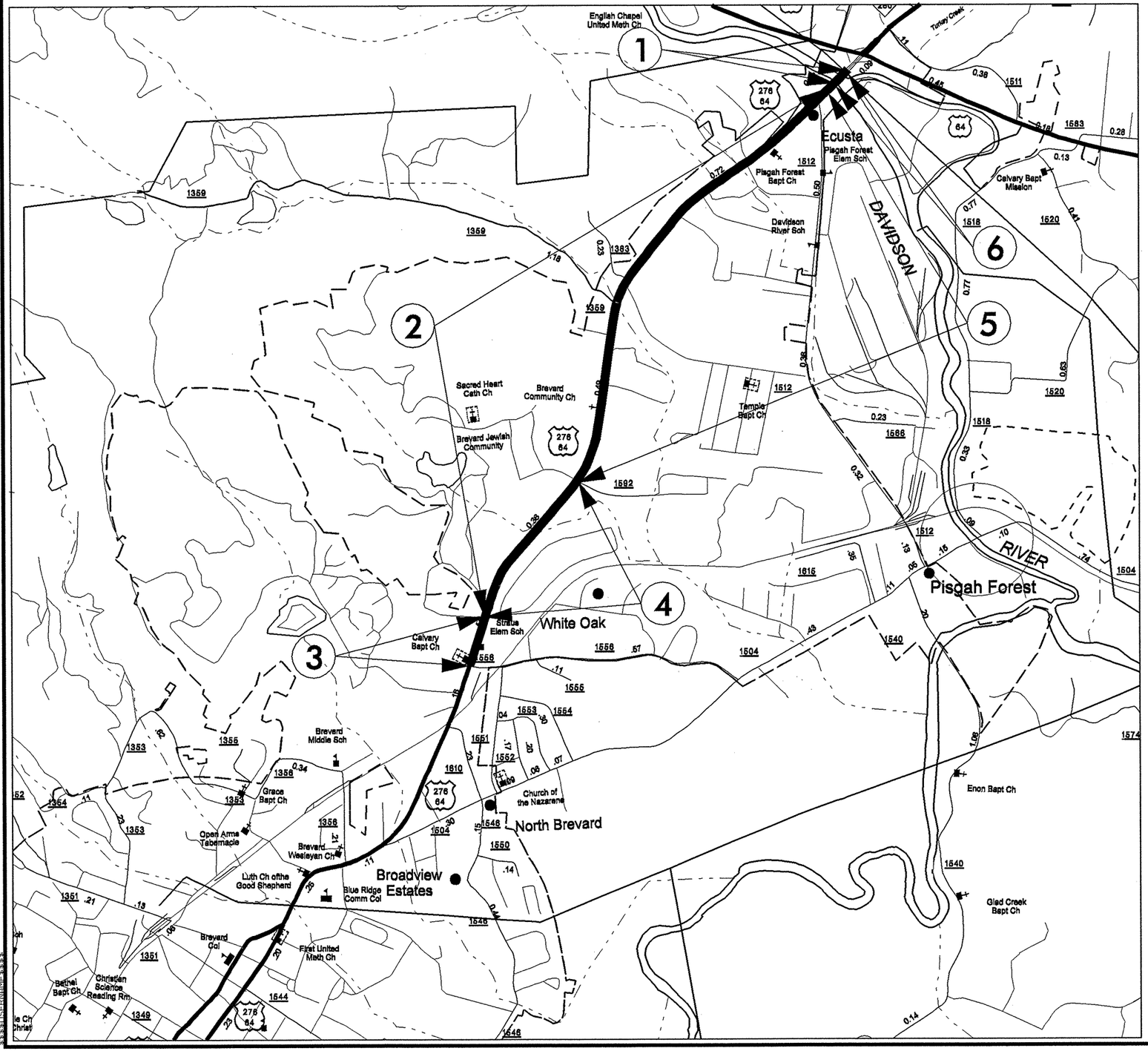
PROJECT REFERENCE NO.	SHEET NO.
R-5146	1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSYLVANIA COUNTY



01-MAY-2009 14:04
S:\contracts\contracts\resurfacing projects\division 14\r-5146\see cbp 4 plan files\title sheet transyvania.dgn
$$$$USERNAME$$$$
5/28/99
050197

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

2006 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
225.01	Guide for Grading Subgrade - Interstate and Freeway
225.05	Method of Obtaining Superelevation - Divided Highways
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation - Method 'A'
DIVISION 8 - INCIDENTALS	
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.22	Frames and Wide Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.36	Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates
840.37	Steel Grate and Frame
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.02	Drop Inlet Installation in Expressway Gutter
848.05	Wheelchair Ramp - Curb Cut
852.01	Concrete Islands
862.01	Guardrail Placement
862.02	Guardrail Installation

GENERAL NOTES:

2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-30-08

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SIDE ROADS:

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

GUARDRAIL:

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

TEMPORARY SHORING:

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

SUBSURFACE PLANS:

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

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE PSNC, COMPORIUM, and DUKE ENERGY

THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY OWNERS TO RESOLVE ANY UTILITY CONFLICTS DURING CONSTRUCTION.

WHEELCHAIR RAMPS:

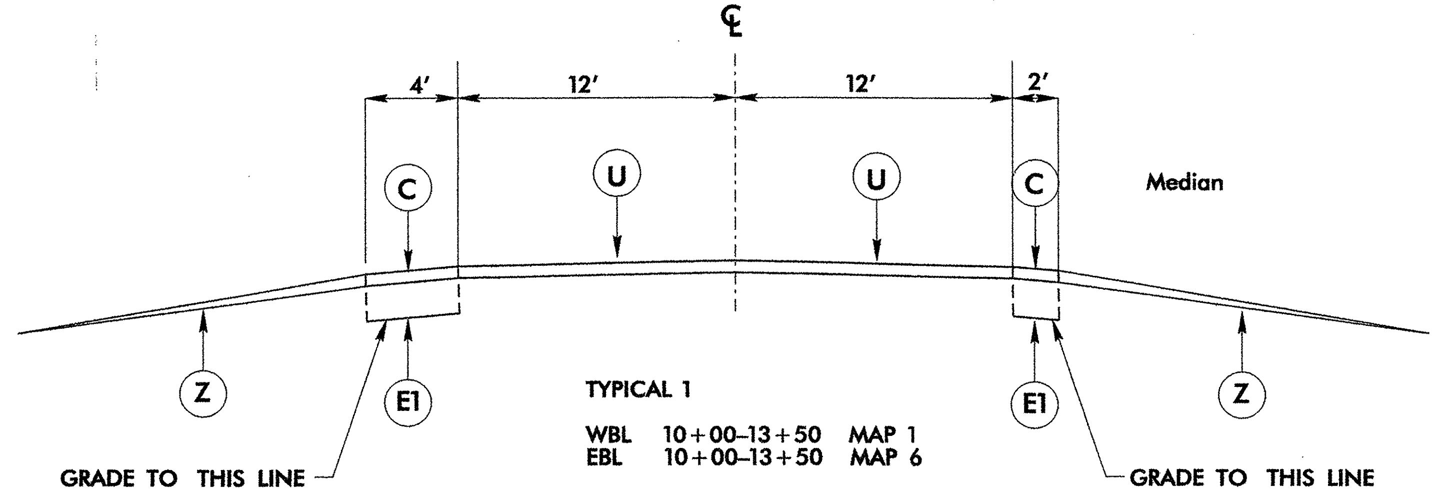
WHEELCHAIR RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. THE CONSTRUCTION OF ALL WHEELCHAIR RAMPS SHALL BE IN ACCORDANCE WITH STD. NO. 848.05

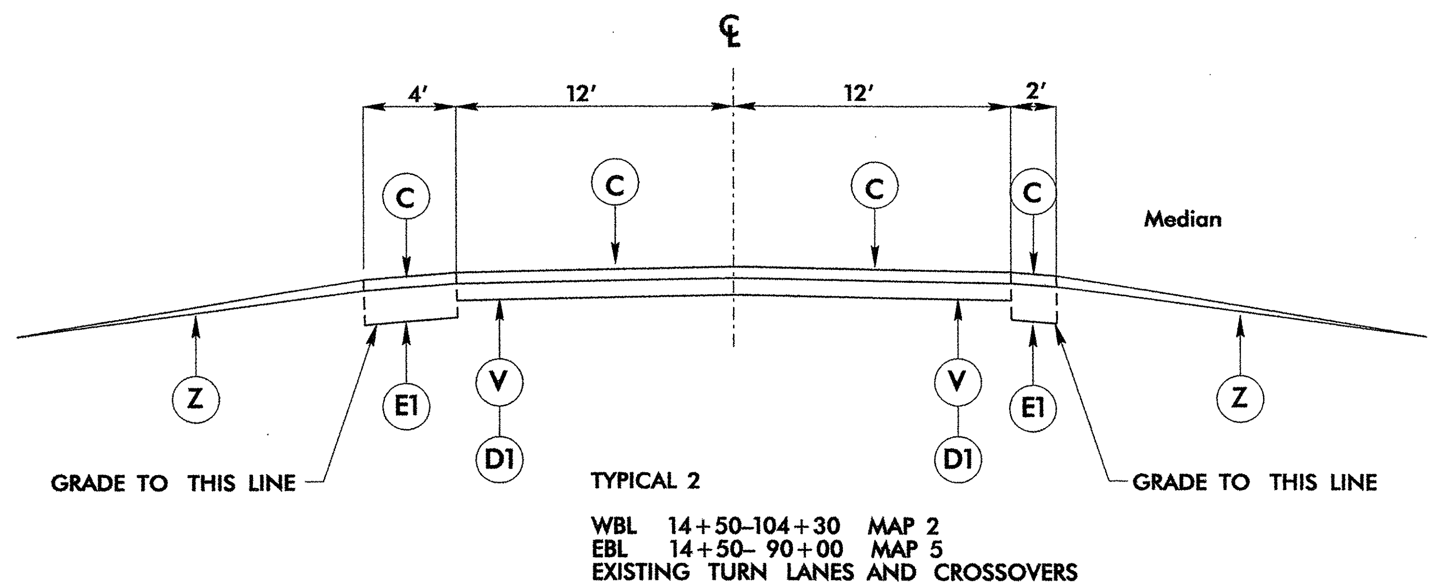
PROJECT REFERENCE NO.	SHEET NO.
R-5146	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

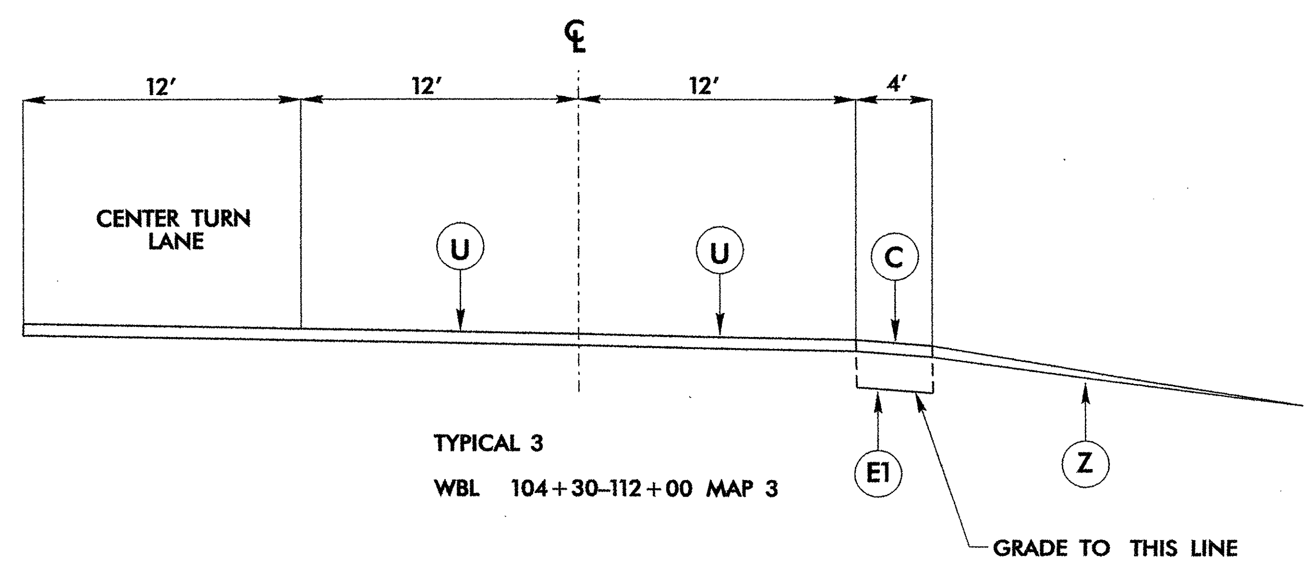
NORTH CAROLINA PROFESSIONAL SEAL 16887 ENGINEER JAMES R. WILSON

5-4-09

PAVEMENT SCHEDULE	
C	ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. (1.5")
D1	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD. (2.5")
D2	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD. (3")
E1	ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD. (5.5")
E2	ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD. (4")
U	EXISTING PAVEMENT
V	MILLING EXISTING ASPHALT PAVEMENT 2.5" AS DIRECTED BY PROJECT ENGINEER
Z	SHOULDER RECONSTRUCTION AS DIRECTED BY THE PROJECT ENGINEER



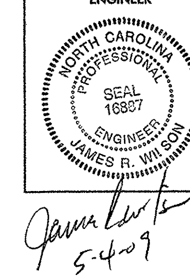




6/2/99

04-MAY-2009 13:52

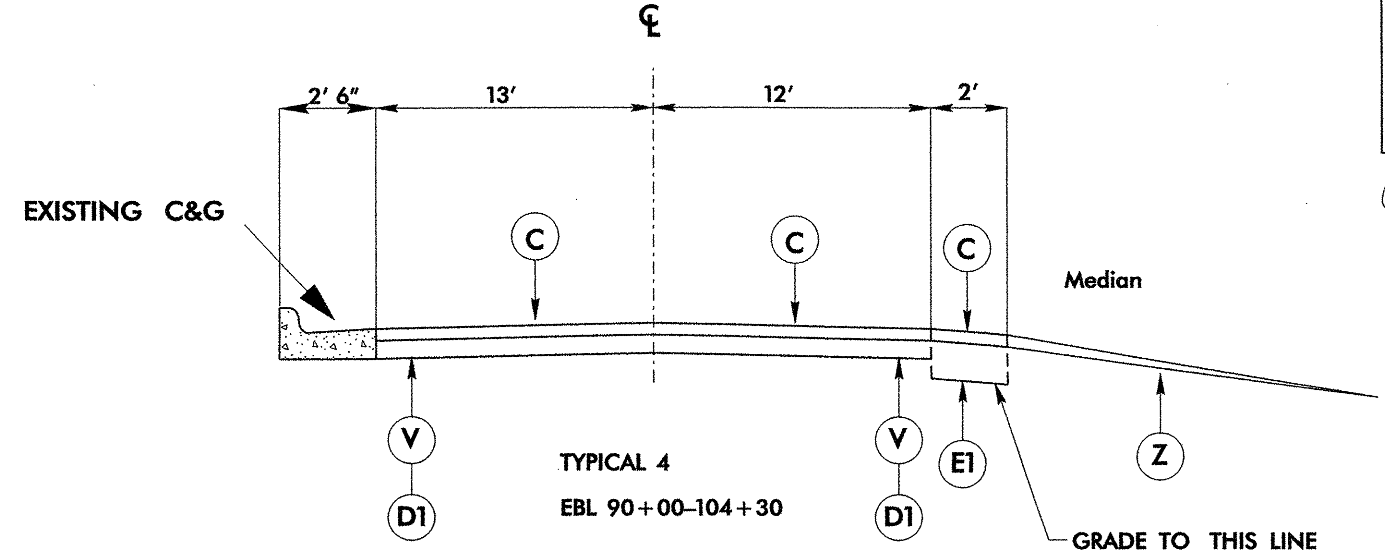
PROJECT REFERENCE NO.	SHEET NO.
R-5146	2A

ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
	

6/2/99

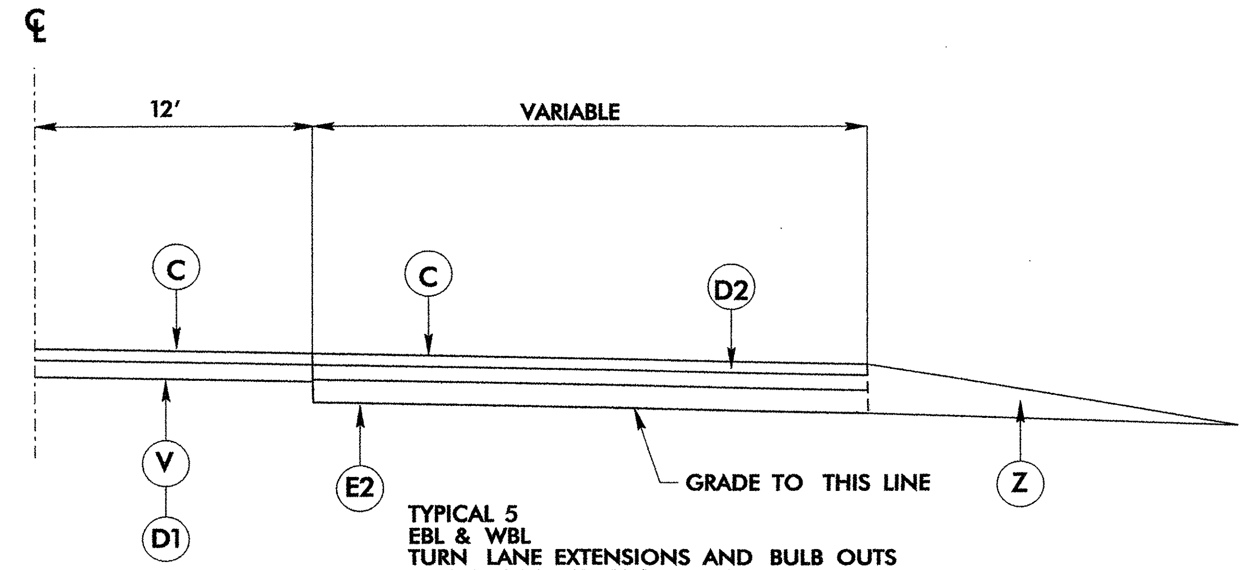
PAVEMENT SCHEDULE

C	ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. (1.5")
D1	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD. (2.5")
D2	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD. (3")
E1	ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD. (5.5")
E2	ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD. (4")
U	EXISTING PAVEMENT
V	MILLING EXISTING ASPHALT PAVEMENT 2.5" AS DIRECTED BY PROJECT ENGINEER
Z	SHOULDER RECONSTRUCTION AS DIRECTED BY THE PROJECT ENGINEER

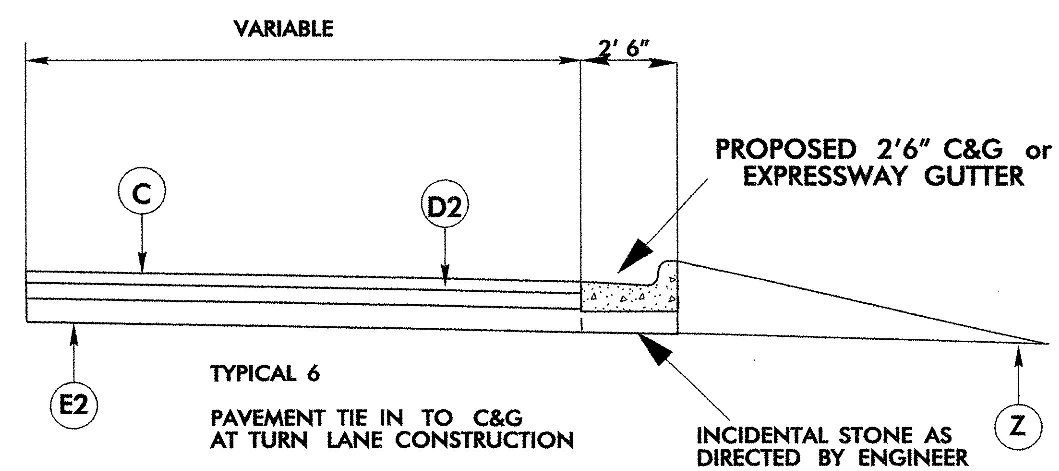


TYPICAL 4

EBL 90+00–104+30



TYPICAL 5
EBL & WBL
TURN LANE EXTENSIONS AND BULB OUTS
AS DIRECTED BY PROJECT ENGINEER

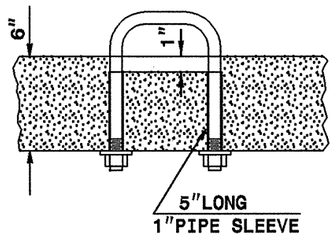


TYPICAL 6

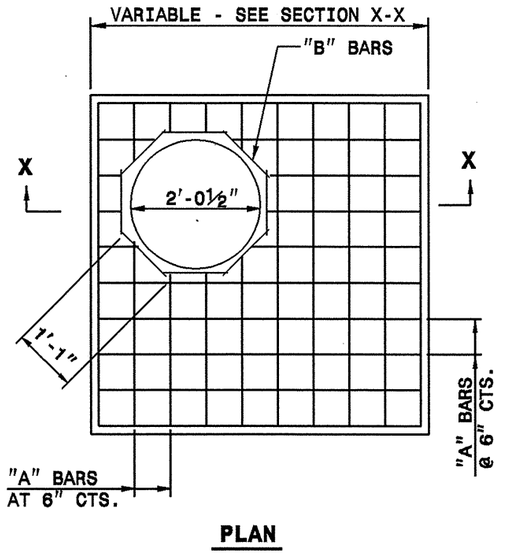
PAVEMENT TIE IN TO C&G
AT TURN LANE CONSTRUCTION

04-MAY-2009 13:53
i:\brevardbulbouts\roadway\Typicals\brev_rdy_typ.dgn
kmccoy AT D14CAD23969696

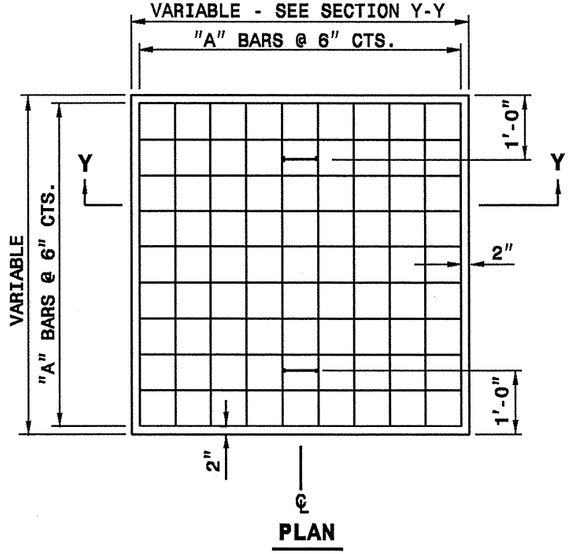
PROJECT REFERENCE NO.	SHEET NO.
R-5146	2B



PARTIAL SECTION



PLAN



PLAN

GENERAL NOTES:

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

FIELD VERIFY THE DIMENSIONS FOR THE EXISTING BOXES

DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

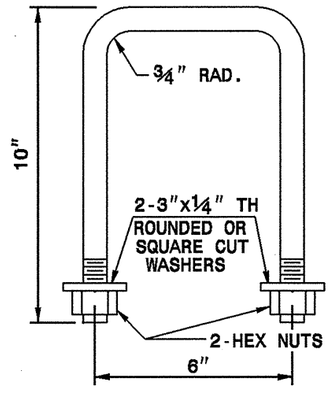
BILL OF MATERIALS

REINFORCING STEEL

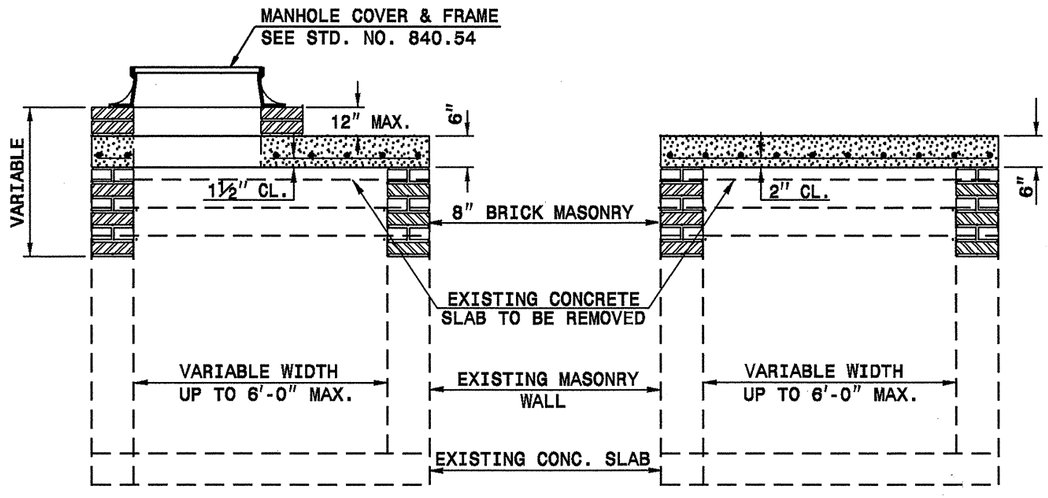
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
TOTAL				65.91 *

MASONRY	CU YDS
TOP SLAB CONCRETE CLASS "B"	.433 *
BRICK MASONRY PER FT HT (MIN)	.4111

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



DETAIL OF HANDLE



SECTION X-X **SECTION Y-Y**

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON

5/6/09

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

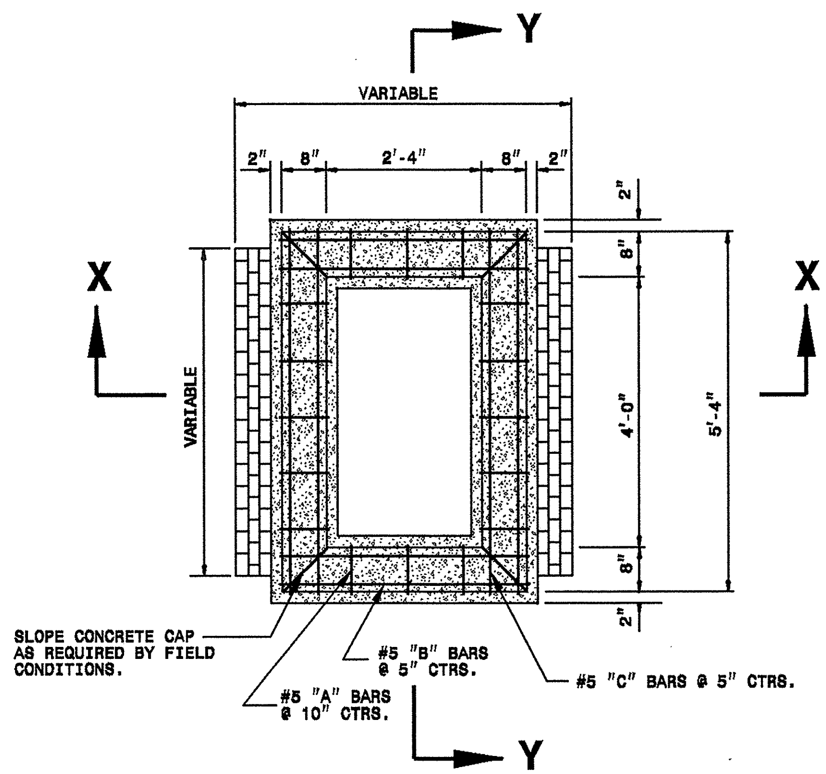
DETAIL TO CONVERT EXISTING OPEN THROAT CATCH BASIN TO JUNCTION BOX (MANHOLE OPTIONAL)

ORIGINAL BY: T.S.S. DATE: NOV.1997
MODIFIED BY: E.E.W DATE: 8-28-02
CHECKED BY: DATE:
FILE SPEC.: /usr/details/stand/boxtojbs.dgn

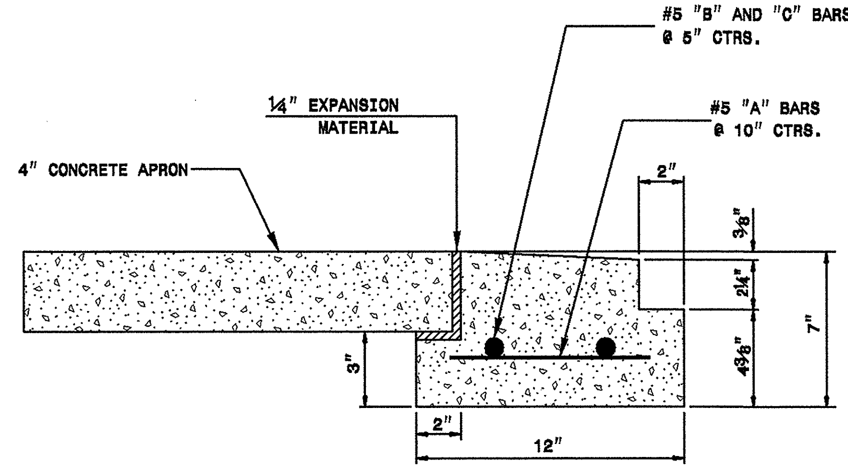
$$$$$$SYSTEM$$$$$$
$$$$$$DESIGN$$$$$$
$$$$$$USERNAME$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5146	2C

NOTES:
- USE CLASS 'B' CONCRETE.
- DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
- CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.



PLAN VIEW
APRON NOT SHOWN

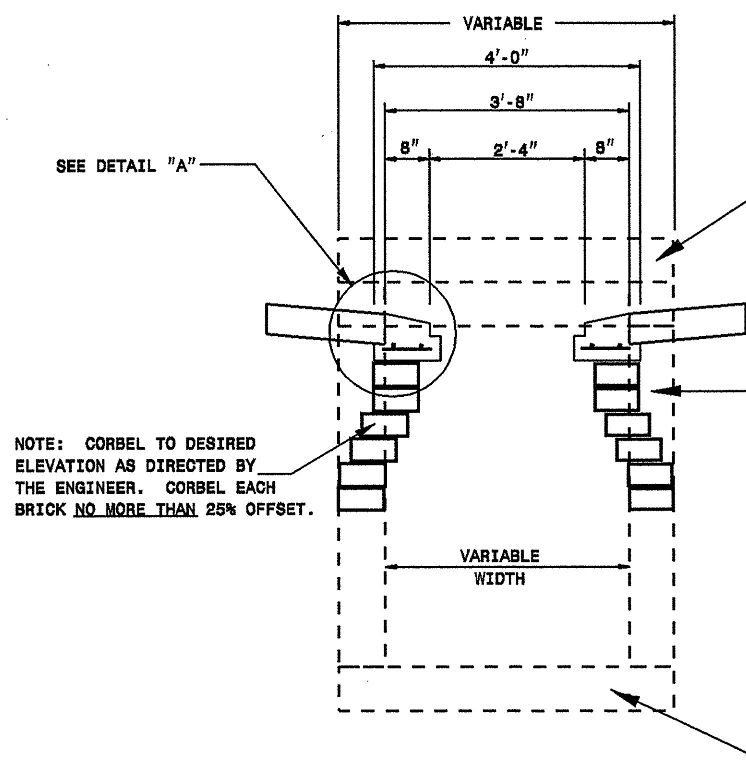


DETAIL "A"
CONCRETE CAP WITH APRON

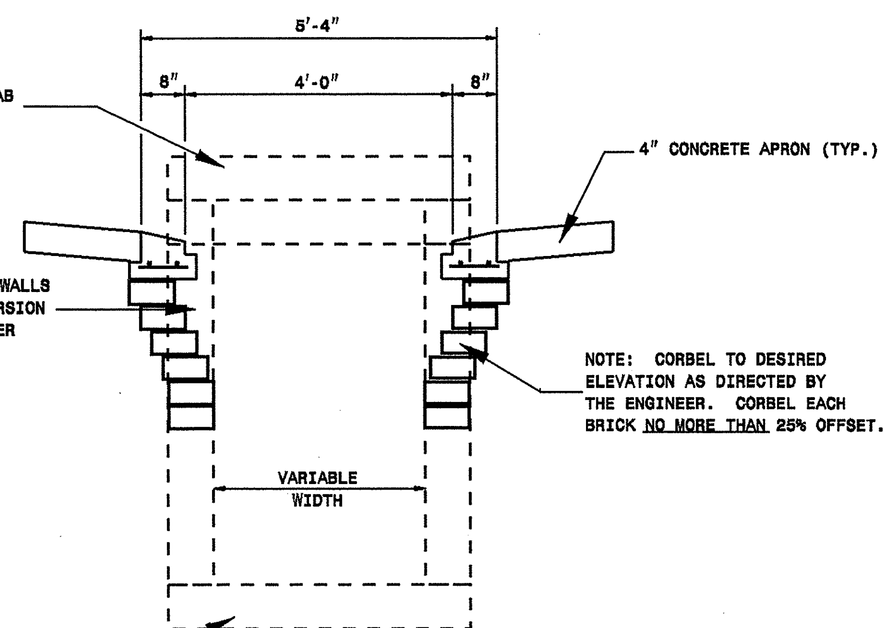
BILL OF MATERIAL

BAR	NO.	SIZE	LENGTH	WEIGHT
A	16	5	9"	13
B	4	5	3'-5"	14
C	4	5	5'-1"	21
TOTAL REINF. STEEL (lbs.)				48
BRICK MASONRY (per ft. ht.) (cu. yds.)				0.38
CLASS "B" CONC. (cu. yds.)				0.23

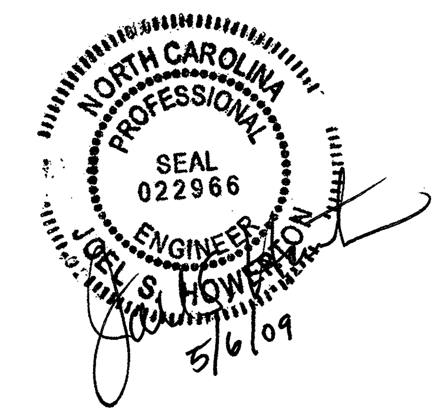
FRAME AND GRATES	STD. NO.
PREFERRED:	840.22
	840.24
ACCEPTABLE:	840.20
	840.29
	840.33



SECTION X-X



SECTION Y-Y



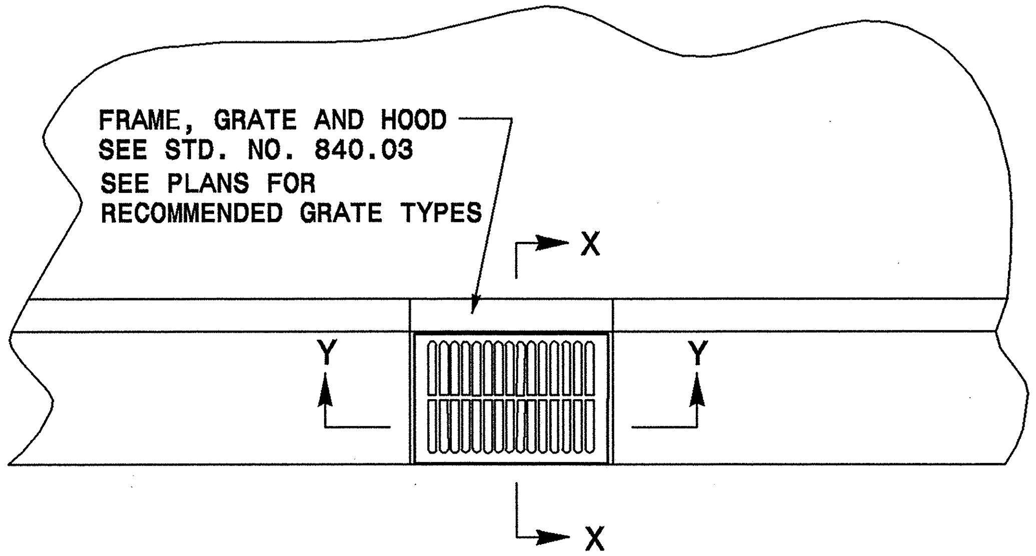
PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

CONVERT EXISTING OPEN THROAT CATCH BASIN TO GRATED DROP INLET

ORIGINAL BY: L.M.LEWIS DATE: 3/97
MODIFIED BY: E.E.WARD DATE: 1/00
CHECKED BY: DATE:
FILE SPEC.: s:usr\details\stand\cbto2gi.dgn

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

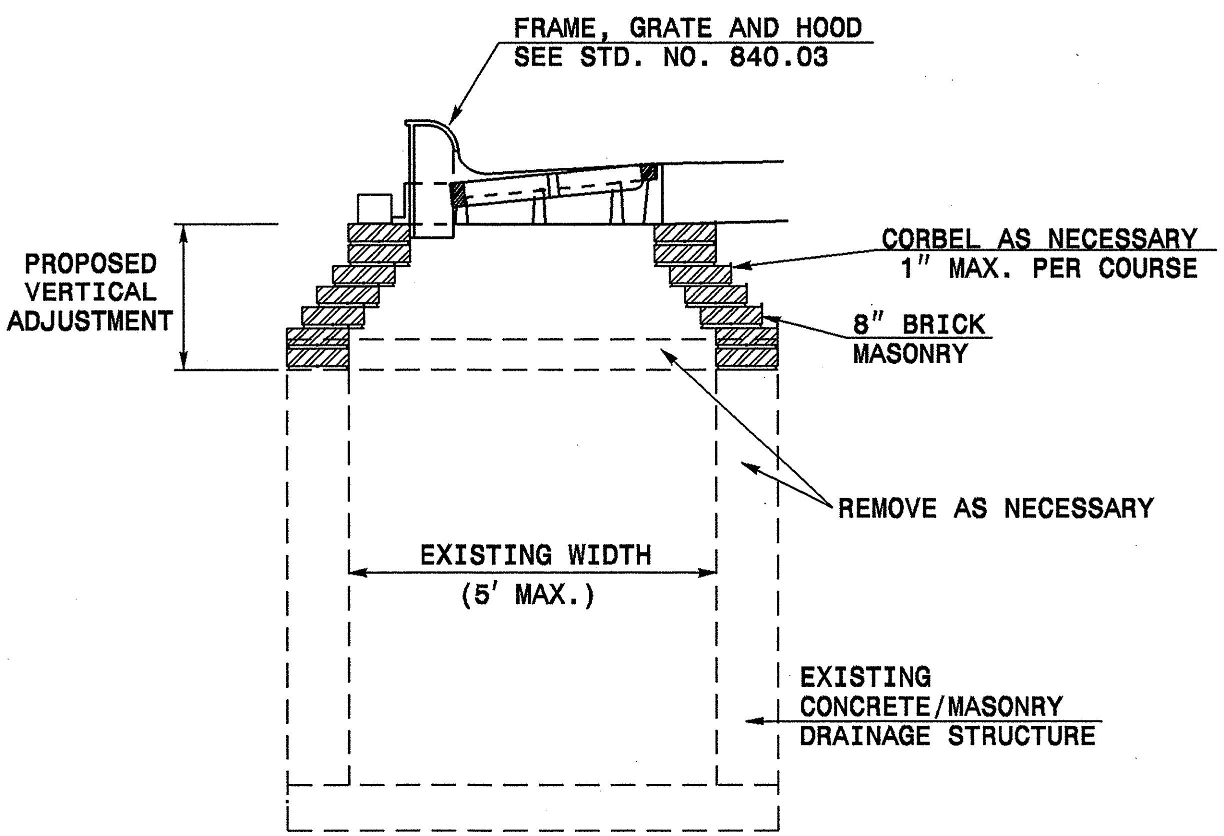
5/14/99



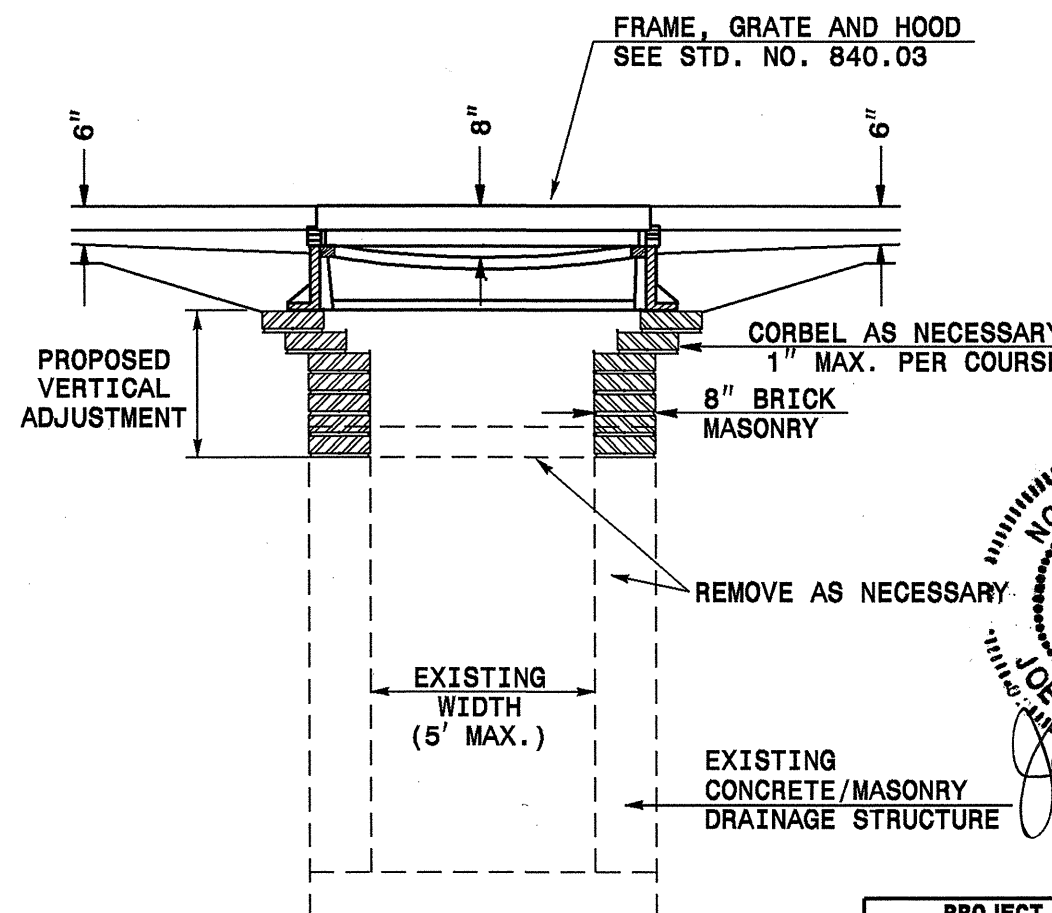
PLAN

GENERAL NOTES:

- THE ROADWAY PLANS INDICATE STRUCTURES TO BE CONVERTED.
- AFTER REMOVAL, STORE GRATES AND FRAMES AS DIRECTED BY THE ENGINEER.
- 4″ SOLID CLAY BRICK, JUMBO BRICK, CONCRETE, OR 4″ SOLID CONCRETE BLOCK MAY BE USED FOR VERTICAL ADJUSTMENT OF THE STRUCTURE.
- CONVERT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.



SECTION X-X



SECTION Y-Y

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
5/6/09

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

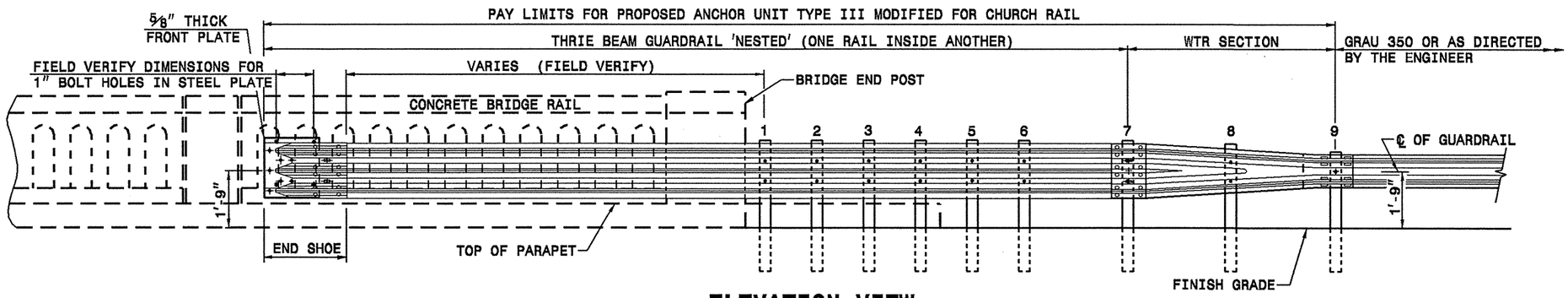
CONVERSION OF OPEN THROAT CATCH BASIN TO CATCH BASIN

ORIGINAL BY: E.E. WARD DATE: 11-97
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: DS97:usr\details\stand\ibtocb.dgn

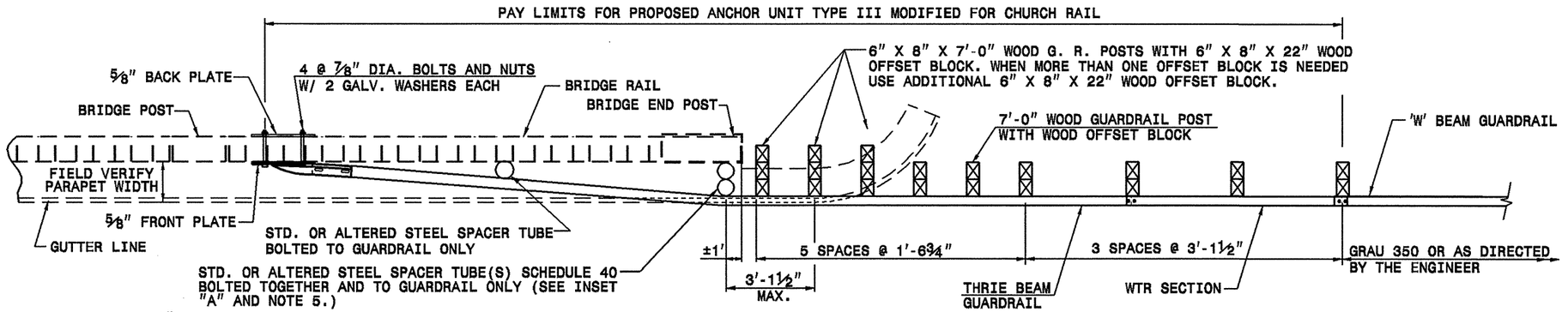
5/14/99

$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

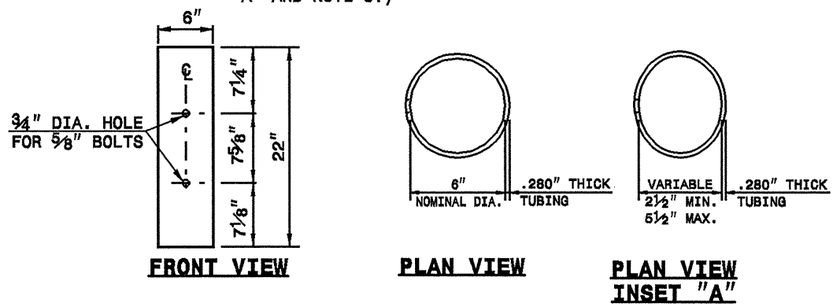
PROJECT REFERENCE NO.	SHEET NO.
R-5146	2E



ELEVATION VIEW

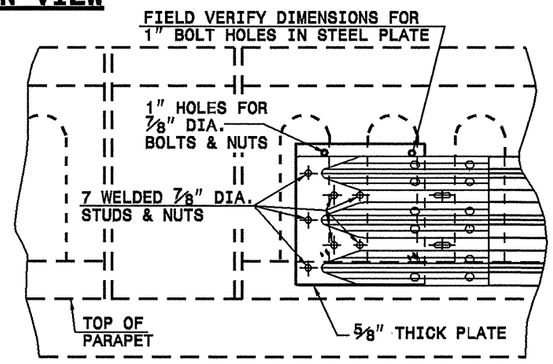


PLAN VIEW

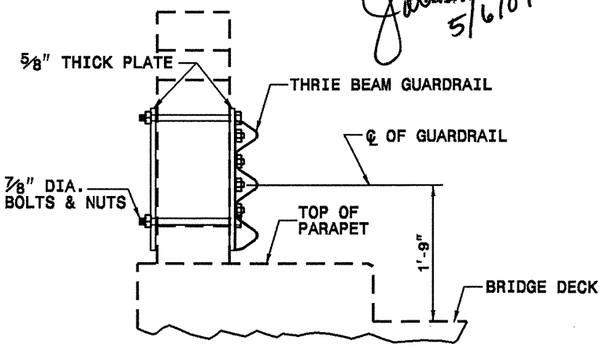


FRONT VIEW | PLAN VIEW | PLAN VIEW INSET "A"

STEEL SPACER TUBE



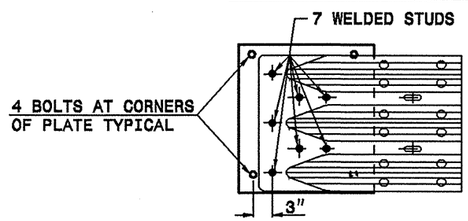
ELEVATION VIEW



SECTION VIEW

GENERAL NOTES:
1. USE NUTS, BOLTS, AND WASHERS CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-307 AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
2. TAP NUTS FOR THE 7/8" DIA. STUDS AND BOLTS AFTER GALVANIZING SEE A.S.T.M. A-563.
3. USE PLATES AND TUBES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
4. ADDITIONAL FIELD HOLES MAY BE DRILLED IN STEEL RAIL AS DIRECTED BY THE ENGINEER.
5. INSTALL FACE OF GUARDRAIL AS NEAR AS POSSIBLE TO PLUMB WITH THE PARAPET FACE AT BRIDGE END POST SPACER TUBE LOCATION BY USING STANDARD OR ALTERED SPACER TUBES OR A COMBINATION THEREOF OR AS DIRECTED BY THE ENGINEER. FOR VERY SMALL PARAPET WIDTHS, GUARDRAIL MAY BE INSTALLED AGAINST BRIDGE RAIL WITHOUT SPACER TUBES.
6. DO NOT DRILL BRIDGE RAIL IN ORDER TO INSTALL GUARDRAIL ANCHOR UNIT.
7. ATTACH THREADED STUDS TO PLATE WITH 1/4" WELDS ALL AROUND.
8. PROVIDE SHOP DRAWINGS OF THE PLATES TO THE ENGINEER FOR APPROVAL BEFORE FABRICATING THE PLATES.
9. LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
10. SEE 2002 ROADWAY STANDARD DRAWING 862.03 SHEET 4 FOR ADDITIONAL INFORMATION ON THE TYPE III ANCHOR UNIT.

GUARDRAIL ATTACHMENT TO BRIDGE POST



NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON 5/6/09

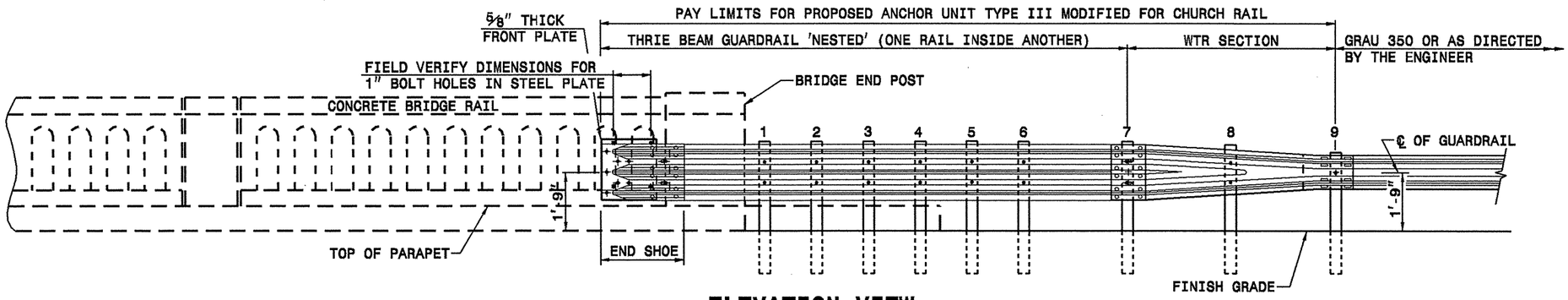
DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

GUARDRAIL ANCHOR UNIT TYPE III MODIFIED FOR CHURCH RAIL

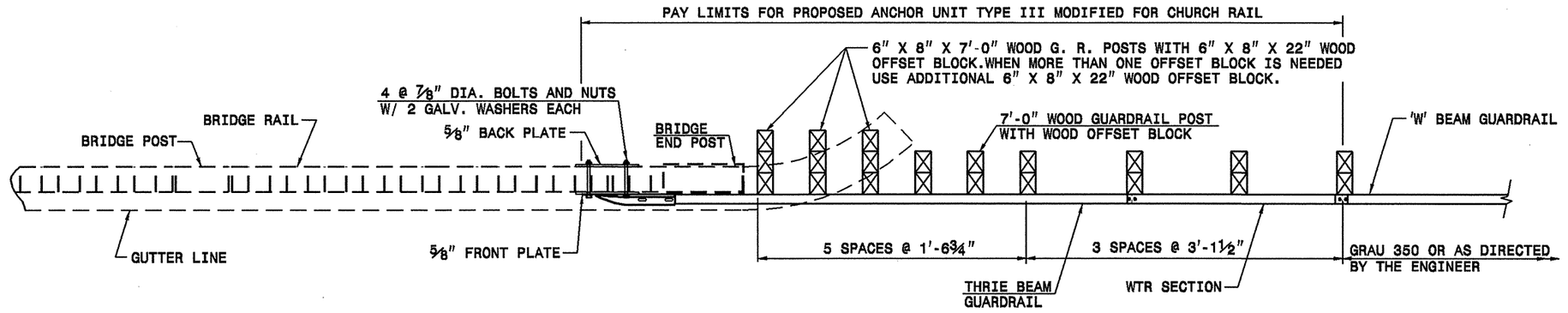
ORIGINAL BY: C.O. CUEVAS DATE: 12-00
MODIFIED BY: E.E. WARD DATE: 02-04
CHECKED BY: DATE:
FILE SPEC.: \usr\details\stand\bpiii.dgn

5/14/99

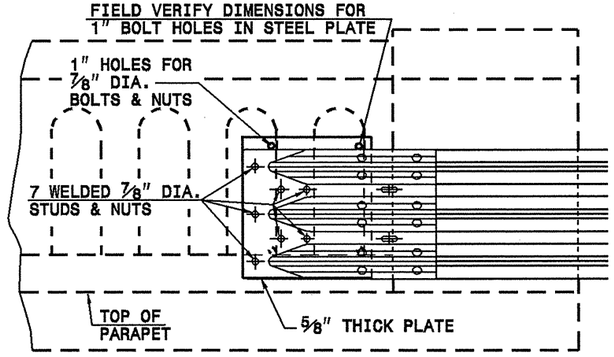
PROJECT REFERENCE NO.	SHEET NO.
R-5146	2F



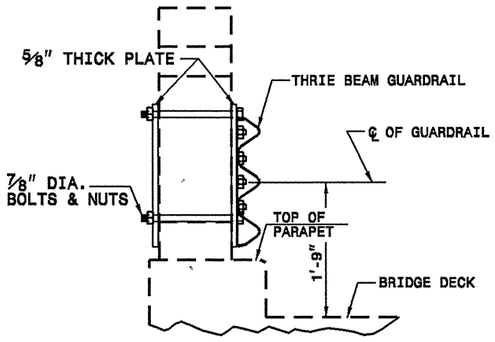
ELEVATION VIEW



PLAN VIEW



ELEVATION VIEW



SECTION VIEW

GENERAL NOTES:

1. USE NUTS, BOLTS, AND WASHERS CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-307 AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
2. TAP NUTS FOR THE 7/8" DIA. STUDS AND BOLTS AFTER GALVANIZING SEE A.S.T.M. A-563.
3. USE PLATES AND TUBES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
4. ADDITIONAL FIELD HOLES MAY BE DRILLED IN STEEL RAIL AS DIRECTED BY THE ENGINEER.
5. INSTALL FACE OF GUARDRAIL AS NEAR AS POSSIBLE TO PLUMB WITH THE PARAPET FACE AT BRIDGE END POST SPACER TUBE LOCATION BY USING STANDARD OR ALTERED SPACER TUBES OR A COMBINATION THEREOF OR AS DIRECTED BY THE ENGINEER. FOR VERY SMALL PARAPET WIDTHS, GUARDRAIL MAY BE INSTALLED AGAINST BRIDGE RAIL WITHOUT SPACER TUBES.
6. DO NOT DRILL BRIDGE RAIL IN ORDER TO INSTALL GUARDRAIL ANCHOR UNIT.
7. ATTACH THREADED STUDS TO PLATE WITH 1/4" WELDS ALL AROUND.
8. PROVIDE SHOP DRAWINGS OF THE PLATES TO THE ENGINEER FOR APPROVAL BEFORE FABRICATING THE PLATES.
9. LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
10. SEE ROADWAY STANDARD DRAWING 862.03 SHEET 4 FOR ADDITIONAL INFORMATION ON THE TYPE III ANCHOR UNIT.

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON 5/6/09

GUARDRAIL ATTACHMENT TO BRIDGE POST

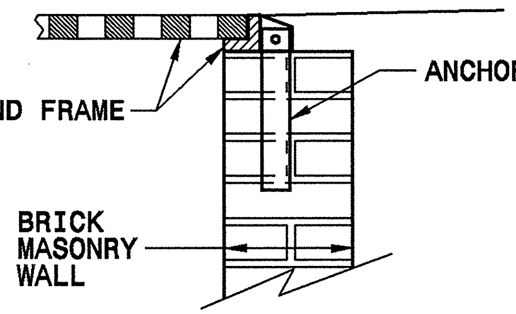
DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

GUARDRAIL ANCHOR UNIT TYPE III MODIFIED FOR CHURCH RAIL

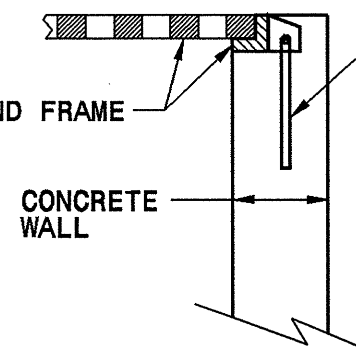
ORIGINAL BY: E.E. WARD DATE: 10-02
MODIFIED BY: E.E. WARD DATE: 02-04
CHECKED BY: DATE:
FILE SPEC.: \usr\details\stand\bpiii.dgn

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

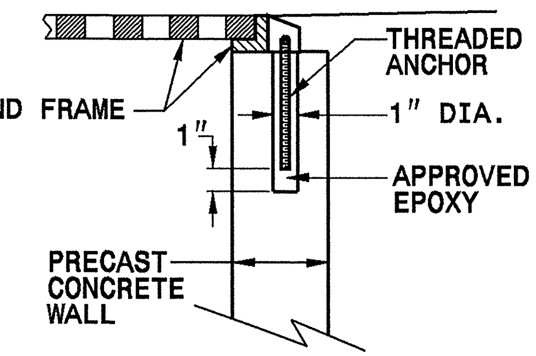
ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE



BRICK MASONRY CONSTRUCTION



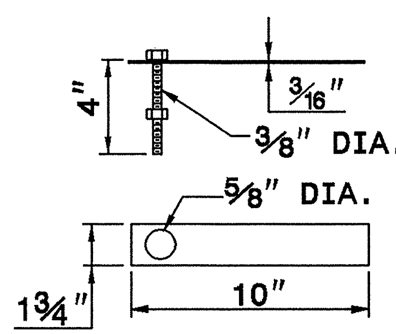
CONCRETE CONSTRUCTION



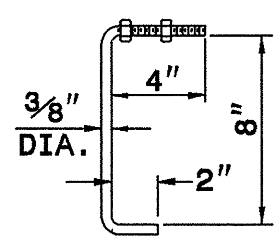
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

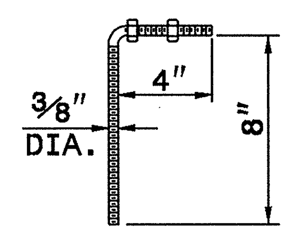
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



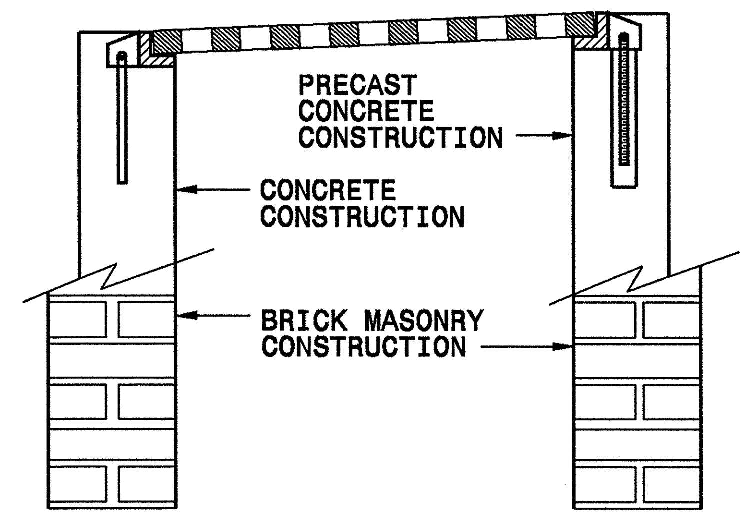
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

SHEET 1 OF 1
840D25

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

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

SHEET 1 OF 1
840D25

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON
5/6/09

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

SEE PLATE FOR TITLE

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

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PS237492

COMPUTED BY: ______________________ DATE: __________

CHECKED BY: ______________________ DATE: __________

PROJECT NO.	SHEET NO.
R-5146	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

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

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE) 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.
10+20	MED	1	2															20																		
10+83	MED	2																																		
17+20	MED	3																																		
19+15	MED	4																																		
22+80	MED	5																																		
26+97	MED	6																																		
32+75	MED	7																																		
32+80	WBL (RT)	8																																		
37+15	MED	9																																		
41+17	MED	10																																		
44+85	EBL (RT)	11																20																		
45+00	EBL (RT)	12																40																		
48+70	MED	13																																		
52+20	MED	14																																		
56+00	MED	15																																		
57+30	EBL (RT)	16																																		
59+80	MED	17																																		
61+60	MED	18																																		
71+73	MED	19																																		
82+60	MED	20																																		
86+33	MED	21																																		
92+13	MED	22																																		
96+67	MED	23																																		
101+80	MED	24																																		
																		200																		
SHEET TOTALS																		280																		

STATION	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	TRAFFIC BEARING JUNCTION BOX STD. 840.34	TRAFFIC BEARING GRATED DROP INLET STD. 840.36	STEEL FRAME WITH TWO GRATES STD. 840.37	CONVERT O.T.C.B. TO J.B. (SEE DETAIL 2-B)	CONVERT O.T.C.B. TO G.D.I. (SEE DETAIL 2-C)	CONVERT O.T.C.B. TO C.B. (SEE DETAIL 2-D)	ADJUSTMENT OF DROP INLETS	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD. 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN. FT.	REMARKS
10+20																			1								
10+83	1										1		1														2GI - 840.22
17+20													1							1							2GI - 840.22
19+15																						1					
22+80													1							1							2GI - 840.22
26+97																						1					
32+75																						1					
32+80	1	3.5															1	1									
37+15																						1					
41+17													1							1							2GI - 840.22
44+85	1															1											In Y-Line Ditch
45+00	1																1	1									30' in -L- Ditch, 10' STR 11 to 12
48+70													1							1							2GI - 840.22
52+20													1							1							2GI - 840.22
56+00																						1					
57+30					1																1						
59+80													1							1							2GI - 840.22
61+60													1							1							2GI - 840.22
71+73													1							1							2GI - 840.22
82+60													1							1							2GI - 840.22
86+33													1							1							2GI - 840.22
92+13													1							1							2GI - 840.22
96+67													1							1							2GI - 840.22
101+80													1							1							2GI - 840.22
	5										5		5														
SHEET TOTALS	9	3.5			1						6		19			1	2	2	1	13	1	5					

NOTE: 5 MDS's, FRAME WITH TWO GRATES, AND 200 LF OF 18" BCCS PIPE ADDED AS CONTINGENCY TO BE USED AT DIRECTION OF ENGINEER

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

COMPUTED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
GUARDRAIL SUMMARY

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-5146	3A

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL
W = TOTAL WIDTH OF FLARE FROM BEGIN

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GRAU 350	M-350	AT-1	CAT-1	VI MOD	TYPE 350 TL-2	TYPE III MOD	G	NG				
-L-	12+12.5	13+50	WBL MED	137.5			13+50 (BR)		4	7	143.75		2.875									1	1						Anchor to Bridge
-L-	12+75	13+50	WBL RT	75			13+50 (BR)		4	7	56.25		1.125									1	1				62.5		Anchor to Bridge
-L-	12+75	13+50	EBL LT	75			13+50 (BR)		4	7										1			1				75		Anchor to Bridge
-L-	14+50	15+25	EBL LT	75			14+50 (BR)		4	7	56.25		1.125									1	1				75		Anchor to Bridge
-L-	14+50	15+87.5	EBL MED	137.5			14+50 (BR)		4	7	118.75		2.375									1	1						Anchor to Bridge
-L-	14+50	16+50	WBL RT	200			14+50 (BR)		4	7										1			1				75		Anchor to Bridge
-L-	32+58.75	32+90	EBL LT	31.25	37.5		32+80	32+60	2	6	25		1							1		1							At 2x6 C & G Non-Standard
-L-	56+25	59+25	WBL RT	300	37.5		57+00	59+00	7	10	6.25		4						1	1									Radius to Y- line
-L-	60+00	61+75	WBL RT	175			60+75	61+50	7	10	50		1				1			1									
-L-	71+00	72+00	WBL RT	100			71+50	71+75	7	10	50		1				1			1									
-L-	71+85	73+10	EBL LT	125			72+25	72+10	7	10	50		1				1			1									
-L-	94+75	97+00	WBL RT	225			95+50	96+75	7	10	50		1				1			1									
-L-	98+25	105+75	WBL RT	750			99+00	105+50	7	10	50		1				1			1									
	SUBTOTAL			2,406.25	75												5		1	9		5	6				287.5		
	ANCOR DEDUCT			550																									
	TOTAL			1,856.25	75												5		1	9		5	6				287.5		
	SAY			1862.5	75																								

DEDUCTIONS FOR ANCHORS
GRAU-350 5 @ 50 EA. = 250
TYPE 350 TL=2 5 @ 25' = 125
AT- 1 1 @ 6.25 = 6.25
CAT- 1 9 @ 6.25 = 56.25
TYPE III MOD 6 @ 18.75 = 112.5

TOTAL = 550

PROJECT REFERENCE NO.	SHEET NO.
R-5146	4

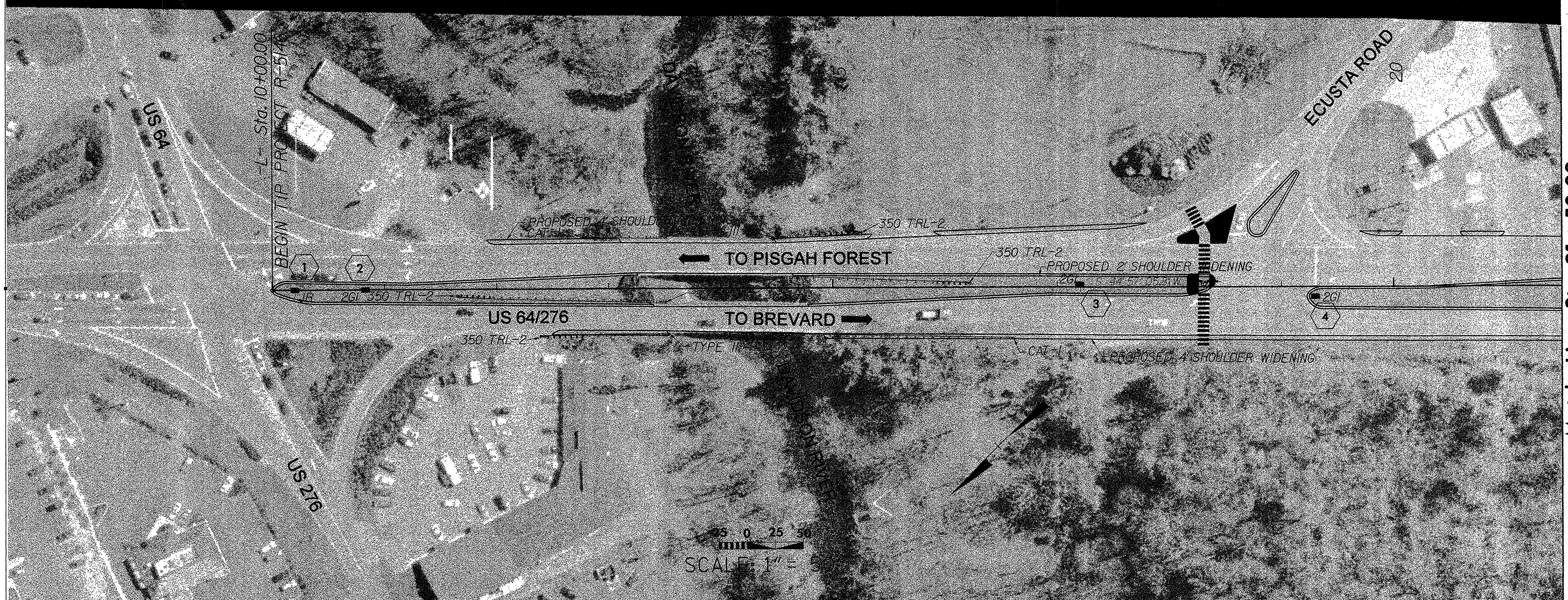
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 16887 ENGINEER JAMES R. WILSON

James R. Wilson
5-4-09

8/17/99

REVISIONS



Match Line Sta. 21+50.00

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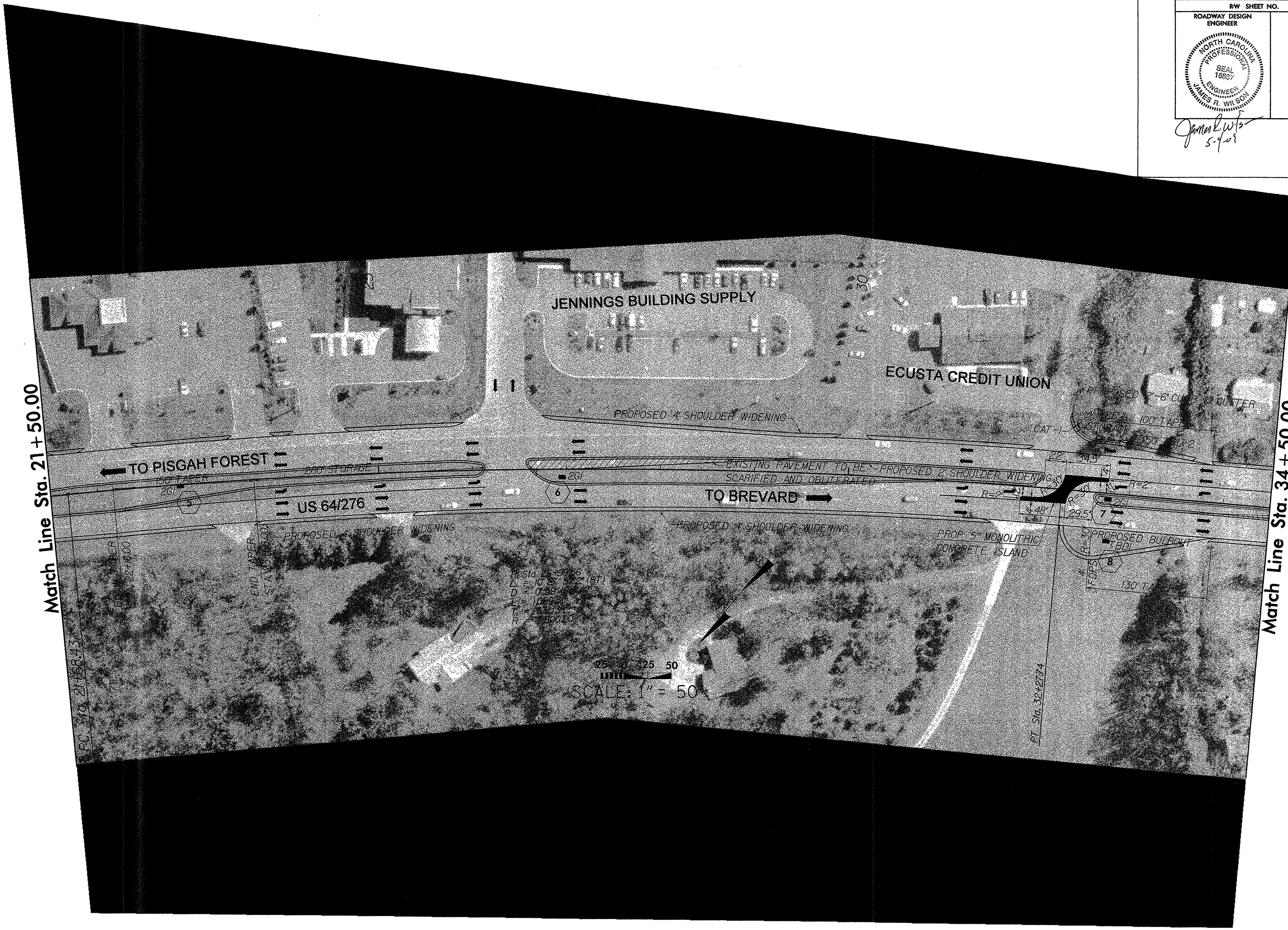
PROJECT REFERENCE NO.	SHEET NO.
R-5146	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 16897 ENGINEER JAMES R. WILSON

5-4-09

REVISIONS

8/17/99



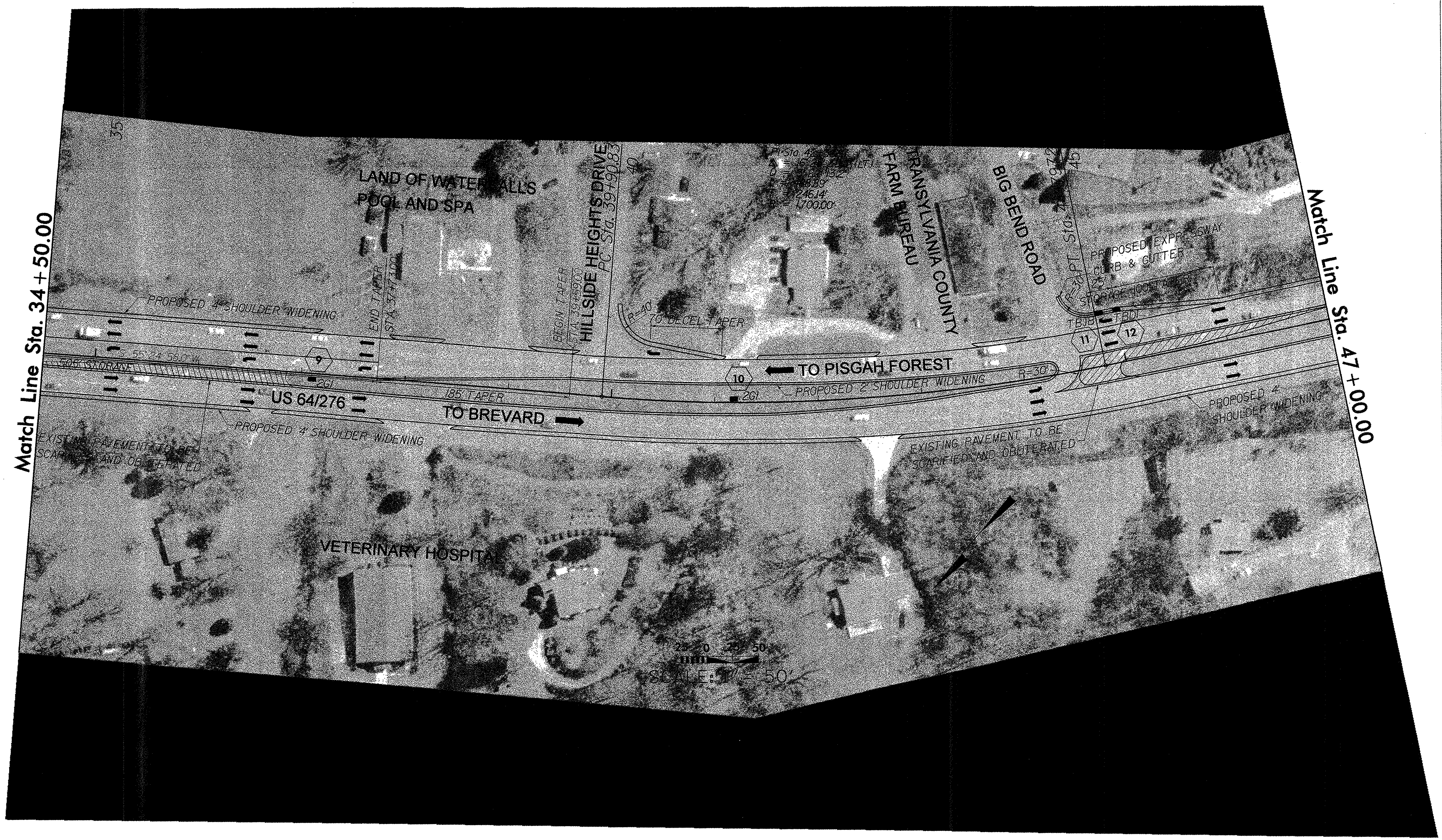
8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-5146	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 16887 ENGINEER JAMES R. WILSON

5-4-09



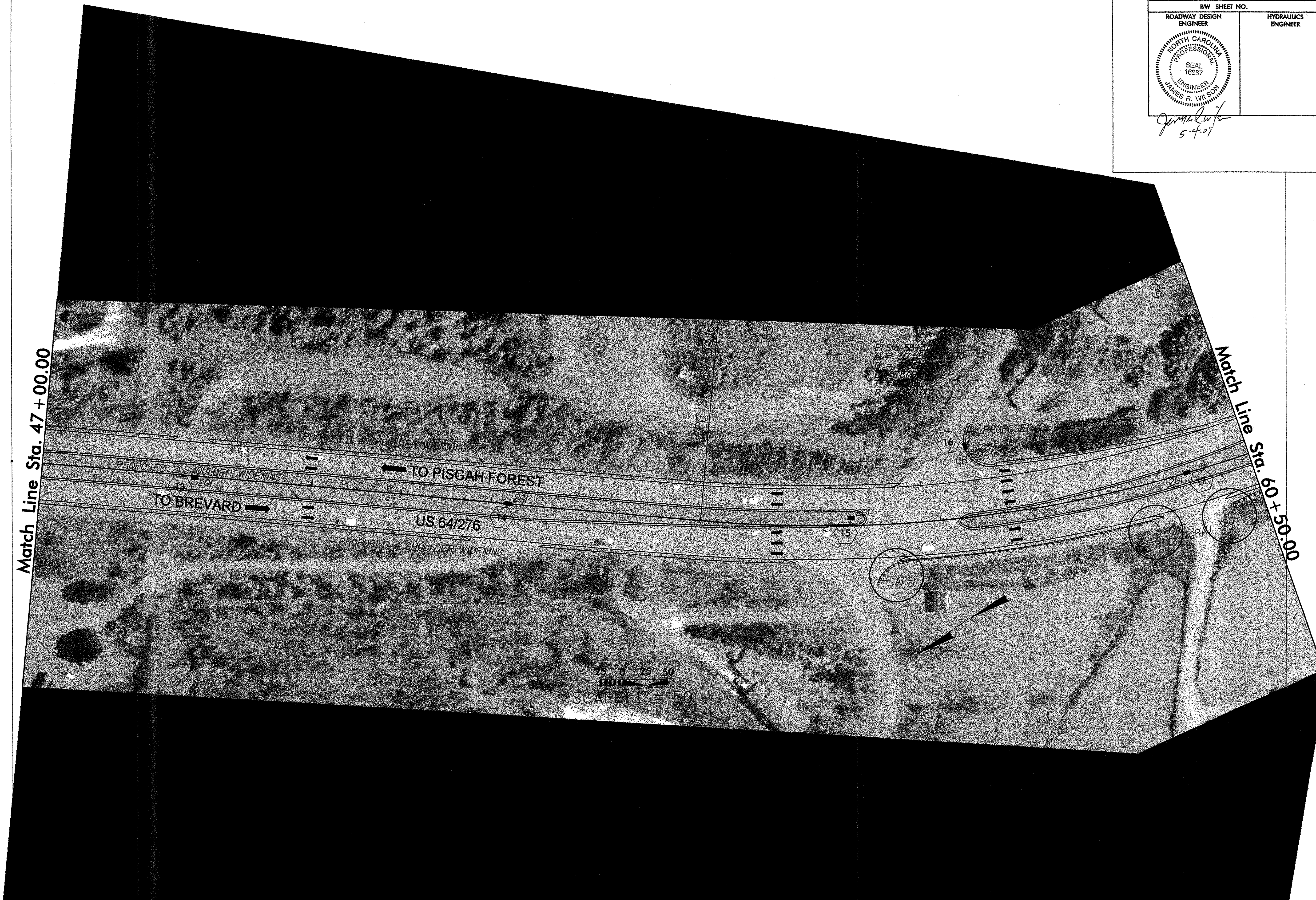
PROJECT REFERENCE NO.	SHEET NO.
R-5146	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 16997 ENGINEER JAMES R. WILSON

5-4-09

8/17/99

REVISIONS



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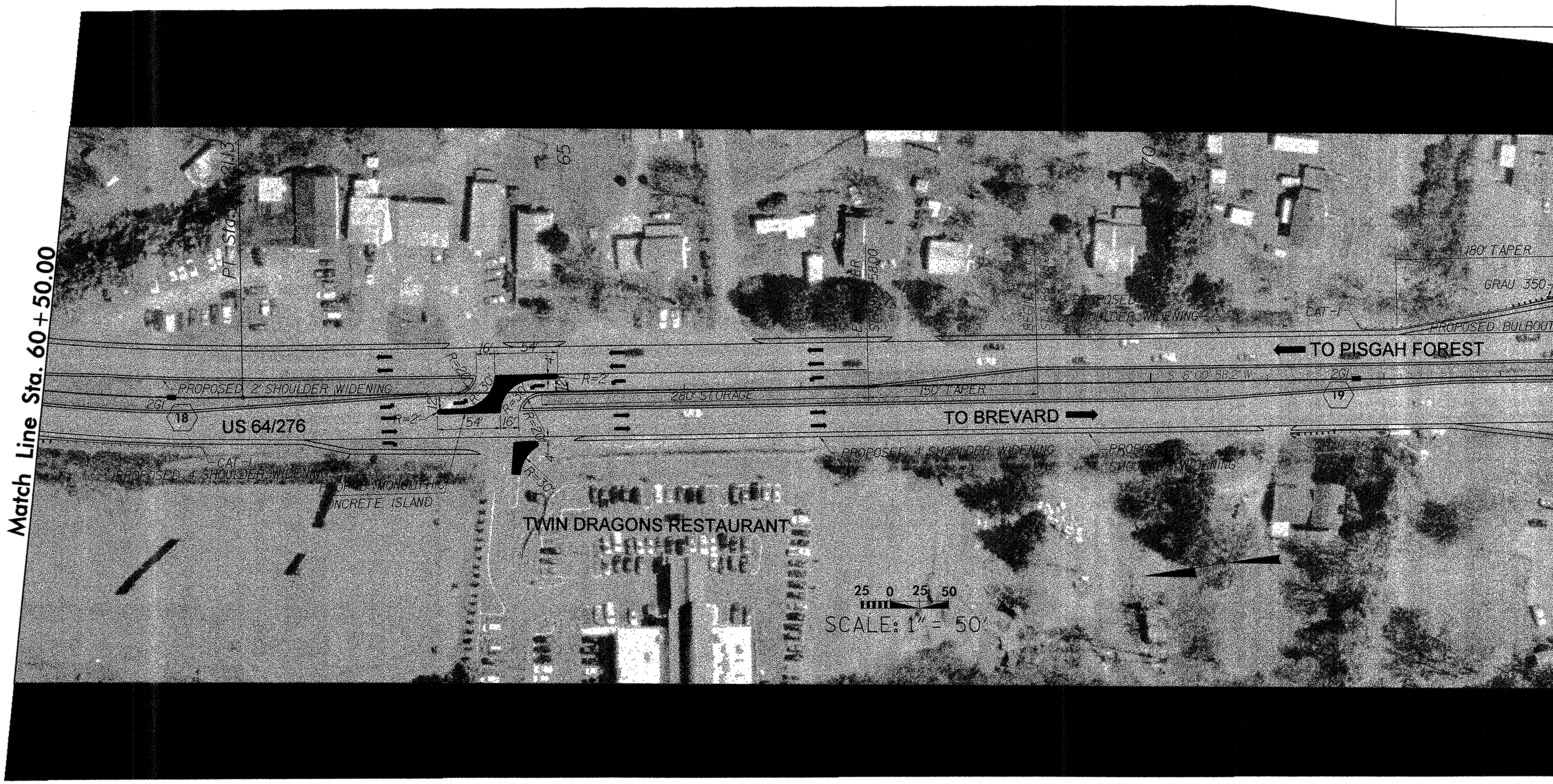
PROJECT REFERENCE NO.	SHEET NO.
R-5146	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 16887 ENGINEER JAMES R. WILSON

5-4-09

8/17/99

REVISIONS



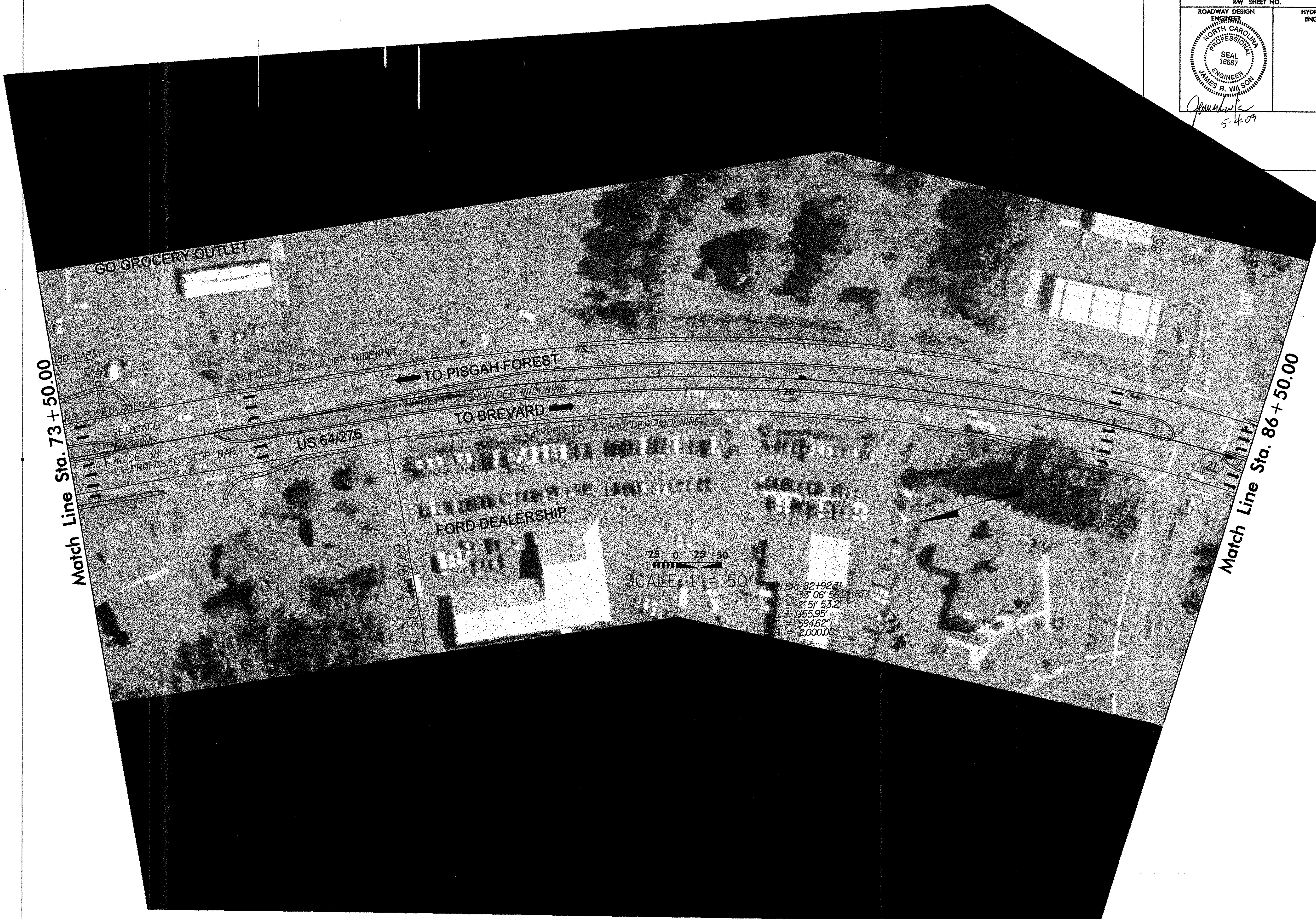
PROJECT REFERENCE NO.	SHEET NO.
R-5146	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 16887 ENGINEER JAMES R. WILSON

5-4-09

REVISIONS

8/17/99



PROJECT REFERENCE NO.	SHEET NO.
R-5146	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 16887 ENGINEER JAMES R. WILSON

5-4-09

REVISIONS

8/17/99

Match Line Sta. 86+50.00

SAINT TIMOTHY'S METHODIST CHURCH

PROPOSED 4' SHOULDER WIDENING

TO PISGAH FOREST

R=30'

26'

22

US 64/276

PROPOSED 2' SHOULDER WIDENING

23

TO BREVARD

GRAV. 350

Sta. 86+53.64

25 0 25 50

SCALE: 1" = 50'

Match Line Sta. 99+50.00

04-MAY-2009 15:14
J:\brevard\pulbouts\roadway\dgn\pln7.dgn

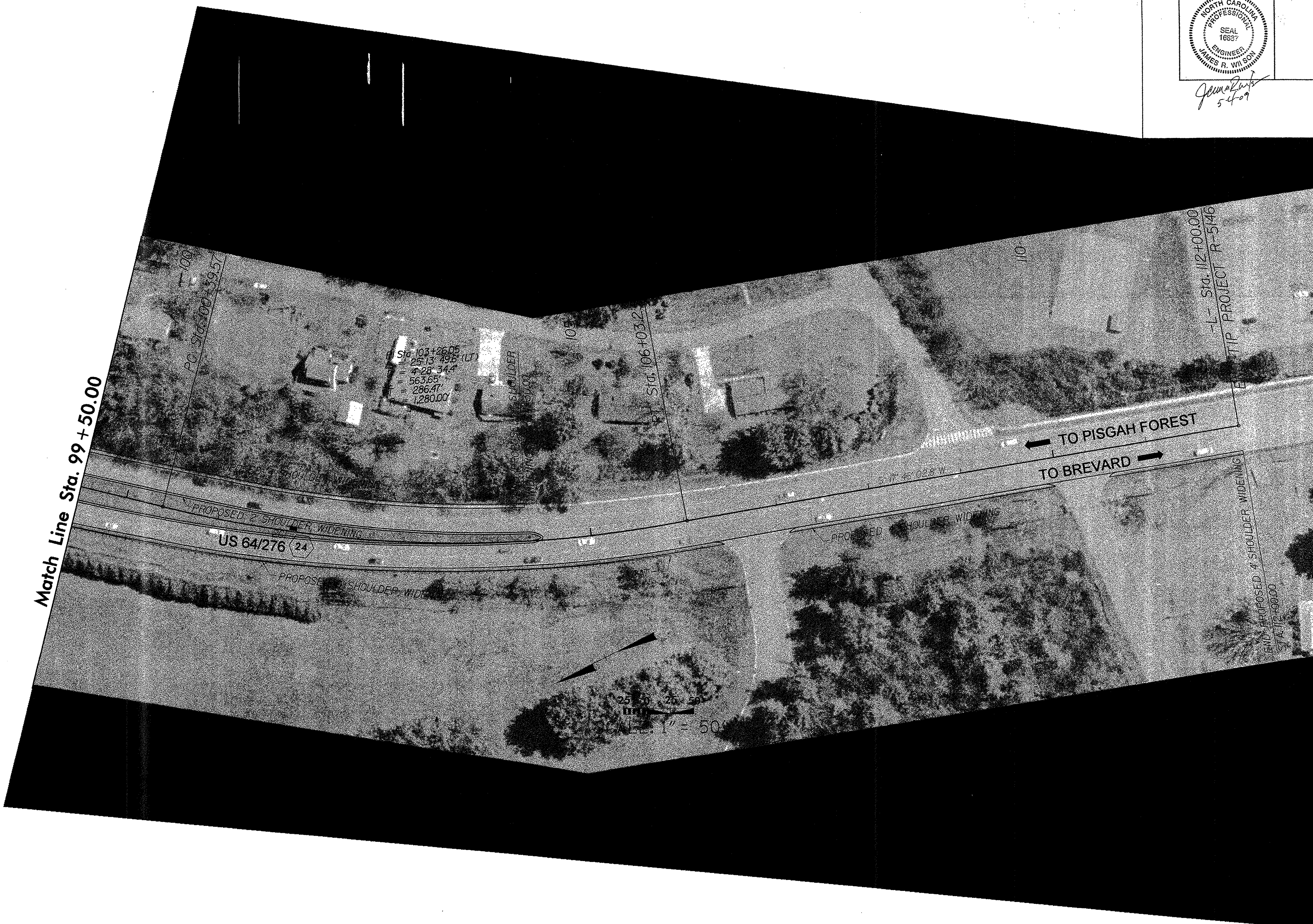
PROJECT REFERENCE NO.	SHEET NO.
R-5146	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 16837 ENGINEER JAMES R. WILSON

5-4-09

8/17/99

REVISIONS



PROJECT NO.	SHEET NO.	TOTAL NO.
R-5146	12	16

SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LENGTH MI	WIDTH FT	REMOVAL OF EXISTING ASPHALT PAVEMENT SY	FOUNDATION CONDITIONING MATERIAL, MINOR STRS TON	18"BCCS PIPE CULVERTS, TYPE B 0.064" THICK LF	PIPE CLEANOUT EA	INCIDENTAL STONE BASE TON	SHOULDER RECONSTRUCTION SMI	2 1/2" MILLING SY	INCIDENTAL MILLING SY	BASE COURSE, B25.0B TONS	INTERMEDIATE COURSE, I19.0B TONS	SURFACE COURSE, S9.5B TONS	PG 64-22 PLANT MIX TONS	MASONRY DRAINAGE STRUCTURE EA	MASONRY DRAINAGE STRUCTURE LF
45046.3.ST1	Transylvania	1	US276	WESTBOUND FROM STATION 10+00 TO 13+50	1	0.066	6		10	20	1		0.53			73.00		19.00	4.00	1	
"	"	2	US276	WESTBOUND FROM STATION 14+50 TO 104+30	2	1.7	30	245	15	200	20	40	3.50	27,000.00	1,250.00	2,263.00	4,316.00	3,015.00	481.00	6	3.5
"	"	3	US276	WESTBOUND FROM STATION 104+30 TO 112+00	3	0.146	14						0.15			108.00		30.00	6.00		
"	"	4	US276	EASTBOUND FROM STATION 90+00 TO 104+30	4	0.271	27	210					0.27	3,975.00		100.00	570.00	363.00	53.00		
"	"	5	US276	EASTBOUND FROM STATION 14+50 TO 90+00	2	1.43	30	414	10	60			2.90	23,420.00		1,968.00	3,622.00	2,524.00	406.00	2	
"	"	6	US276	EASTBOUND FROM STATION 10+00 TO 13+50	1	0.066	6						0.13			73.00		19.00	4.00		
TOTAL FOR PROJ NO. 45046.3.ST1						**3.679**		**869**	**35**	**280**	**21**	**40**	**7.48**	**54,395.00**	**1,250.00**	**4,585.00**	**8,508.00**	**5,970.00**	**954.00**	**9**	**3.5**
GRAND TOTAL						**3.679**		**869**	**35**	**280**	**21**	**40**	**7.48**	**54,395.00**	**1,250.00**	**4,585.00**	**8,508.00**	**5,970.00**	**954.00**	**9**	**3.5**

PROJECT NO.	SHEET NO.	TOTAL NO.
R-5146	13	16

SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	FRAME WITH GRATE & HOOD, STD 840.03 TYPE E EA	FRAME WITH 2 GRATES, STD 840.22 EA	STEEL FRAME WITH 2 GRATES, STD 840.37 EA	2'-6" CURB & GUTTER LF	CONCRETE EXPRESSWAY GUTTER LF	RETROFIT EXISTING WHEELCHAIR RAMPS EA	6" CONCRETE DRIVEWAYS SY	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED) SY	ADJ. OF DROP INLET EA	CONVERT EXISTING CATCH BASIN TO JUNCTION BOX EA	CONVERT EXISTING CATCH BASIN TO DROP INLET EA	CONVERT EXIST. OPEN THROAT CATCH BASIN TO CATCH BASIN EA	STEAL BEAM GUARDRAIL LF	STEEL BEAM GUARDRAIL, SHOP CURVED LF	GUARDRAIL ANCHOR UNIT, TYPE TL-2 EA	GUARDRAIL ANCHOR UNIT, AT-1 EA
45046.3.ST1	Transylvania	1	US276	WESTBOUND FROM STATION 10+00 TO 13+50	1		1								1			125.00		2	
"	"	2	US276	WESTBOUND FROM STATION 14+50 TO 104+30	2		18	1			3	35	410	5		13		1,487.50	37.50		1
"	"	3	US276	WESTBOUND FROM STATION 104+30 TO 112+00	3																
"	"	4	US276	EASTBOUND FROM STATION 90+00 TO 104+30	4																
"	"	5	US276	EASTBOUND FROM STATION 14+50 TO 90+00	2	1		1	62	25		35					1	200.00	37.50	3	
"	"	6	US276	EASTBOUND FROM STATION 10+00 TO 13+50	1													50.00			
TOTAL FOR PROJ NO. 45046.3.ST1						**1**	**19**	**2**	**62**	**25**	**3**	**70**	**410**	**5**	**1**	**13**	**1**	**1,862.50**	**75.00**	**5**	**1**
GRAND TOTAL						**1**	**19**	**2**	**62**	**25**	**3**	**70**	**410**	**5**	**1**	**13**	**1**	**1,862.50**	**75.00**	**5**	**1**

PROJECT NO.	SHEET NO.	TOTAL NO.
R-5146	14	16

SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	GUARDRAIL ANCHOR UNIT, CAT-1 EA	GUARDRAIL ANCHOR UNITS, TYPE III MOD EA	GUARDRAIL ANCHOR UNIT, TYPE 350 EA	REMOVE EXISTING GUARDRAIL LF	PORTABLE LIGHTING LS	TEMPORARY SILT FENCE LF	SEDIMENT CONTROL STONE TON	MATTING (EROSION CONTROL) SY	1/4" HARDWARE CLOTH LF	SEEDING WITHOUT MULCH ACR	PEDESTRIAN SIGNAL HEAD, 16" , 1 SECTION W/ COUNTDOWN EA	SIGNAL CABLE LF	VEHICLE SIGNAL HEAD, 12", 3 SECTION EA	VEHICLE SIGNAL HEAD, 12", 4 SECTION EA	UNPAVED TRENCHING, 1 - 2" LF	DIRECTIONAL DRILL, 1 - 2" LF
45046.3.ST1	Transylvania	1	US276	WESTBOUND FROM STATION 10+00 TO 13+50	1		2		62.50	1		10	300	75							
"	"	2	US276	WESTBOUND FROM STATION 14+50 TO 104+30	2	6	1	4	75.00		300	20	8,000	650	2	1	805	1	1	945	60
"	"	3	US276	WESTBOUND FROM STATION 104+30 TO 112+00	3								345								
"	"	4	US276	EASTBOUND FROM STATION 90+00 TO 104+30	4								640								
"	"	5	US276	EASTBOUND FROM STATION 14+50 TO 90+00	2	2	2	1	75.00		300		6,725		1	1	805		1	945	60
"	"	6	US276	EASTBOUND FROM STATION 10+00 TO 13+50	1	1	1		75.00				315								
TOTAL FOR PROJ NO. 45046.3.ST1						**9**	**6**	**5**	**287.50**	**1**	**600**	**30**	**16,325**	**725**	**3**	**2**	**1,610**	**1**	**2**	**1,890**	**120**
GRAND TOTAL						**9**	**6**	**5**	**287.50**	**1**	**600**	**30**	**16,325**	**725**	**3**	**2**	**1,610**	**1**	**2**	**1,890**	**120**

PROJECT NO.	SHEET NO.	TOTAL NO.
R-5146	15	16

SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	JUNCTION BOX (STANDARD SIZE) EA	JUNCTION BOX (OVER-SIZED, HEAVY DUTY) EA	1/2" RISER WITH WEATHERHEAD EA	2" RISER WITH WEATHERHEAD EA	INDUCTIVE LOOP SAWCUT LF	LEAD-IN CABLE, 14-2 LF	SIGNAL PEDESTAL WITH FOUNDATION EA	SIGNS FOR SIGNALS EA	SIGNAL CABINET FOUNDATION EA	CONTROLLER / CABINET(TYPE 2070L,BASE MOUNTED) EA	DETECTOR CARD (TYPE 2070L) EA	CABINET BASE EXTENDER EA
45046.3.ST1	Transylvania	1	US276	WESTBOUND FROM STATION 10+00 TO 13+50	1												
"	"	2	US276	WESTBOUND FROM STATION 14+50 TO 104+30	2	12	4	1	1	2,484	3,030		1				
"	"	3	US276	WESTBOUND FROM STATION 104+30 TO 112+00	3												
"	"	4	US276	EASTBOUND FROM STATION 90+00 TO 104+30	4												
"	"	5	US276	EASTBOUND FROM STATION 14+50 TO 90+00	2	12	4			2,484	3,030	1	1	1	1	7	1
"	"	6	US276	EASTBOUND FROM STATION 10+00 TO 13+50	1												
TOTAL FOR PROJ NO. 45046.3.ST1						**24**	**8**	**1**	**1**	**4,968**	**6,060**	**1**	**2**	**1**	**1**	**7**	**1**
GRAND TOTAL						**24**	**8**	**1**	**1**	**4,968**	**6,060**	**1**	**2**	**1**	**1**	**7**	**1**

PROJECT NO.	SHEET NO.	TOTAL NO.
R-5146	16	16

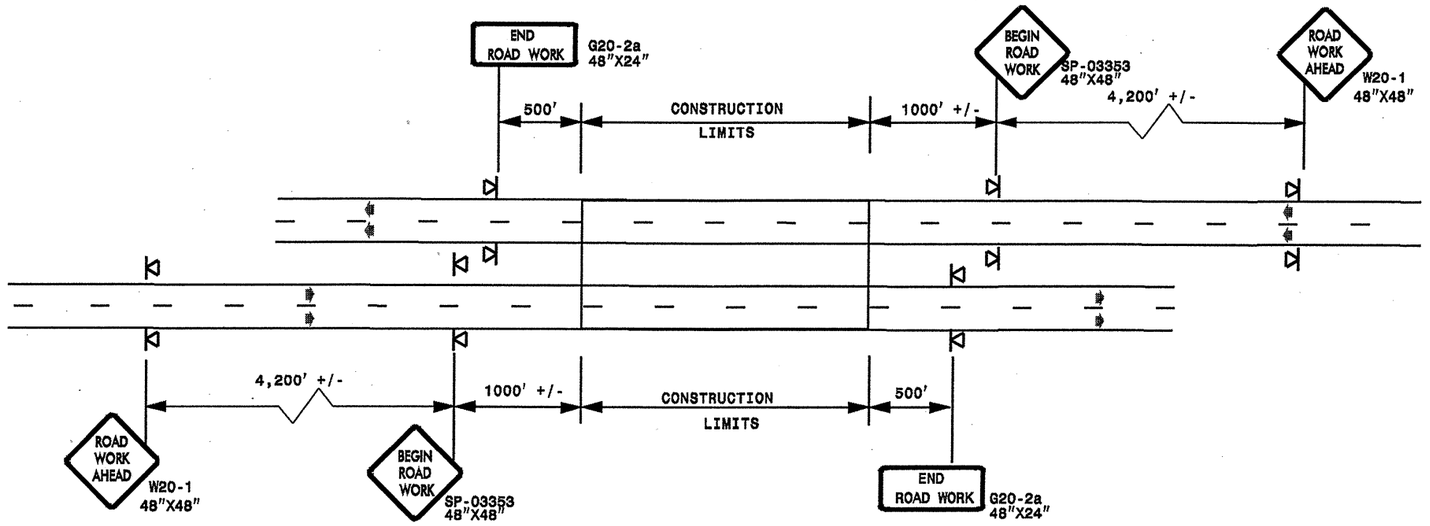
P A I N T & TRAFFIC CONTROL Q U A N T I T I E S

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	4400000000-E STATIONARY WORK ZONE SIGN SF	4405000000-E PORTABLE WORK ZONE SIGN SF	4415000000-N FLASHING ARROW PANELS, TYPE C EA	4420000000-N CHANGEABLE MESSAGE SIGN EA	4430000000-N DRUMS EA	4480000000-N TMIA EA	4516000000-N SKINNY DRUM EA	4810000000-E 4" WHITE PAINT LF	4810000000-E 4" YELLOW PAINT LF	4820000000-E 8" WHITE PAINT LF	4835000000-E 24" WHITE PAINT LF	4845000000-N PAINT LT ARROW EA	4845000000-N PAINT STR ARROW EA	4845000000-N PAINT RT ARROW EA	4905000000-N SNOW PLOWABLE MARKERS, CRYSTAL & RED EA
45046.3.ST1	Transylvania	1	US276	WESTBOUND FROM STATION 10+00 TO 13+50	288	96	2	2	24	2	200	900	700						5
"	"	2	US276	WESTBOUND FROM STATION 14+50 TO 104+30								45,000	36,000		1,350	27	36		160
"	"	3	US276	WESTBOUND FROM STATION 104+30 TO 112+00								1,540							
"	"	4	US276	EASTBOUND FROM STATION 90+00 TO 104+30								7,000	5,600						10
"	"	5	US276	EASTBOUND FROM STATION 14+50 TO 90+00								37,500	30,000	1,800	1,008	27	36	6	125
"	"	6	US276	EASTBOUND FROM STATION 10+00 TO 13+50								720	700						5
TOTAL FOR PROJ NO. 45046.3.ST1					**288**	**96**	**2**	**2**	**24**	**2**	**200**	**92,660**	**73,000**	**1,800**	**2,358**	**54**	**72**	**6**	**305**
												165,660				**132**			
GRAND TOTAL					**288**	**96**	**2**	**2**	**24**	**2**	**200**	**92,660**	**73,000**	**1,800**	**2,358**	**54**	**72**	**6**	**305**
												165,660				**132**			

PROJ. REFERENCE NO.	SHEET NO.
45046.3.ST1 (R-5148)	TCP-1

ADVANCE WORK ZONE WARNING SIGNING FOR FREEWAYS (4 LANES OR GREATER)

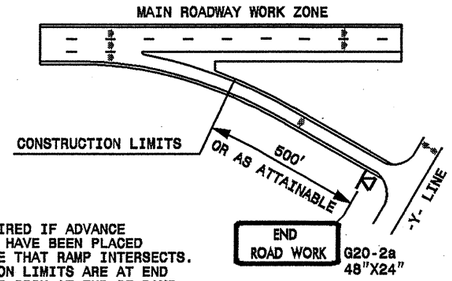
DETAIL A



ROADWAYS INTERSECTING ALONG FREEWAY WORK ZONE (Y-LINES)

DETAIL B

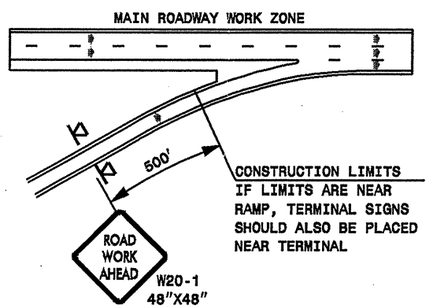
EXIT RAMPS



NOTE:
SIGN NOT REQUIRED IF ADVANCE WARNING SIGNS HAVE BEEN PLACED ALONG -Y- LINE THAT RAMP INTERSECTS. IF CONSTRUCTION LIMITS ARE AT END OF RAMP, PLACE SIGN AT END OF RAMP.

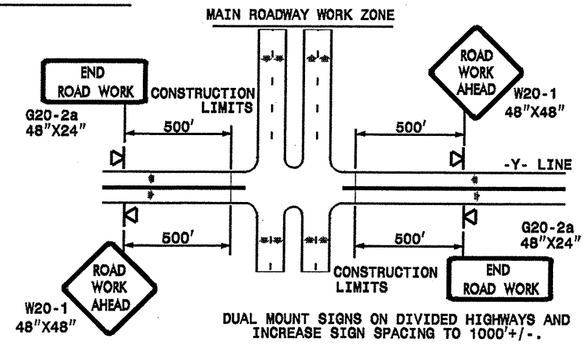
DETAIL C

ENTRANCE RAMPS



DETAIL D

-Y- LINES



DUAL MOUNT SIGNS ON DIVIDED HIGHWAYS AND INCREASE SIGN SPACING TO 1000'+/-.

GENERAL NOTES

- USE FLUORESCENT ORANGE SHEETING (TYPE VII OR HIGHER) ON ALL ADVANCE WORK ZONE SIGNS.
- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK.
- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- USE PORTABLE WORK ZONE SIGNS ONLY WITH PORTABLE WORK ZONE SIGN STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER. PORTABLE WORK ZONE SIGNS MAY BE ROLL UP OR APPROVED COMPOSITE.
- PROVIDE PORTABLE WORK ZONE SIGN STANDS, PORTABLE SIGNS AND SIGN SHEETING WHICH ARE LISTED ON THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S APPROVED PRODUCT LIST OR ACCEPTED AS TRAFFIC QUALIFIED BY THE TRAFFIC CONTROL UNIT.
- ** TWO-WAY UNDIVIDED ADVANCE WARNING SIGN CONFIGURATION MAY BE USED ON MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.

LEGEND

- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

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

DETAIL DRAWING
FOR FREEWAYS
WORK ZONE WARNING SIGNS
(SHORT-DURATION LANE CLOSURES)

SHEET 1 OF 1

APPROVED:_____ DATE:_____

SEAL

DETAIL DRAWING
FOR FREEWAYS
WORK ZONE WARNING SIGNS

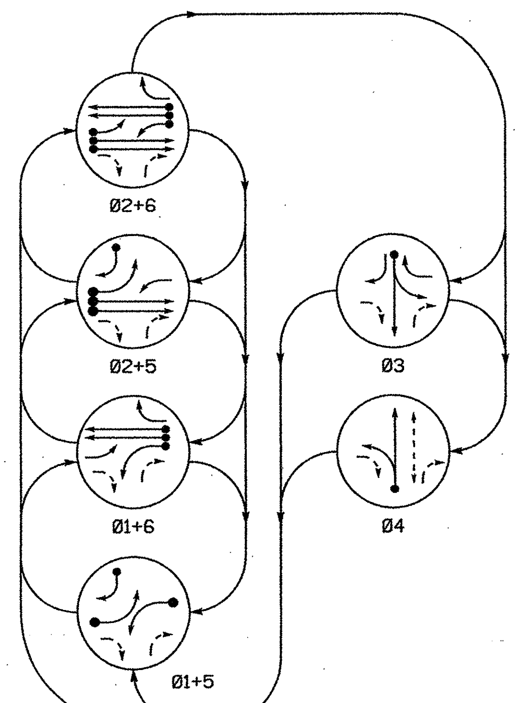
SCALE:	NONE
DATE:	
DWGL BY:	
DESIGN BY:	
REVIEWED BY:	

REVISIONS	
7-98	10/01
10-98	03/04
01/01	11/04
CADD FILE	

22-APR-2009 19:41
s:\signing\resurfacing_030509\resurfacing2009\dlvl4\c202309_450463st1_r-5146_transylvania_us276\c202309_450463st1_r-5146_free4lanesgreatJuly2006_portable.dgn
pseymore AT WZTC237502

PROJECT REFERENCE NO.	SHEET NO.
R-5146	SIG.1

NORMAL PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- ◄——● DETECTED MOVEMENT
- ◄—— UNDETECTED MOVEMENT (OVERLAP)
- ◄- - UNSIGNALIZED MOVEMENT
- ◄- - -► PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	FYA	FYA	R←	R←	R←
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	G / ←	R	R
32	R / →	R	R / →	R	G	R	R
41	R	R	R	R	R	G / ←	R
42	R	R	R	R	R	G	R
51	←	FYA	←	FYA	R←	R←	R←
61	R	G	R	G	R	R	Y
62	R	G	R	G	R / →	R	Y
P41, P42	DW	DW	DW	DW	DW	W	DRK

FYA = Flashing Yellow Arrow

W - Walk
DW - Don't Walk
DRK - Dark

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM \ TO	← 1	← 2	FYA 1	FYA 2	R← 1	R← 2
←	←	←	Y←	R←	Y←	R←
FYA	FYA	FYA	FYA	FYA	Y←	R←
R←	R←	R←	R←	R←	R←	R←

FYA = Flashing Yellow Arrow

2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING: PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	+15	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
2A	6X6	420	5	-	2	Y	Y	-	-	-	-	Y
2B	6X6	420	5	-	2	Y	Y	-	-	-	-	Y
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	3	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	Y
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	Y	-	3	-	Y
5B	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A	6X6	315	5	-	6	Y	Y	-	-	-	-	Y
6B	6X6	315	5	-	6	Y	Y	-	-	-	-	Y

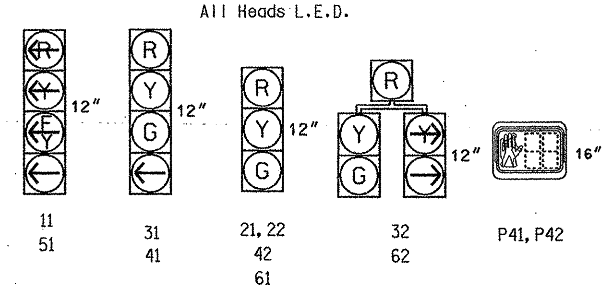
6 PHASE
FULLY ACTUATED
(TIME BASED COORDINATION)

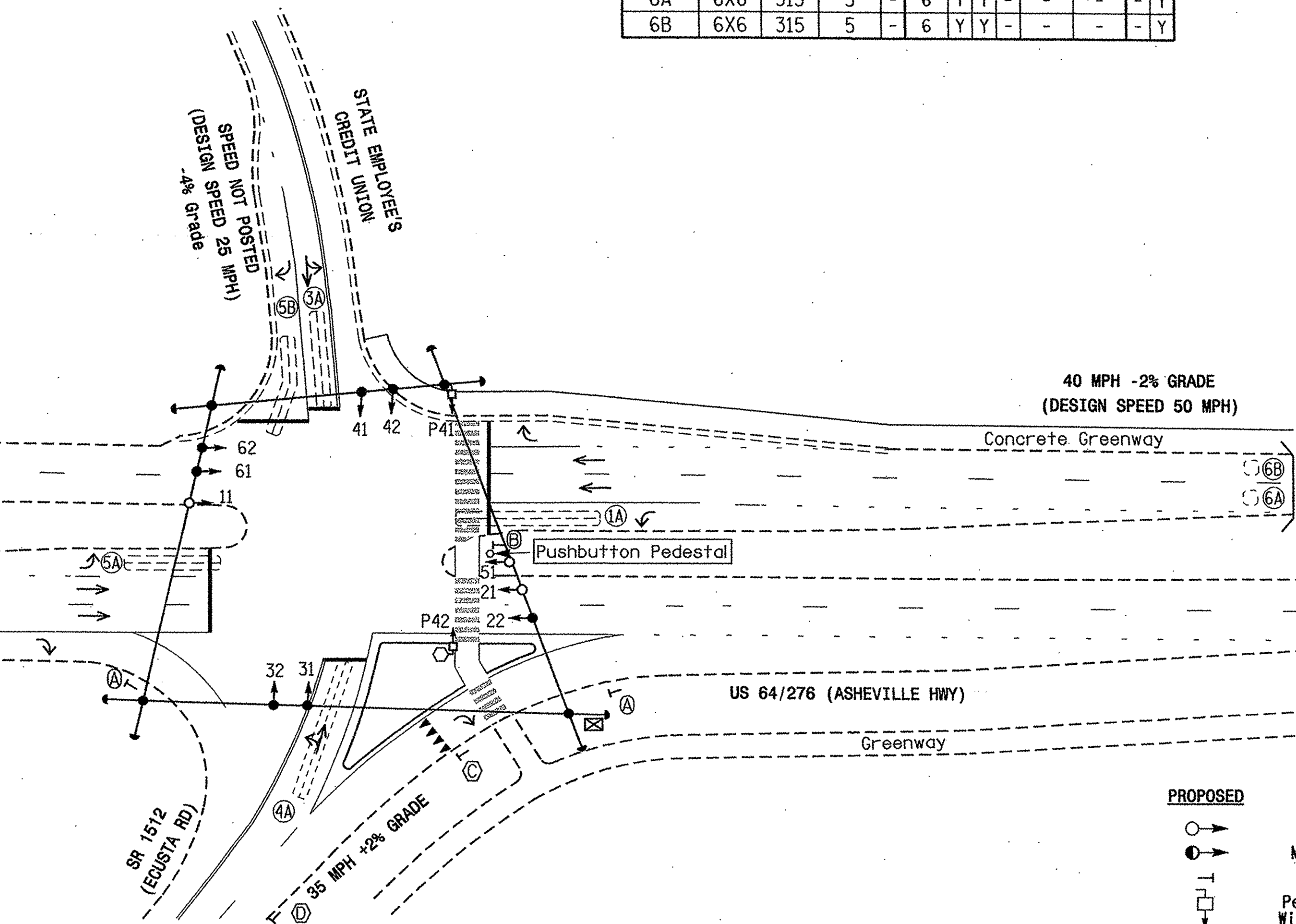
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal heads numbered 22.
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

SIGNAL FACE I.D.

All Heads L.E.D.





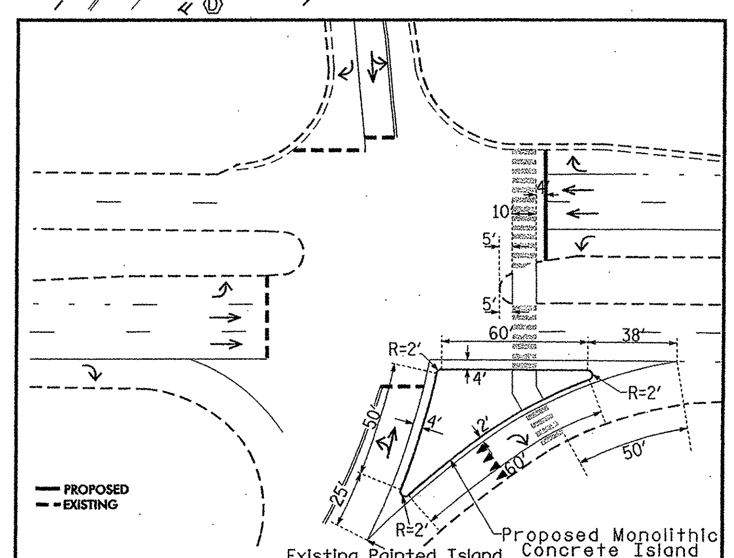
LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
⊠	Controller & Cabinet	
□	Junction Box	■
- - - -	2-in Underground Conduit	- · - · -
N/A	Right of Way	
→	Directional Arrow	→
—DD—	Directional Drill	N/A
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓑ
Ⓒ	In-Street Pedestrian Crossing Sign (R1-6)	Ⓒ
Ⓓ	Bicycle Crossing Sign (W11-1)	Ⓓ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	14	7	7	7	14
Extension 1 *	2.0	6.0	2.0	2.0	2.0	5.0
Max Green 1 *	25	90	15	20	15	90
Yellow Clearance	3.0	5.8	3.4	3.7	3.1	5.8
Red Clearance	3.1	1.4	2.8	2.2	3.1	1.4
Walk 1 *	-	-	-	7	-	-
Don't Walk 1	-	-	-	20	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	46	-	-	-	36
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.4	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



PROPOSED STOPBAR AND CROSSWALK LOCATIONS

SIGNAL UPGRADE

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 64/276 (ASHEVILLE HWY) AT SR 1512 (ECUSTA ROAD)/ SECU ENTRANCE

DIVISION 14 TRANSYLVANIA COUNTY NEAR BREVARD

PLAN DATE:	FEBRUARY 2009	REVIEWED BY:
PREPARED BY:	R. HOUGH	REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

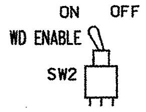
SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 30530 ZACHARY M. LITTLE

SIGNATURE DATE 4/10/09

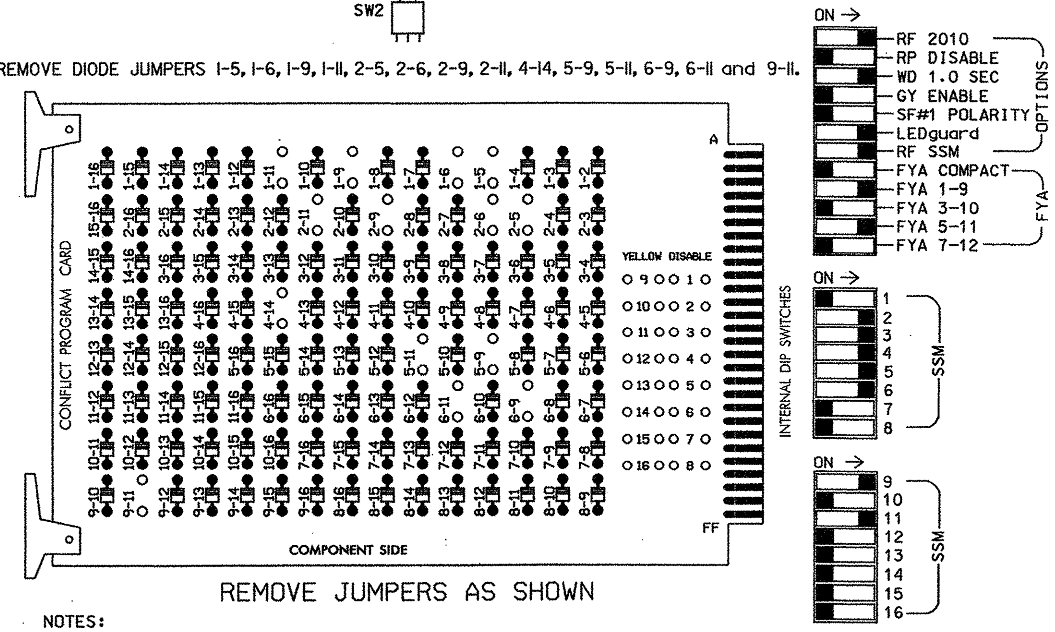
SIG. INVENTORY NO. 14-0798

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-14, 5-9, 5-11, 6-9, 6-11 and 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,7,8 10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
6. Program phase 4 for 'STARTUP PED CALL'.
7. The cabinet and controller are part of a time base Coordinated System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3			S4		S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1★	2	2 PED	3			4		4 PED	5★		6	6 PED	7	8	8 PED	OLA★	OLB	SPARE	OLC★	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31	32	62	41	42	P41, P42	51	32	61,62	NU	NU	NU	NU	11	NU	NU	51	NU	NU
RED		128		116	116		101	101			✳	134										
YELLOW	✳	129		117	117		102	102				135										
GREEN		130		118	118		103	103				136										
RED ARROW																	A121			A114		
YELLOW ARROW						117					132						A122			A115		
FLASHING YELLOW ARROW																	A123			A116		
GREEN ARROW	127			118		118	103			133	133											
(Don't Walk hand)									104													
(Walk person)									106													

NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail this sheet.

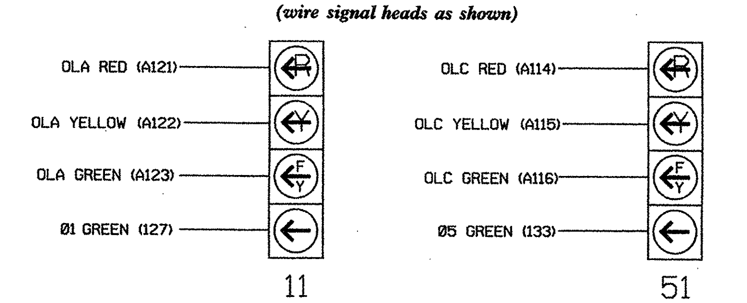
★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER..............2070L
CABINET.................McCAIN/CONTROL TECHNOLOGIES
(DWG.NO.9500-332-NCDOT)
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S3,S4,S4P,S5,S6,S9,S12.
PHASES USED.............1,2,3,4,5,6,4PED.
OVERLAP "A".............1+2
OVERLAP "B".............NOT USED
OVERLAP "C".............5+6
OVERLAP "D".............NOT USED

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B			NOT USED	NOT USED						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6 6B											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

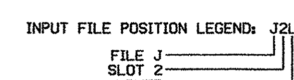
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

NOTE:
INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

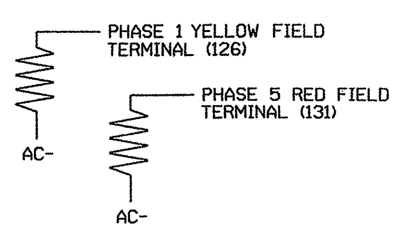


THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-0798
DESIGNED: February 2009
SEALED: 4-20-09
REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Transportation Mobility and Safety Division, Signals Management Section, State of North Carolina Department of Transportation

750 N.Greenfield Pkwy,Garner,NC 27529

US 64/276 (Asheville HWY)
at
SR 1512 (Ecusta Road)/
SECU Entrance

Division 14 Transylvania County Near Brevard

PLAN DATE: 4-7-09	REVIEWED BY: D.T.Joyce
PREPARED BY: D.H. Spaulding	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

George C. Brown 5/1/09
SIGNATURE DATE

SIG. INVENTORY NO. 14-0798

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1   (+/-COMMAND#)
IF  ACTIVE PHASE          #1   IS ON
AND RED CLEAR ON PHASE #1    IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2   (+/-COMMAND#)
IF  ACTIVE PHASE          #1   IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3   (+/-COMMAND#)
IF  YELLOW ON PHASE       #1   IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4   (+/-COMMAND#)
IF  ACTIVE PHASE          #5   IS ON
AND RED CLEAR ON PHASE #5    IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #5   (+/-COMMAND#)
IF  ACTIVE PHASE          #5   IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #6   (+/-COMMAND#)
IF  YELLOW ON PHASE       #5   IS ON
                 ↓
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          |12345678910111213141516
VEH OVL PARENTS:|XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED   _ YELLOW  _ GREEN
FLASH COLORS:  _ RED   _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          |12345678910111213141516
VEH OVL PARENTS:|    XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED   _ YELLOW  _ GREEN
FLASH COLORS:  _ RED   _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-0798
DESIGNED: February 2009
SEALED: 4-20-09
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 64/276 (Asheville HWY) at SR 1512 (Ecusta Road)/ SECU Entrance

Division 14 | Transylvania County | Near Brevard

PLAN DATE: 4-7-09	REVIEWED BY: D.T.Joyce
PREPARED BY: D.H. Spaulding	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Signals Management Section, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

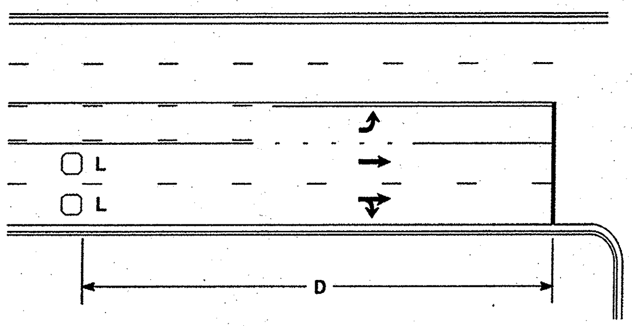
SIGNATURE: George C. Brown DATE: 5/1/09

SIG. INVENTORY NO. 14-0798

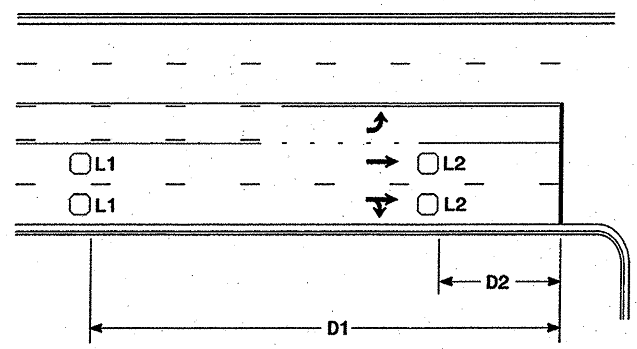
PROJECT REFERENCE NO.	SHEET NO.
	SIG4

45046.3.ST1 (R-5146)

High Speed Detection
[≥40 mph (64 km/hr)]



OR



Speed Limit mph (km/hr)	D ft	(m)
40 (64)	250	(75)
45 (72)	300	(90)
50 (80)	355	(110)
55 (88)	420	(130)

L = 6ft X 6ft (1.8m X 1.8m)
Wired in series for TS1 Controllers
Wired separately for TS2, 170, and 2070L Controllers

Volume Density Operation

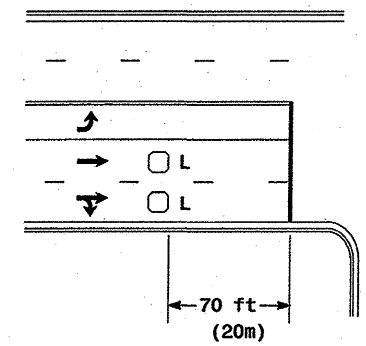
Speed Limit mph (km/hr)	D1 ft	(m)	D2 ft	(m)
40 (64)	250	(75)	80	(25)
45 (72)	300	(90)	90	(27)
50 (80)	355	(110)	100	(30)
55 (88)	420	(130)	110	(35)

L1 = 6ft X 6ft (1.8m X 1.8m) Wired in series

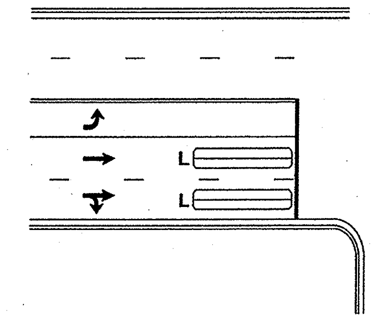
L2 = 6ft X 6ft (1.8m X 1.8m) Wired in series

"Stretch" Operation

Low Speed Detection
[≤35 mph (56 km/hr)]



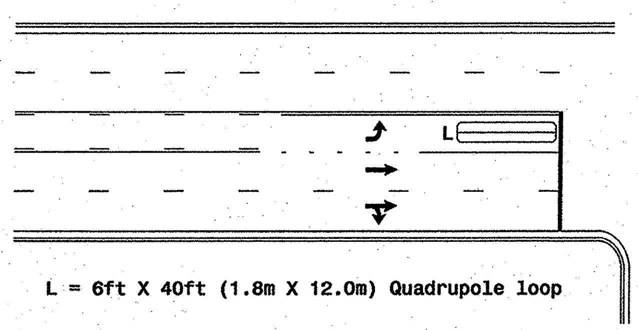
OR



L = 6ft X 6ft (1.8m X 1.8m)
Wired in series

L = 6ft X 40ft (1.8m X 12.0m)
Quadrupole loop, wired separately

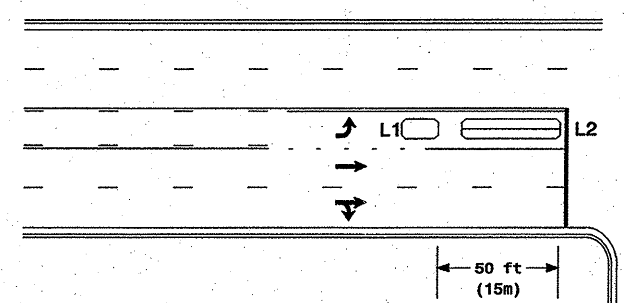
Left Turn Lane Detection



L = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

Presence Loop Detection

OR

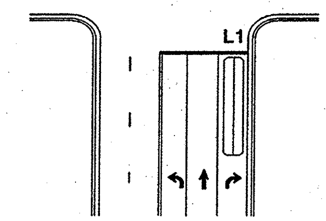


L1 = 6ft X 15ft (1.8m X 4.6m) Queue detector
L2 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

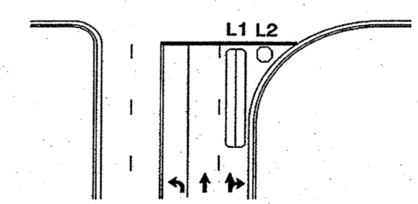
Queue Loop Detection

Right Turn Lane Detection

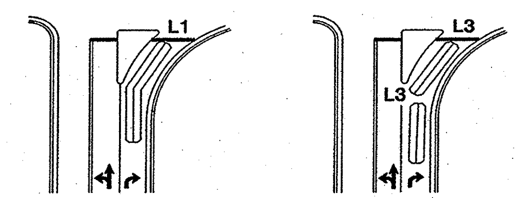
L1 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop
L2 = 6ft X 6ft (1.8m X 1.8m) [Minimum] Presence loop
Wired separately
L3 = 6ft X 20ft (1.8m X 6.0m) Quadrupole loop
Wired in series



Standard Turn

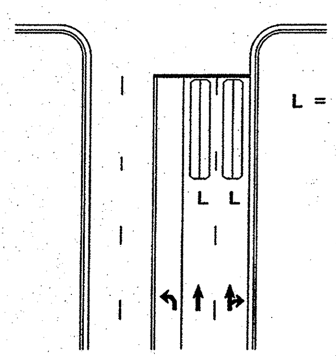


Wide Radius Turn



Channelized Turn

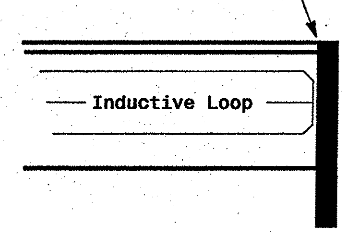
Side Street Detection



L = 6ft X 40ft (1.8m X 12.0m)
Quadrupole loop
Wired to separate detectors/channels

Presence Loop Placement at Stop Lines

Locate loop slightly behind leading edge of stop line



Note:
Loop may be located in advance of stop line when stop line is greater than 15' (4.5m) from edge of intersecting roadway; or, when loop detects a permissive or protected/permissive left turn.

Recommended Number of Turns

Single 6' X 6' (1.8m X 1.8m) loop (wired separately):

Length of Lead-in ft (m)	Number of Turns
< 250 (75)	3
250-375 (75-115)	4
375-525 (115-160)	5
> 525 (160)	6

Quadrupole loops: Use 2-4-2 turns

6' X 15' (1.8m X 4.6m) Loops:
Lead-in < 150' (45 m), use 2 turns
Lead-in > 150' (45 m), use 3 turns

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, North Carolina Department of Transportation
122 N. McDowell St., Raleigh, NC 27603

Typical Loop Locations

PLAN DATE: June 2006	REVIEWED BY:
PREPARED BY: P L Alexander	REVIEWED BY:

REVISIONS	INIT.	DATE
Revise pavement markings		

SCALE N/A

SEAL
North Carolina Professional Engineer Seal 23486 Pamela L. Alexander

SIGNATURE 6/6/06 DATE

SIG. INVENTORY NO.

19-DEC-2006 14:29
pcalexander