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State ID	Street 1	Street 2	Signal Plan Sheet No.
04-0717	SR 1004 (Old US 70)	SR 1553 (Shotwell Road)	Sig. 2.0
04-1083	NC 42	SR 1902 (Glen Laurel Road)/Caterpillar Access Road	Sig. 3.0
04-1215	NC 42	Entrance to Clayton Fire Department	Sig. 4.0
04-1234	NC 42	SR 2022 (Front Street)	Sig. 5.0
04-1249	NC 42	Caterpillar Entrance/Bayer Research Entrance	Sig. 6.0
04-1433	NC 42	Sam Hunt Property	Sig. 7.0
04-1437	SR 1003 (Buffalo Road)	Neuse River Parkway/Riverdell Townes Avenue	Sig. 8.0
04-1439	SR 1003 (Buffalo Road)	Jordan Narron Road/Flowers Parkway	Sig. 9.0
04-1451	SR 1553 (Shotwell Road)	SR 1007 (Covered Bridge Road)	Sig. 10.0

K:\RAL\IPTD\TITS\01\036622\C\Clayton Signal Systems\Signal\54 - Signal Design\gnw\U-5943B_T111esheet.dgn 5/21/2025 5:39:31 PM Mallory Burke

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000

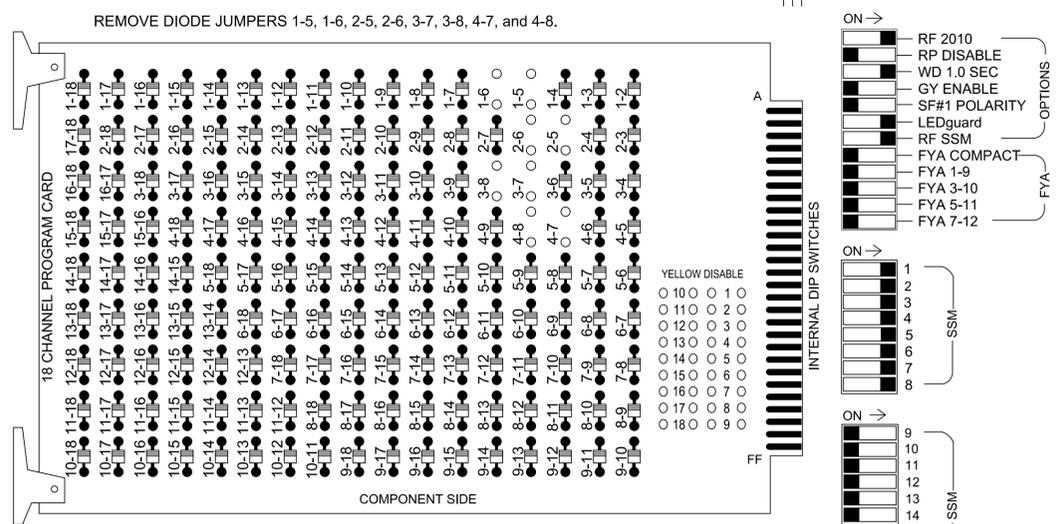
 Prepared For: TOWN OF CLAYTON COMPUTERIZED SIGNAL SYSTEM SIGNAL DESIGN COVER SHEET	PLAN DATE: May 2025	REVIEWED BY:
	PREPARED BY:	REVIEWED BY:
SCALE 0	REVISIONS	INIT. DATE


 KEVIN P. BAUMGARDNER
 ENGINEER
 SEAL
 044434
 NORTH CAROLINA
 PROFESSIONAL ENGINEER

Digitized by: 
 DATE: **5/22/2025**
 SIGNATURE: _____
 DATE: _____
 SIG. INVENTORY NO. _____

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk, 39 Phase Not On and 40 Green No Walk.
- Program phase 39 for No Startup Call.
- Program phases 2, 6, and 40 for Veh Min Recall.
- The cabinet and controller are part of the Clayton Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S4, S5, S7, S8, S10, S11
 Phases Used.....1, 2, 3, 4, 5, 6, 7, 8, 39*, 40*
 Overlap "1".....NOT USED
 Overlap "2".....NOT USED
 Overlap "3".....NOT USED
 Overlap "4".....NOT USED

* Phase used for preemption timing purposes only.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31	41,42	NU	51	61,62	NU	71	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125			116			131			122								
YELLOW ARROW	126			117			132			123								
GREEN ARROW	127			118			133			124								

NU = Not Used

SEQUENCE DETAIL

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

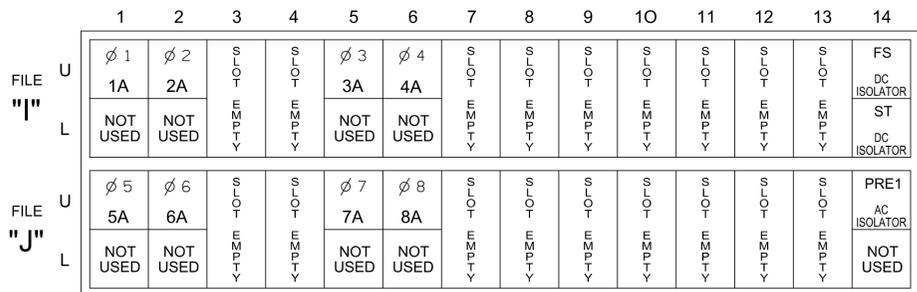
Web Interface
 Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	1,2,a,3,4,b
2	5,6,a,7,8,b
3	39,c,40,d

INPUT FILE POSITION LAYOUT

(front view)



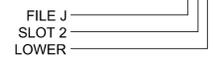
EX. : 1A, 2A, ETC. = LOOP NO.'S

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	TB2-1,2	I1U	56	18	1	1	3.0		X		X	
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7	3			X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
5A	TB3-1,2	J1U	55	17	15	5	3.0		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
7A	TB5-5,6	J5U	57	19	21	7			X		X	
8A	TB5-9,10	J6U	42	4	22	8	5.0		X		X	

INPUT FILE POSITION LEGEND: J2L



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

NOTICE: FLASH RED

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0717
 DESIGNED: OCTOBER 2023
 SEALED: 5/22/2025
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 1004 (Old US 70)
 at
 SR 1553 (Shotwell Road)

Division 4	Johnston County	Clayton
PLAN DATE: October 2023	REVIEWED BY: KP Baumann	
PREPARED BY: Cf Davis	REVIEWED BY:	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL	DATE
SEAL 044434	5/22/2025
SIGNATURE	DATE
SIG. INVENTORY NO. 04-0717	

PLANS PREPARED IN THE OFFICE OF:
Kimley Horn
 NC License #F-0102
 421 Fayetteville Street, Suite 600
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 (919) 617-2000

PREEMPTION PROGRAMMING

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

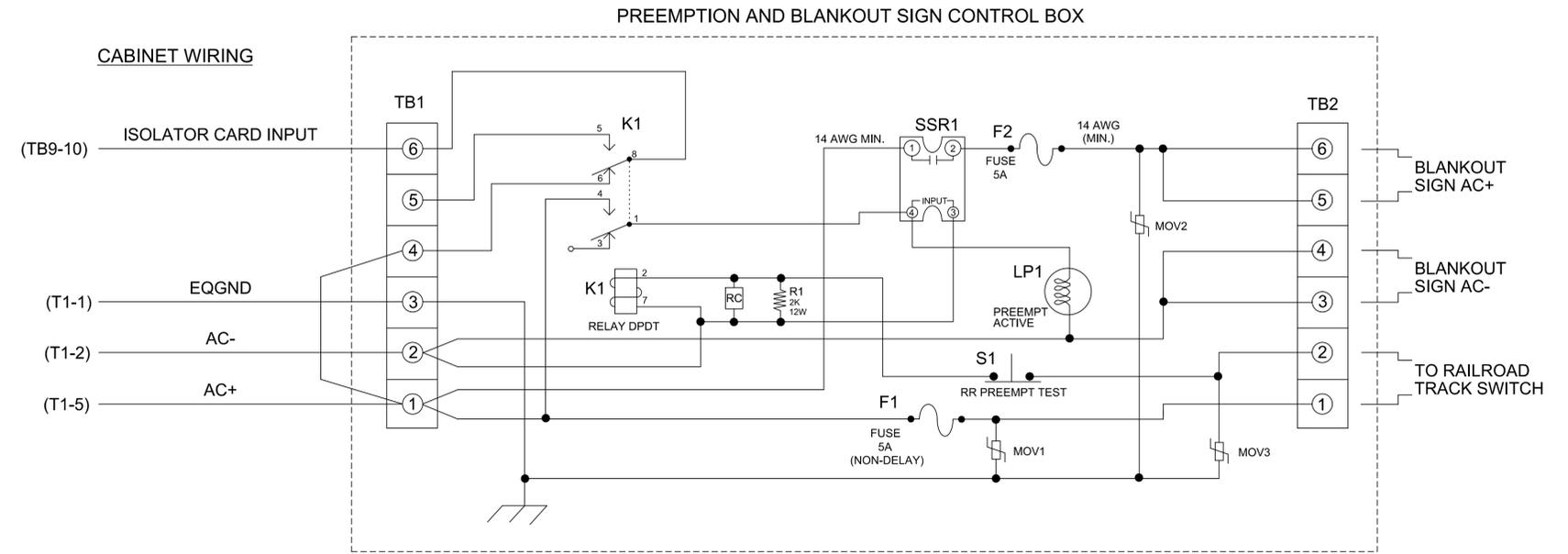
Web Interface
Home >Controller >Preempt Configuration >Preempts

Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	3,8,39
Track Overlaps	-
Dwell Phases	2,6
Dwell Peds	-
Dwell Overlaps	-
Cycling Phases	5,7
Cycling Peds	-
Cycling Overlaps	-
Exit Phases	1,5
Exit Overlaps	-
Delay	0
Call Ext Time	1.0
Max Presence	0
Max Pres Act	Terminate
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	4.5
Enter Red Clear	3.3
Track Green	32
Track Yellow Clr	4.5
Track Red Clear	3.3
Dwell Green	0
Exit Min Green	255
Exit Yellow Change	25.5
Exit Red Clear	25.5
Exit Type	Exit Phases
Non Locking Memory	
Not Ovr Flash	X
Not Ovr Nxt Pre	
Require All Red Entry	-
Track Clear Ovr	X
Ped Clear During Yellow	-
Entry Omit OLTG	X
Track Reserve	X

RAILROAD PREEMPTION WIRING DETAIL

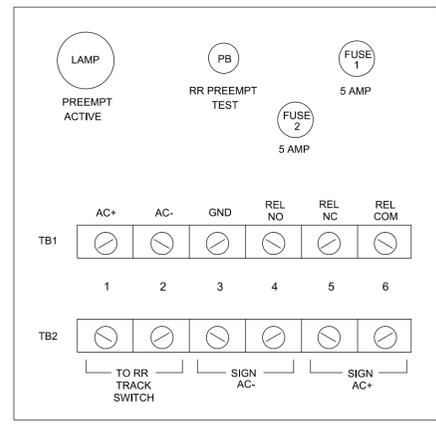
(wire as shown below)



NOTES

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

FRONT VIEW



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

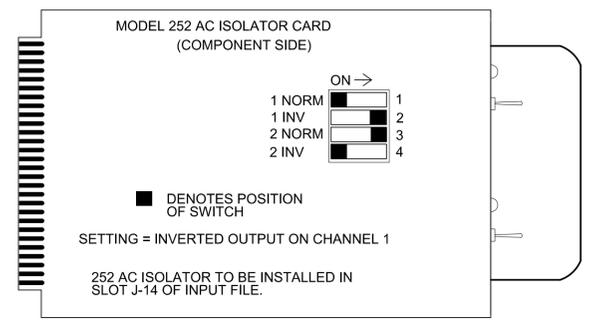
StartUp Clearance Hold	6
------------------------	---

Unit Flash Parameters

All Red Flash Exit Time	6
-------------------------	---

PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



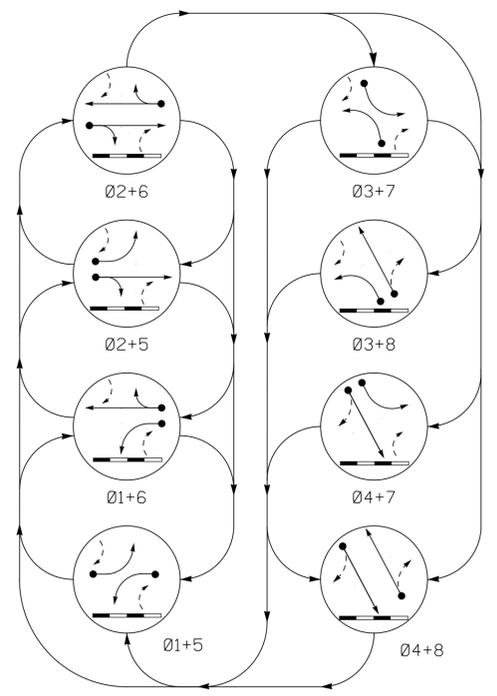
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0717
DESIGNED: OCTOBER 2023
SEALED: 5/22/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For: Prepared For: PLANS PREPARED IN THE OFFICE OF: Kimley-Horn NC License #F-0102 421 Fayetteville Street, Suite 600 Raleigh, NC 27601 (919) 677-2000	SR 1004 (Old US 70) at SR 1553 (Shotwell Road)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
	Division 4 Johnston County Clayton PLAN DATE: October 2023 PREPARED BY: CF Davis	REVIEWED BY: KP Baumann REVIEWED BY:	

5/21/2025 11:54:58 AM No. 1/ly.Burke K:\RAL\TPTD\115\011036622_Clayton_Signal_System\Signal_Signals\54 - Signal - Des\gnm\cup2\04-0717\ez.dgn

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

RAIL PREEMPT PHASES (High Priority)

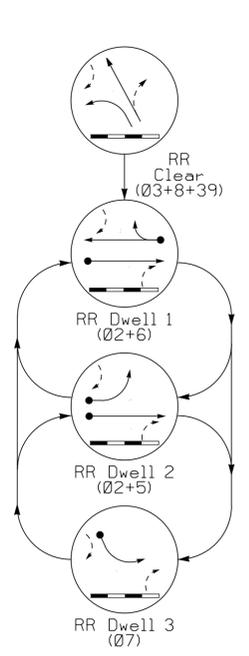


TABLE OF OPERATION

SIGNAL FACE	PHASE											
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	RR Clear (03+8+39)	RR Dwell 1 (02+6)	RR Dwell 2 (02+5)	RR Dwell 3 (07)
11	←	←	←	←	←	←	←	←	←	←	←	←
21,22	R	R	G	G	R	R	R	R	G	G	R	R
31	←	←	←	←	←	←	←	←	←	←	←	←
41,42	R	R	R	R	R	R	R	G	G	R	R	R
51	←	←	←	←	←	←	←	←	←	←	←	←
61,62	R	G	R	G	R	R	R	R	R	G	R	R
71	←	←	←	←	←	←	←	←	←	←	←	←
81,82	R	R	R	R	R	G	R	G	G	R	R	R

MAXTIME RAIL PREEMPTION CHART

FUNCTION	PRE 1 RAIL ROAD
Type	1.5
Exit Phases	0
Delay	0
Max Presence	0
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	4.5
Enter Red Clear	3.3
Track Green	32
Track Yellow Change	4.5
Track Red Clear	3.3
Dwell Green	0
Exit Min Green	25.5 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Call Extend Time	1.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	N
Require All Red Entry	N

* Directs controller to use default phase timing.

MAXTIME DETECTOR INSTALLATION CHART

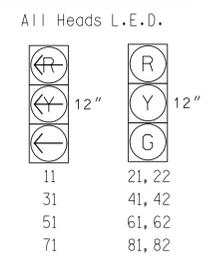
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	
1A	6X60	+5	2-4-2	-	1	3.0	-	X	-	X	-	X
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	X
3A	6X60	+5	2-4-2	-	3	-	-	X	-	X	-	X
4A	6X40	0	2-4-2	-	4	-	-	X	-	X	-	X
5A	6X60	+5	2-4-2	-	5	3.0	-	X	-	X	-	X
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	X
7A	6X40	0	2-4-2	-	7	-	-	X	-	X	-	X
8A	6X60	+5	2-4-2	-	8	5.0	-	X	-	X	-	X

8 Phase Fully Actuated w/ RR Preemption (Clayton Signal System)

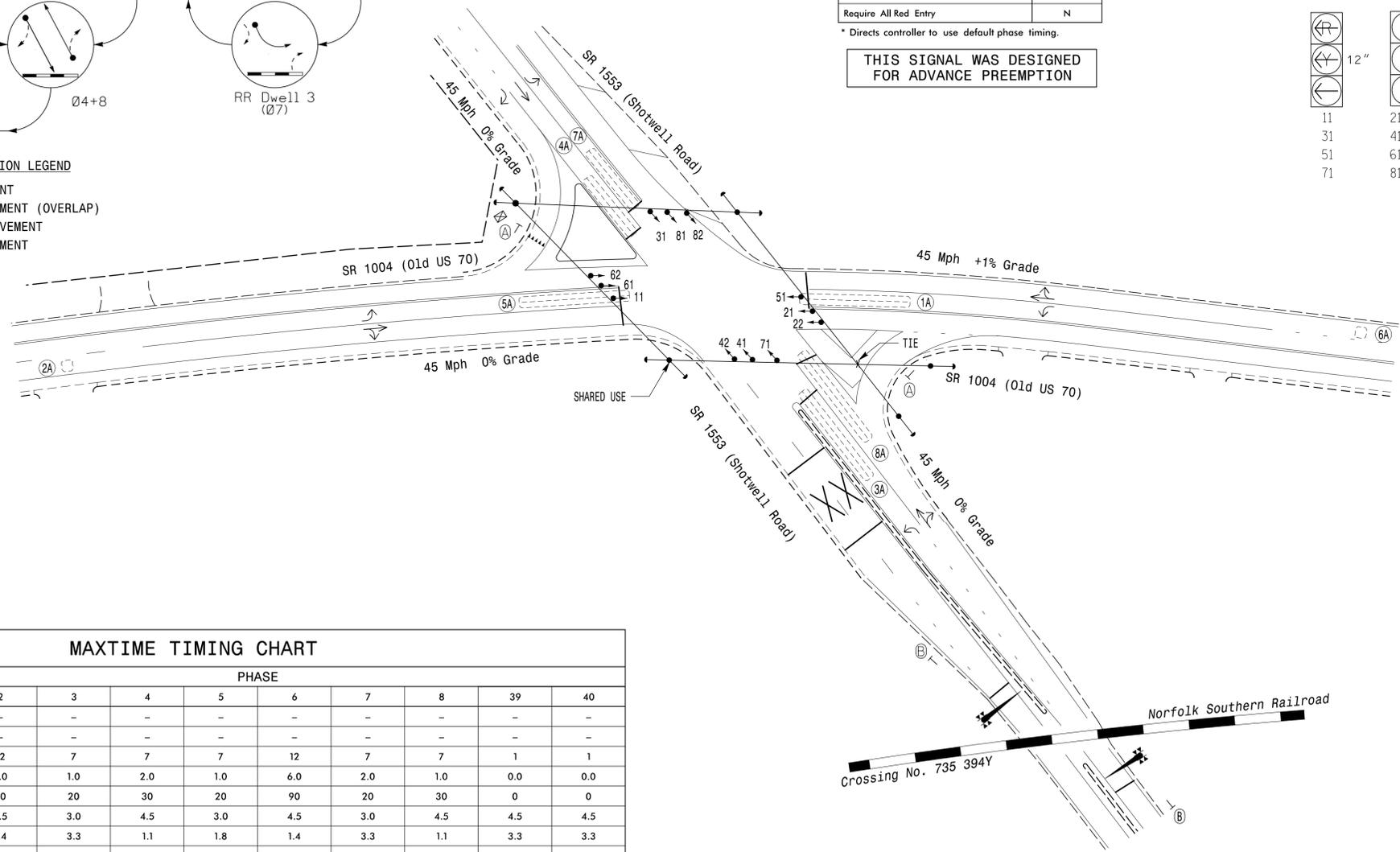
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- This location contains railroad preemption. Do not program signal for late night flashing operation.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Install new cabinet on the existing cabinet foundation.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 40 to run concurrently with all phases during normal operation.
- Program phase 39 to be incompatible with phase 40 and included as a track clear phase.

SIGNAL FACE I.D.



THIS SIGNAL WAS DESIGNED FOR ADVANCE PREEMPTION

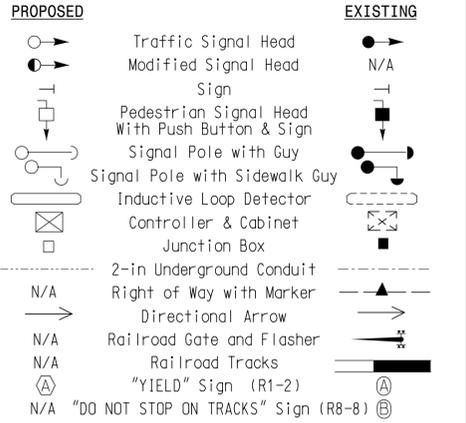


MAXTIME TIMING CHART

FEATURE	PHASE									
	1	2	3	4	5	6	7	8	39	40
Walk *	-	-	-	-	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-	-	-	-	-
Min Green *	7	12	7	7	7	12	7	7	1	1
Passage *	1.0	6.0	1.0	2.0	1.0	6.0	2.0	1.0	0.0	0.0
Max I *	20	90	20	30	20	90	20	30	0	0
Yellow Change	3.0	4.5	3.0	4.5	3.0	4.5	3.0	4.5	4.5	4.5
Red Clear	1.8	1.4	3.3	1.1	1.8	1.4	3.3	1.1	3.3	3.3
Added Initial *	-	2.5	-	-	-	2.5	-	-	-	-
Maximum Initial *	-	34	-	-	-	34	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-	-	-
Time To Reduce *	-	45	-	-	-	45	-	-	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-	-	-
Advance Walk	-	-	-	-	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-	X	X	X	X
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL	-	-	-	MIN RECALL
Dual Entry	-	-	-	-	-	-	-	-	-	-

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

LEGEND



Signal Upgrade

Prepared For:

 750 N. Greenfield Pkwy, Garner, NC 27529
 NC License #0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000

**SR 1004 (Old US 70)
at
SR 1553 (Shotwell Road)**

Division 4 Johnston County Clayton
 PLAN DATE: October 2023 REVIEWED BY: KP Baumann
 PREPARED BY: CF Davis REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

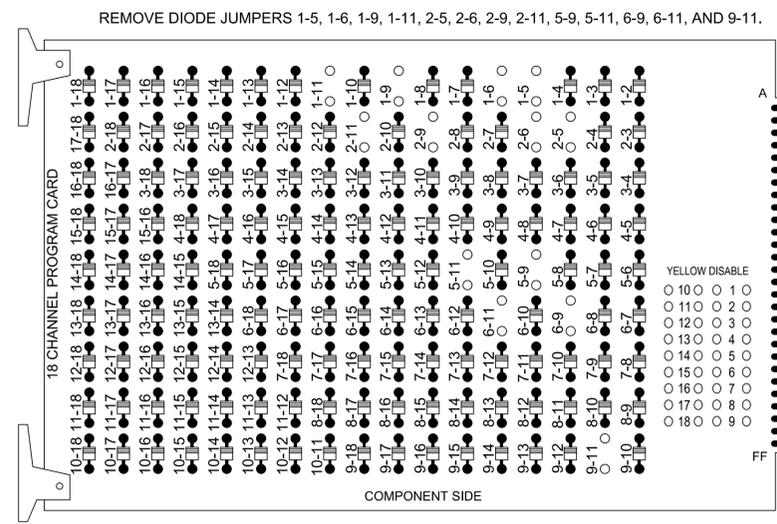
 KEVIN P. BAUMANN
 ENGINEER
 044434

SIGNATURE DATE
 5/22/2025

SIG. INVENTORY NO. 04-0717

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Clayton Signal System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

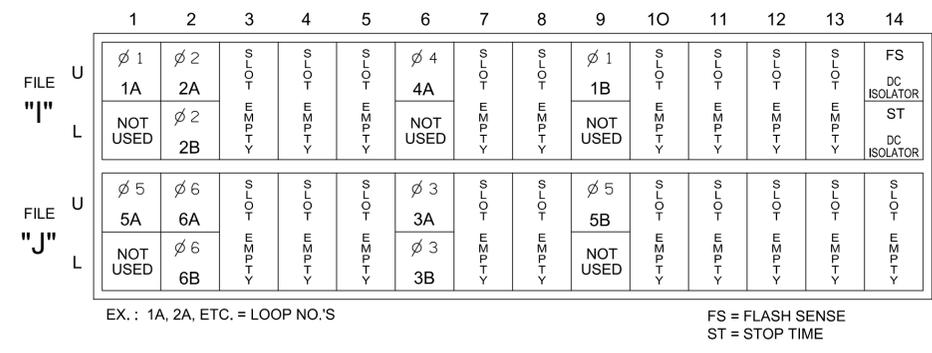
SIGNAL HEAD HOOK-UP CHART

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.	11	33,34	21,22	NU	22	31	32	33,34	41	42	NU	42	51	61,62	NU	NU	NU	NU	11*	NU	NU	51*	NU	NU	
RED	*	128				116	116	101	101		*		134												
YELLOW		129				117	117	102	102				135												
GREEN		130				118	118	103	103				136												
RED ARROW						116																	A121		A114
YELLOW ARROW	126					117	117						132										A122		A115
FLASHING YELLOW ARROW																							A123		A116
GREEN ARROW	127	127				118	118	118	103				133	133											

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

INPUT FILE POSITION LAYOUT

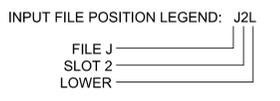
(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

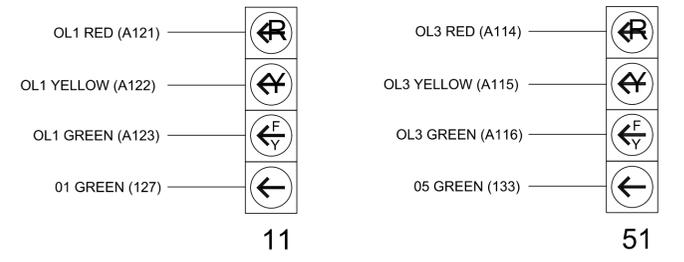
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1★	1	15.0		X		X	
1B	TB6-9,10	I9U	60	22	13	1	15.0		X		X	X
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
3A	TB5-9,10	J6U	42	4	22	3	3.0		X		X	
3B	TB5-11,12	J6L	46	8	23	3	3.0		X		X	
4A	TB4-9,10	I6U	41	3	8	4	3.0		X		X	
5A	TB3-1,2	J1U	55	17	15★	5	15.0		X		X	
5B	TB7-9,10	J9U	59	21	27	5	15.0		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	

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



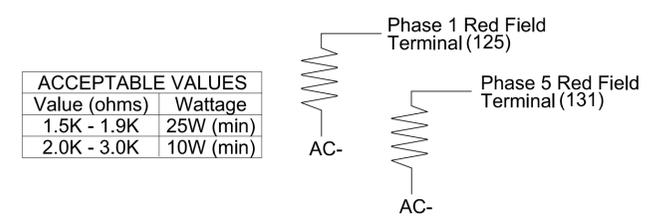
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



Electrical Detail - Sheet 1 of 3

Electrical and Programming Details For:

PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000

NC 42
 at
 SR 1902 (Glen Laurel Road) /
 Caterpillar Access Road
 Division 4 Johnston County Clayton
 PLAN DATE: July 2023 REVIEWED BY: KP Baumann
 PREPARED BY: GG Piarro REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1083
 DESIGNED: JULY 2023
 SEALED: 5/22/2025
 REVISED: N/A

5/22/2025
 SIGNATURE: _____ DATE: _____
 SIG. INVENTORY NO. 04-1083

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

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

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0
29	0	-

5A

Detector	Call Phase	Delay
15	5	0
31	0	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

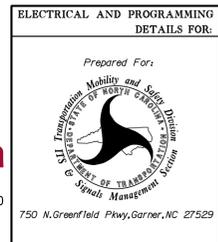
← NOTICE INCLUDED PHASE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1083
DESIGNED: JULY 2023
SEALED: 5/22/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

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PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
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Raleigh, NC 27601
(919) 677-2000



ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 42 at SR 1902 (Glen Laurel Road) / Caterpillar Access Road	
Prepared For:	Division 4	Johnston County	Clayton
PLAN DATE: July 2023	REVIEWED BY: KP Baumann		
PREPARED BY: GG Piero	REVIEWED BY:		
REVISIONS	INIT.	DATE	



5/22/2025
SIGNATURE DATE
SIG. INVENTORY NO. 04-1083

5/21/2025 11:49:54 AM Noilly,Burke \\mskimley-horn.com\SD_AM\RAL_TFD\..._ITS\011036622_C\oyton_Signal_System9_Signal\w54 - Signal1_DesignGroup\041083-2023a2.dgn

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

<u>PHASING</u>	<u>OVERLAP PLAN</u>	<u>VEH DET PLAN</u>
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

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

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

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
★	2	2

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

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

NOTICE: FLASH RED

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1083
DESIGNED: JULY 2023
SEALED: 5/22/2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:
Division 4
PLAN DATE: July 2023
PREPARED BY: GG PIERRO

PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
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NC 42
at
**SR 1902 (Glen Laurel Road) /
Caterpillar Access Road**

Division 4 Johnston County Clayton

REVIEWED BY: KP Baumann
REVIEWED BY: GG PIERRO

REVISIONS	INIT.	DATE

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SEAL

SEAL 044434
KEVIN P. BAUMANN
ENGINEER

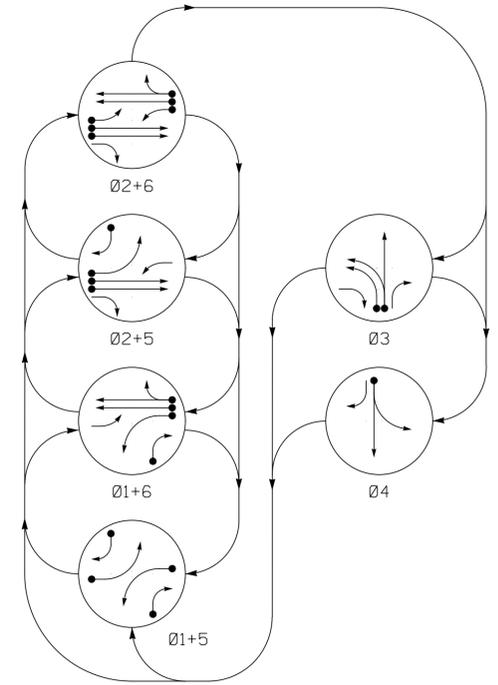
DocuSigned by:

5/22/2025

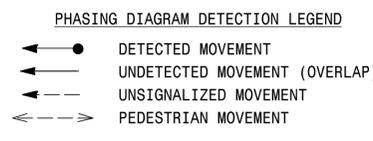
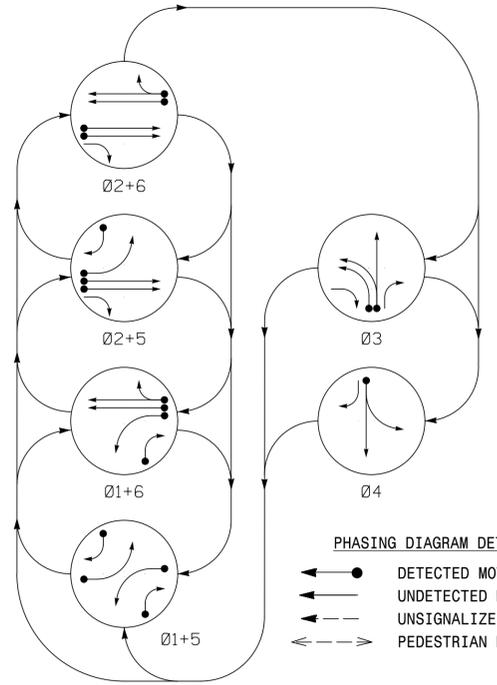
SIG. INVENTORY NO. 04-1083

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DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	←	←	←	←	←	←
21	R	R	G	G	R	R
22	R	R	G	G	R	R
31	←	←	←	←	←	←
32	←	←	←	←	←	←
33,34	←	←	←	←	←	←
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	←	←	←	←	←	←
61,62	R	G	R	G	R	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	←	←	←	←	←	←
21	R	R	G	G	R	R
22	R	R	G	G	R	R
31	←	←	←	←	←	←
32	←	←	←	←	←	←
33,34	←	←	←	←	←	←
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	←	←	←	←	←	←
61,62	R	G	R	G	R	R

MAXTIME DETECTOR INSTALLATION CHART

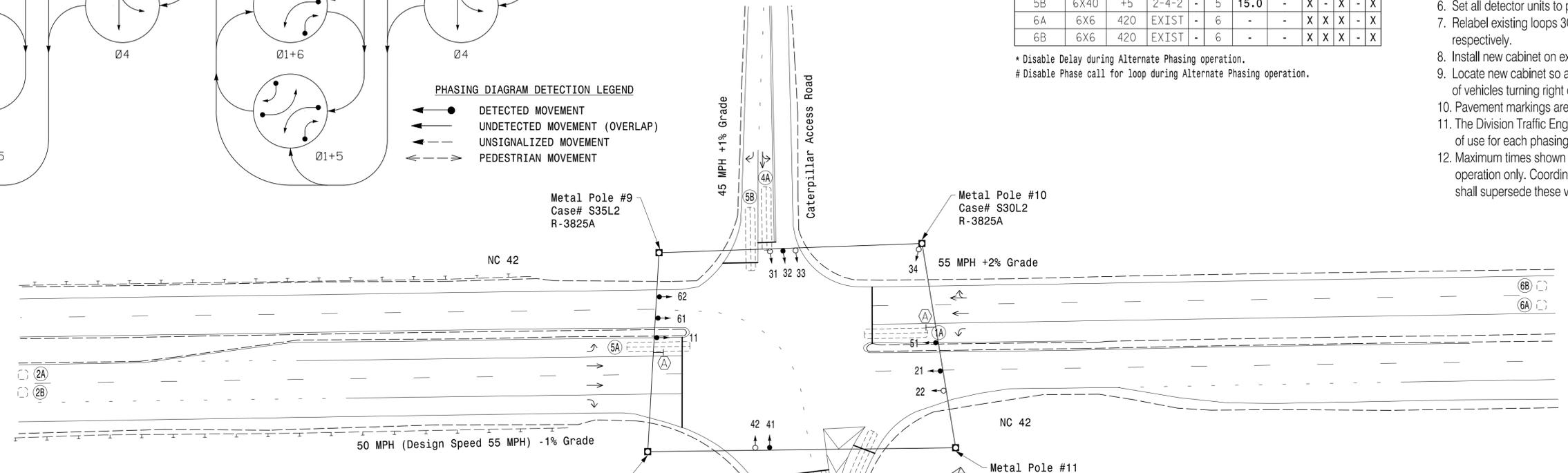
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING						
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	6X40	+5	2-4-2	-	1	15.0*	-	X	X	X	X
1B	6X40	0	2-4-2	-	1	15.0	-	X	X	X	X
2A	6X6	420	EXIST	-	2	-	-	X	X	X	X
2B	6X6	420	EXIST	-	2	-	-	X	X	X	X
3A	6X40	0	2-4-2	-	3	3.0	-	X	X	X	X
3B	6X40	0	2-4-2	-	3	3.0	-	X	X	X	X
4A	6X40	+5	2-4-2	-	4	3.0	-	X	X	X	X
5A	6X40	+5	2-4-2	-	5	15.0*	-	X	X	X	X
5B	6X40	+5	2-4-2	-	5	15.0	-	X	X	X	X
6A	6X6	420	EXIST	-	6	-	-	X	X	X	X
6B	6X6	420	EXIST	-	6	-	-	X	X	X	X

* Disable Delay during Alternate Phasing operation.
Disable Phase call for loop during Alternate Phasing operation.

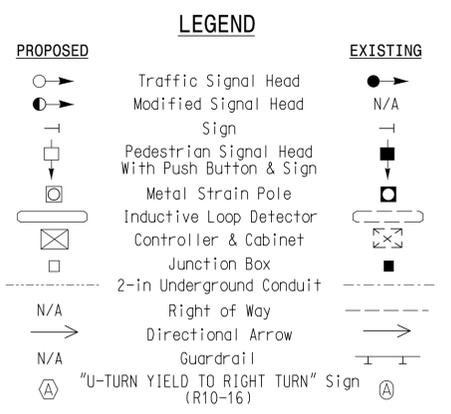
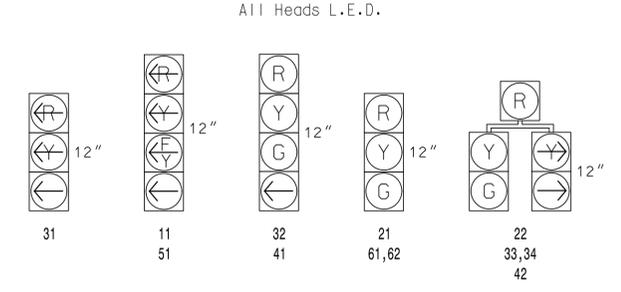
6 Phase Fully Actuated (Clayton Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Relabel existing signal head 31 to 32 and reposition as shown.
- Set all detector units to presence mode.
- Relabel existing loops 3C and 4B as 1B and 5B, respectively.
- Install new cabinet on existing cabinet foundation.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.



SIGNAL FACE I.D.



MAXTIME TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Min Green *	7	14	7	7	7	14
Passage *	2.0	6.0	2.0	2.0	2.0	6.0
Max I *	15	90	20	20	15	90
Yellow Change	3.0	5.3	4.6	4.4	3.0	5.3
Red Clear	2.8	1.4	2.0	1.8	2.6	1.4
Added Initial *	-	1.5	-	-	-	1.5
Maximum Initial *	-	46	-	-	-	46
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.4	-	-	-	3.4
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL
Dual Entry	-	-	-	-	-	-

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

Signal Upgrade

Prepared For:
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NC 42
at
SR 1902 (Glen Laurel Road) /
Caterpillar Access Road
Division 4 Johnston County Clayton
PLAN DATE: July 2023 REVIEWED BY: KP Baumann
PREPARED BY: CF Davis REVIEWED BY:

REVISIONS	INIT.	DATE

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KEVIN P. BAUMANN
ENGINEER
044434

SIGNATURE: _____ DATE: 5/22/2025
SIG. INVENTORY NO. 04-1083

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OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Overlap	7	X			2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Overlap	8	X		X	6
7	Phase Vehicle	7		X		7
8	Overlap	9		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
19	Adv. Warning Flasher	2				19

NOTE OVERLAP 7 AND YELLOW FLASH →

NOTE OVERLAP 8 AND YELLOW FLASH →

NOTE OVERLAP 9 →

NOTE ADV. FLASHER →

CUSTOM OVERLAP PROGRAMMING

Front Panel
Main Menu >Controller >Overlap >Custom Overlap Rules

Web Interface
Home >Controller >Overlap Configuration >Custom Overlap Rules

Rule	Custom Overlap	Included Phase State	Modifier Phase State	Modifier Overlap State	Negative Phase State	Output	Flash
1	Custom 1	Green	Any	Any	Any	Green	Not Set
2	Custom 1	Yellow	Any	Any	Any	Yellow	Not Set
3	Custom 1	Any	Green	Any	Any	Blank	Not Set

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	Phase Phase Omit	8	Result=IA	Preempt Input	3	-	-	0.0	0.0

LOGIC STATEMENT DESCRIPTION

Statement 1 Description: Omits Phase 8 while not in Preempt 3.

OUTPUT POINTS CONFIGURATION

Front Panel
Main Menu >Controller >More>Advanced IO >Output Points

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >Output Points

Plan 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Channel Green Walk Driver	19
34	C1-36	Channel Red Do Not Walk Driver	19

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	7	8	9
Type	Normal	Normal	Custom 1
Included Phases	2	6	8
Modifier Phases	-	-	2
Modifier Overlaps	-	-	-
Trail Green	0	0	0
Trail Yellow	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0
Flash	On	On	Off

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	0
------------------------	---

Unit Flash Parameters

All Red Flash Exit Time	0
-------------------------	---

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1215
DESIGNED: MARCH 2024
SEALED: 5/22/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:

750 N. Greenfield Pkwy, Garner, NC 27529

PLANS PREPARED IN THE OFFICE OF:
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NC 42
at
Clayton Fire Dept.

Division 4 Johnston County Clayton

PLAN DATE: March 2024 REVIEWED BY: KP Baumann
PREPARED BY: CF Davis REVIEWED BY:

REVISIONS	INIT.	DATE

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SEAL



SEAL 044434

Kevin P. Baumann
ENGINEER

SIGNATURE DATE 5/22/2025

SIG. INVENTORY NO. 04-1215

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PREEMPTION PROGRAMMING

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

Web Interface
Home > Controller > Preempt Configuration > Preempts

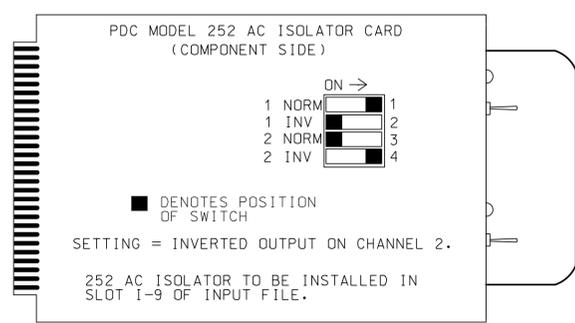
Preempt Configuration

Preempt	2
Enabled	Enabled
Type	Rail Road
Track Phases	-
Track Overlaps	-
Dwell Phases	8
Dwell Peds	-
Dwell Overlaps	9
Cycling Phases	-
Cycling Peds	-
Cycling Overlaps	-
Exit Phases	2,6
Exit Overlaps	7,8,9
Delay	#
Call Ext Time	2.0
Max Presence	120
Max Pres Act	Terminate
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Green	-
Track Yellow Clr	25.5
Track Red Clear	25.5
Dwell Green	#
Exit Min Green	255
Exit Yellow Change	25.5
Exit Red Clear	25.5
Exit Type	Exit Phases
Non Locking Memory	-
Not Ovr Flash	X
Not Ovr Nxt Pre	X
Require All Red Entry	-
Track Clear Ovr	X
Ped Clear During Yellow	-
Entry Omit OLTG	-
Track Reserve	-

Time to be set by Division and/or City Traffic Engineer

PREEMPT 2 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

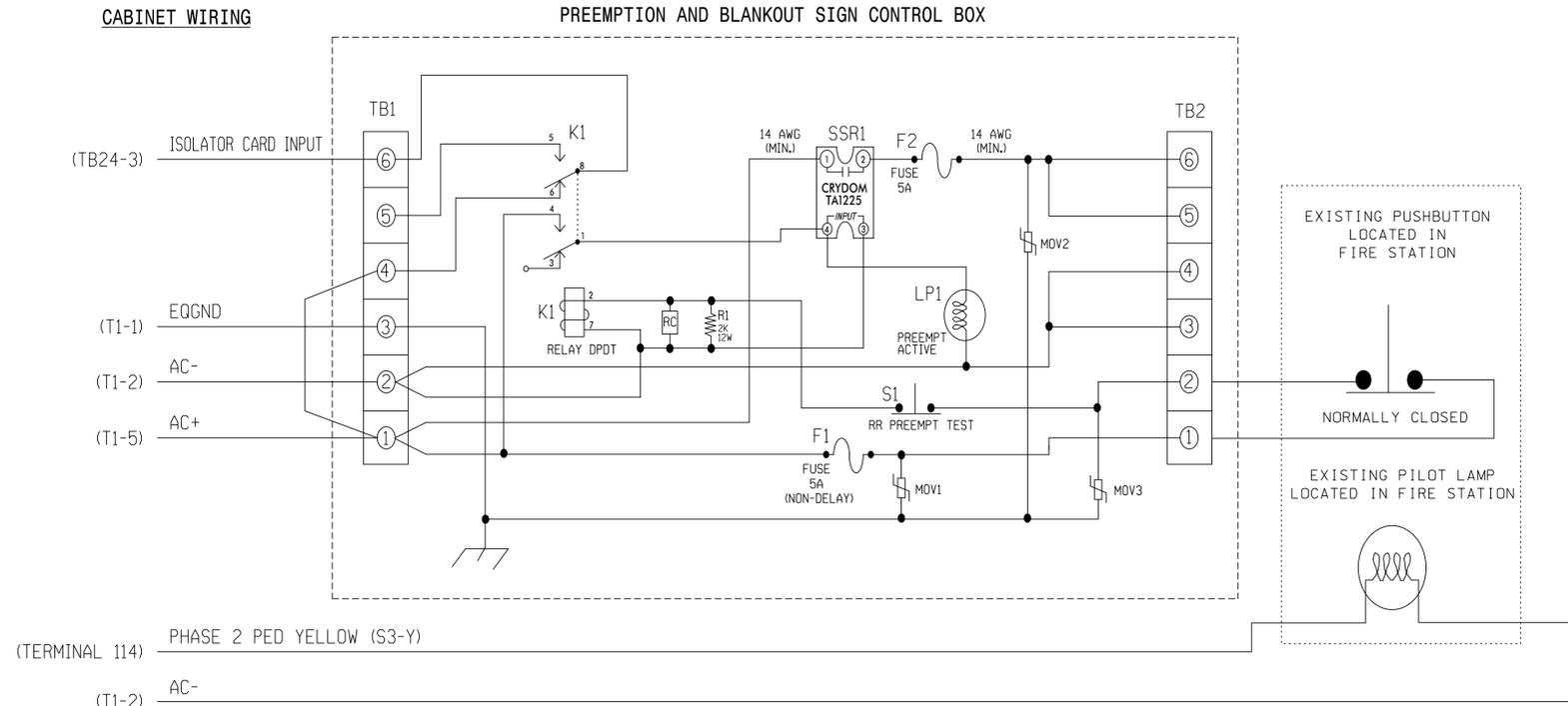
(set DIP switches as shown below)



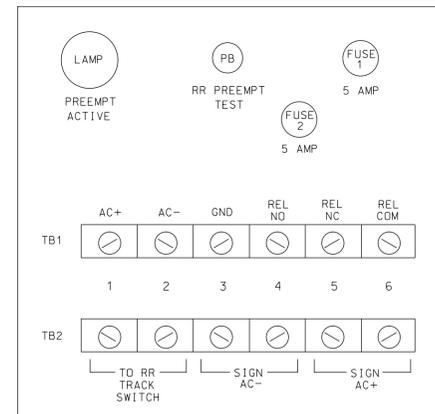
NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

EV Preemption Control Box Wiring Detail

(wire as shown below)



FRONT VIEW



LAMP NOTES

1. Ensure Molex plug labeled 2PY-4PY-6PY-8PY (located behind rear panel of output file) is disconnected.
2. Make sure load resistors are in place as shown in the Load Resistor Installation Detail on sheet 2.
3. Install a loadswitch in Output File Slot S3.

NOTES

1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card (See detail this sheet).
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K; DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. IMPORTANT!! Terminal TB24-4 (on input panel) shall be connected to AC neutral (jumper may have to be added).

Electrical Detail - Sheet 3 of 3

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1215
DESIGNED: MARCH 2024
SEALED: 5/22/2025
REVISED: N/A

PLANS PREPARED IN THE OFFICE OF:
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Prepared For:
North Carolina Department of Transportation
750 N. Greenfield Pkwy, Garner, NC 27529

NC 42
at
Clayton Fire Dept.

Division 4 Johnston County Clayton
PLAN DATE: March 2024 REVIEWED BY: KP Baumann
PREPARED BY: CF Davis REVIEWED BY:

REVISIONS	INIT.	DATE

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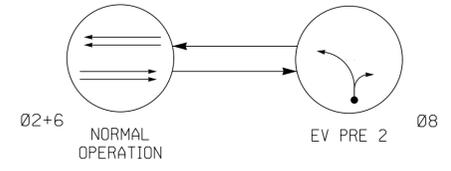
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NORTH CAROLINA PROFESSIONAL ENGINEERS
SEAL 044434
KEVIN P. BAUMANN

5/22/2025
DATE

SIG. INVENTORY NO. 04-1215

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø2+6	EV PRE 2	FLASH
21,22	F _Y	R	Y
23,24,25,26	DRK	Y	DRK
61,62	F _Y	R	Y
63,64,65,66	DRK	Y	DRK
81,82	DRK	G	R

F_Y = 8" Flashing Yellow

FLASHING BEACON TABLE OF OPERATION

SIGNAL FACE	INTERVAL	
	1	2
23, 24 63, 64	ON	OFF
25, 26 65, 66	OFF	ON

SIGNAL FACE I.D.

All Heads L.E.D.

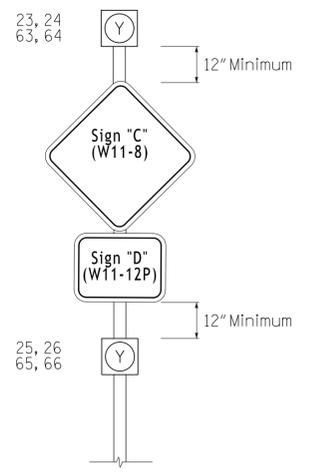
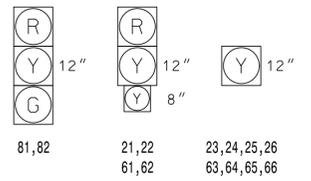
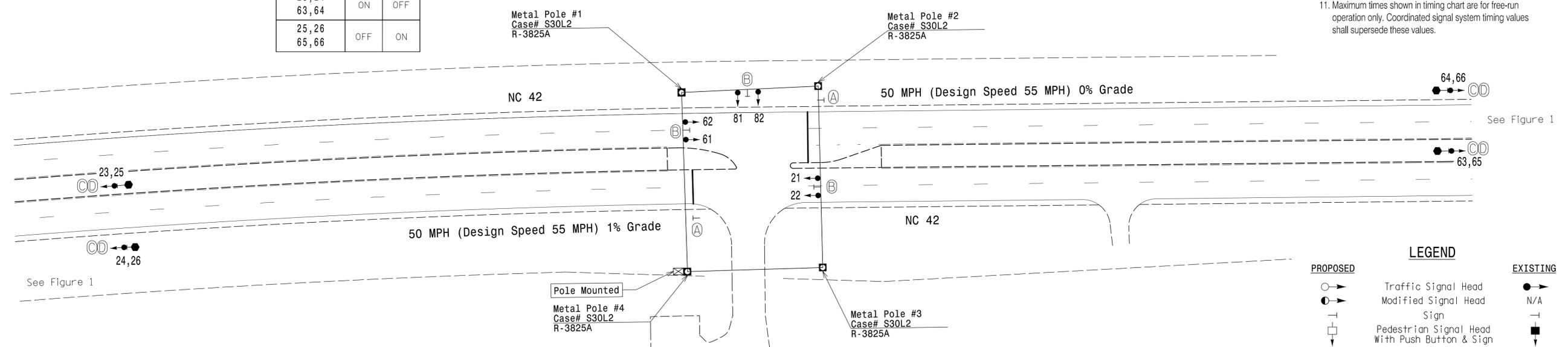


FIGURE 1
Flash vertically mounted beacons alternately.

**2 Phase
Emergency Vehicle Preemption
(Clayton Signal System)**

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Pavement markings are existing.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Emergency vehicle preemption switch is located in the fire department.
- The Division Traffic Engineer will determine the Preempt Delay Time and the Preempt Dwell Green Time for the emergency vehicle.
- Clear signal heads 21, 22, 61, and 62 from flashing 8" yellow to steady 12" yellow during Enter Yellow and steady red during Enter Red and through Dwell Interval.
- Signal heads 81 and 82 will display Red indication during clearance to preemption.
- Activate beacons 23, 24, 25, 26, 63, 64, 65, and 66 at the onset of preemption call.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.



MAXTIME TIMING CHART

FEATURE	PHASE		
	2	6	8
Walk *	-	-	-
Ped Clear	-	-	-
Min Green	14	14	7
Passage *	0.0	0.0	0.0
Max I *	30	30	30
Yellow Change	5.1	5.2	3.0
Red Clear	1.0	1.0	2.6
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Advance Walk	-	-	-
Non Lock Detector	-	-	-
Vehicle Recall	MIN RECALL	MIN RECALL	-
Dual Entry	-	-	-
No Startup Veh Call	-	-	X

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

MAXTIME PREEMPTION CHART

FUNCTION	PRE 2
	EMERG VEH
Type	2,6
Exit Phases	@
Delay	@
Max Presence	120
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	25.5*
Enter Red Clear	25.5*
Track Green	0
Track Yellow Change	25.5*
Track Red Clear	25.5*
Dwell Green	@
Exit Min Green	255*
Exit Yellow Change	25.5*
Exit Red Clear	25.5*
Call Extend Time	0.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	-
Require All Red Entry	-

* Directs controller to use default phase timing.
@ See Note #7.

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
○ → Sign	○ → N/A
○ → Pedestrian Signal Head With Push Button & Sign	○ → N/A
○ → Signal Pole with Guy	○ → N/A
○ → Signal Pole with Sidewalk Guy	○ → N/A
○ → Metal Strain Pole	○ → N/A
○ → Type II Signal Pedestal	○ → N/A
○ → Inductive Loop Detector	○ → N/A
○ → Controller & Cabinet	○ → N/A
○ → Junction Box	○ → N/A
○ → 2-in Underground Conduit	○ → N/A
○ → Right of Way	○ → N/A
○ → Directional Arrow	○ → N/A
○ → "STOP HERE ON RED" Sign (R10-16)	○ → N/A
○ → "Emergency Signal" Sign (R10-13)	○ → N/A
○ → Emergency Vehicle Sign (W11-8)	○ → N/A
○ → "Emergency Signal Ahead" Sign (W11-12P)	○ → N/A

Signal Upgrade

Prepared For:
Kimley-Horn
750 N. Greenfield Pkwy, Garner, NC 27529
NC License #0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

**NC 42
at
Clayton Fire Dept.**

Division 4 Johnston County Clayton
PLAN DATE: March 2024 REVIEWED BY: KP Baumann
PREPARED BY: CF Davis REVIEWED BY:

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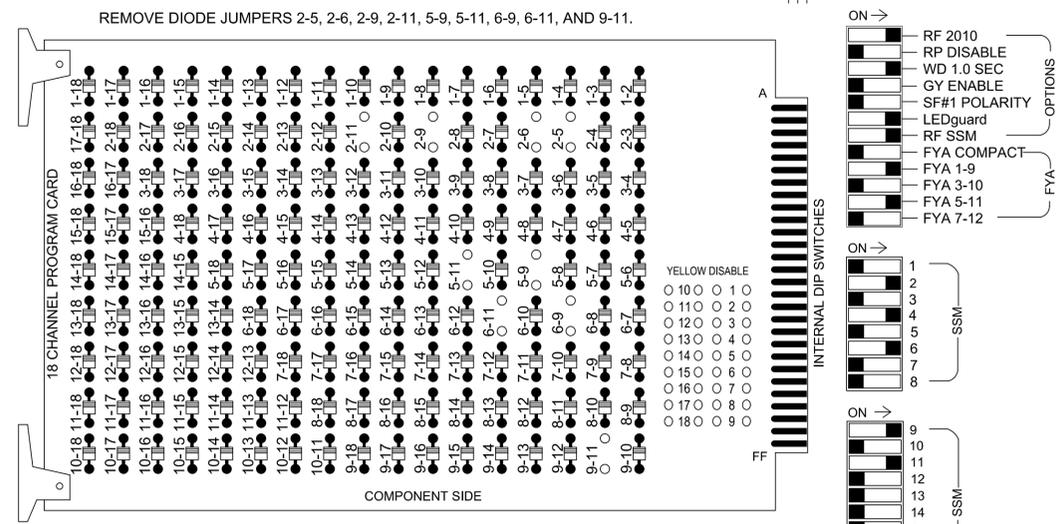
SEAL
SEAL 044434
KEVIN P. BAUMANN
ENGINEER

5/22/2025

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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Clayton Signal System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

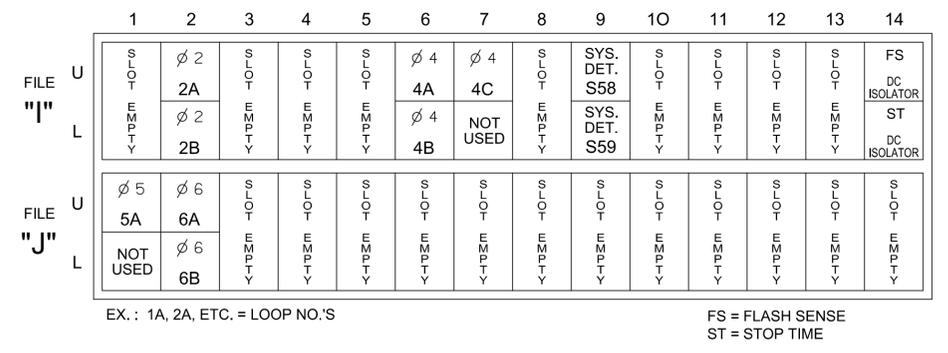
SIGNAL HEAD HOOK-UP CHART

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
GMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	43	63	NU	51*	62,63	NU	NU	NU	61*	NU	51*	NU	NU
RED		128			101					134								
YELLOW		129						*		135								
GREEN		130								136								
RED ARROW					101								A121				A114	
YELLOW ARROW					102	102	102						A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW					103	103	103	133										

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

INPUT FILE POSITION LAYOUT

(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

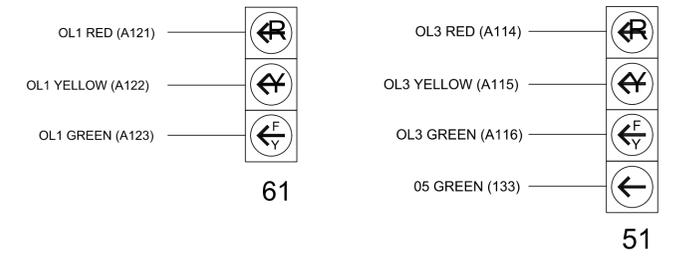
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	3.0		X		X	
4B	TB4-11,12	I6L	45	7	9	4	3.0		X		X	
4C	TB6-1,2	I7U	65	31	10	4	15.0		X		X	
5A	TB3-1,2	J1U	55	17	15*	5	15.0		X		X	
				-	31*	2	3.0		X		X	X
6A	TB3-9,10	J2U	40	30	18	6			X	X	X	
6B	TB3-11,12	J2L	44	43	19	6			X	X	X	
*S58	TB6-9,10	I9U	60	22	13	-			X		X	
*S59	TB6-11,12	I9L	62	24	14	-			X		X	

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

INPUT FILE POSITION LEGEND: J2L
 FILE J
 SLOT 2
 LOWER

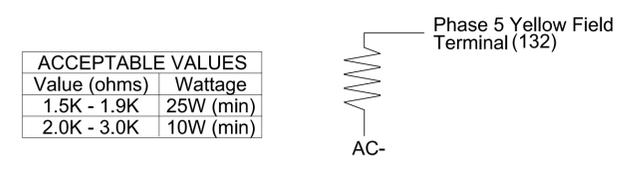
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



Electrical Detail - Sheet 1 of 3

Electrical and Programming Details For:

Prepared For: **Kimley-Horn**

PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 617-2000

Division 4 Johnston County Clayton
 SR 2851 (Front Street)
 PLAN DATE: July 2023 REVIEWED BY: KP Baumann
 PREPARED BY: GG Piarro REVIEWED BY:

REVISIONS: INIT. DATE

Signature: *GG Piarro* DATE: 5/22/2025

Seal: NORTH CAROLINA PROFESSIONAL ENGINEERS SEAL 044434

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SIG. INVENTORY NO. 04-1234

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1234
 DESIGNED: JULY 2023
 SEALED: 5/22/2025
 REVISED: N/A

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector	Call Phase	Delay
15	5	0
31	0	-

5/21/2025 11:50:11 AM No lly.Burke ***kimley-horn.comSD_AMTRAL_TFDW_ITS#01036622_Cloyton_Signal_System9_Signal_Signals#4 - Signal Design Group#041234-2023#2.dgn

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

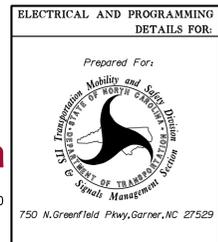
Overlap	1	3
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	2	-
Modifier Phases	-	5
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

← NOTICE REMOVE INCLUDED PHASE FOR OL3

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1234
DESIGNED: JULY 2023
SEALED: 5/22/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
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(919) 677-2000



Prepared For: NC 42 at SR 2851 (Front Street)	
Division 4	Johnston County Clayton
PLAN DATE: July 2023	REVIEWED BY: KP Baumann
PREPARED BY: GG Pierro	REVIEWED BY:
REVISIONS	INIT. DATE

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SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044434 KEVIN P. BAUMANN	5/22/2025 DATE SIGNATURE
SIG. INVENTORY NO.	04-1234

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

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

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

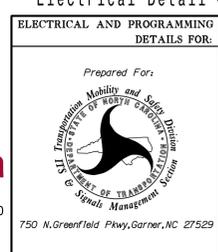
Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2		X		2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6		X	X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1		X	X	9
10	Overlap	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

NOTICE: FLASH RED

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1234
DESIGNED: JULY 2023
SEALED: 5/22/2025
REVISED: N/A

5/21/2025 11:50:15 AM Noilly,Burke ***kimley-horn.comSD_AMT\MRAL_TFTD\..._ITS\011036622_C\oyton_Signal_System9_Signal\w64 - Signal DesignGroup\041234-2023a3.dgn

PLANS PREPARED IN THE OFFICE OF:
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Raleigh, NC 27601
(919) 677-2000



Electrical Detail - Sheet 3 of 3

Prepared For:
NC 42 at SR 2851 (Front Street)

Division 4 Johnston County Clayton

PLAN DATE: July 2023 REVIEWED BY: KP Baumann

PREPARED BY: GG Pjero REVIEWED BY:

REVISIONS	INIT.	DATE

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SEAL

SEAL 044434

SEAL

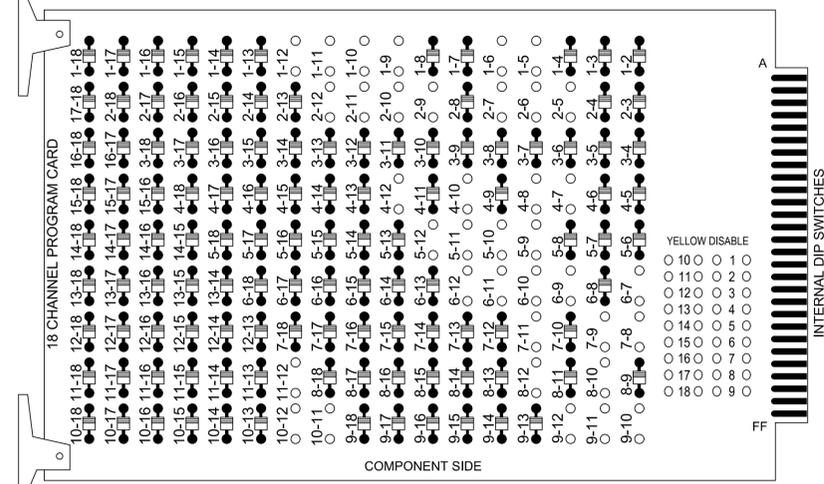
DocuSigned by: *Kevin P. Baumann* 5/22/2025

SIGNATURE DATE

SIG. INVENTORY NO. 04-1234

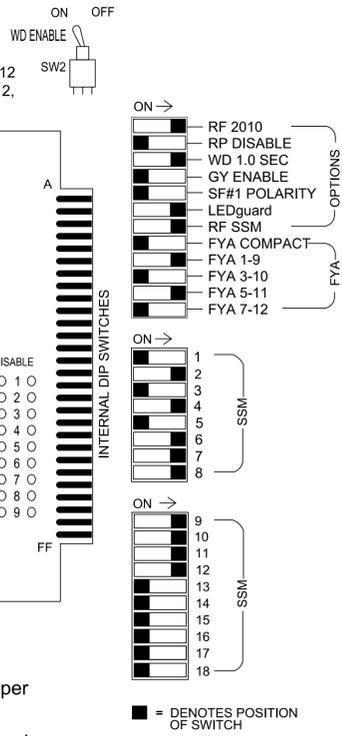
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)
 REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-10, 1-11, 1-12, 2-5, 2-6, 2-7, 2-9, 2-10, 2-11, 2-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-10, 5-11, 5-12, 6-7, 6-9, 6-10, 6-11, 6-12, 7-8, 7-9, 7-11, 8-10, 8-12, 9-10, 9-11, 9-12, 10-11, 10-12, and 11-12.



REMOVE JUMPERS AS SHOWN

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- DO NOT** program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- Enable Detector 59 for Red Lock Call.
- The cabinet and controller are part of the Clayton Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S5, S7, S8, S10, S11
 AUX S1, AUX S2, AUX S4, AUX S5

Phases Used.....1, 2, 4, 5, 6, 8, 9
 Overlap "1".....*
 Overlap "2".....*
 Overlap "3".....*
 Overlap "4".....*
 Overlap "5".....*
 Overlap "6".....*

*See overlap programming detail on sheet 2

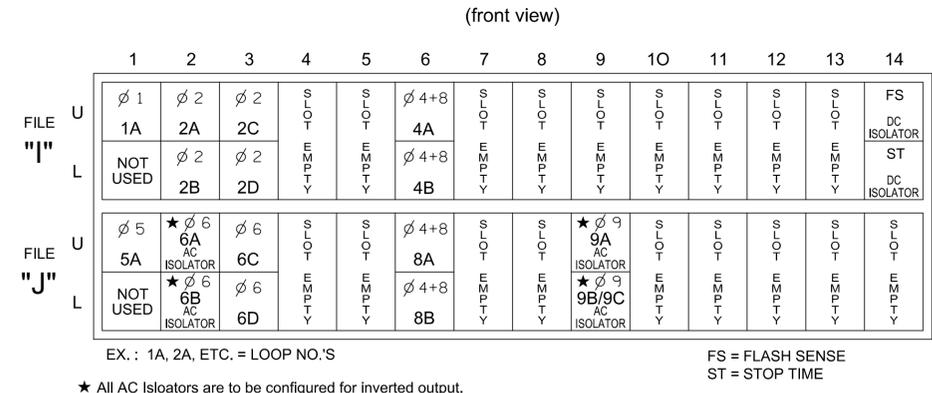
** Denotes Load Switch requires re-assignment; See sheet 2 for programming details.

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	OL5	2 PED	3	4	4 PED	5	OL6	6 PED	9	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE	
SIGNAL HEAD NO.	11*	21,22	NU	NU	41,42	NU	51*	62,63	NU	91,92	81,82	NU	11*	64,65	NU	51*	23	24	NU
RED		128			101			134		122	107			A124			A101	A101	
YELLOW	*	129			102		*	135		123	108			A125			A102	A102	
GREEN		130			103			136		124	109							A103	
RED ARROW														A121			A114		
YELLOW ARROW														A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127							133						A126			A103		

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 *See pictorial of head wiring in detail this sheet.
 NOTE: Signal heads 23, 24, 64, 65, 91, and 92 shall be wired with 12AWG signal cable.

INPUT FILE POSITION LAYOUT



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

IMPORTANT: LOOPS 6A, 6B, 9A, 9B/C USE 120VAC INPUTS FROM AUX. DETECTOR CABINET. SEE AUX. DETECTOR CABINET WIRING ON SHEET 3.

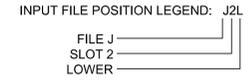
CAUTION! REMOVE ALL FACTORY INSTALLED SURGE ARRESTORS ON: TERMINALS TB3-5 & 6 AND TB3-7 & 8. TERMINALS TB7-9 & 10 AND TB7-11 & 12.

INPUT FILE CONNECTION & PROGRAMMING CHART

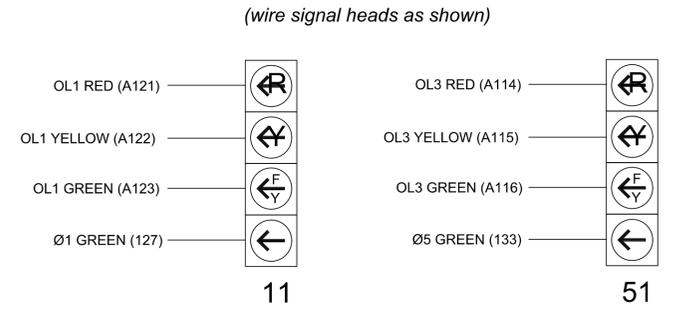
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	HU	56	18	1	1	15.0			X	X	X
2A	TB2-5,6	I2U	39	1	2	2		2.0	X	X	X	
2B	TB2-7,8	I2L	43	5	3	2		2.0	X	X	X	
2C	TB2-9,10	I3U	63	29	4	2			X	X	X	
2D	TB2-11,12	I3L	76	42	5	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4,8	3.0		X	X	X	
4B	TB4-11,12	I6L	45	7	9	4,8	10.0		X	X	X	
5A	TB3-1,2	J1U	55	17	15	5	15.0		X		X	
6A	*	J2U	40	2	16	6		2.0	X	X	X	
6B	*	J2L	44	6	17	6		2.0	X	X	X	
6C	TB3-9,10	J3U	64	30	18	6			X	X	X	
6D	TB3-11,12	J3L	77	43	19	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	4,8	3.0		X		X	
8B	TB5-11,12	J6L	46	8	23	4,8	15.0		X		X	
9A	*	J9U	59	21	27	**			X			
9B,9C	*	J9L	61	23	28	**			X			
					59	9	5.0		X		X	

This detector is called by logic (see sheet 2 programming detail). Loops 9A AND 9B/C have to be activated simultaneously to start the delay timer for this detector in order to call phase 9.

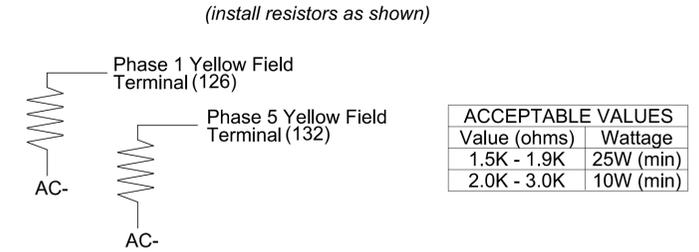
* Loops wired to Aux. Detector Cabinet. See wiring detail on sheet 3.
 ** No Call Phase associated with these loops. See sheet 2 for programming details.



FYA SIGNAL WIRING DETAIL

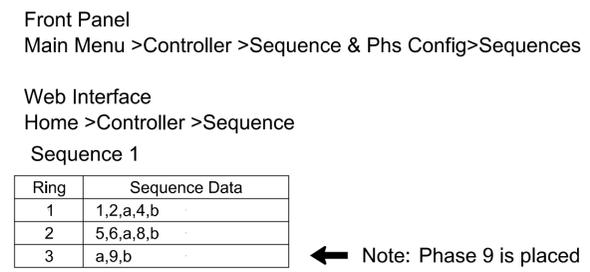


LOAD RESISTOR INSTALLATION DETAIL



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1249
 DESIGNED: OCTOBER 2023
 SEALED: 5/22/2025
 REVISED: N/A

SEQUENCE DETAIL



Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR: 	NC 42 at Caterpillar Entrance/ Envu Entrance		SEAL
	Division 4 PLAN DATE: October 2023 PREPARED BY: Cf Davis	Johnston County REVIEWED BY: KP Baumann REVIEWED BY:	

PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000

750 N. Greenfield Pkwy, Garner, NC 27529

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SIG. INVENTORY NO. 04-1249

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	Overlap	5		X		2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Overlap	6		X	X	6
7	Phase Vehicle	9		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

NOTICE CHANNEL 2
SET AS OVERLAP 5 →

NOTICE CHANNEL 6
SET AS OVERLAP 6 →

NOTICE CHANNEL 7
SET AS PHASE 9 →

NOTICE: FLASH RED

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	Local Variable	10	Result=(A OR B)	Phase Next	4	Phase On	4	0.0	0.0
2	Local Variable	11	Result=!A	Phase Next	9	None	0	0.0	0.0
3	Phase Phase Omit	9	Result=(A AND B)	Local Variable	11	Local Variable	10	0.0	0.0
4	Veh Detector Call	59	Result=(A AND B)	Vehicle Detector Input	27	Vehicle Detector Input	28	0.0	0.0

LOGIC STATEMENT DESCRIPTION

Statement 1 Description: Set Local Variable to 10 if Phase 4 is next or Phase 4 is green.
Statement 2 Description: Set Local Variable to 11 if Phase 9 is not next.
Statement 3 Description: Omit Phase 9 if Phase 4 is next or Phase 4 is green and Phase 9 is not next.
Statement 4 Description: Call Vehicle Detector 59 if Vehicle Detectors 27 & 28 are activated.

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

NOTICE: FLASH RED

Overlap	1	2	3	4	5	6
Type	FYA 4 - Section	Normal	FYA 4 - Section	Normal	Normal	Normal
Description	Head 11	Heads 64,65	Head 51	Heads 23,24	Heads 21,22	Heads 62,63
Included Phases	2,9	2,4,5,6,8	6,9	2,4,5,6,8	2,9	6,9
Modifier Phases	1	-	5	-	-	-
Modifier Overlaps	-	-	-	-	-	-
Trail Green	0	0	0	0	0	0
Trail Yellow	5.3	5.3	5.3	5.3	5.3	5.3
Trail Red	1.4	1.4	1.4	1.4	1.4	1.4
Green Suppress Phases	4,8	9	4,8	9	4,8	4,8

NOTICE GREEN SUPPRESS
FOR OVERLAPS

VEHICLE DETECTOR PROGRAMMING

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

Plan 1

Detector	Call Phase	Call Overlap	Call Ped	Switch Phase	Delay	Extend
27	0	-	-	-	-	-
28	0	-	-	-	-	-
59	9	-	-	-	5.0	-

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

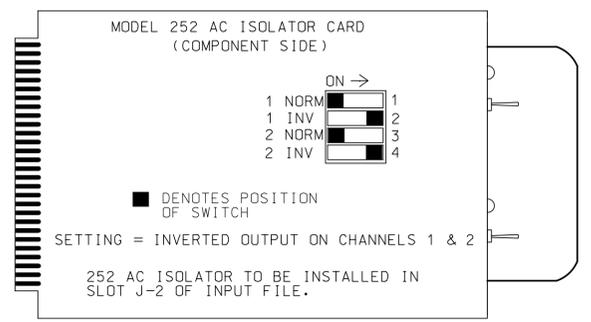
Modify parameters as shown below and save changes.

Start Up Parameters
StartUp Clearance Hold
6

Unit Flash Parameters
All Red Flash Exit Time
6

LOOP 6A & 6B AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

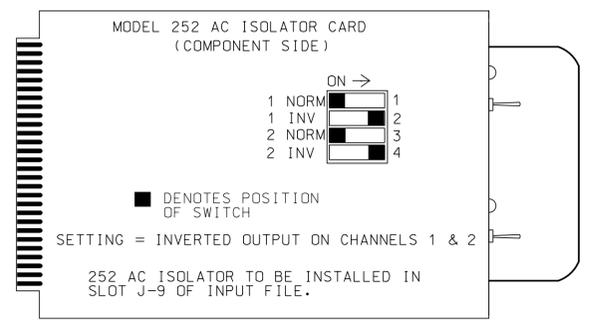
(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

LOOP 9A, 9B & 9C AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 04-1249
DESIGNED: OCTOBER 2023
SEALED: 5/22/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:

NC 42
at
**Caterpillar Entrance/
Envu Entrance**

Division 4 Johnston County Clayton

PLAN DATE: October 2023 REVIEWED BY: KP Baumann
PREPARED BY: CF Davis REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL

SIGNATURE: DATE: 5/22/2025
SIG. INVENTORY NO. 04-1249

K:\MRAL_IPTD\115\011036622_Clayton_Signal_System9_Signal_SMS4 - Signal_Design\mrcup2\04-1249a2.dgn 5/21/2025 11:55:11 AM NoT/y/Burke

332 CONTROLLER CABINET LOCATED AT ENVU/CATERPILLAR ENTRANCE

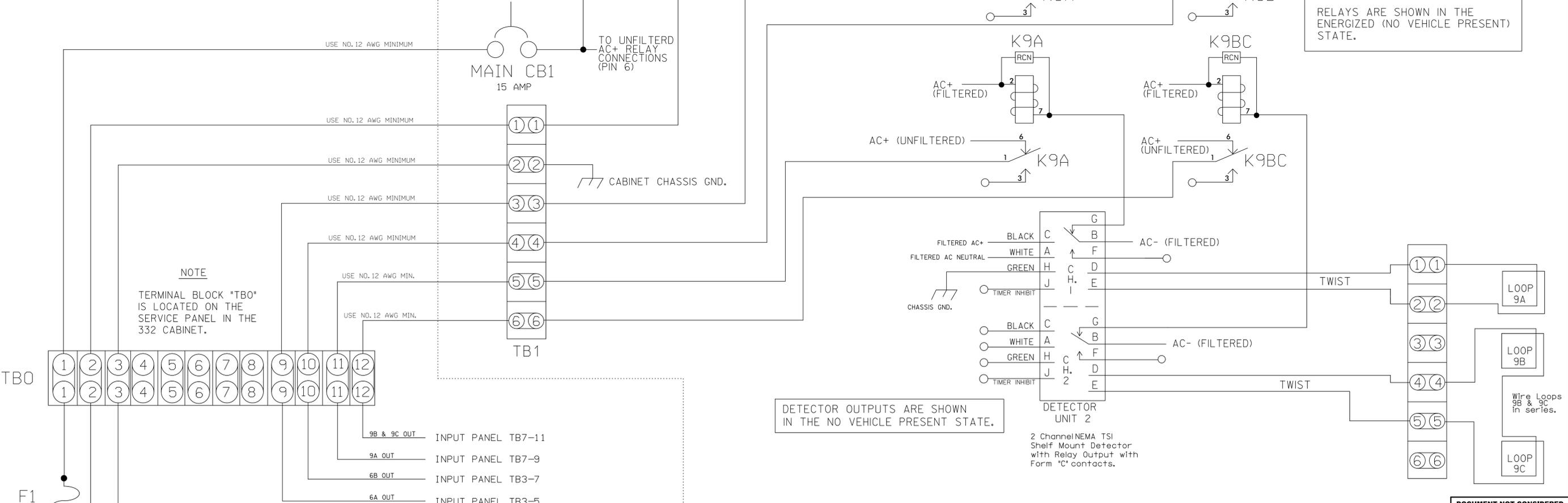
(Wire cabinet as shown)

TYPE F3 AUX. DETECTOR CABINET LOCATED AT TRUCK ENTRANCE

(Wire cabinet as shown)

NOTES

- ALL LOOP LEAD-INS SHALL BE TWISTED.
- ALL RELAYS ARE SPDT WITH 120VAC COIL AND 10 AMP, FORM "C" CONTACTS. RELAY IS MOUNTED ON 8-PIN OCTAL BASE.
- SURGE PROTECTOR SHOWN SHOULD BE SUPPLIED WITH TYPE F-3 CABINET.
- DETECTOR UNITS ARE A NEMA TS1 STANDARD SHELF MOUNTED TYPE WITH A RELAY OUTPUT WITH FORM "C" CONTACTS.
- RC NETWORKS ACROSS THE RELAY COILS ARE RATED AT .1 MICRO-FARAD, 100 OHM.
- USE 12 AWG, 7 CONDUCTOR SIGNAL CABLE FOR INTERCONNECT BETWEEN AUX. DETECTOR CABINET AND CONTROLLER CABINET.
- USE 18 AWG, CONDUCTORS (MIN.) FOR USER INSTALLED WIRING TO RELAYS WITHIN AUX. DETECTOR CABINET.
- DO NOT INSTALL GROUND ROD AT AUX. DETECTOR CABINET. BOND CABINET CHASSIS TO GROUND AT CONTROLLER CABINET.



NOTE
TERMINAL BLOCK "TBO" IS LOCATED ON THE SERVICE PANEL IN THE 332 CABINET.

INPUT PANEL AC NEUTRAL JUMPER DETAIL

- ADD JUMPER FROM INPUT PANEL TB3-6 TO AC NEUTRAL.
- ADD JUMPER FROM INPUT PANEL TB3-8 TO AC NEUTRAL.
- ADD JUMPER FROM INPUT PANEL TB7-10 TO AC NEUTRAL.
- ADD JUMPER FROM INPUT PANEL TB7-12 TO AC NEUTRAL.

CAUTION!!
REMOVE ALL FACTORY INSTALLED SURGE ARRESTORS ON: TERMINALS TB3-5 & 6 AND TB3-7 & 8. TERMINALS TB7-9 & 10 AND TB7-11 & 12.

NOTE: THESE AC CONNECTIONS PROVIDE THE NEUTRAL SIDE OF THE OUTPUT FOR THE OPERATION OF THE AC ISOLATORS INSTALLED IN INPUT FILE POSITIONS J-2 AND J-9.

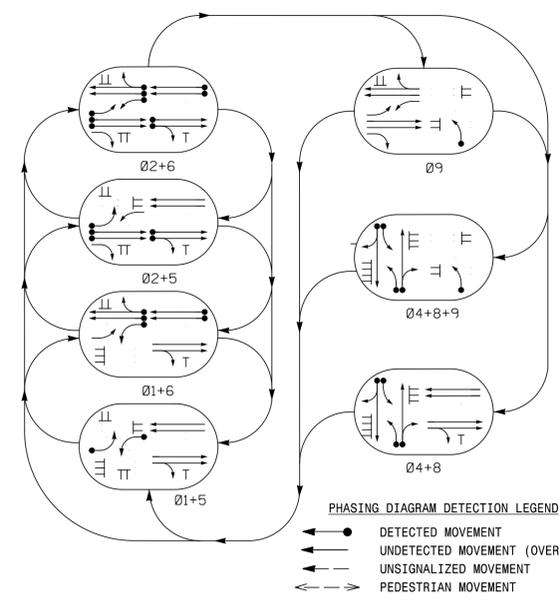
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1249
DESIGNED: OCTOBER 2023
SEALED: 5/22/2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

 PLANS PREPARED IN THE OFFICE OF: Kimley-Horn NC License #F-0102 421 Fayetteville Street, Suite 600 Raleigh, NC 27601 (919) 677-2000	NC 42 at Caterpillar Entrance/ Envu Entrance		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL 044434 KEVIN P. BAUMANN ENGINEER
	Division 4 Johnston County Clayton PLAN DATE: October 2023 REVIEWED BY: KP Baumann PREPARED BY: CF Davis REVIEWED BY:		
ELECTRICAL AND PROGRAMMING DETAILS FOR:	REVISIONS	INIT.	DATE
Signature: 750 N. Greenfield Pkwy, Garner, NC 27529			5/22/2025 DATE
SIG. INVENTORY NO. 04-1249			DATE

K:\RAL\TPTD\115\011036622 Clayton Signal System\Signal\Design\Wiring\04-1249a3.dgn
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PHASING DIAGRAM

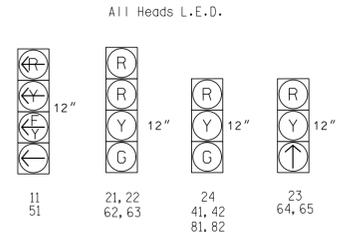


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	04+8	04+8+9	09	11
11	←	←	←	←	←	←	←	←
21,22	R	R	G	G	R	R	R	R
23	↑	↑	↑	↑	↑	↑	↑	↑
24	G	G	G	G	R	R	R	R
41,42	R	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←	←
62,63	R	G	R	G	R	R	R	R
64,65	↑	↑	↑	↑	R	R	↑	R
81,82	R	R	R	R	R	R	G	G
91,92	R	R	R	R	G	G	R	R

SIGNAL FACE I.D.



AUXILIARY CABINET LOOP & DETECTOR UNIT INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	UNIT NO.	CHANNEL	CALL PHASE	TIMING		PLACE CALL DURING PHASE	INHIBIT DELAY DURING GREEN?
								DELAY TIME	EXTEND TIME		
6A	6X6	420	EXIST	-	1	1	6	-	-	ALL	NO
6B	6X6	420	EXIST	-	1	2	6	-	-	ALL	NO
9A	6X15	38	EXIST	-	2	1	9	-	-	ALL	NO
9B,9C	6X20	+10	EXIST	-	2	2	9	-	-	ALL	NO

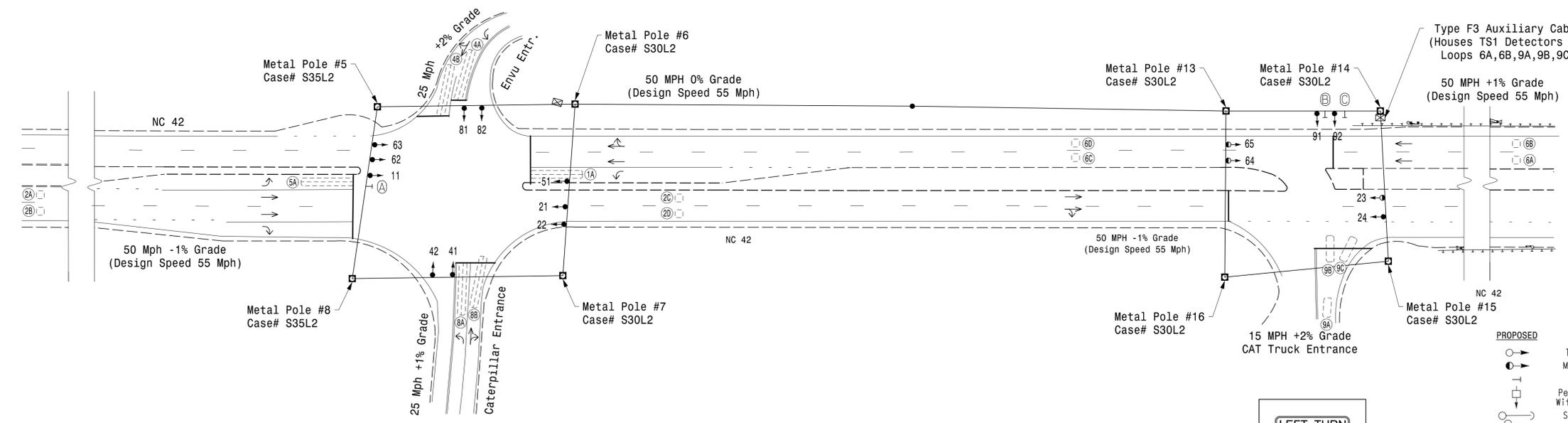
MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL DURING GREEN	NEW CARD	
1A	6X40	0	2-4-2	-	1	15.0	-	X	-	X	-	X
2A	6X6	420	EXIST	-	2	-	2.0	X	X	X	-	X
2B	6X6	420	EXIST	-	2	-	2.0	X	X	X	-	X
2C	6X6	420	EXIST	-	2	-	-	X	X	X	-	X
2D	6X6	420	EXIST	-	2	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	-	4,8	3.0	-	X	-	X	-	X
4B	6X40	0	2-4-2	-	4,8	10.0	-	X	-	X	-	X
5A	6X40	0	2-4-2	-	5	15.0	-	X	-	X	-	X
6C	6X6	420	EXIST	-	6	-	-	X	X	X	-	X
6D	6X6	420	EXIST	-	6	-	-	X	X	X	-	X
8A	6X40	0	2-4-2	-	8,4	3.0	-	X	-	X	-	X
8B	6X40	+5	2-4-2	-	8,4	15.0	-	X	-	X	-	X
6A					6	-	2.0	X	X	X	-	X
6B					6	-	2.0	X	X	X	-	X
9A*					9	-	-	X	-	-	-	X
9B,9C*					9	-	-	X	-	-	-	X

* After 5 seconds of simultaneous activation, place call for phase 9

7 Phase Fully Actuated (Clayton Signal System) NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- If no call exists on phase 9 at the beginning of phase 2 clearance then omit phase 9 for the remainder of the cycle.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- Install new cabinet on existing cabinet foundation.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



MAXTIME TIMING CHART

FEATURE	PHASE							
	1	2	4	5	6	8	9	
Walk *	-	-	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-	-	-
Min Green *	7	14	7	7	14	7	7	
Passage *	2.0	6.0	2.0	2.0	6.0	2.0	2.0	
Max 1 *	15	90	20	15	90	20	15	
Yellow Change	3.0	5.3	3.1	3.0	5.3	3.1	3.0	
Red Clear	2.9	1.4	2.8	3.2	1.4	2.8	3.9	
Added Initial *	-	1.5	-	-	1.5	-	-	
Maximum Initial *	-	46	-	-	46	-	-	
Time Before Reduction *	-	15	-	-	15	-	-	
Time To Reduce *	-	30	-	-	30	-	-	
Minimum Gap	-	3.4	-	-	3.4	-	-	
Advance Walk	-	-	-	-	-	-	-	
Non Lock Detector	X	-	X	X	-	X	-	
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-	-	
Dual Entry	-	-	-	-	-	-	-	

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

OVERLAP TIMING

FEATURE	OVERLAP					
	1	2	3	4	5	6
Trail Green	0	0	0	0	0	0
Trail Yellow	5.3	5.3	5.3	5.3	5.3	5.3
Trail Red	1.4	1.4	1.4	1.4	1.4	1.4

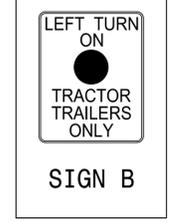
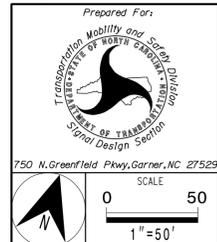


FIGURE -1-

PROPOSED	EXISTING
	N/A

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn
 NC License #0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000



Prepared For:		NC 42 at Caterpillar Entrance/Envu Entrance	
Division 4		Johnston County Clayton	
PLAN DATE: October 2023	REVIEWED BY: KP Baumann	PREPARED BY: CF Davis	REVIEWED BY:
REVISIONS			
INIT.	DATE		
SIGNATURE			
DATE			

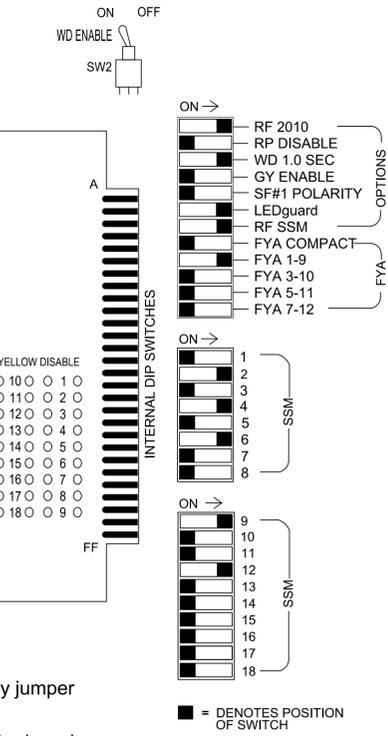
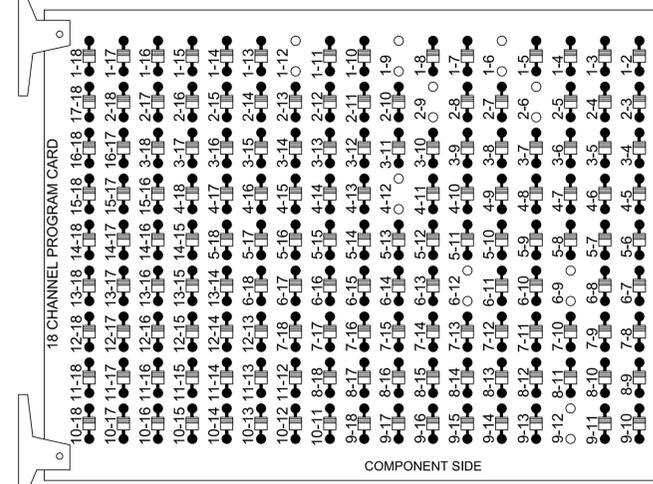
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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Clayton Signal System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11*	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU	11*	NU	NU	NU	43	NU
RED		128						134										A101
YELLOW	*	129						135										
GREEN		130						136										
RED ARROW						101							A121					
YELLOW ARROW						102							A122					A102
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127					103												A103

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

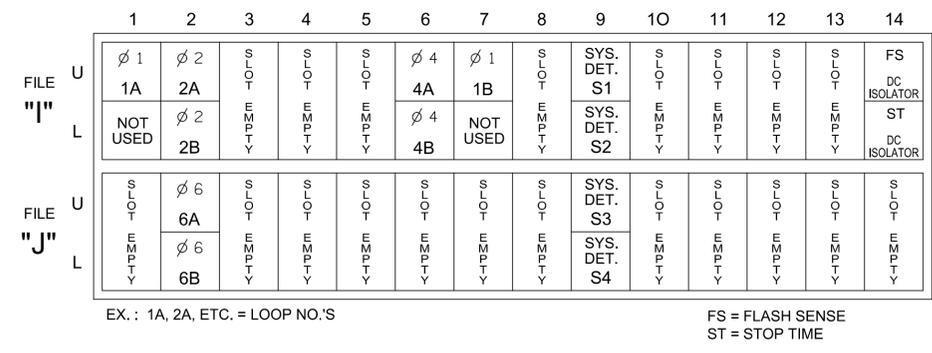
FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



INPUT FILE POSITION LAYOUT

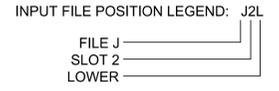
(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15.0		X		X	
1B	TB6-1,2	I7U	65	31	10	1	15.0		X		X	
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
4B	TB4-11,12	I6L	45	7	9	4			X		X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
*S1	TB6-9,10	I9U	60	22	13	SYS						
*S2	TB6-11,12	I9L	62	24	14	SYS						
*S3	TB7-9,10	J9U	59	21	27	SYS						
*S4	TB7-11,12	J9L	61	23	28	SYS						

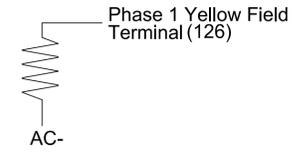
*System detector only. Remove any assigned vehicle phase.
 ★ For the detectors to work as shown on the signal design plan, see the Detector Programming Detail for Alternate Phasing on sheet 2.



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:

 PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 04-1433
 DESIGNED: MARCH 2024
 SEALED: 5/22/2025
 REVISED: N/A

NC 42
 at
 McKenzie Ridge Drive

Division 4 Johnston County Clayton
 PLAN DATE: March 2024 REVIEWED BY: KP Baumann
 PREPARED BY: CF Davis REVIEWED BY:

REVISIONS	INIT.	DATE

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SEAL

 SEAL 044434
 KEVIN P. BAUMANN
 ENGINEER

DocuSigned by:

 5/22/2025
 SIGNATURE DATE
 SIG. INVENTORY NO. 04-1433

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

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

NOTICE: FLASH RED

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE INCLUDED PHASE

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector	Call Phase	Delay
1	1	0.0
29	0	3.0

1A

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1433
DESIGNED: MARCH 2024
SEALED: 5/22/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:



Prepared For:
750 N. Greenfield Pkwy, Garner, NC 27529

NC 42
at
McKenzie Ridge Drive

Division 4 Johnston County Clayton

PLAN DATE: March 2024	REVIEWED BY: KP Baumann
PREPARED BY: CF Davis	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL



SEAL 044434
KEVIN P. BAUMANN
ENGINEER

DocuSigned by:
5/22/2025
SIGNATURE DATE
SIG. INVENTORY NO. 04-1433

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

<u>PHASING</u>	<u>OVERLAP PLAN</u>	<u>VEH DET PLAN</u>
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

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

- OVERLAP PLAN 2:** Modifies overlap included phases for head 11 to run protected turns only.
- VEH DET PLAN 2:** Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

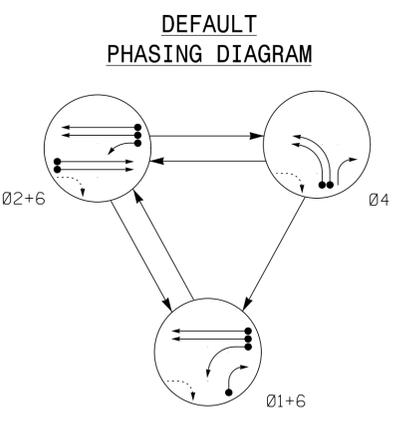
* The Pattern number(s) are to be determined by the Division and/or City Traffic Engineer.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1433
DESIGNED: MARCH 2024
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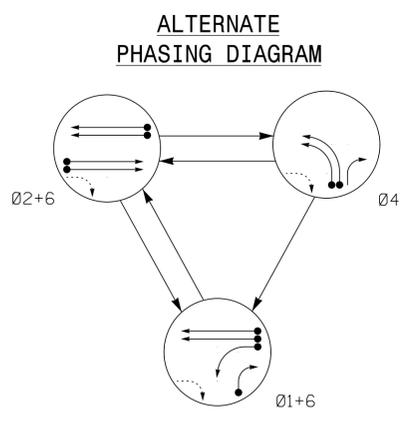
Electrical Detail - Sheet 3 of 3

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<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <div style="text-align: center;">  <p style="font-size: x-small;">Prepared For: Division 4 Johnston County Clayton</p> </div> <p style="font-size: x-small;">PLANS PREPARED IN THE OFFICE OF: Kimley»Horn NC License #F-0102 421 Fayetteville Street, Suite 600 Raleigh, NC 27601 (919) 677-2000</p>	<p>NC 42 at McKenzie Ridge Drive</p> <p style="font-size: x-small;">PLAN DATE: March 2024 REVIEWED BY: KP Baumann PREPARED BY: CF Davis REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<div style="text-align: center;">  <p style="font-size: x-small;">SEAL 044434 KEVIN P. BAUMANN ENGINEER</p> </div> <p style="font-size: x-small;">DocuSigned by: Signature DATE: 5/22/2025 SIG. INVENTORY NO. 04-1433</p>
REVISIONS	INIT.	DATE						



SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 4	FLASH
11	←	←	←	←
21,22	R	G	R	R
41,42	←	←	←	←
43	→	R	→	R
61,62	G	G	R	R



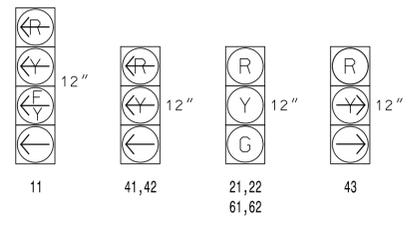
SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 4	FLASH
11	←	←	←	←
21,22	R	G	R	R
41,42	←	←	←	←
43	→	R	→	R
61,62	G	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.

PHASING DIAGRAM DETECTION LEGEND

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



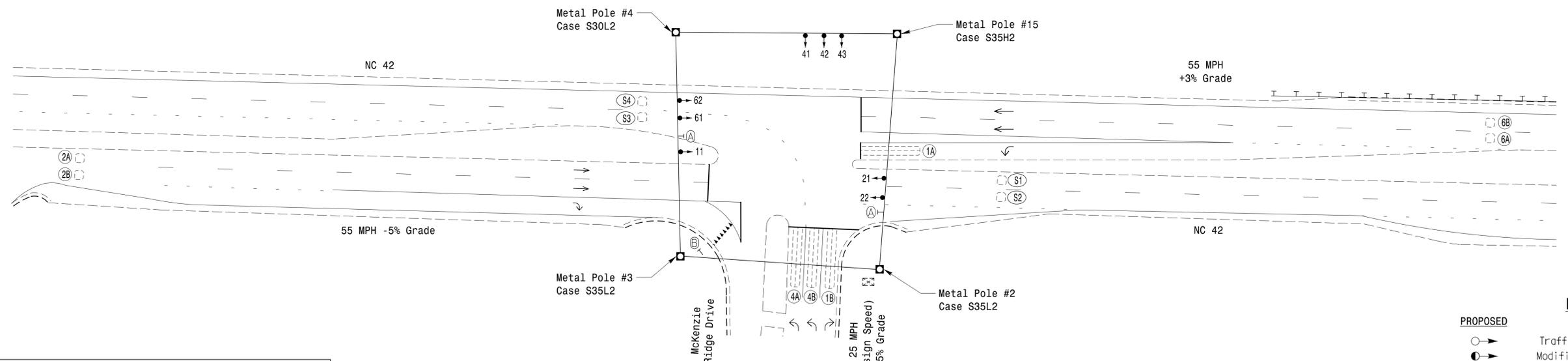
MAXTIME DETECTOR INSTALLATION CHART										
DETECTOR					PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL DURING GREEN
1A	6X40	0	2-4-2	-	1	15.0*	-	X	X	-
1B	6X40	0	2-4-2	-	1	15.0	-	X	X	-
2A	6X6	420	EXIST	-	2	-	-	X	X	-
2B	6X6	420	EXIST	-	2	-	-	X	X	-
4A	6X40	0	2-4-2	-	4	-	-	X	X	-
4B	6X40	0	2-4-2	-	4	-	-	X	X	-
6A	6X6	420	EXIST	-	6	-	-	X	X	-
6B	6X6	420	EXIST	-	6	-	-	X	X	-
S1	6X6	+200	EXIST	-	-	-	-	-	-	-
S2	6X6	+200	EXIST	-	-	-	-	-	-	-
S3	6X6	+150	EXIST	-	-	-	-	-	-	-
S4	6X6	+150	EXIST	-	-	-	-	-	-	-

* Disable Delay during Alternate Phasing operation.
Disable Phase call for loop during Alternate Phasing operation.

3 Phase Fully Actuated (Clayton Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Pavement markings are existing.
6. The Division Traffic Engineer will determine the hours of use for each phasing plan.
7. Install 2070LX controller in existing cabinet.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



FEATURE	PHASE			
	1	2	4	6
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Min Green *	7	14	7	14
Passage *	2.0	6.0	2.0	6.0
Max I *	25	90	45	90
Yellow Change	3.0	5.8	3.1	5.8
Red Clear	2.8	1.3	3.3	1.3
Added Initial *	-	1.5	-	1.5
Maximum Initial *	-	46	-	46
Time Before Reduction *	-	15	-	15
Time To Reduce *	-	45	-	45
Minimum Gap	-	3.4	-	3.4
Advance Walk	-	-	-	-
Non Lock Detector	X	-	X	-
Vehicle Recall	-	MIN RECALL	-	MIN RECALL
Dual Entry	-	-	-	-

* These values may be field adjusted. Do not adjust Min Green and 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	● →	Modified Signal Head
○	Sign	○	N/A
□	Metal Strain Pole	□	Sign
⊗	Inductive Loop Detector	⊗	2-in Underground Conduit
⊠	Controller & Cabinet	⊠	Right of Way
■	Junction Box	■	Directional Arrow
- - -	2-in Underground Conduit	- - -	Guardrail
N/A	Right of Way	N/A	Street Name Sign (D3-1)
→	Directional Arrow	→	"YIELD" Sign (R1-2)
N/A	Guardrail	N/A	
Ⓐ	Street Name Sign (D3-1)	Ⓐ	
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ	

Signal Upgrade

Prepared For:

 750 N. Greenfield Pkwy, Garner, NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn
 NC License #0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000

NC 42 at McKenzie Ridge Drive

Division 4 Johnston County Clayton
 PLAN DATE: March 2024 REVIEWED BY: KP Baumann
 PREPARED BY: EE Dogbe REVIEWED BY:

REVISIONS	INIT.	DATE

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SEAL

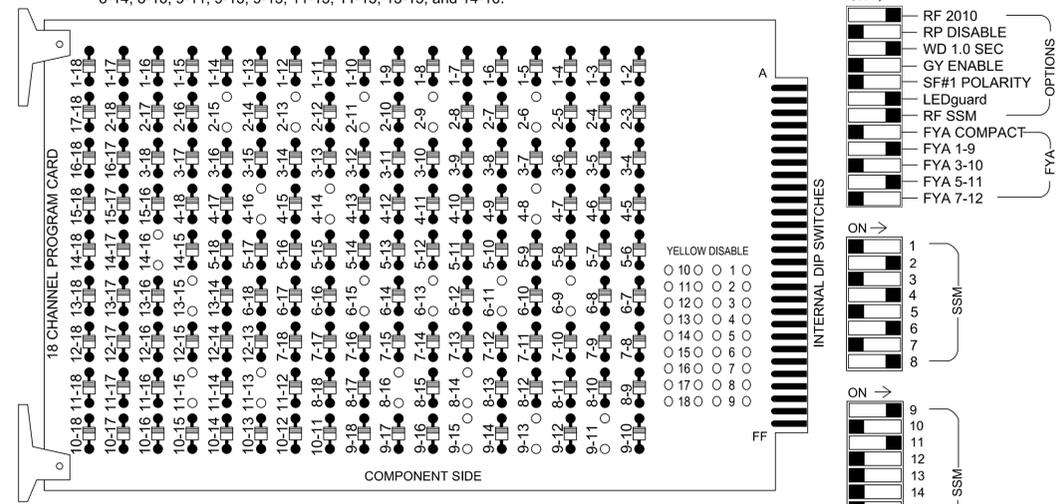
 Kevin P. Baumann
 ENGINEER

5/22/2025
 SIGNATURE DATE
 SIG. INVENTORY NO. 04-1433

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



REMOVE JUMPERS AS SHOWN

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Clayton Signal System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on this sheet

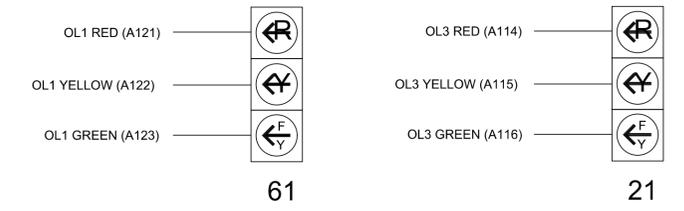
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	22,23	P21, P22	NU	41,42	P41, P42	NU	62,63	P61, P62	NU	81,82	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																		
Hand icon										113		104					119	110
Walking person icon										115		106					121	112

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	S	∅ 2	T	T	T	∅ 4	T	T	T	T	T	∅ 2 PED	∅ 6 PED	FS
L	M	2A	T	T	T	4A	T	T	T	T	T	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
L	T	2B	T	T	T	NOT USED	T	T	T	T	T	∅ 4 PED	∅ 8 PED	ST
U	S	∅ 6	T	T	T	∅ 8	T	T	T	T	T	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
L	M	6A	T	T	T	8A	T	T	T	T	T	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
L	T	6B	T	T	T	NOT USED	T	T	T	T	T	DC ISOLATOR	DC 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	TB2-5.6	I2U	39	1	2	2			X	X	X	
2B	TB2-7.8	I2L	43	5	3	2	3.0		X	X	X	X
4A	TB4-9,10	I6U	41	3	8	4	5.0		X	X	X	
6A	TB3-5.6	J2U	40	2	16	6			X	X	X	
6B	TB3-7.8	J2L	44	6	17	6	3.0		X	X	X	X
8A	TB5-9,10	J6U	42	4	22	8	5.0		X	X	X	
PED PUSH BUTTONS												
P21,P22	TB8-4.6	I12U	67	33	2	PED 2						
P41,P42	TB8-5.6	I12L	69	35	4	PED 4						
P61,P62	TB8-7.9	I13U	68	34	6	PED 6						
P81,P82	TB8-8.9	I13L	70	36	8	PED 8						

INPUT FILE POSITION LEGEND: J2L
 FILE J
 SLOT 2
 LOWER

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1437
 DESIGNED: MARCH 2024
 SEALED: 5/22/2025
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: 	SR 1003 (Buffalo Road) at River Dell Townes Avenue/ East Neuse River Parkway		SEAL
	Division 4 Johnston County Clayton PLAN DATE: March 2024 PREPARED BY: CF Davis	REVIEWED BY: KP Baumann REVIEWED BY:	
REVISIONS INIT. DATE	SIGNATURE DATE	5/22/2025	SIG. INVENTORY NO. 04-1437

PLANS PREPARED IN THE OFFICE OF:
KimleyHorn
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 617-2000

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

NOTICE: FLASH RED

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

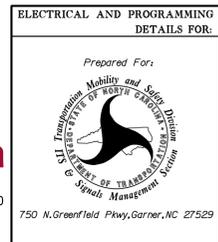
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 04-1437
DESIGNED: MARCH 2024
SEALED: 5/22/2025
REVISED: N/A

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Electrical Detail - Sheet 2 of 2

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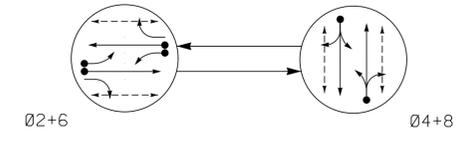
PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
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Prepared For: SR 1003 (Buffalo Road) at River Dell Townes Avenue/ East Neuse River Parkway	
Division 4 Johnston County Clayton	
PLAN DATE: March 2024	REVIEWED BY: KP Baumann
PREPARED BY: CF Davis	REVIEWED BY:
REVISIONS	INIT. DATE

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

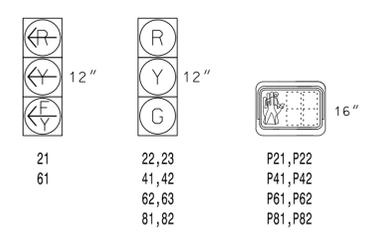
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- ⇄ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø 2+6	Ø 4+8	FLUSH
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	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

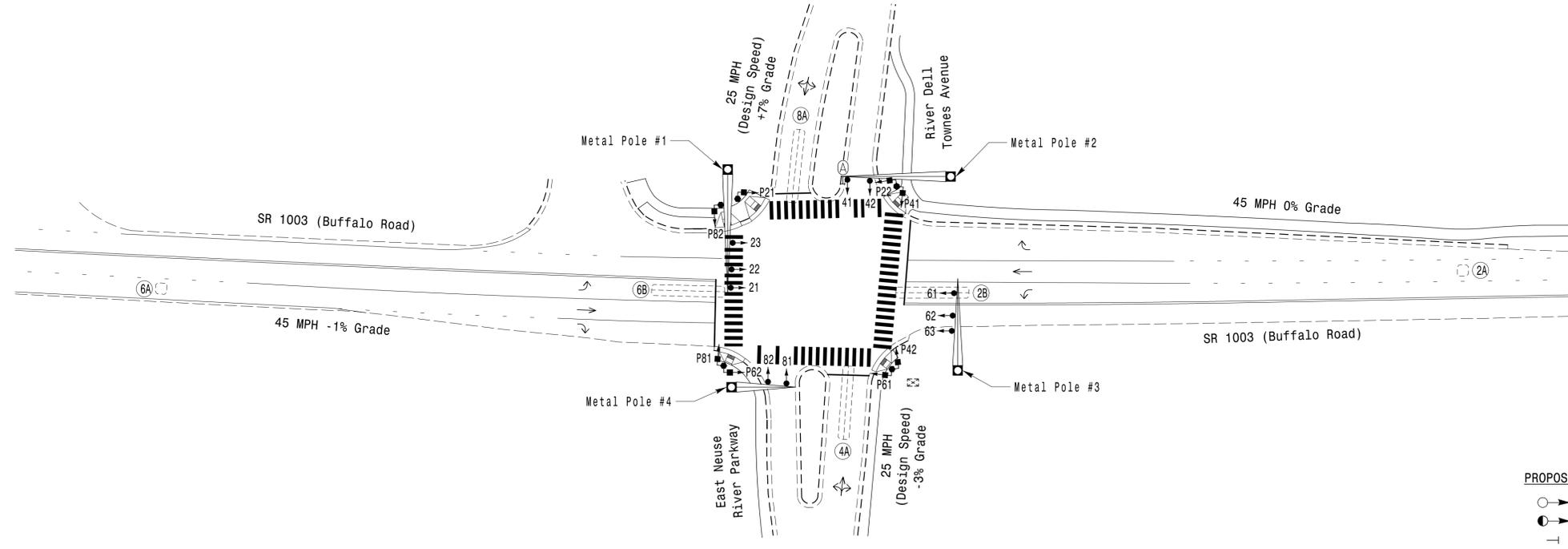


MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	DELAY DURING GREEN	NEW CARD	
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	-
2B	6X40	+5	2-4-2	-	2	3.0	-	X	-	X	X	-
4A	6X40	+5	2-4-2	-	4	5.0	-	X	-	X	-	-
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	-
6B	6X40	+5	2-4-2	-	6	3.0	-	X	-	X	X	-
8A	6X40	+5	2-4-2	-	8	5.0	-	X	-	X	-	-

2 Phase Fully Actuated (Clayton Signal System) NOTES

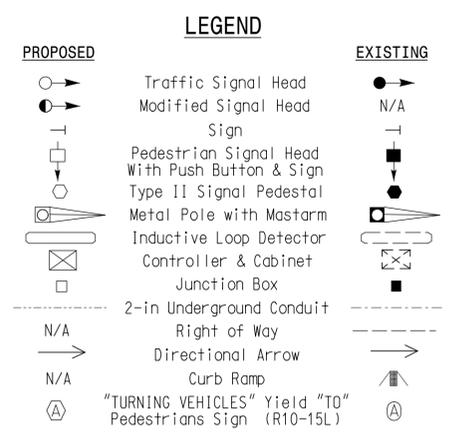
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DONT WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Install 2070LX controller in existing cabinet.
- 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	13
Ped Clear	17	22	20	18
Min Green *	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Max 1 *	90	25	90	25
Yellow Change	4.6	3.3	4.6	3.0
Red Clear	1.4	2.8	1.4	2.9
Added Initial *	2.5	-	2.5	-
Maximum Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	45	-	45	-
Minimum Gap	3.0	-	3.0	-
Advance Walk	7	7	7	6
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

Prepared For: **SR 1003 (Buffalo Road) at River Dell Townes Avenue / East Neuse River Parkway**

Division 4 Johnston County Clayton

PLAN DATE: March 2024 REVIEWED BY: KP Baumann

PREPARED BY: EE Dogbe REVIEWED BY:

REVISIONS: INIT. DATE

SCALE: 1" = 40'

PLANS PREPARED IN THE OFFICE OF: **Kimley-Horn**

750 N. Greenfield Pkwy, Garner, NC 27529
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000

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SEAL: KEVIN P. BAUMANN, ENGINEER, SEAL 044434

5/22/2025

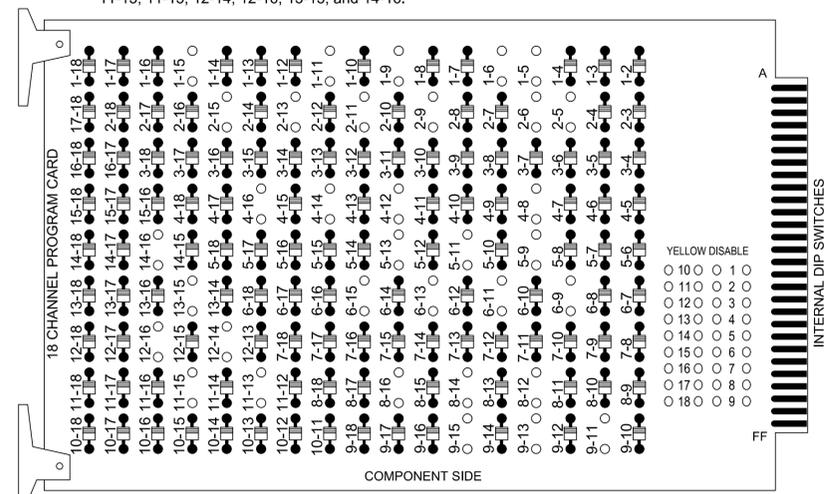
SIG. INVENTORY NO. 04-1437

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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

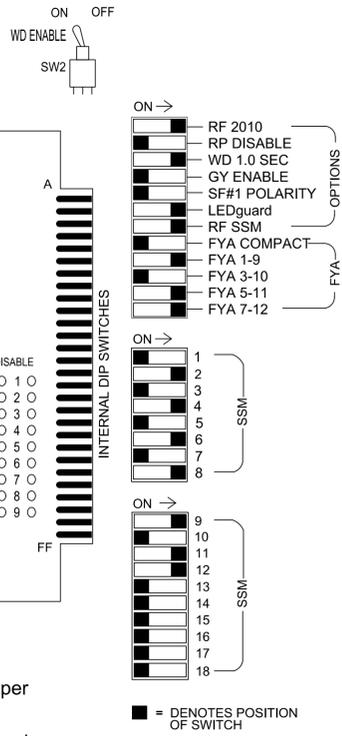
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-12, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 12-14, 12-16, 13-15, and 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Clayton Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S3, S5, S6, S7, S8, S9, S11, S12, AUX S1, AUX S4, AUX S5
 Phases Used.....1, 2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED
 Overlap "1".....*
 Overlap "2".....NOT USED
 Overlap "3".....*
 Overlap "4".....*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	42,43	P41, P42	51	61,62	P61, P62	NU	81,82	P81, P82	11	NU	NU	51	41	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114	A101	
YELLOW ARROW													A122			A115	A102	
FLASHING YELLOW ARROW													A123			A116	A103	
GREEN ARROW	127							133										
Hand				113		104			119		110							
Walking				115		106			121		112							

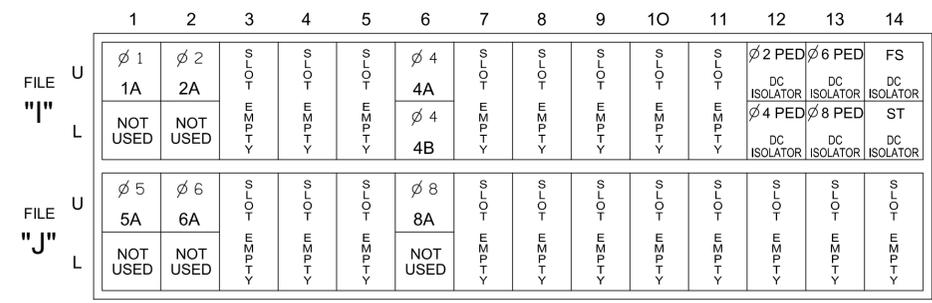
NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail this sheet.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)



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

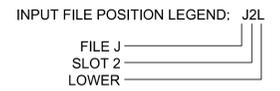
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	15.0	3.0		X		X	X
2A	TB2-5,6	I2U	39	1	2				X	X	X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
4B	TB4-11,12	I6L	45	7	9	4	10.0		X		X	
5A	TB3-1,2	J1U	55	17	15	5	15.0		X		X	
6A	TB3-5,6	J2U	40	2	16	6	3.0		X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	10.0		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

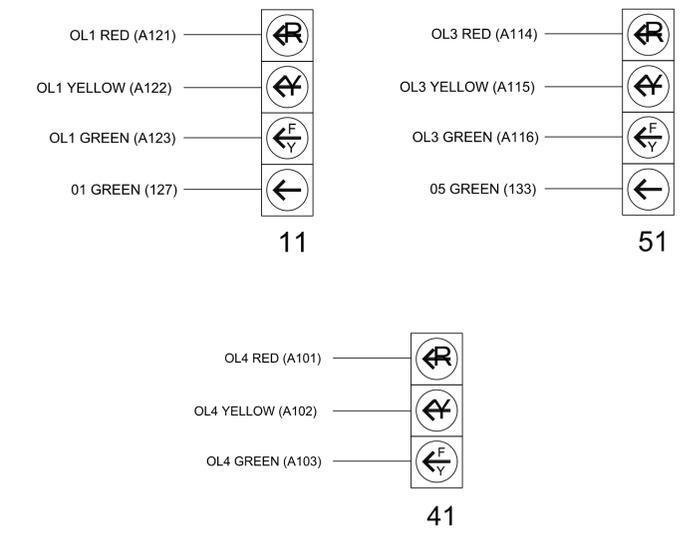
NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

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



FYA SIGNAL WIRING DETAIL

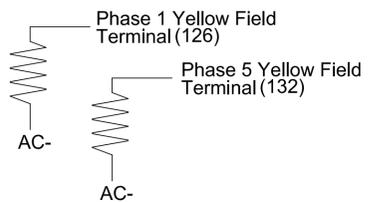
(wire signal heads as shown)



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)



FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1439
 DESIGNED: MARCH 2024
 SEALED: 5/22/2025
 REVISED: N/A

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 617-2000

Electrical Detail - Sheet 1 of 2

Prepared For: **SR 1003 (Buffalo Road) at Jordan Narron Road/Flowers Parkway**

Division 4 Johnston County Clayton

PLAN DATE: March 2024 REVIEWED BY: KP Baumann

PREPARED BY: EE Dogbe REVIEWED BY:

REVISIONS: _____ INIT. DATE

Signature: _____ DATE: 5/22/2025

SIG. INVENTORY NO. 04-1439

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

NOTICE PHASE
2 RED FLASH →

NOTICE PHASE
6 RED FLASH →

NOTICE OVERLAP
1 RED FLASH →
NOTICE OVERLAP
3 RED FLASH →

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 OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

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

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

1A

5A

Plan 2

Detector	Call Phase	Delay
1	1	3.0
29	0	3.0

Detector	Call Phase	Delay
15	5	3.0
31	0	3.0

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	Unit Flash Parameters
Startup Clearance Hold 6	All Red Flash Exit Time 6

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

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

Electrical Detail - Sheet 2 of 2



SR 1003 (Buffalo Road)
at
Jordan Narron Road/
Flowers Parkway
Clayton, Johnston County

PLANNED BY: EE Dogbe	REVIEWED BY: KP Baumann
DATE: March 2024	DATE: 5/22/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

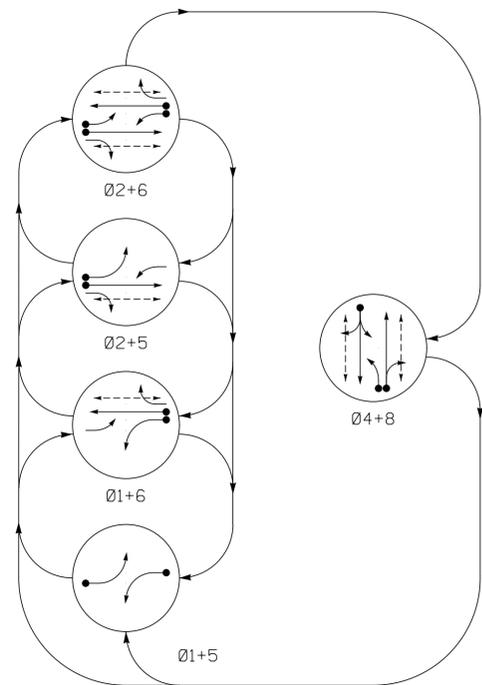


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1439
DESIGNED: MARCH 2024
SEALED: 5/22/2025
REVISED: N/A

PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

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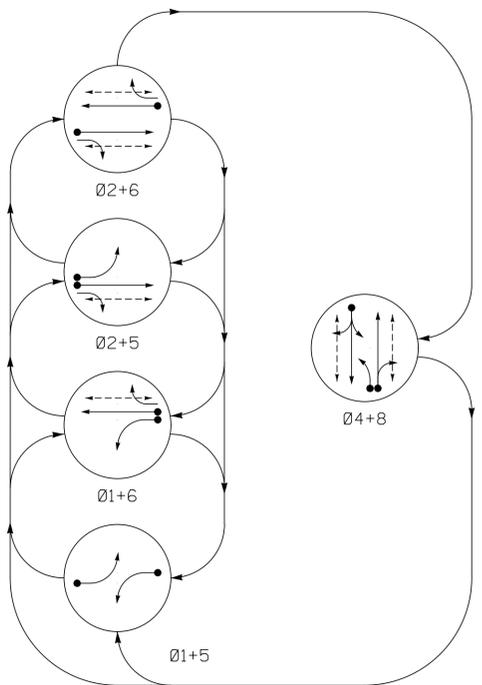
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					FLASH
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 4+8	
11	←	←	←	←	←	—
21,22	R	R	G	G	R	R
41	←	←	←	←	←	—
42,43	R	R	R	R	G	R
51	←	←	←	←	←	—
61,62	R	G	R	G	R	R
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					FLASH
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 4+8	
11	←	←	←	←	←	—
21,22	R	R	G	G	R	R
41	←	←	←	←	←	—
42,43	R	R	R	R	G	R
51	←	←	←	←	←	—
61,62	R	G	R	G	R	R
81,82	R	R	R	R	G	R
P21,P22	DW	DW	W	W	DW	DRK
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	DELAY DURING GREEN	NEW CARD	
1A	6X40	0	2-4-2	-	1	15.0*	-	X	-	X	-	-
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	-
4A	6X40	+5	2-4-2	-	4	-	-	X	-	X	-	-
4B	6X40	+5	2-4-2	-	4	10.0	-	X	-	X	-	-
5A	6X40	+3	2-4-2	-	5	15.0*	-	X	-	X	-	-
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	-
8A	6X40	+5	2-4-2	-	8	10.0	-	X	-	X	-	-

* Reduce Delay to 3 seconds during Alternate Phasing operation.
Disable Phase call for loop during Alternate Phasing operation.

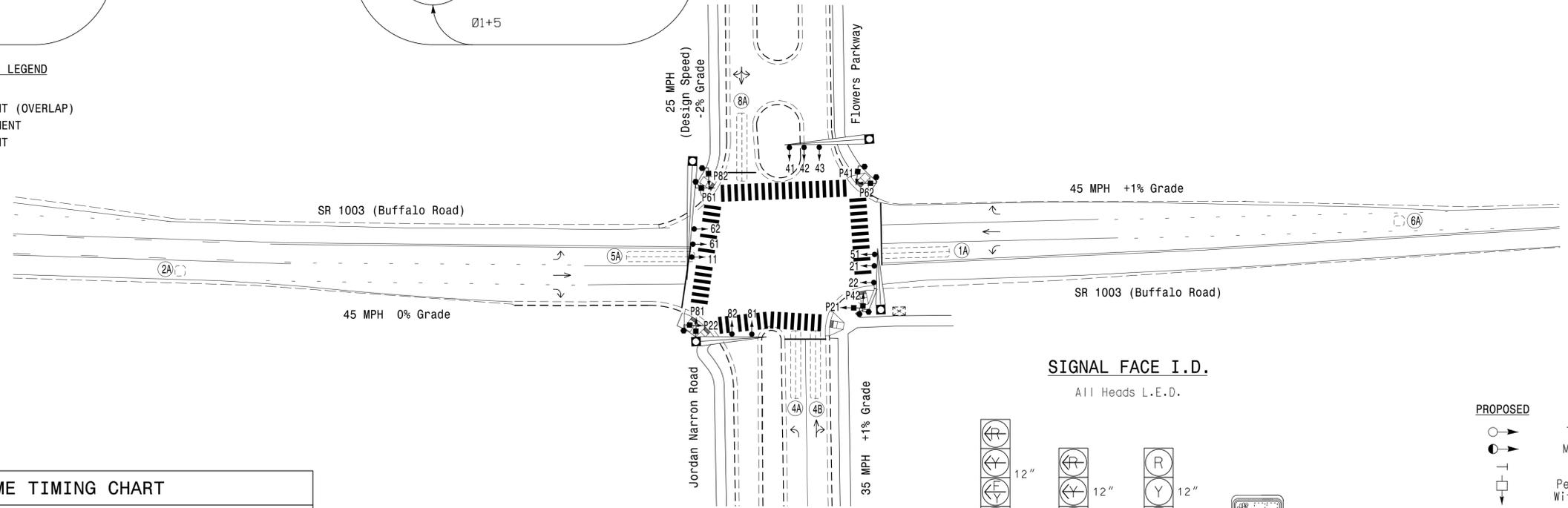
5 Phase Fully Actuated (Clayton Signal System)

NOTES

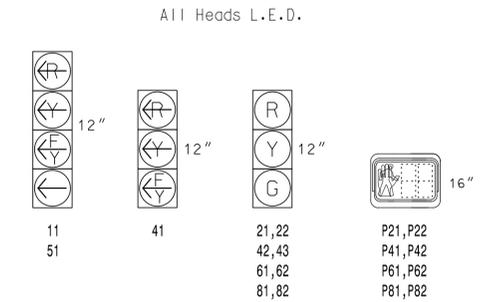
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DONT WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Install 2070LX controller in existing cabinet.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal timing values shall supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



SIGNAL FACE I.D.



LEGEND

- | PROPOSED | EXISTING |
|--|----------------------------|
| ○ → Traffic Signal Head | ● → N/A |
| ○ → Modified Signal Head | ○ → N/A |
| ○ → Pedestrian Signal Head With Push Button & Sign | ○ → N/A |
| ○ → Type II Signal Pedestal | ○ → N/A |
| ○ → Metal Pole with Mastarm | ○ → N/A |
| ○ → Inductive Loop Detector | ○ → N/A |
| □ → Controller & Cabinet | □ → N/A |
| □ → Junction Box | □ → N/A |
| — 2-in Underground Conduit | — 2-in Underground Conduit |
| N/A → Right of Way | N/A → Right of Way |
| → → Directional Arrow | → → Directional Arrow |
| N/A → Curb Ramp | N/A → Curb Ramp |

MAXTIME TIMING CHART

FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	-	14	14	-	14	14
Ped Clear *	-	17	15	-	21	19
Min Green *	7	12	7	7	12	7
Passage *	2.0	6.0	2.0	2.0	6.0	2.0
Max I *	15	75	20	15	75	20
Yellow Change	3.0	4.5	3.8	3.0	4.5	3.8
Red Clear	2.9	1.6	2.9	2.8	1.6	2.9
Added Initial *	-	2.5	-	-	2.5	-
Maximum Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Advance Walk	-	7	7	-	7	7
Non Lock Detector	X	-	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X

* These values may be field adjusted. Do not adjust Min Green and 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

<p>PLANS PREPARED IN THE OFFICE OF: Kimley-Horn NC License #0102 421 Fayetteville Street, Suite 600 Raleigh, NC 27601 (919) 677-2000</p>	<p>SR 1003 (Buffalo Road) at Jordan Narron Road/ Flowers Parkway</p>		<p>SEAL KEVIN P. BAUMANN ENGINEER 044434</p>		
	<p>Division 4 Johnston County Clayton</p> <p>PLAN DATE: March 2024 PREPARED BY: EE Dogbe</p>	<p>REVIEWED BY: KP Baumann</p> <p>REVISIONS</p> <table border="1"> <thead> <tr> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		INIT.	DATE
INIT.	DATE				

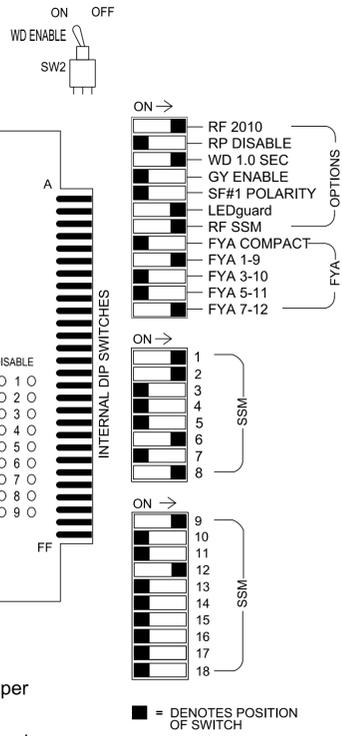
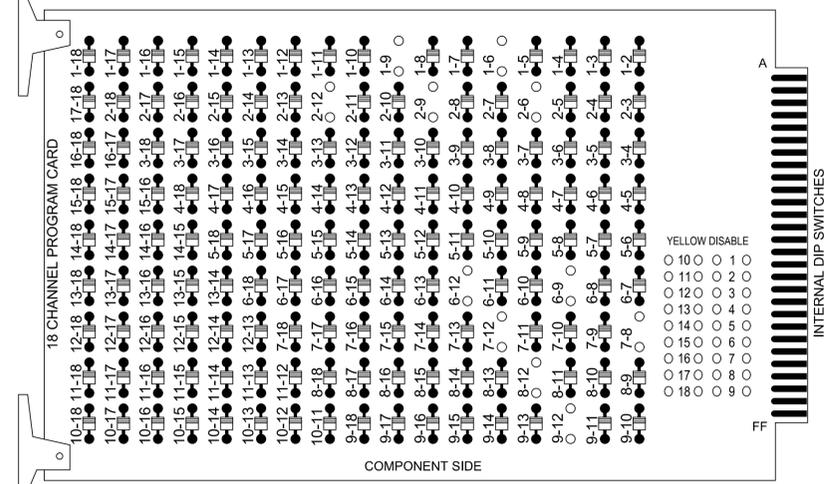
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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 2-6, 2-9, 2-12, 6-9, 6-12, 7-8, 7-12, 8-12, and 9-12.



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- The cabinet and controller are part of the Clayton Signal System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

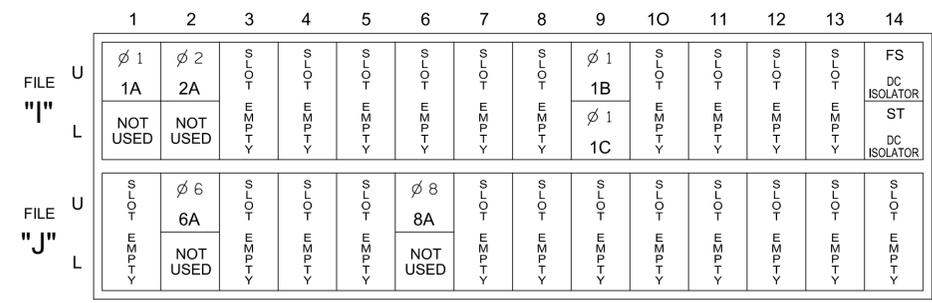
SIGNAL HEAD HOOK-UP CHART

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	OL7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	82	21,22	NU	NU	NU	NU	61,62	NU	23★	81,82	NU	11★	NU	NU	NU	23★	NU
RED	*	128						134			107							A101
YELLOW		129						135		*	108							
GREEN		130						136			109							
RED ARROW													A121					
YELLOW ARROW		126											A122					A102
FLASHING YELLOW ARROW													A123					A103
GREEN ARROW	127	127									124							

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

INPUT FILE POSITION LAYOUT

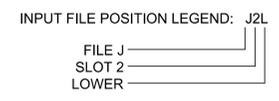
(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

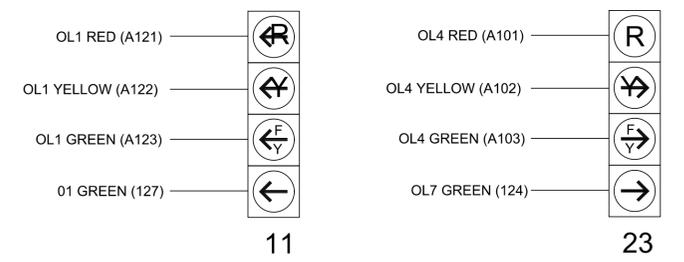
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A ¹	TB2-1,2	I1U	56	18	1★	1	15.0		X		X	
					29★	6	3.0		X		X	X
1B	TB6-9,10	I9U	60	22	13	1	15.0		X		X	
1C	TB6-11,12	I9L	62	24	14	1	15.0		X		X	
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	3.0		X		X	

- ¹ Remove jumper from I1-W to J4-W, on rear of input file.
 ★ For the detectors to work as shown on the signal design plan, see the Detector Programming Detail for Alternate Phasing on sheet 2.



FYA SIGNAL WIRING DETAIL

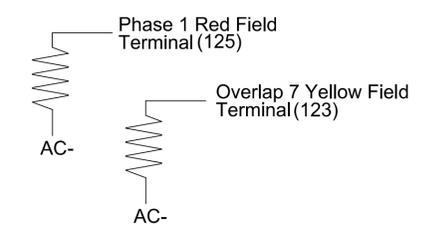
(wire signal heads as shown)



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: 04-1451
 DESIGNED: MARCH 2024
 SEALED: 5/22/2025
 REVISED: N/A

Electrical Detail - Sheet 1 of 3

Prepared For: **Kimley-Horn**
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000

Division 4 Johnston County Clayton
 SR 1553 (Shotwell Road) at SR 1007 (Covered Bridge Road)
 PLAN DATE: March 2024 REVIEWED BY: KP Baumann
 PREPARED BY: CF Davis REVIEWED BY:

REVISIONS: _____ INIT. DATE _____

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 044434
 KETIN P. BAUMANN
 5/22/2025
 SIG. INVENTORY NO. 04-1451

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MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

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	Overlap	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

NOTICE OVERLAP 7
ASSIGNED TO CHANNEL 7 →

NOTICE: FLASH RED

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE INCLUDED PHASE

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector	Call Phase	Delay
1	1	0.0
29	0	3.0

1A

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1451
DESIGNED: MARCH 2024
SEALED: 5/22/2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR: 	SR 1553 (Shotwell Road) at SR 1007 (Covered Bridge Road)		
	Prepared For: PLANS PREPARED IN THE OFFICE OF: Kimley»Horn NC License #F-0102 421 Fayetteville Street, Suite 600 Raleigh, NC 27601 (919) 677-2000	Division 4 Johnston County Clayton PLAN DATE: March 2024 REVIEWED BY: KP Baumann PREPARED BY: CF Davis REVIEWED BY:	
REVISIONS INIT. DATE	SIGNATURE DATE	SIG. INVENTORY NO. 04-1451	

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO <u>RUN DEFAULT PHASING</u>	1	1
ACTIVE PLAN REQUIRED TO <u>RUN ALTERNATE PHASING</u>	2	2

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu > Controller > Coordination > Patterns

Web Interface
Home > Controller > Coordination > Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1451
DESIGNED: MARCH 2024
SEALED: 5/22/2025
REVISED: N/A

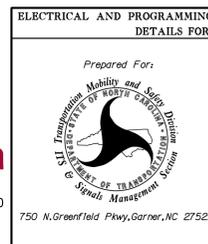
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Electrical Detail - Sheet 3 of 3

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PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000



Prepared For: SR 1553 (Shotwell Road) at SR 1007 (Covered Bridge Road)	
Division 4 Johnston County Clayton	
PLAN DATE: March 2024	REVIEWED BY: KP Baumann
PREPARED BY: CF Davis	REVIEWED BY:
REVISIONS	INIT. DATE

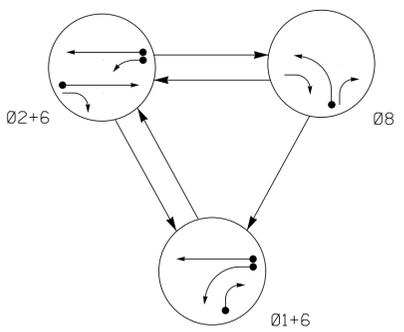
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DocuSigned by:
Kevin P. Baumann
5/22/2025

SIGNATURE DATE

SIG. INVENTORY NO. 04-1451

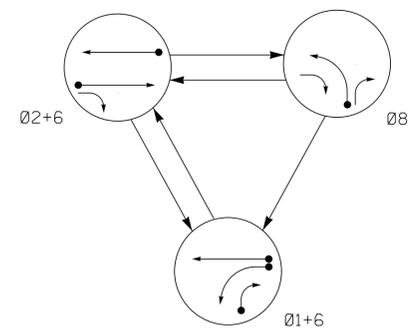
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

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

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

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

MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15.0*	-	X	-	X	-	-
1B	6X40	0	2-4-2	-	6#	3.0	-	X	-	X	X	-
1C	6X6	0	EXIST	-	1	15.0	-	X	-	X	-	-
2A	6X6	300	EXIST	-	2	-	-	X	X	X	-	-
6A	6X6	300	EXIST	-	6	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	-	8	3.0	-	X	-	X	-	-

3 Phase Fully Actuated (Clayton Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated 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. Phase 1 may be lagged.
5. Pavement markings are existing.
6. Install 2070LX controller in existing cabinet.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

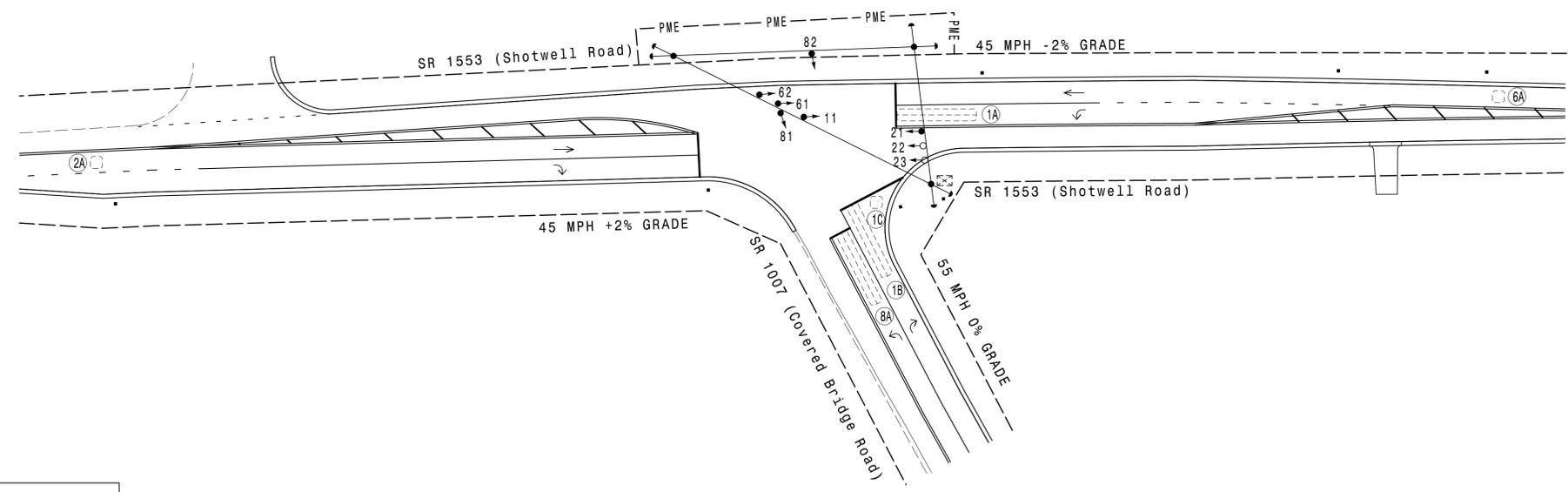
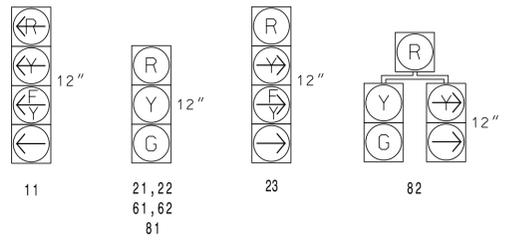
* Disable Delay during Alternate Phasing operation.
Disable Phase call for loop during Alternate Phasing operation.

SIGNAL FACE I.D.

All Heads L.E.D.

PHASING DIAGRAM DETECTION LEGEND

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



MAXTIME TIMING CHART

FEATURE	PHASE			
	1	2	6	8
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Min Green *	7	12	12	7
Passage *	2.0	6.0	6.0	2.0
Max I *	20	90	90	30
Yellow Change	3.0	4.7	4.7	3.0
Red Clear	2.3	1.4	1.4	2.6
Added Initial *	-	2.5	2.5	-
Maximum Initial *	-	34	34	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.0	3.0	-
Advance Walk	-	-	-	-
Non Lock Detector	X	-	-	X
Vehicle Recall	-	MIN RECALL	MIN RECALL	-
Dual Entry	-	-	-	-

* 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 With Push Button & Sign | ↓ |
| ○ → | Signal Pole with Guy | ● → |
| ○ → | Signal Pole with Sidewalk Guy | ● → |
| ○ → | Inductive Loop Detector | ○ → |
| ⊠ | Controller & Cabinet | ⊠ |
| □ | Junction Box | □ |
| --- | 2-in Underground Conduit | --- |
| N/A | Right of Way | --- |
| -PME- | Permanent Maintenance Easement | -PME- |
| → | Directional Arrow | → |

Signal Upgrade

Prepared For:

 750 N. Greenfield Pkwy, Garner, NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
 NC License #0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000

**SR 1553 (Shotwell Road)
at
SR 1007 (Covered Bridge Road)**

Division 4 Johnston County Clayton
 PLAN DATE: March 2024 REVIEWED BY: KP Baumann
 PREPARED BY: CF Davis REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE: 0 40
1" = 40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

 Kevin P. Baumann
 ENGINEER

DocuSigned by:

 5/22/2025
 SIGNATURE DATE
 SIG. INVENTORY NO. 04-1451

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