

DCN:
0053DEL P10a2

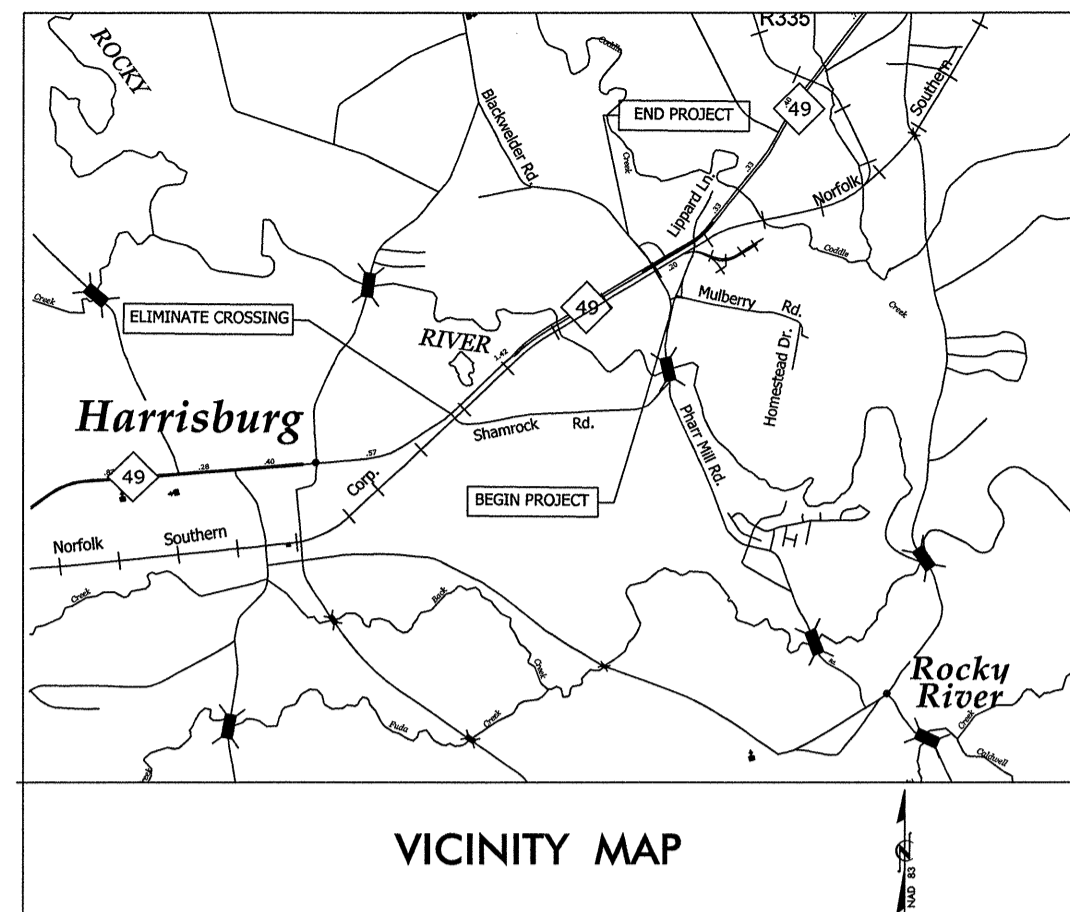
PROJECT REFERENCE NO. P-5208B	SHEET NO. Sig. 1
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

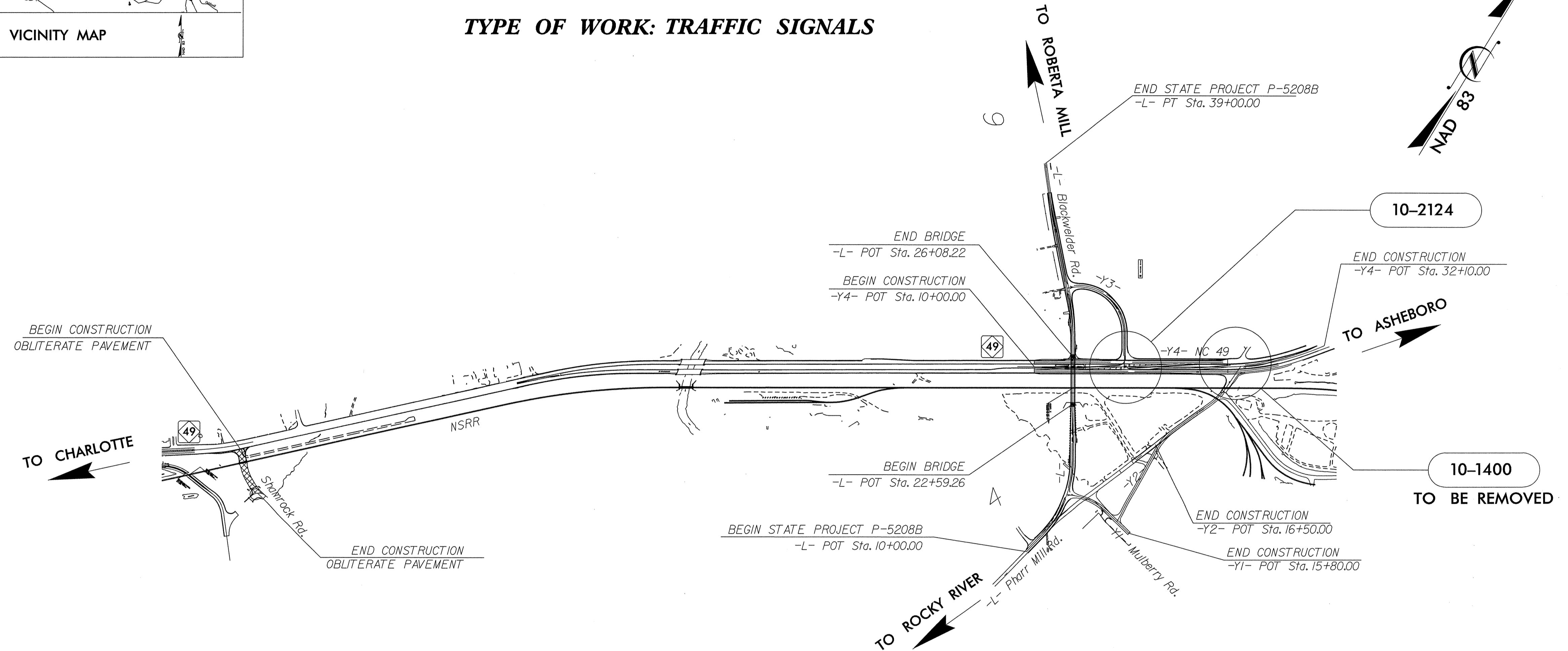
CABARRUS COUNTY

**LOCATION: PHARR MILL ROAD /BLACKWELDER
ROAD GRADE SEPARATION OVER NCRRS**

TYPE OF WORK: TRAFFIC SIGNALS



VICINITY MAP



TIP PROJECT: P-5208B

PLANS PREPARED BY:

SEPI
ENGINEERING & CONSTRUCTION
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License #: C-2197

JEFFREY P. HOCHANADEL, P.E. - PROJECT ENGINEER
MATTHEW B. COPPLE, PE - DESIGN ENGINEER
CLIFF LAWSON, E.I. - DESIGN ENGINEER

INDEX OF PLANS

SHEET NUMBER	SIGNAL INV. NUMBER	LOCATION / DESCRIPTION
1	-	TITLE SHEET
2	10-2124	NC 49 AT NC 49 CONNECTOR / SIGNAL DESIGN
3 - 4	10-2124	NC 49 AT NC 49 CONNECTOR / ELECTRICAL DESIGN

LEGEND

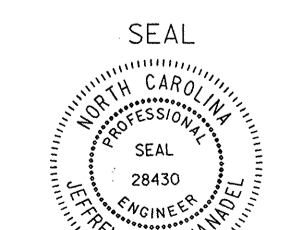
##-#### SIGNAL INVENTORY NUMBER

PLANS PREPARED FOR:

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
TIMOTHY J. WILLIAMS, P.E. - WESTERN REGION SIGNALS ENGINEER
ZACHARY M. LITTLE, P.E. - SIGNAL PROJECT ENGINEER
GEORGE C. BROWN, P.E. - SIGNAL EQUIPMENT DESIGN ENGINEER



ALL DIMENSIONS IN THESE PLANS ARE IN FEET UNLESS OTHERWISE NOTED

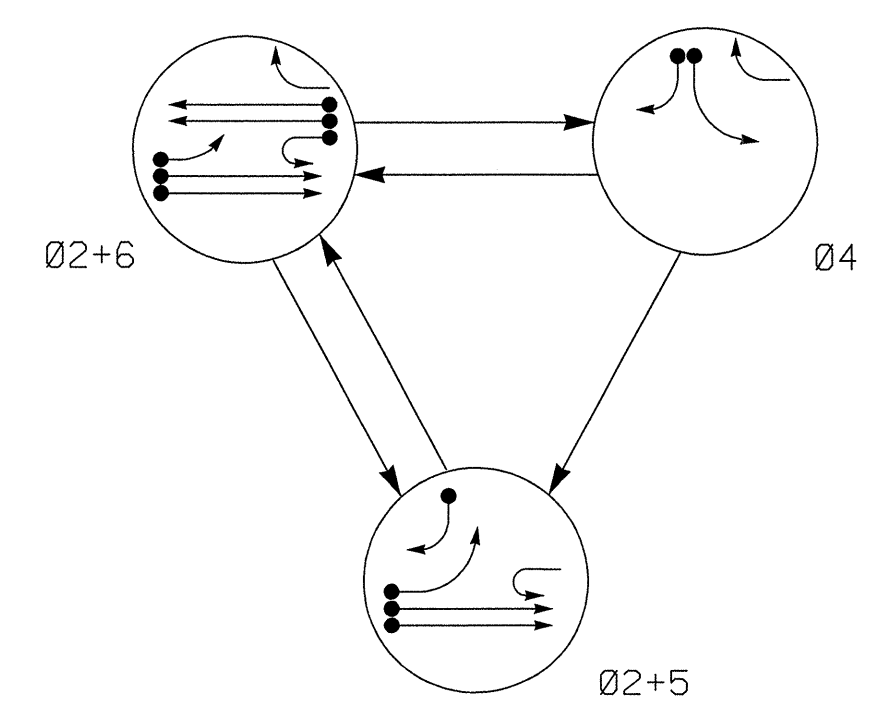


Signature: *Matthew B. Copple*
DATE: 11/30/12

\$\$\$\$SYTIME\$\$\$\$DCN\$\$\$\$USERNAME\$\$\$\$

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PHASING DIAGRAM

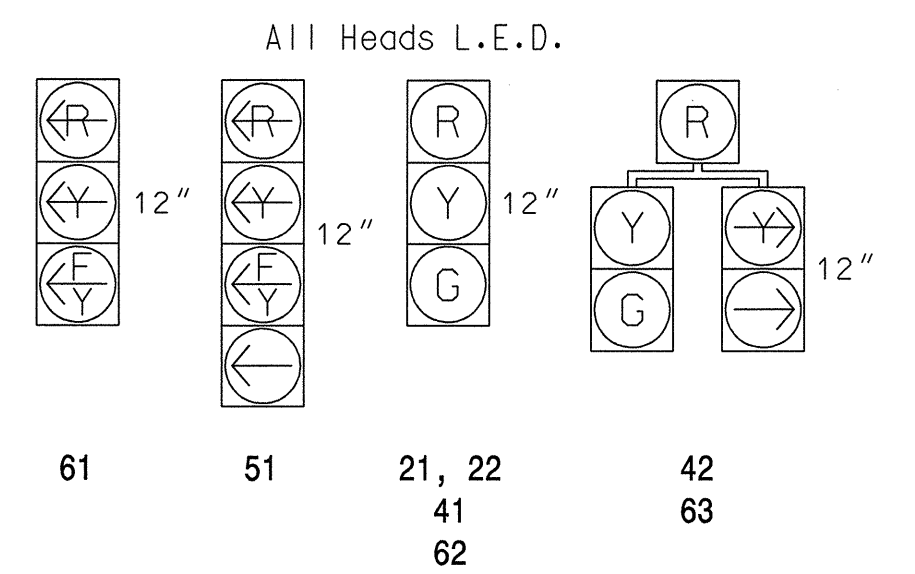


PHASING DIAGRAM DETECTION LEGEND
 ● DETECTED MOVEMENT
 ◐ UNDETECTED MOVEMENT (OVERLAP)
 ◑ UNSIGNALIZED MOVEMENT
 ◒ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	04	F L P D
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	F	F	R	Y
61	F	F	R	Y
62	R	G	R	Y
63	R	G	R	Y

SIGNAL FACE I.D.



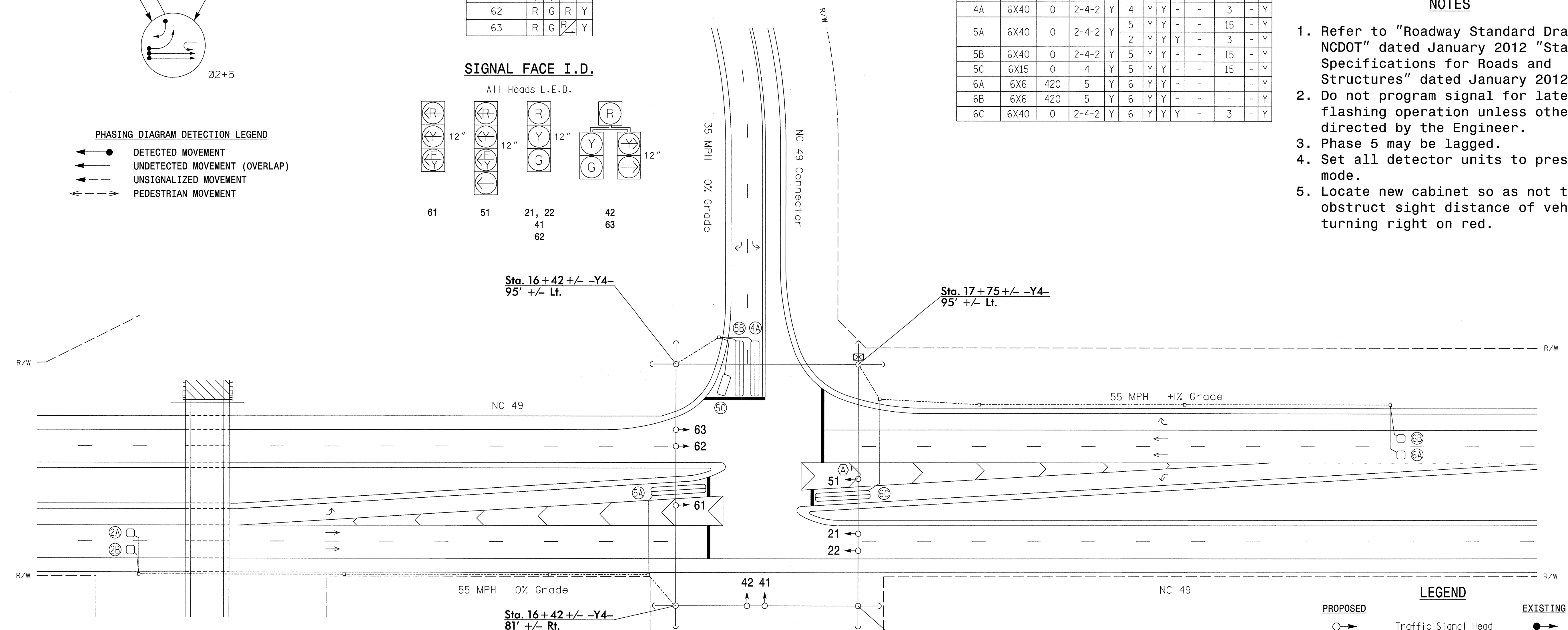
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
2A	6X6	420	6	Y	2	Y	Y	-	-	-	-	Y
2B	6X6	420	6	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
5B	6X40	0	2-4-2	Y	2	Y	Y	-	-	3	-	Y
5C	6X15	0	4	Y	5	Y	Y	-	-	15	-	Y
6A	6X6	420	5	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	420	5	Y	6	Y	Y	-	-	-	-	Y
6C	6X40	0	2-4-2	Y	6	Y	Y	-	-	3	-	Y

3 PHASE FULLY ACTUATED ISOLATED

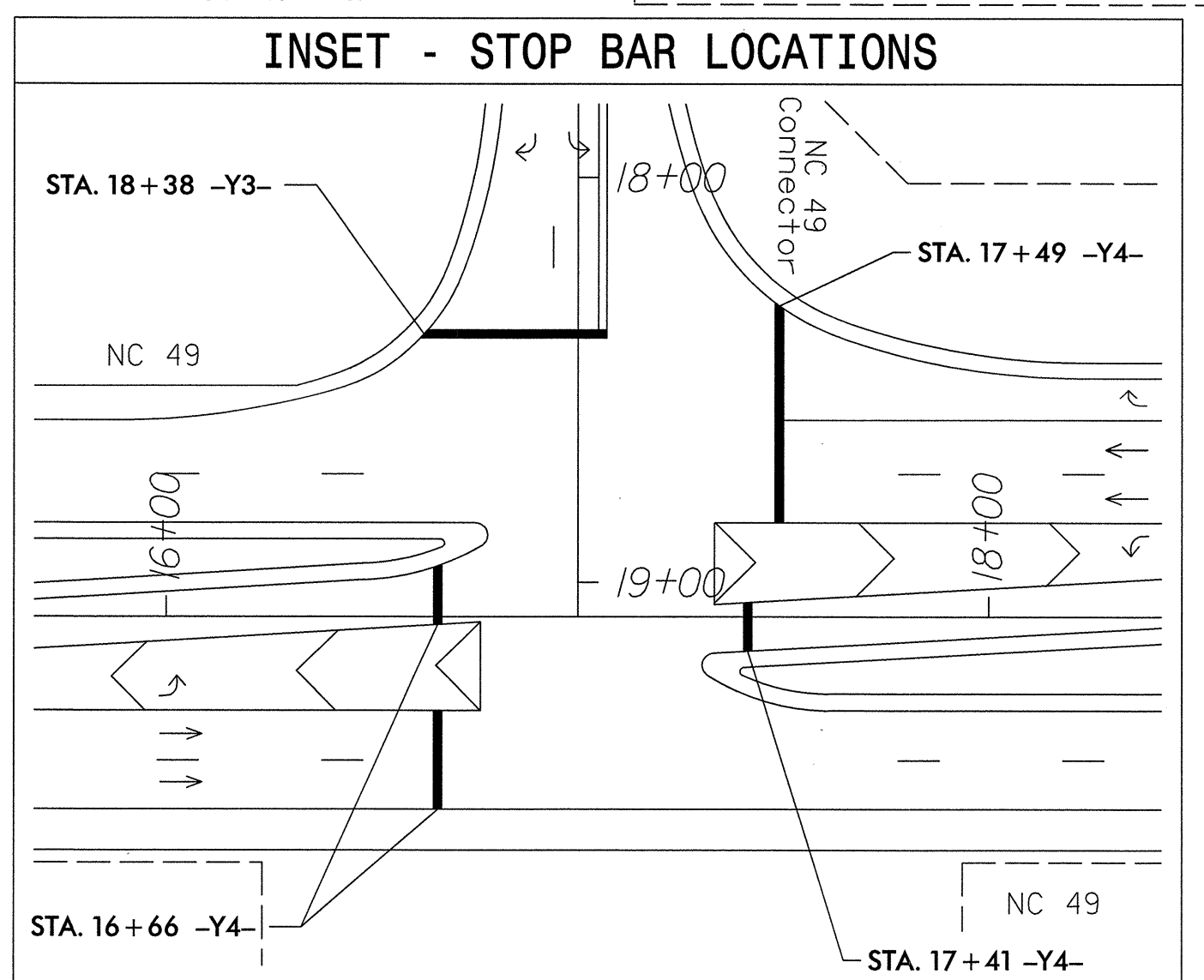
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 "Standard Specifications for Roads and Structures" dated January 2012.
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.



OASIS 2070L TIMING CHART

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	50	30	120
Yellow Clearance	5.2	3.0	3.0	5.2
Red Clearance	1.2	3.2	2.9	1.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	1.5	-	-	1.5
Max Variable Initial *	46	-	-	46
Time Before Reduction *	15	-	-	15
Time To Reduce *	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



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
□ Signal Pole with Guy	□ Signal Pole with Guy
□ Signal Pole with Sidewalk Guy	□ Signal Pole with Sidewalk Guy
□ Inductive Loop Detector	□ Inductive Loop Detector
□ Controller & Cabinet	□ Controller & Cabinet
□ Junction Box	□ Junction Box
□ 2-in Underground Conduit	□ 2-in Underground Conduit
N/A Right of Way	— Right of Way
→ Directional Arrow	→ Directional Arrow
⊙ "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	⊙ "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)

New Signal Design

SEPI ENGINEERING & CONSTRUCTION
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North Carolina Department of Transportation
 Signal Design Section
 750 N. Greenfield Pkwy, Garner, NC 27529

NC 49 at NC 49 Connector
 Division 10 Cabarrus County Harrisburg
 PLAN DATE: January 2013 REVIEWED BY: J Hochanadel
 PREPARED BY: C Lawson REVIEWED BY:

REVISIONS	INIT.	DATE

Professional Engineer Seal
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 28430
 J. HOCHANADEL
 DATE 11/30/13
 SIG. INVENTORY NO. 10-2124

*****SYSTEMS*****
 *****DESIGN*****
 *****DRAWING*****

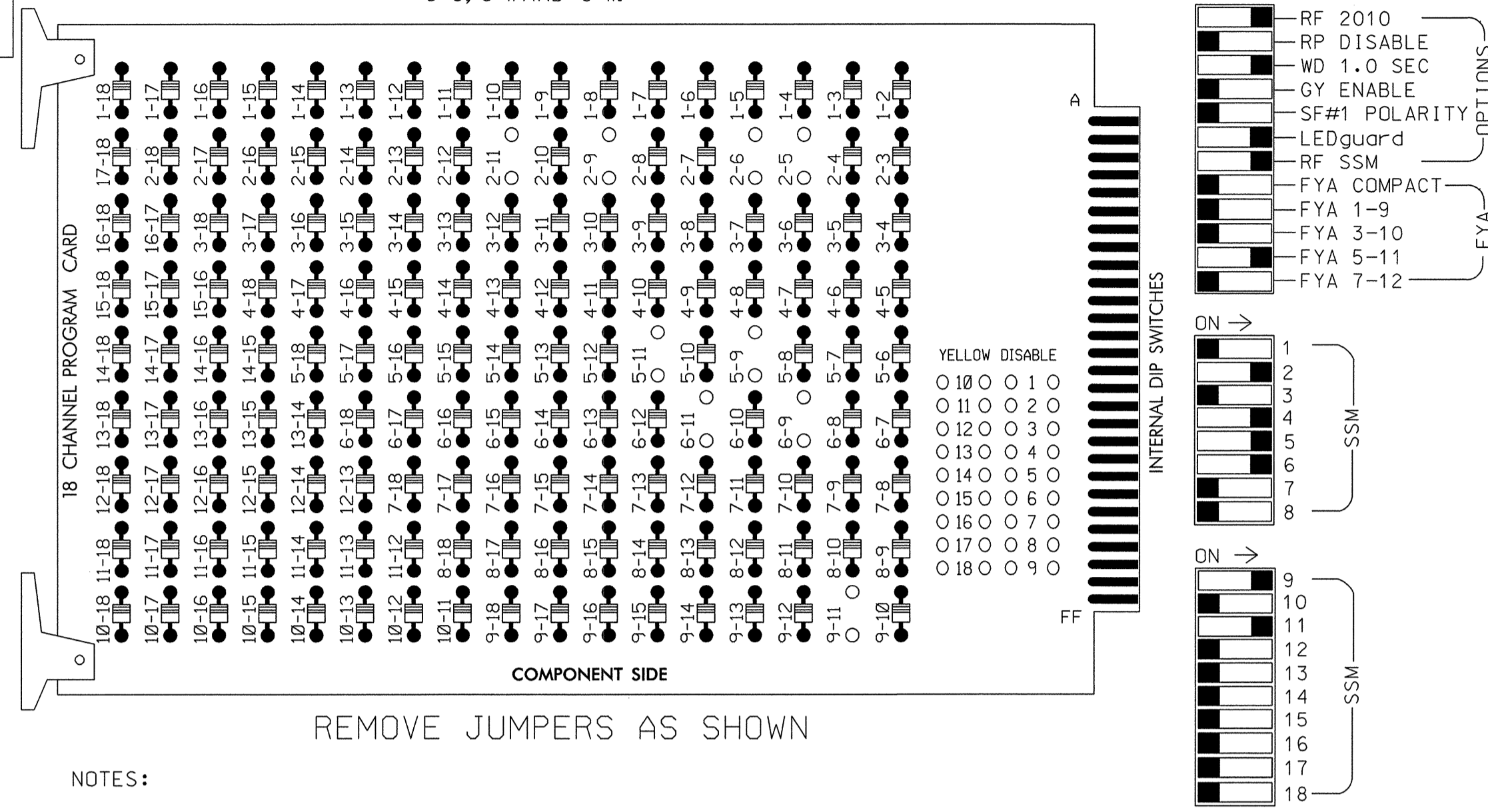
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

DCN: 0053DEL P10a2

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 5-9, 5-11, 6-9, 6-11 AND 9-11.



NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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.
- 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.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET332
 SOFTWAREECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS..18 W/AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5,S7,S8,AUX S1,AUX S4
 PHASES USED.....2,4,5,6
 OVERLAP "A".....2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
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	63	NU	51*	42	62,63	NU	NU	NU	61*	NU	NU	51*	NU	NU
RED		128			101				*	134									
YELLOW		129			102					135									
GREEN		130			103					136									
RED ARROW																A121		A114	
YELLOW ARROW						102				132						A122		A115	
FLASHING YELLOW ARROW																A123		A116	
GREEN ARROW						103		133	133										

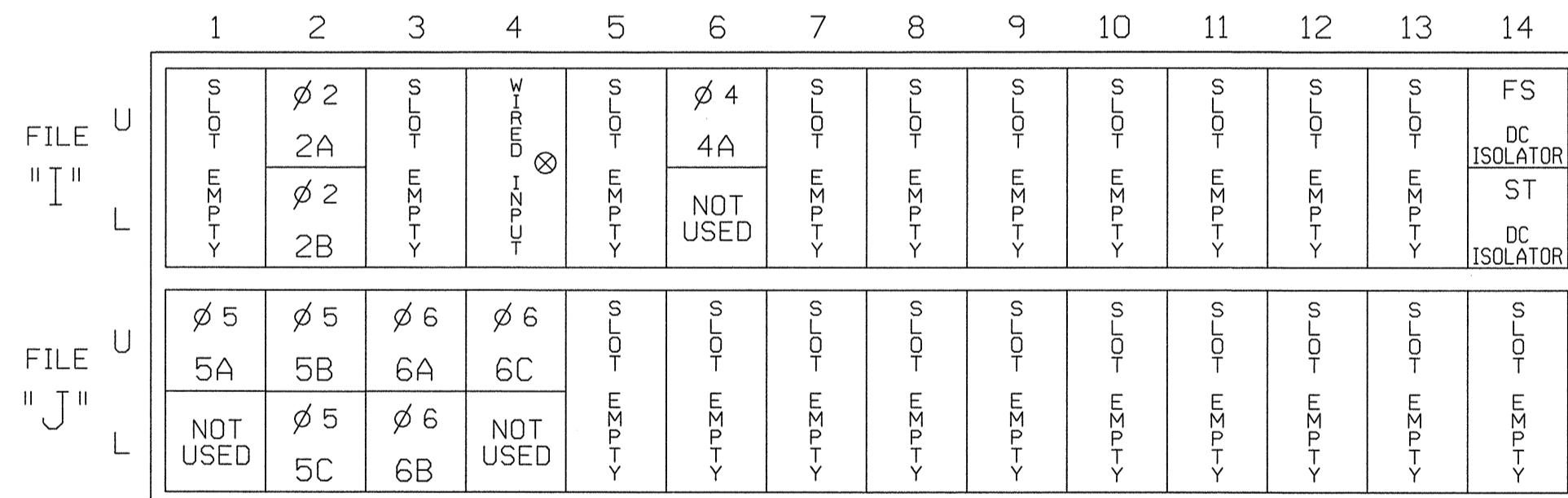
NU = Not Used

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

★ See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

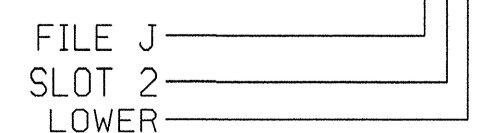
⊗ Wired Input - Do not populate slot with detector card

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	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			3
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
5C	TB3-7,8	J2L	44	6	16	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			
6C	TB5-1,2	J4U	48	10	26	6	Y	Y	Y		3

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

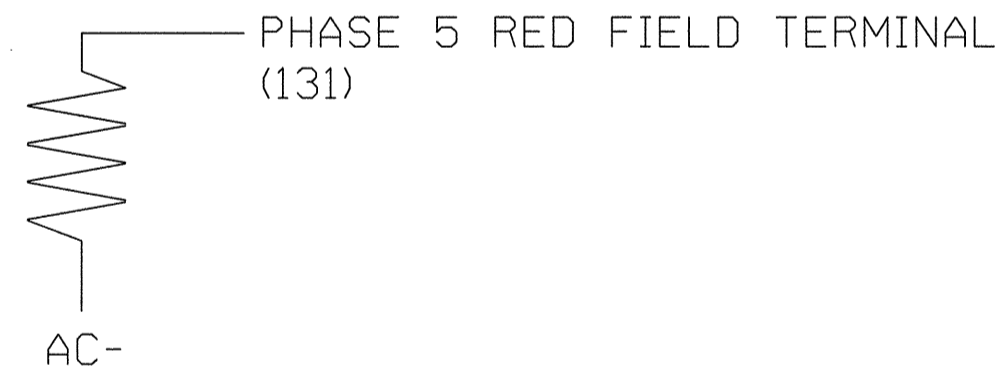
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

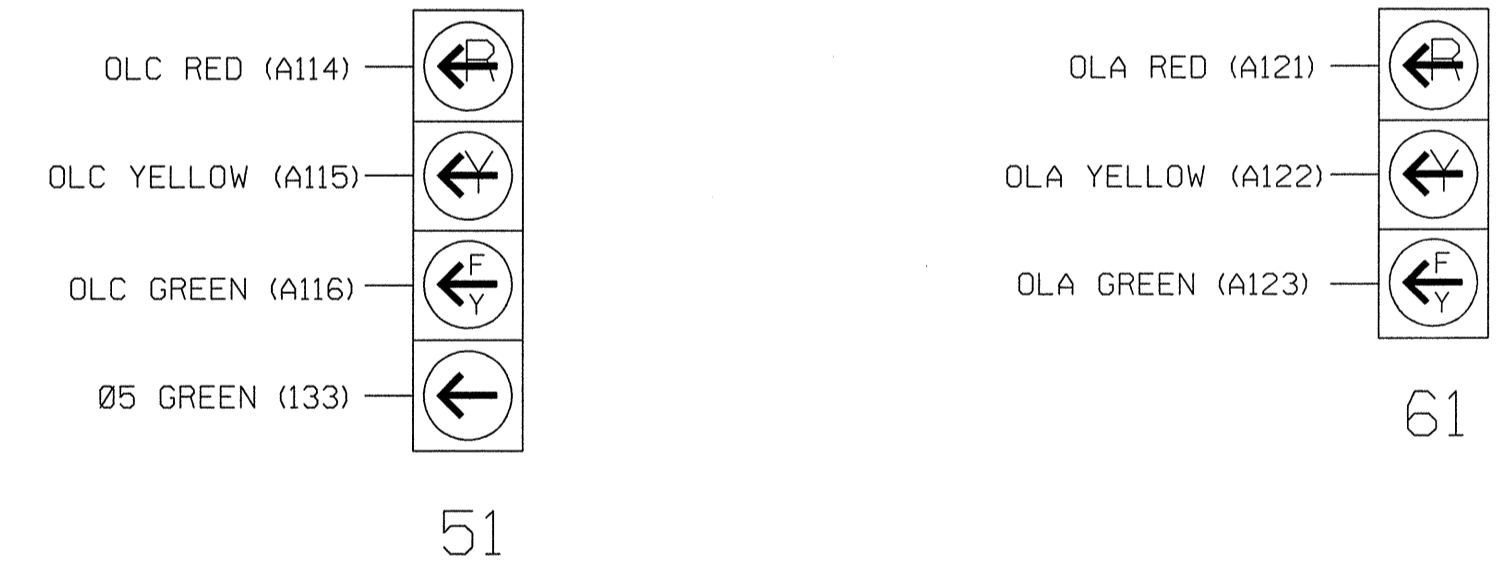
ACCEPTABLE VALUES

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



3 & 4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal head 51 requires special logic programming. See sheet 2 of 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2124
 DESIGNED: January 2013
 SEALED: 01/30/13
 REVISED: 02/12/13

New Signal Design - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 49 at NC 49 Connector

Division 10 Cabarrus County Harrisburg

PLAN DATE: January 2013 REVIEWED BY: M Copple
 PREPARED BY: C Lawson REVIEWED BY:

REVISIONS INIT. DATE

SEAL

SEAL

SIGNATURE DATE

SIG. INVENTORY NO. 10-2124

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750 N. Greenfield Pkwy, Garner, NC 27529

*****SYTIME*****
 *****SDCON*****
 *****SDNAME*****

DCN:
0053DEL P10a2

**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).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

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).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
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

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

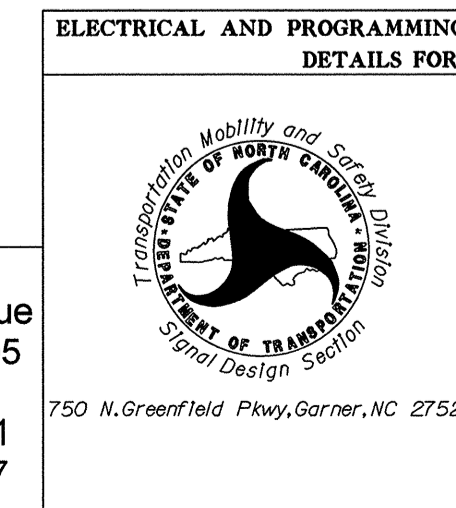
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

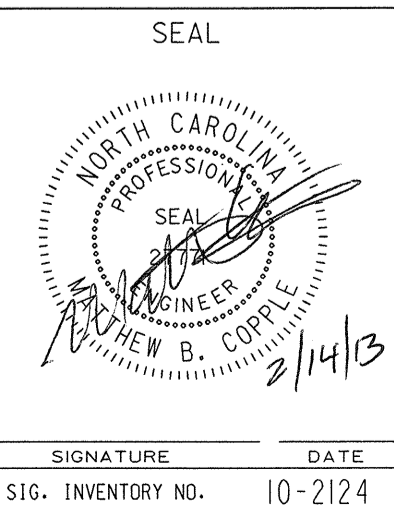
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2124
DESIGNED: January 2013
SEALED: 01/30/13
REVISED: 02/12/13

New Signal Design - Sheet 2 of 2



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ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 49 at NC 49 CONNECTOR	
PLAN DATE: January 2013	REVIEWED BY: M Copple	Division 10	Cabarrus County Harrisburg
PREPARED BY: C Lawson	REVIEWED BY:	SEAL	
REVISIONS	INIT.	DATE	



*****SYTIME*****
*****DGN*****
*****DGN*****
*****DGN*****