

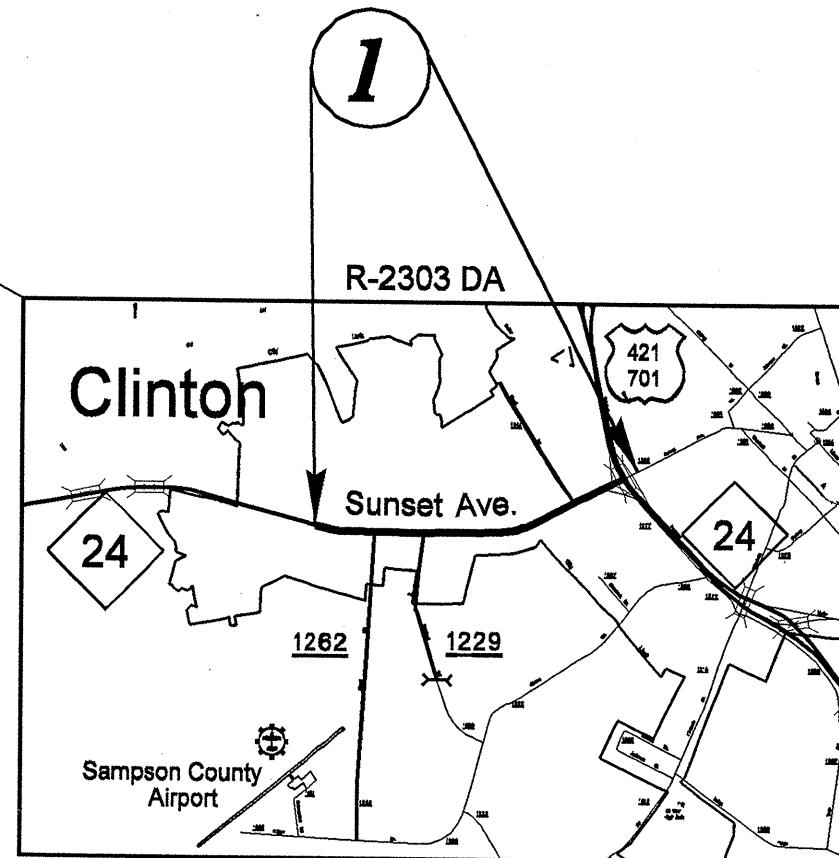
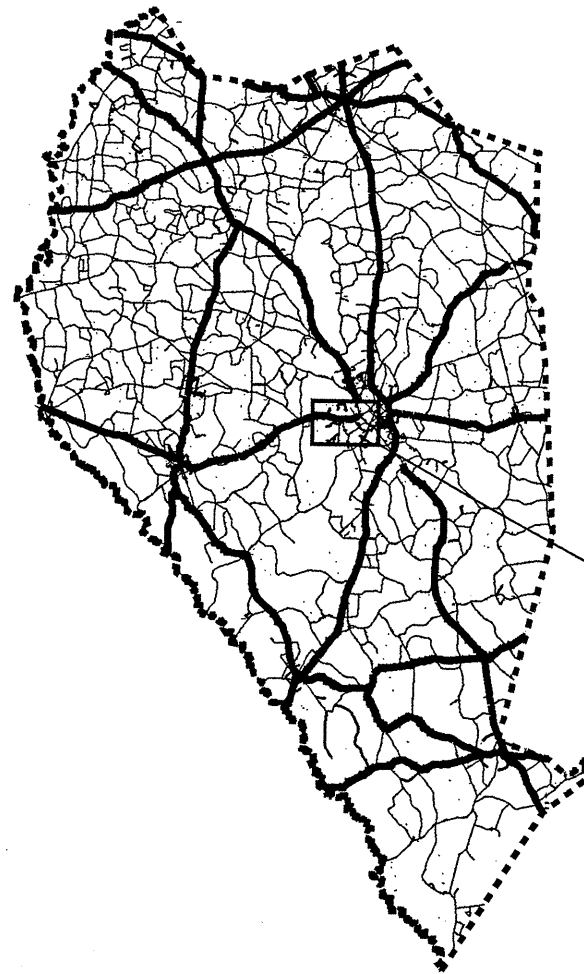
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**SAMPSON COUNTY**

LOCATION: SAMPSON CO. - NC 24 W OF SR 1262

TYPE OF WORK: RESURFACING, MILLING, PAVEMENT  
MARKERS AND MARKINGS, ETC.

R-2303DA		SHEET	TOTAL
34416.3.9		1	
		R-2303DA	

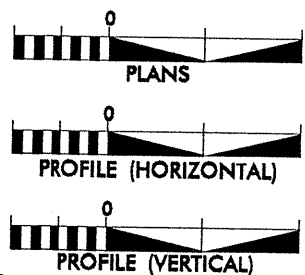


NOT TO SCALE

WBS ELEMENT: 34416.3.9

T.I.P. NO.: R-2303 DA

GRAPHIC SCALES



DESIGN DATA

ADT =  
ADT =  
DHV = %  
D = %  
T = %  
V = MPH  
\* TTST DUAL

PROJECT LENGTH

MAP NO. 1 = 1.46 MI.

TOTAL = 1.46 MI.

Prepared in the Office of:

**DIVISION OF HIGHWAYS**

124 Division Dr., Wilmington, NC 28401

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:  
APRIL 21, 2009

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN  
TECHNICIAN

DNL

SIGNATURE:

SIGNATURE:

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

DIVISION DESIGN ENGINEER

09-FEB-2009 12:35  
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09/08/09





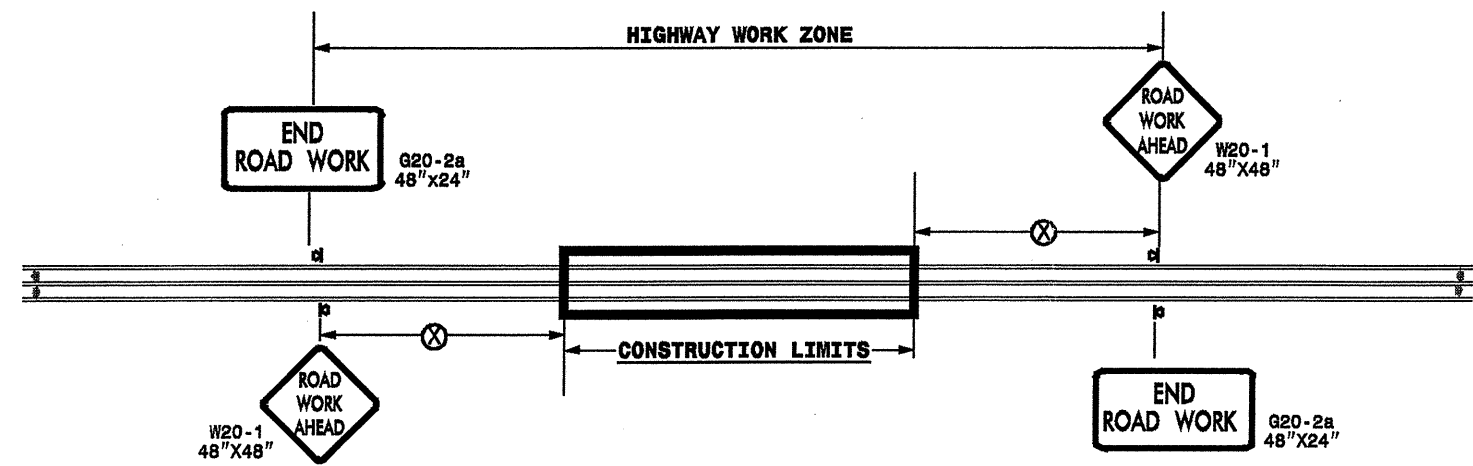
PROJECT NO.	SHEET NO.	TOTAL NO.
34416.3.9	4	

### SUMMARY OF QUANTITIES

PROJECT NO.	COUNTY	MAP NO.	ROUTE	DESCRIPTION	TYP	LENGTH MI	WIDTH FT	BORROW EXC. CY	INC. STONE BASE TONS	SHOULDER RECON. SMI	3" MILLING SY	INC. MILLING SY	SURFACE COURSE, S9.5C TONS	PG 70-22 PLANT MIX TONS	PATCHING (MILL) TON	PATCHING (FULL DEPTH) TONS	W/C RAMPS EA	2'-6" CURB & GUTTER, REMOVE AND REPLACE LF	ADJ. MANHOLES EA	ADJ. MON EA	ADJ. METER OR VALVE BOX EA	PORTABLE LIGHTING LS	TEMP. SILT FENCE LF	STONE FOR EC CLASS B TON	SEDIMENT CONTROL STONE TON	TEMP. MULCHING ACR	SEED FOR TEMP. SEEDING LBS	FERTILIZER FOR TEMP. SEEDING TON	MATTING (EROSION CONTROL) SY	1/4" HARDWARE CLOTH LF	SEED & MULCHING AC	INDUCTIVE LOOP SAWCUT LF	
34416.3.9	Sampson	1	NC 24	0.25 MI. WEST OF SR 1262 TO 0.06 MI. EAST OF US 421 (MP 0.00-1.46)			39								25	100	14	60	5	1	2	1	30	8	8	1.46	15	0.45	25	15	0.40	5,900	
		"	"	FULL WIDTH (MP 0.00-0.23)	1	0.23	39	98	50	0.46		217	510	31																			
		"	"	TAPER 39'-64' (MP 0.23-0.25)	1	0.02	51.5	8		0.04			56	3																			
		"	"	FULL WIDTH (MP 0.25-0.27)	1	0.02	64	8		0.04		180	73	4																			
		"	"	FULL WIDTH (MP 0.27-0.34, 0.40-0.48, 0.70-1.00, 1.09-1.17, 1.26-1.37)	2	0.64	64				24,030	450	4,661	280																			
		"	"	FULL WIDTH (MP 0.34-0.36, 1.03-1.09, 1.20-1.26)	2	0.14	76				6,242	1,060	1,210	73																			
		"	"	TAPER 76'-64' (MP 0.36-0.40, 1.00-1.03, 1.17-1.20)	2	0.1	70				4,107	90	796	48																			
		"	"	TAPER 64'-79' (MP 0.48-0.53)	2	0.05	71.5				2,097		407	25																			
		"	"	FULL WIDTH (MP 0.53-0.70)	2	0.17	79				7,879	775	1,527	92																			
		"	"	FULL WIDTH (MP 1.37-1.46)	2	0.09	55				2,904	306	564	34																			
TOTAL FOR MAP NO. 1						1.46		114	50	0.54	47,259	3,078	9,804	590	25	100	14	60	5	1	2	1	30	8	8	1.46	15	0.45	25	15	0.40	5,900	
TOTAL FOR PROJ NO. 34416.3.9						1.46		114	50	0.54	47,259	3,078	9,804	590	25	100	14	60	5	1	2	1	30	8	8	1.46	15	0.45	25	15	0.40	5,900	
GRAND TOTAL						1.46		114	50	0.54	47,259	3,078	9,804	590	25	100	14	60	5	1	2	1	30	8	8	1.46	15	0.45	25	15	0.40	5,900	



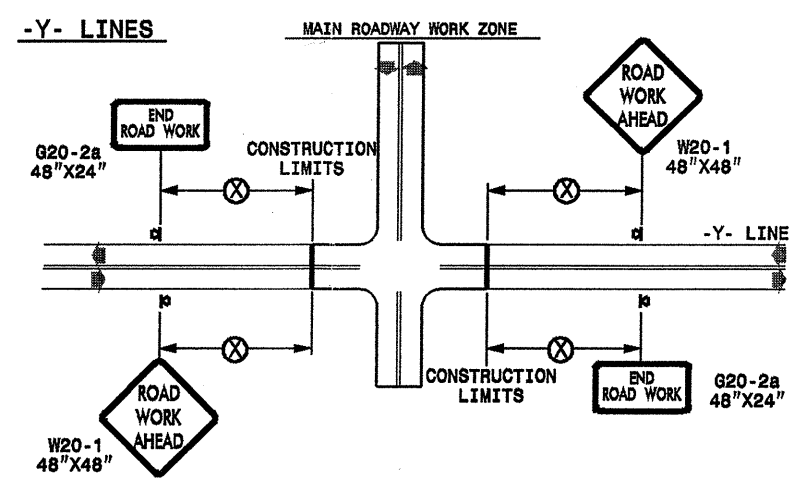
**TWO-WAY UNDIVIDED \*\* (L-LINES)**



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)**



**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 URBAN MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.

**LEGEND**

◀ PORTABLE SIGN

➡ DIRECTION OF TRAFFIC FLOW

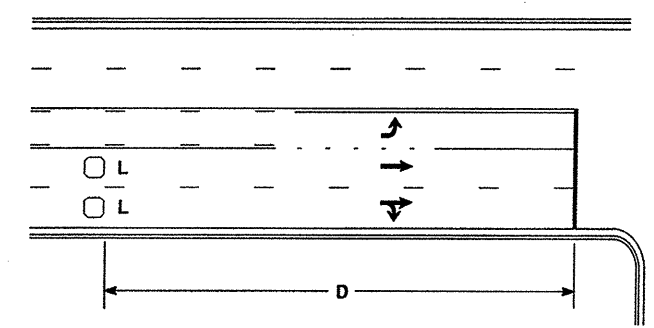
DETAIL DRAWING  
FOR TWO-WAY UNDIVIDED  
WORK ZONE WARNING SIGNS

SHEET 1 OF 1

APPROVED: _____ DATE: _____	DETAIL DRAWING FOR TWO-WAY UNDIVIDED ADVANCED WORK ZONE WARNING SIGNS	SCALE: NONE DATE: _____ DWG. BY: _____ DESIGN BY: _____ REVIEWED BY: _____		REVISIONS	
SEAL				7-98	10/01
				10-98	08/04
				01/01	11/04

27-FEB-2009 18:23  
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 psey/more AT WZ16237502

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

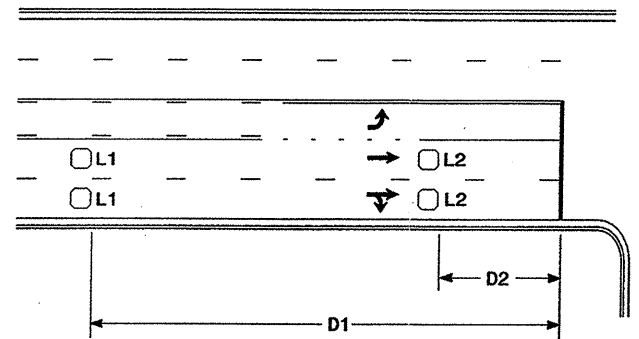


Speed Limit mph (km/hr)	D ft (m)
40 (64)	250 (75)
45 (72)	300 (90)
50 (80)	355 (110)
55 (88)	420 (130)

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

OR



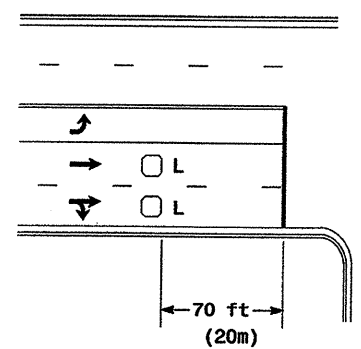
Speed Limit mph (km/hr)	D1 ft (m)	D2 ft (m)
40 (64)	250 (75)	80 (25)
45 (72)	300 (90)	90 (27)
50 (80)	355 (110)	100 (30)
55 (88)	420 (130)	110 (35)

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)]

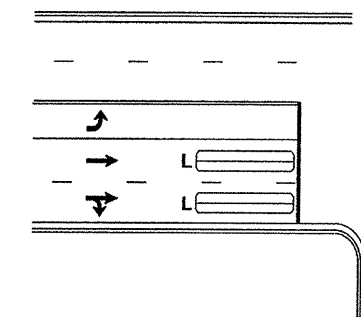
34416.3.9 (R-2303DA)



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

Volume Density Operation

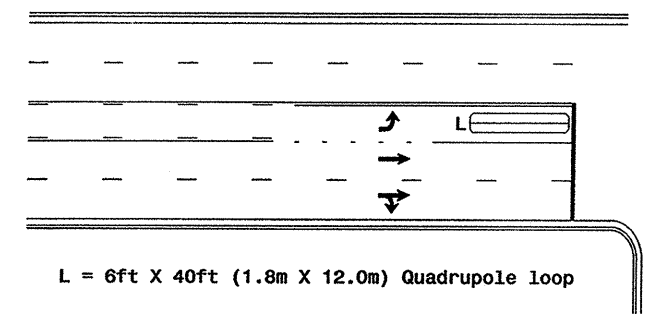
OR



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

"Stretch" Operation

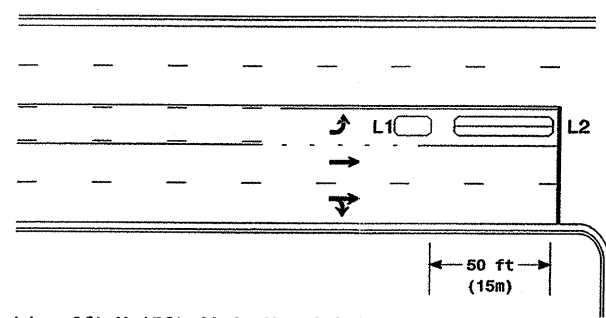
### Left Turn Lane Detection



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

Presence Loop Detection

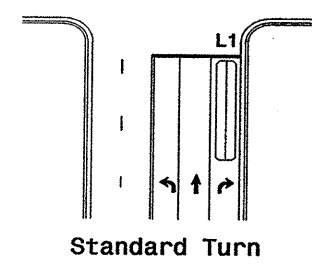
OR



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

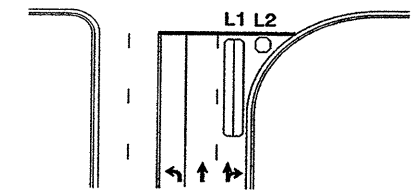
Queue Loop Detection

### Right Turn Lane Detection

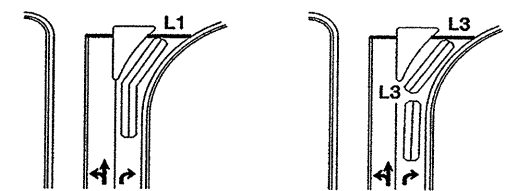


Standard Turn

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

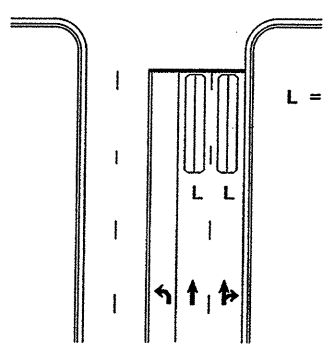


Wide Radius Turn



Channelized Turn

### Side Street Detection

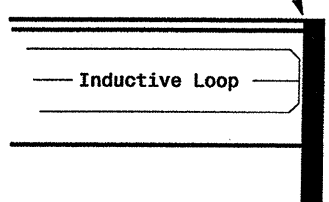


L = 6ft X 40ft (1.8m X 12.0m)  
Quadrupole loop  
Wired to separate  
detectors/channels

Side Street Detection

### 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.

Presence Loop Placement at Stop Lines

### 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

	<b>Typical Loop Locations</b>		
	PLAN DATE: <b>JUNE 2006</b> PREPARED BY: <b>P. L. Alexander</b>	REVIEWED BY: REVIEWED BY:	
REVISIONS: Revise pavement markings			SIGNATURE: <i>P. L. Alexander</i> DATE: <b>6/6/06</b>

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

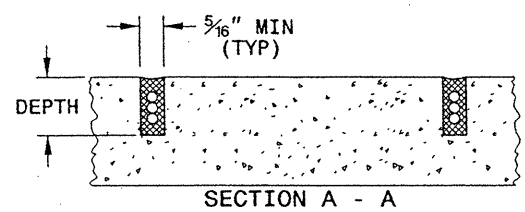
5-07

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**

SHEET 1 OF 3  
**1725D01**

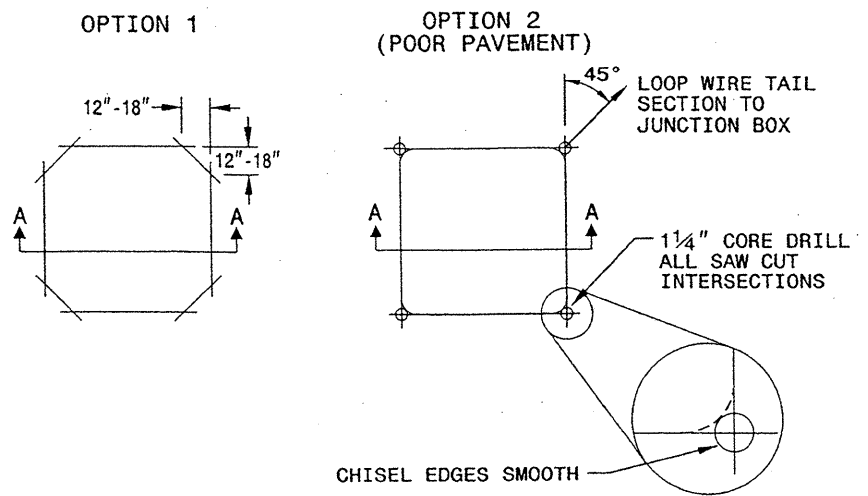
**SAW SLOT DEPTH CHART**

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

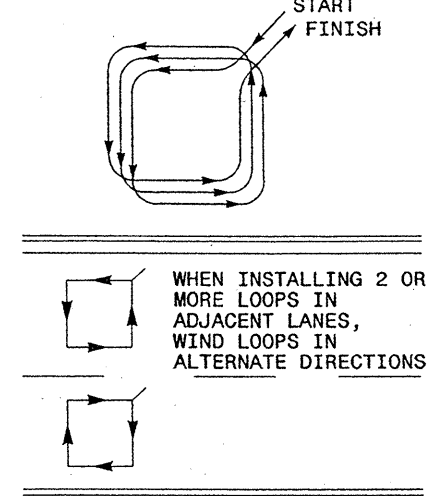


**CONVENTIONAL 4-SIDED LOOP**

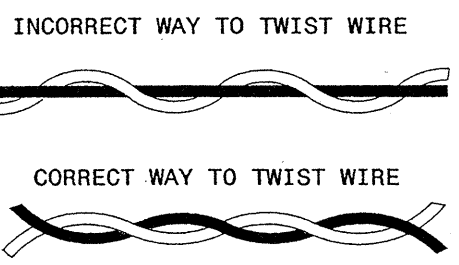
**SAW CUT OPTIONS**



**LOOP WINDING METHOD**



**LOOP WIRE TWISTING METHOD**

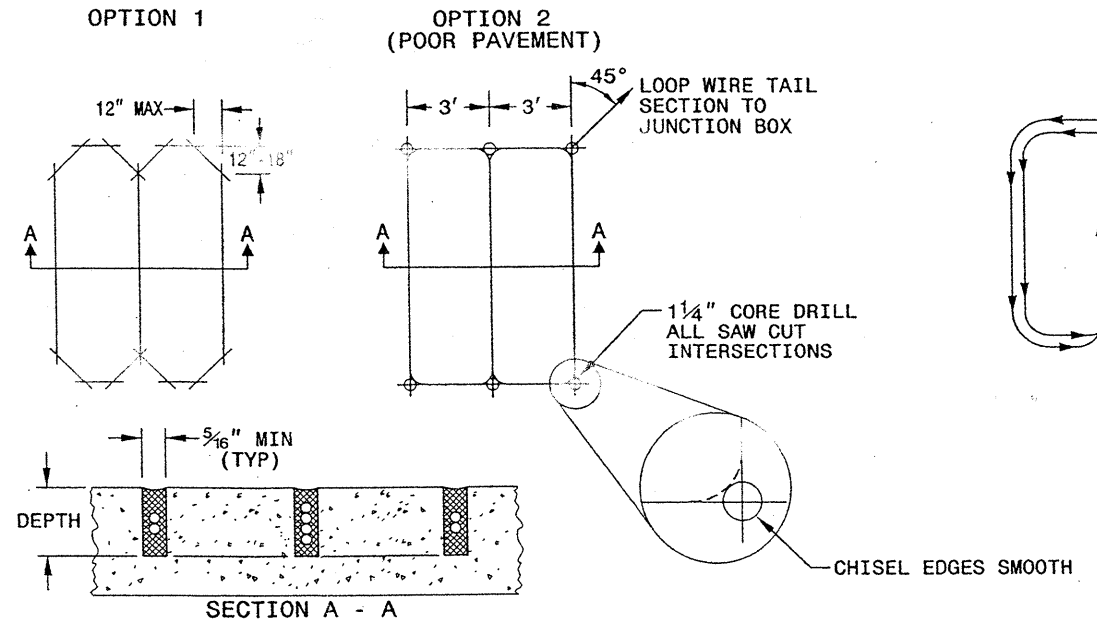


**NOTES**

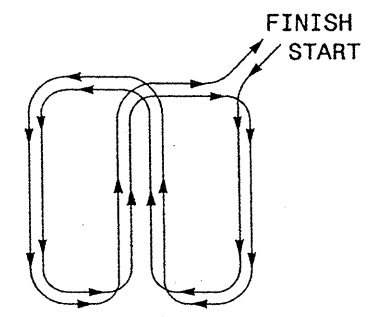
1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

**QUADRUPOLE LOOP**

**SAW CUT OPTIONS**



**LOOP WINDING METHOD**



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

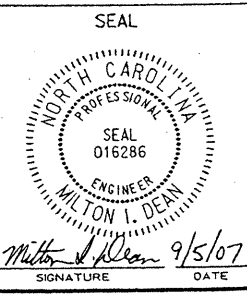
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

5-07

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**

SHEET 1 OF 3  
**1725D01**

See Plate for Title



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

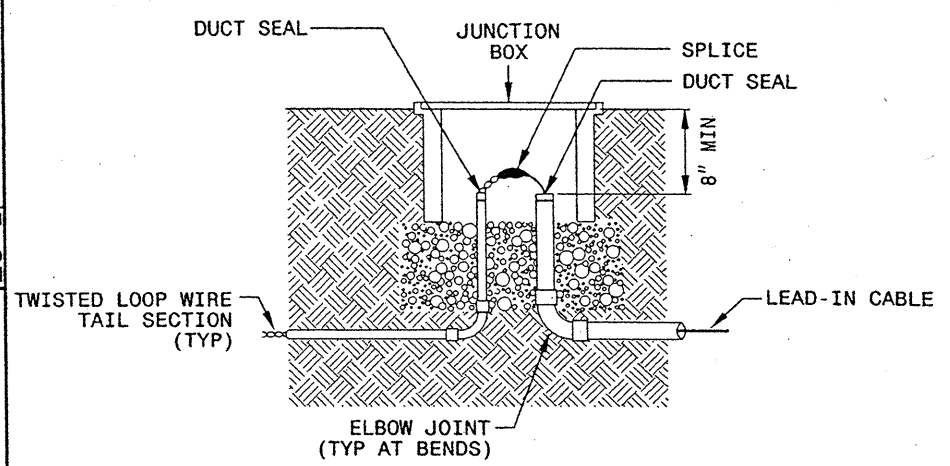
5-07

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

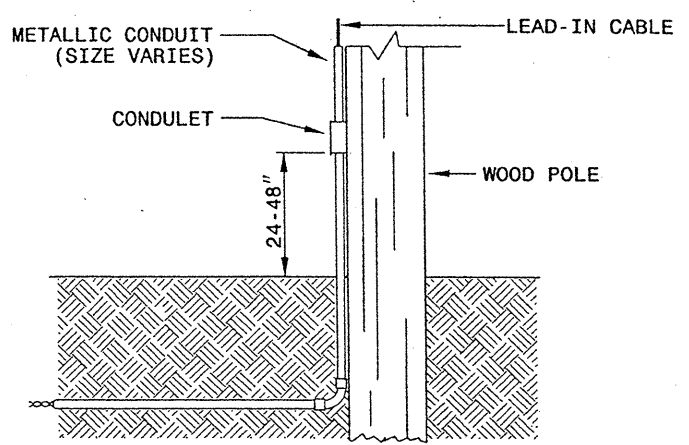
SHEET 2 OF 3  
**1725D01**

**LOOP WIRE SPLICE POINT DETAILS**

**LOOP WIRE AT JUNCTION BOX**



**LOOP WIRE AT POLE**

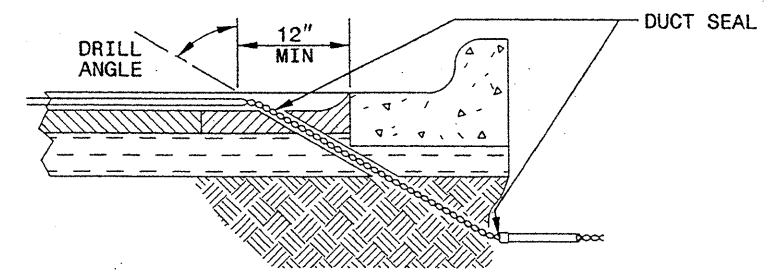


**NOTE**

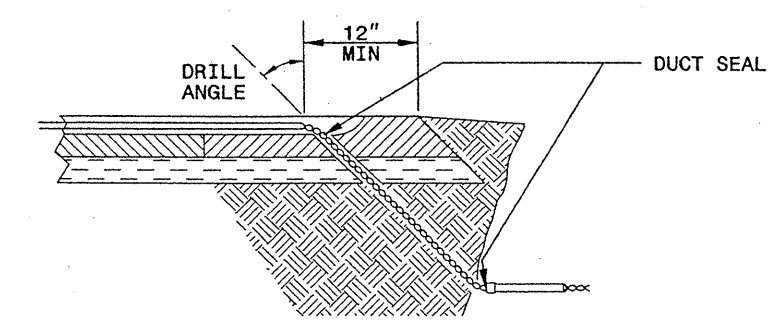
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

**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.

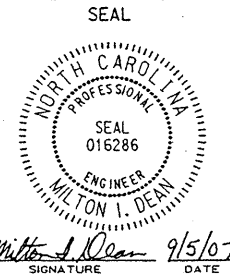
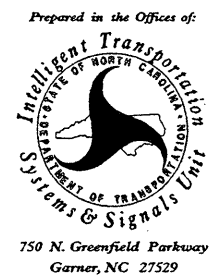
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

5-07

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

SHEET 2 OF 3  
**1725D01**

See Plate for Title



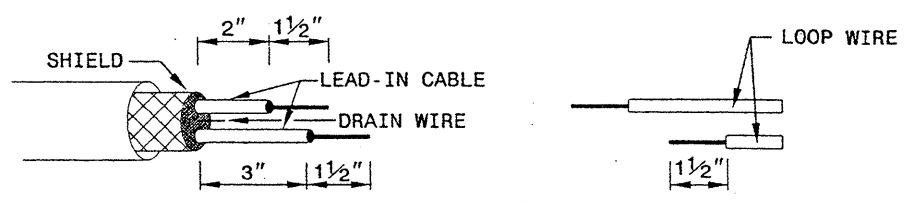
STATE OF  
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DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

5-07

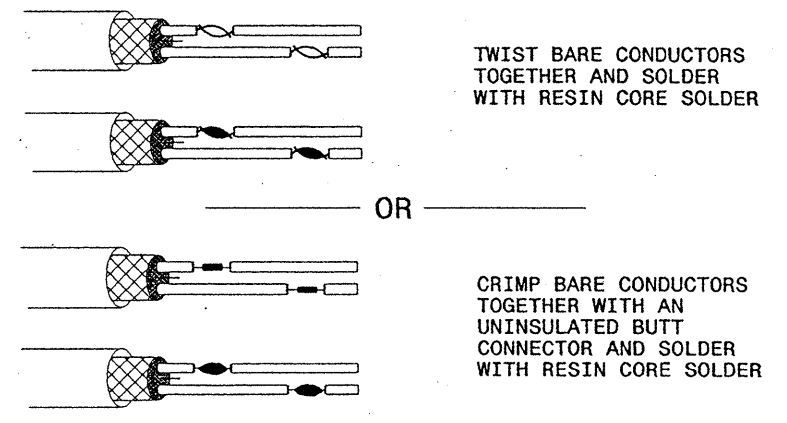
ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3  
**1725D01**

**STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE**

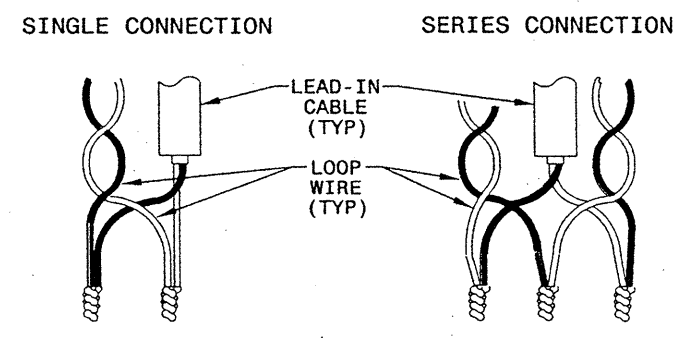


**STEP 2. CONNECT AND SOLDER**

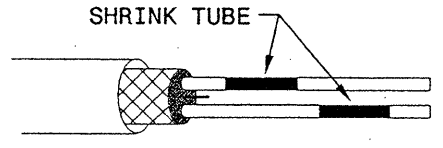


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

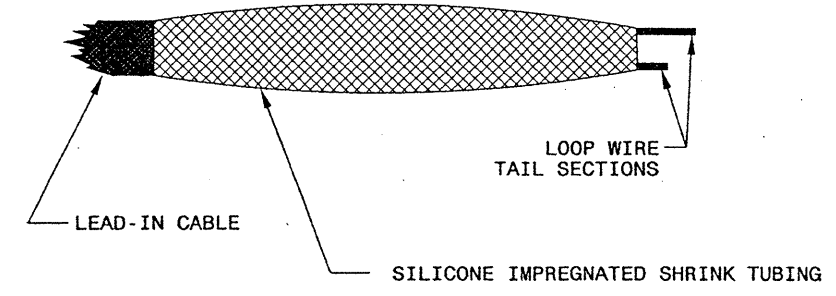
**LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS**



**STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY**



**STEP 4. ENVIRONMENTALLY PROTECT SPLICE**



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

5-07

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:

750 N. Greenfield Parkway  
Garner, NC 27529

SEAL

SEAL  
016286  
ENGINEER  
MILTON I. DEAN

*Milton I. Dean* 9/15/07  
SIGNATURE DATE

05-SEP-2007 14:01  
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