



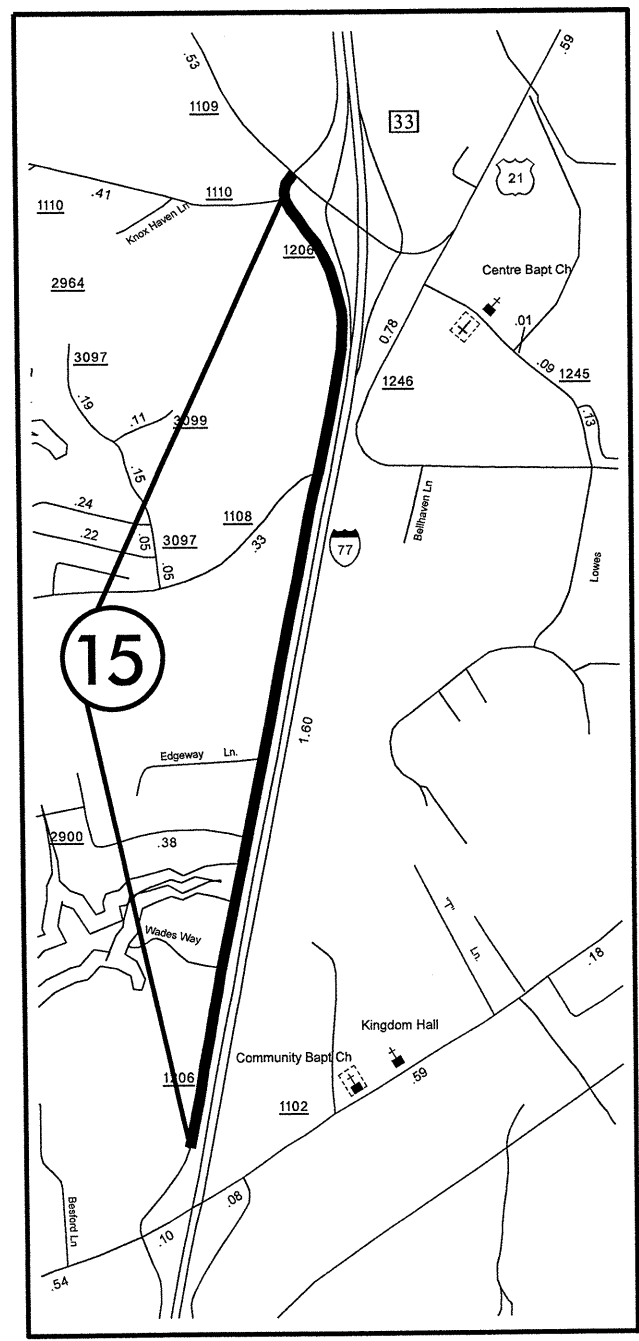
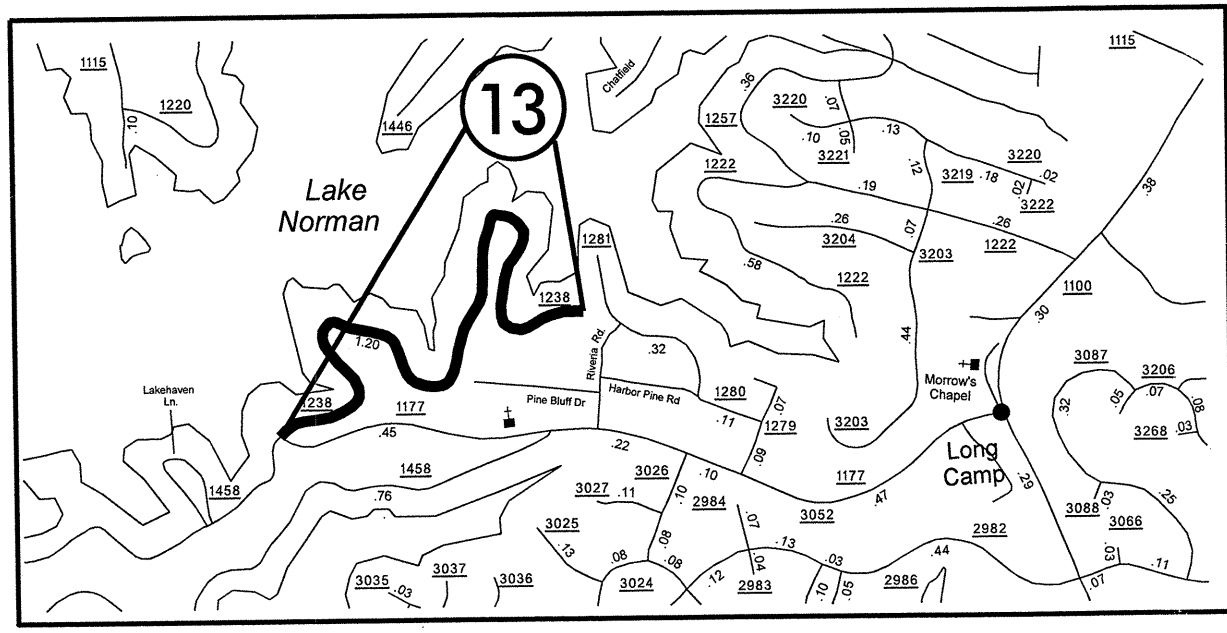
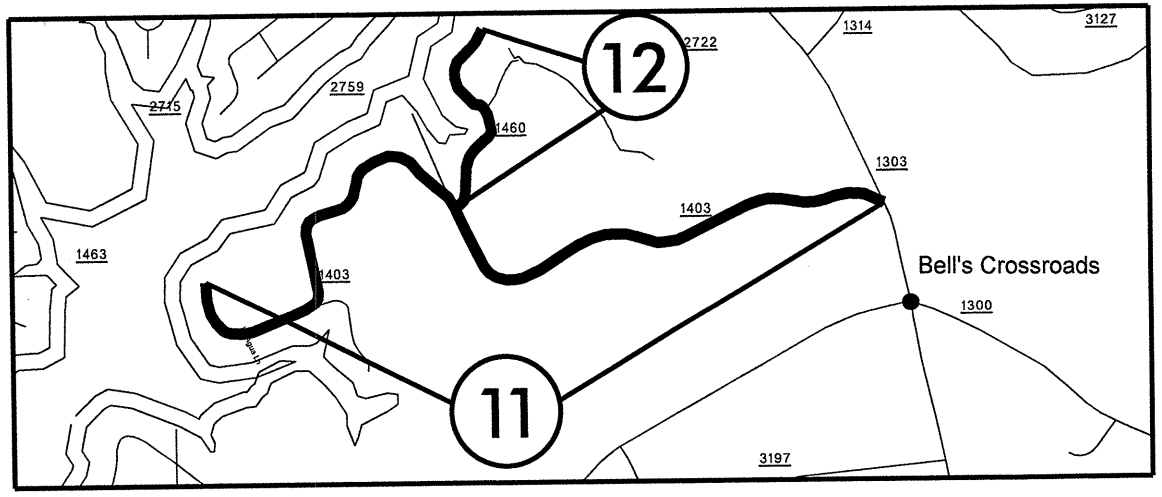






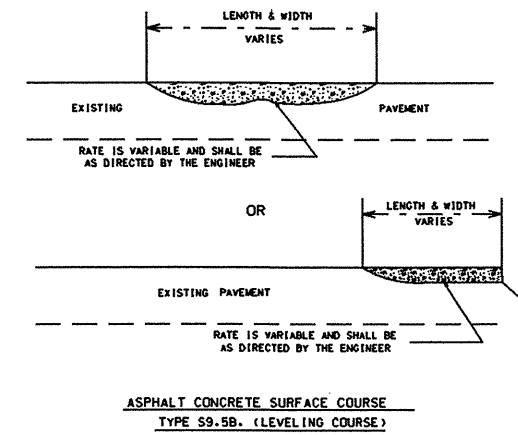
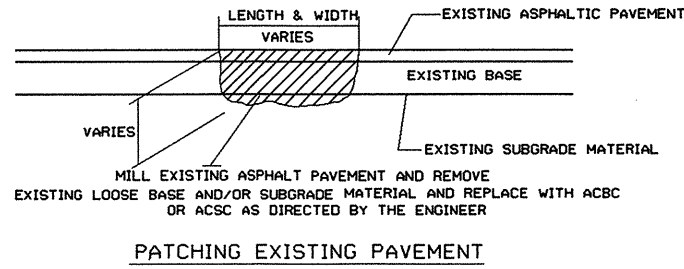
# IREDELL RESURFACING 2011-2012

SYSTEMS DESIGN  
 5/14/09  
 \*\*\*\*\*

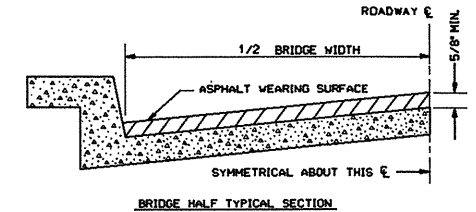


PAVEMENT SCHEDULE	
C	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 188 LBS. PER SQ. YD.
E	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B26.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
V	MILL ASPHALT PAVEMENT 1.5" AS DIRECTED BY ENGINEER
Y	SHOULDER RECONSTRUCTION

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.  
MILL BRIDGE APPROACHES 100' TO PROVIDE A SMOOTH TRANSITION AS DIRECTED, THIS WILL BE PAID FOR AS INCIDENTAL MILLING.



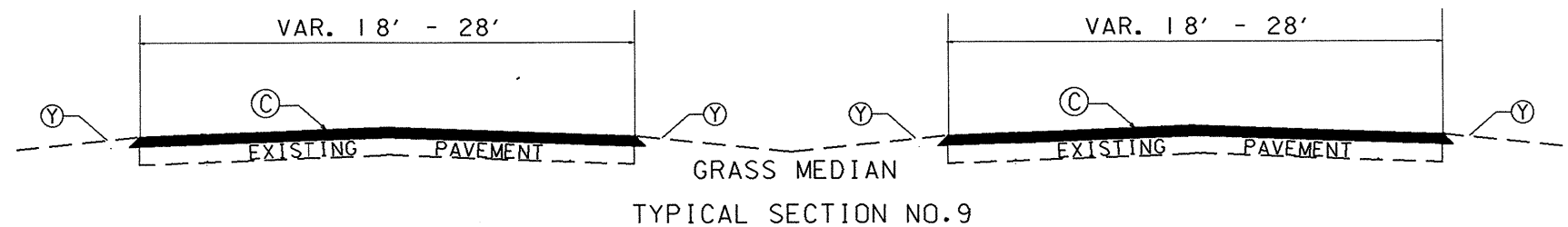
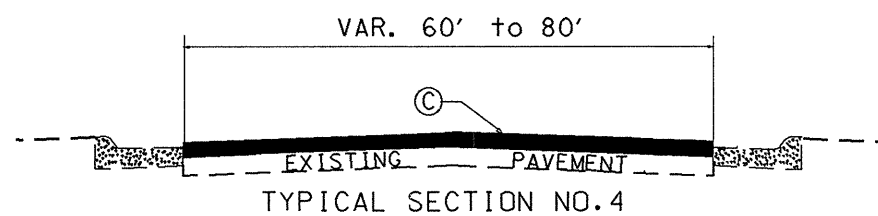
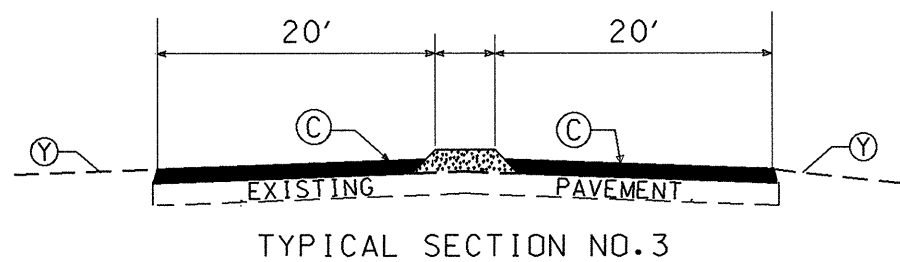
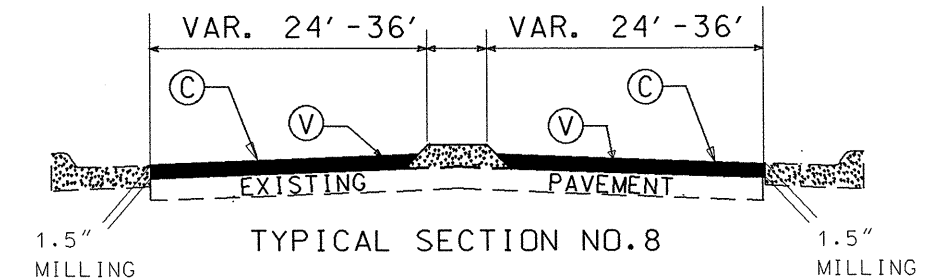
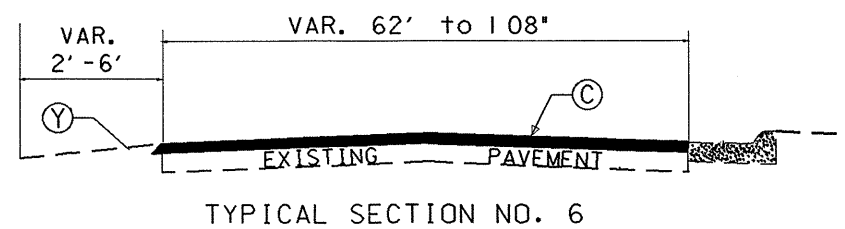
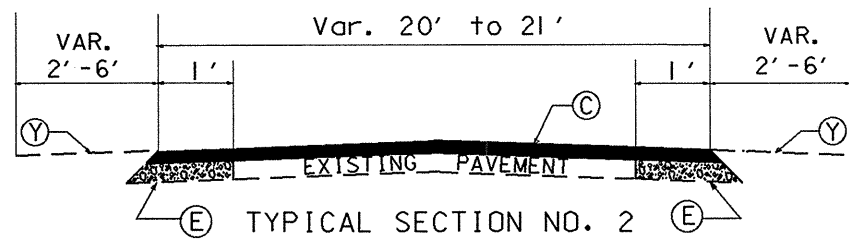
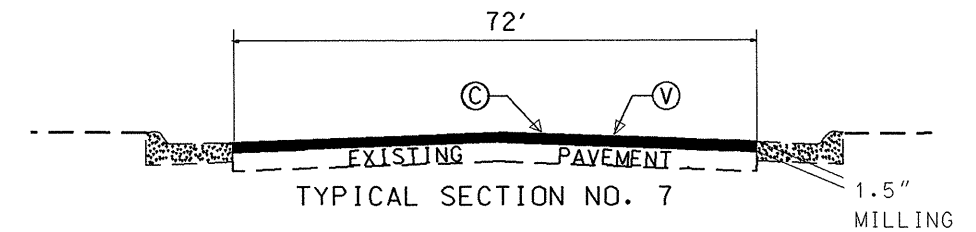
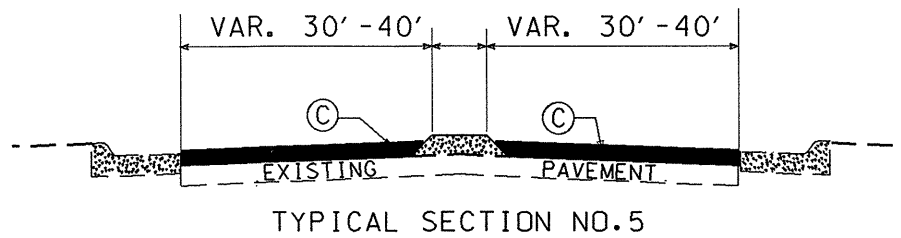
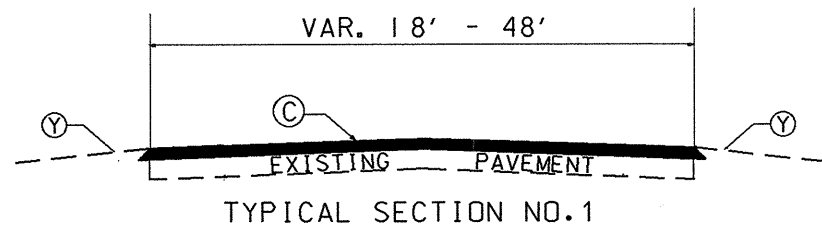
PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
[REDELL COUNTY]	6	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
12CR.18491.13		
12CR.28491.13		



THE PROPOSED WEARING SURFACE SHALL VARY IN THICKNESS AS NECESSARY TO PROVIDE A SMOOTH RIDING SURFACE. A THICKNESS OF NOT LESS THAN 5/8" SHALL BE PROVIDED. THE MAXIMUM THICKNESS SHALL PREFERABLY BE 1-1/2" UNLESS IT IS IMPRACTICAL TO PROVIDE A SMOOTH RIDING SURFACE OTHERWISE.

NOTES

ALL UNPAVED S.R. ROADS TO BE SURFACED 50' FROM EDGE OF PAVEMENT OF MAIN PROJECT.  
ALL PAVED S.R. ROADS TO BE RESURFACED TO THE ENDS OF THE RADII, OR AS DIRECTED BY THE ENGINEER.  
EDGES, PAVEMENT WIDENING, INTERSECTIONS AND BRIDGE FLARES ARE INCLUDED IN THE TABLE OF QUANTITIES.  
SHOULDERS AND DITCHES ARE TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE NOTED.  
BRIDGES TO BE RESURFACED AT LOCATIONS AND TO DEPTH AS DIRECTED BY THE ENGINEER.



PROJECT NO.	SHEET NO.	TOTAL NO.
12CR.10491.13 (Primary)	7	
12CR.20491.13 (Secondary)		

### SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	FINAL SURFACE TESTING REQUIRED	LENGTH MI	WIDTH FT	AGGREGATE SHOULDER BORROW TON	INCIDENTAL STONE BASE TONS	SHOULDER RECONSTRUCTION SMI	1½" MILLING SY	INCIDENTAL MILLING SY	BASE COURSE, B25.0B TONS	SURFACE COURSE, S9.5B TONS	LEVELING COURSE, S9.5B TONS	ASPHALT BINDER FOR PLANT MIX TONS	PATCHING EXISTING PAVEMENT TONS	ADJ. OF MANHOLES EA	ADJ. OF METER OR VALVE BOX EA	PORTABLE LIGHTING LS	INDUCTIVE LOOP LF				
12CR.10491.13 (Primary)	Iredell	1	NC 150	FROM I-77 TO MCLELLAND AVE	4	NO	1.626	Var. 60 - 80							6,000	300	378	600	14	20	1.00					
				FROM NC 115 TO ROWAN COUNTY LINE	5	NO	0.15	Var. 60 - 80																		
					1	NO	4.08	24	816	350	8.16						6,290	500	407	700	2	6	*			
			US 64/90	FROM US 70 TO SR 1621	1		0.733	Var. 28 - 48																		
				NORTHSIDE DR	6		0.139	Var. 62 - 108																		
					7		0.043	72																		
					8	NO	0.27	Var. 48 - 72	200		1.97	13,240					4,240	350	276	500	10	3	*	200		
<b>TOTAL FOR PROJ NO. 12CR.10491.13 (Primary)</b>							<b>7.225</b>		<b>1,016</b>	<b>350</b>	<b>10.13</b>	<b>13,240</b>		<b>16,530</b>	<b>1,150</b>	<b>1,061</b>	<b>1,800</b>	<b>26</b>	<b>29</b>	<b>1.00</b>	<b>200</b>					
12CR.20491.13 (Secondary)	Iredell	4	TABOR RD SR-1845	FROM TATUM RD SR-1887 TO NC 901	2	NO	2.914	21	580	200	5.82			2,370	3,340	330	322	600								
				SHEFFIELD RD SR-2126	5	NO	1.826	18	365	150	3.65		4,000			2,000	180	131	250				*			
				PIONEER RD SR-1851	6	NO	0.945	22	189	100	1.89					1,140	150	78	200				*			
				RAIDER RD SR-1953	7	NO	0.561	20	112	75	1.12					620	75	42	200							
				SULLIVAN FARM RD SR-1929	8	NO	0.102	20	120	50	1.20					400	650		57	340						
				COOPER FARM RD SR-1925	9	NO	0.487	20	314	100	3.14					520	1,720	400	152	250						
				WESTMINISTER DR SR-1617	10	NO	0.636	20	310	100	3.10						2,200	100	139	350		1				
				NEILL FARM RD SR-1403	11	NO	0.936	26	303	125	3.03						1,490	150	99	400						
				WINDING SHORE LN SR-1460	12	NO	1.549	18	72	25	0.72						360	50	25	100						
				INDIAN TRAIL RD SR-1238	13	NO	0.358	18	226	75	2.26						1,240	200	87	250						
				MALLARD WAY SR-2930	14	NO	1.133	20	174	75	1.74						1,110	100	73	150						
				ALCOVE RD SR-1206	15	NO	0.72	20	288	100	2.88						1,170	1,730	175	167	400		1			
				<b>TOTAL FOR PROJ NO. 12CR.20491.13 (Secondary)</b>							<b>15.269</b>		<b>3,053</b>	<b>1,175</b>	<b>30.55</b>		<b>4,000</b>	<b>4,460</b>	<b>17,600</b>	<b>1,910</b>	<b>1,372</b>	<b>3,490</b>		<b>2</b>		
				<b>GRAND TOTAL</b>							<b>22.494</b>		<b>4,069</b>	<b>1,525</b>	<b>40.68</b>	<b>13,240</b>	<b>4,000</b>	<b>4,460</b>	<b>34,130</b>	<b>3,060</b>	<b>2,433</b>	<b>5,290</b>	<b>26</b>	<b>31</b>	<b>1.00</b>	<b>200</b>

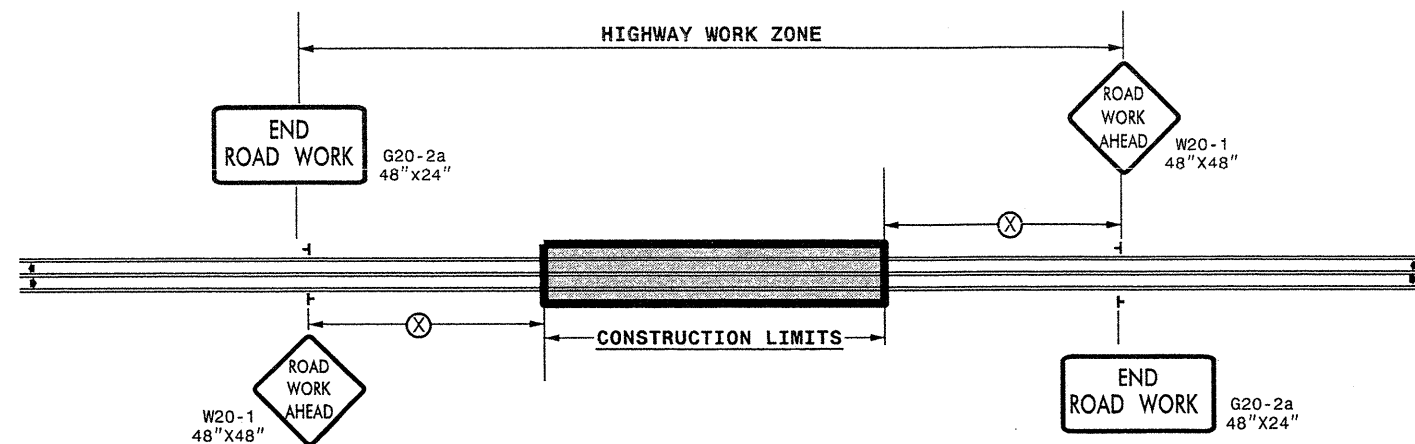
PROJECT NO.	SHEET NO.	TOTAL NO.
12CR.10491.13 (Primary)	5	
12CR.20491.13 (Secondary)		

### THERMOPLASTIC AND PAINT QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	LENGTH	WIDTH	4685000000-E	4686000000-E	4697000000-E	4705000000-E	4710000000-E	4721000000-E			4725000000-E			4810000000-E		4905000000-N				
							4" X 90 M WHITE THERMO LF	4" X 120 M YELLOW THERMO LF	4" X 120 M WHITE THERMO LF	8" X 120 M WHITE THERMO LF	8" X 120 M YELLOW THERMO LF	16" X 120 M WHITE THERMO LF	24" X 120 M WHITE THERMO LF	THERMO RXR 120 M EA	THERMO MSG ONLY 120 M EA	THERMO MSG SCHOOL 120 M EA	THERMO LT ARROW 90 M EA	THERMO RT ARROW 90 M EA	THERMO STR ARROW 90 M EA	THERMO STR & RT ARROW 90 M EA	THERMO STR & LT ARROW 90 M EA	4" WHITE PAINT LF	4" YELLOW PAINT LF	SNOW PLOWABLE MARKERS EA
12CR.10491.13	Iredell	1	NC 150	FROM I-77 TO MCLELLAND AVE	1.626	Var. 60 - 80		37,500	28,125							53	12	29	10			470		
		2	NC 150	FROM NC 115 TO ROWAN COUNTY LINE	4.08	24	43,080	43,080		250		150	225	6		19	5					350		
		3	US 64/90	FROM US 70 TO SR 1621 NORTHSIDE DR	0.733 0.139 0.043 0.27 0.184	Var. 28 - 48 Var. 62 - 108 72 Var. 48 - 72 Var. 36 - 56	11,150	14,460	3,310		450		200		4	13	8	23	7	1		150		
TOTAL FOR PROJ NO. 12CR.10491.13 (Primary)							4.08	54,230	95,040	31,435	250	740	150	845	6	4	85	25	52	17	1		970	
								126,475		990					180									
12CR.20491.13	Iredell	4	TABOR RD SR-1845	FROM TATUM RD SR-1887 TO NC 901	2.914	21							20								61,540	61,540		
		5	SHEFFIELD RD SR-2126	FROM NC 901 TO START OF BST	1.826	18							20								38,560	38,560		
		6	PIONEER RD SR-1851	FROM SLOANS MILL RD SR-1852 TO NC 901	0.945	22							40								19,960	19,960		
		7	RAIDER RD SR-1953	FROM JENNINGS RD SR-1892 TO FRIENDSHIP RD SR-1896	0.561	20							140		12						11,840	11,840		
		8	SULLIVAN FARM RD SR-1929	FROM S. CHIPLEY FORD RD SR-1907 TO NC 115	0.102 0.487	20							40								12,440	12,440		
		9	COOPER FARM RD SR-1925	FROM FORT DOBBS RD SR-1930 TO NIXON RD SR-1924	0.636 0.936	20							40								33,200	33,200		
		10	WESTMINISTER DR SR-1617	FROM US 70 TO BRISTOL DR SR-1359	1.549	26							40								32,720	32,720		
		11	NEILL FARM RD SR-1403	FROM PERTH RD SR-1303 TO DEAD END	1.515	18							20								32,000	32,000		
		12	WINDING SHORE LN SR-1460	FROM NEILL FARM RD SR-1403 TO DEAD END	0.358	18							20								7,560	7,560		
		13	INDIAN TRAIL RD SR-1238	FROM CHUCKWOOD RD SR-1177 TO DEAD END	1.133	20							20								23,920	23,920		
		14	MALLARD WAY SR-2930	FROM BRAWLEY SCHOOL RD SR-1100 TO DEAD END	0.72 0.148	20							20								18,328	18,328		
		15	ALCOVE RD SR-1206	JAMSON RD SR-1109 TO PAVEMEN	1.439	22							20			1	1				30,400	30,400		
TOTAL FOR PROJ NO. 12CR.20491.13 (Secondary)							15.269						440		12	12	1	1	2			322,468	322,468	
GRAND TOTAL							19.349	54,230	95,040	31,435	250	740	150	1,285	6	4	86	26	52	17	1	322,468	322,468	970
								126,475		990					182			644,936						



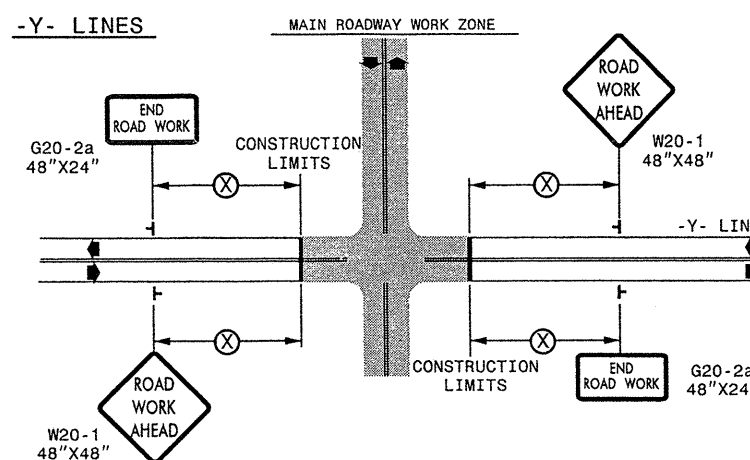
**TWO-WAY UNDIVIDED \*\* (L-LINES)**



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

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

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



DETAIL DRAWING FOR  
 TWO-WAY UNDIVIDED  
 WORK ZONE WARNING SIGNS


**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

SHEET 1 OF 1

APPROVED: _____ DATE: _____	DETAIL DRAWING FOR TWO-WAY UNDIVIDED AND URBAN FREEWAYS ADVANCED WORK ZONE WARNING SIGNS	
SEAL	SCALE: NONE	REVISIONS
	DATE: _____	7-98 10/01
	DWG. BY: _____	10-98 03/04
	DESIGN BY: _____	01/01 11/04
REVIEWED BY: _____		






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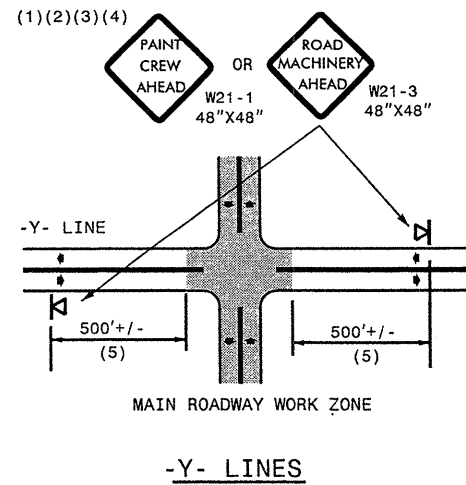


### GENERAL NOTES

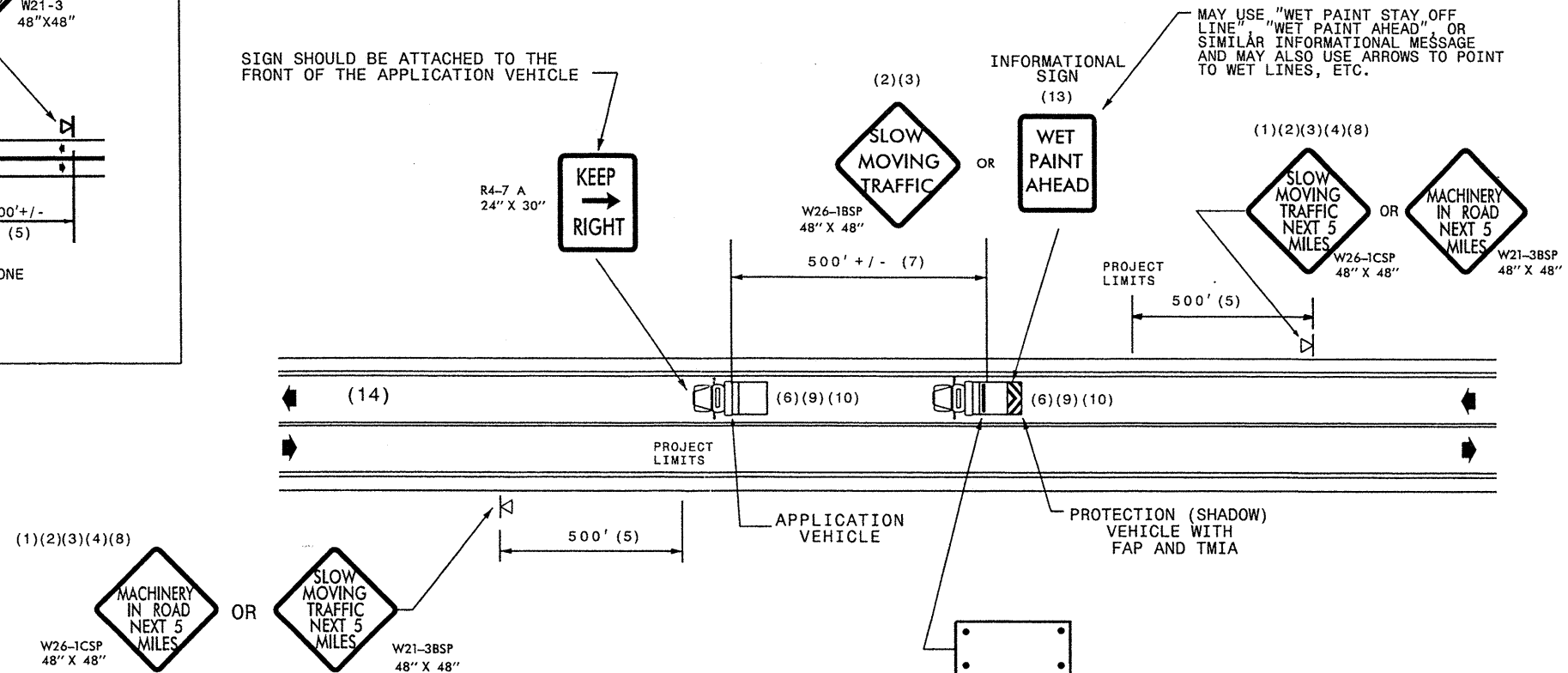
- (1) THE FOLLOWING OPTIONS MAY BE USED FOR ADVANCE WARNING SIGNS:
  - A. TRUCK MOUNTED SIGNS
  - B. TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS)
  - C. GROUND MOUNTED ADVANCE WARNING SIGNS (MUST CIRCLE TO PICK UP SIGNS)
  - D. GROUND MOUNTED CHANGEABLE MESSAGE SIGN (CMS) (MUST USE CIRCLE TO PICK UP SIGNS)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



SIGN SHOULD BE ATTACHED TO THE FRONT OF THE APPLICATION VEHICLE



## MOVING OPERATION CARAVAN








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

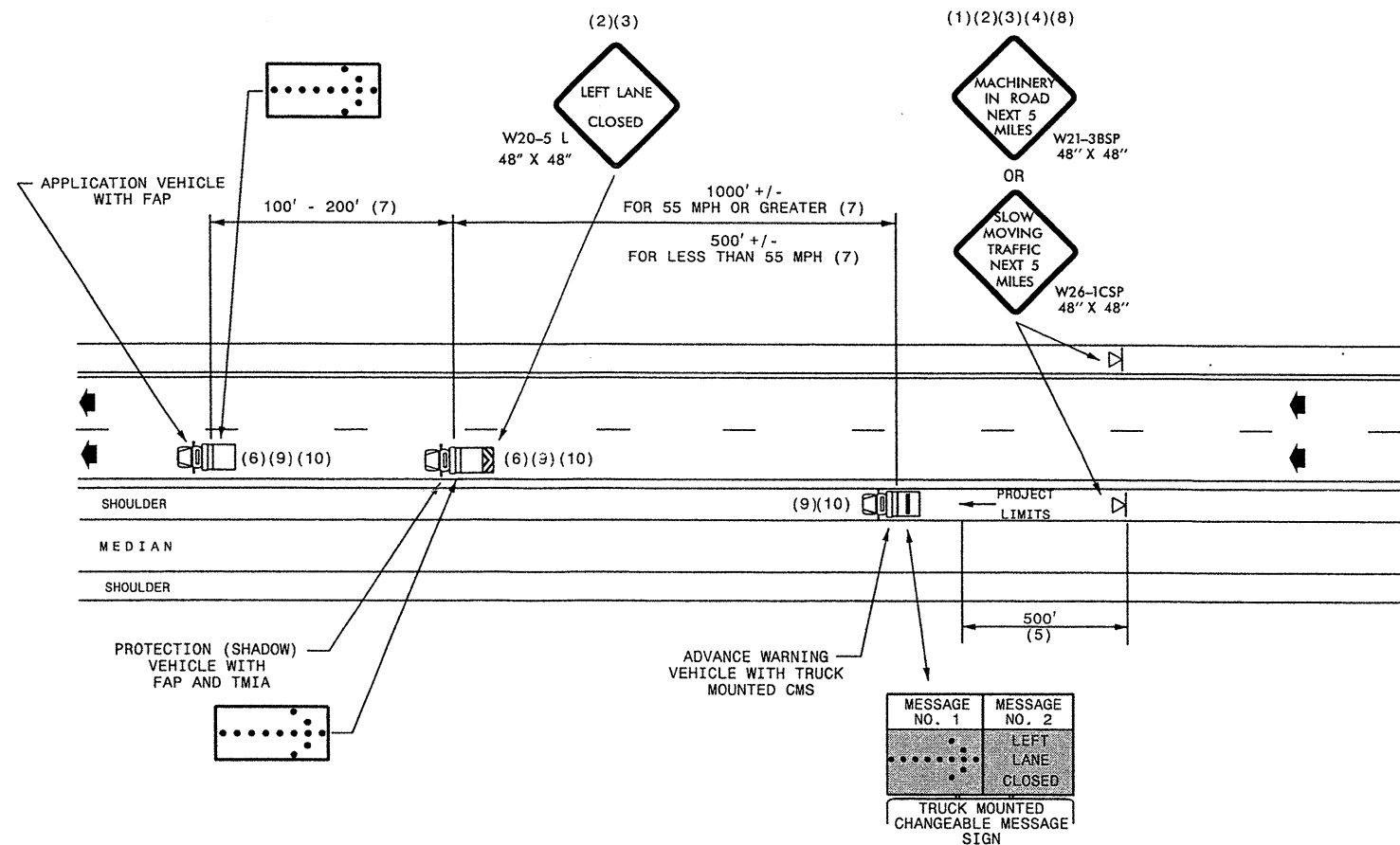
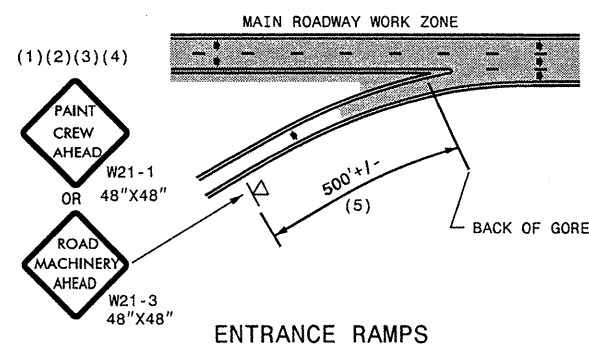
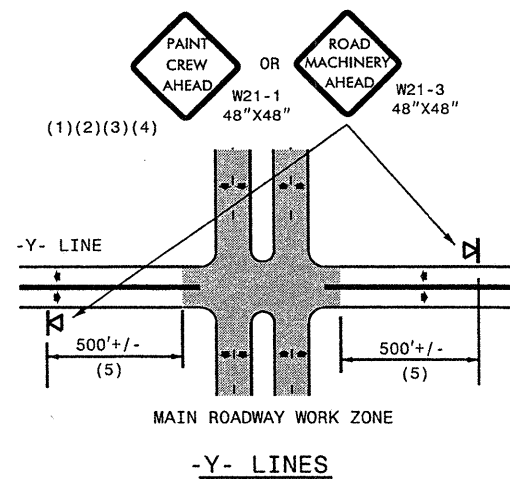
**DRAWING NUMBER 6**  
IMPLEMENTATION DATE: 07/01/97  
REVISED: 11/03/04

### 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 ACCOMMODATE 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 CHANGEABLE 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

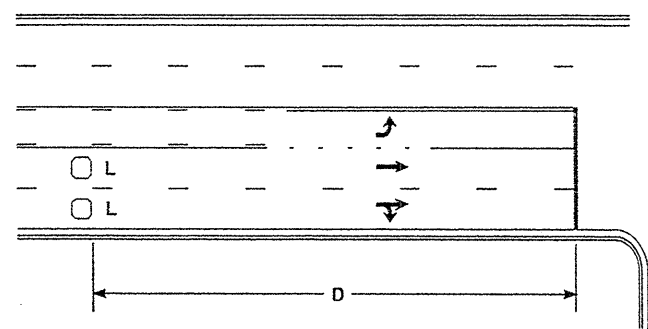


## MOVING OPERATION CARAVAN

(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)]

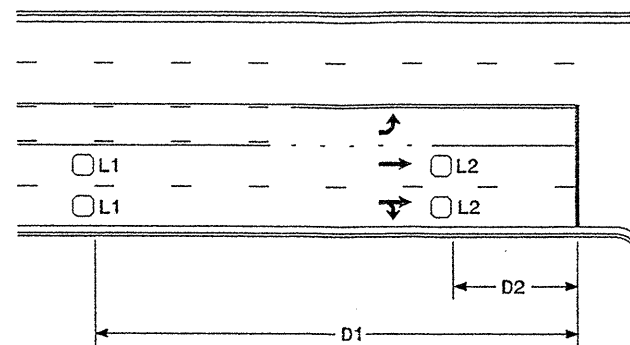


Speed Limit mph (km/hr)	D ft (m)
40 (64)	250 (75)
45 (72)	300 (90)
50 (80)	355 (110)
55 (88)	420 (130)

Volume Density Operation

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

OR

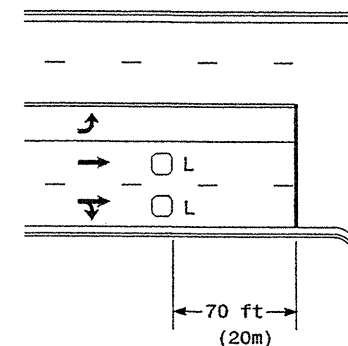


Speed Limit mph (km/hr)	D1 ft (m)	D2 ft (m)
40 (64)	250 (75)	80 (25)
45 (72)	300 (90)	90 (27)
50 (80)	355 (110)	100 (30)
55 (88)	420 (130)	110 (35)

"Stretch" Operation

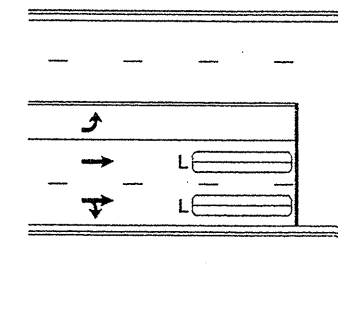
L1 = 6ft X 6ft  
(1.8m X 1.8m)  
Wired in series  
L2 = 6ft X 6ft  
(1.8m X 1.8m)  
Wired in series

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



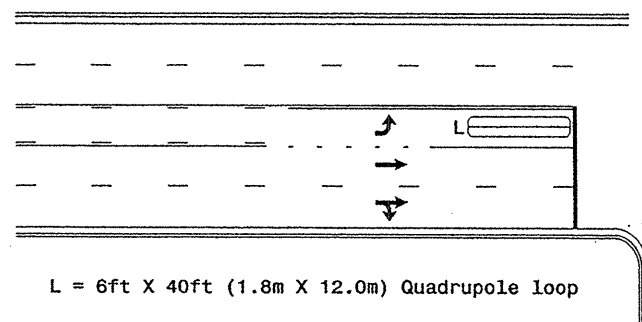
L = 6ft X 6ft (1.8m X 1.8m)  
Wired in series

OR



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

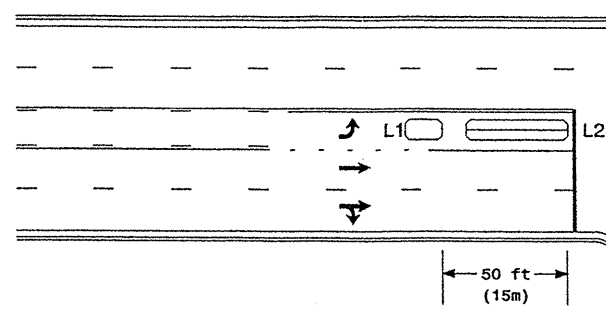
### Left Turn Lane Detection



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

Presence Loop Detection

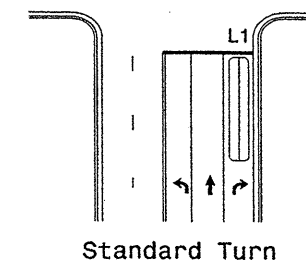
OR



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

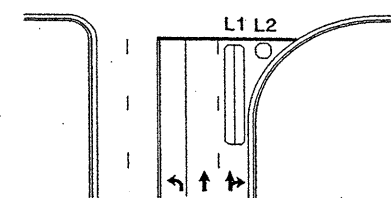
Queue Loop Detection

### Right Turn Lane Detection

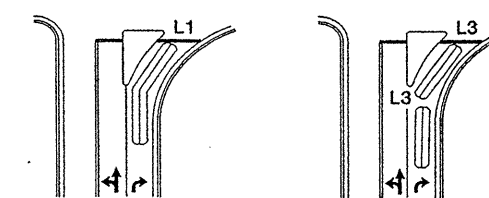


Standard Turn

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

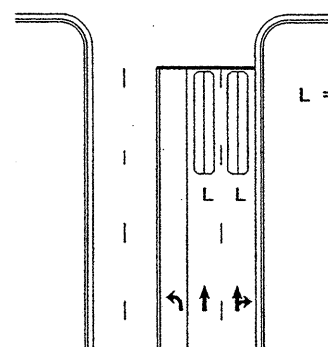


Wide Radius Turn



Channelized Turn

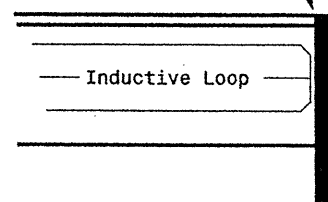
### Side Street Detection



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


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P:\alexander

Prepared in the Office of:  
  
122 N. McDowell St., Raleigh, NC 27603

SCALE: N/A

Typical Loop Locations

PLAN DATE: June 2006	REVIEWED BY:
PREPARED BY: P L Alexander	REVIEWED BY:
REVISIONS	INIT. DATE
✓ Revise pavement markings	

SIGNATURE:  DATE: 12/11/06

SIG. INVENTORY NO.

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RALEIGH, N.C.

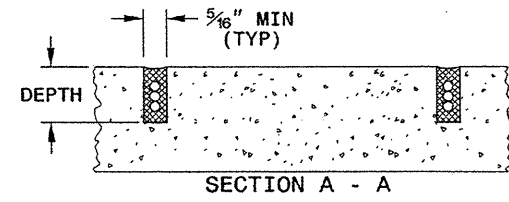
11-08

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**

SHEET 1 OF 3  
**1725D01**

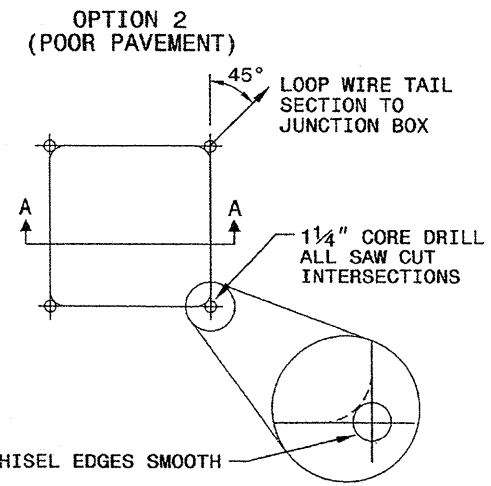
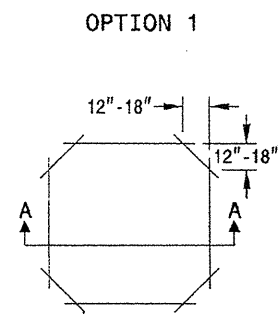
**SAW SLOT DEPTH CHART**

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

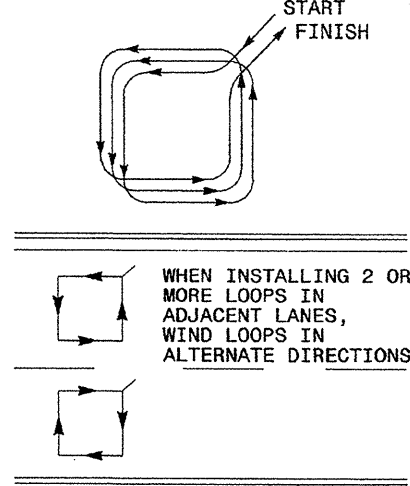


**CONVENTIONAL 4-SIDED LOOP**

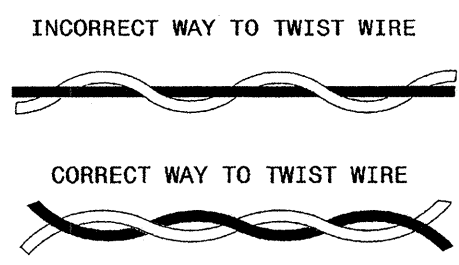
**SAW CUT OPTIONS**



**LOOP WINDING METHOD**



**LOOP WIRE TWISTING METHOD**

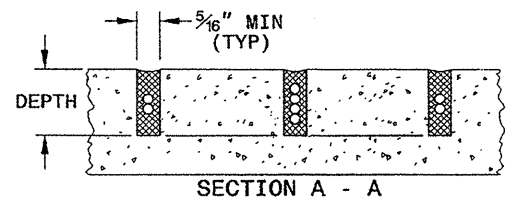
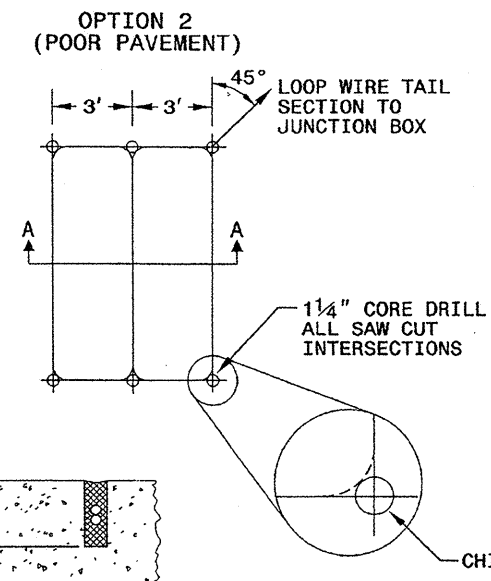
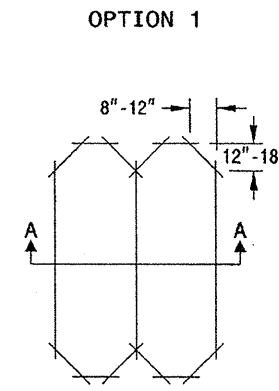


**NOTES**

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.

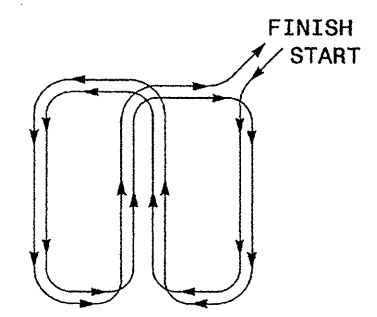
**QUADRUPOLE LOOP**

**SAW CUT OPTIONS**



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

**LOOP WINDING METHOD**



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ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**

SHEET 1 OF 3  
**1725D01**

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway  
Garner, NC 27529

SEAL

Wilton I. Dean  
4/24/08  
SIGNATURE DATE

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24/11/10

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DIVISION OF HIGHWAYS  
RALEIGH, N.C.

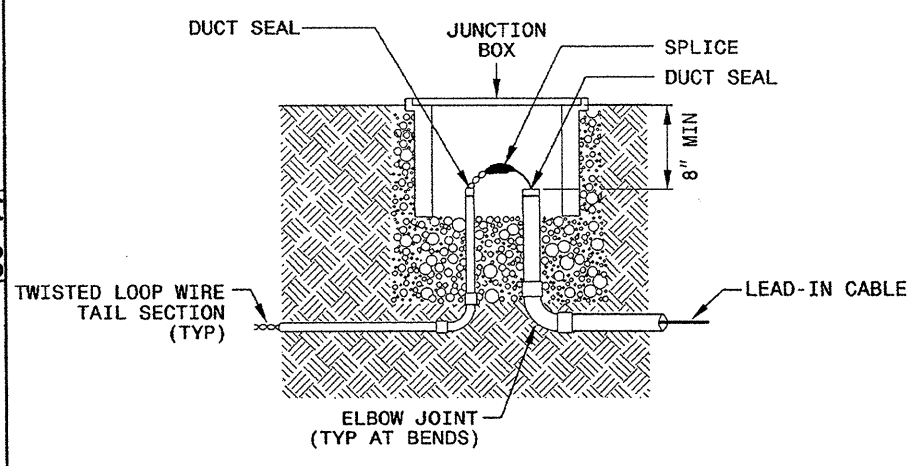
11-08

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
LOOP WIRE DETAILS

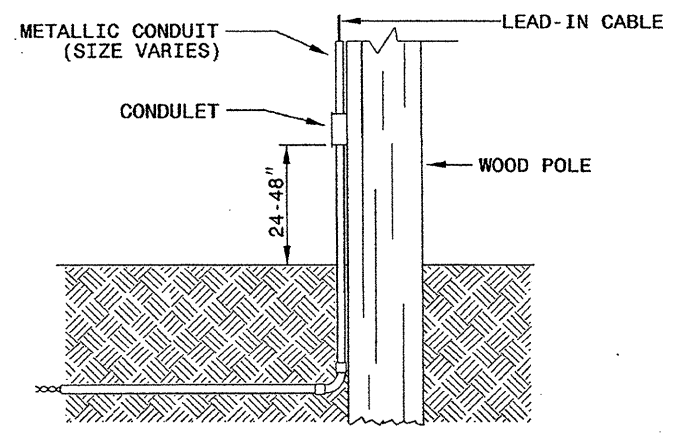
SHEET 2 OF 3  
**1725D01**

**LOOP WIRE SPLICE POINT DETAILS**

**LOOP WIRE AT JUNCTION BOX**



**LOOP WIRE AT POLE**

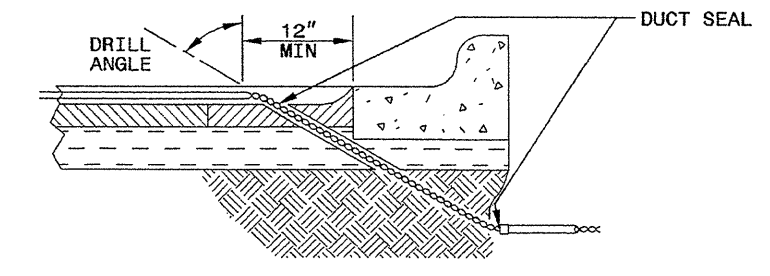


**NOTE**

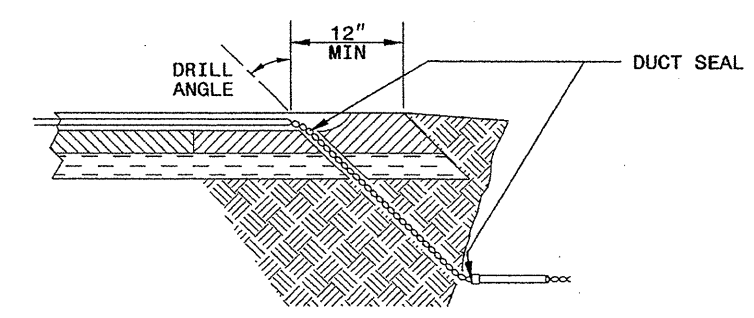
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

**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.

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ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
LOOP WIRE DETAILS

SHEET 2 OF 3  
**1725D01**

See Plate for Title

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Garnet, NC 27529

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



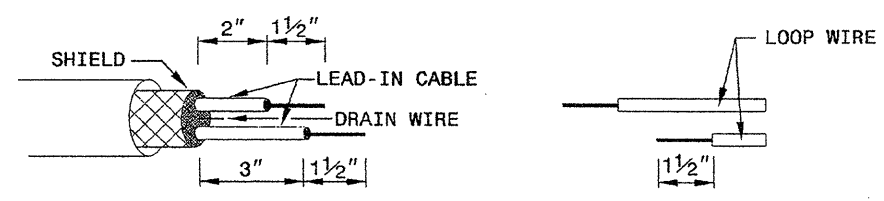
STATE OF  
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 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

11-08

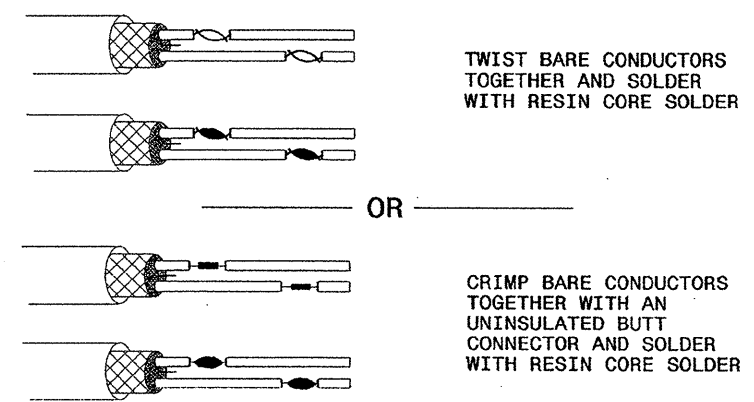
ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
 SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3  
**1725D01**

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE

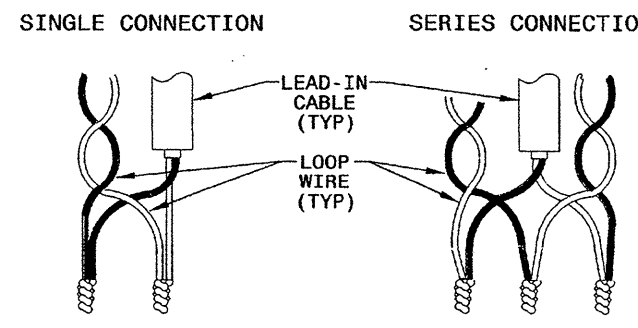


STEP 2. CONNECT AND SOLDER

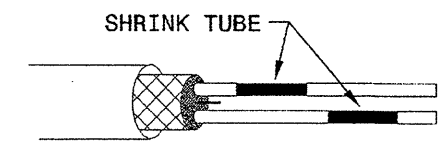


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

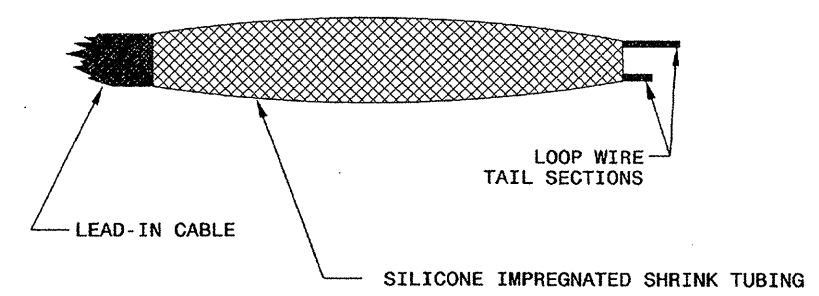
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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

SHEET 3 OF 3  
**1725D01**

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