

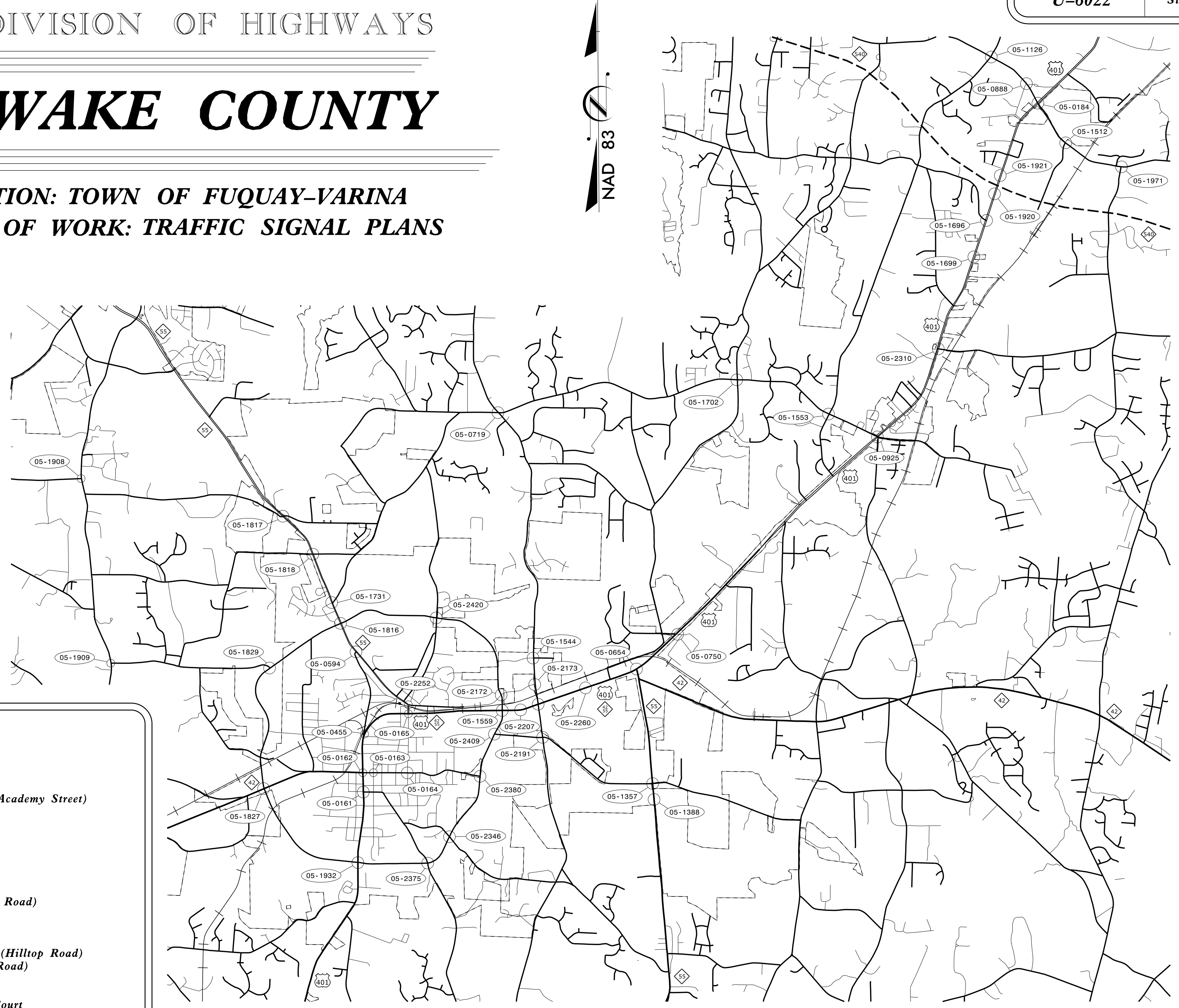
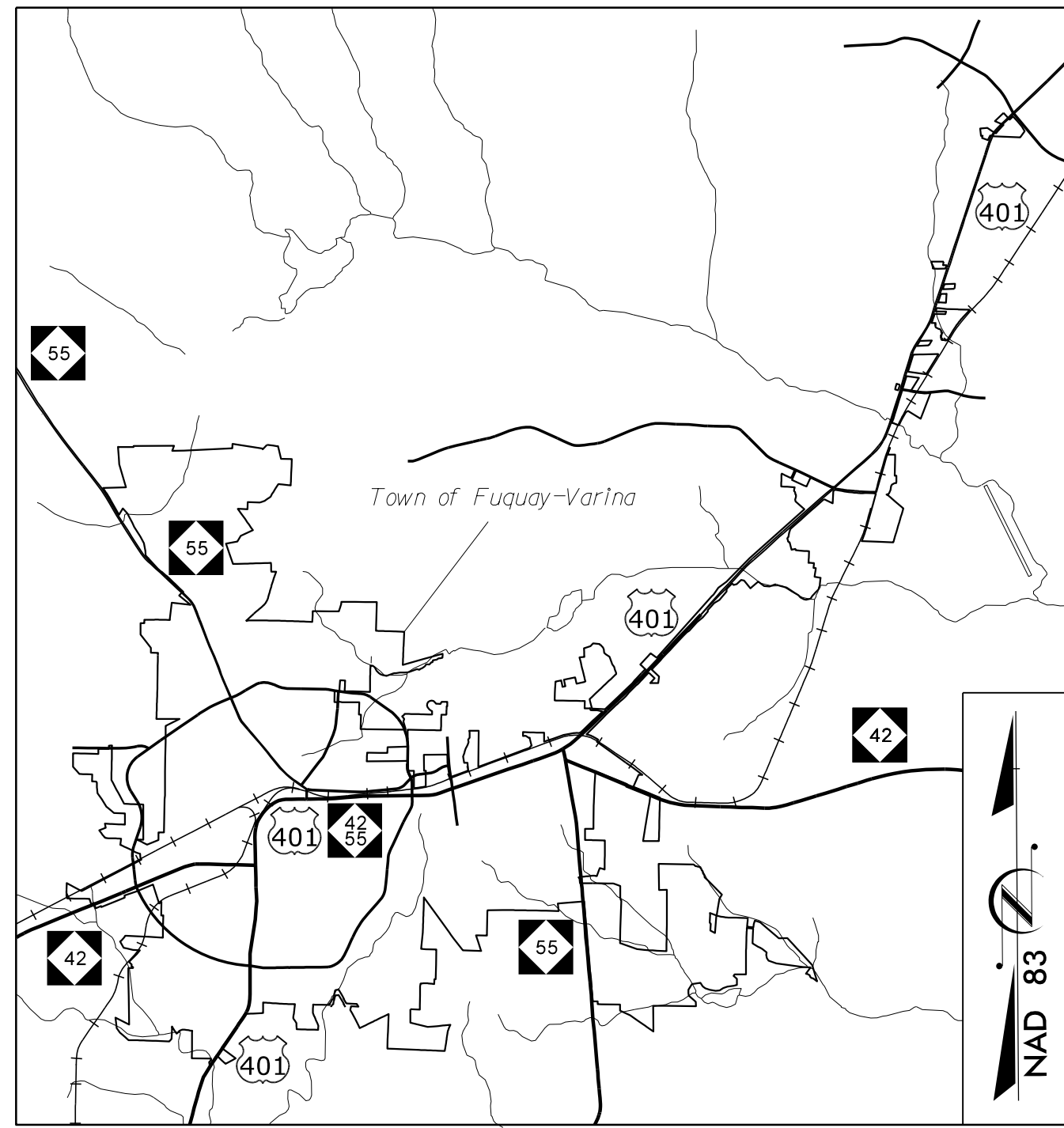
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

LOCATION: TOWN OF FUQUAY-VARINA
TYPE OF WORK: TRAFFIC SIGNAL PLANS

Project: U-6022

Vicinity



Index of Plans

Sheet #	Reference #	Location/Description
Sheet #	Reference #	Location/Description
Sig. 1.0	-----	Title Sheet
Sig. 1.1 - 1.2	-----	Standard Plate Sheet(s)
Sig. 2.0 - 2.2	05-0161	US 401 (S Main Street) at SR 2770 (Vance Street)
Sig. 3.0 - 3.2	05-0162	US 401-NC 42 (Main Street) at NC 42 (W Academy Street)/SR 1107 (E Academy Street)
Sig. 4.0 - 4.2	05-0163	SR 1107 (E Academy Street) at Fuquay Avenue
Sig. 5.0 - 5.2	05-0164	SR 1107 (E Academy Street) at Ennis Street
Sig. 6.0 - 6.4	05-0165	US 401-NC 42-55 (N Main Street) at NC 55 (N Ennis Street)
Sig. 7.0 - 7.2	05-0184	US 401 (Fayetteville Road) at SR 1010 (Ten Ten Road)
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Sig. 9.0 - 9.1	05-0594	NC 55 (Broad Street) at SR 1108 (Wake Chapel Road)
Sig. 10.0 - 10.4	05-0654	US 401-NC 42-55 (N Main Street) at NC 42-55/Sheetz Entrance
Sig. 11.0 - 11.2	05-0719	SR 1301 (Sunset Lake Road) at SR 1393 (Hilltop Needmore Road/Bass Lake Road)
Sig. 12.0 - 12.2	05-0750	US 401 (N Main Street) at SR 1404 (Mill Creek Drive/Ideal Lane)
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Sig. 14.0 - 14.2	05-0925	US 401 (N Main Street/Fayetteville Road) at SR 2752 (Air Park Road)/SR 1393 (Hilltop Needmore Road) and SR 2751 (Hilltop Road)
Sig. 15.0 - 15.2	05-0935	US 401-NC 42-55 (N Main Street) at SR 1301 (Sunset Lake Road/Purfoy Road)
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Sig. 17.0 - 17.2	05-1357	NC 55 at SR 2765 (Old Honeycutt Road)
Sig. 18.0 - 18.2	05-1512	SR 1010 (Ten Ten Road) at SR 2722 (Old McCullers Road)/Tawny Slope Court
Sig. 19.0 - 19.1	05-1544	SR 1301 (Sunset Lake Road) at SR 1431 (Products Road)/Products Road
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Sig. 24.0 - 24.1	05-1702	SR 1393 (Hilltop Needmore Road) at SR 1404 (Johnson Pond Road)
Sig. 25.0 - 25.2	05-1731	NC 55 (N Broad Street) at SR 1399 (James Slaughter Road)
Sig. 26.0 - 26.2	05-1816	NC 55 (N Broad Street) at SR 5056 (Judd Parkway)
Sig. 27.0 - 27.1	05-1817	NC 55 (N Broad Street) at SR 1398 (Dickens Road)/SR 1113 (Wade Nash Road)
Sig. 28.0 - 28.2	05-1818	NC 55 (N Broad Street) at SR 1111 (Old Powell Road)
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Sig. 30.0 - 30.2	05-1829	SR 5056 (Judd Parkway NW) at SR 1110 (Wilbon Road)
Sig. 31.0 - 31.2	05-1908	SR 1101 (Piney Grove Wilbon Road) at SR 1126 (Honeycutt Road)
Sig. 32.0 - 32.1	05-1909	SR 1101 (Piney Grove Wilbon Road) at SR 1110 (Wilbon Road)
Sig. 33.0 - 33.1	05-1920	US 401 (Fayetteville Road) at NC 540 EB Ramps
Sig. 34.0 - 34.1	05-1921	US 401 (Fayetteville Road) at NC 540 WB Ramps
Sig. 35.0 - 35.2	05-1932	US 401 (S Main Street) at SR 2768 (Judd Parkway)
Sig. 36.0 - 36.2	05-2172	SR 5056 (Judd Parkway NE) at E Broad Street
Sig. 37.0 - 37.2	05-2173	SR 1301 (Sunset Lake Road) at E Broad Street
Sig. 38.0 - 38.2	05-2191	SR 1301 (Purfoy Road) at SR 2765/SR 3736 (Old Honeycutt Road)
Sig. 39.0 - 39.2	05-2207	US 401-NC 42-55 (N Main Street) at Sunset Plaza (Food Lion)/Hampton Square (Aldi)
Sig. 40.0 - 40.4	05-2252	NC 55/SR 1402 (E Broad Street) at NC 55 (N Ennis Street)
Sig. 41.0 - 41.2	05-2260	US 401-NC 42-55 (N Main Street) at Lakestone Commons Avenue
Sig. 42.0 - 42.2	05-2310	US 401 (Fayetteville Road) at SR 2724 (Banks Road)
Sig. 43.0 - 43.2	05-2346	SR 2768 (Judd Parkway SE) at SR 2767 (Holland Road)
Sig. 44.0 - 44.2	05-2375	SR 2768 (Judd Parkway SE) at SR 2770 (Angier Road)
Sig. 45.0 - 45.3	05-2380	SR 2768 (Judd Parkway) at SR 1107 (E Academy Street)
Sig. 46.0 - 46.2	05-2409	SR 2768 (Judd Parkway NE) at SR 3736 (Old Honeycutt Road)/Century 21 Entrance
Sig. 47.0 - 47.2	05-2420	SR 5056 (Judd Parkway NE) at SR 1401 (Stewart Street)

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

TRANSPORTATION SYSTEMS
MANAGEMENT & OPERATIONS

Contacts:

Robert J. Ziemba, PE - Central Region Signals Engineer
D. Todd Joyce, PE - Signal Equipment Design Review Engineer

Prepared In the Office of:

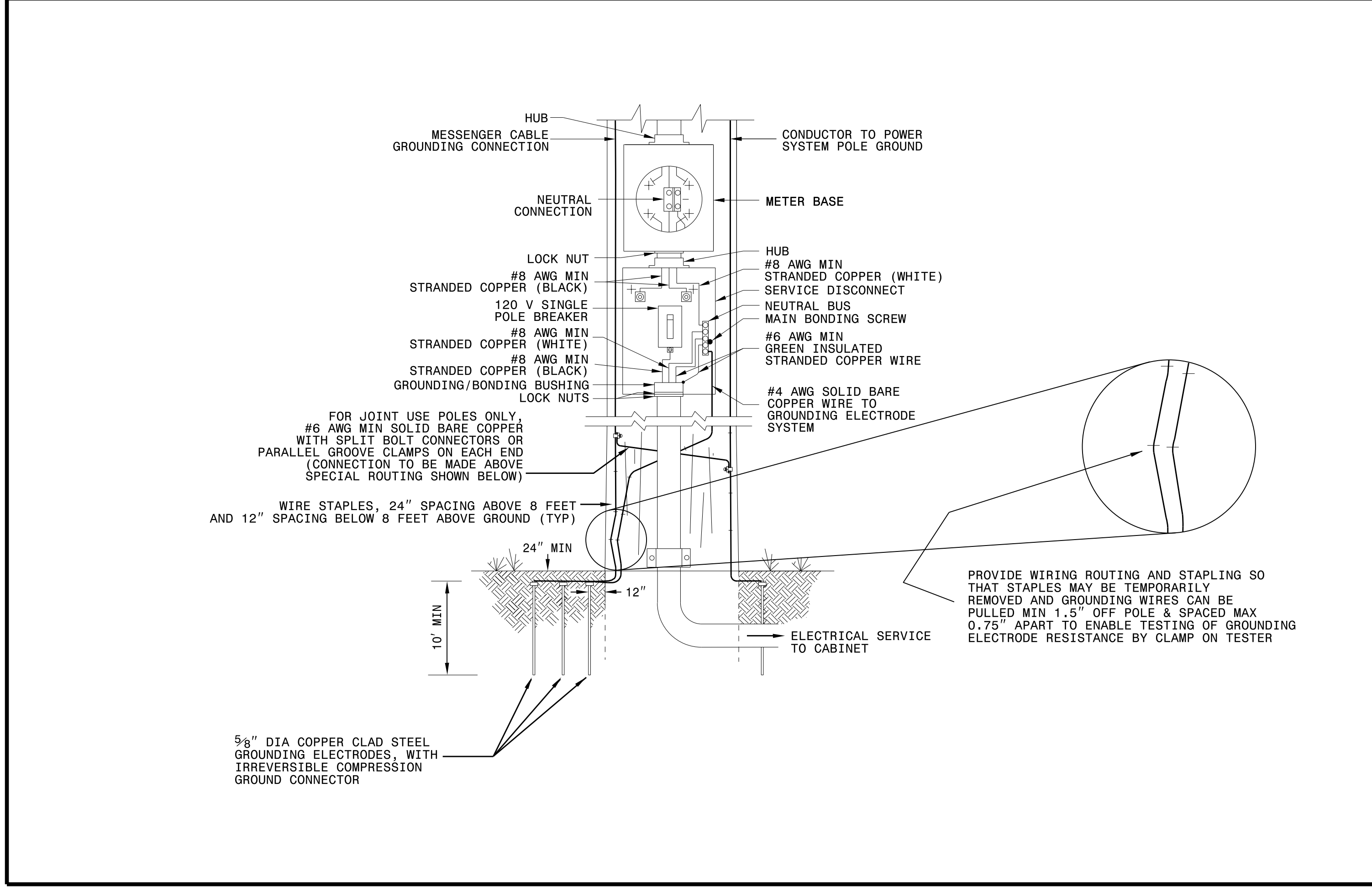
ATKINS

1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBES #F-0326

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

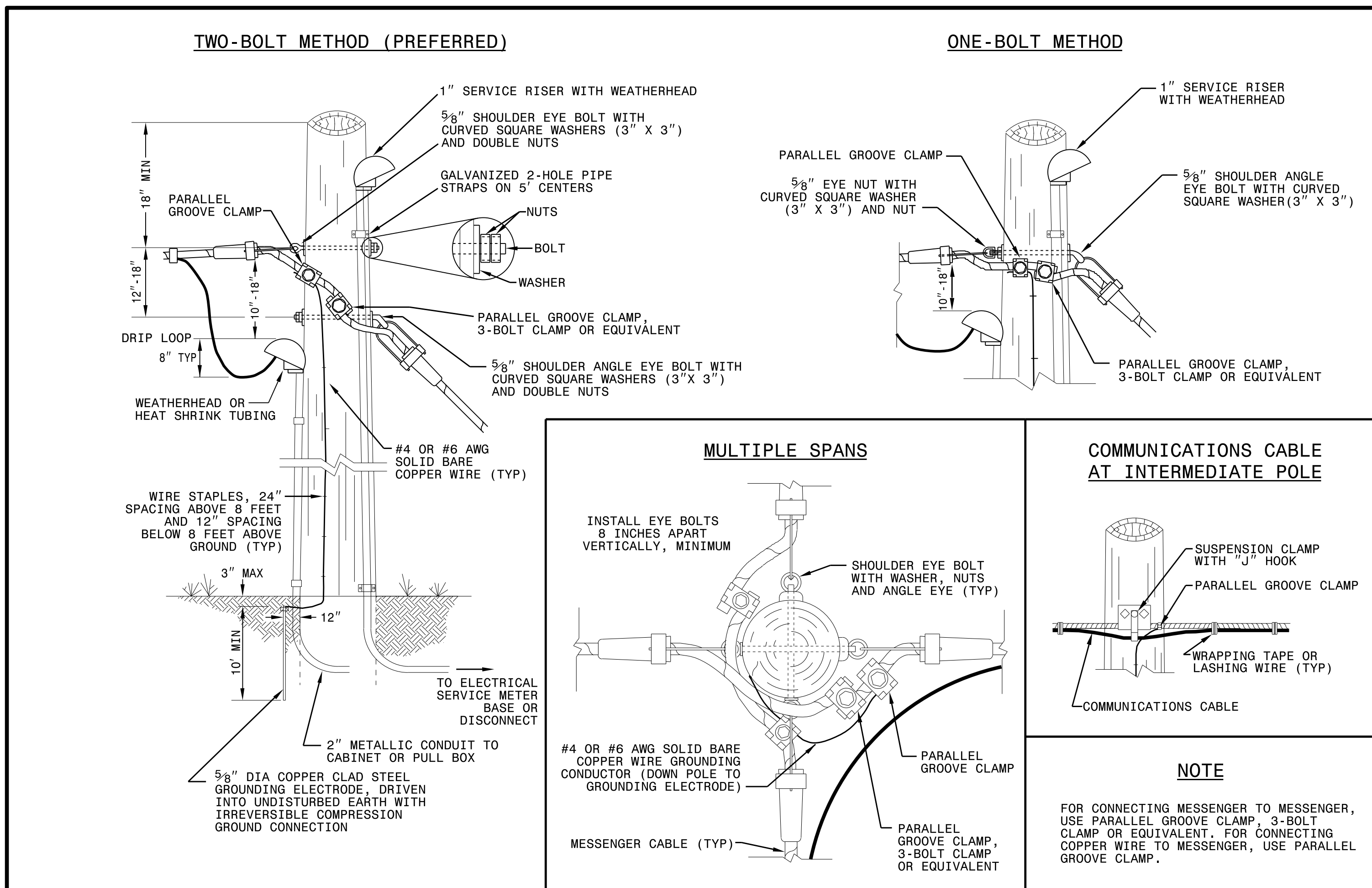
SHEET 1 OF 1
1700D01



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

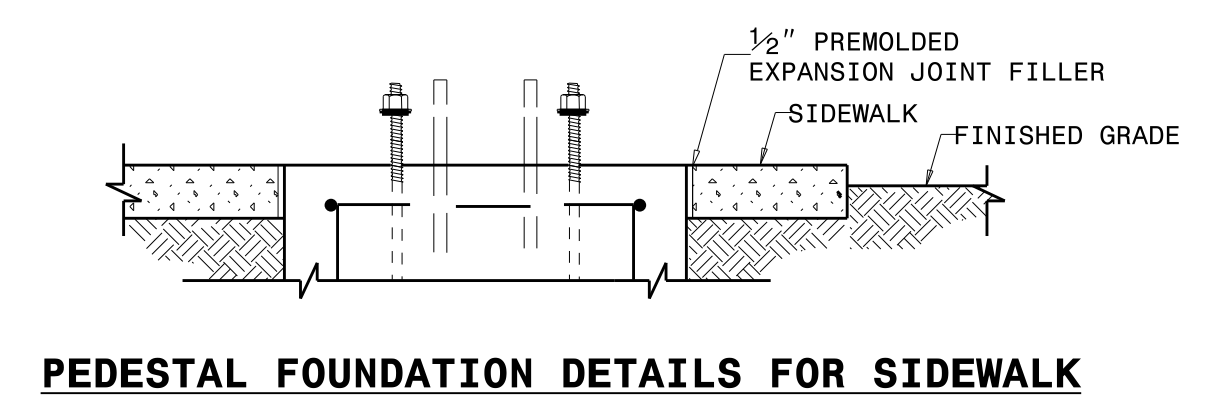
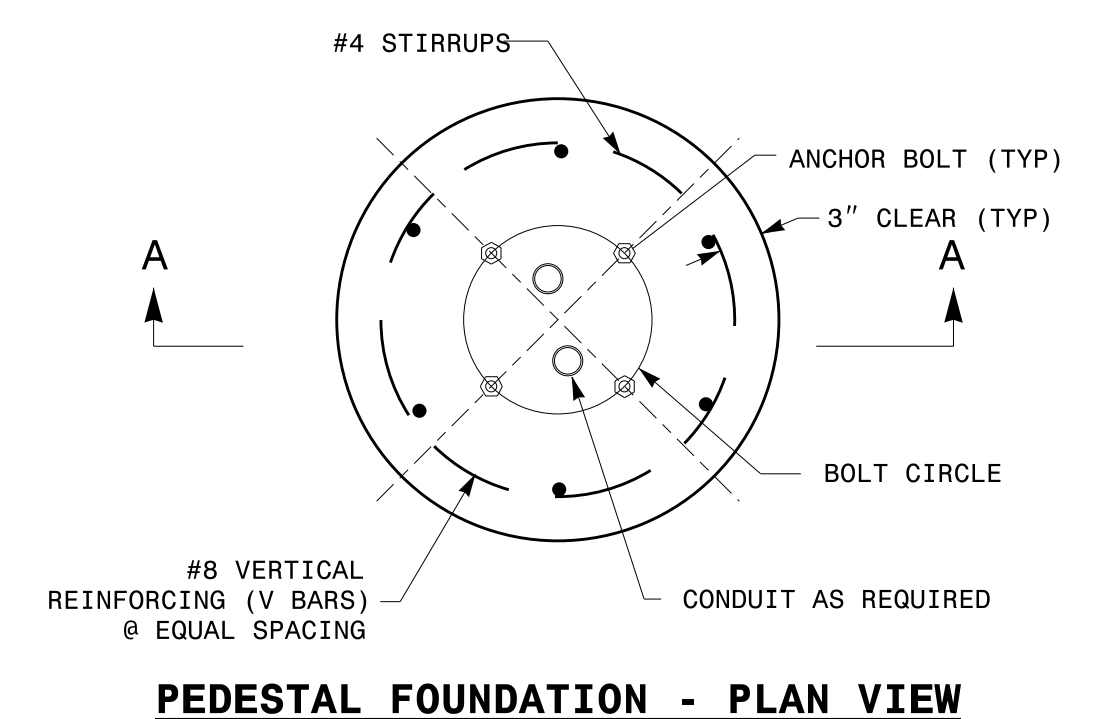


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SIGNATURES COMPLETED

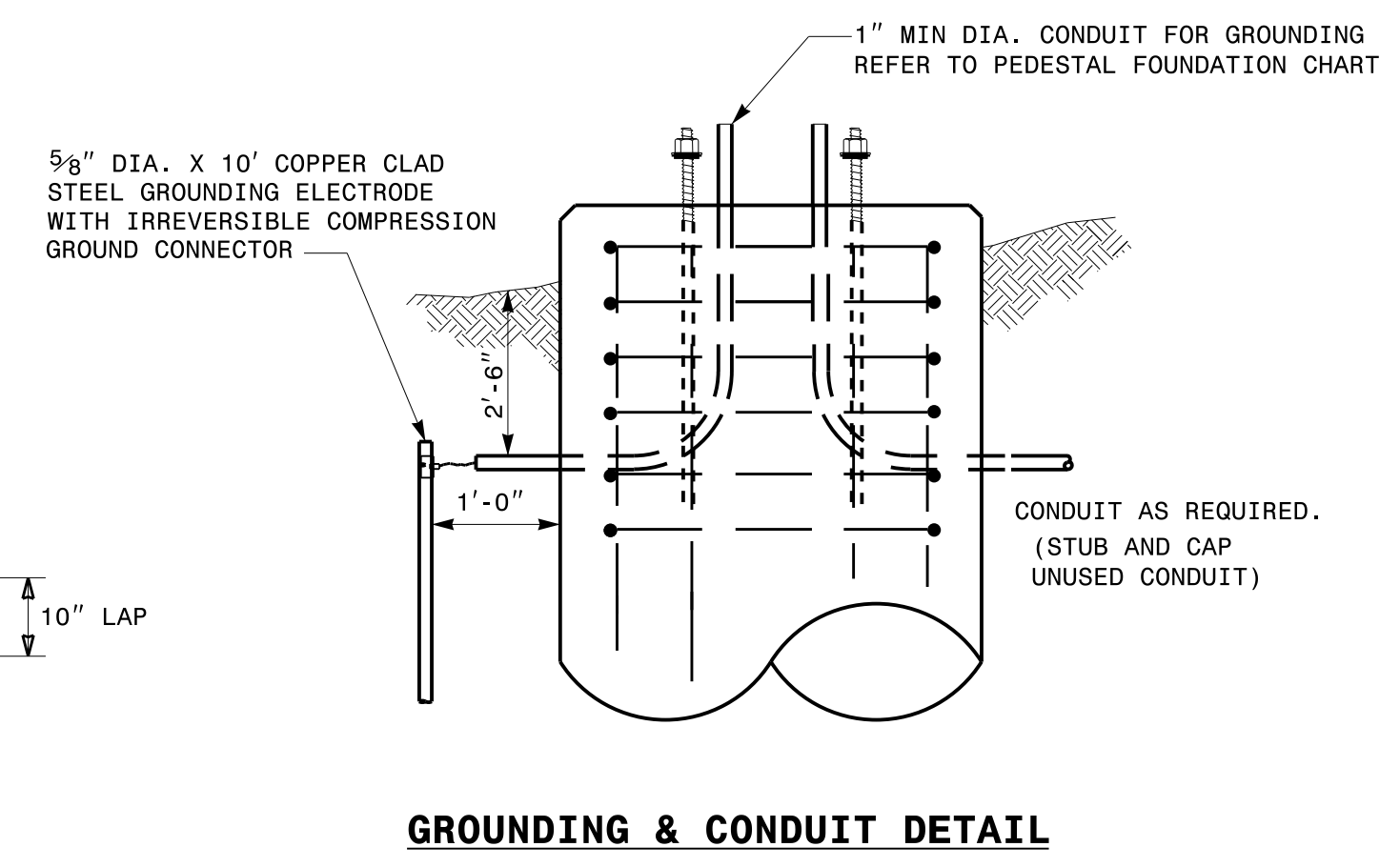
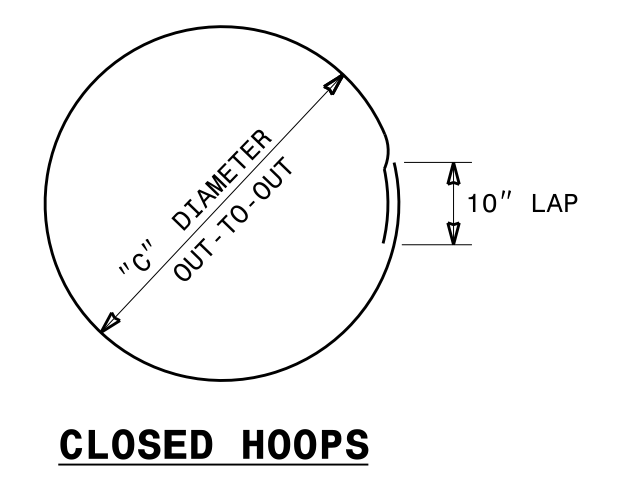
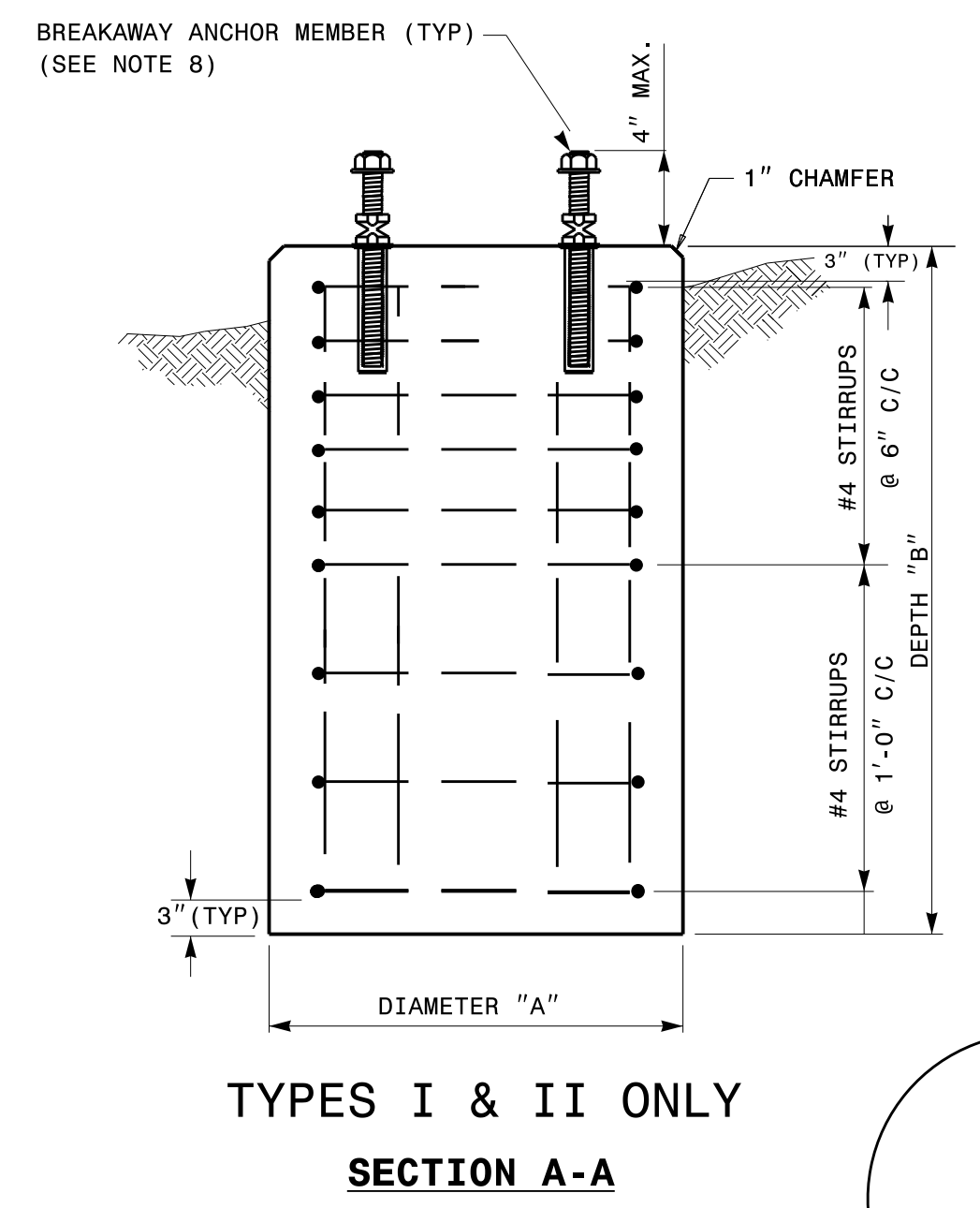
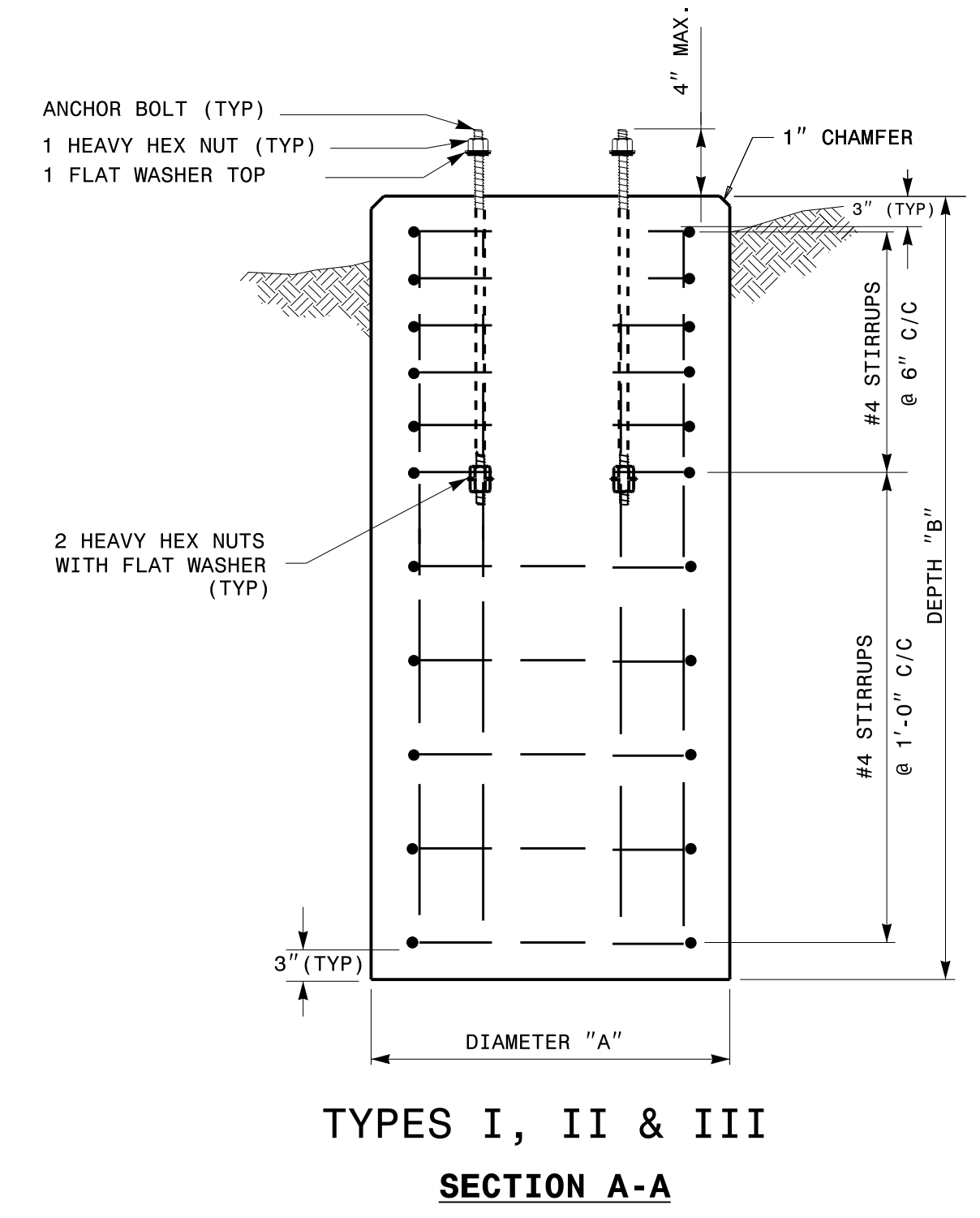
See Plate for Title

<p>Prepared in the Offices of:</p> <p>750 N. Greenfield Parkway Garner, NC 27529</p>	<p>SEAL</p> <p>DocuSigned by: <i>Mohd Aslami</i> 10/11/2017</p>
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- 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	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS
					VERTICAL SPACING ON 6" CENTERS	ON 12" CENTERS	TOTAL					
I	8	6	3'-0"	56	4	0	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	7'-2"	2'-0"	0'-10"	53	175

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

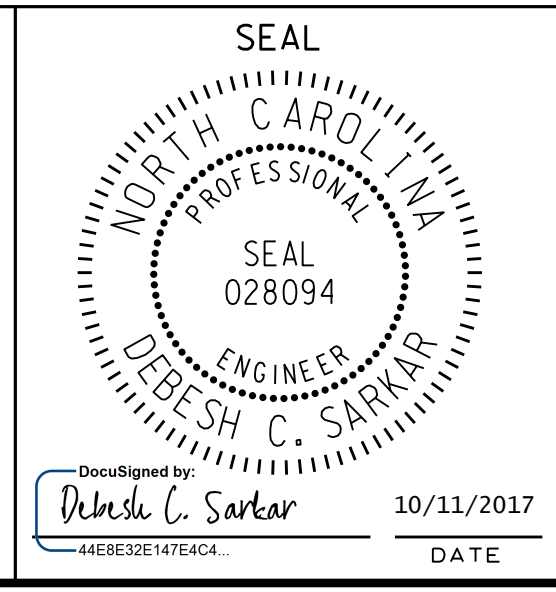
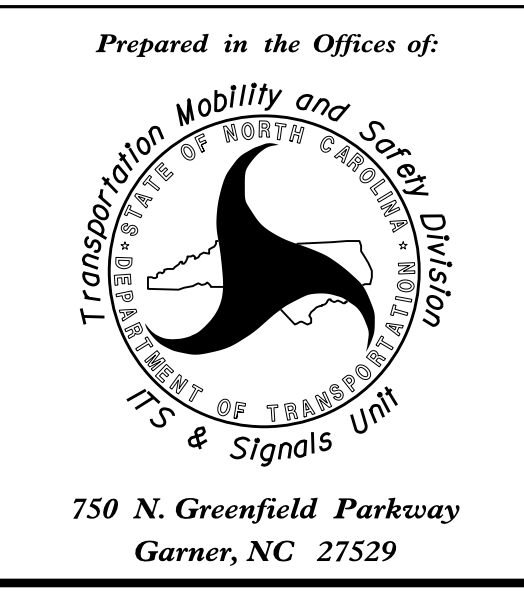
ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

SHEET 1 OF 1
1743D01

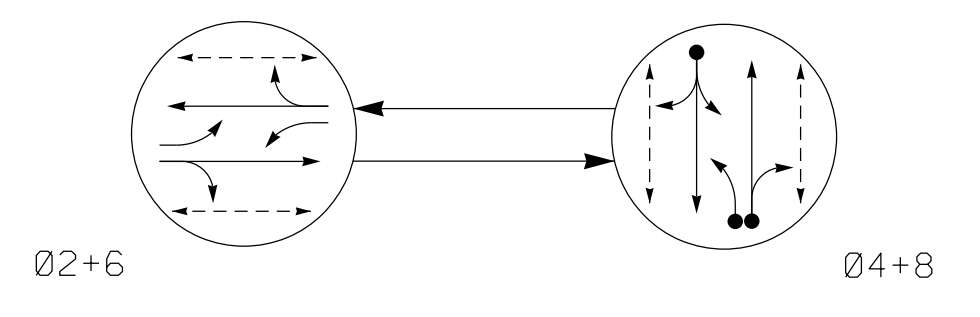
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See Plate for Title



PHASING DIAGRAM



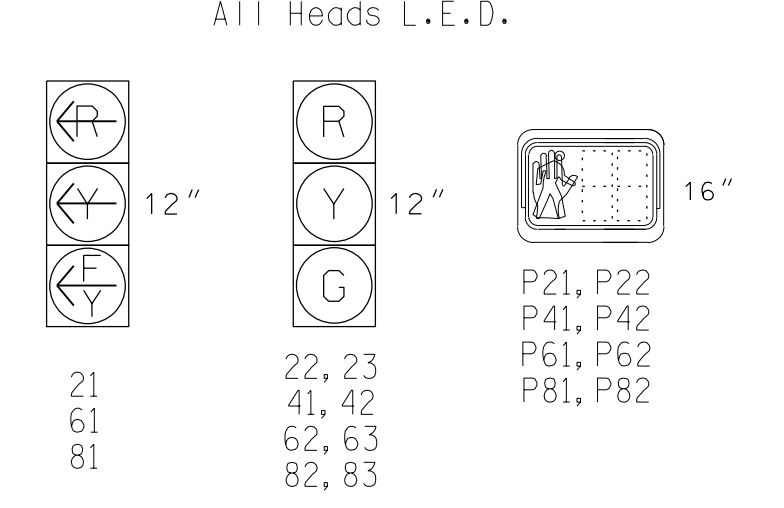
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
21	F	R	Y
22, 23	G	R	Y
41, 42	R	G	R
61	F	R	Y
62, 63	G	R	Y
81	R	F	R
82, 83	R	G	R
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK

SIGNAL FACE I.D.



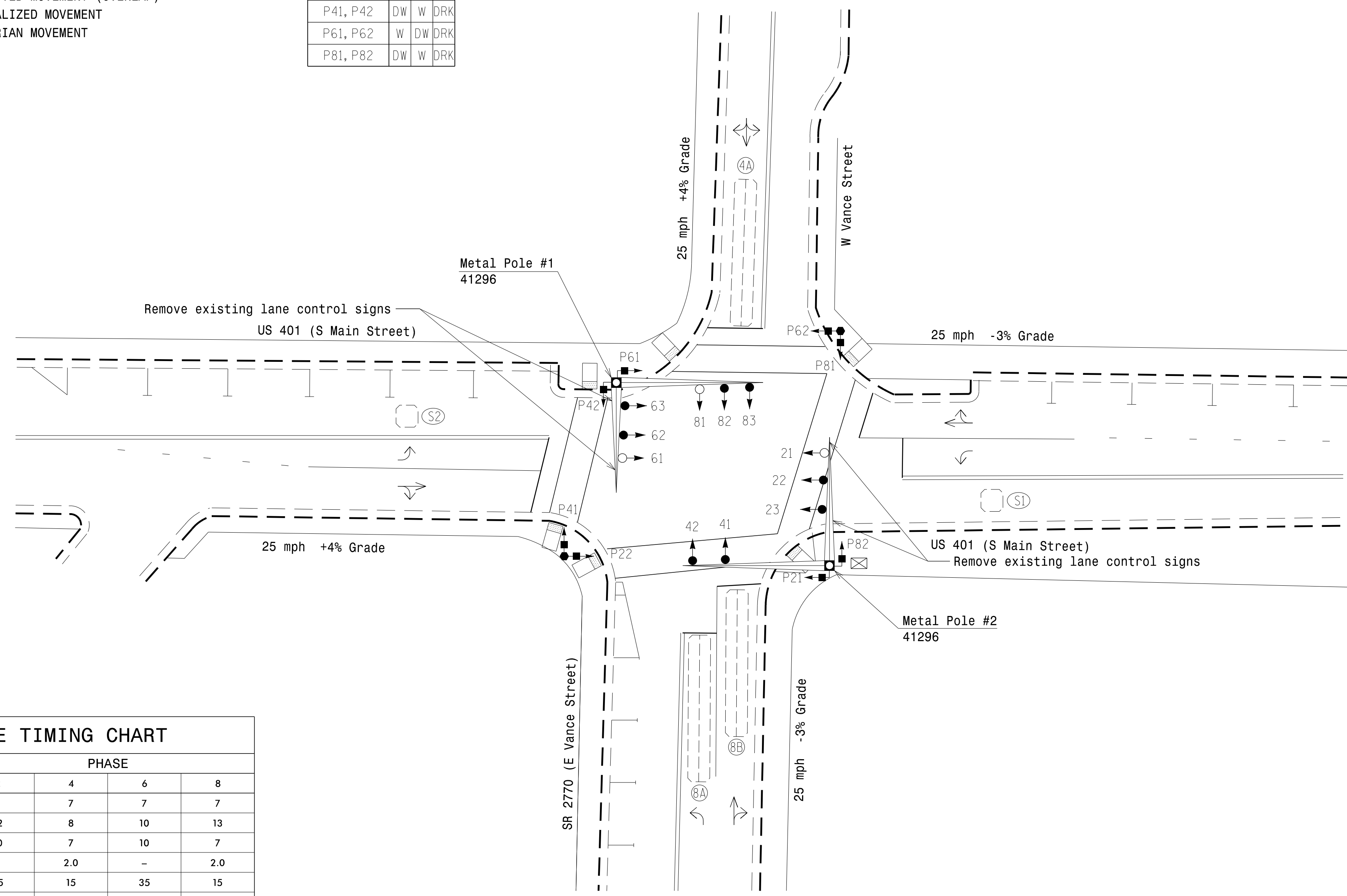
MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	DELAY DURING GREEN	NEW CARD	
4A	6X40	0	2-4-2	-	4	5	-	X	-	X	-	X
8A	6X40	0	2-4-2	-	8	3	-	X	-	X	-	X
8B	6X40	0	2-4-2	-	8	10	-	X	-	X	-	X
S1	6X6	+120	EXIST	-	-	-	-	-	-	-	-	X
S2	6X6	+120	EXIST	-	-	-	-	-	-	-	-	X

2 Phase Semi-Actuated (Fuquay-Varina Signal System)

NOTES

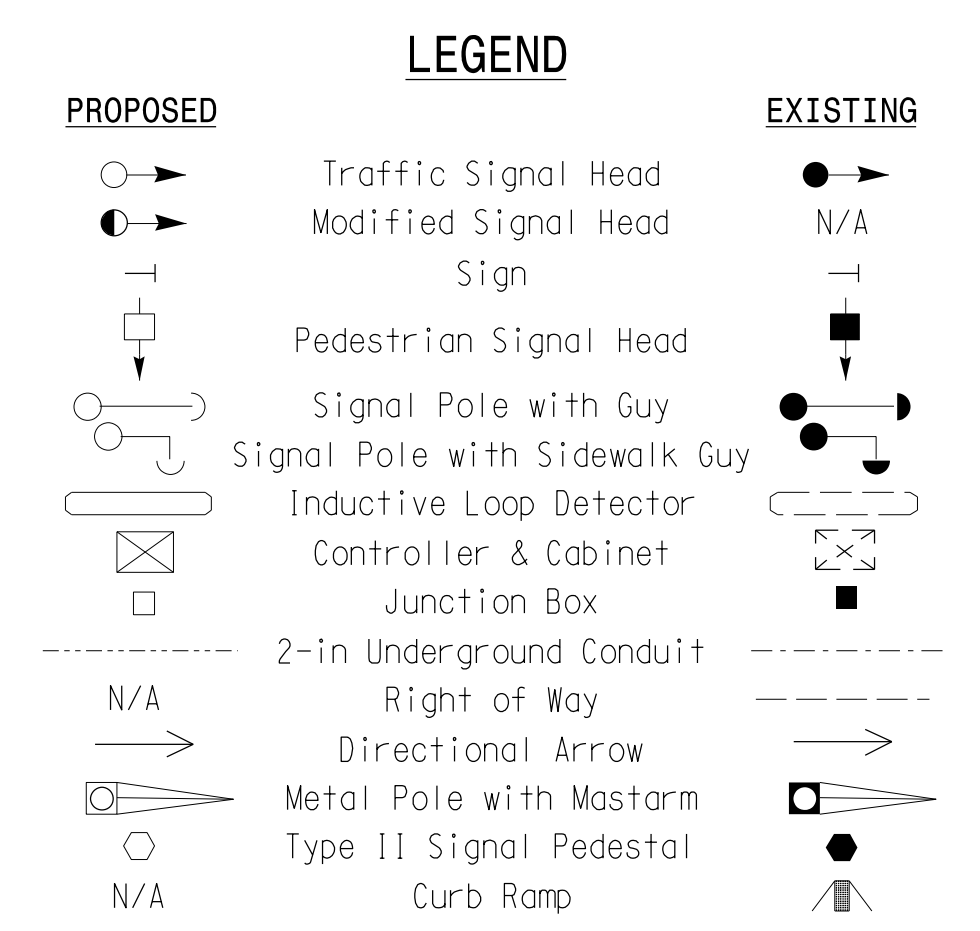
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Re-number existing signal heads 21, 22, 61, 62, 81 and 82 as 22, 23, 62, 63, 82 and 83 respectively.
- Re-position existing signal heads 22, 23, 62, 63 and 82.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" for phase 4 and phase 8 with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Remove existing Left "ONLY" (R3-5L) and Combined Through and Right Arrow (R3-6R) signs.
- Program phase 4 ped detector to call phase 8 ped and phase 8 ped detector to call phase 4 ped for leading pedestrian interval.



MAXTIME TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Walk *	7	7	7	7
Ped Clear *	12	8	10	13
Min Green	10	7	10	7
Passage *	-	2.0	-	2.0
Max I *	35	15	35	15
Yellow Change	3.3	3.3	3.3	3.3
Red Clear	2.4	2.0	2.4	2.0
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	3	3	3	3
Non Lock Detector	-	X	-	X
Vehicle Recall	MAX / PED RECALL	-	MAX / PED RECALL	-
Dual Entry	-	X	-	X

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



Signal Upgrade

US 401 (S Main Street) at SR 2770 (Vance Street)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion

PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

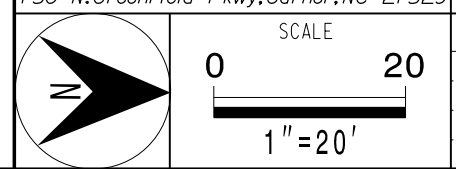
REVISIONS	INIT.	DATE

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4/14/2023

SIG. INVENTORY NO. 05-0161

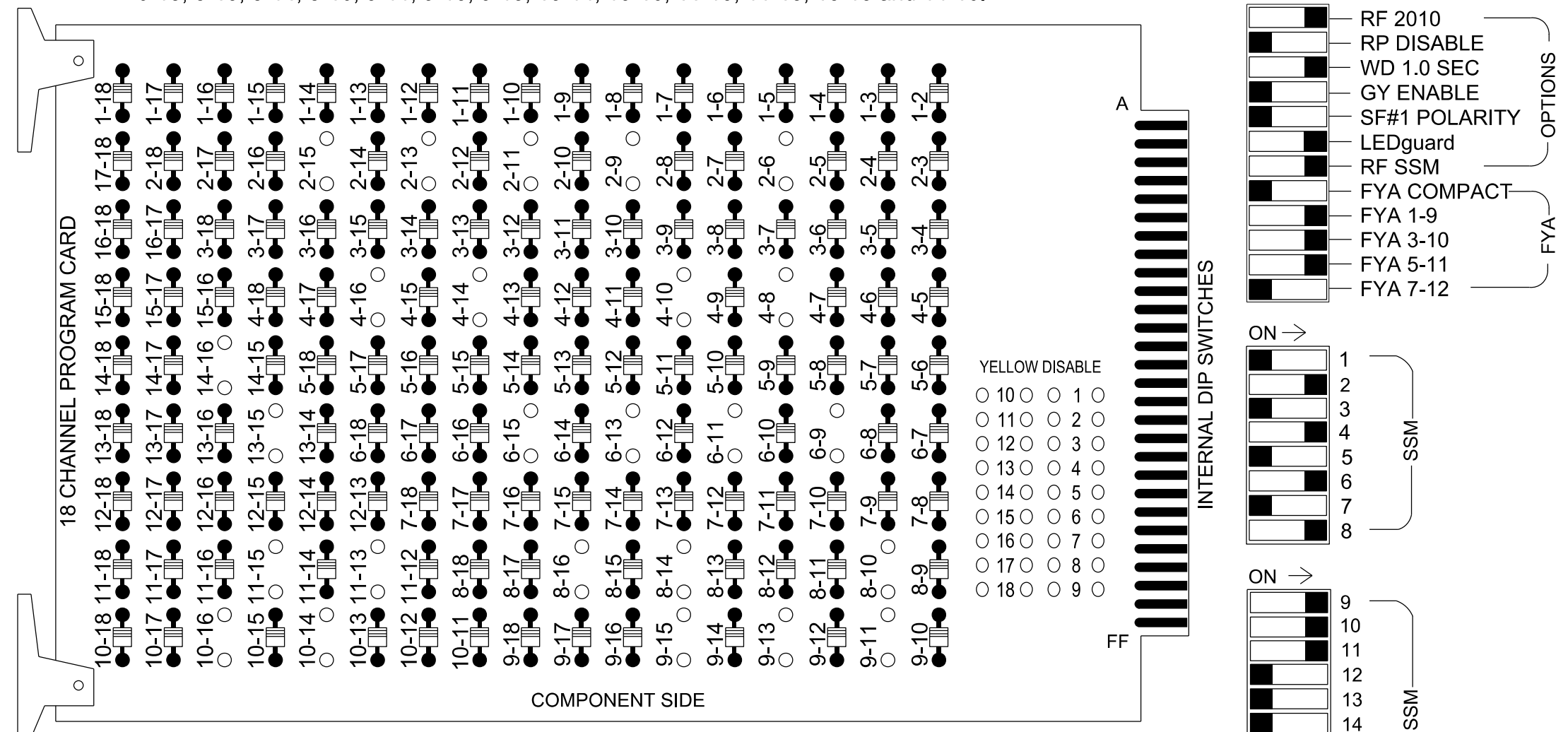
ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-8888 NCBEES #F-0326



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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)
 REMOVE DIODE JUMPERS 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-10, 4-14, 4-16, 6-9, 6-11, 6-13, 6-15, 8-10, 8-14, 8-16, 9-11, 9-13, 9-15, 10-14, 10-16, 11-13, 11-15, 13-15 and 14-16.



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 the Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.

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 plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- Program simultaneous start for phase 8.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S2, S3, S5, S6, S8, S9, S11, S12, AUX S1, AUX S2, AUX S4
 Phases Used.....2, 2PED, 4, 4PED, 6, 6PED, 8, 8PED
 Overlap "1".....*
 Overlap "2".....*
 Overlap "3".....*
 Overlap "4".....NOT USED
 *See overlap programming detail this sheet

SIGNAL HEAD HOOK-UP CHART

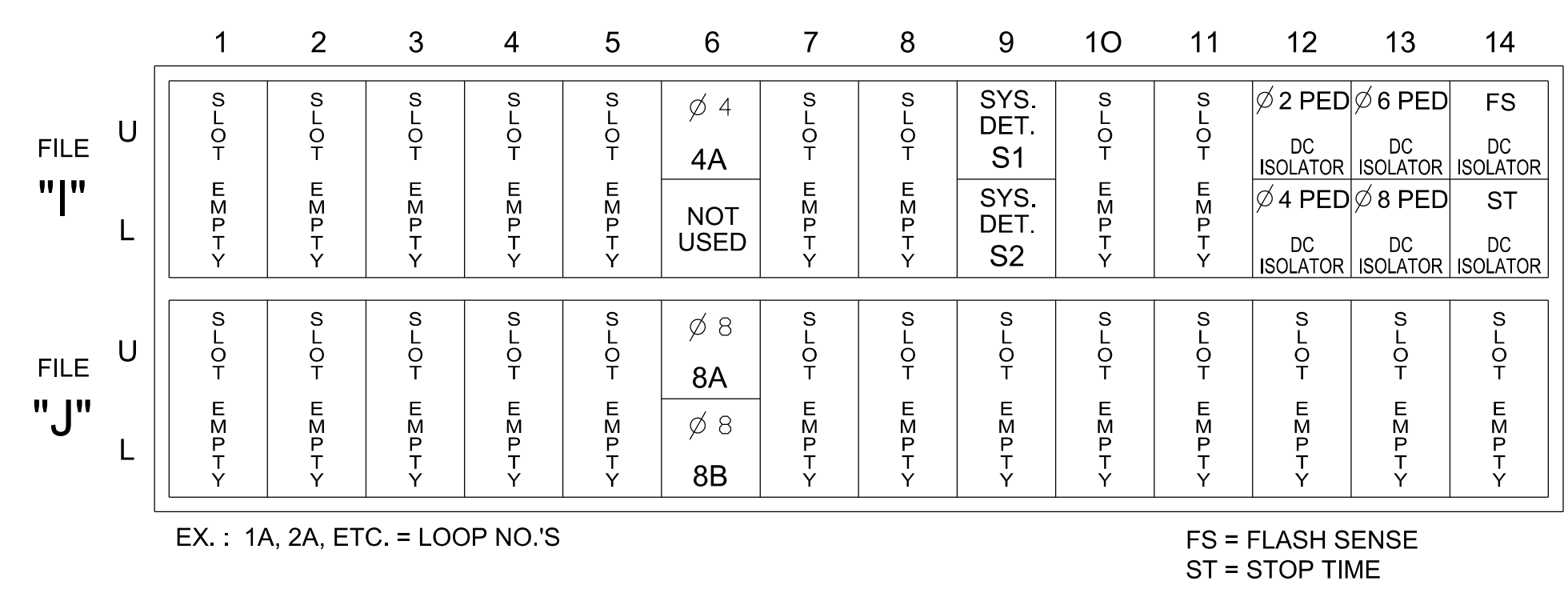
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	22,23	P21, P22	NU	41,42	P41, P42	NU	62,63	P61, P62	NU	82,83	P81, P82	61*	81*	NU	21*	NU	NU
RED		128			101				134			107						
YELLOW		129			102				135			108						
GREEN		130			103				136			109						
RED ARROW																A121	A124	A114
YELLOW ARROW																A122	A125	A115
FLASHING YELLOW ARROW																A123	A126	A116
GREEN ARROW																		
Hand icon			113			104			119			110						
Walking person icon			115			106			121			112						

NU = Not Used
 *See pictorial of head wiring in detail this sheet.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

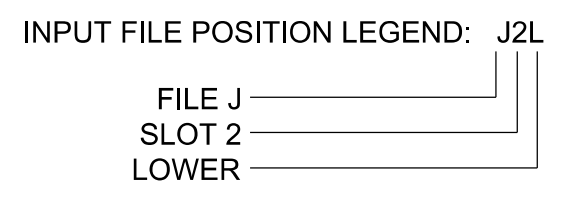
INPUT FILE POSITION LAYOUT (front view)



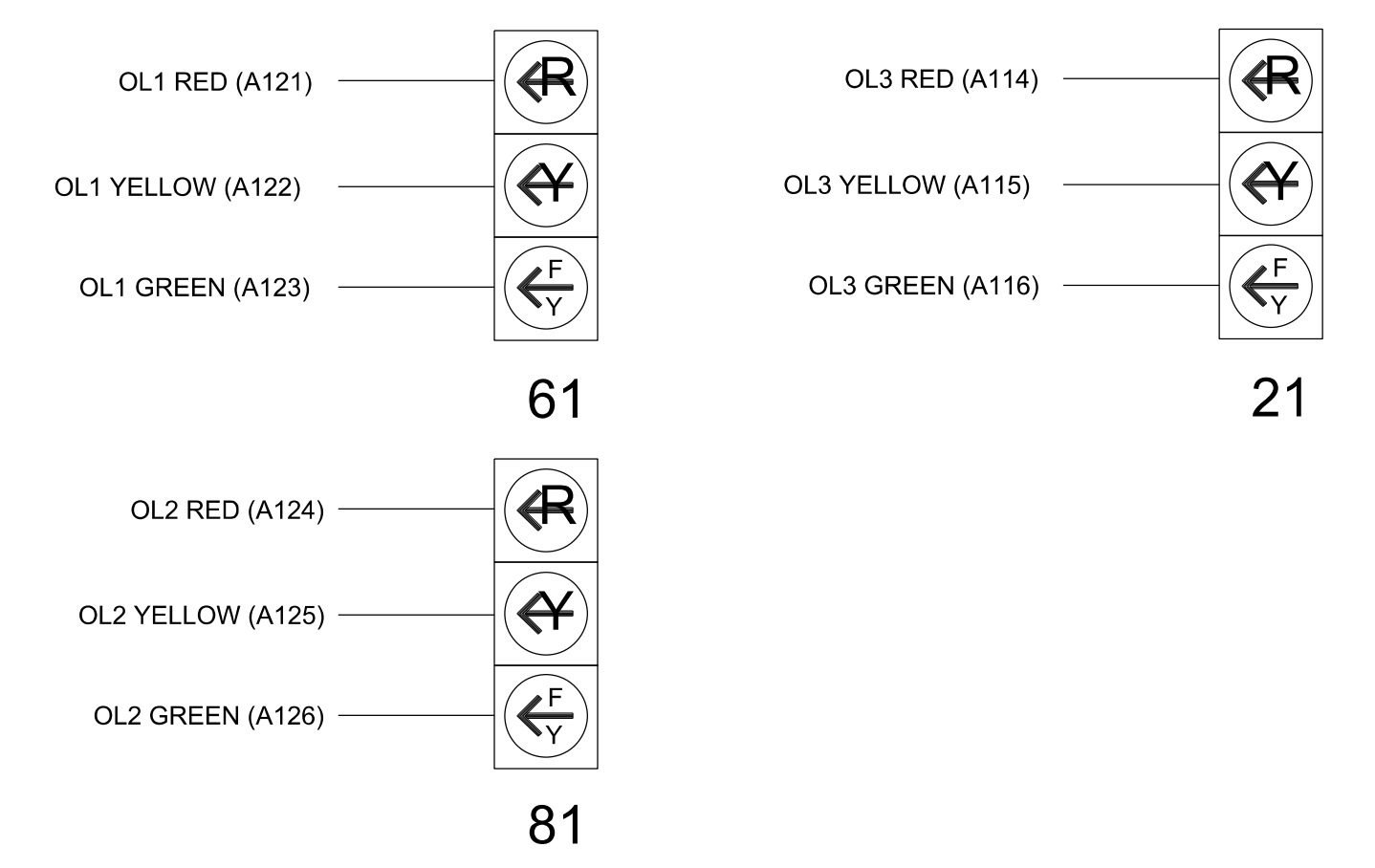
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
4A	TB4-9,10	I6U	41	3	8	4	5		X		X	
*S1	TB6-9,10	I9U	60	22	13	SYS						
*S2	TB6-11,12	I9L	62	24	14	SYS						
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
8B	TB5-11,12	J6L	46	8	23	8	10		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

*System detector only. Remove any assigned vehicle phase.



FYA SIGNAL WIRING DETAIL (wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0161
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: Prepared for the Offices of: TRANSPORTATION MOBILITY AND STAFF DIVISION COUNTY OF WAKE COUNTY SIGNALS MANAGEMENT SECTION 750 N. Greenfield Pkwy, Garner, NC 27529	US 401 (S Main Street) at SR 2770 (Vance Street)		SEAL SEAL 044476 M. ENCARNACION
	Division 5 Wake County Fuquay-Varina PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion PREPARED BY: JT Stiff REVIEWED BY: PL Alexander	Revisions table with columns for Revisions, Init., and Date.	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signature: Anthony Encarnacion DATE: 4/14/2023
 SIG. INVENTORY NO. 05-0161

OVERLAP PROGRAMMING

Front Panel
 Main Menu > Controller > Overlap > Overlap Parameters/Overlap Timings

Web Interface
 Home > Controller > Overlap Configuration > Overlaps

Overlap Plan 1

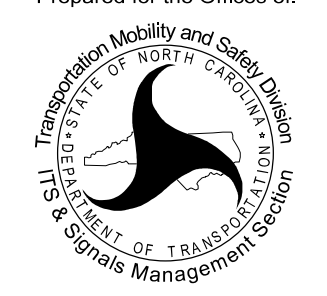

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	-
Included Phases	2	4	6	-
Modifier Phases	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

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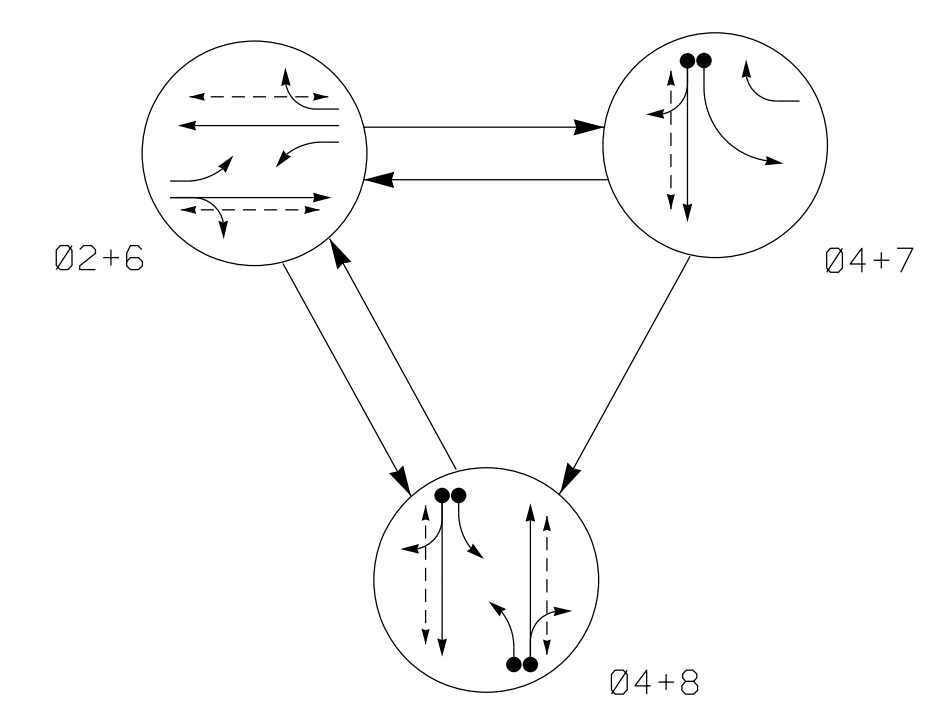
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 05-0161
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	US 401 (S Main Street) at SR 2770 (Vance Street)		SEAL  SEAL 044476 ANTHONY M. ENCARNACION ENGINEER								
	Division 5 Wake County Fuquay-Varina PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion PREPARED BY: JT Stiff REVIEWED BY: PL Alexander	<table border="1"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>		REVISIONS	INIT.	DATE					
REVISIONS	INIT.	DATE									
Designed by: <u>Anthony Encarnacion</u> 4/14/2023 SIGNATURE DATE SIG. INVENTORY NO. 05-0161			DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED								

PHASING DIAGRAM



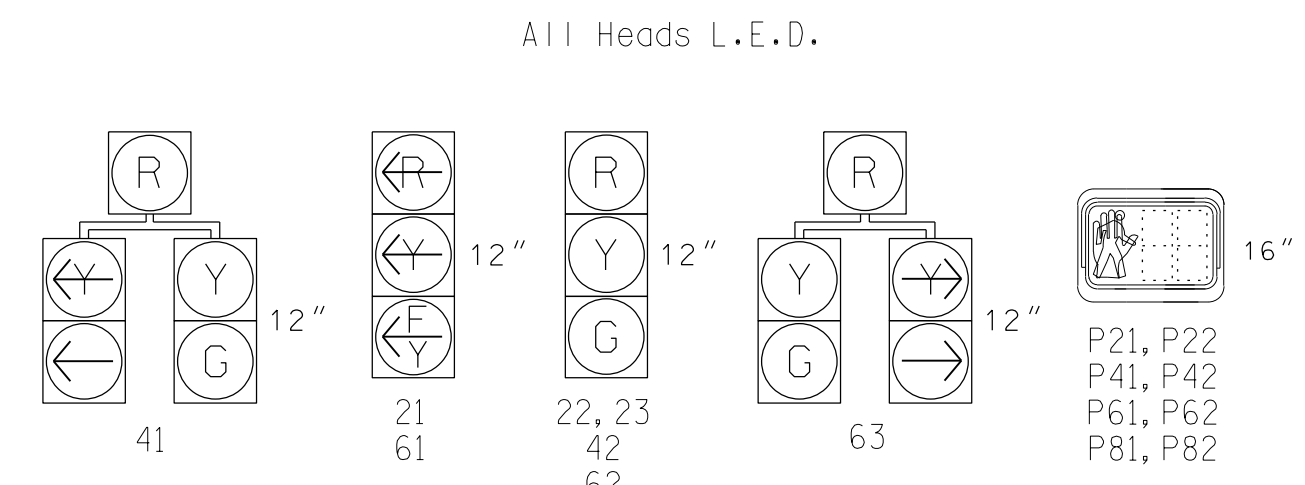
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+6	04+7	04+8	FLASH
21	F	R	R	Y
22, 23	G	R	R	Y
41	R	G	G	R
42	R	G	G	R
61	F	R	R	Y
62	G	R	R	Y
63	G	R	R	Y
81, 82	R	R	G	R
P21, P22	W	DW	DW	DRK
P41, P42	DW	W	W	DRK
P61, P62	W	DW	DW	DRK
P81, P82	DW	DW	W	DRK

SIGNAL FACE I.D.



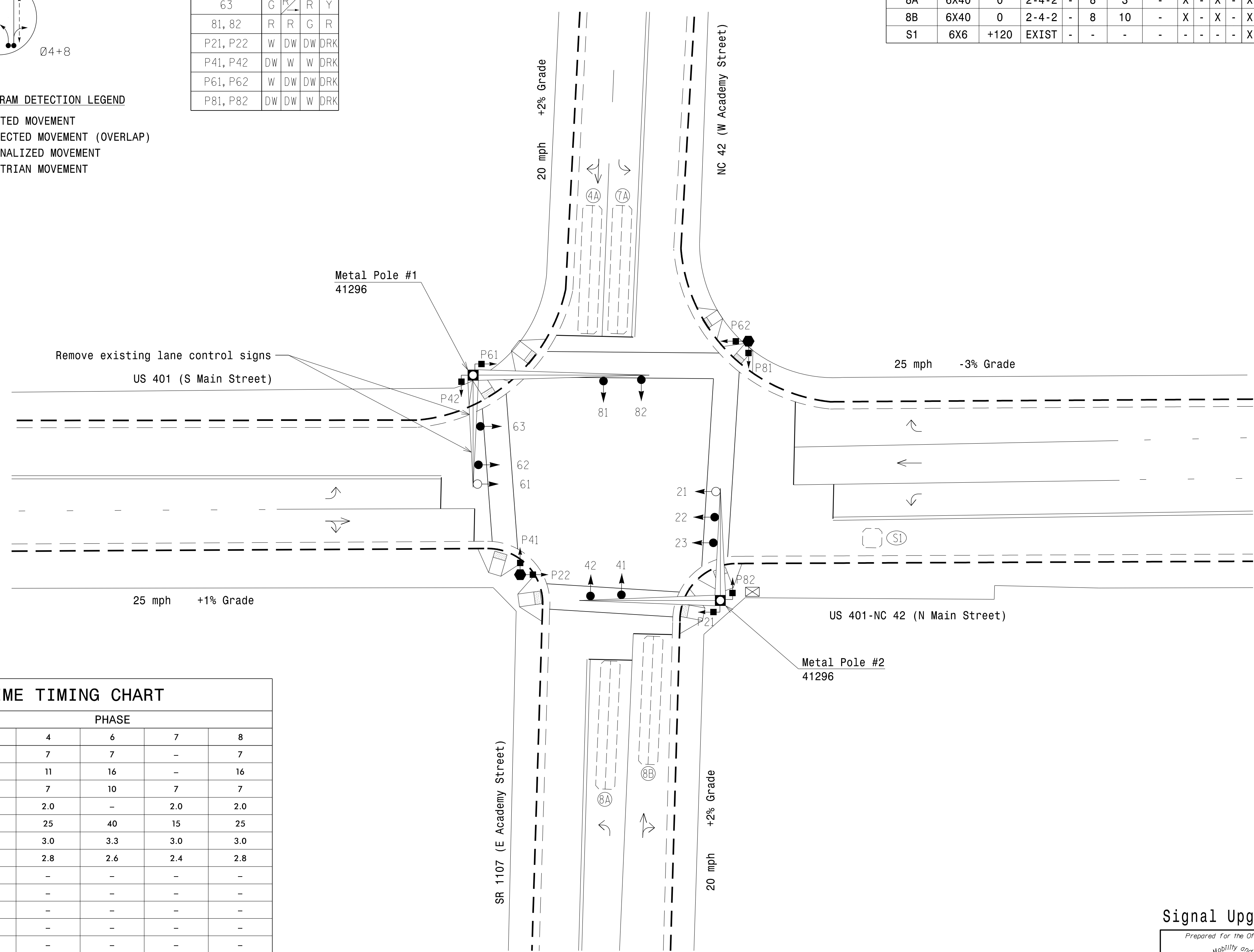
MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
4A	6X40	0	2-4-2	-	4	10	-	X	X	X	-	X
7A	6X40	0	2-4-2	-	7	15	-	X	X	X	-	X
8A	6X40	0	2-4-2	-	8	3	-	X	X	X	-	X
8B	6X40	0	2-4-2	-	8	10	-	X	X	X	-	X
S1	6X6	+120	EXIST	-	-	-	-	-	-	-	-	X

3 Phase Semi-Actuated (Fuquay-Varina 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.
- Omit phase 7 during phase 8 on.
- Reposition existing signal heads 21, 22, 61 and 62.
- Renumber existing signal heads 21, 22, 61 and 62 as 22, 23, 62 and 63 respectively.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" for phase 4 and phase 8 with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Remove existing Left "ONLY" (R3-5L) and Right Arrow "ONLY" (R3-5R) Signs.

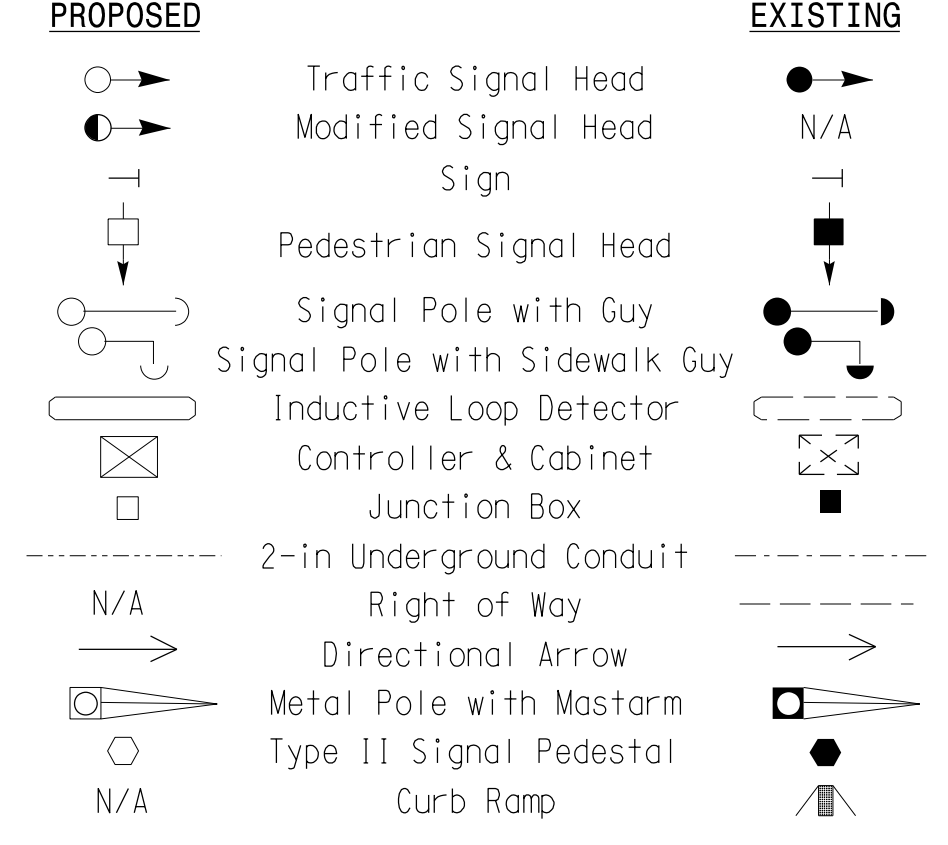


MAXTIME TIMING CHART

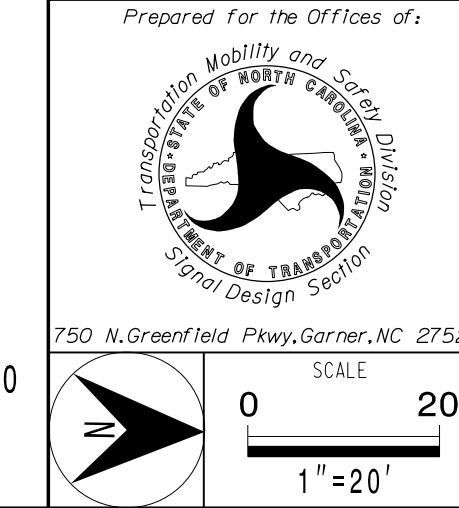
FEATURE	PHASE				
	2	4	6	7	8
Walk *	7	7	7	-	7
Ped Clear *	10	11	16	-	16
Min Green	10	7	10	7	7
Passage *	-	2.0	-	2.0	2.0
Max I *	40	25	40	15	25
Yellow Change	3.3	3.0	3.3	3.0	3.0
Red Clear	2.6	2.8	2.6	2.4	2.8
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Advance Walk	3	-	3	-	-
Non Lock Detector	-	X	-	X	X
Vehicle Recall	MAX / PED RECALL	-	MAX / PED RECALL	-	-
Dual Entry	-	X	-	-	X

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

LEGEND



Signal Upgrade



US 401-NC 42 (Main Street) at NC 42 (W Academy Street) / SR 1107 (E Academy Street)

Division 5 Wake County Fuquay-Varina

PLANNED BY: April 2023 REVIEWED BY: AM Encarnacion

PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 20 1"=20'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Matthew M. Encarnacion
Professional Engineer
4/14/2023
DATE

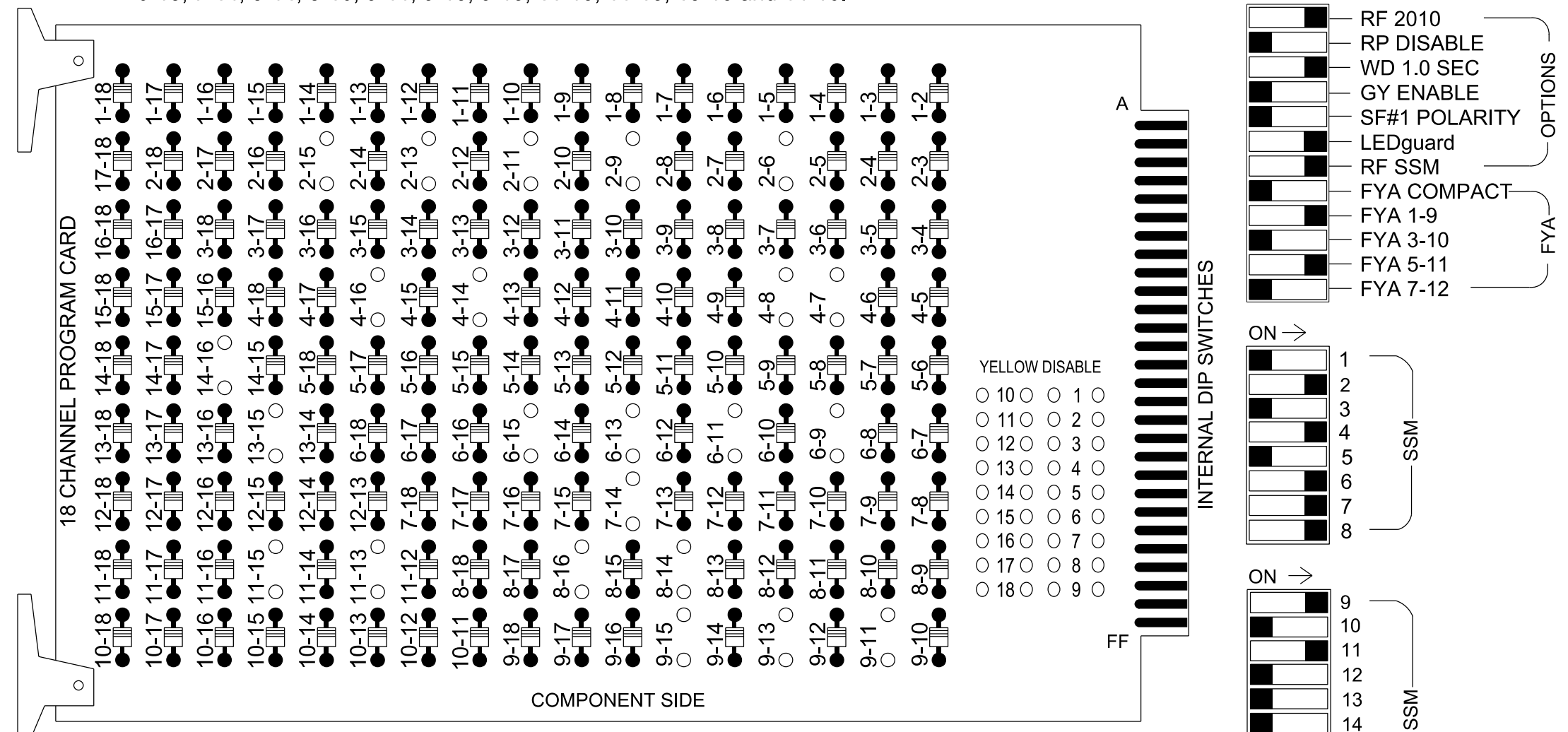
SIG. INVENTORY NO. 05-0162

13-APR-2023 14:08 DW:/SUS03633.msk/K:\nc.com\AT\MANC01\Documents\Roads and Br\Roads/Projects/100063268 Fuquay Varina/Task 05-11_Signals/050162_slg_csh_2022.mxd.dgn STP14685 AT LUS4FD89

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-9, 2-11, 2-13, 2-15, 4-7, 4-8, 4-14, 4-16, 6-9, 6-11, 6-13, 6-15, 7-14, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15 and 14-16.



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 the Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.

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 plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S2, S3, S5, S6, S8, S9, S10, S11, S12, AUX S1, AUX S4
 Phases Used.....2, 2PED, 4, 4PED, 6, 6PED, 7, 8, 8PED
 Overlap "1".....*
 Overlap "2".....NOT USED
 Overlap "3".....*
 Overlap "4".....NOT USED

*See overlap programming detail this sheet

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE	
SIGNAL HEAD NO.	NU	22,23	P21, P22	NU	41,42	P41, P42	NU	62,63	P61, P62	41	63	81,82	P81, P82	61*	NU	21*	NU	NU	
RED	128			101				134		*		107							
YELLOW	129			102				135				108							
GREEN	130			103				136				109							
RED ARROW													A121					A114	
YELLOW ARROW												123	123					A122	A115
FLASHING YELLOW ARROW														A123					A116
GREEN ARROW												124	124						
Hand		113				104			119				110						
Walking		115				106			121				112						

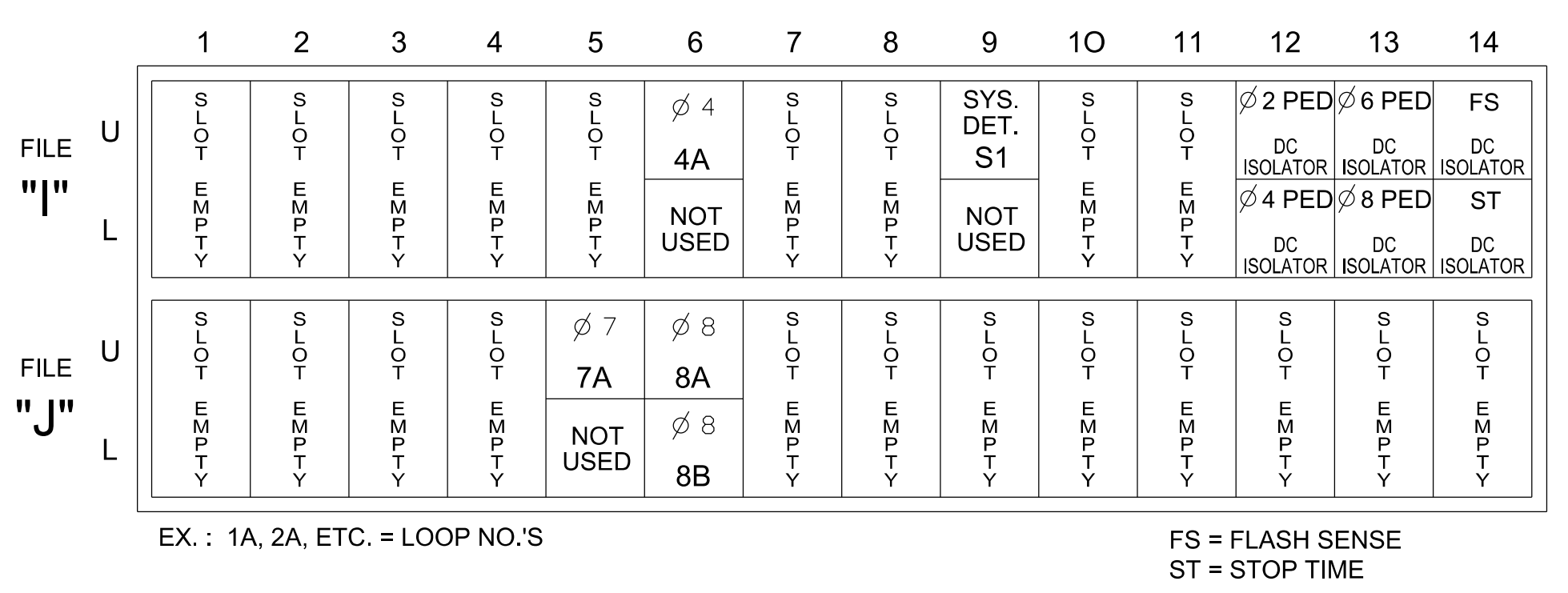
NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail this sheet.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)



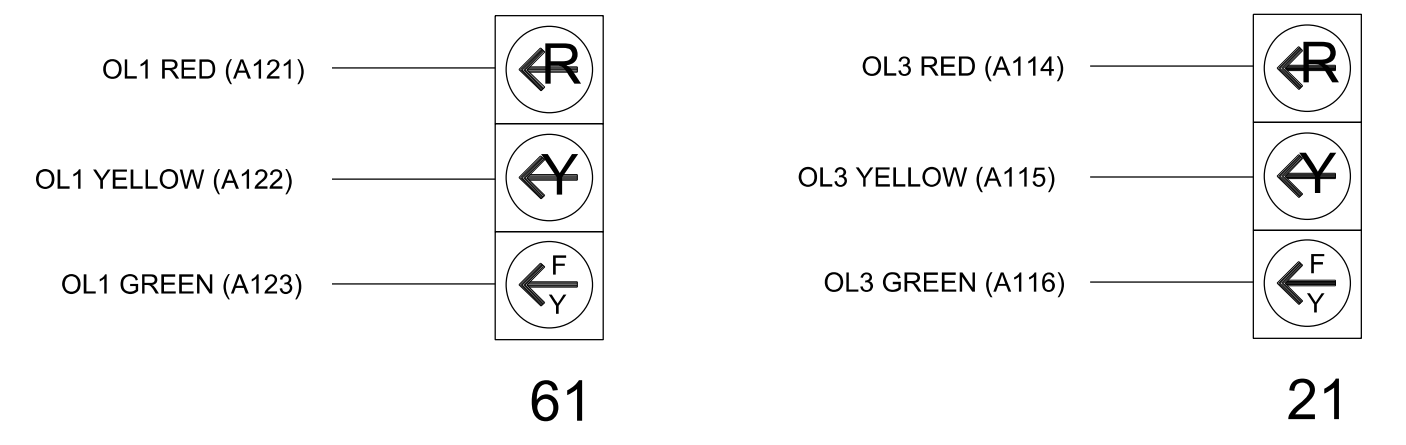
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
4A	TB4-9,10	I6U	41	3	8	4	10				X	
*S1	TB6-9,10	I8U	60	22	13	SYS					X	
7A	TB5-5,6	J5U	57	19	21	7	15		X		X	
				32	4		3		X		X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
8B	TB5-11,12	J6L	46	8	23	8	10		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

*System detector only. Remove any assigned vehicle phase.
 INPUT FILE POSITION LEGEND: J2L
 FILE J
 SLOT 2
 LOWER

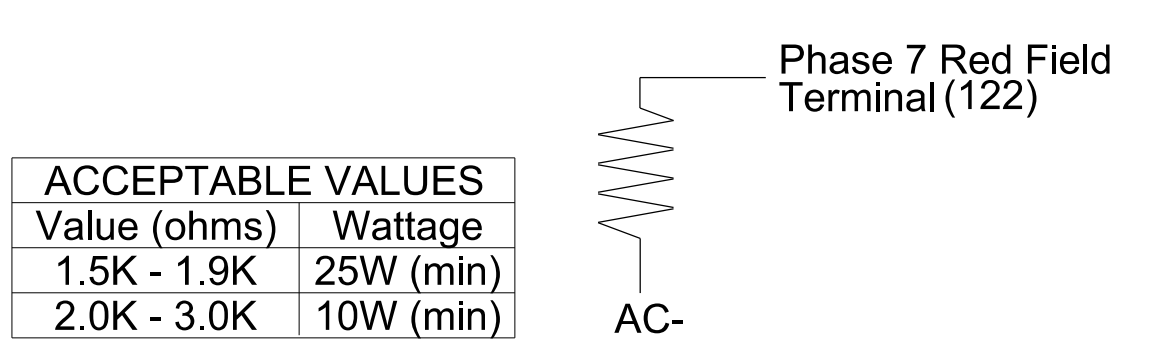
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0162
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

Prepared for the Offices of: 	US 401-NC 42 (Main Street) at NC 42 (W Academy Street)/ SR 1107 (E Academy Street)		SEAL
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	
Revisions Table:			Signature: Anthony Encarnacion Date: 4/14/2023 Sig. Inventory No.: 05-0162

OVERLAP PROGRAMMING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	2	-	6	-
Modifier Phases	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

BACKUP PREVENTION PROGRAMMING

Front Panel
Main Menu >Controller >Sequence & Phs Config >Backup Prevention > Backup Protection Plan

Web Interface
Home >Controller > Backup Prevention >Backup Protection Plan

Sequence 1

No Backup Phase	1	2	3	4	5	6	7	8
Serve Phase 1	-	-	-	-	-	-	-	-
Serve Phase 2	-	-	-	-	-	-	-	-
Serve Phase 3	-	-	-	-	-	-	-	-
Serve Phase 4	-	-	-	-	-	-	-	-
Serve Phase 5	-	-	-	-	-	-	-	-
Serve Phase 6	-	-	-	-	-	-	-	-
Serve Phase 7	-	-	-	-	-	-	-	-
Serve Phase 8	-	-	-	-	-	-	X	-

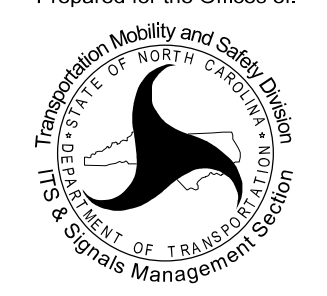
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THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0162
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 2

Electrical and Programming
Details For:

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

US 401-NC 42 (Main Street)
at NC 42 (W Academy Street)/
SR 1107 (E Academy Street)

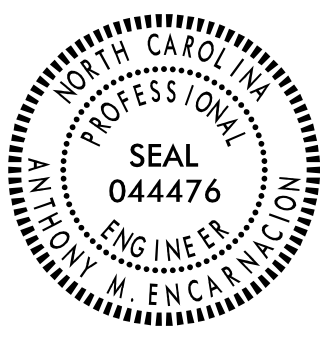
Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

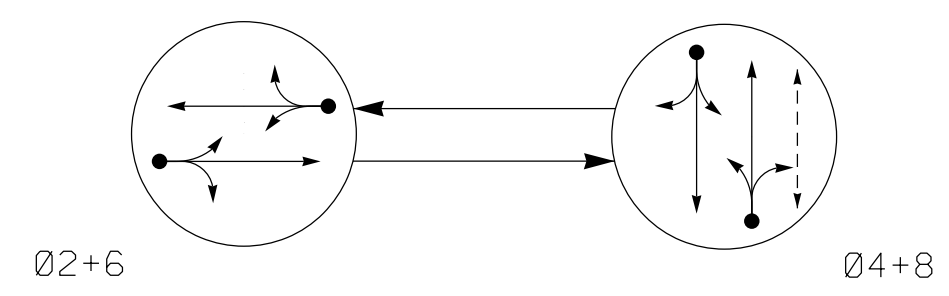
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SIGNATURES COMPLETED

SEAL



Anthony Encarnacion
4/14/2023
SIGNATURE DATE
SIG. INVENTORY NO. 05-0162

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

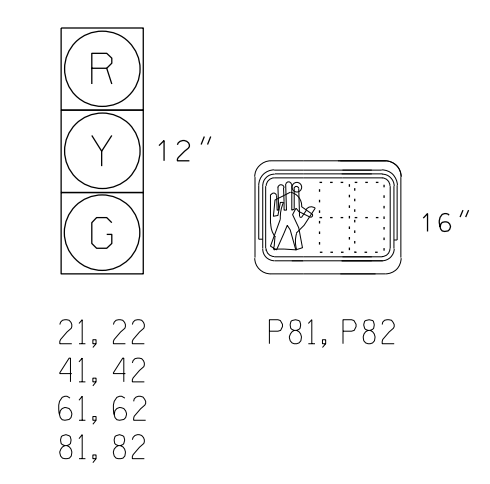
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- ◄◄◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄◄◄◄ UNSIGNALIZED MOVEMENT
- ◄◄◄◄◄ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R
P81, P82	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



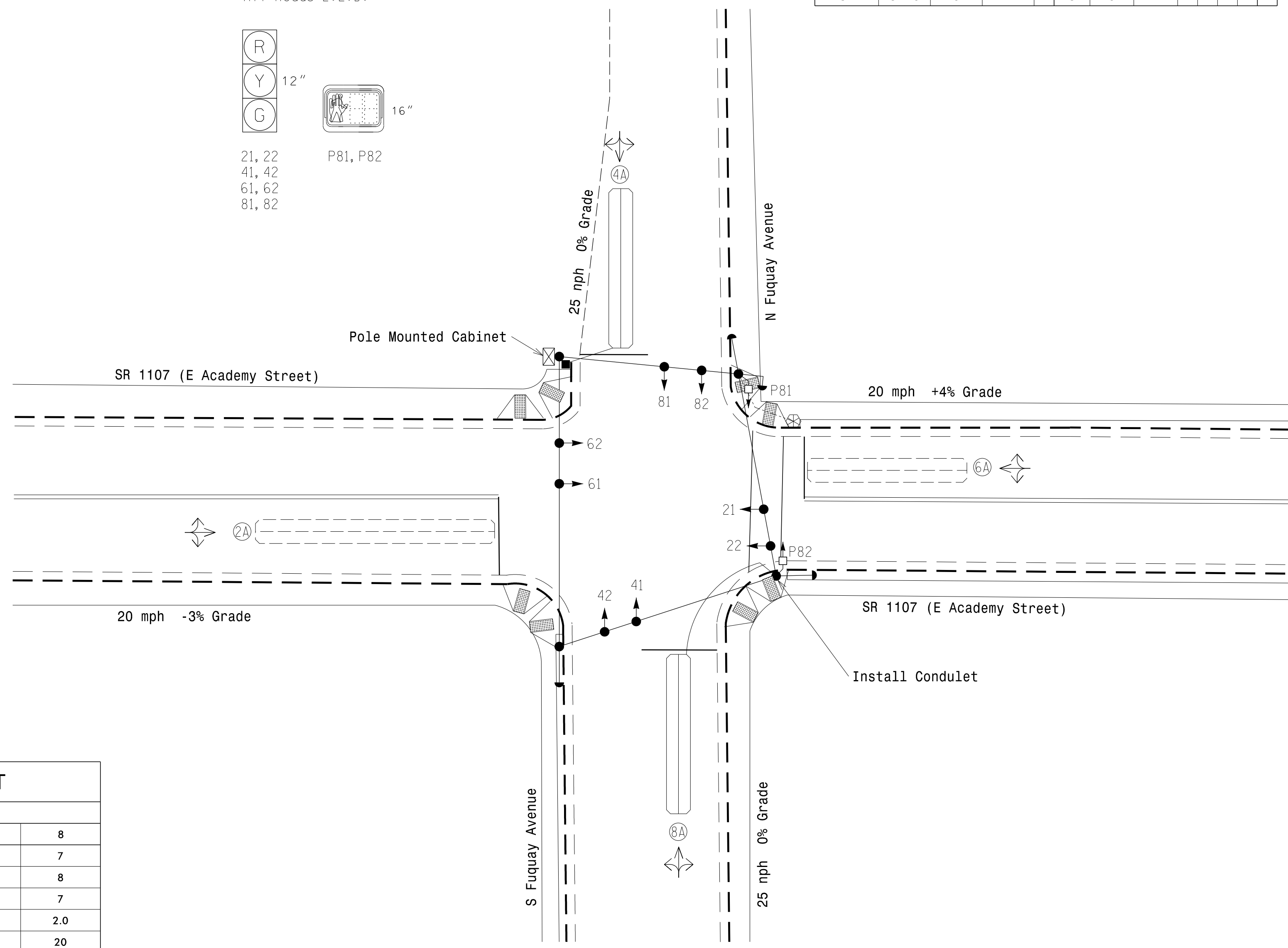
MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	PROGRAMMING									
			TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND INITIAL	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X60	0	2-4-2	-	2	-	-	-	X	X	-	X
4A	6X40	0	2-4-2	X	4	5	-	-	X	X	-	X
6A	6X40	0	2-4-2	-	6	-	-	-	X	X	-	X
8A	6X40	0	2-4-2	X	8	5	-	-	X	X	-	X

2 Phase Fully Actuated (Fuquay-Varina 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.
- 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.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 8 ped detector to call phase 4 ped dummy phase for leading pedestrian interval on both phases 4 and 8.



MAXTIME TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Walk *	-	-	-	7
Ped Clear *	-	-	-	8
Min Green	7	7	7	7
Passage *	1.0	2.0	2.0	2.0
Max I *	45	20	45	20
Yellow Change	3.0	3.2	3.0	3.2
Red Clear	2.3	1.9	2.1	1.7
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	-	-	3
Non Lock Detector	X	X	X	X
Vehicle Recall	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	X	-	X

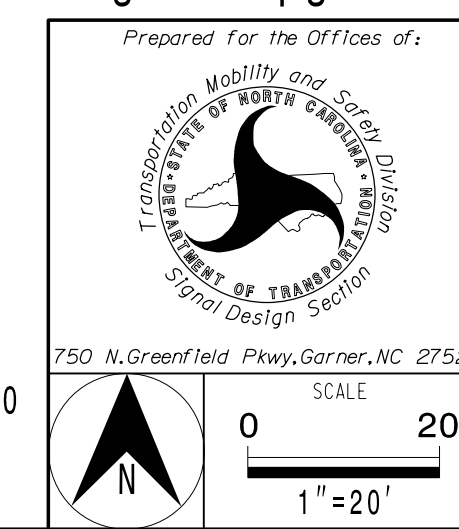
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED	EXISTING
○► Traffic Signal Head	●► N/A
◐► Modified Signal Head Sign	◐► N/A
◓► Pedestrian Signal Head	◓► N/A
○ Signal Pole with Guy	● Signal Pole with Sidewalk Guy
▭ Inductive Loop Detector	▭ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Controller & Cabinet
□ Junction Box	□ Junction Box
--- 2-in Underground Conduit	--- 2-in Underground Conduit
N/A Right of Way	--- Right of Way
→ Directional Arrow	→ Directional Arrow
N/A Curb Ramp	▭ Curb Ramp
⊗ Type 1 Pushbutton Post	⊗ Type 1 Pushbutton Post

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Signal Upgrade



SR 1107 (E Academy Street) at Fuquay Avenue

Division 5	Wake County	Fuquay-Varina
PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion	
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander	
REVISIONS	INIT.	DATE

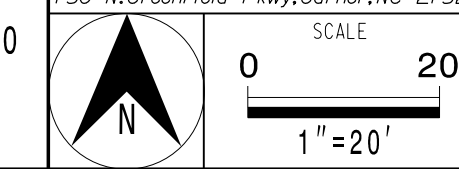
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Seal of William M. Encarnacion, Professional Engineer, License No. 044476, State of North Carolina.

4/14/2023

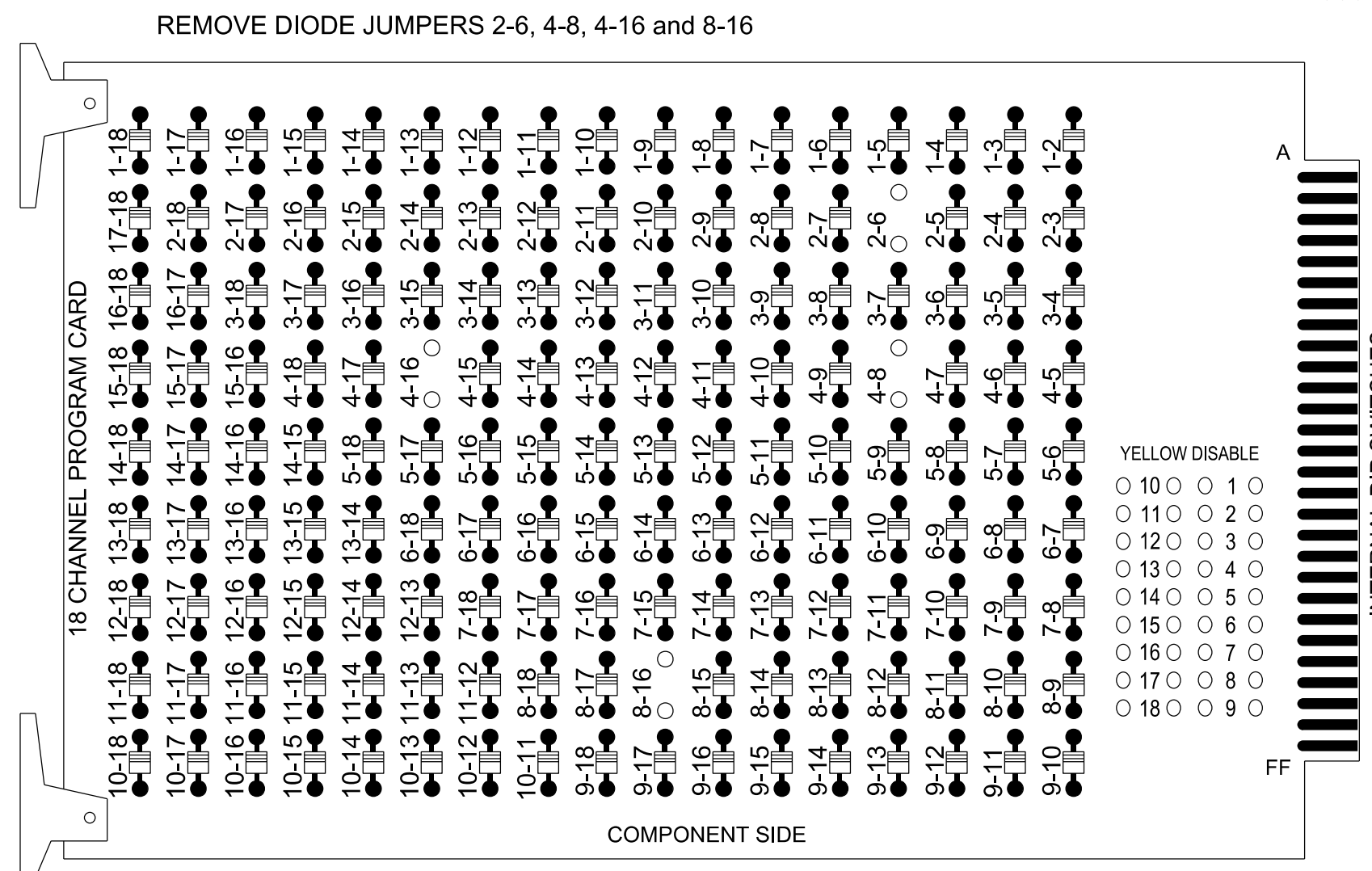
SIG. INVENTORY NO. 05-0163

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326



18 CHANNEL IP 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 the Red Enable is active at all times during normal operation.
 - Integrate monitor with Ethernet network in cabinet.

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 plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- Program phase 8 for simultaneous start.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....336
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....12
 Load Switches Used.....S2, S5, S8, S11, S12
 Phases Used.....2, 4, 6, 8, 8PED
 Overlap "1".....NOT USED
 Overlap "2".....NOT USED
 Overlap "3".....NOT USED
 Overlap "4".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon												110
Walking person icon												112

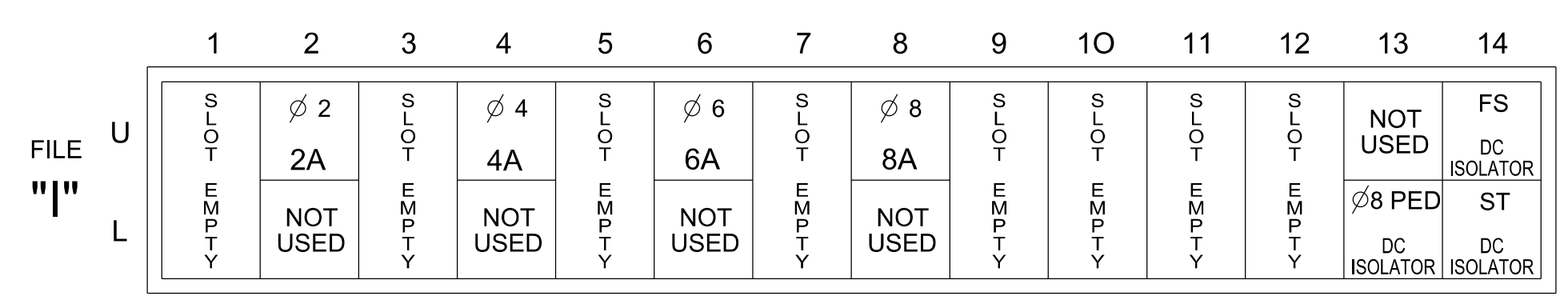
NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)



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

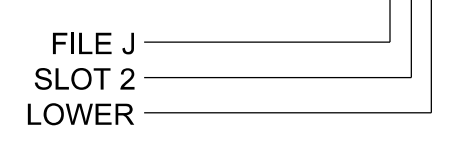
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB21-3,4	I2U	39	1	2	2			X		X	
4A	TB21-7,8	I4U	41	3	8	4	5		X		X	
6A	TB21-11,12	I6U	40	2	16	6			X		X	
8A	TB24-1,2	I8U	42	4	22	8	5		X		X	
PED PUSH BUTTONS												
P81,P82	TB24-11,12	I13L	70	36	8	PED 8						

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L



13-APR-2023 12:15 PW:///SUD0036433_worh.ris.com:ATKMANC01/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/TASK 05_11_23/signals/Electrical/Detail/050163_sm_e_2023rmd.dgn ST14685 AT U0591089

Electrical Detail

Electrical and Programming Details For:

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0163
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

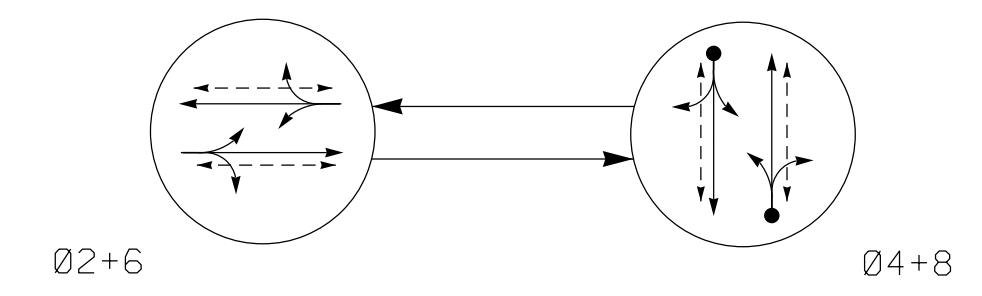
SR 1107 (E Academy Street) at Fuquay Avenue	
Division 5	Wake County Fuquay-Varina
PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Anthony Encarnacion
 PROFESSIONAL ENGINEER
 License No. 044476
 4/14/2023
 SIGNATURE DATE
 SIG. INVENTORY NO. 05-0163

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

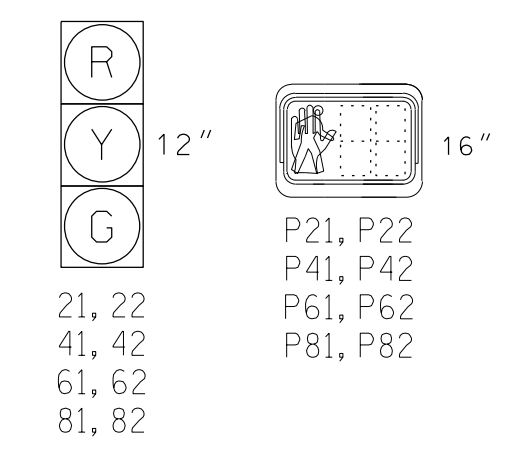
- → DETECTED MOVEMENT
- → UNDETECTED MOVEMENT (OVERLAP)
- ⋯ → UNSIGNALIZED MOVEMENT
- ⚡ → PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø 2+6	Ø 4+8	F L H A
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



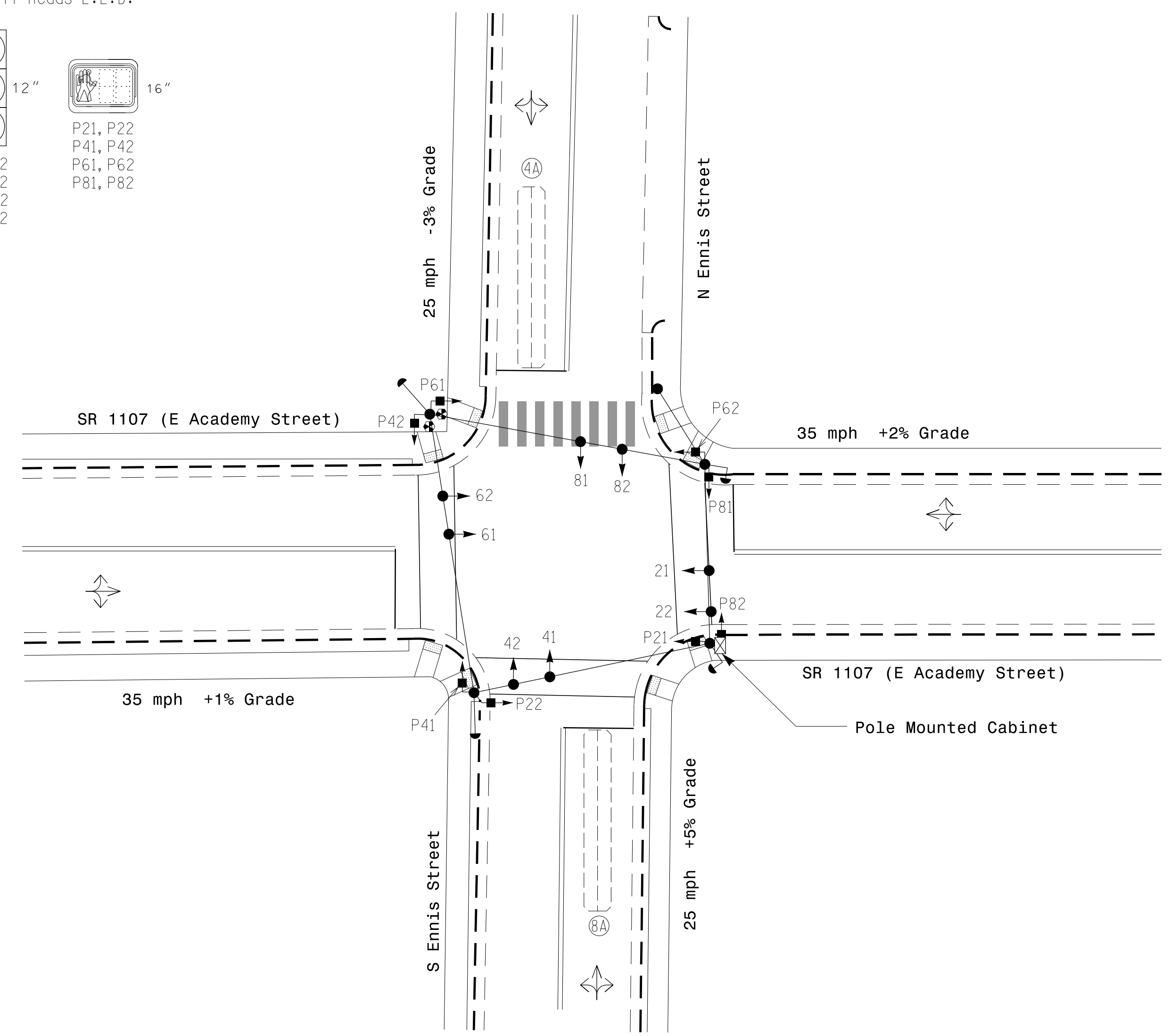
MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	
4A	6X40	0	2-4-2	-	4	5	-	X	-	X	-	X
8A	6X40	0	2-4-2	-	8	5	-	X	-	X	-	X

2 Phase Semi-Actuated (Fuquay-Varina 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.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls for phases 4+8.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 2 ped detector to call phase 6 ped and phase 6 ped detector to call phase 2 ped for leading pedestrian interval on phases 2 and 6.
- Program phase 4 ped detector to call phase 8 ped and phase 8 ped detector to call phase 4 ped for leading pedestrian interval on phases 4 and 8.



MAXTIME TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Walk *	7	7	7	7
Ped Clear *	8	8	8	8
Min Green	10	7	10	7
Passage *	-	2.0	-	2.0
Max I *	45	20	45	20
Yellow Change	3.8	3.3	3.7	3.0
Red Clear	1.3	2.0	1.3	2.3
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	3	3	3	3
Non Lock Detector	-	X	-	X
Vehicle Recall	PED /MAX RECALL	-	PED /MAX RECALL	-
Dual Entry	-	X	-	X

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

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head Sign	— → N/A
⚡ → Pedestrian Signal Head	⚡ → N/A
○ → Signal Pole with Guy	● → Signal Pole with Sidewalk Guy
⊠ → Inductive Loop Detector	⊠ → Inductive Loop Detector
⊠ → Controller & Cabinet	⊠ → Junction Box
⊠ → 2-in Underground Conduit	⊠ → 2-in Underground Conduit
— → Right of Way	— → Right of Way
→ → Directional Arrow	→ → Directional Arrow
⊕ → Type 1 Pushbutton Post	⊕ → Type 1 Pushbutton Post
N/A → Curb Ramp	⚡ → Curb Ramp

Signal Upgrade

SR 1107 (E Academy Street) at Ennis Street

Division 5	Wake County	Fuquay-Varina
PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion	
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

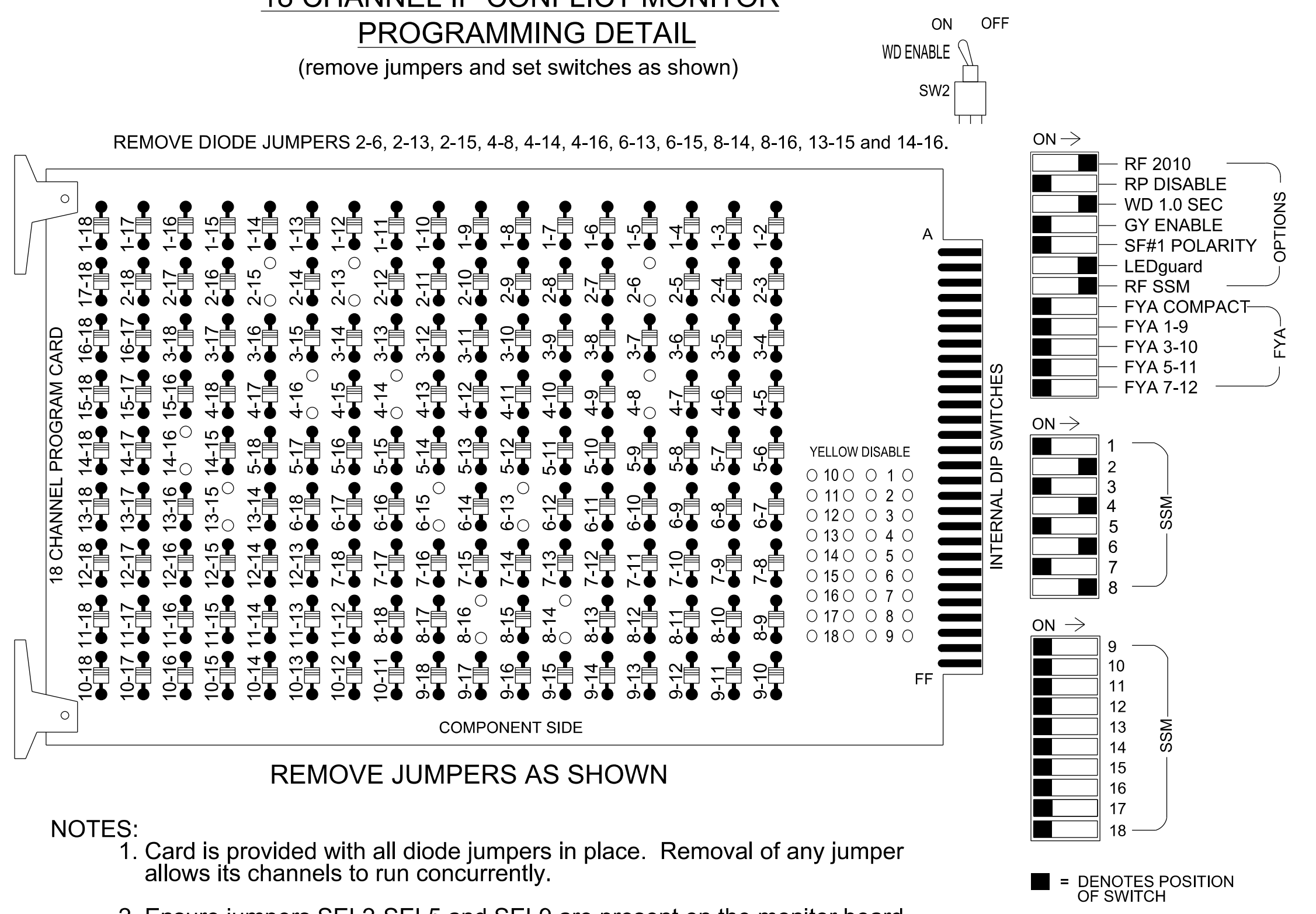
Signature: _____ DATE: 4/14/2023
 Signature: _____ DATE: _____
 SIG. INVENTORY NO. 05-0164

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

13-APR-2023 12:16
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 STIF4685 AT LUS47089

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- REMOVE DIODE JUMPERS 2-6, 2-13, 2-15, 4-8, 4-14, 4-16, 6-13, 6-15, 8-14, 8-16, 13-15 and 14-16.
- 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 the Red Enable is active at all times during normal operation.
 - Integrate monitor with Ethernet network in cabinet.

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 plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- Program phases 4 and 8 for simultaneous start.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

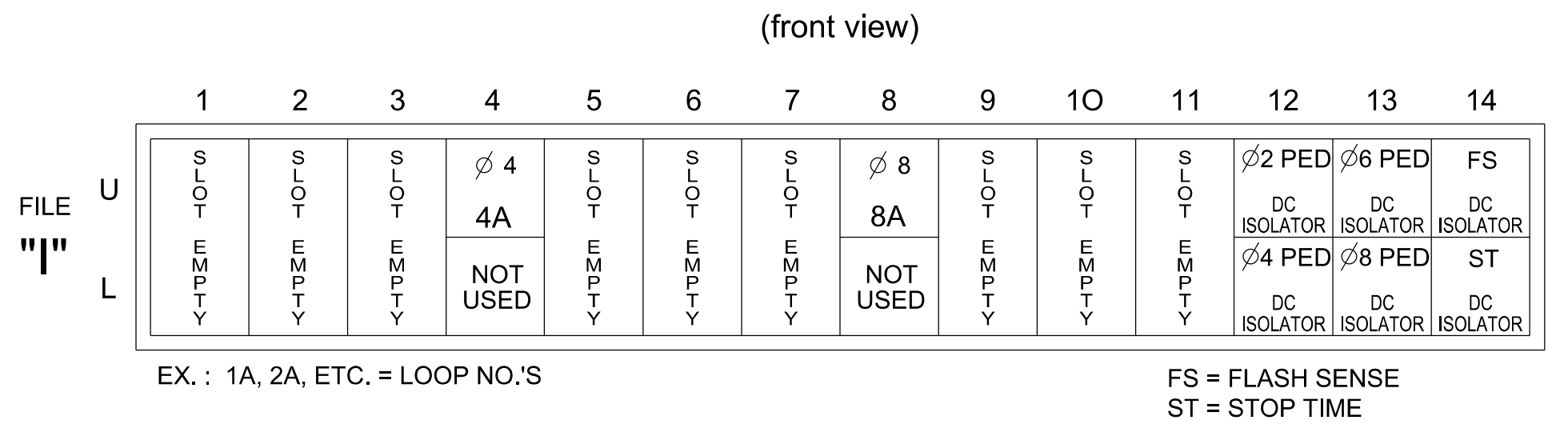
Controller.....2070LX
 Cabinet.....336
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....12
 Load Switches Used.....S2, S3, S5, S6, S8, S9, S11, S12
 Phases Used.....2, 2PED, 4, 4PED, 6, 6PED, 8, 8PED
 Overlap "1".....NOT USED
 Overlap "2".....NOT USED
 Overlap "3".....NOT USED
 Overlap "4".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
FLASHING YELLOW ARROW												
GREEN ARROW												
			113			104			119			110
			115			106			121			112

NU = Not Used

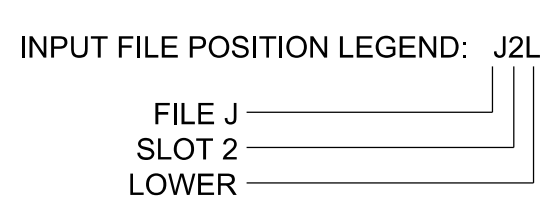
INPUT FILE POSITION LAYOUT



INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
4A	TB21-7,8	I4U	41	3	8	4				X	X	
8A	TB24-1,2	I8U	42	4	22	8				X	X	
PED PUSH BUTTONS												
P21,P22	TB22-9,10	I12U	67	33	2	PED 2						
P41,P42	TB24-9,10	I12L	69	35	4	PED 4						
P61,P62	TB22-11,12	I13U	68	34	6	PED 6						
P81,P82	TB24-11,12	I13L	70	36	8	PED 8						

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0164
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

Electrical Detail

Prepared for the Offices of: 	SR 1107 (E Academy Street) at Ennis Street		SEAL
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	
Revisions Table:			DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

6 Phase Fully Actuated w/ Railroad Preemption (Fuquay-Varina Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal head numbered 42.
6. Renumber existing signal heads 41 and 42 as 42 and 43, respectively.
7. Set all detector units to presence mode.
8. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
9. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
10. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
12. Pavement markings are existing.
13. The Division Traffic Engineer will determine the hours of use for each phasing plan.
14. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
15. Remove Left Arrow "ONLY" Sign (R3-5L) and Dual Turn and Through Arrows Sign
16. To provide a leading pedestrian interval on phase 6, program FYA heads 51 and 63 to delay for 3 seconds after the start of the phase 6 walk interval. See electrical details.

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	NEW CARD		
1A	6X60	+11	2-4-2	-	1	15*	-	X	-	X	-	X
					6#	-	-	X	-	X	-	X
2A,2B	6X6	70	EXIST	-	2	-	-	X	-	X	-	X
3A	6X60	+5	2-4-2	-	3	3	-	X	-	X	-	X
3B	6X60	0	2-4-2	-	3	10	-	X	-	X	-	X
4A	6X60	+5	2-4-2	-	4	3	-	X	-	X	-	X
4B	6X60	+5	2-4-2	-	4	5	-	X	-	X	-	X
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	X
					2#	-	-	X	-	X	-	X
6A	6X6	70	EXIST	-	6	-	-	X	-	X	-	X
S1	6X6	+120	EXIST	-	-	-	-	-	-	-	-	X
S2	6X6	+137	EXIST	-	-	-	-	-	-	-	-	X
S3	6X6	+137	EXIST	-	-	-	-	-	-	-	-	X

* Reduce delay to 3 seconds during alternate phasing operation
Disable phase call for loop(s) during alternate phasing operation.

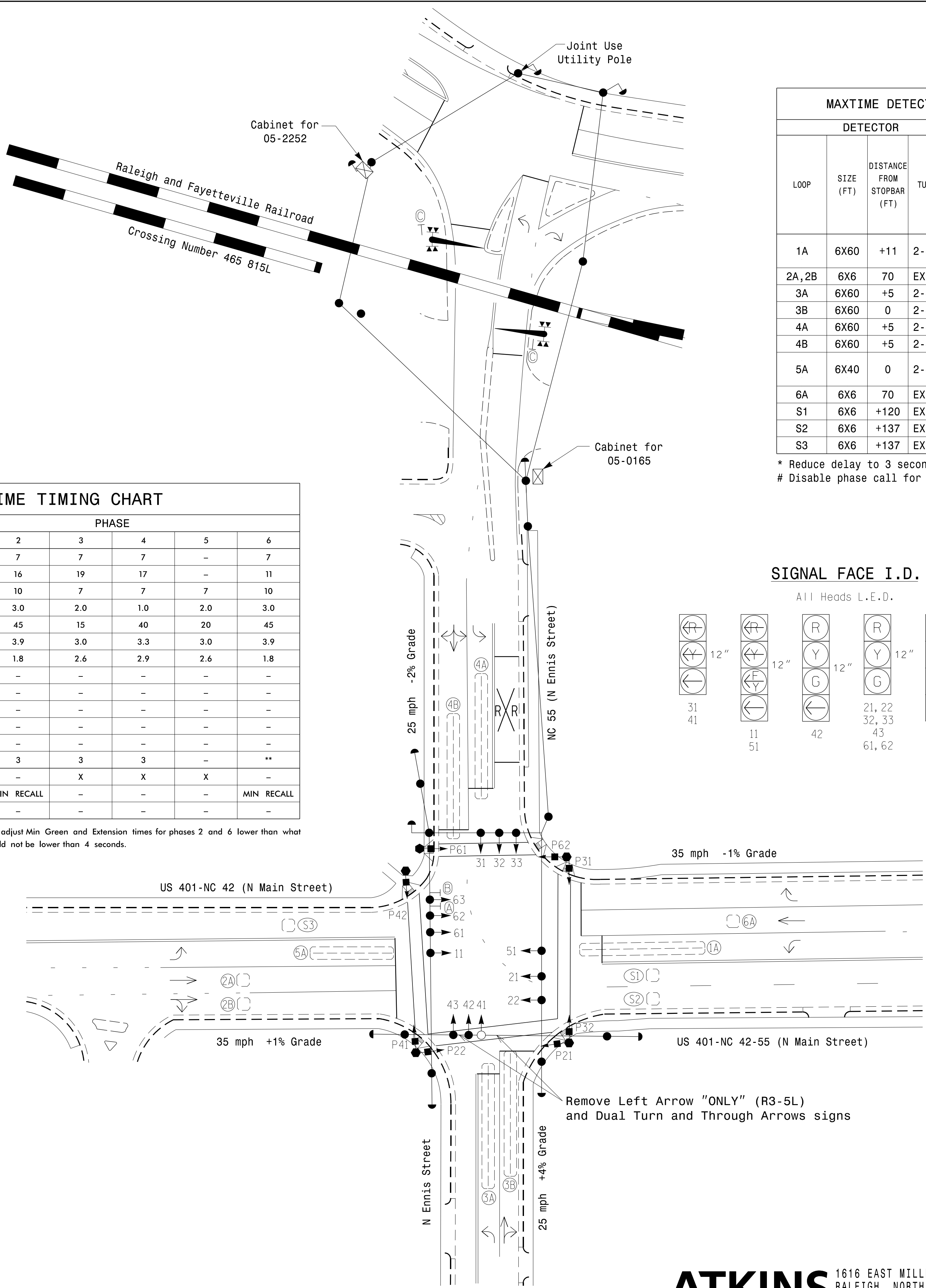
FEATURE	PHASE					
	1	2	3	4	5	6
Walk *	-	7	7	7	-	7
Ped Clear *	-	16	19	17	-	11
Min Green	7	10	7	7	7	10
Passage *	1.0	3.0	2.0	1.0	2.0	3.0
Max I *	15	45	15	40	20	45
Yellow Change	3.0	3.9	3.0	3.3	3.0	3.9
Red Clear	2.6	1.8	2.6	2.9	2.6	1.8
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Advance Walk	-	3	3	3	-	**
Non Lock Detector	X	-	X	X	X	-
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL
Dual Entry	-	-	-	-	-	-

* 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.
** See Note 17

FUNCTION	PRE 1
Type	RAIL ROAD
Exit Phases	4
Delay	0
Max Presence	0
Enter Min Green	1
Enter Walk	1
Enter Ped Clear	4
Enter Yellow Change	3.9
Enter Red Clear	2.9
Track Green	33
Track Yellow Change	3.3
Track Red Clear	2.9
Dwell Green	0
Exit Min Green	25.5 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Dwell Extend Time	1.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	Y
Require All Red Entry	-

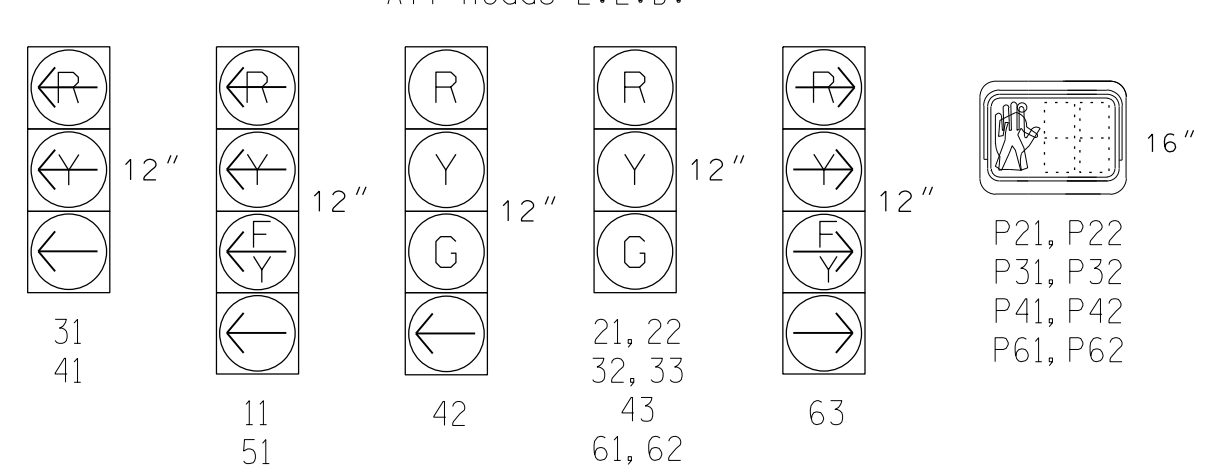
* Directs controller to use default phase timing.

This signal was designed for simultaneous preemption



SIGNAL FACE I.D.

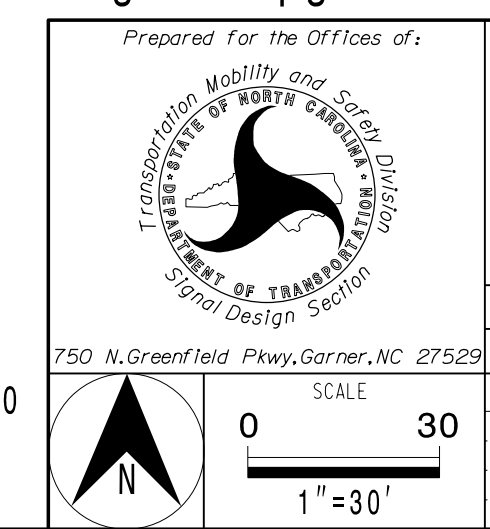
All Heads L.E.D.



Remove Left Arrow "ONLY" (R3-5L) and Dual Turn and Through Arrows signs

PROPOSED	EXISTING
	Traffic Signal Head
	Modified Signal Head
	Pedestrian Signal Head
	Signal Pole with Guy
	Signal Pole with Sidewalk Guy
	Inductive Loop Detector
	Controller & Cabinet
	Junction Box
	2-in Underground Conduit
	Right of Way
	Directional Arrow
	Type II Signal Pedestal
	Curb Ramp
	Railroad Tracks
	Railroad Gate and Flasher
	Right Arrow "ONLY" Sign (R3-5R)
	"NO TURN ON RED" Sign (R10-11a)
	"DO NOT STOP ON TRACKS" Sign (R8-8)

Signal Upgrade - Sheet 1 of 2



US 401-NC 42-55 (N Main Street) at NC 55 (N Ennis Street)		
Division 5	Wake County	Fuquay-Varina
PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion	
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
STATE OF NORTH CAROLINA
PROFESSIONAL ENGINEER
PL ALEXANDER
044476

4/14/2023
DATE
SIG. INVENTORY NO. 05-0165

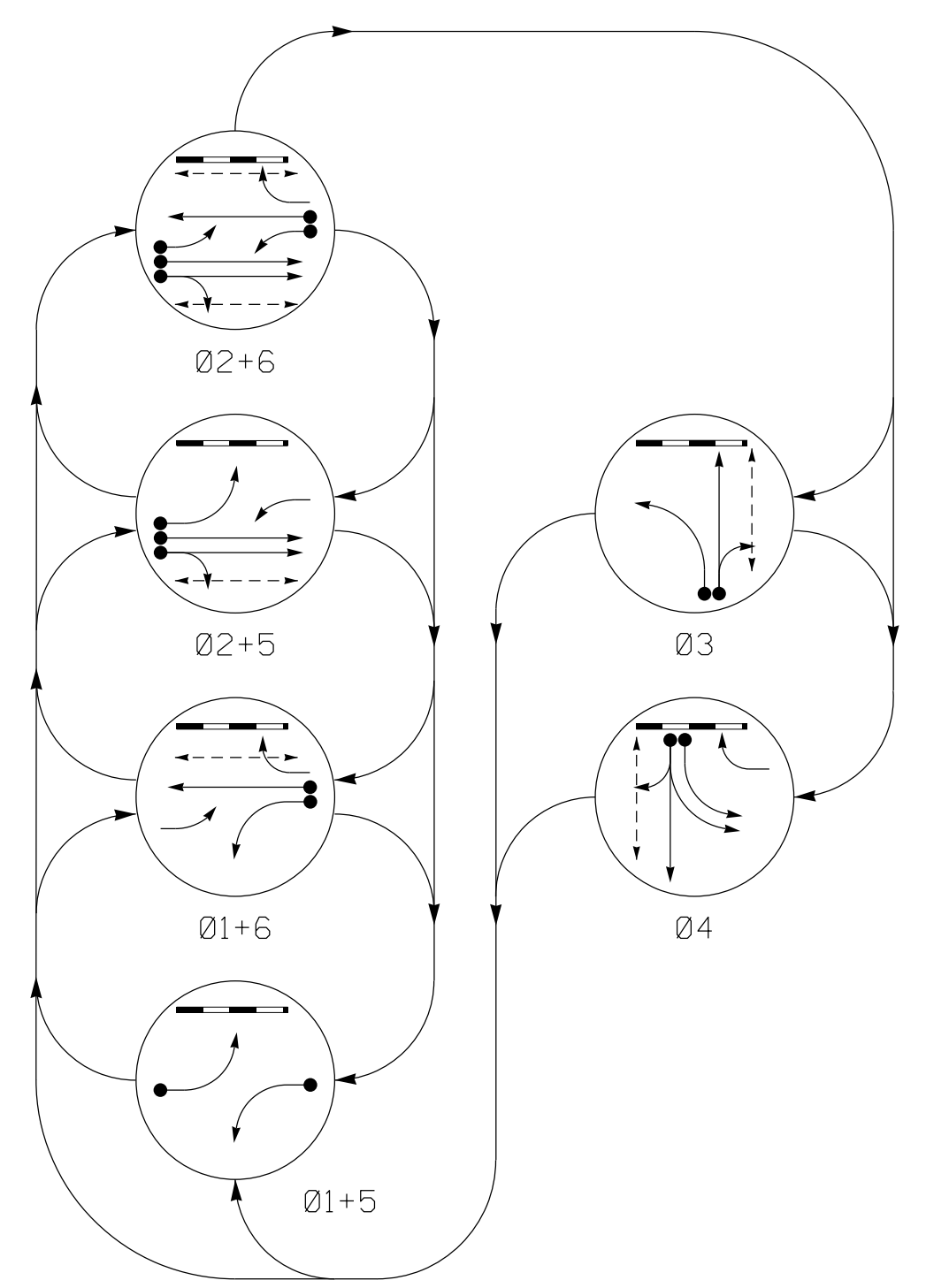
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S:\P4685 AT LUS4F1089

**6 Phase
Fully Actuated
w/ Railroad Preemption
(Fuquay-Varina Signal System)**

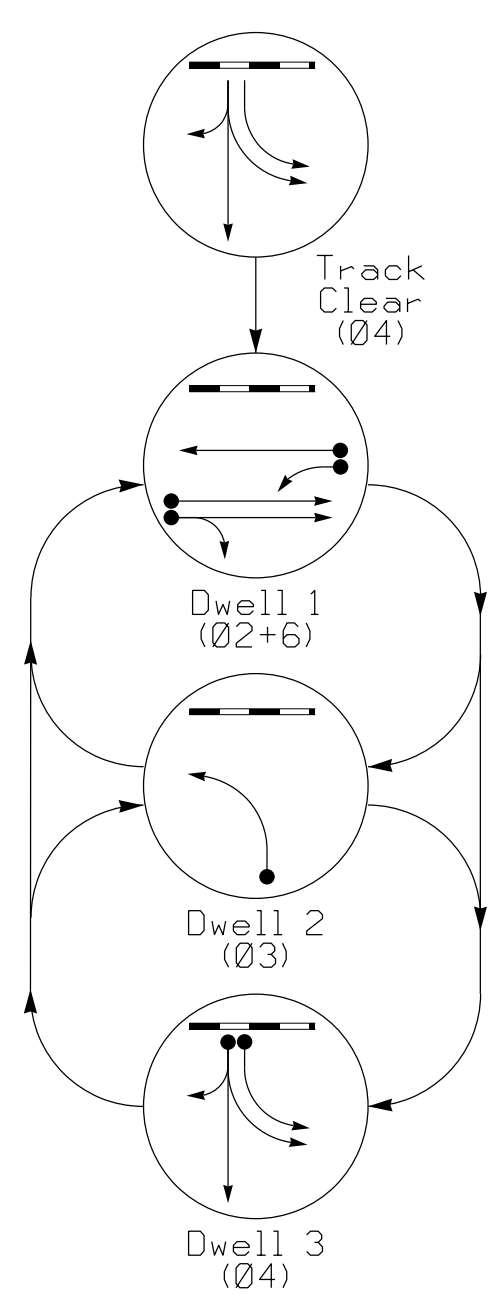
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal head numbered 42.
6. Renumber existing signal heads 41 and 42 as 42 and 43, respectively.
7. Set all detector units to presence mode.
8. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
9. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
10. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
12. Pavement markings are existing.
13. The Division Traffic Engineer will determine the hours of use for each phasing plan.
14. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
15. Remove Left Arrow "ONLY" Sign (R3-5L) and Dual Turn and Through Arrows Sign
16. To provide a leading pedestrian interval on phase 6, program FYA heads 51 and 63 to delay for 3 seconds after the start of the phase 6 walk interval. See electrical details.

DEFAULT PHASING DIAGRAM



DEFAULT RAIL PREEMPT PHASES
(High Priority)



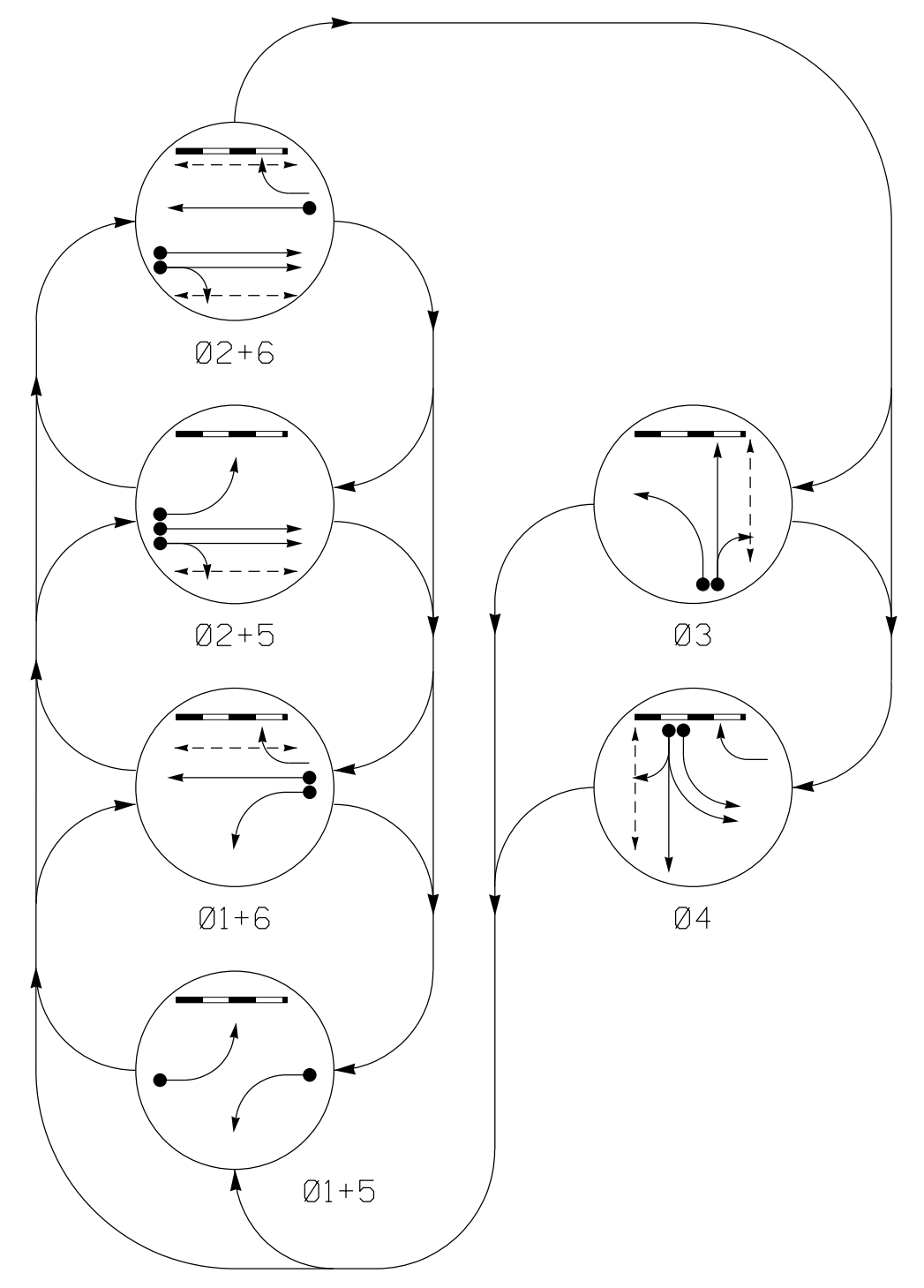
DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE										
	01+5	01+6	02+5	02+6	03	04	TRAIL	DWELL	DWELL	DWELL	FLASH
11	←	←	←	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	R	R	G	R	R
31	←	←	←	←	←	←	←	←	←	←	←
32, 33	R	R	R	R	G	R	R	R	R	R	R
41	←	←	←	←	←	←	←	←	←	←	←
42	R	R	R	R	G	G	R	R	G	R	R
43	R	R	R	R	G	G	R	R	G	R	R
51	←	←	←	←	←	←	←	←	←	←	←
61, 62	R	G	R	G	R	R	R	G	R	R	Y
63	R	←	←	←	←	←	←	←	←	←	←
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DRK
P31, P32	DW	DW	DW	DW	W	DW	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	W	DW	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	DRK

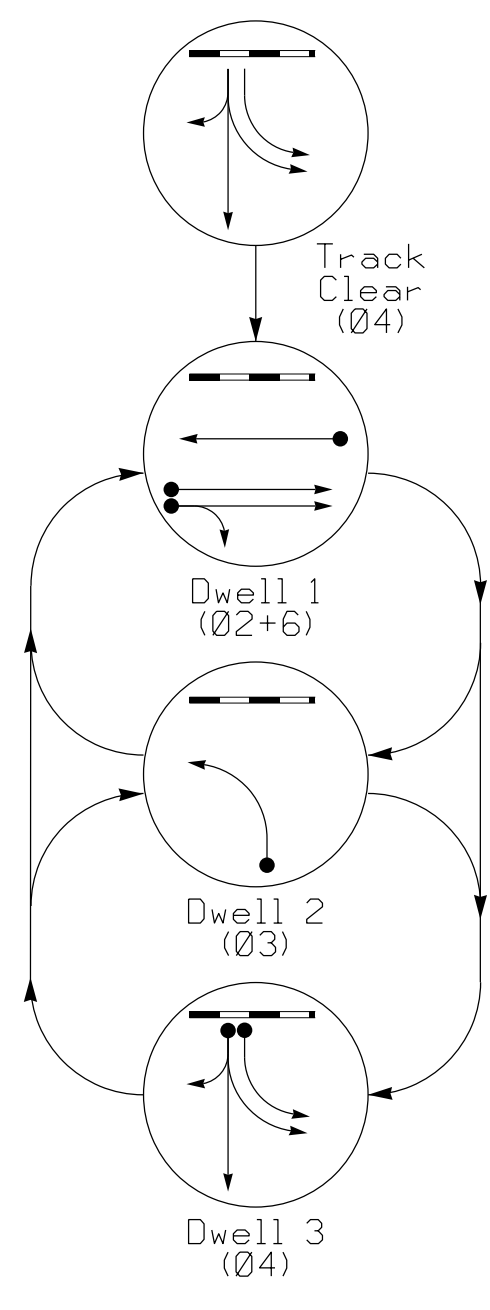
PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING DIAGRAM



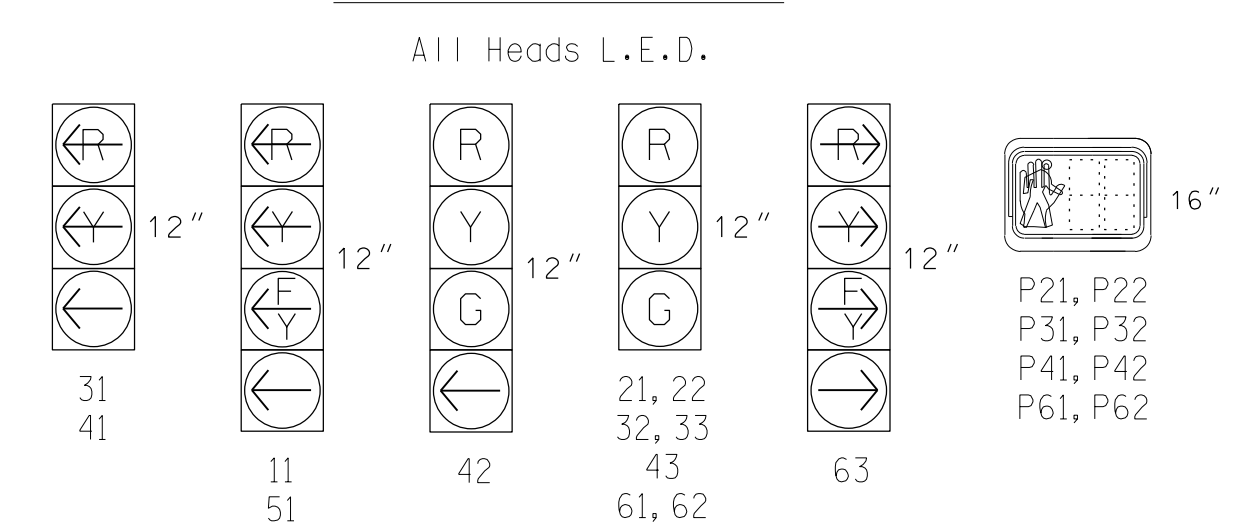
ALTERNATE RAIL PREEMPT PHASES
(High Priority)



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE										
	01+5	01+6	02+5	02+6	03	04	TRAIL	DWELL	DWELL	DWELL	FLASH
11	←	←	←	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	R	R	G	R	R
31	←	←	←	←	←	←	←	←	←	←	←
32, 33	R	R	R	R	G	R	R	R	R	R	R
41	←	←	←	←	←	←	←	←	←	←	←
42	R	R	R	R	G	G	R	R	G	R	R
43	R	R	R	R	G	G	R	R	G	R	R
51	←	←	←	←	←	←	←	←	←	←	←
61, 62	R	G	R	G	R	R	R	G	R	R	Y
63	R	←	←	←	←	←	←	←	←	←	←
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DRK
P31, P32	DW	DW	DW	DW	W	DW	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	W	DW	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	DRK

SIGNAL FACE I.D.



13-APR-2023 12:17 PM:Z:\SUS036333_mskk\res-com\ATMAN\01\Documents\Roads and Br\ldgs\Prj\0063268_Fuquay Var\tr\Task_05-11_Signals\050165_sig_dsn_2022mdd.dgn STP1485 AT LUS41089

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Signal Upgrade - Sheet 2 of 2

	Prepared for the Offices of: US 401-NC 42-55 (N Main Street) at NC 55 (N Ennis Street)		
	Division 5 Wake County Fuquay-Varina PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion PREPARED BY: JT Stiff REVIEWED BY: PL Alexander	REVISIONS INIT. DATE _____ _____	

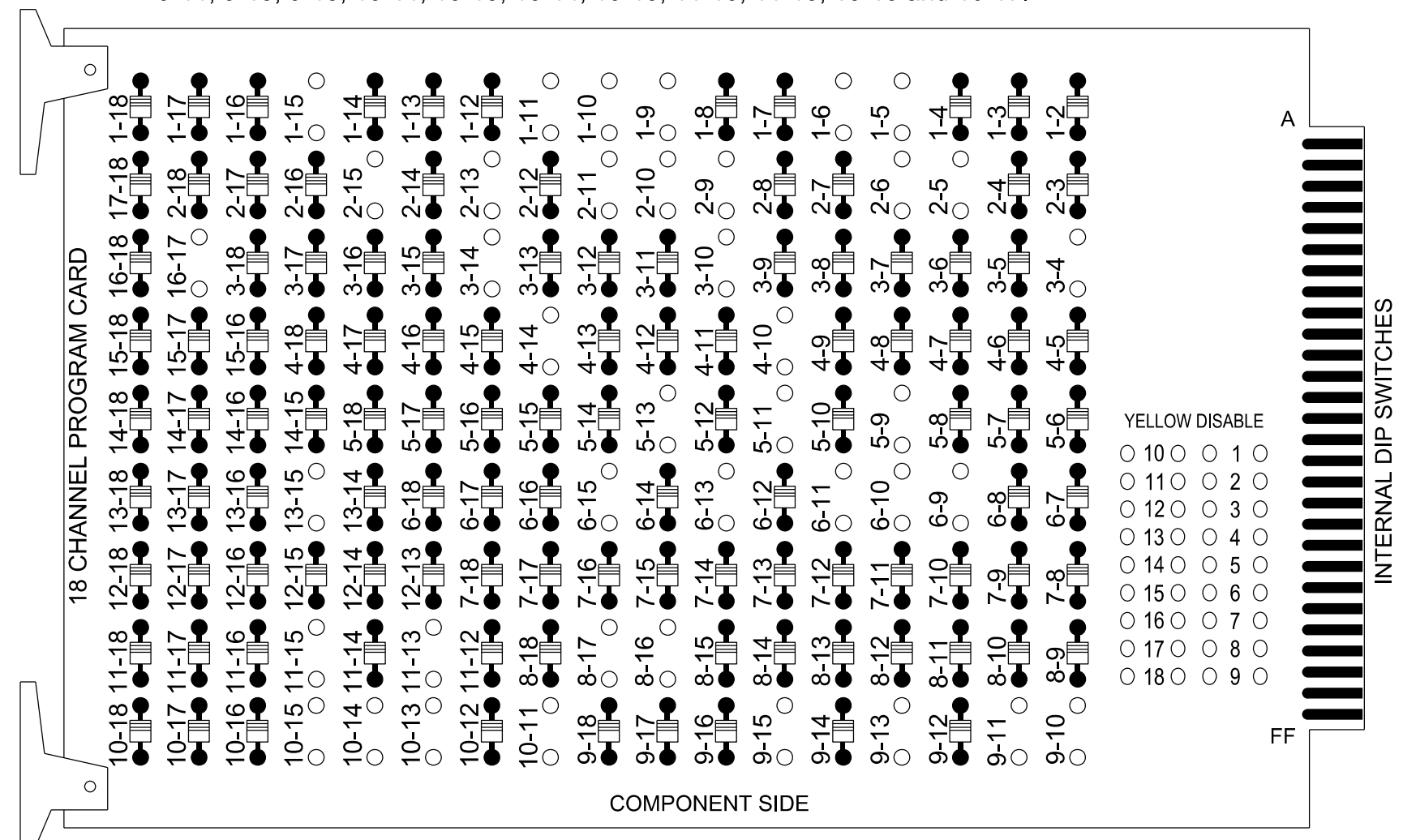
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 05-0165

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

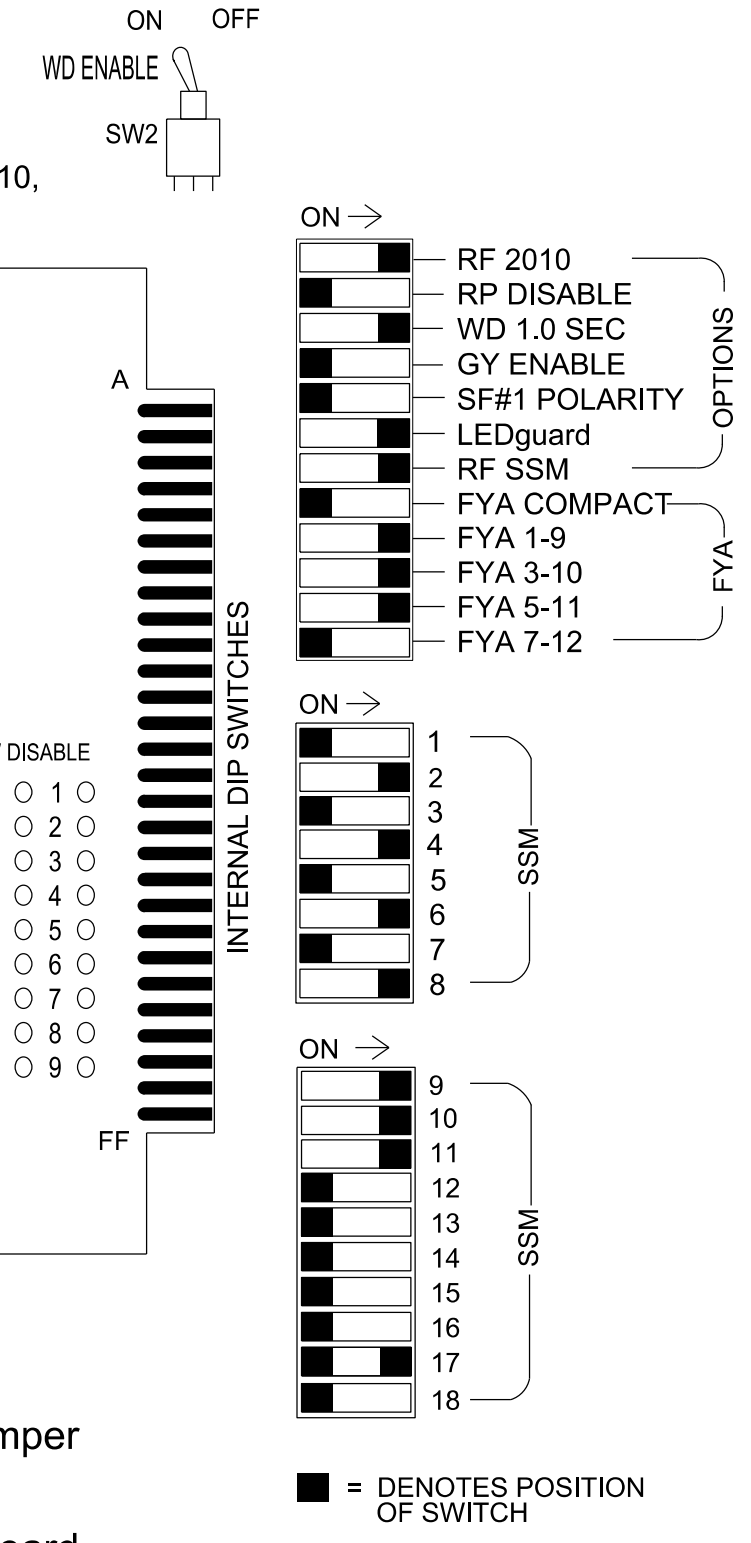
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-10, 1-11, 1-15, 2-5, 2-6, 2-9, 2-10, 2-11, 2-13, 2-15, 3-4, 3-10, 3-14, 4-10, 4-14, 5-9, 5-11, 5-13, 6-9, 6-10, 6-11, 6-13, 6-15, 8-16, 8-17, 9-10, 9-11, 9-13, 9-15, 10-11, 10-13, 10-14, 10-15, 11-13, 11-15, 13-15 and 16-17.



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 the Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.



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 plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 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 S3, AUX S4
 Phases Used.....1, 2, 2PED, 3, 3PED, 4, 4PED, 5, 6, 6PED
 Overlap "1".....*
 Overlap "2".....*
 Overlap "3".....*
 Overlap "4".....NOT USED
 Overlap "5".....*
 Overlap "7".....*
 Overlap "8".....*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6		
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18		
PHASE	1	2	2 PED	OL7	4	4 PED	5	6	6 PED	7	OL8	3 PED	OL1	OL2	OL5	OL3	OL4	SPARE		
SIGNAL HEAD NO.	11*	21,22	P21, P22	63*	41	42	43	P41, P42	51*	61,62	P61, P62	NU	31	P31, P32	11*	63*	32,33	51*	NU	NU
RED		128			101	101			134									A111		
YELLOW	*	129		*	102	102		*	135									A112		
GREEN		130			103	103			136									A113		
RED ARROW					101								107		A121	A124		A114		
YELLOW ARROW					102								108		A122	A125		A115		
FLASHING YELLOW ARROW															A123	A126		A116		
GREEN ARROW	127			118	103	103			133			109								
Hand				113				104			119		110							
Walking				115				106			121		112							

NU = Not Used

- * Denotes install load resistor. See load resistor installation detail this sheet.
- * See pictorial of head wiring in detail this sheet.

Note: Outputs for load switch S4 and load switch S11 have been remapped. See sheet 2 for programming details.

INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	∅ 1 1A	∅ 2 2A,2B	∅ 3 3A	∅ 3 3B	∅ 4 4A	∅ 4 4B	SYS. DET. S1	SYS. DET. S2	∅ 2 PED DC ISOLATOR	∅ 6 PED DC ISOLATOR	FS DC ISOLATOR	∅ 4 PED DC ISOLATOR	∅ 3 PED DC ISOLATOR	ST DC ISOLATOR
	NOT USED	NOT USED	NOT USED	NOT USED	∅ 4									
"J"	∅ 5 5A	∅ 6 6A	SYS. DET. S3	NOT USED	PRE1 AC ISOLATOR	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

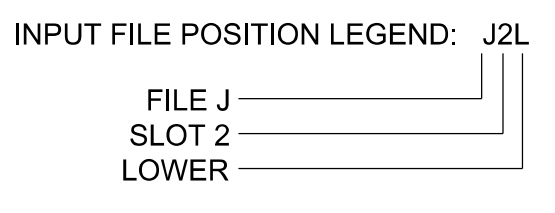
FS = FLASH SENSE
 ST = STOP TIME
 PRE = PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
2A, 2B	TB2-5,6	I2U	39	1	2	2			X		X	
3A	TB4-5,6	I6U	58	20	7	3	3		X		X	
3B	TB4-9,10	I6U	41	3	8	3	10		X		X	
4A	TB6-1,2	I7U	65	31	10	4	3		X		X	
4B	TB6-3,4	I7L	78	44	11	4	5		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
*S1	TB6-9,10	I9U	60	22	13	SYS						
*S2	TB6-11,12	I9L	62	24	14	SYS						
*S3	TB7-9,10	J9U	59	21	27	SYS						
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P31,P32	TB8-8,9	I13L	70	36	8	PED 3						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

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

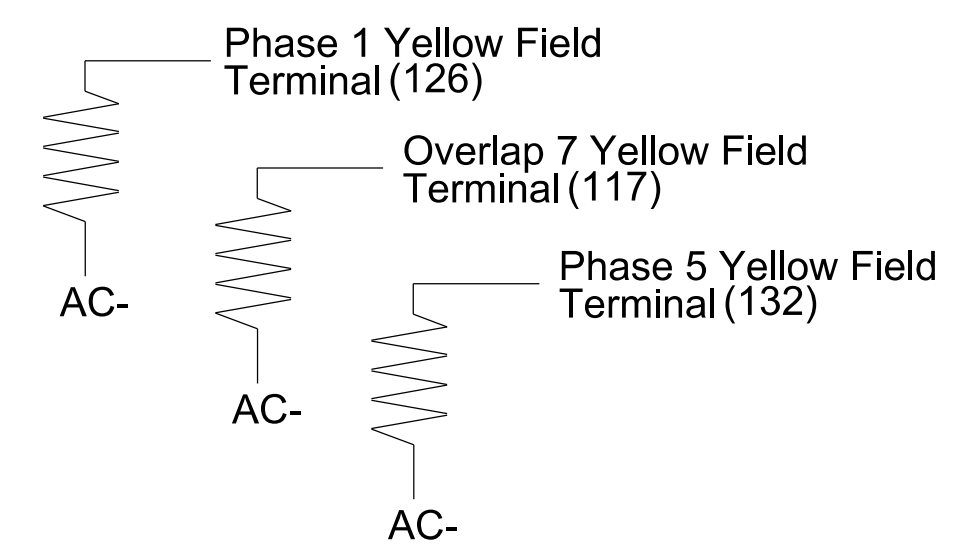
- *System detector only. Remove any assigned vehicle phase.
- * For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.



LOAD RESISTOR INSTALLATION DETAIL

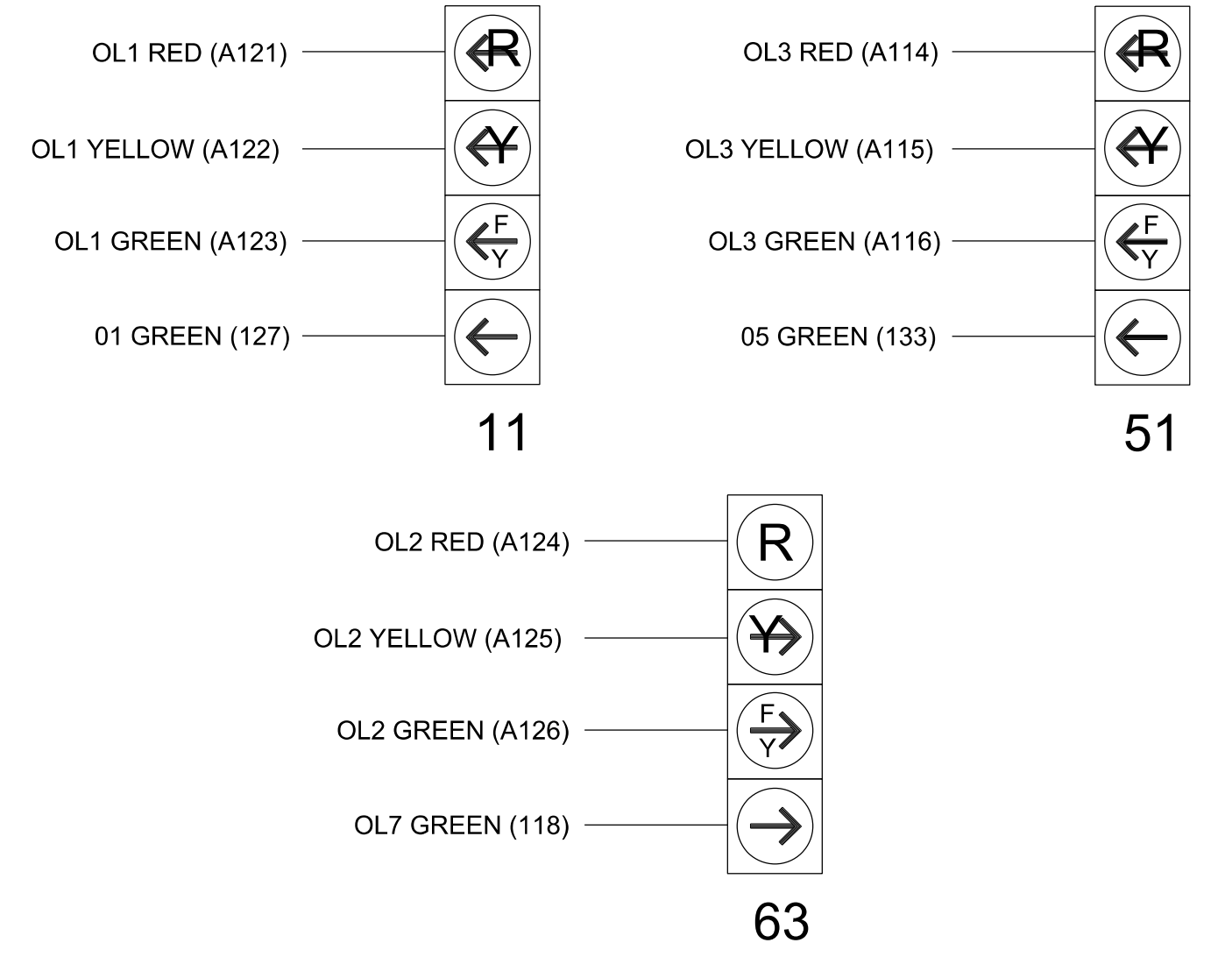
(install resistors as shown)

ACCEPTABLE VALUES	Value (ohms)	Wattage
1	1.5K - 1.9K	25W (min)
2	2.0K - 3.0K	10W (min)



FYA SIGNAL WIRING DETAIL

(wire signal heads 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.

Electrical Detail - Sheet 1 of 3

Electrical and Programming Details For: Prepared for the Offices of: 	US 401-NC 42-55 (N Main Street) at NC 55 (N Ennis Street)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County Fuquay-Varina REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBEES #F-0326

750 N. Greenfield Pkwy, Garner, NC 27529

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4	5	7	8
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	-	Normal	Normal	Normal
Included Phases	2	6	6	-	3	4	3
Modifier Phases	1	-	5	-	-	-	-
Modifier Overlaps	-	7	-	-	-	-	-
Trail Green	0	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	3.0	3.0	0.0	0.0	0.0	0.0

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

Detector	Call Phase	Delay
1	1	3
29	0	-

1A

Detector	Call Phase	Delay
15	5	3
31	0	-

5A

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4	5	7	8
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	-	Normal	Normal	Normal
Included Phases	2	6	-	-	3	4	3
Modifier Phases	1	-	5	-	-	-	-
Modifier Overlaps	-	7	-	-	-	-	-
Trail Green	0	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	3.0	3.0	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2. A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

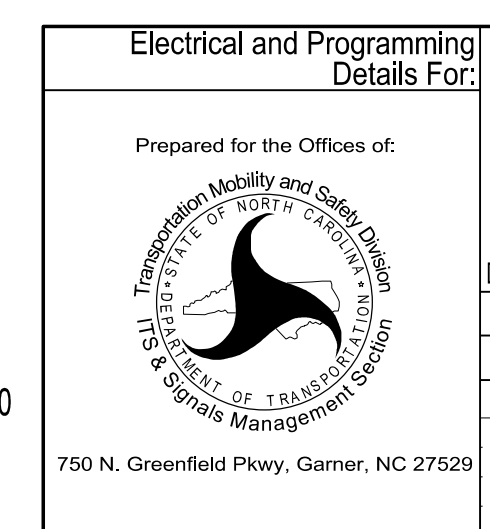
Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0165
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 3



**US 401-NC 42-55 (N Main Street)
at
NC 55 (N Ennis Street)**

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Designed by: Anthony Encarnacion 4/14/2023
Signature: _____ DATE: _____
SIG. INVENTORY NO. 05-0165

PREEMPTION PROGRAMMING

Front Panel
Main Menu > Controller > Preemption > Preempt Phasing/Preempt Parameters

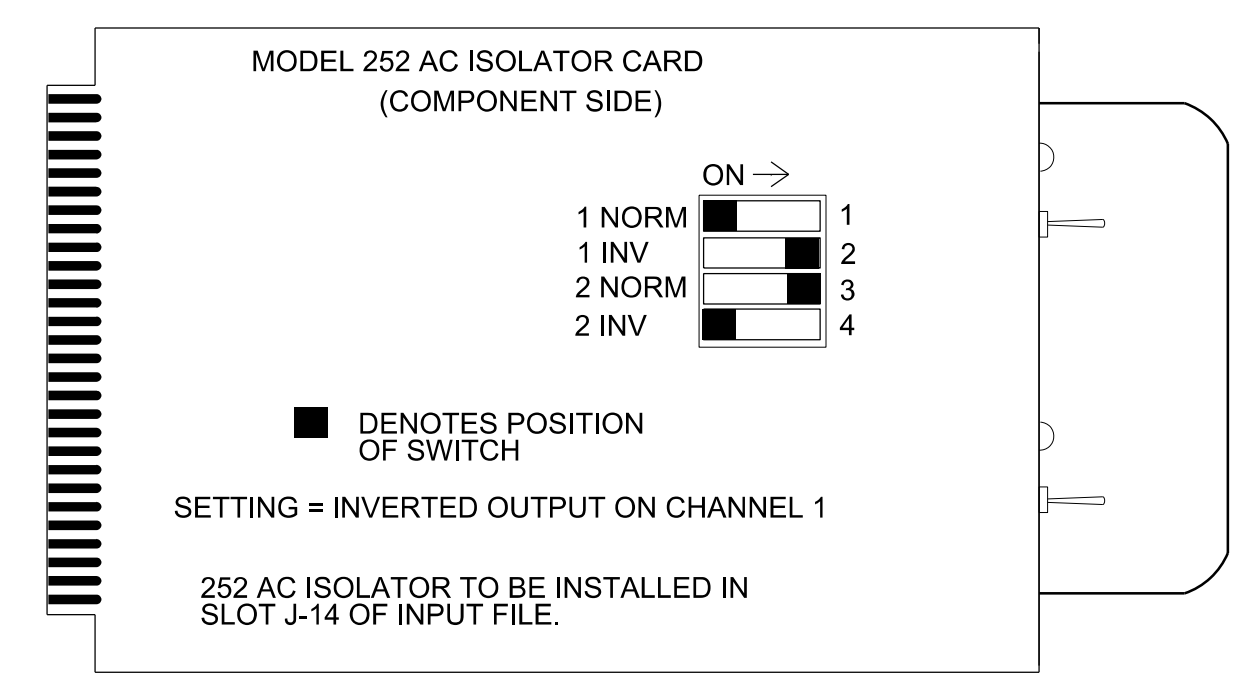
Web Interface
Home > Controller > Preempt Configuration > Preempts

Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	4
Track Overlaps	-
Dwell Phases	-
Dwell Overlaps	-
Cycling Phases	2,3,4,6
Cycling Overlaps	1,8
Exit Phases	4
Exit Overlaps	-
Delay	0
Max Presence	0
Max Pres Act	Terminate
Enter Min Green	1
Enter Walk	1
Enter Ped Clear	4
Enter Yellow Change	3.9
Enter Red Clear	2.9
Track Green	33
Track Yellow Clr	3.3
Track Red Clear	2.9
Dwell Green	0
Exit Min Green	255
Exit Yellow Change	25.5
Exit Red Clear	25.5
Dwell Ext Time	1.0
Exit Type	Exit Phases
Not Ovrd Flash	X
Not Ovrd Nxt Pre	-
Track Clear Ovrd	X
Ped Clear During Yellow	X

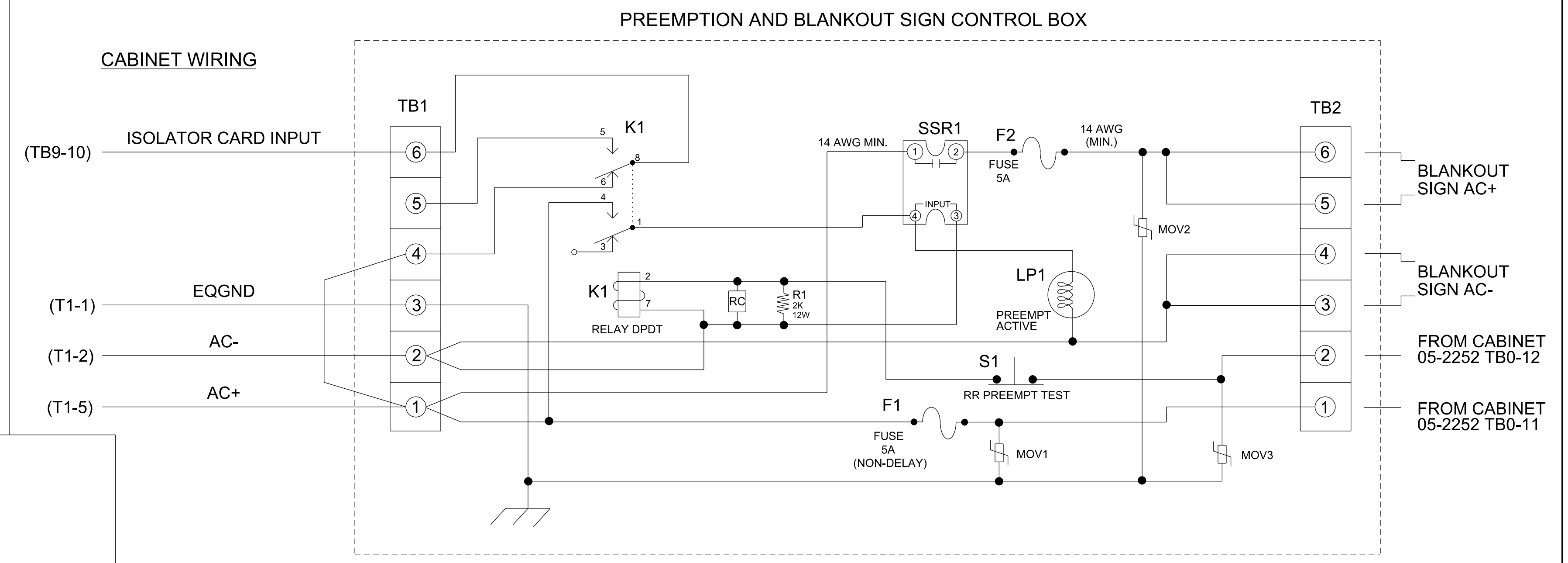
PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



RAILROAD PREEMPTION WIRING DETAIL

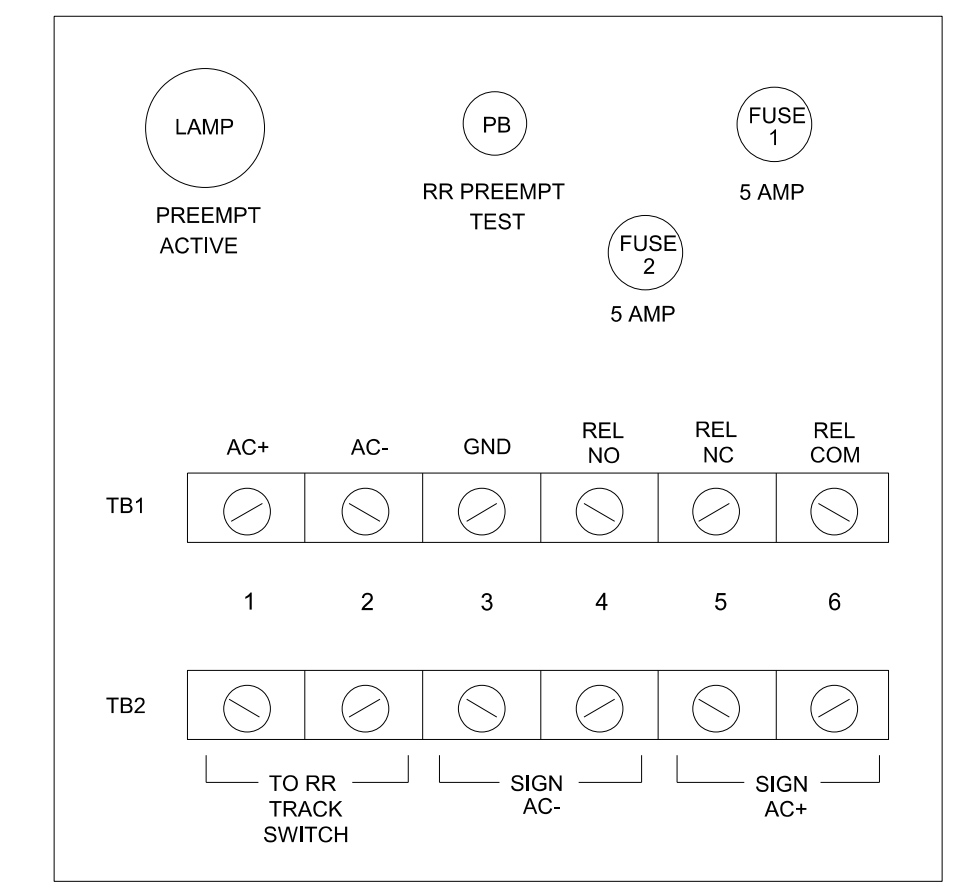
(wire as shown below)



NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT with 120VAC coil with octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
- IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW



CHANNEL CONFIGURATION

Front Panel
Main Menu > Controller > More > Channels > Channels Config

Web Interface
Home > Controller > Advanced IO > Channels > Channels Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2	X			2
3	Overlap	7		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6	X		X	6
7	Phase Vehicle	7		X		7
8	Overlap	8		X	X	8
9	Overlap	1	X		X	9
10	Overlap	2	X		X	10
11	Overlap	3	X			11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	3				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

NOTICE OVERLAP 7 ASSIGNED TO CHANNEL 3 →

NOTICE OVERLAP 8 ASSIGNED TO CHANNEL 8 →

NOTICE PHASE 3 PED ASSIGNED TO CHANNEL 16 →

NOTICE PHASE 3 PED ASSIGNED TO DETECTOR 8 PED →

PED 3 PROGRAMMING DETAIL

Front Panel
Main Menu > Controller > Detector > Ped Det Plans

Web Interface
Home > Controller > Detector Configuration > Pedestrian Detector

Plan 1

Detector	Description	Call Phase	Call Overlap
2		2	0
4		4	0
6		6	0
8		3	0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0165
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

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.

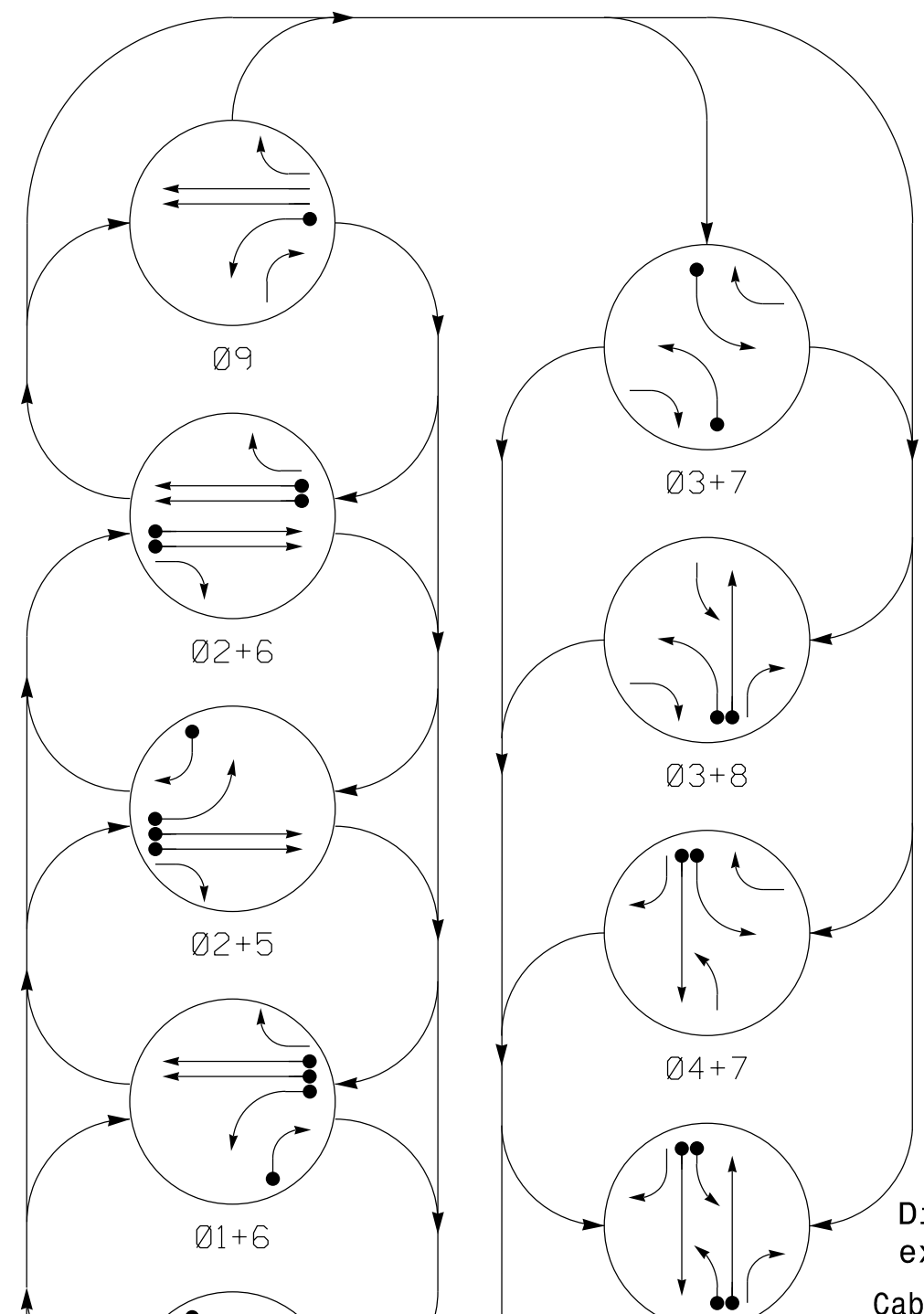
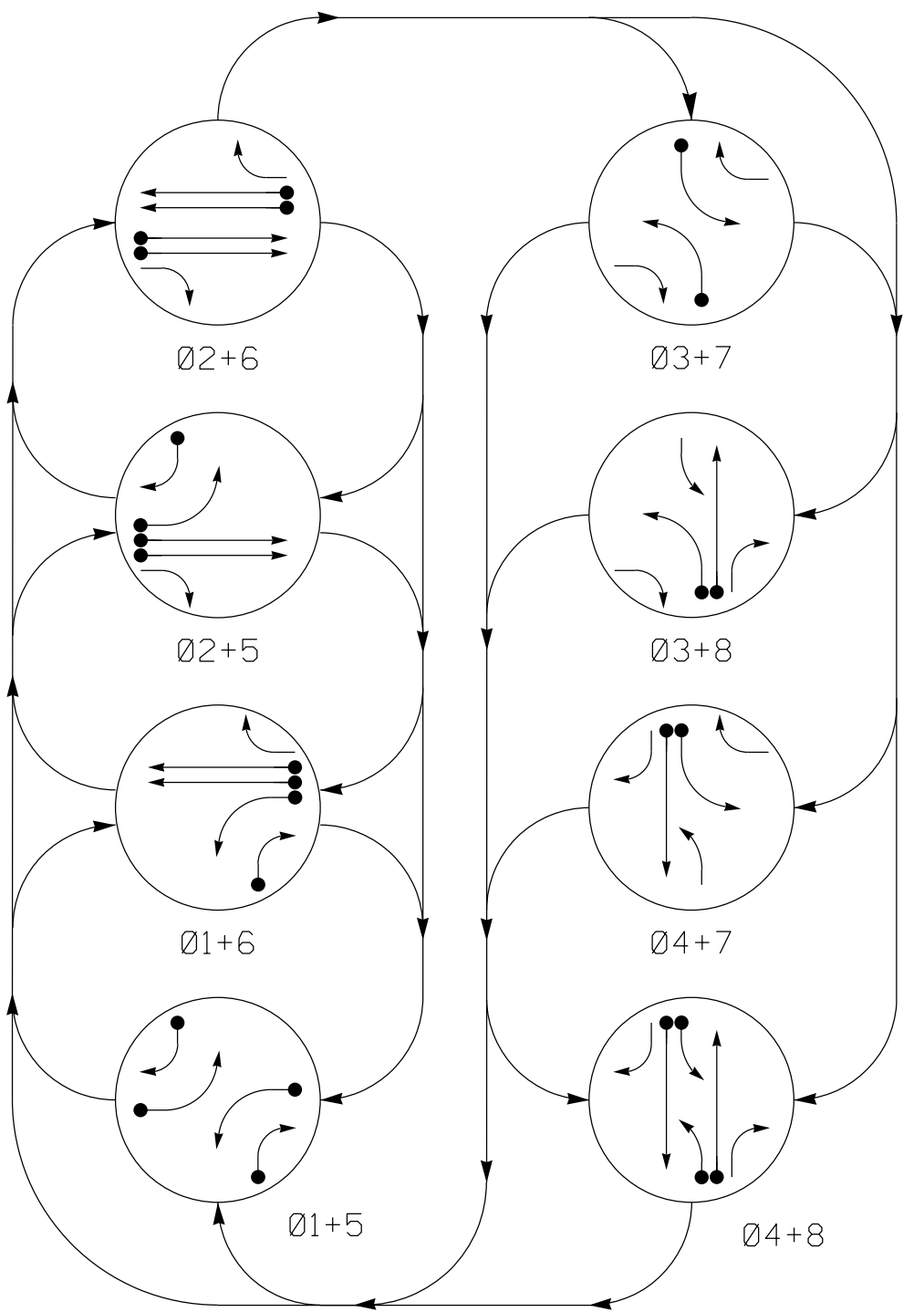
Electrical Detail - Sheet 3 of 3

Electrical and Programming Details For: Prepared for the Offices of: 	US 401-NC 42-55 (N Main Street) at NC 55 (N Ennis Street)		SEAL
	Division 5 Wake County Fuquay-Varina PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion PREPARED BY: JT Stiff REVIEWED BY: PL Alexander	REVISIONS INT. DATE	
750 N. Greenfield Pkwy, Garner, NC 27529			AUTHORIZED SIGNATURE: Anthony Encarnacion DATE: 4/14/2023 SIG. INVENTORY NO. 05-0165

13-APR-2023 12:18
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 S:\14685 - AT 050165

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- ◄● DETECTED MOVEMENT
- ◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄ UN SIGNALIZED MOVEMENT
- ◄ PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

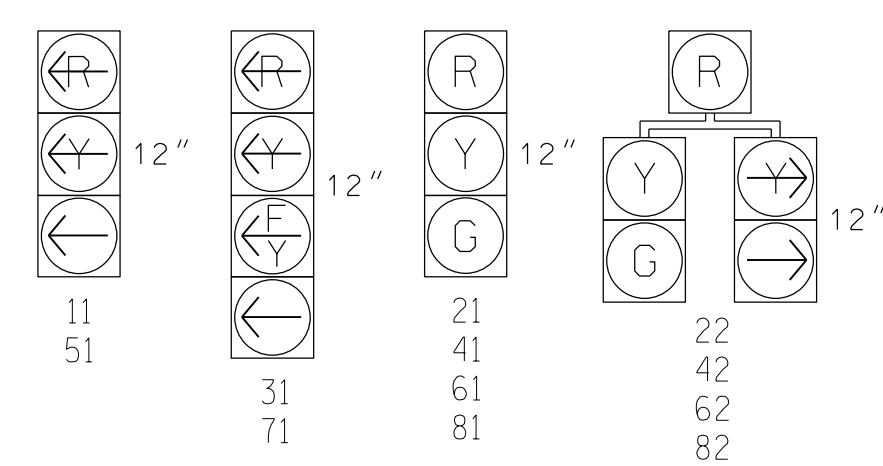
SIGNAL FACE	PHASE								FLASH
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	
11	←	←	←	←	←	←	←	←	
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
31	←	←	←	←	←	←	←	←	
41	R	R	R	R	R	R	G	G	R
42	R	R	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←	←	
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R	R	R	R	Y
71	←	←	←	←	←	←	←	←	
81	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE								FLASH
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	
11	←	←	←	←	←	←	←	←	
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
31	←	←	←	←	←	←	←	←	
41	R	R	R	R	R	R	G	G	R
42	R	R	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←	←	
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R	R	R	R	Y
71	←	←	←	←	←	←	←	←	
81	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



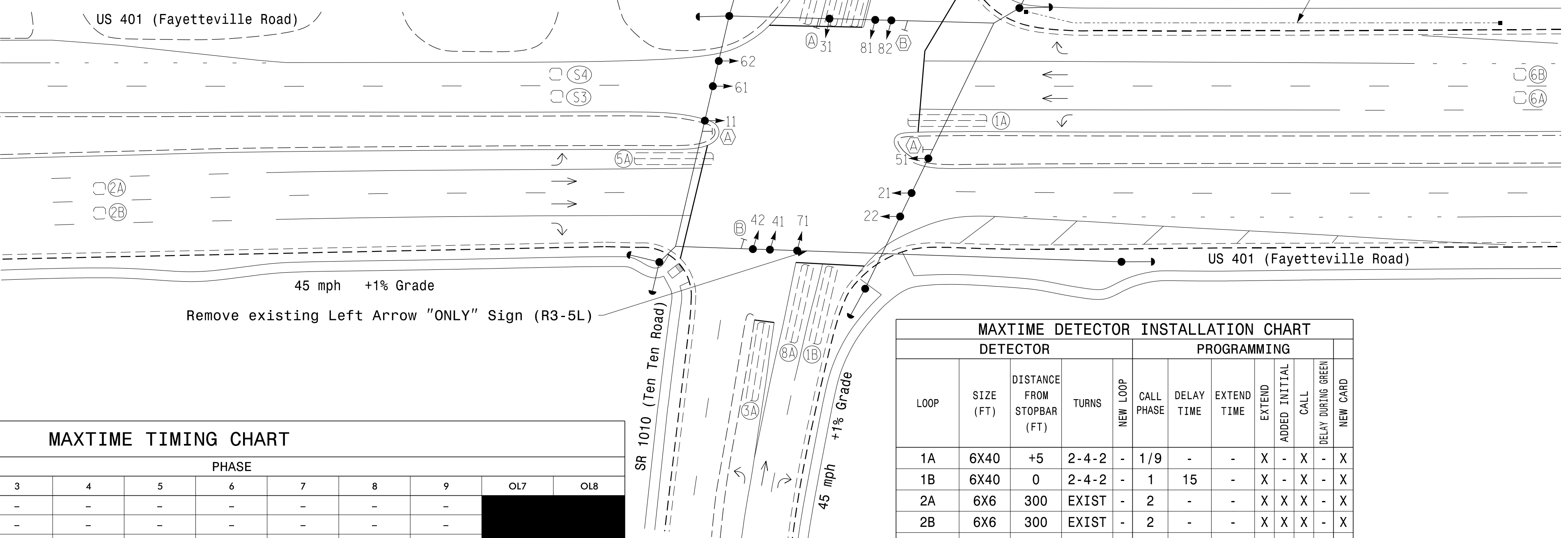
8 Phase Fully Actuated (Fuquay-Varina Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red. Obtain approval for location of new cabinet from Engineer prior to installation.
7. Pavement markings are existing.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Remove existing Left Arrow "ONLY" Sign (R3-5L).
11. Disconnect and abandon existing loop 7A.
12. Renumber existing loops 4A and 4B as 7A and 4A, respectively.

LEGEND

- | PROPOSED | EXISTING |
|--|----------|
| ○ Traffic Signal Head | ● N/A |
| ◐ Modified Signal Head Sign | ◐ N/A |
| ◑ Pedestrian Signal Head | ◑ N/A |
| ◒ Signal Pole with Guy | ◒ N/A |
| ◓ Signal Pole with Sidewalk Guy | ◓ N/A |
| ◔ Inductive Loop Detector Controller & Cabinet | ◔ N/A |
| ◕ Junction Box | ◕ N/A |
| ◖ 2-in Underground Conduit | ◖ N/A |
| ◗ Right of Way | ◗ N/A |
| ◘ Directional Arrow | ◘ N/A |
| ◙ Curb Ramp | ◙ N/A |
| ◚ "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) | ◚ N/A |
| ◛ Right Arrow "ONLY" Sign (R3-5R) | ◛ N/A |



MAXTIME TIMING CHART

FEATURE	PHASE									OL7	OL8
	1	2	3	4	5	6	7	8	9		
Walk *	-	-	-	-	-	-	-	-	-		
Ped Clear *	-	-	-	-	-	-	-	-	-		
Min Green	7	12	7	7	7	12	7	7	7		
Passage *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0	2.0		
Max I *	25	90	15	45	25	90	15	45	25		
Yellow Change	3.0	4.4	3.0	4.5	3.0	4.3	3.0	4.5	3.0	3.0	4.3
Red Clear	3.4	1.4	3.4	2.0	3.4	1.3	2.6	2.0	0.0	3.4	1.3
Added Initial *	-	1.5	-	-	-	1.5	-	-	-		
Maximum Initial *	-	34	-	-	-	34	-	-	-		
Time Before Reduction *	-	15	-	-	-	15	-	-	-		
Time To Reduce *	-	30	-	-	-	30	-	-	-		
Minimum Gap	-	3.0	-	-	-	3.0	-	-	-		
Advance Walk	-	-	-	-	-	-	-	-	-		
Non Lock Detector	X	-	X	X	X	-	X	X	X		
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL	-	-	-		
Dual Entry	-	-	-	X	-	-	-	X	-		

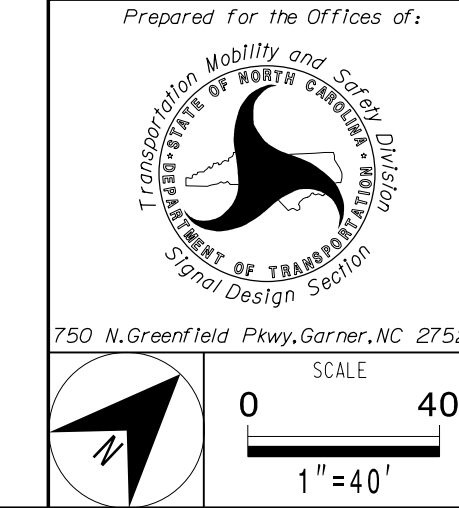
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING						
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DELAY DURING GREEN	NEW CARD	
1A	6X40	+5	2-4-2	-	1/9	-	-	X	X	X	
1B	6X40	0	2-4-2	-	1	15	-	X	X	X	
2A	6X6	300	EXIST	-	2	-	-	X	X	X	
2B	6X6	300	EXIST	-	2	-	-	X	X	X	
3A	6X40	0	2-4-2	-	3	15	-	X	X	X	
3B	6X40	0	2-4-2	-	8	-	-	X	X	X	
4A	6X40	0	2-4-2	-	4	-	-	X	X	X	
5A	6X40	+5	2-4-2	-	5	-	-	X	X	X	
5B	6X40	0	2-4-2	-	5	15	-	X	X	X	
6A	6X6	300	EXIST	-	6	-	-	X	X	X	
6B	6X6	300	EXIST	-	6	-	-	X	X	X	
7A	6X40	0	2-4-2	-	7	15	-	X	X	X	
7B	6X40	0	2-4-2	-	4	3	-	X	X	X	
8A	6X40	0	2-4-2	-	8	-	-	X	X	X	
S3	6X6	+185	EXIST	-	-	-	-	-	-	-	X
S4	6X6	+185	EXIST	-	-	-	-	-	-	-	X

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

Signal Upgrade



US 401 (Fayetteville Road) at SR 1010 (Ten Ten Road)
 Division 5 Wake County Fuquay-Varina
 PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
 PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA
 PROFESSIONAL ENGINEER
 044476
 AM ENCARNACION

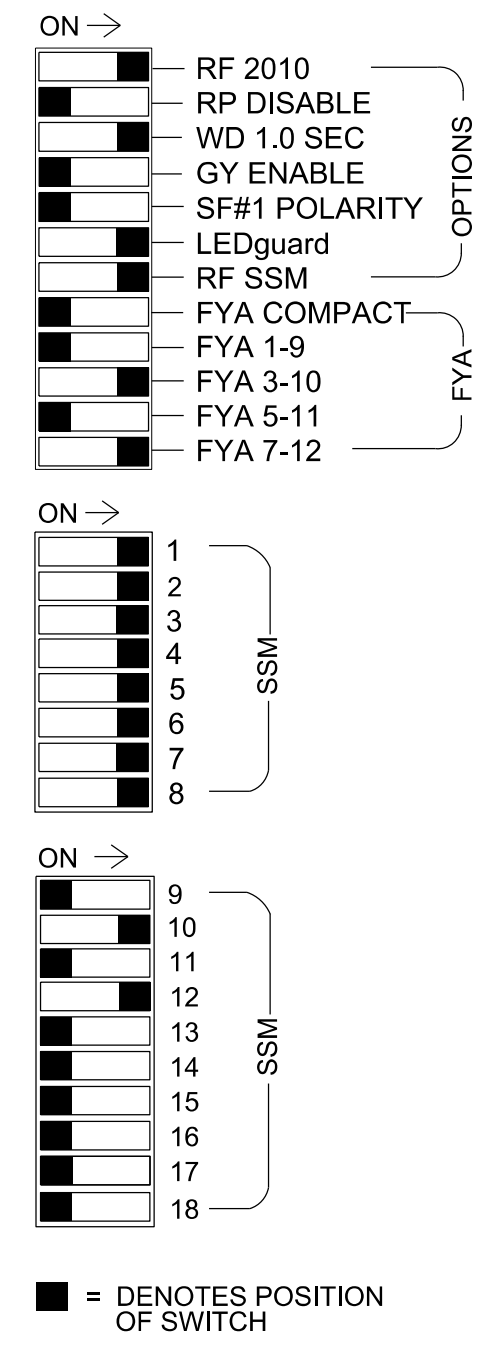
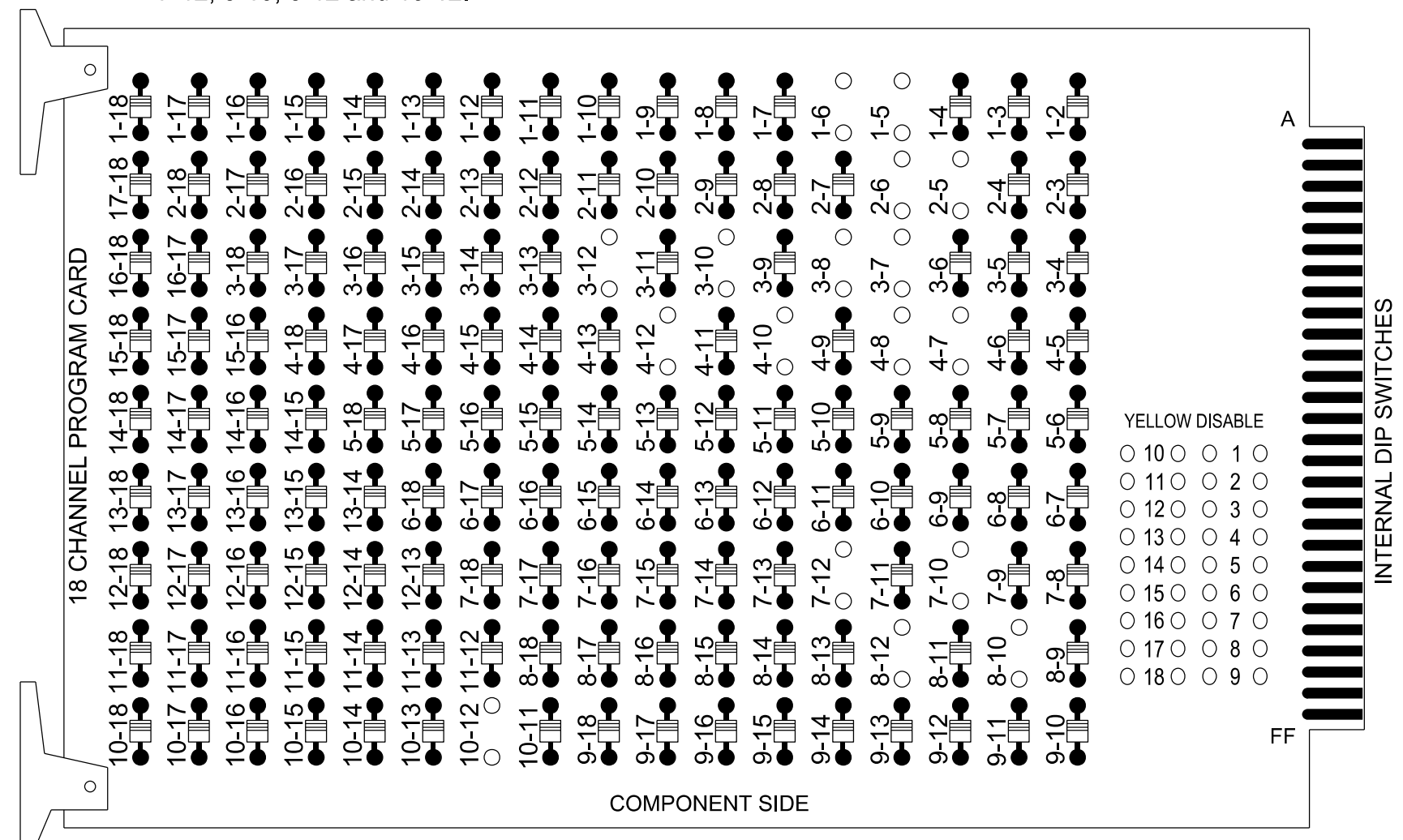
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 SIG. INVENTORY NO. 05-0184

13-APR-2023 12:18 PM: /S:\S03036333_westk\line.com\AT\MANCO1\Documents\Roads and Br\Roads/Projects/100063268_Fuquay Varina/Task_05-11_Signals/050184.stg_csn_2022.mxd.dgn STP14685 AT LUS4FT089

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



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 the Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.

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 plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S4, S5, S7, S8, S10, S11, AUX S2, AUX S5
 Phases Used.....1, 2, 3, 4, 5, 6, 7, 8, 9**
 Overlap "1".....NOT USED
 Overlap "2".....*
 Overlap "3".....NOT USED
 Overlap "4".....*
 Overlap "7".....*
 Overlap "8".....*

*See overlap programming detail on sheet 2
 ** Used for timing purposes only

SIGNAL HEAD HOOK-UP CHART

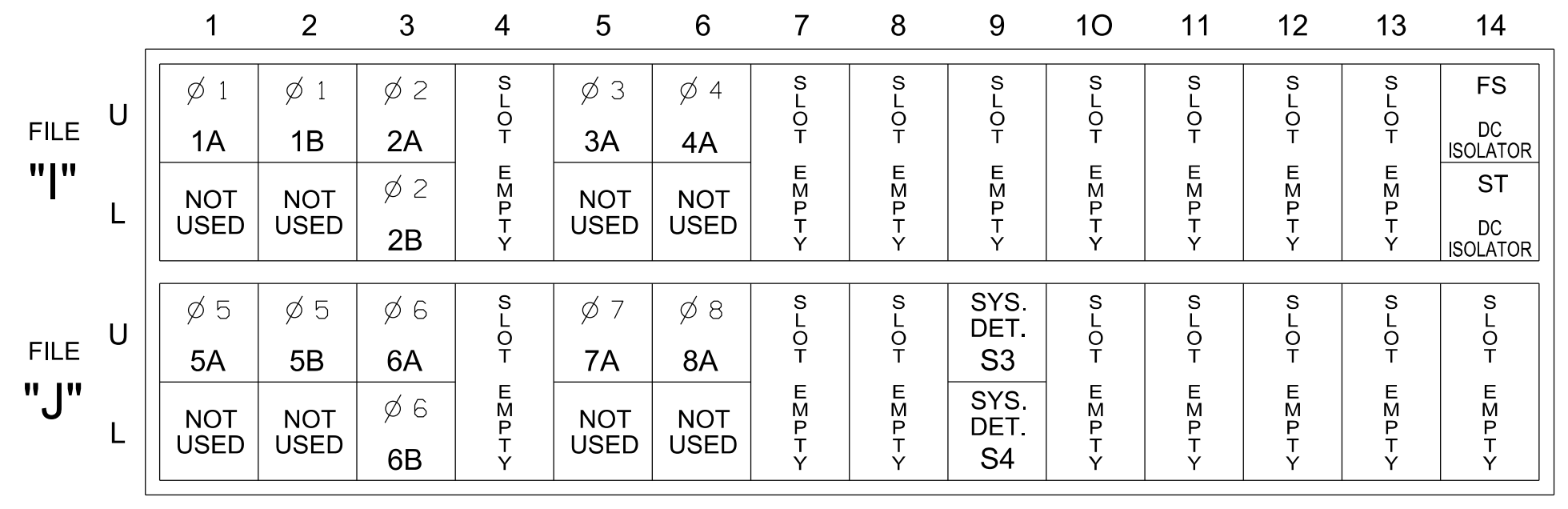
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	OL7	2	2 PED	3	4	4 PED	5	OL8	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE	
SIGNAL HEAD NO.	11	82	21,22	22	31*	41,42	42	51	61,62	62	71*	81,82	NU	NU	31*	NU	NU	71*	NU
RED		128		*	101				134	*	107								
YELLOW		129			102				135		108								
GREEN		130			103				136		109								
RED ARROW	125								131						A124				A101
YELLOW ARROW	126	126			117			132	132		123				A125				A102
FLASHING YELLOW ARROW															A126				A103
GREEN ARROW	127	127			118	118		133	133		124	124							

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.
 *See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

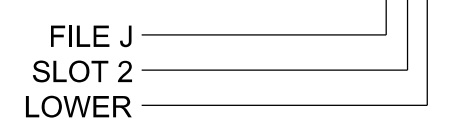
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1/9			X		X	
1B	TB2-5,6	I2U	39	1	2	1	15		X		X	
2A	TB2-9,10	I3U	63	29	4	2			X	X	X	
2B	TB2-11,12	I3L	76	42	5	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7	3	15		X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
5A	TB3-1,2	J1U	55	17	15	5			X		X	
5B	TB3-5,6	J2U	40	2	16	5	15		X		X	
6A	TB3-9,10	J3U	64	30	18	6			X	X	X	
6B	TB3-11,12	J3L	77	43	19	6			X	X	X	
7A	TB5-5,6	J5U	57	19	21	7	15		X		X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
*S3	TB7-9,10	J9U	59	21	27	SYS			X		X	
*S4	TB7-11,12	J9L	61	23	28	SYS			X		X	

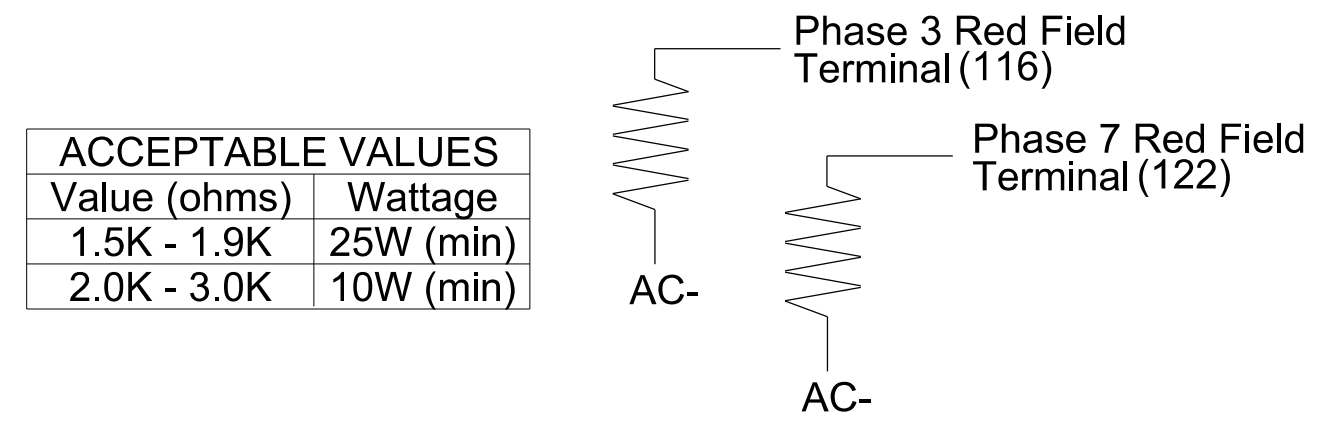
*System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L



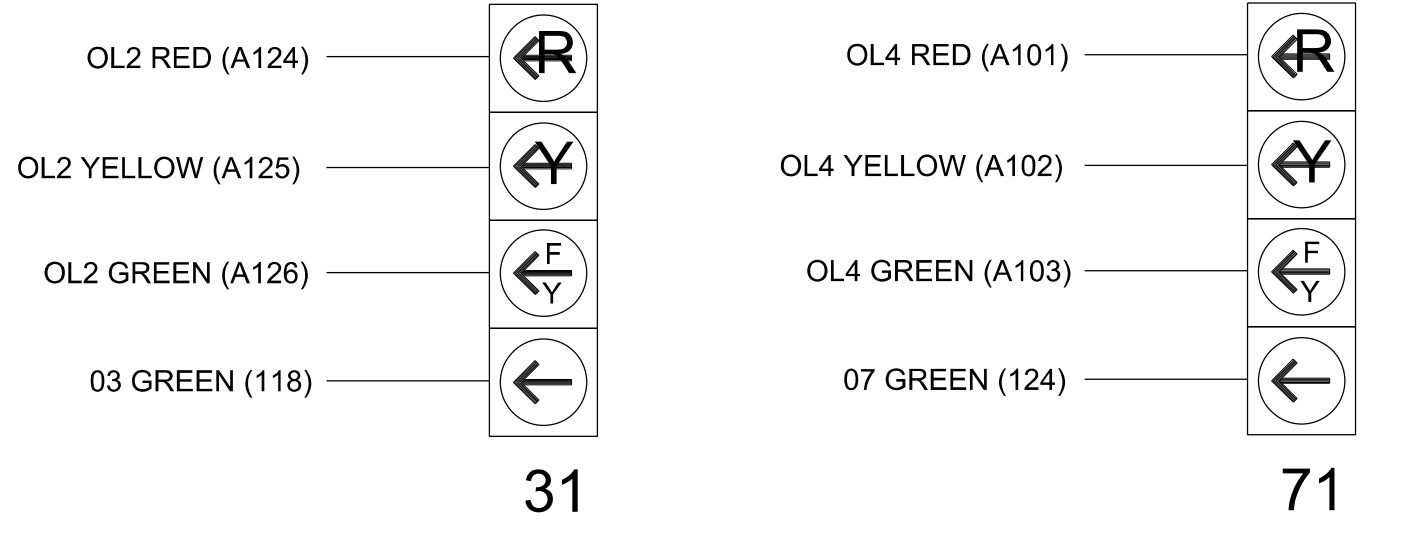
LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0184
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

Prepared for the Offices of:

US 401 (Fayetteville Road) at SR 1010 (Ten Ten Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
 PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

REVISIONS INT. DATE

Seal: SEAL 044476

Signature: Anthony Encarnacion 4/14/2023

SIG. INVENTORY NO. 05-0184

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Sequence Number 2. A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	SEQ NUMBER
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SEQUENCE 2 PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

SEQ NUMBER 2: Adds phase 9 to sequence

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Seq Number
*	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

OVERLAP PROGRAMMING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4	7	8
Type	-	FYA 4 - Section	-	FYA 4 - Section	Normal	Normal
Included Phases	-	4	-	8	1,9	6,9
Modifier Phases	-	3	-	7	-	-
Trail Green	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	3.0	4.3
Trail Red	0.0	0.0	0.0	0.0	3.4	1.3

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Overlap	7		X	X	1
2	Phase Vehicle	2	X			2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Overlap	8	X		X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1	X		X	9
10	Overlap	2		X	X	10
11	Overlap	3	X			11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

NNOTICE OVERLAP 7
ASSIGNED TO CHANNEL 1 →

NOTICE OVERLAP 8
ASSIGNED TO CHANNEL 6 →

SEQUENCE DETAIL

Front Panel
Main Menu >Controller >Sequence & Phs Config>Sequences

Web Interface
Home >Controller >Sequence

Sequence 1

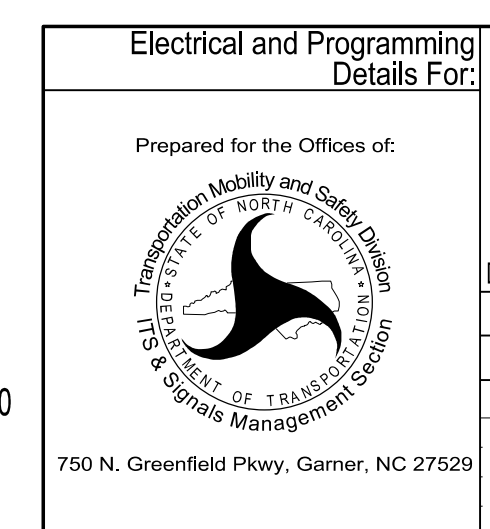
Ring	Sequence Data
1	1,2,a,3,4,b
2	5,6,a,7,8,b

Sequence 2

Ring	Sequence Data
1	1,2,a,9,b,3,4,c
2	5,6,a,b,7,8,c

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0184
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

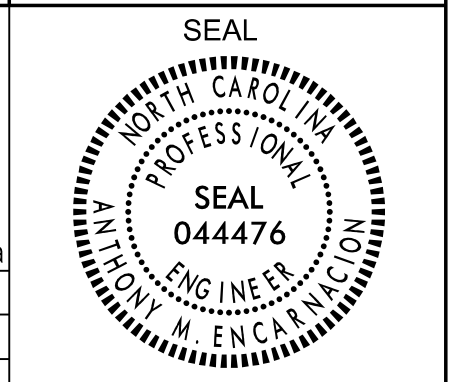
Electrical and Programming Details For:



US 401 (Fayetteville Road)
at
SR 1010 (Ten Ten Road)

Division 5 Wake County Fuquay-Varina
PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

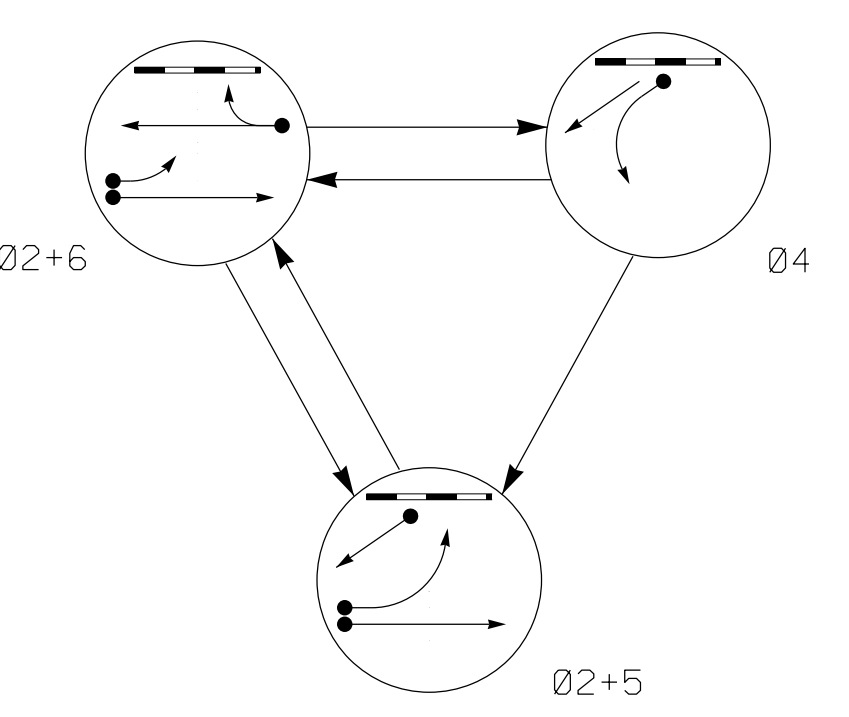
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Signature: Anthony Encarnacion DATE: 4/14/2023
SIG. INVENTORY NO. 05-0184

13-APR-2023 12:19 P:\S\00036343\work\1.ris-com\ATKMANCO\Documents\Roads and Bridges\Projects\100063268 Fuquay Varina\Task 05-11_Signals\Electrical\050184_sm_e_2023rmod.dgn

DEFAULT PHASING DIAGRAM

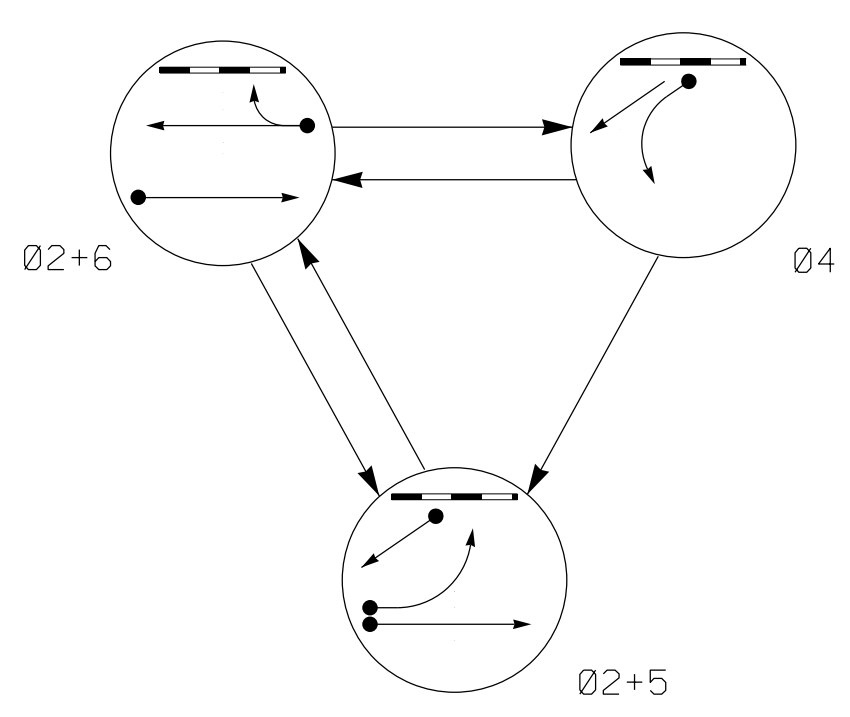


DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	02+5	02+6	04	T	D	1
21, 22	G	G	R	R	G	Y
41	+	+	+	+	+	+
42, 43	G	R	G	G	R	R
51	+	+	+	+	+	+
61, 62	R	G	R	R	G	Y
SIGN (A)	OFF	OFF	OFF	ON	ON	**

** See Note 9

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	02+5	02+6	04	T	D	1
21, 22	G	G	R	R	G	Y
41	+	+	+	+	+	+
42, 43	G	R	G	G	R	R
51	+	+	+	+	+	+
61, 62	R	G	R	R	G	Y
SIGN (A)	OFF	OFF	OFF	ON	ON	**

** See Note 9

MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	PROGRAMMING								
				NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	DELAY DURING GREEN	NEW CARD	
2A	6X60	+5	2-4-2	-	2	-	-	X	-	X	-	X
4A	6X50	0	2-4-2	-	4	-	-	X	-	X	-	X
5A	6X60	+5	2-4-2	-	2#	15*	-	X	-	X	-	X
5B	6X60	+5	2-4-2	-	5	5	-	X	-	X	-	X
6A	6X60	+5	2-4-2	-	6	-	-	X	-	X	-	X
S1	6X6	+300	EXIST	-	-	-	-	-	-	-	-	X
S2	6X6	+175	EXIST	-	-	-	-	-	-	-	-	X

* Disable delay during alternate phasing operation
Disable phase call for loop(s) during alternate phasing operation

3 Phase Fully Actuated w/ Railroad Preemption (Fuquay-Varina Signal System)

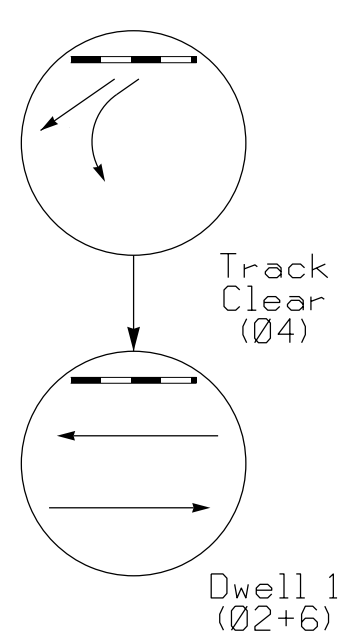
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
- Phase 5 may be lagged.
- Reposition existing signal head numbered 22.
- 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.
- Pavement markings are existing.
- Ensure flashing operation does not alter operation of blankout sign.
- Program phase 9 to run green concurrently with all phases during normal operation. Phase 9 shall clear to red prior to entering preemption.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

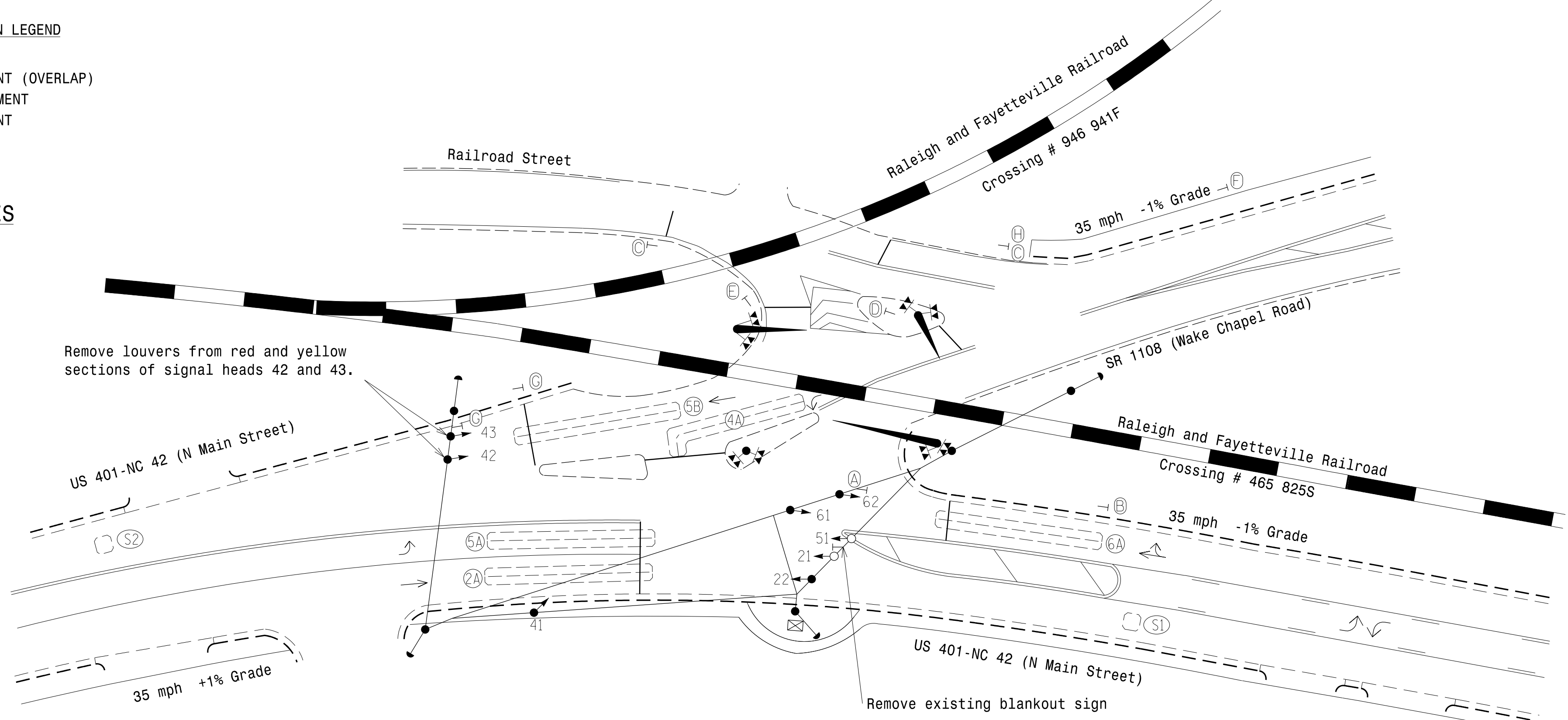
PHASING DIAGRAM DETECTION LEGEND

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

RAIL PREEMPT PHASES (High Priority)



Remove louvers from red and yellow sections of signal heads 42 and 43.



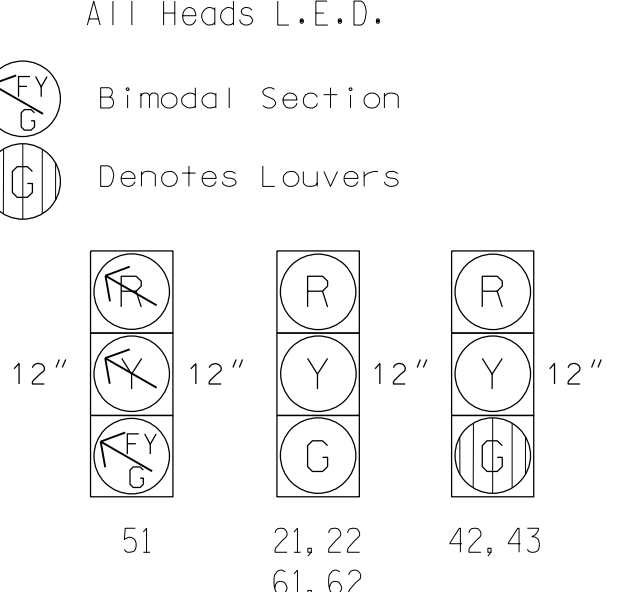
Remove existing blankout sign

MAXTIME TIMING CHART

FEATURE	PHASE				
	2	4	5	6	9 (DUMMY)
Walk *	-	-	-	-	-
Ped Clear *	-	-	-	-	-
Min Green	10	7	7	10	1
Passage *	2.5	2.0	2.0	2.5	-
Max 1 *	60	25	25	60	1
Yellow Change	3.9	3.6	3.0	3.9	3.9
Red Clear	3.1	3.3	1.8	3.1	3.1
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Advance Walk	-	-	-	-	-
Non Lock Detector	-	X	X	-	-
Vehicle Recall	MIN RECALL	-	-	MIN RECALL	MIN RECALL
Dual Entry	-	-	-	-	X

* 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.



MAXTIME PREEMPTION CHART

FUNCTION	PRE 1
Type	RAIL ROAD
Exit Phases	4
Delay	0
Max Presence	0
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	3.9
Enter Red Clear	3.1
Track Green	20
Track Yellow Change	3.6
Track Red Clear	3.3
Dwell Green	0
Exit Min Green	255 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Dwell Extend Time	1.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	N
Require All Red Entry	-

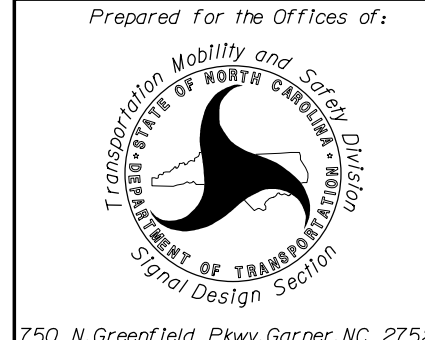
* Directs controller to use default phase timing.

This signal was designed for advanced preemption

LEGEND

- | PROPOSED | EXISTING |
|----------|----------|
| | |
| | N/A |
| | |
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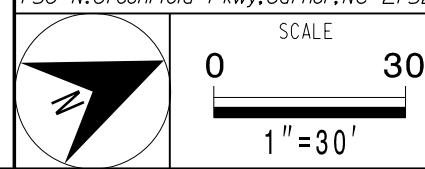
Signal Upgrade



US 401-NC 42 (N Main Street) at SR 1108 (Wake Chapel Road)
 Division 5 Wake County Fuquay-Varina
 PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
 PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 JONATHAN M. ENCARNACION
 PROFESSIONAL ENGINEER
 044476
 DATE: 4/14/2023
 SIGNATURE: _____
 DATE: _____
 SIG. INVENTORY NO. 05-0455

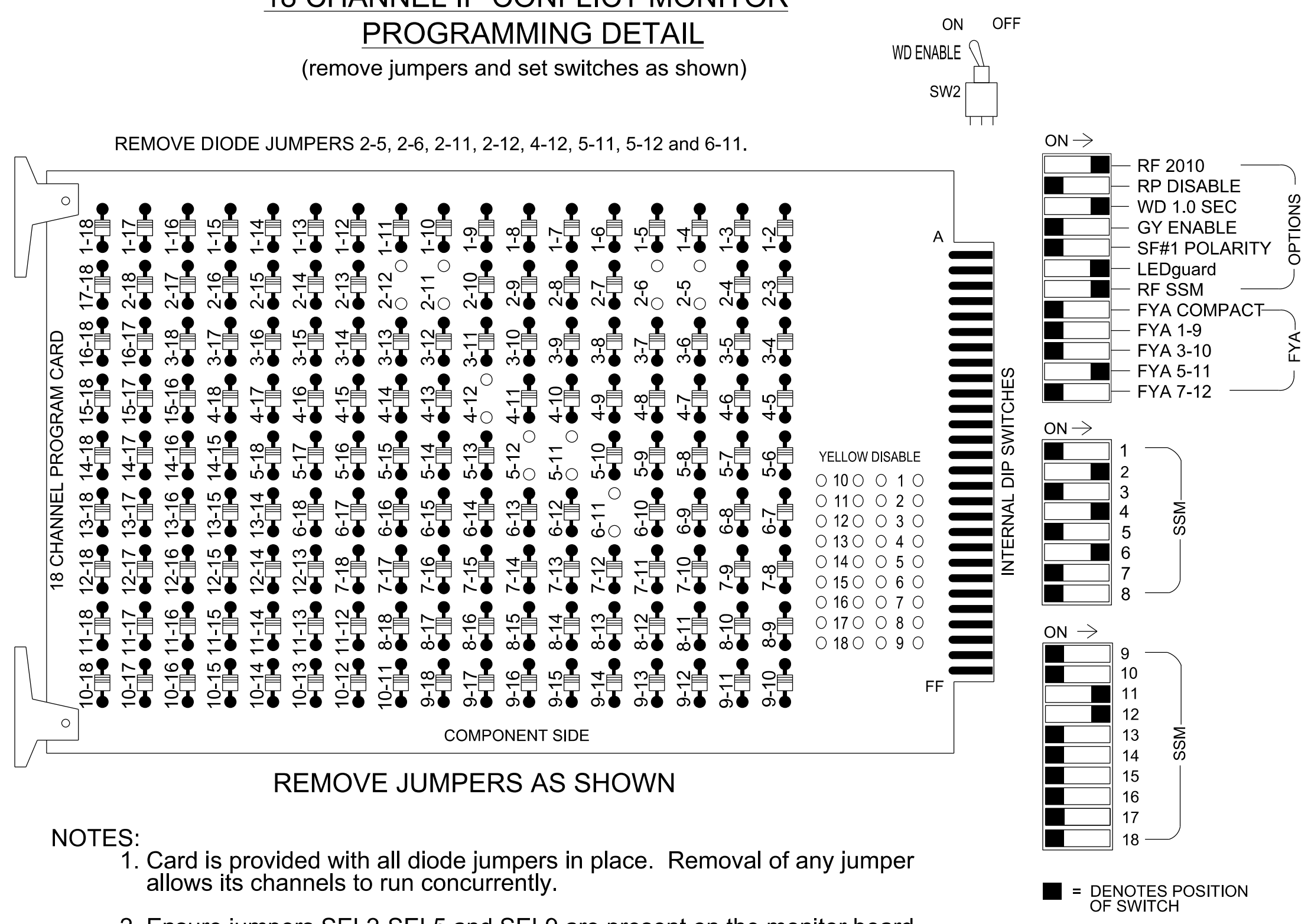


ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-8888 NCBEES #F-0326

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 STIP:4685 AT:LU54F1089

18 CHANNEL IP 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 the Red Enable is active at all times during normal operation.
 - Integrate monitor with Ethernet network in cabinet.

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 plan.
- Program controller to start up in phase 2 Green No Walk, 6 Green No Walk and 16 Green No Walk.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S2, S5, S7, S8, AUX S4, AUX S5
 Phases Used.....2, 4, 5, 6, 9
 Overlap "1".....NOT USED
 Overlap "2".....NOT USED
 Overlap "3".....*
 Overlap "4".....*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41	NU	51*	61,62	NU	NU	NU	NU	NU	NU	NU	51*	42,43	NU
RED		128						134										A101
YELLOW		129					*	135										A102
GREEN		130						136										A103
RED ARROW					101													A114
YELLOW ARROW					102													A115
FLASHING YELLOW ARROW																		A116
GREEN ARROW					103		133											

NU = Not Used
 * 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	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	S-TOR 2A	S-TOR NOT USED	S-TOR NOT USED	S-TOR 4A	S-TOR NOT USED	S-TOR NOT USED	S-TOR NOT USED	SYS. DET. S1	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	FS DC ISOLATOR
FILE "J"	5A	5B	6A	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	PRE1 AC ISOLATOR
	NOT USED	NOT USED	NOT USED	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	S-TOR	NOT USED

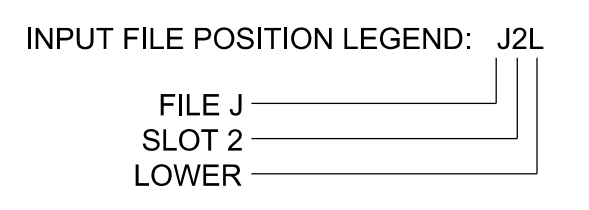
EX : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME
 PRE = PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

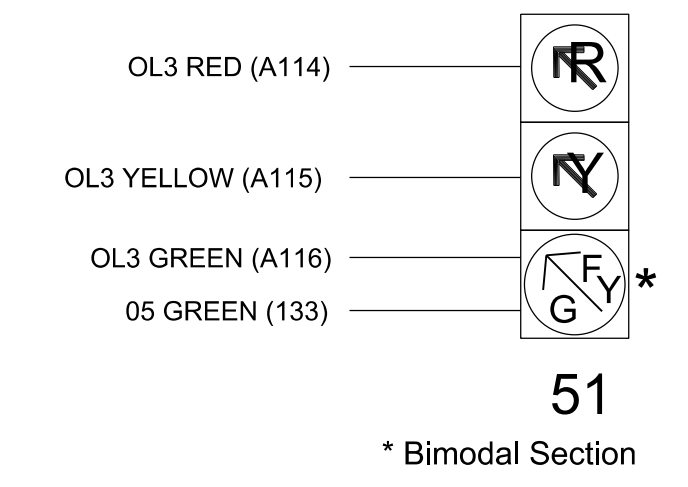
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
*S1	TB6-9,10	I9U	60	22	13	SYS						
*S2	TB6-11,12	I9L	62	24	14	SYS						
5A	TB3-1,2	J1U	55	17	15	5	15		X		X	
5B	TB3-5,6	J2U	40	2	16	5	5		X		X	
6A	TB3-9,10	J3U	64	30	18	6			X		X	

*System detector only. Remove any assigned vehicle phase.
 *For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.



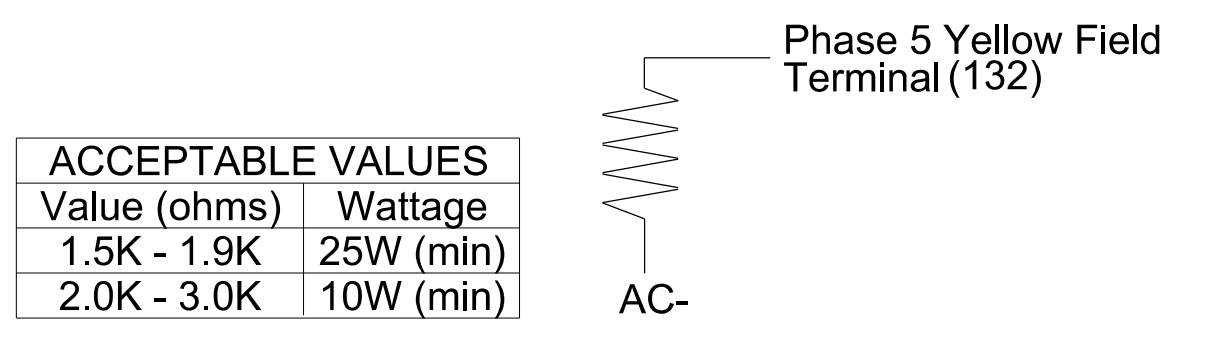
FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0455
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

Electrical Detail - Sheet 1 of 3

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

750 N. Greenfield Pkwy, Garner, NC 27529

US 401-NC 42 (N Main Street) at SR 1108 (Wake Chapel Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
 PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

REVISIONS INT. DATE

Seal: SEAL 044476
 ANTHONY M. ENCARNACION
 PROFESSIONAL ENGINEER

4/14/2023
 Signature: Anthony Encarnacion
 Date: 4/14/2023
 Sig. Inventory No. 05-0455

13-APR-2023 16:34 PW:///SUD0036433_worhtk.ris.com:ATKMANC01/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/TASK 05-11_Signals/Electrical Detail/050455_sm_e_2023mdd.dgn ST14669 AT 05491089

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	-	-	FYA 4 - Section	Normal
Included Phases	-	-	6	4,5
Modifier Phases	-	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Detector	Call Phase	Delay
15	5	0
31	0	-

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	-	-	FYA 4 - Section	Normal
Included Phases	-	-	-	4,5
Modifier Phases	-	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2. A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phase for head 51 to run protected turn only.

VEH DET PLAN 2: Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0455
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns


Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

Electrical Detail - Sheet 2 of 3

Electrical and Programming Details For:



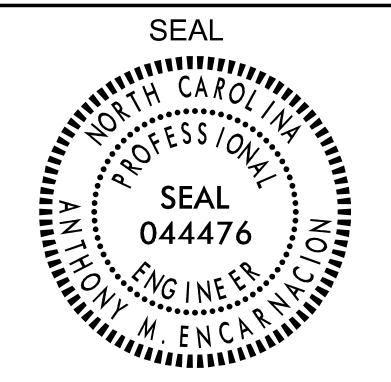
Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 401-NC 42 (N Main Street) at SR 1108 (Wake Chapel Road)

Division 5	Wake County	Fuquay-Varina
PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion	
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Designed by: Anthony Encarnacion 4/14/2023
Signature: _____ DATE: _____
SIG. INVENTORY NO. 05-0455

PREEMPTION PROGRAMMING

Front Panel
Main Menu > Controller > Preemption > Preempt Phasing/Preempt Parameters

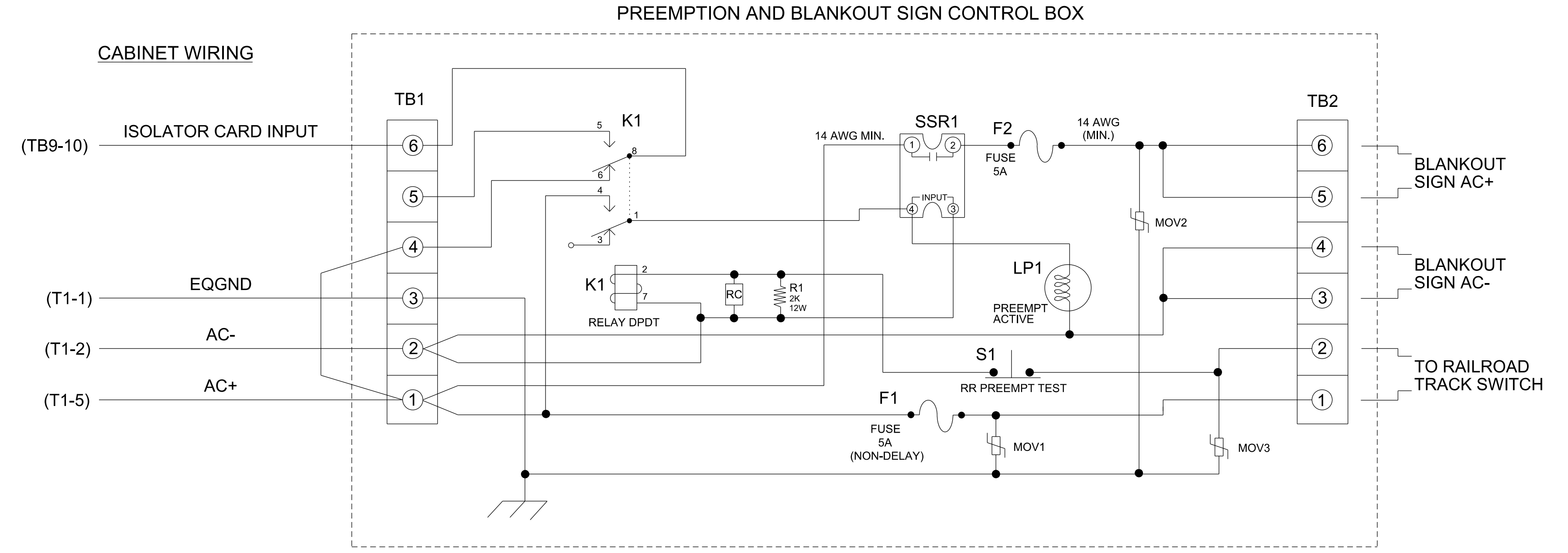
Web Interface
Home > Controller > Preempt Configuration > Preempts

Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	4
Track Overlaps	4
Dwell Phases	2,6
Dwell Overlaps	-
Cycling Phases	-
Cycling Overlaps	-
Exit Phases	4
Exit Overlaps	-
Delay	0
Max Presence	0
Max Pres Act	Terminate
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	3.9
Enter Red Clear	3.3
Track Green	20
Track Yellow Clr	3.6
Track Red Clear	3.3
Dwell Green	0
Exit Min Green	255
Exit Yellow Change	25.5
Exit Red Clear	25.5
Dwell Ext Time	1.0
Exit Type	Exit Phases
Not Ovrd Flash	X
Not Ovrd Nxt Pre	-
Track Clear Ovrd	X
Ped Clear During Yellow	-

RAILROAD PREEMPTION WIRING DETAIL

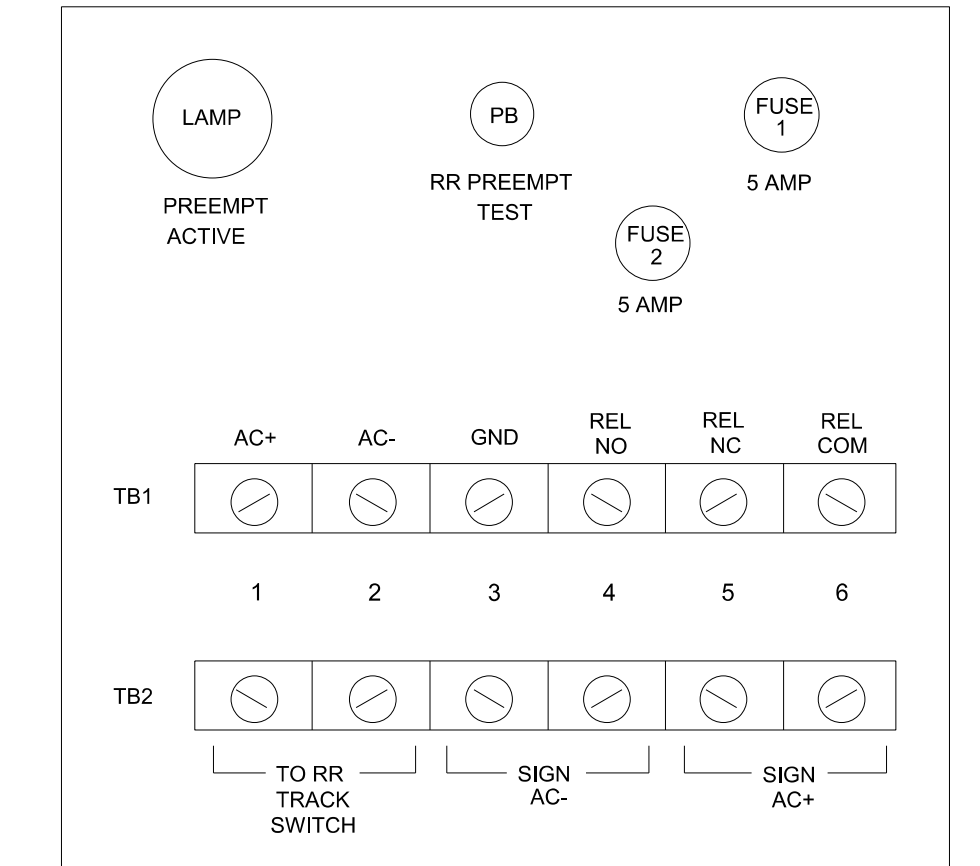
(wire as shown below)



NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT with 120VAC coil with octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
- IMPORTANT!!** A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW



SEQUENCE DETAIL

Front Panel
Main Menu > Controller > Sequence & Phs Config > Sequences

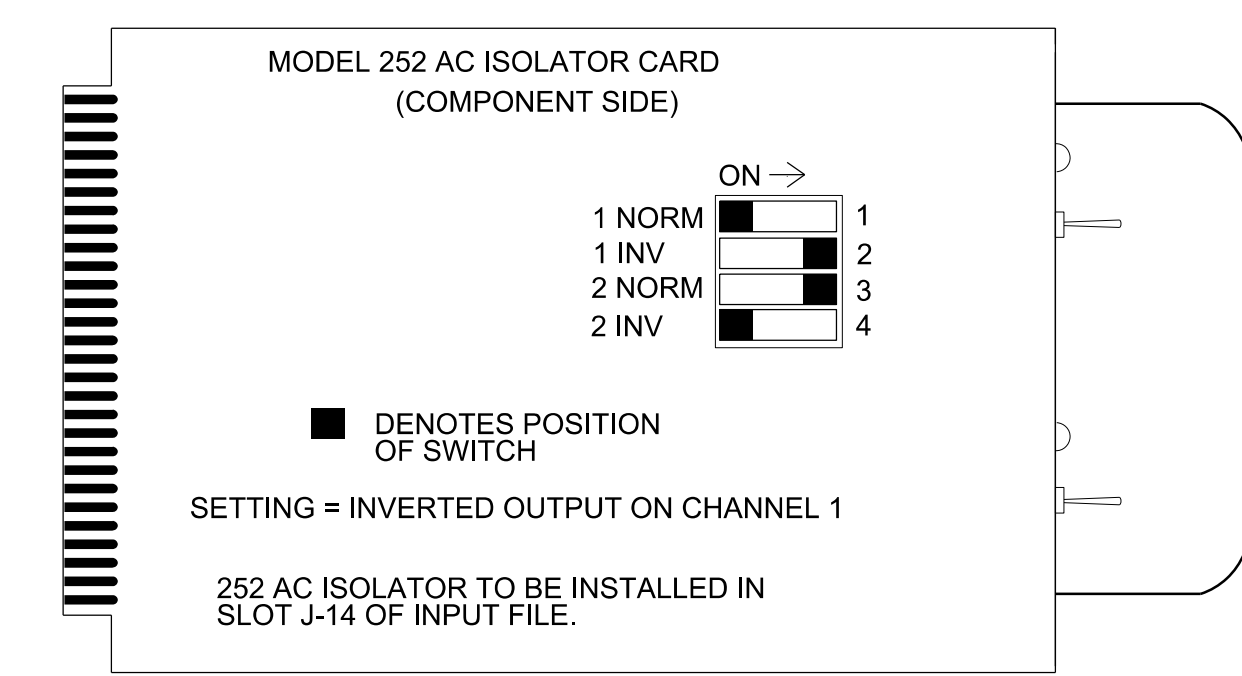
Web Interface
Home > Controller > Sequence

Sequence 1

Ring	Sequence Data
1	1,2,a,3,4,b
2	5,6,a,7,8,b
3	9,c

PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



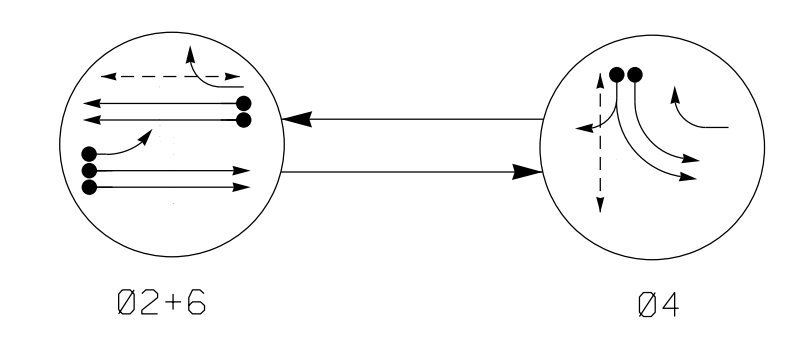
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0455
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail - Sheet 3 of 3

Electrical and Programming Details For: Prepared for the Offices of: 	US 401-NC 42 (N Main Street) at SR 1108 (Wake Chapel Road)		SEAL 						
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander		Fuquay-Varina DATE:					
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REVISIONS	INIT.	DATE							

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 S1F4669 - AT U0591089

PHASING DIAGRAM

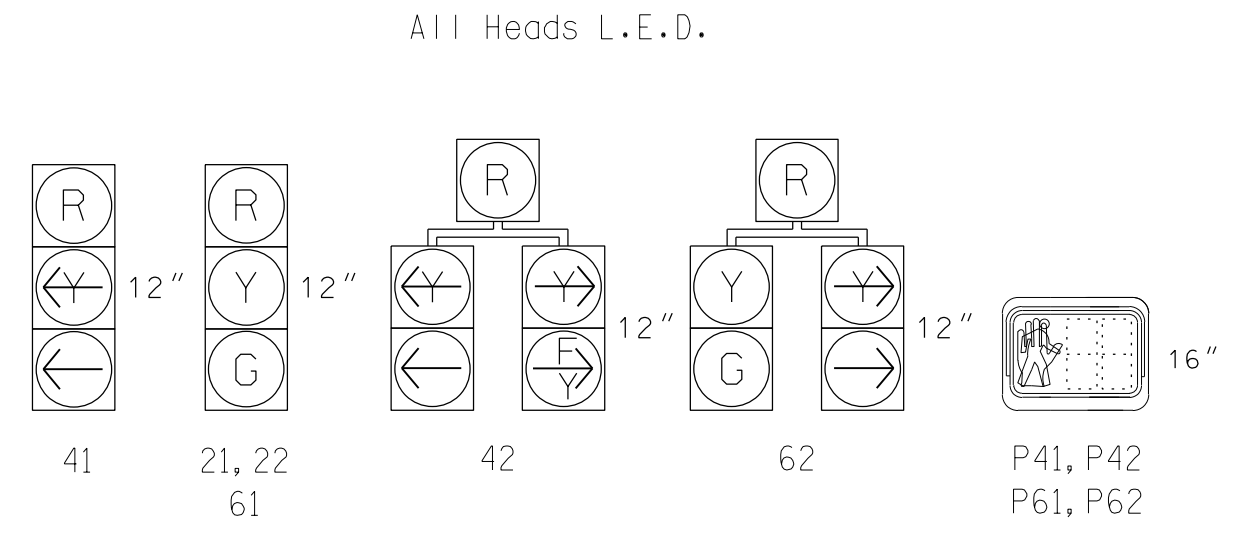


- PHASING DIAGRAM DETECTION LEGEND**
- DETECTED MOVEMENT
 - ◄ UNDETECTED MOVEMENT (OVERLAP)
 - ⋯ UNSIGNALIZED MOVEMENT
 - ⇄ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø2+6	Ø4	FLASH
21, 22	G	R	Y
41	R	←	R
42	R	←	R
61	G	R	Y
62	G	R	Y
P41, P42	DW	W	DRK
P61, P62	W	DW	DRK

SIGNAL FACE I.D.



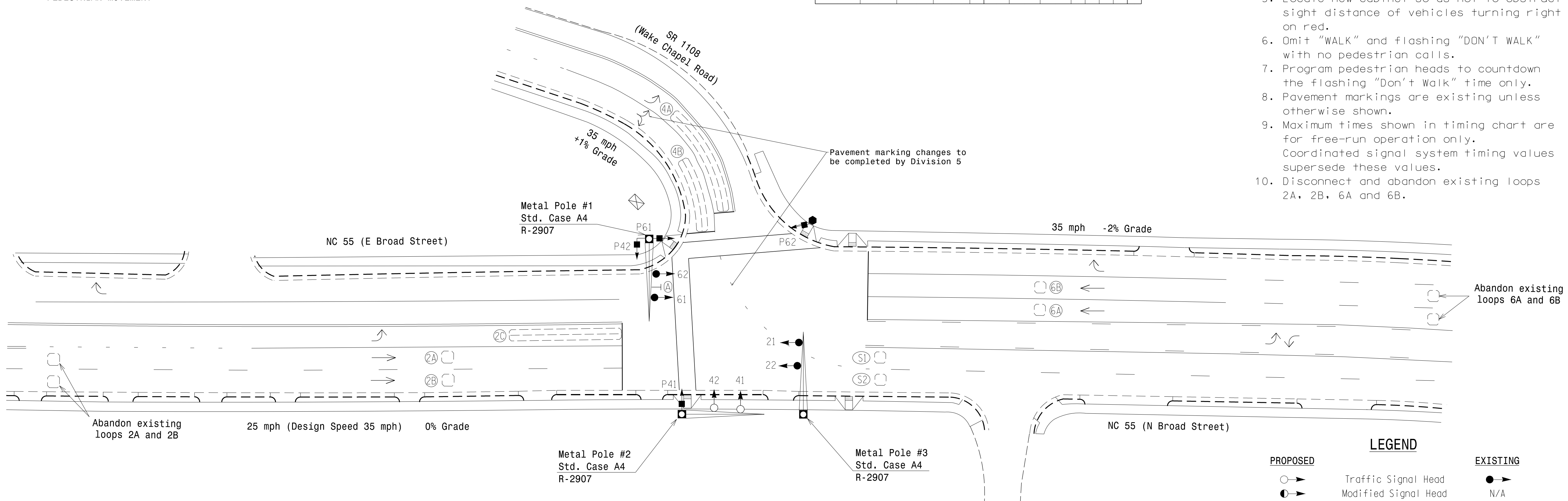
MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	PROGRAMMING								
				NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	NEW CARD		
2A, 2B	6X6	90	EXIST	-	2	-	-	X	-	X	-	X
2C	6X60	0	2-4-2	-	2	-	-	X	-	X	-	X
4A	6X60	0	2-4-2	-	4	3	-	X	-	X	-	X
4B	6X40	0	2-4-2	-	4	10	-	X	-	X	-	X
6A, 6B	6X6	90	EXIST	-	6	-	-	X	-	X	-	X
S1	6X6	+135	EXIST	-	-	-	-	-	-	-	-	X
S2	6X6	+135	EXIST	-	-	-	-	-	-	-	-	X

2 Phase Fully Actuated (Fuquay-Varina 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.
- 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.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing unless otherwise shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Disconnect and abandon existing loops 2A, 2B, 6A and 6B.



MAXTIME TIMING CHART

FEATURE	PHASE		
	2	4	6
Walk *	-	7	7
Ped Clear *	-	19	17
Min Green	10	7	10
Passage *	3.0	2.0	3.0
Max I *	50	25	50
Yellow Change	3.8	3.0	4.0
Red Clear	2.1	3.3	1.9
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Advance Walk	-	3	3
Non Lock Detector	-	X	-
Vehicle Recall	MIN RECALL	-	MIN RECALL
Dual Entry	-	-	-

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

LEGEND

- | | | | |
|--|---|--|---|
| | Proposed Traffic Signal Head | | Existing Traffic Signal Head |
| | Proposed Modified Signal Head | | Existing Modified Signal Head |
| | Proposed Pedestrian Signal Head | | Existing Pedestrian Signal Head |
| | Proposed Signal Pole with Guy | | Existing Signal Pole with Guy |
| | Proposed Signal Pole with Sidewalk Guy | | Existing Signal Pole with Sidewalk 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 Metal Pole with Mastarm | | Existing Metal Pole with Mastarm |
| | Proposed Type II Signal Pedestal | | Existing Type II Signal Pedestal |
| | Proposed Curb Ramp | | Existing Curb Ramp |
| | Proposed "BEYOND SIGNAL" "RIGHT LANE MUST TURN RIGHT" Sign (R3-7) | | Existing "BEYOND SIGNAL" "RIGHT LANE MUST TURN RIGHT" Sign (R3-7) |

Signal Upgrade

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 55 (Broad Street) at SR 1108 (Wake Chapel Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion

PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

SCALE: 0 30
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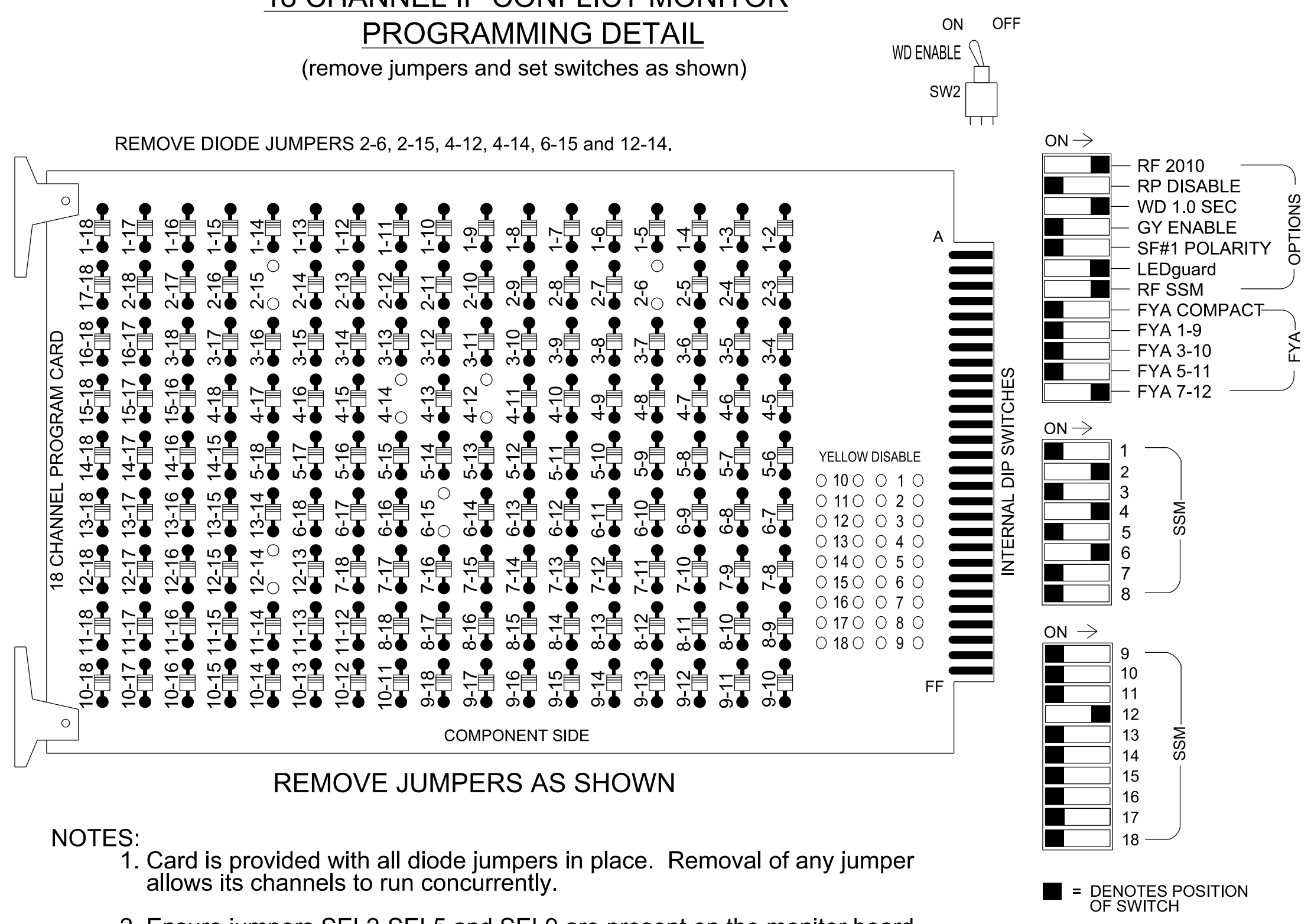
DATE: 4/14/2023

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 STIP:4685 AT LUS4FD89

18 CHANNEL IP 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 the Red Enable is active at all times during normal operation.
 - Integrate monitor with Ethernet network in cabinet.

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 plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- Program phase 6 for simultaneous start.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

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.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S2, S5, S6, S8, S9, AUX S5
 Phases Used.....2, 4, 4PED, 6, 6PED
 Overlap "1".....NOT USED
 Overlap "2".....NOT USED
 Overlap "3".....NOT USED
 Overlap "4".....*

*See overlap programming detail this sheet

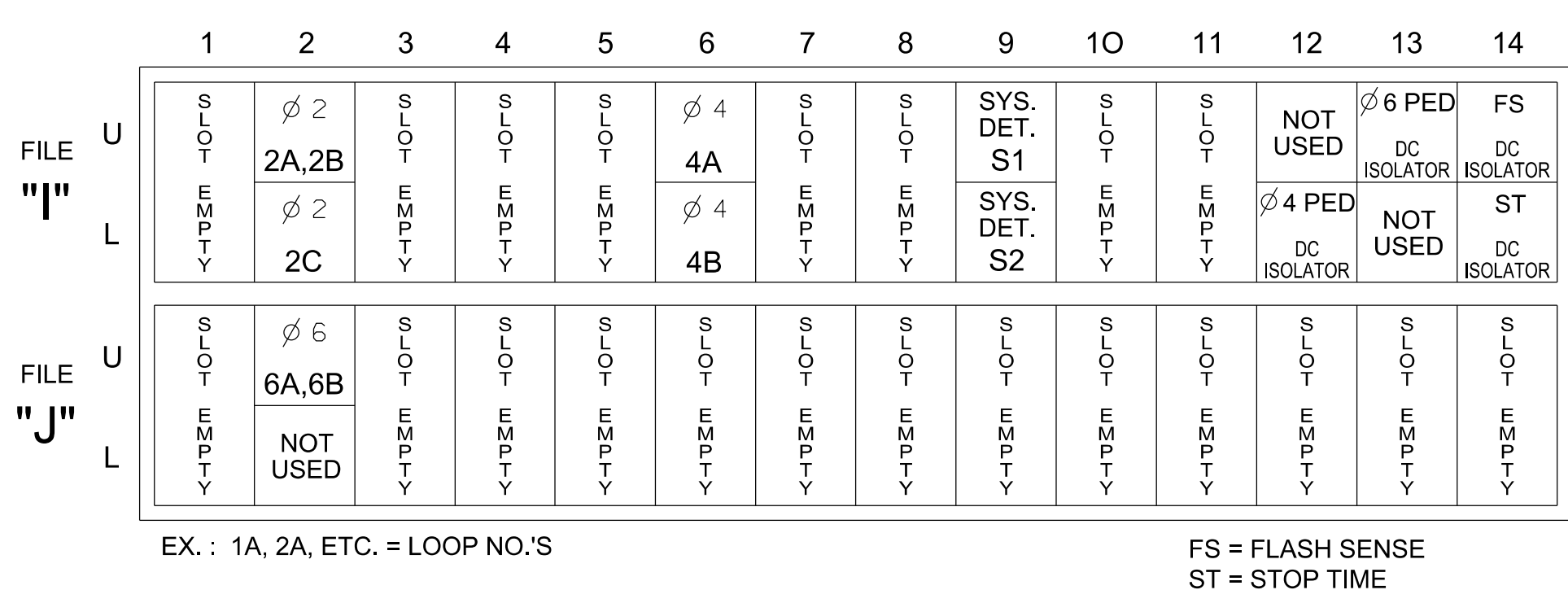
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	P41, P42	NU	61,62	P61, P62	NU	NU	NU	NU	NU	NU	42*	NU
RED		128			101				134									*
YELLOW		129							135									
GREEN		130							136									
RED ARROW																		
YELLOW ARROW																		A102
FLASHING YELLOW ARROW																		A103
GREEN ARROW																		
Hand									104									
Walker									106									

NU = Not Used
 * 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)



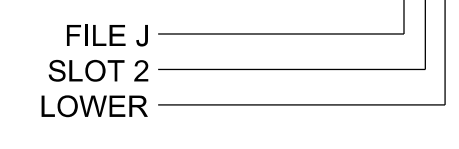
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A,2B	TB2-5,6	I2U	39	1	2	2					X	
2C	TB2-7,8	I2L	43	5	3	2					X	
4A	TB4-9,10	I6U	41	3	8	4	3				X	
4B	TB4-11,12	I6L	45	7	9	4	10				X	
*S1	TB6-9,10	I9U	60	22	13	SYS						
*S2	TB6-11,12	I9L	62	24	14	SYS						
6A,6B	TB3-5,6	J2U	40	2	16	6					X	
PED PUSH BUTTONS												
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

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

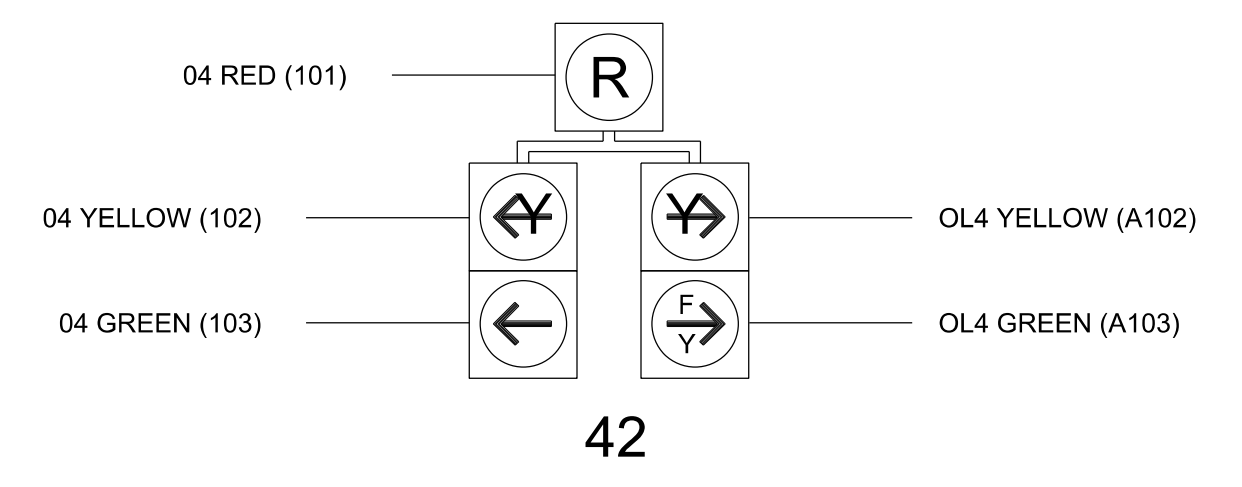
*System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND:



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



OVERLAP PROGRAMMING

Front Panel
 Main Menu > Controller > Overlap > Overlap Parameters/Overlap Timings

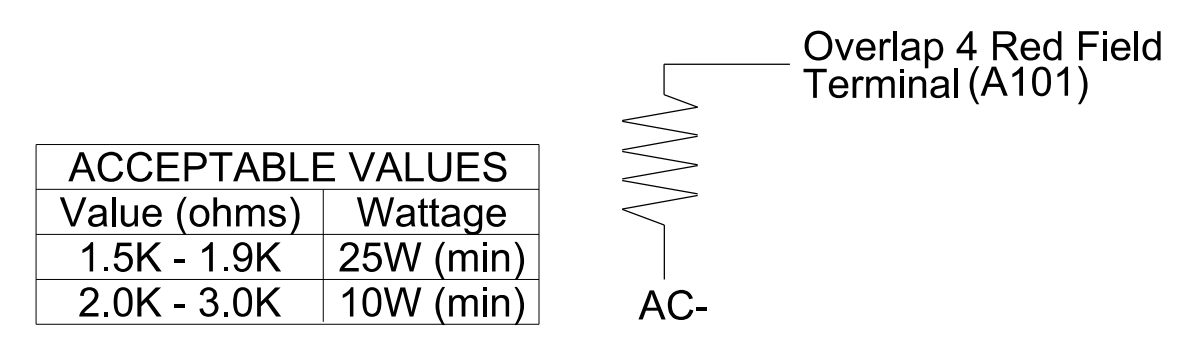
Web Interface
 Home > Controller > Overlap Configuration > Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	-	-	-	FYA 4 - Section
Included Phases	-	-	-	4
Modifier Phases	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0594
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBEES #F-0326

Electrical Detail

Prepared for the Offices of:

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
 PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

REVISIONS INT. DATE

NC 55 (Broad Street) at SR 1108 (Wake Chapel Road)

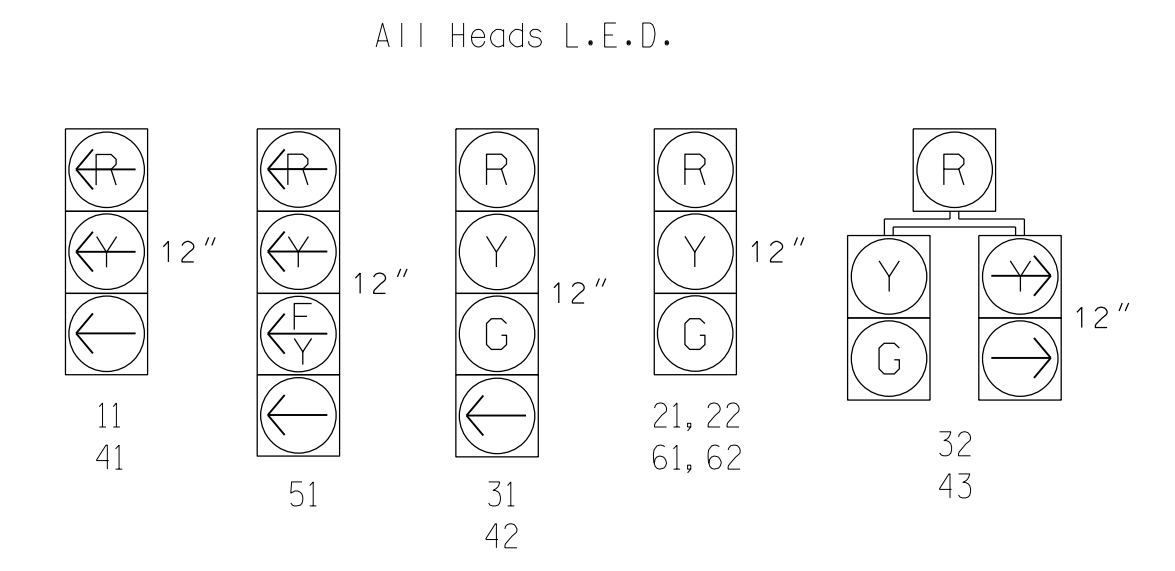
SEAL 044476
 SEAL 044476
 ENGINEER
 ANTHONY M. ENCARNACION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Designed by: Anthony Encarnacion 4/14/2023
 SIGNATURE DATE
 SIG. INVENTORY NO. 05-0594

13-APR-2023 12:21
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SIGNAL FACE I.D.



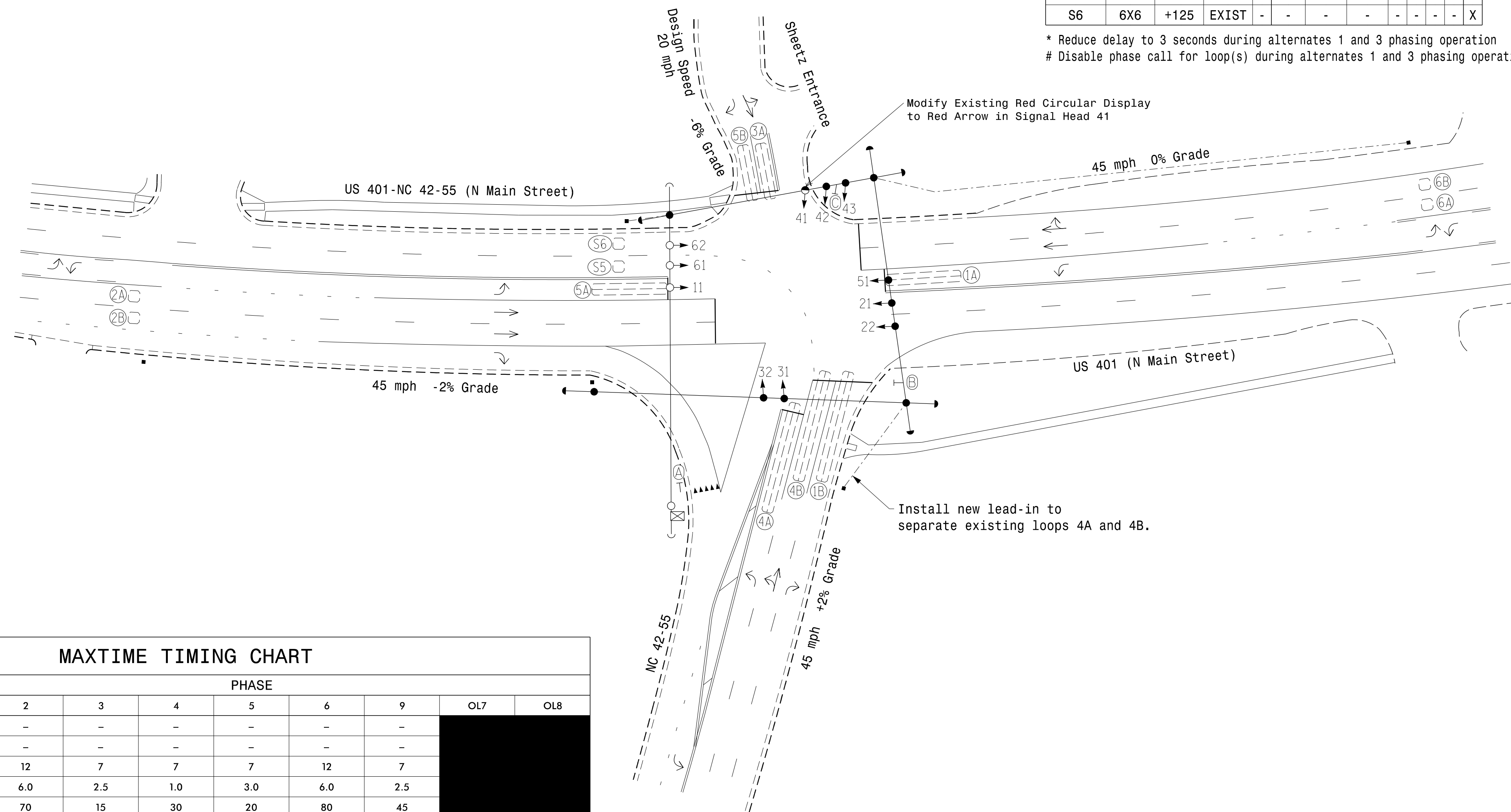
MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR						PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1/9	3	-	X	-	X	-	X
1B	6X60	+5	2-4-2	-	1	15	-	X	-	X	-	X
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	X
2B	6X6	300	EXIST	-	2	-	-	X	X	X	-	X
3A	6X30	+5	2-4-2	-	3	3	-	X	-	X	-	X
4A	6X60	+5	2-4-2	-	4	3	-	X	-	X	-	X
4B	6X60	+5	2-4-2	-	4	3	-	X	-	X	-	X
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	X
					2#	3	-	X	-	X	-	X
5B	6X30	+5	2-4-2	-	5	15	-	X	-	X	-	X
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	X
6B	6X6	300	EXIST	-	6	-	-	X	X	X	-	X
S5	6X6	+125	EXIST	-	-	-	-	-	-	-	-	X
S6	6X6	+125	EXIST	-	-	-	-	-	-	-	-	X

* Reduce delay to 3 seconds during alternates 1 and 3 phasing operation
 # Disable phase call for loop(s) during alternates 1 and 3 phasing operation

6 Phase Fully Actuated (Fuquay-Varina 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.
- Pavement markings are existing.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



FEATURE	MAXTIME TIMING CHART								OL7	OL8
	1	2	3	4	5	6	9			
Walk *	-	-	-	-	-	-	-	-		
Ped Clear *	-	-	-	-	-	-	-	-		
Min Green	7	12	7	7	7	12	7			
Passage *	2.5	6.0	2.5	1.0	3.0	6.0	2.5			
Max 1 *	45	70	15	30	20	80	45			
Yellow Change	3.0	4.7	3.1	4.3	3.0	4.7	3.0			
Red Clear	2.1	1.4	2.9	1.6	2.6	1.4	0.0	3.0	4.7	
Added Initial *	-	1.8	-	-	-	1.8	-			
Maximum Initial *	-	34	-	-	-	34	-			
Time Before Reduction *	-	15	-	-	-	15	-			
Time To Reduce *	-	20	-	-	-	30	-			
Minimum Gap	-	3.0	-	-	-	3.0	-			
Advance Walk	-	-	-	-	-	-	-			
Non Lock Detector	X	-	X	X	X	-	X			
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL	-			
Dual Entry	-	-	-	-	-	-	-			

* 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	
	Traffic Signal Head		Traffic Signal Head
	Modified Signal Head		N/A
	Pedestrian Signal Head		Pedestrian Signal Head
	Signal Pole with Guy		Signal Pole with Guy
	Signal Pole with Sidewalk Guy		Signal Pole with Sidewalk Guy
	Inductive Loop Detector		Inductive Loop Detector
	Controller & Cabinet		Controller & Cabinet
	Junction Box		Junction Box
	2-in Underground Conduit		2-in Underground Conduit
	Right of Way		Right of Way
	Directional Arrow		Directional Arrow
	Curb Ramp		Curb Ramp
	"YIELD" Sign (R1-2)		"YIELD" Sign (R1-2)
	Right Arrow "ONLY" Sign (R3-5R)		Right Arrow "ONLY" Sign (R3-5R)
	Combined Through and Left Arrow Sign (R3-6L)		Combined Through and Left Arrow Sign (R3-6L)

Signal Upgrade - Sheet 1 of 2

1616 EAST MILLBROOK ROAD, SUITE 160
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-8888 NCBEES #F-0326

US 401-NC 42-55 (N Main Street) at NC 42-55/Sheetz Entrance

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion

PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

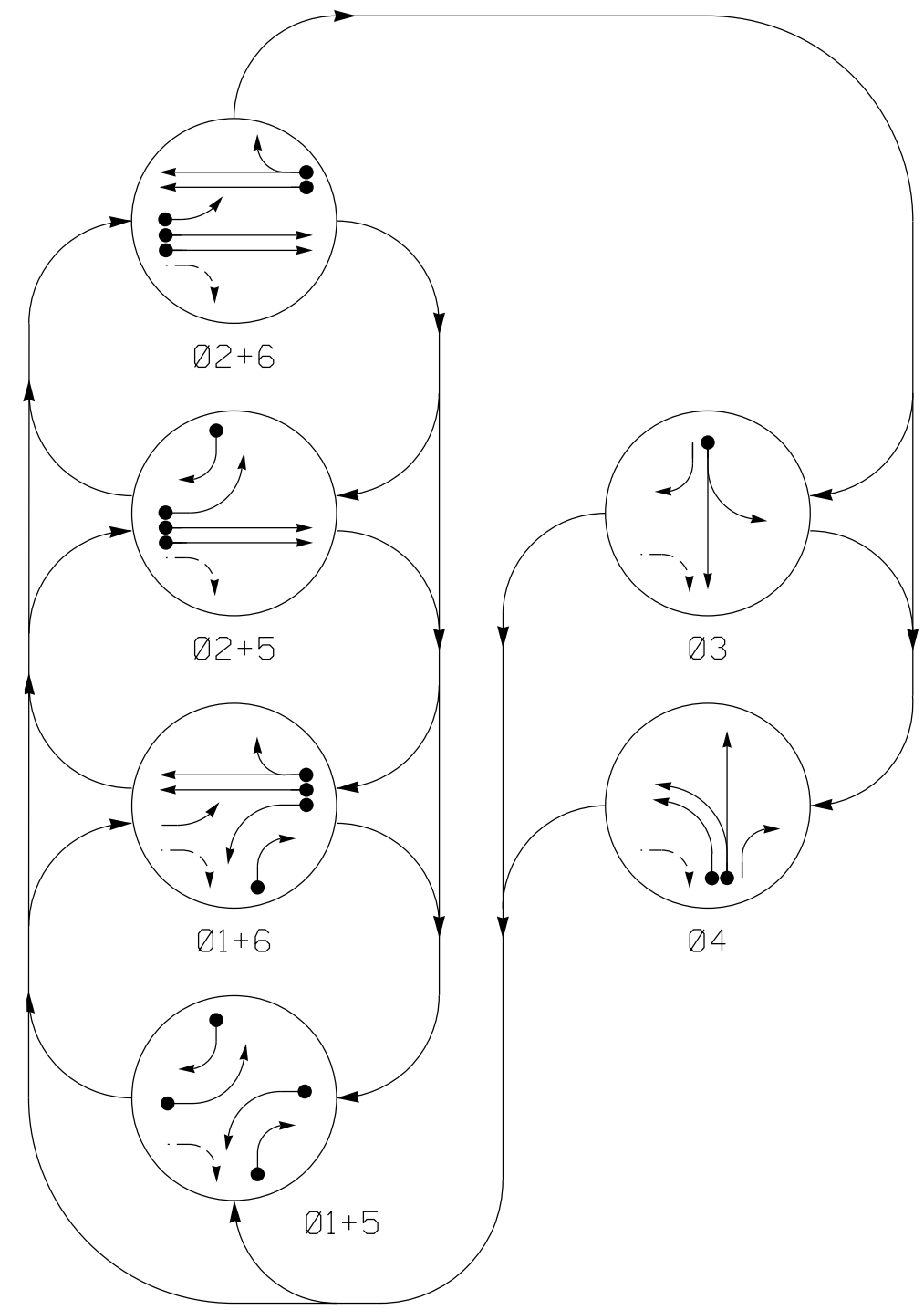
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4/14/2023

SIG. INVENTORY NO. 05-0654

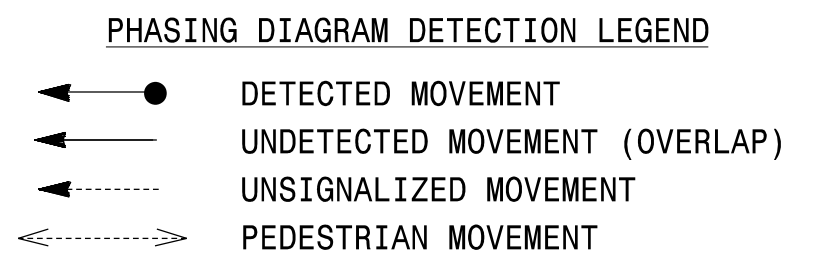
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 STIP14685 AT LUS41089

DEFAULT PHASING DIAGRAM

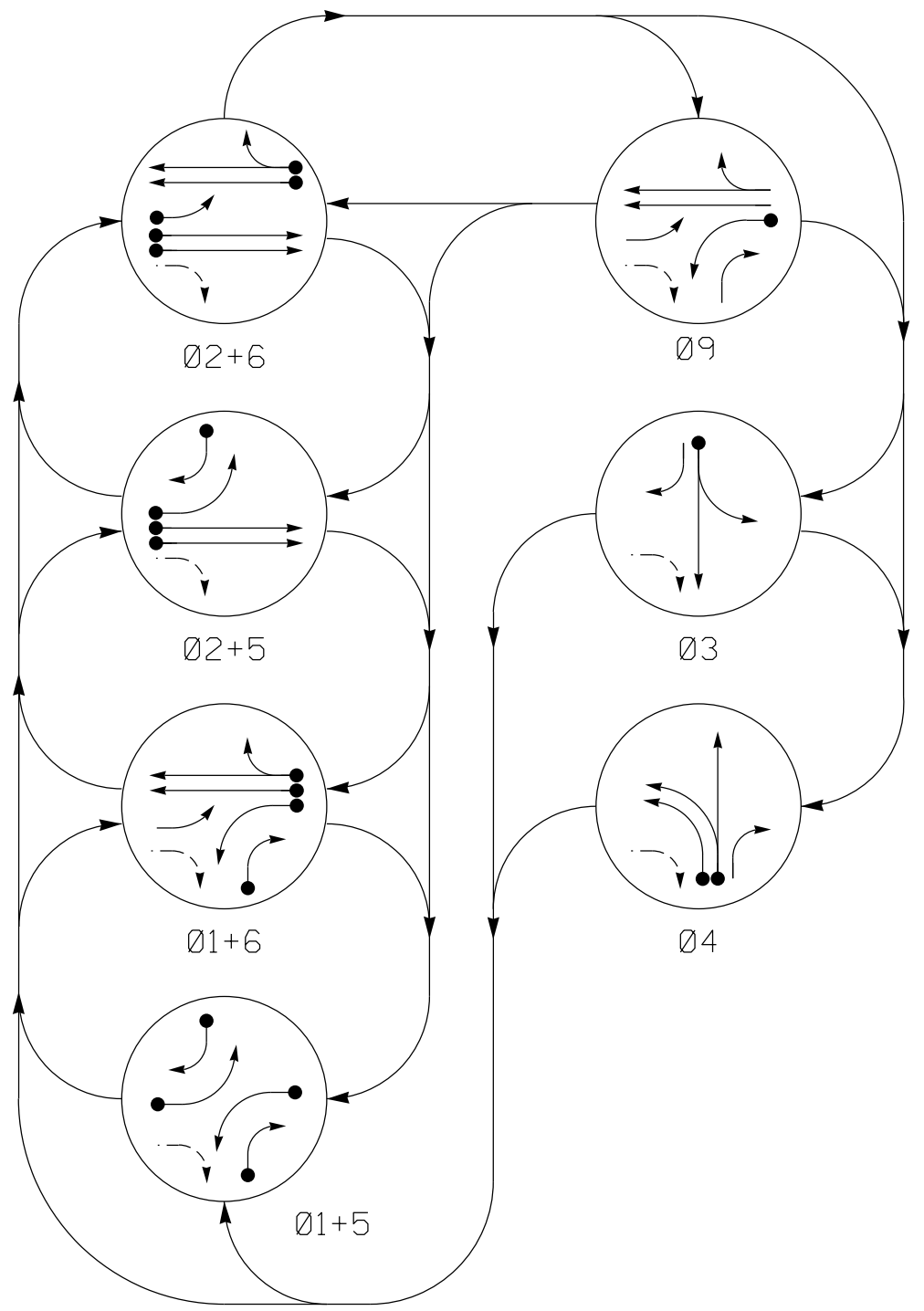


DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE						F	L	S	H	P
	01+5	01+6	02+5	02+6	03	04					
11	←	←	←	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	Y				
31	R	R	R	R	←	←	R				
32	R	R	R	R	←	←	R				
41	←	←	←	←	←	←	←				
42	R	R	R	R	R	←	R				
43	R	R	R	R	R	←	R				
51	←	←	←	←	←	←	←				
61, 62	R	G	R	G	R	R	Y				



ALTERNATE 2 PHASING DIAGRAM



ALTERNATE 2 PHASING TABLE OF OPERATION

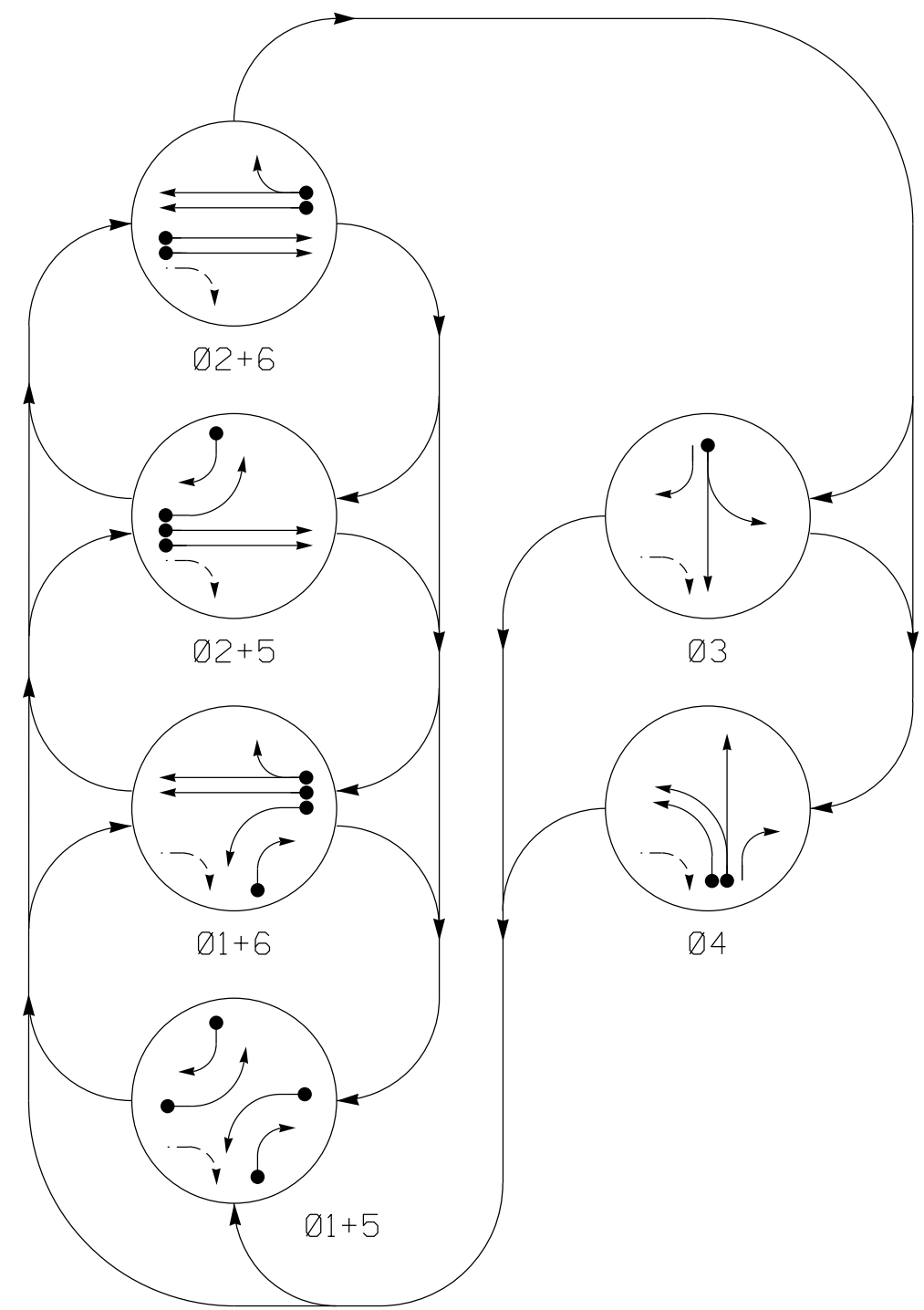
SIGNAL FACE	PHASE						F	L	S	H	P
	01+5	01+6	02+5	02+6	03	04					
11	←	←	←	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	Y				
31	R	R	R	R	←	←	R				
32	R	R	R	R	←	←	R				
41	←	←	←	←	←	←	←				
42	R	R	R	R	R	←	R				
43	R	R	R	R	R	←	R				
51	←	←	←	←	←	←	←				
61, 62	R	G	R	G	R	R	Y				

6 Phase Fully Actuated (Fuquay-Varina 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.
- Pavement markings are existing.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

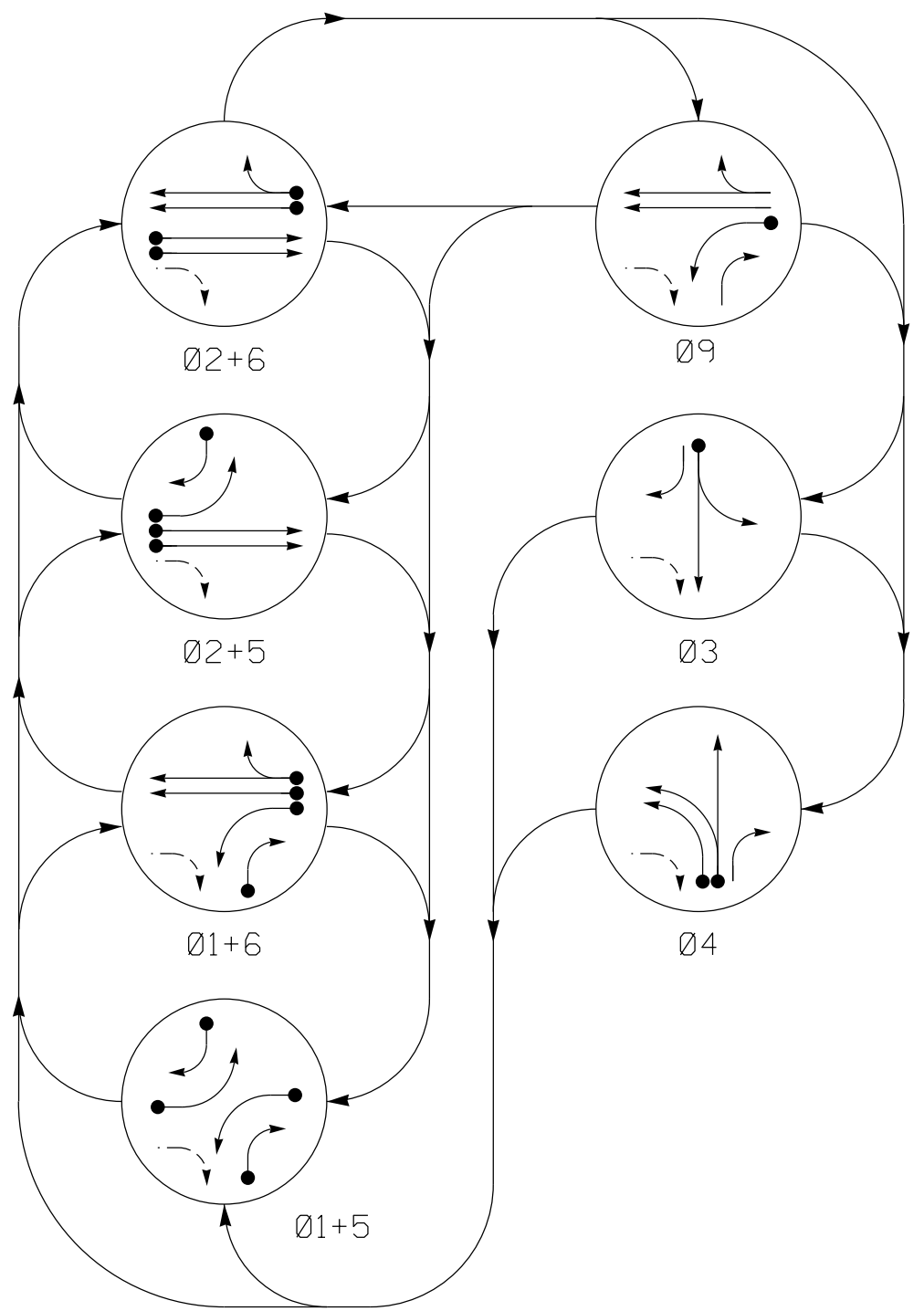
ALTERNATE 1 PHASING DIAGRAM



ALTERNATE 1 PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE						F	L	S	H	P
	01+5	01+6	02+5	02+6	03	04					
11	←	←	←	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	Y				
31	R	R	R	R	←	←	R				
32	R	R	R	R	←	←	R				
41	←	←	←	←	←	←	←				
42	R	R	R	R	R	←	R				
43	R	R	R	R	R	←	R				
51	←	←	←	←	←	←	←				
61, 62	R	G	R	G	R	R	Y				

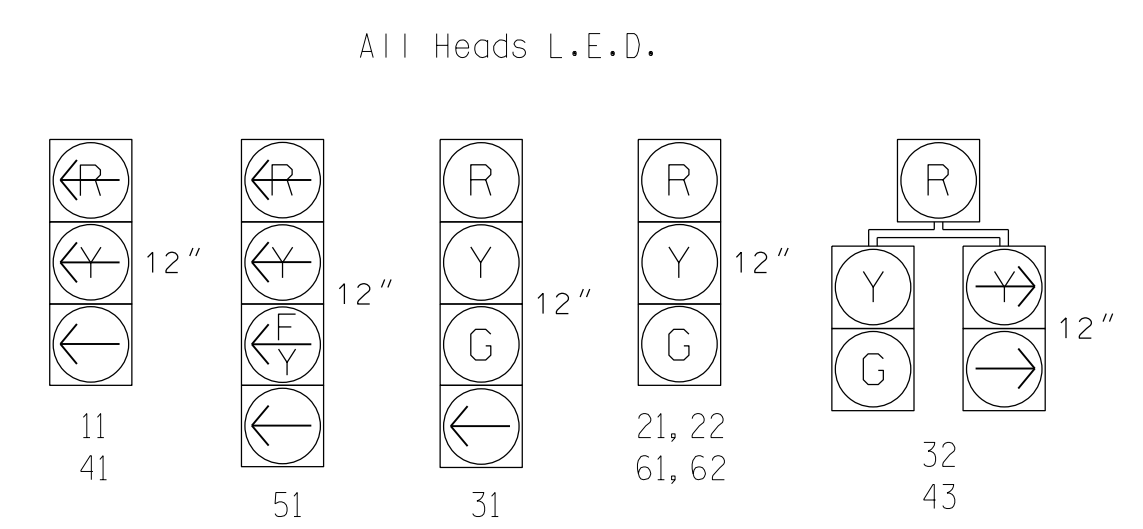
ALTERNATE 3 PHASING DIAGRAM



ALTERNATE 3 PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE						F	L	S	H	P
	01+5	01+6	02+5	02+6	03	04					
11	←	←	←	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	Y				
31	R	R	R	R	←	←	R				
32	R	R	R	R	←	←	R				
41	←	←	←	←	←	←	←				
42	R	R	R	R	R	←	R				
43	R	R	R	R	R	←	R				
51	←	←	←	←	←	←	←				
61, 62	R	G	R	G	R	R	Y				

SIGNAL FACE I.D.



Signal Upgrade - Sheet 2 of 2

	Prepared for the Offices of: US 401-NC 42-55 (N Main Street) at NC 42-55/Sheetz Entrance		
	Division 5 Wake County Fuquay-Varina	PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion PREPARED BY: JT Stiff REVIEWED BY: PL Alexander	
750 N. Greenfield Pkwy, Garner, NC 27529	REVISIONS	INIT.	DATE
	N/A	DATE: 4/14/2023	DATE:

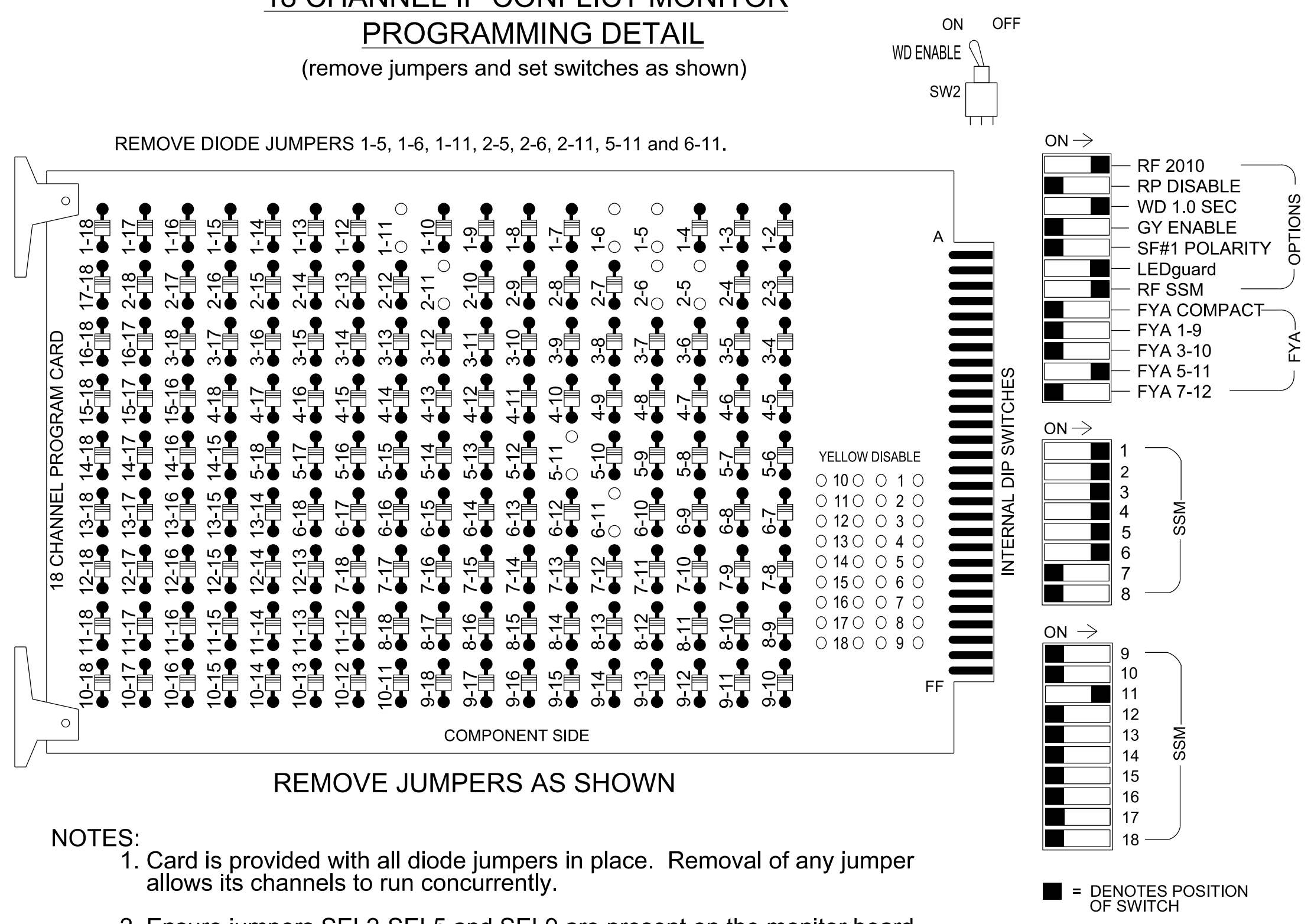
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 STP14685 AT LUS4F1089

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 05-0654

18 CHANNEL IP 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 the Red Enable is active at all times during normal operation.
 - Integrate monitor with Ethernet network in cabinet.

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 plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S4, S5, S7, S8, AUX S4
 Phases Used.....1, 2, 3, 4, 5, 6, 9**
 Overlap "1".....NOT USED
 Overlap "2".....NOT USED
 Overlap "3".....*
 Overlap "4".....NOT USED
 Overlap "7".....*
 Overlap "8".....*

*See overlap programming detail on sheet 2
 **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	OL7	2	2 PED	3	4	4 PED	5	OL8	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	43	21,22	NU	31	32	41	42	43	NU	32	51*	61,62	NU	NU	NU	51*	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											A114
YELLOW ARROW	126	126					102					132						A115
FLASHING YELLOW ARROW																		A116
GREEN ARROW	127	127		118	103	103				133	133							

NU = Not Used
 * 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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FILE "I"	∅ 1 1A	∅ 1 1B	∅ 2 2A	∅ 3 3A	∅ 4 4A	∅ 5 5A	∅ 6 6A	∅ 7 7A	∅ 8 8A	∅ 9 9A	∅ 10 10A	∅ 11 11A	∅ 12 12A	∅ 13 13A	∅ 14 14A
FILE "J"	NOT USED	NOT USED	∅ 2 2B	NOT USED	∅ 4 4B	∅ 5 5B	∅ 6 6B	∅ 7 7B	∅ 8 8B	∅ 9 9B	∅ 10 10B	∅ 11 11B	∅ 12 12B	∅ 13 13B	∅ 14 14B

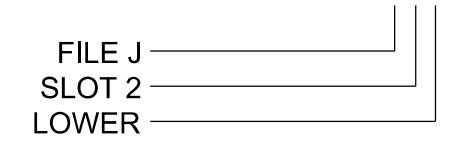
EX : 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1/9	3				X	
1B	TB2-5,6	I2U	39	1	2	1	15				X	
2A	TB2-9,10	I3U	63	29	4	2				X	X	
2B	TB2-11,12	I3L	76	42	5	2				X	X	
3A	TB4-5,6	I5U	58	20	7	3	3			X	X	
4A	TB4-9,10	I6U	41	3	8	4	3			X	X	
4B	TB4-11,12	I6L	45	7	9	4	3			X	X	
*S5	TB6-9,10	I9U	60	22	13	SYS						
*S6	TB6-11,12	I9L	62	24	14	SYS						
5A	TB3-1,2	J1U	55	17	15	★	5	15		X	X	
				31	★	2	3			X	X	X
5B	TB3-5,6	J2U	40	2	16	5	15			X	X	
6A	TB3-9,10	J3U	64	30	18	6				X	X	
6B	TB3-11,12	J3L	77	43	19	6				X	X	

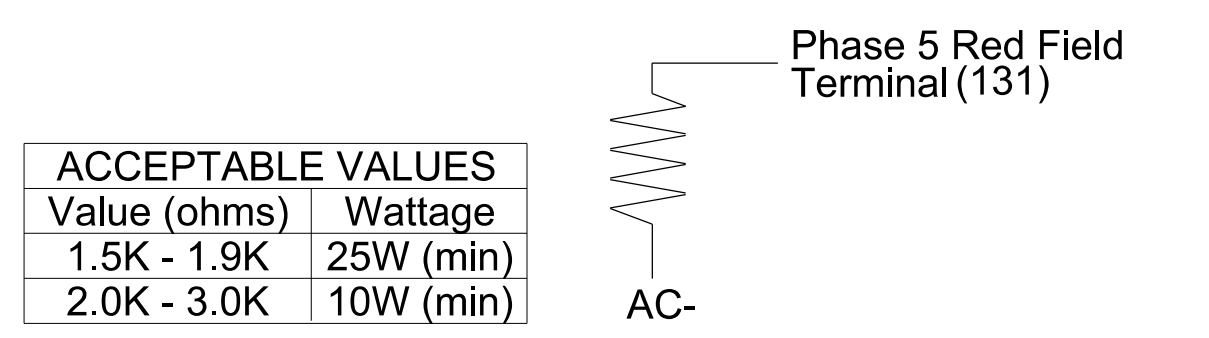
*System detector only. Remove any assigned vehicle phase.
 ★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L



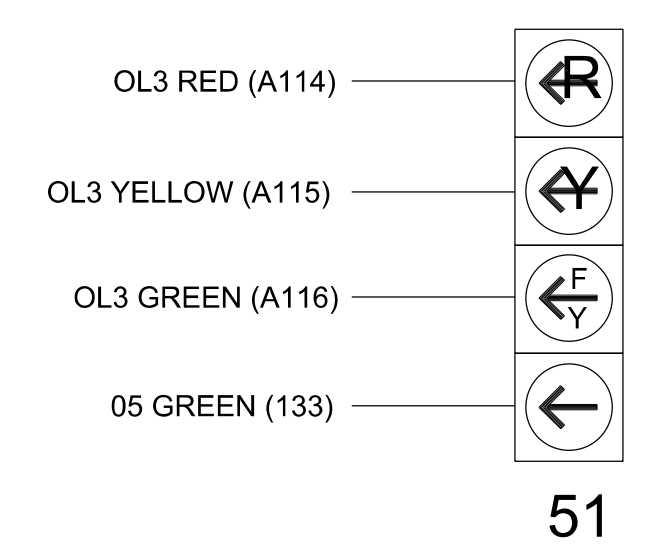
LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0654
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

Electrical Detail - Sheet 1 of 3

Prepared for the Offices of: 	US 401-NC 42-55 (N Main Street) at NC 42-55/Sheetz Entrance		SEAL
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	

13-APR-2023 12:23
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Anthony Encarnacion
 PROFESSIONAL ENGINEER
 License No. 044476
 DATE: 4/14/2023
 SIG. INVENTORY NO. 05-0654

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4	7	8
Type	-	-	FYA 4 - Section	-	Normal	Normal
Included Phases	-	-	6	-	1,9	6,9
Modifier Phases	-	-	5	-	-	-
Trail Green	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	3.0	4.7
Trail Red	0.0	0.0	0.0	0.0	2.1	1.4

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

5A

Detector	Call Phase	Delay
15	5	3
31	0	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4	7	8
Type	-	-	FYA 4 - Section	-	Normal	Normal
Included Phases	-	-	-	-	1,9	6,9
Modifier Phases	-	-	5	-	-	-
Trail Green	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	3.0	4.7
Trail Red	0.0	0.0	0.0	0.0	2.1	1.4

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan, Detector Plan and Sequence Number shown below. A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN	SEQ NUMBER
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING 1	2	2	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING 2	1	1	2
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING 3	2	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SEQUENCE 2, OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phase for head 51 to run protected turn only.

VEH DET PLAN 2: Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

SEQ NUMBER 2: Adds phase 9 to sequence.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

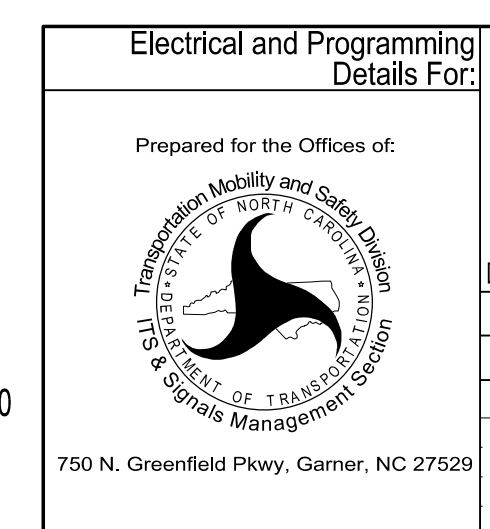
Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan	Seq Number
*	2	2	1
*	1	1	2
*	2	2	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0654
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 3



US 401-NC 42-55 (N Main Street) at NC 42-55/Sheetz Entrance	
Division 5	Wake County
Prepared by: JT Stiff	Reviewed by: AM Encarnacion
Prepared by: PL Alexander	Reviewed by: PL Alexander
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

ANTHONY M. ENCARNACION

PROFESSIONAL ENGINEER

SEAL 044476

Signature: Anthony Encarnacion
Date: 4/14/2023

SIG. INVENTORY NO. 05-0654

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OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

NOTICE OVERLAP 7
ASSIGNED TO CHANNEL 1 →

NOTICE OVERLAP 8
ASSIGNED TO CHANNEL 6 →

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Overlap	7		X	X	1
2	Phase Vehicle	2	X			2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Overlap	8	X		X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1	X		X	9
10	Overlap	2		X	X	10
11	Overlap	3	X			11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

SEQUENCE DETAIL

Front Panel
Main Menu >Controller >Sequence & Phs Config>Sequences

Web Interface
Home >Controller >Sequence

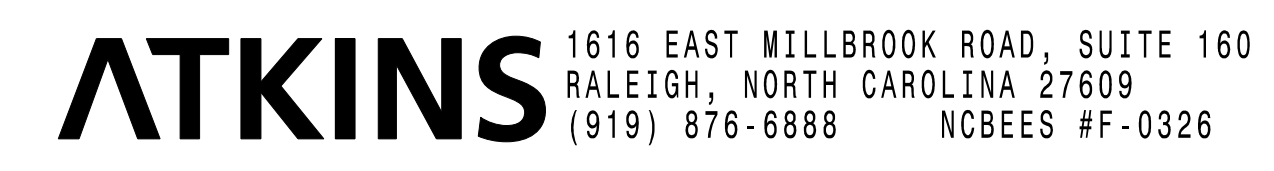
Sequence 1

Ring	Sequence Data
1	1,2,a,3,4,b
2	5,6,a,7,8,b

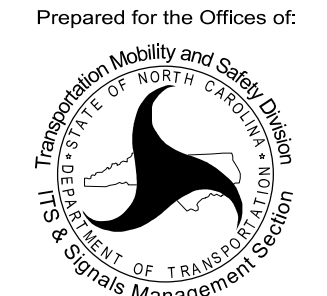
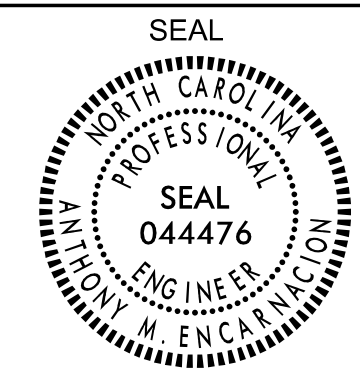
Sequence 2

Ring	Sequence Data
1	1,2,a,9,b,3,4,c
2	5,6,a,b,7,8,c

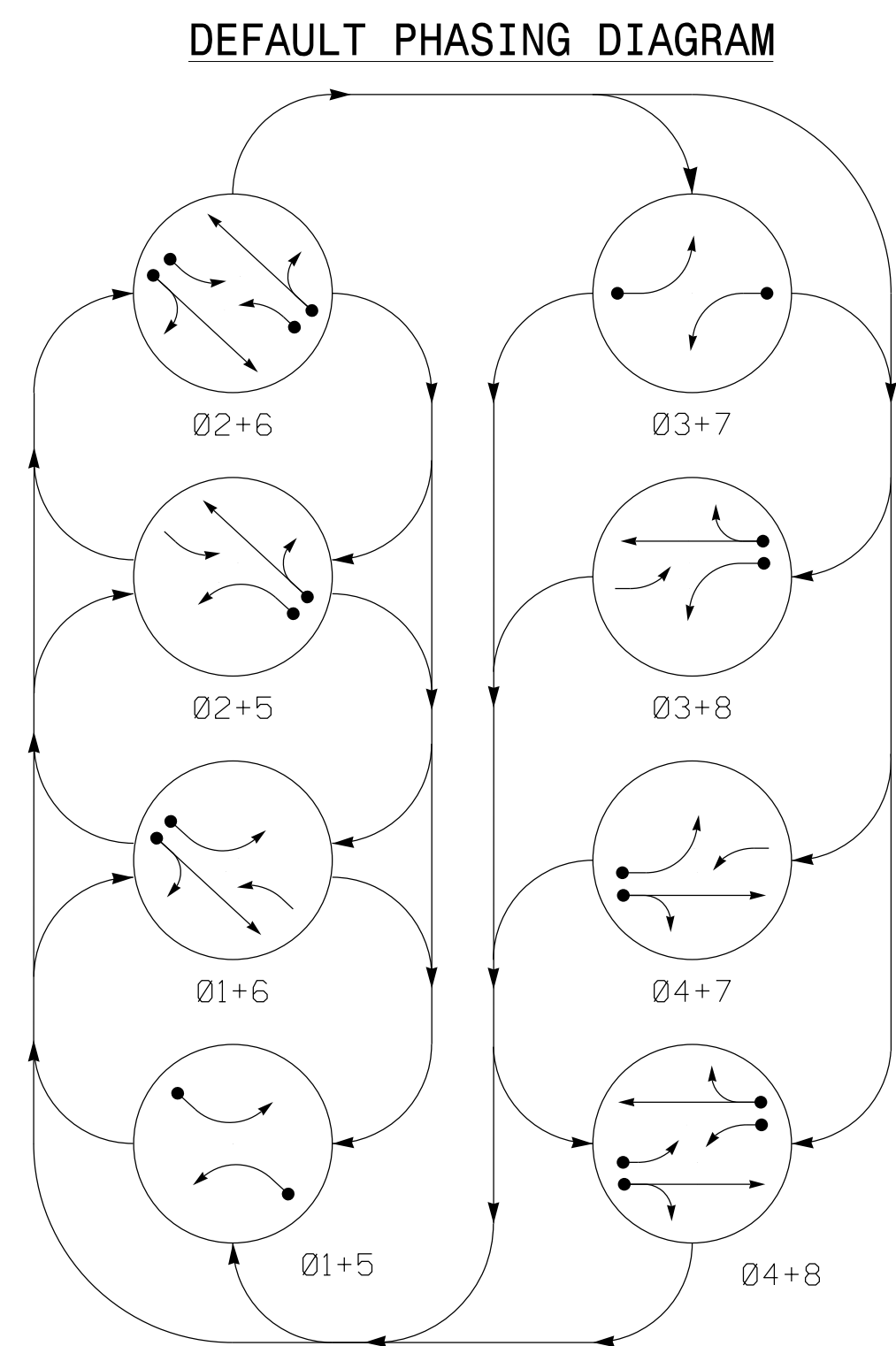
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-0654
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A



Electrical Detail - Sheet 3 of 3

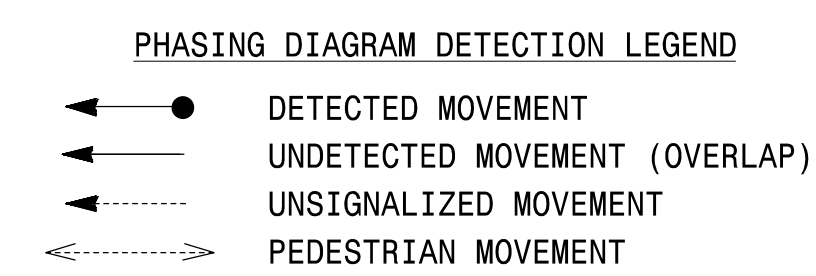
Electrical and Programming Details For: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	US 401-NC 42-55 (N Main Street) at NC 42-55/Sheetz Entrance		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED 
	Division 5 Wake County Fuquay-Varina		
PLAN DATE: April 2023 PREPARED BY: JT Stiff	REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander		
REVISIONS _____ _____	INIT. _____ _____	DATE _____ _____	
Designed by: <i>Anthony Encarnacion</i> 4/14/2023 _____ SIGNATURE DATE _____ SIG. INVENTORY NO. 05-0654			

13-APR-2023 12:23
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 S1F4669 - AT U0591089

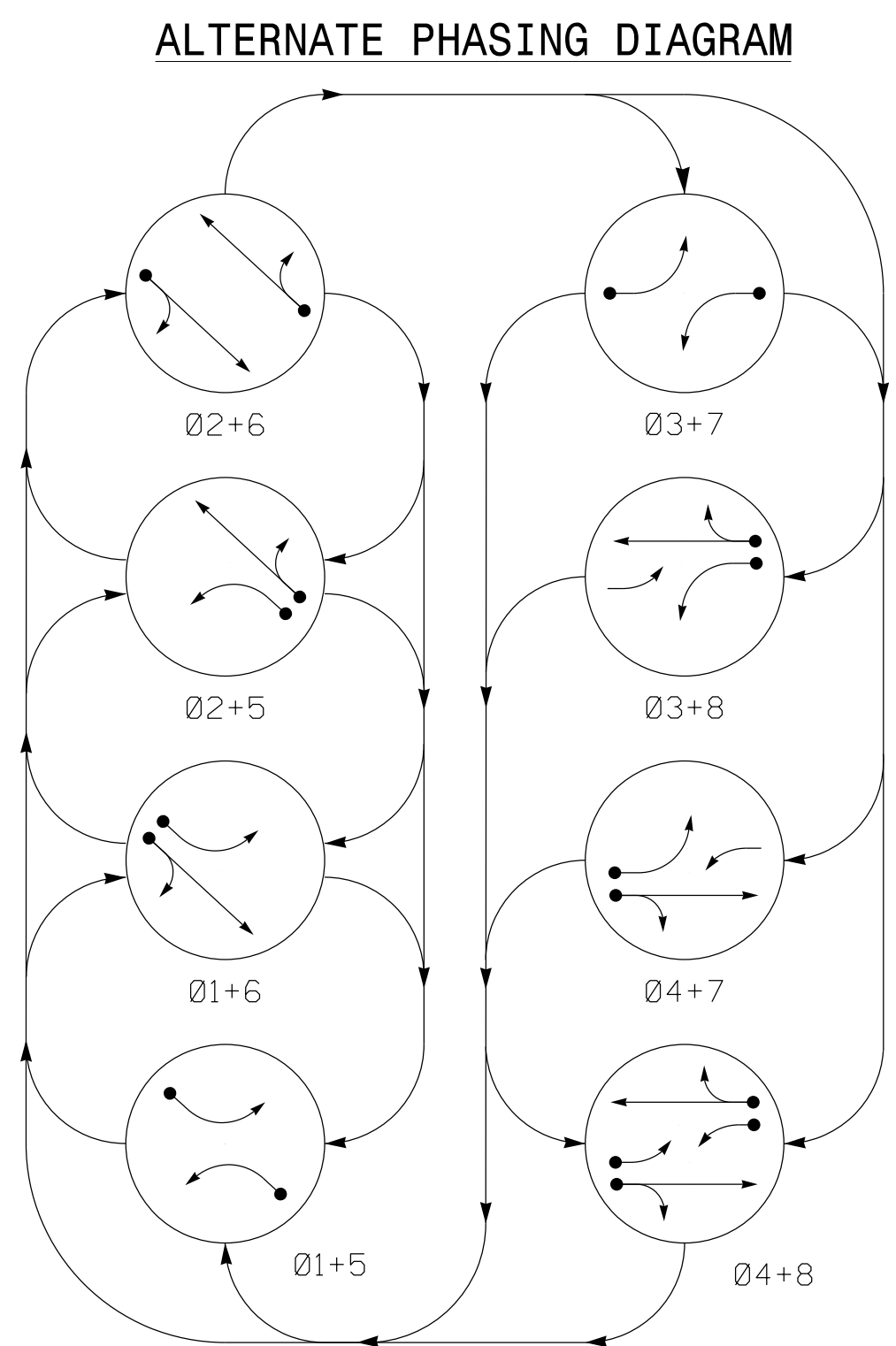
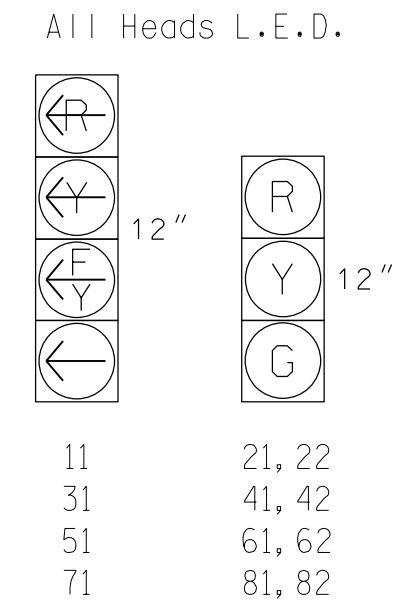


SIGNAL FACE	PHASE								FLASH
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	
11	←	←	←	←	←	←	←	←	Y
21, 22	R	R	G	G	R	R	R	R	Y
31	←	←	←	←	←	←	←	←	Y
41, 42	R	R	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←	←	Y
61, 62	R	G	R	G	R	R	R	R	Y
71	←	←	←	←	←	←	←	←	Y
81, 82	R	R	R	R	R	G	R	G	R

SIGNAL FACE	PHASE								FLASH
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	
11	←	←	←	←	←	←	←	←	Y
21, 22	R	R	G	G	R	R	R	R	Y
31	←	←	←	←	←	←	←	←	Y
41, 42	R	R	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←	←	Y
61, 62	R	G	R	G	R	R	R	R	Y
71	←	←	←	←	←	←	←	←	Y
81, 82	R	R	R	R	R	G	R	G	R



SIGNAL FACE I.D.



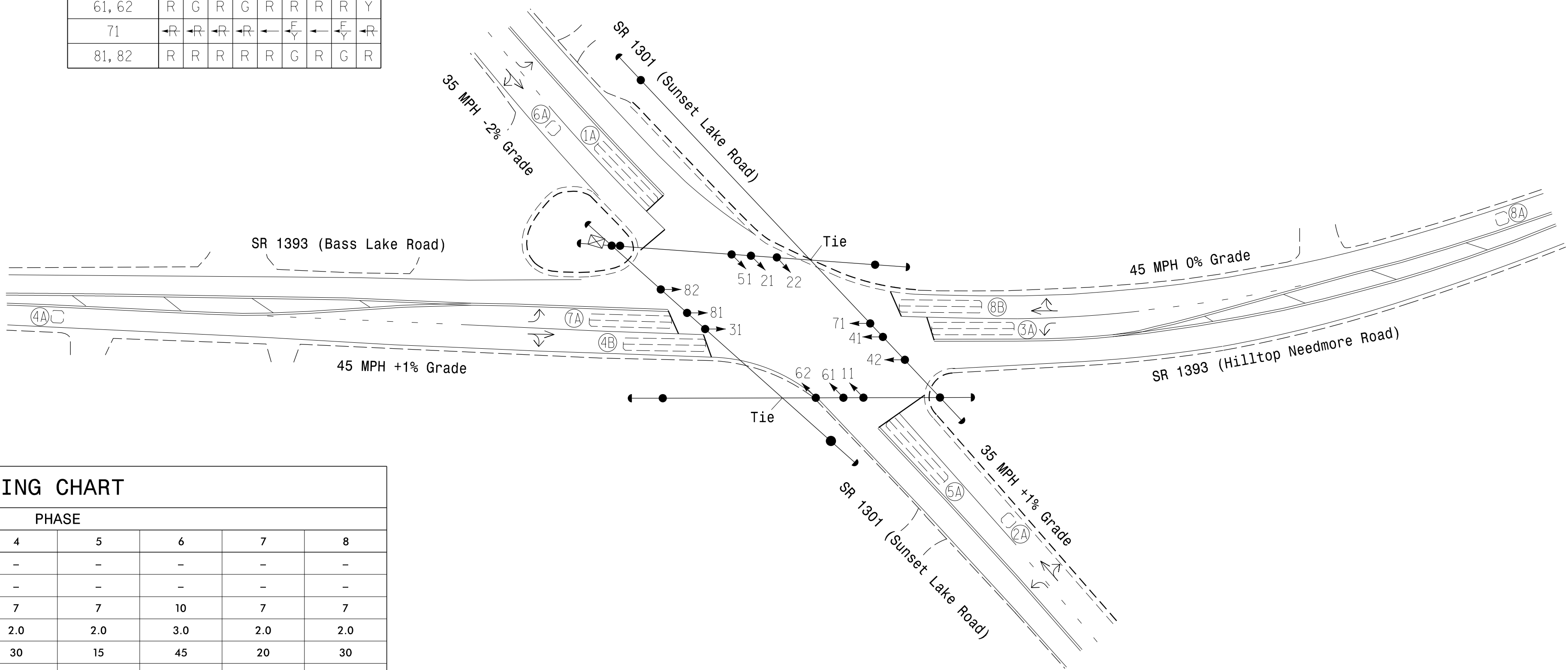
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	DELAY DURING GREEN	NEW CARD	
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	X
2A	6X6	70	EXIST	-	2	-	-	X	-	X	-	X
3A	6X40	0	2-4-2	-	3	15	-	X	-	X	-	X
4A	6X6	300	4	-	4	-	-	X	-	-	-	X
4B	6X40	0	2-4-2	-	4	5	2.0	X	-	X	X	X
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	X
6A	6X6	70	EXIST	-	6	-	-	X	-	X	-	X
7A	6X40	0	2-4-2	-	7	15	-	X	-	X	-	X
8A	6X6	300	4	-	8	-	-	X	-	-	-	X
8B	6X40	0	2-4-2	-	8	5	2.0	X	-	X	X	X

* Reduce delay to 3 seconds during alternate phasing operation
 # Disable phase call for loop(s) during alternate phasing operation

8 Phase Fully Actuated (Fuquay-Varina Signal System)

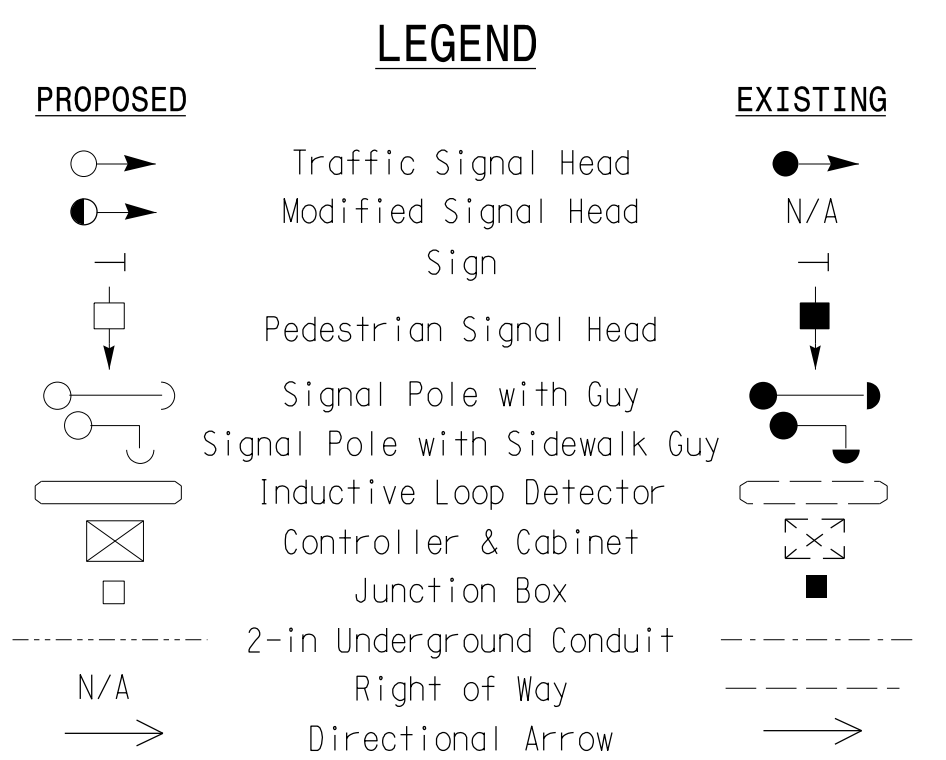
NOTES

- 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.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



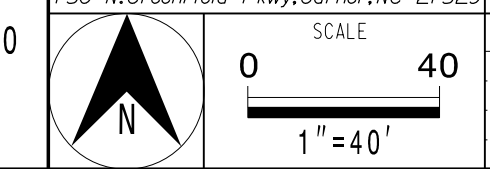
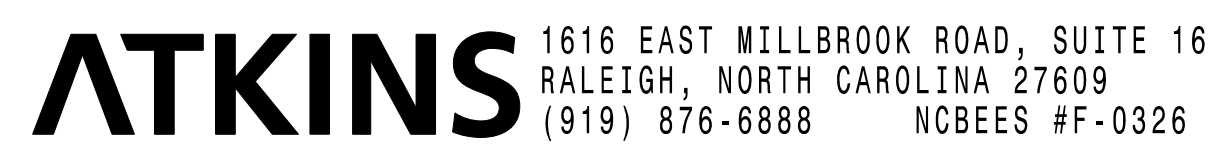
FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Walk *	-	-	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-	-	-
Min Green	7	10	7	7	7	10	7	7
Passage *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max I *	15	45	20	30	15	45	20	30
Yellow Change	3.0	4.0	3.0	4.5	3.0	4.0	3.0	4.5
Red Clear	3.6	2.6	2.1	1.5	3.3	2.6	1.6	1.5
Added Initial *	-	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	15	-	-	-	15
Time To Reduce *	-	-	-	30	-	-	-	30
Minimum Gap	-	-	-	3.0	-	-	-	3.0
Advance Walk	-	-	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-	X	X
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X

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



Signal Upgrade

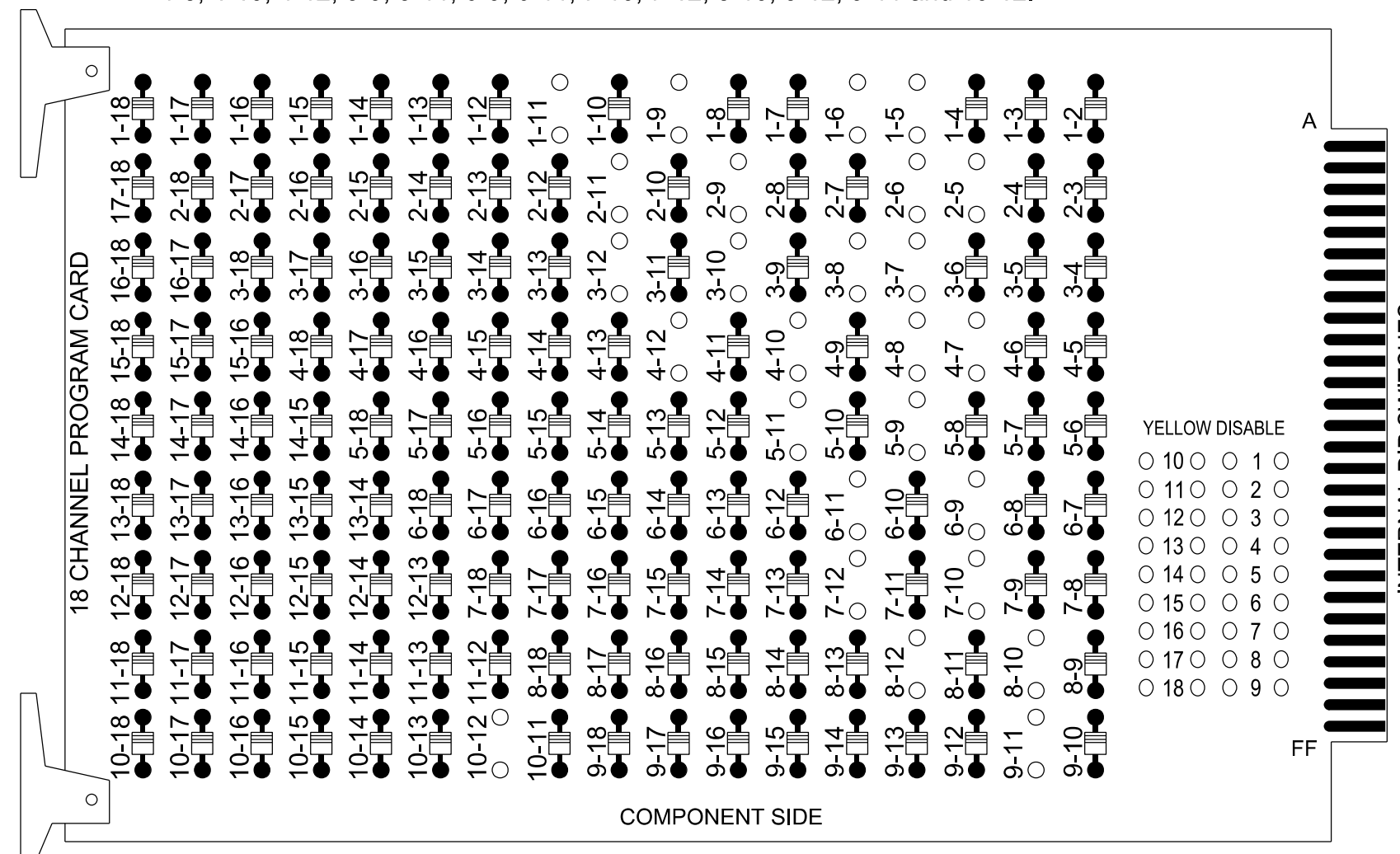
	SR 1301 (Sunset Lake Road) at SR 1393 (Hilltop Needmore Rd/ Bass Lake Road)		
	Division 5 Wake County Fuquay-Varina PLAN DATE: April 2023 PREPARED BY: JT Stiff	REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	



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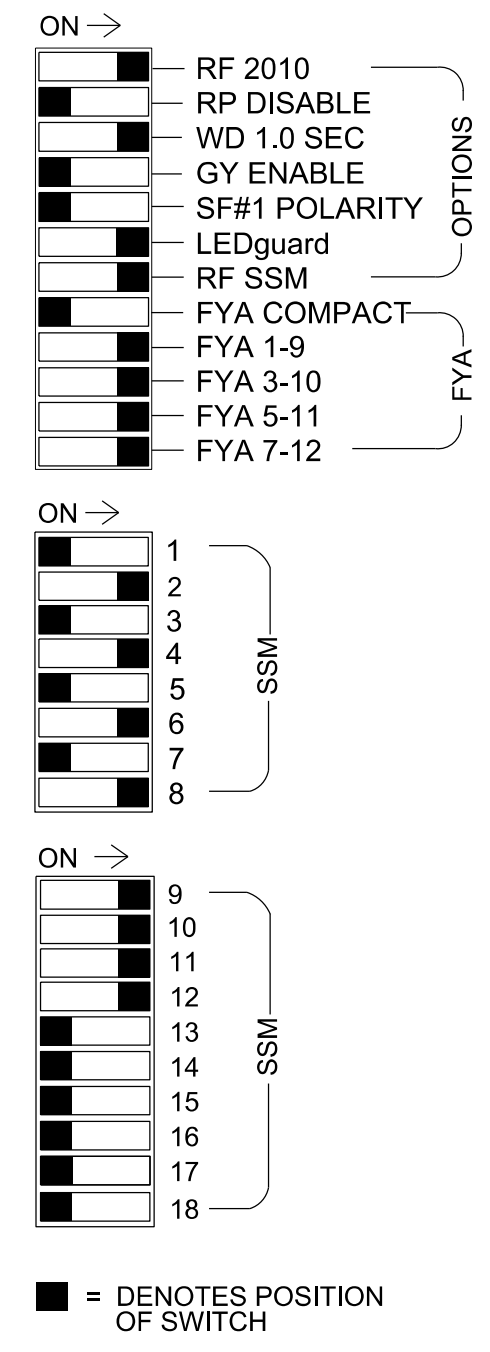
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(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, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11 and 10-12.



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 the Red Enable is active at all times during normal operation.
 - Integrate monitor with Ethernet network in cabinet.



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 plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S4, S5, S7, S8, S10, S11, AUX S1, AUX S2, AUX S4, AUX S5
 Phases Used.....1, 2, 3, 4, 5, 6, 7, 8
 Overlap "1".....*
 Overlap "2".....*
 Overlap "3".....*
 Overlap "4".....*

*See overlap programming detail on sheet 2

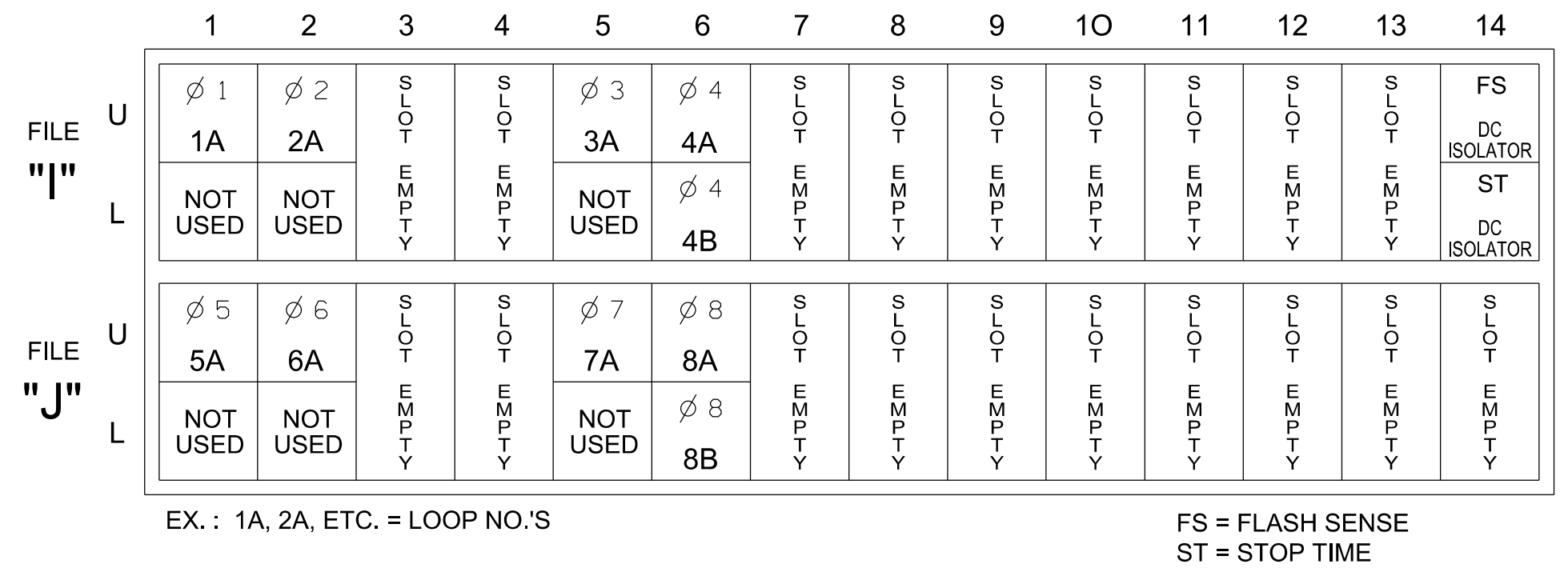
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11*	21,22	NU	31*	41,42	NU	51*	61,62	NU	71*	81,82	NU	11*	31*	NU	51*	71*	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			124							

NU = Not Used
 * 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)



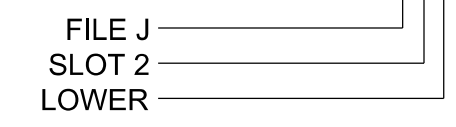
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	11U	56	18	1 *	1	15		X		X	
2A	TB2-5,6	12U	39	1	2 *	2			X		X	
3A	TB4-5,6	15U	58	20	7	3	15		X		X	
4A	TB4-9,10	16U	41	3	8	4			X			
4B	TB4-11,12	16L	45	7	9	4	5	2.0	X		X	X
5A	TB3-1,2	11U	55	17	15 *	5	15		X		X	
6A	TB3-5,6	12U	40	2	16	6			X		X	
7A	TB5-5,6	15U	57	19	21	7	15		X		X	
8A	TB5-9,10	16U	42	4	22	8			X		X	
8B	TB5-11,12	16L	46	8	23	8	5	2.0	X		X	X

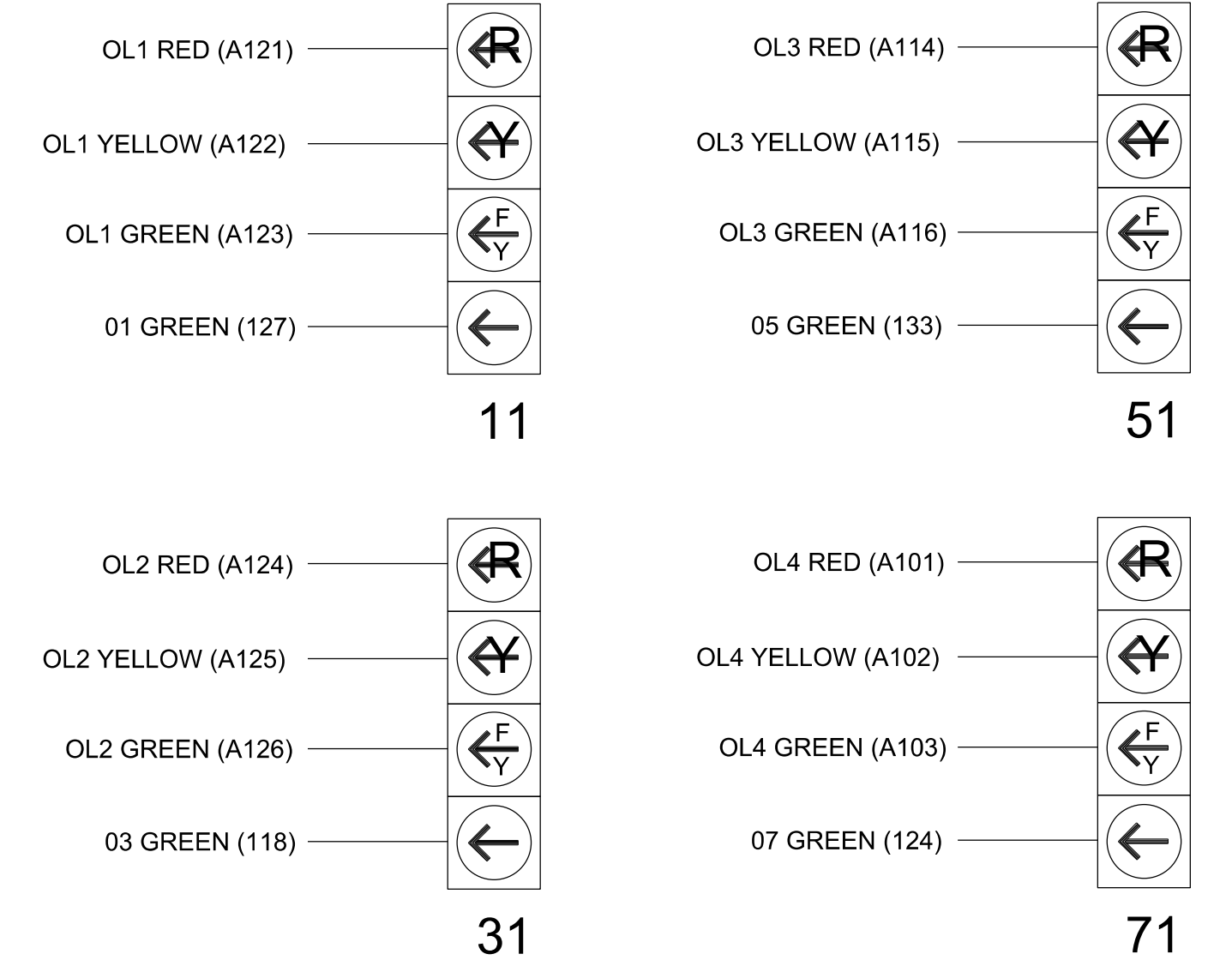
* For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L



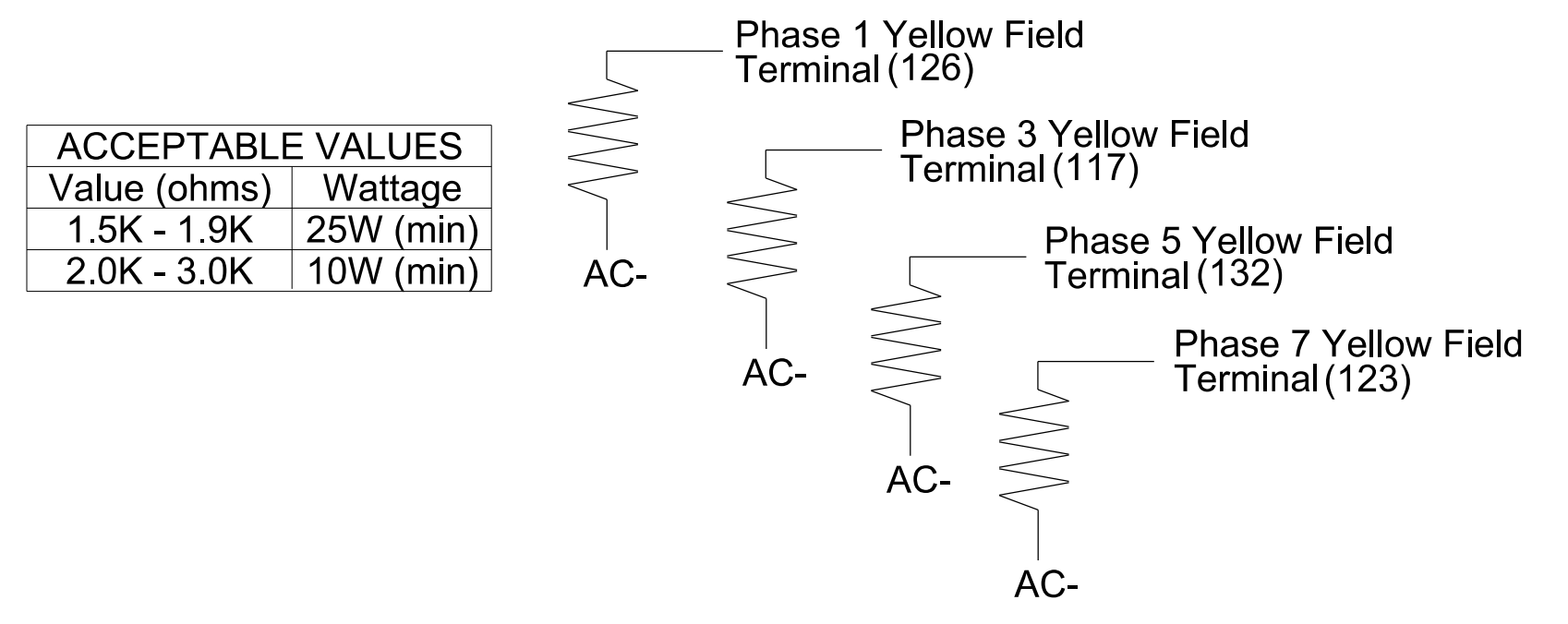
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0719
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

Document Not Considered Final Unless All Signatures Completed

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476

Division 5 Wake County Fuquay-Varina

Prepared for the Offices of: SR 1301 (Sunset Lake Road) at SR 1393 (Hilltop Needmore Road/ Bass Lake Road)

Prepared by: JT Stiff
 Reviewed by: AM Encarnacion
 Revisions: INT. DATE

1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

750 N. Greenfield Pkwy, Garner, NC 27529

4/14/2023
 Signature: Anthony Encarnacion
 Date: 4/14/2023
 Sig. Inventory No. 05-0719

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8
Modifier Phases	1	3	5	7
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2. A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 3A, 5A & 7A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

Detector	Call Phase	Delay
1A	1	3
	29	0

Detector	Call Phase	Delay
5A	15	3
	31	0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	4	-	8
Modifier Phases	1	3	5	7
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for heads 11, 31, 51, and 71 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

*The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

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: 05-0719
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:

Prepared for the Offices of:
 Transportation Mobility and Safety Division
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 Traffic Management Services
 750 N. Greenfield Pkwy, Garner, NC 27529

SR 1301 (Sunset Lake Road)
at
SR 1393 (Hilltop Needmore Road/
Bass Lake Road)

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE

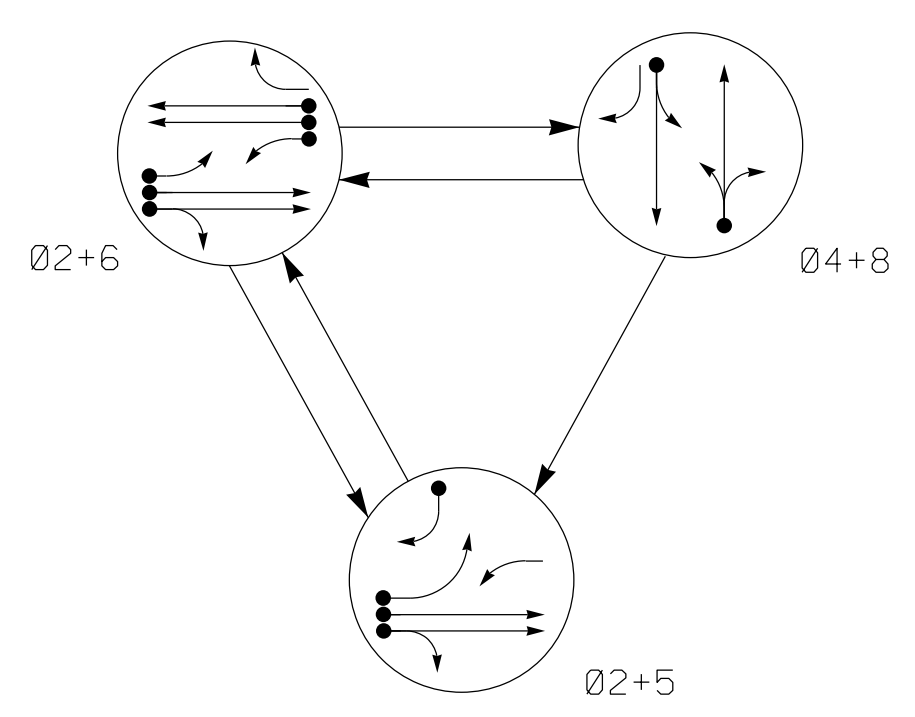
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Anthony Encarnacion
PROFESSIONAL ENGINEER
044476
ANTHONY M. ENCARNACION

4/14/2023
SIGNATURE DATE
SIG. INVENTORY NO. 05-0719

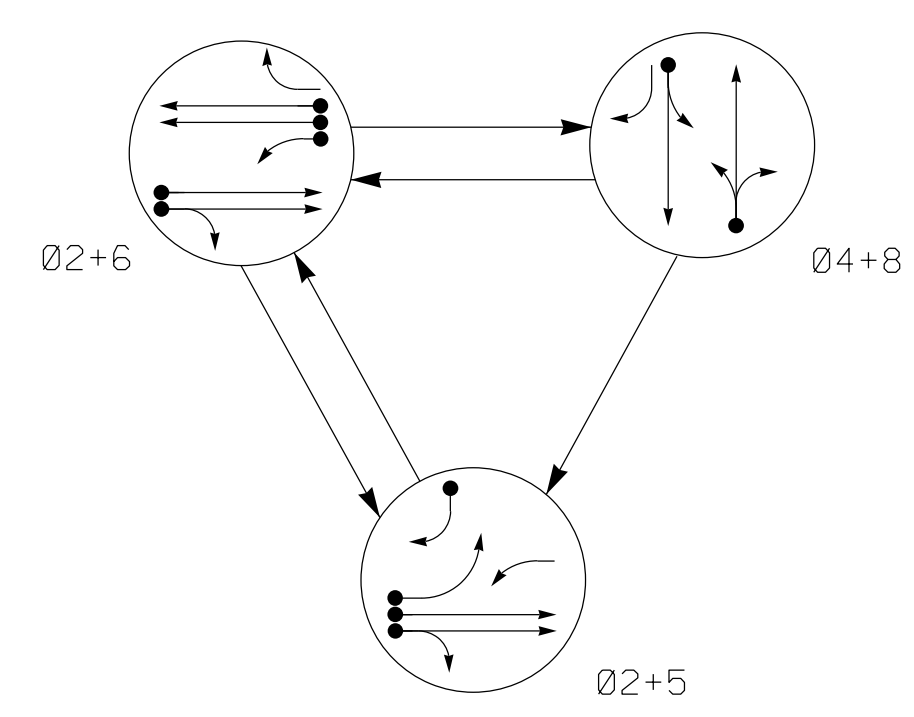
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 2+5	Ø 2+6	Ø 4+8	FLASH
21, 22	G	G	R	Y
41, 43	R	R	G	R
42	R	R	G	R
51	F	F	R	Y
61	F	F	R	Y
62, 63	R	G	R	Y
81, 82, 83	R	R	G	R

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 2+5	Ø 2+6	Ø 4+8	FLASH
21, 22	G	G	R	Y
41, 43	R	R	G	R
42	R	R	G	R
51	F	F	R	Y
61	F	F	R	Y
62, 63	R	G	R	Y
81, 82, 83	R	R	G	R

MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	DELAY DURING GREEN	NEW CARD	
2A	6X6	420	EXIST	-	2	-	-	X	X	X	-	X
2B	6X6	420	EXIST	-	2	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	-	4	-	-	X	-	X	-	X
5A	6X40	0	2-4-2	-	5	15*	-	X	-	X	-	X
5B	6X40	0	2-4-2	-	5	15	-	X	-	X	-	X
5C	6X15	0	EXIST	-	5	15	-	X	-	X	-	X
6A	6X6	420	EXIST	-	6	-	-	X	X	X	-	X
6B	6X6	420	EXIST	-	6	-	-	X	X	X	-	X
6C	6X40	0	2-4-2	-	6	3	-	X	-	X	X	X
8A	6X40	0	2-4-2	-	8	5	-	X	-	X	-	X

3 Phase Fully Actuated (Fuquay-Varina Signal System)

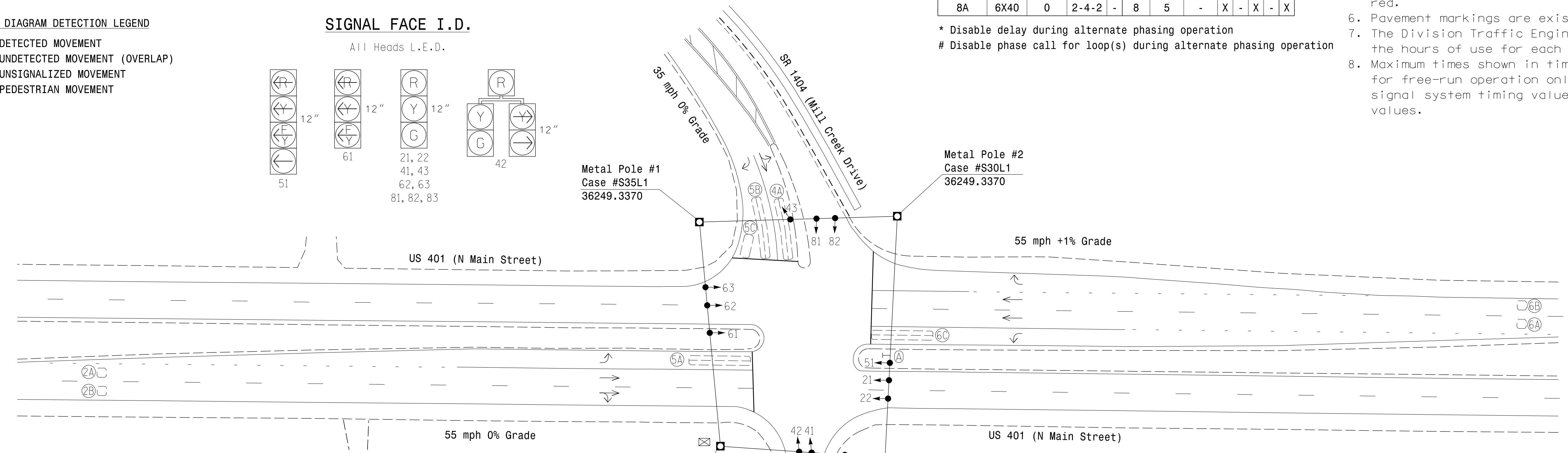
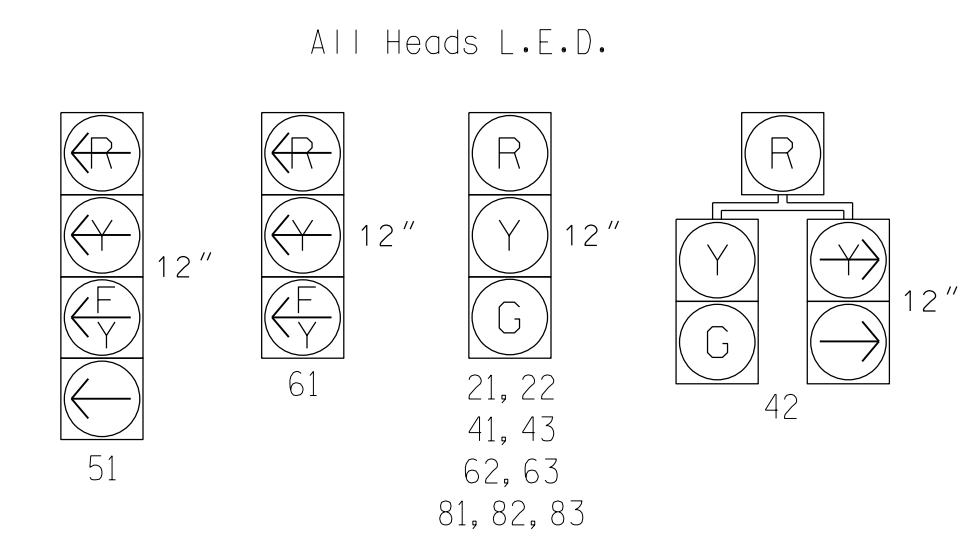
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "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 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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

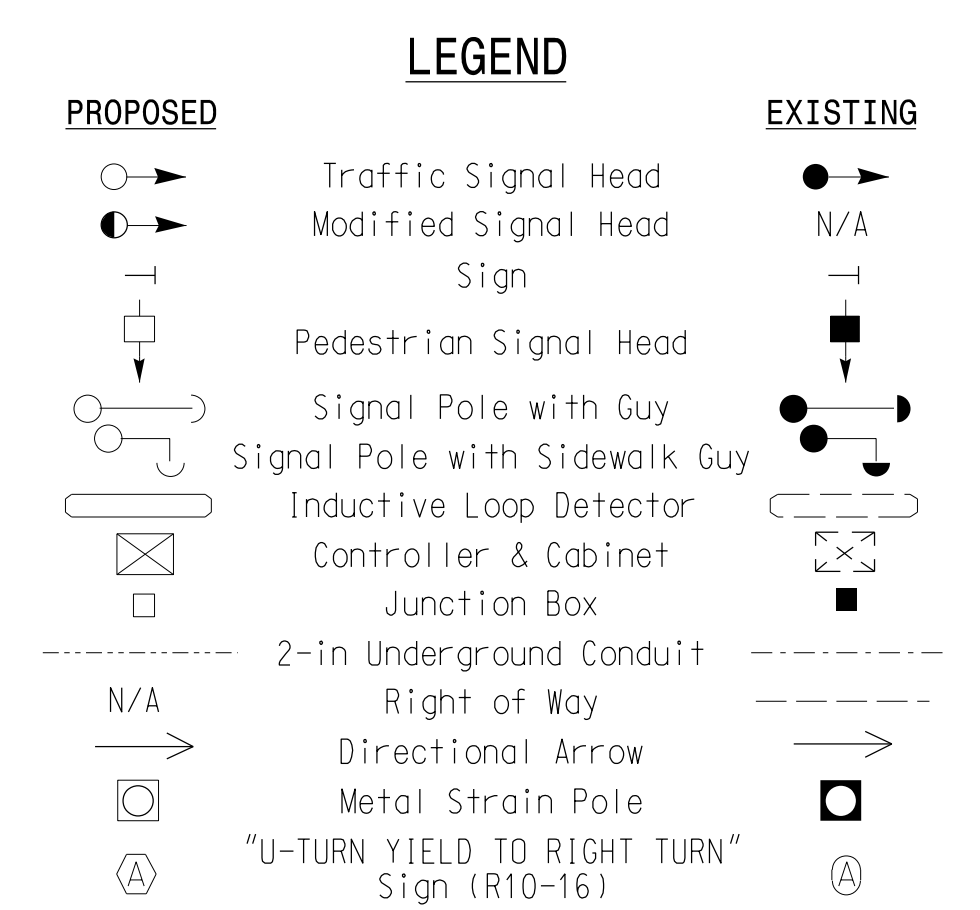
SIGNAL FACE I.D.



MAXTIME TIMING CHART

FEATURE	PHASE				
	2	4	5	6	8
Walk *	-	-	-	-	-
Ped Clear *	-	-	-	-	-
Min Green	14	7	7	14	7
Passage *	6.0	2.0	2.0	6.0	2.0
Max 1 *	90	40	30	90	40
Yellow Change	5.2	3.8	3.0	5.2	3.8
Red Clear	1.1	2.0	2.8	1.1	2.4
Added Initial *	1.8	-	-	1.8	-
Maximum Initial *	46	-	-	46	-
Time Before Reduction *	15	-	-	15	-
Time To Reduce *	30	-	-	30	-
Minimum Gap	3.4	-	-	3.4	-
Advance Walk	-	-	-	-	-
Non Lock Detector	-	X	X	-	X
Vehicle Recall	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	X	-	-	X

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



Signal Upgrade

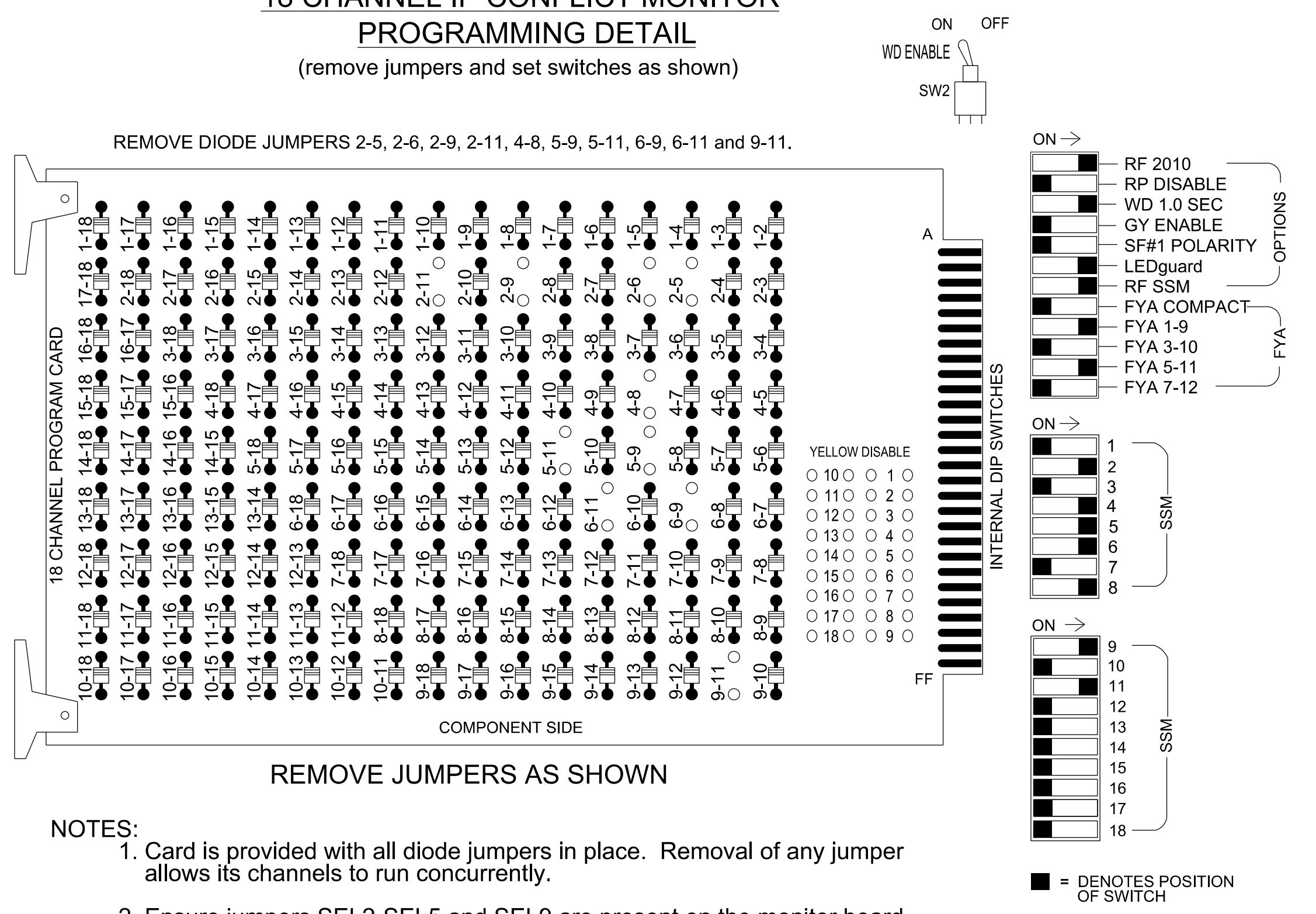
Prepared for the Offices of:

US 401 (N Main Street) at SR 1404 (Mill Creek Drive) / Ideal Lane
 Division 5 Wake County Fuquay-Varina
 PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
 PREPARED BY: JT Stiff REVIEWED BY: PL Alexander
 SCALE: 1"=40'
 DATE: 4/14/2023
 SIGNATURE: [Signature] DATE: [Date]
 SIG. INVENTORY NO. 05-0750

13-APR-2023 12:25
 D:\S\50363\3. mesk\ne.com\AT\MANC01\Documents\Roads and Br\Roads\Projects\100063268 Fuquay Var\Task\05-11_Signals\050750.stg_csn_2022mdd.dgn
 STIP4685 AT LUS47089

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11 and 9-11.
- 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 the Red Enable is active at all times during normal operation.
 - Integrate monitor with Ethernet network in cabinet.

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 plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S2, S5, S7, S8, S11, AUX S1, AUX S4
 Phases Used.....2, 4, 5, 6, 8
 Overlap "1".....*
 Overlap "2".....NOT USED
 Overlap "3".....*
 Overlap "4".....NOT USED

*See overlap programming detail on this sheet

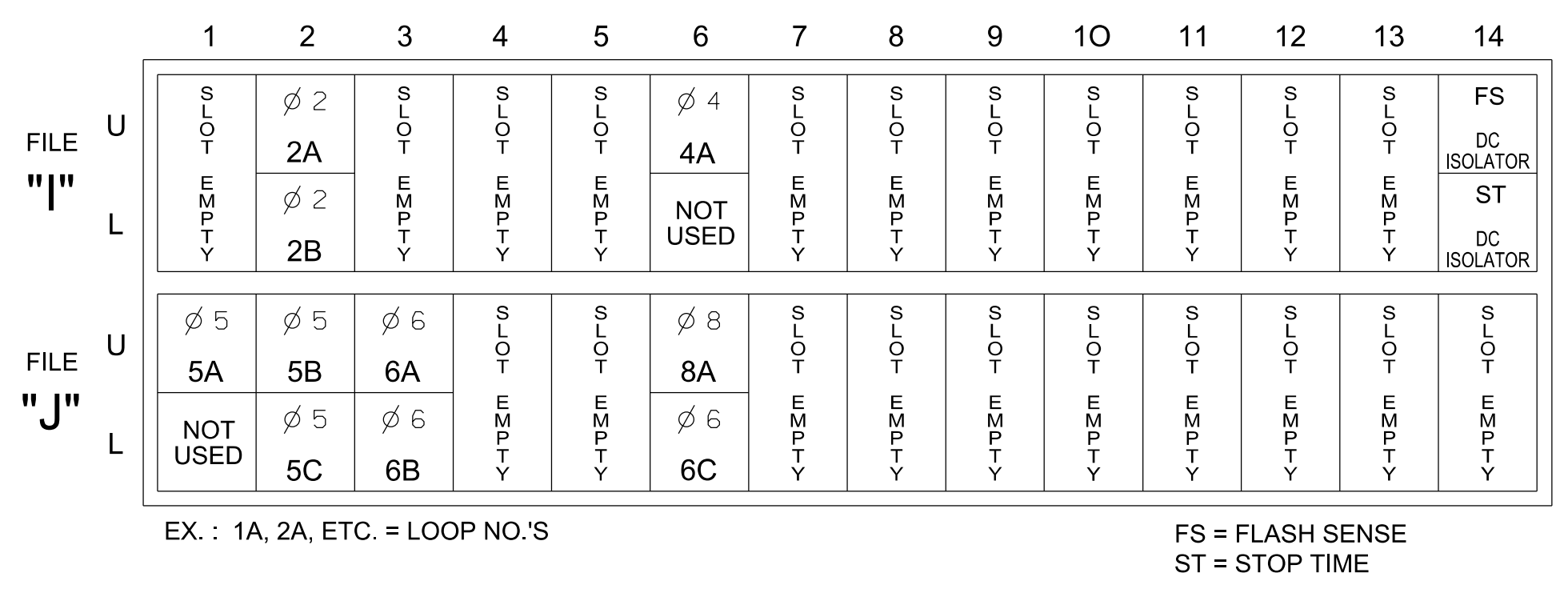
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42, 43	NU	42	51*	62,63	NU	NU	81,82, 83	NU	61*	NU	NU	51*	NU	NU
RED		128			101		*		134		107								
YELLOW		129			102				135		108								
GREEN		130			103				136		109								
RED ARROW														A121				A114	
YELLOW ARROW								132						A122				A115	
FLASHING YELLOW ARROW														A123				A116	
GREEN ARROW								133	133										

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

INPUT FILE POSITION LAYOUT

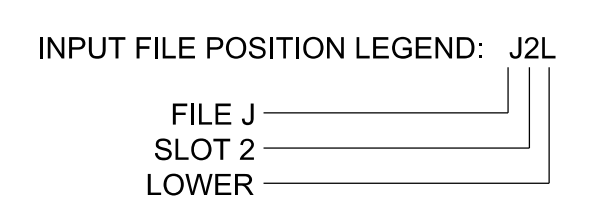
(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

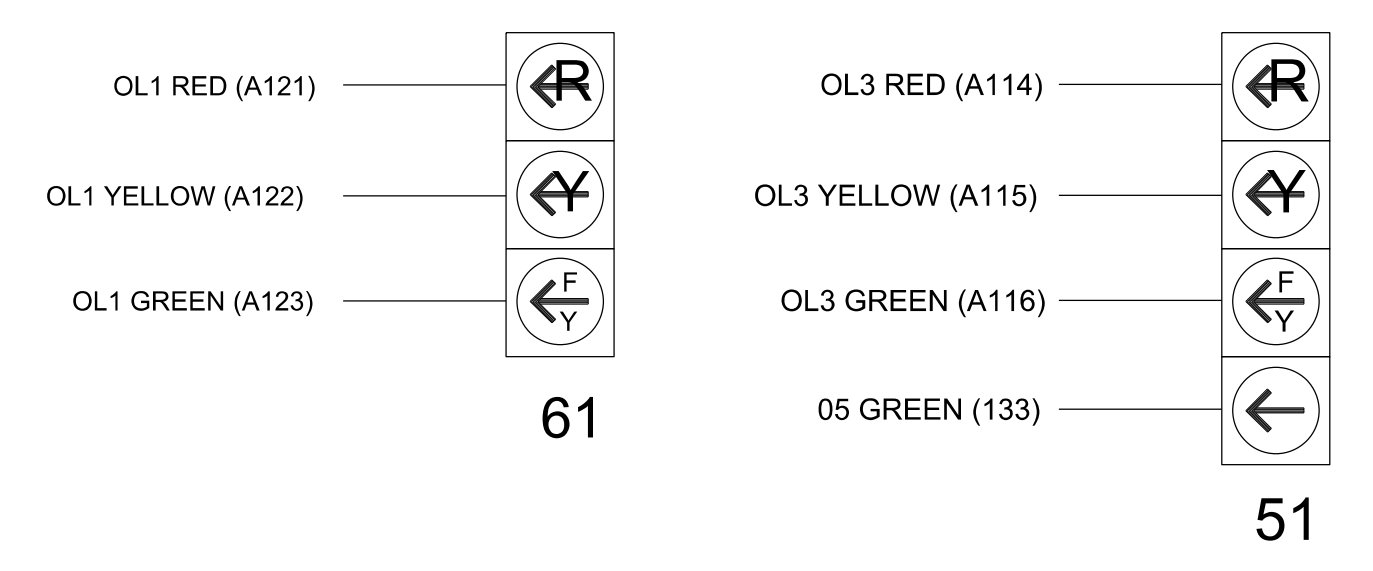
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
5A	TB3-1,2	J1U	55	17	15	5	15		X		X	
5B	TB3-5,6	J2U	40	2	16	5	15		X		X	
5C	TB3-7,8	J2L	44	6	17	5	15		X		X	
6A	TB3-9,10	J3U	64	30	18	6			X	X	X	
6B	TB3-11,12	J3L	77	43	19	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	5		X		X	
6C	TB5-11,12	J6L	46	8	23	6	3		X		X	X

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.



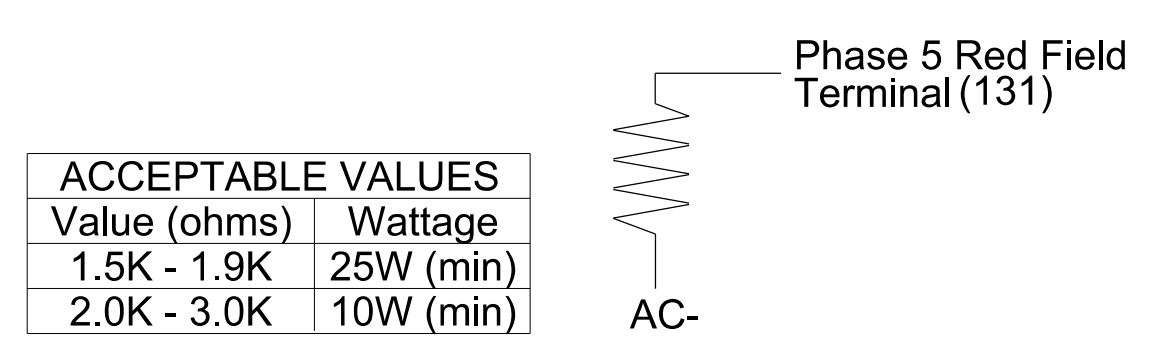
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0750
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

Prepared for the Offices of: 	US 401 (N Main Street) at SR 1404 (Mill Creek Drive)/ Ideal Lane		SEAL
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	
Revisions Table:			AUTHORIZED SIGNATURE: Anthony Encarnacion DATE: 4/14/2023 SIG. INVENTORY NO. 05-0750

13-APR-2023 12:25
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 ST14665 AT L0591089

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	2	-	6	-
Modifier Phases	-	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	-	FYA 4 - Section	-
Included Phases	2	-	-	-
Modifier Phases	-	-	5	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

5A

Detector	Call Phase	Delay
15	5	0
31	0	-

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2. A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

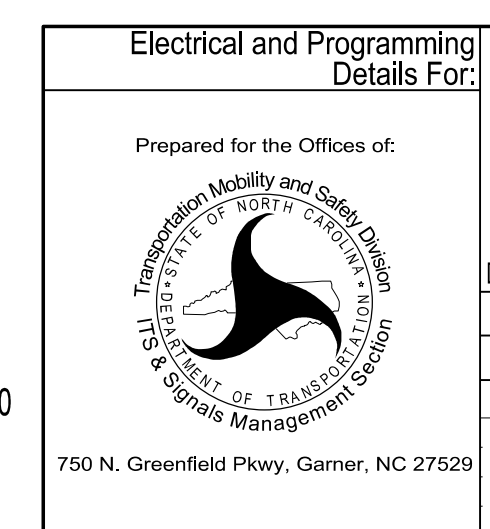
THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phase for head 51 to run protected turn only.

VEH DET PLAN 2: Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

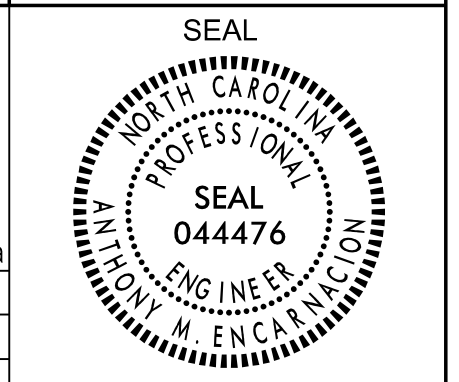
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0750
DESIGNED: APRIL 2023
SEALED: 4/14/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 2

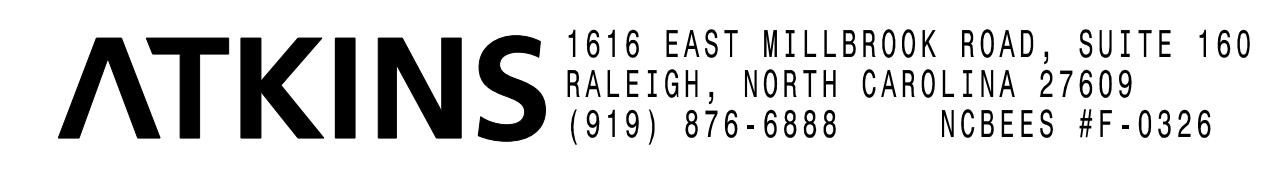


US 401 (N Main Street) at SR 1404 (Mill Creek Drive)/ Ideal Lane	
Division 5	Wake County Fuquay-Varina
PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

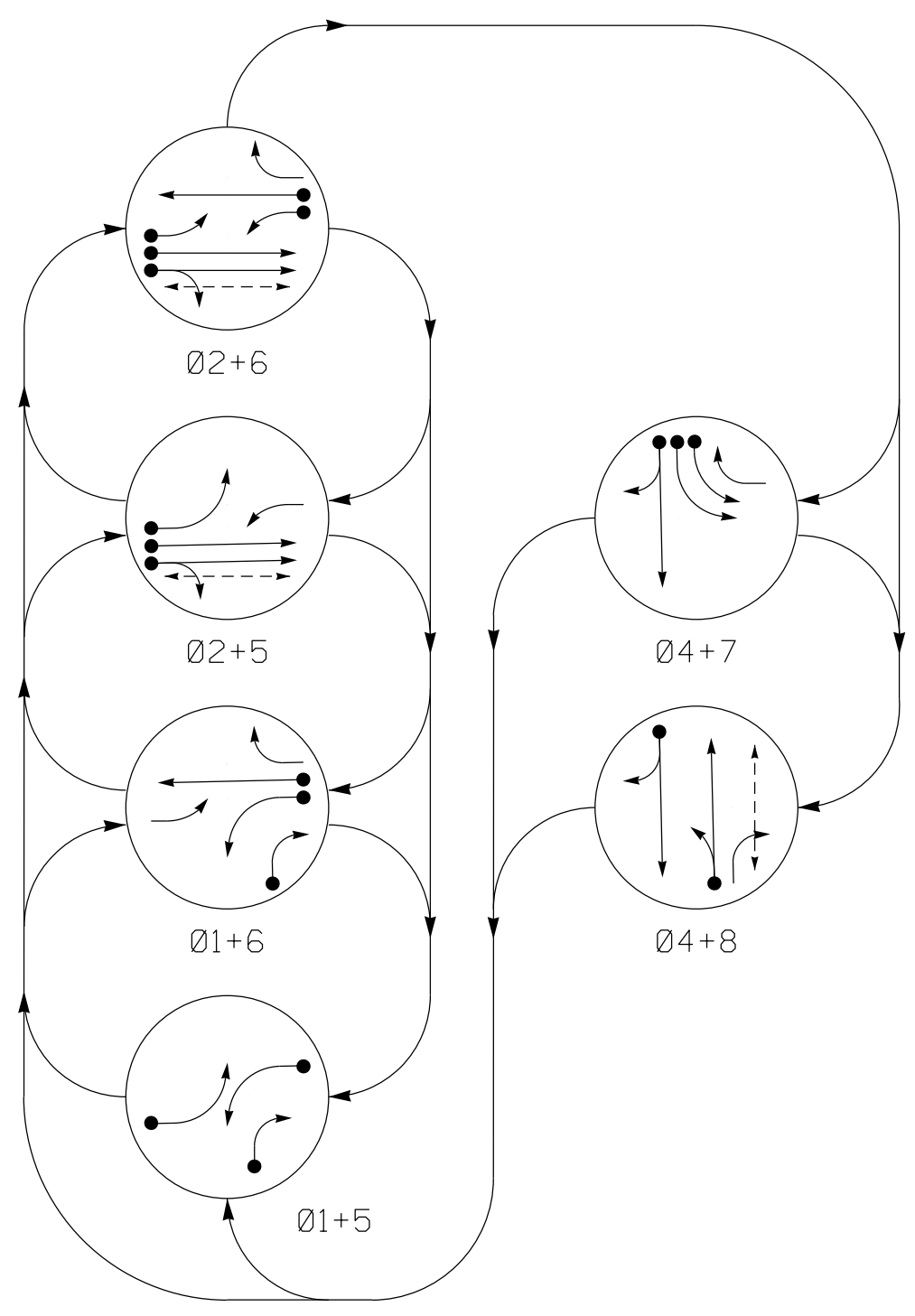


Designed by: Anthony Encarnacion 4/14/2023
Signature: _____ DATE: _____
SIG. INVENTORY NO. 05-0750



13-APR-2023 12:26 PW:///SUD0036343:work1.ris-com:ATKMANCO1/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/Task 05_11_23/ign1.s/Electrical Detail/050750_sm_e_2023mod.dgn 5174669 - AT 05091089

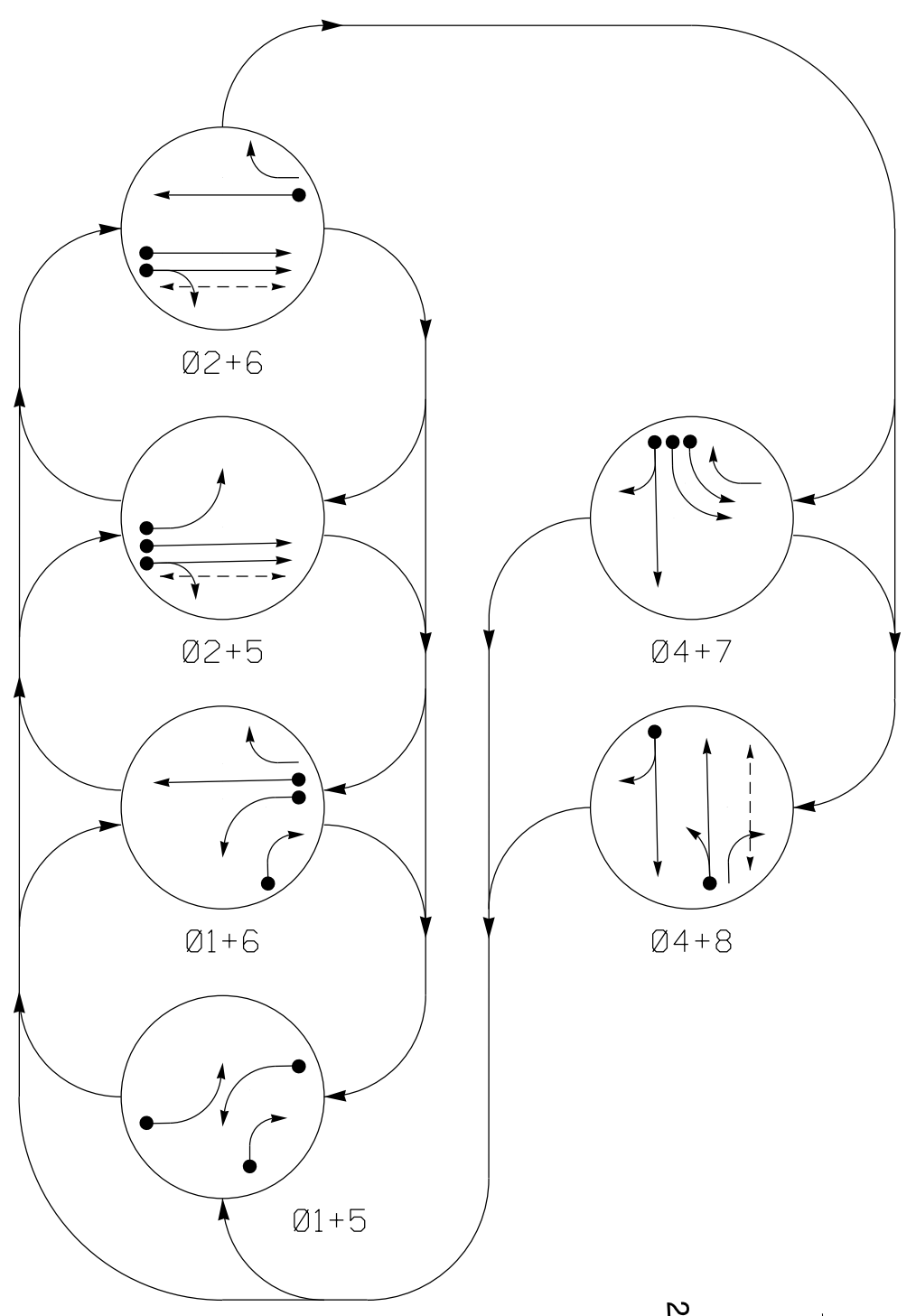
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	04+7	04+8	F	FL
11	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	Y	
41, 42	R	R	R	R	G	G	R	
51	←	←	←	←	←	←	←	←
61	R	G	R	G	R	R	Y	
62	R	G	R	G	R	R	Y	
71, 72	←	←	←	←	←	←	←	←
81	R	R	R	R	R	G	R	
82	R	R	R	R	R	G	R	
P21, P22	DW	DW	W	W	DW	DW	DRK	
P81, P82	DW	DW	DW	DW	DW	W	DRK	

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	04+7	04+8	F	FL
11	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	Y	
41, 42	R	R	R	R	G	G	R	
51	←	←	←	←	←	←	←	←
61	R	G	R	G	R	R	Y	
62	R	G	R	G	R	R	Y	
71, 72	←	←	←	←	←	←	←	←
81	R	R	R	R	R	G	R	
82	R	R	R	R	R	G	R	
P21, P22	DW	DW	W	W	DW	DW	DRK	
P81, P82	DW	DW	DW	DW	DW	W	DRK	

MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	CALL DURING GREEN	NEW CARD	
1A	6X40	0	2-4-2	-	1	15*	-	X	X	-	-	-
1B	6X40	0	2-4-2	-	1	15	-	X	X	-	-	-
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	10	-	X	X	-	-	-
5A	6X40	0	2-4-2	-	5	15*	-	X	X	-	-	-
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	-
7A	6X40	0	2-4-2	-	7	3	-	X	X	-	-	-
7B	6X40	0	2-4-2	-	7	-	-	X	X	-	-	-
8A	6X40	0	2-4-2	-	8	3	-	X	X	-	-	-

* Reduce delay to 3 seconds during alternate phasing operation
Disable phase call(s) for loop(s) during alternate phasing operation

6 Phase Fully Actuated (Fuquay-Varina Signal System)

NOTES

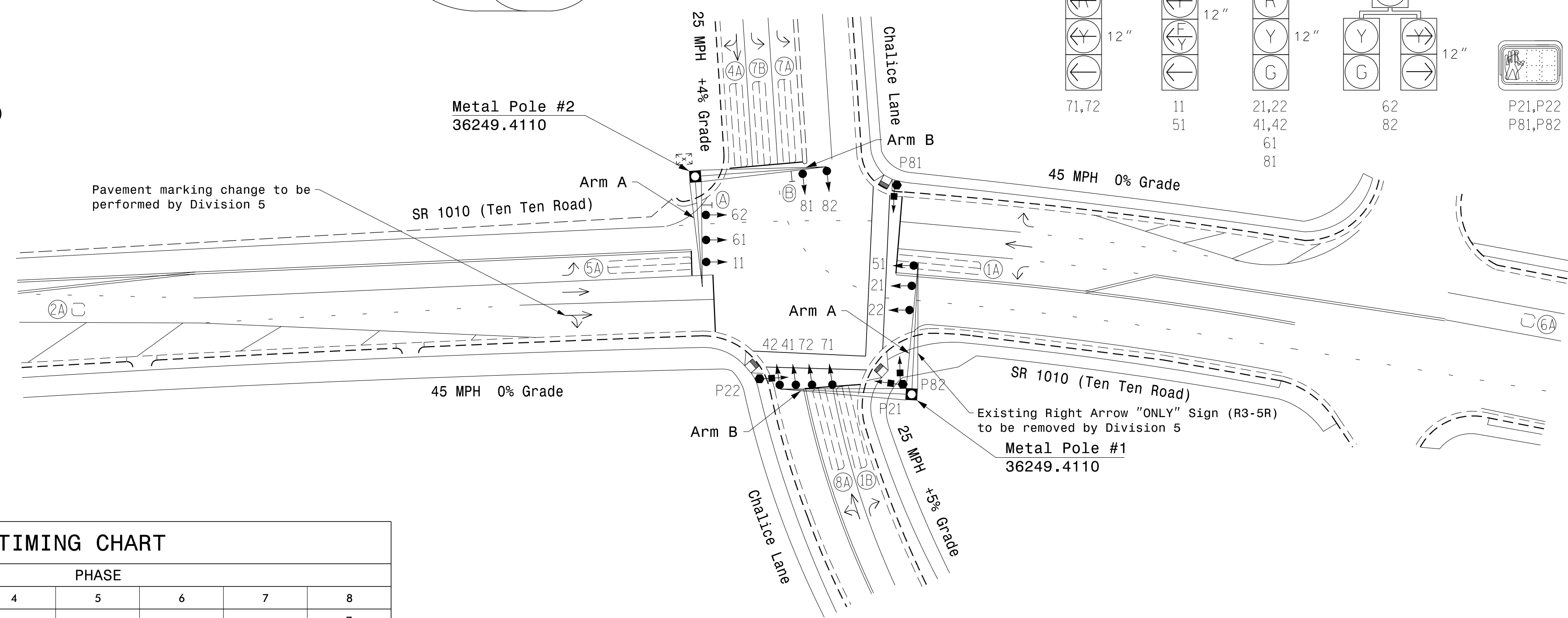
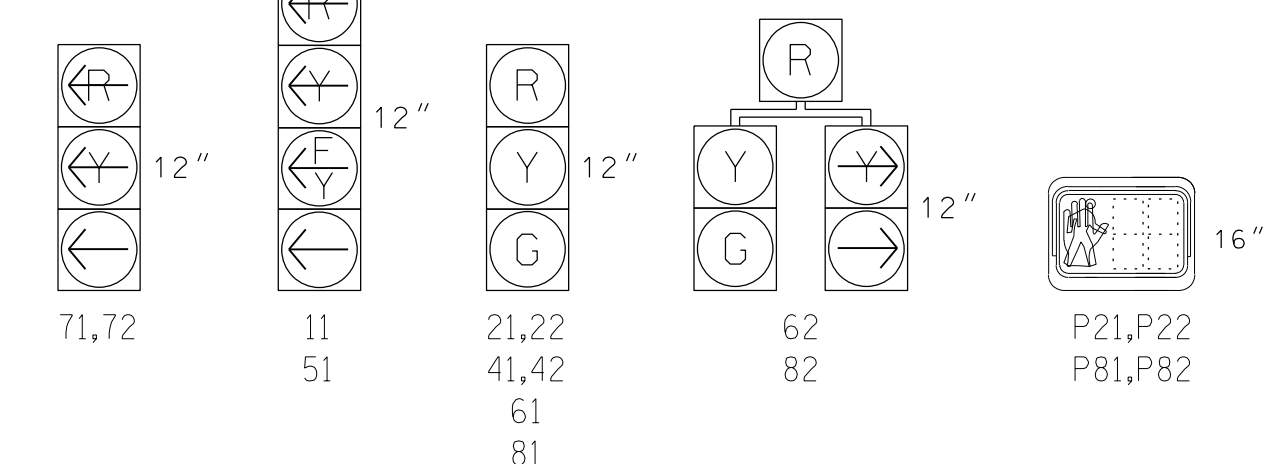
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Omit phase 7 during phase 8 on.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
- Pavement markings are existing unless otherwise shown.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Install new controller, software and conflict monitor in existing cabinet.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Remove Right Arrow "ONLY" Sign (R3-5R) from Metal Pole 1 - Arm A

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME TIMING CHART

FEATURE	PHASE							
	1	2	4	5	6	7	8	
Walk *	-	7	-	-	-	-	7	
Ped Clear *	-	12	-	-	-	-	22	
Min Green	7	12	7	7	12	7	7	
Passage *	2.0	6.0	2.0	2.0	6.0	2.0	2.0	
Max I *	20	75	20	20	75	20	20	
Yellow Change	3.0	4.5	3.0	3.0	4.5	3.0	3.0	
Red Clear	2.4	1.3	2.9	2.6	1.3	2.9	2.9	
Added Initial *	-	2.5	-	-	2.5	-	-	
Maximum Initial *	-	34	-	-	34	-	-	
Time Before Reduction *	-	15	-	-	15	-	-	
Time To Reduce *	-	30	-	-	30	-	-	
Minimum Gap	-	3.0	-	-	3.0	-	-	
Advance Walk	-	3	-	-	-	-	3	
Non Lock Detector	X	-	X	X	-	X	X	
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-	-	
Dual Entry	-	-	X	-	-	-	X	

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

LEGEND

- | PROPOSED | EXISTING |
|--|--|
| ○ → Traffic Signal Head | ● → Traffic Signal Head |
| ○ → Modified Signal Head | N/A |
| ○ → Pedestrian Signal Head With Push Button & Sign | ○ → Pedestrian Signal Head |
| ○ → Signal Pole with Guy | ○ → Signal Pole with Guy |
| ○ → Signal Pole with Sidewalk Guy | ○ → Signal Pole with Sidewalk Guy |
| ○ → Inductive Loop Detector | ○ → Inductive Loop Detector |
| ○ → Controller & Cabinet | ○ → Controller & Cabinet |
| ○ → Junction Box | ○ → Junction Box |
| ○ → 2-in Underground Conduit | ○ → 2-in Underground Conduit |
| N/A → Right of Way | ○ → Right of Way |
| ○ → Directional Arrow | ○ → Directional Arrow |
| ○ → Metal Pole with Mastarm | ○ → Metal Pole with Mastarm |
| ○ → Type II Signal Pedestal | ○ → Type II Signal Pedestal |
| N/A → Curb Ramp | ○ → Curb Ramp |
| ○ → Right Arrow "ONLY" Sign (R3-5R) | ○ → Right Arrow "ONLY" Sign (R3-5R) |
| ○ → Combined Through and Left Arrow Sign (R3-6L) | ○ → Combined Through and Left Arrow Sign (R3-6L) |

Signal Upgrade

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1010 (Ten Ten Road) at Chalice Lane

Division 5 Wake County Fuquay-Varina

PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion

PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

REVISIONS: _____ INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PL Alexander
Professional Engineer
License No. 044476

1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-8888 NCBEES #F-0326

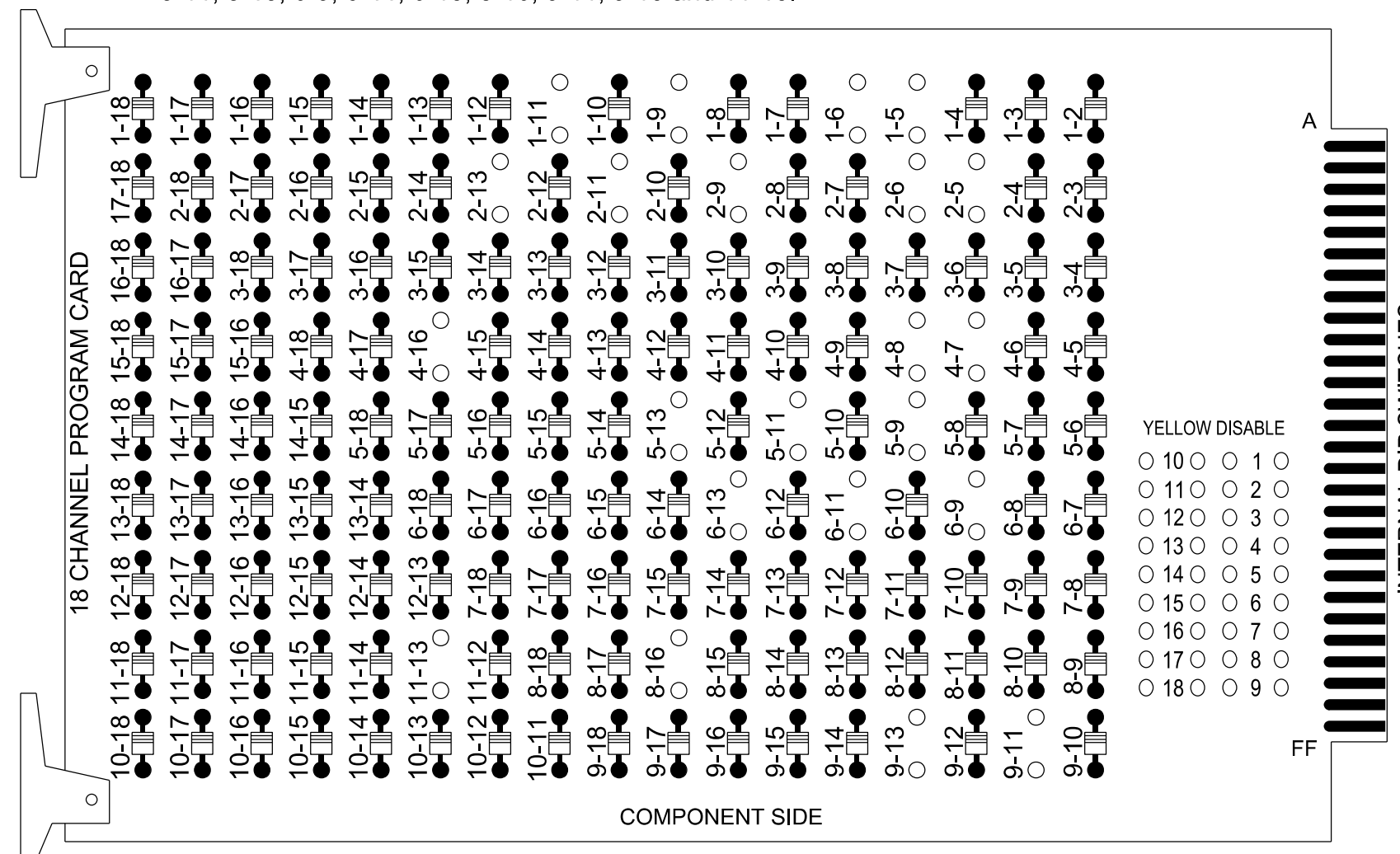
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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

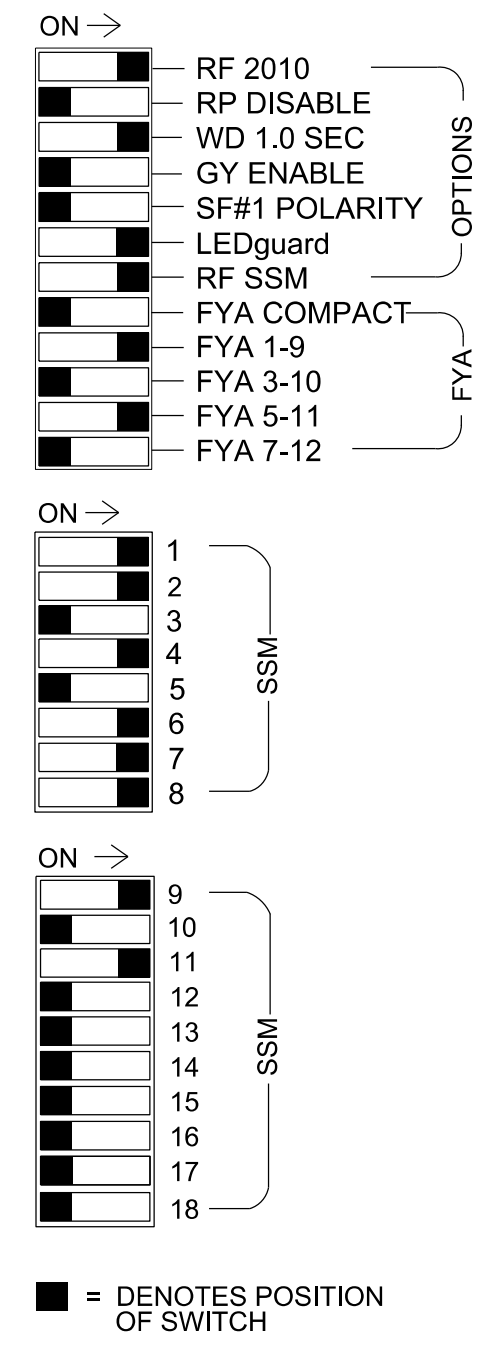
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 4-7, 4-8, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 8-16, 9-11, 9-13 and 11-13.



REMOVE JUMPERS AS SHOWN

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 the Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.



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 plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Fuquay-Varina Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S3, S5, S7, S8, S10, S11, S12, AUX S1, AUX S4,
 Phases Used.....1, 2, 2PED, 4, 5, 6, 7, 8, 8PED
 Overlap "1".....*
 Overlap "2".....NOT USED
 Overlap "3".....*
 Overlap "4".....NOT USED

*See overlap programming detail on this sheet

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6			
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18			
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE			
SIGNAL HEAD NO.	11*	82	21,22	P21, P22	NU	41,42	NU	51*	61,62	NU	71,72	62	81,82	P81, P82	11*	NU	NU	51*	NU	NU	
RED	*	128				101			134				107								
YELLOW		129				102		*	135				108								
GREEN		130				103			136				109								
RED ARROW												122				A121			A114		
YELLOW ARROW	126											123	123			A122			A115		
FLASHING YELLOW ARROW																A123			A116		
GREEN ARROW	127	127							133			124	124								
Hand icon																				110	
Walking person icon																					112

NU = Not Used

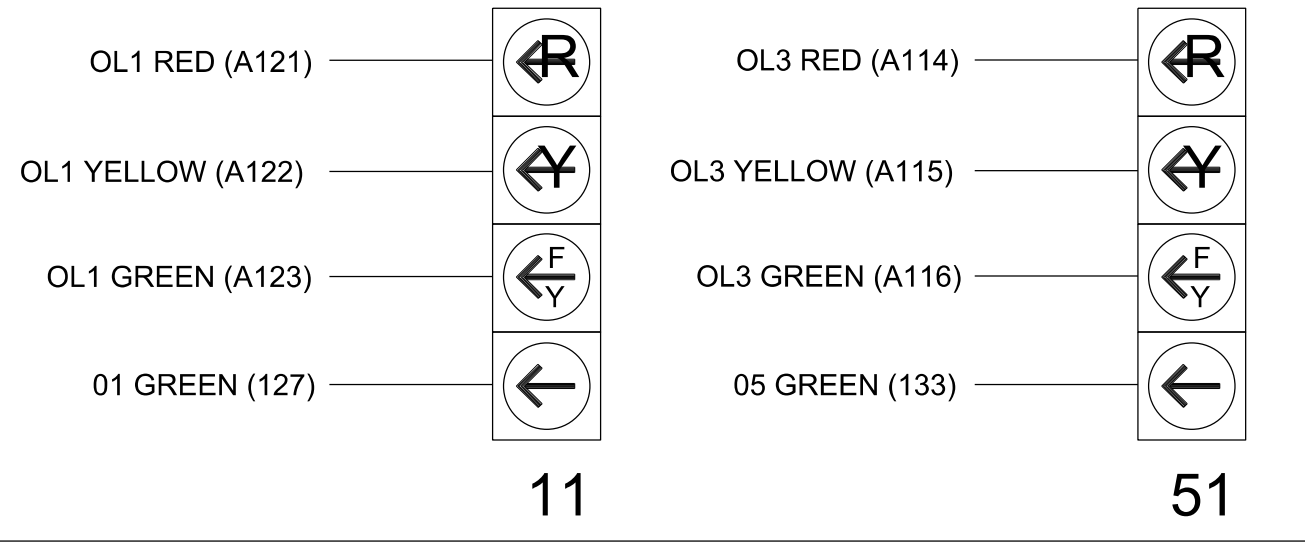
* Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail this sheet.

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.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

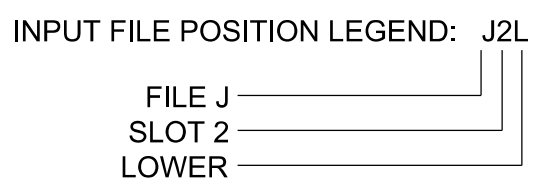
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
1B	TB2-5,6	I2U	39	1	29 ★	6	3		X		X	X
2A	TB2-9,10	I3U	63	29	4	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
6A	TB3-9,10	J3U	64	30	18	6			X	X	X	
7A	TB5-5,6	J5U	57	19	21	7	3		X		X	
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
7B	TB7-11,12	J9L	61	23	28	7			X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

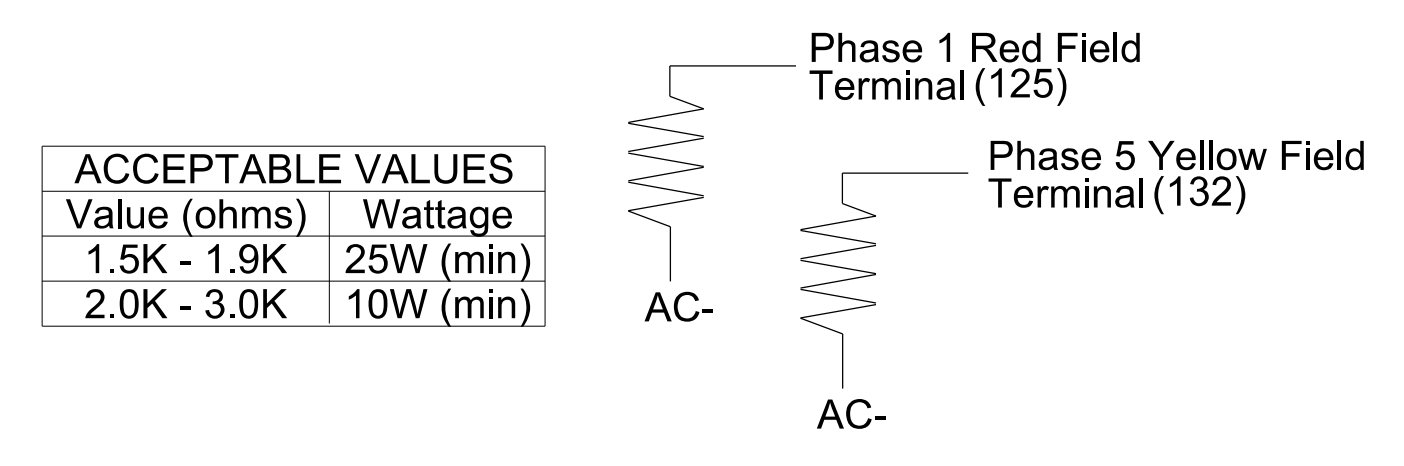
NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-0888
 DESIGNED: APRIL 2023
 SEALED: 4/14/2023
 REVISED: N/A

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBEES #F-0326

Electrical Detail - Sheet 1 of 2

Prepared for the Offices of:

 Division 5 Wake County Fuquay-Varina
 PLAN DATE: April 2023 REVIEWED BY: AM Encarnacion
 PREPARED BY: JT Stiff REVIEWED BY: PL Alexander
 REVISIONS INT. DATE
 750 N. Greenfield Pkwy, Garner, NC 27529
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
 SEAL

 AUTHORIZED SIGNATURE DATE: 4/14/2023
 SIGNATURE: Anthony Encarnacion
 DATE: 4/14/2023
 SIG. INVENTORY NO. 05-0888

13-APR-2023 12:27 PW://SUD0036433_worh.ris.com:ATKMANCO/Projects/100063268_Fuquay_Var/Ino/Task_05_11_21/signals/Electrical/Detail/13/050888_sm_e_2022mdd.dgn ST14665 AT L05491089