

**PROJECT: B-2515**

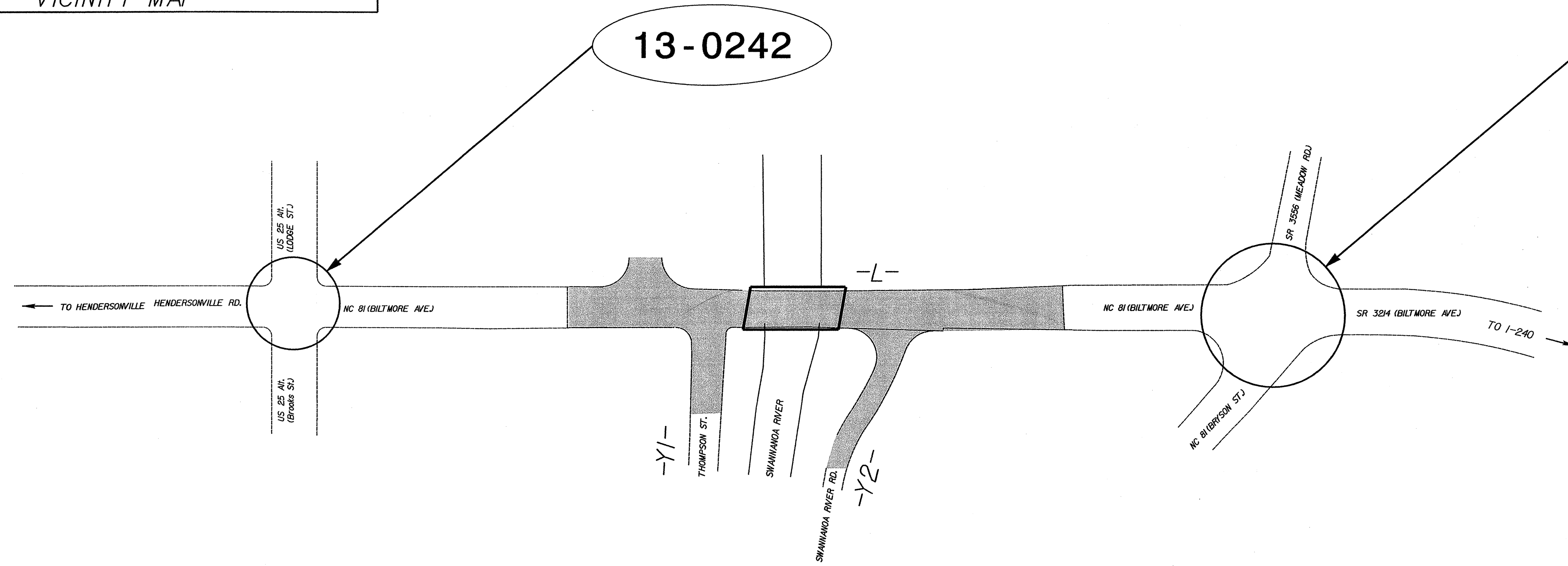
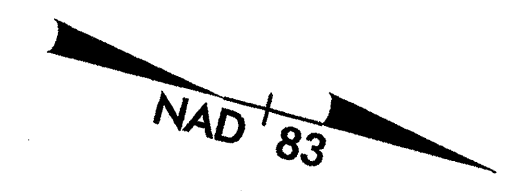
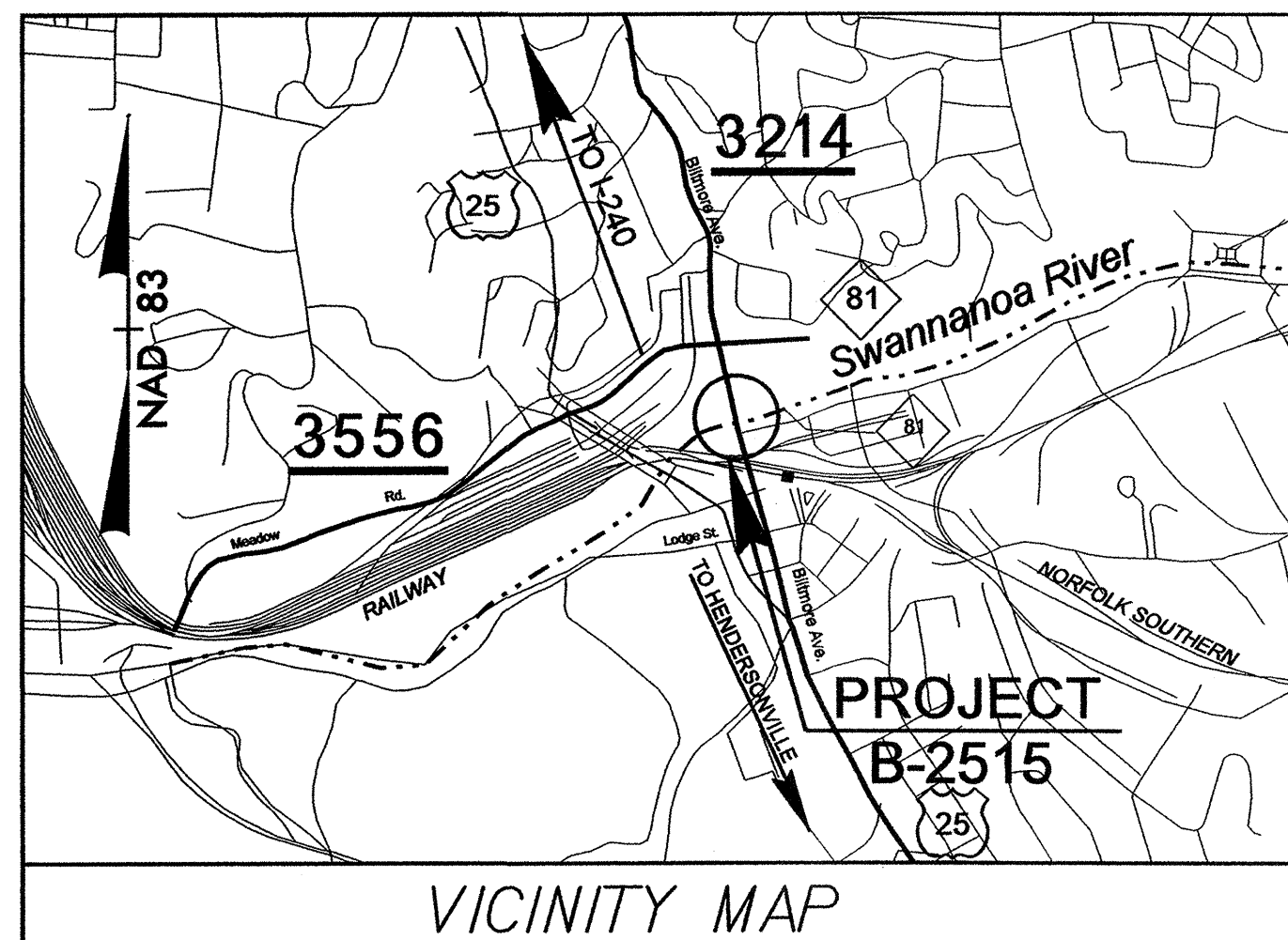
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**BUNCOMBE COUNTY**

**LOCATION: BRIDGE NO. 39 OVER SWANNANOA RIVER ON NC 81 (BILTMORE AVENUE)**

**TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS**

STATE	PROJECT NO.	SHEET NO.
N.C.	B-2515	Sig. 1
F.A. PROJ. NO.		
PROJECT ID. NO.		



**INDEX OF PLANS**

SHEET NO.	SIGNAL INVENTORY NO.	LOCATION /DESCRIPTION
SIG. 1	N/A	Tile Sheet
SIG. 2-7	13-0242	NC 81 (Biltmore Ave.) at Sweeten Creek Rd./Lodge St.
SIG. 8-11	13-0243	NC 81/SR 3214 (Biltmore Ave.) at NC 81 (Bryson St./SR 3556 (Meadow Rd.)
SIG. 12-14	N/A	Inductive Detection Loops Details
SIG. 15-24	N/A	Signal Communication Plans

**LEGEND**

##-#### SIGNAL INVENTORY NUMBER

**NCDOT CONTACTS:  
INTELLIGENT TRANSPORTATION SYSTEMS & SIGNALS UNIT**

- Nathaniel Bitting, PE - S&G Project Engineer
- George C. Brown, PE - Signal Equipment Design Engineer
- G. G. Murr, Jr. PE - Intelligent Transportation Systems Engineer

Prepared in the Offices of:

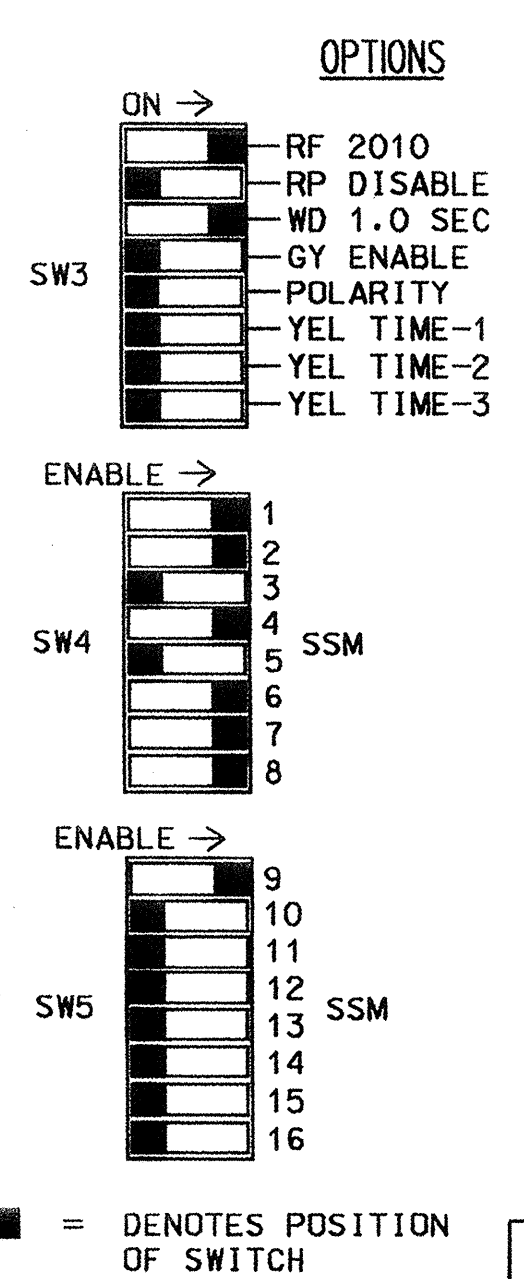
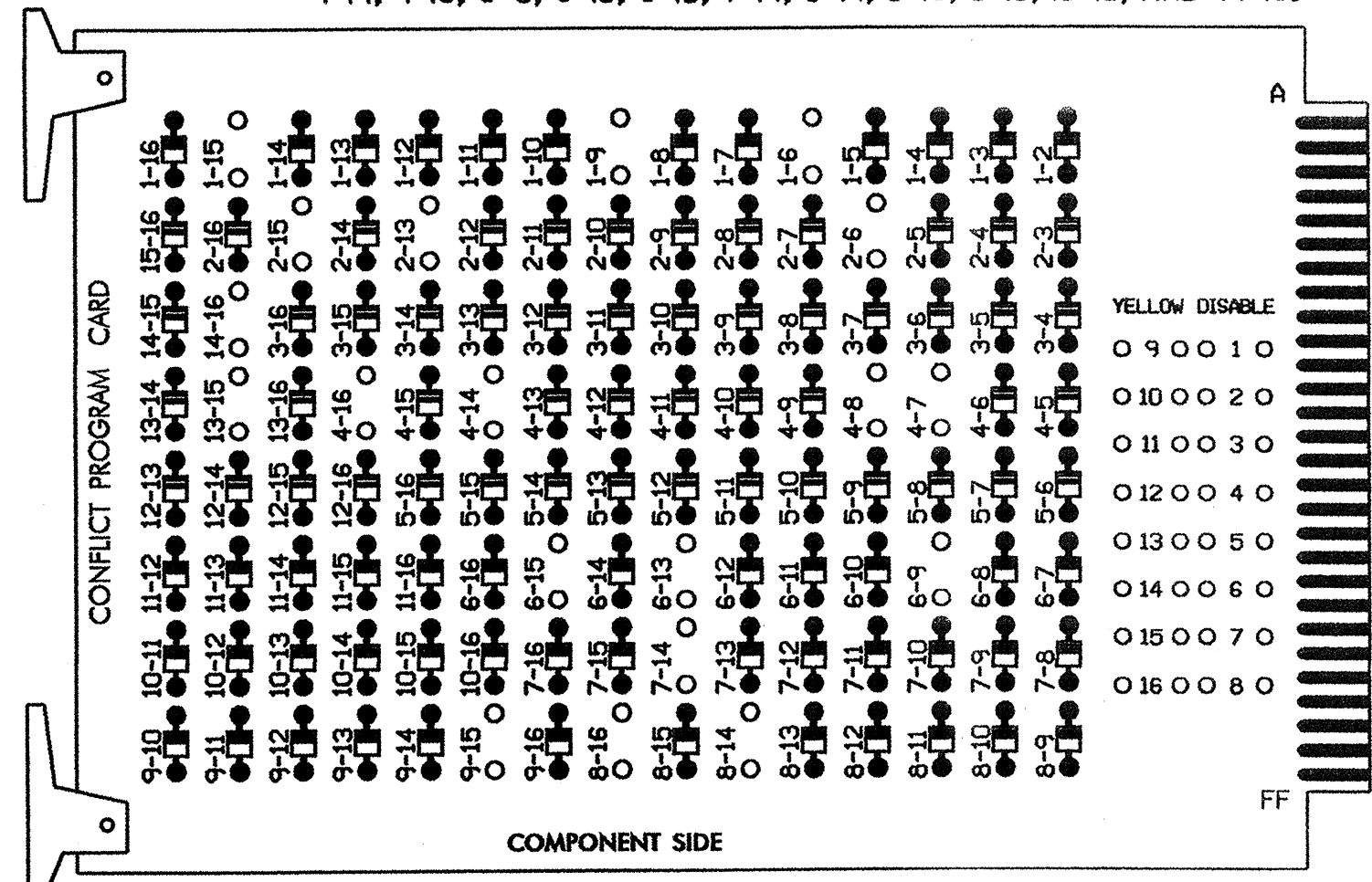
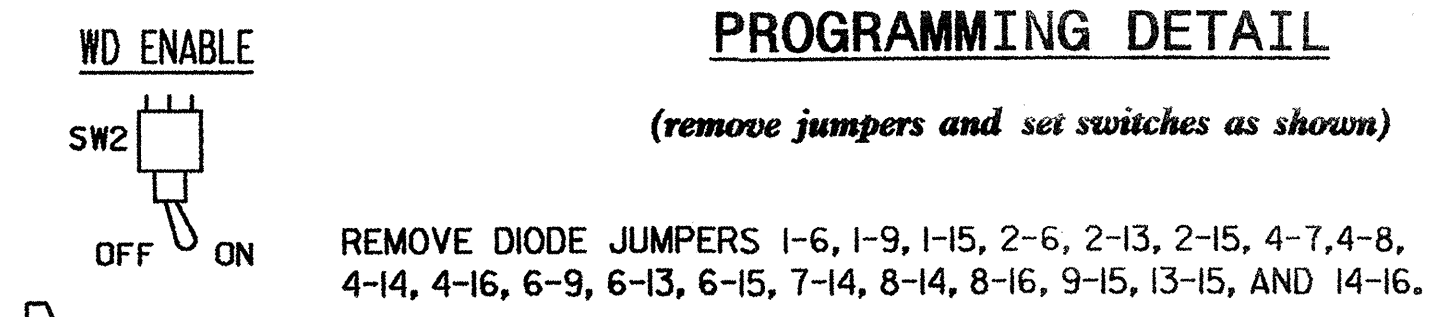


750 N. Greenfield Parkway, Garner, NC 27529





### EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL



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

### NOTES

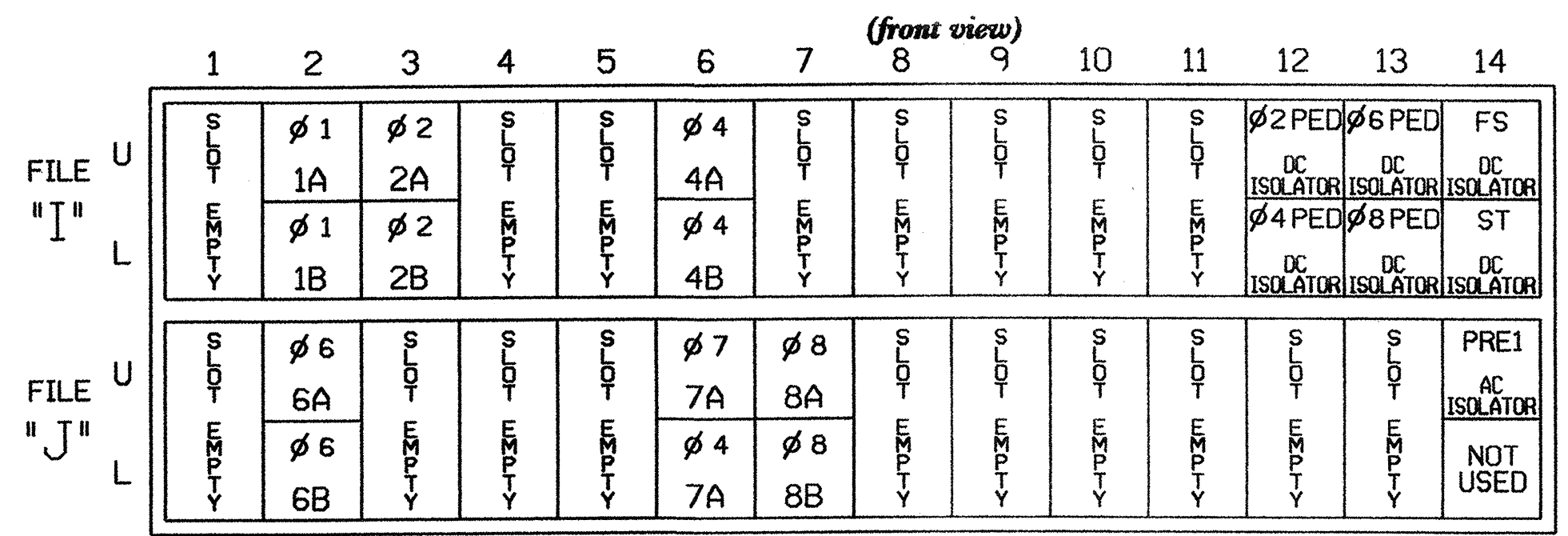
- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Asheville Signal System.

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	41	61,62	P81, P82	82	NU	NU	NU	NU	NU
RED	*	128			101			134		* 107		*						
YELLOW		129			102			135		108								
GREEN		130			103			136		109								
RED ARROW																		
YELLOW ARROW	126									123			A122					
GREEN ARROW	127									124			A123					
Hand icon				113		104		119		110								
Person icon				115		106		121		112								

NU = Not Used  
\* Denotes install load resistor. See load resistor installation detail this sheet.

### INPUT FILE POSITION LAYOUT



### OVERLAP PROGRAMMING DETAIL

(program controller as shown below)  
FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

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

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

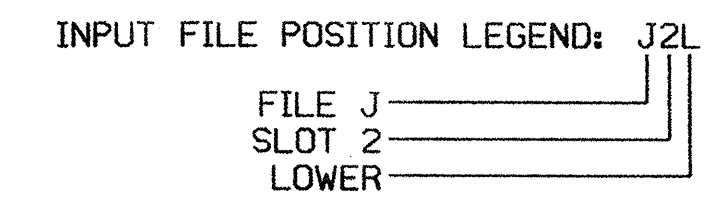
OVERLAP PROGRAMMING COMPLETE  
PRESS '+' UP TO 'P'  
The utilization of overlap P ensures consistent clearance timing during transition to preemption.

### INPUT FILE CONNECTION & PROGRAMMING CHART

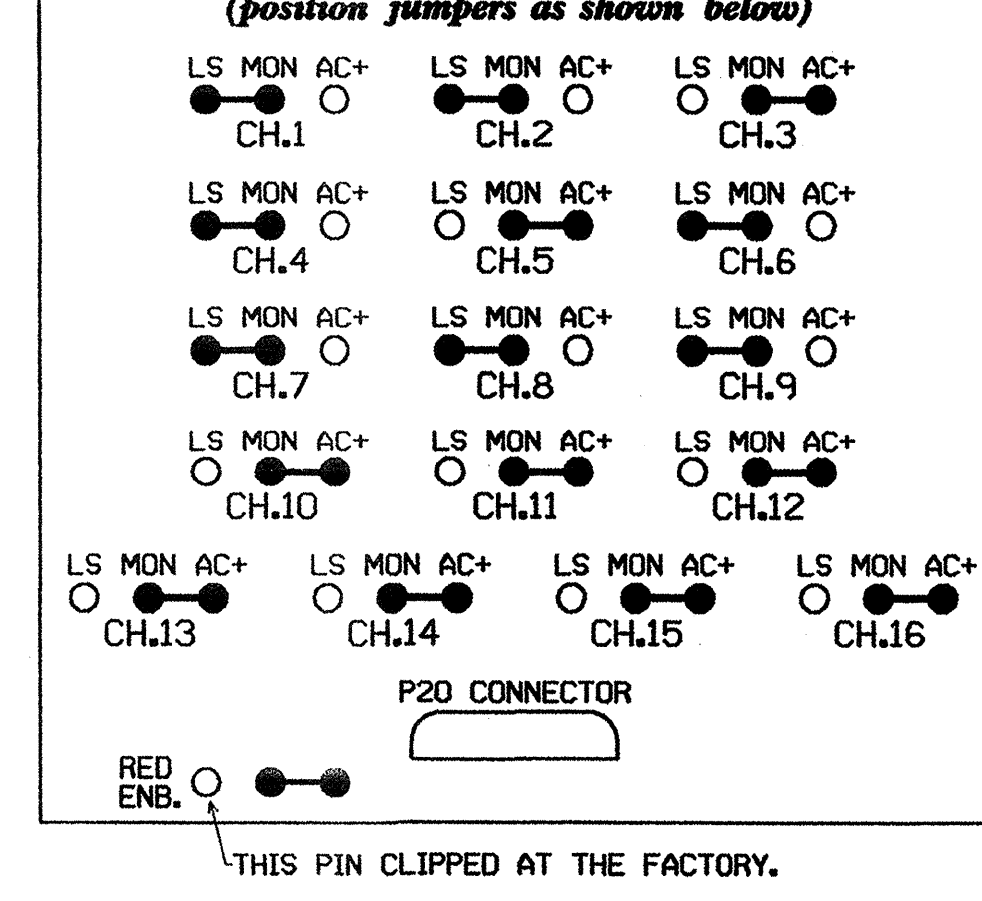
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y	-	-	5
1B	TB2-7,8	I2L	43	5	12	1	Y	Y	-	-	15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y	-	-	-
2B	TB2-11,12	I3L	76	38	42	2	Y	Y	-	-	-
4A	TB4-9,10	I6U	41	3	4	4	Y	Y	-	-	-
4B	TB4-11,12	I6L	45	7	14	4	Y	Y	-	-	10
6A	TB3-5,6	J2U	40	2	6	6	Y	Y	-	-	-
6B	TB3-7,8	J2L	44	6	16	6	Y	Y	-	-	-
7A <sup>1</sup>	TB5-9,10	J6U	42	4	8	7	Y	Y	-	-	15
	TB5-11,12	J6L	46	8	18	4	Y	Y	-	-	3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y	-	-	3
8B	TB7-3,4	J7L	79	41	48	8	Y	Y	-	-	-

NOTE:  
INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

<sup>1</sup>Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.



### RED MONITOR BOARD PROGRAMMING

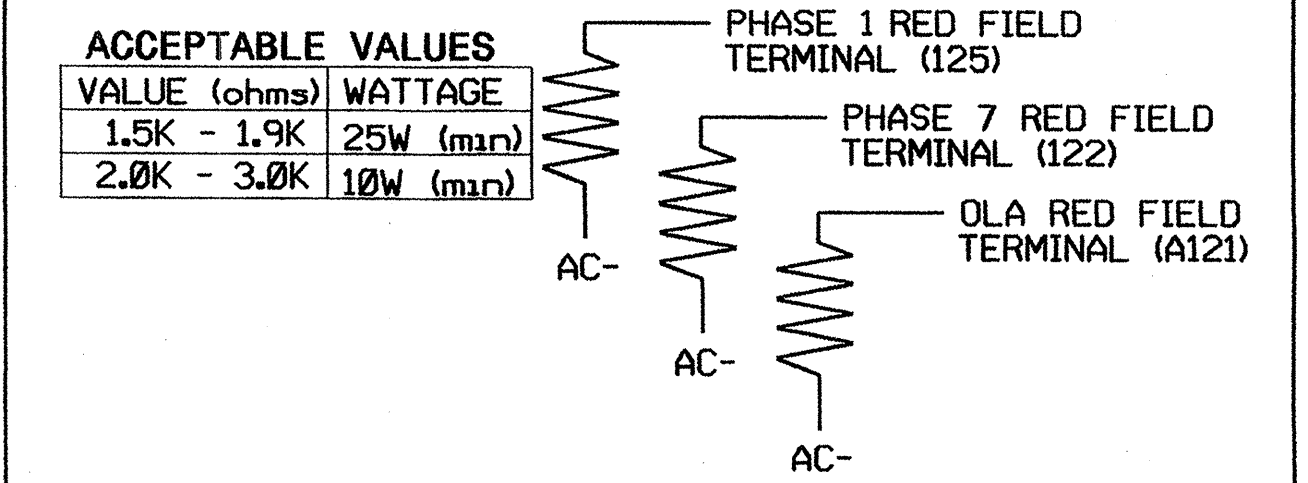


### EQUIPMENT INFORMATION

CONTROLLER.....EAGLE TYPE 2070L  
CABINET.....McCAIN/CONTROL TECHNOLOGIES (DWG.NO.9500-332-NCDOT)  
SOFTWARE.....ECONOLITE OASIS 3.02.20  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)  
LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S6,S6P,S7,S8,S8P,S9  
PHASES USED.....1,2,4,6,7,8  
PEDS USED.....2,4,6,8  
OVERLAPS.....OLA=1  
OLP= 1,2,4,6,7,8

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0242T  
DESIGNED: August 2008  
SEALED: 9-26-08  
REVISED: N/A

### LOAD RESISTOR INSTALLATION DETAIL



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

### Temporary Design (Sheet 1 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 81 (Biltmore Ave) at Sweeten Creek Rd /Lodge St

Division 13 Buncombe County Asheville

PLAN DATE: 9-12-08 REVIEWED BY: D.T. Joyce

PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS

122 N. McDowell St., Raleigh, NC 27603

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

SIGNATURE DATE

SIG. INVENTORY NO. 13-0242T



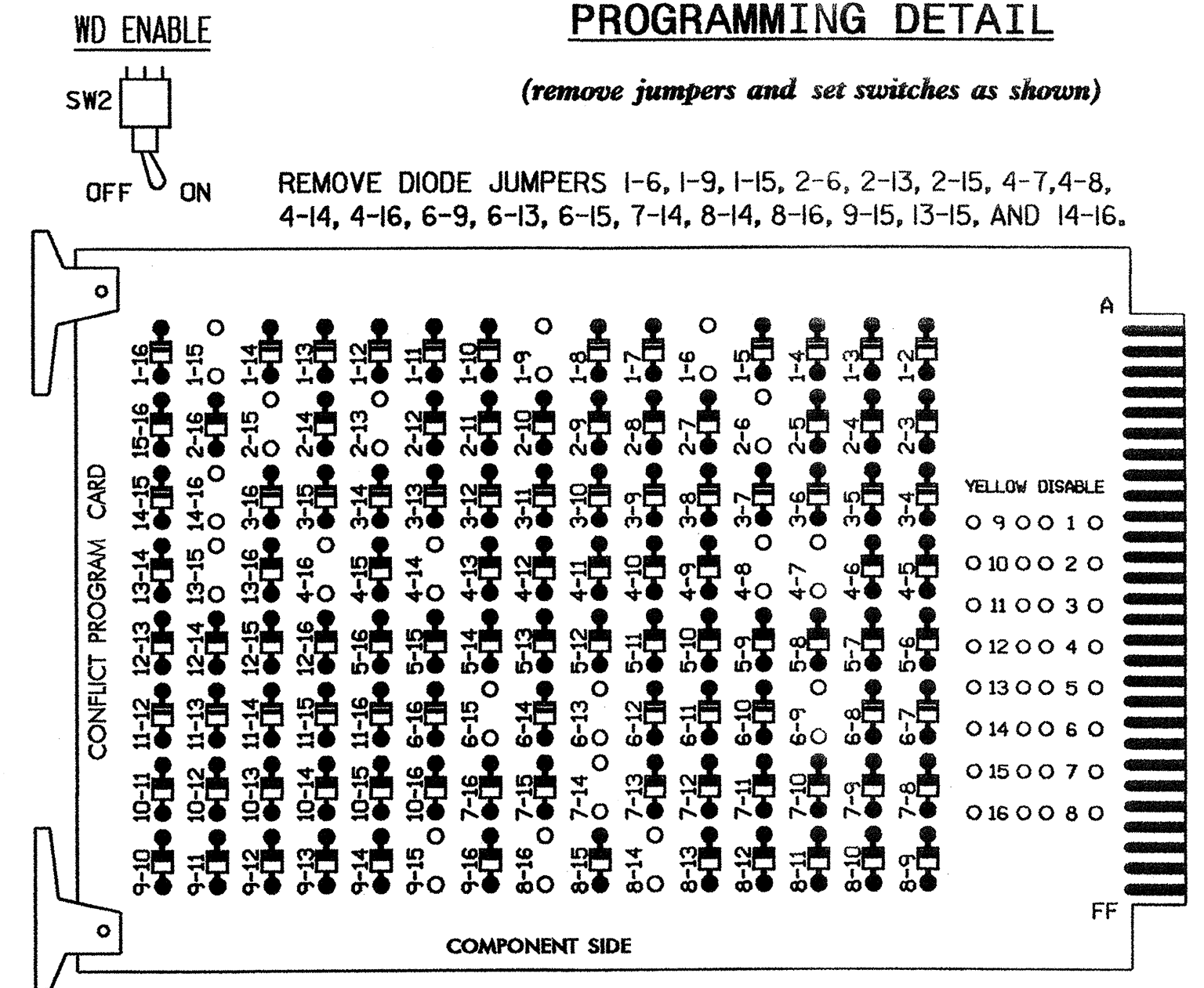








**EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL**



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

**NOTES**

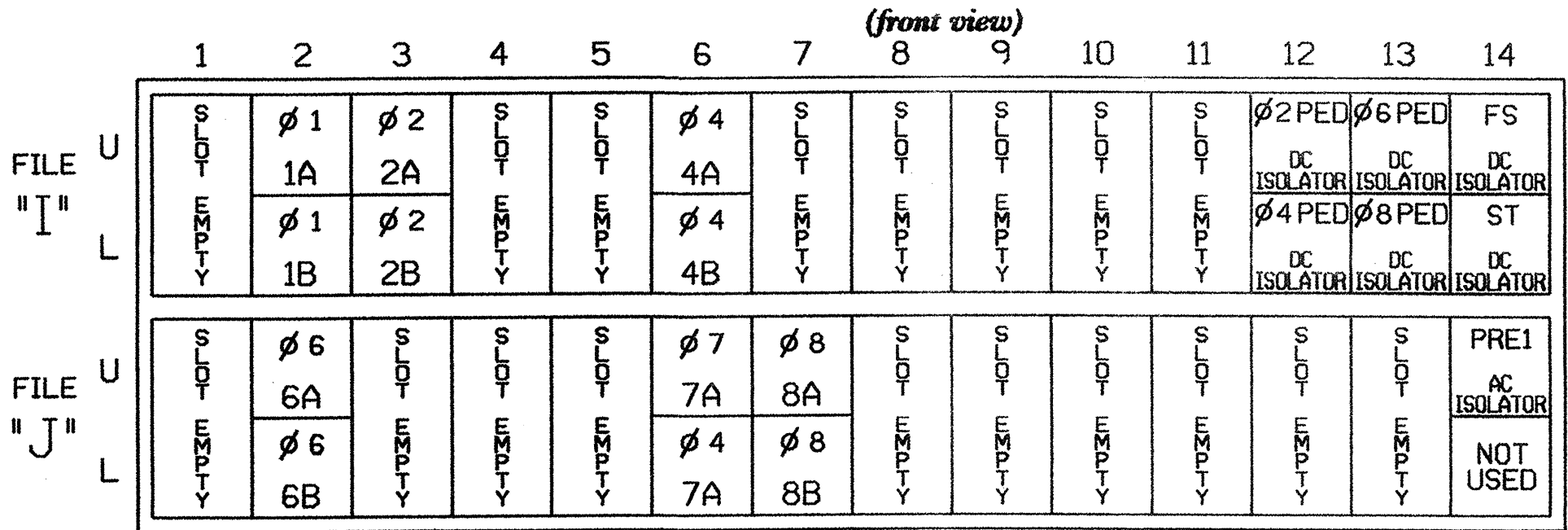
- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Asheville Signal System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	41	81,82	P81, P82	82	NU	NU	NU	NU	NU
RED	*	128			101			134		*	107		*					
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW	126									123			A122					
GREEN ARROW	127									124			A123					
Hand				113		104		119				110						
Person				115		106		121				112						

NU = Not Used  
\* Denotes install load resistor. See load resistor installation detail this sheet.

**INPUT FILE POSITION LAYOUT**



**OVERLAP PROGRAMMING DETAIL**

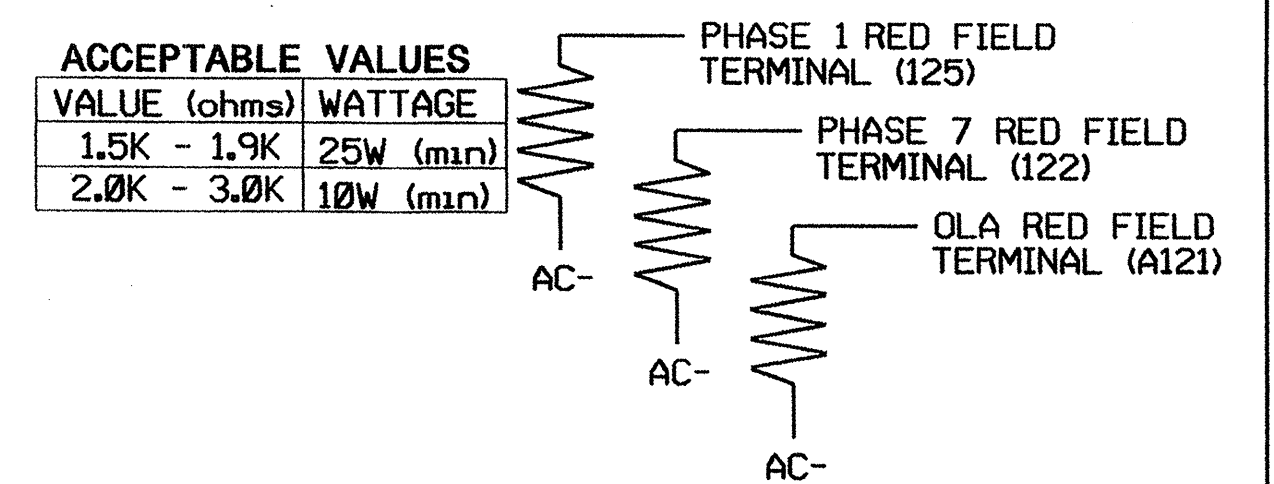
(program controller as shown below)  
FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

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

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

OVERLAP PROGRAMMING COMPLETE  
PRESS '+' UP TO 'P'  
The utilization of overlap P ensures consistent clearance timing during transition to preemption.

**LOAD RESISTOR INSTALLATION DETAIL**



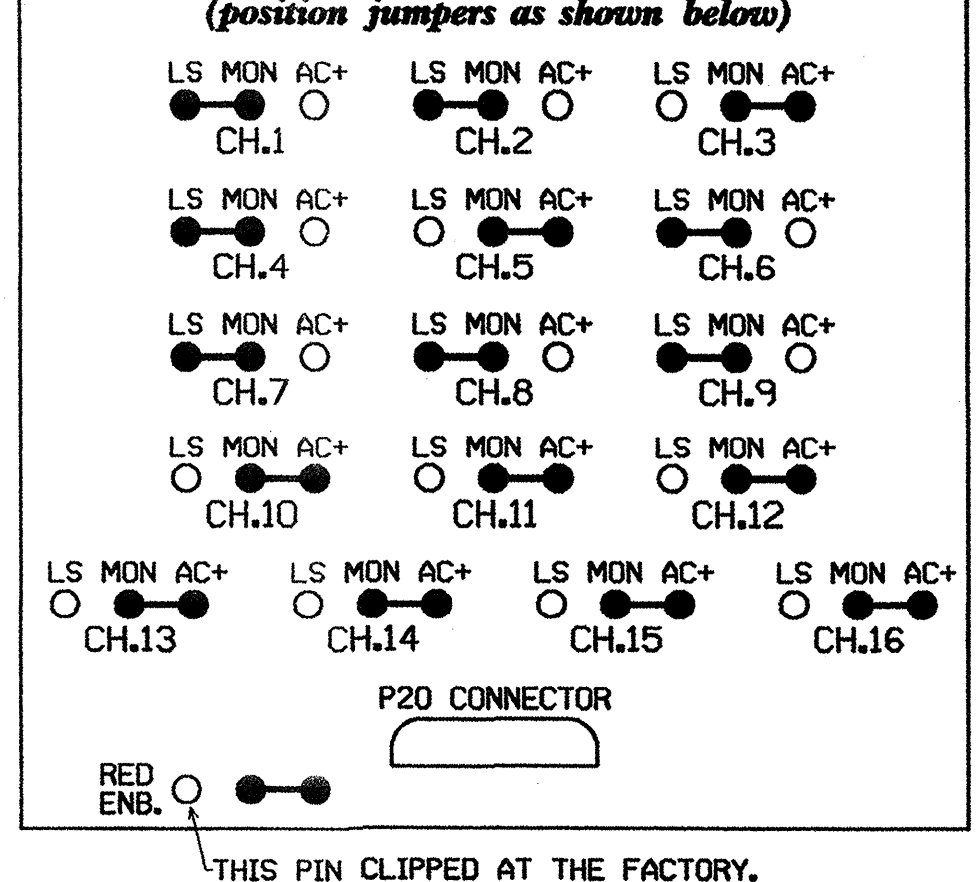
NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y	-	-	5
1B	TB2-7,8	I2L	43	5	12	1	Y	Y	-	-	15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y	-	-	-
2B	TB2-11,12	I3L	76	38	42	2	Y	Y	-	-	-
4A	TB4-9,10	I6U	41	3	4	4	Y	Y	-	-	-
4B	TB4-11,12	I6L	45	7	14	4	Y	Y	-	-	10
6A	TB3-5,6	J2U	40	2	6	6	Y	Y	-	-	-
6B	TB3-7,8	J2L	44	6	16	6	Y	Y	-	-	-
7A	TB5-9,10	J6U	42	4	8	7	Y	Y	-	-	15
7B	TB5-11,12	J6L	46	8	18	4	Y	Y	-	-	3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y	-	-	3
8B	TB7-3,4	J7L	79	41	48	8	Y	Y	-	-	-

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

**RED MONITOR BOARD PROGRAMMING**



**EQUIPMENT INFORMATION**

CONTROLLER.....EAGLE TYPE 2070L  
CABINET.....McCAIN/CONTROL TECHNOLOGIES (DWG.NO.9500-332-NC DOT)  
SOFTWARE.....ECONOLITE OASIS 3.02.20  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)  
LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S6,S6P,S7,S8,S8P,S9  
PHASES USED.....1,2,4,6,7,8  
PEDS USED.....2,4,6,8  
OVERLAPS.....OLA=1  
OLP= 1,2,4,6,7,8

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0242  
DESIGNED: July 2008  
SEALED: 9-26-08  
REVISED: N/A

**Final Design (Sheet 1 of 2)**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 81 (Biltmore Ave) at Sweeten Creek Rd /Lodge St

Division 13 Buncombe County Asheville

PLAN DATE: 9-12-08 REVIEWED BY: D.T. Joyce

PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS INIT. DATE

SEAL  
NORTH CAROLINA PROFESSIONAL ENGINEER  
GEORGE C. BROWN  
SEAL 022013  
SIGNATURE DATE

222 N. McDowell St., Raleigh, NC 27603

SIG. INVENTORY NO. 13-0242



**RAILROAD PREEMPTION PROGRAMMING DETAIL**

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions).

PREEMPTION #	SETTINGS (NEXT:1-10)	CLEAR/DWELL PHASES											
INTERVAL/TIMING	GRN	YEL	RED	1	2	3	4	5	6	7	8	9	10
1	32	3.8	1.5	X	X								
2	255	0.0	0.0		X	X							
3	0	0.0	0.0										
4	0	0.0	0.0										
5	1	0.0	0.0	X	X								

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	.....HIGH
DELAY TIMER (0-255 SEC)	.....0
MIN GREEN BEFORE PRE (0= DEFAULT)	...1
PED CLEAR BEFORE PRE (0= DEFAULT)	...4
YELLOW CLEAR BEFORE PRE (0= DEFAULT)	...3.8
RED CLEAR BEFORE PRE (0= DEFAULT)	...1.5
DWELL MIN TIMER (0-255 SEC)	.....7
DWELL MAX TIMER (0=OFF,1-255MIN)	.....0
DWELL HOLD-OVER TIMER (0-255)	.....0
LATCH CALL?	.....N
LINK TO NEXT PREEMPT?	.....N
ENABLE BACKUP PROTECTION?	.....N
HOLD CLEAR 1 PHASES DURING DELAY?	...N
FAST GREEN FLASH DWELL PHASES?	.....N
PED CLEARANCE THROUGH YELLOW?	.....Y
INHIBIT OVERLAP GREEN EXTENSION?	...N
SERVICE DURING SOFTWARE FLASH?	.....N
REST IN RED DURING DWELL INTERVAL?	..N
FLASH DWELL INTERVAL?	.....N
ALLOW PEDS IN DWELL INTERVAL?	.....N
RE-TIME DWELL INTERVAL?	.....N
OVERLAPS:	ABCDEFGHIJKLMN
DWELL INT FLASH YELLOW	.....X
OMIT OVERLAPS:	.....X

**DYNAMIC BACK-UP CONTROL PROGRAMMING**

(program controller as shown below)

- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Functions 1 and 2.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

DYNAMIC/BACKUP CONTROL FUNCTION #01  
 OVERLAPS:ABCDEFGHIJKLMN  
 IF OVERLAPS ARE ACTIVE :  
 OR PHASES:12345678910111213141516  
 IF PHASES ARE ON : X  
 OMIT PHASES : X  
 CALL PHASES : X

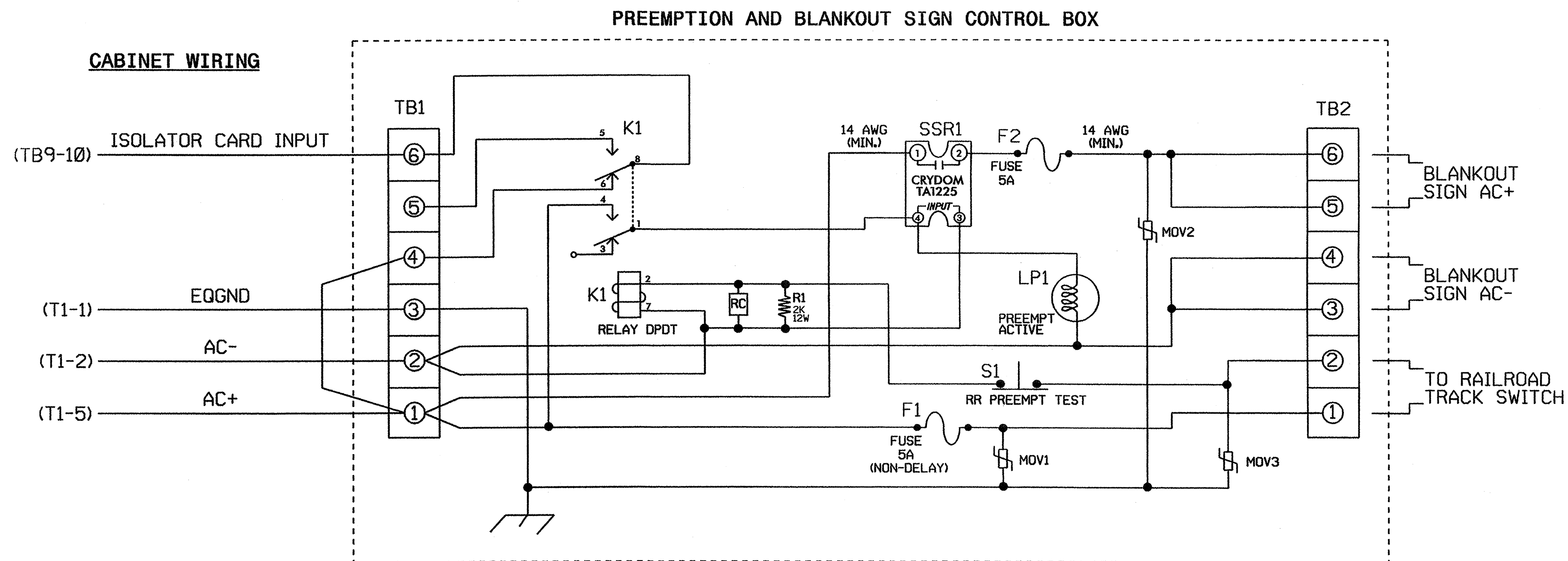
PRESS 'NEXT'

DYNAMIC/BACKUP CONTROL FUNCTION #02  
 OVERLAPS:ABCDEFGHIJKLMN  
 IF OVERLAPS ARE ACTIVE :  
 OR PHASES:12345678910111213141516  
 IF PHASES ARE ON : X  
 OMIT PHASES : X  
 CALL PHASES : X

BACKUP PROTECTION PROGRAMMING COMPLETE

**RAILROAD PREEMPTION WIRING DETAIL**

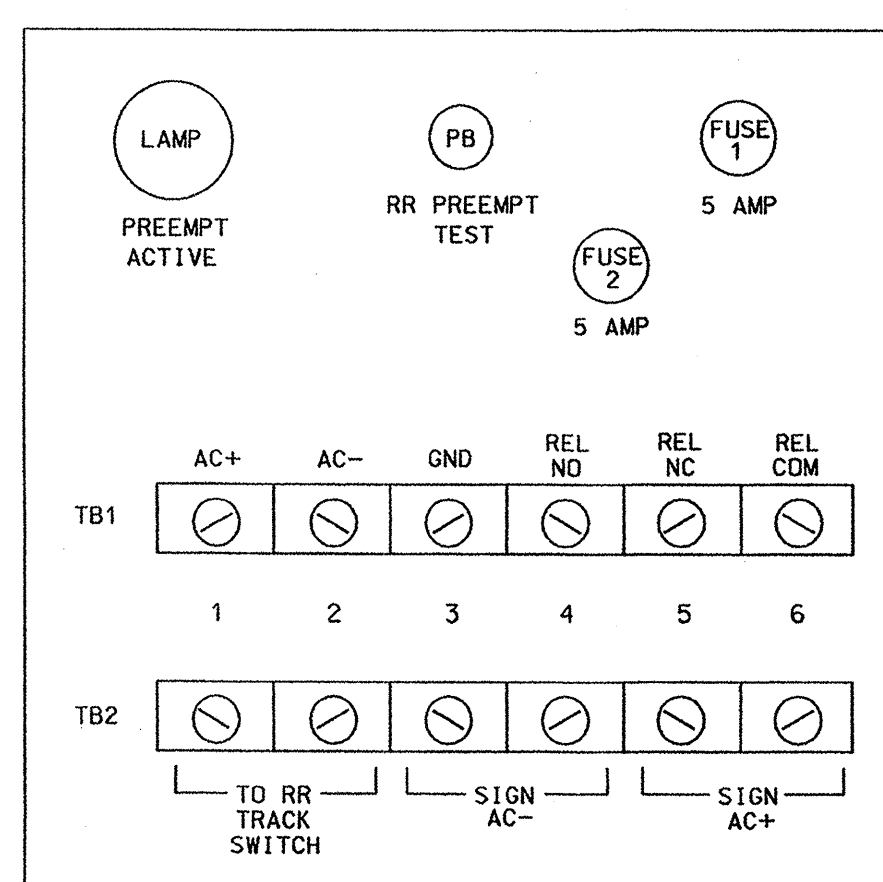
(wire as shown below)



**NOTES**

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT with 120VAC coil. Potter & Brumfield KRP11AG with octal base or approved equivalent.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output. Crydom TA1225 or approved equivalent.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
- Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K or approved equivalent.
- RC network is valued at .1 microfarad, 100 ohm.
- If replacement movs are needed, GE part no. V150LA20A may be used.
- Preemption and Blankout Sign Control Box is a Control Technologies part no. 2299-101 or approved equivalent.
- IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

**FRONT VIEW**



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0242  
 DESIGNED: July 2008  
 SEALED: 9-26-08  
 REVISED: N/A

**Final Design (Sheet 2 of 2)**

ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 81 (Biltmore Ave) at Sweeten Creek Rd /Lodge St

Division 13 Buncombe County Asheville

PLAN DATE: 9-12-08 REVIEWED BY: D.T. Joyce

PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS	INIT.	DATE

122 N. McDowell St., Raleigh, NC 27603

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

SIGNATURE: [Signature] DATE: [Date]

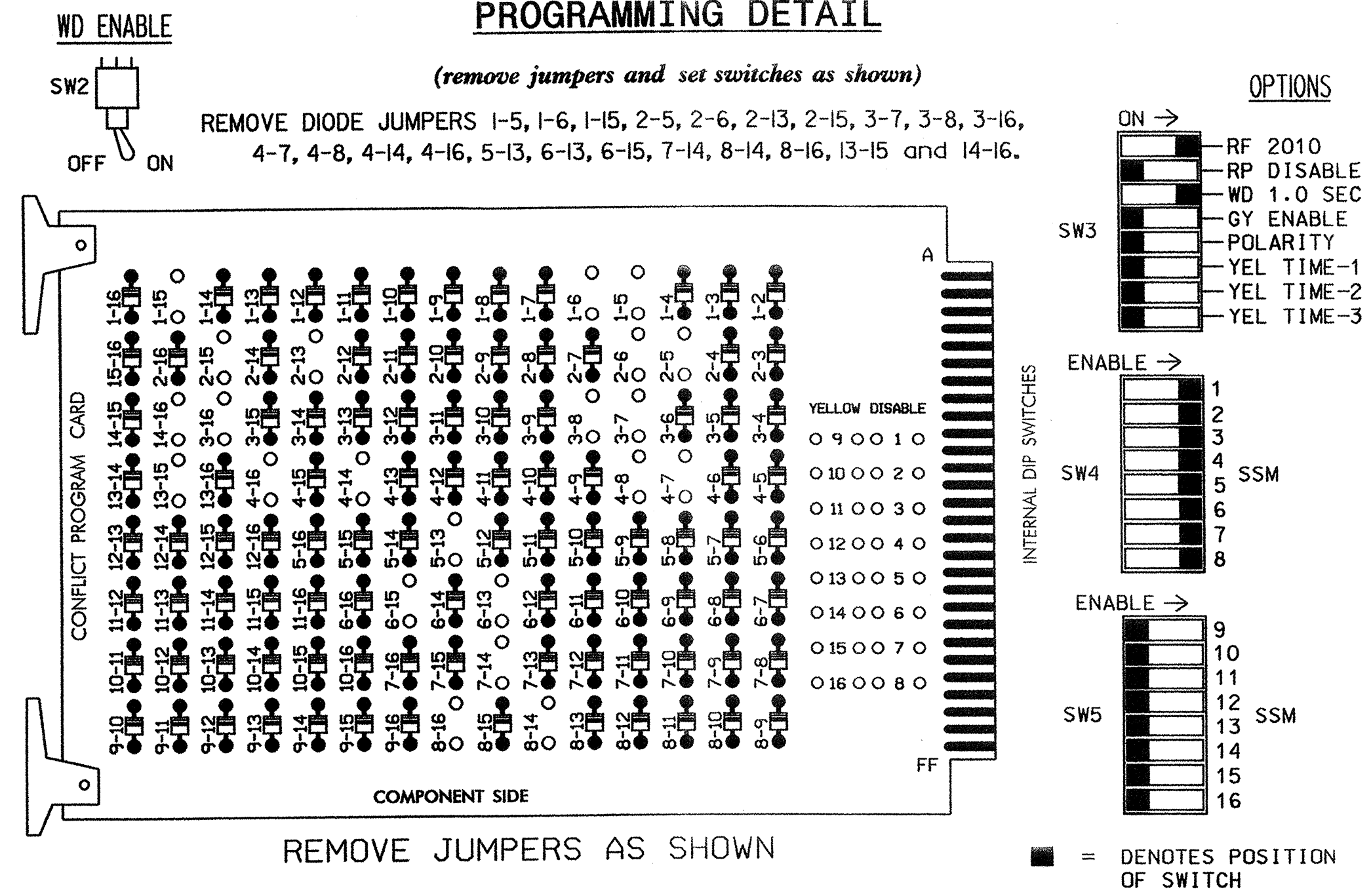
SIG. INVENTORY NO. 13-0242





**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**



REMOVE JUMPERS AS SHOWN

**NOTES:**

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

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Asheville Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....EAGLE TYPE 2070L  
 CABINET.....McCAIN/CONTROL TECHNOLOGIES  
 (DWG. NO. 9500-332-NCDDOT)  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S7,S8,S8P  
 PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED,7,8,8PED  
 OVERLAPS.....NONE

**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.	11	82	21,22	P21, P22	31	41,42	P41, P42	51	61,62	P61, P62	71	62	81,82	P81, P82
RED		128			101			134				107		
YELLOW		129			102			135				108		
GREEN		130			103			136				109		
RED ARROW	125				116			131			122			
YELLOW ARROW	126	126			117			132			123	123		
GREEN ARROW	127	127			118			133			124	124		
Hand icon					113			104			119		110	
Person icon					115			106			121		112	

NU = Not Used

**INPUT FILE POSITION LAYOUT**

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 3	∅ 4	SYS. DET. S25							∅ 2 PED	∅ 6 PED	FS
L	1A	2A,2B	3A	4A								DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
U	∅ 1	NOT USED	NOT USED	NOT USED	SYS. DET. S26							∅ 4 PED	∅ 8 PED	ST
L	1B											DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
U	∅ 5	∅ 6	∅ 7	∅ 8	SYS. DET. S27									
L	5A	6A,6B	7A	8A										
U	NOT USED	NOT USED	NOT USED	NOT USED	SYS. DET. S28									
L														

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
1A	TB2-5,6	I2U	39	1	2	1	Y	Y			3
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
* S25	TB6-1,2	I7U	65	27	34	SYS					
* S26	TB6-3,4	I7L	78	40	44	SYS					
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
* S27	TB7-1,2	J7U	66	28	38	SYS					
* S28	TB7-3,4	J7L	79	41	48	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29		PED 2	2 PED				
P41,P42	TB8-5,6	I12L	69	31		PED 4	4 PED				
P61,P62	TB8-7,9	I13U	68	30		PED 6	6 PED				
P81,P82	TB8-8,9	I13L	70	32		PED 8	8 PED				

NOTE:  
INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

\* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L  
FILE J  
SLOT 2  
LOWER

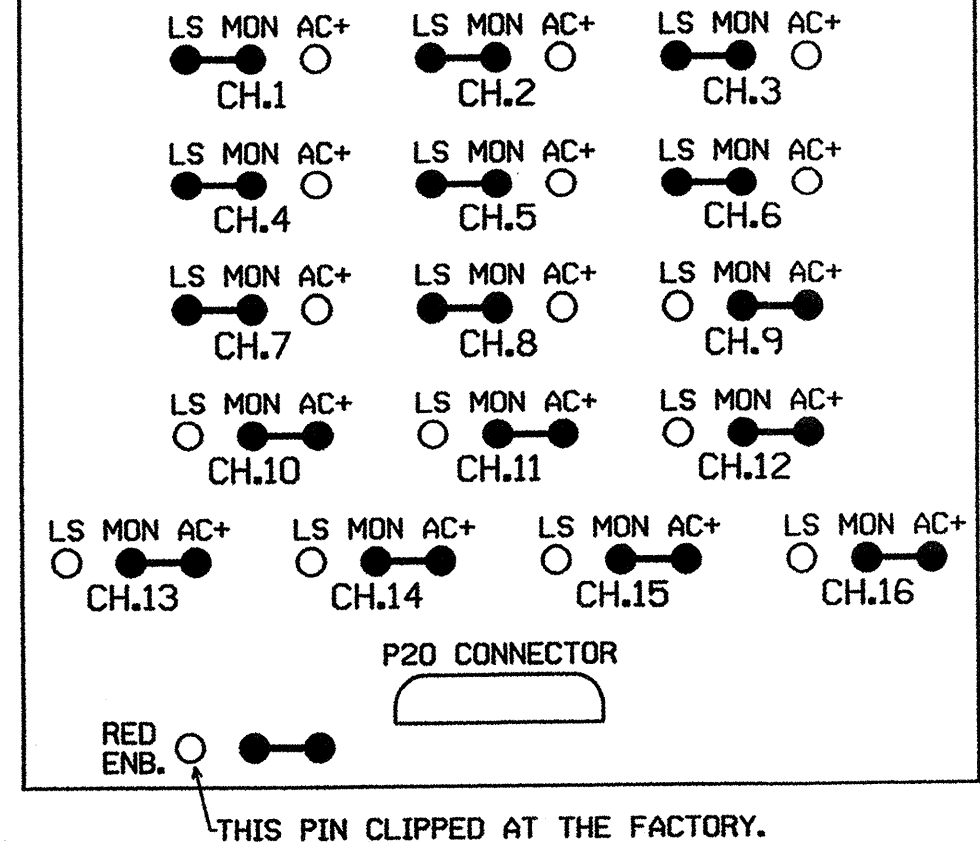
**COUNTDOWN PEDESTRIAN SIGNAL OPERATION**

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0243T  
DESIGNED: July 2008  
SEALED: 9-26-08  
REVISED: N.A.

**RED MONITOR BOARD PROGRAMMING**

(position jumpers as shown below)



**Temporary Design**

ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 81/SR 3214 (Biltmore Ave) at NC 81 (Bryson St) / SR 3556 (Meadow Road)

Division 13 Buncombe County Asheville

PLAN DATE: 9-12-08 REVIEWED BY: D.T. Joyce

PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS

INIT. DATE

Signature: D.H. Spaulding

DATE

122 N. McDowell St., Raleigh, NC 27603

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER GEORGE C. BRUNN

Sig. Inventory No. 13-0243T

01-OCT-2008 11:17 s:\wfs\sig\workgroups\sig\manuspauld\ingr\progress\130243t-sm.le\_2008xx.dgn

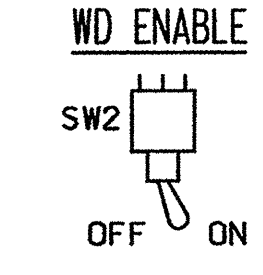




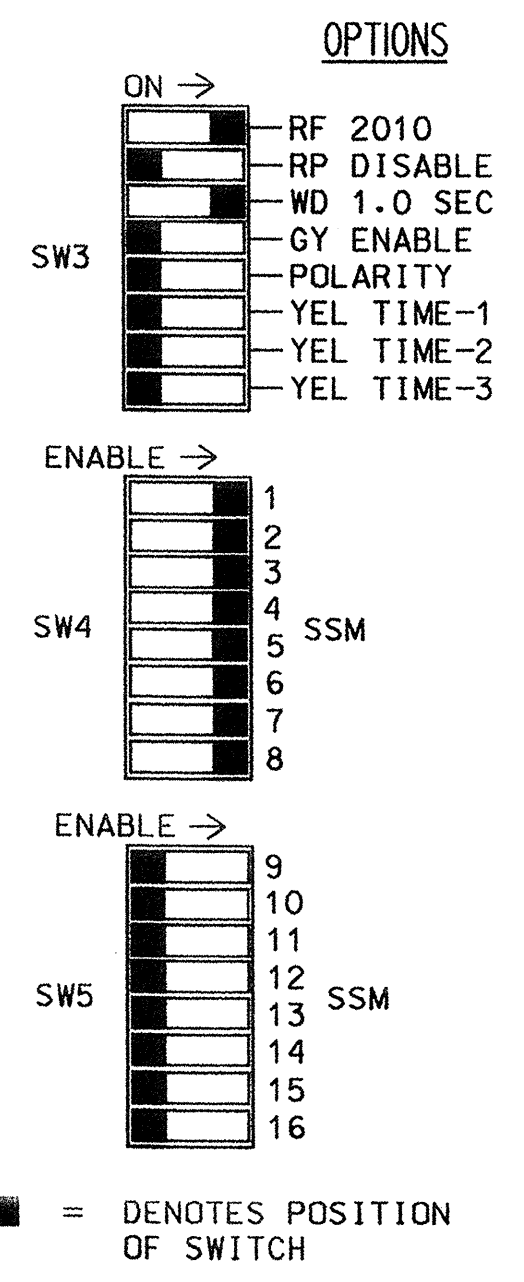
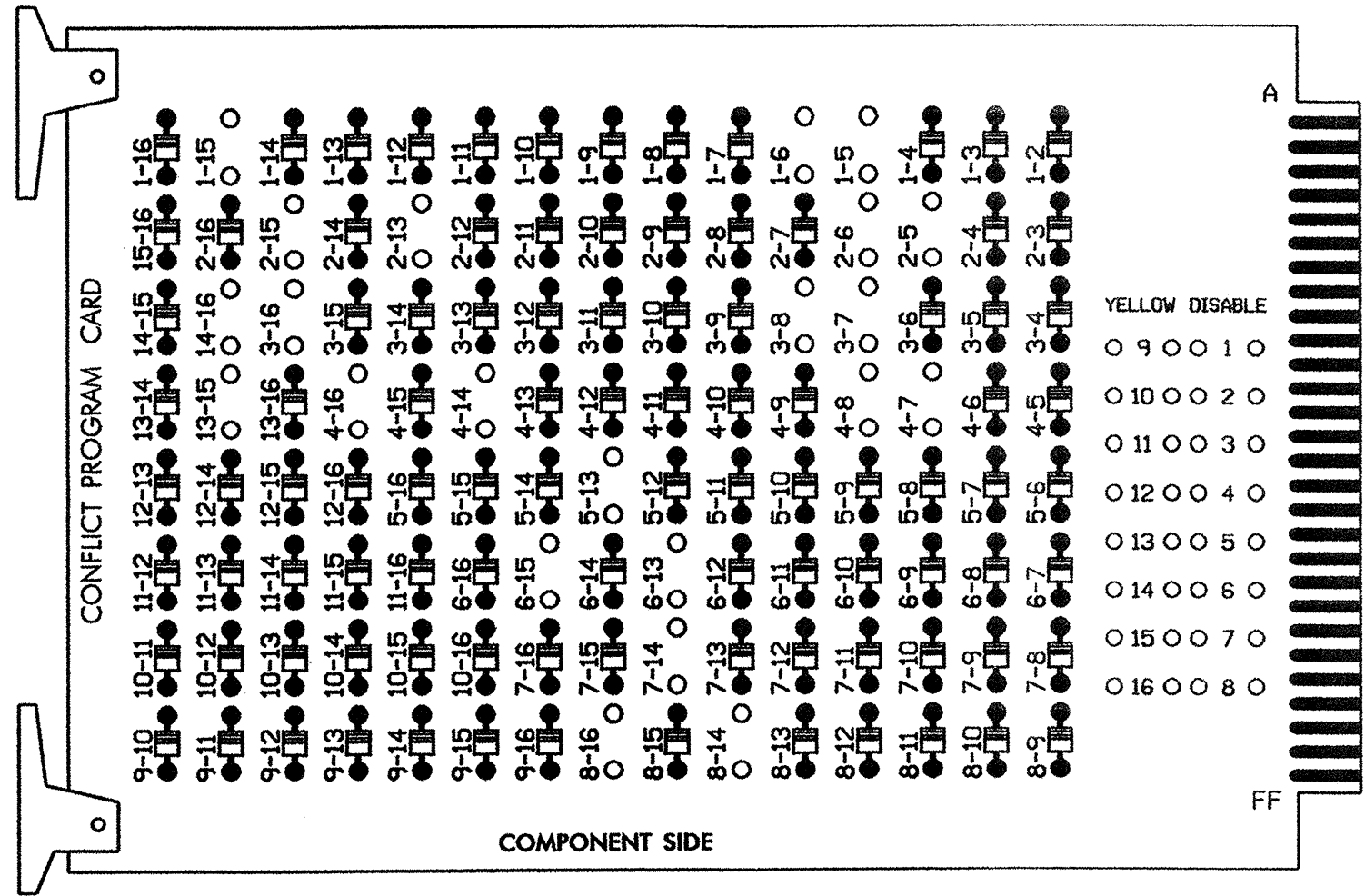


**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**



(remove jumpers and set switches as shown)  
 REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-7, 3-8, 3-16, 4-7, 4-8, 4-14, 4-16, 5-13, 6-13, 6-15, 7-14, 8-14, 8-16, 13-15 and 14-16.



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

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Asheville Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....EAGLE TYPE 2070L  
 CABINET.....McCAIN/CONTROL TECHNOLOGIES (DWG. NO. 9500-332-NCDDT)  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S7,S8,S8P  
 PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED,7,8,8PED  
 OVERLAPS.....NONE

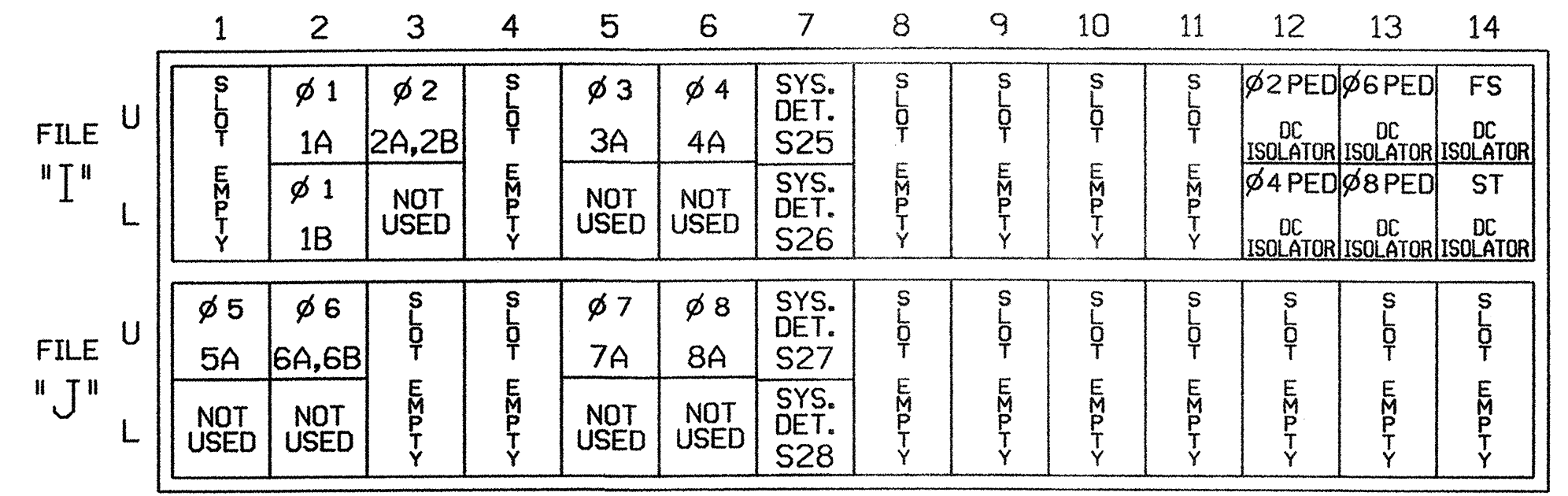
**SIGNAL HEAD HOOK-UP CHART**

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.	11	82	21,22	P21, P22	31	41,42	P41, P42	51	61,62	P61, P62	71	81,82	P81, P82
RED		128			101			134			107		
YELLOW		129			102			135			108		
GREEN		130			103			136			109		
RED ARROW	125			116			131				122		
YELLOW ARROW	126	126		117			132				123		
GREEN ARROW	127	127		118			133				124		
				113			104				119		
				115			106				121		

NU = Not Used

**INPUT FILE POSITION LAYOUT**

(front view)



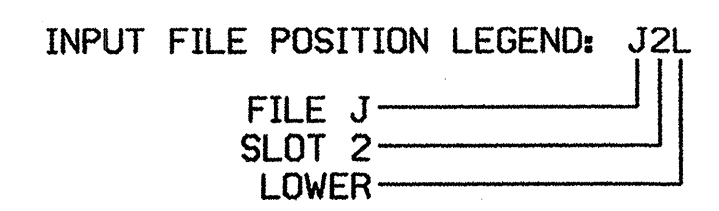
EX: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

**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
1A	TB2-5,6	I2U	39	1	2	1	Y	Y			3
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
* S25	TB6-1,2	I7U	65	27	34	SYS					
* S26	TB6-3,4	I7L	78	40	44	SYS					
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
* S27	TB7-1,2	J7U	66	28	38	SYS					
* S28	TB7-3,4	J7L	79	41	48	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29		2 PED					
P41,P42	TB8-5,6	I12L	69	31		PED 4					
P61,P62	TB8-7,9	I13U	68	30		PED 6					
P81,P82	TB8-8,9	I13L	70	32		PED 8					

NOTE:  
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

\* System detector only. Remove the vehicle phase assigned to this detector in the default programming.



**COUNTDOWN PEDESTRIAN SIGNAL OPERATION**

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0243  
 DESIGNED: July 2008  
 SEALED: 9-26-08  
 REVISED: N.A.

Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR: **NC 81/SR 3214 (Biltmore Ave) at NC 81 (Bryson St) / SR 3556 (Meadow Road)**

Division 13 Buncombe County Asheville

PLAN DATE: 9-12-08 REVIEWED BY: D.T. Joyce 07

PREPARED BY: D.H. Spaulding REVIEWED BY:

REVISIONS: INIT. DATE

122 N. McDowell St., Raleigh, NC 27603

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

SIGNATURE: *George C. Brown* DATE: \_\_\_\_\_

SIG. INVENTORY NO. 13-0243

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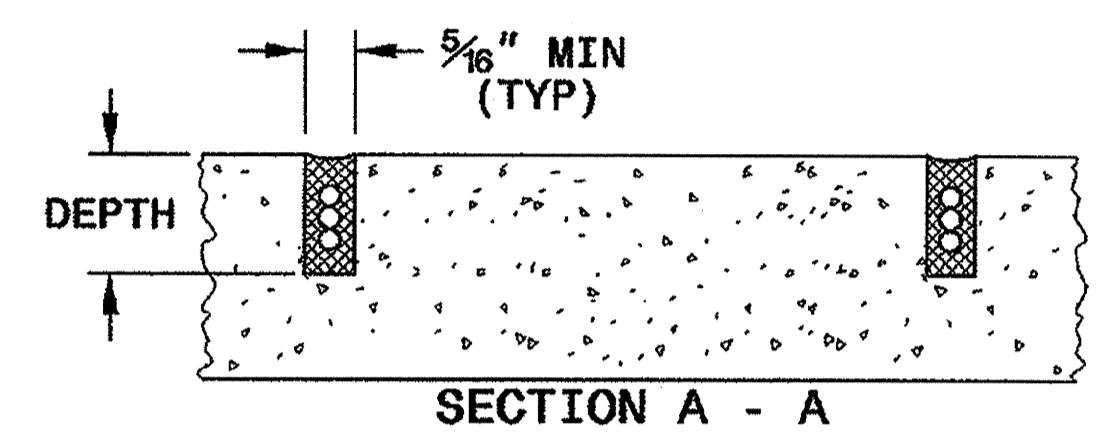
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

INDUCTIVE DETECTION LIPS  
ENGLISH DETAIL DRAWING FOR

SHEET 1 OF 3  
1725D01

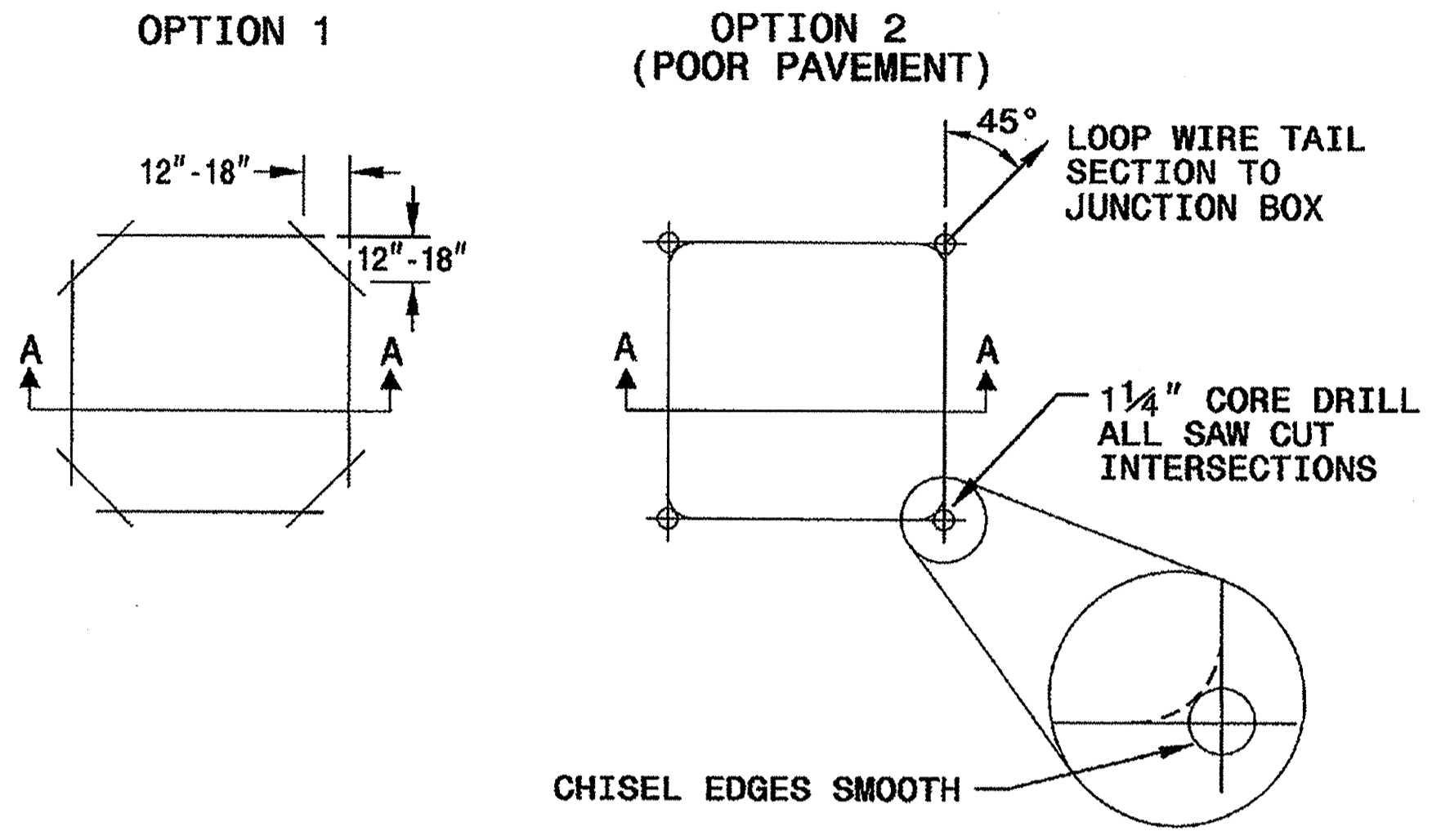
SAW SLOT DEPTH CHART

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

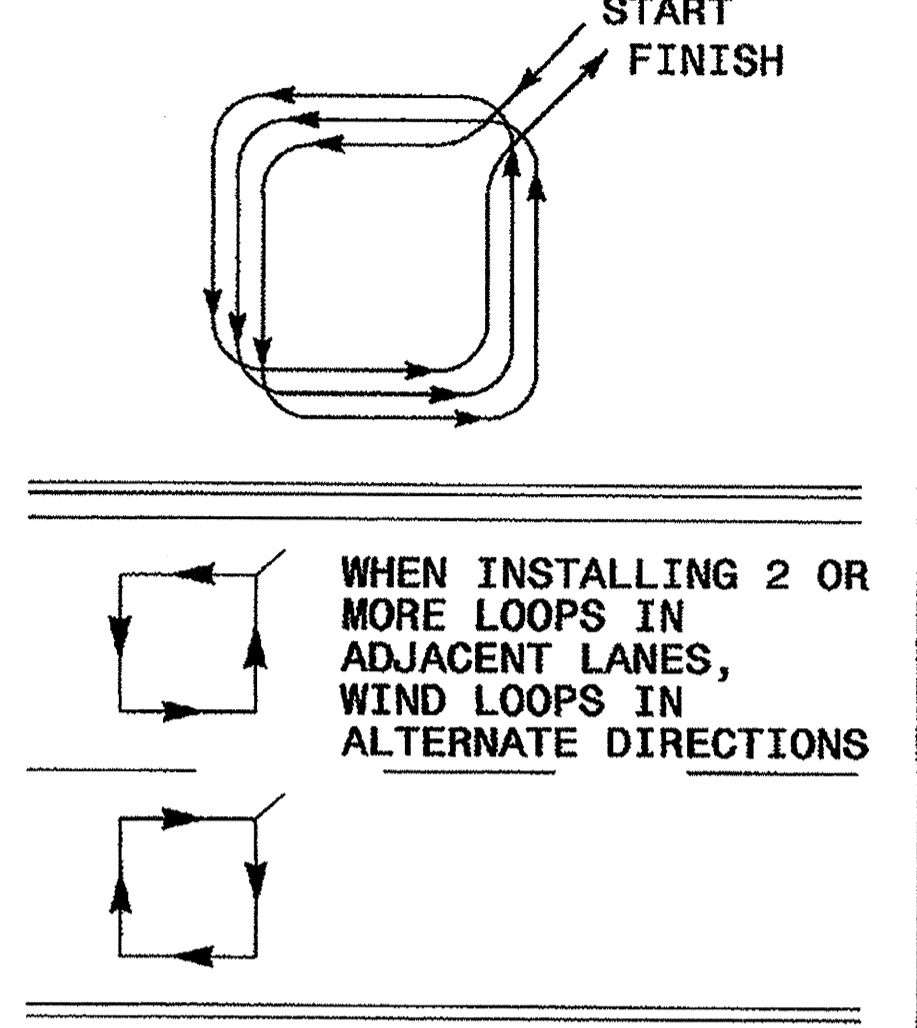


CONVENTIONAL 4-SIDED LOOP

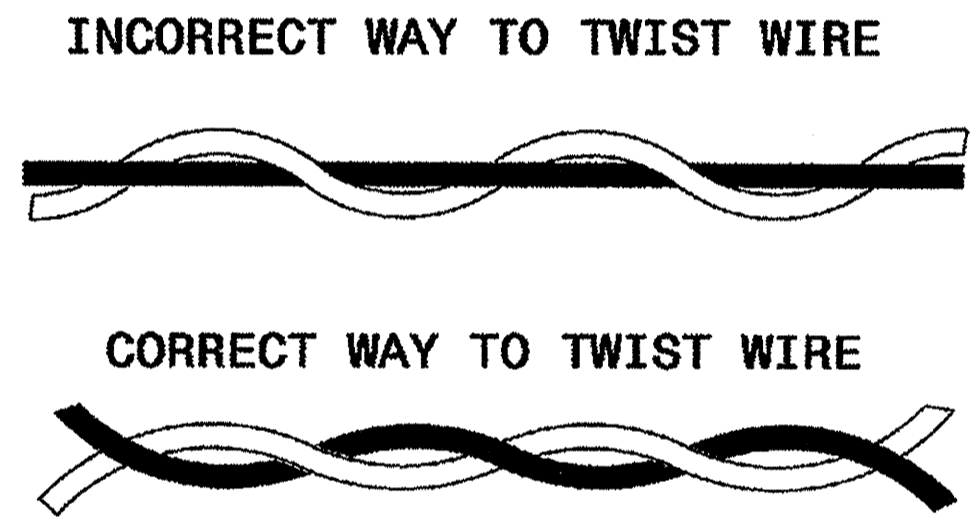
SAW CUT OPTIONS



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

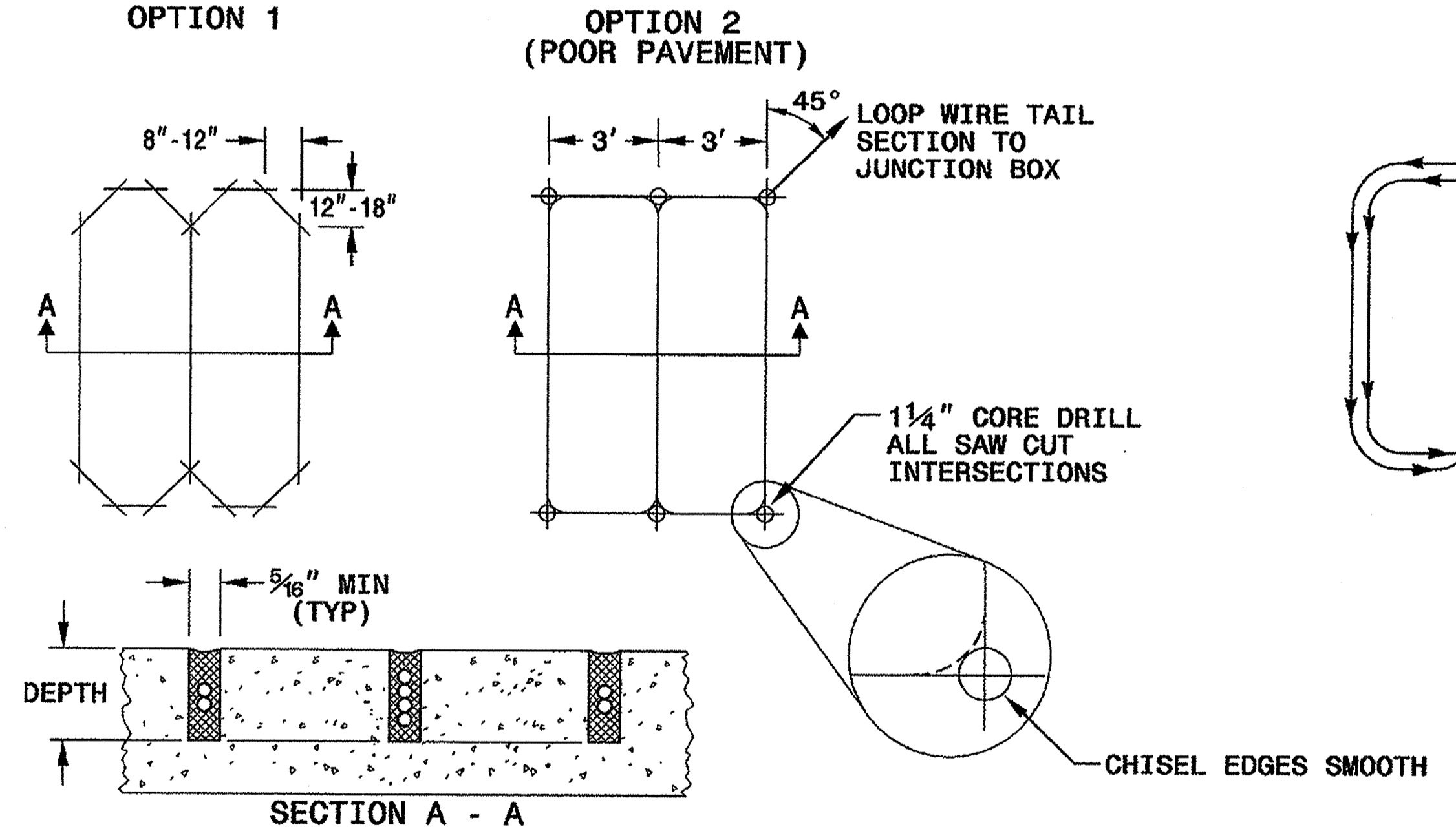


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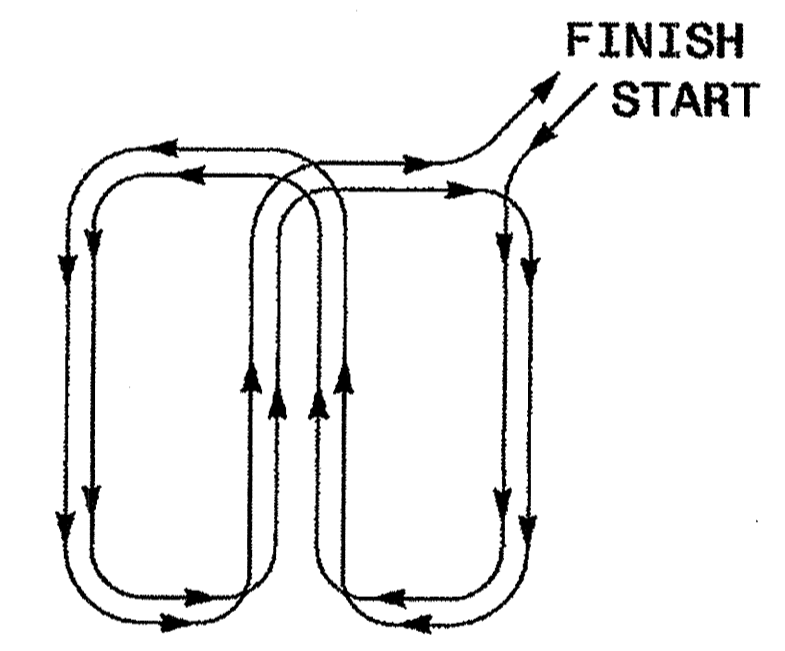
1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

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.

INDUCTIVE DETECTION LIPS  
ENGLISH DETAIL DRAWING FOR

SHEET 1 OF 3  
1725D01

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway  
Garner, NC 27529

SEAL

Signature: *Milton Dean* 11/24/08  
DATE

24-Nov-2008 09:28  
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STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

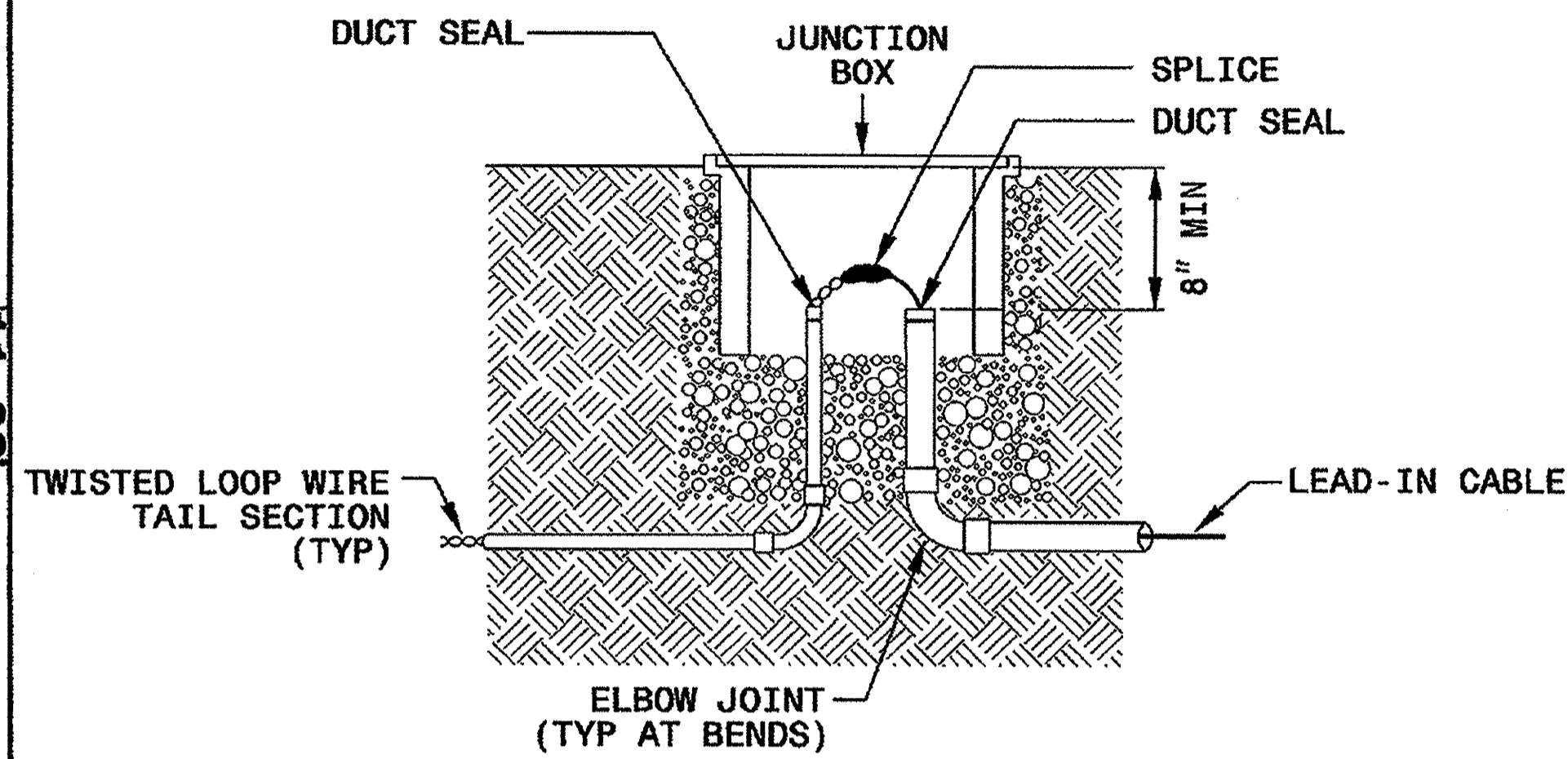
11-08

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

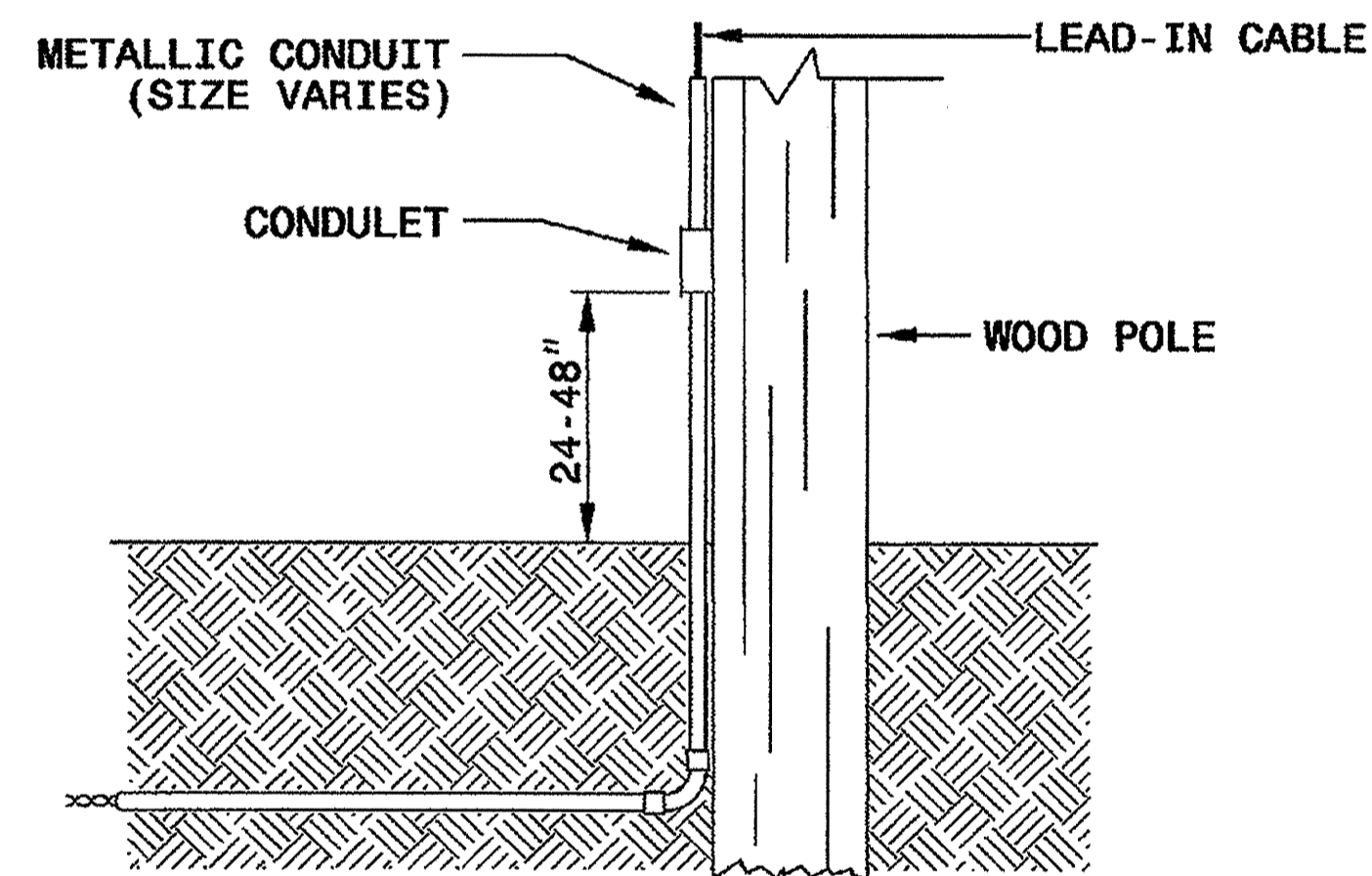
SHEET 2 OF 3  
**1725D01**

**LOOP WIRE SPLICE POINT DETAILS**

**LOOP WIRE AT JUNCTION BOX**



**LOOP WIRE AT POLE**

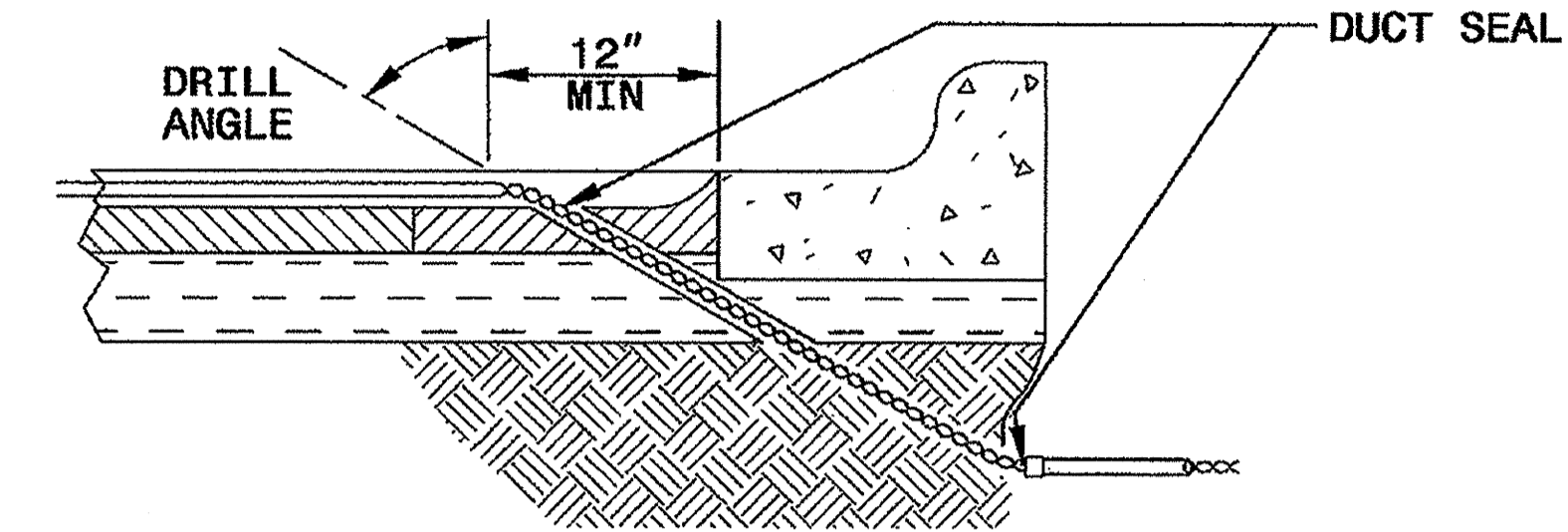


**NOTE**

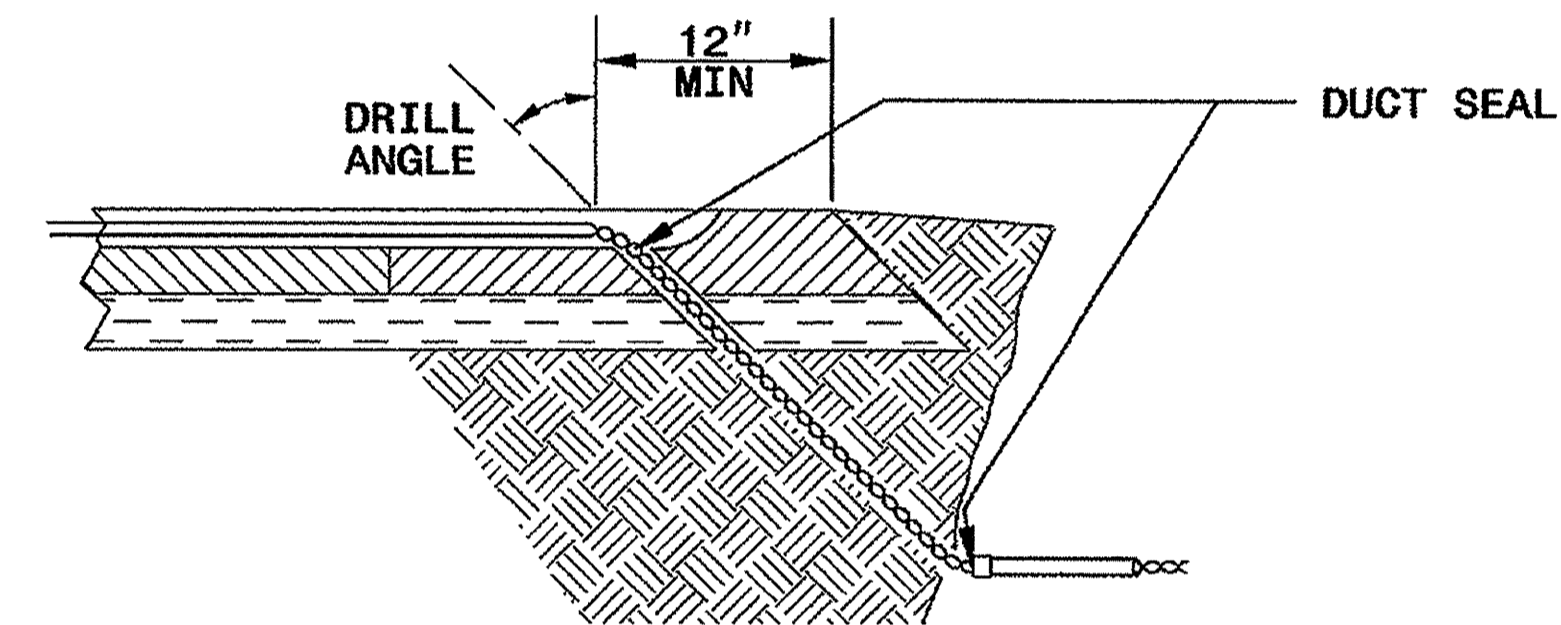
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

**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  
 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**

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway  
 Garner, NC 27529

SEAL

*Milton Dean* 11/24/08  
 SIGNATURE DATE

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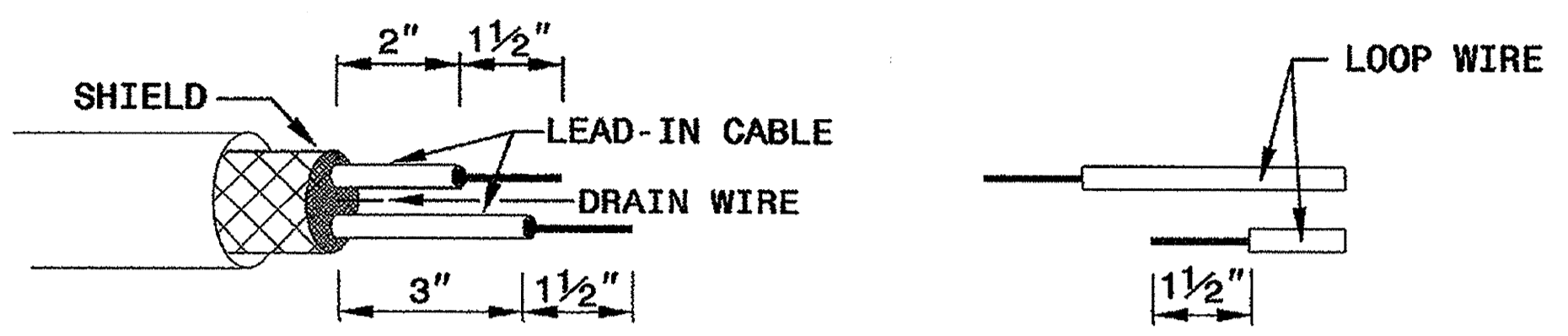
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

11-08

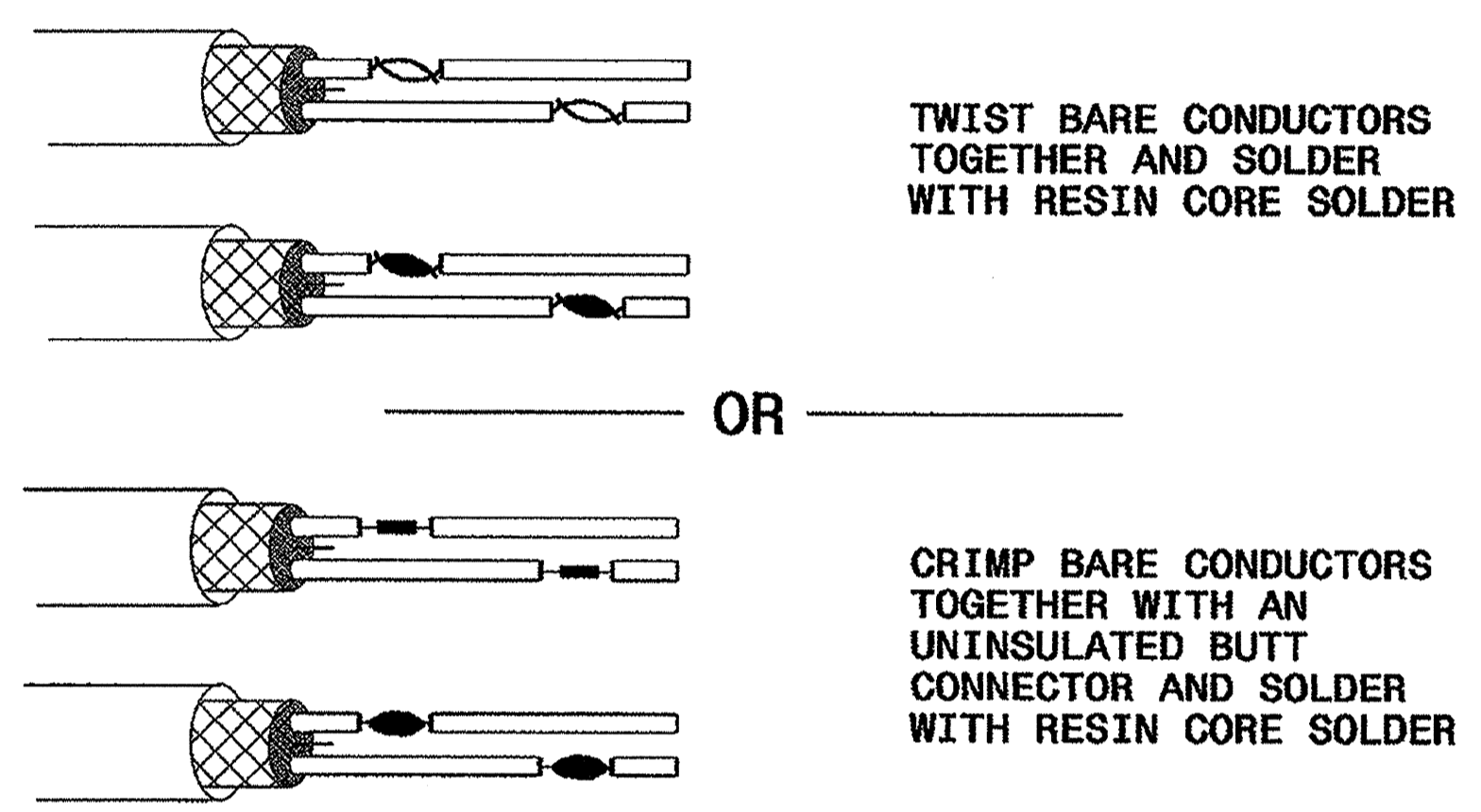
ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3  
**1725D01**

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

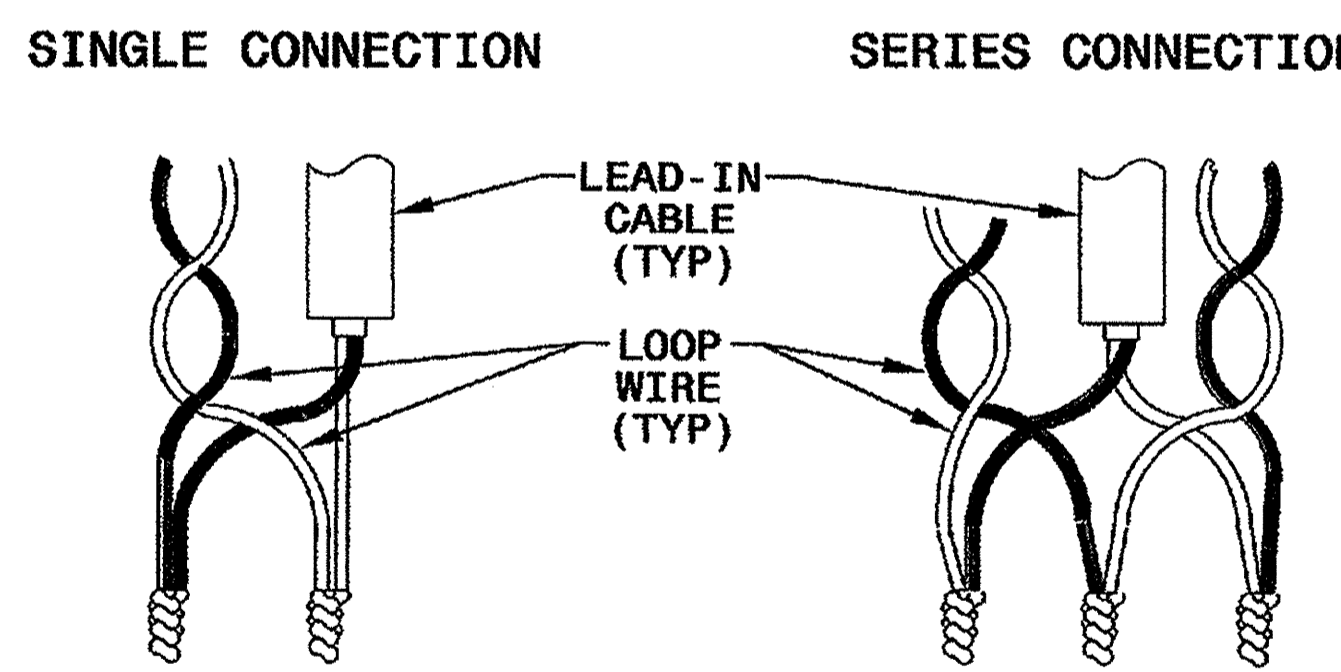


**STEP 2. CONNECT AND SOLDER**

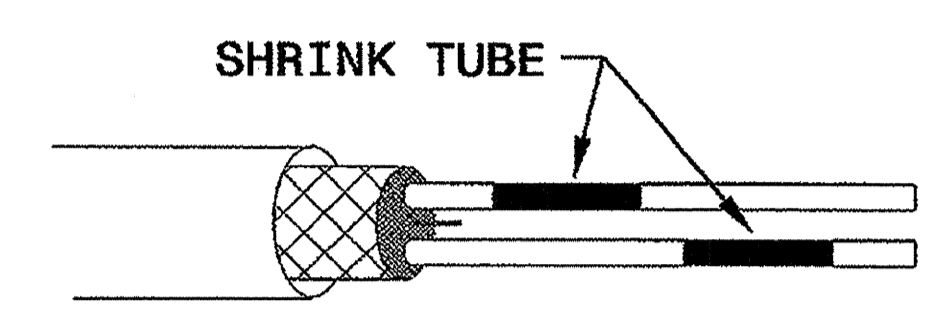


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

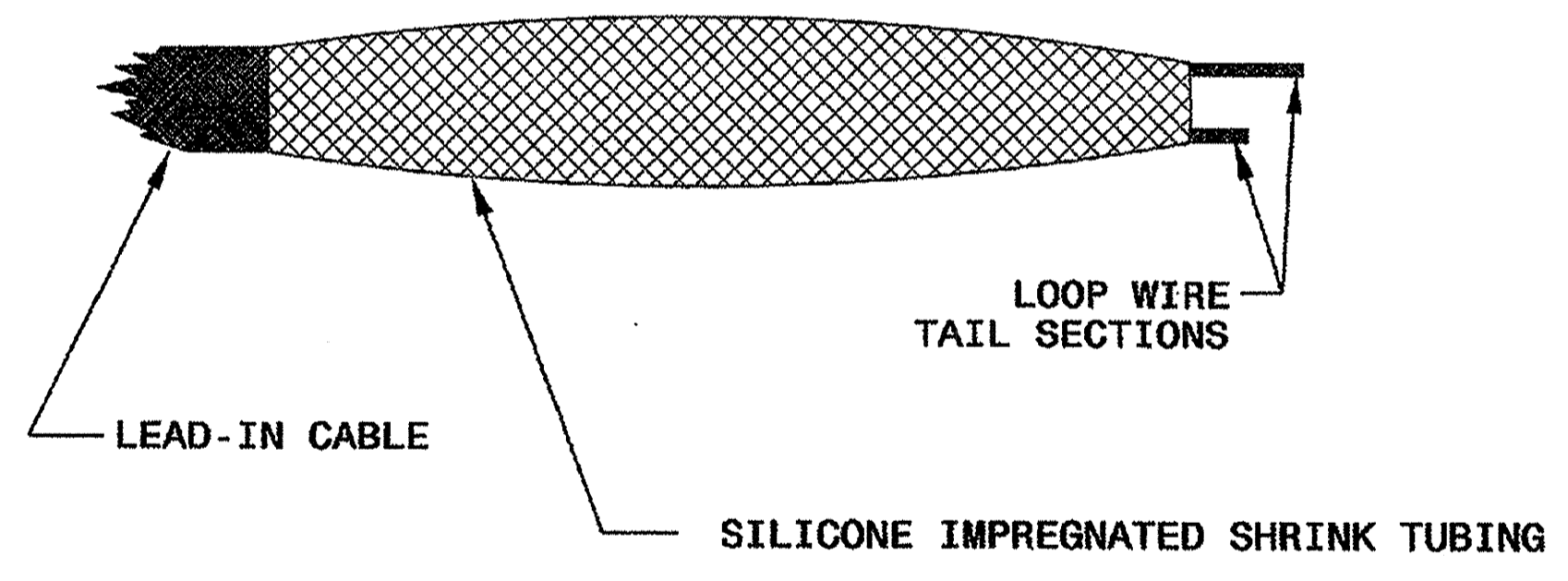
**LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS**



**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:

750 N. Greenfield Parkway  
Garner, NC 27529

SEAL

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

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zmlittle



- 1 INSTALL REA, PE - 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL REA, PE - 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 3 INSTALL REA, PE - 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH
- 9 INSTALL PVC CONDUIT
- 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
- 13 INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
- 14 INSTALL POLYETHYLENE CONDUIT
- 15 DIRECTIONAL DRILL CONDUIT
- 16 BORE AND JACK CONDUIT
- 17 INSTALL CABLE(S) IN EXISTING CONDUIT
- 18 INSTALL CABLE(S) IN NEW CONDUIT
- 19 INSTALL CABLE(S) IN EXISTING RISER
- 20 INSTALL CABLE(S) IN NEW RISER
- 21 INSTALL CABLE(S) IN EXISTING CONDUIT STUB-OUTS
- 22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 24 INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
- 25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26 TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 27 INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPlice CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPlice ENCLOSURE
- 30 INSTALL AERIAL SPlice ENCLOSURE
- 31 INSTALL POLE MOUNTED SPlice CABINET
- 32 INSTALL BASE MOUNTED SPlice CABINET
- 33 REMOVE EXISTING SPlice CABINET

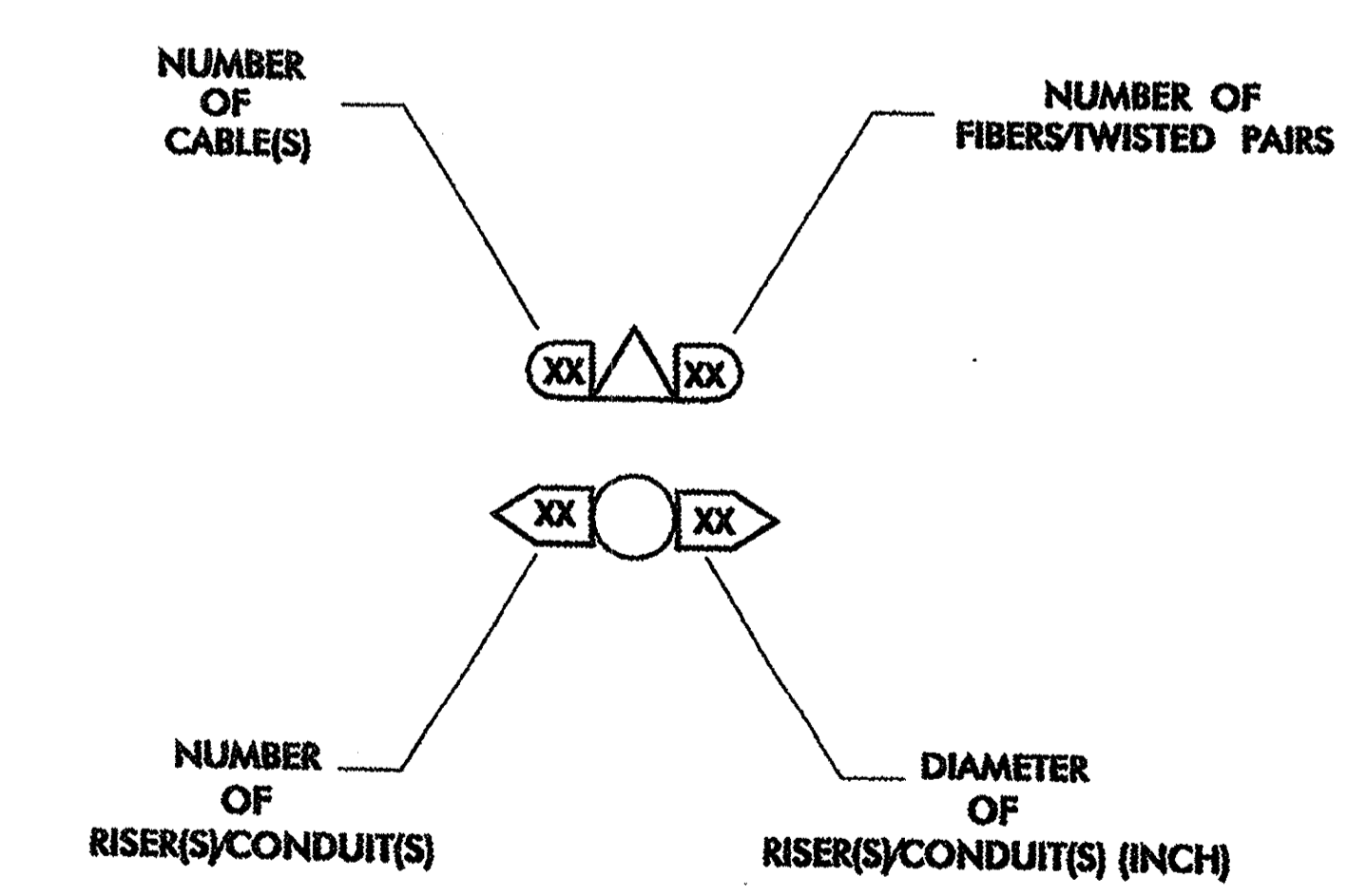
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48 REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
- 49 REMOVE EXISTING MESSENGER CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 20 FEET OF COMMUNICATIONS CABLE
- 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56 LASH CABLE(S) TO NEW MESSENGER CABLE
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE

**LEGEND**

	NEW FIBER OPTIC COMMUNICATIONS CABLE
	NEW TWISTED PAIR COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE TO BE REMOVED
	NEW AERIAL GUY ASSEMBLY
	NEW CONDUIT
	EXISTING CONDUIT
	NEW DIRECTIONAL DRILLED CONDUIT
	NEW BORED AND JACKED CONDUIT
	NEW JUNCTION BOX
	EXISTING JUNCTION BOX
	NEW WOOD POLE
	EXISTING WOOD POLE
	AERIAL SPlice ENCLOSURE
	NEW METAL POLE
	EXISTING METAL POLE
	NEW CCTV ASSEMBLY
	NEW STANDARD GUY ASSEMBLY
	NEW SIDEWALK GUY ASSEMBLY
	NEW CABLE STORAGE RACKS (SNOW SHOES)
	EXISTING CONTROLLER AND CABINET
	EXISTING SPlice CABINET
	NEW SPlice CABINET
	SIGNAL POLE
	SIGNAL INVENTORY NUMBER

**CONSTRUCTION NOTE SYMBOLOGY KEY**

- INDICATES NUMBER OF CABLES, LOOPS, ETC.
- INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



	<b>CONSTRUCTION NOTES</b>		
	PLAN DATE: _____ PREPARED BY: _____	REVIEWED BY: _____ REVIEWED BY: <b>G. A. FULLER</b>	
122 N. McDowell St., Raleigh, NC 27603			SIGNATURE: <i>Gregory A. Fuller</i> 10/31/02 DATE: _____



# DECAL

# POLE MOUNTED SIGN

**SIGN NUMBER:** SPO5224 **BACKG COLOR:** Yellow  
**TYPE:** DECAL **COPY COLOR:** Black

**QUANTITY:**

SYMBOL	X	Y	WID	HT

**SIGN WIDTH:** 0'-9"  
**HEIGHT:** 0'-6"  
**TOTAL AREA:** 0.4 Sq.Ft.

**BORDER TYPE:** FLUSH  
**RECESS:** 0"  
**WIDTH:** 0.25"  
**RADII:** 1"

**NO. Z BARS:**      **MAT'L:** 0.063" (1.6 mm) ALUMINUM  
**LENGTH:**      **LENGTH:**

**DESIGN BY:** S PIOTROWSKI **DATE:** Jul 18, 2005 **CHECKED BY:** SUSAN B. KUNZ  
**PROJECT ID:** ID **DIV:** INTELLIGENT TRANSPORTATION SYSTEM

**NOTE:**  
 THIS SIGN SHALL BE PRODUCED AS A DECAL

**USE NOTES:** 2, 4  
 1. Legend and border shall be direct applied Type III reflective sheeting.  
 2. Legend and border shall be direct applied non-reflective sheeting.  
 3. Shields shall be Type III reflective sheeting on 0.032" (0.8mm) aluminum and demountable.  
 4. Background shall be Type III reflective sheeting.  
 5. Background shall be Type I reflective sheeting.  
 6. Center arrow(s) vertically on sign.  
 7. Bottom panel shall be yellow Type III sheeting. Legend shall be direct applied black non-reflective sheeting. Yellow panel is:

**LETTER POSITIONS**

Letter spacings are to start of next letter

Series/Size	Text Length
C1	7.2
C1	6.7
C1	3.9

Spacing Factor is 1 unless specified otherwise

**SIGN NUMBER:** SPO5223 **BACKG COLOR:** Yellow  
**TYPE:** D **COPY COLOR:** Black

**QUANTITY:**

SYMBOL	X	Y	WID	HT
BAR	0.2	8.2	8.6	1.0

**SIGN WIDTH:** 0'-9"  
**HEIGHT:** 1'-0"  
**TOTAL AREA:** 0.8 Sq.Ft.

**BORDER TYPE:** FLUSH  
**RECESS:** 0"  
**WIDTH:** 0.2"  
**RADII:** 1"

**NO. Z BARS:**      **MAT'L:** 0.063" (1.6 mm) ALUMINUM  
**LENGTH:**      **LENGTH:**

**DESIGN BY:** M. TRACEY **DATE:** Oct 25, 2007 **CHECKED BY:** SUSAN KUNZ  
**PROJECT ID:**      **DIV:** INTELLIGENT TRANSPORTATION SYSTEMS

**NOTE:**  
 THIS SIGN SHALL BE PRODUCED AS A DECAL

**USE NOTES:** 2, 4  
 1. Legend and border shall be direct applied Type III reflective sheeting.  
 2. Legend and border shall be direct applied non-reflective sheeting.  
 3. Shields shall be Type III reflective sheeting on 0.032" (0.8mm) aluminum and demountable.  
 4. Background shall be Type III reflective sheeting.  
 5. Background shall be Type I reflective sheeting.  
 6. Center arrow(s) vertically on sign.  
 7. Bottom panel shall be yellow Type III sheeting. Legend shall be direct applied black non-reflective sheeting. Yellow panel is:

**LETTER POSITIONS**

Letter spacings are to start of next letter

Series/Size	Text Length
C	4.4
C	6.7
C	6.1
C	6.8
C	6
C	6.2
C	7.9

Spacing Factor is 1 unless specified otherwise

Prepared in the Office of:

**WIRELESS RADIO ANTENNA TYPICAL DETAILS**

PLAN DATE: JULY 2005 REVIEWED BY: I. N. AVERY  
 PREPARED BY: A. CREECH REVIEWED BY: A. T. FAULKNER

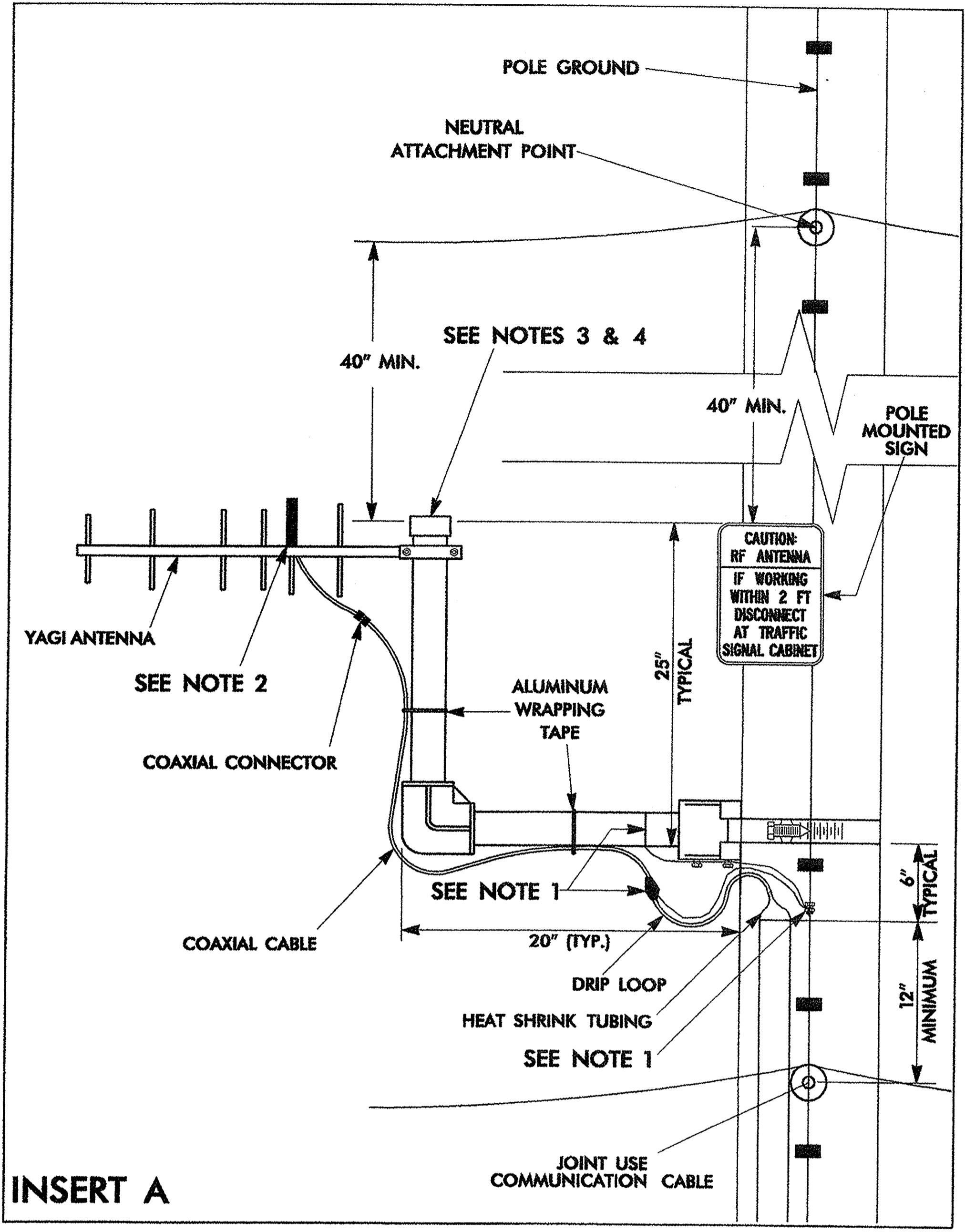
SCALE: 0

REVISIONS:      INIT.      DATE

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 023919  
 CATEGORY A FULL  
 Signature: *Avery* 9/12/05  
 DATE

CADD File name:

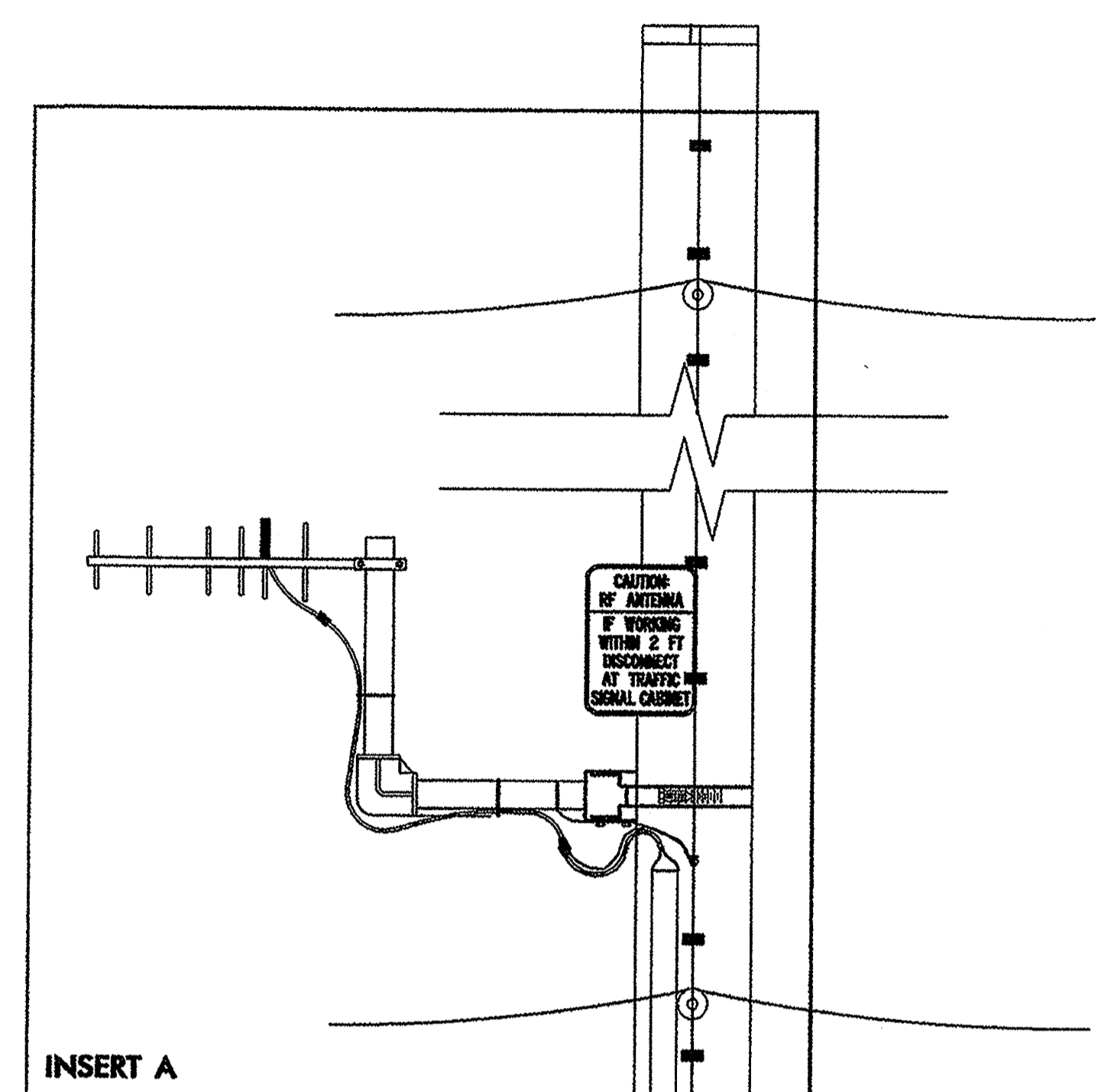




INSERT A

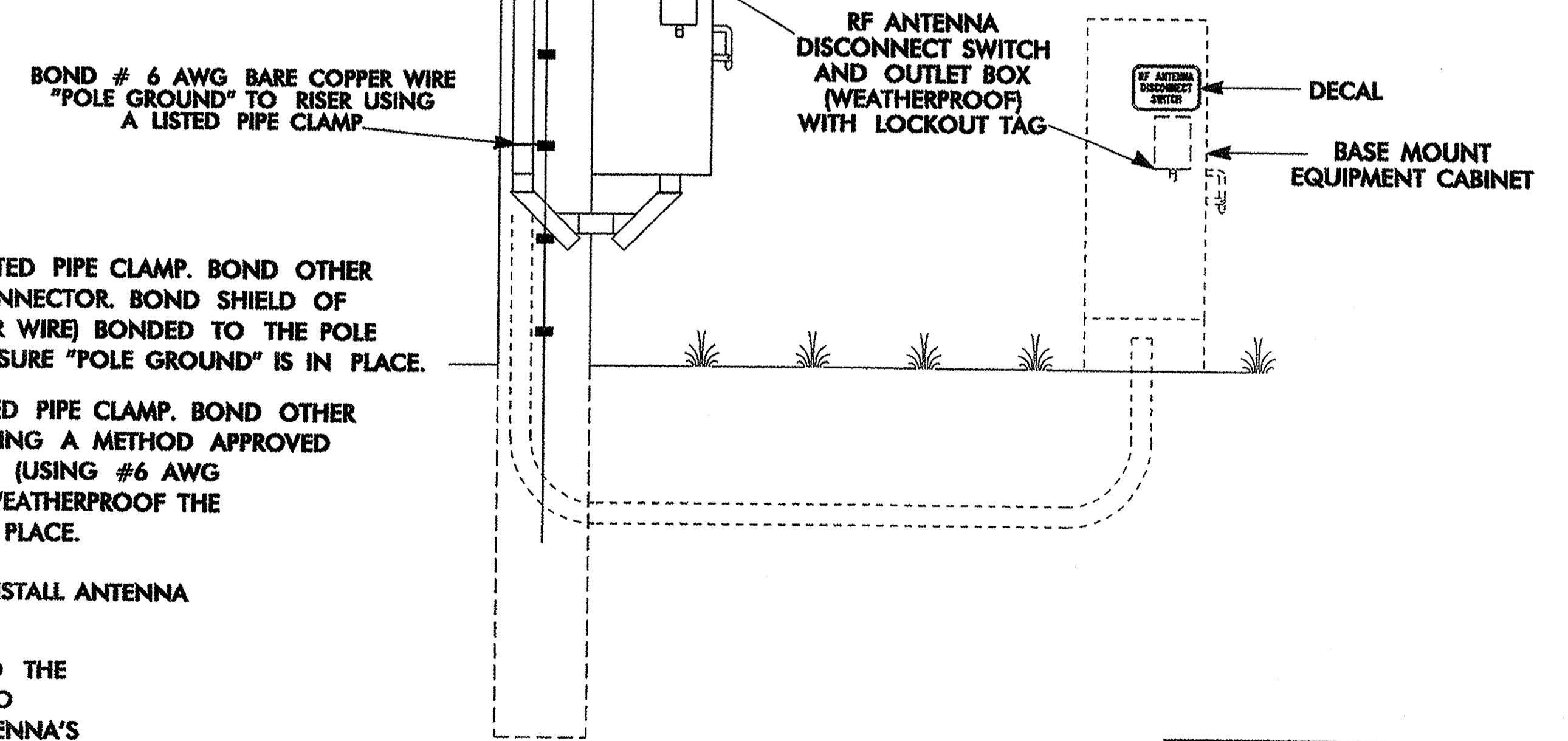
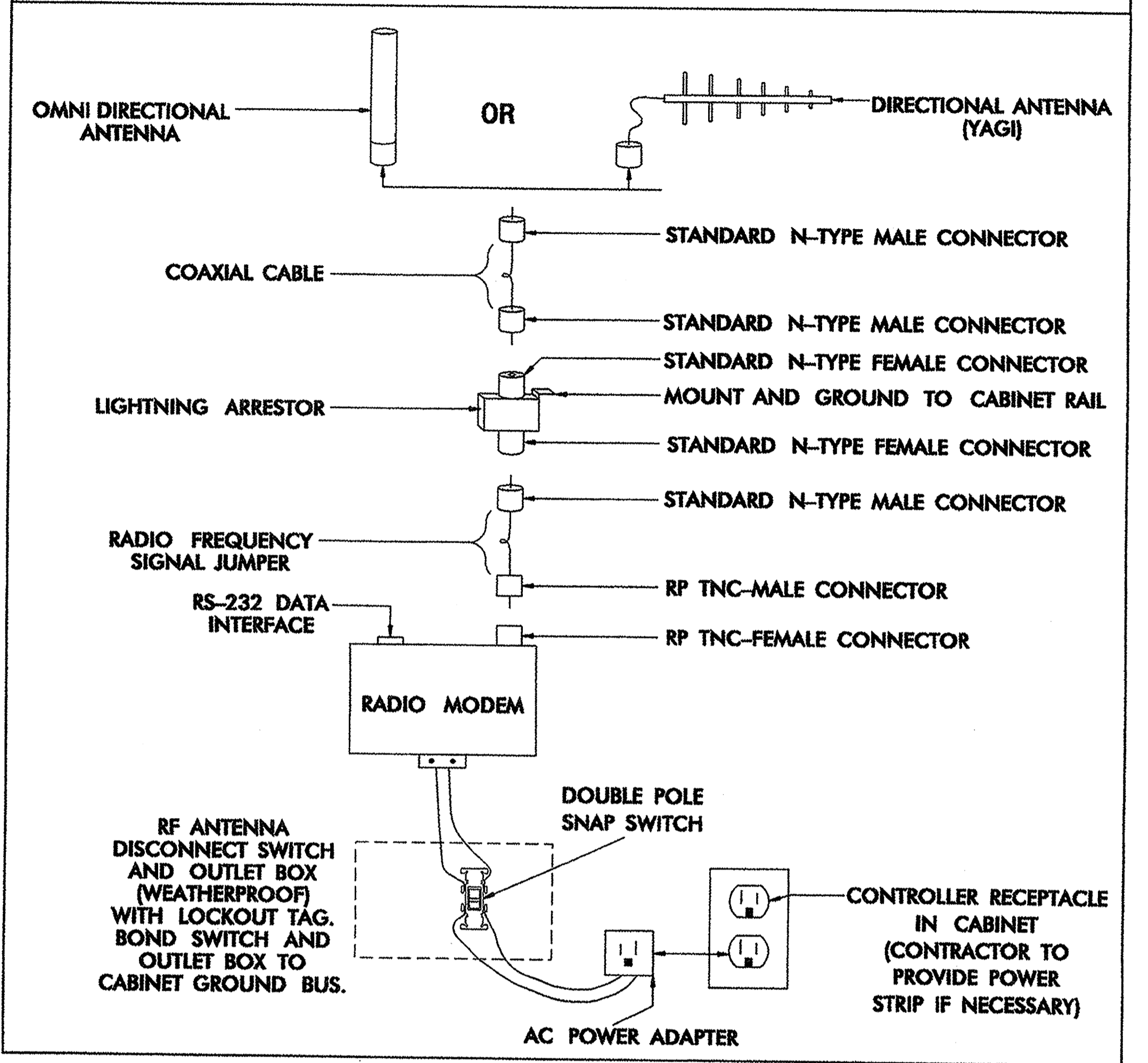
NOTES

- WOOD POLE — BOND # 6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF # 6 AWG SOLID BARE COPPER WIRE TO THE POLE GROUND USING A SPLIT BOLT CONNECTOR. BOND SHIELD OF COAXIAL CABLE WITH AN APPROVED GROUNDING SYSTEM (USING #6 AWG STRANDED COPPER WIRE) BONDED TO THE POLE GROUND. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "POLE GROUND" IS IN PLACE.  
 METAL POLE — BOND # 6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF # 6 AWG SOLID BARE COPPER WIRE TO THE POLE OR EXISTING SYSTEM GROUND USING A METHOD APPROVED BY THE ENGINEER. BOND SHIELD OF COAXIAL CABLE WITH AN APPROVED GROUNDING SYSTEM (USING #6 AWG STRANDED COPPER WIRE) BONDED TO THE POLE BY A METHOD APPROVED BY THE ENGINEER. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "SYSTEM GROUND" IS IN PLACE.
- YAGI ANTENNA SHOWN IN VERTICAL POLARIZATION POSITION FOR CLARIFICATION. TYPICALLY INSTALL ANTENNA IN HORIZONTAL POLARIZATION POSITION.
- TO CONSERVE VERTICAL SPACING ON THE POLE (JOINT-USE OR SIGNAL POLE) WITH REGARDS TO THE SURROUNDING UTILITIES, INSTALL THE ANTENNA MOUNTING HARDWARE USING ONE OF THE TWO METHODS LISTED BELOW: (ENSURE THAT THE MOUNTING METHOD DOES NOT DEGRADE THE ANTENNA'S SIGNAL INTEGRITY)
  - A) ROTATE THE VERTICAL SUPPORT ARM 90 DEGREES SUCH THAT THE ANTENNA IS AT THE SAME HEIGHT AS THE HORIZONTAL SUPPORT ARM.
  - B) ELIMINATE THE VERTICAL SUPPORT ARM AND MOUNT THE ANTENNA TO THE HORIZONTAL SUPPORT ARM.
  - C) ANTENNA, ANTENNA SUPPORT ARM, AND SIGN TO MAINTAIN A 40" SEPARATION FROM NEUTRAL/POWER AND 12" FROM OTHER UTILITIES.
- INSTALL AN END CAP TO SEAL THE EXPOSED END OF THE MOUNTING PIPE.



1-2" RISER FOR COAXIAL CABLE  
 POLE MOUNT EQUIPMENT CABINET  
 BOND # 6 AWG BARE COPPER WIRE "POLE GROUND" TO RISER USING A LISTED PIPE CLAMP.

ANTENNA AND COAXIAL CABLE CONNECTION SCHEMATIC

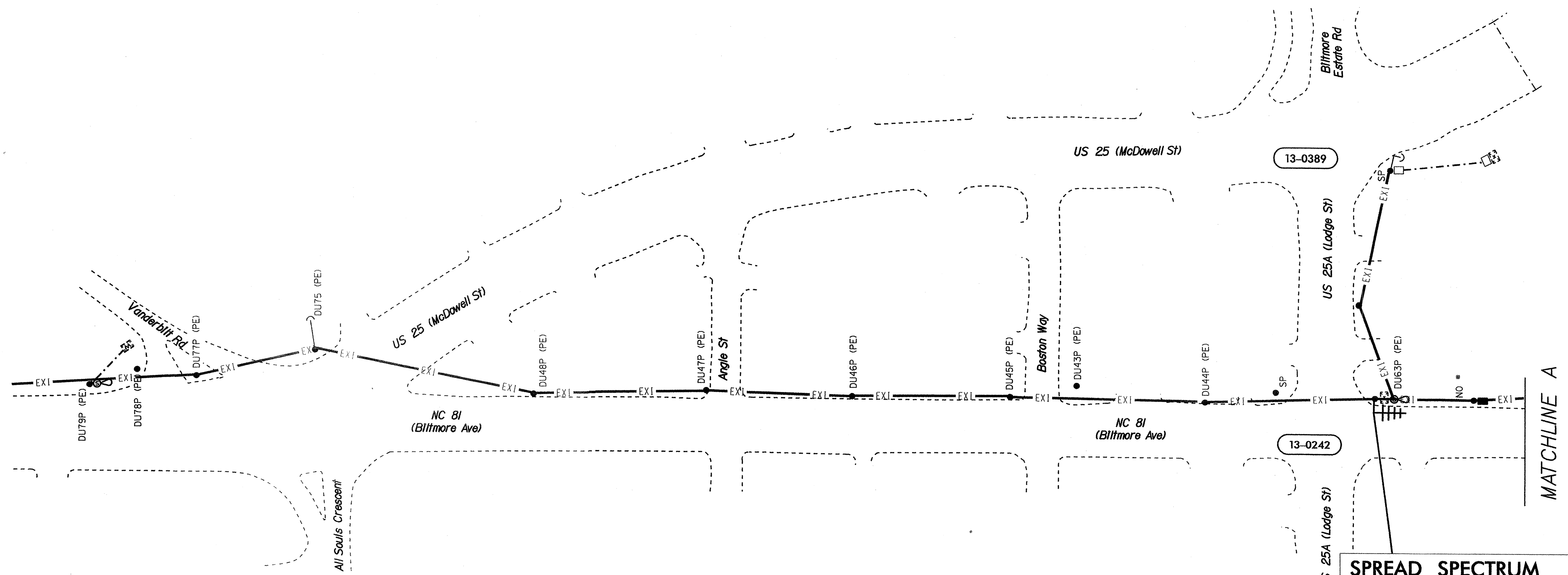


	<b>WIRELESS RADIO ANTENNA TYPICAL DETAILS</b>	
	PLAN DATE: JULY 2005 PREPARED BY: A. CREECH	REVIEWED BY: I. N. AVERY REVIEWED BY: A. T. FAULKNER
SCALE: 0	REVISIONS: UPDATE GROUNDING - COAXIAL CABLE SHIELD	DATE: 9/12/05 SIGNATURE: <i>[Signature]</i>



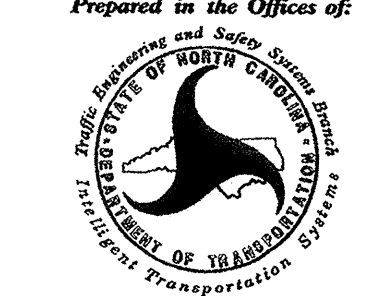
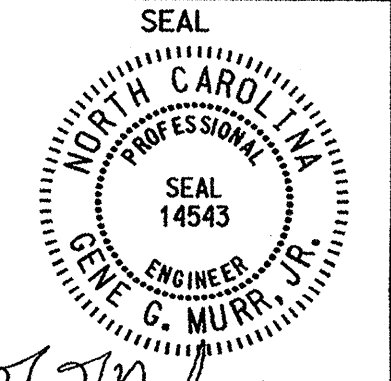
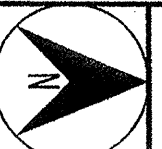

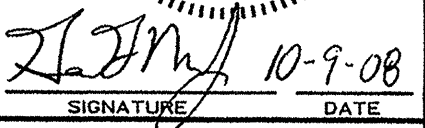
**LEGEND**

- ⚡⚡ YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
- ⚡ YAGI ANTENNA (SINGLE)
- 📡 OMNI ANTENNA
- 📦 EXISTING CONTROLLER AND CABINET
- 📦 EXISTING MASTER CONTROLLER AND CABINET
- Ⓜ SIGNAL INVENTORY NUMBER
- 📍 METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- ◻ NEW METAL POLE
- SP SIGNAL POLE
- ◻ EXISTING METAL POLE



SHOWN FOR INFORMATIONAL PURPOSES ONLY

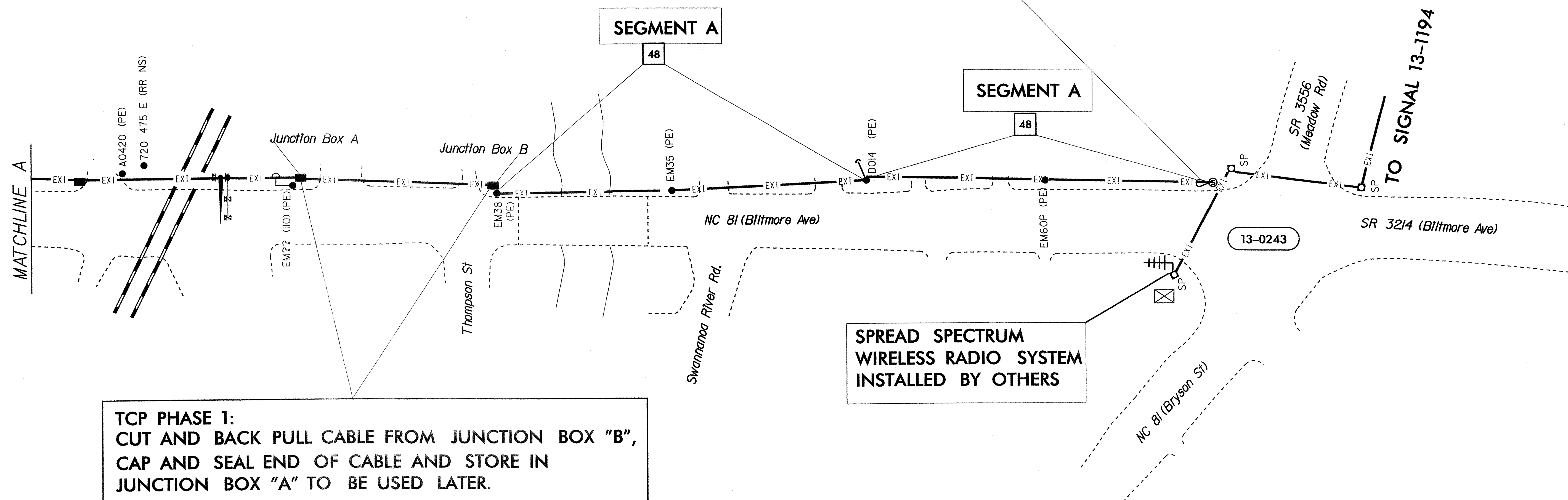
TCP PHASE 1

 <small>Prepared in the Offices of:        Public Engineering and Safety Services        DIVISION OF TRANSPORTATION        STATE OF NORTH CAROLINA</small>	<b>Asheville Signal System</b> <b>US 25 (Henderson Rd.)</b> <b>Communications Cable and</b> <b>Conduit Routing Plans</b>											
	<small>DIVISION 13 BUNCOMBE COUNTY ASHEVILLE</small> <small>PLAN DATE: OCTOBER 2008</small> <small>PREPARED BY: P. C. LOUDER</small> <small>REVIEWED BY: I. N. AVERY</small> <small>REVIEWED BY: G. G. MURR, JR., PE</small>		<small>SEAL</small> <small>14543</small> <small>ENGINEER</small> <small>G. G. MURR, JR.</small>									
	<small>SCALE</small> 	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE							 <small>SIGNATURE</small> <small>DATE</small> <small>CADD File Name:</small>
REVISIONS	INIT.	DATE										

**LEGEND**

- ⦚⦚ YAGI ANTENNA (DOUBLE) FOR REPEATOR OPERATION
- ⦚ YAGI ANTENNA (SINGLE)
- ⦚ OMNI ANTENNA
- ⦚ EXISTING CONTROLLER AND CABINET
- ⦚ EXISTING MASTER CONTROLLER AND CABINET
- ⦚ SIGNAL INVENTORY NUMBER
- ⦚ METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- ⦚ NEW METAL POLE
- SP SIGNAL POLE
- EXISTING METAL POLE

REMOVE EXISTING COMMUNICATIONS CABLE "SEGMENT A" FROM THE AERIAL SPLICE ENCLOSURE. RECORD EXISTING CABLE TERMINATIONS AND SPLICES PRIOR TO REMOVING. ENSURE COMMUNICATION WITH SIGNAL 13-1194 IS STILL OPERATIONAL AFTER THE REMOVAL OF THE "SEGMENT A" CABLE.

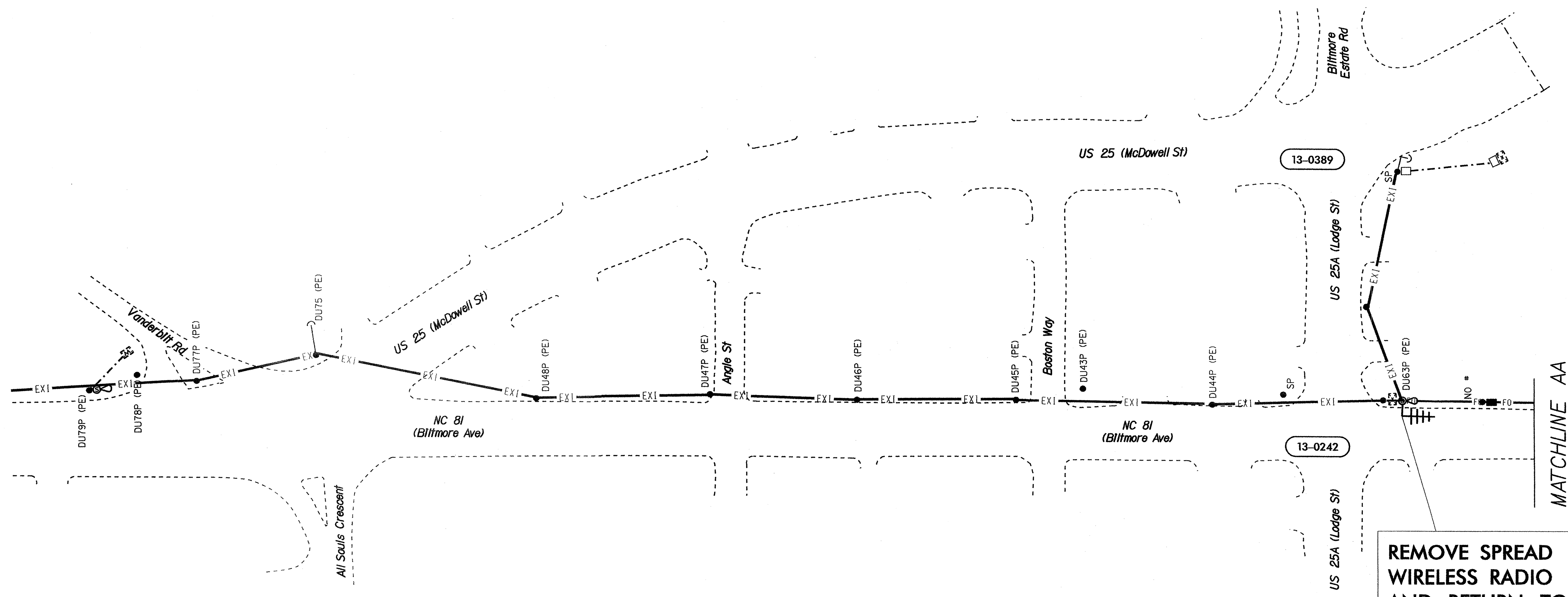


TCP PHASE 1:  
CUT AND BACK PULL CABLE FROM JUNCTION BOX "B",  
CAP AND SEAL END OF CABLE AND STORE IN  
JUNCTION BOX "A" TO BE USED LATER.

TCP PHASE 1

<p>Prepared in the Offices of: North Carolina Department of Transportation 750 N. Greenfield Place, Garner, NC 27529</p>	<p>Asheville Signal System US 25 (Henderson Rd.) Communications Cable and Conduit Routing Plans</p>		<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER G. G. MURR, JR. SEAL 14543</p>
	<p>DIVISION 13 BUNCOMBE COUNTY ASHEVILLE</p>	<p>PLAN DATE: OCTOBER 2008 REVIEWED BY: I. N. AVERY</p>	
<p>SCALE 0</p>	<p>PREPARED BY: P. C. LOUDER REVIEWED BY: G. G. MURR, JR., PE</p>	<p>INIT. DATE</p>	<p>SIGNATURE: <i>G. G. Murr, Jr.</i> DATE: 10-9-08</p>



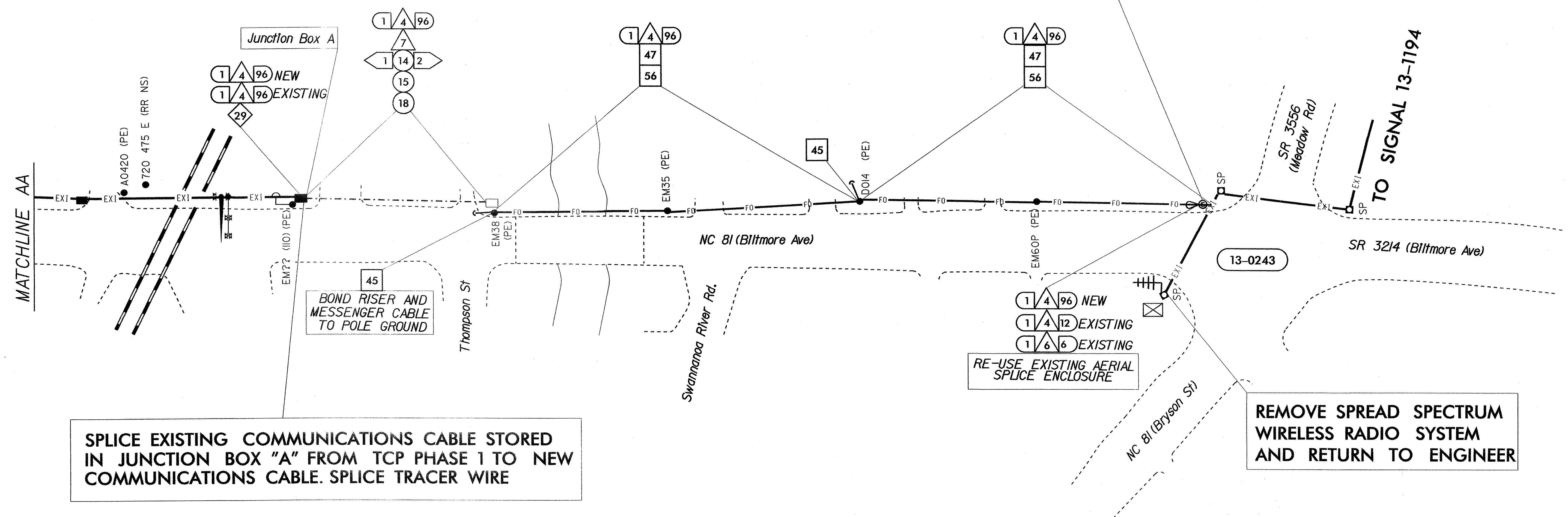


**REMOVE SPREAD SPECTRUM  
WIRELESS RADIO SYSTEM  
AND RETURN TO ENGINEER**

**FINAL CABLE ROUTING PLAN**

	<p>Asheville Signal System US 25 (Henderson Rd.) Communications Cable and Conduit Routing Plans</p>		
	<p>DIVISION 13 BUNCOMBE COUNTY ASHEVILLE</p>		
<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>PLAN DATE: OCTOBER 2008</p>	<p>REVIEWED BY: I. N. AVERY</p>	<p>NOV 10 2008</p>
<p>SCALE</p>	<p>PREPARED BY: P. C. LOUDER</p>	<p>REVIEWED BY: G. G. MURR, JR., PE</p>	<p>10-9-08</p>
<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>	<p>SIGNATURE</p>
<p>CADD Filename:</p>	<p>DATE</p>		

SPLICE NEW 96 FIBER TO EXISTING FIBER AS SHOWN IN SPLICE PLAN. IF SPLICE IS DIFFERENT FROM THE PROVIDED SPLICE PLAN WHEN COMPARED TO RECORDED SPLICING, (REFERENCE TCP PHASE 1) THEN USE RECORDED INFORMATION.



SPLICE EXISTING COMMUNICATIONS CABLE STORED IN JUNCTION BOX "A" FROM TCP PHASE 1 TO NEW COMMUNICATIONS CABLE. SPLICE TRACER WIRE

REMOVE SPREAD SPECTRUM WIRELESS RADIO SYSTEM AND RETURN TO ENGINEER

FINAL CABLE ROUTING PLAN

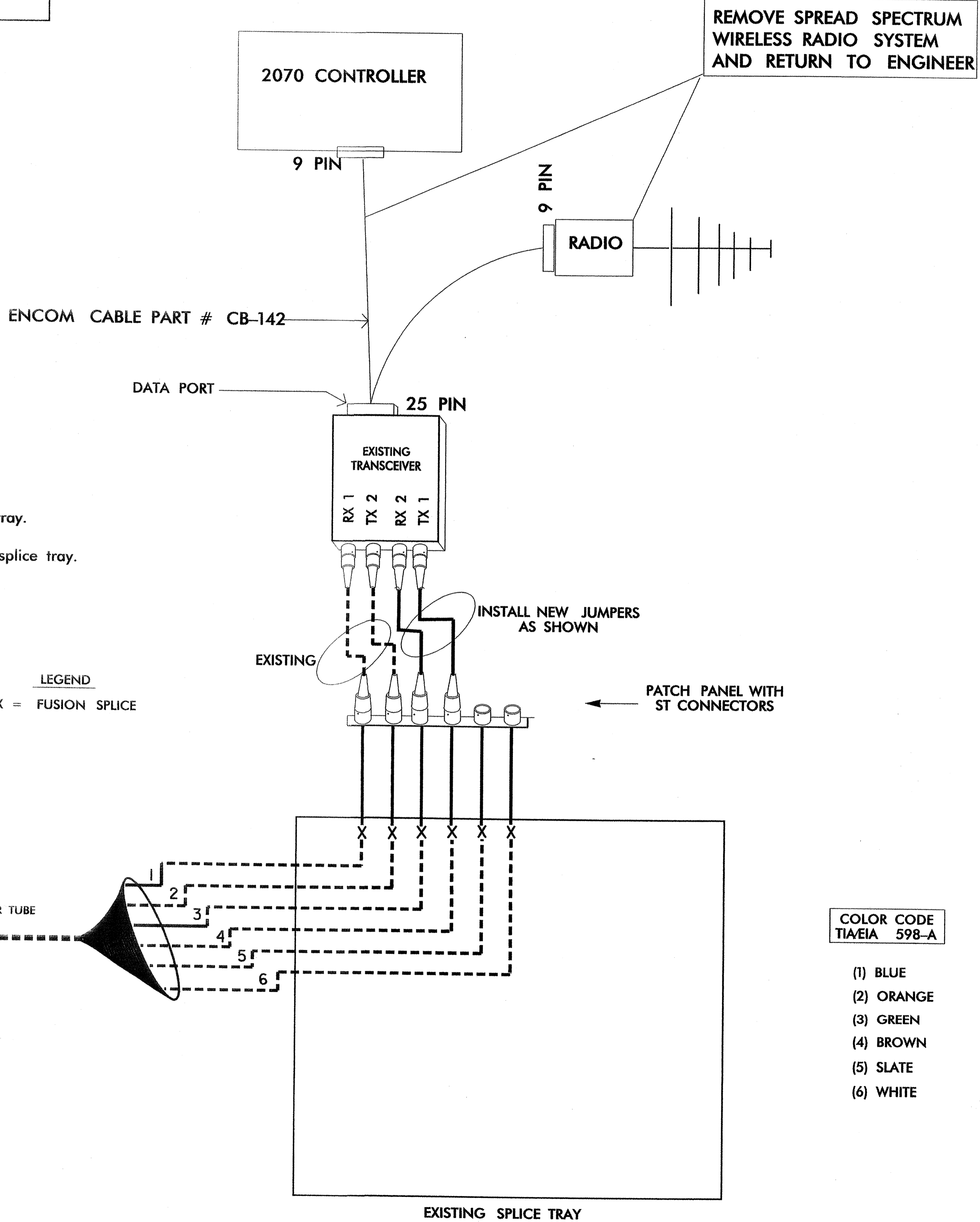
<p>Prepared in the Offices of: The Engineer and Safety Engineer STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION</p> <p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>Asheville Signal System US 25 (Henderson Rd.) Communications Cable and Conduit Routing Plans</p>							
	<p>DIVISION 13 BUNCOMBE COUNTY ASHEVILLE</p> <p>PLAN DATE: OCTOBER 2008 REVIEWED BY: I. N. AVERY</p> <p>PREPARED BY: P. C. LOUDER REVIEWED BY: G. G. MURR, JR., PE</p>	<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		NO.	INIT.	DATE		
NO.	INIT.	DATE						



INTERSECTION LOCATION  
 US 25A (LODGE ST.) AT  
 NC 81 (BILTMORE AVE.)  
 SIG. INV. # 13-0242

Notes:

- Unused fibers left coiled and stored in splice tray.
- Unused Buffer Tubes left coiled and stored in splice tray.



REMOVE SPREAD SPECTRUM  
 WIRELESS RADIO SYSTEM  
 AND RETURN TO ENGINEER

ENCOM CABLE PART # CB-142

DATA PORT

25 PIN

EXISTING  
 TRANSCEIVER

RX 1  
 TX 2  
 RX 2  
 TX 1

INSTALL NEW JUMPERS  
 AS SHOWN

EXISTING

PATCH PANEL WITH  
 ST CONNECTORS

LEGEND  
 X = FUSION SPLICE

COLOR CODE  
 TIA/EIA 598-A

- (1) BLUE
- (2) ORANGE
- (3) GREEN
- (4) BROWN
- (5) SLATE
- (6) WHITE

EXISTING  
 TO AERIAL SPLICE  
 ENCLOSURE AT  
 13-0242

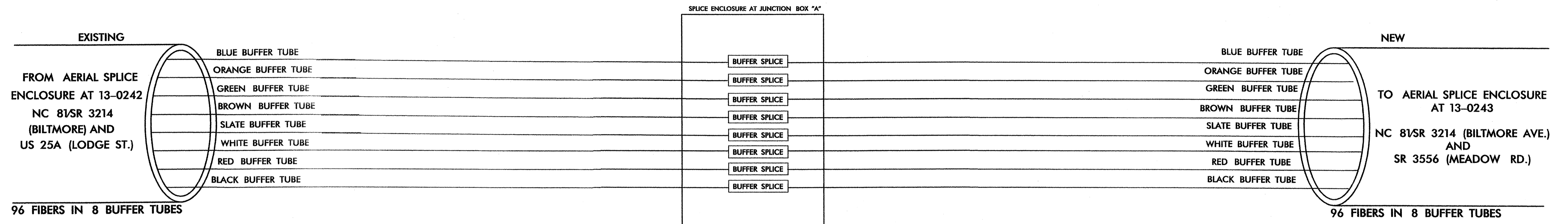
BLUE BUFFER TUBE

EXISTING SPLICE TRAY

FINAL

	<b>SPLICE PLAN</b>		SEAL 14543
	DIVISION 13 PLAN DATE: OCTOBER 2008 PREPARED BY: P. C. LOUDER	BUNCOMBE COUNTY REVIEWED BY: I. N. AVERY REVIEWED BY: G. G. MURR, JR., PE	ASHEVILLE INIT. DATE DATE
SCALE NONE	REVISIONS	INIT. DATE	CADD FILE NAME: splice.dgn

**UNDERGROUND SPLICE  
AT JUNCTION BOX "A"**




**LEGEND**

COLOR CODE TIA/EIA 598-A		
(1) BLUE	(7) RED	X = FUSION SPLICE INDIVIDUAL FIBER
(2) ORANGE	(8) BLACK	C = CAP AND SEAL
(3) GREEN	(9) YELLOW	— [ BUFFER TUBE ] — = EXPRESS ENTIRE BUFFER TUBE
(4) BROWN	(10) VIOLET	— [ BUFFER SPLICE ] — = SPLICE ENTIRE BUFFER TUBE COLOR TO COLOR
(5) SLATE	(11) ROSE	
(6) WHITE	(12) AQUA	

**NOTE:**  
TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING/ENSURING THE PROPER TERMINATIONS.

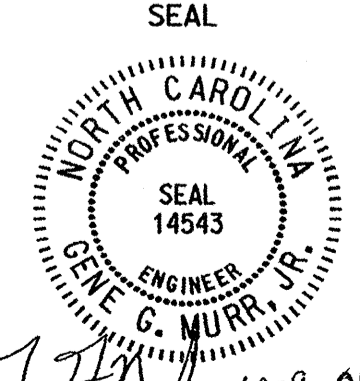
**FINAL**

Prepared in the Office of:  
  
 DIVISION 13 BUNCOMB COUNTY ASHEVILLE

**SPLICE PLAN**

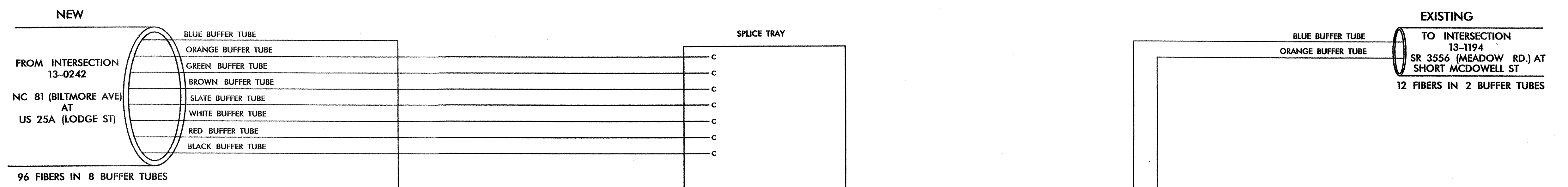
PLAN DATE: OCTOBER 2008	REVIEWED BY: I. N. AVERY
PREPARED BY: P. C. LOUDER	REVIEWED BY: G. G. WURR, JR. PE

SCALE	REVISIONS	INIT.	DATE
0			

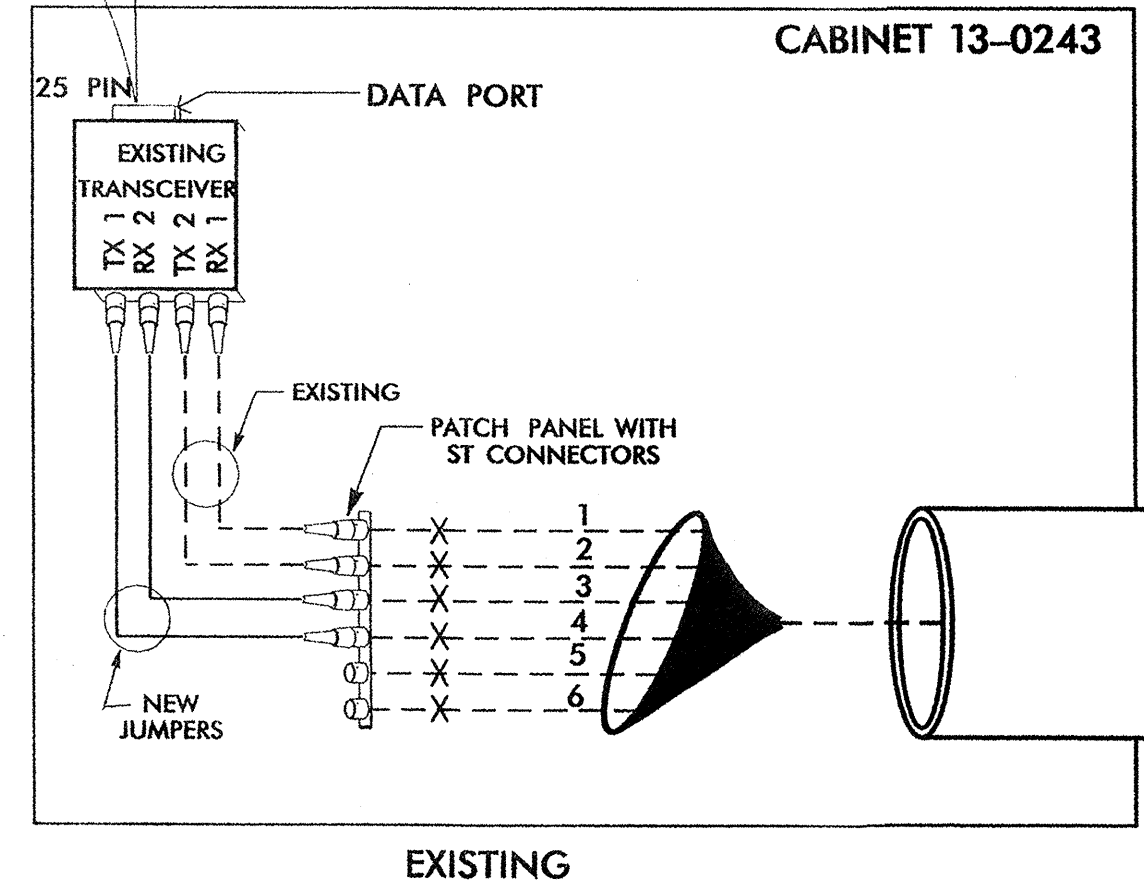
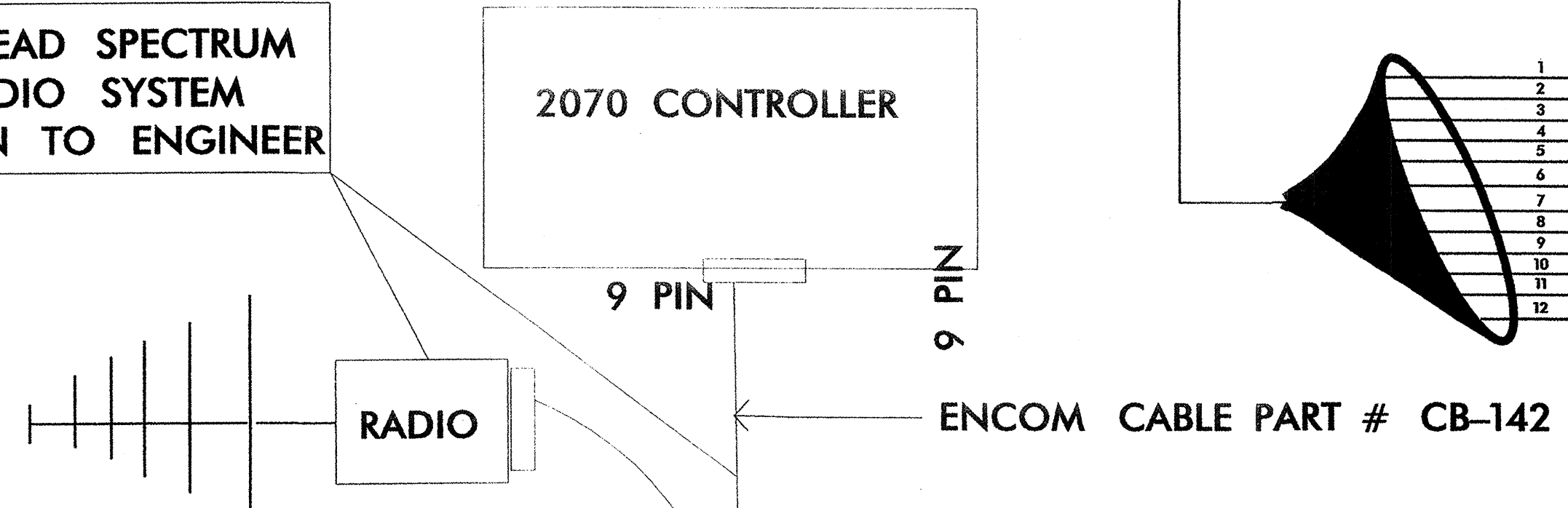
  
 SIGNATURE: *G. G. Wurr, Jr.* DATE: 10-9-08  
 CADD File Name:



13-0243  
NC 81/SR 3214 (BILTMORE AVE.)  
NC 81 (BILTMORE AVE.) AT  
NC81 BRYSON ST./SR 3556 (MEADOW RD.)



REMOVE SPREAD SPECTRUM  
WIRELESS RADIO SYSTEM  
AND RETURN TO ENGINEER



**LEGEND**

COLOR CODE TIA/EIA 598-A		X = FUSION SPlice INDIVIDUAL FIBER
(1) BLUE	(7) RED	C = CAP AND SEAL
(2) ORANGE	(8) BLACK	— BUFFER TUBE = EXPRESS ENTIRE BUFFER TUBE
(3) GREEN	(9) YELLOW	— BUFFER SPlice = SPlice ENTIRE BUFFER TUBE COLOR TO COLOR
(4) BROWN	(10) VIOLET	
(5) SLATE	(11) ROSE	
(6) WHITE	(12) AQUA	

**NOTE:**  
TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC.  
CONTRACTOR IS RESPONSIBLE FOR DETERMINING/ENSURING  
THE PROPER TERMINATIONS.

FINAL

	<b>SPLICE PLAN</b>	
	DIVISION 13 BUNCOMB COUNTY ASHEVILLE PLAN DATE: OCTOBER 2008 REVIEWED BY: I. N. AVERY PREPARED BY: P. C. LOUDER REVIEWED BY: G. G. MURR, JR. PE	
SCALE 0	REVISIONS INIT. DATE	SIGNATURE DATE