PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 14.2

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

1A

Detector	Call Phase	Delay
1	1	0
29	0	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL1

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0502T2
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Design 2
Electrical Detail - Sheet 2 of 3

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343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch
750 N. Greenfield Pkwy, Garner, NC 27529

NC 49 (Albemarle Rd)
at
I-73-US 220 SB Ramps/
I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0502T2

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 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: 08-0502T2
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
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Signal Upgrade
Temporary Design 2
Electrical Detail - Sheet 3 of 3

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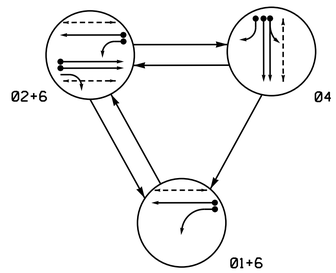
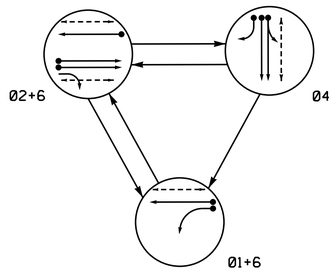
DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
SIG. INVENTORY NO. 08-0502T2

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 15.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←	F/Y	R	~~Y~~
21	R	↑	R	Y
22	R	G	R	Y
23	R	F/Y	R	F/Y
41,42	R	R	G	R
43	R	R	→	R
61	G	G	R	Y
62	↑	↑	R	Y
P21,P22	W	DW	DW	DRK
P41,P42	DW	DW	W	DRK
P61,P62	W	W	DW	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←	~~R~~	R	~~Y~~
21	R	↑	R	Y
22	R	G	R	Y
23	R	F/Y	R	F/Y
41,42	R	R	G	R
43	R	R	→	R
61	G	G	R	Y
62	↑	↑	R	Y
P21,P22	W	DW	DW	DRK
P41,P42	DW	DW	W	DRK
P61,P62	W	W	DW	DRK

MAXTIME DETECTOR INSTALLATION CHART

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

✱Disable Delay During Alternate Phasing Operation.
* Disable phase call during Alternate Phasing operation.

3 Phase
Fully Actuated
Signal System #D08-29_Asheboro
US 64 Bus-NC 49 (Asheboro)

NOTES

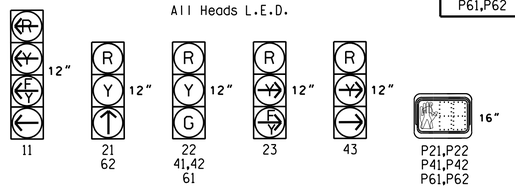
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. 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 shall supersede these values.

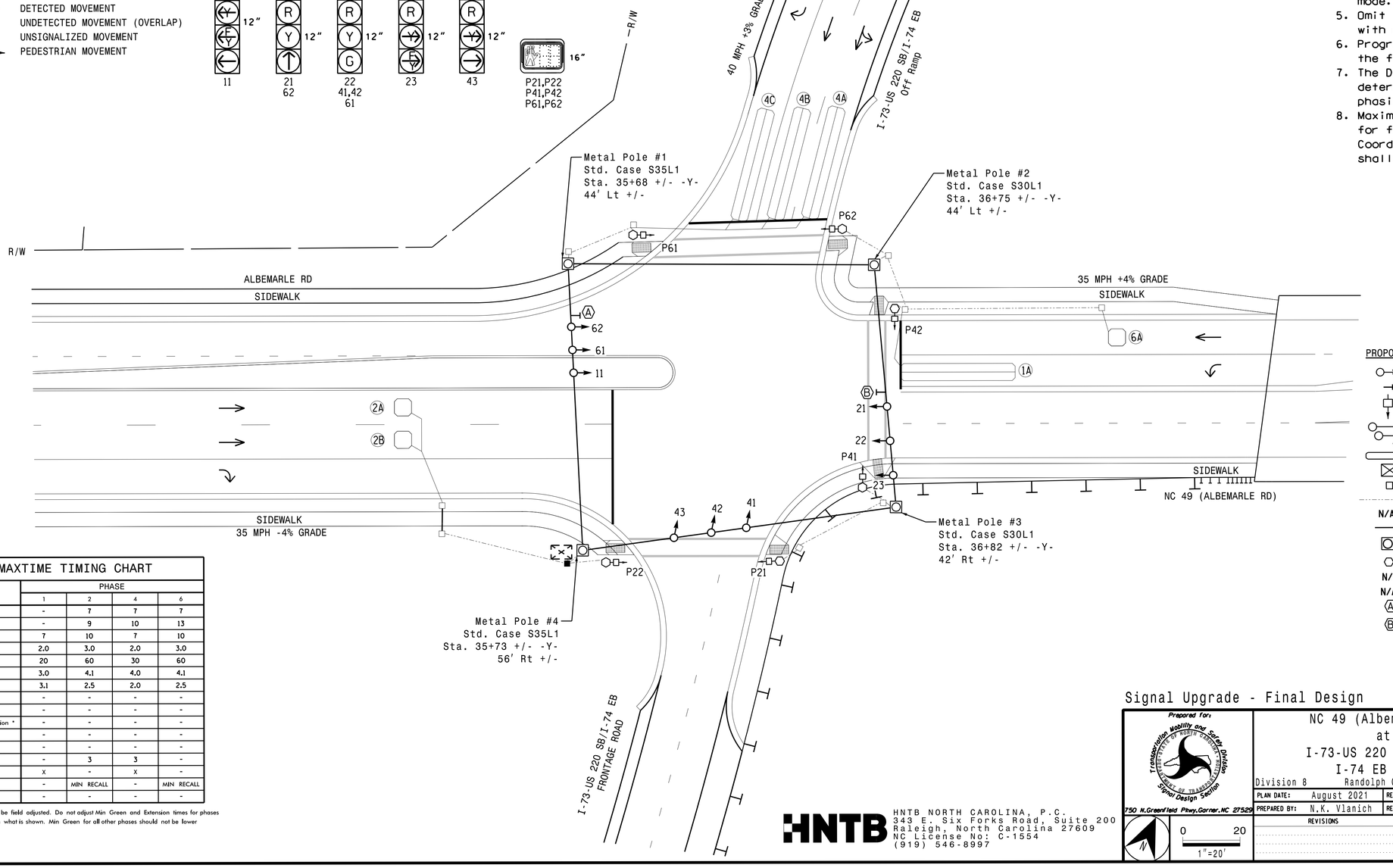
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.





LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	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	
	Directional Arrow	
	Metal Strain Pole	
	Type II Signal Pedestal	
N/A	Guardrail	
N/A	Curb Ramp	
A	No Right Turn Sign (R3-1)	A
B	No U-Turn/No Left Turn Sign (R3-18)	B

MAXTIME TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Walk *	-	7	7	7
Ped Clear *	-	9	10	13
Min Green	7	10	7	10
Passage *	2.0	3.0	2.0	3.0
Max 1 *	20	60	30	60
Yellow Change	3.0	4.1	4.0	4.1
Red Clear	3.1	2.5	2.0	2.5
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	3	3	-
Non Lock Detector	X	-	X	-
Vehicle Recall	-	MIN RECALL	-	MIN RECALL
Dual Entry	-	-	-	-

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

Signal Upgrade - Final Design

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343 E. Six Forks Road, Suite 200
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Prepared For:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

0 20
1"=20'

NC 49 (Albemarle Rd)
at
I-73-US 220 SB Ramps/
I-74 EB Ramps
Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

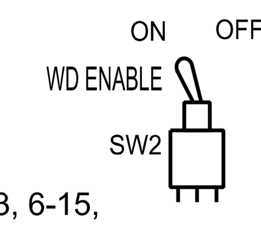
DocuSigned by:
~~Natasha R Simmons~~ SIGNATURE 5/21/2024 DATE

STC. INVENTORY NO. 08-0502

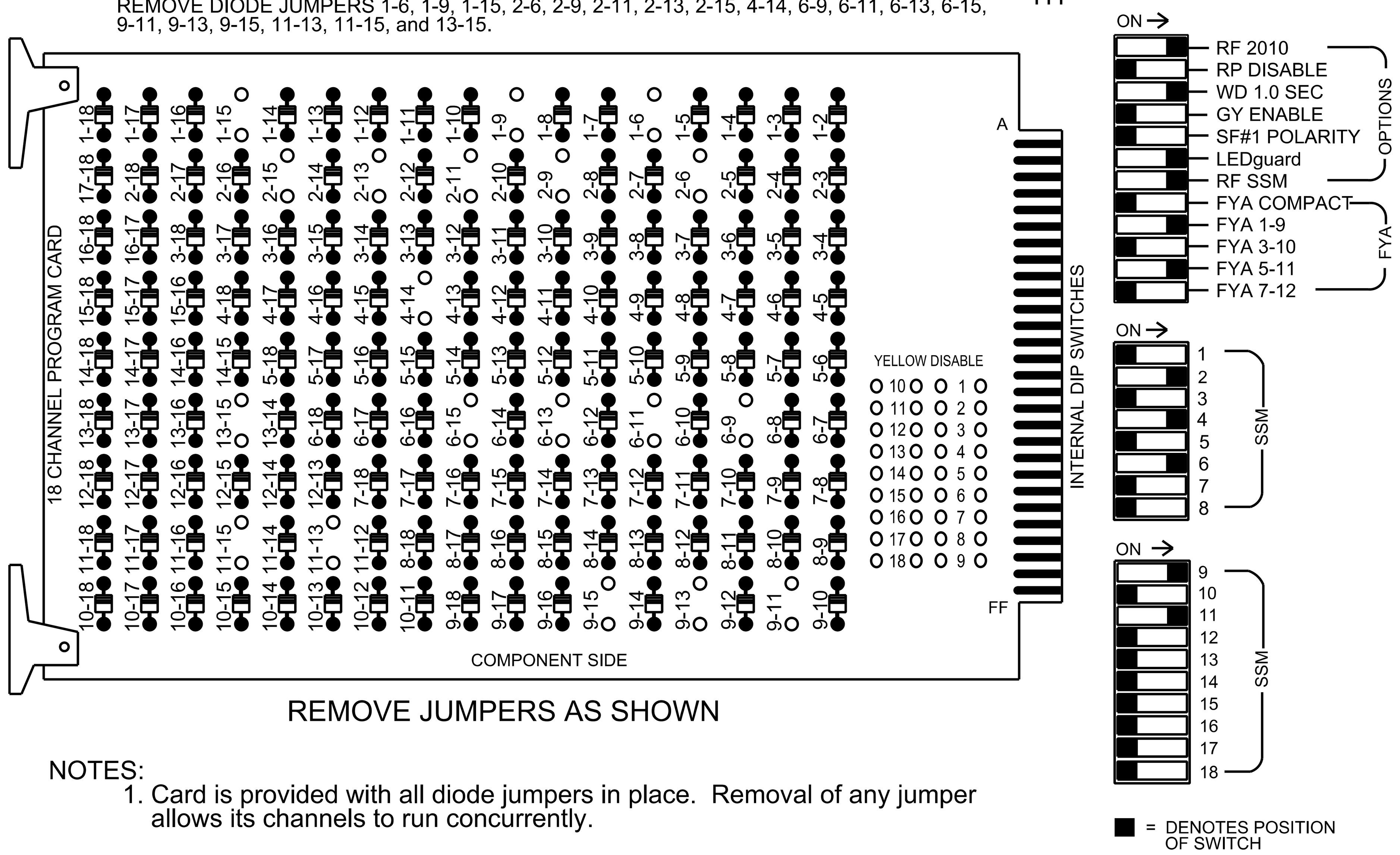
PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 15.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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



REMOVE JUMPERS AS SHOWN

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plans.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all enabled detectors used at this location.
4. The cabinet and controller are part of Signal System #D08-29_Asheboro, US 64 Bus-NC 49 (Asheboro).

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,S6,S8,S9
AUX S1, AUX S4
Phases Used..1,2,2 PED,4,4 PED,6,6 PED
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★	21	22	P21, P22	NU	41,42	43	P41, P42	NU	61	62	P61, P62	NU	NU	NU	11★	NU	NU	23★	NU	NU
RED		128	128			101	101			134	134								A114		
YELLOW	*	129	129			102				135	135										
GREEN			130			103				136											
RED ARROW																A121					
YELLOW ARROW							102									A122			A115		
FLASHING YELLOW ARROW																A123			A116		
GREEN ARROW	127	130					103				136										
(Don't Walk hand)				113				104				119									
(Walk person)				115				106				121									

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6			X		X	
2A	TB2-5,6	I2U	39	1	2	2			X		X	
2B	TB2-7,8	I2L	43	5	3	2			X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
4B	TB4-11,12	I6L	45	7	9	4			X		X	
4C	TB6-1,2	I7U	65	31	10	4	15		X		X	
6A	TB3-5,6	J2U	40	2	16	6			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						

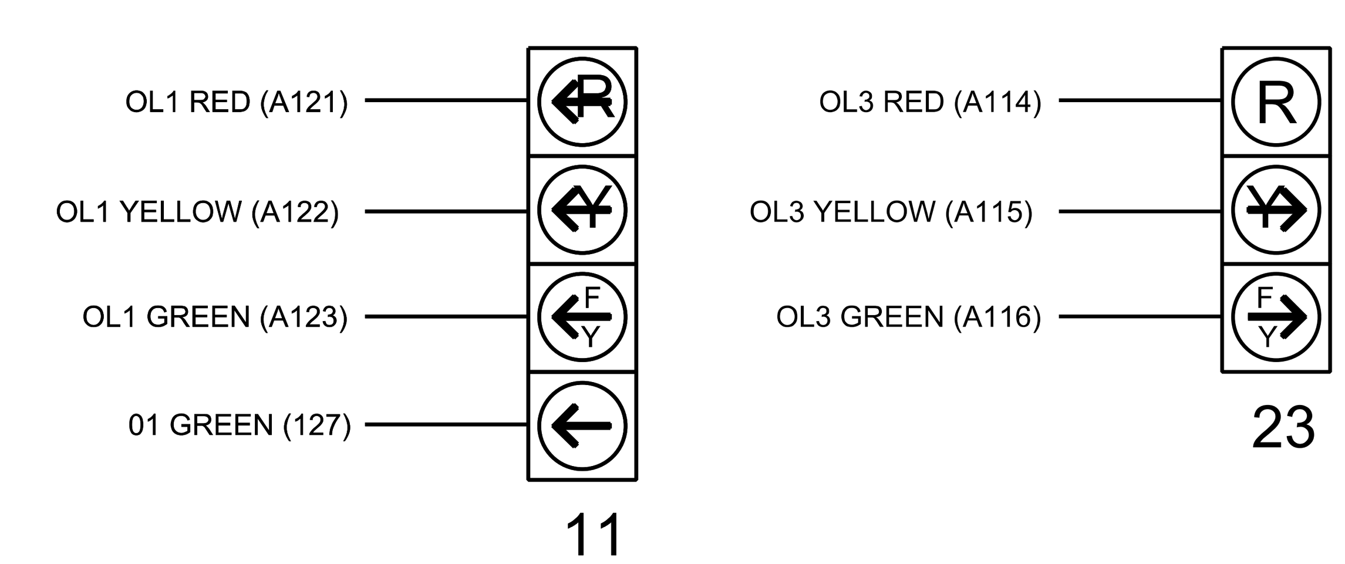
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

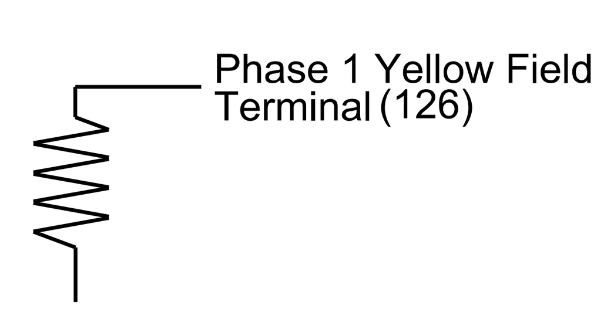


THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0502
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

HNTB

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

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 49 (Albemarle Rd)
at
I-73-US 220 SB Ramps/
I-74 EB Ramps

Division 8 — Randolph County — Asheboro

Prepared for the Offices of:
Transportation Mobility and Safety Division, ITS & Signals Management Section, State of North Carolina Department of Transportation
750 N. Greenfield Pkwy, Garner, NC 27529

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
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REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons — 5/21/2024
SIGNATURE — DATE
F6DA88DF3AD445A...

SIG. INVENTORY NO. 08-0502

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 15.2

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

1A

Detector	Call Phase	Delay
1	1	0
29	0	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL1

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0502
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 3

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NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 49 (Albemarle Rd)
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Division 8 | Randolph County | Asheboro

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PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0502

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 15.3

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 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: 08-0502
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 49 (Albemarle Rd)
at
I-73-US 220 SB Ramps/
I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

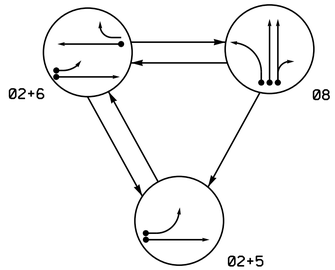
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

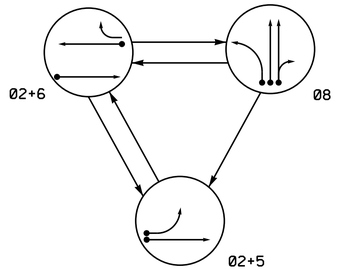
SIG. INVENTORY NO. 08-0502

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 16.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 08	FLASH
21	G	G	R	Y
22	↑	↑	R	Y
51	←	F Y	~~R~~	~~Y~~
61	R	↑	R	Y
62	R	G	R	Y
63	R	F Y	R	~~Y~~
81	~~R~~	~~R~~	—	~~R~~
82,83	R	R	G	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 08	FLASH
21	G	G	R	Y
22	↑	↑	R	Y
51	←	~~R~~	~~R~~	~~Y~~
61	R	↑	R	Y
62	R	G	R	Y
63	R	F Y	R	~~Y~~
81	~~R~~	~~R~~	←	~~R~~
82,83	R	R	G	R

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DELAY DURING GREEN	NEW CARD
2A✳	6X6	70	✳	✳	2	-	-	X - X - ✳		
5A✳	6X40	0	✳	✳	5	✳✳ 15	-	X - X - ✳		
					▪ 2	-	-	X - X - ✳		
6A✳	6X6	70	✳	✳	6	-	-	X - X - ✳		
8A✳	6X40	0	✳	✳	8	-	-	X - X - ✳		
8B✳	6X40	0	✳	✳	8	-	-	X - X - ✳		
8C✳	6X40	0	✳	✳	8	10	-	X - X - ✳		
8D✳	6X20	0	✳	✳	8	15	-	X - X - ✳		

✳ Microwave Detection
✳✳ Disable Delay during Alternate Phasing Operation.
▪ Disable phase call during Alternate Phasing operation.

3 Phase
Fully Actuated
(Isolated)

NOTES

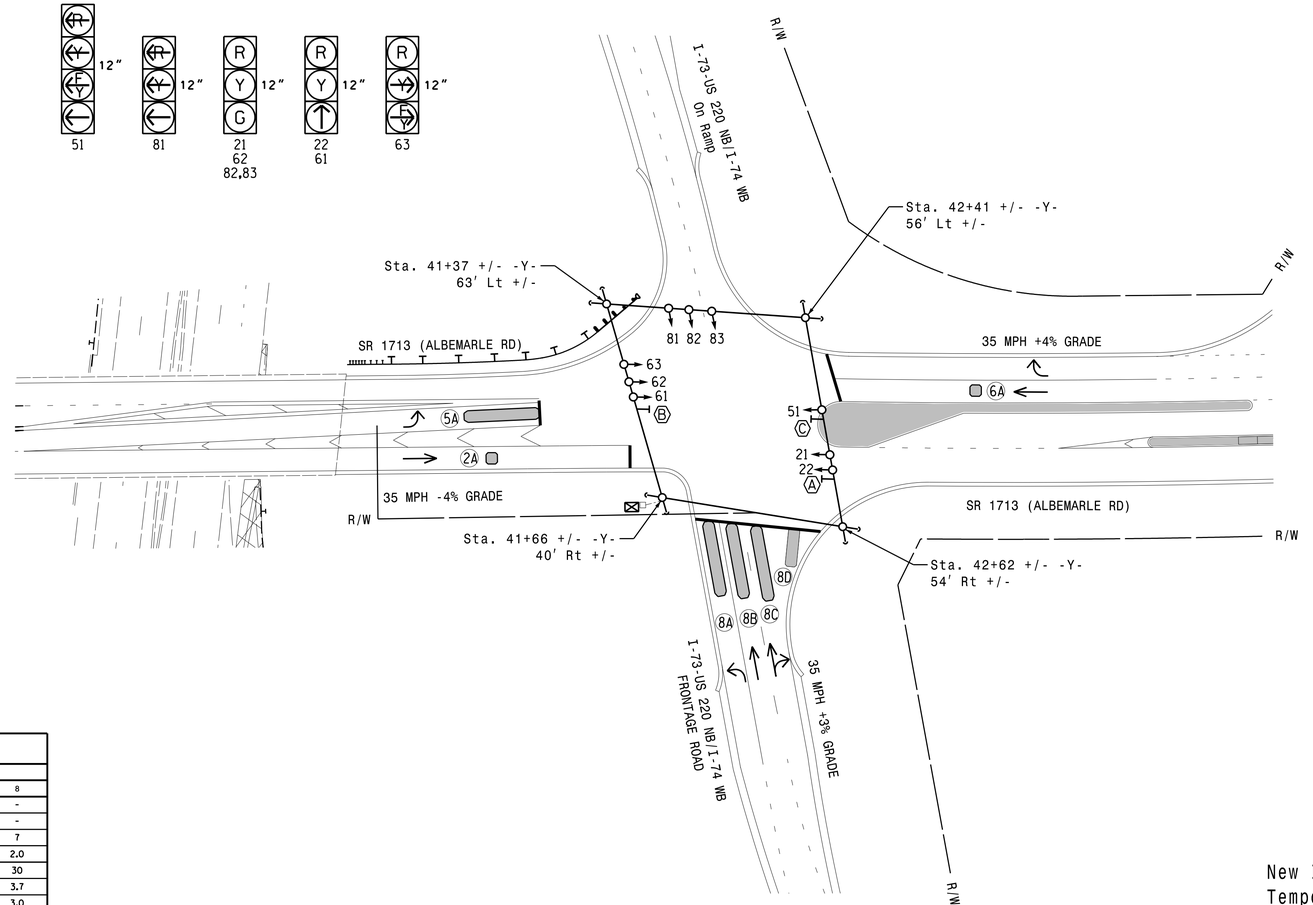
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



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	———
→	Directional Arrow	→
▒	Construction Zone	▒
▬	Microwave Detection Zone	▬
N/A	Guardrail	⊥⊥
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ
Ⓒ	Left Turn Sign (R3-1L)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	10	7	10	7
Passage *	3.0	2.0	3.0	2.0
Max 1 *	60	20	60	30
Yellow Change	4.1	3.0	4.1	3.7
Red Clear	3.1	3.3	3.1	3.0
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	-	-	-
Non Lock Detector	-	X	-	X
Vehicle Recall	MIN RECALL	-	MIN RECALL	-
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.

New Installation -
Temporary Design
(Construction Phase IIA)

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343 E. Six Forks Road, Suite 200
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Prepared for: Transportation Mobility and Safety Division, Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 1713 (Albemarle Rd)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE: August 2021 | REVIEWED BY: A.D. Klinksiek
PREPARED BY: N.K. Vlanich | REVIEWED BY: N.R. Simmons

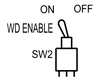
REVISIONS	INIT.	DATE

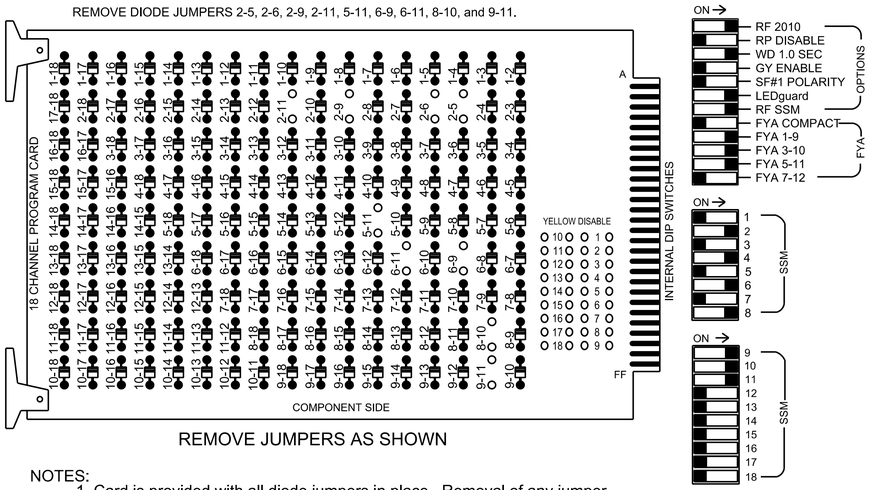
0 40
1"=40'

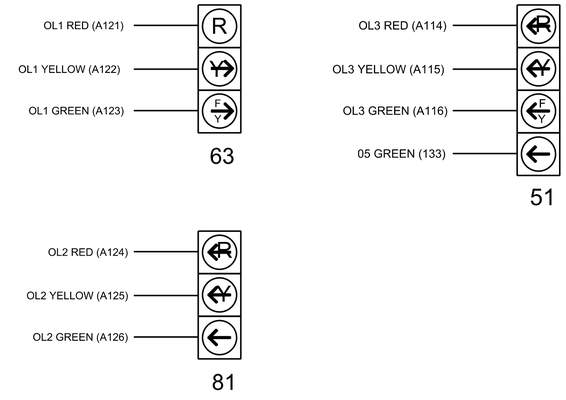
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

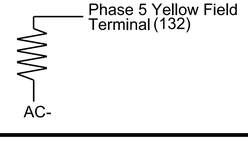
DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0503T









PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 16.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 5-11, 6-9, 6-11, 8-10, and 9-11.

REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

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

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2		S3	S4	S5	S6	S7	S8		S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2		13	3	4	14	5	6		15	7	8	16	9	10	17	11	12	18
PHASE	1	2		2 PED	3	4	4 PED	5	6		6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	NU	51★	61	62	NU	NU	82,83	NU	63★	81★	NU	51★	NU	NU
RED		128	128						134	134			107		A121					
YELLOW		129	129					*	135	135			108							
GREEN		130								136			109							
RED ARROW																A124		A114		
YELLOW ARROW															A122	A125		A115		
FLASHING YELLOW ARROW															A123			A116		
GREEN ARROW			130					133	136							A126				
✋																				
🚶																				

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
5A	TB3-1,2	J1U	55	17	15★	5	15		X		X	
				-	31★	2	3		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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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: 08-0503T
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

New Installation
Temporary Design
Electrical Detail - Sheet 1 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 49/SR 1713 (Albemarle Rd)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
SEAL 031464
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
F6DA88DF3AD445A...

SIG. INVENTORY NO. 08-0503T

21-MAY-2024 11:53
HNTB

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 16.2

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

5A

Detector	Call Phase	Delay
15	5	0
31	0	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL3

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0503T
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

New Installation
Temporary Design
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 49/SR 1713 (Albemarle Rd)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0503T

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 16.3

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.

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: 08-0503T
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

New Installation
Temporary Design
Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

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Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
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REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

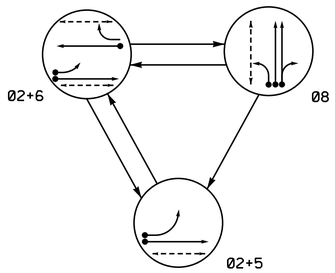
DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0503T

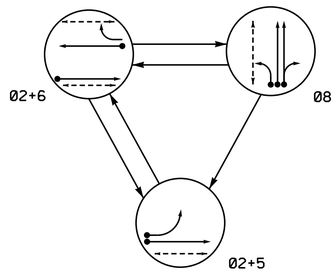
PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 17.0

3 Phase
Fully Actuated
Signal System #D08-29_Asheboro
US 64 Bus-NC 49 (Asheboro)

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 08	FLASH
21	G	G	R	Y
22	↑	↑	R	Y
51	←	F Y	R	Y
61	R	↑	R	Y
62	R	G	R	Y
63	R	F Y	R	Y
81	R	R	F Y	R
82,83	R	R	G	R
P21,P22	W	W	DW	DRK
P61,P62	DW	W	DW	DRK
P81,P82	DW	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 08	FLASH
21	G	G	R	Y
22	↑	↑	R	Y
51	←	R	R	Y
61	R	↑	R	Y
62	R	G	R	Y
63	R	F Y	R	Y
81	R	R	F Y	R
82,83	R	R	G	R
P21,P22	W	W	DW	DRK
P61,P62	DW	W	DW	DRK
P81,P82	DW	DW	W	DRK

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DELAY DATING AREA	NEW CARD
2A	6X6	70	3	X	2	-	-	X -	X -	X
5A	6X40	0	2-4-2	X	5	✱15	-	X -	X -	X
					▪2	-	-	X -	X -	X
6A	6X6	70	5	X	6	-	-	X -	X -	X
8A	6X40	0	2-4-2	X	8	-	-	X -	X -	X
8B	6X40	0	2-4-2	X	8	-	-	X -	X -	X
8C	6X40	0	2-4-2	X	8	10	-	X -	X -	X
8D	6X20	0	3	X	8	15	-	X -	X -	X

✱ Disable Delay during Alternate Phasing Operation.
▪ Disable phase call during Alternate Phasing operation.

NOTES

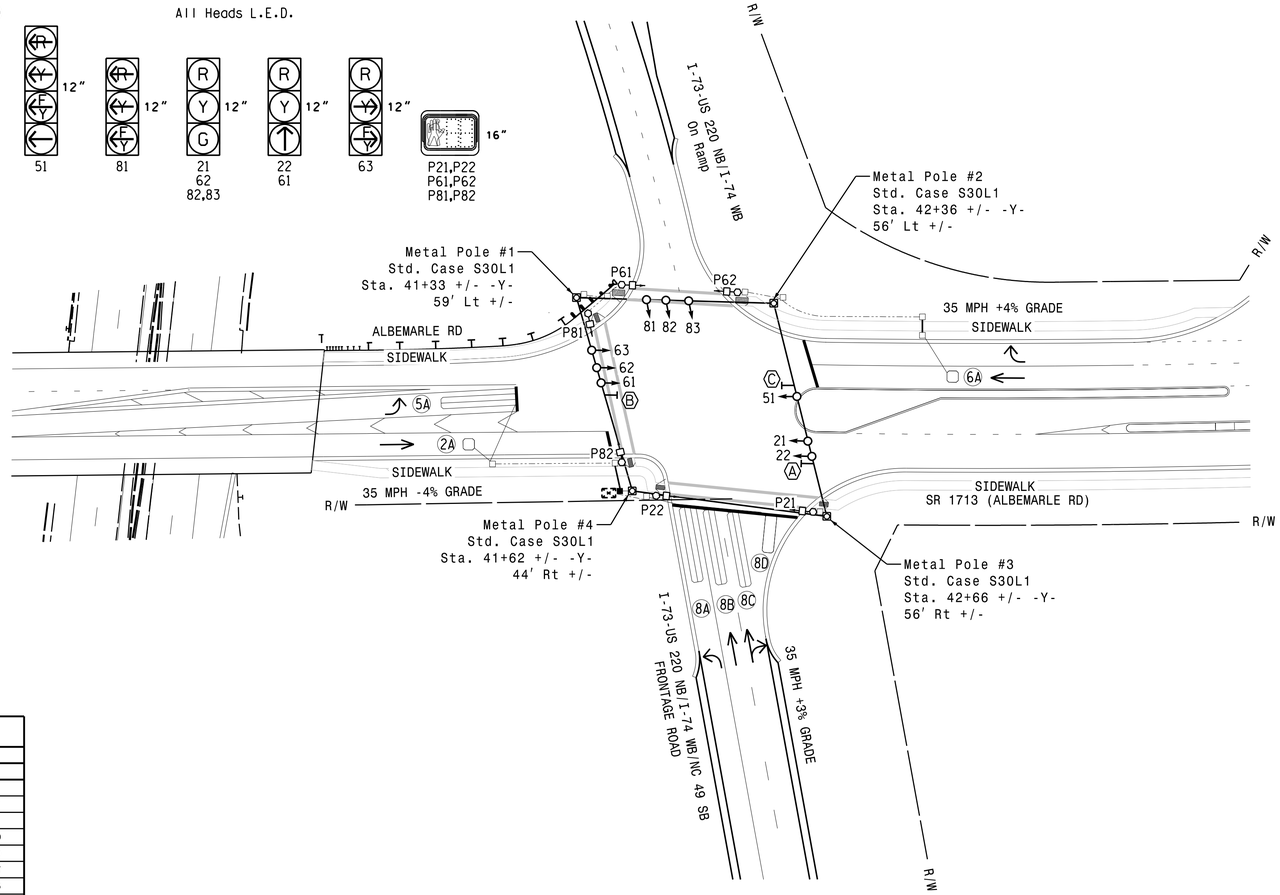
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



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	——
→	Directional Arrow	→
◎	Metal Strain Pole	◘
⬡	Type II Signal Pedestal	⬢
N/A	Curb Ramp	◿
N/A	Guardrail	⊥⊥
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ
Ⓒ	Left Arrow "ONLY" Sign (R3-5L)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Walk *	7	-	7	7
Ped Clear *	18	-	11	17
Min Green	10	7	10	7
Passage *	3.0	2.0	3.0	2.0
Max 1 *	60	20	60	30
Yellow Change	4.1	3.0	4.1	3.7
Red Clear	2.2	3.3	2.2	2.3
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	-	3	3
Non Lock Detector	-	X	-	X
Vehicle Recall	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	-	-	-

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

Signal Upgrade - Final Design

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HNTB NORTH CAROLINA, P.C.
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Prepared for: Transportation Mobility and Safety Division, Signal Design Section, NC DEPARTMENT OF TRANSPORTATION
750 N.Greenfield Pkwy,Garner,NC 27529

NC 49/SR 1713 (Albemarle Rd)
at
I-73-US 220 NB/I-74 WB Ramps

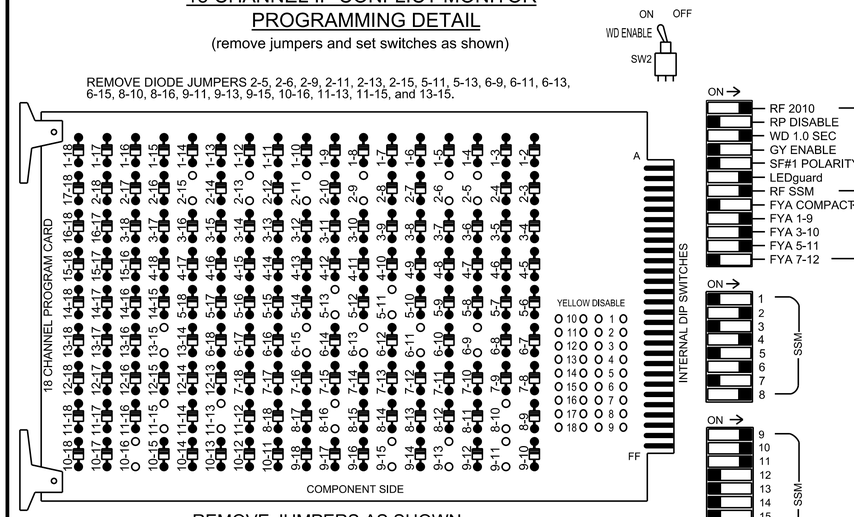
Division 8 Randolph County Asheboro

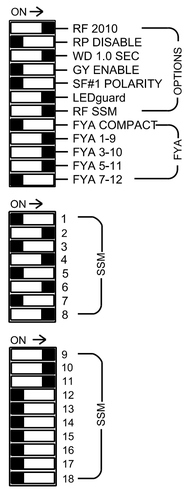
PLAN DATE: August 2021 REVIEWED BY: A.D. Klinksiek
PREPARED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons

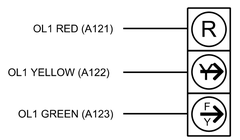
0 40
1"=40'

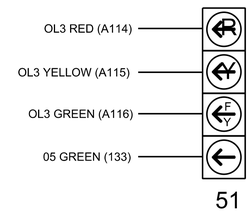
REVISIONS	INIT.	DATE

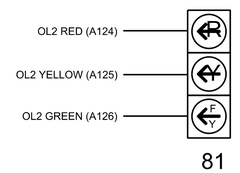
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS
DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE
SIG. INVENTORY NO. 08-0503











PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 17.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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

REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plans.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all enabled detectors used at this location.
4. The cabinet and controller are part of Signal System #D08-29_Asheboro, US 64 Bus-NC 49 (Asheboro).

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,S7,S8,S9,S11,S12 AUX S1,AUX S2,AUX S4
Phases Used	2,2 PED,5,6,6 PED,8,8 PED
Overlap "1"	*
Overlap "2"	*
Overlap "3"	*
Overlap "4"	Not Used

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2		S3	S4	S5	S6	S7	S8		S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2		13	3	4	14	5	6		15	7	8	16	9	10	17	11	12	18
PHASE	1	2		2 PED	3	4	4 PED	5	6		6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22	P21, P22	NU	NU	NU	51 ★	61	62	P61, P62	NU	82,83	P81, P82	63 ★	81 ★	NU	51 ★	NU	NU
RED		128	128						134	134			107		A121					
YELLOW		129	129					*	135	135			108							
GREEN		130								136			109							
RED ARROW																A124		A114		
YELLOW ARROW															A122	A125		A115		
FLASHING YELLOW ARROW															A123	A126		A116		
GREEN ARROW			130					133	136											
✋				113							119			110						
🚶				115							121			112						

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

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

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	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2			X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
8B	TB5-11,12	J6L	46	8	23	8			X		X	
8C	TB7-1,2	J7U	66	32	24	8	10		X		X	
8D	TB7-3,4	J7L	79	45	25	8	15		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
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.

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)

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

21-MAY-2024 11:53
$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$
HNTB

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: 08-0503
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

HNTB
HNTB NORTH CAROLINA, P.C.
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Signal Upgrade - Final Design
Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 49/SR 1713 (Albemarle Rd)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
SEAL 031464
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
F6DA88DF3AD445A...

SIG. INVENTORY NO. 08-0503

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 17.2

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

5A

Detector	Call Phase	Delay
15	5	0
31	0	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL3

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0503
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NCDOT Transportation Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 49/SR 1713 (Albemarle Rd)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0503

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 17.3

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 ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0503
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

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

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Division 8 | Randolph County | Asheboro

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PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

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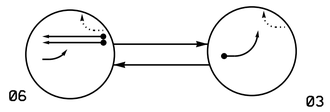
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE

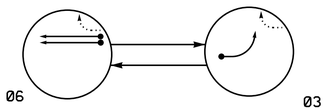
SIG. INVENTORY NO. 08-0503

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 18.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 06	PHASE 03	FLASH
51	~~G~~ Y	←	~~Y~~
61,62	↑	R	Y

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 06	PHASE 03	FLASH
51	~~R~~	←	~~Y~~
61,62	↑	R	Y

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DELAY DURING GREEN	NEW CARD
3A✳	6X40	0	✳	✳	3	✳✳ 15	-	X	-	X	-	✳
6A✳	6X6	300	✳	✳	6	-	-	X	X	X	-	✳
6B✳	6X6	300	✳	✳	6	-	-	X	X	X	-	✳

✳ Microwave Detection
✳✳ Disable Delay During Alternate Phasing Operation.

2 Phase
Fully Actuated
(Isolated)

NOTES

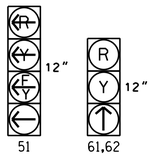
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Incorporate Microwave Detection system for vehicle detection.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

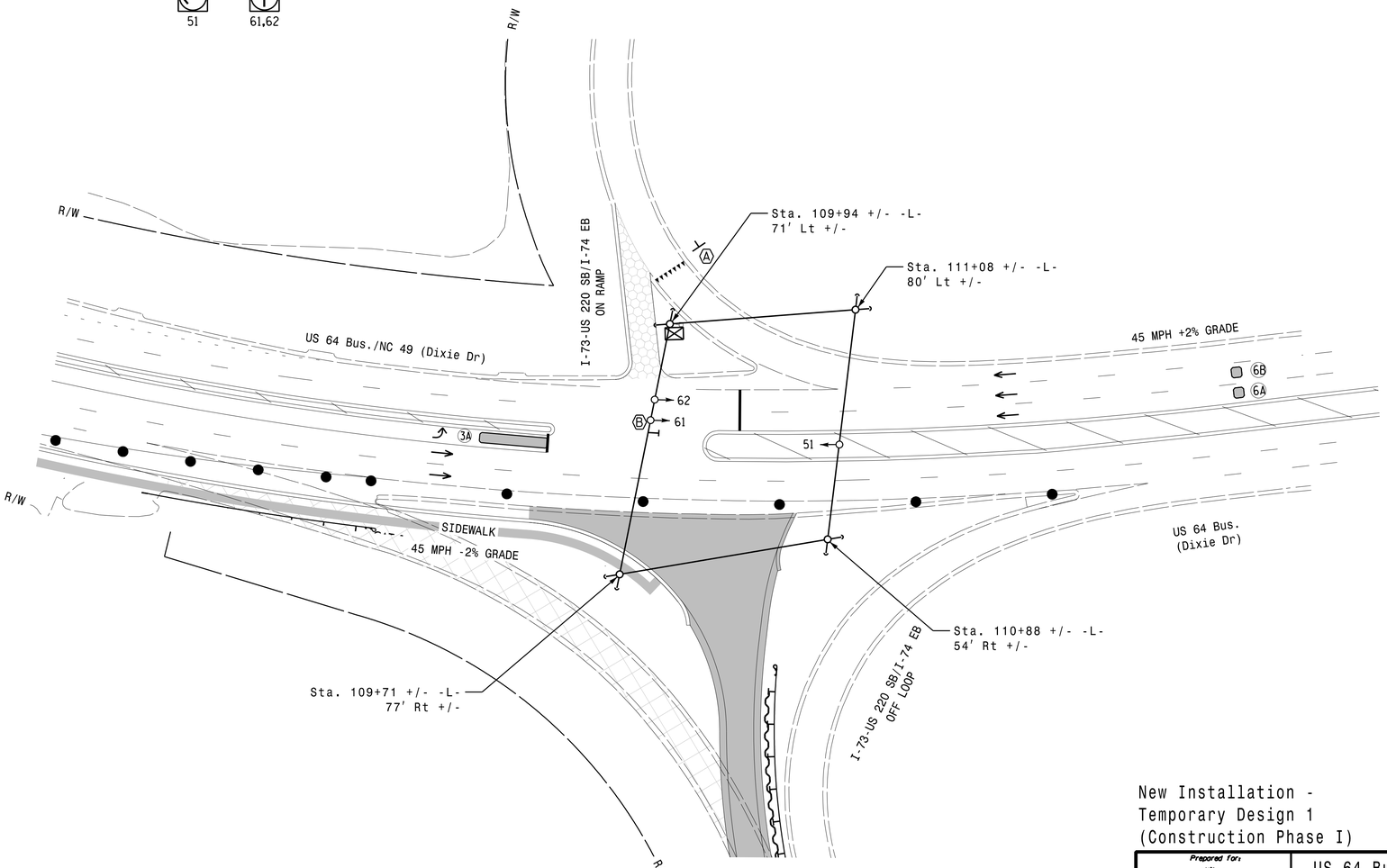
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.





LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
⊣	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	— — —
→	Directional Arrow	→
▭	Construction Zone	▭
▭	Microwave Detection Zone	▭
N/A	Guardrail	⊣⊣⊣
●●●	Construction Zone Drums	●●●
⬡	Temporary Pavement	⬡
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ

MAXTIME TIMING CHART

FEATURE	PHASE 3	PHASE 6
Walk *	-	-
Ped Clear *	-	-
Min Green	7	12
Passage *	2.0	6.0
Max 1 *	30	90
Yellow Change	3.0	4.3
Red Clear	2.4	1.7
Added Initial *	-	1.5
Maximum Initial *	-	34
Time Before Reduction *	-	15
Time To Reduce *	-	30
Minimum Gap	-	3.0
Advance Walk	-	-
Non Lock Detector	X	-
Vehicle Recall	-	MIN RECALL
Dual Entry	-	-

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

New Installation -
Temporary Design 1
(Construction Phase I)

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Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

0 40
1"=40'

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

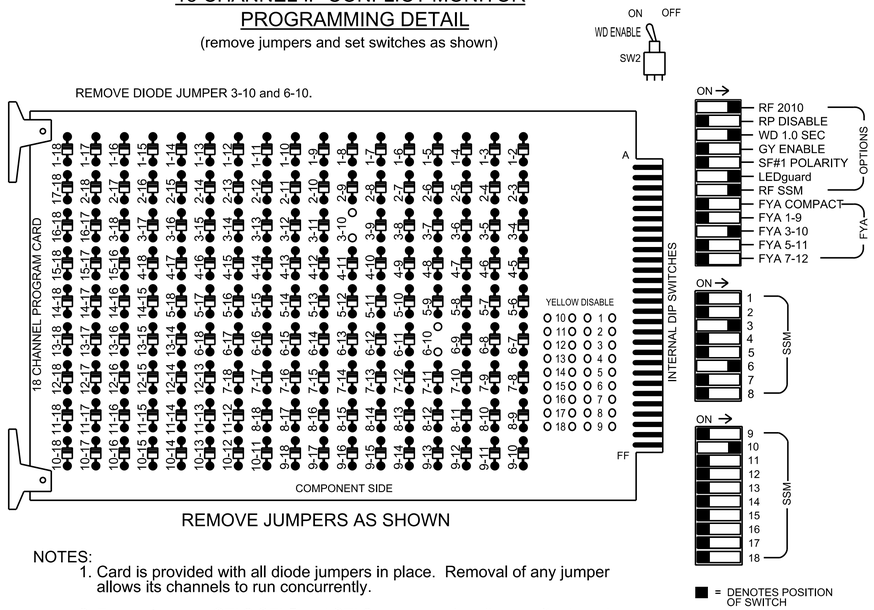
PLAN DATE: August 2021 | REVIEWED BY: A.D. Klinksiek
PREPARED BY: N.K. Vlanich | REVIEWED BY: N.R. Simmons

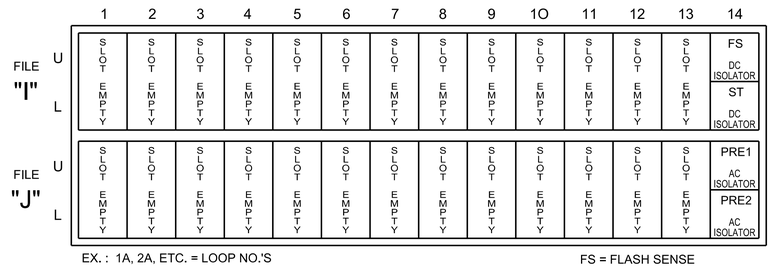
REVISIONS	INIT.	DATE

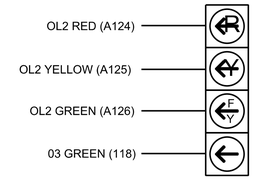
SEAL
NORTH CAROLINA PROFESSIONAL
SEAL 031464
ENGINEER
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500T1







PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 18.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

NOTES:

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

NOTES

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

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	51★	NU	NU	NU	61,62	NU	NU	NU	NU	NU	51★	NU	NU	NU	NU
RED								134										
YELLOW				*				135										
GREEN																		
RED ARROW														A124				
YELLOW ARROW														A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW				118				136										
✋																		
🚶																		

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
3A	TB4-5,6	I5U	58	20	7★	3	15		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.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0500T1
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

New Installation
Temporary Design 1
Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
SEAL 031464
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
F6DA88DF3AD445A...
SIG. INVENTORY NO. 08-0500T1

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 18.2

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A

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
3A	7	3	0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED FOR PHASE OL2

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0500T1
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

New Installation
Temporary Design 1
Electrical Detail - Sheet 2 of 3

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500T1

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 18.3

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: Reduce delay time for phase 3 call on loop 3A 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: 08-0500T1
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

New Installation
Temporary Design 1
Electrical Detail - Sheet 3 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NCDOT Transportation Mobility and Safety Division Traffic Engineering Branch Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

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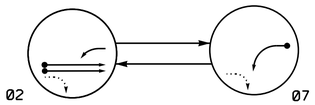
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE

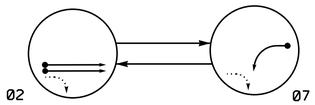
SIG. INVENTORY NO. 08-0500T1

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 19.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

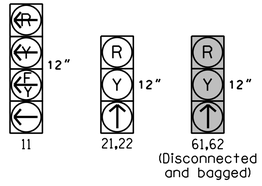
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION			
SIGNAL FACE	PHASE 02	PHASE 07	FLASH
11	FY	—	Y
21,22	↑	R	Y

ALTERNATE PHASING TABLE OF OPERATION			
SIGNAL FACE	PHASE 02	PHASE 07	FLASH
11	R	—	Y
21,22	↑	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



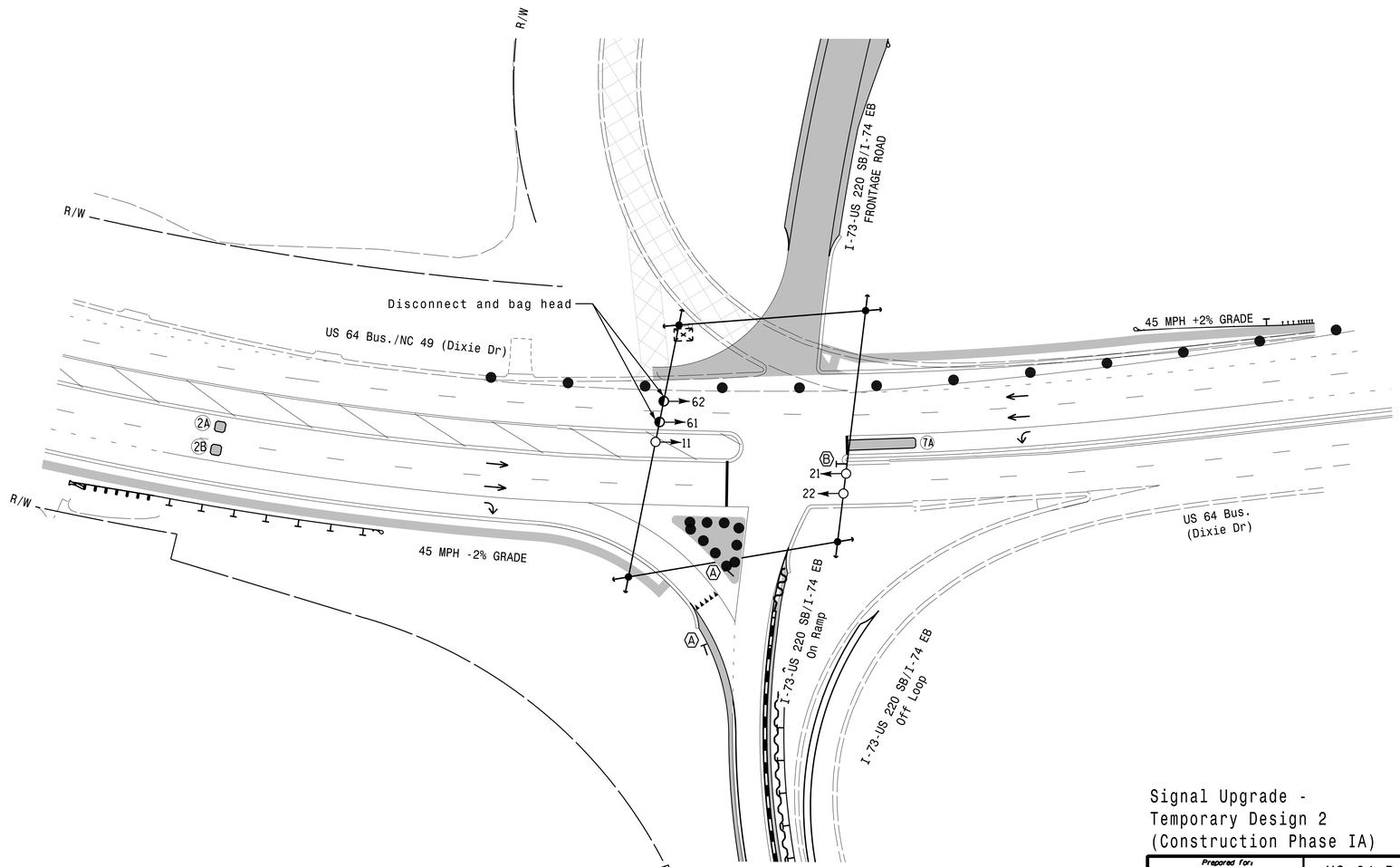
MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DELAY DURING GREEN	NEW CARD	
2A✱	6X6	300	✱	✱	2	-	-	X	X	X	-	✱
2B✱	6X6	300	✱	✱	2	-	-	X	X	X	-	✱
7A✱	6X40	0	✱	✱	7	✱✱ 15	-	X	-	X	-	✱

✱ Microwave Detection
✱✱ Disable Delay During Alternate Phasing Operation.

2 Phase
Fully Actuated
(Isolated)

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. Disconnect and bag existing signal heads numbered 61 and 62.
4. Set all detector units to presence mode.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. The Division Traffic Engineer will determine the hours of use for each phasing plan.



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	— —
→	Directional Arrow	→
▒	Construction Zone	▒
▭	Microwave Detection Zone	▭
N/A	Curb Ramp	◢
N/A	Guardrail	⊥
▬	Barrier	N/A
●●●	Construction Zone Drums	●●●
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ

MAXTIME TIMING CHART		
FEATURE	PHASE 2	PHASE 7
Walk *	-	-
Ped Clear *	-	-
Min Green	12	7
Passage *	6.0	2.0
Max 1 *	90	20
Yellow Change	4.7	3.0
Red Clear	1.1	1.8
Added Initial *	1.5	-
Maximum Initial *	34	-
Time Before Reduction *	15	-
Time To Reduce *	30	-
Minimum Gap	3.0	-
Advance Walk	-	-
Non Lock Detector	-	X
Vehicle Recall	MIN RECALL	-
Dual Entry	-	-

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

Signal Upgrade -
Temporary Design 2
(Construction Phase IA)

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Prepared For:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 64 Bus. (Dixie Dr)/NC 49 at I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE: August 2021 | REVIEWED BY: A.D. Klinksiek
PREPARED BY: N.K. Vlanich | REVIEWED BY: N.R. Simmons

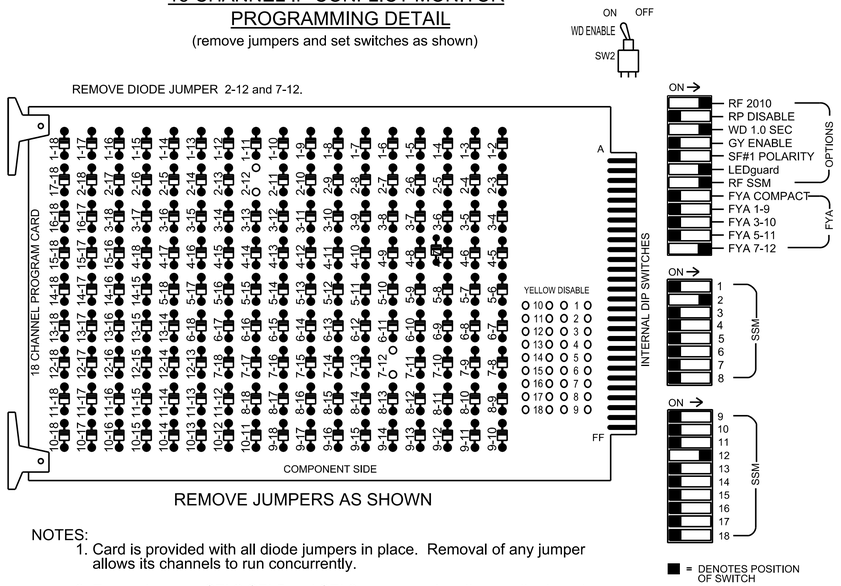
REVISIONS	INIT.	DATE

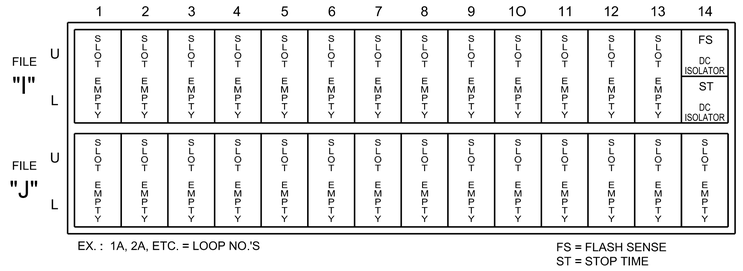
0 40
1"=40'

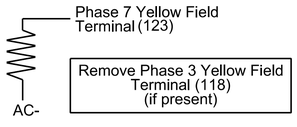
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500T2







PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 19.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPER 2-12 and 7-12.

REMOVE JUMPERS AS SHOWN

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

NOTES

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

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet..332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used...........................S2,S10,AUX S5
Phases Used.......................................2,7
Overlap "1"..NOT USED
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.	NU	21,22	NU	NU	NU	NU	NU	NU	NU	11 ★	NU	NU	NU	NU	NU	NU	11 ★	NU
RED		128																
YELLOW		129								*								
GREEN																		
RED ARROW																	A101	
YELLOW ARROW																	A102	
FLASHING YELLOW ARROW																	A103	
GREEN ARROW		130								124								
✋																		
🚶																		

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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
7A	TB5-5,6	J5U	57	19	21 ★	7			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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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: 08-0500T2
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Design 2
Electrical Detail - Sheet 1 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

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750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus. (Dixie Dr)/NC 49
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Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
SEAL 031464
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
F6DA88DF3AD445A...
SIG. INVENTORY NO. 08-0500T2

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 19.2

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

7A

Detector	Call Phase	Delay
21	7	0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL4

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0500T2
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Design 2
Electrical Detail - Sheet 2 of 3

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HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500T2

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 11 to run protected turns only.

VEH DET PLAN 2: Reduce delay time for phase 7 call on loop 7A 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: 08-0500T2
DESIGNED: AUGUST 2021
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Signal Upgrade
Temporary Design 2
Electrical Detail - Sheet 3 of 3

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NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signals Management Section
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US 64 Bus. (Dixie Dr)/NC 49
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Division 8 | Randolph County | Asheboro

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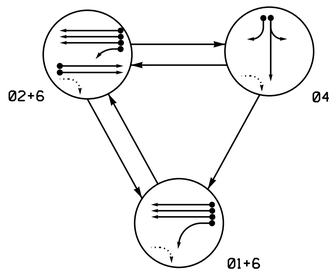
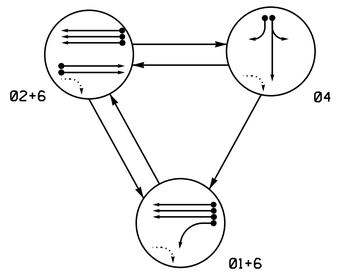
SIG. INVENTORY NO. 08-0500T2

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 20.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←	F Y	~~R~~	~~Y~~
21,22	R	↑	R	Y
41,42	R	R	G	R
61,62,63	↑	↑	R	Y

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←	~~R~~	~~R~~	~~Y~~
21,22	R	↑	R	Y
41,42	R	R	G	R
61,62,63	↑	↑	R	Y

MAXTIME DETECTOR INSTALLATION CHART

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

✳ Microwave Detection
✳✳ Reduce Delay to 3 seconds for loop during Alternate Phasing operation.
* Disable phase call during Alternate Phasing operation.

3 Phase
Fully Actuated
(Isolated)

NOTES

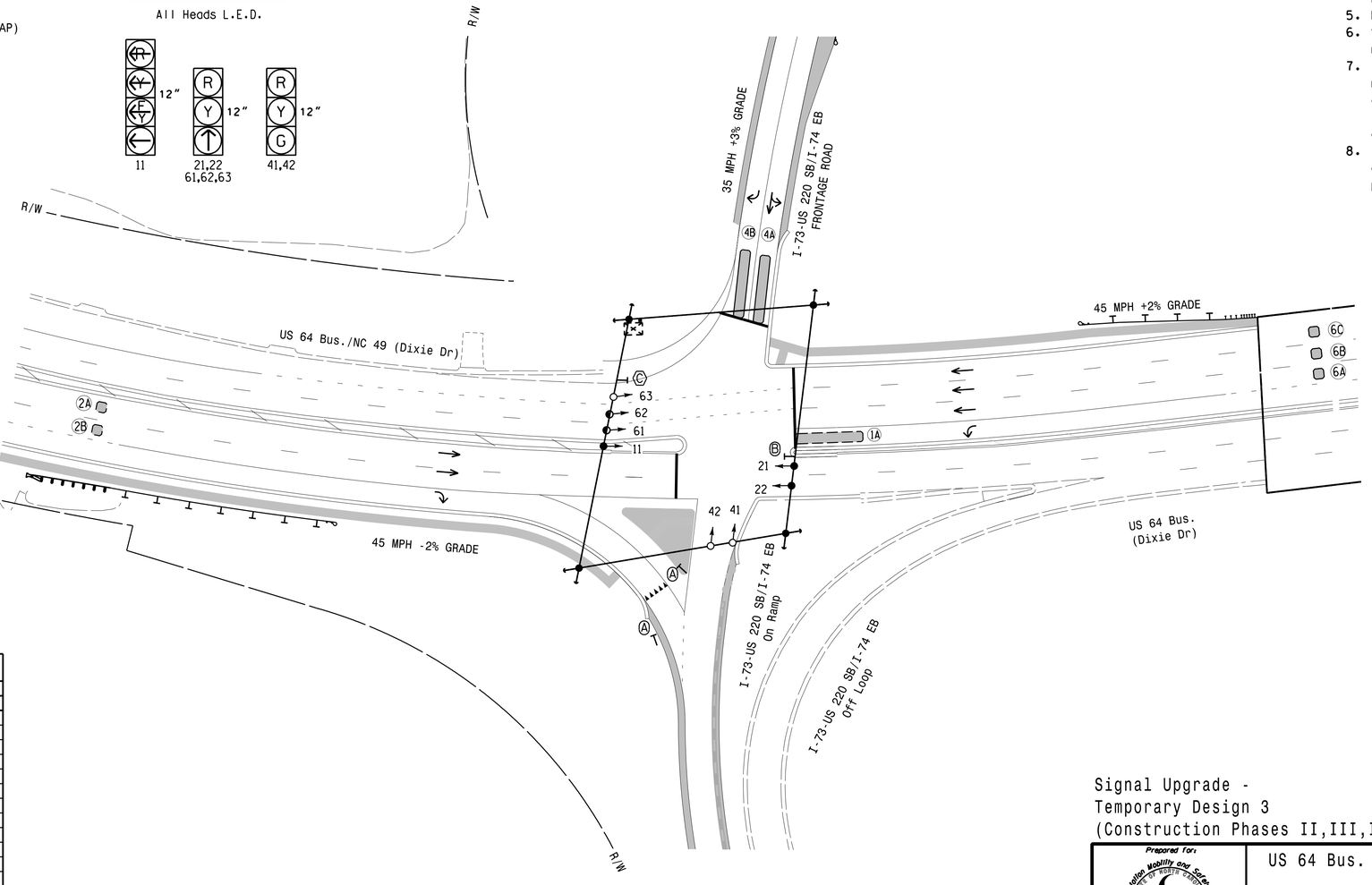
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal heads numbered 11, 61, and 62.
5. Renumber existing loop 7A as 1A.
6. Set all detector units to presence mode.
7. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



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	
DD	Directional Drill	N/A
	Directional Arrow	
	Construction Zone	N/A
	Microwave Detection Zone	
N/A	Curb Ramp	
N/A	Guardrail	
	Construction Zone Drums	
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ
Ⓒ	No Right Turn Sign (R3-1)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	7	12	7	12
Passage *	2.0	6.0	2.0	6.0
Max 1 *	20	90	30	90
Yellow Change	3.0	4.7	3.7	4.7
Red Clear	1.9	1.1	2.2	1.1
Added Initial *	-	1.5	-	1.0
Maximum Initial *	-	34	-	34
Time Before Reduction *	-	15	-	15
Time To Reduce *	-	30	-	30
Minimum Gap	-	3.0	-	3.0
Advance Walk	-	-	-	-
Non Lock Detector	X	-	X	-
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 -
Temporary Design 3
(Construction Phases II,III,IIIA)

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Prepared for:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

0 40
1"=40'

US 64 Bus. (Dixie Dr)/NC 49 at I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

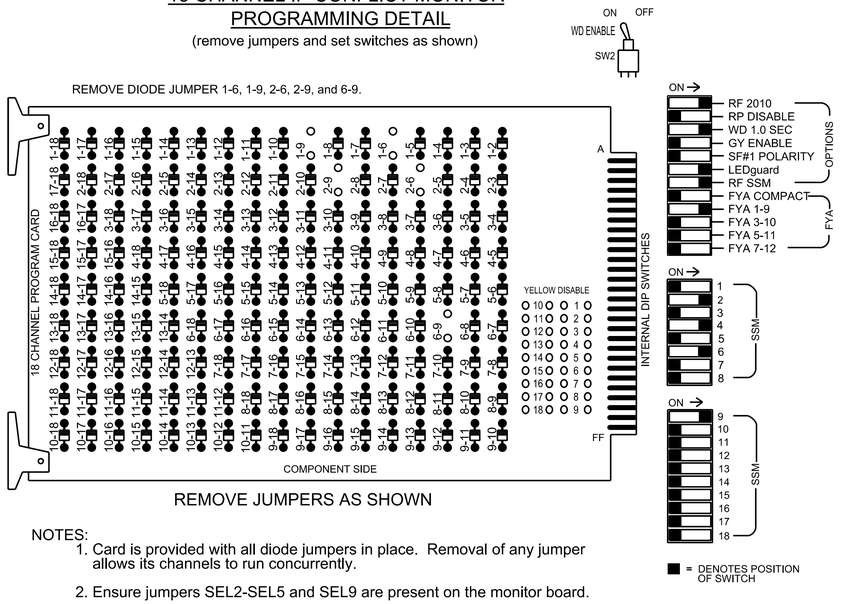
PLAN DATE: August 2021 | REVIEWED BY: A.D. Klinksiek
PREPARED BY: N.K. Vlanich | REVIEWED BY: N.R. Simmons

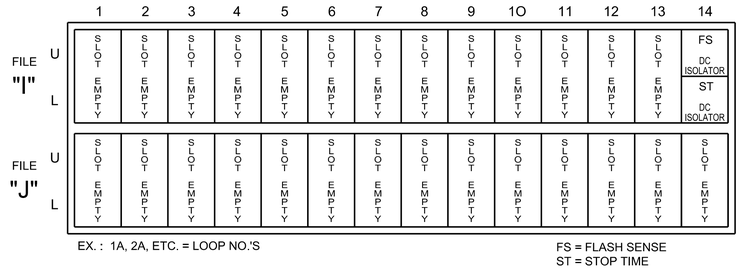
REVISIONS	INIT.	DATE

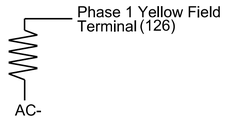
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

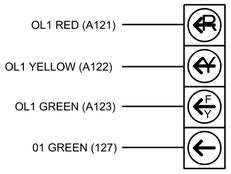
DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500T3









PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 20.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPER 1-6, 1-9, 2-6, 2-9, and 6-9.

REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

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

EQUIPMENT INFORMATION

Controller...2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1,S2,S5,S8,AUX S1
Phases Used..1,2,4,6
Overlap "1"...*
Overlap "2"...NOT USED
Overlap "3"...NOT USED
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★	21,22	NU	NU	41,42	NU	NU	61,62,63	NU	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW	*	129			102			135										
GREEN					103													
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127	130						136										
✋																		
🚶																		

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		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.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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

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THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0500T3
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

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

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

Transportation Mobility and Safety Division
ITS & Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL

SEAL 031464
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
F6DA88DF3AD445A...

SIG. INVENTORY NO. 08-0500T3

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 20.2

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

1A

Detector	Call Phase	Delay
1	1	3
29	0	3

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL1

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Temporary Design 3
Electrical Detail - Sheet 2 of 3

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US 64 Bus. (Dixie Dr)/NC 49
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DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500T3

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 20.3

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 11 to run protected turns only.

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

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.

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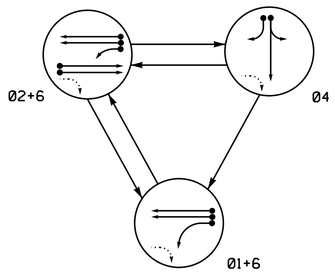
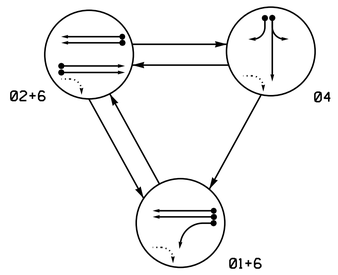
SIG. INVENTORY NO. 08-0500T3

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 21.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←	~~F~~	~~R~~	~~Y~~
21,22	R	↑	R	Y
41,42	R	R	G	R
61,62	↑	↑	R	Y

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←	~~R~~	~~R~~	~~Y~~
21,22	R	↑	R	Y
41,42	R	R	G	R
61,62	↑	↑	R	Y

MAXTIME DETECTOR INSTALLATION CHART

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

✱ Microwave Detection
✱✱ Reduce Delay to 3 seconds for loop during Alternate Phasing operation.
▪ Disable phase call during Alternate Phasing operation.

3 Phase
Fully Actuated
(Isolated)

NOTES

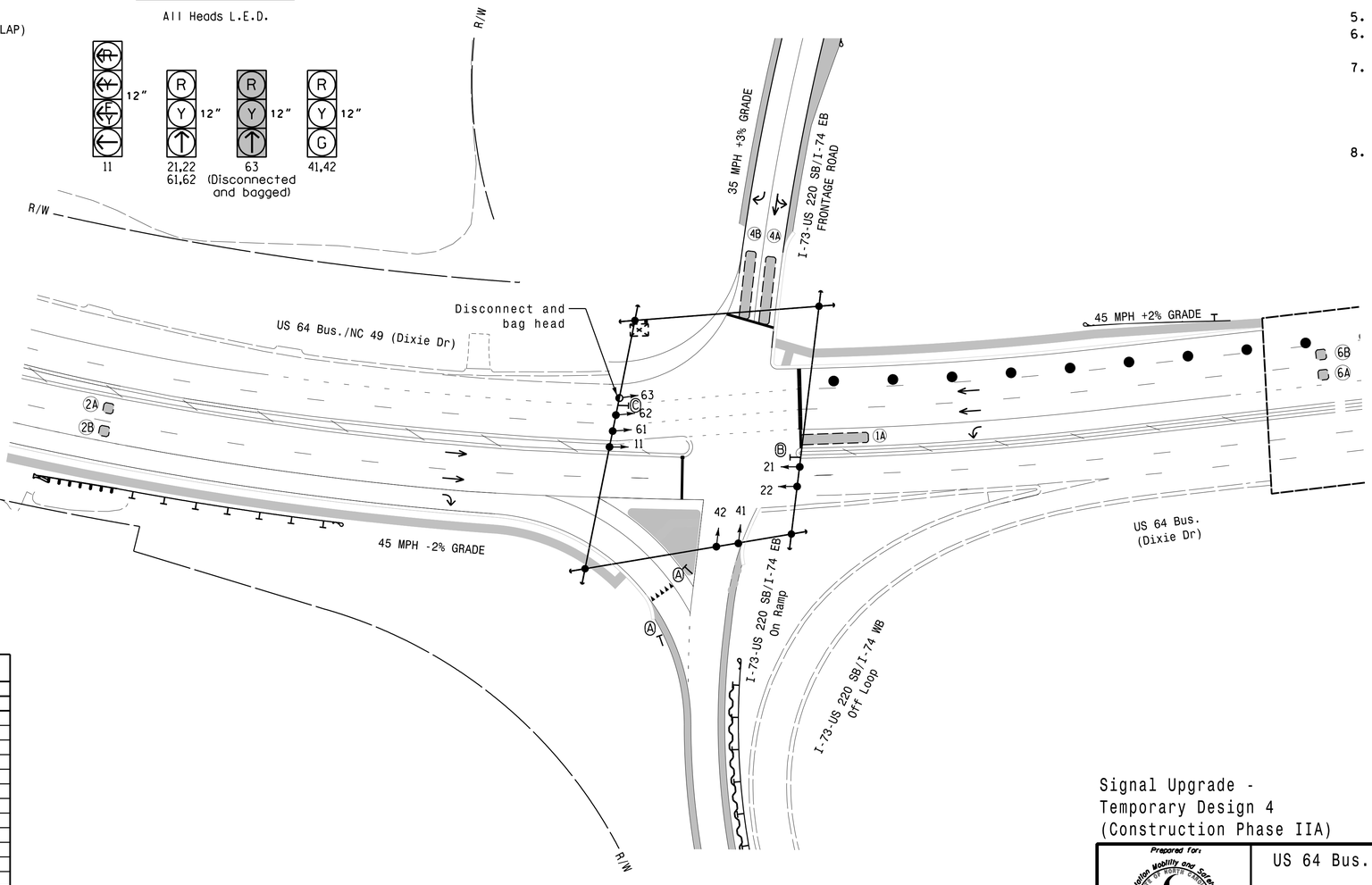
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Disconnect and bag existing signal head numbered 63.
5. Reposition existing sign Ⓒ.
6. Set all detector units to presence mode.
7. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



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	——
—DD—	Directional Drill	N/A
→	Directional Arrow	→
▒	Construction Zone	N/A
▭	Microwave Detection Zone	▭
N/A	Curb Ramp	◢
N/A	Guardrail	⊤
●●●	Construction Zone Drums	●●●
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ
Ⓒ	No Right Turn Sign (R3-1)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	7	12	7	12
Passage *	2.0	6.0	2.0	6.0
Max 1 *	20	90	30	90
Yellow Change	3.0	4.7	3.7	4.7
Red Clear	1.9	1.1	2.2	1.1
Added Initial *	-	1.5	-	1.5
Maximum Initial *	-	34	-	34
Time Before Reduction *	-	15	-	15
Time To Reduce *	-	30	-	30
Minimum Gap	-	3.0	-	3.0
Advance Walk	-	-	-	-
Non Lock Detector	X	-	X	-
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 -
Temporary Design 4
(Construction Phase IIA)

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HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
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(919) 546-8997

Prepared for:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE: August 2021 | REVIEWED BY: A.D. Klinksiek
PREPARED BY: N.K. Vlanich | REVIEWED BY: N.R. Simmons

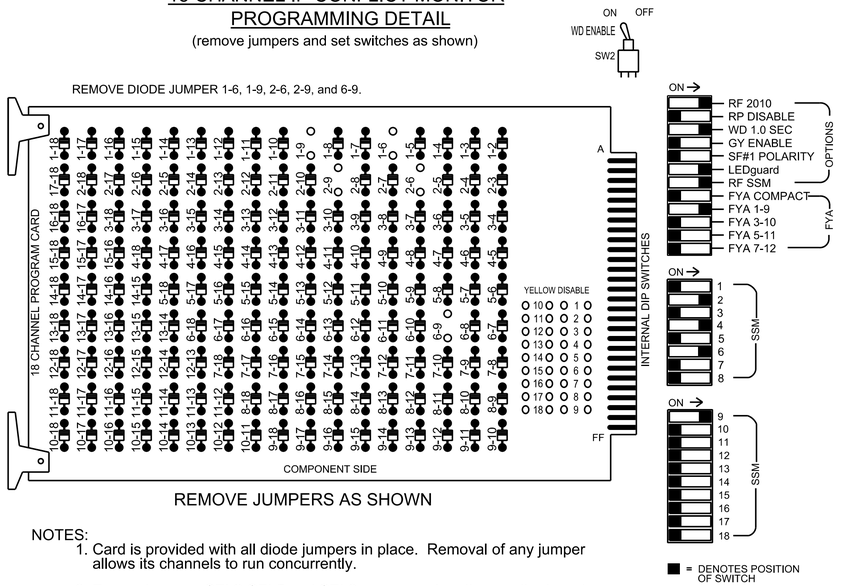
REVISIONS	INIT.	DATE

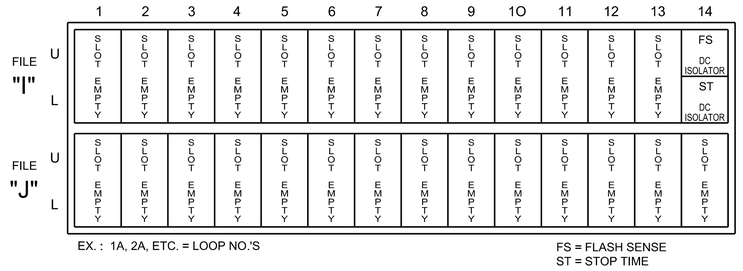
0 40
1"=40'

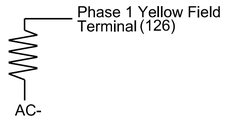
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

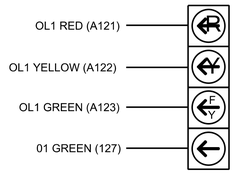
DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500T4









PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 21.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

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

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used...........................S1,S2,S5,S8,AUX S1
Phases Used.......................................1,2,4,6
Overlap "1"..*
Overlap "2"..NOT USED
Overlap "3"..NOT USED
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 ★	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU	11 ★	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW	*	129			102			135										
GREEN					103													
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127	130						136										
✋																		
🚶																		

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
"J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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: 08-0500T4
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Design 4
Electrical Detail - Sheet 1 of 3

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343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
SEAL 031464
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
F6DA88DF3AD445A...
SIG. INVENTORY NO. 08-0500T4

21-MAY-2024 11:53
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HNTB

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 21.2

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

1A

Detector	Call Phase	Delay
1	1	3
29	0	3

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL1

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0500T4
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Design 4
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
NC DEPARTMENT OF TRANSPORTATION
Traffic Engineering & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500T4

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 21.3

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 11 to run protected turns only.

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

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: 08-0500T4
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Design 4
Electrical Detail - Sheet 3 of 3

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Prepared for the Offices of:
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ITS & Signals Management Section
State of North Carolina Department of Transportation
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

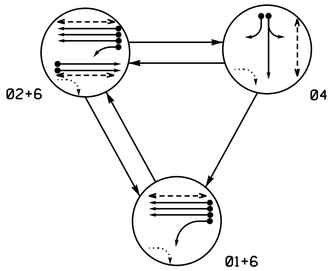
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons — SIGNATURE — 5/21/2024 DATE

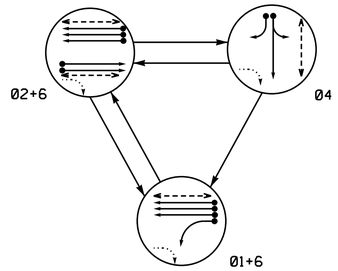
SIG. INVENTORY NO. 08-0500T4

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 22.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←	~~↓~~	~~R~~	~~Y~~
21,22	R	↑	R	Y
41,42	R	R	G	R
61,62,63	↑	↑	R	Y
P21,P22	DW	W	DW	DRK
P41,P42	DW	DW	W	DRK
P61,P62	W	W	DW	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←	~~R~~	~~R~~	~~Y~~
21,22	R	↑	R	Y
41,42	R	R	G	R
61,62,63	↑	↑	R	Y
P21,P22	DW	W	DW	DRK
P41,P42	DW	DW	W	DRK
P61,P62	W	W	DW	DRK

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP/ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DELAY DURING GREEN	NEW CARD	
1A	6X40	0	2-4-2	X	1	✱✱ 15	-	X	-	X	-
					▪ 6	3	-	X	-	X	X
2A	6X6	300	6	X	2	-	-	X	X	X	-
2B	6X6	300	6	X	2	-	-	X	X	X	-
4A	6X40	0	2-4-2	X	2	-	-	X	-	X	-
4B	6X40	0	2-4-2	X	4	15	-	X	-	X	-
6A✱	6X6	300	✱	✱	6	-	-	X	X	X	-
6B✱	6X6	300	✱	✱	6	-	-	X	X	X	-
6C✱	6X6	300	✱	✱	6	-	-	X	X	X	-

✱ Microwave Detection
✱✱ Reduce Delay to 3 seconds for loop during Alternate Phasing operation.
▪ Disable phase call during Alternate Phasing operation.

3 Phase
Fully Actuated
Signal System #D08-29_Asheboro
US 64 Bus-NC 49 (Asheboro)

NOTES

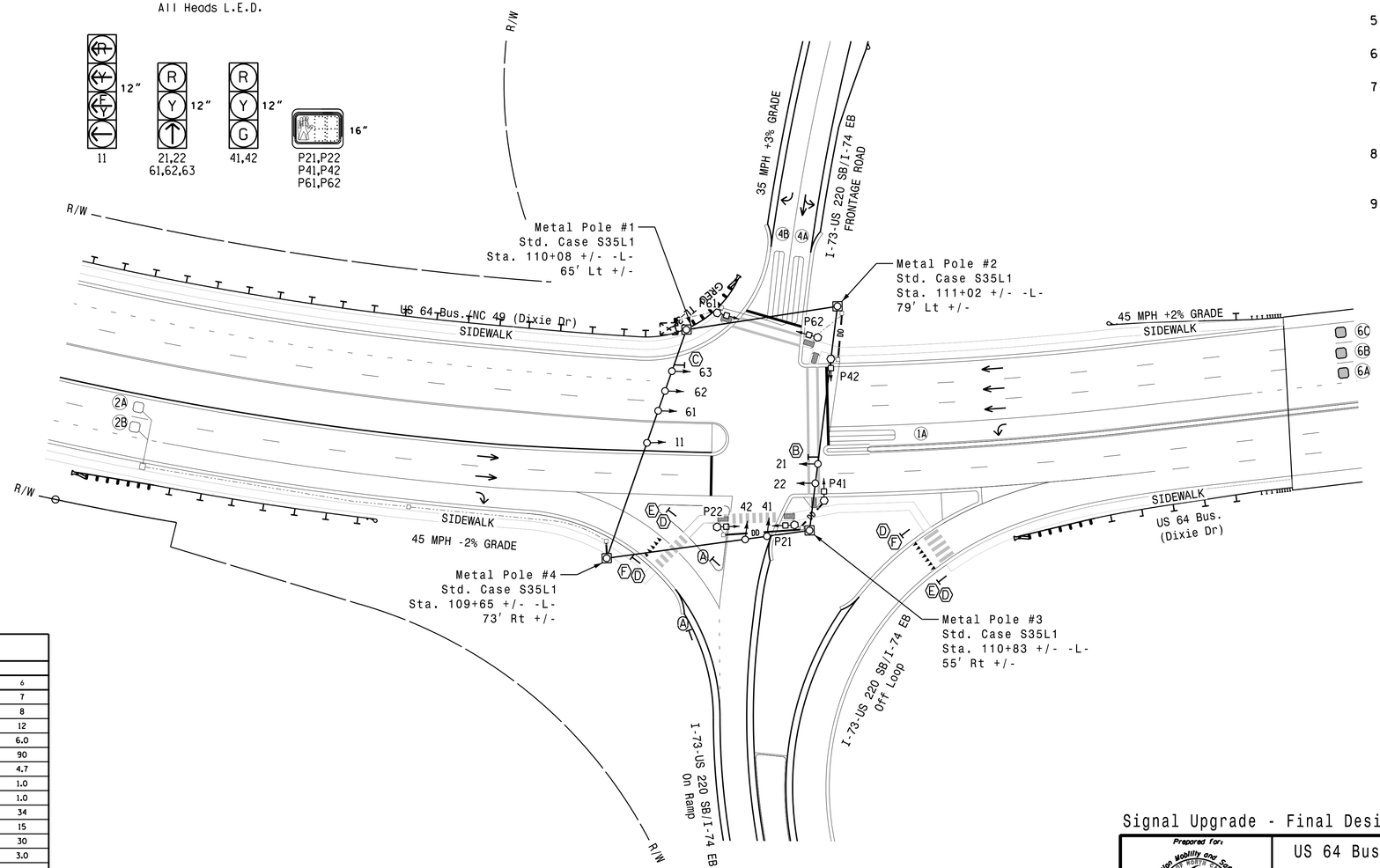
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. This intersection uses microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
⊣	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	———
—DD—	Directional Drill	N/A
→	Directional Arrow	→
◎	Metal Strain Pole	◘
⬡	Type II Signal Pedestal	⬢
▬	Microwave Detection Zone	▬
N/A	Curb Ramp	♿
N/A	Guardrail	⊥⊥
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ
Ⓒ	No Right Turn Sign (R3-1)	Ⓒ
Ⓓ	Pedestrian Crossing Sign (W11-2)	Ⓓ
Ⓔ	Left Diagonal Arrow Plaque (W16-7p)	Ⓔ
Ⓕ	Right Diagonal Arrow Plaque (W16-7pR)	Ⓕ

MAXTIME TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Walk *	-	7	7	7
Ped Clear *	-	5	19	8
Min Green	7	12	7	12
Passage *	2.0	6.0	2.0	6.0
Max 1 *	20	90	30	90
Yellow Change	3.0	4.7	3.7	4.7
Red Clear	2.3	1.0	2.4	1.0
Added Initial *	-	1.5	-	1.0
Maximum Initial *	-	34	-	34
Time Before Reduction *	-	15	-	15
Time To Reduce *	-	30	-	30
Minimum Gap	-	3.0	-	3.0
Advance Walk	-	3	3	-
Non Lock Detector	X	-	X	-
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 - Final Design

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Prepared For:
Transportation Mobility and Safety Division
Signal Design Section
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US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE: August 2021 | REVIEWED BY: A.D. Klinksiek
PREPARED BY: N.K. Vlanich | REVIEWED BY: N.R. Simmons

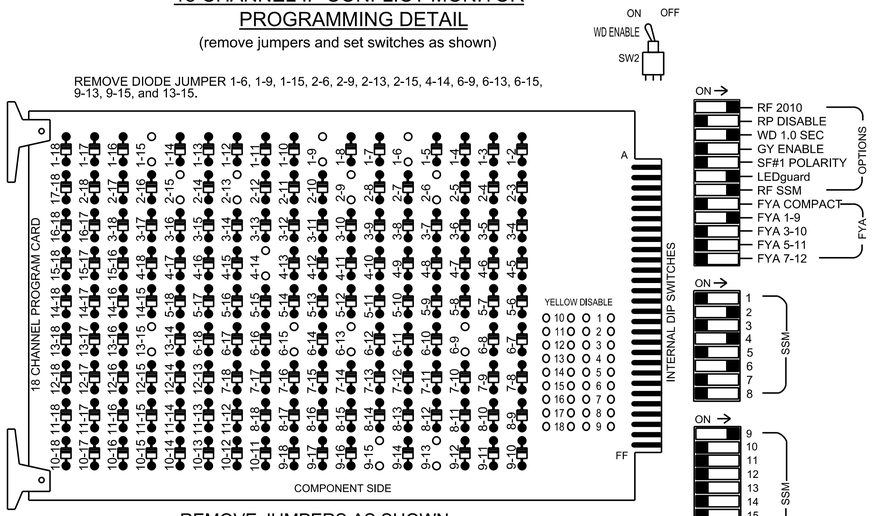
REVISIONS	INIT.	DATE

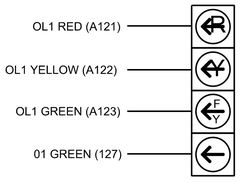
0 40
1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500





PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 22.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPER 1-6, 1-9, 1-15, 2-6, 2-9, 2-13, 2-15, 4-14, 6-9, 6-13, 6-15, 9-13, 9-15, and 13-15.

REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plans.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all enabled detectors used at this location.
4. The cabinet and controller are part of Signal System #D08-29_Asheboro, US 64 Bus-NC 49 (Asheboro).

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,S8,S9
AUX S1
Phases Used.......................................1,2,2 PED,4,4 PED,6,6 PED
Overlap "1"...*
Overlap "2"...NOT USED
Overlap "3"...NOT USED
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★	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62, 63	P61, P62	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED		128			101			134										
YELLOW	*	129			102			135										
GREEN					103													
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127	130						136										
✋			113			104			119									
🚶			115			106			121									

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 2 PED DC ISOLATOR	Ø 6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø 2 2B				Ø 4 4B						Ø 4 PED DC ISOLATOR	NOT USED	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6	3		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	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
4B	TB4-11,12	I6L	45	7	9	4	15		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						

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.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

HNTB

HNTB NORTH CAROLINA, P.C.
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Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0500
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL

SEAL 031464
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
F6DA88DF3AD445A...

SIG. INVENTORY NO. 08-0500

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 22.2

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

1A

Detector	Call Phase	Delay
1	1	3
29	0	3

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL1

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0500
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus. (Dixie Dr)/NC 49
at
I-73-US 220 SB/I-74 EB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
SIG. INVENTORY NO. 08-0500

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 22.3

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 11 to run protected turns only.

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

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: 08-0500
DESIGNED: AUGUST 2021
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REVISED:

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

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Traffic Engineering, Mobility and Safety Division
NC Department of Transportation
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Bus. US 64 (Dixie Dr)/NC 49
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Division 8 | Randolph County | Asheboro

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REVISIONS	INIT.	DATE

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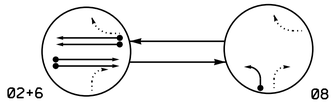
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0500

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 23.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

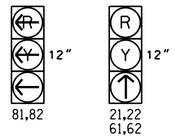
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+6	PHASE 08	PHASE FLASH
21,22	↑	R	Y
61,62	↑	R	Y
81,82	~~R~~	~~←~~	~~R~~

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

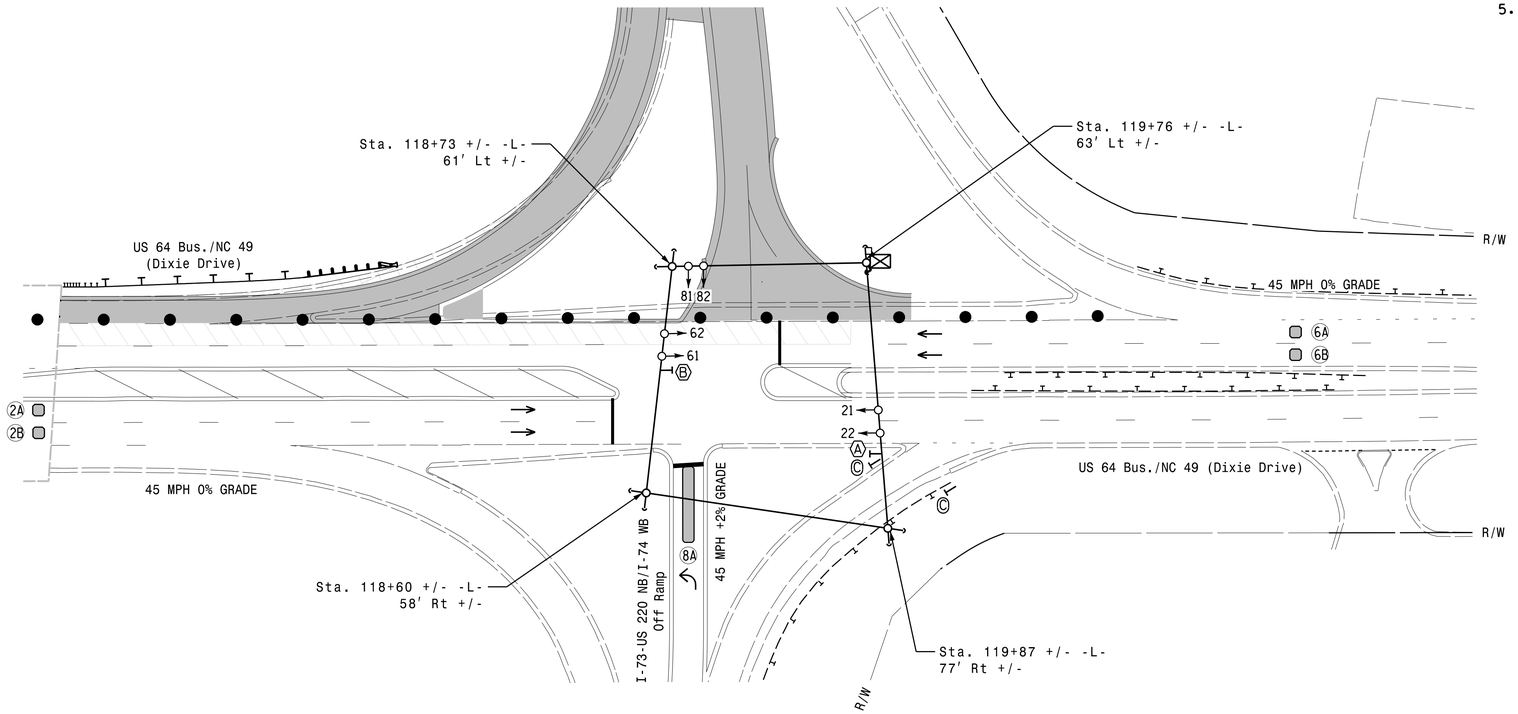
DETECTOR					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A✱	6X6	300	✱	✱	2	-	-	X	X	X	-	✱
2B✱	6X6	300	✱	✱	2	-	-	X	X	X	-	✱
6A✱	6X6	300	✱	✱	6	-	-	X	X	X	-	✱
6B✱	6X6	300	✱	✱	6	-	-	X	X	X	-	✱
8A✱	6X40	0	✱	✱	8	-	-	X	-	X	-	✱

✱Microwave Detection

2 Phase
Fully Actuated
(Isolated)

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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
○	Pedestrian Signal Head 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	———
→	Directional Arrow	→
▨	Construction Zone	▨
N/A	Guardrail	⊥⊥⊥
▭	Microwave Detection Zone	▭
N/A	Curb Ramp	◢
●●●	Construction Zone Drums	●●●
▨	Wedge/Widen	▨
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ
Ⓒ	"YIELD" SIGN (R1-2)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Walk *	-	-	-
Ped Clear *	-	-	-
Min Green	12	12	7
Passage *	6.0	6.0	2.0
Max 1 *	90	90	30
Yellow Change	4.5	4.5	3.0
Red Clear	1.0	1.4	2.4
Added Initial *	1.5	1.5	-
Maximum Initial *	34	34	-
Time Before Reduction *	15	15	-
Time To Reduce *	30	30	-
Minimum Gap	3.0	3.0	-
Advance Walk	-	-	-
Non Lock Detector	-	-	X
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.

New Installation -
Temporary Design 1
(Construction Phase IIA)

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Prepared For:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

0 40
1"=40'

US 64 Bus./NC 49 (Dixie Drive)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

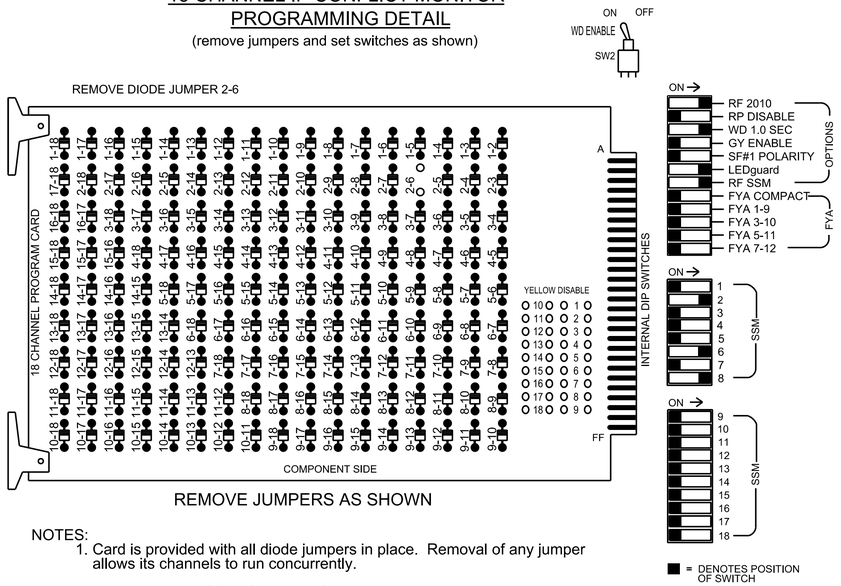
DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0501T1

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 23.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

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

SIGNAL HEAD HOOK-UP CHART

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

NU = Not Used

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,S8,S11
Phases Used	2,6,8
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
"I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
"J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0501T1
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

New Installation
Temporary Design 1
Electrical Detail

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US 64 Bus./NC 49 (Dixie Drive)
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Division 8 Randolph County Asheboro

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PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

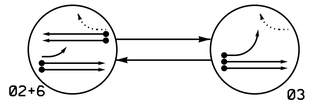
REVISIONS	INIT.	DATE

SEAL
SEAL 031464
NATASHA R. SIMMONS

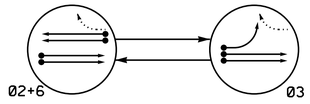
DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
SIG. INVENTORY NO. 08-0501T1

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 24.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION			
SIGNAL FACE	PHASE 02+6	PHASE 03	FLASH
21,22	↑	↑	Y
51	~~Y~~	—	~~Y~~
61,62	↑	R	Y

ALTERNATE PHASING TABLE OF OPERATION			
SIGNAL FACE	PHASE 02+6	PHASE 03	FLASH
21,22	↑	↑	Y
51	~~R~~	—	~~Y~~
61,62	↑	R	Y

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DELAY DURING GREEN		NEW CARD
2A✱	6X6	300	✱	✱	2	-	-	X	X	-	✱
2B✱	6X6	300	✱	✱	2	-	-	X	X	-	✱
3A✱	6X40	0	✱	✱	3	✱✱15	-	X	-	-	✱
6A✱	6X6	300	✱	✱	6	-	-	X	X	-	✱
6B✱	6X6	300	✱	✱	6	-	-	X	X	-	✱

✱ Microwave Detection
✱✱ Disable Delay During Alternate Phasing Operation.

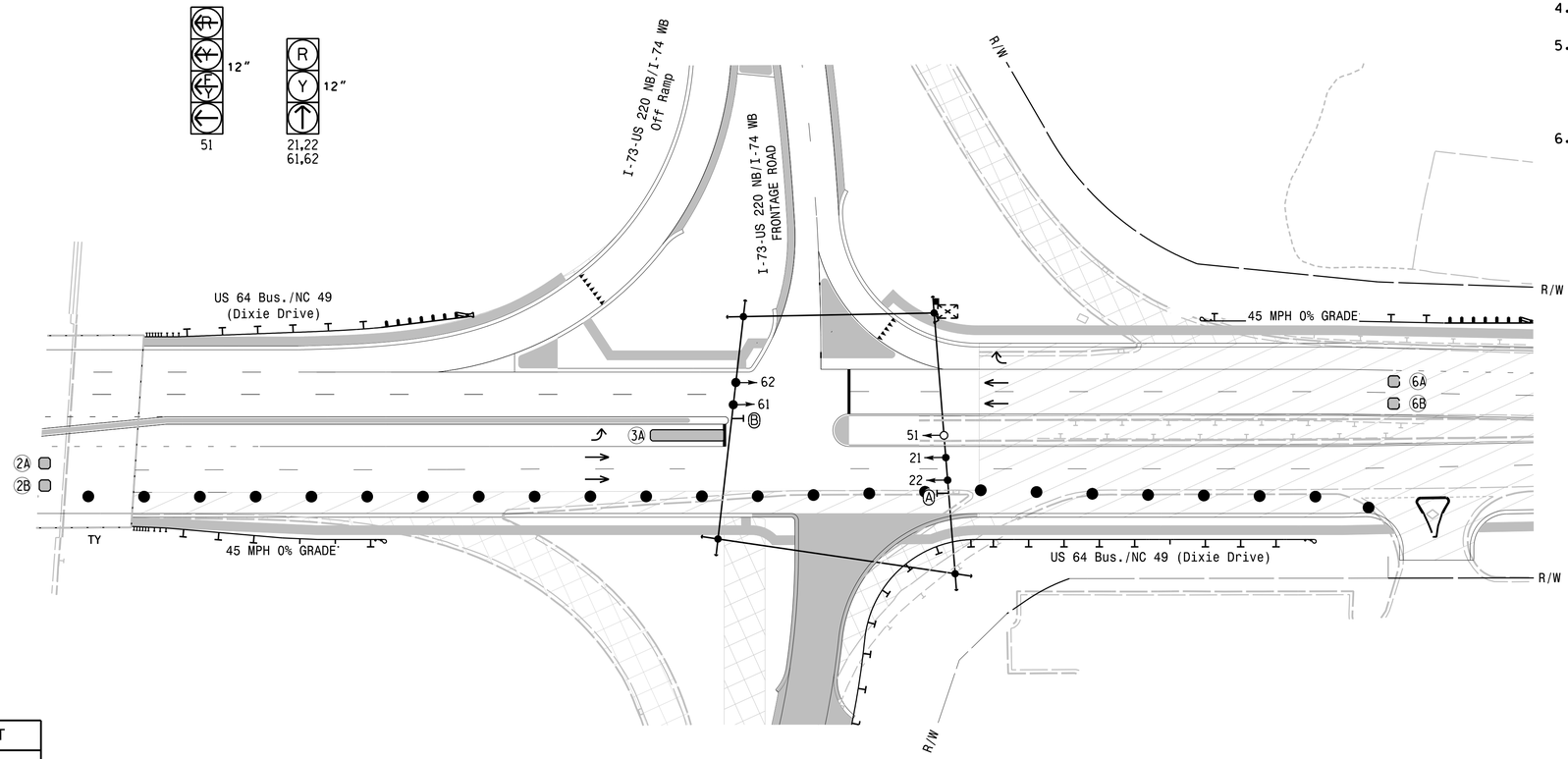
2 Phase
Fully Actuated
(Isolated)

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. Remove existing signal heads numbered 81 and 82.
4. Set all detector units to presence mode.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. The Division Traffic Engineer will determine the hours of use for each phasing plan.

SIGNAL FACE I.D.

All Heads L.E.D.



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	
	Directional Arrow	
DD	Directional Drill	N/A
N/A	Guardrail	
	Microwave Detection Zone	
	Construction Zone	N/A
N/A	Curb Ramp	
	Wedge/Widen (Lane Closure Required)	
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 3	PHASE 6
Walk *	-	-	-
Ped Clear *	-	-	-
Min Green	12	7	12
Passage *	6.0	2.0	6.0
Max 1 *	90	20	90
Yellow Change	4.5	3.0	4.5
Red Clear	1.0	1.8	1.0
Added Initial *	1.5	-	1.5
Maximum Initial *	34	-	34
Time Before Reduction *	15	-	15
Time To Reduce *	30	-	30
Minimum Gap	3.0	-	3.0
Advance Walk	-	-	-
Non Lock Detector	-	X	-
Vehicle Recall	MIN RECALL	-	MIN RECALL
Dual Entry	-	-	-

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

Signal Upgrade -
Temporary Design 2
(Construction Phase III)

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Prepared for:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

N
0 40
1"=40'

US 64 Bus./NC 49 (Dixie Drive)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 Randolph County Asheboro

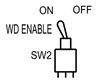
PLAN DATE: August 2021 REVIEWED BY: A.D. Klinksiek
PREPARED BY: N.K. Vlanich REVIEWED BY: N.R. Simmons

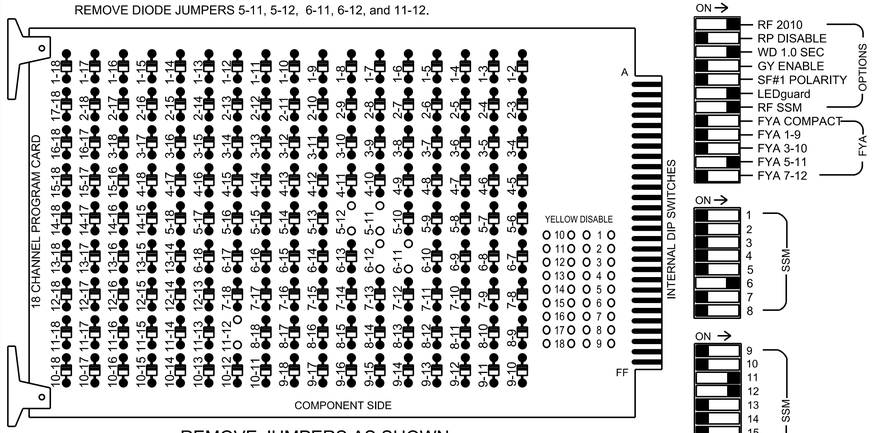
REVISIONS	INIT.	DATE

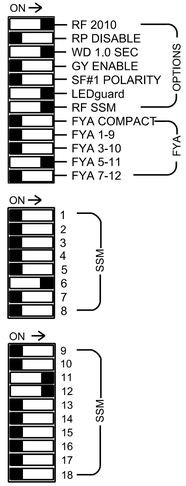
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

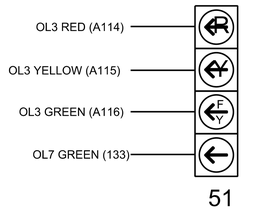
DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

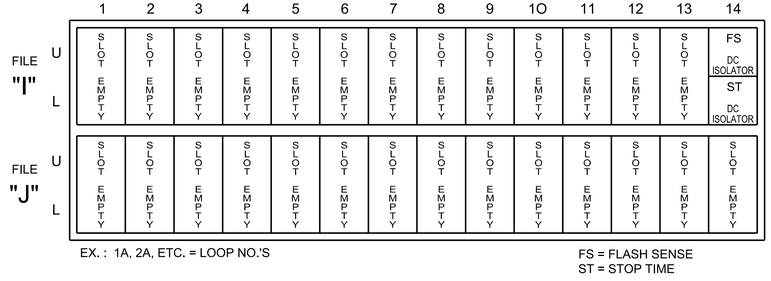
SIG. INVENTORY NO. 08-0501T2











PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 24.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 5-11, 5-12, 6-11, 6-12, and 11-12.

REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

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

NOTES

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

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet..332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S7,S8,AUX S4,AUX S5
Phases Used..2,3,6
Overlap "1"...Not Used
Overlap "2"...Not Used
Overlap "3"...*
Overlap "4"...*
Overlap "5"...Not Used
Overlap "6"...Not Used
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	OL7	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NC	NU	NC	NU	NU	51★	61,62	NU	NU	NU	NU	NU	NU	NU	51★	21,22	NU
RED								134									A101	
YELLOW							*	135									A102	
GREEN																	A103	
RED ARROW																A114		
YELLOW ARROW																A115		
FLASHING YELLOW ARROW																A116		
GREEN ARROW							133	136										
✋																		
🚶																		

NC = Not Connected
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)

		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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
3A	TB4-5,6	I5U	58	20	7★	3	15		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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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: 08-0501T2
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Signal 2
Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus./NC 49 (Dixie Drive)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
SEAL 031464
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
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SIG. INVENTORY NO. 08-0501T2

21-MAY-2024 11:54
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HNTB

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 24.2

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A

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

3A

Detector	Call Phase	Delay
7	3	0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	3	4	7
Type	-	-	FYA 4 - Section	NORMAL	NORMAL
Included Phases	-	-	-	2,3	3
Modifier Phases	-	-	-	-	-
Modifier Overlaps	-	-	7	-	-
Trail Green	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0

← NOTICE REMOVED INCLUDED PHASES FOR OL3

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

NOTICE OVERLAP 7 ASSIGNED TO CHANNEL 5 →

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	Overlap	7		X		5
6	Phase Vehicle	6	X		X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1	X		X	9
10	Overlap	2		X	X	10
11	Overlap	3	X			11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

Signal Upgrade
Temporary Signal 2
Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0501T2
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

HNTB NORTH CAROLINA, P.C.
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Raleigh, North Carolina 27609
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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus./NC 49 (Dixie Drive)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE
SIG. INVENTORY NO. 08-0501T2

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 24.3

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: Reduce delay time for phase 3 call on loop 3A 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.

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0503T2
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Signal 2
Electrical Detail - Sheet 3 of 3

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Prepared for the Offices of:
NC DOT Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signals Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus./NC 49 (Dixie Drive)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

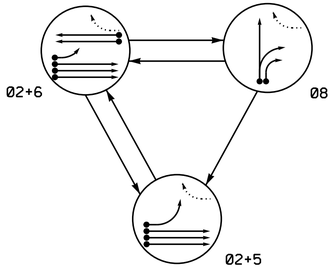
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

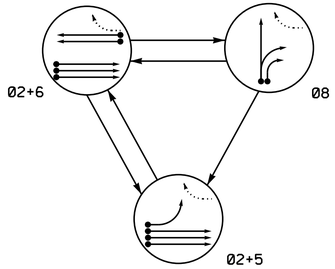
SIG. INVENTORY NO. 08-0501T2

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 25.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 08	FLASH
21,22	G	G	R	Y
23	↑	↑	R	Y
51	~~←~~	~~←F~~	~~R~~	~~Y~~
61,62	R	↑	R	Y
81,82	R	R	G	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 08	FLASH
21,22	G	G	R	Y
23	↑	↑	R	Y
51	~~←~~	~~R~~	~~R~~	~~Y~~
61,62	R	↑	R	Y
81,82	R	R	G	R

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR ZONE	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	✱	✱	2	-	-	X	X	X	-	✱
2B✱	6X6	300	✱	✱	2	-	-	X	X	X	-	✱
2C✱	6X6	300	✱	✱	2	-	-	X	X	X	-	✱
5A✱	6X40	0	✱	✱	5	✱✱ 15	-	X	-	X	-	✱
					▪2	3	-	X	-	X	X	✱
6A✱	6X6	300	✱	✱	6	-	-	X	X	X	-	✱
6B✱	6X6	300	✱	✱	6	-	-	X	X	X	-	✱
8A✱	6X40	0	✱	✱	8	-	-	X	-	X	-	✱
8B✱	6X40	0	✱	✱	8	-	-	X	-	X	-	✱

✱ Microwave Detection
✱✱ Reduce Delay to 3 seconds for loop during Alternate Phasing operation.
▪ Disable phase call during Alternate Phasing operation.

3 Phase
Fully Actuated
(Isolated)

NOTES

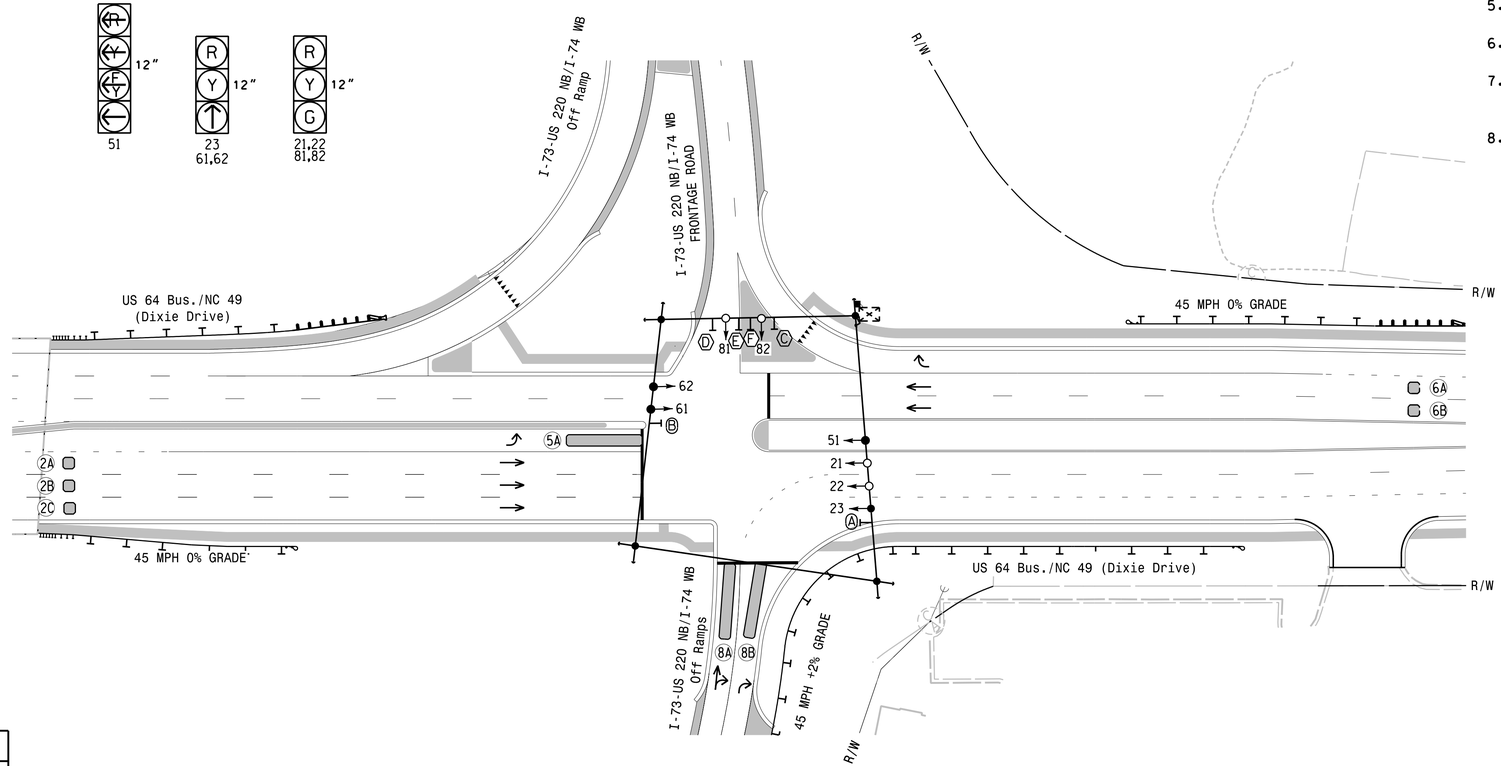
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Renumber existing loop 3A to 5A.
5. Renumber existing signal head 22 to 23.
6. Set all detector units to presence mode.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



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	
→	Directional Arrow	→
	Construction Zone	
DD	Directional Drill	N/A
N/A	Guardrail	
	Microwave Detection Zone	
N/A	Curb Ramp	
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	No Left Turn Sign (R3-2)	Ⓓ
Ⓔ	Combined Through and Right Arrow Sign (R3-6R)	Ⓔ
Ⓕ	"NO TURN ON RED" Sign (R10-11a)	Ⓕ

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Max 1 *	90	20	90	30
Yellow Change	4.5	3.0	4.5	4.3
Red Clear	1.3	1.8	1.3	1.6
Added Initial *	1.0	-	1.5	-
Maximum Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Advance Walk	-	-	-	-
Non Lock Detector	-	X	-	X
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 -
Temporary Signal 3
(Construction Phase IIIA)

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HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
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NC License No: C-1554
(919) 546-8997

Prepared For:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

0 40
1"=40'

US 64 Bus./NC 49 (Dixie Drive)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

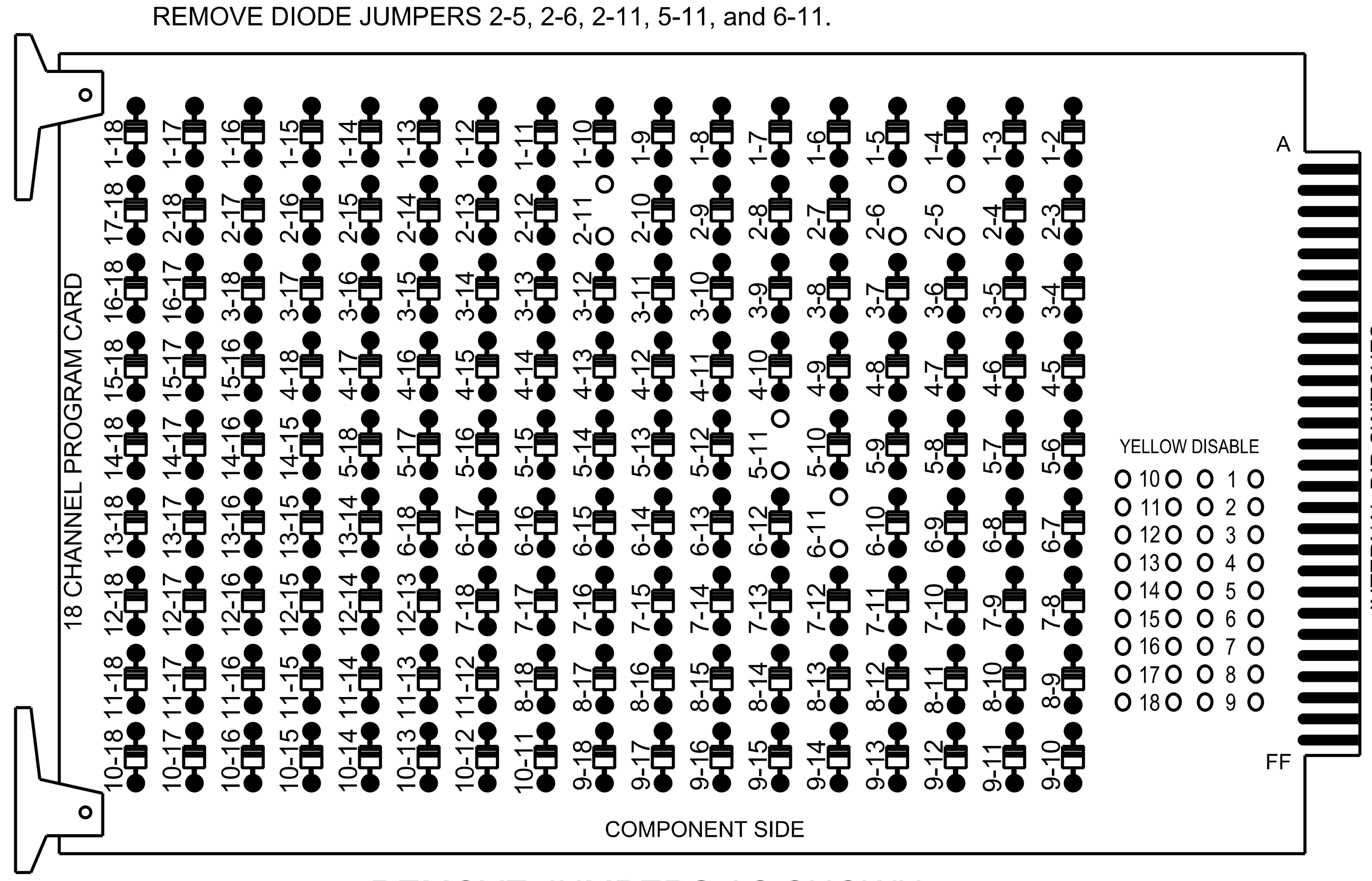
SIG. INVENTORY NO. 08-0501T3

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 25.1

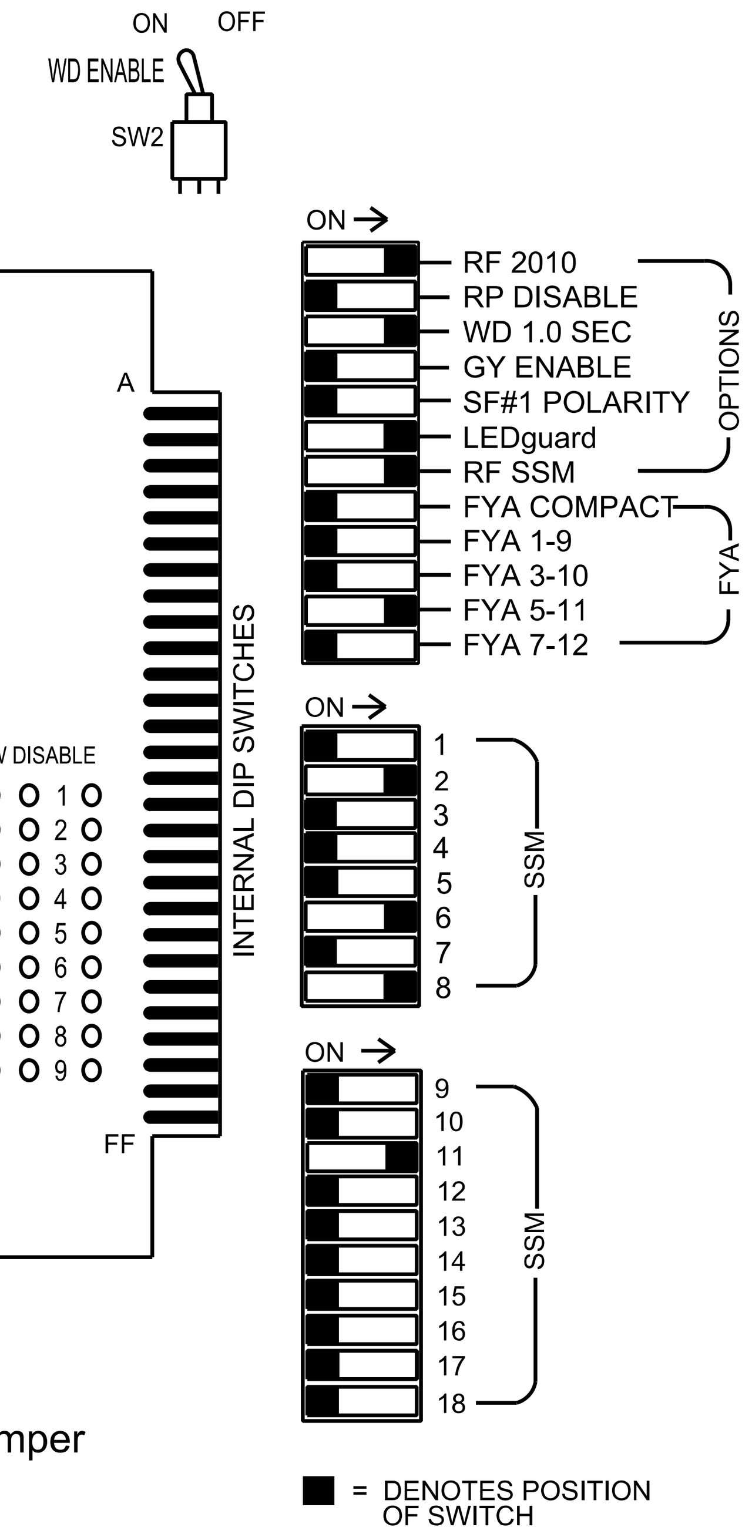
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 5-11, and 6-11.



REMOVE JUMPERS AS SHOWN



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

NOTES

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

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2		S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2		13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2		2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	23	NU	NU	NU	NU	51 ★	61,62	NU	NU	81,82	NU	NU	NU	NU	51 ★	NU	NU
RED		128	128						134			107							
YELLOW		129	129					*	135			108							
GREEN		130										109							
RED ARROW																	A114		
YELLOW ARROW																	A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW			130					133	136										
(Don't Walk symbol)																			
(Walk symbol)																			

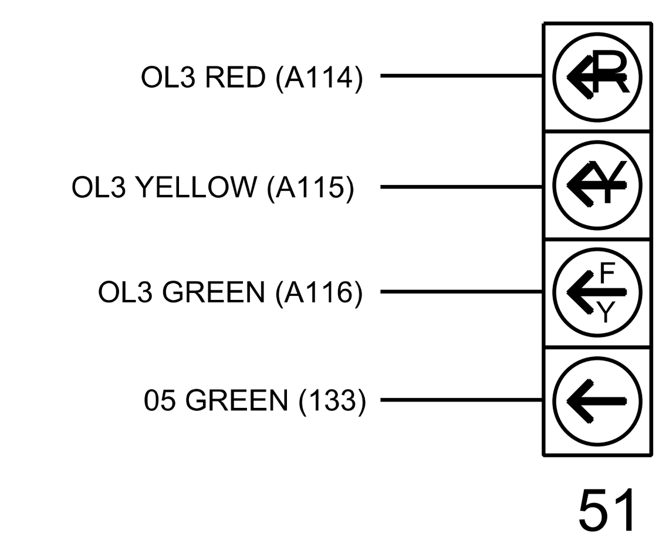
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

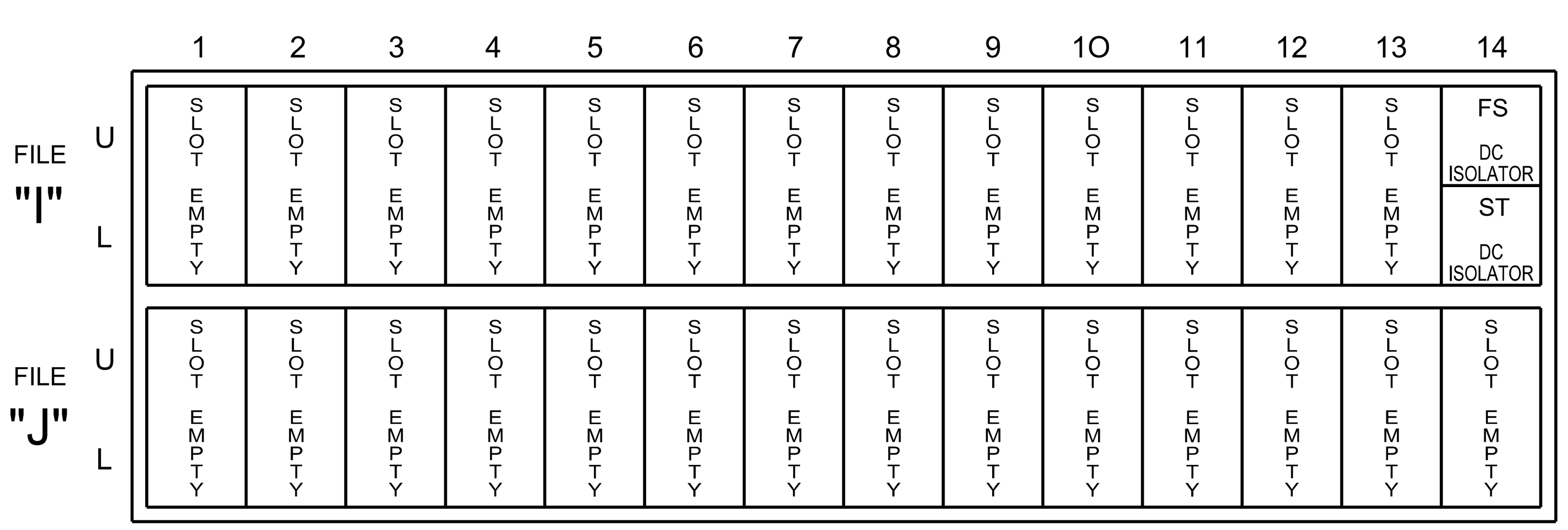
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2			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.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

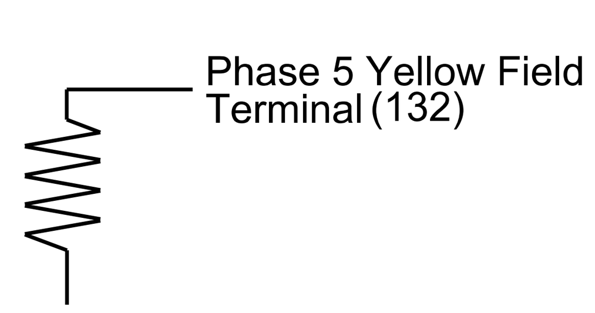
SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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: 08-0501T3
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Signal 3
Electrical Detail - Sheet 1 of 3

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division, ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus./NC 49 (Dixie Drive)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8	Randolph County		Asheboro
PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by: Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0501T3

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 25.2

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

5A

Detector	Call Phase	Delay
15	5	3
31	0	3

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL3

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0501T3
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Signal 3
Electrical Detail - Sheet 2 of 3

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
North Carolina Department of Transportation
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus./NC 49 (Dixie Drive)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0501T3

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 25.3

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 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0503T3
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade
Temporary Signal 3
Electrical Detail - Sheet 3 of 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Traffic Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus./NC 49 (Dixie Drive)
at
I-73-US 220 NB/I-74 WB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
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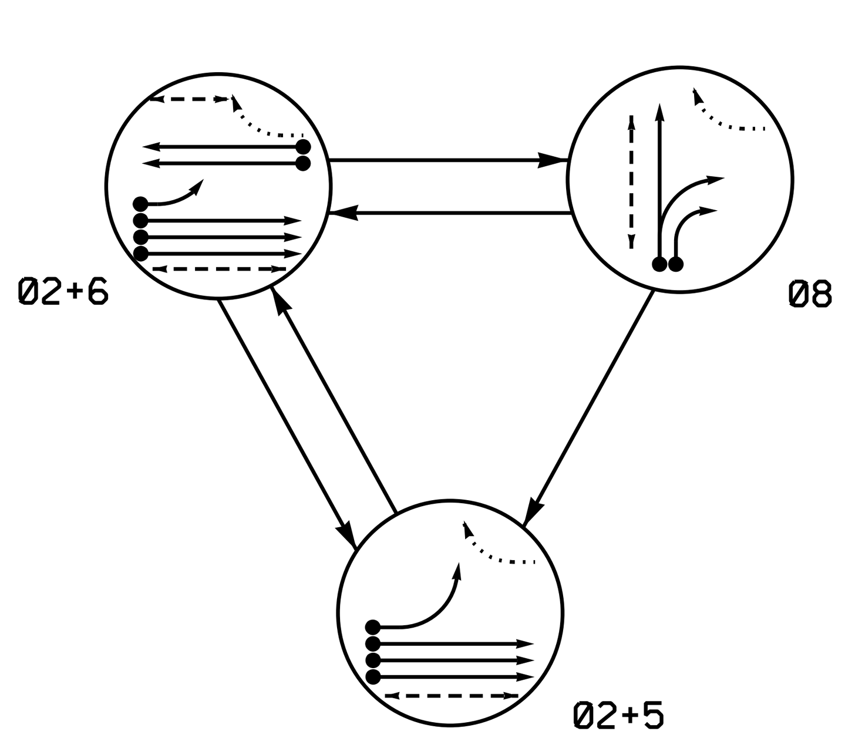
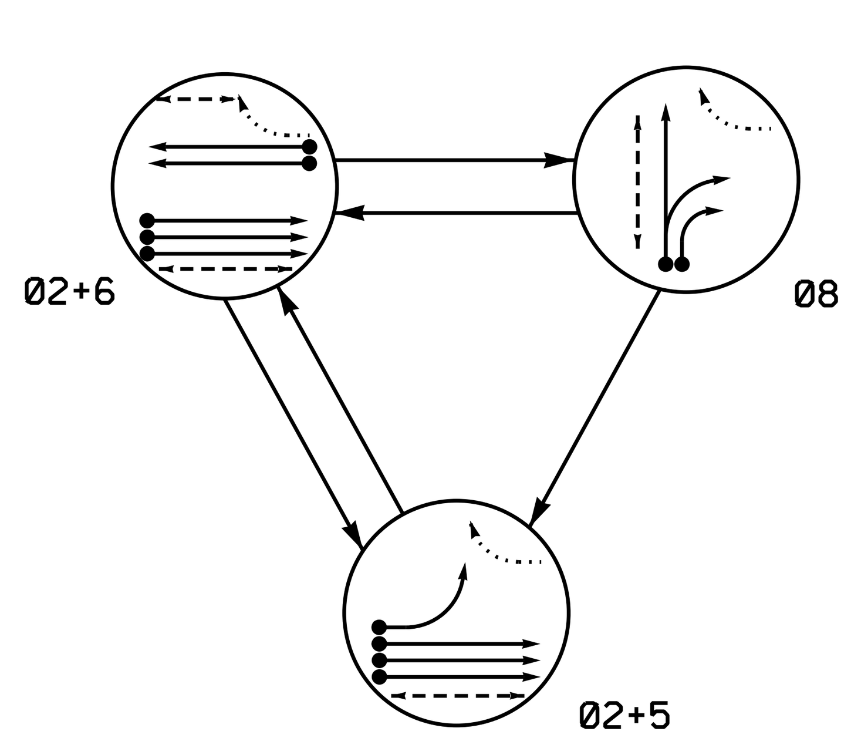
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
SIG. INVENTORY NO. 08-0501T3

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø8	FLASH
21,22	G	G	R	Y
23	↑	↑	R	Y
51	←	←F/Y	←R	←Y
61,62	R	↑	R	Y
81,82	R	R	G	R
P21,P22	W	W	DW	DRK
P61,P62	DW	W	DW	DRK
P81,P82	DW	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø8	FLASH
21,22	G	G	R	Y
23	↑	↑	R	Y
51	←	←R	←R	←Y
61,62	R	↑	R	Y
81,82	R	R	G	R
P21,P22	W	W	DW	DRK
P61,P62	DW	W	DW	DRK
P81,P82	DW	DW	W	DRK

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR 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	6	X	2	-	-	X	X	X	-	X
2B	6X6	300	6	X	2	-	-	X	X	X	-	X
2C	6X6	300	6	X	2	-	-	X	X	X	-	X
5A	6X40	0	2-4-2	X	5	✱15	-	X	-	X	-	X
					#2	3	-	X	-	X	X	X
6A	6X6	300	4	X	6	-	-	X	X	X	-	X
6B	6X6	300	4	X	6	-	-	X	X	X	-	X
8A	6X40	0	2-4-2	X	8	-	-	X	-	X	-	X
8B	6X40	0	2-4-2	X	8	-	-	X	-	X	-	X

✱ Reduce Delay to 3 seconds for loop during Alternate Phasing operation.
Disable phase call during Alternate Phasing operation.

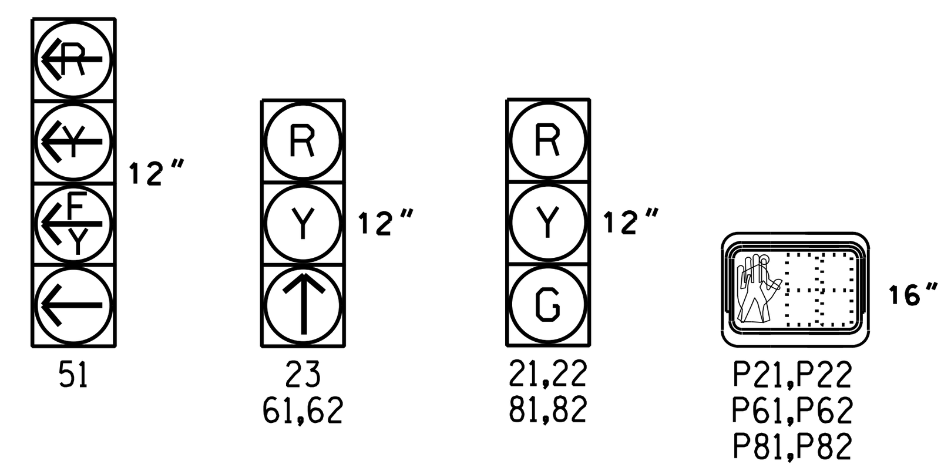
3 Phase
Fully Actuated
Signal System #D08-29_Asheboro
US 64 Bus-NC 49 (Asheboro)

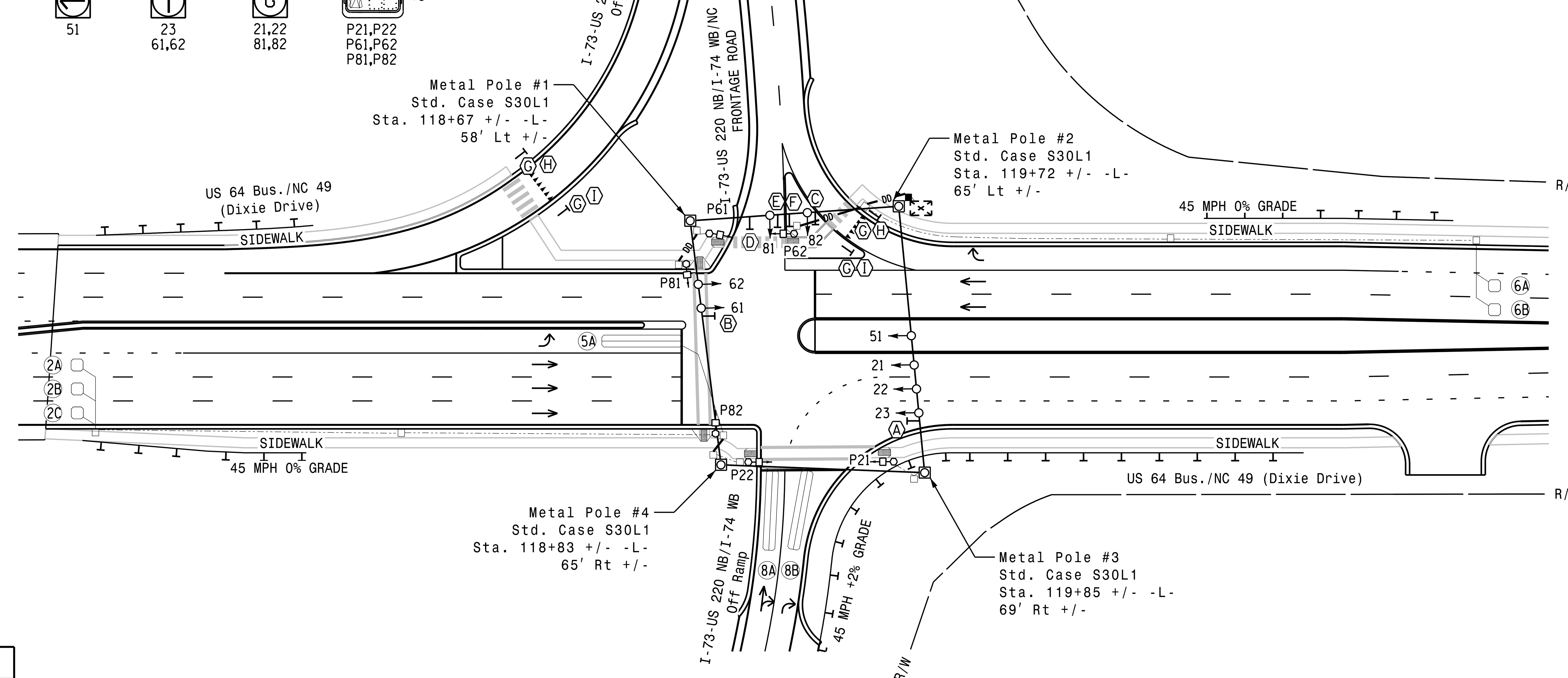
NOTES

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 5 may be lagged.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. 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 shall supersede these values.

SIGNAL FACE I.D.

All Heads L.E.D.





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	
	Directional Arrow	
	Directional Drill	N/A
N/A	Guardrail	
	Metal Strain Pole	
	Type II Signal Pedestal	
N/A	Curb Ramp	
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No U-Turn/No Left Turn Sign (R3-18)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	No Left Turn Sign (R3-2)	Ⓓ
Ⓔ	Combined Through and Right Arrow Sign (R3-6R)	Ⓔ
Ⓕ	"NO TURN ON RED" Sign (R10-11a)	Ⓕ
Ⓖ	Pedestrian Crossing Sign (W11-2)	Ⓖ
Ⓗ	Left Diagonal Arrow Plaque (W16-7pL)	Ⓗ
Ⓘ	Right Diagonal Arrow Plaque (W16-7pR)	Ⓘ

MAXTIME TIMING CHART

FEATURE	PHASE 2	5	6	8
Walk *	7	-	7	7
Ped Clear *	11	-	4	18
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Max 1 *	90	20	90	30
Yellow Change	4.5	3.0	4.5	4.3
Red Clear	1.3	2.1	1.3	1.8
Added Initial *	1.0	-	1.5	-
Maximum Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Advance Walk	-	-	3	-
Non Lock Detector	-	X	-	X
Vehicle Recall	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	-	-	-

* 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 - Final Design

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Prepared for:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

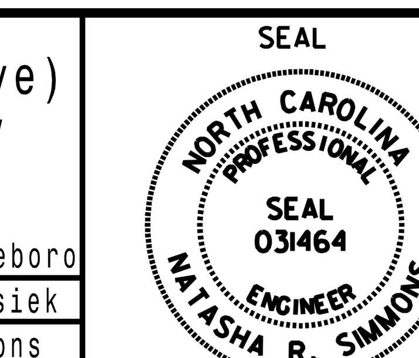
0 40
1"=40'

US 64 Bus./NC 49 (Dixie Drive) at I-73-US 220 NB/I-74 WB/ NC 49 SB Ramps

Division 8	Randolph County	Asheboro
PLAN DATE: August 2021	REVIEWED BY: A.D. Klinksiek	
PREPARED BY: N.K. Vlanich	REVIEWED BY: N.R. Simmons	

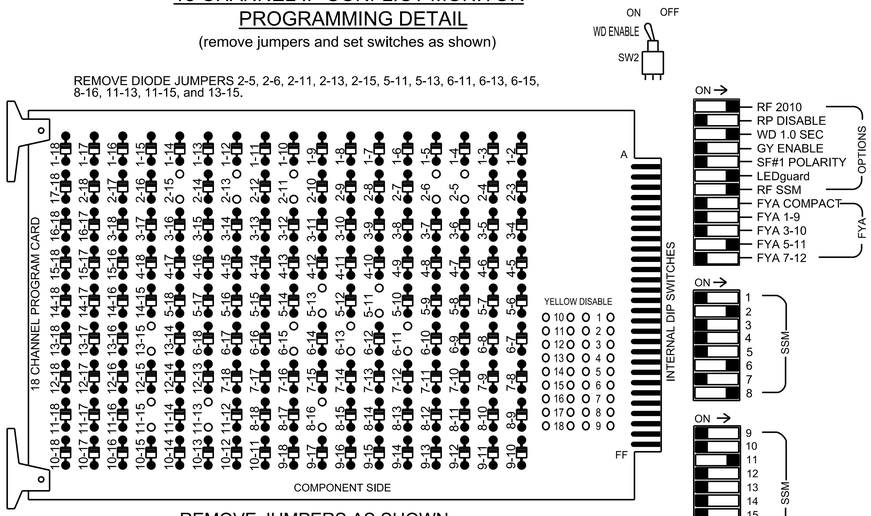
REVISIONS	INIT.	DATE

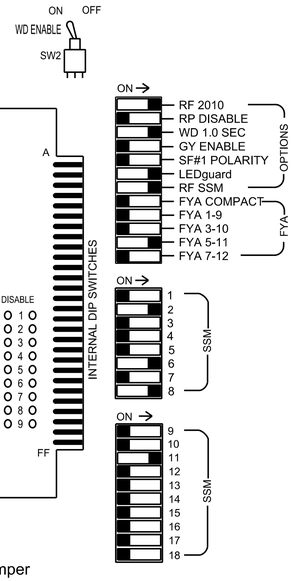
SEAL

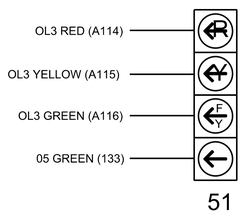


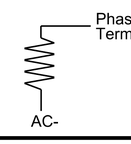
DocuSigned by:
Natasha R. Simmons 5/21/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0501









PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 26.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 2-13, 2-15, 5-11, 5-13, 6-11, 6-13, 6-15, 8-16, 11-13, 11-15, and 13-15.

REMOVE JUMPERS AS SHOWN

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plans.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all enabled detectors used at this location.
4. The cabinet and controller are part of Signal System #D08-29_Asheboro, US 64 Bus-NC 49 (Asheboro).

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,S7,S8,S9,S11,S12,AUX S4
Phases Used.......................................2,2 PED,5,6,6 PED,8,8 PED
Overlap "1"..Not Used
Overlap "2"..Not Used
Overlap "3"..*
Overlap "4"..Not Used

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2		S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2		13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2		2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	23	P21, P22	NU	NU	NU	51 ★	61,62	P61, P62	NU	81,82	P81, P82	NU	NU	NU	51 ★	NU	NU
RED		128	128						134			107							
YELLOW		129	129					*	135			108							
GREEN		130										109							
RED ARROW																	A114		
YELLOW ARROW																	A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW			130					133	136										
✋				113						119			110						
🚶				115						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.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

INPUT FILE POSITION LAYOUT

(front view)

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

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			X	X	X	
2C	TB2-9,10	I3U	63	29	4	2			X	X	X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2	3		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
8B	TB5-11,12	J6L	46	8	23	8			X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0501
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

HNTB NORTH CAROLINA, P.C.
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Raleigh, North Carolina 27609
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Signal Upgrade - Final Design
Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus./NC 49 (Dixie Drive)
at I-73-US 220 NB/I-74 WB/
NC 49 SB Ramps

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
SEAL 031464
NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
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SIG. INVENTORY NO. 08-0501

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
5A	15	5	3
	31	0	3

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE REMOVED INCLUDED PHASE FOR OL3

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0501
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 64 Bus./NC 49 (Dixie Drive) at I-73-US 220 NB/I-74 WB/ NC 49 SB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Transportation Mobility and Safety Division
ITS & Signals Management Section
State of North Carolina Department of Transportation
750 N. Greenfield Pkwy, Garner, NC 27529

HNTB
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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE
SIG. INVENTORY NO. 08-0501

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 26.3

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 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0503
DESIGNED: AUGUST 2021
SEALED: 05/21/2024
REVISED:

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

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NC Department of Transportation Mobility and Safety Division Traffic Engineering & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 64 Bus./NC 49 (Dixie Drive)
at I-73-US 220 NB/I-74 WB/
NC 49 SB Ramps

Division 8 | Randolph County | Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by:
Natasha R Simmons 5/21/2024
SIGNATURE DATE

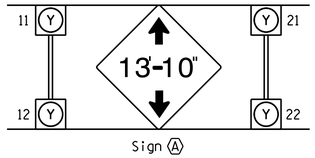
SIG. INVENTORY NO. 08-0501

PROJECT REFERENCE NO.	SHEET NO.
U-5813	Sig. 27.0

2 Circuit Flasher
(Isolated)

SIGNAL FACE I.D.

All Heads L.E.D.

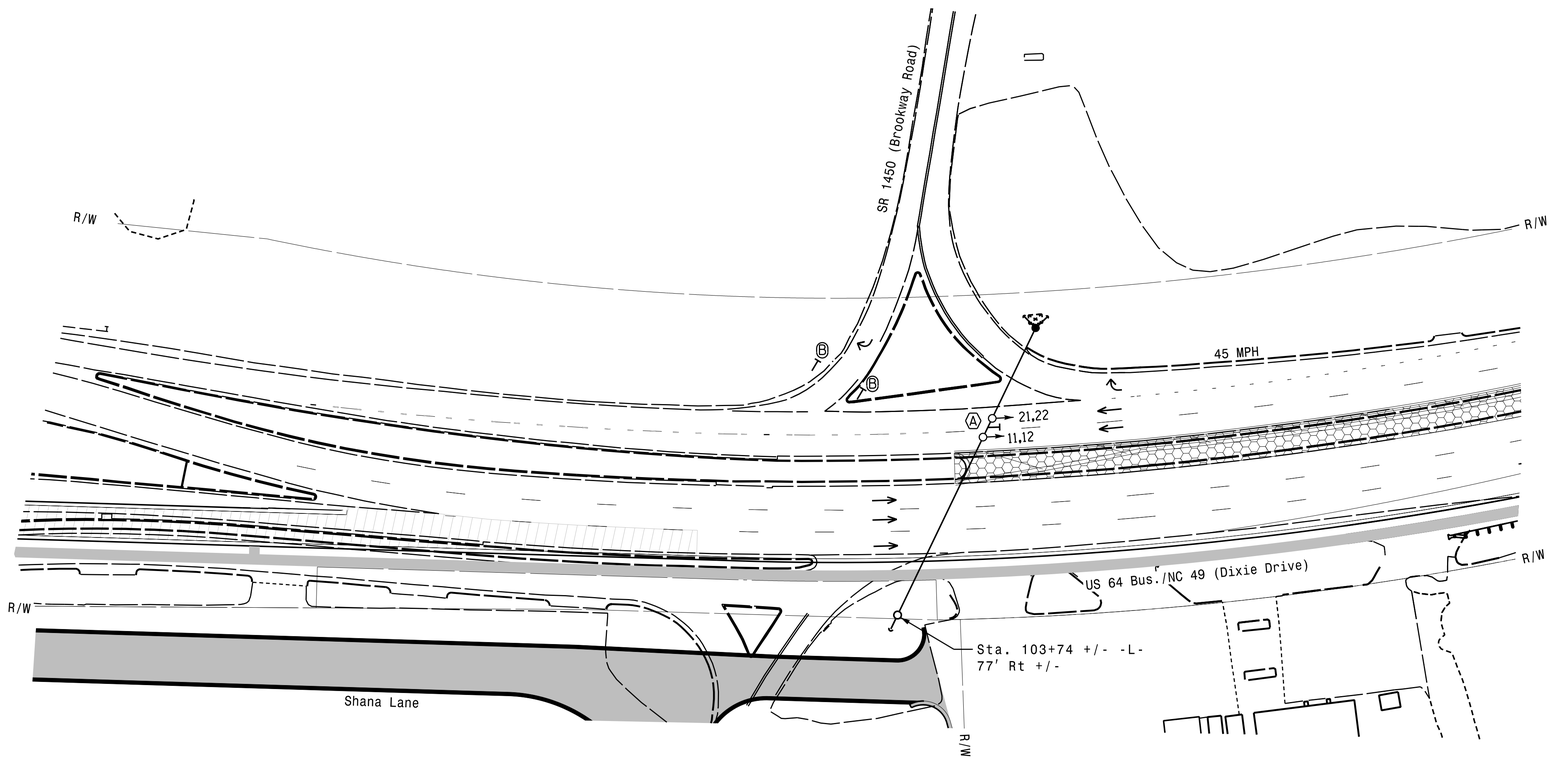


Sign Ⓐ

TABLE OF OPERATION		
SIGNAL FACE	INTERVAL 1	INTERVAL 2
11,22	ON	OFF
12,21	OFF	ON

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. All beacons shall flash continuously.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	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	
	Directional Arrow	
	Construction Zone	N/A
N/A	Curb Ramp	
N/A	Guardrail	
	Construction Zone Drums	
	Temporary Pavement	
	Wedge/Widen (Lane Closure Required)	
Ⓐ	Low Clearance Sign (W12-2) with Warning Beacons	Ⓐ
Ⓑ	Stop Sign (R1-1)	Ⓑ

Signal Upgrade -
Temporary Design
(Construction Phase IIA)

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Prepared for: Transportation Mobility and Safety Division, Signal Design Section, North Carolina Department of Transportation

750 N.Greenfield Pkwy.Garner,NC 27529

N

0 40
1"=40'

Overheight Flasher on US 64 WB
for
SR 1713 Bridge

Division 8 Randolph County Asheboro

PLAN DATE:	August 2021	REVIEWED BY:	A.D. Klinksiek
PREPARED BY:	N.K. Vlanich	REVIEWED BY:	N.R. Simmons

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

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Natasha R Simmons 5/21/2024
SIGNATURE DATE

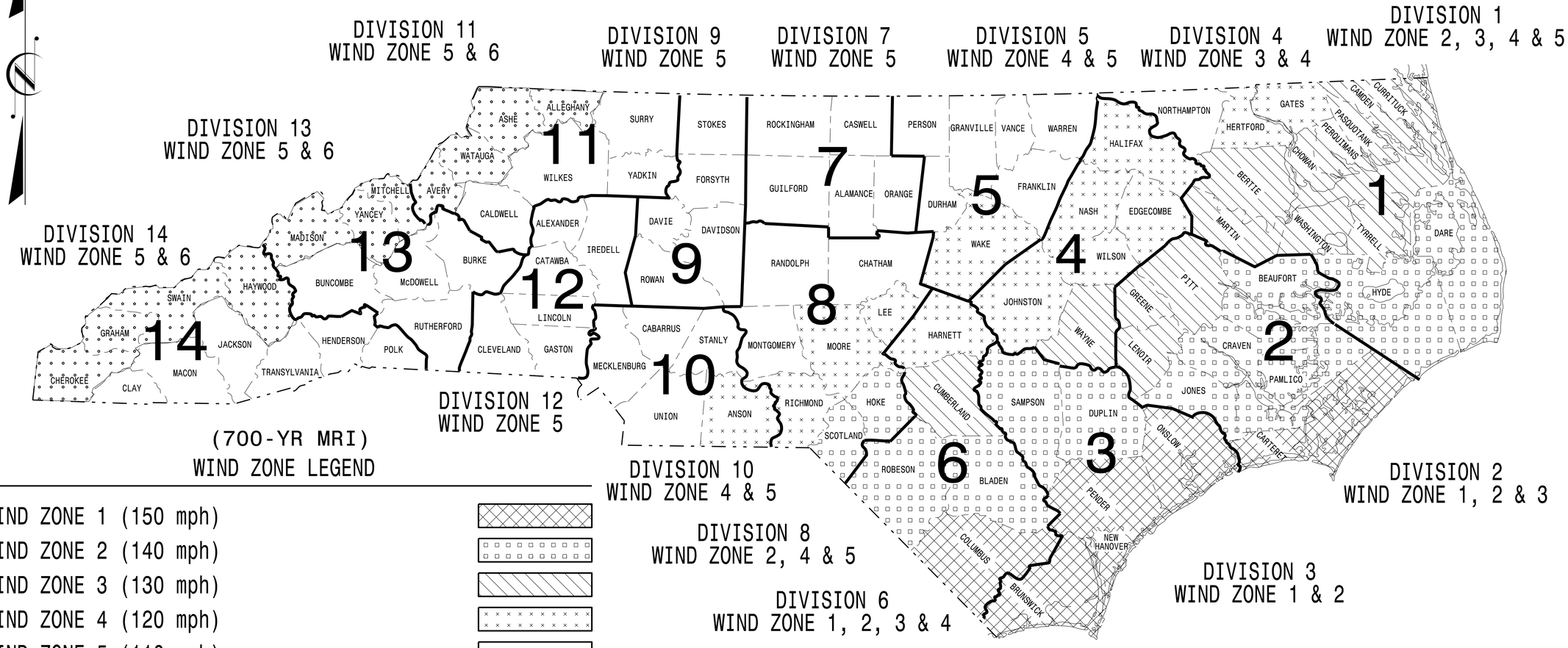
SIG. INVENTORY NO. 08-0345T

PROJECT I.D. NO.	SHEET NO.
U-5813	Sig.M1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)

NCDOT METAL POLE STANDARDS



(700-YR MRI)
WIND ZONE LEGEND

WIND ZONE 1 (150 mph)	
WIND ZONE 2 (140 mph)	
WIND ZONE 3 (130 mph)	
WIND ZONE 4 (120 mph)	
WIND ZONE 5 (110 mph)	
WIND ZONE 6 (135 mph) Special Wind Zone	

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

Prepared in the Offices of:

Transportation Mobility and Safety Division
Signal Design Section
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy.
Garner, NC 27529

Designed in conformance with the latest 2020 Interim to the 1st Edition 2015

AASHTO LRFD

Standard Specifications for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS

DRAWING NUMBER	DESCRIPTION
Sig. M 1A	Statewide Wind Zone Map (700–yr MRI)
Sig. M 1B	Statewide Wind Zone Map (10–yr MRI)
Sig. M 2	Typical Fabrication Details–All Metal Poles
Sig. M 3	Typical Fabrication Details–Strain Poles
Sig. M 4	Typical Fabrication Details–Mast Arm Poles
Sig. M 5	Typical Fabrication Details–Mast Arm Connection
Sig. M 6	Typical Fabrication Details–Strain Pole Attachments
Sig. M 7	Construction Details–Foundations
Sig. M 8	Standard Strain Pole Foundation–All Soil Conditions
Sig. M 9	Typical Fabrication Details–CCTV Camera Poles

MOBILITY AND SAFETY DIVISION – TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS UNIT

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K. DURIGON, P.E. – ITS AND SIGNALS STRUCTURAL ENGINEER

B. WALKER, P.E. – ITS AND SIGNALS STRUCTURAL ENGINEER

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Kevin Durigon
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09/21/2023
DATE

21-SEP-2023 08:20
S:\ITS&SU\ITS Signals\Signal Design Sections\Structures\Drawings\2024 Metal Pole Std Drawings for LRFD\2024 Sig. M1A Standard All Metal Pole (700-yr MRI).dgn
kdurigon