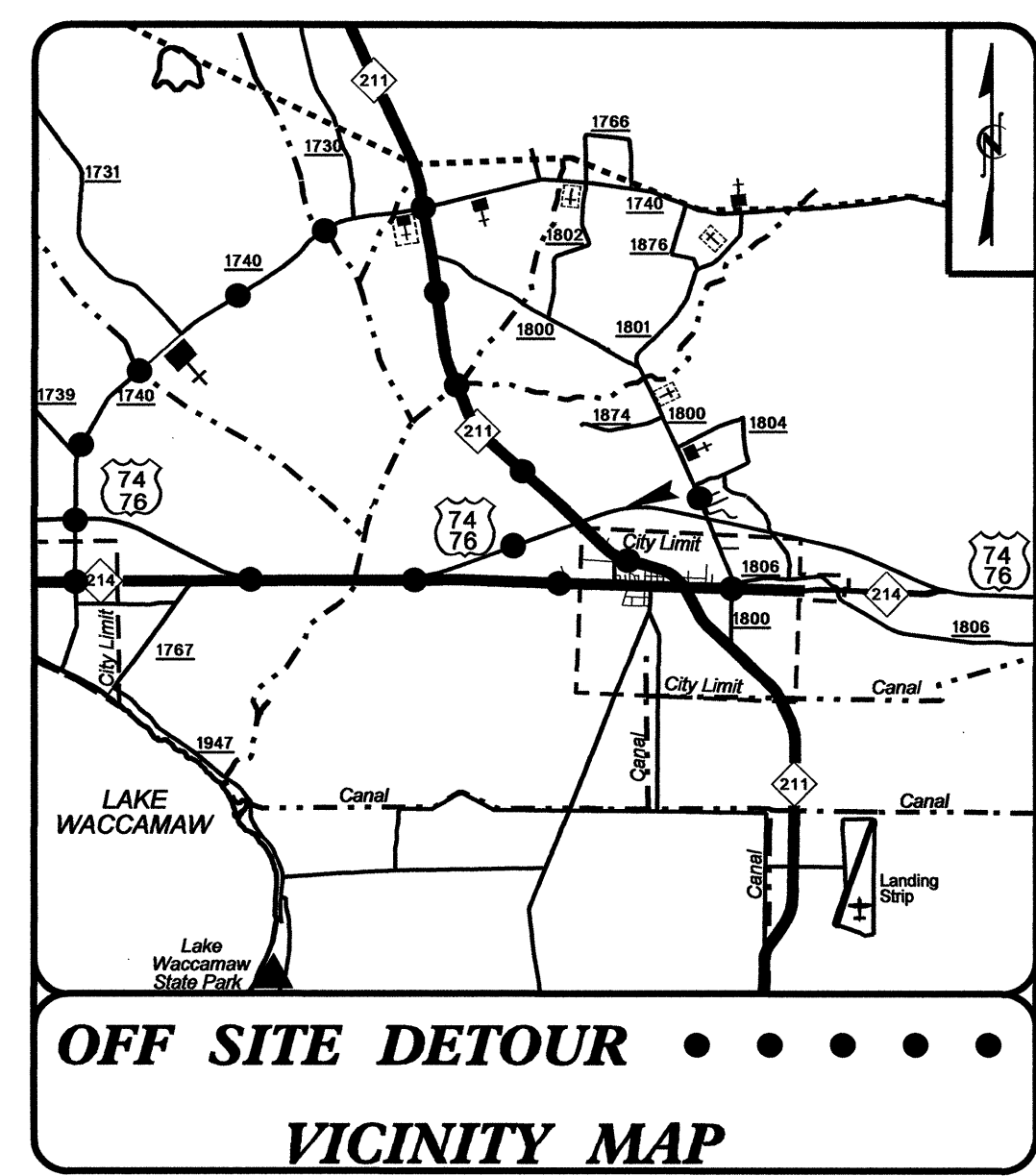


TIP: R-0061C



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

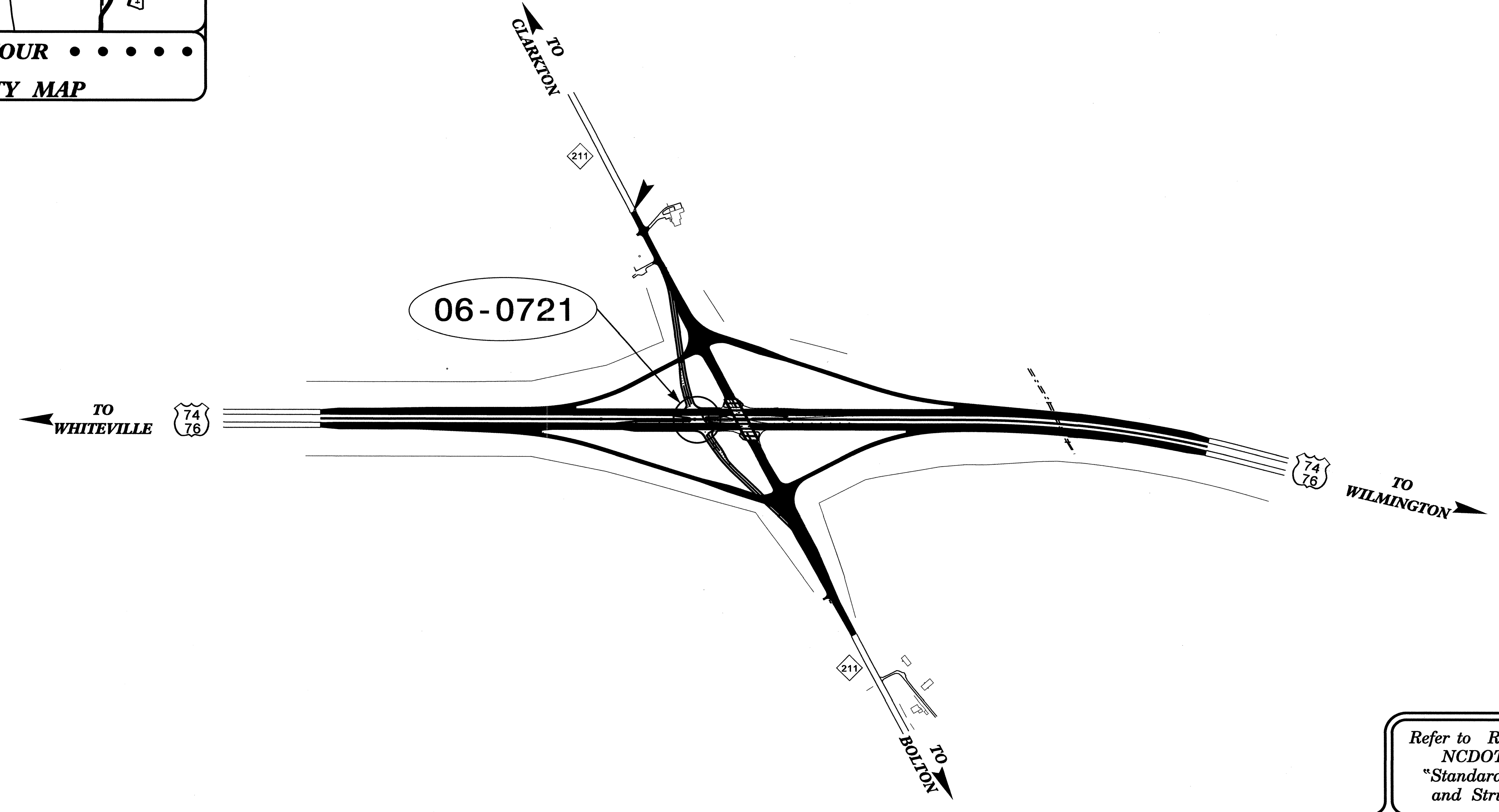
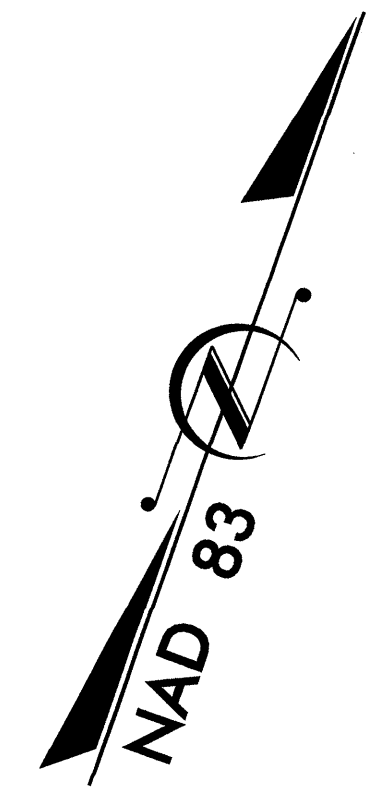
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# COLUMBUS COUNTY

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**LOCATION:** US 74 AT NC 211 PROPOSED INTERCHANGE AT INTERSECTION OF US 74 /76 (ANDREW JACKSON HWY.) AND NC 211 (GREEN SWAMP RD.)

**TYPE OF WORK:** TEMPORARY TRAFFIC SIGNALS.



Refer to Roadway Standard Drawings NCDOT dated Jul, 2006 and "Standard Specifications for Roads and Structures" dated Jul, 2006.

Sheet #	Reference #	Index of Plans Location/Description
Sig. 1	-----	Title Sheet
Sig. 2-3	06-0721 Temp	US 74-76 (Andrew Jackson Road) At NC 211 (Green Swamp Road)
Sig. 4-6	N/A	Inductive Detection Loops Details

**INTELLIGENT TRANSPORTATION AND SIGNALS UNIT**

Contacts:

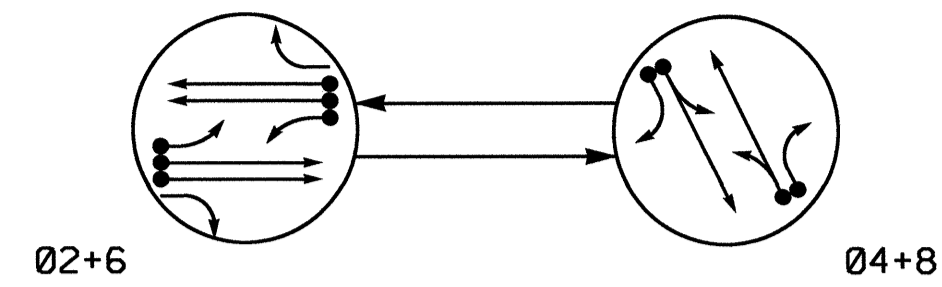
Pamela L. Alexander, PE - Eastern Region Signals Engineer  
John T. Rowe Jr., PE - Signal Equipment Design Engineer

Prepared In the Office of:  
DIVISION OF HIGHWAYS  
TRANSPORTATION MOBILITY AND SAFETY  
BRANCH

750 N. Greenfield Parkway, Garner, NC 27529

03-MAY-2010 16:15 S:\TIP\_Signals\Workgroups\TIP Projects\R-0061C\Signals\Design\Titlesheet\Cover\_sheet.dgn

**PHASING DIAGRAM**



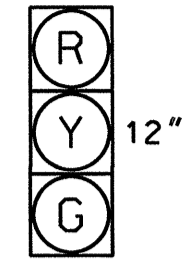
**PHASING DIAGRAM DETECTION LEGEND**

- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←---→ UNSIGNALIZED MOVEMENT
- ←- - -> PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
21, 22, 23	G	R	Y
41, 42	R	G	R
61, 62, 63	G	R	Y
81, 82	R	G	R

**SIGNAL FACE I.D.**

All Heads L.E.D.



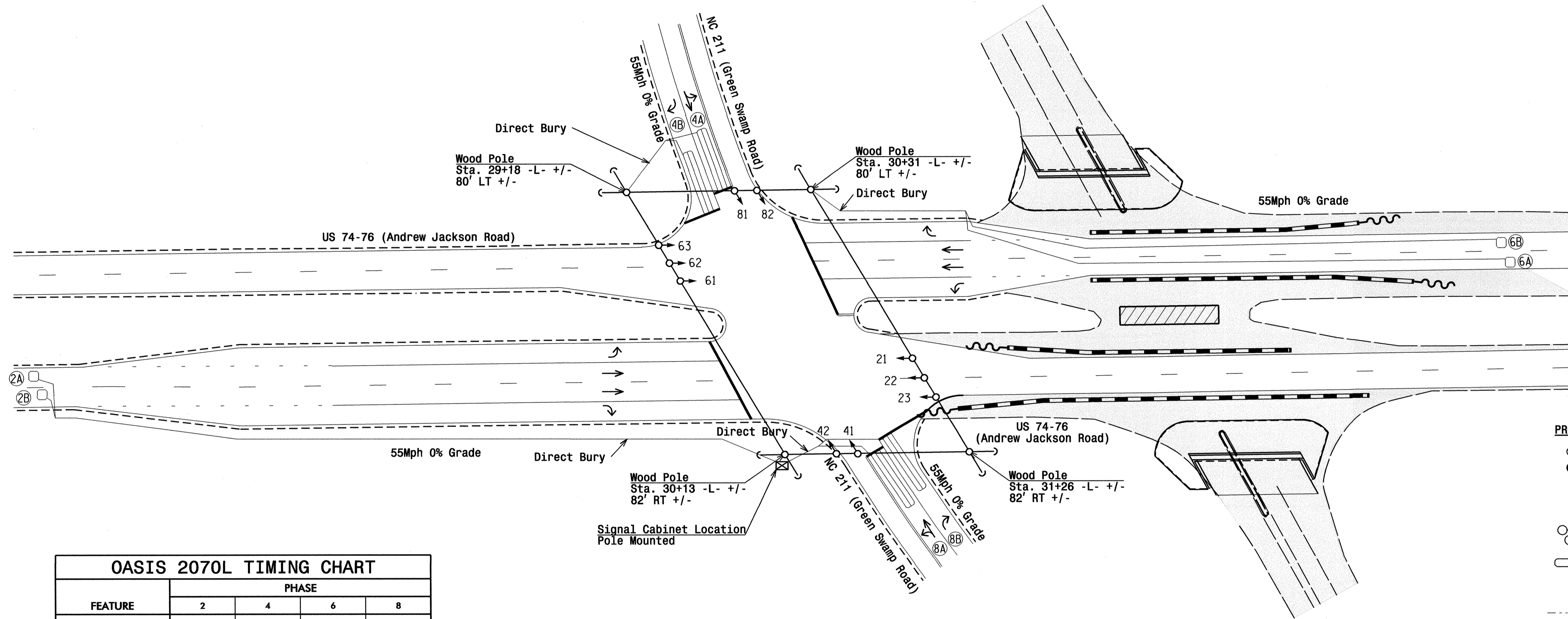
21, 22, 23  
41, 42  
61, 62, 63  
81, 82

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	420	5	Y	2	Y	Y	-	-	-	-	Y
2B	6X6	420	5	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	15	-	Y
6A	6X6	420	5	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	420	5	Y	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	3	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	15	-	Y

**2 Phase Fully Actuated Isolated**

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.



FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	14	7	14	7
Extension 1 *	6.0	2.0	6.0	2.0
Max Green 1 *	90	20	90	20
Yellow Clearance	5.2	5.2	5.2	5.2
Red Clearance	1.2	1.9	1.0	1.9
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	1.5	-	1.5	-
Max Variable Initial *	46	-	46	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	60	-	60	-
Minimum Gap	3.4	-	3.4	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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

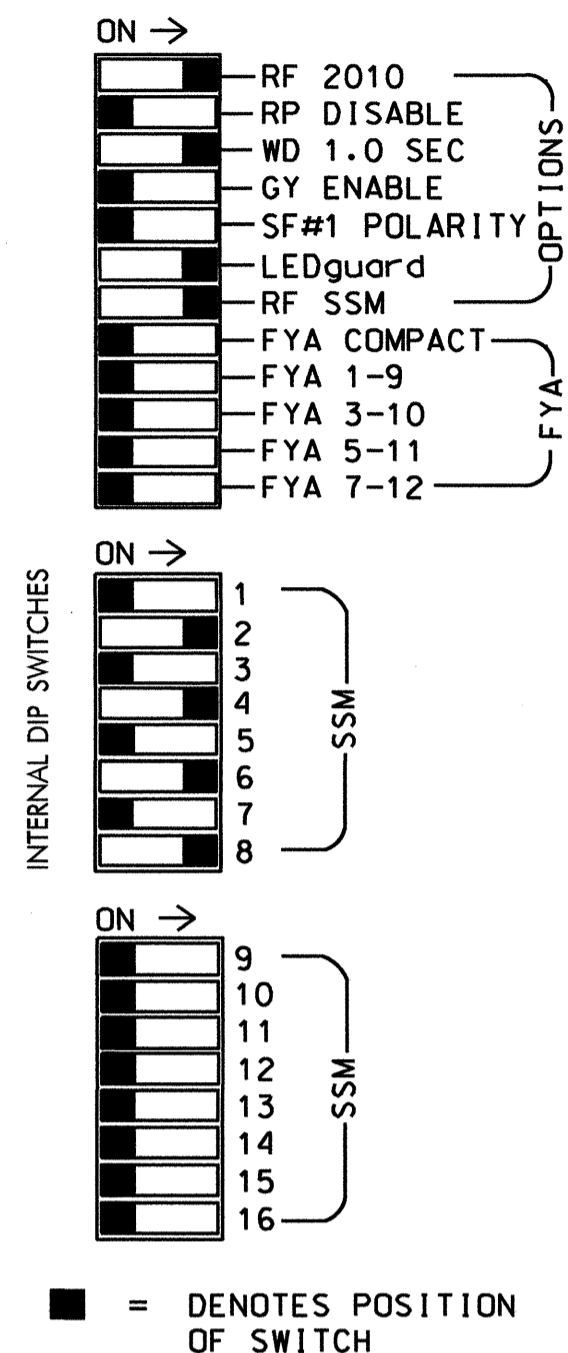
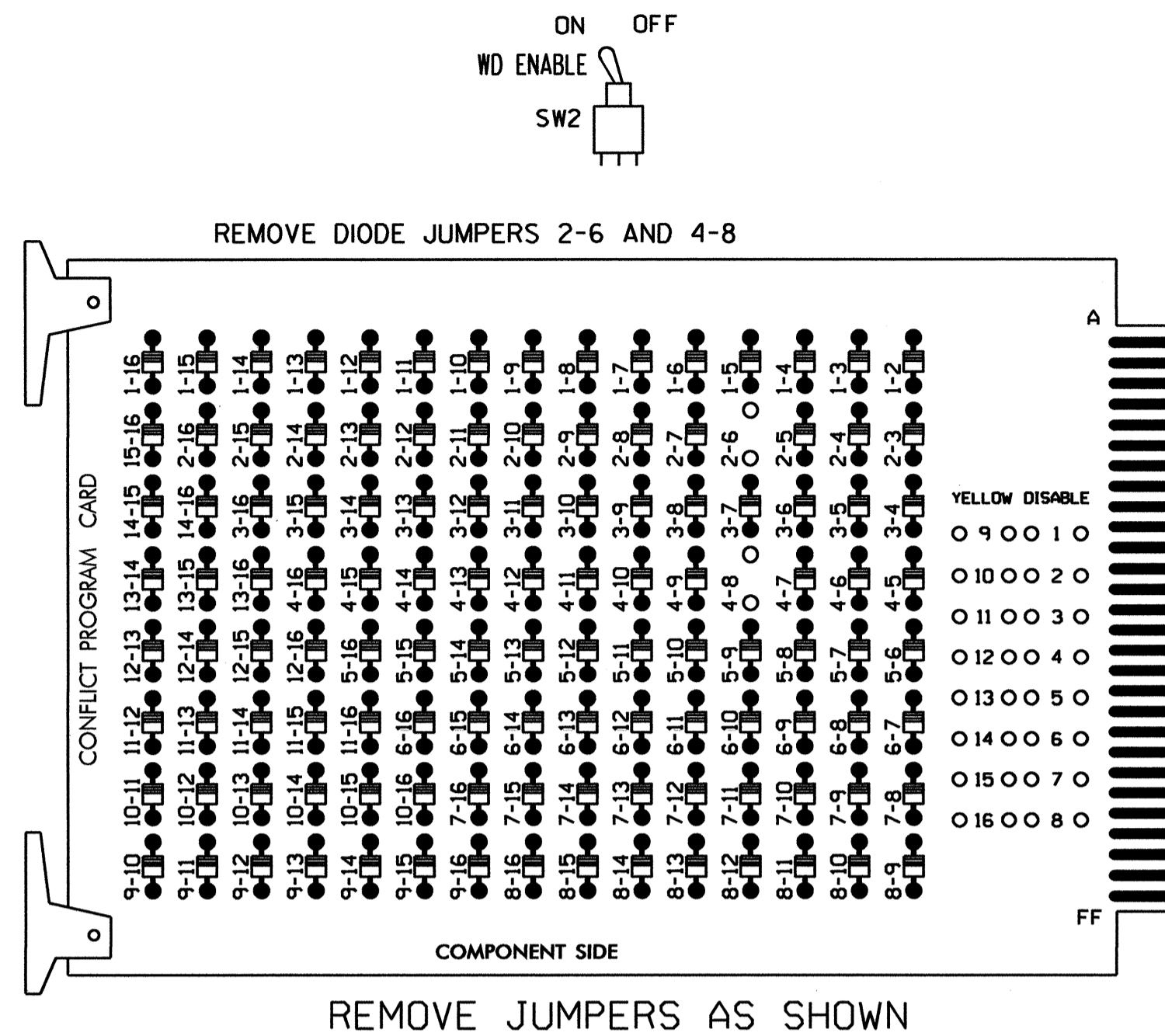
PROPOSED	EXISTING
	N/A

**Temporary Signal (To Be Removed after construction)**

	<p><b>US 74-76</b> <b>(Andrew Jackson Road)</b> <b>at</b> <b>NC 211 (Green Swamp Road)</b></p>		
	<p>Division 6 Columbus County West of Bolton</p> <p>PLAN DATE: March 2010 REVIEWED BY: I. O. Umzurike</p> <p>PREPARED BY: I. O. Umzurike REVIEWED BY: Paul J. Anderson</p>		
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p> <p>SCALE: 1" = 40'</p>		<p>SIGNATURE: <i>I. O. Umzurike</i> DATE: 3/31/10</p> <p>SIG. INVENTORY NO. 06-0721</p>	

**EDI MODEL 2010ECL-NC CONFLICT MONITOR  
PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



**NOTES:**

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

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. Verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Variable Initial and Gap Reduction.
6. Program phases 2 and 6 for Start-Up in Green.
7. Set all detector card channels to 'PRESENCE' mode.
8. Program phases 2 and 6 for Yellow Flash.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22,23	NU	NU	41,42	NU	NU	61,62,63	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

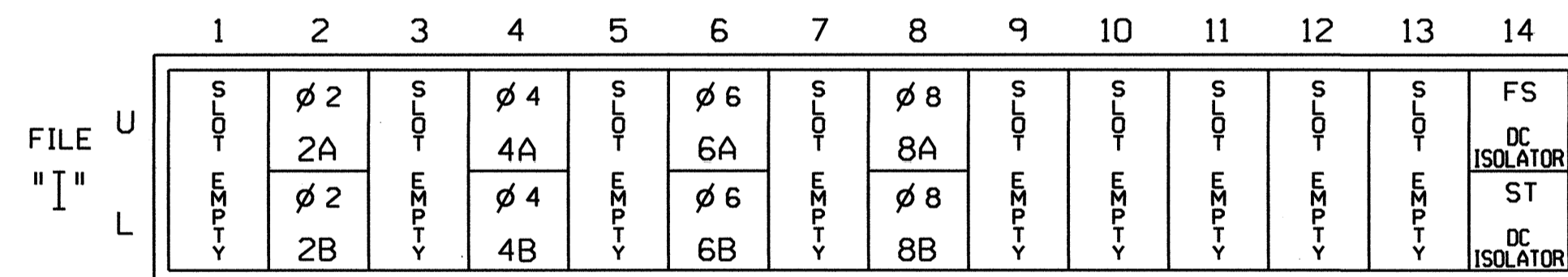
NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336S  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....POLE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S4,S6,S8  
 PHASES USED.....2,4,6,8  
 OVERLAPS USED.....NONE

**INPUT FILE POSITION LAYOUT**

(front view)



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

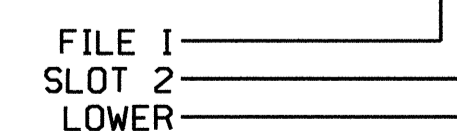
FS = FLASH SENSE  
 ST = STOP TIME

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
2B	TB23-3,4	I2L	43	5	12	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			3
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			15

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0721  
 DESIGNED: MARCH 2010  
 SEALED: 3/31/10  
 REVISED: N/A

**INPUT FILE POSITION LEGEND: I2L**



Temporary Signal (To be removed after construction)

Electrical and Programming Details For:

Prepared in the Offices of:

750 H. Greenfield Pkwy, Garner, NC 27529

US 74-76  
 (Andrew Jackson Road)  
 at  
 NC 211 (Green Swamp Road)

Division 06 Columbus County West of Bolton

PLAN DATE: March 2010 REVIEWED BY: [Signature]

PREPARED BY: F.E. Russ REVIEWED BY: [Signature]

REVISIONS: INIT. DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR.

SIGNATURE: [Signature] DATE: 4-8-10

SIG. INVENTORY NO. 06-0721

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

11-08

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**

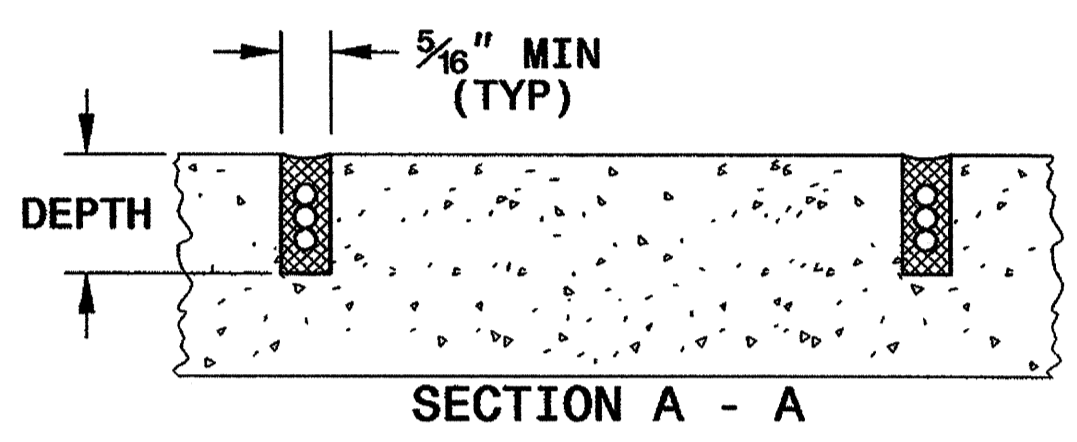
SHEET 1 OF 3  
**1725D01**

**CONVENTIONAL 4-SIDED LOOP**

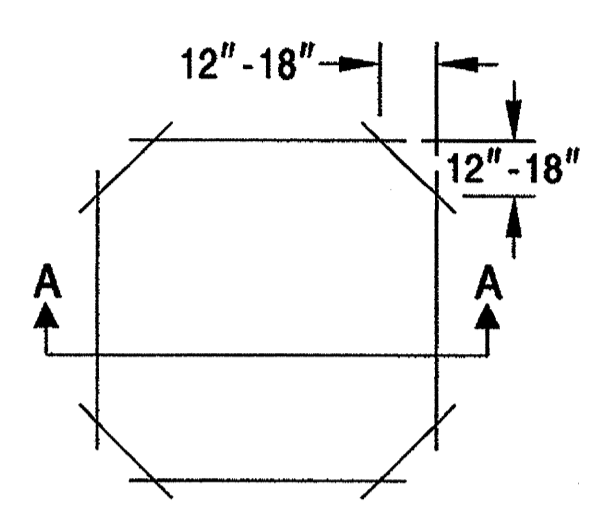
**SAW CUT OPTIONS**

**SAW SLOT DEPTH CHART**

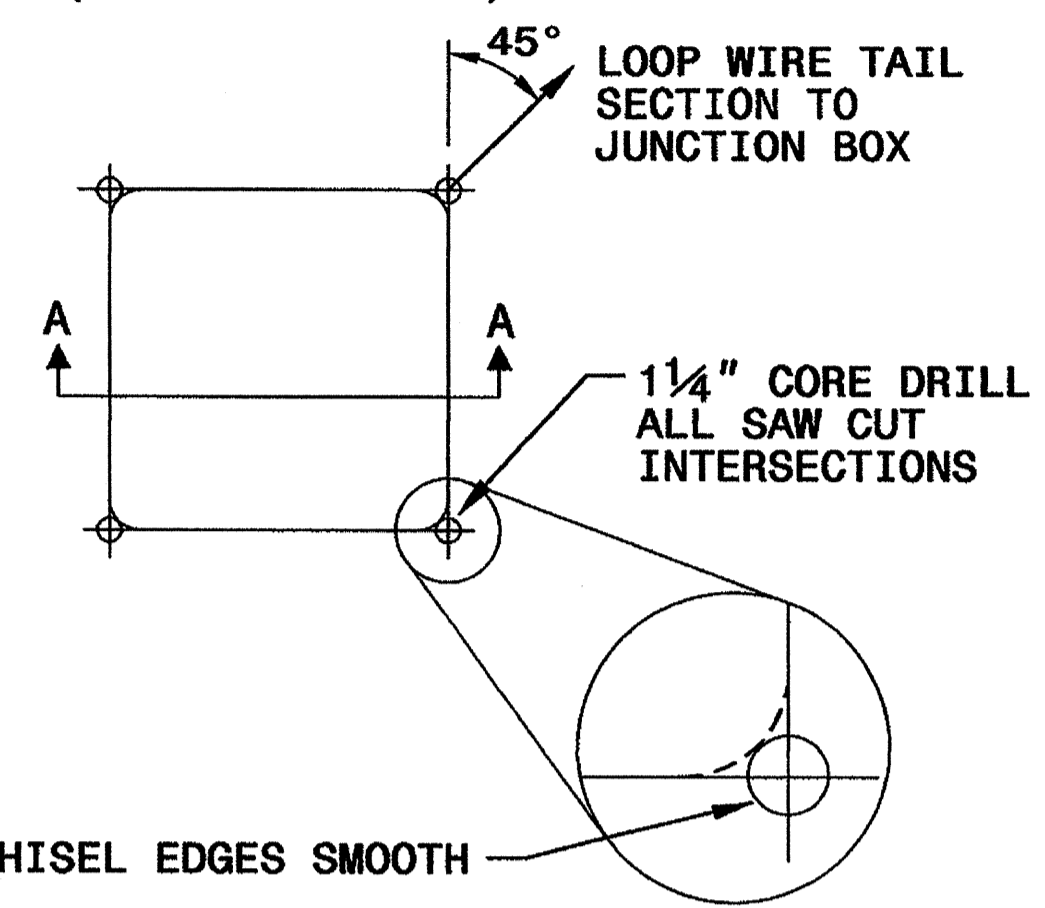
DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0



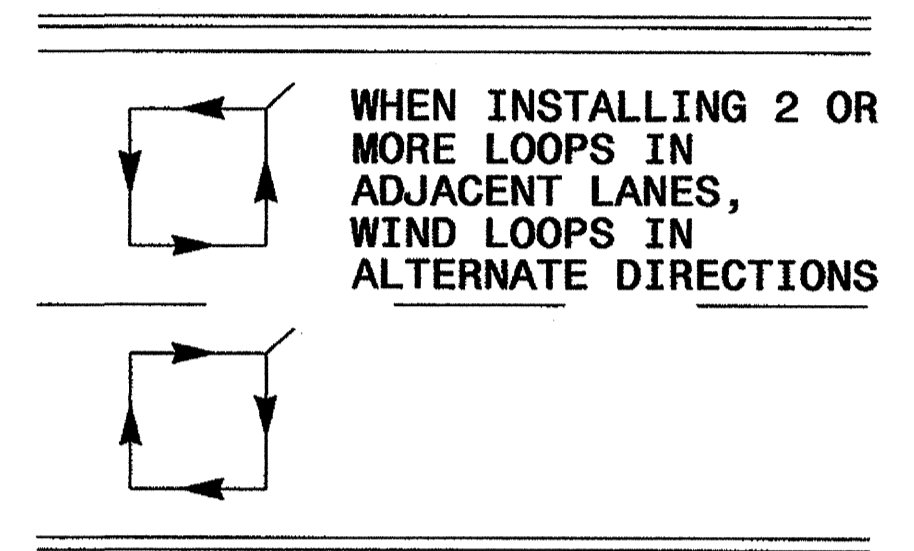
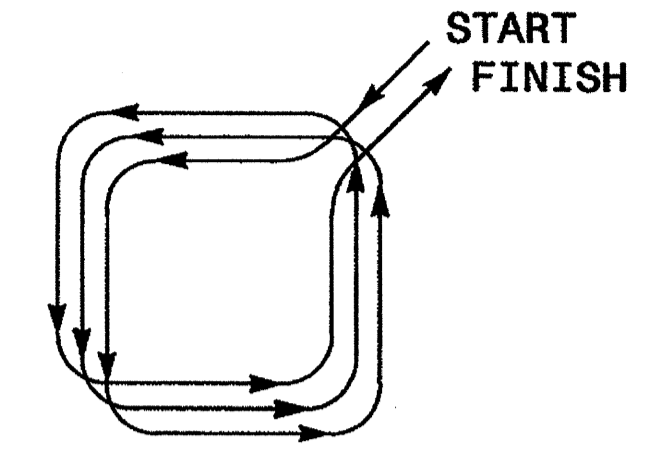
**OPTION 1**



**OPTION 2 (POOR PAVEMENT)**



**LOOP WINDING METHOD**



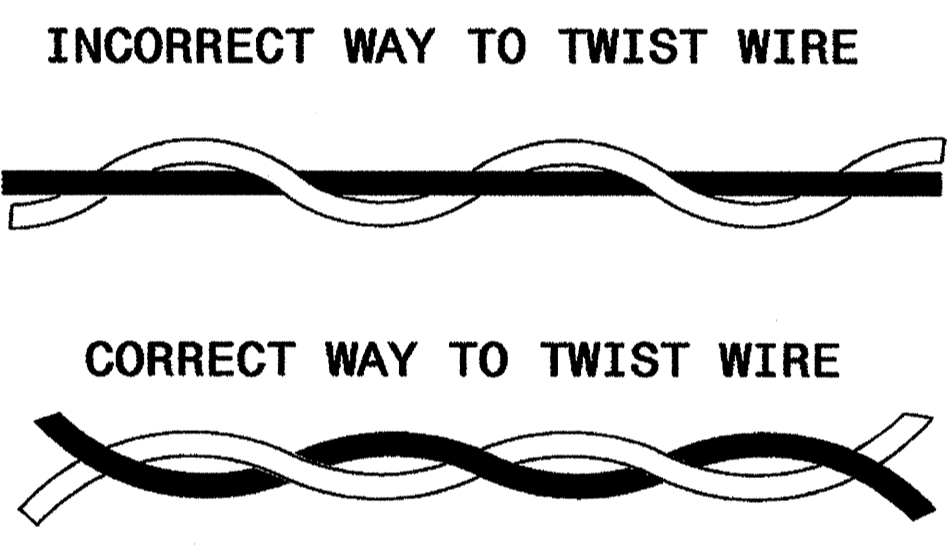
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

11-08

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**

SHEET 1 OF 3  
**1725D01**

**LOOP WIRE TWISTING METHOD**



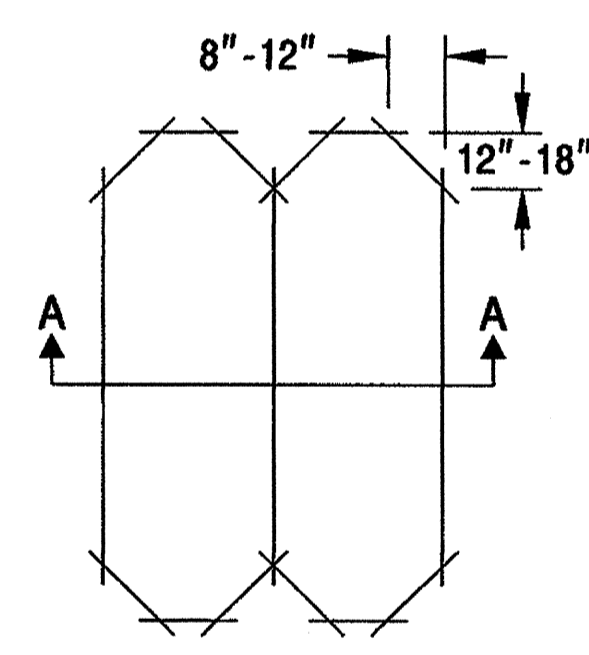
**NOTES**

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.

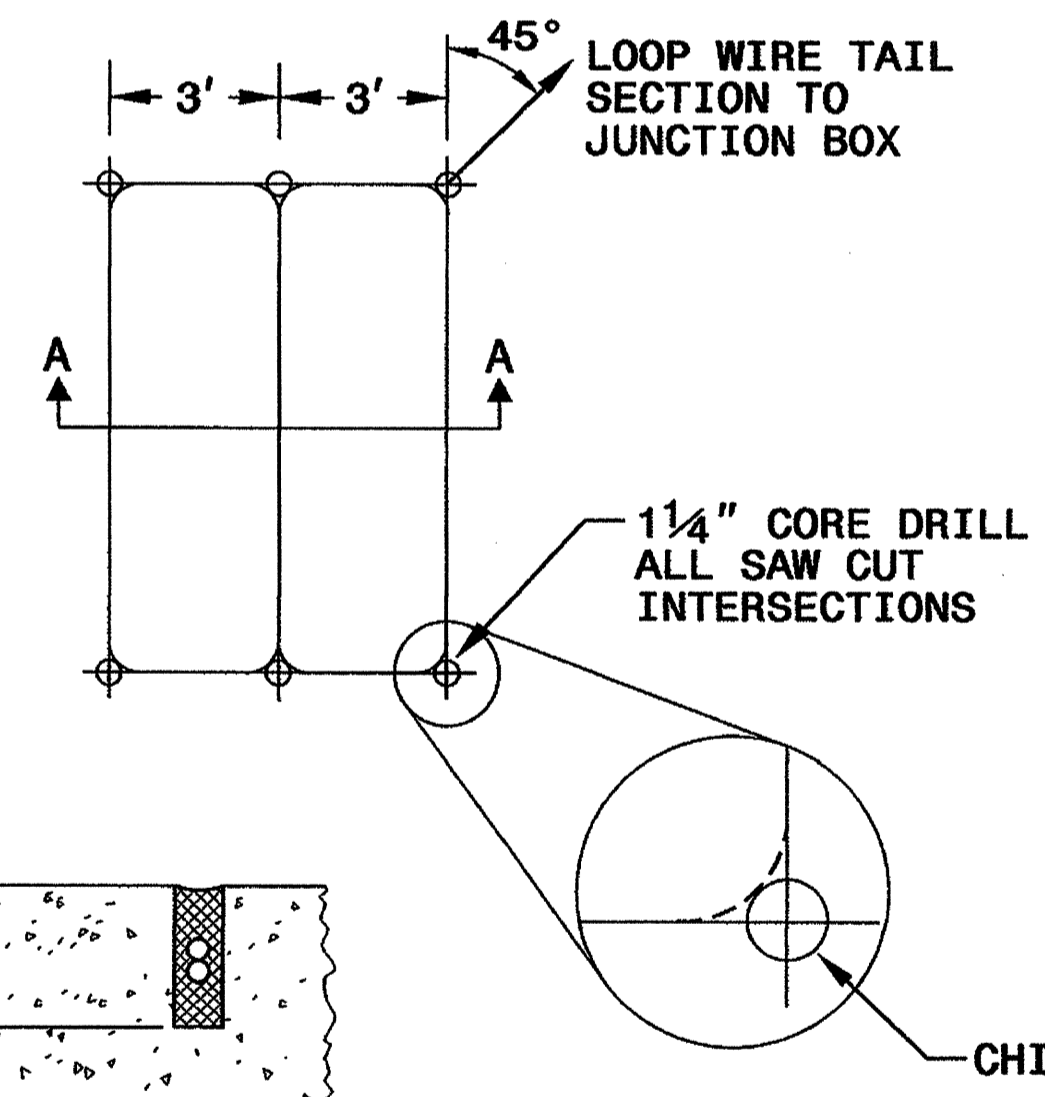
**QUADRUPOLE LOOP**

**SAW CUT OPTIONS**

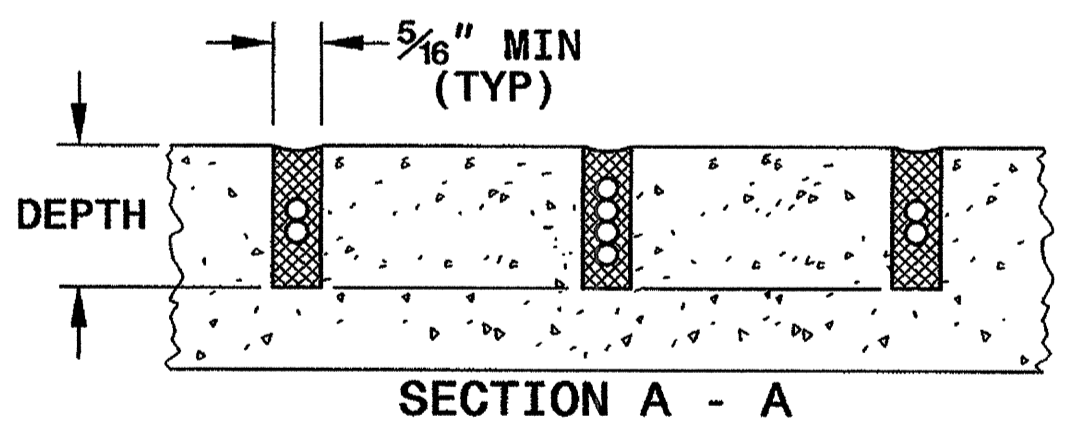
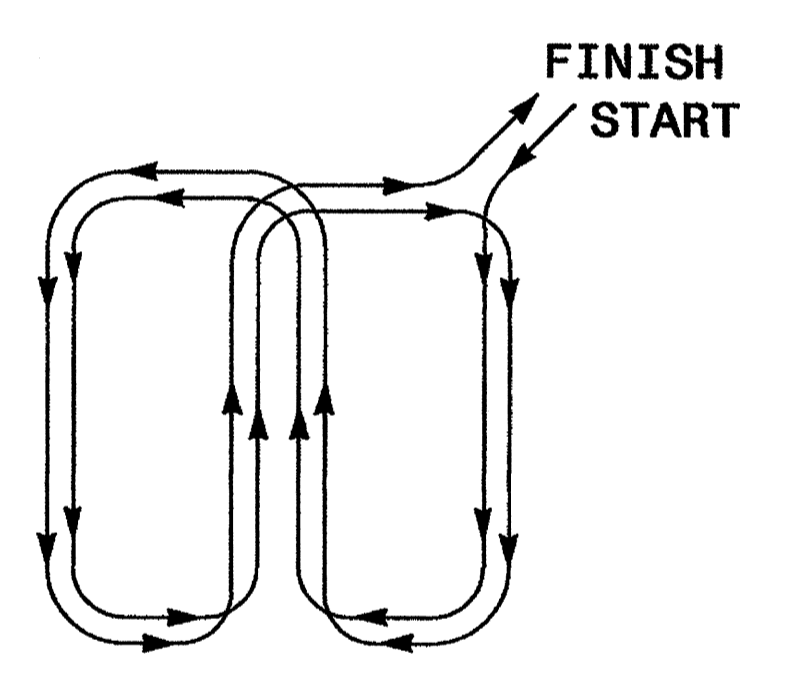
**OPTION 1**



**OPTION 2 (POOR PAVEMENT)**



**LOOP WINDING METHOD**



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway  
Garner, NC 27529

SEAL

*Milton Dean* 11/24/08  
SIGNATURE DATE

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

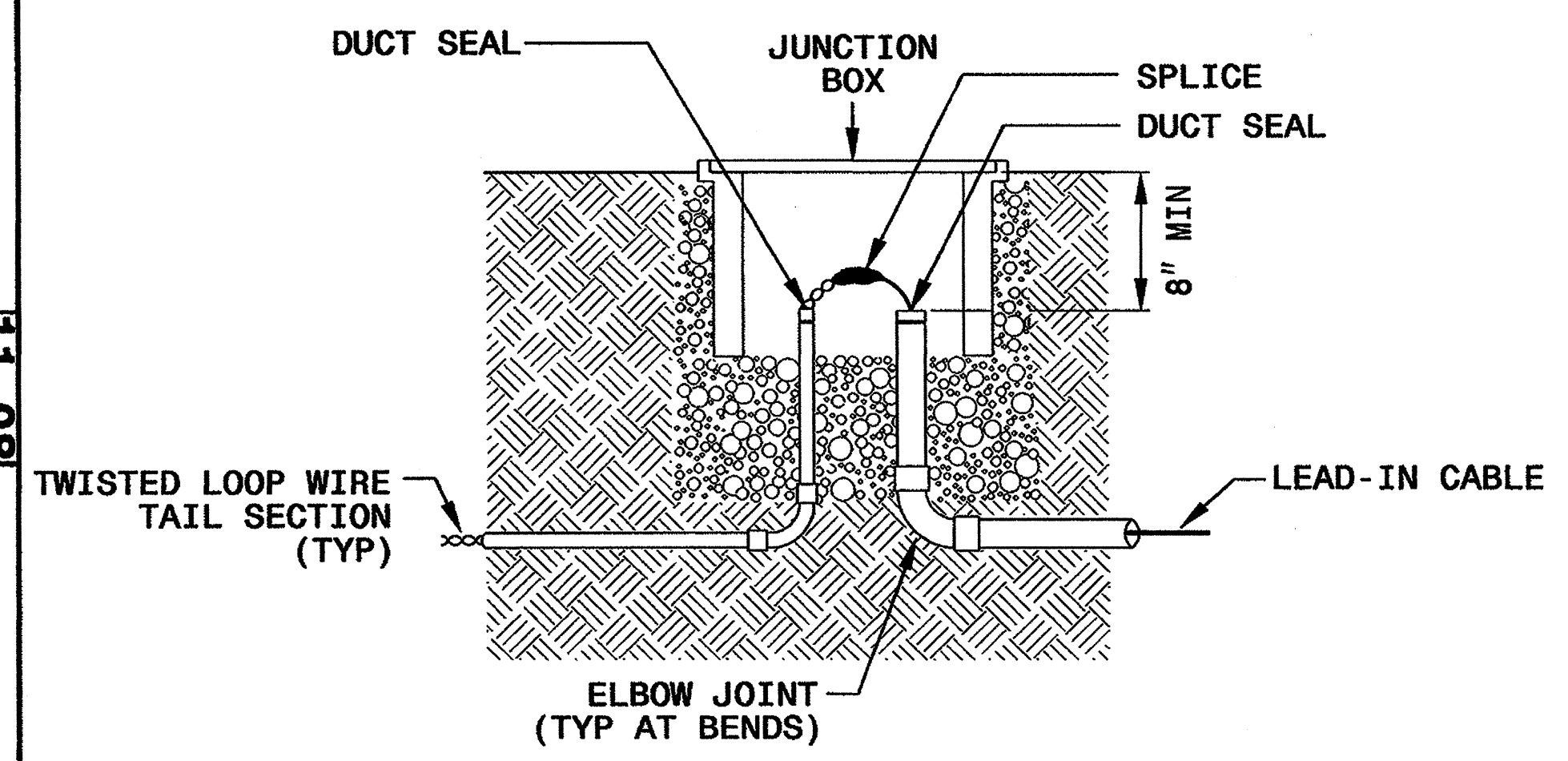
11-08

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

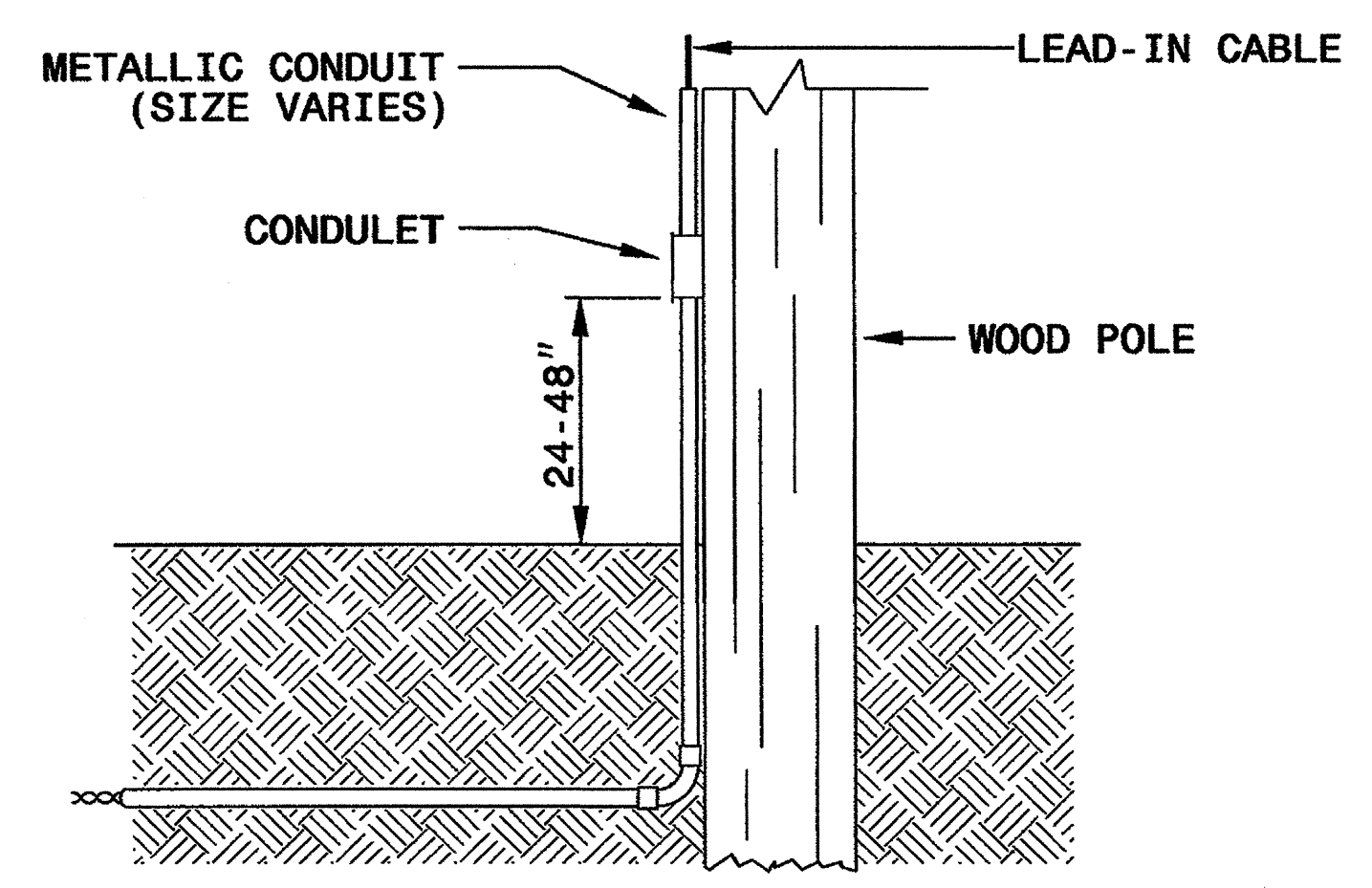
SHEET 2 OF 3  
**1725D01**

**LOOP WIRE SPLICE POINT DETAILS**

**LOOP WIRE AT JUNCTION BOX**



**LOOP WIRE AT POLE**

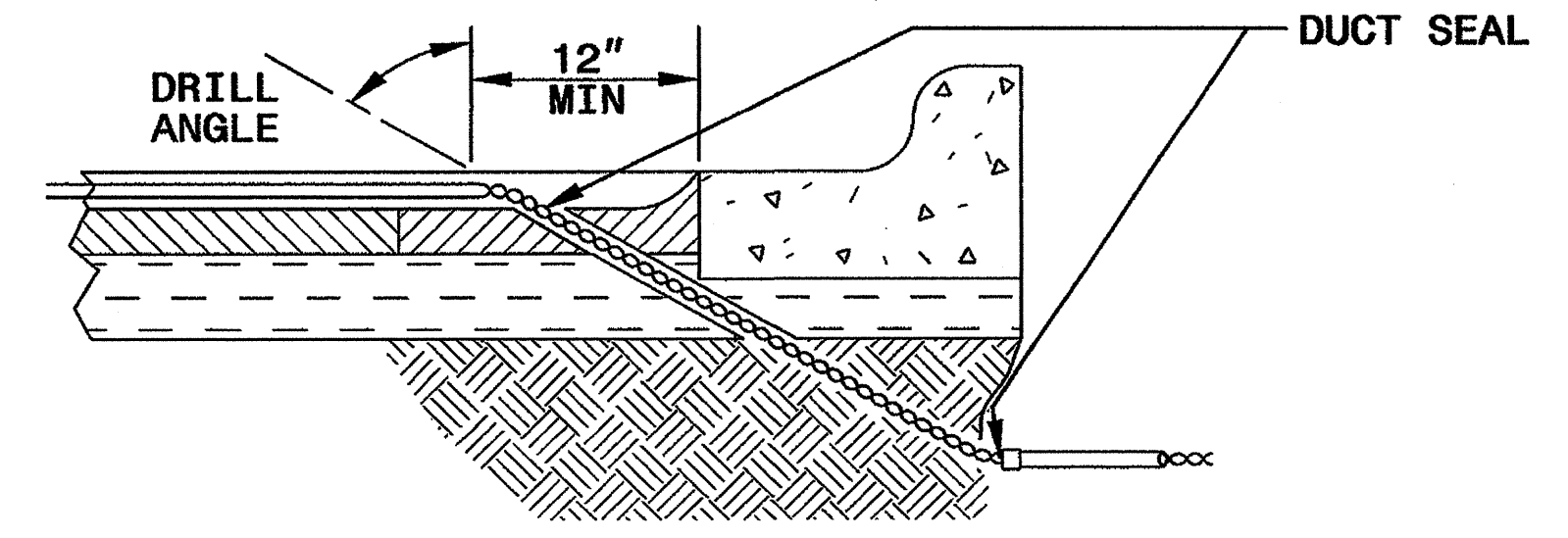


**NOTE**

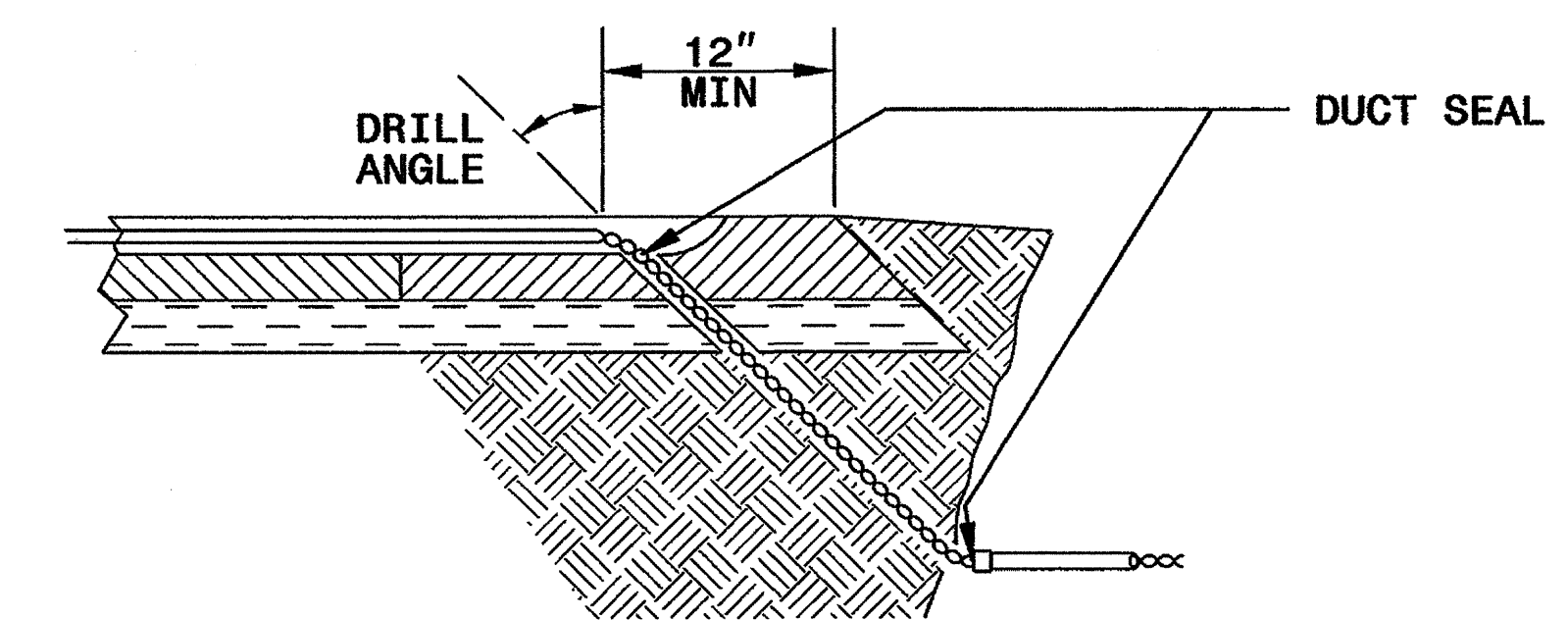
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

**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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DIVISION OF HIGHWAYS  
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:

750 N. Greenfield Parkway  
Garner, NC 27529

SEAL

Milton J. Deay 11/24/08  
SIGNATURE DATE

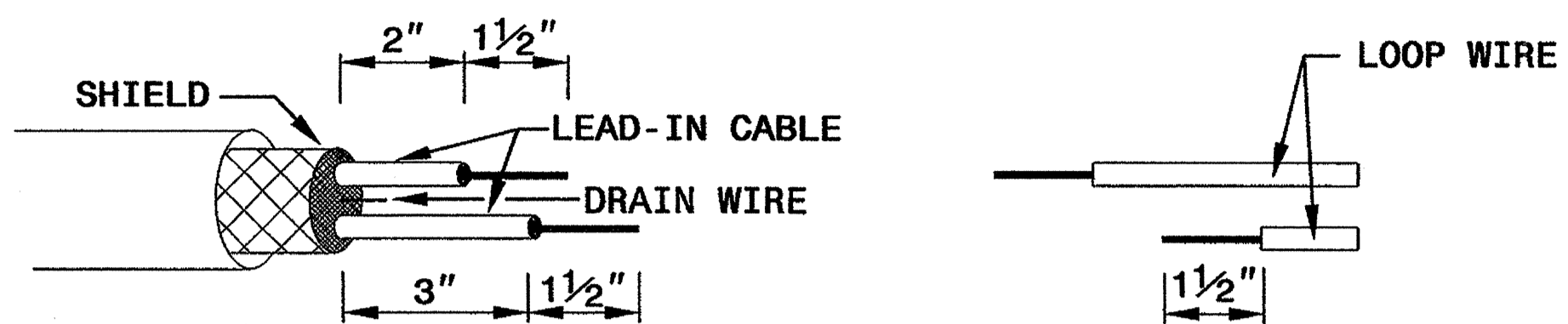
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

11-08

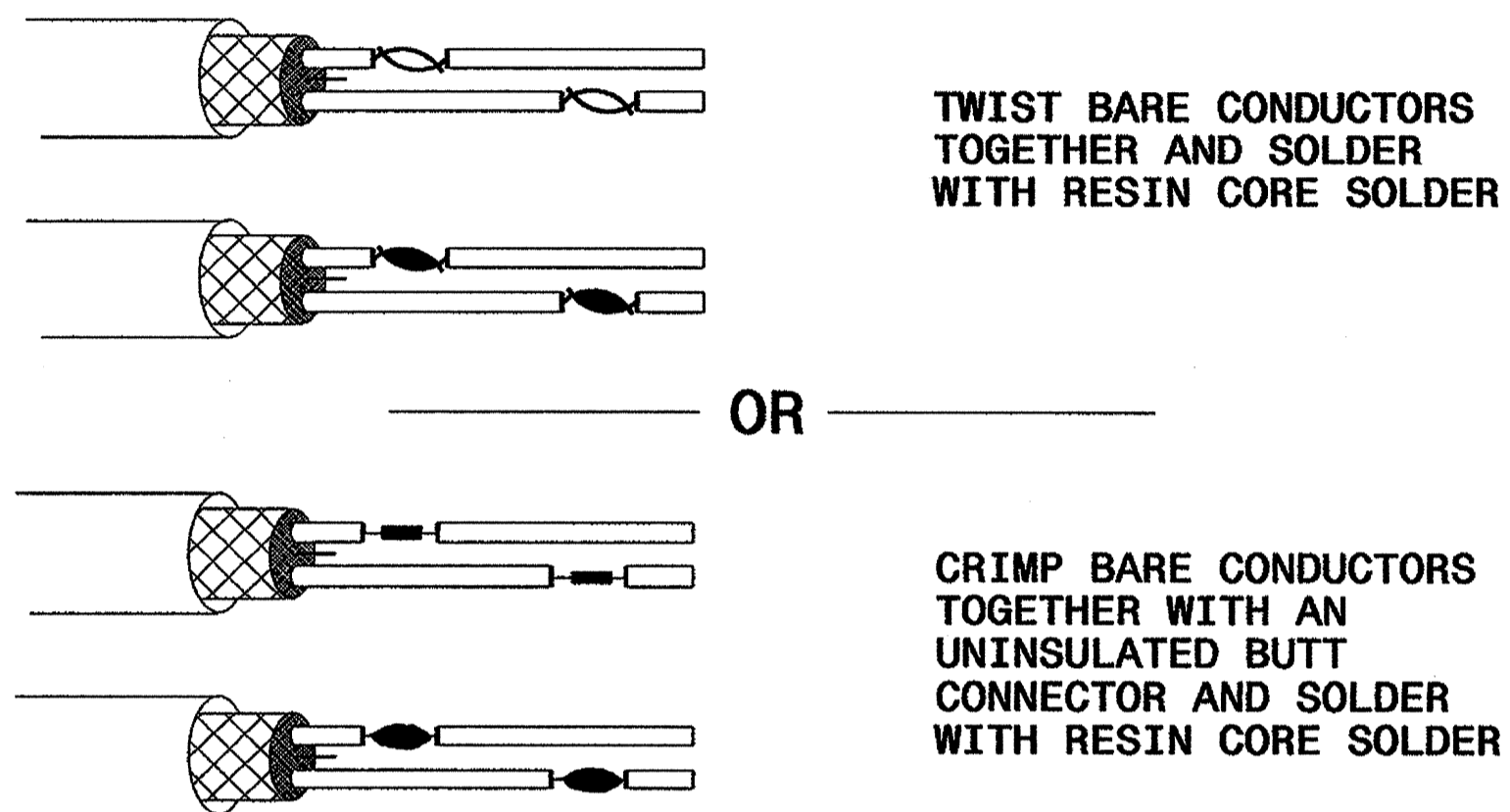
ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3  
**1725D01**

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

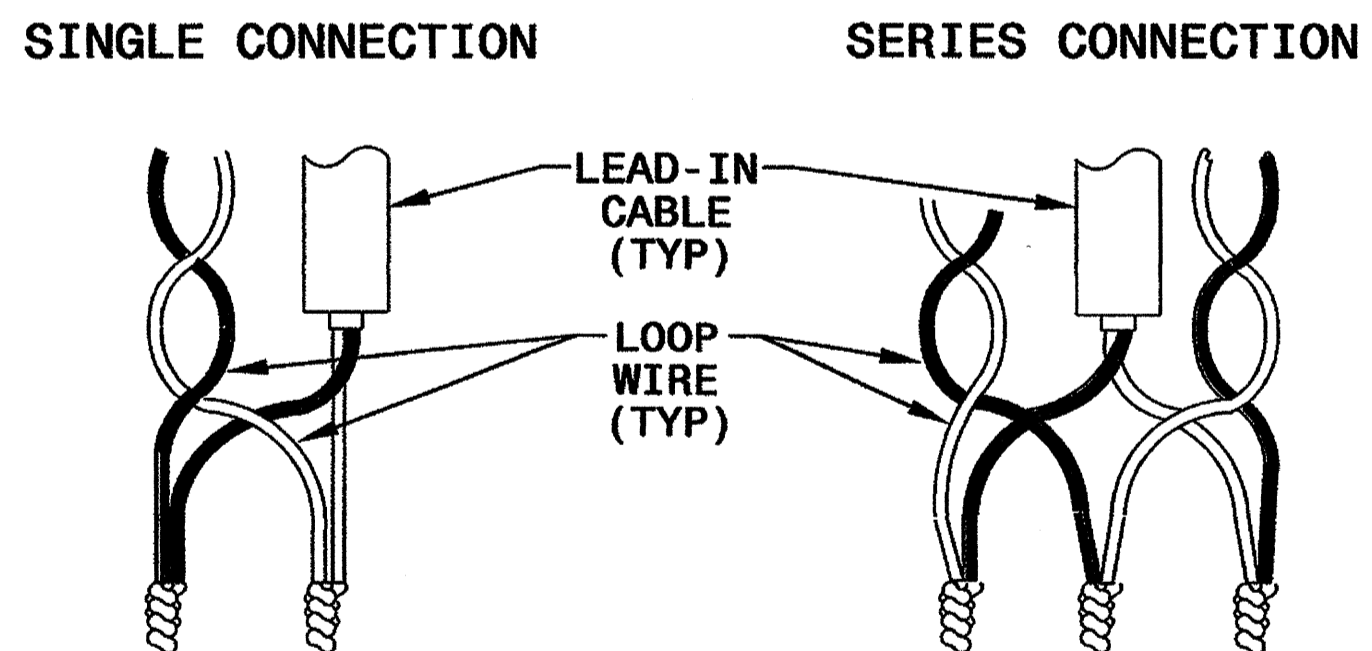


**STEP 2. CONNECT AND SOLDER**

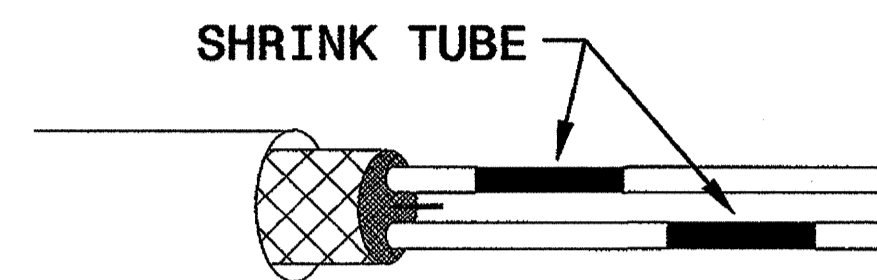


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

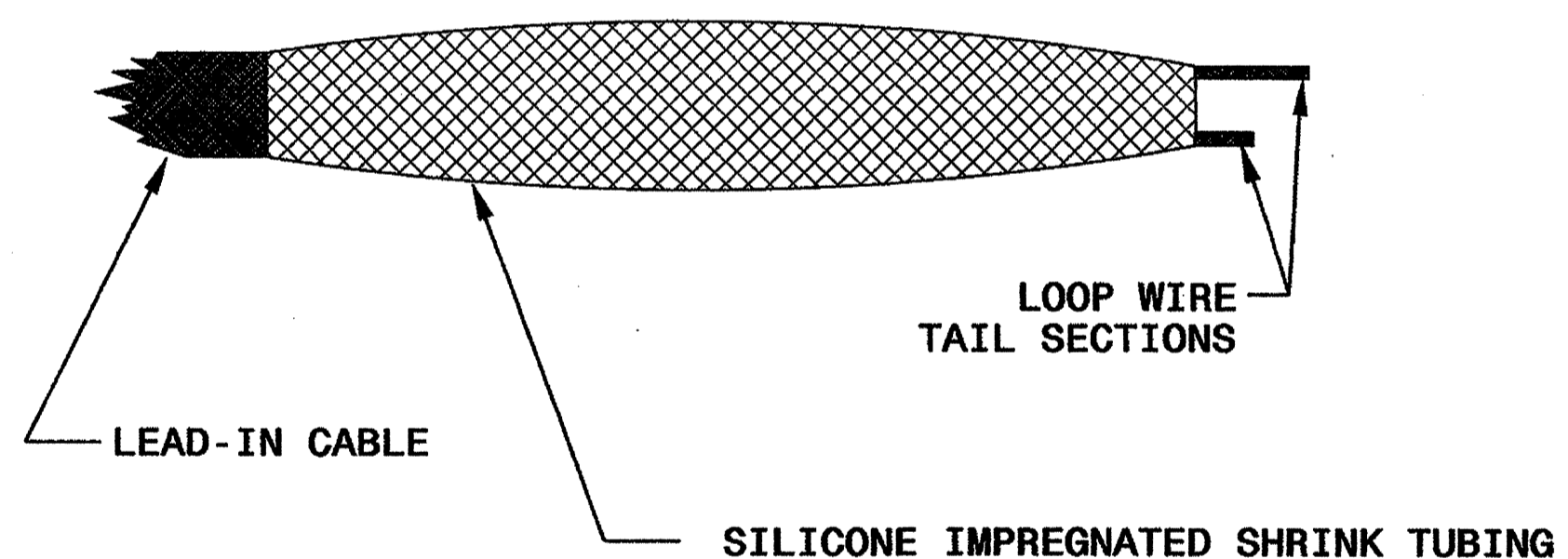
**LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS**



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



**STEP 4. ENVIRONMENTALLY PROTECT SPLICE**



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**  
750 N. Greenfield Parkway  
Garner, NC 27529

SEAL  
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 16286  
WILSON I. DEAN  
*Wilson I. Dean* 11/24/08  
SIGNATURE DATE