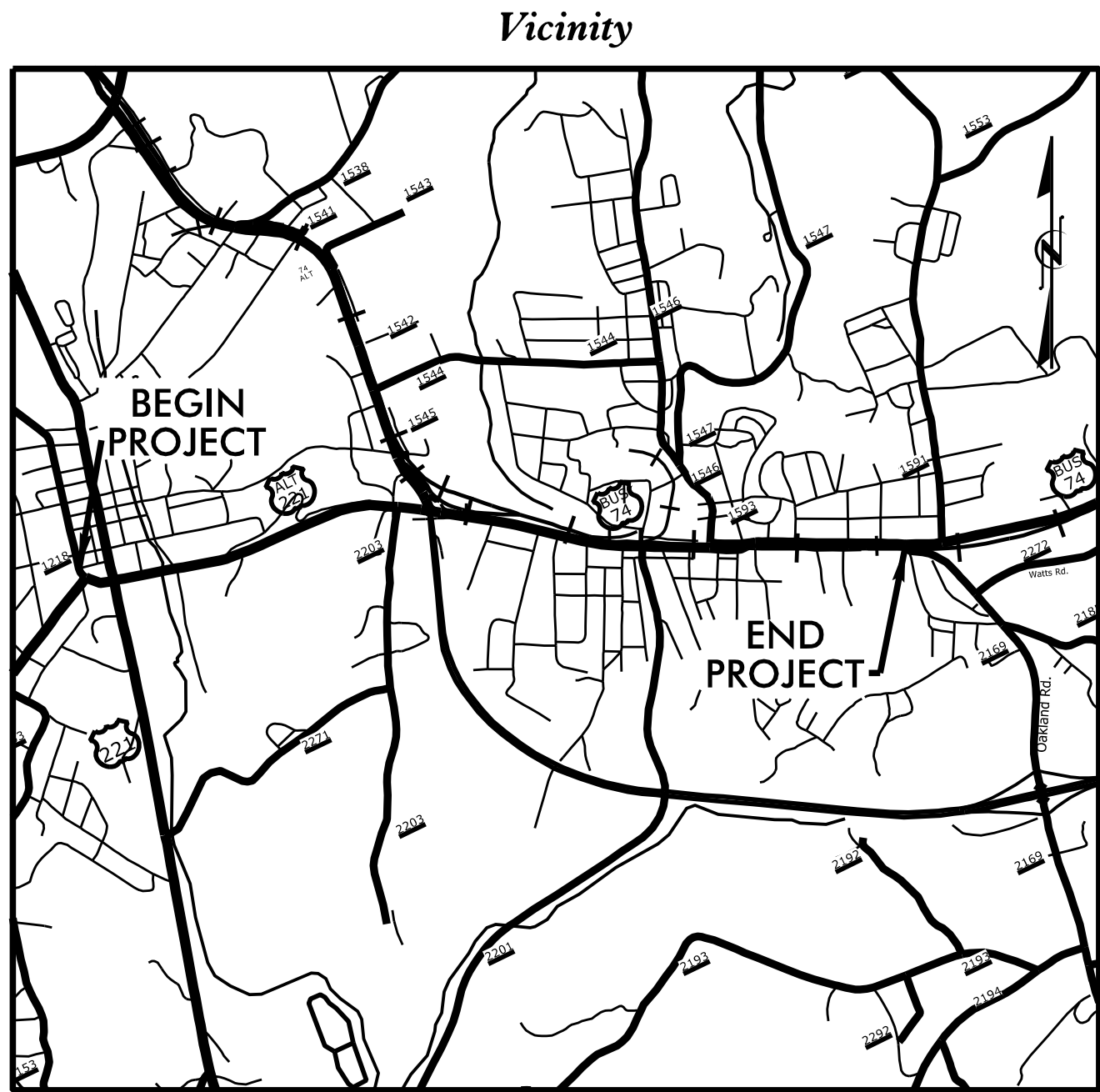


Project: HL-0065

Contract: C205219

SYTIME 20240101 10:00:00

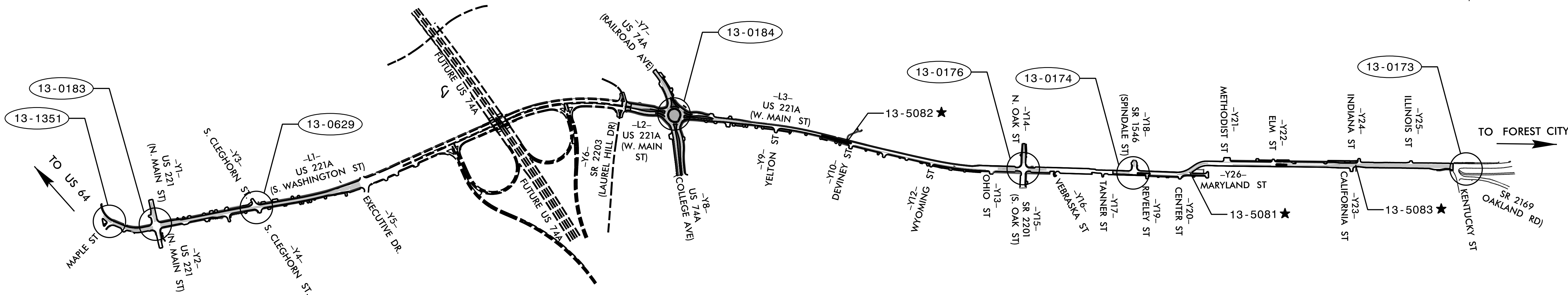
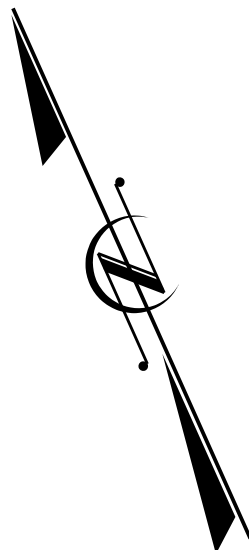


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RUTHERFORD COUNTY

LOCATION: US 221A (CHARLOTTE ROAD/MAIN STREET) IN RUTHERFORDTON.
CONSTRUCT COMPLETE STREET.

TYPE OF WORK: SIGNALS, SIGNAL COMMUNICATION
AND RRFB INSTALLATION



PLANS PREPARED BY:

HNTB

HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

Natasha R. Simmons, P.E., PTOE - Project Engineer

Nicole K. Vlanich, P.E. - Design Engineer

John A. Wagner, P.E. - Design Engineer

Emily E. Tiller, E.I. - Design Engineer

LEGEND

13-####

SIGNAL INVENTORY NUMBER



RRFB INSTALLATION

TRANSPORTATION SYSTEMS
MANAGEMENT & OPERATIONS UNIT

Contacts:

R. Nicholas Zinser, PE - Western Region Signals Engineer

Ryan W. Hough, PE - State ITS Engineer

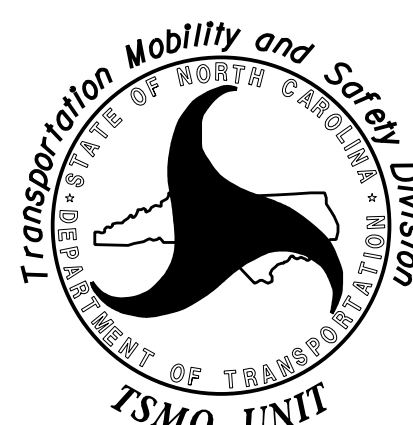
NCDOT - DIVISION 13

Contacts:

Randy M. Tritt - Division Traffic Engineer

Refer to "Roadway Standard Drawings
NCDOT" dated January 2024 and
"Standard Specifications for Roads
and Structures" dated January 2024.

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



750 N. Greenfield Parkway, Garner, NC 27529

	DETECTED MOVEMENT
	UNDETECTED MOVEMENT (OVERLAP)
	UNSIGNALIZED MOVEMENT
	PEDESTRIAN MOVEMENT

MAXTIME PREEMPTION CHART		
FUNCTION	PRE 3	PRE 5
Type	EMERG VEH	EMERG VEH
Exit Phases	1,6	4
Call Extend Time	2.0	2.0
Delay	**	**
Max Presence	120	120
Enter Min Green	1	1
Enter Walk	255*	255*
Enter Ped Clear	255*	255*
Enter Yellow Change	25.5 *	25.5 *
Enter Red Clear	25.5 *	25.5 *
Track Green	0	0
Track Yellow Change	25.5 *	25.5 *
Track Red Clear	25.5 *	25.5 *
Dwell Green	**	**
Exit Min Green	255 *	255 *
Exit Yellow Change	25.5 *	25.5 *
Exit Red Clear	25.5 *	25.5 *
Exit Type	EXIT PHASES	EXIT PHASES
Ped Clear Through Yellow	Y	Y
Require All Red Entry	-	-

* Directs controller to use default phase timing
** See Note 10.

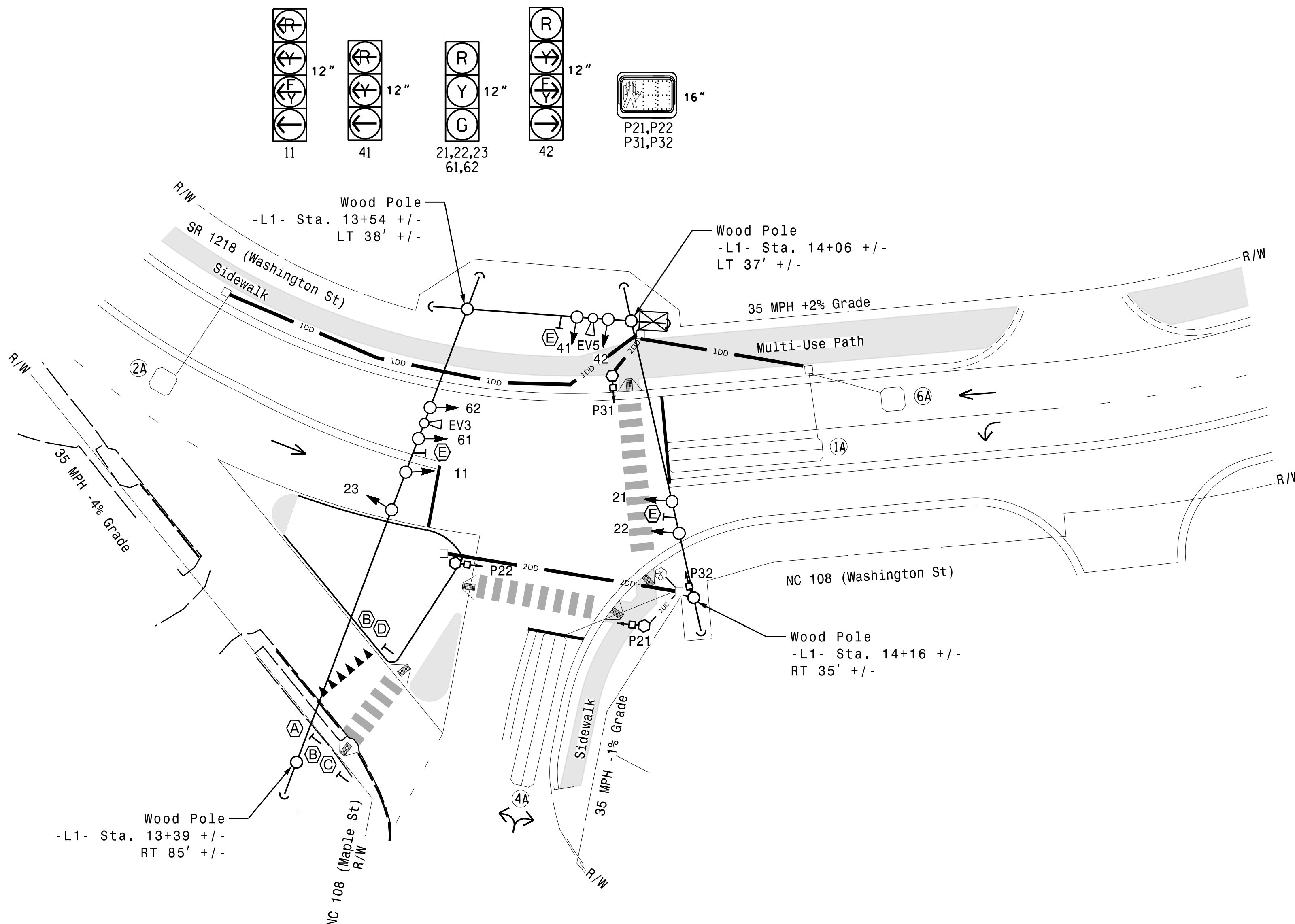
MAXTIME TIMING CHART					
FEATURE	PHASE				
	1	2	3	4	6
Walk *	–	13	14	–	–
Ped Clear	–	7	11	–	–
Min Green *	7	10	7	7	10
Passage *	2.0	3.0	2.0	2.0	3.0
Max 1 *	20	40	30	30	40
Yellow Change	3.0	4.1	3.0	3.0	4.1
Red Clear	1.8	1.1	1.8	1.8	1.1
Red Revert	2.0	2.0	2.0	2.0	2.0
Added Initial *	–	–	–	–	–
Maximum Initial *	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–
Time To Reduce *	–	–	–	–	–
Minimum Gap	–	–	–	–	–
Advance Walk	–	6	**	–	–
Non Lock Detector	X	–	X	X	–
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL
Dual Entry	–	–	–	–	–

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

** See Note 9.

TABLE OF OPERATION								
SIGNAL FACE	PHASE							
	1 + 6	2 + 6	3	4	PREV 3	PREV 5	PREV H	PREV H
11	←	←	←	←	←	←	←	←
21,22,23	R	G	R	R	R	R	R	R
41	←	←	←	←	←	←	←	←
42	R	R	←	←	R	←	←	←
61,62	G	G	R	R	G	R	R	R
P21,P22	DW	W	DW	DW	DW	DW	DRK	DRK
P31,P32	DW	DW	W	DW	DW	DW	DRK	DRK

All Heads L.E.D.



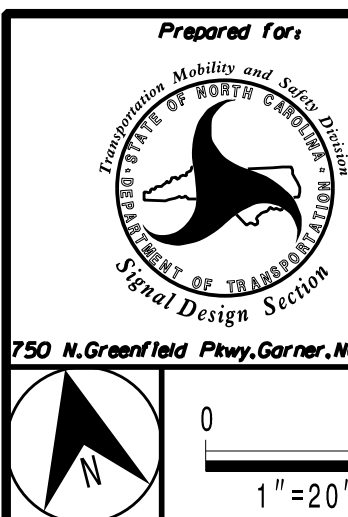
MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	X	1 6	15.0 -	-	X	-	X	-	X
2A	6X6	70	3	X	2	-	-	X	-	X	-	X
4A	6X40	0	2-4-2	X	4	5.0	-	X	-	X	-	X
6A	6X6	70	3	X	6	-	-	X	-	X	-	X

4 Phase
Fully Actuated with EVP
Signal System #: D13-24 Rutherfordton

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 4 during phase 3 on.
4. Phase 1 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. To provide a leading pedestrian interval on Phase 3, program FYA heads numbered 41 and 42 to delay for 7 seconds after the start of the phase 4 walk interval. See Electrical Details for programming.
10. The Division Traffic Engineer will determine the Delay Before Preempt and Preempt Dwell Min Green time for the emergency vehicle preemption timing.
11. This intersection features an optical preemption system. Shown locations of the optical detectors are conceptual only.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Directional Drill	
	DD	
	X-UC	
	Right of Way	
	UC	
	N/A	
	Directional Arrow	
	Curb Ramp	
	"YIELD" Sign (R1-2)	
	Pedestrian Crossing Sign (W11-2)	
	Left Downward Diagonal Arrow Plaque (W16-7pL)	
	Right Downward Diagonal Arrow Plaque (W16-7pR)	
	Street Name Sign	

New Installation



SR 1218/NC 108 (Washington St)
at
NC 108 (Maple Street)

Division 13 Rutherford County Rutherfordto

PLAN DATE: February 2026	REVIEWED BY: N.K. Vlanich
PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons

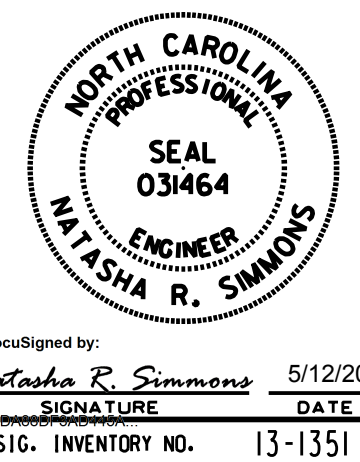
REVISIONS	INIT.	DATE
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.....		

[illegible][illegible]

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



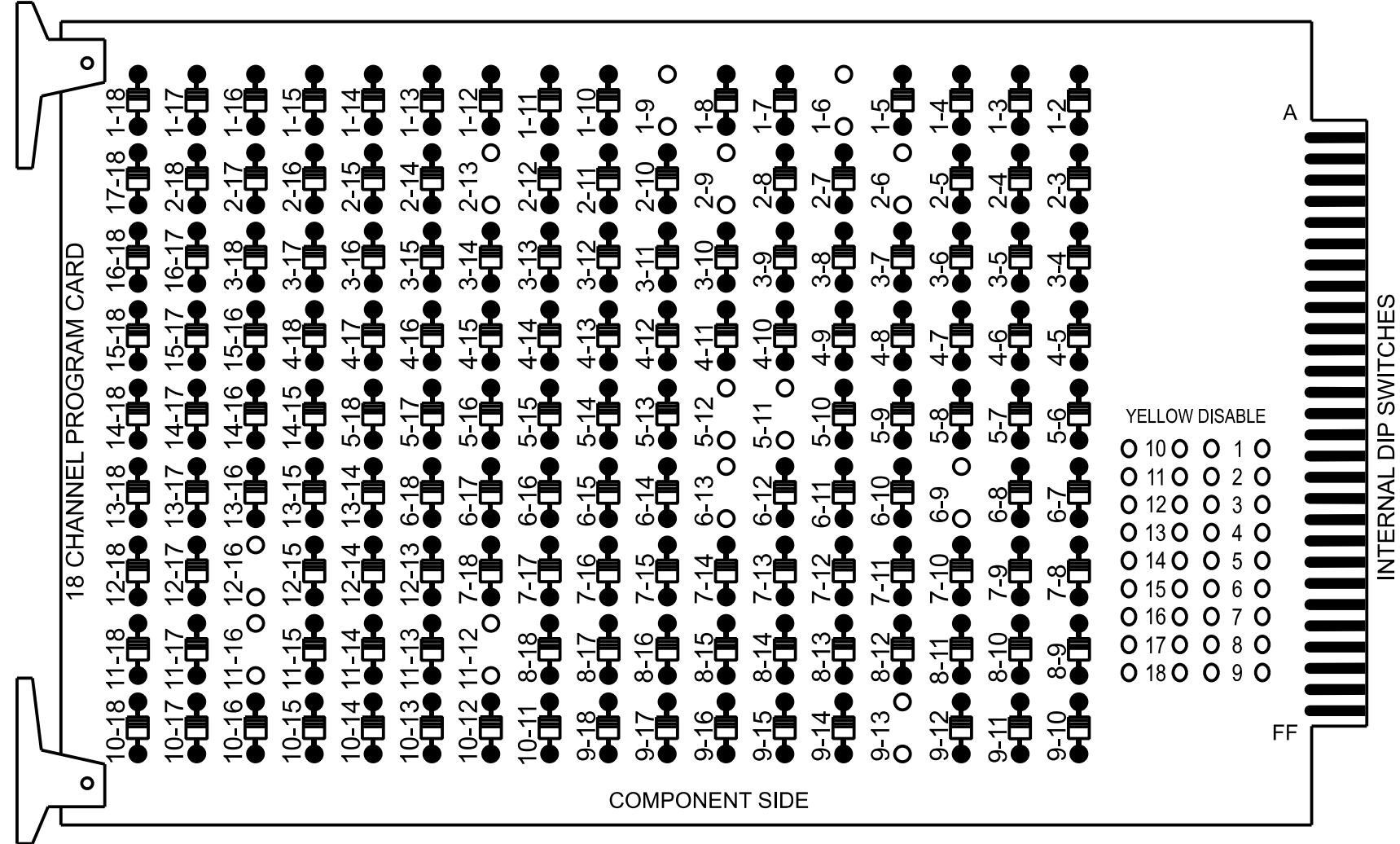
DocuSigned by: 5/12/2020

Natasha R. Simmons 5/12/2026
SIGNATURE DATE

SIG. INVENTORY NO. 13-1351

(remove jumpers and set switches as shown)

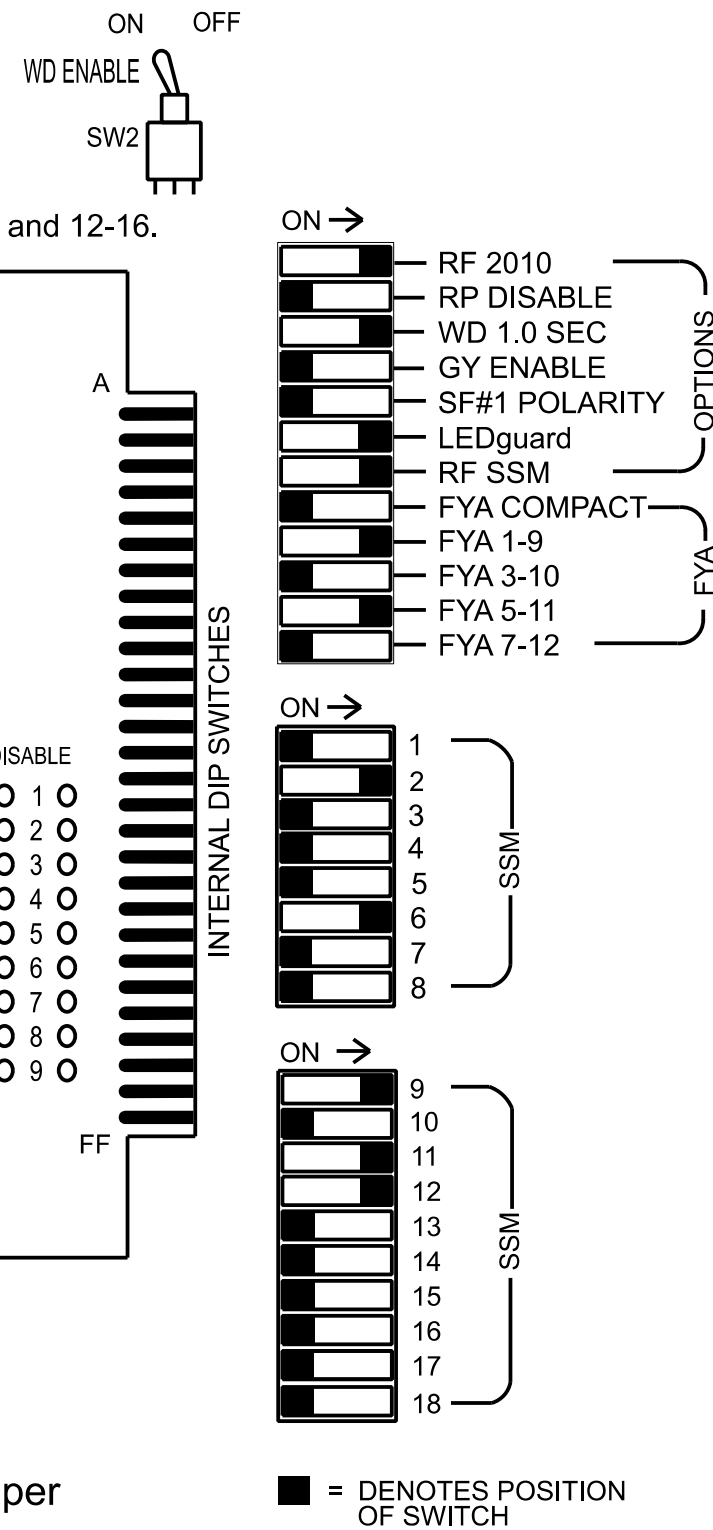
REMOVE DIODE JUMPERS 1-6, 1-9, 2-6, 2-9, 2-13, 5-11, 5-12, 6-9, 6-13, 9-13, 11-12, 11-16, and 12-16.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D13-24_Rutherfordton System.

EQUIPMENT INFORMATION

Controller.....	2070LX
Cabinet.....	332 w/ Aux
Software.....	Q-Free MAXTIME
Cabinet Mount.....	Base
Output File Positions.....	18 With Aux. Output File
Load Switches Used.....	S1, S2, S3, S7, S8, S12, AUX S1, AUX S4 AUX S5

Phases Used.....	1, 2, 2PED, 3PED, 4*, 6
Overlap "1".....	**
Overlap "2".....	Not Used
Overlap "3".....	**
Overlap "4".....	**
Overlap "5".....	Not Used
Overlap "6".....	Not Used
Overlap "7".....	**

*Timing purposes only
**See overlap programming detail on sheet 2

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A	S I O T	S I O T	S I O T	Ø 4 4A	S I O T	S I O T	S I O T	S I O T	S I O T	Ø 2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L	NOT USED	NOT USED	E M P T Y	E M P T Y	E M P T Y	NOT USED	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	NOT USED	Ø 3 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	S I O T E M P T Y	Ø 6 6A	S I O T	S I O T	S I O T	S I O T	S I O T	S I O T	S I O T	S I O T	S I O T	PRE3 DC ISOLATOR	S I O T	S I O T
	L	E M P T Y	NOT USED	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	PRE5 DC ISOLATOR	E M P T Y	E M P T Y

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

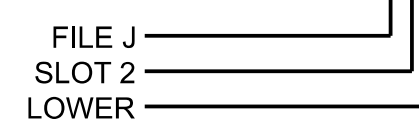
FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

[illegible]

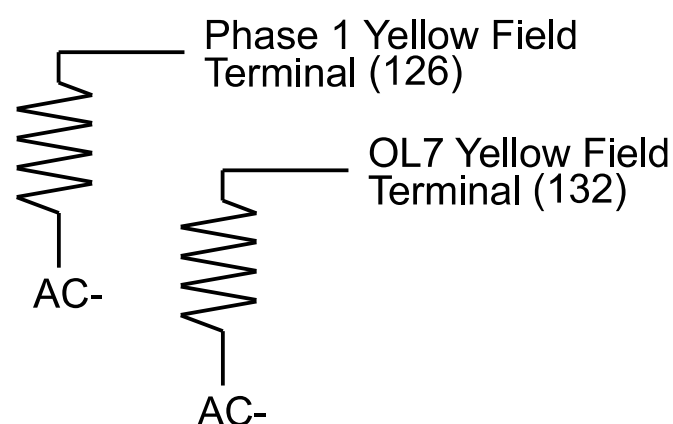
NOTE:
INSTALL DC ISOLATORS
IN INPUT FILE SLOTS
I12 AND I13.

INPUT FILE POSITION LEGEND: J2L



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: 13-1351
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB 4000 North Carolina, P.O.
Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

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	OL7	6	6 PED	7	8	3 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	11★	21, 22, 23	P21, P22	NU	NC	NU	42★	61, 62	NU	NU	NU	P31, P32	11★	NU	NU	42★	41★	NU
RED		128						134										
YELLOW	★	129					★	135										
GREEN		130						136										
RED ARROW													A121			A114	A101	
YELLOW ARROW													A122			A115	A102	
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133										A103	
			113										110					
			115										112					

NU = Not Used

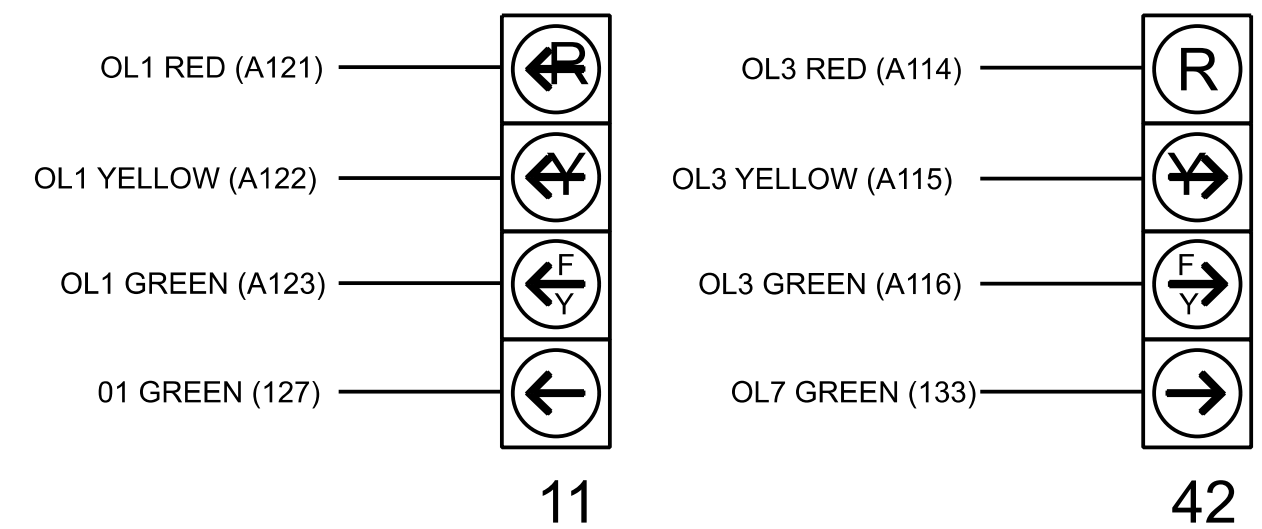
NC = Not Connected

* 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)

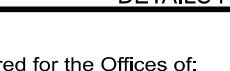


COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

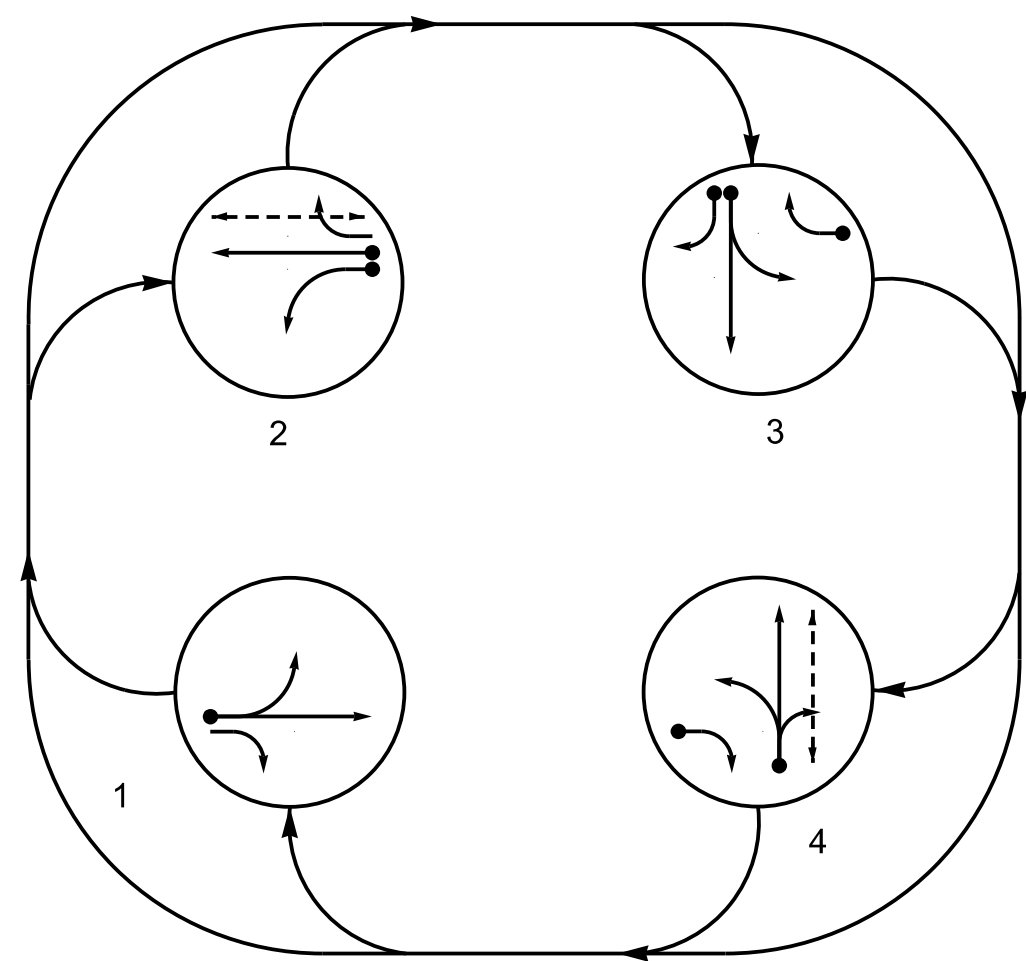
New Installation
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1218/NC 108 (Washington St) at NC 108 (Maple St)	SEAL 															
Prepared for the Offices of: 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Division 13</td> <td style="width: 33%;">Rutherford County</td> <td style="width: 33%;">Rutherfordton</td> </tr> <tr> <td>PLAN DATE: February 2026</td> <td>REVIEWED BY: N. K. Vianich</td> <td></td> </tr> <tr> <td>PREPARED BY: E.E. Tiller</td> <td>REVIEWED BY: N. R. Simmons</td> <td></td> </tr> <tr> <td style="text-align: center;">REVISIONS</td> <td style="text-align: center;">INIT.</td> <td style="text-align: center;">DATE</td> </tr> <tr> <td style="height: 40px;"></td> <td></td> <td></td> </tr> </table>		Division 13	Rutherford County	Rutherfordton	PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich		PREPARED BY: E.E. Tiller	REVIEWED BY: N. R. Simmons		REVISIONS	INIT.	DATE			
Division 13	Rutherford County	Rutherfordton															
PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich																
PREPARED BY: E.E. Tiller	REVIEWED BY: N. R. Simmons																
REVISIONS	INIT.	DATE															
750 N. Greenfield Pkwy. Garner, NC 27529	DocuSigned by:  5/12/2026 DATE SIGNATURE DATE SIG. INVENTORY NO. 13-1351																

PROJECT REFERENCE NO.	SHEET NO.
HL-0065	Sig. 3.0

PHASING DIAGRAM



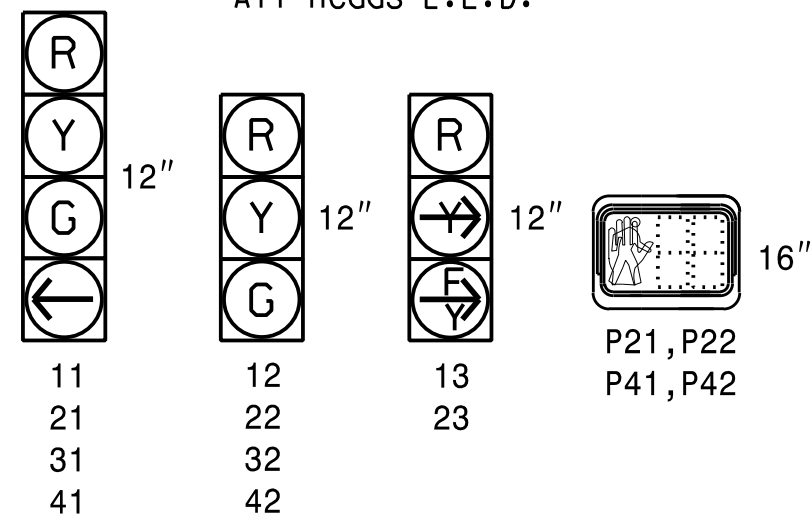
PHASING DIAGRAM DETECTION LEGEND

- | | | |
|---|-------------------------------|------------|
|  | DETECTED MOVEMENT | |
|  | UNDETECTED MOVEMENT (OVERLAP) | |
|  | UNSIGNALIZED MOVEMENT | $R/W \geq$ |
|  | PEDESTRIAN MOVEMENT | |

TABLE OF OPERATION					
SIGNAL FACE	PHASE				
	1	2	3	4	FLASH
11	<u>G</u>	R	R	R	R
12	G	<u>R</u>	R	R	R
13	<u>F</u>	R	R	<u>F</u>	R
21	R	<u>G</u>	R	R	R
22	R	G	<u>R</u>	R	R
23	R	<u>F</u>	<u>F</u>	R	R
31	R	R	<u>G</u>	R	R
32	R	R	G	<u>R</u>	R
41	R	R	R	<u>G</u>	R
42	R	R	R	G	<u>R</u>
P21,P22	DW	W	DW	DW	DRK
P41,P42	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



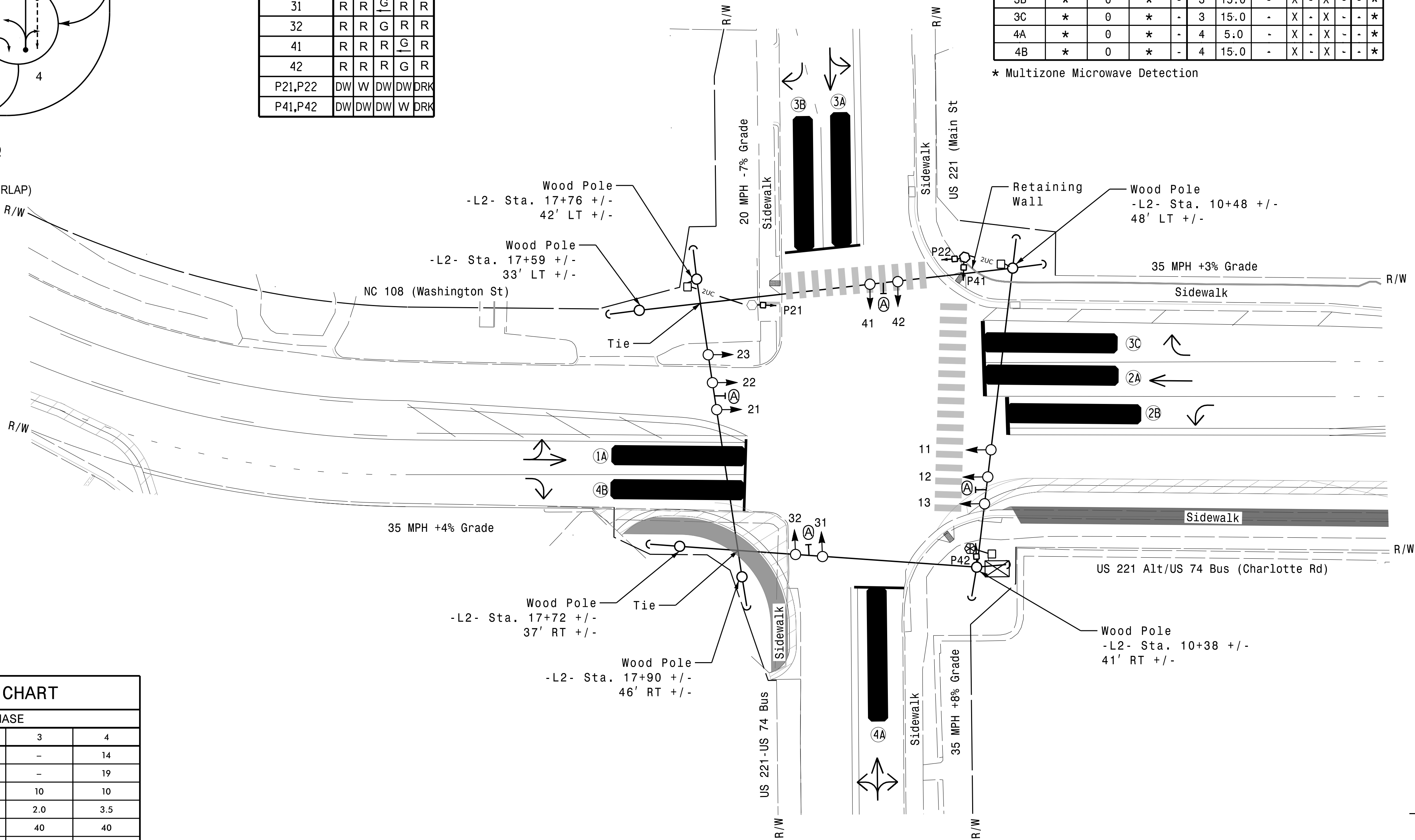
MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR				PROGRAMMING								
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURN	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED	INITIAL CALL	DELAY DURING GREEN	SYSTEM LOOP	NEW CARD
1A	*	0	*	-	1	-	-	X	-	X	-	*
2A	*	0	*	-	2	-	-	X	-	X	-	*
2B	*	0	*	-	2	-	-	X	-	X	-	*
3A	*	0	*	-	3	3.0	-	X	-	X	-	*
3B	*	0	*	-	3	15.0	-	X	-	X	-	*
3C	*	0	*	-	3	15.0	-	X	-	X	-	*
4A	*	0	*	-	4	5.0	-	X	-	X	-	*
4B	*	0	*	-	4	15.0	-	X	-	X	-	*

* Multizone Microwave Detection

4 Phase
Fully Actuated
Signal System #: D13-24_Rutherfordton

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 2 may be lagged.
4. Phase 3 and/or phase 4 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. To provide a leading pedestrian interval on phase 2 program FYA head numbered 24 to delay for 7 seconds after the start of the phases 2 walk interval. See Electrical Details for programming.
10. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
11. Maximum times shown in the timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. See HL-0065 TMP Phase 1 for Pavement Marking.
13. Relocate existing street name signs.



MAXTIME TIMING CHART				
FEATURE	PHASE			
	1	2	3	4
Walk *	–	14	–	14
Ped Clear	–	11	–	19
Min Green *	10	7	10	10
Passage *	2.0	3.0	2.0	3.5
Max I *	40	40	40	40
Yellow Change	3.6	3.7	3.2	3.4
Red Clear	1.7	1.4	2.8	1.8
Red Revert	2.0	2.0	2.0	2.0
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	–	**	–	7
Non Lock Detector	X	X	X	X
Vehicle Recall	–	–	–	–
Dual Entry	–	–	–	–

LEGEND

- | PROPOSED | | EXISTING |
|----------|-------------------------------|----------|
| | Traffic Signal Head | |
| | Modified Signal Head | N/A |
| | Sign | |
| | Pedestrian Signal Head | |
| | Signal Pole with Guy | |
| | Signal Pole with Sidewalk Guy | |
| | Non-Intrusive Detection Zone | |
| | Controller & Cabinet | |
| | Junction Box | |
| | Type I Pushbutton Post | |
| | Type II Signal Pedestal | |
| | Directional Drill | |
| | 2-in Underground Conduit | |
| | Right of Way | |
| N/A | Right of Way | |
| | Directional Arrow | |
| | Construction Zone | |
| N/A | Curb Ramp | |
| | Street Name Sign | |

Signal Upgrade
Temporary Design 1
(Construction Phase 1)

Prepared For:  750 N. Greenfield Pkwy, Garner, NC 27529 	US 221 Alt-US 74 Bus (Charlotte Rd)/NC 108 (Washington St) at US 221 (Main St)/US 221-74 Bus Division 13 Rutherford County Rutherfordton <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">PLAN DATE: February 2026</td> <td style="width: 50%;">REVIEWED BY: N.K. Vlanich</td> </tr> <tr> <td>PREPARED BY: E.E. Tiller</td> <td>REVIEWED BY: N.R. Simmons</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;">REVISIONS</td> <td style="width: 20%;">INIT.</td> <td style="width: 40%;">DATE</td> </tr> <tr> <td style="height: 40px;"> </td> <td> </td> <td> </td> </tr> </table>	PLAN DATE: February 2026	REVIEWED BY: N.K. Vlanich	PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons	REVISIONS	INIT.	DATE				SEAL  DocuSigned by: <i>Natasha R. Simmons</i> 5/12/2026 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">SIGNATURE</td> <td style="width: 50%;">DATE</td> </tr> <tr> <td>SIC. INVENTORY NO. 13-0183T1</td> <td> </td> </tr> </table>	SIGNATURE	DATE	SIC. INVENTORY NO. 13-0183T1	
PLAN DATE: February 2026	REVIEWED BY: N.K. Vlanich															
PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons															
REVISIONS	INIT.	DATE														
SIGNATURE	DATE															
SIC. INVENTORY NO. 13-0183T1																

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

Overlap	2	4
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	1,4	2,3
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0
FYA Ped Delay	7.0	-

All Red Flash Exit Time
6

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 MMU	Default

☒ Disable TS2 Cabinet Alarms

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ELECTRICAL AND PROGRAMMING
DETAILS FOR:

US 221 Alt-US 74 Bus

(Charlotte Rd)/NC 108 (Washington St)

US 221 (Main St) / US 221-74 Bus

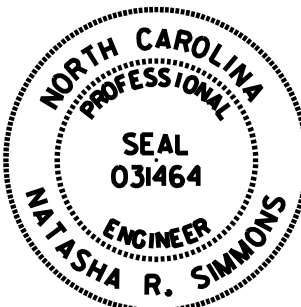
Division 13 Rutherford County Rutherfordton

PLAN DATE: February 2026	REVIEWED BY: N. K. Vlanich
PREPARED BY: E. E. Tiller	REVIEWED BY: N. B. Simmons

REVISIONS		INIT.	DATE

[illegible][illegible]

SEAL



DocuSigned by:

Malasha K. Simmons 5/12/2020
SIGNATURE DATE

SIG. INVENTORY NO. 13-0183T1

	DETECTED MOVEMENT
	UNDETECTED MOVEMENT (OVERLAP)
	UNSIGNALIZED MOVEMENT
	PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE				
	1	2	3	4	FLASH
11	<u>G</u>	R	R	R	R
12	G	R	R	R	R
13	<u>F</u>	R	R	<u>F</u>	R
21	R	<u>G</u>	R	R	R
22	R	G	R	R	R
23	R	<u>F</u>	<u>F</u>	R	R
31	R	R	<u>G</u>	R	R
32	R	R	G	R	R
41	R	R	R	<u>G</u>	R
42	R	R	R	G	R
P11,P12	W	DW	DW	DW	DRK
P41,P42	DW	DW	DW	W	DRK

ART MODES LEVEL:

11 12 13
21 22 23
31 32
41 42

P11, P12
P41, P42

P22
(Disconnected & Bagged)

DETECTOR					PROGRAMMING								
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	SYSTEM LOOP	NEW CARD
1A	*	0	*	-	1	-	-	X	-	X	-	-	*
2A	*	0	*	-	2	-	-	X	-	X	-	-	*
2B	*	0	*	-	2	3.0	-	X	-	X	-	-	*
3A	*	0	*	-	3	3.0	-	X	-	X	-	-	*
3B	*	0	*	-	3	-	-	X	-	X	-	-	*
3C	*	0	*	-	3	-	-	X	-	X	-	-	*
4A	*	0	*	-	4	3.0	-	X	-	X	-	-	*
4B	*	0	*	-	4	15.0	-	X	-	X	-	-	*

31	R	R	G	R	R
32	R	R	G	R	R
41	R	R	R	G	R
42	R	R	R	G	R
P11,P12	W	DW	DW	DW	DRK
P41,P42	DW	DW	DW	W	DRK

* Multizone Microwave Detection

MAXTIME TIMING CHART				
FEATURE	PHASE			
	1	2	3	4
Walk *	14	—	—	14
Ped Clear	13	—	—	15
Min Green *	10	7	10	10
Passage *	2.0	3.0	2.0	2.0
Max 1 *	40	40	40	40
Yellow Change	3.6	3.7	3.2	3.4
Red Clear	1.8	1.7	2.6	1.7
Red Revert	2.0	2.0	2.0	2.0
Added Initial *	—	—	—	—
Maximum Initial *	—	—	—	—
Time Before Reduction *	—	—	—	—
Time To Reduce *	—	—	—	—
Minimum Gap	—	—	—	—
Advance Walk	**	—	—	7
Non Lock Detector	X	X	X	X
Vehicle Recall	—	—	—	—
Dual Entry	—	—	—	—

** See Note 9.

** See Note 9.

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Non-Intrusive Detection Zone	
	Controller & Cabinet	
	Junction Box	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Directional Drill	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Construction Zone	
	Construction Drums	
N/A	Curb Ramp	
	Street Name Sign	

4 Phase
Fully Actuated
Signal System #: D13-24_Rutherfordton

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 2 may be lagged.
4. Phase 3 and/or phase 4 may be lagged.
5. Reposition existing signal heads numbered 21 and 22 and sign (A).
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. To provide a leading pedestrian interval on phase 1 program FYA head numbered 13 to delay for 7 seconds after the start of the phases 1 walk interval. See Electrical Details for programming.
10. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
11. Maximum times shown in the timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. See HL-0065 TMP Phase II for Pavement Marking.

Signal Upgrade
Temporary Design 2
(Construction Phase 2)

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REAL

US 221 Alt-US 74 Bus (Charlotte Rd)/NC 108 (Washington St) at US 221 (Main St)/US 221-74 Bus		
Division 13	Rutherford County	Rutherfordton



SEAL

NORTH CAROLINA
PROFESSIONAL
SEAL
031464
ENGINEER

Signed by:

Nasha R. Simmons 5/12/2026

SIGNATURE	DATE
[Signature]	10-01-2020

G. INVENTORY NO. 13-018312

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Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997



750 N. Greenfield Pkwy, Garner, NC 27540

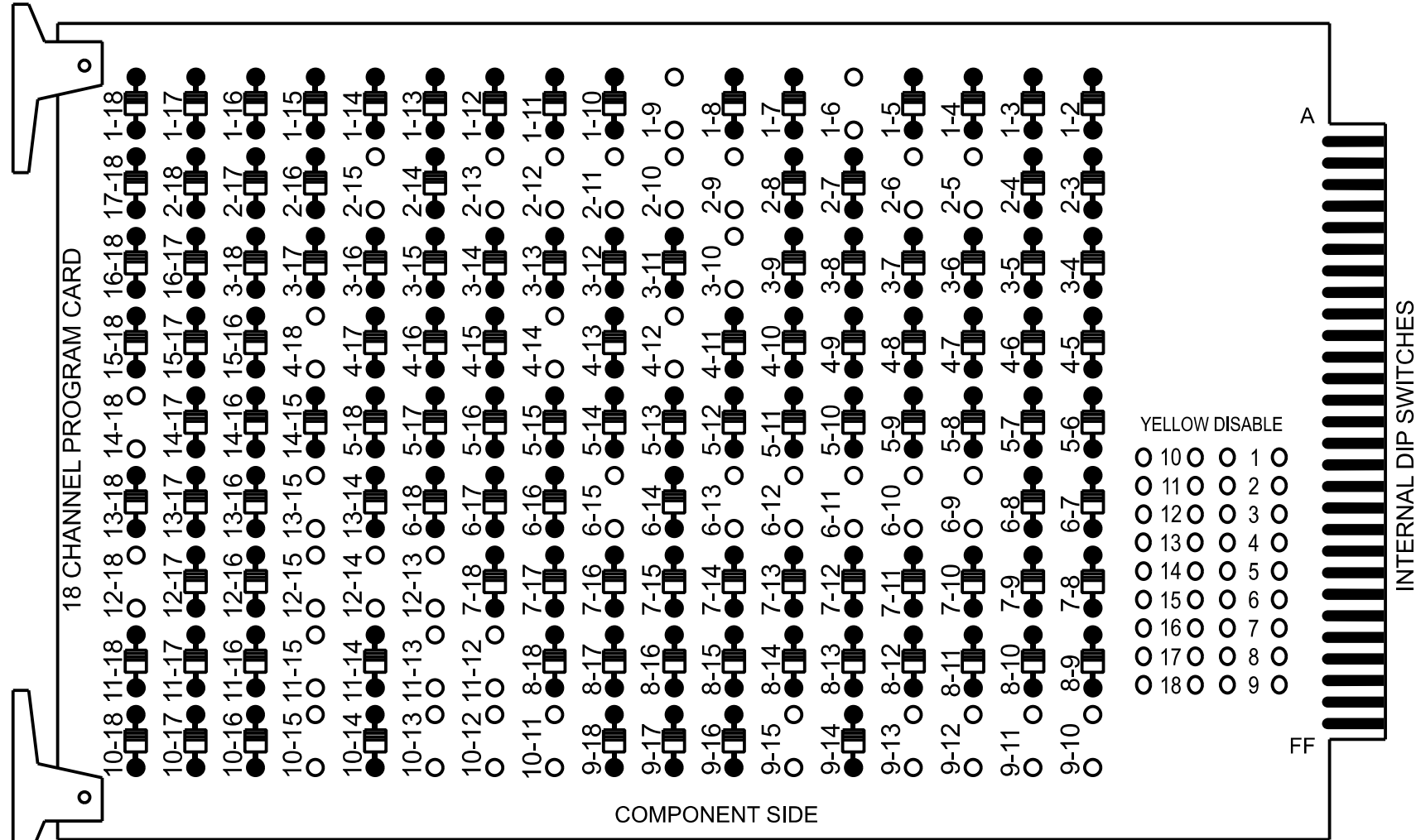
SIG. INVENTORY NO. 13-018



18 CHANNEL CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

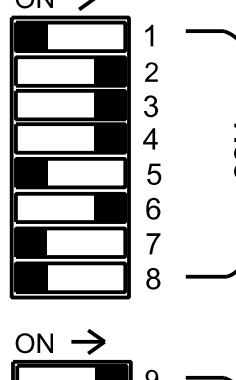
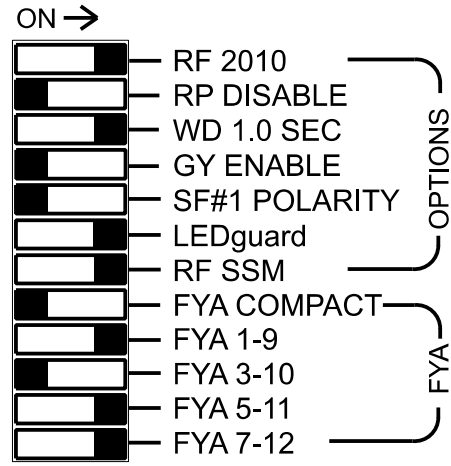
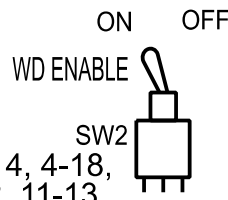
REMOVE DIODE JUMPERS 1-6, 1-9, 2-5, 2-6, 2-9, 2-10, 2-11, 2-12, 2-13, 2-15, 3-10, 4-12, 4-14, 4-18, 6-9, 6-10, 6-11, 6-12, 6-13, 6-15, 9-10, 9-11, 9-12, 9-13, 9-15, 10-11, 10-12, 10-13, 10-15, 11-12, 11-13, 11-15, 12-13, 12-14, 12-15, 12-18, 13-15, and 14-18.



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.



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.

- Return controller to Factory Defaults before programming per this electrical detail.

- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.

- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

- The cabinet and controller are part of the D13-24_Rutherfordton System.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S3, S4, S5, S6, S7, S8, S9,
AUX S1, AUX S2, AUX S4, AUX S5,
AUX S6
Phases Used.....1, 2, 2PED, 3, 4, 4PED, 6, 6PED,
Overlap "1".....*
Overlap "2".....*
Overlap "3".....*
Overlap "4".....*
Overlap "5".....Not Used
Overlap "6".....*

*See overlap programming detail on sheet 2

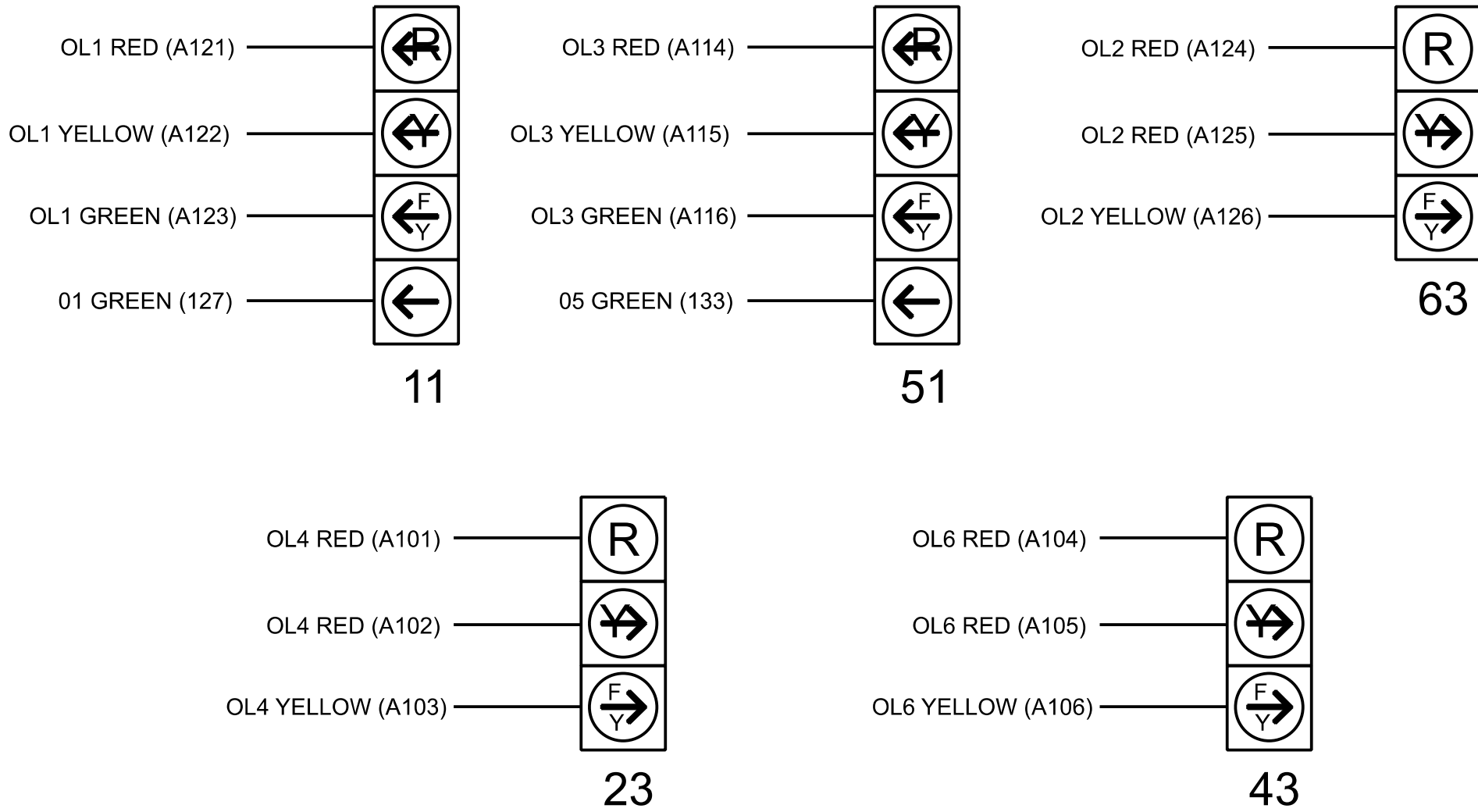
SIGNAL HEAD HOOK-UP CHART

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	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	11★	21,22	P21, P22	31	32	33	41	42	P41, P42	51★	61,62	P61, P62	NU	NU	NU	11★	63★	NU	51★	23★	43★	
RED		128		116	116	116	101	101			134						A124			A101	A104	
YELLOW	★	129			117		102	102		★	135											
GREEN		130		118	118		103	103			136											
RED ARROW																	A121			A114		
YELLOW ARROW				117		117											A122	A125		A115	A102	A105
FLASHING YELLOW ARROW																	A123	A126		A116	A103	A106
GREEN ARROW	127			118		118	103			133												
			113						104			119										
			115						106			120										

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

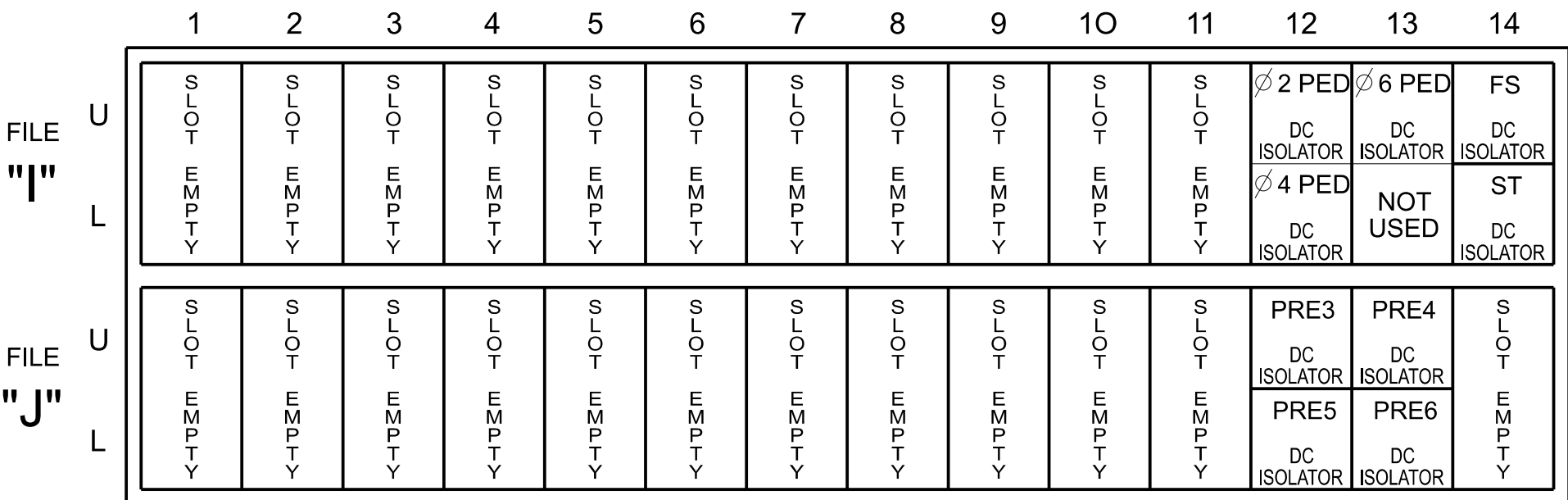
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

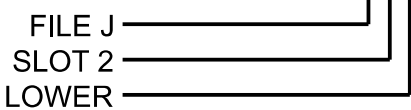
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	-	-	-	*	33	1	15.0		X		X	
2A	-	-	-	*	125	6			X		X	
3A	-	-	-	*	38	2			X		X	
3B	-	-	-	*	34	3	3.0		X		X	
3C	-	-	-	*	44	3			X		X	
4A	-	-	-	*	45	3	15.0		X		X	
4B	-	-	-	*	46	4	3.0		X		X	
5A	-	-	-	*	47	4	15.0		X		X	
6A	-	-	-	*	35	5	15.0		X		X	
PED PUSH BUTTONS					127	2			X		X	
P21,P22	TB8-4,6	I12U	67	33	54	6			X		X	
P41,P42	TB8-5,6	I12L	69	35								
P61,P62	TB8-7,9	I13U	68	34								

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

*For Input Point numbers, see SDLC Non-Intrusive Detection Chart sheet 2.

INPUT FILE POSITION LEGEND: J2L



SPECIAL DETECTOR NOTE

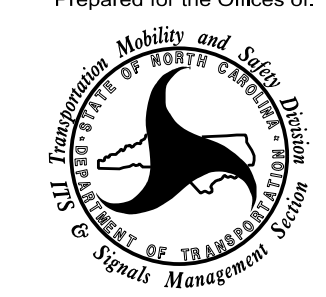
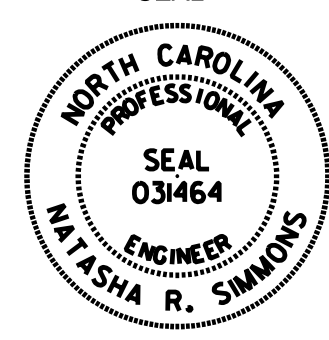
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0183
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

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4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

Signal Upgrade - Final Design
Electrical Detail - Sheet 1 of 3

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	US 221 Alt-US 74 Bus (Charlotte Rd)/NC 108 (Washington St) at US 221 (Main St)/US 221-74 Bus Division 13 Rutherford County Rutherfordton		SEAL 
	PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich	
	PREPARED BY: E.E. Tiller	REVIEWED BY: N. R. Simmons	
	REVISIONS	INIT.	DATE
DocuSigned by:  SIGNATURE		5/12/2026 DATE	
SIG. INVENTORY NO.		13-0183	

SDLC NON-INTRUSIVE DETECTION CHART

Input Point	Detector Rack #3		Detector Rack #4	
	Det # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	1A	49	NU
2	34	3A	50	NU
3	35	5A	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	NU	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	3B	60	NU
13	45	3C	61	NU
14	46	4A	62	NU
15	47	4B	63	NU
16	48	NU	64	NU

NU = Not Used

LOGIC PROCESSOR PROGRAMMING

Front Panel
Main Menu >Controller >More >User Programs >Definition

Web Interface
Home >Controller >User Programs Configuration >User Programs Definition

Program 1

Statement	Result	Index	Operation	Parameter A	Index	Parameter B	Index	Delay	Ext
1	Veh Detector Call	125	Is Module A Input B ON	Number	2	Number	1	0.0	0.0
2	Veh Detector Call	127	Is Module A Input B ON	Number	2	Number	3	0.0	0.0

LOGIC STATEMENT DESCRIPTION

Statement 1 Description: Mirrors vehicle detector 33 to vehicle detector 125.

Statement 2 Description: Mirrors vehicle detector 35 to vehicle detector 127.

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

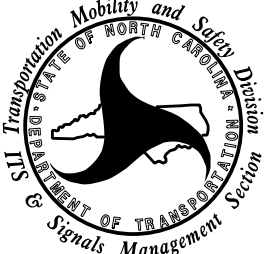
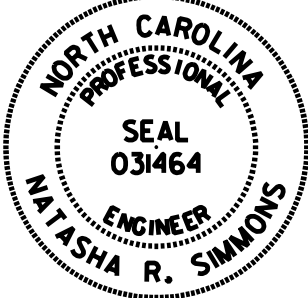
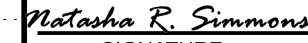
☒ Disable TS2 Cabinet Alarms

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0183
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

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Suite 500
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NC License No: C-1554
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Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	US 221 Alt-US 74 Bus (Charlotte Rd)/NC 108 (Washington St) at US 221 (Main St)/US 221-74 Bus Division 13 Rutherford County Rutherfordton		SEAL 
	PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich	
	PREPARED BY: E.E. Tiller	REVIEWED BY: N. R. Simmons	
	REVISIONS	INIT. DATE	
	DocuSigned by:  5/12/2026		
SIGNATURE DATE		SIG. INVENTORY NO. 13-0183	

OUTPUT CHANNEL CONFIGURATION

Front Panel

Main Menu >Controller >More>Channels>Channels Config

Web Interface

Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

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

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	6
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	3,6	6	2,4	4
Modifier Phases	1	-	5	-	-
Modifier Overlaps	-	-	-	-	-
Trail Green	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0
FYA Ped Delay	7.0	7.0	7.0	7.0	7.0

PREEMPTION PROGRAMMING

Front Panel

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

Web Interface

Home >Controller >Preempt Configuration >Preempts

Preempt Configuration

Preempt	3	4	5	6
Enabled	Enabled	Enabled	Enabled	Enabled
Type	Emergency Veh	Emergency Veh	Emergency Veh	Emergency Veh
Track Phases	-	-	-	-
Track Overlaps	-	-	-	-
Dwell Phases	1,6	2,5	3	4
Dwell Overlaps	1,2	3,4	-	6
Cycling Phases	-	-	-	-
Cycling Overlaps	-	-	-	-
Exit Phases	2,6	2,6	2,6	2,6
Exit Overlaps	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4
Delay	*	*	*	*
Max Presence	120	120	120	120
Call Ext Time	2.0	2.0	2.0	2.0
Max Pres Act	Terminate	Terminate	Terminate	Terminate
Enter Min Green	1	1	1	1
Enter Walk	0	0	0	0
Enter Ped Clear	255	255	255	255
Enter Yellow Change	25.5	25.5	25.5	25.5
Enter Red Clear	25.5	25.5	25.5	25.5
Track Green	0	0	0	0
Track Yellow Change	25.5	25.5	25.5	25.5
Track Red Clear	25.5	25.5	25.5	25.5
Dwell Green	*	*	*	*
Exit Min Green	255	255	255	255
Exit Yellow Change	25.5	25.5	25.5	25.5
Exit Red Clear	25.5	25.5	25.5	25.5
Dwell Ext Time	2.0	2.0	2.0	2.0
Exit Type	Exit Phases	Exit Phases	Exit Phases	Exit Phases
Non Locking Memory	X	X	X	X
Not Ovrd Flash	X	X	X	X
Not Ovrd Nxt Pre	X	X	X	X
Require All Red Entry	-	-	-	-
Track Clear Ovrd	X	X	X	X
Ped Clear During Yellow	X	X	X	X
Entry Omit OLTG	-	-	-	-
Track Clear Reserve	-	-	-	-

* Times to be determined by Division Traffic Engineer

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0183
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB

HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

PROJECT REFERENCE NO.	SHEET NO.
HL-0065	Sig. 5.3

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Unit

Web Interface

Home > Controller > Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

FLASHER CIRCUIT MODIFICATION DETAIL

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

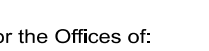
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

Signal Upgrade - Final Design

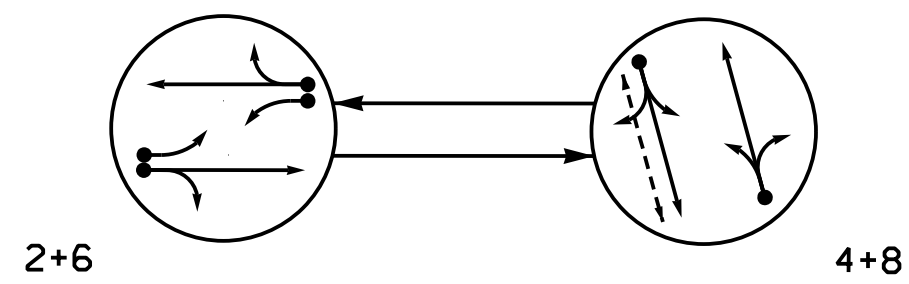
Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 221 Alt-US 74 Bus (Charlotte Rd)/NC 108 (Washington St) at US 221 (Main St)/US 221-74 Bus	SEAL 
Prepared for the Office of: 	Division 13 Rutherford County Rutherfordton	
	PLAN DATE: February 2026 REVIEWED BY: N. K. Vianich	
	PREPARED BY: E.E. Tiller REVIEWED BY: N. R. Simmons	
	REVISIONS INT. DATE	
750 N. Greenfield Pkwy, Garner, NC 27529 DocuSigned by:  5/12/2026		
	SIGNATURE _____	DATE _____
	SIG. INVENTORY NO.	13-0183

PROJECT REFERENCE NO.	SHEET NO.
HL-0065	Sig. 6.0

PHASING DIAGRAM



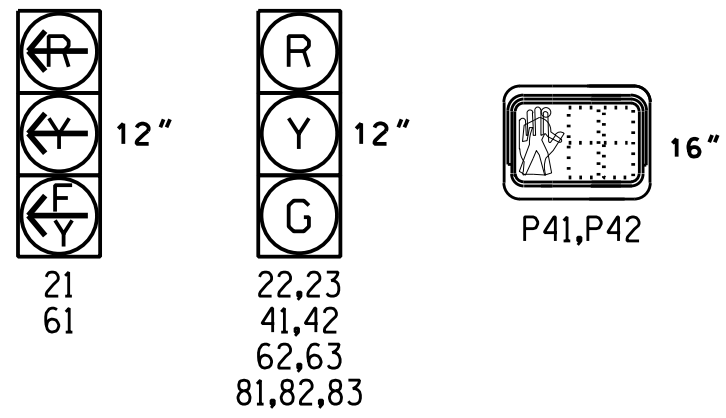
PHASING DIAGRAM DETECTION LEGEND

- | | |
|---------|-------------------------------|
| ←● | DETECTED MOVEMENT |
| ← | UNDETECTED MOVEMENT (OVERLAP) |
| ← - - | UNSIGNALIZED MOVEMENT |
| ← - - → | PEDESTRIAN MOVEMENT |

SIGNAL FACE	PHASE		
	2 + 6	4 + 8	FLASH
21			
22,23	G	R	R
41,42	R	G	R
61			
62,63	G	R	R
81,82,83	R	G	R
P41,P42	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



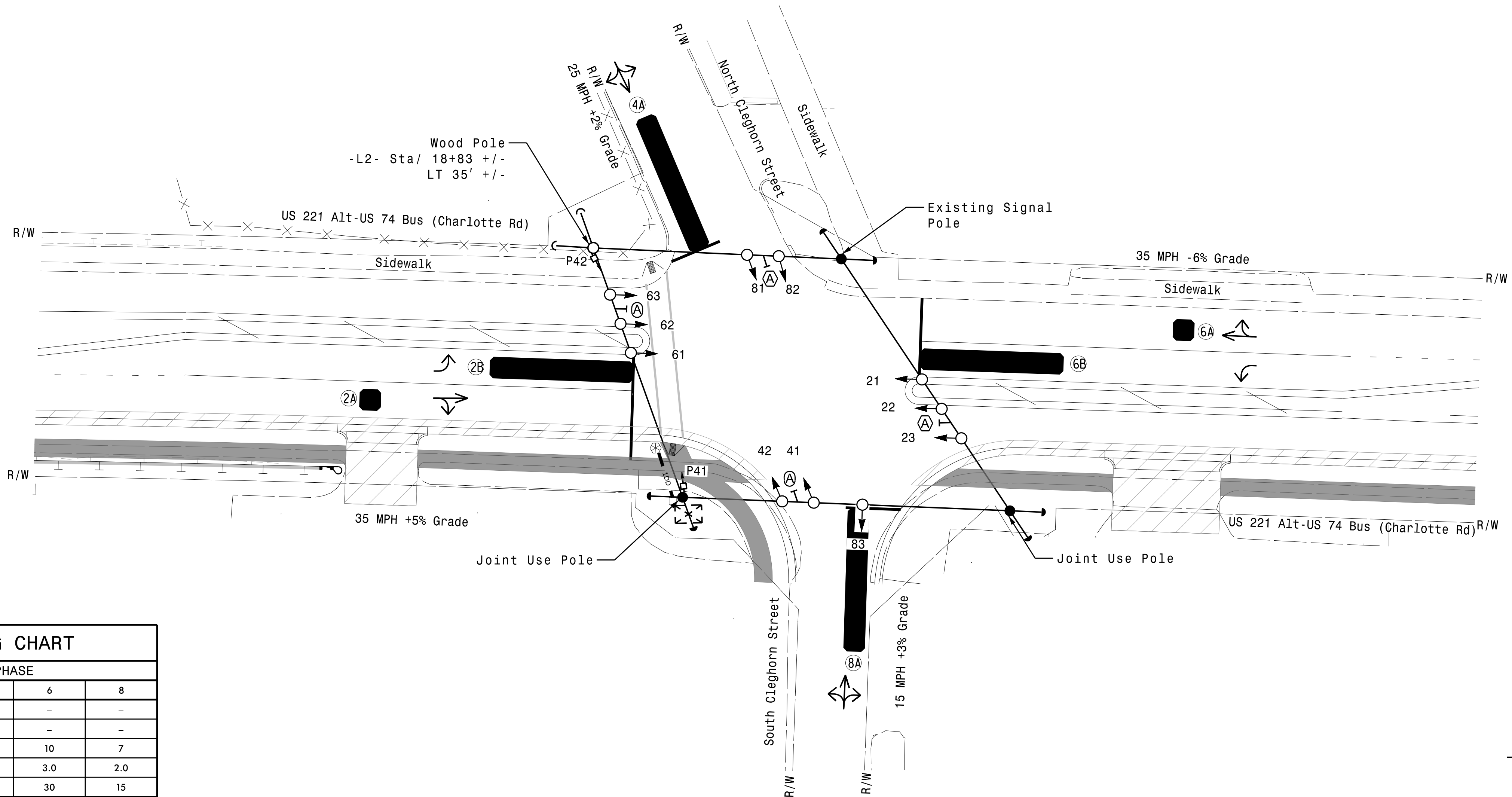
MAXTIME DETECTOR INSTALLATION CHART													
DETECTOR					PROGRAMMING								
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	INITIAL	CALL	DELAY DURING GREEN	SYSTEM LOOP	NEW CARD
2A	*	70	*	-	2	-	-	X	-	X	-	-	*
2B	*	0	*	-	2	3.0	-	X	-	X	-	-	*
4A	*	0	*	-	4	10.0	-	X	-	X	-	-	*
6A	*	70	*	-	6	-	-	X	-	X	-	-	*
6B	*	0	*	-	6	3.0	-	X	-	X	-	-	*
8A	*	0	*	-	8	10.0	-	X	-	X	-	-	*

* Multizone Microwave Detection

2 Phase
Fully Actuated
Signal System #: D13-24_Rutherfordton

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Install new 2070LX controller in existing cabinet.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. See HL-0065 TMP Phase I for pavement markings.
10. Relocate existing street name signs.



MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	4	6	8
Walk *	—	12	—	—
Ped Clear	—	11	—	—
Min Green *	10	7	10	7
Passage *	3.0	2.0	3.0	2.0
Max l *	30	15	30	15
Yellow Change	4.3	3.1	4.3	3.1
Red Clear	1.4	3.4	1.4	3.4
Red Revert	2.0	2.0	2.0	2.0
Added Initial *	—	—	—	—
Maximum Initial *	—	—	—	—
Time Before Reduction *	—	—	—	—
Time To Reduce *	—	—	—	—
Minimum Gap	—	—	—	—
Advance Walk	—	5	—	—
Non Lock Detector	—	X	—	X
Vehicle Recall	MIN RECALL	—	MIN RECALL	—
Dual Entry	—	X	—	X

LEGEND

- | PROPOSED | | EXISTING |
|----------|-------------------------------|----------|
| | Traffic Signal Head | |
| | Modified Signal Head | N/A |
| | Sign | |
| | Pedestrian Signal Head | |
| | Signal Pole with Guy | |
| | Signal Pole with Sidewalk Guy | |
| | Non-Intrusive Detection Zone | |
| | Controller & Cabinet | |
| | Junction Box | |
| | Type I Pushbutton Post | |
| | Type II Signal Pedestal | |
| | Directional Drill | |
| | 24-in Underground Conduit | |
| N/A | Right of Way | |
| | Directional Arrow | |
| | Curb Construction | |
| N/A | Curb Ramp | |
| N/A | Fence | |
| | Street Name Sign | |

Signal Upgrade
Temporary Design 1
(Construction Phase 1)

Prepared For:  750 N. Greenfield Pkwy, Garner, NC 27529  0 20 1" = 20'	US 221 Alt- US 74 Bus (Charlotte Rd) at S. Cleghorn Street Division 13 Rutherford County Rutherfordton <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">PLAN DATE: February 2026</td> <td style="width: 50%;">REVIEW BY: N.K. Vlanich</td> </tr> <tr> <td>PREPARED BY: E.E. Tiller</td> <td>REVIEWED BY: N.R. Simmons</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">REVISIONS</td> <td style="width: 50%;">INIT.</td> <td style="width: 50%;">DATE</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>	PLAN DATE: February 2026	REVIEW BY: N.K. Vlanich	PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons	REVISIONS	INIT.	DATE																												SEAL  DocuSigned by: <i>Natasha R. Simmons</i> 5/12/2026 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">SIGNATURE</td> <td style="width: 50%;">DATE</td> </tr> <tr> <td> </td> <td> </td> </tr> </table> SIG. INVENTORY NO. 13-06291T1	SIGNATURE	DATE		
PLAN DATE: February 2026	REVIEW BY: N.K. Vlanich																																							
PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons																																							
REVISIONS	INIT.	DATE																																						
SIGNATURE	DATE																																							

PROJECT REFERENCE NO.	SHEET NO.
HL-0065	Sig. 6.2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

MAXTIME STARTUP AND SOFTWARE FLASH
PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters	Unit Flash Parameters
StartUp Clearance Hold	All Red Flash Exit Time
6	6

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

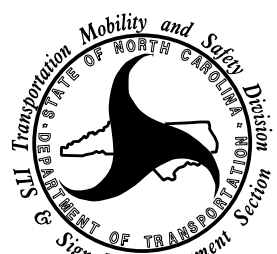
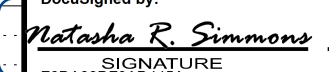
Overlap	1	3
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	2	6
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

Signal Upgrade -
Electrical Detail - Sheet 2 of 2
(Construction Phase 1)

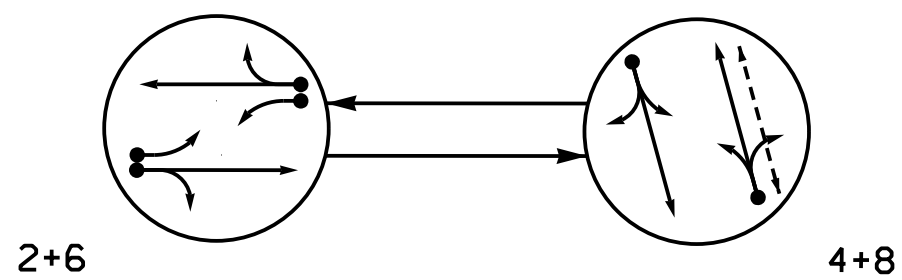
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0629T1
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	US 221 Alt- US 74 Bus (Charlotte Rd) at S. Cleghorn Street		SEAL 
	Division 13 Rutherford County Rutherfordton		
	PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich	
	PREPARED BY: E.E. Tiller	REVIEWED BY: N. R. Simmons	
	REVISIONS		
INIT.		DATE	
DocuSigned by:  SIGNATURE		5/12/2026 DATE	
SIG. INVENTORY NO.		13-0629T1	

PHASING DIAGRAM



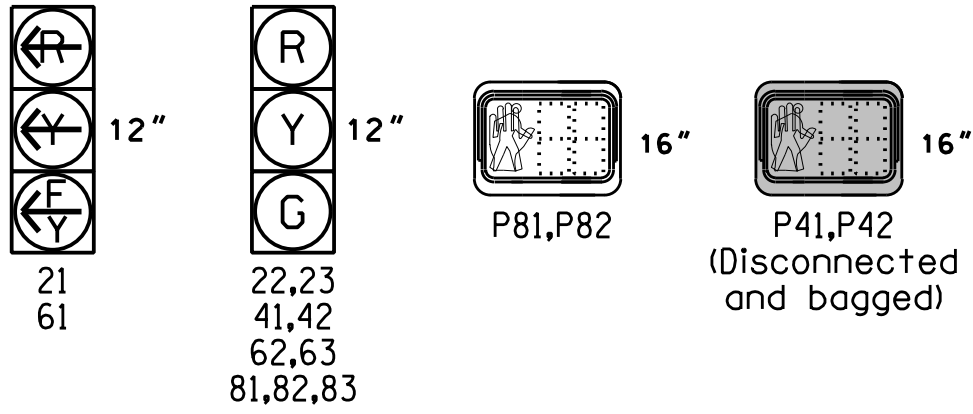
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	2+6	4+8	FLASH
21	F	R	R
22,23	G	R	R
41,42	R	G	R
61	F	R	R
62,63	G	R	R
81,82,83	R	G	R
P81,P82	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



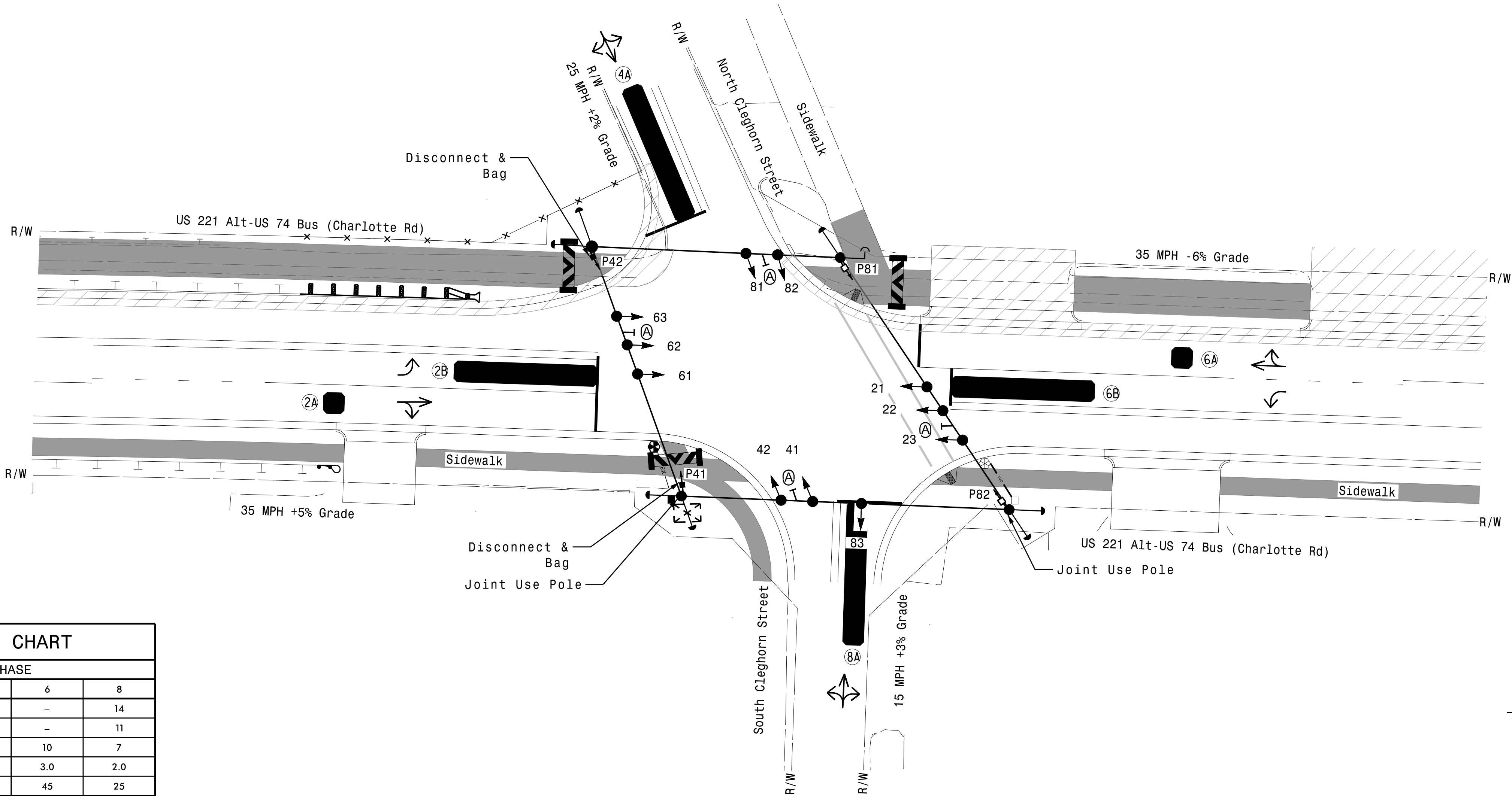
MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR						PROGRAMMING					
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	SYSTEM LOOP
2A	*	70	*	-	2	-	-	X	-	X	-
2B	*	0	*	-	2	3.0	-	X	-	X	-
4A	*	0	*	-	4	10.0	-	X	-	X	-
6A	*	70	*	-	6	-	-	X	-	X	-
6B	*	0	*	-	6	3.0	-	X	-	X	-
8A	*	0	*	-	8	10.0	-	X	-	X	-

* Multizone Microwave Detection

2 Phase
Fully Actuated
Signal System #: D13-24_Rutherfordton

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Reposition existing signal heads numbered 21, 22, 23, 61, 62, and 63 and sign A.
- Disconnect and bag existing pedestrian heads P41 and P42.
- 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.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- See HL-0065 TMP Phase II for pavement markings.



MAXTIME TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Walk *	-	-	-	14
Ped Clear	-	-	-	11
Min Green *	10	7	10	7
Passage *	3.0	2.0	3.0	2.0
Max I *	45	25	45	25
Yellow Change	4.3	3.1	4.3	3.1
Red Clear	1.8	3.0	1.8	3.0
Red Revert	2.0	2.0	2.0	2.0
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	-	-	7
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 Passage times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

PROPOSED		EXISTING	
	Traffic Signal Head		N/A
	Modified Signal Head		N/A
	Sign		N/A
	Pedestrian Signal Head		N/A
	Signal Pole with Guy		N/A
	Signal Pole with Sidewalk Guy		N/A
	Non-Intrusive Detection Zone		N/A
	Controller & Cabinet		N/A
	Junction Box		N/A
	Type I Pushbutton Post		N/A
	Type II Signal Pedestal		N/A
	Directional Drill		DD
	2-in Underground Conduit		UC
	Right of Way		N/A
	Directional Arrow		N/A
	Curb Construction		N/A
	Pedestrian Barricade		N/A
	Curb Ramp		N/A
	Fence		N/A
	Guardrail		N/A
	Street Name Sign		N/A

Signal Upgrade
Temporary Design 2
(Construction Phase 2)

Prepared for:

750 N. Greenfield Hwy, Garner, NC 27529

US 221 Alt-US 74 Bus (Charlotte Rd)
at
S. Cleghorn Street

Division 13 Rutherford County Rutherfordton

PLAN DATE: February 2026 REVIEWED BY: N.K. Vianich

PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER

SEAL 031464

W. J. SIMMONS

DocuSigned by: 5/12/2026

SIGNATURE DATE

SIG. INVENTORY NO. 13-062912

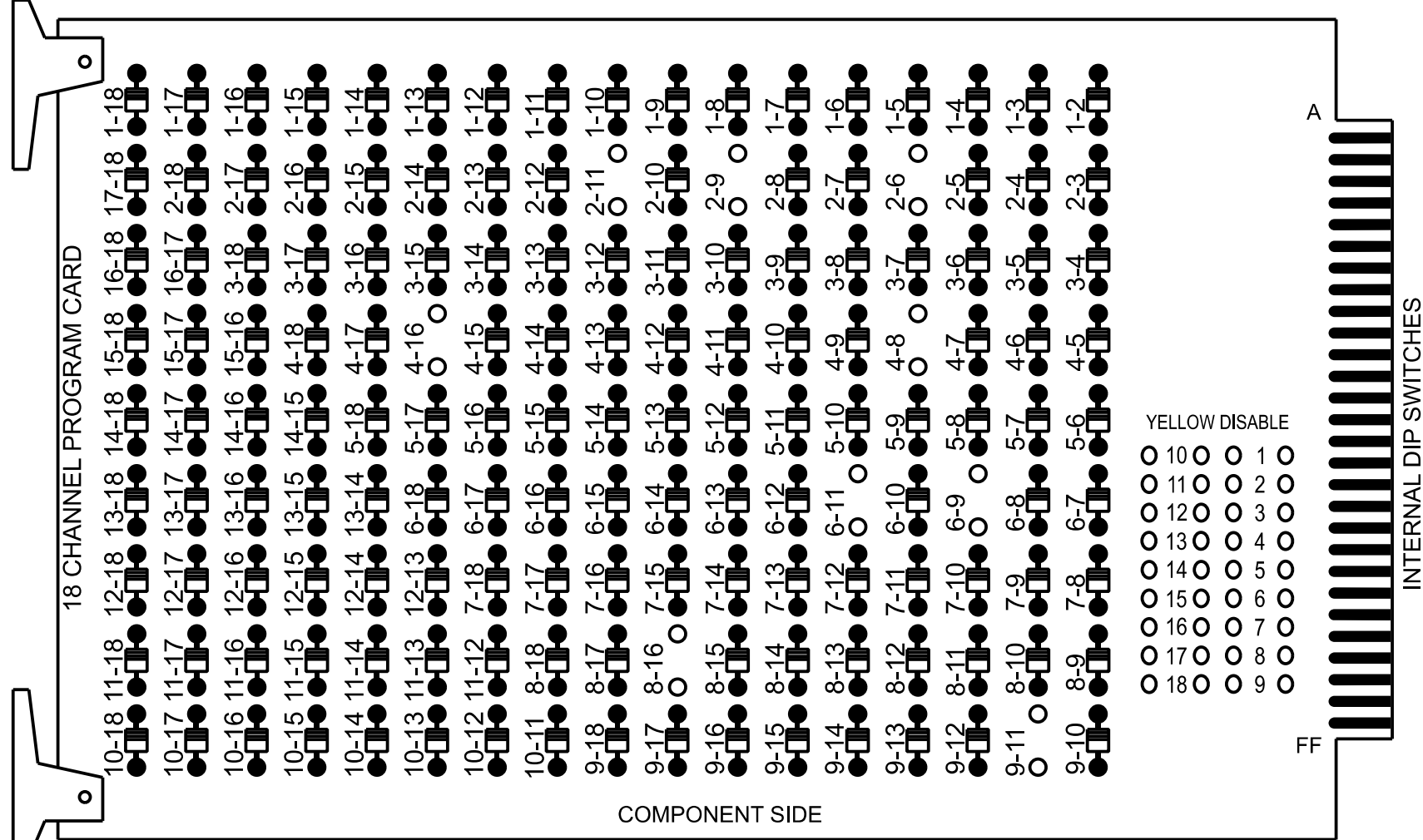
HNTB

HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

18 CHANNEL CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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

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 phases 4 and 8 for Simultaneous Start.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the D13-24_Rutherfordton 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 S4
Phases Used.....2, 4, 6, 8, 8PED
Overlap "1".....*
Overlap "2".....Not Used
Overlap "3".....*
Overlap "4".....Not Used

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

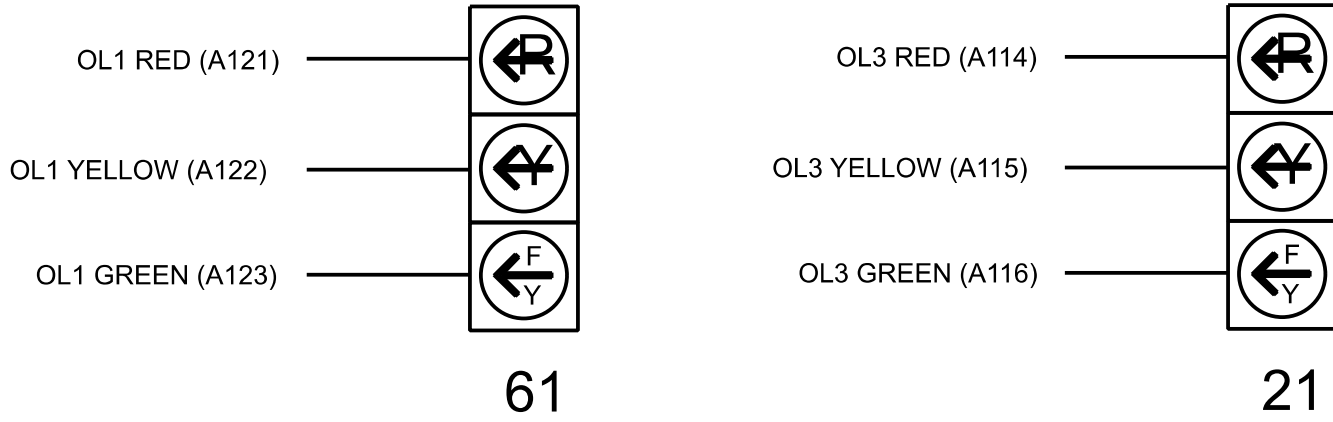
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	41,42	NU	NU	62,63	NU	NU	81, 82,83	P81,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

NU = Not Used

★See pictorial of head wiring in detail this sheet.

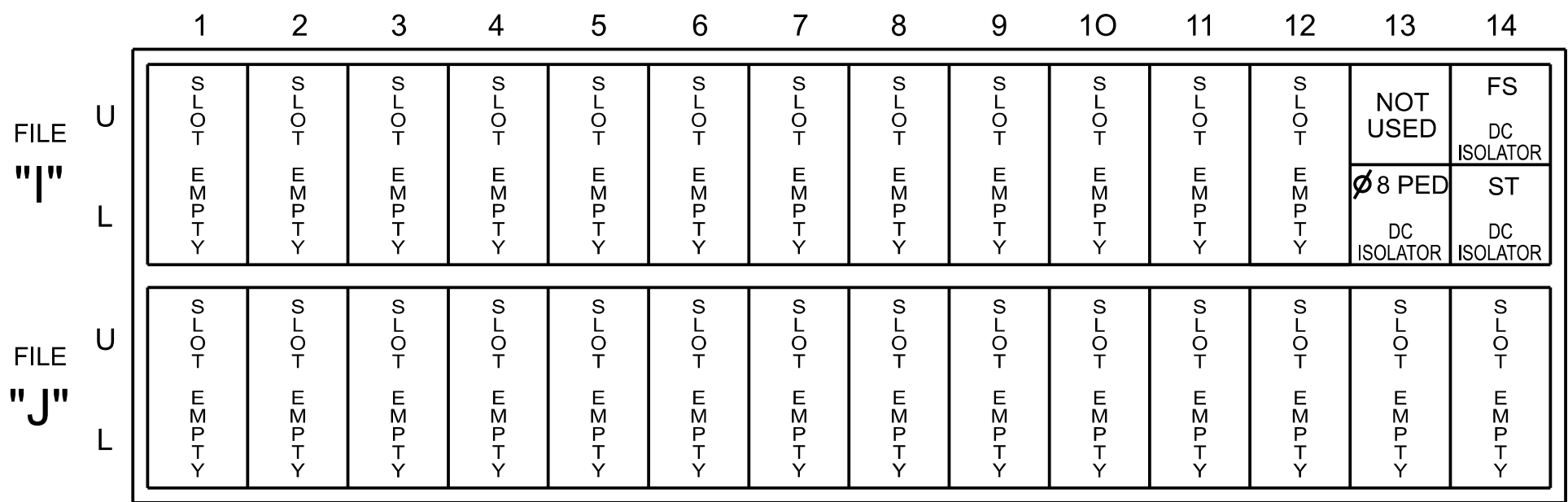
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

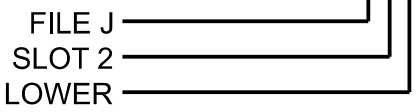
INPUT FILE CONNECTION & PROGRAMMING CHART

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	-	-	-	*	38	2			X		X	
2B	-	-	-	*	39	2	3.0		X		X	
4A	-	-	-	*	44	4	10.0		X		X	
6A	-	-	-	*	54	6			X		X	
6B	-	-	-	*	55	6	3.0		X		X	
8A	-	-	-	*	60	8	10.0		X		X	
PED PUSH BUTTONS												
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

*For Input Point numbers, see SDLC Non-Intrusive Detection Chart detail on this sheet.

NOTE:
INSTALL DC ISOLATORS
IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L



SDLC NON-INTRUSIVE DETECTION CHART

		Detector Rack #3		Detector Rack #4	
Input Point	Det # (Index)	Detector Zone	Det # (Index)	Detector Zone	
1	33	NU	49	NU	
2	34	NU	50	NU	
3	35	NU	51	NU	
4	36	NU	52	NU	
5	37	NU	53	NU	
6	38	2A	54	6A	
7	39	2B	55	6B	
8	40	NU	56	NU	
9	41	NU	57	NU	
10	42	NU	58	NU	
11	43	NU	59	NU	
12	44	4A	60	8A	
13	45	NU	61	NU	
14	46	NU	62	NU	
15	47	NU	63	NU	
16	48	NU	64	NU	

NU = Not Used

HNTB

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NC License No: C-1554
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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.

Signal Upgrade -
Electrical Detail - Sheet 1 of 2
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:		US 221 Alt- US 74 Bus (Charlotte Rd) at S. Cleghorn Street		SEAL
Prepared for the Offices of:		Division 13 Rutherford County Rutherfordton		
		PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich	
		PREPARED BY: E.E. Tiller	REVIEWED BY: N. R. Simmons	
		REVISIONS	INIT.	DATE
750 N. Greenfield Pkwy, Garner, NC 27529				
		DocuSigned by: SIGNATURE DATE		5/12/2026
		SIG. INVENTORY NO.		13-0629T2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters	Unit Flash Parameters
StartUp Clearance Hold	All Red Flash Exit Time
6	6

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options
☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps
Overlap Plan 1

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

Signal Upgrade -
Electrical Detail - Sheet 2 of 2
(Construction Phase 1)

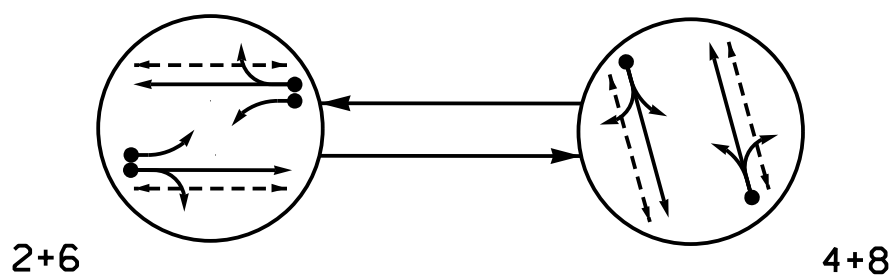
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0629T2
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB
HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Management 750 N. Greenfield Pkwy, Garner, NC 27529	US 221 Alt- US 74 Bus (Charlotte Rd) at S. Cleghorn Street Division 13 Rutherford County Rutherfordton <table><tr><td>PLAN DATE:</td><td>February 2026</td><td>REVIEWED BY:</td><td>N. K. Vianich</td></tr><tr><td>PREPARED BY:</td><td>E.E. Tiller</td><td>REVIEWED BY:</td><td>N. R. Simmons</td></tr></table> <table><tr><td>REVISIONS</td><td>INIT.</td><td>DATE</td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></table>		PLAN DATE:	February 2026	REVIEWED BY:	N. K. Vianich	PREPARED BY:	E.E. Tiller	REVIEWED BY:	N. R. Simmons	REVISIONS	INIT.	DATE													SEAL NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER WATISHA R. SIMMONS DocuSigned by: Watisha R. Simmons SIGNATURE 5/12/2026 DATE SIG. INVENTORY NO. 13-0629T2
	PLAN DATE:	February 2026	REVIEWED BY:	N. K. Vianich																						
	PREPARED BY:	E.E. Tiller	REVIEWED BY:	N. R. Simmons																						
	REVISIONS	INIT.	DATE																							

PHASING DIAGRAM



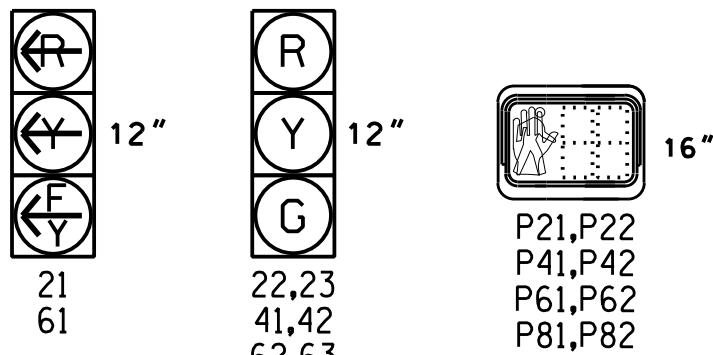
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	2 + 6	4 + 8	FLASH
21	F	R	R
22,23	G	R	R
41,42	R	G	R
61	F	R	R
62,63	G	R	R
81,82,83	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



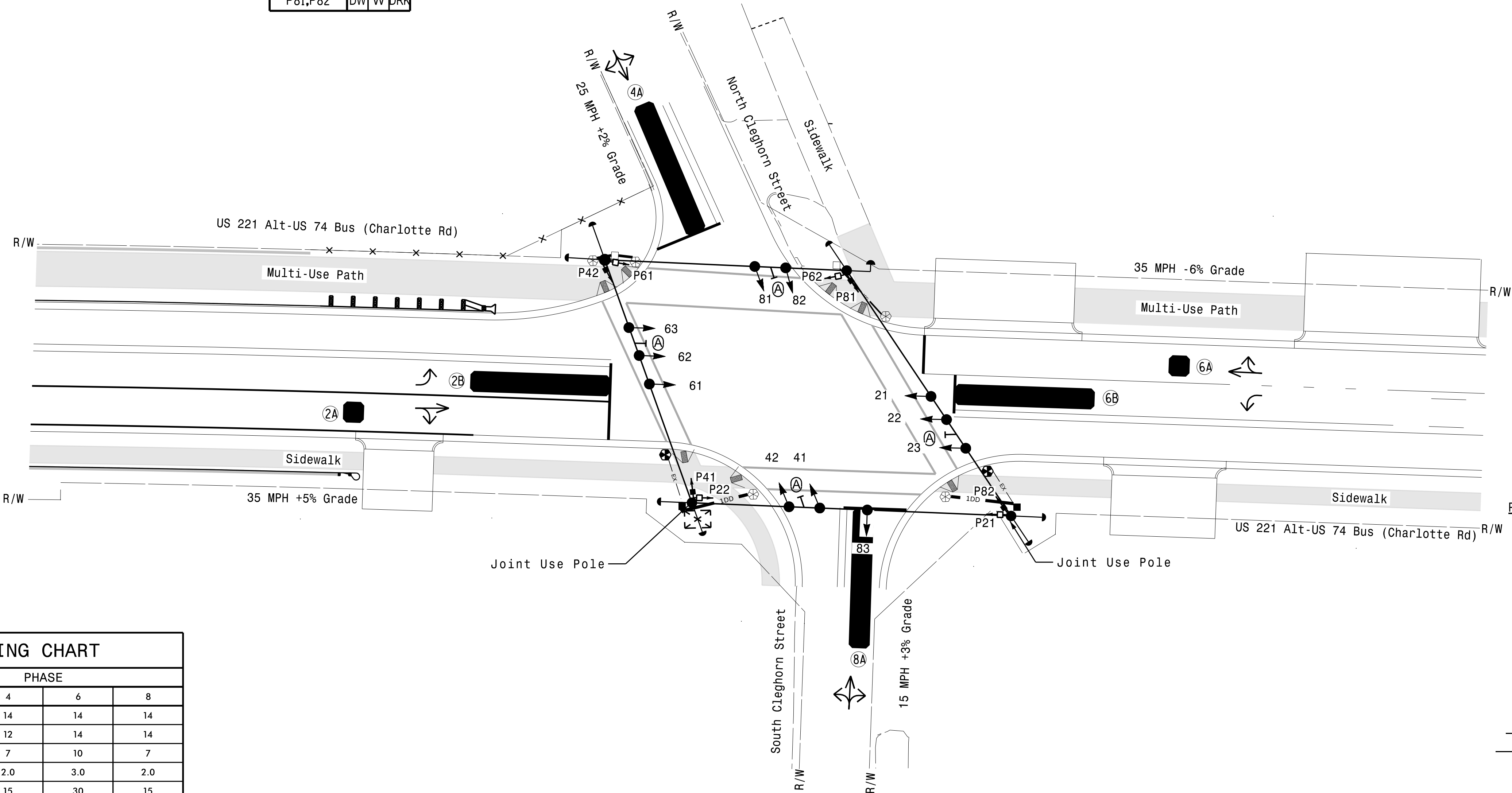
MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	NEW CARD
2A	*	70	*	-	2	-	-	X	-	X	*
2B	*	0	*	-	2	3.0	-	X	-	X	*
4A	*	0	*	-	4	10.0	-	X	-	X	*
6A	*	70	*	-	6	-	-	X	-	X	*
6B	*	0	*	-	6	3.0	-	X	-	X	*
8A	*	0	*	-	8	10.0	-	X	-	X	*

* Multizone Microwave Detection

2 Phase
Fully Actuated
Signal System #: D13-24_Rutherfordton

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 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.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- 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 *	14	14	14	14
Ped Clear	13	12	14	14
Min Green *	10	7	10	7
Passage *	3.0	2.0	3.0	2.0
Max l *	30	15	30	15
Yellow Change	4.3	3.1	4.3	3.1
Red Clear	1.8	3.4	1.8	3.4
Red Revert	2.0	2.0	2.0	2.0
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	7	7	7	7
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 Passage 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	
Modified Signal Head	N/A
Sign	
Pedestrian Signal Head	
Signal Pole with Guy	
Signal Pole with Sidewalk Guy	
Non-Intrusive Detection Zone	
Controller & Cabinet	
Junction Box	
Type I Pushbutton Post	
Type II Signal Pedestal	
Directional Drill	DD
2-in Underground Conduit	UC
Right of Way	
Directional Arrow	
Curb Ramp	
Fence	
Guardrail	
Street Name Sign	

Signal Upgrade - Final Design

Prepared for:

750 N. Greenfield Hwy, Garner, NC 27529

US 221 Alt-US 74 Bus (Charlotte Rd) at S. Cleghorn Street

Division 13 Rutherford County Rutherfordton

PLAN DATE: February 2026 REVIEWED BY: N.K. Vianich

PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

REVISIONS

INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSigned by: Natasha R. Simmons 5/12/2026

SIGNATURE DATE

SIG. INVENTORY NO. 13-0629

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4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters	Unit Flash Parameters
StartUp Clearance Hold	All Red Flash Exit Time
6	6

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options
☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps
Overlap Plan 1

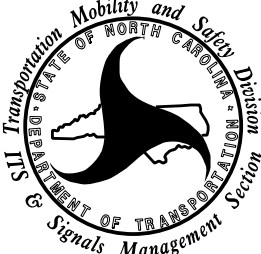
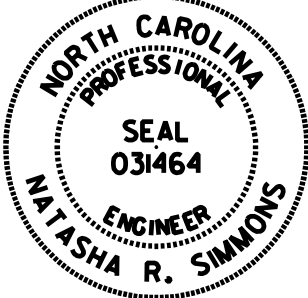
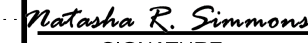
Overlap	1	3
Type	FYA 4 -Section	FYA 4 -Section
Included Phases	2	6
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

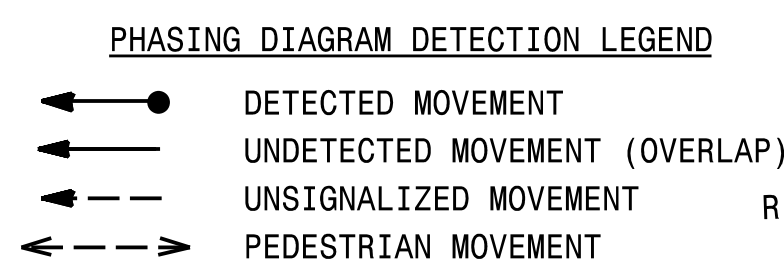
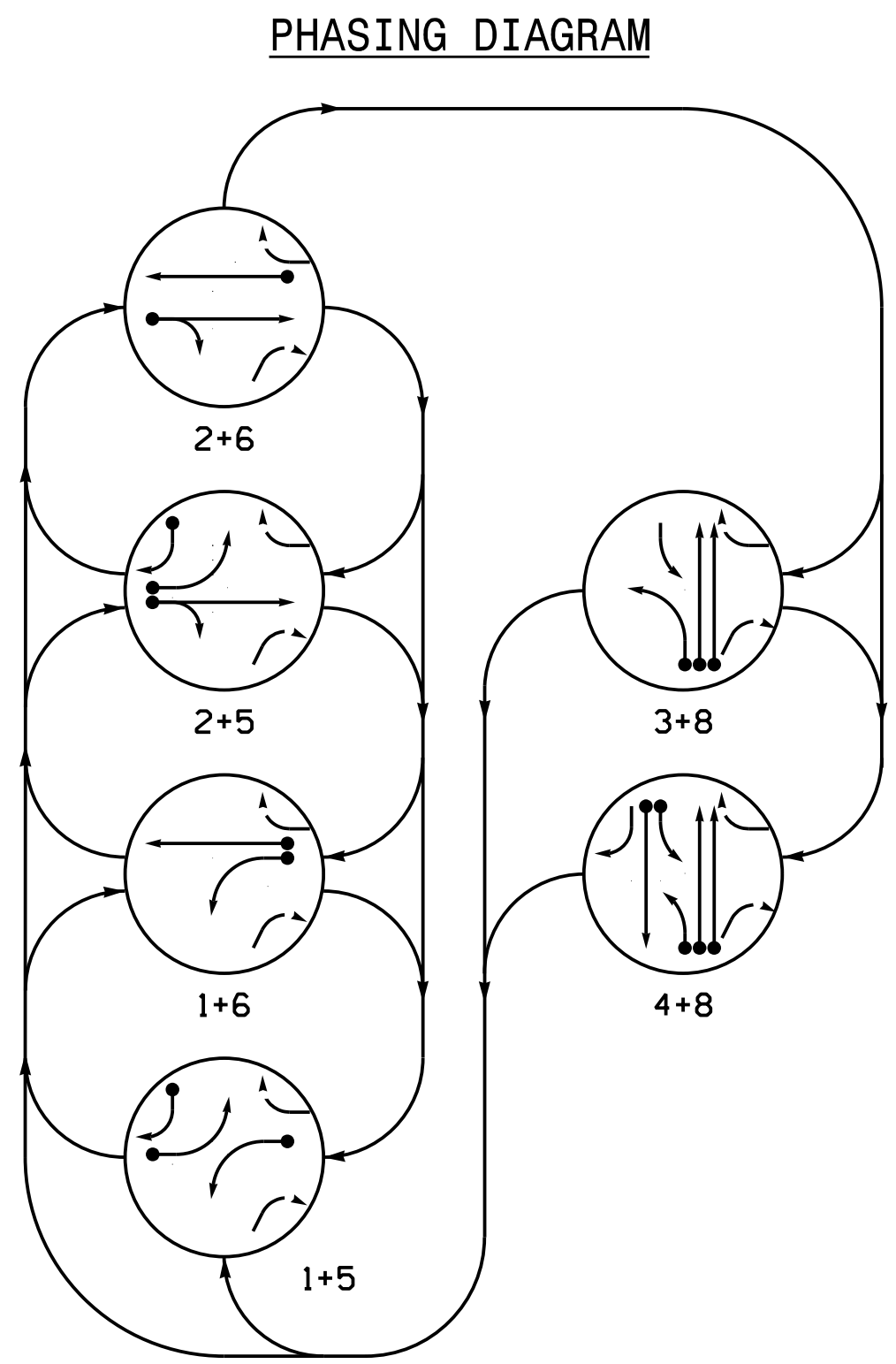
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0629
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB
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Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 2

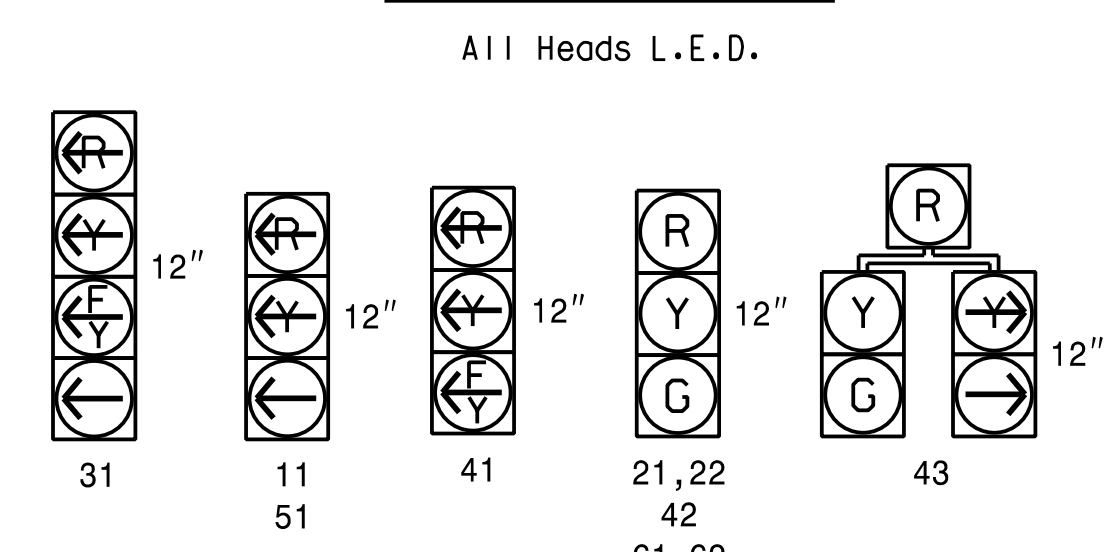
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	US 221 Alt- US 74 Bus (Charlotte Rd) at S. Cleghorn Street		SEAL 
	Division 13 Rutherford County Rutherfordton		
	PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich	
	PREPARED BY: E.E. Tiller	REVIEWED BY: N. R. Simmons	
	REVISIONS		
INIT.		DATE	
DocuSigned by: 		5/12/2026	
SIGNATURE		DATE	
SIG. INVENTORY NO.		13-0629	



SIGNAL FACE	PHASE						
	1 + 5	1 + 6	2 + 5	2 + 6	3 + 8	4 + 8	FLUSH
11	←	←	→	→	→	→	→
21,22	R	R	G	G	R	R	R
31	→	→	→	→	←	←	←
41	→	→	→	→	←	←	←
42	R	R	R	R	G	G	R
43	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←
61,62	R	G	R	G	R	R	R
81,82	R	R	R	R	G	G	R

SIGNAL FACE I.D.



MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR						PROGRAMMING					
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURN	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	*	0	*	-	1	3.0	-	X	-	X	-
2A	*	300	*	-	2	-	-	X	-	X	-
3A	*	0	*	-	3	15.0	-	X	-	X	-
4A	*	0	*	-	4	-	-	X	-	X	-
4B	*	0	*	-	4	-	-	X	-	X	-
5A	*	0	*	-	5	-	-	X	-	X	-
5B	*	0	*	-	5	15.0	-	X	-	X	-
6A	*	300	*	-	6	-	-	X	-	X	-
8A	*	0	*	-	8	-	-	X	-	X	-
8B	*	0	*	-	8	-	-	X	-	X	-

* Multizone Microwave Detection

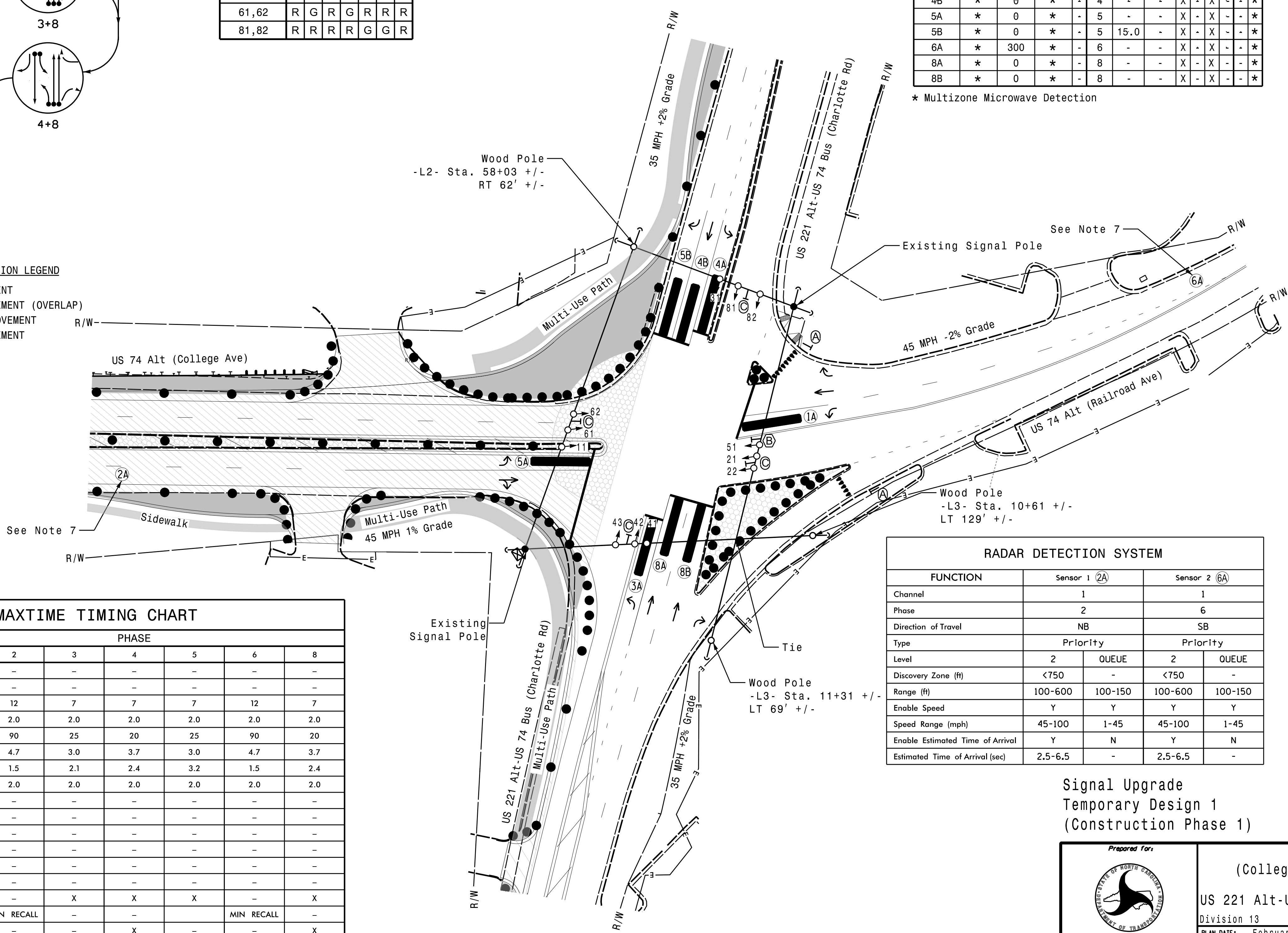
6 Phase
Fully Actuated
Signal System #: D13-24_Rutherfordton

NOTES

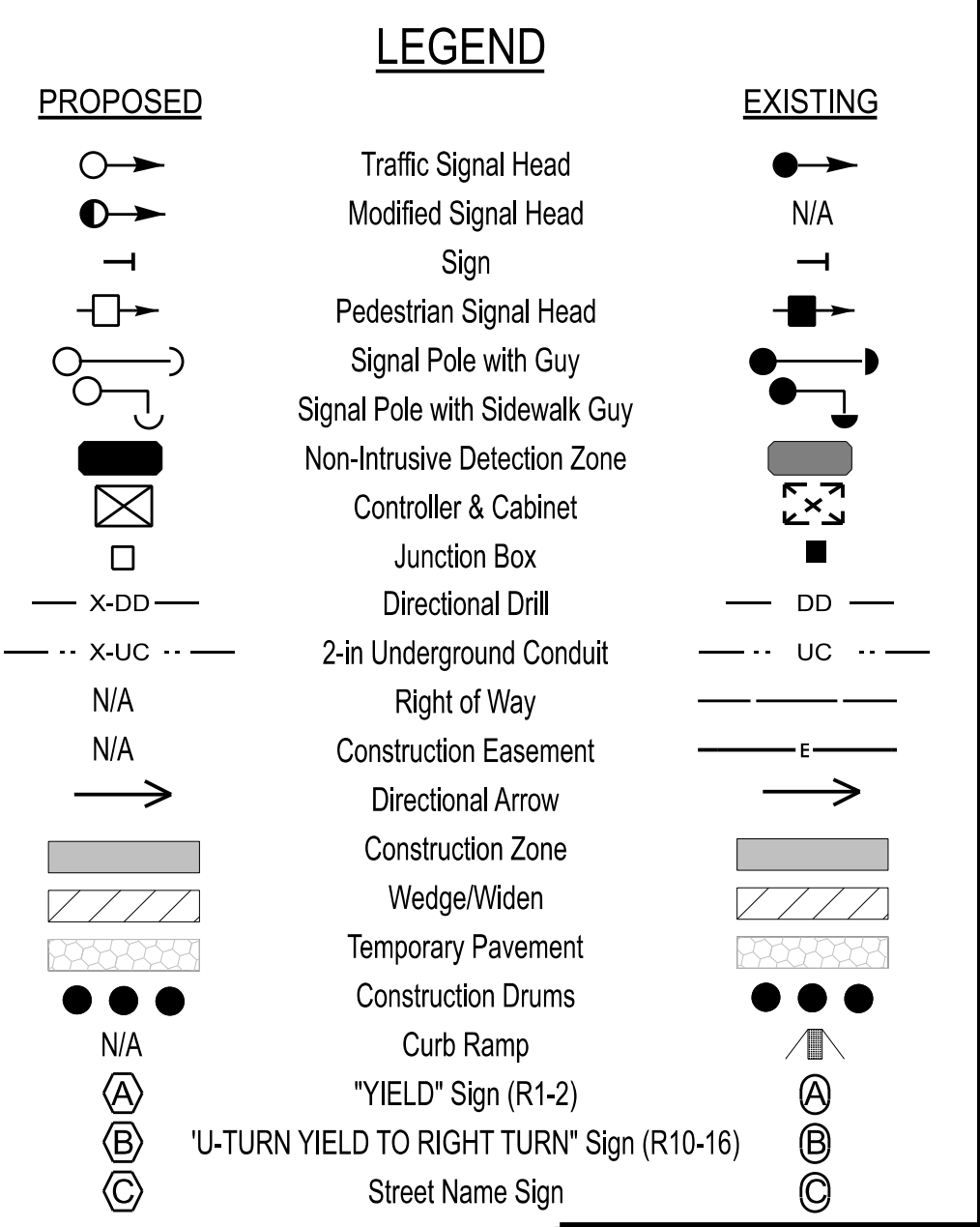
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- Phase 3 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- See HL-0065 TMP Phase I for pavement markings.
- Relocate existing street name signs.

MAXTIME TIMING CHART							
FEATURE	PHASE						
	1	2	3	4	5	6	8
Walk *	-	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-	-
Min Green *	7	12	7	7	7	12	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	25	90	25	20	25	90	20
Yellow Change	3.0	4.7	3.0	3.7	3.0	4.7	3.7
Red Clear	3.2	1.5	2.1	2.4	3.2	1.5	2.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Added Initial *	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL	-
Dual Entry	-	-	-	X	-	-	X

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



RADAR DETECTION SYSTEM				
FUNCTION	Sensor 1 (2A)		Sensor 2 (6A)	
Channel	1		1	
Phase	2		6	
Direction of Travel	NB		SB	
Type	Priority		Priority	
Level	2	QUEUE	2	QUEUE
Discovery Zone (ft)	<750		<750	
Range (ft)	100-600	100-150	100-600	100-150
Enable Speed	Y	Y	Y	Y
Speed Range (mph)	45-100	1-45	45-100	1-45
Enable Estimated Time of Arrival	Y	N	Y	N
Estimated Time of Arrival (sec)	2.5-6.5		2.5-6.5	



Signal Upgrade
Temporary Design 1
(Construction Phase 1)

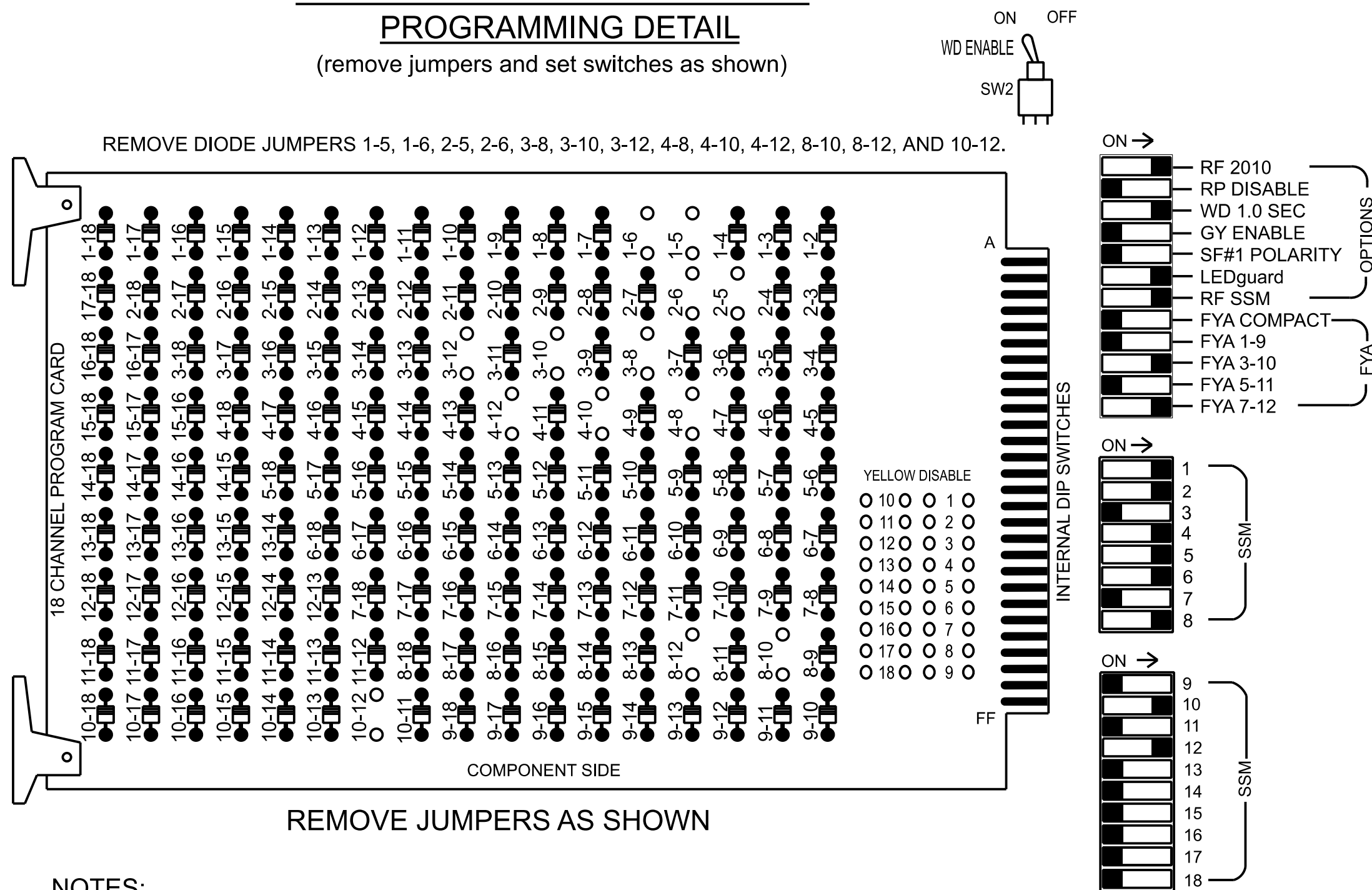


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	US 74 Alt (College Ave/Railroad Ave) at US 221 Alt-US 74 Bus (Charlotte Rd)	
	Division 13 Rutherford County Rutherfordton PLAN DATE: February 2026 REVIEWED BY: N.K. Vianich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons	
REVISIONS		INITIALS DATE
0 40 1"=40'		5/12/2026
DocuSigned by: Natasha R. Simmons		SIGNATURE DATE
SIC. INVENTORY NO. 13-018471		

18 CHANNEL 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.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all 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. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
5. This cabinet and controller are part of the Signal System #: D13-24_Rutherforddon.

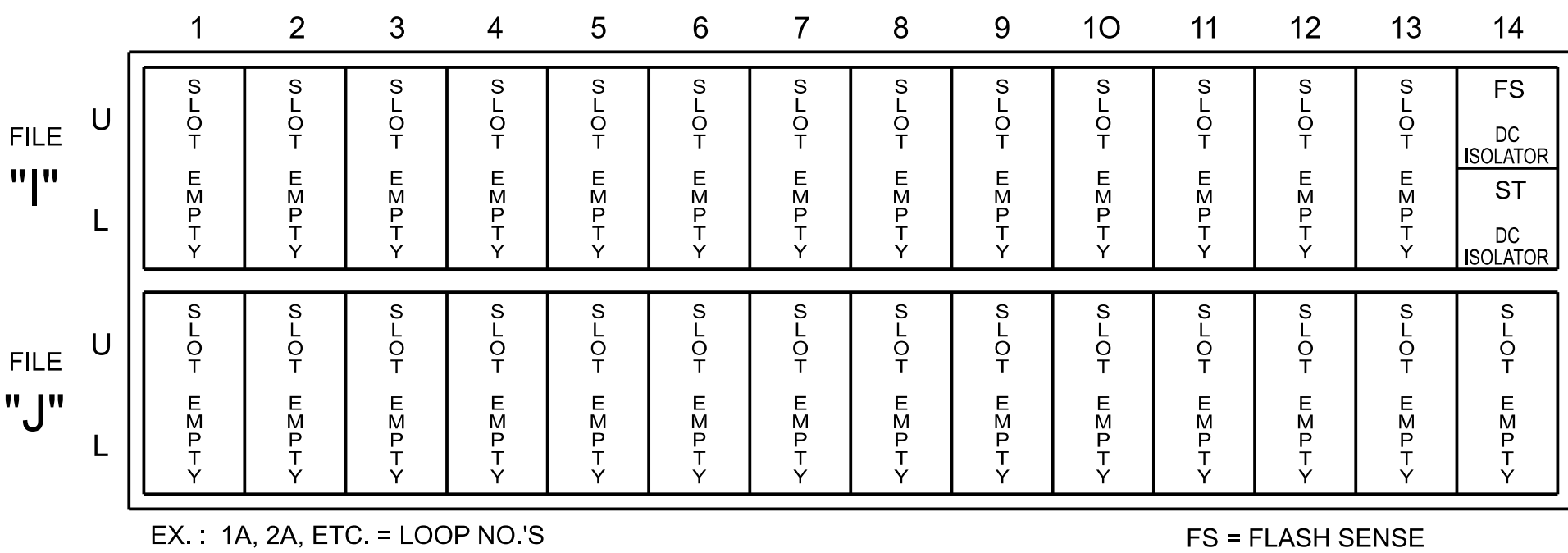
EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

INPUT FILE POSITION LAYOUT

(front view)

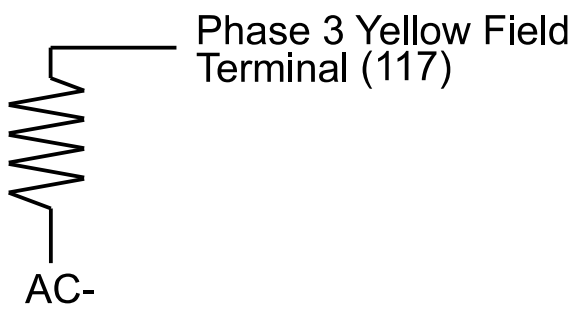
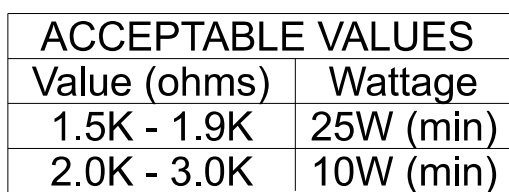


SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

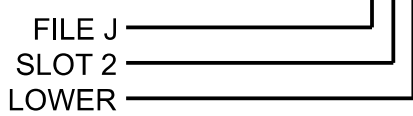


INPUT FILE CONNECTION & PROGRAMMING CHART

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	-	-	-	*	33	1	3.0		X		X	
2A	-	-	-	*	38	2			X		X	
3A	-	-	-	*	34	3	15.0		X		X	
				*	126	8	3.0		X		X	
4A	-	-	-	*	44	4			X		X	
4B	-	-	-	*	45	4			X		X	
5A	-	-	-	*	35	5			X		X	
5B	-	-	-	*	51	5	15.0		X		X	
6A	-	-	-	*	54	6			X		X	
8A	-	-	-	*	60	8			X		X	
8B	-	-	-	*	61	8			X		X	

*For Input Point numbers, see SDLC Non-Intrusive Detection Chart this sheet.

INPUT FILE POSITION LEGEND: J2L



SDLC NON-INTRUSIVE DETECTION CHART

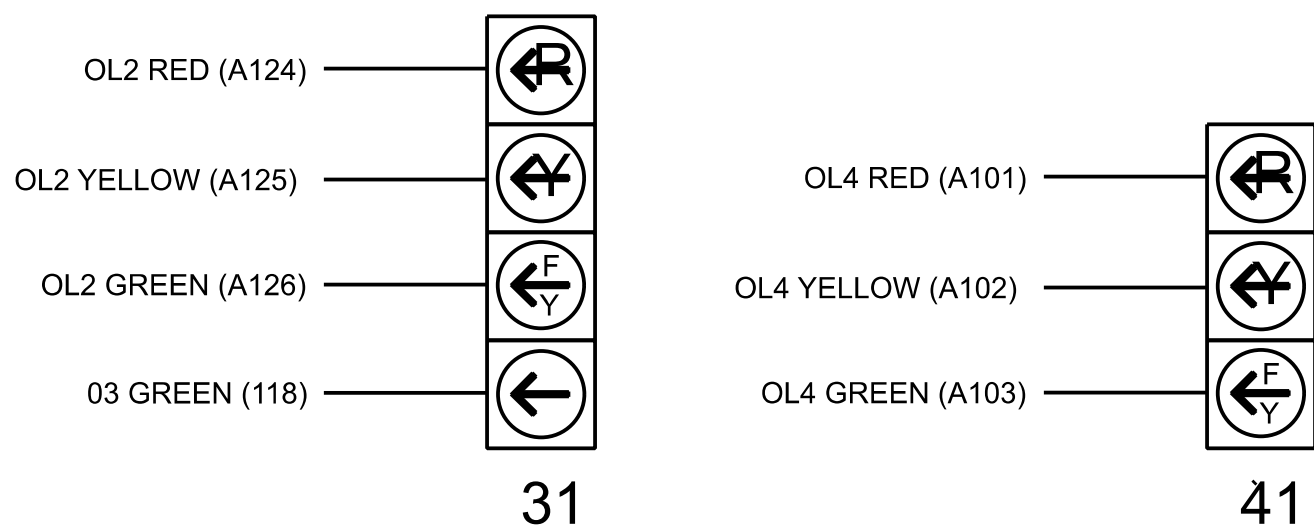
	Detector Rack #3		Detector Rack #4	
Input Point	Det # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	1A	49	NU
2	34	3A	50	NU
3	35	5A	51	5B
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	NU	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	8A
13	45	4B	61	8B
14	46	NU	62	NU
15	47	NU	63	NU
16	48	NU	64	NU

NU = Not Used

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4000 Center at North Hills St
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(919) 546-8997

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



Signal Upgrade -
Electrical Detail - Sheet 1 of 2
(Construction Phase 1)

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0184T1
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

US 74 Alt
(College Ave/Railroad Ave)
at
US 221 Alt-US 74 Bus (Charlotte Rd)

SEAL



Prepared for the Offices of:



TRANSPORTATION
DEPARTMENT OF TRANSPORTATION
DIVISION OF TRAFFIC AND SIGNAL MANAGEMENT SYSTEMS

Division 13		Rutherford County		Rutherfordton	
PLAN DATE:	February 2026	REVIEWED BY:	N. K. Vianich		
PREPARED BY:	E. E. Tiller	REVIEWED BY:	N. R. Simmons		
REVISIONS		INT.	DATE		

750 N. Greenfield Pkwy. Garner, NC 27529

DocuSigned by:
Natascha R. Simmons

SIGNATURE

SIG. INVENTORY NO.

5/12/2026

DATE

13-018471

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

LOGIC PROCESSOR PROGRAMMING

Front Panel
Main Menu >Controller >More >User Programs >Definition

Web Interface
Home >Controller >User Programs Configuration >User Programs Definition

Program 1

Statement	Result	Index	Operation	Parameter A	Index	Parameter B	Index	Delay	Ext
1	Veh Detector Call	126	Is Module A Input B ON	Number	2	Number	3	0.0	0.0

LOGIC STATEMENT DESCRIPTION

Statement 1 Description: Mirrors vehicle detector 34 to vehicle detector 126.

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

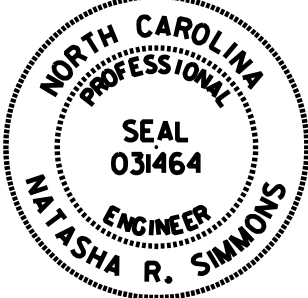
All Red Flash Exit Time
6

Signal Upgrade -
Electrical Detail - Sheet 2 of 2
(Construction Phase 1)

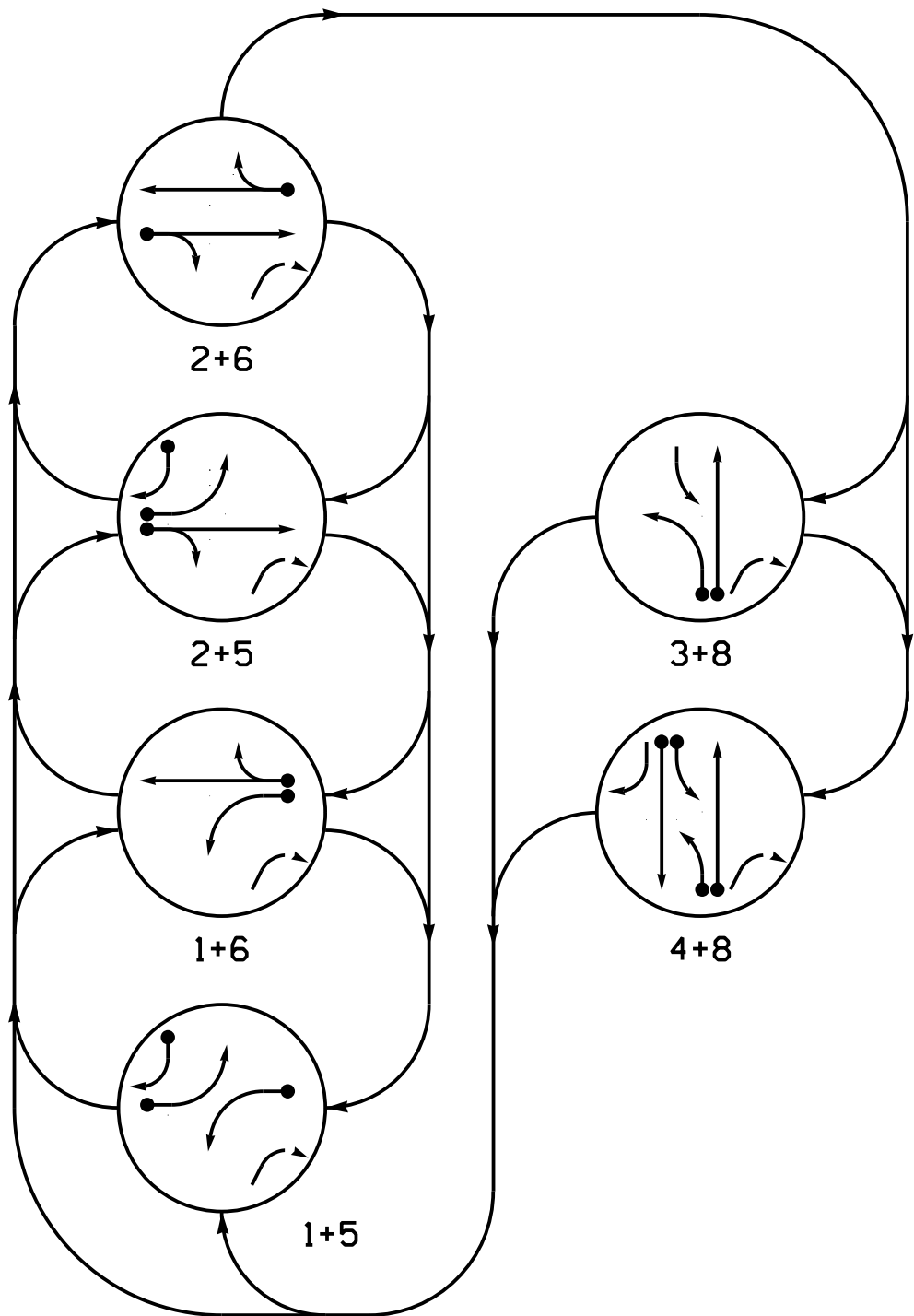
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0184T1
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	US 74 Alt (College Ave/Railroad Ave) at US 221 Alt-US 74 Bus (Charlotte Rd) Division 13 Rutherford County Rutherfordton	SEAL 
	PLAN DATE: February 2026 PREPARED BY: E.E. Tiller REVISIONS INIT. DATE SIGNED BY: <i>Natasha R. Simmons</i> DATE: 5/12/2026 SIG. INVENTORY NO. 13-0184T1	REVIEWED BY: N. K. Vianich REVIEWED BY: N. R. Simmons

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

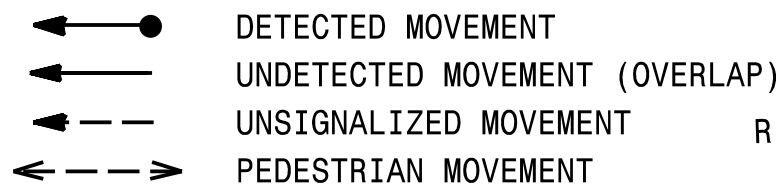
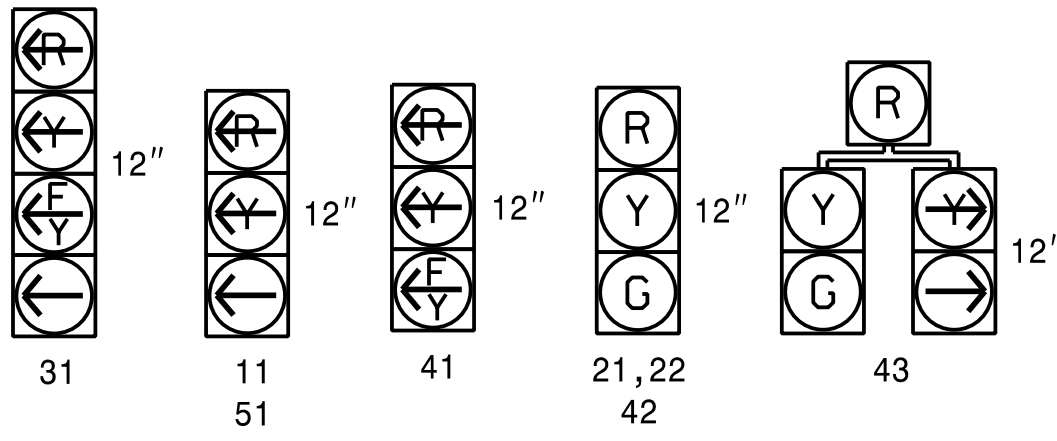


TABLE OF OPERATION

SIGNAL FACE	PHASE						
	1 + 5	1 + 6	2 + 5	2 + 6	3 + 8	4 + 8	FLASHER
11	←	←	→	→	→	→	
21, 22	R	R	G	G	R	R	
31	→	→	→	→	←	←	
41	→	→	→	→	←	←	
42	R	R	R	R	G	G	
43	R	R	R	R	G	G	
51	←	←	←	←	→	→	
61, 62	R	G	R	G	R	R	
81, 82	R	R	R	R	G	G	

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR				PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	*	0	*	-	1	3.0	-	X	-	X	-
2A	*	300	*	-	2	-	-	X	X	X	-
3A	*	0	*	-	3	15.0	-	X	-	X	-
4A	*	0	*	-	4	-	-	X	-	X	-
4B	*	0	*	-	4	-	-	X	-	X	-
5A	*	0	*	-	5	-	-	X	-	X	-
5B	*	0	*	-	5	15.0	-	X	-	X	-
6A	*	300	*	-	6	-	-	X	X	X	-
8A	*	0	*	-	8	-	-	X	-	X	-

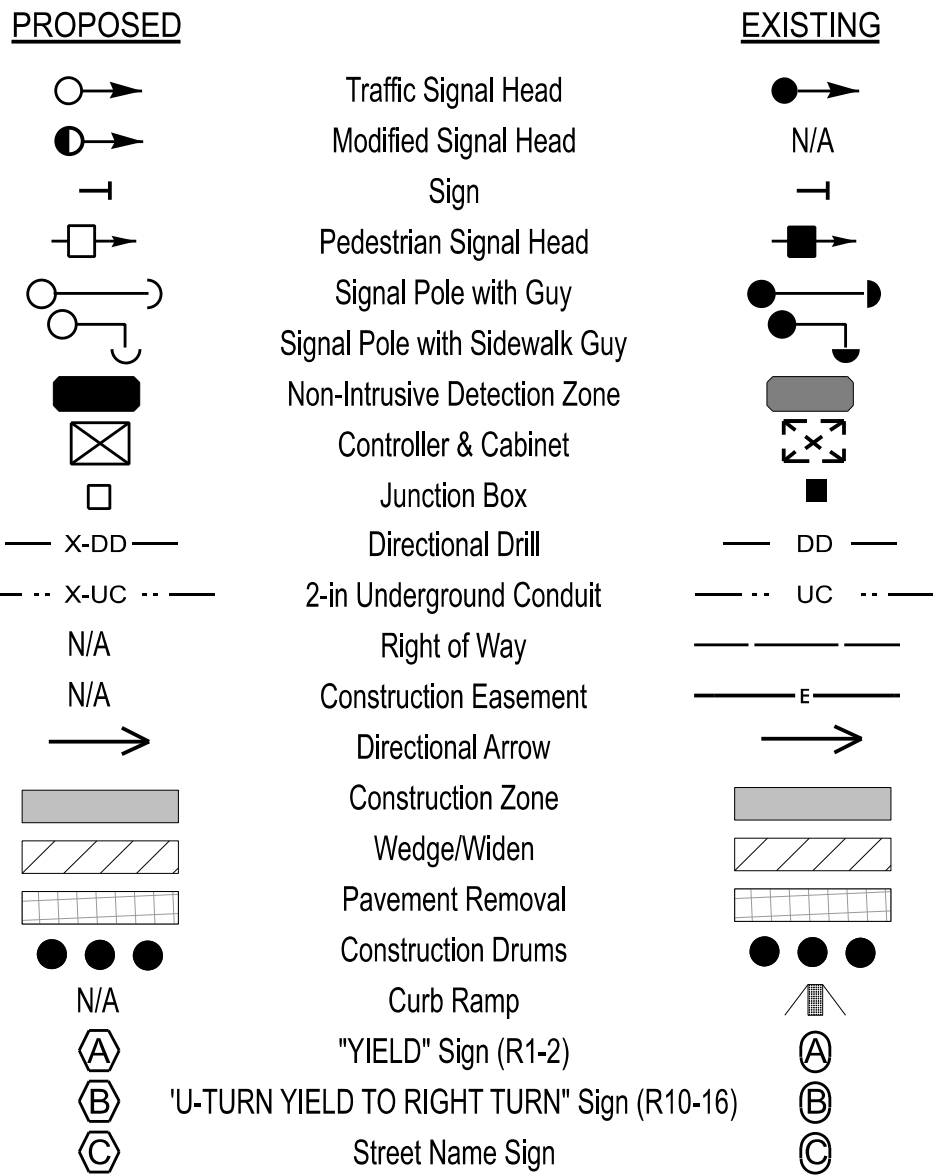
* Multizone Microwave Detection

6 Phase
Fully Actuated
Signal System #: D13-24_Rutherfordton

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- Phase 3 may be lagged.
- Reposition existing signal heads numbered 81 and 82 and existing sign 8.
- Set all detector units to presence mode.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- See HL-0065 TMP Phase II for pavement markings.
- Relocate existing street name signs.

LEGEND



MAXTIME TIMING CHART

FEATURE	PHASE						
	1	2	3	4	5	6	8
Walk *	-	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-	-
Min Green *	7	12	7	7	7	12	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	25	90	25	20	25	90	20
Yellow Change	3.0	4.6	3.0	3.8	3.0	4.6	3.8
Red Clear	3.5	1.5	2.1	2.4	3.1	1.5	2.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Added Initial *	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL	-
Dual Entry	-	-	-	X	-	-	X

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

RADAR DETECTION SYSTEM

FUNCTION	Sensor 1 (2A)	Sensor 2 (6A)
Channel	1	1
Phase	2	6
Direction of Travel	NB	SB
Type	Priority	Priority
Level	2	2
Discovery Zone (ft)	<750	<750
Range (ft)	100-600	100-600
Enable Speed	Y	Y
Speed Range (mph)	45-100	45-100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5-6.5	2.5-6.5

Signal Upgrade
Temporary Design 2
(Construction Phase 2)

HNTB

HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

Prepared for: 	US 74 Alt (College Ave/Railroad Ave) at US 221 Alt-US 74 Bus (Charlotte Rd) Division 13 Rutherford County Rutherfordton PLAN DATE: February 2026 REVIEWED BY: N.K. Vianich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons	SEAL NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER WATSHA R. SIMMONS
750 N. Greenfield Pkwy, Garner, NC 27526 	REVISIONS INIT. DATE 5/12/2026	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SIC. INVENTORY NO. 13-018472

PROJECT REFERENCE NO.	SHEET NO.
HL-0065	Sig. 10.2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

LOGIC PROCESSOR PROGRAMMING

Front Panel
Main Menu >Controller >More >User Programs >Definition

Web Interface
Home >Controller >User Programs Configuration >User Programs Definition.

Program 1

Statement	Result	Index	Operation	Parameter A	Index	Parameter B	Index	Delay	Ext
1	Veh Detector Call	126	Is Module A Input B ON	Number	2	Number	3	0:0	0:0

LOGIC STATEMENT DESCRIPTION

Statement 1 Description: Mirrors vehicle detector 34 to vehicle detector 126.

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0184T2
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home > Controller > Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

Signal Upgrade -
Electrical Detail - Sheet 2 of 2
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 74 Alt (College Ave/Railroad Ave) at US 221 Alt-US 74 Bus (Charlotte Rd)	SEAL 															
Prepared for the Offices of:																	
	Division 13 Rutherford County Rutherfordton																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">PLAN DATE: February 2026</td> <td style="width: 33%;">REVIEWED BY: N. K. Vianich</td> <td style="width: 33%;"></td> </tr> <tr> <td>PREPARED BY: E. E. Tiller</td> <td>REVIEWED BY: N. R. Simmons</td> <td></td> </tr> <tr> <td>REVISIONS</td> <td>INT.</td> <td>DATE</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich		PREPARED BY: E. E. Tiller	REVIEWED BY: N. R. Simmons		REVISIONS	INT.	DATE						
PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich																
PREPARED BY: E. E. Tiller	REVIEWED BY: N. R. Simmons																
REVISIONS	INT.	DATE															
750 N. Greenfield Pkwy. Garner, NC 27529																	

	DETECTED MOVEMENT
	UNDETECTED MOVEMENT (OVERLAP)
	UNSIGNALIZED MOVEMENT
	PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE		
	2 + 6	4 + 8	F L A S H
21	$\frac{F}{V}$	$\frac{R}{R}$	$\frac{R}{R}$
22, 23	G	R	R
41	$\frac{R}{R}$	$\frac{F}{V}$	$\frac{R}{R}$
42, 43	R	G	R
61	$\frac{F}{V}$	$\frac{R}{R}$	$\frac{R}{R}$
62, 63	G	R	R
81	$\frac{R}{R}$	$\frac{F}{V}$	$\frac{R}{R}$
82, 83	R	G	R
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK
P61, P62	W	DW	DRK

DETECTOR					PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	DELAY DURING GREEN	SYSTEM LOOP	NEW CARD
2A	*	70	*	-	2	-	-	X	-	X	-	*
2B	*	0	*	-	2	-	-	X	-	X	-	*
4A	*	0	*	-	4	3.0	-	X	-	X	-	*
4B	*	0	*	-	4	10.0	-	X	-	X	-	*
6A	*	70	*	-	6	-	-	X	-	X	-	*
6B	*	0	*	-	6	-	-	X	-	X	-	*
8A	*	0	*	-	8	3.0	-	X	-	X	-	*
8B	*	0	*	-	8	10.0	-	X	-	X	-	*

2 Phase
Fully Actuated
Isolated

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Renumber existing signal heads 41 and 42 to 42 and 43, respectively.
5. Locate new cabinet so as to not obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. See HL-0065 TMP Phase II for pavement markings.

	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Non-Intrusive Detection Zone	
	Controller & Cabinet	
	Junction Box	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Directional Drill	
	2-in Underground Conduit	
N/A	Right of Way	
N/A	Permanent Easement	
N/A	Construction Easement	
	Directional Arrow	
	Curb Construction	
N/A	Curb Ramp	
	Left "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15L)	
	Right "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15R)	
	Street Name Sign	

MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	4	6	8
Walk *	12	13	12	—
Ped Clear	10	9	9	—
Min Green *	10	7	10	7
Passage *	3.0	2.0	3.0	2.0
Max 1 *	45	25	45	25
Yellow Change	3.0	4.2	3.0	4.2
Red Clear	3.1	3.0	3.1	3.0
Red Revert	2.0	2.0	2.0	2.0
Added Initial *	—	—	—	—
Maximum Initial *	—	—	—	—
Time Before Reduction *	—	—	—	—
Time To Reduce *	—	—	—	—
Minimum Gap	—	—	—	—
Advance Walk	5	6	5	—
Non Lock Detector	—	X	—	X
Vehicle Recall	MIN RECALL	—	MIN RECALL	—
Dual Entry	—	X	—	X

Signal Upgrade
Temporary Design 1
(Construction Phase 2)

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL

A circular professional seal for the State Board of Accountancy in North Carolina. The outer ring contains the text "NORTH CAROLINA" at the top and "STATE BOARD OF ACCOUNTANCY" at the bottom. Inside this ring, the word "PROFESSIONAL" is written in an arc. In the center of the seal, the word "SEAL" is positioned above the number "031464".

Signed by:

Tasha R. Simmons 5/12/2026

SIGNATURE	DATE
IG. INVENTORY NO.	13-0176T

100-111111-101 15 01101

HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

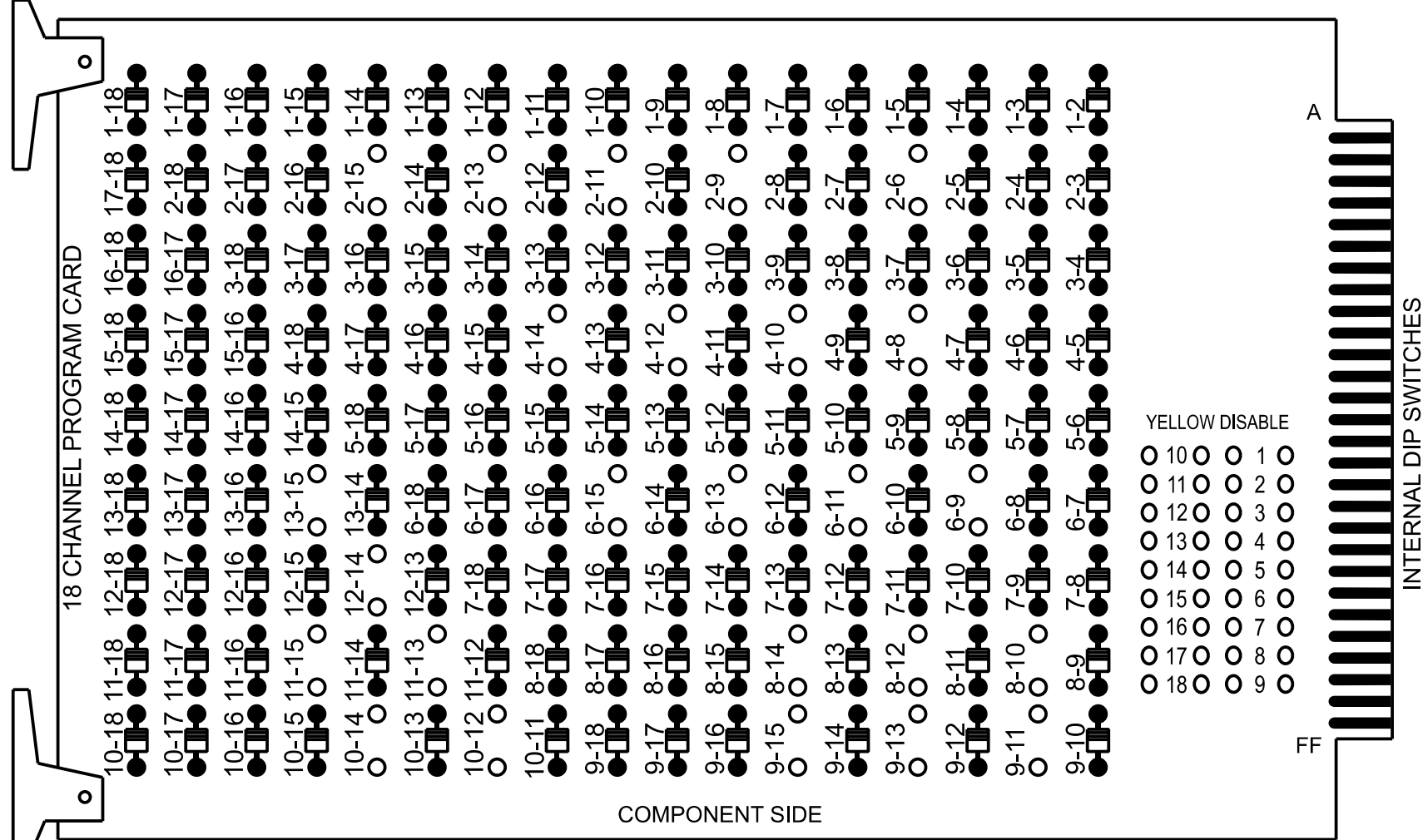
750 N.Greenfield Pkwy.Garner,NC 27529

[illegible]

18 CHANNEL CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

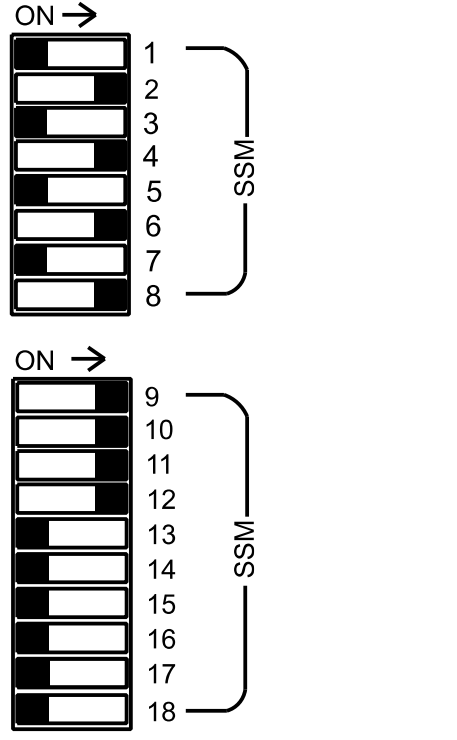
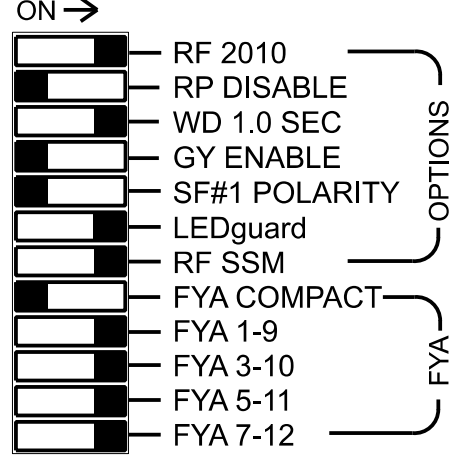
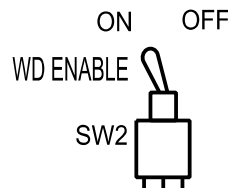
REMOVE DIODE JUMPERS 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-10, 4-12, 4-14, 6-9, 6-11, 6-13, 6-15, 8-10, 8-12, 8-14, 9-11, 9-13, 9-15, 10-12, 10-14, 11-13, 11-15, 12-14, and 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Program phases 4 and 8 for Simultaneous Start.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S2, S3, S5, S6, S8, S9, S11, AUX S1, AUX S2, AUX S4, AUX S5
Phases Used.....2, 2PED, 4, 4PED, 6, 6PED, 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	P21, P22	NU	42,43	P41, P42	NU	62,63	P61, P62	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																		
Hand icon				113		104			119									
Walking person icon				115		106			121									

NU = Not Used

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

* See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

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

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

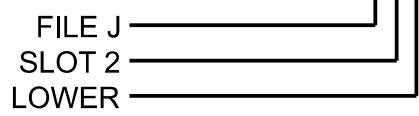
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	-	-	-	*	38	2			X		X	
2B	-	-	-	*	39	2			X		X	
4A	-	-	-	*	44	4	3.0		X		X	
4B	-	-	-	*	45	4	10.0		X		X	
6A	-	-	-	*	54	6			X		X	
6B	-	-	-	*	55	6			X		X	
8A	-	-	-	*	60	8	3.0		X		X	
8B	-	-	-	*	61	8	10.0		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2	NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.					
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

*For Input Point numbers, see SDLC Non-Intrusive Detection Chart detail on this sheet.

INPUT FILE POSITION LEGEND: J2L



SPECIAL DETECTOR NOTE

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

SDLC NON-INTRUSIVE DETECTION CHART

	Detector Rack #3		Detector Rack #4	
Input Point	Det # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	NU	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	2B	55	6B
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	8A
13	45	4B	61	8B
14	46	NU	62	NU
15	47	NU	63	NU
16	48	NU	64	NU

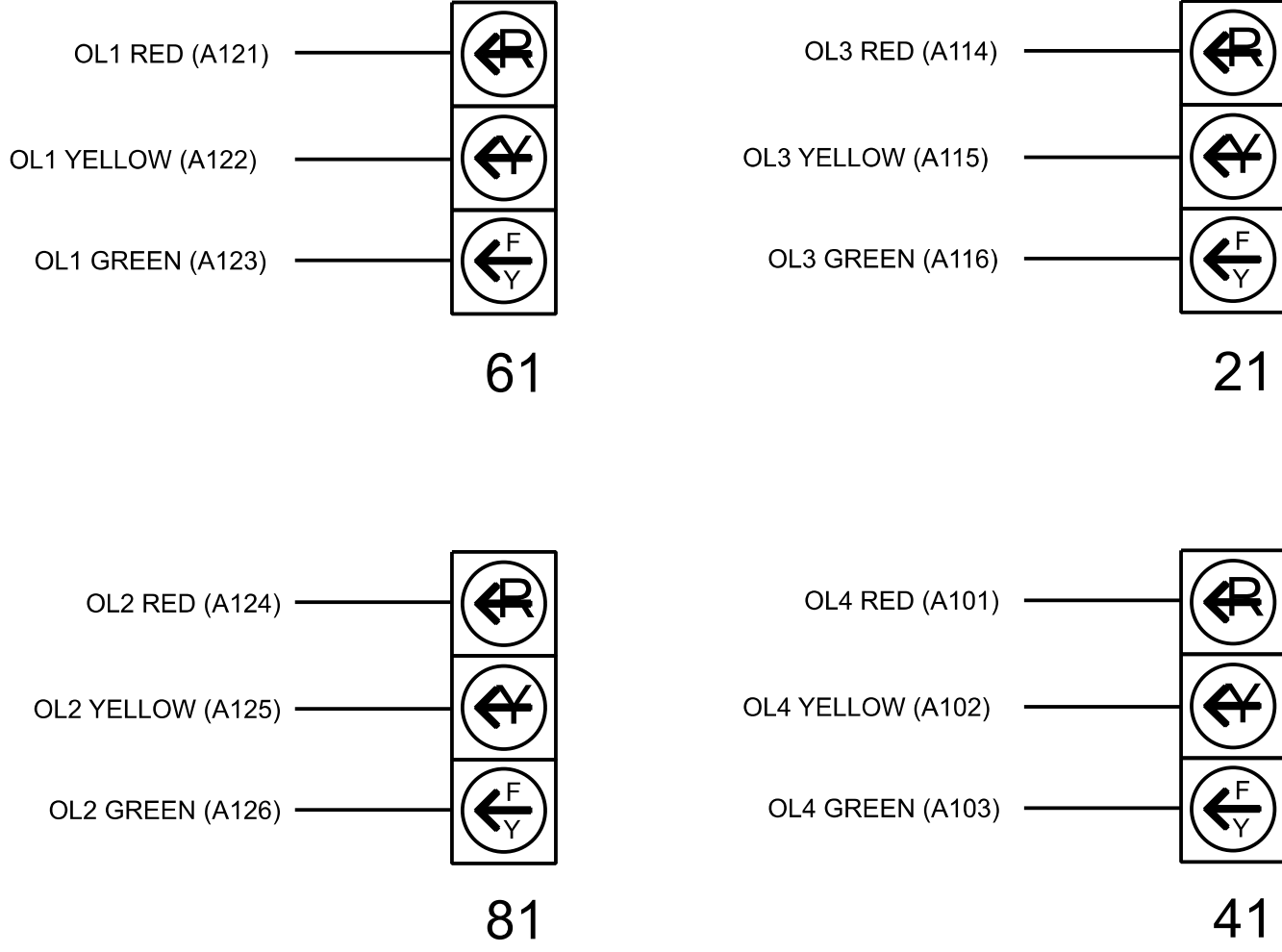
NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0176T
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

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.

Signal Upgrade -
Electrical Detail - Sheet 1 of 2
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:		US 221 Alt-US 74 Bus (Main St)		SEAL	
Prepared for the Offices of:		at		SEAL	
Division 13		Rutherford County		Spindale	
PLAN DATE: February 2026		REVIEWED BY: N. K. Vianich		5/12/2026	
PREPARED BY: E.E. Tiller		REVIEWED BY: N. R. Simmons		DATE	
REVISIONS		INIT.		DATE	
750 N. Greenfield Pkwy, Garner, NC 27529		Signature		DATE	
DocuSigned by:		Signature		DATE	
SIG. INVENTORY NO.		13-0176T			

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options
☒ Disable TS2 Cabinet Alarms

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

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	-	-	-	-
Modifier Overlaps	-	-	-	-
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.

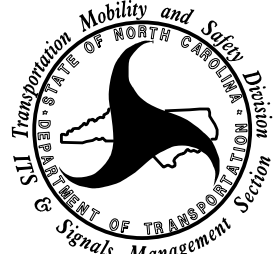
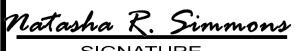
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0176T
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:



HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

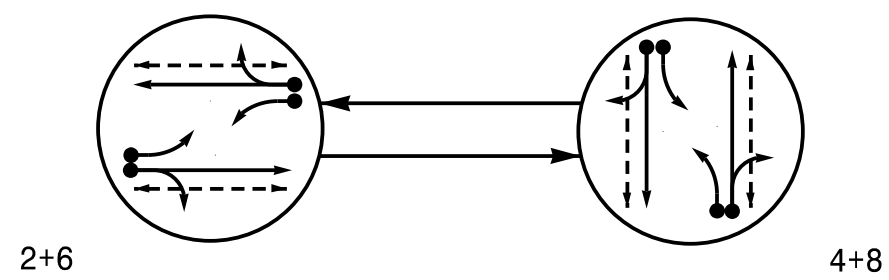
Signal Upgrade -
Electrical Detail - Sheet 2 of 2
(Construction Phase 2)

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	US 221 Alt-US 74 Bus (Main St) at SR 2201 (Oak St)			SEAL 
	Division 13 Rutherford County Spindale			
	PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich		
	PREPARED BY: E.E. Tiller	REVIEWED BY: N. R. Simmons		
	REVISIONS		INIT.	
.....				DocuSigned by:  5/12/2026
.....		SIGNATURE		DATE
.....		SIG. INVENTORY NO.		13-0176T

PROJECT REFERENCE NO.	SHEET NO.
HL-0065	Sig. 12.0

PHASING DIAGRAM

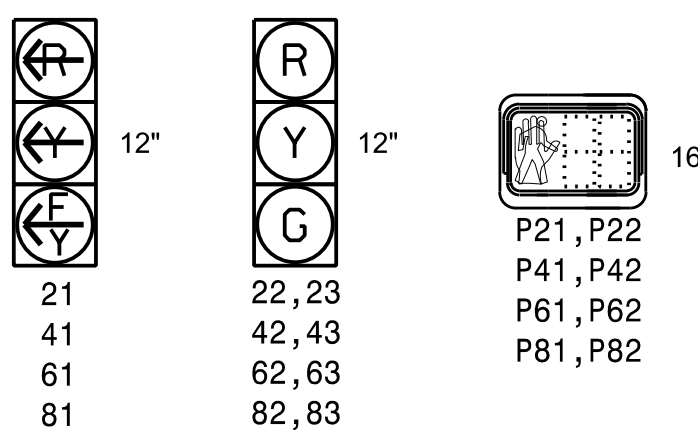


PHASING DIAGRAM DETECTION LEGEND

- | | |
|---------|-------------------------------|
| ←● | DETECTED MOVEMENT |
| ← | UNDETECTED MOVEMENT (OVERLAP) |
| ← - - | UNSIGNALIZED MOVEMENT |
| ← - - → | PEDESTRIAN MOVEMENT |

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING								
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	SYSTEM LOOP	NEW CARD
2A	*	70	*	-	2	-	-	X	-	X	-	-	*
2B	*	0	*	-	2	-	-	X	-	X	-	-	*
4A	*	0	*	-	4	3.0	-	X	-	X	-	-	*
4B	*	0	*	-	4	10.0	-	X	-	X	-	-	*
6A	*	70	*	-	6	-	-	X	-	X	-	-	*
6B	*	0	*	-	6	-	-	X	-	X	-	-	*
8A	*	0	*	-	8	3.0	-	X	-	X	-	-	*
8B	*	0	*	-	8	10.0	-	X	-	X	-	-	*

* Multizone Microwave Detection

2 Phase
Fully Actuated
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

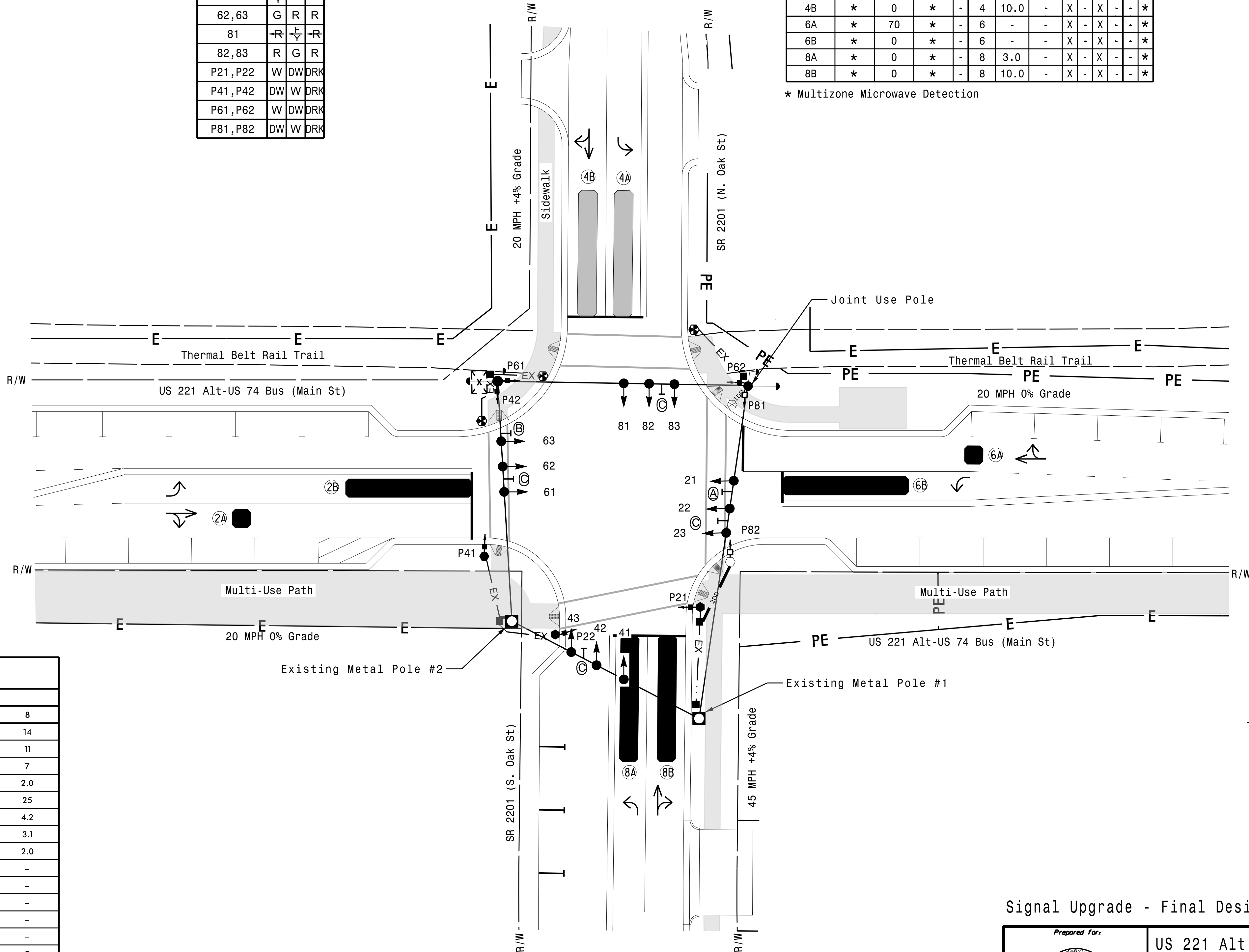
LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Non-Intrusive Detection Zone	
	Controller & Cabinet	
	Junction Box	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
— X-DD —	Directional Drill	— DD —
.. X-UC ..	2-in Underground Conduit	.. UC ..
N/A	Right of Way	— — — — —
N/A	Permanent Easement	— PE — — — — —
N/A	Construction Easement	— E — — — — —
	Directional Arrow	
N/A	Curb Ramp	
	Left "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15L)	
	Right "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15R)	
	Street Name Sign	

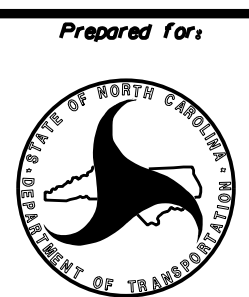
MAXTIME TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Walk *	13	12	12	14
Ped Clear	10	9	9	11
Min Green *	10	10	10	7
Passage *	3.0	2.0	3.0	2.0
Max 1 *	45	25	45	25
Yellow Change	3.0	4.2	3.0	4.2
Red Clear	3.1	3.1	3.1	3.1
Red Revert	2.0	2.0	2.0	2.0
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	6	5	5	7
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 Passage 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 - Final Design

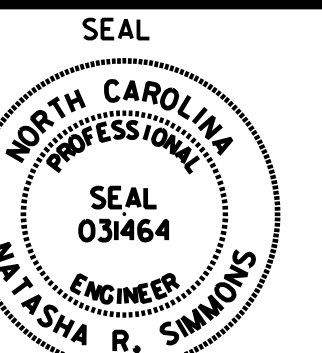


US 221 Alt-US 74 Bus (Main St)
at
SR 2201 (Oak St)

PLAN DATE: February 2026	REVIEWED BY: N.K. Vlanich
PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons

REVISIONS	INIT.	DATE
-----------	-------	------

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



Signed by: _____

Asha R. Simmons 5/12/2026
SIGNATURE DATE

INVENTORY NO. 13-0176



HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997



0 20

PROJECT REFERENCE NO.	SHEET NO.
HL-0065	Sig. 12.2

OUTPUT CHANNEL CONFIGURATION

Front Panel

Main Menu >Controller >More>Channels>Channels Config

Web Interface

Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

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

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel

Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface

Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Unit

Web Interface

Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

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	-	-	-	-
Modifier Overlaps	-	-	-	-
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: 13-0176
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB

HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

Signal Upgrade - Final Design
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

US 221 Alt-US 74 Bus (Main St)
at
SR 2201 (Oak St)

SEAL



Division 13		Rutherford County	Spindale
PLAN DATE:	February 2026	REVIEWED BY:	N. K. Vianich
PREPARED BY:	E.E. Tiller	REVIEWED BY:	N. R. Simmons
REVISIONS		INT.	DATE

DocuSigned by:
Natasha R. Simmons

SIGNATURE

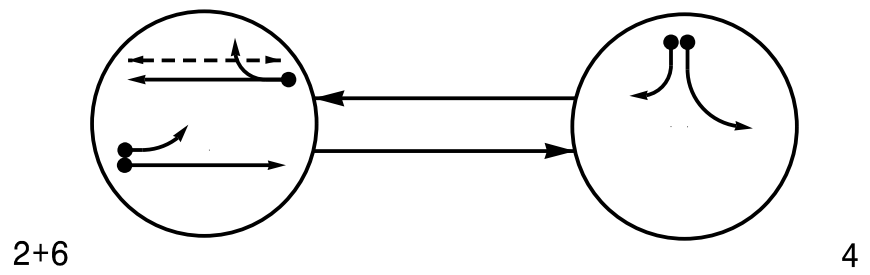
SIG. INVENTORY NO.

5/12/2026

DATE

13-0176

PHASING DIAGRAM



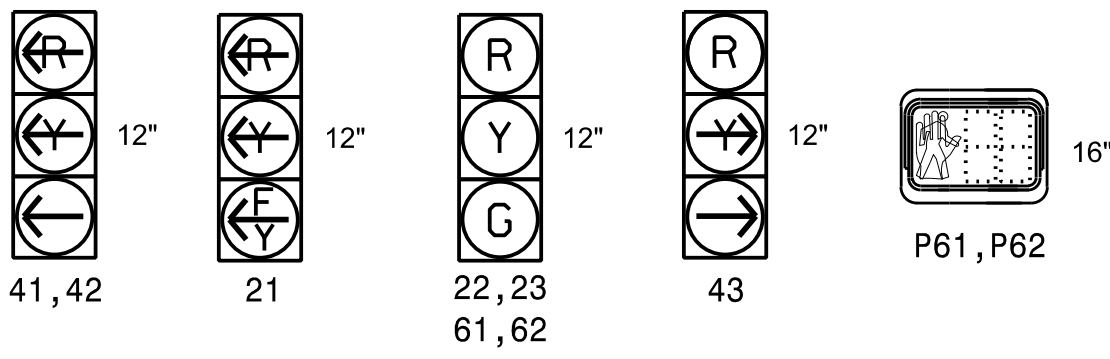
PHASING DIAGRAM DETECTION LEGEND

- ←● DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- ←- - UN SIGNALIZED MOVEMENT
- ←- -> PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE		FLASH
	2 + 6	4	
21	F	R	R
22, 23	G	R	R
41, 42	R	R	R
43	R	R	R
61, 62	G	R	R
P61, P62	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



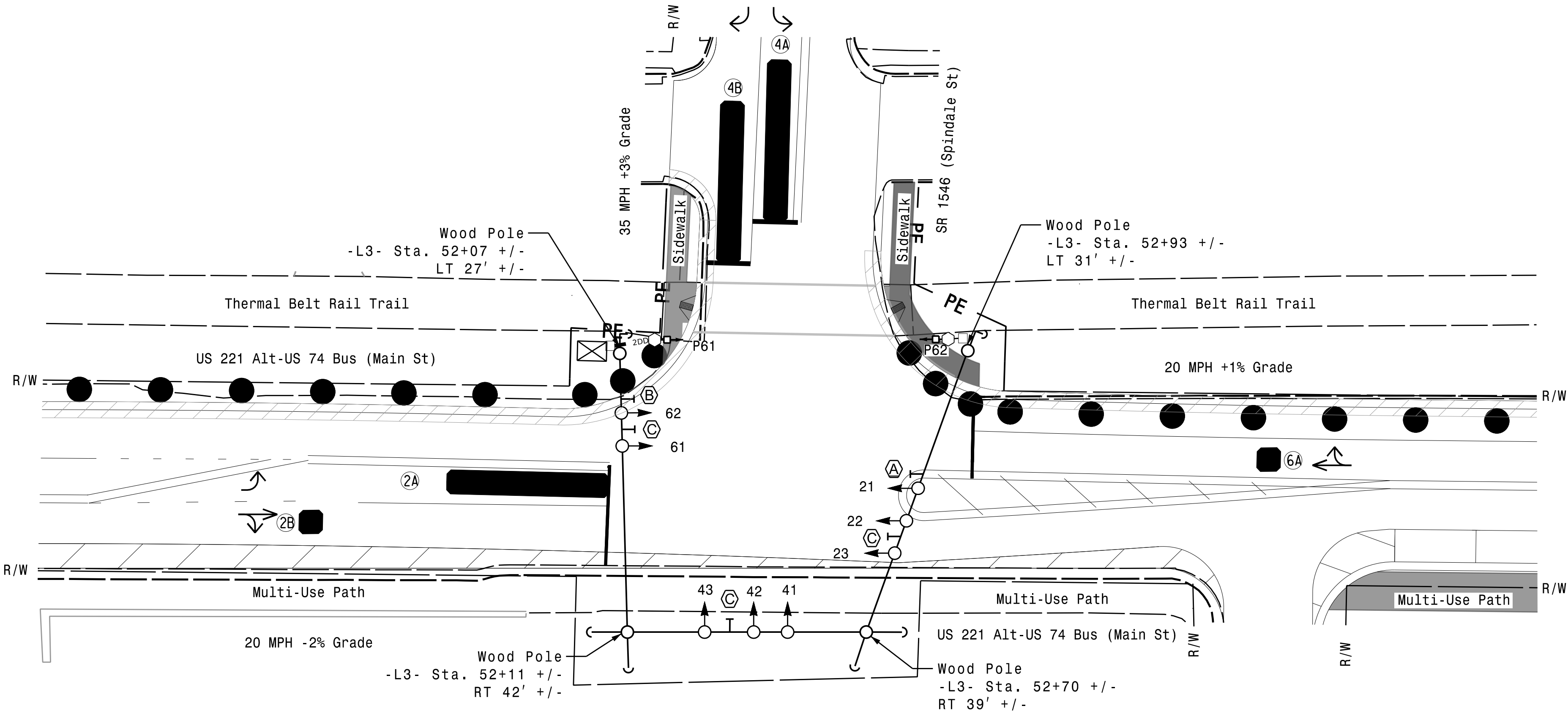
MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR						PROGRAMMING					
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	NEW CARD
2A	*	70	*	X	2	-	-	X	-	X	*
2B	*	0	*	X	2	-	-	X	-	X	*
4A	*	0	*	X	4	3.0	-	X	-	X	*
4B	*	0	*	X	4	-	-	X	-	X	*
6A	*	70	*	X	6	-	-	X	-	X	*

* Multizone Microwave Detection

2 Phase
Fully Actuated
Isolated

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- See HL-0065 TMP Phase II for pavement markings.



MAXTIME TIMING CHART

FEATURE	PHASE		
	2	4	6
Walk *	-	-	14
Ped Clear	-	-	11
Min Green *	10	7	10
Passage *	3.0	2.0	3.0
Max I *	45	25	45
Yellow Change	3.0	3.0	3.0
Red Clear	3.0	2.8	3.0
Red Revert	2.0	2.0	2.0
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Advance Walk	-	-	7
Non Lock Detector	-	X	-
Vehicle Recall	MIN RECALL	-	MIN RECALL
Dual Entry	-	-	-

* These values may be field adjusted. Do not adjust Min Green and Passage 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
	N/A

Signal Upgrade
Temporary Design 1
(Construction Phase 2)

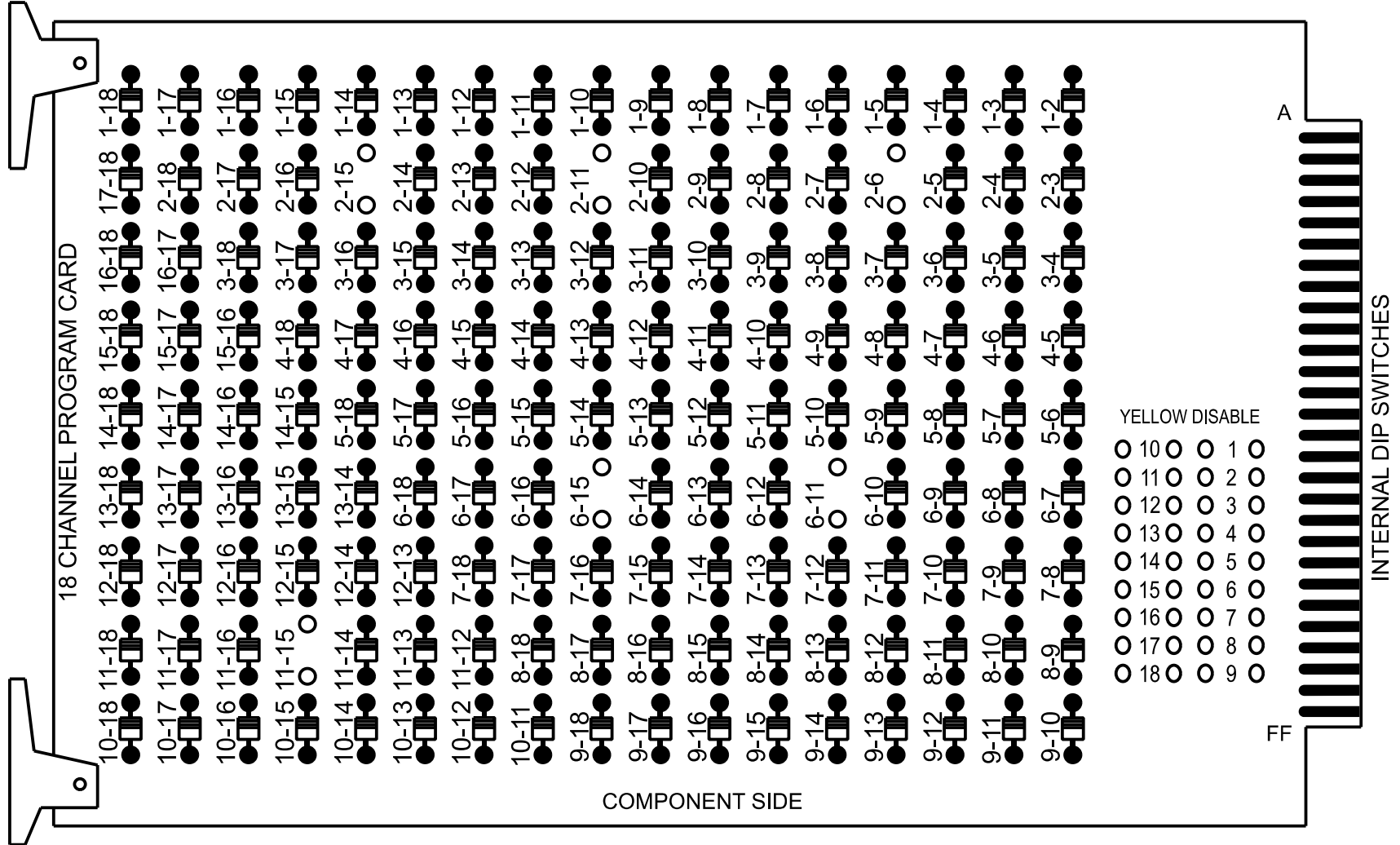
HNTB

HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

Prepared for: 	US 221 Alt-US 74 Bus (Main St) at SR 1546 (Spindale St) Division 13 Rutherford County Spindale PLAN DATE: February 2026 REVIEWED BY: N.K. Vianich PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
750 N. Greenfield Hwy, Garner, NC 27529 	REVISIONS INIT. DATE SIGNATURE DATE	SEAL NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER W. J. SIMMONS R. SIMMONS
	0 20 1"=20'	DocuSigned by: Natalia R. Simmons 5/12/2026 SIGNATURE DATE SIG. INVENTORY NO. 13-01741

(remove jumpers and set switches as shown)

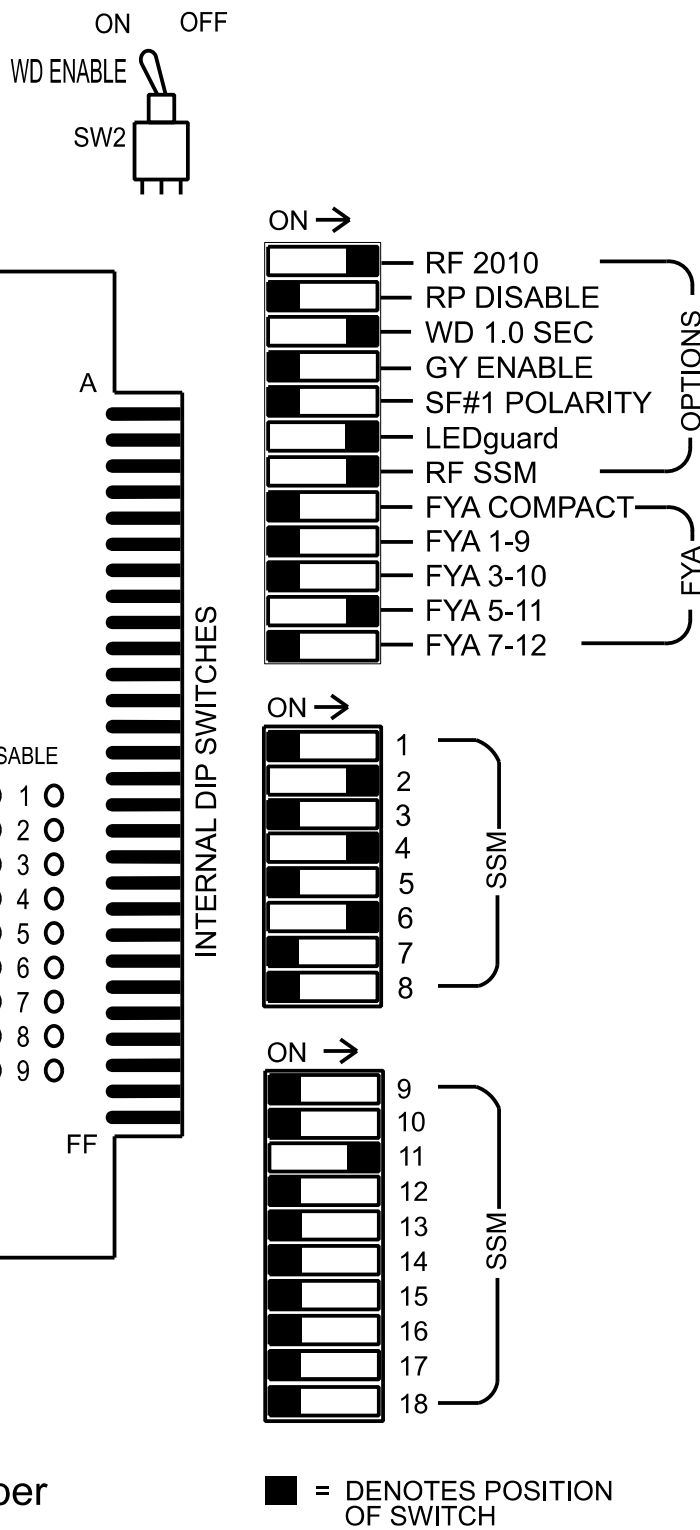
REMOVE DIODE JUMPERS 2-6, 2-11, 2-15, 6-11, 6-15, AND 11-15.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

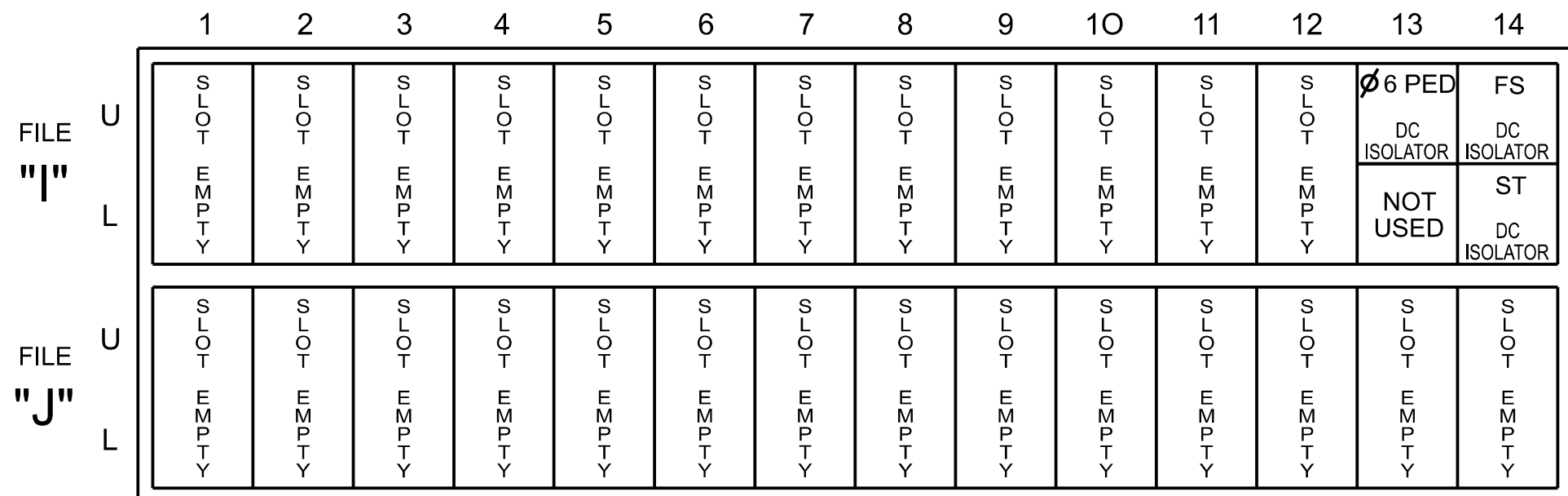
EQUIPMENT INFORMATION

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, S9, AUX S4
Phases Used.....	2, 4, 6, 6 PED
Overlap "1".....	Not Used
Overlap "2".....	Not Used
Overlap "3".....	*
Overlap "4".....	Not Used

*See overlap programming detail on sheet 2

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

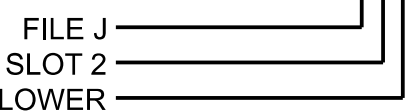
INPUT FILE CONNECTION & PROGRAMMING CHART

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	-	-	-	*	38	2			X		X	
2B	-	-	-	*	39	2			X		X	
4A	-	-	-	*	44	4	3.0		X		X	
4B	-	-	-	*	45	4			X		X	
6A	-	-	-	*	54	6			X		X	
PED PUSH BUTTONS												
P61,P62	TB8-7,9	I13U	68	34	6	PED 6	NOTE: IF THE SIGNALS ARE NOT CORRECT, THE SIGNALS SHOULD BE CHECKED AND ADJUSTED.					

*For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet.

NOTE:
INSTALL DC ISOLATORS
IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L



SDLC NON-INTRUSIVE DETECTION CHART

	Detector Rack #3		Detector Rack #4	
Input Point	Det # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	NU	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	2B	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	NU
13	45	4B	61	NU
14	46	NU	62	NU
15	47	NU	63	NU
16	48	NU	64	NU

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0174T
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB 4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

SIGNAL HEAD HOOK-UP CHART

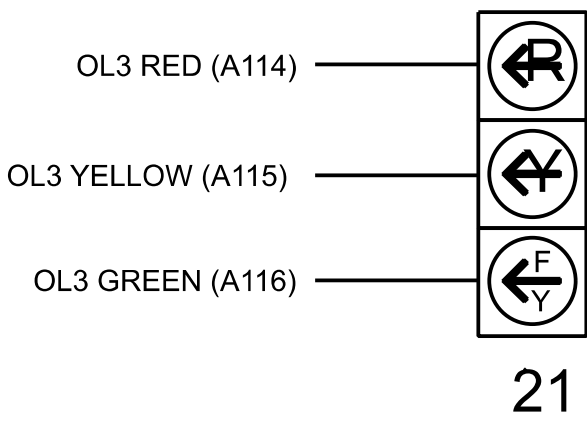
[illegible]

NU = Not Used

★ See pictorial of head wiring in detail this sheet.

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.

Signal Upgrade -
Electrical Detail - Sheet 1 of 2
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

US 221 Alt-US 74 Bus (Main St)
at
SR 1546 (Spindale St)

SEAL



Prepared for the Offices of:



Division 13 Rutherford County Spindale

PLAN DATE: February 2026	REVIEWED BY: N. K. Vianich
PREPARED BY: E.E. Tiller	REVIEWED BY: N. R. Simmons

REVISIONS	INIT.	DATE

750 N. Greenfield Pkwy. Garner, NC 27529

-DocuSigned by:
M. Tasha R. Simmons 5/12/2026

SIGNATURE

DATE

SIG. INVENTORY NO. 13-01747

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0174T
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

Signal Upgrade -
Electrical Detail - Sheet 2 of 2
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

 Prepared for the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	US 221 Alt-US 74 Bus (Main St) at SR 1546 (Spindale St) Division 13 Rutherford County Spindale		 SEAL NORTH CAROLINA PROFESSIONAL SEAL 03464 ENGINEER WATSHA R. SIMMONS
	PLAN DATE: February 2026 REVIEWED BY: N. K. Vlanich		
	PREPARED BY: E.E. Tiller REVIEWED BY: N. R. Simmons		
	REVISIONS INIT. DATE		
	DocuSigned by: Natalia R. Simmons 5/12/2026		

SIGNATURE	DATE
SIG. INVENTORY NO.	13-0174T

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

TABLE OF OPERATION				
SIGNAL FACE	PHASE			
	2 + 6	4	3	F L A S H
21				
22,23	G	R	R	R
41,42				
43	R			
61,62	G	R	R	R
P31, P32, P33, P44	DW	DW	W	DRK
P61, P62	W	DW	DW	DRK

All Heads L.E.D.

41, 42

21

22, 23
61, 62

43

P31, P32, P33, P34
P61, P62

DETECTOR					PROGRAMMING							
ZONE	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	70	*	X	2	-	-	X	-	X	-	*
2B	6X40	0	*	X	2	-	-	X	-	X	-	*
4A	6X40	0	*	X	4	3.0	-	X	-	X	-	*
4B	6X40	0	*	X	4	-	-	X	-	X	-	*
6A	6X6	70	*	X	6	-	-	X	-	X	-	*

3 Phase
Fully Actuated
Isolated

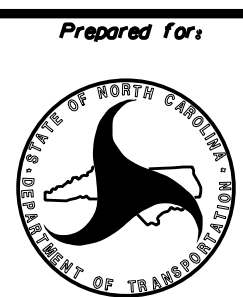
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024."
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 4 during phase 3 on.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. To provide a leading pedestrian interval on phase 3, program FYA head numbered 41, 42, and 43 to delay for 7 seconds after the start of the phase 3 walk interval. See Electrical Details for programming.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

FEATURE	PHASE			
	2	3	4	6
Walk *	–	14	–	14
Ped Clear	–	13	–	11
Min Green *	10	7	7	10
Passage *	3.0	2.0	2.0	3.0
Max 1 *	45	25	25	45
Yellow Change	3.0	3.0	3.0	3.0
Red Clear	3.1	3.1	3.1	3.1
Red Revert	2.0	2.0	2.0	2.0
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	–	**	–	7
Non Lock Detector	–	X	X	–
Vehicle Recall	MIN RECALL	–	–	MIN RECALL
Dual Entry	–	–	–	–

** See Note 7.

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Non-Intrusive Detection Zone	
	Controller & Cabinet	
	Junction Box	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Directional Drill	
	2-in Underground Conduit	
N/A	Right of Way	
N/A	Permanent Easement	
	Directional Arrow	
N/A	Curb Ramp	
	Left "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15L)	
	Right "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15R)	
	Street Name Sign	

Signal Upgrade - Final Design



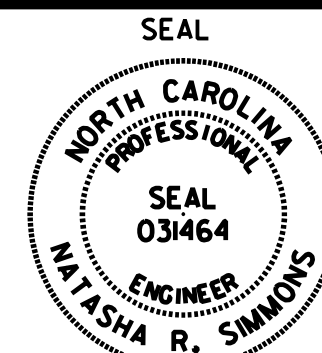
US 221 Alt-US 74 Bus (Main St)
at
SR 1546 (Spindale St)

Division 13 Rutherford County Spindal

PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons
--------------------------	---------------------------

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



Signed by: _____ 5/10/19

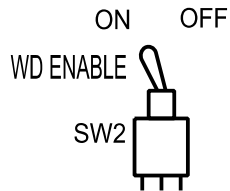
SIG. INVENTORY NO. 13-0174



HNTB NORTH CAROLINA, P.C.
4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-3, 1-9, 1-10, 2-6, 2-12, 2-15, 3-9, 3-10, 6-12, 6-15, 9-10, 9-16, 10-16, and 12-15.



ON →

RF 2010

RP DISABLE

WD 1.0 SEC

GY ENABLE

SF#1 POLARITY

LEDguard

RF SSM

FYA COMPACT

FYA 1-9

FYA 3-10

FYA 5-11

FYA 7-12

OPTIONS

FYA

ON →

1	ON
2	ON
3	ON
4	ON
5	ON
6	ON
7	ON
8	ON

SSM

ON →

9	ON
10	ON
11	ON
12	ON
13	ON
14	ON
15	ON
16	ON
17	ON
18	ON

SSM

■ = DENOTES POS OF SWITCH

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.

(front view)



FS = FLASH SENSE
ST = STOP TIME

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

(install resistors as shown)



1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

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

*Timing purposes only

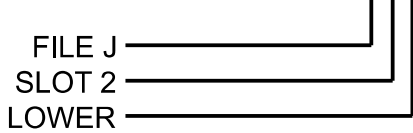
****See overlap programming detail on sheet 2**

[illegible]

*For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet.

NOTE:
INSTALL DC ISOLATORS
IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L



	Detector Rack #3		Detector Rack #4	
Input Point	Det # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	NU	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	2B	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	NU
13	45	4B	61	NU
14	46	NU	62	NU
15	47	NU	63	NU
16	48	NU	64	NU

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 13-0174
DESIGNED: FEBRUARY 2026
SEALED: 05/12/2026
REVISED:

HNTB 4000 Center at North Hills St
Suite 500
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	OL7	2	² PED	OL8	4	⁴ PED	5	6	⁶ PED	7	8	³ PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	41,42	22,23	NU	43	NC	NU	NU	61,62	P61, P62	NU	NU	P31,P32 P33,P34	41,42	43	NU	NU	21	NU
RED		128						134						A124				
YELLOW	*	129		*				135										
GREEN		130						136										
RED ARROW													A121				A101	
YELLOW ARROW													A122	A125			A102	
FLASHING YELLOW ARROW													A123	A126			A103	
GREEN ARROW	127			118														
									119			110						
									121			112						

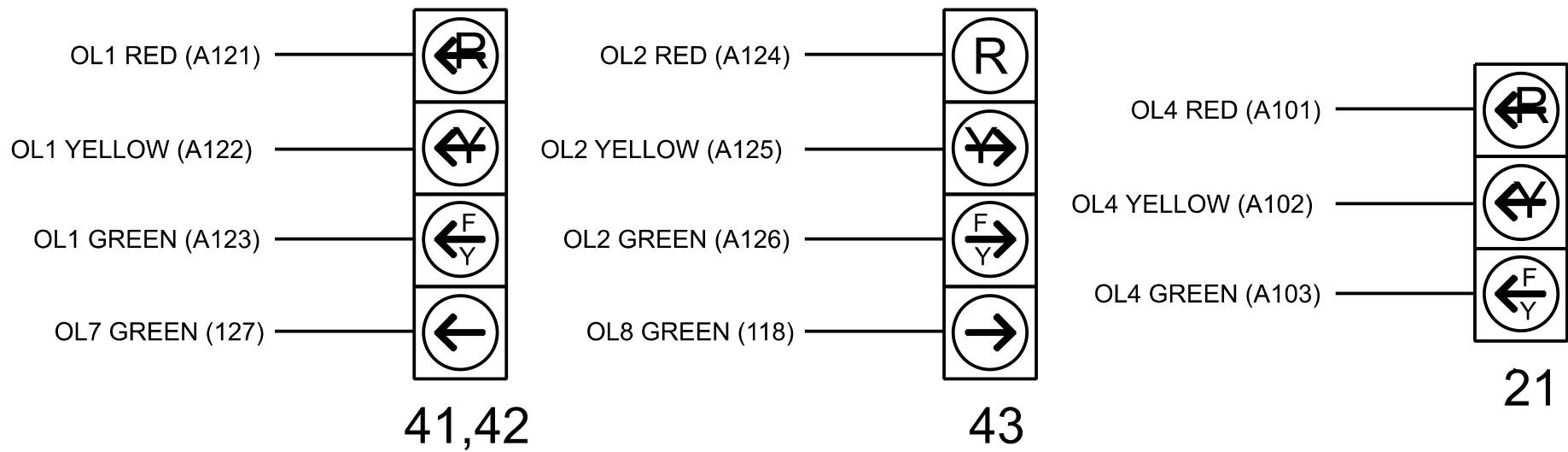
NU = Not Used

NC = Not Connected

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

★ See pictorial of head wiring in detail this sheet.

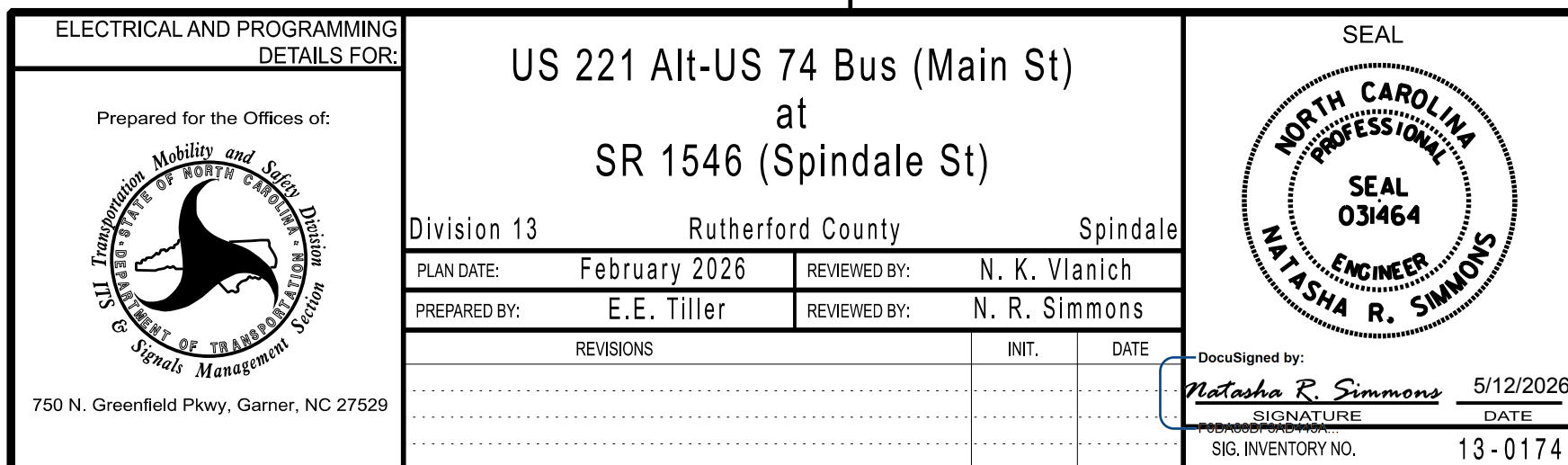
(wire signal heads as shown)



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.

Signal Upgrade - Final Design
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



	DETECTED MOVEMENT
	UNDETECTED MOVEMENT (OVERLAP)
	UNSIGNALIZED MOVEMENT
	PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE				
	1 + 6	2 + 3	4	FLASH	
11					
21, 22	R	G	R	R	R
23	R		R		R
41					
42	R	R			
61, 62	G	G	R	R	R
P21, P22	DW	W	DW	DW	DR
P31, P32	DW	DW	W	DW	DR

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	X	1	15.0	-	X	-	X	-	-
					6	-	-	X	-	X	-	-
2A	6X6	70	3	X	2	-	-	X	-	X	-	-
4A	6X40	0	2-4-2	X	4	3.0	-	X	-	X	-	X
4B	6X6	0	3	X	4	10.0	-	X	-	X	-	-
6A	6X6	70	EXIST	-	6	-	-	X	-	X	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 4 during phase 3 on.
4. Enable Backup Protect to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
5. Phase 1 may be lagged.
6. Set all detector units to presence mode.
7. Install new 2070LX controller in existing cabinet.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. To provide a leading pedestrian interval on phase 2, program FYA heads numbered 11 & 23 to delay for 7 seconds after the start of the phase 2 walk interval. See Electrical Details for programming.

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Directional Drill	
	2-in Underground Conduit	
	Right of Way	
	Construction Easement	
	Construction Easement	
	Directional Arrow	
	Curb Ramp	
	Left "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15L)	
	Right "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15R)	
	Street Name Sign	

FEATURE	PHASE				
	1	2	3	4	6
Walk *	–	14	12	–	–
Ped Clear	–	12	13	–	–
Min Green *	7	10	7	7	10
Passage *	2.0	3.0	2.0	2.0	3.0
Max 1 *	20	40	30	30	40
Yellow Change	3.0	3.9	3.0	3.0	3.9
Red Clear	2.8	2.9	3.2	3.2	2.9
Red Revert	2.0	2.0	2.0	2.0	2.0
Added Initial *	–	–	–	–	–
Maximum Initial *	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–
Time To Reduce *	–	–	–	–	–
Minimum Gap	–	–	–	–	–
Advance Walk	–	**	5	–	–
Non Lock Detector	X	–	X	X	–
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL
Dual Entry	–	–	–	–	–

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

** See Note 10.

Prepared for: 750 N. Greenfield Pkwy, Garner, NC 27529	US 221 Alt-US 74 Bus (Main St) at SR 2169 (Oakland Rd)/ Kentucky Street <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Division 13</td> <td style="width: 50%;">Rutherford County</td> </tr> <tr> <td>PLAN DATE: February 2026</td> <td>REVIEWED BY: N.K. Vlanich</td> </tr> <tr> <td>PREPARED BY: E.E. Tiller</td> <td>REVIEWED BY: N.R. Simmons</td> </tr> </table>	Division 13	Rutherford County	PLAN DATE: February 2026	REVIEWED BY: N.K. Vlanich	PREPARED BY: E.E. Tiller	REVIEWED BY: N.R. Simmons	SEAL							
Division 13	Rutherford County														
PLAN DATE: February 2026	REVIEWED BY: N.K. Vlanich														
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