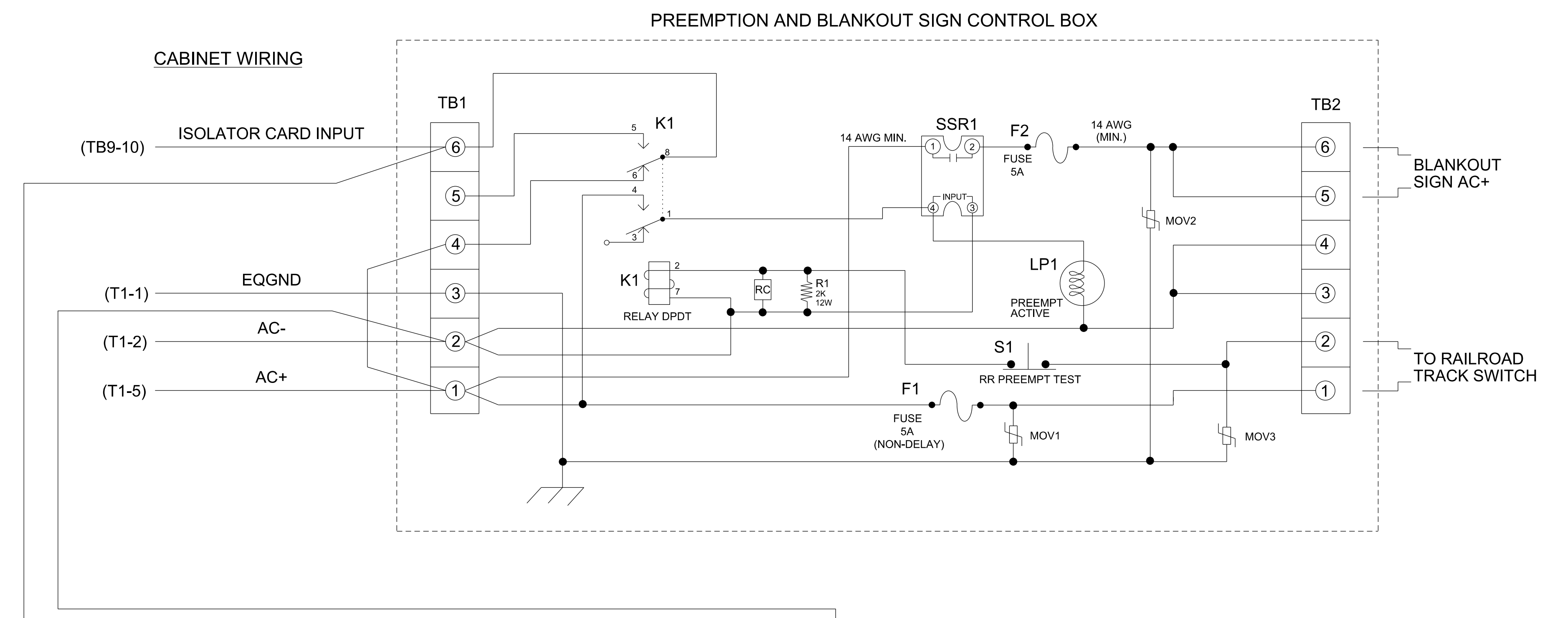


### RAILROAD PREEMPTION WIRING DETAIL

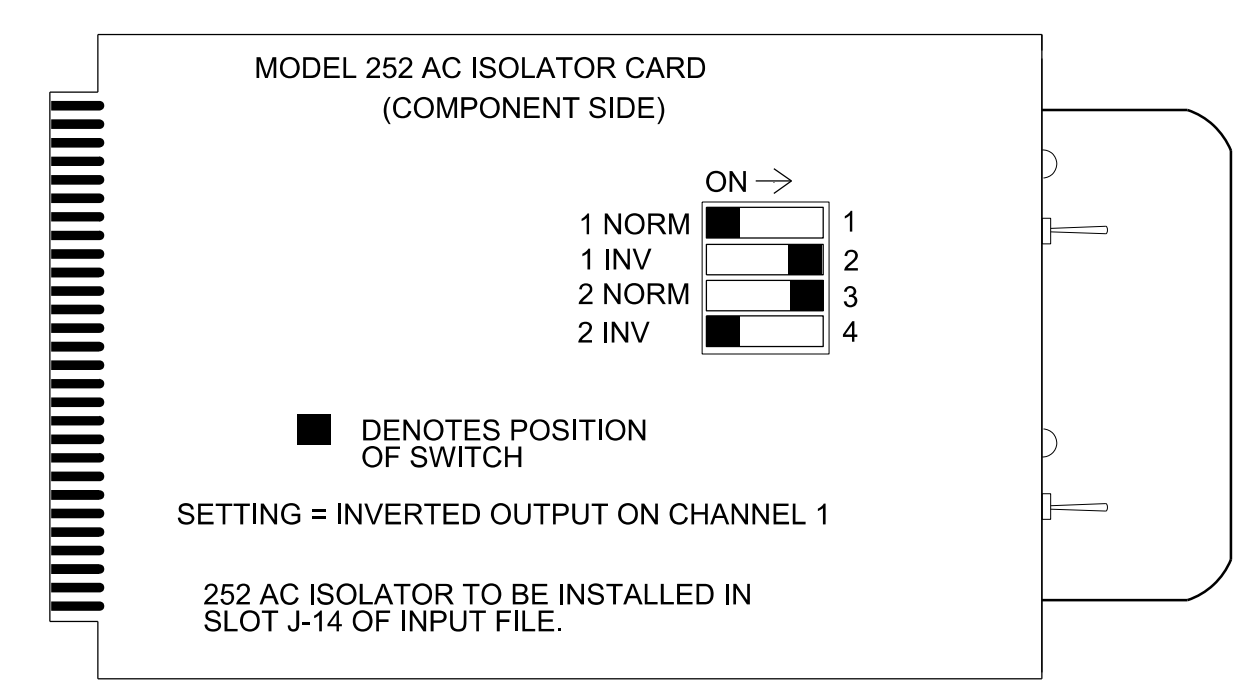
(wire as shown below)

- #### 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.
  - RC networks are valued at .1 microfarad, 100 ohm.
  - 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).
  - Relay K2 is a SPDT with 120 VAC coil and 10 Amp contacts with octal base.
  - Terminal block TB0 is located in the rear of the controller cabinet.

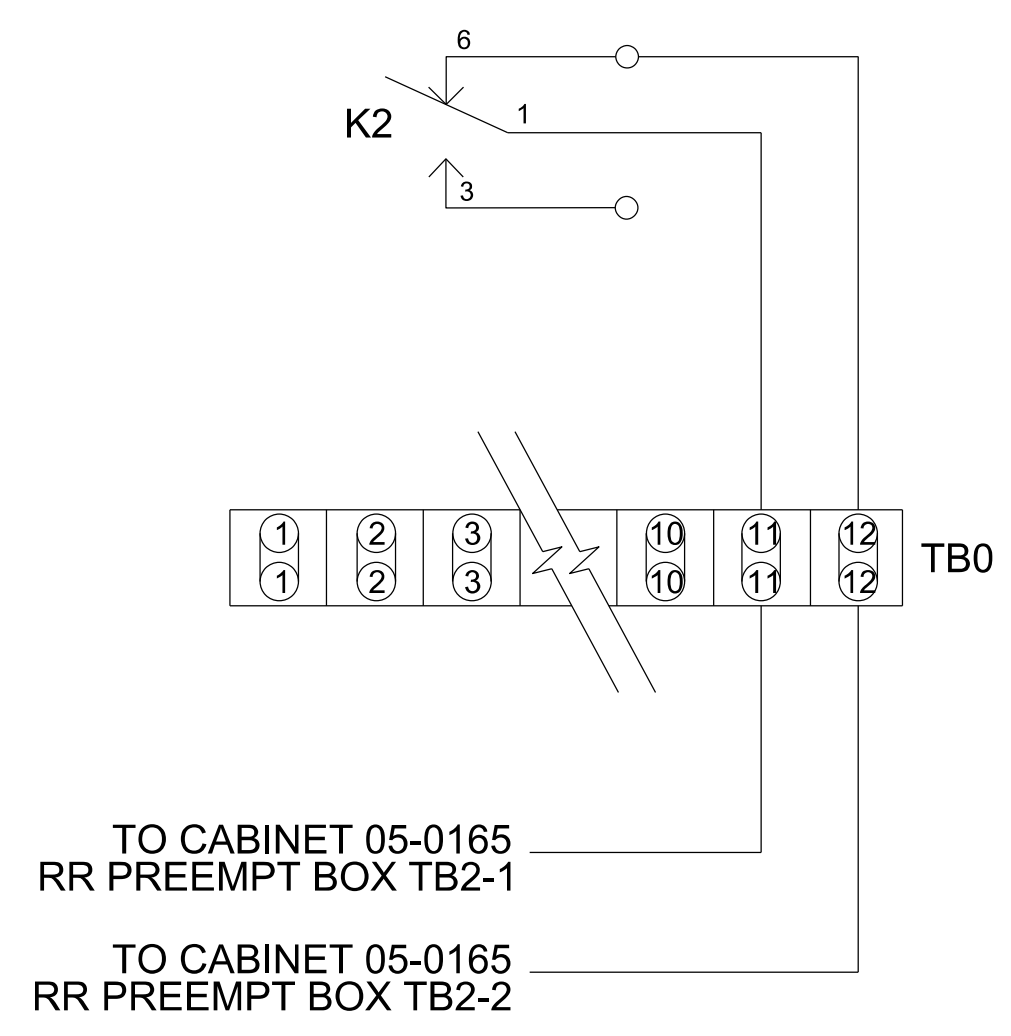
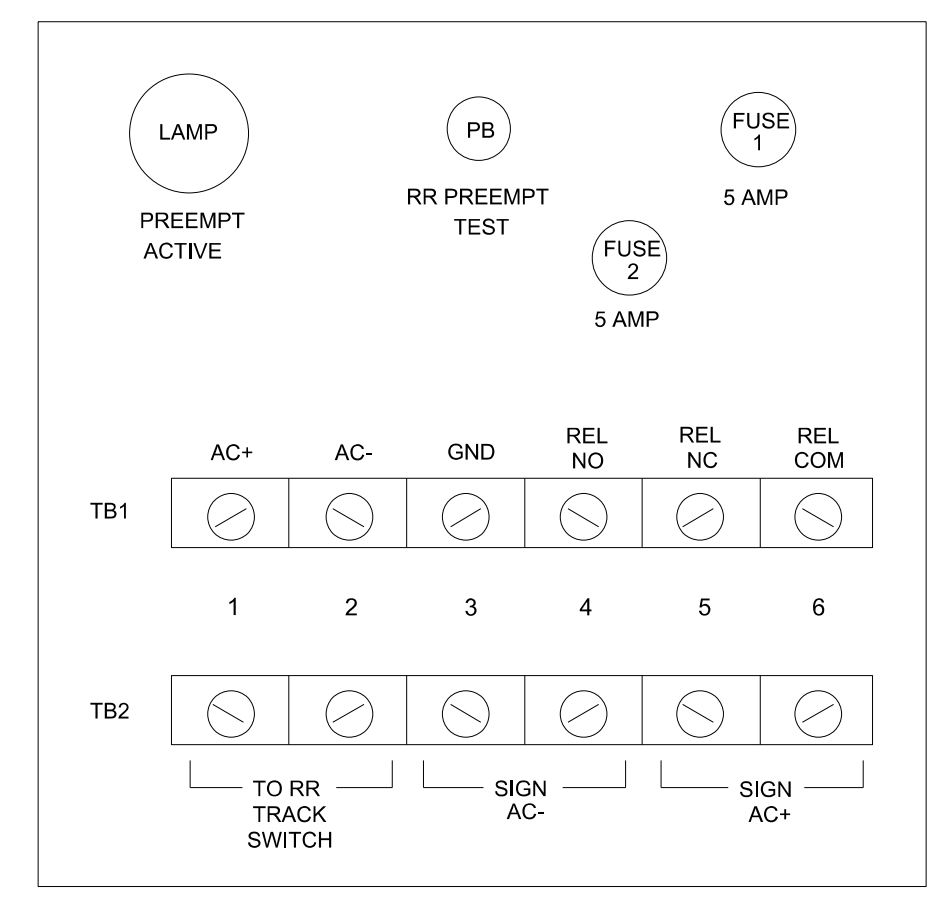


#### PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

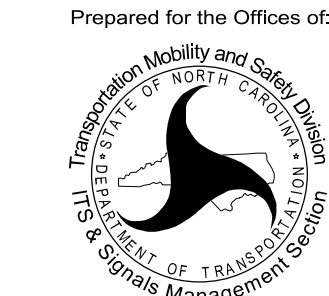
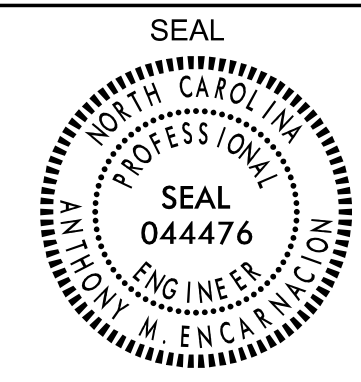


#### FRONT VIEW



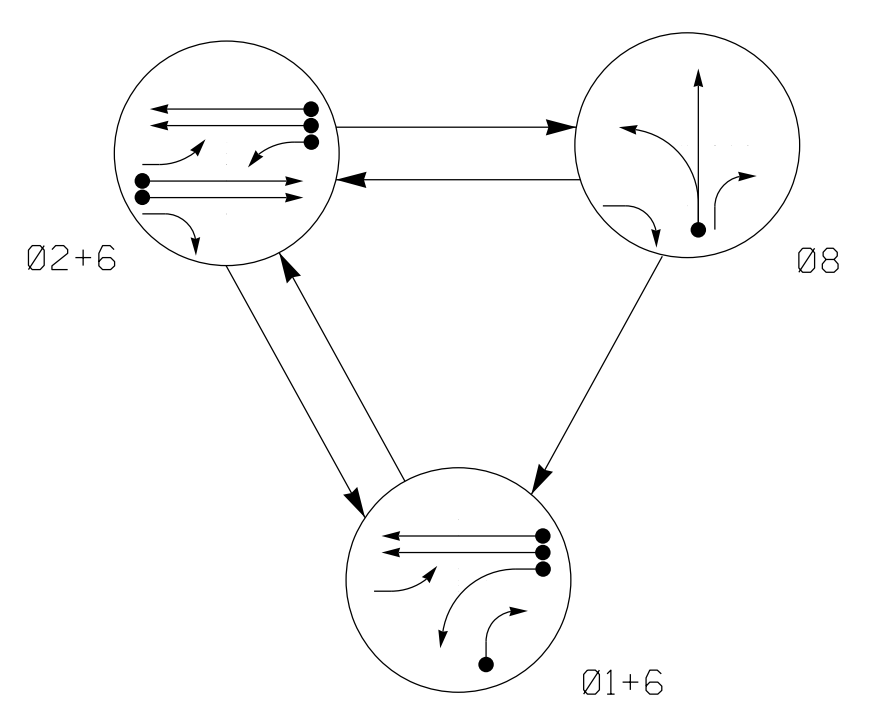
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2252  
 DESIGNED: APRIL 2023  
 SEALED: 4/14/2023  
 REVISED: N/A

Electrical Detail - Sheet 4 of 4

Electrical and Programming Details For: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	<b>NC 55/SR 1402 (E Broad Street) at NC 55 (N Ennis Street)</b>		SEAL  SEAL 044476 ANTHONY M. ENCARNACION ENGINEER						
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander		Fuquay-Varina DATE:					
Revisions Table: <table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			REVISIONS	INIT.	DATE				AUTHORIZED SIGNATURE: Anthony Encarnacion DATE: 4/14/2023 SIG. INVENTORY NO. 05-2252
REVISIONS	INIT.	DATE							

13-APR-2023 13:03 P:\S\000036433\work\ATKINS\com\ATKMANCO\Documents\Roads and Bridges\Projects\100063268 Fuquay Varina\Task 05-11\_Signals\Electrical\052252\_sm\_e\_2023mdd.dgn  
 S:\14685 - AT 052252

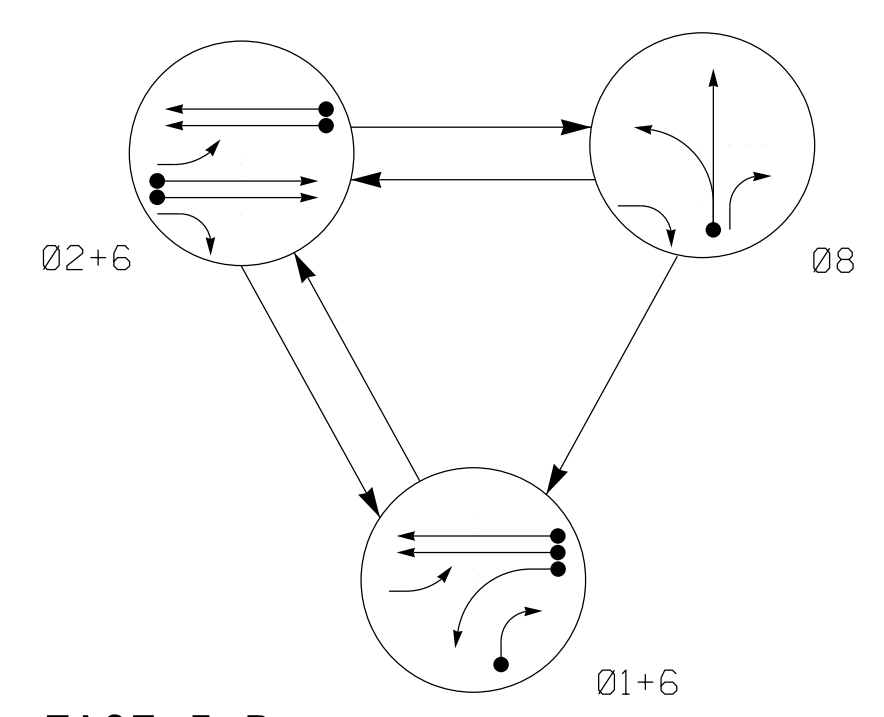
**DEFAULT PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 8	F
11	←	←	←	←
21	←	←	←	←
22	R	G	R	Y
23	R	G	R	Y
61, 62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

**ALTERNATE PHASING DIAGRAM**



**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 8	F
11	←	←	←	←
21	←	←	←	←
22	R	G	R	Y
23	R	G	R	Y
61, 62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

**MAXTIME DETECTOR INSTALLATION CHART**

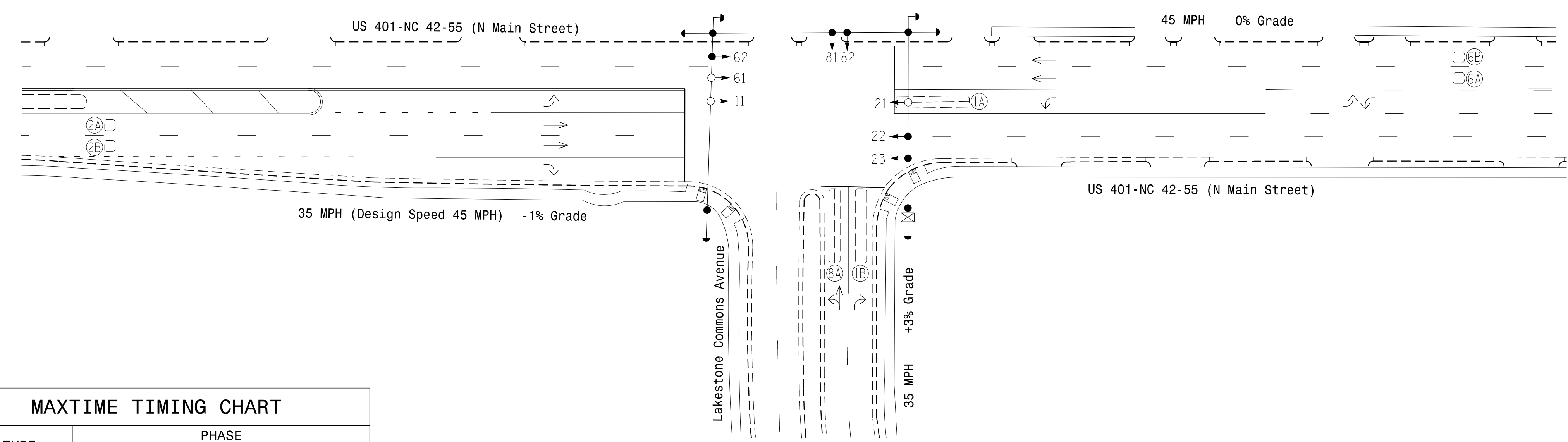
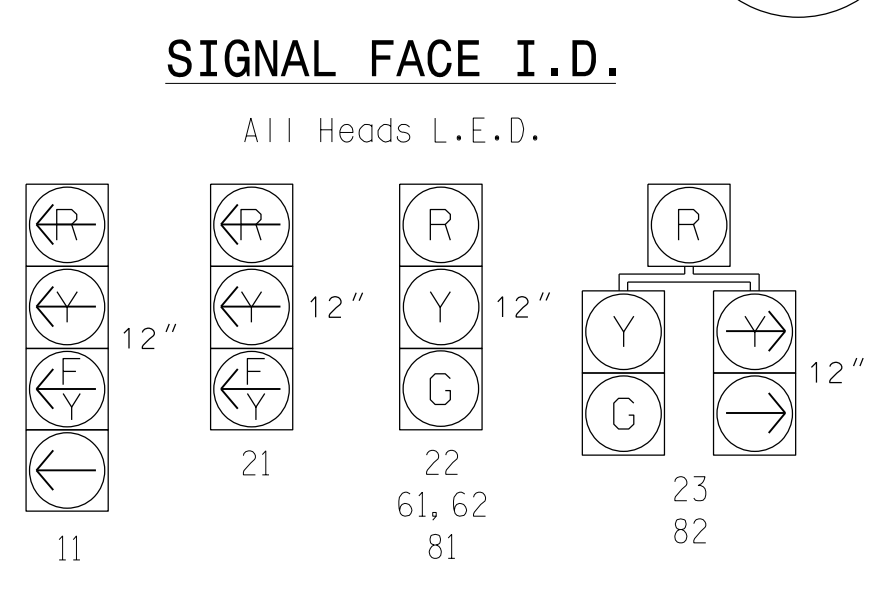
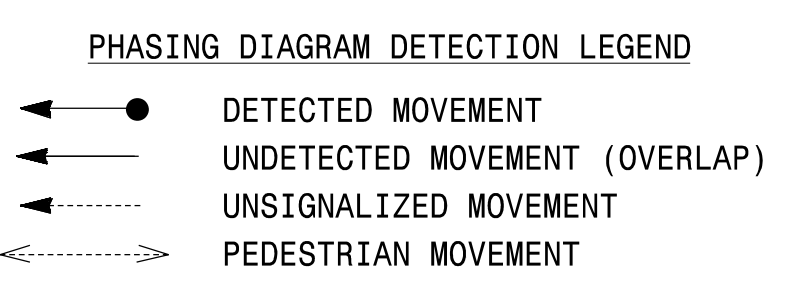
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	X
1B	6X40	0	2-4-2	-	1	15	-	X	-	X	-	X
2A	6X6	300	EXIST	-	6#	3	-	X	-	X	-	X
2B	6X6	300	EXIST	-	2	-	-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

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

**3 Phase Fully Actuated (Fuquay-Varina Signal System)**

**NOTES**

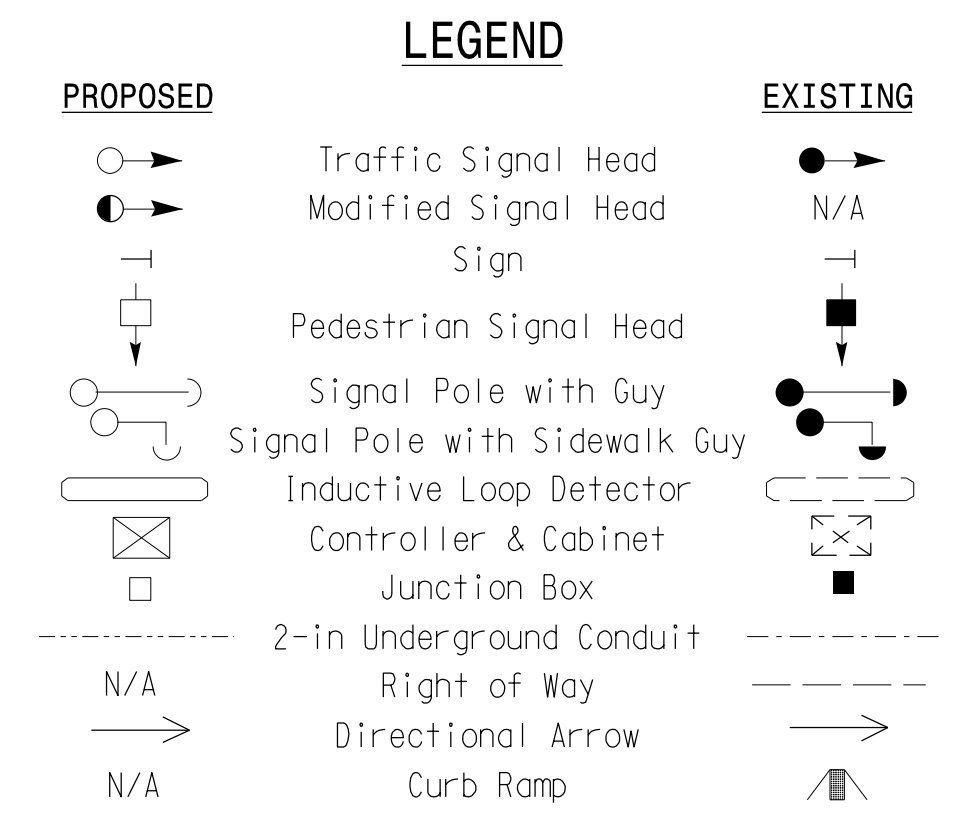
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Reposition existing signal head numbered 62.
- 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.



**MAXTIME TIMING CHART**

FEATURE	PHASE			
	1	2	6	8
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	7	12	12	7
Passage *	2.0	6.0	6.0	2.0
Max 1 *	15	90	90	30
Yellow Change	3.0	4.6	4.6	3.0
Red Clear	2.6	1.6	1.6	2.6
Added Initial *	-	1.5	1.5	-
Maximum Initial *	-	34	34	-
Time Before Reduction *	-	20	20	-
Time To Reduce *	-	30	30	-
Minimum Gap	-	3.0	3.0	-
Advance Walk	-	-	-	-
Non Lock Detector	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.



13-APR-2023 13:03  
 p:\2\5\50363\33\_msk\kinc.com\AT\MANC01\Documents\Roads and Br\10aps/Pr-jects/100063268\_Fuquay Var\Task\_05-11\_Signals/052268\_sig\_csh\_2022mtda.dgn  
 STP14685 AT LUS41089

**Signal Upgrade**

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

**US 401-NC 42-55 (N Main Street) at Lakestone Commons Avenue**

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

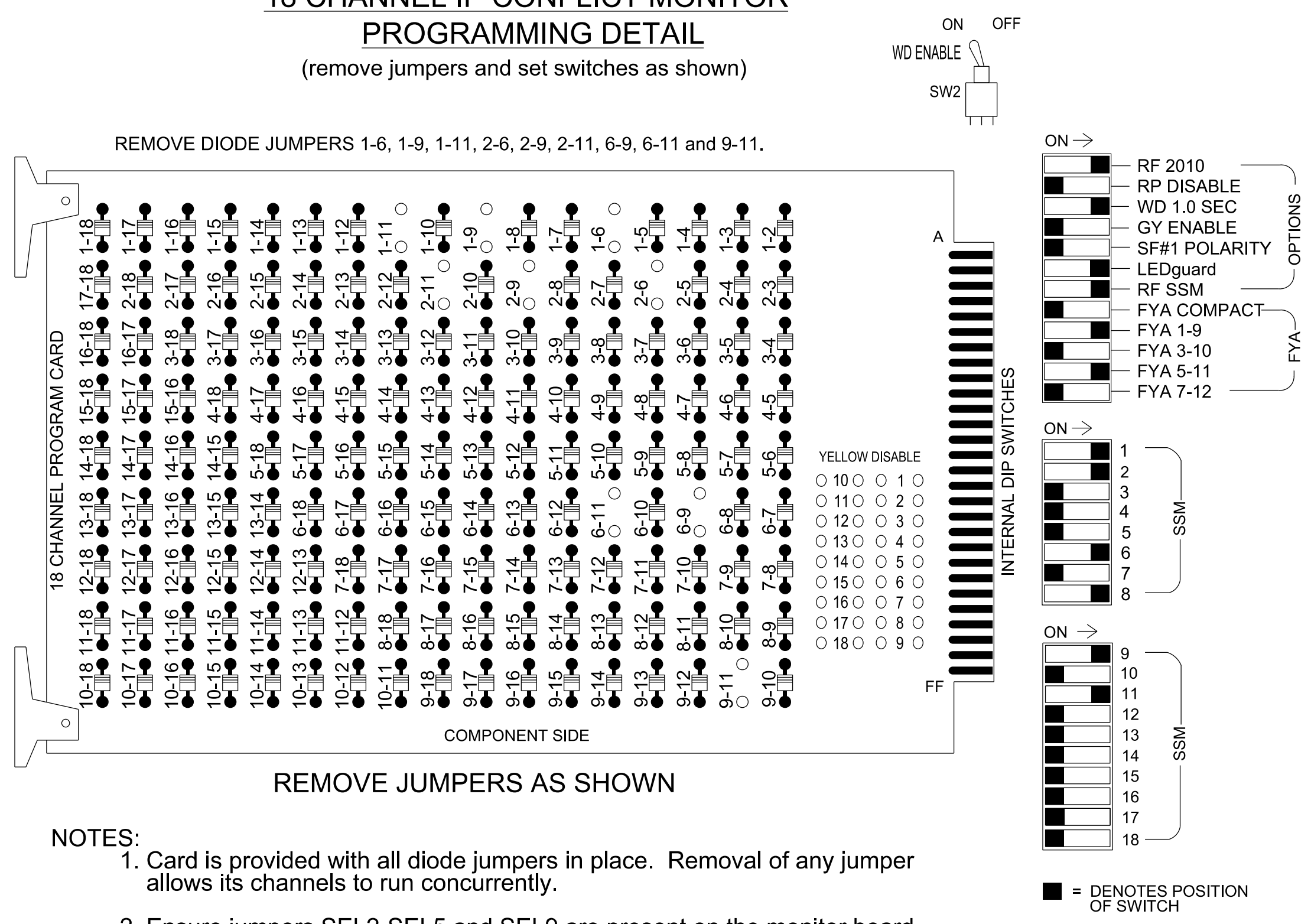
SIG. INVENTORY NO. 05-2260

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 044476  
 AM ENCARNACION

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 2-6, 2-9, 2-11, 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 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, S8, S11, AUX S1, AUX S4  
 Phases Used.....1, 2, 6, 8  
 Overlap "1".....\*  
 Overlap "2".....NOT USED  
 Overlap "3".....\*  
 Overlap "4".....NOT USED

\*See overlap programming detail this sheet

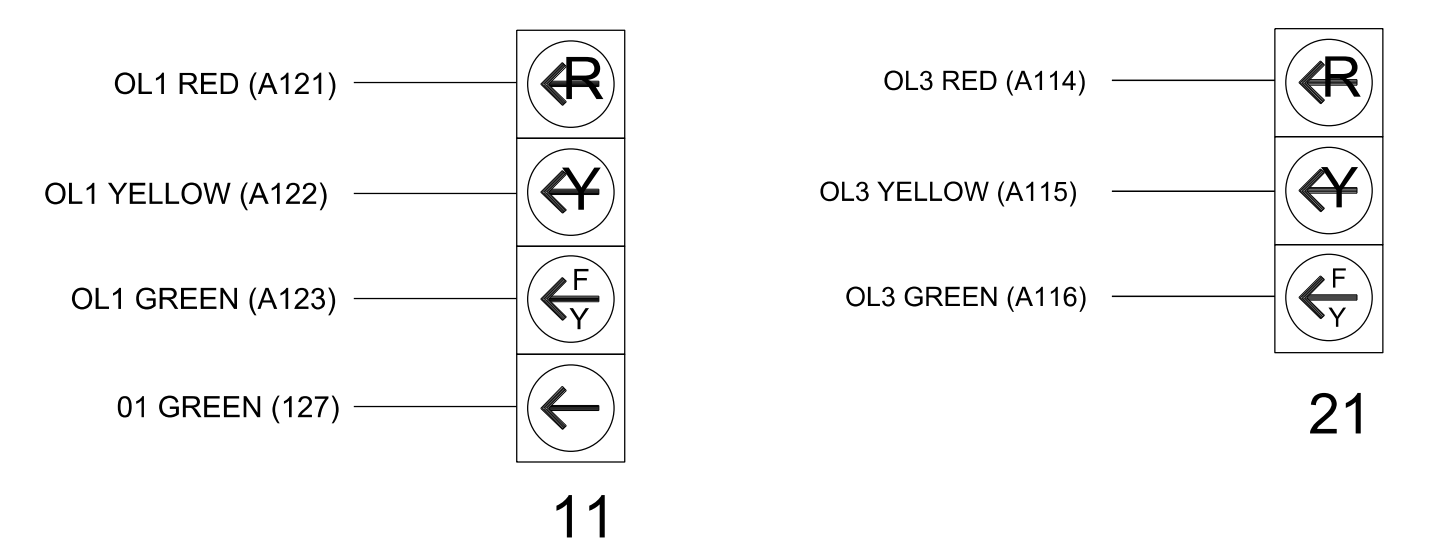
### SIGNAL HEAD HOOK-UP CHART

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.	11*	82	22,23	NU	NU	NU	NU	61,62	NU	NU	23	81,82	NU	11*	NU	NU	21*	NU
RED	*	128						134			107							
YELLOW		129						135			108							
GREEN		130						136			109							
RED ARROW														A121			A114	
YELLOW ARROW	126										108			A122			A115	
FLASHING YELLOW ARROW														A123			A116	
GREEN ARROW	127	127									109							

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

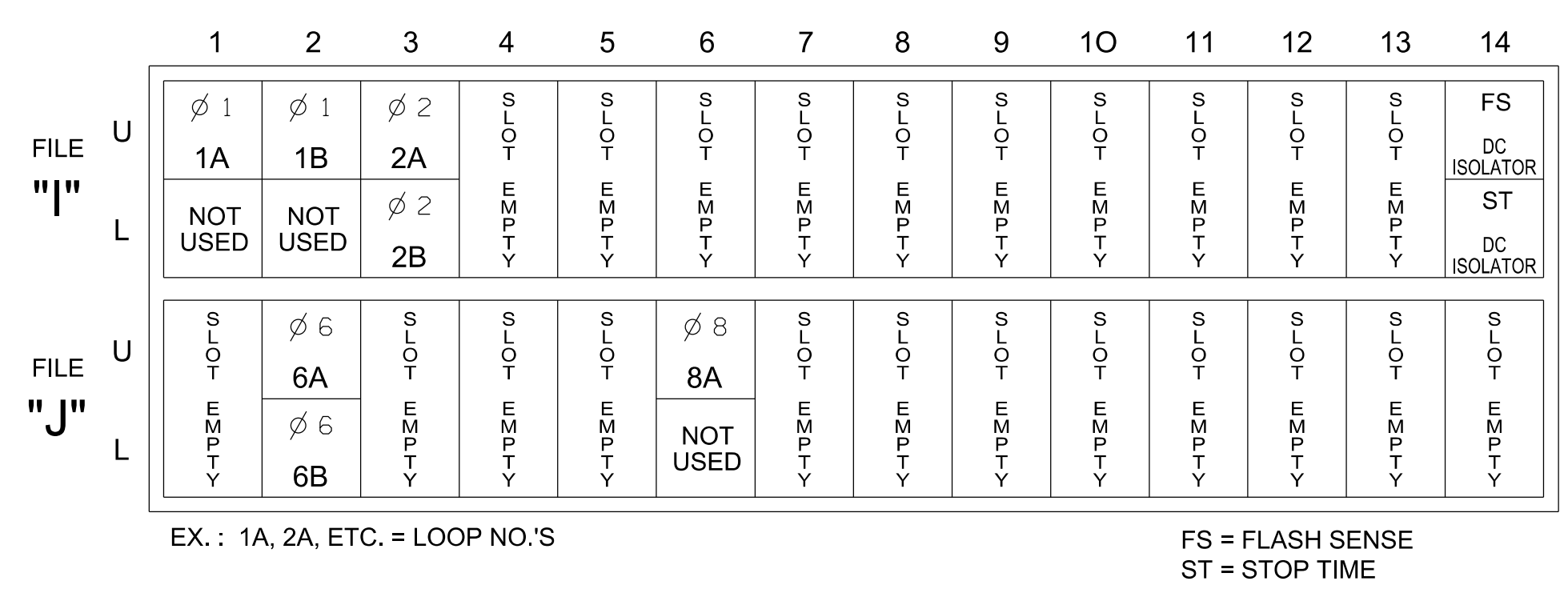
### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



### INPUT FILE POSITION LAYOUT

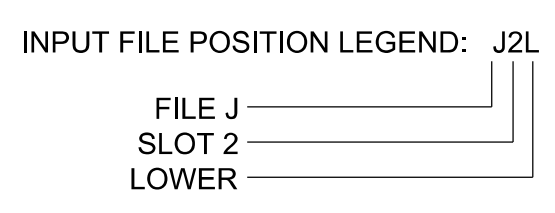
(front view)



### INPUT FILE CONNECTION & PROGRAMMING CHART

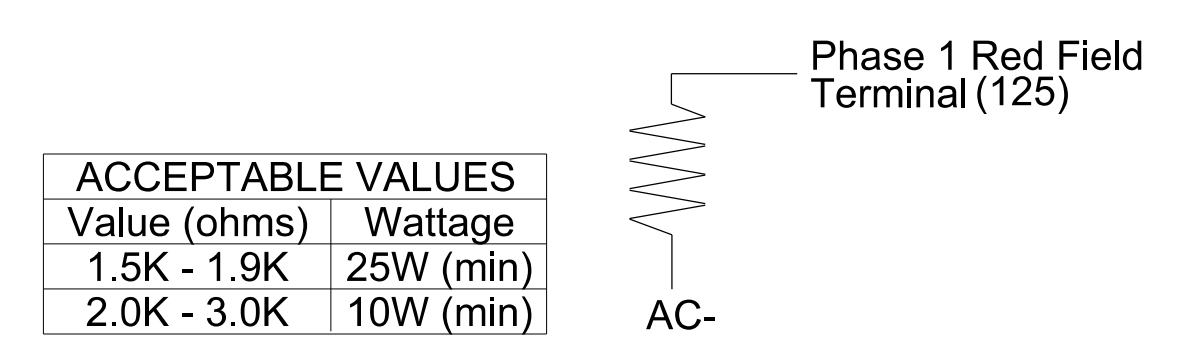
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 *	1	15		X		X	
1B	TB2-5,6	I2U	39	1	2 *	1	15		X		X	X
2A	TB2-9,10	I3U	63	29	4	2			X	X	X	
2B	TB2-11,12	I3L	76	42	5	2			X	X	X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8			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.



### LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2260  
 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: 750 N. Greenfield Pkwy, Garner, NC 27529	US 401-NC 42-55 (N Main Street) at Lakestone Commons Avenue 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  SEAL 044476 ANTHONY M. ENCARNACION PROFESSIONAL ENGINEER NORTH CAROLINA
Revisions table with columns for Revisions, Init., and Date.	Signature and Date fields for the preparer and reviewer.	Date: 4/14/2023 Signature: Anthony Encarnacion Date: _____ Signature: _____ Date: _____ Sig. Inventory No.: 05-2260

### 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	1	-	-	-
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	-	-	6	-
Modifier Phases	1	-	-	-
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 1A

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.

1A

Detector	Call Phase	Delay
1	1	3
29	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**

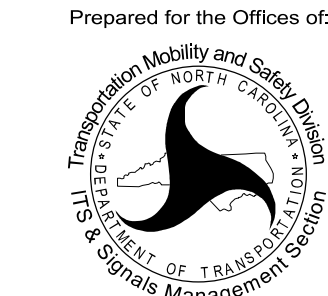
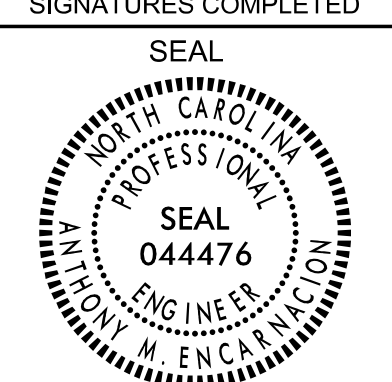
THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phase for head 11 to run protected turns only.

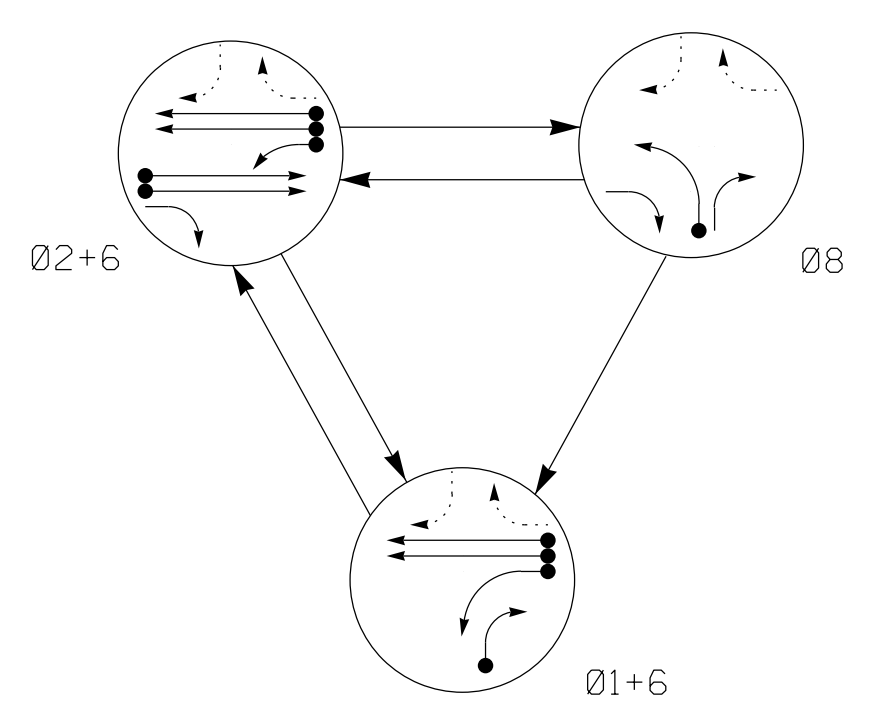
VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

13-APR-2023 13:04 PW:///SUD0036343...w...atkins.com:ATKMANCO1/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/TASK 05\_11\_23/ignou/electrical/Detail/052260\_sm\_e\_2022mmdd.dgn 5174669 - AT 05491089

Electrical Detail - Sheet 2 of 2

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2260 DESIGNED: APRIL 2023 SEALED: 4/14/2023 REVISED: N/A	Electrical and Programming Details For:  Prepared for the Offices of: Transportation Mobility and Safety Division Planning and Design Section Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529	<b>SIGNAL DESIGN: 05-2260</b> US 401-NC 42-55 (N Main Street) at Lakestone Commons 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 M. ENCARNACION PROFESSIONAL ENGINEER License No. 044476 AUTHORITY: Encarnacion DATE: 4/14/2023 SIGNATURE DATE SIG. INVENTORY NO. 05-2260
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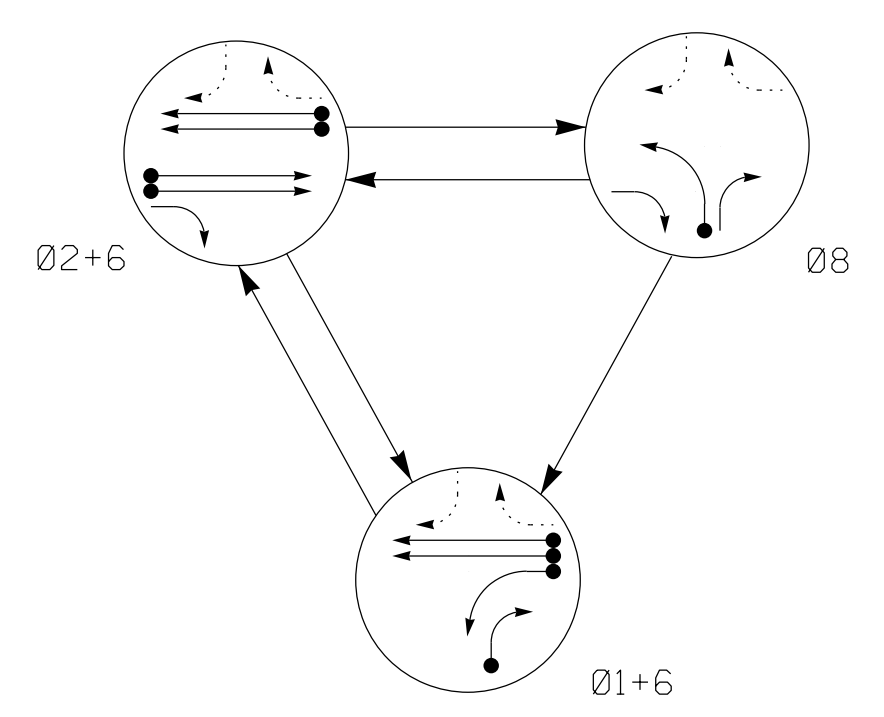
**DEFAULT PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	01+6	02+6	08	01+6
11	←	←	←	←
21	R	G	R	Y
22	R	G	R	Y
61, 62	G	G	R	Y
81, 83	←	←	←	←
82	→	→	→	→
84	←	←	←	←

**ALTERNATE PHASING DIAGRAM**

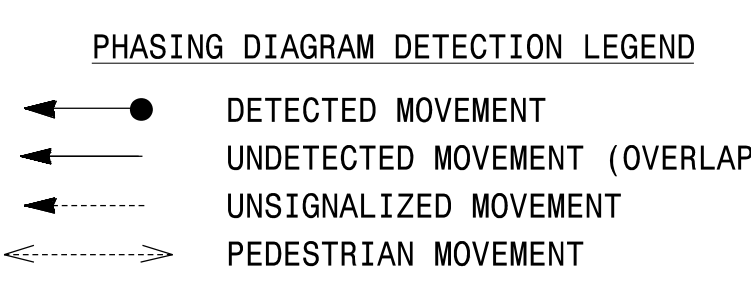
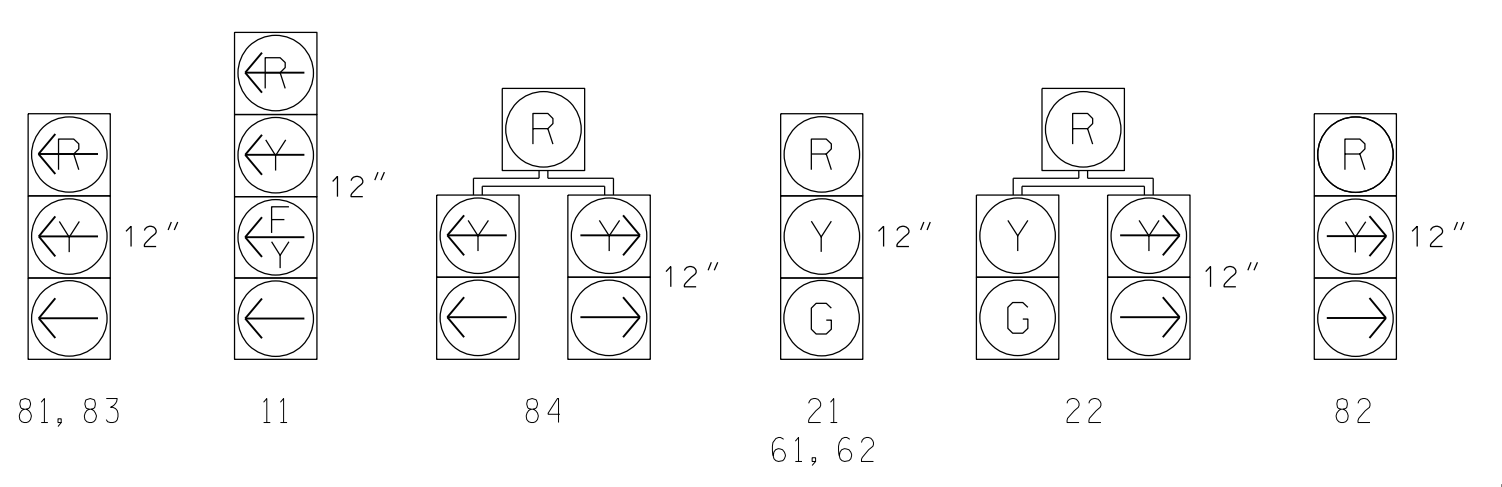


**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	01+6	02+6	08	01+6
11	←	←	←	←
21	R	G	R	Y
22	R	G	R	Y
61, 62	G	G	R	Y
81, 83	←	←	←	←
82	→	→	→	→
84	←	←	←	←

**SIGNAL FACE I.D.**

All Heads L.E.D.



**MAXTIME DETECTOR INSTALLATION CHART**

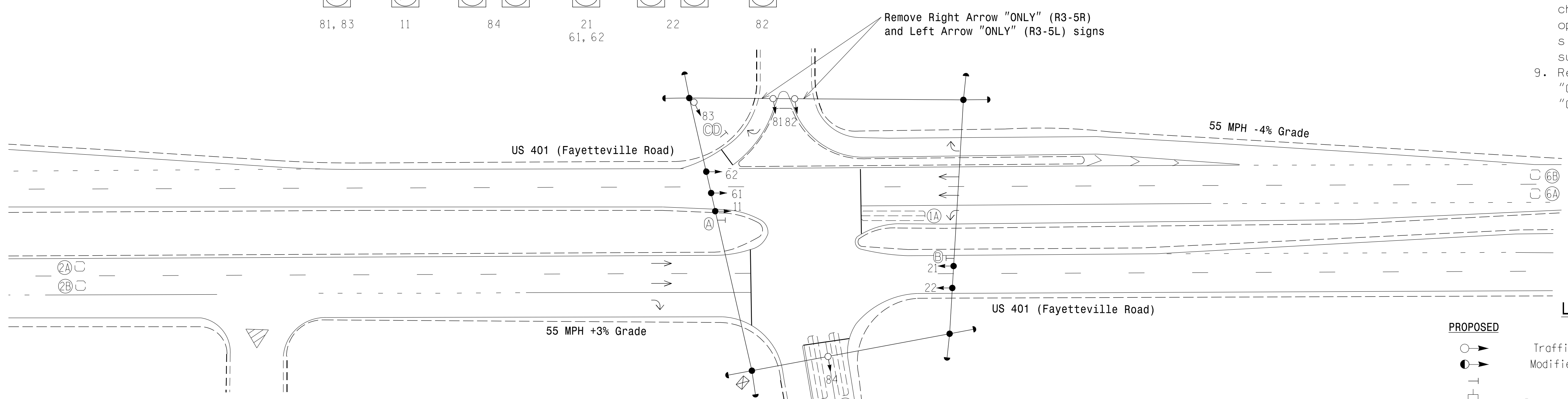
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	-
1B	6X40	+5	2-4-2	-	1	15	-	X	-	X	-	-
2A	6X6	420	EXIST	-	2	-	-	X	X	X	-	-
2B	6X6	420	EXIST	-	2	-	-	X	X	X	-	-
6A	6X6	420	EXIST	-	6	-	-	X	X	X	-	-
6B	6X6	420	EXIST	-	6	-	-	X	X	X	-	-
8A	6X40	+5	2-4-2	-	8	3	-	X	-	X	-	-

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

**3 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 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.
- Remove existing Right Arrow "ONLY" (R3-5R) and Left Arrow "ONLY" (R3-5L) signs.

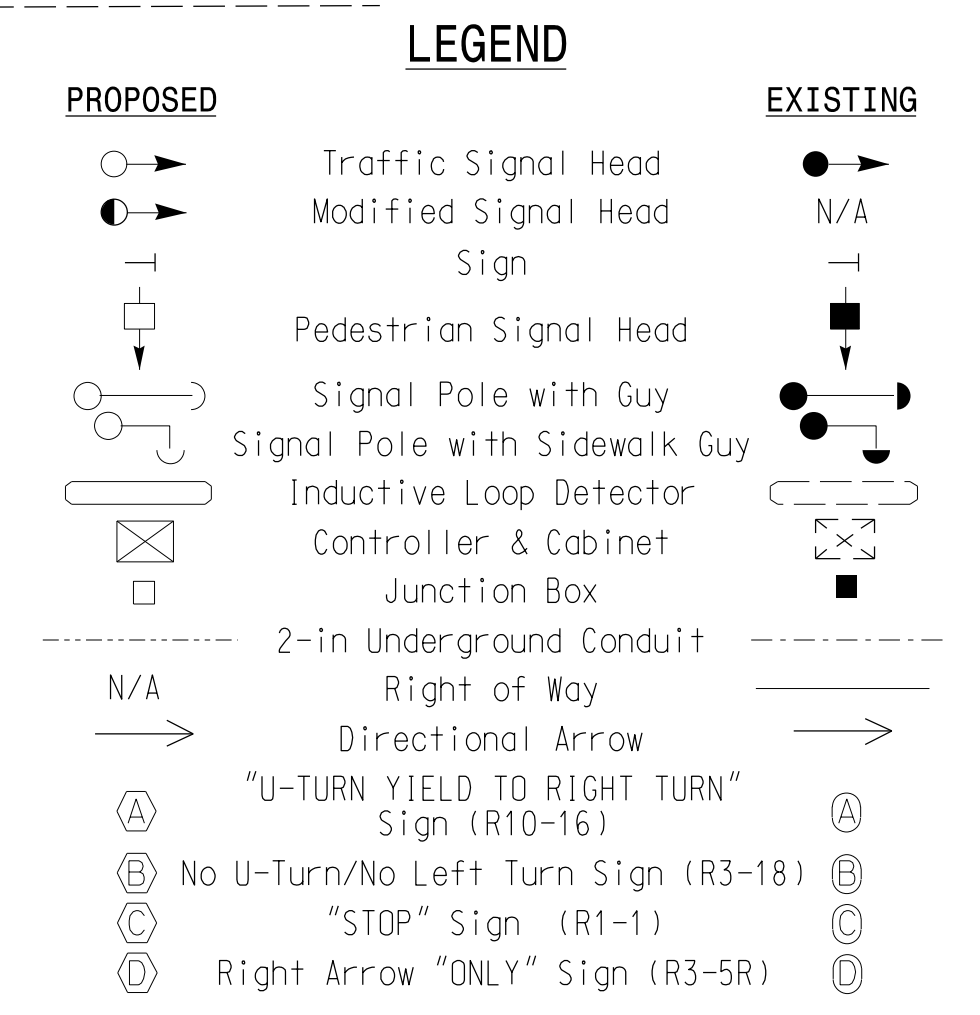


Remove Right Arrow "ONLY" (R3-5R) and Left Arrow "ONLY" (R3-5L) signs

**MAXTIME TIMING CHART**

FEATURE	PHASE			
	1	2	6	8
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	7	14	14	7
Passage *	2.0	6.0	6.0	2.0
Max 1 *	15	90	90	20
Yellow Change	3.0	5.6	5.6	3.0
Red Clear	2.9	1.0	1.0	3.2
Added Initial *	-	1.5	1.5	-
Maximum Initial *	-	46	46	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.4	3.4	-
Advance Walk	-	-	-	-
Non Lock Detector	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.



**Signal Upgrade**

Prepared for the Offices of:  
  
 750 N. Greenfield Pkwy, Garner, NC 27529  
 SCALE: 1" = 40'

**US 401 (Fayetteville Road) at SR 2724 (Banks 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  
  
 ANTHONY M. ENCARNACION  
 PROFESSIONAL ENGINEER

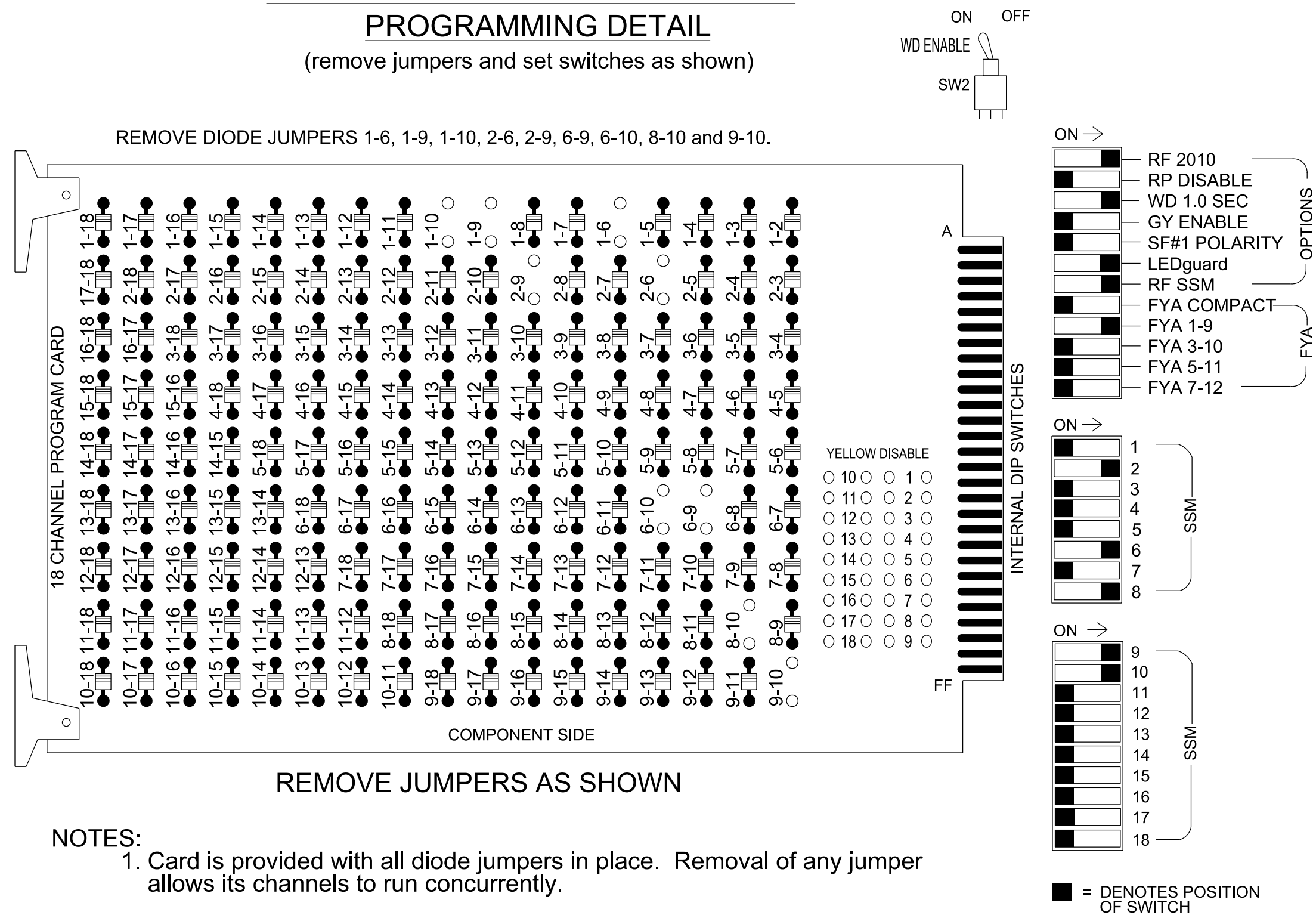
DATE: 4/14/2023  
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 SIG. INVENTORY NO. 05-2310

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

13-APR-2023 13:05  
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 STIP:4685 AT:LU54FD89

### 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, S8, S11, AUX S1, AUX S2  
 Phases Used.....1, 2, 6, 8  
 Overlap "1".....\*  
 Overlap "2".....\*  
 Overlap "3".....NOT USED  
 Overlap "4".....NOT USED

\*See overlap programming detail this sheet

### SIGNAL HEAD HOOK-UP CHART

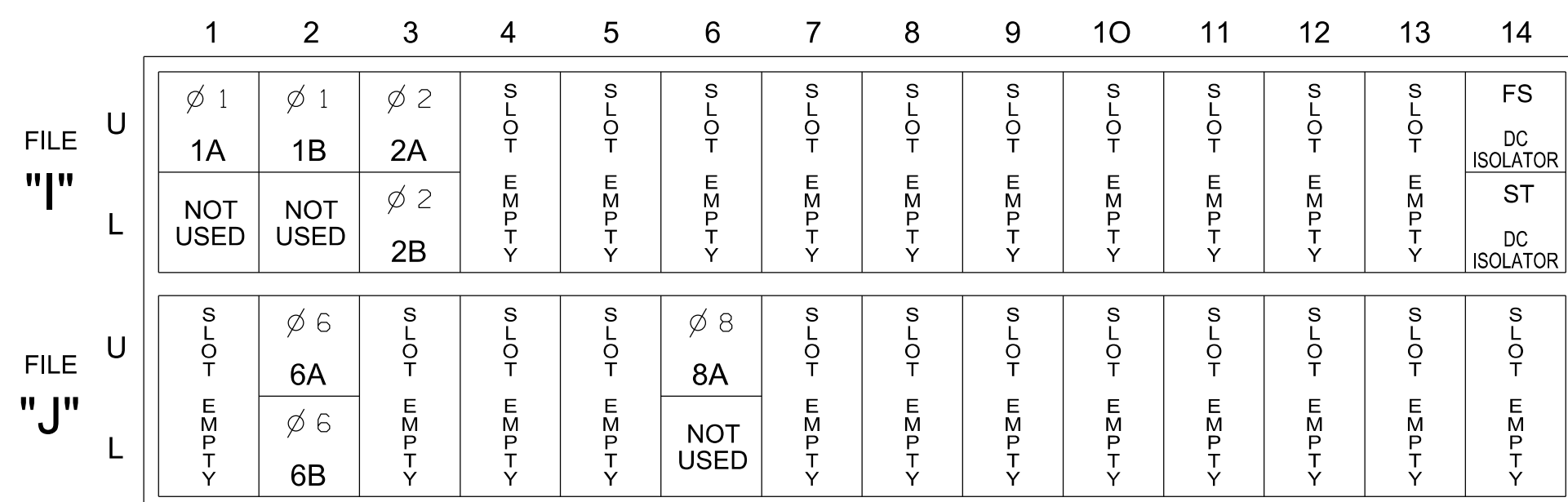
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE	
SIGNAL HEAD NO.	11	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	22	81,83	84	NU	11	82	84	NU	NU
RED	128							134				107		A124					
YELLOW	*	129						135											
GREEN		130						136											
RED ARROW												107		A121					
YELLOW ARROW											108	108 (LEFT)		A122	A125 (RIGHT)				
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127										109	109 (LEFT)		A126 (RIGHT)					

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

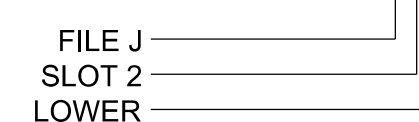
FS = FLASH SENSE  
 ST = STOP TIME

### 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	15		X		X	
					29	6			X		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	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	

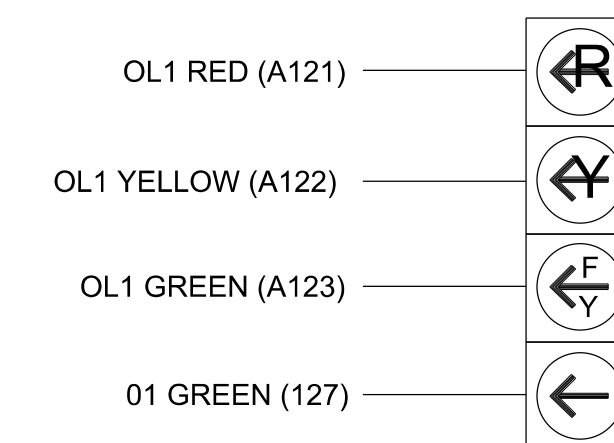
\* For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

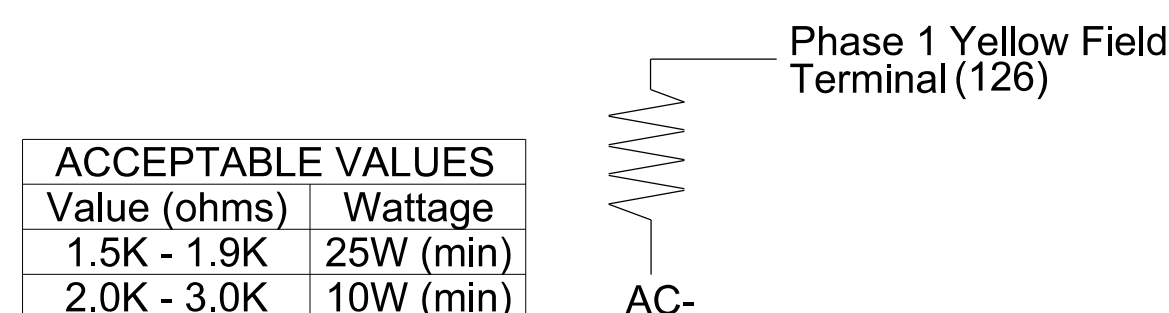
(wire signal head as shown)



11

### 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: 05-2310  
 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: 	<b>US 401 (Fayetteville Road)                  at                  SR 2724 (Banks Road)</b>		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL  SEAL 044476 ANTHONY M. ENCARNACION ENGINEER
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	

750 N. Greenfield Pkwy, Garner, NC 27529

Disasigned by: Anthony Encarnacion 4/14/2023  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 05-2310

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

Table with 5 columns: Overlap, 1, 2, 3, 4. Rows include Type, Included Phases, Modifier Phases, Trail Green, Trail Yellow, Trail Red.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

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.

Table 1A with 3 columns: Detector, Call Phase, Delay. Row 1: 1, 1, 0. Row 2: 29, 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

Table with 5 columns: Overlap, 1, 2, 3, 4. Rows include Type, Included Phases, Modifier Phases, Trail Green, Trail Yellow, Trail Red.

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.

Table with 3 columns: PHASING, OVERLAP PLAN, VEH DET PLAN. Rows: ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING, ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING.

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 11 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 0 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel Main Menu >Controller >Coordination >Patterns

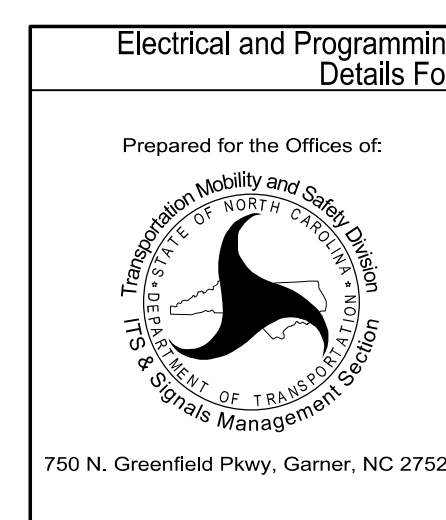
Web Interface Home >Controller >Coordination >Patterns

Table with 3 columns: Pattern, Veh Det Plan, Overlap Plan. Row 1: \*, 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: 05-2310 DESIGNED: APRIL 2023 SEALED: 4/14/2023 REVISED: N/A

Electrical Detail - Sheet 2 of 2



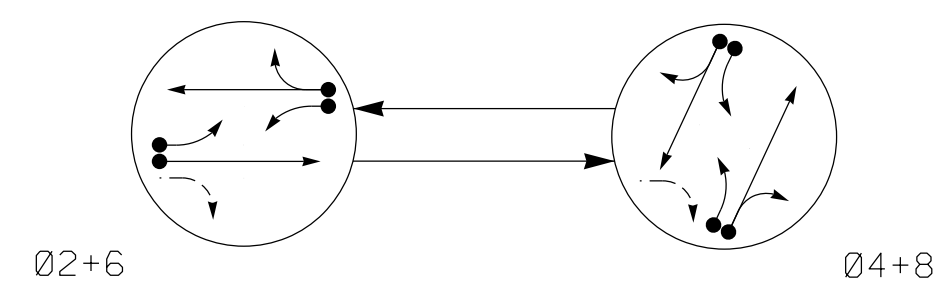
US 401 (Fayetteville Road) at SR 2724 (Banks Road)

Table with columns: Division 5, Wake County, Fuquay-Varina, PLAN DATE, REVIEWED BY, PREPARED BY, REVISIONS, INIT., DATE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with columns: SEAL, SIGNATURE, DATE, SIG. INVENTORY NO.

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

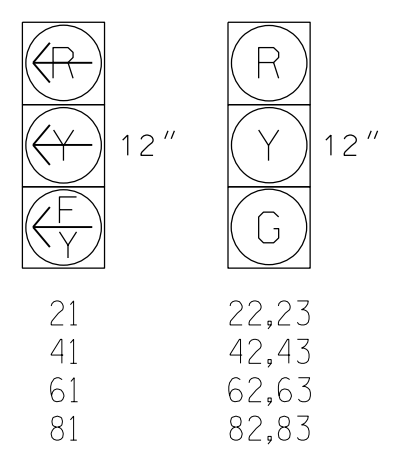
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- ⋯ UNSIGNALIZED MOVEMENT
- ⚡ PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
21	F	R	Y
22, 23	G	R	Y
41	R	F	R
42, 43	R	G	R
61	F	R	Y
62, 63	G	R	Y
81	R	F	R
82, 83	R	G	R

**SIGNAL FACE I.D.**

All Heads L.E.D.



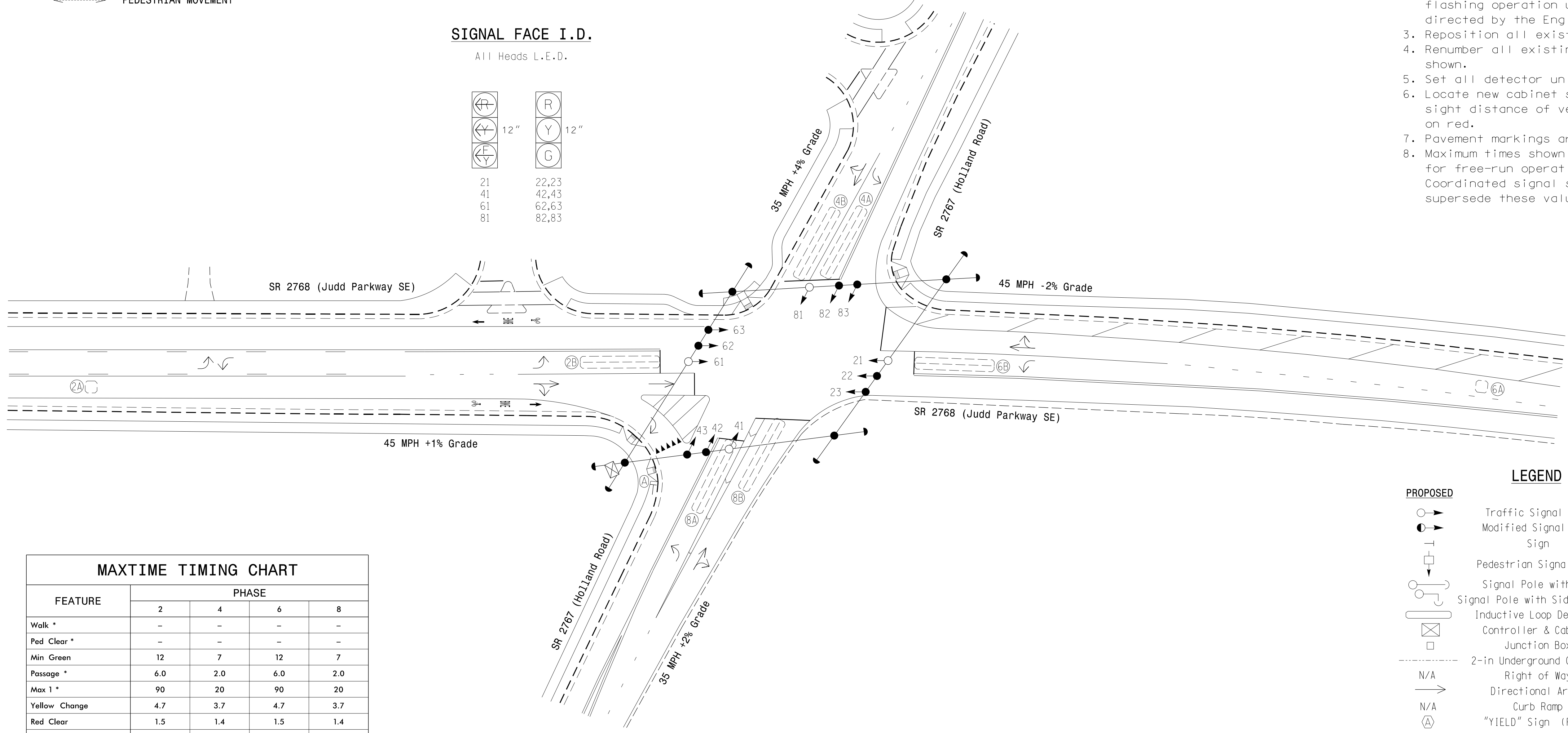
**MAXTIME DETECTOR INSTALLATION CHART**

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

**2 Phase Fully Actuated (Fuquay-Varina Signal System)**

**NOTES**

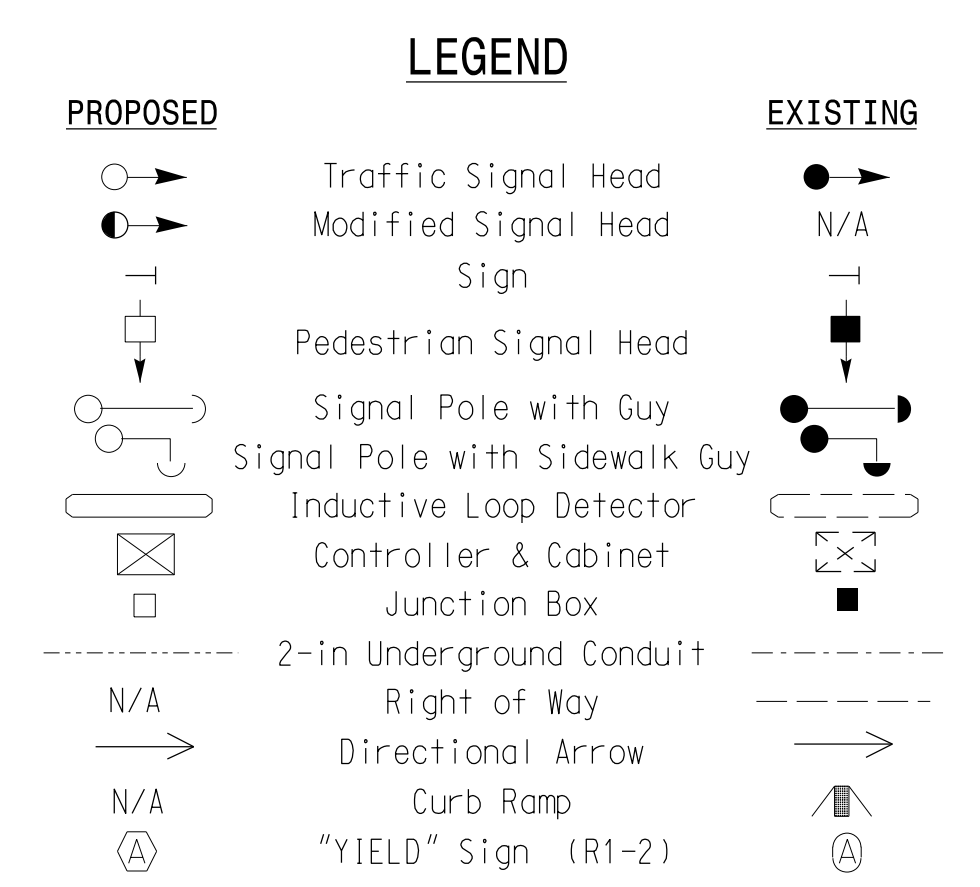
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Reposition all existing signal heads.
- Renumber all existing signal heads as shown.
- 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.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



**MAXTIME TIMING CHART**

FEATURE	PHASE			
	2	4	6	8
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Max I *	90	20	90	20
Yellow Change	4.7	3.7	4.7	3.7
Red Clear	1.5	1.4	1.5	1.4
Added Initial *	2.5	-	2.5	-
Maximum Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	45	-	45	-
Minimum Gap	3.0	-	3.0	-
Advance Walk	-	-	-	-
Non Lock Detector	-	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.



14-APR-2023 14:01 P:\2768\2768\_03.dwg User: jk... 14-APR-2023 14:01 P:\2768\2768\_03.dwg User: jk... 14-APR-2023 14:01 P:\2768\2768\_03.dwg User: jk...

**Signal Upgrade**

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

**SR 2768 (Judd Parkway SE) at SR 2767 (Holland 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

SCALE: 0 30  
1"=30'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 044476  
 ALLIUM M. ENCARNACION

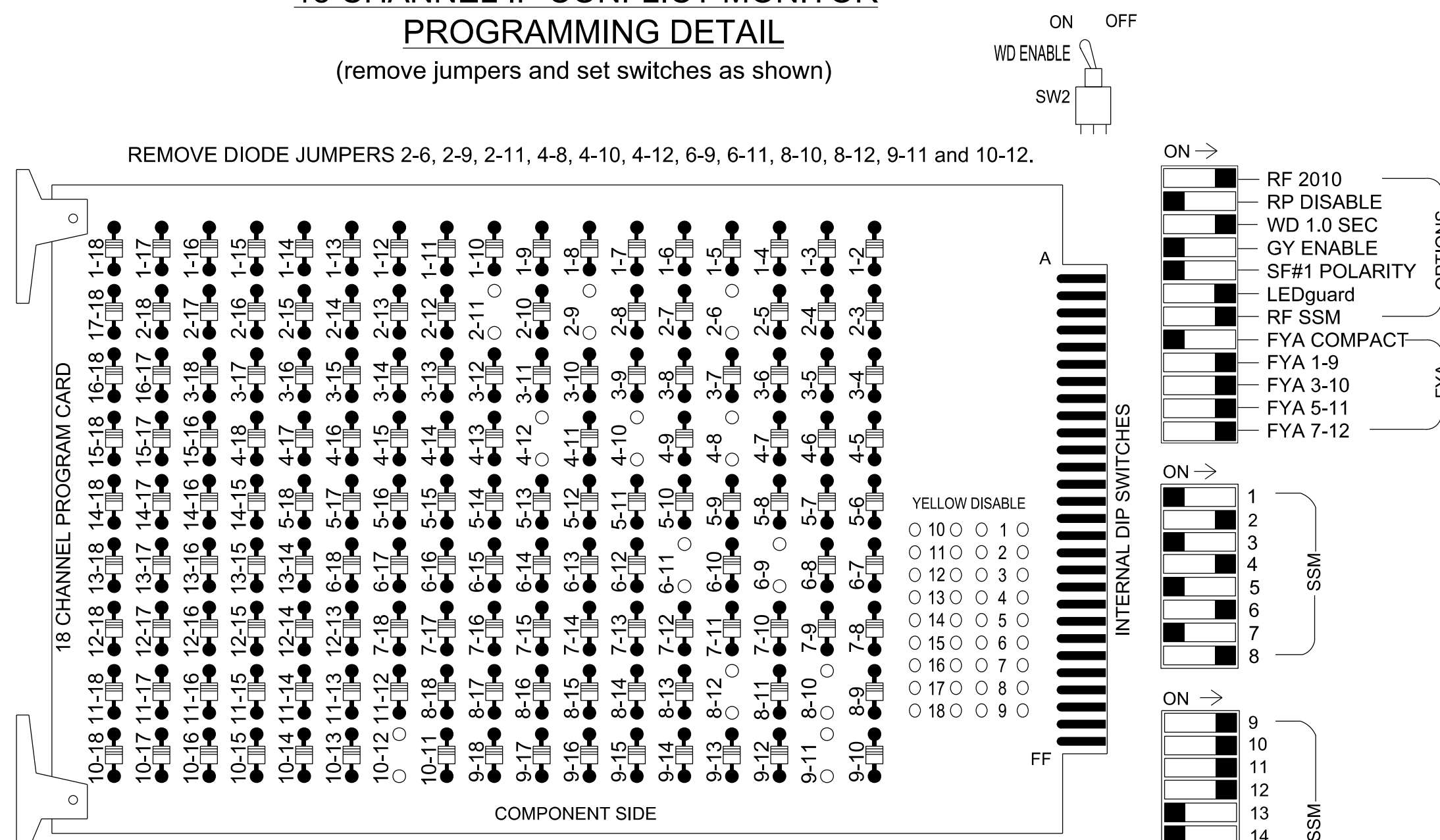
DATE: 4/14/2023  
 SIGNATURE: [Signature]  
 SIG. INVENTORY NO. 05-2346



### 18 CHANNEL IP CONFLICT MONITOR

#### PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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, S8, S11, AUX S1  
 AUX S2, AUX S4, AUX S5  
 Phases Used.....2, 4, 6, 8  
 Overlap "1".....\*  
 Overlap "2".....\*  
 Overlap "3".....\*  
 Overlap "4".....\*

\*See overlap programming detail on sheet 2

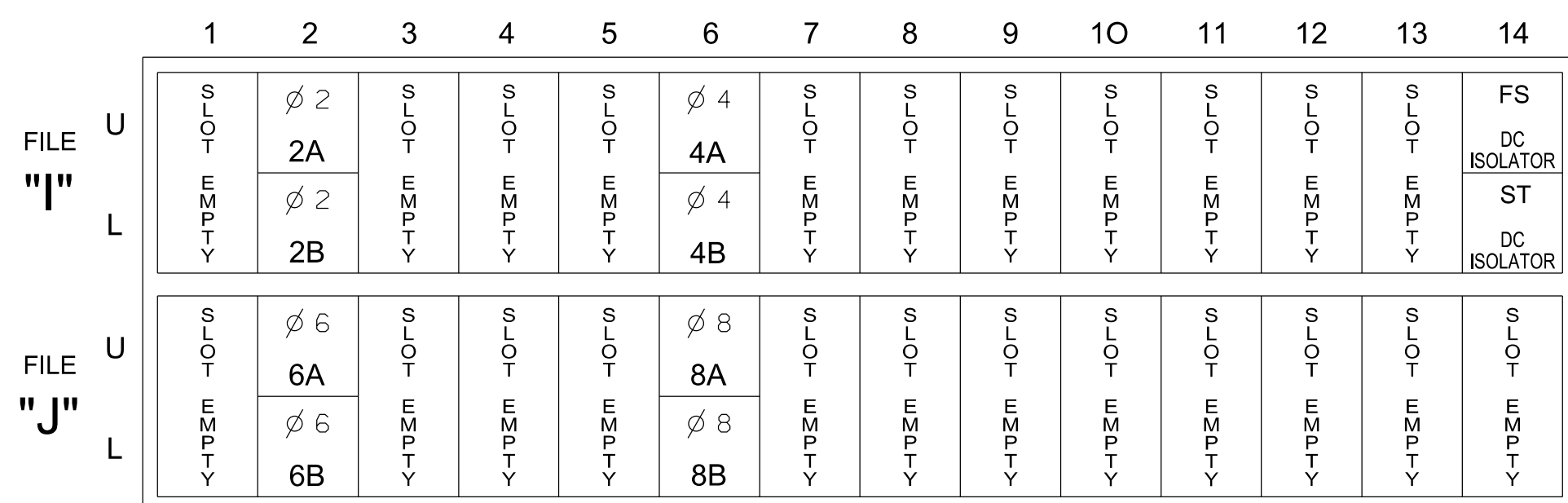
### SIGNAL HEAD HOOK-UP CHART

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.	NU	22,23	NU	NU	42,43	NU	NU	62,63	NU	NU	82,83	NU	61*	81*	NU	21*	41*	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW																		

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

### INPUT FILE POSITION LAYOUT

(front view)



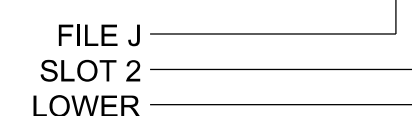
EX. : 1A, 2A, ETC. = LOOP NO.'S

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
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2	3		X		X	X
4A	TB4-9,10	I6U	41	3	8	4	3		X		X	
4B	TB4-11,12	I6L	45	7	9	4	10		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6	3		X		X	X
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
8B	TB5-11,12	J6L	46	8	23	8	10		X		X	

INPUT FILE POSITION LEGEND: J2L



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: Prepared for the Offices of: 	<b>SR 2768 (Judd Parkway SE)                      at                      SR 2767 (Holland Road)</b>		SEAL 
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County REVIEWED BY: AM Encarnacion Fuquay-Varina REVIEWED BY: PL Alexander	
REVISIONS INT. DATE	4/14/2023 Anthony Encarnacion SIGNATURE DATE	4/14/2023 DATE	SIG. INVENTORY NO. 05-2346

### 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	FYA 4 - Section
Included Phases	2	4	6	8
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

### FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 05-2346  
DESIGNED: APRIL 2023  
SEALED: 4/14/2023  
REVISED: N/A

Electrical Detail - Sheet 2 of 2


DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

13-APR-2023 13:07 PW:///SUD0036343.wootk.ris.com:ATKMANC01/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/Task 05\_11\_Signals/Electrical Detail/052346\_sm.e\_2023mdd.dgn S1F4669 - AT U0591089

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

Electrical and Programming  
Details For:

Prepared for the Offices of:



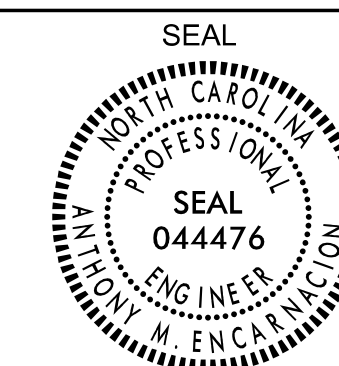
750 N. Greenfield Pkwy, Garner, NC 27529

SR 2768 (Judd Parkway SE)  
at  
SR 2767 (Holland Road)

Division 5 Wake County Fuquay-Varina

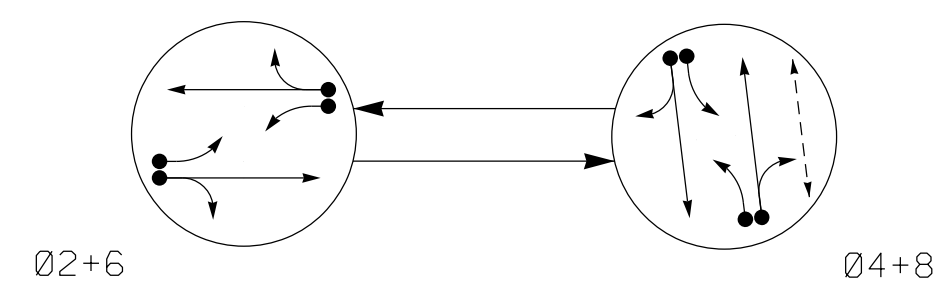
PLAN DATE: April 2023	REVIEWED BY: AM Encarnacion
PREPARED BY: JT Stiff	REVIEWED BY: PL Alexander

REVISIONS	INIT.	DATE



Designed by: Anthony Encarnacion 4/14/2023  
Signature: \_\_\_\_\_ DATE: \_\_\_\_\_  
SIG. INVENTORY NO. 05-2346

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

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

**TABLE OF OPERATION**

SIGNAL FACE	PHASE		FLASH
	02+6	04+8	
21	F	R	Y
22, 23	G	R	Y
41	R	F	R
42, 43	R	G	R
61	F	R	Y
62, 63, 64	G	R	Y
81	R	F	R
82, 83	R	G	R
P81, P82	DW	W	DRK

**MAXTIME DETECTOR INSTALLATION CHART**

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

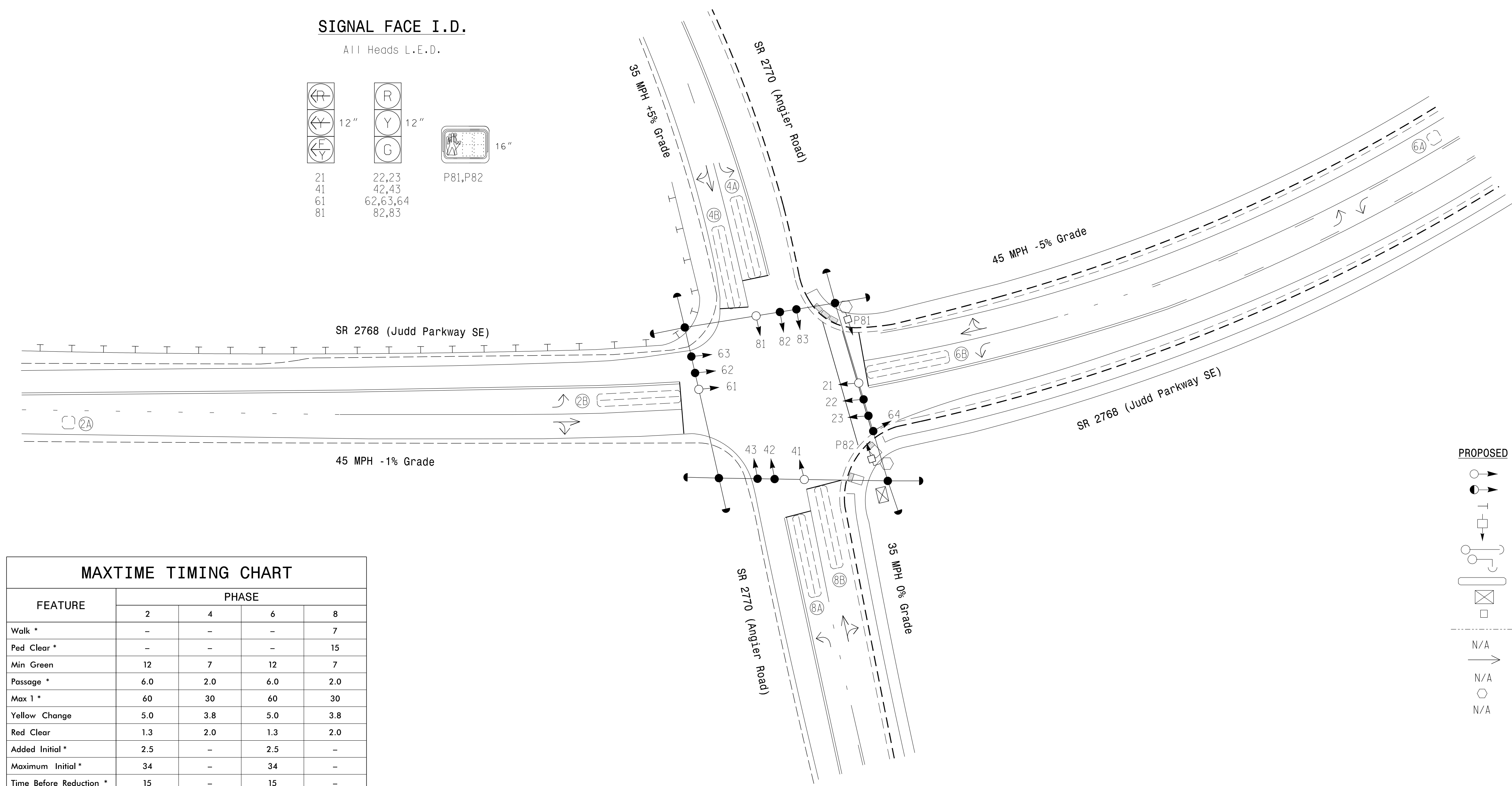
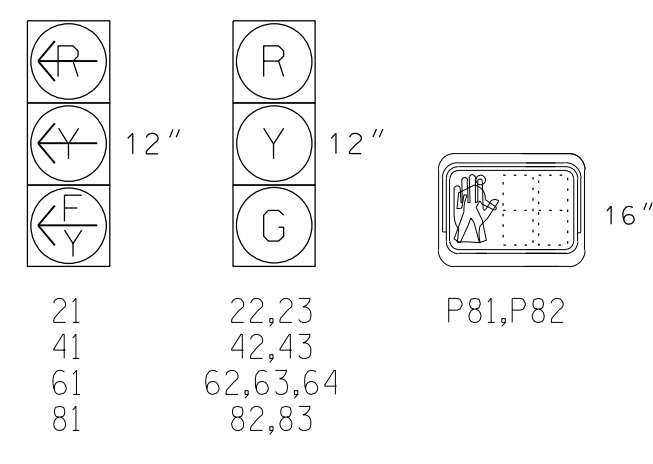
**2 Phase Fully Actuated (Fuquay-Varina Signal System)**

**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.
- Reposition all existing signal heads.
- Renumber all existing signal heads as shown.
- 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.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

**SIGNAL FACE I.D.**

All Heads L.E.D.



**MAXTIME TIMING CHART**

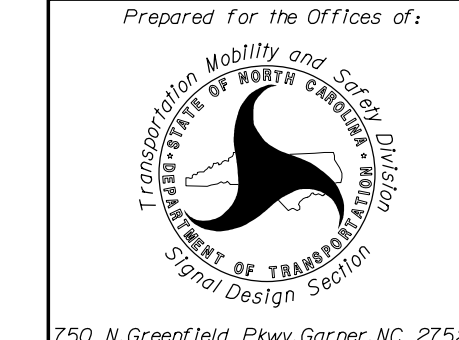
FEATURE	PHASE			
	2	4	6	8
Walk *	-	-	-	7
Ped Clear *	-	-	-	15
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Max I *	60	30	60	30
Yellow Change	5.0	3.8	5.0	3.8
Red Clear	1.3	2.0	1.3	2.0
Added Initial *	2.5	-	2.5	-
Maximum Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Advance Walk	-	-	-	3
Non Lock Detector	-	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**

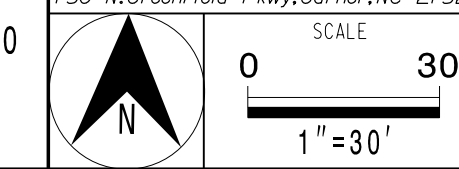
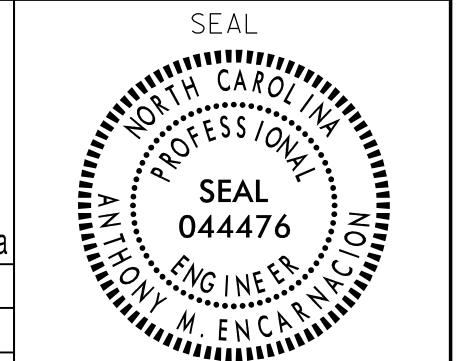
PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	— Sign
⊥ Pedestrian Signal Head	⊥ Signal Pole with Guy
○ ⊥ Signal Pole with Guy	○ ⊥ Signal Pole with Sidewalk Guy
⊠ Inductive Loop Detector	⊠ Controller & Cabinet
⊠ Junction Box	⊠ 2-in Underground Conduit
— N/A Right of Way	—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

**Signal Upgrade**



SR 2768 (Judd Parkway SE) at SR 2770 (Angier 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



REVISIONS	INIT.	DATE

DATE: 4/14/2023  
 SIGNATURE: [Signature]  
 SIG. INVENTORY NO. 05-2375

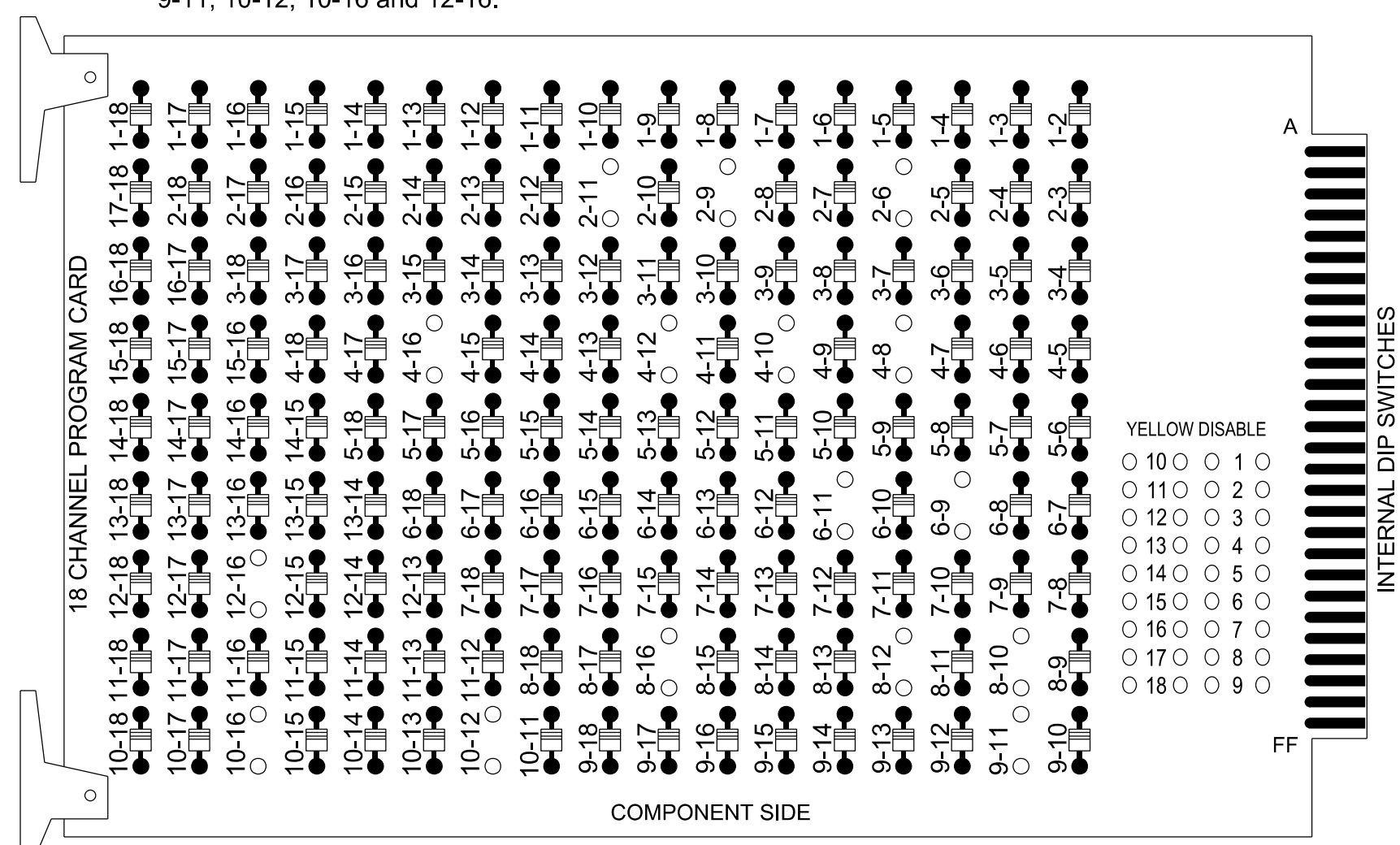
**ATKINS** 1616 EAST MILLBROOK ROAD, SUITE 160  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888 NCBEES #F-0326

13-APR-2023 13:08  
 P:\2768\2768\_SIG\0363\3. encarnacion\Documents\Roads and Br\0606\06062668\_Fuquay\_Var\Task\05-11\_Signals\052375\_sig\_csn\_2022.mxd.dgn  
 STIP4685 AT LUS41089

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



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.....332 w/ Aux  
 Software.....Q-Free MAXTIME  
 Cabinet Mount.....Base  
 Output File Positions.....18 With Aux. Output File  
 Load Switches Used.....S2, S5, S8, S11, S12, AUX S1, AUX S2, AUX S4, AUX S5  
 Phases Used.....2, 4, 6, 8, 8PED  
 Overlap "1".....\*  
 Overlap "2".....\*  
 Overlap "3".....\*  
 Overlap "4".....\*

\*See overlap programming detail on sheet 2

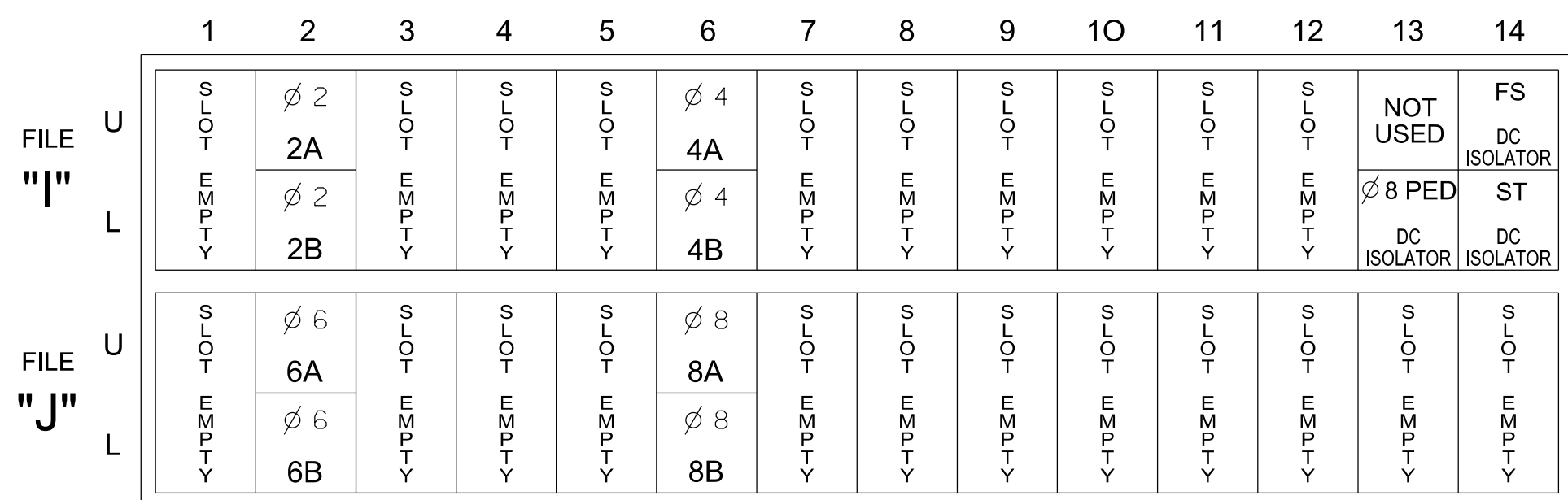
### SIGNAL HEAD HOOK-UP CHART

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.	NU	22,23	NU	NU	42,43	NU	NU	62,63,64	NU	NU	82,83	P81, P82	61*	81*	NU	21*	41*	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW																		
												110						
												112						

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

### INPUT FILE POSITION LAYOUT

(front view)



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

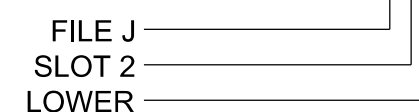
FS = FLASH SENSE  
 ST = STOP TIME

### 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
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2	3		X	X	X	X
4A	TB4-9,10	I6U	41	3	8	4	3		X	X	X	
4B	TB4-11,12	I6L	45	7	9	4	10		X	X	X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6	3		X	X	X	X
8A	TB5-9,10	J6U	42	4	22	8	3		X	X	X	
8B	TB5-11,12	J6L	46	8	23	8	10		X	X	X	
PED PUSH BUTTONS												
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L



### 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2375  
 DESIGNED: APRIL 2023  
 SEALED: 4/14/2023  
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

Prepared for the Offices of: 	SR 2768 (Judd Parkway SE) at SR 2770 (Angier Road)		SEAL 
	Division 5 PLAN DATE: April 2023 PREPARED BY: JT Stiff	Wake County REVIEWED BY: AM Encarnacion REVIEWED BY: PL Alexander	
Revisions Table	Signature Line	Date Line	Date: 4/14/2023 Signature: Anthony Encarnacion Date: _____ Signature: _____ Date: _____

### 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	FYA 4 - Section
Included Phases	2	4	6	8
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

### 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.

13-APR-2023 13:08 PW:///SUD0036343.wootk@is.com:ATKMANC01/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/Task 05\_11\_Signals/Electrical Details/052375\_sm.e\_2022mdd.dgn S1F4669 - AT U0591089

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 05-2375  
DESIGNED: APRIL 2023  
SEALED: 4/14/2023  
REVISED: N/A

Electrical Detail - Sheet 2 of 2

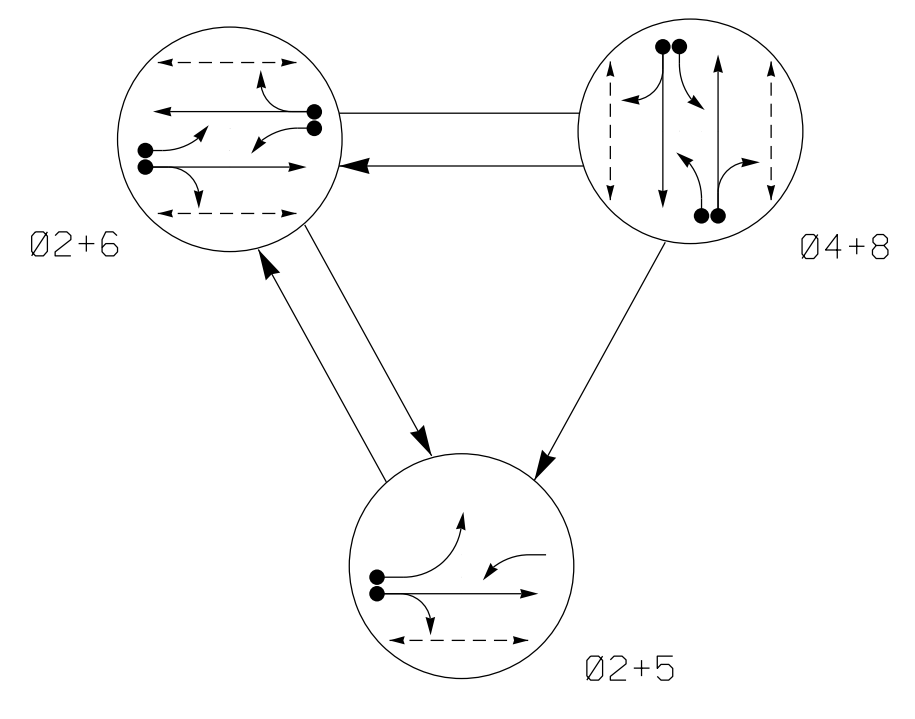
DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

Electrical and Programming Details For:  Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	<b>SR 2768 (Judd Parkway SE) at SR 2770 (Angier Road)</b>		SEAL  SEAL 044476 ANTHONY M. ENCARNACION ENGINEER
	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

Designed by: Anthony Encarnacion 4/14/2023  
SIGNATURE DATE  
SIG. INVENTORY NO. 05-2375

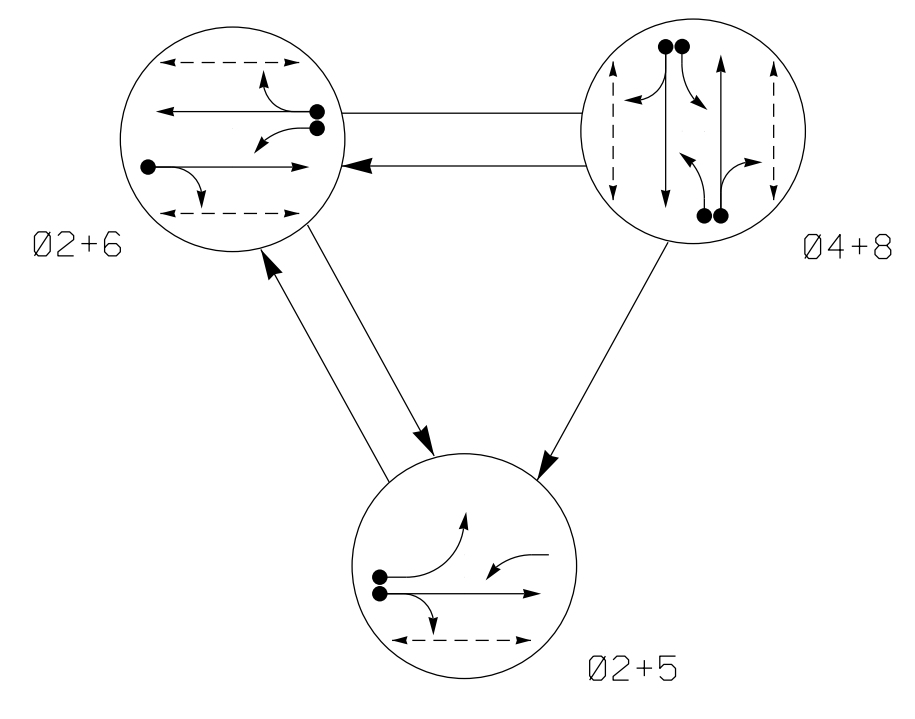
**DEFAULT PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41	-R	-R	-F	-R
42, 43	R	R	G	R
51	-F	-F	-R	-Y
61	-F	-F	-R	-Y
62, 63	R	G	R	Y
81	-R	-R	-F	-R
82, 83	R	R	G	R
P21, P22	W	W	DW	DRK
P41, P42	DW	DW	W	DRK
P61, P62	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK

**ALTERNATE PHASING DIAGRAM**



**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41	-R	-R	-F	-R
42, 43	R	R	G	R
51	-F	-F	-R	-Y
61	-F	-F	-R	-Y
62, 63	R	G	R	Y
81	-R	-R	-F	-R
82, 83	R	R	G	R
P21, P22	W	W	DW	DRK
P41, P42	DW	DW	W	DRK
P61, P62	DW	W	DW	DRK
P81, P82	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	DELAY DURING GREEN	NEW CARD
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	-	4	3	-	X	-	X	-	X
4B	6X40	0	2-4-2	-	4	10	-	X	-	X	-	X
5A	6X40	+10	2-4-2	-	5	15*	-	X	-	X	-	X
					2#	3	-	X	-	X	X	X
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	X
6B	6X40	+10	2-4-2	-	6	3	-	X	-	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

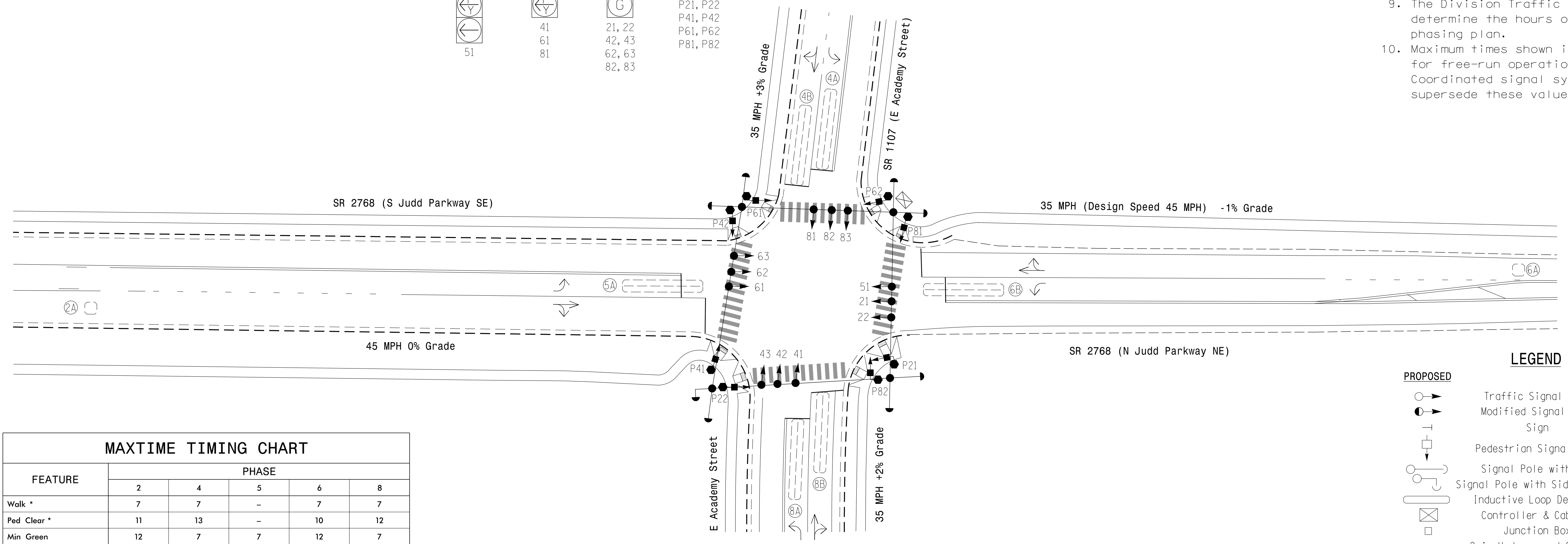
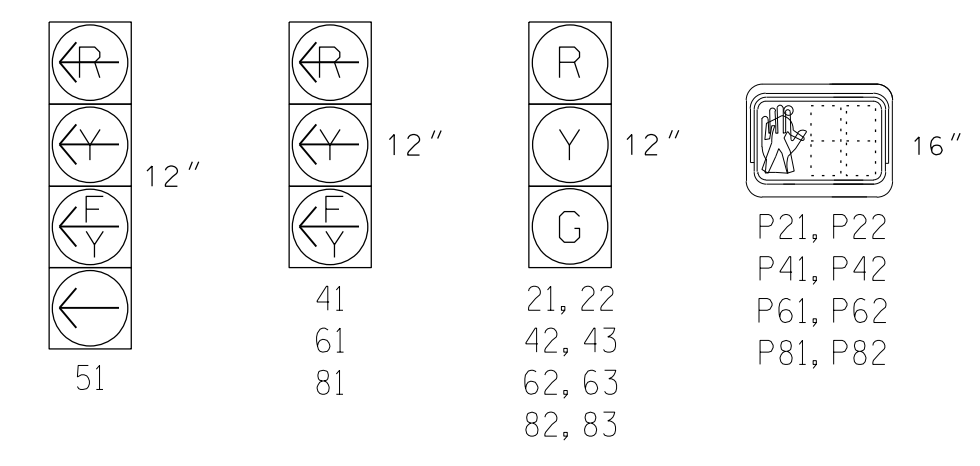
\* Reduce delay to 3 seconds during alternate phasing operation  
 # Disable phase call for loop(s) during alternate phasing operation

**PHASING DIAGRAM DETECTION LEGEND**

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

**SIGNAL FACE I.D.**

All Heads L.E.D.



**MAXTIME TIMING CHART**

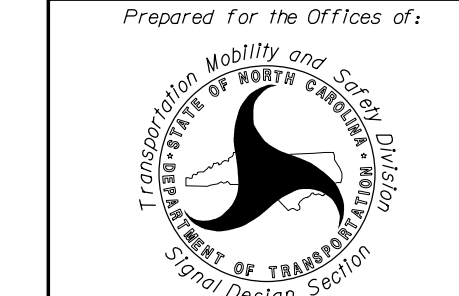
FEATURE	PHASE				
	2	4	5	6	8
Walk *	7	7	-	7	7
Ped Clear *	11	13	-	10	12
Min Green	12	7	7	12	7
Passage *	6.0	2.0	2.0	6.0	2.0
Max I *	90	20	15	90	20
Yellow Change	4.6	3.7	3.0	4.6	3.7
Red Clear	2.2	2.1	2.9	2.2	2.1
Added Initial *	2.5	-	-	2.5	-
Maximum Initial *	34	-	-	34	-
Time Before Reduction *	15	-	-	15	-
Time To Reduce *	30	-	-	30	-
Minimum Gap	3.0	-	-	3.0	-
Advance Walk	3	3	-	3	3
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.

**LEGEND**

PROPOSED	EXISTING
○▶ Traffic Signal Head	●▶ N/A
◐▶ Modified Signal Head	N/A
⊥ Sign	⊥ N/A
⊥ Pedestrian Signal Head	⊥ N/A
○ 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
○ Type II Signal Pedestal	● Type II Signal Pedestal
N/A Curb Ramp	▴ Curb Ramp

**Signal Upgrade**



**SR 2768 (Judd Parkway) at 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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

ANTHONY M. ENCARNACION

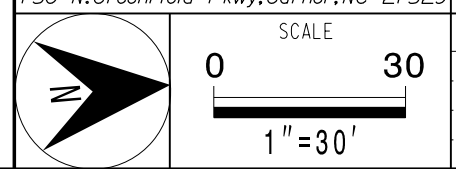
PROFESSIONAL ENGINEER

044476

DATE: 4/14/2023

SIG. INVENTORY NO. 05-2380

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

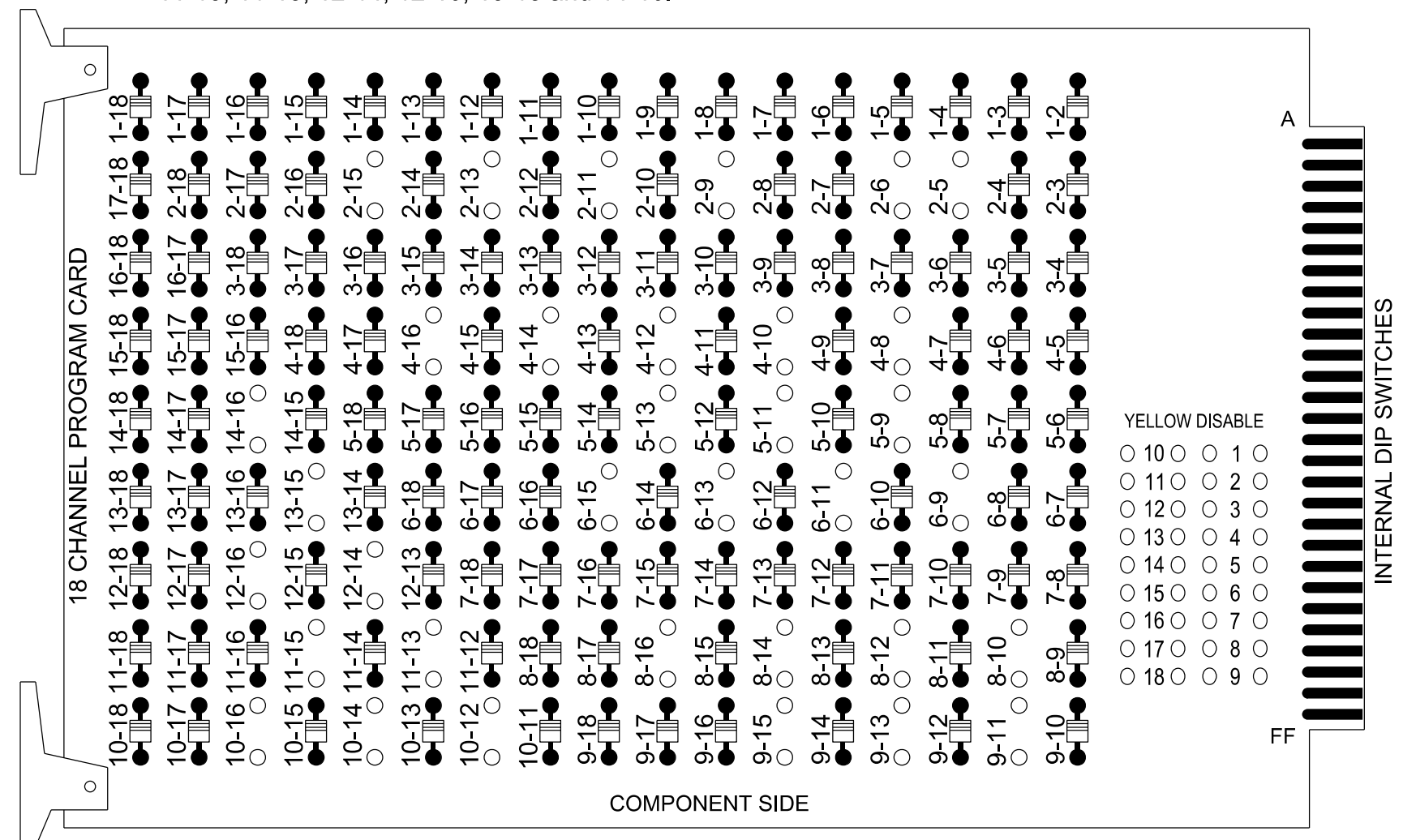


13-APR-2023 13:09 P:\2768\SR2768\Task\_05-11\_Signals\052380.stg\_csn\_2022mdd.dgn STIP 4685 AT LUS41089

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

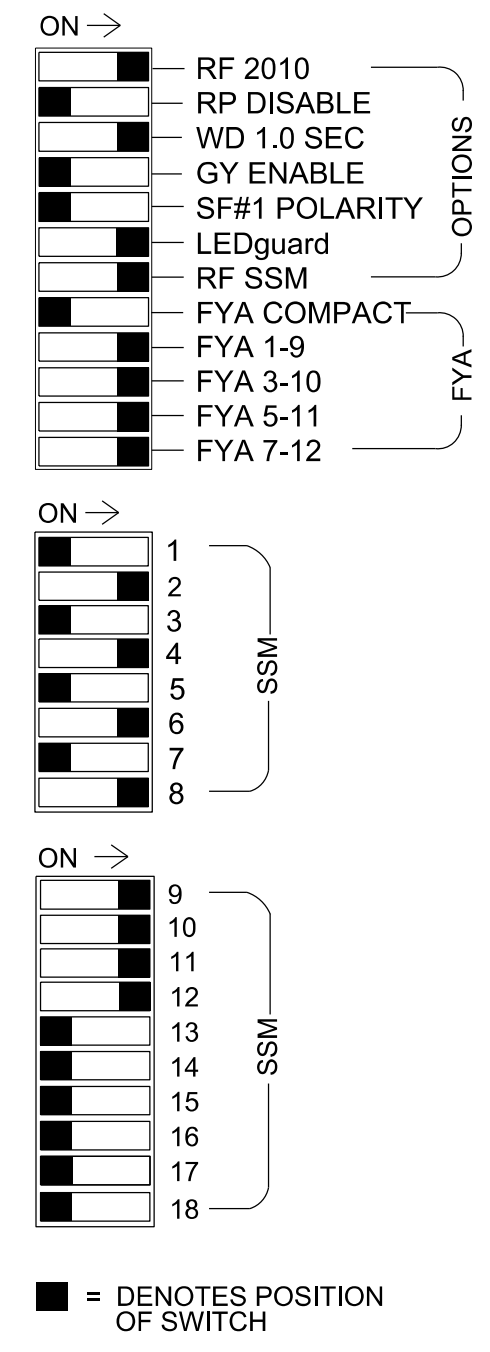
REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-10, 4-12, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-10, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 10-12, 10-14, 10-16, 11-13, 11-15, 12-14, 12-16, 13-15 and 14-16.



REMOVE JUMPERS AS SHOWN

**NOTES:**

- 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, S7, S8, S9, S11, S12, AUX S1, AUX S2, AUX S4, AUX S5  
 Phases Used.....2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED  
 Overlap "1".....\*  
 Overlap "2".....\*  
 Overlap "3".....\*  
 Overlap "4".....\*

\*See overlap programming detail on sheet 2

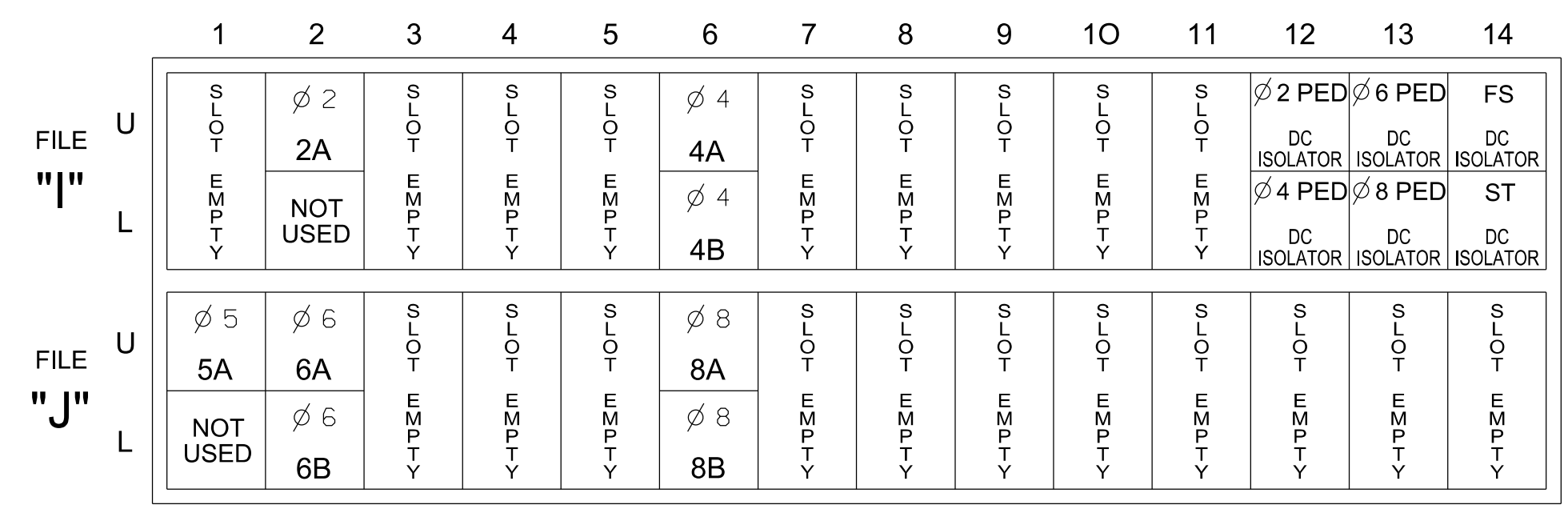
### SIGNAL HEAD HOOK-UP CHART

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.	NU	21,22	P21, P22	NU	42,43	P41, P42	51*	62,63	P61, P62	NU	82,83	P81, P82	61*	81*	NU	51*	41*	NU			
RED		128			101			134			107										
YELLOW		129			102		*	135			108										
GREEN		130			103			136			109										
RED ARROW													A121	A124		A114	A101				
YELLOW ARROW													A122	A125		A115	A102				
FLASHING YELLOW ARROW													A123	A126		A116	A103				
GREEN ARROW								133													
Hand										113			104					119	110		
Person													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.

### INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

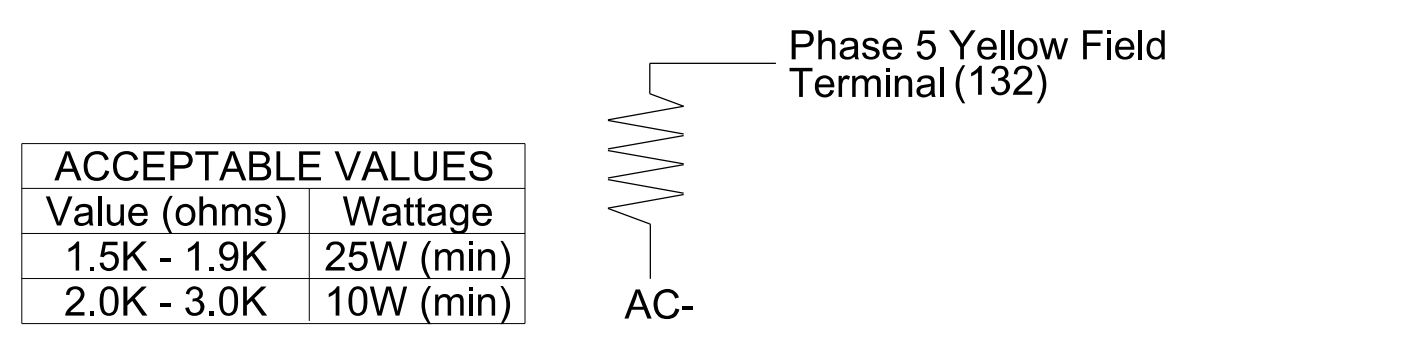
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2				X	X	X
4A	TB4-9,10	I6U	41	3	8	4	3			X	X	X
4B	TB4-11,12	I6L	45	7	9	4	10			X	X	X
5A	TB3-1,2	J1U	55	17	15	5	15			X	X	X
6A	TB3-5,6	J2U	40	2	16	6				X	X	X
6B	TB3-7,8	J2L	44	6	17	6	3			X	X	X
8A	TB5-9,10	J6U	42	4	22	8	3			X	X	X
8B	TB5-11,12	J6L	46	8	23	8	10			X	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						

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 resistor as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2380  
 DESIGNED: APRIL 2023  
 SEALED: 4/14/2023  
 REVISED: N/A

### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

Electrical Detail - Sheet 1 of 2

Document Not Considered Final Unless All Signatures Completed

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044476

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

Designed by: Anthony Encarnacion 4/14/2023  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 05-2380

### 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	-	-	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	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	-	8
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.

Detector	Call Phase	Delay
15	5	3
31	0	-

5A

### 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 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 turns 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2380  
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:  
North Carolina Department of Transportation  
Statewide Management Section  
750 N. Greenfield Pkwy, Garner, NC 27529

SR 2768 (Judd Parkway)  
at  
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

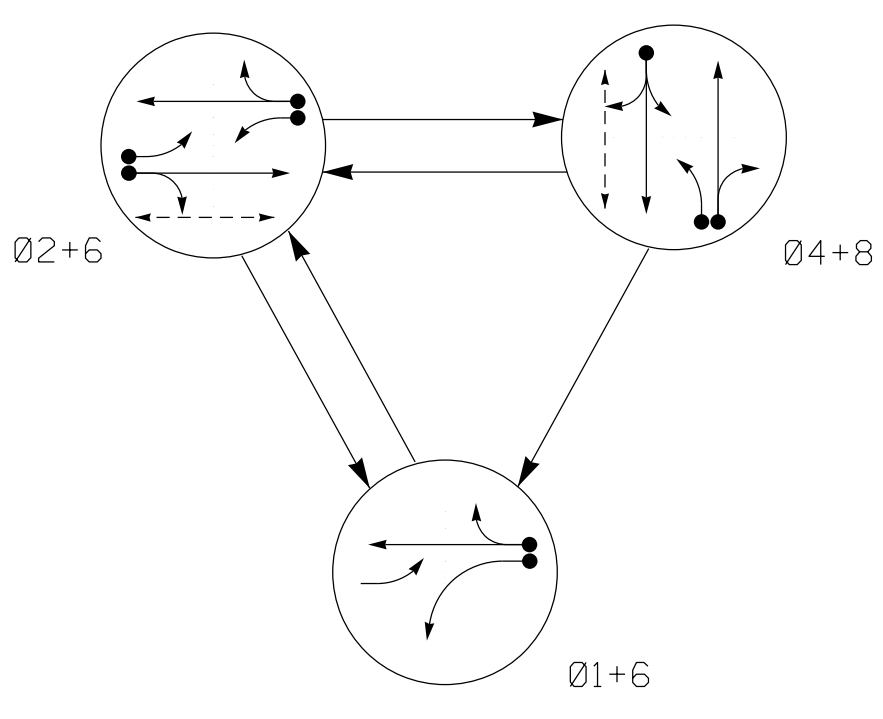
SEAL



Anthony Encarnacion  
PROFESSIONAL ENGINEER  
044476  
DATE  
4/14/2023  
SIG. INVENTORY NO. 05-2380



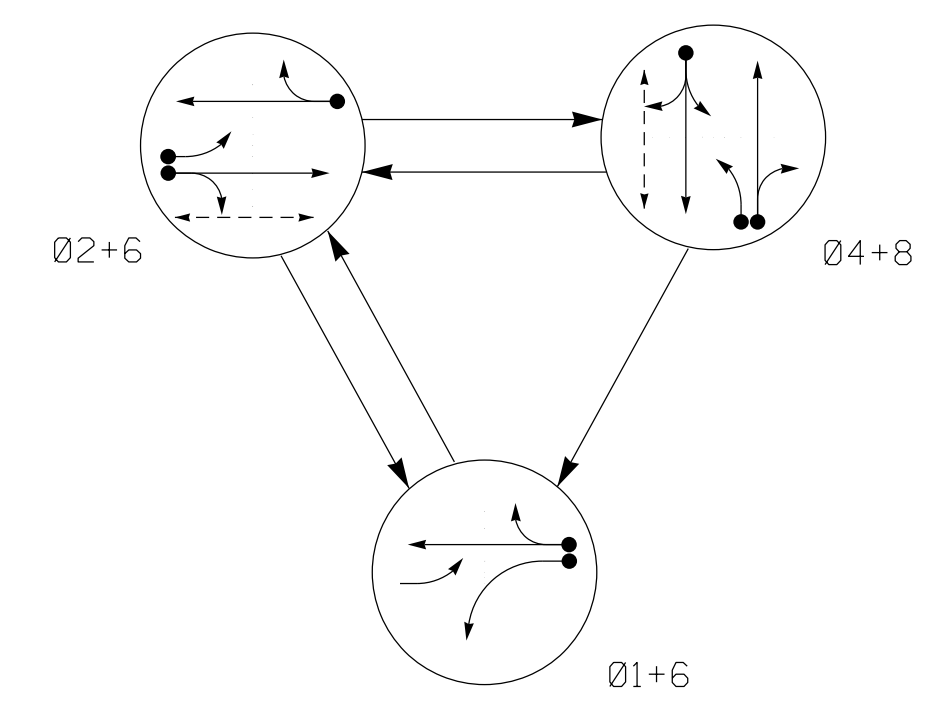
**DEFAULT PHASING DIAGRAM**



**DEFAULT PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 4 + 8	F L E D
11	←	←	←	←
21	←	←	←	←
22, 23	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y
81	←	←	←	←
82, 83	R	R	G	R
P21, P22	DW	W	DW	DRK
P41, P42	DW	DW	W	DRK

**ALTERNATE PHASING DIAGRAM**



**ALTERNATE PHASING TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 4 + 8	F L E D
11	←	←	←	←
21	←	←	←	←
22, 23	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y
81	←	←	←	←
82, 83	R	R	G	R
P21, P22	DW	W	DW	DRK
P41, P42	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	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15*	-	X	-	X	-	-
2A	6X6	70	EXIST	-	2	-	-	X	-	X	-	-
2B	6X40	0	2-4-2	-	2	-	-	X	-	X	-	-
4A	6X15	+5	EXIST	-	4	5	-	X	-	X	-	-
6A	6X6	70	EXIST	-	6	-	-	X	-	X	-	-
8A	6X40	0	2-4-2	-	8	3	-	X	-	X	-	-
8B	6X40	0	2-4-2	-	8	10	-	X	-	X	-	-
S1	6X6	+100	EXIST	-	-	-	-	-	-	-	-	-
S2	6X6	+100	EXIST	-	-	-	-	-	-	-	-	-

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

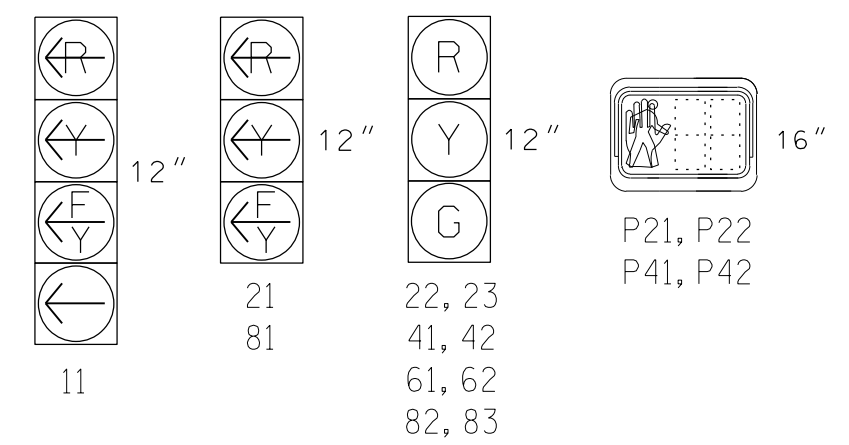
**3 Phase Fully Actuated (Fuquay-Varina Signal System)**

**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 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.
- 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.

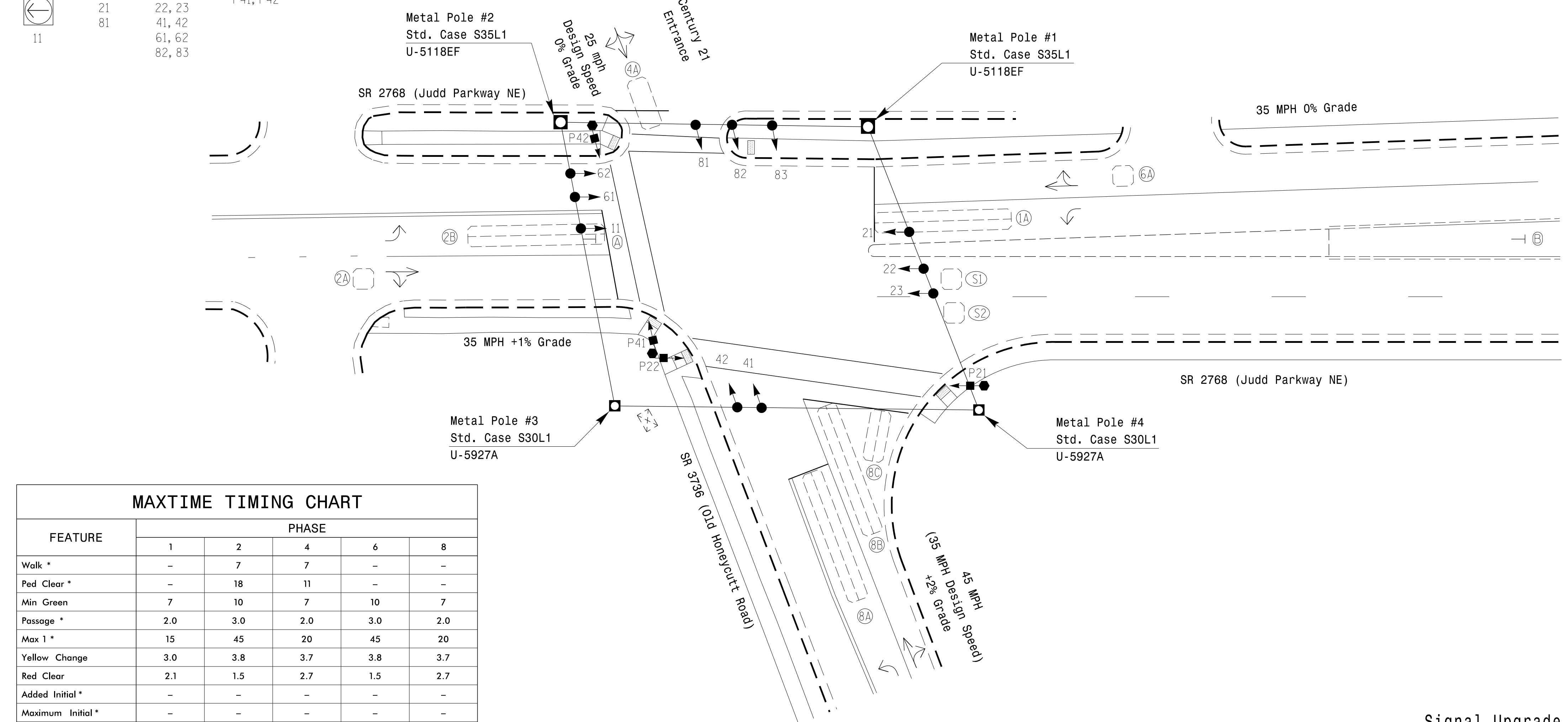
**SIGNAL FACE I.D.**

All Heads L.E.D.



**PHASING DIAGRAM DETECTION LEGEND**

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



**MAXTIME TIMING CHART**

FEATURE	PHASE				
	1	2	4	6	8
Walk *	-	7	7	-	-
Ped Clear *	-	18	11	-	-
Min Green	7	10	7	10	7
Passage *	2.0	3.0	2.0	3.0	2.0
Max 1 *	15	45	20	45	20
Yellow Change	3.0	3.8	3.7	3.8	3.7
Red Clear	2.1	1.5	2.7	1.5	2.7
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Advance Walk	-	3	3	-	-
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.

**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	○ → N/A
○ → Controller & Cabinet	○ → N/A
○ → Junction Box	○ → N/A
○ → 2-in Underground Conduit	○ → N/A
○ → Right of Way	○ → N/A
○ → Directional Arrow	○ → N/A
○ → Metal Strain Pole	○ → N/A
○ → Type II Signal Pedestal	○ → N/A
○ → Curb Ramp	○ → N/A
○ → Left Arrow "ONLY" Sign (R3-5L)	○ → N/A
○ → "LEFT LANE MUST TURN LEFT" Sign (R3-7L)	○ → N/A

**Signal Upgrade**

SR 2768 (Judd Parkway NE) at SR 3736 (Old Honeycutt Road) / Century 21 Entrance

Division 5 Wake County Fuquay-Varina

PLANNED BY: April 2023 REVIEWED BY: AM Encarnacion

PREPARED BY: JT Stiff REVIEWED BY: PL Alexander

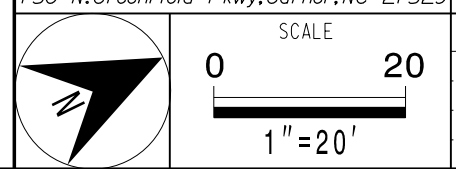
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DATE: 4/14/2023

SIG. INVENTORY NO. 05-2409

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



13-APR-2023 13:10 P:\275103\3633\_msk\krc\cmt\ATM\NC01\Documents\Roads and Br\Roads\Projects\100063268\_Fuquay Var\Task\05-11\_Signals\052409\_sig\_dsn\_2022.mxd.dgn STP14685 AT LUS47089



### 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	-
Included Phases	2	4	6	-
Modifier Phases	1	-	-	-
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	FYA 4 - Section	-
Included Phases	-	4	6	-
Modifier Phases	1	-	-	-
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 1A

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.

1A

Detector	Call Phase	Delay
1	1	0
29	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 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":

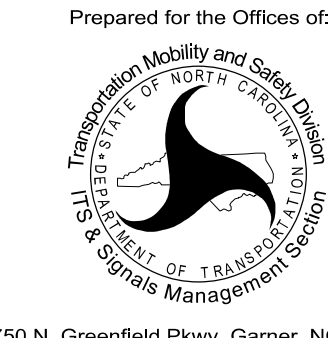
OVERLAP PLAN 2: Modifies overlap included phase for head 11 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2409  
DESIGNED: APRIL 2023  
SEALED: 4/14/2023  
REVISED: N/A

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:



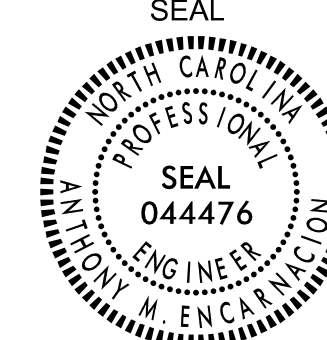
Prepared for the Offices of:  
Wake County  
750 N. Greenfield Pkwy, Garner, NC 27529

SR 2768 (Judd Parkway NE)  
at  
SR 3736 (Old Honeycutt Road)/  
Century 21 Entrance

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

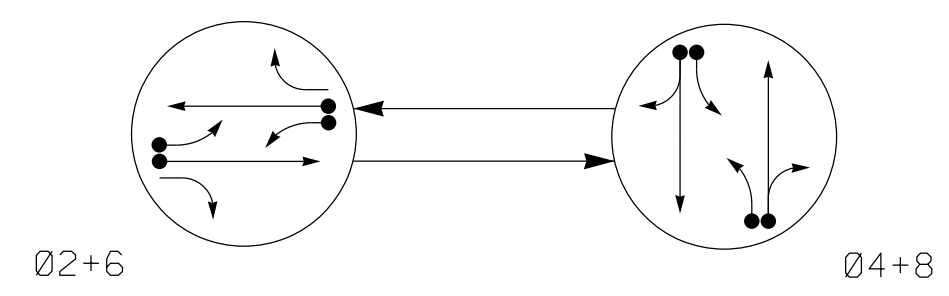
SEAL



Anthony Encarnacion  
PROFESSIONAL ENGINEER  
044476  
STATE OF NORTH CAROLINA

4/14/2023  
DATE  
SIG. INVENTORY NO. 05-2409

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

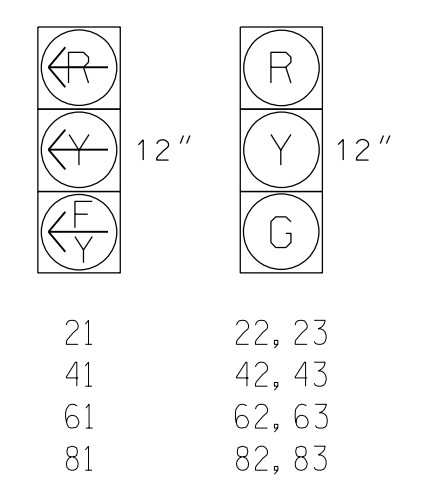
- ◄● DETECTED MOVEMENT
- ◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄--- UNSIGNALIZED MOVEMENT
- ◄--- PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
21	F	R	Y
22, 23	G	R	Y
41	R	F	R
42, 43	R	G	R
61	F	R	Y
62, 63	G	R	Y
81	R	F	R
82, 83	R	G	R

**SIGNAL FACE I.D.**

All Heads L.E.D.



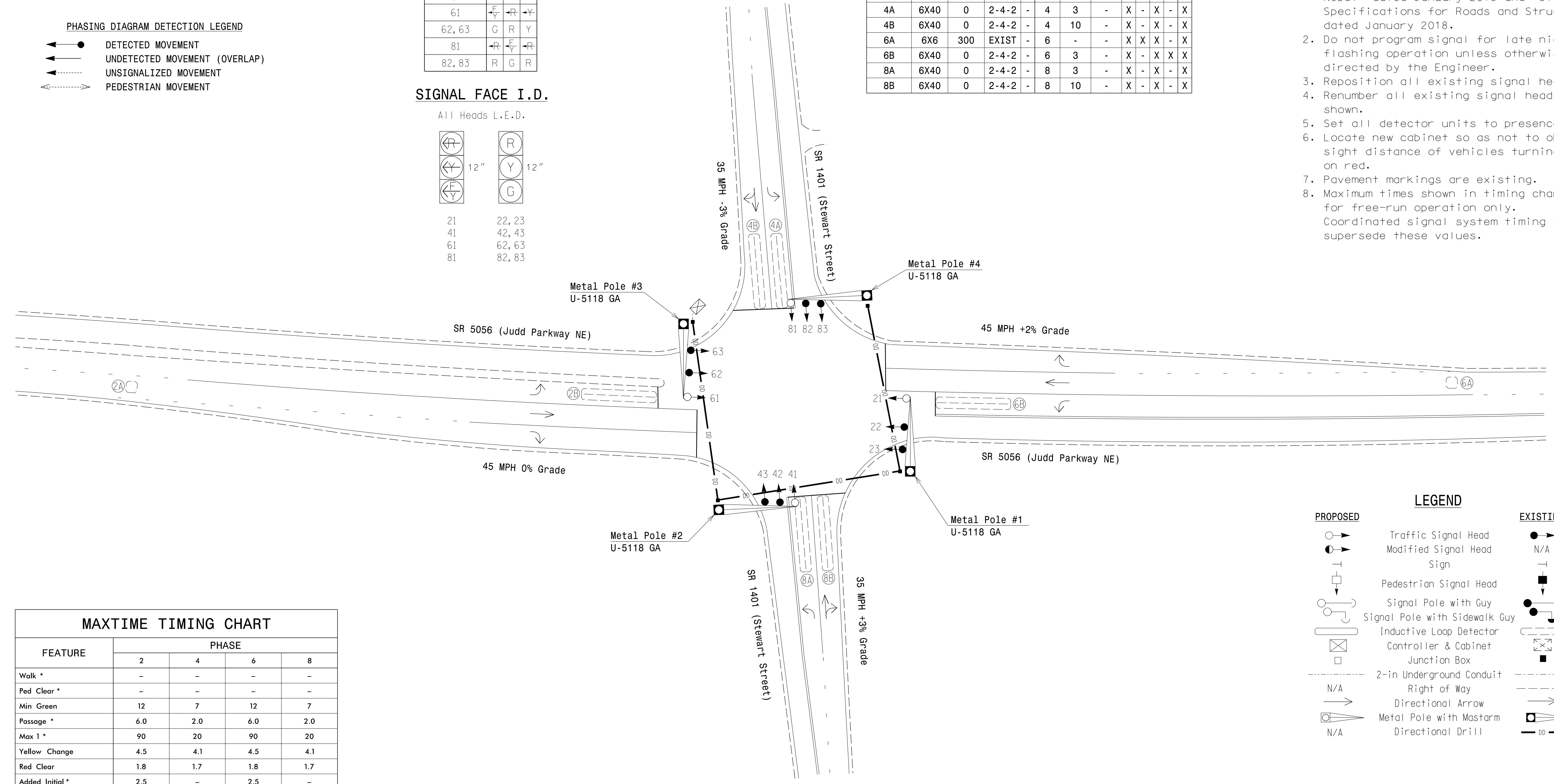
**MAXTIME DETECTOR INSTALLATION CHART**

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

**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.
- Reposition all existing signal heads.
- Renumber all existing signal heads as shown.
- 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.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



**MAXTIME TIMING CHART**

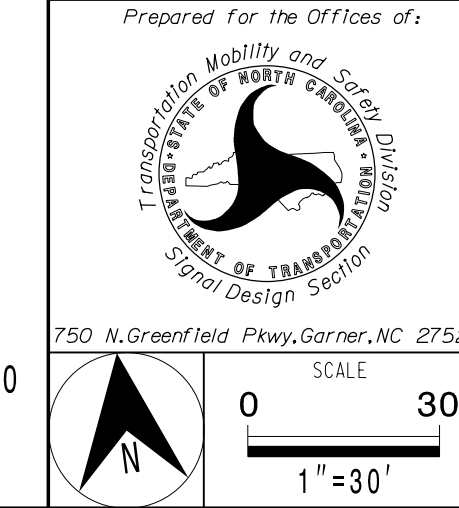
FEATURE	PHASE			
	2	4	6	8
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Max I *	90	20	90	20
Yellow Change	4.5	4.1	4.5	4.1
Red Clear	1.8	1.7	1.8	1.7
Added Initial *	2.5	-	2.5	-
Maximum Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	45	-	45	-
Minimum Gap	3.0	-	3.0	-
Advance Walk	-	-	-	-
Non Lock Detector	-	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 Junction Box	⊠ --- Controller & Cabinet Junction Box
--- 2-in Underground Conduit	--- 2-in Underground Conduit
N/A --- Right of Way	N/A --- Right of Way
→ Directional Arrow	→ Directional Arrow
⊠ --- Metal Pole with Mastarm	⊠ --- Metal Pole with Mastarm
N/A --- Directional Drill	--- Directional Drill

**Signal Upgrade**



**SR 5056 (Judd Parkway NE) at SR 1401 (Stewart 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  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 044476  
 AM ENCARNACION

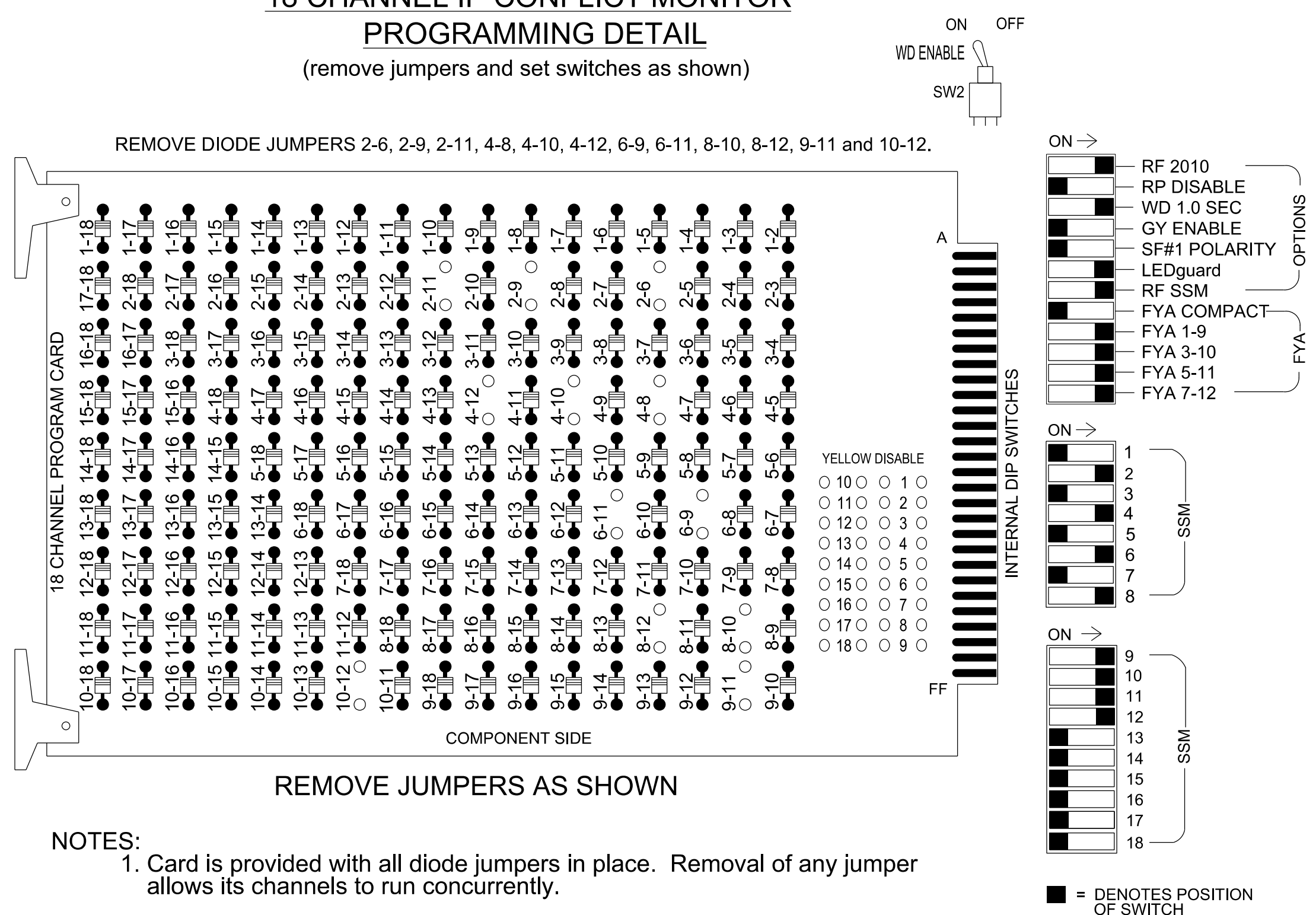
4/14/2023  
 DATE  
 SIG. INVENTORY NO. 05-2420

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

13-APR-2023 13:12  
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 STIP4685 AT LUS47089

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



#### NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

### NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. 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, S8, S11, AUX S1, AUX S2, AUX S4, AUX S5  
 Phases Used.....2, 4, 6, 8  
 Overlap "1".....\*  
 Overlap "2".....\*  
 Overlap "3".....\*  
 Overlap "4".....\*

\*See overlap programming detail on sheet 2

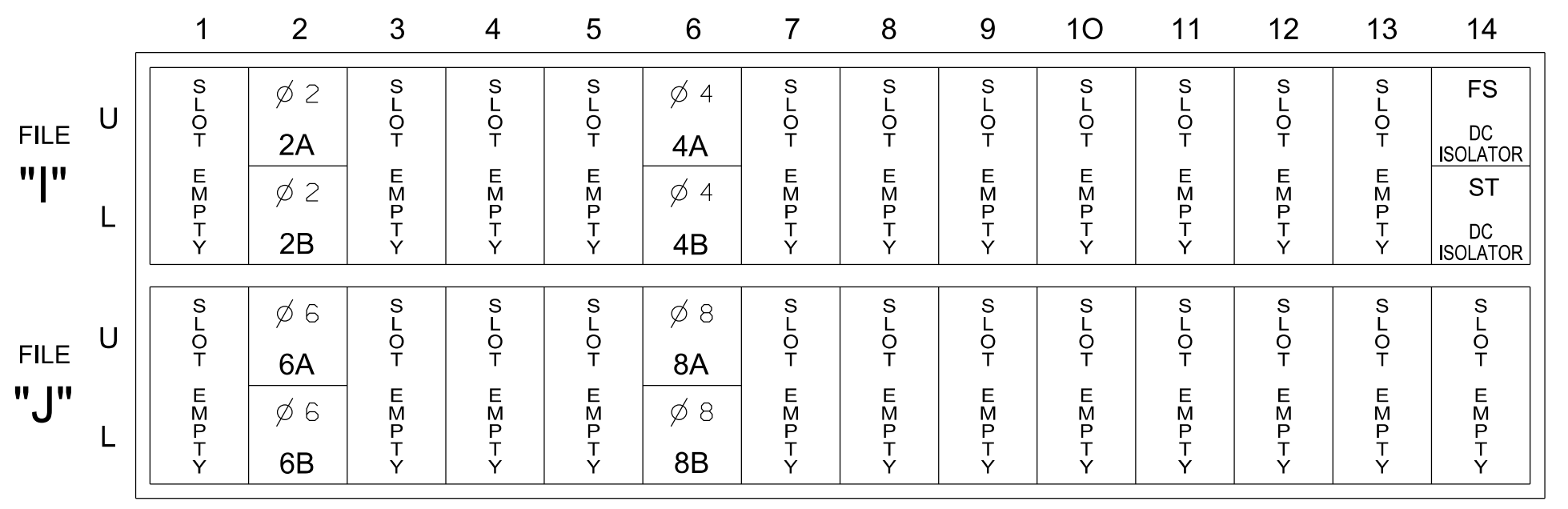
### SIGNAL HEAD HOOK-UP CHART

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.	NU	22,23	NU	NU	42,43	NU	NU	62,63	NU	NU	82,83	NU	61*	81*	NU	21*	41*	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW																		

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

### INPUT FILE POSITION LAYOUT

(front view)

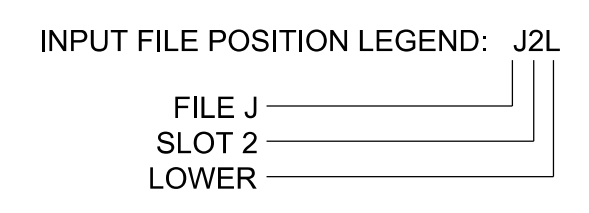


EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

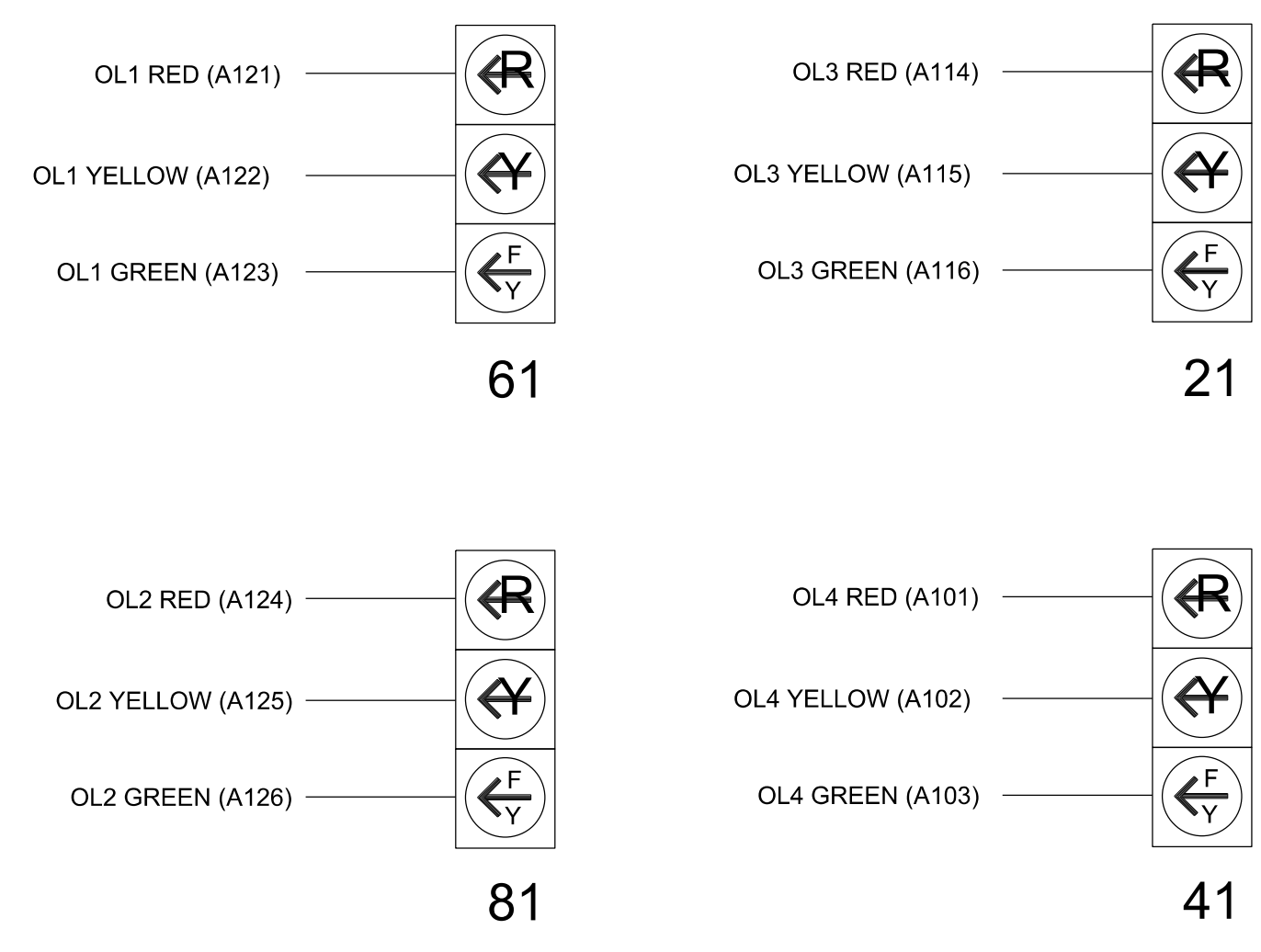
### INPUT FILE CONNECTION & PROGRAMMING CHART

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
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2	3		X		X	X
4A	TB4-9,10	I6U	41	3	8	4	3		X		X	
4B	TB4-11,12	I6L	45	7	9	4	10		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6	3		X		X	X
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
8B	TB5-11,12	J6L	46	8	23	8	10		X		X	



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2420  
 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:  
  
 750 N. Greenfield Pkwy, Garner, NC 27529

SR 5056 (Judd Parkway NE) at SR 1401 (Stewart Street)  
 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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED  
 SEAL  
  
 SEAL 044476  
 ANTHONY M. ENCARNACION  
 PROFESSIONAL ENGINEER  
 STATE OF NORTH CAROLINA  
 AUTHORIZED SIGNATURE DATE 4/14/2023  
 SIGNATURE DATE  
 SIG. INVENTORY NO. 05-2420

### 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	FYA 4 - Section
Included Phases	2	4	6	8
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

### 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.

13-APR-2023 13:12 PW:///S:\00036343\work\ATKINS.com\ATKMANC01\Documents\Roads and Bridges\Projects\100063268 Fuquay Varina\Task 05\_11\_Signals\Electrical Details\052420\_sm\_e\_2022mdd.dgn S:\14689 - AT U0591089

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2420  
DESIGNED: APRIL 2023  
SEALED: 4/14/2023  
REVISED: N/A


Electrical Detail - Sheet 2 of 2

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

Electrical and Programming Details For:

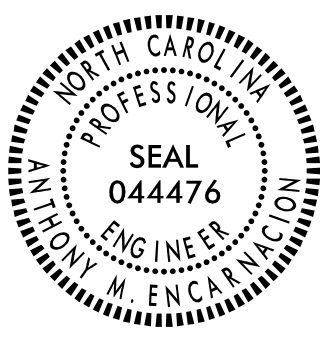
Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

SR 5056 (Judd Parkway NE) at SR 1401 (Stewart 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

SEAL



SEAL 044476 ENGINEER ANTHONY M. ENCARNACION

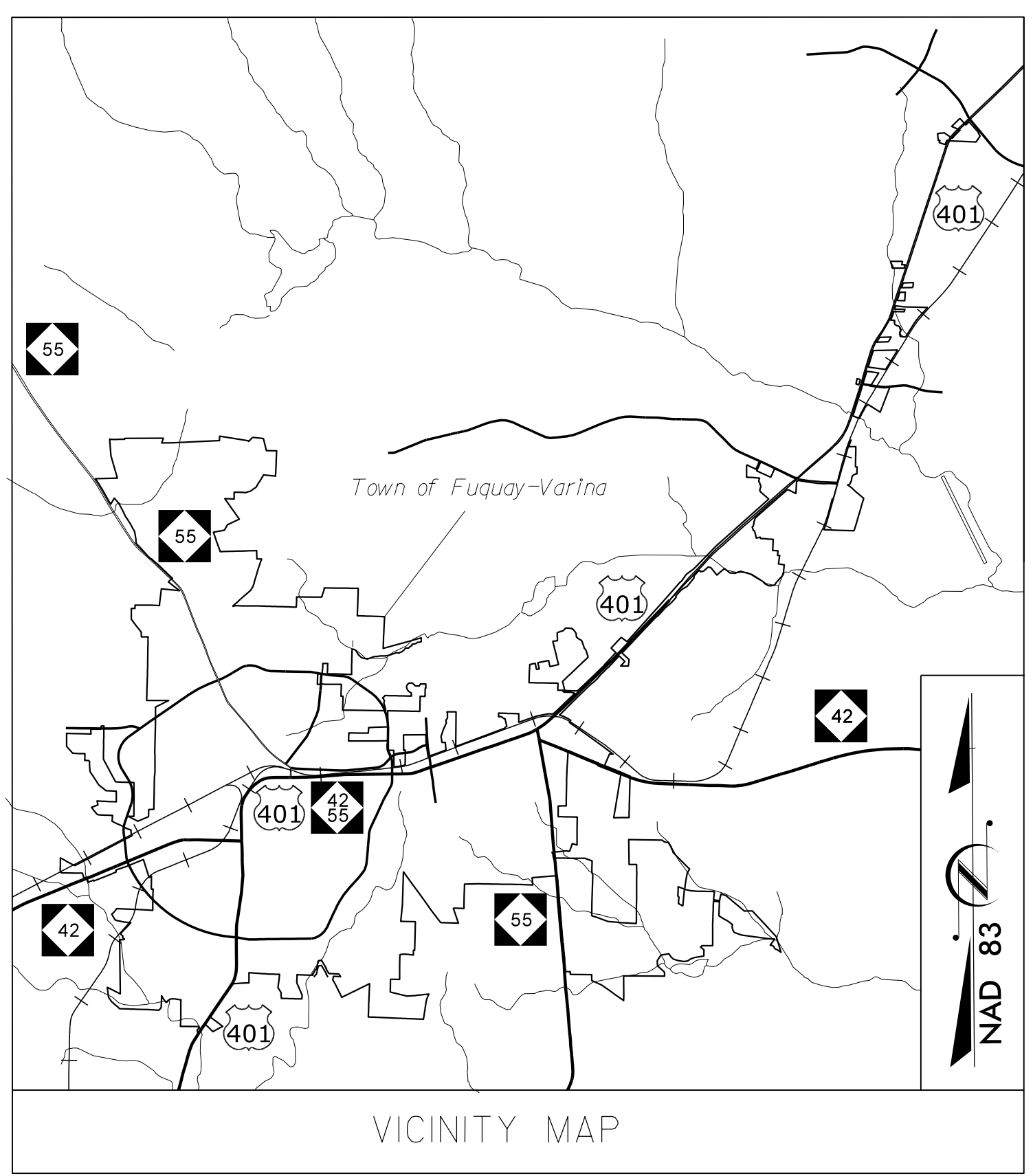
DocuSigned by: Anthony Encarnacion 4/14/2023

SIGNATURE DATE

SIG. INVENTORY NO. 05-2420

16-MAR-2023 16:22  
pw://SUS0036343-wsahrkins.com:ATKINANC01/Documents/Roads and Bridges/Projects/100063268 Fuquay Varina/Task 11\_CL/Front Sheets/U-6022\_SCP-1\_00.dgn  
STIF4685 AT LUS491089

**CONTRACT: C204419 TIP PROJECT: U-6022**



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

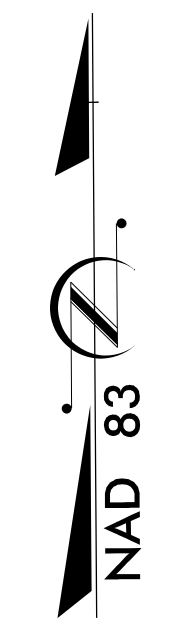
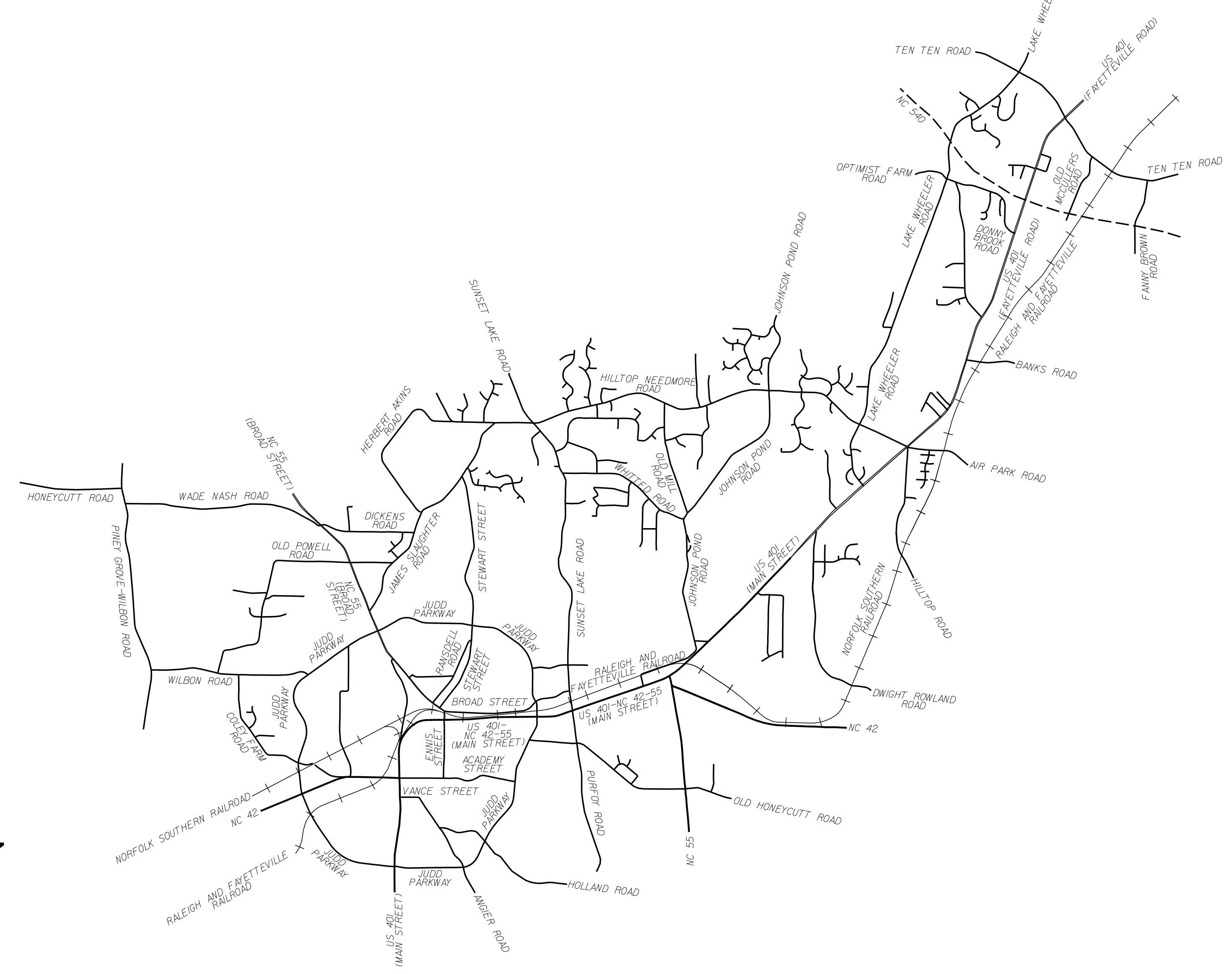
PLANS FOR PROPOSED IMPROVEMENTS  
**FUQUAY-VARINA TOWN-WIDE SIGNAL SYSTEM**

REPLACEMENT OF EXISTING SIGNAL SYSTEM WITH A NEW COMPUTERIZED CLOSED LOOP TRAFFIC SIGNAL SYSTEM.  
RELATED WORK INCLUDES:

UPGRADING LOCAL INTERSECTION CONTROLLERS, CABINETS, AND SYSTEM DETECTORS WITH LIMITED SIGNAL WIRING AND SIGNAL HEAD UPGRADES WHEN NECESSARY; UPGRADE AND EXPANSION OF CCTV MONITORING NETWORK; AND INSTALLATION OF AN ETHERNET COMMUNICATIONS NETWORK COMPRISED OF FIBER-OPTIC CABLE WITH ALL RELATED EQUIPMENT.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6022	SCP-01	146
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
47148.1.1		P.E.	
47148.3.1		CONSTRUCTION	

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UNLESS ALL SIGNATURES COMPLETED**



**Communications & CCTV  
Field Infrastructure  
and Traffic Signal Designs**

2018 STANDARD SPECIFICATIONS

LETTING DATE: APRIL 26, 2023

PROJECT LENGTH = 24 MILES

750 Greenfield Parkway, Garner, NC 27529

**NCDOT CONTACTS:**  
**TRANSPORTATION MOBILITY & SAFETY DIVISION**  
**INTELLIGENT TRANSPORTATION SYSTEMS SECTION**  
 GREGORY A. GREEN - SIGNAL COMMUNICATIONS PROJECT ENGINEER  
 HEIDI T. BERGGREN - PROJECT DESIGN ENGINEER  
 DOUG SONDERFAN - DESIGN ENGINEER

**ATKINS**

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

BRADFORD J. SLOCUM, PE - ATKINS PROJECT MANAGER  
 ANTHONY M. ENCARNACION, PE, PTOE - ATKINS PROJECT ENGINEER

SEAL

ANTHONY M. ENCARNACION  
 SEAL  
 044476  
 ENGINEER  
 STATE OF NORTH CAROLINA

Developed by  
  
 SIGNATURE DATE

4/14/2023  
 DATE

# INDEX OF SHEETS

SCP-01	TITLE SHEET – COMMUNICATIONS & CCTV FIELD INFRASTRUCTURE AND TRAFFIC SIGNAL DESIGNS
SCP-02.0	INDEX OF SHEETS AND ROADWAY STANDARD DRAWINGS
SCP-02.1	SIGNAL PLANS INDEX SHEET
SCP-03	CABLE ROUTING PLANS KEY SHEET
SCP-04	LEGEND/GENERAL NOTES/ABBREVIATIONS
SCP-05	CONSTRUCTION NOTES
SCP-06 THRU SCP-105	CABLE ROUTING PLANS
SCP-106 THRU SCP-107	COMMUNICATIONS CABLE SCHEMATICS
SCP-108	FIBER-OPTIC SPLICING DETAILS KEY SHEET
SCP-109 THRU SCP-141	FIBER-OPTIC SPLICING DETAILS
SCP-142 THRU SCP-144	CCTV CAMERA INSTALLATION FOR WOOD POLES
Sig. 1.0 THRU Sig. 47.3	TRAFFIC SIGNAL PLANS

## ROADWAY STANDARD DRAWINGS

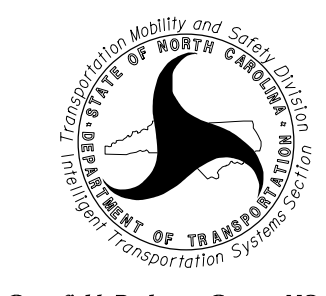
THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" CONTRACT SERVICES UNIT – N.C. DEPARTMENT OF TRANSPORTATION – RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE ARE HEREBY CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
848.01	CONCRETE SIDEWALK
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW BOARDS
1130.01	DRUMS
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGERS
1165.01	TRUCK MOUNTED ATTENUATOR
1180.01	SKINNY DRUMS
1700.02	ELECTRICAL SERVICE GROUNDING
1705.01	SIGNAL HEADS – SIGNAL HEADS
1705.03	SIGNAL HEADS – WIRE COLOR CONVENTIONS
1715.01	UNDERGROUND CONDUIT – TRENCHING
1716.01	JUNCTION BOXES
1720.01	WOOD POLES
1721.01	GUY ASSEMBLIES
1725.01	INDUCTIVE DETECTION LOOPS
1730.01	FIBER-OPTIC CABLE – SPARE CABLE STORAGE
1751.01	CONTROLLERS AND CABINETS – CABINET COMPONENT LAYOUT
1751.02	CONTROLLERS AND CABINETS – POWER, GROUND AND AUXILIARY

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 Prepared for the Offices of: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION 750 Greenfield Parkway, Garner, NC 27529	Fuquay-Varina Signal System Index of Sheets and Roadway Standard Drawings		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER ANTHONY M. ENCARNACION 044476
	Division 5 Wake County Fuquay-Varina		
	PLAN DATE: June 2022 PREPARED BY: JT Stiff	REVIEWED BY: MB Toth REVIEWED BY: AM Encarnacion	
NTS	REVISIONS _____ _____ _____	INIT. DATE _____ _____ _____	Disigned by: Anthony Encarnacion 4/14/2023 CHECKED BY: _____ DATE: _____ CADD Filename: U-6022_SCP-2.00.dgn



# SIGNAL PLANS INDEX SHEET

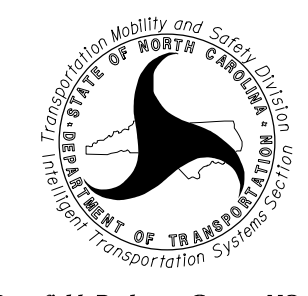

NCDOT SIN	INTERSECTION	SIGNAL SHEET NO.	SCP SHEET
05-0161	US 401 (S Main Street) at SR 2770 (E Vance Street)/W Vance Street	2	6
05-0162	US 401/US 401-NC 42 (Main Street) at NC 42/SR 1107 (Academy Street)	3	6
05-0163	SR 1107 (E Academy Street) at Fuquay Avenue	4	6
05-0164	SR 1107 (E Academy Street) at Ennis Street	5	41
05-0165	US 401-NC 42-55 (N Main Street) at NC 55 (N Ennis Street)/N Ennis Street	6	9
05-0184	US 401 (Fayetteville Road) at SR 1010 (Ten Ten Road)	7	38
05-0455	US 401-NC 42 (N Main Street) at SR 1108 (Wake Chapel Road)	8	8
05-0594	NC 55 (Broad Street) at SR 1108 (Wake Chapel Road)	9	78
05-0654	US 401-NC 42-55/US 401 (N Main Street) at NC 42-55/Sheetz Entrance	10	17
05-0719	SR 1301 (Sunset Lake Road) at SR 1393 (Hilltop Needmore Road/Bass Lake Road)	11	55
05-0750	US 401 (N Main Street) at SR 1404 (Mill Creek Drive)/Ideal Lane	12	18
05-0888	SR 1010 (Ten Ten Road) at Chalice Lane	13	39
05-0925	US 401 (Fayetteville Road/N Main Street) at SR 2752 (Air Park Road)/SR 1393 (Hilltop Needmore Road) and SR 2751 (Hilltop Road)	14	27
05-0935	US 401-NC 42-55 (N Main Street) at SR 1301 (Sunset Lake Road/Purfoy Road)	15	13
05-1126	SR 1010 (Ten Ten Road) at SR 1375 (Lake Wheeler Road)	16	40
05-1357	NC 55 at SR 2765 (Old Honeycutt Road)	17	51A
05-1388	NC 55 at John Deere Driveway	N/A	51
05-1512	SR 1010 (Ten Ten Road) at SR 2722 (Old McCullers Road)/Tawny Slope Court	18	103
05-1544	SR 1301 (Sunset Lake Road) at SR 1431 (Products Road)/Products Road	19	72
05-1553	SR 1375 (Lake Wheeler Road) at SR 1393 (Hilltop Needmore Road)	20	66
05-1559	US 401-NC 42-55 (N Main Street) at SR 2768/SR 5056 (N Judd Parkway NE)	21	12
05-1696	US 401 (Fayetteville Road) at SR 1503 (Donnybrook Road)/Wake Tech Way	22	34
05-1699	US 401 (Fayetteville Road) at Learning Way	23	33
05-1702	SR 1393 (Hilltop Needmore Road) at SR 1404 (Johnson Pond Road)	24	63
05-1731	NC 55 (N Broad Street) at SR 1399 (James Slaughter Road)	25	76
05-1816	NC 55 (N Broad Street) at SR 5056 (NW Judd Parkway)/N Judd Parkway NE	26	77

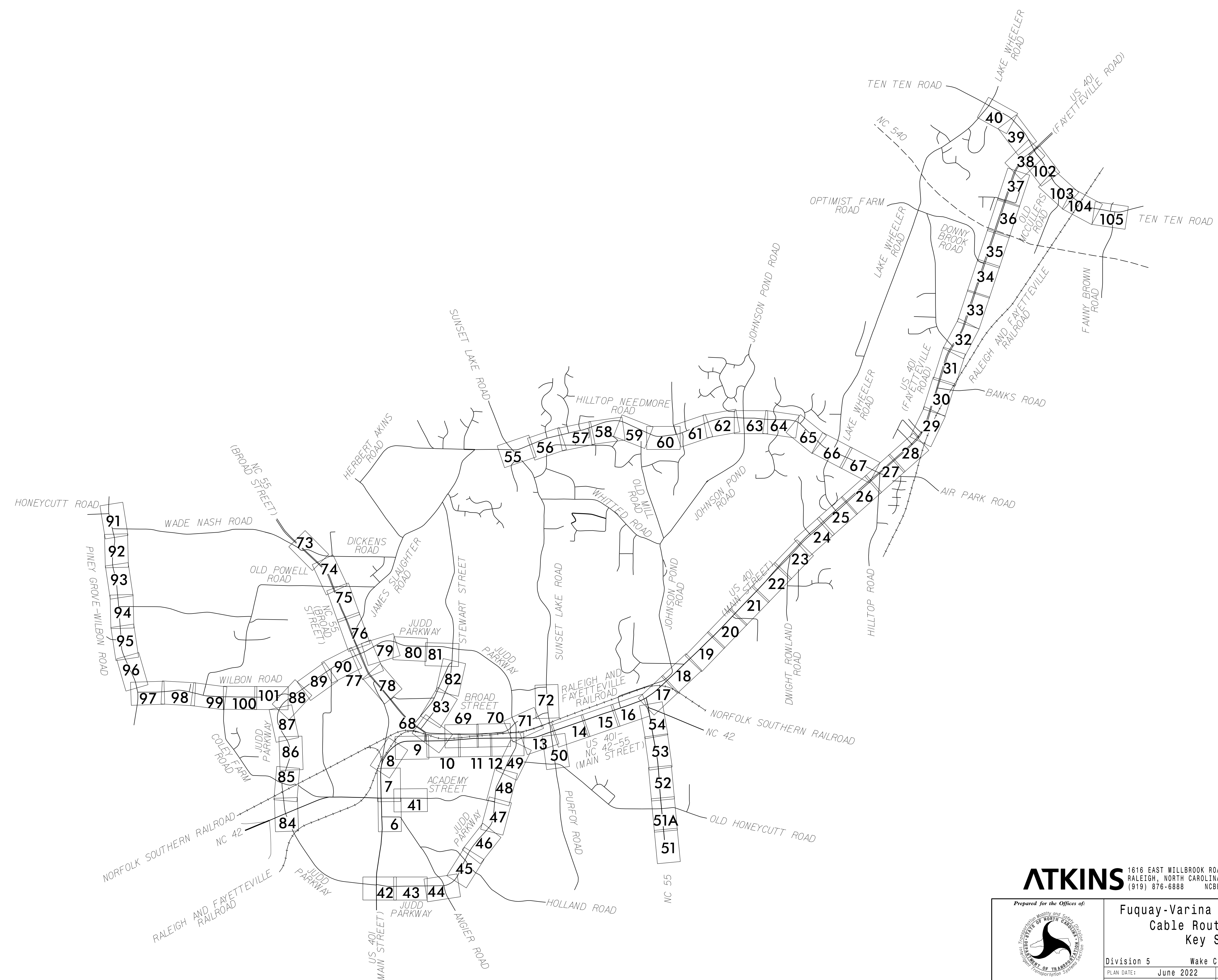
NCDOT SIN	INTERSECTION	SIGNAL SHEET NO.	SCP SHEET
05-1817	NC 55 (N Broad Street) at SR 1398 (Dickens Road)/SR 1113 (Wade Nash Road)	27	73
05-1818	NC 55 (N Broad Street) at SR 1111 (Old Powell Road)	28	74
05-1827	NC 42 (W Academy Street) at SR 2768 (S Judd Parkway SW)/SR 5056 (N Judd Parkway NW)	29	84
05-1829	SR 5056 (N Judd Parkway NW) at SR 1110 (Wilbon Road)	30	88
05-1908	SR 1101 (Piney Grove-Wilbon Road) at SR 1126 (Honeycutt Road)	31	91
05-1909	SR 1101 (Piney Grove-Wilbon Road) at SR 1110 (Wilbon Road)	32	97
05-1920	US 401 (Fayetteville Road) at NC 540 EB Ramp	33	35
05-1921	US 401 (Fayetteville Road) at NC 540 WB Ramp	34	36
05-1932	US 401 (S Main Street) at SR 2768 (S Judd Parkway SE)	35	42
05-1971	SR 1010 (Ten Ten Road) at SR 2723 (Fanny Brown Road)	N/A	105
05-2172	SR 5056 (N Judd Parkway NE) at Broad Street	36	71
05-2173	SR 1301 (Sunset Lake Road) at E Broad Street	37	72
05-2191	SR 1301 (Purfoy Road) at SR 2765/SR 3736 (Old Honeycutt Road)	38	50
05-2207	US 401-NC 42-55 (N Main Street) at Sunset Plaza (Food Lion)/Hampton Square (Aldi)	39	13
05-2252	NC 55/SR 1402 (E Broad Street) at NC 55 (N Ennis Street)	40	68
05-2260	US 401-NC 42-55 (N Main Street) at Lakestone Commons Avenue	41	15
05-2310	US 401 (Fayetteville Road) at SR 2724 (Banks Road)	42	30
05-2346	SR 2768 (S Judd Parkway SE) at SR 2767 (Holland Road)	43	45
05-2375	SR 2768 (S Judd Parkway SE) at SR 2770 (Angier Road)	44	44
05-2380	SR 2768 (S Judd Parkway SE) at SR 1107 (E Academy Street)	45	47
05-2409	SR 2768 (N Judd Parkway NE) at SR 3736 (Old Honeycutt Road)	46	49
05-2420	N Judd Parkway NE at SR 1401 (Stewart Street)	47	81

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 Prepared for the Offices of: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION TRANSPORTATION SYSTEMS DIVISION 750 Greenfield Parkway, Garner, NC 27529	Fuquay-Varina Signal System Signal Plans Index Sheet		 SEAL ANTHONY M. ENCARNACION PROFESSIONAL ENGINEER 044476 STATE OF NORTH CAROLINA
	Division 5 Wake County Fuquay-Varina PLAN DATE: June 2022 REVIEWED BY: MB Toth PREPARED BY: JT Stiff REVIEWED BY: AM Encarnacion	REVISIONS INIT. DATE _____ _____ _____	
NTS	4/14/2023 Anthony Encarnacion DATE		CADD Filename: U-6022_SCP-2.01.dgn



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	<b>Fuquay-Varina Signal System          Cable Routing Plans          Key Sheet</b>										
	Division 5 Wake County Fuquay-Varina PLAN DATE: June 2022 REVIEWED BY: MB Toth PREPARED BY: JT Stiff REVIEWED BY: AM Encarnacion	<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									
	<b>NTS</b>	CADD Filename: U-6022_SCP-3_001.dgn									

### ABBREVIATIONS

AGUY	Aerial Guy
ARLT	Area Light
AT&T	AT&T
BOT	Bottom Attachment
BS	Backside Attachment
CATV	Cable Television (Spectrum)
CAM	Camera Bracket
CCTV	Closed-Circuit Television
CLINK	Century Link
COMM	Communications Cable
COMP	Composite Cable
DL	Drip Loop
DRP	Drop
DNET	DukeNet
DUKE	Duke Energy
EXI	Existing Communications Cable
FLCAB	Flasher Cabinet
FOC / FO	Fiber Optic Cable
FS	Front Side Attachment
IMC	Intermediate Metallic Conduit
LIC	Lead-In Cable (Detector)
MSGR	Messenger
NCDOT	North Carolina Department of Transportation
NEUT	Neutral
OH	Overhead
OSS	Overhead Sign Span
OWS	Open Wire Secondary
PNG	Piedmont Natural Gas
PWR	Power
RSR	Riser
SAME	Same Elevation/Attachment Height
SEC	Secondary Power
SGRSR	Signal Riser
SIG	Signal Span
SP	Signal Pole
SO	Standoff
STLT	Streetlight
SVRSR	Service Riser
TEL	Telephone
TFMR	Transformer
TOP	Top of Pole or Top Attachment
TOWN	Town of Fuquay-Varina
TRI	Triplex
UG	Underground
VZN	Verizon
X ANY	Crossing Line, where "Any" is the abbreviation for the overhead line that is crossing exist/prop. cable route

	NEW FIBER OPTIC COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE TO BE REMOVED
	NEW AND EXISTING AERIAL GUY ASSEMBLY
	NEW CONDUIT
	EXISTING CONDUIT
	NEW DIRECTIONAL DRILLED CONDUIT
	NEW BORED AND JACKED CONDUIT
	RAILROAD TRACK
	NEW WOOD POLE
	EXISTING WOOD POLE
	NEW METAL POLE
	EXISTING METAL POLE
	EXISTING CONCRETE POLE
	NEW STANDARD GUY ASSEMBLY
	EXISTING STANDARD GUY ASSEMBLY
	NEW SIDEWALK GUY ASSEMBLY
	EXISTING SIDEWALK GUY ASSEMBLY
	NEW HUB CABINET
	EXISTING HUB CABINET

	NEW CONTROLLER AND CABINET
	EXISTING CONTROLLER AND CABINET
	NEW SPLICE CABINET
	EXISTING SPLICE CABINET
	NEW AERIAL SPLICE ENCLOSURE
	EXISTING AERIAL SPLICE ENCLOSURE
	NEW UNDERGROUND SPLICE ENCLOSURE IN NEW SPECIAL-SIZED JUNCTION BOX
	NEW UNDERGROUND SPLICE ENCLOSURE IN EXISTING SPECIAL-SIZED JUNCTION BOX
	EXISTING UNDERGROUND SPLICE ENCLOSURE IN EXISTING SPECIAL-SIZED JUNCTION BOX
	NEW CABLE STORAGE GUIDES (SNOW SHOES)
	EXISTING CABLE STORAGE GUIDES (SNOW SHOES)
	NEW CCTV CAMERA ASSEMBLY
	EXISTING CCTV CAMERA ASSEMBLY
	EXISTING ELECTRICAL JUNCTION BOX
	YAGI ANTENNA
	OMNI-DIRECTIONAL ANTENNA
	900 MHZ RADIO / FLAT-PANEL ANTENNA

	NEW STANDARD JUNCTION BOX
	EXISTING STANDARD JUNCTION BOX
	NEW OVER-SIZED OR SPECIAL-SIZED JUNCTION BOX
	EXISTING OVER-SIZED OR SPECIAL-SIZED JUNCTION BOX
	EXISTING UNDERGROUND VAULT
	EXISTING COMMUNICATIONS MANHOLE
	NCDOT SIGNAL ID NUMBER
	CCTV CAMERA ID NUMBER
	EDGE OF PAVEMENT
	EDGE OF LANE
	BACK OF CURB
	FACE OF CURB
	NEW SYSTEM DETECTOR
	EXISTING SYSTEM DETECTOR
	NEW ELECTRICAL SERVICE PEDESTAL

### LEGEND

### GENERAL NOTES

1. THESE PLANS WERE PREPARED FROM INVENTORIES AND FIELD DATA COLLECTED DURING JANUARY 2019 THRU MARCH 2019 AND APRIL 2022 THRU JUNE 2022. ACTUAL CONDITIONS IN THE FIELD AT THE TIME OF CONSTRUCTION MAY BE DIFFERENT FROM THOSE SHOWN IN THE PLANS.
2. THE FIELD LOCATION OF ANY ITEM TO BE INSTALLED AS PART OF THIS PROJECT SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
3. NEW TRAFFIC SIGNAL CONTROLLER CABINETS ARE SPECIFIED ON THE SIGNAL PLANS.
4. BURIED UTILITIES AND STRUCTURES: PIPELINES, STORM SEWERS, POWER CABLES, UTILITY CABLES, BASEMENTS, AND OTHER PUBLICLY AND PRIVATELY OWNED UNDERGROUND OBSTRUCTIONS EXIST ADJACENT TO AND WITHIN THE STREET RIGHT-OF-WAY WITHIN THE CONSTRUCTION LIMITS OF THIS PROJECT. INVESTIGATE THE LOCATION OF SUCH BURIED UTILITIES AND STRUCTURES WITH PUBLIC AND PRIVATE UTILITIES.
5. THE PLAN SHEETS HAVE BEEN DEVELOPED AS CLOSE TO SCALE AS PRACTICAL. HOWEVER, ACTUAL FIELD CONDITIONS SHALL PROVIDE THE BASIS FOR APPLYING THE WORK SHOWN.
6. THE ROADWAY STANDARD DRAWINGS AND THE DETAILS PROVIDED IN THIS PLAN SET SHALL APPLY TO ALL WORK REQUIRED IN THIS PROJECT, WHETHER A PARTICULAR DETAIL IS SPECIFICALLY REFERENCED TO A WORK ITEM OR NOT. IN THE EVENT OF A CONFLICT, THE ORDER OF PRECEDENCE SHALL BE: THE PROJECT SPECIAL PROVISIONS, THE PLAN SET - INCLUDING DETAILS - SUPPLEMENTAL SPECIFICATIONS, THE STANDARD SPECIFICATIONS, AND THEN THE ROADWAY STANDARD DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR APPLYING THE PROPER DETAILS.
7. ANY OF THE CONTRACTOR'S WORK ACTIVITIES WHICH IMPACT ANY UTILITY FACILITY SHALL BE COORDINATED WITH THE OWNER OF THE AFFECTED UTILITIES. THE CONTRACTOR SHALL FOLLOW ANY AND ALL WORK PROCEDURES THE UTILITY OWNERS MAY REQUIRE.
8. ALL WORK SHOWN ON THESE PLANS SHALL BE PERFORMED BY THE CONTRACTOR UNLESS SPECIFICALLY NOTED TO BE PERFORMED BY OTHERS.
9. AREAS WITHIN THIS PROJECT HAVE BEEN DETERMINED TO CONTAIN PROPERTIES WITH DOCUMENTED HISTORICAL SIGNIFICANCE. IF IT IS NECESSARY TO DEVIATE FROM THE PLANS IN AN AREA IDENTIFIED TO CONTAIN PROPERTIES WITH HISTORIC SIGNIFICANCE, ALERT THE ENGINEER TO CONTACT ENVIRONMENTAL ANALYSIS UNIT - HISTORIC ARCHITECTURE GROUP OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION FOR AN EFFECTS DETERMINATION BEFORE PROCEEDING.

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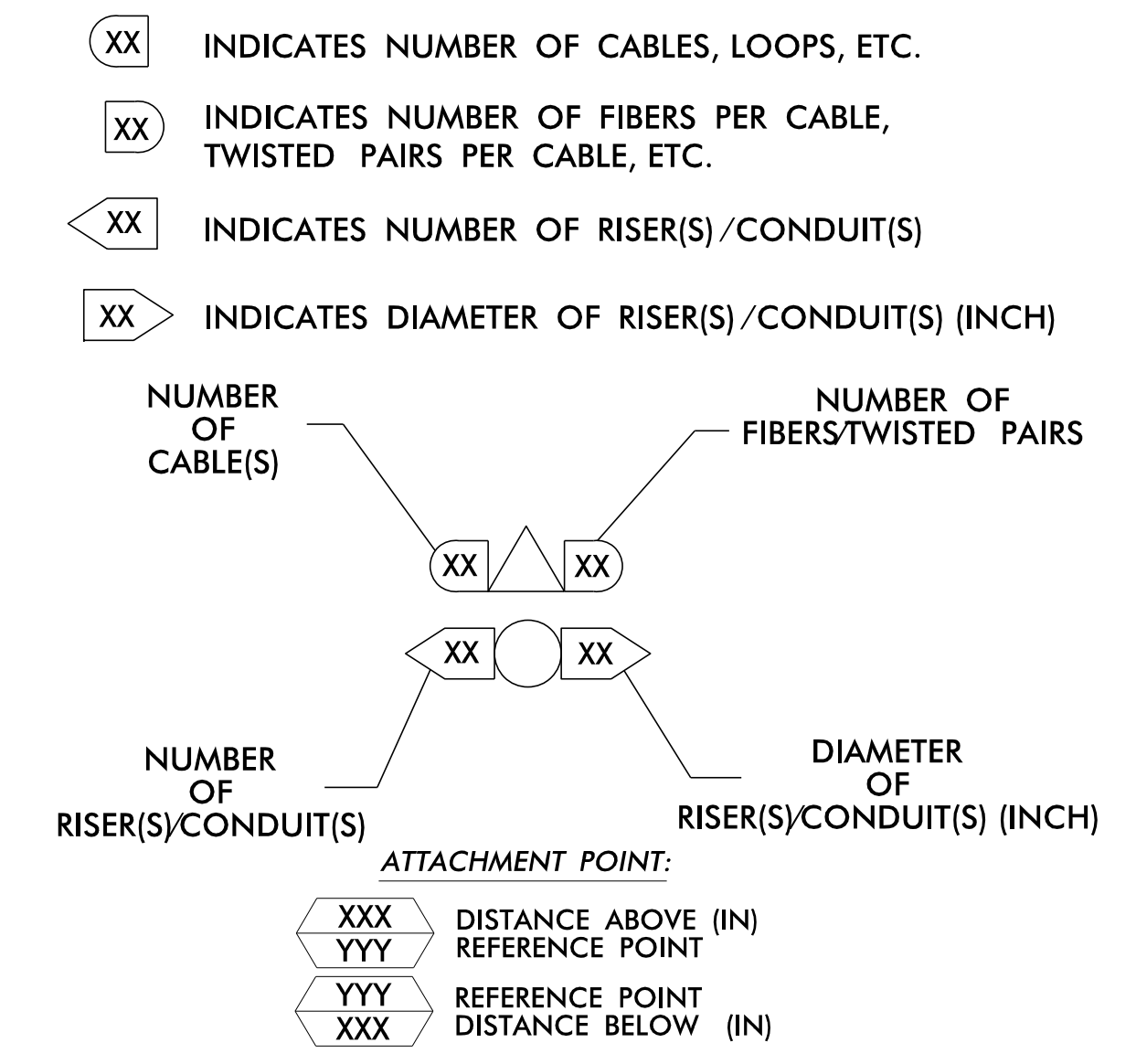
	1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBES #F-0326		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Fuquay-Varina Signal System Legend/ General Notes/ Abbreviations		
Prepared for the Offices of: 	Division 5 Wake County Fuquay-Varina PLAN DATE: June 2022 REVIEWED BY: MB Toth PREPARED BY: JT Stiff REVIEWED BY: AM Encarnacion		REVISIONS INIT. DATE _____ _____ _____
750 Greenfield Parkway, Garner, NC 27529 <b>NTS</b>	REVISIONS INIT. DATE _____ _____ _____	_____ _____ _____	_____ _____ _____

- 1 INSTALL CATEGORY 6 CABLE
- 2 INSTALL 3-WIRE COPPER SERVICE ENTRANCE CONDUCTORS
- 3 INSTALL 3-WIRE COPPER FEEDER CONDUCTORS
- 4 INSTALL SMFO CABLE
- 5 INSTALL COAXIAL ANTENNA CABLE
- 6 INSTALL FIBER-OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 INSTALL CONDUIT UNDERGROUND
- 9 INSTALL PVC CONDUIT
- 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING
- 13 INSTALL HEAT SHRINK TUBING RETROFIT KIT
- 14 INSTALL HIGH DENSITY POLYETHYLENE CONDUIT
- 15 DIRECTIONAL DRILL CONDUIT
- 16 BORE AND JACK CONDUIT
- 17 INSTALL CABLE(S) IN EXISTING CONDUIT
- 18 INSTALL CABLE(S) IN NEW CONDUIT
- 19 INSTALL CABLE(S) IN EXISTING RISER(S)
- 20 INSTALL CABLE(S) IN NEW RISER(S)
- 21 INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE
- 22 INSTALL NEW CONDUIT INTO CABINET BASE (USE EXISTING CONDUIT STUBOUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO CABINET BASE (USE EXISTING CONDUIT STUBOUTS WHEN AVAILABLE)
- 24 INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET
- 25 INSTALL NEW RISER INTO POLE MOUNTED CABINET
- 26 INSTALL DIGITAL VIDEO ENCODER
- 27 INSTALL NEW ETHERNET EDGE SWITCH IN CABINET
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPLICE ENCLOSURE
- 30 INSTALL AERIAL SPLICE ENCLOSURE
- 31 INSTALL TYPE 332 HUB CABINET
- 32 MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER

- 33 REMOVE EXISTING SPLICE / HUB / CCTV CABINET
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL STANDARD SIZE JUNCTION BOX
- 39 INSTALL SPECIAL-SIZED JUNCTION BOX (36" x 24" x 24")
- 40 INSTALL OVER-SIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48 REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
- 49 REMOVE EXISTING COMMUNICATIONS CABLE
- 50 INSTALL SERVICE CONDUCTORS
- 51 INSTALL CABLE STORAGE GUIDE(S) [SNOW SHOE(S)] AND STORE 100 FEET OF EACH CABLE
- 52A INSTALL DELINEATOR MARKER
- 52B INSTALL JUNCTION BOX MARKER
- 53 STORE 30 FEET OF COMMUNICATIONS CABLE (EACH CABLE)
- 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56 LASH CABLE(S) TO NEW MESSENGER CABLE
- 57 MODIFY EXISTING ELECTRICAL SERVICE FOR CCTV
- 58 INSTALL NEW ELECTRICAL SERVICE
- 59 INSTALL NEW POLE MOUNTED CCTV CABINET (336)
- 60 INSTALL NEW CCTV CABINET (NEMA TYPE 4)
- 61 REMOVE EXISTING CCTV CAMERA ASSEMBLY
- 62 NEW CABINET ENTRANCE INTO NEW FOUNDATION
- 63 DRILL/CORE DRILL EXISTING FOUNDATION

- 64 INTERCEPT AND REROUTE EXISTING CONDUITS
- 65 BOND MESSENGER TO POLE GROUND
- 66 BOND RISER TO POLE GROUND
- 67 BOND TRACER WIRE TO EQUIPMENT GROUND BUS
- 68 NOT USED
- 69 HANDLASH AND INSTALL AERIAL CABLE PROTECTOR
- 70 INSTALL EQUIPMENT CABINET DISCONNECT
- 71 INSTALL ETHERNET SWITCH
- 72 INSTALL CCTV METAL POLE
- 73 REMOVE EXISTING CCTV METAL POLE
- 74 REMOVE WIRELESS COMMUNICATIONS EQUIPMENT
- 75 BACKPULL AND COIL NCDOT ITS CABLE
- 76 INSTALL HUB SWITCH
- 77 INSTALL CELLULAR MODEM

**CONSTRUCTION NOTE SYMBOLOGY KEY**



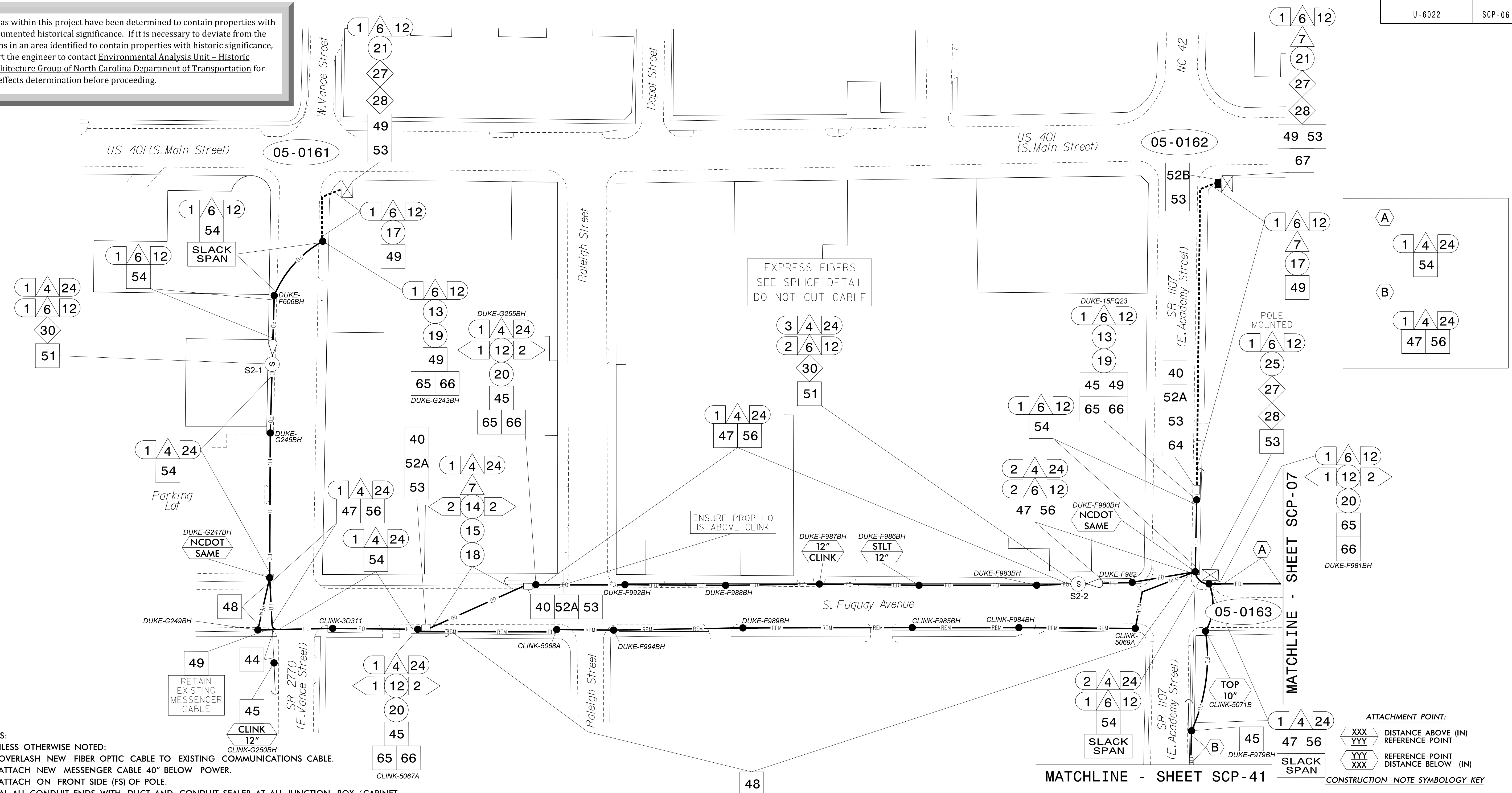
**ATKINS** 1616 EAST MILLBROOK ROAD, SUITE 160  
 RALEIGH, NORTH CAROLINA 27609  
 (919) 876-6888 NCBEE# #F-0326

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	Prepared for the Offices of: <b>Fuquay-Varina Signal System</b>		
	<b>Construction Notes</b>		
Division 5 Wake County Fuquay-Varina	PLAN DATE: June 2022	REVIEWED BY: MB Toth	SEAL 044476 ANTHONY M. ENCARNACION PROFESSIONAL ENGINEER STATE OF NORTH CAROLINA
750 Greenfield Parkway, Garner, NC 27529	PREPARED BY: JT Stiff	REVIEWED BY: AM Encarnacion	DATE: 4/14/2023
NTS	REVISIONS	INIT.	DATE

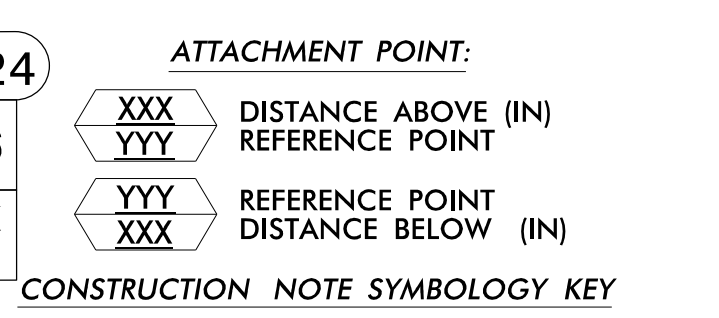
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Areas within this project have been determined to contain properties with documented historical significance. If it is necessary to deviate from the plans in an area identified to contain properties with historic significance, alert the engineer to contact Environmental Analysis Unit - Historic Architecture Group of North Carolina Department of Transportation for an effects determination before proceeding.



- NOTES:
- UNLESS OTHERWISE NOTED:
    - OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.
    - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.
    - ATTACH ON FRONT SIDE (FS) OF POLE.
  - SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

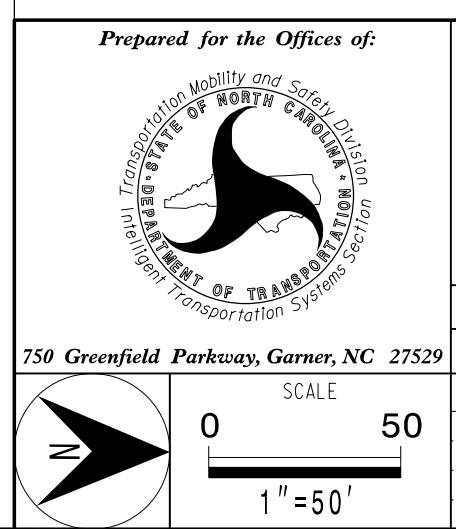
1	INSTALL CATEGORY 6 CABLE	11	INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD	22	INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER	43	REMOVE EXISTING WOOD POLE	54	LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE	66	BOND RISER TO POLE GROUND
2	INSTALL 3-WIRE COPPER SERVICE ENTRANCE CONDUCTORS	12	INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING	23	INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	33	REMOVE EXISTING SPLICE / HUB / CCTV CABINET	44	INSTALL AERIAL GUY ASSEMBLY	55	LASH CABLE(S) TO EXISTING MESSENGER CABLE	67	BOND TRACER WIRE TO EQUIPMENT GROUND BUS
3	INSTALL 3-WIRE COPPER FEEDER CONDUCTORS	13	INSTALL HEAT SHRINK TUBING RETROFIT KIT	24	INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET	34	INSTALL CABINET FOUNDATION	45	INSTALL STANDARD GUY ASSEMBLY	56	LASH CABLE(S) TO NEW MESSENGER CABLE	68	NOT USED
4	INSTALL SMFO CABLE	14	INSTALL HIGH DENSITY POLYETHYLENE CONDUIT	25	INSTALL NEW RISER INTO POLE MOUNTED CABINET	35	REMOVE EXISTING CABINET FOUNDATION	46	INSTALL SIDEWALK GUY ASSEMBLY	57	MODIFY EXISTING ELECTRICAL SERVICE	69	HANDLASH AND INSTALL AERIAL CABLE PROTECTOR
5	INSTALL COAXIAL ANTENNA CABLE	15	DIRECTIONAL DRILL CONDUIT	26	INSTALL DIGITAL VIDEO ENCODER	36	INSTALL CCTV CAMERA ASSEMBLY	47	INSTALL MESSENGER CABLE	58	INSTALL NEW ELECTRICAL SERVICE	70	INSTALL EQUIPMENT CABINET DISCONNECT
6	INSTALL FIBER-OPTIC DROP CABLE	16	BORE AND JACK CONDUIT	27	INSTALL NEW ETHERNET EDGE SWITCH IN CABINET	37	INSTALL CCTV CAMERA WOOD POLE	48	REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE	59	INSTALL NEW POLE MOUNTED CCTV CABINET (336)	71	INSTALL MANAGED ETHERNET SWITCH
7	INSTALL TRACER WIRE	17	INSTALL CABLE(S) IN EXISTING CONDUIT	28	INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET	38	INSTALL STANDARD SIZE JUNCTION BOX	49	REMOVE EXISTING COMMUNICATIONS CABLE	60	INSTALL NEW CCTV CABINET (NEMA TYPE 4)	72	INSTALL CCTV METAL POLE
8	INSTALL CONDUIT UNDERGROUND	18	INSTALL CABLE(S) IN NEW CONDUIT	29	INSTALL UNDERGROUND SPLICE ENCLOSURE	39	INSTALL SPECIAL-SIZED JUNCTION BOX (36" x 24" x 24")	50	INSTALL SERVICE CONDUCTORS	61	REMOVE EXISTING CCTV CAMERA ASSEMBLY	73	REMOVE EXISTING CCTV METAL POLE
9	INSTALL PVC CONDUIT	19	INSTALL CABLE(S) IN EXISTING RISER(S)	30	INSTALL AERIAL SPLICE ENCLOSURE	40	INSTALL OVER-SIZED JUNCTION BOX	51	INSTALL CABLE STORAGE GUIDE(S) (SNOW SHOE(S)) AND STORE 100 FEET OF EACH CABLE	62	NEW CABINET ENTRANCE INTO NEW FOUNDATION	74	REMOVE WIRELESS COMMUNICATIONS EQUIPMENT
10	INSTALL RIGID, GALVANIZED STEEL CONDUIT	20	INSTALL CABLE(S) IN NEW RISER(S)	31	INSTALL TYPE 332 HUB CABINET	41	REMOVE EXISTING JUNCTION BOX	52A	INSTALL DELINEATOR MARKER	63	DRILL/CORE DRILL EXISTING FOUNDATION	75	BACKPULL AND COIL NCDOT ITS CABLE
		21	INSTALL CABLE(S) IN EXISTING CABINET ENTRANCE			42	INSTALL WOOD POLE	53	STORE 30' OF COMMUNICATIONS CABLE (EACH CABLE)	64	INTERCEPT AND REROUTE EXISTING CONDUITS	76	INSTALL HUB SWITCH
										65	BOND MESSENGER TO POLE GROUND	77	INSTALL CELLULAR MODEM



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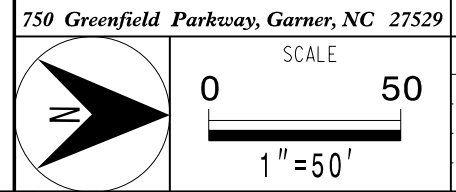
MATCHLINE - SHEET SCP-07

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-8888 NGBEES #F-03226



Fuquay-Varina Signal System Cable Routing Plans

Division 5	Wake County	Fuquay-Varina
PLAN DATE: June 2022	REVIEWED BY: MB Toth	
PREPARED BY: JT Stiff	REVIEWED BY: AM Encarnacion	
REVISIONS	INIT.	DATE



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

ANTHONY ENCARNACION PROFESSIONAL ENGINEER

044476

4/14/2023

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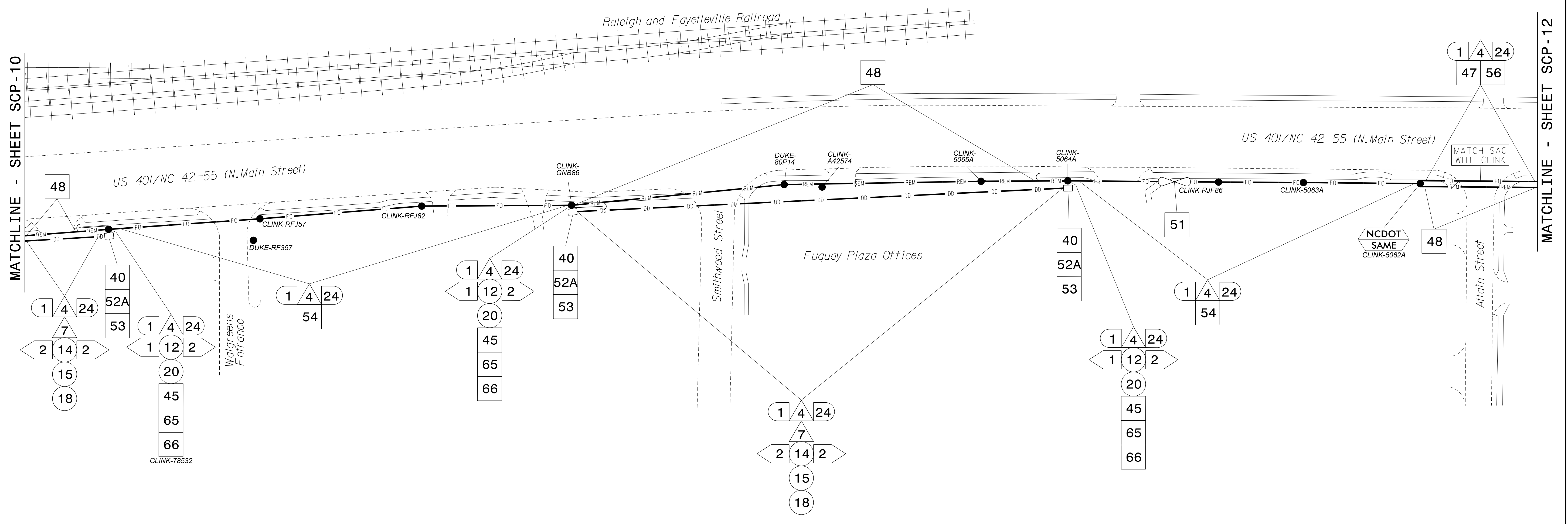




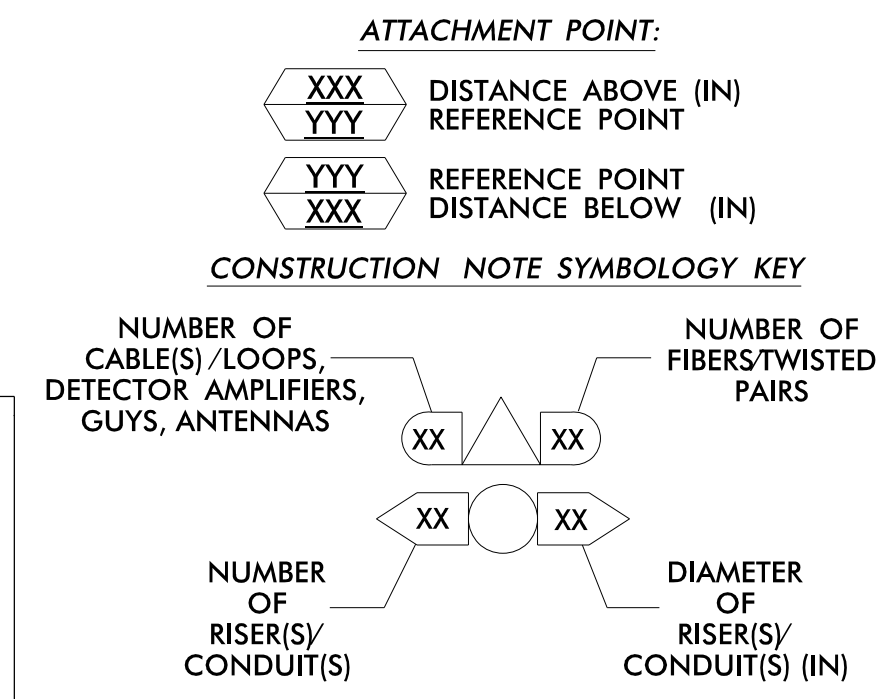








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1	INSTALL CATEGORY 6 CABLE	11	INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD	22	INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)	32	MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER	43	REMOVE EXISTING WOOD POLE	54	LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE	66	BOND RISER TO POLE GROUND
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						42	INSTALL WOOD POLE	53	STORE 30' OF COMMUNICATIONS CABLE (EACH CABLE)	64	INTERCEPT AND REROUTE EXISTING CONDUITS	76	INSTALL HUB SWITCH
										65	BOND MESSENGER TO POLE GROUND	77	INSTALL CELLULAR MODEM

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

Prepared for the Offices of: **Fuquay-Varina Signal System Cable Routing Plans**

Division 5 Wake County Fuquay-Varina

PLAN DATE: June 2022 REVIEWED BY: MB Toth

PREPARED BY: JT Stiff REVIEWED BY: AM Encarnacion

REVISIONS: INIT. DATE

SCALE: 1"=50'

Seal: **ATKINS PROFESSIONAL ENGINEER SEAL 044476**

Disseminated by: **Anthony Encarnacion** DATE: 4/14/2023

CADD File Name: CL-06.dgn

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

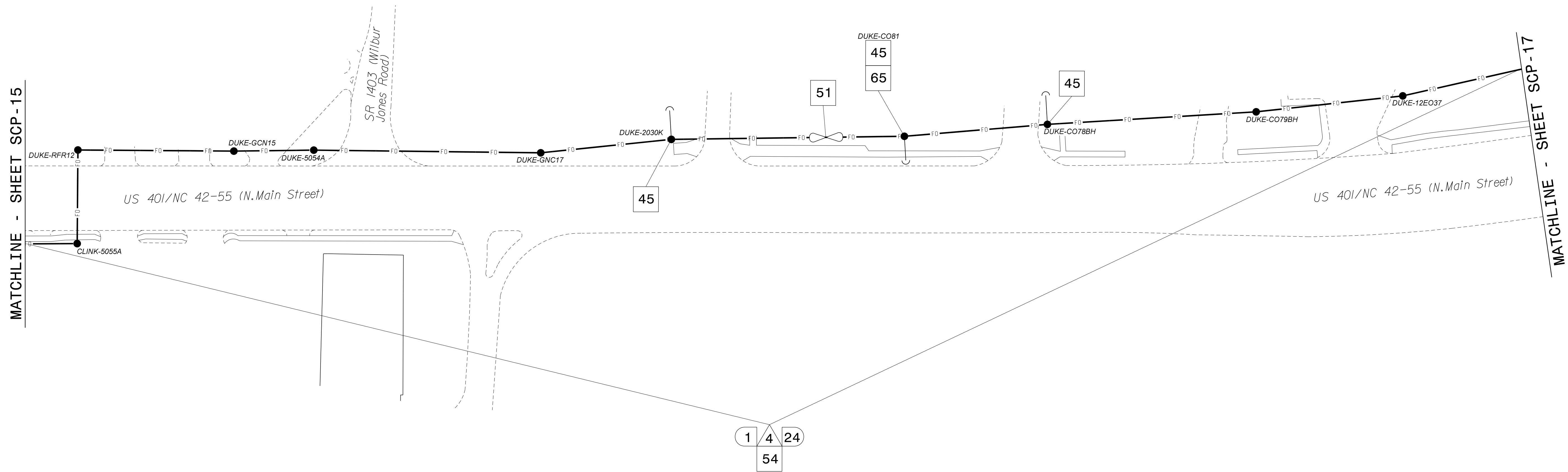
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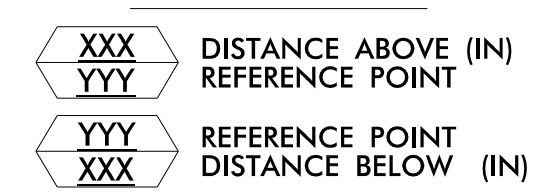


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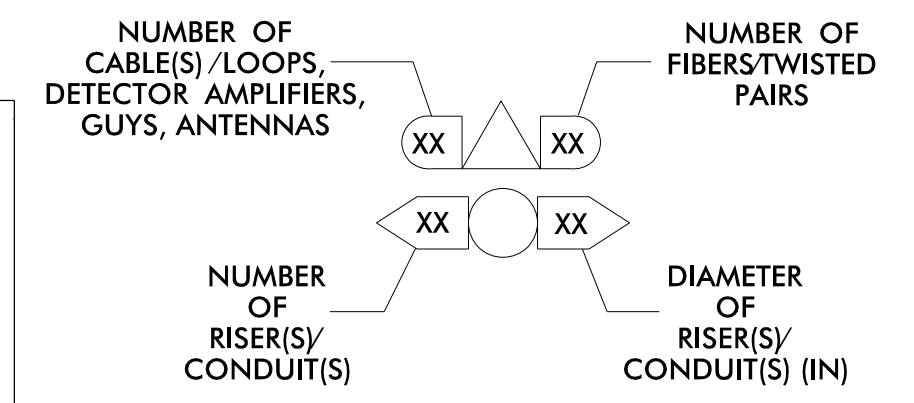
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10	INSTALL RIGID, GALVANIZED STEEL CONDUIT	20	INSTALL CABLE(S) IN NEW RISER(S)	31	INSTALL TYPE 332 HUB CABINET	41	REMOVE EXISTING JUNCTION BOX	52A	INSTALL DELINEATOR MARKER	63	DRILL/CORE DRILL EXISTING FOUNDATION	75	BACKPULL AND COIL NCDOT ITS CABLE
						42	INSTALL WOOD POLE	52B	INSTALL JUNCTION BOX MARKER	64	INTERCEPT AND REROUTE EXISTING CONDUITS	76	INSTALL HUB SWITCH
								53	STORE 30' OF COMMUNICATIONS CABLE (EACH CABLE)	65	BOND MESSENGER TO POLE GROUND	77	INSTALL CELLULAR MODEM

ATTACHMENT POINT:



CONSTRUCTION NOTE SYMBOLY KEY



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

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Prepared for the Offices of:

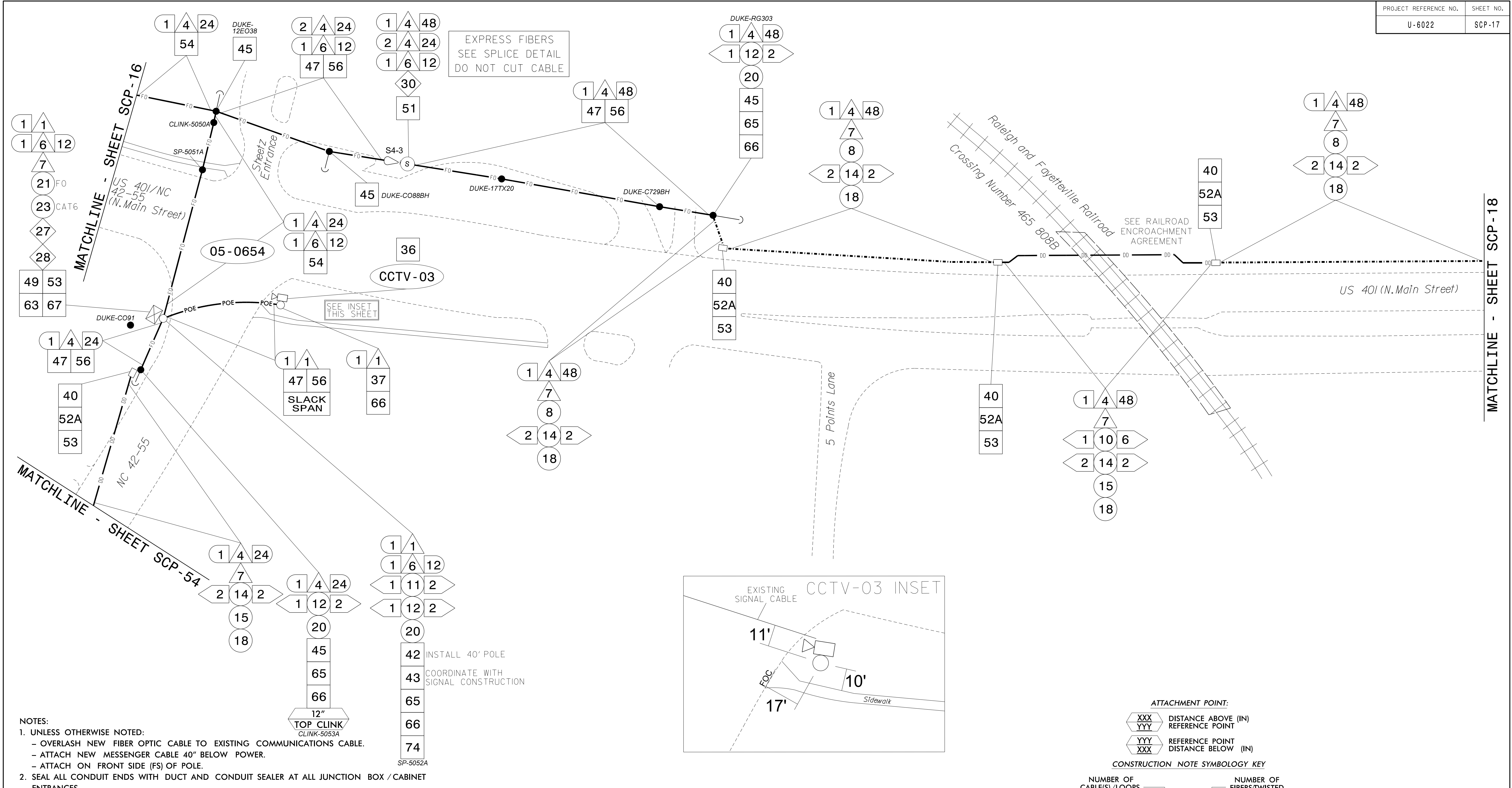
750 Greenfield Parkway, Garner, NC 27529

Fuquay-Varina Signal System Cable Routing Plans	
Division 5	Wake County Fuquay-Varina
PLAN DATE: June 2022	REVIEWED BY: MB Toth
PREPARED BY: JT Stiff	REVIEWED BY: AM Encarnacion
REVISIONS	INIT. DATE

SEAL

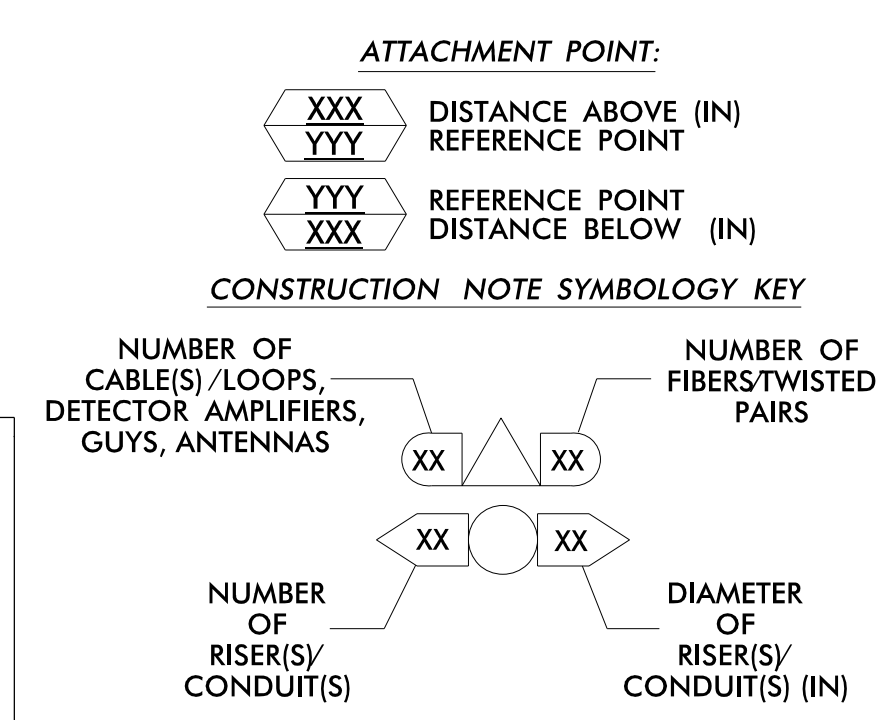
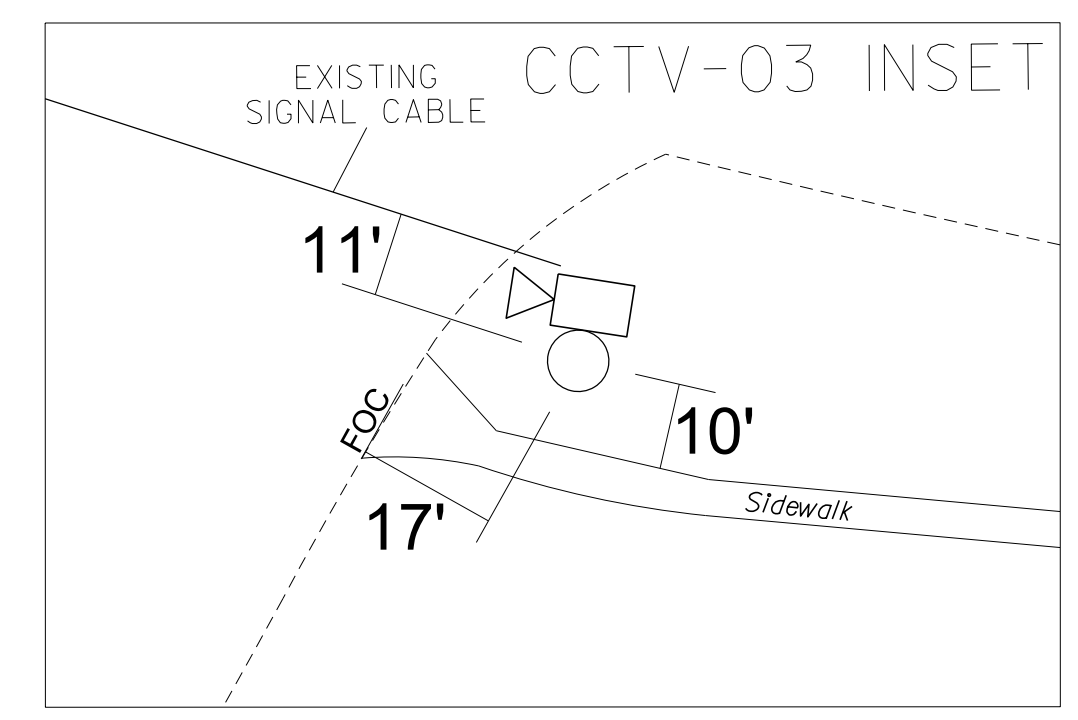
Anthony Encarnacion 4/14/2023  
 DATE  
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**NOTES:**  
 1. UNLESS OTHERWISE NOTED:  
 - OVERLASH NEW FIBER OPTIC CABLE TO EXISTING COMMUNICATIONS CABLE.  
 - ATTACH NEW MESSENGER CABLE 40" BELOW POWER.  
 - ATTACH ON FRONT SIDE (FS) OF POLE.  
 2. SEAL ALL CONDUIT ENDS WITH DUCT AND CONDUIT SEALER AT ALL JUNCTION BOX / CABINET ENTRANCES.

- |   |  |  |  |   |  |  |
|---|--|--|--|---|--|--|
| 1 INSTALL CATEGORY 6 CABLE                          | 11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD        | 22 INSTALL NEW CONDUIT INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)        | 32 MODIFY EXISTING SPLICE ENCLOSURE OR INTERCONNECT CENTER | 43 REMOVE EXISTING WOOD POLE  | 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE | 66 BOND RISER TO POLE GROUND                   |
| 2 INSTALL 3-WIRE COPPER SERVICE ENTRANCE CONDUCTORS | 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH HEAT SHRINK TUBING | 23 INSTALL NEW RISER INTO CABINET BASE (USE EX CABINET ENTRANCE WHEN AVAILABLE)          | 33 REMOVE EXISTING SPLICE / HUB / CCTV CABINET             | 44 INSTALL AERIAL GUY ASSEMBLY  | 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE             | 67 BOND TRACER WIRE TO EQUIPMENT GROUND BUS    |
| 3 INSTALL 3-WIRE COPPER FEEDER CONDUCTORS           | 13 INSTALL HEAT SHRINK TUBING RETROFIT KIT                       | 24 INSTALL NEW CONDUIT INTO POLE MOUNTED CABINET   | 34 INSTALL CABINET FOUNDATION                              | 45 INSTALL STANDARD GUY ASSEMBLY  | 56 LASH CABLE(S) TO NEW MESSENGER CABLE                  | 68 NOT USED                                    |
| 4 INSTALL SMFO CABLE                                | 14 INSTALL HIGH DENSITY POLYETHYLENE CONDUIT                     | 25 INSTALL NEW RISER INTO POLE MOUNTED CABINET   | 35 REMOVE EXISTING CABINET FOUNDATION                      | 46 INSTALL SIDEWALK GUY ASSEMBLY  | 57 MODIFY EXISTING ELECTRICAL SERVICE                    | 69 HANDLASH AND INSTALL AERIAL CABLE PROTECTOR |
| 5 INSTALL COAXIAL ANTENNA CABLE                     | 15 DIRECTIONAL DRILL CONDUIT                                     | 26 INSTALL DIGITAL VIDEO ENCODER   | 36 REMOVE EXISTING CCTV CAMERA ASSEMBLY                    | 47 INSTALL MESSENGER CABLE  | 58 INSTALL NEW ELECTRICAL SERVICE                        | 70 INSTALL EQUIPMENT CABINET DISCONNECT        |
| 6 INSTALL FIBER-OPTIC DROP CABLE                    | 16 BORE AND JACK CONDUIT   | 27 INSTALL NEW ETHERNET EDGE SWITCH IN CABINET   | 37 INSTALL CCTV CAMERA WOOD POLE                           | 48 REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE                       | 59 INSTALL NEW POLE MOUNTED CCTV CABINET (336)           | 71 INSTALL MANAGED ETHERNET SWITCH             |
| 7 INSTALL TRACER WIRE                               | 17 INSTALL CABLE(S) IN EXISTING CONDUIT                          | 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET | 38 INSTALL STANDARD SIZE JUNCTION BOX                      | 49 REMOVE EXISTING COMMUNICATIONS CABLE   | 60 INSTALL NEW CCTV CABINET (NEMA TYPE 4)                | 72 INSTALL CCTV METAL POLE                     |
| 8 INSTALL CONDUIT UNDERGROUND                       | 18 INSTALL CABLE(S) IN NEW CONDUIT                               | 29 INSTALL UNDERGROUND SPLICE ENCLOSURE  | 39 INSTALL SPECIAL-SIZED JUNCTION BOX (36" x 24" x 24")    | 50 INSTALL SERVICE CONDUCTORS   | 61 REMOVE EXISTING CCTV CAMERA ASSEMBLY                  | 73 REMOVE EXISTING CCTV METAL POLE             |
| 9 INSTALL PVC CONDUIT                               | 19 INSTALL CABLE(S) IN EXISTING RISER(S)                         | 30 INSTALL AERIAL SPLICE ENCLOSURE   | 40 INSTALL OVER-SIZED JUNCTION BOX                         | 51 INSTALL CABLE STORAGE GUIDE(S) (SNOW SHOE(S) AND STORE 100 FEET OF EACH CABLE) | 62 NEW CABINET ENTRANCE INTO NEW FOUNDATION              | 74 REMOVE WIRELESS COMMUNICATIONS EQUIPMENT    |
| 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT          | 20 INSTALL CABLE(S) IN NEW RISER(S)                              | 31 INSTALL TYPE 332 HUB CABINET  | 41 REMOVE EXISTING JUNCTION BOX                            | 52A INSTALL DELINEATOR MARKER   | 63 DRILL/CORE DRILL EXISTING FOUNDATION                  | 75 BACKPULL AND COIL NCDOT ITS CABLE           |
|   |  |  | 42 INSTALL WOOD POLE                                       | 52B INSTALL JUNCTION BOX MARKER   | 64 INTERCEPT AND REROUTE EXISTING CONDUITS               | 76 INSTALL HUB SWITCH                          |
|   |  |  |  | 53 STORE 30' OF COMMUNICATIONS CABLE (EACH CABLE)                                 | 65 BOND MESSENGER TO POLE GROUND                         | 77 INSTALL CELLULAR MODEM                      |



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

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Prepared for the Offices of:  
 Fuquay-Varina Signal System Cable Routing Plans

Division 5 Wake County Fuquay-Varina  
 PLAN DATE: June 2022 REVIEWED BY: MB Toth  
 PREPARED BY: JT Stiff REVIEWED BY: AM Encarnacion

REVISIONS: INIT. DATE

SCALE: 1"=50'

Seal: SEAL 044476 PROFESSIONAL ENGINEER NORTH CAROLINA

Signature: Anthony Encarnacion DATE: 4/14/2023  
 CADD File Name: CL-12.dgn

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