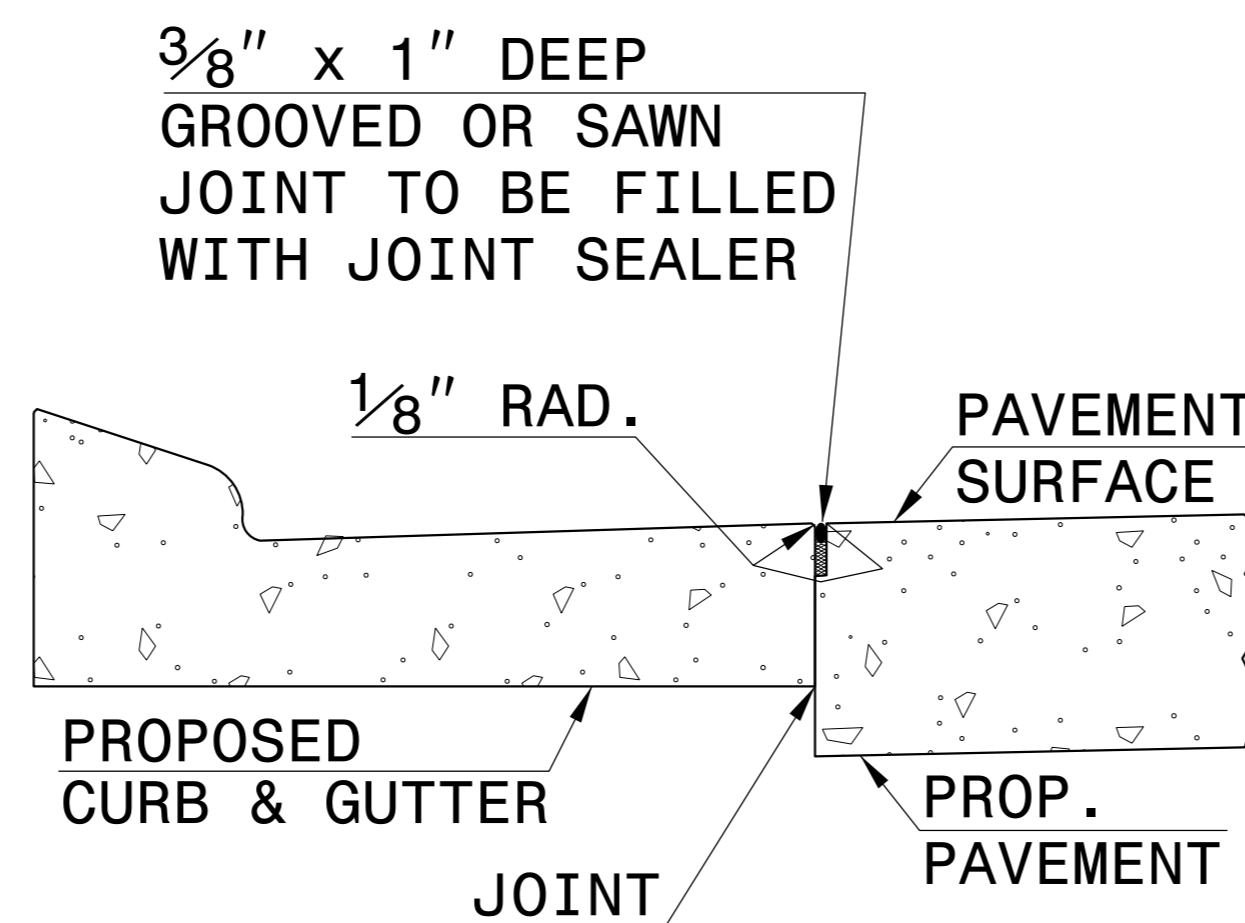
GENERAL NOTES:

- PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
- JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
- CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. MAKE NON-TEMPLATE FORMED JOINTS A MIN. OF 1 1/2" DEEP.
- FILL ALL CONSTRUCTION JOINTS WITH JOINT FILLER AND SEALER.
- SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.
- SEE RDWY. STD. DWG. NO. 846.01, SHEET 2 OF 3 FOR PLACEMENT IN SUPERELEVATIONS. (USE 2'-6" CURB AND GUTTER RATES)

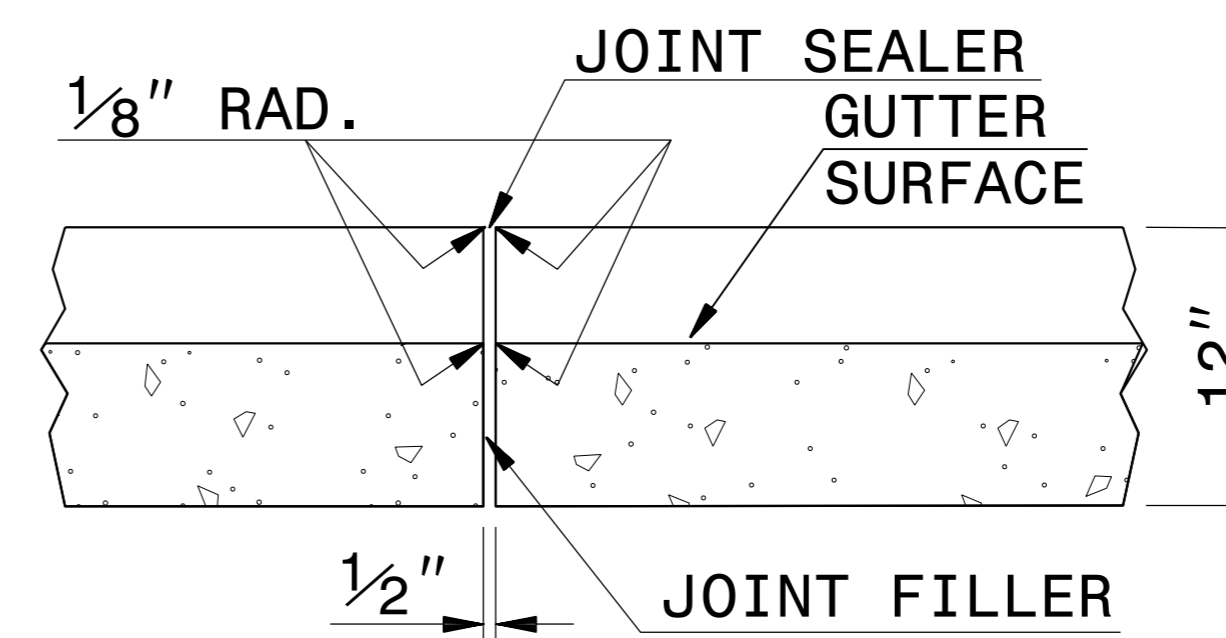


2'-9" CURB AND GUTTER

SECTION VIEW OF CURB AND GUTTER



LONGITUDINAL JOINT



TRANSVERSE EXPANSION JOINT IN CURB AND GUTTER

SECTION VIEW OF JOINTS

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

ENGLISH DETAIL DRAWING FOR
2'-9" CONCRETE CURB & GUTTER

SHEET 1 OF 1
846D01

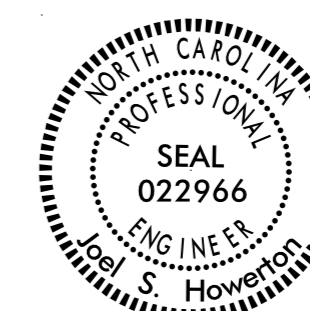
SHEET 1 OF 1
846D01

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Office 919-707-6950 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: STD. 846.01 DATE: _____
MODIFIED BY: E.E. WARD DATE: 8-15-00
CHECKED BY: _____ DATE: _____
FILE SPEC.: /usr/details/stand/c&g2'-9".dgn

12/10/2014



DocuSigned by:
Jed Howerton
873F3D17DCDC45F

846D01.dgn
 12/10/2014 10:00 AM
 JED HOWERTON
 873F3D17DCDC45F

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DEPT. OF TRANSPORTATION
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RALEIGH, N.C.

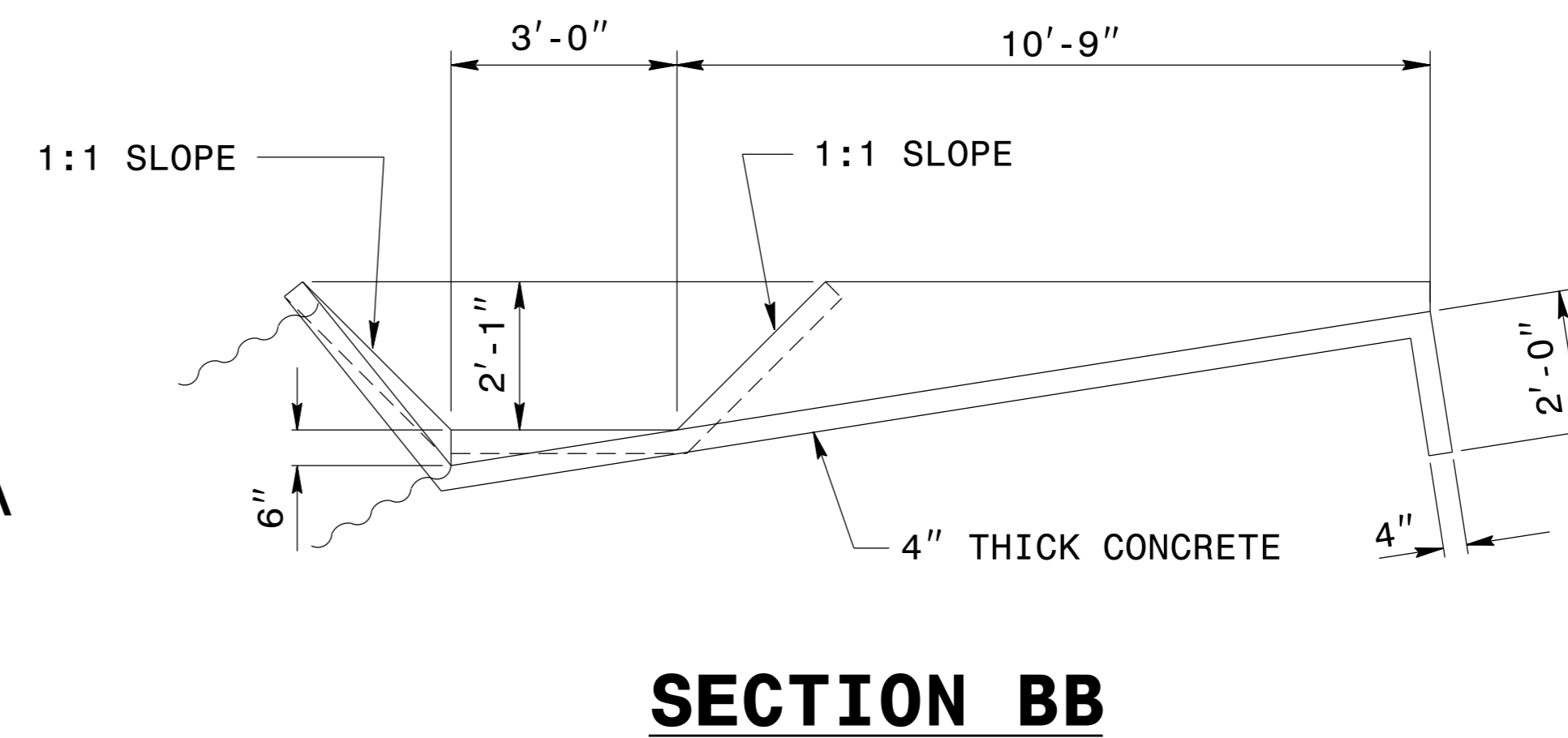
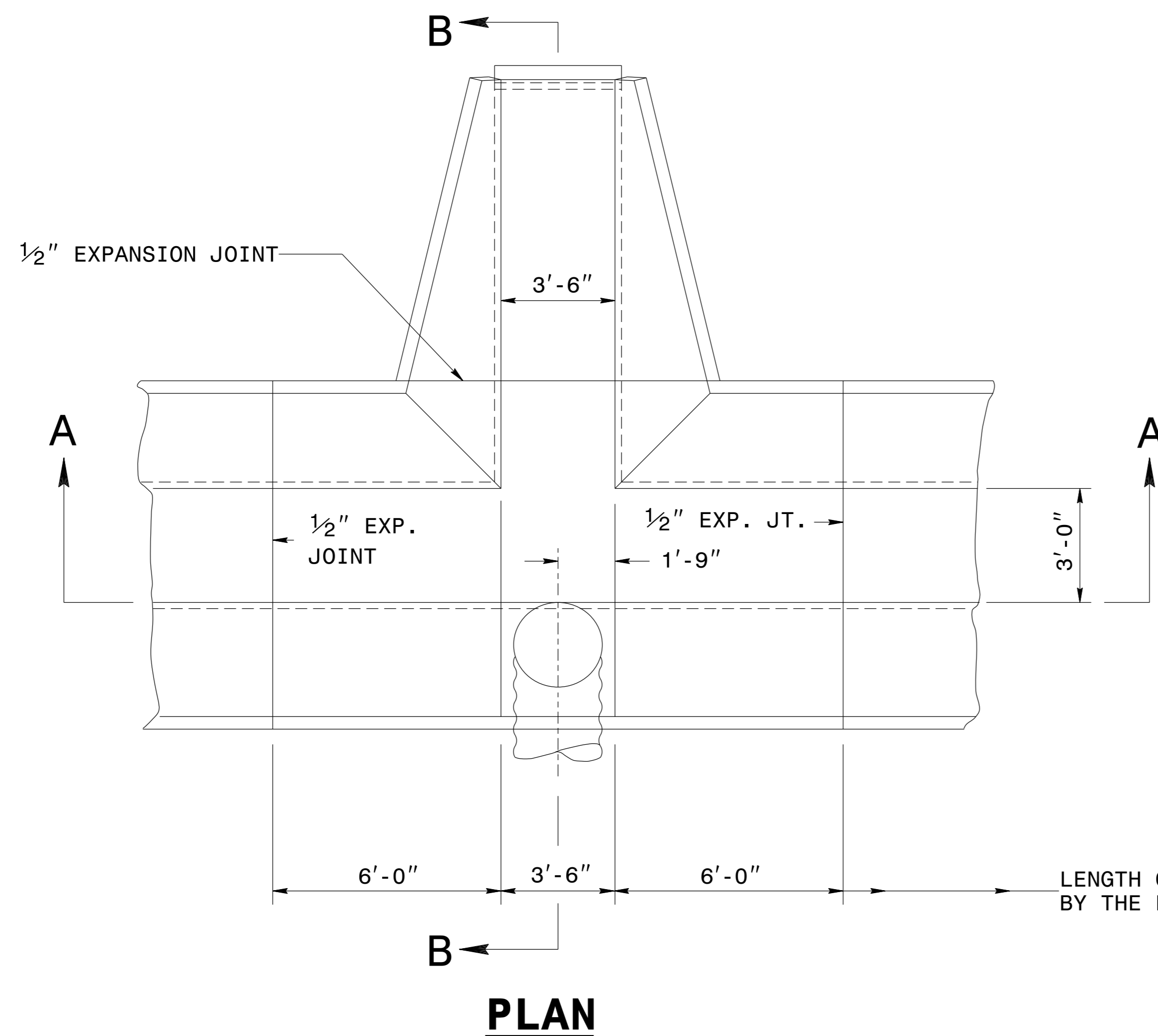
ENGLISH DETAIL DRAWING FOR
GUIDE FOR BERM DRAINAGE OUTLET
36" PIPE

SHEET 1 OF 1
850D11

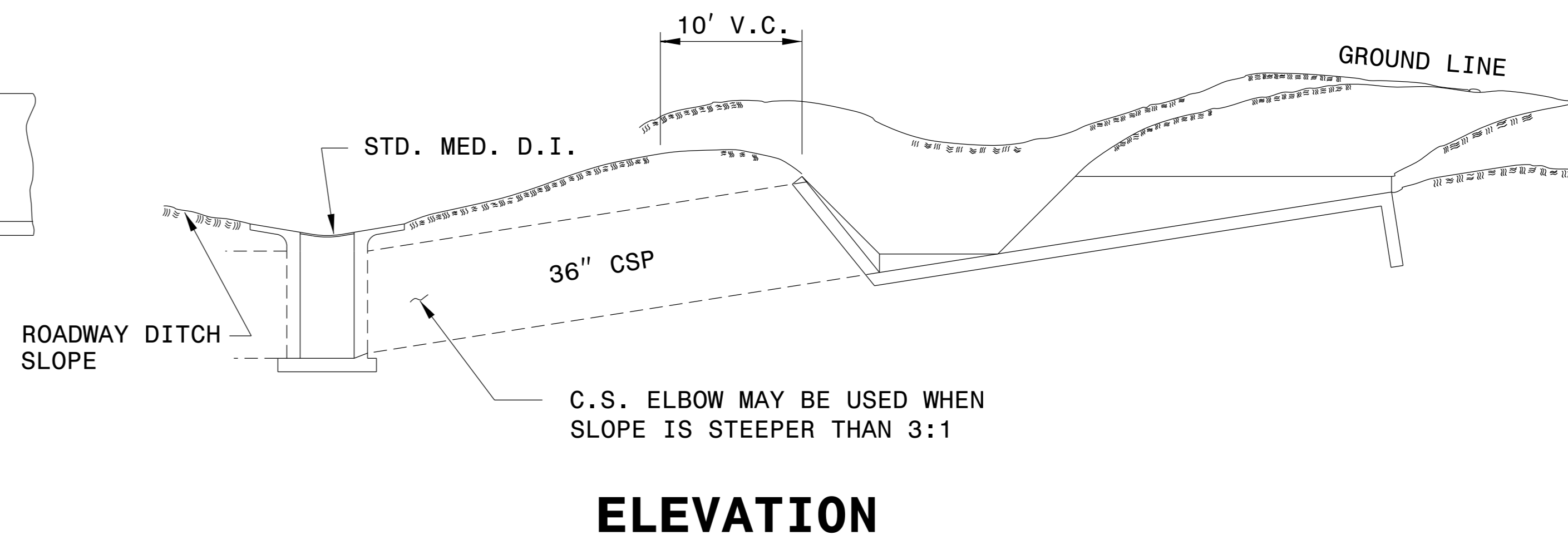
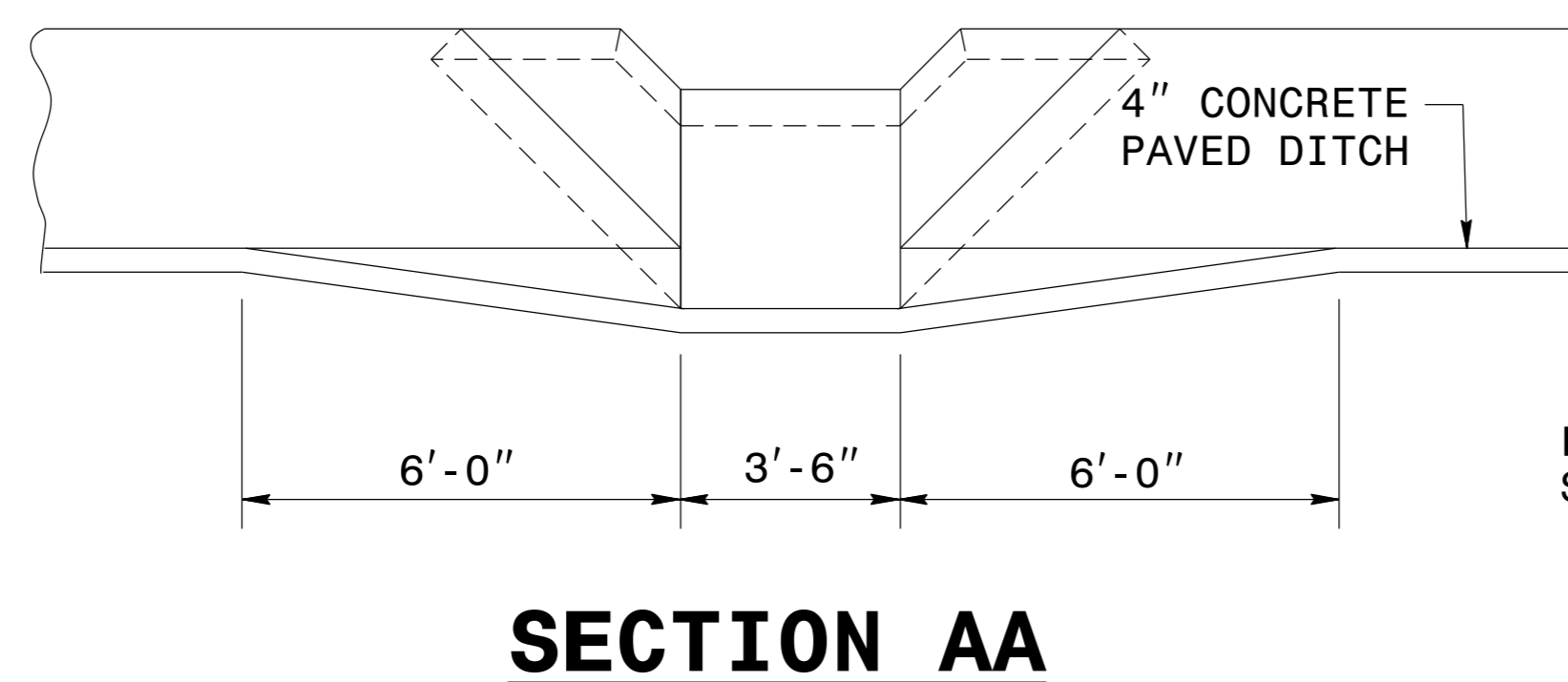
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
GUIDE FOR BERM DRAINAGE OUTLET
36" PIPE

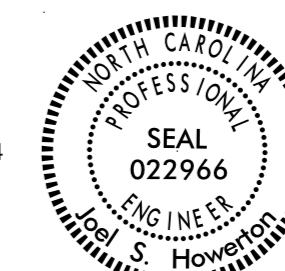
SHEET 1 OF 1
850D11



GENERAL NOTES:
WHERE NECESSARY, ELBOWS MAY BE USED TO SKEW PIPE TO FIT INLETS WHERE THERE IS OFFSET BETWEEN THE INLET END AT BERM AND THE D.I.



12/10/2014



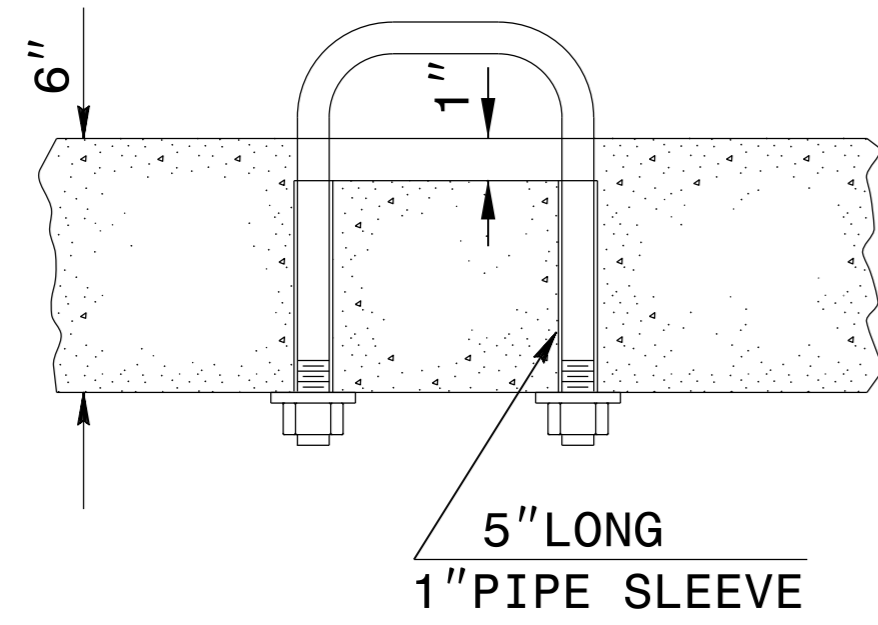
DocuSigned by:
Joel Howerton
873F3D17DCDC45F

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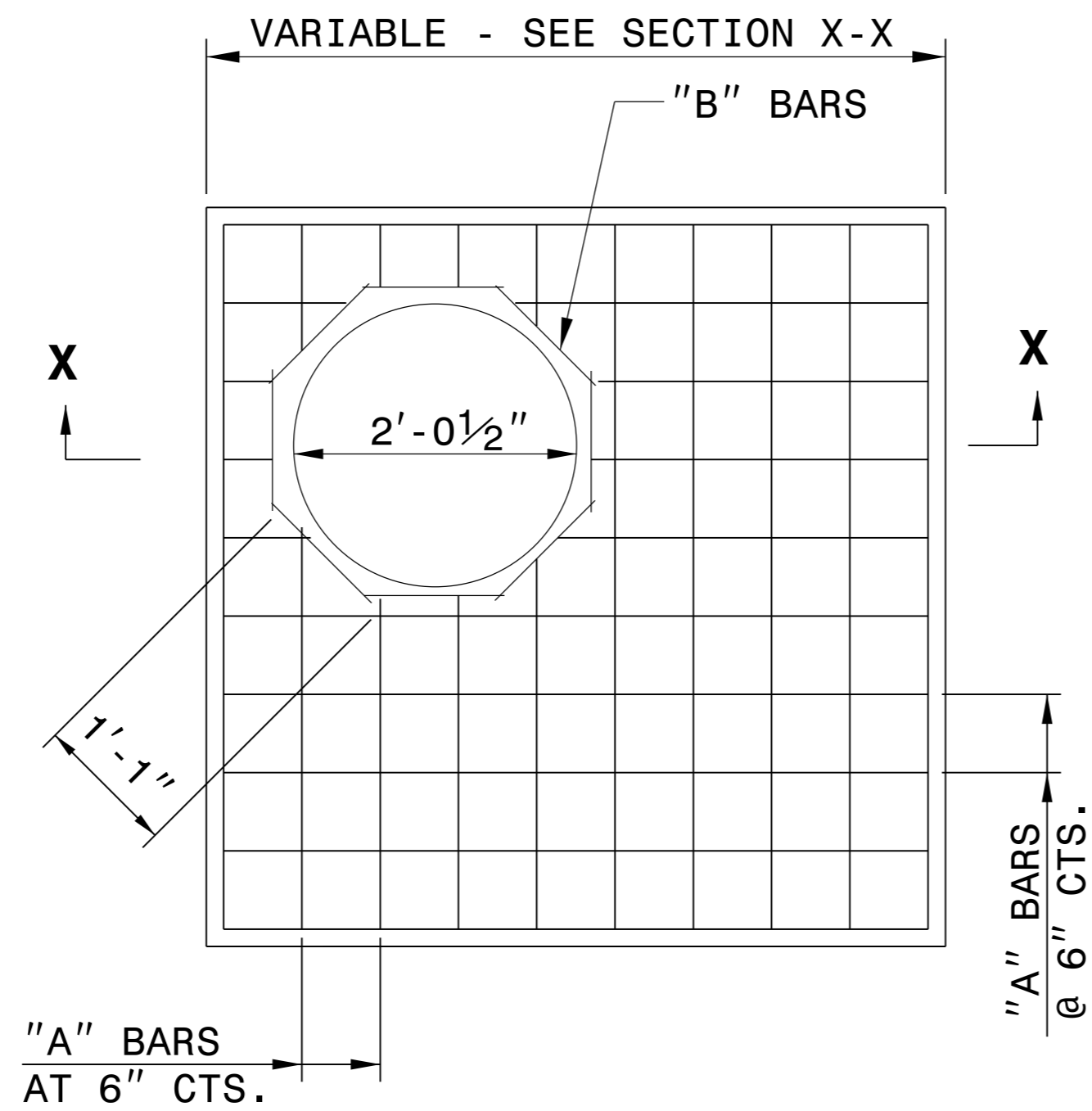
SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STANDARDS DATE: 01-15-02
MODIFIED BY: E.E. WARD DATE: 10-26-04
CHECKED BY: DATE:
FILE SPEC.: usr/details/stand/850d01.dgn

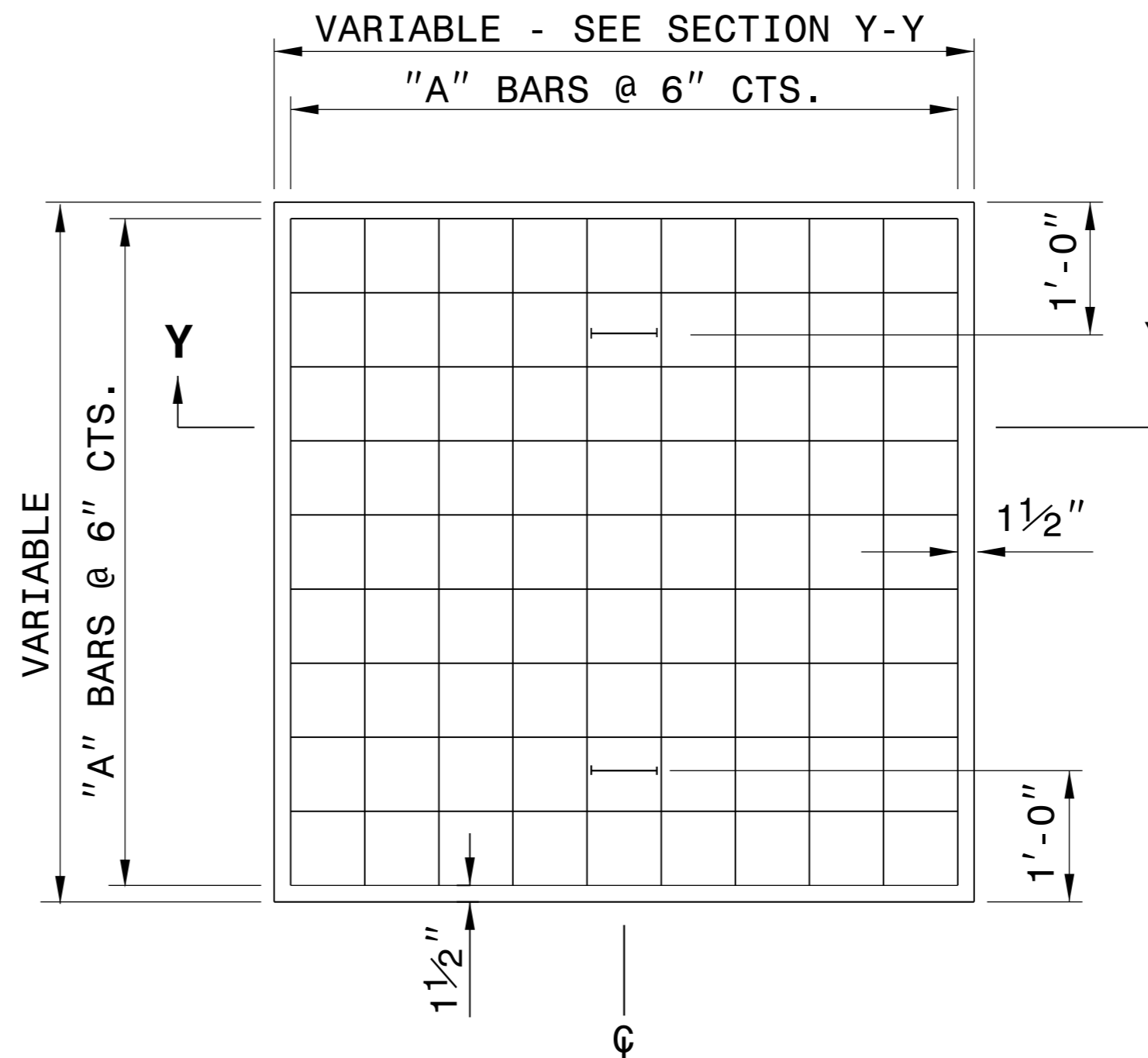
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 10:26:04
 E.E. WARD
 10-26-04
 850D11.dgn



PARTIAL SECTION



PLAN



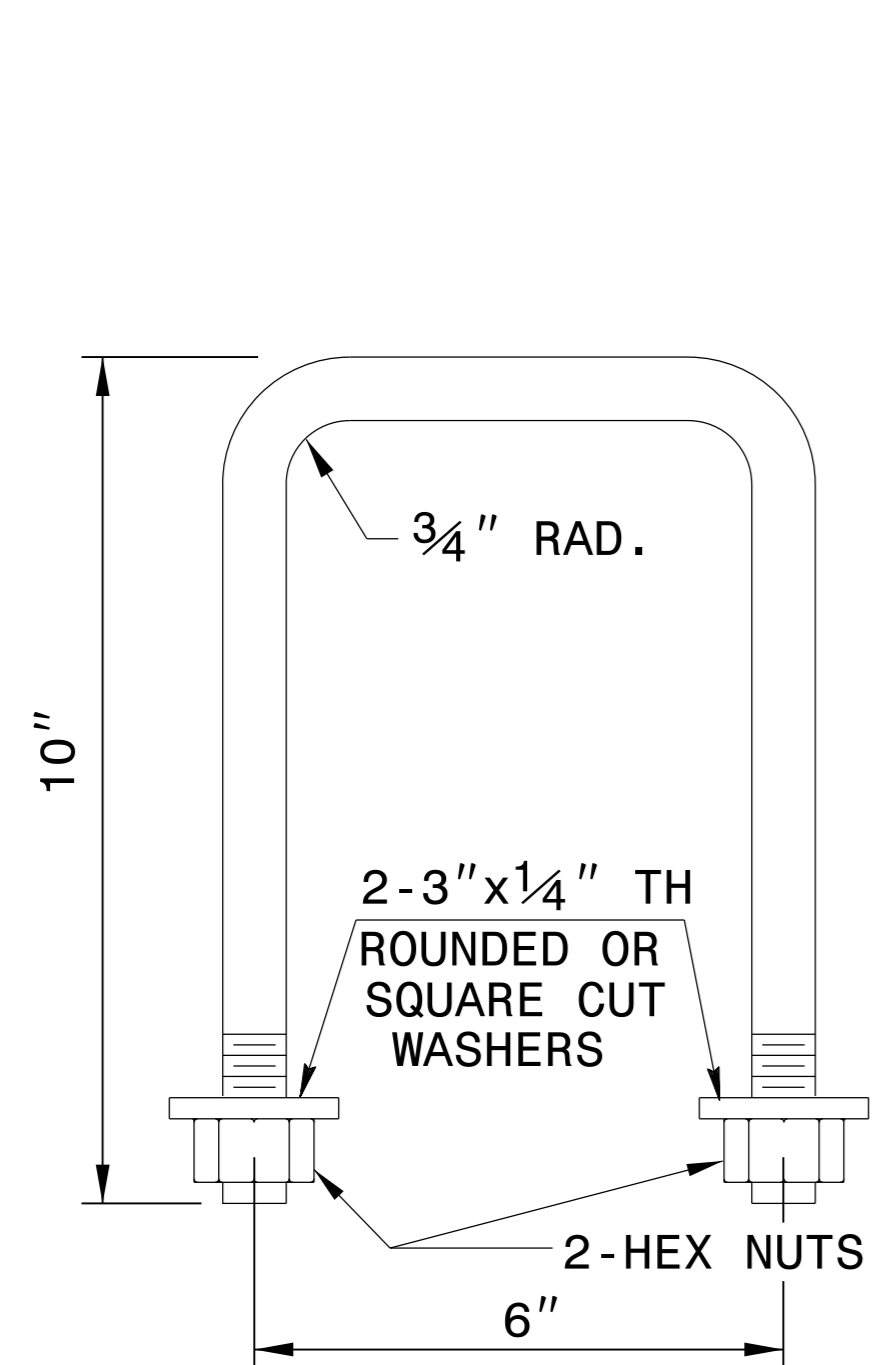
PLAN

GENERAL NOTES:

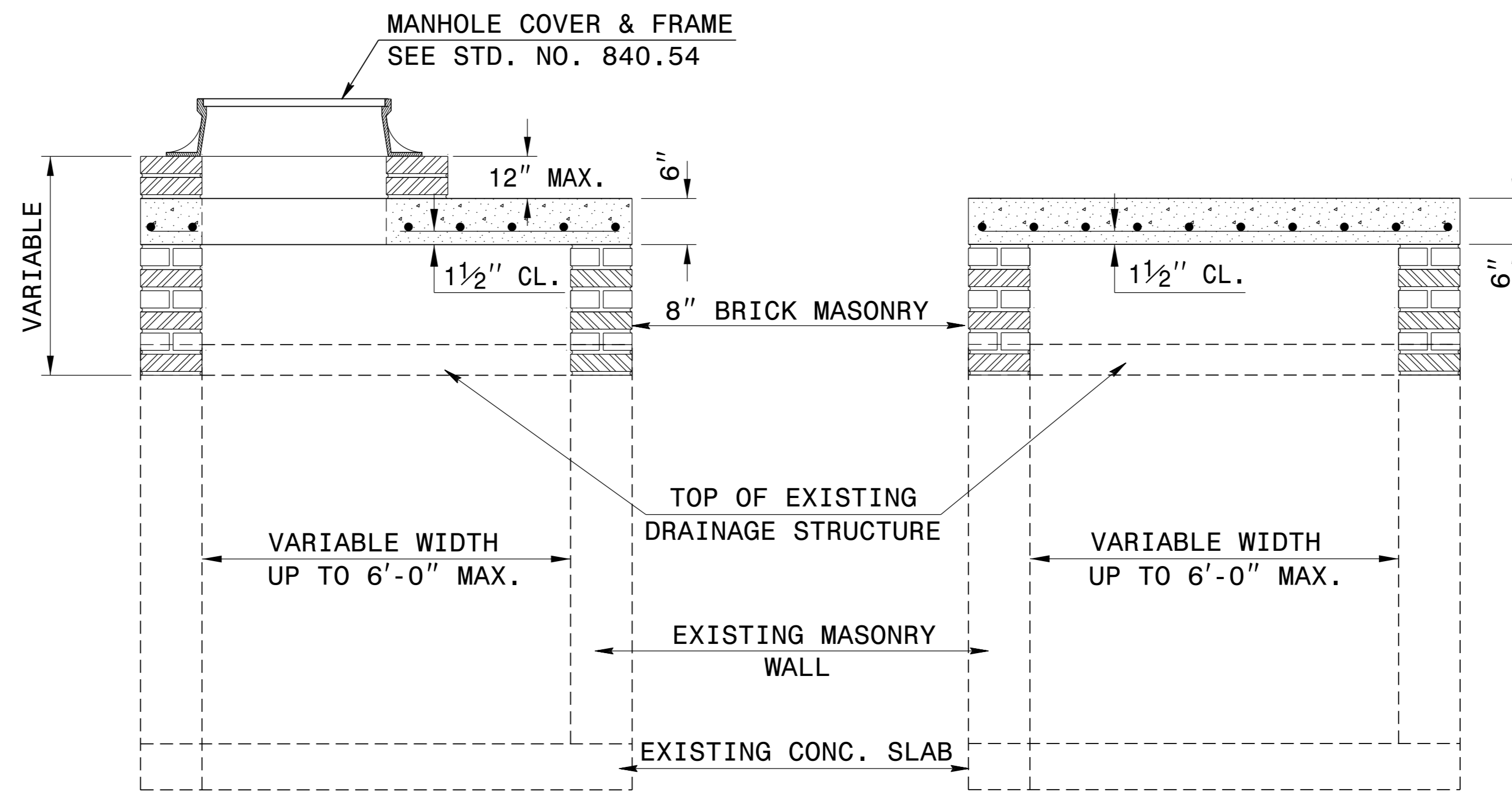
CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

THE DIMENSIONS FOR THE EXISTING BOXES ARE APPROXIMATE AND MAY VARY SLIGHTLY.

DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.



DETAIL OF HANDLE



SECTION X-X

SECTION Y-Y

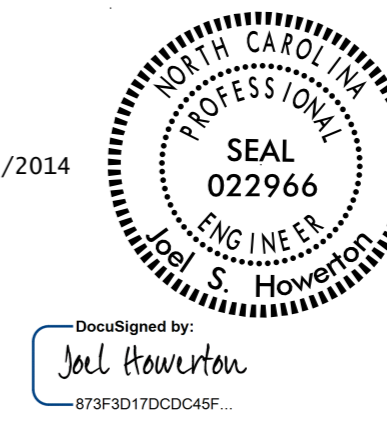
BILL OF MATERIALS

| REINFORCING STEEL | | | | |
|-------------------------------|------|------|--------|-------------------|
| CODE | SIZE | QTY. | LENGTH | REINF. STEEL LBS. |
| A | #4 | 20 | 4'-6" | 60.12 |
| B | #4 | 8 | 1'-1" | 5.79 |
| TOTAL | | | | 65.91 * |
| MASONRY | | | | CU YDS |
| TOP SLAB CONCRETE CLASS "B" | | | | .4326 * |
| BRICK MASONRY PER FT HT (MIN) | | | | .4111 |

*** NOTE:**
QUANTITIES BASED ON 3'-6" X 3'-6" DRAINAGE STRUCTURE. ADJUST QUANTITIES FOR LARGER STRUCTURES AND MANHOLE CONSTRUCTION.

12/10/2014
 873F3D17DCDC46F...

12/10/2014

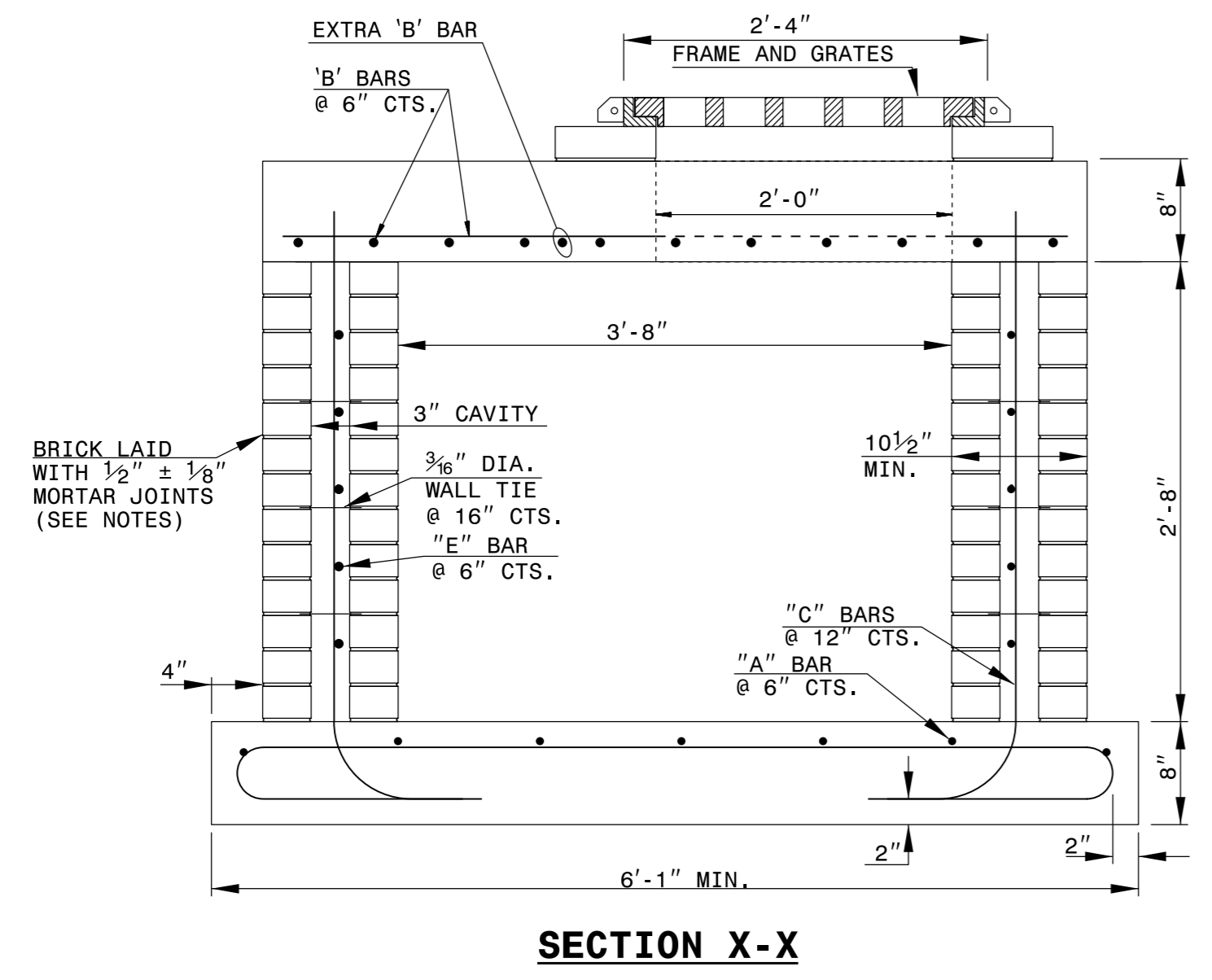


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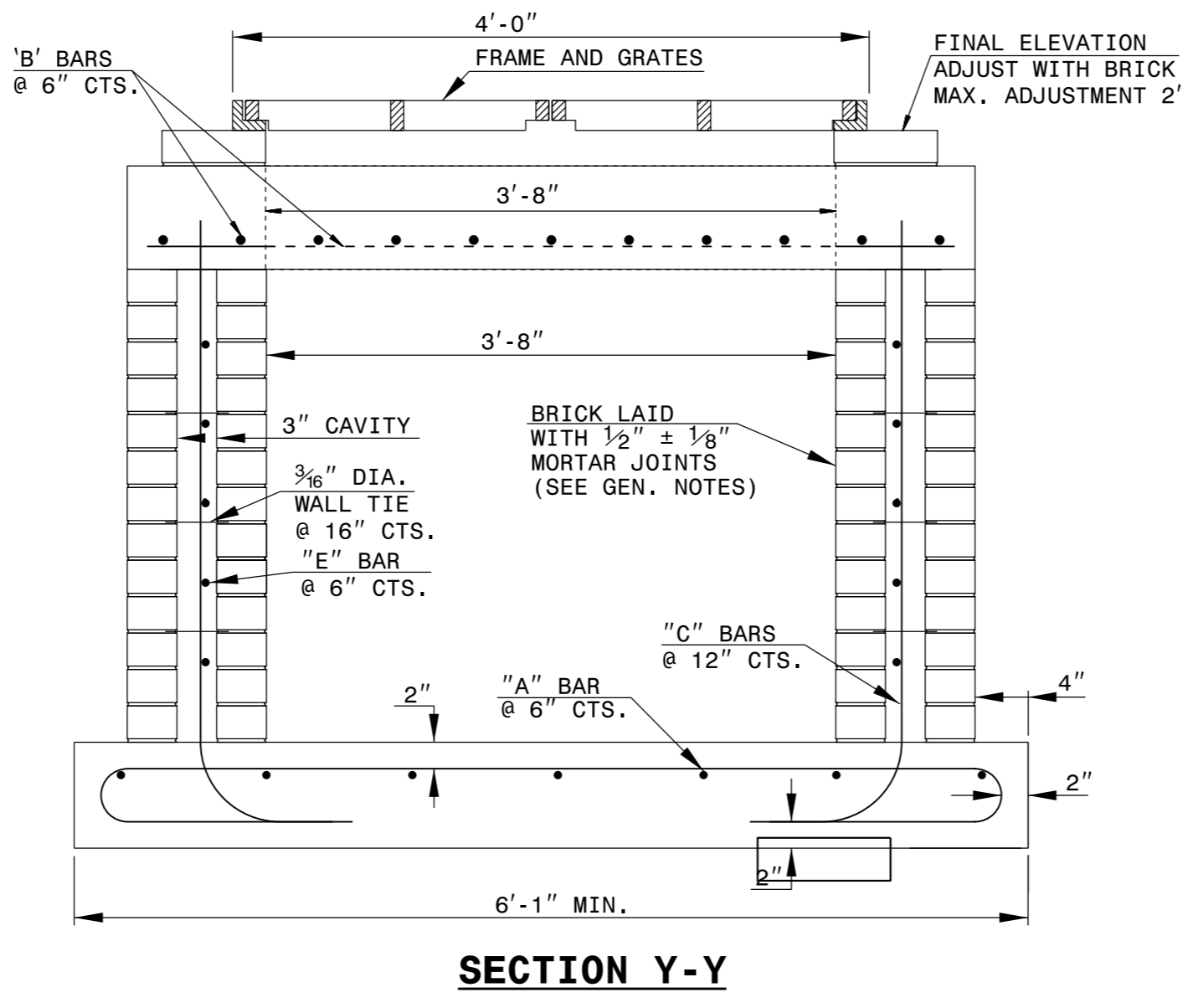
DETAIL TO CONVERT EXISTING DI, CB, OTCB or GI TO JUNCTION BOX (MANHOLE OPTIONAL)

| | |
|--|-----------------|
| ORIGINAL BY: T.S.S. | DATE: NOV. 1997 |
| MODIFIED BY: T.S.S. | DATE: FEB. 2000 |
| CHECKED BY: | DATE: |
| FILE SPEC.: ds174:/usr/details/stand/boxtojb.dgn | |

5/14/99

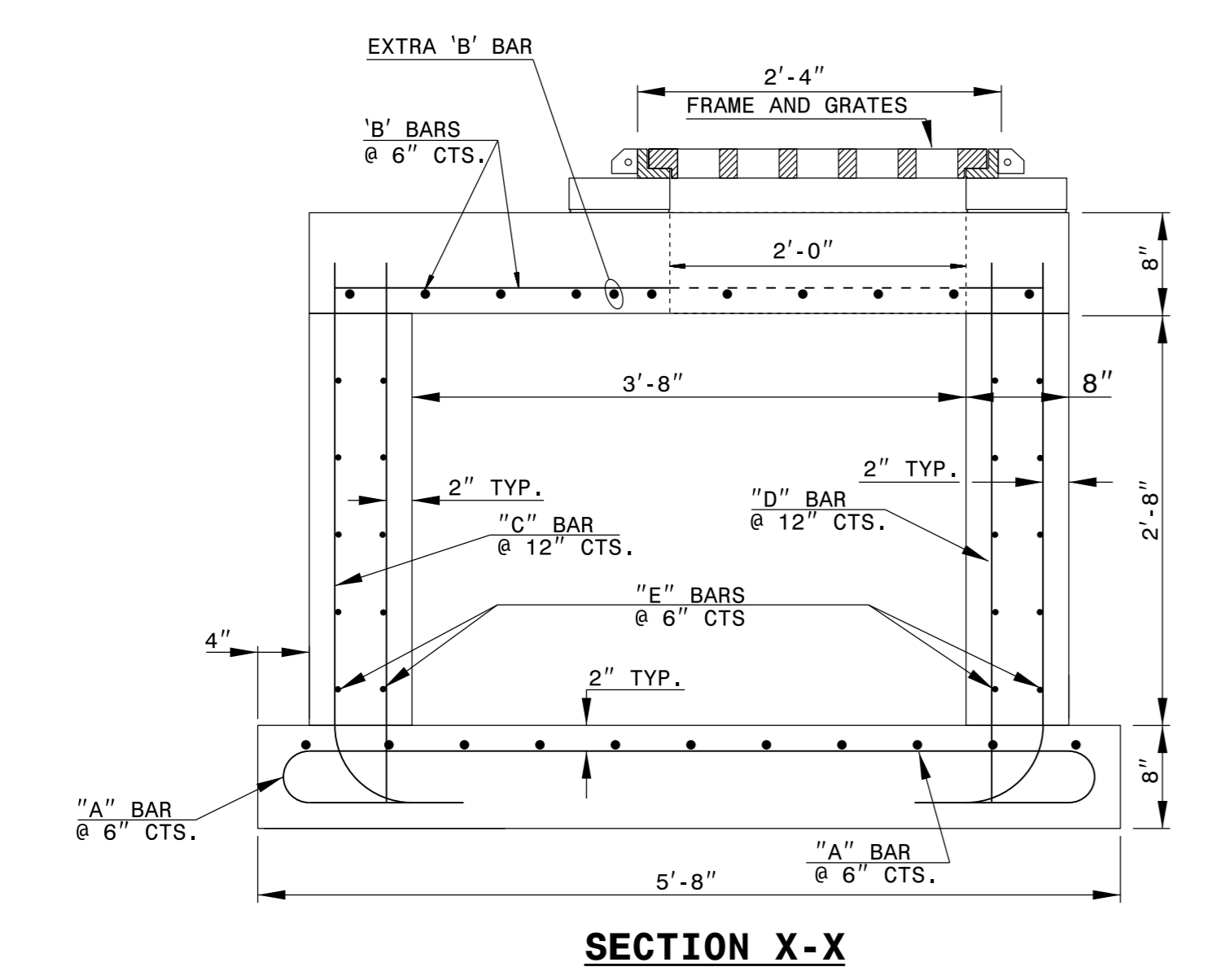


SECTION X-X

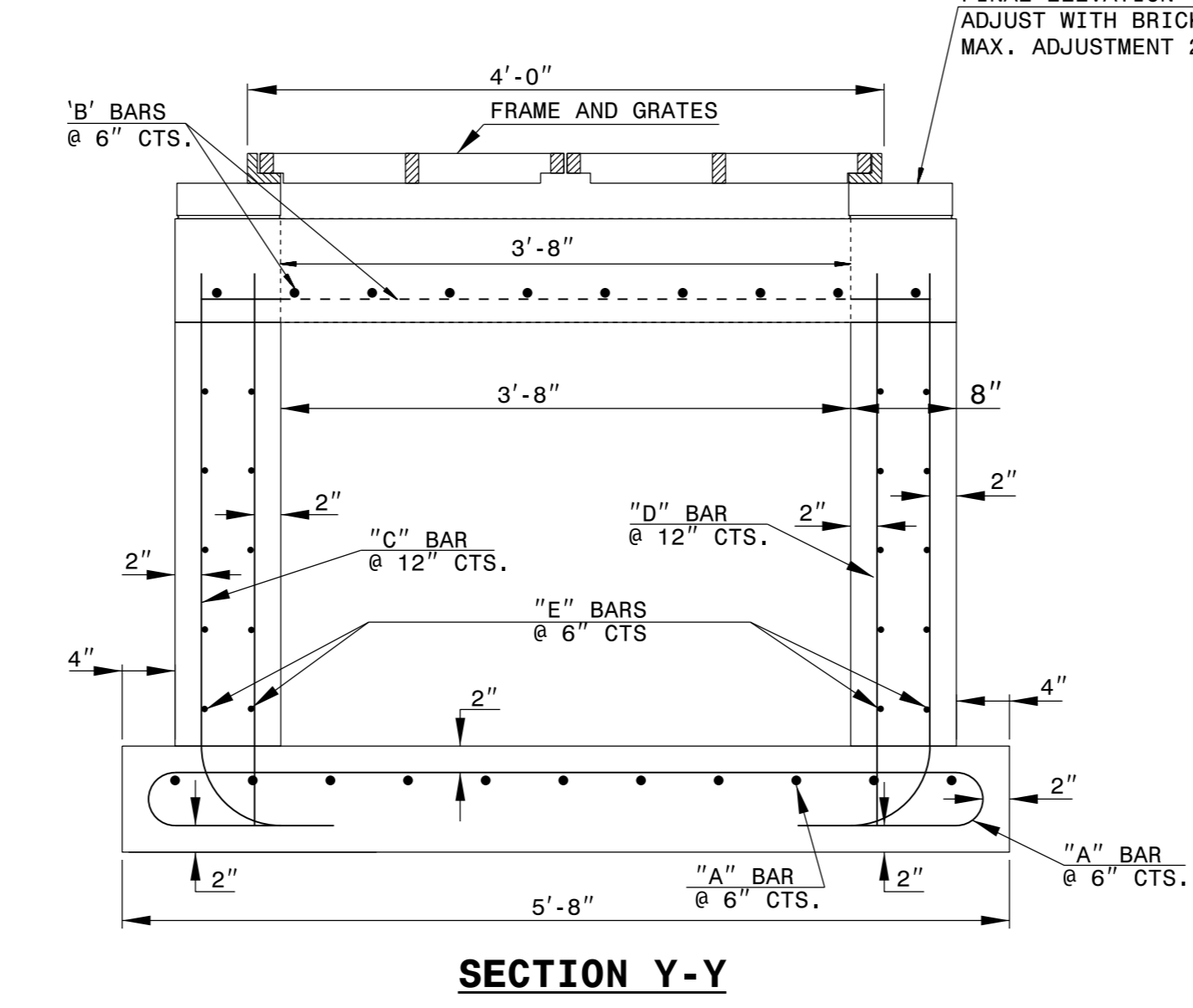


SECTION Y-Y

BRICK ALT.

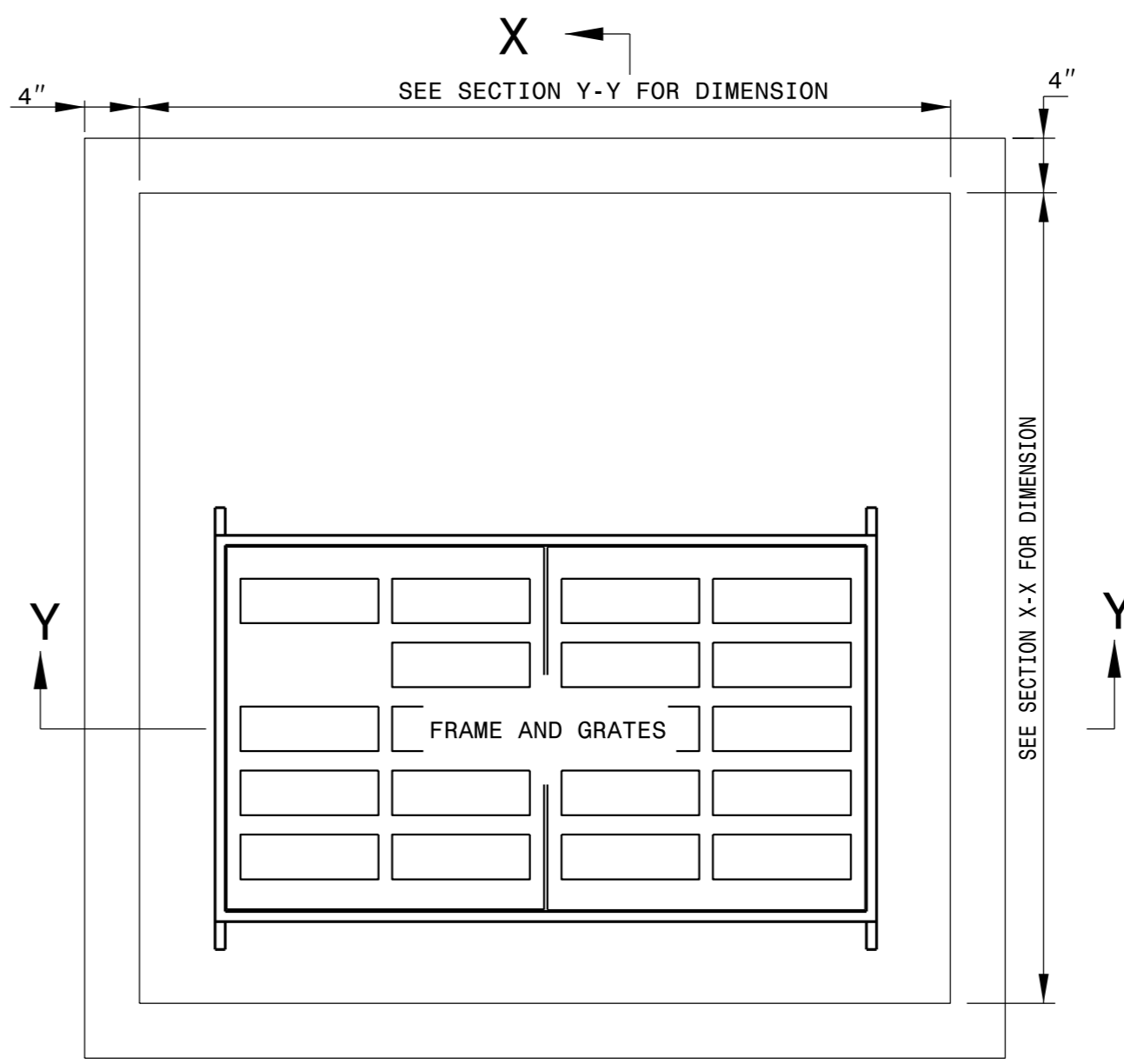


SECTION X-X

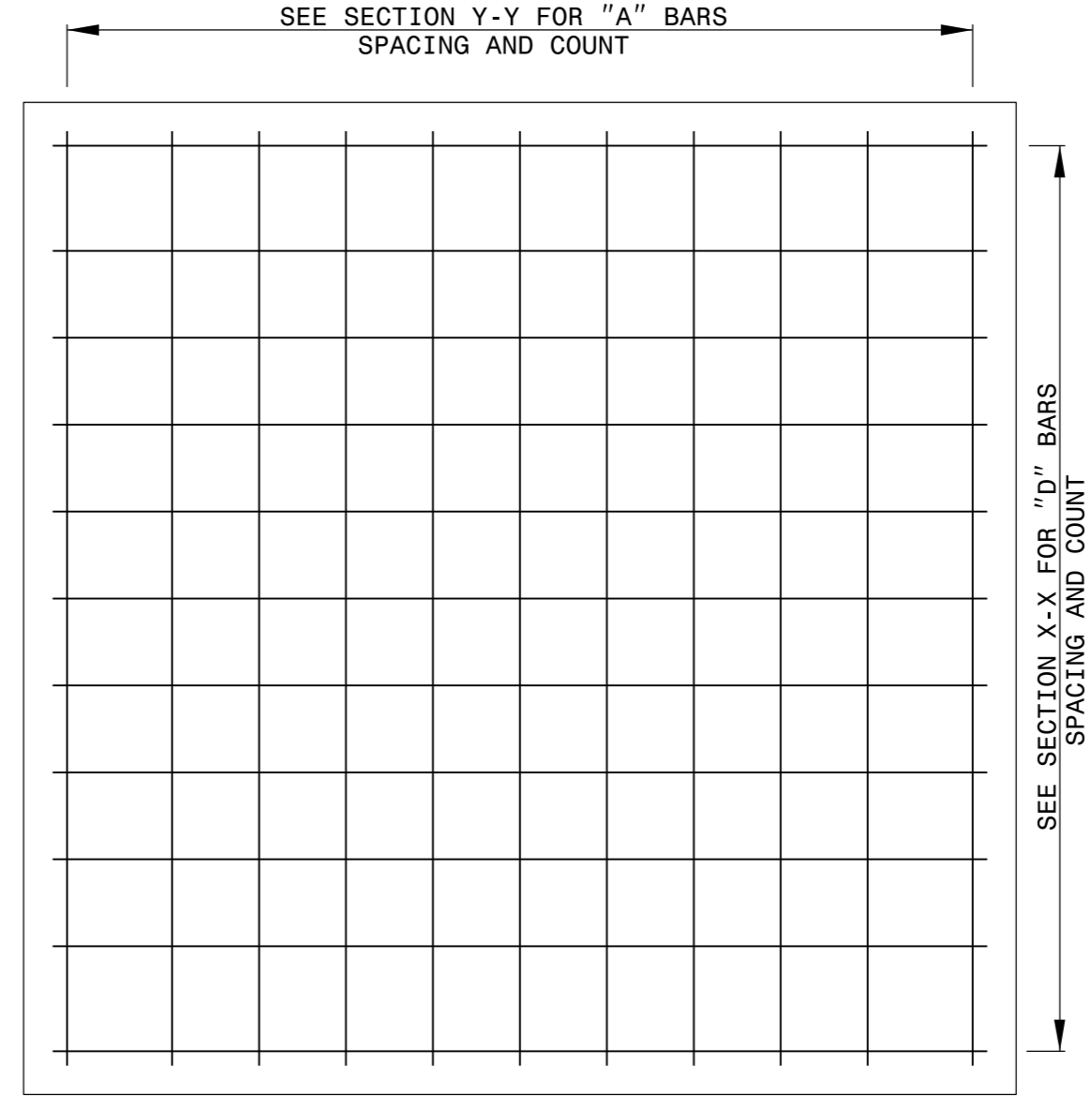


SECTION Y-Y

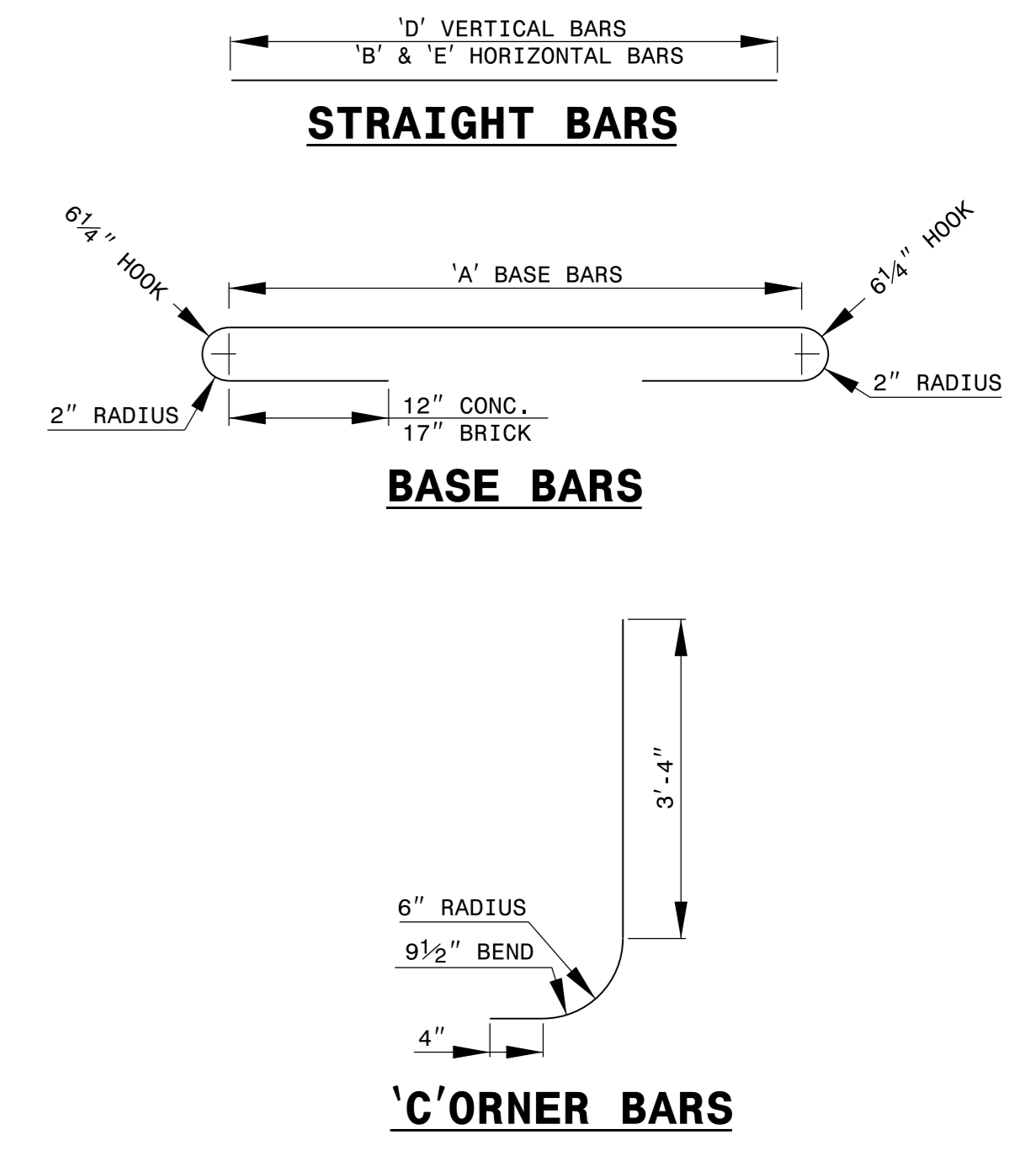
CONCRETE ALT.



PLAN

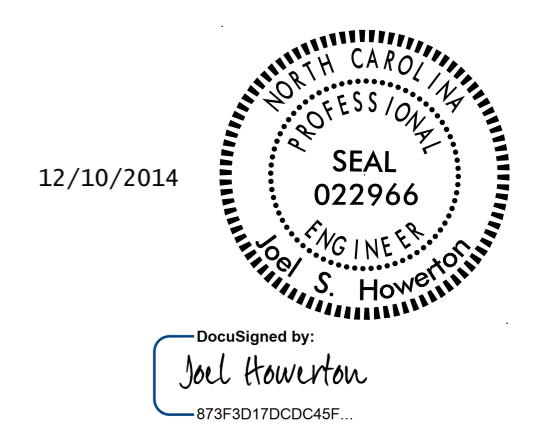


PLAN OF BASE



| BILL OF MATERIALS | | | | | | | |
|---|------|---------------|----------|------------|--------|----------|--------|
| COMMON | | CONCRETE ALT. | | BRICK ALT. | | | |
| BAR | SIZE | LENGTH | QUANTITY | WEIGHT | LENGTH | QUANTITY | WEIGHT |
| A | #7 | 8'-1" | 20 | 330.4 | 9'-4" | 22 | 419.7 |
| B | #7 | 4'-8" | 20 | 190.8 | 5'-1" | 23 | 239.0 |
| C | #5 | 4'-2" | 20 | 87.0 | 4'-2" | 22 | 95.6 |
| D | #5 | 3'-6" | 20 | 73.0 | 3'-6" | 22 | 80.3 |
| E | #5 | 4'-8" | 40 | 194.7 | 4'-6" | 20 | 93.9 |
| REINF. STEEL (TOTAL WEIGHT LBS.) | | | | 875.9 | 928.5 | | |
| CONCRETE (yd ³) | | | | 2.4 | 1.4 | | |
| BRICK IN WALLS (yd ³) | | | | 0.0 | 1.6 | | |
| BRICK + CONCRETE (yd ³) | | | | 2.4 | 3.0 | | |
| 24" RCP DEDUCTION @ 90° SKEW (yd ³) | | | | 0.1 | 0.1 | | |

GENERAL NOTES:
 -CHAMFER ALL EXPOSED CONCRETE CORNERS 1".
 -USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
 -IF PIPES ARE SET IN THE BASE FOLLOW CONSTRUCTION PROCEDURES SHOWN BY STD. DWG. 840.00.
 -REINFORCING STEEL COST IS INCLUSIVE IN THE UNIT BID PRICE FOR "MASONRY DRAINAGE STRUCTURE".
 -REFERENCE STD. DWG. 840.25 FOR FRAME ANCHORAGE.
 -CONCRETE BRICK, JUMBO BRICK AND 4" SOLID CONCRETE BLOCK WILL BE PERMITTED
 -PROVIDE DROP INLETS OVER 3'-6" DEEP WITH STEPS AS DIRECTED BY STD. DWG. 840.66.
 -FRAME AND GRATES ARE SEPARATE CONTRACT ITEM.
 -ADJUSTMENTS MAY BE MADE AS FIELD CONDITIONS DICTATE OR AS DIRECTED BY THE ENGINEER.
 -ANCHOR FRAMES IN ACCORDANCE WITH STD. DWG. 840.25.
 -THE HEIGHT OF THIS STRUCTURE MAY BE ADJUSTED UP TO 14".



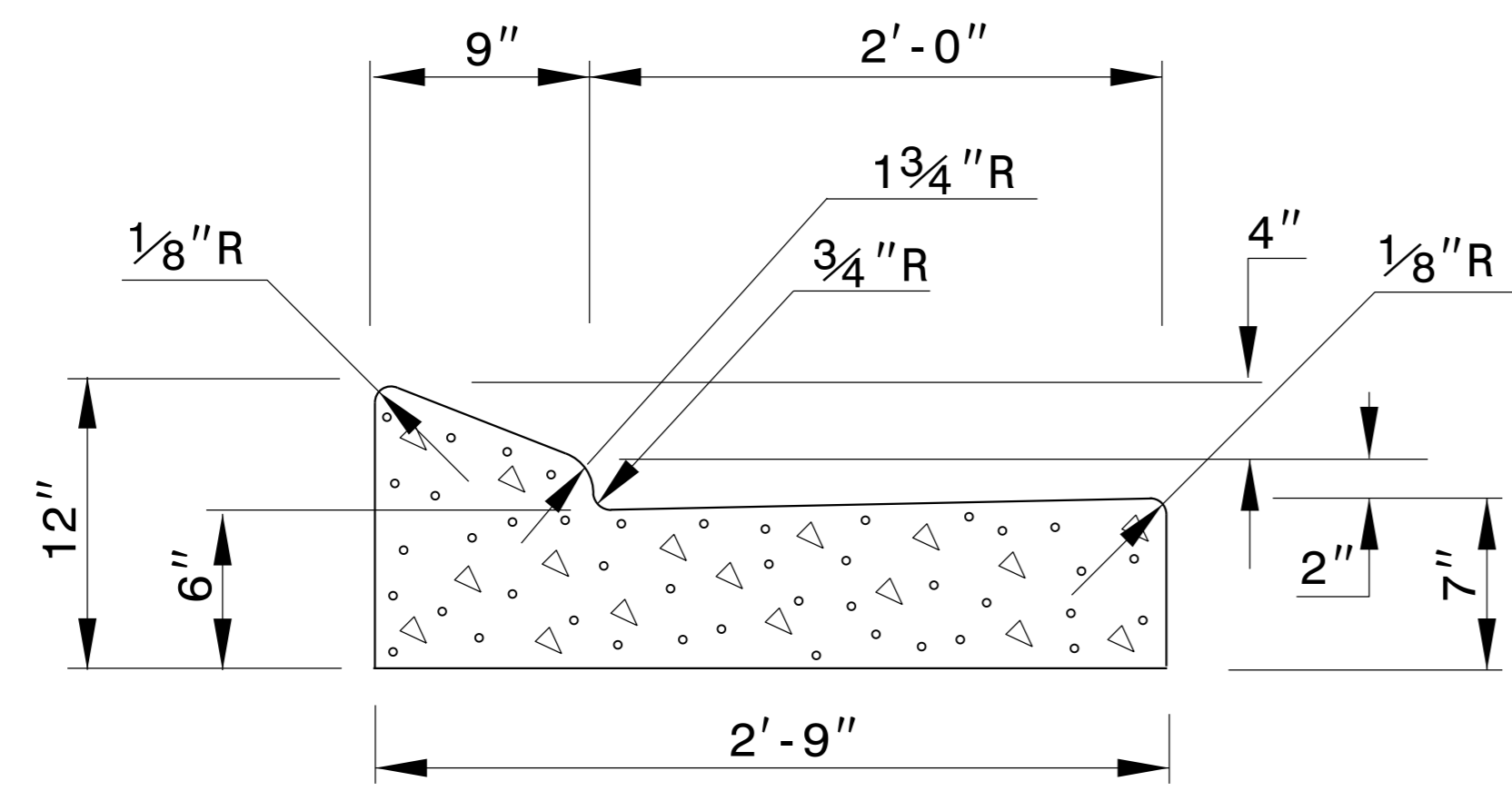
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 Office 919-707-6950 FAX 919-250-4119

DETAIL OF TRAFFIC BEARING DROP INLET UP TO 36" RCPs

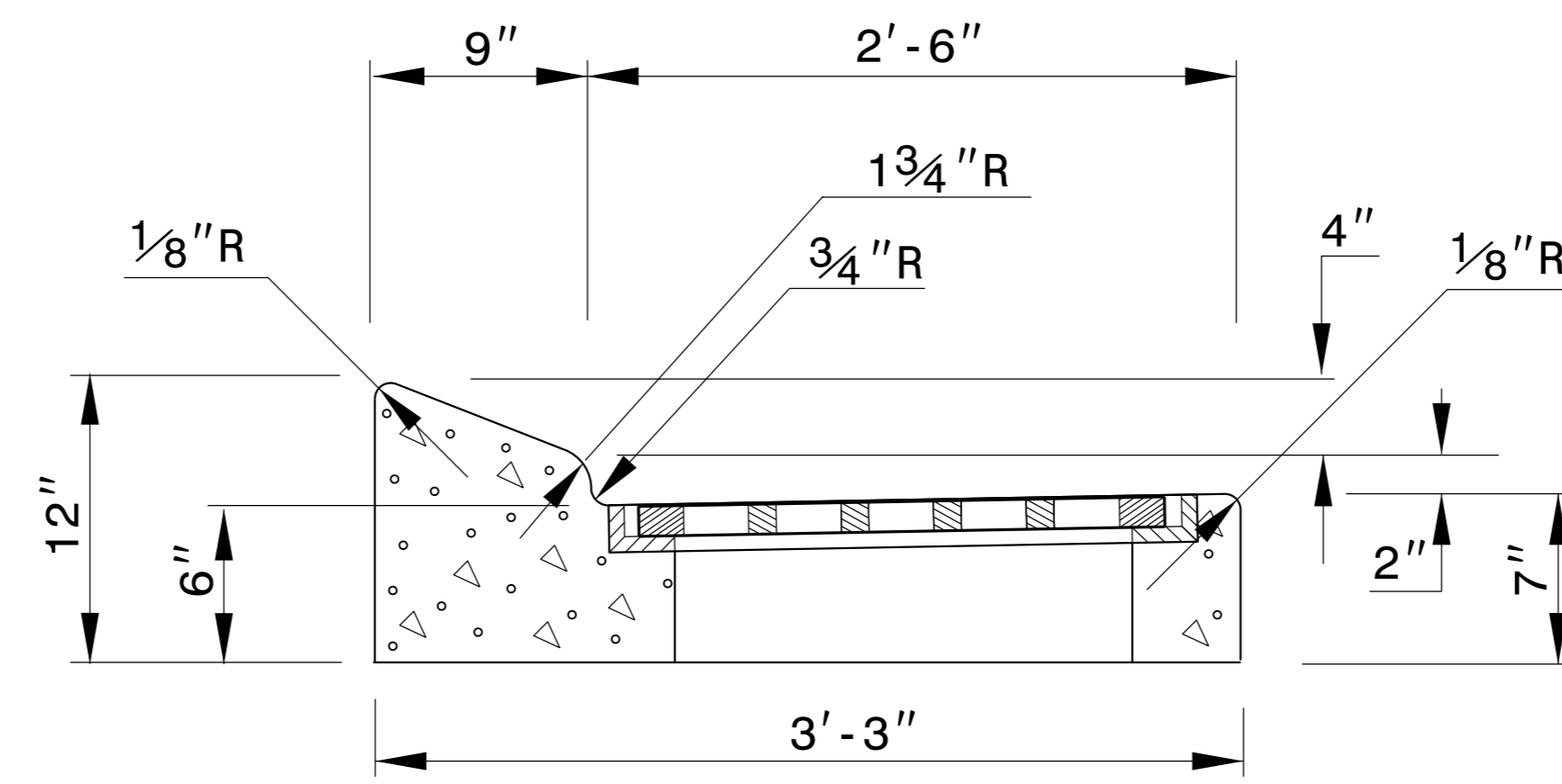
ORIGINAL BY: Std. Dwg. 840.35 DATE: July 1995
 MODIFIED BY: L. Robinson DATE: Aug. 1996
 CHECKED BY: DATE:
 FILE SPEC.: :tspell/terry_ds8/tbdi for up to 36 in pipe.dgn

TIME \$\$\$\$\$\$
 DATE \$\$\$\$\$\$
 USER \$\$\$\$\$\$
 \$\$\$\$\$\$

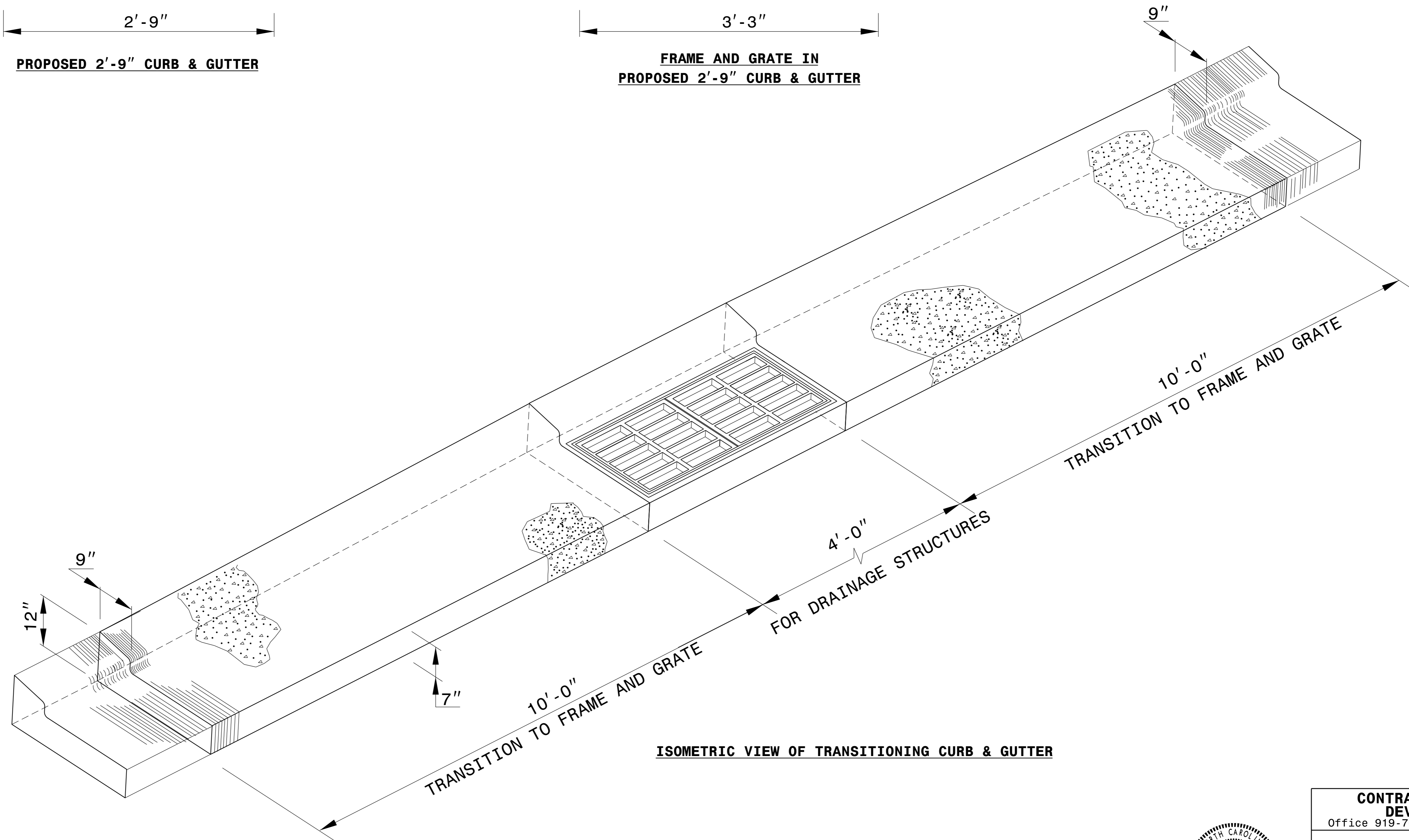
5/14/99



PROPOSED 2'-9" CURB & GUTTER

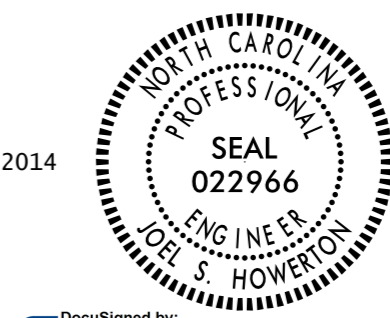


FRAME AND GRATE IN PROPOSED 2'-9" CURB & GUTTER



ISOMETRIC VIEW OF TRANSITIONING CURB & GUTTER

12/10/2014



DocuSigned by:
Joel Howerton
873F3D17DC045F...

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

DETAIL OF 2'-9" TO FRAME AND GRATE

| | |
|---|-------------|
| ORIGINAL BY: _____ | DATE: _____ |
| MODIFIED BY: _____ | DATE: _____ |
| CHECKED BY: _____ | DATE: _____ |
| FILE SPEC.: kkempf/english/curb_gutter_transition.dgn | |

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

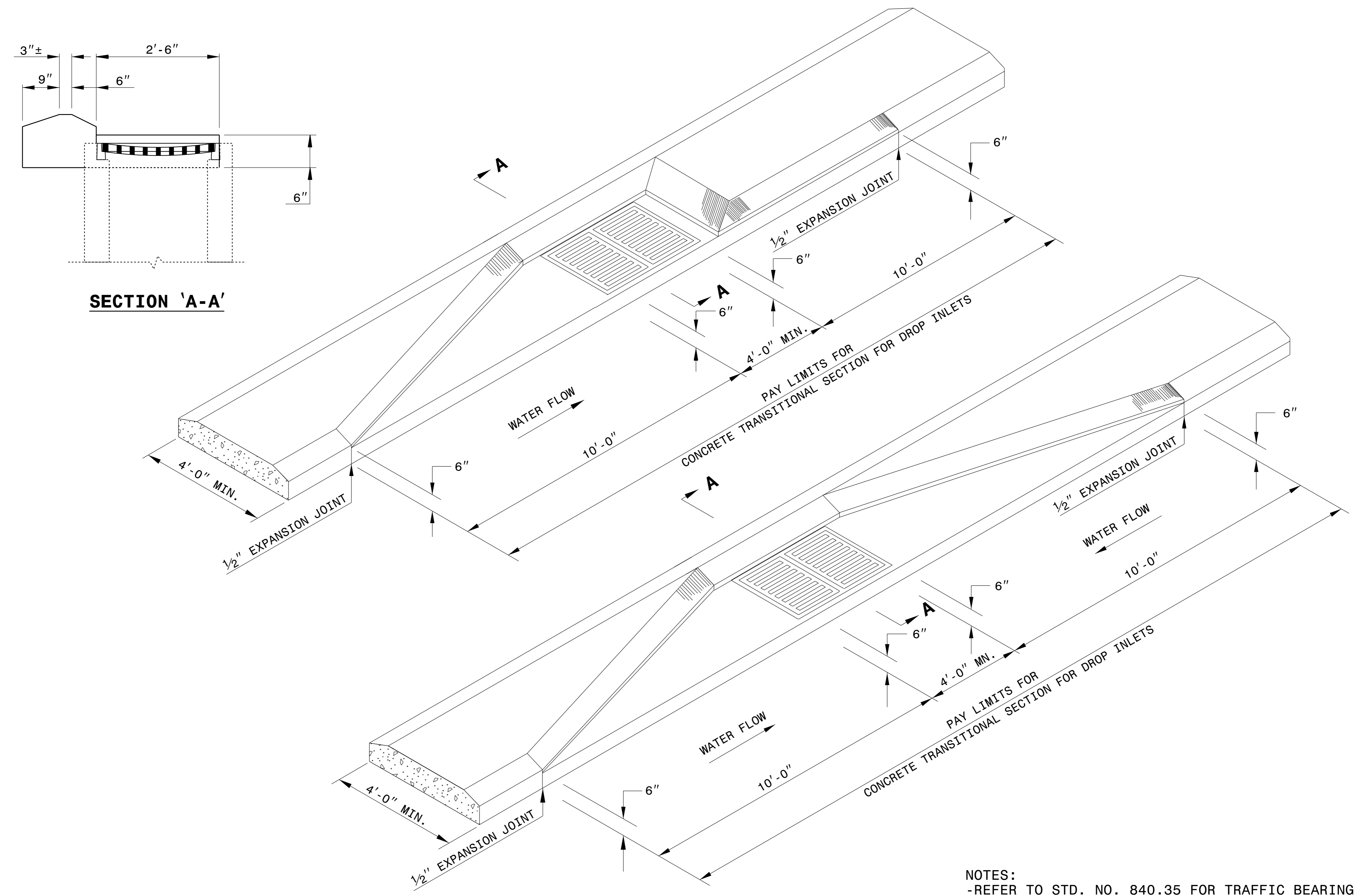
ENGLISH DETAIL DRAWING FOR
**METHOD FOR PLACEMENT OF
DROP INLETS IN CONCRETE ISLANDS**

SHEET 1 OF 1
852D06

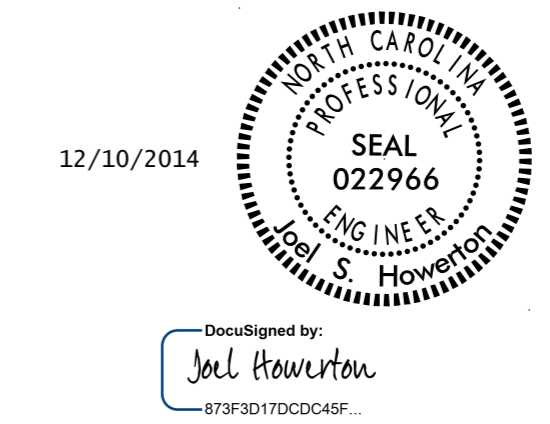
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
**METHOD FOR PLACEMENT OF
DROP INLETS IN CONCRETE ISLANDS**

SHEET 1 OF 1
852D06



NOTES:
-REFER TO STD. NO. 840.35 FOR TRAFFIC BEARING DRAINAGE STRUCTURE.
-REFER TO STD. NO. 840.20 or 840.29 FOR GRATE AND FRAME.

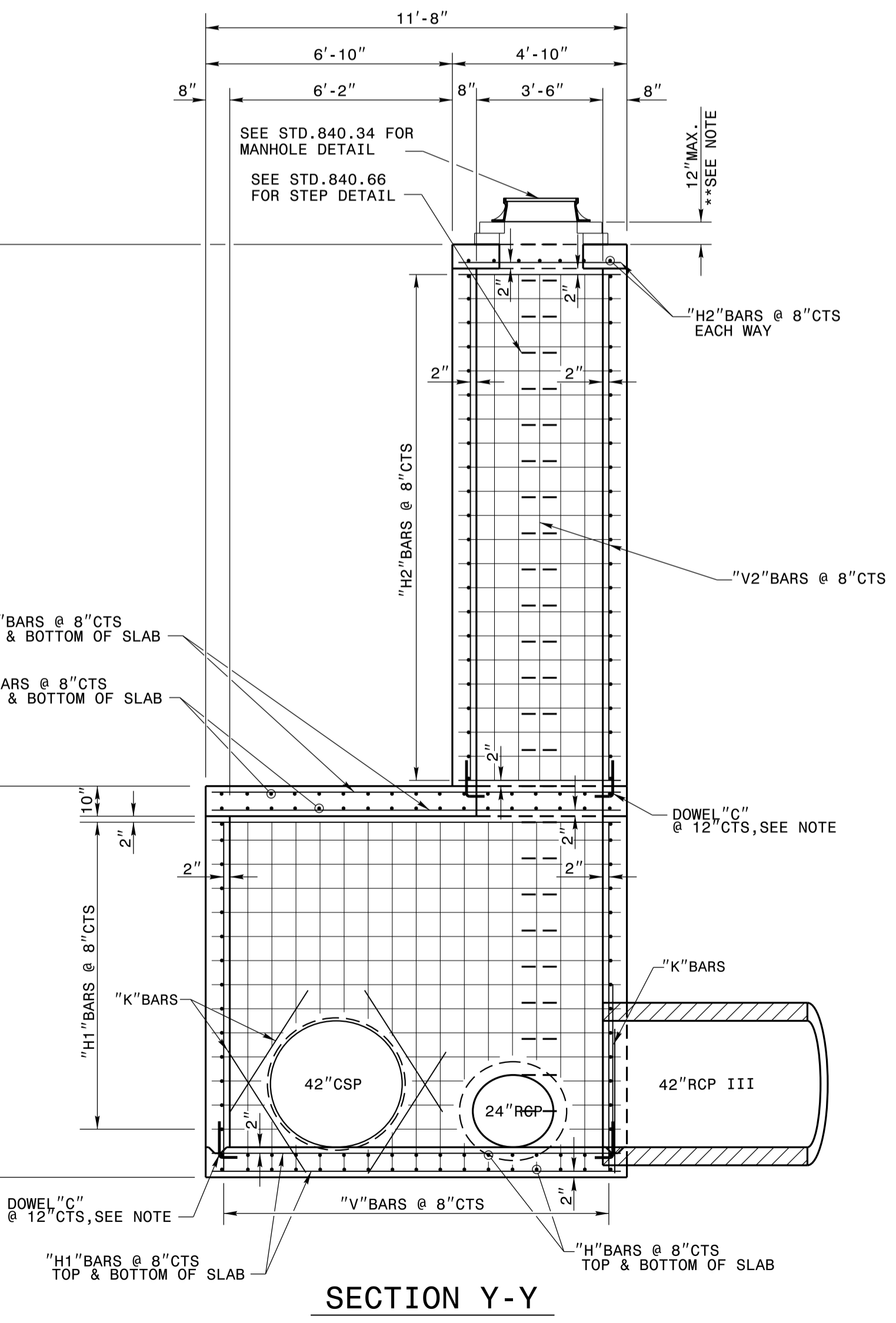
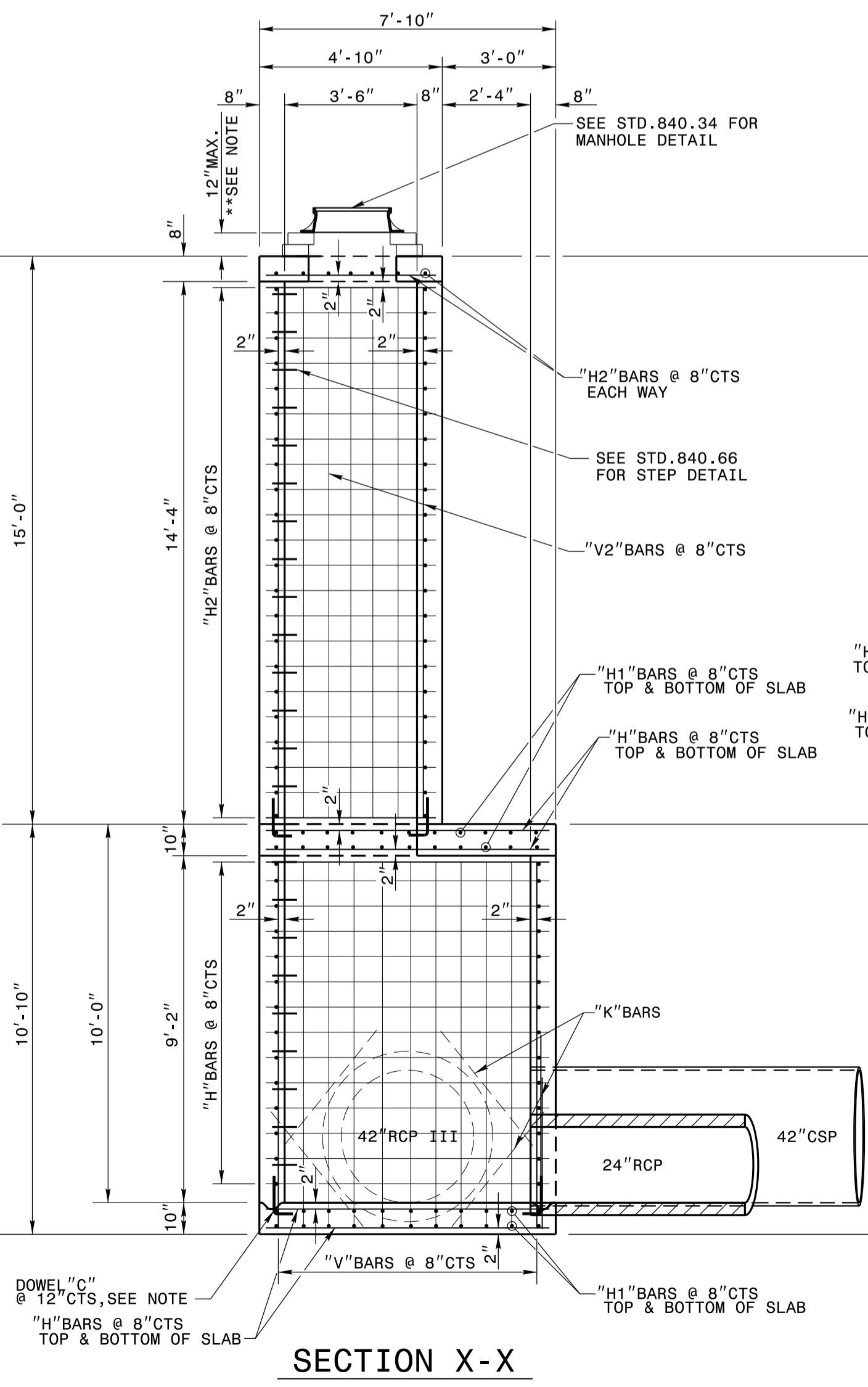
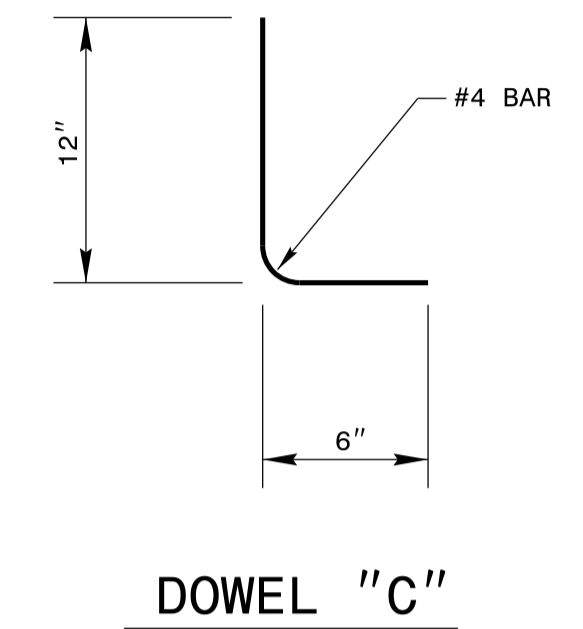
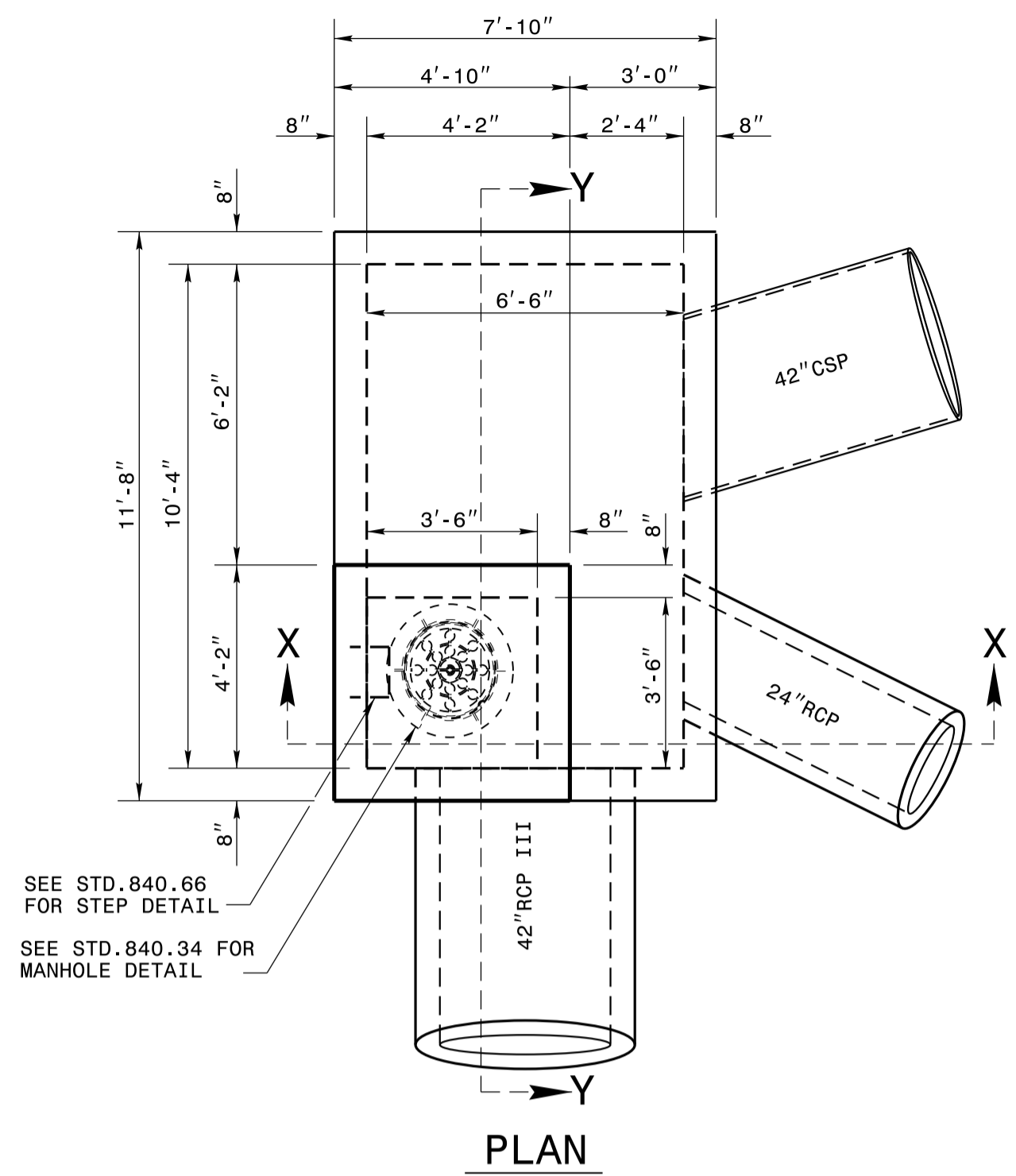


CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE PLATE

ORIGINAL BY: KKEMPF DATE: 8/2/10
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: KKEMPF\ENGLISH\852D0601.DGN

852D06

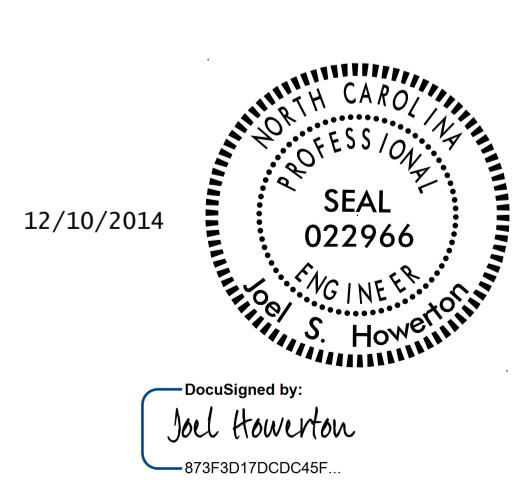


GENERAL NOTES:

- THE BASE SLAB TO BE CONSTRUCTED BY FORMING.
- SEE STD. DWG. 840.00 FOR CONSTRUCTION OF BASE SLAB
- CLASS 'B' CONCRETE TO BE USED THROUGHOUT.
- CONSTRUCTION OPTIONS: MONOLITHIC POUR; 2" KEYWAY OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
- REINFORCING STEEL TO BE CUT, BENT OR RELOCATED TO POSITION PIPE AS DIRECTED BY THE ENGINEER.
- ALL EXPOSED CORNERS TO BE CHAMFERED 1".
- SEE STD. DRAWING 840.34 FOR CONSTRUCTION OF RISER AND MANHOLE.
- JUNCTION BOXES OVER 3'-6" IN DEPTH WITH MANHOLES WILL REQUIRE STEPS TO BE PLACED ON 12" CTRS. REFERENCE STD. NO. 840.66.
- MAINTAIN 2" MINIMUM CONCRETE COVERAGE ON ALL STEEL.

| BILL OF MATERIAL | | | | | |
|--------------------------|------|--------|---------|------|--------------|
| CODE | BAR# | LENGTH | LBS/FT. | QTY. | LBS |
| H | 4 | 7'-6" | 0.668 | 96 | 481 |
| H1 | 4 | 11'-4" | 0.668 | 72 | 545 |
| H2 | 4 | 4'-6" | 0.668 | 102 | 307 |
| V | 4 | 9'-8" | 0.668 | 52 | 336 |
| V2 | 4 | 14'-0" | 0.668 | 24 | 225 |
| K | 4 | 4'-0" | 0.668 | 8 | 22 |
| TOTAL WEIGHT STEEL | | | | | 1916 |
| MASONRY QUANTITIES | | | | | |
| CLASS "B" CONCRETE | | | | | 20.4 CU.YDS. |
| PIPE DEDUCTIONS | | | | | |
| 1-24" RCP | | | | | -0.2 CU.YD. |
| 1-42" RCP III | | | | | -0.4 CU.YD. |
| 1-42" CSP | | | | | -0.3 CU.YDS. |
| TOTAL CLASS "B" CONCRETE | | | | | 19.5 CU.YDS. |

** 0.30 CU.YD. PER FOOT OF RISER HEIGHT.

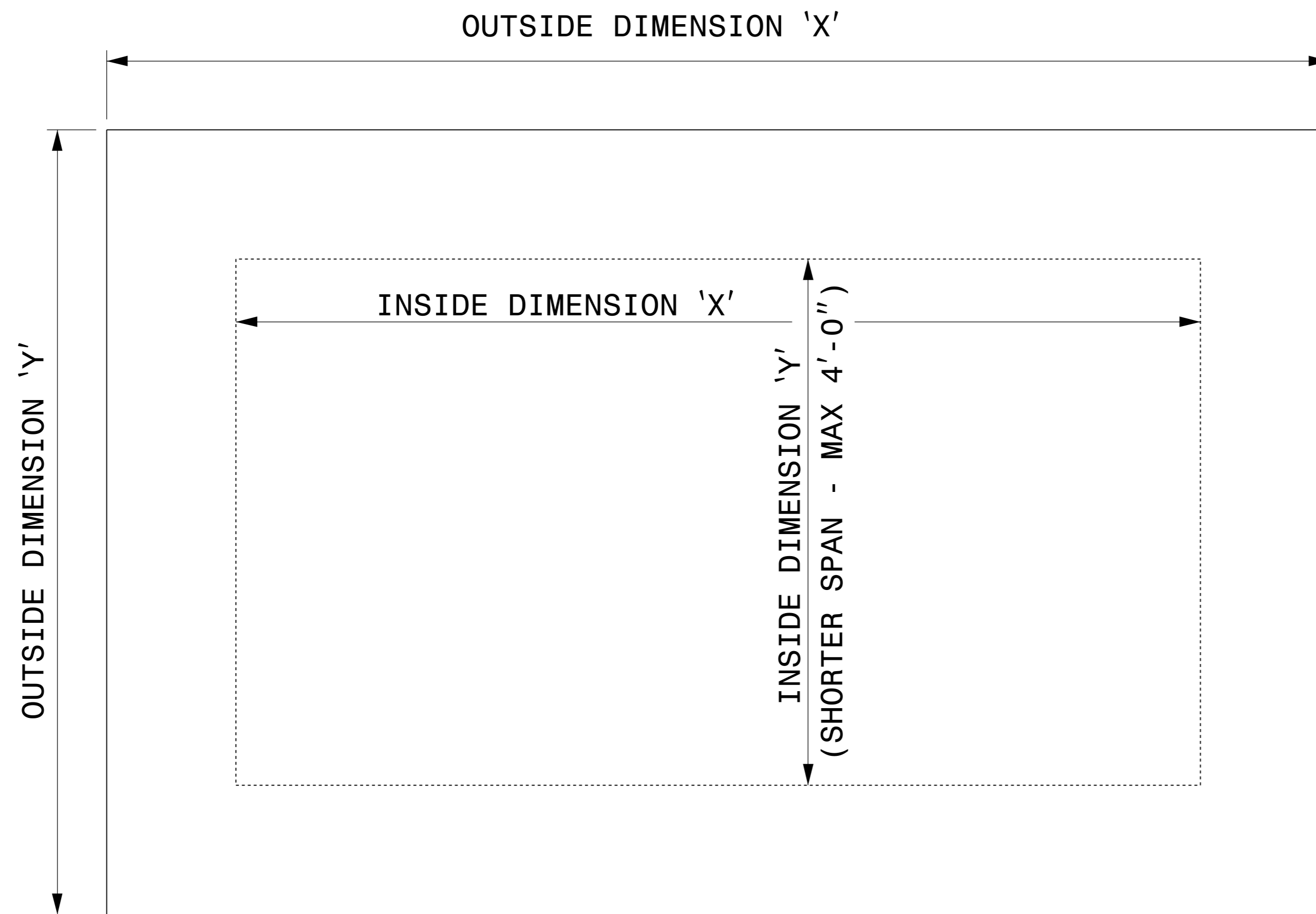


STRUCTURE #1713

CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-707-6900 FAX 919-250-4119

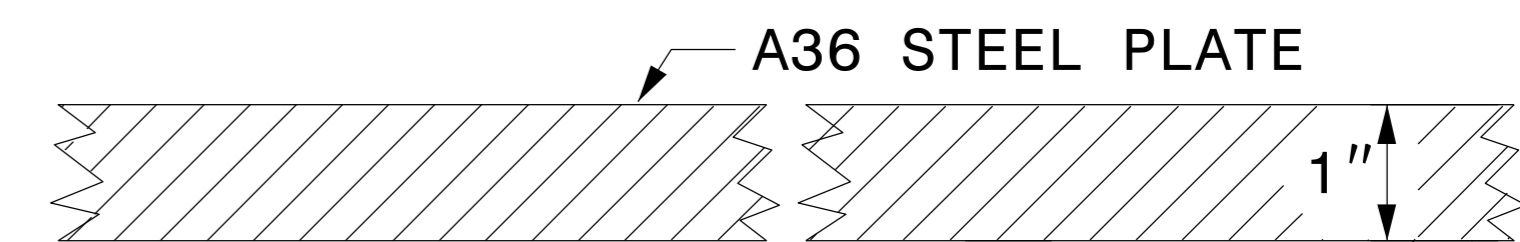
EXTRA DEPTH JUNCTION BOX

ORIGINAL BY: rnbritt DATE: 12-02-14
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPEC.: details/rnbritt/english/rural/r2915d extra_depth_jb.dgn



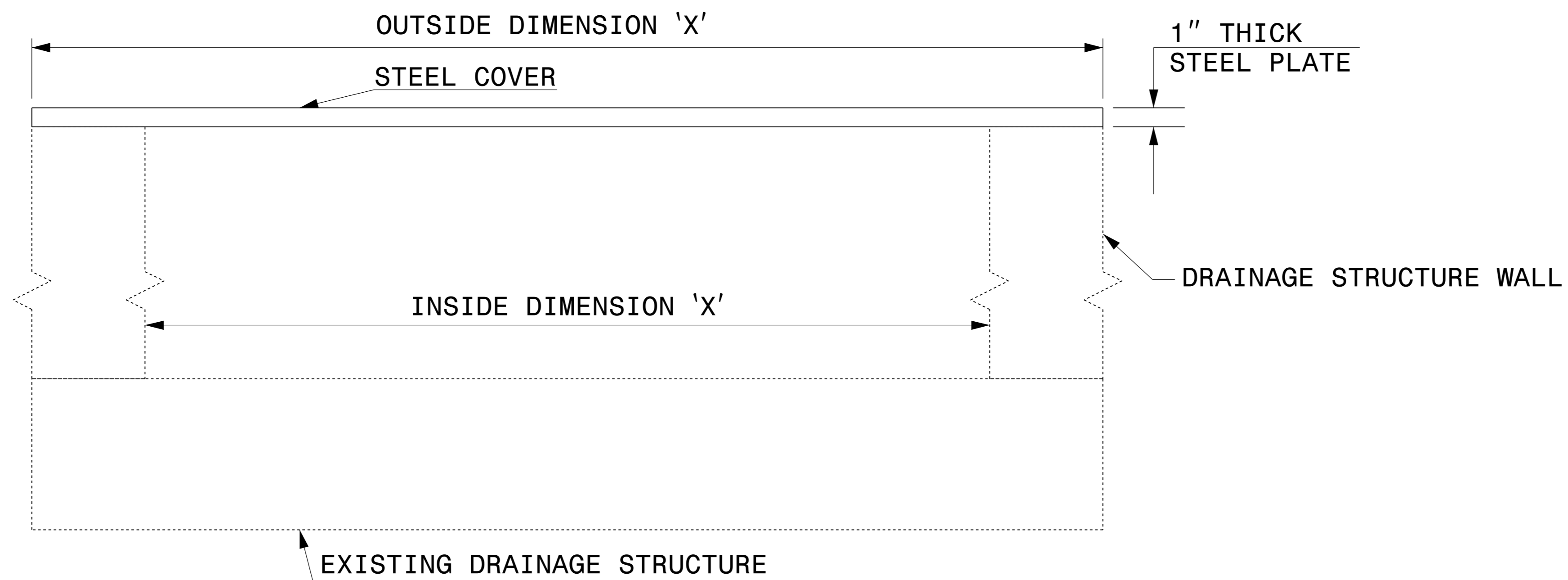
GENERAL NOTES:

- USE GRADE A36 STEEL
- STEEL COVERS ARE FOR TEMPORARY USE DURING PHASE CONSTRUCTION.
- FILL SHALL BE PLACED DIRECTLY OVER THE STEEL PLATES.
- SEE ROADWAY PLANS AND PROVISIONS FOR LOCATIONS
- QUANTITIES TO BE PAID FOR AT THE UNIT PRICE BID PER EACH.

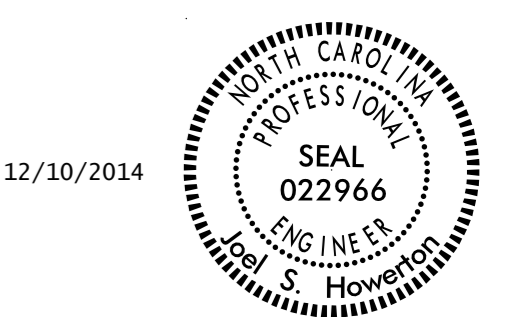


SECTION VIEW OF STEEL TOP PLATE

PLAN VIEWS



ELEVATION VIEWS



DocuSigned by:
Joel Howerton
573F3D17DCDCAF

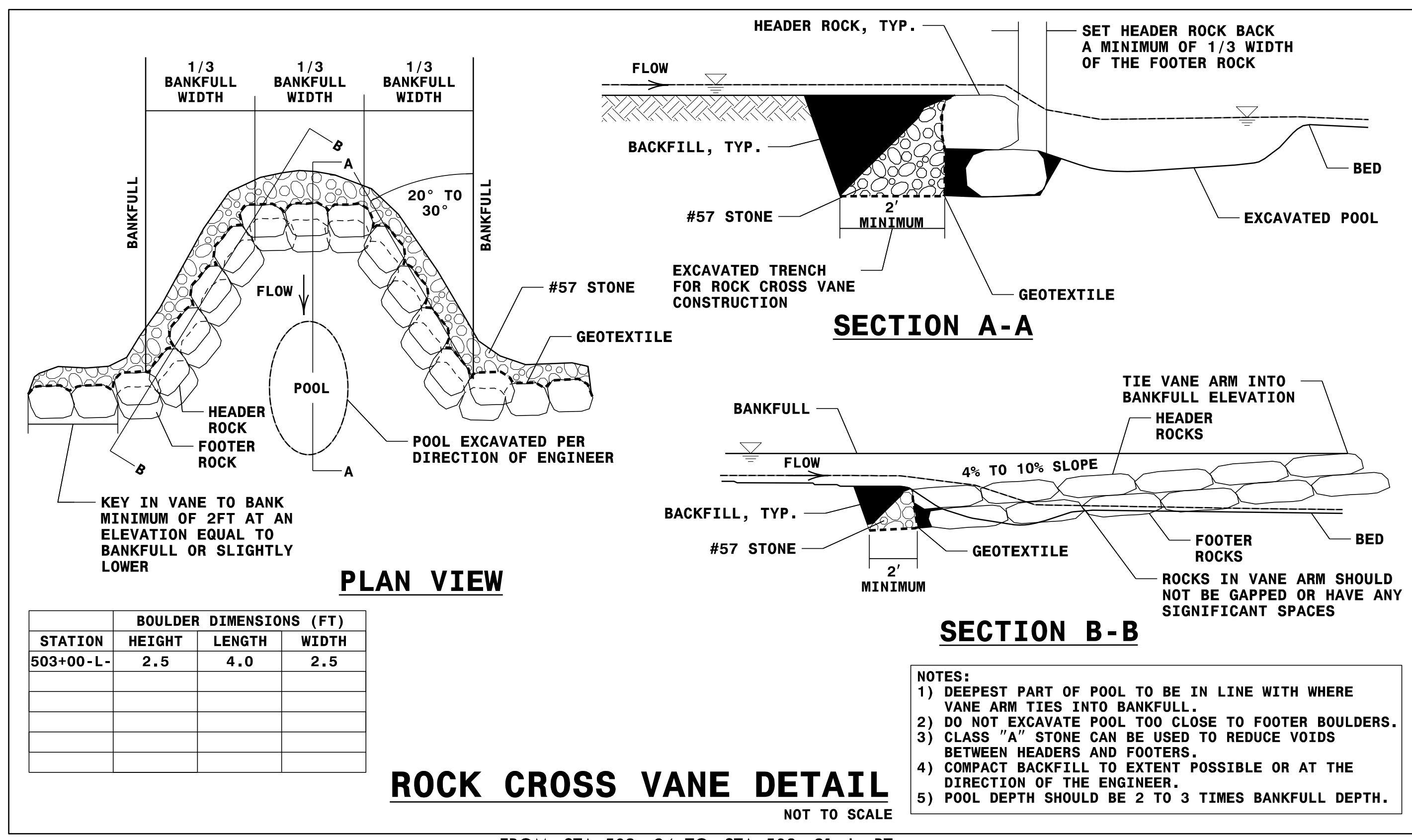
| | |
|---|------------------|
| CONTRACT STANDARDS AND DEVELOPMENT UNIT | |
| Office 919-707-6950 | FAX 919-250-4119 |
| DETAIL OF TEMPORARY 1" STEEL COVER OVER DRAINAGE STRUCTURE | |
| ORIGINAL BY: E.E. WARD | DATE: 2-2-98 |
| MODIFIED BY: | DATE: |
| CHECKED BY: | DATE: |
| FILE SPEC.: eric:/usr/details/metric/stand/st1cvr2.dgn | |

\$\$\$\$\$CUTIME\$\$\$\$\$
\$\$\$\$\$DIACTION\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$

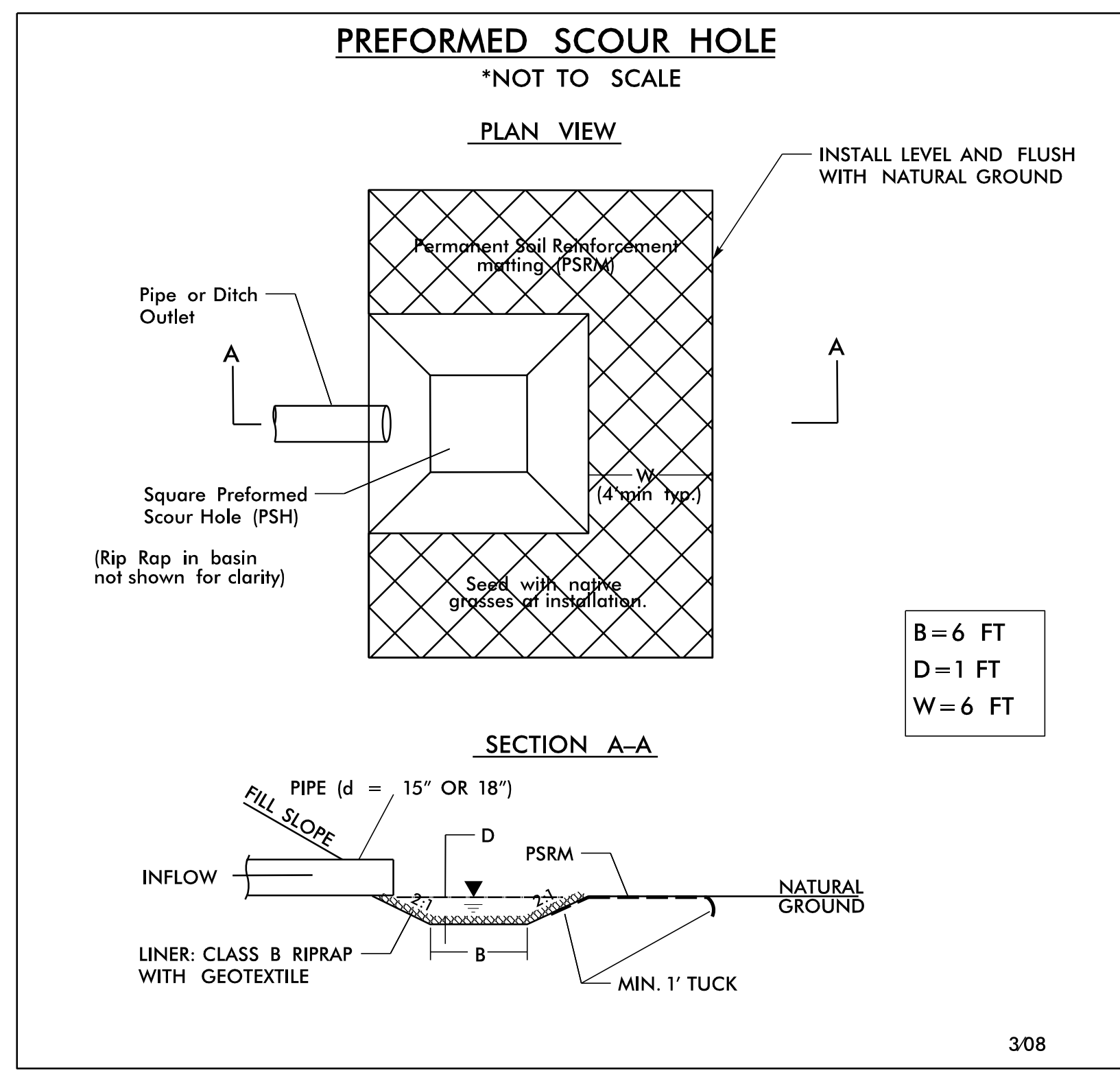
DRAINAGE DETAIL SHEET

| | |
|----------------------------------|-------------------|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 2D-1 |
| RW SHEET NO. | |
| HYDRAULICS ENGINEER | |
| | |

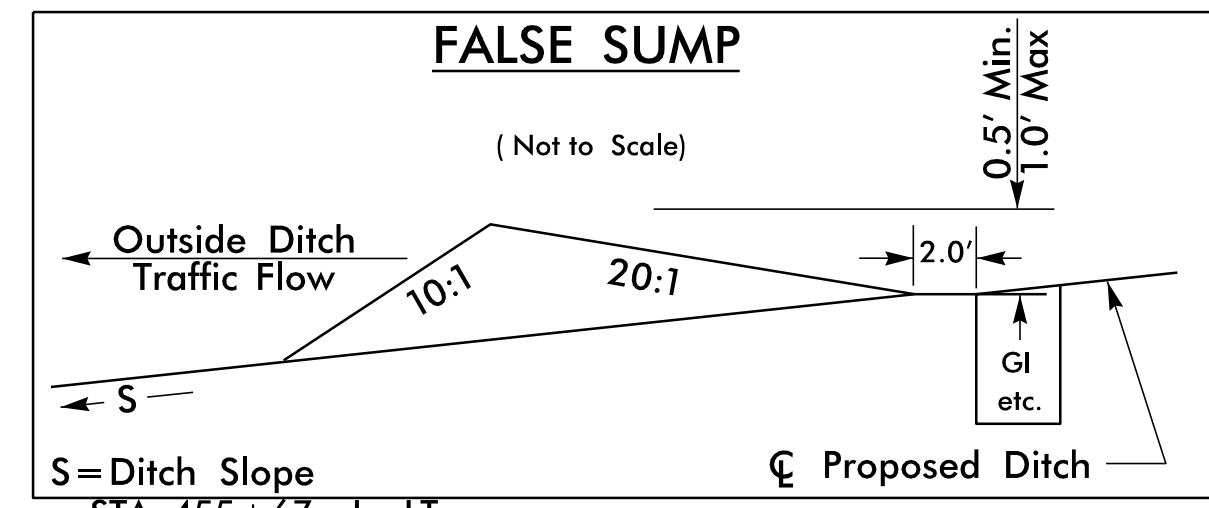
SUNGATE DESIGN GROUP, P.A.
 915 JONES FRANKLIN ROAD
 FOLEY, NORTH CAROLINA 27605
 TEL: (919) 859-2243 FAX: (919) 859-6258
 ENG FROM LICENSE NO. C-490



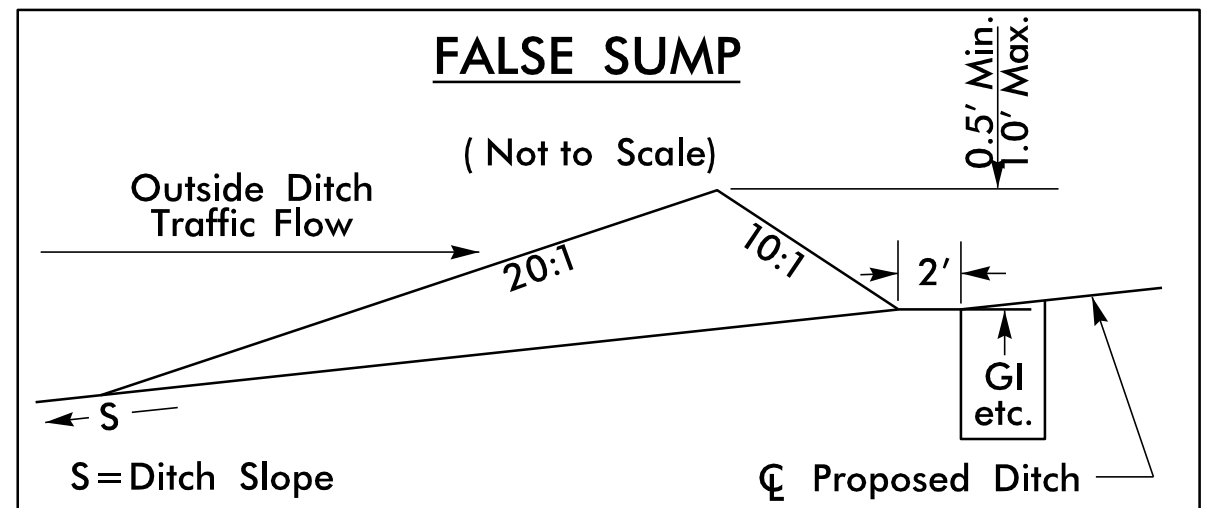
FROM STA. 502+94 TO STA. 503+21 -L- RT



STA. 20+00 -TIE- RT
 STA. 504+52 -L- RT
 STA. 506+50 -L- LT
 STA. 613+50 -L- RT
 STA. 661+00 -L- LT



| | |
|--------------------|---------------------------|
| STA. 455+67 -L- LT | STA. 552+52 -L- LT (-60') |
| STA. 457+84 -L- LT | STA. 561+92 -L- RT |
| STA. 460+35 -L- LT | STA. 569+67 -L- RT |
| STA. 462+20 -L- LT | STA. 573+17 -L- RT |
| STA. 464+84 -L- LT | STA. 576+55 -L- RT |
| STA. 468+85 -L- LT | STA. 583+66 -L- RT |
| STA. 484+34 -L- LT | STA. 586+16 -L- RT |
| STA. 488+04 -L- LT | STA. 594+50 -L- LT |
| STA. 492+84 -L- LT | STA. 599+16 -L- RT |
| STA. 496+06 -L- LT | STA. 602+30 -L- RT |
| STA. 496+70 -L- LT | STA. 606+16 -L- RT |
| STA. 513+35 -L- LT | STA. 628+16 -L- RT |
| STA. 515+49 -L- LT | STA. 632+81 -L- RT |
| STA. 516+00 -L- LT | STA. 633+49 -L- RT |
| STA. 517+58 -L- LT | STA. 637+16 -L- RT |
| STA. 519+84 -L- LT | STA. 640+66 -L- RT |
| STA. 522+08 -L- LT | STA. 647+56 -L- RT |
| STA. 524+02 -L- LT | STA. 658+66 -L- RT |
| STA. 526+34 -L- LT | STA. 660+16 -L- RT |
| STA. 528+97 -L- LT | STA. 669+34 -L- LT |
| STA. 531+84 -L- LT | STA. 625+89 -L- RT |
| STA. 545+84 -L- LT | |



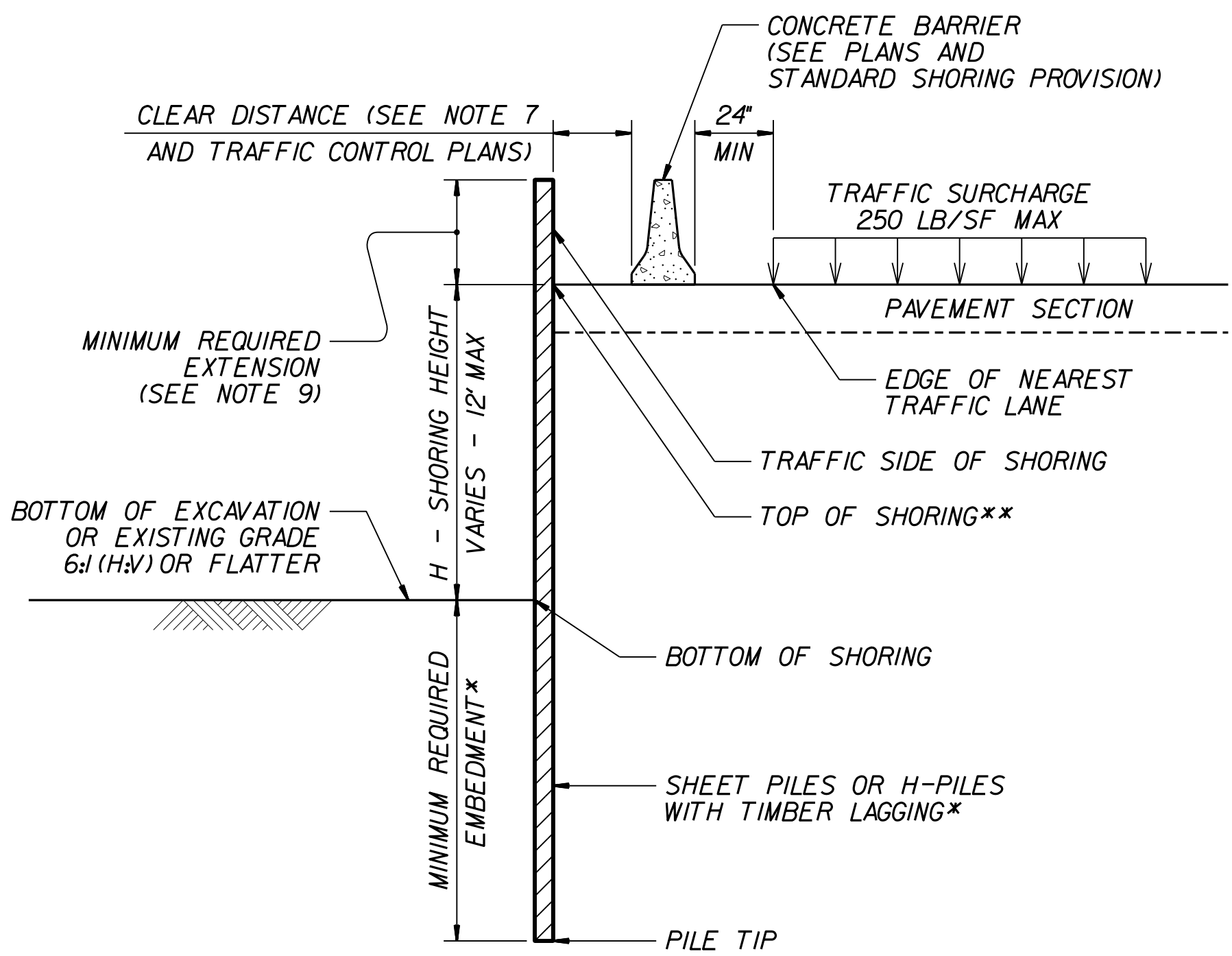
| |
|----------------------------|
| STA. 461+50 -L- RT |
| STA. 468+36 -L- RT |
| STA. 470+91 -L- RT |
| STA. 477+28 -L- RT |
| STA. 488+03 -L- RT |
| STA. 495+73 -L- RT |
| STA. 514+67 -L- RT |
| STA. 517+55 -L- RT |
| STA. 545+84 -L- RT |
| STA. 549+08 -L- RT |
| STA. 552+55 -L- RT |
| STA. 552+52 -L- LT (-112') |
| STA. 561+91 -L- LT |
| STA. 575+16 -L- LT |
| STA. 581+66 -L- LT |
| STA. 583+66 -L- LT |
| STA. 599+16 -L- LT |
| STA. 603+66 -L- LT |
| STA. 606+57 -L- LT |
| STA. 633+46 -L- LT |
| STA. 658+66 -L- LT |
| STA. 666+44 -L- RT |
| STA. 671+84 -L- RT |

8/17/99
 24-NOV-2014 08:32
 P:\2011\2915D\Roadway\Proj\2915D_Rdwy\drainage_dtl_2D-1.dgn
 \$\$\$\$LSPERNAME\$\$\$\$

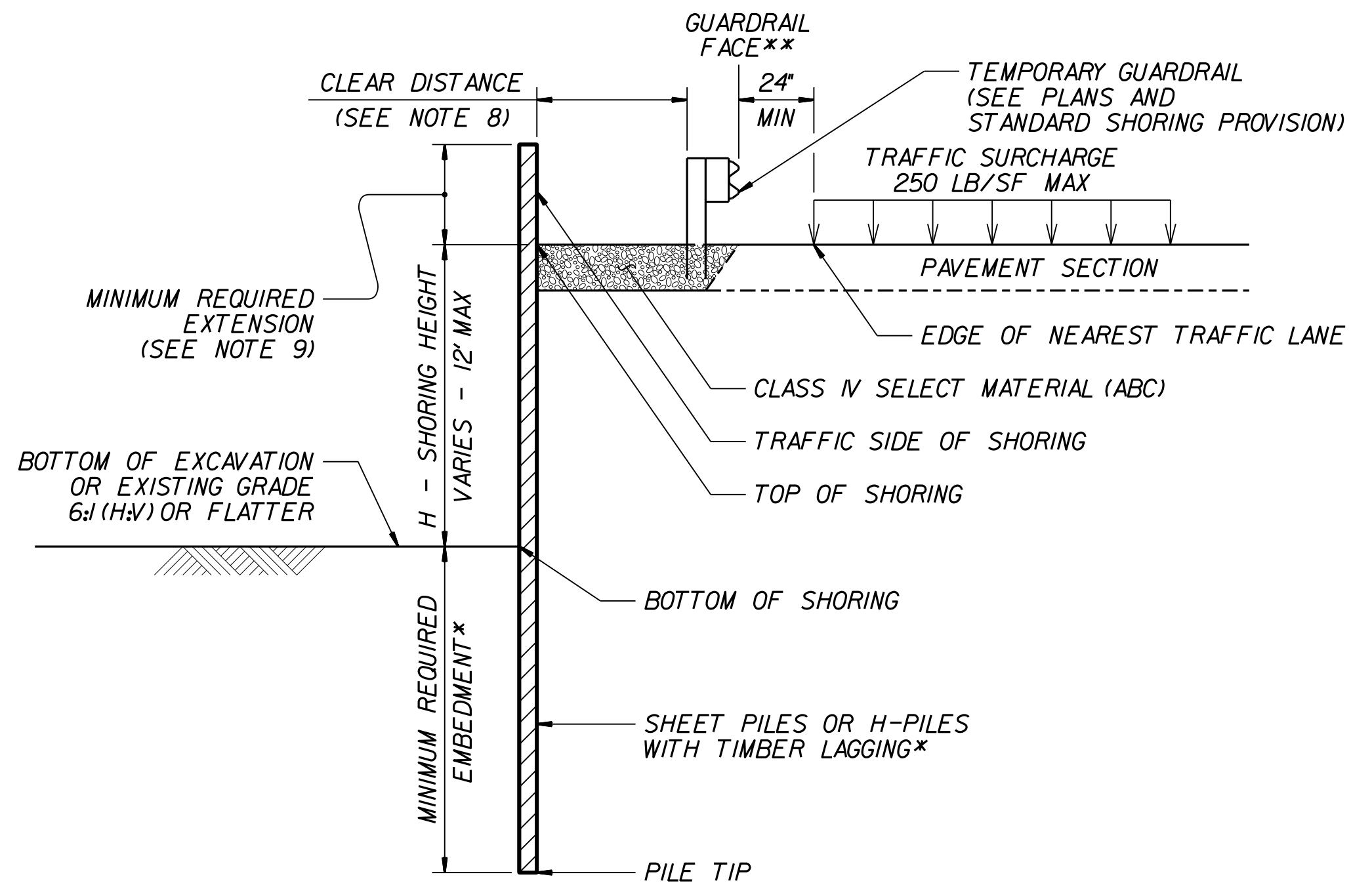
| GROUNDWATER CONDITION (SEE NOTE 6) | H SHORING HEIGHT (FT) | SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT | | | | | | SURCHARGE CASE WITH TRAFFIC IMPACT | | | | | |
|--|-----------------------|--|--|--|----------|------|---------------------------------|--|--|----------|------|--|--|
| | | SHEET PILES | | H-PILES WITH TIMBER LAGGING | | | SHEET PILES | | H-PILES WITH TIMBER LAGGING | | | | |
| | | MINIMUM REQUIRED EMBEDMENT (FT) | MINIMUM REQUIRED SECTION MODULUS (IN ³ /FT) | MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10) | | | MINIMUM REQUIRED EMBEDMENT (FT) | MINIMUM REQUIRED SECTION MODULUS (IN ³ /FT) | MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10) | | | | |
| | | | HP 10x42 | HP 12x53 | HP 14x73 | | | HP 10x42 | HP 12x53 | HP 14x73 | | | |
| GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP | < 6 | 11.5 | 4.5 | 11.5 | 11.5 | 11.5 | 16.0 | 12.0 | 13.0 | 13.0 | 13.0 | | |
| | 7 | 13.0 | 7.0 | 13.0 | 13.0 | 13.0 | 17.0 | 14.5 | 14.5 | 14.5 | | | |
| | 8 | 15.0 | 10.0 | -- | 15.0 | 15.0 | 18.0 | 17.0 | -- | 15.5 | 15.5 | | |
| | 9 | 17.0 | 14.0 | -- | 17.0 | 17.0 | 19.0 | 20.0 | -- | 17.0 | 17.0 | | |
| | 10 | 18.5 | 19.5 | -- | -- | 18.5 | 20.0 | 23.5 | -- | -- | 18.5 | | |
| | 11 | 20.5 | 26.0 | -- | -- | -- | 21.0 | 28.0 | -- | -- | 20.0 | | |
| GROUNDWATER ELEVATION BELOW PILE TIP | < 6 | 7.5 | 3.0 | 8.0 | 8.0 | 8.0 | 11.0 | 10.0 | 9.5 | 9.5 | 9.5 | | |
| | 7 | 8.5 | 4.5 | 9.5 | 9.5 | 9.5 | 12.0 | 12.0 | 10.5 | 10.5 | 10.5 | | |
| | 8 | 10.0 | 6.5 | 10.5 | 10.5 | 10.5 | 12.5 | 14.0 | 11.5 | 11.5 | 11.5 | | |
| | 9 | 11.0 | 9.5 | -- | 12.0 | 12.0 | 13.5 | 16.5 | -- | 12.5 | 12.5 | | |
| | 10 | 12.5 | 13.0 | -- | -- | 13.5 | 14.0 | 19.5 | -- | 13.5 | 13.5 | | |
| | 11 | 13.5 | 17.0 | -- | -- | 14.5 | 15.0 | 22.5 | -- | -- | 14.5 | | |
| 12 | 15.0 | 21.5 | -- | -- | 16.0 | 16.0 | 25.5 | -- | -- | 15.5 | | | |

- NOTES:**
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
 - FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
 - STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
 UNIT WEIGHT, $\gamma = 120$ LB/CF
 FRICTION ANGLE, $\phi = 30$ DEGREES
 COHESION, $c = 0$ LB/SF
 - DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
 - DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
 - USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
 - AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
 - AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
 - MINIMUM REQUIRED EXTENSION IS 6' FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32' FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
 - MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
 - SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:
connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
 - CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.

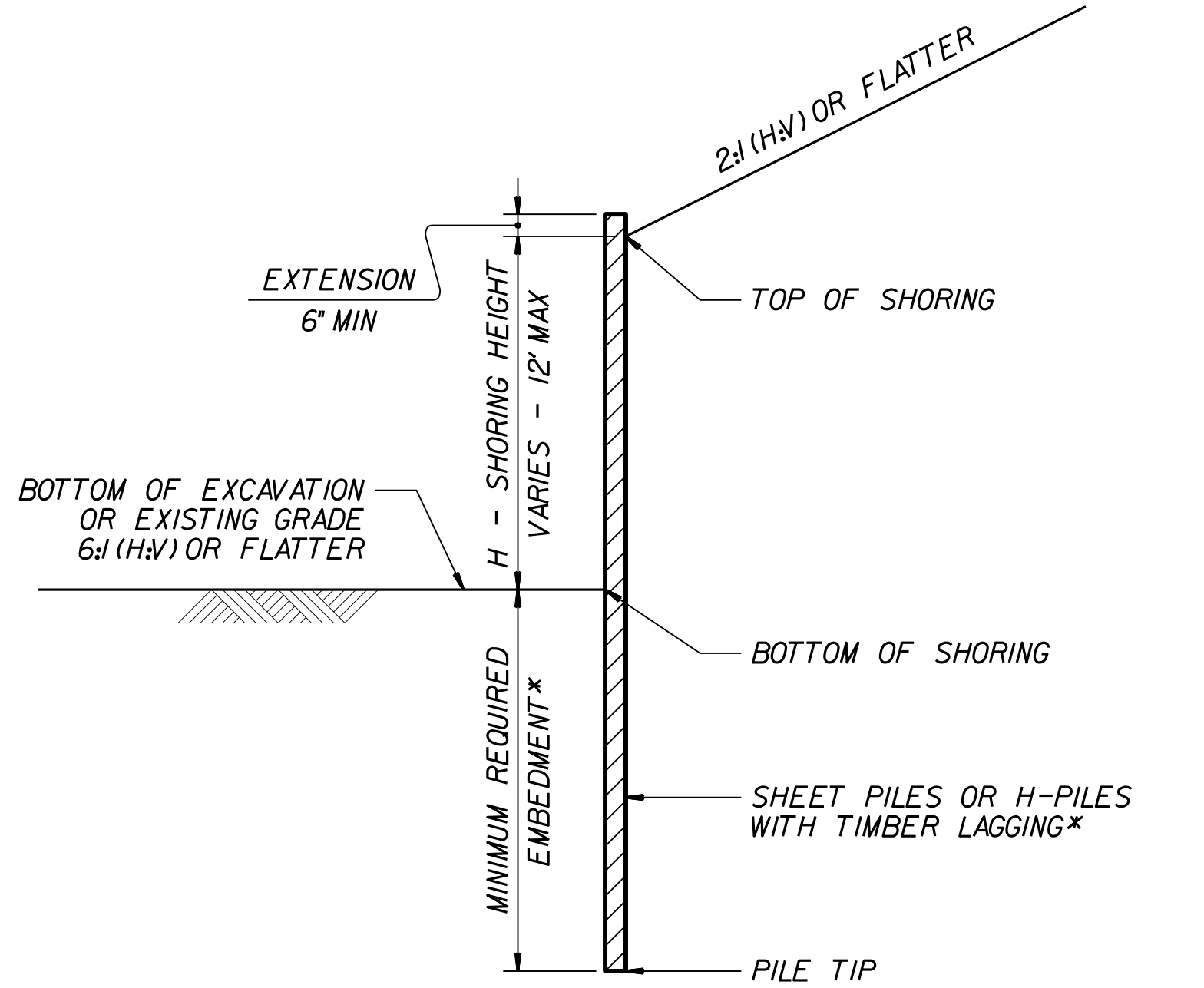
MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS
 *DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".



CONCRETE BARRIER
 **TOP OF SHORING =
 EDGE OF PAVEMENT

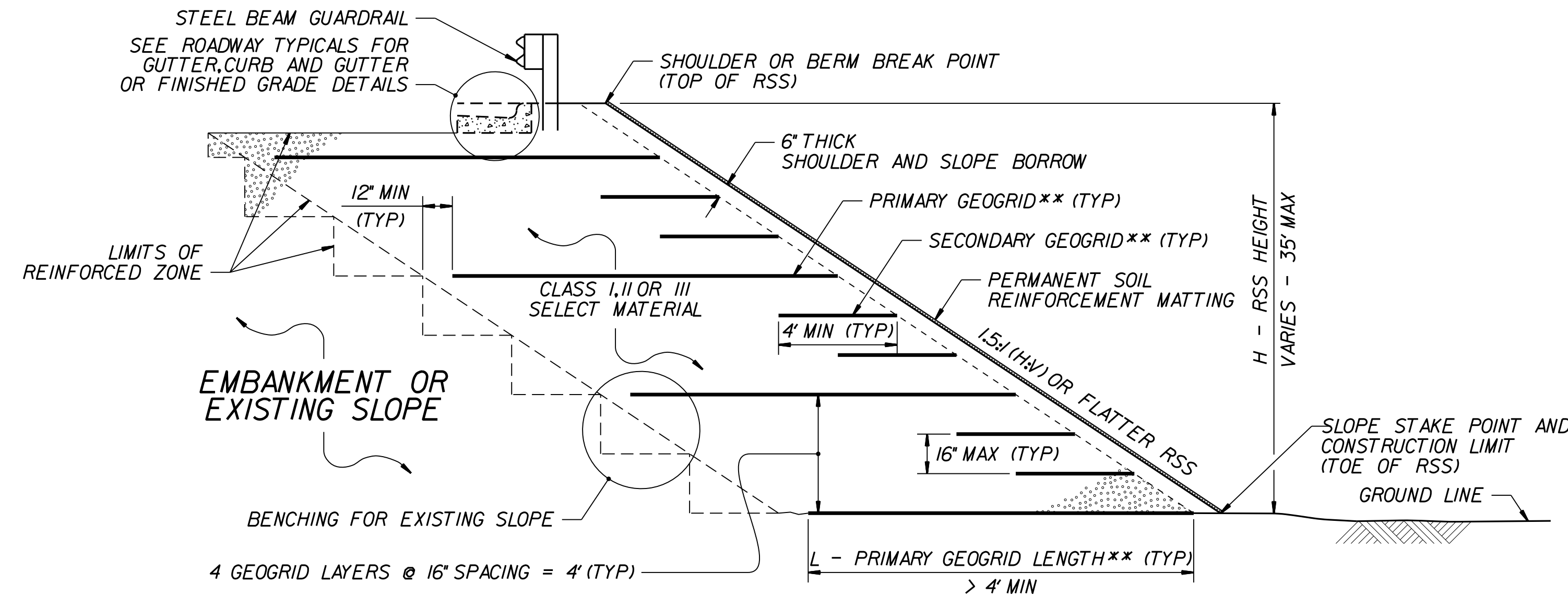


TEMPORARY GUARDRAIL
 **GUARDRAIL FACE =
 EDGE OF PAVEMENT

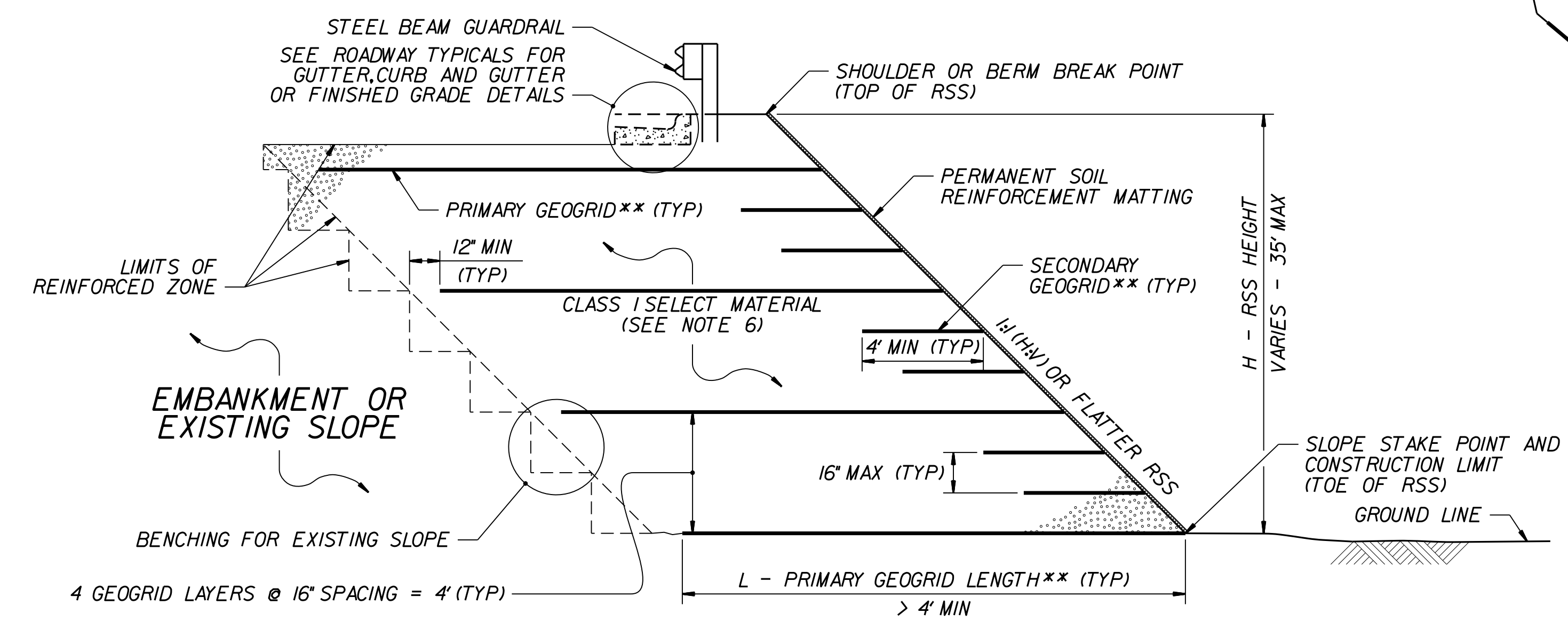


STANDARD TEMPORARY SHORING
 (SLOPE CASE)
 *SEE TABLE ABOVE.

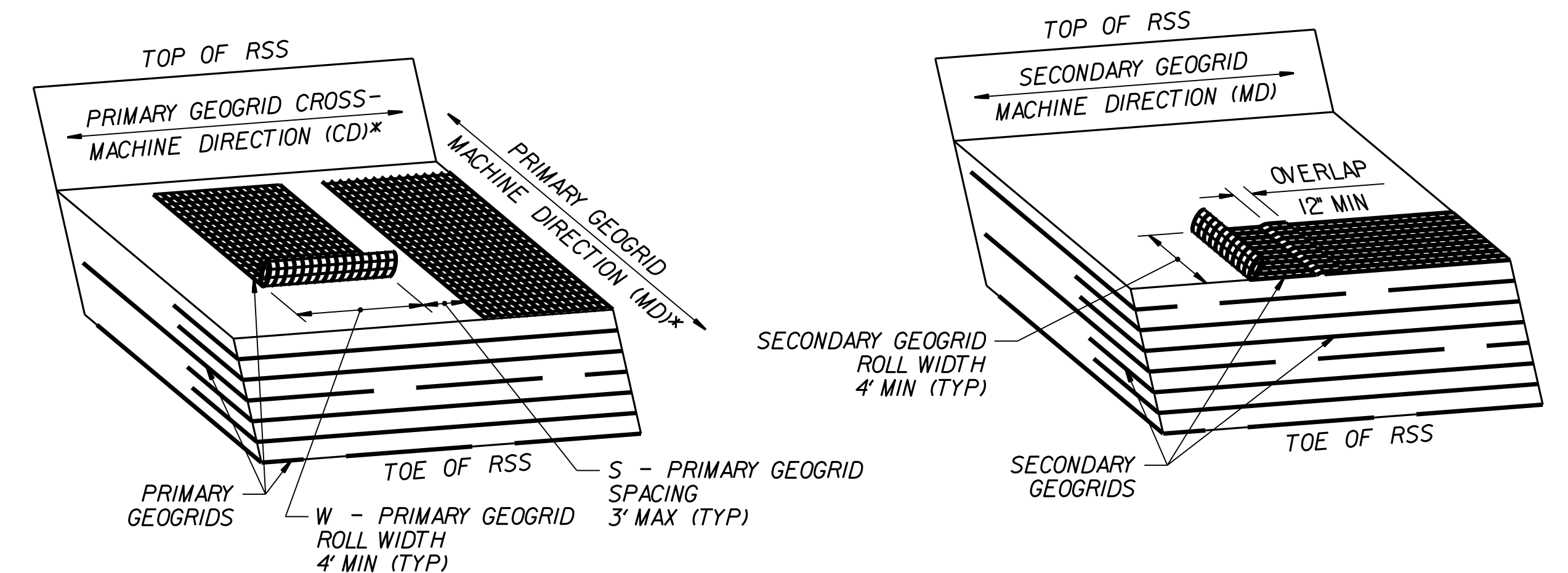
STANDARD TEMPORARY SHORING
 (SURCHARGE CASE)
 *SEE TABLE ABOVE.



STANDARD RSS WITH SELECT MATERIAL THAT DOES NOT MEET ARTICLE 1019-2 OF THE STANDARD SPECIFICATIONS
 **SEE TABLES ON SHEET 2 AND GEOGRID PLACEMENT DETAILS.



STANDARD RSS WITH SELECT MATERIAL THAT MEETS ARTICLE 1019-2 OF THE STANDARD SPECIFICATIONS
 **SEE TABLES ON SHEET 2 AND GEOGRID PLACEMENT DETAILS.



GEOGRID PLACEMENT DETAILS
 $(\% \text{ COVERAGE} = \frac{W}{W+S} \times 100 \geq 75\%)$
 *SEE NOTES 8 AND 9 ON SHEET 2.



NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS

**GEOTECHNICAL
 ENGINEERING UNIT**

STANDARD DETAIL NO. 1803.01

**STANDARD
 REINFORCED SOIL SLOPE (RSS)
 SHEET 1 OF 2**

DATE: 11-19-13

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

SUMMARY OF PAVEMENT REMOVAL

| SURVEY LINE | STATION | STATION | LOCATION LT/RT/CL | SY |
|----------------|---------------------------|-----------|-------------------|--------|
| -TIE- | 17+91.00 | 25+18.64 | CL | 636 |
| -L- | 467+12.00 | 471+45.00 | RT | 188 |
| -L- | 472+32.00 | 474+71.00 | LT | 31 |
| -Y27- | 16+14.50 | 18+10.00 | RT | 456 |
| -Y27B- | 11+34.00 | 12+70.00 | RT | 177 |
| -Y27C- | 10+36.50 | 11+33.50 | RT | 180 |
| -L- | 478+51.00 | 484+50.25 | RT | 316 |
| -L- | 490+53.00 | 498+20.00 | RT | 269 |
| -L- | 500+35.00 | 506+35.95 | RT | 135 |
| -Y28- | 17+00.00 | 17+68.00 | LT | 110 |
| -Y29- | 10+35.00 | 12+04.00 | RT | 602 |
| -L- | 512+45.00 | 513+40.00 | CL | 243 |
| -L- | 515+33.00 | 523+47.50 | RT | 375 |
| -L- | 529+53.00 | 553+20.80 | RT | 1862 |
| -L- | 563+94.15 | 577+73.00 | LT | 1880 |
| -L- | 579+66.00 | 585+07.10 | RT | 211 |
| -L- | 591+03.00 | 625+08.00 | CL | 3739 |
| -L- | 630+90.95 | 648+85.00 | LT | 1229 |
| -L- | 654+66.50 | 660+09.45 | LT | 327 |
| -Y32- | 22+83.50 | 28+56.00 | CL | 1283 |
| -L- | 666+68.00 | 669+48.25 | CL | 199 |
| -L- | 670+36.55 | 676+29.00 | LT | 302 |
| TEMP. PAVEMENT | FROM TRAFFIC CONTROL UNIT | | | 3750 |
| TOTAL: | | | | 18,500 |
| SAY: | | | | 18,500 |

**SUMMARY OF WOVEN WIRE FENCE
 & BARBED WIRE FENCE**

| SURVEY LINE | STATION | STATION | LOCATION LT/RT/CL | LENGTH (FT) | END BRACE (EACH) | CORNER BRACE (EACH) | LINE BRACE (EACH) | 4" POSTS (EACH) | 5" POSTS (EACH) |
|--|-----------|-----------|-------------------|-------------|------------------|---------------------|-------------------|-----------------|-----------------|
| -TIE- /-Y27C- | 17+07.48 | 12+74.99 | RT | 2,126.20 | 2 | 5 | 7 | 131 | 39 |
| -L- | 459+27.60 | 475+10.61 | LT | 1,650.20 | 2 | 7 | 5 | 96 | 40 |
| -L- /-Y28- | 476+44.54 | 16+95.27 | LT | 3,522.50 | 2 | 10 | 11 | 215 | 67 |
| -Y27C- /-L- | 12+53.88 | 510+72.45 | RT | 3,300.40 | 2 | 3 | 10 | 212 | 44 |
| -L- | 512+37.02 | 569+41.02 | LT | 5,704.00 | 2 | 23 | 18 | 339 | 126 |
| -L- | 515+47.40 | 577+57.25 | RT | 6,209.85 | 2 | 6 | 19 | 400 | 79 |
| -L- | 569+73.55 | 659+63.04 | LT | 8,989.50 | 2 | 18 | 28 | 565 | 141 |
| -L- | 578+26.15 | 625+02.45 | RT | 4,676.30 | 2 | 8 | 14 | 295 | 71 |
| -L- | 626+47.45 | 648+66.80 | RT | 2,219.35 | 2 | 4 | 7 | 139 | 37 |
| -L- | 650+46.84 | 662+42.16 | RT | 1,195.30 | 2 | 5 | 4 | 69 | 30 |
| -L- | 662+65.00 | 663+78.08 | RT | 113.10 | 2 | 1 | 0 | 4 | 8 |
| -L- | 660+18.02 | 664+93.78 | LT | 545.75 | 2 | 3 | 2 | 29 | 18 |
| -Y32- /-L- | 24+24.18 | 679+81.92 | RT | 1,418.85 | 2 | 3 | 4 | 87 | 26 |
| -L- | 668+34.86 | 680+45.00 | LT | 1,210.15 | 2 | 2 | 4 | 75 | 21 |
| TOTAL: | | | | 42,881.45 | | | | 2,655 | 747 |
| SAY: | | | | 42,900 | | | | 2,660 | 750 |
| ADDITIONAL BARBED WIRE (CONTINGENCY) | | | | 2,000 | | | | | |
| TEMP. 4 STRAND BARBED WIRE FENCE (CONTINGENCY) | | | | | | | | | |
| -L- | 472+00 | 473+00 | LT | 100 | | | | | |
| -L- | 539+00 | 545+00 | LT | 600 | | | | | |
| TOTAL: | | | | 700 | | | | | |
| SAY: | | | | 1,000 | | | | | |

SUMMARY OF EXPRESSWAY GUTTER

| SURVEY LINE | STATION | STATION | LOCATION LT/RT/CL | LENGTH (FT) |
|-------------|-----------|-----------|-------------------|-------------|
| -L- | 514+00.00 | 516+00.00 | LT | 200.0 |
| TOTAL: | | | | 200.0 |
| SAY: | | | | 200 |

SUMMARY OF SHOULDER BERM GUTTER

| SURVEY LINE | STATION | STATION | LOCATION LT/RT/CL | LENGTH (FT) |
|-------------|-----------|-----------|-------------------|-------------|
| -L- | 535+95.00 | 545+75.00 | LT | 980.0 |
| -L- | 562+25.00 | 565+95.00 | RT | 370.0 |
| -L- | 584+50.00 | 588+71.00 | LT | 421.0 |
| -L- | 610+65.00 | 624+82.00 | RT | 1,417.0 |
| -L- | 660+00.00 | 665+00.00 | LT | 500.0 |
| TOTAL: | | | | 3,688.0 |
| SAY: | | | | 3,690 |

5/28/99
 24-NOV-2014 08:52
 K:\2014\11\07\14-2915D-Roadway\Proje\2915D-Rdy_sum.dgn

COMPUTED BY: BEH DATE: 12/24/14
 CHECKED BY: BCS DATE: 12/24/14

(11-19-13)

| | |
|------------------------|-------------------|
| PROJECT NO. R-2915D | SHEET NO. 3G-1 |
|------------------------|-------------------|

**STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS**

SUMMARY OF SUBSURFACE DRAINAGE

| LINE | Station | Station | Location LT/RT/CL | Drain Type* UD/BD/SD | LF |
|-------------|---------|---------|----------------------|-------------------------|-------|
| | | | | | |
| CONTINGENCY | | | | UD | 1,000 |
| | | | | TOTAL LF: | 1,000 |

*UD = Underdrain
 *BD = Blind Drain
 *SD = Subsurface Drain

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

| LINE | Station | Station | Aggregate Type* ASU/AST | Aggregate Thickness INCHES | Shallow Undercut CY | Class IV Subgrade Stabilization TONS | Geotextile for Soil Stabilization SY | Stabilizer Aggregate TONS | Class IV Aggregate Stabilization TONS | |
|-----------------|---------|---------|-------------------------------|----------------------------------|---------------------------|---|---|---------------------------------|--|---|
| | | | | | | | | | | |
| CONTINGENCY | | | | | 1,500 | 3,000 | 4,500 | 500 | | |
| EROSION CONTROL | | | | | | | 2,000 | | | |
| | | | | | TOTAL CY/TONS/SY: | 1,500 | 3,000 | 6,500 | 500 | 0 |

*ASU = Aggregate Subgrade
 *AST = Aggregate Stabilization

SUMMARY OF REINFORCED SOIL SLOPES (RSS)

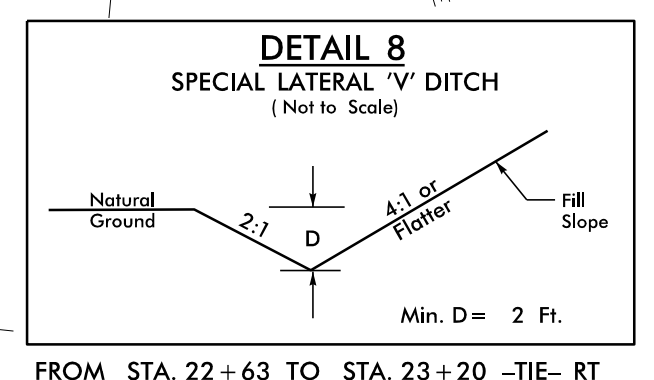
| LINE | Beginning Slope | Approx. Station | Ending Slope | Approx. Station | Location LT/RT | SY |
|-------|--------------------|--------------------|-----------------|--------------------|-------------------|-----------------------|
| -L- | 1.5:1 | 505+28 | 1.5:1 | 506+50 | LT | |
| -Y32- | 1.5:1 | 15+84 | 1.5:1 | 21+00 | RT | |
| | | | | | | TOTAL SY: 2850 |

**SUMMARY OF GEOTEXTILE
FOR PAVEMENT STABILIZATION**

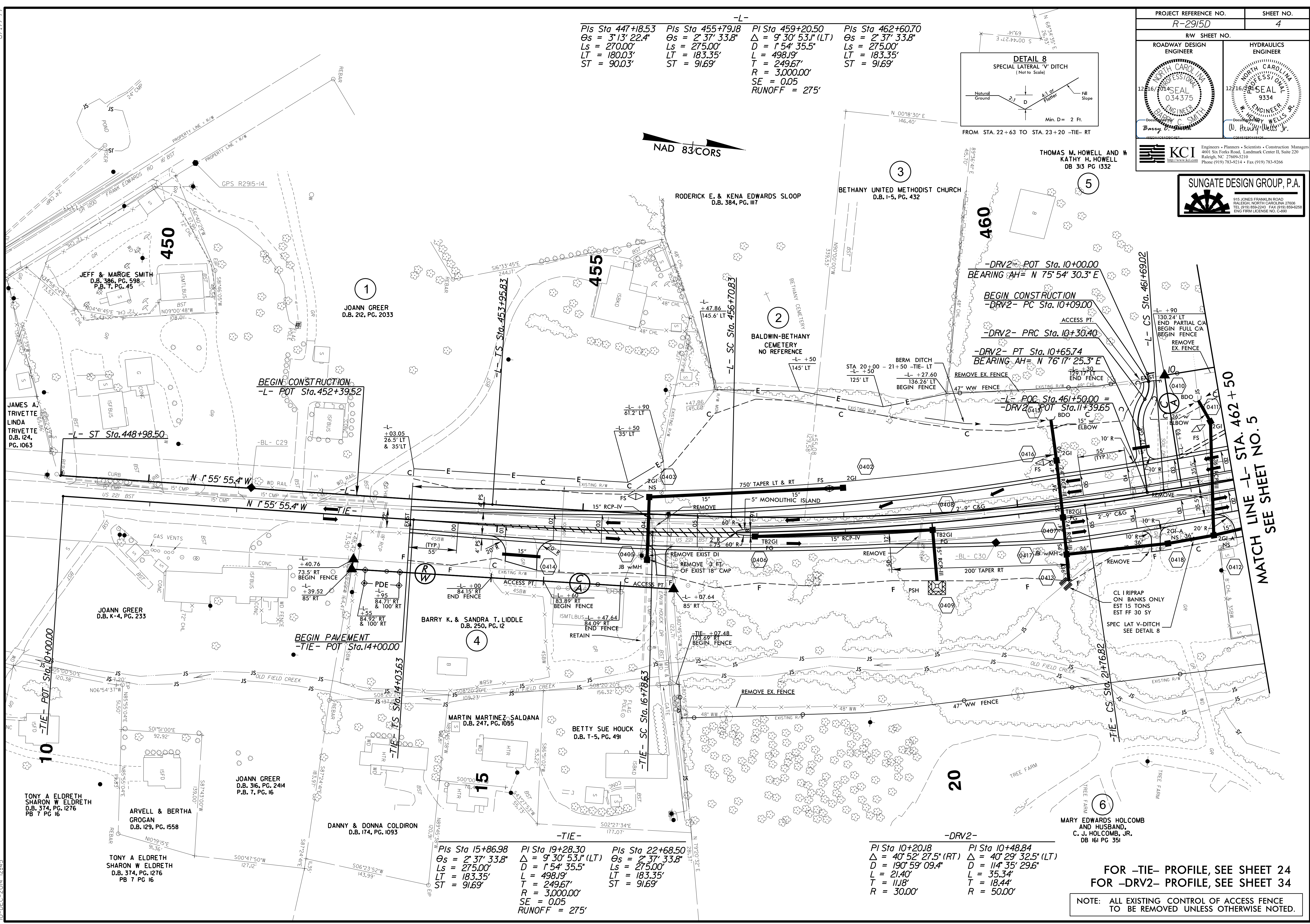
| LINE | Station | Station | SY |
|-------------|---------|---------|-------------------------|
| -L- | 477+50 | 483+50 | 2,333 |
| -L- | 503+00 | 512+00 | 3,500 |
| -L- | 534+50 | 545+00 | 4,083 |
| -L- | 563+00 | 566+50 | 1,361 |
| -L- | 584+50 | 593+00 | 3,306 |
| -L- | 606+50 | 625+00 | 7,194 |
| -L- | 628+50 | 629+00 | 194 |
| -L- | 650+00 | 652+50 | 972 |
| -L- | 660+50 | 664+50 | 2,667 |
| -Y27- | 17+50 | 18+50 | 400 |
| -Y28- | 17+00 | 17+50 | 183 |
| CONTINGENCY | | | |
| | | | TOTAL SY: 26,193 |

8-17-99
10-DEC-2014 12:45

| | | | |
|--|--|---|--|
| Pls Sta 447+18.53 Os = 3°13' 22.4" Ls = 270.00' LT = 180.03' ST = 90.03' | Pls Sta 455+79.18 Os = 2°37' 33.8" Ls = 275.00' LT = 183.35' ST = 91.69' | Pls Sta 459+20.50 Δ = 9°30' 53.1" (LT) D = 1°54' 35.5" L = 498.19' T = 249.67' R = 3,000.00' SE = 0.05 RUNOFF = 275' | Pls Sta 462+60.70 Os = 2°37' 33.8" Ls = 275.00' LT = 183.35' ST = 91.69' |
|--|--|---|--|



| | |
|---|-----------------------|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 4 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| | |
| | |
| | |



| | | |
|---|--|---|
| Pls Sta 15+86.98 Os = 2°37' 33.8" Ls = 275.00' LT = 183.35' ST = 91.69' | Pls Sta 19+28.30 Δ = 9°30' 53.1" (LT) D = 1°54' 35.5" L = 498.19' T = 249.67' R = 3,000.00' SE = 0.05 RUNOFF = 275' | Pls Sta 22+68.50 Os = 2°37' 33.8" Ls = 275.00' LT = 183.35' ST = 91.69' |
|---|--|---|

| | |
|--|--|
| Pls Sta 10+20.18 Δ = 40°52' 27.5" (RT) D = 190°59' 09.4" L = 21.40' T = 11.18' R = 30.00' | Pls Sta 10+48.84 Δ = 40°29' 32.5" (LT) D = 114°35' 29.6" L = 35.34' T = 18.44' R = 50.00' |
|--|--|

FOR -TIE- PROFILE, SEE SHEET 24
FOR -DRV2- PROFILE, SEE SHEET 34

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

MATCH LINE -L- STA. 462+50
MATCH LINE -L- STA. 462+50
MATCH LINE -L- STA. 462+50

END TIP PROJECT R-2915C
BEGIN TIP PROJECT R-2915D
-TIE- POT Sta. 25+44.02 =
-L- ST Sta. 464+44.02

-L-
 Pls Sta 462+60.70
 Os = 2' 37" 33.8"
 Ls = 275.00'
 LT = 183.35'
 ST = 91.69'

5
 THOMAS M. HOWELL AND WIFE,
 KATHY H. HOWELL
 DB 313 PG 1332

ALICE H. ATWOOD AND HUSBAND,
 CECIL FOREST ATWOOD
 DB 128 PG 555

CHARLES DONOVAN SAUNDERS
 DB 222 PG 2292

ARCHIE LINCOLN PIERCE AND WIFE,
 NANCY CAROLYN PIERCE, TRUSTEES
 DB 402 PG 1408

AGNES BALDWIN
 LIVING TRUST
 DB 390 PG 1553

6
 MARY EDWARDS HOLCOMB
 AND HUSBAND,
 C. J. HOLCOMB, JR.
 DB 161 PG 351

MABEL T. MILLER AND HUSBAND,
 STEPHEN H. MILLER
 DB 158 PG 161

DENOS P. MARVIN AND
 FRANCES D. MARVIN
 DB 122 PG 821

-L-
 Pls Sta 468+51.71
 Os = 5' 54" 31.1"
 Ls = 330.00'
 LT = 220.12'
 ST = 110.11'

-L-
 Pls Sta 474+40.42
 Δ = 33' 19" 17.0" (RT)
 D = 3' 34" 51.6"
 L = 930.51'
 T = 478.83'
 R = 1,600.00'
 SE = .06
 RUNOFF = 330'

-TIE-
 Pls Sta 22+68.50
 Os = 2' 37" 33.8"
 Ls = 275.00'
 LT = 183.35'
 ST = 91.69'

MATCH LINE -L- STA. 462+50
 SEE SHEET NO. 4

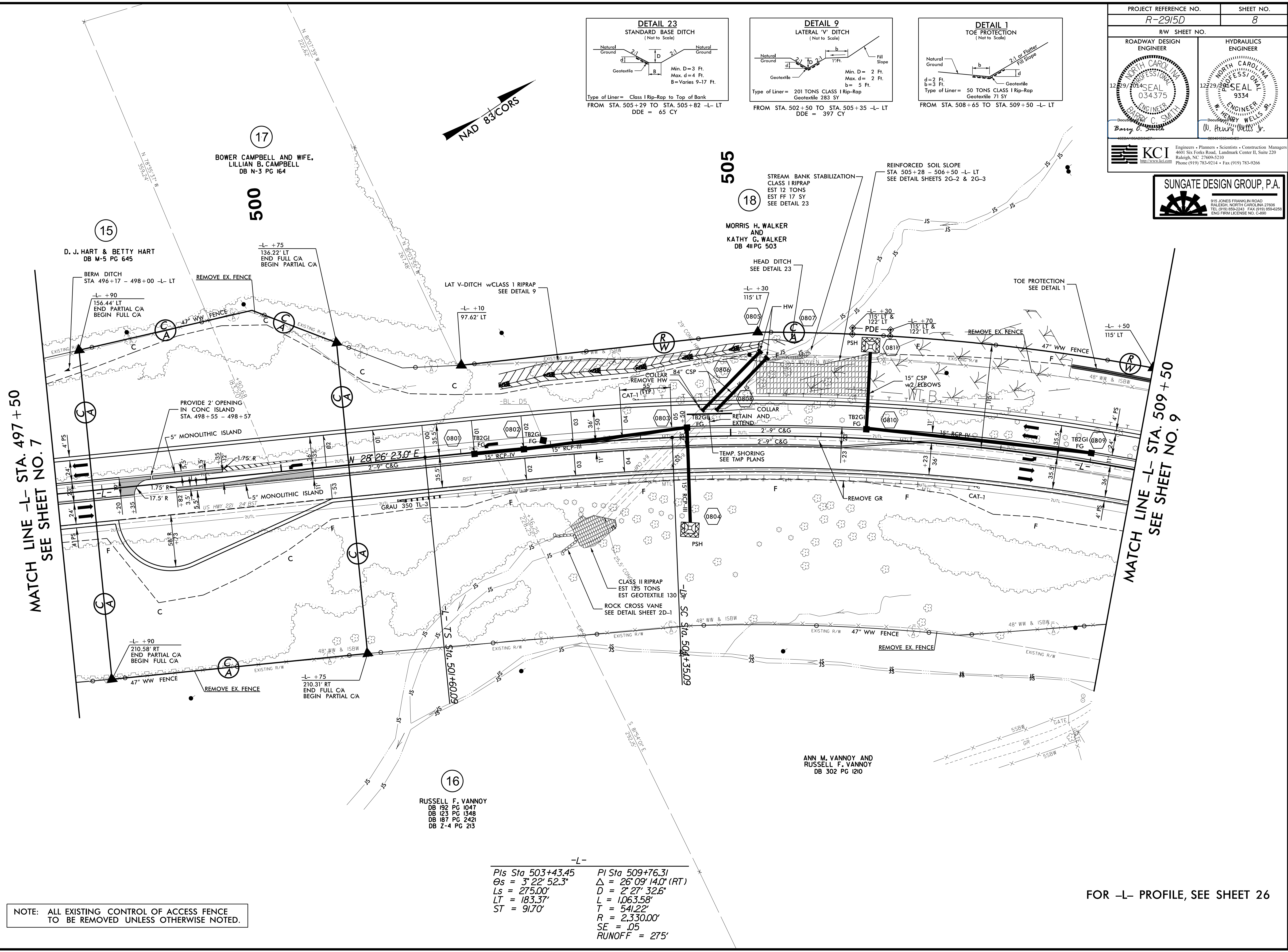
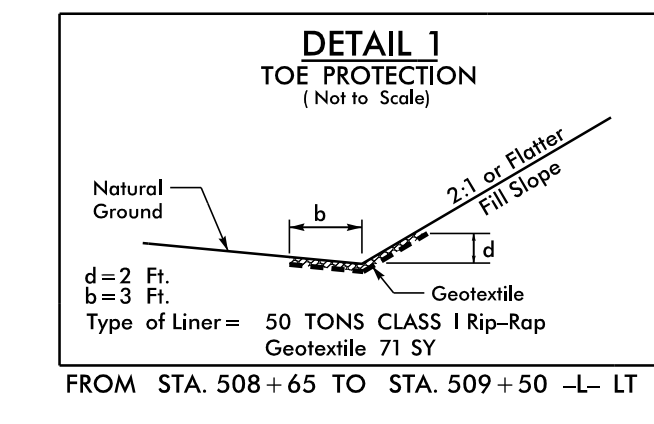
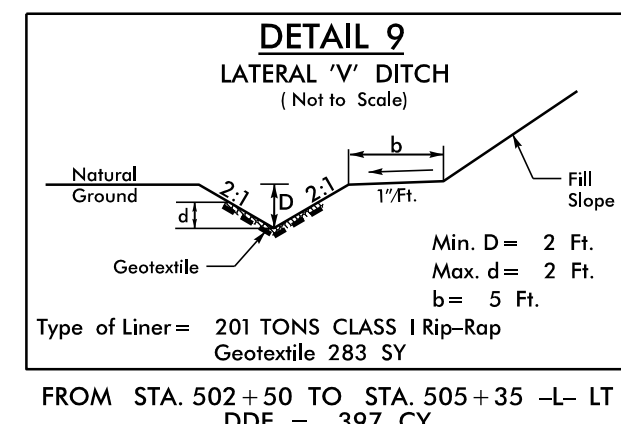
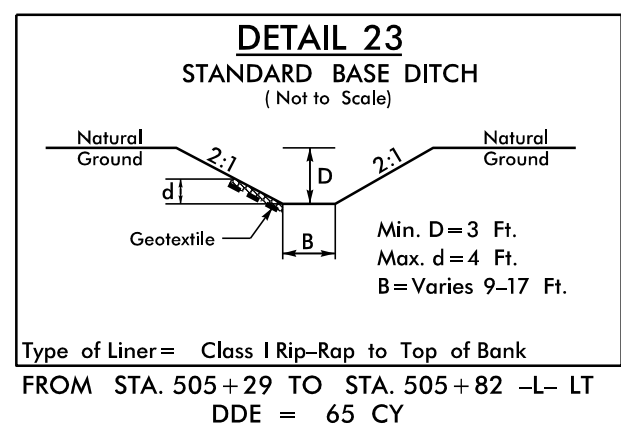
MATCH LINE -L- STA. 473+00
 SEE SHEET NO. 6

FOR -TIE- PROFILE, SEE SHEET 24
 FOR -L- PROFILE, SEE SHEET 24

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

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 24-NOV-2014 08:32
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 \$\$\$\$\$\$ ISEIENRME\$\$\$\$\$\$

| | |
|---|---|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 8 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER Barry C. Smith | HYDRAULICS ENGINEER Henry Wells Jr. |
| | |
| KCI Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |
| SUNGATE DESIGN GROUP, P.A. 915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 885-2244 FAX (919) 858-4258 ENG FIRM LICENSE NO. C-890 | |



MATCH LINE -L- STA. 497+50
SEE SHEET NO. 7

MATCH LINE -L- STA. 509+50
SEE SHEET NO. 9

-L-

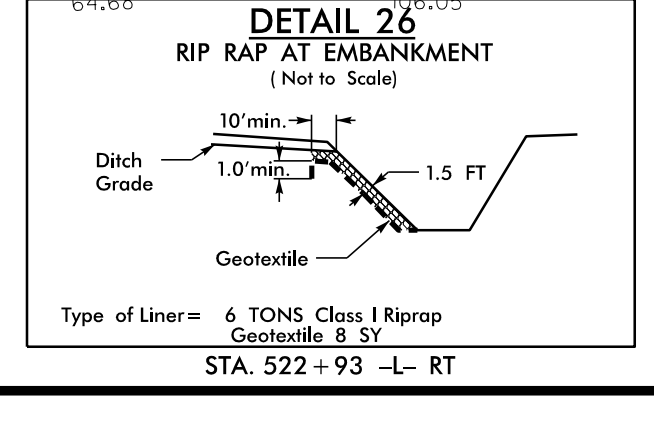
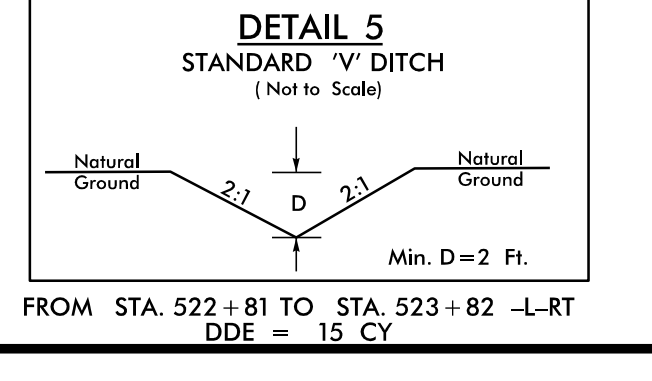
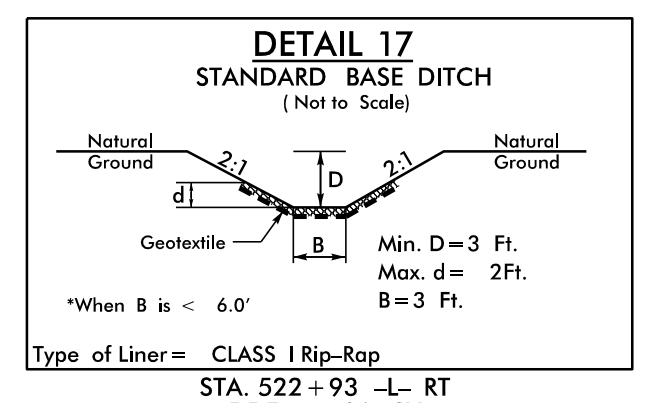
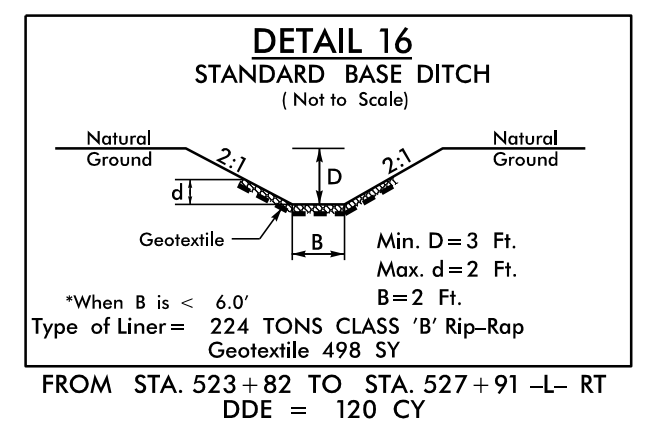
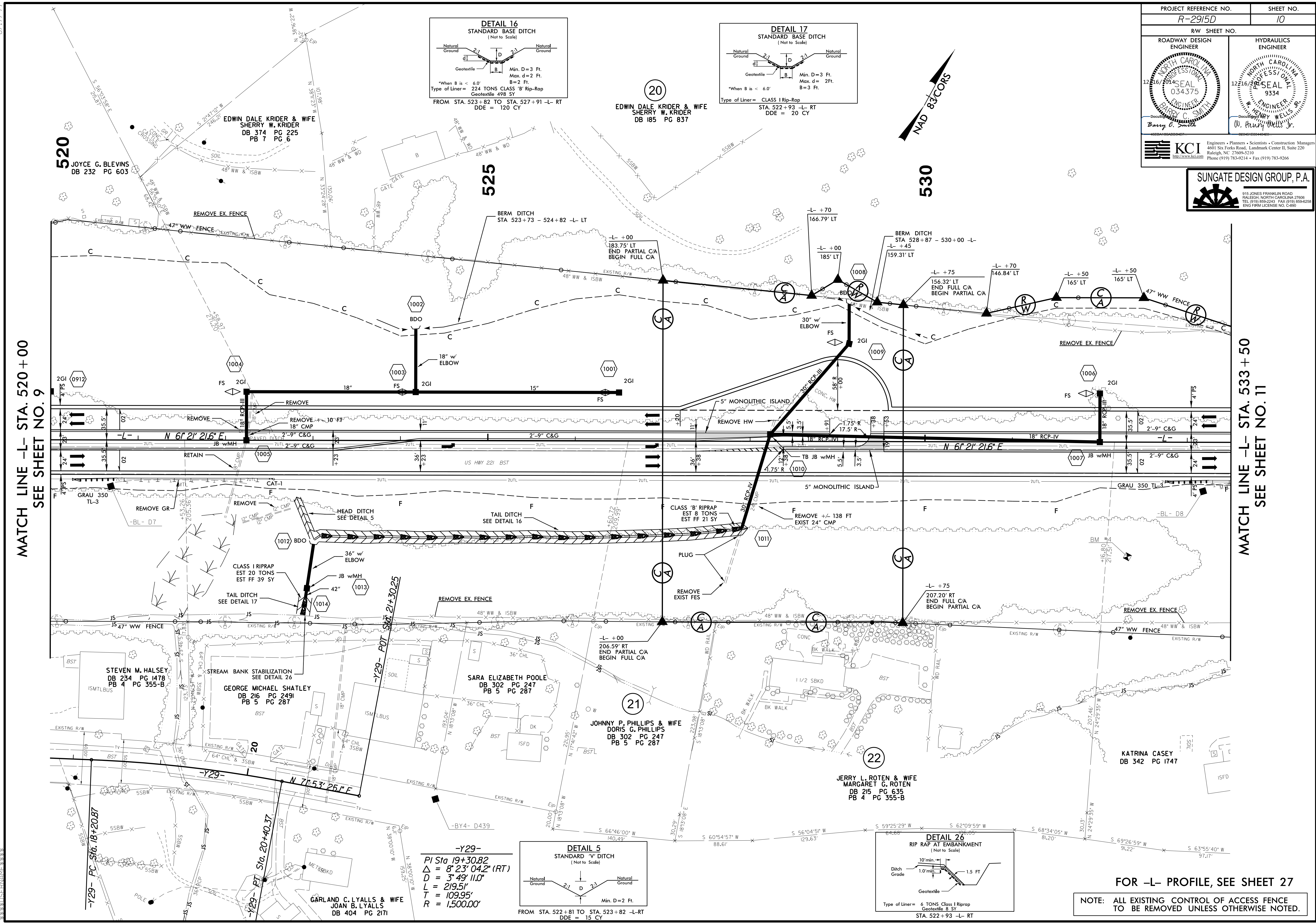
| | |
|-------------------|------------------------|
| PI Sta 503+43.45 | PI Sta 509+76.31 |
| Os = 3° 22' 52.3" | Δ = 26° 09' 14.0" (RT) |
| Ls = 275.00' | D = 2' 27' 32.6" |
| LT = 183.37' | L = 1,063.58' |
| ST = 91.70' | T = 541.22' |
| | R = 2,330.00' |
| | SE = .05 |
| | RUNOFF = 275' |

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

FOR -L- PROFILE, SEE SHEET 26

8.17.799
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\$\$\$\$\$USERNAME\$\$\$\$\$

| | |
|--|---|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 10 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER Barry C. Smith | HYDRAULICS ENGINEER Henry Wells Jr. |
| | |
| KCI Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 TEL (919) 859-2243 FAX (919) 859-4259 Phone (919) 783-9214 • Fax (919) 783-9266 | |
| SUNGATE DESIGN GROUP, P.A. 915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL (919) 859-2243 FAX (919) 859-4259 ENG FIRM LICENSE NO. C-860 | |



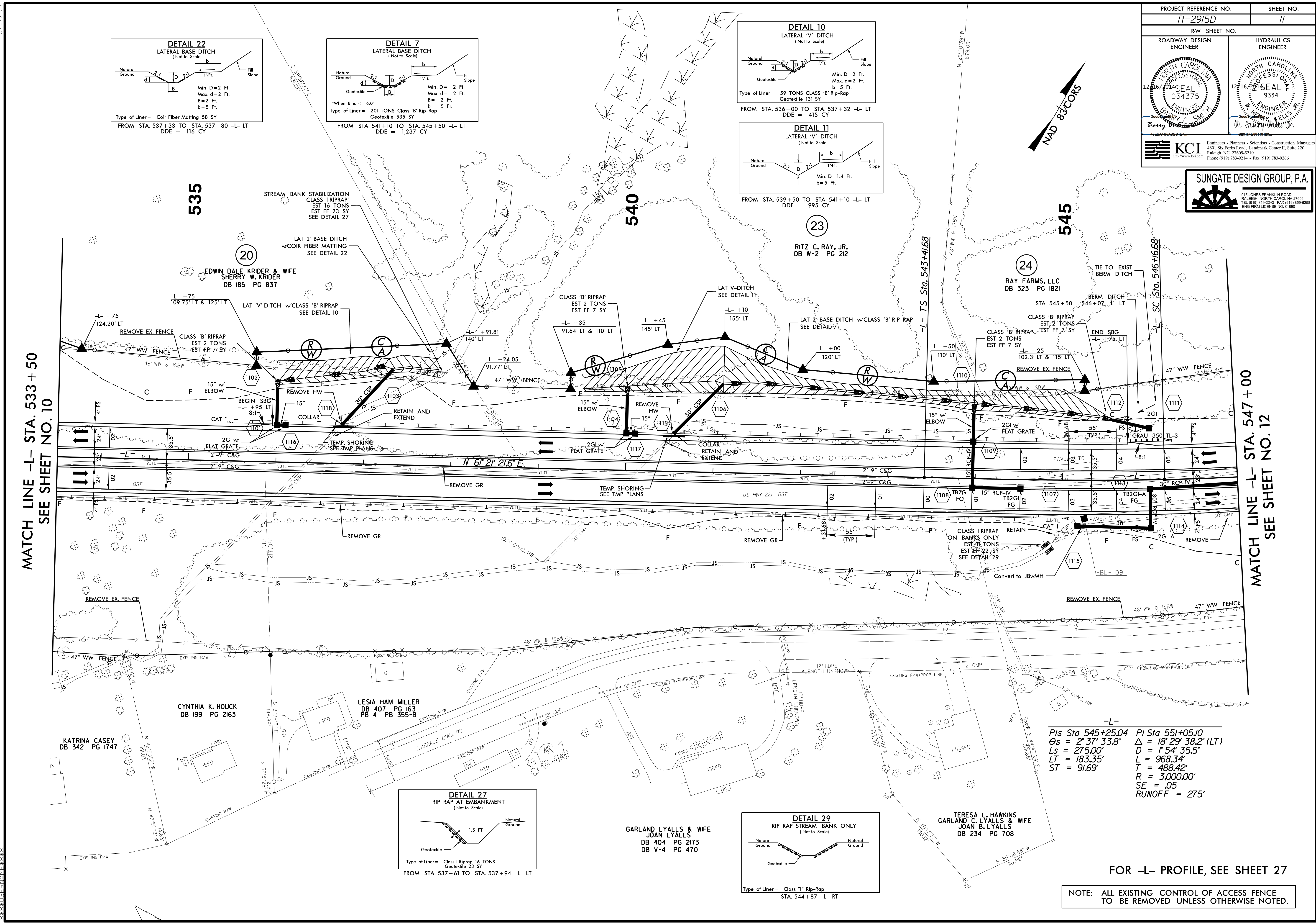
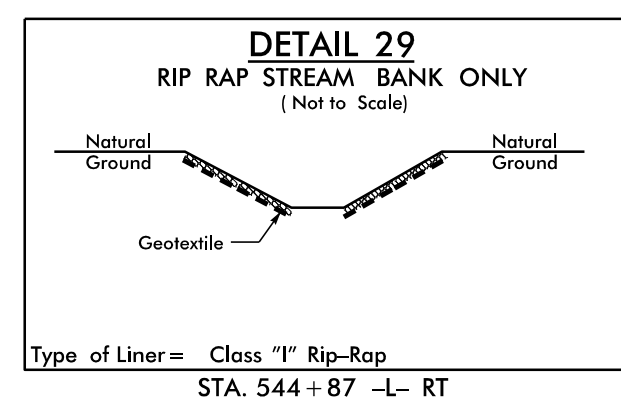
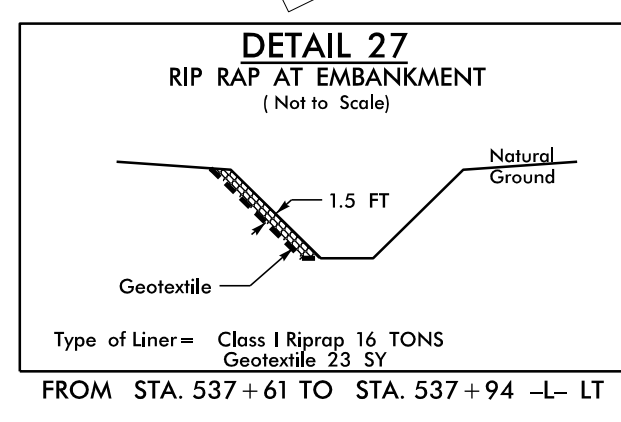
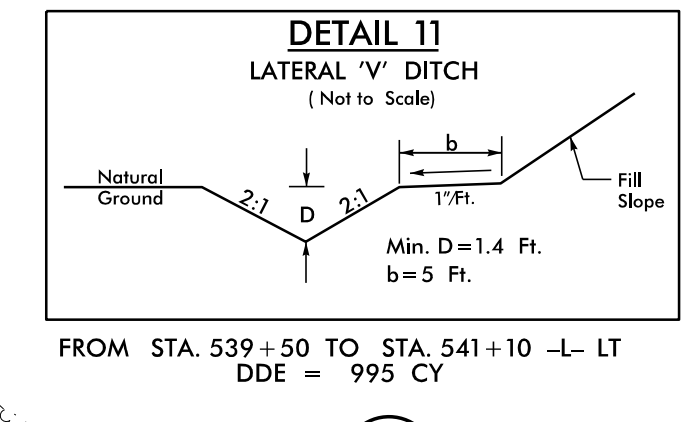
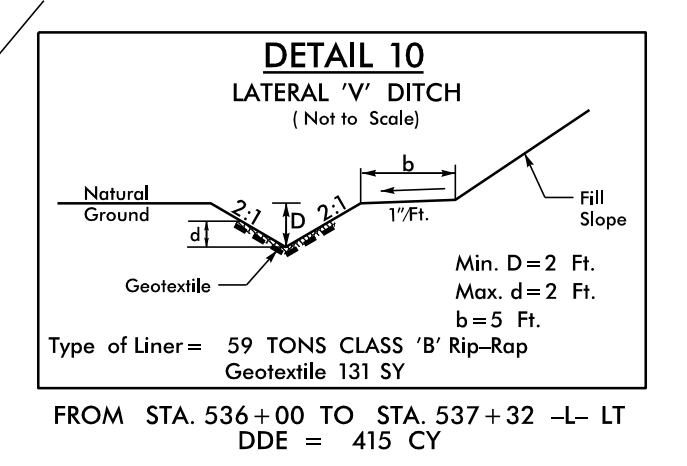
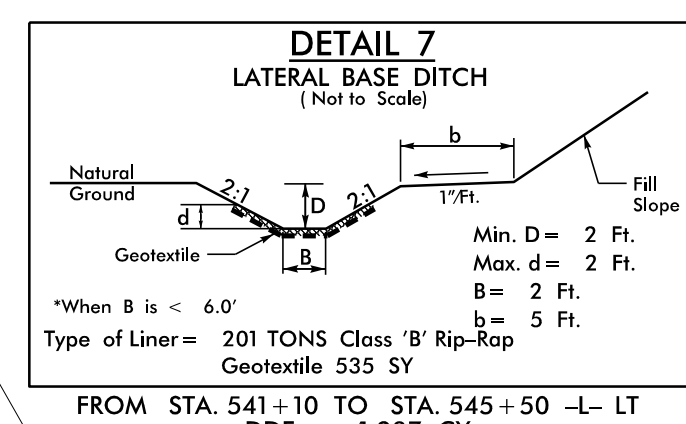
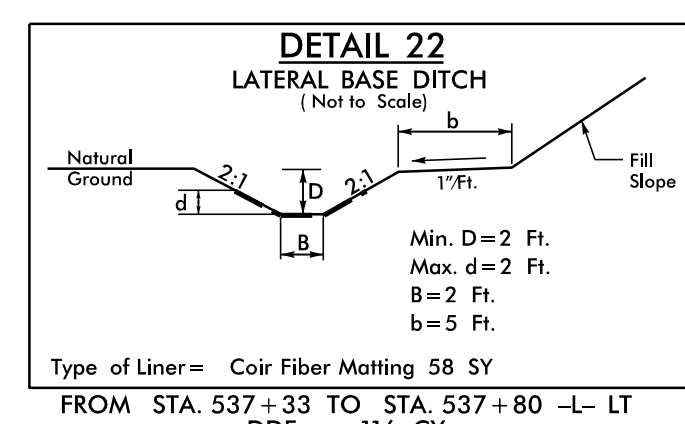
MATCH LINE -L- STA. 520+00
SEE SHEET NO. 9

MATCH LINE -L- STA. 533+50
SEE SHEET NO. 11

FOR -L- PROFILE, SEE SHEET 27

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

8.17.7.99
 10-DEC-2014 14:03
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 \$\$\$\$\$\$USERNAME\$\$\$\$\$\$



MATCH LINE -L- STA. 533+50
SEE SHEET NO. 10

MATCH LINE -L- STA. 547+00
SEE SHEET NO. 12

-L-
 Pts Sta 545+25.04 PI Sta 551+05.10
 $\Delta s = 2' 37" 33.8"$ $\Delta = 18' 29" 38.2" (LT)$
 $Ls = 275.00'$ $D = 1' 54" 35.5"$
 $LT = 183.35'$ $L = 968.34'$
 $ST = 91.69'$ $T = 488.42'$
 $R = 3,000.00'$
 $SE = .05$
 $RUNOFF = 275'$

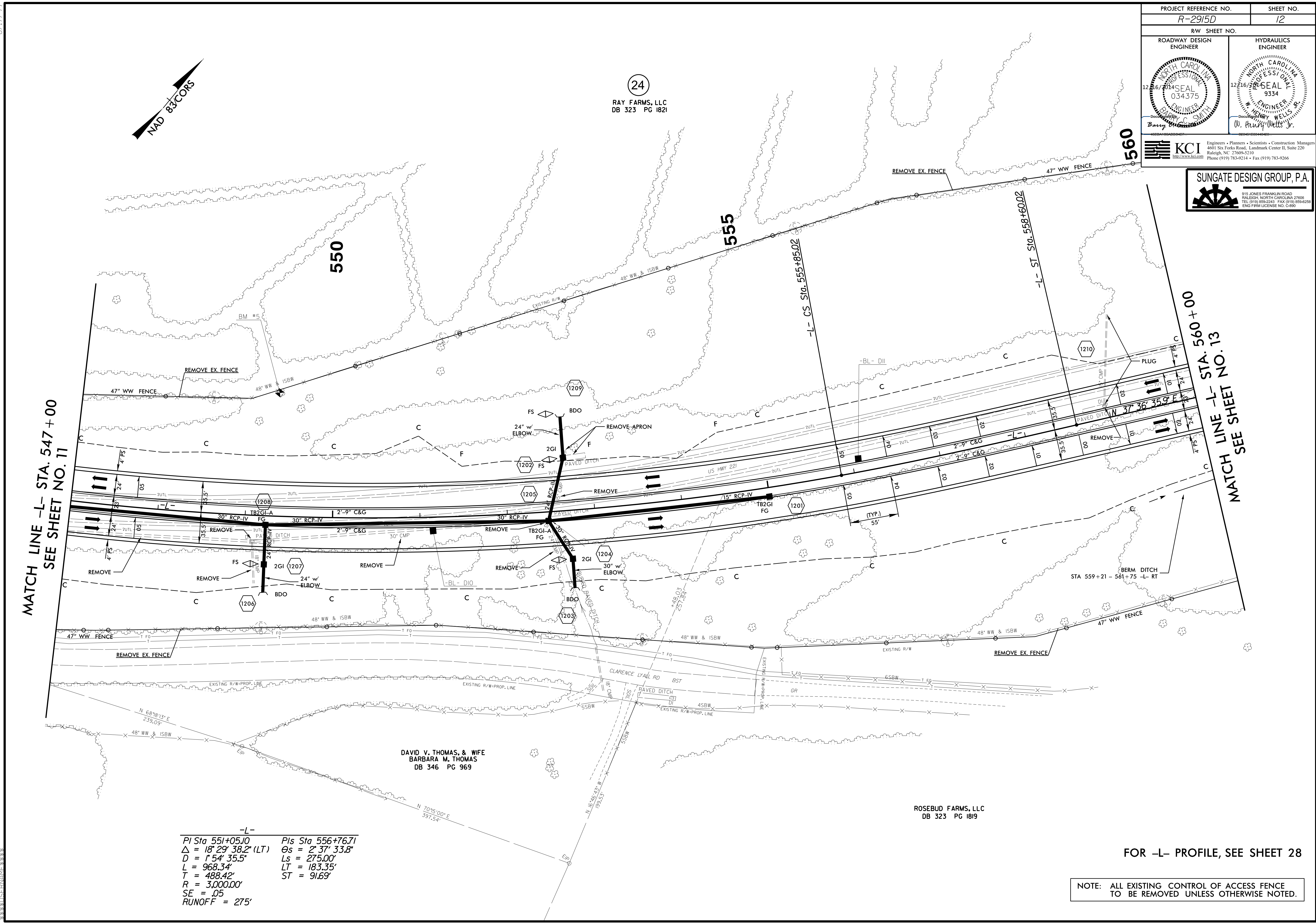
FOR -L- PROFILE, SEE SHEET 27

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

8.17.7.99
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 \$\$\$\$\$\$
 \$\$\$\$\$\$

| | |
|--|------------------------|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 12 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| | |
| | |
| Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |

SUNGATE DESIGN GROUP, P.A.
 915 JONES FRANKLIN ROAD
 RALEIGH, NORTH CAROLINA 27608
 TEL: (919) 896-2245 FAX: (919) 896-4209
 ENG FIRM LICENSE NO. C-880



MATCH LINE -L- STA. 547+00
SEE SHEET NO. 11

MATCH LINE -L- STA. 560+00
SEE SHEET NO. 13

-L-
 PI Sta 551+05.10 Pls Sta 556+76.71
 $\Delta = 18^{\circ} 29' 38.2''$ (LT) $\Theta_s = 2^{\circ} 37' 33.8''$
 $D = 1^{\circ} 54' 35.5''$ $L_s = 275.00'$
 $L = 968.34'$ $LT = 183.35'$
 $T = 488.42'$ $ST = 91.69'$
 $R = 3,000.00'$
 $SE = .05$
 $RUNOFF = 275'$

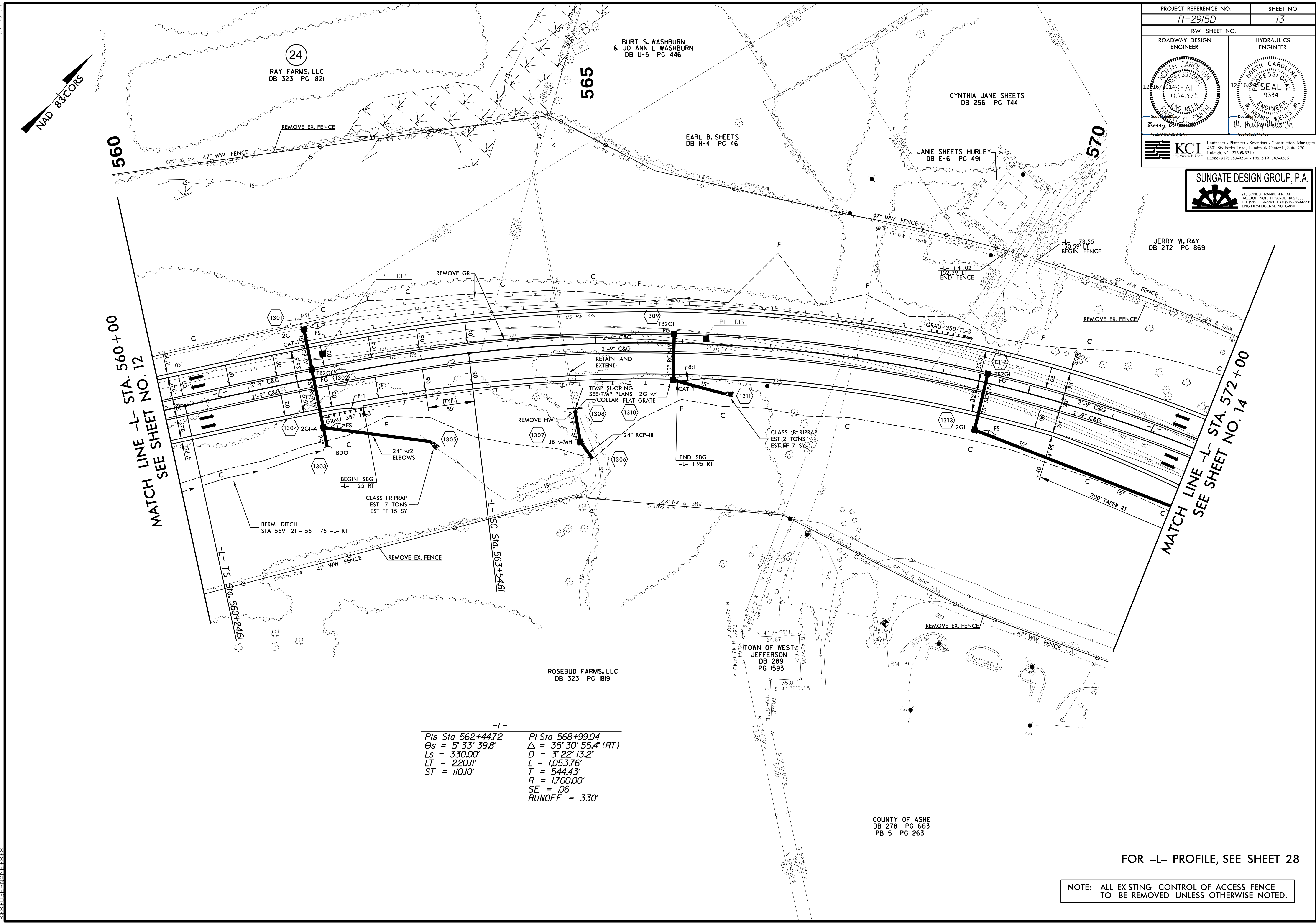
FOR -L- PROFILE, SEE SHEET 28

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

8.17.99
 10 DEC 2014 10:21 AM
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| | | | |
|--|--|------------------------|--|
| PROJECT REFERENCE NO. R-2915D | | SHEET NO. 13 | |
| ROADWAY DESIGN ENGINEER | | HYDRAULICS ENGINEER | |
| | | | |
| | | | |
| <small>Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266</small> | | | |

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27608
TEL. (919) 859-2245 • FAX (919) 859-4229
ENG FIRM LICENSE NO. C-860



MATCH LINE -L- STA. 560+00
SEE SHEET NO. 12

MATCH LINE -L- STA. 572+00
SEE SHEET NO. 14

-L-
PIs Sta 562+44.72 PI Sta 568+99.04
θs = 5° 33' 39.8" Δ = 35° 30' 55.4" (RT)
Ls = 330.00' D = 3° 22' 13.2"
LT = 220.11' L = 1,053.76'
ST = 110.10' T = 544.43'
R = 1,700.00'
SE = .06
RUNOFF = 330'

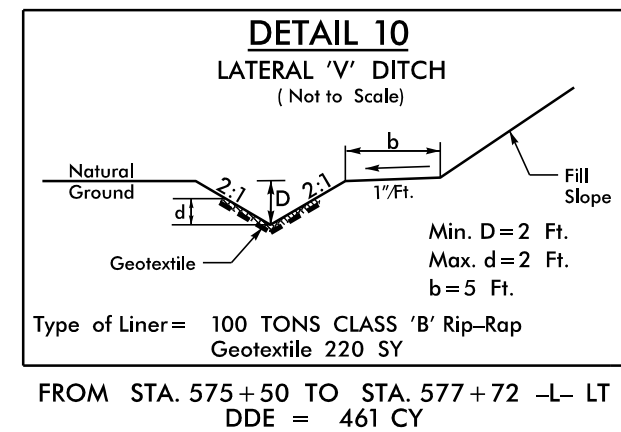
COUNTY OF ASHE
DB 278 PG 663
PB 5 PG 263

FOR -L- PROFILE, SEE SHEET 28

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

8.17.99
 24-NOK-2014_08.22
 24-2014-0411015-72915D-Roadway-Proj-R2915D_Rdu_psh_13.dgn
 \$\$\$\$\$\$

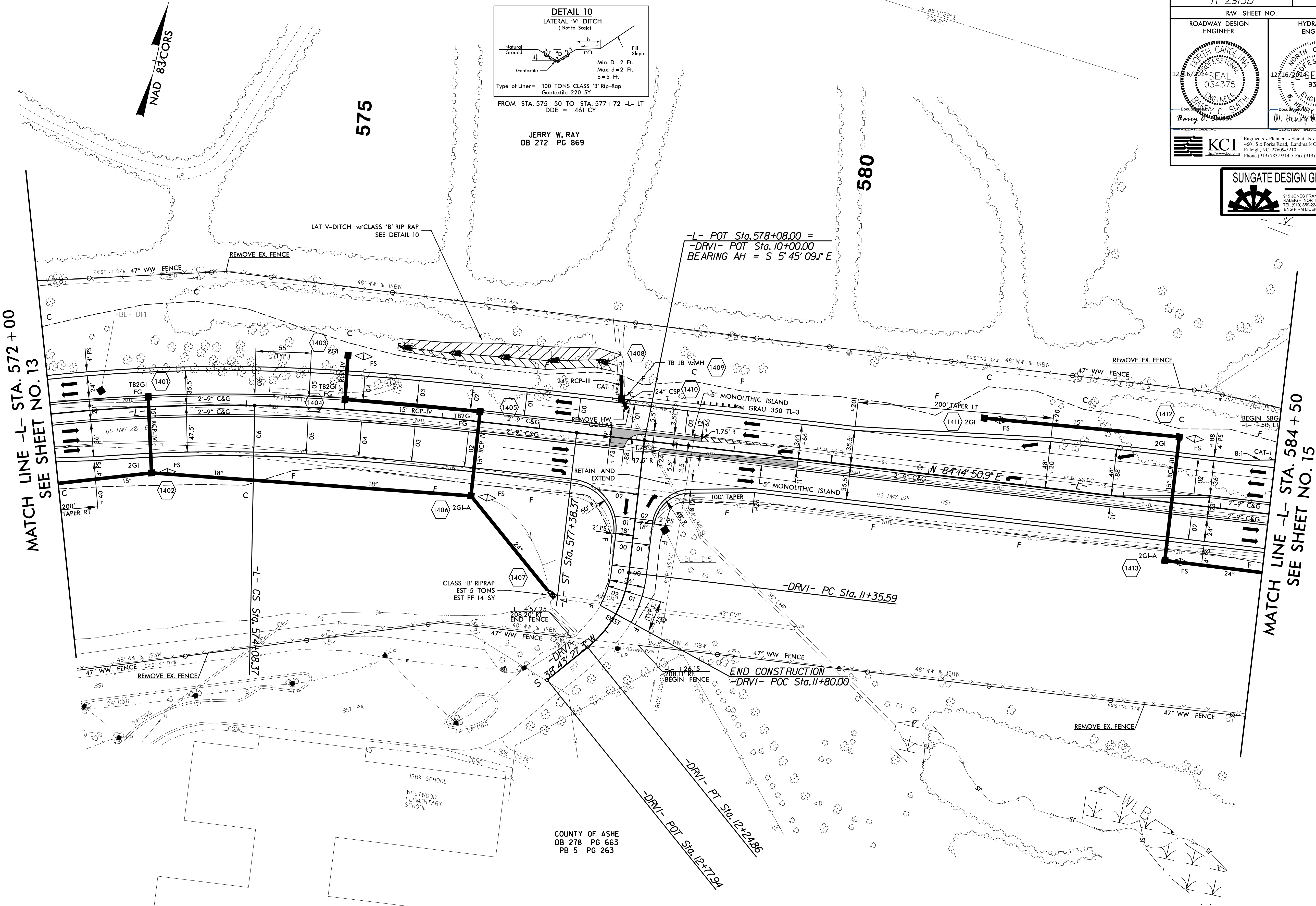
| | |
|---|------------------------|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 14 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| | |
| | |
| SUNGATE DESIGN GROUP, P.A. <small>915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL: (919) 889-2245 FAX: (919) 889-2259 ENG FIRM LICENSE NO. C-890</small> | |



JERRY W. RAY
DB 272 PG 869

MATCH LINE -L- STA. 572+00
SEE SHEET NO. 13

MATCH LINE -L- STA. 584+50
SEE SHEET NO. 15



COUNTY OF ASHE
DB 278 PG 663
PB 5 PG 263

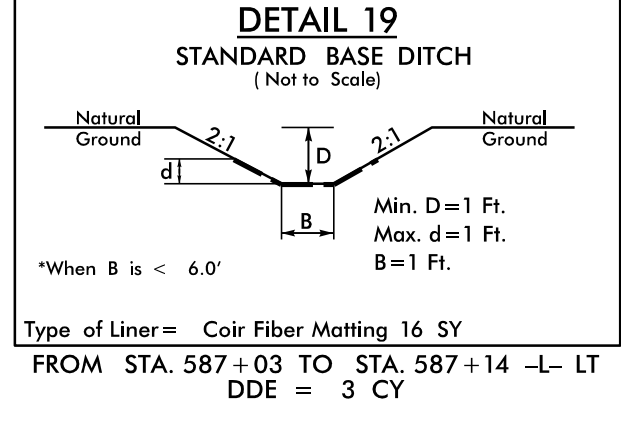
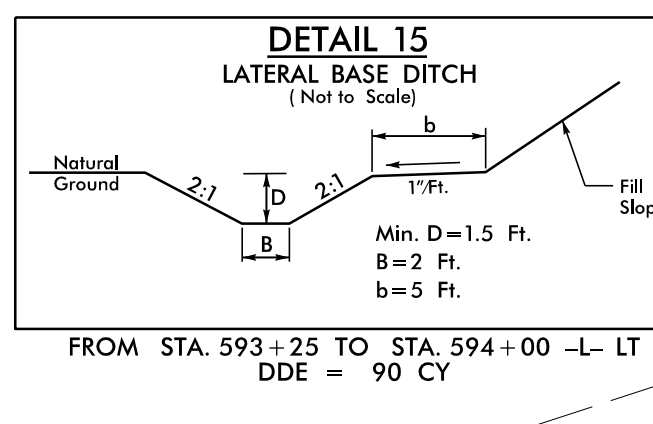
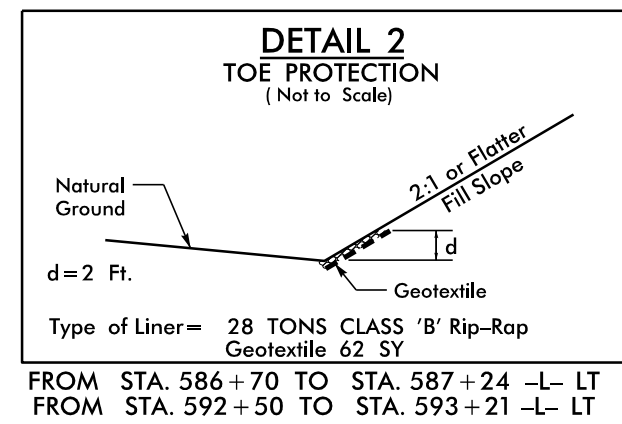
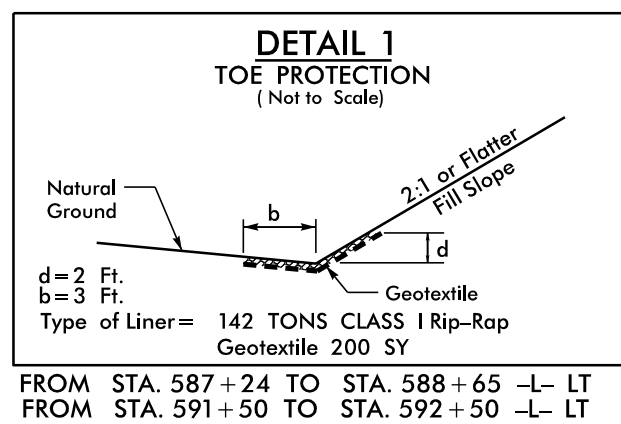
| | | |
|---------------------------------------|-----------------------------------|---------------------------------------|
| -L- | | -DRVI- |
| PI Sta 568+99.04 | PIs Sta 575+18.47 | PI Sta 11+82.61 |
| $\Delta = 35^{\circ} 30' 55.4''$ (RT) | $\Theta_s = 5^{\circ} 33' 39.8''$ | $\Delta = 44^{\circ} 28' 36.3''$ (RT) |
| $D = 3^{\circ} 22' 13.2''$ | $L_s = 330.00'$ | $D = 49^{\circ} 49' 20.7''$ |
| $L = 1,053.76'$ | $LT = 220.11'$ | $T = 89.27'$ |
| $T = 544.43'$ | $ST = 110.00'$ | $T = 47.02'$ |
| $R = 1,700.00'$ | | $R = 115.00'$ |
| $SE = .06$ | | $SE = \text{SEE PLANS}$ |
| $RUNOFF = 330'$ | | $RUNOFF = \text{SEE PLANS}$ |

FOR -L- PROFILE, SEE SHEET 29
FOR -DRVI- PROFILE, SEE SHEET 34
NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

8.17.09
 24-NOV-2014 08:32
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| | |
|---|------------------------|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 15 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| | |
| KCI Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |
| SUNGATE DESIGN GROUP, P.A. 915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL (919) 896-2245 • FAX (919) 896-2259 ENG FIRM LICENSE NO. C-860 | |

ZEB V. GAMBILL & WIFE
ANGIE TRIBBLE GAMBILL
DB 304 PG 1918

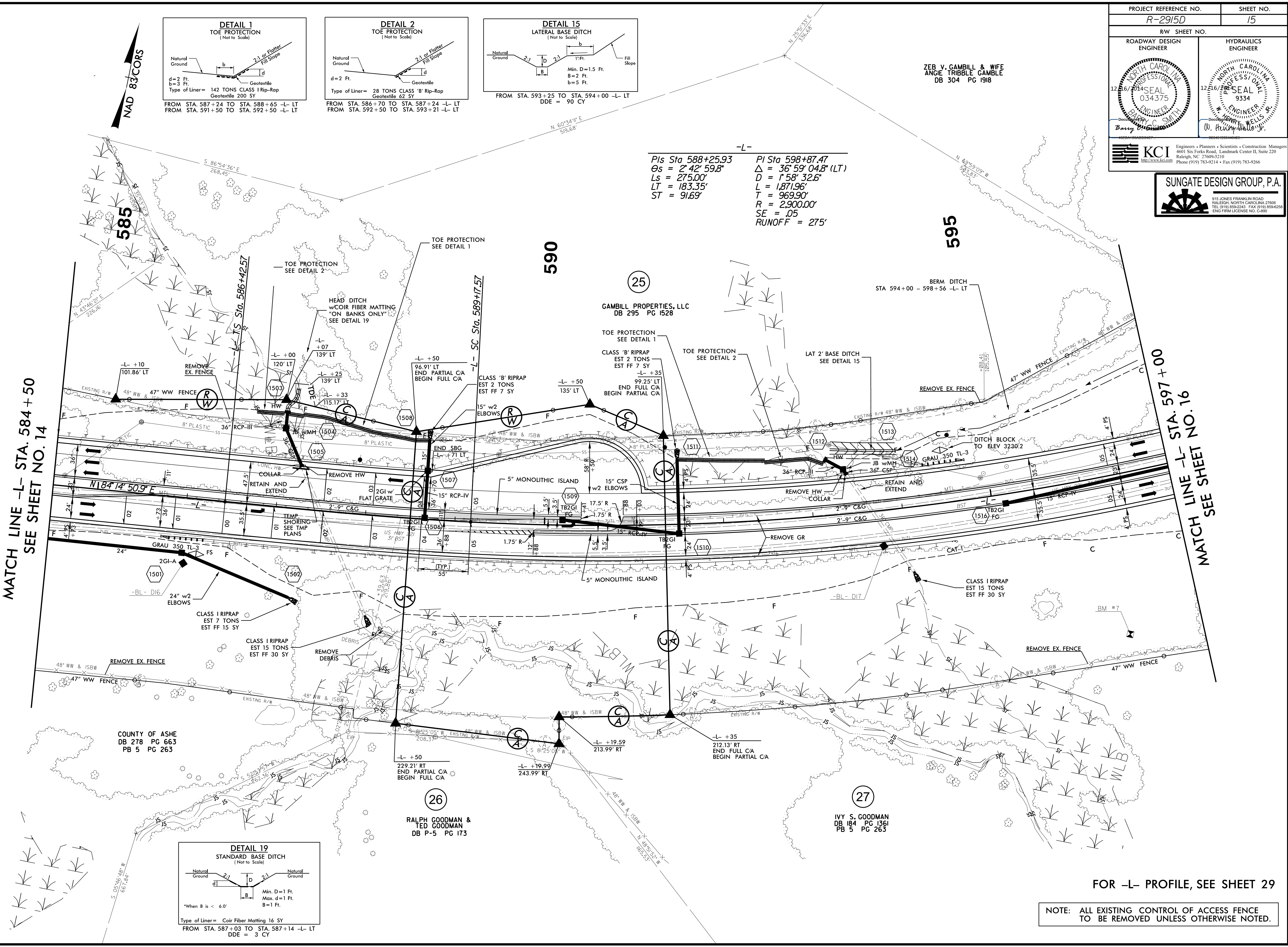


-L-
 Pls Sta 588+25.93
 Os = 2' 42" 59.8"
 Ls = 275.00'
 LT = 183.35'
 ST = 91.69'

Pl Sta 598+87.47
 Δ = 36' 59" 04.8" (LT)
 D = 1' 58" 32.6"
 L = 1,871.96'
 T = 969.90'
 R = 2,900.00'
 SE = .05
 RUNOFF = 275'

MATCH LINE -L- STA. 584+50
SEE SHEET NO. 14

MATCH LINE -L- STA. 597+00
SEE SHEET NO. 16

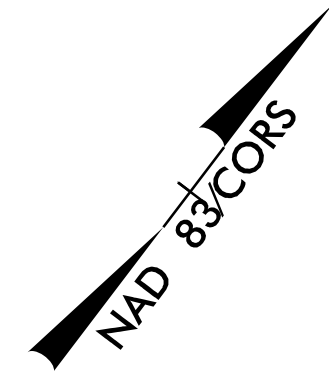


FOR -L- PROFILE, SEE SHEET 29

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

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| | | | |
|--|--|------------------------|--|
| PROJECT REFERENCE NO. R-2915D | | SHEET NO. 16 | |
| RW SHEET NO. | | | |
| ROADWAY DESIGN ENGINEER | | HYDRAULICS ENGINEER | |
| | | | |
| | | | |
| Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | | | |
| | | | |
| 915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL (919) 856-2343 FAX (919) 856-2359 ENG FIRM LICENSE NO. C-880 | | | |

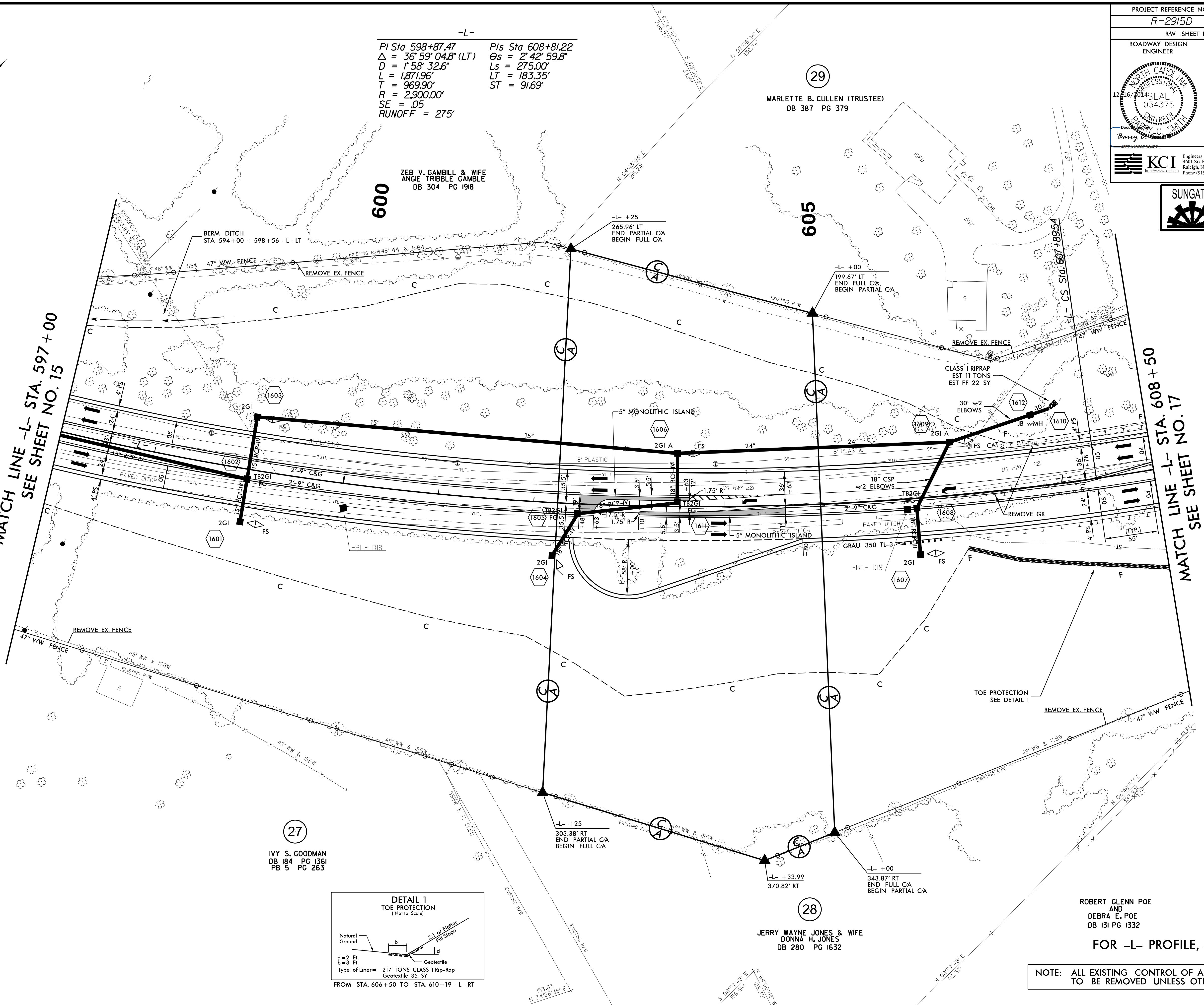


-L-

| | |
|---------------------------------------|-----------------------------------|
| PI Sta 598+87.47 | PIs Sta 608+81.22 |
| $\Delta = 36^{\circ} 59' 04.8''$ (LT) | $\Theta_s = 2^{\circ} 42' 59.8''$ |
| $D = 1^{\circ} 58' 32.6''$ | $L_s = 275.00'$ |
| $L = 1,871.96'$ | $LT = 183.35'$ |
| $T = 969.90'$ | $ST = 91.69'$ |
| $R = 2,900.00'$ | |
| $SE = .05$ | |
| $RUNOFF = 275'$ | |

MATCH LINE -L- STA. 597+00
SEE SHEET NO. 15

MATCH LINE -L- STA. 608+50
SEE SHEET NO. 17

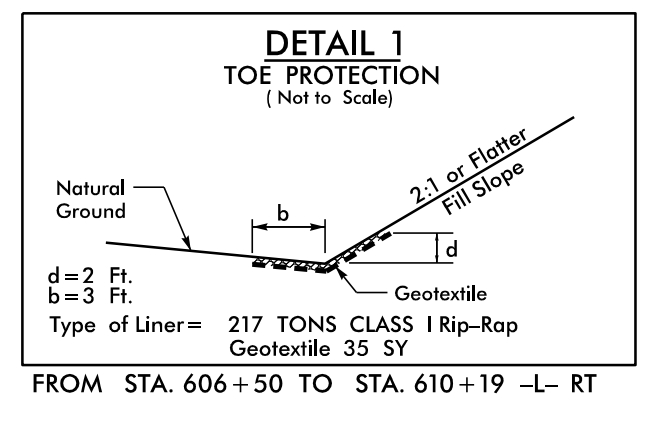


27
 IVY S. GOODMAN
 DB 184 PG 1361
 PB 5 PG 263

28
 JERRY WAYNE JONES & WIFE
 DONNA H. JONES
 DB 280 PG 1632

ROBERT GLENN POE
 AND
 DEBRA E. POE
 DB 131 PG 1332

FOR -L- PROFILE, SEE SHEET 30



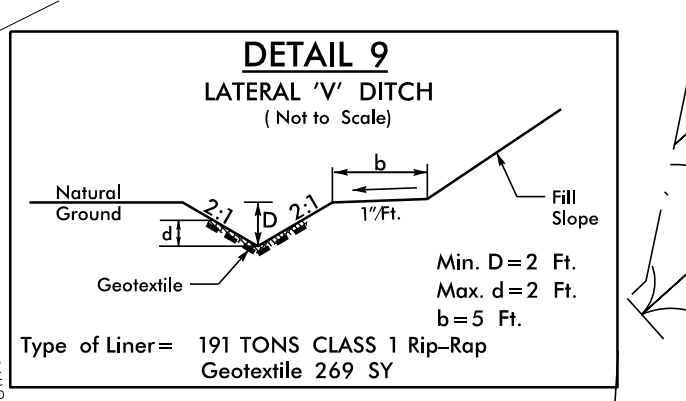
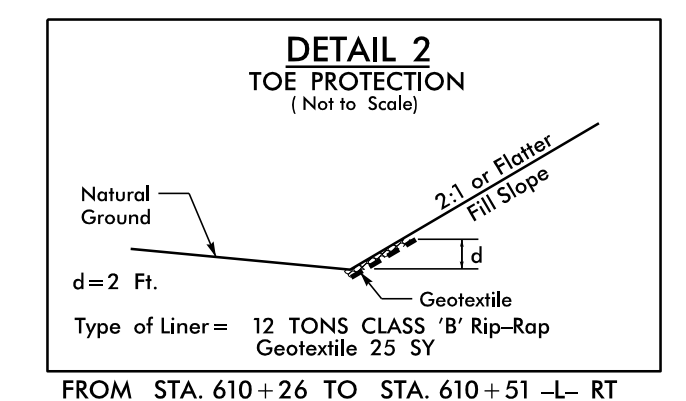
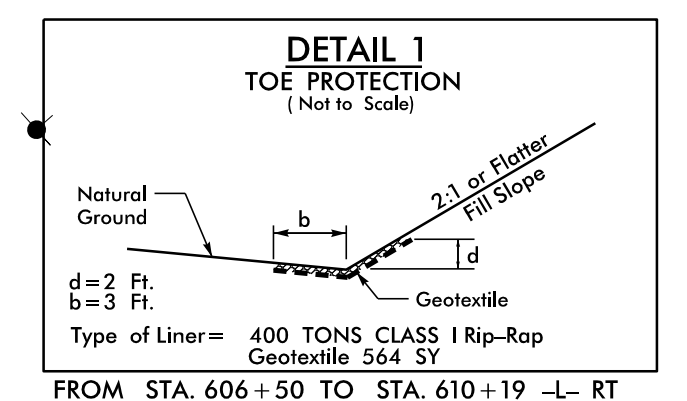
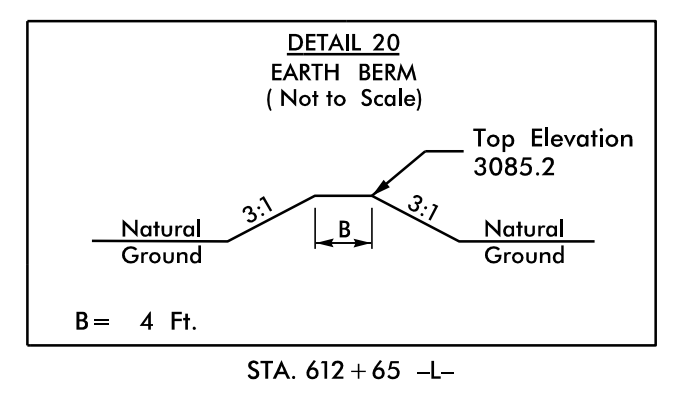
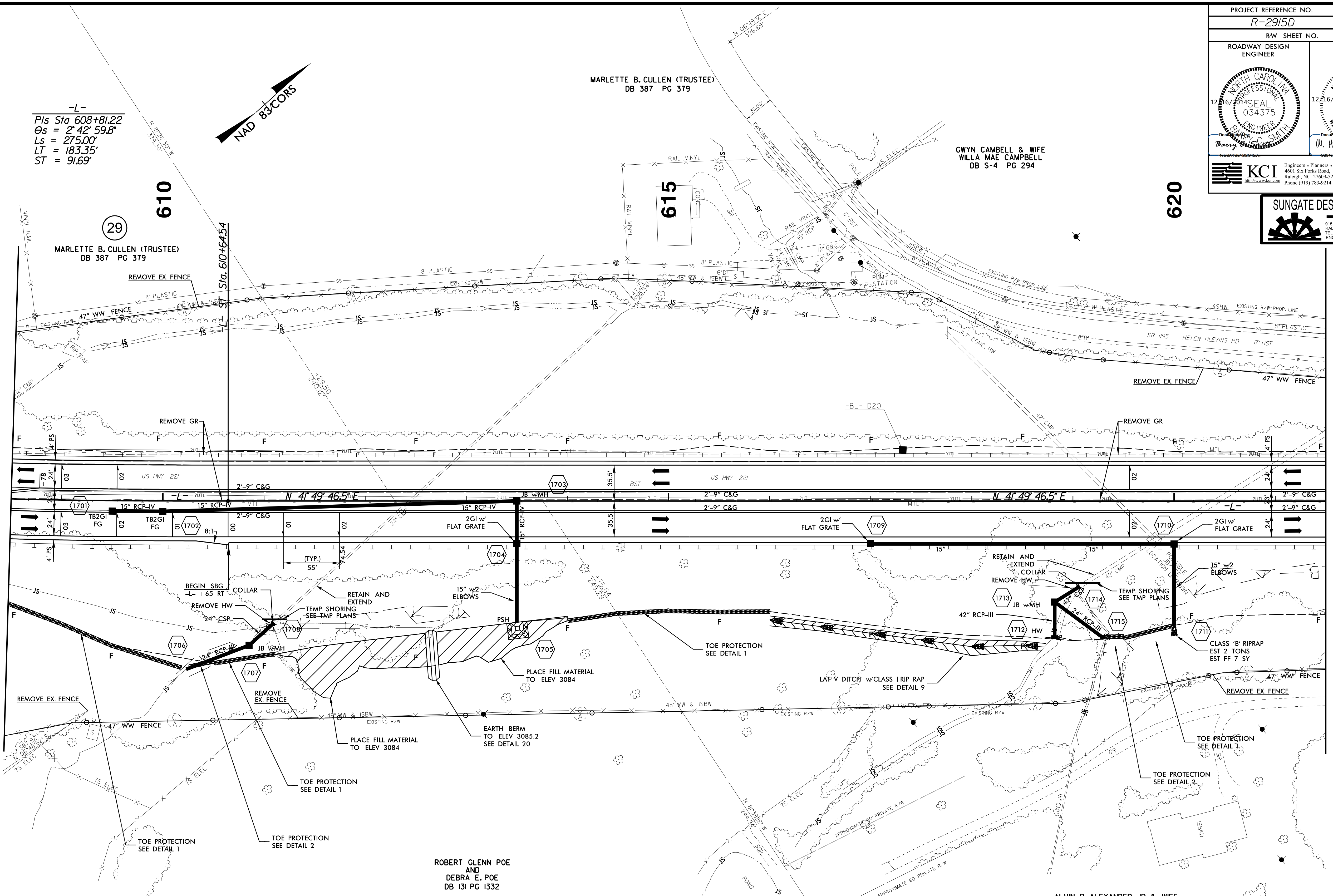
NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

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-L-
 Pts Sta 608+81.22
 $\theta_s = 2^\circ 42' 59.8''$
 Ls = 275.00'
 LT = 183.35'
 ST = 91.69'

MATCH LINE -L- STA. 608 + 50
 SEE SHEET NO. 16

MATCH LINE -L- STA. 621 + 50
 SEE SHEET NO. 18



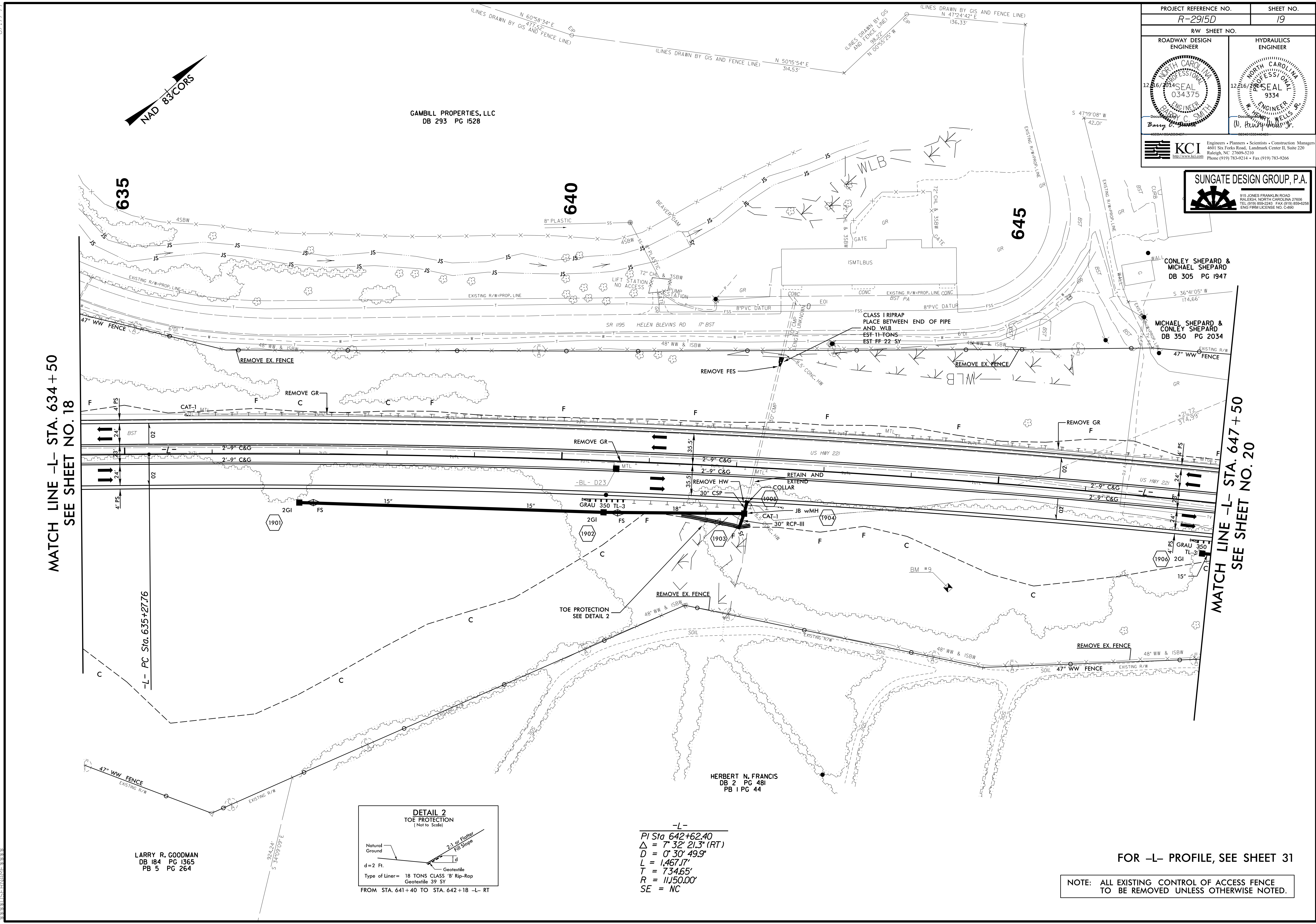
ALVIN P. ALEXANDER JR. & WIFE
 ALMA W. ALEXANDER
 GARY E. KEY & WIFE
 JEANNETTE A. KEY
 DB 188 PG 1208
 DB 188 PG 1214

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

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| | | | |
|--|--|--|--|
| PROJECT REFERENCE NO. R-2915D | | SHEET NO. 19 | |
| RW SHEET NO. | | HYDRAULICS ENGINEER | |
| ROADWAY DESIGN ENGINEER | | PROFESSIONAL SEAL 12.26.2014 034375 ENGINEER BARRY C. SMITH | |
| NORTH CAROLINA PROFESSIONAL SEAL 12.26.2014 034375 ENGINEER BARRY C. SMITH | | NORTH CAROLINA PROFESSIONAL SEAL 12.26.2014 9334 ENGINEER W. HENRY WELLS JR. | |
| KCI | | Engineers • Planners • Scientists • Construction Managers 4401 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |

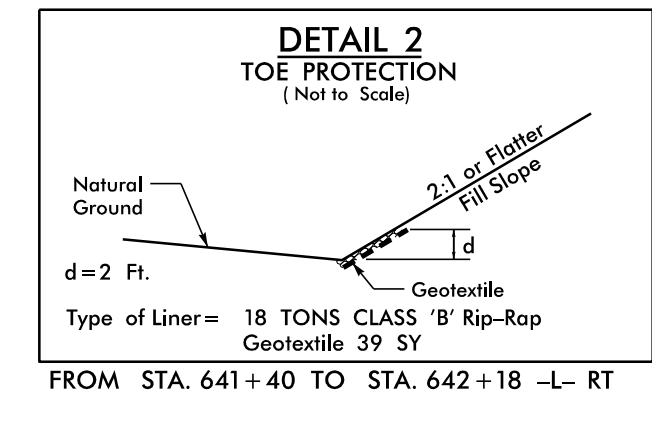
SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 899-2241 FAX (919) 899-0250
ENG PRM LICENSE NO. C-469



MATCH LINE -L- STA. 634 + 50
SEE SHEET NO. 18

MATCH LINE -L- STA. 647 + 50
SEE SHEET NO. 20

LARRY R. GOODMAN
DB 184 PG 1365
PB 5 PG 264

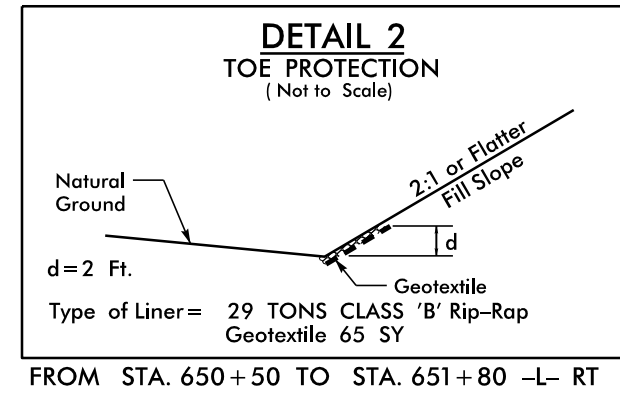


-L-
PI Sta. 642+62.40
 $\Delta = 7' 32" 21.3" (RT)$
 $D = 0' 30" 49.9"$
 $L = 1,467.17'$
 $T = 734.65'$
 $R = 11,500.00'$
 $SE = NC$

FOR -L- PROFILE, SEE SHEET 31

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

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\$\$\$\$\$USERNAME\$\$\$\$\$

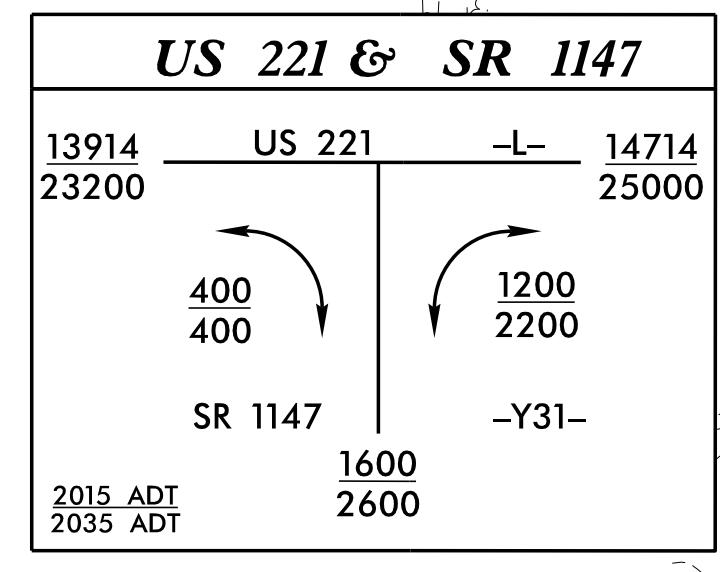


-L-
 PI Sta 642+62.40
 $\Delta = 7^{\circ} 32' 21.3" (RT)$
 $D = 0^{\circ} 30' 49.9"$
 $L = 1,467.17'$
 $T = 734.65'$
 $R = 11,500.00'$
 SE = NC

8.17/99
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MATCH LINE -L- STA. 647 + 50
 SEE SHEET NO. 19

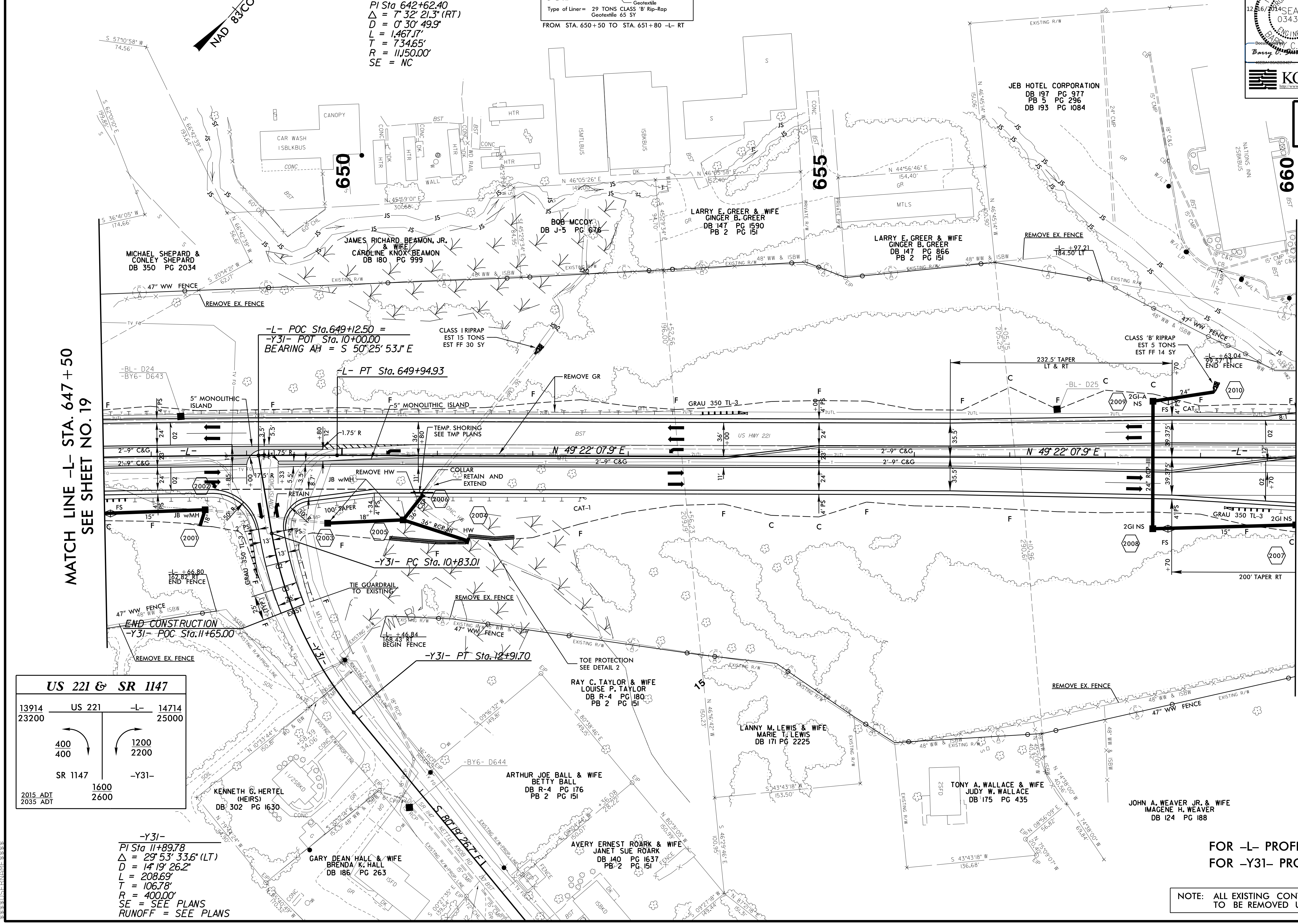
MATCH LINE -L- STA. 660 + 00
 SEE SHEET NO. 21



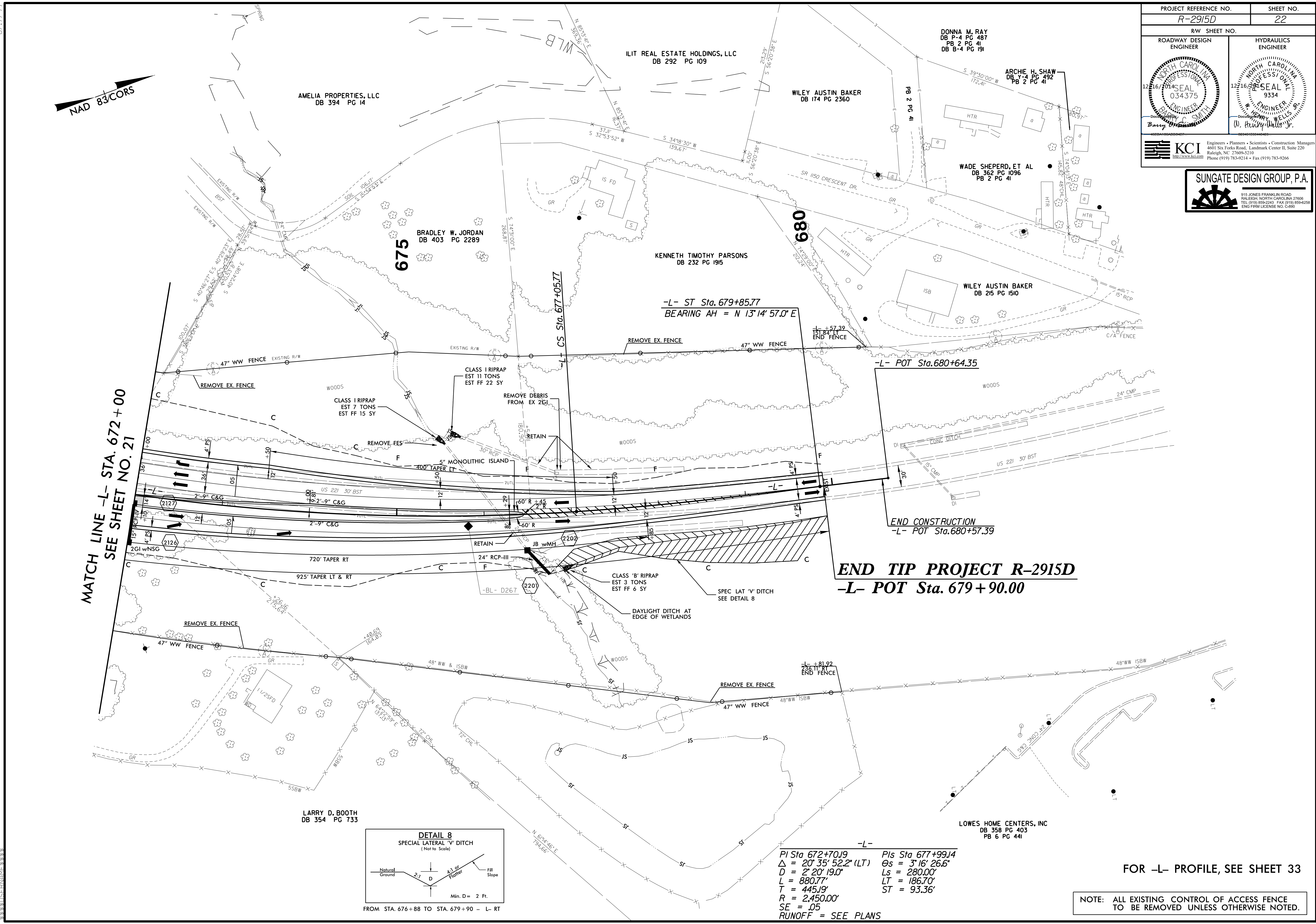
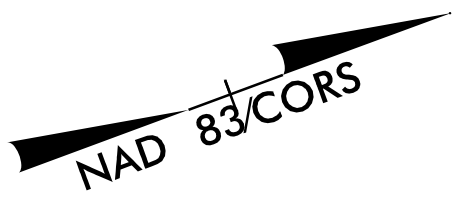
-Y31-
 PI Sta 11+89.78
 $\Delta = 29^{\circ} 53' 33.6" (LT)$
 $D = 14^{\circ} 19' 26.2"$
 $L = 208.69'$
 $T = 106.78'$
 $R = 400.00'$
 SE = SEE PLANS
 RUNOFF = SEE PLANS

FOR -L- PROFILE, SEE SHEET 32
 FOR -Y31- PROFILE, SEE SHEET 35

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

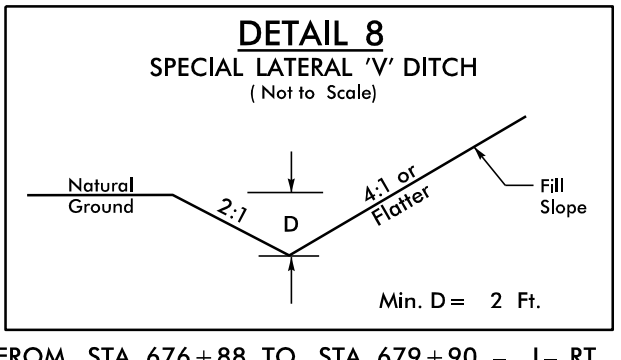


| | |
|--|------------------------|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 22 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| | |
| | |
| Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |
| | |
| 915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL. (919) 859-2245 FAX (919) 859-6259 ENG FIRM LICENSE NO. C-890 | |



MATCH LINE -L- STA. 672+00
 SEE SHEET NO. 21

END TIP PROJECT R-2915D
-L- POT Sta. 679+90.00



FROM STA. 676+88 TO STA. 679+90 - L- RT

-L-
 PI Sta 672+70.19 Pls Sta 677+99.4
 $\Delta = 20' 35' 52.2''$ (LT) $\Theta_s = 3' 16' 26.6''$
 $D = 2' 20' 19.0''$ $L_s = 280.00'$
 $L = 880.77'$ $LT = 186.70'$
 $T = 445.19'$ $ST = 93.36'$
 $R = 2,450.00'$
 $SE = .05$
 RUNOFF = SEE PLANS

FOR -L- PROFILE, SEE SHEET 33

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

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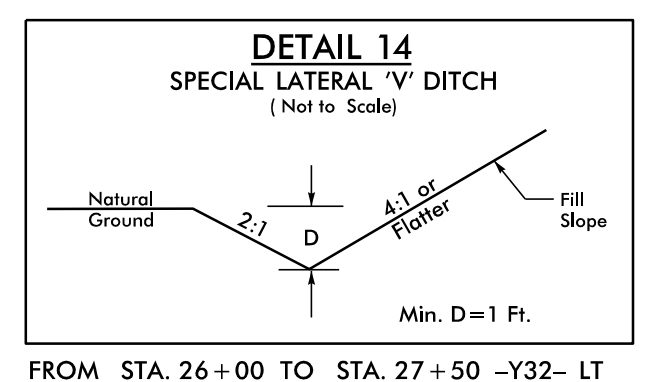
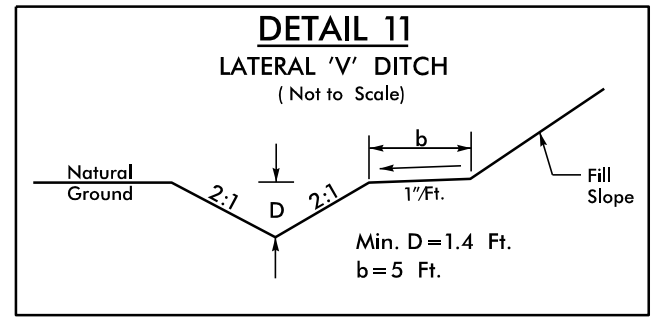
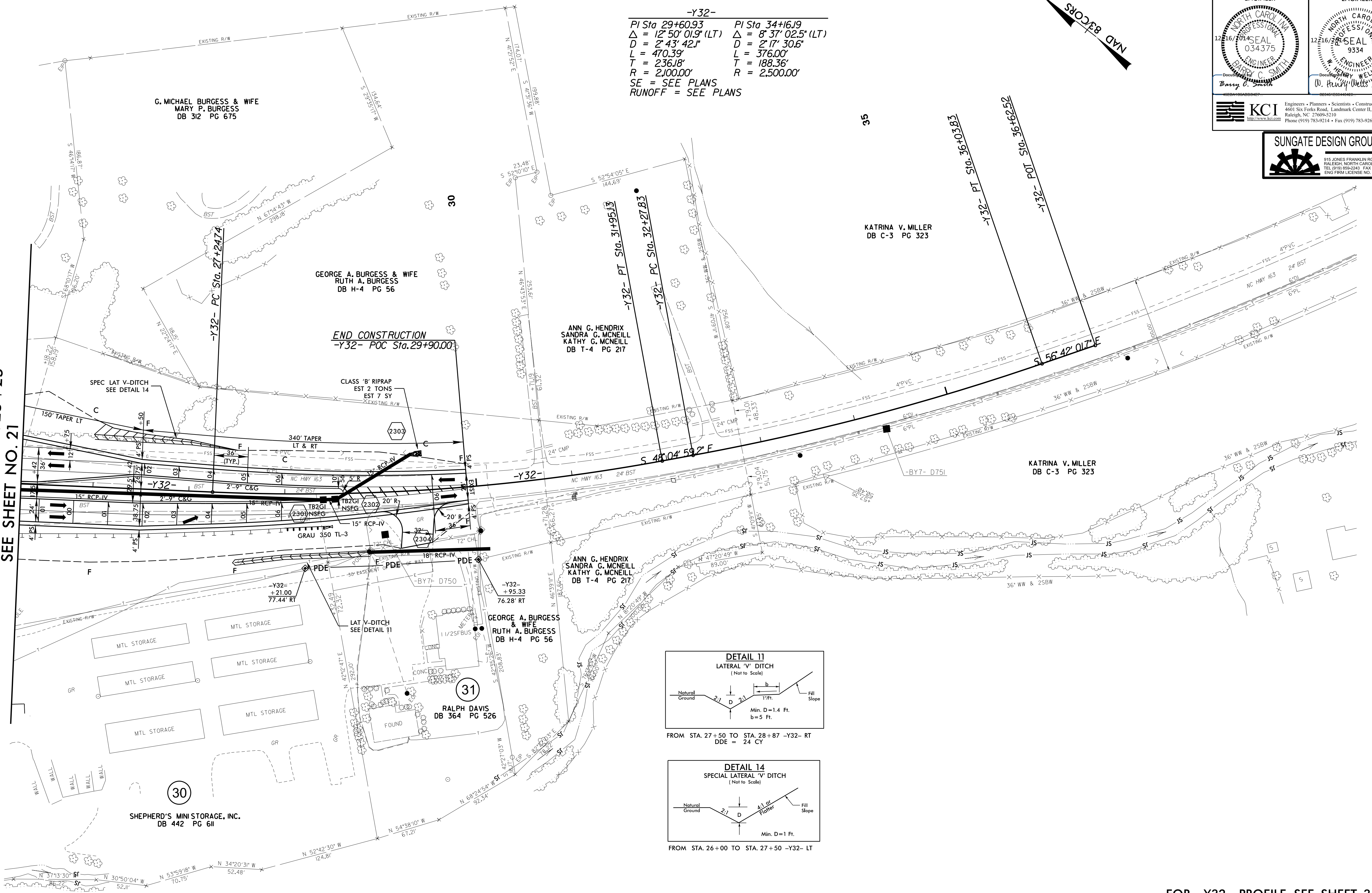
| | |
|--|------------------------|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 23 |
| RW SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| | |
| KCI Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 TEL: (919) 850-2243 FAX: (919) 850-4298 Phone: (919) 783-9214 • Fax: (919) 783-9266 | |
| SUNGATE DESIGN GROUP, P.A. 915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL: (919) 850-2243 FAX: (919) 850-4298 ENG FROM LICENSE NO. C-890 | |

-Y32-

| | |
|--------------------------------------|-------------------------------------|
| PI Sta 29+60.93 | PI Sta 34+16.19 |
| $\Delta = 12^{\circ} 50' 01.9" (LT)$ | $\Delta = 8^{\circ} 37' 02.5" (LT)$ |
| $D = 2^{\circ} 43' 42.1"$ | $D = 2^{\circ} 17' 30.6"$ |
| $L = 470.39'$ | $L = 376.00'$ |
| $T = 236.18'$ | $T = 188.36'$ |
| $R = 2100.00'$ | $R = 2500.00'$ |

SE = SEE PLANS
RUNOFF = SEE PLANS

MATCH LINE -Y32- STA. 25 +25
SEE SHEET NO. 21




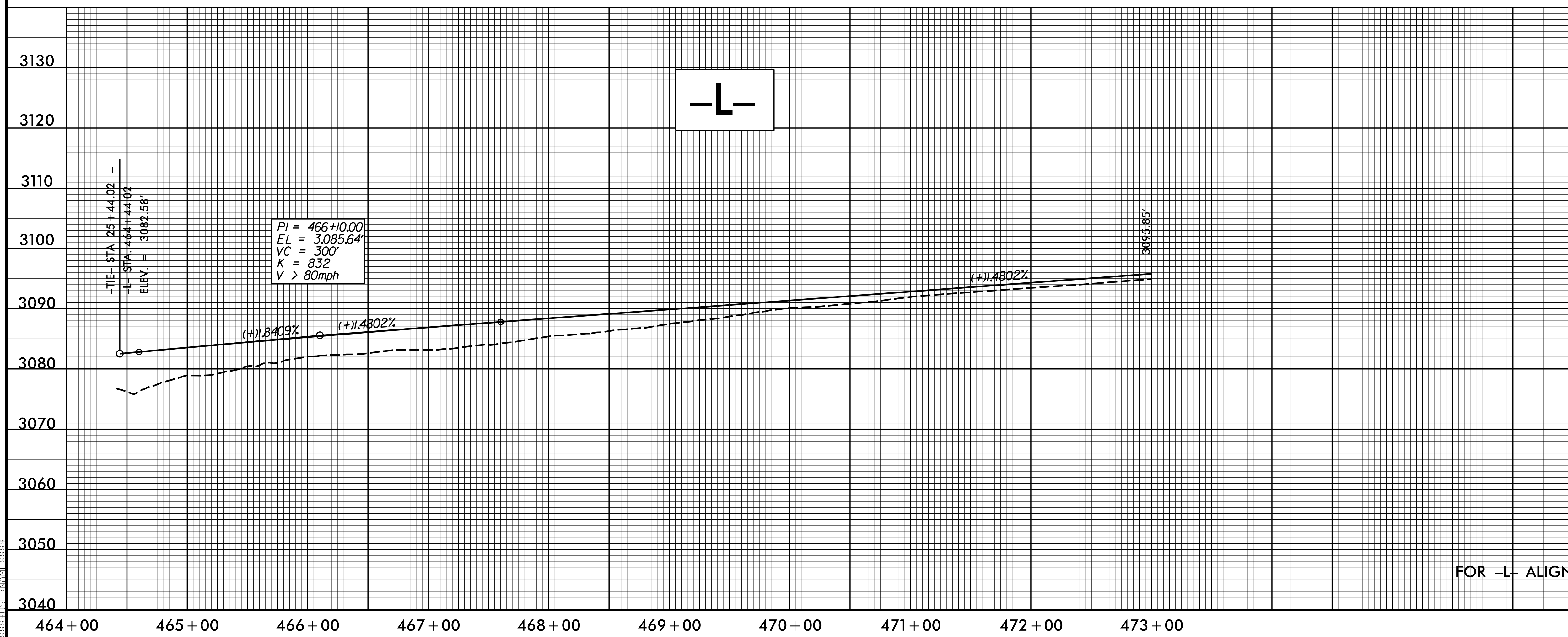
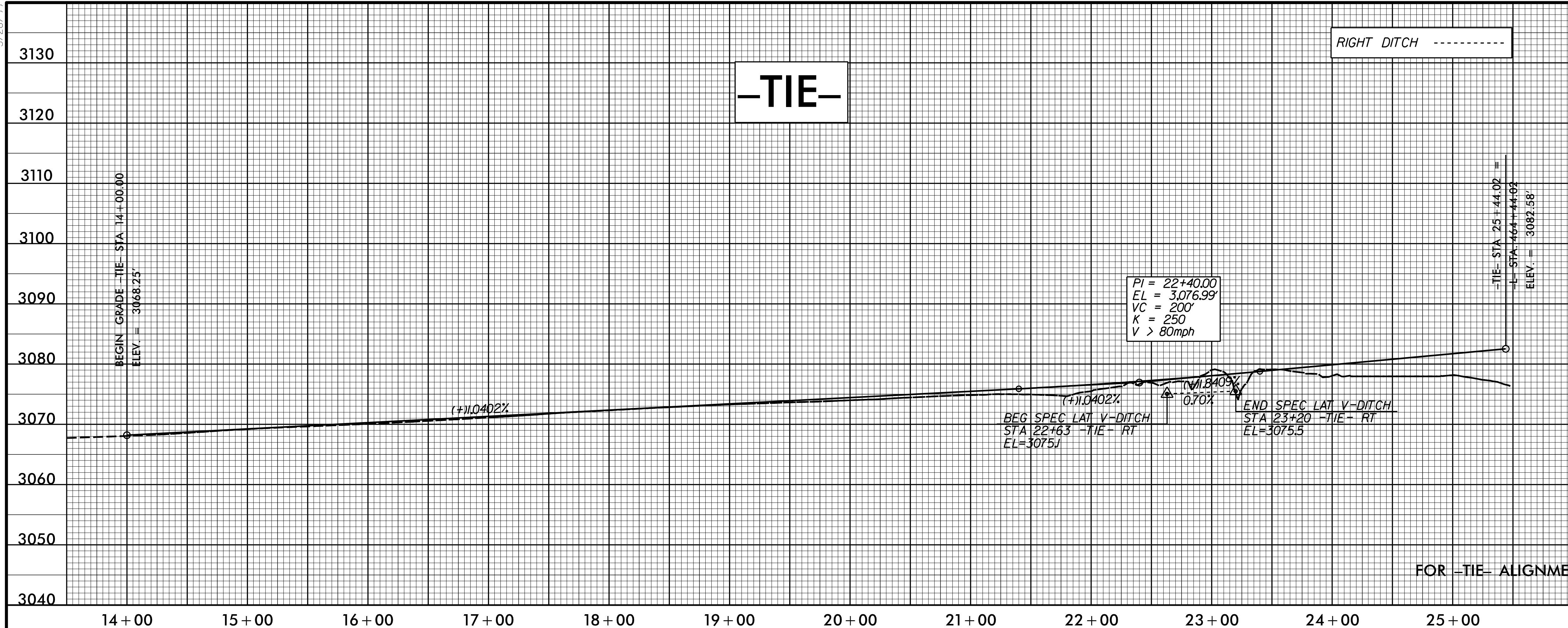
FOR -Y32- PROFILE, SEE SHEET 35

NOTE: ALL EXISTING CONTROL OF ACCESS FENCE TO BE REMOVED UNLESS OTHERWISE NOTED.

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| | |
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| PROJECT REFERENCE NO. R-2915D | SHEET NO. 24 |
| ROADWAY DESIGN ENGINEER BARRY C. SMITH NORTH CAROLINA PROFESSIONAL ENGINEER 034375 | HYDRAULICS ENGINEER W. HENRY WELLS JR. NORTH CAROLINA PROFESSIONAL ENGINEER 9334 |
|  KCI <small>Engineers • Planners • Scientists • Construction Managers</small> 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 http://www.kci.com | |
| SUNGATE DESIGN GROUP, P.A. <small>476 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 859-2243 FAX (919) 859-6258 ENG FROM LICENSE NO. C-400</small> | |



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| | |
|--|---|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 25 |
| ROADWAY DESIGN ENGINEER BARRY C. SMITH NORTH CAROLINA PROFESSIONAL SEAL 034375 | HYDRAULICS ENGINEER W. HENRY WELLS JR. NORTH CAROLINA PROFESSIONAL SEAL 9334 |
|  KCI <small>Engineers • Planners • Scientists • Construction Managers</small> <small>4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266</small> | |
|  SUNGATE DESIGN GROUP, P.A. <small>401 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 859-2243 FAX (919) 859-6258 ENG FROM LICENSE NO. C-400</small> | |

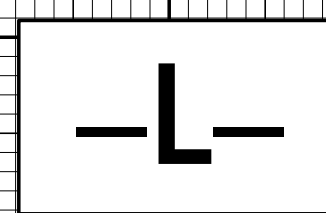
CULVERT HYDRAULIC DATA
84" CMP Sta. 474+18 -L-

| | | |
|-----------------------|----------|-----|
| DESIGN DISCHARGE | = 500 | CFS |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN HW ELEVATION | = 3094.0 | FT |
| BASE DISCHARGE | = 600 | CFS |
| BASE FREQUENCY | = 100 | YRS |
| BASE HW ELEVATION | = 3097.9 | FT |
| OVERTOPPING DISCHARGE | = 500 + | CFS |
| OVERTOPPING FREQUENCY | = 50 + | YRS |
| OVERTOPPING ELEVATION | = 3096.0 | FT |

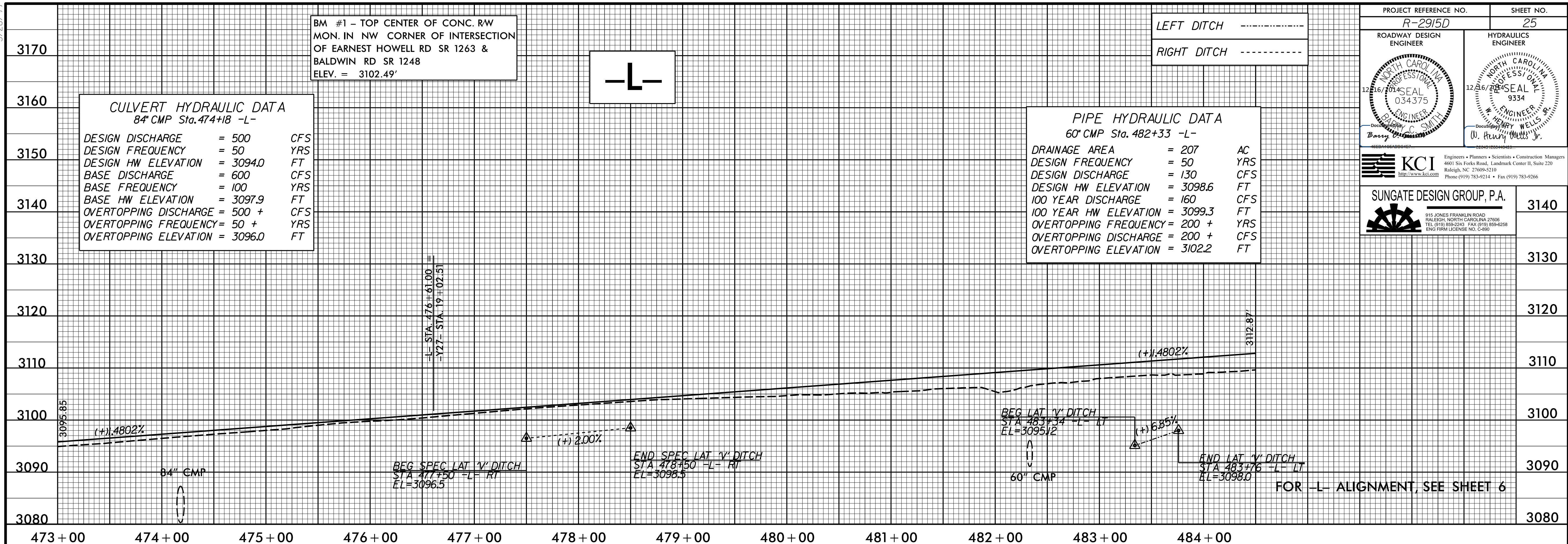
PIPE HYDRAULIC DATA
60" CMP Sta. 482+33 -L-

| | | |
|-----------------------|----------|-----|
| DRAINAGE AREA | = 207 | AC |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN DISCHARGE | = 130 | CFS |
| DESIGN HW ELEVATION | = 3098.6 | FT |
| 100 YEAR DISCHARGE | = 160 | CFS |
| 100 YEAR HW ELEVATION | = 3099.3 | FT |
| OVERTOPPING FREQUENCY | = 200 + | YRS |
| OVERTOPPING DISCHARGE | = 200 + | CFS |
| OVERTOPPING ELEVATION | = 3102.2 | FT |

BM #1 - TOP CENTER OF CONC. RW
MON. IN NW CORNER OF INTERSECTION
OF EARNEST HOWELL RD SR 1263 &
BALDWIN RD SR 1248
ELEV. = 3102.49'

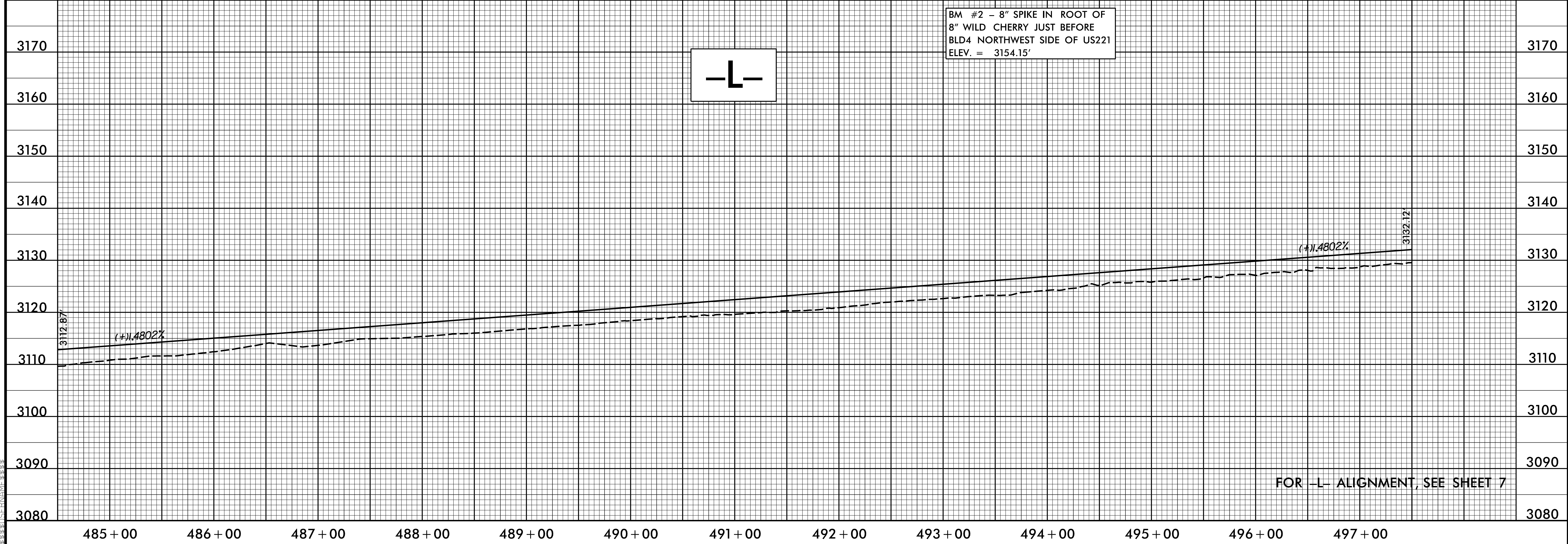
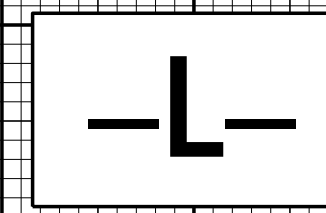


LEFT DITCH -----
RIGHT DITCH -----



FOR -L- ALIGNMENT, SEE SHEET 6

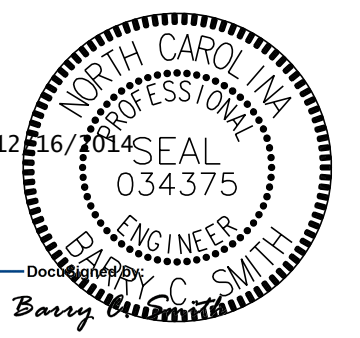
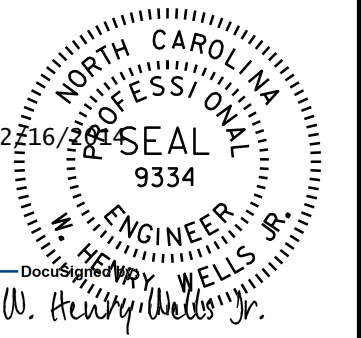


BM #2 - 8" SPIKE IN ROOT OF
8" WILD CHERRY JUST BEFORE
BLD4 NORTHWEST SIDE OF US221
ELEV. = 3154.15'

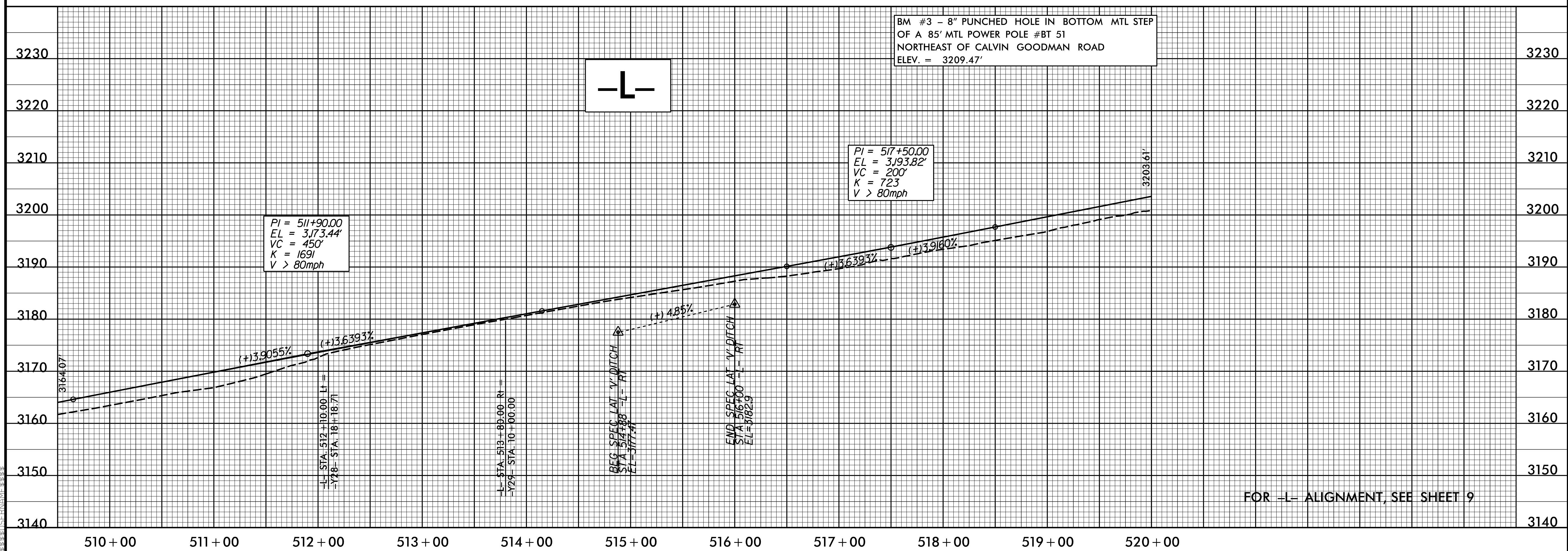
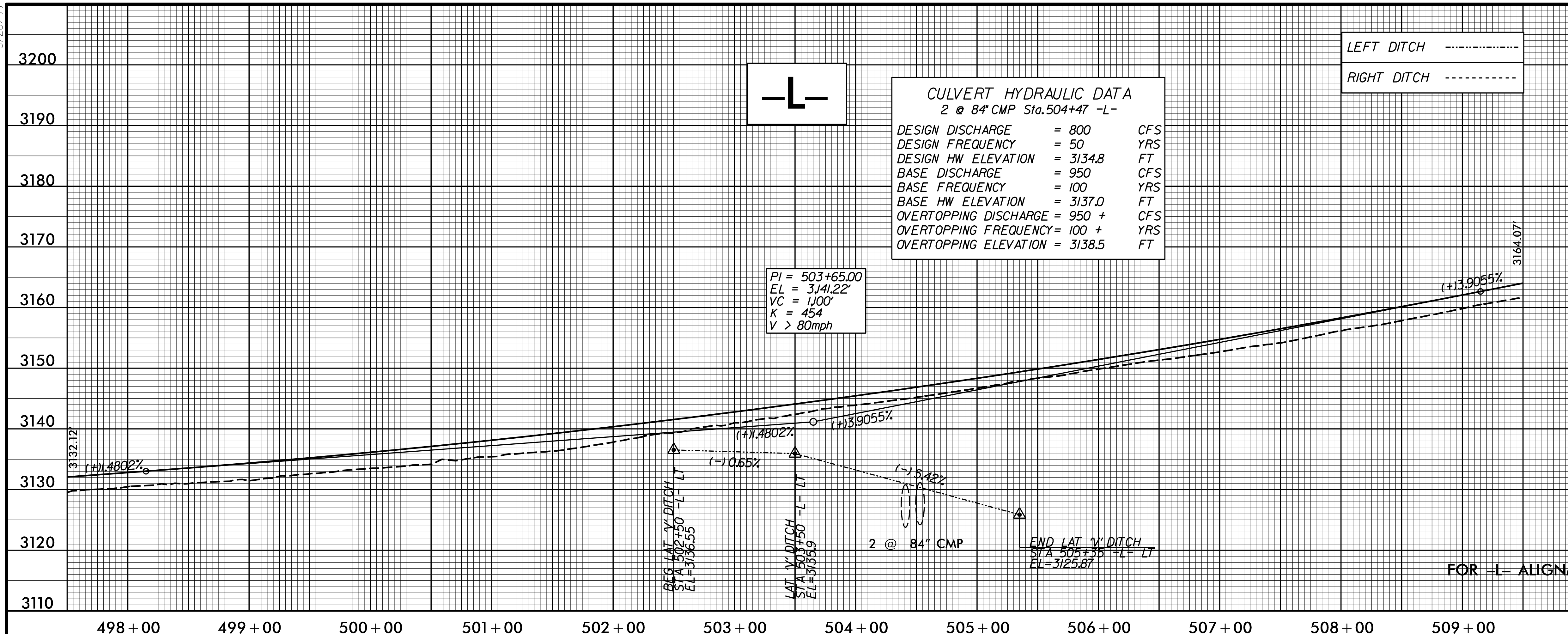


FOR -L- ALIGNMENT, SEE SHEET 7

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5/28/99

| | |
|---|--|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 26 |
| ROADWAY DESIGN ENGINEER  | HYDRAULICS ENGINEER  |
|  KCI Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |
|  SUNGATE DESIGN GROUP, P.A. 476 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 859-2243 FAX (919) 859-6258 ENG FROM LICENSE NO. C-400 | |



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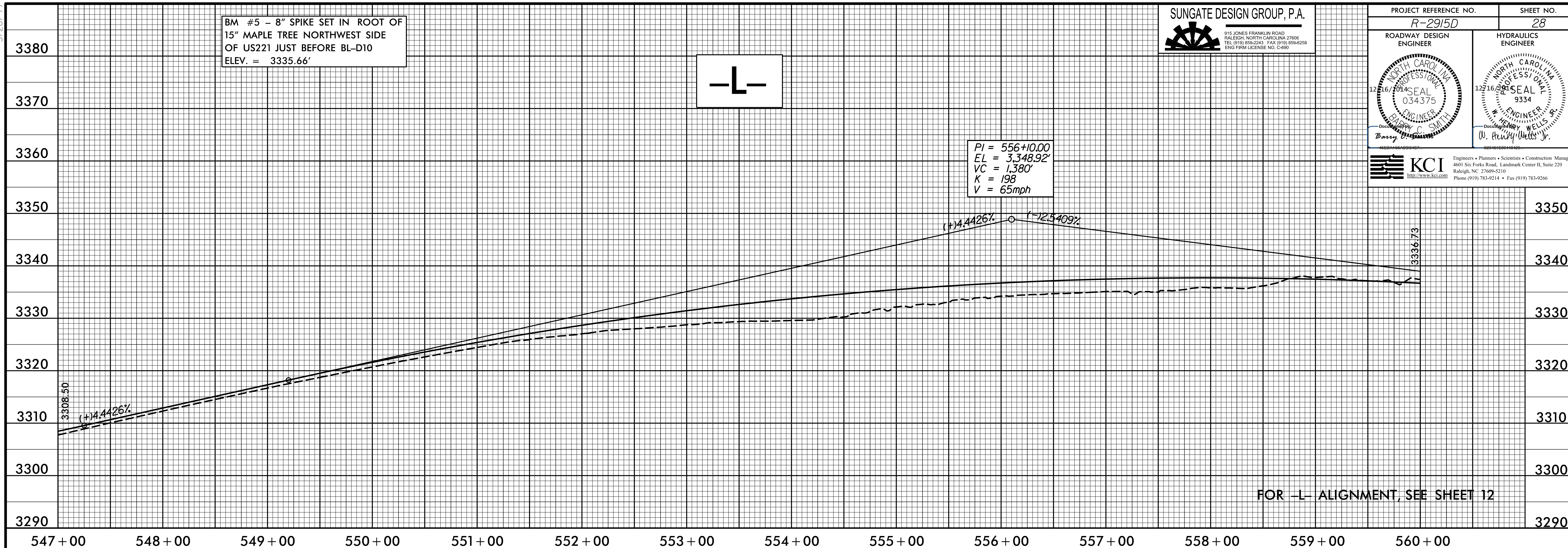
SUNGATE DESIGN GROUP, P.A.
875 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-6288
ENG. FIRM LICENSE NO. C-490

| | |
|--|--|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 28 |
| ROADWAY DESIGN ENGINEER Barry C. Smith | HYDRAULICS ENGINEER W. Henry Wells Jr. |
| | |
| | |
| <small>Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266</small> | |

BM #5 - 8" SPIKE SET IN ROOT OF 15" MAPLE TREE NORTHWEST SIDE OF US221 JUST BEFORE BL-D10
ELEV. = 3335.66'

-L-

PI = 556+10.00
EL = 3,348.92'
VC = 1,380'
K = 198
V = 65mph



FOR -L- ALIGNMENT, SEE SHEET 12

BM #6 - BOLT IN NORTHWEST CORNER OF CONC. BOX FOR WATER LINE IN SOUTHWEST SIDE OF PARKING LOT FOR WESTWOOD ELEMENTARY SCHOOL
ELEV. = 3322.77'

-L-

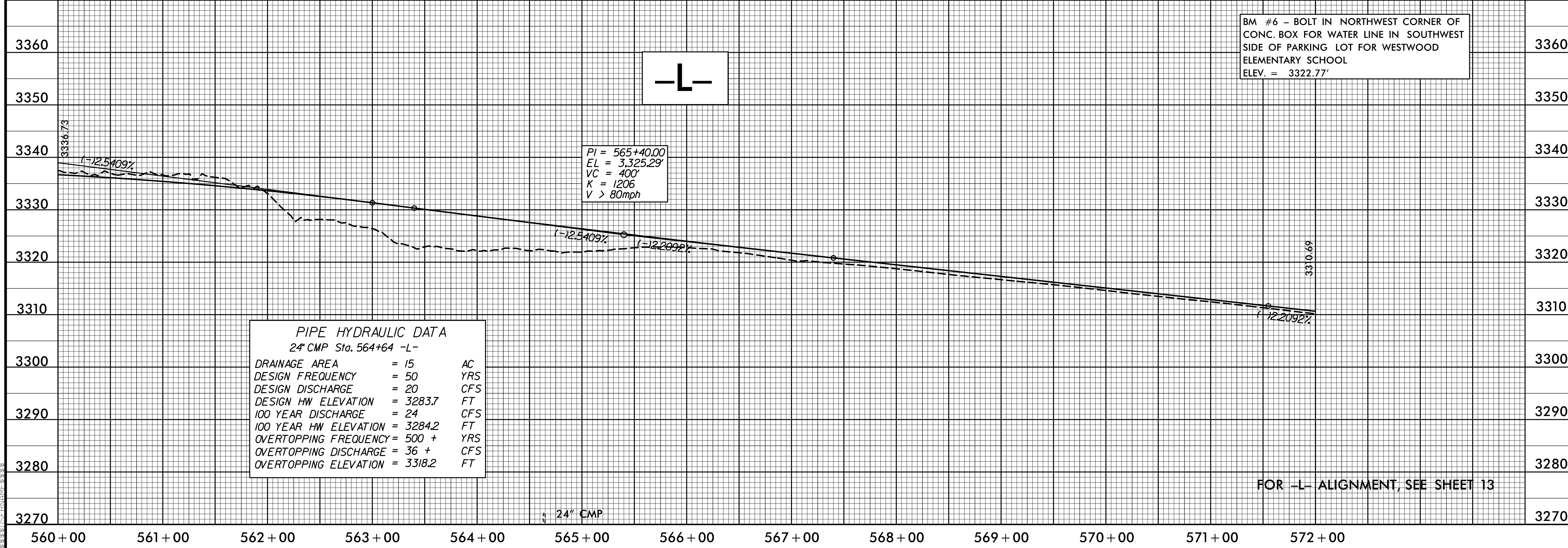
PI = 565+40.00
EL = 3,325.29'
VC = 400'
K = 1206
V > 80mph

PIPE HYDRAULIC DATA
24" CMP Sta. 564+64 -L-

| | | |
|-----------------------|----------|-----|
| DRAINAGE AREA | = 15 | AC |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN DISCHARGE | = 20 | CFS |
| DESIGN HW ELEVATION | = 3283.7 | FT |
| 100 YEAR DISCHARGE | = 24 | CFS |
| 100 YEAR HW ELEVATION | = 3284.2 | FT |
| OVERTOPPING FREQUENCY | = 500 + | YRS |
| OVERTOPPING DISCHARGE | = 36 + | CFS |
| OVERTOPPING ELEVATION | = 3318.2 | FT |

24" CMP

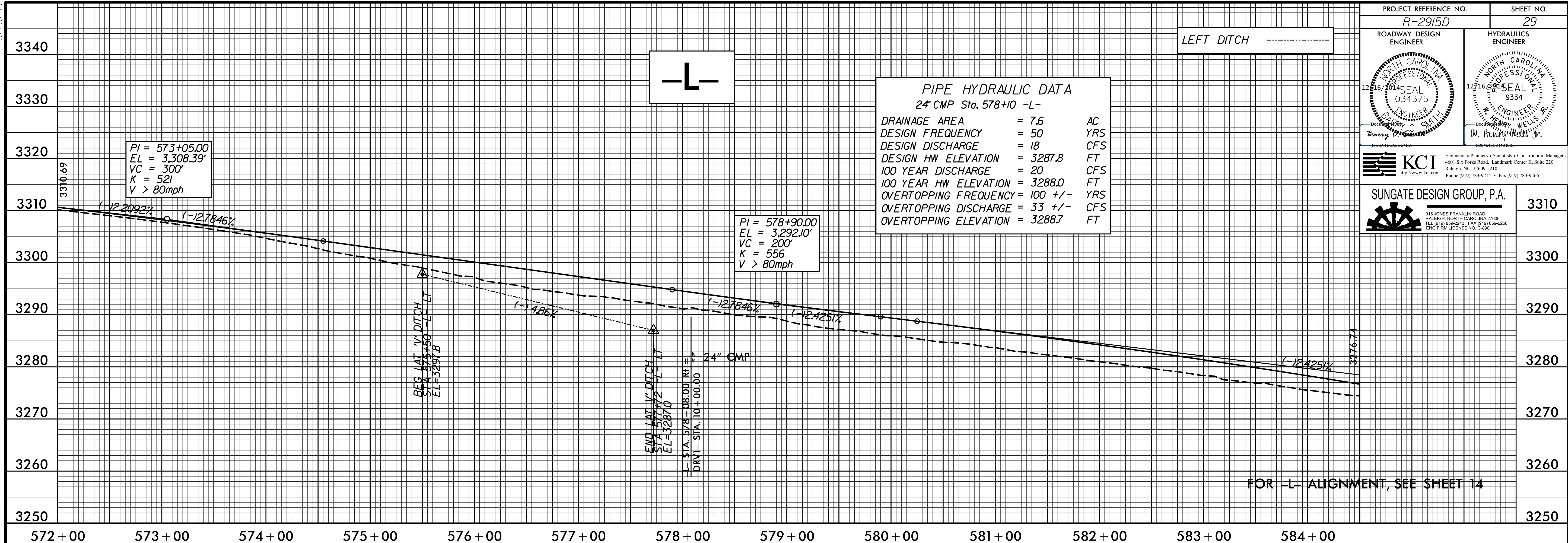
FOR -L- ALIGNMENT, SEE SHEET 13



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| | |
|--|---|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 29 |
| ROADWAY DESIGN ENGINEER BARRY C. SMITH | HYDRAULICS ENGINEER W. HEWITT WELLS JR. |
| | |
| | |
| SUNGATE DESIGN GROUP, P.A. | |



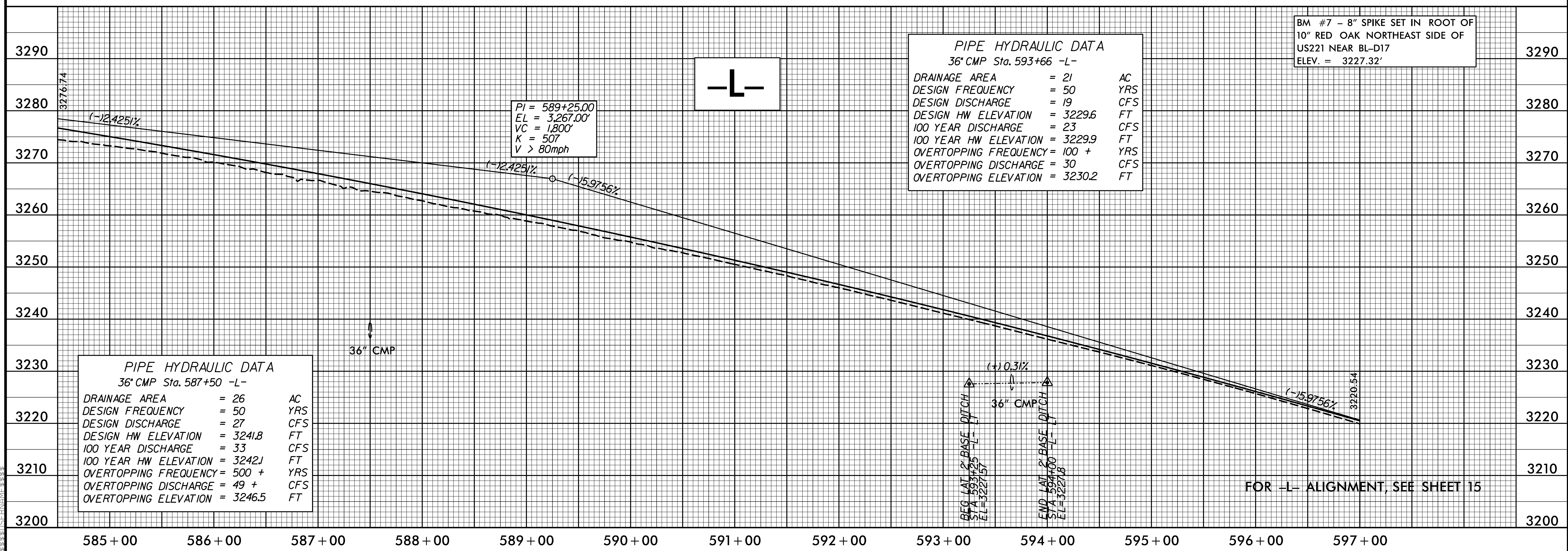
PIPE HYDRAULIC DATA
24" CMP Sta. 578+10 -L-

| | | |
|-----------------------|-----------|-----|
| DRAINAGE AREA | = 7.6 | AC |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN DISCHARGE | = 18 | CFS |
| DESIGN HW ELEVATION | = 3287.8 | FT |
| 100 YEAR DISCHARGE | = 20 | CFS |
| 100 YEAR HW ELEVATION | = 3288.0 | FT |
| OVERTOPPING FREQUENCY | = 100 +/- | YRS |
| OVERTOPPING DISCHARGE | = 33 +/- | CFS |
| OVERTOPPING ELEVATION | = 3288.7 | FT |

PI = 573+05.00
EL = 3308.39'
VC = 300'
K = 521
V > 80mph

PI = 578+90.00
EL = 3292.10'
VC = 200'
K = 556
V > 80mph

BM #7 - 8" SPIKE SET IN ROOT OF
10" RED OAK NORTHEAST SIDE OF
US221 NEAR BL-D17
ELEV. = 3227.32'



PIPE HYDRAULIC DATA
36" CMP Sta. 593+66 -L-

| | | |
|-----------------------|----------|-----|
| DRAINAGE AREA | = 21 | AC |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN DISCHARGE | = 19 | CFS |
| DESIGN HW ELEVATION | = 3229.6 | FT |
| 100 YEAR DISCHARGE | = 23 | CFS |
| 100 YEAR HW ELEVATION | = 3229.9 | FT |
| OVERTOPPING FREQUENCY | = 100 + | YRS |
| OVERTOPPING DISCHARGE | = 30 | CFS |
| OVERTOPPING ELEVATION | = 3230.2 | FT |

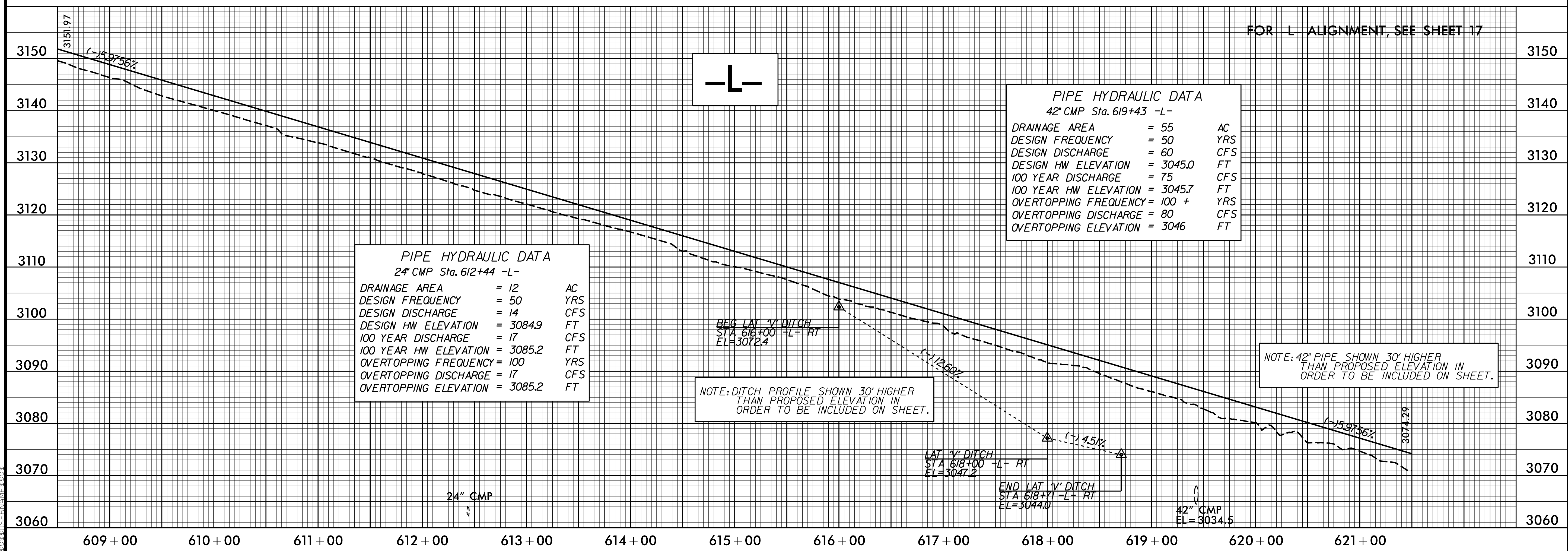
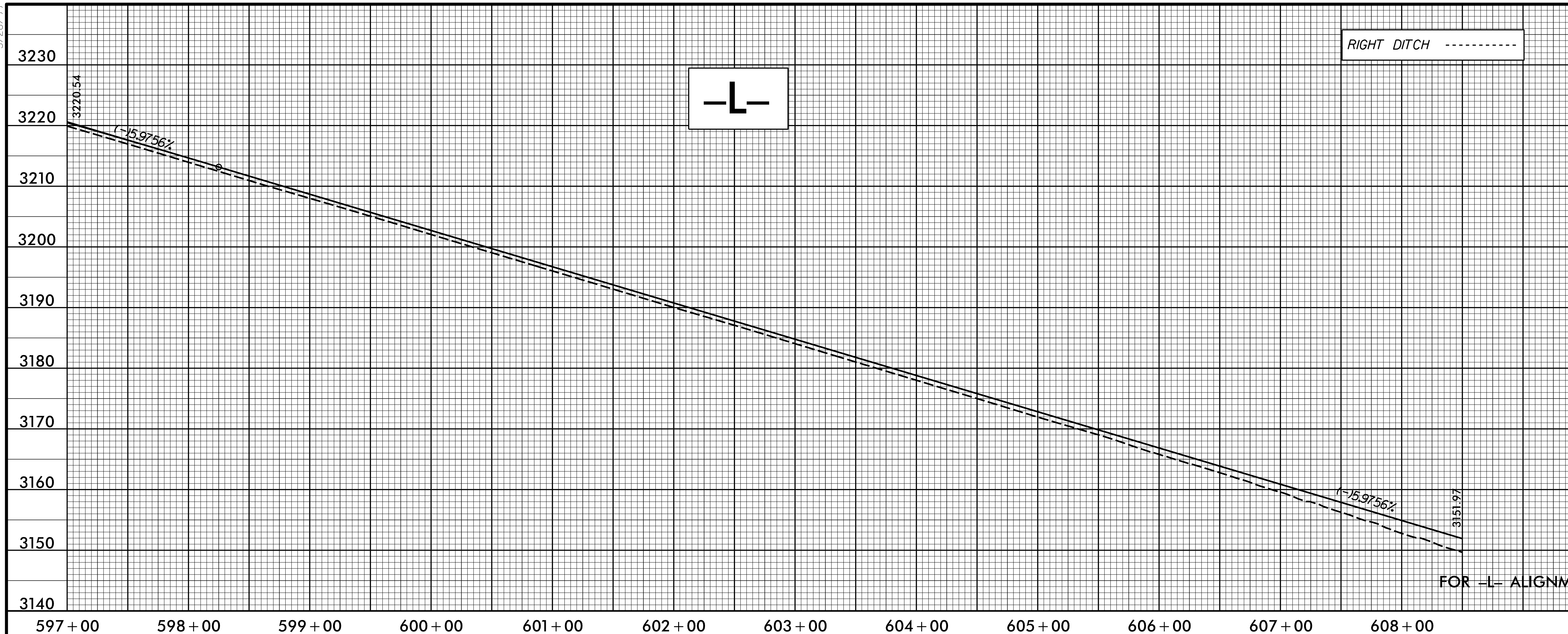
PIPE HYDRAULIC DATA
36" CMP Sta. 587+50 -L-

| | | |
|-----------------------|----------|-----|
| DRAINAGE AREA | = 26 | AC |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN DISCHARGE | = 27 | CFS |
| DESIGN HW ELEVATION | = 3241.8 | FT |
| 100 YEAR DISCHARGE | = 33 | CFS |
| 100 YEAR HW ELEVATION | = 3242.1 | FT |
| OVERTOPPING FREQUENCY | = 500 + | YRS |
| OVERTOPPING DISCHARGE | = 49 + | CFS |
| OVERTOPPING ELEVATION | = 3246.5 | FT |

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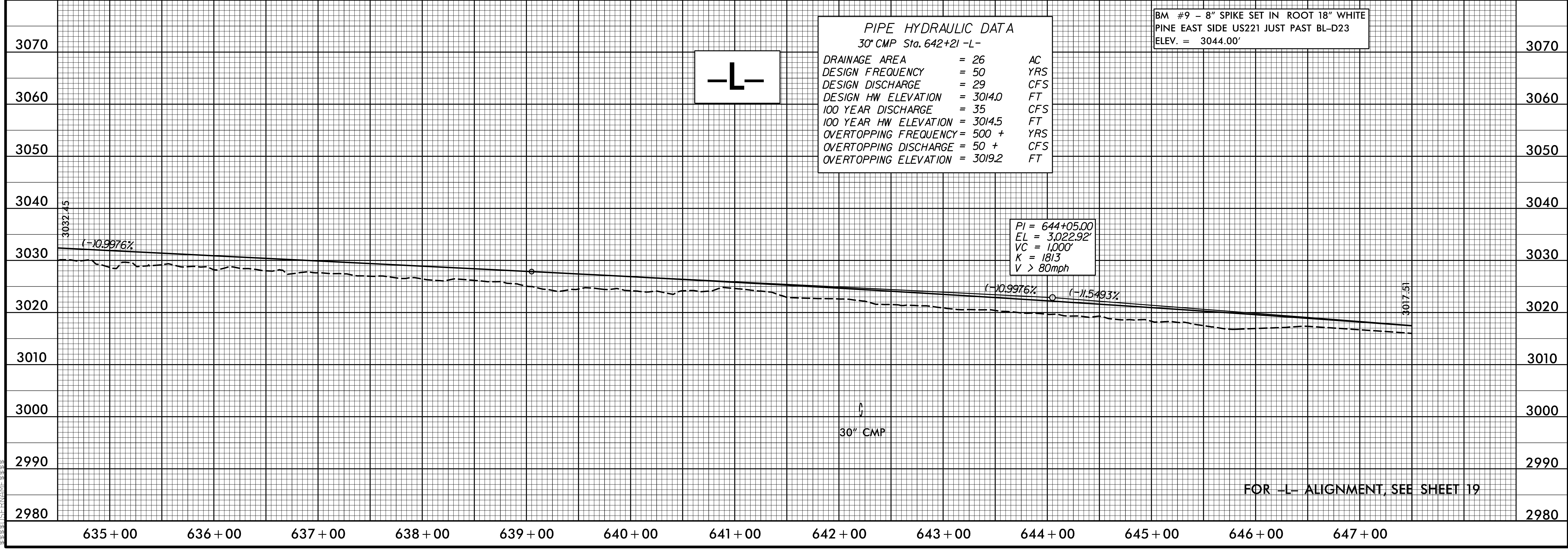
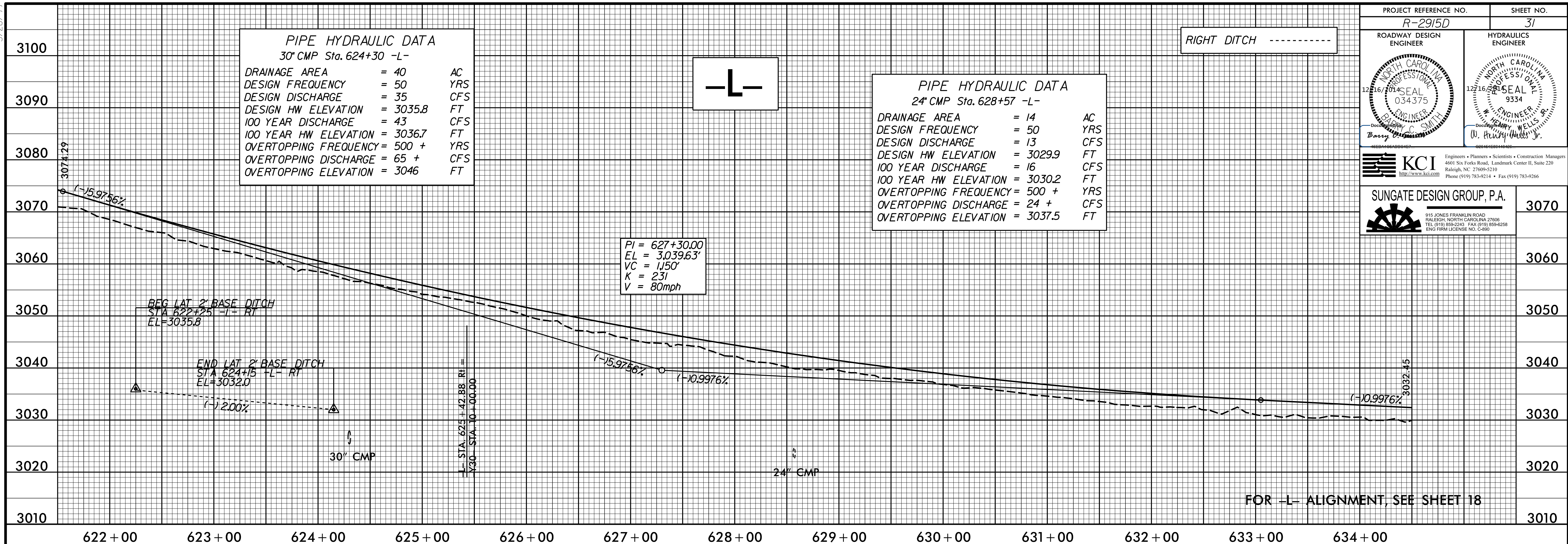
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| PROJECT REFERENCE NO. R-2915D | SHEET NO. 30 |
| ROADWAY DESIGN ENGINEER BARRY C. SMITH | HYDRAULICS ENGINEER W. Henry Wells Jr. |
| | |
| | Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 |
| | SUNGATE DESIGN GROUP, P.A. |



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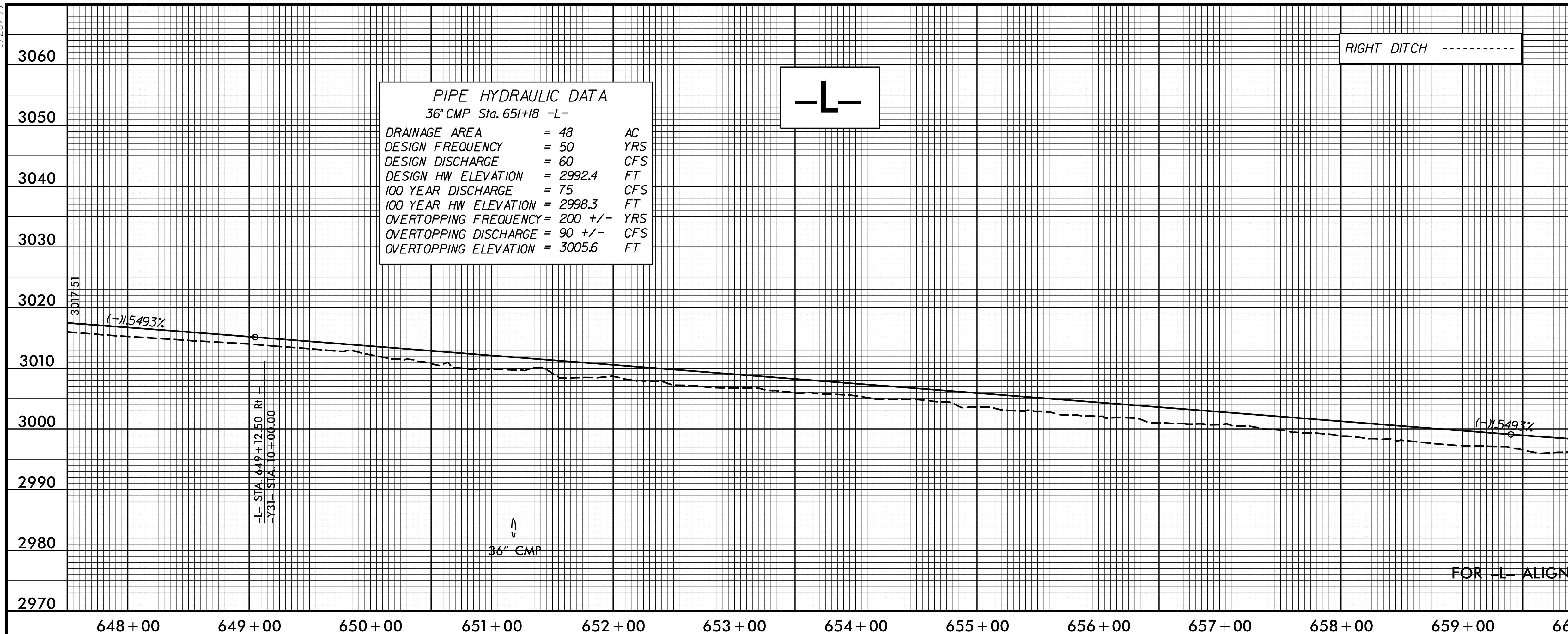
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|---|--|
| PROJECT REFERENCE NO. R-2915D | SHEET NO. 31 |
| ROADWAY DESIGN ENGINEER Barry C. Smith | HYDRAULICS ENGINEER W. Henry Wells Jr. |
| | |
| | |
| SUNGATE DESIGN GROUP, P.A. <small>4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-0266</small> | |



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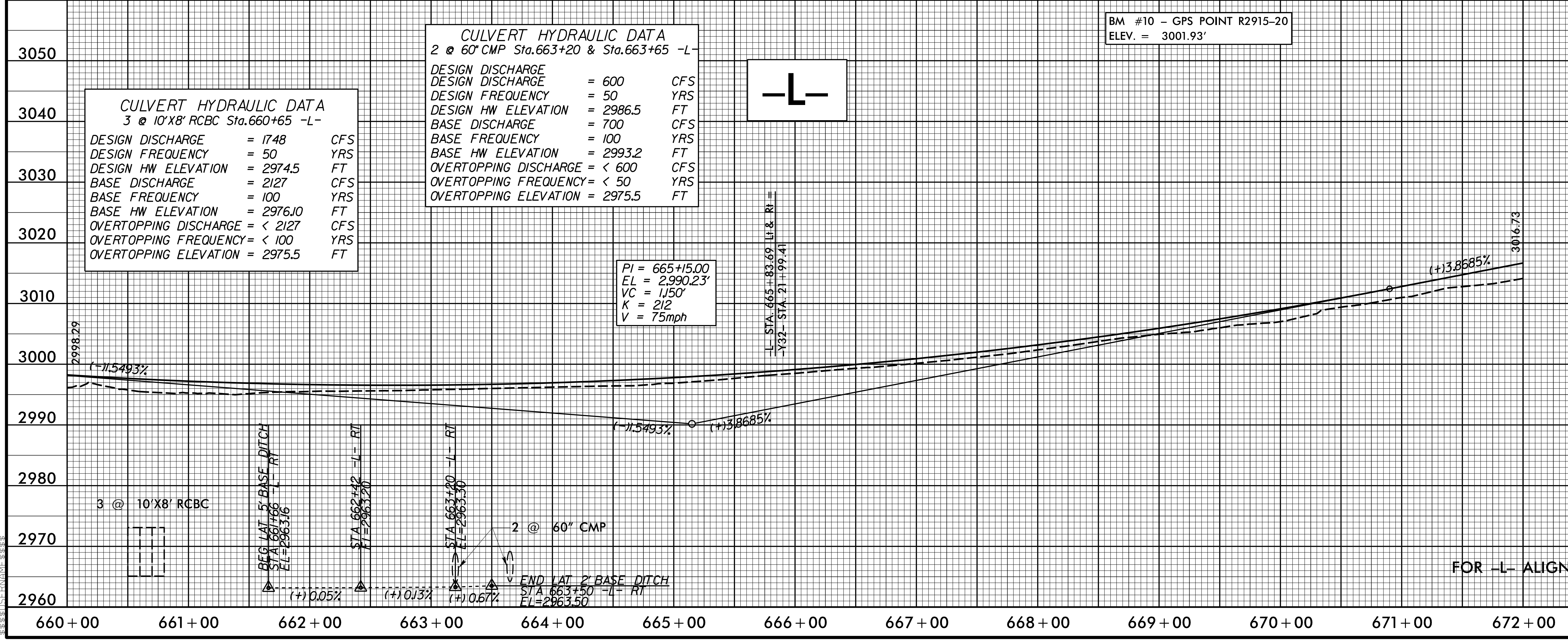
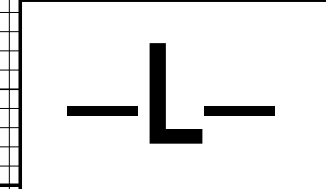
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| PROJECT REFERENCE NO. R-2915D | SHEET NO. 32 |
| ROADWAY DESIGN ENGINEER Barry C. Smith | HYDRAULICS ENGINEER W. Henry Wells Jr. |
| | |
| KCI Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |
| SUNGATE DESIGN GROUP, P.A. 400 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 859-2243 FAX (919) 859-6258 ENG FROM LICENSE NO. C-400 | |



PIPE HYDRAULIC DATA
36" CMP Sta. 651+18 -L-

| | | |
|-----------------------|-----------|-----|
| DRAINAGE AREA | = 48 | AC |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN DISCHARGE | = 60 | CFS |
| DESIGN HW ELEVATION | = 2992.4 | FT |
| 100 YEAR DISCHARGE | = 75 | CFS |
| 100 YEAR HW ELEVATION | = 2998.3 | FT |
| OVERTOPPING FREQUENCY | = 200 +/- | YRS |
| OVERTOPPING DISCHARGE | = 90 +/- | CFS |
| OVERTOPPING ELEVATION | = 3005.6 | FT |



CULVERT HYDRAULIC DATA
3 @ 10'X8' RCBC Sta. 660+65 -L-

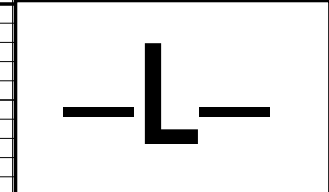
| | | |
|-----------------------|-----------|-----|
| DESIGN DISCHARGE | = 1748 | CFS |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN HW ELEVATION | = 2974.5 | FT |
| BASE DISCHARGE | = 2127 | CFS |
| BASE FREQUENCY | = 100 | YRS |
| BASE HW ELEVATION | = 2976.10 | FT |
| OVERTOPPING DISCHARGE | = < 2127 | CFS |
| OVERTOPPING FREQUENCY | = < 100 | YRS |
| OVERTOPPING ELEVATION | = 2975.5 | FT |

CULVERT HYDRAULIC DATA
2 @ 60" CMP Sta. 663+20 & Sta. 663+65 -L-

| | | |
|-----------------------|----------|-----|
| DESIGN DISCHARGE | = 600 | CFS |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN HW ELEVATION | = 2986.5 | FT |
| BASE DISCHARGE | = 700 | CFS |
| BASE FREQUENCY | = 100 | YRS |
| BASE HW ELEVATION | = 2993.2 | FT |
| OVERTOPPING DISCHARGE | = < 600 | CFS |
| OVERTOPPING FREQUENCY | = < 50 | YRS |
| OVERTOPPING ELEVATION | = 2975.5 | FT |

PI = 665+15.00
EL = 2990.23'
VC = 1150'
K = 212
V = 75mph

BM #10 - GPS POINT R2915-20
ELEV. = 3001.93'



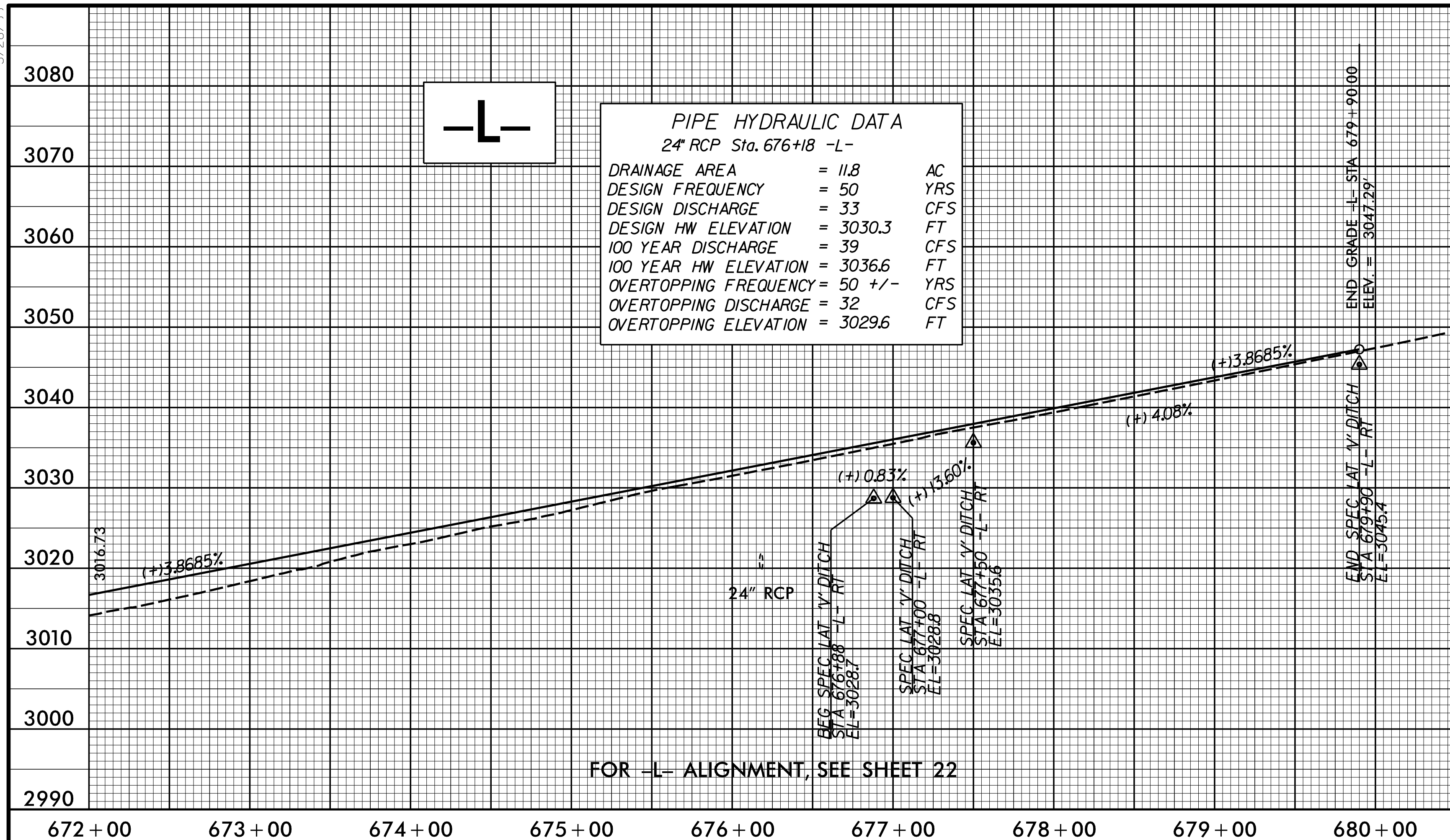
FOR -L- ALIGNMENT, SEE SHEET 20

FOR -L- ALIGNMENT, SEE SHEET 21

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| PROJECT REFERENCE NO. R-2915D | SHEET NO. 33 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| KCI Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |
| SUNGATE DESIGN GROUP, P.A. #10 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 858-2243 FAX (919) 858-6258 ENG. FROM LICENSE NO. C-400 | |

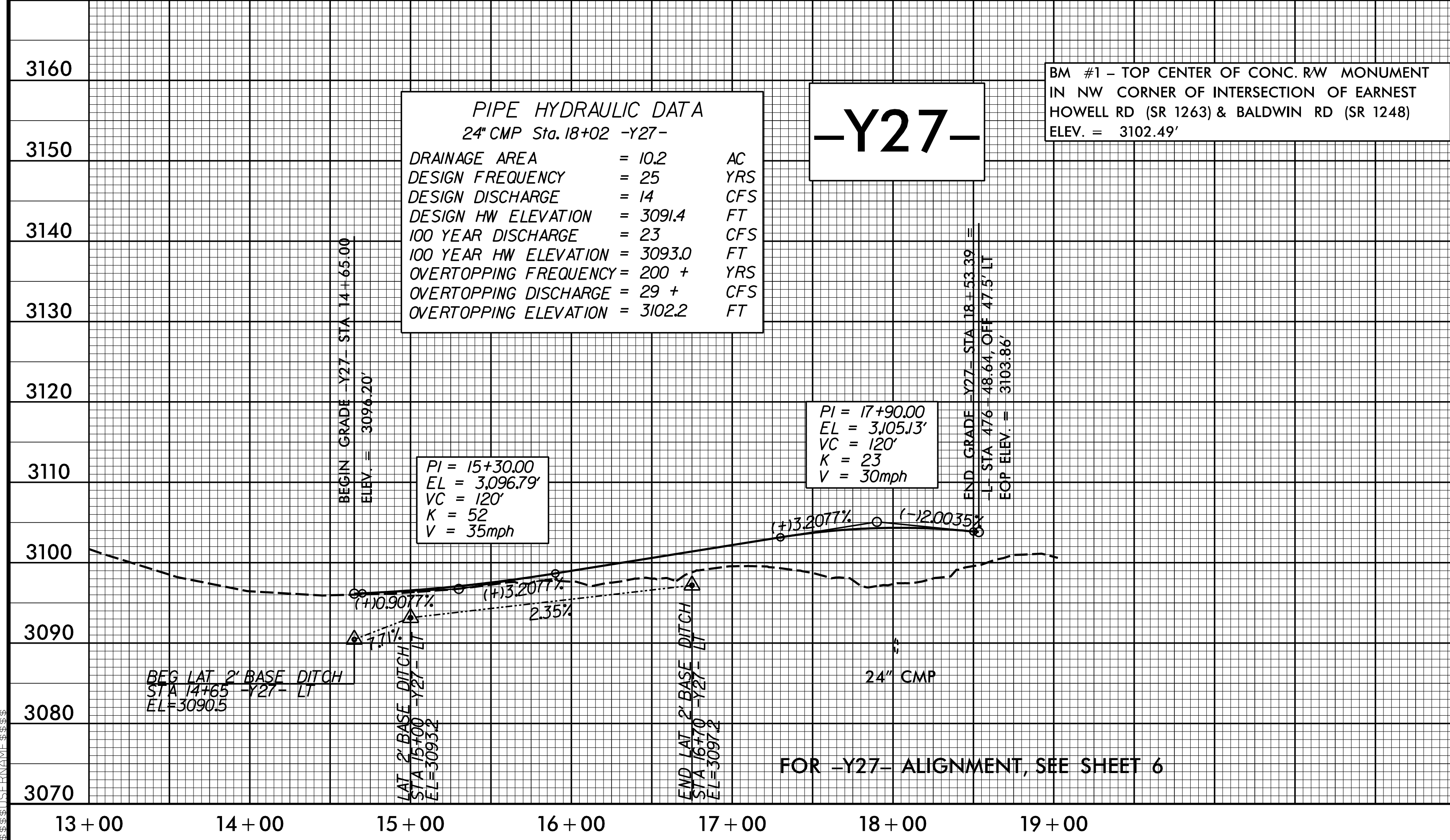


PIPE HYDRAULIC DATA
24" RCP Sta. 676+18 -L-

| | | |
|-----------------------|----------|-----|
| DRAINAGE AREA | = 11.8 | AC |
| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN DISCHARGE | = 33 | CFS |
| DESIGN HW ELEVATION | = 3030.3 | FT |
| 100 YEAR DISCHARGE | = 39 | CFS |
| 100 YEAR HW ELEVATION | = 3036.6 | FT |
| OVERTOPPING FREQUENCY | = 50 +/- | YRS |
| OVERTOPPING DISCHARGE | = 32 | CFS |
| OVERTOPPING ELEVATION | = 3029.6 | FT |

LEFT DITCH -----
RIGHT DITCH -----

FOR -L- ALIGNMENT, SEE SHEET 22



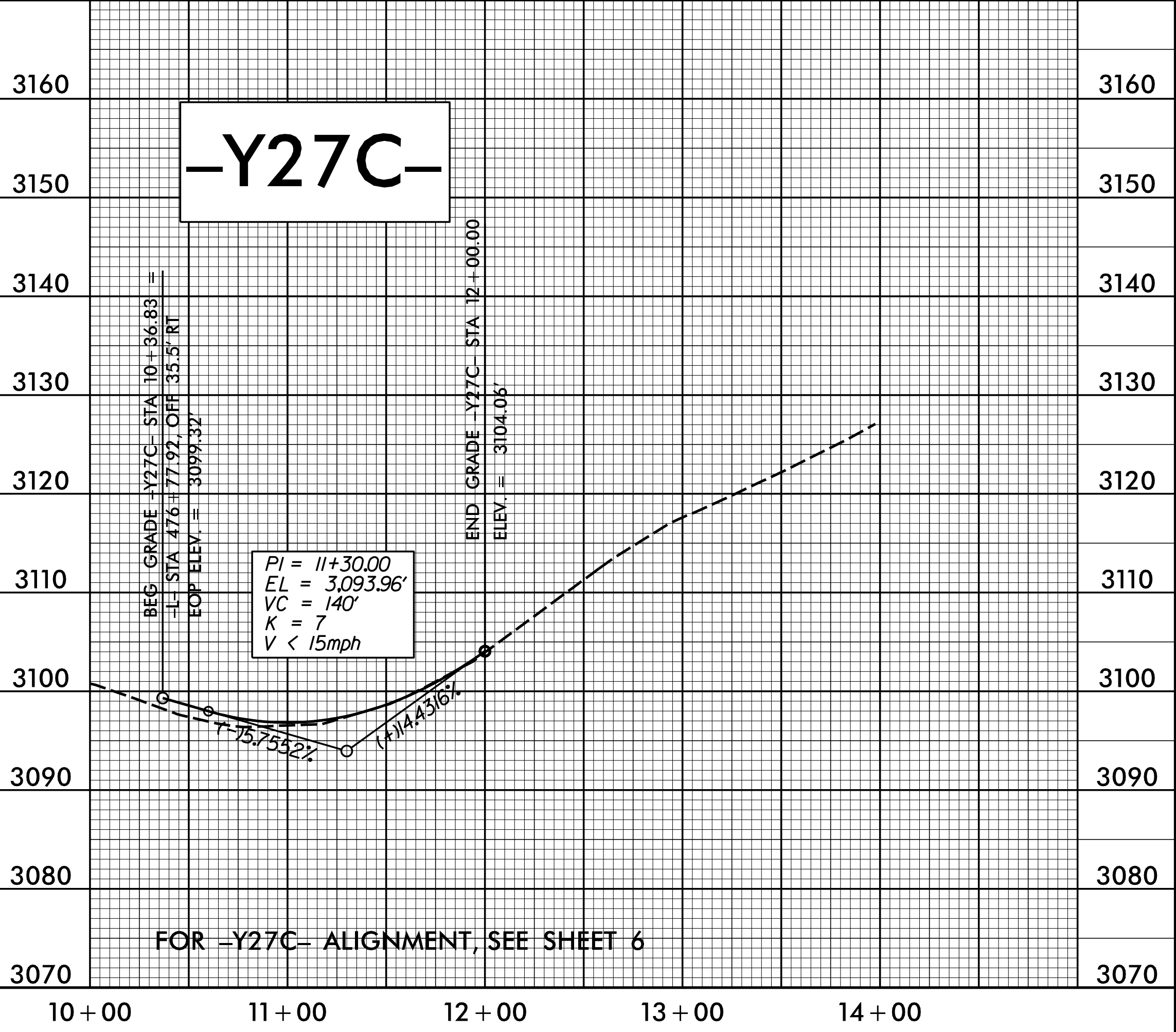
PIPE HYDRAULIC DATA
24" CMP Sta. 18+02 -Y27-

| | | |
|-----------------------|----------|-----|
| DRAINAGE AREA | = 10.2 | AC |
| DESIGN FREQUENCY | = 25 | YRS |
| DESIGN DISCHARGE | = 14 | CFS |
| DESIGN HW ELEVATION | = 3091.4 | FT |
| 100 YEAR DISCHARGE | = 23 | CFS |
| 100 YEAR HW ELEVATION | = 3093.0 | FT |
| OVERTOPPING FREQUENCY | = 200 + | YRS |
| OVERTOPPING DISCHARGE | = 29 + | CFS |
| OVERTOPPING ELEVATION | = 3102.2 | FT |

-Y27-

BM #1 - TOP CENTER OF CONC. RW MONUMENT
IN NW CORNER OF INTERSECTION OF EARNEST
HOWELL RD (SR 1263) & BALDWIN RD (SR 1248)
ELEV. = 3102.49'

FOR -Y27- ALIGNMENT, SEE SHEET 6



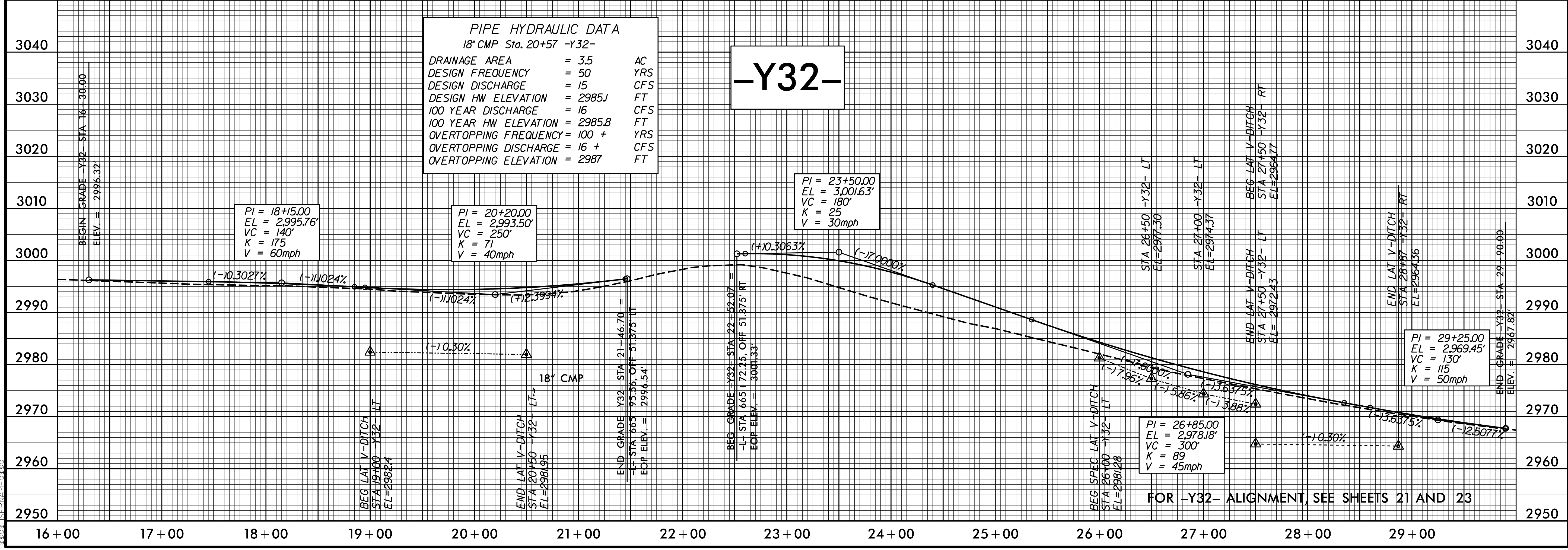
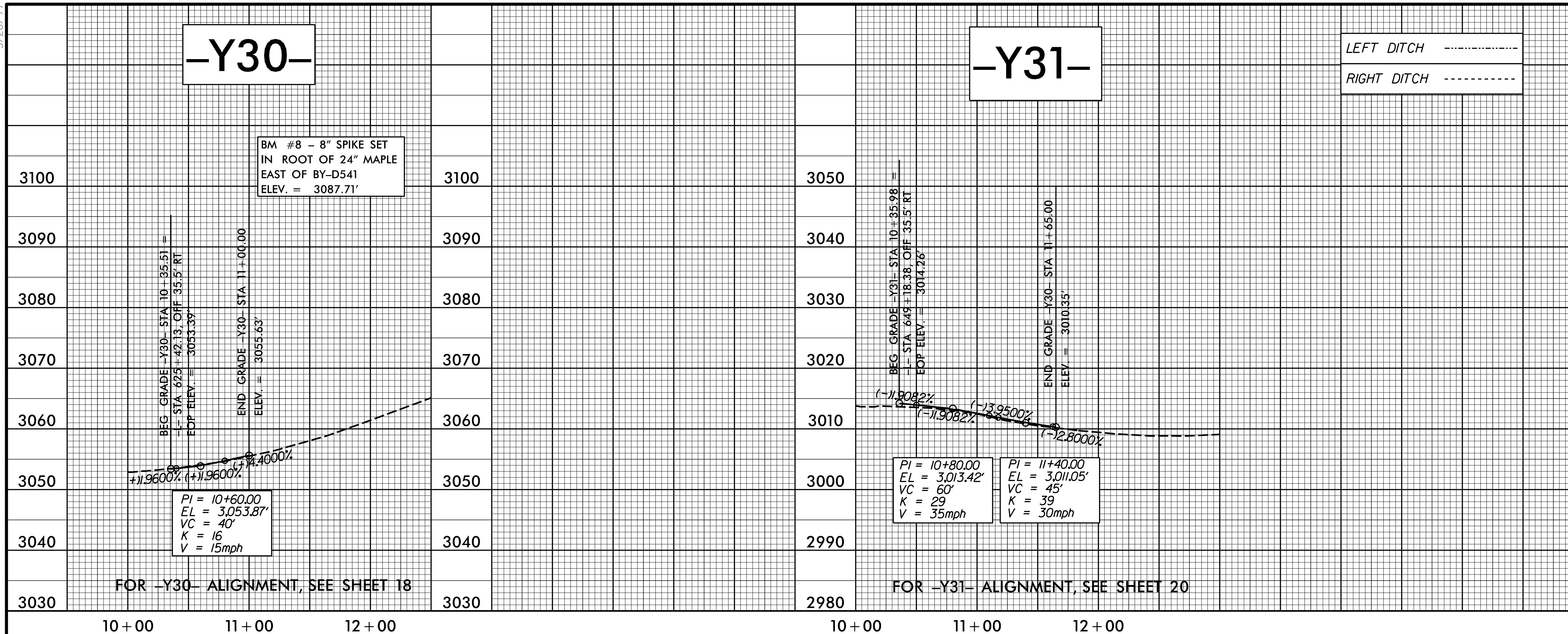
-Y27C-

FOR -Y27C- ALIGNMENT, SEE SHEET 6

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| PROJECT REFERENCE NO. R-2915D | SHEET NO. 35 |
| ROADWAY DESIGN ENGINEER BARRY C. SMITH | HYDRAULICS ENGINEER W. Henry Wells Jr. |
| | |
| KCI Engineers • Planners • Scientists • Construction Managers 4601 Six Forks Road, Landmark Center II, Suite 220 Raleigh, NC 27609-5210 Phone (919) 783-9214 • Fax (919) 783-9266 | |
| SUNGATE DESIGN GROUP, P.A. P.O. JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 859-2243 FAX (919) 859-6258 ENG FROM LICENSE NO. C-400 | |



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