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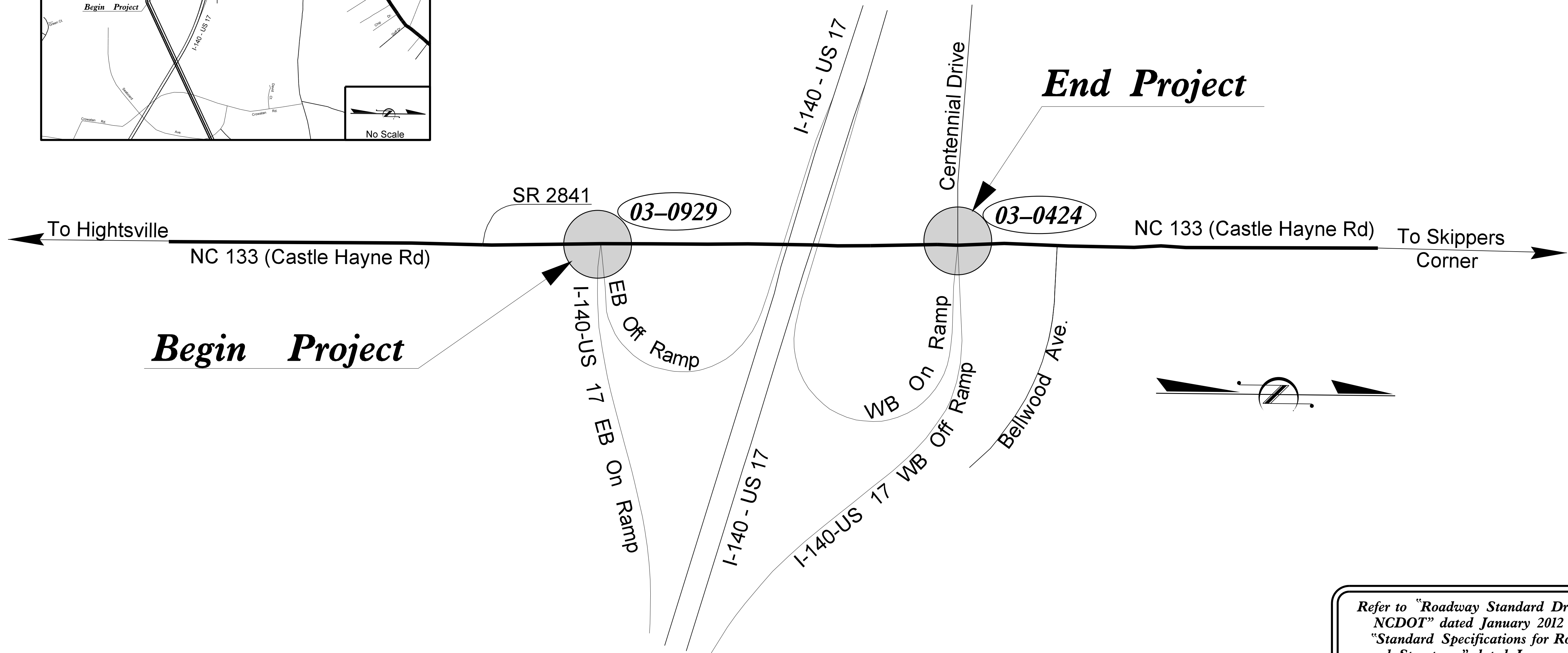
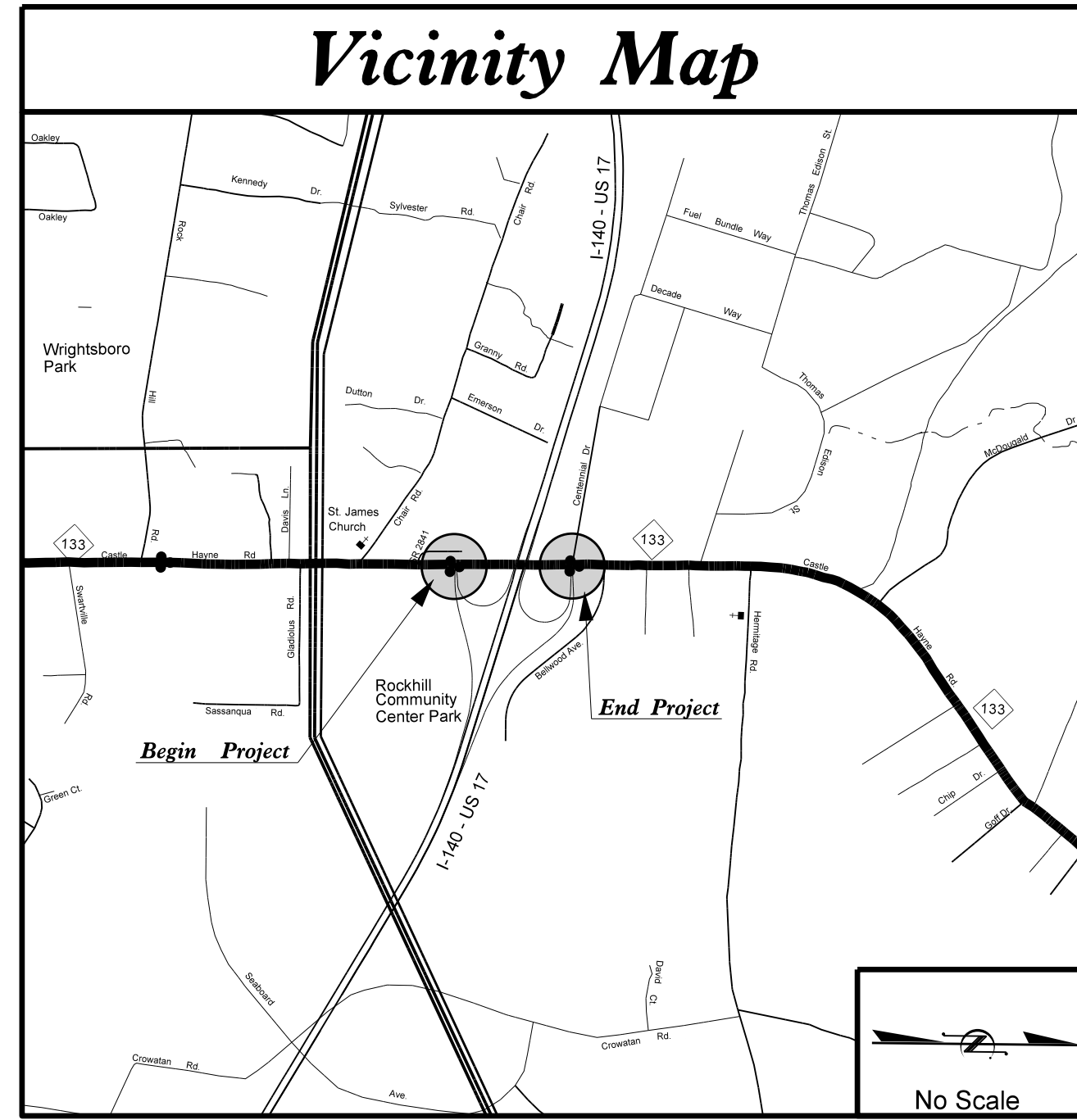
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# NEW HANOVER COUNTY

**LOCATION:** NC 133 (Castle Hayne Rd) From I-140 – US 17 Eastbound On/Off Ramps to I-140 – US 17 Westbound On/Off Ramps at Centennial Drive

**TYPE OF WORK:** Traffic Signals

**Project: I-5760**



**Project: 52038.3.1**

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

Sheet #	Reference #	Index of Plans	Location/Description
Sig. 1.0	-----	Title Sheet	NC 133 (Castle Hayne Rd) at I - 140-US 17 WB Off/On Ramps /Centennial Dr
Sig. 2.0-2.5	03-0424		NC 133 (Castle Hayne Rd) at I - 140-US 17 EB Off/On Ramps
Sig. 3.0-3.4	03-0929		

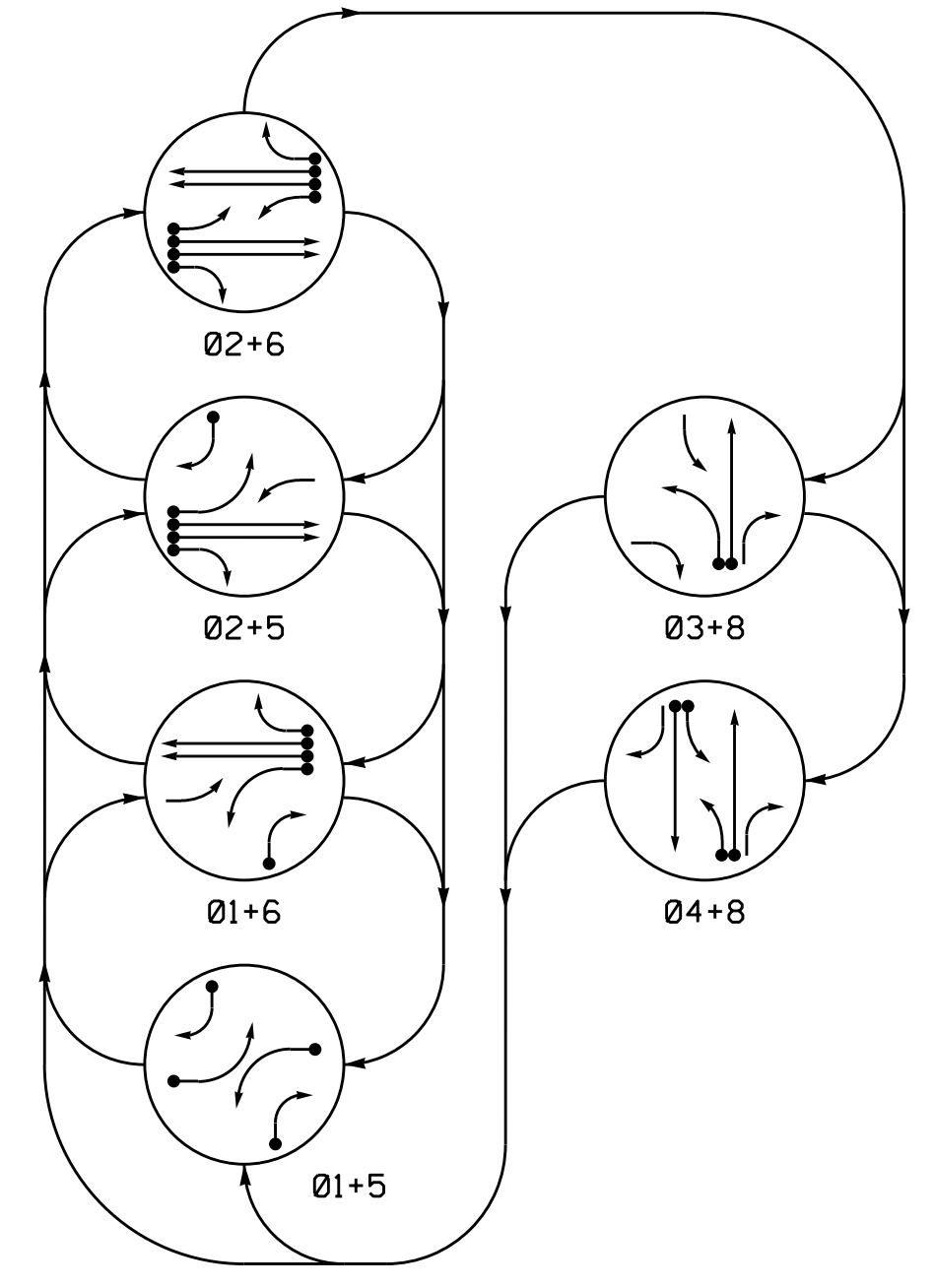
**INTELLIGENT TRANSPORTATION AND SIGNALS UNIT**  
Contacts:  
Pamela L. Alexander, PE - Eastern Region Signals Engineer  
Keith M. Mims, PE - Signal Equipment Design Engineer

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

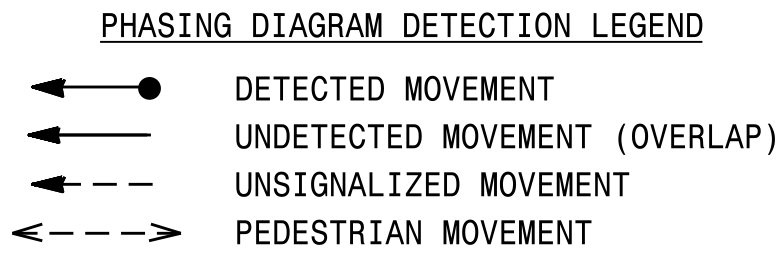
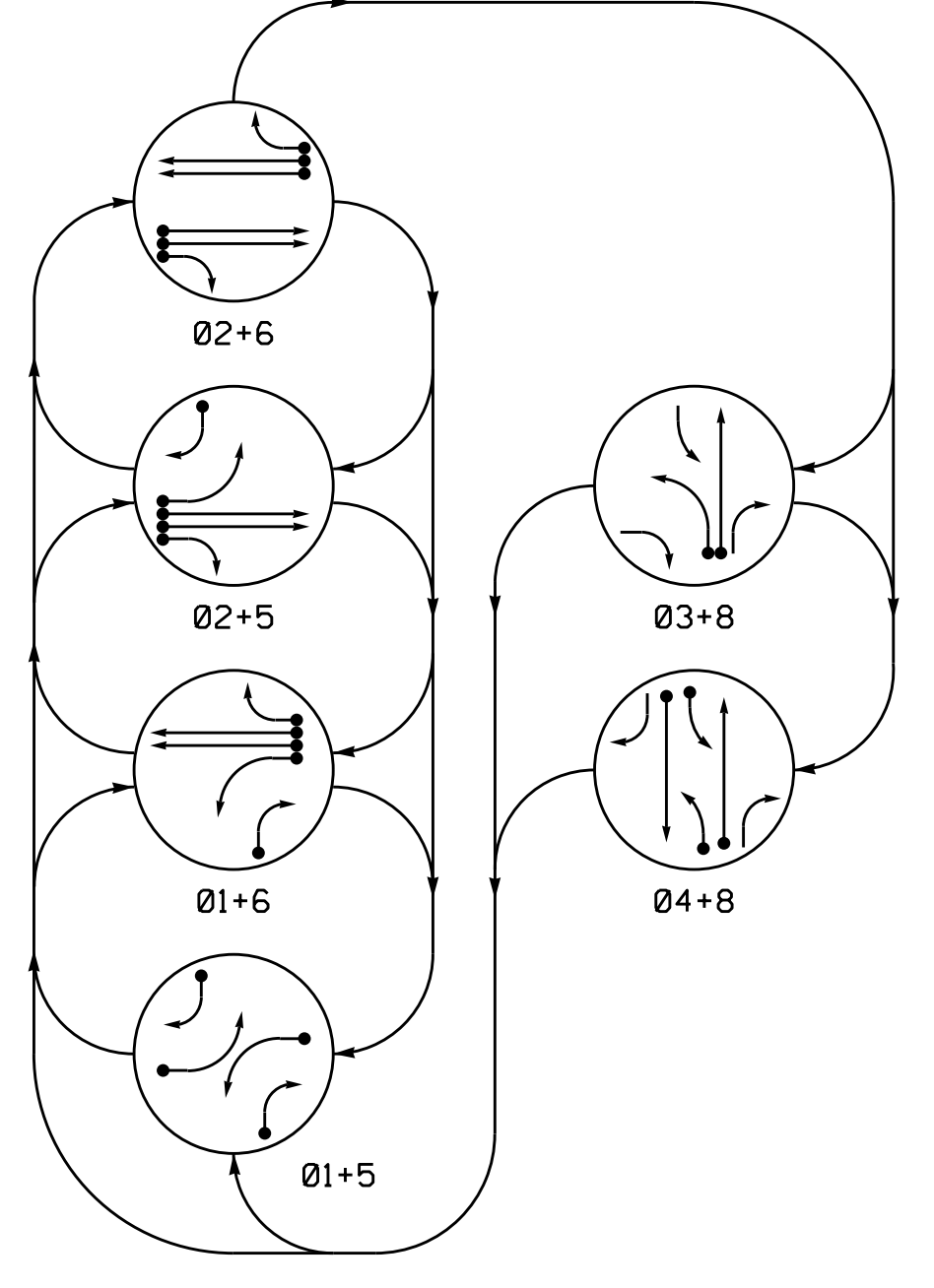
750 N. Greenfield Parkway, Garner, NC 27529

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DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



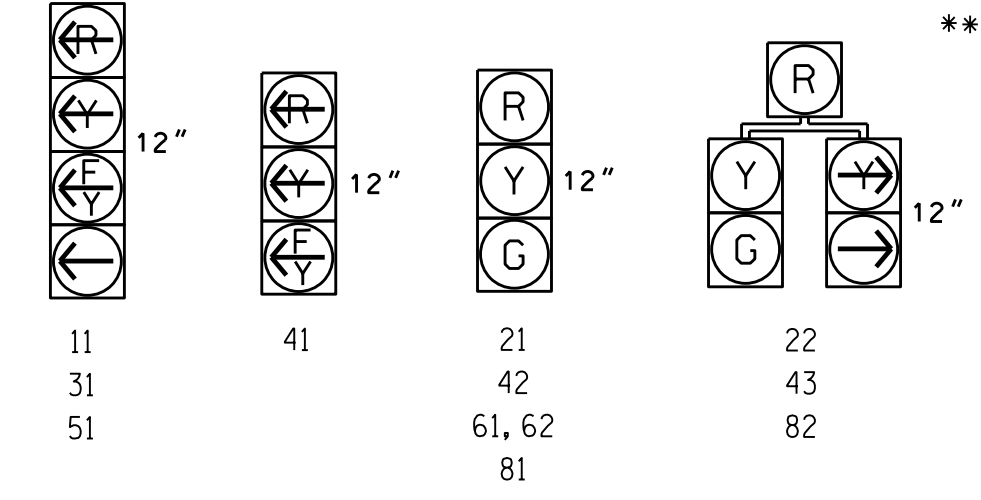
DEFAULT TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+8	04+8	01+5	01+6
11								
21	R	R	G	G	R	R	Y	
22	R	R	G	G	R	R	Y	
31	R	R	R	R	R	R		
41	R	R	R	R	R	R		
42	R	R	R	R	R	R		
43	R	R	R	R	R	R		
51								
61,62	R	G	R	G	R	R	Y	
81	R	R	R	R	R	R		
82	R	R	R	R	R	R		

ALTERNATE TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+8	04+8	01+5	01+6
11								
21	R	R	G	G	R	R	Y	
22	R	R	G	G	R	R	Y	
31	R	R	R	R	R	R		
41	R	R	R	R	R	R		
42	R	R	R	R	R	R		
43	R	R	R	R	R	R		
51								
61,62	R	G	R	G	R	R	Y	
81	R	R	R	R	R	R		
82	R	R	R	R	R	R		

SIGNAL FACE I.D.  
All Heads L.E.D.



\*Disable delay during alternate phasing operation.  
\*\* Disable phases 2 and 6 call during alternate phasing operation.

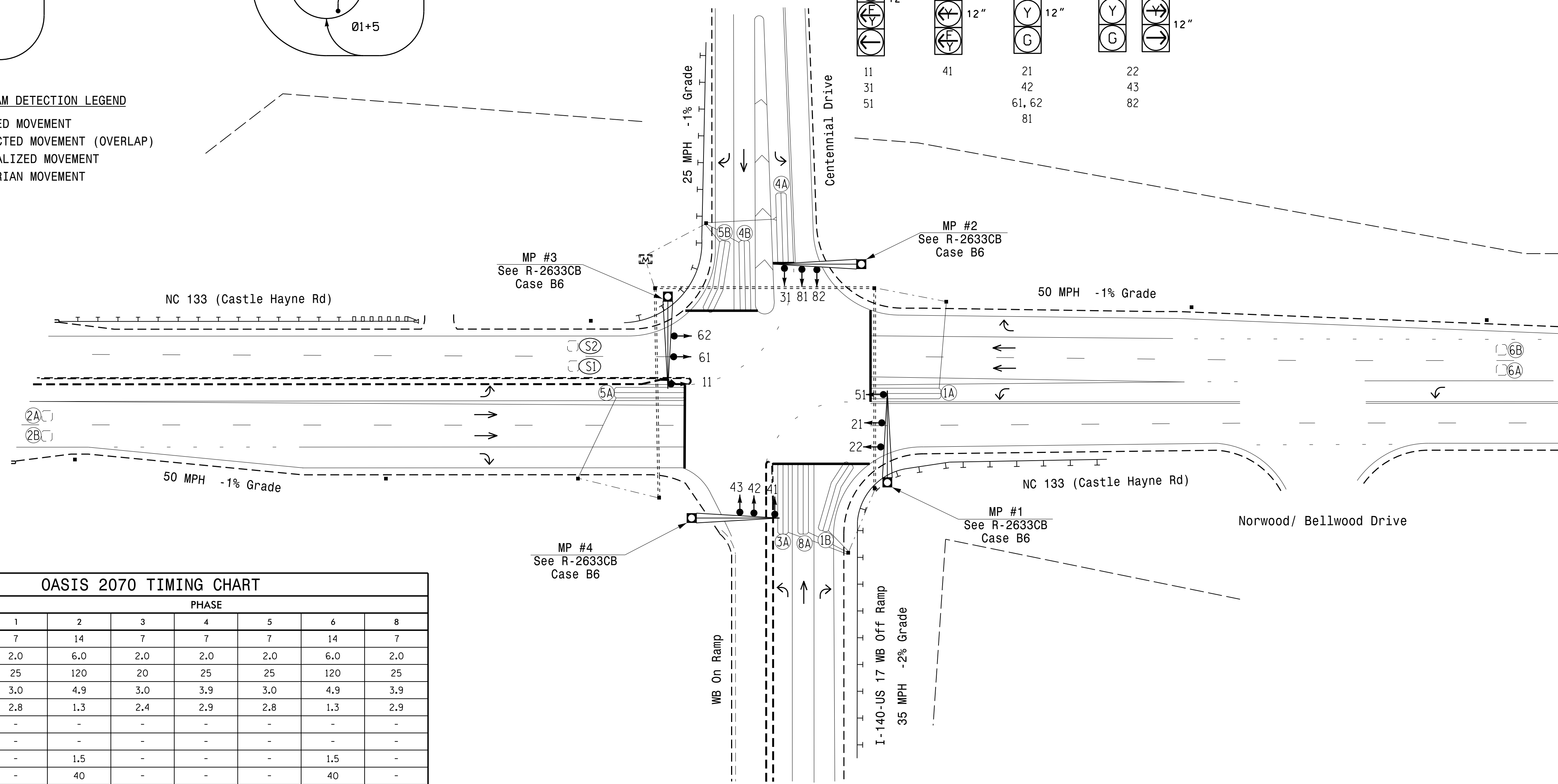
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING				STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
				PHASE	CALLING	EXTENSION	FULL TIME DELAY				
1A	6X40	0	2-4-2	Y	1	Y	Y	-	*15	-	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	15	-	-
2A,2B	6X6	355	5	-	2	Y	Y	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	15	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	3	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	*15	-	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	15	-	-
6A,6B	6X6	355	5	-	6	Y	Y	-	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-
S1	6X6	+160	4	-	-	-	-	-	-	Y	-
S2	6X6	+160	4	-	-	-	-	-	-	Y	-

6 Phase Fully Actuated NC 133 (Castle Hayne Rd) CLS

NOTES

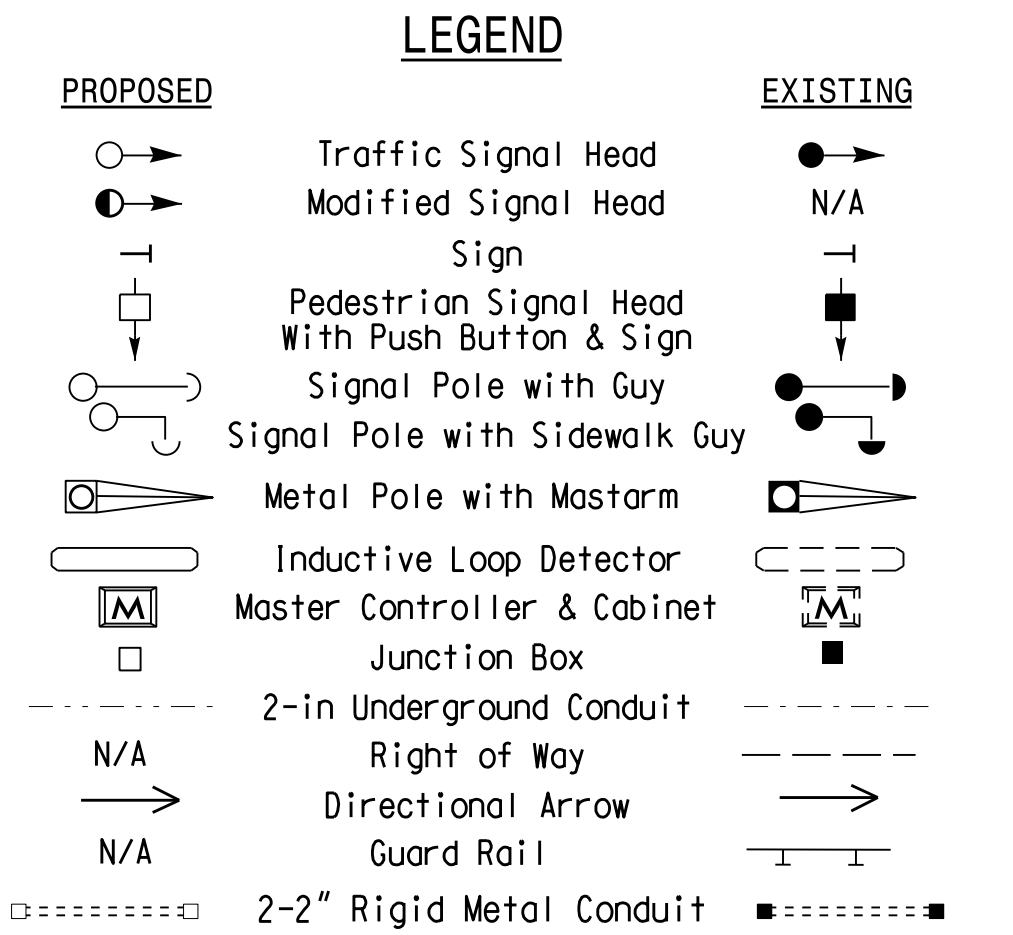
- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 may be lagged.
- Set all detector units to presence mode.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #10327, Controller Asset #0424.



**OASIS 2070 TIMING CHART**

FEATURE	PHASE							
	1	2	3	4	5	6	8	
Min Green 1 *	7	14	7	7	7	14	7	
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	
Max Green 1 *	25	120	20	25	25	120	25	
Yellow Clearance	3.0	4.9	3.0	3.9	3.0	4.9	3.9	
Red Clearance	2.8	1.3	2.4	2.9	2.8	1.3	2.9	
Walk 1 *	-	-	-	-	-	-	-	
Don't Walk 1	-	-	-	-	-	-	-	
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	
Max Variable Initial *	-	40	-	-	-	40	-	
Time Before Reduction *	-	15	-	-	-	15	-	
Time To Reduce *	-	30	-	-	-	30	-	
Minimum Gap	-	3.1	-	-	-	3.1	-	
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	
Dual Entry	-	-	-	ON	-	-	ON	
Simultaneous Gap	ON	ON	ON	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.



Signal Upgrade

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 133 (Castle Hayne Road) at I-140-US 17 WB Ramps/ Centennial Drive

Division 3 New Hanover County, Wilmington

PLAN DATE: January 2016 REVIEWED BY: PLA, PE

PREPARED BY: EM Minshew REVIEWED BY:

REVISIONS: \_\_\_\_\_ INIT. DATE

SCALE: 0 40 1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: PAMELA L. ALEXANDER, PROFESSIONAL ENGINEER, No. 023489

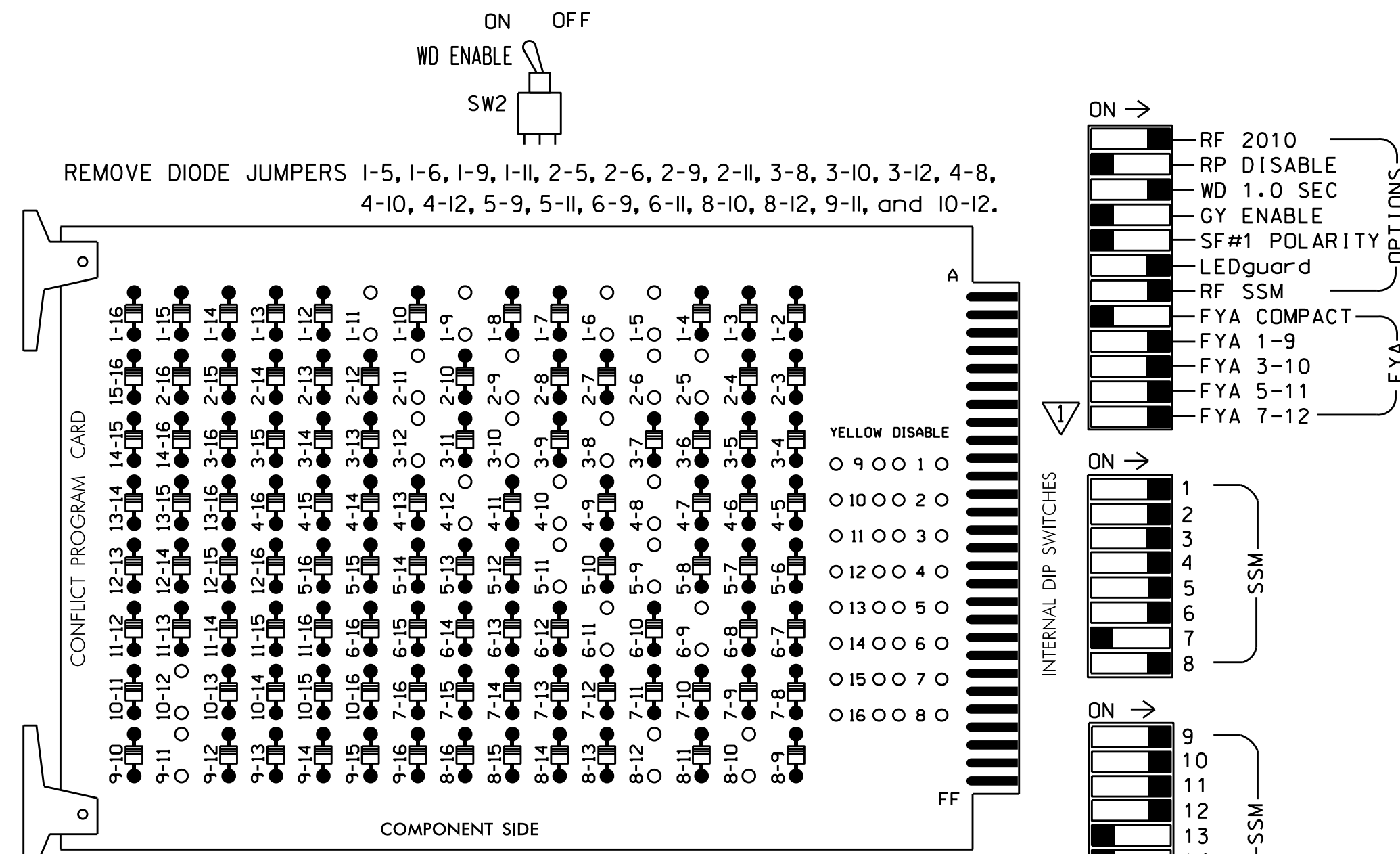
2/16/16

SIG. INVENTORY NO. 03-0424

09-0424-2016-01-05  
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 emminshew

### 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.

REMOVE JUMPERS AS SHOWN

■ = 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.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- The cabinet and controller are part of the NC 133 (Castle Hayne Rd) CLS.

### 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.	11	82	21,22	NU	22	31	42,43	NU	43	51	61,62	NU	81,82	NU	11	31	NU	51	41	NU	
RED	*	128		*	101		*		134		107										
YELLOW		129			102				135		108										
GREEN		130			103				136		109										
RED ARROW															A121	A124		A114	A101		
YELLOW ARROW		126			117			132							A122	A125		A115	A102		
FLASHING YELLOW ARROW															A123	A126		A116	A103		
GREEN ARROW	127	127			118	118			133	133											

NU = Not Used

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

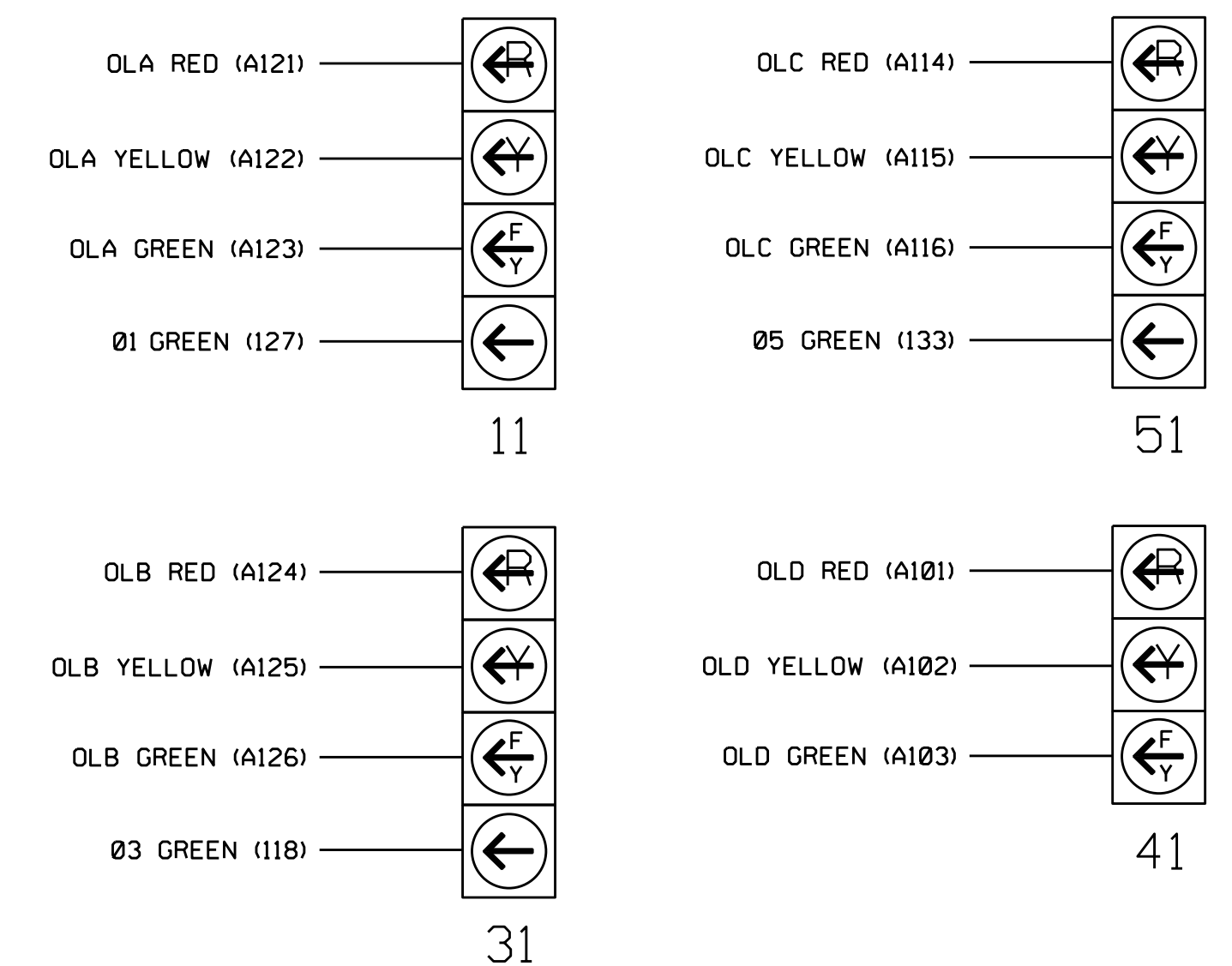
★ See pictorial of head wiring in detail below.

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....McCain/CONTROL TECHNOLOGIES  
 DWG.NO.9500-332-NC DOT /W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S8,S9,S10,S12,S13  
 PHASES USED.....1,2,3,4,5,6,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....3+4  
 OVERLAP "C".....5+6  
 OVERLAP "D".....8

### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



**NOTE**

- The sequence display for signal heads 11, 31, and 51 requires special logic programming. See sheet 2 of 5 for programming instructions.

### INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 5	∅ 3	∅ 4	∅ 4	∅ 5	∅ 5	SYS. DET. S1	∅ 5	∅ 5	∅ 5	∅ 5	FS
L	1A	1B	2A,2B	3A	4A	4B	5A	5B	SYS. DET. S2	6A	6B	7A	7B	DC ISOLATOR
U	∅ 5	∅ 5	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	DC ISOLATOR
L	5A	5B	6A,6B	8A	8B	8C	8D	8E	8F	8G	8H	8I	8J	8K

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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

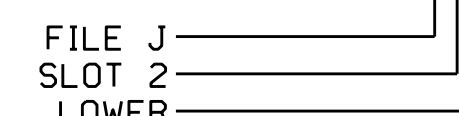
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A <sup>1</sup>	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10★	26	6	Y	Y	Y		3
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	2A,2B	TB2-7,8	I2L	43	5	12	Y	Y			
3A <sup>2</sup>	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	J8U	50	12	28	8	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
	4B	TB4-11,12	I6L	45	7	14	4	Y	Y		
5A <sup>3</sup>	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9★	22	2	Y	Y	Y		3
	-	J1U	55	17★	55	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A,6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					

- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from I5-W to J8-W, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.

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

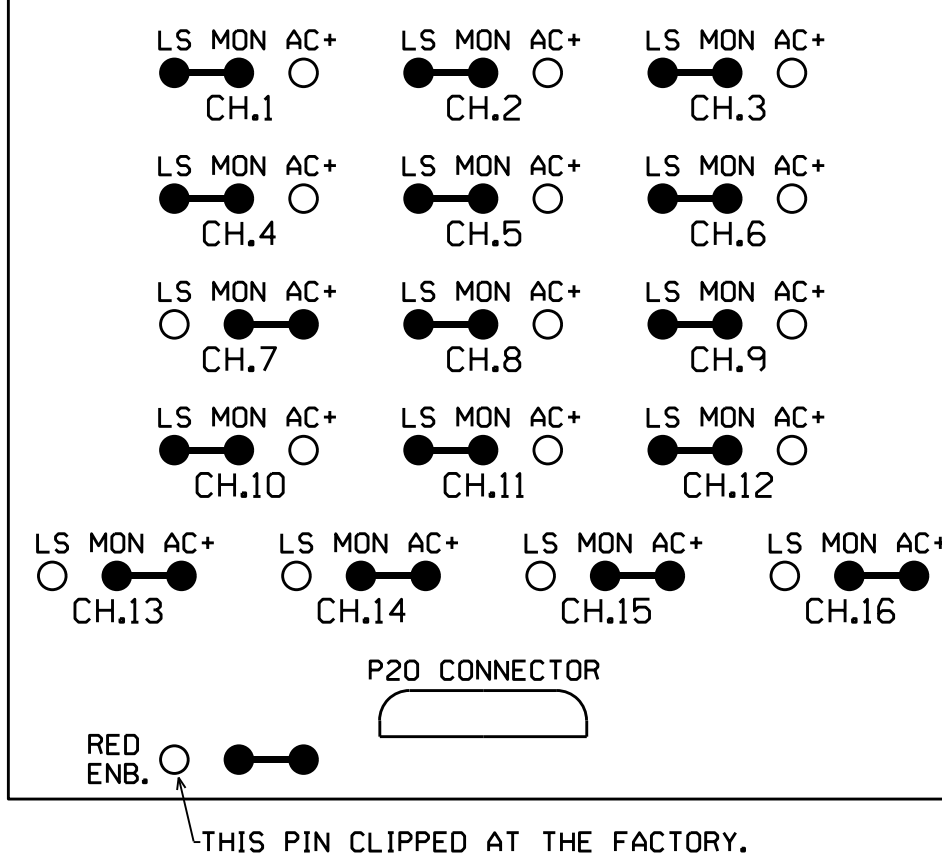
★ See Input Page Assignment programming details on sheets 3 and 4.

INPUT FILE POSITION LEGEND: J2L



### RED MONITOR BOARD PROGRAMMING

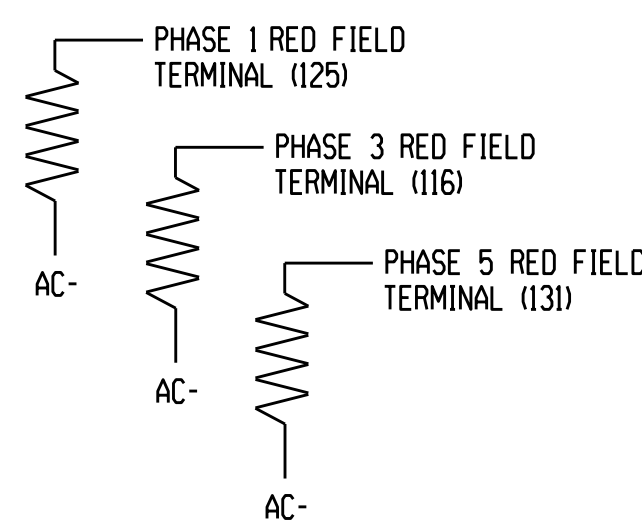
(position jumpers as shown below)



### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0424  
 DESIGNED: January 2016  
 SEALED: 2-16-16  
 REVISED: N/A

Electrical Detail - Sheet 1 of 5

REVISION SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 KEITH M. MIMS  
 3-03-16 DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:  
 Prepared in the Offices of:  
 TRANSPORTATION MOBILITY AND SAFETY CONSULTANTS  
 750 N. Greenfield Pkwy, Garner, NC 27529

NC 133 (Castle Hayne Road) at I-140-US 17 WB Ramps/ Centennial Drive  
 Division 03 New Hanover County Wilmington  
 PLAN DATE: September 2009 REVIEWED BY: T. Joyce  
 PREPARED BY: S. Armstrong REVIEWED BY:  
 REVISIONS  
 Added alternate phasing and revised overlap programming. JWP  
 KMM 3-03-16  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 03-0424

SEAL  
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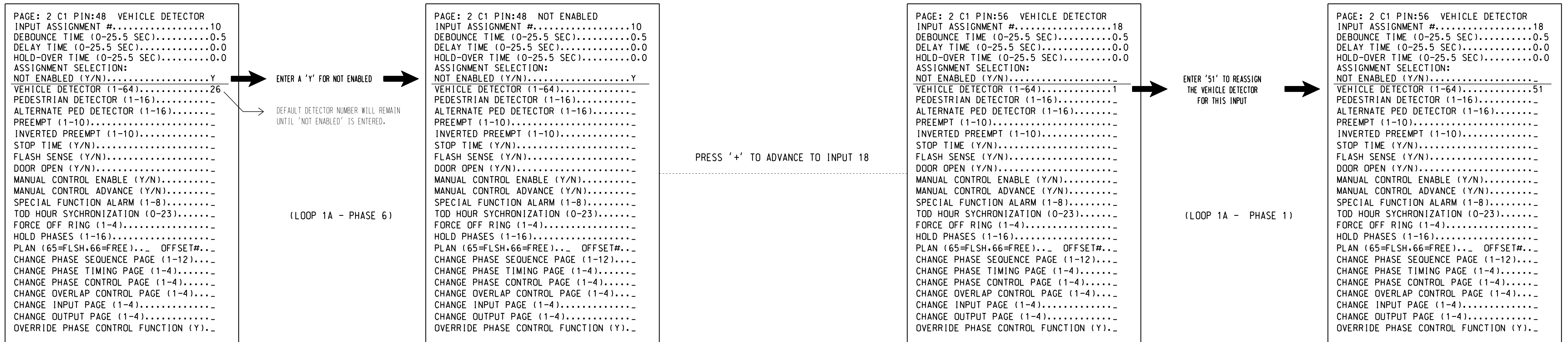


### INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

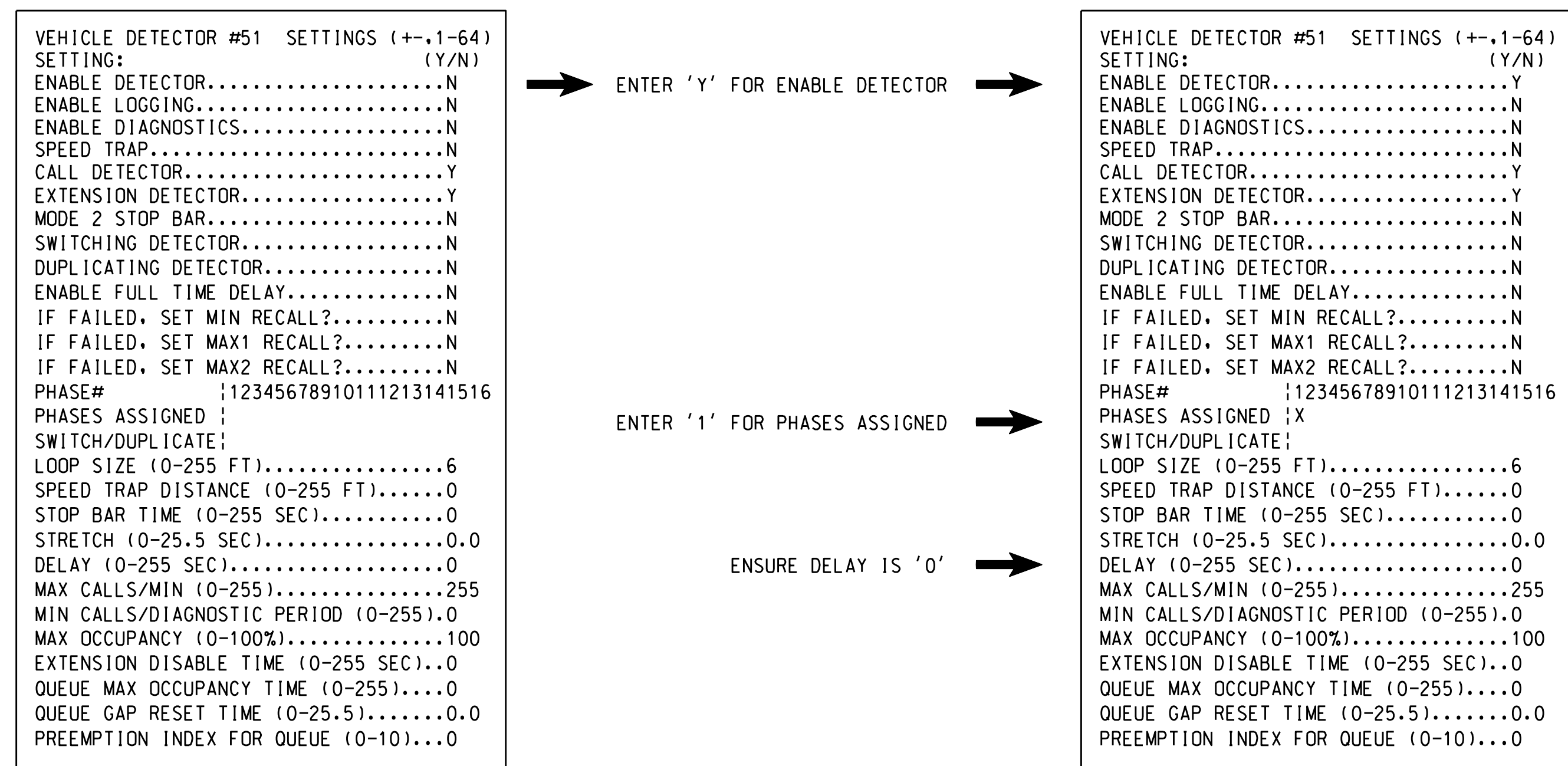
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.



### SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.



NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0424  
DESIGNED: January 2016  
SEALED: 2-16-16  
REVISED: N/A

Electrical Detail - Sheet 3 of 5

	ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: 750 N. Grantfield Pkwy, Garner, NC 27529	NC 133 (Castle Hayne Road) at I-140-US 17 WB Ramps/ Centennial Drive		SEAL Not a certified document as to the Original Document but only as to the Revisions - This document originally issued and sealed by George C. Brown, PE #022013, on 09/23/09. This document is only certified as to the revisions.
		Division 03 New Hanover County Wilmington PLAN DATE: September 2009 REVIEWED BY: T. Joyce PREPARED BY: S. Armstrong REVIEWED BY:	REVISIONS Added alternate phasing and revised overlap programming. (JPL)	

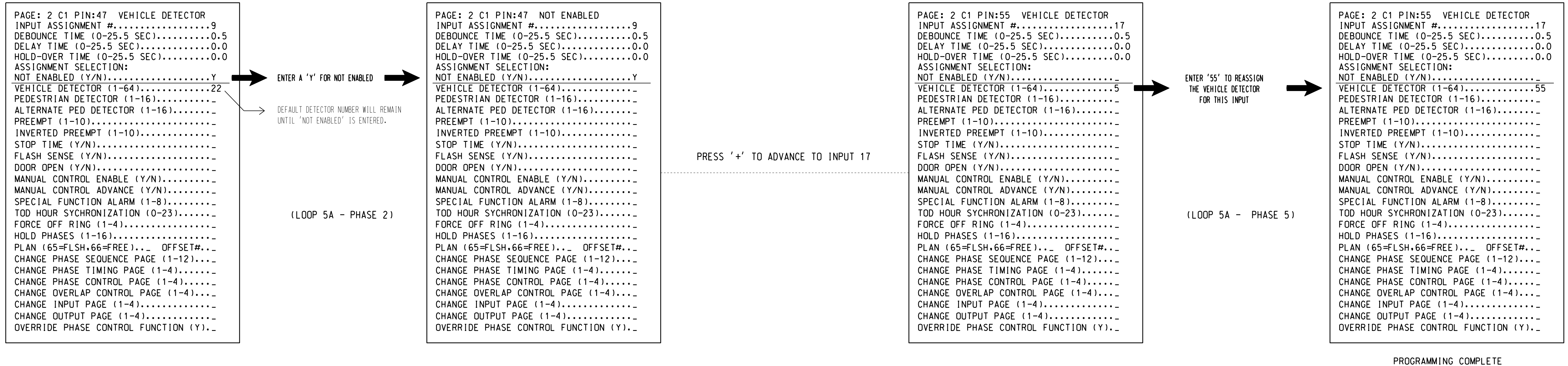
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 T. Peterson

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #9 (DETECTOR 22) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 2 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 55 TO INPUT #17 SO THAT THE DELAY ON LOOP 5A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

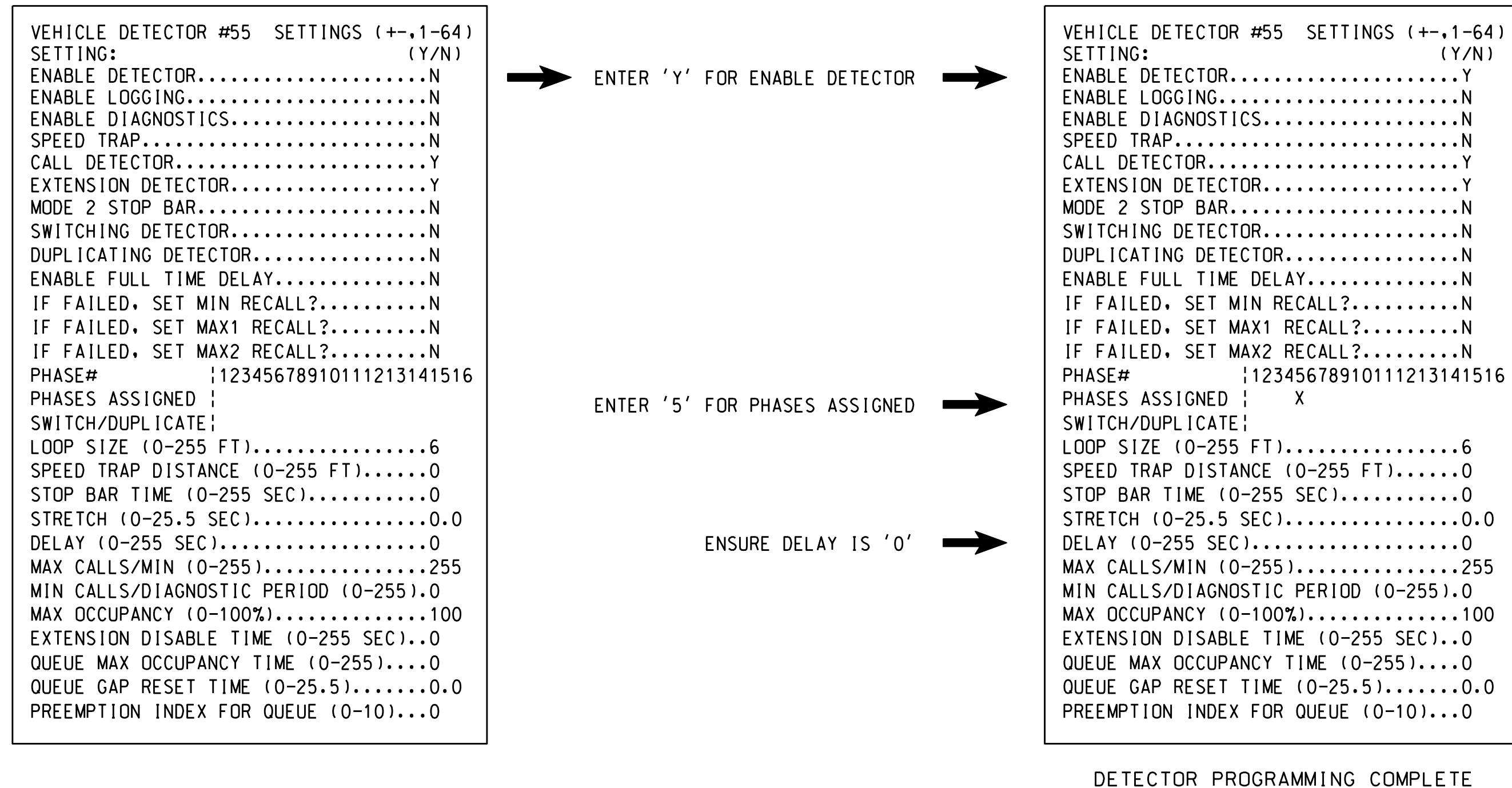
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 9 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 5A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #55.



NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0424  
DESIGNED: January 2016  
SEALED: 2-16-16  
REVISED: N/A

Electrical Detail - Sheet 4 of 5

		NC 133 (Castle Hayne Road) at I-140-US 17 WB Ramps/ Centennial Drive		SEAL Not a certified document as to the Original Document but only as to the Revisions - This document originally issued and sealed by George C. Brown, PE #022013, on 09/23/09. This document is only certified as to the revisions.
		Division 03 PLAN DATE: September 2009 PREPARED BY: S. Armstrong	New Hanover County REVIEWED BY: T. Joyce REVIEWED BY:	

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## ▽ ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY PAGE CHANGE EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN PAGE CHANGE EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

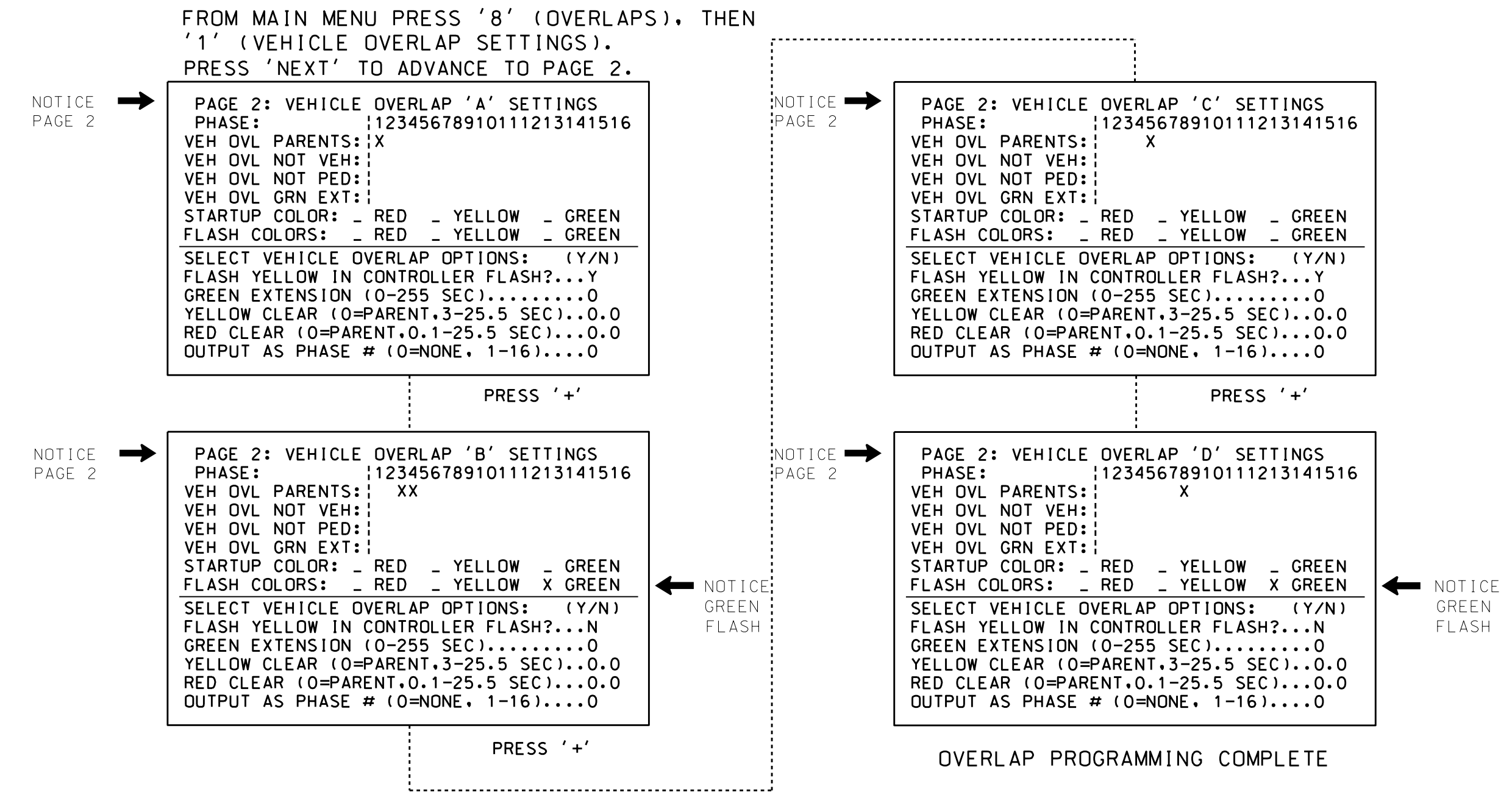
### ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

- OVERLAPS PAGE 2:** Modifies overlap parent phases for heads 11 and 51 to run protected turns only.
- INPUTS PAGE 2:** Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.
- Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

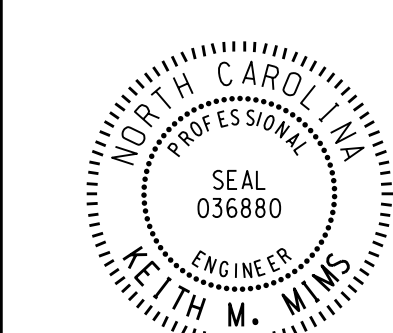

## ▽ OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)



THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 03-0424  
DESIGNED: January 2016  
SEALED: 2-16-16  
REVISED: N/A

Electrical Detail - Sheet 5 of 5

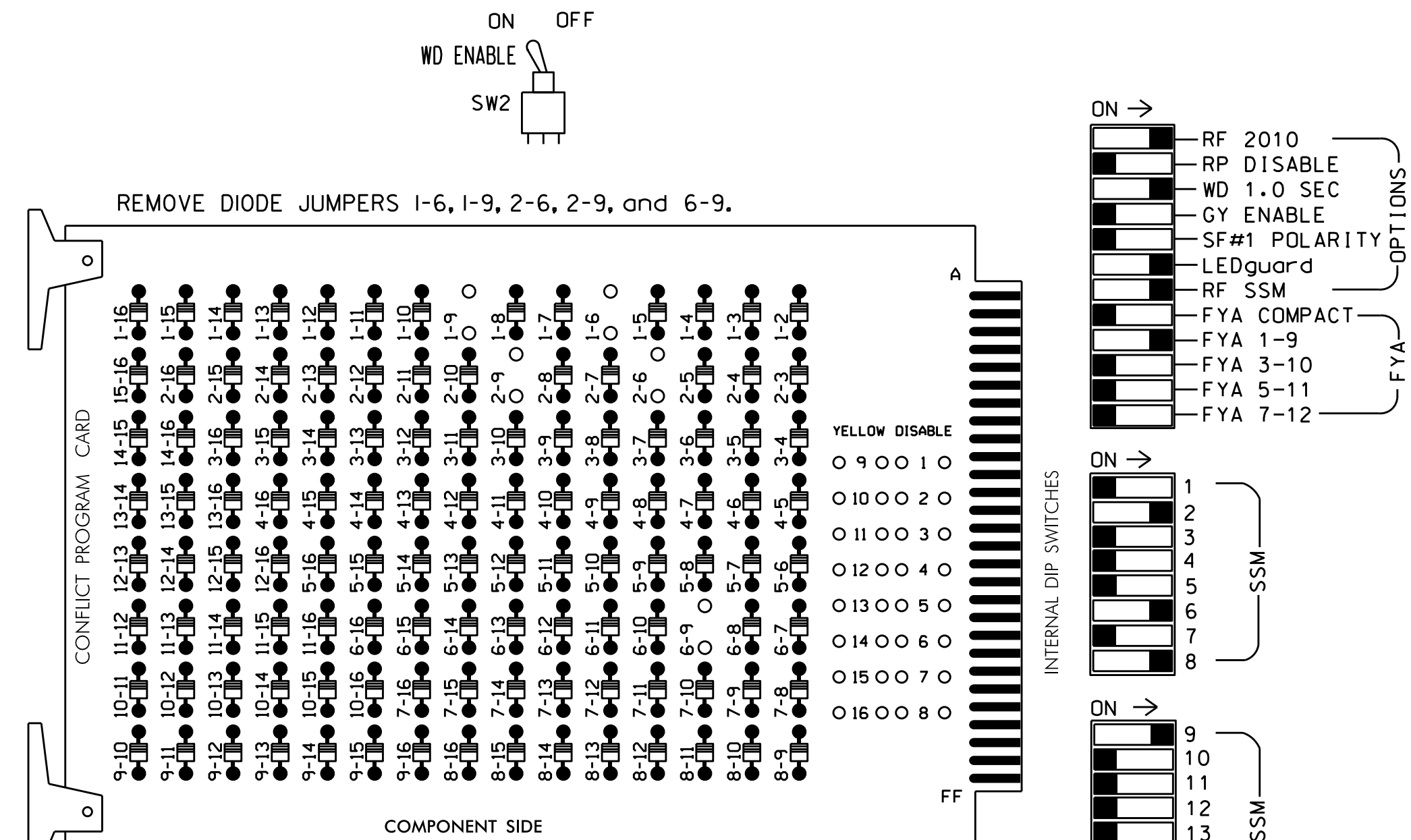
REVISION SEAL 	ELECTRICAL AND PROGRAMMING DETAILS FOR: 	NC 133 (Castle Hayne Road) at I-140-US 17 WB Ramps/ Centennial Drive Division 03 New Hanover County Wilmington PLAN DATE: September 2009 REVIEWED BY: T. Joyce PREPARED BY: S. Armstrong REVIEWED BY: REVISIONS Added alternate phasing and revised overlap programming. (JPL) KMM 3-03-16 SIGNATURE DATE SIG. INVENTORY NO. 03-0424	SEAL Not a certified document as to the Original Document but only as to the Revisions - This document originally issued and sealed by George C. Brown, PE #022013, on 09/23/09. This document is only certified as to the revisions.
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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.

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- The cabinet and controller are part of the NC 133 (Castle Hayne Rd.) CLS.

**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.	11*	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU	11*	NU	NU	NU	NU	
RED		128						134			107								
YELLOW	*	129						135			108								
GREEN		130						136			109								
RED ARROW																		A121	
YELLOW ARROW											108								A122
FLASHING YELLOW ARROW																			A123
GREEN ARROW	127										109								

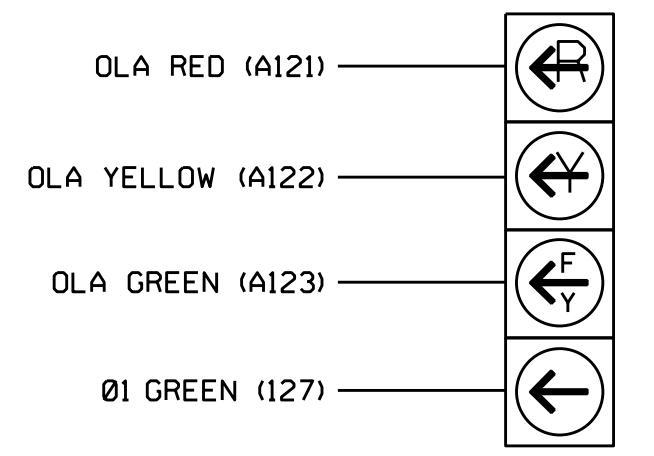
NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \* See pictorial of head wiring in detail below.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070  
 CABINET.....McCAIN/CONTROL TECHNOLOGIES  
 DWG.NO.9500-332-NC DOT /W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S6,S8,S9  
 PHASES USED.....1,2,6,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....NOT USED

**4 SECTION FYA PPLT SIGNAL WIRING DETAIL**

(wire signal head as shown)

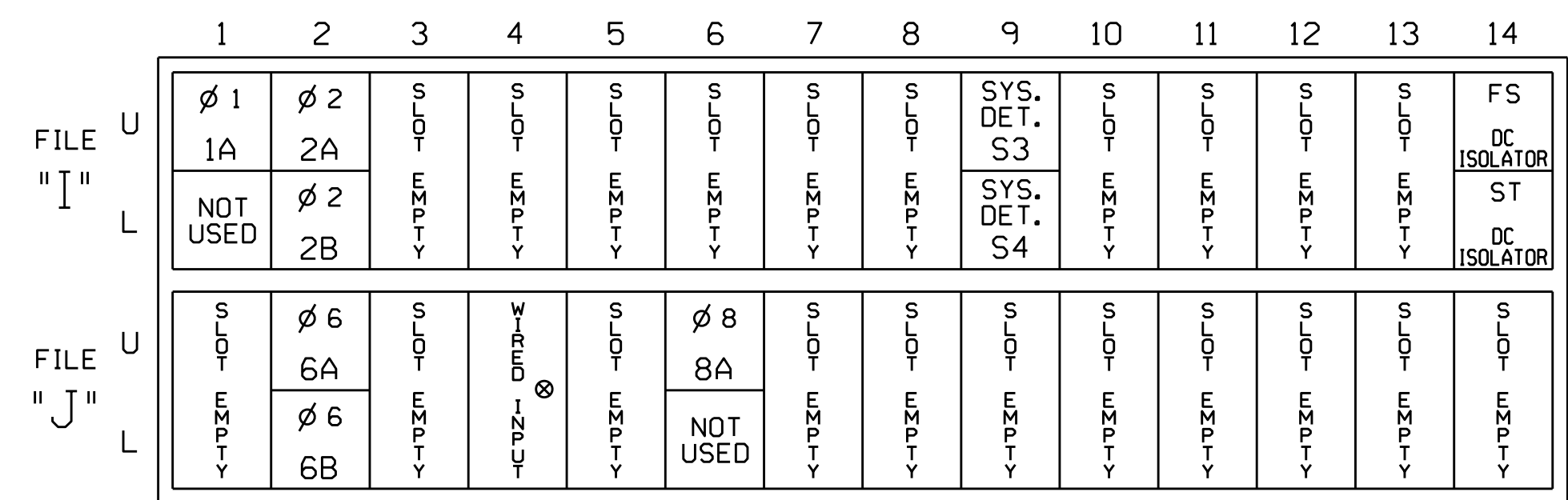


**NOTE**

- The sequence display for signal head 11 requires special logic programming. See sheet 2 of 4 for programming instructions.

**INPUT FILE POSITION LAYOUT**

(front view)



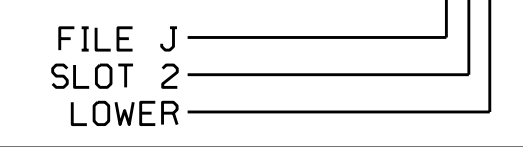
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 ⊗ Wired Input - Do not populate slot with detector card

**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 <sup>1</sup>	TB2-1,2	11U	56	18	1	1	Y	Y			20
	-	J4U	48	10	26*	6	Y	Y	Y		3
2A	TB2-5,6	12U	39	1	2	2	Y	Y			
2B	TB2-7,8	12L	43	5	12	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10
* S3	TB6-9,10	I9U	60	22	11	SYS					
* S4	TB6-11,12	I9L	62	24	13	SYS					

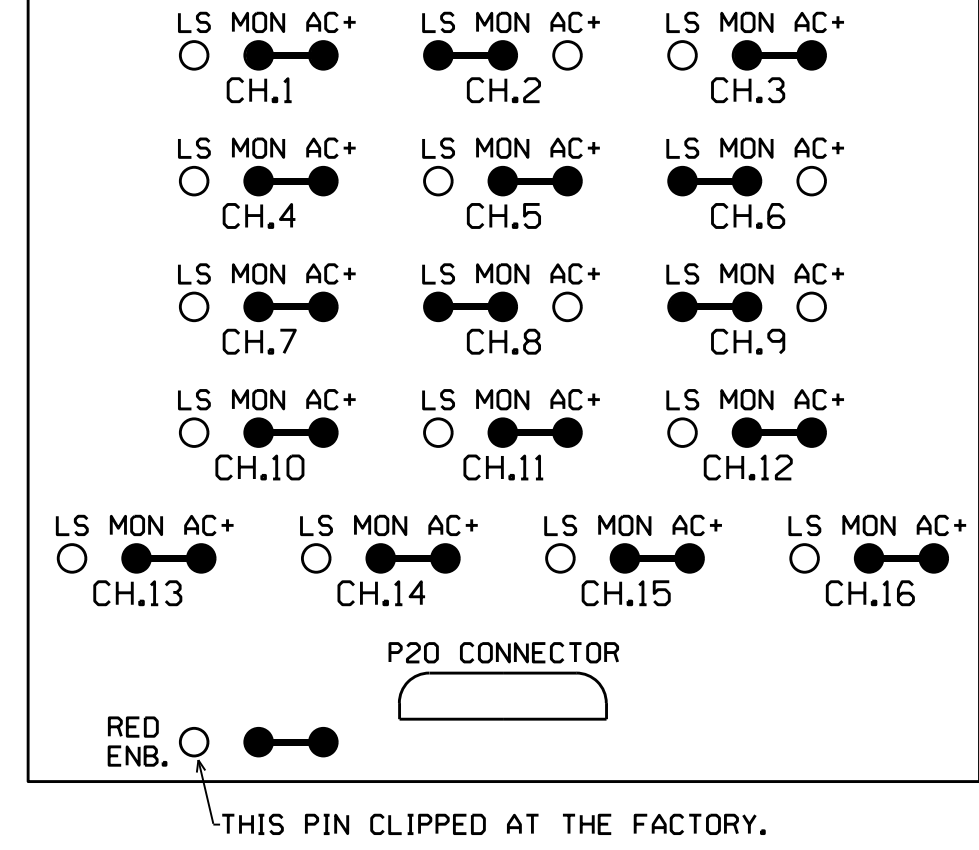
- Add jumper from I1-W to J4-W, on rear of input file.
- System detector only. Remove the vehicle phase assigned to this detector in the default programming.
- See input Page Assignment programming detail on sheet 3.

**INPUT FILE POSITION LEGEND:**



**RED MONITOR BOARD PROGRAMMING**

(position jumpers as shown below)

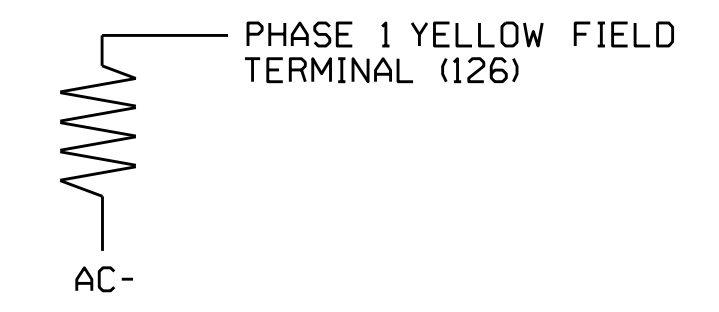


THIS PIN CLIPPED AT THE FACTORY.

**LOAD RESISTOR INSTALLATION DETAIL**

(install resistors as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0929  
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 REVISED: N/A

Electrical Detail - Sheet 1 of 4

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REVISION SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 036880  
 KEITH M. MIMS  
 3-03-16 DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:  
 Prepared in the Offices of:  
 TRANSPORTATION MOBILITY AND SAFETY CONSULTANTS  
 750 N. Greenfield Pkwy, Garner, NC 27529

NC 133 (Castle Hayne Road) at I-140-US 17 EB Ramps  
 Division 03 New Hanover County Wilmington  
 PLAN DATE: September 2009 REVIEWED BY: T. Joyce  
 PREPARED BY: S. Armstrong REVIEWED BY:  
 REVISIONS: [Table with columns for REVISION, DATE, and SIGNATURE]

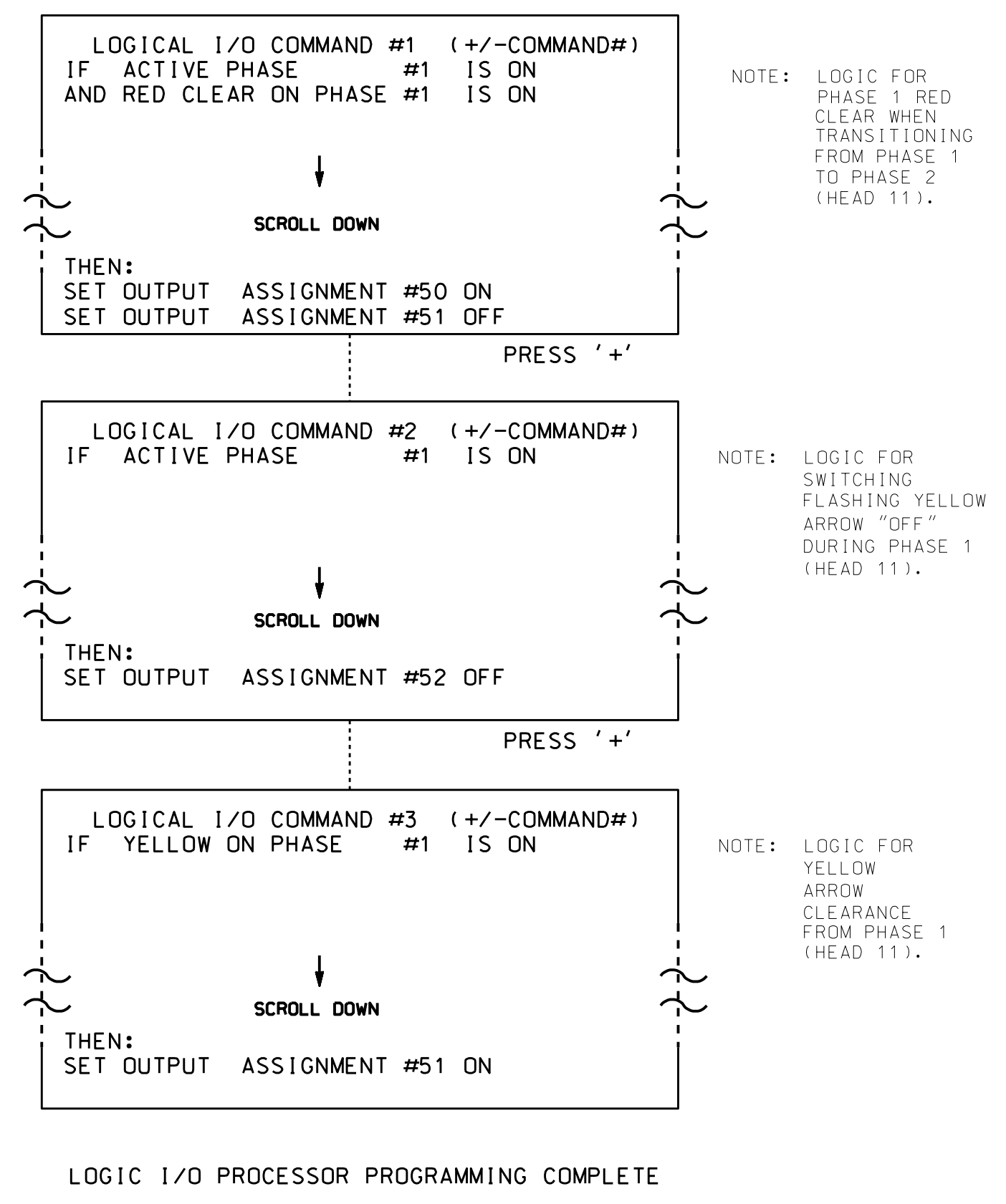
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 SIGNATURE: [Blank] DATE: [Blank]  
 SIG. INVENTORY NO. 03-0929

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

**OVERLAP PROGRAMMING DETAIL  
FOR DEFAULT PHASING**

(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)...0.0
    
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

**OVERLAP PROGRAMMING DETAIL  
FOR ALTERNATE PHASING**

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

NOTICE PAGE 2 →

```

PAGE 2: 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 _ 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)...0.0
    
```

OVERLAP PROGRAMMING COMPLETE

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DESIGNED: January 2016  
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REVISED: N/A

Electrical Detail - Sheet 2 of 4

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REVISION SEAL

Keith M. Mims  
3-03-16  
DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 133 (Castle Hayne Road) at I-140-US 17 EB Ramps	
Division 03 New Hanover County	Wilmington
PLAN DATE: September 2009	REVIEWED BY: T. Joyce
PREPARED BY: S. Armstrong	REVIEWED BY:
REVISIONS	
Added alternate phasing and updated overlap programming.	KMA 3-03-16
SIGNATURE	DATE

SEAL

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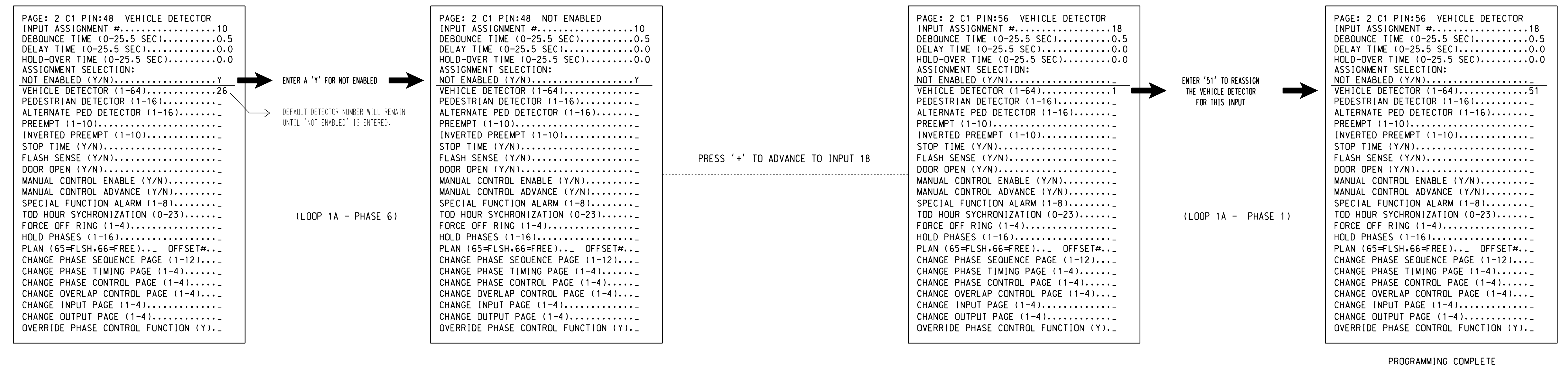
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T. Peterson

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 20 SECONDS TO 0 SECONDS.

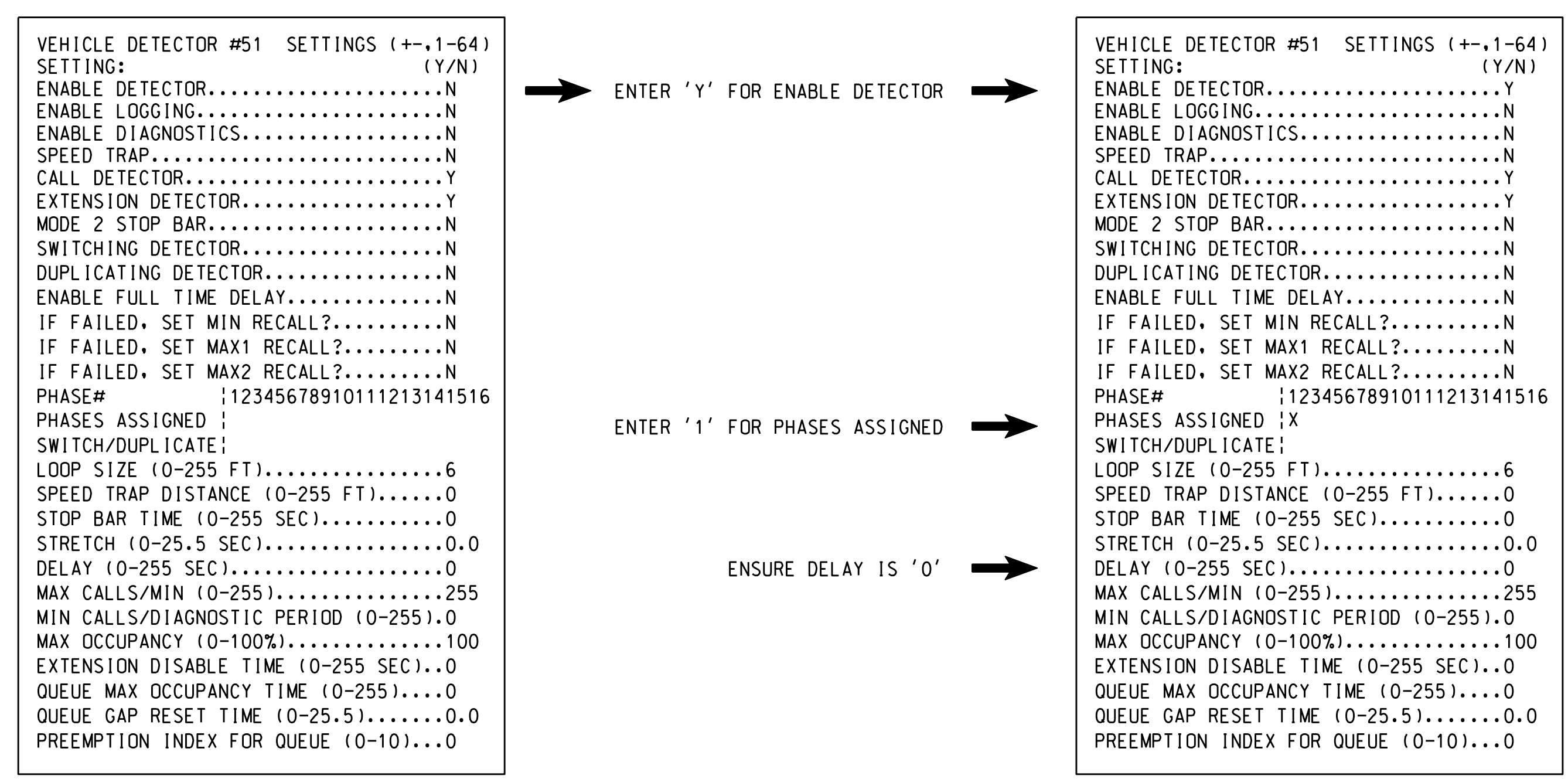
FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.



SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.



NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

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 SEALED: 2-16-16  
 REVISED: N/A

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Electrical Detail - Sheet 3 of 4

REVISION SEAL

KEITH M. MIMS  
 ENGINEER  
 036880  
 3-03-16

Prepared In the Offices of:  
 TRANSPORTATION MOBILITY AND SAFETY DIVISION  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 750 N. Greenfield Pkwy, Garner, NC 27529

NC 133 (Castle Hayne Road) at I-140-US 17 EB Ramps

Division 03 New Hanover County Wilmington

PLAN DATE: September 2009 REVIEWED BY: T. Joyce

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS

Added alternate phasing and updated overlap programming (JP) KMM 3-03-16

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## ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

<u>PHASING</u>	<u>INPUTS PAGE</u>	<u>OVERLAPS PAGE</u>
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY PAGE CHANGE EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN PAGE CHANGE EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

### ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

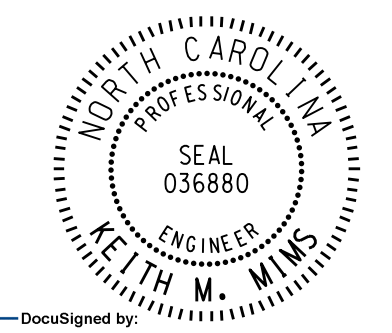
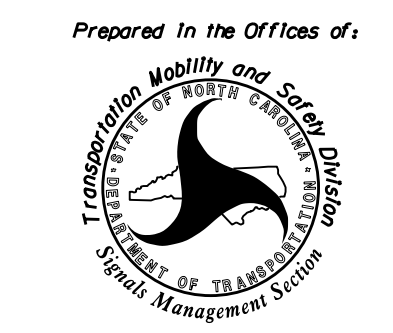
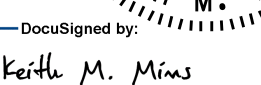
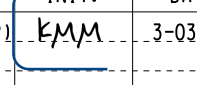
OVERLAPS PAGE 2: Modifies overlap parent phases for head 11 to run protected turns only.

INPUTS PAGE 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

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Electrical Detail - Sheet 4 of 4

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		Division 03 New Hanover County Wilmington PLAN DATE: September 2009 REVIEWED BY: T. Joyce PREPARED BY: S. Armstrong REVIEWED BY:	Not a certified document as to the Original Document but Only as to the Revisions - This document originally issued and sealed by George C. Brown, PE #022013, on 09/23/09. This document is only certified as to the revisions.
DocuSigned by:  KEITH M. MIMS PROFESSIONAL ENGINEER	3-03-16 DATE	750 N. Greenfield Pkwy, Garner, NC 27529	REVISIONS Added alternate phasing and updated overlap programming (JP)  DATE 3-03-16
		SIGNATURE	DATE
		SIG. INVENTORY NO.	03-0929