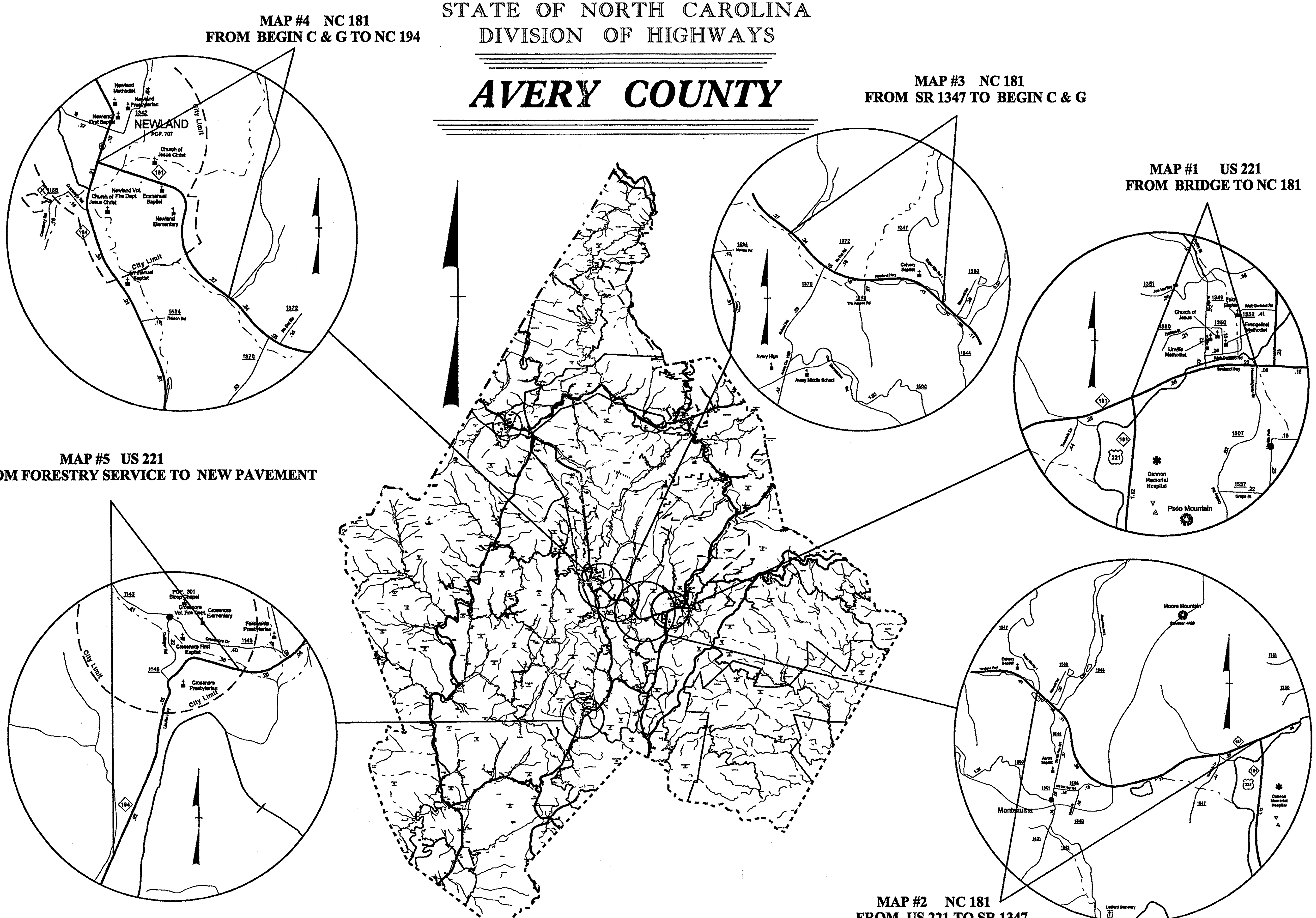
PROJECT REFERENCE NO.	SHEET NO.
11CRJ006119	1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

AVERY COUNTY



8/17/99

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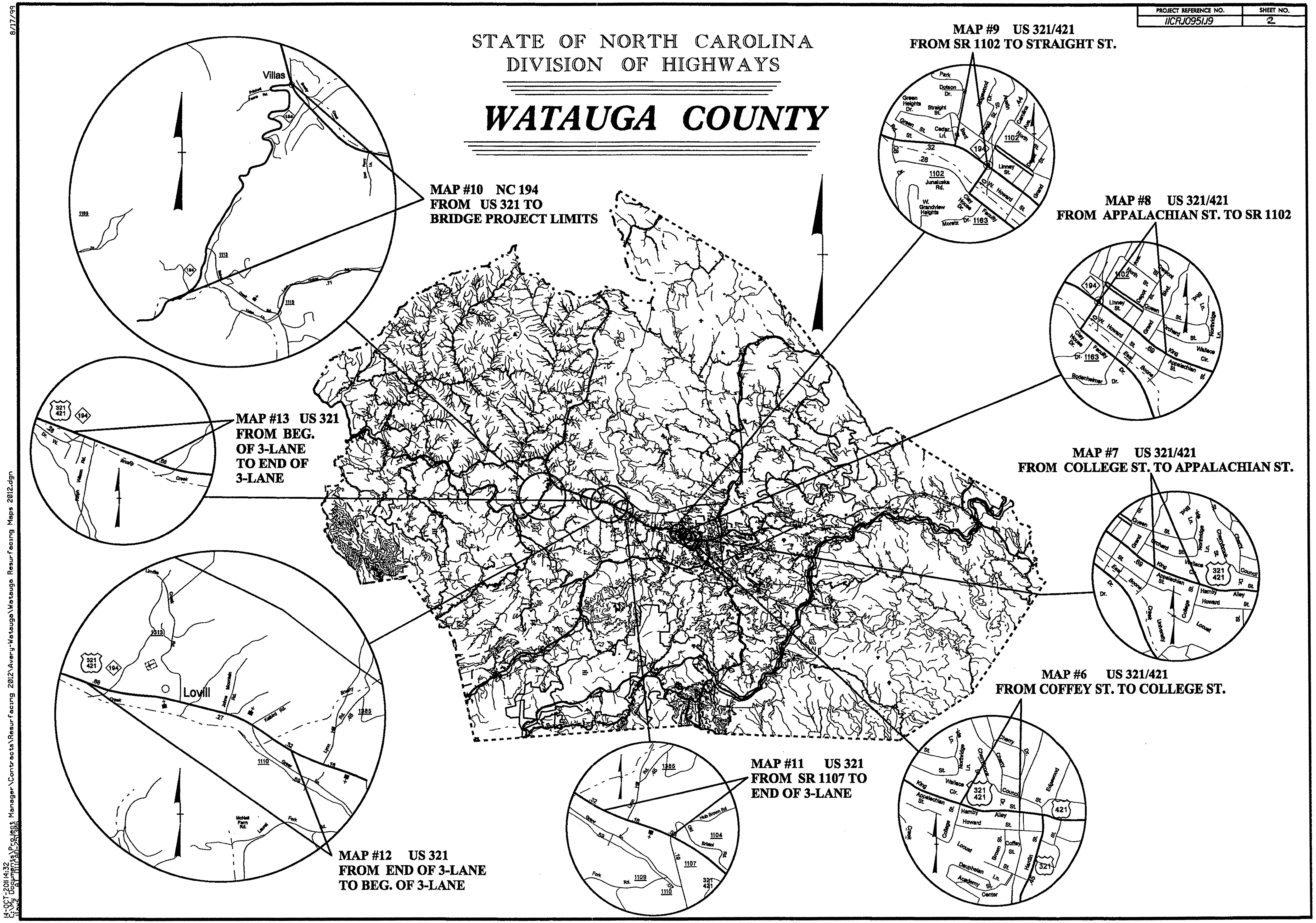
PROJECT REFERENCE NO.	SHEET NO.
11CRJ0951J9	2

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA COUNTY



8/17/99

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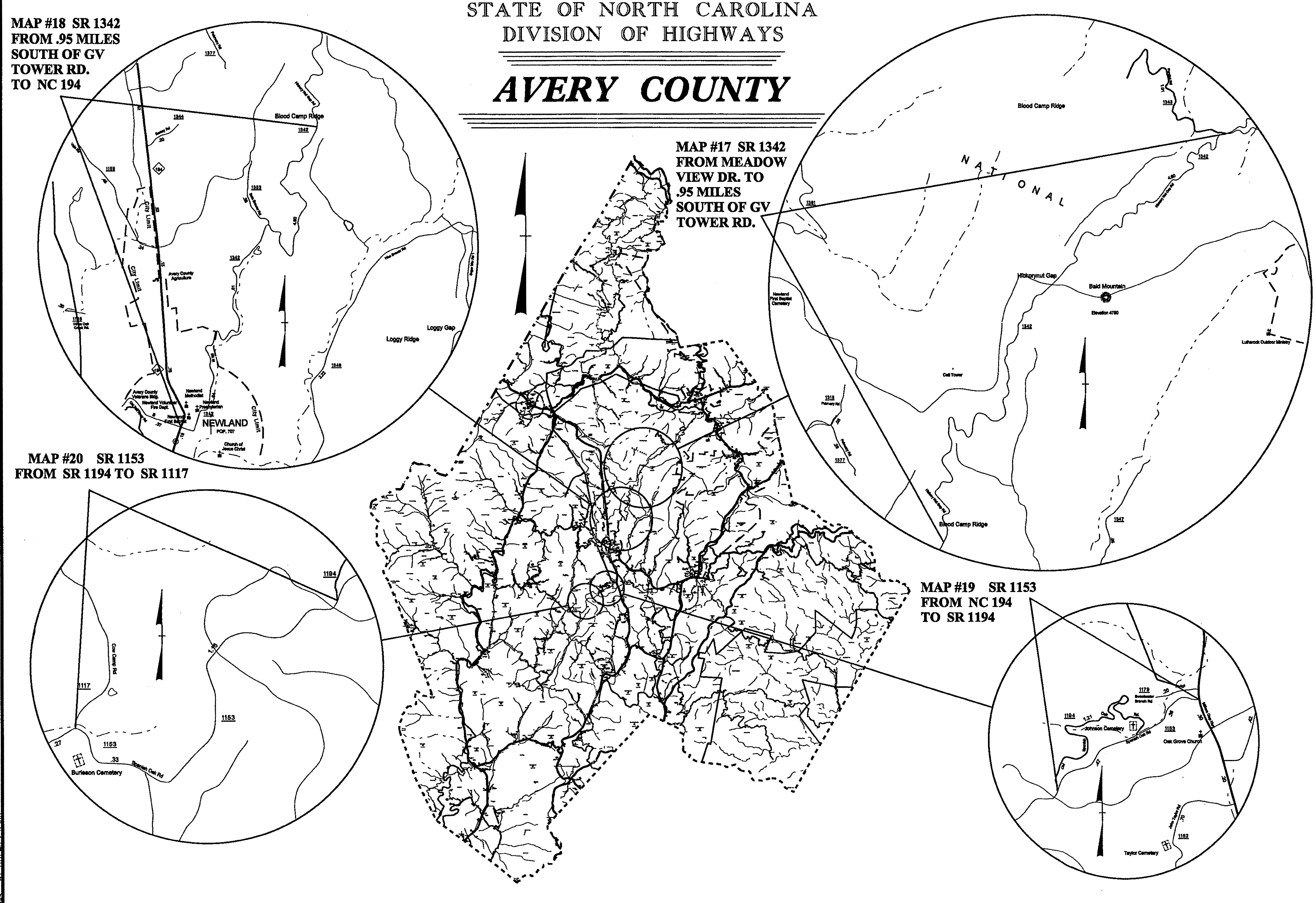
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

AVERY COUNTY

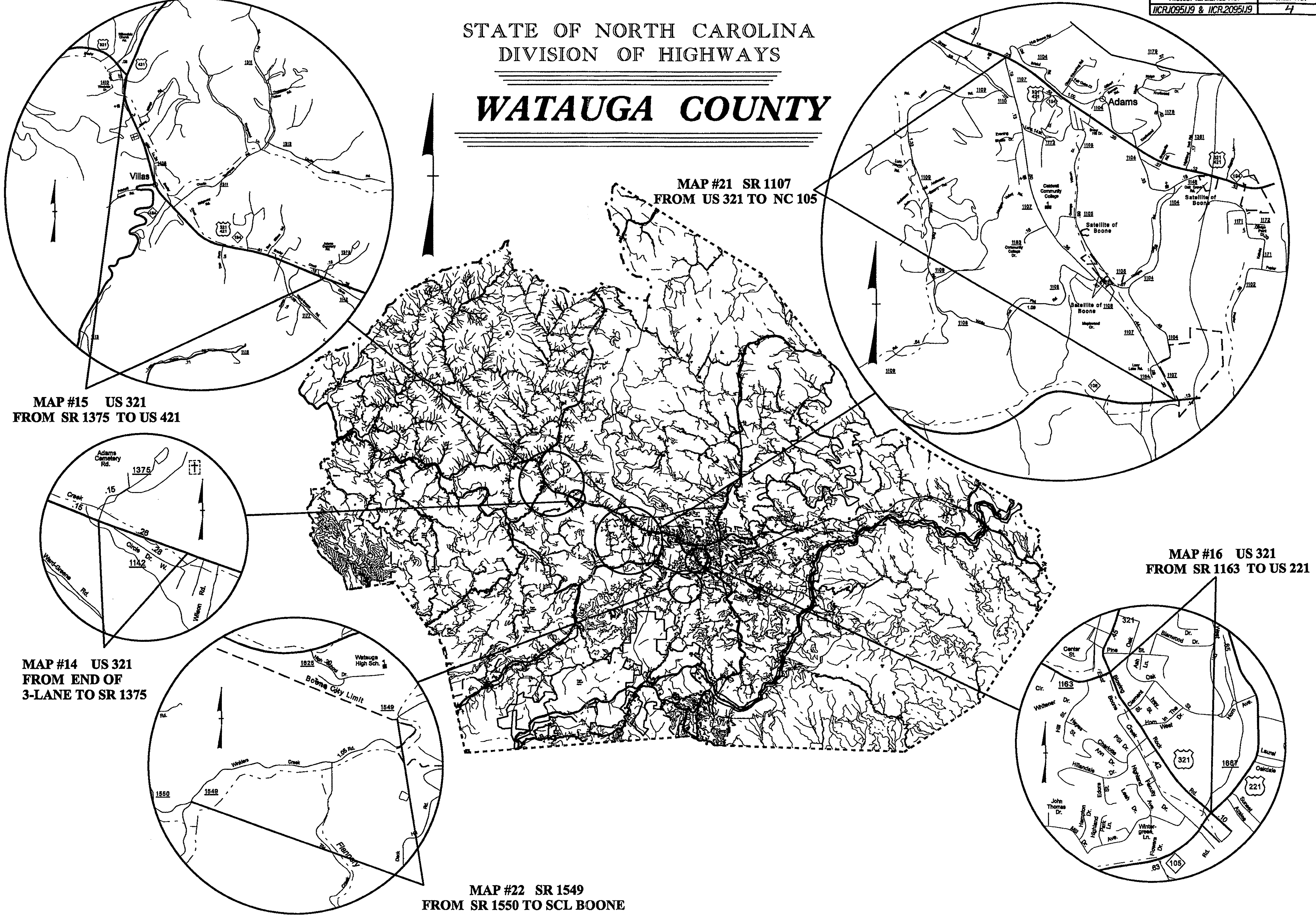


MAP #18 SR 1342
FROM .95 MILES
SOUTH OF GV
TOWER RD.
TO NC 194
Blood Camp Ridge
1342
Avery County Agriculture
Loggy Gap
Loggy Ridge
City Limit
NEWLAND
POP. 707
Church of Jesus Christ
Newland Methodist
Newland Presbyterian
Newland Volunteer Fire Dept.
Avery County Veterans Bldg.
MAP #17 SR 1342
FROM MEADOW
VIEW DR. TO
.95 MILES
SOUTH OF GV
TOWER RD.
NATIONAL
Blood Camp Ridge
Hickorynut Gap
Bald Mountain
Elevation 4780
Newland First Baptist Cemetery
Cell Tower
Lutherock Outdoor Ministry
Blood Camp Ridge
1342
1347
MAP #20 SR 1153
FROM SR 1194 TO SR 1117
1194
1117
1153
Burleson Cemetery
Spanish Oak Rd
MAP #19 SR 1153
FROM NC 194
TO SR 1194
1194
Johnson Cemetery
1153
Oak Grove Church
1162
Taylor Cemetery

PROJECT REFERENCE NO.	SHEET NO.
IICRJ0951J9 & IICR.2095IJ9	4

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

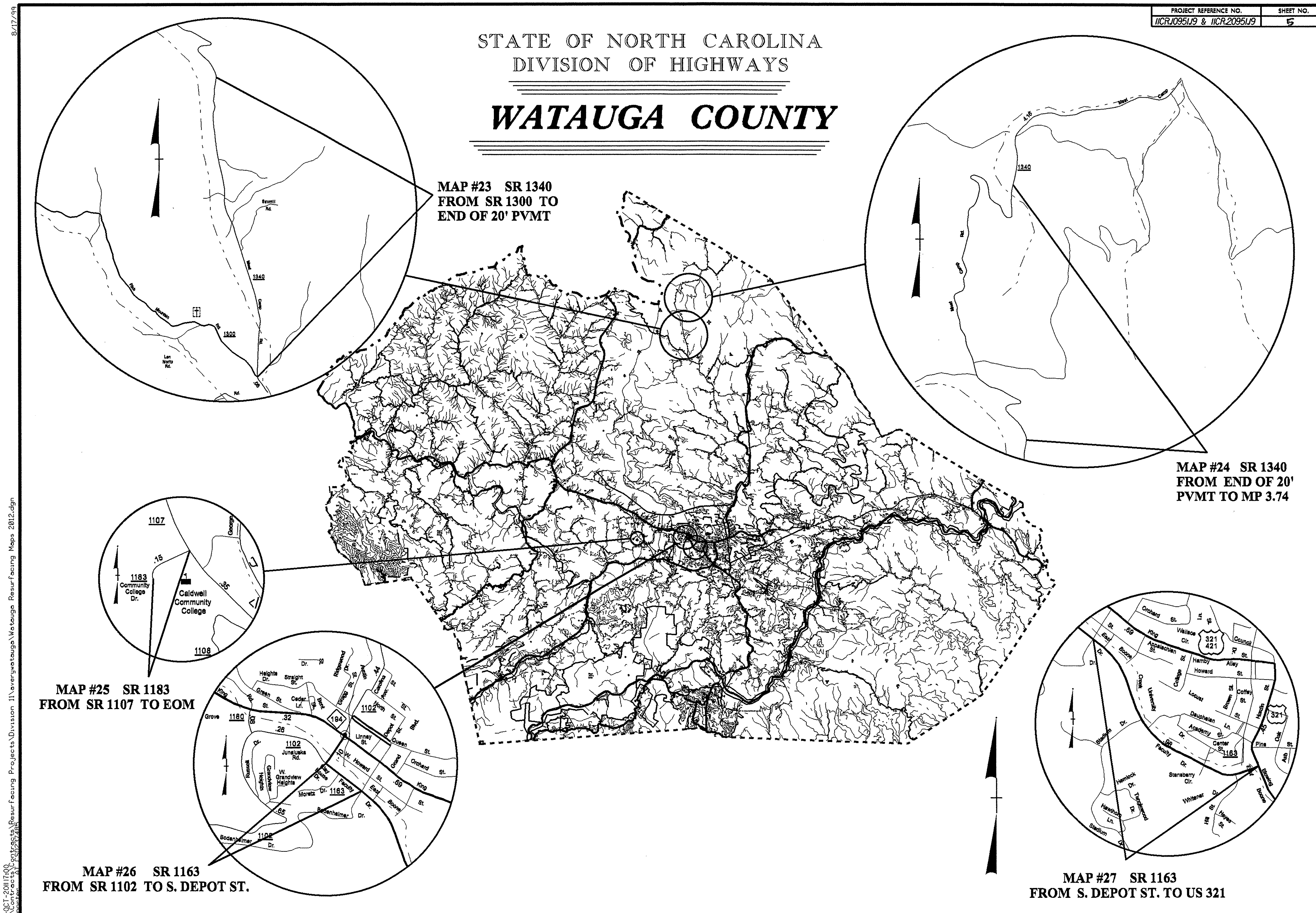
WATAUGA COUNTY



PROJECT REFERENCE NO.	SHEET NO.
11CR.10951.19 & 11CR.20951.19	5

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA COUNTY



8/17/99

PROJECT REFERENCE NO.	SHEET NO.
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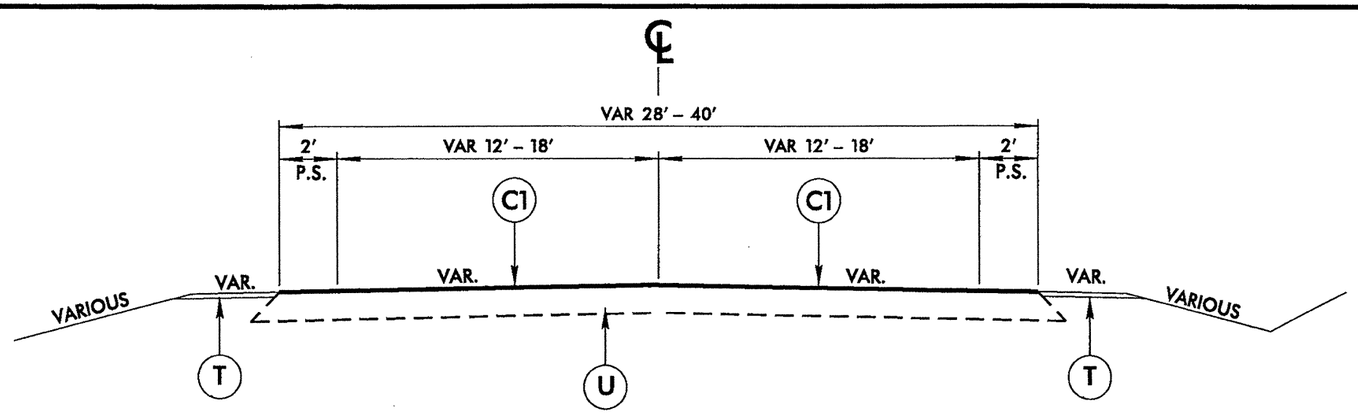
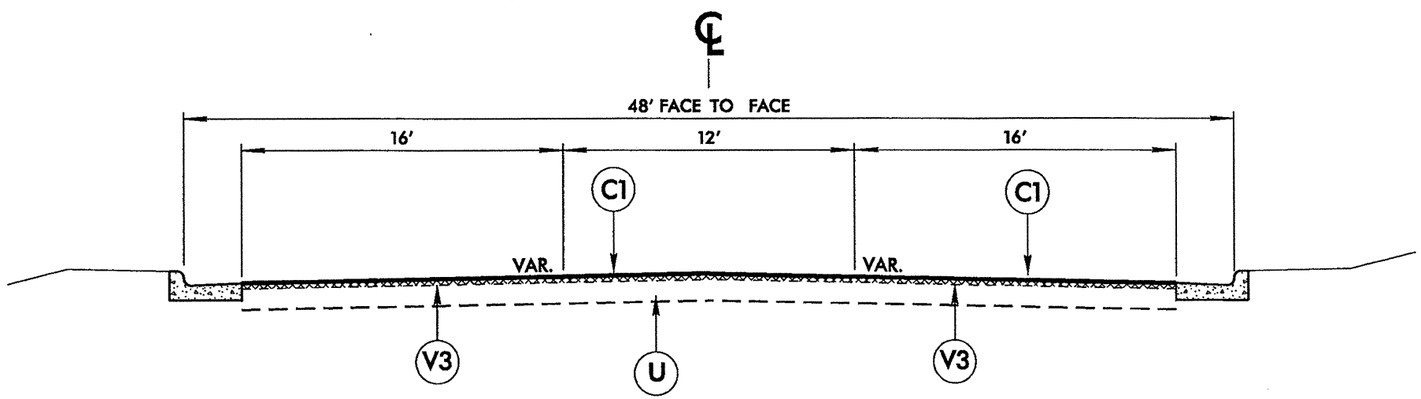


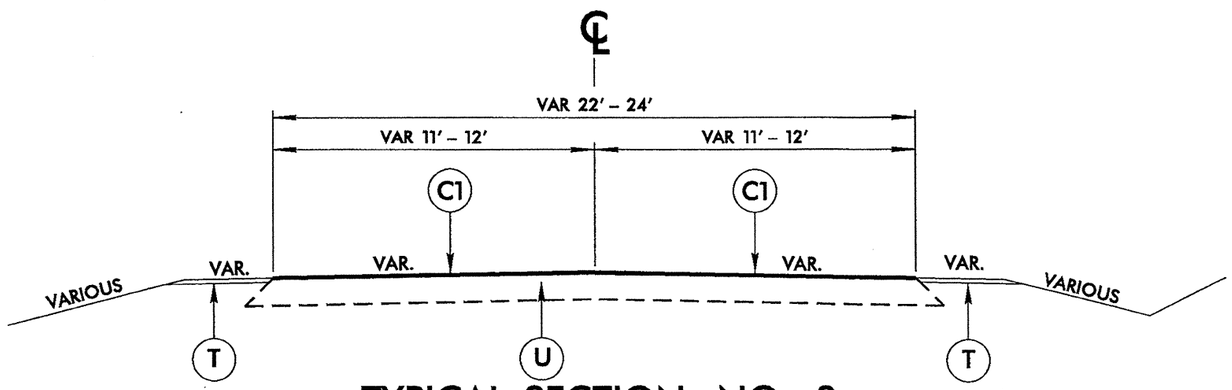
TYPICAL SECTION NO. 1

MAP 1 – US221 FROM BRIDGE TO NC 181
MAP 2 – NC 181 FROM US 221 TO SR 1347
MAP 3 – NC 181 FROM SR 1347 TO BEGIN C&G



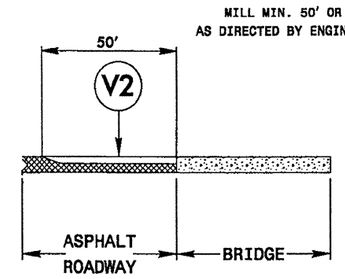
TYPICAL SECTION NO. 2

MAP 4 – NC 181 FROM BEGIN C&G TO NC 194



TYPICAL SECTION NO. 3

MAP 5 – US 221 FROM FORESTRY SERVICE TO NEW PAVEMENT
MAP 19 – SR 1153 FROM NC 194 TO SR 1194



BRIDGE TIE IN DETAIL

TIE ASPHALT OVERLAY TO BRIDGE APPROACH SLABS OR AS DIRECTED BY THE ENGINEER

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C3	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C4	PROP. APPROX. 1" THIN LIFT HOT MIX ASPHALT, AT AN AVERAGE RATE OF 100 LBS. PER SQ. YD.
T	SHOULDER RECONSTRUCTION
U	EXISTING PAVEMENT
V1	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 1½"
V2	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 1½"
V3	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 3½"

AVERY AND WATAUGA COUNTIES
PRIMARY AND SECONDARY RESURFACING

DIVISION II

REVISIONS	INIT.	DATE

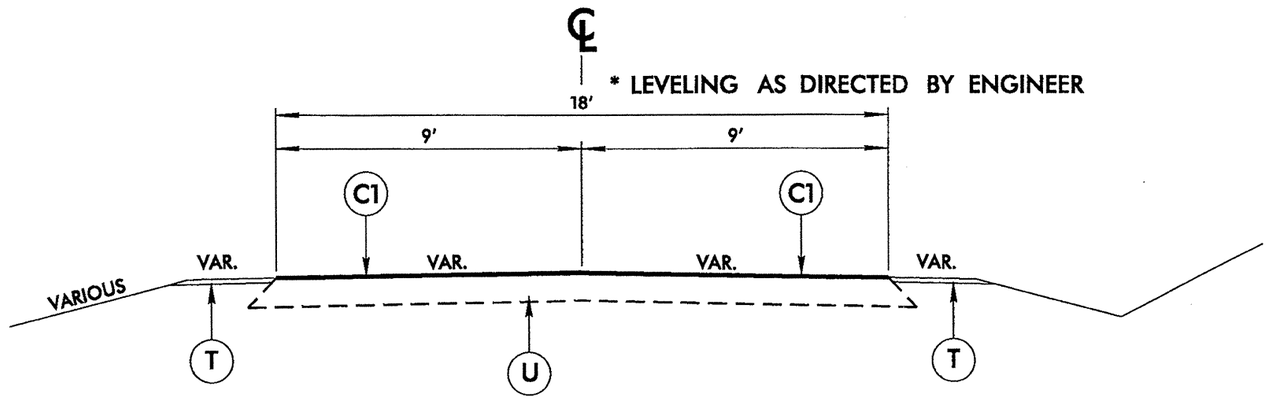
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
DIVISION ELEVEN

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

SCALE: N/A	DATE: 10/2011
PREPARED BY:	R.A. SHAW
REVIEWED BY:	J.L. LAWS
REVIEWED BY:	

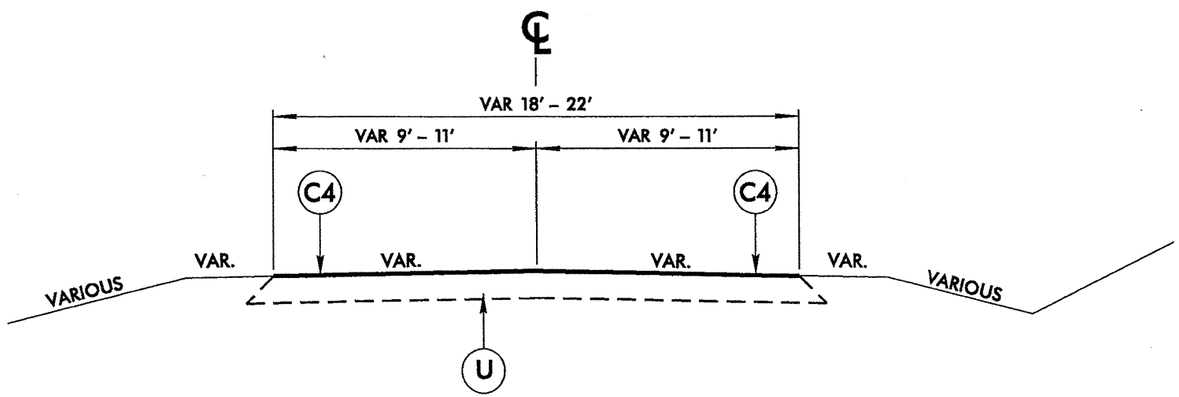
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
IICRJ006IJ9, IICR2006IJ9 IICRJ095IJ9, IICR2095IJ9	7



TYPICAL SECTION NO. 4

* MAP 17 – SR 1342 FROM MEADOW VIEW DR TO 0.95MI SOUTH OF GV TOWER RD



TYPICAL SECTION NO. 5

MAP 18 – SR 1342 FROM 0.95MI SOUTH OF GV TOWER RD TO NC 194
MAP 20 – SR 1153 FROM SR 1194 TO SR 1117

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C3	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C4	PROP. APPROX. 1" THIN LIFT HOT MIX ASPHALT, AT AN AVERAGE RATE OF 100 LBS. PER SQ. YD.
T	SHOULDER RECONSTRUCTION
U	EXISTING PAVEMENT
V1	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 1½"
V2	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 1½"
V3	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 3½"

AVERY AND WATAUGA COUNTIES
PRIMARY AND SECONDARY RESURFACING

DIVISION II

REVISIONS	INIT.	DATE

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
DIVISION ELEVEN

DIVISION OF HIGHWAYS · DIVISION 11 · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

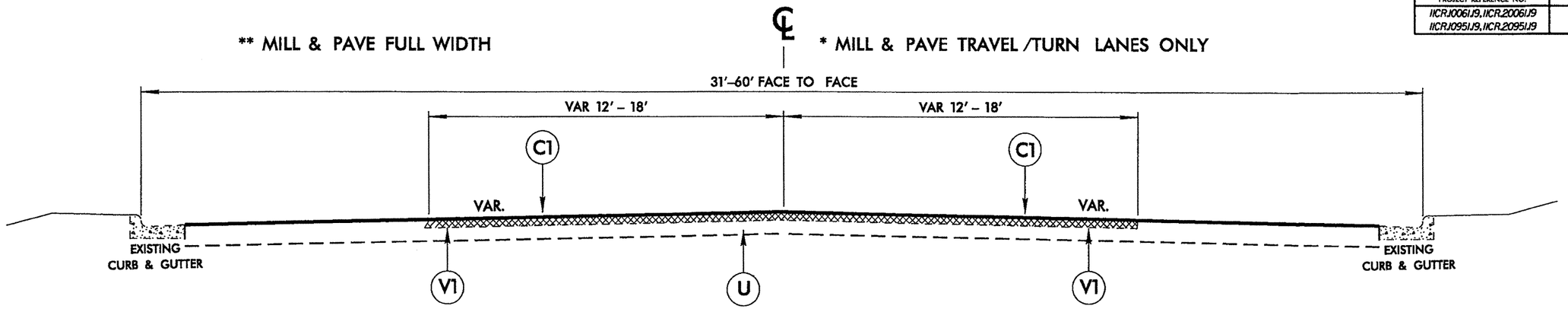
SCALE: N/A	DATE: 10/2011
PREPARED BY:	R.A. SHAW
REVIEWED BY:	J.L. LAWS
REVIEWED BY:	

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
IICRJ0061J9, IICR2006IJ9 IICRJ0951J9, IICR2095IJ9	8

** MILL & PAVE FULL WIDTH

* MILL & PAVE TRAVEL /TURN LANES ONLY

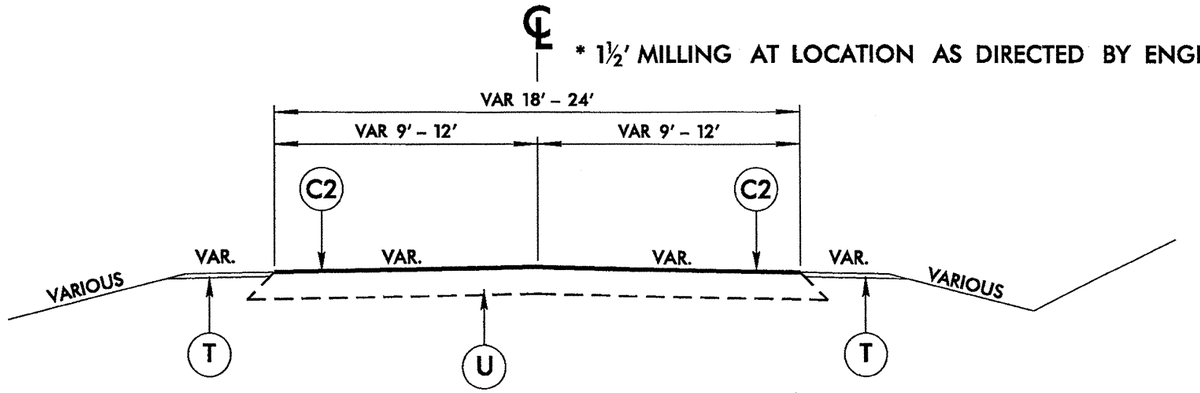


TYPICAL SECTION NO. 6

** MAP 6 – US 321/421 FROM COFFEY STREET TO COLLEGE STREET
* MAP 7 – US 321/421 FROM COLLEGE STREET TO APPALACHIAN STREET
* MAP 8 – US 321/421 FROM APPALACHAIN STREET TO SR 1102
* MAP 9 – US 321/421 FROM SR 1102 TO STRAIGHT STREET

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C3	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C4	PROP. APPROX. 1" THIN LIFT HOT MIX ASPHALT, AT AN AVERAGE RATE OF 100 LBS. PER SQ. YD.
T	SHOULDER RECONSTRUCTION
U	EXISTING PAVEMENT
V1	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 1½"
V2	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 1½"
V3	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 3½"

* 1½' MILLING AT LOCATION AS DIRECTED BY ENGINEER



TYPICAL SECTION NO. 7

* MAP 10 – NC 194 FROM US 321 TO BRIDGE PROJ LIMITS
MAP 22 – SR 1549 FROM SR 1550 TO SCL BOONE
MAP 23 – SR 1340 FROM SR 1300 TO END 20' PVT
MAP 24 – SR 1340 FROM END 20' PVT TO MP 3.74
MAP 25 – SR 1183 FROM SR 1107 TO END OF MAINTENANCE

AVERY AND WATAUGA COUNTIES
PRIMARY AND SECONDARY RESURFACING

DIVISION II

REVISIONS	INIT.	DATE

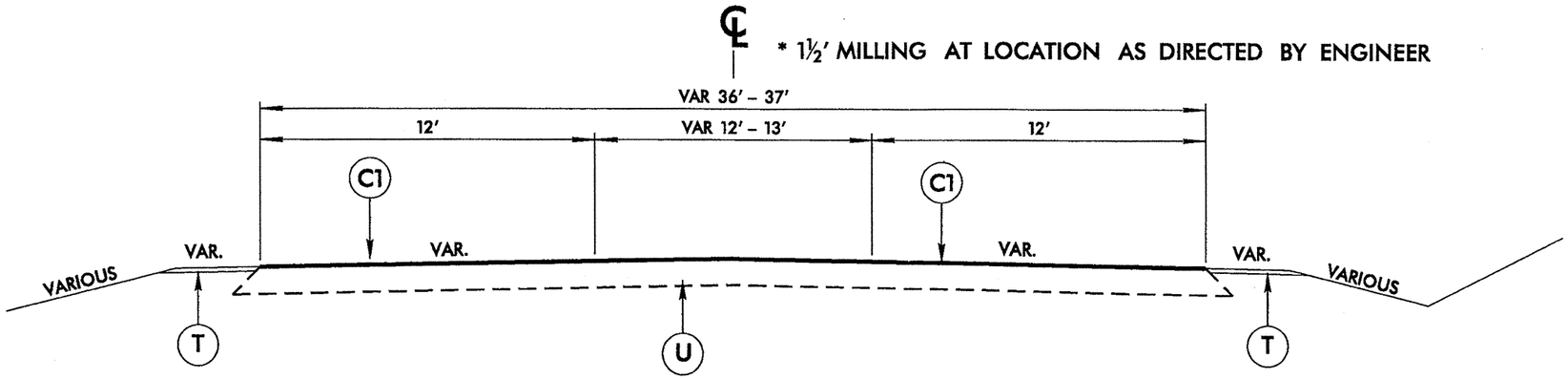
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
DIVISION ELEVEN

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

SCALE:	N/A	DATE:	10/2011
PREPARED BY:	R.A. SHAW		
REVIEWED BY:	J.L. LAWS		
REVIEWED BY:			

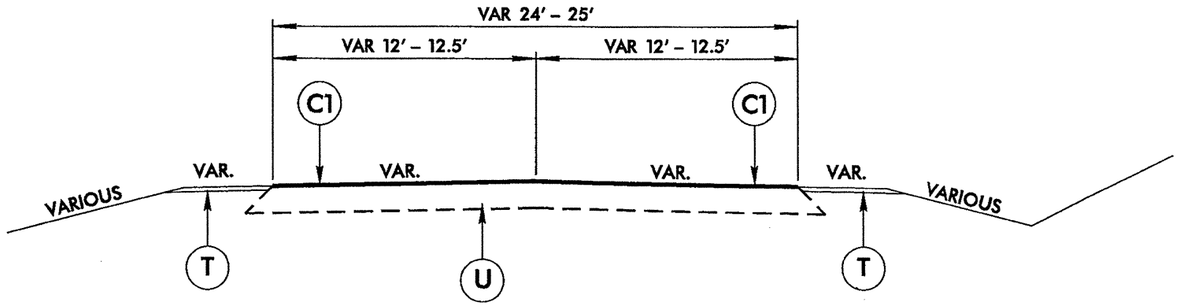
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
IICRJ0061J9, IICR.2006IJ9 IICRJ0951J9, IICR.2095IJ9	9



TYPICAL SECTION NO. 8

* MAP 11 – US 321 FROM SR 1107 TO END 3 LANE
* MAP 13 – US 321 FROM BEGIN 3 LANE TO END 3 LANE



TYPICAL SECTION NO. 9

* MAP 12 – US 321 FROM END 3 LANES TO BEGIN 3 LANES
MAP 14 – US 321 FROM END 3 LANES TO SR 1375
MAP 15 – US 321 FROM SR 1375 TO US 421

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C3	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C4	PROP. APPROX. 1" THIN LIFT HOT MIX ASPHALT, AT AN AVERAGE RATE OF 100 LBS. PER SQ. YD.
T	SHOULDER RECONSTRUCTION
U	EXISTING PAVEMENT
V1	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 1½"
V2	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 1½"
V3	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 3½"

AVERY AND WATAUGA COUNTIES
PRIMARY AND SECONDARY RESURFACING

DIVISION II

REVISIONS	INT.	DATE

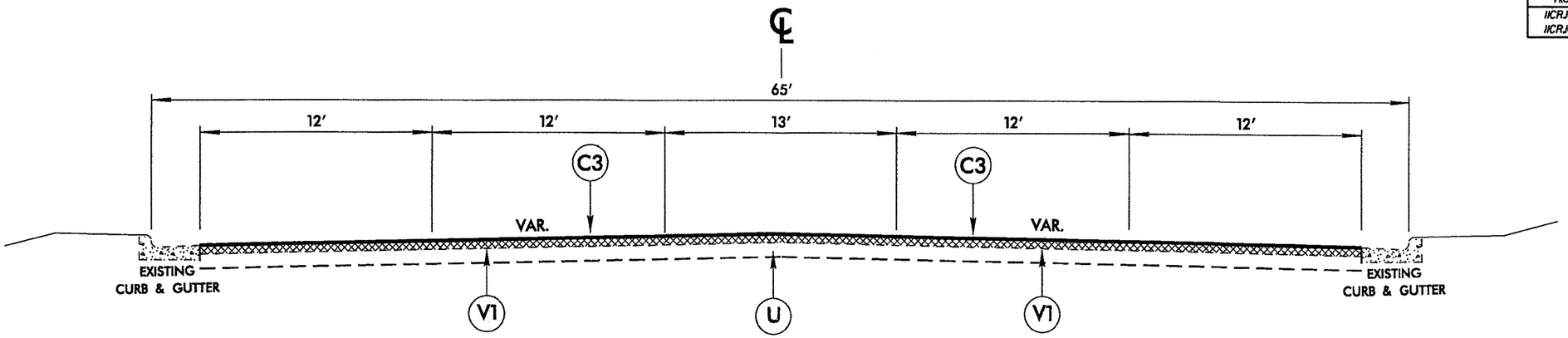
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
DIVISION ELEVEN

DIVISION OF HIGHWAYS · DIVISION 11 · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

SCALE:	N/A	DATE:	10/2011
PREPARED BY:	R.A. SHAW		
REVIEWED BY:	J.L. LAWS		
REVIEWED BY:			

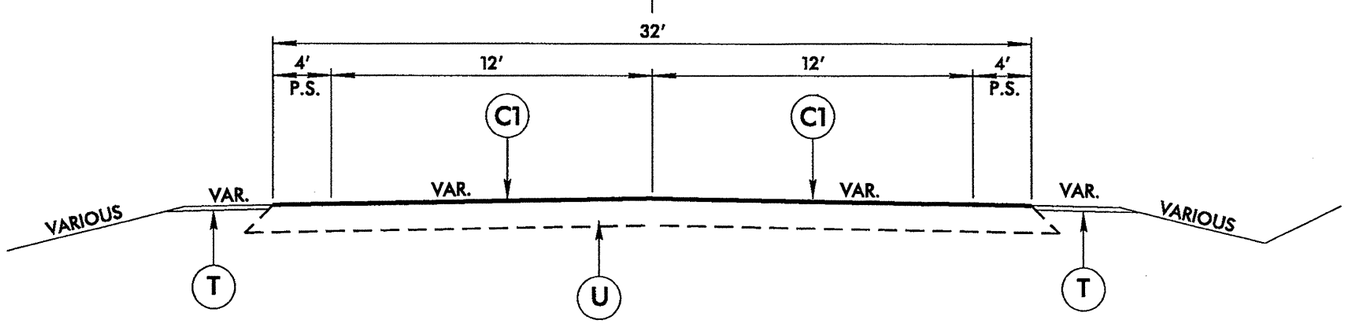
8/17/95

PROJECT REFERENCE NO.	SHEET NO.
IICRJ0061J9, IICR2006IJ9 IICRJ0951J9, IICR2095IJ9	10



TYPICAL SECTION NO. 10

MAP 16 – US 321 FROM SR 1163 TO US 221



TYPICAL SECTION NO. 11

MAP 21 – SR 1107 FROM US 321 TO NC 105

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C3	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C4	PROP. APPROX. 1" THIN LIFT HOT MIX ASPHALT, AT AN AVERAGE RATE OF 100 LBS. PER SQ. YD.
T	SHOULDER RECONSTRUCTION
U	EXISTING PAVEMENT
V1	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 1½"
V2	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 1½"
V3	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 3½"

AVERY AND WATAUGA COUNTIES
PRIMARY AND SECONDARY RESURFACING

DIVISION II

REVISIONS	INIT.	DATE

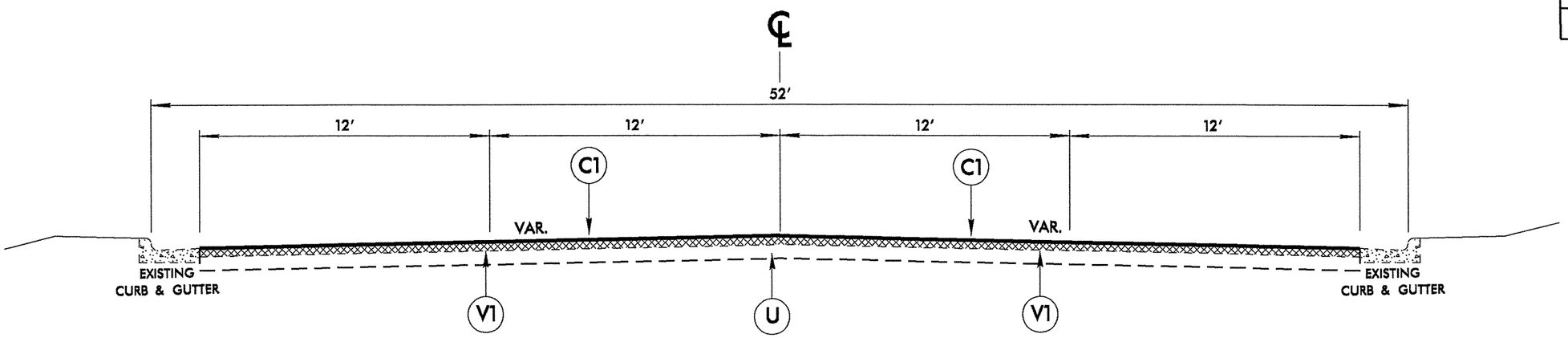
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
DIVISION ELEVEN

DIVISION OF HIGHWAYS · DIVISION 11 · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

SCALE:	N/A
DATE:	10/2011
PREPARED BY:	R.A. SHAW
REVIEWED BY:	J.L. LAWS
REVIEWED BY:	

8/17/99

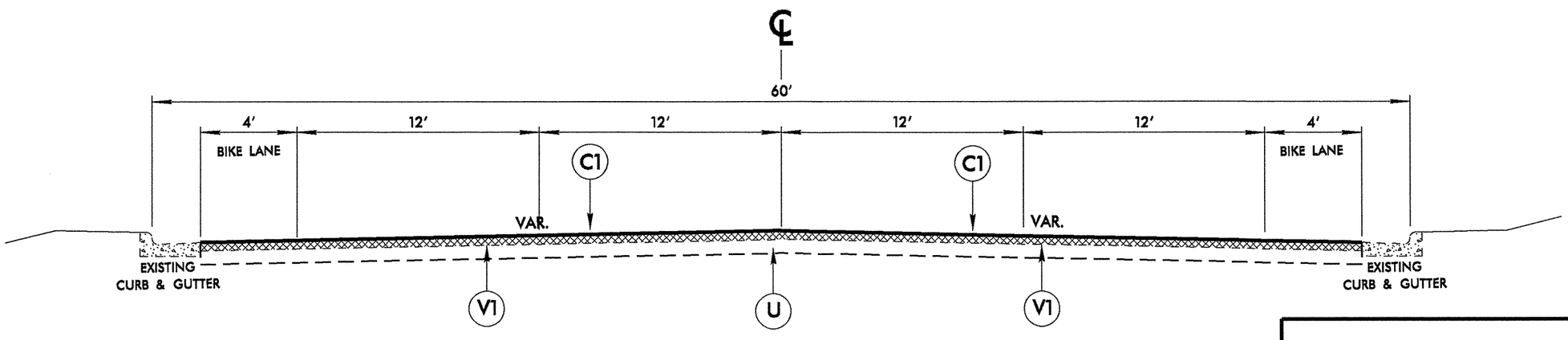
PROJECT REFERENCE NO.	SHEET NO.
IICRJ006IJ9, IICR.2006IJ9 IICRJ095IJ9, IICR.2095IJ9	11



TYPICAL SECTION NO. 12

MAP 26 – SR 1163 FROM SR 1102 TO SOUTH DEPOT STREET

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
U	EXISTING PAVEMENT
V1	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 1½"



TYPICAL SECTION NO. 13

MAP 27 – SR 1163 FROM SOUTH DEPOT STREET TO US 321

AVERY AND WATAUGA COUNTIES
PRIMARY AND SECONDARY RESURFACING

DIVISION II

REVISIONS	INIT.	DATE

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
DIVISION ELEVEN

DIVISION OF HIGHWAYS · DIVISION 11 · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

SCALE: N/A | DATE: 10/2011
PREPARED BY: R.A. SHAW
REVIEWED BY: J.L. LAWS
REVIEWED BY:

PROJECT REFERENCE NO.	SHEET NO.
11CR.10061.19 & 11CR.20061.19	12

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

AVERY COUNTY

ASPHALT RESURFACING
AGGREGATE SHOULDER BORROW DETAILS

MAP #1 US 221
FROM BRIDGE TO NC 181

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- *** APPROX. STATION 0+00 100' *AT BRIDGE RT (SEE DETAIL)***
- *** APPROX. STATION 0+00 100' *AT BRIDGE LT (SEE DETAIL)***

MAP #2 NC 181
FROM US 221 TO SR 1347

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- *** APPROX. STATION 61+90 400' (SEE DETAIL)***
- *** APPROX. STATION 77+20 400' (SEE DETAIL)***
- *** APPROX. STATION 87+90 400' (SEE DETAIL)***

MAP #3 NC 181
FROM SR 1347 TO BEGIN C & G

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- *** APPROX. STATION 7+00 400' (SEE DETAIL)***
- *** APPROX. STATION 21+50 400' (SEE DETAIL)***
- *** APPROX. STATION 30+00 400' (SEE DETAIL)***
- *** APPROX. STATION 31+00 400' (SEE DETAIL)***
- *** APPROX. STATION 44+50 400' (SEE DETAIL)***

MAP #5 US 221
FROM FORESTRY SERVICE TO NEW PAVEMENT

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- *** APPROX. STATION 46+00 400' (SEE DETAIL)***

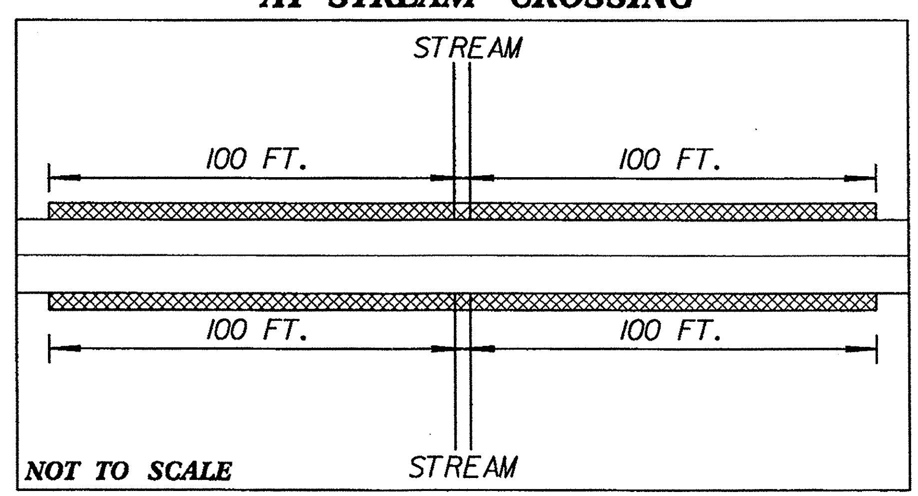
MAP #17 SR 1342
FROM MEADOW VIEW DR. TO
.95 MILES SOUTH OF GV TOWER RD.

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- *** APPROX. STATION 64+00 400' (SEE DETAIL)***

MAP #19 SR 1153
FROM NC 194 TO SR 1194

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- *** APPROX. STATION 27+00 400' (SEE DETAIL)***

**DETAIL FOR AGGREGATE SHOULDER BORROW AT STREAM CROSSING*



HATCHED AREA SHOWS PLACEMENT OF AGGREGATE SHOULDER BORROW

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA COUNTY

ASPHALT RESURFACING
AGGREGATE SHOULDER BORROW DETAILS

MAP #10 NC 194
FROM US 321 TO
BRIDGE PROJECT LIMITS

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- ** APPROX. STATION 3+00 400' (SEE DETAIL)*
- ** APPROX. STATION 47+50 400' (SEE DETAIL)*
- ** APPROX. STATION 57+00 400' (SEE DETAIL)*
- ** APPROX. STATION 86+00 400' (SEE DETAIL)*

MAP #11 US 321
FROM SR 1107 TO END OF 3-LANE

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- ** APPROX. STATION 7+00 400' (SEE DETAIL)*

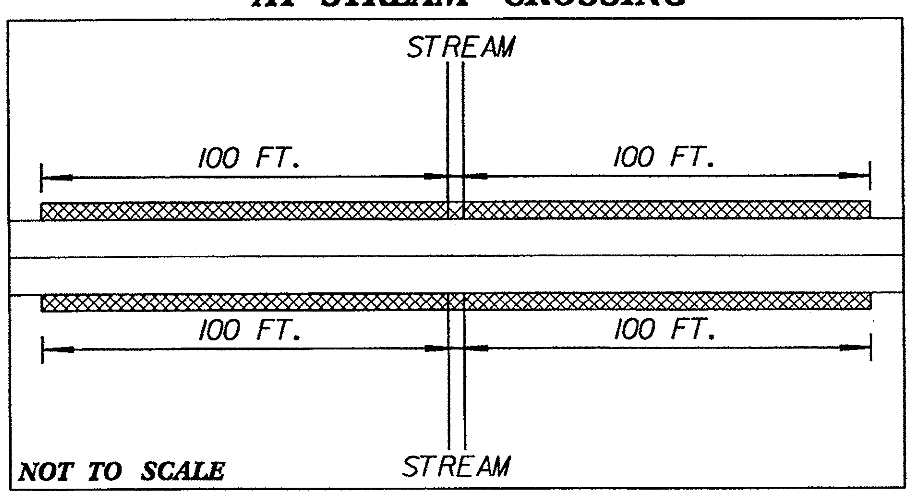
MAP #12 US 321
FROM END OF 3-LANE TO BEG. OF 3-LANE

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- ** APPROX. STATION 0+50 400' (SEE DETAIL)*
- ** APPROX. STATION 5+00 400' (SEE DETAIL)*
- ** APPROX. STATION 15+00 400' (SEE DETAIL)*
- ** APPROX. STATION 37+00 400' (SEE DETAIL)*

MAP #14 US 321
FROM END OF 3-LANE TO SR 1375

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- ** APPROX. STATION 5+00 400' (SEE DETAIL)*

**DETAIL FOR AGGREGATE SHOULDER BORROW AT STREAM CROSSING*



HATCHED AREA SHOWS PLACEMENT OF AGGREGATE SHOULDER BORROW

MAP #15 US 321
FROM SR 1375 TO US 421

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- ** APPROX. STATION 52+50 400' (SEE DETAIL)*
- ** APPROX. STATION 92+50 400' (SEE DETAIL)*

MAP #21 SR 1107
FROM US 321 TO NC 105

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- ** APPROX. STATION 87+00 400' (SEE DETAIL)*

MAP #22 SR 1549
FROM SR 1550 TO SCL BOONE

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- ** APPROX. STATION 2+00 400' (SEE DETAIL)*
- ** APPROX. STATION 3+50 400' (SEE DETAIL)*
- ** APPROX. STATION 16+50 400' (SEE DETAIL)*
- ** APPROX. STATION 30+50 400' (SEE DETAIL)*

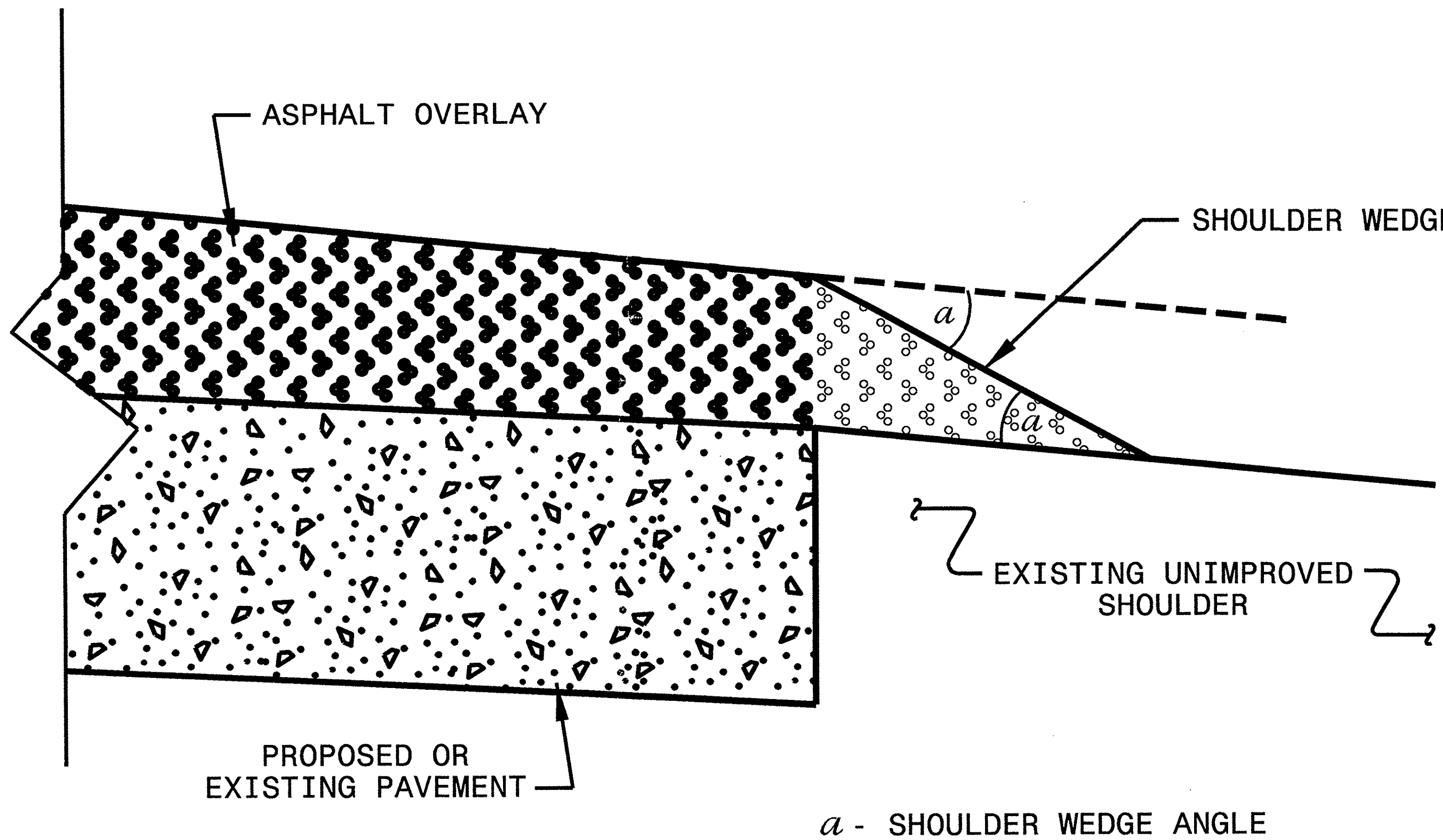
MAP #23 SR 1340
FROM SR 1300 TO END OF 20' PVMT

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- ** APPROX. STATION 12+00 400' (SEE DETAIL)*
- ** APPROX. STATION 36+50 400' (SEE DETAIL)*
- ** APPROX. STATION 43+50 400' (SEE DETAIL)*

MAP #24 SR 1340
FROM END OF 20' PVMT TO MP 3.74

AGGREGATE SHOULDER BORROW TO BE PLACED AS FOLLOWS:
- ** APPROX. STATION 8+00 400' (SEE DETAIL)*
- ** APPROX. STATION 47+50 400' (SEE DETAIL)*
- ** APPROX. STATION 52+50 400' (SEE DETAIL)*

PROJECT REFERENCE NO.	SHEET NO.
11CR.10061.19, ETC	14



SHOULDER WEDGE DETAIL

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

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

SHOULDER WEDGE DETAIL

ORIGINAL BY: T.SPELL DATE: 7-19-11
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: s:usr/details/stand/shoulderwedgedetail.dgn

PROJECT NO.	SHEET NO.	TOTAL NO.
11CR.10061.19, 11CR.10951.19 11CR.20061.19, ETC.	15	

SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	FINAL SURFACE TESTING REQUIRED	AGGREGATE SHOULDER BORROW ALLOWED	LENGTH MI	WIDTH FT	BORROW EXCAVATION CY	INCIDENTAL STONE BASE TONS	SHOULDER RECONSTRUCTION SMI	1½" MILLING SY	0" TO 1.5" MILLING SY	0" TO 3.5" MILLING SY	SURFACE COURSE, S9.5B TONS	LEVELING COURSE, S9.5B TONS	SURFACE COURSE, S9.5C TONS	SURFACE COURSE, SF9.5A TONS	ASPHALT BINDER FOR PLANT MIX TONS	PATCHING EXISTING PAVEMENT TONS	THIN LIFT HMA SY	ADJ. OF MAN-HOLES EA	ADJ. OF METER OR VALVE BOX EA	PORTABLE LIGHTING LS	SEED & MULCH-ING AC	UNPAVED TRENCH-ING (1, 2") LF	INDUCTIVE LOOP LF	LEAD-IN CABLE (14-2) LF
11CR.10061.19	Avery	1	US 221	FROM BRIDGE TO NC 181	1	NO	YES	0.25	28	50		0.50		165		430				26						0.20	100	1,000	100
		2	NC 181	FROM US 221 TO SR 1347	1	NO	YES	1.652	28	330	50	3.30				2,500				150						1.20	100	50	100
		3	NC 181	FROM SR 1347 TO BEGIN C & G	1	NO	YES	0.975	29	195	30	1.95				1,700				102				1		0.95			
		4	NC 181	FROM C & G TO NC 194	2	NO	NO	0.86	44						23,000	1,950				117							100	384	100
		5	US 221	FROM FORESTRY SERVICE TO NEW PAVEMENT	3	NO	YES	1.15	24	230	30	2.30				1,450				87						1.20			
TOTAL FOR PROJ NO. 11CR.10061.19								**4.887**		**805**	**110**	**8.05**		**165**	**23,000**	**8,030**				**482**				**1**		**3.55**	**300**	**1,434**	**300**
11CR.10951.19	Watauga	6	US 321/421	FROM COFFEY STREET TO COLLEGE STREET	6	NO	NO	0.211	27				3,345			290				17	10		4	2	*				
		7	US 321/421	FROM COLLEGE STREET TO APPALACHIAN STREET	6	NO	NO	0.159	25				2,550			215				13	10		2		*				
		8	US 321/421	FROM APPALACHIAN STREET TO SR 1102	6	NO	NO	0.277	24				5,200			440				26			5		*				
		9	US 321/421	FROM SR 1102 TO STRAIGHT STREET	6	NO	NO	0.13	24				1,955			170				10			1		*				
		10	NC 194	FROM US 321 TO BRIDGE PROJECT LIMITS	7	NO	YES	1.334	18	267		2.67	1,400						1,300	87						1.00			
		11	US 321	FROM SR 1107 TO END OF 3-LANE	8	NO	YES	0.379	37	76		0.76	850			800				48						0.30	100	718	100
		12	US 321	FROM END OF 3-LANE TO BEG OF 3-LANE	9	NO	YES	0.718	24	144		1.44	1,045			1,000				60						0.55			
		13	US 321	FROM BEG. OF 3-LANE TO END OF 3-LANE	8	NO	YES	0.417	36	84		0.84	900			840				50						0.30			
		14	US 321	FROM END OF 3 LANE TO SR 1375	9	NO	YES	0.29	25	58		0.58				375				22						0.20			
		15	US 321	FROM SR 1375 TO US 421	9	NO	YES	1.699	25	340		3.40				2,450				147						1.20			
		16	US 321	FROM SR 1163 TO US 221	10	NO	NO	0.5	61				18,044					1,550		91			7	6	*		100	1,600	100
TOTAL FOR PROJ NO. 11CR.10951.19								**6.114**		**969**		**9.69**	**35,289**			**6,580**		**1,550**	**1,300**	**571**	**20**		**19**	**8**	**1**	**3.55**	**200**	**2,318**	**200**
11CR.20061.19	Avery	17	SR 1342	FROM MEADOW VIEW DRIVE TO 0.95 MILES SOUTH OF GV TOWER ROAD	4	NO	YES	2.221	18	444	60	4.44				2,000	760			169						1.60			
		18	SR 1342	FROM 0.95 MILES SOUTH OF GV TOWER ROAD TO NC 194	5	NO	NO	2.311	18		60									95	155	27,800	14	2					
		19	SR 1153	FROM NC 194 TO SR 1194	3	NO	YES	0.811	22	162	25	1.62				900				54						0.60			
		20	SR 1153	FROM SR 1194 TO SR 1117	5	NO	NO	1.534	22		40									75		24,800							
TOTAL FOR PROJ NO. 11CR.20061.19								**6.877**		**606**	**185**	**6.06**				**2,900**	**760**			**393**	**155**	**52,600**	**14**	**2**		**2.20**			
11CR.20951.19	Watauga	21	SR 1107	FROM US 321 TO NC 105	11	NO	YES	1.895	32	380	100	3.80				3,300				198					*	1.40			
		22	SR 1549	FROM SR 1550 TO SCL BOONE	7	NO	YES	0.8	19	160	75	1.60							765	51						0.60			
		23	SR 1340	FROM SR 1300 TO END OF 20' PAVEMENT	7	NO	YES	1.16	20	232	50	2.32							1,150	77						0.85			
		24	SR 1340	FROM END OF 20' PAVEMENT TO MP 3.74	7	NO	YES	1.5	20	300	50	3.00							1,520	102						1.10			
		25	SR 1183	FROM SR 1107 TO EOM	7	NO	YES	0.17	24	34		0.34							210	14						0.12			
		26	SR 1163	FROM SR 1102 TO SOUTH DEPOT STREET	12	NO	NO	0.16	48				4,570			400				24			2		*		100	1,350	100
		27	SR 1163	FROM SOUTH DEPOT STREET TO US 321	13	NO	NO	0.75	56				25,770			2,175				131	1,445		30	8	*		100	3,400	100
TOTAL FOR PROJ NO. 11CR.20951.19								**6.435**		**1,106**	**275**	**11.06**	**30,340**			**5,875**			**3,645**	**597**	**1,445**		**32**	**8**	**1**	**4.07**	**200**	**4,750**	**200**
GRAND TOTAL								**24.313**		**3,486**	**570**	**34.86**	**65,629**	**165**	**23,000**	**23,385**	**760**	**1,550**	**4,945**	**2,043**	**1,620**	**52,600**	**65**	**19**	**1**	**13.37**	**700**	**8,502**	**700**

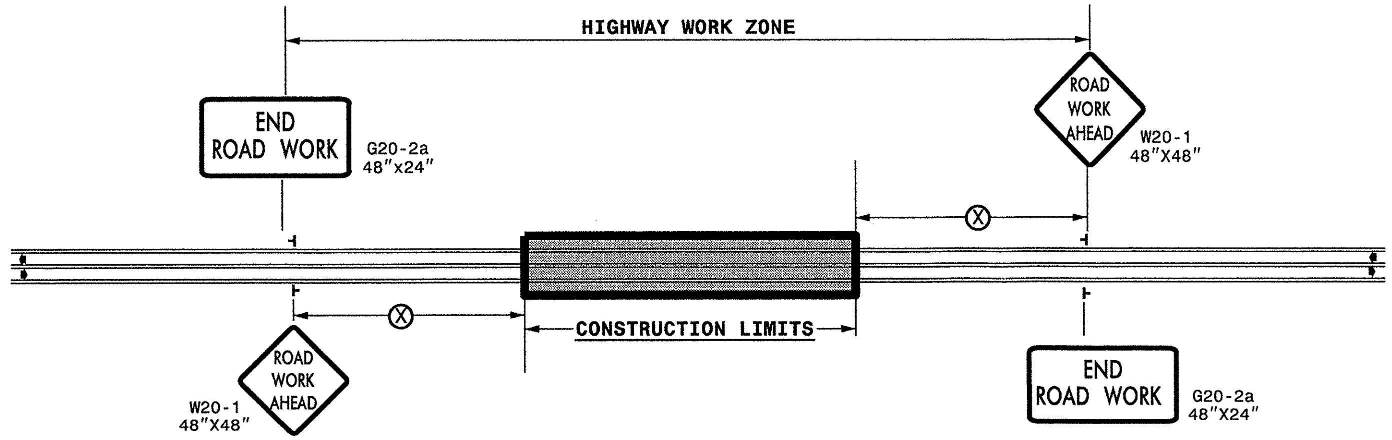
PROJECT NO.	SHEET NO.	TOTAL NO.
11CR.10061.19, 11CR.10951.19 11CR.20061.19, ETC.	16	

THERMOPLASTIC AND PAINT QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	LENGTH	WIDTH	4810000000-E		4820000000-E		4725000000-E	4835000000-E	4840000000-N		4845000000-N					4905000000-N
							4" WHITE PAINT LF	4" YELLOW PAINT LF	8" YELLOW PAINT LF	8" WHITE PAINT LF	THERMO (BIKE LANE) SYMBOL 90 M EA	24" WHITE PAINT LF	PAINT MSG SCHOOL EA	PAINT MSG ONLY EA	PAINT LT ARROW EA	PAINT STR & RT ARROW EA	PAINT STR ARROW EA	PAINT RT ARROW EA	PAINT STR & LT ARROW EA	SNOW PLOWABLE MARKERS EA
11CR.10061.19	Avery	1	US 221	FROM BRIDGE TO NC 181	0.25	28	6,800	5,600	100			60			3	2				50
		2	NC 181	FROM US 221 TO SR 1347	1.652	28	39,000	41,000	180			40			5		2	5		120
		3	NC 181	FROM SR 1347 TO BEGIN C & G	0.975	29	21,000	24,000	450			92			4			1		115
		4	NC 181	FROM C & G TO NC 194	0.86	44	4,550	18,165		250		230	12				2	2	2	174
		5	US 221	FROM FORESTRY SERVICE TO NEW PAVEMENT	1.15	24	24,300	24,300												80
TOTAL FOR PROJ NO. 11CR.10061.19					**4.887**		**95,650**	**113,065**	**730**	**250**		**422**	**12**		**12**	**2**	**4**	**8**	**2**	**539**
							208,715		**980**				**12**		**28**					
11CR.10951.19	Watauga	6	US 321/421	FROM COFFEY STREET TO COLLEGE STREET	0.211	27		4,460		110		34			1					
		7	US 321/421	FROM COLLEGE STREET TO APPALACHIAN STREET	0.159	25	1,050	5,040		250		70			1		1			
		8	US 321/421	FROM APPALACHIAN STREET TO SR 1102	0.277	24	800	8,775		630		186			3	3				
		9	US 321/421	FROM SR 1102 TO STRAIGHT STREET	0.13	24	150	4,375		170		45			1	1				
		10	NC 194	FROM US 321 TO BRIDGE PROJECT LIMITS	1.334	18	28,175	28,175				15								88
		11	US 321	FROM SR 1107 TO END OF 3-LANE	0.379	37	10,005	8,005				40					3	3		50
		12	US 321	FROM END OF 3-LANE TO BEG OF 3-LANE	0.718	24	15,165	15,165												48
		13	US 321	FROM BEG. OF 3-LANE TO END OF 3-LANE	0.417	36	11,010	8,810							1		2			56
		14	US 321	FROM END OF 3 LANE TO SR 1375	0.29	25	6,125	6,125												20
		15	US 321	FROM SR 1375 TO US 421	1.699	25	35,900	34,500												112
		16	US 321	FROM SR 1163 TO US 221	0.5	61	5,280	15,840		150		150		8	17	2	11		1	160
TOTAL FOR PROJ NO. 11CR.10951.19					**6.114**		**113,660**	**139,270**		**1,310**		**540**		**8**	**24**	**6**	**17**	**3**	**1**	**534**
							252,930		**1,310**				**8**		**51**					
11CR.20061.19	Avery	17	SR 1342	FROM MEADOW VIEW DRIVE TO 0.95 MILES SOUTH OF GV TOWER ROAD	2.221	18	46,910	46,910												147
		18	SR 1342	FROM 0.95 MILES SOUTH OF GV TOWER ROAD TO NC 194	2.311	18	48,810	48,810		170		30								153
		19	SR 1153	FROM NC 194 TO SR 1194	0.811	22	17,130	17,130												54
		20	SR 1153	FROM SR 1194 TO SR 1117	1.534	22	32,400	32,400												102
TOTAL FOR PROJ NO. 11CR.20061.19					**6.877**		**145,250**	**145,250**		**170**		**30**								**456**
							290,500		**170**											
11CR.20951.19	Watauga	21	SR 1107	FROM US 321 TO NC 105	1.895	32	42,022	44,022	250			110			9			2		135
		22	SR 1549	FROM SR 1550 TO SCL BOONE	0.8	19	16,900	16,900												
		23	SR 1340	FROM SR 1300 TO END OF 20' PAVEMENT	1.16	20	24,500	24,500												
		24	SR 1340	FROM END OF 20' PAVEMENT TO MP 3.74	1.5	20	31,680	31,680												
		25	SR 1183	FROM SR 1107 TO EOM	0.17	24	3,590	3,590												
		26	SR 1163	FROM SR 1102 TO SOUTH DEPOT STREET	0.16	48	2,700	3,380		280		30		4		1	2	2	2	70
		27	SR 1163	FROM SOUTH DEPOT STREET TO US 321	0.75	56	20,500	17,000	80	350	10	260			4	5	10	4	5	330
TOTAL FOR PROJ NO. 11CR.20951.19					**6.435**		**141,892**	**141,072**	**330**	**630**	**10**	**400**		**4**	**13**	**6**	**12**	**8**	**7**	**535**
							282,964		**960**				**4**		**46**					
GRAND TOTAL					**24.313**		**496,452**	**538,657**	**1,060**	**2,360**	**10**	**1,392**	**12**	**12**	**49**	**14**	**33**	**19**	**10**	**2,064**
							1,035,109		**3,420**				**24**		**125**					

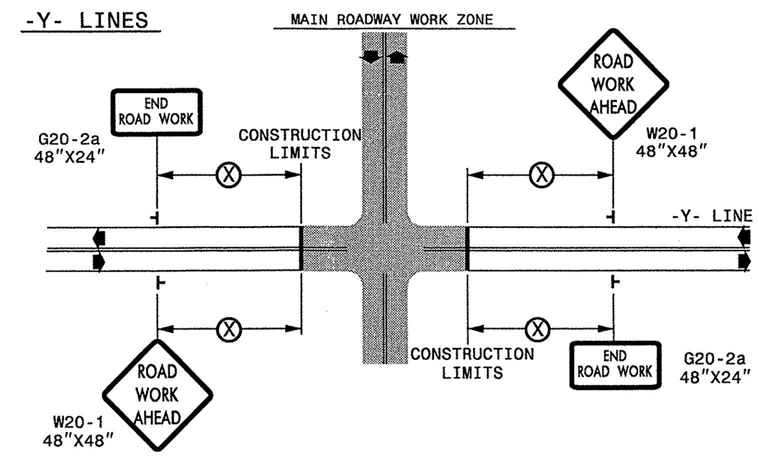
PROJ. REFERENCE NO.	SHEET NO.
11CR.10061.19, 11CR.20061.19 11CR.10951.19, 11CR.20951.19	TCP-1

TWO-WAY UNDIVIDED ** (L-LINES)



POSTED SPEED LIMIT (M.P.H.)	RECOMMENDED MINIMUM SIGN SPACING ⓧ
≤ 50	500'
≥ 55	1000'

ROADWAYS INTERSECTING ALONG 2 WAY UNDIVIDED WORK ZONE (Y-LINES)



GENERAL NOTES

- USE FLUORESCENT ORANGE SHEETING (TYPE VII OR HIGHER) ON ALL ADVANCED WORK ZONE SIGNS.
- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK.
- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT OVERNIGHT. FOR SHORT-TERM DAILY MAINTENANCE TYPE OPERATIONS, THIS SIGNING APPLICATION IS OPTIONAL; MAY USE ONLY APPLICABLE ROADWAY STANDARD DRAWINGS INSTEAD. HOWEVER, IF THIS SIGNING APPLICATION IS USED, SIGNS MAY BE PORTABLE MOUNTED.
- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- USE 3LB STEEL U-CHANNEL POST OR 4" X 4" WOOD POST FOR ALL WORK ZONE SIGNS. 3LB STEEL U-CHANNEL POSTS MUST MEET THE REQUIREMENTS OF STANDARD SPECIFICATION SECTION 1094-1(B), MAY BE GALVANIZED STEEL, OR MAY BE PAINTED GREEN BY THE POST MANUFACTURER. SQUARE STEEL TUBING POSTS HAVING EQUIVALENT STRENGTH OF THE 3 LB STEEL U-CHANNEL POST ARE ALSO ACCEPTABLE FOR USE. ERECT SIGNS PER ROADWAY STANDARD DRAWING 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATION "WORK ZONE SIGNS" SECTION 1110.
- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1110.01. REMOVE ENTIRE POST WHEN REMOVING SIGNS WITH SPLICED POSTS.
- DO NOT BACK BRACE SIGN SUPPORTS.
- ** TWO-WAY UNDIVIDED ADVANCE WARNING SIGN CONFIGURATION MAY BE USED ON URBAN MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.

LEGEND

├ STATIONARY SIGN

◀ DIRECTION OF TRAFFIC FLOW

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

DETAIL DRAWING FOR TWO-WAY UNDIVIDED WORK ZONE WARNING SIGNS

SHEET 1 OF 1

APPROVED: ________ DATE: ________

SEAL

DETAIL DRAWING FOR TWO-WAY UNDIVIDED AND URBAN FREEWAYS ADVANCED WORK ZONE WARNING SIGNS

SCALE: NONE
DATE:
DWG. BY:
DESIGN BY:
REVIEWED BY:

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

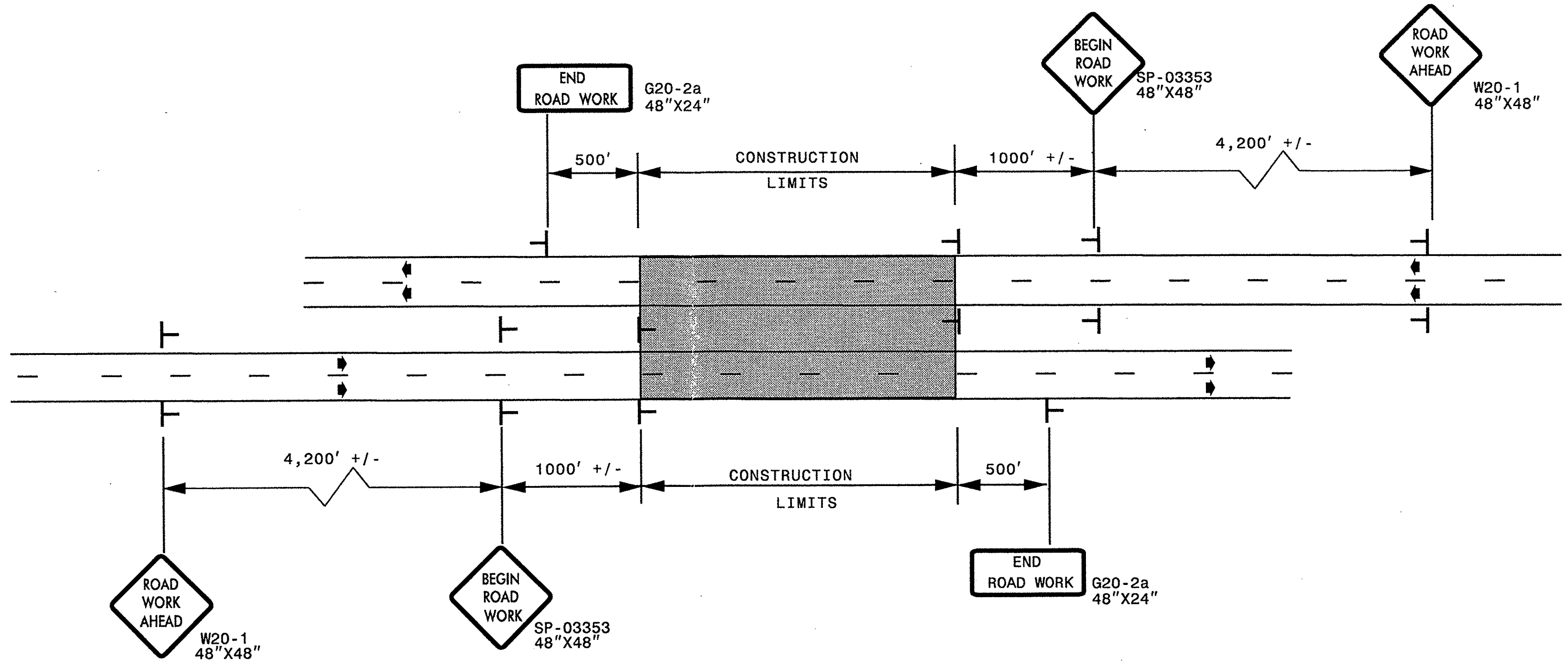
CADD FILE

18-OCT-2011 09:24
sngreen AT TE244735

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

PROJ. REFERENCE NO.	SHEET NO.
11CR.10061.19, 11CR.20061.19 11CR.10951.19, 11CR.20951.19	TCP-2

DETAIL A



LEGEND

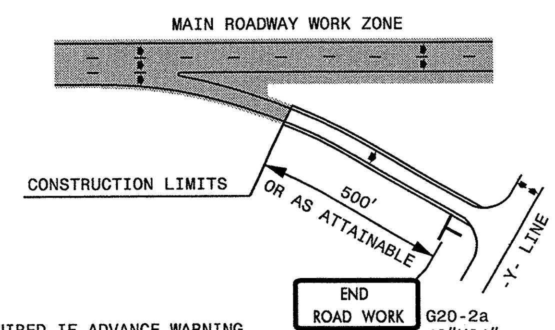
├ STATIONARY SIGN

➧ DIRECTION OF TRAFFIC FLOW

* USE THE "$250 SPEEDING PENALTY" SIGN, SPEED LIMIT SIGN, AND ORANGE PANEL; ONLY WHEN A "$250 SPEEDING PENALTY" ORDINANCE HAS BEEN ISSUED BY THE REGIONAL TRAFFIC ENGINEER.

DETAIL B

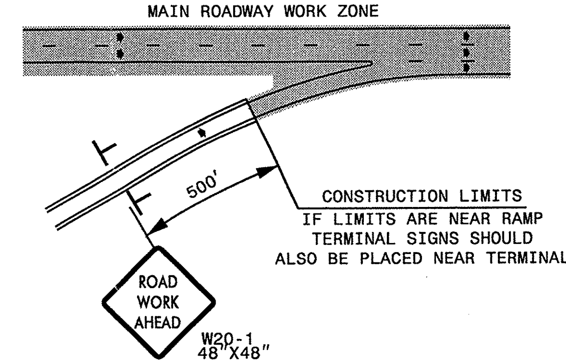
EXIT RAMPS



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.

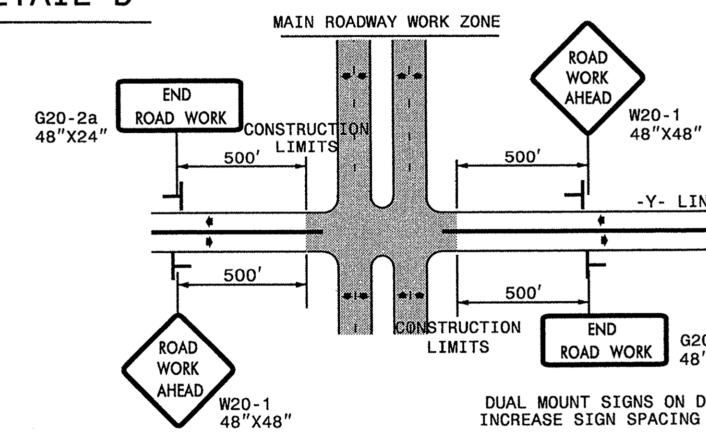
DETAIL C

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 ADVANCED WORK ZONE SIGNS.
- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK.
- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT OVERNIGHT. FOR SHORT-TERM DAILY MAINTENANCE TYPE OPERATIONS, THIS SIGNING APPLICATION IS OPTIONAL; MAY USE ONLY APPLICABLE ROADWAY STANDARD DRAWINGS INSTEAD. HOWEVER, IF THIS SIGNING APPLICATION IS USED, SIGNS MAY BE PORTABLE MOUNTED.
- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- USE 3LB STEEL U-CHANNEL POST OR 4" X 4" WOOD POST FOR ALL WORK ZONE SIGNS. 3LB STEEL U-CHANNEL POSTS MUST MEET THE REQUIREMENTS OF STANDARD SPECIFICATION SECTION 1094-1(B), MAY BE GALVANIZED STEEL, OR MAY BE PAINTED GREEN BY THE POST MANUFACTURER. SQUARE STEEL TUBING POSTS HAVING EQUIVALENT STRENGTH OF THE 3 LB STEEL U-CHANNEL POST ARE ALSO ACCEPTABLE FOR USE. ERECT SIGNS PER ROADWAY STANDARD DRAWING 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATION "WORK ZONE SIGNS" SECTION 1110.
- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1110.01. REMOVE ENTIRE POST WHEN REMOVING SIGNS WITH SPLICED POSTS.
- DO NOT BACK BRACE SIGN SUPPORTS.

APPROVED:__________ DATE:______

SEAL

ADVANCED WORK ZONE WARNING SIGNS FOR FREEWAYS (4 LANES OR GREATER)

SCALE:	NONE
DATE:	8/03
DWG. BY:	JI
DESIGN BY:	JI
REVIEWED BY:	

DIVISION OF HIGHWAYS · TRAFFIC ENGINEERING BRANCH · TRAFFIC CONTROL UNIT · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

REVISIONS	
03/04	
CADD FILE	

GENERAL NOTES

(1) THE FOLLOWING OPTIONS MAY BE USED FOR ADVANCE WARNING SIGNS:
- A. TRUCK MOUNTED SIGNS
- B. TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS)
- C. GROUND MOUNTED ADVANCE WARNING SIGNS (MUST CIRCLE TO PICK UP SIGNS)
- D. GROUND MOUNTED CHANGEABLE MESSAGE SIGN (CMS) (MUST USE CIRCLE TO PICK UP SIGNS)

(2) ALL ADVANCE WARNING SIGNS MUST BE 48" X 48" WITH FLUORESCENT ORANGE TYPE VII, VIII OR IX SHEETING. IF SPACE LIMITATIONS ON SHOULDER PROHIBIT A 48" X 48" SIGN, A SMALLER SIGN CAN BE USED WITH APPROVAL FROM ENGINEER.

(3) SIGNS ON VEHICLES SHOULD BE MOUNTED A MINIMUM OF ONE (1) FOOT FROM THE GROUND AND SHOULD NOT BLOCK THE MOTORIST'S SIGHT OF THE FLASHING ARROW PANEL AND/OR LIGHTBAR.

(4) GROUND MOUNTED ADVANCED WARNING SIGNS SHOULD BE MOUNTED A MINIMUM OF ONE (1) FOOT FROM THE GROUND TO BOTTOM OF SIGN.

(5) SIGN SPACING SHOULD BE ADJUSTED FOR HORIZONTAL AND VERTICAL CURVES, ETC. TO IMPROVE SIGHT DISTANCES.

(6) ADDITIONAL VEHICLES SHOULD BE USED IN WORK CARAVAN TO FACILITATE DRYING OF PAVEMENT MARKING MATERIAL (TMIA'S ARE OPTIONAL ON THESE ADDITIONAL VEHICLES). HOWEVER, THE FIRST VEHICLE MOTORISTS SEE IN THE TRAVEL LANE SHALL HAVE A TMIA.

(7) ADJUST DISTANCE AS NEEDED TO PREVENT MOTORISTS FROM ENTERING SPACE BETWEEN THE APPLICATION AND PROTECTION VEHICLE. DISTANCE CAN BE LENGTHENED TO ACCOMODATE SIGHT DISTANCE NEEDS.

(8) ROUND UP MILEAGE TO NEXT WHOLE MILE. WORK ZONE SHOULD NOT EXCEED FIVE (5) MILES IN LENGTH.

(9) RADIO COMMUNICATION BETWEEN VEHICLES IS REQUIRED.

(10) USE OF A LIGHT BAR ON ALL VEHICLES IS PREFERRED, BUT A ROTATING BEACON MAY BE USED INSTEAD.

(11) IF WORK IS PERFORMED AT NIGHT, THE WORK AREA MUST BE ILLUMINATED WITH MACHINE AND/OR TOWER LIGHTS AS APPROVED BY THE ENGINEER.

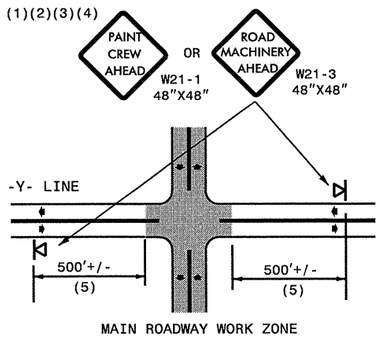
(12) ALL TRAFFIC CONTROL DEVICES WILL BE CONSIDERED INCIDENTAL TO THE PAY ITEMS FOR PAVEMENT MARKING AND MARKERS.

(13) INFORMATIONAL SIGNS SHOULD BE ACTIVITY SPECIFIC, i.e. "PAINT CREW IN ROAD". SIGNS MAY BE RECTANGULAR OR DIAMOND SHAPE. SIGN SIZE SHOULD BE BASED ON THE MOTORIST ABILITY TO RECOGNIZE SIGN WHEN TRAVELING FIVE (5) MILES ABOVE POSTED SPEED LIMIT.

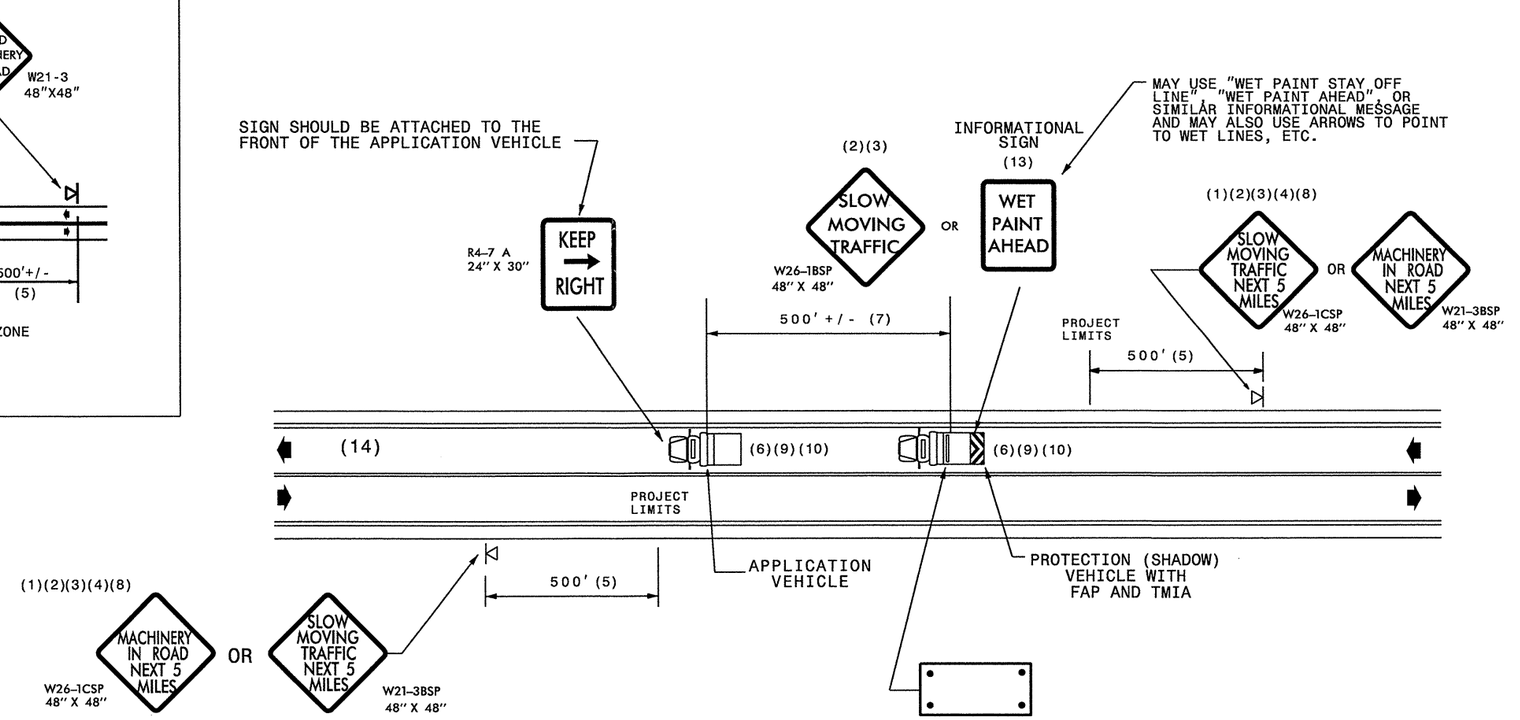
(14) IF A LEAD VEHICLE IS ADDED TO OPERATION, IT SHOULD HAVE THE SAME ADVANCE WARNING SIGNS AS THE APPLICATION VEHICLE SHOWN BELOW.

LEGEND

- PORTABLE SIGN. SIGNS MUST BE NCHRP-350 AND NCDOT APPROVED.
- DIRECTION OF TRAFFIC FLOW
- APPLICATION VEHICLE WITH LIGHT BAR
- PROTECTION VEHICLE WITH TRUCK MOUNTED IMPACT ATTENUATOR (TMIA) AND LIGHT BAR (SEE ROADWAY STANDARD NO. 1165.01). TMIA MUST BE NCHRP-350 TEST LEVEL 3 (60+MPH) APPROVED.
- FLASHING ARROW PANEL, TYPE "B" (60"X30" MIN.), "CAUTION MODE"



-Y- LINES



MOVING OPERATION CARAVAN

(OPERATIONS TRAVELING 3 MPH OR FASTER)
PLACING PAVEMENT MARKING OR MARKERS
ON TWO-LANE TWO-WAY ROADWAYS

DRAWING NUMBER 6
IMPLEMENTATION DATE: 07/01/97
REVISED: 11/03/04

GENERAL NOTES

(1) THE FOLLOWING OPTIONS MAY BE USED FOR ADVANCE WARNING SIGNS:
- A. TRUCK MOUNTED SIGNS
- B. TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS)
- C. GROUND MOUNTED ADVANCE WARNING SIGNS (MUST CIRCLE TO PICK UP SIGNS)
- D. GROUND MOUNTED CHANGEABLE MESSAGE SIGN (CMS) (MUST USE CIRCLE TO PICK UP SIGNS)

(2) ALL ADVANCE WARNING SIGNS MUST BE 48″ X 48″ WITH FLUORESCENT ORANGE TYPE VII, VIII OR IX SHEETING. IF SPACE LIMITATIONS ON SHOULDER PROHIBIT A 48″ X 48″ SIGN, A SMALLER SIGN CAN BE USED WITH APPROVAL FROM ENGINEER.

(3) SIGNS ON VEHICLES SHOULD BE MOUNTED A MINIMUM OF ONE (1) FOOT FROM THE GROUND AND SHOULD NOT BLOCK THE MOTORIST'S SIGHT OF THE FLASHING ARROW PANEL AND/OR LIGHTBAR.

(4) GROUND MOUNTED ADVANCED WARNING SIGNS SHOULD BE MOUNTED A MINIMUM OF FIVE (5) FEET FROM THE GROUND TO BOTTOM OF SIGN.

(5) SIGN SPACING SHOULD BE ADJUSTED FOR HORIZONTAL AND VERTICAL CURVES, ETC. TO IMPROVE SIGHT DISTANCES.

(6) ADDITIONAL VEHICLES SHOULD BE USED IN WORK CARAVAN TO FACILITATE DRYING OF PAVEMENT MARKING MATERIAL (TMIA'S ARE OPTIONAL ON THESE ADDITIONAL VEHICLES). HOWEVER, THE FIRST VEHICLE MOTORISTS SEE IN THE TRAVEL LANE SHALL HAVE A TMIA.

(7) ADJUST DISTANCE AS NEEDED TO PREVENT MOTORISTS FROM ENTERING SPACE BETWEEN THE APPLICATION AND PROTECTION VEHICLE. DISTANCE CAN BE LENGTHENED TO ACCOMODATE SIGHT DISTANCE NEEDS.

(8) ROUND UP MILEAGE TO NEXT WHOLE MILE. WORK ZONE SHOULD NOT EXCEED FIVE (5) MILES IN LENGTH.

(9) RADIO COMMUNICATION BETWEEN VEHICLES IS REQUIRED.

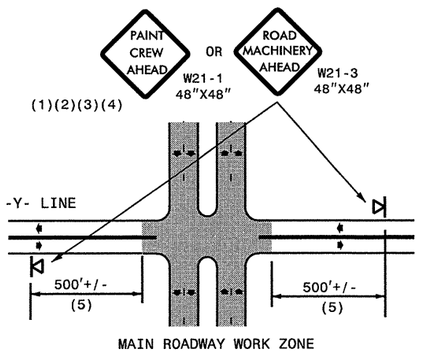
(10) USE OF A LIGHT BAR ON ALL VEHICLES IS PREFERRED, BUT A ROTATING BEACON MAY BE USED INSTEAD.

(11) IF WORK IS PERFORMED AT NIGHT, THE WORK AREA MUST BE ILLUMINATED WITH MACHINE AND/OR TOWER LIGHTS AS APPROVED BY THE ENGINEER.

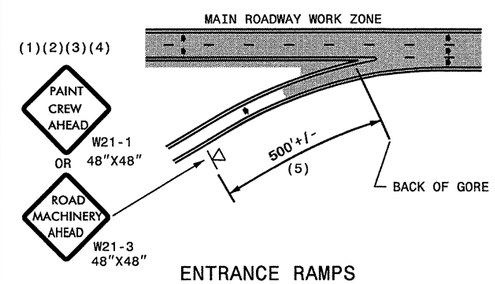
(12) ALL TRAFFIC CONTROL DEVICES WILL BE CONSIDERED INCIDENTAL TO THE PAY ITEMS FOR PAVEMENT MARKING AND MARKERS.

LEGEND

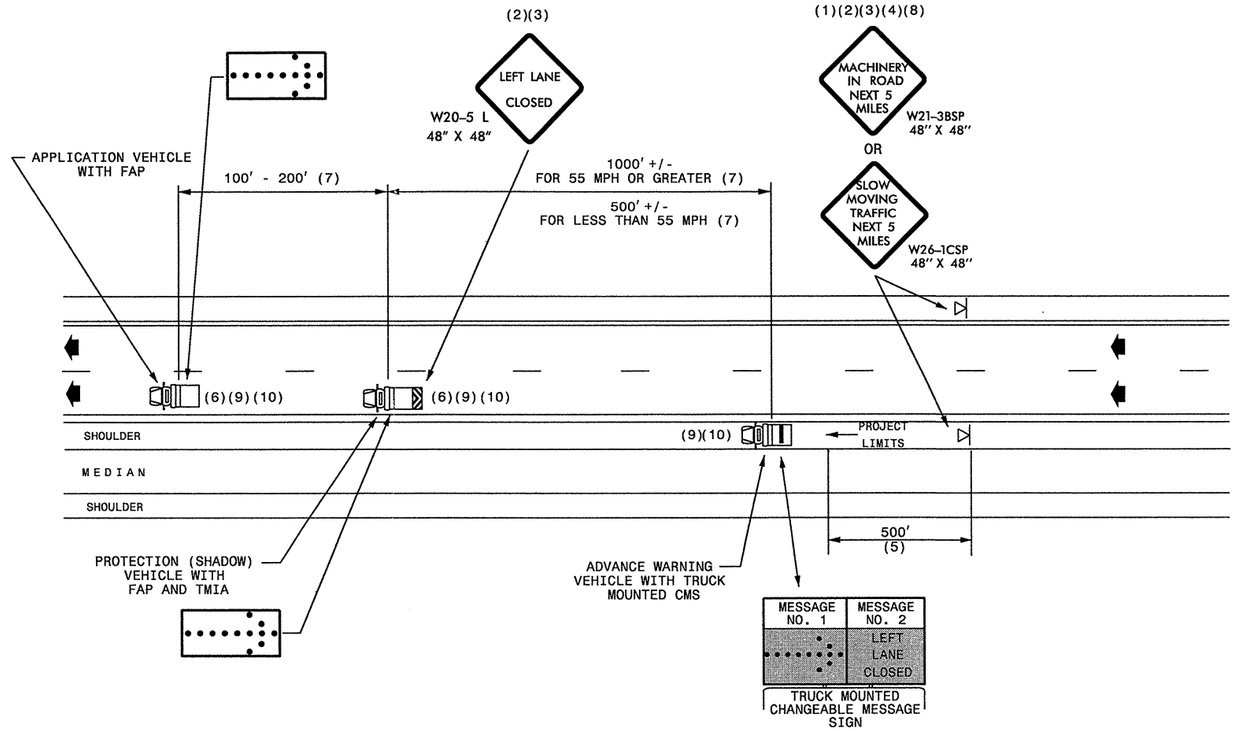
- PORTABLE SIGN. SIGNS MUST BE NCHRP-350 AND NCDOT APPROVED.
- DIRECTION OF TRAFFIC FLOW
- APPLICATION VEHICLE WITH LIGHT BAR
- PROTECTION VEHICLE WITH TRUCK MOUNTED IMPACT ATTENUATOR (TMIA) AND LIGHT BAR (SEE ROADWAY STANDARD NO. 1165.01). TMIA MUST BE NCHRP-350 TEST LEVEL 3 (60+MPH) APPROVED.
- ADVANCE WARNING VEHICLE WITH TRUCK MOUNTED CHANGEBLE MESSAGE SIGN (CMS) AND LIGHT BAR. MESSAGE SIGN LETTER HEIGHT SHOULD BE A MINIMUM OF 10 INCHES.
- FLASHING ARROW PANEL, TYPE "B" (60″X30″ MIN.), APPROPRIATE DIRECTION INDICATED
- CHANGEABLE MESSAGE SIGN



-Y- LINES



ENTRANCE RAMPS

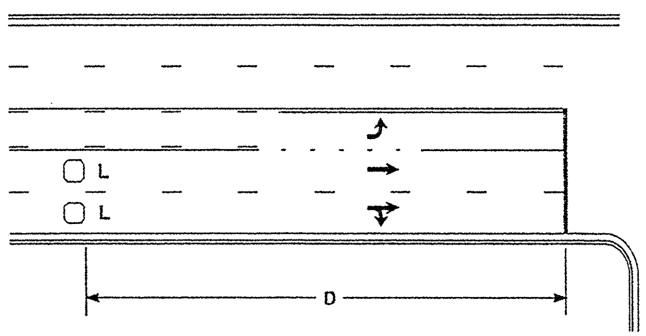


MOVING OPERATION CARAVAN

(OPERATIONS TRAVELING 3 MPH OR FASTER)
PLACING PAVEMENT MARKING OR MARKERS
ON NON-INTERSTATE MULTILANE DIVIDED ROADWAYS

DRAWING NUMBER 7
IMPLEMENTATION DATE: 07/01/97
REVISED: 11/03/04

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



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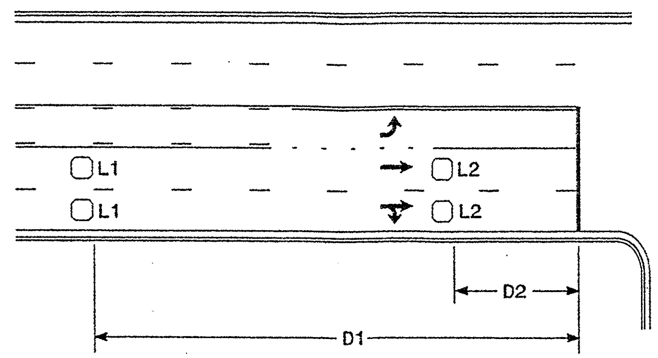


Speed Limit mph (km/hr)	D ft	(m)
40 (64)	250	(75)
45 (72)	300	(90)
50 (80)	355	(110)
55 (88)	420	(130)

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

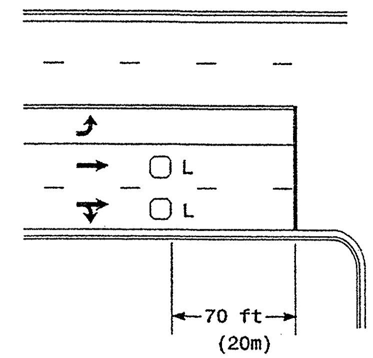
Speed Limit mph (km/hr)	D1 ft	(m)	D2 ft	(m)
40 (64)	250	(75)	80	(25)
45 (72)	300	(90)	90	(27)
50 (80)	355	(110)	100	(30)
55 (88)	420	(130)	110	(35)

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

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

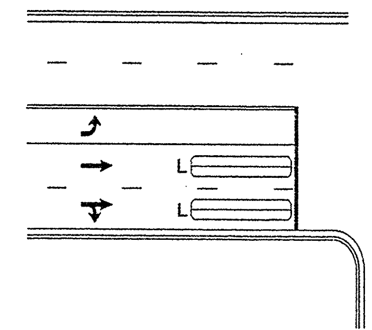
"Stretch" Operation

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



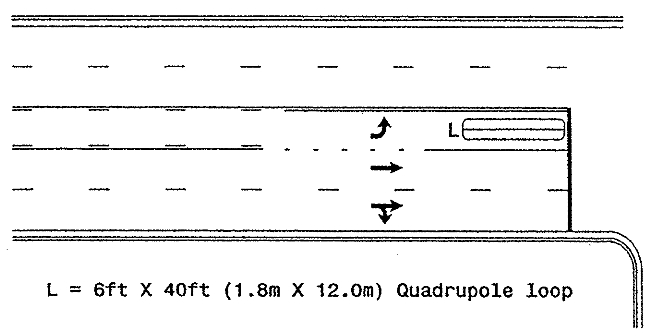
L = 6ft X 6ft (1.8m X 1.8m)
Wired in series

OR



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

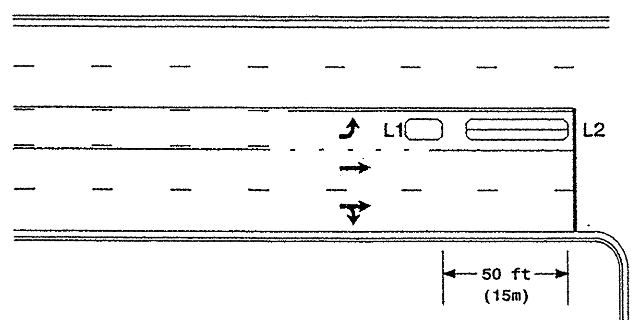
Left Turn Lane Detection



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

Presence Loop Detection

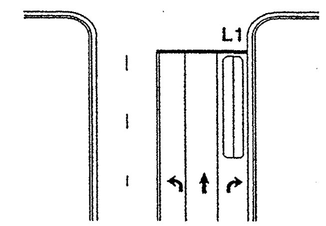
OR



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

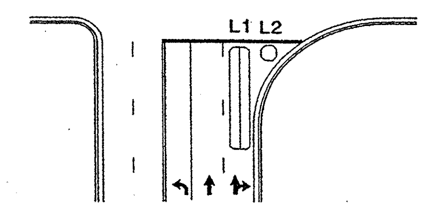
Queue Loop Detection

Right Turn Lane Detection

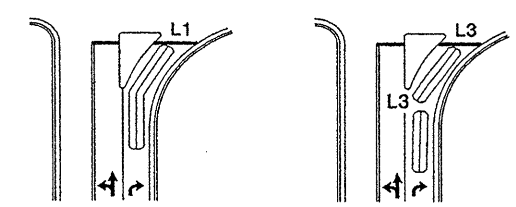


Standard Turn

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

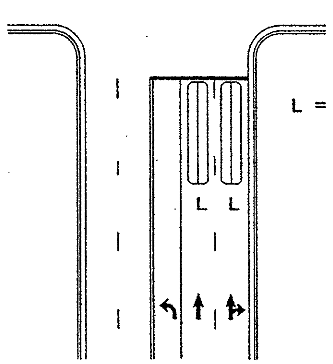


Wide Radius Turn



Channelized Turn

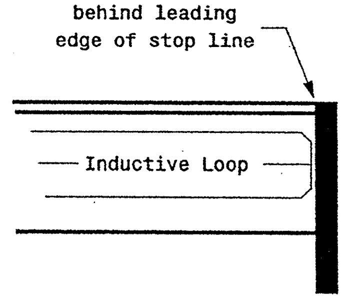
Side Street Detection



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
State of North Carolina Department of Transportation
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

Typical Loop Locations

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

SCALE
N/A

REVISIONS	INIT.	DATE
▽ Revise pavement markings	aa	12/19/06

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23480 PAMELA A. ALEXANDER

SIGNATURE DATE 6/6/06

SIG. INVENTORY NO.

19-DEC-2006 14:29
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palexander

PROJECT REFERENCE NO.	SHEET NO.
11CR.10061.19,etc.	Sig. 2

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

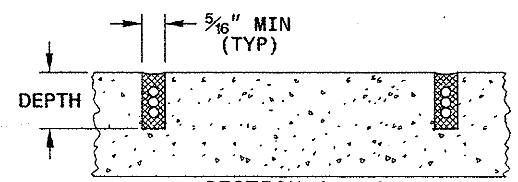
11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

CONVENTIONAL 4-SIDED LOOP

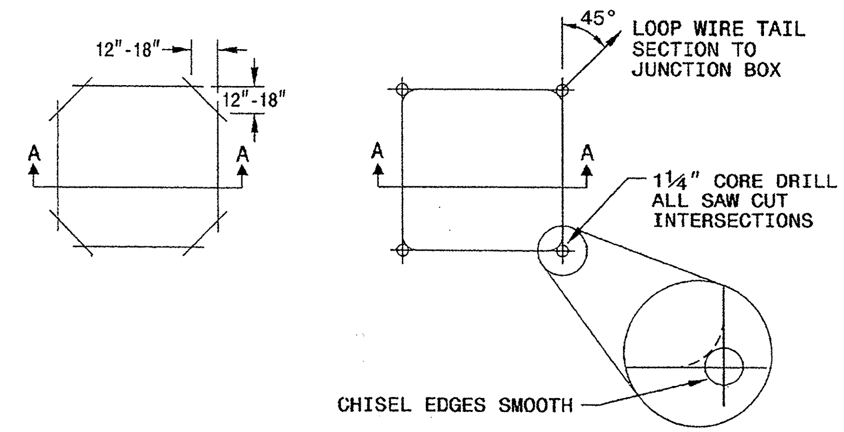
SAW SLOT DEPTH CHART

DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0

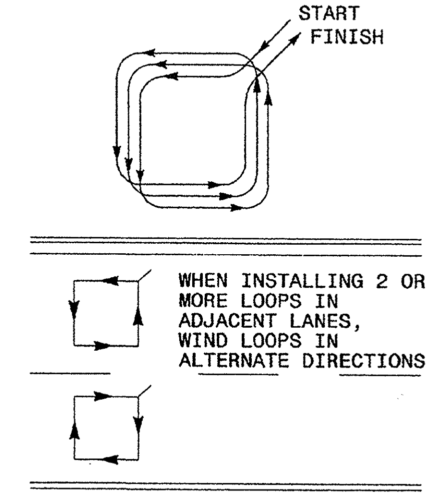


SECTION A - A

SAW CUT OPTIONS



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE

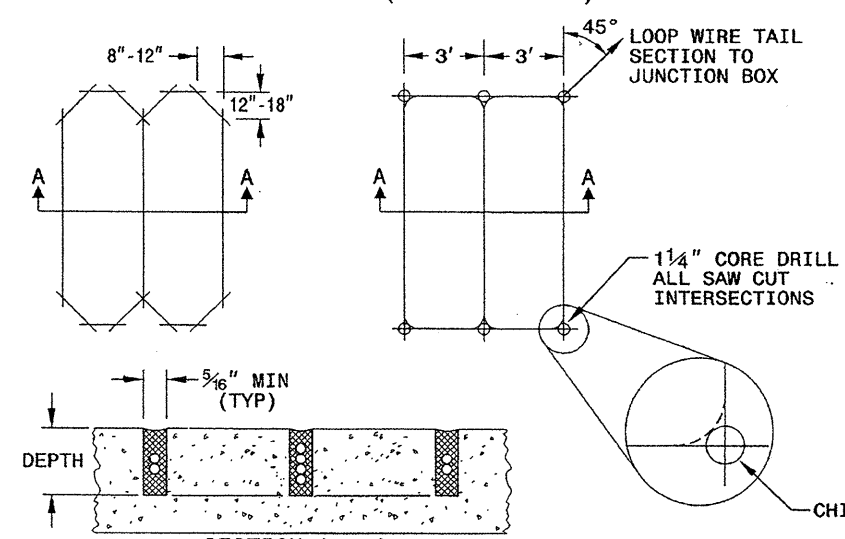
CORRECT WAY TO TWIST WIRE

NOTES

1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

QUADRUPOLE LOOP

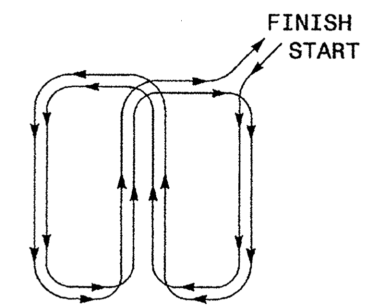
SAW CUT OPTIONS



SECTION A - A

DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

LOOP WINDING METHOD



SHEET 1 OF 3
1725D01

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

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 16286 ENGINEER MILTON I. DEAN

SIGNATURE 11/24/08
DATE

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PROJECT REFERENCE NO.	SHEET NO.
11CR10061.19,etc.	Sig.3

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

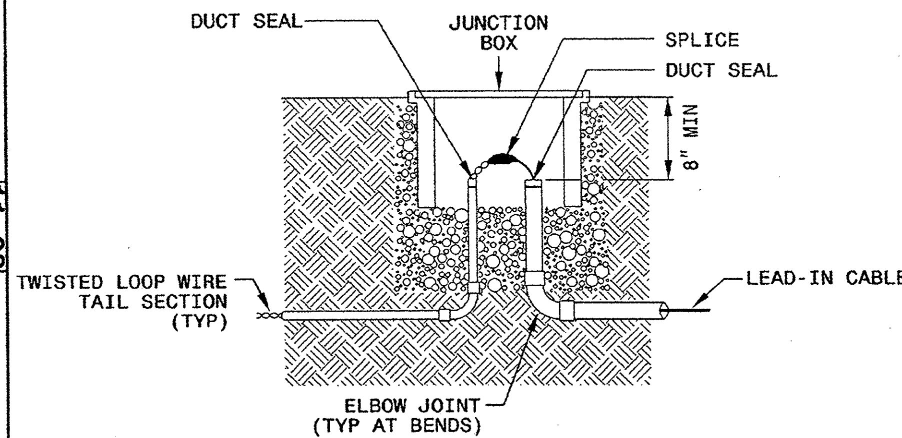
11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

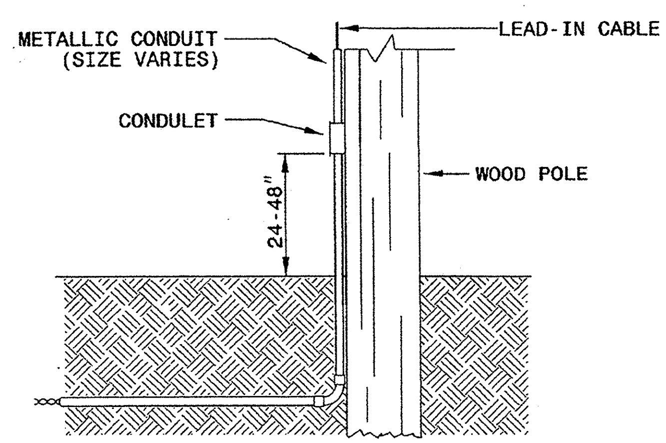
SHEET 2 OF 3
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

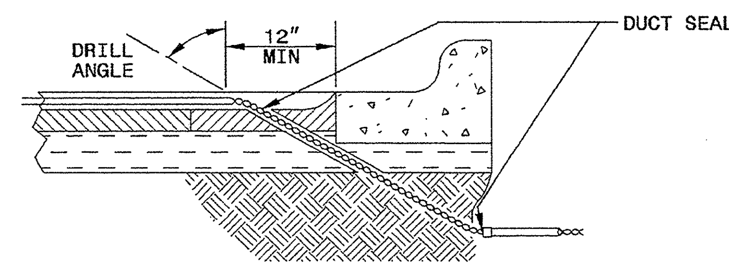


NOTE

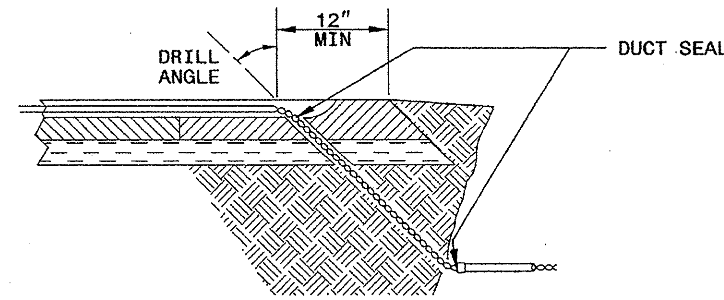
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

1. DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
2. TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
3. BEFORE SEALING LOOPS, INSTALL DUCT SEAL WHERE LOOP WIRE TAIL SECTION LEAVES SAW CUT IN PAVEMENT AND AT ENTRANCE OF CONDUIT TO JUNCTION BOX.

STATE OF NORTH CAROLINA
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RALEIGH, N.C.

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

SHEET 2 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 16286 ENGINEER MILTON I. DEAN

Milton I. Dean 11/24/08
SIGNATURE DATE

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PROJECT REFERENCE NO.	SHEET NO.
11CR.10061.19, etc.	Sig. 4

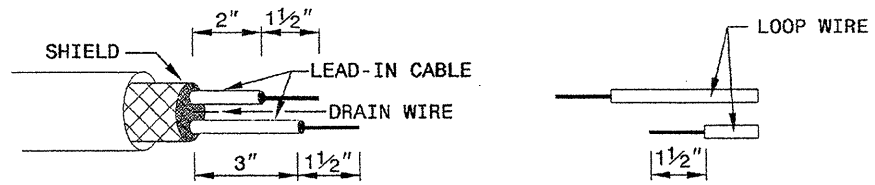
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

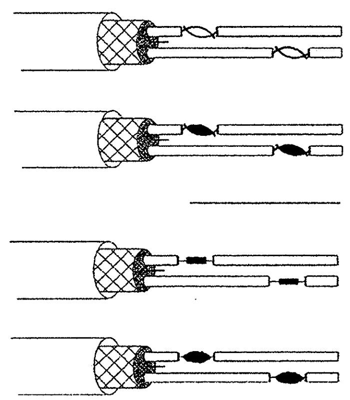
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE



STEP 2. CONNECT AND SOLDER



TWIST BARE CONDUCTORS TOGETHER AND SOLDER WITH RESIN CORE SOLDER

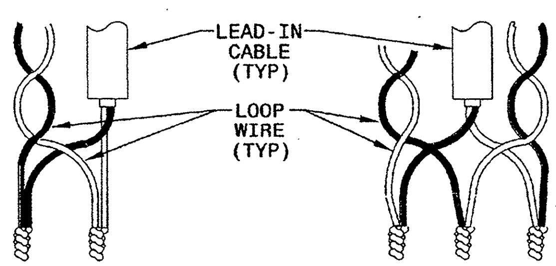
OR

CRIMP BARE CONDUCTORS TOGETHER WITH AN UNINSULATED BUTT CONNECTOR AND SOLDER WITH RESIN CORE SOLDER

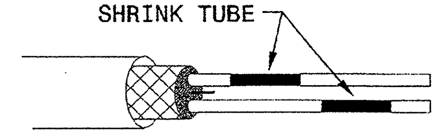
BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS

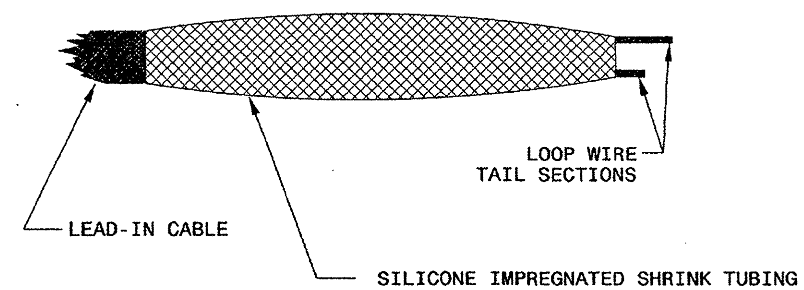
SINGLE CONNECTION | SERIES CONNECTION



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
State of North Carolina Department of Transportation
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 16286 MILTON I. DEAN

Milton I. Dean — SIGNATURE
11/24/08 — DATE

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