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09/08/99

TIP PROJECT: W-5601DM /SS-4906BZ

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

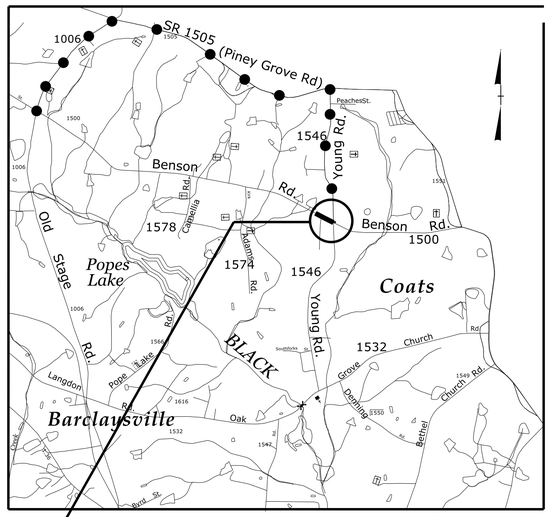
HARNETT COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5601DM/SS-4906BZ	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
44269.1.FD1	HSIP-1500(9)	PE
44269.2.FD1	HSIP-1500(9)	R/W, UTILS
50138.1.118	HSIP-1500(010)	PE
50138.3.118	HSIP-1500(010)	CONSTR

LOCATION: SR 1500 (BENSON RD) AT SR 1546 (YOUNG RD)

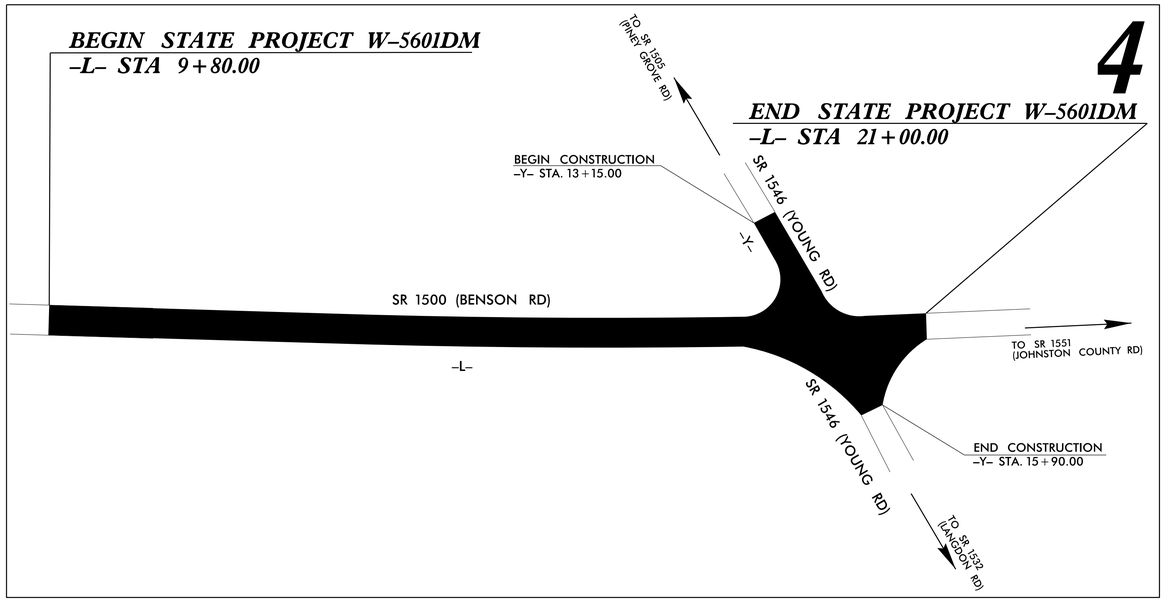
TYPE OF WORK: GRADING, PAVING, DRAINAGE, WATERLINE RELOCATION AND PAVEMENT MARKINGS



PROJECT LIMITS TIP W-5601DM

VICINITY MAP NOT TO SCALE | ***DETOUR***

NAD 83 NA 2011



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 2,400
ADT 2035 = 4,350
D = 50 %
V = 55 MPH

PROJECT LENGTH

PROJECT LENGTH = 0.210mi

Prepared in the Office of:
DIVISION OF HIGHWAYS
431 Transportation Drive, Fayetteville, NC 28301

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: AUGUST 2015

LETTING DATE: MAY 18, 2016

SEAN MATUSZEWSKI
PROJECT ENGINEER

RICK HANDLIN
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

19-APR-2016 14:09
H:\DDC_Projects\W-5601DM Benson Rd at Young Rd\Roadway\project\W-5601DM_Rdy_tsh.dgn
$$$$USERNAME$$$$

04/06/15

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	L-B

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 — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A 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 — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H–Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

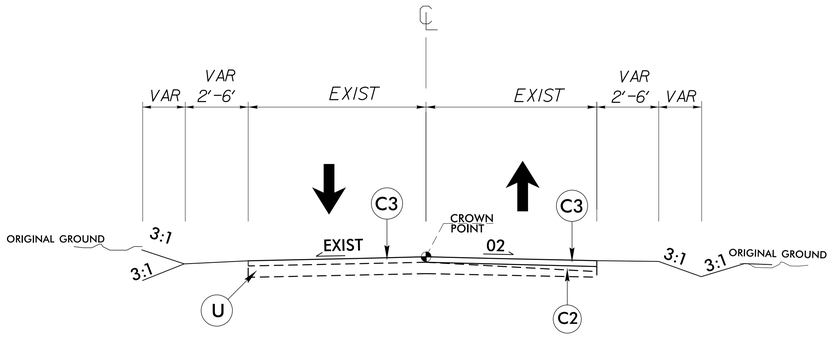
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

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

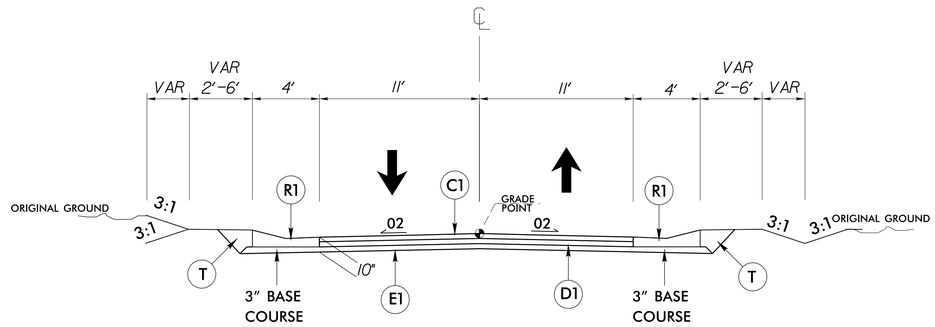
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	2



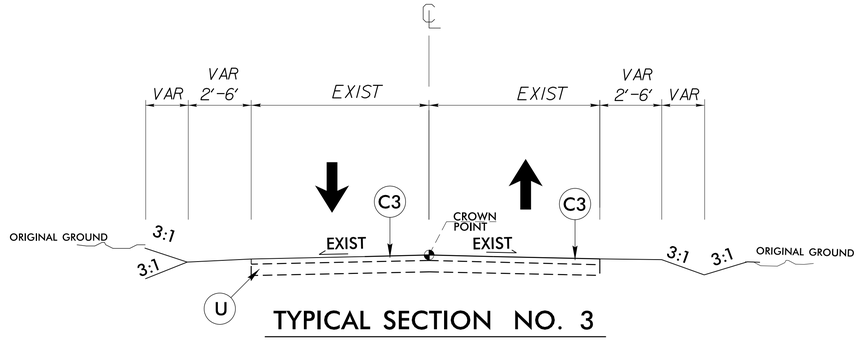
TYPICAL SECTION NO. 1

–L– STA. 9+80.00 TO STA 13+71.00



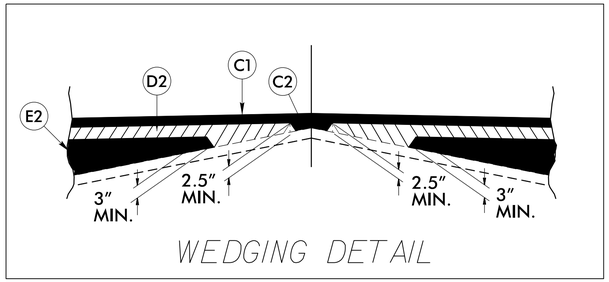
TYPICAL SECTION NO. 2

–L– STA. 13+71.00 TO STA 19+50.00



TYPICAL SECTION NO. 3

–L– STA. 19+50.00 TO STA 21+00.00



WEDGING DETAIL

–L– STA. 9+80.00 TO 13+71.00 RT.

PROJECT NOTES

1. The Contractor shall not work on both sides of the road simultaneously within the same area.
2. Ingress and egress shall be maintained to all businesses dwellings on the project.
3. at the end of each workday, the Contractor shall be required to backfill any area adjacent to existing travelway that has been graded leaving no more than a 3" drop–off.
4. A minimum of two–way, two–lane traffic (plus all existing left and right turn lanes) shall be maintained during periods of construction inactivity.
5. The Contractor shall not be allowed to stop traffic for more than 5 minutes at a time in any one direction.
6. During periods of construction inactivity, the difference in elevation between lanes shall not exceed $1\frac{1}{2}$ inch.
7. Access to police and fire stations, fire hydrants, and hospitals shall be maintained at all times.
8. During periods of construction inactivity, place cones/drums 3' from existing edge of pavement (travelway) as directed by the Engineer.
9. Channelizing devices in work areas shall be spaced no greater than 10' on center in radii, and shall be set 3' off the edge of travelway, unless otherwise indicated on plans.
10. Contractor to install and maintain all Erosion Control devises as directed by the Engineer.

CONTRACTOR SHALL COORDINATE WITH LOCAL TRAFFIC SERVICES UNIT PRIOR TO THE PLACEMENT OF ALL PAVEMENT MARKINGS.

FOR PAVEMENT MARKING, CONTACT KENT LANGDON 910–486–1452, 14 DAYS PRIOR TO FINAL PLACEMENT.

PAVEMENT SCHEDULE

C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 336 LBS. PER SQ. YD.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED $1\frac{1}{2}$" IN DEPTH.
C3	PROP. APPROX. $1\frac{1}{2}$" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN $2\frac{1}{2}$" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 5.5" IN DEPTH OR LESS THAN 3" IN DEPTH
R1	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT

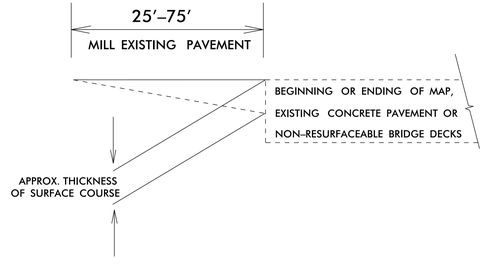
MILLING AT PAVEMENT TIE–INS

NOTES TO CONTRACTOR

For surface mixes over 1" in thickness, mill the existing pavement in acoordance with the following sketch as directed by the Engineer.

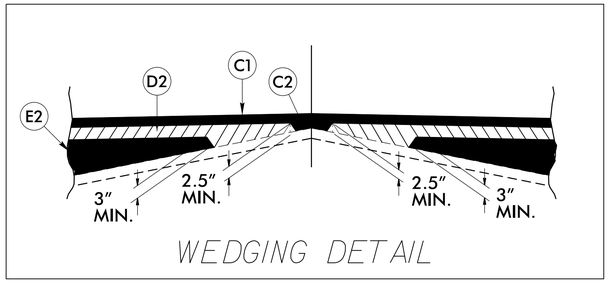
Locations shall include ties into existing concrete pavement, at bridge approaches where the bridge will not be resurfaced, and at the beginning and ending point of each resurfacing map.

Perform the work in accordance with Section 607 of the January 2012 North Carolina Department of Transportation Standard Specifications for Roads and Structures. Resurfacing will be accomplished at the same time as the milling operation.

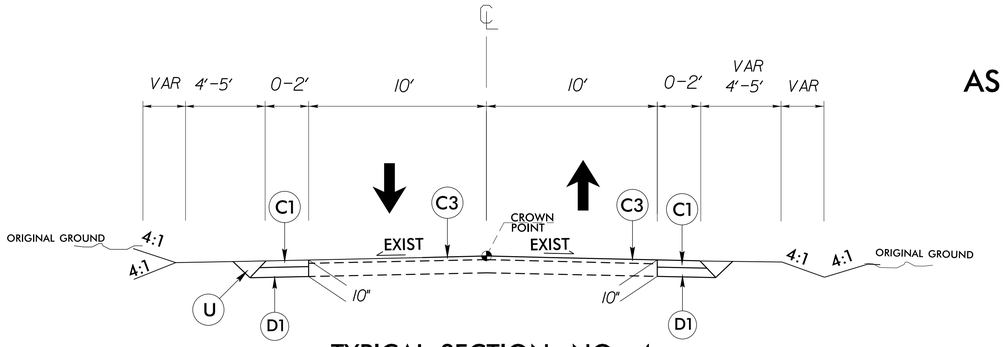


6/2/99

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	2A

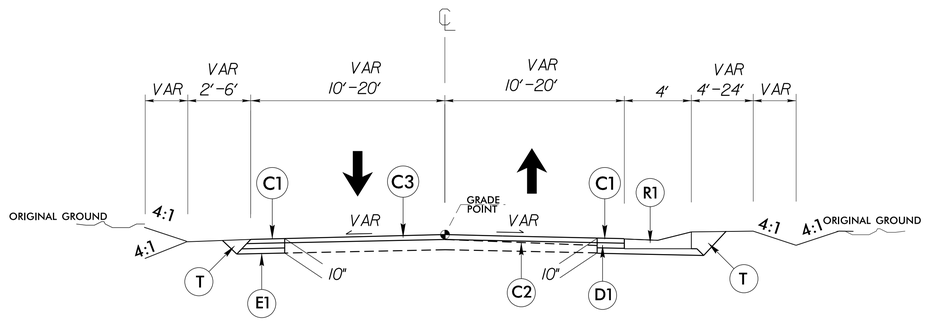


WEDGING DETAIL



TYPICAL SECTION NO. 4

–Y– STA. 13+50.33 TO STA 13+83.21
–Y– STA. 15+47.32 TO 15+61.00



TYPICAL SECTION NO. 5

–Y– STA. 13+13+81.21 TO STA 15+47.32

AS NEEDED TO TIE TO –L– PROFILE RIGHT OF CENTER LINE –Y– STA. 13+83.21 TO 15+47.32

PROJECT NOTES

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T	EARTH MATERIAL
U	EXISTING PAVEMENT

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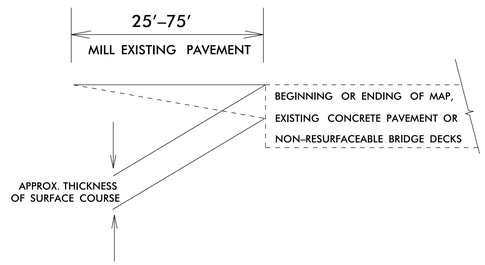

PROJECT REFERENCE NO.	SHEET NO.
W–5601DM	3B

SUMMARY OF EARTHWORK

IN CUBIC YARDS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCL. EXCAV.	ROCK	UNDER–CUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 25%		ROCK	SUITABLE	UNSUIT.	TOTAL
10+25 (–L–)	21+00 (–L–)	4087				4087	99		99	124			3963		3963
13+50 (–Y–)	15+60 (–Y–)	237				237	70		70	88			150		150
10+10 (–DRV1–)	10+50 (–DRV1–)	170				170							170		170
10+10 (–DRV2–)	10+40 (–DRV2–)	66				66							66		66
TOTALS		4560				4560	169		169	212			4349		4349
GRAND TOTALS		4560				4560	169		169	212			4348		4348
SAY													4600		

D6CAD293566

COMPUTED BY: ECM DATE: 10/26/15

CHECKED BY: ges DATE: 04/07/2016

PROJECT NO.	SHEET NO.
W-5601DM	3-D

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

LINE & STATION / SIZE / THICKNESS OR GAUGE	OFFSET		STRUCTURE NUMBER FROM	STRUCTURE NUMBER TO	TOP ELEVATION FT.	INVERT ELEVATION FT.	INVERT ELEVATION FT.	MINIMUM REQUIRED SLOPE %	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC) DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	C. S. PIPE 12 .064	15 .064	18 .064	24 .064		30 .079			36 .079			42 .109	48 .109	54	R. C. PIPE CLASS III 12	15	18	24	30	R. C. PIPE CLASS IV 12	15	18	24	30	DRAINAGE STRUCTURE MASONRY CY	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) 0' THRU 5' EACH	A 5' THRU 10' LIN. FT.	B 10' AND ABOVE LIN. FT.	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E	F	G		D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATES STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28	G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.2	G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840.	G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22	G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.2	G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24	G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.2	G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.2	DRIVEWAY D.I. STD. 840.30	FRAME W/ GRATE FOR DRIVEWAY STD. 840.30	J.B. STD. 840.31 OR STD. 840.32	ANGLED VANE GRATES AND FRAMES STD. 840.3	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	T.B.D.I. FOR STEEL GRATES STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37				BERM DITCH OUTLET STD. 850.10 (PER EACH)	BERM DITCH OUTLET STD. 850.11 (PER EACH)		##" SLUICE GATE (##" SIZE SLUICE GATE)		MODIFIED CONC. FLUME	PREFORMED SCOUR HOLE (PER EACH)	ENERGY DISSIPATION BASIN		FLOWABLE FILL CY	CONCRETE COLLARS CL. "B" STD. 840.72 CY	CONCRETE AND BRICK PIPE PLUG STD. 840.7 CY	PIPE REMOVAL LIN. FT.	REMARKS
L 9+91	20	LT	0401																																				1										1									1	1																									
L 10+30	23	RT	0401A																										28																																																									
L 12+50	20	LT	0402	0401																											260																																																								
L 12+50	20	LT	0402		288.8																																		1										1										1																									
L 13+71	13	LT	0403		295.2																																		1	1.2																			1						1																			
L 13+71	13	LT	0403	0402		289.0	284.0																								124																																																									
L 13+71	13	RT	0404		294.8																																		1																				1						1																			
L 13+71			0404	0403		292.1	289.0																											28																																																									
L 14+02	24	LT	0405		294.8																																		1										1								2																															
			0405	0406		290.0	289.5																								12																																																									
L 14+00	13	LT	0406		295.8																																		1	1.3																			1						1																			
			0406	0403		289.5	289.0																													32																																																						
L 15+19	25	LT	0406A																										60																																																									
L 17+27	23	LT	0407		297.0																																		1																					1	30																								Paid for in Linear Feet
			0407	0408		293.5	293.0																					28																																																											
L 17+27	13	LT	0408		296.3																																		1																				1						1																			
			0408	0410		293.3	288.0																											164																																																								
L 17+50	13	RT	0409		295.8																																		1																				1						1																			
			0409	0414		293.1	289.0																											144																																																								
L 18+88	13	LT	0410		291.9																																		1																				1						1																			
			0410	0413		288.0	282.0																												144																																																							
Y 13+74	20	RT	0411			289.3																																																																																		
			0411	0412		289.3	288.3																							16																																																									
Y 13+86	13	RT	0412		291.3																																		1																				1						1																			
			0412	0410		288.3	288.0																							60																																																								
L 18+90	13	RT	0414		291.8																																		1																				1						1																			
			0414	0415		289.0	282.0																											120																																																								
Y 15+40	13	RT	0415		284.8																																		1																				1						1																			
			0415	0416		282.0	281.7																						32																																																									
SHEET TOTALS																												28	120	76	396			456	144	32			13	2.5									3								2	1	11	1	30				9																			
PROJECT TOTALS																												28	120	76	396			456	144	32			13	2.5									3								2	1	11	1	30				9																			

ABBREVIATIONS

C.A.A.	CORRUGATED ALUMINIUM ALLOY
C.B.	CATCH BASIN
C.S.	CORRUGATED STEEL
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
H.D.P.E.	HIGH DENSITY POLYETHYLENE
J.B.	JUNCTION BOX
M.H.	MANHOLE
N.S.	NARROW SLOT
P.V.C.	POLYVINYL CHLORIDE
R.C.	REINFORCED CONCRETE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX
W.S.	WIDE SLOT

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

EASEMENT REVISED ON PARCELS 1,2 & 3,4 NOVEMBER 2015

8/17/99

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$$$$USERNAME$$$$

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "SS-4906BZ BL-1"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 631814.771(ft) EASTING: 2098216.370(ft)
ELEVATION: 280.60(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99987223
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"SS-4906BZ BL-1" TO -L- STATION 9+80.00 IS
N73°46'4"E AT 73.60'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

–L–

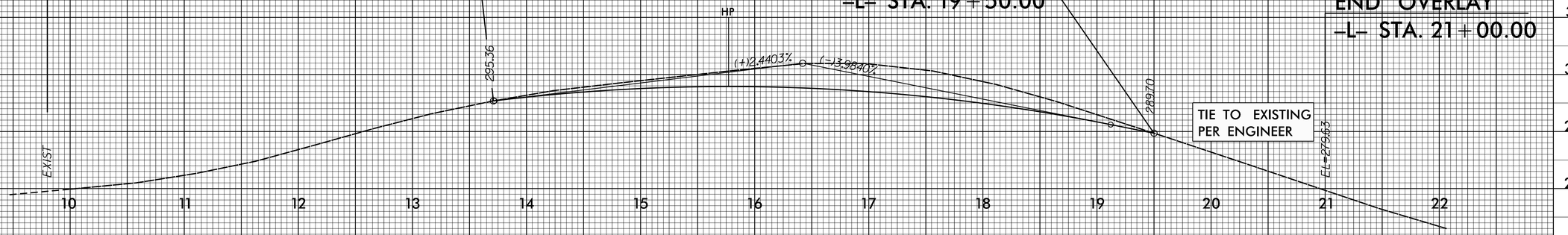
BEGIN OVERLAY
–L– STA. 9+80.00

END OVERLAY
BEGIN GRADE
–L– STA. 13+71.00

PI = 16+42.00
EL = 301.97'
VC = 540'
K = 84

END GRADE
BEGIN OVERLAY
–L– STA. 19+50.00

END OVERLAY
–L– STA. 21+00.00



TIE TO EXISTING
PER ENGINEER

–DRV1–

SEE CROSS SECTION STA. 17+00 FOR DRWY PROFILE

–DRV2–

SEE CROSS SECTION STA. 16+75 FOR DRWY PROFILE

SEE SHEET 4 FOR PLAN

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	6

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BEGIN OVERLAY GRADE
-Y- STA. 13+50.33
EL=292.51

END OVERLAY GRADE
-Y- STA. 15+61.00
EL=284.42

390
380
370
360
350
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200
190

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00

11 12 13 14 15 16 17

-Y-

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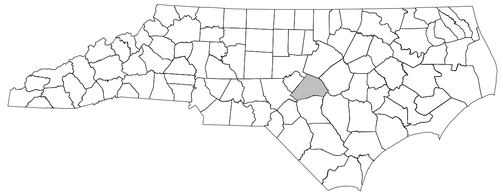
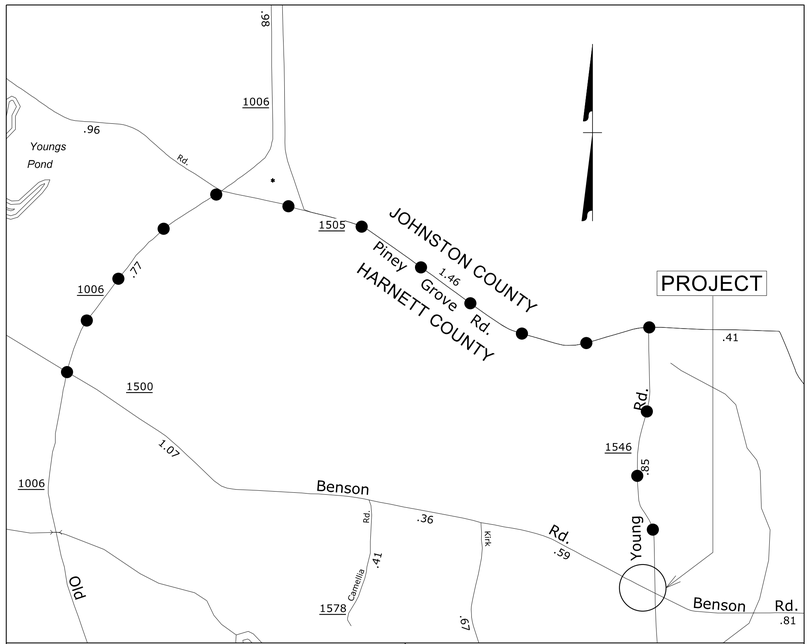
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

HARNETT COUNTY





VICINITY MAP | **DETOUR**

INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, INDEX OF SHEETS AND LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS
TMP-1A	TRANSPORTATION OPERATIONS PLAN: (GENERAL NOTES AND TEMPORARY TRAFFIC CONTROL PHASING
TMP-2	SPECIAL SIGN DESIGN
TMP-3	OFF-SITE DETOUR ROUTE AND BARRICADE PLACEMENT

ROADWAY STANDARD DRAWINGS

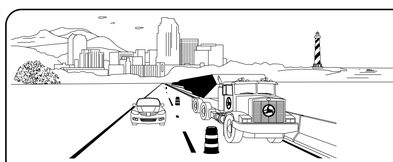
THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C.,DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD.NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUM
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGING DEVICES
1180.01	SKINNY-DRUM
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS

SHEET NO.
TMP-1

W-5601DM

TIP PROJECT:



WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

N.C.D.O.T. WORK ZONE TRAFFIC CONTROL
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)
PHONE: (919) 773-2800 FAX: (919) 771-2745

J. S. BOURNE, P.E. — *STATE TRAFFIC MANAGEMENT ENGINEER*
STEVE KITE, P.E. — *TRAFFIC CONTROL PROJECT ENGINEER*
DON A. PARKER, P.E. — *TRAFFIC CONTROL PROJECT DESIGN ENGINEER*
SPENCER JENNINGS — *TRAFFIC CONTROL DESIGN ENGINEER*

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

APPROVED: DocuSigned by: Don A. Parker 4DD4828626184 1D...

DATE: 4/11/2016

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A. PARKER

4/11/2016
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User:sbjennings

PROJ. REFERENCE NO.	SHEET NO.
W-5601DM	TMP-1A

GENERAL NOTES

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

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

LANE AND SHOULDER CLOSURE REQUIREMENTS

A) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

B) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

C) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

E) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

PAVEMENT EDGE DROP OFF REQUIREMENTS

F) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

G) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) 500 FT IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

I) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

J) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

K) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

L) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

M) INSTALL BLACK ON ORANGE "DIP" SIGNS (W8-2) AND/OR "BUMP" SIGNS (W8-1) 100 FT IN ADVANCE OF THE UNEVEN AREA, OR AS DIRECTED BY THE ENGINEER.

TRAFFIC CONTROL DEVICES

N) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT, 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

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

PAVEMENT MARKINGS AND MARKERS

P) INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY PAVEMENT MARKERS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
ALL ROADS	PAINT	NA

Q) PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INITIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.

R) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

S) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

PHASING

NOTE: MAINTAIN ACCESS TO RESIDENCES AT ALL TIMES WITHIN PROJECT LIMITS

STEP 1:
INSTALL ADVANCED WORK ZONE WARNING SIGNS ON SR 1546 (YOUNG RD) AS REQUIRED IN THE GENERAL NOTES.(RSD 1101.01, SHEET 3 OF 3)

STEP 2:
USING RSD 1101.03, SHEET 1 OF 9, AND SHEET TMP-3, INSTALL DETOUR SIGNS, PLACE TYPE III BARRICADES TO CLOSE SR 1500 (BENSON RD) TO THROUGH TRAFFIC AND DETOUR TRAFFIC OFF-SITE.

STEP 3:
AWAY FROM TRAFFIC, CONSTRUCT -L- (SR 1500) FROM BEGINNING OF PROJECT TO -Y- (SR 1546) UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE. PLACE TEMPORARY PAVEMENT MARKINGS IN FINAL PATTERN AND TIE TO EXISTING PAVEMENT MARKINGS. (SEE ROADWAY PLANS)

USING RSD 1101.02, SHEET 1 OF 15, CONSTRUCT -Y- (SR 1546) AND -L- FROM -Y- TO END OF PROJECT, UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE. PLACE TEMPORARY PAVEMENT MARKINGS IN FINAL PATTERN AND TIE TO EXISTING PAVEMENT MARKINGS. (SEE ROADWAY PLANS)

STEP 4:
REMOVE ALL ROAD CLOSURE AND DETOUR SIGNING AND OPEN SR 1500 (BENSON ROAD) TO PROPOSED TRAFFIC PATTERN.

STEP 5:
USING RSD 1101.02, SHEET 1 OF 15, PLACE FINAL LAYER OF SURFACE COURSE AND FINAL PAVEMENT MARKINGS. REMOVE REMAINING TRAFFIC CONTROL DEVICES.

APPROVED: Don A. Parker
DocuSigned by: 4DD48286261841D...
DATE: 4/11/2016

NORTH CAROLINA PROFESSIONAL SEAL 043251 ENGINEER DON A PARKER

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

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TRANSPORTATION OPERATIONS PLAN

4/11/2016
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User:sbjennings

PROJ. REFERENCE NO.	SHEET NO.
W-5601DM	TMP-2

SIGN NUMBER: SS-5906BZ
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 3′-6″
HEIGHT: 2′-0″
TOTAL AREA: 7.0 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.38″
WIDTH: 1″
RADII: 3″

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.080″ (2.0 mm) ALUMINUM

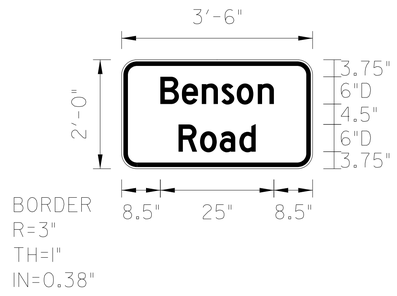
USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

DESIGN BY: none
PROJECT ID: ID

CHECKED BY:
LOCATION:

Nov 09, 2015
DIV: 06



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

																											Series/Size Text Length
		B	e	n	s	o	n																				D 2000
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		R	o	a	d																						D 2000
	12.5	4.7	4.3	4.3	3.6	12.5																					17

FILENAME: SS-4906BZ_Sgn_SGN_Benson Rd

NORTH CAROLINA D.O.T. SIGN DETAIL

4/11/2016

APPROVED: DocuSigned by: Ayman Alqudwah F32AC5CAF965472...

DATE: 4/11/2016

NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER AYMAN I ALQUDWAH

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DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

SPECIAL SIGN DESIGN

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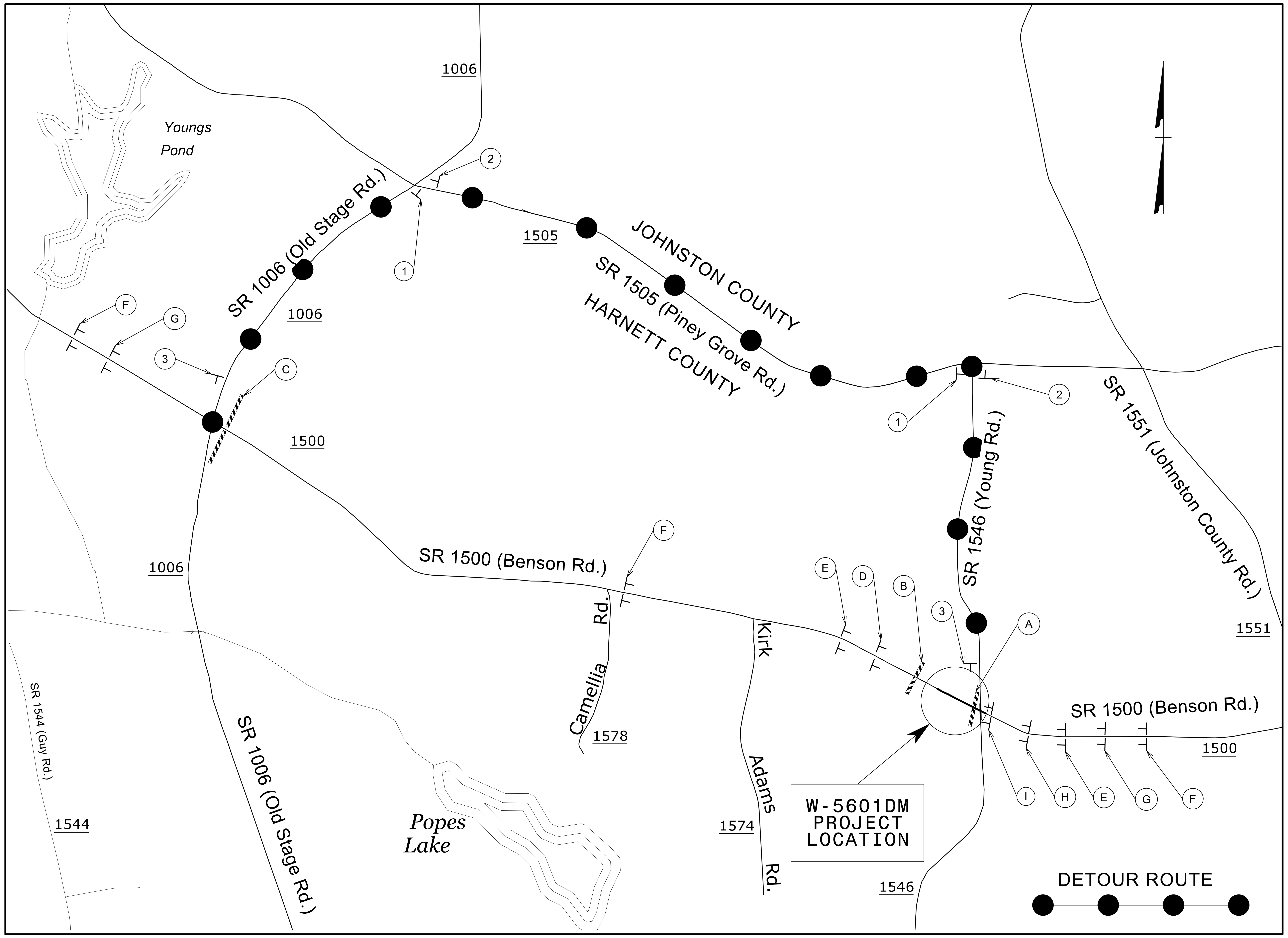
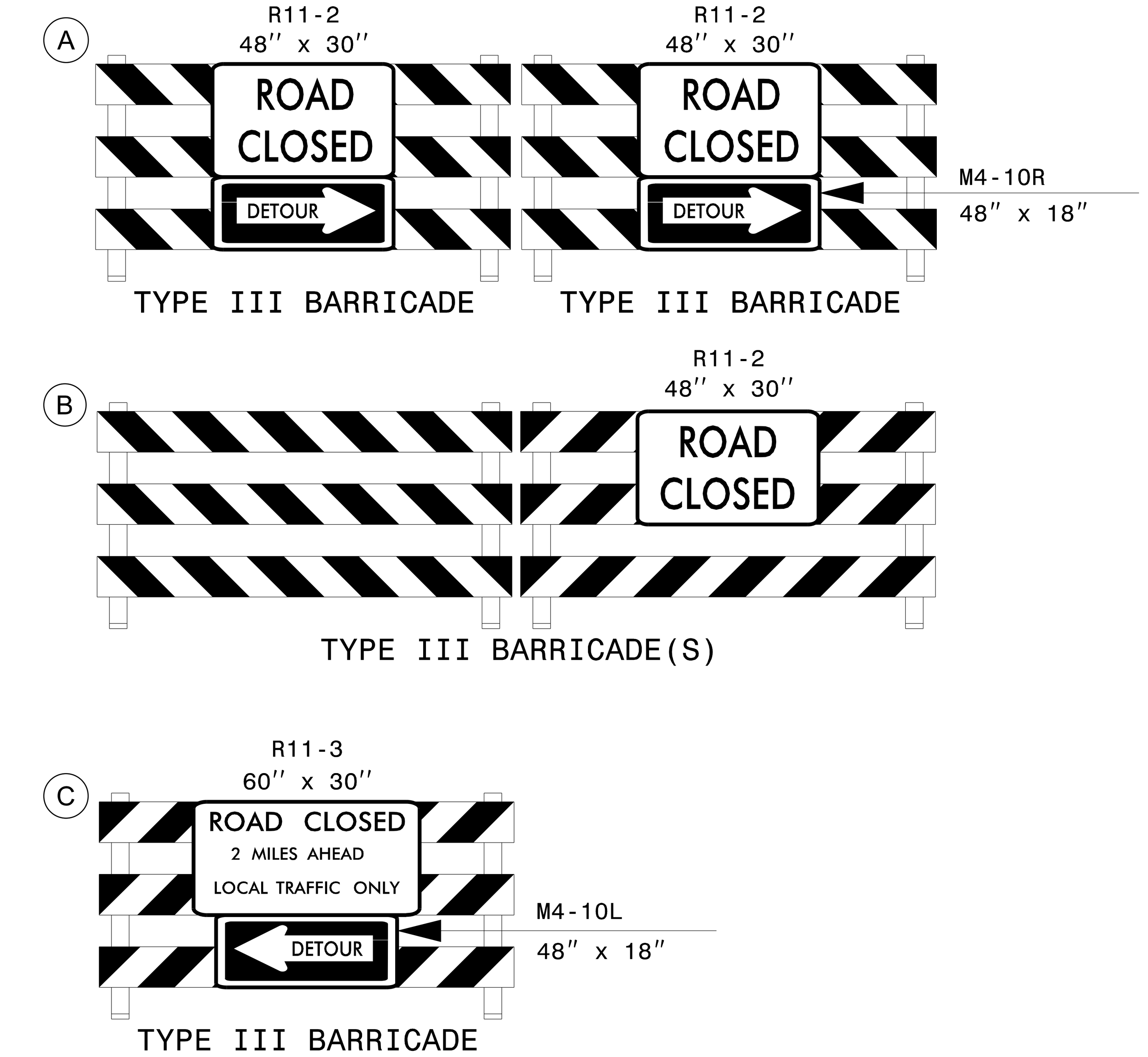
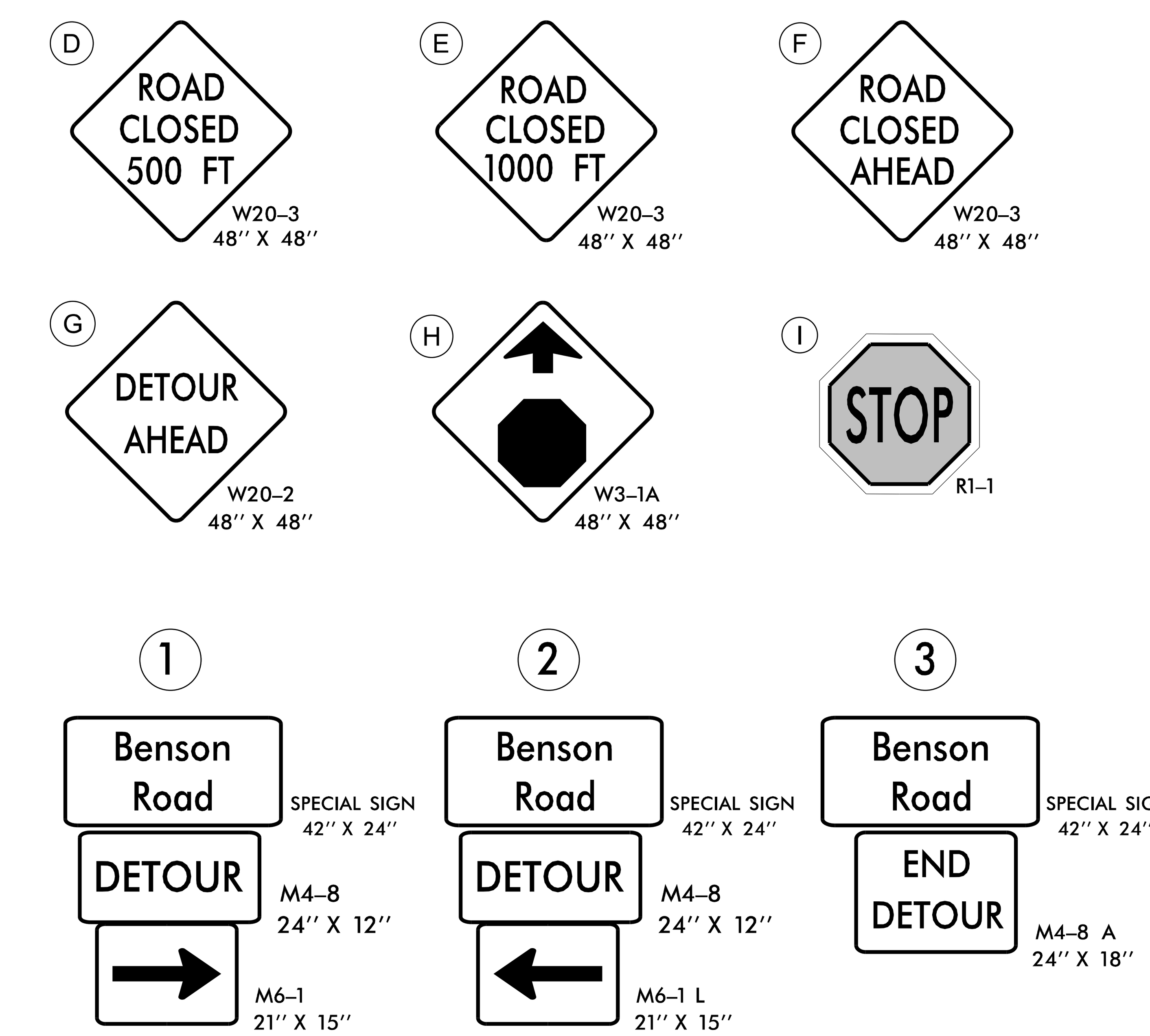






LEGEND

TRAFFIC CONTROL DEVICES

BARRICADE (TYPE III)

TEMPORARY SIGNING

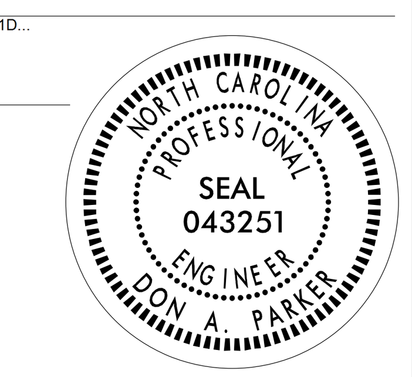
STATIONARY SIGN

NOTES:
TRAFFIC CONTROL DEVICES (A) THROUGH (I) SHALL BE INSTALLED ACCORDING TO RSD 1101.03, SHEET 1 AND 2 OF 9.

TRAFFIC CONSTROL DEVICES (1) THROUGH (3) SHALL BE INSTALLED AS SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER.

APPROVED: Don A. Parker

DATE: 4/11/2016



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DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

OFF-SITE DETOUR ROUTE AND BARRICADE PLACEMENT

4/11/2016
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09/08/99

TIP PROJECT: W-5601DM /SS-4906BZ

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

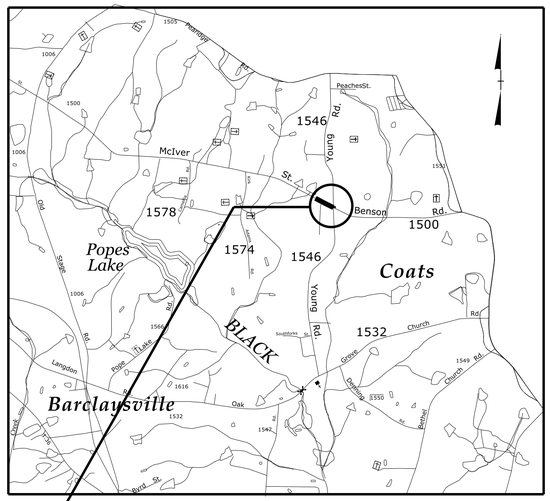
STATE	T.I.P. NO.	SHEET NO.
N.C.	W-5601DM	UC-1

HARNETT COUNTY

PRELIMANARY UC PLANS FOR BIDDING ONLY

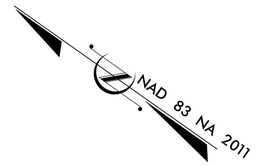
LOCATION: SR 1500 (BENSON RD) AT SR 1546 (YOUNG RD)

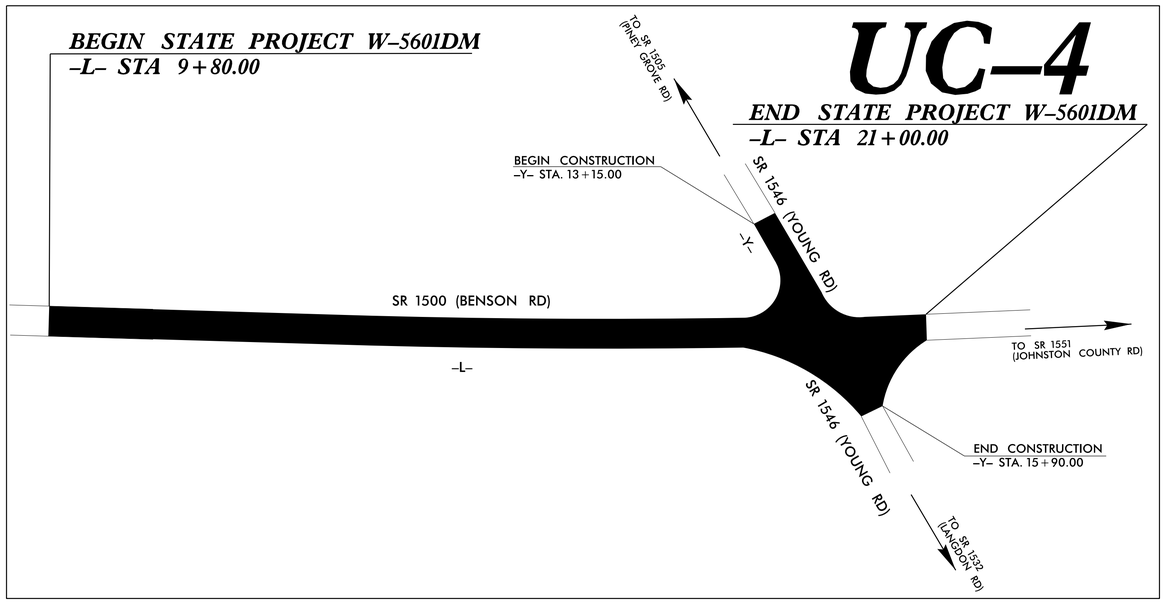
TYPE OF WORK: WATER LINE RELOCATION



PROJECT LIMITS TIP W-5601DM

VICINITY MAP NOT TO SCALE





GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 2,400
ADT 2035 = 4,350
D = 50 %
V = 55 MPH

HARNETT COUNTY OWNES THE WATER LINE

Prepared in the Office of:
DIVISION OF HIGHWAYS
431 Transportation Drive, Fayetteville, NC 28301

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
AUGUST 2015

LETTING DATE:
MAY 18, 2016

SEAN MATUSZEWSKI
PROJECT ENGINEER

RICK HANDLIN
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	UC-2

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Item	Symbol
Water Line (Sized as Shown)	12" WL
11¼ Degree Bend	
22½ Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	GV
Butterfly Valve	BV
Tapping Valve	TGV
Line Stop	LS
Line Stop with Bypass	LS/BP
Blow Off	BO
Fire Hydrant	PFH
Relocate Fire Hydrant	RFH
Remove Fire Hydrant	REM FH
Water Meter	PWM
Relocate Water Meter	RWM
Remove Water Meter	REM WM
Water Pump Station	PS(W)
RPZ Backflow Preventer	PRPZ
DCV Backflow Preventer	PBFP
Relocate RPZ Backflow Preventer	RRPZ
Relocate DCV Backflow Preventer	RBFP

PROPOSED SEWER SYMBOLS

Item	Symbol
Gravity Sewer Line (Sized as Shown)	12" SS
Force Main Sewer Line (Sized as Shown)	12" FSS
Manhole (Sized per Note)	
Sewer Pump Station	PS(SS)

PROPOSED MISCELLANOUS UTILITIES SYMBOLS

Item	Symbol
Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	TEL PED
Utility Line by Others (Type as Shown)	PROP O/H POW LINES
Trenchless Installation	12" TL INSTALL
Encasement by Open Cut	24" ENCAS BY OC
Encasement	24" ENCASEMENT
Thrust Block	
Air Release Valve	AR
Utility Vault	UV
Concrete Pier	CP
Steel Pier	SP
Plan Note	NOTE
Pay Item Note	PAY ITEM

EXISTING UTILITIES SYMBOLS

Item	Symbol
Power Pole	
Telephone Pole	
Joint Use Pole	
Utility Pole	
Utility Pole with Base	
H-Frame Pole	
Power Transmission Line Tower	
Water Manhole	
Power Manhole	
Telephone Manhole	
Sanitary Sewer Manhole	
Hand Hole for Cable	
Power Transformer	
Telephone Pedestal	
CATV Pedestal	
Gas Valve	
Gas Meter	
Located Miscellaneous Utility Object	
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.
*Underground Power Line	
*Underground Telephone Cable	
*Underground Telephone Conduit	
*Underground Fiber Optics Telephone Cable	
*Underground TV Cable	
*Underground Fiber Optics TV Cable	
*Underground Gas Pipeline	
Aboveground Gas Pipeline	A/G Gas
*Underground Water Line	
Aboveground Water Line	A/G Water
*Underground Gravity Sanitary Sewer Line	SS
Aboveground Gravity Sanitary Sewer Line	A/G Sanitary Sewer
*Underground SS Forced Main Line	
Underground Unknown Utility Line	?UTL
SUE Test Hole	
Water Meter	
Water Valve	
Fire Hydrant	
Sanitary Sewer Cleanout	

*For Existing Utilities

Item	Symbol
Utility Line Drawn from Record (Type as Shown)	
Designated Utility Line (Type as Shown)	

REV: 2/1/2012

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	UC-3

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
REVISED:

NORTH CAROLINA
DEPARTMENT OF
TRANSPORTATION

UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

UTILITY CONSTRUCTION
PLANS ONLY

UTILITY CONSTRUCTION

UTILITY CONSTRUCTION

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2012.

2. THE EXISTING UTILITIES BELONG TO HARNETT COUNTY PUBLIC UTILITIES .

3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES, DIVISION OF ENVIRONMENTAL HEALTH. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, DIVISION OF WATER QUALITY. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.

4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.

5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND TWO WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.

7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.

8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.

9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

PRELIMANARY UC PLANS
FOR BIDDING ONLY

5/14/99

19-APR-2016 14:09
on Rd at Young Rd\UC\W-5601DM Prelim UC plans\W-5601DM_ut_notes_UC03_psh.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	UC-3A
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

UTILITY CONSTRUCTION

PRELIMANARY UC PLANS FOR BIDDING ONLY

PROJECT SPECIFIC NOTES (WATER LINES)

The Utility Contractor shall notify Harnett County Department of Public Utilities (HCDPU) at least two weeks prior to construction commencing.

The Utility Contractor must schedule a pre-construction conference with Mr. Alan Moss, HCDPU Utility Construction Inspector at least two weeks prior to construction and the Utility Contractor must coordinate with HCDPU for regular inspection visitations and acceptance of the water system(s). Construction work shall be performed during the normal working hours of HCDPU which is 8:00 am 5:00 pm Monday through Friday. Holiday, night and weekend work shall only be done in extreme cases.

The Professional Engineer (PE) shall obtain and provide the NCDENR "Authorization to Construct"permit to the Utility Contractor before the construction of the water line shall begin. The Utility Contractor must post a copy of the NCDENR "Authorization to Construct"permit issued by the North Carolina Department of Environment and Natural Resources Division of Environmental Health, Public Water Supply Section (NCDENR-DEH,PWSS) on site prior to the start of construction. The permit must be maintained on site throughout the entire construction process of the proposed water lines that will serve this project.

The Professional Engineer (PE) shall provide HCDPU and the Utility Contractor with a set of NCDENR approved plans marked "Released For Construction"two weeks prior to construction commencing.

The Utility Contractor shall provide NCDOT and HCDPU Utility Construction Inspector material submittals and shop drawings for all project materials prior to the construction of any water lines, and associated water services. The materials to be used on the project must meet NCDOT Standard Specifications and the Project Special Provisions and be approved by the Engineer of Record prior to construction. All substandard materials or materials not approved for use by Harnett County and NCDOT found on the project site must be removed immediately when notified by the HCDPU Utility Construction Inspector.

The water main(s) all associated appurtenances shall be constructed in strict in accordance with NCDOT Standard Specifications and Project Special Provisions. The Utility Contractor shall be responsible to locate the newly installed water main(s) and all associated appurtenances for other utility companies and their contractors until the new water main(s) have been approved by the North Carolina Department of Environment and Natural Resources Division of Environmental Health, Public Water Supply Section (NCDENR-DEH, PWSS) and accepted by HCDPU.

Prior to acceptance, all services will be inspected to insure that they are installed at the proper depth. All relocated meter boxes must be flush with the ground level at finish grade and the relocated meter setters must be a minimum of 8" below the meter box lid. Meter setters shall be centered in the meter box and supported by brick, block or stone.

The Contractor shall provide the Engineer four (4) 24" x 36" bond prints and (1) 24" x 36" mylar prints of the "As-Built Record Drawings" signed and sealed by a Registered Professional Engineer "marked Record Drawings". Any field changes that were made during construction shall be properly documented in the "As-Built Record drawings". The " As-Built Record Drawings" shall include all parcel/lot numbers, water valves, valve markers, water meter setters/meters, meter vaults, fire hydrants, backflow preventers, manholes, sewer cleanouts and air release valves as installed by the contractor.

A digitals copy of the " As-Built Record Drawings" must be submitted to HCDPU in AutoCAD (dwg of dxf) format.

After the final certification has been accepted by NCDENR for the water and sewer line construction the contractor shall provide a warranty for all work and materials for the next 12 months.

Upon the receipt of the final certification, a copy will be forwarded to Mr. Alan Moss, Utility Construction Inspector HCDPU for a final inspection.

All fire hydrants installations in Harnett County must meet all requirements established by the Harnett County Fire Marshal's office. All fire hydrants installations must be inspected by the Harnett County Deputy Fire Marshal. The contractor shall notify the Fire Marshal at (910) 893-7580 once the construction is completed to request a site inspection of all relocated fire hydrants installations.

The Utility Contractor shall provide the Professional Engineer (PE) and HCDPU Utility Construction Inspector a set of red line drawings identifying the complete water system installed. The red line drawings should identify the materials, pipe sizes and approximate depths of the water lines as well as the gate valves, fire hydrants, meter setters, and all associated appurtenances for all water line(s) constructed in Harnett County. The red line drawings should clearly identify any deviations from the NCDENR approved plans. All change orders must be approved by HCDPU and the Professional Engineer (PE) in writing and properly documented in the red line field drawings.

Potable water mains crossing other utilities and non-potable water lines (sanitary sewer, storm sewer, RCP, etc.) shall be laid to provide a minimum vertical distance of twenty-four (24") inches between the potable water main and all other utilities. NCDOT requires the new water mains to be installed under the storm water lines. The potable water main shall be installed with twenty-four (24") inches of vertical separation and with ductile iron pipe.

All water lines 2" and larger shall be PVC SDR 21, 200# WP except where noted on the plans or profiles to use DI water pipe, Class 50.

All DI fittings and pipe restraint are incidental to the water line pay items. Concrete thrust blocking is required at all horizontal fitting in addition to the restraint along the pipe line with restrained retainer glands. At vertical bends use 2-3/4" bituminous coated steel rods between each bend instead of concrete thrust blocking with restrained retainer glands. See plans and profile for restraint lengths.

The relocated meters shall be installed at least one (1') foot inside the right-of-way or PUE and at least three (3') to five (5') feet from the property line between the lots.

The relocated fire hydrants shall be installed one (1') foot inside the right-of-way or PUE.

The Utility Contractor shall use polyethylene tubing SDR-9, 200 #WP for all water meter service lines less than 2".

The water main(s), fire hydrants, gate valves, service lines, meter setters and associated appurtenances must be rated for 200 psi and hydrostatically pressure tested to 200 psi. The hydrostatic pressure test(s) must be witnessed by the HCDPU Utility Construction Inspector. The Utility Contractor must notify HCDPU when they are ready to begin filling in lines and coordinate with Harnett County to witness all pressure testing.

All water mains will be constructed with SDR-21 PVC Pipe or Class 50 Ductile Iron Pipe rated for at least 200 psi or greater as shown on plans. All pipes must be protected during loading, transport, unloading, staging, and installation. PVC pipe must be protected from extended exposure to sunlight prior to installation.

All water mains will be flushed and disinfected in strict accordance with the Harnett County Standard Specifications For Flushing and Disinfection and the Project Special Provisions. All water samples collected for bacteria testing will be collected by the HCDPU Utility Construction Inspector and tested in the HCDPU Laboratory.

HCDPU requires that the Utility Contractor install tracer wire in the trench with all water lines. The tracer wire shall be 12 ga. insulated, solid copper conductor and it shall be terminated at the top of the valve boxes or manholes. No spliced wire connections shall be made underground on tracer wire installed in Harnett County. The tracer wire may be secured with duct tape to the bottom of the pipe before backfilling (See detail drawing). Do not use NCDOT specification concerning tracer wires, use this requirement.

The Utility Contractor shall spot dig to expose each utility pipe or line which may conflict with construction of proposed water line well in advance to verify locations of the existing utilities. The Utility Contractor shall provide both horizontal and vertical clearances to allow the Engineer to adjust the water line design in order to avoid conflicts with existing underground utilities. The Utility Contractor shall coordinate with the utility owner and be responsible for temporary relocation and/or securing existing utility poles, pipes, wires, cables, signs and/or utilities including services in accordance with the utility owner requirements during water line installation, grading and street construction.

The Utility Contractor must call the NC One Call Center at 811 or (800) 632-4949 to verify the location of existing utilities prior to the beginning of construction. Some of the existing utilities shown in these plans are taken from maps furnished by various utility companies and have not been physically located or verified by the P.E. (i.e. TELEPHONE, CABLE, WATER, SEWER, ELECTRICAL POWER, FIBER OPTIC, NATURAL GAS, ETC.). The Utility Contractor will be responsible to repair any and all damages to the satisfaction of the related utility company.

The Engineer of Record is responsible to insure that construction is, at all times, in compliance with accepted approved plans and specifications. No field changes to the approved plans are allowed without prior written approval by HCDPU. A copy of each engineer's field report is to be submitted to HCDPU as each such inspection is made on system improvements or testing is performed by the contractor. Water line infrastructure must pass all tests required by specifications and those of all applicable regulatory agencies. These tests include, but are not limited to: pressure test, bacteriological test, etc. A HCDPU Inspector must be present during testing and all test results shall be submitted to HCDPU. All tests must be satisfied before the final inspection will be scheduled with the HCDPU Inspector. The Engineer of Record must request in writing to schedule the final inspection once all construction is complete. The Engineer and the HCDPU Utility Construction Inspector shall prepare a written list of any defects or deficiencies noted during the final inspection, should any exist. Upon completion of the punch list, the Engineer will schedule another inspection.

Upon receipt of final certification, a copy will be forwarded to Mr. Alan Moss, Utility Construction Inspector HCDPU for a final inspection.

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	UC-3B

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
REVISED:

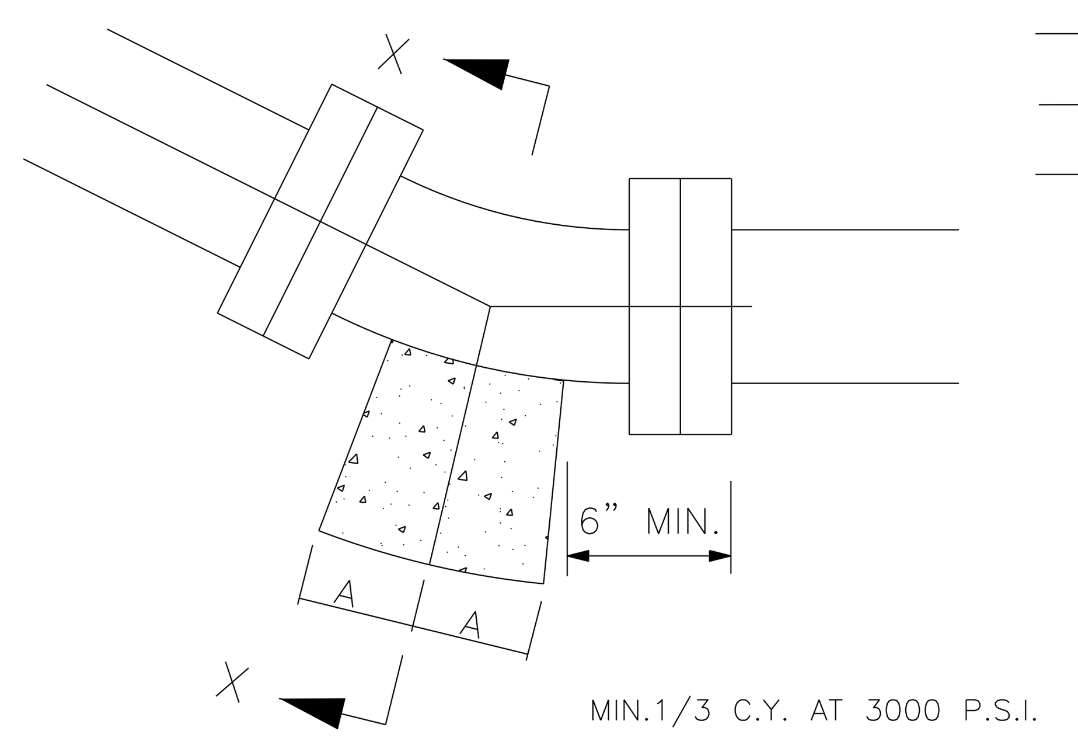
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

UTILITY CONSTRUCTION PLANS ONLY

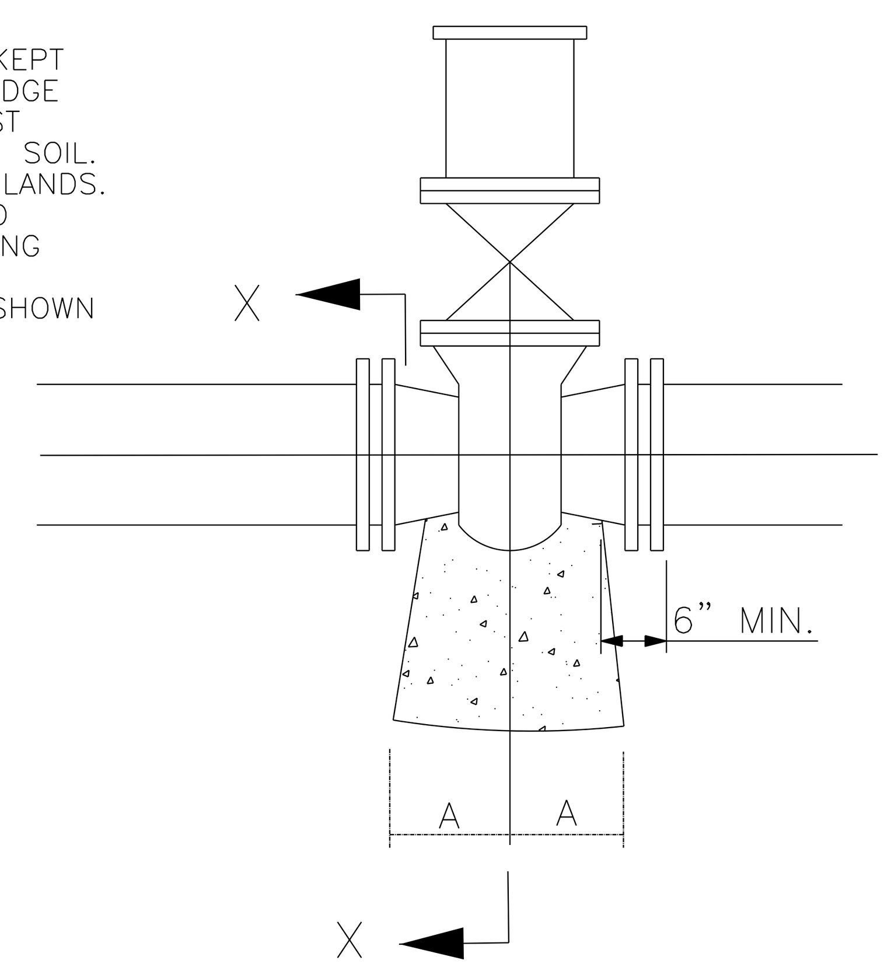
PROJECT TYPICAL DETAILS

PRELIMANARY UC PLANS FOR BIDDING ONLY

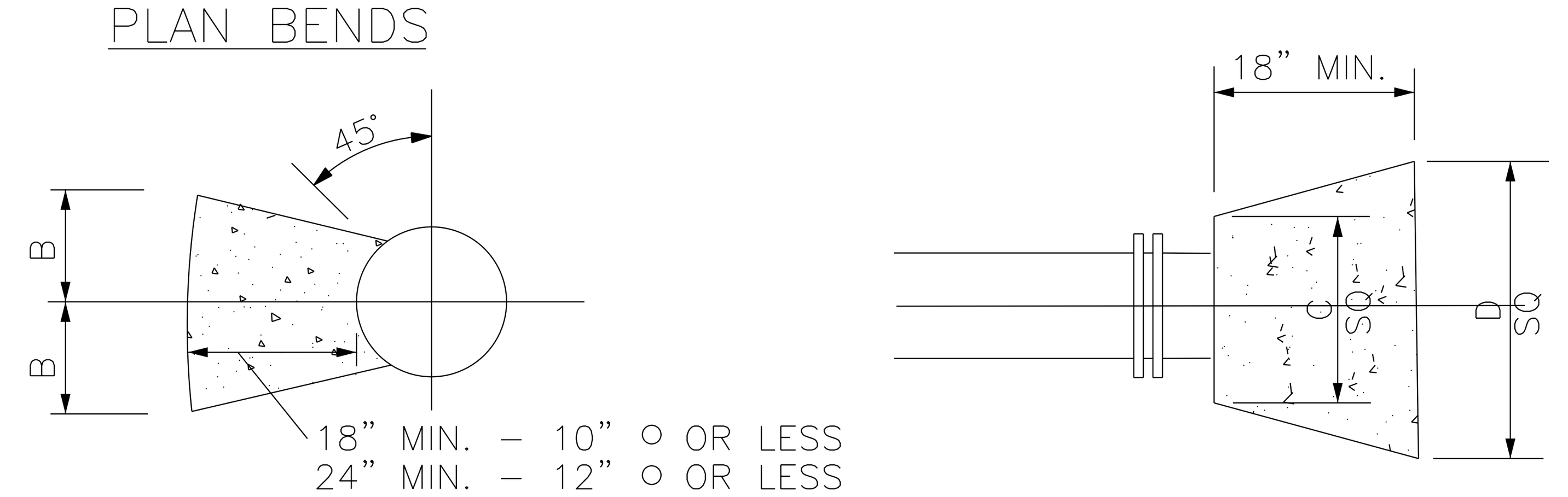
NOTES:
1. CONCRETE SHALL BE 3,000 PSI MIN.
2. CONCRETE FOR THRUST BLOCKING SHALL BE KEPT FAIRLY DRY, THUS MAKING THE CONCRETE WEDGE SHAPE MORE EASILY FORMED WITH THE WIDEST PART (BLOCKING AREA) AGAINST UNDISTURBED SOIL.
3. NO CONCRETE SHALL COVER ANY BOLTS OR GLANDS.
4. ALL PIPING AND ACCESSORIES TO BE WRAPPED WITH 10 MIL. POLYETHYLENE PRIOR TO POURING BLOCKING.
5. VOLUME OF THRUST BLOCKING SHALL BE AS SHOWN ON THE THRUST BLOCKING SCHEDULE.



PLAN BENDS

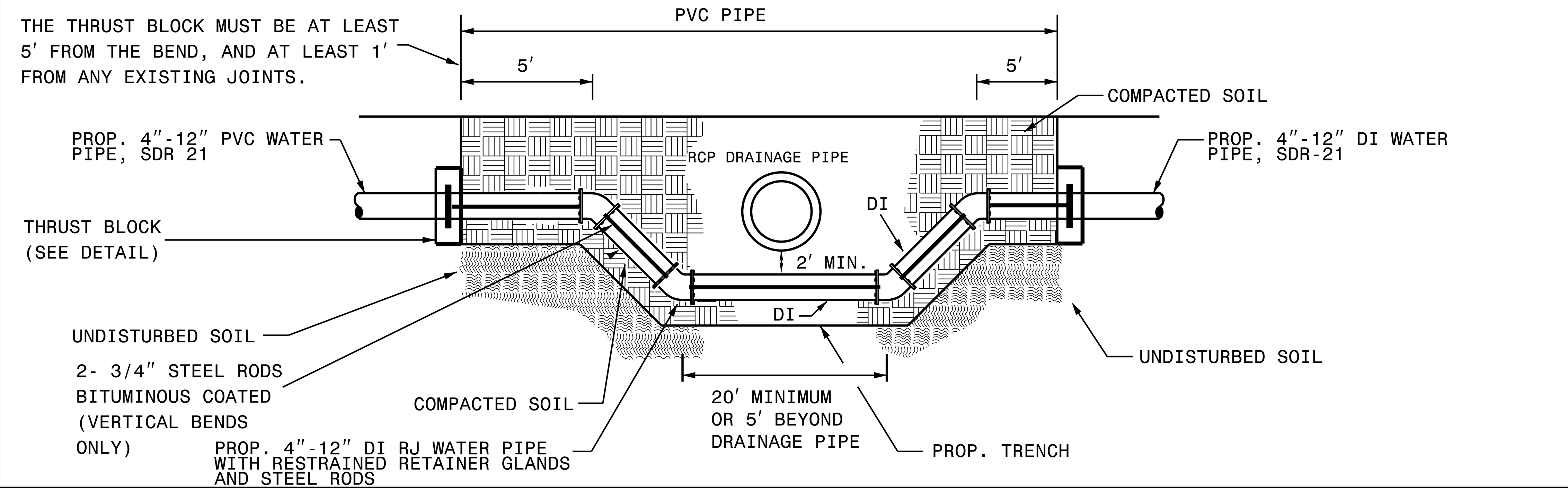


HYDRANT TEE
PLAN TEES

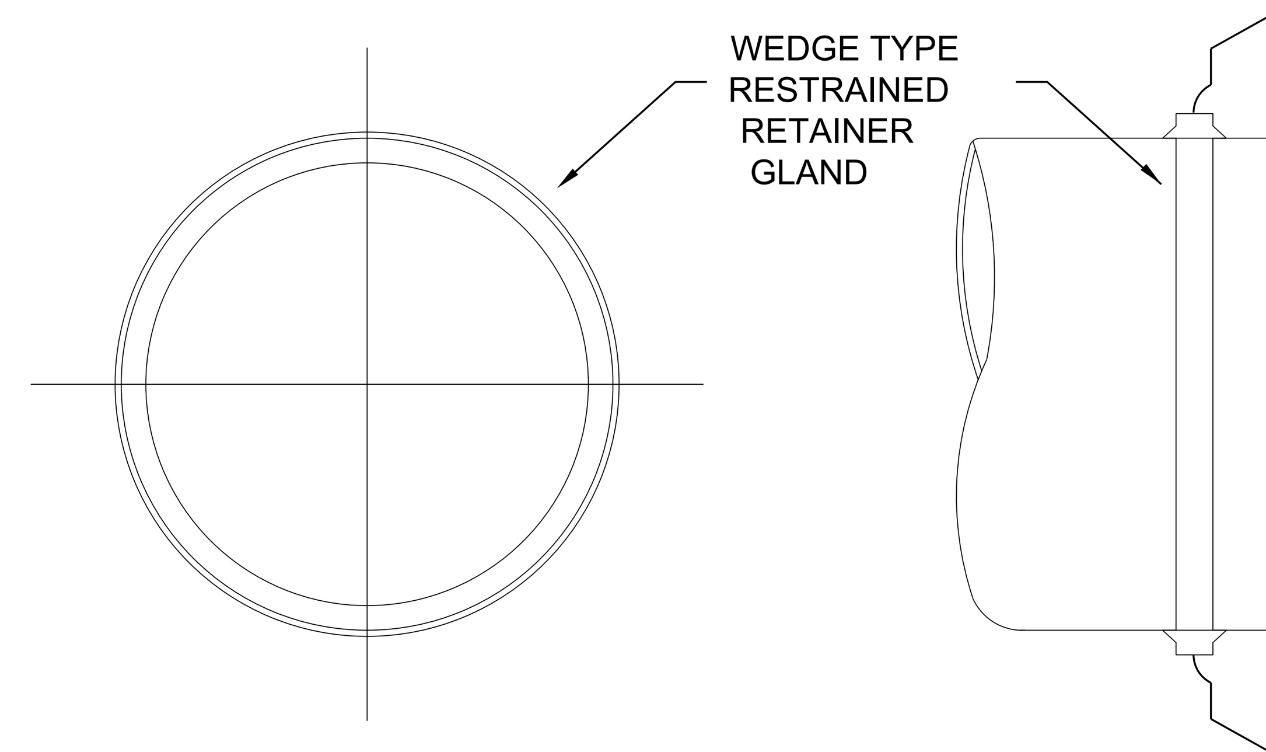


PIPE SIZE	90° BEND		45° BEND		221/2° BEND		11/4° BEND		TEE		PLUG	
	A	B	A	B	A	B	A	B	A	B	C	D
4"	8"	12"	8"	8"	6"	6"	6"	6"	8"	9"	10"	16"
6"	10"	12"	8"	10"	8"	8"	8"	8"	10"	10"	12"	18"
8"	15"	13"	10"	10"	8"	8"	8"	8"	10"	12"	12"	24"
10"	16"	14"	10"	12"	6"	10"	6"	10"	11"	14"	14"	25"
12"	20"	16"	12"	14"	8"	12"	8"	12"	14"	16"	16"	30"
14"	22"	18"	14"	16"	10"	14"	10"	14"	16"	18"	18"	34"
16"	26"	20"	16"	18"	12"	16"	12"	16"	18"	20"	20"	36"

THRUST BLOCK DETAIL (15)
NO SCALE

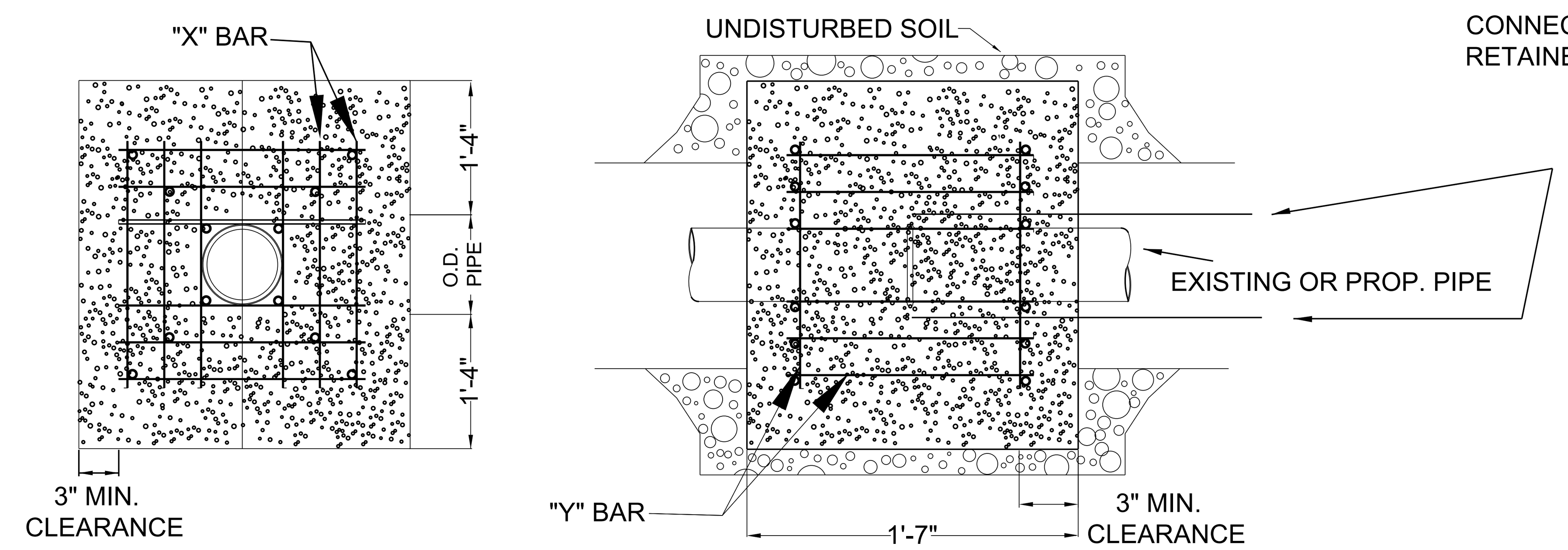


WATER PIPE CROSSING STORM DRAIN



EXISTING OR PROP. PIPE
(PVC OR DI TIGHTEN WEDGES)

(AC PIPE DO NOT TIGHTEN WEDGES)



CONNECT THRUST RODS TO RESTRAINED RETAINER GLADS

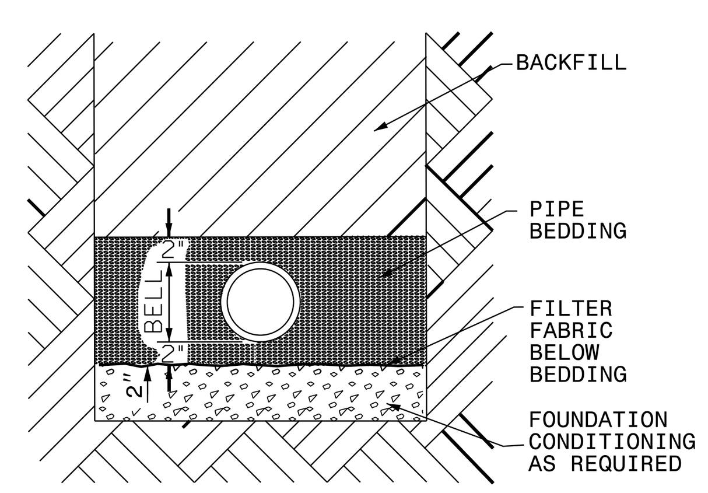
CONNECT THRUST RODS TO BEND

REINFORCING REQUIREMENTS

REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24, Y-12

NOTES:
1. CONCRETE SHALL BE 3000 PSI AND TRANSIT MIXED.
2. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH.
4. BACKFILL TAMPED IN 6" LIFTS.

TRENCH DETAIL



PLACE FOUNDATION CONDITIONING MATERIAL BELOW BEDDING IF REQUIRED, AS DIRECTED BY ENGINEER. PIPE BEDDED IN SELECT MATERIAL, CLASS IV. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROX. 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	UC-3C

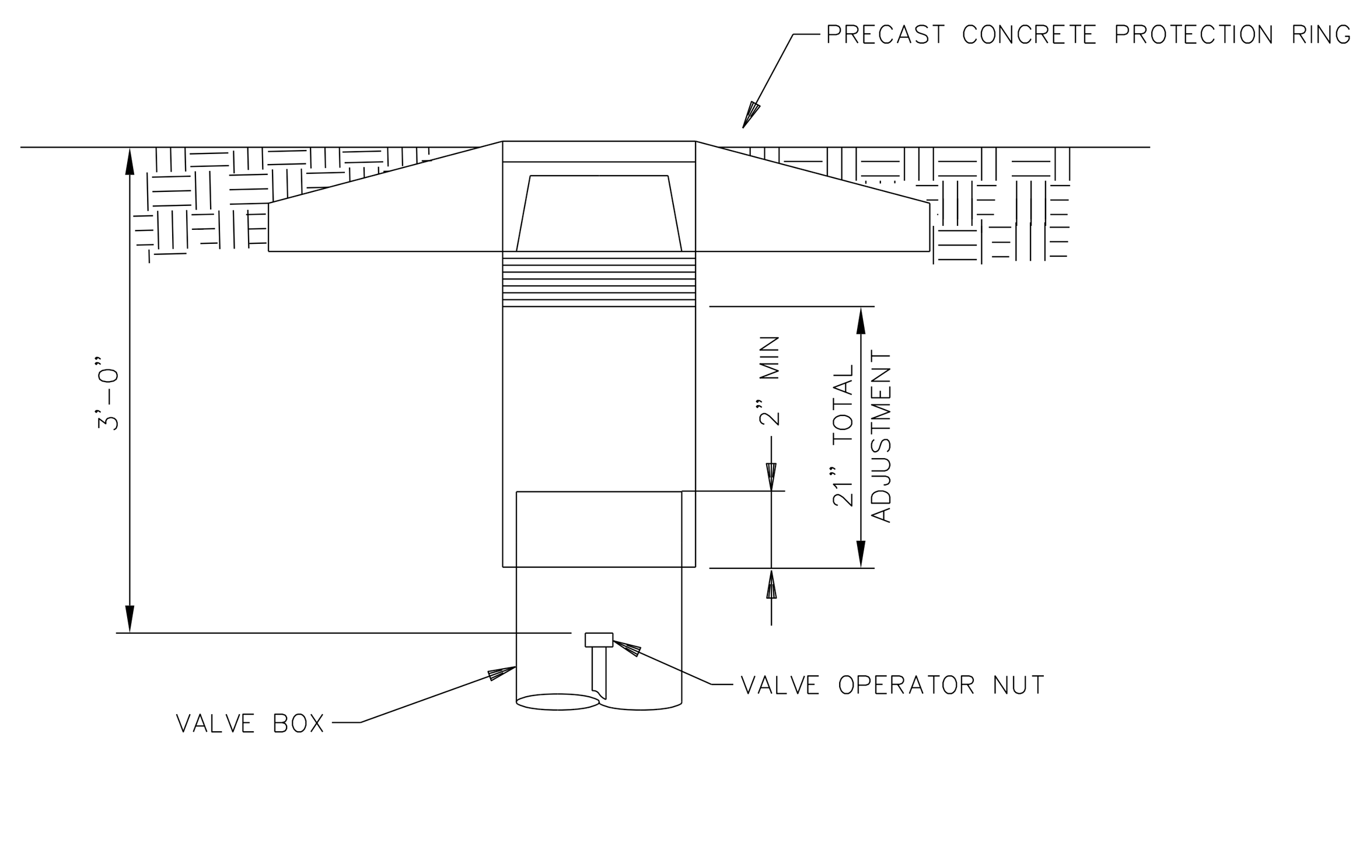
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
REVISED:

NORTH CAROLINA
DEPARTMENT OF
TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE:(919)707-6690
FAX:(919)250-4151

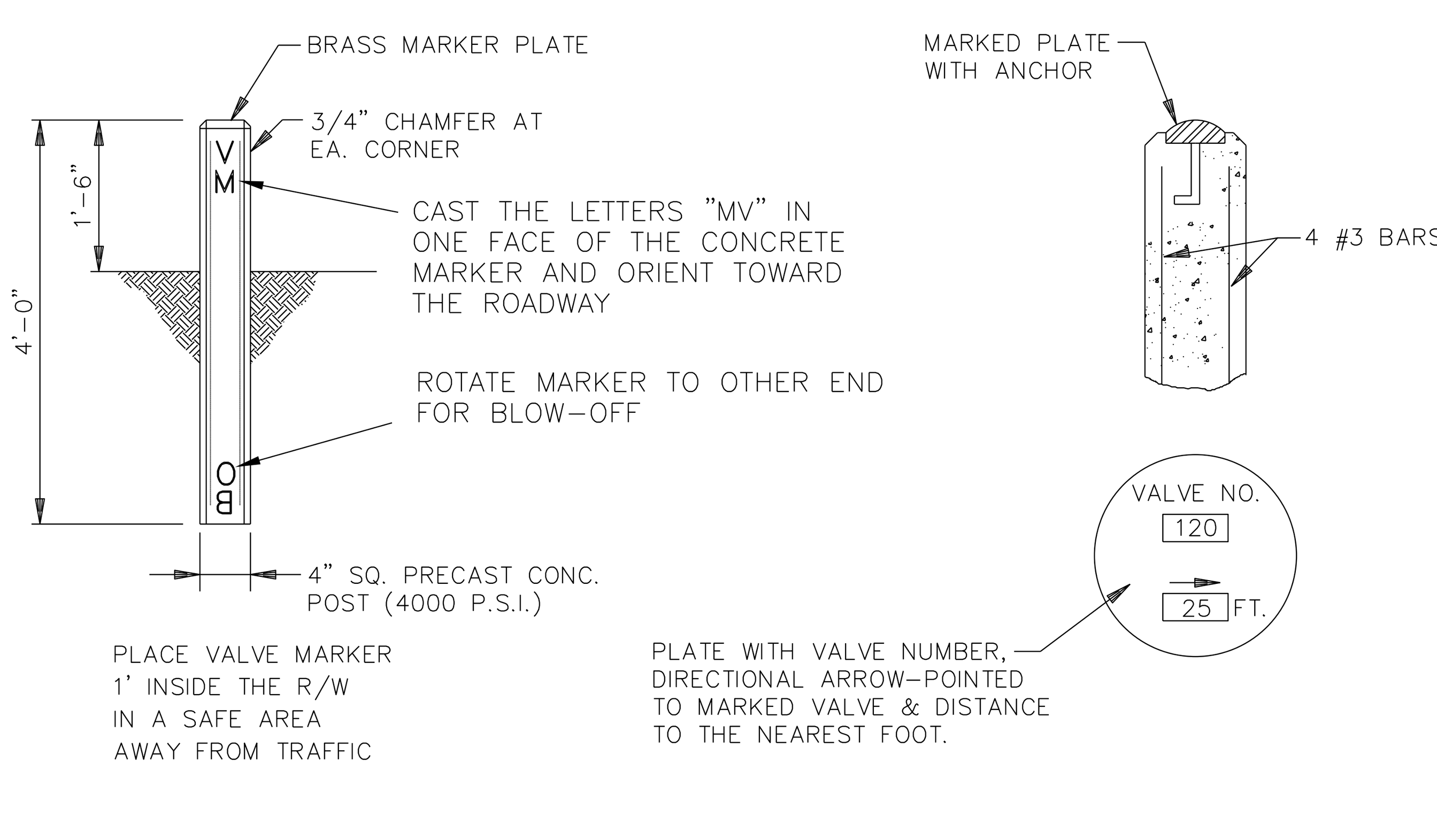
UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

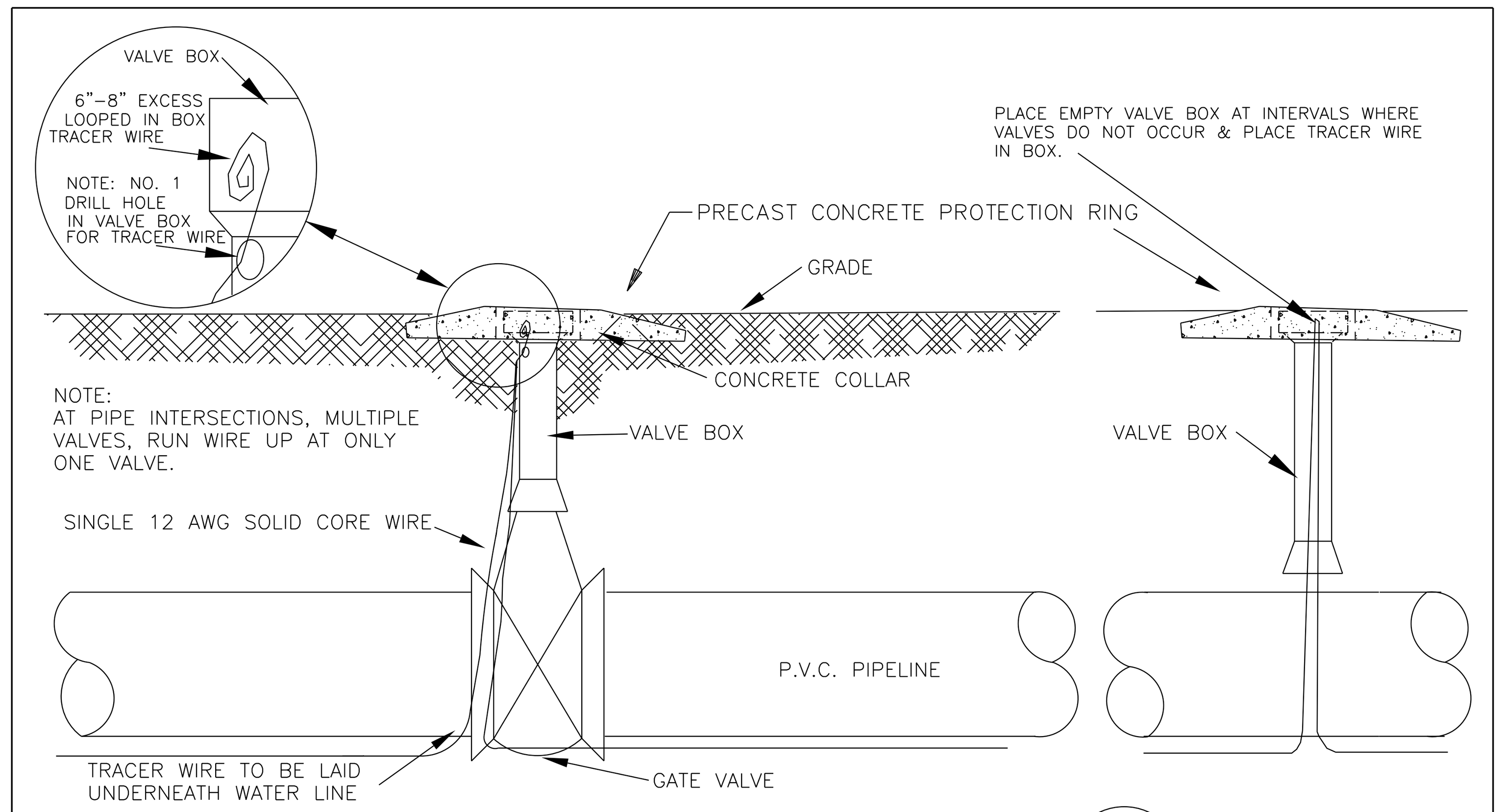
PRELIMANARY UC PLANS FOR BIDDING ONLY



TYPICAL VALVE BOX DETAIL 2
NO SCALE



VALVE MARKER DETAIL 1
NO SCALE

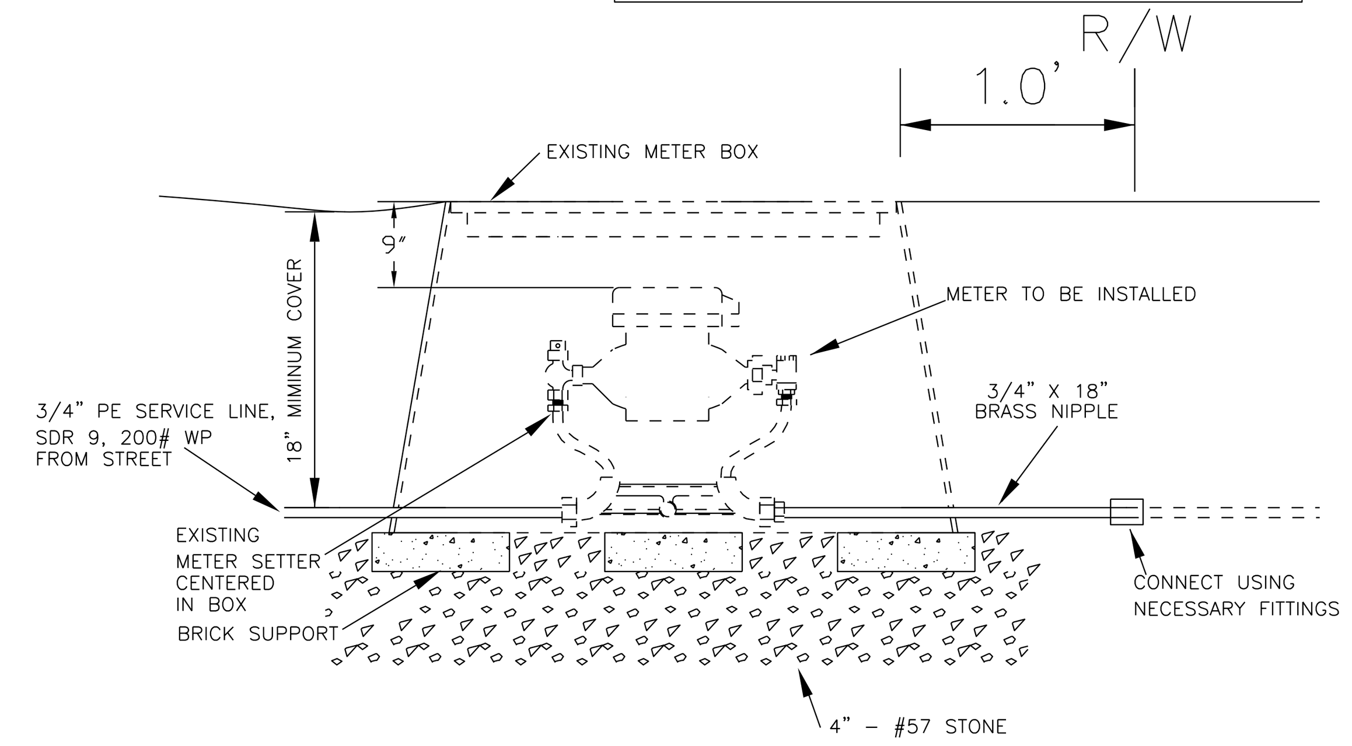


TYPICAL TRACER WIRE INSTALLATION 3
NO SCALE

NOTES:
1. DRILL HOLE IN VALVE BOX TO INSERT TRACER WIRE,BRING UP TO INSIDE AND ROLL UP AT LEAST 6"-8" EXCESS
2. PLACE TRACER WIRE IN VALVE BOX AT 1,000" INTERVALS OR AS NOTED ON THE PLANS, TYPICAL.
3. DO NOT SPLICE WIRE WHEN BEGINNING A NEW SPOOL. INSTEAD INSTALL A VALVE BOX AND ATTACH EACH WIRE WITH A BRASS SCREW TO THE VALVE BOX.

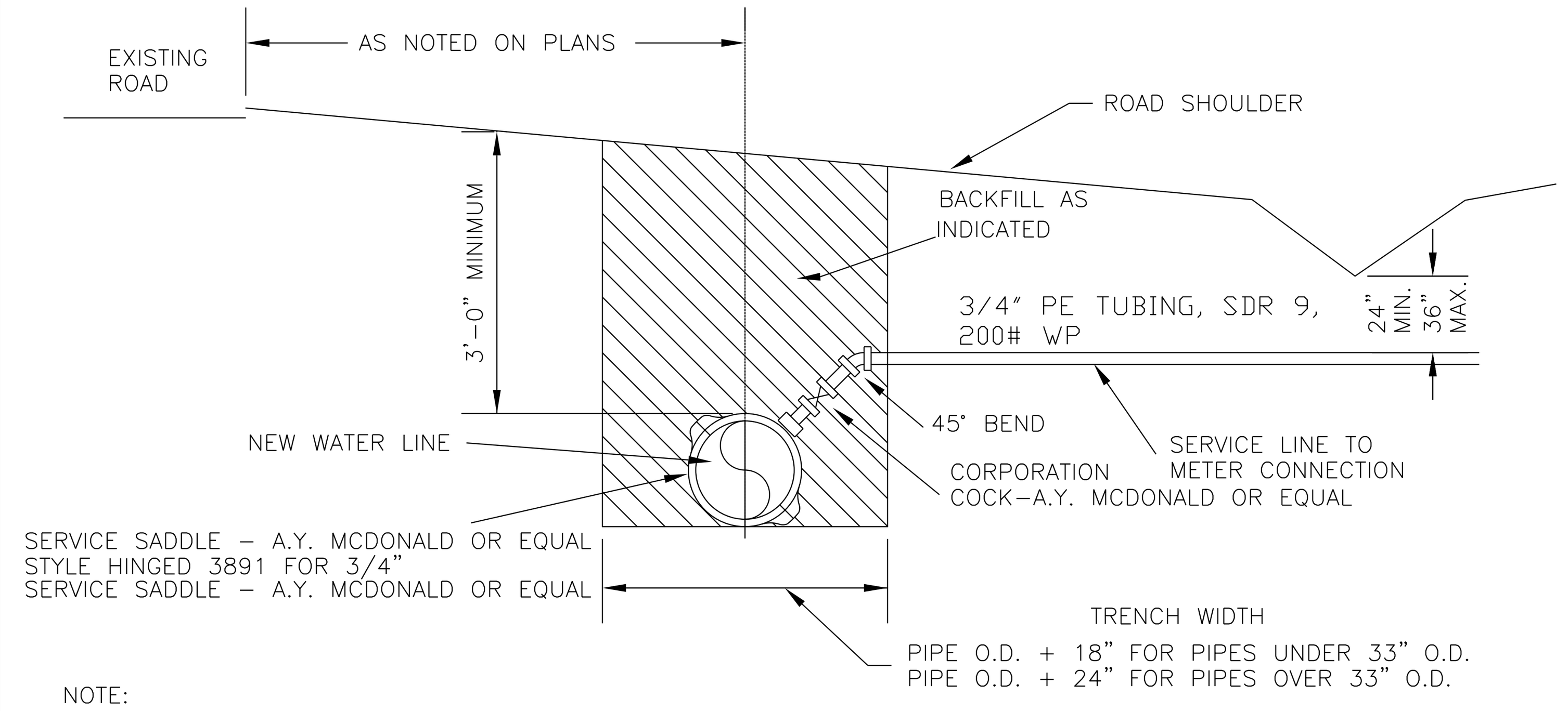
SHOWN FOR CONFIGURING RELOCATED AND RECONNECTED WATER METER ASEMBLIES

ALL NEW FITTINGS VALVES, SERVICE TUBING AND NECESSARY COMPONENTS TO RECONNECT EXIST. WATER METERS ARE INCIDENTAL TO RECONNECT OR RELOCATE WATER METERS PAY ITEMS



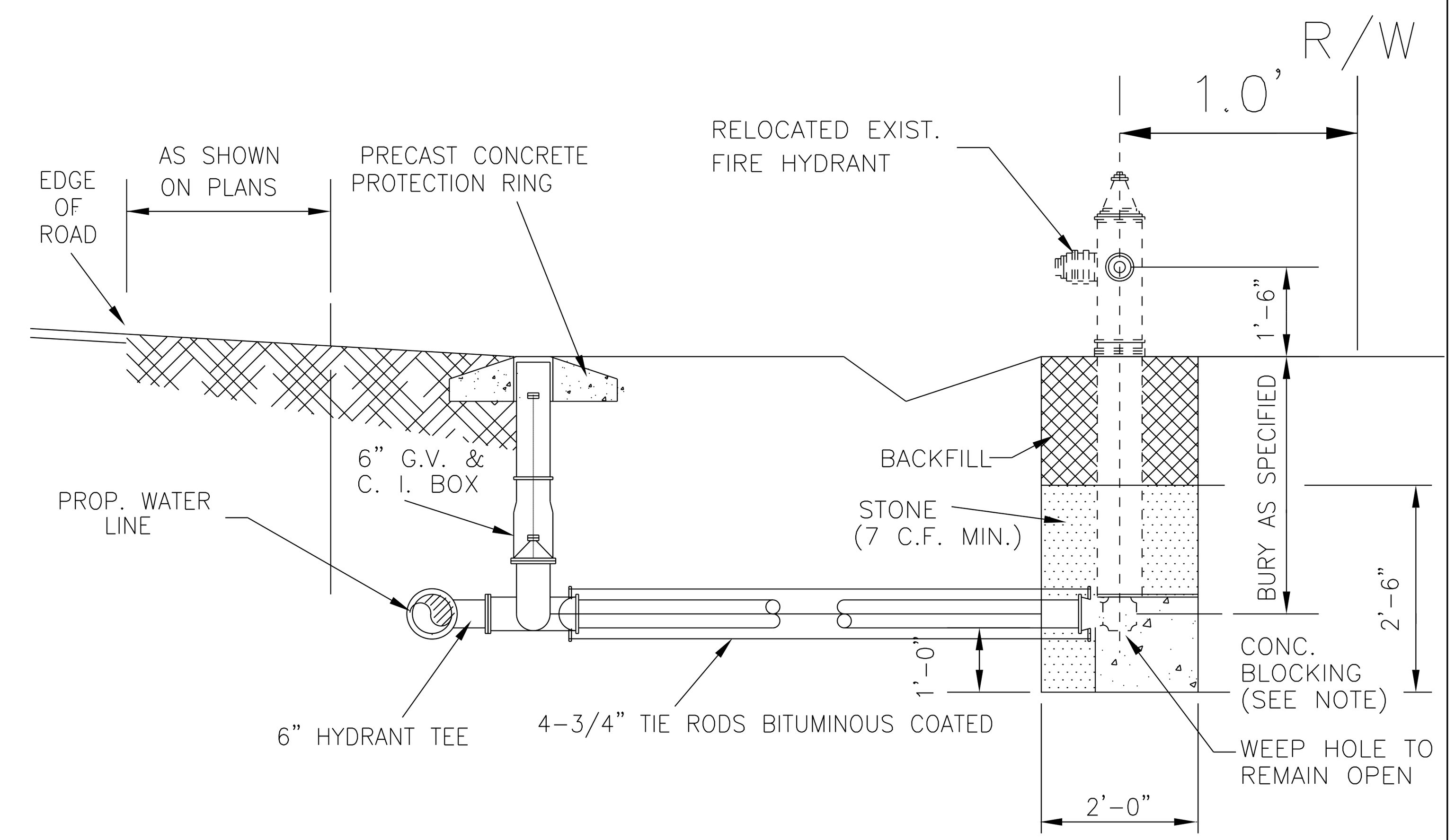
1. INCLUDE STONE IN PRICE OF METER BOX.
2. ALL BRASS FITTINGS SHALL BE COMPRESSION TYPE.

RELOCATE OR RECONNECT 3/4" METER DETAIL W 14
NO SCALE



NOTE:
1. "SERVICE CONNECTION" IN PROPOSAL TO INCLUDE SERVICE SADDLE, 45° BEND, CORPORATION COCK AND ALL LABOR INVOLVED IN MAKING A COMPLETE SERVICE CONNECTION.
2. SERVICE PIPING TO BE 3/4"
3. ALL BRASS FITTINGS SHALL BE COMPRESSION TYPE

TYPICAL WATER SERVICE CONNECTION USING TAPPING SADDLE DETAIL W 13
NO SCALE



TYPICAL RELOCATED FIRE HYDRANT INSTALLATION DETAIL W 6
NO SCALE

5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
W-5601DM	UC-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY UC PLANS FOR BIDDING PURPOSES ONLY

UTILITY CONSTRUCTION PRELIMANARY UC PLANS FOR BIDDING ONLY

NAD 83 2011

REVISIONS 8/17/99

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1 - 6" RJDI 45 BEND

PROP. 660 LF 6" WATER LINE

PROP. 1 EA 6" VALVE

2 - 6" RJDI 11¼ BEND

PROP. 1 EA 6" VALVE

-L-
PI Sta 18+02.99
△ = 3° 49' 59.5" (LT)
D = 0° 45' 00.0"
L = 511.09'
T = 255.64'
R = 7,639.44'
SE = SEE PLANS
RO = SEE PLANS

DETAIL A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 4:1 or Flatter, Fill Slope
Min. D = Variable.
FROM STA.14+00 TO STA.15+25 LT

DETAIL B
BERM DITCH
(Not to Scale)
SLOPE STAKE, 5.0', 6', 5.0', ?, 2:1, 10.0' V.C., D-Variable
Min. D = 1.0'
FROM STA.15+25 TO STA.16+00 LT
FROM STA.15+25 TO STA.16+00 RT

TO SR 1505 (PINEY GROVE RD)

2" PVC

-Y- POT Sta. 10+00.00

Century Link, D.A.T.U.R.

20' BSY YOUNG RD (SR 1546)

PROP. 1 EA 2" VALVE
PROP. 1 EA 6" VALVE

RAYTHELL ADAMS
DB 2068 PG 74

TEL/FIBER UTIL LINES WERE CALLED IN, BUT WERE NOT MARKED, DRAWN ACCORDING TO EVIDENCE IN FIELD

ABANDON 75 LF 2" UTIL PIPE

PROP. 180 LF 6" WATER LINE

-L- POT Sta. 22+06.40

-L- POT Sta. 9+00.00

DB 424 PG 83
DANNY WATKINS

-L- PC Sta. 15+47.34

RELOCATE WATER METER

1 - 6" RJDI 11¼" BEND

-DRV1-Sta. 10+00.00

SR 1546 YOUNG RD EXIST

-Y- 13+56.57
EX. R/W
30' -E-

DRIVEWAY DROP INLET

+63.00
45' -E-
75' -E-

+20.00
75' -E-
45' -E-

+52.00
60' -E-
45' -E-

+60.00
45' -E-

+85
EX. R/W
40' -E-

+90.00
40' -E-
60' -E-

SPECIAL LATERAL V DITCH SEE DETAIL A

BERM DITCH SEE DETAIL B

5' DRWY

CL 'B' RIP RAP

TO ANGIER

SR 1500 BENSON RD

PLUG

Sprint Communications D.A.T.U.R.

CL 'B' RIP RAP

+81.74
EX. R/W
40' PDE

+01.74
40' PDE
40' -E-
EX. R/W

+65.00
40' -E-
EX. R/W

+16.42
EX. R/W
35' -E-

+50.00
35' -E-
55' -E-

+95.00
55' -E-
35' -E-

+01.62
35' -E-
EX. R/W

20' DRWY

-DRV1-Sta. 11+00.00

-Y- PI Sta. 14+63.62
-L- PI Sta. 19+68.28

RELOCATE WATER METER

-DRV2- POT Sta. 10+64.28

-DRV2- POT Sta. 10+00.00

ABANDON 750 LF 6' UTIL PIPE

RECONNECT WATER METER

JILL LUTPTON ADAMS
DB 3225 PG 246

JILL LUTPTON ADAMS
DB 1654 PG 410
PB 2002 PG 707

REXWELL ADAMS
DB 485 PG 86
PB 2002 PG 707

COY L BROADWELL
DB 3149 PG 92

ROGER HOWARD DUPREE
DB 2848 PG 20

TO JOHNSTON COUNTY LINE

-L- PT Sta. 20+58.44

PROP. 1 EA 6" VALVE

RELOCATE FIRE HYDRANT

RAYTHELL ADAMS
DB 2068 PG 74

-Y- POT Sta. 17+82.29

6" PVC TO (LANGDON RD) SR 1532

1

2

3


PROJ. REFERENCE NO.
W-5601DM
SHEET NO.
X-1
0 2.5 5
SS 281.95
6:1
0.08
EXIST
282.46
0.02
0.08
4'
4'
3:1
3:1
SS 279.95
282.33
279.00
11+00.00
SS 281.10
6:1
281.67
281.54
SS 279.20
278.00
10+75.00
SS 280.00
280.98
280.85
SS 278.45
277.10
10+50.00
SS 278.75
6:1
0.08
EXIST
280.50
0.02
0.08
4'
4'
19'
EXIST
DRWY
12:1
SS 278.40
3:1
3:1
280.37
276.70
10+25.00
BEGIN RESURFACING
-L- STA. 9+80.00

19-APR-2016 14:09
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$$$$USERNAME$$$$

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
W-5601DM	X-3

0 2.5 5
4'
12'
295.50
3:1 0.02
0.02 295.45 0.02
0.02
SS 296.00
SS 295.37
13+75.00
BEGIN GRADE
-L- STA. 13+71.00
4'
4'
294.63
SS 294.22
0.08
EXIST
0.08 0.07
SS 293.90
294.50
13+50.00
4.5'
293.59
SS 293.09
0.08
EXIST
0.08 0.05
SS 293.30
293.46
SS 293.06
13+25.00
EXIST.
ASPHALT
DRWY
4'
292.39
292.16
8.6'
291.99
SS 291.83 6:1
0.02
292.26
13+00.00
4'
291.11
SS 290.50
0.08 16.5:1
SS 291.00
290.98
12+75.00
4'
4'
291.11
SS 289.10 6:1
0.08
EXIST
0.02
0.08 4:1
SS 288.75
289.62
12+50.00
-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	W-5601DM	X-4

8/23/99

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

310 305 300 295 290

4′ 4′ 10′

SS 299.38 3:1 4:1 296.16 0.02 0.02 298.91 297.53 0.02 0.02 0.08 SS 297.00

15+00.00

4′ 4′ 8′

SS 299.19 3:1 3:1 295.87 298.35 297.26 0.02 0.05 SS 297.20

14+75.00

SS 298.61 295.54 297.78 296.92 TC=296.87 12′ ASPHALT DRWY 0.026 SS 297.17

14+50.00

12′

SS 297.94 295.09 297.20 296.47 0.04 SS 297.10

14+25.00

4′ 4′

SS 297.18 3:1 3:1 294.63 0.02 0.02 296.36 296.02 0.02 0.04 SS 296.40

14+00.00

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PROJ. REFERENCE NO.	SHEET NO.
W-5601DM	X-5

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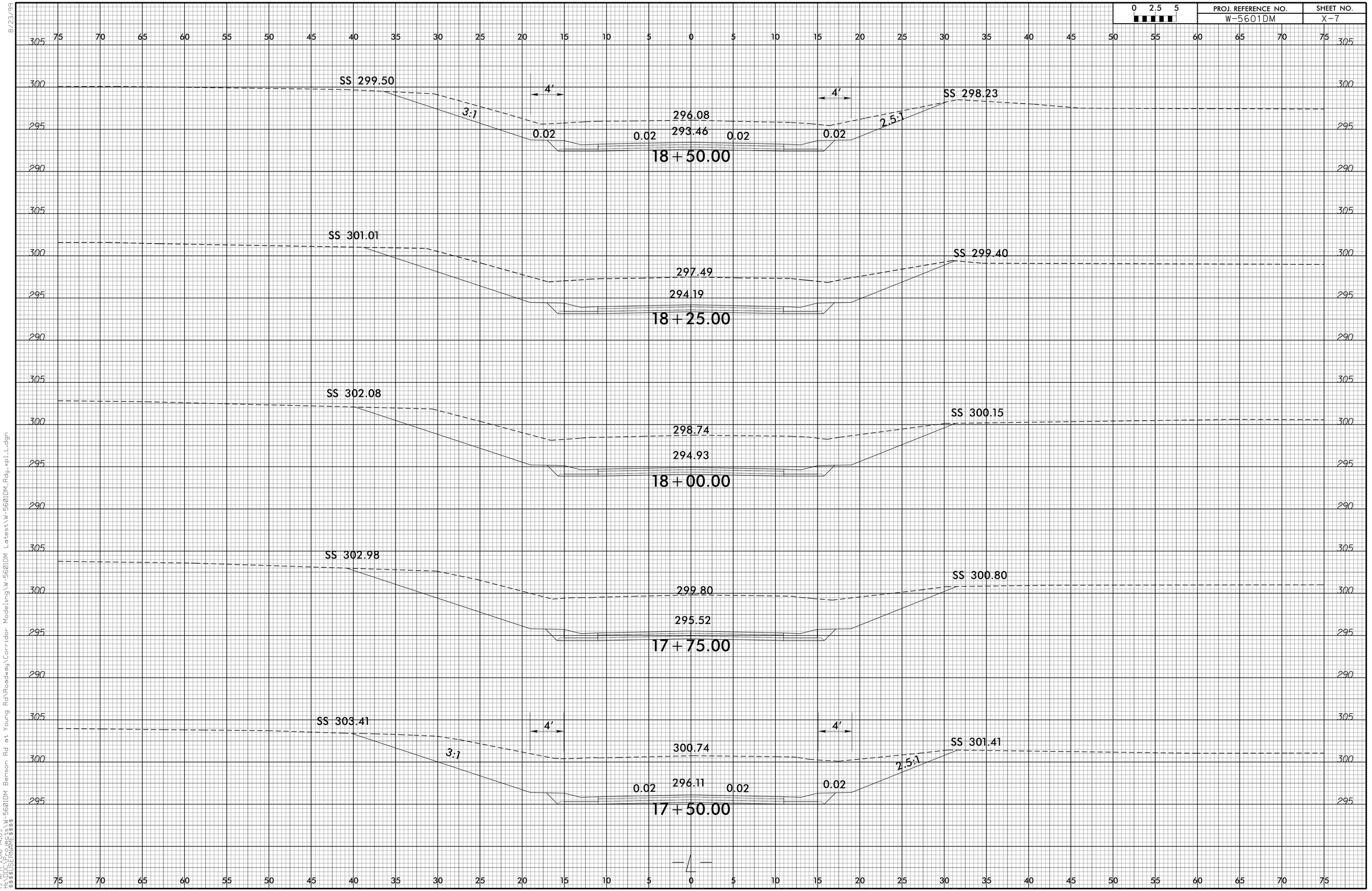
PROJ. REFERENCE NO.	SHEET NO.
W-5601DM	X-6


0 2.5 5
SS 303.73
3:1
301.30
SS 301.63
2.5:1
0.02
296.55
17+25.00
2.5'
45'
10'
4'
SS 303.99
301.85
SS 301.75
0.150
CONC. DRWY # 1
2.5:1
0.02
296.93
296.99
0.02
17+00.00
5.7'
10'
28.5'
SS 303.98
301.92
CONC. DRWY # 2
SS 301.69
7.64:1
0.150
0.02
297.28
297.22
0.02
16+75.00
SS 303.82
4'
301.92
4'
SS 301.38
3:1
3:1
0.02
297.57
0.02
16+50.00
SS 304.12
4'
301.55
4'
SS 300.55
3:1
3:1
0.02
0.02
297.71
0.02
0.02
16+25.00
310
305
300
295
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	W-5601DM	X-7



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8/23/99

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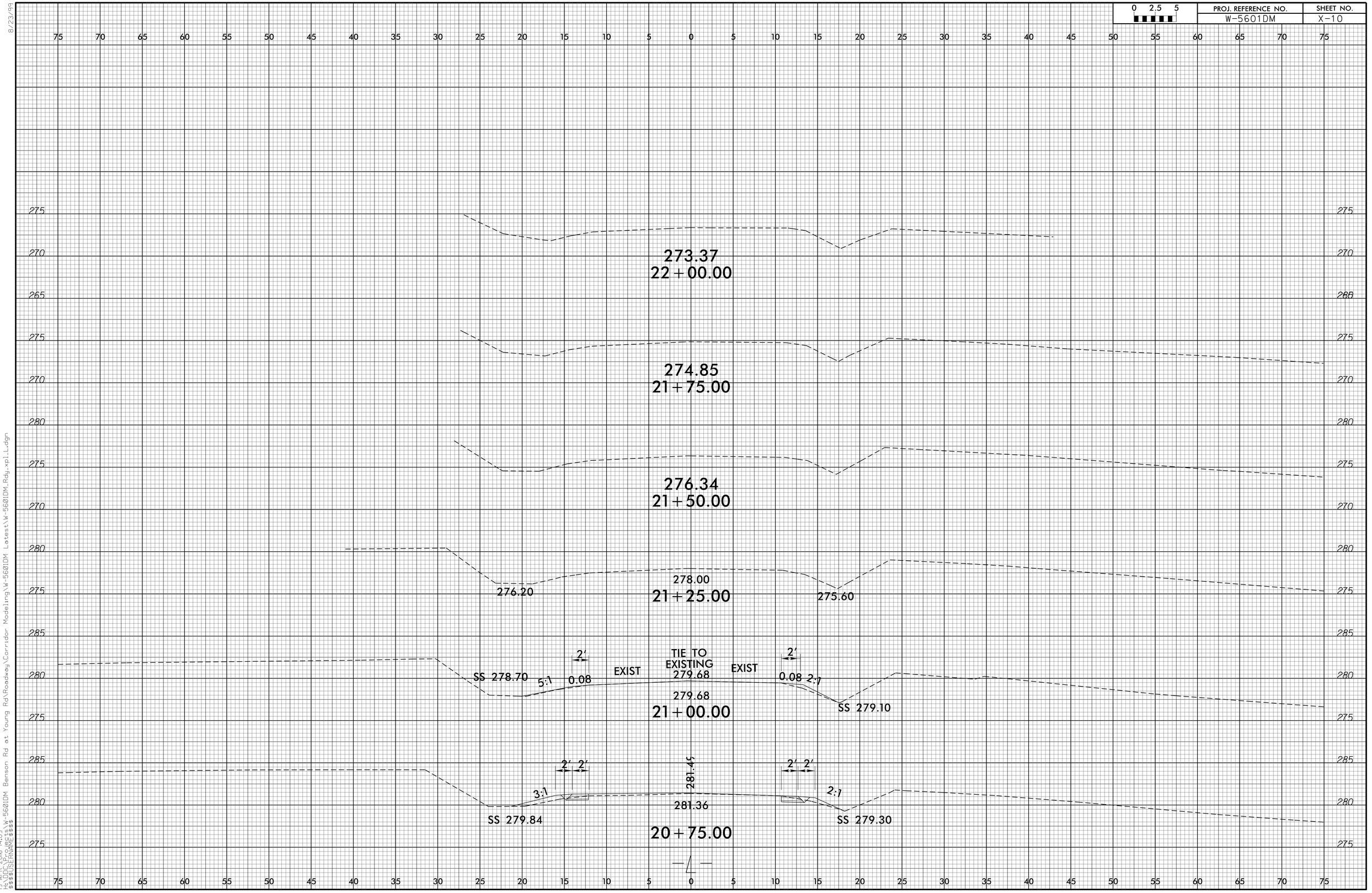
PROJ. REFERENCE NO.	SHEET NO.
W-5601DM	X-9

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
W-5601DM	X-10



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PROJ. REFERENCE NO.	SHEET NO.
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8/23/99

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

305 300 295 290 285 280

SS 288.80

4:1 4:1

285.50

5′ 287.91 19.4′

0.06 289.59 0.03

SHEAR LINE

289.46

14 + 40.00

SS 289.65

4:1 4:1

286.20

5′ 288.59 15.3′

0.06 289.96 0.032

SHEAR LINE

289.82

14 + 30.00

SS 290.40

4:1 4:1

287.10

5′ 11.2′

0.048 EXIST. 290.31 EXIST. 290.65 11′ 290.64 0.00

SHEAR LINE

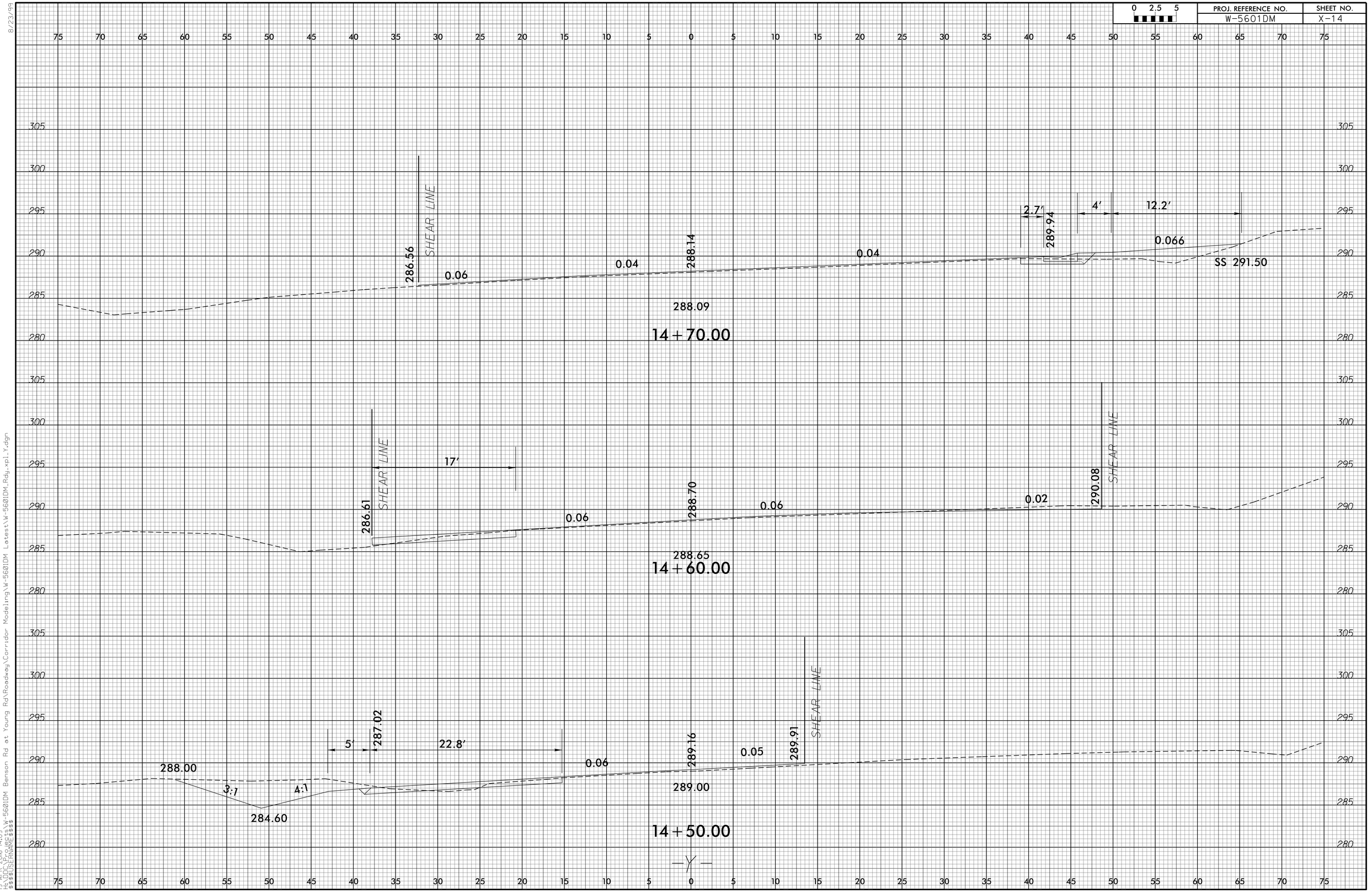
290.18

14 + 20.00

—Y—

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	W-5601DM	X-14



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$$$$USERNAME

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	W-5601DM	X-15

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

305 300 295 290 285 280

SHEAR LINE

286.79

0.06

286.66

15+00.00

0.023

3.4′

287.29

0.00

0.02

SS 287.80

SHEAR LINE

286.06

0.05

287.19

287.06

14+90.00

0.04

0.027

3.5′

288.21

0.02

SS 288.94

SHEAR LINE

286.42

0.04

287.53

287.48

14+80.00

0.04

5.2′

288.87

0.00

0.02

SS 289.60

—Y—

305 300 295 290 285 280

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

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	W-5601DM	X-16

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

295 290 285 280

5′ 2.5′ 7′ 4′

285.07 285.07

EXIST. EXIST.

0.02

SS 285.50

SS 282.30

3:1

285.03

15+40.00

295 290 285 280

4.8′

5′ 2.2′

285.69

285.57

EXIST. EXIST.

0.02

SS 286.15

SS 283.24

4:1

285.44

15+30.00

295 290 285 280

4.8′

5′ 283.99

285.88 286.24

EXIST. EXIST.

0.02

SS 286.93

3:1

SS 283.41

285.84

15+20.00

305 300 295 290 285 280

SHEAR LINE

3.2′ 4′

286.75

285.82 286.29

EXIST. EXIST.

0.02

SS 287.60

286.25

15+10.00

—Y—

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

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	W-5601DM	X-17

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

290 285 280 275 295 290 285 280 275 290 285 280 275

281.90

284.07
15+70.00

5′ 8′ 5′ 9.5′

284.42

EXIST. EXIST.

0.08 0.08 0.02

6:1

SS 283.70 SS 284.50

284.00

284.39
15+60.00

5′ 8′ 5′ 9′

284.74 284.67

EXIST. EXIST.

0.08 0.08 0.02

6:1

SS 283.10 SS 284.93

284.40

284.70
15+50.00

—Y—

REFERENCE: SS-4906BZ

PROJECT: 44269

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SS-4906BZ	1	11

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *HARNETT*

PROJECT DESCRIPTION *SR 1500 (BENSON RD.) AT SR 1546 (YOUNG RD.)*

INVENTORY

CONTENTS

CROSS SECTIONS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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NOTES:

1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

J. R. SWARTLEY

O. B. OTI

D. G. PINTER

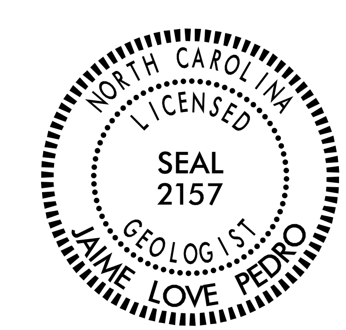
INVESTIGATED BY *J. L. PEDRO*

DRAWN BY *J. L. PEDRO*

CHECKED BY *N. T. ROBERSON*

SUBMITTED BY *N. T. ROBERSON*

DATE *NOVEMBER 2015*



DocuSigned by:

Jaime Love Pedro 12/3/2015

B935710398B04B5

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
SS–4906BZ	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP		40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0		0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND					SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD								FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [X] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [X] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

ELEVATION: FEET

NOTES:

DATE: 8-15-14

09/08/66

TIP PROJECT: SS–4906BZ

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SS–4906BZ	3	11

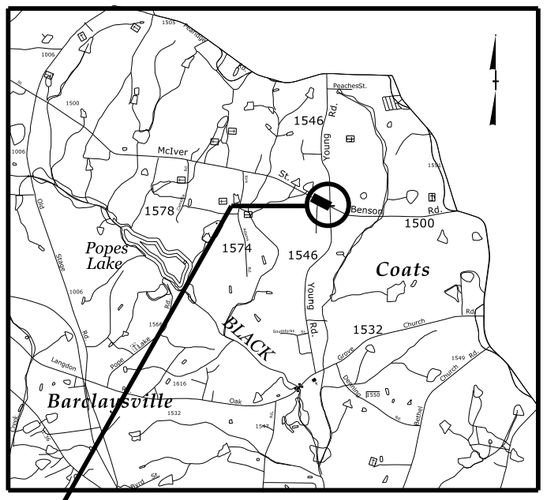
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
44269.1.FD1	HSIP–1500(9)	PE
44269.2.FD1	HSIP–1500(9)	R/W, UTILS
44269.3.1FD1	HSIP–1500(9)	CONSTR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HARNETT COUNTY

LOCATION: SR 1500 (BENSON RD) AT SR 1546 (YOUNG RD)

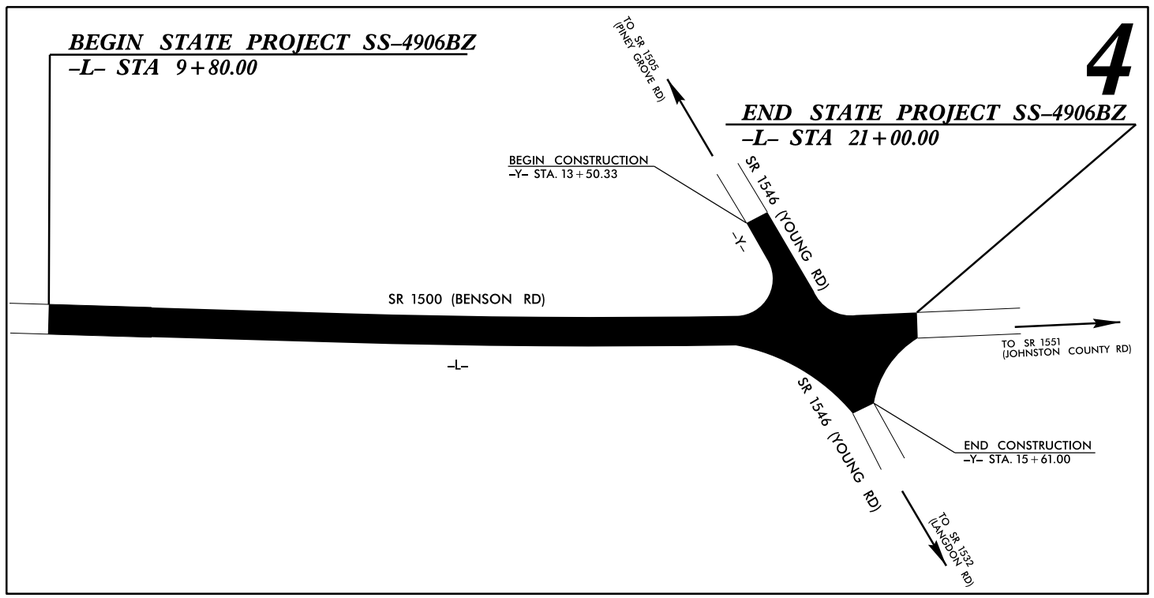
TYPE OF WORK: GRADING, PAVING, DRAINAGE, WATERLINE RELOCATION AND PAVEMENT MARKINGS



PROJECT LIMITS TIP SS–4906BZ

VICINITY MAP NOT TO SCALE

NAD 83 NA 2011



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 2,400
ADT 2035 = 4,350
D = 50 %
V = 55 MPH

PROJECT LENGTH

PROJECT LENGTH = 0.210mi

Prepared In the Office of:
DIVISION OF HIGHWAYS
431 Transportation Drive, Fayetteville, NC 28301

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
AUGUST 2015

LETTING DATE:
MAY 18, 2016

SEAN MATUSZEWSKI
PROJECT ENGINEER

RICK HANDLIN
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

PAT McCRORY
Governor

NICHOLAS J. TENNYSON
Secretary

November 23, 2015

STATE PROJECT: 44269.1.1 (SS-4906BZ)
FEDERAL PROJECT: HSIP-1500(9)
COUNTY: Harnett

DESCRIPTION: SR 1500 (Benson Rd.) at SR 1546 (Young Rd.)

SUBJECT: Geotechnical Report – Inventory

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following inventory.

Project Description

This project consists of lowering the existing grade along Benson Road (-L-) from northwest of Young Road (-Y-) to the intersection. The types of work included in the project are grading, paving, drainage, waterline relocation and pavement markings.

A geotechnical investigation was conducted during October and November of 2015. Standard Penetration Tests were performed along Benson Rd., using a CME-55, track mounted drill machine with an automatic hammer. Hand augers were also performed along the -L- alignment. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the Materials and Tests Unit.

The following alignments, totaling 0.2 miles, were investigated. Subsurface plans, profiles and/or cross sections of these alignments are included in this report.

Line	Stations
-L-	12+85 to 21+00
-DRV1-	10+13 to 10+53
-DRV2-	10+11 to 10+38

Areas of Special Geotechnical Interest

1) Highly Plastic Clays: Coastal Plain clays with moderate plastic indices (PI > 18), which may cause problems during construction, were encountered on the project at the following locations:

Line	Stations	Offsets
-L-	16+25 to 18+34	LT to RT

A discussion of these highly plastic clay soils is located below in the section titled “Soil Properties”.

2) Water Wells: One water well was noted within the construction limits at the following location:

Line	Stations	Offsets
-L-	16+47	28’ LT

Physiography and Geology

The project is located in the northeastern portion of Harnett County near the town of Barclaysville. Surficial soils consist of Cretaceous aged sands and clays of the Middendorf formation. The terrain is relatively flat with some gently rolling hills. A mixture of single family dwellings and agricultural fields make up the project area.

Soils Properties

Soils encountered during this investigation are Coastal Plain in origin. These soils are characterized by surficial sands with some sandy silt. The soils in the surface layer consist of tan, orange, and brown, loose to medium dense, moist, silty sand and sand (A-2-4 and A-3) and medium stiff to stiff, sandy silt (A-4). Underneath the surficial sands and silts are tan, orange, gray, and brown, soft to stiff, moist, silty and sandy clays (A-7-6 and A-6). The plastic indices of these clayey soils range from 18 and higher.

Groundwater

Groundwater was encountered when the 0-hour measurement was taken in the boring at Sta. 15+31. The groundwater elevation in that boring was 287.5 feet. Groundwater is not anticipated to cause problems during construction.

State of North Carolina | Department of Transportation | Geotechnical Engineering Unit
1020 Birch Ridge Drive | 1589 Mail Service Center | Raleigh, NC 27699-1589
919 707 6850

PROJECT REFERENCE NO.	SHEET NO.
SS-4906BZ	4

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L- POT Sta. 9+00.00

BEGIN STATE PROJECT
-L- POT STA 9+80.00

BL-1
N: 631814.771
E: 2098216.370
EL: 280.60
STA. 10+71.16
16.36' LT. -L-

-L- PC Sta. 15+47.34

-DRV1- POT Sta. 11+05.79

BEGIN CONSTRUCTION
-Y- STA. 13+50.33

BEG EXPRESS GUTTER
-L- STA. 13+71.00

END EXPRESS GUTTER
-Y- STA. 13+83.21

CONSTRUCT NEW
36' GRAVEL
DRIVEWAY

-Y- POT Sta. 10+00.00

BL-3
N: 631390.7512
E: 2099015.9271
EL: 287.59
STA. 19+78.09
22.25 LT. -L-

END STATE PROJECT
-L- STA 21+00.00

-L- POT Sta. 22+06.40

TEL/FIBER UTL LINES WERE CALLED IN, BUT WERE NOT MARKED. DRAWN ACCORDING TO EVIDENCE IN FIELD

23' BST BENSON RD (SR 1500)

Sprint Communications D.A.T.U.R.

Century Link D.A.T.U.R.

20' BST YOUNG RD (SR 1546)

9+83.28
EXIST R/W
40.00

9+99.40
EXIST R/W
40.00

+85
EXIST
56'

+14.19
EXIST

+20.94
45'

+76.02
EXIST
56'

+93.83
EXIST
45'

1,5SFRD

48" CONC

15" BST

18" RCP

54" RCP

FALLOW

WOODS

25'
TYP

ISBKD

BL-2
N: 631512.6880
E: 2098695.0528
EL: 301.08
STA. 16+36.74
15.54' RT. -L-

-Y- PI Sta. 14+63.62
-L- PI Sta. 19+68.28

-DRV1- POT Sta. 10+00.00

-DRV2- POT Sta. 10+64.28

-DRV2- POT Sta. 10+00.00

END CONSTRUCTION
-Y- STA. 15+61.00

-Y- POT Sta. 17+82.29

SEE SHEET 5 FOR PROFILE

REVISIONS

8/17/99

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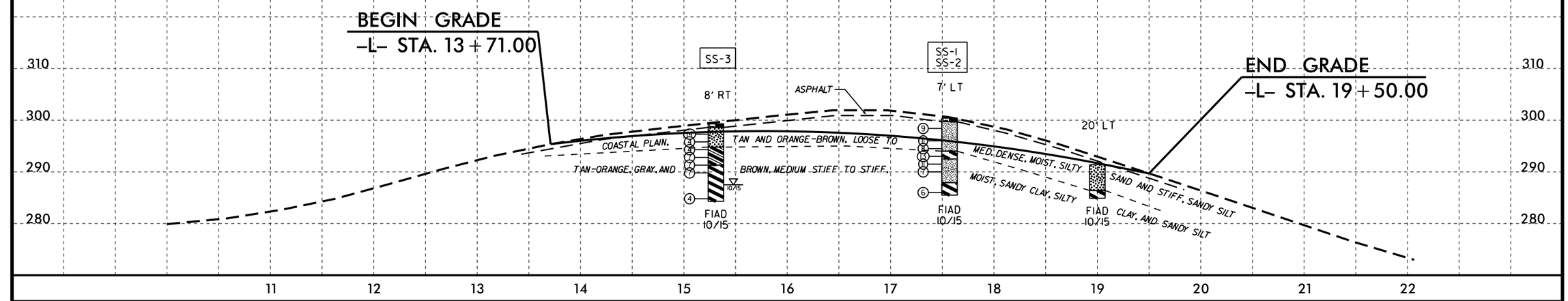
PROJECT REFERENCE NO.	SHEET NO.
SS-4906BZ	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

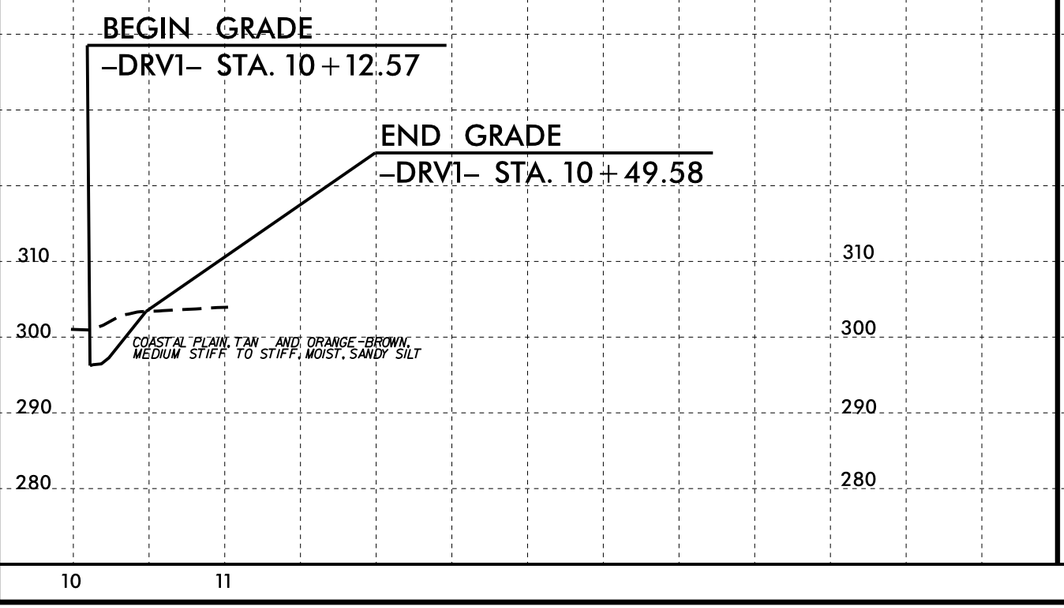
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C SAND	F SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-3	8 RT	15+31	4.0-5.5	A-6(2)	39	18	38.1	29.4	6.2	26.2	100	82	37	22.2	-
SS-1	7 LT	17+57	6.4-7.9	A-7-6(14)	48	20	0.6	46.2	16.9	36.3	100	100	70	-	-
SS-2	7 LT	17+57	7.9-9.4	A-4(4)	32	7	1.0	55.0	11.7	32.3	100	82	37	32.6	-



–DRV1–



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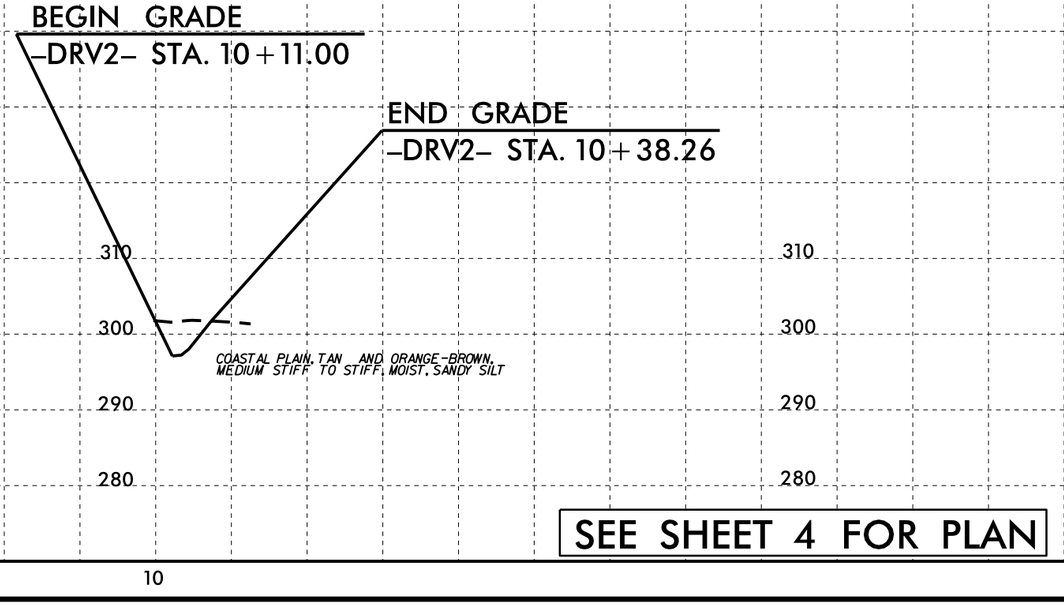

SEE SHEET 4 FOR PLAN

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	SS-4906BZ	6

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

310 305 300 295 290

ASPHALT

4′ 4′

3:1 3:1

COASTAL PLAIN, TAN AND ORANGE-BROWN, LOOSE, MOIST, SILTY SAND AND STIFF, SANDY SILT

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF, MOIST, SILTY CLAY, SANDY CLAY AND SILT

16+50.00

310 305 300 295 290 285

ASPHALT

4′ 4′

3:1 3:1

COASTAL PLAIN, TAN AND ORANGE-BROWN, LOOSE, MOIST, SILTY SAND AND STIFF, SANDY SILT

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF TO STIFF, MOIST, SILTY CLAY, SANDY CLAY AND SILT

16+25.00

310 305 300 295 290

5′ 17.4′ 3.8′ 4′ 4′ 5′ 8.7′

ASPHALT

3:1 3:1 3:1

COASTAL PLAIN, TAN AND ORANGE-BROWN, LOOSE, MOIST, SILTY SAND

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF, MOIST, SILTY AND SANDY CLAY

16+00.00

—L—

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

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$$$$USERNAME$$$$

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	SS-4906BZ	7

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

310 305 300 295 290

ASPHALT

2.5:1

COASTAL PLAIN, TAN AND ORANGE-BROWN, STIFF, MOIST, SANDY SILT

TAN, BROWN, ORANGE, AND GRAY, MED. STIFF TO STIFF, MOIST, SILTY CLAY AND SANDY SILT

17+25.00

2.5' 45' 10' 4'

CONC. DRWY

ASPHALT

2.5:1

COASTAL PLAIN, TAN AND ORANGE-BROWN, STIFF, MOIST, SANDY SILT

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF, MOIST, SILTY CLAY AND SANDY SILT

17+00.00

4' 10' 28.5'

ASPHALT

CONC. DRWY

COASTAL PLAIN, TAN AND ORANGE-BROWN, STIFF, MOIST, SANDY SILT

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF, MOIST, SILTY CLAY, SANDY CLAY AND SILT

16+75.00

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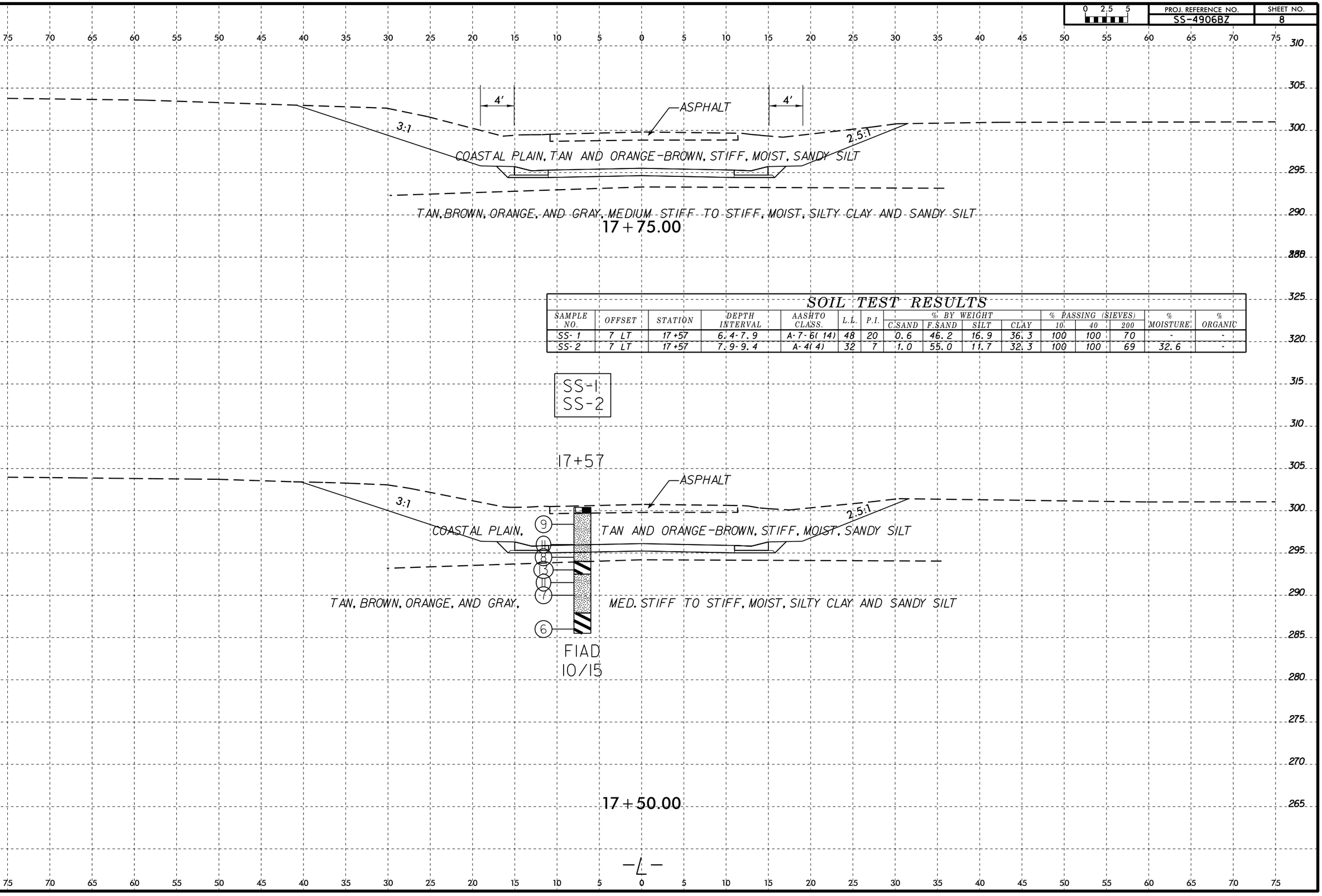
8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	SS-4906BZ	8



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	7 LT	17+57	6.4-7.9	A-7-6(14)	48	20	0.6	46.2	16.9	36.3	100	100	70	-	-
SS-2	7 LT	17+57	7.9-9.4	A-4(4)	32	7	1.0	55.0	11.7	32.3	100	100	69	32.6	-

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	SS-4906BZ	9

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

305 300 295 290 285

4' 4' ASPHALT 3:1 2.5:1

COASTAL PLAIN, TAN AND ORANGE-BROWN, STIFF, MOIST, SANDY SILT AND LOOSE TO MED. DENSE, SILTY SAND

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF TO STIFF, MOIST, SILTY CLAY AND SANDY SILT

18+50.00

310 305 300 295 290 285

ASPHALT 3:1 2.5:1

COASTAL PLAIN, TAN AND ORANGE-BROWN, STIFF, MOIST, SANDY SILT AND LOOSE, SILTY SAND

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF TO STIFF, MOIST, SILTY CLAY AND SANDY SILT

18+25.00

305 300 295 290 285

4' 4' ASPHALT 3:1 2.5:1

COASTAL PLAIN, TAN AND ORANGE-BROWN, STIFF, MOIST, SANDY SILT

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF TO STIFF, MOIST, SILTY CLAY AND SANDY SILT

18+00.00

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

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8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	SS-4906BZ	10

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

310 305 300 295 290 285 280

SHEAR LINE

41.5'

4'

SS 292.50

SIGHT DISTANCE GRADING

ASPHALT

6:1

FIAD 11/15

COASTAL PLAIN, TAN AND ORANGE-BROWN, STIFF, MOIST, SANDY SILT AND LOOSE TO MED. DENSE, SILTY SAND

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF TO STIFF, MOIST, SILTY CLAY AND SANDY SILT

FIAD

19 + 00.00

17'

9.1'

SS 297.87

4:1

SIGHT DISTANCE GRADING

ASPHALT

2.5:1

COASTAL PLAIN, TAN AND ORANGE-BROWN, STIFF, MOIST, SANDY SILT AND LOOSE TO MED. DENSE, SILTY SAND

TAN, BROWN, ORANGE, AND GRAY, MEDIUM STIFF TO STIFF, MOIST, SILTY CLAY AND SANDY SILT

18 + 75.00

-L-

23-NOV-2015 12:20
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$$$$USERNAME$$$$