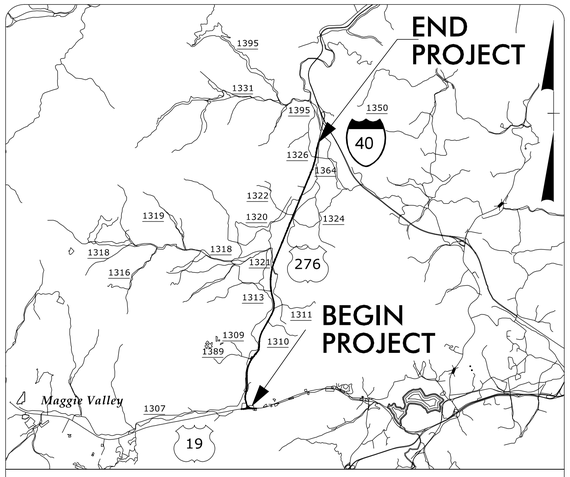
09/08/69

TIP PROJECT: R–5921

CONTRACT:



VICINITY MAP

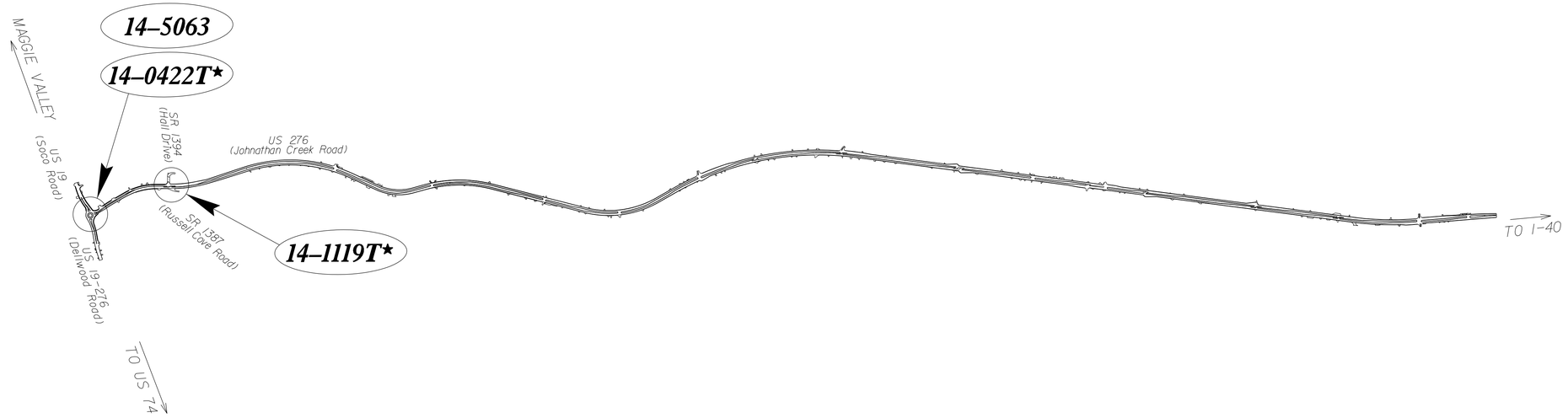
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HAYWOOD COUNTY

Project No.	Sheet No.
R–5921	Sig.1.0

LOCATION: *US 276 (JONATHAN CREEK RD) FROM US 19 TO 0.5 MILES SOUTH OF I–40*

TYPE OF WORK: *TRAFFIC SIGNALS*



*** Signal to be removed upon completion of TIP project.**

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF PLANS

Sheet #	Reference #	Location /Description
Sig. 1.0	––––––––	Title Sheet
Sig. 2.0–2.2	14–0422T	US 19 (Soco Road) / US 19–276 (Dellwood Road) at US 276 (Johnathan Creek Road)
Sig. 3.0–4.1	14–1119T	US 276 (Johnathan Creek Road) at SR 1387 (Russell Cove Road) / SR 1394 (Hall Drive)
Sig. 5.0	14–5063	Standard Drawing for Rectangular Rapid Flashing Beacon

LEGEND

##-#### SIGNAL INVENTORY NUMBER

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

R. Nicholas Zinser, PE – Western Region Signals Engineer

Todd Joyce, PE – Signal Equipment Design Engineer

Prepared for the North Carolina Department of Transportation
In the Office of:

vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328

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

Jimmy Terry, PE
PROJECT ENGINEER

Jianxin(Justine) Ma, PE PTOE
PROJECT DESIGN ENGINEER

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 033108 ENGINEER JIANXIN MA

DocuSigned by: Jianxin Ma 8/20/2024
SIGNATURE DATE

DIVISION OF HIGHWAYS

TRANSPORTATION MOBILITY AND SAFETY DIVISION

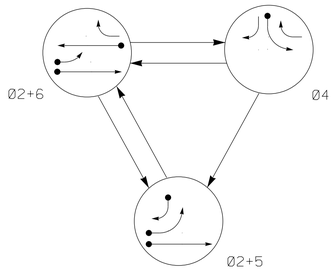
Transportation Mobility and Safety Division · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

TSMO Unit

750 N. Greenfield Parkway, Garner, NC 27529

PROJECT REFERENCE NO.	SHEET NO.
R-5921	Sig.2.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.

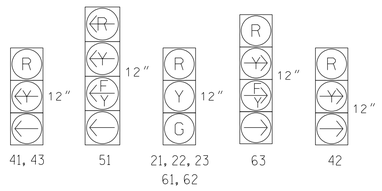


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21, 22, 23	G	G	R	Y
41, 43	R	R	←	R
42	→	R	→	R
51	←	~~F Y~~	~~R~~	~~Y~~
61, 62	R	G	R	Y
63	R	~~F Y~~	→	~~Y~~

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	✳	70	✳	✳	2	-	-	X	-	X	-	✳
4A	✳	0	✳	✳	4	-	-	X	-	X	-	✳
5A	✳	0	✳	✳	5	15.0	-	X	-	X	-	✳
				✳	2	-	-	X	-	X	-	✳
5B	✳	0	✳	✳	5	15.0	-	X	-	X	-	✳
5C	✳	0	✳	✳	5	15.0	-	X	-	X	-	✳
6A	✳	70	✳	✳	6	-	-	X	-	X	-	✳

✳ Multizone Microwave Detection Zones

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Walk *	–	–	–	–
Ped Clear	–	–	–	–
Min Green *	10	7	7	10
Passage *	3.0	2.0	2.0	3.0
Max 1 *	90	45	35	90
Yellow Change	4.3	3.0	3.0	4.3
Red Clear	3.3	2.9	4.0	3.3
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.

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. Refer to Traffic Manangement Plan for pavement markings.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. This intersection features a multizone microwave detection system. Install detectors according to manufacturer's specifications to ensure optimum detection zone coverage.

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	→
▬	Multizone Microwave Detection	N/A
▬	Construction Area	N/A

Signal Upgrade-Temporary Design (TCP Phase I)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 19 (Soco Road) /
US 19-276 (Dellwood Road)
at
US 276 (Johnathan Creek Road)

Division 14 Haywood County Dellwood

PLAN DATE:	April 2024	REVIEWED BY:	M. L. Stygles
PREPARED BY:	J. Ma	REVIEWED BY:	J. L. Lewis

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

NORTH CAROLINA PROFESSIONAL SEAL 033108 ENGINEER JIANXIN MA

DocuSigned by: Jianxin Ma 827E1953081444F... 4/18/2024 DATE

SIG. INVENTORY NO. 14-0422T

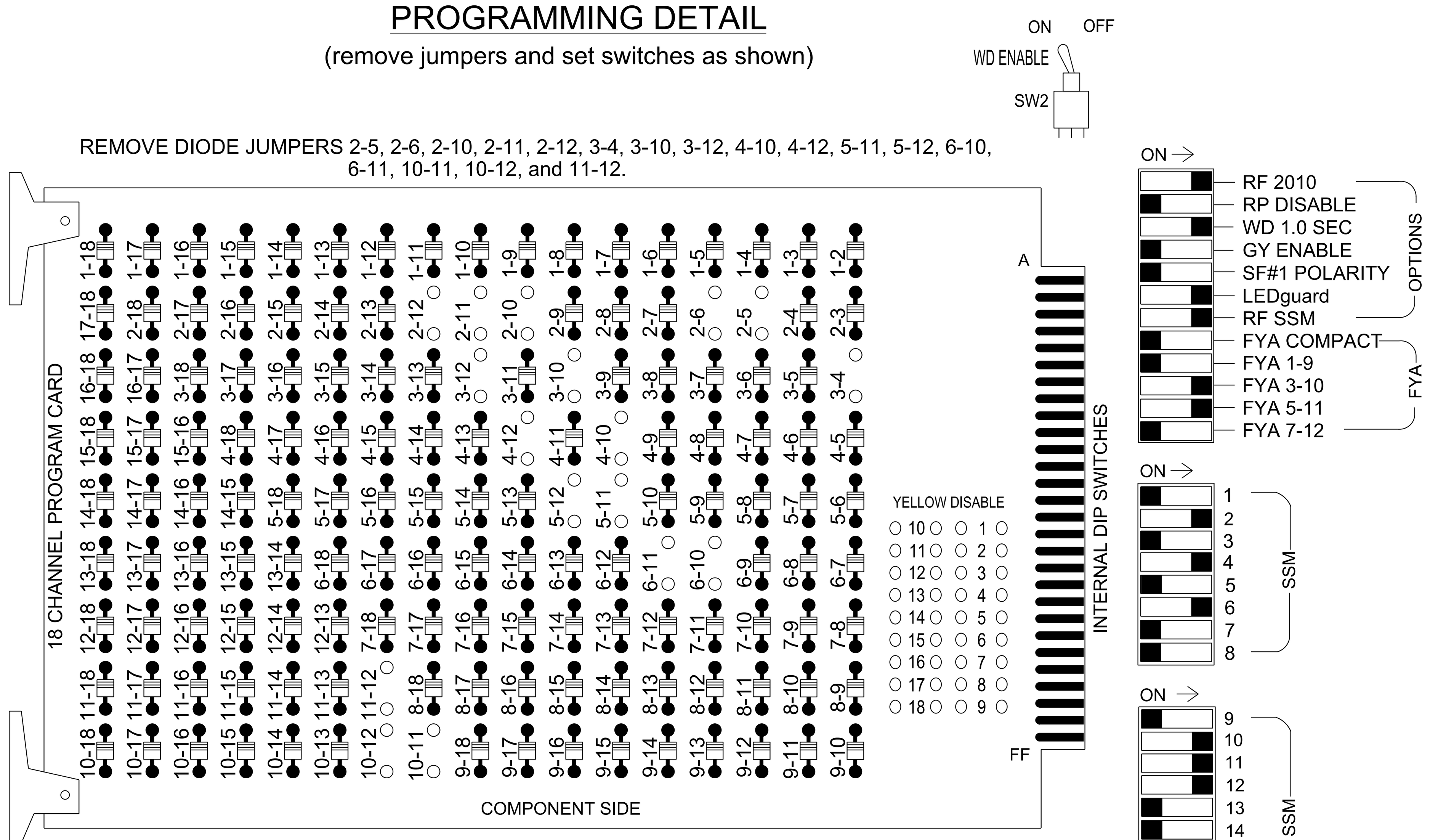
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27607
P: 919-829-0328

38536.13

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-10, 2-11, 2-12, 3-4, 3-10, 3-12, 4-10, 4-12, 5-11, 5-12, 6-10, 6-11, 10-11, 10-12, and 11-12.



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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 2 Green No Walk and 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...........................S2,S4,S5,S7,S8, AUXS2,AUXS4,AUXS5
Phases Used.......................................2,4,5,6
Overlap "2"..*
Overlap "3"..*
Overlap "4"..*
Overlap "7"..*

*See overlap programming detail on sheet 2.

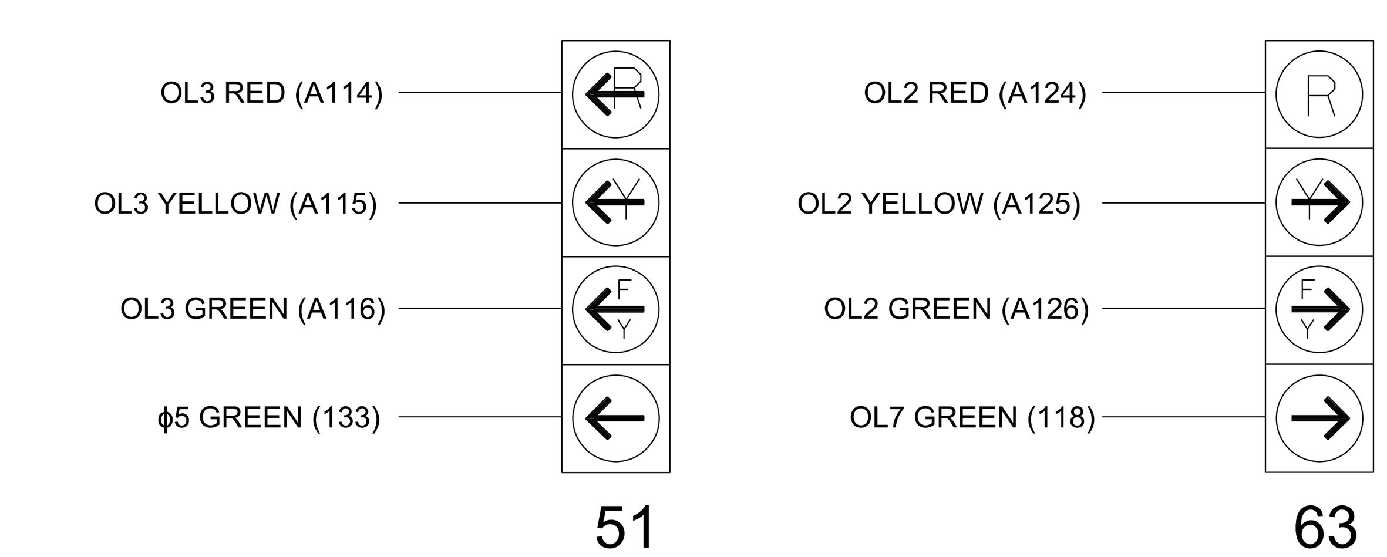
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	OL7	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	63★	41,43	NU	51★	61,62	NU	NU	NU	NU	NU	63★	NU	51★	42	NU
RED		128			101			134						A124			A101	
YELLOW		129		*			*	135										
GREEN		130						136										
RED ARROW																A114		
YELLOW ARROW					102									A125		A115	A102	
FLASHING YELLOW ARROW														A126		A116		
GREEN ARROW				118	103		133										A103	

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

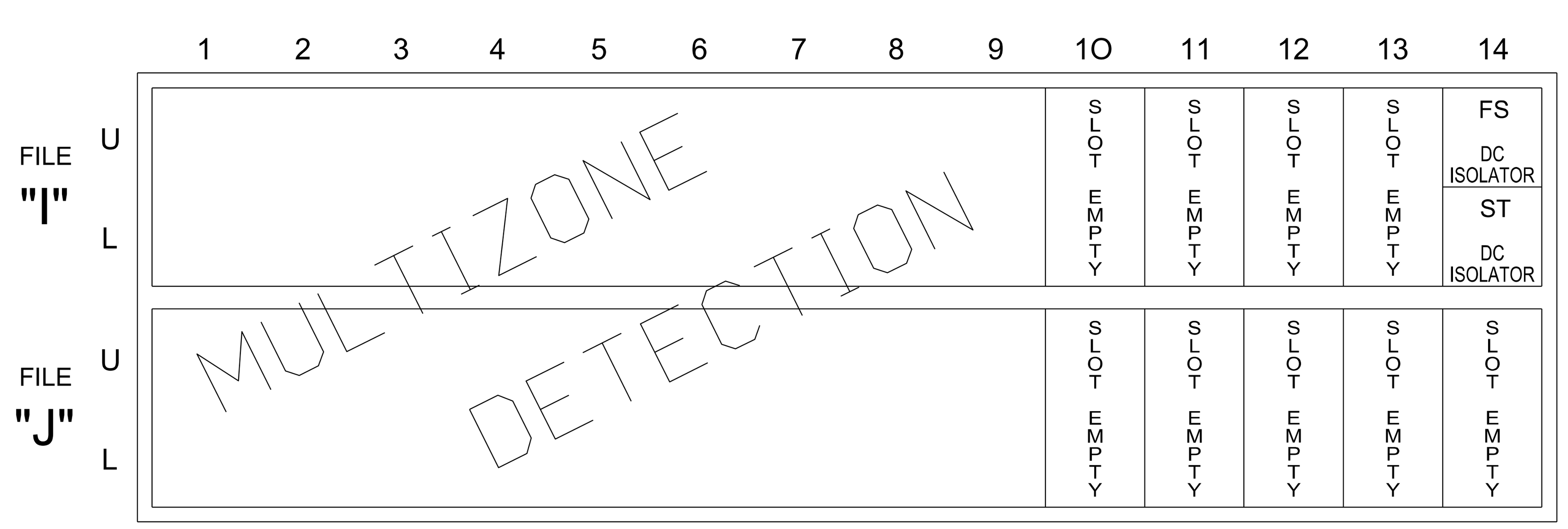
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

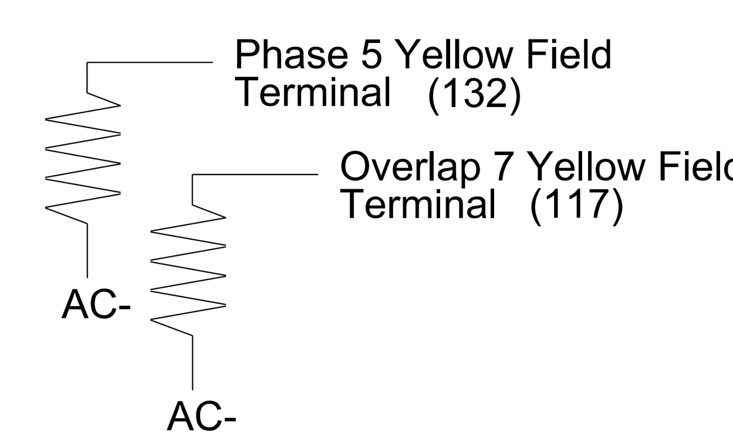
SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-0422T
DESIGNED: April 2024
SEALED: 4/18/2024
REVISED: N/A

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27607
P: 919-829-0328

Electrical Detail-Sheet 1 of 2-Temporary Design (TCP Phase I)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 19 (Soco Road) /
US 19-276 (Dellwood Road)
at
US 276 (Johnathan Creek Road)

Division 14 Haywood County Dellwood

PLAN DATE: April 2024	REVIEWED BY: M.L. Stygles
PREPARED BY: J. Ma	REVIEWED BY: J. L. Lewis

REVISIONS	INIT.	DATE

750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 033108 ENGINEER JIANXIN MA

DocuSigned by: Jianxin Ma 827E1953081444F... 4/18/2024 DATE

SIG. INVENTORY NO. 14-0422T

PROJECT REFERENCE NO.	SHEET NO.
R-5921	Sig.2.2

MAXTIME OVERLAP PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

ASSIGN CHANNEL 3 TO OVERLAP 7 →

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

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: 14-0422T
DESIGNED: April 2024
SEALED: 4/18/2024
REVISED: N/A

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27607
P: 919-829-0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical Detail-Sheet 2 of 2-Temporary Design (TCP Phase I)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 19 (Soco Road) /
US 19-276 (Dellwood Road)
at
US 276 (Johnathan Creek Road)

Division 14 Haywood County Dellwood

PLAN DATE:	April 2024	REVIEWED BY:	M.L. Stygles
PREPARED BY:	J. Ma	REVIEWED BY:	J. L. Lewis

REVISIONS	INIT.	DATE

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

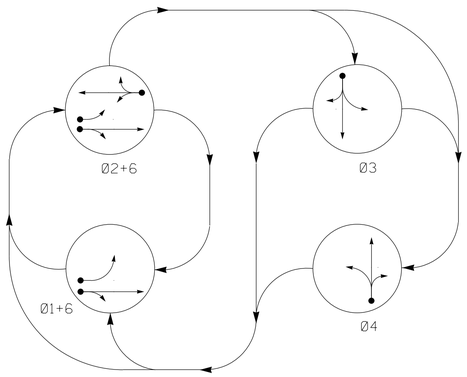
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 033108 ENGINEER JIANXIN MA

DocuSigned by: Jianxin Ma
827E1953081444F...
4/18/2024
DATE

SIG. INVENTORY NO. 14-0422T

PROJECT REFERENCE NO.	SHEET NO.
R-5921	Sig.3.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

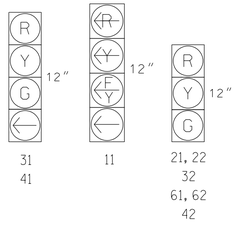
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø3	PHASE Ø4	FLASH
11	←	~~F Y~~	~~← R~~	~~R~~	~~Y~~
21, 22	R	G	R	R	Y
31	R	R	G ←	R	R
32	R	R	G	R	R
41	R	R	R	G ←	R
42	R	R	R	G	R
61, 62	G	G	R	R	Y

SIGNAL FACE I.D.

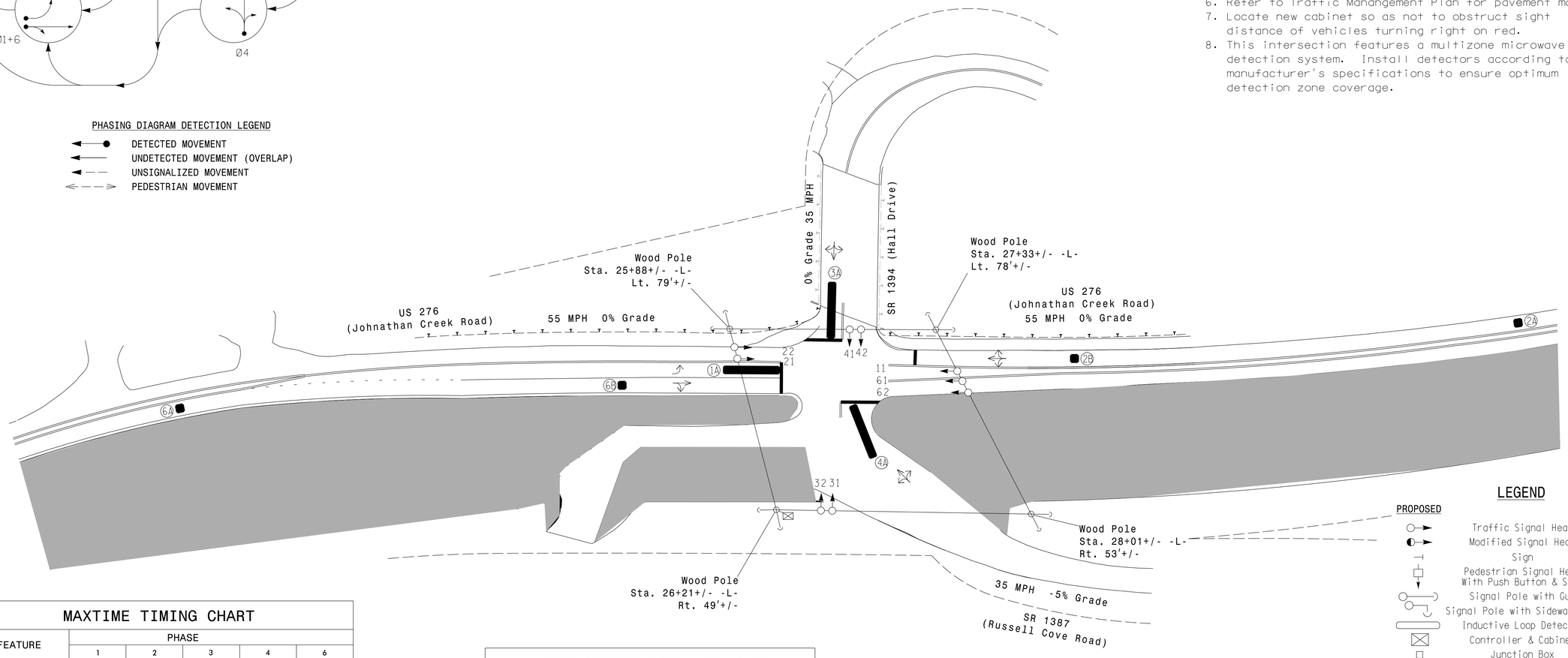
All Heads L.E.D.



4 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. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Refer to Traffic Manangement Plan for pavement markings.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. This intersection features a multizone microwave detection system. Install detectors according to manufacturer's specifications to ensure optimum detection zone coverage.



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	→
▬	Multizone Microwave Detection	N/A
▬	Construction Area	N/A
—T—T—	Guard Rail	N/A

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	6
Walk *	–	–	–	–	–
Ped Clear	–	–	–	–	–
Min Green *	7	14	7	7	14
Passage *	2.0	2.0	2.0	2.0	2.0
Max 1 *	35	90	45	45	90
Yellow Change	3.0	5.2	3.8	4.2	5.2
Red Clear	1.8	1.0	1.1	1.0	1.0
Added Initial *	–	–	–	–	–
Maximum Initial *	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–
Time To Reduce *	–	–	–	–	–
Minimum Gap	–	–	–	–	–
Advance Walk	–	–	–	–	–
Non Lock Detector	X	–	X	X	–
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL
Dual Entry	–	–	–	–	–

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

MAXTIME DETECTOR INSTALLATION CHART

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
1A	✳	0	✳	✳	1	15.0	-	X	-	X	-	✳
				✳	6	3.0	-	X	-	X	-	✳
2A	✳	420	✳	✳	2	-	2.2	X	-	X	-	✳
2B	✳	110	✳	✳	2	-	-	X	-	X	-	✳
3A	✳	0	✳	✳	3	3.0	-	X	-	X	-	✳
4A	✳	0	✳	✳	4	3.0	-	X	-	X	-	✳
6A	✳	420	✳	✳	6	-	2.2	X	-	X	-	✳
6B	✳	110	✳	✳	6	-	-	X	-	X	-	✳

✳ Multizone Microwave Detection Zones

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Signal Upgrade-Temporary Design 1 (TCP Phase II)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 276 (Johnathan Creek Road) at SR 1387 (Russell Cove Road) / SR 1394 (Hall Drive)

Division 14 Haywood County Dellwood

PLAN DATE:	April 2024	REVIEWED BY:	M. L. Stygles
PREPARED BY:	J. Ma	REVIEWED BY:	J. L. Lewis

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

NORTH CAROLINA PROFESSIONAL SEAL 033108 ENGINEER JIANXIN MA

DocuSigned by: Jianxin Ma 827E1953081444F...

4/18/2024
DATE

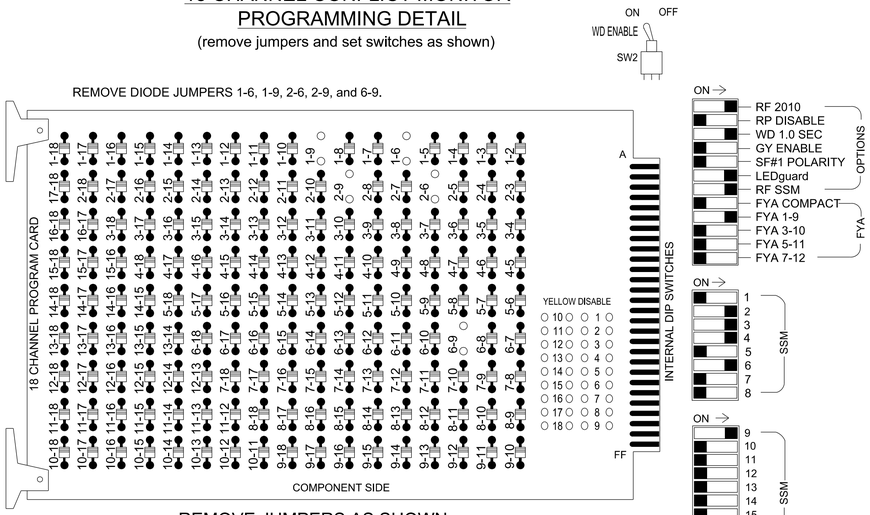
SIG. INVENTORY NO. 14-1119T1

38536.34

PROJECT REFERENCE NO.	SHEET NO.
R-5921	Sig.3.1

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



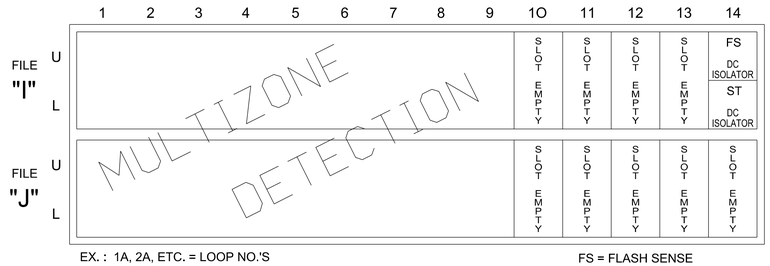
REMOVE JUMPERS AS SHOWN

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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

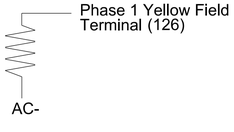
SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



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 2 Green No Walk and 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.....S1,S2,S4,S5,S8, AUXS1
Phases Used.....1,2,3,4,6
Overlap "1".....*

*See overlap programming detail on this sheet.

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

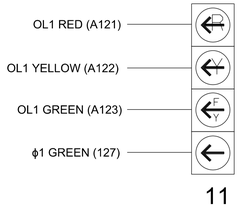
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11 ★	21,22	NU	31	32	41	42	NU	NU	61,62	NU	NU	NU	NU	11 ★	NU	NU	NU	NU	NU
RED		128		116	116	101	101			134										
YELLOW	✱	129		117	117	102	102			135										
GREEN		130		118	118	103	103			136										
RED ARROW															A121					
YELLOW ARROW															A122					
FLASHING YELLOW ARROW															A123					
GREEN ARROW	127			118		103														

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-1119T1
DESIGNED: April 2024
SEALED: 4/18/2024
REVISED: N/A

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27607
P: 919-829-0328

Electrical Detail-Temporary Design 1 (TCP Phase II)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 276 (Johnathan Creek Road)
at
SR 1387 (Russell Cove Road) /
SR 1394 (Hall Drive)

Division 14 Haywood County Dellwood

PLAN DATE:	April 2024	REVIEWED BY:	M.L. Stygles
PREPARED BY:	J. Ma	REVIEWED BY:	J. L. Lewis

REVISIONS	INIT.	DATE

750 N.Greenfield Pkwy,Garner,NC 27529

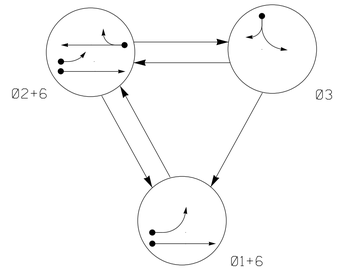
SEAL NORTH CAROLINA PROFESSIONAL SEAL 033108 ENGINEER JIANXIN MA

DocuSigned by: Jianxin Ma 827E1953081444F... 4/18/2024 DATE

SIG. INVENTORY NO. 14-1119T1

PROJECT REFERENCE NO.	SHEET NO.
R-5921	Sig.4.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

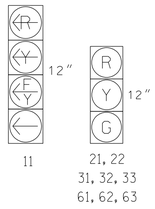
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø3	PHASE FLASH
11	←	~~Y~~	~~R~~	~~Y~~
21, 22	R	G	R	Y
31, 32, 33	R	R	G	R
61, 62, 63	G	G	R	Y

SIGNAL FACE I.D.

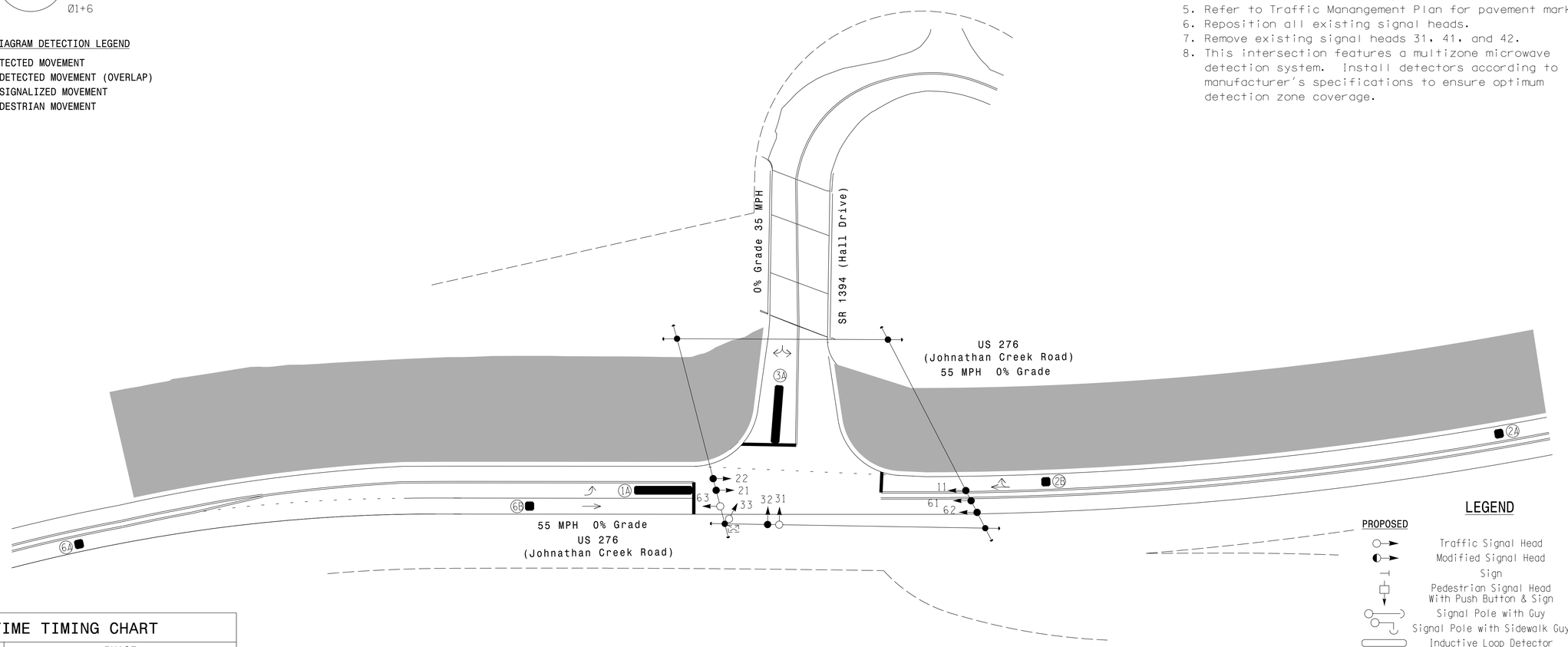
All Heads L.E.D.



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. Set all detector units to presence mode.
5. Refer to Traffic Manangement Plan for pavement markings.
6. Reposition all existing signal heads.
7. Remove existing signal heads 31, 41, and 42.
8. This intersection features a multizone microwave detection system. Install detectors according to manufacturer's specifications to ensure optimum detection zone coverage.



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	→
▬	Multizone Microwave Detection	N/A
▬	Construction Area	N/A

MAXTIME TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 3	PHASE 6
Walk *	–	–	–	–
Ped Clear	–	–	–	–
Min Green *	7	14	7	14
Passage *	2.0	2.0	2.0	2.0
Max 1 *	35	90	45	90
Yellow Change	3.0	5.2	3.0	5.2
Red Clear	2.6	1.7	3.3	1.7
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.

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
1A	✳	0	✳	✳	1	15.0	-	X	-	X	-	✳
				✳	6	3.0	-	X	-	X	-	✳
2A	✳	420	✳	✳	2	-	2.2	X	-	X	-	✳
2B	✳	110	✳	✳	2	-	-	X	-	X	-	✳
3A	✳	0	✳	✳	3	3.0	-	X	-	X	-	✳
6A	✳	420	✳	✳	6	-	2.2	X	-	X	-	✳
6B	✳	110	✳	✳	6	-	-	X	-	X	-	✳

✳ Multizone Microwave Detection Zones

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27607
P: 919-829-0328

Signal Upgrade-Temporary Design 2 (TCP Phase III)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 276 (Johnathan Creek Road) at SR 1394 (Hall Drive)

Division 14 Haywood County Dellwood

PLAN DATE:	April 2024	REVIEWED BY:	M. L. Stygles
PREPARED BY:	J. Ma	REVIEWED BY:	J. L. Lewis

REVISIONS	INIT.	DATE

SCALE: 0 40, 1"=40'

NORTH CAROLINA PROFESSIONAL SEAL 033108 ENGINEER JIANXIN MA

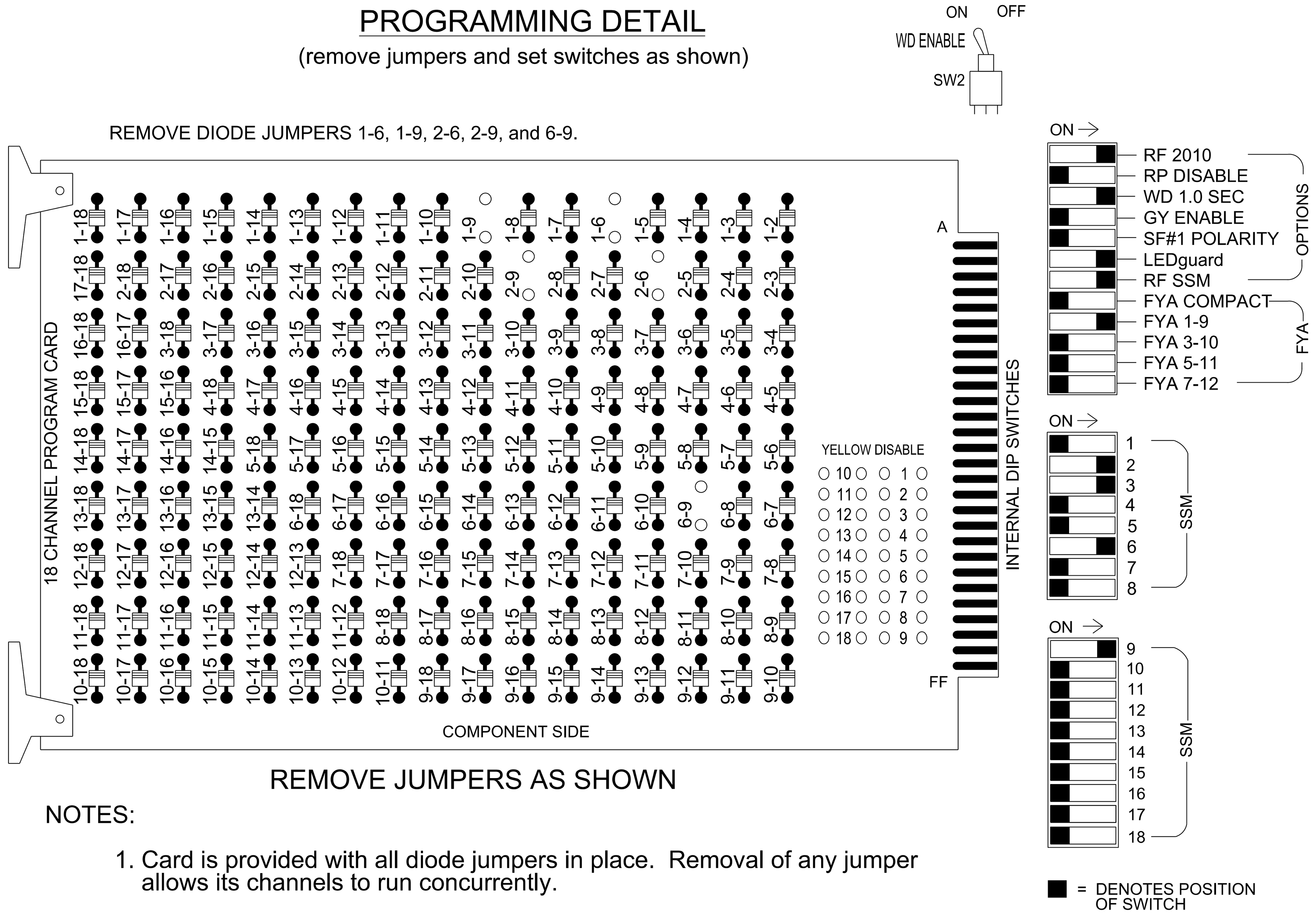
DocuSigned by: Jianxin Ma B27E1953081444F... 4/18/2024 DATE

SIG. INVENTORY NO. 14-1119T2

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 2 Green No Walk and 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.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	31,32, 33	NU	NU	NU	61,62, 63	NU	NU	NU	NU	11★	NU	NU	NU	NU	NU
RED		128		116				134										
YELLOW	*	129		117				135										
GREEN		130		118				136										
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127																	

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

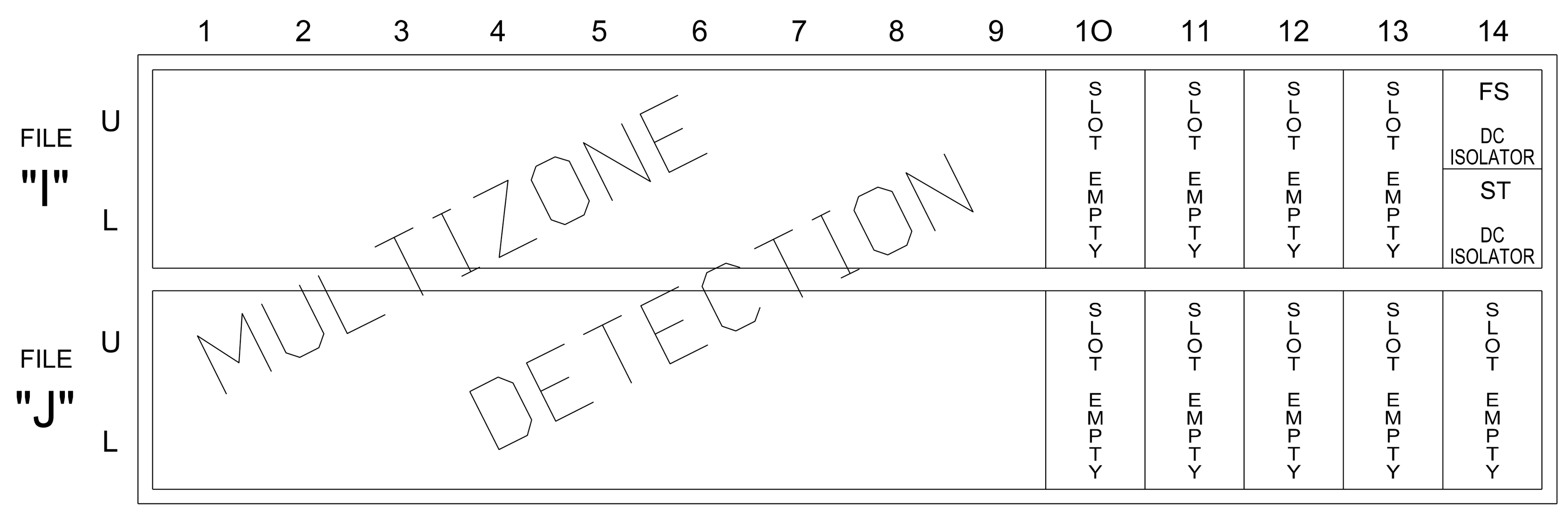
EQUIPMENT INFORMATION

Controller...2070LX
Cabinet...332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1,S2,S4,S8, AUXS1
Phases Used..1,2,3,6
Overlap "1"...*

*See overlap programming detail on this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

OVERLAP PROGRAMMING

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

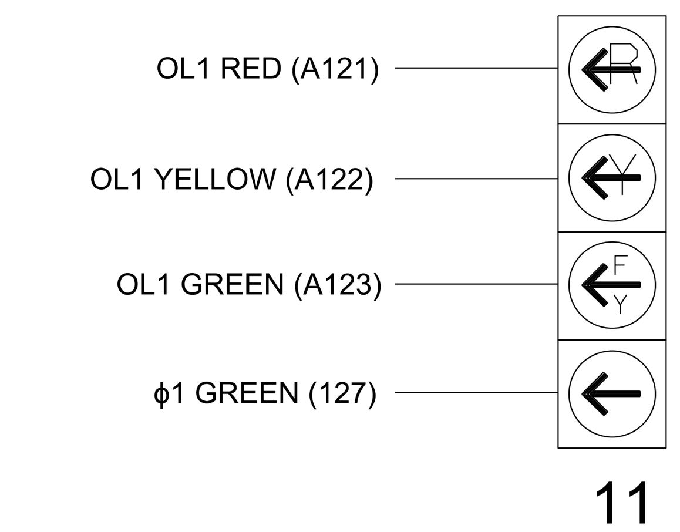
Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

FYA SIGNAL WIRING DETAIL

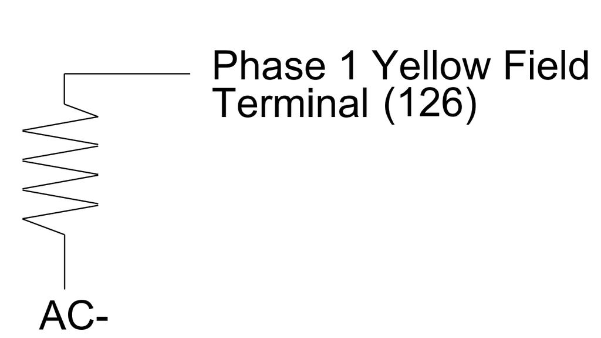
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-1119T2
DESIGNED: April 2024
SEALED: 4/18/2024
REVISED: N/A

VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27607
P: 919-829-0328

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical Detail-Temporary Design 2 (TCP Phase III)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 276 (Johnathan Creek Road)
at
SR 1394 (Hall Drive)

Division 14 Haywood County Dellwood

PLAN DATE: April 2024	REVIEWED BY: M.L. Stygles
PREPARED BY: J. Ma	REVIEWED BY: J. L. Lewis

REVISIONS	INIT.	DATE

750 N.Greenfield Pkwy,Garner,NC 27529

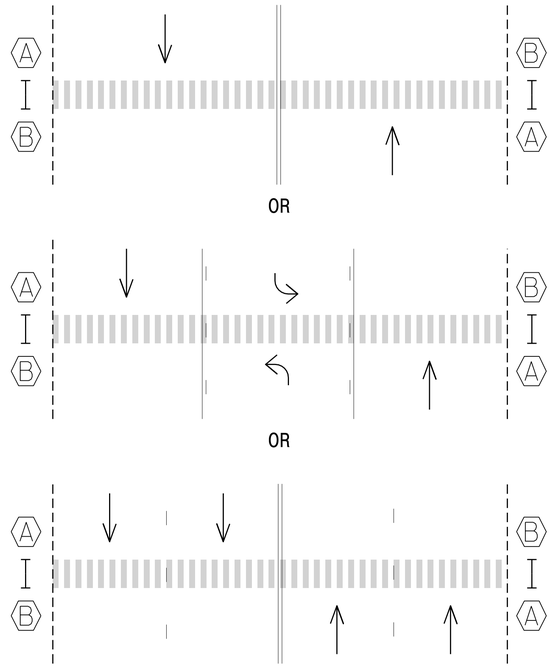
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 033108 ENGINEER JIANXIN MA

DocuSigned by: Jianxin Ma 827E1953081444F... 4/18/2024 DATE

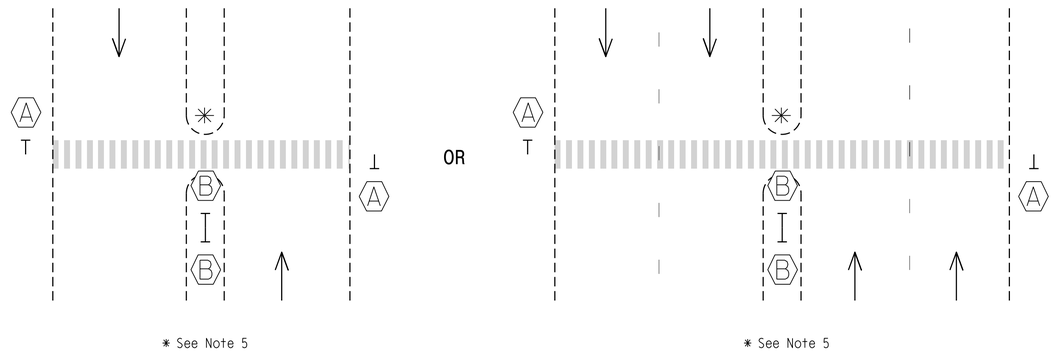
SIG. INVENTORY NO. 14-1119T2

PROJECT REFERENCE NO.	SHEET NO.
R-5921	Sig. 5.0

Two to Four Lanes, Undivided



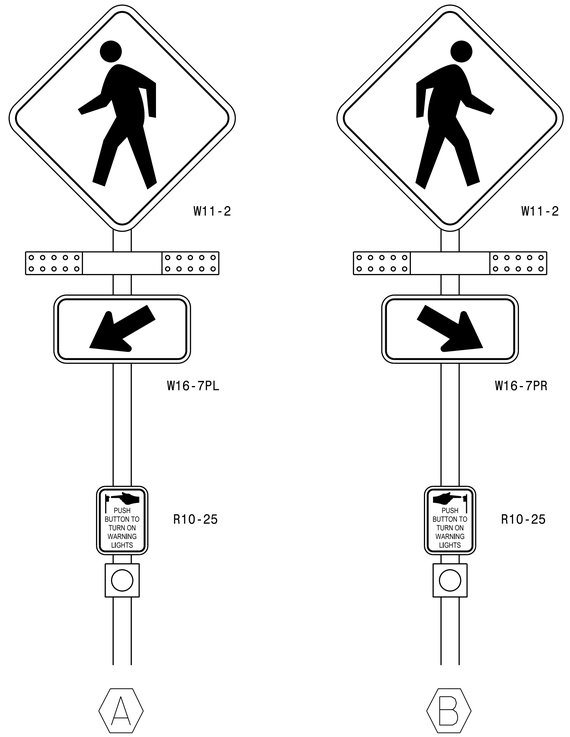
Two or Multi-Lanes, Divided



* See Note 5

* See Note 5

RRFB Sign Detail



Notes

1. Design the RRFB in accordance with the 2009 MUTCD Interim Approval 21 -- Rectangular Rapid-Flashing Beacons at Crosswalks. The RRFB unit associated with a post-mounted sign and plaque should be located between the pedestrian crossing warning (W11-2) sign and the supplemental downward diagonal arrow plaque (W16-7p).
2. If sight distance approaching the crosswalk is deemed insufficient, a supplemental RRFB with an "AHEAD" (W16-9P) plaque may be installed on that approach in advance of the crosswalk.
3. When practical, the RRFB and mounting post on the right side of the road shall be mounted on the approach side of the crosswalk closest to approaching traffic.
4. When practical, the RRFB and mounting post on the left side of the road may be mounted on the back of the post for the opposing approach.
5. A RRFB on the left side of the roadway or in the median may be individually mounted on the approach side of the crosswalk closest to approaching traffic, or, when practical, may be mounted back to back on the same post and mounted on either side of the crosswalk in the median.
6. Locate push button sign (R10-25) and push button to face crosswalk, even if it is mounted on the back side of the sign.
7. All RRFB units associated with a given crosswalk (including those with an advance crossing sign) shall, when actuated, simultaneously commence operation of their rapid-flashing indications and shall cease operation simultaneously.

Timing of RRFBs

When actuated, the two yellow indications in each RRFB unit shall flash in a rapidly flashing sequence.

The RRFB shall flashing sequence shall provide enough time for pedestrians to cross from curb to curb. It is recommened to be a minimum of 7 seconds plus the crossing distance (D) divided by 3.5 feet/per sec., rounded up to the next whole second:

$$\text{Flash Time (sec.)} = 7 + D/3.5$$

RRFBs shall provide 75 flashing sequences per minute. During each 800-millisecond flashing sequence, the left and right RRFB indications shall operate using the following sequence:

- The RRFB indication on the left-hand side shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
- The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
- The RRFB indication on the left-hand side shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
- The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
- Both RRFB indications shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
- Both RRFB indications shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 250 milliseconds.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Standard Drawing for Rectangular Rapid Flashing Beacon

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by: [signature] SIGNATURE

12/19/2022 DATE

19-DEC-2022 15:47
S:\Traffic\Signals\Signal Design Section\Central Region\Rob's Files\RRFB Stds\rrfb.dgn
rziemba