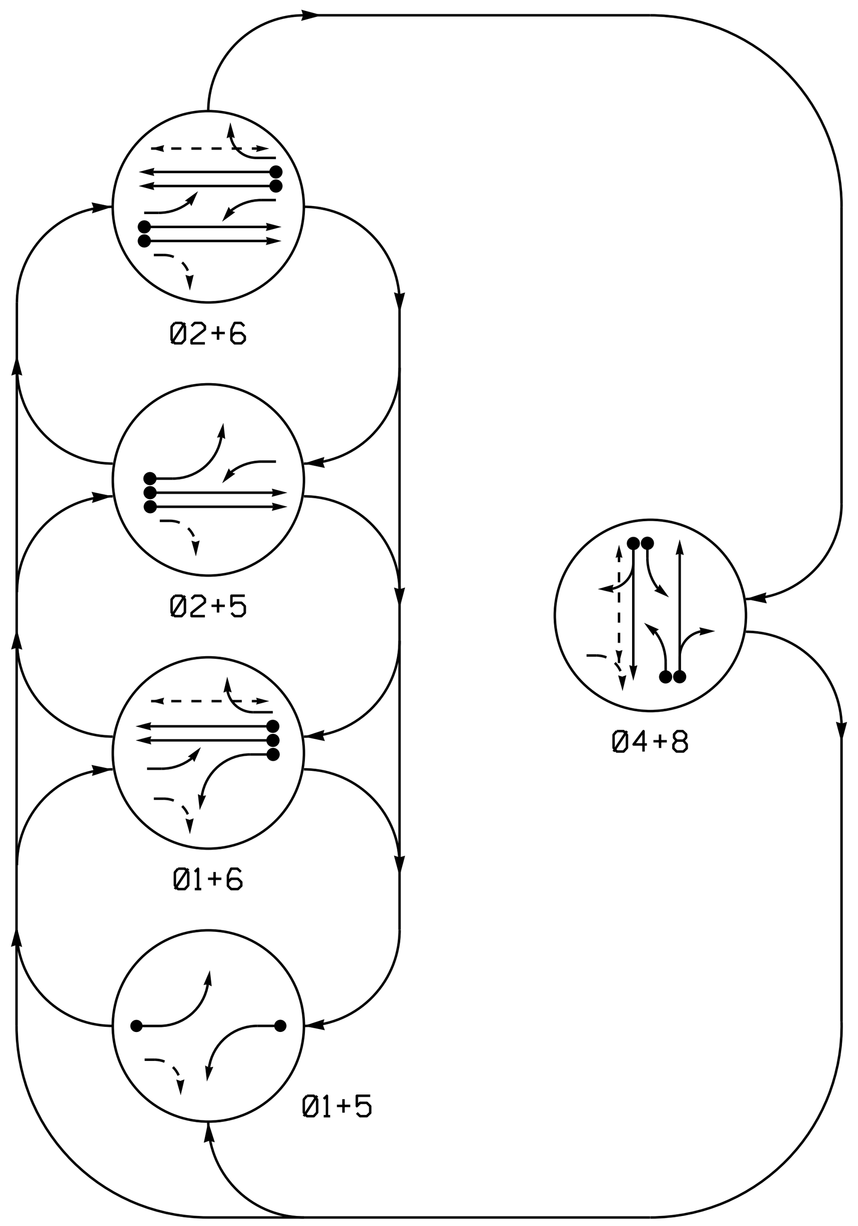
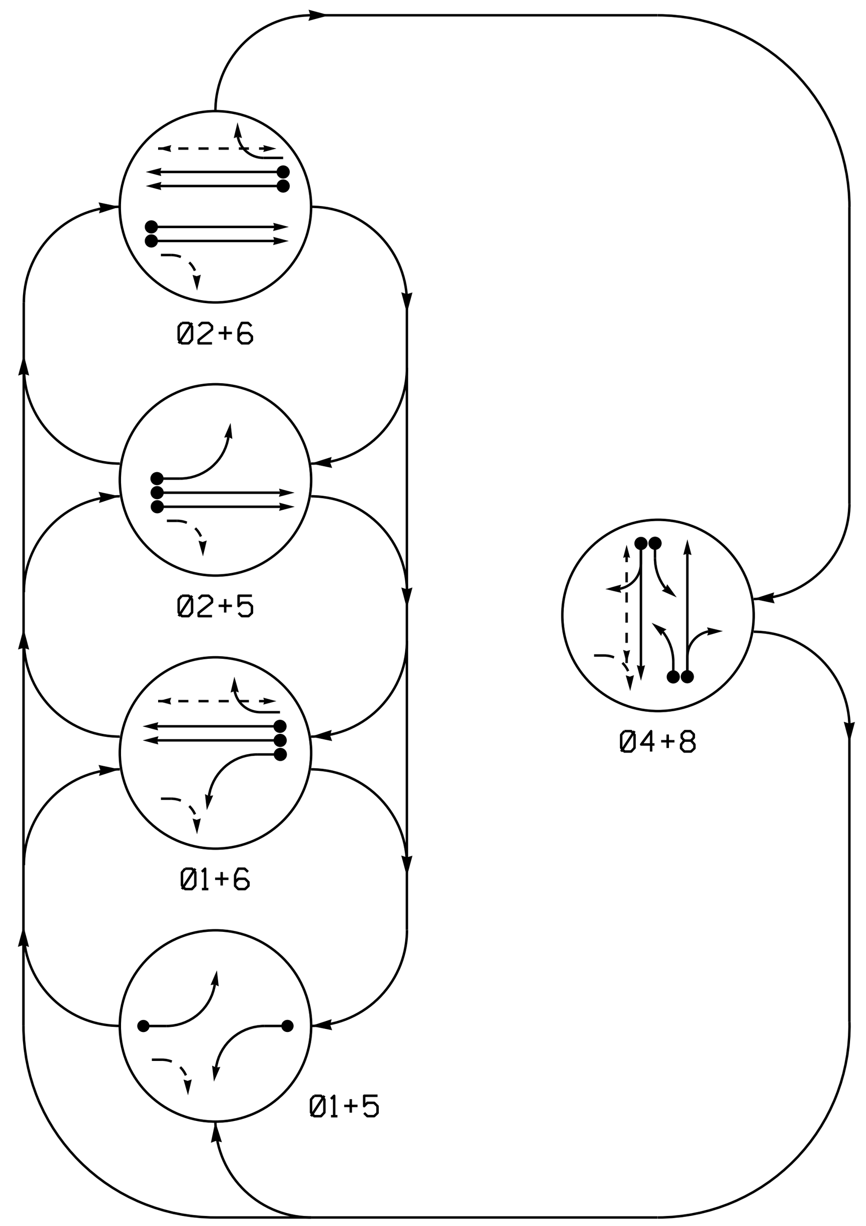

W-5705AA - SR 2026 (Hammond Rd) at Chapanoke Rd and Wake County Jail:
- 3 yellow dots = retrofit existing (Note, the yellow dot in the median requires trucated domes on both sides of the median)
- 1 green dot = in compliance, no work needed
- 3 red dots with black outline = new curb ramp install
Chapanoke Rd
Hammond Rd
Hammond Rd
05-1933
5

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM

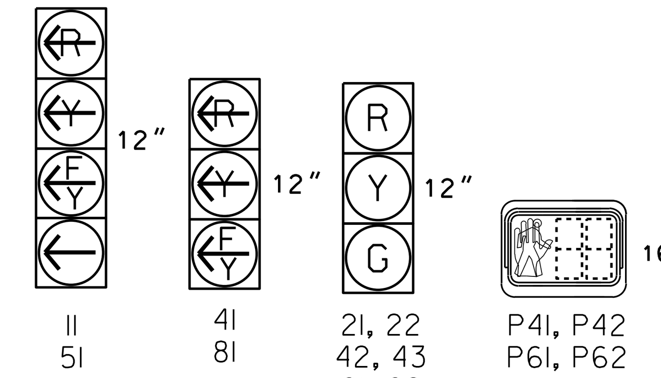


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
						ASSIGNED PHASE	TIMING		OPERATION MODE								SWITCH	SYSTEM LOOPS	STATUS	
									0	1	2	3	4	5	6	7				
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING		DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	1 CALL	STOP A	STOP B	PROT/PER LEFT	PROT/PER THROUGH	AND			NEW	EXISTING
1A	6X60	2-4-2	0	-	X	1	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2A	6X6	EXISTING	286	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2B	6X6	EXISTING	286	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2C, 2D	6X6	EXISTING	76	-	X	-	- SEC.	- SEC.	DISCONNECT & ABANDON										-	-
4A	6X40	2-4-2	0	-	X	4	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4B	6X60	2-4-2	0	-	X	4	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X60	2-4-2	+14	-	X	5	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	EXISTING	300	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	EXISTING	300	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6C, 6D	6X6	EXISTING	90	-	X	-	- SEC.	- SEC.	DISCONNECT & ABANDON										-	-
8A	6X60	2-4-2	0	-	X	8	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8B	6X60	2-4-2	0	-	X	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

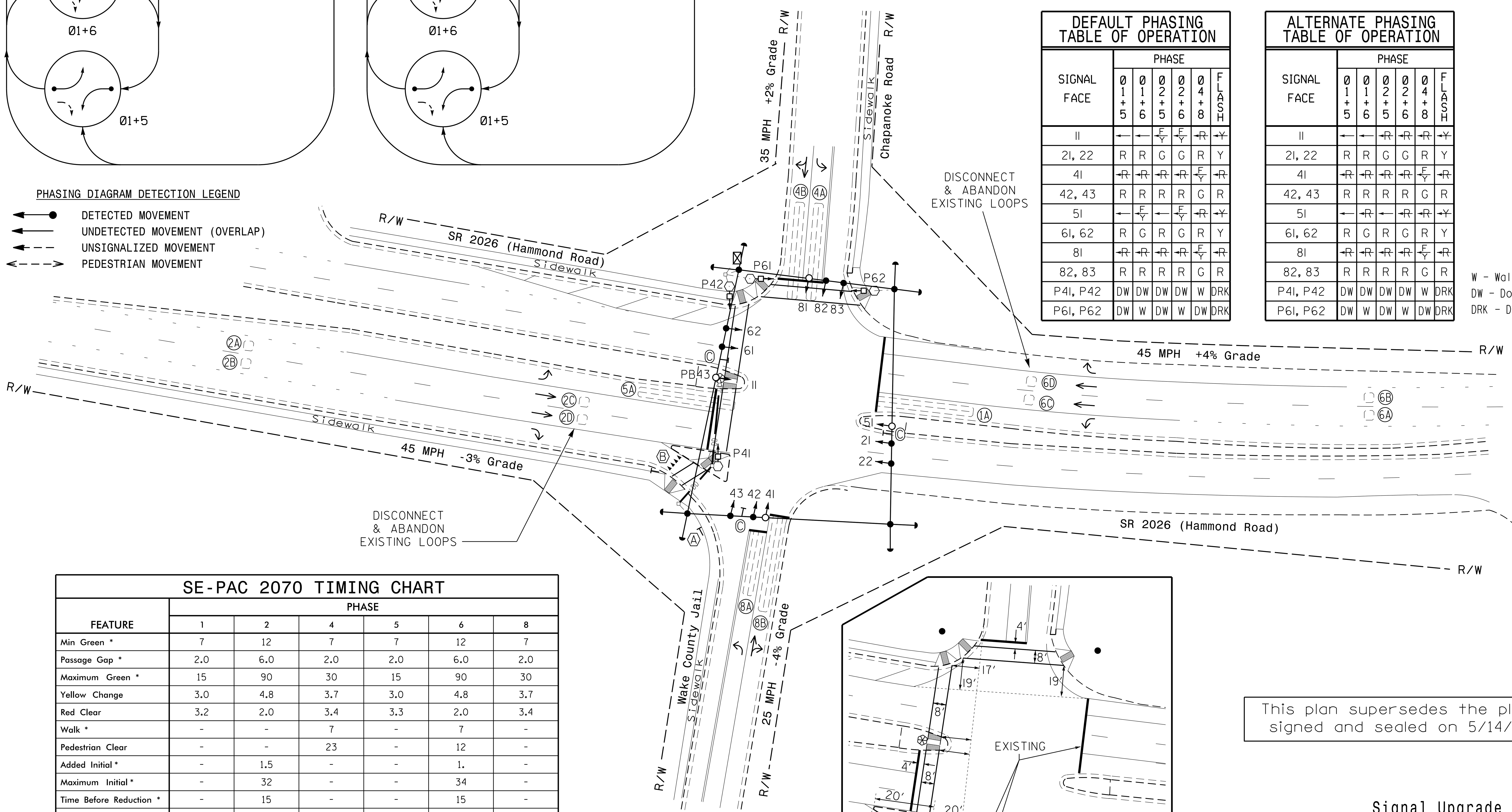
DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←F/Y	←F/Y	←R	←Y
21, 22	R	R	G	G	R	Y
41	←R	←R	←R	←R	←F/Y	←R
42, 43	R	R	R	R	G	R
51	←	←F/Y	←	←F/Y	←R	←Y
61, 62	R	G	R	G	R	Y
81	←R	←R	←R	←R	←F/Y	←R
82, 83	R	R	R	R	G	R
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←R	←R	←R	←Y
21, 22	R	R	G	G	R	Y
41	←R	←R	←R	←R	←F/Y	←R
42, 43	R	R	R	R	G	R
51	←	←R	←	←R	←R	←Y
61, 62	R	G	R	G	R	Y
81	←R	←R	←R	←R	←F/Y	←R
82, 83	R	R	R	R	G	R
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK

W - Walk
DW - Don't Walk
DRK - Dark



SE-PAC 2070 TIMING CHART

FEATURE	PHASE					
	1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Passage Gap *	2.0	6.0	2.0	2.0	6.0	2.0
Maximum Green *	15	90	30	15	90	30
Yellow Change	3.0	4.8	3.7	3.0	4.8	3.7
Red Clear	3.2	2.0	3.4	3.3	2.0	3.4
Walk *	-	-	7	-	7	-
Pedestrian Clear	-	-	23	-	12	-
Added Initial *	-	1.5	-	-	1.	-
Maximum Initial *	-	32	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	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.

Proposed Crosswalk and Stop Line Locations

This plan supersedes the plan signed and sealed on 5/14/19.

8 Phase
Fully Actuated
(Raleigh Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Renumber existing signal heads as shown.
5. Reposition all existing signal heads.
6. Disconnect and Abandon existing loops 2C, 2D, 6C, and 6D.
7. Run new lead-in cable to rewire existing loops 2A, 2B, 6A, an 6B to operate independently for volume density detection.
8. Set all detector units to presence mode.
9. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
10. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
11. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
12. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
13. Remove existing "Left Turn Yield on Green" ball signs (R10-12).
14. Pavement markings are existing unless otherwise shown.
15. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
16. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
	Directional Drill	N/A
	Type I Pushbutton Post	
	Type II Signal Pedestal	
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	Pedestrian Crossing Sign (W11-2) w/ Diagonal Arrow Plaque (W16-7p)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SR 2026 (Hammond Road)
at
Chapanoke Road and
Wake County Jail

Division 5 | Wake County | Raleigh

PLAN DATE:	June 2020	REVIEWED BY:
PREPARED BY:	C.E. Carter	REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by:
1B9B4B6027AA494...
SIGNATURE 7/10/2020 DATE

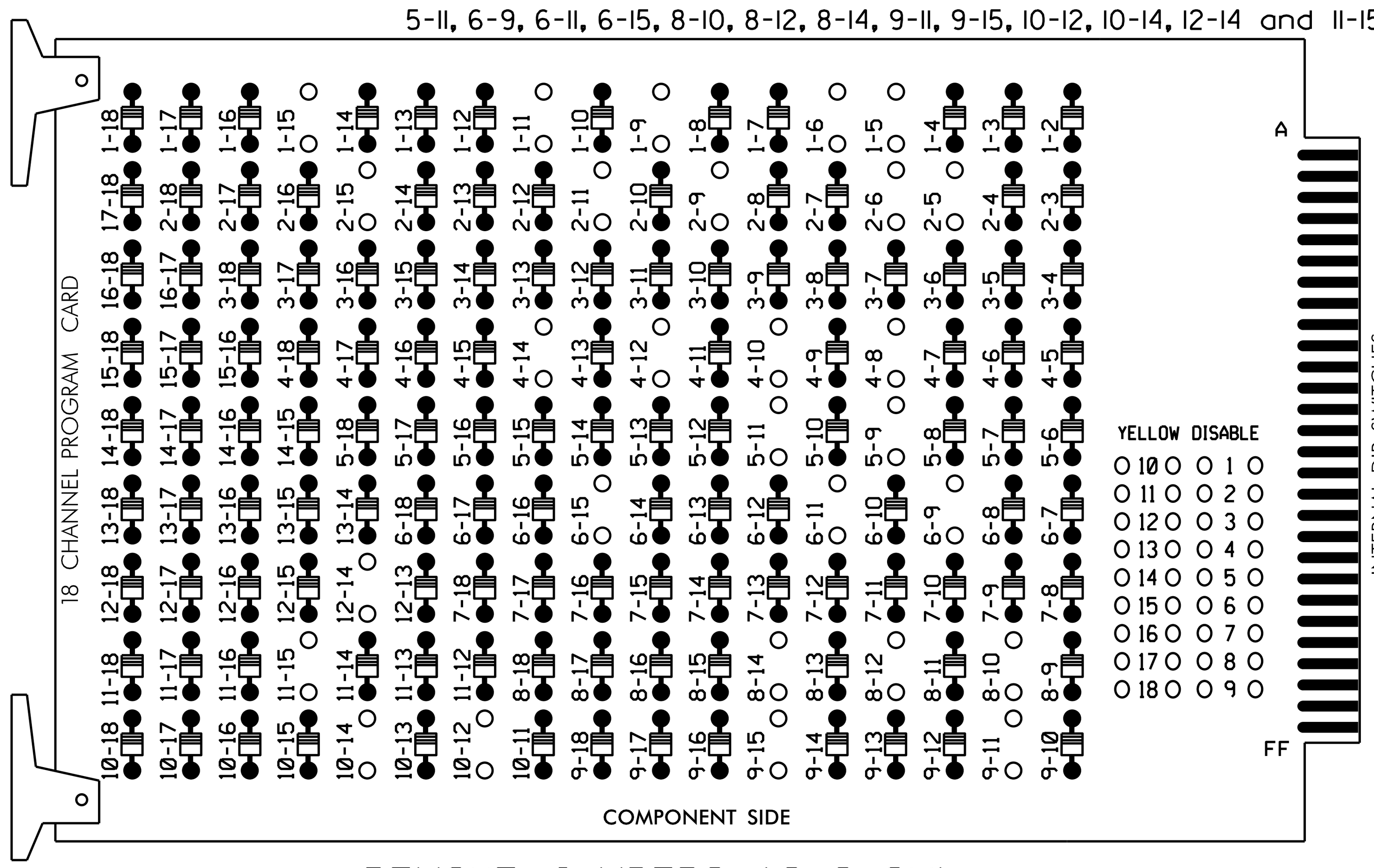
SIG. INVENTORY NO. 05-1933

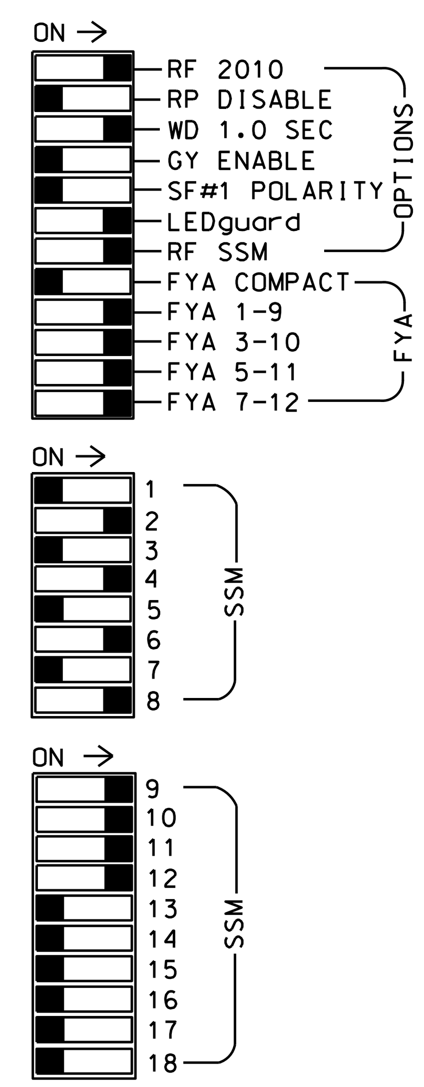
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

ON OFF
WD ENABLE
SW2

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-15, 4-8, 4-10, 4-12, 4-14, 5-9, 5-11, 6-9, 6-11, 6-15, 8-10, 8-12, 8-14, 9-11, 9-15, 10-12, 10-14, 12-14 and 11-15.





REMOVE JUMPERS AS SHOWN

NOTES:

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

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. Program controller to start up in phases 2 and 6 green.
3. Enable simultaneous gap-out feature for all phases.
4. Program phases 4 and 8 for dual entry.
5. Program phases 2 and 6 for volume density operation.
6. The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............2070
CABINET.................332 W/ AUX
SOFTWARE................SE-PAC2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX FILE
LOAD SWITCHES USED......S1,S2,S5,S6,S7,S8,S9,S11,AUX S1, AUX S2,AUX S4,AUX S5
PHASES USED.............1,2,4,4 PED,5,6,6 PED,8
OVERLAP A...............*
OVERLAP B...............*
OVERLAP C...............*
OVERLAP D...............*
* SEE SHEET 2 FOR OVERLAP PROGRAMMING

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.	11★	21,22	NU	NU	42,43	P41, P42	51★	61,62	P61, P62	NU	82,83	NU	11★	81★	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													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127						133											
(hand)						104			119									
(walking person)						106			121									

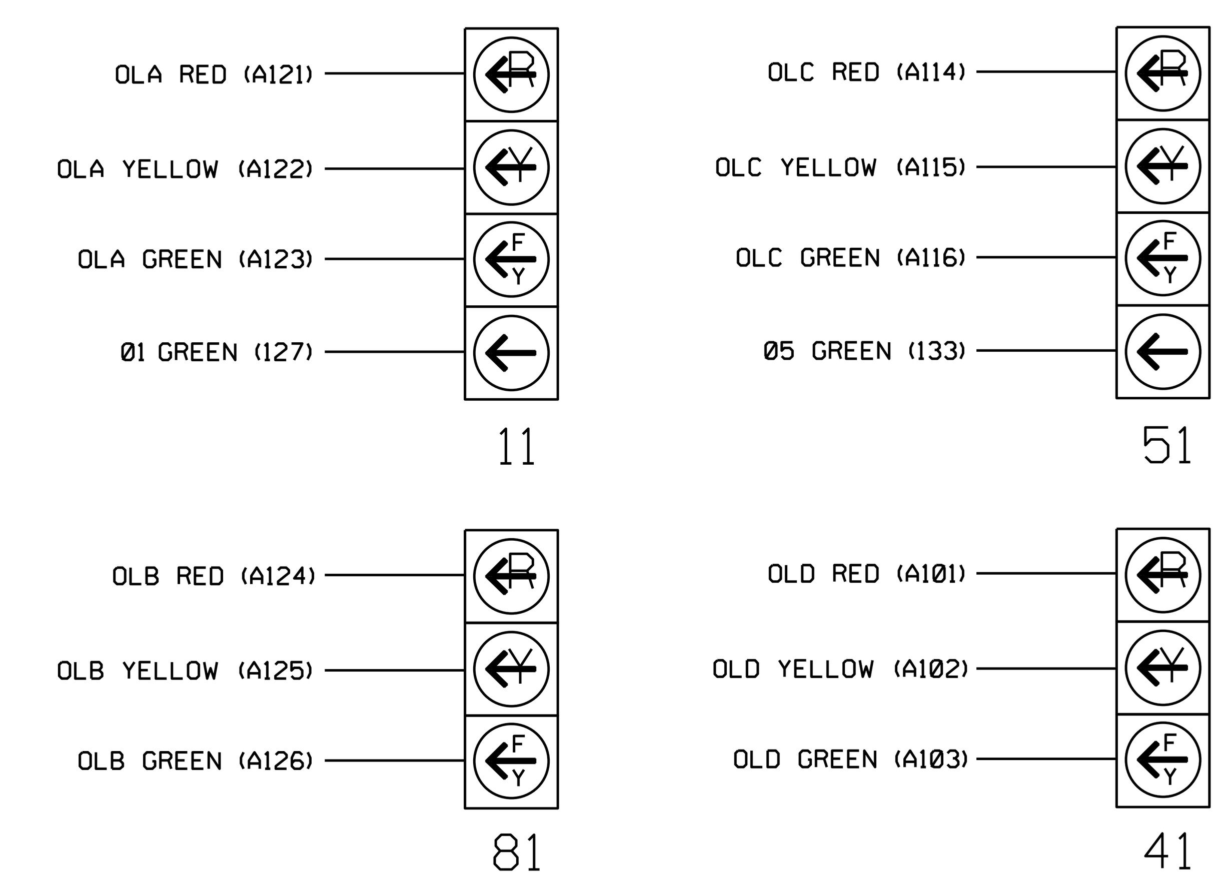
NU = Not Used

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

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE: See sheet 2 for Protected & Permitted Phases programming.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	NOT USED	Ø6PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø2 2B	EMPTY	EMPTY	EMPTY	Ø4 4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	NOT USED	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø6 6B	EMPTY	EMPTY	EMPTY	Ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1	5	
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
4A	TB4-9,10	I6U	41	11	4	3	
4B	TB4-11,12	I6L	45	12	4	10	
5A	TB3-1,2	J1U	55	19	5	5	
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
8A	TB5-9,10	J6U	42	31	8	3	
8B	TB5-11,12	J6L	46	32	8	10	
PED PUSH BUTTONS							
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

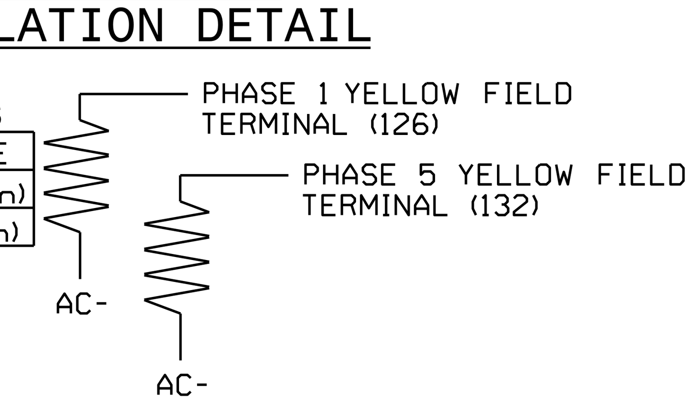
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1933
DESIGNED: June 2020
SEALED: 7-10-20
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 5-15-19.

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 2026 (Hammond Road) at Chapanoke Road and Wake County Jail

Division 5 Wake County Raleigh

PLAN DATE: July 2020	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH
DocuSigned by: Ryan W. Hough 7/24/2020
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SIGNATURE DATE

SIG. INVENTORY NO. 05-1933

24-JUL-2020 08:55
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jpeterson

PROJECT REFERENCE NO.	SHEET NO.
W-5705AA	Sig. 3

FLASHING YELLOW ARROW PROTECTED/PERMISSIVE SEQUENCE for OVERLAPS "A" "B" "C" & "D"

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA           PRESS # DESIRED

 1-STARTUP & MISC          6-ALT SEQUENCES
 2-REMOTE FLASH            7-PORT 1 DATA
[3-OVERLAP STANDARD]       8-I/O MISC
 4-OVERLAP SPECIAL         9-SIG DRV OUT
 5-RING STRUCTURE
                                  F-PRIOR MENU
```

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - A                (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 0001000000 00000


A-UP B-DN D-DspChn   E-EDIT   F-PRIOR MENU
```

PRESS "B" ONCE

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - B                (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 0000100000 00000


A-UP B-DN D-DspChn   E-EDIT   F-PRIOR MENU
```

PRESS "B" ONCE

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - C                (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 0000010000 00000


A-UP B-DN D-DspChn   E-EDIT   F-PRIOR MENU
```

PRESS "B" ONCE

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - D                (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 0000001000 00000


A-UP B-DN D-DspChn   E-EDIT   F-PRIOR MENU
```

OVERLAP PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO UNIT DATA

INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

```
SE-PAC PHASE DATA          PRESS # DESIRED

 1-VEHICLE TIMES           6-N.LOCK & MISC
 2-DENSITY TIMES           7-SPEC. SEQUENCE
 3-PEDEST. TIMES           8-SPEC. DETECTOR
[4-INIT & N.A. RESP]       9-PHASE COPY
 5-V & P RECALLS           0-MISC PED OPTIONS
                                  F-PRIOR MENU
```

Note Phases 3 & 7 NOT used!

```
PHASE......1...2...3...4...5...6...7...8
 INITIAL   1   4   0   1   1   4   0   1
 NA RESP   0   1   0   2   0   1   0   2

CODES.......0....1....2....3....4....5
 INITIAL   NONE  INACT RED  YEL  GRN  DRK
 NA RESP   NONE  NA1   NA2 BOTH  ---  ---
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

INIT & N.A. RESP programming complete.

PROTECTED & PERMISSIVE PHASES for FLASHING YELLOW ARROW

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA           PRESS # DESIRED

 1-STARTUP & MISC          6-ALT SEQUENCES
 2-REMOTE FLASH            7-PORT 1 DATA
 3-OVERLAP STANDARD        8-I/O MISC
[4-OVERLAP SPECIAL]        9-SIG DRV OUT
 5-RING STRUCTURE
                                  F-PRIOR MENU
```

```
SE-PAC OVLP.A...B...C...D...E...F...G...H.
   TR GRN   0   0   0   0   0   0   0   0
   YEL/10  40  40  40  40  40  40  40  40
   RED/10  20  20  20  20  20  20  20  20
   -G/Y     1   3   5   7   0   0   0   0    <- PROTECTED PHASES
   +GRN     2   4   6   8   0   0   0   0    <- PERMISSIVE PHASES
 (-) #-PH G/Y KILLS OVLP= (+) #-PH G STRT
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

NOTE: THIS PROGRAMMING IS REQUIRED FOR SIGNAL HEADS 11 & 51 SO THAT THE SOLID GREEN ARROW TURNS ON EXCLUSIVELY DURING THE PROTECTED GREEN INTERVAL PHASES 1 & 5. THE FLASHING YELLOW ARROW FOR SIGNAL HEADS 11, 41, 51 AND 81 FLASHES ONLY DURING PERMITTED GREEN INTERVAL PHASES 2, 4, 6 & 8.

PPLT DEFINITION PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO UNIT DATA

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1933
DESIGNED: June 2020
SEALED: 7-10-20
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 5-15-19.

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 2026 (Hammond Road) at Chapanoke Road and Wake County Jail

Division 5 | Wake County | Raleigh

PLAN DATE: July 2020	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough
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SIGNATURE 7/24/2020 DATE

SIG. INVENTORY NO. 05-1933

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jtpeterson

TOD EVENT SCHEDULING PROGRAMMING DETAIL TO CALL ALTERNATE PHASING OPERATION DURING COORDINATION

(program controller as shown below)

* DENOTES TO BE DETERMINED BY THE DIVISION TRAFFIC ENGINEER.

NOTES

1. Phase Functions can be called by Time of Day (TOD) in Traffic Events, but not during coordination.
2. Special Functions can be called by Time of Day using Aux Events, and can run in conjunction with Coordination.
3. Special Functions can be used to call a Phase Function. In doing this a Phase function can run while a Coordination pattern is running.
4. If Alternate Phasing is used during FREE-RUN Phase Function 1 must be turned on with a Traffic Event.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 1 - Assign OMIT OVERLAP "A" AND "C" to Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT            6-EQUATE/TRANSFER
 2-SET TIME/DATE           7-CLEAR MEMORY
 3-TRAFFIC EVENTS          8-DIMMING
 4-AUX EVENTS             [9-PHS FUNC MAPPING]
 5-TOY EVENTS              0-SPC FUNC MAPPING
                                 F-PRIOR MENU
```

```
EPAC  TIME BASE PHS FUNC MAPPING
                PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
   1  PHS-01 MAX # 2    000000000 0000000   <- REMOVE PHASE FUNCTION NUM 1 DEFAULT VALUE
   2  PHS-02 MAX # 2    010000000 0000000
   3  PHS-03 MAX # 2    001000000 0000000
   4  PHS-04 MAX # 2    000100000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

HIT "A" KEY UNTIL POSITIONED ON NUM 145

```
EPAC  TIME BASE PHS FUNC MAPPING
                PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
 145  OVERLAP A OMIT    100000000 0000000   <- OVERLAPS A OMIT
 146  OVERLAP B OMIT    000000000 0000000
 147  OVERLAP C OMIT    100000000 0000000   <- OVERLAPS C OMIT
 148  OVERLAP D OMIT    000000000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

SET SWITCH 1 "ON" FOR

PHASE FUNCTION PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO TIME BASE DATA

SPECIAL FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 2 - Assign Special Function 1 to call Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT            6-EQUATE/TRANSFER
 2-SET TIME/DATE           7-CLEAR MEMORY
 3-TRAFFIC EVENTS          8-DIMMING
 4-AUX EVENTS              9-PHS FUNC MAPPING
 5-TOY EVENTS             [0-SPC FUNC MAPPING]
                                 F-PRIOR MENU
```

```
EPAC TIME BASE SPC FUNC MAPPING
                              SPC FUNC
 S-FUNCTION NAME .........    12345678
   SPC 1-8 AS PHS FUNC 1- 8   10000000   <- PHASE FUNCTION 1 WILL BE CALLED WHEN SPECIAL FUNCTION 1 IS SELECTED
   SPC 1-8 AS PHS FUNC 9-16   00000000
   SPEC FUNCTION 1            10000000
 CODES.......0-OFF....1-ON...........
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

SPECIAL FUNCTION PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO TIME BASE DATA

PROGRAM AUX EVENT TO CALL SPECIAL FUNCTION

(program controller as shown below)

Step 3 - An Auxiliary event will be used to call the Special Function. This is done in Time Base Data under Aux Event. Add Auxiliary events as needed remembering to use one event to turn the Special Function on and one event to turn the Special Function off. If these are to be used in conjunction with the Traffic Events during Coordination then the On/Off times should be identical.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT            6-EQUATE/TRANSFER
 2-SET TIME/DATE           7-CLEAR MEMORY
 3-TRAFFIC EVENTS          8-DIMMING
[4-AUX EVENTS]             9-PHS FUNC MAPPING
 5-TOY EVENTS              0-SPC FUNC MAPPING
                                 F-PRIOR MENU
```

Special Function (SF)

```
EPAC TIME BASE - AUXILIARY EVENTS
  DD   HH  MM   A123   D123   DIM   S12345678
  *    *   *    000    000    0     10000000   <- SF 1 "ON"
  *    *   *    000    000    0     00000000   <- SF 1 "OFF"
  *    *   *    000    000    0     00000000
CODES........0-OFF....1-ON.............
OVERWRITE ">" W/ 1-ADD  2-DELETE  3-EDIT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

AUX EVENT PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO TIME BASE DATA

! AUX EVENT MUST BE SCHEDULED TO RUN CONCURRENT WITH A TRAFFIC EVENT SCHEDULED COORDINATION PATTERN.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1933
DESIGNED: June 2020
SEALED: 7-10-20
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 5-15-19.

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 2026 (Hammond Road)
at
Chapanoke Road and
Wake County Jail

Division 5 | Wake County | Raleigh

PLAN DATE: July 2020	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough
430320FAA2654C3...
SIGNATURE 7/24/2020 DATE

SIG. INVENTORY NO. 05-1933

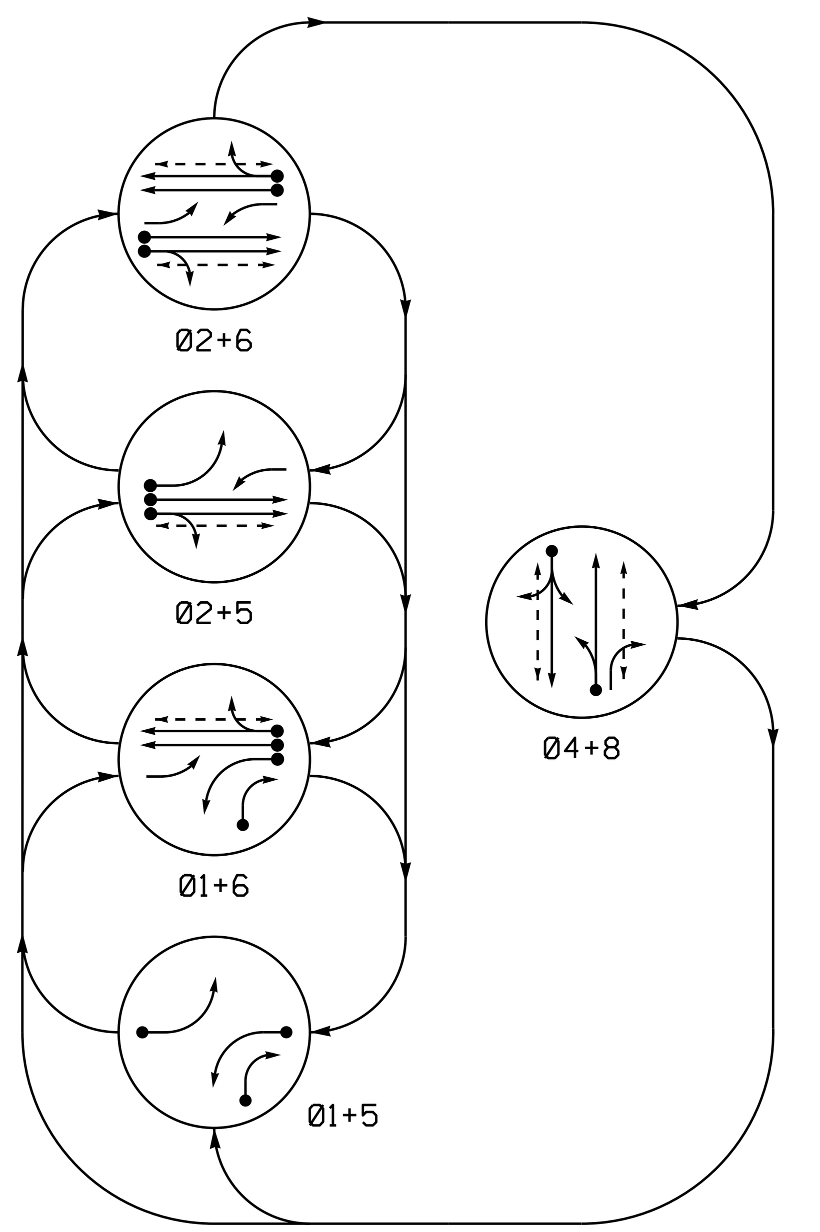
22-JUL-2020 10:54
r051933_sm_ele_20190515.dgn
jtpeterson

W-5705AB - SR 4363 (Martin Luther King Jr. Blvd) at S State St:

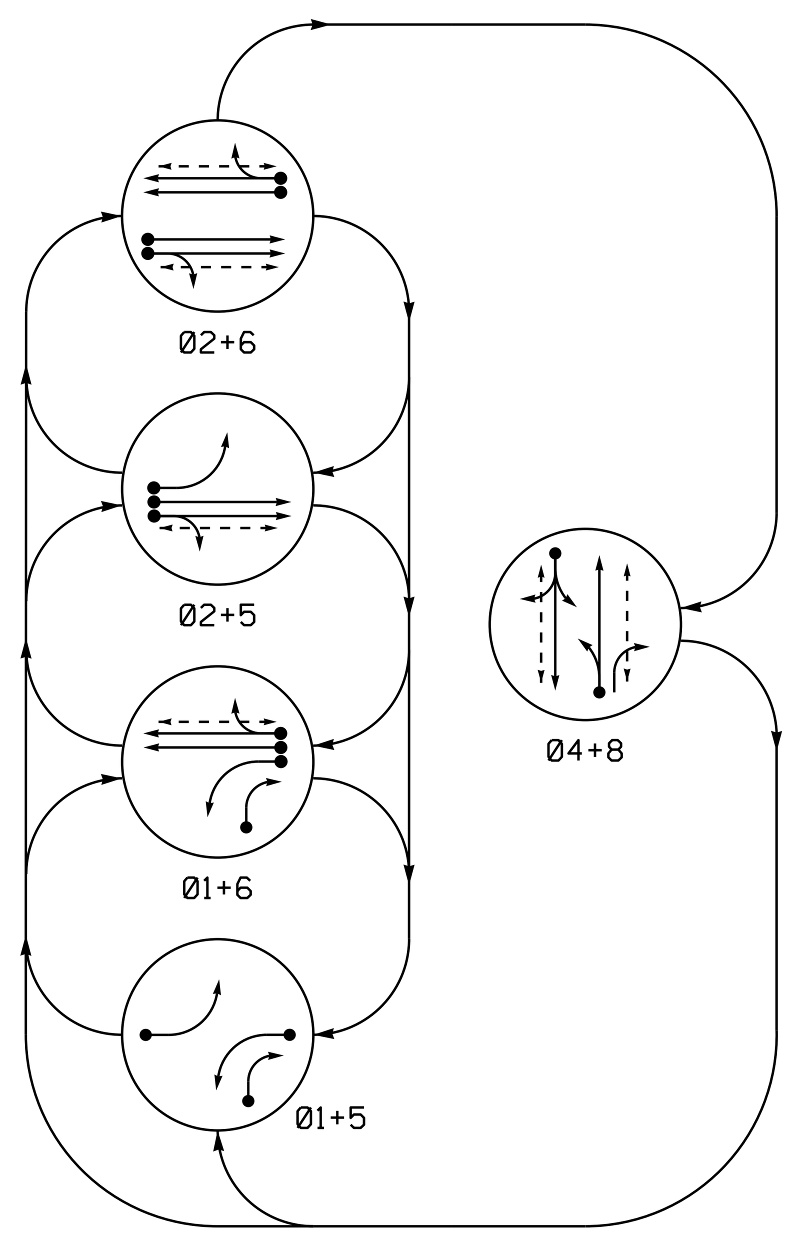
- 4 yellow = remove and replace existing curb ramps
- 4 green dots = ramps are in compliance and no work is required

PROJECT REFERENCE NO.	SHEET NO.
W-5705AB	Sig. 1

DEFAULT PHASING DIAGRAM

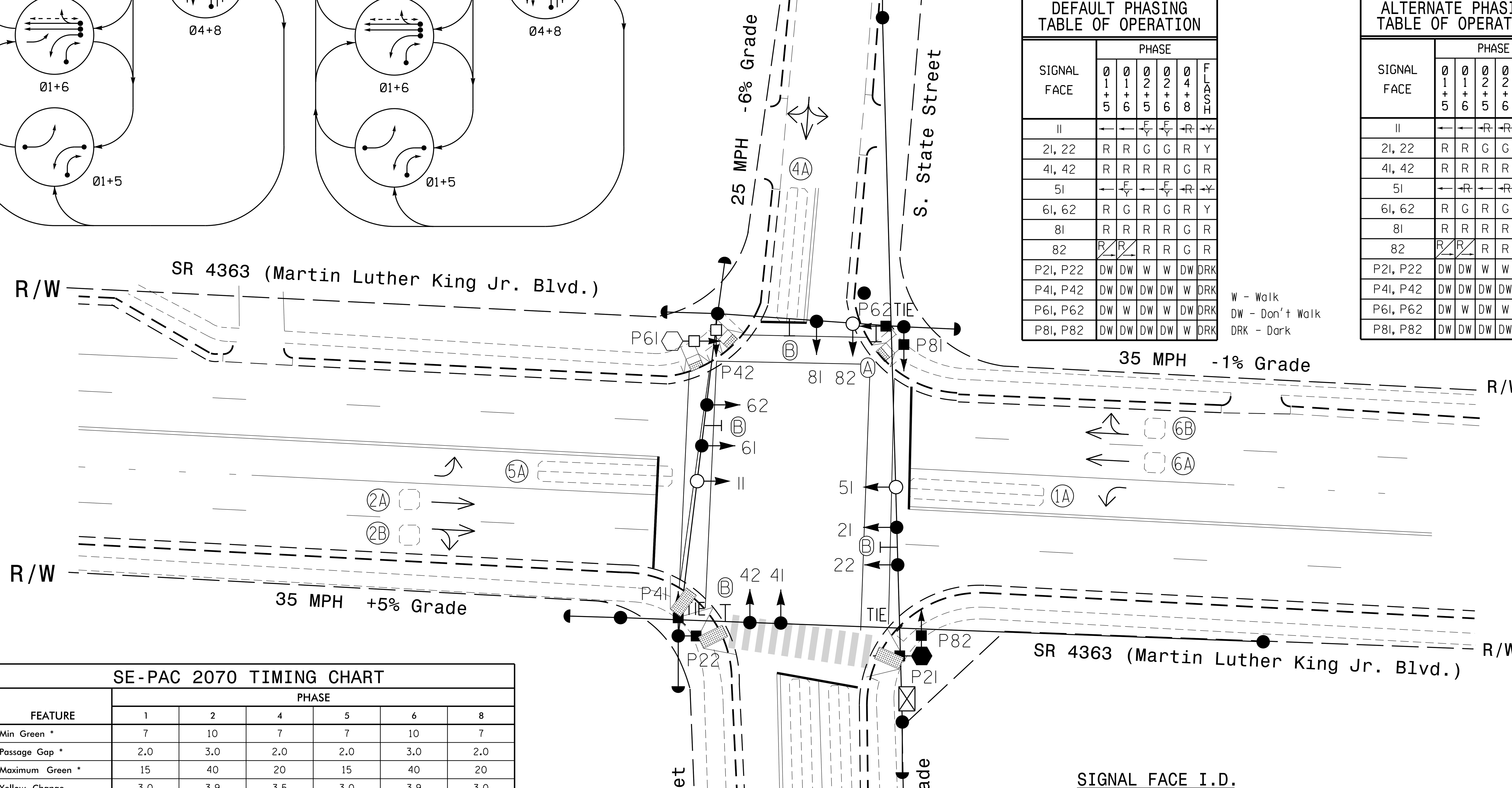


ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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



SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE										STATUS	
									0	1	2	3	4	5	6	7				
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	1 CALL	STOP A	STOP B	PROT/PER LEFT	PROT/PER THROUGH	AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	0	-	X	1	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
1B	6X40	2-4-2	0	-	X	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2A	6X6	EXISTING	70	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2B	6X6	EXISTING	70	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	-	X	4	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	+5	-	X	5	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	EXISTING	70	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	EXISTING	70	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	-	X	8	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←F/Y	←F/Y	←R	←Y
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	←F/Y	←	←F/Y	←R	←Y
61, 62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/→	R/→	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←R	←R	←R	←Y
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	←R	←	←R	←R	←Y
61, 62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/→	R/→	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

5 Phase
Fully Actuated
(Raleigh Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Reposition existing signal heads numbered 21, 22, 61, and 62.
5. Install and maintain backplates for signal heads numbered 11, 21, 22, 51, 61, and 62.
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Remove existing Left Arrow "ONLY" (R3-5L) signs.
11. Pavement markings are existing.
12. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
13. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Type II Signal Pedestal	
N/A	Curb Ramp	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	Street Name Sign (D3-1)	B

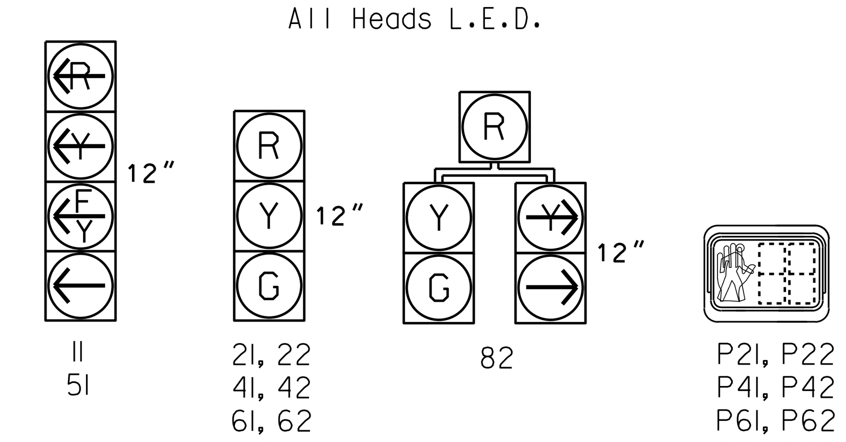
SE-PAC 2070 TIMING CHART

FEATURE	PHASE					
	1	2	4	5	6	8
Min Green *	7	10	7	7	10	7
Passage Gap *	2.0	3.0	2.0	2.0	3.0	2.0
Maximum Green *	15	40	20	15	40	20
Yellow Change	3.0	3.9	3.5	3.0	3.9	3.0
Red Clear	2.1	2.5	2.5	2.1	2.5	2.6
Walk *	-	7	7	-	7	7
Pedestrian Clear	-	9	16	-	9	22
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	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 FACE I.D.

All Heads L.E.D.



Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner.NC 27529

SCALE 0 20 1"=20'

SR 4363
(Martin Luther King Jr. Blvd.)
at
S. State Street

Division 5 Wake County Raleigh

PLAN DATE: April 2019	REVIEWED BY:
PREPARED BY: C.E. Carter	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

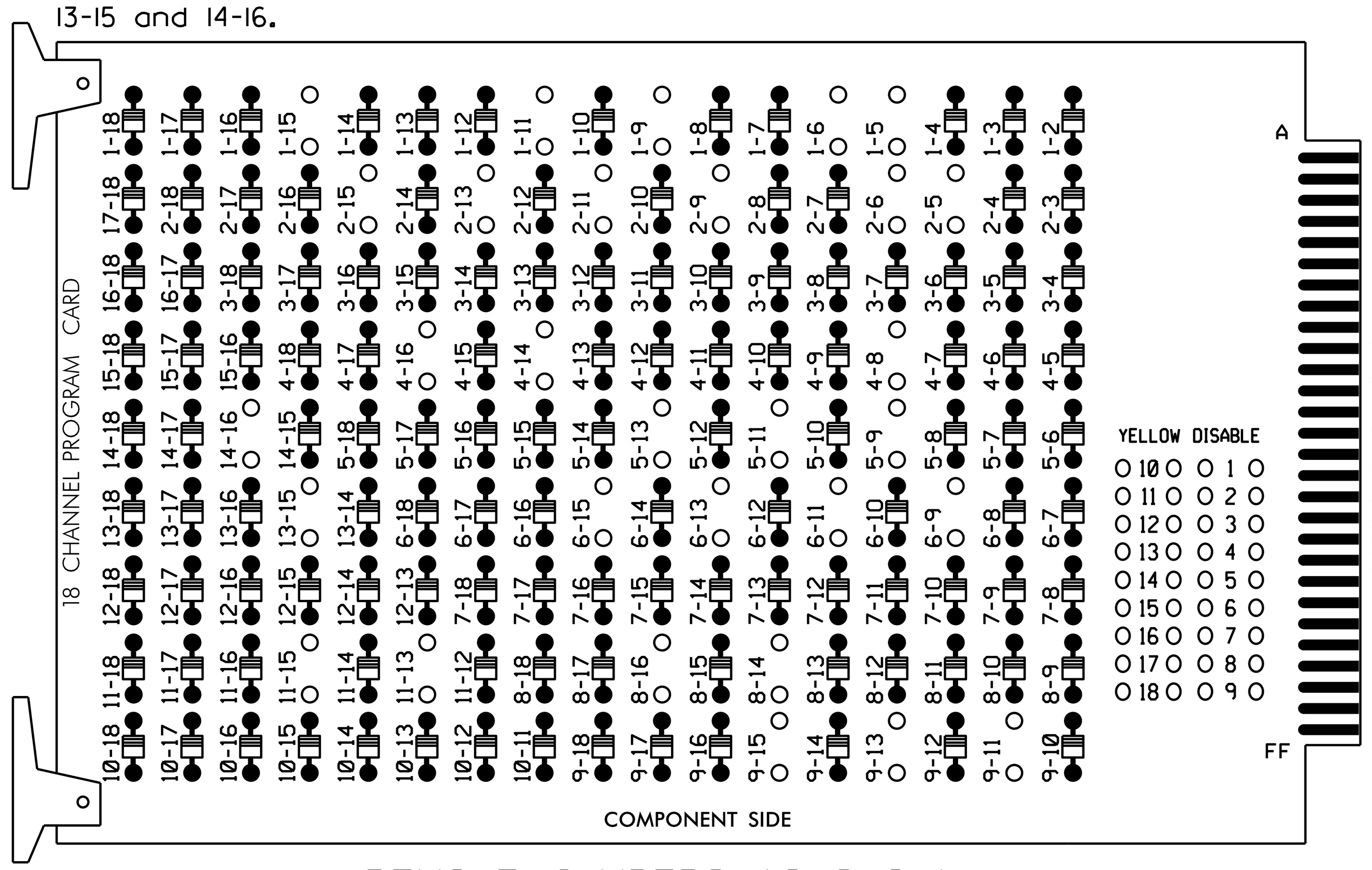
DocuSigned by:
SIGNATURE 4/30/2019 DATE

SIG. INVENTORY NO. 05-2389

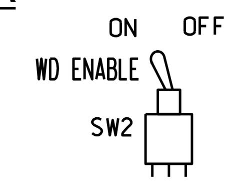
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

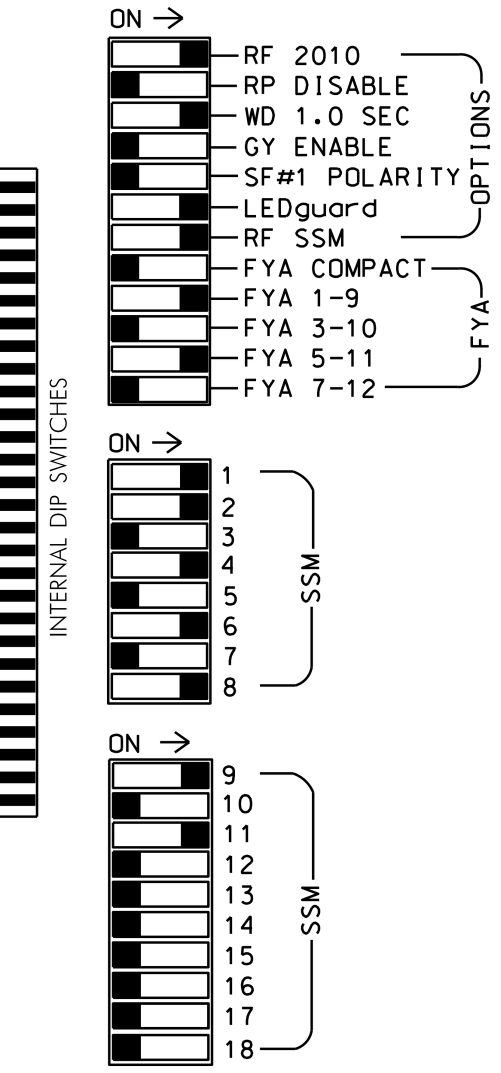
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15 and 14-16.



REMOVE JUMPERS AS SHOWN





■ = DENOTES POSITION OF SWITCH

NOTES:

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

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. Program controller to start up in phases 2 and 6 green.
3. Enable simultaneous gap-out feature, on controller unit, for all phases.
4. Program phases 4 and 8, on controller unit, for dual entry.
5. The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.............2070
CABINET................332 /W/ AUX
SOFTWARE...............SE-PAC2070
CABINET MOUNT..........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S3,S5,S6,S7,S8,S9,S11,S12, AUX S1,AUX S4
PHASES USED............1,2,2 PED,4,4 PED,5,6,6 PED, 8,8 PED
OVERLAP "A"............*
OVERLAP "B"............NOT USED
OVERLAP "C"............*
OVERLAP "D"............NOT USED

*See sheet 2 for Overlap and Protected & Permissive Phases programming.

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.	11★	82	21,22	P21, P22	NU	41,42	P41, P42	51★	61,62	P61, P62	NU	81,82	P81, P82	11★	NU	NU	51★	NU	NU
RED		*	128			101			134			107							
YELLOW			129			102		*	135			108							
GREEN			130			103			136			109							
RED ARROW														A121			A114		
YELLOW ARROW		126												A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127	127						133											
✋				113			104			119			110						
🚶				115			106			121			112						

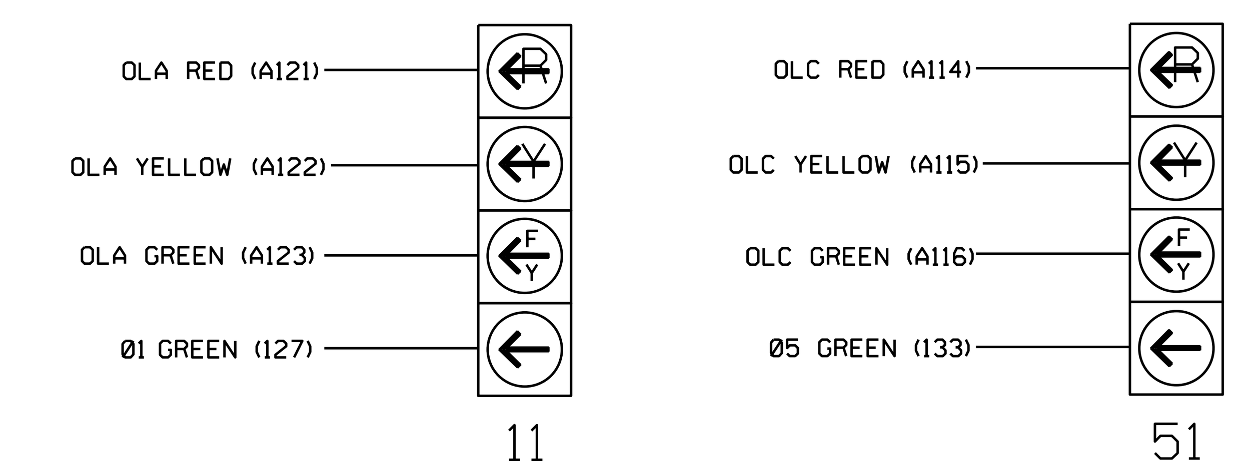
NU = Not Used

* 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)



NOTE

1. See sheet 2 for Protected & Permissive Phases programming.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2B	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø6 6B	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1	5	
1B	TB2-5,6	I2U	39	3	1	15	
2A	TB2-9,10	I3U	63	5	2		
2B	TB2-11,12	I3L	76	6	2		
4A	TB4-9,10	I6U	41	11	4	5	
5A	TB3-1,2	J1U	55	19	5	5	
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
8A	TB5-9,10	J6U	42	31	8	3	
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED		

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

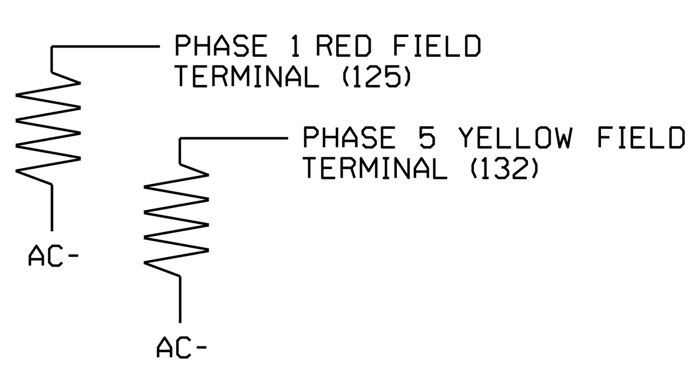
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2389
DESIGNED: April 2019
SEALED: 4-30-19
REVISED: N/A

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)



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 4363
(Martin Luther King Jr. Blvd.)
at
S. State Street

Division 5 | Wake County | Raleigh

PLAN DATE: April 2019 | REVIEWED BY:
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS | INIT. | DATE

Prepared in the Offices of:
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036833 RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 5/1/2019
DATE

SIG. INVENTORY NO. 05-2389

PROJECT REFERENCE NO.	SHEET NO.
W-5705AB	Sig. 3

FLASHING YELLOW ARROW PROTECTED/PERMITTED SPECIAL SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

SELECT 4 FROM MAIN MENU

SE-PAC UNIT DATA PRESS # DESIRED

1- STARTUP & MISC 6- ALT SEQUENCES
2- REMOTE FLASH 7- PORT 1 DATA
3- OVERLAP STANDARD 8- I/O MISC
4- OVERLAP SPECIAL 9- SIG DRV OUT
5- RING STRUCTURE
F- PRIOR MENU

Do NOT enter any OVL PHASES!

SE-PAC OVERLAP - A (0-NO / 1-YES)

OVL PHASES: 000000000 0000000
PHS/CHN: 123456789 0123456789 01234
OVL CHN(S): 000000000 0001000000 00000

A-UP B-DN D-DspChn E-EDIT F-PRIOR MENU

PRESS 'B' TWICE

Do NOT enter any OVL PHASES!

SE-PAC OVERLAP - C (0-NO / 1-YES)

OVL PHASES: 000000000 0000000
PHS/CHN: 123456789 0123456789 01234
OVL CHN(S): 000000000 0000010000 00000

A-UP B-DN D-DspChn E-EDIT F-PRIOR MENU

select F – return to Unit Data menu

SE-PAC UNIT DATA PRESS # DESIRED

1- STARTUP & MISC 6- ALT SEQUENCES
2- REMOTE FLASH 7- PORT 1 DATA
3- OVERLAP STANDARD 8- I/O MISC
4- OVERLAP SPECIAL 9- SIG DRV OUT
5- RING STRUCTURE
F- PRIOR MENU

SE-PAC OVLP.	A	B	C	D	E	F	G	H
TR GRN	0	0	0	0	0	0	0	0
YEL/10	40	40	40	40	40	40	40	40
RED/10	20	20	20	20	20	20	20	20
-G/Y	1	0	5	0	0	0	0	0
+GRN	2	0	6	0	0	0	0	0

PROTECTED PHASES
PERMITTED PHASES

(-) #-PH G/Y KILLS OVLP= (+) #-PH G STRT

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

end of programming

NOTE: THIS PROGRAMMING IS REQUIRED FOR SIGNAL HEADS 11 AND 51 SO THAT THE SOLID GREEN ARROW TURNS ON EXCLUSIVELY DURING THE PROTECTED GREEN INTERVALS OF PHASES 1 & 5. THE FLASHING YELLOW ARROW FOR SIGNAL HEADS 11 AND 51 TURNS ON EXCLUSIVELY DURING PERMITTED GREEN PHASES 2 & 6.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2389
DESIGNED: April 2019
SEALED: 4-30-19
REVISED: N/A

Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 4363
(Martin Luther King Jr. Blvd.)
at
S. State Street

Division 5 Wake County Raleigh

Prepared in the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

PLAN DATE: April 2019	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough
430320FAA2654C3...
5/1/2019
DATE

SIG. INVENTORY NO. 05-2389

30-APR-2019 14:09
.*052389_sm_ele_xxx.dgn
jtpeterson

TOD EVENT SCHEDULING PROGRAMMING DETAIL TO CALL ALTERNATE PHASING OPERATION DURING COORDINATION

(program controller as shown below)

* DENOTES TO BE DETERMINED BY THE DIVISION TRAFFIC ENGINEER.

NOTES

1. Phase Functions can be called by Time of Day (TOD) in Traffic Events, but not during coordination.
2. Special Functions can be called by Time of Day using Aux Events, and can run in conjunction with Coordination.
3. Special Functions can be used to call a Phase Function. In doing this a Phase function can run while a Coordination pattern is running.
4. If Alternate Phasing is used during FREE-RUN Phase Function 1 must be turned on with a Traffic Event.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 1 - Assign OMIT OVERLAP "A" AND "C" to Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT            6-EQUATE/TRANSFER
 2-SET TIME/DATE           7-CLEAR MEMORY
 3-TRAFFIC EVENTS          8-DIMMING
 4-AUX EVENTS              9-PHS FUNC MAPPING
 5-TOY EVENTS              0-SPC FUNC MAPPING
                                F-PRIOR MENU
```

```
EPAC  TIME BASE PHS FUNC MAPPING
                PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
   1   PHS-01 MAX # 2   000000000 0000000
   2   PHS-02 MAX # 2   010000000 0000000
   3   PHS-03 MAX # 2   001000000 0000000
   4   PHS-04 MAX # 2   000100000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

REMOVE PHASE FUNCTION NUM 1 DEFAULT VALUE

HIT "A" KEY UNTIL POSITIONED ON NUM 145

```
EPAC  TIME BASE PHS FUNC MAPPING
                PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
 145  OVERLAP A OMIT   100000000 0000000
 146  OVERLAP B OMIT   000000000 0000000
 147  OVERLAP C OMIT   100000000 0000000
 148  OVERLAP D OMIT   000000000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

SET SWITCH 1 "ON" FOR

OVERLAP A OMIT

OVERLAP C OMIT

PHASE FUNCTION PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO TIME BASE DATA

SPECIAL FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 2 - Assign Special Function 1 to call Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT            6-EQUATE/TRANSFER
 2-SET TIME/DATE           7-CLEAR MEMORY
 3-TRAFFIC EVENTS          8-DIMMING
 4-AUX EVENTS              9-PHS FUNC MAPPING
 5-TOY EVENTS              0-SPC FUNC MAPPING
                                F-PRIOR MENU
```

```
EPAC TIME BASE SPC FUNC MAPPING
                              SPC FUNC
 S-FUNCTION NAME .........    12345678
   SPC 1-8 AS PHS FUNC 1- 8   10000000
   SPC 1-8 AS PHS FUNC 9-16   00000000
   SPEC FUNCTION 1            10000000
 CODES.......0-OFF....1-ON...........
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

PHASE FUNCTION 1 WILL BE CALLED WHEN SPECIAL FUNCTION 1 IS SELECTED

SPECIAL FUNCTION PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO TIME BASE DATA

PROGRAM AUX EVENT TO CALL SPECIAL FUNCTION

(program controller as shown below)

Step 3 - An Auxiliary event will be used to call the Special Function. This is done in Time Base Data under Aux Event. Add Auxiliary events as needed remembering to use one event to turn the Special Function on and one event to turn the Special Function off. If these are to be used in conjunction with the Traffic Events during Coordination then the On/Off times should be identical.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT            6-EQUATE/TRANSFER
 2-SET TIME/DATE           7-CLEAR MEMORY
 3-TRAFFIC EVENTS          8-DIMMING
 4-AUX EVENTS              9-PHS FUNC MAPPING
 5-TOY EVENTS              0-SPC FUNC MAPPING
                                F-PRIOR MENU
```

```
EPAC TIME BASE - AUXILIARY EVENTS
  DD  HH MM  A123  D123  DIM  S12345678
  *   *  *   000   000   0    10000000
  *   *  *   000   000   0    00000000
  *   *  *   000   000   0    00000000
CODES........0-OFF....1-ON.............
OVERWRITE ">" W/ 1-ADD  2-DELETE  3-EDIT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Special Function (SF)

SF 1 "ON"

SF 1 "OFF"

AUX EVENT PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO TIME BASE DATA

! AUX EVENT MUST BE SCHEDULED TO RUN CONCURRENT WITH A TRAFFIC EVENT SCHEDULED COORDINATION PATTERN.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2389
DESIGNED: April 2019
SEALED: 4-30-19
REVISED: N/A

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 4363
(Martin Luther King Jr. Blvd.)
at
S. State Street

Division 5 | Wake County | Raleigh

PLAN DATE: April 2019	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough
430320FAA2654C3...

5/1/2019
DATE

SIG. INVENTORY NO. 05-2389

30-APR-2019 14:10
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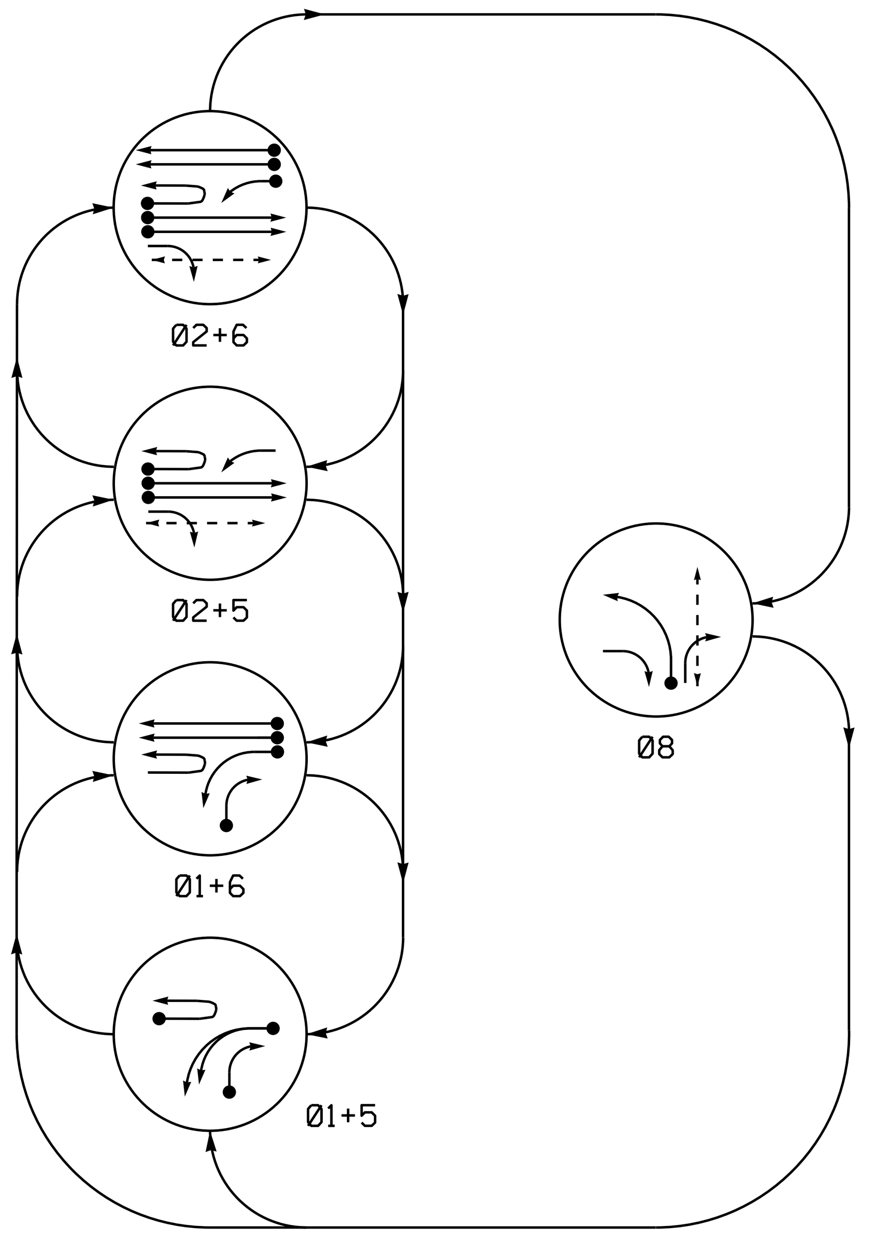
jtpeterson


N Broad St
N Broad St
James Slaughter Rd
Stroll Cir
05-1731
Promenade Ct
Promenade Ct
W-5705AC - NC 55 (N Broad St) at SR 1399 (James Slaughter Rd):
- 6 green dots = ramps in compliance, no work needed.
- Black Boxes = existing curb ramps outside of project scope of work

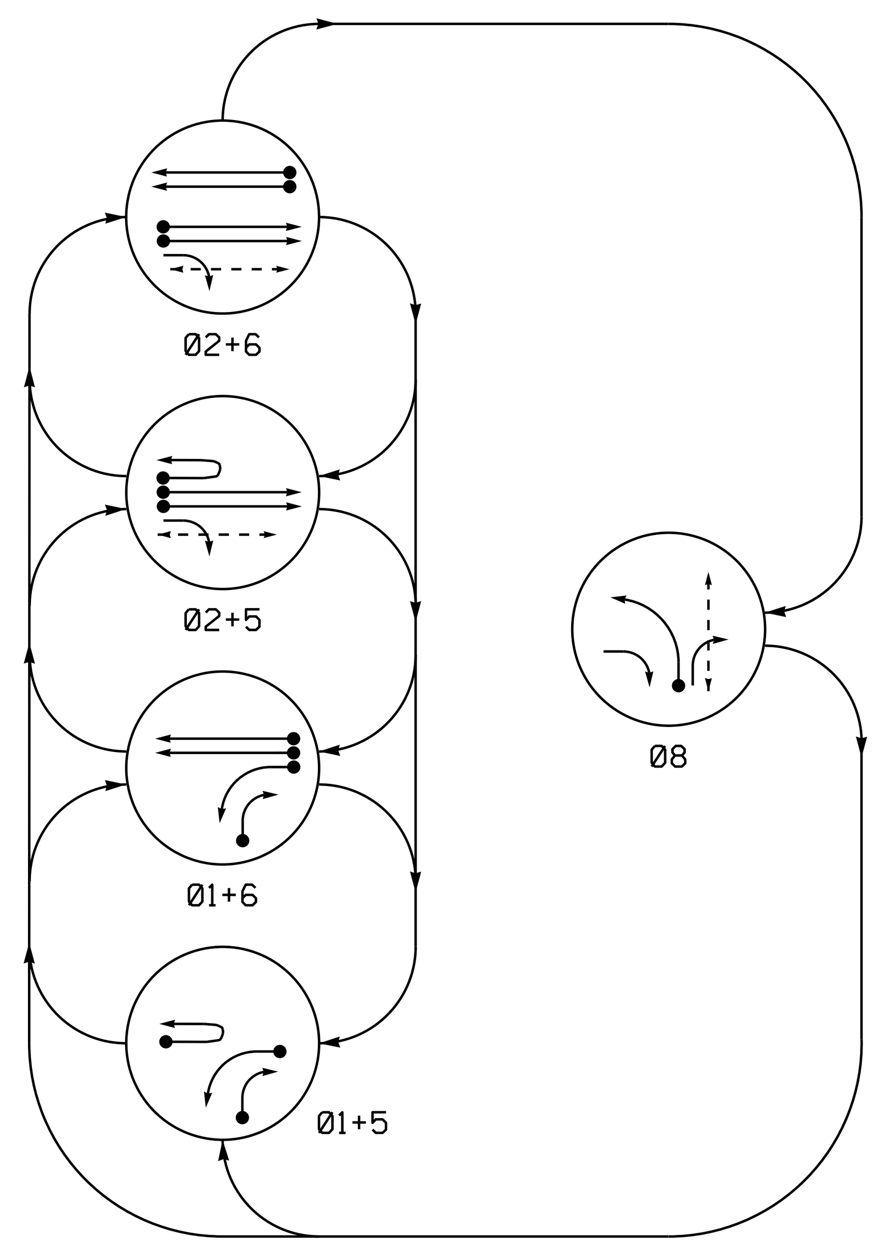
PROJECT REFERENCE NO.	SHEET NO.
W-5705AC	Sig. 1

5 Phase
Fully Actuated
(NC 55 Broad St. CLS)
Signal System #: 10532

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø8	FLASH
11	←	←	F Y ←	F Y ←	← R	← Y
22	R	R	G	G	R	Y
23	R	R	G	G	R / →	Y
51	U-turn	U-turn F Y	U-turn	U-turn F Y	U-turn R	U-turn Y
61, 62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R / →	R / →	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

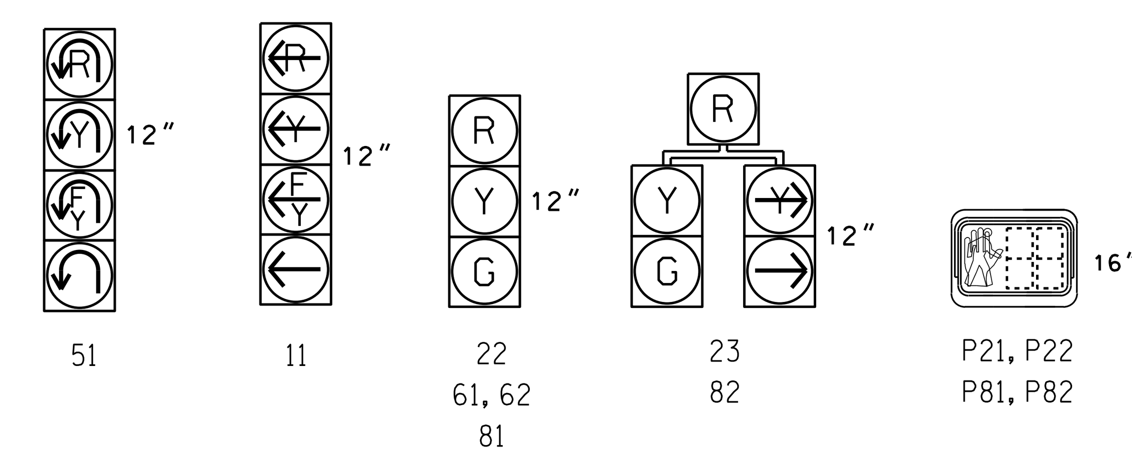
W - Walk
DW - Don't Walk
DRK - Dark

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø8	FLASH
11	←	←	← R	← R	← R	← Y
22	R	R	G	G	R	Y
23	R	R	G	G	R / →	Y
51	U-turn	U-turn R	U-turn	U-turn R	U-turn R	U-turn Y
61, 62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R / →	R / →	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

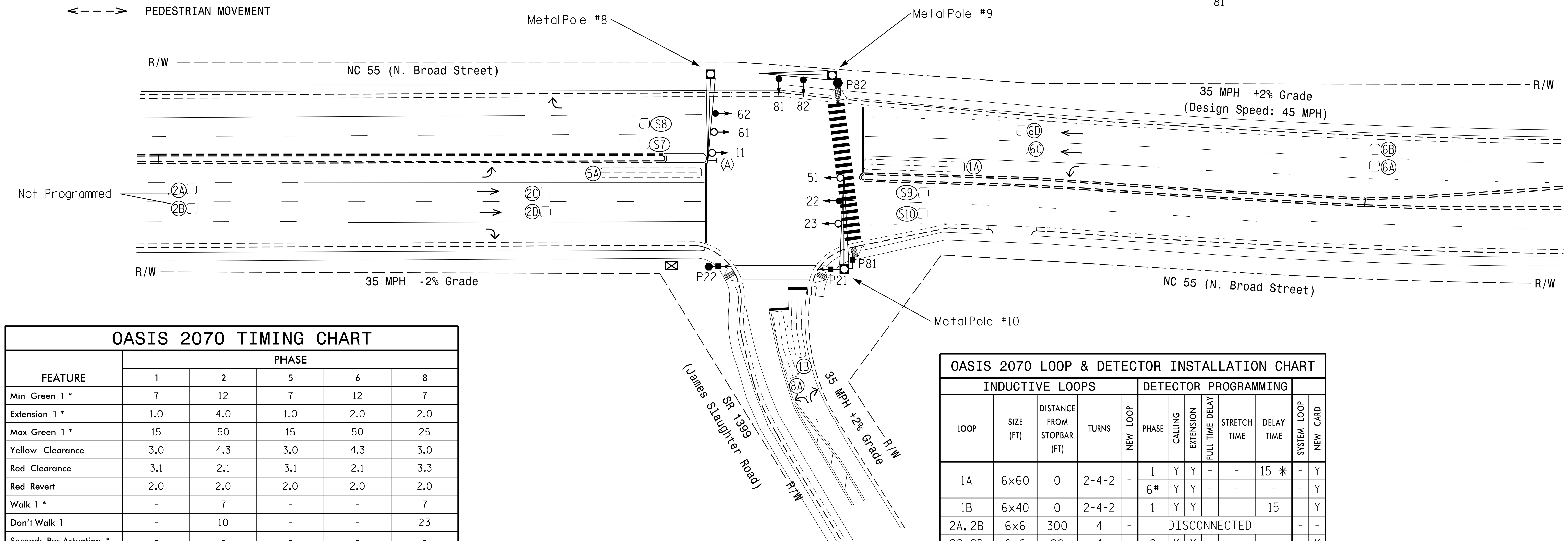
SIGNAL FACE I.D.

All Heads L.E.D.



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Renumber existing loop 2E as 5A.
5. Reposition existing signal head number 62.
6. Utilize existing conduit system for new cable/wire as required.
7. Set all detector units to presence mode.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
10. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
11. Pavement markings are existing.
12. The Division Traffic Engineer will determine the hours of use for each phasing plan.
13. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
14. Closed loop system data:
    Controller Asset #: 1731.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Metal Pole with Mastarm	
	Type II Signal Pedestal	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
N/A	Curb Ramp	
	2-in Underground Conduit	
N/A	Right of Way	
→	Directional Arrow	→
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	5	6	8
Min Green 1 *	7	12	7	12	7
Extension 1 *	1.0	4.0	1.0	2.0	2.0
Max Green 1 *	15	50	15	50	25
Yellow Clearance	3.0	4.3	3.0	4.3	3.0
Red Clearance	3.1	2.1	3.1	2.1	3.3
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	-	7
Don't Walk 1	-	10	-	-	23
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-	-
Simultaneous Gap	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.

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING: PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x60	0	2-4-2	-	1	Y	Y	-	-	15 *	-	Y
					6#	Y	Y	-	-	-	-	Y
1B	6x40	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A, 2B	6x6	300	4	-	DISCONNECTED						-	-
2C, 2D	6x6	90	4	-	2	Y	Y	-	-	-	-	Y
5A	6x60	0	2-4-2	-	5	Y	Y	-	-	15 *	-	Y
					2#	Y	Y	-	-	-	-	Y
6A, 6B	6x6	300	4	-	6	Y	Y	-	1.6	-	-	Y
6C, 6D	6x6	90	4	-	6	Y	Y	-	-	-	-	Y
8A	6x40	0	2-4-2	-	8	Y	Y	-	-	3	-	Y
S7	6x6	+130	5	-	-	-	-	-	-	-	Y	Y
S8	6x6	+130	5	-	-	-	-	-	-	-	Y	Y
S9	6x6	+130	4	-	-	-	-	-	-	-	Y	Y
S10	6x6	+130	4	-	-	-	-	-	-	-	Y	Y

* Disable Delay During Alternate Phasing Operation.
# Disable Phase Call For Loop(s) During Alternate Phasing Operation.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 55 (N. Broad Street) at SR 1399 (James Slaughter Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE:	March 2019	REVIEWED BY:	
PREPARED BY:	RJ Ziemba	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

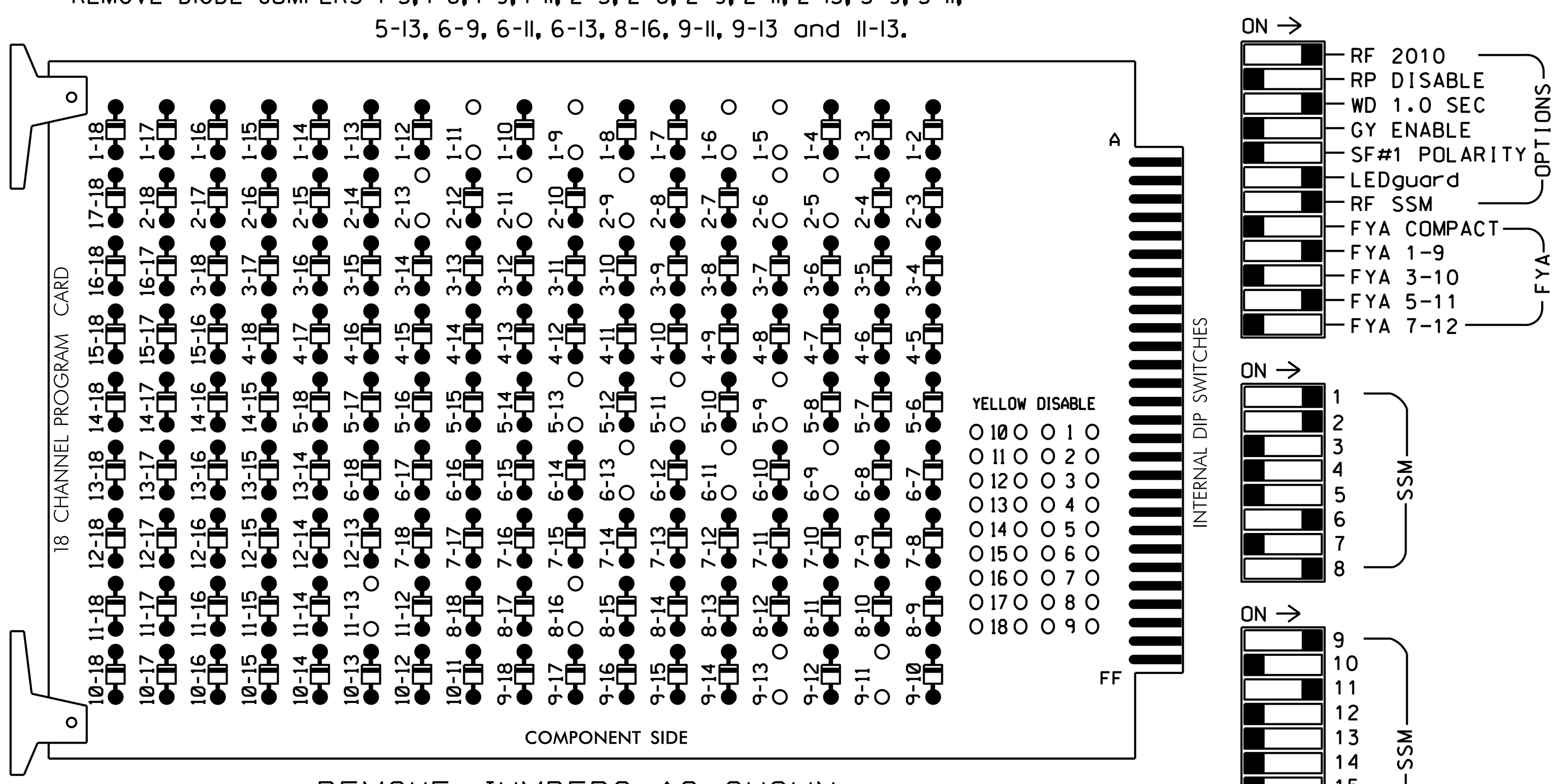
DocuSigned by:
SIGNATURE 4/1/2019 DATE

SIG. INVENTORY NO. 05-1731

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 8-16, 9-11, 9-13 and 11-13.



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

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

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. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Startup In Green.
4. Program phases 2 and 8 for Startup Ped Call.
5. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
6. The cabinet and controller are part of the NC 55 Broad St. CLS.

EQUIPMENT INFORMATION

CONTROLLER.............2070
CABINET................332 W/AUX
SOFTWARE...............ECONOLITE OASIS
CABINET MOUNT..........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S3,S7,S8,S11,S12, AUX S1,AUX S4
PHASES USED............1,2,2 PED,5,6,8,8 PED
OVERLAP "A"............1+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.	11★	82	22,23	P21, P22	NU	NU	NU	51★	61,62	NU	NU	23	81,82	P81, P82	11★	NU	NU	51★	NU	NU
RED	✳		128						134				107							
YELLOW			129					✳	135				108							
GREEN			130						136				109							
RED ARROW															A121			A114		
YELLOW ARROW		126										108			A122			A115		
FLASHING YELLOW ARROW															A123			A116		
GREEN ARROW	127	127						133				109								
✋				113										110						
🚶				115										112						

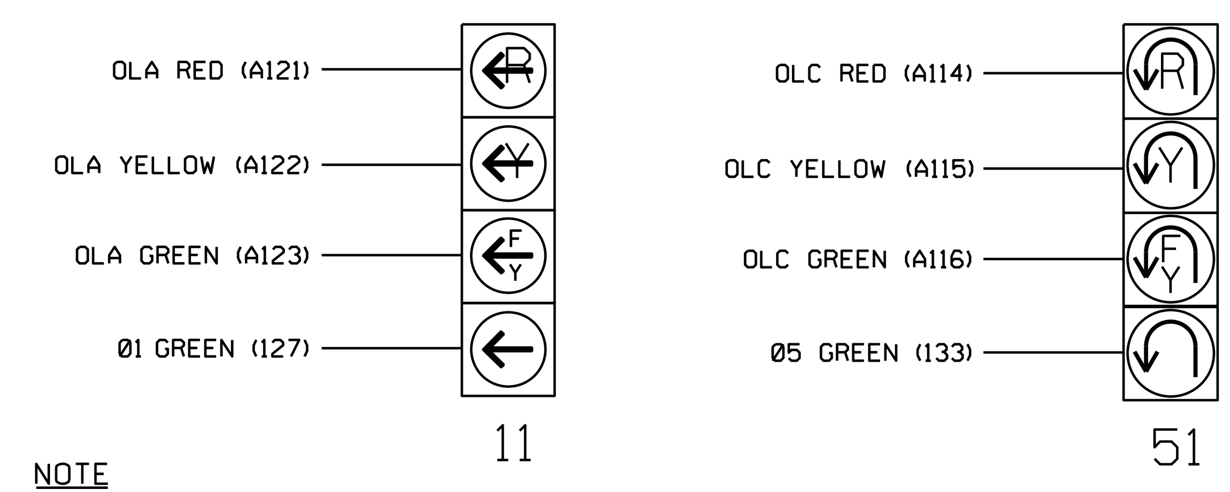
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 2 for programming instructions.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1731
DESIGNED: March 2019
SEALED: 4/1/2019
REVISED: N/A

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S7	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L	NOT USED	Ø2 2C,2D							SYS. DET. S8			NOT USED	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A,6B	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S9	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6C,6D				NOT USED			SYS. DET. S10					

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			
	-	I1U	56	18★	51	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2C, 2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9★	22	2	Y	Y			
	-	J1U	55	17★	55	5	Y	Y			
6A, 6B	TB3-5,6	J2U	40	2	6	6	Y	Y		1.6	
6C, 6D	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
✳ S7	TB6-9,10	I9U	60	22	11	SYS					
✳ S8	TB6-11,12	I9L	62	24	13	SYS					
✳ S9	TB7-9,10	J9U	59	21	15	SYS					
✳ S10	TB7-11,12	J9L	61	23	17	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

[1] Add jumper from I1-W to J4-W, on rear of input file.
[2] Add jumper from J1-W to I4-W, on rear of input file.
★ See Input Page Assignment programming details on sheets 3 and 4.
✳ System detector only. Remove the vehicle phase assigned to this detector in the default programming.

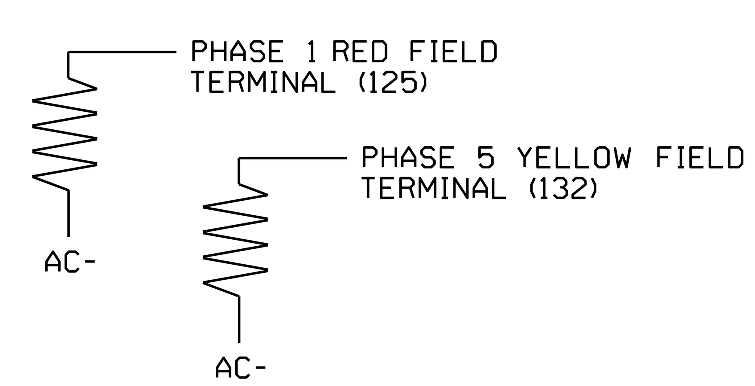
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLTION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES

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



Electrical Detail - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
750 N.Greenfield Pkwy,Garner,NC 27529

NC 55 (N. Broad Street)
at
SR 1399 (James Slaughter Road)

Division 5 | Wake County | Fuquay-Varina
PLAN DATE: March 2019 | REVIEWED BY: CES
PREPARED BY: B. Christian | REVIEWED BY:
REVISIONS | INIT. | DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE
DocuSigned by: D. Todd Joyce
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4/3/2019
DATE
SIG. INVENTORY NO. 05-1731

03-APR-2019 12:12
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bbchristian

PROJECT REFERENCE NO.	SHEET NO.
W-5705AC	Sig. 3

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, 3, 4, 5 AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #1  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-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
```

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

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON
        SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

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

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-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
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
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
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

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
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
```

PRESS '+' TWICE

NOTICE PAGE 2

```
PAGE 2: VEHICLE OVERLAP 'C' 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
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1731
DESIGNED: March 2019
SEALED: 4/1/2019
REVISED: N/A

Electrical Detail - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 55 (N. Broad Street)
at
SR 1399 (James Slaughter Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE:	March 2019	REVIEWED BY:	CES
PREPARED BY:	B. Christian	REVIEWED BY:	

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by:
D. Todd Joyce
A90CADFDBD4241D...
4/3/2019
DATE

SIG. INVENTORY NO. 05-1731

02-APR-2019 09:01
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bbchristian

PROJECT REFERENCE NO.	SHEET NO.
W-5705AC	Sig. 4

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.

```
PAGE: 2 C1 PIN:48  VEHICLE DETECTOR
INPUT ASSIGNMENT #..................10
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)...................Y
VEHICLE DETECTOR (1-64).............26
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 SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................._
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)._
```

ENTER A 'Y' FOR NOT ENABLED

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 1A - PHASE 6)

```
PAGE: 2 C1 PIN:48  NOT ENABLED
INPUT ASSIGNMENT #..................10
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)...................Y
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 SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................._
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 '+' TO ADVANCE TO INPUT 18

```
PAGE: 2 C1 PIN:56  VEHICLE DETECTOR
INPUT ASSIGNMENT #..................18
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).............1
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 SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................._
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)._
```

ENTER '51' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 1A - PHASE 1)

```
PAGE: 2 C1 PIN:56  VEHICLE DETECTOR
INPUT ASSIGNMENT #..................18
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).............51
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 SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................._
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)._
```

PROGRAMMING COMPLETE

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.

```
VEHICLE DETECTOR #51  SETTINGS (+-,1-64)
SETTING:                           (Y/N)
ENABLE DETECTOR.....................N
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '1' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #51  SETTINGS (+-,1-64)
SETTING:                           (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦X
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1731
DESIGNED: March 2019
SEALED: 4/1/2019
REVISED: N/A

Electrical Detail - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

NC 55 (N. Broad Street)
at
SR 1399 (James Slaughter Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: March 2019	REVIEWED BY: CES
PREPARED BY: B. Christian	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by:
D. Todd Joyce
A90CADFDBD4241D...

4/3/2019
DATE

SIG. INVENTORY NO. 05-1731

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PROJECT REFERENCE NO.	SHEET NO.
W-5705AC	Sig. 5

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.

```
PAGE: 2 C1 PIN:47  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................9
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)..................Y
VEHICLE DETECTOR (1-64)............22
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 SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)..............._
HOLD PHASES (1-16)................._
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).._
```

ENTER A 'Y' FOR NOT ENABLED

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 5A - PHASE 2)

```
PAGE: 2 C1 PIN:47  NOT ENABLED
INPUT ASSIGNMENT #.................9
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)..................Y
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 SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)..............._
HOLD PHASES (1-16)................._
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 '+' TO ADVANCE TO INPUT 17

```
PAGE: 2 C1 PIN:55  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................17
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)............5
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 SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)..............._
HOLD PHASES (1-16)................._
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).._
```

ENTER '55' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 5A - PHASE 5)

```
PAGE: 2 C1 PIN:55  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................17
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)............55
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 SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)..............._
HOLD PHASES (1-16)................._
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).._
```

PROGRAMMING COMPLETE

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.

```
VEHICLE DETECTOR #55  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR.....................N
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '5' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #55  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................Y
EXTENSION DETECTOR..................Y
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦    X
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1731
DESIGNED: March 2019
SEALED: 4/1/2019
REVISED: N/A

Electrical Detail - Sheet 4 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

NC 55 (N. Broad Street)
at
SR 1399 (James Slaughter Road)

Division 5 | Wake County | Fuquay-Varina

PLAN DATE: March 2019	REVIEWED BY: CES
PREPARED BY: B. Christian	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by:
D. Todd Joyce
A90CADFDBD4241D...

4/3/2019
DATE

SIG. INVENTORY NO. 05-1731

02-APR-2019 09:02
bbchristian

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 DEFAULT PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1731
DESIGNED: March 2019
SEALED: 4/1/2019
REVISED: N/A

Electrical Detail - Sheet 5 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

NC 55 (N. Broad Street)
at
SR 1399 (James Slaughter Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: March 2019	REVIEWED BY: CES
PREPARED BY: B. Christian	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by:
D. Todd Joyce
A90CADFDBD4241D...

4/3/2019
DATE

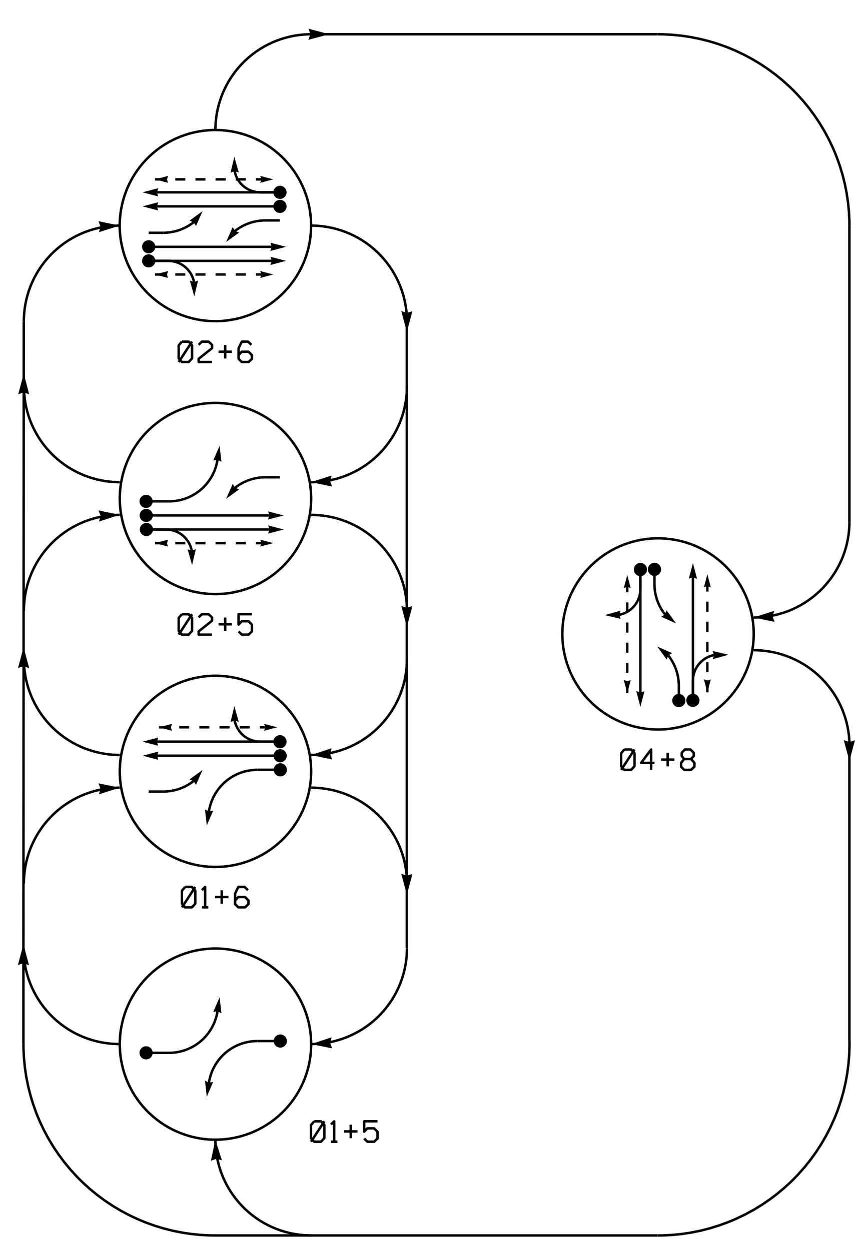
SIG. INVENTORY NO. 05-1731

02-APR-2019 09:03
.*051731_sm_ele_xxx.dgn
bbchristian

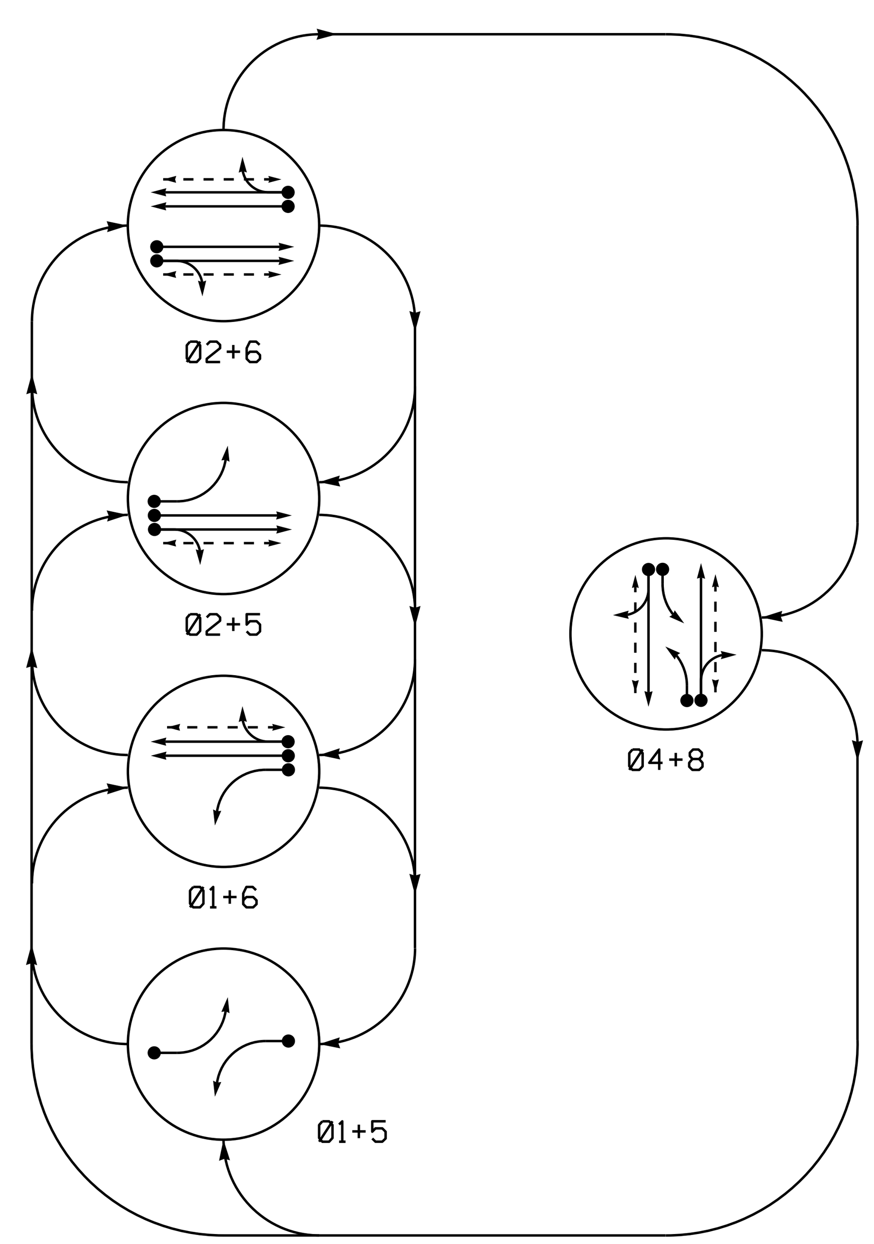

W-5705AD - SR 1827 (Lynn Rd) at Hilburn Dr:
- 8 yellow dots = remove and replace
- Black Boxes = existing curb ramps that are outside of the scope of work for this project
Hilburn Dr
Lynn Rd
Lynn Rd
Lynn Rd
Lynn Rd
Lynn Rd
05-2451
Lynn Rd
Lynn Rd
Lynn Rd
Lynn Rd
Lynn Rd
Lynn Rd
Hilburn Dr

PROJECT REFERENCE NO.	SHEET NO.
W-5705AD	Sig. 1

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←FY	←FY	←R	←Y
21, 22	R	R	G	G	R	Y
41	←R	←R	←R	←R	←FY	←R
42, 43	R	R	R	R	G	R
51	←	←FY	←	←FY	←R	←Y
61, 62	R	G	R	G	R	Y
81	←R	←R	←R	←R	←FY	←R
82, 83	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

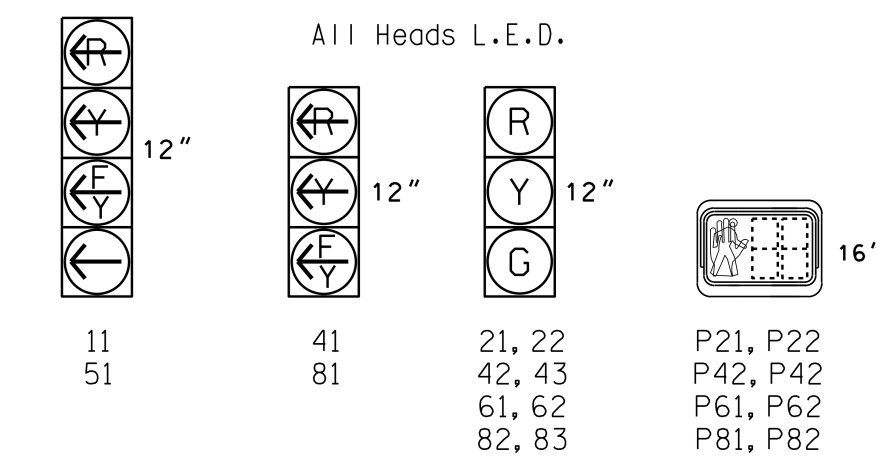
ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←R	←R	←R	←Y
21, 22	R	R	G	G	R	Y
41	←R	←R	←R	←R	←FY	←R
42, 43	R	R	R	R	G	R
51	←	←R	←	←R	←R	←Y
61, 62	R	G	R	G	R	Y
81	←R	←R	←R	←R	←FY	←R
82, 83	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

5 Phase
Fully Actuated
(Raleigh Signal System)

SIGNAL FACE I.D.

All Heads L.E.D.

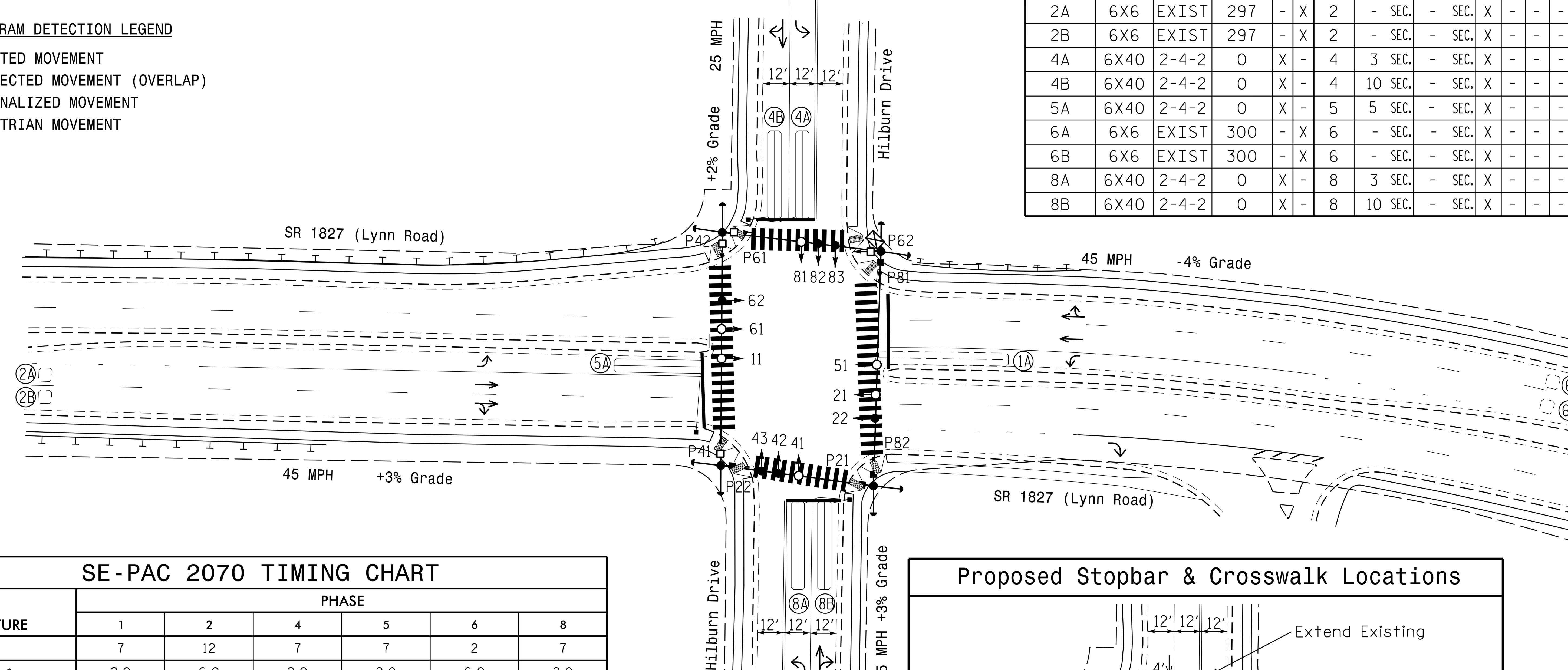


NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Renumber existing signal heads 41 and 42 as 42 and 43 and 81 and 82 as 82 and 83.
5. Reposition existing signal heads numbered 22, 42, 42, 61, 82, and 83.
6. Run lead-in cable to separate loops 2A, 2B, 6A, and 6B to operate on separate detectors.
7. Set all detector units to presence mode.
8. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
9. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
10. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
12. Remove existing "Left Yield on Green" ball signs (R10-12).
13. Pavement markings are existing unless otherwise shown.
14. The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
15. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS: LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	DETECTOR PROGRAMMING: ASSIGNED PHASE	TIMING: DELAY	EXTEND (STRETCH)	OPERATION MODE 0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROT/PER LEFT	6 PROT/PER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	STATUS: NEW	EXISTING
1A	6X60	2-4-2	+5	-	X	1	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2A	6X6	EXIST	297	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2B	6X6	EXIST	297	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	X	-	4	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4B	6X40	2-4-2	0	X	-	4	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	X	-	5	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	EXIST	300	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	EXIST	300	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8B	6X40	2-4-2	0	X	-	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

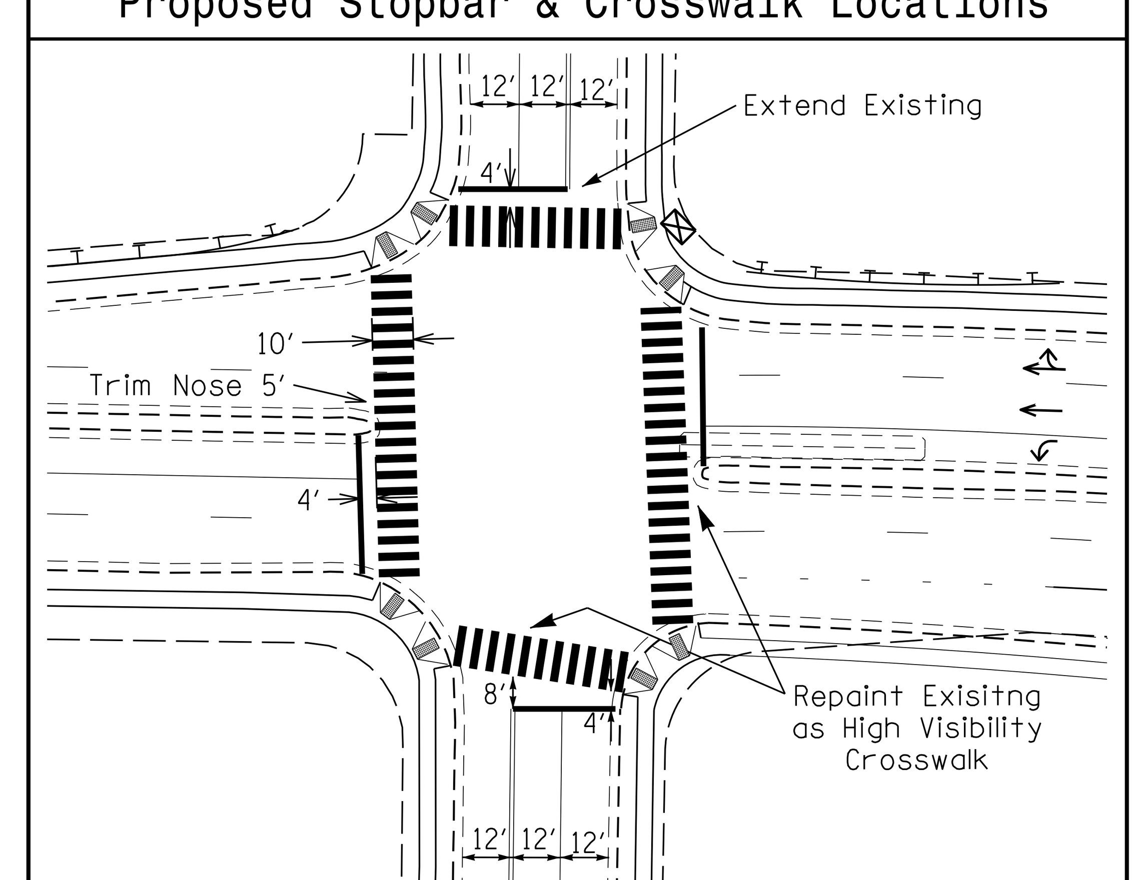


SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	2	7
Passage Gap *	2.0	6.0	2.0	2.0	6.0	2.0
Maximum Green *	15	60	30	15	60	30
Yellow Change	3.0	4.9	3.7	3.0	4.9	3.7
Red Clear	2.4	1.5	3.0	2.8	1.5	3.0
Walk *	-	7	7	-	7	7
Pedestrian Clear	-	10	21	-	9	21
Added Initial *	-	1.8	-	-	1.8	-
Maximum Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	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.

Proposed Stopbar & Crosswalk Locations



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
N/A	Guardrail	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signal Upgrade

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

SR 1827 (Lynn Road) at Hilburn Drive

Division 5 | Wake County | Raleigh

PLAN DATE:	March 2019	REVIEWED BY:
PREPARED BY:	I.O. Umozurike	REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40
1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

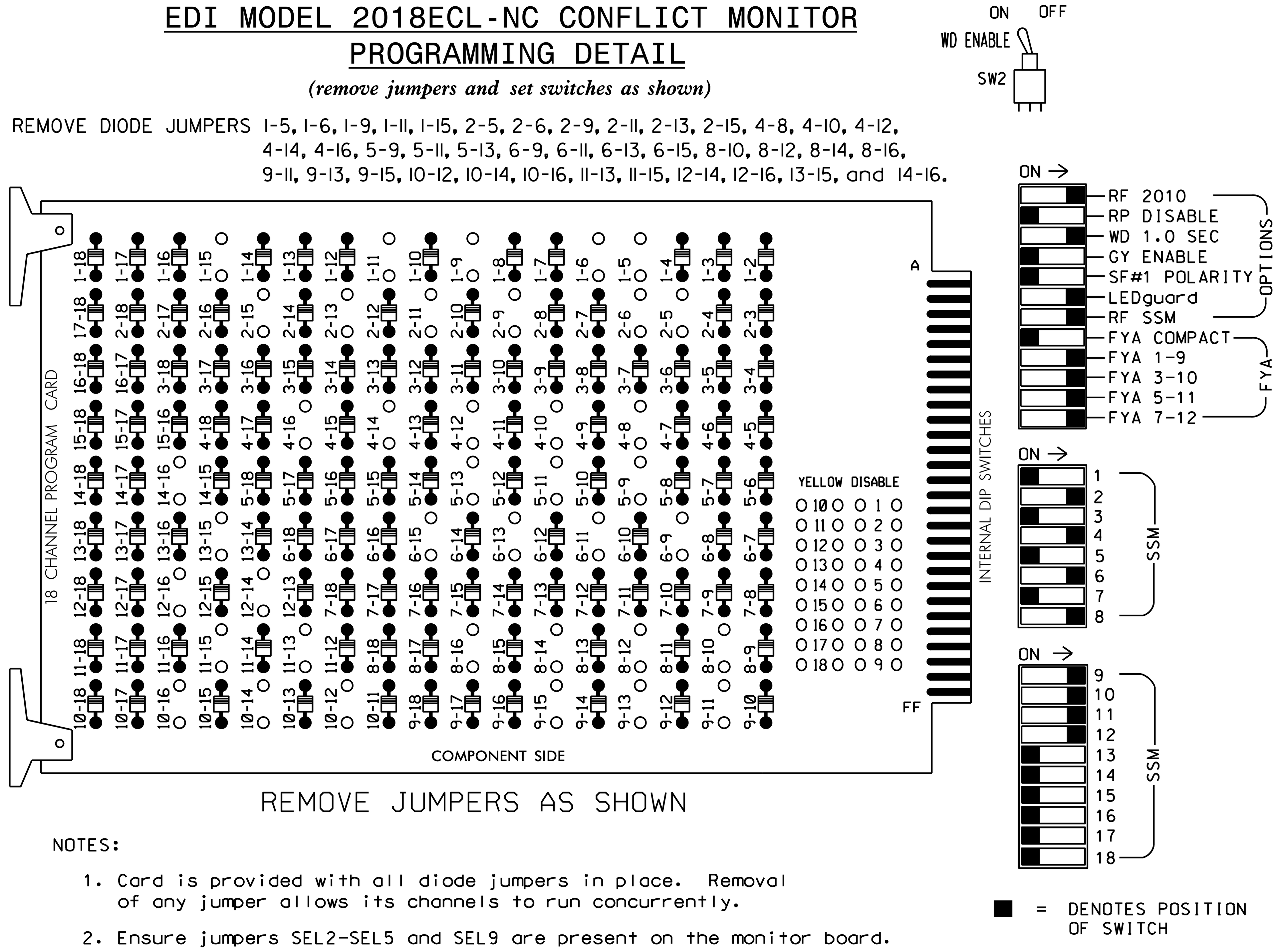
DocuSigned by:
SIGNATURE 4/3/2019 DATE

SIG. INVENTORY NO. 05-2451

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-10, 4-12, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-10, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 10-12, 10-14, 10-16, 11-13, 11-15, 12-14, 12-16, 13-15, and 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

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

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. Program controller to start up in phases 2 and 6 green.
3. Enable simultaneous gap-out feature, on controller unit, for all phases.
4. Program phases 4 and 8, on controller unit, for dual entry.
5. Program phases 2 and 6, on controller unit, for volume density operation.
6. The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............2070
CABINET.................332 W/ AUX
SOFTWARE................SE-PAC2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX FILE
LOAD SWITCHES USED......S1,S2,S3,S5,S6,S7,S8,S9,S11,S12, AUX S1,AUX S2,AUX S4,AUX S5
PHASES USED.............1,2,2 PED,4,4 PED,5,6,6 PED,8,8 PED
OVERLAP A...............*
OVERLAP B...............*
OVERLAP C...............*
OVERLAP D...............*
* SEE SHEET 2 FOR OVERLAP PROGRAMMING

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.	11★	21,22	P21, P22	NU	42,43	P41, P42	51★	61,62	P61, P62	NU	82,83	P81, P82	11★	81★	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													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127						133											
			113			104			119			110						
			115			106			121			112						

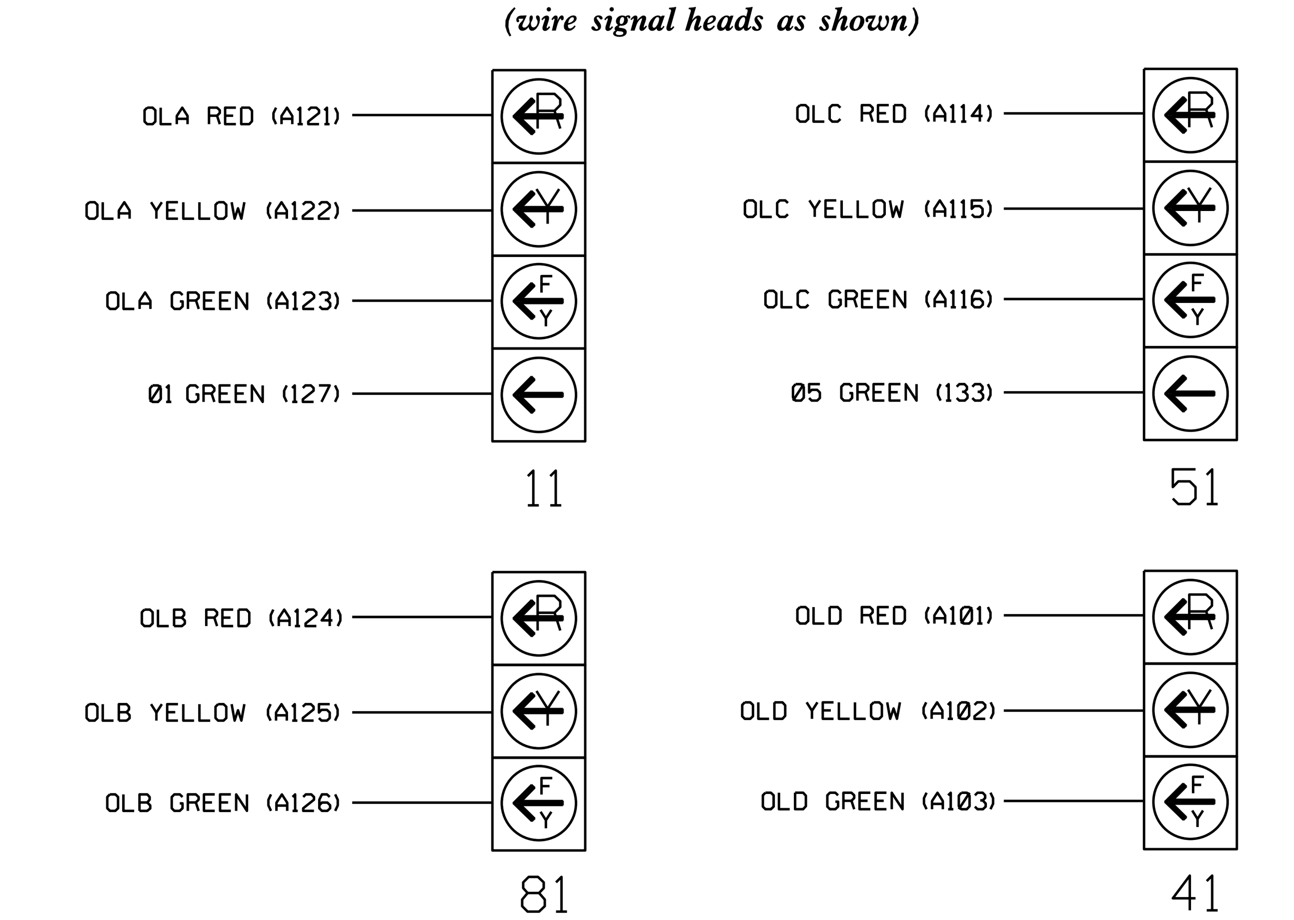
NU = Not Used

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

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE: See sheet 2 for Protected & Permitted Phases programming.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø2 2B				Ø4 4B						Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B				Ø8 8B								

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.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1	5	
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
4A	TB4-9,10	I6U	41	11	4	3	
4B	TB4-11,12	I6L	45	12	4	10	
5A	TB3-1,2	J1U	55	19	5	5	
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
8A	TB5-9,10	J6U	42	31	8	3	
8B	TB5-11,12	J6L	46	32	8	10	
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED		

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L

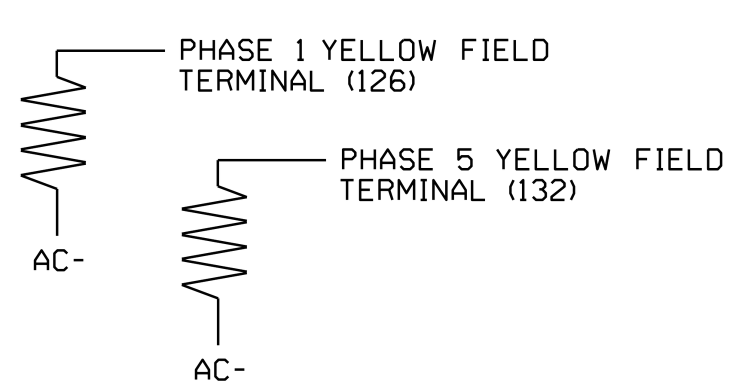
FILE J
SLOT 2
LOWER

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)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2451
DESIGNED: March 2019
SEALED: 04-03-2019
REVISED: N/A

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:

Transportation Mobility and Safety Division
ITS & Signals Management Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1827 (Lynn Road)
at
Hilburn Drive

Division 5 | Wake County | Raleigh

PLAN DATE: March 2019	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough
430320FAA2654C3...
4/4/2019
DATE

SIG. INVENTORY NO. 05-2451

$FILE$ $USER$ $TIME$ $DATE$

FLASHING YELLOW ARROW PROTECTED/PERMISSIVE SEQUENCE FOR OVERLAPS A, B, C, & D

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC     6-ALT SEQUENCES
 2-REMOTE FLASH       7-PORT 1 DATA
[3-OVERLAP STANDARD]  8-I/O MISC
 4-OVERLAP SPECIAL    9-SIG DRV OUT
 5-RING STRUCTURE
                              F-PRIOR MENU
```

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - A              (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 000100000 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

PRESS "B" once

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - B              (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 000010000 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

PRESS "B" once

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - C              (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 000001000 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

PRESS "B" once

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - D              (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 000000100 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

OVERLAP PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO UNIT DATA

PROTECTED AND PERMISSIVE PHASES FOR FLASHING YELLOW ARROW

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA        PRESS # DESIRED

 1-STARTUP & MISC     6-ALT SEQUENCES
 2-REMOTE FLASH       7-PORT 1 DATA
 3-OVERLAP STANDARD   8-I/O MISC
[4-OVERLAP SPECIAL]   9-SIG DRV OUT
 5-RING STRUCTURE
                            F-PRIOR MENU
```

```
SE-PAC OVLP.A...B...C...D...E...F...G...H.
   TR GRN   0   0   0   0   0   0   0   0
   YEL/10  40  40  40  40  40  40  40  40
   RED/10  20  20  20  20  20  20  20  20
   -G/Y     1   3   5   7   0   0   0   0
   +GRN     2   4   6   8   0   0   0   0
 (-) #-PH G/Y KILLS OVLP= (+) #-PH G STRT
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

PROTECTED PHASES → (-G/Y)
PERMISSIVE PHASES → (+GRN)

NOTE: THIS PROGRAMMING IS REQUIRED FOR SIGNAL HEADS 11, 41, 51, AND 81 SO THAT THE SOLID GREEN ARROWS TURN ON EXCLUSIVELY DURING PROTECTED PROTECTED GREEN PHASES 1 AND 5, AND THE FLASHING YELLOW ARROWS TURN ON EXCLUSIVELY DURING PERMITTED GREEN PHASES 2, 4, 6, & 8.

PPLT DEFINITION PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO UNIT DATA

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

```
SE-PAC PHASE DATA        PRESS # DESIRED

 1-VEHICLE TIMES       6-N.LOCK & MISC
 2-DENSITY TIMES       7-SPEC. SEQUENCE
 3-PEDEST. TIMES       8-SPEC. DETECTOR
[4-INIT & N.A. RESP]   9-PHASE COPY
 5-V & P RECALLS       0-MISC PED OPTIONS
                             F-PRIOR MENU
```

Phases 3 & 7 NOT used! →

```
PHASE......1...2...3...4...5...6...7...8...9
 INITIAL   1   4   0   1   1   4   0   1   0
 NA RESP   0   1   0   2   0   1   0   2   0

CODES.......0....1....2....3....4....5
 INITIAL   NONE INACT RED  YEL  GRN  DRK
 NA RESP   NONE NA1   NA2 BOTH  ---  ---
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

INIT & N.A. RESP programming complete.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2451
DESIGNED: March 2019
SEALED: 04-03-19
REVISED: N/A

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:

Transportation Mobility and Safety Division — State of North Carolina Department of Transportation — ITS & Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1827 (Lynn Road)
at
Hilburn Drive

Division 5 | Wake County | Raleigh

PLAN DATE: March 2019	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough
430320FAA2654C3

4/4/2019
DATE

SIG. INVENTORY NO. 05-2451

$FILE$ $USER$ $TIME$ $DATE$

TOD EVENT SCHEDULING PROGRAMMING DETAIL
TO CALL ALTERNATE PHASING OPERATION DURING COORDINATION

(program controller as shown below)

* DENOTES TO BE DETERMINED BY THE DIVISION TRAFFIC ENGINEER.

NOTES

1. Phase Functions can be called by Time of Day (TOD) in Traffic Events, but not during coordination.
2. Special Functions can be called by Time of Day using Aux Events, and can run in conjunction with Coordination.
3. Special Functions can be used to call a Phase Function. In doing this a Phase function can run while a Coordination pattern is running.
4. If Alternate Phasing is used during FREE-RUN, Phase Function 1 must be turned on with a Traffic Event.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 1 - Assign OMIT OVERLAPS "A" & "C" to Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT         6-EQUATE/TRANSFER
 2-SET TIME/DATE        7-CLEAR MEMORY
 3-TRAFFIC EVENTS       8-DIMMING
 4-AUX EVENTS           9-PHS FUNC MAPPING
 5-TOY EVENTS           0-SPC FUNC MAPPING
                                F-PRIOR MENU
```

```
EPAC  TIME BASE PHS FUNC MAPPING
                PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
   1  PHS-01 MAX # 2    000000000 0000000
   2  PHS-02 MAX # 2    010000000 0000000
   3  PHS-03 MAX # 2    001000000 0000000
   4  PHS-04 MAX # 2    000100000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

← REMOVE PHASE FUNCTION NUM 1 DEFAULT VALUE

HIT "A" KEY UNTIL POSITIONED ON NUM 145

```
EPAC  TIME BASE PHS FUNC MAPPING
                PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
 145  OVERLAP A OMIT    100000000 0000000
 146  OVERLAP B OMIT    000000000 0000000
 147  OVERLAP C OMIT    100000000 0000000
 148  OVERLAP D OMIT    000000000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

SET SWITCH 1 ON FOR OVERLAPS

← OVERLAP A OMIT

← OVERLAP C OMIT

PHASE FUNCTION PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO TIME BASE DATA

SPECIAL FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 2 - Assign Special Function 1 to call Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT         6-EQUATE/TRANSFER
 2-SET TIME/DATE        7-CLEAR MEMORY
 3-TRAFFIC EVENTS       8-DIMMING
 4-AUX EVENTS           9-PHS FUNC MAPPING
 5-TOY EVENTS           0-SPC FUNC MAPPING
                                F-PRIOR MENU
```

```
EPAC TIME BASE SPC FUNC MAPPING
                                SPC FUNC
 S-FUNCTION NAME .........      12345678
   SPC 1-8 AS PHS FUNC 1- 8     10000000
   SPC 1-8 AS PHS FUNC 9-16     00000000
   SPEC FUNCTION 1              10000000
 CODES.......0-OFF....1-ON...........
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

← PHASE FUNCTION 1 WILL BE CALLED WHEN SPECIAL FUNCTION 1 IS SELECTED

SPECIAL FUNCTION PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO TIME BASE DATA

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2451
DESIGNED: March 2019
SEALED: 04-03-2019
REVISED: N/A

AUX EVENT PROGRAMMING TO CALL SPECIAL FUNCTION DURING COORDINATION

(program controller as shown below)

Step 3 - An Auxiliary event will be used to call the Special Function. This is done in Time Base Data under Aux Event. Add Auxiliary events as needed remembering to use one event to turn the Special Function on and one event to turn the Special Function off. If these are to be used in conjunction with the Traffic Events during Coordination then the On/Off times should be identical.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT         6-EQUATE/TRANSFER
 2-SET TIME/DATE        7-CLEAR MEMORY
 3-TRAFFIC EVENTS       8-DIMMING
 4-AUX EVENTS           9-PHS FUNC MAPPING
 5-TOY EVENTS           0-SPC FUNC MAPPING
                                F-PRIOR MENU
```

```
EPAC TIME BASE - AUXILIARY EVENTS
  DD  HH  MM  A123  D123  DIM  S12345678
  *   *   *   000   000   0    10000000
  *   *   *   000   000   0    00000000
  *   *   *   000   000   0    00000000
CODES........0-OFF....1-ON.............
OVERWRITE ">" W/ 1-ADD  2-DELETE  3-EDIT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Special Function (SF)

← SF 1 "ON"

← SF 1 "OFF"

AUX EVENT PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO TIME BASE DATA

! AUX EVENT MUST BE SCHEDULED TO RUN CONCURRENT WITH A TRAFFIC EVENT SCHEDULED COORDINATION PATTERN.

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:

Transportation Mobility and Safety Division
ITS & Signals Management Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1827 (Lynn Road)
at
Hilburn Drive

Division 5 | Wake County | Raleigh

PLAN DATE: March 2019	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036833 RYAN W. HOUGH

DocuSigned by: Ryan W. Hough
430320FAA2654C3...
4/4/2019
DATE

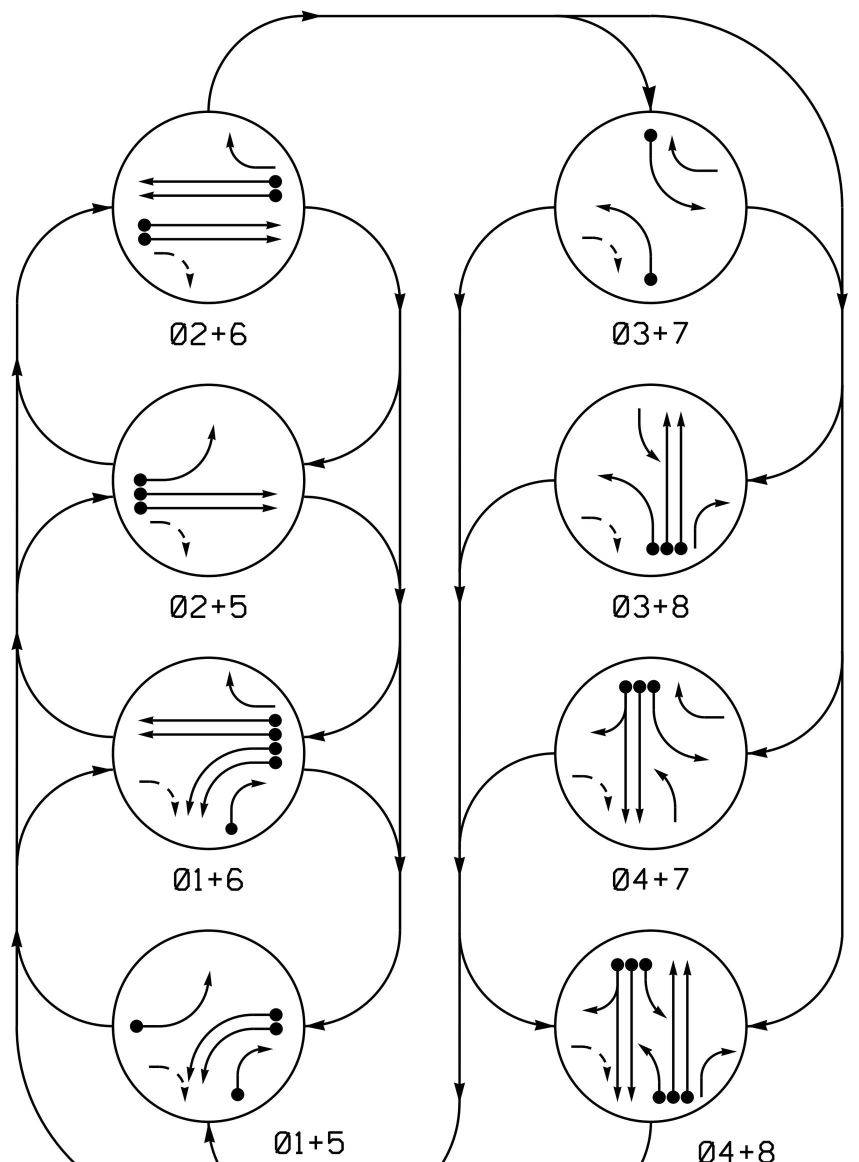
SIG. INVENTORY NO. 05-2451

$FILE$ $USER$ $TIME$ $DATE$


Ruin Creek Rd
SR-1295
Ruin Creek Rd
US 158 Bypass
US 158 Bypass
US 158 Bypass
US 158 Bypass
05-1471
5
Ruin Creek Rd
SR-1295
Ruin Creek Rd
Ruin Creek Rd
W-5705AF - US 158 Bypass at SR 1295 (Ruin Creek Rd):
No concrete curb ramps are included in the scope of work for this project/ intersection

PROJECT REFERENCE NO.	SHEET NO.
W-5705AF	Sig. 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

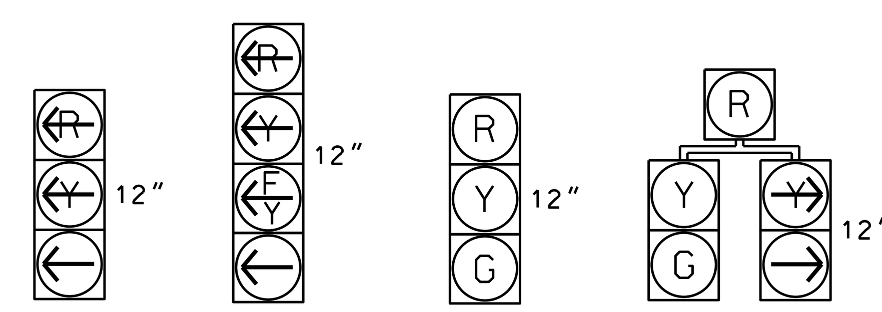
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11, 12	←	←	←R	←R	←R	←R	←R	←R	←R
21, 22	R	R	G	G	R	R	R	R	Y
31	←R	←R	←R	←R	←	←	←F/Y	←F/Y	←R
41, 42, 43	R	R	R	R	R	R	G	G	R
51	←	←R	←	←R	←R	←R	←R	←R	←R
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/→	R	R/→	R	Y
71	←R	←R	←R	←R	←	←F/Y	←	←F/Y	←R
81	R	R	R	R	R	G	R	G	R
82	R/→	R/→	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



11, 12
51

31
71

21, 22
41, 42, 43
61
81

62
82

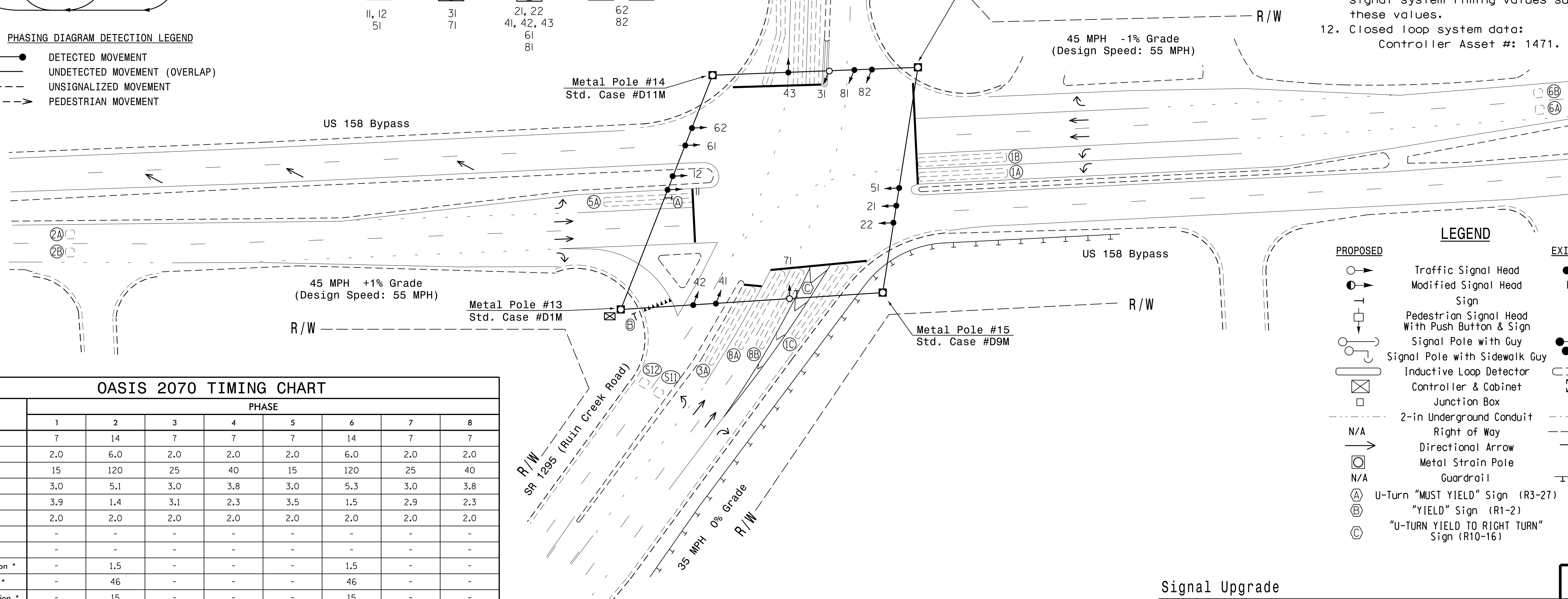
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
1C	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6X6	420	EXISTING	-	2	Y	Y	-	-	-	-	Y
2B	6X6	420	EXISTING	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	15	-	Y
					8	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	-	-	Y
6A	6X6	420	EXISTING	-	6	Y	Y	-	-	-	-	Y
6B	6X6	420	EXISTING	-	6	Y	Y	-	-	-	-	Y
7A	6X60	0	2-4-2	-	7	Y	Y	-	-	15	-	Y
					4	Y	Y	-	-	3	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
S11	6X6	+225	EXISTING	-	-	-	-	-	-	-	Y	Y
S12	6X6	+225	EXISTING	-	-	-	-	-	-	-	Y	Y

8 Phase
Fully Actuated
(Western Outer Loop - System 1)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads numbered 41, 42, 81, and 82.
6. Renumber existing loop number 8C as 1C.
7. Set all detector units to presence mode.
8. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
9. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
10. Pavement markings are existing unless otherwise shown.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. Closed loop system data:
    Controller Asset #: 1471.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
N/A	Guardrail	
A	U-Turn "MUST YIELD" Sign (R3-27)	A
B	"YIELD" Sign (R1-2)	B
C	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	C

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	14	7	7	7	14	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	15	120	25	40	15	120	25	40
Yellow Clearance	3.0	5.1	3.0	3.8	3.0	5.3	3.0	3.8
Red Clearance	3.9	1.4	3.1	2.3	3.5	1.5	2.9	2.3
Red Revert	2.0	2.0	2.0	2.0	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	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner.NC 27529

US 158 Bypass at SR 1295 (Ruin Creek Road)

Division 5 Vance County Henderson

PLAN DATE:	April 2019	REVIEWED BY:
PREPARED BY:	C.E. Carter	REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by:
SIGNATURE 5/13/2019 DATE

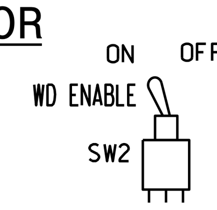
SIG. INVENTORY NO. 05-1471

17-MAY-2019 11:56
S:*ITS&SU*ITS Signals*Signal Design Section*Central Region*Div 5*W-5705AF*05-1471_sig_dsn_20190513.dgn
rziemba

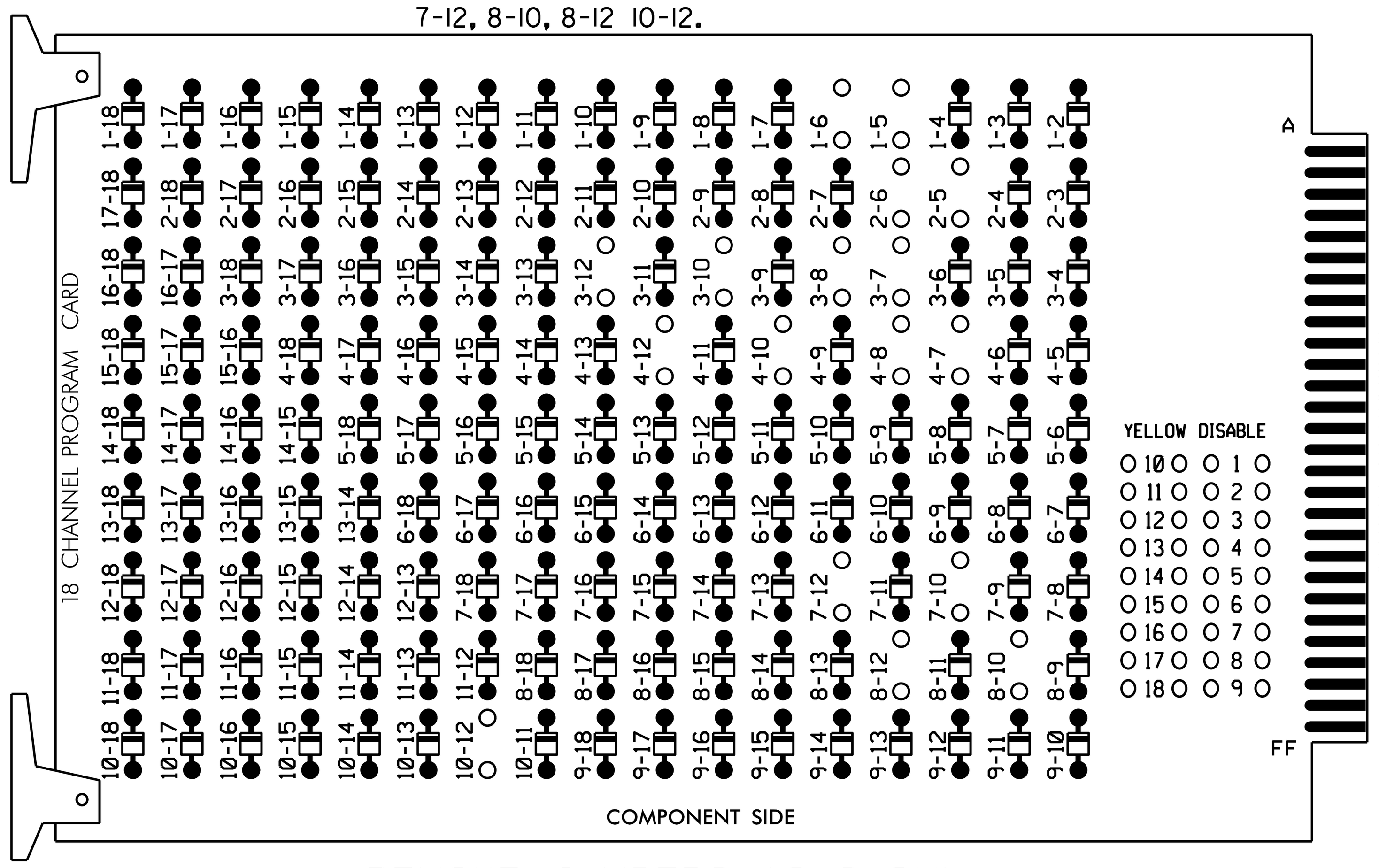
PROJECT REFERENCE NO.	SHEET NO.
W-5705AF	Sig. 2

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

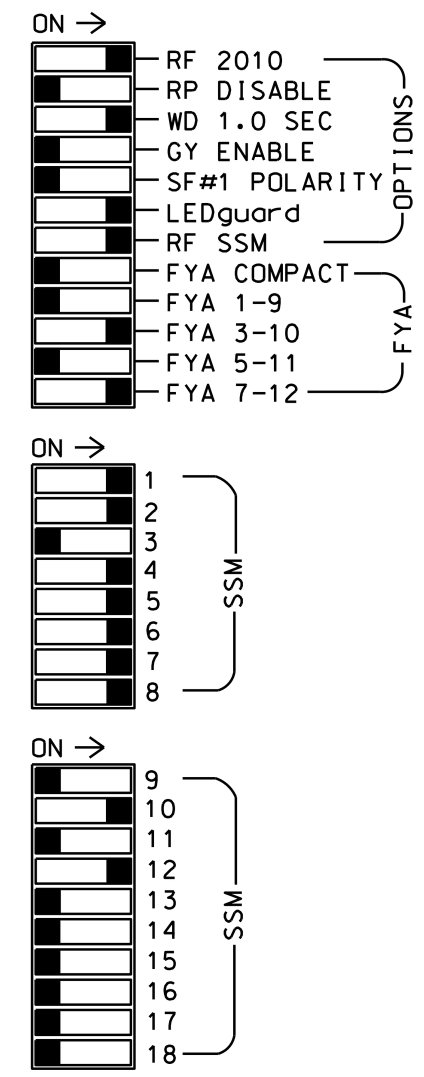
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 7-10, 7-12, 8-10, 8-12 10-12.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

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

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. Program phases 4 and 8 for Dual Entry.
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 Startup In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 2 as Wag Overlaps.
7. The cabinet and controller are part of the (Western Outer Loop - System 1).

EQUIPMENT INFORMATION

CONTROLLER.............2070
CABINET................332 W/ AUX
SOFTWARE...............ECONOLITE OASIS
CABINET MOUNT..........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S4,S5,S7,S8,S10,S11, AUX S2,AUX S5
PHASES USED............1,2,3,4,5,6,7,8
OVERLAP "A"............NOT USED
OVERLAP "B"............3+4
OVERLAP "C"............NOT USED
OVERLAP "D"............7+8

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.	11	82	21,22	NU	31★	41,42 43	NU	51	61,62	NU	62	71★	81,82	NU	NU	31★	NU	NU	71★	NU
RED			128			101			134		✳		107							
YELLOW			129		✳	102			135				108							
GREEN			130			103			136				109							
RED ARROW	125							131								A124			A101	
YELLOW ARROW	126	126						132			123					A125			A102	
FLASHING YELLOW ARROW																A126			A103	
GREEN ARROW	127	127			118			133			124	124								

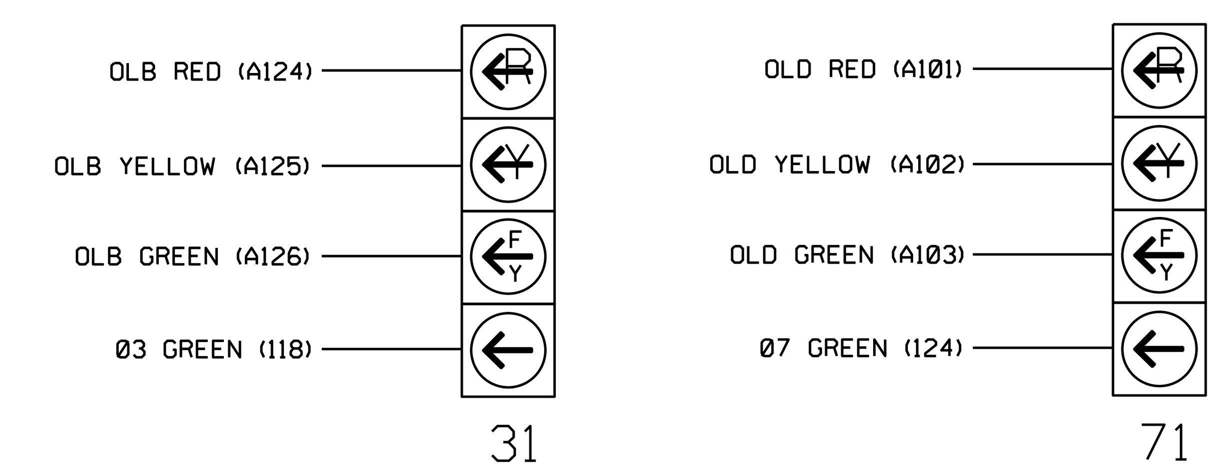
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 31 and 71 requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 1 1B	Ø 2 2A	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	WIRED INPUT ⊗	SYS. DET. S11	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 1 1C	Ø 2 2B		NOT USED	Ø 4 4B			SYS. DET. S12					ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	Ø 7 7A	Ø 8 8A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø 6 6B			NOT USED	Ø 8 8B								

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	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			
1C	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
3A[1]	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			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
✳ S11	TB6-9,10	I9U	60	22	11	SYS					
✳ S12	TB6-11,12	I9L	62	24	13	SYS					
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A[2]	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11	24	4	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

[1] Add jumper from I5-W to J8-W, on rear of input file.

[2] Add jumper from J5-W to I8-W, on rear of input file.

✳ SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

INPUT FILE POSITION LEGEND: J2L

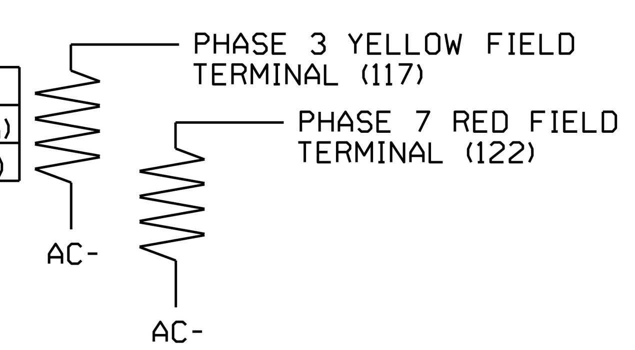
FILE J
SLOT 2
LOWER

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1471
DESIGNED: April 2019
SEALED: 05-13-19
REVISED: N/A

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division — Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 158 Bypass
at
SR 1295 (Ruin Creek Road)

Division 5 | Vance County | Henderson

PLAN DATE: May 2019 | REVIEWED BY:
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 036833
RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough | 5/14/2019
DATE

SIG. INVENTORY NO. 05-1471

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, 3, 4, 5 and 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #3  IS ON
AND RED CLEAR ON PHASE #3  IS ON
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #47 ON
SET OUTPUT  ASSIGNMENT #48 OFF
```

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #3  IS ON
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #49 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #3  IS ON
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #48 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE        #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #39 ON
SET OUTPUT  ASSIGNMENT #40 OFF
```

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE        #7  IS ON
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #41 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #7  IS ON
            SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #40 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green
OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'B' 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?...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
```

NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'D' 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?...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
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1471
DESIGNED: April 2019
SEALED: 05-13-19
REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 158 Bypass
at
SR 1295 (Ruin Creek Road)

Division 5 | Vance County | Henderson

PLAN DATE: May 2019	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough 5/14/2019
430320FAA2654C3...
DATE

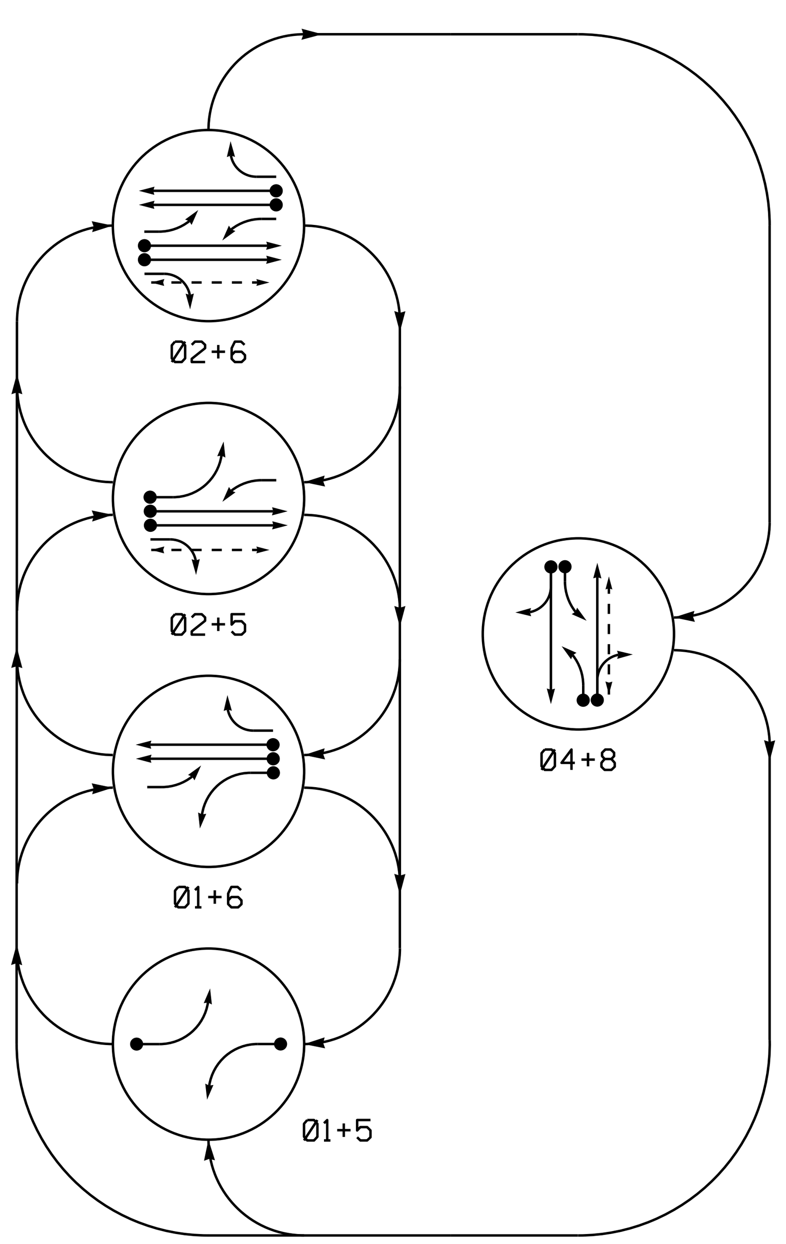
SIG. INVENTORY NO. 05-1471

14-MAY-2019 09:40
...\051471_sm_ele_xxx.dgn
jpeterson

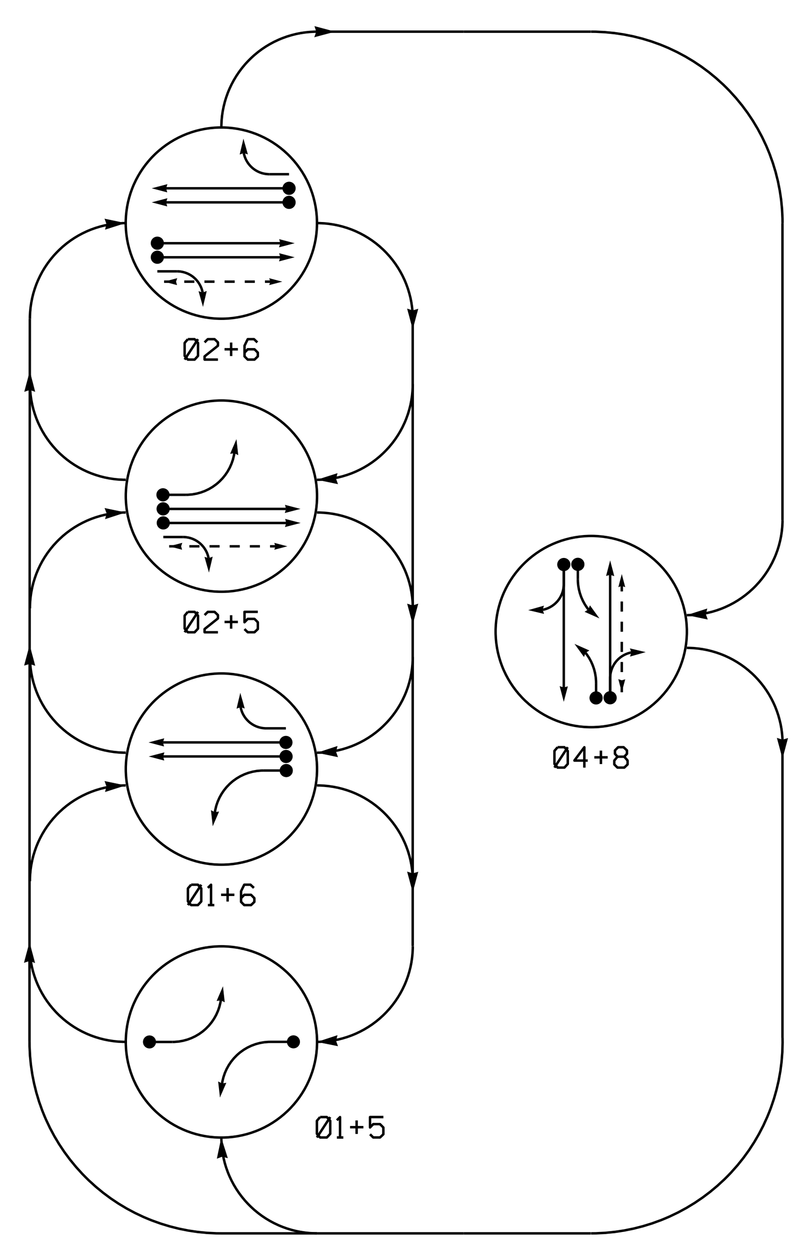

W-5705AH - S Wilmington St at Illeagnes Rd / Rush St:
- 2 yellow dots with blue circles = remove ramp
- 2 yellow dots with green circles - remove and replace curb ramp
- 3 plain yellow dots = retrofit existing curb ramp
Illeagnes Rd
Ileagnes Rd
S Wilmington St
05-0662
S Wilmington St
5
Rush St
Rush St

PROJECT REFERENCE NO.	SHEET NO.
W-5705AH	Sig. 1

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←F/Y	←F/Y	←R	←Y
21, 22	R	R	G	G	R	Y
41	←R	←R	←R	←R	←F/Y	←R
42, 43	R	R	R	R	G	R
51	←	←F/Y	←	←F/Y	←R	←Y
61, 62	R	G	R	G	R	Y
81	←R	←R	←R	←R	←F/Y	←R
82, 83	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

W - Walk
DW - Don't Walk
DRK - Dark

ALTERNATE PHASING TABLE OF OPERATION

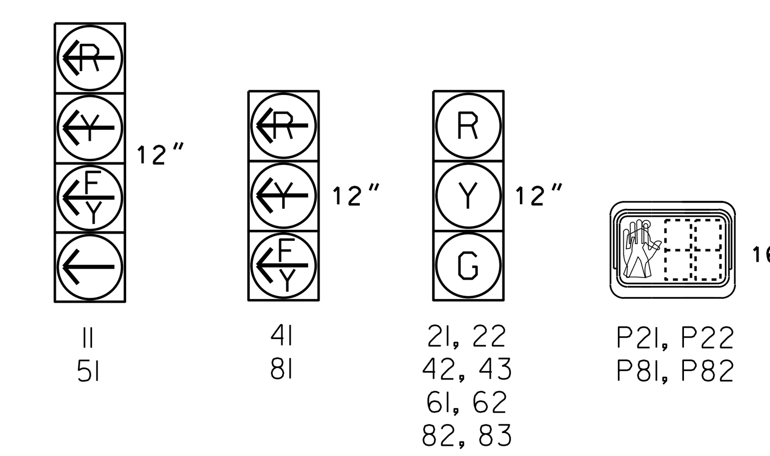
SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	←R	←R	←R	←Y
21, 22	R	R	G	G	R	Y
41	←R	←R	←R	←R	←F/Y	←R
42, 43	R	R	R	R	G	R
51	←	←R	←	←R	←R	←Y
61, 62	R	G	R	G	R	Y
81	←R	←R	←R	←R	←F/Y	←R
82, 83	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS: LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	DETECTOR PROGRAMMING: ASSIGNED PHASE	TIMING: DELAY	EXTEND (STRETCH)	OPERATION MODE 0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROT/PER LEFT	6 PROT/PER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	STATUS: NEW	EXISTING
1A	6X60	2-4-2	0	-	X	1	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2A	6X6	EXISTING	300	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2B	6X6	EXISTING	300	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2C	6X6	EXISTING	90	-	X	-	- SEC.	- SEC.	DISCONNECT & ABANDON										-	-
2D	6X6	EXISTING	90	-	X	-	- SEC.	- SEC.	DISCONNECT & ABANDON										-	-
4A	6X60	2-4-2	0	-	X	4	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4B	6X60	2-4-2	0	-	X	4	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X60	2-4-2	0	-	X	5	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	EXISTING	300	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	EXISTING	300	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6C	6X6	EXISTING	90	-	X	-	- SEC.	- SEC.	DISCONNECT & ABANDON										-	-
6D	6X6	EXISTING	90	-	X	-	- SEC.	- SEC.	DISCONNECT & ABANDON										-	-
8A	6X60	2-4-2	0	-	X	8	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8B	6X60	2-4-2	0	-	X	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

SIGNAL FACE I.D.

All Heads L.E.D.



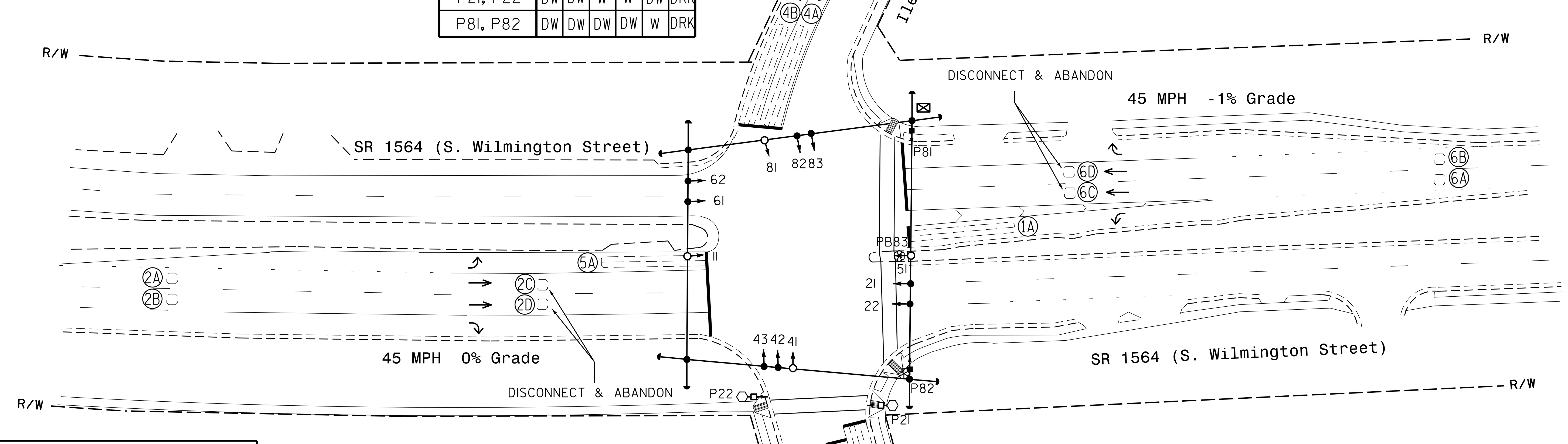
5 Phase
Fully Actuated
(Raleigh Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Renumber existing signal heads as shown.
5. Reposition existing signal heads numbered 42, 42, 82, and 83.
6 Disconnect and Abandon existing loops 2C, 2D, 6C, and 6D.
7. Run new lead-in cable to rewire existing loops 2A, 2B, 6A, an 6B to operate independently for volume density detection.
8. Set all detector units to presence mode.
9. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
10. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
11. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
12. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
13. Remove existing "Left Turn Yield on Green" ball signs (R10-12).
14. Pavement markings are existing unless otherwise shown.
15. The Division (City) Traffic Engineer will dtetermine the hours of use for each phasing plan.
16. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
	Type I Pushbutton Post	
	Type II Signal Pedestal	

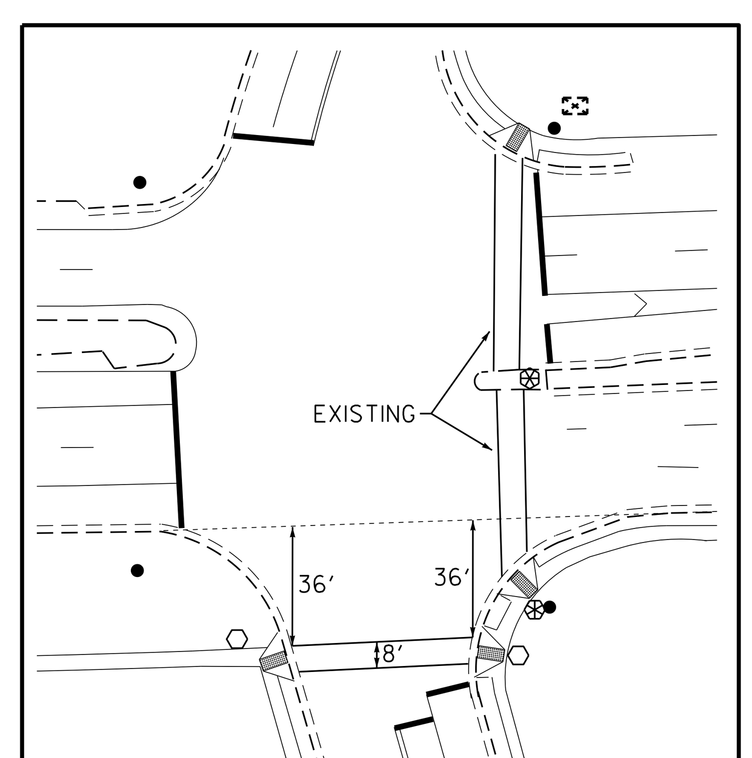


This plan supersedes the plan signed and sealed on 5/9/19.

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Passage Gap *	2.0	6.0	2.0	2.0	6.0	2.0
Maximum Green *	15	75	25	15	75	25
Yellow Change	3.0	4.6	3.7	3.0	4.6	4.4
Red Clear	3.8	2.2	3.1	2.8	2.2	2.6
Walk *	-	4	-	-	-	4
Pedestrian Clear	-	11	-	-	-	32
Added Initial *	-	1.5	-	-	1.5	-
Maximum Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	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.



Proposed Crosswalk Locations

Signal Upgrade

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

SR 1564 (S. Wilmington Street) at Ileagnes Road and Rush Street

Division 5	Wake County	Raleigh
PLAN DATE: June 2020	REVIEWED BY:	
PREPARED BY: C.E. Carter	REVIEWED BY:	

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

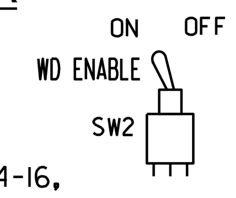
DocuSigned by: SIGNATURE 7/10/2020 DATE

SIG. INVENTORY NO. 05-0662

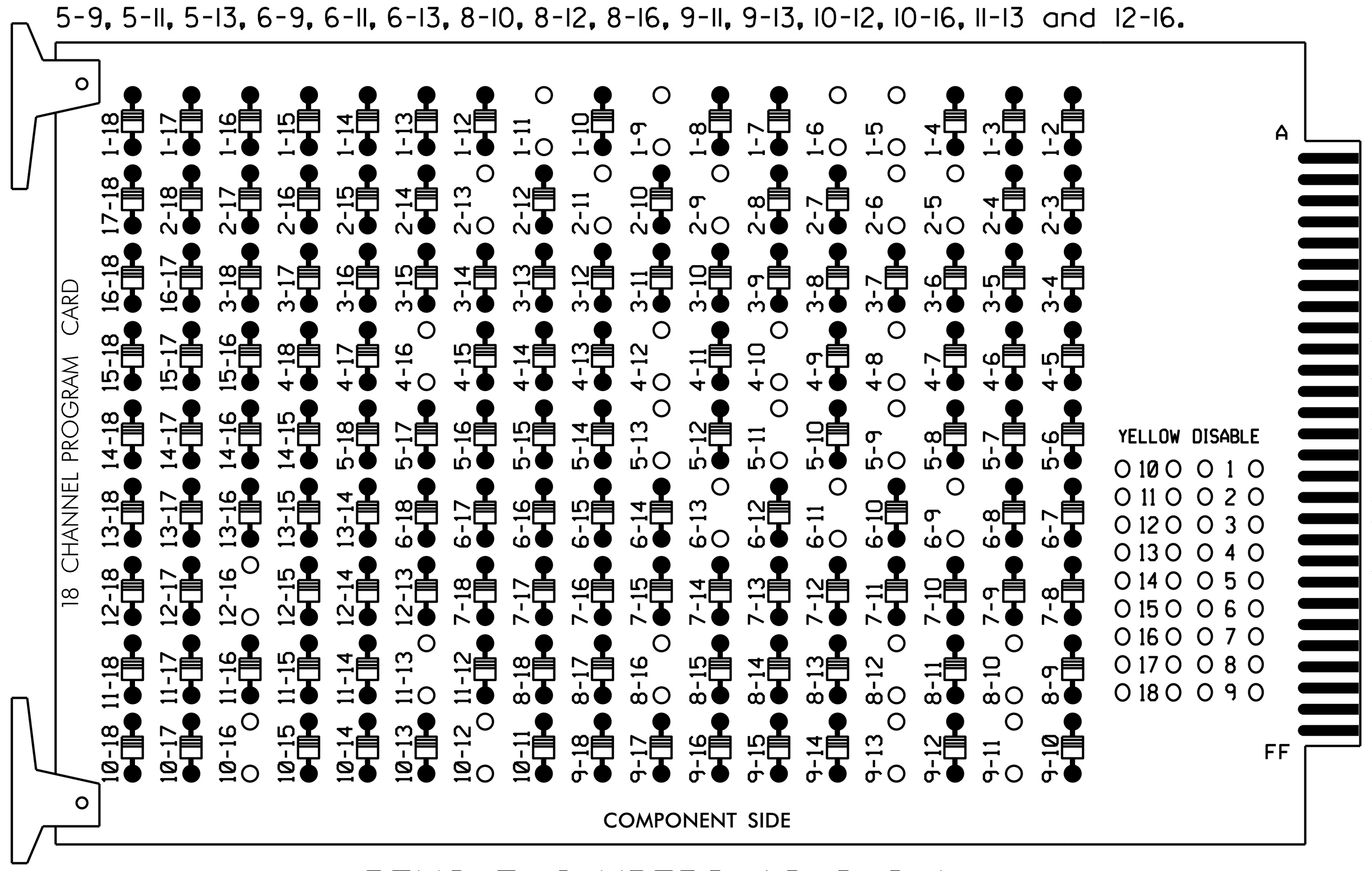
09-JUL-2020 17:58
S:\ITS&SU\ITS Signals\Signal Design Section\Central Region\Div 5\W-5705AH\050662_sig_dgn_20200710.dgn
rziemba

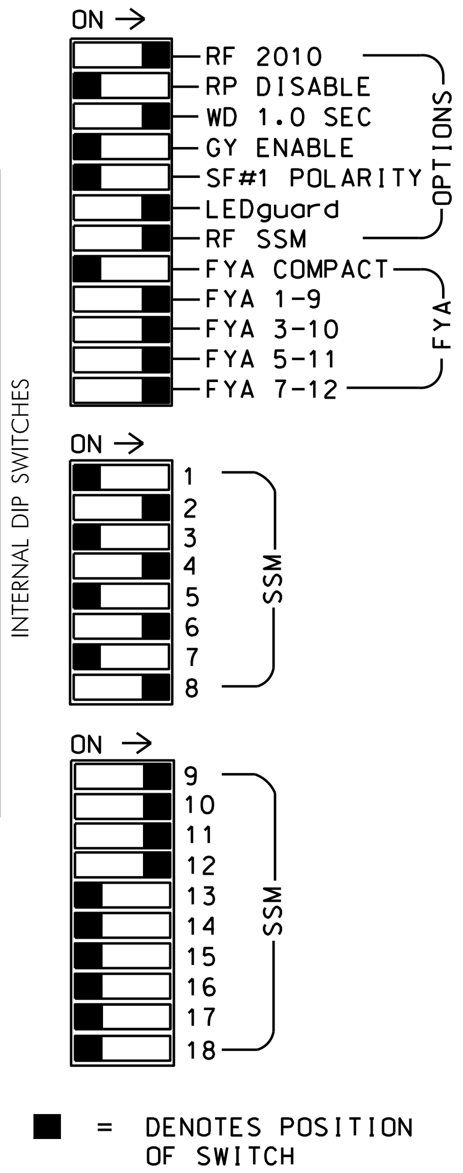
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 4-8, 4-10, 4-12, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 8-10, 8-12, 8-16, 9-11, 9-13, 10-12, 10-16, 11-13 and 12-16.





REMOVE JUMPERS AS SHOWN

NOTES:

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

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. Program controller to start up in phases 2 and 6 green.
3. Enable simultaneous gap-out feature for all phases.
4. Program phases 4 and 8 for dual entry.
5. Program phases 2 and 6 for volume density operation.
6. The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............2070
CABINET.................332 /W/ AUX
SOFTWARE................SE-PAC2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S3,S5,S7,S8,S11,S12, AUX S1,AUX S2,AUX S4,AUX S5
PHASES USED.............1,2,2 PED,4,5,6,8,8 PED
OVERLAP "A".............*
OVERLAP "B".............*
OVERLAP "C".............*
OVERLAP "D".............*

*See sheet 2 for Overlap and Protected & Permissive Phases programming.

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.	11★	21,22	P21, P22	NU	42,43	NU	51★	61,62	NU	NU	82,83	P81, P82	11★	81★	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													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127						133											
(hand symbol)			113									110						
(pedestrian symbol)			115									112						

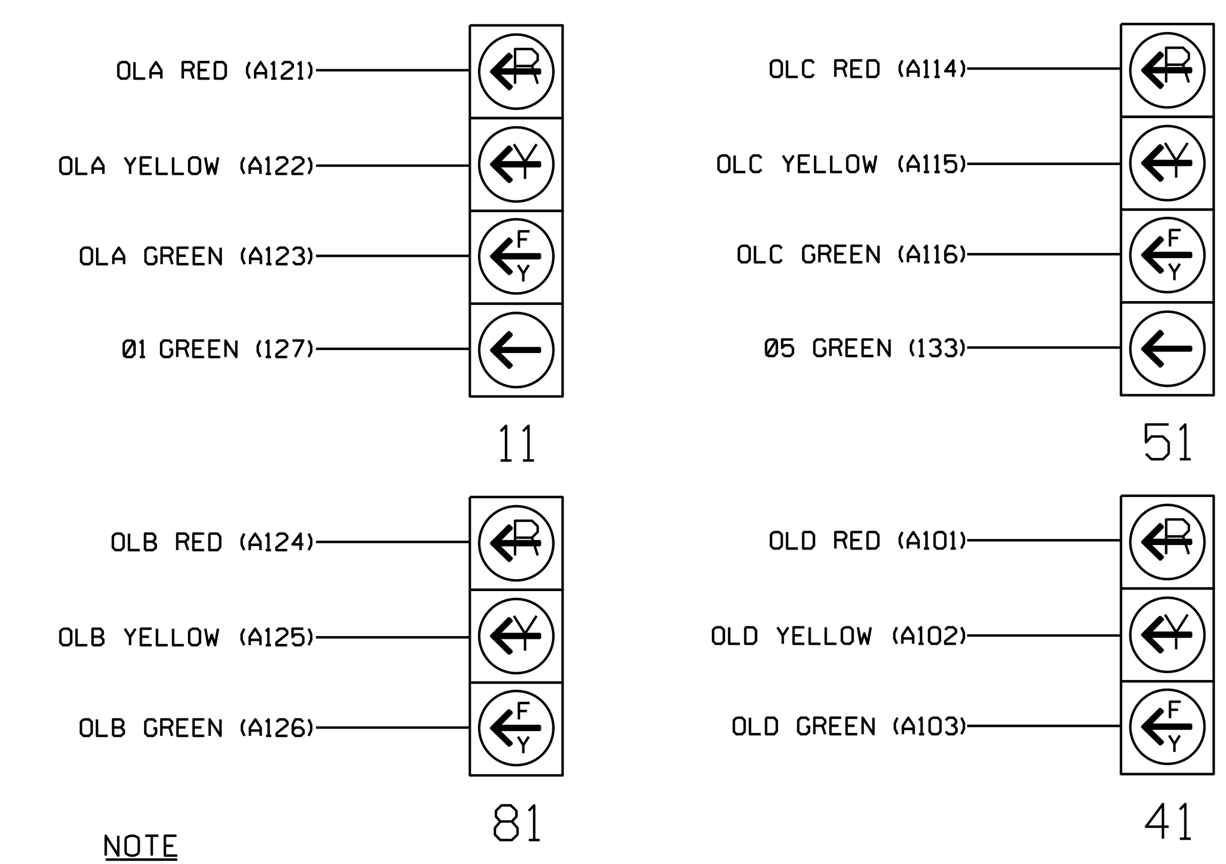
NU = Not Used

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

★ See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. For signal heads 11 and 51 see sheet 2 for Protected & Permissive Phase programming.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
"I"	L	NOT USED	Ø2 2B				Ø4 4B						NOT USED	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L	NOT USED	Ø6 6B				Ø8 8B								

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.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1	5	
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
4A	TB4-9,10	I6U	41	11	4	3	
4B	TB4-11,12	I6L	45	12	4	10	
5A	TB3-1,2	J1U	55	19	5	5	
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
8A	TB5-9,10	J6U	42	31	8	3	
8B	TB5-11,12	J6L	46	32	8	10	
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED		

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

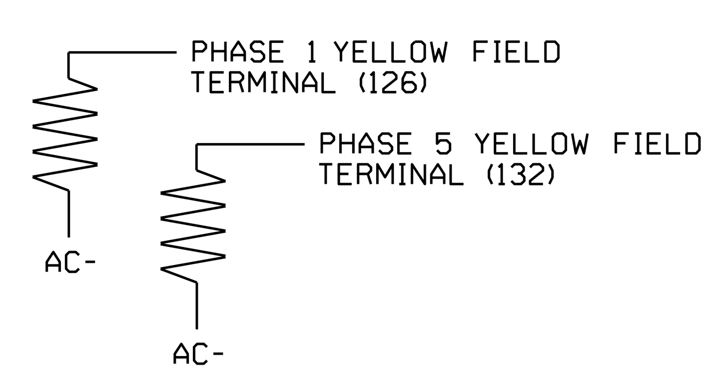
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

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)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0662
DESIGNED: June 2020
SEALED: 7-10-20
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 5-10-19.

Electrical Details - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1564 (S. Wilmington Street)
at
Ileagnes Road and Rush Street

Division 5 Wake County Raleigh

PLAN DATE: July 2020	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough
430320EAA2654C3...
SIGNATURE
7/24/2020
DATE

SIG. INVENTORY NO. 05-0662

FLASHING YELLOW ARROW PROTECTED/PERMISSIVE SEQUENCE for OVERLAPS "A" "B" "C" & "D"

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC        6-ALT SEQUENCES
 2-REMOTE FLASH          7-PORT 1 DATA
[3-OVERLAP STANDARD]     8-I/O MISC
 4-OVERLAP SPECIAL       9-SIG DRV OUT
 5-RING STRUCTURE
                              F-PRIOR MENU
```

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - A               (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 0001000000 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

PRESS "B" ONCE

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - B               (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 0000100000 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

PRESS "B" ONCE

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - C               (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 0000010000 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

PRESS "B" ONCE

DO NOT enter any OVL PHASES!

```
SE-PAC OVERLAP - D               (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 0000001000 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

OVERLAP PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO UNIT DATA

INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

```
SE-PAC PHASE DATA          PRESS # DESIRED

 1-VEHICLE TIMES          6-N.LOCK & MISC
 2-DENSITY TIMES          7-SPEC. SEQUENCE
 3-PEDEST. TIMES          8-SPEC. DETECTOR
[4-INIT & N.A. RESP]      9-PHASE COPY
 5-V & P RECALLS          0-MISC PED OPTIONS

                               F-PRIOR MENU
```

Note Phases 3 & 7 NOT used!

```
PHASE......1...2...3...4...5...6...7...8
 INITIAL   1   4   0   1   1   4   0   1
 NA RESP   0   1   0   2   0   1   0   2

CODES.......0....1....2....3....4....5
 INITIAL   NONE INACT RED  YEL  GRN  DRK
 NA RESP   NONE  NA1  NA2 BOTH  ---  ---
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

INIT & N.A. RESP programming complete.

PROTECTED & PERMISSIVE PHASES for FLASHING YELLOW ARROW

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC        6-ALT SEQUENCES
 2-REMOTE FLASH          7-PORT 1 DATA
 3-OVERLAP STANDARD      8-I/O MISC
[4-OVERLAP SPECIAL]      9-SIG DRV OUT
 5-RING STRUCTURE

                              F-PRIOR MENU
```

```
SE-PAC OVLP.A...B...C...D...E...F...G...H.
   TR GRN   0   0   0   0   0   0   0   0
   YEL/10  40  40  40  40  40  40  40  40
   RED/10  20  20  20  20  20  20  20  20
   -G/Y     1   3   5   7   0   0   0   0    <- PROTECTED PHASES
   +GRN     2   4   6   8   0   0   0   0    <- PERMISSIVE PHASES
 (-) #-PH G/Y KILLS OVLP= (+) #-PH G STRT
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

NOTE: THIS PROGRAMMING IS REQUIRED FOR SIGNAL HEADS 11 & 51 SO THAT THE SOLID GREEN ARROW TURNS ON EXCLUSIVELY DURING THE PROTECTED GREEN INTERVAL PHASES 1 & 5. THE FLASHING YELLOW ARROW FOR SIGNAL HEADS 11, 41, 51 AND 81 FLASHES ONLY DURING PERMITTED GREEN INTERVAL PHASES 2, 4, 6 & 8.

PPLT DEFINITION PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO UNIT DATA

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0662
DESIGNED: June 2020
SEALED: 7-10-20
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 5-10-19.

Electrical Details - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1564 (S. Wilmington Street)
at
Ileagnes Road and Rush Street

Division 5 | Wake County | Raleigh

PLAN DATE: July 2020	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough
430320EAA2654C3...

SIGNATURE	DATE
Ryan W. Hough	7/24/2020

SIG. INVENTORY NO. 05-0662

22-JUL-2020 08:54
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jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
W-5705AH	Sig. 4

TOD EVENT SCHEDULING PROGRAMMING DETAIL
TO CALL ALTERNATE PHASING OPERATION DURING COORDINATION

(program controller as shown below)

✱ DENOTES TO BE DETERMINED BY THE DIVISION TRAFFIC ENGINEER.

NOTES

1. Phase Functions can be called by Time of Day (TOD) in Traffic Events, but not during coordination.
2. Special Functions can be called by Time of Day using Aux Events, and can run in conjunction with Coordination.
3. Special Functions can be used to call a Phase Function. In doing this a Phase function can run while a Coordination pattern is running.
4. If Alternate Phasing is used during FREE-RUN Phase Function 1 must be turned on with a Traffic Event.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 1 - Assign OMIT OVERLAP "A" AND "C" to Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT        6-EQUATE/TRANSFER
 2-SET TIME/DATE       7-CLEAR MEMORY
 3-TRAFFIC EVENTS      8-DIMMING
 4-AUX EVENTS         [9-PHS FUNC MAPPING]
 5-TOY EVENTS          0-SPC FUNC MAPPING
                               F-PRIOR MENU
```

```
EPAC  TIME BASE PHS FUNC MAPPING
                PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
   1  PHS-01 MAX # 2   000000000 0000000
   2  PHS-02 MAX # 2   010000000 0000000
   3  PHS-03 MAX # 2   001000000 0000000
   4  PHS-04 MAX # 2   000100000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

← REMOVE PHASE FUNCTION NUM 1 DEFAULT VALUE

HIT "A" KEY UNTIL POSITIONED ON NUM 145

```
EPAC  TIME BASE PHS FUNC MAPPING
                PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
 145  OVERLAP A OMIT   100000000 0000000
 146  OVERLAP B OMIT   000000000 0000000
 147  OVERLAP C OMIT   100000000 0000000
 148  OVERLAP D OMIT   000000000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

SET SWITCH 1 "ON" FOR

← OVERLAPS A OMIT

← OVERLAPS C OMIT

PHASE FUNCTION PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO TIME BASE DATA

SPECIAL FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 2 - Assign Special Function 1 to call Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT        6-EQUATE/TRANSFER
 2-SET TIME/DATE       7-CLEAR MEMORY
 3-TRAFFIC EVENTS      8-DIMMING
 4-AUX EVENTS          9-PHS FUNC MAPPING
 5-TOY EVENTS         [0-SPC FUNC MAPPING]
                               F-PRIOR MENU
```

```
EPAC TIME BASE SPC FUNC MAPPING
                               SPC FUNC
  S-FUNCTION NAME .........    12345678
    SPC 1-8 AS PHS FUNC 1- 8   10000000
    SPC 1-8 AS PHS FUNC 9-16   00000000
    SPEC FUNCTION 1            10000000
  CODES.......0-OFF....1-ON...........
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

← PHASE FUNCTION 1 WILL BE CALLED WHEN SPECIAL FUNCTION 1 IS SELECTED

SPECIAL FUNCTION PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO TIME BASE DATA

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0662
DESIGNED: June 2020
SEALED: 7-10-20
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 5-10-19.

PROGRAM AUX EVENT TO CALL SPECIAL FUNCTION

(program controller as shown below)

Step 3 - An Auxiliary event will be used to call the Special Function. This is done in Time Base Data under Aux Event. Add Auxiliary events as needed remembering to use one event to turn the Special Function on and one event to turn the Special Function off. If these are to be used in conjunction with the Traffic Events during Coordination then the On/Off times should be identical.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA        PRESS # DESIRED

 1-VIEW CURRENT        6-EQUATE/TRANSFER
 2-SET TIME/DATE       7-CLEAR MEMORY
 3-TRAFFIC EVENTS      8-DIMMING
[4-AUX EVENTS]         9-PHS FUNC MAPPING
 5-TOY EVENTS          0-SPC FUNC MAPPING
                               F-PRIOR MENU
```

```
EPAC TIME BASE - AUXILIARY EVENTS
 DD   HH MM   A123  D123  DIM  S12345678
  *    *  *    000   000   0    10000000
  *    *  *    000   000   0    00000000
  *    *  *    000   000   0    00000000
CODES........0-OFF....1-ON.............
OVERWRITE ">" W/ 1-ADD  2-DELETE  3-EDIT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Special Function (SF)

← SF 1 "ON"

← SF 1 "OFF"

AUX EVENT PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO TIME BASE DATA

! AUX EVENT MUST BE SCHEDULED TO RUN CONCURRENT WITH A TRAFFIC EVENT SCHEDULED COORDINATION PATTERN.

Electrical Details - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1564 (S. Wilmington Street)
at
Ileagnes Road and Rush Street

Division 5 | Wake County | Raleigh

PLAN DATE: July 2020	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough
430320FAA2654C3...

SIGNATURE 7/24/2020 DATE

SIG. INVENTORY NO. 05-0662

22-JUL-2020 08:55
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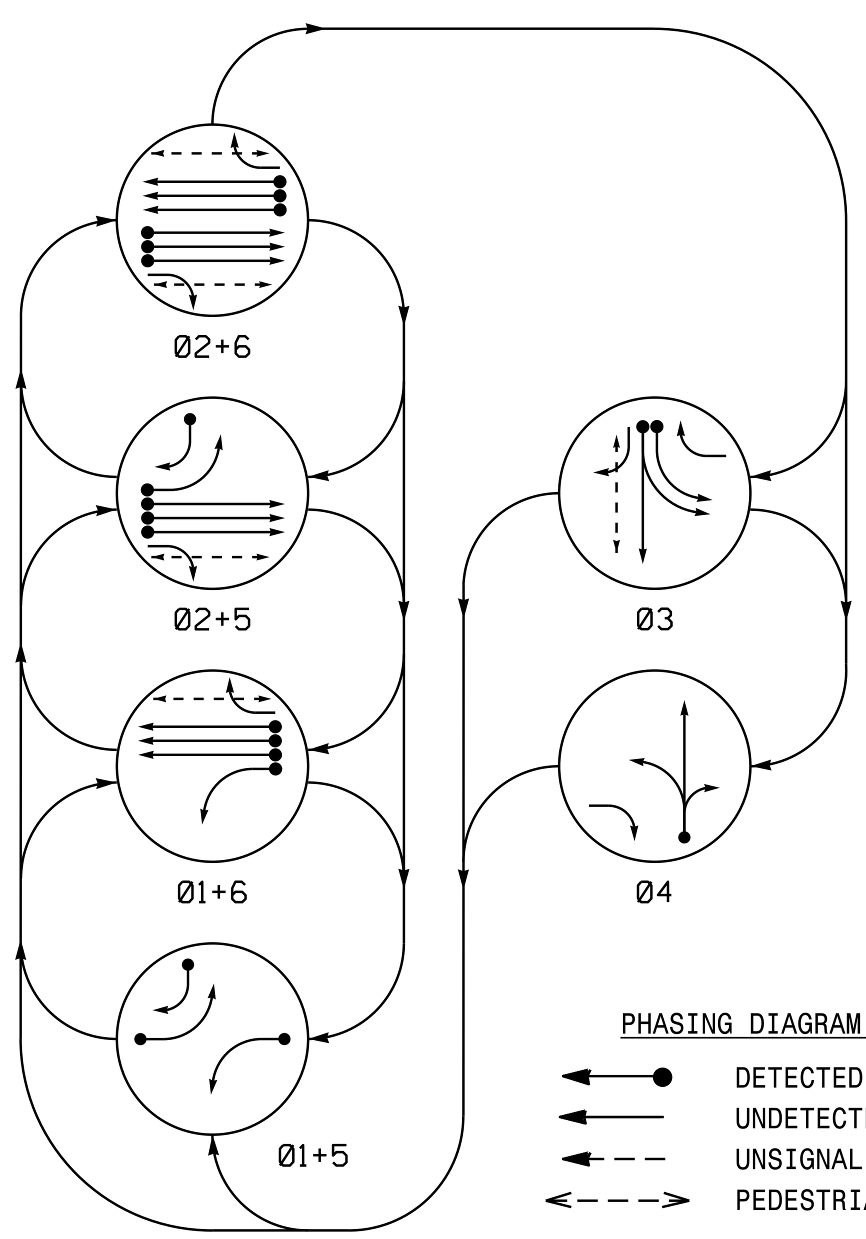
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
W-5705J	Sig. 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	←R	←R	←R	←R	←R
21, 22	R	R	G	G	R	R	Y
23	R	R	G	G	R	R/→	Y
31	R	R	R	R	G←	R	R
32	R/→	R	R/→	R	G	R	R
41	R	R	R	R	R	G←	R
42	R	R	R	R	R	G	R
51	←	←R	←	←R	←R	←R	←R
61, 62	R	G	R	G	R	R	Y
63	R	G	R	G	R/→	R	Y
P21, P22	DW	DW	W	W	DW	DW	DRK
P31, P32	DW	DW	DW	DW	W	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK

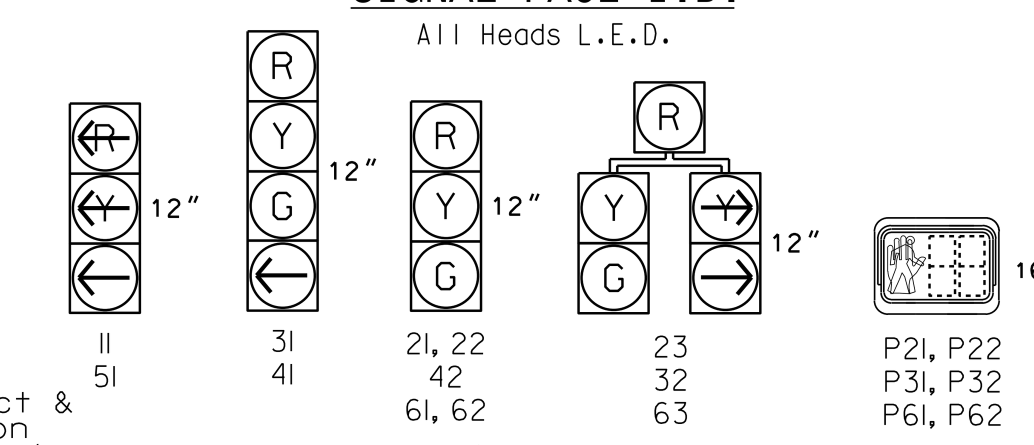
W - Walk
DW - Don't Walk
DRK - Dark

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS: LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	DETECTOR PROGRAMMING: ASSIGNED PHASE	TIMING: DELAY	TIMING: EXTEND (STRETCH)	OPERATION MODE 0: VEHICLE	1: PEDESTRIAN	2: 1 CALL	3: STOP A	4: STOP B	5: PROT/PER LEFT	6: PROT/PER THROUGH	7: AND	SWITCH	SYSTEM LOOPS	STATUS: NEW	STATUS: EXISTING
1A	6X60	2-4-2	+5	-	X	1	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2A	6X6	5	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2B	6X6	5	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2C	6X6	5	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
3A	6X40	2-4-2	0	X	-	3	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3B	6X40	2-4-2	0	X	-	3	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5A	6X40	2-4-2	0	X	-	5	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6A	6X6	5	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6B	6X6	5	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6C	6X6	5	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

SIGNAL FACE I.D.

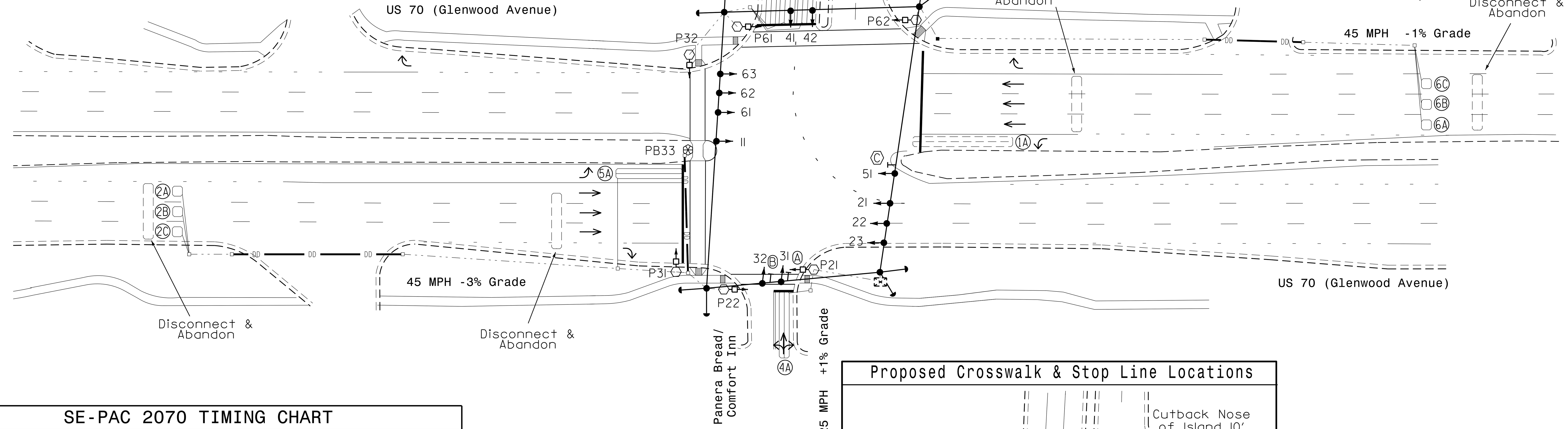
All Heads L.E.D.



6 Phase
Fully Actuated
(Raleigh Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Disconnect and abandon existing loops numbered 2A, 2B, 6A and 6B.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing unless otherwise shown.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Directional Drill	N/A
	Type I Pushbutton Post	
	Type II Signal Pedestal	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)	Ⓑ
Ⓒ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓒ

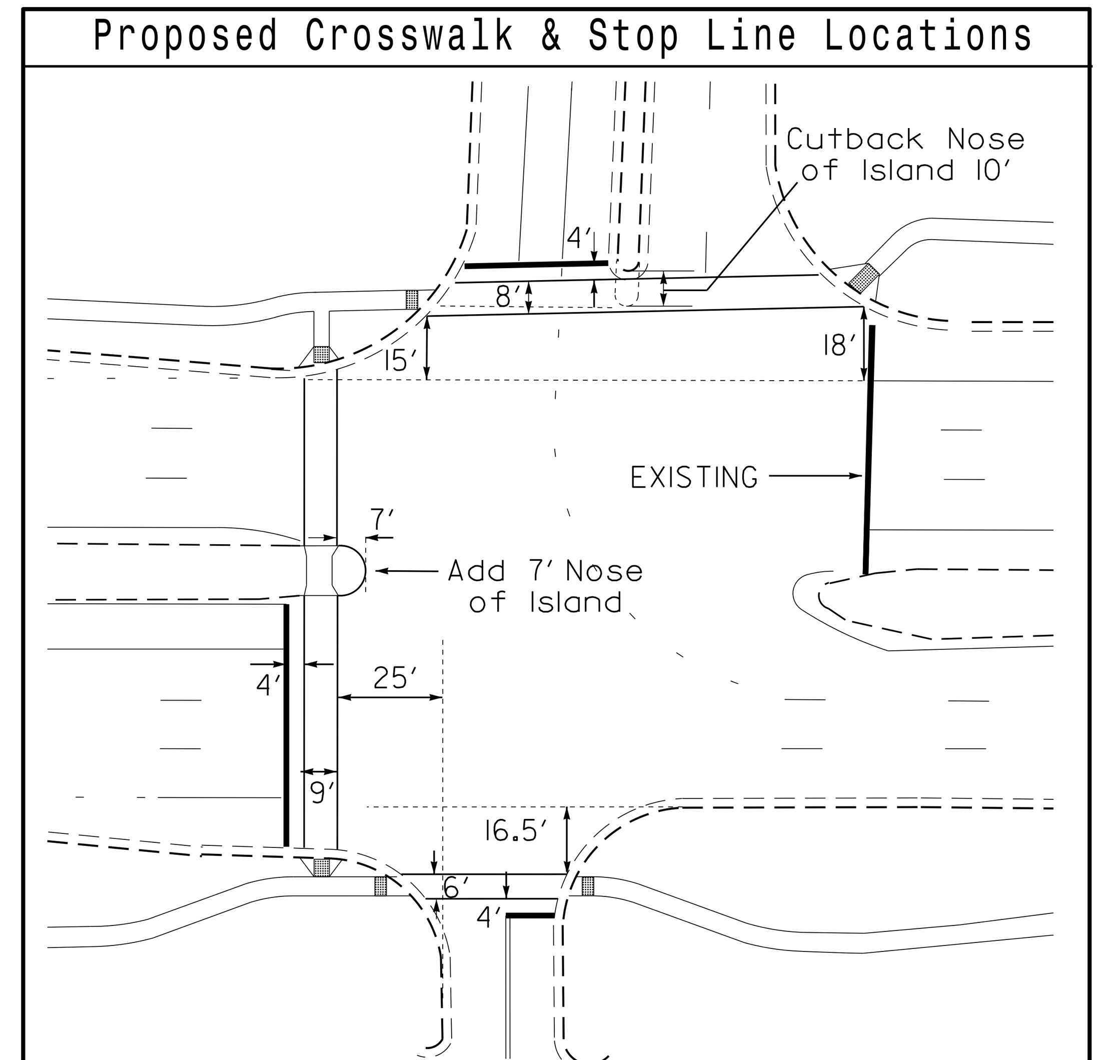
SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Passage Gap *	1.0	6.0	2.0	2.0	2.0	6.0
Maximum Green *	15	90	25	15	25	90
Yellow Change	3.0	4.8	3.3	3.0	3.0	4.6
Red Clear	3.8	1.7	3.6	4.2	3.7	2.0
Walk *	-	7	4	-	-	7
Pedestrian Clear	-	6	30	-	-	23
Added Initial *	-	1.0	-	-	-	1.0
Maximum Initial *	-	34	-	-	-	34
Time Before Reduction *	-	30	-	-	-	30
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	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.

This plan supersedes the plan signed and sealed on 5/17/18.

Proposed Crosswalk & Stop Line Locations



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signal Upgrade

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

US 70 (Glenwood Avenue)
at
Pleasant Valley Promonade
and Panera Bread/Comfort Inn

Division 5 Wake County Raleigh

PLAN DATE:	July 2020	REVIEWED BY:
PREPARED BY:	C.E. Carter	REVIEWED BY:

SCALE 0 40
1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZIEMBA

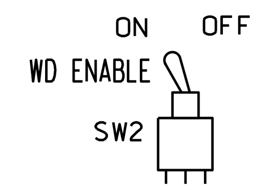
DocuSigned by: [signature] 7/15/2020
SIGNATURE DATE

SIG. INVENTORY NO. 05-1193

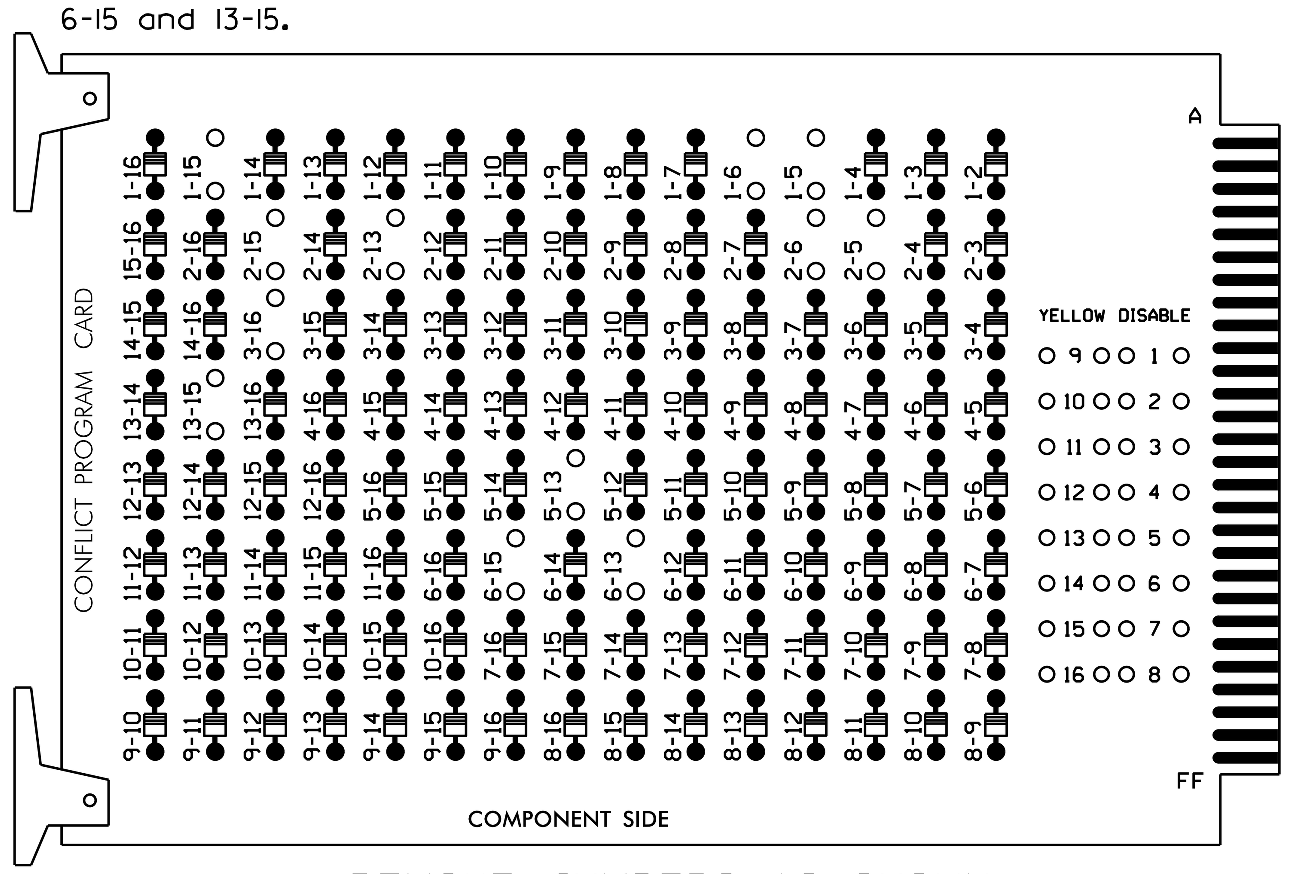
15-JUL-2020 10:42
S:*ITS&SU*ITS Signals*Signal Design Section*Central Region*Div 5*W-5705J*051193_sig_dsn_20200715.dgn
rziemba

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

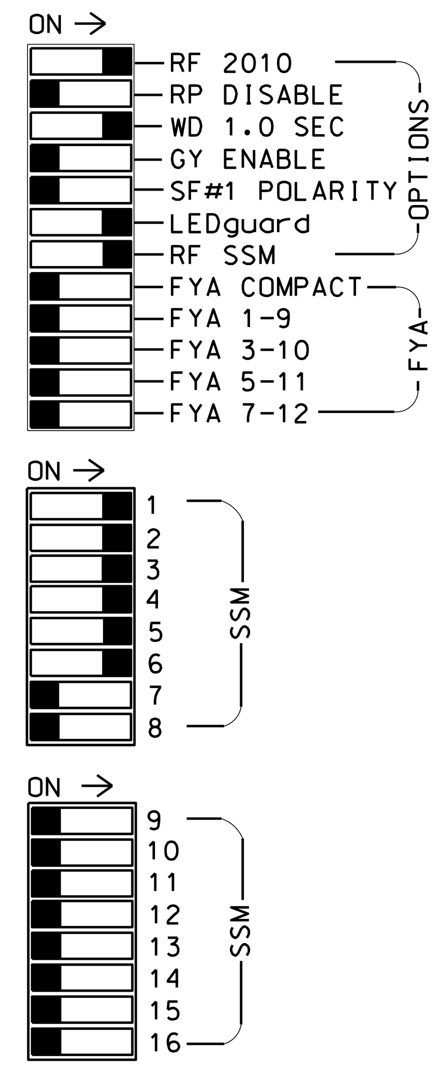
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-16, 5-13, 6-13, 6-15 and 13-15.



REMOVE JUMPERS AS SHOWN



NOTES:

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

■ = DENOTES POSITION OF SWITCH

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 7,8,9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature for all phases.
5. Program phases 2 and 6 for volume density operation.
6. The cabinet and controller are part of the Raleigh Signal System.

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	3 PED
SIGNAL HEAD NO.	11	21, 22,23	P21, P22	31	32	63	41	42	23	NU	51	32	61, 62,63	P61, P62	NU	NU	P31, P32
RED		128		116	116		101	101					134				
YELLOW		129		117	117		102	102					135				
GREEN		130		118	118		103	103					136				
RED ARROW	125										131						
YELLOW ARROW	126					117			102		132	132					
GREEN ARROW	127			118		118	103		103		133	133					
✋			113											119			110
🚶			115											121			112

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER..............2070
CABINET.................332
SOFTWARE................SE-PAC2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S1,S2,S2P,S3,S4,S5,S6,S6P,S8P
PHASES USED.............1,2,2 PED,3,3 PED,4,5,6,6 PED
OVERLAPS................NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A	Ø 2 2C	SLOT EMPTY	SLOT EMPTY	Ø 3 3A	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø 2 2B	NOT USED			Ø 3 3B	NOT USED					NOT USED	Ø3 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 5 5A	Ø 6 6A	Ø 6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 5 5B	Ø 6 6B	NOT USED										

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.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1		
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
2C	TB2-9,10	I3U	63	5	2		
3A	TB4-9,10	I6U	41	11	3		
3B	TB4-11,12	I6L	45	12	3		
4A	TB6-1,2	I7U	65	13	4	10	
5A	TB3-5,6	J2U	40	21	5		
5B	TB3-7,8	J2L	44	22	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
6C	TB5-1,2	J4U	48	25	6		
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P31,P32	TB8-8,9	I13L	70	PED 8	3 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1193
DESIGNED: July 2020
SEALED: 7-15-20
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 5-09-18.

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 70 (Glenwood Avenue)
at
Pleasant Valley Promenade
and Panera Bread/Comfort Inn

Division 05 Wake County Raleigh

Prepared in the Offices of:
ITS & Signals Management Section
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N.Greenfield Pkwy,Garner,NC 27529

PLAN DATE: July 2020	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough
430320FAA2654C3...
7/24/2020
DATE

SIG. INVENTORY NO. 05-1193

24-JUL-2020 08:35
r:\051193_sm_ele_20180509.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
W-5705J	Sig. 3

SIGNAL DRIVER OUTPUT PROGRAMMING DETAIL FOR PHASE 3 PED

From Main Menu press 4 (Unit Data)

```
SE-PAC UNIT DATA                  PRESS # DESIRED

1- STARTUP & MISC       6- ALT SEQUENCES
2- REMOTE FLASH         7- PORT 1 DATA
3- OVERLAP STANDARD     8- I/O MISC
4- OVERLAP SPECIAL      9- SIG DRV OUT
5- RING STRUCTURE       A- 224E STATUS
                           F- PRIOR MENU
```

```
SE-PAC SIGNAL DRIVER OUTPUTS
 SIG DRV GRP CHN  HDWE OUTPUT PIN..  SET
 Ph 1 Vehicle..1  Ph 1 Red/Yel/Grn...  1
 Ph 2 Vehicle..2  Ph 2 Red/Yel/Grn...  2

        Scroll Down to Ph 3 Pedest

Ph 3 Pedest ..18  Ph 3 DW/PC/WK...... 11   <- Default Value
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

For "Ph 3 Pedest" change "HDWE OUTPUT PIN SET"
FROM: 11
TO: 16

This will reassign loadswitch S8P to Ph 3 Pedest

Display will now echo
HDWE OUTPUT PIN SET "Ph 8"

```
Ph 3 Pedest ..18  Ph 8 DW/PC/WK ....16   <- Modified Value
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Press "F" to return to Unit Data

CONTROLLER PED DETECTOR ASSIGNMENT PROGRAMMING

From the Main Menu press '3' (Phase Data), then from Phase Menu press '8' (Spec. Detector), then from Detector Control Data Menu press '9' (Ped 1-8):

```
PED DET CONTROL .1..2..3..4..5..6..7..8
 ASSIGNED PHASE  1  2  3  4  0  6  0  3
 OPERATION MODE  1  1  1  1  0  1  0  1
 SWITCHED PHASE  0  0  0  0  0  0  0  0
MODE:  0-VEH    1-PED    2-ONE    3-SBA
       4-SBB    5-PPL    6-PPT    7-AND
SWITCHED: TO PH # (AP=Y/R & SP=GRN)
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Press "F" to return to Detector Control Data

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1193
DESIGNED: July 2020
SEALED: 7-15-20
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 5-09-18.

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division, ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 70 (Glenwood Avenue)
at
Pleasant Valley Promenade
and Panera Bread/Comfort Inn

Division 05 | Wake County | Raleigh

PLAN DATE: July 2020	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

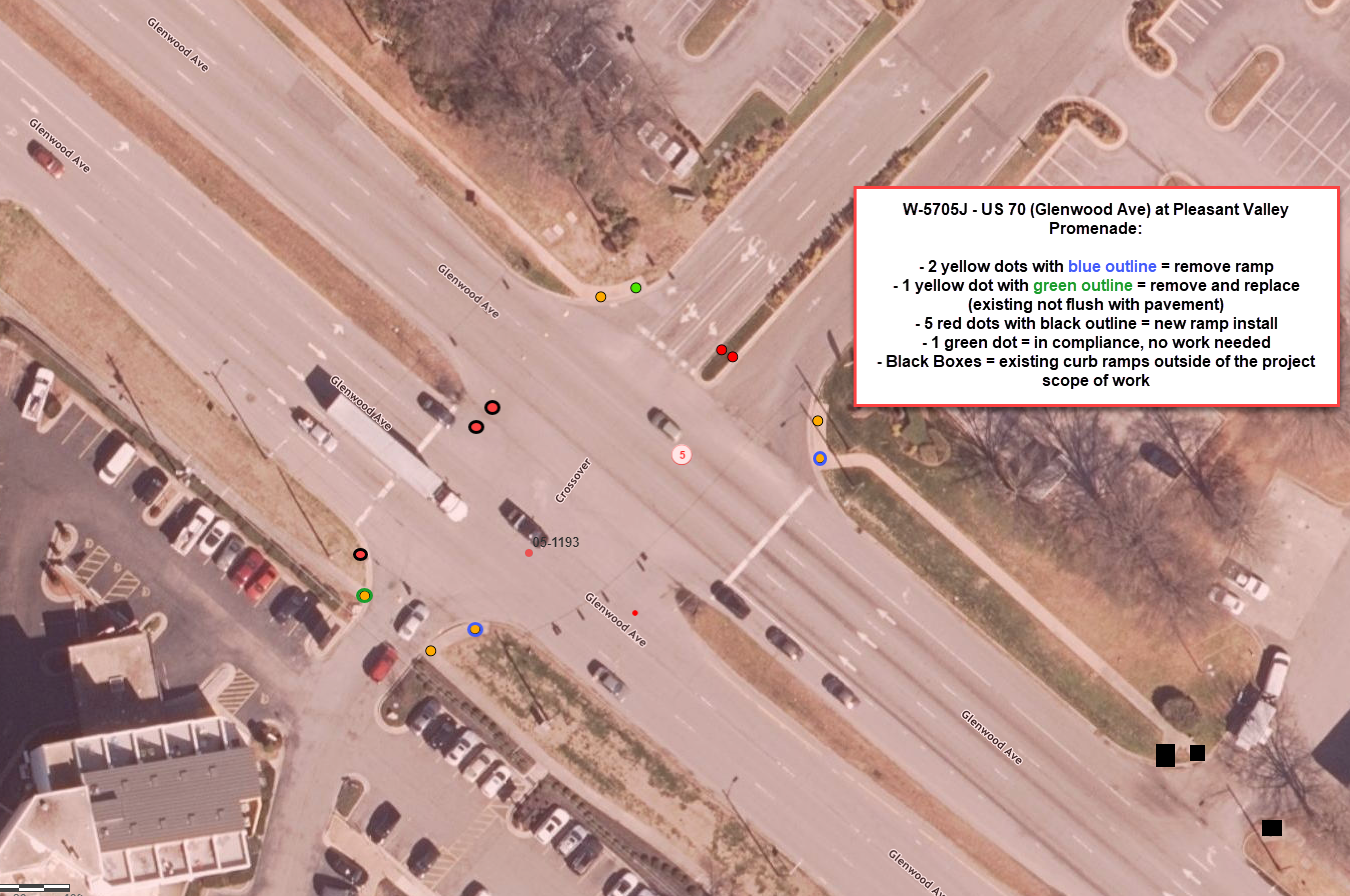
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036833 RYAN W. HOUGH

DocuSigned by:
Ryan W. Hough 7/24/2020
430320FAA2654C3
DATE

SIG. INVENTORY NO. 05-1193

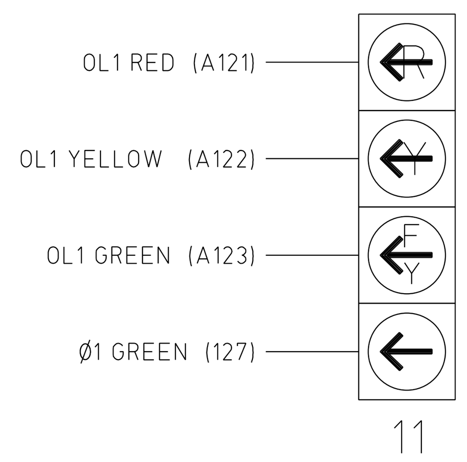
22-JUL-2020 08:58
r051193_sm_ele_20180509.dgn
jtpeterson

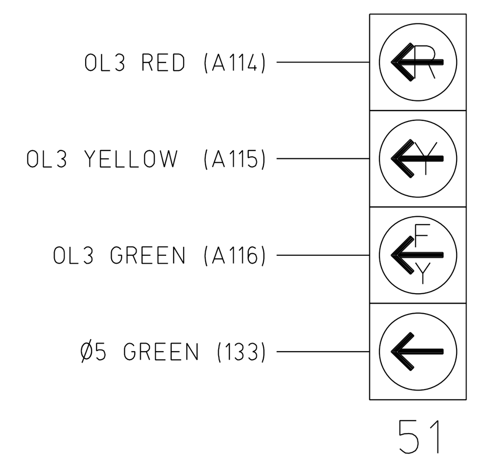

W-5705J - US 70 (Glenwood Ave) at Pleasant Valley Promenade:
- 2 yellow dots with blue outline = remove ramp
- 1 yellow dot with green outline = remove and replace (existing not flush with pavement)
- 5 red dots with black outline = new ramp install
- 1 green dot = in compliance, no work needed
- Black Boxes = existing curb ramps outside of the project scope of work
Glenwood Ave
Glenwood Ave
Glenwood Ave
Glenwood Ave
Crossover
05-1193
5
Glenwood Ave
Glenwood Ave
Glenwood Ave


NC 54 W Hwy
NC 54 W Hwy
NC 54 W Hwy
NC 54 W Hwy
NC 54 W Hwy
Hwy 54 W Service Rd
05-1744
5
Huntingridge Rd
W-5705V - NC 54 at Huntingridge Rd:
- 5 red dots with black outline = new ramp installation.

PROJECT REFERENCE NO.	SHEET NO.
W-5705V	SIG. 3

4-SECTION FYA PPLT SIGNAL WIRING DETAIL

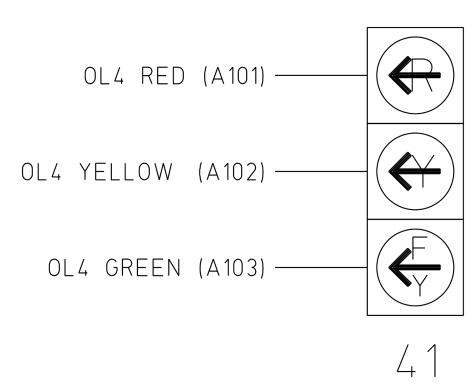


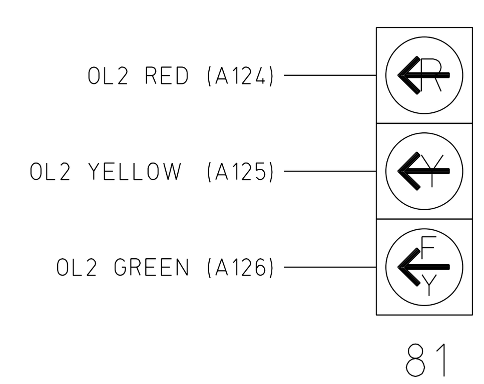


FLASHING YELLOW ARROW PROGRAMMING

1. PROGRAM FLASHING YELLOW ARROW PHASES AS FOLLOWS:
Main Menu > (1) PHASE > (2) PHASE FUNCTIONS PAGE TWO
PPLT FYA = Ø1,5
2. ASSIGN OUTPUT PIN FOR FLASHING YELLOW ARROW AS FOLLOWS:
Main Menu > (6) OUTPUTS > (F) FYA PPLT
Phase 1 = 99
Phase 5 = 90
3. REDIRECT RED AND YELLOW OUTPUTS FOR LEFT TURN PHASES AS FOLLOWS:
Main Menu > (6) OUTPUTS > (8) REDIRECT PHASE
Phase 1 RED = 97, Phase 1 YELLOW = 98
Phase 5 RED = 88, Phase 5 YELLOW = 89

3-SECTION FYA SIGNAL WIRING DETAIL





3-SECTION FYA PROGRAMMING

1. PROGRAM FLASHING YELLOW ARROW PHASES AS FOLLOWS:
Main Menu > (4) OVERLAPS > Scroll to OVERLAP 2 by using '+' key
LOAD SWITCH NUMBER = 10
VEH SET 1 = 4
YELLOW CLEARANCE = 3.3
RED CLEARANCE = 2.8
Scroll to OVERLAP 4 by using '+' key
LOAD SWITCH NUMBER = 12
VEH SET 1 = 8
YELLOW CLEARANCE = 3.3
RED CLEARANCE = 2.8
2. PROGRAM HEADS 41 AND 81 FOR GREEN FLASH AS FOLLOWS:
Main Menu > (1) PHASE > (2) PHASE FUNCTIONS PAGE 2
OLAP G FL = 2,4

EMERGENCY VEHICLE PREEMPTION PROGRAMMING

E.V. PREEMPT	OPTICAL DETECTOR	TERMINAL
EVB	B	TB9-7,9

1. PROGRAM PREEMPTION INPUT PIN AS FOLLOWS:
Main Menu > (5) INPUTS > (3) PREEMPTS
EVB = 72
2. PROGRAM CLEARANCE PHASES AND TIMING AS FOLLOWS:
Main Menu > (2) PREEMPTS > (4) EMERGENCY VEHICLE
EVB DELAY = 0
EVB CLEAR = 2
EVB CLEARANCE PHASES = 1,6
3. PROGRAM MINIMUM GREEN BEFORE PREEMPT AS FOLLOWS:
Main Menu > (2) PREEMPTS > (6) MISC PREEMPTION PARAMETERS
MIN TIME BEFORE PE FORCEOFF = 1
4. PROGRAM PED CLEAR BEFORE PREEMPT AS FOLLOWS:
Main Menu > (1) PHASE > (5) PEDESTRIAN TIMING
Phase 4 MIN FDW = 14
5. FOR PREEMPTION IMMEDIATE RESPONSE, DISABLE MIN WALK AS FOLLOWS:
Main Menu > (9) UTILITIES > (5) CONFIGURATION
EXTRA TWO = 3
6. PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNIT FOR 2 SEC.

SPECIAL NOTE EV PREEMPT PROGRAMMING

Setting 'FYA DURING PREEMPT' to 'Y' eliminates yellow trap when transitioning from adjacent through phase:
Main Menu > (9) UTILITIES > (9) MISC
FYA DURING PREEMPT (Y/N) = Y

FLASHER CIRCUIT MODIFICATION DETAIL

In order to insure that signals flash concurrently on the same approach, make the following flasher circuit changes:

1. On rear of PDA - Remove wire from Term. T2-4 and Terminate on T2-2.
2. On rear of PDA - Remove wire from Term. T2-5 and Terminate on T2-3.
3. Remove Flasher Unit 2.

The changes listed above tie all Phases and Overlaps to Flasher Unit 1.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1744
DESIGNED: February 2018
SEALED: Nov 7, 2018
REVISED:

NC Dept of Transportation
Division of Highways
Final Drawing Date: 12/21/2018
DocuSigned by:
ITS & Signals Unit

DURHAM
1869
City of Durham
101 City Hall Plaza
Durham, NC 27701
(919) 560-4366

SIGNAL UPGRADE

SHEET 2 OF 2

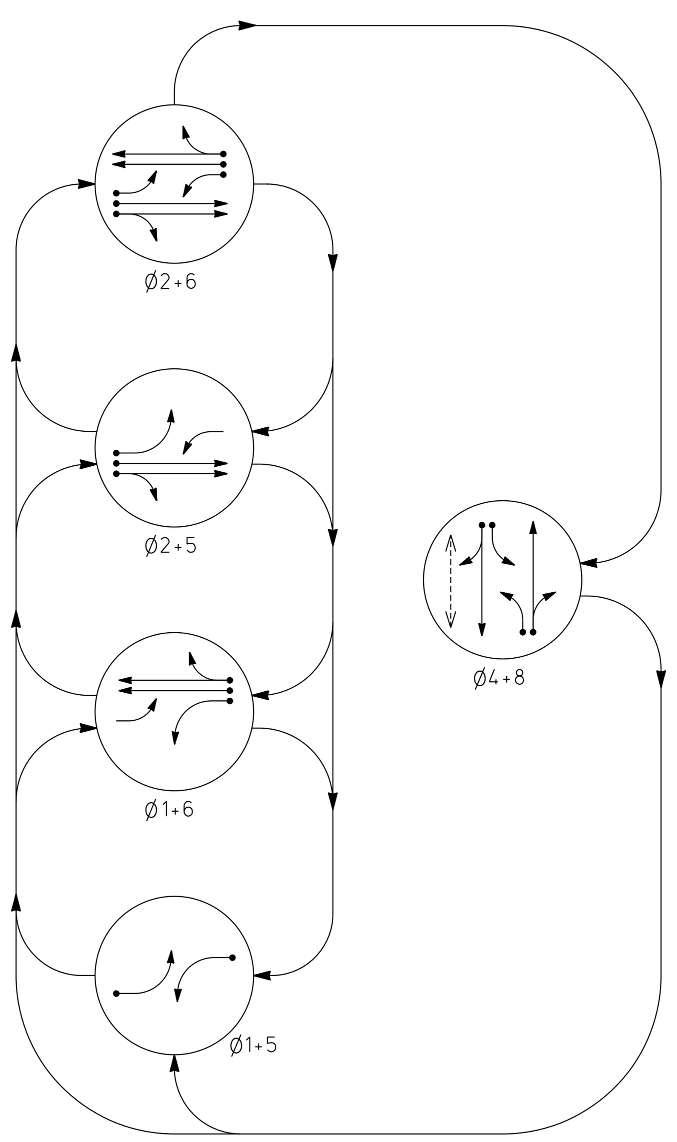
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 Greenfield Pkwy, Garner, NC 27529

NC 54
at
Huntingridge Road

DIVISION 5 | DURHAM COUNTY | DURHAM
PLAN DATE: FEBRUARY 2018 | REVIEWED BY: P NICHOLAS
PREPARED BY: L TRACEY | REVIEWED BY:
REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 038734 ENGINEER LESLIE M. TRACEY
DocuSigned by:
Leslie Tracey
11-7-18
DATE
SIG. INVENTORY NO. 05-1744

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

EV PREEMPT PHASES

*See Note 15

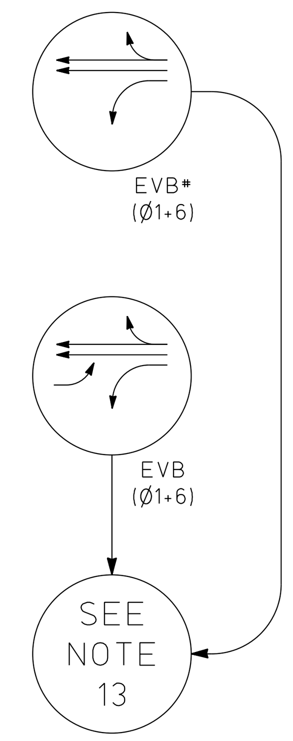


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	EVB	EVB*	FLASH
11	←	←	←FY	←FY	←R	←	←	←Y
21, 22	R	R	G	G	R	R	R	Y
41	←R	←R	←R	←R	←FY	←R	←R	←R
42, 43	R	R	R	R	G	R	R	R
51	←	←FY	←	←FY	←R	←FY	R	←Y
61, 62	R	G	R	G	R	G	G	Y
81	←R	←R	←R	←R	←FY	←R	←R	←R
82, 83	R	R	R	R	G	R	R	R
P41,P42	DW	DW	DW	DW	W	DW	DW	DRK

DRK - Dark Signal Face
W - Walk
DW - Don't Walk

LOOP & DETECTOR UNIT INSTALLATION CHART
2033 SOFTWARE WITH 2070 CONTROLLER

INDUCTIVE LOOPS: LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	DETECTOR PROGRAMMING: NEMA PHASE	TIMING: DELAY	CARRY (STRETCH)	ATTRIBUTES: 1 FULL TIME DELAY	2 PEDESTRIAN CALL	3 RESERVED	4 COUNT	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	SYSTEM LOOPS	STATUS: NEW	EXISTING
1A	6x60	2-4-2	+5		X	1	15 SEC.	- SEC.					X		X				X
						6	3 SEC.	- SEC.	X				X		X				X
2A	6x6	4	300		X	2	- SEC.	- SEC.					X		X				X
2B	6x6	4	300		X	2	- SEC.	- SEC.					X		X				X
4A	6x40	2-4-2	0		X	4	3 SEC.	- SEC.					X		X				X
4B	6x40	2-4-2	0		X	4	10 SEC.	- SEC.					X		X				X
5A	6x60	2-4-2	+5		X	5	15 SEC.	- SEC.					X		X				X
						2	3 SEC.	- SEC.	X				X		X				X
6A	6x6	4	300		X	6	- SEC.	- SEC.					X		X				X
6B	6x6	4	300		X	6	- SEC.	- SEC.					X		X				X
8A	6x60	2-4-2	0		X	8	3 SEC.	- SEC.					X		X				X
8B	6x60	2-4-2	0		X	8	10 SEC.	- SEC.					X		X				X
PEDESTRIAN DETECTION																			
P41,P42,P43	N/A	N/A	N/A	X		4	- SEC.	- SEC.		X								X	

5 Phase
Fully Actuated
with EV Preemption
(Durham Signal System)

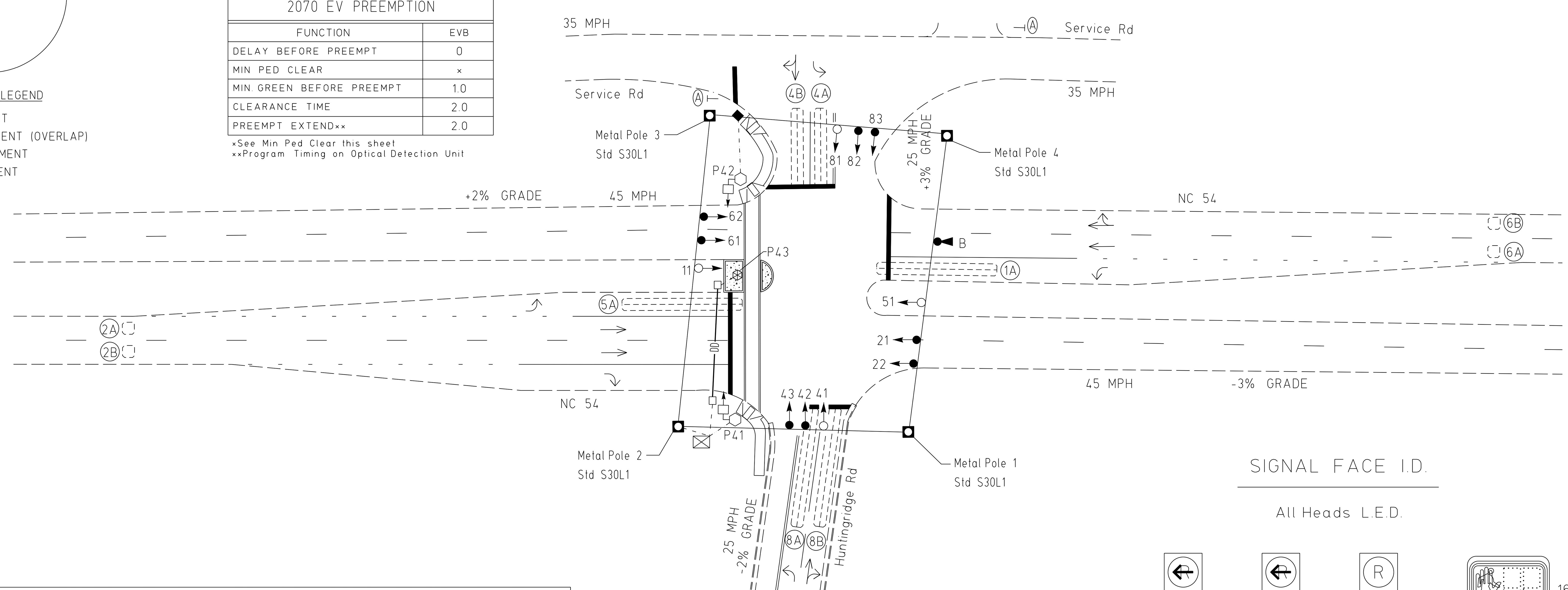
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Pavement markings are existing unless otherwise shown.
4. Phase 1 and/or phase 5 may be lagged.
5. Reposition all existing signal heads.
6. Renumber existing signal heads 22, 23, 41, 42, 62, 63, 81 and 82.
7. Set all detector units to presence mode.
8. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
9. Set phase bank 3 maximum limit to 250 seconds for phases used.
10. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
13. Upon completion of emergency vehicle preemption phase, controller returns to normal operation based on vehicle demand.
14. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
15. If preempt phasing resides in the barrier being serviced, then the opposing 4-section FYA will flash continuously. If the preempt phase requires crossing the barrier, then the opposing 4-section FYA will display a red arrow.
16. Remove existing "LEFT TURN YIELD ON GREEN" Ball sign(s) (R10-12).

2070 EV PREEMPTION

FUNCTION	EVB
DELAY BEFORE PREEMPT	0
MIN PED CLEAR	*
MIN GREEN BEFORE PREEMPT	10
CLEARANCE TIME	2.0
PREEMPT EXTEND**	2.0

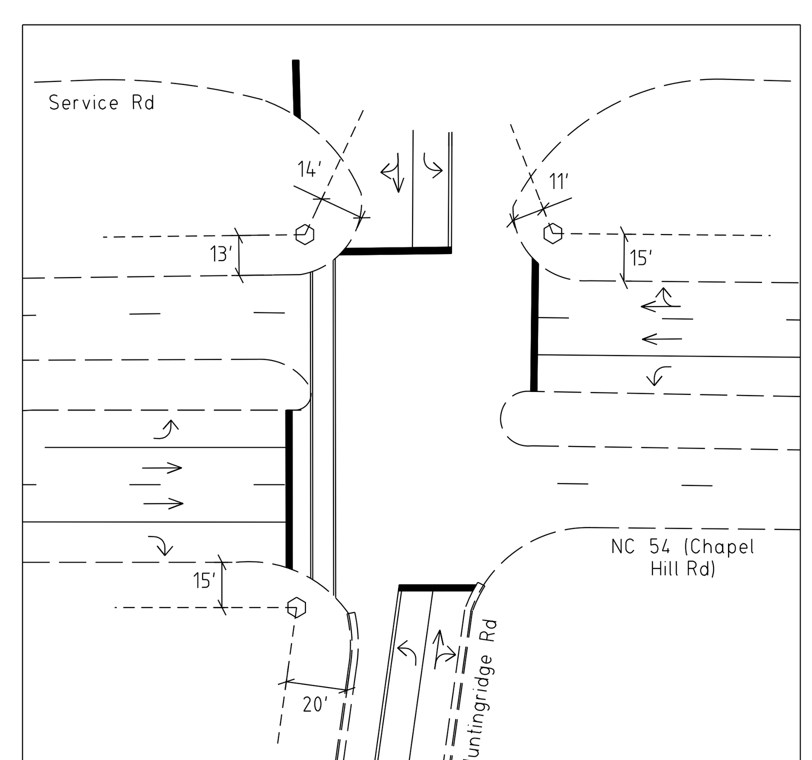
*See Min Ped Clear this sheet
**Program Timing on Optical Detection Unit



TIMING CHART
2033 SOFTWARE WITH 2070 CONTROLLER

PHASE	Ø1	Ø2	Ø4	Ø5	Ø6	Ø8	OL2	OL4
MINIMUM INITIAL*	7 SEC.	12 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.	0 SEC.	0 SEC.
VEHICLE EXTENSION*	2.0 SEC.	6.0 SEC.	2.0 SEC.	2.0 SEC.	6.0 SEC.	2.0 SEC.	- SEC.	- SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.8 SEC.	3.3 SEC.	3.0 SEC.	4.8 SEC.	3.3 SEC.	3.3 SEC.	3.3 SEC.
RED CLEARANCE	3.1 SEC.	1.5 SEC.	2.8 SEC.	2.8 SEC.	1.5 SEC.	2.8 SEC.	2.8 SEC.	2.8 SEC.
MAXIMUM LIMIT*	15 SEC.	75 SEC.	20 SEC.	15 SEC.	75 SEC.	20 SEC.		
RECALL POSITION	NONE	VEH RECALL	NONE	NONE	VEH RECALL	NONE		
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	YELLOW LOCK	NONE		
DOUBLE ENTRY	OFF	OFF	ON	OFF	OFF	ON		
WALK*	- SEC.	- SEC.	7 SEC.	- SEC.	- SEC.	- SEC.		
FLASHING DON'T WALK	- SEC.	- SEC.	27 SEC.	- SEC.	- SEC.	- SEC.		
MIN PED CLEAR*	- SEC.	- SEC.	14 SEC.	- SEC.	- SEC.	- SEC.		
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.		
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.		
ADD PER VEHICLE*	- SEC.	1.5 SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.		
MAXIMUM INITIAL*	- SEC.	34 SEC.	- SEC.	- SEC.	34 SEC.	- SEC.		
MAXIMUM GAP*	2.0 SEC.	7.0 SEC.	2.0 SEC.	2.0 SEC.	7.0 SEC.	2.0 SEC.		
REDUCE 0.1 SEC EVERY*	- SEC.	1.5 SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.		
MINIMUM GAP	2.0 SEC.	3.0 SEC.	2.0 SEC.	2.0 SEC.	3.0 SEC.	2.0 SEC.		

* 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.

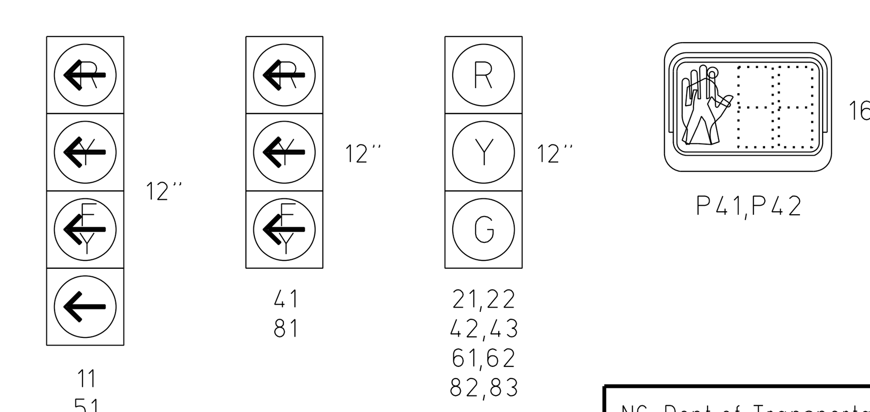


Pole and Crosswalk Locations
Not to Scale

Note: Crosswalk lines are 8 inches thick with 8 feet of separation. Locate stopbars 4 feet behind and parallel to crosswalks.

SIGNAL FACE I.D.

All Heads L.E.D.



NC Dept of Transportation
Division of Highways
Final Drawing Date: 12/21/2018
DocuSigned by:
1B9B4B66274A494...
ITS & Signals Unit

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Pull Box	
	2 in Underground Conduit	
	Directional Drill	N/A
	Pedestrian Pushbutton Pedestal Type I	
	Signal Pedestal Type II	
	Optical Detector	
	Stop Bar	
	Curb Ramp	
	"STOP" Sign (R1-1)	

SIGNAL UPGRADE

City of Durham
101 City Hall Plaza
Durham, NC 27701
(919) 560-4366

Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
Signal Design Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40
1" = 40'

NC 54 at Huntingridge Road

DIVISION 5 | DURHAM COUNTY | DURHAM

PLAN DATE: FEBRUARY 2018	REVIEWED BY: P NICHOLAS
PREPARED BY: L TRACEY	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 038734 ENGINEER LESLIE M. TRACEY

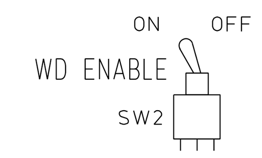
DocuSigned by:
Leslie Tracey
F820ACA757354BE...
11-7-18
DATE

SIG. INVENTORY NO. 05-1744

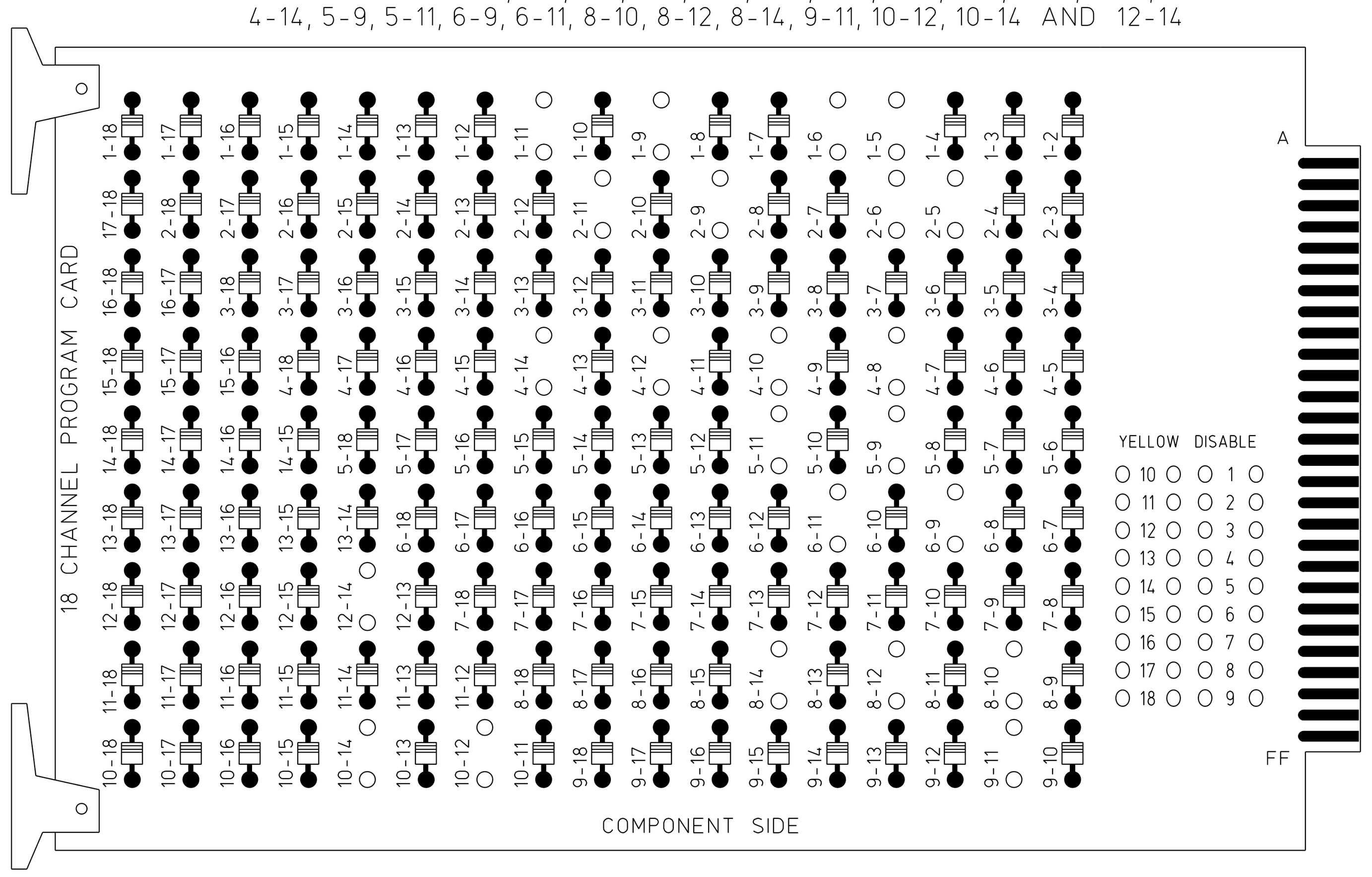
PROJECT REFERENCE NO.	SHEET NO.
W-5705V	SIG. 2

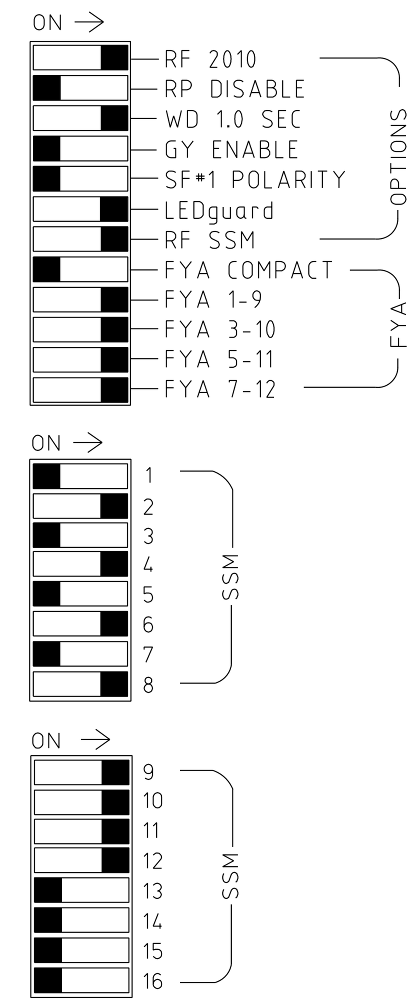
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-8, 4-10, 4-12, 4-14, 5-9, 5-11, 6-9, 6-11, 8-10, 8-12, 8-14, 9-11, 10-12, 10-14 AND 12-14





■ = DENOTES POSITION OF SWITCH

REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. Verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phases 2 and 6 green.
3. Program Startup Ped Call for phase 4.
4. Set power-up flash time to 0 seconds within the controller programming. The conflict monitor will govern start-up flash time. Ensure STARTUP "RED START" is set to 0 seconds.
5. Enable simultaneous gap-out feature for all phases.
6. Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
7. Set phase bank 3 maximum limit to 250 seconds for phases used.
8. Program phases 2 and 6 for Volume Density operation.
9. Program phases 4 and 8 for Double Entry.
10. Set the Red Revert interval, on the controller unit, to 1 second.
11. Ensure start up flash phases are coordinated with flash program block assignments.
12. This controller and cabinet are to be programmed and wired to be a part of the Durham Computerized Signal System. The Contractor is responsible for the proper interconnection of this signal within the system.

EQUIPMENT INFORMATION

CONTROLLER.............................2070E
CABINET.....................................332
SOFTWARE.................................McCAIN 2033×
CABINET MOUNT........................BASE
OUTPUT FILE POSITIONS.......18 (12-STD, 6-AUX)
LOAD SWITCHES USED.........S1,S2,S5,S6,S7,S8,S11,AUXS1,AUXS2, AUXS4,AUXS5
PHASES USED............................1,2,4,4PED,5,6,8
OVERLAP1.....................................××
OVERLAP2.....................................4
OVERLAP3.....................................××
OVERLAP4.....................................8

×Software to be supplied by City of Durham.
××See FYA PPLT Programming Detail Sheet 2.

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	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	42,43	P41, P42	51★	61,62	NU	NU	82,83	NU	11★	81★	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													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127						133											
						104												
						106												

NU = Not Used

★ See pictorial of head wiring in detail on Sheet 2.

× Denotes Install Load Resistor. See Load Resistor Installation Detail this page.

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN OUTPUT 4P AS FOLLOWS:
Main Menu > (6) OUTPUTS > (7) PEDS
PED 4P = Ø4

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	Ø1,6 1A	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 2 2B				Ø 4 4B						Ø4PED DC ISOLATOR		ST DC ISOLATOR
"J"	U	Ø5,2 5A	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED TOMAR	EVB × 4-CH	SLOT EMPTY
	L	NOT USED	Ø 6 6B				Ø 8 8B						NOT USED	NOT USED	

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

× NOTE: OPTICAL DETECTORS SHALL BE WIRED TO INPUT FILE PER MANUFACTURER'S INSTRUCTIONS.

FS = FLASH SENSE
ST = STOP TIME
EV = EMER VEH PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
1A	TB2-1,2	I1U	14	56	5, 7	1
			10	56	1, 5, 7	6
2A	TB2-5,6	I2U	1	39	5, 7	2
2B	TB2-7,8	I2L	5	43	5, 7	2
4A	TB4-9,10	I6U	3	41	5, 7	4
4B	TB4-11,12	I6L	7	45	5, 7	4
5A	TB3-1,2	J1U	13	55	5, 7	5
			9	55	1, 5, 7	2
6A	TB3-5,6	J2U	2	40	5, 7	6
6B	TB3-7,8	J2L	6	44	5, 7	6
8A	TB5-9,10	J6U	4	42	5, 7	8
8B	TB5-11,12	J6L	8	46	5, 7	8
PEDESTRIAN PUSHBUTTONS						
P41,P42	TB8-5,6	I12L	27	69	2	4

NOTE: Program detector delay and carryover times as specified on signal design plans.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

DETECTOR ATTRIBUTES LEGEND:

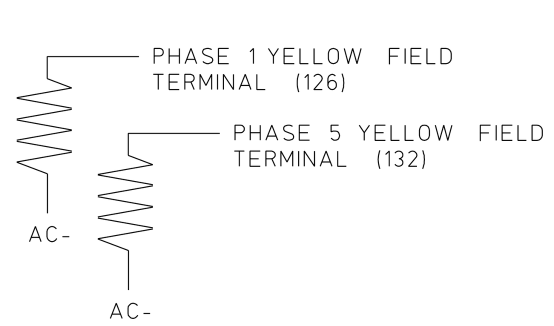
1-FULL TIME DELAY
2-PED CALL
3-RESERVED
4-COUNTING
5-EXTENSION
6-TYPE 3
7-CALLING
8-ALTERNATE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1744
DESIGNED: February 2018
SEALED: Nov. 7, 2018
REVISED:

SIGNAL SYSTEM DATA:	
Drop	20
Area	3
Area Address	34
Comm Channel	C-15

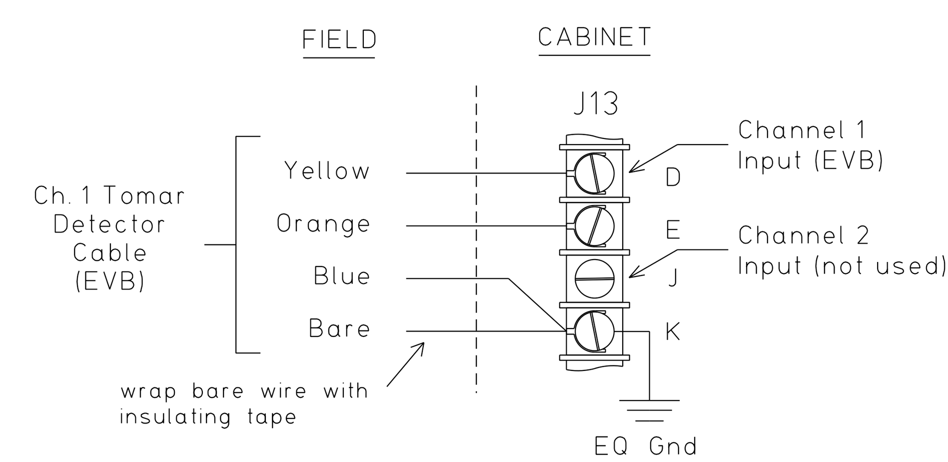
LOAD RESISTOR INSTALLATION DETAIL

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



TYPICAL TOMAR FIELD WIRE DETAIL

(input file, rear view)



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Final Drawing Date: 12/21/2018
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ITS & Signals Unit
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City of Durham
101 City Hall Plaza
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SIGNAL UPGRADE

SHEET 1 OF 2

Transportation Mobility and Safety Division
Signals Management Section
750 Greenfield Pkwy, Garner, NC 27529

NC 54 at Huntingridge Road

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE: FEBRUARY 2018	REVIEWED BY: P NICHOLAS
PREPARED BY: L TRACEY	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 038734 ENGINEER LESLIE M. TRACEY

DocuSigned by:
Leslie Tracey
F820ACA757354BE...
12-20-18
DATE

SIG. INVENTORY NO. 05-1744