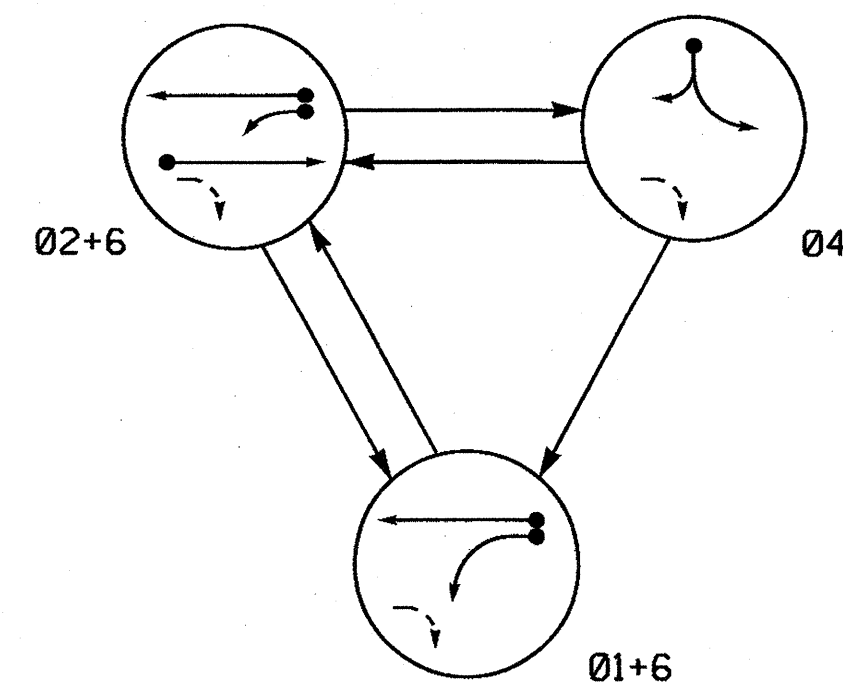


PHASING DIAGRAM

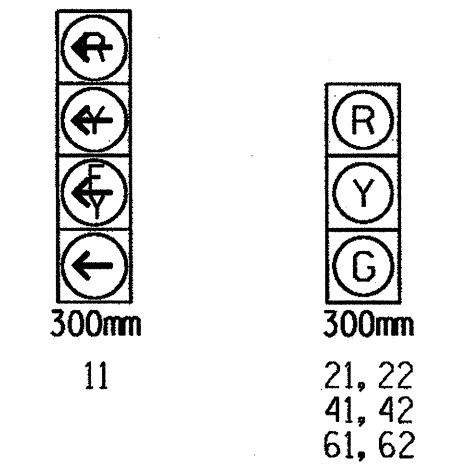


SIGNAL FACE	PHASE			
	01+6	02+6	04	FL
11	←	←	←	←
21, 22	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y

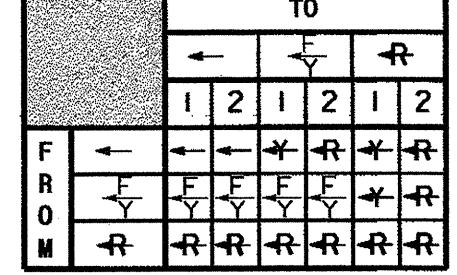
FL = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL



OASIS 2070L LOOP & DETECTOR INSTALLATION

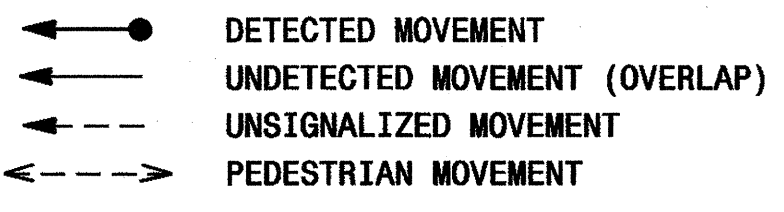
LOOP	SIZE (M)	TURNS	DISTANCE FROM STOPBAR (M)	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
1A	1.8X12	2-4-2	0	Y	1	Y	Y	-	-	-	15	Y
2A	1.8X1.8	6	130	Y	2	Y	Y	-	-	-	3	Y
4A	1.8X12	2-4-2	0	Y	4	Y	Y	-	-	-	-	Y
4B	1.8X4.6	3	+1.5	Y	4	Y	Y	-	-	-	15	Y
6A	1.8X1.8	6	130	Y	6	Y	Y	-	-	-	-	Y

3 Phase Fully Actuated (Isolated)

NOTES

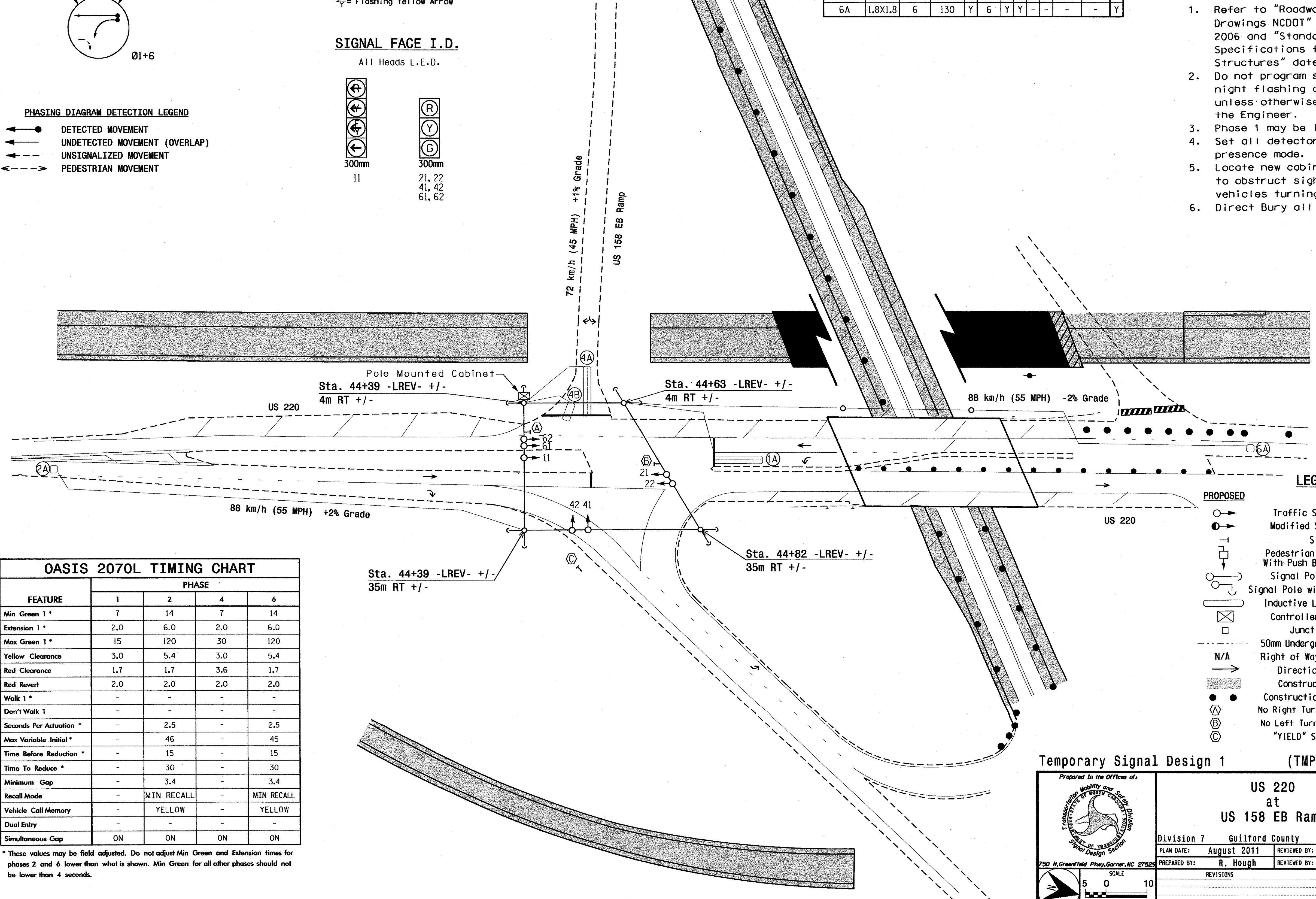
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Direct Bury all lead-in cable.

PHASING DIAGRAM DETECTION LEGEND



FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	7	14	7	14
Extension 1 *	2.0	6.0	2.0	6.0
Max Green 1 *	15	120	30	120
Yellow Clearance	3.0	5.4	3.0	5.4
Red Clearance	1.7	1.7	3.6	1.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	2.5	-	2.5
Max Variable Initial *	-	46	-	45
Time Before Reduction *	-	15	-	15
Time To Reduce *	-	30	-	30
Minimum Gap	-	3.4	-	3.4
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
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.



LEGEND	
PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	○ → N/A
□ → Sign	□ → N/A
□ → Pedestrian Signal Head With Push Button & Sign	□ → N/A
□ → Signal Pole with Guy	□ → N/A
□ → Signal Pole with Sidewalk Guy	□ → N/A
□ → Inductive Loop Detector	□ → N/A
□ → Controller & Cabinet	□ → N/A
□ → Junction Box	□ → N/A
□ → 50mm Underground Conduit	□ → N/A
□ → Right of Way with Marker	□ → N/A
□ → Directional Arrow	□ → N/A
□ → Construction Zone	□ → N/A
● → Construction Zone Drums	● → N/A
○ → No Right Turn Sign (R3-1)	○ → N/A
○ → No Left Turn Sign (R3-2)	○ → N/A
○ → "YIELD" Sign (R1-2)	○ → N/A

Temporary Signal Design 1 (TMP Phase I, Step 3)

Prepared in the Offices of:
 Transportation Mobility and Safety Division
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 220 at US 158 EB Ramp

Division 7 Guilford County Stokesdale

PLAN DATE: August 2011 REVIEWED BY: R. Hough

PREPARED BY: R. Hough REVIEWED BY: R. Hough

SCALE: 1:500

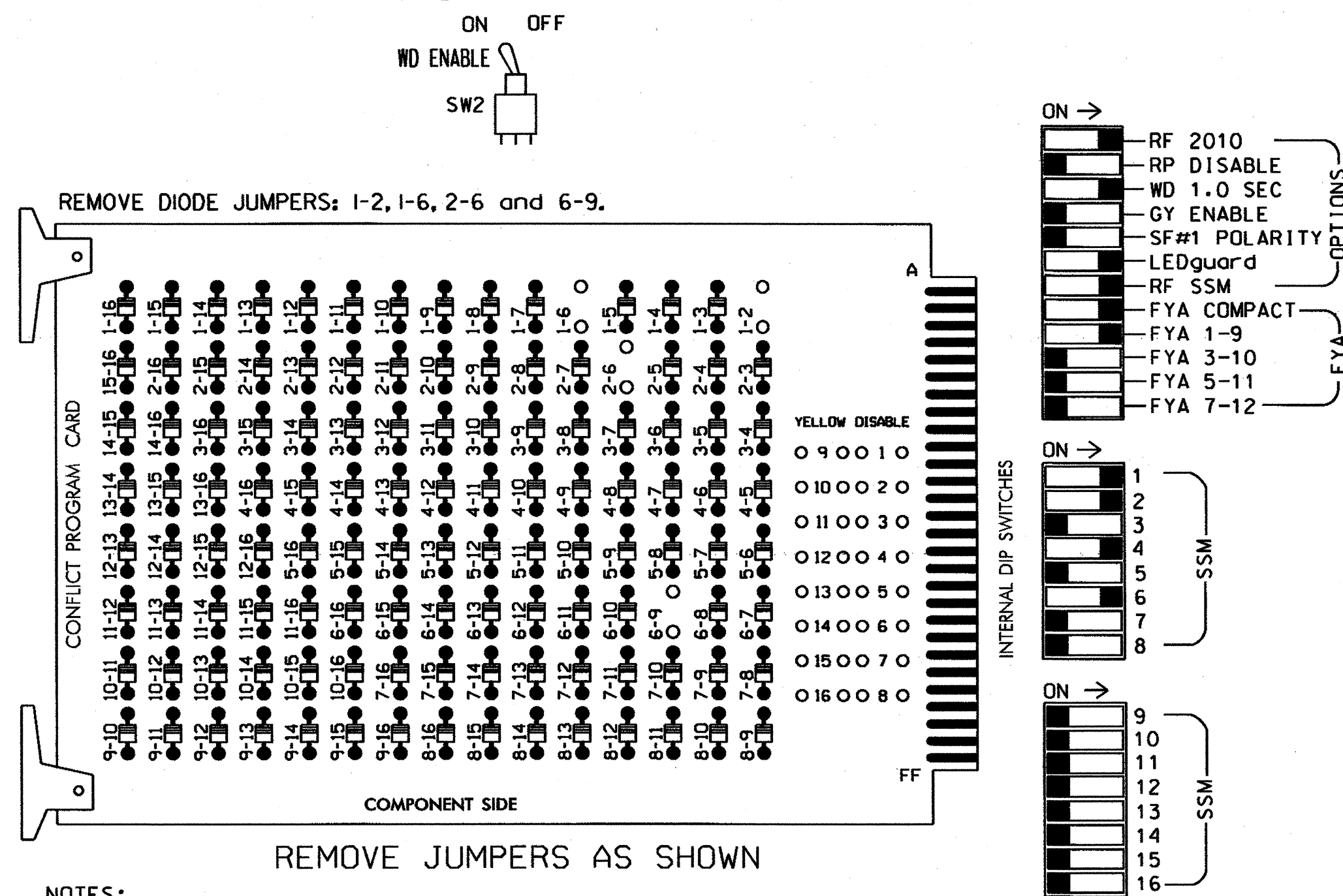
SIGNATURE: [Signature] DATE: 8/24/11

SIG. INVENTORY NO. 07-217511

31-AUG-2011 17:15 P:\11\BPO\projects\2413\2413.dwg

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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.
- Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

■ = DENOTES POSITION OF SWITCH

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.
- 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 3,5,7, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S2P,S4,S6
 PHASES USED.....1,2,4,6.
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

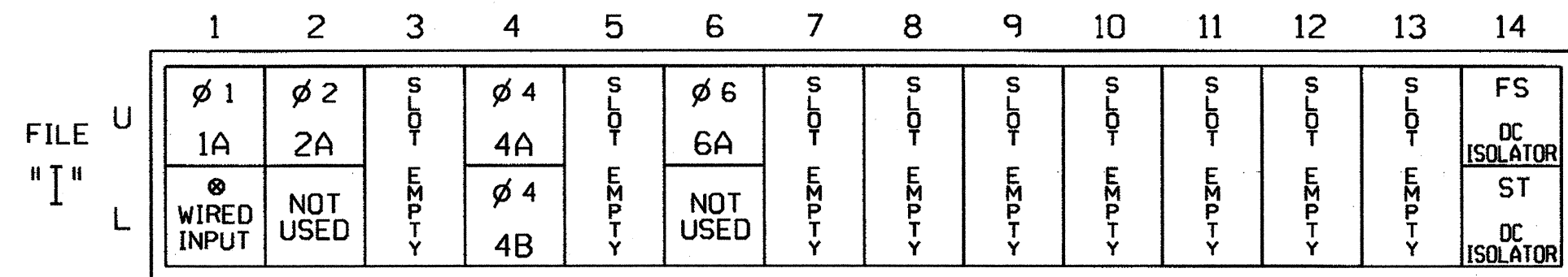
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	OLA	2	2 PED T GRN	3	4	4 PED	4	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	11	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW		125										
YELLOW ARROW		126										
FLASHING YELLOW ARROW		127										
GREEN ARROW			114									
			*									

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail below.
 NOTE: Load Switches S1 and S2P, require output remapping. See sheet 3 of this electrical detail for instructions.

INPUT FILE POSITION LAYOUT

(front view)

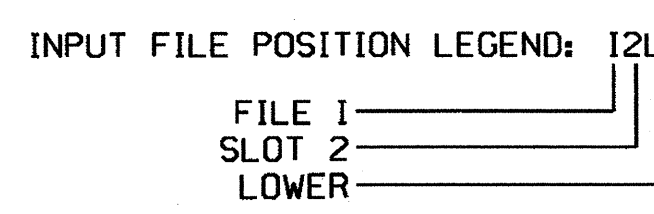


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

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 ¹	TB21-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB21-3,4	I1L	47	9	22	6	Y	Y	Y		3
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			15
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

¹Add jumper from I1-F to I1-W, on rear of input file.

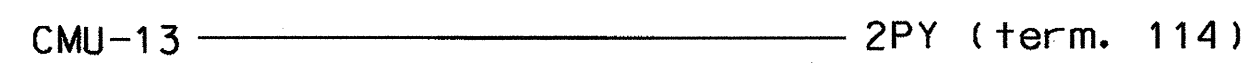


PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode on the 2010ECL-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 2 PY (field term. 114) to chan. 9 green (monitor pin 13).

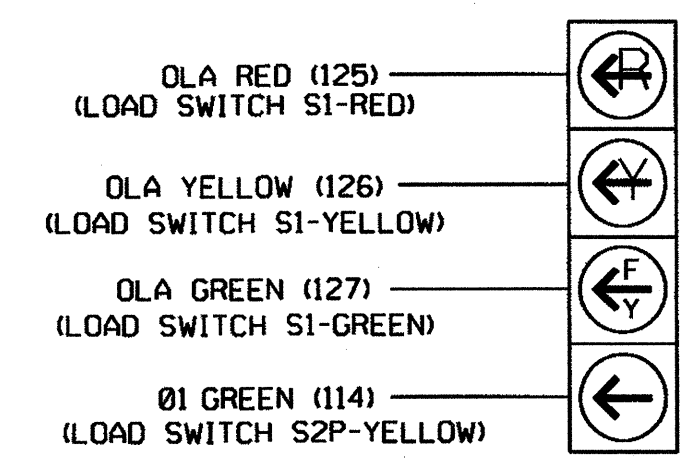
- Follow the instructions below to make the appropriate connections:
- STEP 1: Fold down rear panel of output file.
 - STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).
 - STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:



NOTE: Some cabinet manufacturers use a molex plug to accomplish this wiring configuration. If connectors are used, simply plug the two connectors together that are labeled with the pin-out as shown above.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

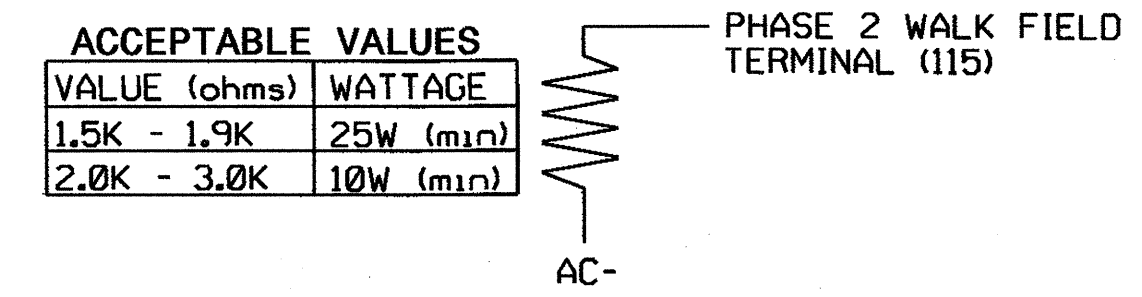
(wire signal heads as shown)



NOTE: 1. The sequence display for this signal requires special logic and output remapping. See sheet 2 and 3 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

31-AUG-2011 13:49 S:\MITSUBISHI\SIGNAL\WORKGROUPS\SIG\ManFlow\Production\Drawings\2175_sml\le...dfr.dwg 8-31-11.dgn

Electrical and Programming Details For:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 220 at US 158 EB Ramp

Division 7 Guilford County Stokesdale

PLAN DATE: August 2011 REVIEWED BY: JHP

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

SEAL

JOHN T. ROWE, JR. ENGINEER

Signature: John Rowe Date: 8-31-11

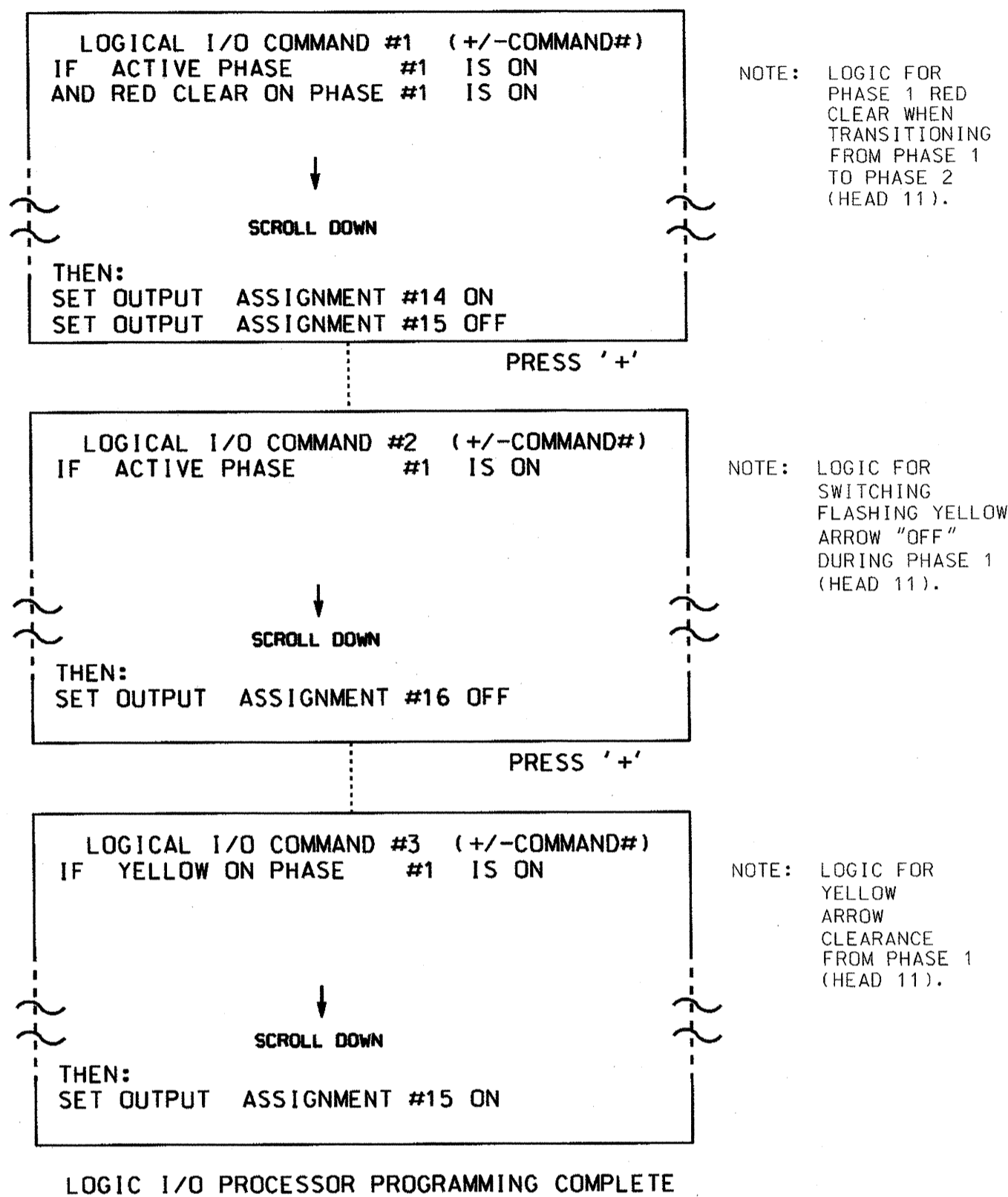
SIG. INVENTORY NO. 07-217511

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-2175T1
 DESIGNED: August 2011
 SEALED: 08-24-11
 REVISED: N/A

**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(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 ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE

- OUTPUT 14 = Overlap A Red
- OUTPUT 15 = Overlap A Yellow
- OUTPUT 16 = Overlap A Green
- OUTPUT 33 = Phase 1 Green

Note: All outputs shown above have been remapped. See sheet 3 this electrical detail.

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: XX
 VEH OVL NOT VEH:
 VEH OVL NOT PED:
 VEH OVL GRN EXT:
 STARTUP COLOR: - RED - YELLOW - GREEN
 FLASH COLORS: - RED - YELLOW X GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 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

← NOTICE GREEN FLASH

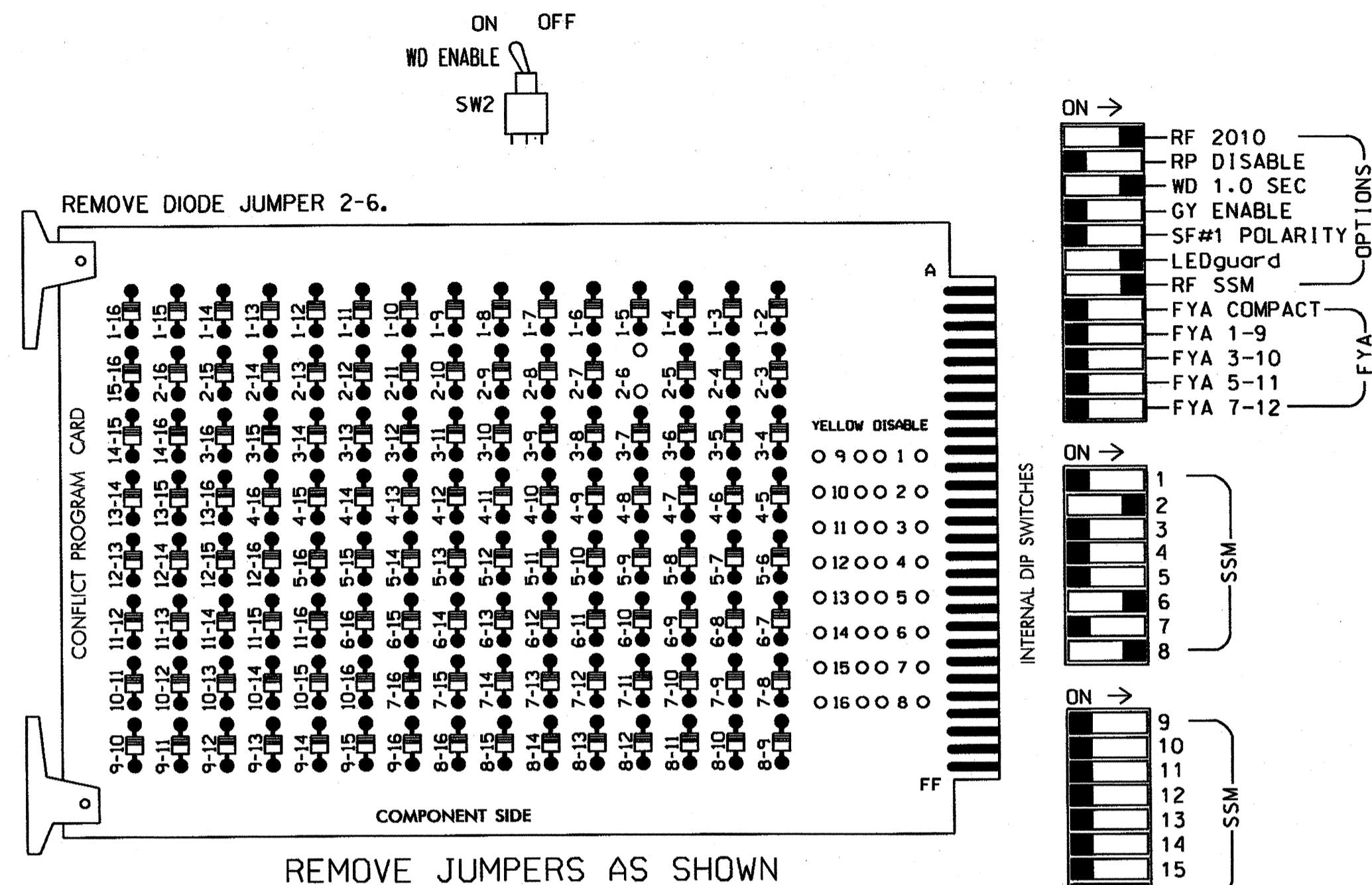
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-2175T1
 DESIGNED: August 2011
 SEALED: 08-24-11
 REVISED: N/A

Temporary Signal Design 1 Electrical Detail Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	US 220 at US 158 EB Ramp		SEAL SEAL 008453 ENGINEER JOHN T. ROWE, PE
	Division 7 PLAN DATE: August 2011 PREPARED BY: James Peterson	Guilford County REVIEWED BY: <i>MLA</i> REVIEWED BY:	
REVISIONS			INIT. DATE
SIGNATURE: <i>John T. Rowe</i> 8-31-11			DATE:
SIG. INVENTORY NO. 07-2175T1			

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper 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. The installer shall 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 1,3,4,5,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

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

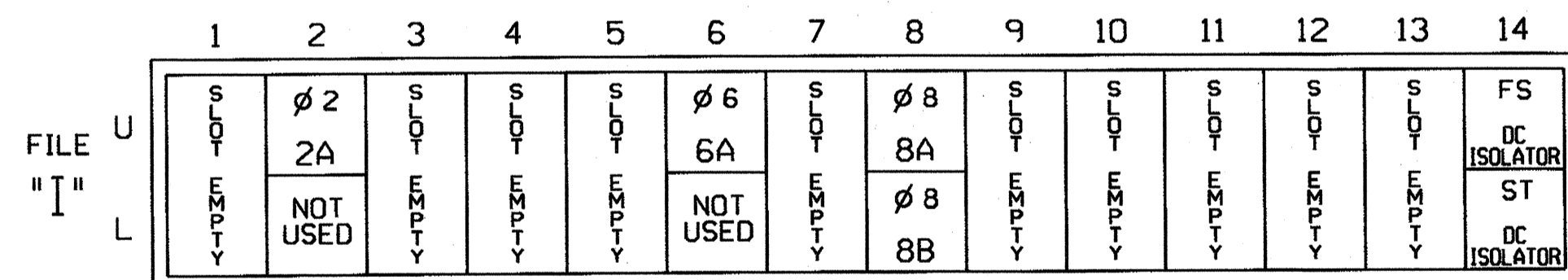
SIGNAL HEAD HOOK-UP CHART

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.	NU	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

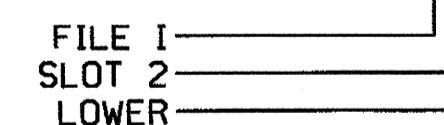
(front view)



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			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			15

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-2175T2
 DESIGNED: August 2011
 SEALED: 08-24-11
 REVISED: N/A

Temporary Signal Design 2 Electrical Detail

Electrical and Programming Details For: US 220 at US 158 Ramp

Division 7 Guilford County Stokesdale

PLAN DATE: August 2011 REVIEWED BY: JLP

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS: INIT. DATE

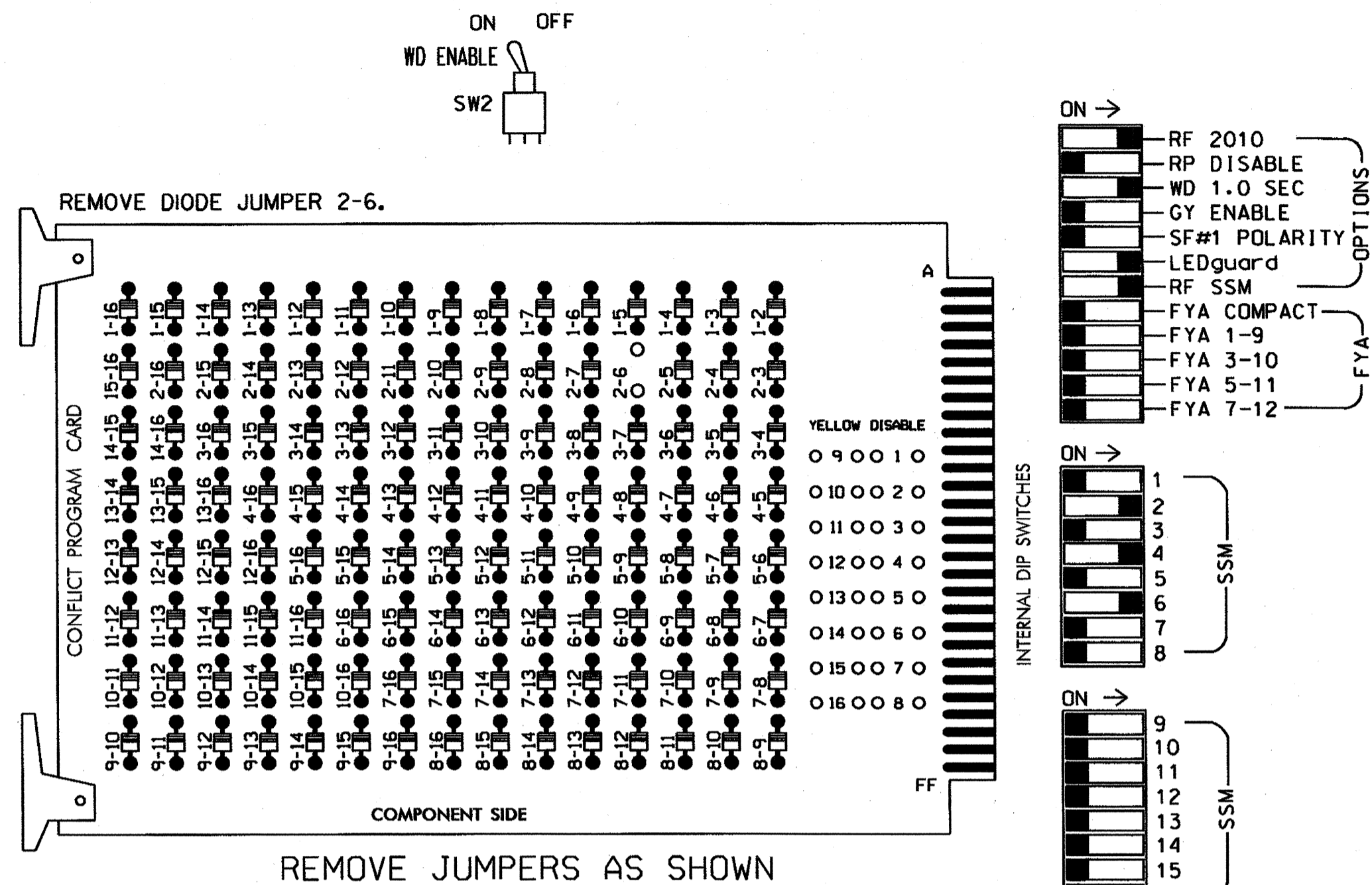
Signature: John T. Rowe, Engineer, Seal 008453

750 N. Greenfield Pkwy, Garner, NC 27529

Sig. Inventory No. 07-2175T2

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper 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. The installer shall 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, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

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

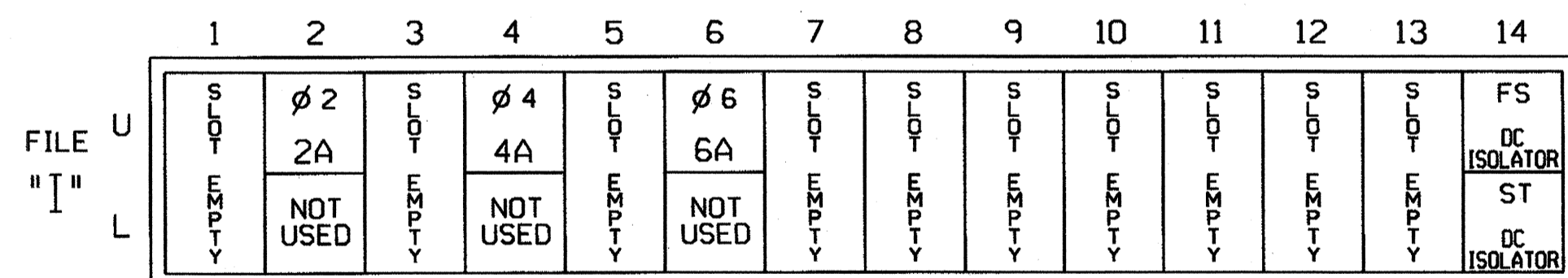
SIGNAL HEAD HOOK-UP CHART

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.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED		128						134				
YELLOW		129						135				
GREEN		130						136				
RED ARROW					101							
YELLOW ARROW					102							
GREEN ARROW					103							

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



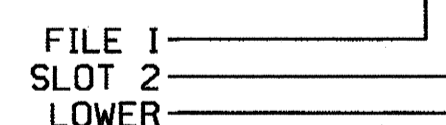
EX.: 1A, 2A, ETC. = LOOP NO.'S

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
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-2175T3
 DESIGNED: August 2011
 SEALED: 08-24-11
 REVISED: N/A

Temporary Signal Design 3 Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Office of:

 750 N. Greenfield Pkwy, Garner, NC 27529

US 220 at US 158 Ramp
 Division 7 Guilford County Stokesdale

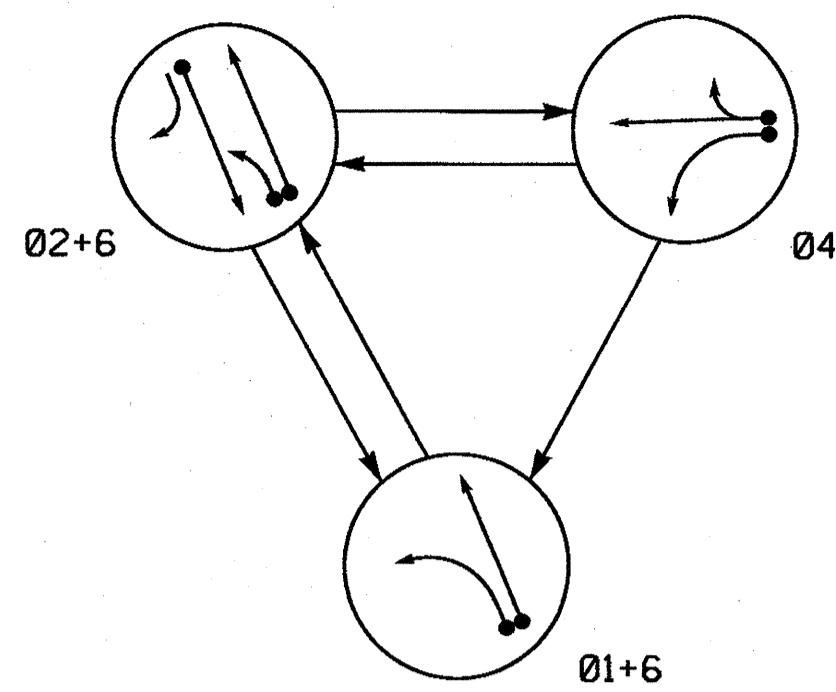
PLAN DATE: August 2011 REVIEWED BY: JWP
 PREPARED BY: James Peterson REVIEWED BY: JWP

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

REVISIONS: INIT. DATE

SIG. INVENTORY NO. 07-2175T3

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- ◄● DETECTED MOVEMENT
- ◄◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄--- UNSIGNALIZED MOVEMENT
- ◄--- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	01+6	02+6	04	FLASH
II	←	←	←	←
21, 22	R	G	R	Y
41, 42, 43	R	R	G	R
61, 62	G	G	R	Y

← = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

TO	FROM			
	1	2	1	2
←	←	←	←	←
←	←	←	←	←
←	←	←	←	←
←	←	←	←	←

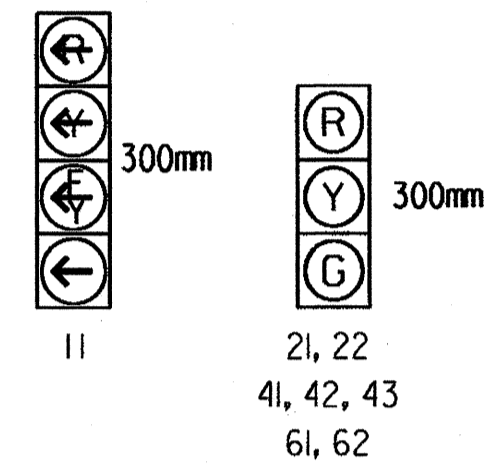
← = Flashing Yellow Arrow

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (m)	DISTANCE FROM STOPBAR (m)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
IA	1.8X12	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
2A/S4	1.8X1.8	130	5	Y	2	Y	Y	-	-	-	-	Y
4A	1.8X12	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
4B	1.8X12	0	2-4-2	Y	4	Y	Y	-	-	10	-	Y
4C	1.8X1.8	0	3	Y	4	Y	Y	-	-	15	-	Y
6A/S3	1.8X1.8	130	5	Y	6	Y	Y	-	-	-	-	Y

SIGNAL FACE I.D.

All Heads L.E.D.



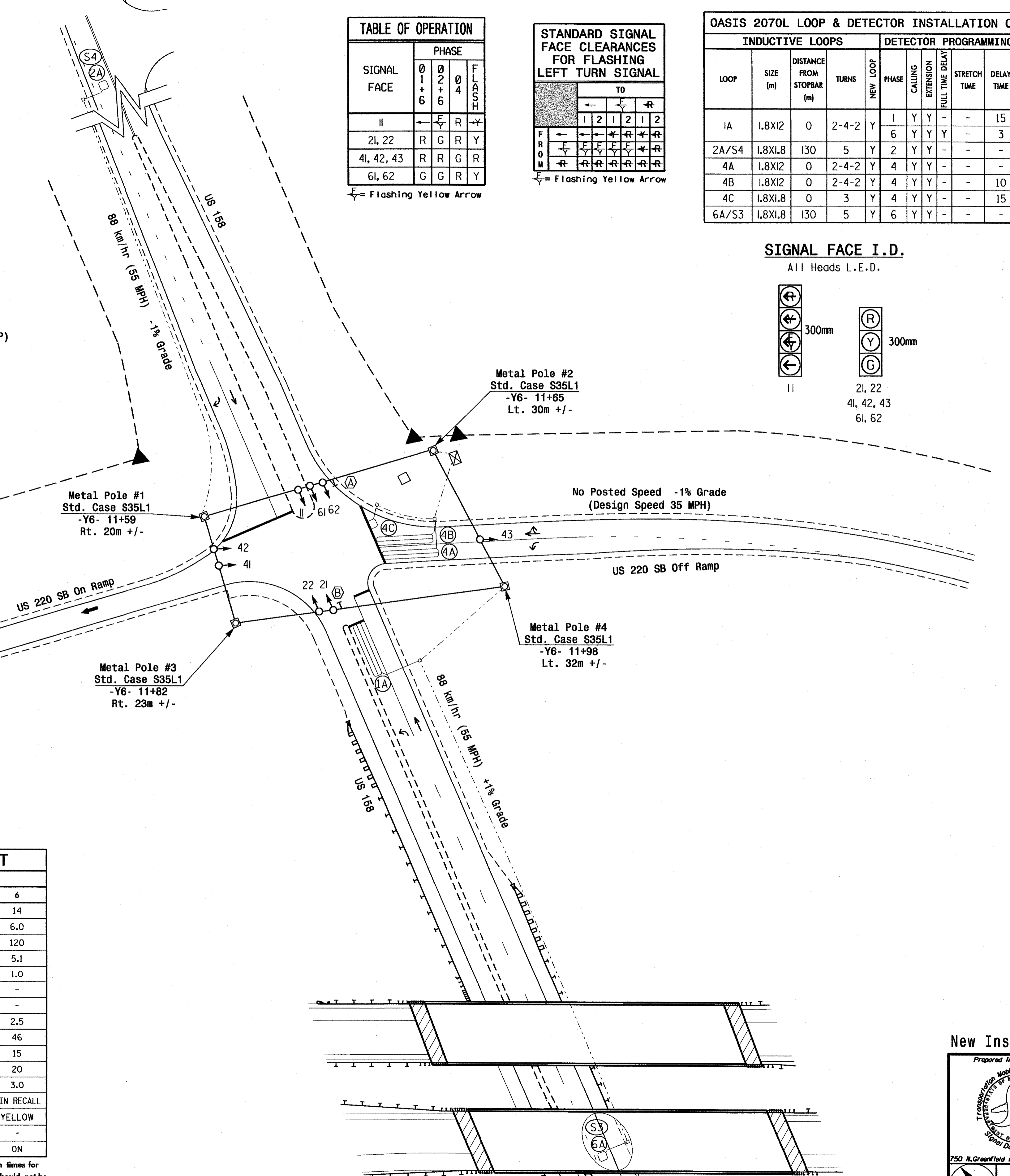
3 Phase Fully Actuated (US 158 (Stokesdale) CLS)

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.
- Phase 1 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 2170.

FEATURE	PHASE			
	1	2	4	6
Min Green 1*	7	14	7	14
Extension 1*	2.0	6.0	2.0	6.0
Max Green 1*	20	120	25	120
Yellow Clearance	3.0	5.3	3.9	5.1
Red Clearance	2.7	1.1	1.6	1.0
Walk 1*	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation*	-	2.5	-	2.5
Max Variable Initial*	-	46	-	46
Time Before Reduction*	-	15	-	15
Time To Reduce*	-	20	-	20
Minimum Gap	-	3.0	-	3.0
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
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.



LEGEND

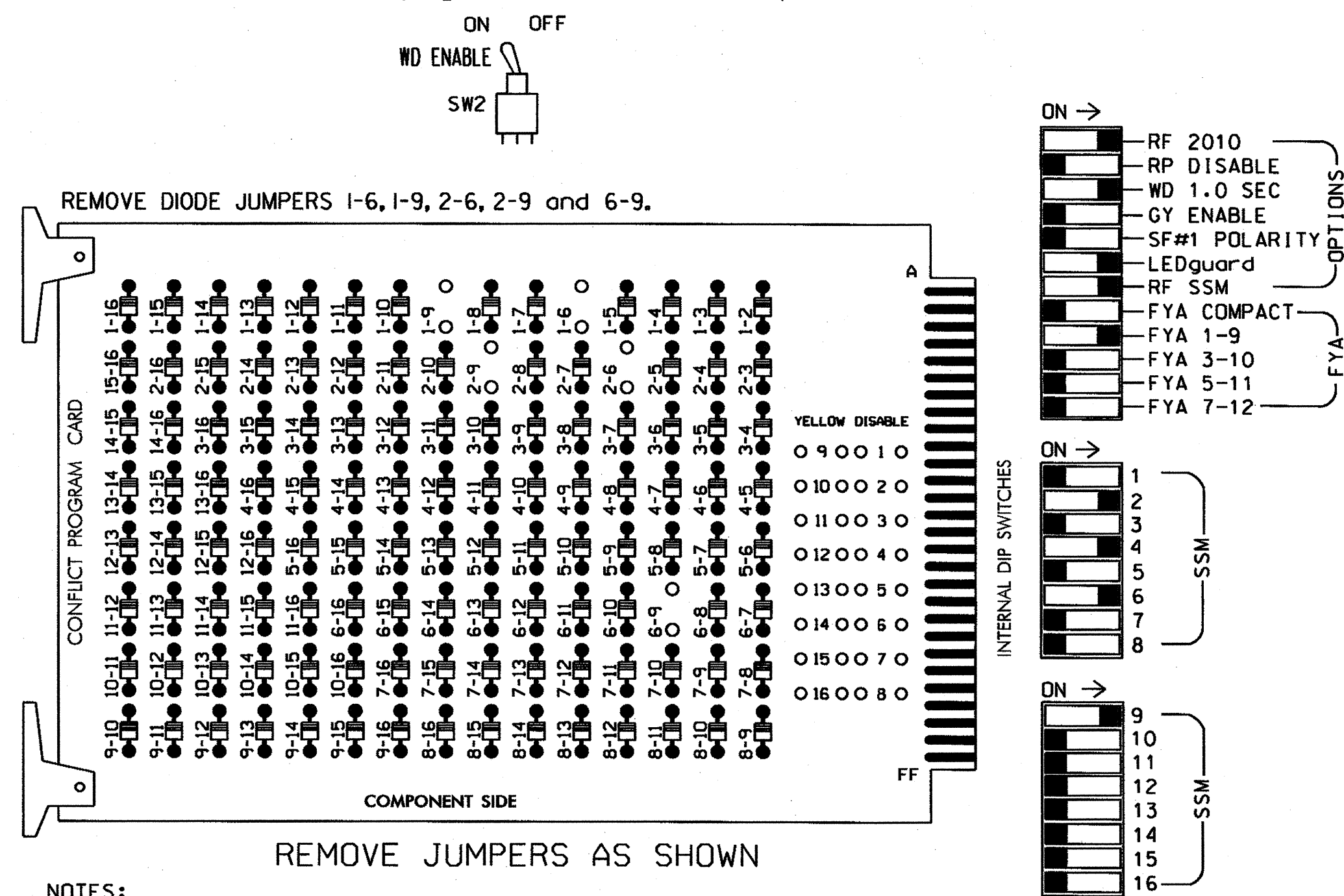
- | PROPOSED | EXISTING |
|--|--|
| ○ → Traffic Signal Head | ● → Traffic Signal Head |
| ○ → Modified Signal Head | N/A |
| ⊥ Sign | ⊥ Sign |
| ⊥ Pedestrian Signal Head With Push Button & Sign | ⊥ Pedestrian Signal Head With Push Button & Sign |
| ○ → Signal Pole with Guy | ○ → Signal Pole with Guy |
| ○ → Signal Pole with Sidewalk Guy | ○ → Signal Pole with Sidewalk Guy |
| ⊠ Metal Strain Pole | ⊠ Metal Strain Pole |
| ⊠ Inductive Loop Detector | ⊠ Inductive Loop Detector |
| ⊠ Controller & Cabinet | ⊠ Controller & Cabinet |
| ⊠ Junction Box | ⊠ Junction Box |
| --- 50mm Underground Conduit | --- 50mm Underground Conduit |
| N/A Right of Way | --- Right of Way |
| N/A Directional Arrow | → Directional Arrow |
| N/A Guardrail | --- Guardrail |
| (A) No Right Turn Sign (R3-1) | (A) No Right Turn Sign (R3-1) |
| (B) No Left Turn Sign (R3-2) | (B) No Left Turn Sign (R3-2) |

New Installation

	<p>US 158 at US 220 SB Ramps</p>		
	<p>Division 7 Guilford County E. of Stokesdale</p>		
<p>PLANNED BY: May 2011</p>	<p>REVIEWED BY:</p>	<p>PREPARED BY: Sterling</p>	<p>REVIEWED BY:</p>
<p>SCALE: 1:500</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>SIGNATURE: <i>[Signature]</i> DATE: 8/16/11</p>
<p>SIG. INVENTORY NO. 07-2170</p>			<p>SEAL</p>

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

(remove jumpers and set switches 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.
- 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, 7,8,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the (US 158 (Stokesdale) CLS).

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S6,S9.
 PHASES USED.....1,2,4,6.
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

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	OLC	OLD	SPARE	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41, 42,43	NU	NU	61,62	NU	NU	NU	NU	11	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW	*	129			102			135										
GREEN		130			103			136										
RED ARROW														A121				
YELLOW ARROW														A122				
FLASHING YELLOW ARROW														A123				
GREEN ARROW	127																	

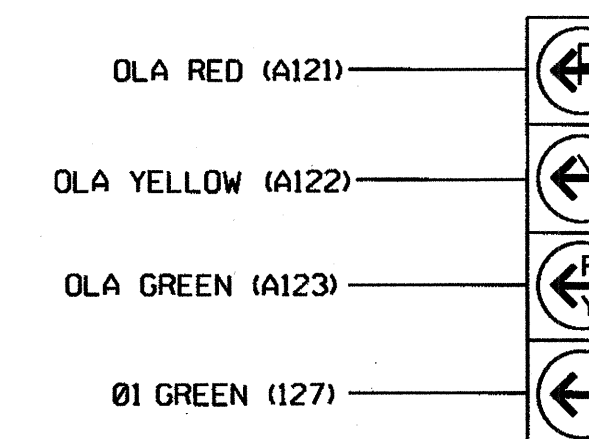
NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



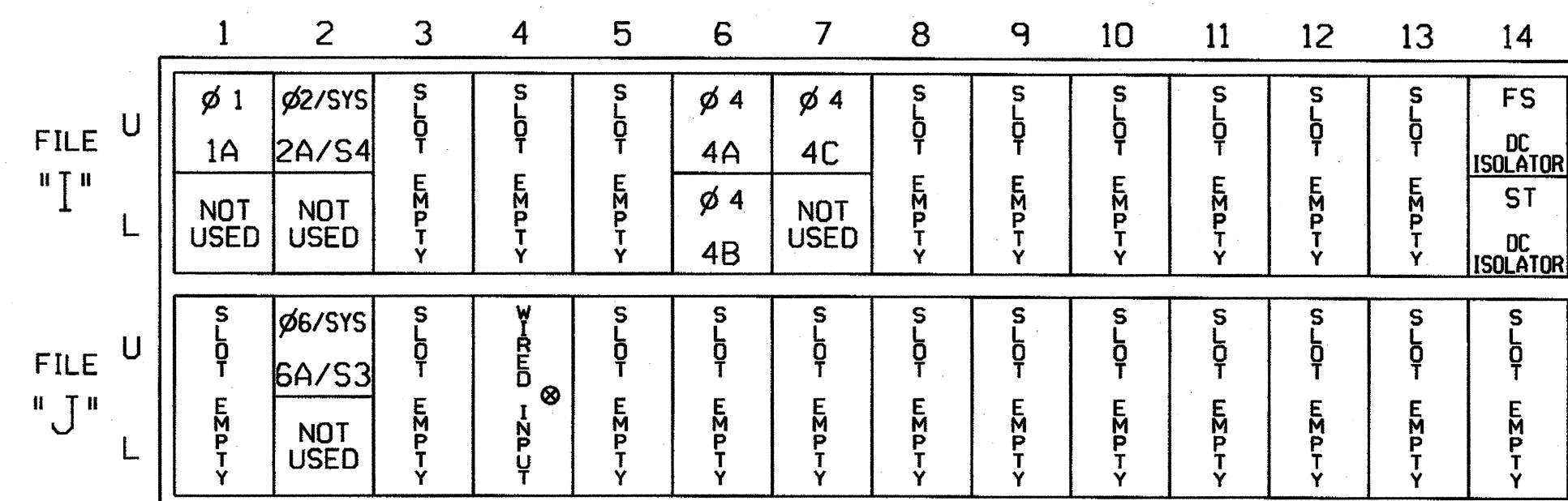
11

NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

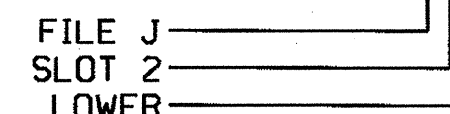
⊗ Wired Input - Do not populate slot with detector card

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 ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
		J4U	48	10	26	6	Y	Y	Y		3
2A/S4	TB2-5,6	I2U	39	1	2	2/SYS	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
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			15
6A/S3	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			

¹Add jumper from I1-W to J4-W, on rear of input file.

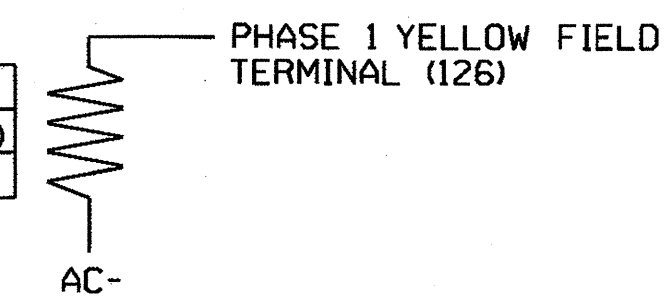
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



ELECTRICAL DETAIL SHEET 1 OF 2

Electrical and Programming Details For:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 158 at US 220 SB Ramps

Division 7 Guilford County E. of Stokesdale

PLAN DATE: August 2011 REVIEWED BY: JTK

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS: _____ INIT. DATE

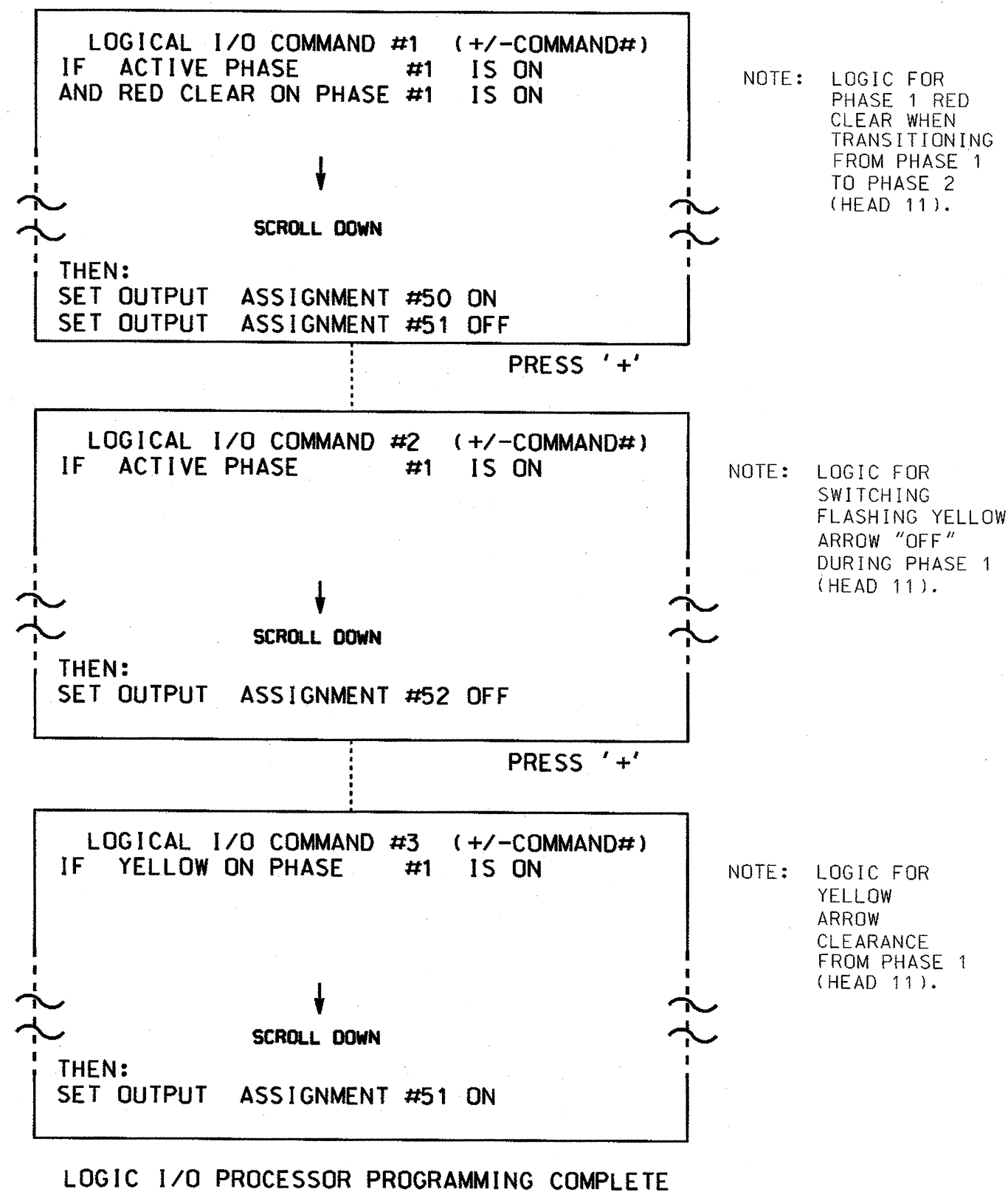
Signature: John T. Rowe 8-18-11 DATE

SIG. INVENTORY NO. 07-2170

**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(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 ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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: XX
 VEH OVL NOT VEH:
 VEH OVL NOT PED:
 VEH OVL GRN EXT:
 STARTUP COLOR: - RED - YELLOW - GREEN
 FLASH COLORS: - RED - YELLOW X GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 GREEN EXTENSION (0-255 SEC)...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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-2170
 DESIGNED: May 2011
 SEALED: 8-16-11
 REVISED: N/A

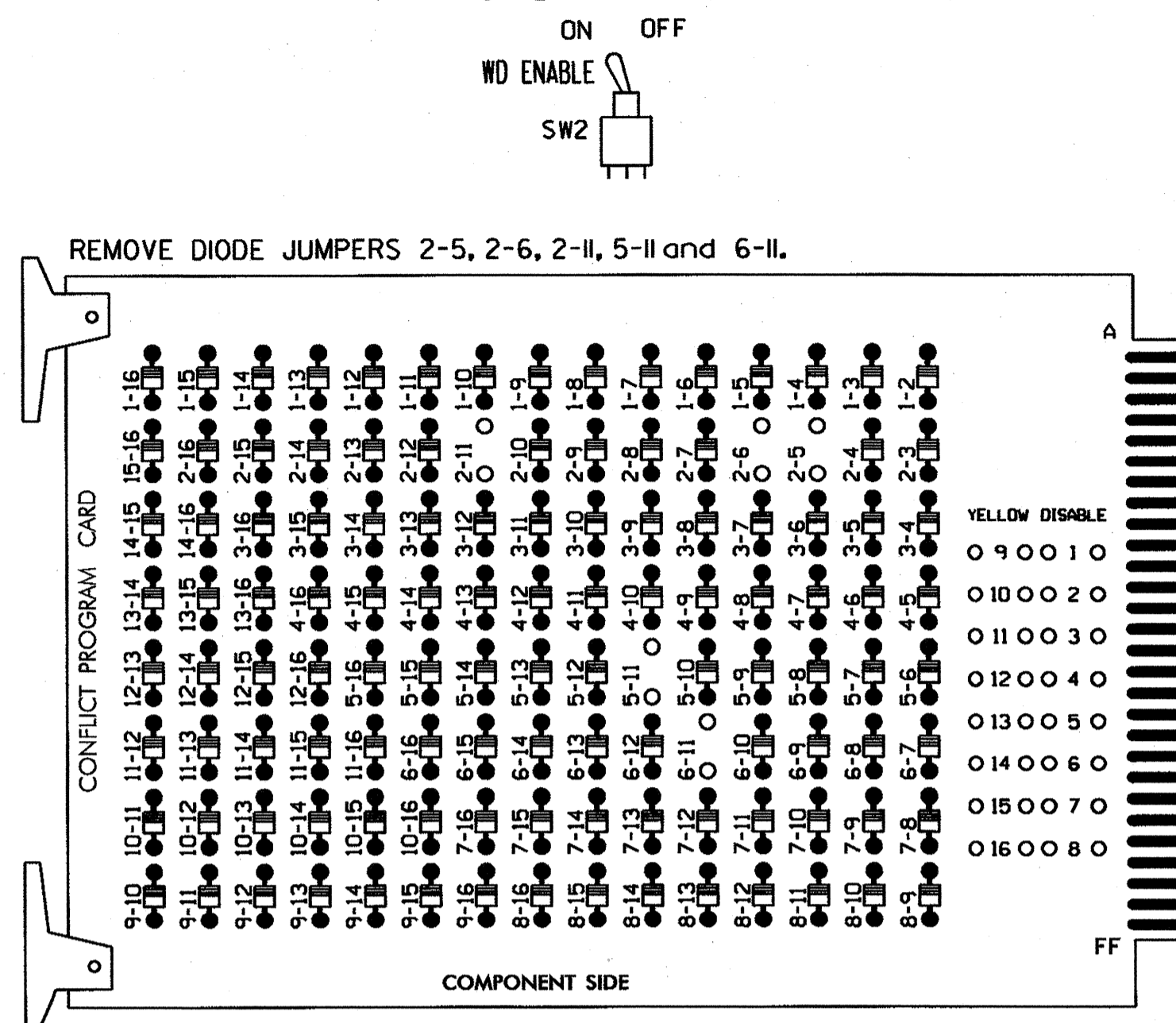
ELECTRICAL DETAIL SHEET 2 OF 2

	US 158 at US 220 SB Ramps		
	Division 7 PLAN DATE: August 2011 PREPARED BY: James Peterson	Guilford County REVIEWED BY: JTR REVIEWED BY:	

17-AUG-2011 14:31
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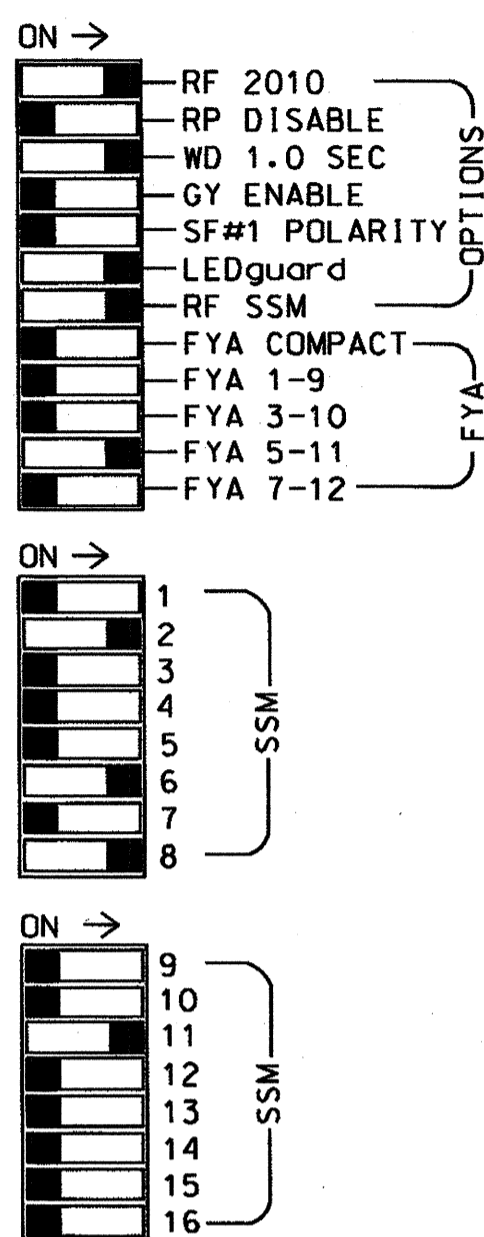
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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.



■ = DENOTES POSITION OF SWITCH

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.
- 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 1,3,4, 5,7,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the (US 158 (Stokesdale) CLS).

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5,S6,S8,S12.
 PHASES USED.....2,5,6,8.
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

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.	NU	21,22	NU	NU	NU	NU	51	61,62	NU	NU	81, 82,83	NU	NU	NU	NU	51	NU	NU
RED		128						134			107							
YELLOW		129					*	135			108							
GREEN		130						136			109							
RED ARROW																		A114
YELLOW ARROW																		A115
FLASHING YELLOW ARROW																		A116
GREEN ARROW								133										

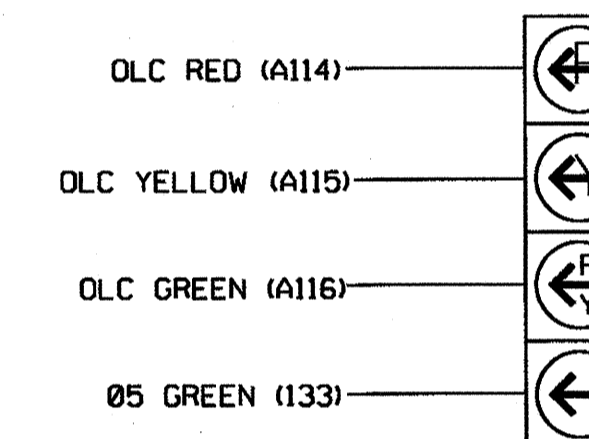
NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



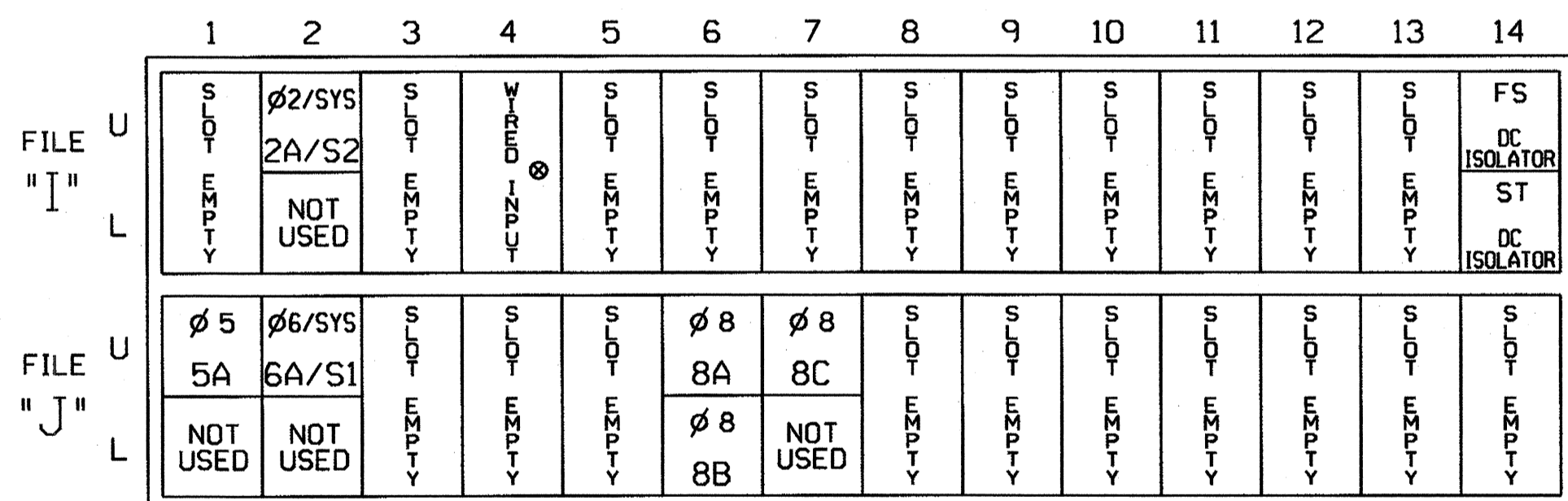
51

NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

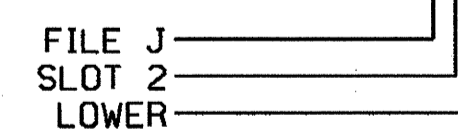
⊗ Wired Input - Do not populate slot with detector card

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/S2	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
6A/S1	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15

¹Add jumper from J1-W to I4-W, on rear of input file.

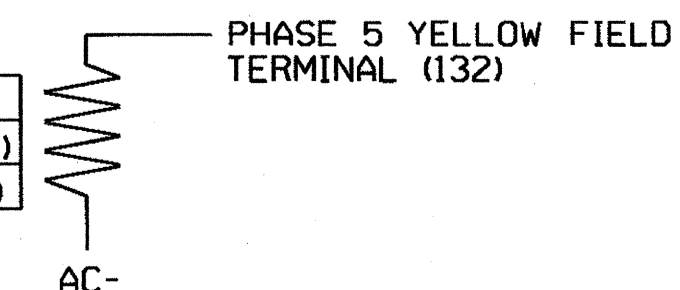
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES	
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



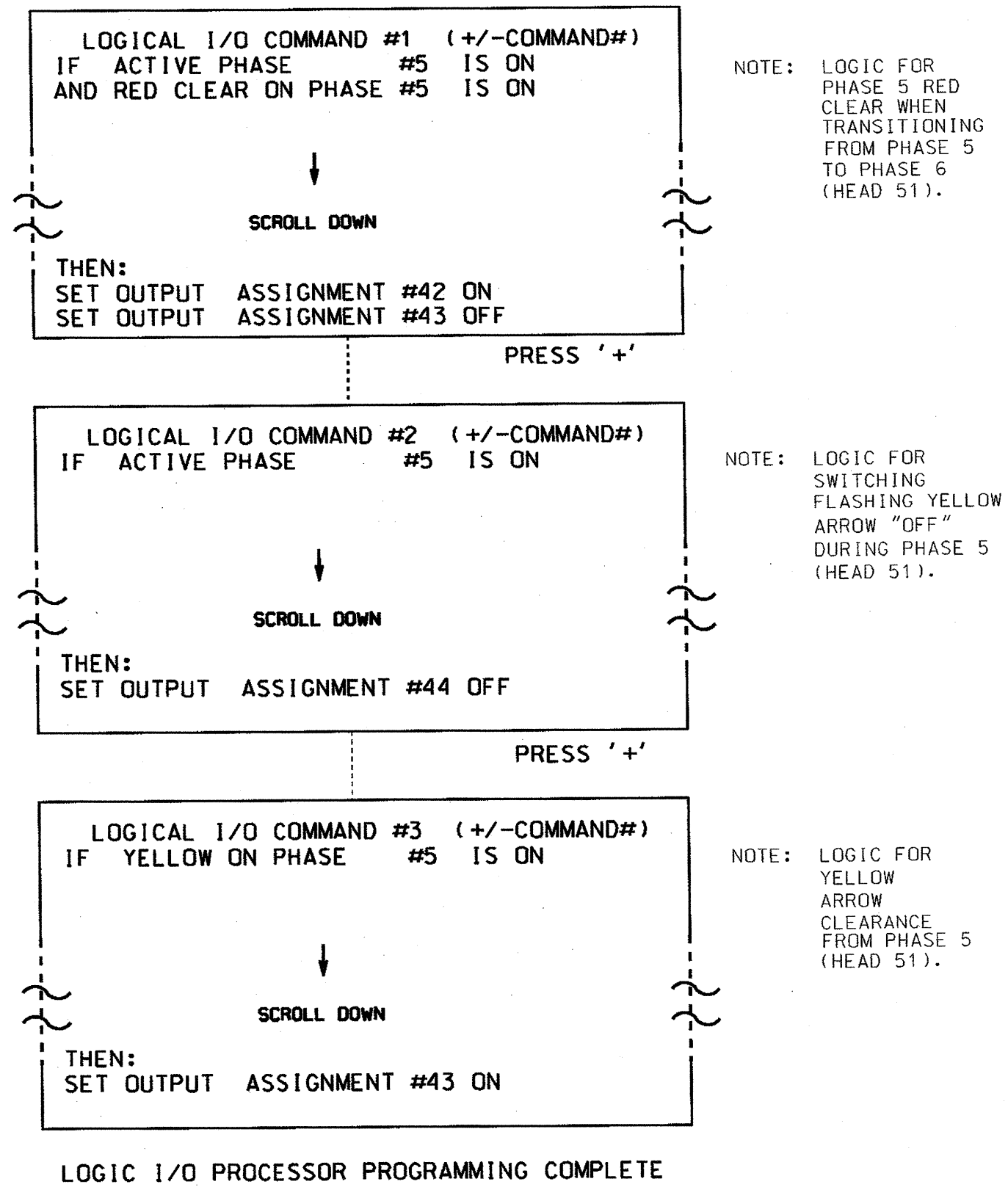
ELECTRICAL DETAIL SHEET 1 OF 2

Prepared in the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	US 158 at US 220 NB Ramps		SEAL JOHN T. ROWE, P.E.
	Division 7 Guilford County E. of Stokesdale		
	PLAN DATE: August 2011 PREPARED BY: James Peterson	REVIEWED BY: JTR REVIEWED BY:	
	REVISIONS INIT. DATE	SIGNATURE DATE _____	

**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2169
DESIGNED: May 2011
SEALED: 08-16-11
REVISED: N/A

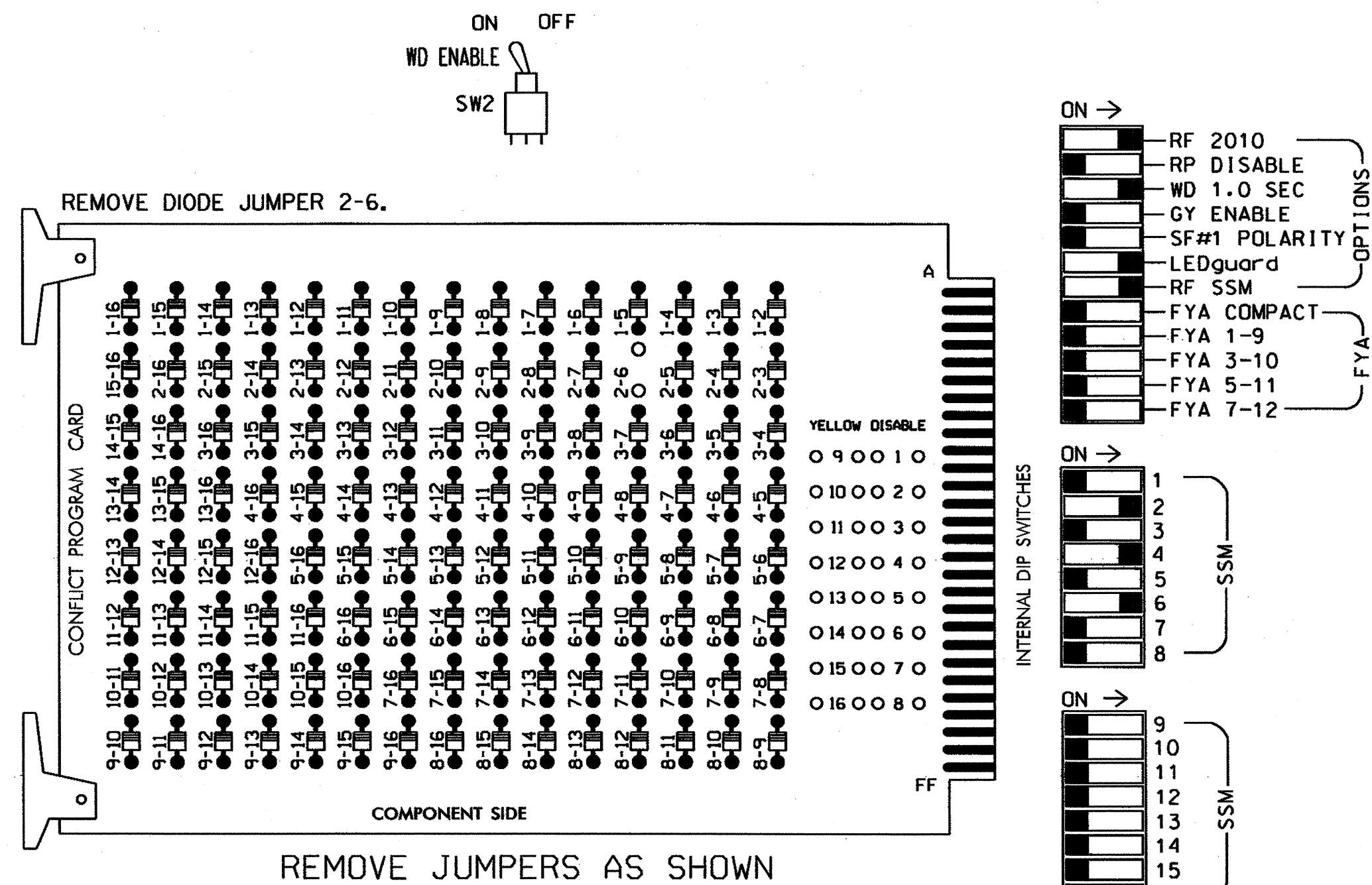
ELECTRICAL DETAIL SHEET 2 OF 2

<p>Prepared in the Office of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>US 158 at US 220 NB Ramps</p>		<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR.</p>
	<p>Division 7 Guilford County E. of Stokesdale</p> <p>PLAN DATE: August 2011 REVIEWED BY: JTR</p> <p>PREPARED BY: James Peterson REVIEWED BY:</p>	<p>REVISIONS</p> <p>INIT. DATE</p>	

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JPeterson

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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.
- 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 1,3,5,7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S6.
PHASES USED.....2,4,6.
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

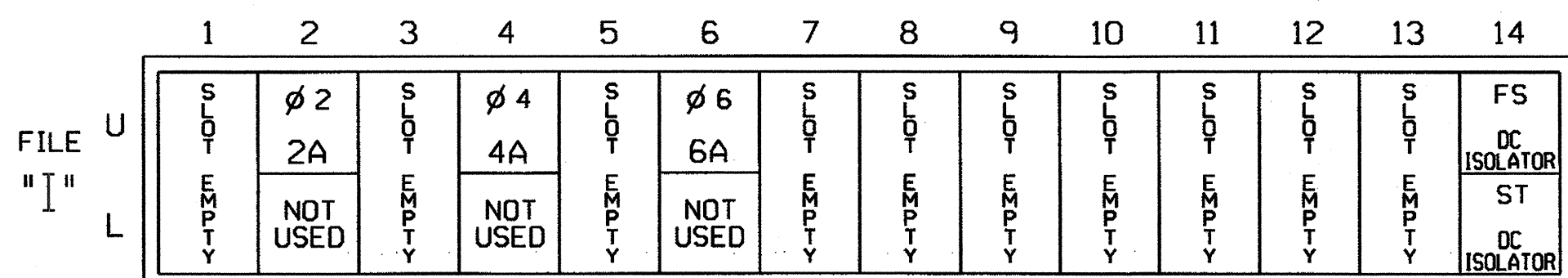
SIGNAL HEAD HOOK-UP CHART

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

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



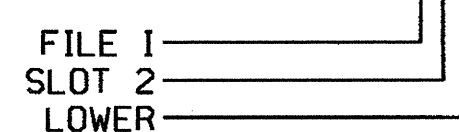
EX.: 1A, 2A, ETC. = LOOP NO.'S

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
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			5
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND:



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1599T1
DESIGNED: August 2011
SEALED: 08-24-11
REVISED: N/A

Temporary Signal Design 1 - Electrical Detail

Prepared in the Offices of:
Transportation Mobility and Safety Division
North Carolina Department of Transportation
Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 220 at NC 65 (South)

Division 7 Rockingham County NE of Stokesdale

PLAN DATE: August 2011 REVIEWED BY: JWA

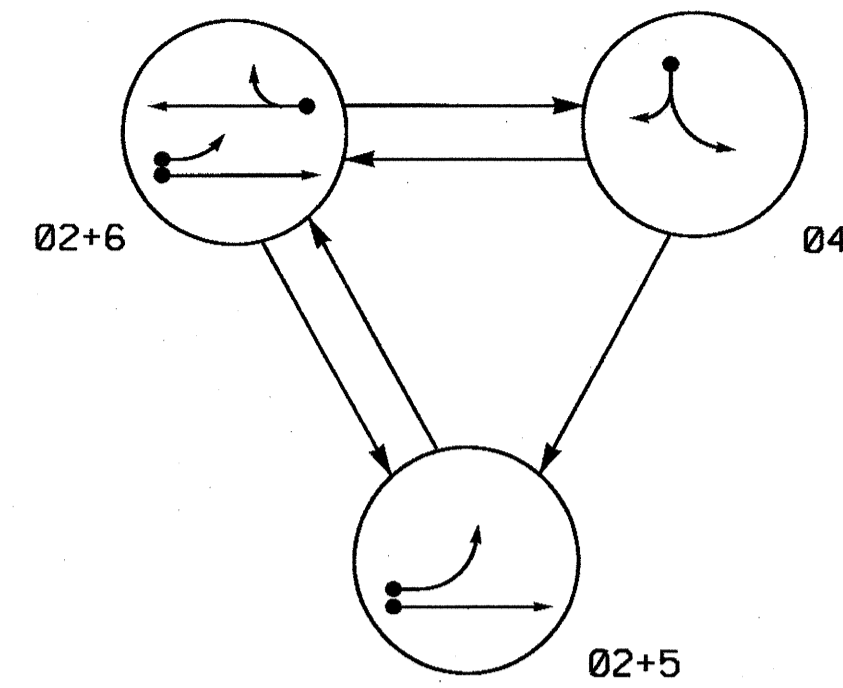
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 008453
JOHN T. ROWE, JR.
DATE 8-31-11
SIGNATURE DATE
SIG. INVENTORY NO. 07-1599T1

31-AUG-2011 10:02
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PHASING DIAGRAM



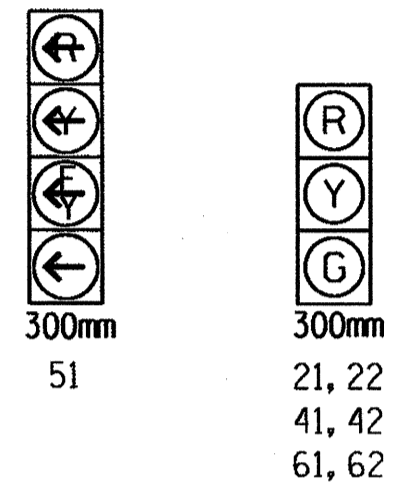
PHASING DIAGRAM DETECTION LEGEND
 ● → DETECTED MOVEMENT
 ○ → UNDETECTED MOVEMENT (OVERLAP)
 - - → UNSIGNALIZED MOVEMENT
 - - - - → PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE			
	02+5	02+6	04	FLIGHT
21, 22	G	G	R	Y
41, 42	R	R	G	R
51	-	-	-	-
61, 62	R	G	R	Y

⚡ = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

	TO			
	1	2	1	2
FROM	←	←	←	←
FROM	←	←	←	←
FROM	←	←	←	←
FROM	←	←	←	←

⚡ = Flashing Yellow Arrow

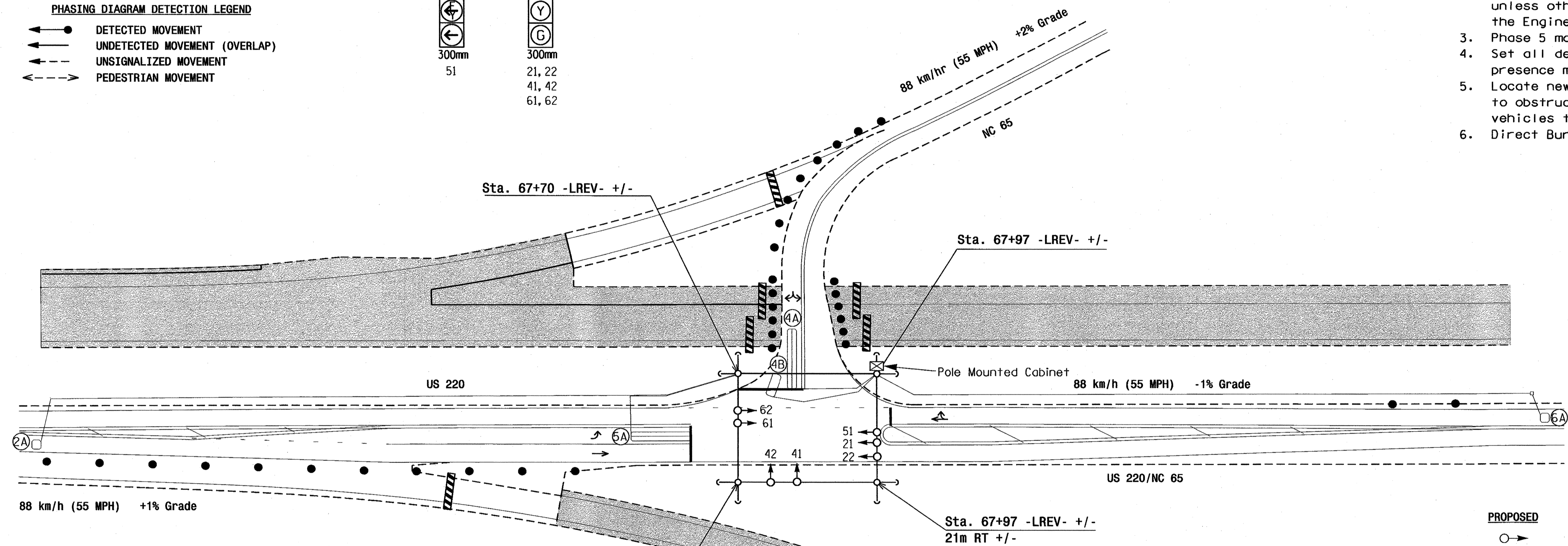
OASIS 2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (M)	DETECTOR PROGRAMMING								
				PHASE	CALLING	EXTENSION	FULL TIME DELET	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD	
2A	6X6	5	130	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	2-4-2	0	Y	4	Y	Y	-	-	-	3	Y
4B	6X15	3	+1	Y	4	Y	Y	-	-	-	15	Y
5A	6X40	2-4-2	0	Y	5	Y	Y	-	-	-	15	Y
6A	6X6	6	130	Y	6	Y	Y	-	-	-	-	Y

3 Phase Fully Actuated (Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Direct Bury all lead-in cable.



FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	14	7	7	14
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	120	30	15	120
Yellow Clearance	5.3	3.0	3.0	5.3
Red Clearance	1.1	2.3	2.7	1.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5
Max Variable Initial *	46	-	-	46
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.4	-	-	3.4
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
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	LEGEND	EXISTING
○ →	Traffic Signal Head	● →
● →	Modified Signal Head	N/A
○ →	Sign	N/A
○ →	Pedestrian Signal Head With Push Button & Sign	○ →
○ →	Signal Pole with Guy	○ →
○ →	Signal Pole with Sidewalk Guy	○ →
□	Inductive Loop Detector	□
□	Controller & Cabinet	□
□	Junction Box	□
□	50mm Underground Conduit	□
N/A	Right of Way	- - - -
→	Directional Arrow	→
● ●	Construction Zone	● ●
● ●	Construction Zone Drums	● ●

Temporary Signal Design 2 (TMP Phase II)

Prepared in the Offices of:
 Transportation Mobility and Safety Solutions
 STATE OF NORTH CAROLINA
 SIGNAL DESIGN SECTION
 750 N. Greenfield Pkwy, Garner, NC 27524

US 220 at NC 65 (South)

Division 7 Rockingham County NE of Stokesdale

PLAN DATE: August 2011 REVIEWED BY: [Signature]

PREPARED BY: R. Hough REVIEWED BY: [Signature]

SCALE: 1:500

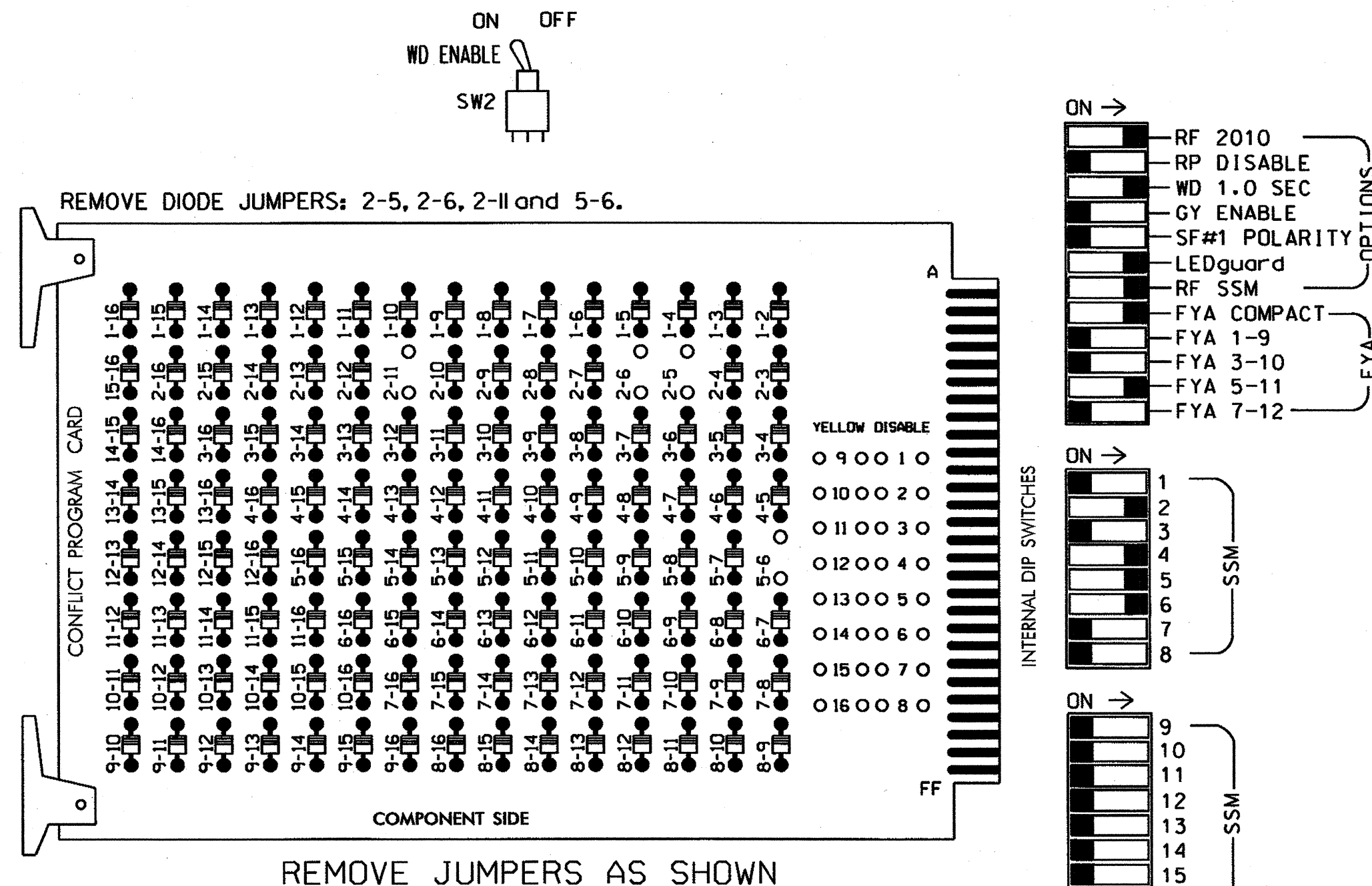
SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZIMMERMAN ENGINEER 8/24/11

SIG. INVENTORY NO. 07-1599T2

24-AUG-2011 16:54 C:\Users\mhz2413\Documents\Projects\07-1599T2\Sig.dgn 20110824.dgn

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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.
- Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

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.
- 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 1,3,7, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S5,S6,S6P.
PHASES USED.....2,4,5,6.
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

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 OLC	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51	61,62	51	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW							131					
YELLOW ARROW							132					
FLASHING YELLOW ARROW							133					
GREEN ARROW									120			
									*			

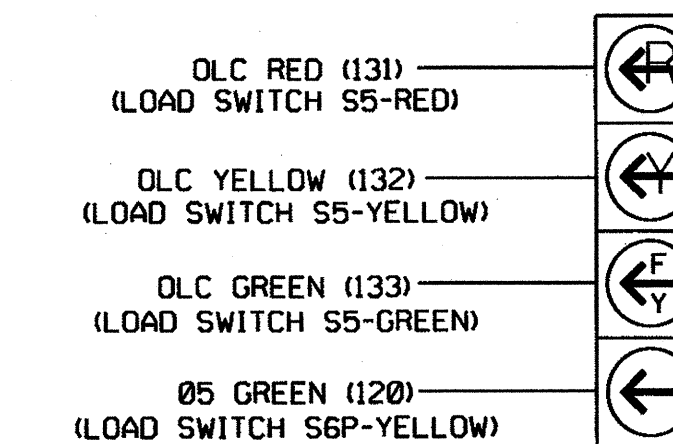
NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



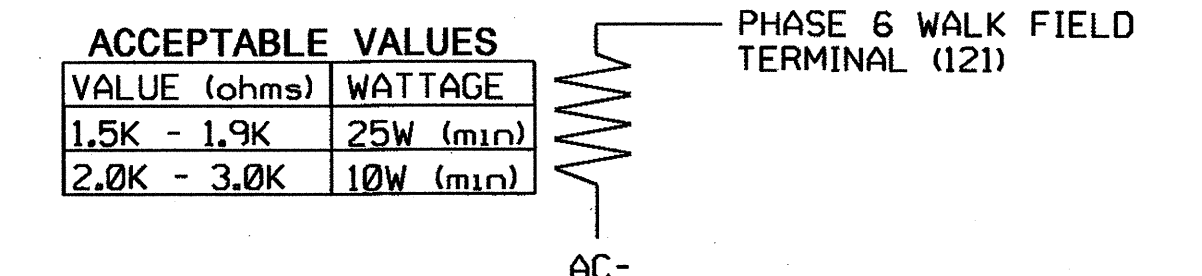
51

NOTE

- The sequence display for this signal requires special logic and output remapping. See sheets 2 and 3 for programming instructions.

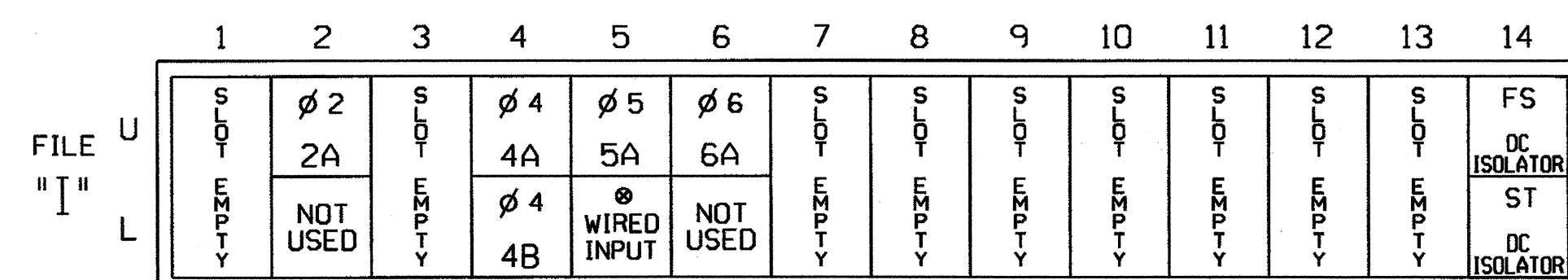
LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

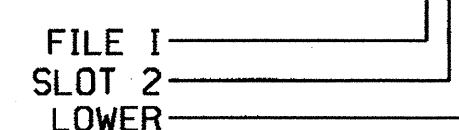
⊗ Wired Input - turn off Channel 2.

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			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			3
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			15
5A	TB21-9,10	I5U	55	17	5	5	Y	Y			15
		I5L	48	10	26	2	Y	Y	Y		3
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

! Add jumper from I5-F to I5-W, on rear of input file.

INPUT FILE POSITION LEGEND:



PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode on the 2010ECL-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 6 PY (field term. 120) to chan. 10 green (monitor pin R).

Follow the instructions below to make the appropriate connections:

- STEP 1: Fold down rear panel of output file.
- STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).
- STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

CMU-R ————— 6PY (term. 120)

NOTE: Some cabinet manufacturers use a molex plug to accomplish this wiring configuration. If connectors are used, simply plug the two connectors together that are labeled with the pin-out as shown above.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1599T2
DESIGNED: August 2011
SEALED: 08-24-11
REVISED: N/A

Temporary Signal Design 2 - Electrical Detail Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
UNIVERSITY OF NORTH CAROLINA
STATE OF NORTH CAROLINA
Signal Management Section

US 220
at
NC 65 (South)

Division 7 Rockingham County NE of Stokesdale

PLAN DATE: August 2011 REVIEWED BY: JLP

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

750 N. Greenfield Pkwy, Carrboro, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 008453
JAMES T. ROWE, JR.
ENGINEER

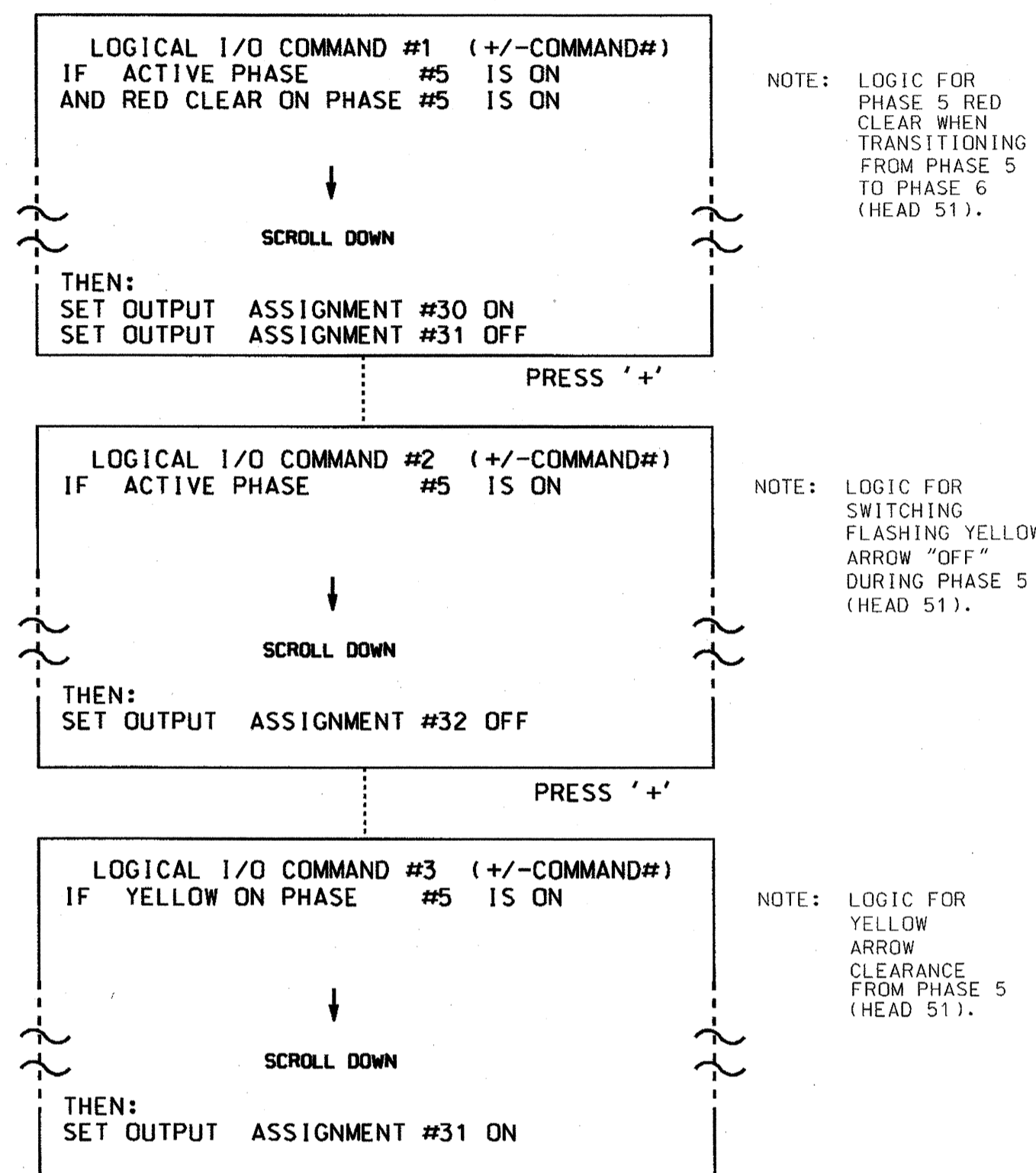
Signature: JLP Date: 8-31-11

SIG. INVENTORY NO. 07-1599T2

**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 and 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 30 = Overlap C Red
OUTPUT 31 = Overlap C Yellow
OUTPUT 32 = Overlap C Green
OUTPUT 34 = Phase 5 Green

Note: All outputs shown above have been remapped. See sheet 2 of this electrical detail.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE: 12345678910111213141516
 VEH OVL PARENTS: XX
 VEH OVL NOT VEH:
 VEH OVL NOT PED:
 VEH OVL GRN EXT:
 STARTUP COLOR: _ RED _ YELLOW _ GREEN
 FLASH COLORS: _ RED _ YELLOW X GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 GREEN EXTENSION (0-255 SEC)...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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1599T2
 DESIGNED: August 2011
 SEALED: 08-24-11
 REVISED: N/A

Temporary Signal Design 2 - Electrical Detail Sheet 2 of 3

<p>750 H.Greenfield Pkwy, Garner, NC 27529</p>	<p>US 220 at NC 65 (South)</p>										
	<p>Division 7 Rockingham County NE of Stokesdale</p>	<p>PLAN DATE: August 2011 REVIEWED BY: JLP</p>		<p>PREPARED BY: James Peterson REVIEWED BY:</p>							
<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		NO.	DESCRIPTION	INIT.	DATE					<p>SIGNATURE: <i>John T. Rowe</i> 8-31-11 DATE</p>	
NO.	DESCRIPTION	INIT.	DATE								
<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p>			<p>SIG. INVENTORY NO. 07-1599T2</p>								

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 51

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS), WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

STEP 1

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....Y
DETECTOR RESET.....Y
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....Y
CONTROLLER FLASH.....Y
RUN FREE.....Y
RESERVED.....Y
PREEMPT.....Y
SOFT PREEMPT.....Y
ANY PREEMPT.....Y
COORDINATION PLAN.....Y
OFFSET.....Y
PHASE CHECK.....Y
PHASE ON.....Y
PHASE NEXT.....Y
    
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...0
    
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

```

PAGE:1 C1 PIN:32 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....Y
DETECTOR RESET.....Y
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....Y
CONTROLLER FLASH.....Y
RUN FREE.....Y
RESERVED.....Y
PREEMPT.....Y
SOFT PREEMPT.....Y
ANY PREEMPT.....Y
COORDINATION PLAN.....Y
OFFSET.....Y
PHASE CHECK.....Y
PHASE ON.....Y
PHASE NEXT.....Y
    
```

PRESS "+" KEY FOR OUTPUT 31

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

STEP 2

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....Y
DETECTOR RESET.....Y
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....Y
CONTROLLER FLASH.....Y
RUN FREE.....Y
RESERVED.....Y
PREEMPT.....Y
SOFT PREEMPT.....Y
ANY PREEMPT.....Y
COORDINATION PLAN.....Y
OFFSET.....Y
PHASE CHECK.....Y
PHASE ON.....Y
PHASE NEXT.....Y
    
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...1
    
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

```

PAGE:1 C1 PIN:33 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....Y
DETECTOR RESET.....Y
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....Y
CONTROLLER FLASH.....Y
RUN FREE.....Y
RESERVED.....Y
PREEMPT.....Y
SOFT PREEMPT.....Y
ANY PREEMPT.....Y
COORDINATION PLAN.....Y
OFFSET.....Y
PHASE CHECK.....Y
PHASE ON.....Y
PHASE NEXT.....Y
    
```

PRESS "+" KEY FOR OUTPUT 32

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

STEP 3

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....Y
DETECTOR RESET.....Y
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....Y
CONTROLLER FLASH.....Y
RUN FREE.....Y
RESERVED.....Y
PREEMPT.....Y
SOFT PREEMPT.....Y
ANY PREEMPT.....Y
COORDINATION PLAN.....Y
OFFSET.....Y
PHASE CHECK.....Y
PHASE ON.....Y
PHASE NEXT.....Y
    
```

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...2
    
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

```

PAGE:1 C1 PIN:34 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....Y
DETECTOR RESET.....Y
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....Y
CONTROLLER FLASH.....Y
RUN FREE.....Y
RESERVED.....Y
PREEMPT.....Y
SOFT PREEMPT.....Y
ANY PREEMPT.....Y
COORDINATION PLAN.....Y
OFFSET.....Y
PHASE CHECK.....Y
PHASE ON.....Y
PHASE NEXT.....Y
    
```

PRESS "+" TWICE TO REACH OUTPUT 34.

STEP 4

```

PAGE:1 C1 PIN:36 NOT ENABLED
OUTPUT ASSIGNMENT #.....34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....Y
DETECTOR RESET.....Y
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....Y
CONTROLLER FLASH.....Y
RUN FREE.....Y
RESERVED.....Y
PREEMPT.....Y
SOFT PREEMPT.....Y
ANY PREEMPT.....Y
COORDINATION PLAN.....Y
OFFSET.....Y
PHASE CHECK.....Y
PHASE ON.....Y
PHASE NEXT.....Y
    
```

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE PHASE.

```

PAGE:1 C1 PIN:36 NOT ENABLED
SELECT VEHICLE PHASE (1-16)...5
SELECT COLOR(0=RED,1=YEL,2=GRN)...2
    
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER INPUTTING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

```

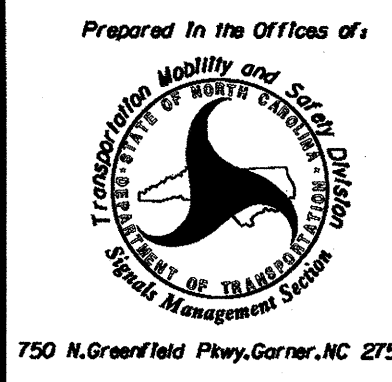
PAGE:1 C1 PIN:36 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....Y
DETECTOR RESET.....Y
ADVANCE BEACON.....Y
OUT OF PHASE FLASHER.....Y
CONTROLLER FLASH.....Y
RUN FREE.....Y
RESERVED.....Y
PREEMPT.....Y
SOFT PREEMPT.....Y
ANY PREEMPT.....Y
COORDINATION PLAN.....Y
OFFSET.....Y
PHASE CHECK.....Y
PHASE ON.....Y
PHASE NEXT.....Y
    
```

OUTPUT PROGRAMMING FOR HEAD 51 COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1599T2
DESIGNED: August 2011
SEALED: 08-24-11
REVISED: N/A

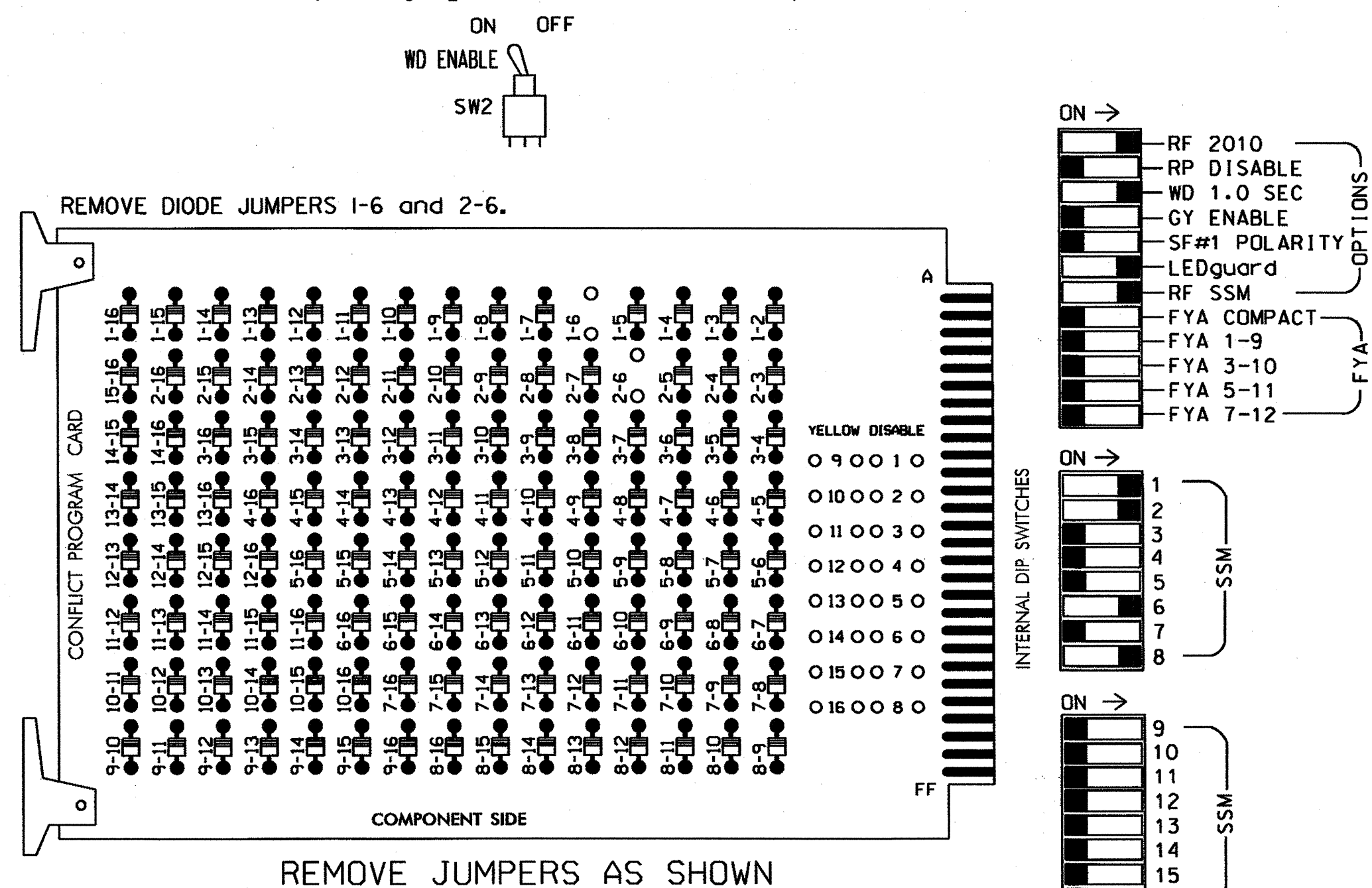
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Temporary Signal Design 2 - Electrical Detail Sheet 3 of 3

 <p>Prepared In the Offices of: Transportation Mobility and Safety Division STATE OF NORTH CAROLINA Signal Management Section 750 N. Greenfield Pkwy, Corner, NC 27529</p>	<p>US 220 at NC 65 (South)</p>	<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR. DATE</p>									
	<p>Division 7 Rockingham County NE of Stokesdale</p> <p>PLAN DATE: August 2011 REVIEWED BY: <i>JWA</i></p> <p>PREPARED BY: James Peterson REVIEWED BY:</p>	<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						
REVISIONS	INIT.	DATE									

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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.
- 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 3,4,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S6,S8
 PHASES USED.....1,2,6,8
 OVERLAPS.....NONE

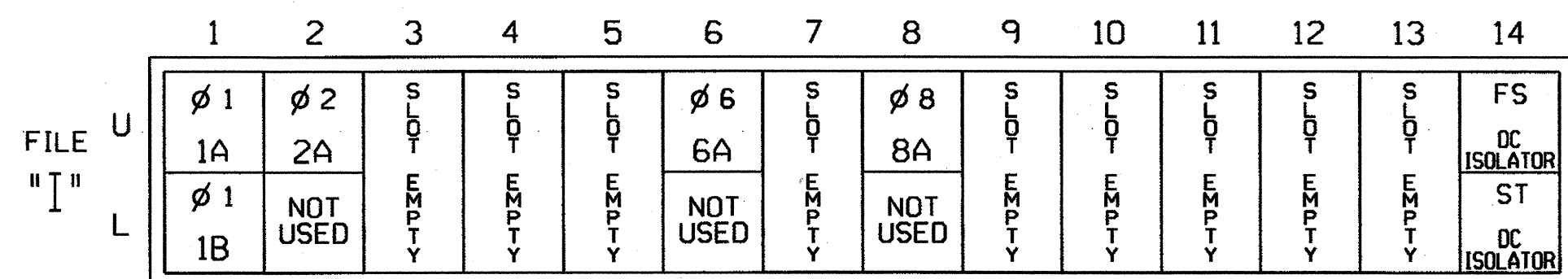
SIGNAL HEAD HOOK-UP CHART

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	NU	NU	NU	NU	61,62	NU	NU	81,82 83	NU
RED			128					134			107	
YELLOW			129					135			108	
GREEN			130					136			109	
RED ARROW	125											
YELLOW ARROW	126	126										
GREEN ARROW	127	127										

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



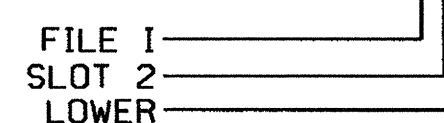
EX.: 1A, 2A, ETC. = LOOP NO.'S

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	TB21-1,2	I1U	56	18	1	1	Y	Y			
1B	TB23-1,2	I1L	47	9	22	1	Y	Y			15
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			3

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-2174T1
 DESIGNED: August 2011
 SEALED: 08-24-11
 REVISED: N/A

Temporary Signal Design 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
 Transportation Mobility and Safety
 UNIVERSITY OF NORTH CAROLINA
 SCHOOL OF TRANSPORTATION
 Signal Management Section
 750 N. Greenfield Pkwy, Garner, NC 27529

US 220 at NC 65 (North)

Division 7 Rockingham County NE of Stokesdale

PLAN DATE: August 2011 REVIEWED BY: JLP

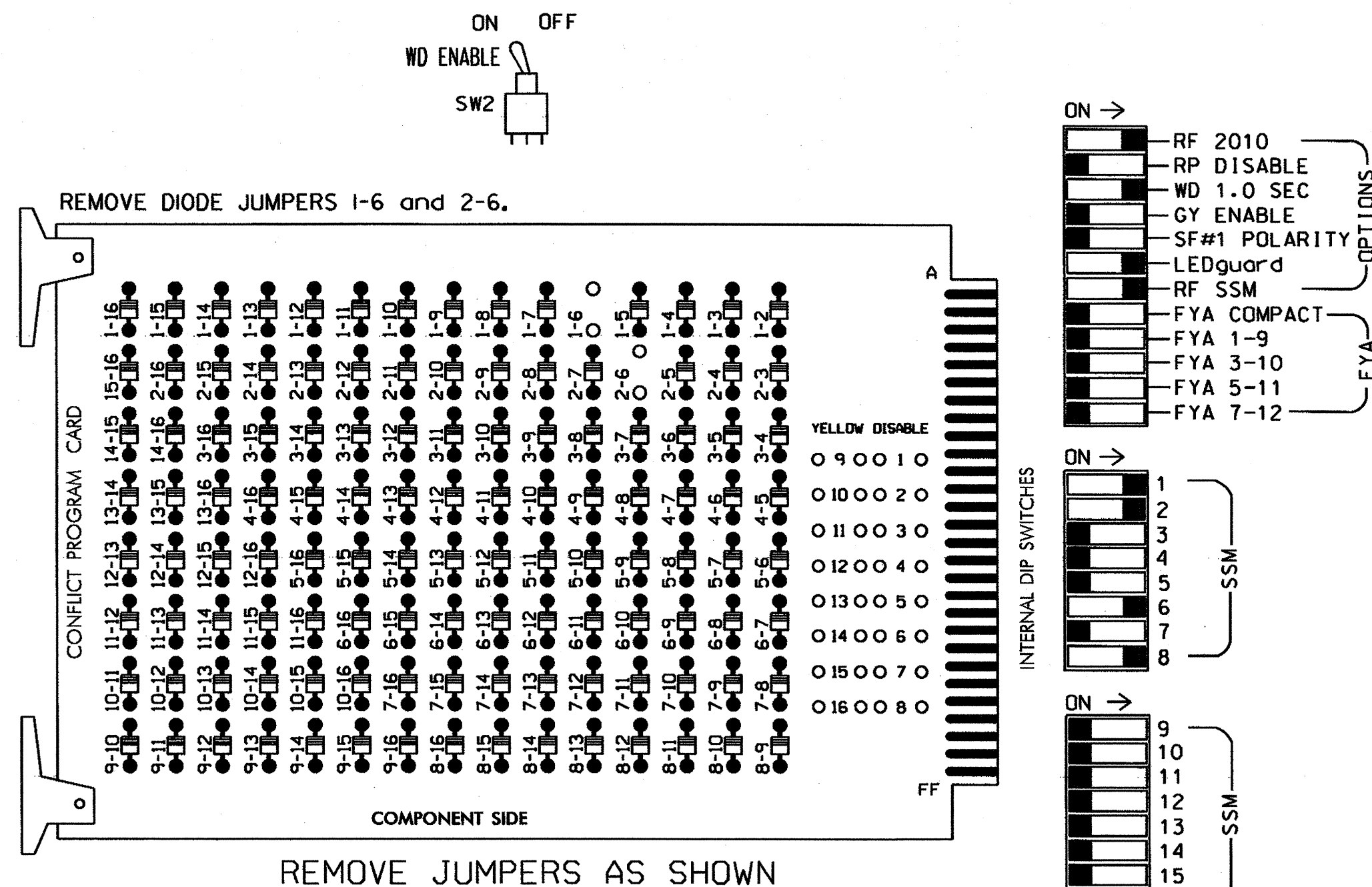
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 008453
 JOHN T. ROWE, JR.
 SIGNATURE DATE 8-31-11
 SIG. INVENTORY NO. 07-2174T1

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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.

■ = DENOTES POSITION OF SWITCH

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.
- 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 3,4,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S6,S8
 PHASES USED.....1,2,6,8
 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	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82 83	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW	125											
YELLOW ARROW	126											
GREEN ARROW	127											

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
∅ 1	∅ 2	S	S	S	∅ 6	S	∅ 8	S	S	S	S	S	S	FS
1A	2A	∅ 1	∅ 2	∅ 3	6A	∅ 4	8A	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	DC ISOLATOR
NOT USED	NOT USED	∅ 1	∅ 2	∅ 3	NOT USED	∅ 4	8B	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	ST
		∅ 1	∅ 2	∅ 3		∅ 4		∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	DC ISOLATOR

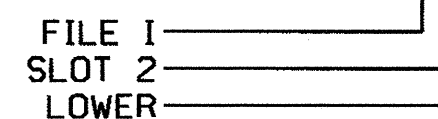
EX. : 1A, 2A, ETC. = LOOP NO.'S

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	TB21-1,2	I1U	56	18	1	1	Y	Y			
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			
8A	TB22-1,2	I8U	42	4	8	8	Y	Y			5
8B	TB24-1,2	I8L	46	8	18	8	Y	Y			15

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-2174T2
 DESIGNED: August 2011
 SEALED: 08-24-11
 REVISED: N/A

Temporary Signal Design 2

Electrical and Programming Details For:

Prepared in the Office of:

 750 N. Greenfield Pkwy, Garner, NC 27529

US 220 at NC 65 (North)

Division 7 Rockingham County NE of Stokesdale

PLAN DATE: August 2011 REVIEWED BY: *[Signature]*

PREPARED BY: James Peterson REVIEWED BY:

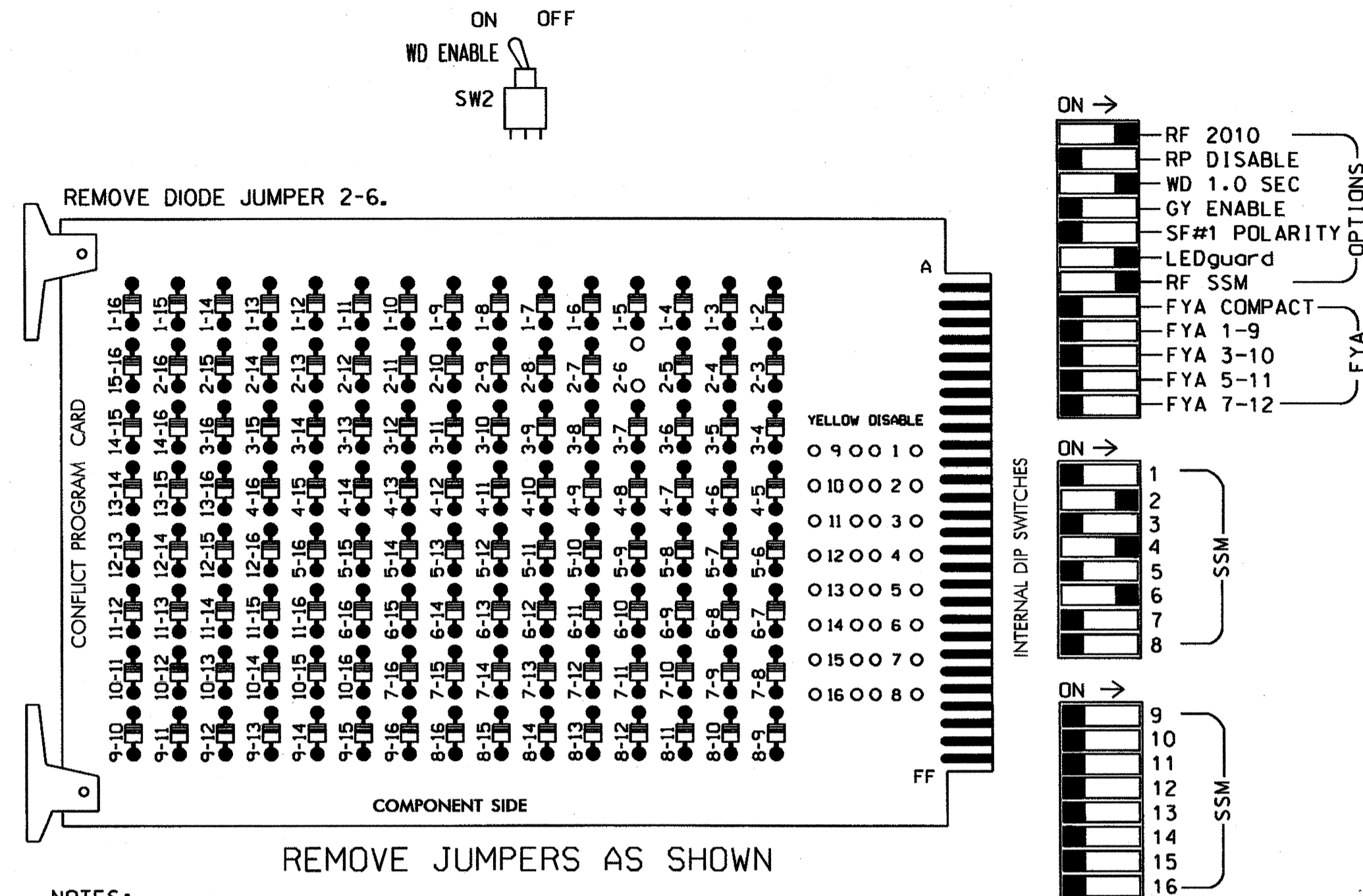
REVISIONS	INIT.	DATE

SIGNATURE: *[Signature]* DATE: 8-31-11

SIG. INVENTORY NO. 07-2174T2

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. The installer shall 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, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S4,S6.
 PHASES USED.....2,4,6.
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

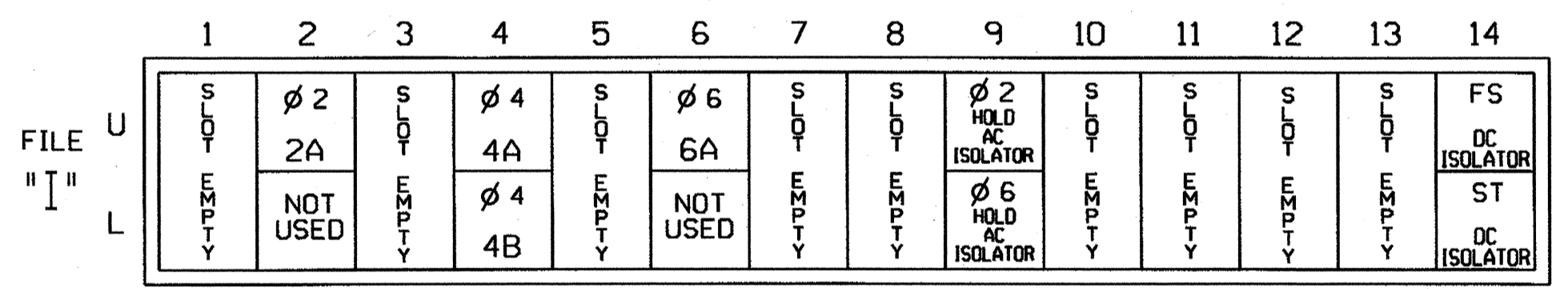
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41, 42,43	NU	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



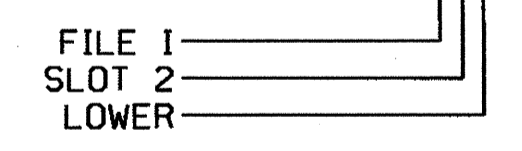
EX.: 1A, 2A, ETC. = LOOP NO.'S

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
2A	TB21-3,4	I2U	39	1	2	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			15
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0282T1
 DESIGNED: July 2011
 SEALED: 08-16-11
 REVISED: N/A

Signal Upgrade - Temporary 1 - Sheet 1 of 4

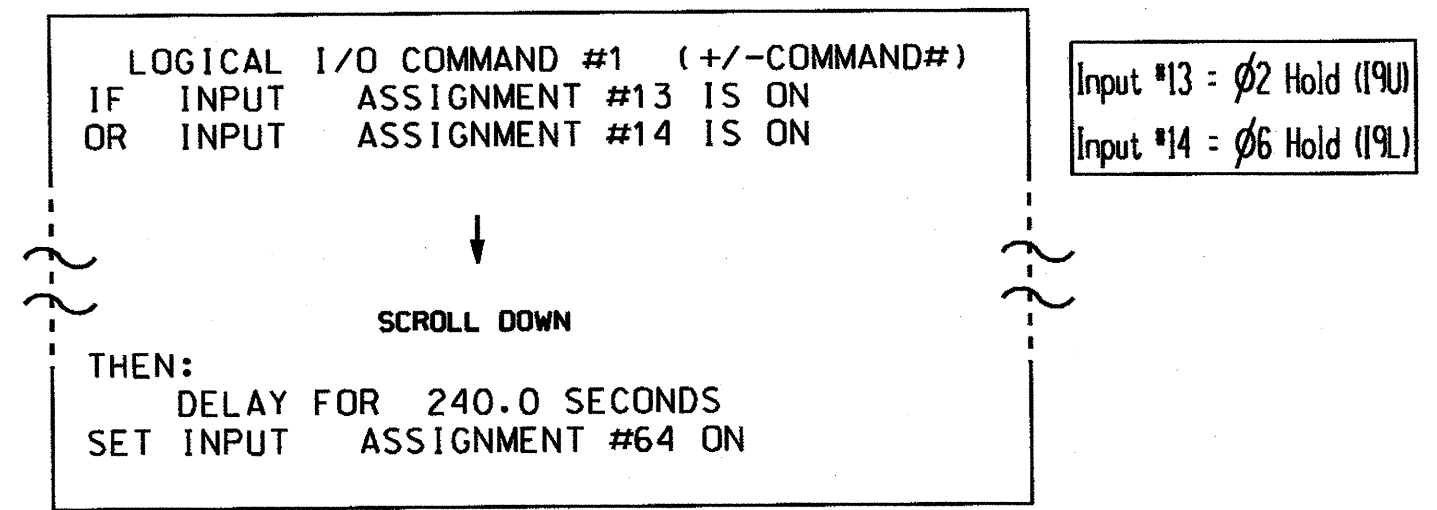
Prepared in the Offices of: 750 N. Greenfield Pkwy, Corner, NC 27529	US 220 at NC 68		SEAL JOHN T. ROWE, P.E.
	Division 7 Rockingham County NE OF Stokesdale		
PLAN DATE: August 2011 PREPARED BY: James Peterson	REVIEWED BY: JTR REVIEWED BY:	REVISIONS INIT. DATE	SIGNATURE: <i>John Rowe</i> 8-19-11 DATE:
			SIG. INVENTORY NO. 07-0282T1

18-AUG-2011 10:15
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 J.Peterson

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu press '6' (Outputs), Then '3' (Logical I/O Processor).
- The programming shown below will place the controller in flash if the output of either Long Vehicle Detection Unit is active for longer than 4 minutes



- From Main Menu press '2' (Phase Control), Then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Logic Flag 1.

INPUT ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '5' (INPUTS), THEN '+' UNTIL PIN 51 (INPUT 13) IS REACHED.

PAGE: 1 C1 PIN:51 HOLD PHASES
 INPUT ASSIGNMENT #.....13
 DEBOUNCE TIME (0-25.5 SEC).....0.5
 DELAY TIME (0-25.5 SEC).....0.0
 HOLD-OVER TIME (0-25.5 SEC).....0.0
 ASSIGNMENT SELECTION:
 NOT ENABLED (Y/N).....
 VEHICLE DETECTOR (1-64).....
 PEDESTRIAN DETECTOR (1-16).....
 ALTERNATE PED DETECTOR (1-16).....
 PREEMPT (1-10).....
 INVERTED PREEMPT (1-10).....
 STOP TIME (Y/N).....
 FLASH SENSE (Y/N).....
 DOOR OPEN (Y/N).....
 MANUAL CONTROL ENABLE (Y/N).....
 MANUAL CONTROL ADVANCE (Y/N).....
 SPECIAL FUNCTION ALARM (1-8).....
 TOD HOUR SYNCHRONIZATION (0-23).....
 FORCE OFF RING (1-4).....
 HOLD PHASES (1-16).....2
 PLAN (65=FLSH,66=FREE)... OFFSET#...
 CHANGE PHASE SEQUENCE PAGE (1-12)....
 CHANGE PHASE TIMING PAGE (1-4).....
 CHANGE PHASE CONTROL PAGE (1-4).....
 CHANGE OVERLAP CONTROL PAGE (1-4)....
 CHANGE INPUT PAGE (1-4).....
 CHANGE OUTPUT PAGE (1-4).....
 OVERRIDE PHASE CONTROL FUNCTION (Y)..

PAGE: 1 C1 PIN:52 HOLD PHASES
 INPUT ASSIGNMENT #.....14
 DEBOUNCE TIME (0-25.5 SEC).....0.5
 DELAY TIME (0-25.5 SEC).....0.0
 HOLD-OVER TIME (0-25.5 SEC).....0.0
 ASSIGNMENT SELECTION:
 NOT ENABLED (Y/N).....
 VEHICLE DETECTOR (1-64).....
 PEDESTRIAN DETECTOR (1-16).....
 ALTERNATE PED DETECTOR (1-16).....
 PREEMPT (1-10).....
 INVERTED PREEMPT (1-10).....
 STOP TIME (Y/N).....
 FLASH SENSE (Y/N).....
 DOOR OPEN (Y/N).....
 MANUAL CONTROL ENABLE (Y/N).....
 MANUAL CONTROL ADVANCE (Y/N).....
 SPECIAL FUNCTION ALARM (1-8).....
 TOD HOUR SYNCHRONIZATION (0-23).....
 FORCE OFF RING (1-4).....
 HOLD PHASES (1-16).....6
 PLAN (65=FLSH,66=FREE)... OFFSET#...
 CHANGE PHASE SEQUENCE PAGE (1-12)....
 CHANGE PHASE TIMING PAGE (1-4).....
 CHANGE PHASE CONTROL PAGE (1-4).....
 CHANGE OVERLAP CONTROL PAGE (1-4)....
 CHANGE INPUT PAGE (1-4).....
 CHANGE OUTPUT PAGE (1-4).....
 OVERRIDE PHASE CONTROL FUNCTION (Y)..

PAGE: 1 C1 PIN:0 PLAN
 INPUT ASSIGNMENT #.....64
 DEBOUNCE TIME (0-25.5 SEC).....0.5
 DELAY TIME (0-25.5 SEC).....0.0
 HOLD-OVER TIME (0-25.5 SEC).....0.0
 ASSIGNMENT SELECTION:
 NOT ENABLED (Y/N).....
 VEHICLE DETECTOR (1-64).....
 PEDESTRIAN DETECTOR (1-16).....
 ALTERNATE PED DETECTOR (1-16).....
 PREEMPT (1-10).....
 INVERTED PREEMPT (1-10).....
 STOP TIME (Y/N).....
 FLASH SENSE (Y/N).....
 DOOR OPEN (Y/N).....
 MANUAL CONTROL ENABLE (Y/N).....
 MANUAL CONTROL ADVANCE (Y/N).....
 SPECIAL FUNCTION ALARM (1-8).....
 TOD HOUR SYNCHRONIZATION (0-23).....
 FORCE OFF RING (1-4).....
 HOLD PHASES (1-16).....
 PLAN (65=FLSH,66=FREE)..65 OFFSET#..0
 CHANGE PHASE SEQUENCE PAGE (1-12)....
 CHANGE PHASE TIMING PAGE (1-4).....
 CHANGE PHASE CONTROL PAGE (1-4).....
 CHANGE OVERLAP CONTROL PAGE (1-4)....
 CHANGE INPUT PAGE (1-4).....
 CHANGE OUTPUT PAGE (1-4).....
 OVERRIDE PHASE CONTROL FUNCTION (Y)..

PRESS '+'

PRESS '+' until input assignment #64 is reached

PROGRAMMING COMPLETE

Note: Program for Plan 65 and Offset 0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0282T1
 DESIGNED: July 2011
 SEALED: 08-16-11
 REVISED: N/A

19-AUG-2011 10:17 S:\TSS\JMTS\SIGNAL\work\gr\0282T1\mle_0282T1.dgn J Peterson

Signal Upgrade - Temporary 1 - Sheet 2 of 4

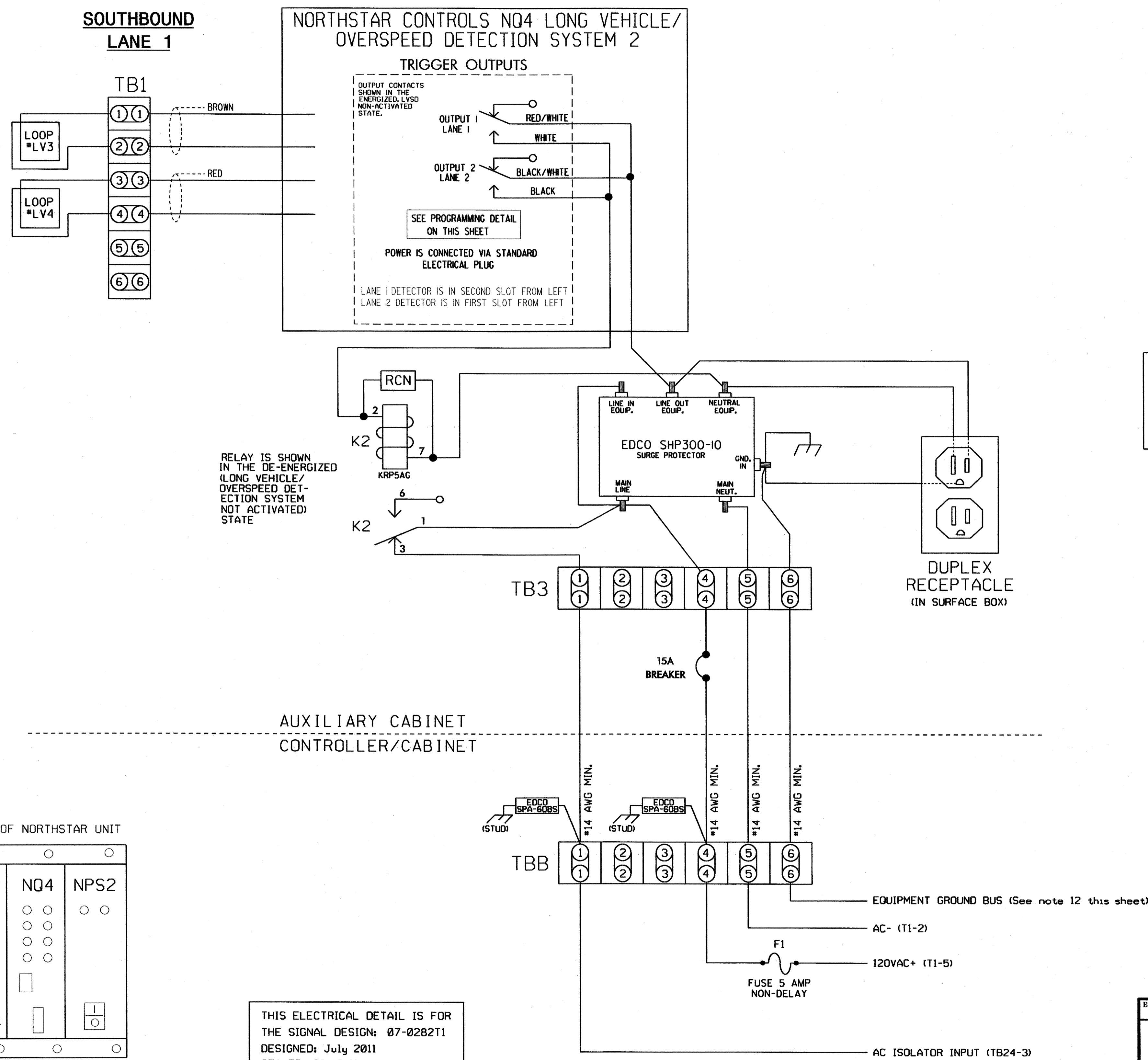
	US 220 at NC 68		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR. 8-19-11
	Division 7 PLAN DATE: August 2011 PREPARED BY: James Peterson	Rockingham County REVIEWED BY: JPK REVIEWED BY:	

SIG. INVENTORY NO. 07-0282T1

WIRING DETAIL FOR NORTHSTAR CONTROLS NQ4 LONG VEHICLE / OVERSPEED DETECTION SYSTEM NO. 2
(wire unit as shown below)

NOTES

1. All loop lead-ins shall be twisted.
2. Loop spacing is critical to the proper operation of this Overspeed Detection System. Make sure loop spacing is correctly programmed in NQ4 Unit.
3. Insure that connectors on rear of NQ4 are seated securely.
4. NQ4 Unit shall be located in an auxiliary cabinet adjacent to Speed Warning System Loops.
5. Unit power is connected by standard electrical plug.
6. Terminal strips TB1, TB2, TB3, & TBB to be added by installer.
7. Relay 'K2' is a SPDT with an 120VAC coil. Potter & Brumfield no. KRP5AGAG. Dot Material no. 625028600.
8. The RC Network across the coil of 'K2' is a .1 micro farad, 100 ohm. Dot Material no. 106018075. P&B no. 104M060C100
9. EDCO SPA-60BS is a surge protector for 120VAC interconnect circuits. Dot Material no. 625022076.
10. EDCO SHP300-10 is an AC service surge protector. Dot Material no. 625022075.
11. Do not install ground rods at auxiliary cabinet.
12. Install equipment ground from controller cabinet to auxiliary cabinet if not already present.
13. Install disconnect if there is no disconnect present at auxiliary cabinet.



NORTHSTAR CONTROLS MODEL NQ4
PROGRAMMING DETAIL
 (program unit as shown)

NOTE: UNIT MUST BE PROGRAMMED USING PC AND HYPERTERMINAL PROGRAM. FOR CONNECTION TO HYPERTERMINAL REFER TO NQ4 OPERATION MANUAL.

PROGRAM NQ4 BY TYPING THE FOLLOWING COMMANDS

1. SET SPEED=55
2. SET LENGTH=22'
3. SET ALARMTIME=12
4. SET SEPARATION=28' (LEADING EDGE TO LEADING EDGE) (THIS VALUE MAY VARY, PROGRAM ACTUAL MEASURED SEPARATION)
5. SET LOOP LENGTH=6' (THIS VALUE MAY VARY, PROGRAM ACTUAL MEASURED LOOP LENGTH)
6. SAVE

NOTE
 PROGRAMMING APPLIES TO LANE 1

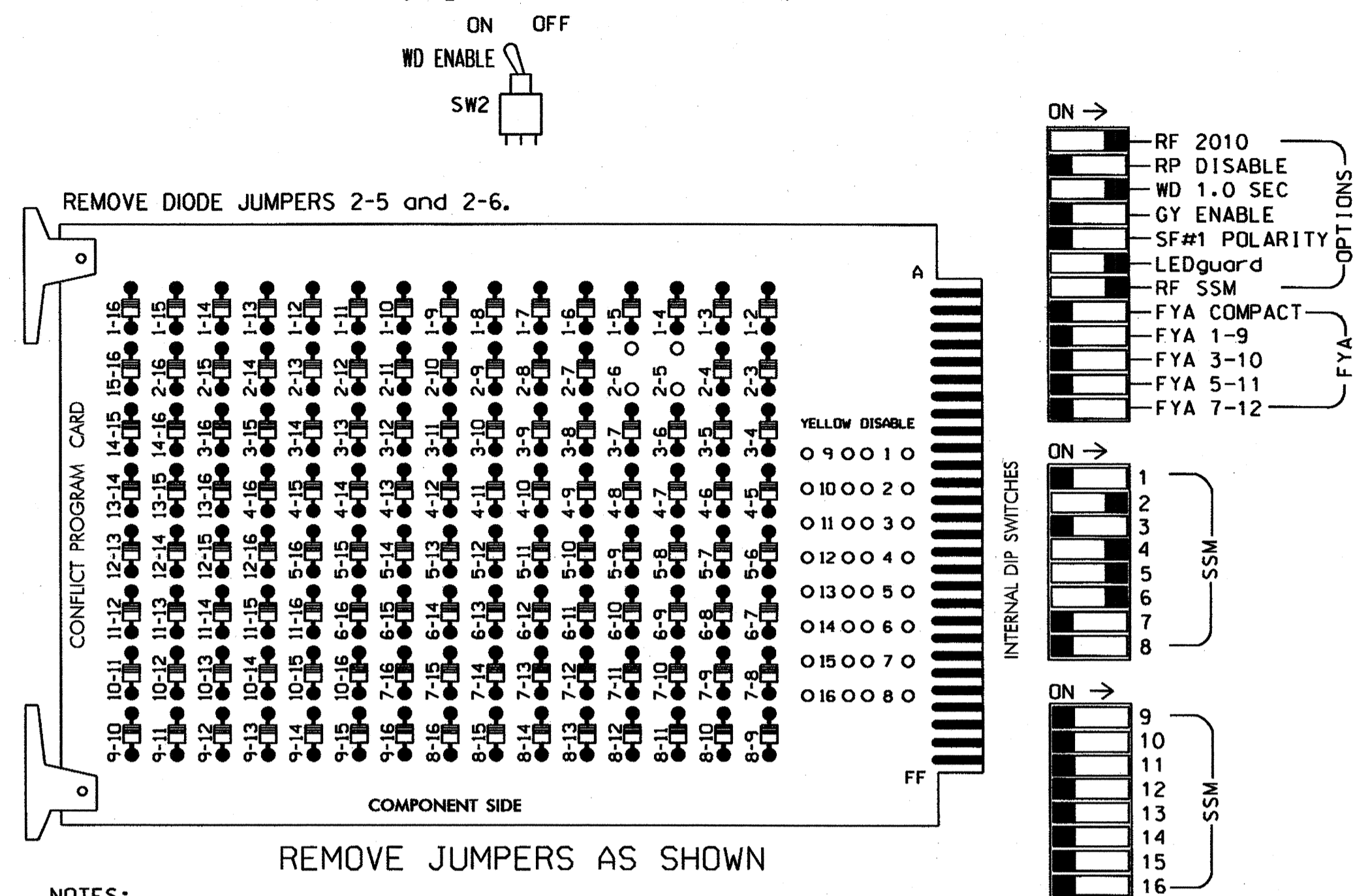
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 J.Peterson

Signal Upgrade - Temporary 1 - Sheet 4 of 4

	<p>US 220 at NC 68</p>		
	<p>Division 7 Rockingham County NE of Stokesdale</p>	<p>PLAN DATE: August 2011 REVIEWED BY: JTR</p>	
<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>SIGNATURE: <i>John T. Rowe</i> DATE: 8-19-11</p>	<p>SIG. INVENTORY NO. 07-0282T1</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. The installer shall 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 1,3,7, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S4,S5,S6
PHASES USED.....2,4,5,6.
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

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.	NU	21,22	NU	NU	41, 42,43	62	NU	42	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU
RED		128			101					134								
YELLOW		129			102					135								
GREEN		130			103					136								
RED ARROW										131								
YELLOW ARROW						102		132	132									
GREEN ARROW						103		133	133									

NU = Not Used

INPUT FILE POSITION LAYOUT

(from view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	S LOT 1	∅ 2 2A	S LOT 3	S LOT 4	S LOT 5	∅ 4 4A	S LOT 7	S LOT 8	S LOT 9	S LOT 10	S LOT 11	S LOT 12	S LOT 13	FS DC ISOLATOR
FILE "J"	∅ 5 5A	∅ 5 5B	NOT USED	S LOT 4	S LOT 5	S LOT 6	S LOT 7	S LOT 8	S LOT 9	S LOT 10	S LOT 11	S LOT 12	S LOT 13	∅ 2 HOLD AC ISOLATOR
	NOT USED	NOT USED	∅ 6 6B	S LOT 4	S LOT 5	S LOT 6	S LOT 7	S LOT 8	S LOT 9	S LOT 10	S LOT 11	S LOT 12	S LOT 13	∅ 6 HOLD AC ISOLATOR

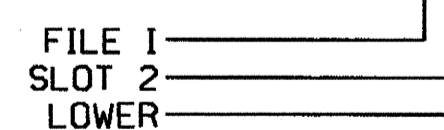
EX. : 1A, 2A, ETC. = LOOP NO.'S

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	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			15
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0282T2
DESIGNED: July 2011
SEALED: 08-16-11
REVISED: N/A

Signal Upgrade - Temporary 2 - Sheet 1 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
TRANSPORTATION MOBILITY AND SAFETY DIVISION
UNIVERSITY OF NORTH CAROLINA
SCHOOL OF TRANSPORTATION
Signal Management Division
750 N. Greenfield Pkwy, Garner, NC 27529

US 220
at
NC 68

Division 7
Rockingham County
NE of Stokesdale

PLAN DATE: August 2011
REVIEWED BY: JTK

PREPARED BY: James Peterson
REVIEWED BY:

REVISIONS: INIT. DATE

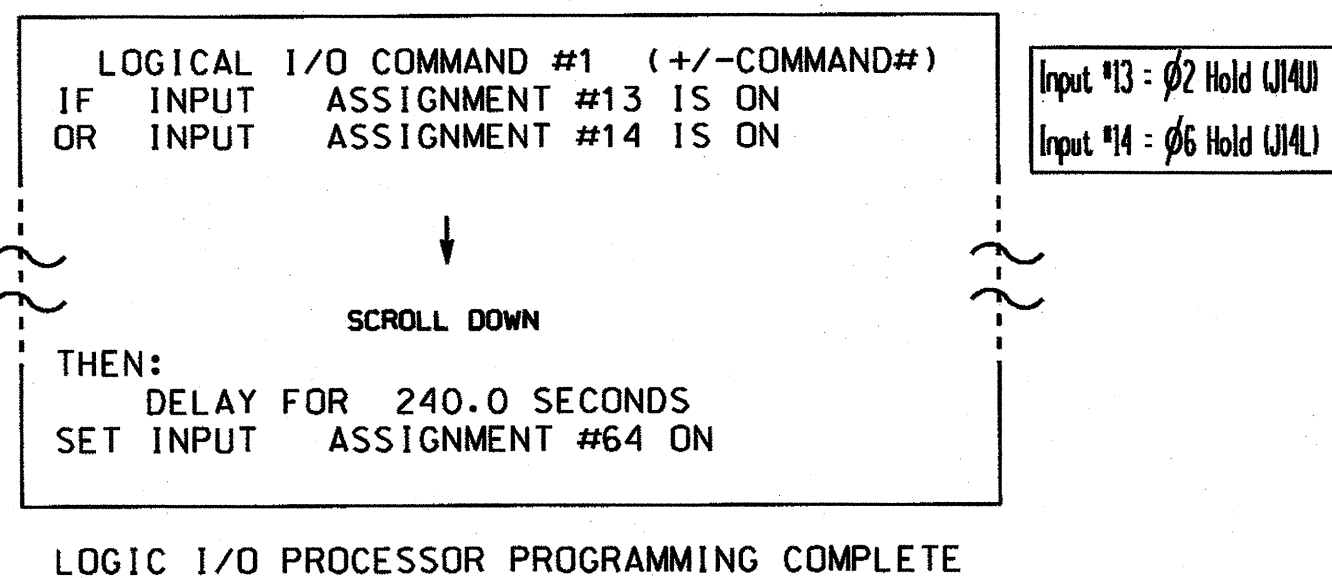
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 008453
JOHN T. ROWE, PE

Signature: John Rowe 8-19-11
DATE

SIG. INVENTORY NO. 07-0282T2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
(program controller as shown below)

- From Main Menu press '6' (Outputs), Then '3' (Logical I/O Processor).
- The programming shown below will place the controller in flash if the output of either Long Vehicle Detection Unit is active for longer than 4 minutes



- From Main Menu press '2' (Phase Control), Then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Logic Flag 1.

INPUT ASSIGNMENT PROGRAMMING DETAIL
(program controller as shown below)

FROM MAIN MENU PRESS '5' (INPUTS), THEN '+' UNTIL PIN 51 (INPUT 13) IS REACHED.

```

PAGE: 1 C1 PIN:51 HOLD PHASES
INPUT ASSIGNMENT #.....13
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....2
PLAN (65=FLSH,66=FREE)... OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)...
  
```

PRESS '+'

```

PAGE: 1 C1 PIN:52 HOLD PHASES
INPUT ASSIGNMENT #.....14
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....6
PLAN (65=FLSH,66=FREE)... OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)...
  
```

PRESS '+' until input assignment #64 is reached

```

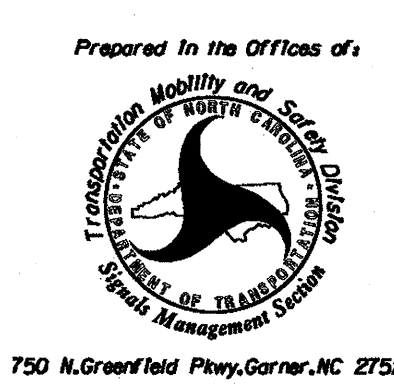
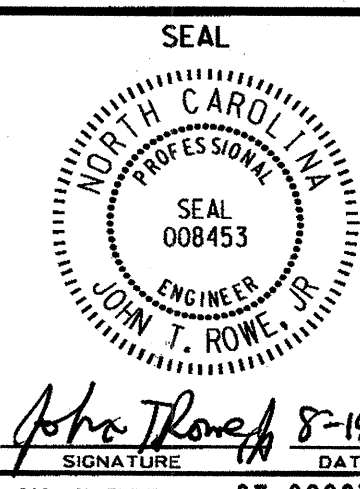
PAGE: 1 C1 PIN:0 PLAN
INPUT ASSIGNMENT #.....64
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)..65 OFFSET#..0
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)...
  
```

PROGRAMMING COMPLETE

Note: Program for Plan 65 and Offset 0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0282T2
DESIGNED: July 2011
SEALED: 08-16-11
REVISED: N/A

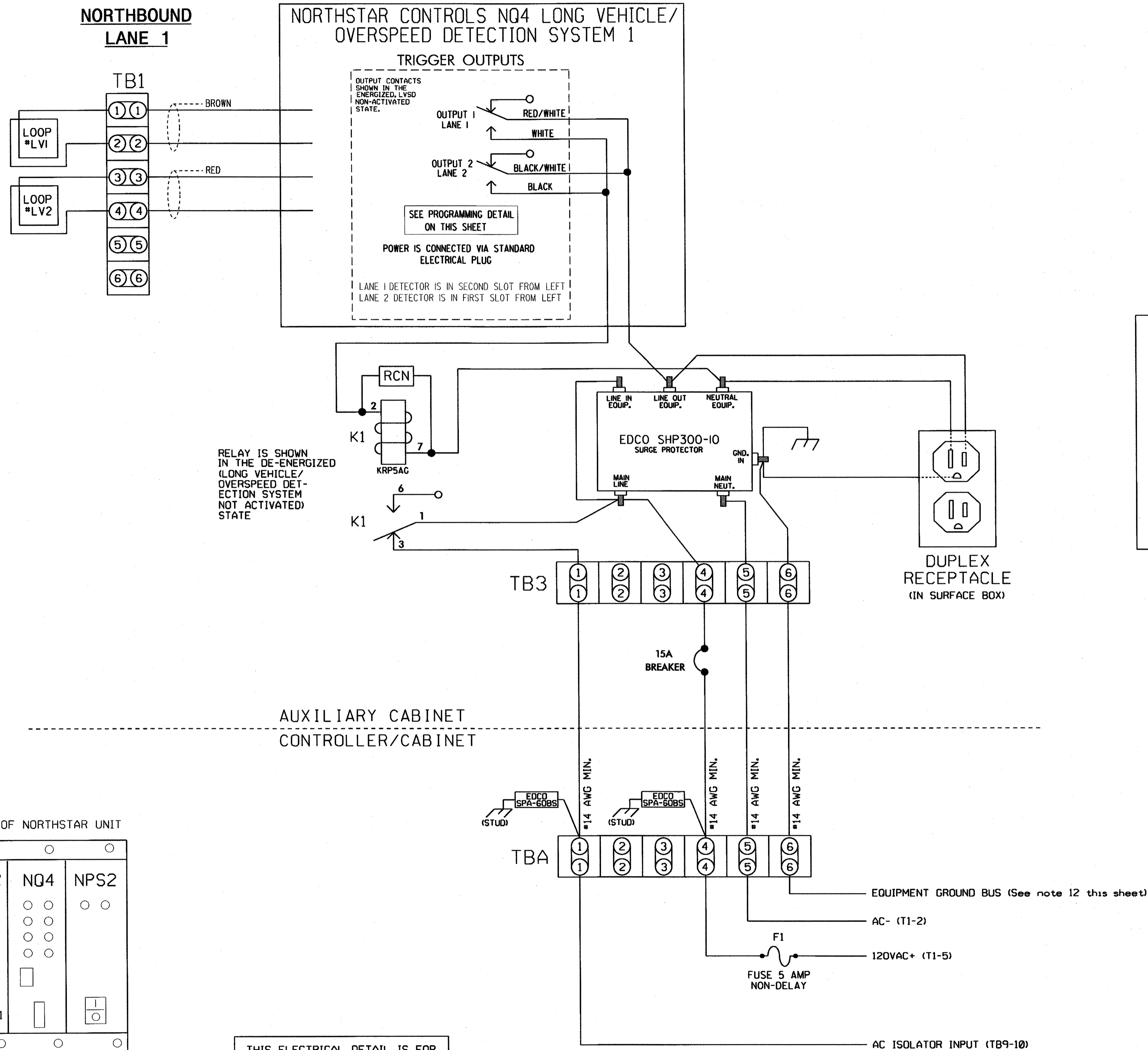
Signal Upgrade - Temporary 2 - Sheet 2 of 4

	US 220 at NC 68		
	Division 7 PLAN DATE: August 2011 PREPARED BY: James Peterson	Rockingham County REVIEWED BY: JTR REVIEWED BY:	
REVISIONS		INIT.	DATE
Signature: <i>John T. Rowe</i> 8-19-11 DATE		SIG. INVENTORY NO. 07-0282T2	

19-AUG-2011 10:19 511115304113 Signal\smc\groups\sig Manager\jpeterson\070282T2.dwg (e:\xxx.dgn)

WIRING DETAIL FOR NORTHSTAR CONTROLS NQ4 LONG VEHICLE / OVERSPEED DETECTION SYSTEM NO. 1

(wire unit as shown below)



NOTES

1. All loop lead-ins shall be twisted.
2. Loop spacing is critical to the proper operation of this Overspeed Detection System. Make sure loop spacing is correctly programmed in NQ4 Unit.
3. Insure that connectors on rear of NQ4 are seated securely.
4. NQ4 Unit shall be located in an auxiliary cabinet adjacent to Speed Warning System loops.
5. Unit power is connected by standard electrical plug.
6. Terminal strips TB1, TB3, & TBA to be added by installer.
7. Relay 'K1' is a SPDT with an 120VAC coil. Potter & Brumfield no. KRP5AGAG. Dot Material no. 625028600.
8. The RC Network across the coil of 'K1' is a .1 micro farad, 100 ohm. Dot Material no. 106018075. P&B no. 104M060C100
9. EDCO SPA-60BS is a surge protector for 120VAC interconnect circuits. Dot Material no. 625022076.
10. EDCO SHP300-10 is an AC service surge protector. Dot Material no. 625022075.
11. Do not install ground rods at auxiliary cabinet.
12. Install equipment ground from controller cabinet to auxiliary cabinet if not already present.
13. Install disconnect if there is no disconnect present at auxiliary cabinet.
14. IMPORTANT! A jumper must be installed between input file terminals J14-E and J14-K if not already present.
15. IMPORTANT! For proper operation of the Long Vehicle Detection Unit, tie TB9-12 to AC neutral.
16. IMPORTANT! Make sure both channels of AC Isolator card inserted at input file position J14 are set for inverted operation.

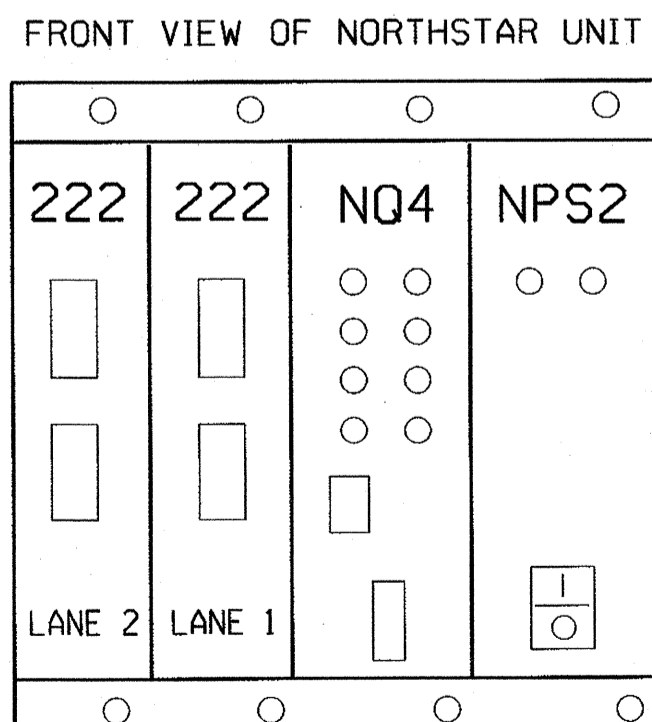
**NORTHSTAR CONTROLS MODEL NQ4
PROGRAMMING DETAIL**
(program unit as shown)

NOTE: UNIT MUST BE PROGRAMMED USING PC AND HYPERTERMINAL PROGRAM. FOR CONNECTION TO HYPERTERMINAL REFER TO NQ4 OPERATION MANUAL.

PROGRAM NQ4 BY TYPING THE FOLLOWING COMMANDS

1. SET SPEED=55
2. SET LENGTH=22'
3. SET ALARMTIME=12
4. SET SEPARATION=28' (LEADING EDGE TO LEADING EDGE)
(THIS VALUE MAY VARY. PROGRAM ACTUAL MEASURED SEPARATION)
5. SET LOOP LENGTH=6'
(THIS VALUE MAY VARY. PROGRAM ACTUAL MEASURED LOOP LENGTH)
6. SAVE

NOTE
PROGRAMMING APPLIES TO LANE 1



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0282T2
DESIGNED: July 2011
SEALED: 08-16-11
REVISED: N/A

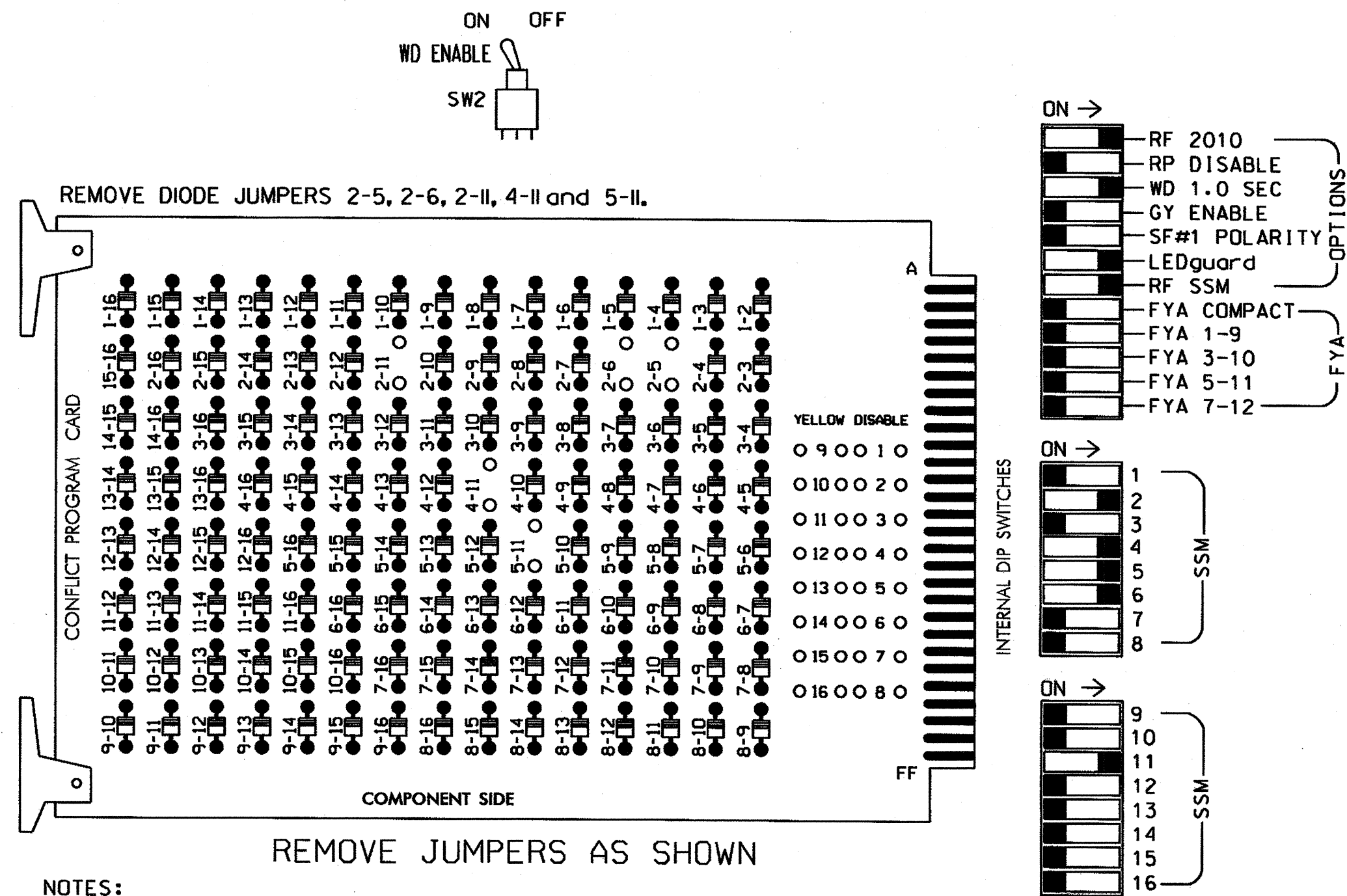
Signal Upgrade - Temporary 2 - Sheet 3 of 4

	US 220 at NC 68		
	Division 7 PLAN DATE: August 2011 PREPARED BY: James Peterson	Rockingham County REVIEWED BY: JTR REVIEWED BY:	
REVISIONS		INIT.	DATE
Signature: <i>John T. Rowe</i> 8-19-11		DATE:	SIG. INVENTORY NO. 07-0282T2

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 31-DEC-2011 10:20

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

(remove jumpers and set switches 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.

■ = DENOTES POSITION OF SWITCH

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.
- 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 1,3,7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S2,S4,S5,S6,S12
 PHASES USED.....2,4,5,6.
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....4+5
 OVERLAP "D".....NOT USED

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.	NU	21,22	NU	NU	41,42	43	NU	NU	61,62	NU	NU	NU	NU	NU	NU	52,53	NU	NU	
RED		128			101				134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW					101				131									A114	
YELLOW ARROW					102				132										A115
GREEN ARROW					103				133										A116

NU = Not Used

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

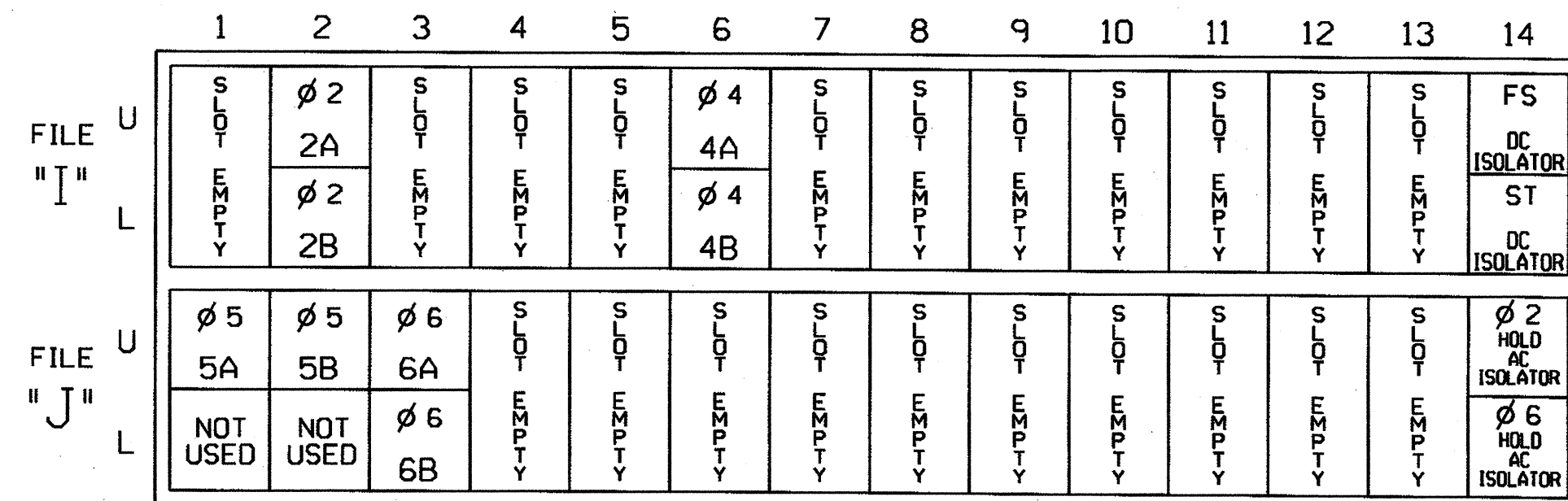
PRESS '+' 2 TIMES

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE: 12345678910111213141516
 VEH OVL PARENTS: XX
 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
 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

INPUT FILE POSITION LAYOUT

(front view)



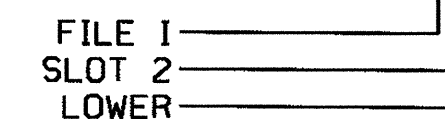
EX. : 1A, 2A, ETC. = LOOP NO.'S

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	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	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			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0282
 DESIGNED: August 2011
 SEALED: 08-16-11
 REVISED: N/A

Signal Upgrade - Final - Sheet 1 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
 Transportation Mobility and Safety Group
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 Signal Management Section
 750 N. Greenfield Pkwy, Carrboro, NC 27529

US 220 at NC 68
 Division 7 Rockingham County NE of Stokesdale

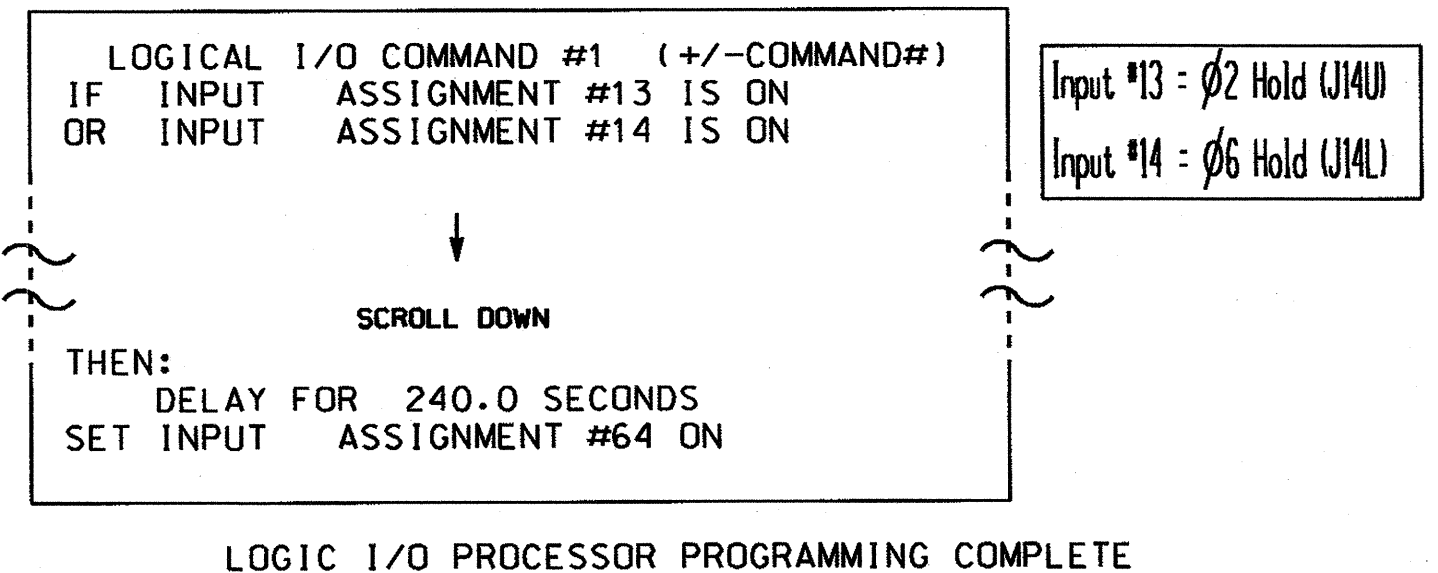
PLAN DATE: August 2011 REVIEWED BY: JPK
 PREPARED BY: James Peterson REVIEWED BY:
 REVISIONS INIT. DATE

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 008453
 JOHN T. ROWE, P.E.
 SIGNATURE DATE 8-19-11
 SIG. INVENTORY NO. 07-0282

19-AUG-2011 10:21
 C:\Users\jpk\Documents\Signal\work\sig\070282\sm_e1e.xxx.dgn
 JPK

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
(program controller as shown below)

- From Main Menu press '6' (Outputs), Then '3' (Logical I/O Processor).
- The programming shown below will place the controller in flash if the output of either Long Vehicle Detection Unit is active for longer than 4 minutes



- From Main Menu press '2' (Phase Control), Then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Logic Flag 1.

INPUT ASSIGNMENT PROGRAMMING DETAIL
(program controller as shown below)

FROM MAIN MENU PRESS '5' (INPUTS), THEN '+' UNTIL PIN 51 (INPUT 13) IS REACHED.

PAGE: 1 C1 PIN:51 HOLD PHASES
 INPUT ASSIGNMENT #.....13
 DEBOUNCE TIME (0-25.5 SEC).....0.5
 DELAY TIME (0-25.5 SEC).....0.0
 HOLD-OVER TIME (0-25.5 SEC).....0.0
 ASSIGNMENT SELECTION:
 NOT ENABLED (Y/N).....
 VEHICLE DETECTOR (1-64).....
 PEDESTRIAN DETECTOR (1-16).....
 ALTERNATE PED DETECTOR (1-16).....
 PREEMPT (1-10).....
 INVERTED PREEMPT (1-10).....
 STOP TIME (Y/N).....
 FLASH SENSE (Y/N).....
 DOOR OPEN (Y/N).....
 MANUAL CONTROL ENABLE (Y/N).....
 MANUAL CONTROL ADVANCE (Y/N).....
 SPECIAL FUNCTION ALARM (1-8).....
 TOD HOUR SYNCHRONIZATION (0-23).....
 FORCE OFF RING (1-4).....
 HOLD PHASES (1-16).....2
 PLAN (65=FLSH,66=FREE)... OFFSET#...
 CHANGE PHASE SEQUENCE PAGE (1-12)....
 CHANGE PHASE TIMING PAGE (1-4).....
 CHANGE PHASE CONTROL PAGE (1-4).....
 CHANGE OVERLAP CONTROL PAGE (1-4)....
 CHANGE INPUT PAGE (1-4).....
 CHANGE OUTPUT PAGE (1-4).....
 OVERRIDE PHASE CONTROL FUNCTION (Y)..

PRESS '+'

PAGE: 1 C1 PIN:52 HOLD PHASES
 INPUT ASSIGNMENT #.....14
 DEBOUNCE TIME (0-25.5 SEC).....0.5
 DELAY TIME (0-25.5 SEC).....0.0
 HOLD-OVER TIME (0-25.5 SEC).....0.0
 ASSIGNMENT SELECTION:
 NOT ENABLED (Y/N).....
 VEHICLE DETECTOR (1-64).....
 PEDESTRIAN DETECTOR (1-16).....
 ALTERNATE PED DETECTOR (1-16).....
 PREEMPT (1-10).....
 INVERTED PREEMPT (1-10).....
 STOP TIME (Y/N).....
 FLASH SENSE (Y/N).....
 DOOR OPEN (Y/N).....
 MANUAL CONTROL ENABLE (Y/N).....
 MANUAL CONTROL ADVANCE (Y/N).....
 SPECIAL FUNCTION ALARM (1-8).....
 TOD HOUR SYNCHRONIZATION (0-23).....
 FORCE OFF RING (1-4).....
 HOLD PHASES (1-16).....6
 PLAN (65=FLSH,66=FREE)... OFFSET#...
 CHANGE PHASE SEQUENCE PAGE (1-12)....
 CHANGE PHASE TIMING PAGE (1-4).....
 CHANGE PHASE CONTROL PAGE (1-4).....
 CHANGE OVERLAP CONTROL PAGE (1-4)....
 CHANGE INPUT PAGE (1-4).....
 CHANGE OUTPUT PAGE (1-4).....
 OVERRIDE PHASE CONTROL FUNCTION (Y)..

PRESS '+' until input assignment #64 is reached

PAGE: 1 C1 PIN:0 PLAN
 INPUT ASSIGNMENT #.....64
 DEBOUNCE TIME (0-25.5 SEC).....0.5
 DELAY TIME (0-25.5 SEC).....0.0
 HOLD-OVER TIME (0-25.5 SEC).....0.0
 ASSIGNMENT SELECTION:
 NOT ENABLED (Y/N).....
 VEHICLE DETECTOR (1-64).....
 PEDESTRIAN DETECTOR (1-16).....
 ALTERNATE PED DETECTOR (1-16).....
 PREEMPT (1-10).....
 INVERTED PREEMPT (1-10).....
 STOP TIME (Y/N).....
 FLASH SENSE (Y/N).....
 DOOR OPEN (Y/N).....
 MANUAL CONTROL ENABLE (Y/N).....
 MANUAL CONTROL ADVANCE (Y/N).....
 SPECIAL FUNCTION ALARM (1-8).....
 TOD HOUR SYNCHRONIZATION (0-23).....
 FORCE OFF RING (1-4).....
 HOLD PHASES (1-16)......65 OFFSET#..0
 PLAN (65=FLSH,66=FREE)..65 OFFSET#..0
 CHANGE PHASE SEQUENCE PAGE (1-12)....
 CHANGE PHASE TIMING PAGE (1-4).....
 CHANGE PHASE CONTROL PAGE (1-4).....
 CHANGE OVERLAP CONTROL PAGE (1-4)....
 CHANGE INPUT PAGE (1-4).....
 CHANGE OUTPUT PAGE (1-4).....
 OVERRIDE PHASE CONTROL FUNCTION (Y)..

PROGRAMMING COMPLETE

Note: Program for Plan 65 and Offset 0

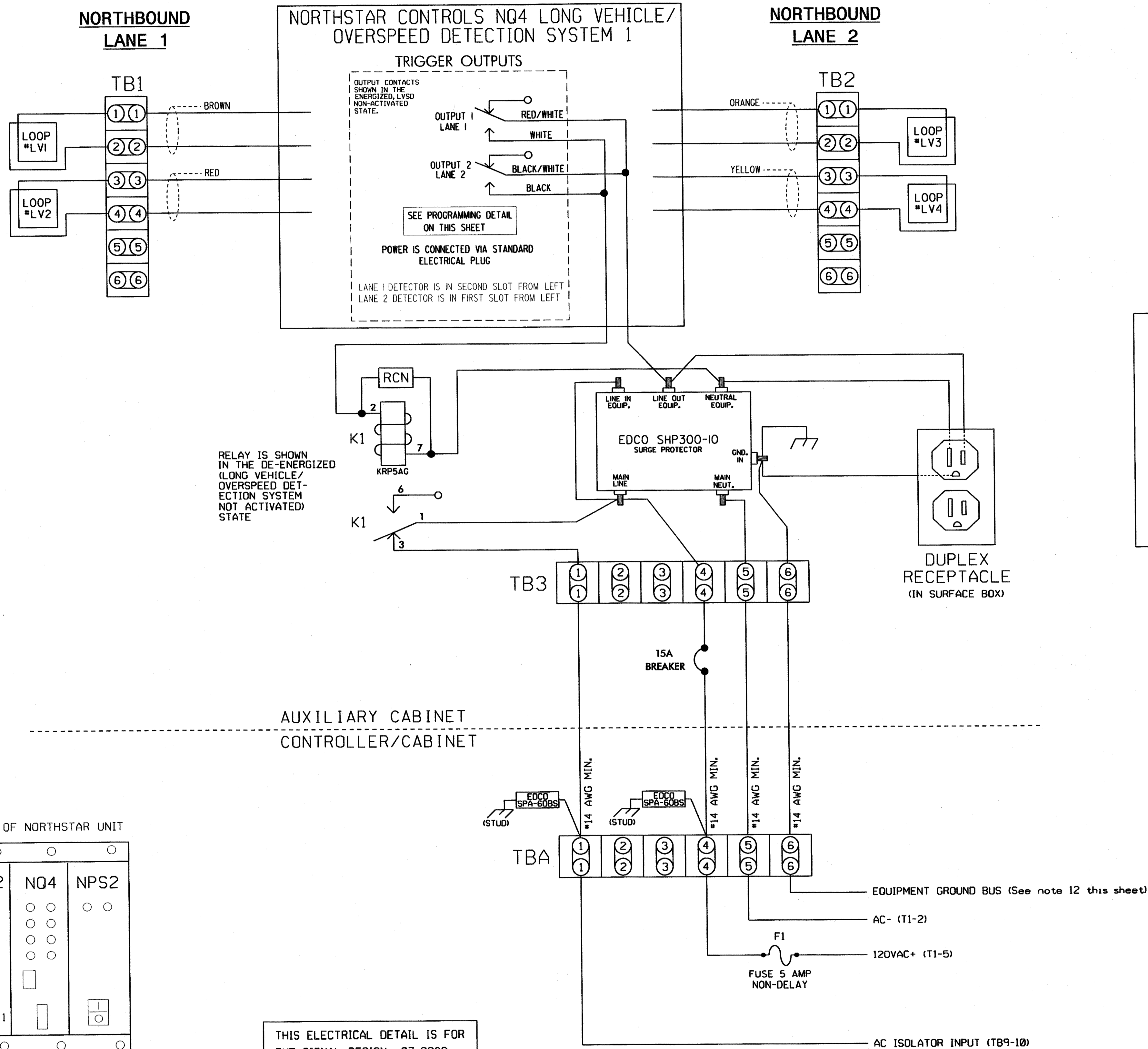
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0282
 DESIGNED: August 2011
 SEALED: 08-16-11
 REVISED: N/A

Signal Upgrade - Final - Sheet 2 of 4

<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>US 220 at NC 68</p>		
	<p>Division 7 Rockingham County NE of Stokesdale</p>		
	<p>PREPARED BY: James Peterson</p>	<p>REVIEWED BY: JTK</p>	
	<p>PLANNING DATE: August 2011</p>	<p>REVIEWED DATE:</p>	
<p>REVISIONS</p>		<p>INIT. DATE</p>	<p>SIGNATURE: John T. Rowe 8-19-11 DATE</p>
<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p>			<p>SIG. INVENTORY NO. 07-0282</p>

10-11-2011 10:22
 S:\MITS\04175\SIGNAL\workgroups\619_Mon\ Peterson\070282_sml.e...xxx.dgn
 Peterson

WIRING DETAIL FOR NORTHSTAR CONTROLS NQ4 LONG VEHICLE / OVERSPEED DETECTION SYSTEM NO. 1
(wire unit as shown below)



NOTES

- All loop lead-ins shall be twisted.
- Loop spacing is critical to the proper operation of this Overspeed Detection System. Make sure loop spacing is correctly programmed in NQ4 Unit.
- Insure that connectors on rear of NQ4 are seated securely.
- NQ4 Unit shall be located in an auxiliary cabinet adjacent to Speed Warning System loops.
- Unit power is connected by standard electrical plug.
- Terminal strips TB1, TB2, TB3, & TBA to be added by installer.
- Relay 'K1' is a SPDT with an 120VAC coil. Potter & Brumfield no. KRP5AGAG. Dot Material no. 625028600.
- The RC Network across the coil of 'K1' is a .1 micro farad, 100 ohm. Dot Material no. 106018075. P&B no. 104M060C100
- EDCO SPA-60BS is a surge protector for 120VAC interconnect circuits. Dot Material no. 625022076.
- EDCO SHP300-10 is an AC service surge protector. Dot Material no. 625022075.
- Do not install ground rods at auxiliary cabinet.
- Install equipment ground from controller cabinet to auxiliary cabinet if not already present.
- Install disconnect if there is no disconnect present at auxiliary cabinet.
- IMPORTANT! A jumper must be installed between input file terminals J14-E and J14-K if not already present.
- IMPORTANT! For proper operation of the Long Vehicle Detection Unit, tie TB9-12 to AC neutral.
- IMPORTANT! Make sure both channels of AC Isolator card inserted at input file position J14 are set for inverted operation.

**NORTHSTAR CONTROLS MODEL NQ4
PROGRAMMING DETAIL
(program unit as shown)**

NOTE: UNIT MUST BE PROGRAMMED USING PC AND HYPERTERMINAL PROGRAM. FOR CONNECTION TO HYPERTERMINAL REFER TO NQ4 OPERATION MANUAL.

PROGRAM NQ4 BY TYPING THE FOLLOWING COMMANDS

- SET SPEED=55
- SET LENGTH=22'
- SET ALARMTIME=12
- SET SEPARATION=28' (LEADING EDGE TO LEADING EDGE)
(THIS VALUE MAY VARY, PROGRAM ACTUAL MEASURED SEPARATION)
- SET LOOP LENGTH=6'
(THIS VALUE MAY VARY, PROGRAM ACTUAL MEASURED LOOP LENGTH)
- SAVE

NOTE
PROGRAMMING APPLIES TO BOTH LANE 1 AND LANE 2

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0282
DESIGNED: August 2011
SEALED: 08-16-11
REVISED: N/A

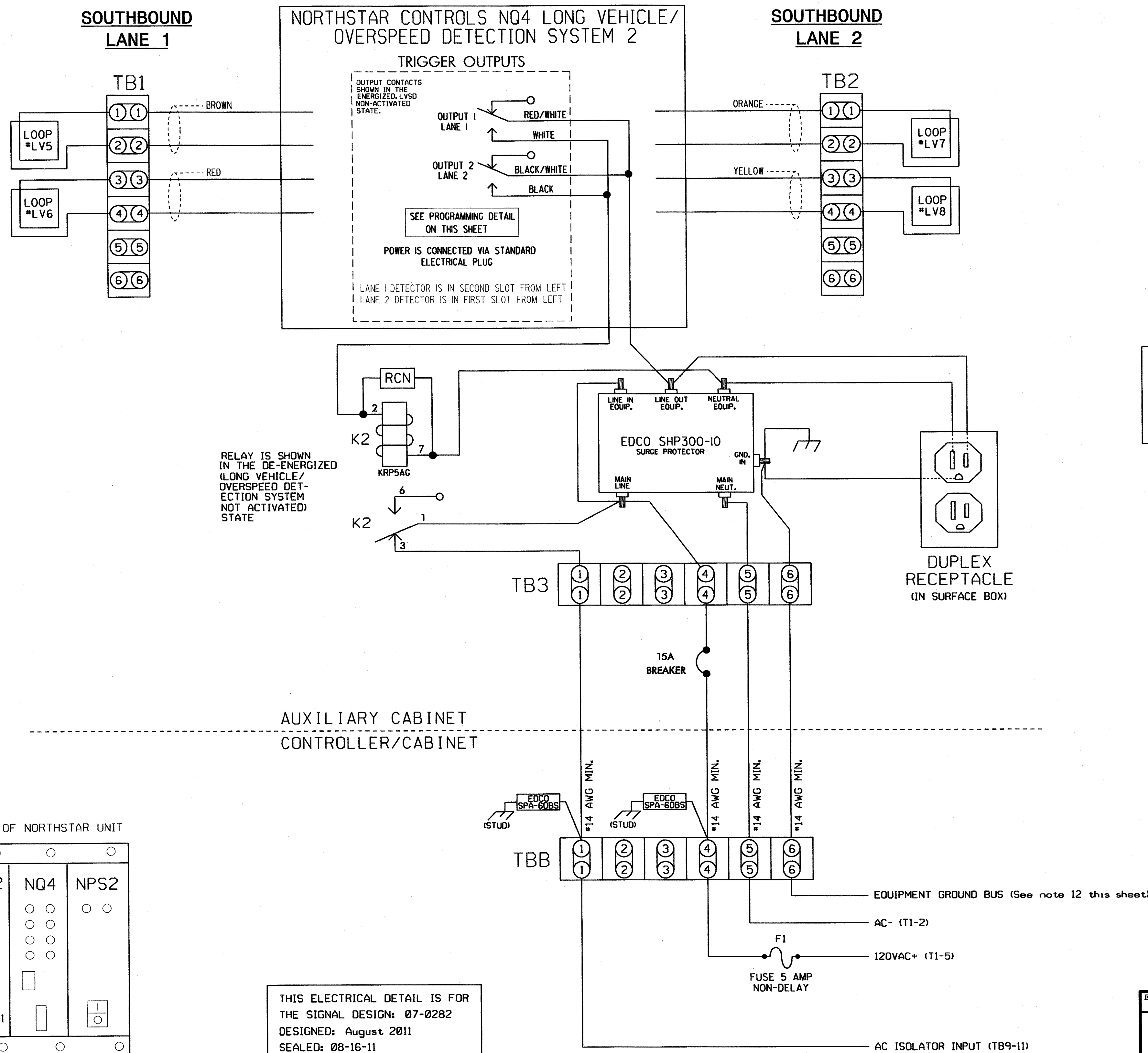
Signal Upgrade - Final - Sheet 3 of 4

<p>Prepared In the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>US 220 at NC 68</p>		<p>SEAL</p>
	<p>Division 7 PLAN DATE: August 2011 PREPARED BY: James Peterson</p>	<p>Rockingham County REVIEWED BY: JPR REVIEWED BY:</p>	
<p>REVISIONS</p>			<p>INIT. DATE</p>
<p>SIGNATURE</p>			<p>DATE</p>
<p>SIG. INVENTORY NO. 07-0282</p>			<p>08-19-11</p>

WIRING DETAIL FOR NORTHSTAR CONTROLS NQ4 LONG VEHICLE / OVERSPEED DETECTION SYSTEM NO. 2
(wire unit as shown below)

NOTES

1. All loop lead-ins shall be twisted.
2. Loop spacing is critical to the proper operation of this Overspeed Detection System. Make sure loop spacing is correctly programmed in NQ4 Unit.
3. Insure that connectors on rear of NQ4 are seated securely.
4. NQ4 Unit shall be located in an auxiliary cabinet adjacent to Speed Warning System Loops.
5. Unit power is connected by standard electrical plug.
6. Terminal strips TB1, TB2, TB3, & TBB to be added by installer.
7. Relay 'K2' is a SPDT with an 120VAC coil. Potter & Brumfield no. KRPSAGAG. Dot Material no. 625028600.
8. The RC Network across the coil of 'K2' is a .1 micro farad, 100 ohm. Dot Material no. 106018075. P&B no. 104M060C100
9. EDCO SPA-60BS is a surge protector for 120VAC interconnect circuits. Dot Material no. 625022076.
10. EDCO SHP300-10 is an AC service surge protector. Dot Material no. 625022075.
11. Do not install ground rods at auxiliary cabinet.
12. Install equipment ground from controller cabinet to auxiliary cabinet if not already present.
13. Install disconnect if there is no disconnect present at auxiliary cabinet.



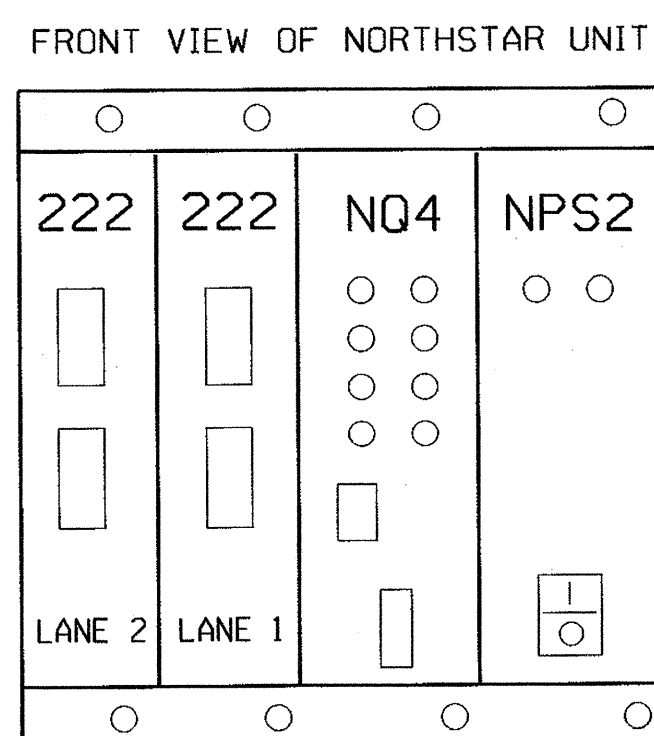
NORTHSTAR CONTROLS MODEL NQ4
PROGRAMMING DETAIL
(program unit as shown)

NOTE: UNIT MUST BE PROGRAMMED USING PC AND HYPERTERMINAL PROGRAM. FOR CONNECTION TO HYPERTERMINAL REFER TO NQ4 OPERATION MANUAL.

PROGRAM NQ4 BY TYPING THE FOLLOWING COMMANDS

1. SET SPEED=55
2. SET LENGTH=22'
3. SET ALARMTIME=12
4. SET SEPARATION=28' (LEADING EDGE TO LEADING EDGE)
(THIS VALUE MAY VARY. PROGRAM ACTUAL MEASURED SEPARATION)
5. SET LOOP LENGTH=6'
(THIS VALUE MAY VARY. PROGRAM ACTUAL MEASURED LOOP LENGTH)
6. SAVE

NOTE
PROGRAMMING APPLIES TO BOTH LANE 1 AND LANE 2



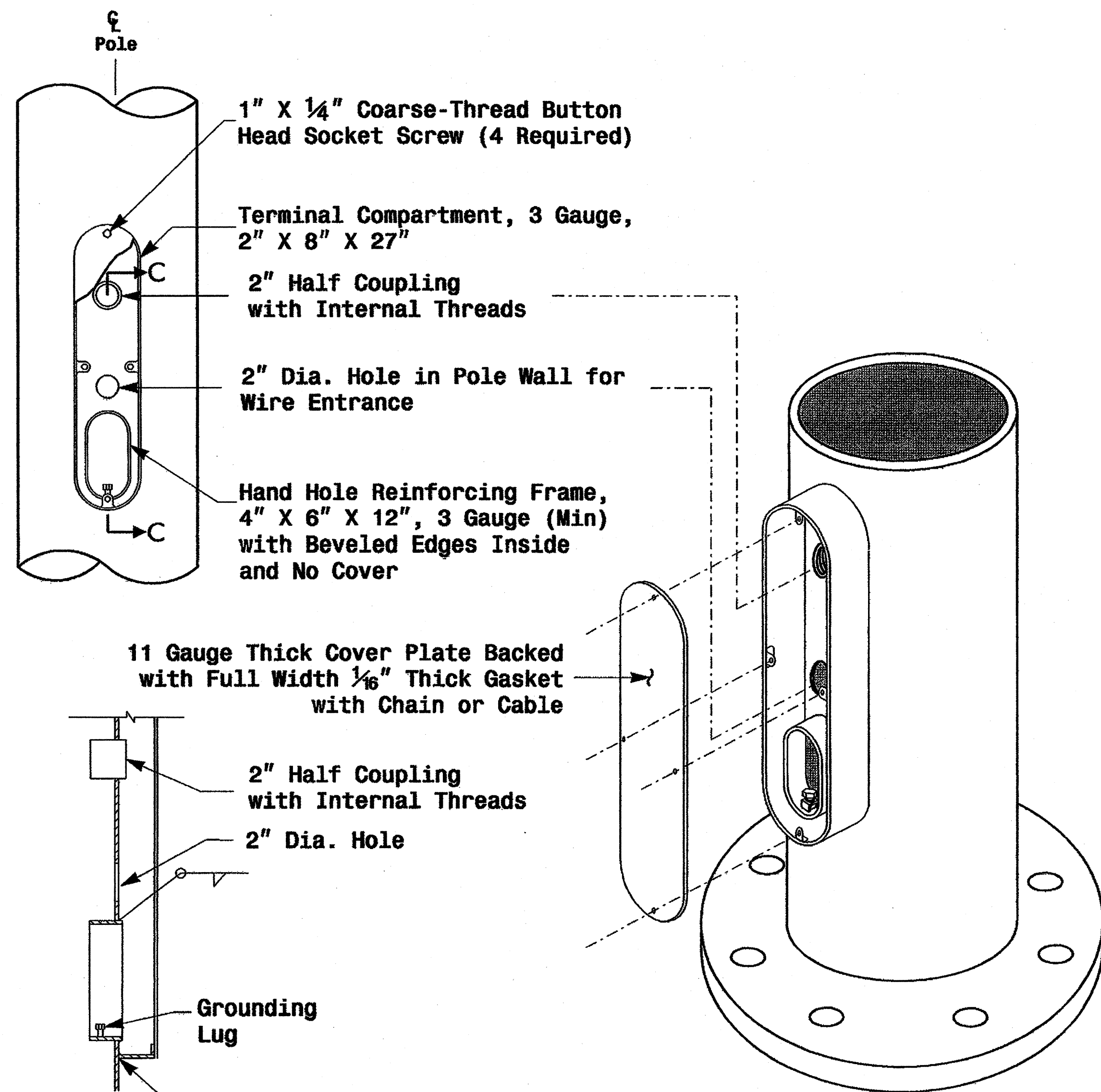
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0282
DESIGNED: August 2011
SEALED: 08-16-11
REVISED: N/A

Signal Upgrade - Final - Sheet 4 of 4

15-AUG-2011 10:23
S:\ATTS\UNITS\SIGNALS\mkr\groups\sig Nam\Peterson\070282.smc.dwg (e.xxx.dgn)
J Peterson

<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p>Prepared In the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>US 220 at NC 68</p>		<p>SEAL</p>
	<p>Division 7</p> <p>PLAN DATE: August 2011</p> <p>PREPARED BY: James Peterson</p>	<p>Rockingham County</p> <p>REVIEWED BY: JPK</p> <p>REVISIONS</p>	

SIG. INVENTORY NO. 07-0282



Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail

MFG _____	MFG. DATE: MM/YY _____
SHAFT D/T/L/Y _____	SECTION D/T/L/Y _____
ARM-A D/T/L/Y _____	NCDOT STANDARD _____
ARM-B D/T/L/Y _____	
A.B. DIA./B.C./L/Y _____	
NCDOT STANDARD _____	

MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	
NCDOT STANDARD _____	

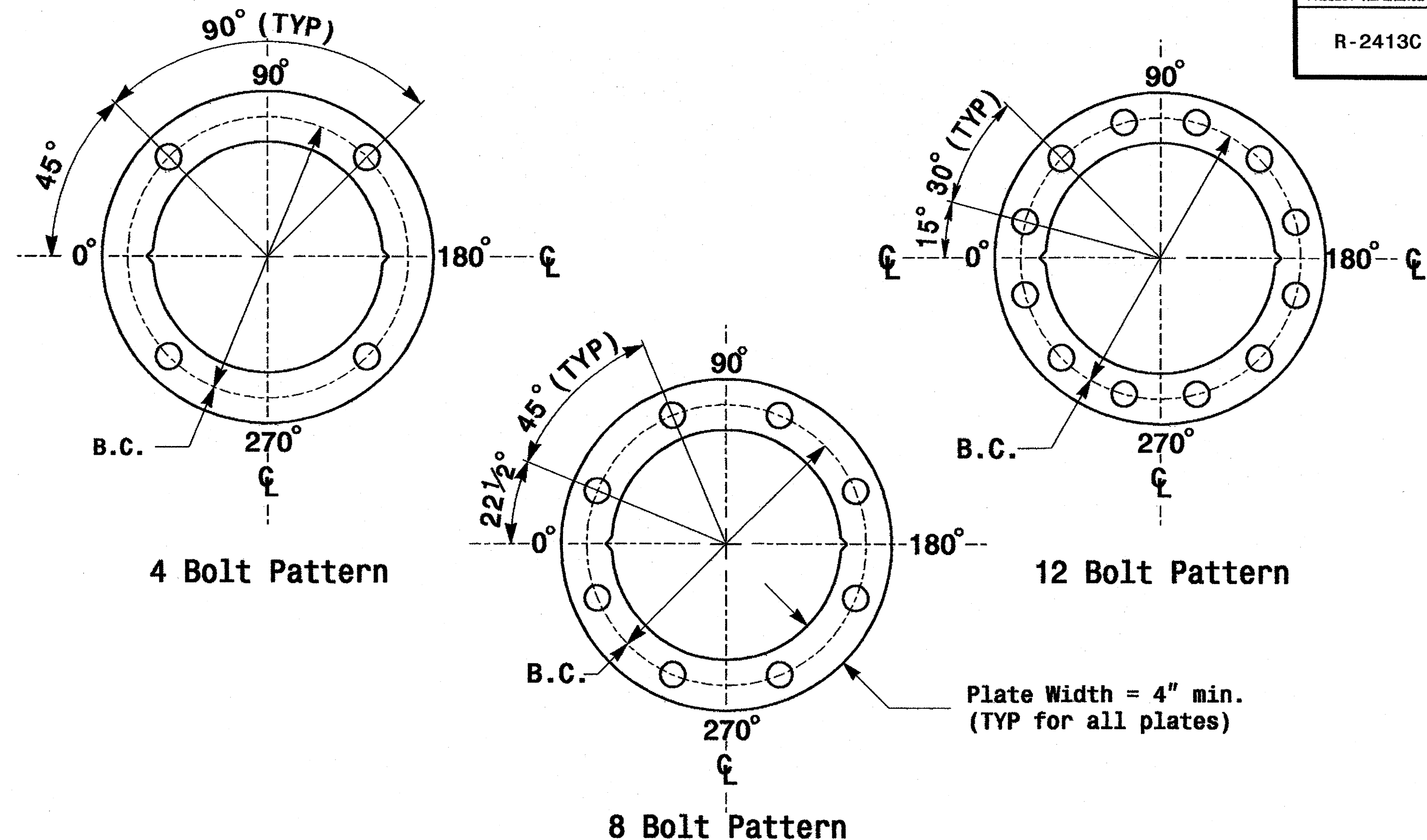
Arm I.D. Tag
(Provide on each section of a multi-section mast arm)

Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

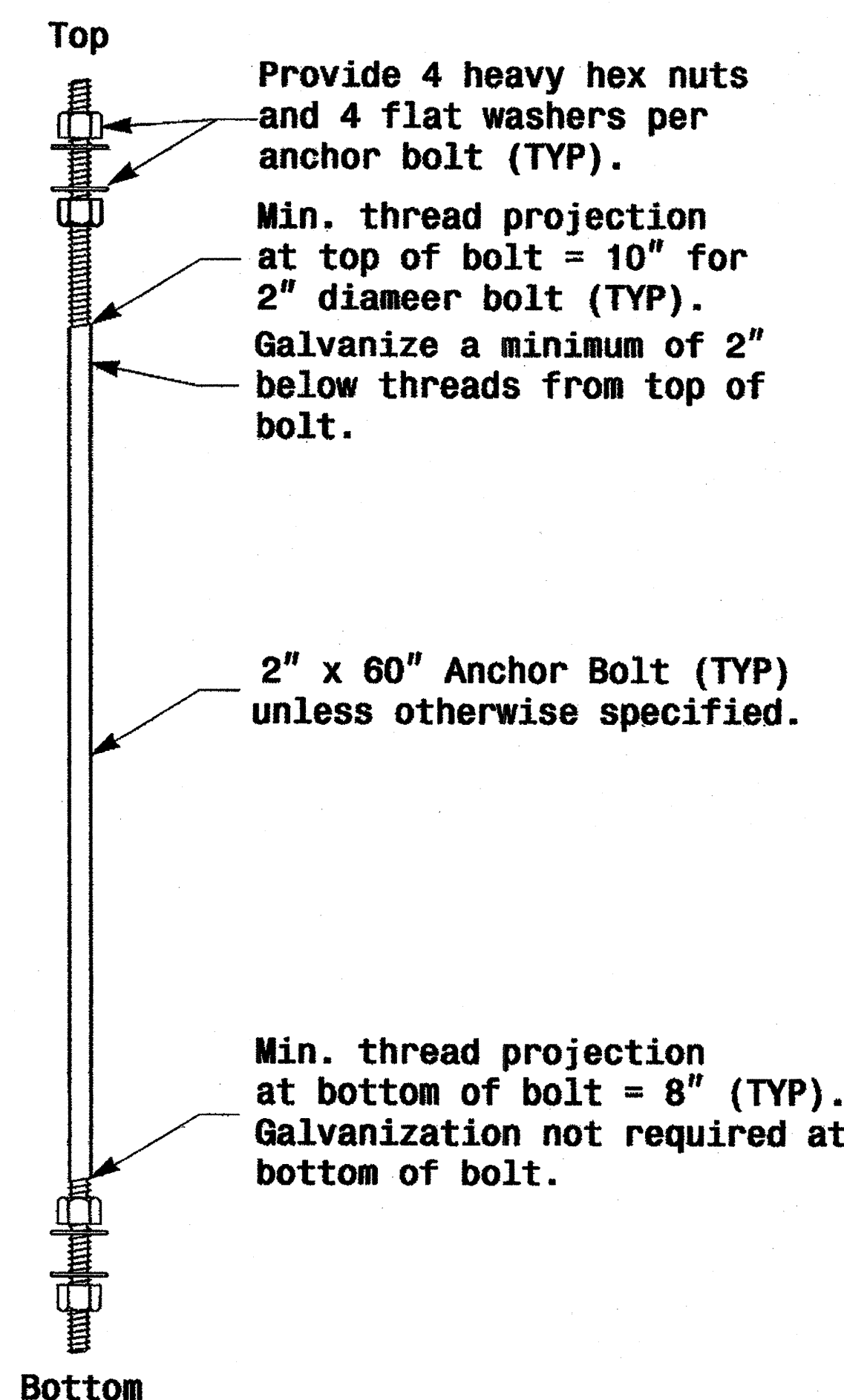
Notes:

- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
- 2) A.B. = Anchor Bolt
- 3) B.C. = Bolt Circle of Anchor Bolts
- 4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
- 5) See drawing M4 for mounting positions of I.D. tags.

Identification Tag Details

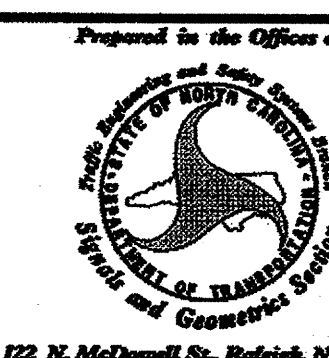
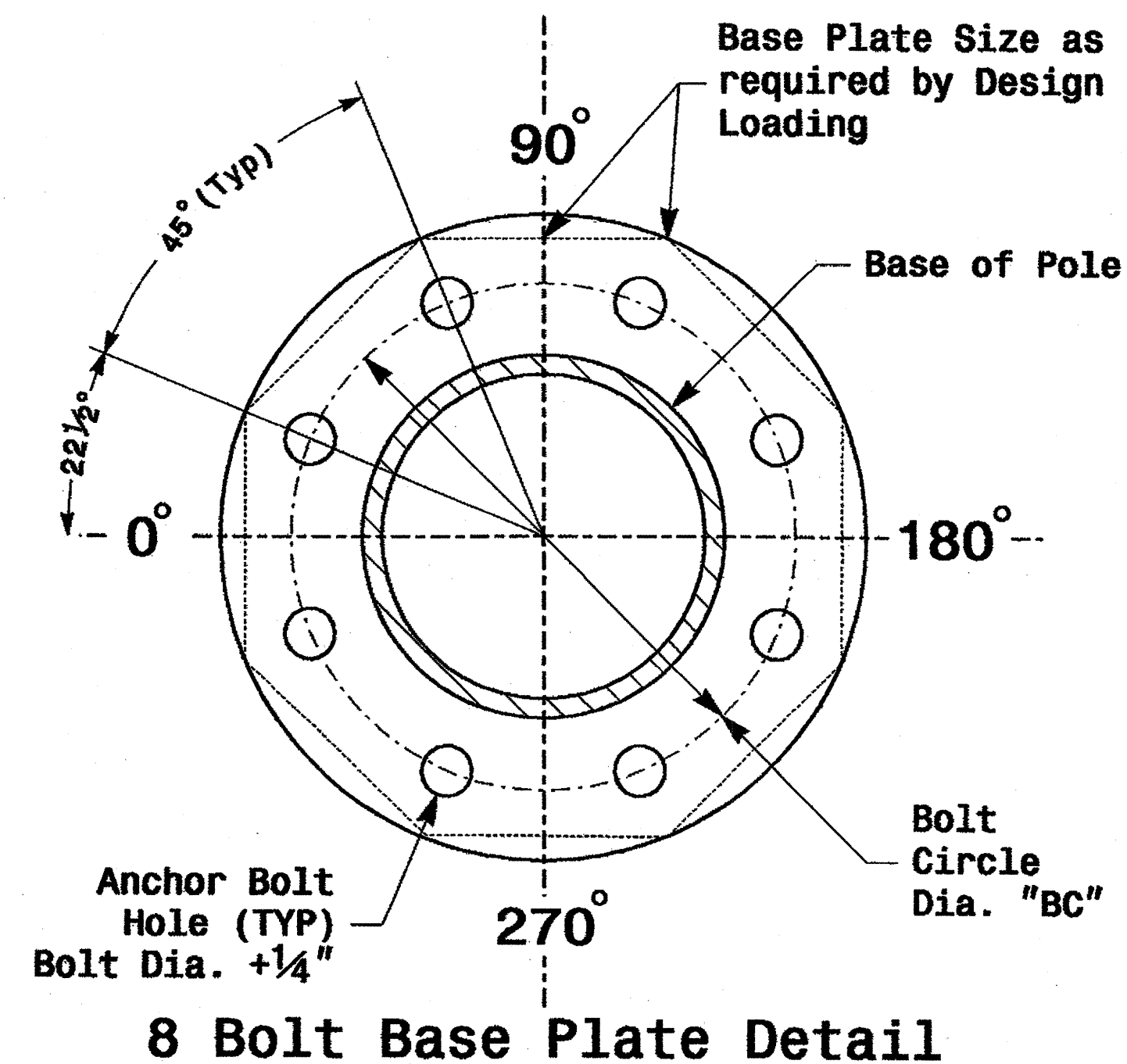


Construct Templates and Plates from 1/4" min. thick Steel. Galvanizing is not required.
Base Plate Template and Anchor Bolt Lock Plate Details



Anchor Bolt Detail

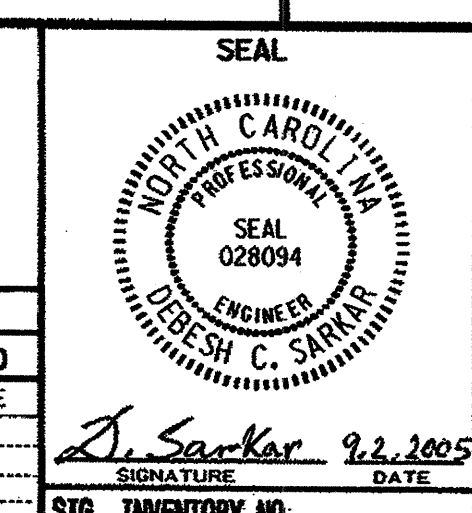
Note: See Strain Pole drawing M3 and Mast arm drawing M4 for base plate weld details.



Typical Fabrication Details Common To All Metal Poles

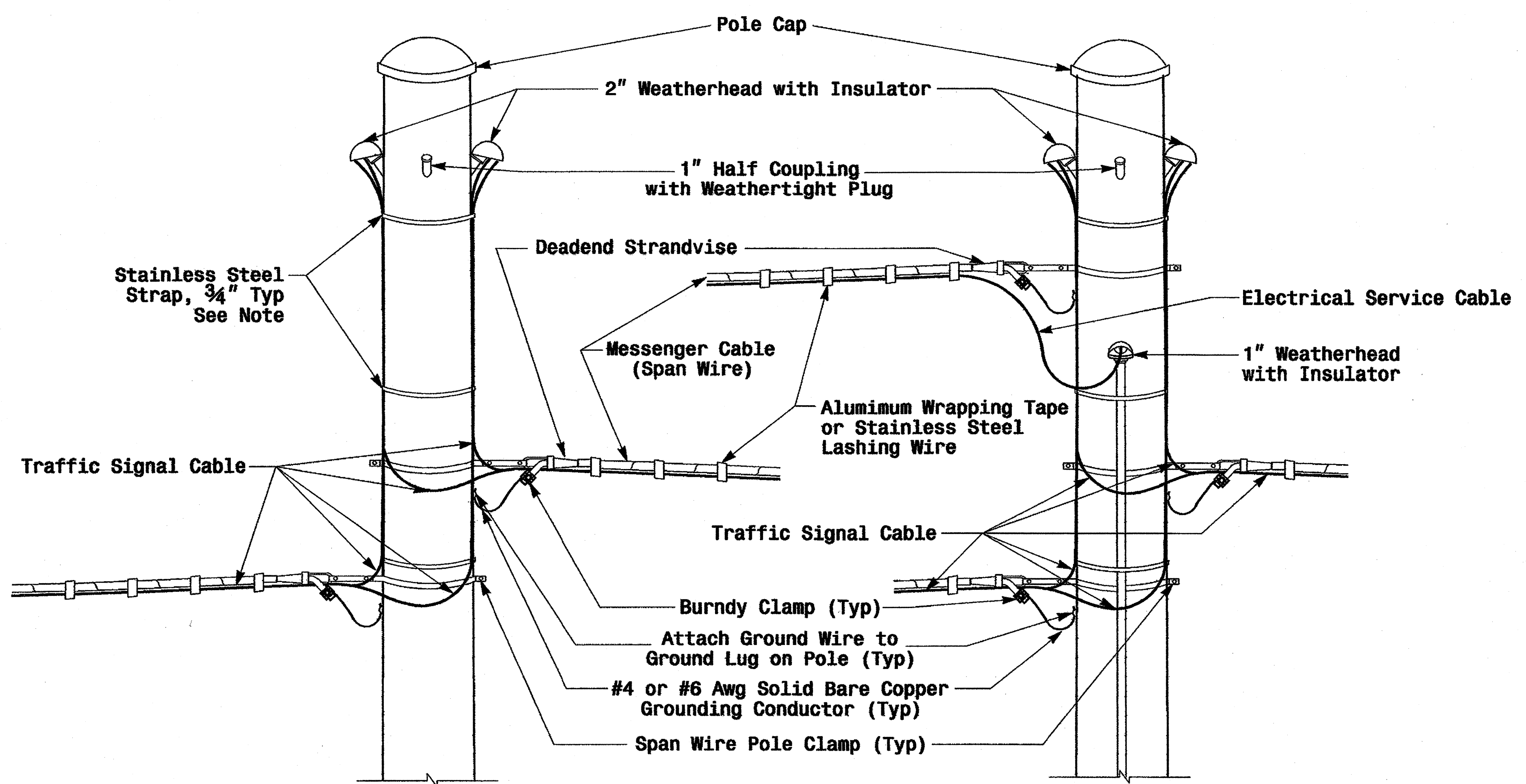
PLAN DATE: May 2005 REVIEWED BY: C.F. Andrews
PREPARED BY: P.L. Alexander REVIEWED BY: A.M. Esposito

REVISIONS	INIT.	DATE



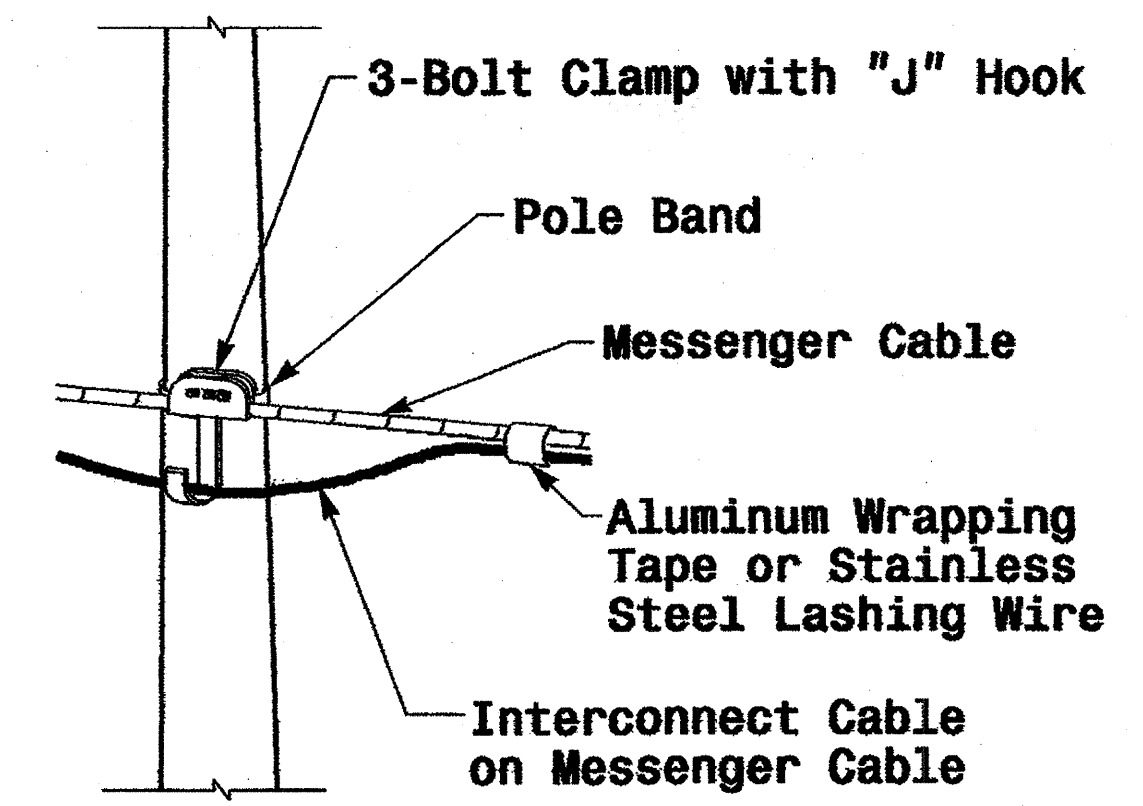
SIGNATURE: D. Sacker 9.2.2005
DATE: 9.2.2005
SIG. INVENTORY NO.

Fabrication Details - All Poles

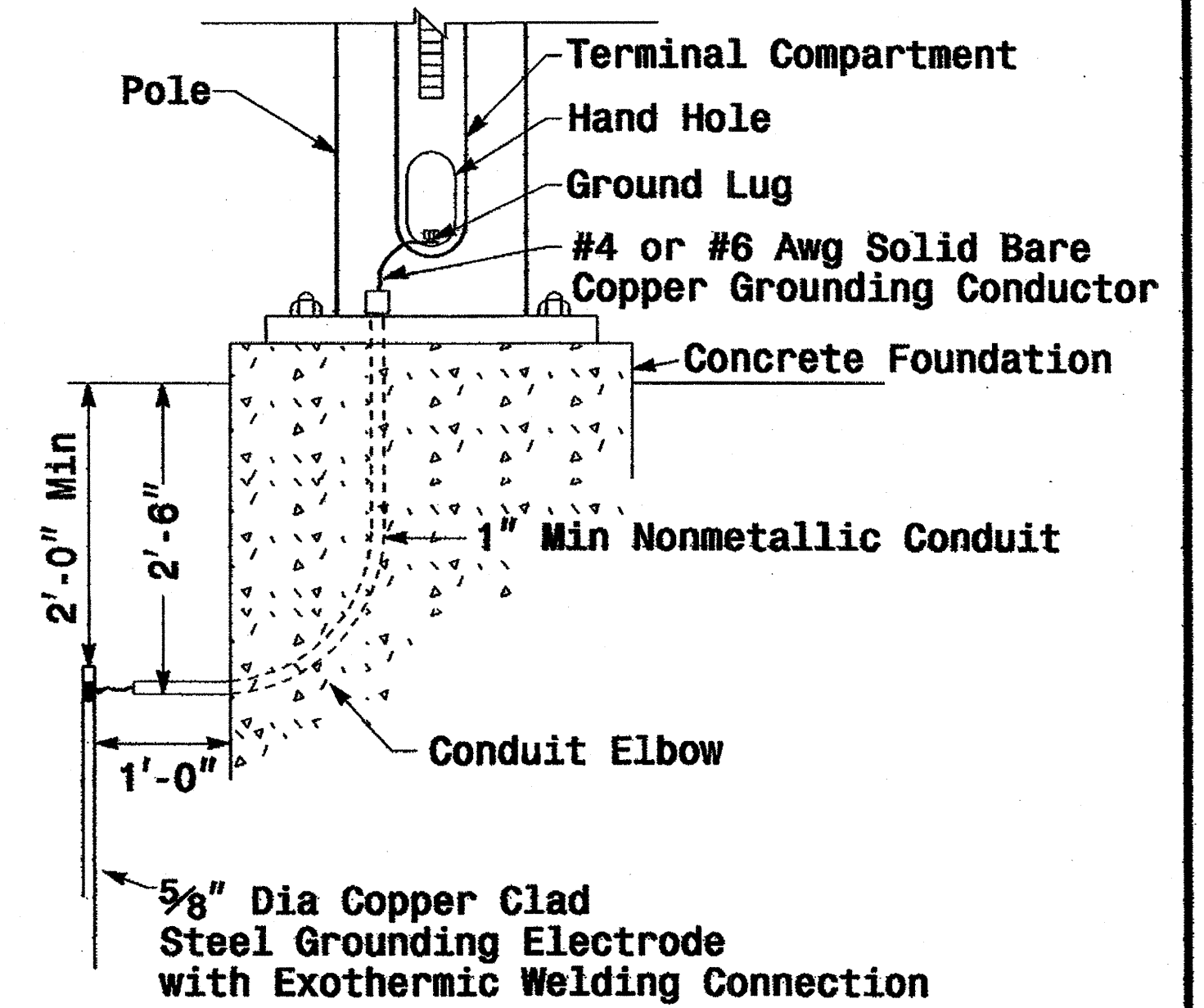


Note: Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole

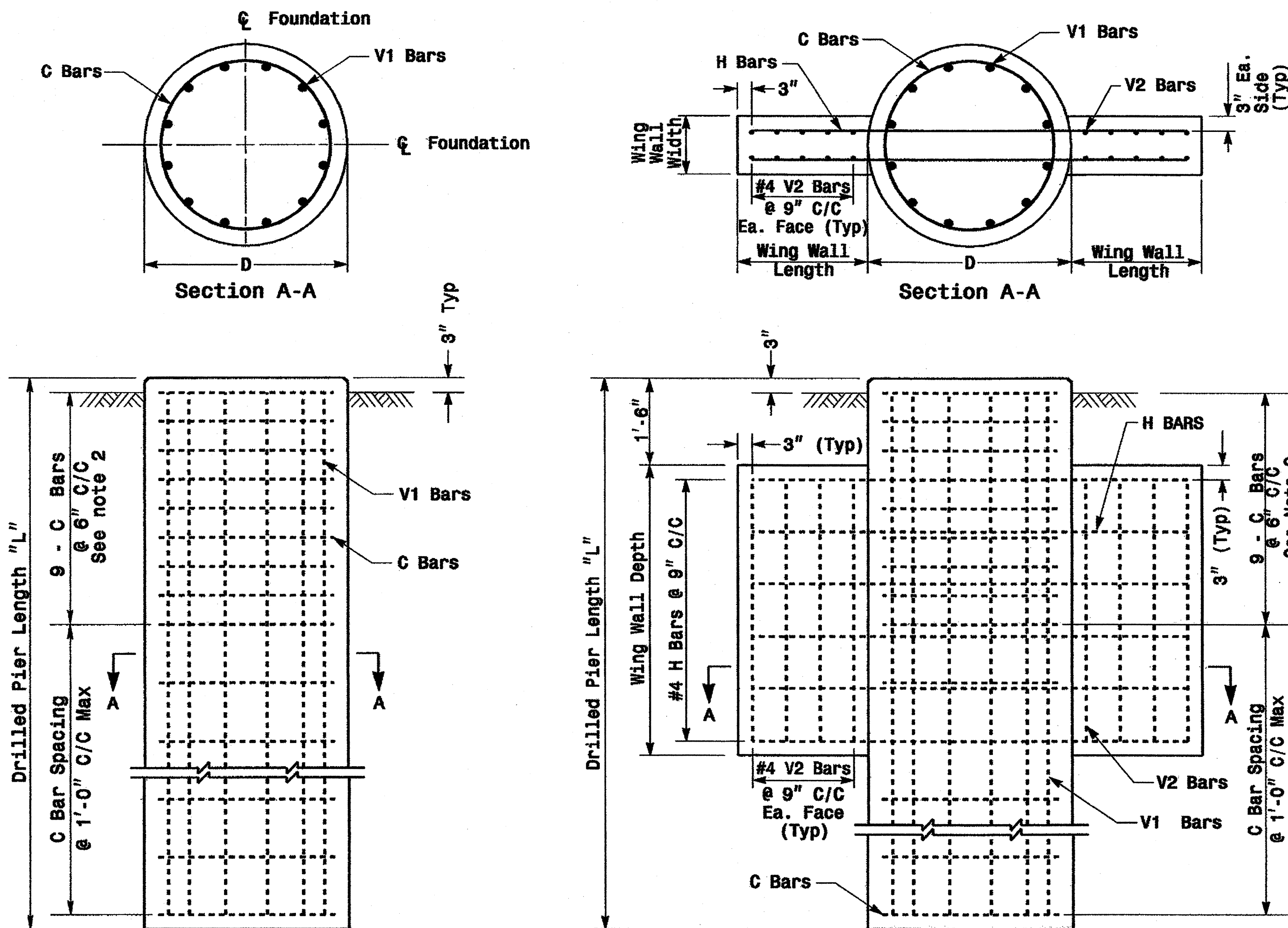


Metal Pole Grounding Detail

01-SEP-2005 16:33 c:\p1\mkg\cups\2004 metal pole standard\2004 m6.dgn

	Construction Details Strain Poles										
	PLAN DATE: May 2005 PREPARED BY: C.F. ANDREWS	REVIEWED BY: P.L. ALEXANDER REVIEWED BY: D.C. SARKAR		SIGNATURE: <i>Milton I. Dean</i> DATE: 9-1-05							
SCALE: 0 NA NONE	REVISIONS: <table border="1"> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		NO.	DESCRIPTION	INIT.	DATE					SIG. INVENTORY NO.
NO.	DESCRIPTION	INIT.	DATE								

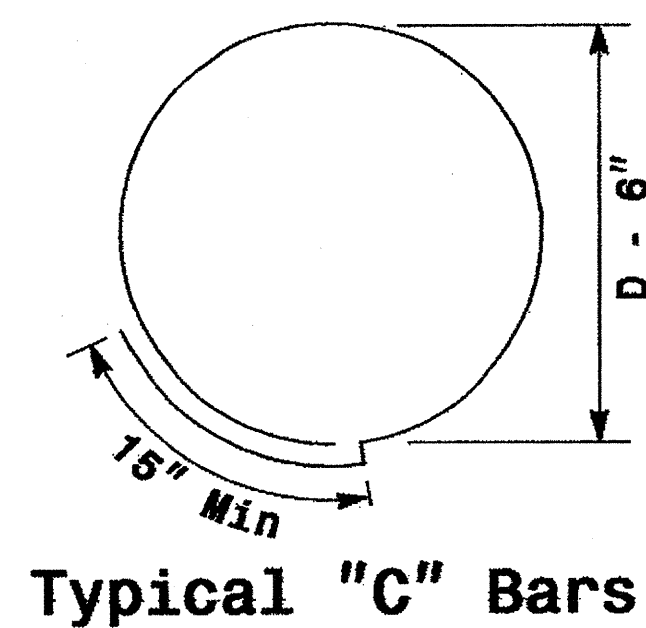
Reinforcing Steel Bars



REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (42" & 48" DIAMETER)

Shaft Dia. (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* See Note No. 1
** See Note No. 3



Typical "C" Bars

REINFORCING STEEL TABLE FOR STANDARD 42" and 48" DRILL PIER SHAFT WITH TYPE 1 AND TYPE 2 WING WALLS

Wing Wall Type	Drill Pier Shaft Dia. (in.)	Reinforcing Steel				
		Bar Name	No.	Size	Type	Length
TYPE 1	42"	V1	9	#8	STR.	**
		V2	12	#4	STR.	2'-6"
		H	8	#4	STR.	6'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	42"	V1	9	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	48"	V1	12	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-6"
		C	*	#4	CIR.	12'-6"

* See Note No. 1
** See Note No. 3

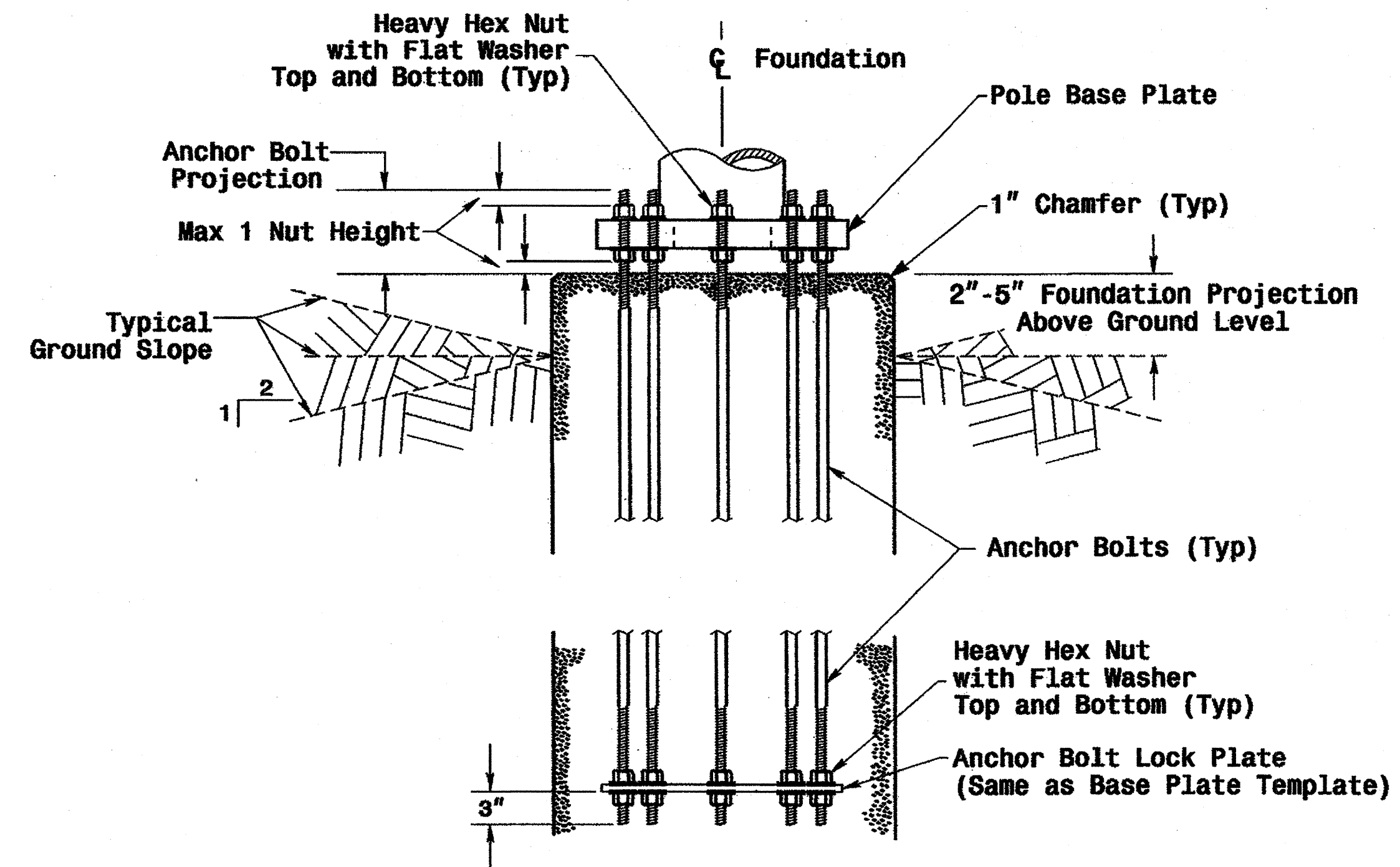
WING WALL DETAILS

Wing Wall Type	Wing Wall Length (Ft.)	Wing Wall Width (Ft.)	Wing Wall Depth (Ft.)	Concrete Volume (Cu. Yds.)
TYPE 1	1'-6"	1'-0"	3'-0"	.4
TYPE 2	3'-0"	1'-0"	5'-0"	1.2

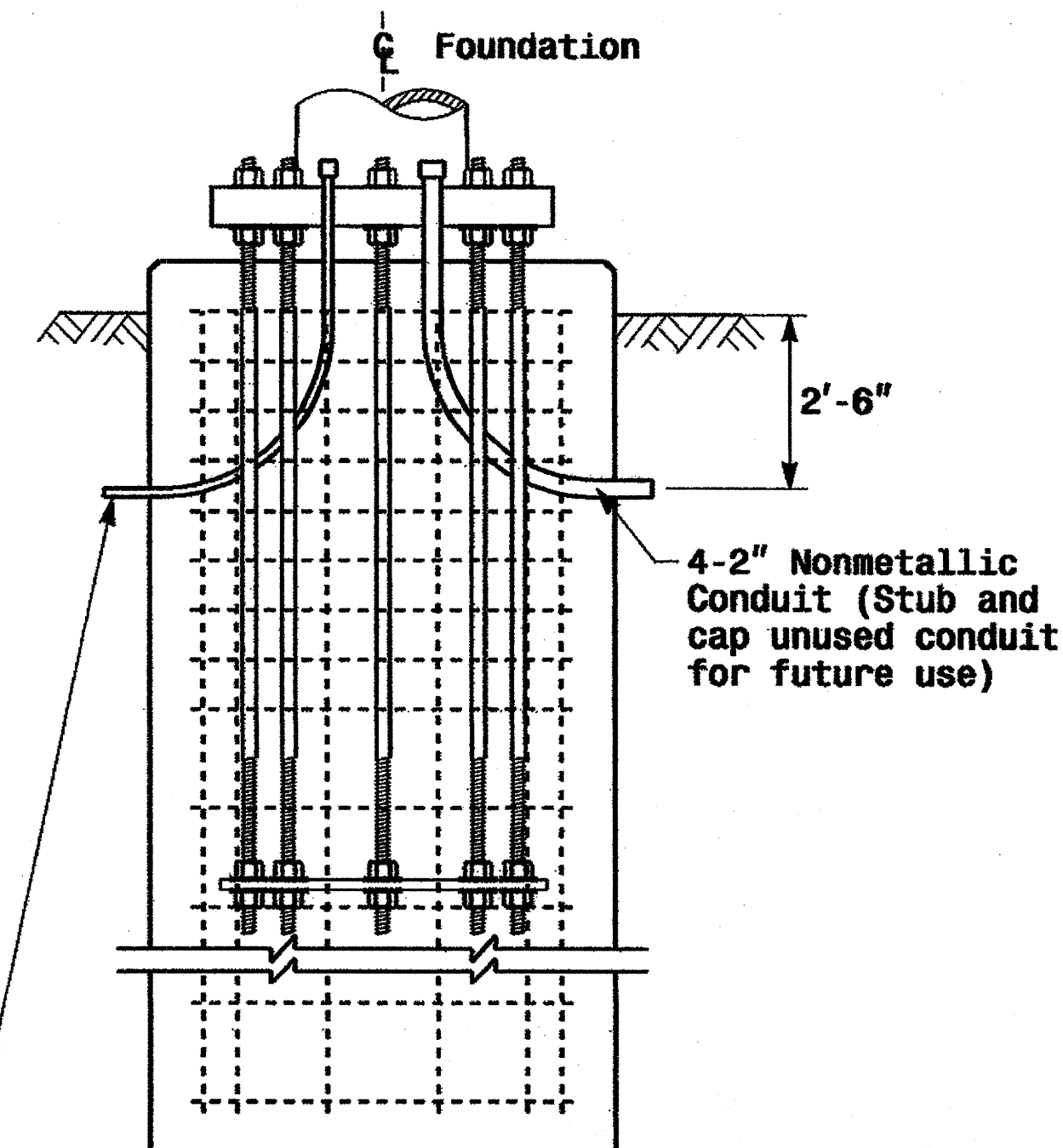
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



Notes

- The number of C-bars is based on foundation depth. For standard foundations, see sheet M 8.
- Circular tie reinforcing rings may be vertically adjusted by +/- 3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
- The length of V1-bars is based on foundation depth. For standard foundations, see sheet M 8.
- The quantities for steel and concrete shown in the Wing Wall Details Chart reflect the amount of material for 1 pair of wing walls (2 wing walls per drilled pier shaft.)

	Construction Details Foundations		
	PLAN DATE: May 2005 PREPARED BY: C.F. ANDREWS	REVIEWED BY: P.L. ALEXANDER REVIEWED BY: A.M. ESPOSITO	
REVISIONS:		INTL. DATE:	SIGNATURE: D. Sarkear 9.2.2005 DATE:
SIG. INVENTORY NO.			SEAL

		STANDARD STRAIN POLES				STANDARD FOUNDATIONS 42" Diameter Drilled Pier Length (L) - Feet						
Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Moment at the Pole Base (ft-kp)	Clay				Sand				
				Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30		
WIND ZONE 1	LIGHT	S26L3	26	25	280	20.5	14.0	11.5	9.5	18.0	16.0	14.0
		S30L3	30	25	310	21.0	14.5	11.5	9.5	18.5	16.5	14.5
		S35L3	35	25	350	22.5	15.0	12.0	10.0	19.5	17.5	15.5
	HEAVY	S30H3	30	29	450	25.5	16.5	13.0	11.0	21.0	18.5	16.5
		S35H3	35	29	540	26.0	17.0	13.5	11.5	22.0	19.5	17.0
		S26L2	26	23	250	19.5	13.5	11.0	9.0	18.0	15.5	14.0
WIND ZONE 2	LIGHT	S30L2	30	23	290	20.0	14.0	11.5	9.5	18.5	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	9.5	19.0	16.5	14.5
		S30H2	30	29	415	24.5	16.0	13.0	10.5	21.0	18.5	16.0
	HEAVY	S35H2	35	29	485	25.5	16.5	13.5	11.0	21.5	19.0	16.5
		S26L2	26	23	250	18.5	13.0	10.5	9.0	17.5	15.0	13.5
		S30L2	30	23	290	19.5	13.5	11.0	9.0	18.0	15.5	14.0
WIND ZONE 3	LIGHT	S35L2	35	23	315	20.0	14.0	11.5	9.5	18.5	16.0	14.5
		S30H2	30	29	415	23.0	15.5	12.5	10.0	20.5	17.5	16.0
		S35H2	35	29	485	24.0	16.0	13.0	10.5	21.0	18.0	16.5
	HEAVY	S26L1	26	22	195	18.0	13.0	10.5	9.0	16.5	14.5	13.0
		S30L1	30	22	225	18.5	13.0	10.5	9.0	17.0	15.0	13.5
		S35L1	35	22	255	19.0	13.5	11.0	9.0	17.5	15.5	14.0
WIND ZONE 4	LIGHT	S30H1	30	25	330	22.0	15.0	12.0	9.5	19.5	17.0	15.0
		S35H1	35	25	385	23.0	15.5	12.5	10.0	20.0	17.5	15.5
		S26L2	26	23	250	19.0	13.5	10.5	9.0	17.5	15.5	13.5
	HEAVY	S30L2	30	23	290	20.0	14.0	11.0	9.5	18.0	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	10.0	19.0	16.5	14.5
		S30H2	30	29	415	23.5	15.5	12.5	10.5	21.0	18.0	16.0
WIND ZONE 5	LIGHT	S35H2	35	29	485	25.0	16.5	13.0	11.0	21.5	18.5	16.5
		S26L2	26	23	250	19.0	13.5	10.5	9.0	17.5	15.5	13.5
		S30L2	30	23	290	20.0	14.0	11.0	9.5	18.0	16.0	14.0
	HEAVY	S35L2	35	23	315	21.0	14.5	11.5	10.0	19.0	16.5	14.5
		S30H2	30	29	415	23.5	15.5	12.5	10.5	21.0	18.0	16.0
		S35H2	35	29	485	25.0	16.5	13.0	11.0	21.5	18.5	16.5

Concrete Volume (cubic yards) = .356 X L

Fabrication Design Notes:

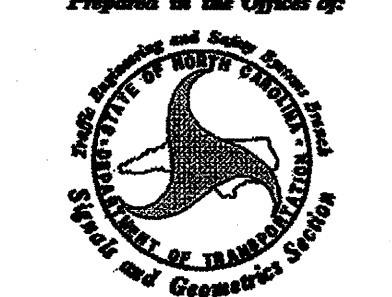
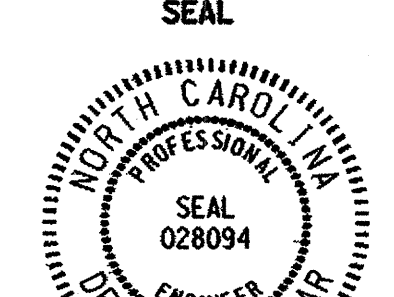
1. Values shown in "Moment at the Pole Base" column represents the minimum acceptable capacity allowable for design using a design CSR of 1.
2. Base plate thickness (T) is 2.0 inches.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from sheet M 1.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate pole case load number from the plans or from the Engineer.
5. Select the appropriate column in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case. The foundation depth is the value where the column and the row intersect.

Standard Strain Poles

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P.L. Alexander

	Standard Strain Poles and Standard Foundations		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito	
SCALE: 0 NA None		SIGNATURE: <i>D. Sarkar</i> 9.2.2005 DATE	

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

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

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

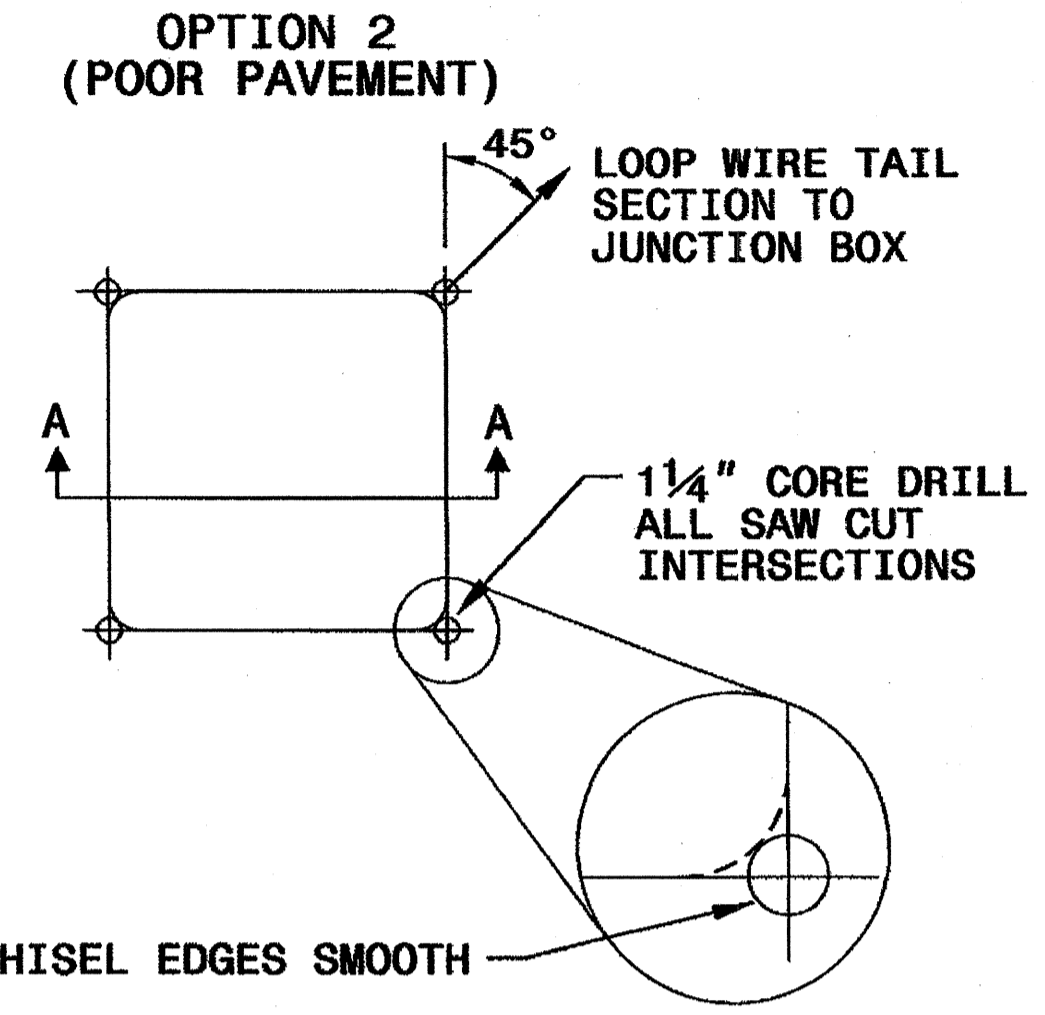
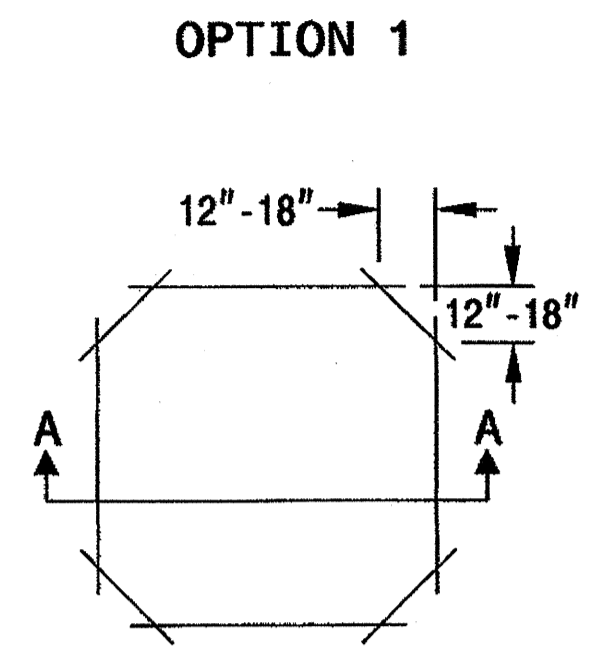
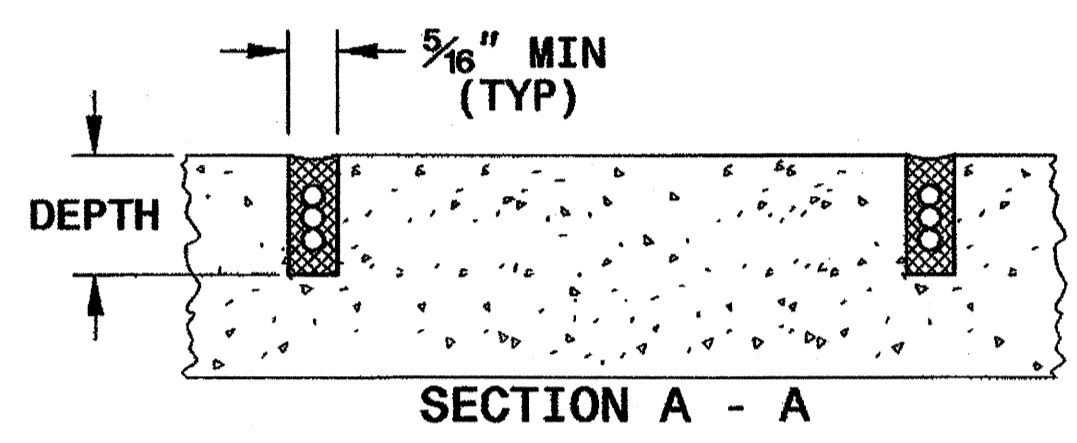
SHEET 1 OF 3
1725D01

CONVENTIONAL 4-SIDED LOOP

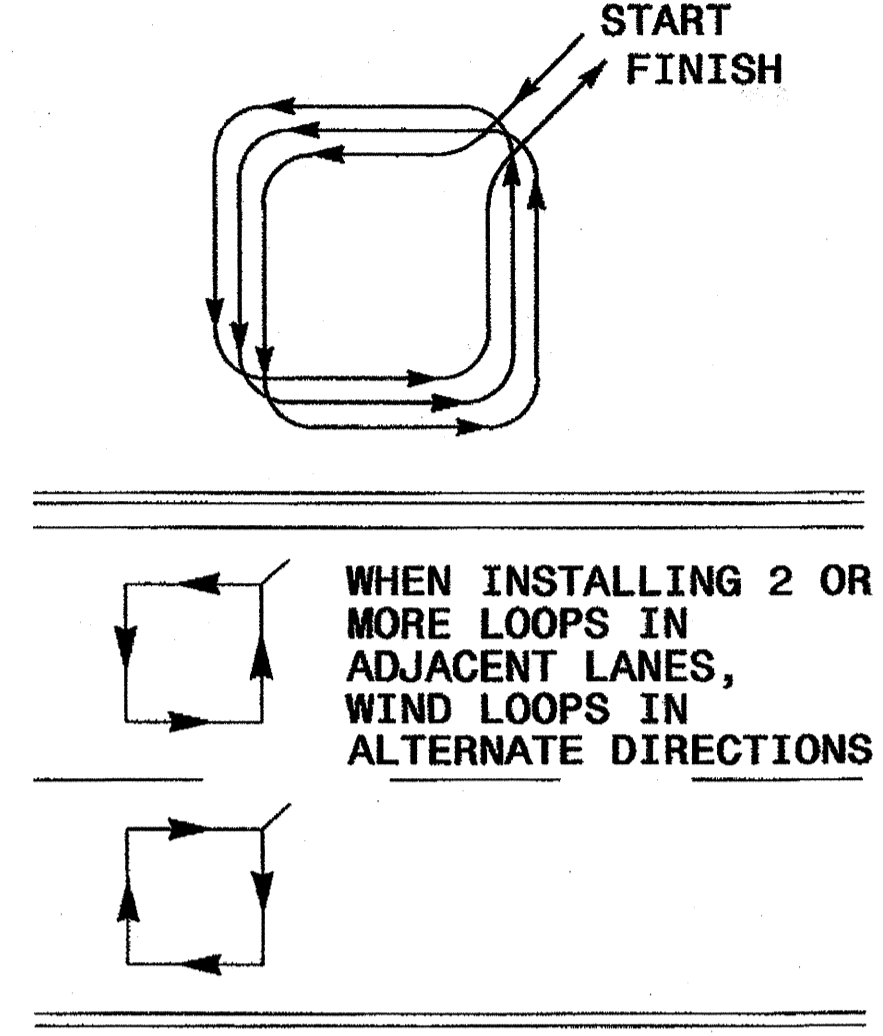
SAW CUT OPTIONS

SAW SLOT DEPTH CHART

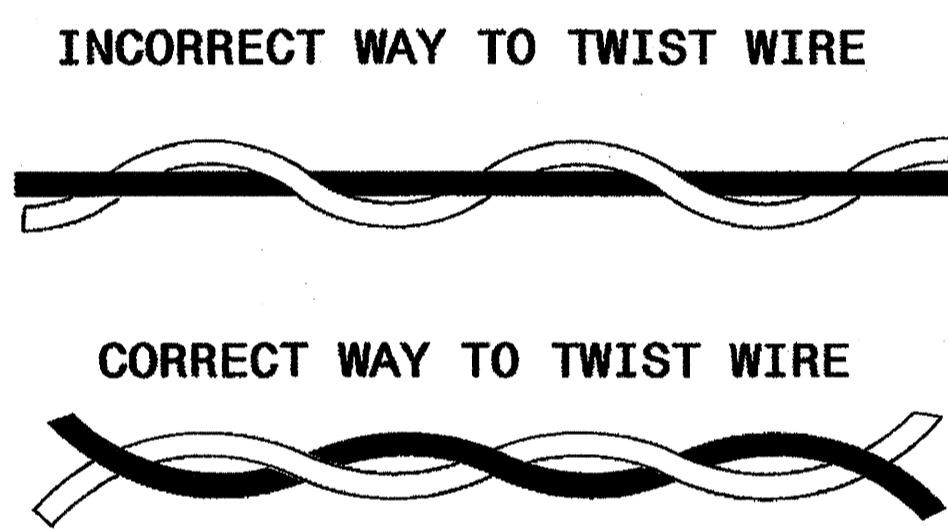
DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

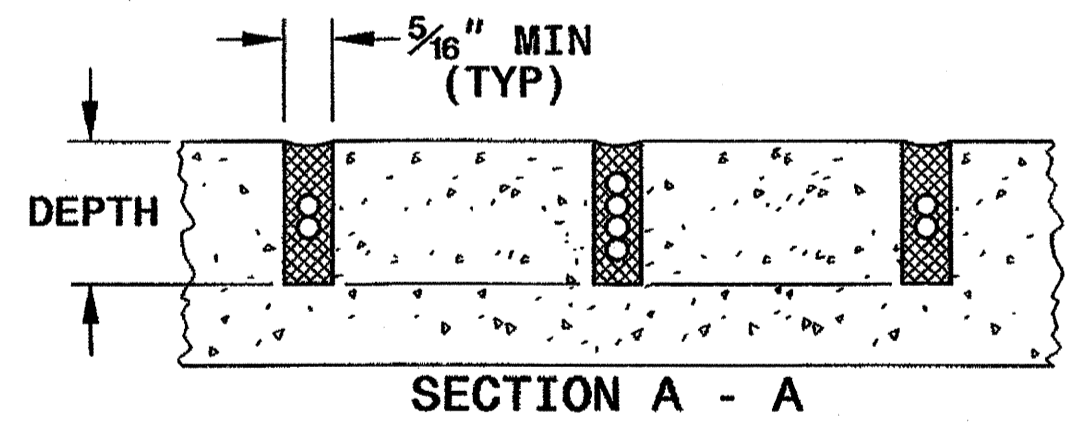
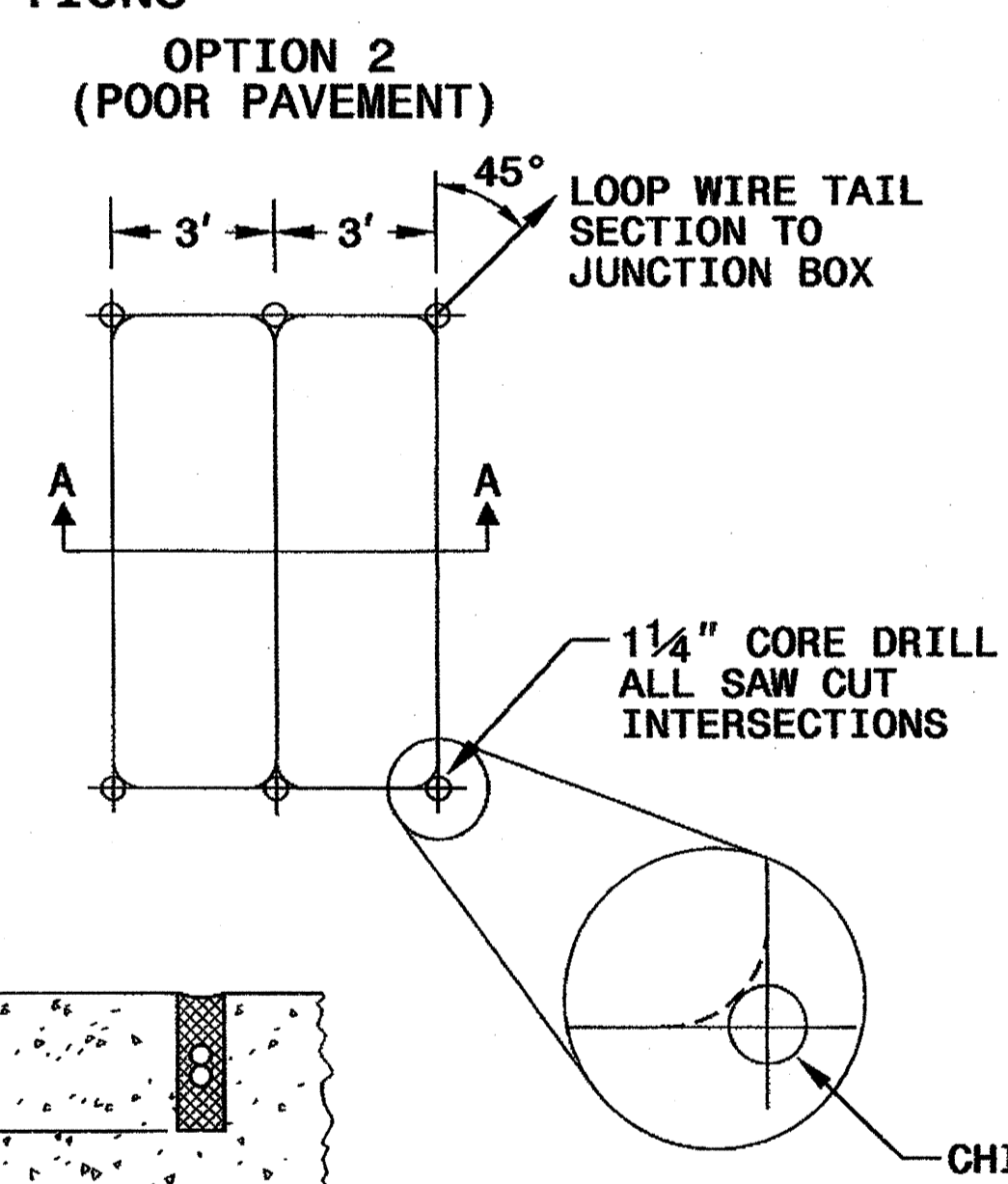
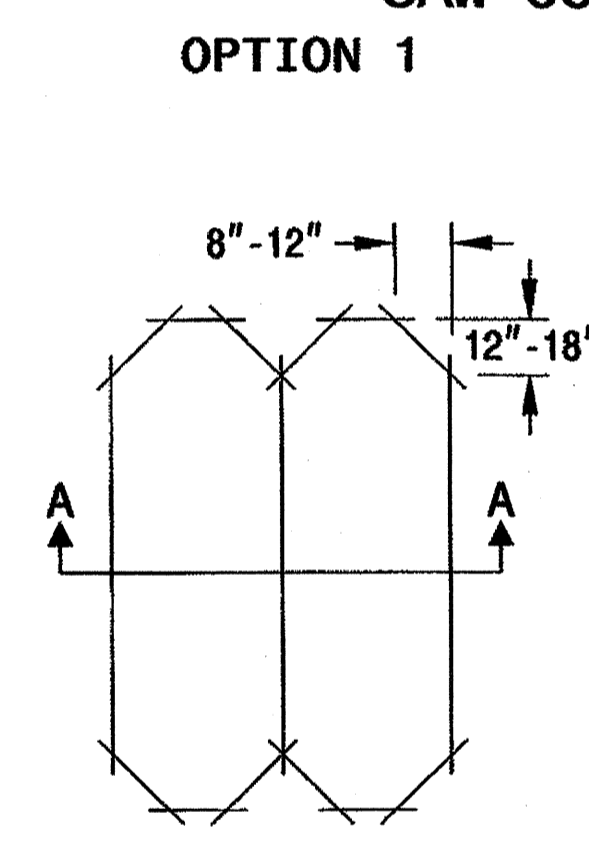


NOTES

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.

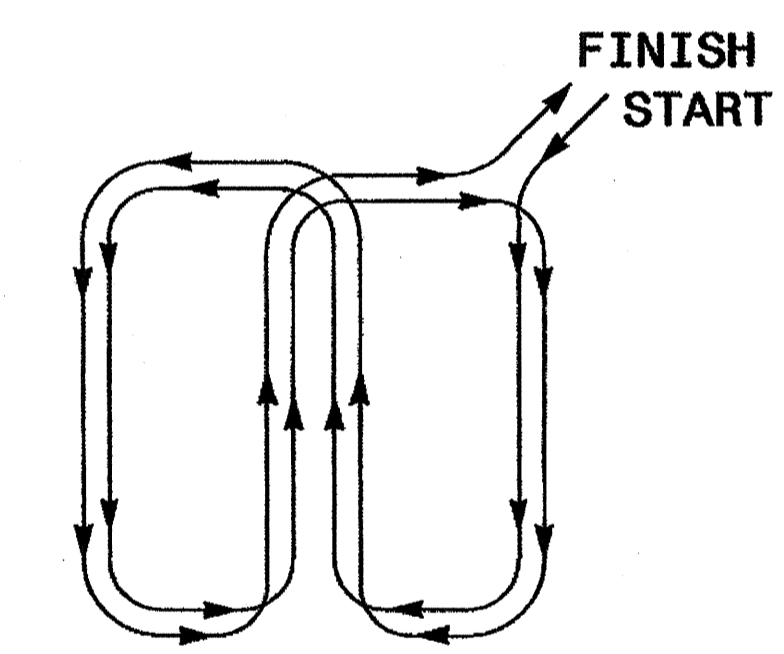
QUADRUPOLE LOOP

SAW CUT OPTIONS



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

LOOP WINDING METHOD



See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

Signature: *Milton I. Dean* 1/24/08
DATE

24-Nov-2008 09:28
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241116

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

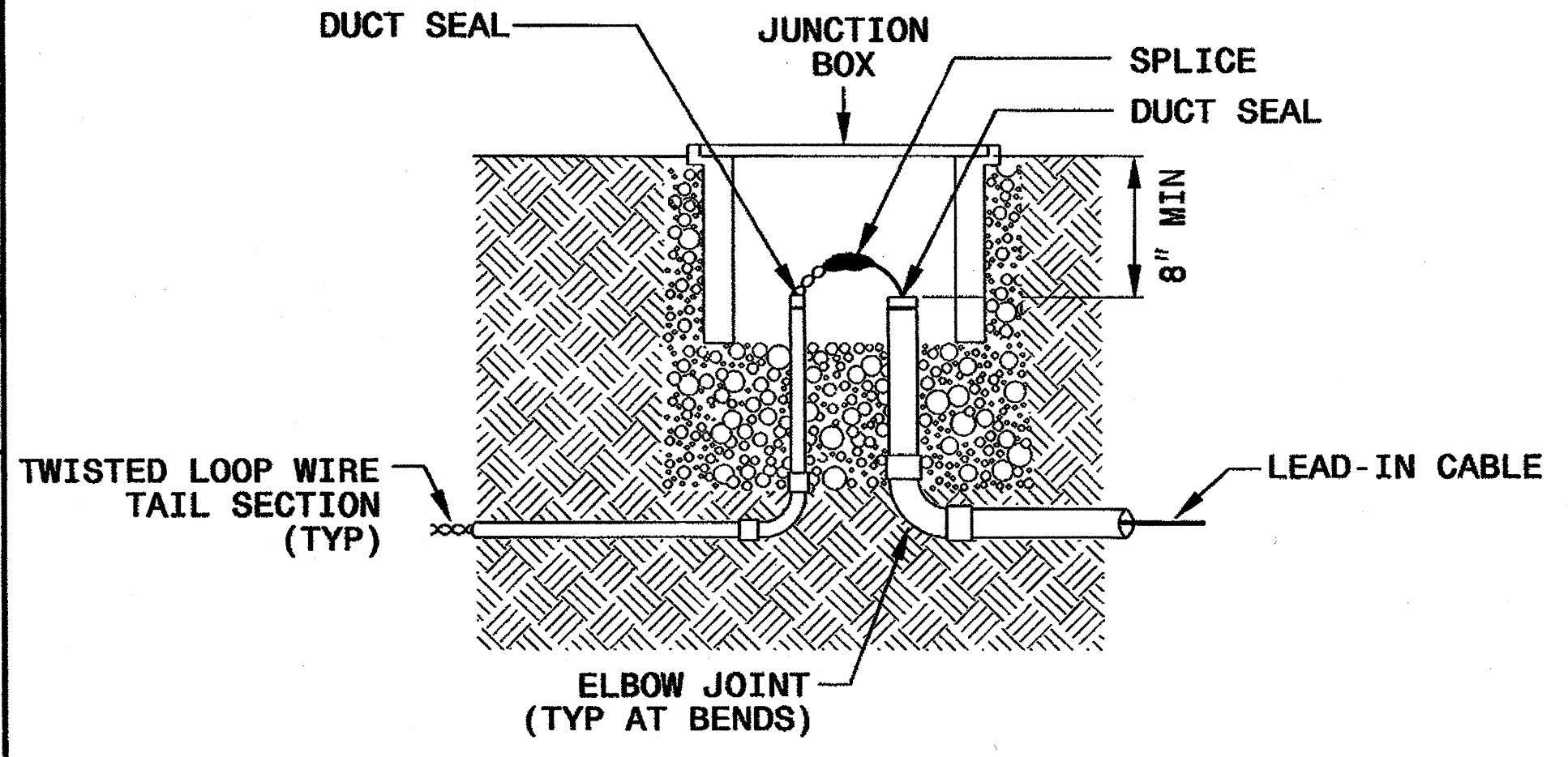
11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
 LOOP WIRE DETAILS

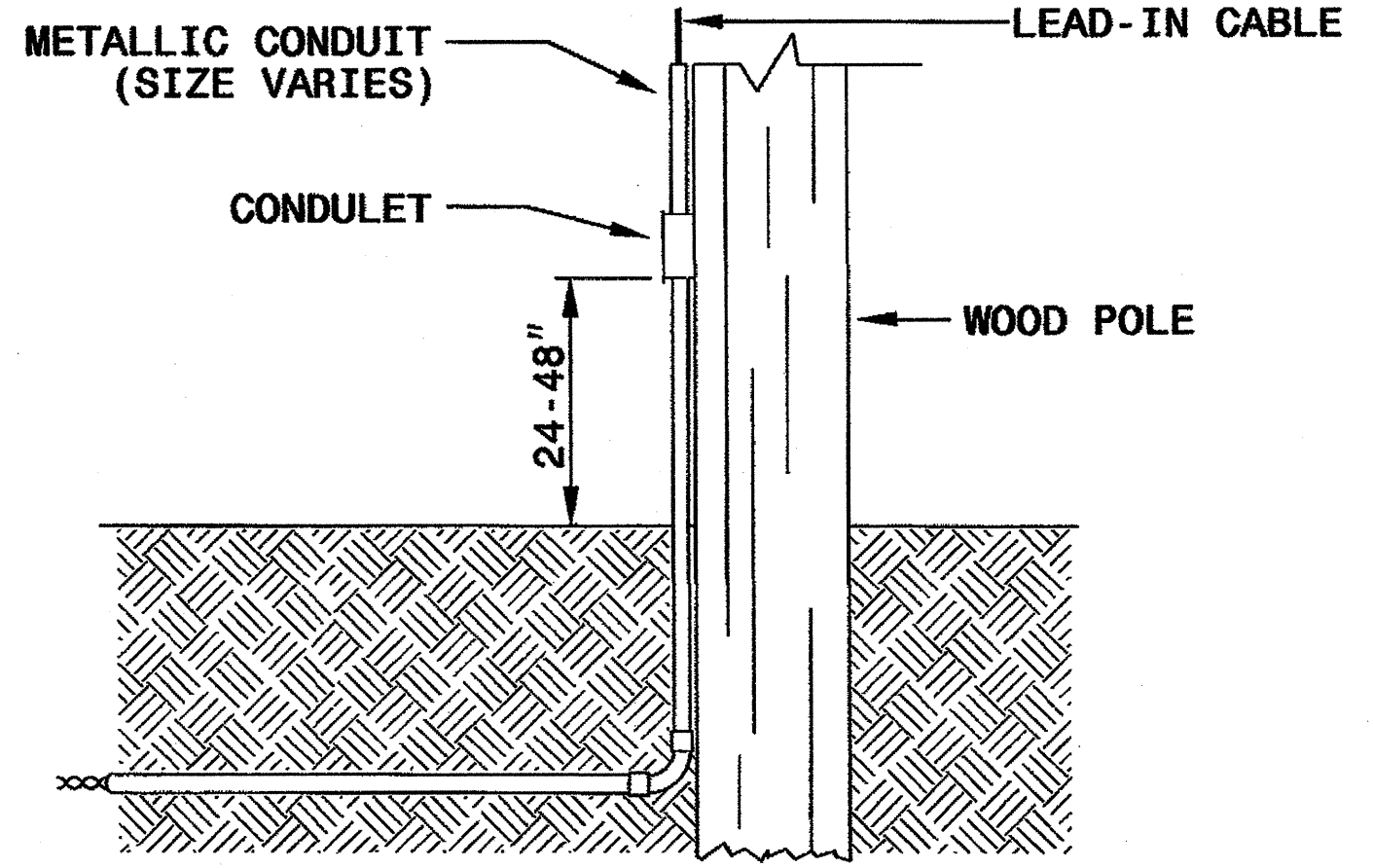
SHEET 2 OF 3
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

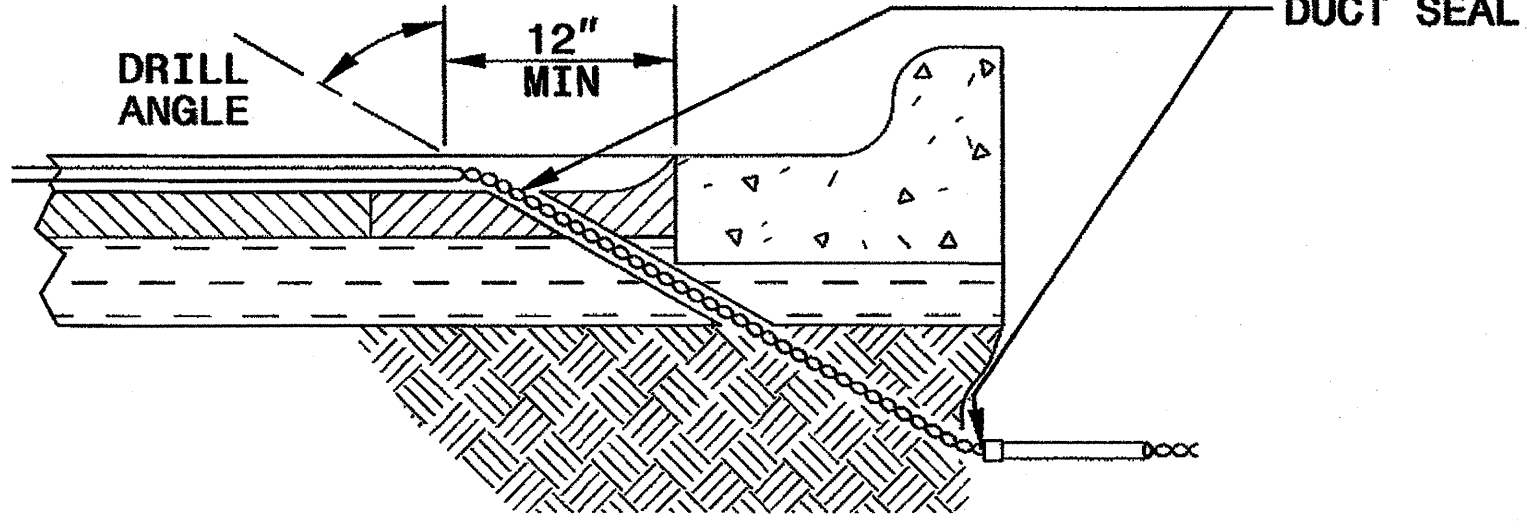


NOTE

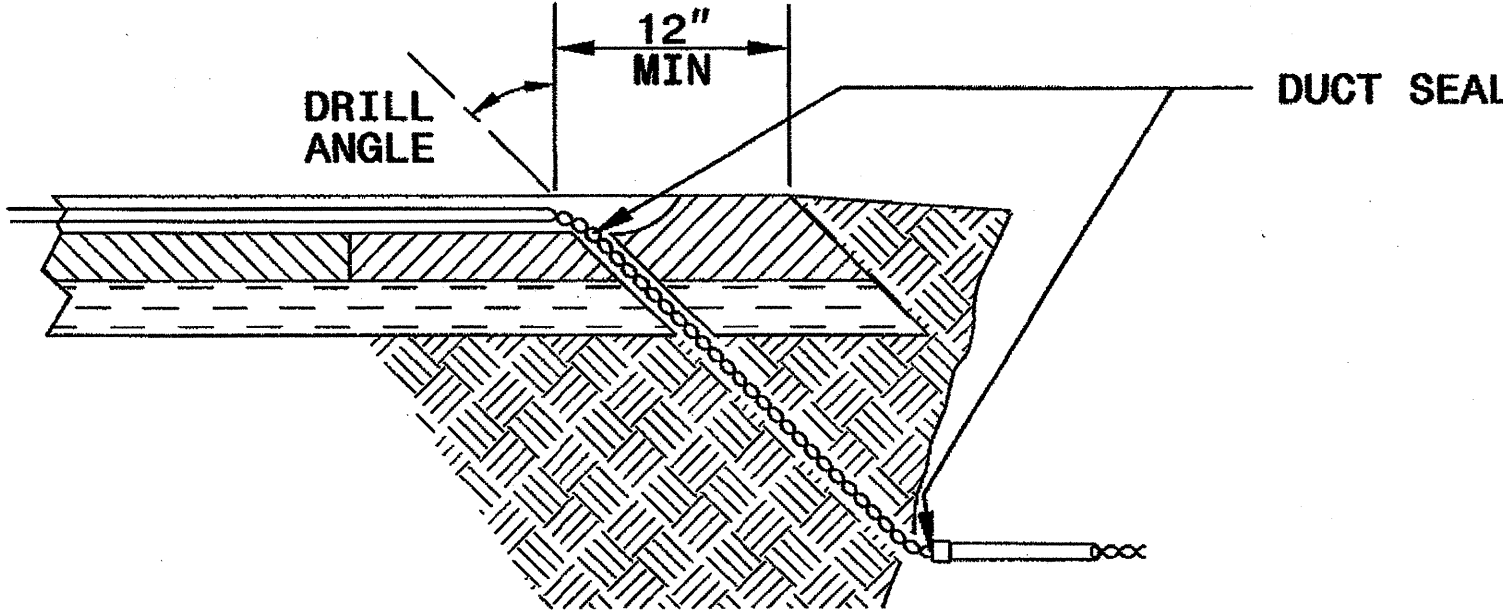
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

- DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
- TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
- 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 L. Dean 11/24/08
SIGNATURE DATE

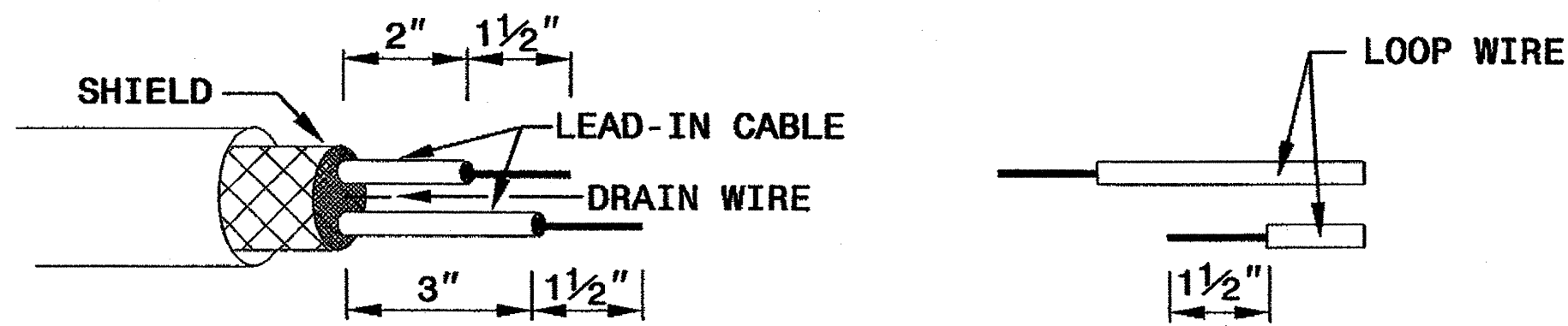
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

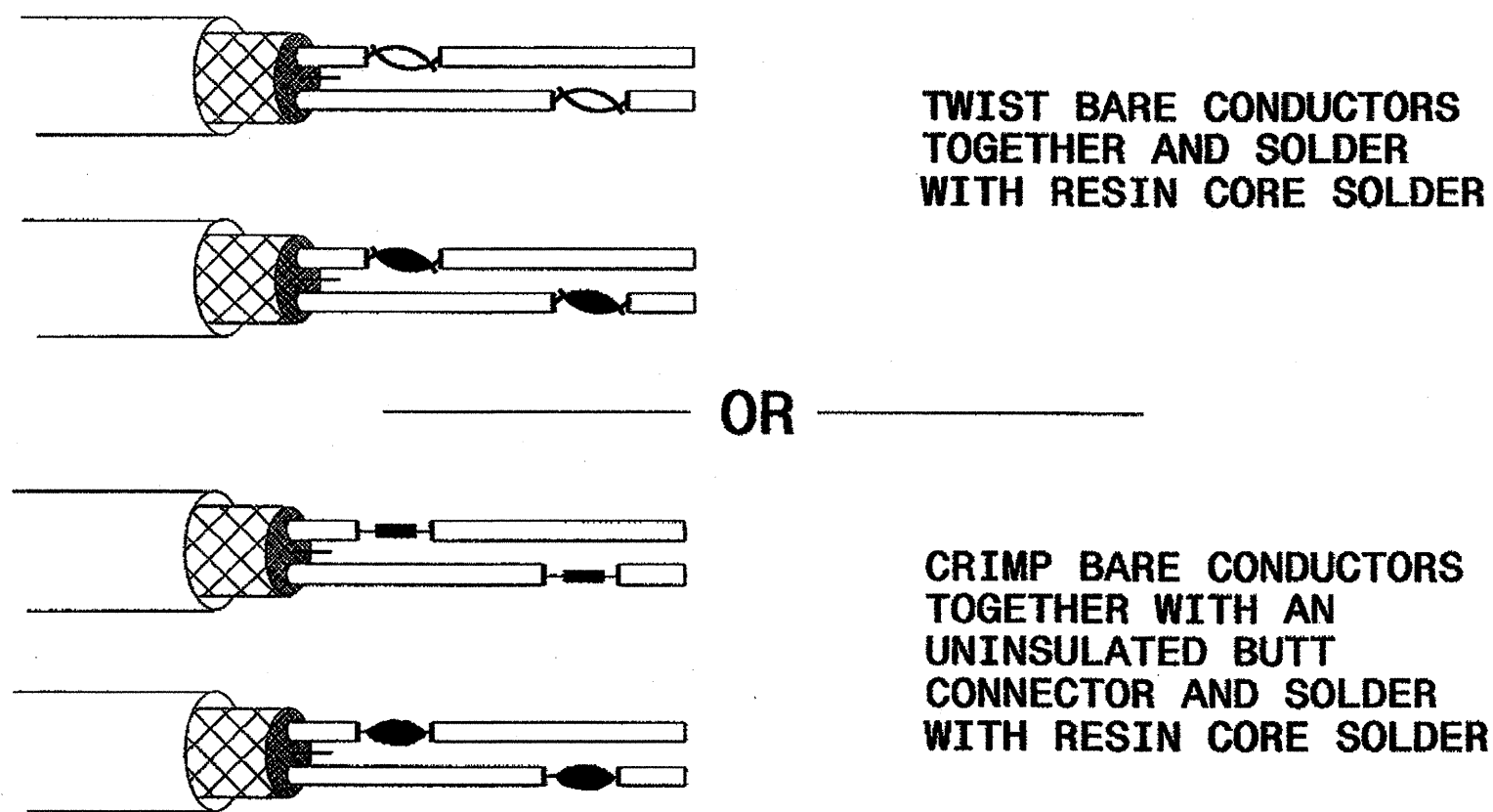
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE

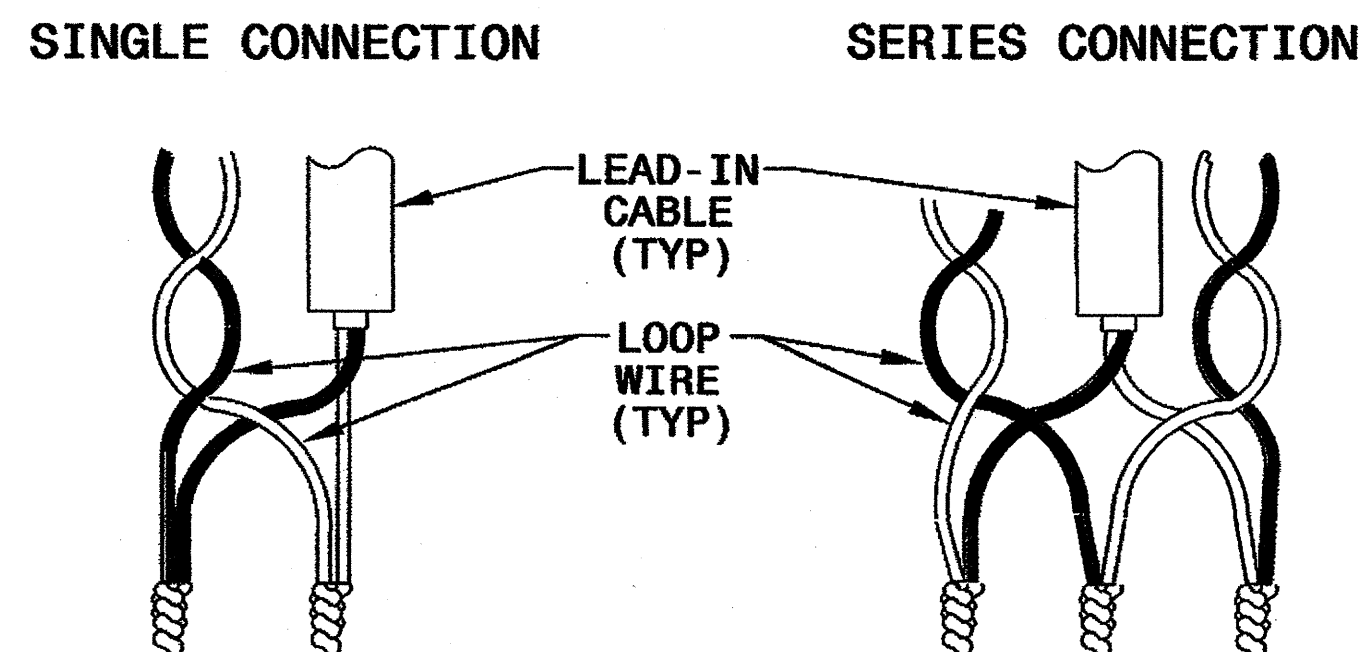


STEP 2. CONNECT AND SOLDER

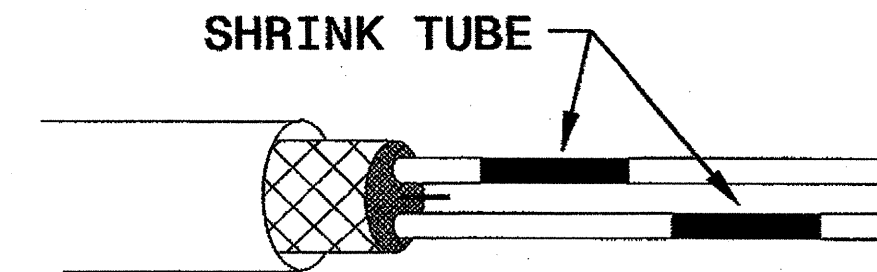


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

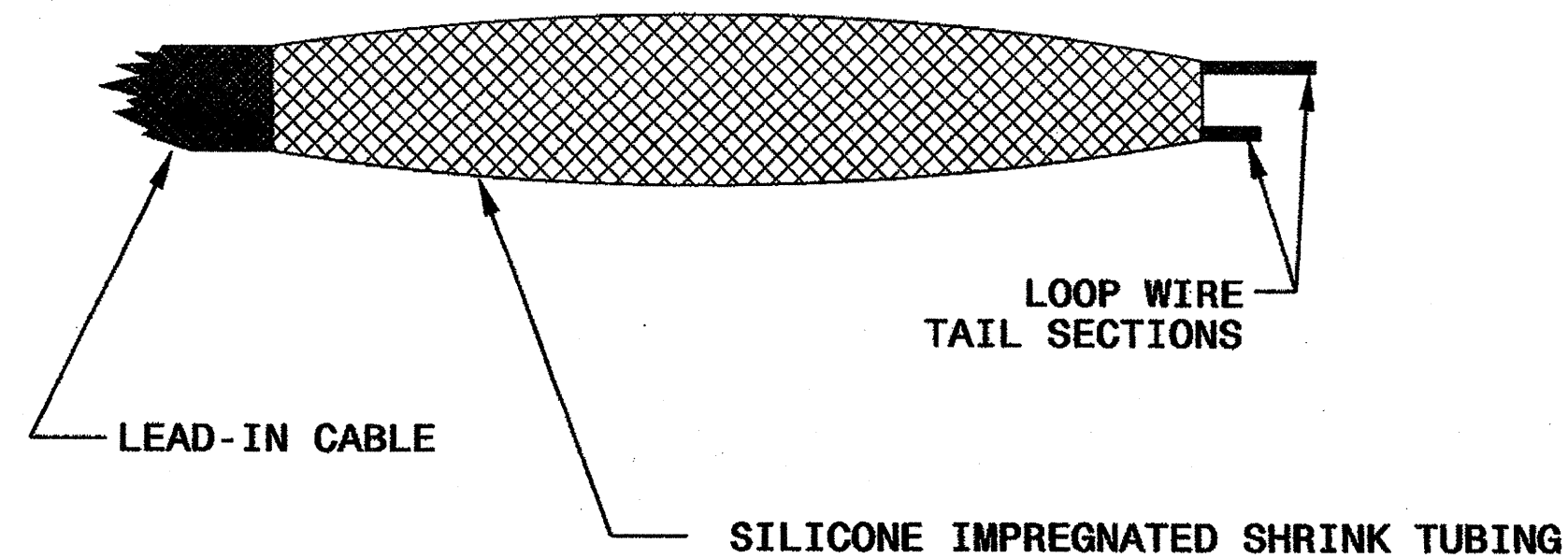
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS



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

24-nov-2008 09:36
d:\work_files\172501\172501_03_may2307.dgn
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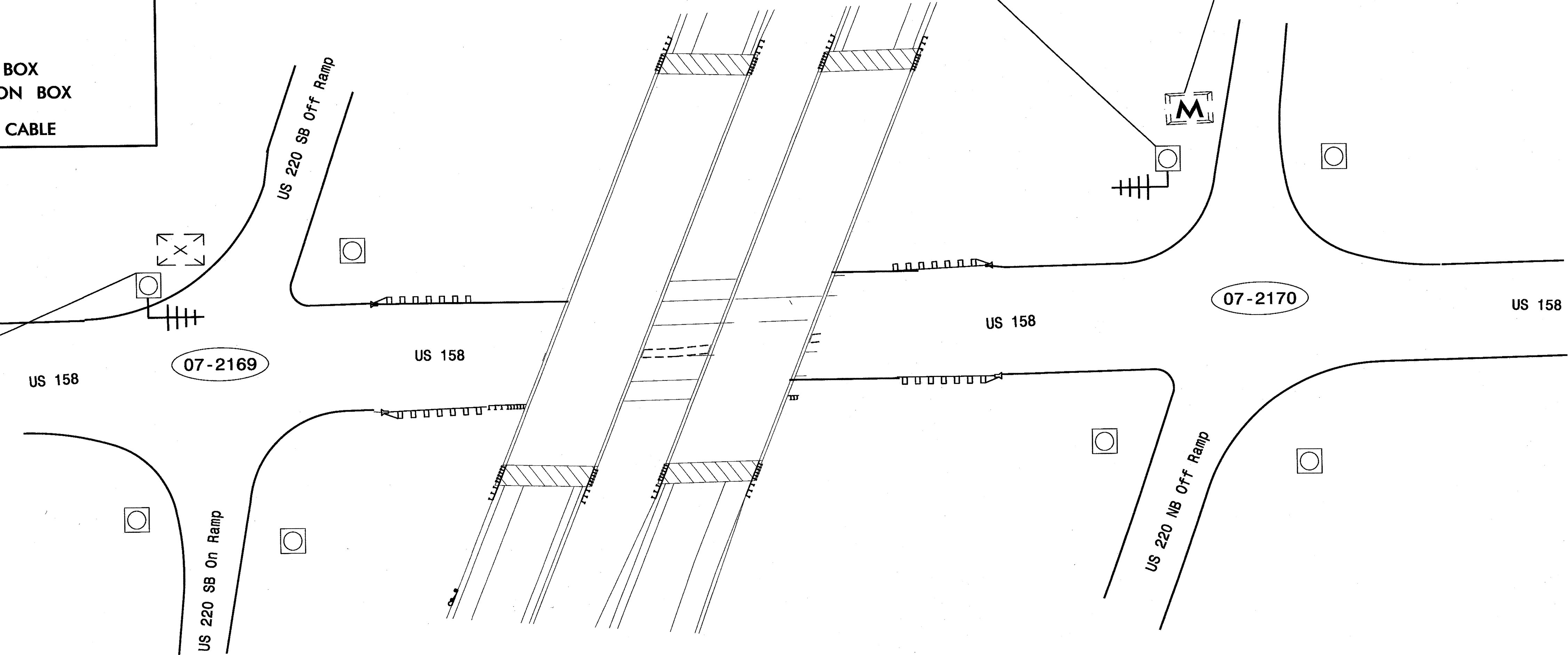
LEGEND

- YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
- YAGI ANTENNA (SINGLE)
- OMNI ANTENNA
- EXISTING CONTROLLER AND CABINET
- EXISTING MASTER CONTROLLER AND CABINET
- SIGNAL INVENTORY NUMBER (XX-XXXX)
- NEW METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- NEW METAL POLE
- SIGNAL POLE
- EXISTING METAL POLE
- NEW OVERSIZED JUNCTION BOX
- EXISTING OVERSIZED JUNCTION BOX
- EXISTING CONDUIT
- EXISTING COMMUNICATIONS CABLE

INSTALL 8.5 dB GAIN YAGI ANTENNA (HORIZONTALLY POLARIZED)
ATTACH ANTENNA 12" ABOVE SIGNAL CABLE

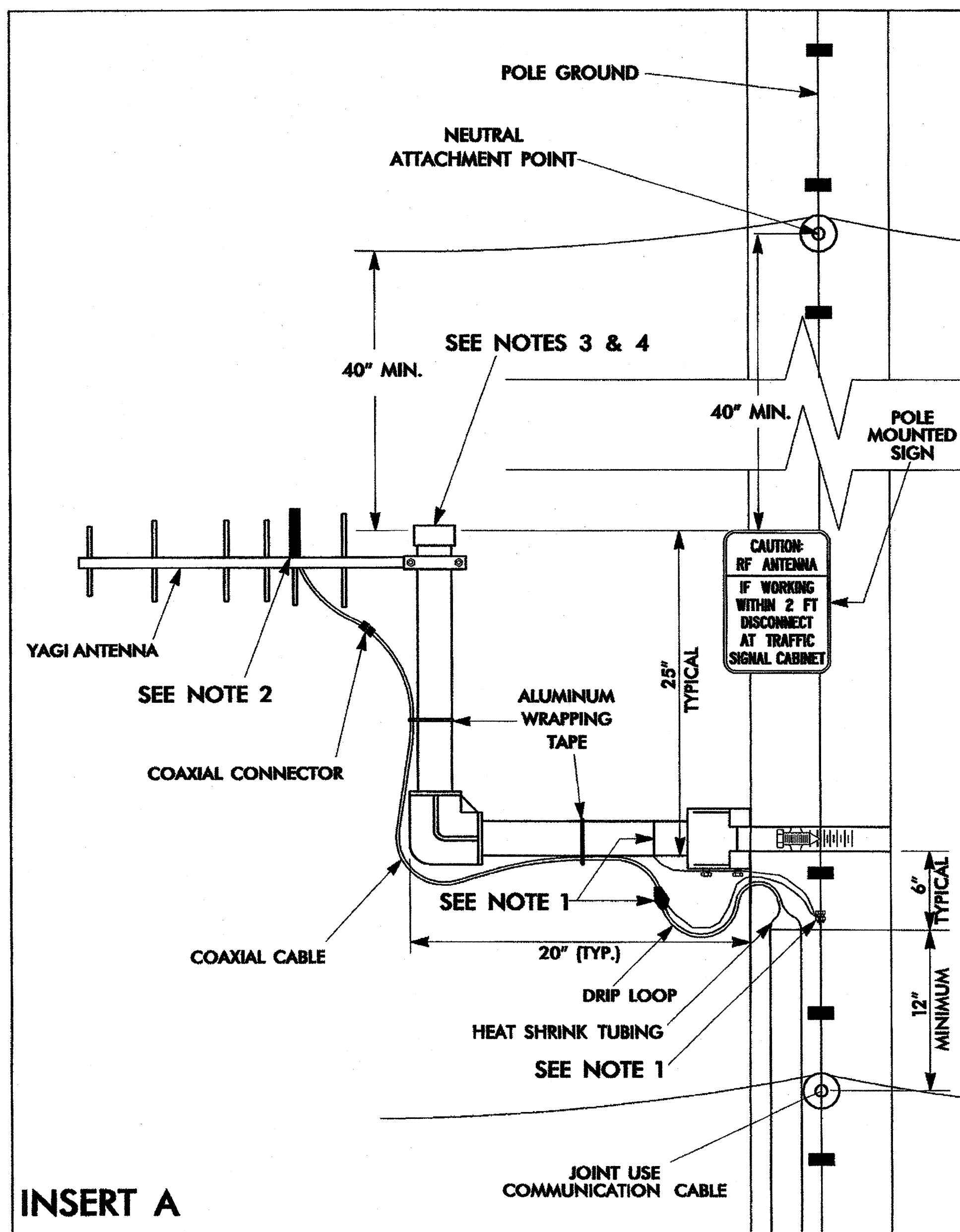
INSTALL 8.5 dB GAIN YAGI ANTENNA (HORIZONTALLY POLARIZED)
ATTACH ANTENNA 12" ABOVE SIGNAL CABLE

INSTALL TELEPHONE SERVICE



- NOTES FOR WIRELESS COMMUNICATIONS:**
- INSTALL COAXIAL CABLE:
 - ON WOOD POLES, REQUIRING A NEW RISER, INSTALL A 2" RISER WITH WEATHERHEAD TO ROUTE THE COAXIAL CABLE TO THE ANTENNA. ON POLES WITH EXISTING RISERS WITH WEATHER HEADS REUSE THE RISER ASSEMBLY.
 - ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL 1/2" HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
 - ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND REPLACE THE WEATHERHEAD WITH HEAT SHRINK TUBING AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - BETWEEN THE POINT OF EXITING THE METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
 - IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
 - INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER.
(NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
 - MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
 - INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET.
(NOTE: RF ANTENNA DISCONNECT SWITCH AND DECAL ARE NOT REQUIRED WHEN THE ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
 - REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

	WIRELESS COMMUNICATIONS PLAN		
	US 158 AT US 220 NB AND SB RAMPS		
DIVISION 07 GUILFORD COUNTY E. OF STOKESDALE		PLAN DATE: AUGUST 2011	REVIEWED BY: I. N. AVERY
PREPARED BY: P. C. LOUDER		REVIEWED BY: G.A. FULLER, PE	SIGNATURE: <i>G. A. Fuller</i> DATE:
SCALE: 0		REVISIONS:	INIT. DATE:

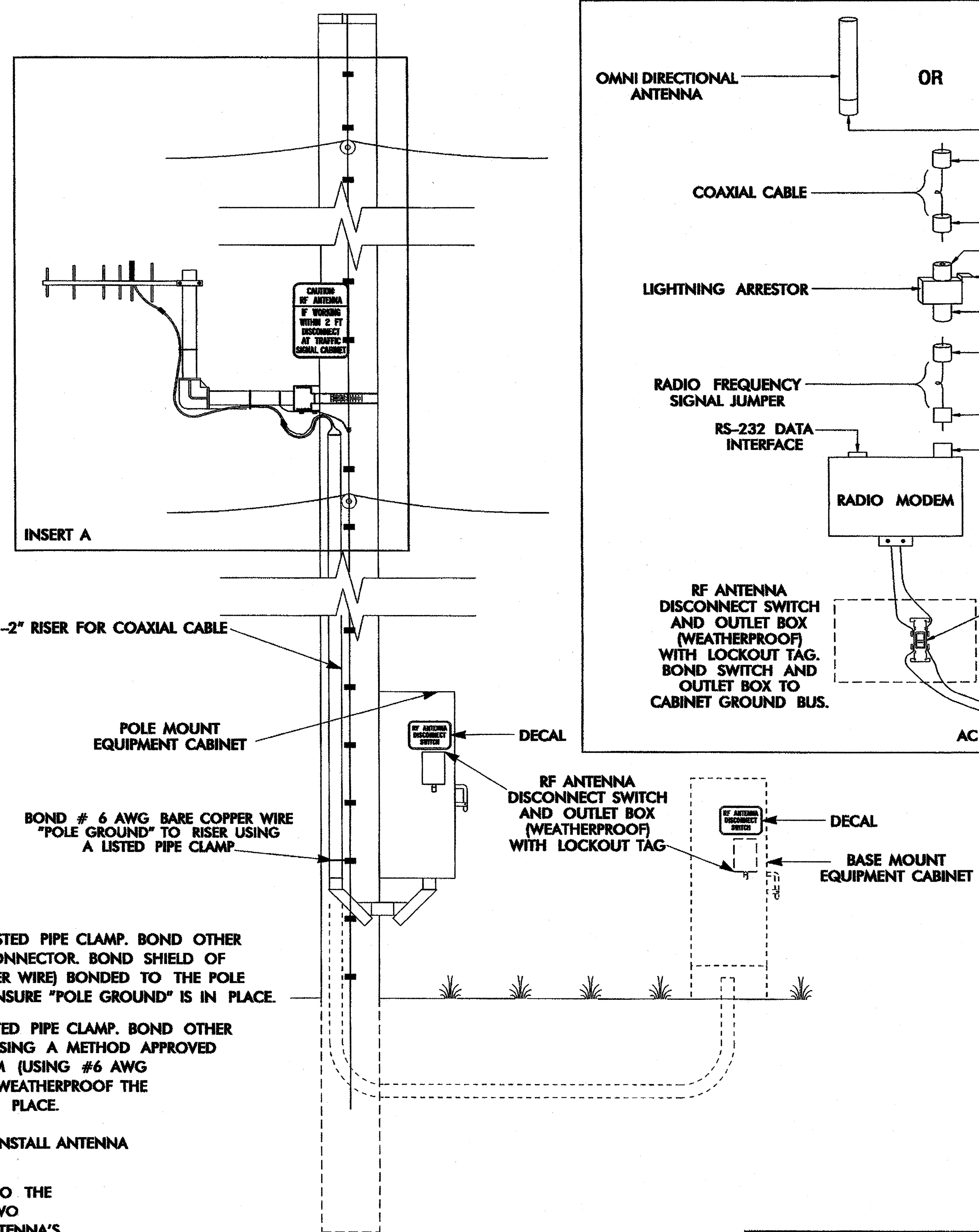


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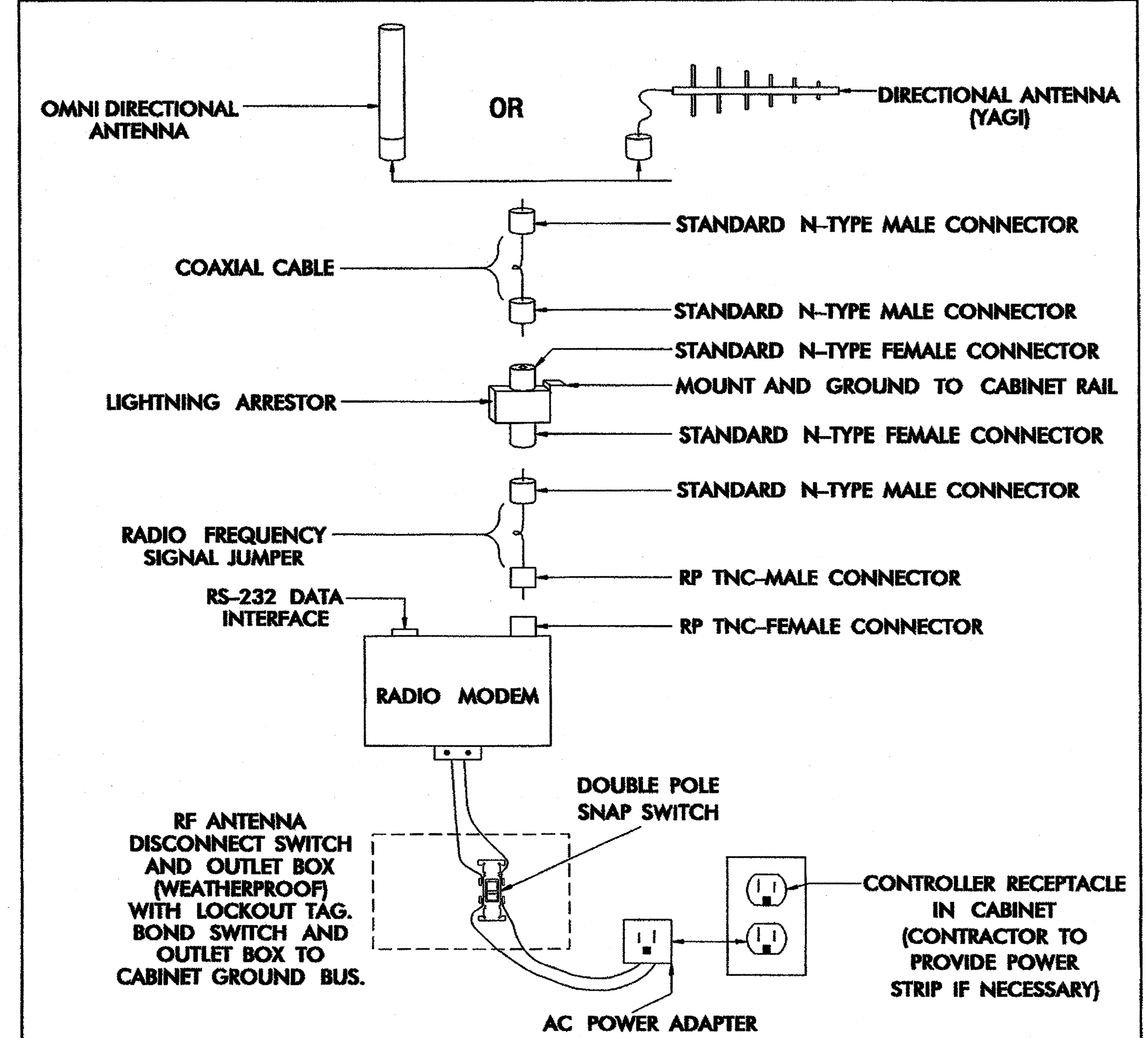
NOTES

- 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.



ANTENNA AND COAXIAL CABLE CONNECTION SCHEMATIC



	WIRELESS RADIO ANTENNA TYPICAL DETAILS	
	PLAN DATE: JULY 2005 PREPARED BY: A. GREECH SCALE: 0	REVIEWED BY: I. N. AVERY REVIEWED BY: A. T. FAULKNER REVISIONS: UPDATE GROUNDING - COAXIAL CABLE SHIELD DATE: 9/12/05

DECAL

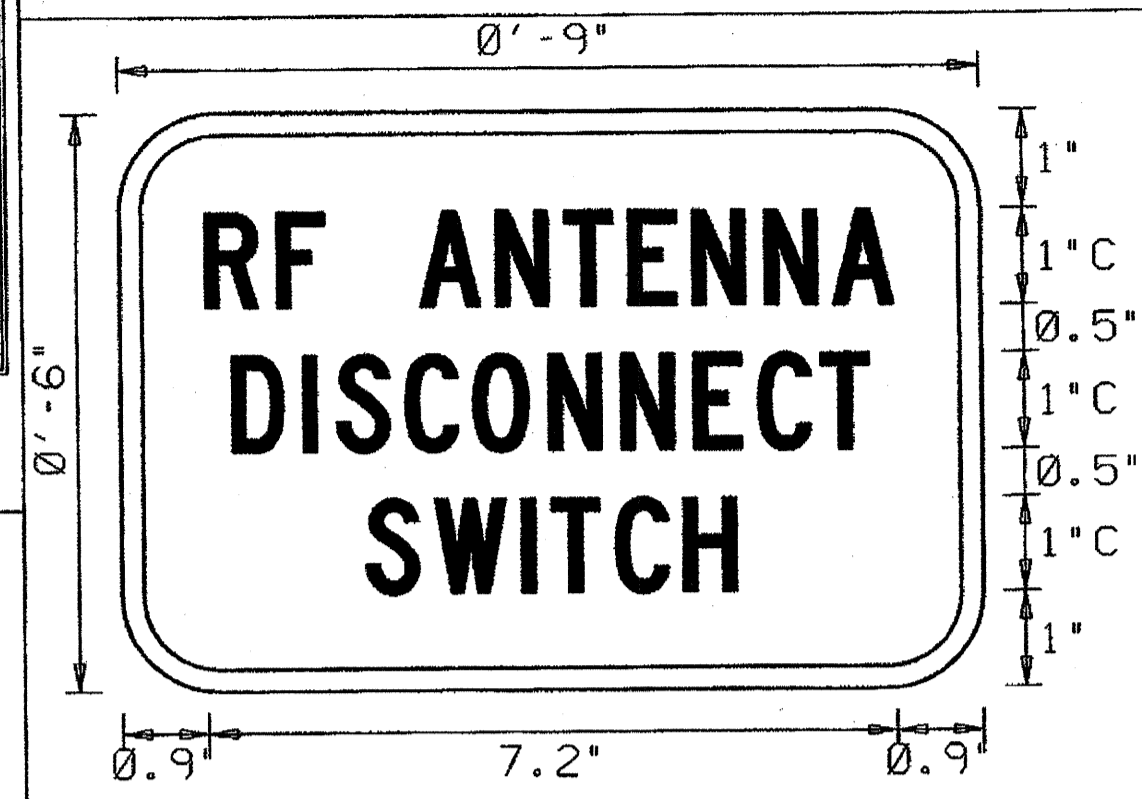
POLE MOUNTED SIGN

SIGN NUMBER: SPO5224
 TYPE: DECAL
 QUANTITY:
 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:
 LENGTH:

SYMBOL	X	Y	WID	HT

MAT'L: 0.063" (1.6 mm) ALUMINUM

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
- Legend and border shall be direct applied Type III reflective sheeting.
 - Legend and border shall be direct applied non-reflective sheeting.
 - Shields shall be Type III reflective sheeting on 0.032" (0.8mm) aluminum and demountable.
 - Background shall be Type III reflective sheeting.
 - Background shall be Type I reflective sheeting.
 - Center arrow(s) vertically on sign.
 - 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

Letter	Series/Size	Text Length
R F A N T E N N A	C1	7.2
D I S C O N N E C T	C1	6.7
S W I T C H	C1	3.9

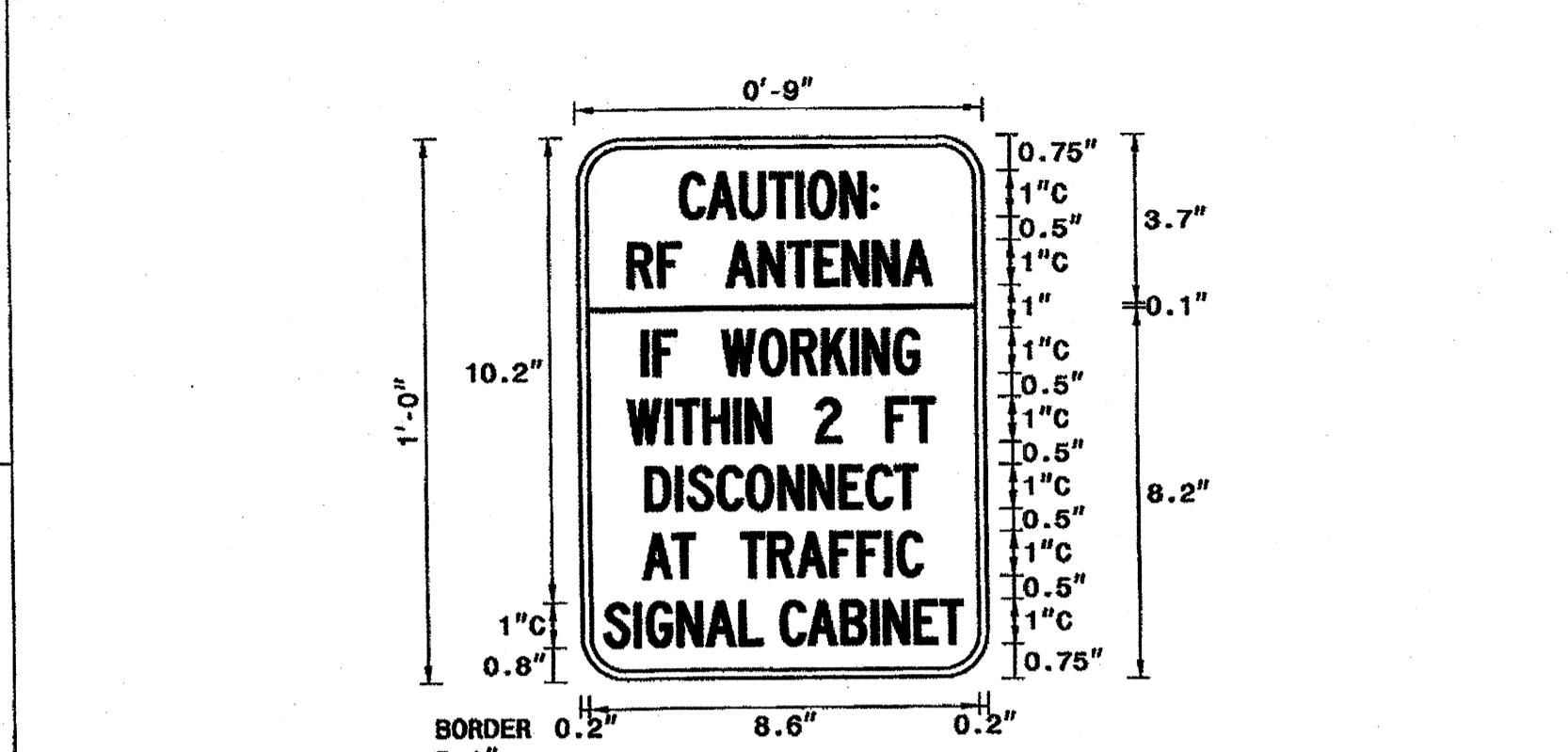
Spacing Factor is 1 unless specified otherwise

SIGN NUMBER: SPO5223
 TYPE: D
 QUANTITY:
 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:
 LENGTH:

SYMBOL	X	Y	WID	HT
BAR	0.2	8.2	8.6	1.0

MAT'L: 0.063" (1.6 mm) ALUMINUM

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



- USE NOTES: 2,4
- Legend and border shall be direct applied Type III reflective sheeting.
 - Legend and border shall be direct applied non-reflective sheeting.
 - Shields shall be Type III reflective sheeting on 0.032" (0.8mm) aluminum and demountable.
 - Background shall be Type III reflective sheeting.
 - Background shall be Type I reflective sheeting.
 - Center arrow(s) vertically on sign.
 - 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

Letter	Series/Size	Text Length
C A U T I O N :	C	4.4
R F A N T E N N A	C	6.7
I F W O R K I N G	C	6.1
W I T H I N 2 F T	C	6.8
D I S C O N N E C T	C	6
A T T R A F F I C	C	6.2
S I G N A L C A B I N E T	C	7.9

Spacing Factor is 1 unless specified otherwise

NORTH CAROLINA D.O.T. SIGN DETAIL

750 N. Greenfield Place, Durham, NC 27709

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

SEAL

Signature: *Gregory A. Faulkner* 9/12/05
 DATE