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TIP PROJECT: U-5826

CONTRACT: C204380

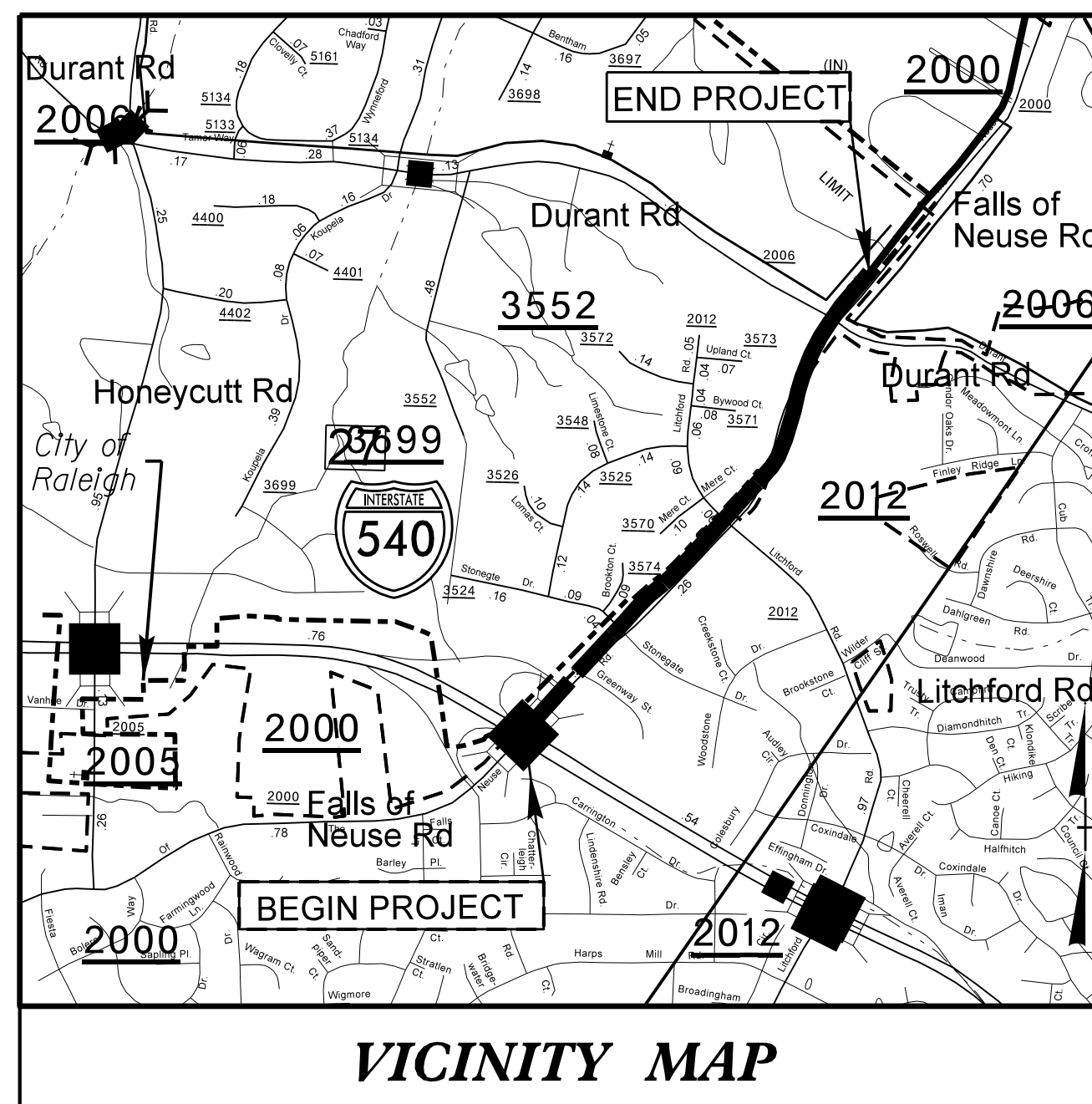
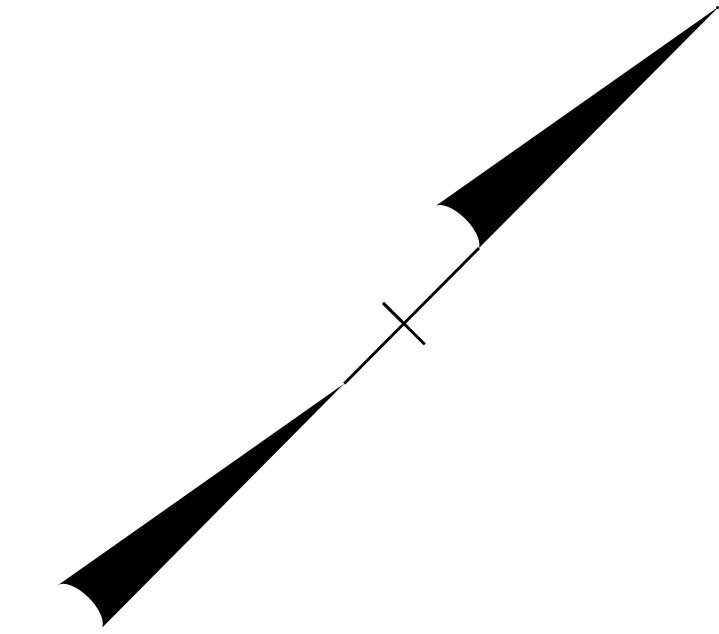
Project No.	Sheet No.
U-5826	Sig. 1.0

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

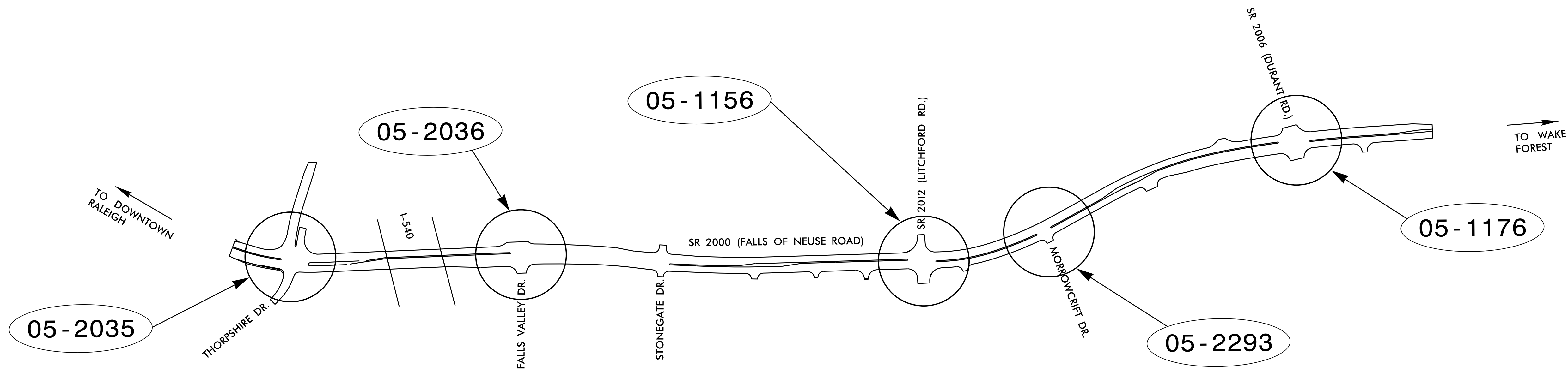
WAKE COUNTY

**LOCATION: SR 2000 (FALLS OF NEUSE ROAD) FROM
I-540 EASTBOUND RAMPS TO SR 2006 (DURANT ROAD)**

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS



VICINITY MAP



Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.

Index of Plans		
Sheet #	Reference #	Location/Description
Sig. 1.0	-----	Title Sheet
Sig. 1.1-1.2	-----	Standard Plate Sheets
Sig. 2.0-4.2	05-2035	SR 2000 (Falls of Neuse Road) at I-540 EB Ramps and Thorpshire Drive
Sig. 5.0-7.4	05-2036	SR 2000 (Falls of Neuse Road) at I-540 WB Ramps and Falls Valley Drive
Sig. 8.0-10.6	05-1156	SR 2000 (Falls of Neuse Road) at SR 2012 (Litchford Road)
Sig. 11.0-13.3	05-2293	SR 2000 (Falls of Neuse Road) at Morrocroft Drive
Sig. 14.0-16.4	05-1176	SR 2000 (Falls of Neuse Road) at SR 2006 (Durant Road)
MI-M8	-----	Standard Metal Pole Sheets
SCP 1-13	-----	Signal Communications Plans and Splice Details

TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS UNIT

Contacts:

Robert J. Ziemba, PE - Central Region Signals Engineer
Ryan W. Hough, PE - Signal Equipment Design Engineer
Gregg Green - Signal Communications Project Engineer

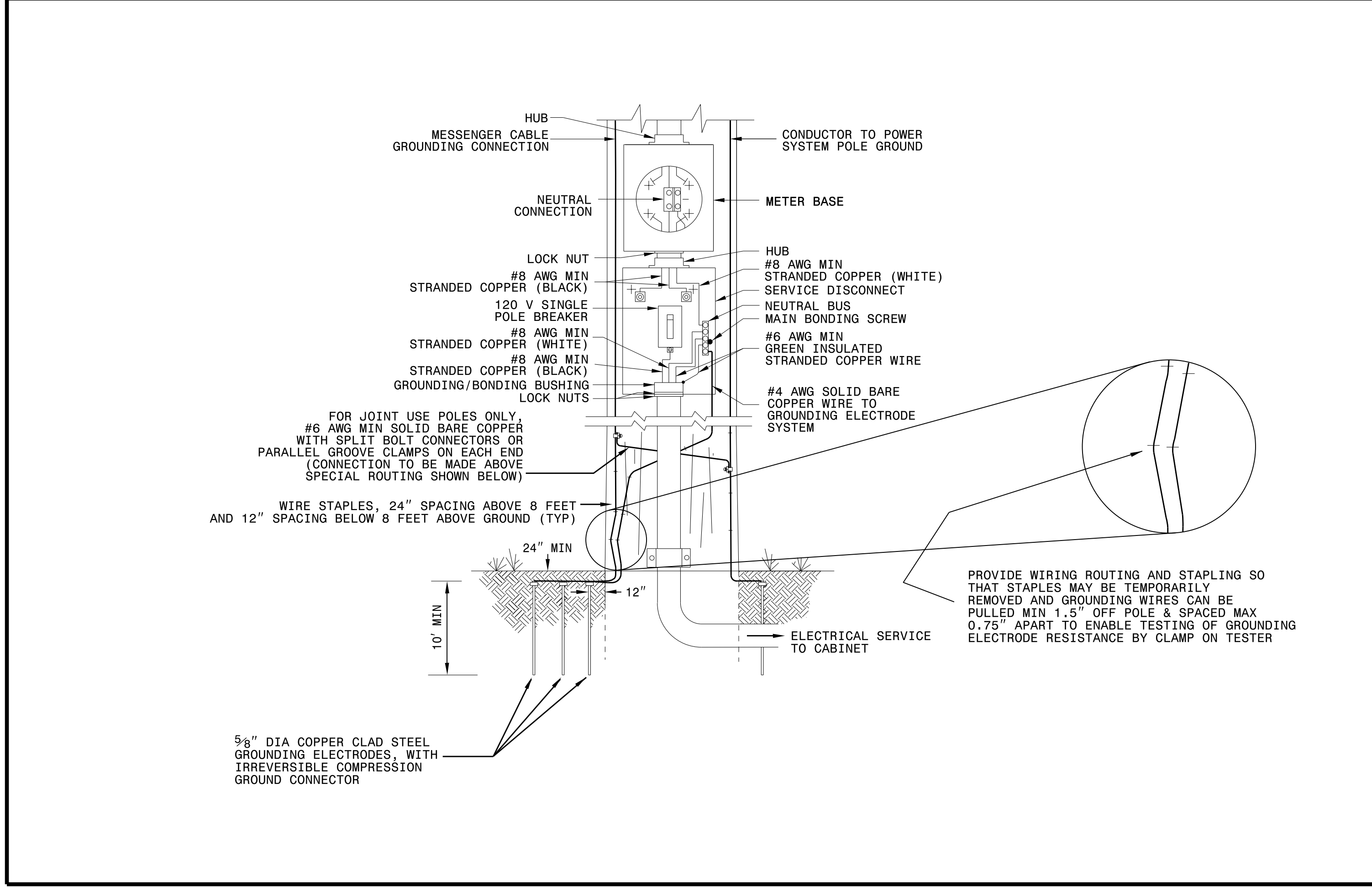
Prepared in the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY
DIVISION

750 N. Greenfield Parkway, Garner, NC 27529

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
ELECTRICAL SERVICE GROUNDING
GROUNDING AND BONDING

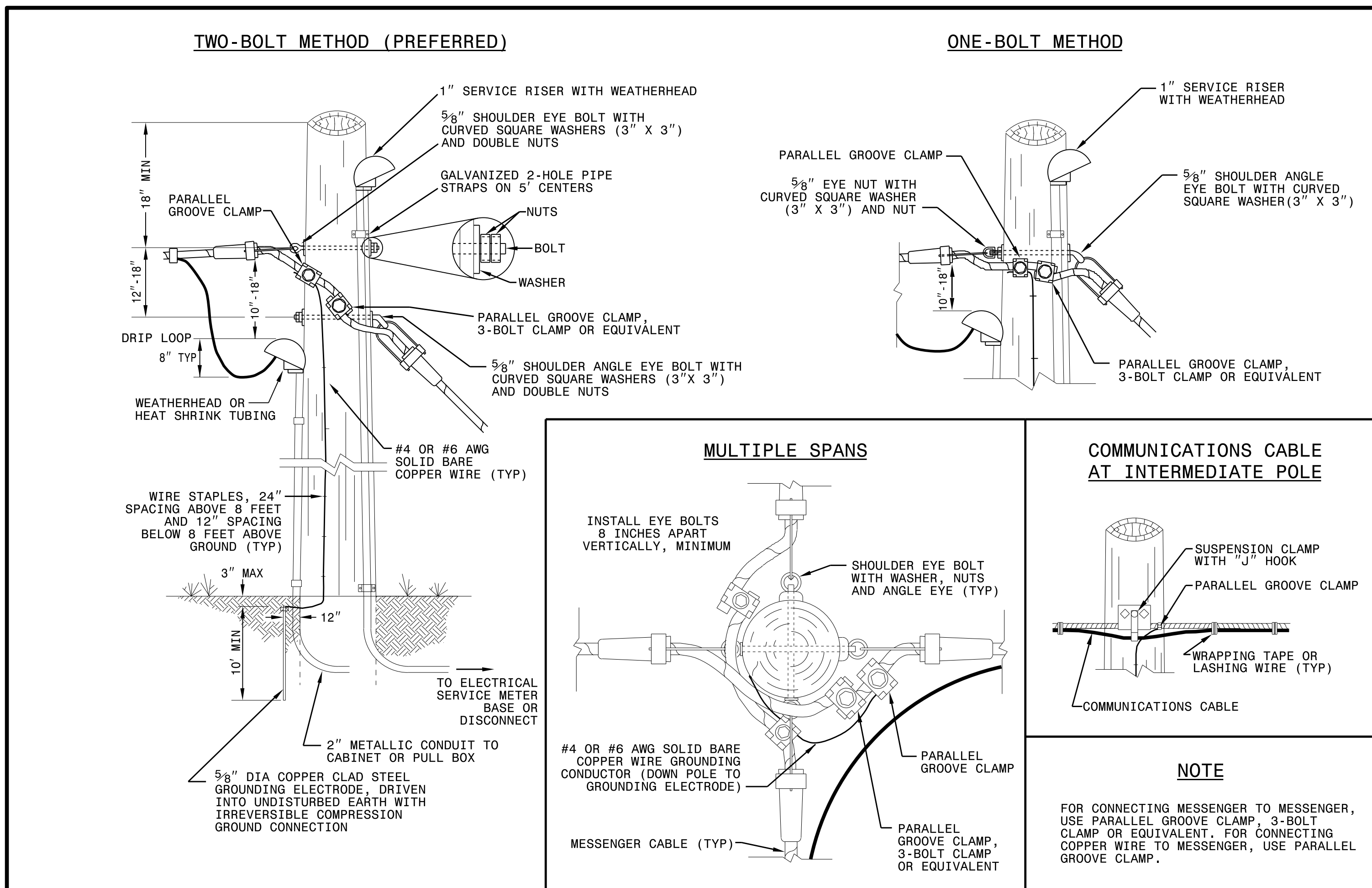
SHEET 1 OF 1
1700D01



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
WOOD POLES
METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1
1720D01



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

See Plate for Title

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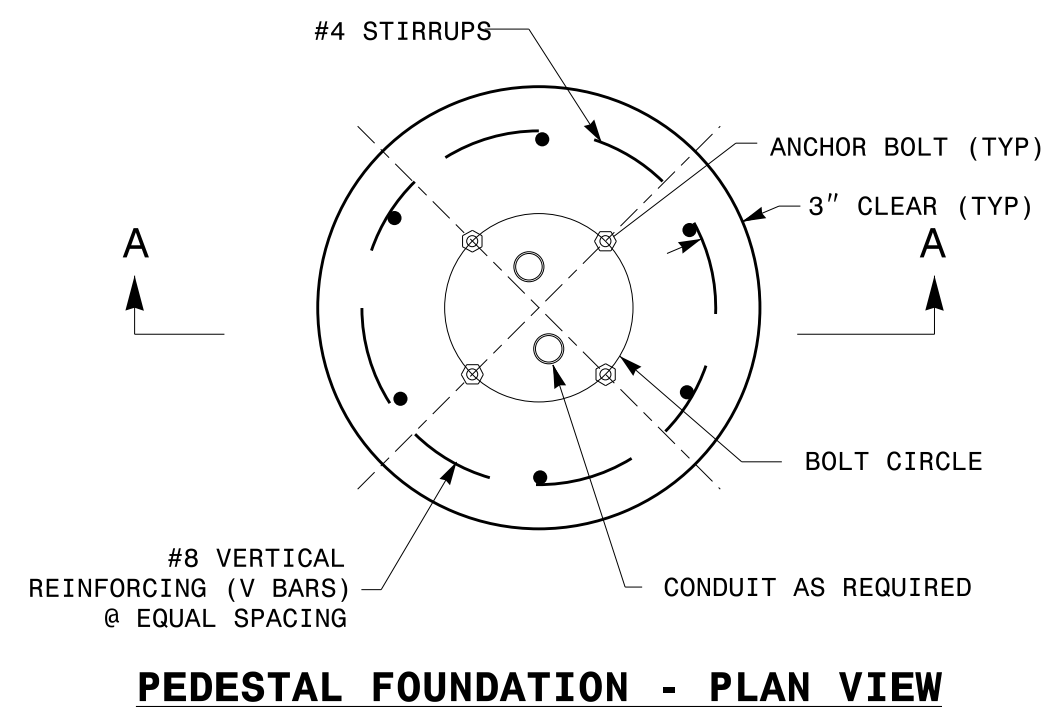
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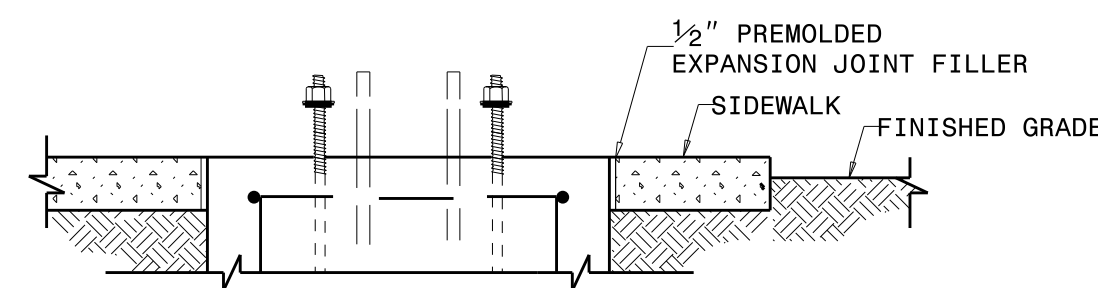
750 N. Greenfield Parkway
Garner, NC 27529

10/11/2017
DATE

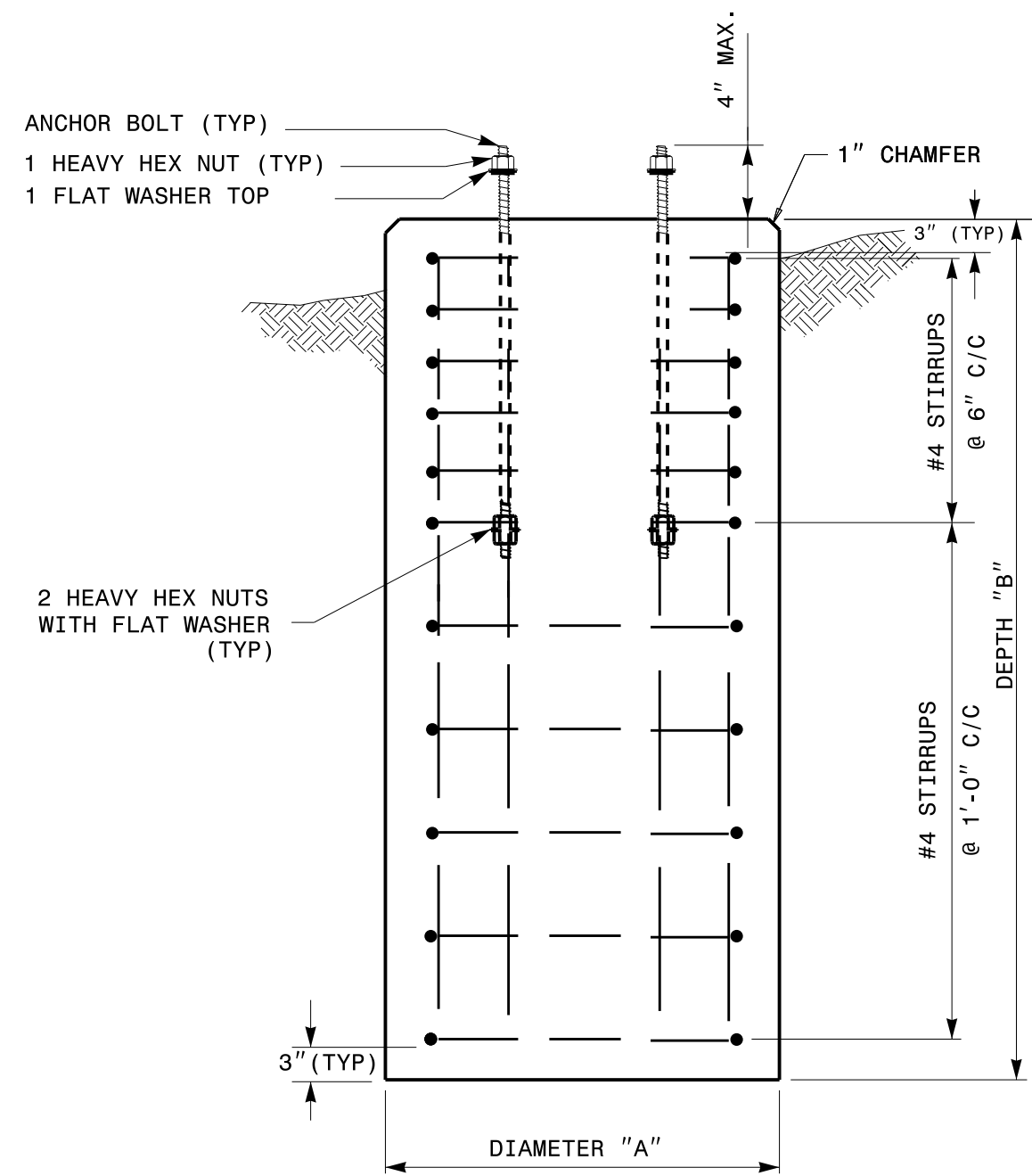
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U:\2018_S14_Drawing\Plate_Sheets\2018_Plate_Sheet.dgn
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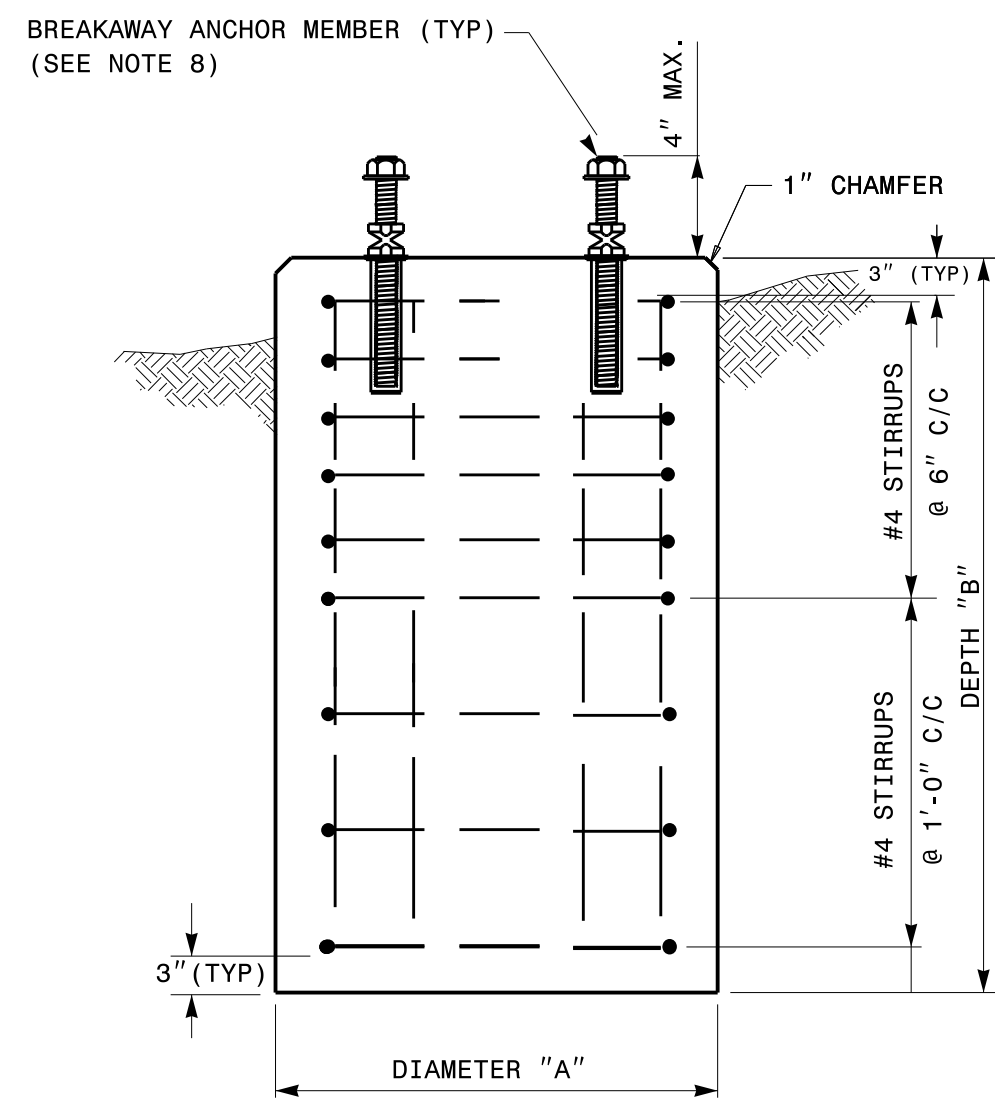
PEDESTAL FOUNDATION - PLAN VIEW



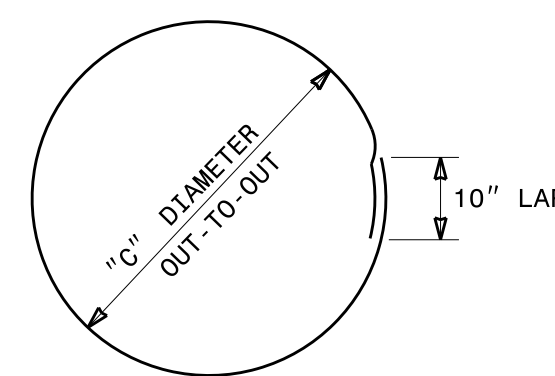
PEDESTAL FOUNDATION DETAILS FOR SIDEWALK



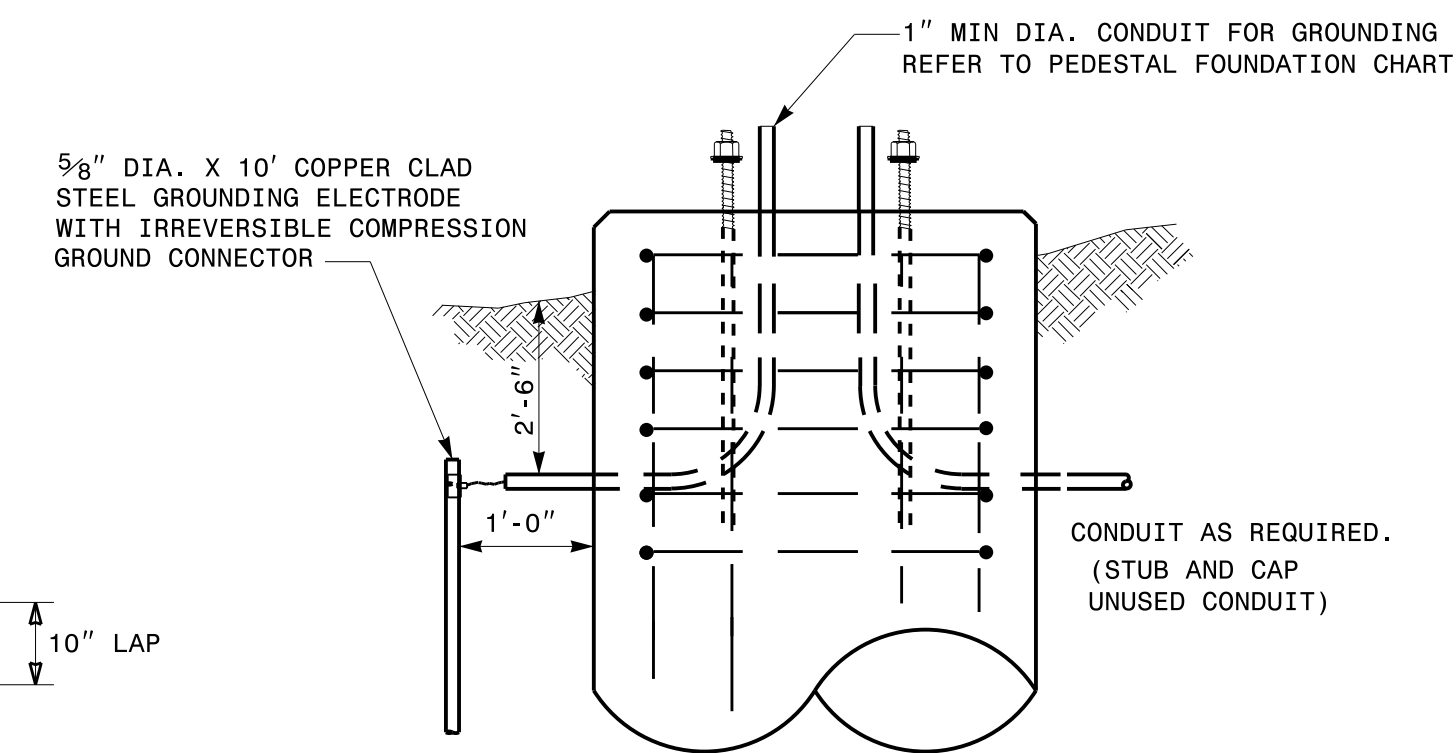
TYPES I, II & III
SECTION A-A



TYPES I & II ONLY
SECTION A-A



CLOSED HOOPS



GROUNDING & CONDUIT DETAIL

NOTES:

- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
- COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
- USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'c = 3000$ PSI (MIN.).
- USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
- GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
 - SANDY TYPE SOIL
 - NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
 - WIND SPEED NOT TO EXCEED 140 MPH
 IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.
- MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
- ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
- USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4 1/2" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6 5/8". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.

PEDESTAL FOUNDATION TYPE AND SIZE							
TYPE	PEDESTAL DESCRIPTION	SIZE			ANCHOR BOLT		INSTALL GROUNDING SYSTEM (YES/NO)
		DIAMETER "A" FT	DEPTH "B" FT	CONCRETE VOLUME CY	DIAMETER (MIN.) IN	LENGTH FT-IN	
I	PEDESTRIAN PUSHBUTTON	2'-0"	3'-6"	.41	1/2	1'-6"	NO
II	NORMAL-DUTY	2'-0"	5'-0"	.58	3/4	2'-0"	YES
III	HEAVY-DUTY	2'-6"	7'-0"	1.27	1	4'-0"	YES

REINFORCING STEEL SCHEDULE													
TYPE	V-BAR				STIRRUP								
	SIZE #	QTY	LENGTH	WEIGHT LBS	SIZE #	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS
						VERTICAL ON 6" CENTERS	ON 12" CENTERS	TOTAL					
I	8	6	3'-0"	56	4	0	4	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	8	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	11	7'-2"	2'-0"	0'-10"	53	175

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

ENGLISH STANDARD DRAWING FOR
PEDESTALS
FOUNDATIONS

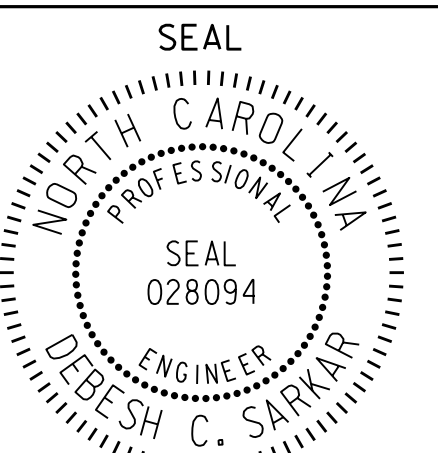
SHEET 1 OF 1
1743D01

See Plate for Title

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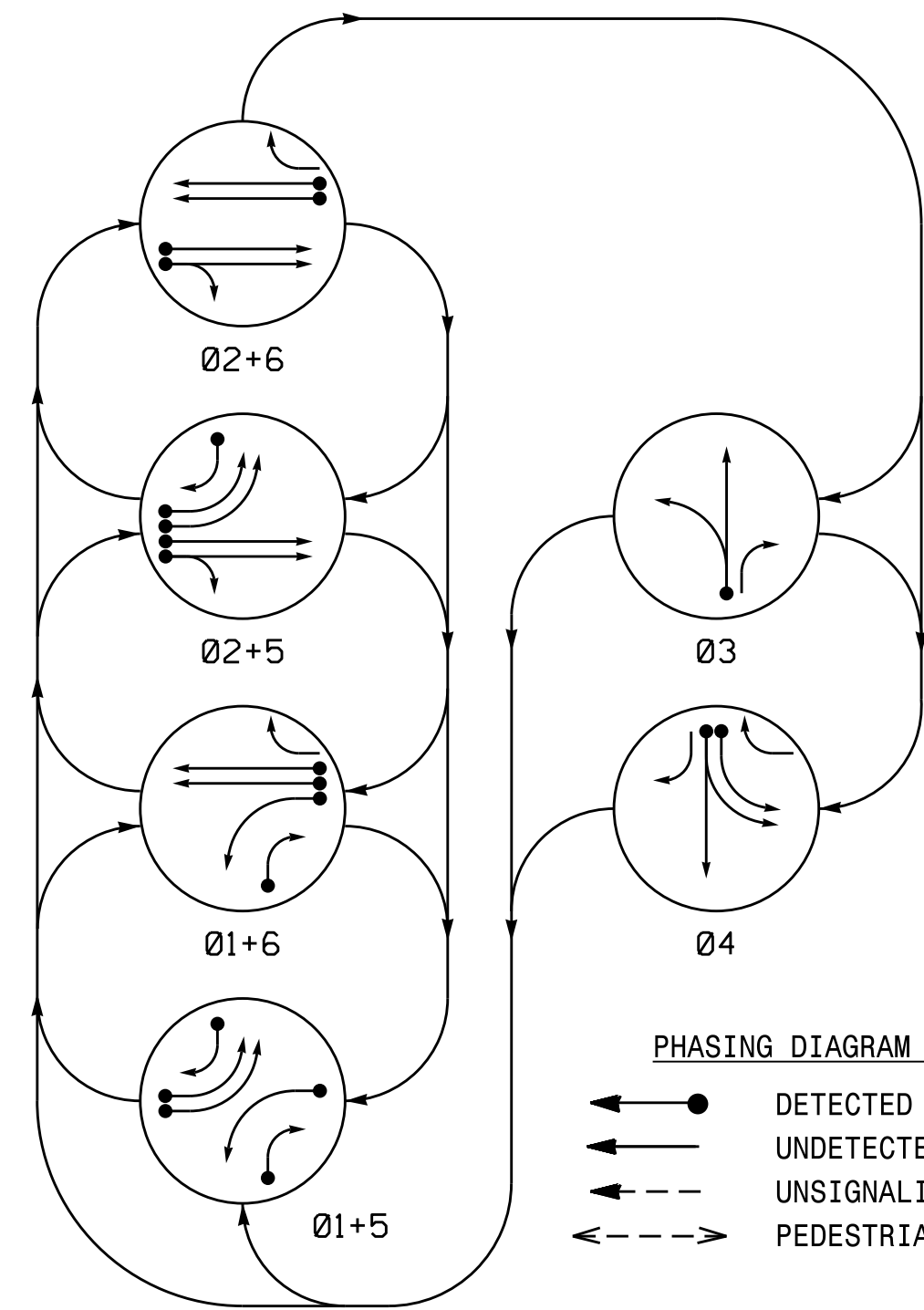
750 N. Greenfield Parkway
Garner, NC 27529



DocuSigned by:
Debesh C. Sarkar
10/11/2017
DATE

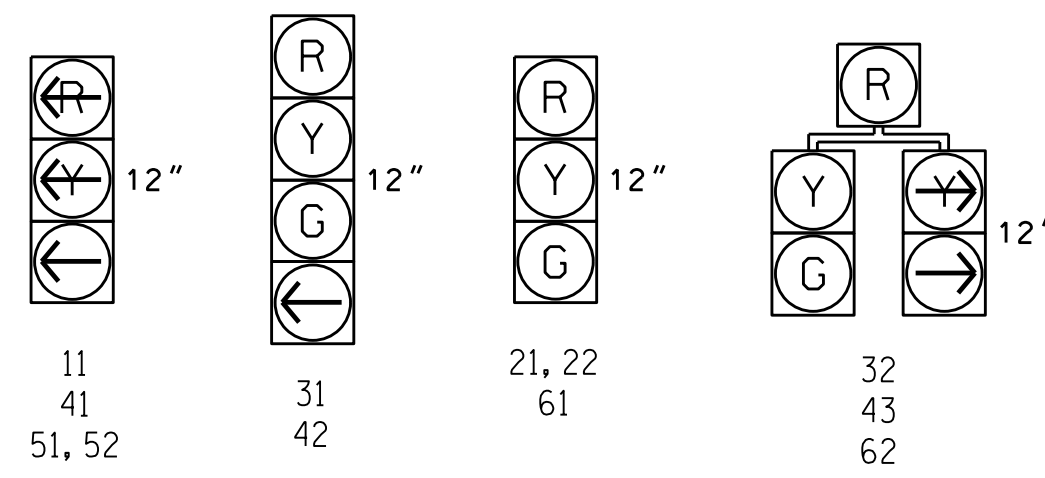
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PHASING DIAGRAM



SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	←	←	←	←	←	←
21, 22	R	R	G	G	R	Y
31	R	R	R	R	C	R
32	R	R	R	R	G	R
41	←	←	←	←	←	←
42	R	R	R	R	R	G
43	R	R	R	R	R	G
51, 52	←	←	←	←	←	←
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

SIGNAL FACE I.D.



SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

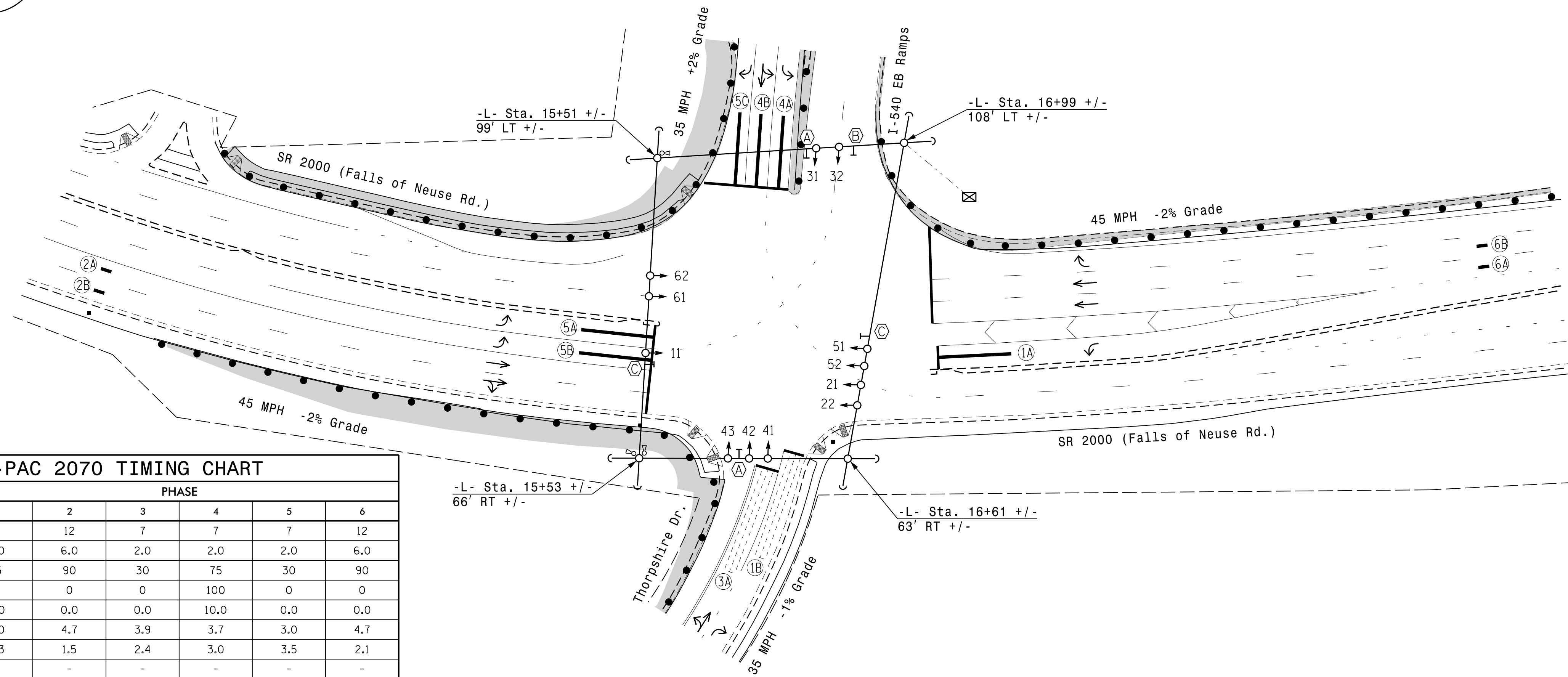
LOOP / ZONE NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DETECTOR PROGRAMMING										STATUS			
							TIMING		OPERATION MODE							SWITCH	SYSTEM	NEW	EXISTING	
							DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	1 CALL	STOP A	STOP B	PROPPER	LEFT TURN					RIGHT TURN
1A*	6X60	*	0	X	-	1	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
1B	6X60	2-4-2	0	-	X	1	15	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
2A*	6X6	*	300	X	-	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
2B*	6X6	*	300	X	-	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
3A	6X60	2-4-2	0	-	X	3	3	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
4A*	6X40	*	0	X	-	4	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
4B*	6X40	*	0	X	-	4	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
5A*	6X40	*	0	X	-	5	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
5B*	6X40	*	0	X	-	5	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
5C*	6X40	*	0	X	-	5	15	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
6A*	6X6	*	300	X	-	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-
6B*	6X6	*	300	X	-	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X	-

* Video detection zone.

6 Phase Fully Actuated (Raleigh Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- 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.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The cabinet should be designed to include an Auxiliary Output file for future use.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- This intersection features a video detection system. Shown locations of detectors are conceptual only. Refer to the manufacturer's guidelines for optimal detector placement.



FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Passage Gap *	2.0	6.0	2.0	2.0	2.0	6.0
Maximum Green *	15	90	30	75	30	90
Dynamic Maximum	0	0	0	100	0	0
Dynamic Step	0.0	0.0	0.0	10.0	0.0	0.0
Yellow Change	3.0	4.7	3.9	3.7	3.0	4.7
Red Clear	3.3	1.5	2.4	3.0	3.5	2.1
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	-	1.5	-	-	-	1.5
Maximum Initial *	-	34	-	-	-	34
Time Before Reduction *	-	20	-	-	-	20
Time To Reduce *	-	40	-	-	-	40
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.

PROPOSED	EXISTING
	N/A
N/A	
N/A	

Signal Upgrade - Temporary Design 1 (TMP Phase I)

SR 2000 (Falls of Neuse Rd.) at I-540 EB Ramps and Thorpshire Dr.

Division 5 Wake County Raleigh

PLAN DATE: July 2019 REVIEWED BY: J.A. Lohr

PREPARED BY: J.A. Lohr REVIEWED BY: [Signature]

8/28/2019

SCALE: 1" = 40'

REVISIONS: [Table]

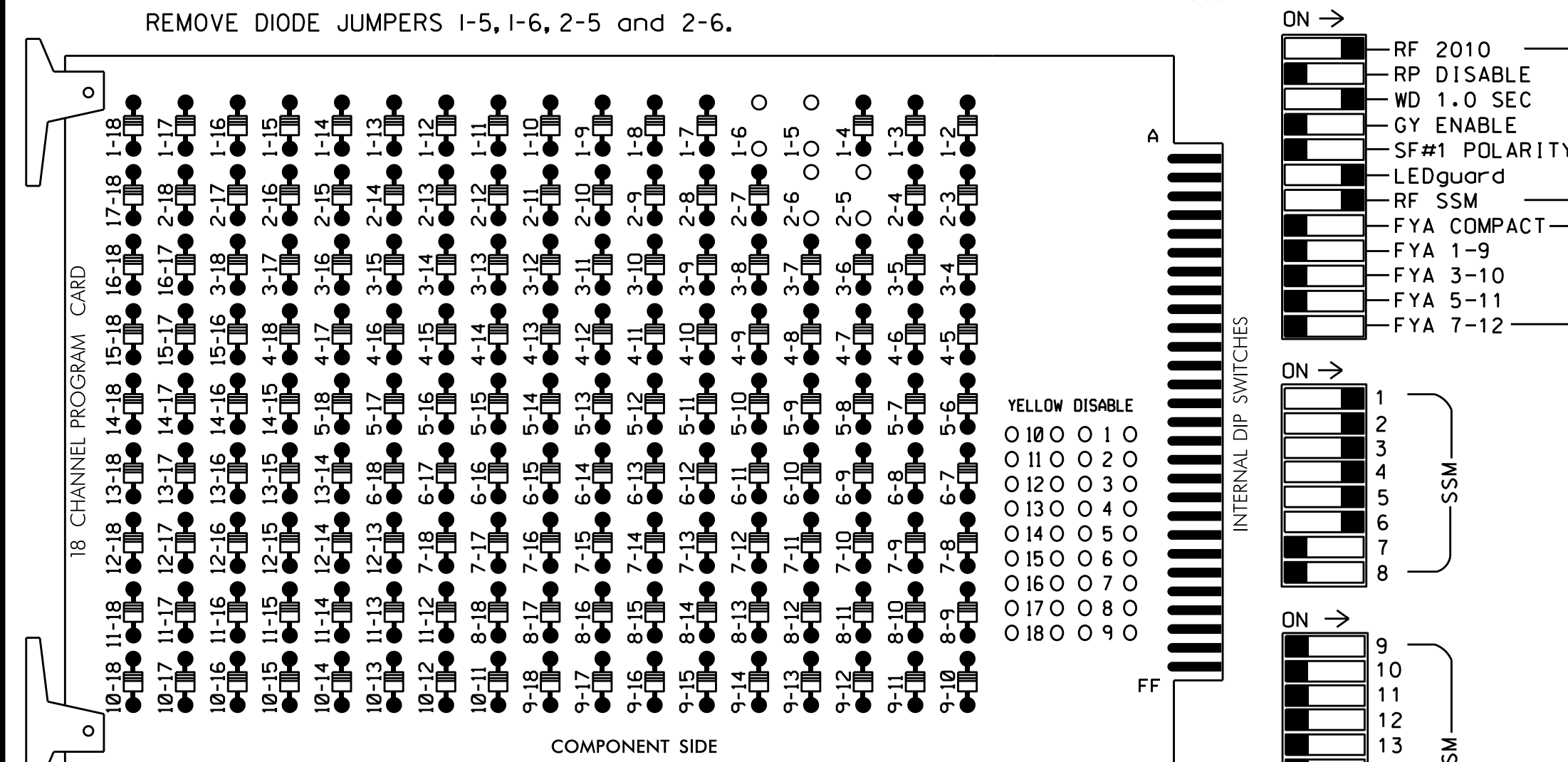
INIT. DATE

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SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER ROBERT J. ZIEMBA

**EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



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.

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

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
 PHASES USED.....1,2,3,4,5,6
 OVERLAPS.....NONE

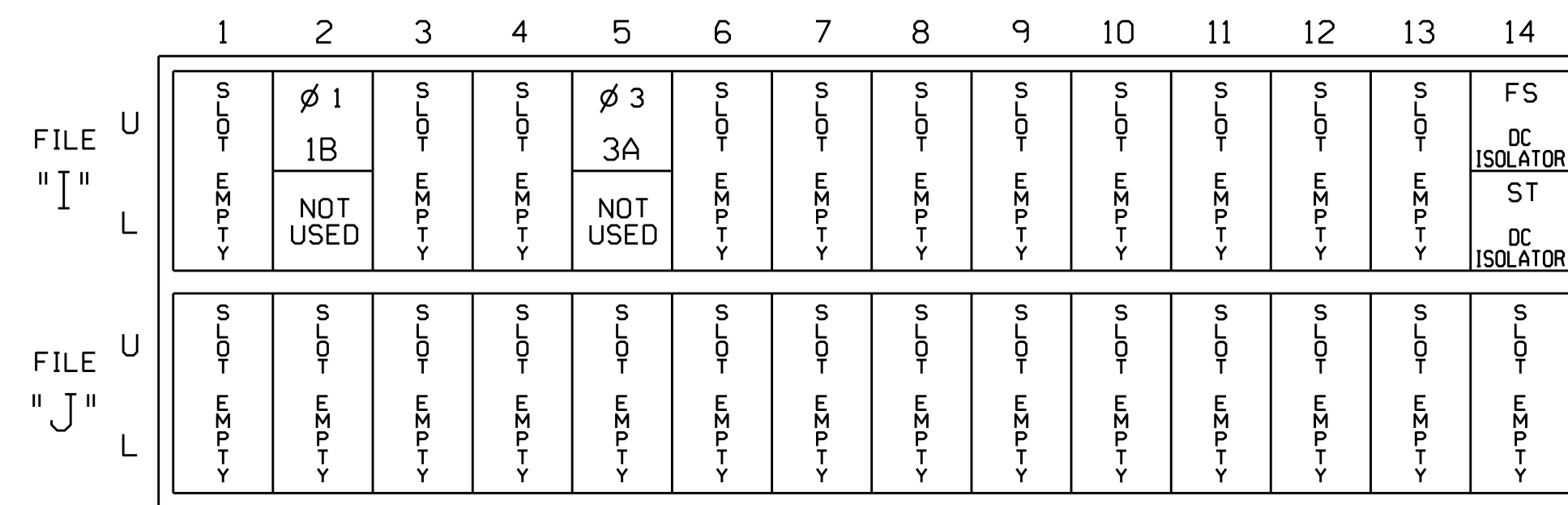
SIGNAL HEAD HOOK-UP CHART

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	3	4	4	5	6	6	7	8	8	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	32	21,22	31	32	41	42	43	62	43	51,52	61,62	NU	NU	NU	NU	NU	NU
RED		128		116	116	101	101				134							
YELLOW		129		117	117	102	102				135							
GREEN		130		118	118	103	103				136							
RED ARROW	125					101					131							
YELLOW ARROW	126	126				102		102	132	132								
GREEN ARROW	127	127		118	103	103	103	133	133									

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



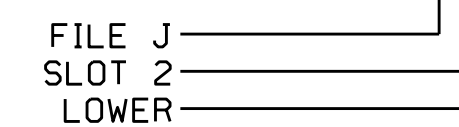
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1B	TB2-5,6	12U	39	3	1	15	
3A	TB4-5,6	15U	58	9	3	3	

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2035T1
 DESIGNED: July 2019
 SEALED: 8/28/2019
 REVISED: N/A

SPECIAL DETECTOR NOTE

For zones 1A, 2A, 2B, 4A, 4B, 5A, 5B, 5C, 6A AND 6B, install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

Electrical Detail - Temp. Design 1 (TMP Phase I)

Electrical and Programming Details For: SR 2000 (Falls of Neuse Rd.) at I-540 EB Ramps and Thorpshire Dr.

Division 5 Wake County Raleigh

PLAN DATE: October 2021 REVIEWED BY:
 PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

Seal: Ryan W. Hough, Professional Engineer, No. 036833, State of North Carolina.

DocuSign by: Ryan W. Hough, 03/07/2022

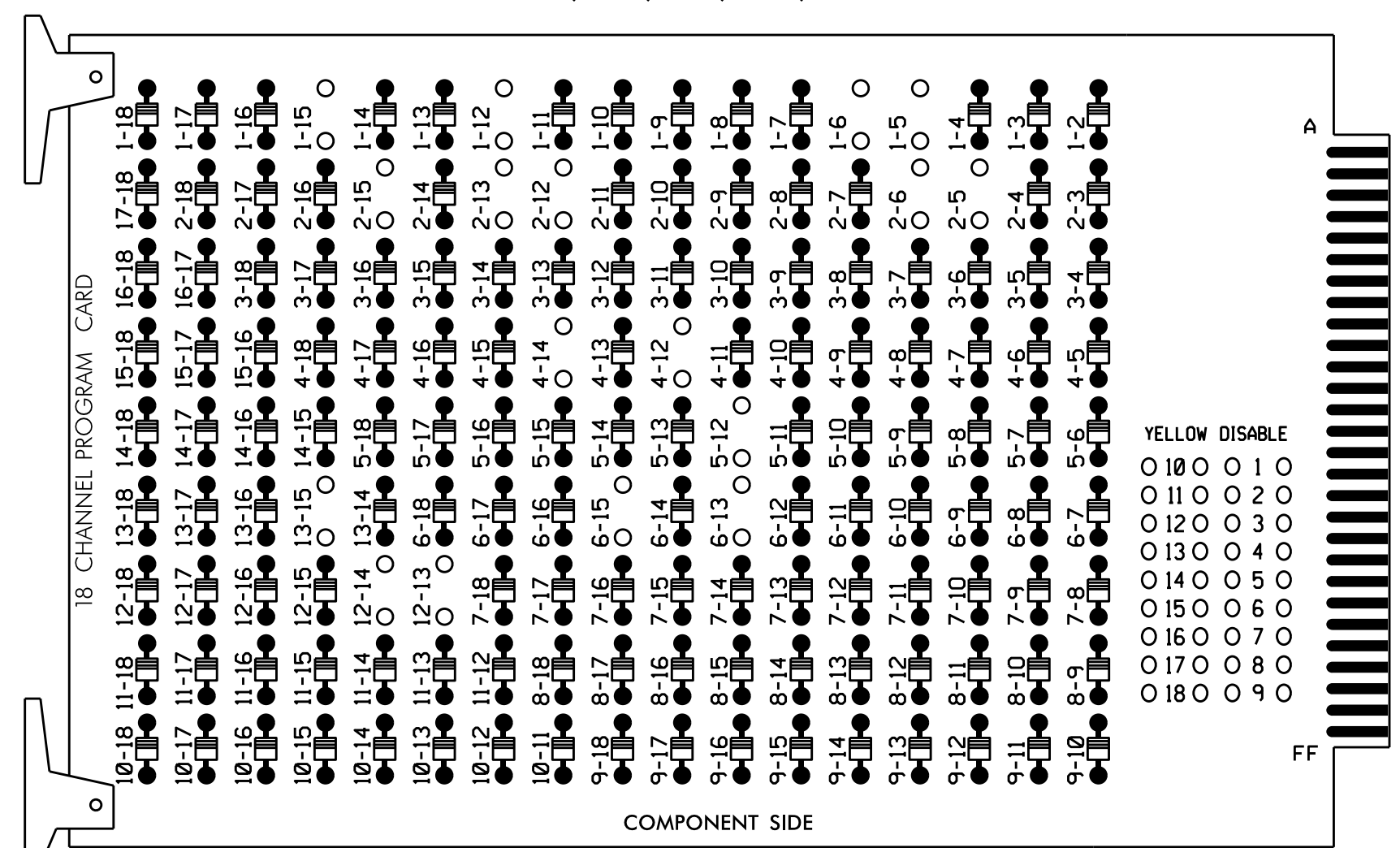
750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. 05-2035T1

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-12, 1-15, 2-5, 2-6, 2-12, 2-13, 2-15, 4-12, 4-14, 5-12, 5-13, 6-13, 6-15, 12-13, 12-14 and 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

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	32	21,22, 23,24	P21, P22	31	32	41,42	43	44	62	P41, P42	51,52	44	61,62, 63	P61, P62	NU	NU	NU	45	NU		
RED		128		116	116		101	101						134								
YELLOW		129		117	117		102	102						135								
GREEN		130		118	118		103	103						136								
RED ARROW	125						101			131										A101		
YELLOW ARROW	126	126					102			132	132										A102	
GREEN ARROW	127	127					103	103	103	133	133										A103	
Hand				113						104												
Walking				115						106												

NU = Not Used

NOTES

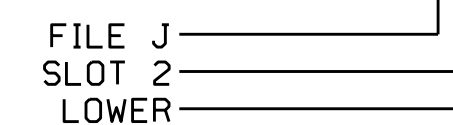
- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Green/Don't Walk and phase 6 Green.
- Enable simultaneous gap-out feature for all phases.
- Program phase 4 for Dynamic Max.
- The cabinet and controller are part of the Raleigh Signal System.

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		
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		
3A	TB4-5,6	I5U	58	9	3		
4A	TB4-9,10	I6U	41	11	4		
4B	TB4-11,12	I6L	45	12	4		
4C	TB6-1,2	I7U	65	13	4		
5A	TB3-1,2	J1U	55	19	5		
5B	TB3-5,6	J2U	40	21	5		
5C	TB3-7,8	J2L	44	22	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
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		

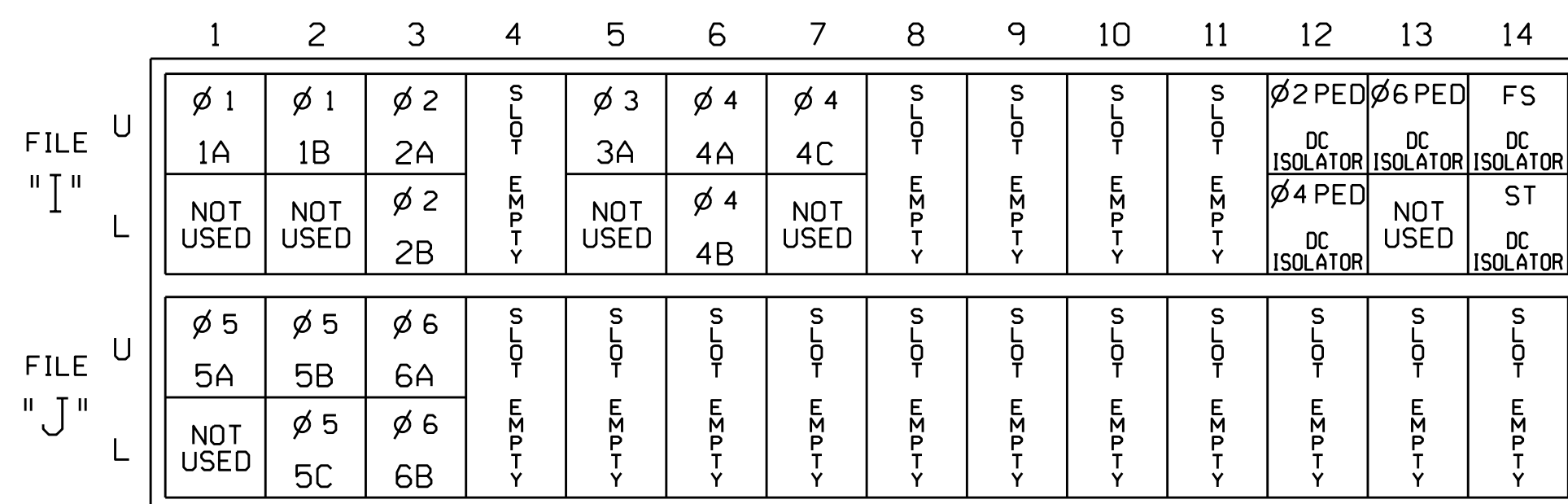
NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

INPUT FILE POSITION LEGEND: J2L



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,AUX S5
 PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....*

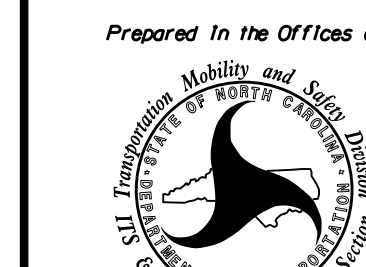
* See sheet 2 for Overlap Programming Detail

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

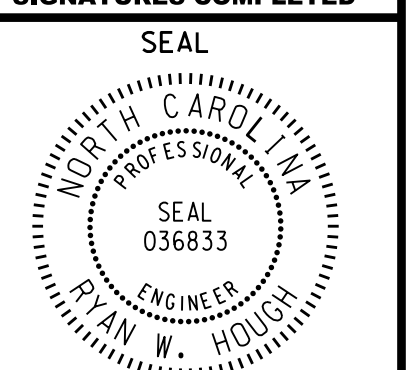
SR 2000 (Falls of Neuse Rd.)



at
I-540 EB Ramps and
Thorpshire Dr.

Division 5 Wake County Raleigh
 PLAN DATE: January 2023 REVIEWED BY:
 PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE



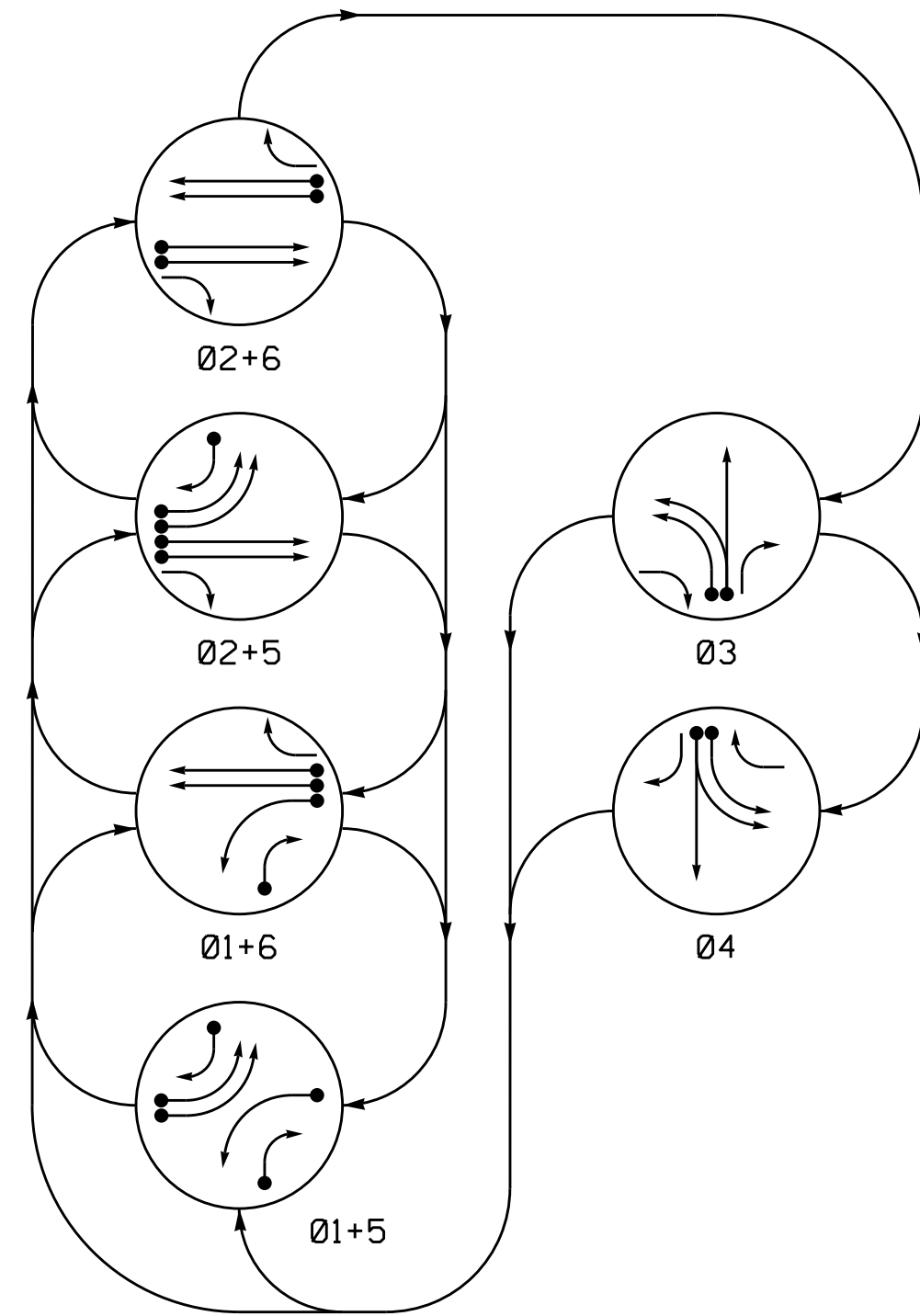
DocuSigned by:
Ryan W. Hough 01/13/2023
 430320FAA2854C3 DATE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2035
 DESIGNED: January 2023
 SEALED: 01/03/2023
 REVISED: N/A

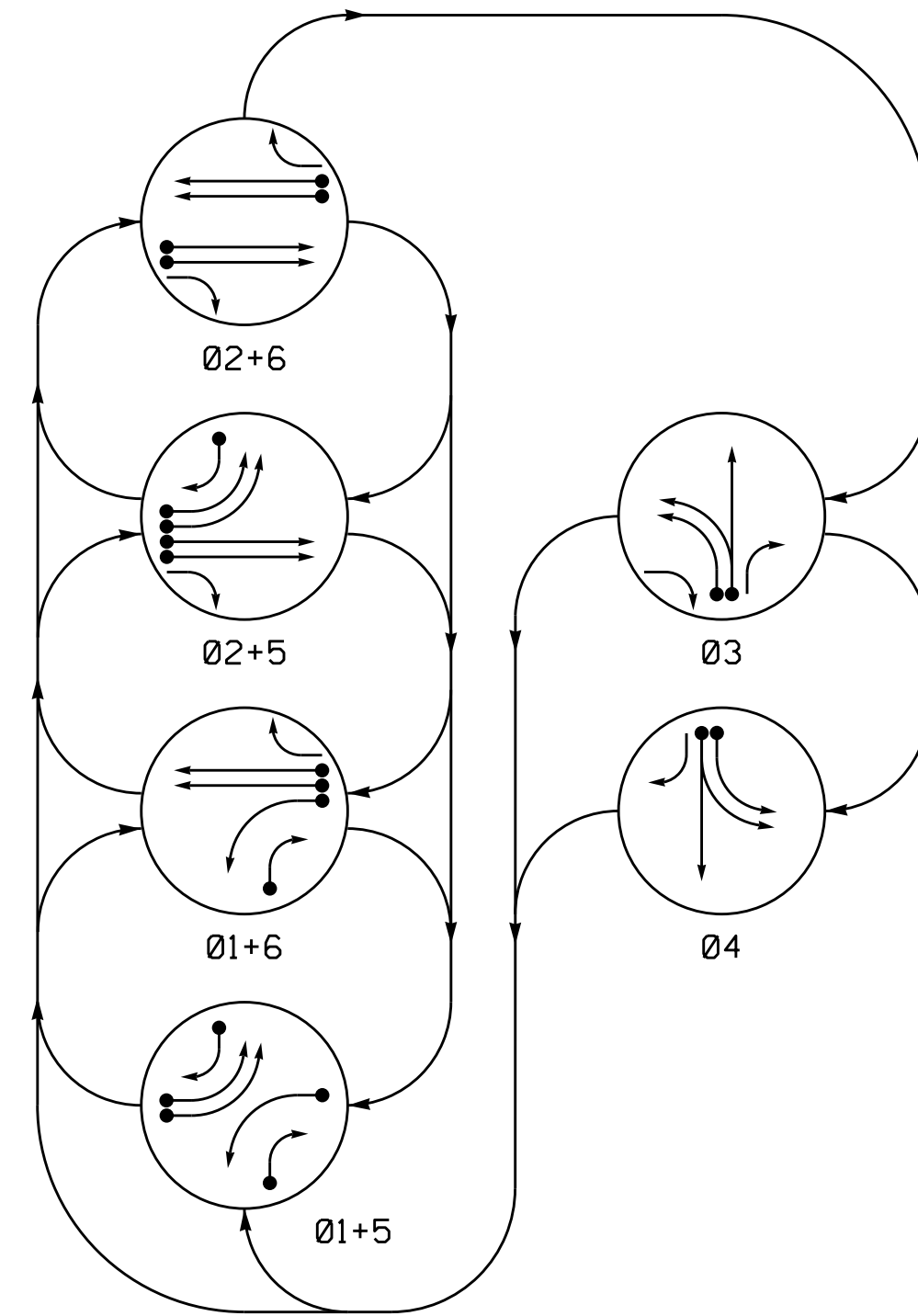
750 N. Greenfield Pkwy, Corner, NC 27529

SIG. INVENTORY NO. 05-2035

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	-	-	R	R	R	R
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
31	R	R	R	R	R	R
32	R	R	R	R	G	R
33	R	R	R	R	G	R
41	R	R	R	R	R	R
42	R	R	R	R	R	G
43	R	R	R	R	R	G
51, 52	-	R	-	R	R	R
61, 62	R	G	R	G	R	Y
63	R	R	R	R	R	Y
SIGN A	OFF	OFF	OFF	OFF	OFF	OFF

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

LOOP / ZONE NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DETECTOR PROGRAMMING														
							DELAY	EXTEND (STRETCH)	OPERATION MODE										SYSTEM LOOPS	STATUS	
									VEHICLE	PEDESTRIAN	T CALL	STOP A	STOP B	PROTECT LEFT TURN THROUGH	AND	SWITCH	NEW	EXISTING			
1A	6X40	2-4-2	0	-	X	1	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
1B	6X40	2-4-2	0	-	X	1	15	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
2A	6X6	EXIST	300	-	X	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
2B	6X6	EXIST	300	-	X	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
3A	6X40	2-4-2	0	-	X	3	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	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
4B	6X40	2-4-2	0	-	X	4	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	-	X	5	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
5B	6X40	2-4-2	0	-	X	5	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
5C	6X40	2-4-2	0	-	X	5	15	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
6A	6X6	EXIST	300	-	X	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
6B	6X6	EXIST	300	-	X	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	-
S1*	6X6	*	300	X	-	-	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	*
S2*	6X6	*	300	X	-	-	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	*
S3	6X6	4	+115*	X	-	-	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	X
S4	6X6	4	+115*	X	-	-	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	X
S5	6X6	5	300	X	-	-	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	X	X

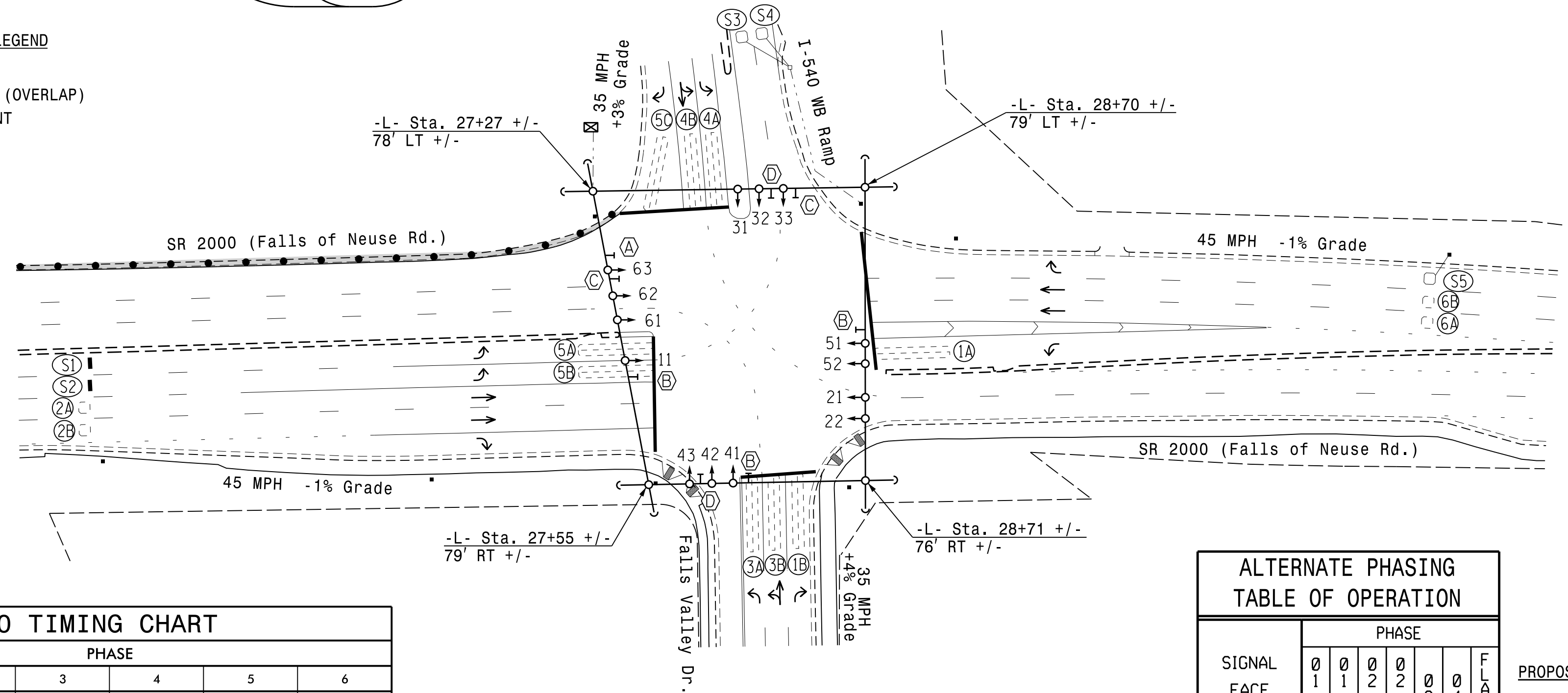
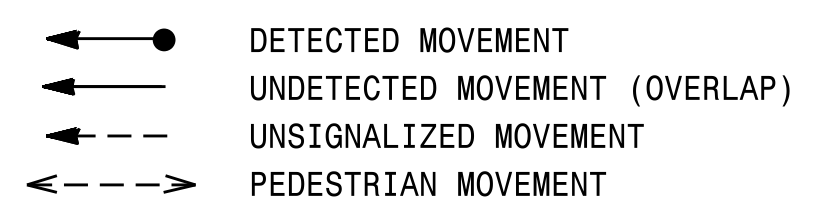
* Video Detection Zone.
Measured from Extended Tangent on End of Ramp

6 Phase Fully Actuated (Raleigh Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The cabinet should be designed to include an Auxiliary Output file for future use.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- During Alternate Phasing sign A will be on when phase 3, 4, or 5 is Green. It will also stay on when transitioning between these phases. It will not be on at any point in the Default Phasing.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal timing values supersede these values.
- This intersection features a video detection system. Shown locations of detectors are conceptual only. Refer to the manufacturer's guidelines for optimal detector placement.

PHASING DIAGRAM DETECTION LEGEND

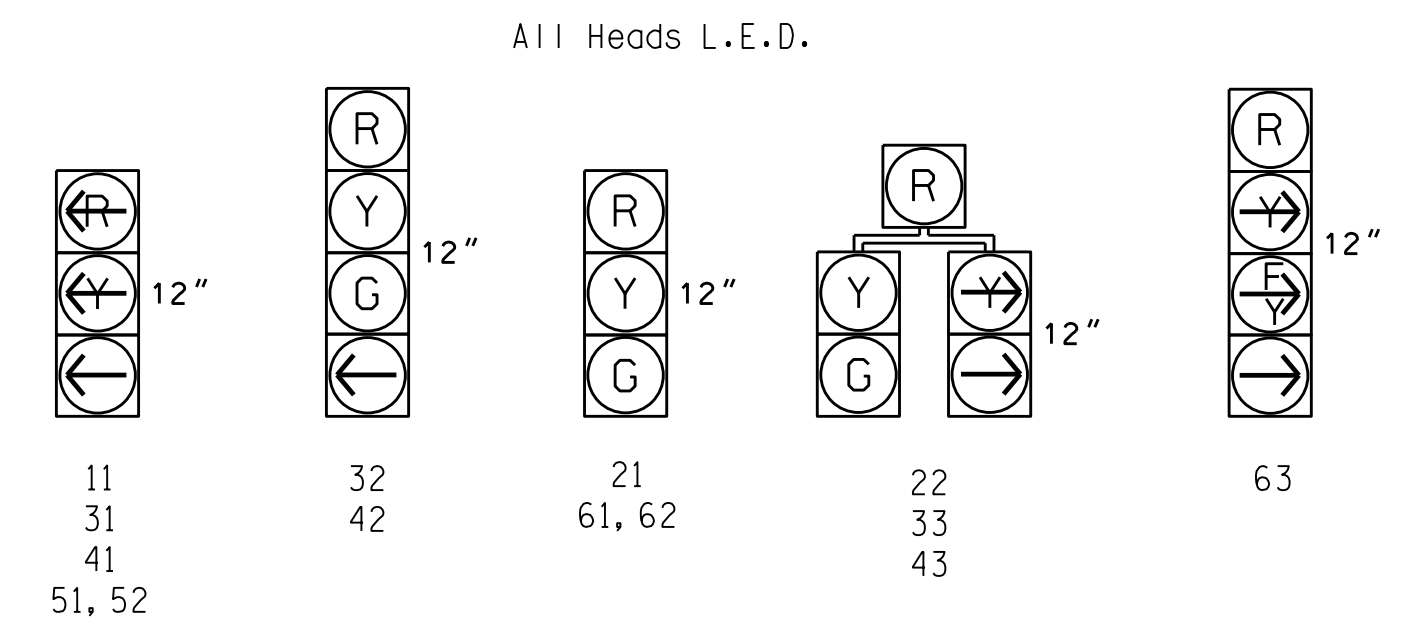


SE-PAC 2070 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Passage Gap *	2.0	6.0	2.0	2.0	2.0	6.0
Maximum Green *	15	75	15	30	30	75
Yellow Change	3.0	4.6	3.6	3.7	3.0	4.6
Red Clear	3.2	1.3	2.9	2.9	3.2	1.8
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	-	1.5	-	-	-	1.5
Maximum Initial *	-	34	-	-	-	34
Time Before Reduction *	-	20	-	-	-	20
Time To Reduce *	-	40	-	-	-	40
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.

SIGNAL FACE I.D.



ALTERNATE PHASING TABLE OF OPERATION

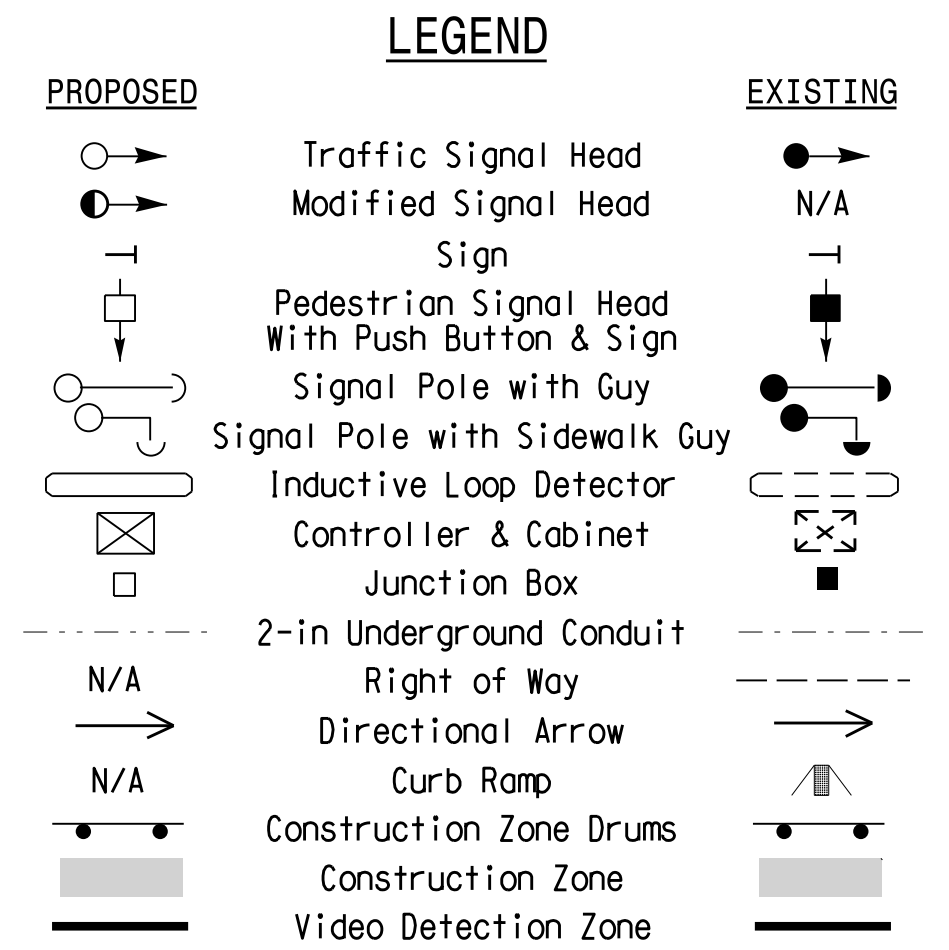
SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	-	-	R	R	R	R
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
31	R	R	R	R	R	R
32	R	R	R	R	G	R
33	R	R	R	R	G	R
41	R	R	R	R	R	R
42	R	R	R	R	R	G
43	R	R	R	R	R	G
51, 52	-	R	-	R	R	R
61, 62	R	G	R	G	R	Y
63	R	R	R	R	R	Y
SIGN A	ON	OFF	ON	OFF	ON	OFF

PROPOSED

- (A) "NO TURN ON RED" L.E.D. Blankout Sign
- (B) "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)
- (C) Right Arrow "ONLY" Sign (R3-5R)
- (D) Combined Through and Left Arrow Sign (R3-6L)

SIGNS

EXISTING



Signal Upgrade - Temporary Design 1 (TMP Phase I)

Prepared in the Offices of:

 SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive
 Division 5 Wake County Raleigh
 PLAN DATE: February 2022 REVIEWED BY:
 PREPARED BY: J.A. Lohr REVIEWED BY:
 SCALE: 1"=50'

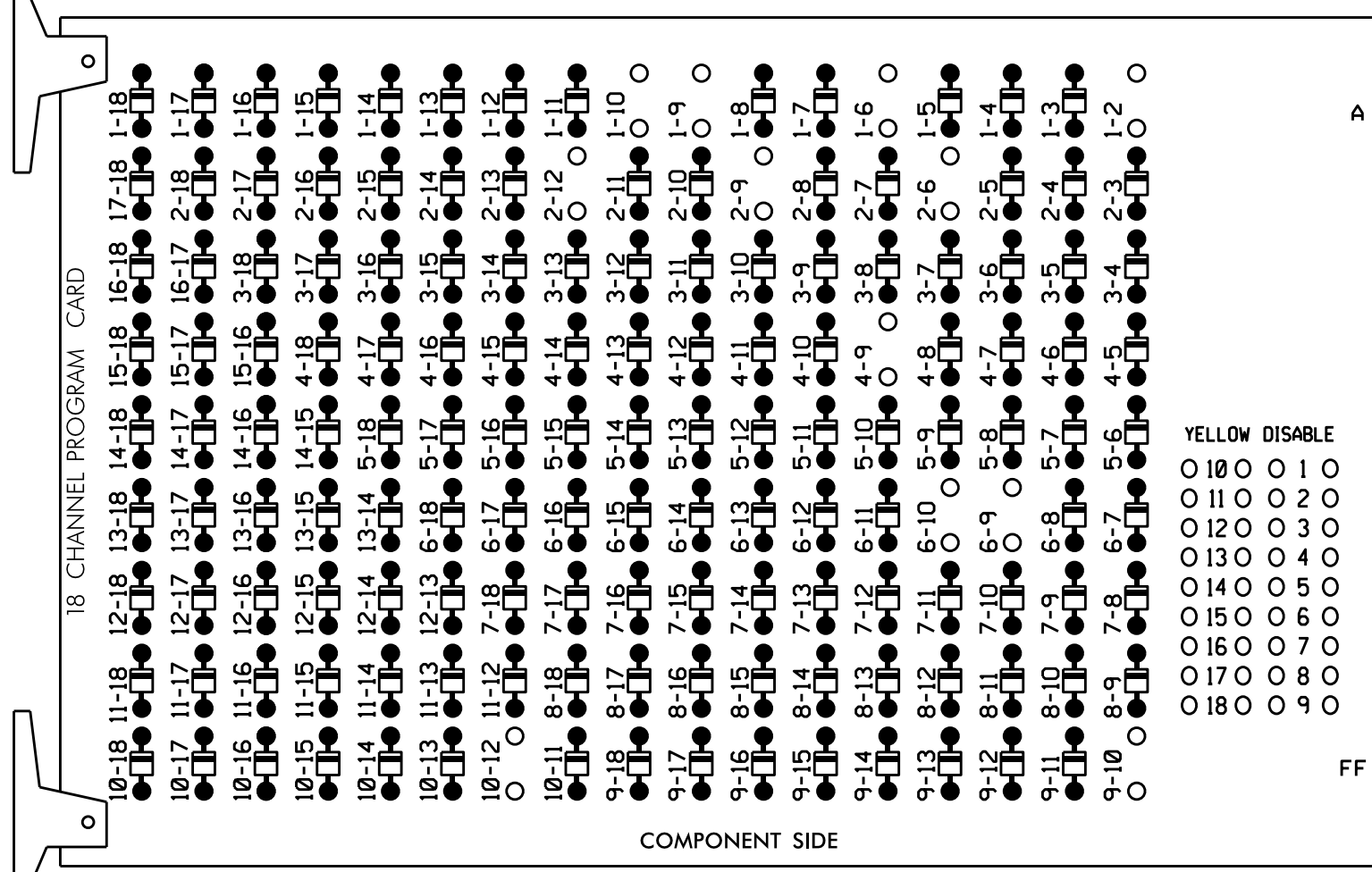
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 026486
 ROBERT J. TIEBER
 ENGINEER
 DATE: 02/22/2022
 SIG. INVENTORY NO. 05-203611

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

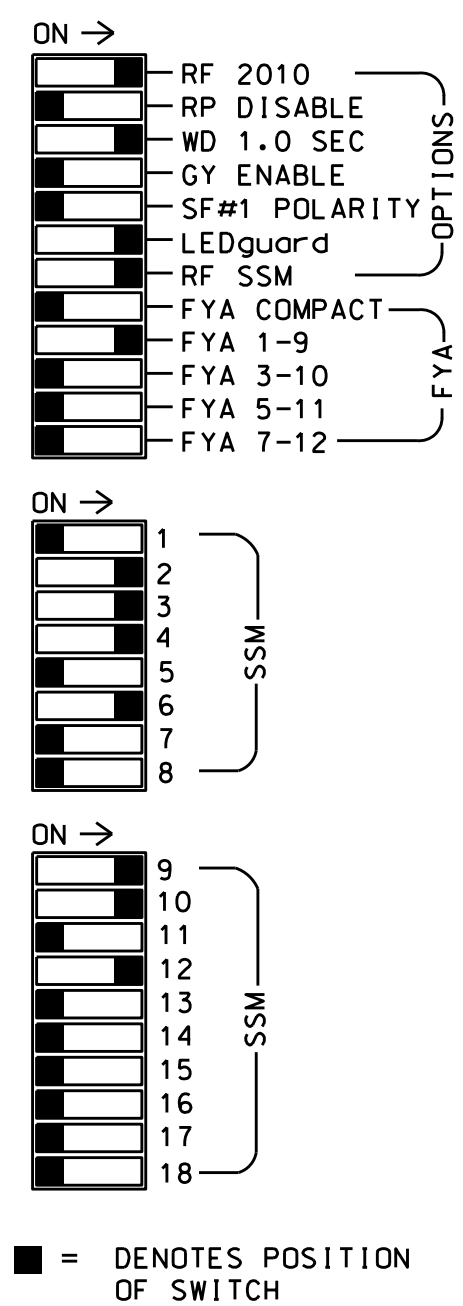
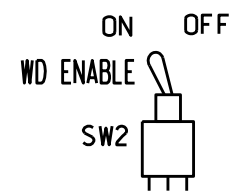
REMOVE DIODE JUMPERS 1-2, 1-6, 1-9, 1-10, 2-6, 2-9, 2-12, 4-9, 6-9, 6-10, 9-10, and 10-12.



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.



■ = DENOTES POSITION OF SWITCH

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	OLG	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	OLE	OLC	OLD	SPARE							
SIGNAL HEAD NO.	63	21,22	NU	22	31	32	33	41	42	43	NU	NU	61,62	NU	NU	NU	63	11	33	BLANK OUT SIGN	NU	43	51,52	NU	
RED		128			116	116		101	101				134				A121			*					
YELLOW	*	129			117	117		102	102				135							*					
GREEN		130			118	118		103	103				136										A113		
RED ARROW					116			101									A124							A101	
YELLOW ARROW					117	117		102									A122	A125	A125					A102	A102
FLASHING YELLOW ARROW																	A123								
GREEN ARROW	127				118	118		103	103								A126	A126						A103	A103
Hand																									
Person																									

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

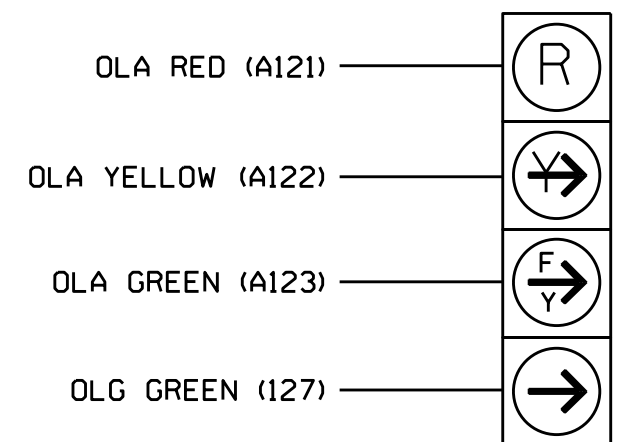
NOTE: Output assignments for load switch S1 and AUUX S3 have been remapped. See sheet 2 for details.

Load switch AUX S3 used for blankout sign control. See sheet 4 for wiring details.

NOTE: Install a white flash block for Overlap E to prevent Sign A from flashing during cabinet or controller flash.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



63

INPUT FILE POSITION LAYOUT

(front view)

FILE	U	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
"I"	U	∅ 1 1A	∅ 1 1B	∅ 2 2A	∅ 3 3A	∅ 3 3B	∅ 4 4A	∅ 5 5A	∅ 5 5B	∅ 6 6A	∅ 7 7A	∅ 7 7B	∅ 8 8A	∅ 8 8B	∅ 9 9A	FS DC ISOLATOR	
	L	NOT USED	NOT USED	∅ 2 2B	NOT USED	NOT USED	∅ 4 4B	∅ 5 5C	∅ 5 5C	∅ 6 6B	SYS. DET. S3	SYS. DET. S5	∅ 9 9B	∅ 9 9B	∅ 10 10A	ST DC ISOLATOR	
"J"	U	∅ 5 5A	∅ 5 5B	∅ 6 6A	∅ 7 7A	∅ 7 7B	SYS. DET. S3	∅ 8 8A	∅ 8 8B	∅ 9 9A	∅ 9 9B	∅ 10 10A	∅ 10 10B	∅ 11 11A	∅ 11 11B	∅ 12 12A	∅ 12 12B
	L	NOT USED	∅ 5 5C	∅ 6 6B	∅ 7 7C	∅ 7 7C	SYS. DET. S4	∅ 8 8C	∅ 8 8C	∅ 9 9C	∅ 9 9C	∅ 10 10C	∅ 10 10C	∅ 11 11C	∅ 11 11C	∅ 12 12C	∅ 12 12C

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

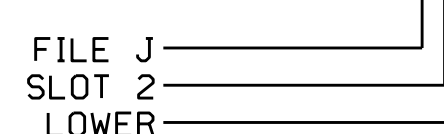
FS = FLASH SENSE
ST = STOP TIME

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		
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		
3A	TB4-5,6	I5U	58	9	3	3	
3B	TB4-9,10	I6U	41	11	3		
4A	TB6-1,2	I7U	65	13	4		
4B	TB6-3,4	I7L	78	14	4		
5A	TB3-1,2	J1U	55	19	5		
5B	TB3-5,6	J2U	40	21	5		
5C	TB3-7,8	J2L	44	22	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
* S3	TB7-1,2	J7U	66	33	SYS		
* S4	TB7-3,4	J7L	79	34	SYS		
* S5	TB7-9,10	J9U	59	37	SYS		

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

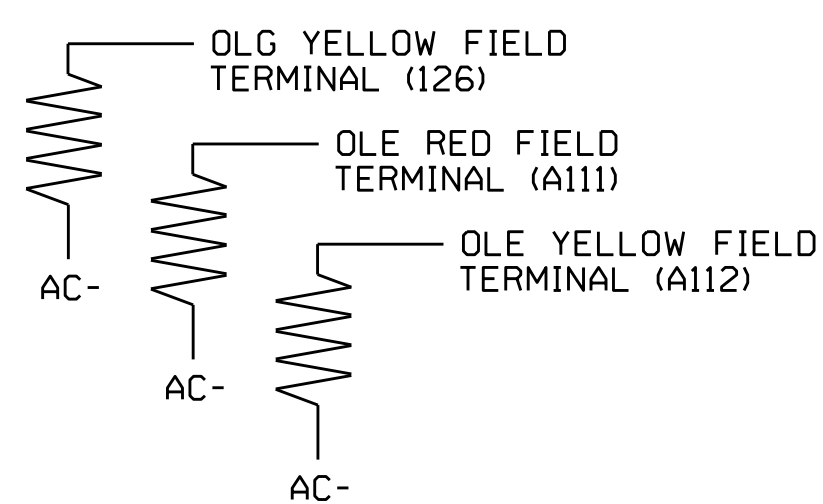
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones S1 and S2. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2036T1
DESIGNED: February 2022
SEALED: 2/22/2022
REVISED: N/A

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/ AUX
SOFTWARE.....SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S8,AUX S1
AUX S2,AUX S3*,AUX S5
PHASES USED.....1,2,3,4,5,6
OVERLAP A.....4+6
OVERLAP B.....1
OVERLAP C.....NOT USED
OVERLAP D.....5
OVERLAP E.....3+4+5
OVERLAP G.....6
* Load switch used for blankout sign control only.

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 2 and 6 for volume density operation.
5. The cabinet and controller are part of the Raleigh Signal System.

Electrical Detail - Temp 1 (TMP Phase I) - Sheet 1 of 4

Electrical and Programming Details For: SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive

Prepared In the Offices of: [Logo]

750 N. Greenfield Pkwy, Garner, NC 27529

PLAN DATE: February 2022	REVIEWED BY:
PREPARED BY: S. Armstrong	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: RYAN W. HOUGH, PROFESSIONAL ENGINEER, STATE OF NORTH CAROLINA, NO. 036833

DocuSigned by: Ryan W. Hough 03/07/2022

SIG. INVENTORY NO. 05-2036T1

OVERLAP PROGRAMMING DETAIL

- From Main Menu select 4 - UNIT DATA
- From UNIT DATA Submenu select 3 - OVERLAP DATA

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA

A: FYA  E: STD  I: ---  M: ---
B: STD  F: ---  J: ---  N: ---
C: ---  G: STD  K: ---  O: ---
D: STD  H: ---  L: ---  P: ---

PREV/NEXT TO CYCLE
  
```

OVERLAP A

Use Up/Dn/Left/Right keys to position cursor on Overlap 'A', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - A      DELAY/10: 0
PHASES..12345678 90123456
PERM PHASES: 00010000 00000000
PROT PHASES: 00000100 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNPO
PERM OVERLAPS: x0000000 00000000
PROT OVERLAPS: x0000000 00000000
  
```

Press ESC

OVERLAP B

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - B      12345678 90123456
PARENTS: 10000000 00000000
+GRN PHASES: 00000000 00000000
-G/Y PHASES: 00000000 00000000
-PED PHASES: 00000000 00000000
TRAIL GREEN STANDARD: 0 YEL/10: 40
TRAIL GREEN PREEMPT: 0 RED/10: 20
  
```

Press ESC

OVERLAP D

Use Up/Dn/Left/Right keys to position cursor on Overlap 'C', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - D      12345678 90123456
PARENTS: 00001000 00000000
+GRN PHASES: 00000000 00000000
-G/Y PHASES: 00000000 00000000
-PED PHASES: 00000000 00000000
TRAIL GREEN STANDARD: 0 YEL/10: 40
TRAIL GREEN PREEMPT: 0 RED/10: 20
  
```

OVERLAP E

Use Up/Dn/Left/Right keys to position cursor on Overlap 'G', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - E      12345678 90123456
PARENTS: 00111000 00000000
+GRN PHASES: 00000000 00000000
-G/Y PHASES: 00000000 00000000
-PED PHASES: 00000000 00000000
TRAIL GREEN STANDARD: 0 YEL/10: 40
TRAIL GREEN PREEMPT: 0 RED/10: 20
  
```

Press ESC

OVERLAP G

Use Up/Dn/Left/Right keys to position cursor on Overlap 'G', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - G      12345678 90123456
PARENTS: 00000100 00000000
+GRN PHASES: 00000000 00000000
-G/Y PHASES: 00000000 00000000
-PED PHASES: 00000000 00000000
TRAIL GREEN STANDARD: 0 YEL/10: 40
TRAIL GREEN PREEMPT: 0 RED/10: 20
  
```

END OVERLAP PROGRAMMING

LOAD SWITCH MAPPING DETAIL FOR S1 AND AUX S3

- From Main Menu select 4 - UNIT DATA
- From UNIT DATA Submenu select 9 - OUTPUT MAPPING

USE ENTER AND NEXT KEYS
TO MAP 'LDSW 1' AS 'OLG'

```

OUTPUT MAPPING      EDIT MODE: LDSW
                    E-TOGGLE MODE
LDSW .1.. .2.. .3.. .4.. .5.. .6..
RED  OLG  PH2  PD2  PH3  PH4  PD4
YEL  -   -   -   -   -   -
GRN  -   -   -   -   -   -
FIO  1   2   3   4   5   6
PREV/NEXT TO CYCLE  D-DISPLAY COMPAT
  
```

USE ENTER AND NEXT KEYS
TO MAP 'LDSW 15' AS 'OLE'

```

OUTPUT MAPPING      EDIT MODE: LDSW
                    E-TOGGLE MODE
LDSW .13.. .14.. .15.. .16.. .17.. .18..
RED  OLA  OLB  OLE  OLC  OLD  PD3
YEL  -   -   -   -   -   -
GRN  -   -   -   -   -   -
FIO  13  14  15  16  17  18
PREV/NEXT TO CYCLE  D-DISPLAY COMPAT
  
```

LOAD SWITCH MAPPING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2036T1
DESIGNED: February 2022
SEALED: 2/22/2022
REVISED: N/A

Electrical Detail - Temp 1 (TMP Phase I) - Sheet 2 of 4		<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> Electrical and Programming DETAILS FOR: SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive </div> <div style="border: 1px solid black; padding: 5px;"> Division 5 Wake County Raleigh PLAN DATE: February 2022 REVIEWED BY: PREPARED BY: S. Armstrong REVIEWED BY: REVISIONS: _____ INIT. DATE: _____ _____ _____ </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> SEAL NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> DocuSigned by: Ryan W. Hough 03/07/2022 <small>430320FA6385403</small> DATE: _____ SIG. INVENTORY NO. 05-2036T1 </div>
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07-1485-2022_01:11
4/2/2022 10:26:02 AM etl-xxxx.dgn
S:\MS1\010

PROGRAMMING DETAILS TO CALL ALTERNATE PHASING

To run the Default phasing where the FYA runs protected and permitted turns and the Blankout sign is not enabled, schedule a Day Plan that calls an Action that is programmed to enable Phase Function 1. To run the Alternate Phasing where the FYA runs protected turns only and the Blankout sign is enabled, schedule a Day Plan that calls an Action that is programmed to enable Phase Function 2.

Actions can be programmed to run free run or call a coordination pattern.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

Step 1 - Assign OMIT OVERLAP A to Phase Function 2 and OMIT OVERLAP E to Phase Function 1.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 9 - PHS FUNC MAPPING

Use Up/Dn Keys to position cursor on NUM 1

```

TIME BASE PHS FUNC MAPPING
      PHS FUNC SEL(O-OFF/1-DN)
NUM..P-FUNCT NAME.....123456789 0123456
1  PHS-01 MAX # 2  00000000 00000000
2  PHS-02 MAX # 2  00000000 00000000
3  PHS-03 MAX # 2  00000000 00000000
4  PHS-04 MAX # 2  00000000 00000000
UP/DOWN TO SCROLL      E-EDIT
    
```

BEFORE PROCEEDING,
SCROLL THRU ENTIRE
RANGE OF FUNCTIONS TO
ENSURE ALL P-FUNCT 1 & 2
NUM x VALUES ARE SET
TO '0' (OFF)

Use Up/Dn/Left/Right keys to position cursor on NUM 145 and program P-FUNCT 1 & as shown.

```

TIME BASE PHS FUNC MAPPING
      PHS FUNC SEL(O-OFF/1-DN)
NUM..P-FUNCT NAME.....123456789 0123456
145 OVERLAP A OMIT  01000000 00000000
146 OVERLAP B OMIT  00000000 00000000
147 OVERLAP C OMIT  00000000 00000000
148 OVERLAP D OMIT  00000000 00000000
148 OVERLAP E OMIT  10000000 00000000
UP/DOWN TO SCROLL      E-EDIT
    
```

← P-FUNCT 2 = 1 (OVERLAP 'A' OMIT)

← P-FUNCT 1 = 1 (OVERLAP 'E' OMIT)

PHASE FUNCTION PROGRAMMING COMPLETE

TIME BASE ACTIONS PROGRAMMING

Step 2 - Set up Actions to run Phase Functions.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 5 - ACTIONS

For any Action that will run during the Default Phasing period:

```

TIME BASE ACTION # ***
                12345678 90123456
PATN:001      PHS: 10000000 00000000
0=I'CONN      AUX: 000-----
1-253=PATN    SPC: 0000000-   0=NO
254=FREE      DIM: 0-----   1=YES
255=FLASH     DET: 000-----
UP/DOWN TO SCROLL
    
```

← NOTICE
PHS 1

For any Action that will run during the Alternate Phasing period:

```

TIME BASE ACTION # ***
                12345678 90123456
PATN:001      PHS: 01000000 00000000
0=I'CONN      AUX: 000-----
1-253=PATN    SPC: 0000000-   0=NO
254=FREE      DIM: 0-----   1=YES
255=FLASH     DET: 000-----
UP/DOWN TO SCROLL
    
```

← NOTICE
PHS 2

SPECIAL FUNCTION PROGRAMMING COMPLETE

*** Action #(s) are to be determined by the Division and/or City Traffic Engineer and are scheduled to run in Day Plan(s).

PHASE FUNCTION OPERATION		
Phasing Period	Default	Alternate
Phase Function 1	ENABLED	DISABLED
Phase Function 2	DISABLED	ENABLED
Blankout Sign	OFF	OPERATIONAL
FYA Operation	PROT/PERM	PROT ONLY

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2036T1
DESIGNED: February 2022
SEALED: 2/22/2022
REVISED: N/A

Electrical Detail - Temp 1 (TMP Phase I) - Sheet 3 of 4

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 2000 (Falls of Neuse Rd.)
at
I-540 WB Ramps and
Falls Valley Drive

Division 5 Wake County Raleigh

PLAN DATE: February 2022 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: _____ INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

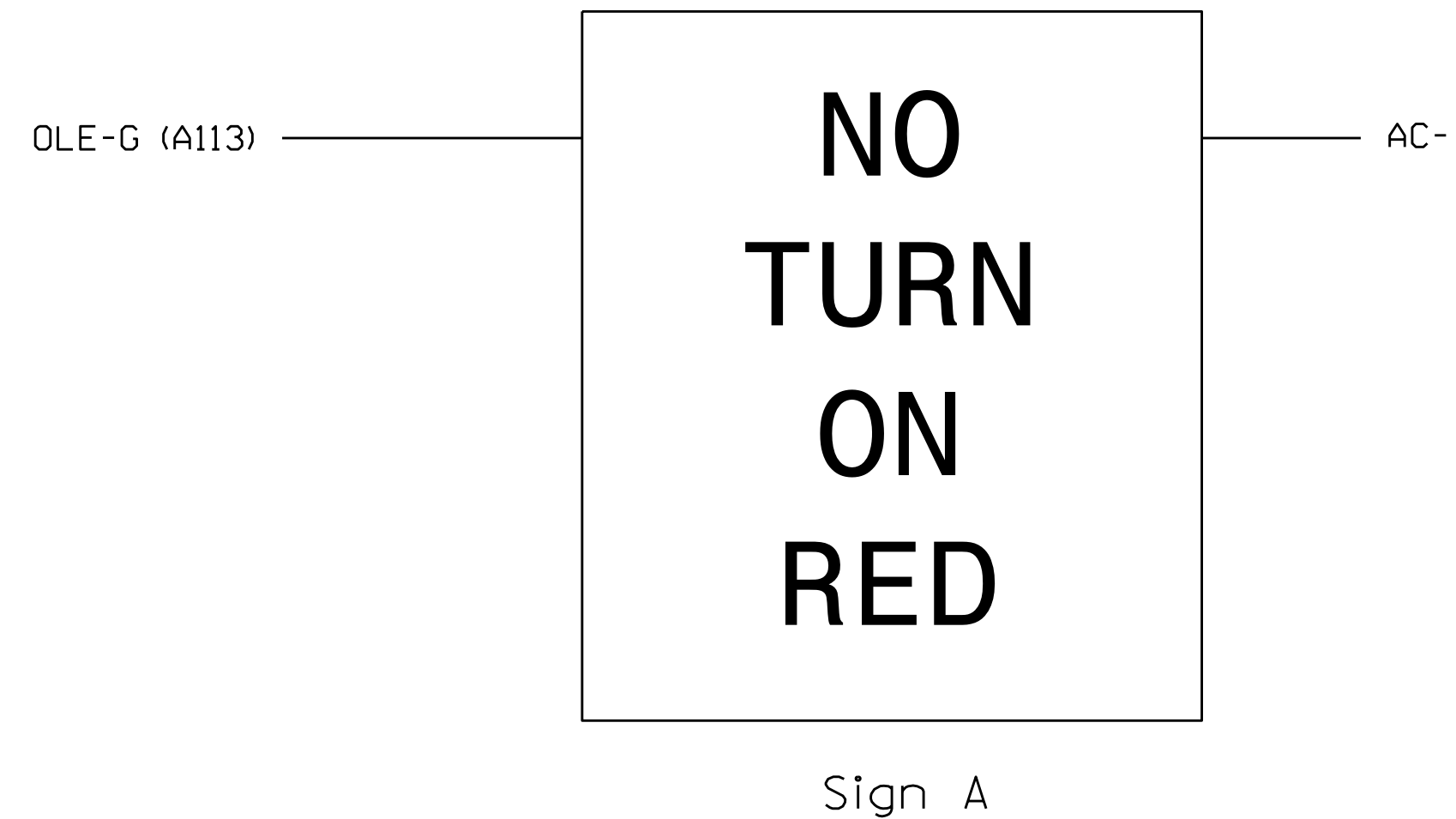
SEAL

Ryan W. Hough
03/07/2022
DATE

SIG. INVENTORY NO. 05-2036T1

07-1485-2022_01:12
W:\2022\05-2036\Draws\elec\td1-wk.dgn
S:\MSR\0103


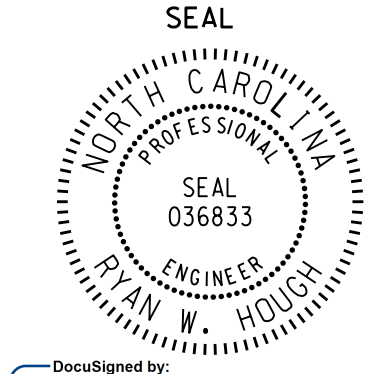
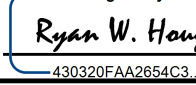
BLANKOUT SIGN WIRING DETAIL



BLANKOUT SIGN 'A' INDICATION						
Phase	I+5	I+6	2+5	2+6	3	4
Default Phasing	OFF	OFF	OFF	OFF	OFF	OFF
Alternate Phasing	ON	OFF	ON	OFF	ON	ON

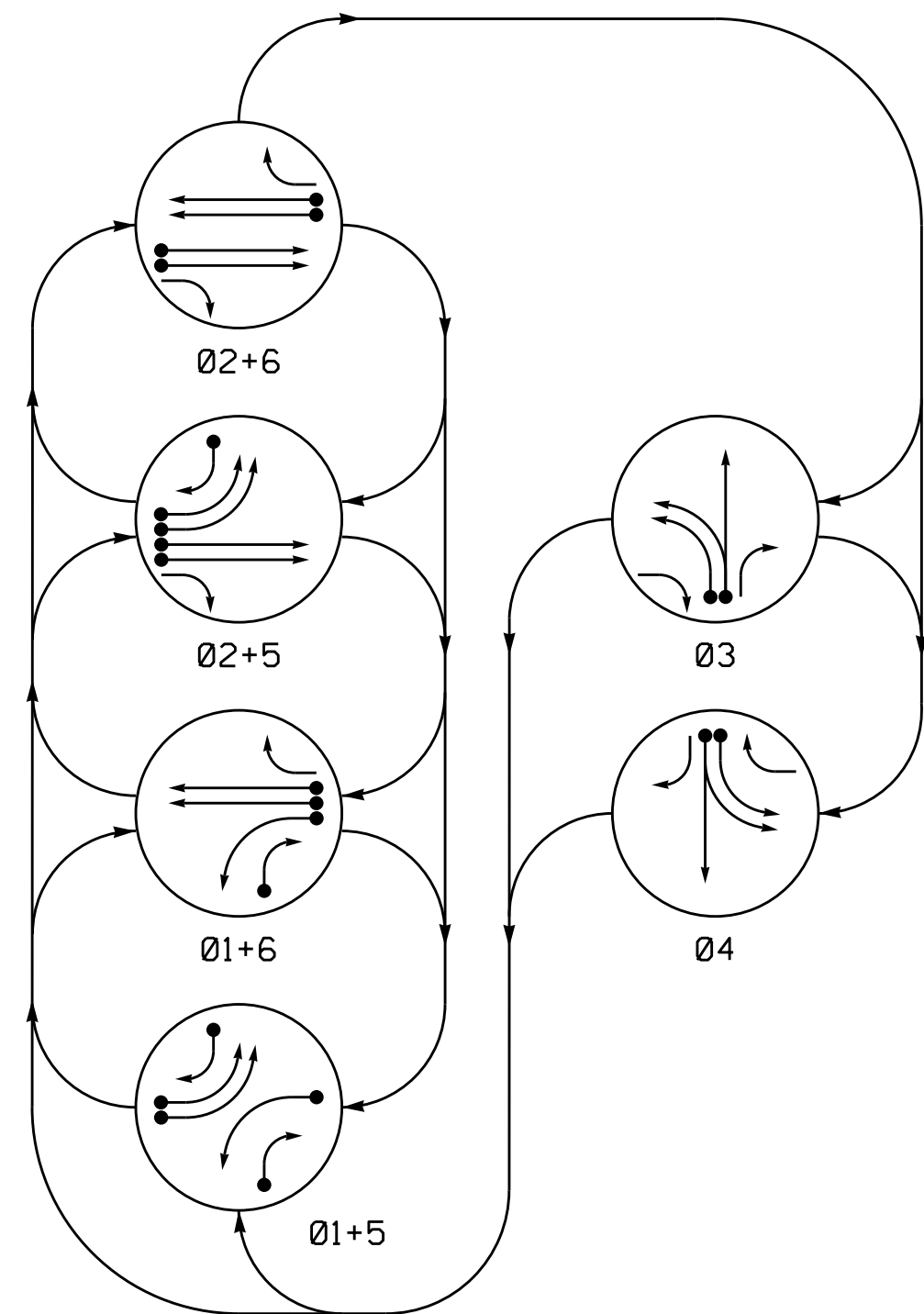
IMPORTANT! Remove, tape and label conflict monitor wires from OLE-G (A113) and OLE-Y (A112).

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2036T1
DESIGNED: February 2022
SEALED: 2/22/2022
REVISED: N/A

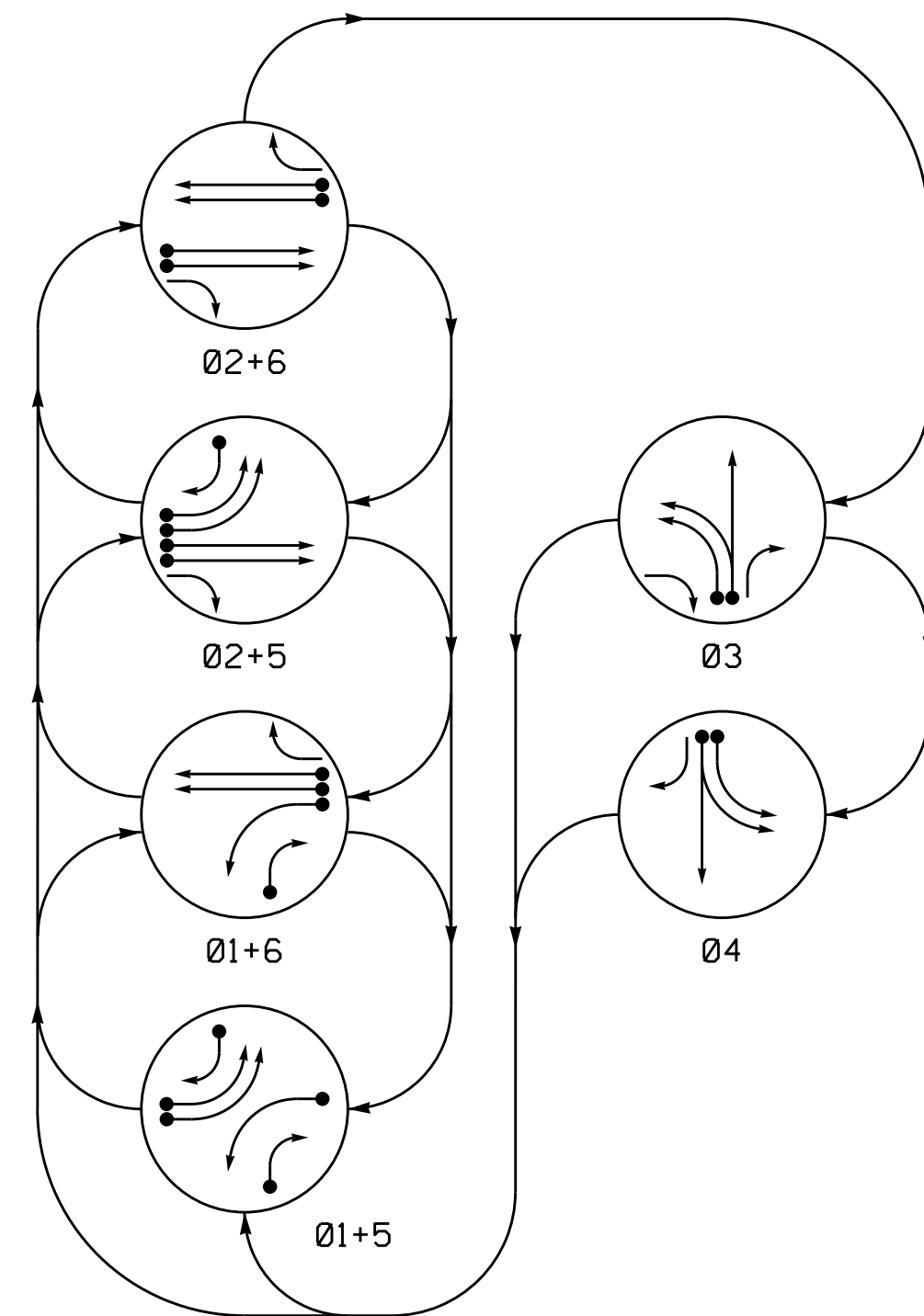
Electrical Detail - Temp 1 (TMP Phase I) - Sheet 4 of 4		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED									
<small>ELECTRICAL AND PROGRAMMING DETAILS FOR:</small> <small>Prepared In the Offices of:</small>  <small>750 N. Greenfield Pkwy, Garner, NC 27529</small>	SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive Division 5 Wake County Raleigh	SEAL  SEAL 036833 ENGINEER RYAN W. HOUGH									
PLAN DATE: February 2022 REVIEWED BY: _____ PREPARED BY: S. Armstrong REVIEWED BY: _____		DocuSigned by:  03/07/2022 <small>430320FAA26645C3</small> DATE									
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REVISIONS	INIT.	DATE									

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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						FLASH
	01+5	01+6	02+5	02+6	03	04	
11	---	---	RR	RR	RR	RR	---
21	R	R	G	G	R	R	Y
22	R	R	G	G	R	Y	---
31	RR	RR	RR	RR	RR	RR	---
32	RR	RR	RR	G	RR	RR	---
33	R	R	R	R	G	R	R
41	RR	RR	RR	RR	---	RR	---
42	R	R	R	R	R	G	R
43	R	R	R	R	G	R	---
51, 52	---	RR	RR	RR	RR	RR	---
61, 62	R	G	R	G	R	Y	---
63	R	---	---	---	---	---	---
SIGN A	OFF	OFF	OFF	OFF	OFF	OFF	OFF

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

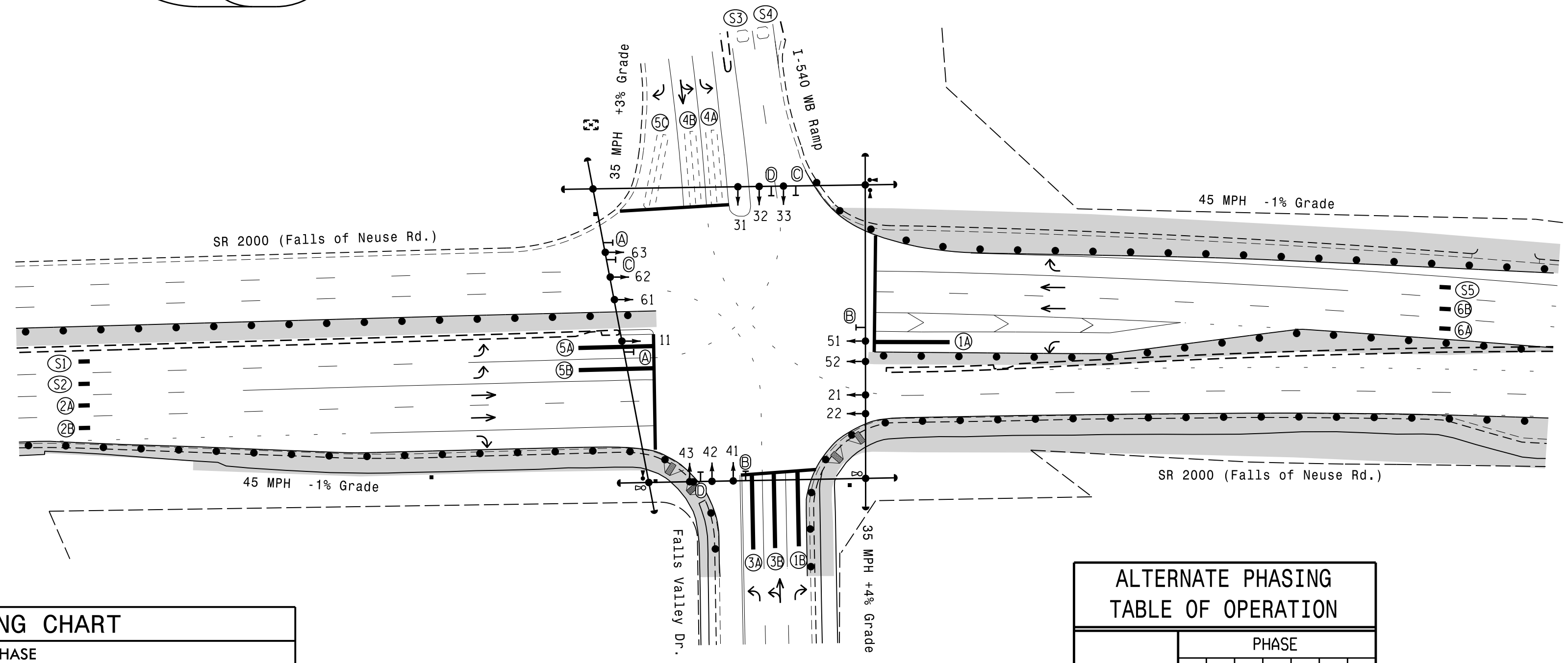
LOOP / ZONE NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	TIMING		DETECTOR PROGRAMMING							STATUS			
							DELAY	EXTEND (STRETCH)	OPERATION MODE							SWITCH	SYSTEM	NEW	EXISTING
									VEHICLE	PEDESTRIAN	1 CALL	2	3	4	5				
1A*	6X40	*	0	X	-	1	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
1B*	6X40	*	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
2A*	6X6	*	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
2B*	6X6	*	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
3A*	6X40	*	0	X	-	3	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
3B*	6X40	*	0	X	-	3	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
4A	6X40	2-4-2	0	-	X	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
4B	6X40	2-4-2	0	-	X	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
5A*	6X40	*	0	X	-	5	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
5B*	6X40	*	0	X	-	5	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
5C	6X40	2-4-2	0	-	X	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
6A*	6X6	*	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
6B*	6X6	*	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	*	-
S1*	6X6	*	300	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
S2*	6X6	*	300	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
S3	6X6	4	+115#	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
S4	6X6	4	+115#	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
S5*	6X6	*	300	X	-	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-

* Video Detection Zone.
Measured from Extended Tangent on End of Ramp

6 Phase Fully Actuated (Raleigh Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Reposition existing signal heads numbered 11, 61, and 62.
- Set all detector units to presence mode.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- During Alternate Phasing sign A will be on when phase 3, 4, or 5 is Green. It will also stay on when transitioning between these phases. It will not be on at any point in the Default Phasing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- This intersection features a video detection system. Shown locations of detectors are conceptual only. Refer to the manufacturer's guidelines for optimal detector placement.

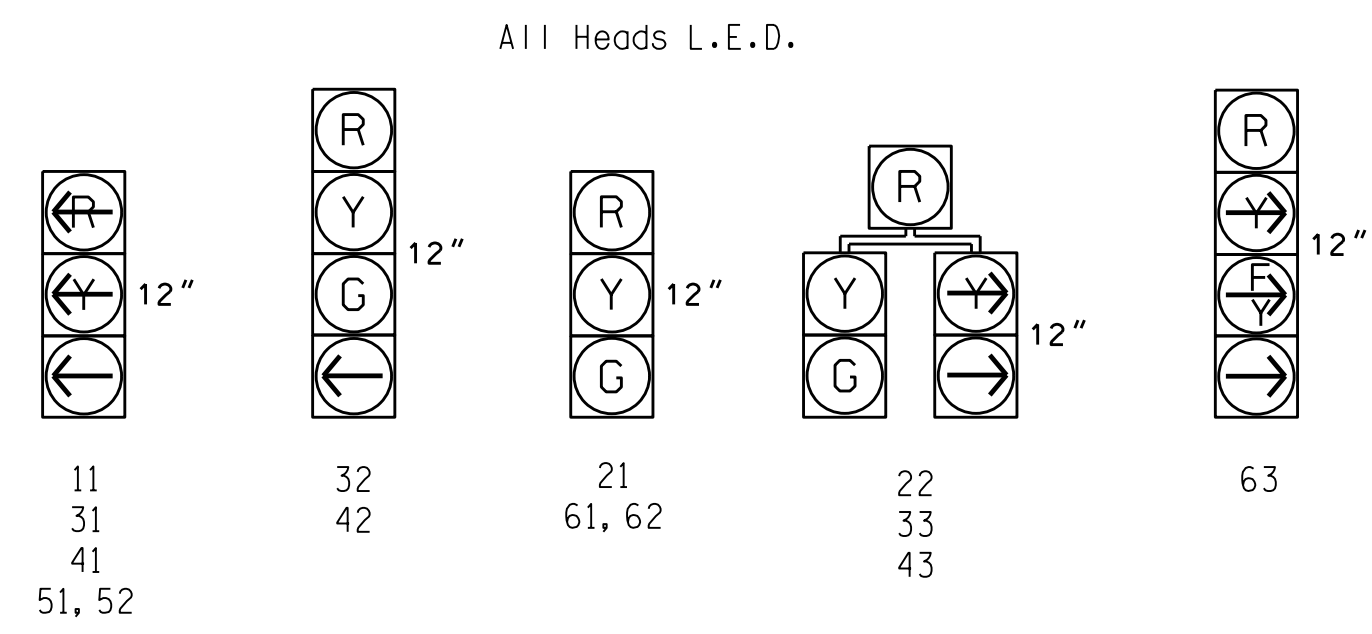


SE-PAC 2070 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Passage Gap *	2.0	6.0	2.0	2.0	2.0	6.0
Maximum Green *	15	75	15	30	25	75
Yellow Change	3.0	4.6	3.6	3.7	3.0	4.6
Red Clear	3.2	1.3	2.9	2.9	3.1	1.9
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	-	1.5	-	-	-	1.5
Maximum Initial *	-	34	-	-	-	34
Time Before Reduction *	-	20	-	-	-	20
Time To Reduce *	-	40	-	-	-	40
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.

SIGNAL FACE I.D.



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE						FLASH
	01+5	01+6	02+5	02+6	03	04	
11	---	---	RR	RR	RR	RR	---
21	R	R	G	G	R	R	Y
22	R	R	G	G	R	Y	---
31	RR	RR	RR	RR	RR	RR	---
32	RR	RR	RR	G	RR	RR	---
33	R	R	R	R	G	R	R
41	RR	RR	RR	RR	---	RR	---
42	R	R	R	R	R	G	R
43	R	R	R	R	G	R	---
51, 52	---	RR	RR	RR	RR	RR	---
61, 62	R	G	R	G	R	Y	---
63	R	---	---	---	---	---	---
SIGN A	ON	OFF	ON	OFF	ON	OFF	---

SIGNS

- | | | | |
|--|--|---|--|
| <p>PROPOSED</p> <ul style="list-style-type: none"> (A) "NO TURN ON RED" L.E.D. Blankout Sign (B) "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) (C) Right Arrow "ONLY" Sign (R3-5R) (D) Combined Through and Left Arrow Sign (R3-6L) | <p>EXISTING</p> <ul style="list-style-type: none"> (A) N/A (B) N/A (C) Construction Zone Drums (D) Construction Zone | <p>LEGEND</p> <ul style="list-style-type: none"> Proposed Traffic Signal Head Proposed Modified Signal Head Proposed Pedestrian Signal Head With Push Button & Sign Proposed Signal Pole with Guy Proposed Signal Pole with Sidewalk Guy Proposed Inductive Loop Detector Proposed Controller & Cabinet Proposed Junction Box Proposed 2-in Underground Conduit Proposed Right of Way Proposed Directional Arrow Proposed Curb Ramp Proposed Construction Zone Drums Proposed Construction Zone Proposed Out of Pavement Detector Proposed Video Detection Zone | <p>EXISTING</p> <ul style="list-style-type: none"> N/A N/A Construction Zone Drums Construction Zone Out of Pavement Detector Video Detection Zone |
|--|--|---|--|

Signal Upgrade - Temporary Design 2 (TMP Phase II)

SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive

Division 5 Wake County Raleigh

PLAN DATE: February 2022 REVIEWED BY: J.A. Lohr

750 N. Greenleaf Pkwy, Garner, NC 27529

SCALE: 1"=50'

REVISIONS: INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER ROBERT J. ZELIMBA 026486

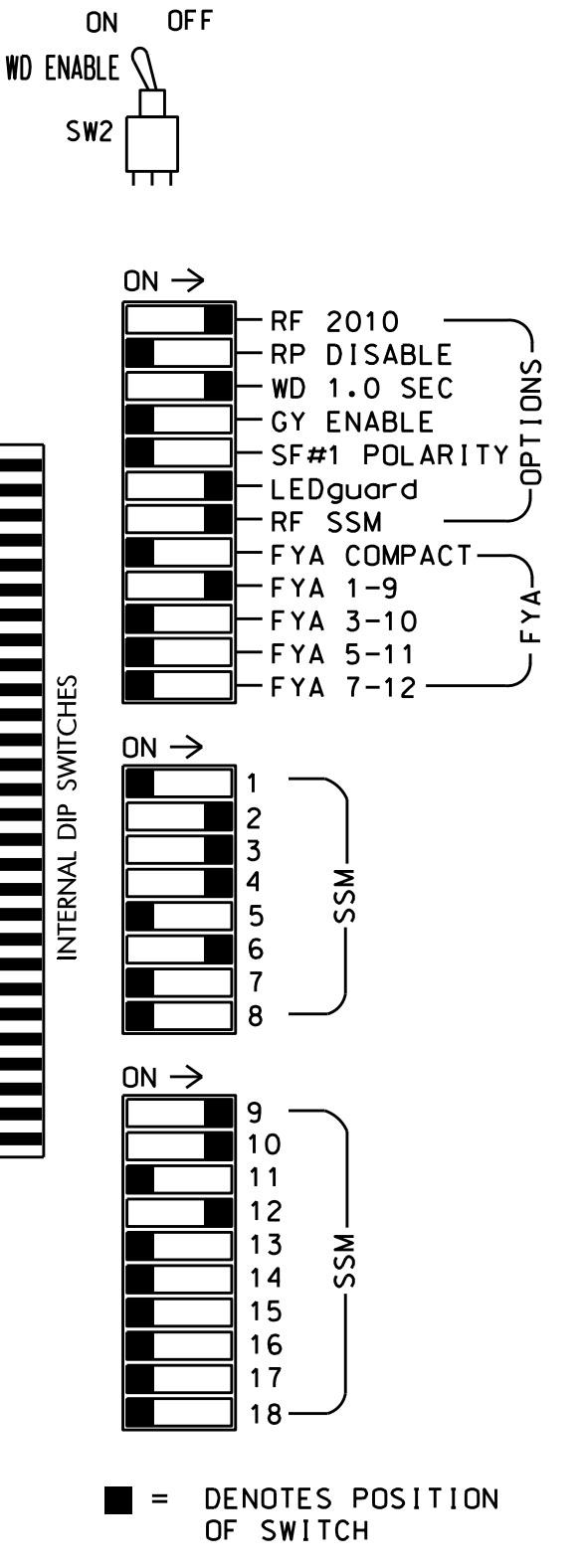
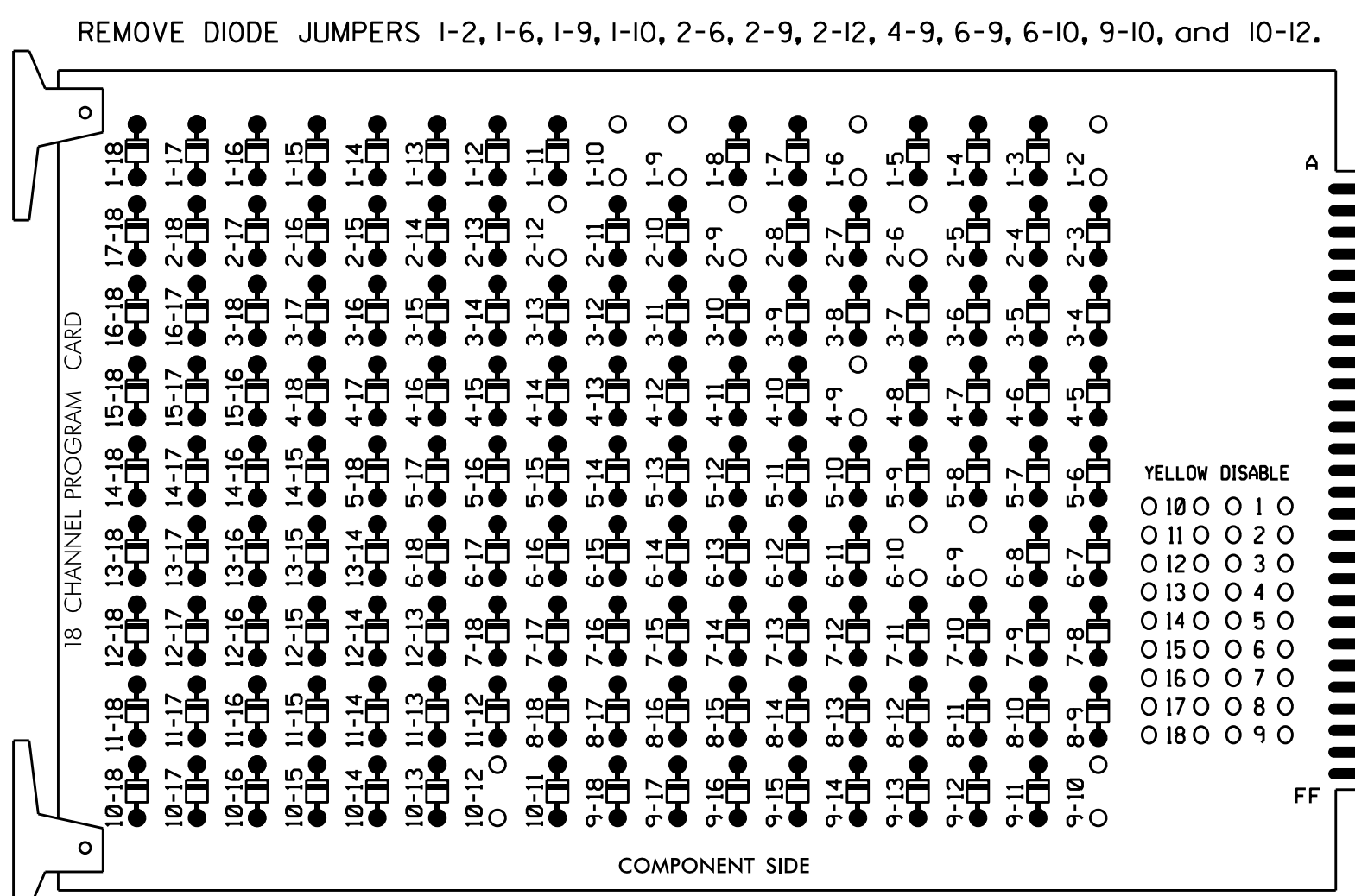
DATE: 02/22/2022

SIG. INVENTORY NO. 05-2036T2

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EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

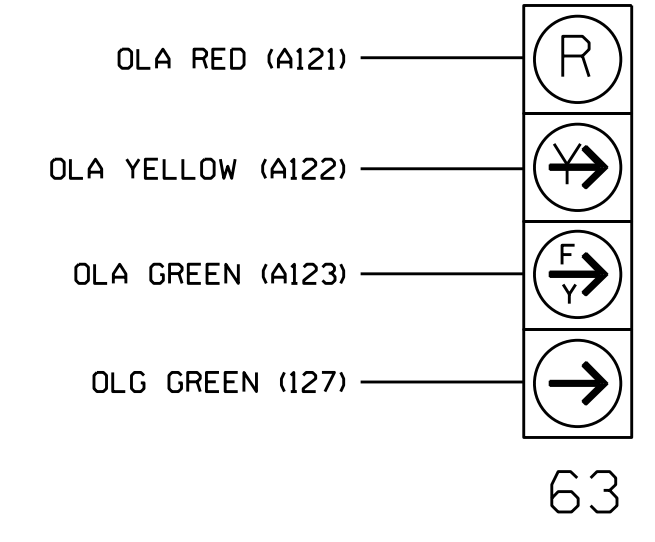
SIGNAL HEAD HOOK-UP CHART

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	OLG	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	OLE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	63	21,22	NU	22	31	32	33	41	42	43	NU	NU	61,62	NU	NU	NU	NU	NU	
RED		128			116	116		101	101				134						
YELLOW	*	129			117	117		102	102				135						
GREEN		130			118	118		103	103				136						
RED ARROW					116			101						A124				A101	
YELLOW ARROW					117	117		102						A122	A125	A125		A102	A102
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127				118	118		103	103					A126	A126			A103	A103
Hand																			
Person																			

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail this sheet.
 NOTE: Output assignments for load switch S1 and AUX S3 have been remapped. See sheet 2 for details.
 Load switch AUX S3 used for blankout sign control. See sheet 4 for wiring details.
 NOTE: Install a white flash block for Overlap E to prevent Sign A from flashing during cabinet or controller flash.

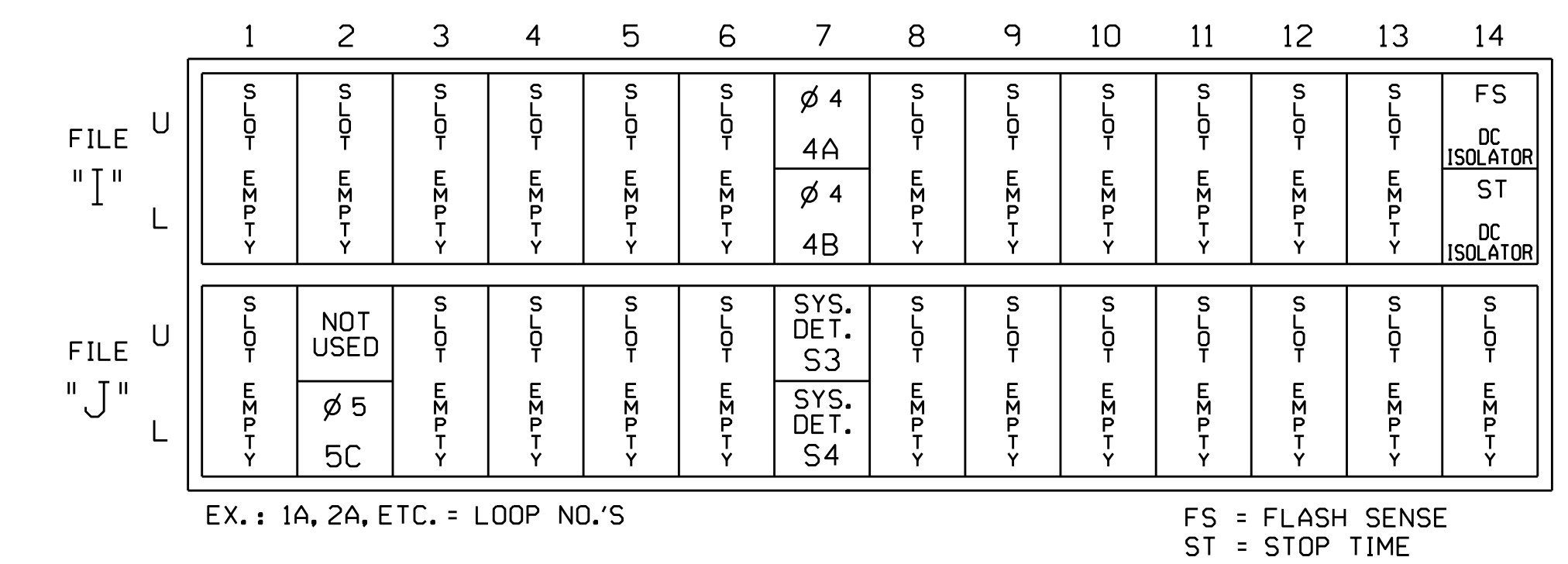
FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



INPUT FILE POSITION LAYOUT

(front view)

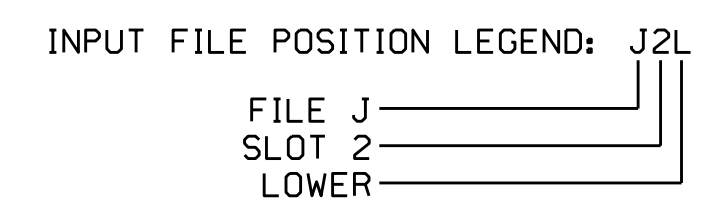


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
4A	TB6-1,2	I7U	65	13	4		
4B	TB6-3,4	I7L	78	14	4		
5C	TB3-7,8	J2L	44	22	5	15	
* S3	TB7-1,2	J7U	66	33	SYS		
* S4	TB7-3,4	J7L	79	34	SYS		

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



EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S5,S8,AUX S1
 AUX S2,AUX S3*,AUX S5
 PHASES USED.....1,2,3,4,5,6
 OVERLAP A.....4+6
 OVERLAP B.....1
 OVERLAP C.....NOT USED
 OVERLAP D.....5
 OVERLAP E.....3+4+5
 OVERLAP G.....6
 * Load switch used for blankout sign control only.

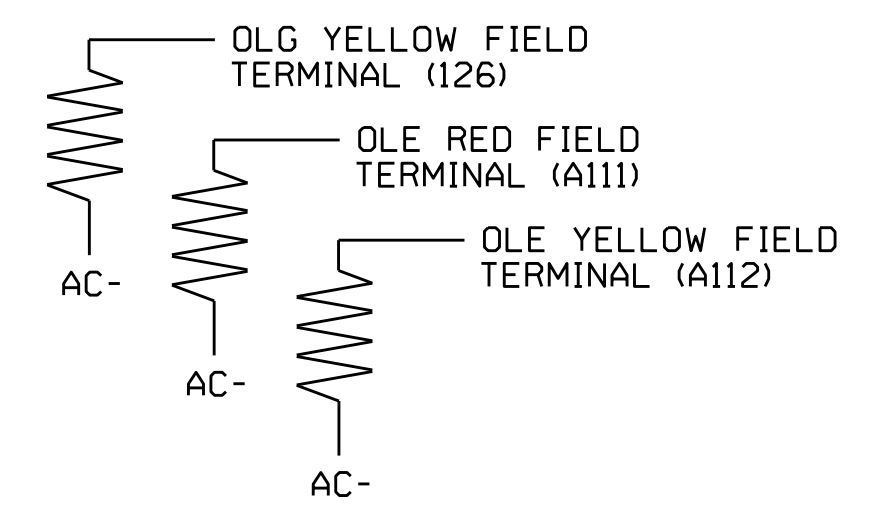
NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature for all phases.
- Program phases 2 and 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 1A, 1B, 2A, 2B, 3A, 3B, 5A, 5B, 6A, 6B, S1, S2, and S5. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2036T2
 DESIGNED: February 2022
 SEALED: 2/22/2022
 REVISED: N/A

Electrical Detail - Temp 2 (TMP Phase II) - Sheet 1 of 4

Electrical and Programming Details For: SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive

Prepared In the Offices of:

Division 5 Wake County Raleigh

PLAN DATE: February 2022 REVIEWED BY: _____

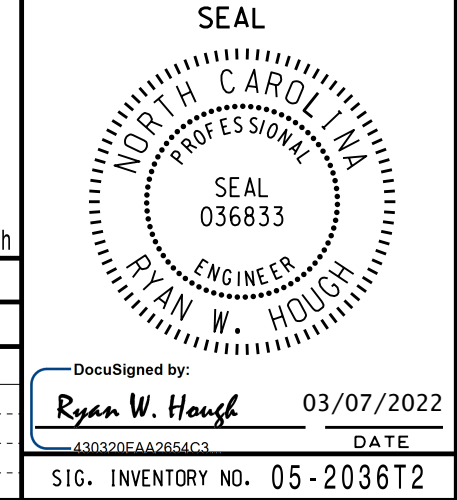
PREPARED BY: S. Armstrong REVIEWED BY: _____

REVISIONS: _____ INIT. DATE

DocuSigned by: Ryan W. Hough 03/07/2022

SIG. INVENTORY NO. 05-2036T2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



07-1415-2022 01:13
 W:\2026\026\026_elec\elec.dgn
 S:\MSTRONG

OVERLAP PROGRAMMING DETAIL

- From Main Menu select 4 - UNIT DATA
- From UNIT DATA Submenu select 3 - OVERLAP DATA

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA

A: FYA  E: STD  I: --- M: ---
B: STD  F: ---  J: --- N: ---
C: ---  G: STD  K: --- O: ---
D: STD  H: ---  L: --- P: ---

PREV/NEXT TO CYCLE
  
```

OVERLAP A

Use Up/Dn/Left/Right keys to position cursor on Overlap 'A', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - A      DELAY/10: 0
  PHASES..12345678 90123456
  PERM PHASES: 00010000 00000000
  PROT PHASES: 00000100 00000000
  -PED PHASES: 00000000 00000000
  OVERLAPS..ABCDEFGH IJKLMNPO
  PERM OVERLAPS: x0000000 00000000
  PROT OVERLAPS: x0000000 00000000
  
```

NOTICE
DELAY/10 = 0

Press ESC

OVERLAP B

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - B      12345678 90123456
  PARENTS: 10000000 00000000
  +GRN PHASES: 00000000 00000000
  -G/Y PHASES: 00000000 00000000
  -PED PHASES: 00000000 00000000
  TRAIL GREEN STANDARD: 0 YEL/10: 40
  TRAIL GREEN PREEMPT: 0 RED/10: 20
  
```

Press ESC

OVERLAP D

Use Up/Dn/Left/Right keys to position cursor on Overlap 'C', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - D      12345678 90123456
  PARENTS: 00001000 00000000
  +GRN PHASES: 00000000 00000000
  -G/Y PHASES: 00000000 00000000
  -PED PHASES: 00000000 00000000
  TRAIL GREEN STANDARD: 0 YEL/10: 40
  TRAIL GREEN PREEMPT: 0 RED/10: 20
  
```

OVERLAP E

Use Up/Dn/Left/Right keys to position cursor on Overlap 'G', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - E      12345678 90123456
  PARENTS: 00111000 00000000
  +GRN PHASES: 00000000 00000000
  -G/Y PHASES: 00000000 00000000
  -PED PHASES: 00000000 00000000
  TRAIL GREEN STANDARD: 0 YEL/10: 40
  TRAIL GREEN PREEMPT: 0 RED/10: 20
  
```

Press ESC

OVERLAP G

Use Up/Dn/Left/Right keys to position cursor on Overlap 'G', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - G      12345678 90123456
  PARENTS: 00000100 00000000
  +GRN PHASES: 00000000 00000000
  -G/Y PHASES: 00000000 00000000
  -PED PHASES: 00000000 00000000
  TRAIL GREEN STANDARD: 0 YEL/10: 40
  TRAIL GREEN PREEMPT: 0 RED/10: 20
  
```

END OVERLAP PROGRAMMING

LOAD SWITCH MAPPING DETAIL FOR S1 AND AUX S3

- From Main Menu select 4 - UNIT DATA
- From UNIT DATA Submenu select 9 - OUTPUT MAPPING

USE ENTER AND NEXT KEYS
TO MAP 'LDSW 1' AS 'OLG'

```

OUTPUT MAPPING      EDIT MODE: LDSW
                    E-TOGGLE MODE
LDSW ..1.. ..2.. ..3.. ..4.. ..5.. ..6..
RED  OLG  PH2  PD2  PH3  PH4  PD4
YEL  -   -   -   -   -   -
GRN  -   -   -   -   -   -
FIO  1   2   3   4   5   6
PREV/NEXT TO CYCLE  D-DISPLAY COMPAT
  
```

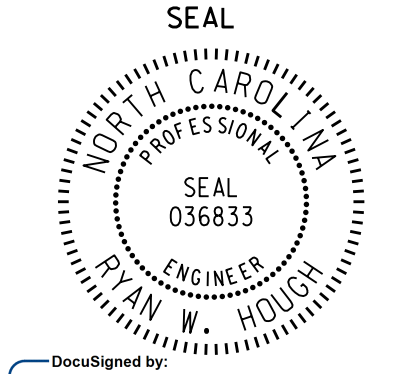

USE ENTER AND NEXT KEYS
TO MAP 'LDSW 15' AS 'OLE'

```

OUTPUT MAPPING      EDIT MODE: LDSW
                    E-TOGGLE MODE
LDSW .13.. .14.. .15.. .16.. .17.. .18..
RED  OLA  OLB  OLE  OLC  OLD  PD3
YEL  -   -   -   -   -   -
GRN  -   -   -   -   -   -
FIO  13  14  15  16  17  18
PREV/NEXT TO CYCLE  D-DISPLAY COMPAT
  
```

LOAD SWITCH MAPPING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2036T2
DESIGNED: February 2022
SEALED: 2/22/2022
REVISED: N/A

Electrical Detail - Temp 2 (TMP Phase II) - Sheet 2 of 4		<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED </div> <div style="text-align: center;">  </div>										
<div style="border: 1px solid black; padding: 2px; font-size: 8px;"> Electrical and Programming DETAILS FOR: </div> <div style="border: 1px solid black; padding: 2px; font-size: 8px; margin-top: 5px;"> Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529 </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive </div> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <td colspan="2">Division 5 Wake County Raleigh</td> </tr> <tr> <td>PLAN DATE: February 2022</td> <td>REVIEWED BY:</td> </tr> <tr> <td>PREPARED BY: S. Armstrong</td> <td>REVIEWED BY:</td> </tr> <tr> <td>REVISIONS</td> <td>INIT. DATE</td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	Division 5 Wake County Raleigh		PLAN DATE: February 2022	REVIEWED BY:	PREPARED BY: S. Armstrong	REVIEWED BY:	REVISIONS	INIT. DATE			<div style="border: 1px solid black; padding: 2px; font-size: 8px;"> DocuSigned by: Ryan W. Hough 03/07/2022 430320FAA2654C3 </div>
Division 5 Wake County Raleigh												
PLAN DATE: February 2022	REVIEWED BY:											
PREPARED BY: S. Armstrong	REVIEWED BY:											
REVISIONS	INIT. DATE											
SIG. INVENTORY NO. 05-2036T2												

PROGRAMMING DETAILS TO CALL ALTERNATE PHASING

To run the Default phasing where the FYA runs protected and permitted turns and the Blankout sign is not enabled, schedule a Day Plan that calls an Action that is programmed to enable Phase Function 1. To run the Alternate Phasing where the FYA runs protected turns only and the Blankout sign is enabled, schedule a Day Plan that calls an Action that is programmed to enable Phase Function 2.

Actions can be programmed to run free run or call a coordination pattern.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

Step 1 - Assign OMIT OVERLAP A to Phase Function 2 and OMIT OVERLAP E to Phase Function 1.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 9 - PHS FUNC MAPPING

Use Up/Dn Keys to position cursor on NUM 1

```

TIME BASE PHS FUNC MAPPING
          PHS FUNC SEL(O-OFF/1-DN)
NUM..P-FUNCT NAME.....123456789 0123456
1  PHS-01 MAX # 2  00000000 00000000
2  PHS-02 MAX # 2  00000000 00000000
3  PHS-03 MAX # 2  00000000 00000000
4  PHS-04 MAX # 2  00000000 00000000
UP/DOWN TO SCROLL          E-EDIT
    
```

BEFORE PROCEEDING,
SCROLL THRU ENTIRE
RANGE OF FUNCTIONS TO
ENSURE ALL P-FUNCT 1 & 2
NUM x VALUES ARE SET
TO '0' (OFF)

Use Up/Dn/Left/Right keys to position cursor on NUM 145 and program P-FUNCT 1 & as shown.

```

TIME BASE PHS FUNC MAPPING
          PHS FUNC SEL(O-OFF/1-DN)
NUM..P-FUNCT NAME.....123456789 0123456
145 OVERLAP A OMIT  01000000 00000000
146 OVERLAP B OMIT  00000000 00000000
147 OVERLAP C OMIT  00000000 00000000
148 OVERLAP D OMIT  00000000 00000000
148 OVERLAP E OMIT  10000000 00000000
UP/DOWN TO SCROLL          E-EDIT
    
```

← P-FUNCT 2 = 1 (OVERLAP 'A' OMIT)

← P-FUNCT 1 = 1 (OVERLAP 'E' OMIT)

PHASE FUNCTION PROGRAMMING COMPLETE

TIME BASE ACTIONS PROGRAMMING

Step 2 - Set up Actions to run Phase Functions.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 5 - ACTIONS

For any Action that will run during the Default Phasing period:

```

TIME BASE ACTION # ***
          12345678 90123456
PATN:001   PHS: 10000000 00000000
0=I'CONN   AUX: 000-----
1-253=PATN SPC: 0000000-   0=NO
254=FREE   DIM: 0-----   1=YES
255=FLASH  DET: 000-----
UP/DOWN TO SCROLL
    
```

← NOTICE
PHS 1

For any Action that will run during the Alternate Phasing period:

```

TIME BASE ACTION # ***
          12345678 90123456
PATN:001   PHS: 01000000 00000000
0=I'CONN   AUX: 000-----
1-253=PATN SPC: 0000000-   0=NO
254=FREE   DIM: 0-----   1=YES
255=FLASH  DET: 000-----
UP/DOWN TO SCROLL
    
```

← NOTICE
PHS 2

SPECIAL FUNCTION PROGRAMMING COMPLETE

*** Action #(s) are to be determined by the Division and/or City Traffic Engineer and are scheduled to run in Day Plan(s).

PHASE FUNCTION OPERATION		
Phasing Period	Default	Alternate
Phase Function 1	ENABLED	DISABLED
Phase Function 2	DISABLED	ENABLED
Blankout Sign	OFF	OPERATIONAL
FYA Operation	PROT/PERM	PROT ONLY

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2036T2
DESIGNED: February 2022
SEALED: 2/22/2022
REVISED: N/A

Electrical Detail - Temp 2 (TMP Phase II) - Sheet 3 of 4

Prepared In the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

SR 2000 (Falls of Neuse Rd.)
at
I-540 WB Ramps and
Falls Valley Drive

Division 5 Wake County Raleigh

PLAN DATE: February 2022 REVIEWED BY:
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: _____ INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL

RYAN W. HOUGH
 ENGINEER
 036833

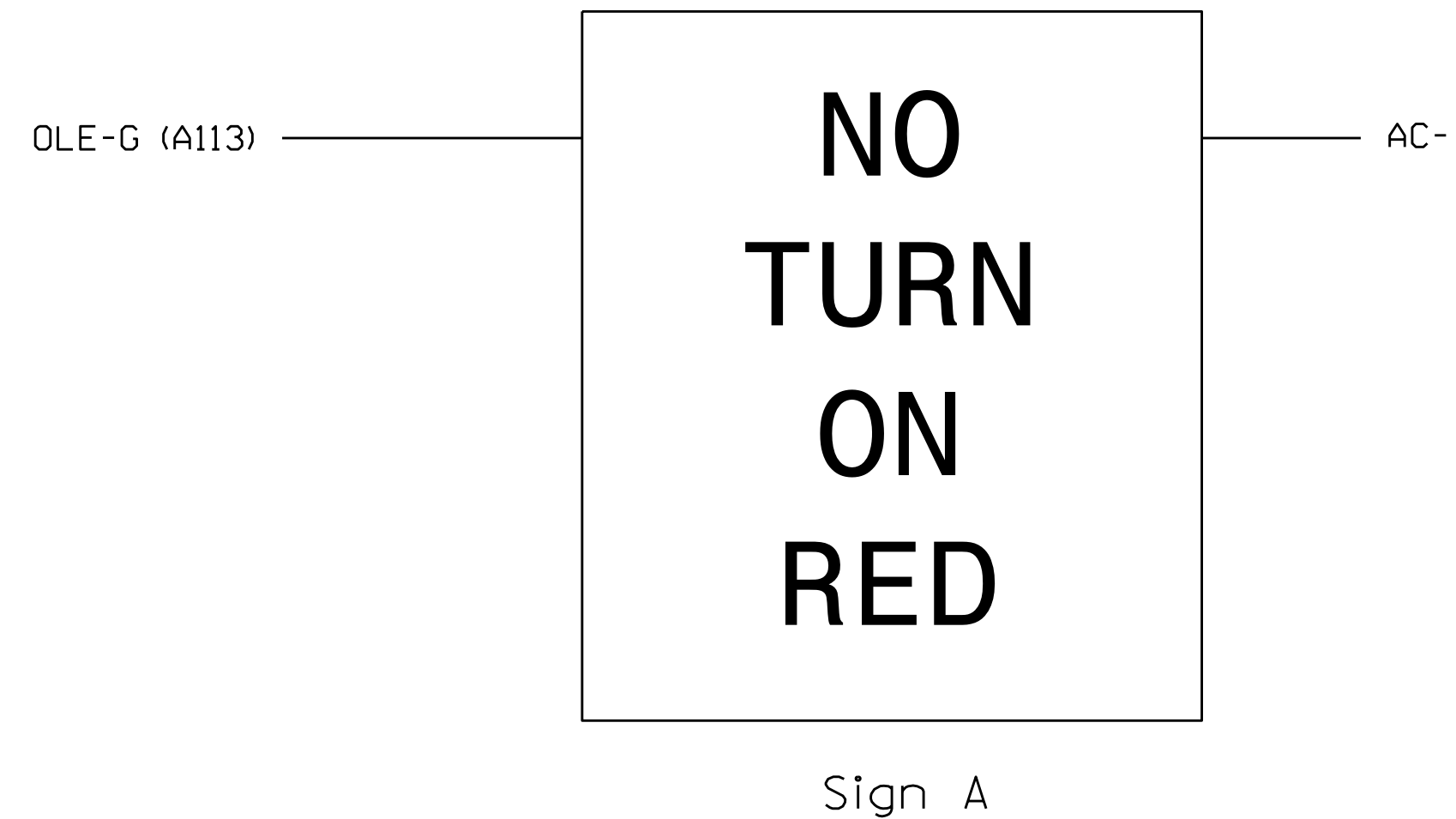
DocuSigned by:

 03/07/2022
 DATE

SIG. INVENTORY NO. 05-2036T2

07-1485-2022 01:15
W:\2022\05-2036\Draws\elec\wtk.dgn
S:\MS\T\010

BLANKOUT SIGN WIRING DETAIL



BLANKOUT SIGN 'A' INDICATION						
Phase	I+5	I+6	2+5	2+6	3	4
Default Phasing	OFF	OFF	OFF	OFF	OFF	OFF
Alternate Phasing	ON	OFF	ON	OFF	ON	ON

IMPORTANT! Remove, tape and label conflict monitor wires from OLE-G (A113) and OLE-Y (A112).

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-2036T2
 DESIGNED: February 2022
 SEALED: 2/22/2022
 REVISED: N/A

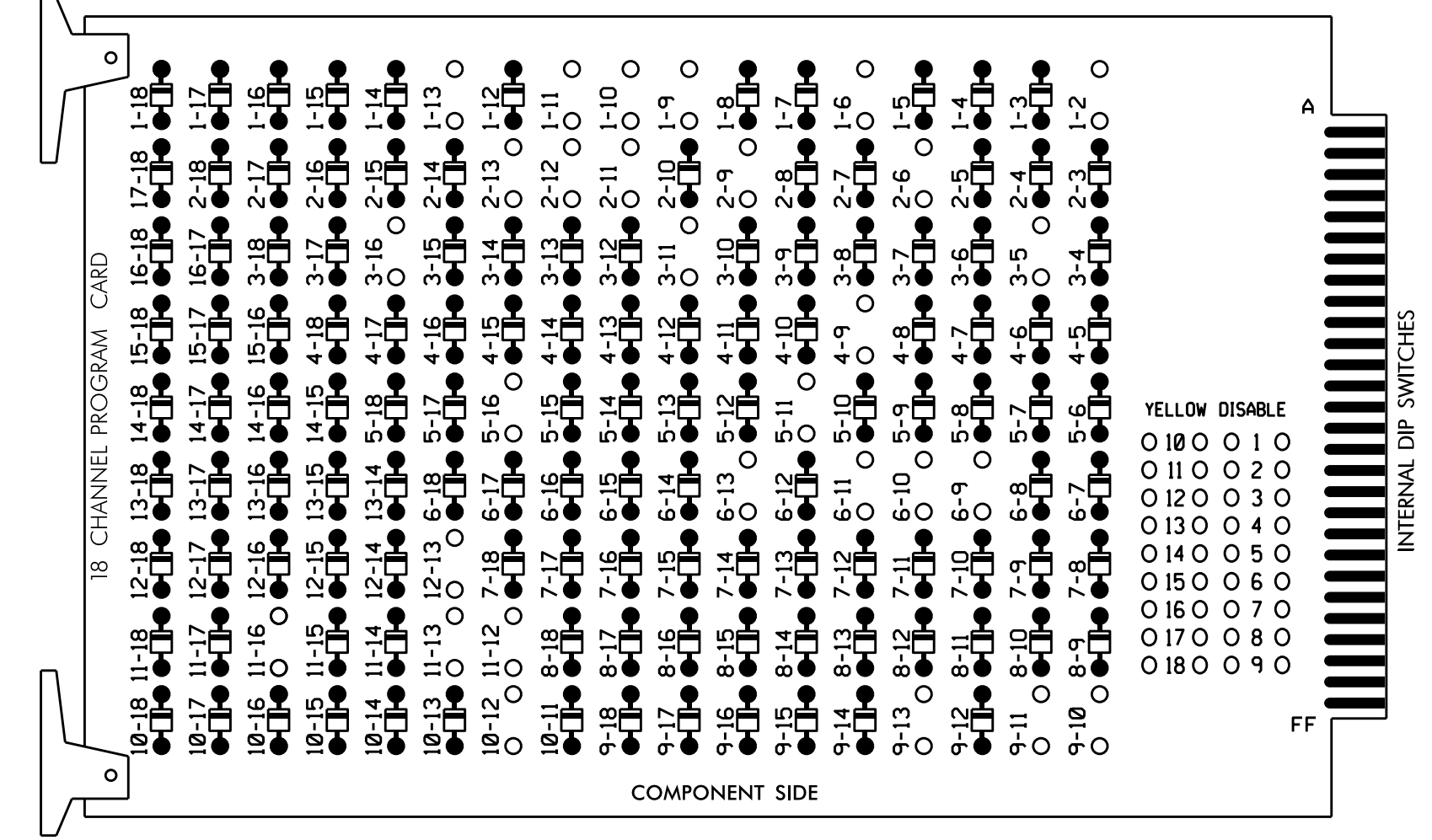
Electrical Detail - Temp 2 (TMP Phase II) - Sheet 4 of 4		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive		SEAL NORTH CAROLINA PROFESSIONAL ENGINEERS SEAL 036833 RYAN W. HOUGH	
Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	Division 5 Wake County Raleigh PLAN DATE: February 2022 PREPARED BY: S. Armstrong	REVIEWED BY: REVIEWED BY:	DocuSigned by: Ryan W. Hough 03/07/2022 DATE
REVISIONS _____ _____		INIT. _____ _____	DATE _____ _____
		SIG. INVENTORY NO. 05-2036T2	

07-1485-2022_01:15
 W:\2036\2022\erl\erl-wk.dgn
 S:\MS\T.DG

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

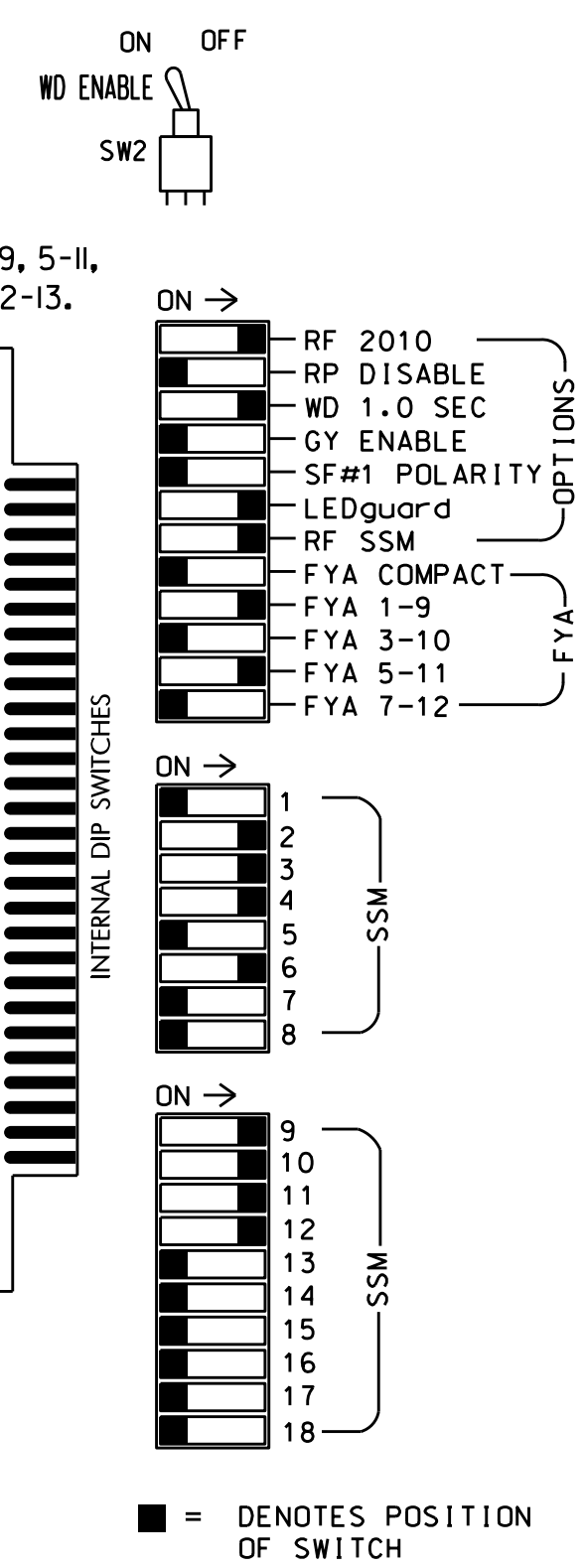
REMOVE DIODE JUMPERS 1-2, 1-6, 1-9, 1-10, 1-11, 1-13, 2-6, 2-9, 2-11, 2-12, 2-13, 3-5, 3-11, 3-16, 4-9, 5-11, 5-16, 6-9, 6-10, 6-11, 6-13, 9-10, 9-11, 9-13, 10-12, 11-12, 11-13, 11-16, and 12-13.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

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	OLG	2 PED	3	4	4 PED	OLH	6	6 PED	7	8	3 PED	OLA	OLB	OLE	OLC	OLD	SPARE							
SIGNAL HEAD NO.	63,64	21,22, 23	P21, P22	31	32	33	41	42	43	NU	24	61,62	NU	NU	NU	P31, P32	63,64	11	33	BLANK OUT SIGN	24	51,52	NU	
RED		128		116	116		101	101				134				A121			*	A114				
YELLOW	*	129		117	117		102	102			*	135							*					
GREEN		130		118	118		103	103				136								A113				
RED ARROW				116			101									A124							A101	
YELLOW ARROW				117			102									A122	A125	A125				A115	A102	
FLASHING YELLOW ARROW																A123						A116		
GREEN ARROW	127			118	118		103	103				133				A126	A126						A103	
Hand				113																		110		
Walking Person				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.

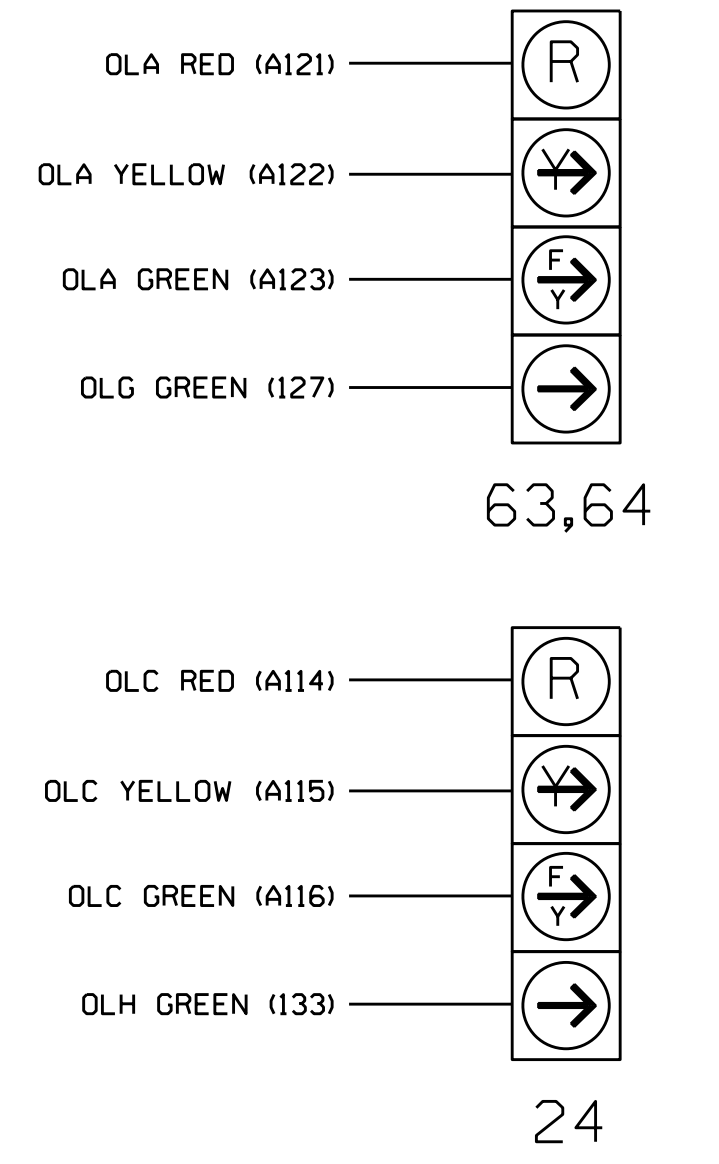
NOTE: Output assignments for load switches S1, S7, S12 and AUX S3 have been remapped. See sheet 3 for details.

Load switch AUX S3 used for blankout sign control. See sheet 3 for wiring details.

NOTE: Install a white flash block for Overlap E to prevent Sign A from flashing during cabinet or controller flash.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



63,64

24

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 2	∅ 2	∅ 3	∅ 3	∅ 4	∅ 4	SYS. DET. S1	S	S	S	S	S
L	1A	1B	2A	2C	3A	3B	4A	4B	SYS. DET. S2	S	S	S	S	S
U	NOT USED	NOT USED	∅ 2	NOT USED	NOT USED	NOT USED	∅ 4	∅ 4	SYS. DET. S3	S	S	S	S	S
L	5A	5B	6A	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	SYS. DET. S4	S	S	S	S	S

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

FS = FLASH SENSE
ST = STOP TIME

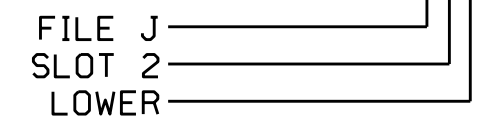
INPUT FILE CONNECTION & PROGRAMMING CHART

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		
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		
2C	TB4-1,2	I4U	47	7	2		
3A	TB4-5,6	I5U	58	9	3	3	
3B	TB4-9,10	I6U	41	11	3		
4A	TB6-1,2	I7U	65	13	4		
4B	TB6-3,4	I7L	78	14	4		
5A	TB3-1,2	J1U	55	19	5		
5B	TB3-5,6	J2U	40	21	5		
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
* S1	TB6-9,10	I9U	60	17	SYS		
* S2	TB6-11,12	I9L	62	18	SYS		
* S3	TB7-1,2	J7U	66	33	SYS		
* S4	TB7-3,4	J7L	79	34	SYS		
* S5	TB7-9,10	J9U	59	37	SYS		
* S6	TB7-11,12	J9L	61	38	SYS		
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		

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

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

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2036
DESIGNED: January 2023
SEALED: 01-03-23
REVISED: N/A

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
CABINET.....332 W/ AUX
SOFTWARE.....SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S7,S8,S12,AUX S1, AUX S2,AUX S3*,AUX S4,AUX S5
PHASES USED.....1,2,2PED,3,3PED,4,5,6
OVERLAP A.....4+6
OVERLAP B.....1
OVERLAP C.....2+3
OVERLAP D.....5
OVERLAP E.....3+4+5
OVERLAP G.....6
OVERLAP H.....3

* Load switch used for blankout sign control only.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 and 6 Green.
- Enable simultaneous gap-out feature for all phases.
- Program phases 2 and 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

Electrical Detail - Final Design (TMP Phase III & Final)
Sheet 1 of 4

	ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Prepared In the Offices of: 	Division 5 Wake County Raleigh PLAN DATE: January 2023 REVIEWED BY: PREPARED BY: James Peterson REVIEWED BY:	
750 N. Greenfield Pkwy, Garner, NC 27529		REVISIONS: _____ INIT. DATE _____ _____ INIT. DATE _____	DocuSigned by: D. Todd Joyce 01/11/2023 DATE: _____ SIG. INVENTORY NO. 05-2036

I:\1414-2023_13-43
 S:\1\TAS\1\15_Signal\work\hgr\hous\51g_Mon\Refer\son\052036_smc.ele_20230307.dgn
 J:\peterson

LOAD SWITCH MAPPING DETAIL FOR S1, S7, S12 AND AUX S3

- From Main Menu select 4 - UNIT DATA
- From UNIT DATA Submenu select 9 - OUTPUT MAPPING

USE ENTER AND NEXT KEYS
TO MAP 'LDSW 1' AS 'OLG'

OUTPUT MAPPING		EDIT MODE: LDSW	
		E-TOGGLE MODE	
LDSW	..1.. ..2.. ..3.. ..4.. ..5.. ..6..		
RED	OLG PH2 PD2 PH3 PH4 PD4		
YEL	- - - - -		
GRN	- - - - -		
FIO	1 2 3 4 5 6		
PREV/NEXT TO CYCLE		D-DISPLAY COMPAT	

USE ENTER AND NEXT KEYS
TO MAP 'LDSW 7' AS 'OLH' AND
TO MAP 'LDSW 12' AS 'PD3'

OUTPUT MAPPING		EDIT MODE: LDSW	
		E-TOGGLE MODE	
LDSW	..7.. ..8.. ..9.. ..10.. ..11.. ..12..		
RED	OLH PH6 PD6 PH7 PH8 PD3		
YEL	- - - - -		
GRN	- - - - -		
FIO	7 8 9 10 11 12		
PREV/NEXT TO CYCLE		D-DISPLAY COMPAT	

USE ENTER AND NEXT KEYS
TO MAP 'LDSW 15' AS 'OLE'
AND 'LDSW 18' AS 'OLF'

OUTPUT MAPPING		EDIT MODE: LDSW	
		E-TOGGLE MODE	
LDSW	.13.. .14.. .15.. .16.. .17.. .18..		
RED	OLA OLB OLE OLC OLD OLF		
YEL	- - - - -		
GRN	- - - - -		
FIO	13 14 15 16 17 18		
PREV/NEXT TO CYCLE		D-DISPLAY COMPAT	

LOAD SWITCH MAPPING COMPLETE

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Install push buttons and APS equipment per manufacturer's instructions.
- Provide a dedicated cable to each push button per manufacturer's instructions.
- If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

INIT & N.A. RESP PROGRAMMING DETAIL (program controller as shown below)

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

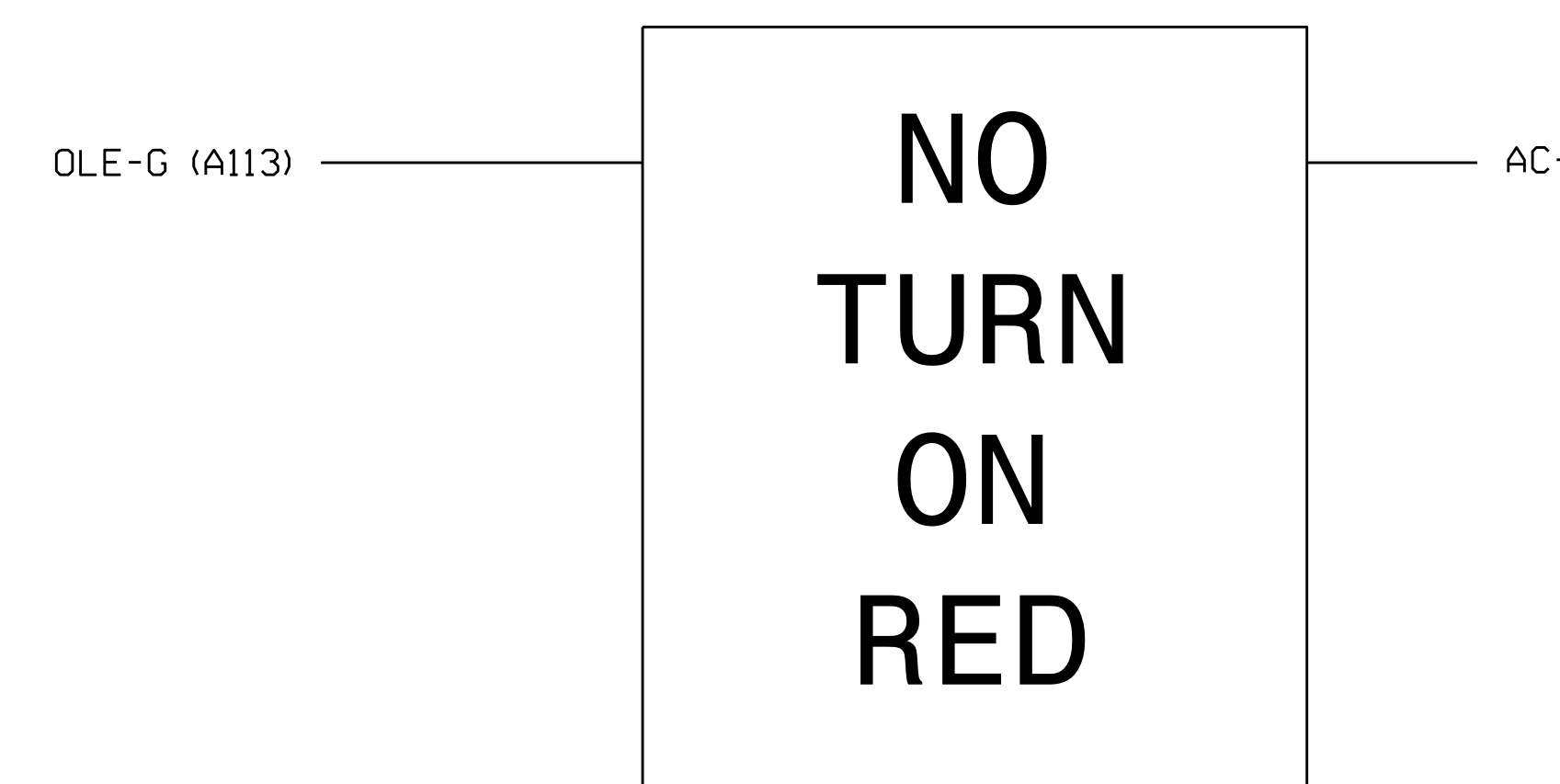
PHASE MENU	
1-VEHICLE DATA	6-SPEC. SEQUENCE+
2-DENSITY TIMES+	7-DETECTOR DATA
3-PEDEST. DATA	9.PHASE & BANK COPY
4-INIT & NA RESP+	9-SELECT PHASE BANK
5-N. LOCK & MISC +	
'+' DENOTES BANKABLE DATA	

PHASE.....1...2...3...4...5...6...7...8...9	
INITIAL 1 6 1 1 1 6 0 0 0	
NA RESP 0 1 0 2 0 1 0 0 0	
CODES.....0....1....2....3....4....5....6	
INITIAL NONE INACT RED YEL GRN DRK G/DW	
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.

* CODE 6 (G/DW) ALLOWS PHASE 2 TO START IN GREEN AND SKIP THE PED PHASE. PHASE 6 INCLUDED FOR TIMING PURPOSES.

BLANKOUT SIGN WIRING DETAIL



Sign A

BLANKOUT SIGN 'A' INDICATION						
Phase	I+5	I+6	2+5	2+6	3	4
Default Phasing	OFF	OFF	OFF	OFF	OFF	OFF
Alternate Phasing	ON	OFF	ON	OFF	ON	ON

IMPORTANT! Remove, tape and label conflict monitor wires from OLE-G (A113) and OLE-Y (A112).

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2036
DESIGNED: January 2023
SEALED: 01-03-23
REVISED: N/A

Electrical Detail - Final Design (TMP Phase III & Final)
Sheet 3 of 4

	<p>SR 2000 (Falls of Neuse Rd.) at I-540 WB Ramps and Falls Valley Drive</p> <p>Division 5 Wake County Raleigh</p> <p>PLAN DATE: January 2023 REVIEWED BY:</p> <p>PREPARED BY: James Peterson REVIEWED BY:</p>	<p style="text-align: center; font-weight: bold;">DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>SEAL</p> <p>PROFESSIONAL ENGINEER</p> <p>SEAL 031001</p> <p>ENGINEER</p> <p>TODD JOYCE</p> </div> <p>DocuSigned by: <i>D. Todd Joyce</i> 01/11/2023</p> <p>SIG. INVENTORY NO. 05-2036</p>
--	--	---

PROGRAMMING DETAILS TO CALL ALTERNATE PHASING

To run the Default phasing where the FYA runs protected and permitted turns and the Blankout sign is not enabled, schedule a Day Plan that calls an Action that is programmed to enable Phase Function 1. To run the Alternate Phasing where the FYA heads 63 and 64 run protected turns only and the Blankout sign is enabled, schedule a Day Plan that calls an Action that is programmed to enable Phase Function 2.

Actions can be programmed to run free run or call a coordination pattern.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

Step 1 - Assign OMIT OVERLAP A to Phase Function 2 and OMIT OVERLAP E to Phase Function 1.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 9 - PHS FUNC MAPPING

Use Up/Dn Keys to position cursor on NUM 1

```

TIME BASE PHS FUNC MAPPING
      PHS FUNC SEL(O-OFF/1-DN)
NUM..P-FUNCT NAME.....123456789 0123456
1  PHS-01 MAX # 2  000000000 0000000
2  PHS-02 MAX # 2  000000000 0000000
3  PHS-03 MAX # 2  000000000 0000000
4  PHS-04 MAX # 2  000000000 0000000
UP/DOWN TO SCROLL      E-EDIT
    
```

BEFORE PROCEEDING,
SCROLL THRU ENTIRE
RANGE OF FUNCTIONS TO
ENSURE ALL P-FUNCT 1 & 2
NUM x VALUES ARE SET
TO '0' (OFF)

Use Up/Dn/Left/Right keys to position cursor on NUM 145 and program P-FUNCT 2 & on NUM 149 to program P-FUNCT 1 as shown.

```

TIME BASE PHS FUNC MAPPING
      PHS FUNC SEL(O-OFF/1-DN)
NUM..P-FUNCT NAME.....123456789 0123456
145 OVERLAP A OMIT  010000000 0000000
146 OVERLAP B OMIT  000000000 0000000
147 OVERLAP C OMIT  000000000 0000000
148 OVERLAP D OMIT  000000000 0000000
149 OVERLAP E OMIT  100000000 0000000
UP/DOWN TO SCROLL      E-EDIT
    
```

← P-FUNCT 2 = 1 (OVERLAP 'A' OMIT)

← P-FUNCT 1 = 1 (OVERLAP 'E' OMIT)

PHASE FUNCTION PROGRAMMING COMPLETE

TIME BASE ACTIONS PROGRAMMING

Step 2 - Set up Actions to run Phase Functions.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 5 - ACTIONS

For any Action that will run during the Default Phasing period:

```

TIME BASE ACTION # ***
                12345678 90123456
PATN:001      PHS: 10000000 00000000
0=I'CONN      AUX: 000-----
1-253=PATN    SPC: 0000000-   0=NO
254=FREE      DIM: 0-----   1=YES
255=FLASH     DET: 000-----
UP/DOWN TO SCROLL
    
```

← NOTICE
PHS 1

For any Action that will run during the Alternate Phasing period:

```

TIME BASE ACTION # ***
                12345678 90123456
PATN:001      PHS: 01000000 00000000
0=I'CONN      AUX: 000-----
1-253=PATN    SPC: 0000000-   0=NO
254=FREE      DIM: 0-----   1=YES
255=FLASH     DET: 000-----
UP/DOWN TO SCROLL
    
```

← NOTICE
PHS 2


SPECIAL FUNCTION PROGRAMMING COMPLETE

*** Action #(s) are to be determined by the Division and/or City Traffic Engineer and are scheduled to run in Day Plan(s).

PHASE FUNCTION OPERATION		
Phasing Period	Default	Alternate
Phase Function 1	ENABLED	DISABLED
Phase Function 2	DISABLED	ENABLED
Blankout Sign	OFF	OPERATIONAL
FYA Operation	PROT/PERM	PROT ONLY

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2036
DESIGNED: January 2023
SEALED: 01-03-23
REVISED: N/A

Electrical Detail - Final Design (TMP Phase III & Final)
Sheet 4 of 4



750 N. Greenfield Pkwy, Garner, NC 27529

SR 2000 (Falls of Neuse Rd.)
at
I-540 WB Ramps and
Falls Valley Drive

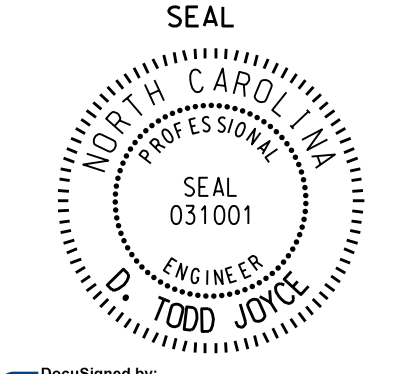
Division 5 Wake County Raleigh

PLAN DATE: January 2023 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



SEAL
TODD JOYCE
ENGINEER
031001

DocuSigned by:
Todd Joyce 01/11/2023
DATE

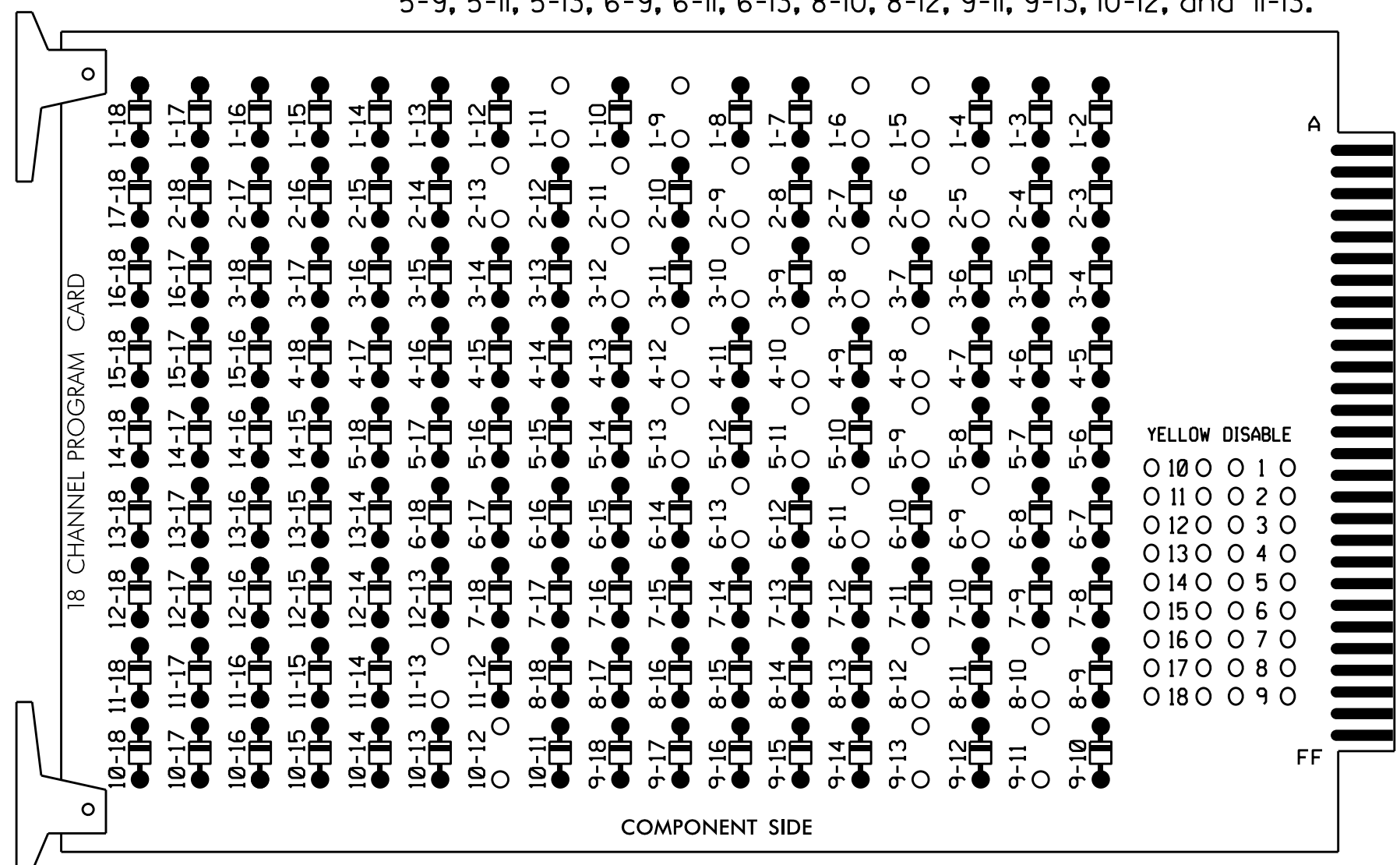
SIG. INVENTORY NO. 05-2036

I:\Projects\2023_13-17_Sig\WKS\Sigs\Sig\Work\Program\05-2036_smc.ele_20230307.dgn
TJPeterson

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

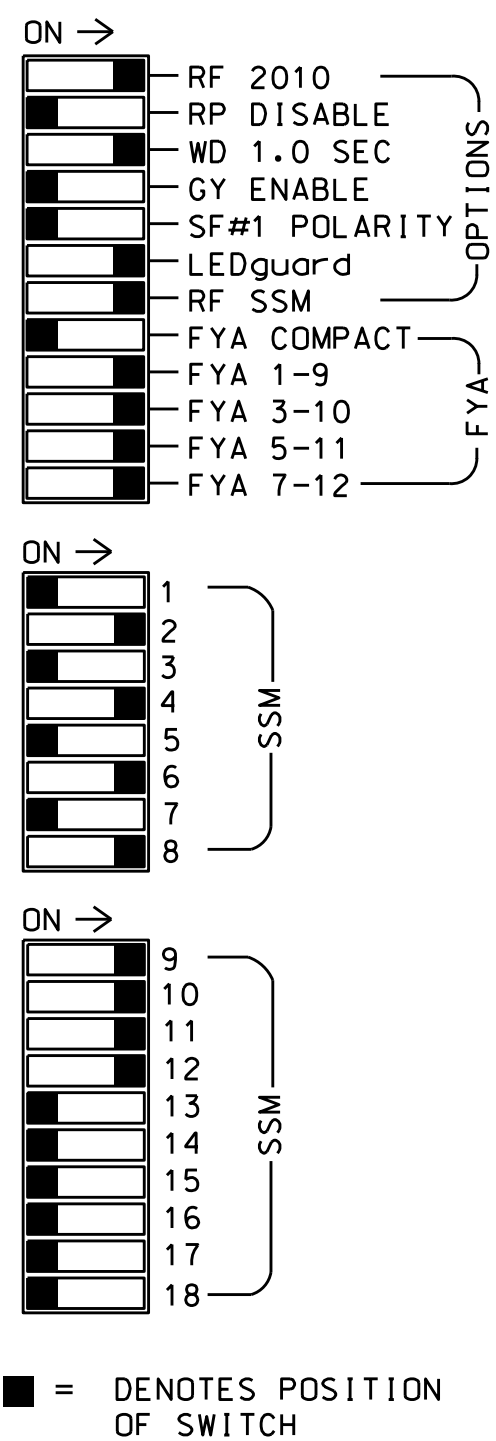
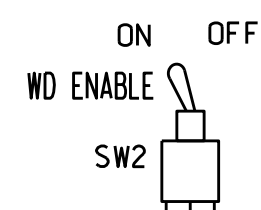
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 3-8, 3-10, 3-12, 4-8, 4-10, 4-12, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 8-10, 8-12, 9-11, 9-13, 10-12, and 11-13.



REMOVE JUMPERS AS SHOWN

NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature for all phases.
- Program phases 4 and 8 for dual entry.
- Program phases 2 and 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S7,S8,S11,
 AUX S1,AUX S2,AUX S4,AUX S5
 PHASES USED.....1,2,2PED,3,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....5+6
 OVERLAP "D".....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
EMU 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 23	P21, P22	31,32	42,43	NU	51	61,62 63	NU	NU	81,82	NU	11	31,32	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			118			133											
Hand icon				113														
Person icon				115														

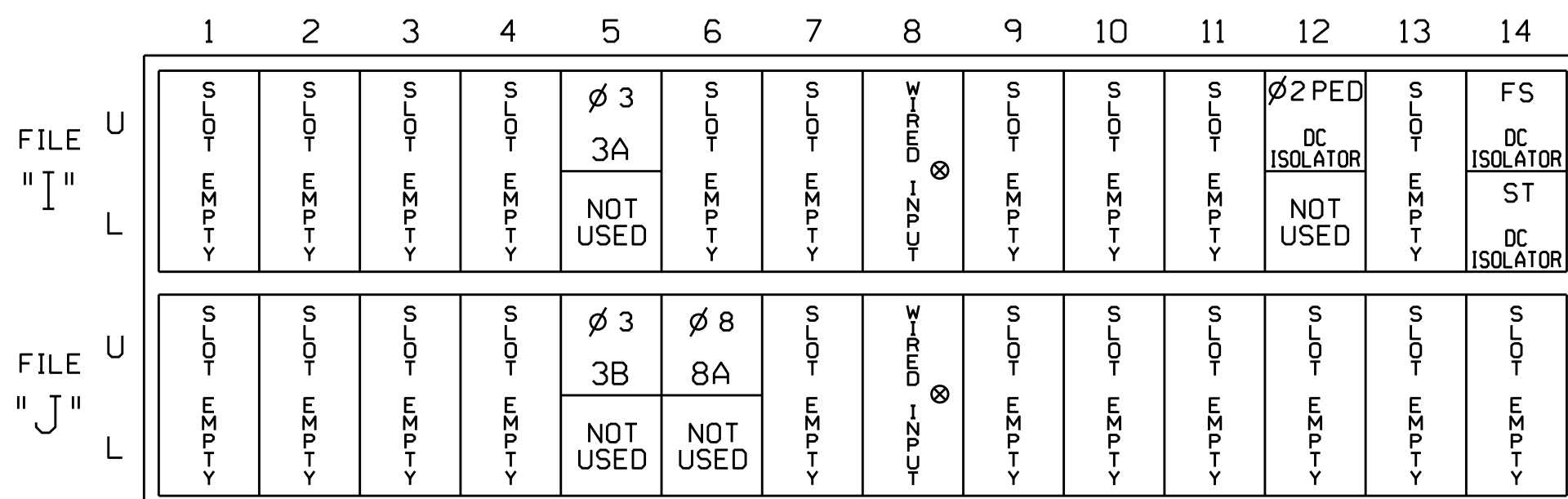
NU = Not Used

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

★ See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

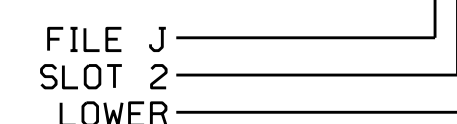
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
3A ¹	TB4-5,6	J5U	58	9	3	15	
	-	J8U	50	35	8	3	
3B ²	TB5-5,6	J5U	57	29	3	15	
	-	J8U	49	15	8		
8A	TB5-9,10	J6U	42	31	8		
PED PUSH BUTTONS							
P21,P22	TB8-4,6	J12U	67	PED 2	2 PED		

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT 112.

¹Add jumper from J5-W to J8-W, on rear of input file.

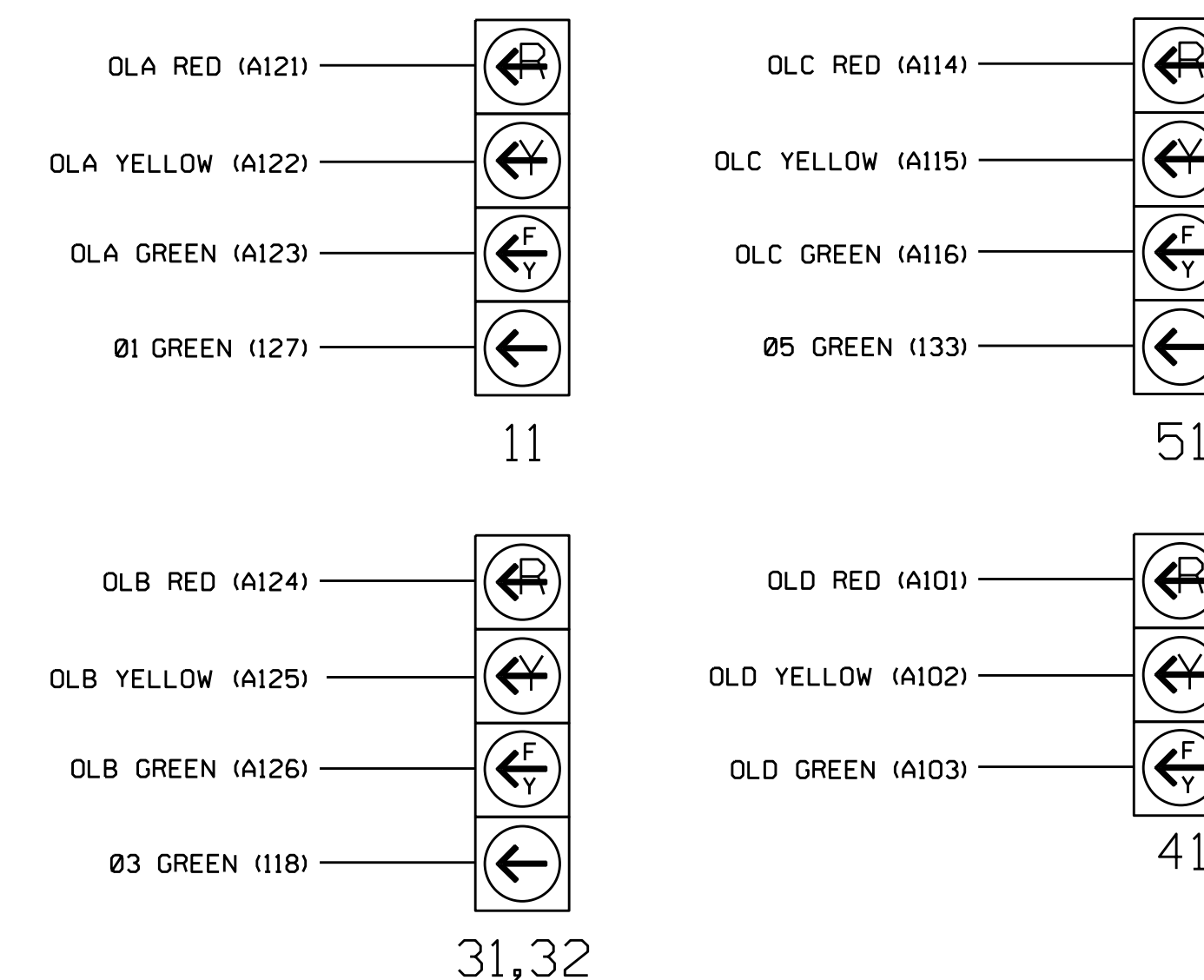
²Add jumper from J5-W to J8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



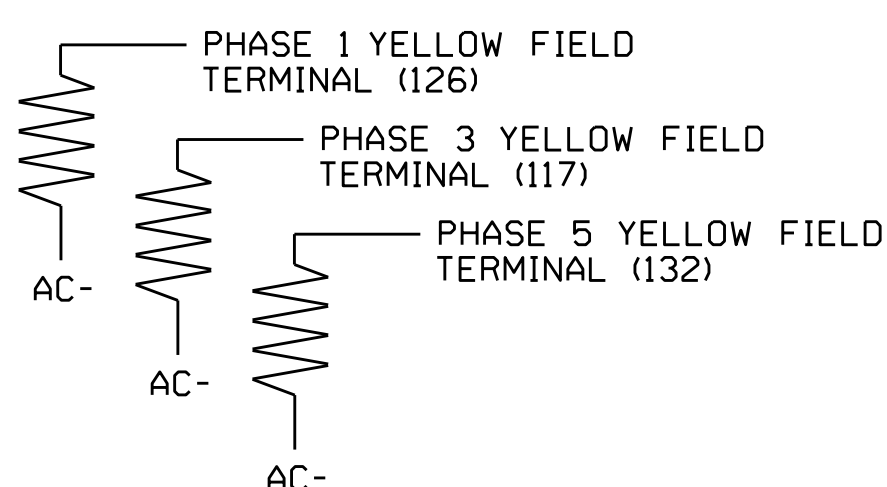
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

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



SPECIAL DETECTOR NOTE

For zones 1A, 2A, 2B, 2C, 4A, 4B, 4C, 5A, 6A and 6B, install a video detection system. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1156T1
 DESIGNED: July 2019
 SEALED: 8/29/2019
 REVISED: N/A

Electrical Detail - Temp. Design 1 (TMP Phase I) - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	SR 2000 (Falls of Neuse Rd.) at SR 1212 (Litchford Rd.)	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL Ryan W. Hough 03/07/2022
	Division 5 Wake County Raleigh PLAN DATE: October 2021 REVIEWED BY: PREPARED BY: S. Armstrong REVIEWED BY: REVISIONS: INIT. DATE	SIG. INVENTORY NO. 05-1156T1

OVERLAP PROGRAMMING DETAIL

- From Main Menu select 4 - UNIT DATA
- From UNIT DATA Submenu select 3 - OVERLAP DATA

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA

A: FYA  E: ---  I: ---  M: ---
B: FYA  F: ---  J: ---  N: ---
C: FYA  G: ---  K: ---  O: ---
D: FYA  H: ---  L: ---  P: ---

PREV/NEXT TO CYCLE
    
```

OVERLAP A

Use Up/Dn/Left/Right keys to position cursor on Overlap 'A', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - A      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 01000000 00000000
PROT PHASES: 10000000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: x0000000 00000000
PROT OVERLAPS: x0000000 00000000
    
```

← NOTICE DELAY/10 = 0

Press ESC

OVERLAP B

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - B      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 00010000 00000000
PROT PHASES: 00100000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: 0x000000 00000000
PROT OVERLAPS: 0x000000 00000000
    
```

← NOTICE DELAY/10 = 0

Press ESC

OVERLAP C

Use Up/Dn/Left/Right keys to position cursor on Overlap 'C', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - C      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 00000100 00000000
PROT PHASES: 00001000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: 00x00000 00000000
PROT OVERLAPS: 00x00000 00000000
    
```

← NOTICE DELAY/10 = 0

Press ESC

OVERLAP D

Use Up/Dn/Left/Right keys to position cursor on Overlap 'D', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - D      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 00000001 00000000
PROT PHASES: 00000010 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: 000x0000 00000000
PROT OVERLAPS: 000x0000 00000000
    
```

← NOTICE DELAY/10 = 0

Press ESC

END OVERLAP PROGRAMMING

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select 3 - PHASE DATA
- From PHASE DATA Submenu select 4 - INIT & N.A RESP

```

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

CODES....0....1....2....3....4....5...6
INITL  NONE INACT RED  YEL  GRN  DRK  G/DW
NA RSP  NONE  NA1  NA2  1&2  ---  ---  ---
    
```

INIT & N.A. RESP PROGRAMMING COMPLETE

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.

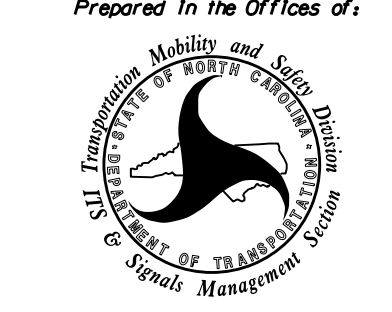
FLASHER CIRCUIT MODIFICATION DETAIL

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

- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- 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: 05-1156T1
 DESIGNED: July 2019
 SEALED: 8/29/2019
 REVISED: N/A

Electrical Detail - Temp. Design 1 (TMP Phase I) - Sheet 2 of 2		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2000 (Falls of Neuse Rd.) at SR 2012 (Litchford Rd.)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036833 RYAN W. HOUGH	
Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	Division 5 Wake County Raleigh PLAN DATE: October 2021 REVIEWED BY: PREPARED BY: S. Armstrong REVIEWED BY:	DocuSigned by: Ryan W. Hough 03/07/2022 13032FAA2854C3 DATE	
		REVISIONS INIT. DATE	SIG. INVENTORY NO. 05-1156T1

OVERLAP PROGRAMMING DETAIL

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **3 - OVERLAP DATA**

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA
A: FYA  E: ---  I: ---  M: ---
B: FYA  F: ---  J: ---  N: ---
C: FYA  G: ---  K: ---  O: ---
D: FYA  H: ---  L: ---  P: ---

PREV/NEXT TO CYCLE
    
```

OVERLAP A

Use Up/Dn/Left/Right keys to position cursor on Overlap 'A', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - A      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 01000000 00000000
PROT PHASES: 10000000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: x0000000 00000000
PROT OVERLAPS: x0000000 00000000
    
```

NOTICE
DELAY/10 = 0

Press ESC

OVERLAP B

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - B      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 00010000 00000000
PROT PHASES: 00100000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: 0x0000000 00000000
PROT OVERLAPS: 0x0000000 00000000
    
```

NOTICE
DELAY/10 = 0

Press ESC

OVERLAP C

Use Up/Dn/Left/Right keys to position cursor on Overlap 'C', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - C      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 00000100 00000000
PROT PHASES: 00001000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: 00x000000 00000000
PROT OVERLAPS: 00x000000 00000000
    
```

NOTICE
DELAY/10 = 0

Press ESC

OVERLAP D

Use Up/Dn/Left/Right keys to position cursor on Overlap 'D', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - D      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 00000001 00000000
PROT PHASES: 00000010 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: 000x0000 00000000
PROT OVERLAPS: 000x0000 00000000
    
```

NOTICE
DELAY/10 = 0

END OVERLAP PROGRAMMING

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

```

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

CODES....0....1....2....3....4....5....6
INITL  NONE INACT RED  YEL  GRN  DRK  G/DW
NA RSP  NONE  NA1  NA2  1&2  ---  ---  ---
    
```

INIT & N.A. RESP PROGRAMMING COMPLETE

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.

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Install push buttons and APS equipment per manufacturer's instructions.
- Provide a dedicated cable to each push button per manufacturer's instructions.
- If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

FLASHER CIRCUIT MODIFICATION DETAIL

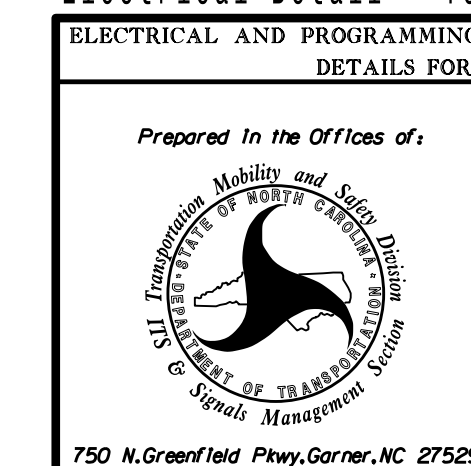
IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- 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: 05-1156T1
DESIGNED: July 2019
SEALED: 8/29/2019
REVISED: N/A

Electrical Detail - Temp. Design 2 (TMP Phase II) - Sheet 2 of 2



SR 2000 (Falls of Neuse Rd.)
at
SR 1012 (Litchford Rd.)

Division 5 Wake County Raleigh

PLAN DATE: October 2021 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by: Ryan W. Hough 03/07/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SIG. INVENTORY NO. 05-1156T2

6 Phase Fully Actuated (Raleigh Signal System)

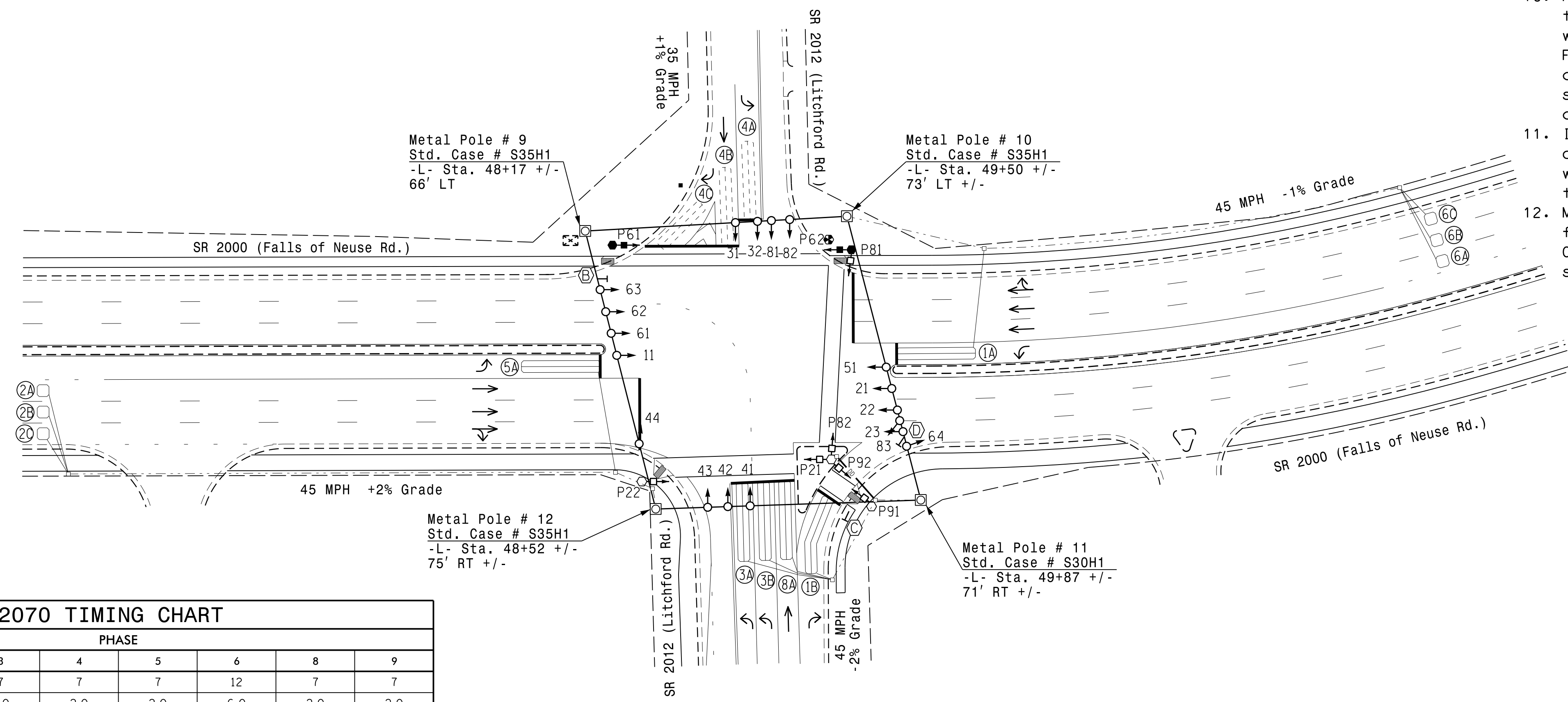
SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION			
SIGNAL FACE	VOICE	TONES	SPEECH MESSAGE
P21	X	-	Walk Litchford, Walk sign is on to cross Litchford.
	X	-	Flashing Don't Walk / Don't Walk Wait, Wait to cross Litchford.
P22	-	X	Walk (Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk Wait, Wait to cross Litchford.
P61, P62	-	X	Walk (Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk Wait, Wait to cross Litchford.
P81	-	X	Walk (Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk Wait, Wait to cross Falls of Neuse.
P82	-	X	Walk Falls of Neuse, Walk sign is on to cross Falls of Neuse
	X	-	Flashing Don't Walk / Don't Walk Wait, Wait to cross Falls of Neuse.
P91	-	X	Walk (Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk Wait, Wait to cross Litchford Ramp.
P92	X	-	Walk Litchford, Walk sign is on to cross Litchford Ramp.
	X	-	Flashing Don't Walk / Don't Walk Wait, Wait to cross Litchford Ramp.

LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DETECTOR PROGRAMMING													
							TIMING		OPERATION MODE							SYSTEM LOOPS		STATUS		
							DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	1 CALL	STOP A	STOP B	PROTECT LEFT	PROTECT THROUGH	AND	SWITCH	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	6X6	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2B	6X6	6X6	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2C	6X6	6X6	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
3A	6X40	2-4-2	0	X	-	3	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
3B	6X40	2-4-2	0	X	-	3	5 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	-
4C	6X30	2-4-2	0	X	-	4	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	X	-	5	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	6X6	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	6X6	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6C	6X6	6X6	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	6X6	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 may be lagged.
- Set all detector units to presence mode.
- Omit phase 9 and sign D with no pedestrian calls.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- Phase 9 and phase 2 or 4 pedestrian timing is designed as a 2 stage crossing when crossing the median island. The FDW time shown is only intended to get a pedestrian to/from the island during a single crossing. Install R10-3d signs as appropriate.
- Illuminate sign D at the beginning of the Ped 9 "Walk" interval. This sign will remain illuminated until the end of the Ped 9 Flashing "Don't Walk" interval.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

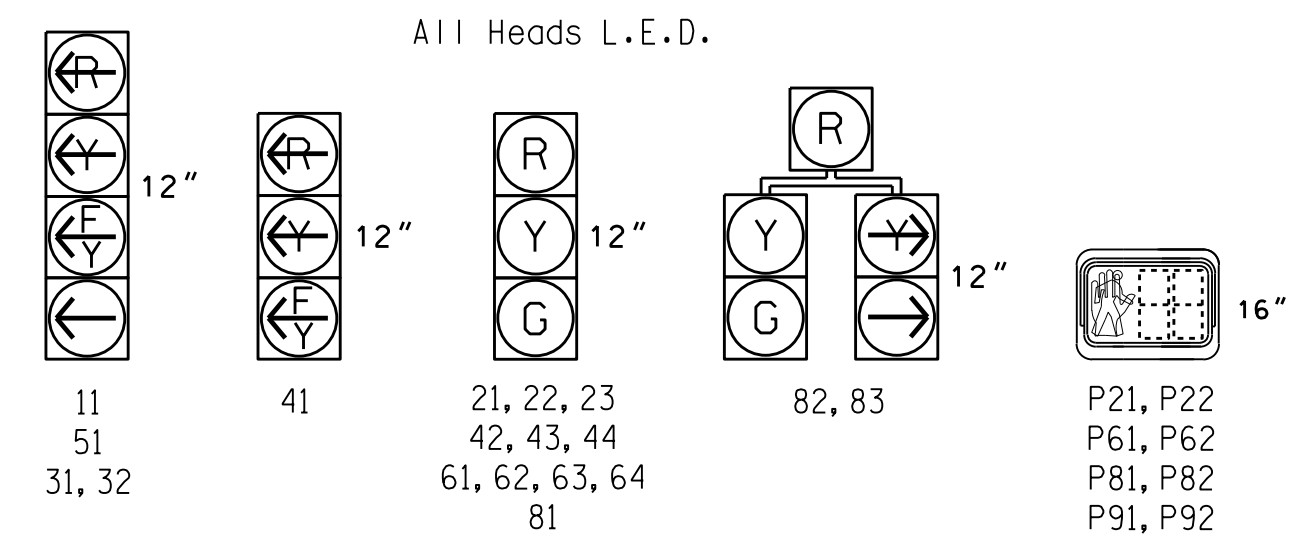


PROPOSED	EXISTING
	N/A
	N/A
N/A	
N/A	
	N/A

FEATURE	SE-PAC 2070 PHASE							
	1	2	3	4	5	6	8	9
Min Green *	7	12	7	7	7	12	7	7
Passage Gap *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Maximum Green *	15	90	40	20	20	90	30	10
Yellow Change	3.0	4.6	3.0	4.7	3.0	4.6	4.7	4.6
Red Clear	3.3	2.0	3.3	2.4	3.3	2.0	2.4	2.0
Advance Walk *	-	4	-	-	-	4	4	-
Walk *	-	7	-	-	-	7	7	4
Pedestrian Clear	-	15	-	-	-	25	22	4
Added Initial *	-	1.0	-	-	-	1.0	-	-
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	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
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 FACE I.D.



Signal Upgrade - Final Design (Sheet 1 of 2)

750 N. Greenfield Pkwy, Garner, NC 27529

SR 2000 (Falls of Neuse Rd.)
at
SR 2012 (Litchford Rd.)

Division 5 Wake County Raleigh

PLAN DATE: January 2023 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

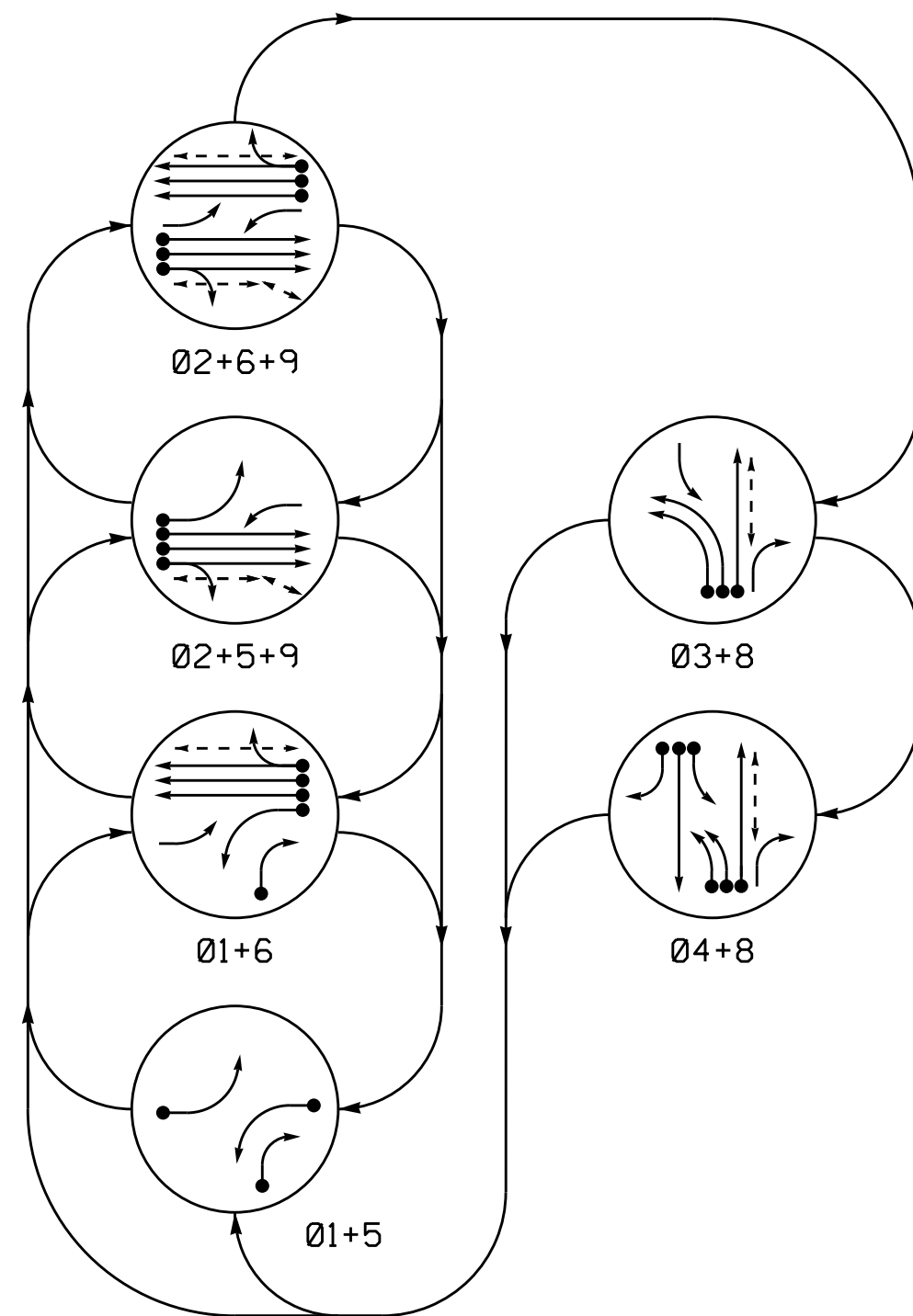
01/03/2023

SIG. INVENTORY NO. 05-1156

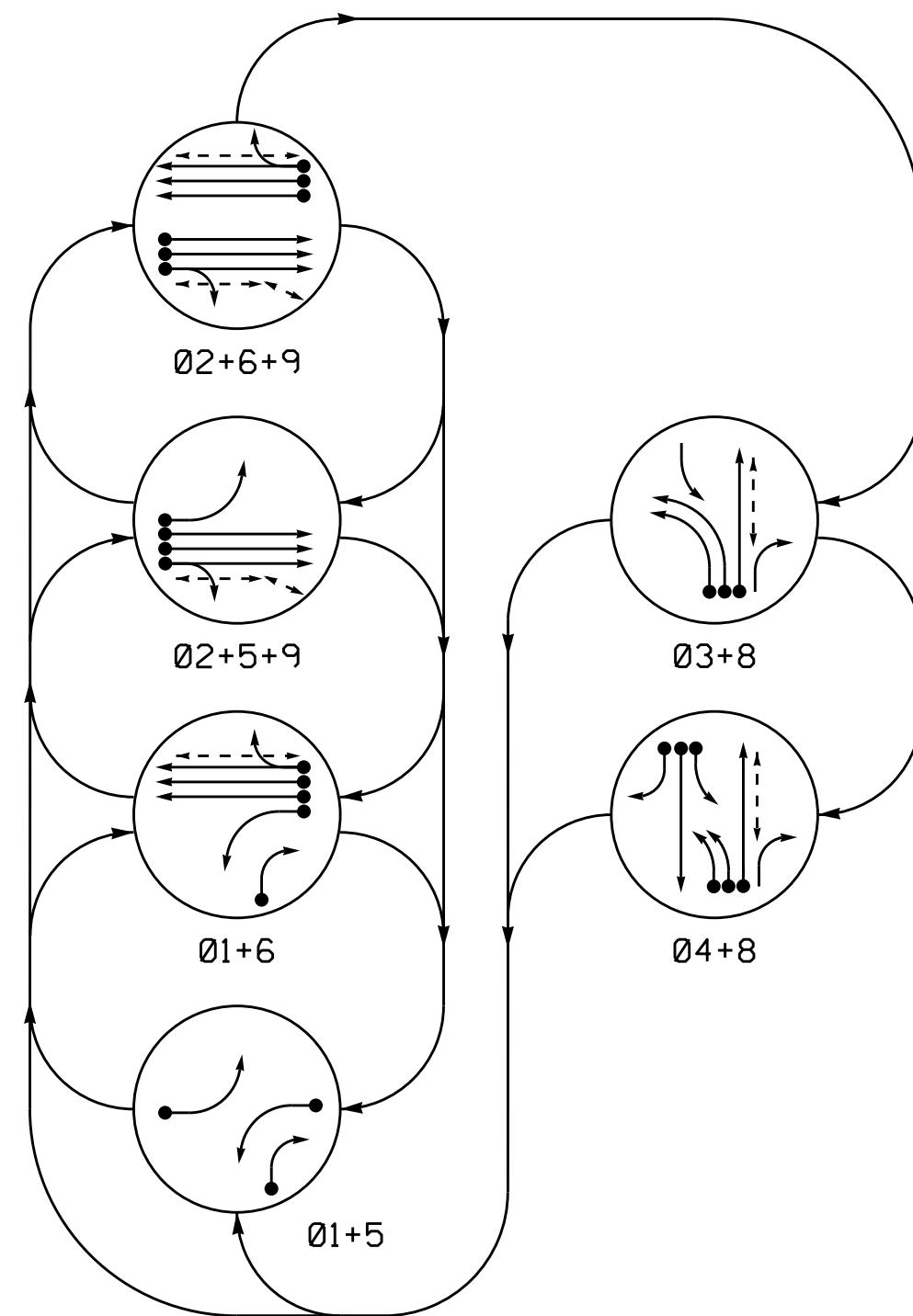
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6 Phase Fully Actuated (Raleigh Signal System)

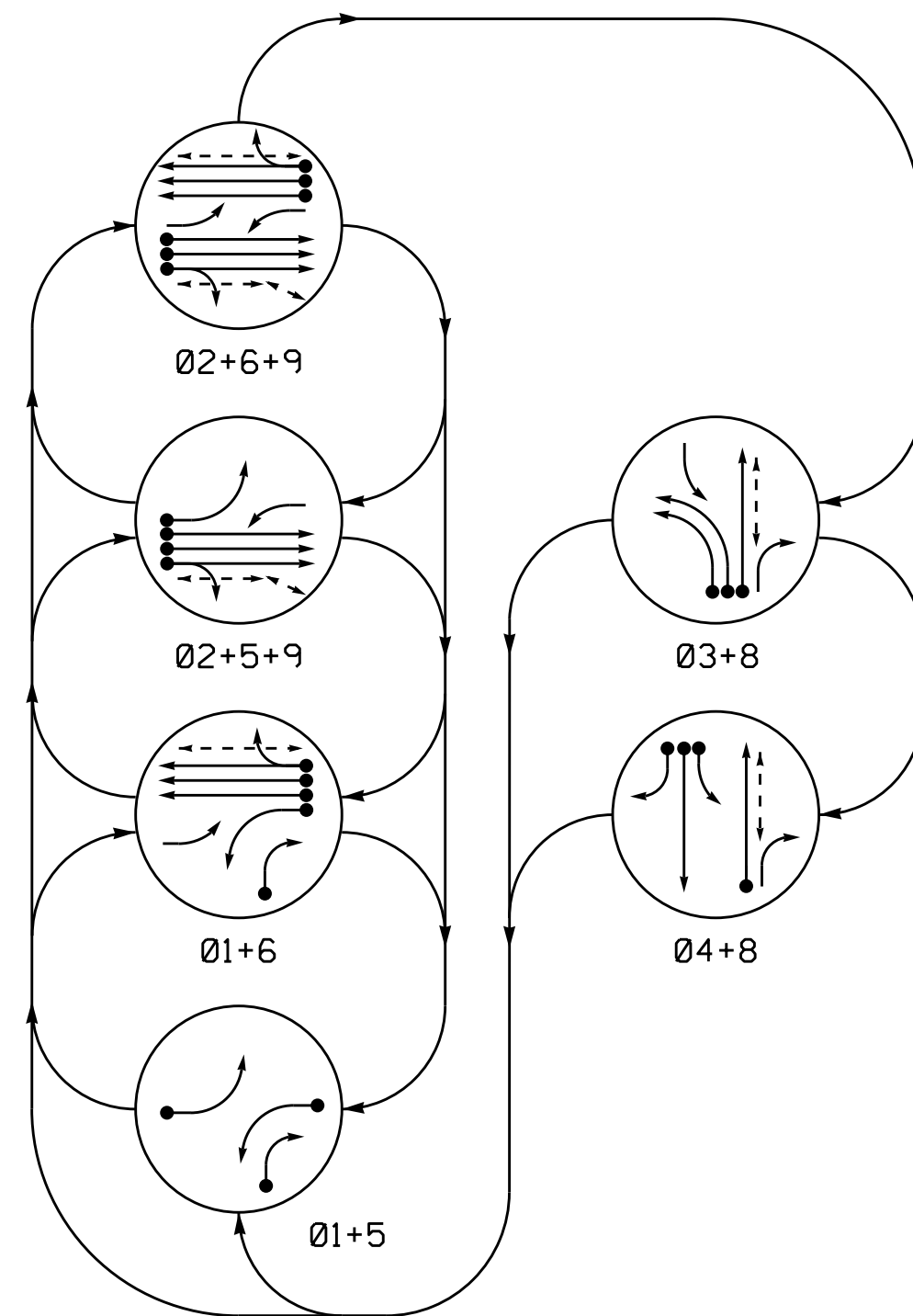
DEFAULT PHASING DIAGRAM



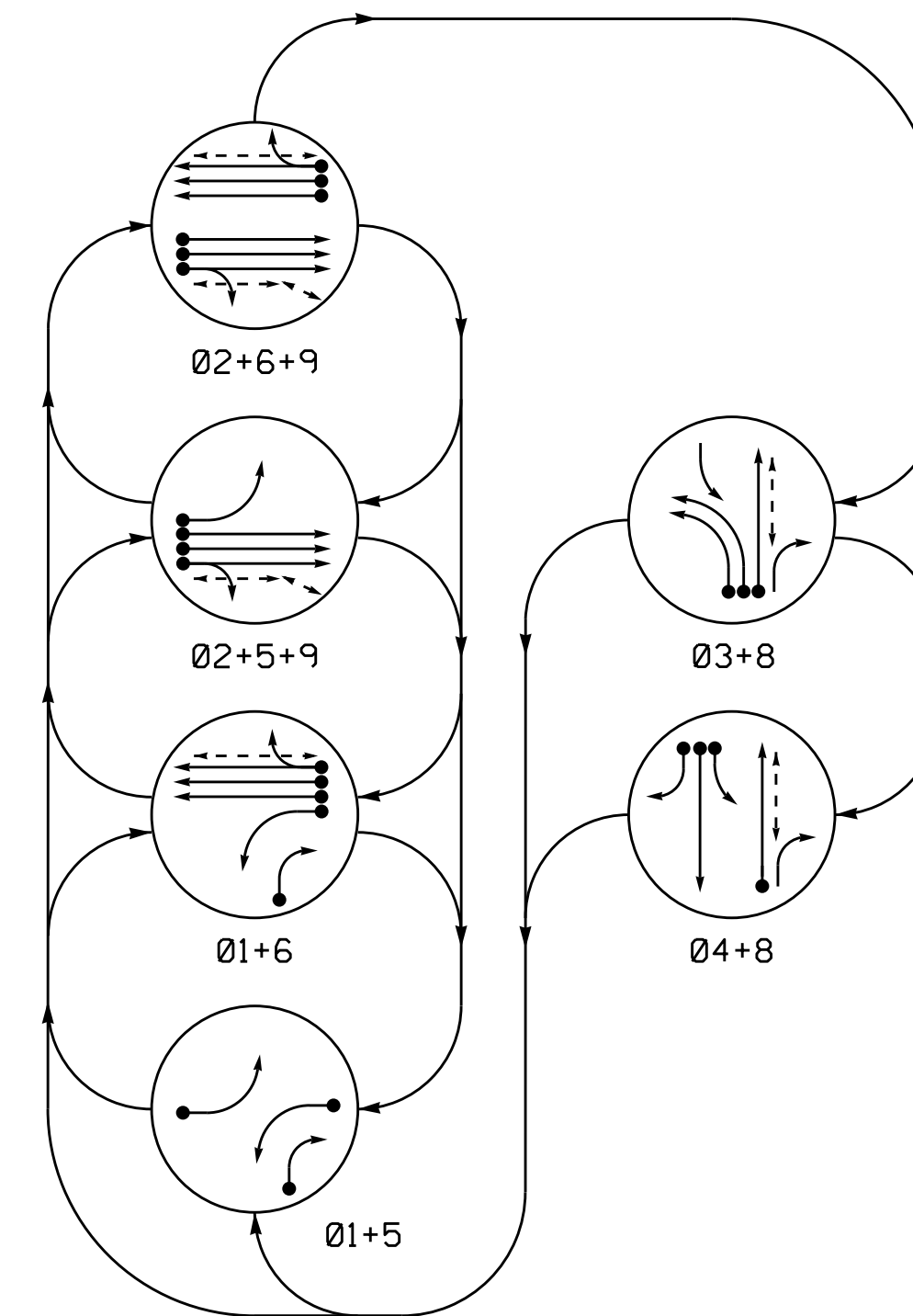
ALTERNATE 1 PHASING DIAGRAM



ALTERNATE 2 PHASING DIAGRAM



ALTERNATE 3 PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE						FLASH
	01+5	01+6	02+5+9	02+6+9	03+8	04+8	
11	—	—	—	—	—	—	Y
21, 22, 23	R	R	G	G	R	R	Y
31, 32	R	R	R	R	—	—	—
41	R	R	R	R	—	—	—
42, 43, 44	R	R	R	R	R	R	—
51	—	—	—	—	—	—	Y
61, 62, 63, 64	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82, 83	R	R	R	R	G	G	R
P21, P22	DW	DW	W	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK
P81, P82	DW	DW	DW	DW	W	W	DRK
P91, P92	DW	DW	W	W	DW	DW	DRK
SIGN D	OFF	OFF	ON	ON	OFF	OFF	OFF

ALTERNATE 1 PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE						FLASH
	01+5	01+6	02+5+9	02+6+9	03+8	04+8	
11	—	—	—	—	—	—	Y
21, 22, 23	R	R	G	G	R	R	Y
31, 32	R	R	R	R	—	—	—
41	R	R	R	R	—	—	—
42, 43, 44	R	R	R	R	R	R	—
51	—	—	—	—	—	—	Y
61, 62, 63, 64	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82, 83	R	R	R	R	G	G	R
P21, P22	DW	DW	W	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK
P81, P82	DW	DW	DW	DW	W	W	DRK
P91, P92	DW	DW	W	W	DW	DW	DRK
SIGN D	OFF	OFF	ON	ON	OFF	OFF	OFF

ALTERNATE 2 PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE						FLASH
	01+5	01+6	02+5+9	02+6+9	03+8	04+8	
11	—	—	—	—	—	—	Y
21, 22, 23	R	R	G	G	R	R	Y
31, 32	R	R	R	R	—	—	—
41	R	R	R	R	—	—	—
42, 43, 44	R	R	R	R	R	R	—
51	—	—	—	—	—	—	Y
61, 62, 63, 64	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82, 83	R	R	R	R	G	G	R
P21, P22	DW	DW	W	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK
P81, P82	DW	DW	DW	DW	W	W	DRK
P91, P92	DW	DW	W	W	DW	DW	DRK
SIGN D	OFF	OFF	ON	ON	OFF	OFF	OFF

ALTERNATE 3 PHASING TABLE OF OPERATION

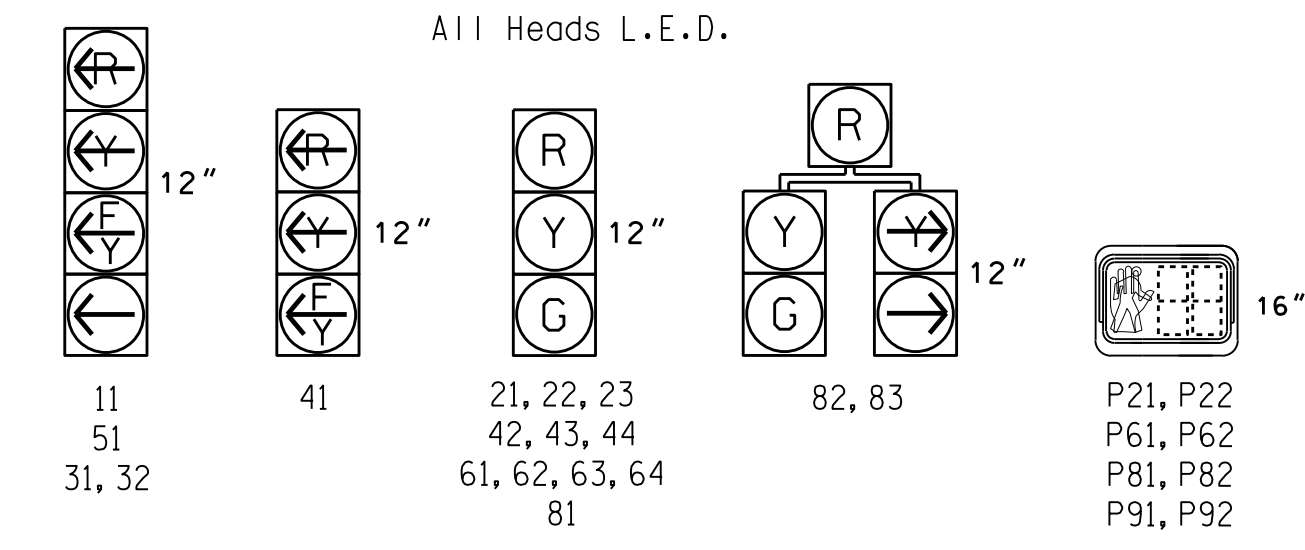
SIGNAL FACE	PHASE						FLASH
	01+5	01+6	02+5+9	02+6+9	03+8	04+8	
11	—	—	—	—	—	—	Y
21, 22, 23	R	R	G	G	R	R	Y
31, 32	R	R	R	R	—	—	—
41	R	R	R	R	—	—	—
42, 43, 44	R	R	R	R	R	R	—
51	—	—	—	—	—	—	Y
61, 62, 63, 64	R	G	R	G	R	R	Y
81	R	R	R	R	G	G	R
82, 83	R	R	R	R	G	G	R
P21, P22	DW	DW	W	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK
P81, P82	DW	DW	DW	DW	W	W	DRK
P91, P92	DW	DW	W	W	DW	DW	DRK
SIGN D	OFF	OFF	ON	ON	OFF	OFF	OFF

- NOTES**
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
 - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
 - Phase 1 and/or phase 5 may be lagged.
 - Phase 3 may be lagged.
 - Set all detector units to presence mode.
 - Omit phase 9 and sign D with no pedestrian calls.
 - Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
 - Program pedestrian heads to countdown the flashing "Don't Walk" time only.
 - This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
 - Phase 9 and phase 2 or 4 pedestrian timing is designed as a 2 stage crossing when crossing the median island. The FDW time shown is only intended to get a pedestrian to/from the island during a single crossing. Install R10-3d signs as appropriate.
 - Illuminate sign D at the beginning of the Ped 9 "Walk" interval. This sign will remain illuminated until the end of the Ped 9 Flashing "Don't Walk" interval.
 - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

- | | | | |
|--|---|--|--|
| | PROPOSED Traffic Signal Head | | EXISTING Traffic Signal Head |
| | PROPOSED Modified Signal Head | | EXISTING Modified Signal Head |
| | PROPOSED Pedestrian Signal Head With Push Button & Sign | | EXISTING Pedestrian Signal Head |
| | PROPOSED Signal Pole with Guy | | EXISTING Signal Pole with Guy |
| | PROPOSED Inductive Loop Detector | | EXISTING Inductive Loop Detector |
| | PROPOSED Controller & Cabinet | | EXISTING Controller & Cabinet |
| | PROPOSED Junction Box | | EXISTING Junction Box |
| | PROPOSED 2-in Underground Conduit | | EXISTING 2-in Underground Conduit |
| | PROPOSED Right of Way | | EXISTING Right of Way |
| | PROPOSED Directional Arrow | | EXISTING Directional Arrow |
| | PROPOSED Curb Ramp | | EXISTING Curb Ramp |
| | PROPOSED Type I Pushbutton Post | | EXISTING Type I Pushbutton Post |
| | PROPOSED Type II Signal Pedestal | | EXISTING Type II Signal Pedestal |
| | PROPOSED Metal Strain Pole | | EXISTING Metal Strain Pole |
| | PROPOSED Directional Drill | | EXISTING Directional Drill |
| | PROPOSED "YIELD" Sign (R1-2) | | EXISTING "YIELD" Sign (R1-2) |
| | PROPOSED "DO NOT BLOCK INTERSECTION" (R10-7) | | EXISTING "DO NOT BLOCK INTERSECTION" (R10-7) |
| | PROPOSED "STOP HERE ON RED" Sign (R10-6) | | EXISTING "STOP HERE ON RED" Sign (R10-6) |
| | PROPOSED "NO TURN ON RED" L.E.D. Blankout Sign | | EXISTING "NO TURN ON RED" L.E.D. Blankout Sign |

SIGNAL FACE I.D.



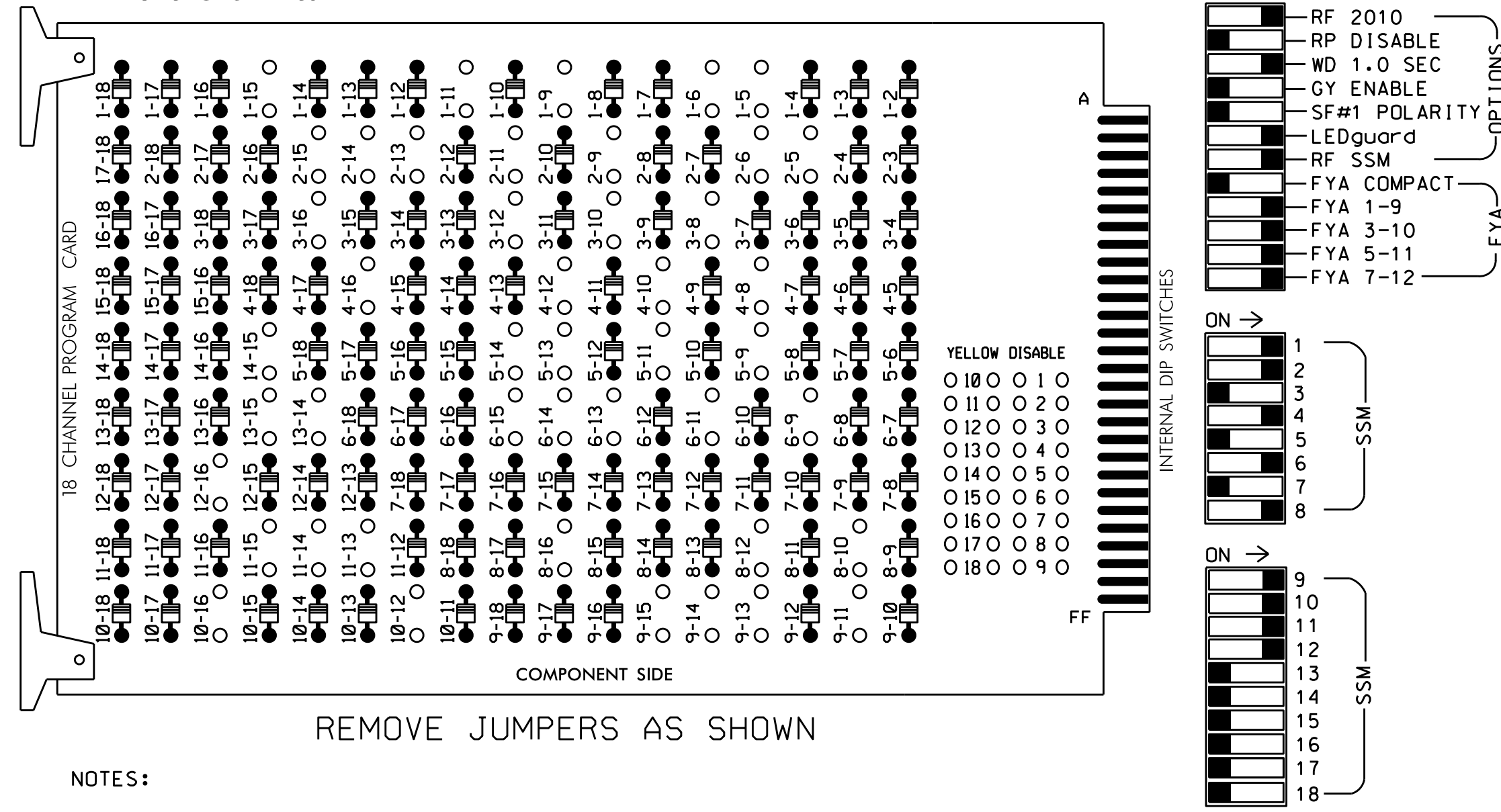
Signal Upgrade - Final Design (Sheet 2 of 2)

	SR 2000 (Falls of Neuse Rd.) at SR 2012 (Litchford Rd.)	
	Division 5 Wake County Raleigh	PREPARED BY: J.A. Lohr REVIEWED BY:
	PLAN DATE: January 2023	REVISIONS:
	SCALE: 1"=40'	DATE: 01/03/2023

02-Jan-2023 11:50
 S:\Projects\Signal Design\Central Region\01-5826\051156...sig.dsn,20230103.dgn
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18 CHANNEL 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, 2-14, 2-15, 3-8, 3-10, 3-12, 3-16, 4-8, 4-10, 4-12, 4-16, 5-9, 5-11, 5-13, 5-14, 6-9, 6-11, 6-13, 6-14, 6-15, 8-10, 8-12, 8-16, 9-11, 9-13, 9-14, 9-15, 10-12, 10-16, 11-13, 11-14, 11-15, 12-16, 13-14, 13-15 and 14-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phases 2 and 6 Green/Don't Walk.
- Enable simultaneous gap-out feature for all phases.
- Program phases 4 and 8 for dual entry.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S11,S12,
 AUX S1,AUX S2,AUX S4,AUX S5
 PHASES USED.....1,2,PED,3,4,5,6,6PED,8,8PED,9**,
 9PED
 OVERLAP "A".....*
 OVERLAP "B".....*
 OVERLAP "C".....*
 OVERLAP "D".....*
 * See sheet 2 for Overlap Programming Detail
 ** Phase used for timing purposes only.

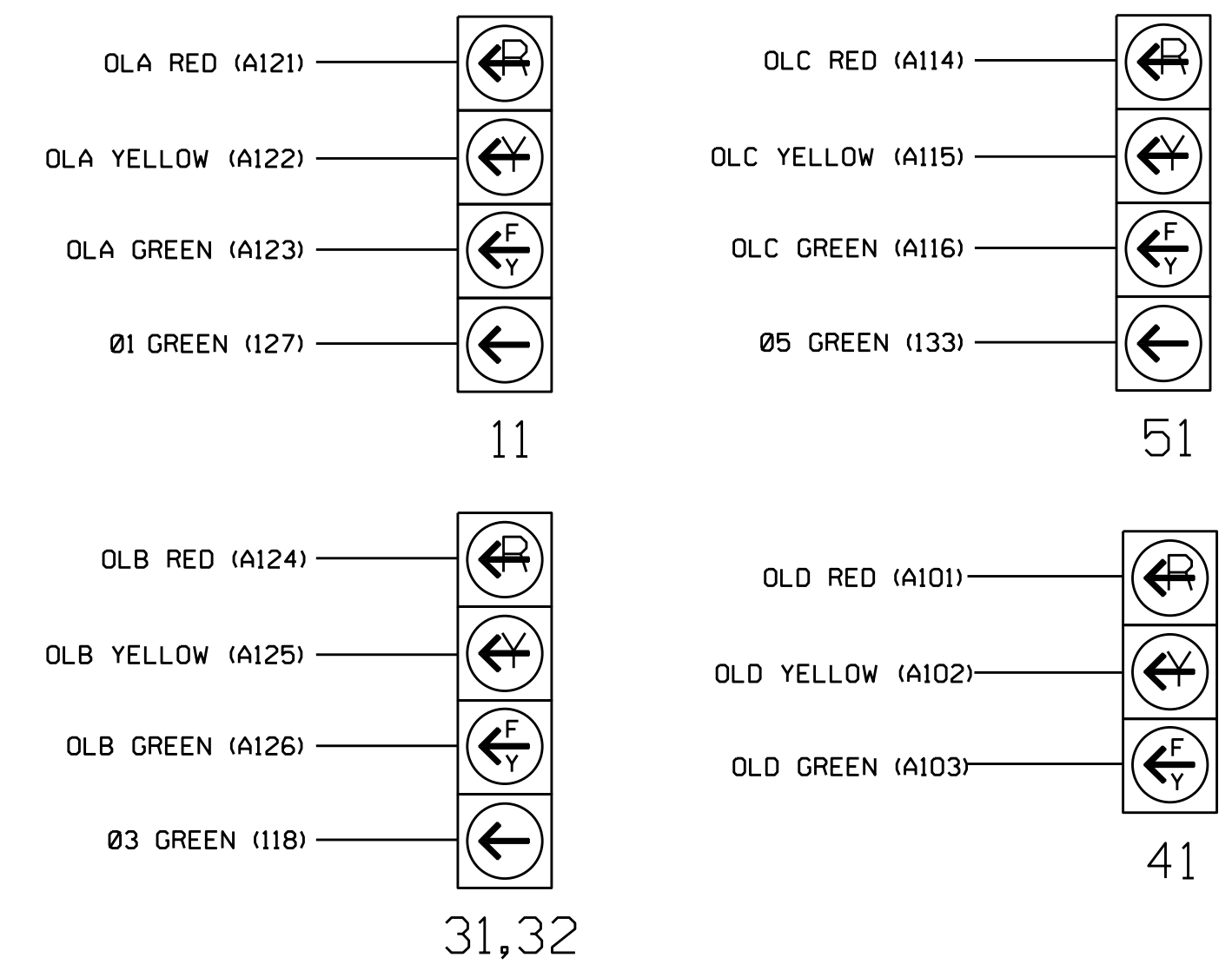
SIGNAL HEAD HOOK-UP CHART

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	9 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11	82,83	21,22,23	P21, P22	31,32	42,43,44	P91, P92	BLANK OUT SIGN	51	61,62,63,64	P61, P62	NU	81,82,83	P81, P82	11	31,32	NU	51	41
RED	*	128			101			134		107									
YELLOW		129		*	102			* 135		108									
GREEN		130			103			136		109									
RED ARROW													A121	A124		A114	A101		
YELLOW ARROW		126											A122	A125		A115	A102		
FLASHING YELLOW ARROW													A123	A126		A116	A103		
GREEN ARROW	127	127			118			133											
PED YELLOW					113		104		119		110								
							** 105												
							** 106		121		112								

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ** See Blankout sign wiring detail on sheet 3.
 ★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	Ø 1	Ø 1	Ø 2	Ø 3	Ø 4	Ø 4	S	S	S	S	S	Ø 2 PED	Ø 6 PED	FS
L	1A	1B	2B	3A	4A	4C	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR
	NOT USED	Ø 2	Ø 2	Ø 3	Ø 4	NOT USED	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR
		2A	2C	3B	4B		ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR
FILE "J"	Ø 5	Ø 6	Ø 6	Ø 8	S	S	S	S	S	S	S	S	S	S
U	5A	6A	6C	8A	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR
L	NOT USED	Ø 6	NOT USED	NOT USED	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR
		6B			ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR	ISOLATOR

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

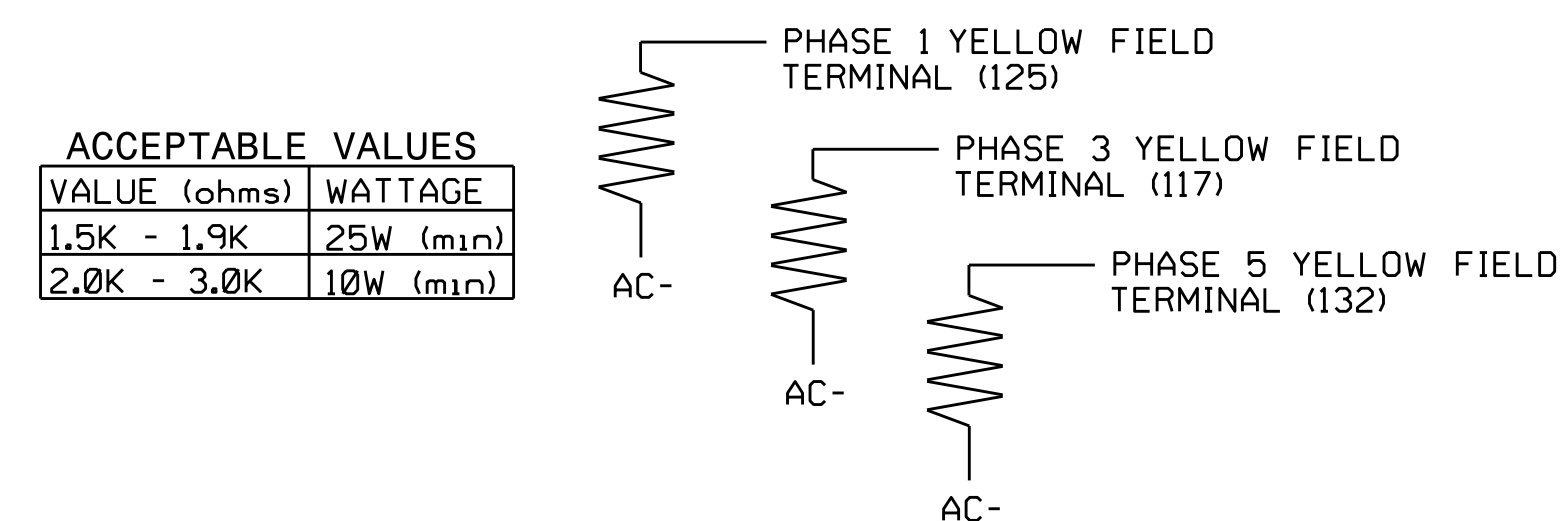
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	11U	56	1	1	5	
1B	TB2-5,6	12U	39	3	1	15	
2A	TB2-7,8	12L	43	4	2		
2B	TB2-9,10	13U	63	5	2		
2C	TB2-11,12	13L	76	6	2		
3A	TB4-5,6	15U	58	9	3	5	
3B	TB4-7,8	15L	58	9	3	5	
4A	TB4-9,10	16U	41	11	4	3	
4B	TB4-11,12	16L	45	12	4	10	
4C	TB6-1,2	17U	65	13	4	15	
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		
6C	TB3-9,10	J3U	64	23	6		
8A	TB5-9,10	J6U	42	31	8		
PED PUSH BUTTONS							
P21,P22	TB8-4,6	112U	67	PED 2	2 PED		
P91,P92	TB8-5,6	112L	69	PED 4	9 PED		
P61,P62	TB8-7,9	113U	68	PED 6	6 PED		
P81,P82	TB8-8,9	113L	70	PED 8	8 PED		

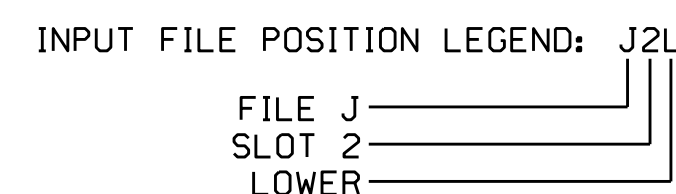
NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

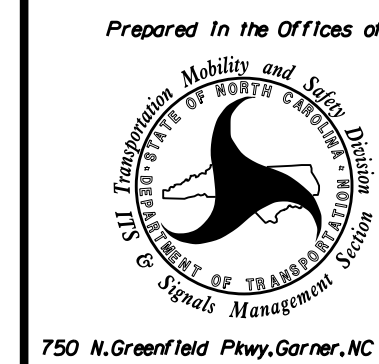


VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



Electrical Detail - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 2000 (Falls of Neuse Rd.)
 at
 SR 2012 (Litchford Rd.)

Division 5 Wake County Raleigh

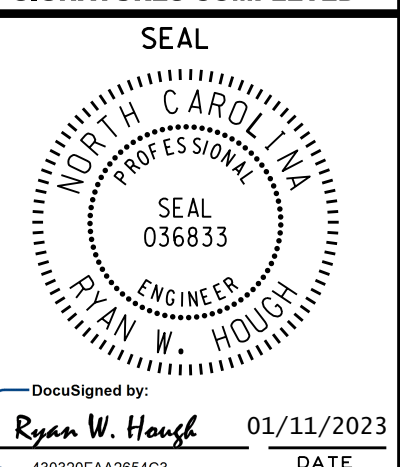
PLAN DATE: January 2023 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by: Ryan W. Hough 01/11/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SIG. INVENTORY NO. 05-1156

OVERLAP PROGRAMMING DETAIL

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **3 - OVERLAP DATA**

```

OVERLAP DATA
A: FYA   E: ---  I: ---  M: ---
B: FYA   F: ---  J: ---  N: ---
C: FYA   G: ---  K: ---  O: ---
D: FYA   H: ---  L: ---  P: ---
PREV/NEXT TO CYCLE
    
```

Press ESC

OVERLAP A

Use Up/Dn/Left/Right keys to position cursor on Overlap 'A', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - A      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 01000000 00000000
PROT PHASES: 10000000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: x0000000 00000000
PROT OVERLAPS: x0000000 00000000
    
```

NOTICE DELAY/10 = 0

Press ESC

OVERLAP B

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - B      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 00010000 00000000
PROT PHASES: 00100000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: 0x000000 00000000
PROT OVERLAPS: 0x000000 00000000
    
```

NOTICE DELAY/10 = 0

Press ESC

OVERLAP C

Use Up/Dn/Left/Right keys to position cursor on Overlap 'C', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - C      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 00000100 00000000
PROT PHASES: 00001000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: 00x00000 00000000
PROT OVERLAPS: 00x00000 00000000
    
```

NOTICE DELAY/10 = 0

Press ESC

OVERLAP D

Use Up/Dn/Left/Right keys to position cursor on Overlap 'D', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - D      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 00000001 00000000
PROT PHASES: 00000010 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNQP
PERM OVERLAPS: 000x0000 00000000
PROT OVERLAPS: 000x0000 00000000
    
```

NOTICE DELAY/10 = 0

END OVERLAP PROGRAMMING

ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **3 - PEDESTRIAN DATA**
- From PEDESTRIAN DATA Submenu select **3 - PED OFFSET+**

```

PHASE.....1...2...3...4...5...6...7...8
WOFF/10  0 40  0  0  0 40  0 40
MODE      0  0  0  0  0  0  0  0
    
```

CODES: * 0-ADVANCE 1-DELAY

Advance Walk PED programming complete.

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

Note Phase 7 NOT used!

```

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

CODES.....0....1....2....3....4....5....6
INITL  NONE  INACT  RED  YEL  GRN  DRK  G/DW
NA RSP  NONE  NA1  NA2  1&2  ---  ---  ---
    
```

INIT & N.A. RESP PROGRAMMING COMPLETE

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.

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Install push buttons and APS equipment per manufacturer's instructions.
- Provide a dedicated cable to each push button per manufacturer's instructions.
- If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

FLASHER CIRCUIT MODIFICATION DETAIL

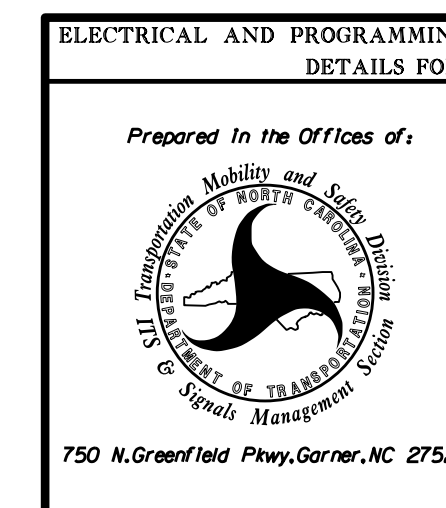
IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- 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: 05-1156
 DESIGNED: January 2023
 SEALED: 01/03/2023
 REVISED: N/A

Electrical Detail - Sheet 2 of 5



SR 2000 (Falls of Neuse Rd.)
 at
 SR 2012 (Litchford Rd.)

Division 5 Wake County Raleigh
 PLAN DATE: January 2023 REVIEWED BY:
 PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
Ryan W. Hough 01/11/2023
 SEAL 036833
 STATE OF NORTH CAROLINA
 PROFESSIONAL ENGINEER
 RYAN W. HOUGH

SIG. INVENTORY NO. 05-1156

PROGRAMMING DETAILS TO CALL ALTERNATE PHASING

To run the Alternate phasing, schedule a Day Plan that calls an Action that is programmed to enable Phase Function 1, 2 or 3.

Actions can be programmed to run free run or call a coordination pattern.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

Step 1 - Assign OMIT OVERLAPS A & C to Phase Function 1.
Assign OMIT OVERLAP B to Phase Function 2.
Assign OMIT OVERLAPS A, B & C to Phase Function 3.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 9 - PHS FUNC MAPPING

Use Up/Dn Keys to position cursor on NUM 1

TIME BASE PHS FUNC MAPING		PHS FUNC SEL(0-OFF/1-ON)	
NUM..P-FUNCT NAME.....	123456789	0123456	
1 PHS-01 MAX # 2	00000000	0000000	
2 PHS-02 MAX # 2	00000000	0000000	
3 PHS-03 MAX # 2	00000000	0000000	
4 PHS-04 MAX # 2	00000000	0000000	
UP/DOWN TO SCROLL		E-EDIT	

BEFORE PROCEEDING,
SCROLL THRU ENTIRE
RANGE OF FUNCTIONS TO
ENSURE ALL P-FUNCT 1
NUM x VALUES ARE SET
TO '0' (OFF)

Use Up/Dn/Left/Right keys to position cursor on NUM 145 and program P-FUNCT 1 as shown.

TIME BASE PHS FUNC MAPING		PHS FUNC SEL(0-OFF/1-ON)	
NUM..P-FUNCT NAME.....	123456789	0123456	
145 OVERLAP A OMIT	10100000	0000000	
146 OVERLAP B OMIT	01100000	0000000	
147 OVERLAP C OMIT	10100000	0000000	
148 OVERLAP D OMIT	00000000	0000000	
UP/DOWN TO SCROLL		E-EDIT	

SET P-FUNCT 1, 2 & 3 VALUES
TO '1' (ON) AS SHOWN

- ← FOR OVERLAP A OMIT
- ← FOR OVERLAP B OMIT
- ← FOR OVERLAP C OMIT

PHASE FUNCTION PROGRAMMING COMPLETE

TIME BASE ACTIONS PROGRAMMING

Step 2 - Set up Action numbers to run Phase Function 1, 2 & 3.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 5 - ACTIONS

TIME BASE ACTION # ***		
PATN:001	PHS:	12345678 90123456
0=1'CONN	AUX:	000-----
1-253=PATN	SPC:	0000000- 0=NO
254=FREE	DIM:	0----- 1=YES
255=FLASH	DET:	000-----
UP/DOWN TO SCROLL		

← NOTICE
PHS 1

TIME BASE ACTION # ***		
PATN:001	PHS:	12345678 90123456
0=1'CONN	AUX:	000-----
1-253=PATN	SPC:	0000000- 0=NO
254=FREE	DIM:	0----- 1=YES
255=FLASH	DET:	000-----
UP/DOWN TO SCROLL		

← NOTICE
PHS 2

TIME BASE ACTION # ***		
PATN:001	PHS:	12345678 90123456
0=1'CONN	AUX:	000-----
1-253=PATN	SPC:	0000000- 0=NO
254=FREE	DIM:	0----- 1=YES
255=FLASH	DET:	000-----
UP/DOWN TO SCROLL		

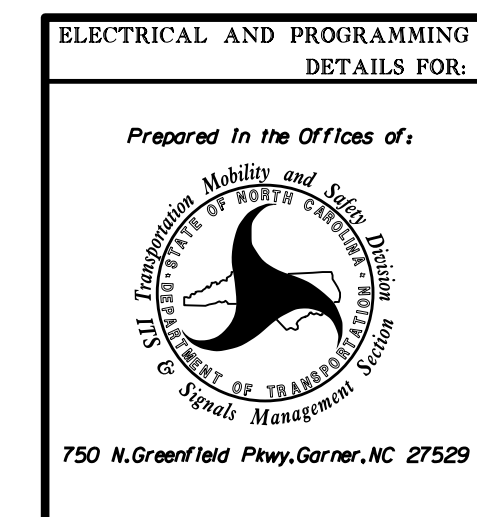
← NOTICE
PHS 3

SPECIAL FUNCTION PROGRAMMING COMPLETE

*** Action #(s) are to be determined by the Division and/or City Traffic Engineer and are scheduled to run in Day Plan(s).

Electrical Detail - Sheet 5 of 5

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1156
DESIGNED: January 2023
SEALED: 01/03/2023
REVISED: N/A



SR 2000 (Falls of Neuse Rd.)
at
SR 2012 (Litchford Rd.)

Division 5		Wake County		Raleigh	
PLN DATE: January 2023	REVIEWED BY:	PREPARED BY: S.Kirkpatrick	REVIEWED BY:	INIT.	DATE
REVISIONS					

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

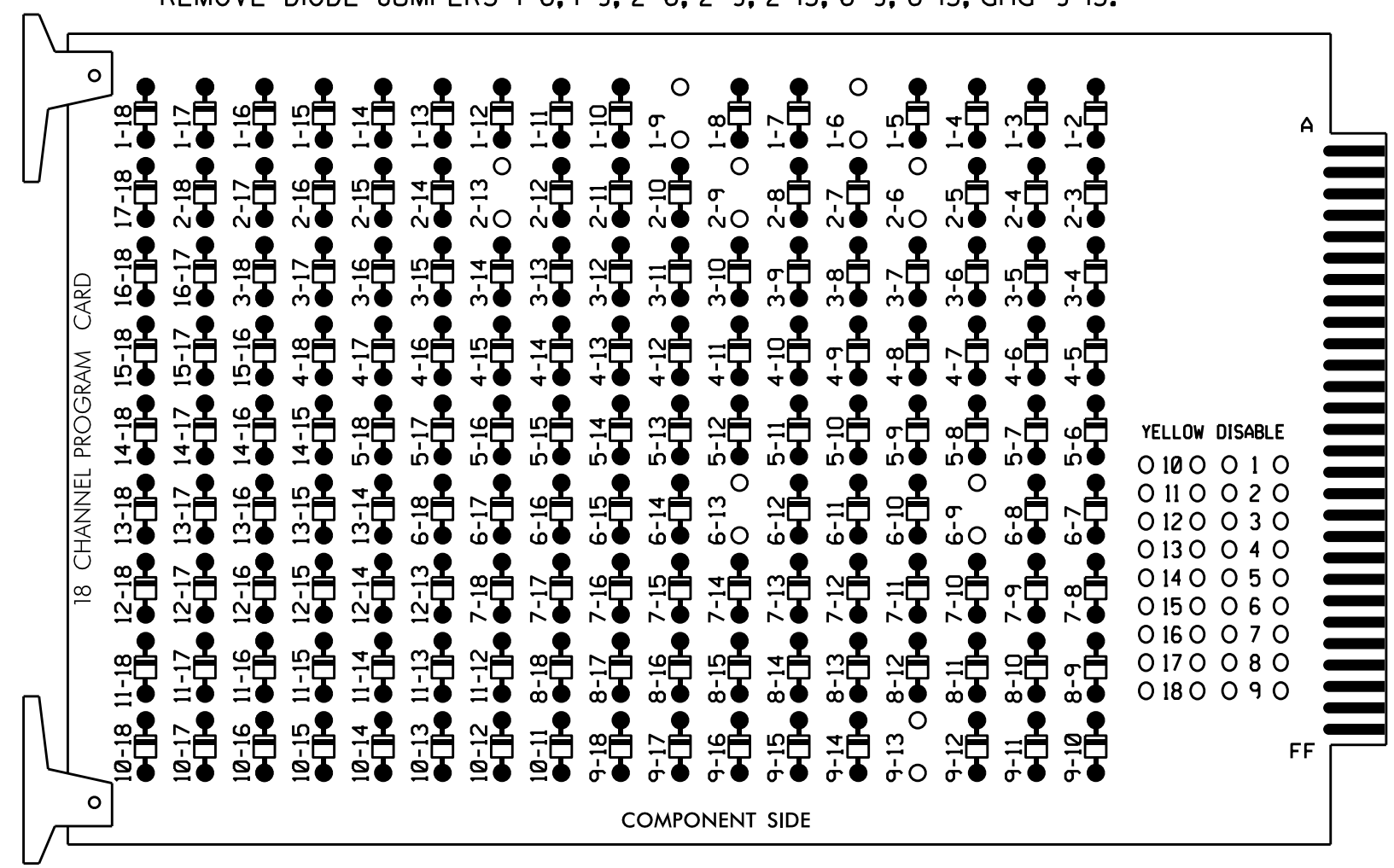
DocuSigned by:
Ryan W. Hough 01/11/2023
SIG. INVENTORY NO. 05-1156

EDI MODEL 2018ECL-NC CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

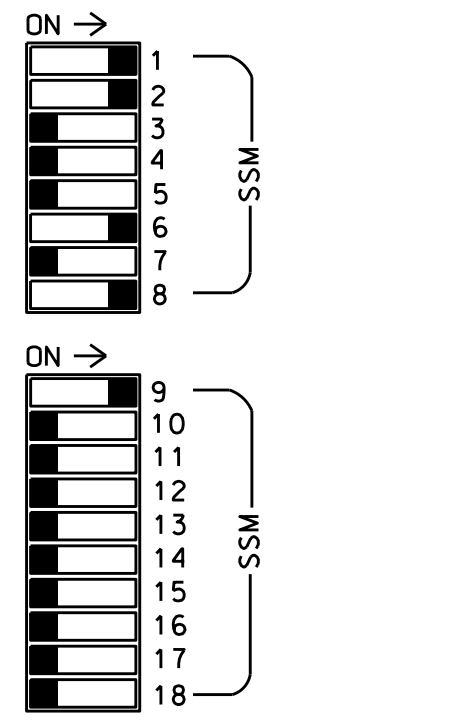
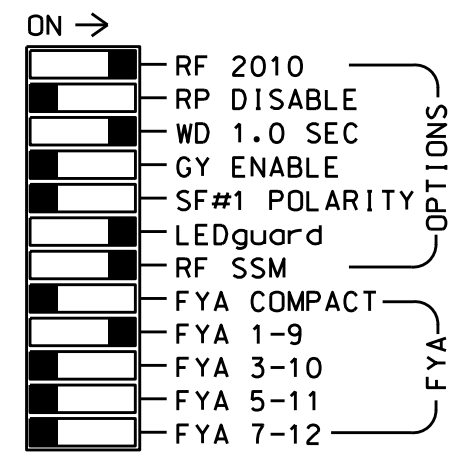
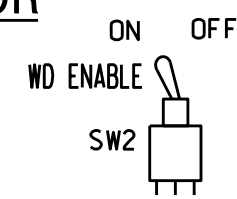
REMOVE DIODE JUMPERS 1-6, 1-9, 2-6, 2-9, 2-13, 6-9, 6-13, and 9-13.



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 2070LX controller. Ensure conflict monitor communicates with 2070LX.



■ = 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. Program controller to start up in phases 2 and 6 green.
3. Enable simultaneous gap-out feature for all phases.
4. Program phase 4 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.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S3,S8,S11,AUX S1
 PHASES USED.....1,2,2PED,4*,6,8
 OVERLAP A.....1+2
 OVERLAP B.....NOT USED
 OVERLAP C.....NOT USED
 OVERLAP D.....NOT USED

* PHASE USED FOR TIMING PURPOSES ONLY
 ** 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	82	21,22,23	P21, P22	NU	NC	NU	NU	61,62	NU	NU	81,82	NU	11	NU	NU	NU	NU	
RED	*	128							134			107							
YELLOW		129							135			108							
GREEN		130							136			109							
RED ARROW																		A121	
YELLOW ARROW		126																	A122
FLASHING YELLOW ARROW																			A123
GREEN ARROW	127	127																	
Hand icon																			113
Walking person icon																			115

NU = Not Used

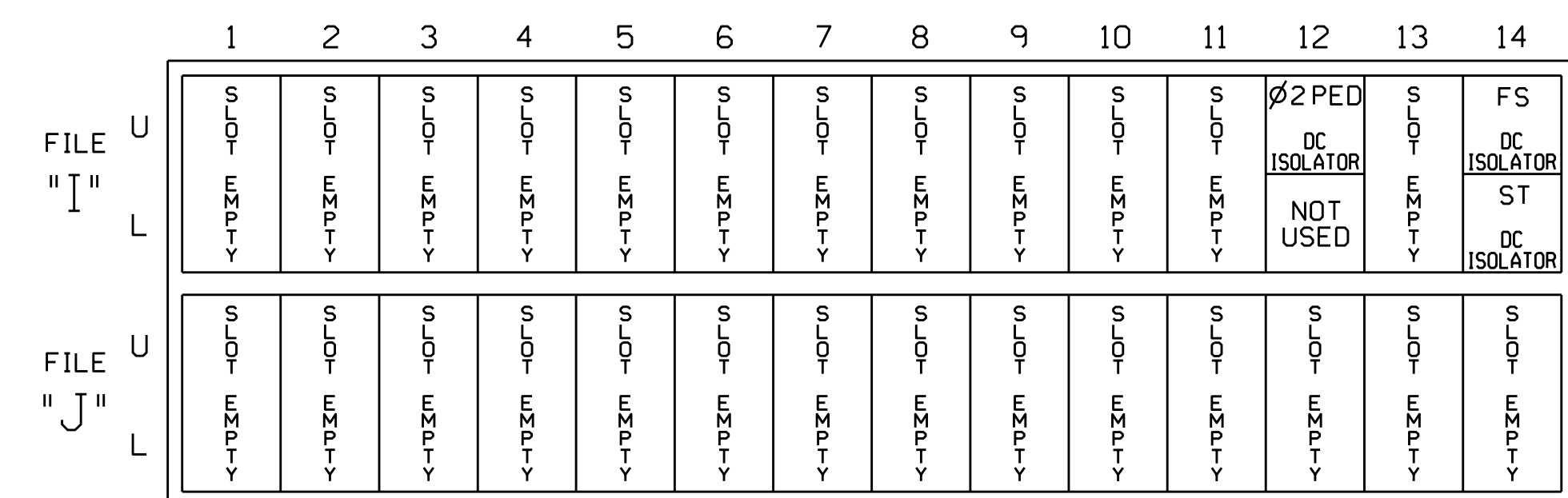
NC = No Connection

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

* See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



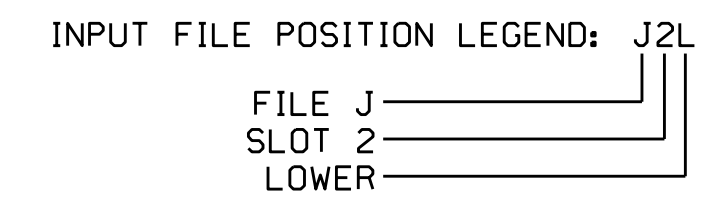
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

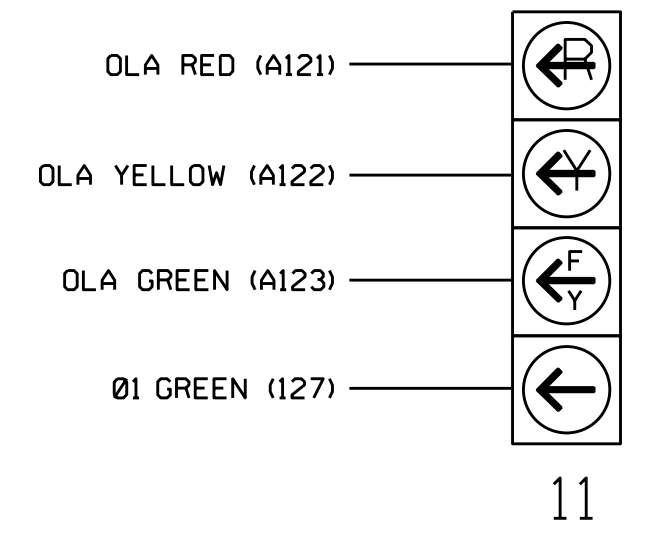
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
PED PUSH BUTTONS							
P21,P22	T88-4,6	I12U	67	PED 2	2 PED		

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



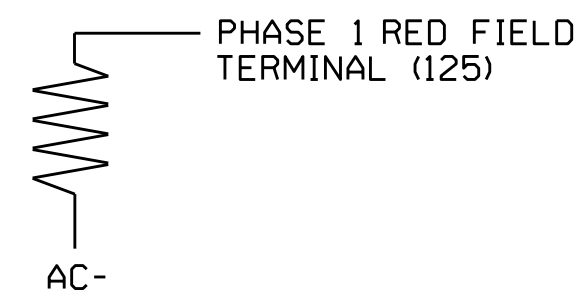
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2293T1
 DESIGNED: July 2019
 SEALED: 8/22/2019
 REVISED: N/A

Electrical Detail - Temp. Design 1 (TMP Phase I & II)
 Sheet 1 of 3

Prepared In the Offices of:
 G.L. Transportation Mobility and Safety Division
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 Signal Management Section
 750 N. Greenfield Pkwy, Garner, NC 27529

SR 2000 (Falls of Neuse Rd.)
 at
 Morrocroft Drive

Division 5 Wake County Raleigh

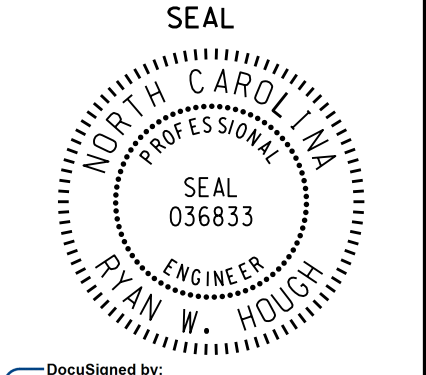
PLAN DATE: October 2021 REVIEWED BY:
 PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by:
 Ryan W. Hough 03/07/2022
 419320EAA20564C1 DATE

SIG. INVENTORY NO. 05-2293T1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



07-MAR-2021 07:51 S:\MITSAS\15\Sig\work\hough\sig\mon\proj\05-5826 div project\05-2293 div project\05-2293.sm.ele.20190828.dgn somstron

OVERLAP PROGRAMMING DETAIL

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **3 - OVERLAP DATA**

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA
A: FYA  E: ---  I: ---  M: ---
B: ---  F: ---  J: ---  N: ---
C: ---  G: ---  K: ---  O: ---
D: ---  H: ---  L: ---  P: ---
PREV/NEXT TO CYCLE
  
```

OVERLAP A

Use Up/Dn/Left/Right keys to position cursor on Overlap 'A', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - A      DELAY/10:  0
PHASES..12345678  90123456
PERM PHASES: 01000000 00000000
PROT PHASES: 10000000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNOP
PERM OVERLAPS: x0000000 00000000
PROT OVERLAPS: x0000000 00000000
  
```

← NOTICE DELAY/10 = 0

END OVERLAP PROGRAMMING

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Install push buttons and APS equipment per manufacturer's instructions.
- Provide a dedicated cable to each push button per manufacturer's instructions.
- If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

```

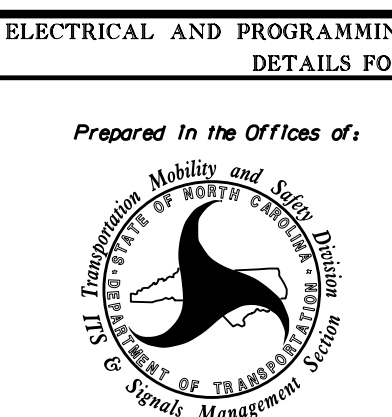
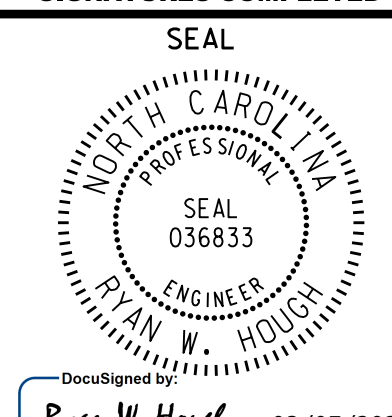
PHASE.....1...2...3...4...5...6...7...8
INITIAL  1  4  0  1  0  4  0  1
NA RESP  0  1  0  2  0  1  0  2

CODES....0....1....2....3....4....5....6
INITL  NONE INACT RED  YEL  GRN  DRK  G/DW
NA RSP  NONE  NA1  NA2  1&2  ---  ---  ---
  
```

INIT & N.A. RESP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2293T1
DESIGNED: July 2019
SEALED: 8/22/2019
REVISED: N/A

Electrical Detail - Temp. Design 1 (TMP Phase I & II)
Sheet 2 of 3

	SR 2000 (Falls of Neuse Rd.) at Morrocroft Drive		
	Division 5 Wake County Raleigh	PLAN DATE: October 2021	
PREPARED BY: S. Armstrong	REVISIONS	REVIEWED BY:	DATE
750 N. Greenfield Pkwy, Garner, NC 27529	Ryan W. Hough	03/07/2022	SIG. INVENTORY NO. 05-2293T1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

07-1458-2022_01.sct
 4/22/2022 10:00:00 AM
 4/22/2022 10:00:00 AM
 4/22/2022 10:00:00 AM

PROGRAMMING DETAILS TO CALL ALTERNATE PHASING

To run the Alternate phasing, schedule a Day Plan that calls an Action that is programmed to enable Phase Function 1.

Actions can be programmed to run free run or call a coordination pattern.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

Step 1 - Assign OMIT OVERLAP A to Phase Function 1.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 9 - PHS FUNC MAPPING

Use Up/Dn Keys to position cursor on NUM 1

```

TIME BASE PHS FUNC MAPING
                PHS FUNC SEL(0-OFF/1-ON)
NUM..P-FUNCT NAME.....123456789 0123456
1 PHS-01 MAX # 2 00000000 0000000
2 PHS-02 MAX # 2 00000000 0000000
3 PHS-03 MAX # 2 00000000 0000000
4 PHS-04 MAX # 2 00000000 0000000
UP/DOWN TO SCROLL                E-EDIT
    
```

BEFORE PROCEEDING,
SCROLL THRU ENTIRE
RANGE OF FUNCTIONS TO
ENSURE ALL P-FUNCT 1
NUM x VALUES ARE SET
TO '0' (OFF)

Use Up/Dn/Left/Right keys to position cursor on NUM 145 and program P-FUNCT 1 as shown.

```

TIME BASE PHS FUNC MAPING
                PHS FUNC SEL(0-OFF/1-ON)
NUM..P-FUNCT NAME.....123456789 0123456
145 OVERLAP A OMIT 10000000 0000000
146 OVERLAP B OMIT 00000000 0000000
147 OVERLAP C OMIT 00000000 0000000
148 OVERLAP D OMIT 00000000 0000000
UP/DOWN TO SCROLL                E-EDIT
    
```

SET P-FUNCT 1 VALUE
TO '1' (ON) AS SHOWN
FOR OVERLAP A OMIT

PHASE FUNCTION PROGRAMMING COMPLETE

TIME BASE ACTIONS PROGRAMMING

Step 2 - Set up an Action to run Phase Function 1.

1. From Main Menu select 6 - TIME BASE DATA
2. From TIME BASE DATA Submenu select 5 - ACTIONS

```

TIME BASE ACTION # ***
                12345678 90123456
PATN:001      PHS: 10000000 00000000
0=I'CONN      AUX: 000-----
1-253=PATN    SPC: 0000000-   0=NO
254=FREE      DIM: 0-----   1=YES
255=FLASH     DET: 000-----
UP/DOWN TO SCROLL
    
```

← NOTICE
PHS 1

SPECIAL FUNCTION PROGRAMMING COMPLETE

*** Action #(s) are to be determined by the Division and/or City Traffic Engineer and are scheduled to run in Day Plan(s).

Electrical Detail - Temp. Design 1 (TMP Phase I & II)
Sheet 3 of 3

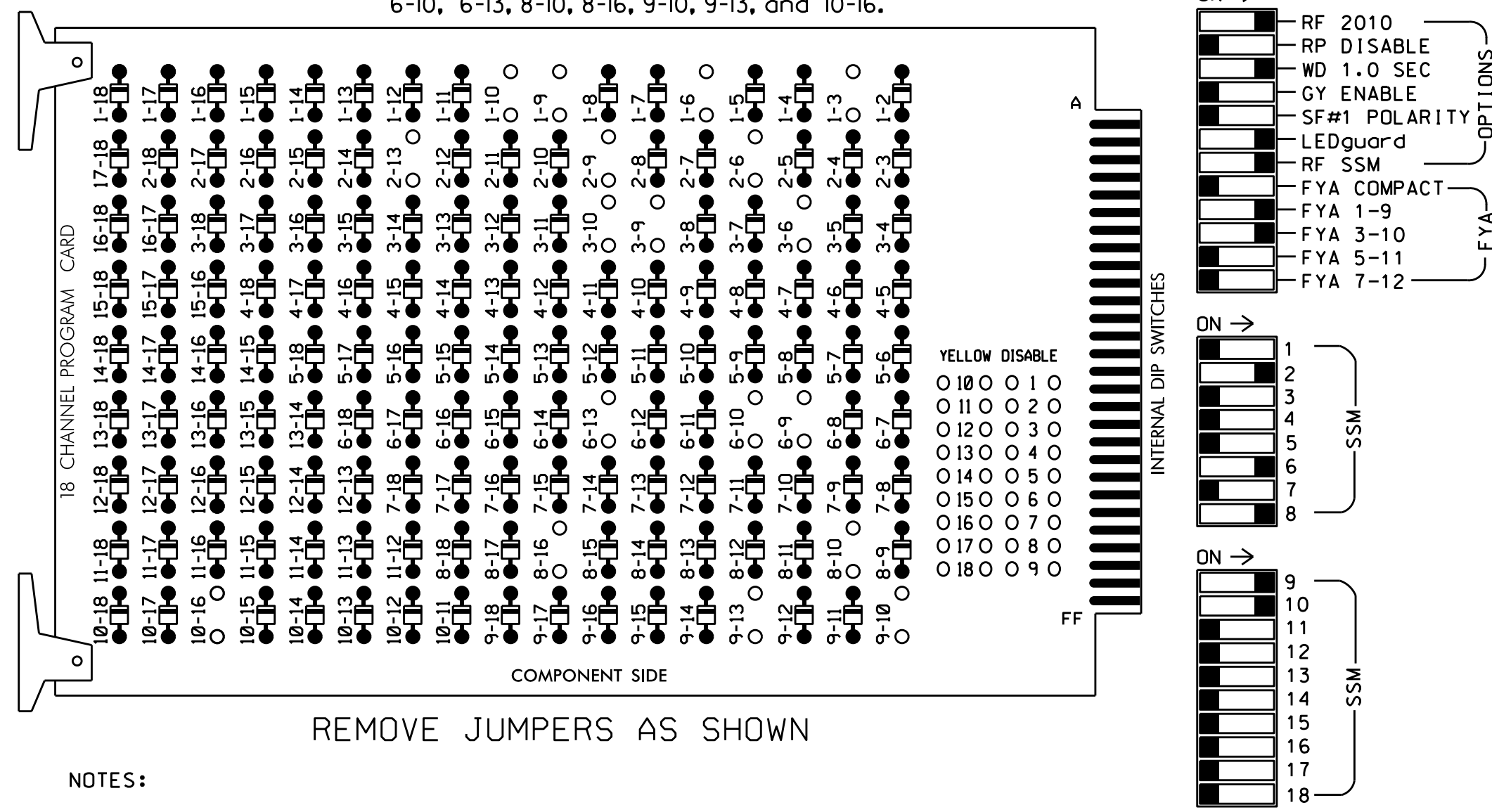
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared In the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SR 2000 (Falls of Neuse Rd.) at Morrocroft Drive</p> <p style="font-size: x-small;">Division 5 Wake County Raleigh</p> <p style="font-size: x-small;">PLAN DATE: October 2021 REVIEWED BY:</p> <p style="font-size: x-small;">PREPARED BY: S. Armstrong REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p style="text-align: center; font-size: x-small;">SEAL</p> <p style="font-size: x-small;">DocuSigned by: Ryan W. Hough 03/07/2022</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 05-2293T1</p>
REVISIONS	INIT.	DATE						

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2293T1
DESIGNED: July 2019
SEALED: 8/22/2019
REVISED: N/A

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-3, 1-6, 1-9, 1-10, 2-6, 2-9, 2-13, 3-6, 3-9, 3-10, 6-9, 6-10, 6-13, 8-10, 8-16, 9-10, 9-13, and 10-16.



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature for all phases.
- Program phase 4 for dual entry.
- Program phases 2 and 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

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

* PHASE USED FOR TIMING PURPOSES ONLY
 ** 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	OLG	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	83	NC	NU	NU	61,62	63	NU	NU	81,82	P81, P82	11	83	NU	NU	NU
RED		128							134						A121			
YELLOW	*	129		*					135									
GREEN		130							136									
RED ARROW											107			A121				
YELLOW ARROW											108			A122	A122			
FLASHING YELLOW ARROW														A123	A123			
GREEN ARROW	127			118							109							
Hand				113									110					
Walking				115														

NU = Not Used

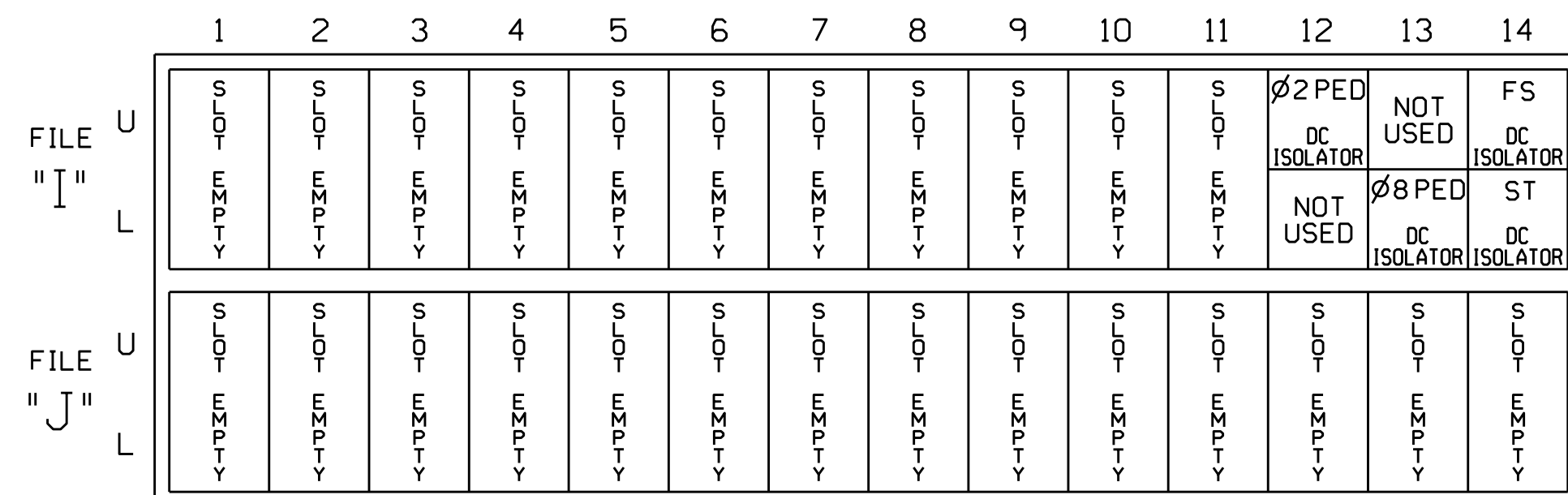
NC = No Connection

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

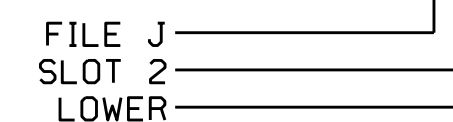
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
P21,P22	T88-4,6	I12U	67	PED 2	2 PED		
P81,P82	T88-8,9	I13L	70	PED 8	8 PED		

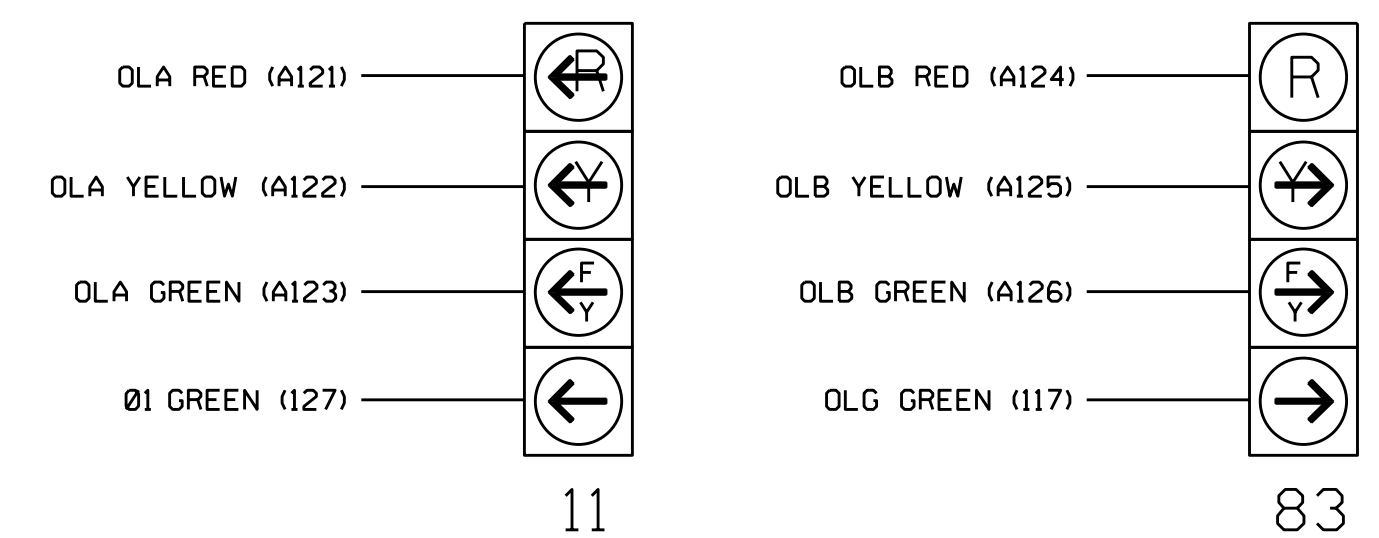
NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

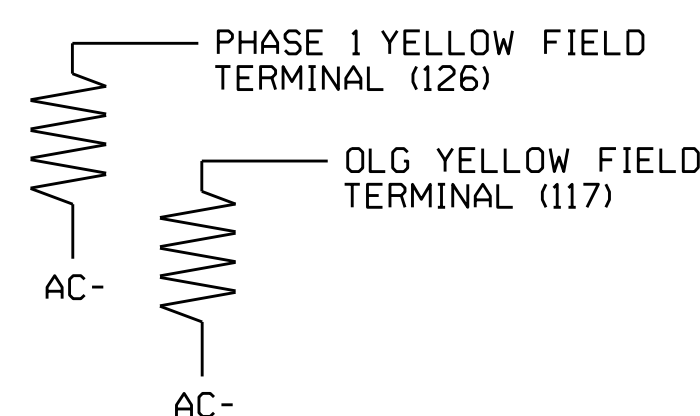
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



IMPORTANT! Move resistor from Red field terminal to Yellow field terminal for Phase 1.

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2293T2
 DESIGNED: July 2019
 SEALED: 8/22/2019
 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 - Temp. Design 2 (TMP Phase III)
 Sheet 1 of 3

Electrical and Programming Details for: SR 2000 (Falls of Neuse Rd.) at Morrocroft Drive

Prepared In the Offices of: *[Logo]*

Division 5 Wake County Raleigh

PLAN DATE: October 2021 REVIEWED BY: *[Signature]*

PREPARED BY: S. Armstrong REVIEWED BY: *[Signature]*

REVISIONS: _____ INIT. DATE

DocuSigned by: *[Signature]* 03/07/2022

SIG. INVENTORY NO. 05-2293T2

OVERLAP PROGRAMMING DETAIL

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **3 - OVERLAP DATA**

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA
A: FYA  E: ---  I: ---  M: ---
B: FYA  F: ---  J: ---  N: ---
C: ---  G: STD  K: ---  O: ---
D: ---  H: ---  L: ---  P: ---
PREV/NEXT TO CYCLE
  
```

OVERLAP A

Use Up/Dn/Left/Right keys to position cursor on Overlap 'A'. use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - A      DELAY/10:  0
PHASES..12345678 90123456
PERM PHASES: 01000000 00000000
PROT PHASES: 10000000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNPD
PERM OVERLAPS: x0000000 00000000
PROT OVERLAPS: x0000000 00000000
  
```

NOTICE
DELAY/10 = 0

Press ESC

OVERLAP B

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B'. use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - B      DELAY/10:  0
PHASES..12345678 90123456
PERM PHASES: 00010000 00000000
PROT PHASES: 10000000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNPD
PERM OVERLAPS: 0x000000 00000000
PROT OVERLAPS: 0x000000 00000000
  
```

NOTICE
DELAY/10 = 0

Press ESC

OVERLAP G

Use Up/Dn/Left/Right keys to position cursor on Overlap 'G'. use the NEXT key to select 'STD', then press ENT

```

OVERLAP - G      12345678 90123456
PARENTS: 10000000 00000000
+GRN PHASES: 00000000 00000000
-G/Y PHASES: 00000000 00000000
-PED PHASES: 00000000 00000000
TRAIL GREEN STANDARD:  0 YEL/10:  40
TRAIL GREEN PREEMPT:  0 RED/10:  20
  
```

END OVERLAP PROGRAMMING

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Install push buttons and APS equipment per manufacturer's instructions.
- Provide a dedicated cable to each push button per manufacturer's instructions.
- If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

LOAD SWITCH MAPPING DETAIL

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **9 - OUTPUT MAPPING**

USE ENTER AND NEXT KEYS
TO MAP 'LDSW 4' AS 'OLG'

```

OUTPUT MAPPING      EDIT MODE: LDSW
                    E-TOGGLE MODE
LDSW ..1.. ..2.. ..3.. ..4.. ..5.. ..6..
RED PH1  PH2  PD2  OLG  PH4  PD4
YEL  -    -    -    -    -    -
GRN  -    -    -    -    -    -
FIO  1    2    3    4    5    6
PREV/NEXT TO CYCLE  D-DISPLAY COMPAT
  
```

LOAD SWITCH MAPPING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP**

```


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

CODES....0...1...2...3...4...5...6
INITL  NONE  INACT  RED  YEL  GRN  DRK  G/DW
NA RSP  NONE  NA1  NA2  1&2  ---  ---  ---
  
```

INIT & N.A. RESP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2293T2
DESIGNED: July 2019
SEALED: 8/22/2019
REVISED: N/A

Electrical Detail - Temp. Design 2 (TMP Phase III)
Sheet 2 of 3

Prepared In the Offices of:

 Ryan W. Hough
 750 N. Greenfield Pkwy, Garner, NC 27529

SR 2000 (Falls of Neuse Rd.)
at
Morrocroft Drive

Division 5 Wake County Raleigh

PLAN DATE: October 2021 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

DocuSigned by:
Ryan W. Hough 03/07/2022
430202FA82256473

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
RYAN W. HOUGH
PROFESSIONAL ENGINEER
SEAL
036833

SIG. INVENTORY NO. 05-2293T2

PROGRAMMING DETAILS TO CALL ALTERNATE PHASING

To run the Alternate phasing, schedule a Day Plan that calls an Action that is programmed to enable Phase Function 1.

Actions can be programmed to run free run or call a coordination pattern.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

Step 1 - Assign OMIT OVERLAP A to Phase Function 1.

- From Main Menu select 6 - TIME BASE DATA
- From TIME BASE DATA Submenu select 9 - PHS FUNC MAPPING

Use Up/Dn Keys to position cursor on NUM 1

```

TIME BASE PHS FUNC MAPING
                PHS FUNC SEL(0-OFF/1-ON)
NUM..P-FUNCT NAME.....123456789 0123456
1 PHS-01 MAX # 2 00000000 0000000
2 PHS-02 MAX # 2 00000000 0000000
3 PHS-03 MAX # 2 00000000 0000000
4 PHS-04 MAX # 2 00000000 0000000
UP/DOWN TO SCROLL                E-EDIT
    
```

BEFORE PROCEEDING,
SCROLL THRU ENTIRE
RANGE OF FUNCTIONS TO
ENSURE ALL P-FUNCT 1
NUM x VALUES ARE SET
TO '0' (OFF)

Use Up/Dn/Left/Right keys to position cursor on NUM 145 and program P-FUNCT 1 as shown.

```

TIME BASE PHS FUNC MAPING
                PHS FUNC SEL(0-OFF/1-ON)
NUM..P-FUNCT NAME.....123456789 0123456
145 OVERLAP A OMIT 10000000 0000000
146 OVERLAP B OMIT 00000000 0000000
147 OVERLAP C OMIT 00000000 0000000
148 OVERLAP D OMIT 00000000 0000000
UP/DOWN TO SCROLL                E-EDIT
    
```

SET P-FUNCT 1 VALUE
TO '1' (ON) AS SHOWN
FOR OVERLAP A OMIT

PHASE FUNCTION PROGRAMMING COMPLETE

TIME BASE ACTIONS PROGRAMMING

Step 2 - Set up an Action to run Phase Function 1.

- From Main Menu select 6 - TIME BASE DATA
- From TIME BASE DATA Submenu select 5 - ACTIONS

```

TIME BASE ACTION # ***
                12345678 90123456
PATN:001      PHS: 10000000 00000000
0=I'CONN      AUX: 000-----
1-253=PATN    SPC: 0000000-   0=NO
254=FREE      DIM: 0-----   1=YES
255=FLASH     DET: 000-----
UP/DOWN TO SCROLL
    
```

← NOTICE
PHS 1

SPECIAL FUNCTION PROGRAMMING COMPLETE

*** Action #(s) are to be determined by the Division and/or City Traffic Engineer and are scheduled to run in Day Plan(s).

Electrical Detail - Temp. Design 2 (TMP Phase III)
Sheet 3 of 3

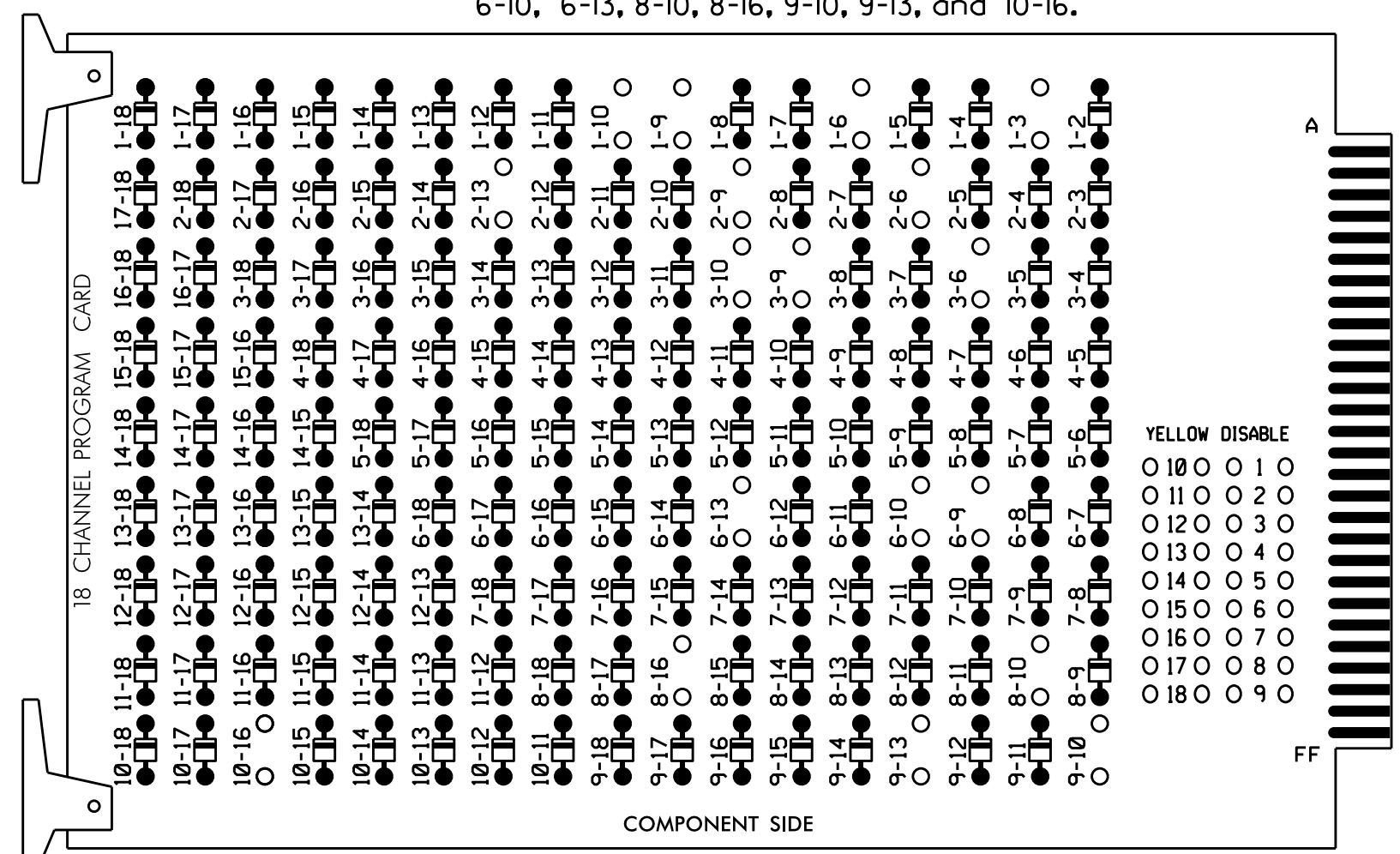
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="text-align: center;">Prepared In the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SR 2000 (Falls of Neuse Rd.) at Morrocroft Drive</p> <p style="font-size: x-small;">Division 5 Wake County Raleigh</p> <p>PLAN DATE: October 2021 REVIEWED BY:</p> <p>PREPARED BY: S. Armstrong REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p style="text-align: center;">SEAL</p> <p style="font-size: x-small;">DocuSigned by: Ryan W. Hough 03/07/2022 490332FAA2854C3 DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 05-2293T2</p>
REVISIONS	INIT.	DATE						

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-2293T2
DESIGNED: July 2019
SEALED: 8/22/2019
REVISED: N/A

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-3, 1-6, 1-9, 1-10, 2-6, 2-9, 2-13, 3-6, 3-9, 3-10, 6-9, 6-10, 6-13, 8-10, 8-16, 9-10, 9-13, and 10-16.



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature for all phases.
- Program phases 2 and 6 for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

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

* PHASE USED FOR TIMING PURPOSES ONLY
 ** 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	OLG	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	83	NC	NU	NU	61,62	63	NU	NU	81,82	P81, P82	11	83	NU	NU	NU
RED		128							134						A124			
YELLOW	*	129		*					135									
GREEN		130							136									
RED ARROW											107			A121				
YELLOW ARROW											108			A122	A125			
FLASHING YELLOW ARROW														A123	A126			
GREEN ARROW	127				118						109							
Hand					113								110					
Walking					115									112				

NU = Not Used

NC = No Connection

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

FILE	U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	∅ 1	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2 PED	NOT USED	FS
	L	1A	2A	2C	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR	∅ 8 PED	ST
"J"	U	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6
	L	6A	6C	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED

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

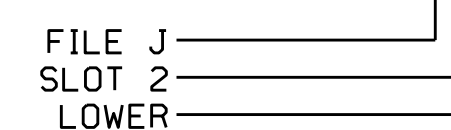
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-5,6	I2U	39	3	1	5	
1B	TB2-7,8	I2L	43	4	1	15	
2A	TB2-9,10	I3U	63	5	2		
2B	TB2-11,12	I3L	76	6	2		
2C	TB4-1,2	I4U	47	7	2		
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
6C	TB3-9,10	J3U	64	23	6		
8A	TB5-9,10	J6U	42	31	8	3	
8B	TB5-11,12	J6L	46	32	8		

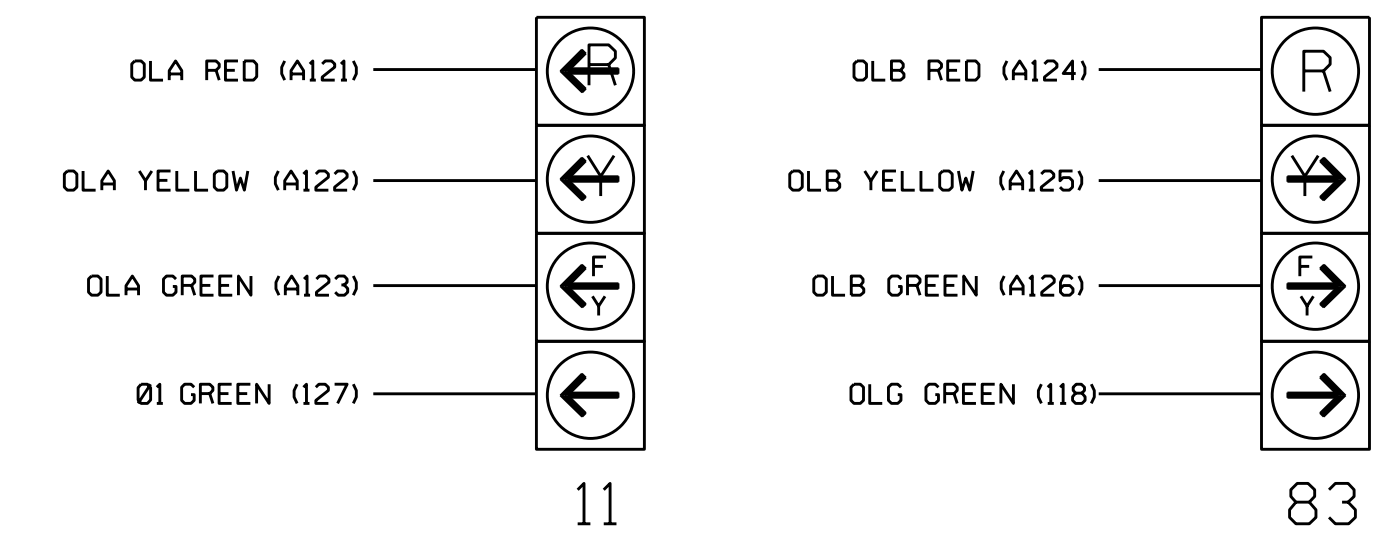
NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

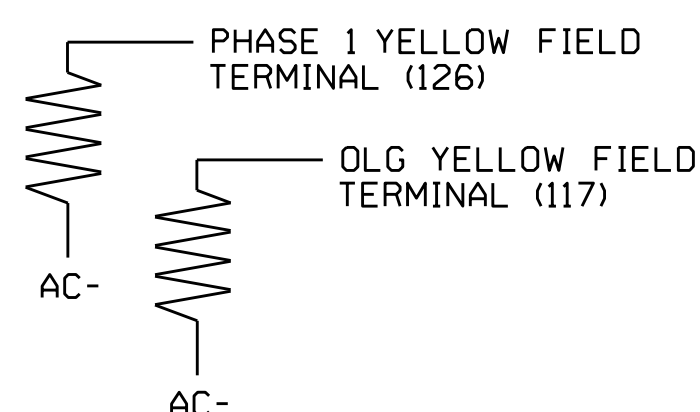


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2293
 DESIGNED: January 2023
 SEALED: 01/03/23
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

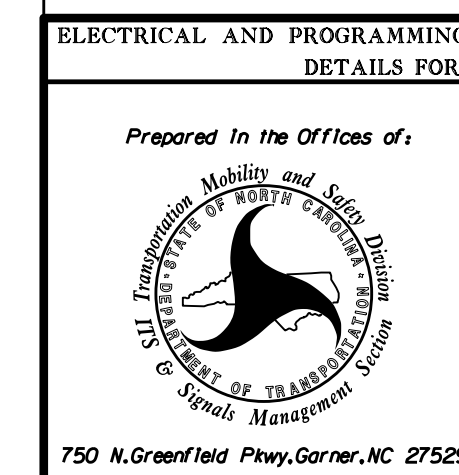
ACCEPTABLE VALUES	WATTAGE
VALUE (ohms)	
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

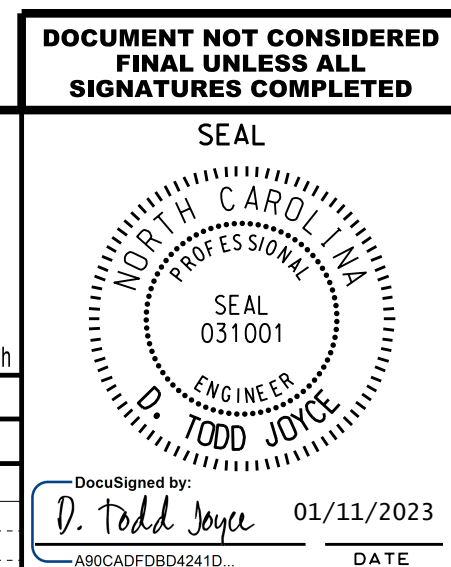
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

Electrical Detail - Sheet 1 of 3



SR 2000 (Falls of Neuse Rd.)
 at
 Morrocroft Drive

Division 5	Wake County	Raleigh
PLAN DATE: January 2023	REVIEWED BY:	
PREPARED BY: James Peterson	REVIEWED BY:	
REVISIONS	INIT.	DATE



SIG. INVENTORY NO. 05-2293

OVERLAP PROGRAMMING DETAIL

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **3 - OVERLAP DATA**

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA

A: FYA  E: ---  I: ---  M: ---
B: FYA  F: ---  J: ---  N: ---
C: ---  G: STD  K: ---  O: ---
D: ---  H: ---  L: ---  P: ---

PREV/NEXT TO CYCLE
    
```

OVERLAP A

Use Up/Dn/Left/Right keys to position cursor on Overlap 'A', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - A      DELAY/10:  0
PHASES..12345678 90123456
PERM PHASES: 01000000 00000000
PROT PHASES: 10000000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNPD
PERM OVERLAPS: x0000000 00000000
PROT OVERLAPS: x0000000 00000000
    
```

NOTICE
DELAY/10 = 0

Press ESC

OVERLAP B

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - B      DELAY/10:  0
PHASES..12345678 90123456
PERM PHASES: 00000001 00000000
PROT PHASES: 10000000 00000000
-PED PHASES: 00000000 00000000
OVERLAPS..ABCDEFGH IJKLMNPD
PERM OVERLAPS: 0x0000000 00000000
PROT OVERLAPS: 0x0000000 00000000
    
```

NOTICE
DELAY/10 = 0

Press ESC

OVERLAP G

Use Up/Dn/Left/Right keys to position cursor on Overlap 'G', use the NEXT key to select 'STD', then press ENT

```

OVERLAP - G      12345678 90123456
PARENTS: 10000000 00000000
+GRN PHASES: 00000000 00000000
-G/Y PHASES: 00000000 00000000
-PED PHASES: 00000000 00000000
TRAIL GREEN STANDARD:  0  YEL/10:  40
TRAIL GREEN PREEMPT:  0  RED/10:  20
    
```

END OVERLAP PROGRAMMING

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Install push buttons and APS equipment per manufacturer's instructions.
- Provide a dedicated cable to each push button per manufacturer's instructions.
- If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

LOAD SWITCH MAPPING DETAIL

- From Main Menu select **4 - UNIT DATA**
- From UNIT DATA Submenu select **9 - OUTPUT MAPPING**

USE ENTER AND NEXT KEYS
TO MAP 'LDSW 4' AS 'OLG'

```

OUTPUT MAPPING          EDIT MODE: LDSW
                        E-TOGGLE MODE
LDSW ..1.. ..2.. ..3.. ..4.. ..5.. ..6..
RED PH1  PH2  PD2  OLG  PH4  PD4
YEL  -    -    -    -    -    -
GRN  -    -    -    -    -    -
FIO  1    2    3    4    5    6
PREV/NEXT TO CYCLE     D-DISPLAY COMPAT
    
```

LOAD SWITCH MAPPING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

INIT & N.A. RESP PROGRAMMING DETAIL

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **4 - INIT & N.A RESP+**

```

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

```

CODES.....0....1....2....3....4....5....6
INITIAL NONE INACT RED YEL GRN DRK G/DW
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.

* CODE 6 (G/DW) ALLOWS PHASE 2 TO START IN GREEN AND SKIP THE PED PHASE. PHASE 6 INCLUDED FOR TIMING PURPOSES.

ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

- From Main Menu select **3 - PHASE DATA**
- From PHASE DATA Submenu select **3 - PEDESTRIAN DATA**
- From DETECTOR DATA Submenu select **3 - PED OFFSET +**

```

PHASE.....1...2...3...4...5...6...7...8
WOFF/10  0  40  0  0  0  0  0  40
MODE*    0  0  0  0  0  0  0  0
    
```

CODES:* 0=ADVANCE 1=DELAY

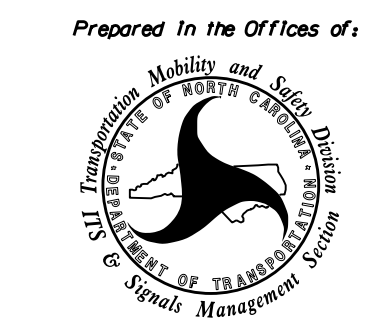
Advance Walk PED programming complete.

I:\1414-2023-13-17
 S:\IT\5826\13-17\Sig\el\work\hgr\aps\sig_MonPeterson\sig_052293_sig.ele_20230307.dgn
 J:\peterson

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-2293
 DESIGNED: January 2023
 SEALED: 01/03/23
 REVISED: N/A

Electrical Detail - Sheet 2 of 3

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

SR 2000 (Falls of Neuse Rd.)
at
Morrocroft Drive

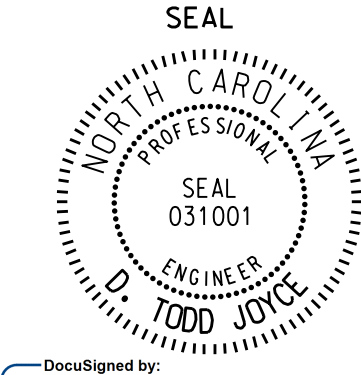
Division 5 Wake County Raleigh

PLAN DATE: January 2023 REVIEWED BY:

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DocuSigned by:
D. Todd Joyce 01/11/2023

SIG. INVENTORY NO. 05-2293