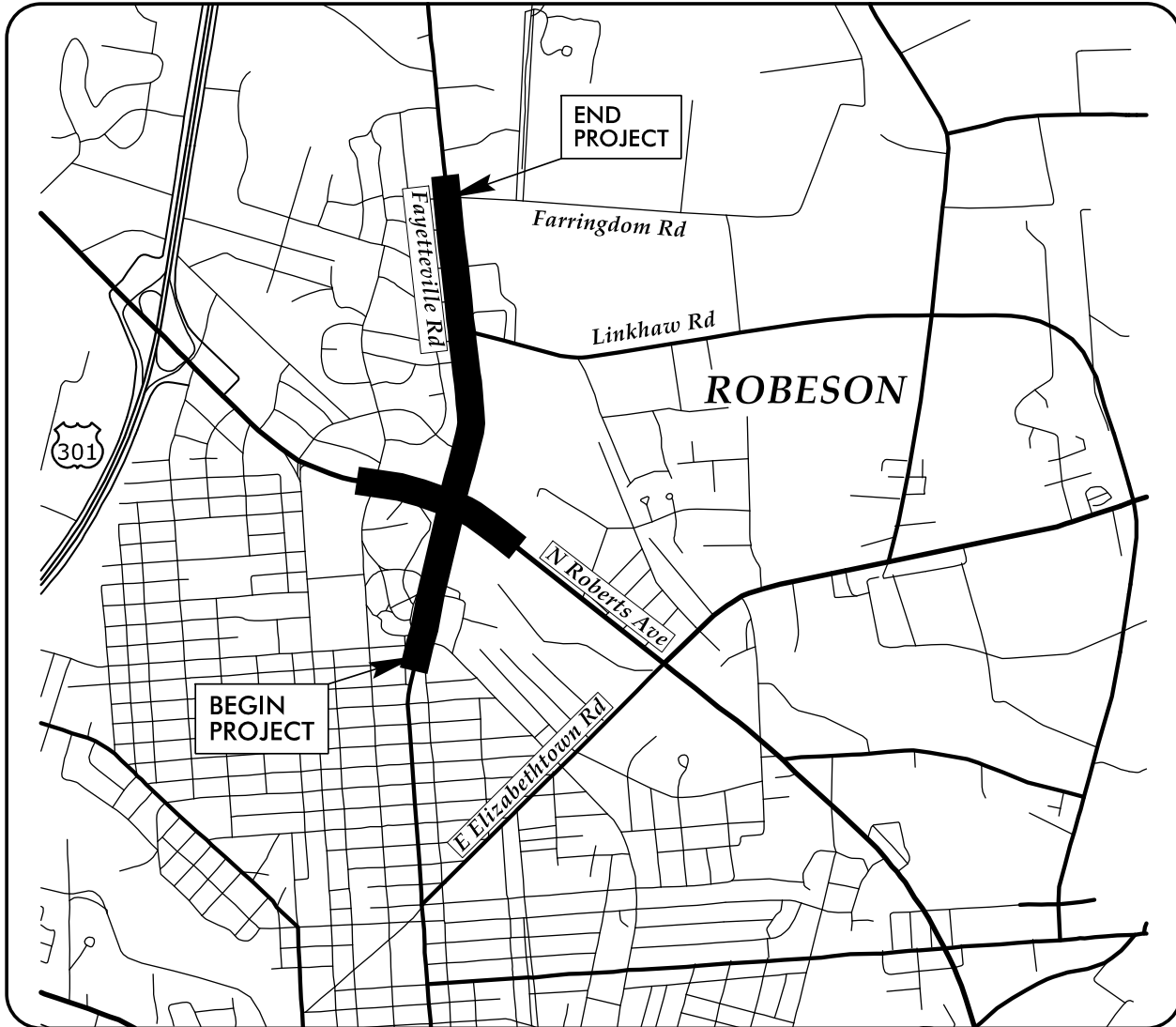


PROJECT: U-5797

CONTRACT:



VICINITY MAP

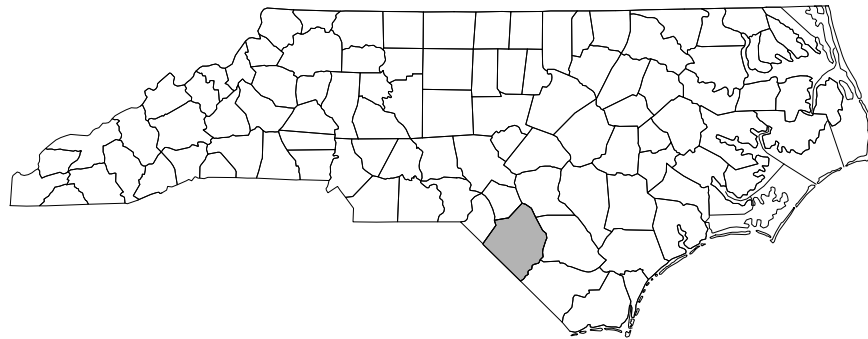
NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ROBESON COUNTY

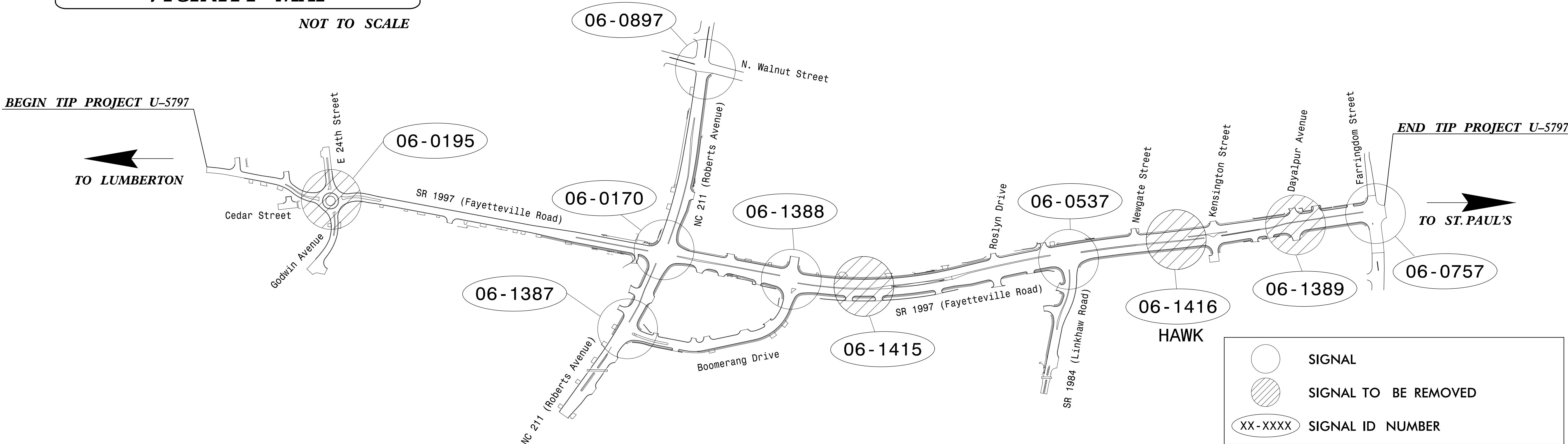
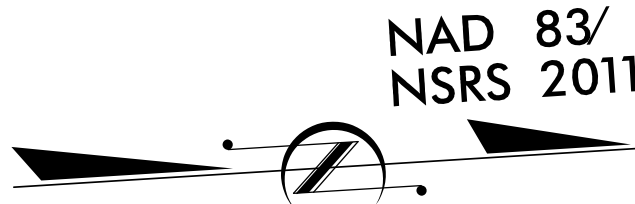
LOCATION: SR 1997 (FAYETTEVILLE ROAD) FROM
FARRINGDOM STREET TO EAST 22ND STREET

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



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

Sheet #	Reference #
Sig. 1.0	N/A
Sig. 2.0-2.2	06-0195
Sig. 3.0-10.2	06-0170
Sig. 11.0-14.3	06-0897
Sig. 15.0-18.4	06-1387
Sig. 19.0-20.3	06-1388
Sig. 21.0-21.3	06-1415
Sig. 22.0-27.2	06-0537
Sig. 28.0-30.1	06-1416
Sig. 31.0-31.3	06-1389
Sig. 32.0-35.3	06-0757
Sig. M1-M9	N/A
SCP 1-16	N/A

Index of Plans

Location/Description
Project Titlesheet
SR 1997 (Fayetteville Road) at Godwin Avenue/E. 24th Street
NC 211 (N Roberts Avenue) at SR 1997 (Fayetteville Road)
NC 211 (N Roberts Avenue) at Walnut Street
NC 211 (N Roberts Avenue) at Boomerang Drive/Restaurant Driveway
SR 1997 (Fayetteville Road) at Boomerang Drive/Highland Avenue
SR 1997 (Fayetteville Road) at Boomerang Drive Temporary U-Turn South
SR 1997 (Fayetteville Road) at SR 1984 (Linkhaw Road)
SR 1997 (Fayetteville Road) at Pedestrian Hybrid Beacon/N. of SR 1984 (Linkhaw Road)
SR 1997 (Fayetteville Road) at Dayalpur Avenue Temporary U-Turn North
SR 1997 (Fayetteville Road) at Farringdom Street
2024 Standard Metal Pole Sheets
Signal Communication Plans

NCDOT TRANSPORTATION SYSTEMS
MANAGEMENT & OPERATIONS UNIT

Contacts:

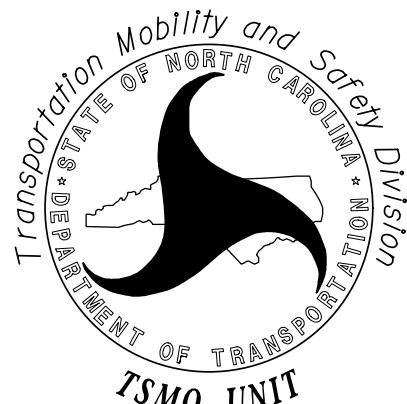
Zachary Little, PE – Eastern Region Signals Engineer
Keith M. Mims, PE – Signal Equipment Design Engineer
Gregory A. Green – Signal Communications Project Engineer

STV Engineers, Inc.

Contacts:

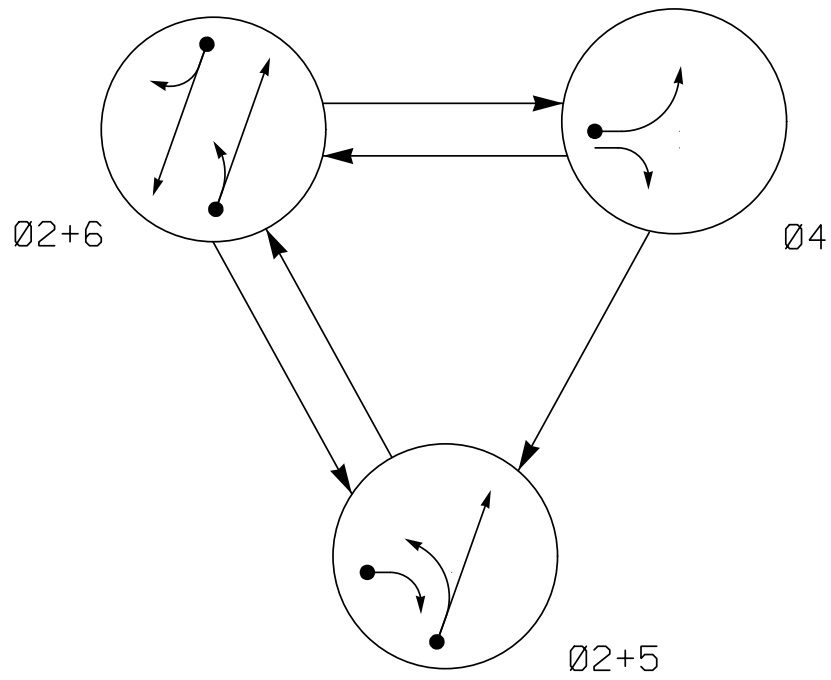
Hemang M. Surti, PE – Senior Project Manager
Trent M. Moody, PE – Senoir Associate Engineering Director

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



750 N. Greenfield Parkway, Garner, NC 27529

PHASING DIAGRAM



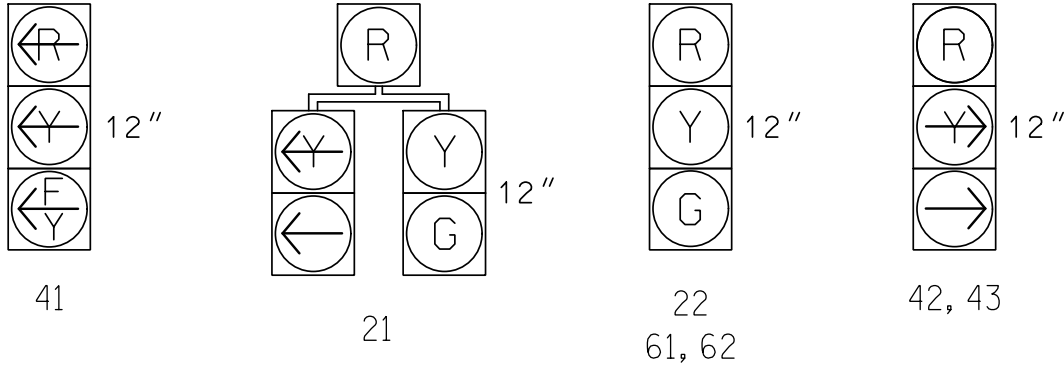
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	Ø 2+5	Ø 2+6	Ø 4	FLASH
21	G	G	R	R
22	G	G	R	R
41	R	R	Y	Y
42, 43	R	R	R	R
61, 62	R	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL DURING GREEN
2A	6X40	0	*	*	2	-	-	X	-	X
4A	6X40	0	*	*	4	3	-	X	-	X
5A	6X6	60	*	*	5	15	-	X	-	X
5B	6X40	0	*	*	5	15	-	X	-	X
6A	6X40	0	*	*	6	3	-	X	-	X

* Multi-zone Microwave Detection Zone

3 Phase
Fully Actuated
(Isolated)

NOTES

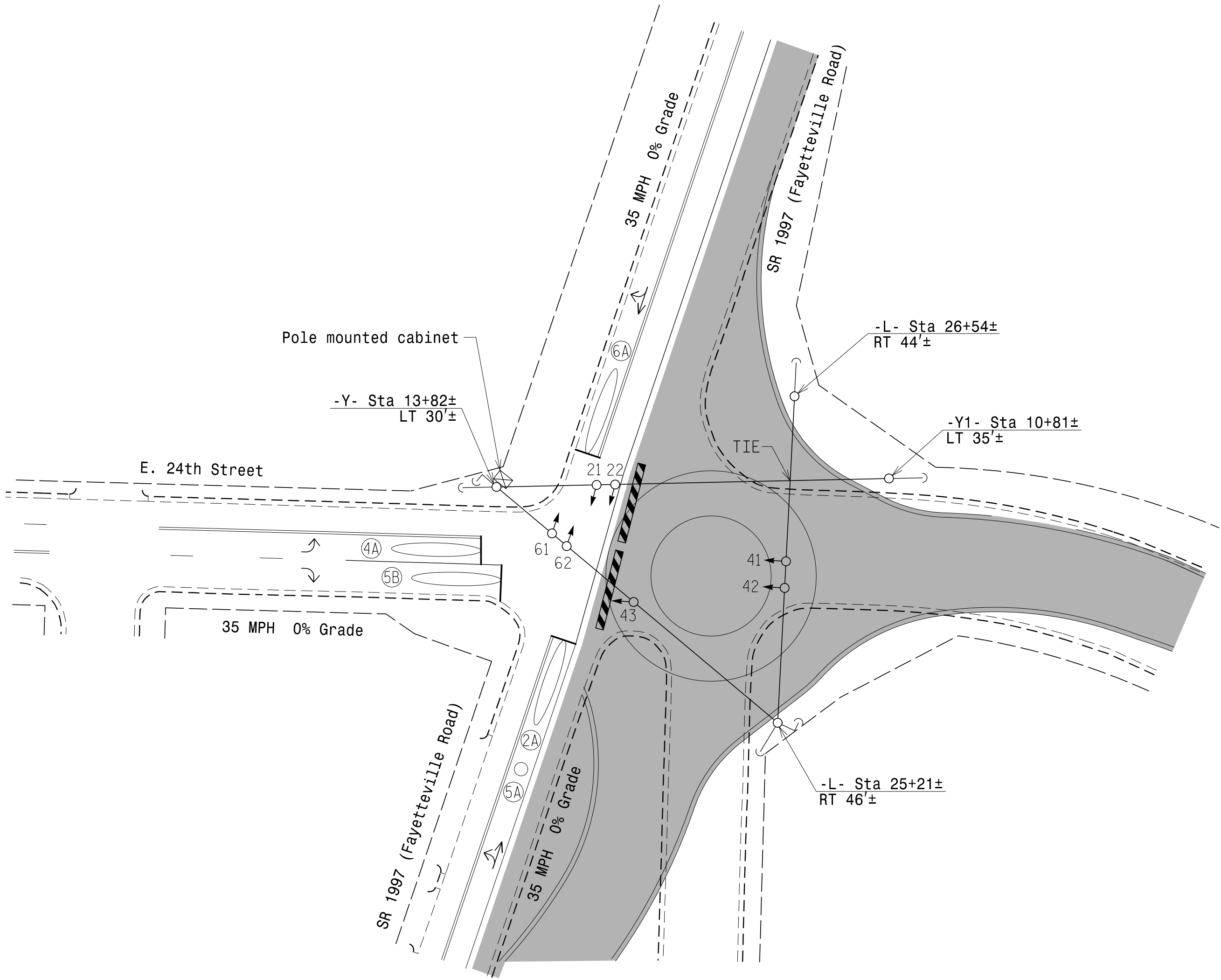
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence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

LEGEND

PROPOSED	EXISTING

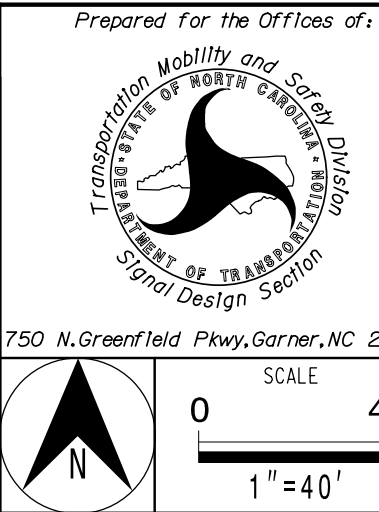
MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	4	5	6
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	10	7	7	10
Passage *	2.0	2.0	2.0	2.0
Max 1 *	90	30	20	90
Yellow Change	3.8	3.0	3.0	3.8
Red Clear	1.3	1.9	1.8	1.5
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
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.



Signal Upgrade
Temporary Design - TMP Phase VI, Step 4

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



SR 1997 (Fayetteville Road)
at
E. 24th Street

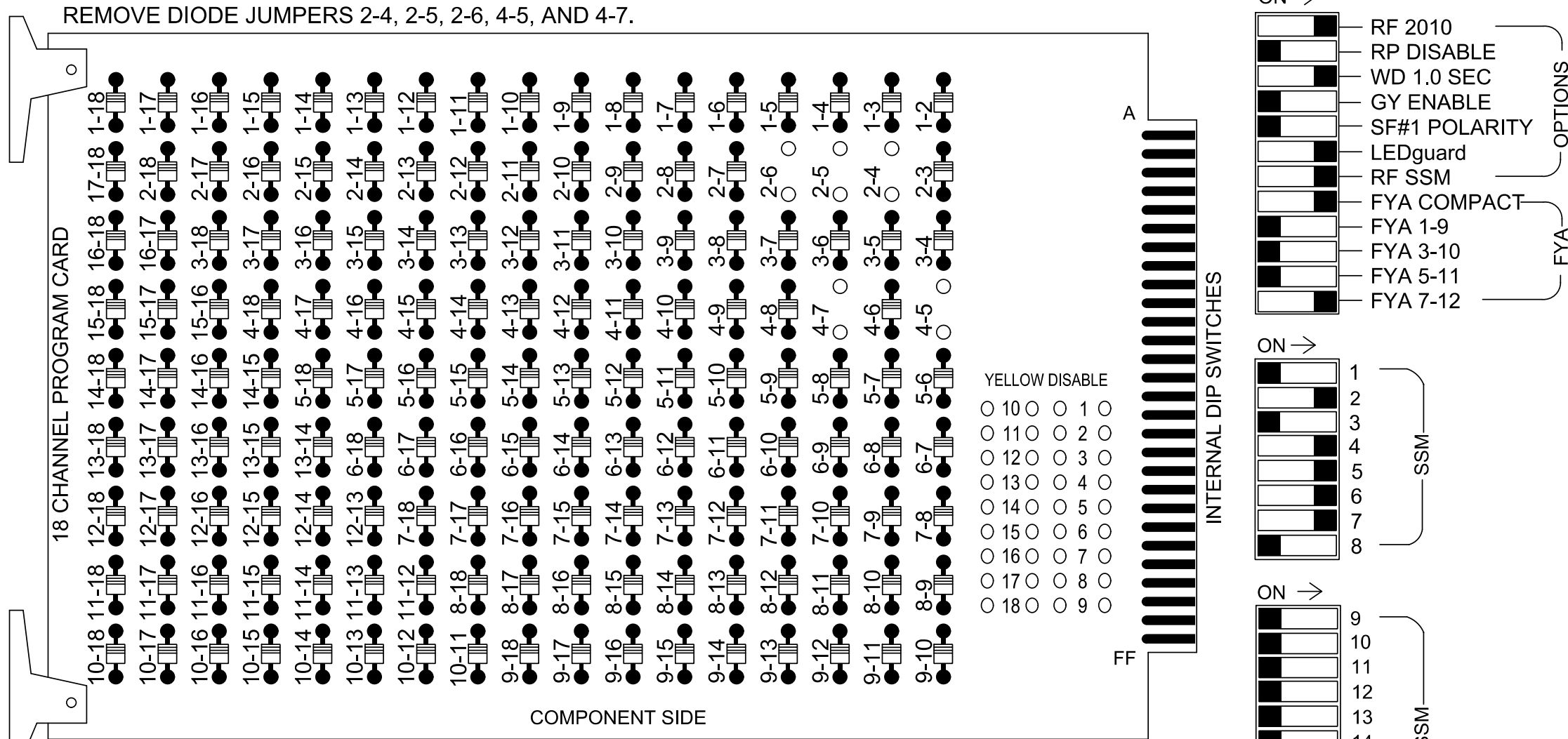
Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER TRENT M. MOODY 040329
DocuSigned by Trent M. Moody 03/19/2025
SIG. INVENTORY NO. 06-0195T

2/21/2025
A:\P\016c18\4018560\4018560_0001\450_Deliverables & Submittals\SMU-5797\MTOffic\Signal\Temporary_Signal\sm06-0195_Fay-Godwin-24th-Cedar_H060195T_smu.ea.2024xxxx.dgn
LeonAR

18 CHANNEL CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

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

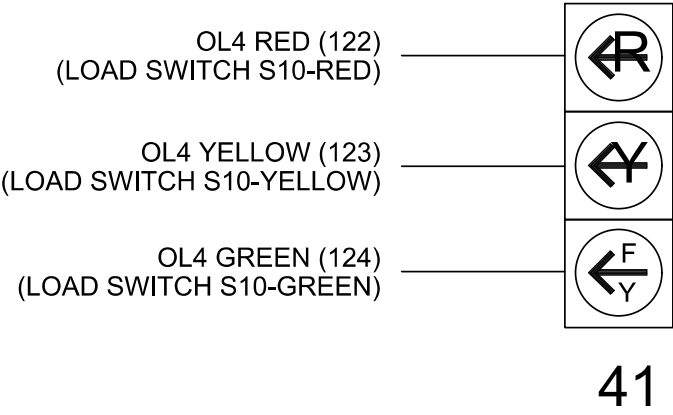
EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....12
Load Switches Used.....S2, S5, S7, S8, S10
Phases Used.....2, 4, 5, 6
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....NOT USED
Overlap "4".....*
Overlap "7".....*

*See overlap programming detail on sheet 2

FYA SIGNAL WIRING DETAIL

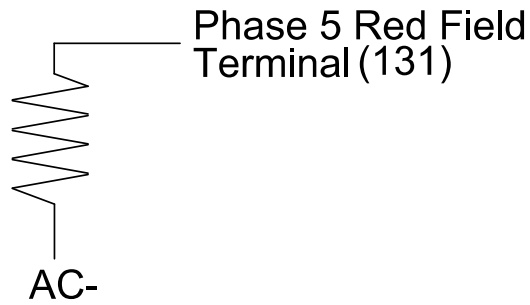
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

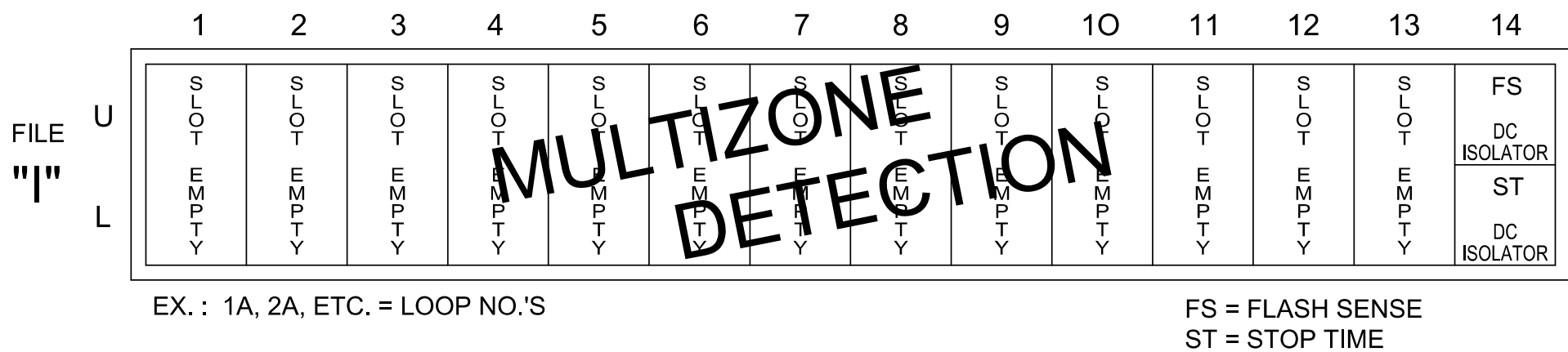
(install resistors as shown)

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



INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

Temporary Design - TMP Phase VI, Step 4
Electrical Detail - Sheet 1 of 2

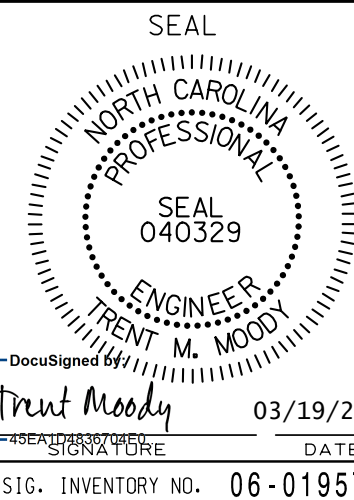
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



SR 1997 (Fayetteville Road)
at
E. 24th Street

Division 6		Robeson County		Lumberton	
PLAN DATE: Feb 2025		REVIEWED BY: H.M. Surti			
PREPARED BY: R.L. Aristondo		REVIEWED BY: T.M. Woody			
REVISIONS		INIT.		DATE	



OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTE OL7 ASSIGNED
TO CHANNEL 4

NOTE OL4 ASSIGNED
TO CHANNEL 7

↑ ↑
NOTE: ALL RED FLASH

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	4	7
Type	FYA 4 - Section	Normal
Included Phases	4	4,5
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

MAXTIME STARTUP AND SOFTWARE FLASH
PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

Temporary Design - TMP Phase VI, Step 4
Electrical Detail - Sheet 2 of 2



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for:



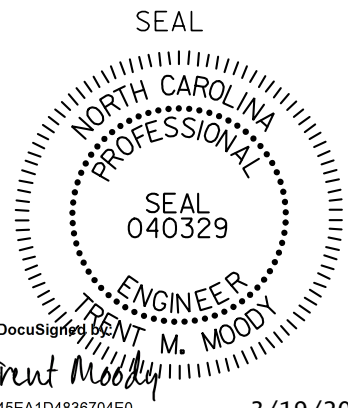
750 N. Greenfield Pkwy, Garner, NC 27529

SR 1997 (Fayetteville Road)
at
E. 24th Street

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL

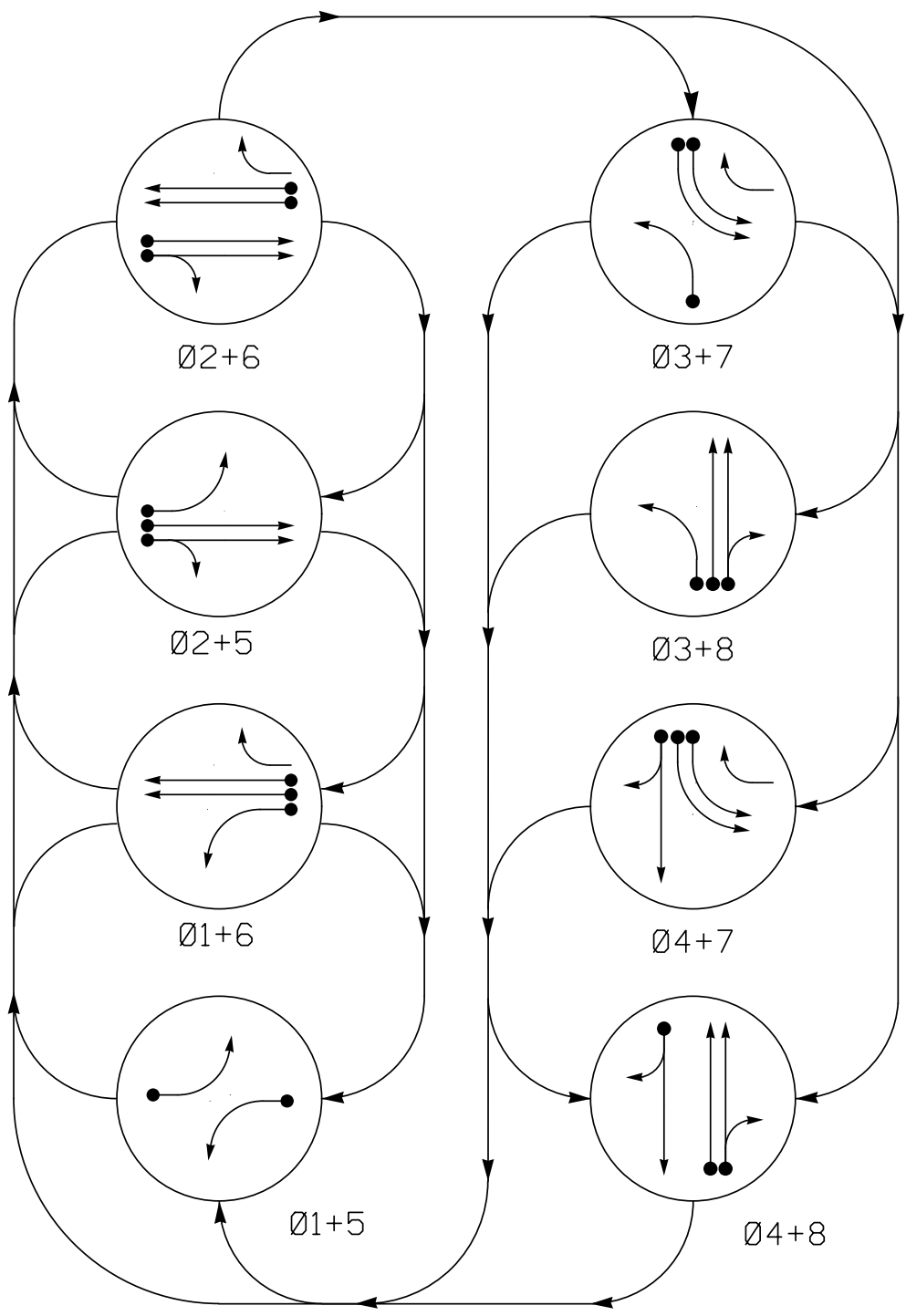


3/19/2025

SIGNATURE DATE

SIG. INVENTORY NO. 06-0195T

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

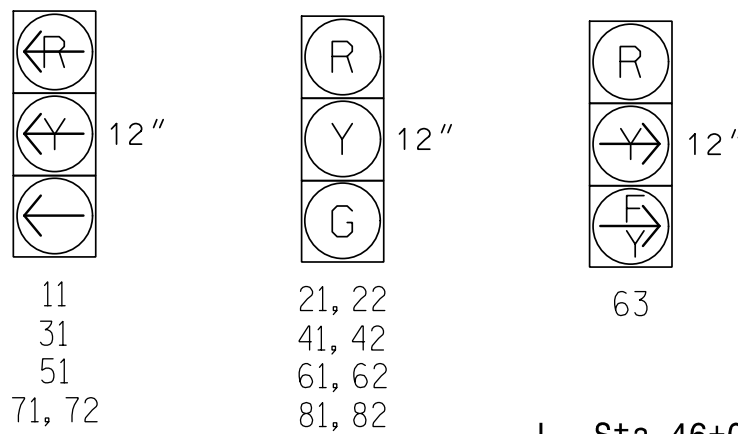
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE							
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 3 + 7	Ø 3 + 8	Ø 4 + 7	Ø 4 + 8
11	←	←	→	→	→	→	→	→
21, 22	R	R	G	G	R	R	R	R
31	→	→	→	→	←	←	→	→
41, 42	R	R	R	R	R	G	G	R
51	←	→	←	→	→	→	→	→
61, 62	R	G	R	G	R	R	R	R
63	R	→	R	→	→	→	→	R
71, 72	→	→	→	→	←	←	→	→
81, 82	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 - (2A)	SENSOR 2 - (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	500 - 100	500 - 100
Enable Speed	Y	Y
Speed Range (mph)	35 - 100	35 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 6.5	2.5 - 6.5

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
1A	6X40	0	*	*	1	3	-	X - X	- *
3A	6X40	0	*	*	3	3	-	X - X	- *
4A	6X40	0	*	*	4	10	-	X - X	- *
5A	6X40	0	*	*	5	3	-	X - X	- *
7A	6X40	0	*	*	7	3	-	X - X	- *
7B	6X40	0	*	*	7	-	-	X - X	- *
8A	6X40	0	*	*	8	-	-	X - X	- *
8B	6X40	0	*	*	8	10	-	X - X	- *
8C	6X6	0	*	*	8	15	-	X - X	- *

* Multi-zone Microwave Detection Zone

8 Phase Fully Actuated Signal System #D06-18 Lumberton NC 211 (N. Roberts Avenue)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to pulse mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED	EXISTING

MAXTIME TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Walk *	-	-	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-	-	-
Min Green	7	12	7	7	7	12	7	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	20	30	20	90	20	30
Yellow Change	3.0	4.6	3.0	3.9	3.0	4.6	3.0	3.8
Red Clear	2.9	1.6	2.8	1.8	2.6	1.3	3.6	1.8
Added Initial *	-	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-	X	X
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-

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

Signal Upgrade Temporary Design 1 - TMP Phase II, Step 3

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE
0 40
1" = 40'

NC 211 (N. Roberts Avenue) at SR 1997 (Fayetteville Road)

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Moody	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 040329
RENT M. MOODY

DocuSigned by:

2/10/2025
DATE
SIC. INVENTORY NO. 06-017011

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-10, 2-5, 2-6, 2-10, 4-7, 4-8, 4-10, 6-10, 7-10, 7-17, 8-17, and 10-17.

- 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.

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

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

FS = FLASH SENSE
ST = STOP TIME

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.
4. The cabinet and controller are part of the #D06-18 Lumberton NC 211 (N. Roberts Avenue) System.

Controller.....	2070LX
Cabinet.....	332 w/ Aux
Software.....	Q-Free MAXTIME
Cabinet Mount.....	Base
Output File Positions.....	18 With Aux. Output File
Load Switches Used.....	S1, S2, S5, S7, S8, S10, S11, AUX S2, AUX S3
Phases Used.....	1, 2, 3, 4, 5, 6, 7, 8
Overlap "1".....	NOT USED
Overlap "2".....	*
Overlap "3".....	NOT USED
Overlap "4".....	NOT USED
Overlap "5".....	*

*See overlap programming detail on sheet 2

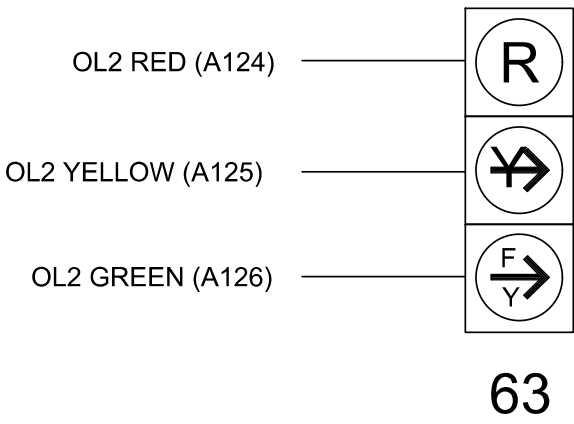
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

[illegible]

NU = Not Used

★ See pictorial of head wiring in detail this sheet.

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T1
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Temporary Design 1 - TMP Phase II, Step 3
Electrical Detail - Sheet 1 of 2

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 3.1

U-5797

Sig. 3.1

FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL

SEAL

NORTH CAROLINA
PROFESSIONAL
ENGINEER
TRENT M. MOODY
040329

DocuSigned by: [Signature]

rent Moody 2/10/2025
SIGNATURE DATE

SIG. INVENTORY NO. 06-0170T1

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More >Channels >Channel Options

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

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

↑ ↑
NOTE: ALL RED FLASH

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T1
DESIGNED: Feb 2025
SEALED:2/10/2025
REVISED:

Temporary Design 1 - TMP Phase II, Step 3
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

750 N.Greenfield Pkwy, Garner, NC 27529

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6Robeson CountyLumberton

PLAN DATE: Feb 2025REVIEWED BY: H.M. Surti

PREPARED BY: R.L. AristondoREVIEWED BY: T.M. Woody

REVISIONSINIT.DAT

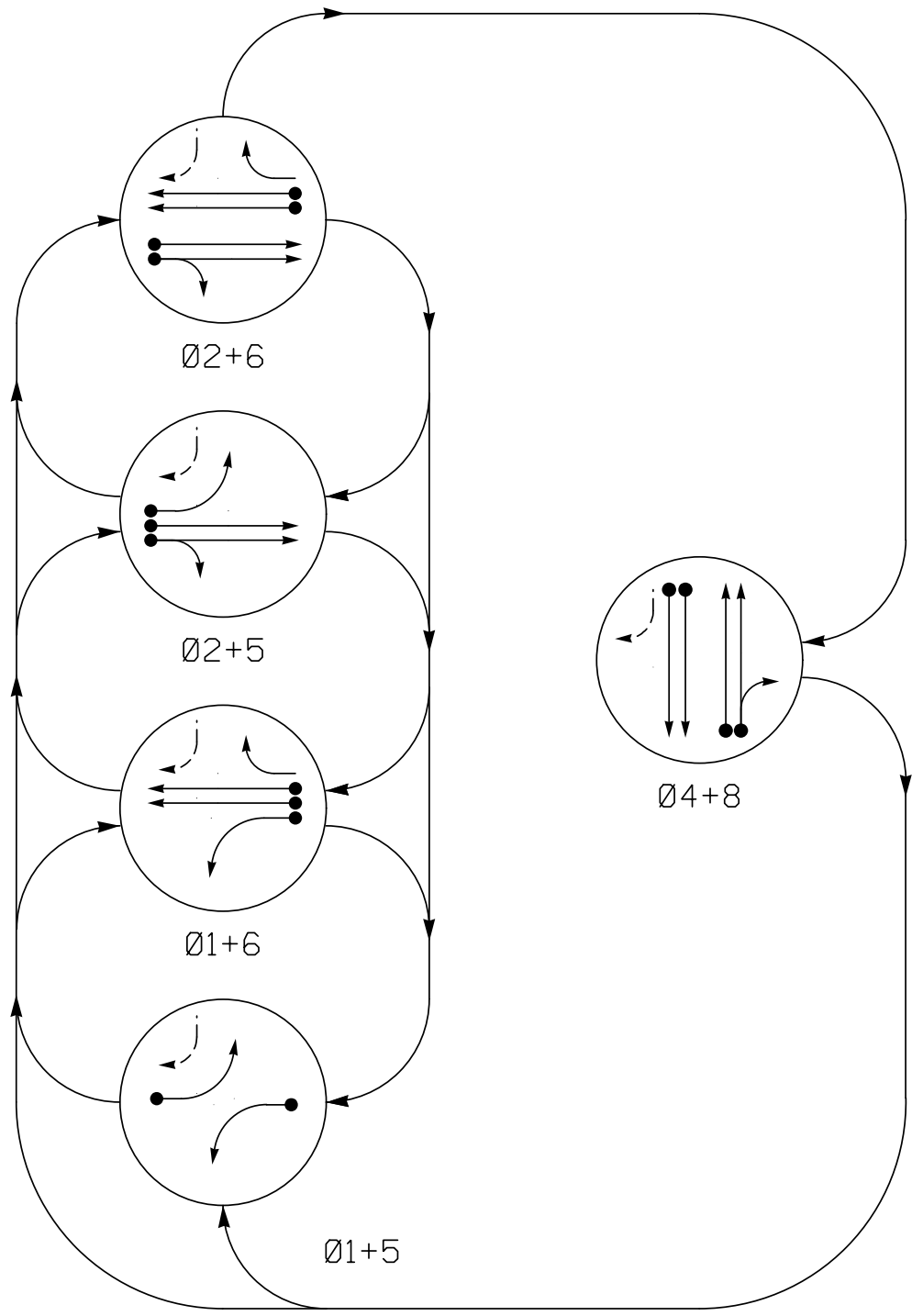
SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL 040329
TRENT M. MOODY

DocuSigned by:
Trent M. Moody

2/10/2025
DATE

SIG. INVENTORY NO. 06-0170T1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

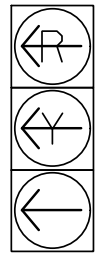
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

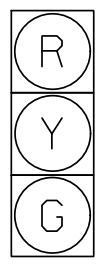
SIGNAL FACE	PHASE					
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 4 + 8	F
11	←	←	→	→	→	→
21, 22	R	R	G	G	R	R
41, 42	R	R	R	R	G	R
51	←	→	←	→	→	→
61, 62	R	G	R	G	R	R
63	R	→	R	→	R	R
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

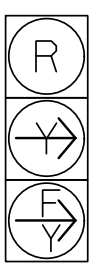
All Heads L.E.D.



11
51



21, 22
41, 42
61, 62
81, 82



63

RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 - (2A)	SENSOR 2 - (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	500 - 100	500 - 100
Enable Speed	Y	Y
Speed Range (mph)	35 - 100	35 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 6.5	2.5 - 6.5

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
1A	6X40	0	*	*	1	3	-	X	-	X
4A	6X40	0	*	*	4	-	-	X	-	X
4B	6X40	0	*	*	4	-	-	X	-	X
5A	6X40	0	*	*	5	3	-	X	-	X
8A	6X40	0	*	*	8	3	-	X	-	X
8B	6X40	0	*	*	8	10	-	X	-	X
8C	6X40	0	*	*	8	15	-	X	-	X

* Multi-zone Microwave Detection Zone

5 Phase
Fully Actuated
Signal System #D06-18 Lumberton
NC 211 (N. Roberts Avenue)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Reposition existing signal heads numbered 41, 42 and 81.
- Set all detector units to presence mode.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED

- Traffic Signal Head
- Modified 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
- Right of Way
- Directional Arrow
- Microwave Detection Zone
- Construction Zone

EXISTING

- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A

- "YIELD" Sign (R1-2)
- No Left Turn/No U-Turn Sign (R3-18)

MAXTIME TIMING CHART						
FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-
Min Green	7	12	7	7	12	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	30	20	90	30
Yellow Change	3.0	4.6	3.9	3.0	4.6	3.8
Red Clear	2.4	1.5	2.1	2.4	1.6	2.0
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X

* These values may be field adjusted. Do not adjust Min Green and 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 2 - TMP Phase III, Step 3

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

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

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6 Robeson County Lumberton
PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti
PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody

REVISIONS	INIT.	DATE

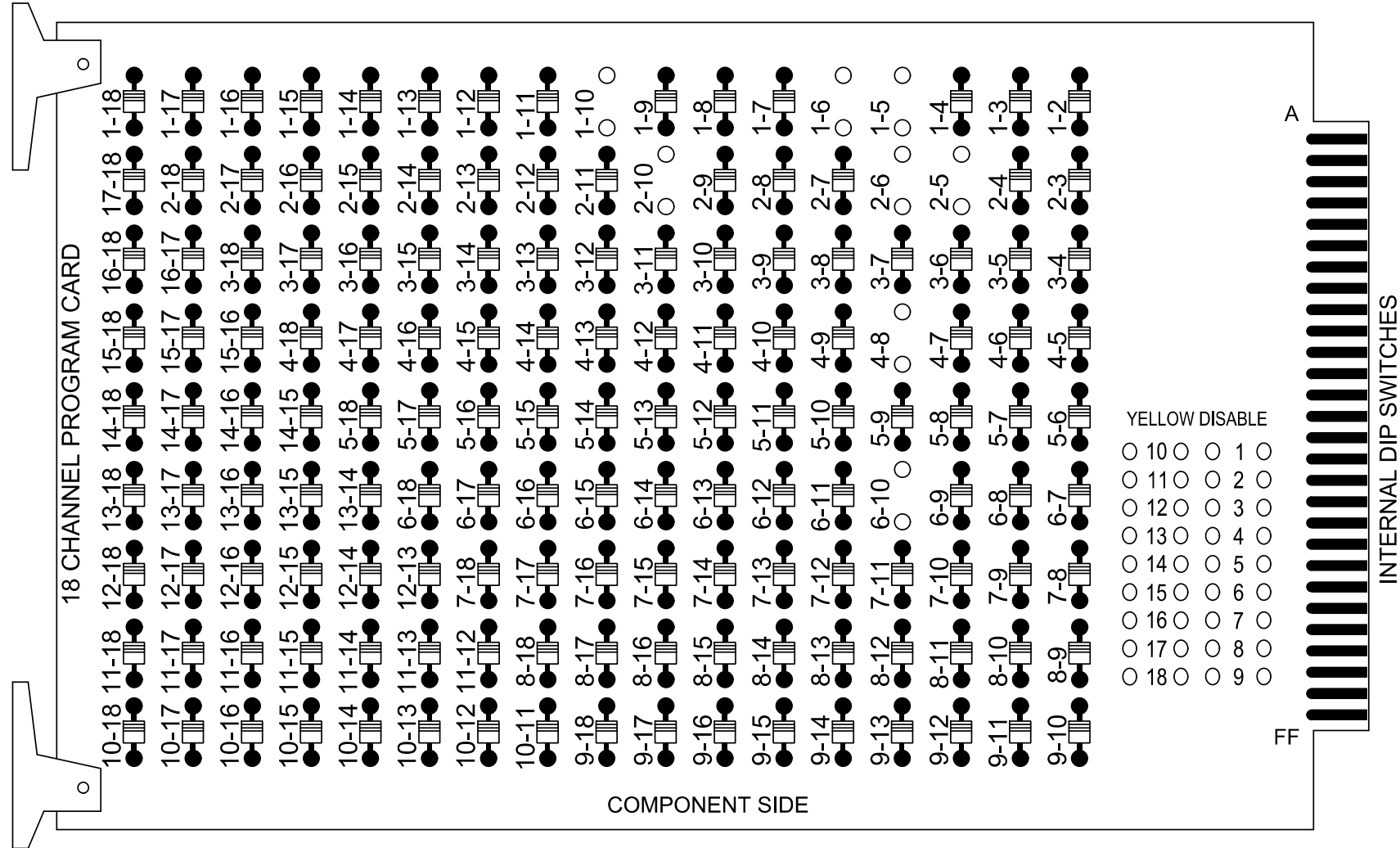
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
RENT M. MOODY
040329
2/10/2025
DATE
SIG. INVENTORY NO. 06-017012

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

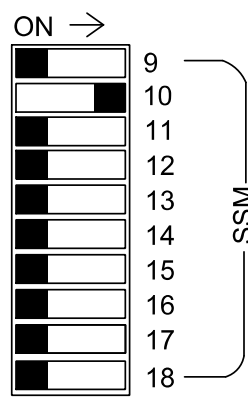
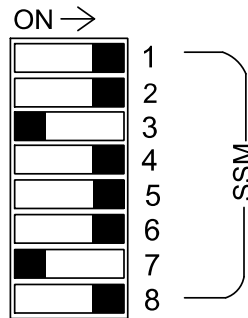
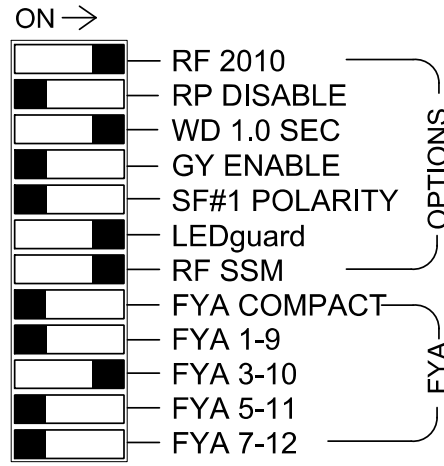
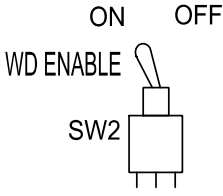
REMOVE DIODE JUMPERS 1-5, 1-6, 1-10, 2-5, 2-6, 2-10, 4-8, AND 6-10.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the #D06-18 Lumberton NC 211 (N. Roberts Avenue) System.

EQUIPMENT INFORMATION

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

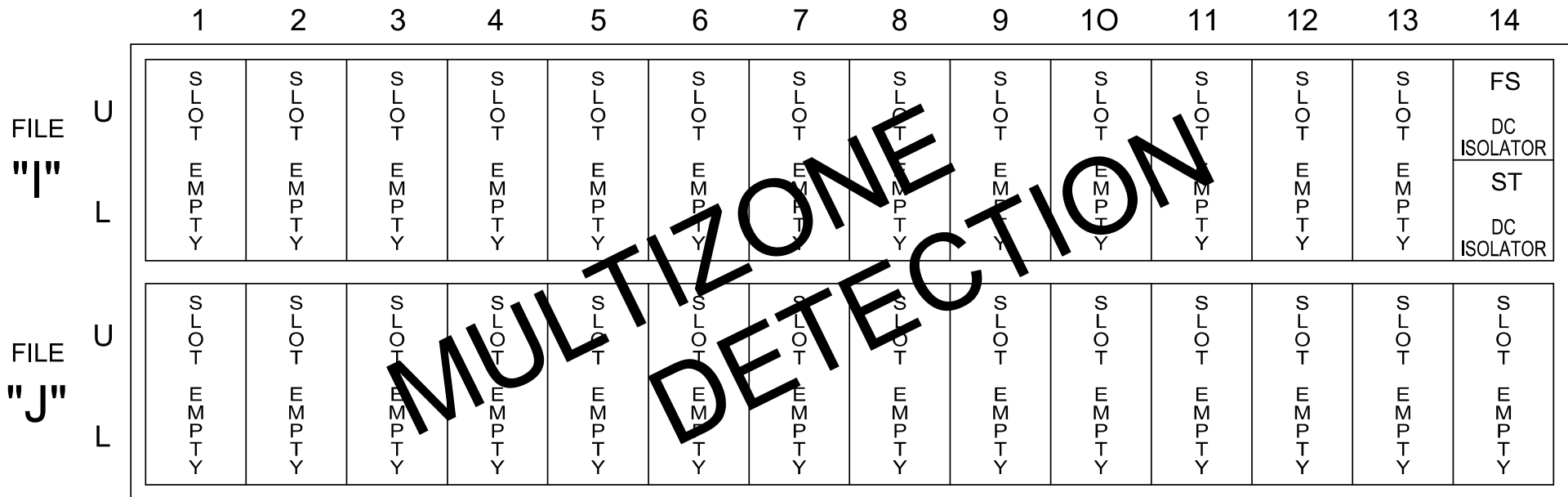
*See overlap programming detail on sheet 2

SPECIAL DETECTOR NOTE

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SIGNAL HEAD HOOK-UP CHART

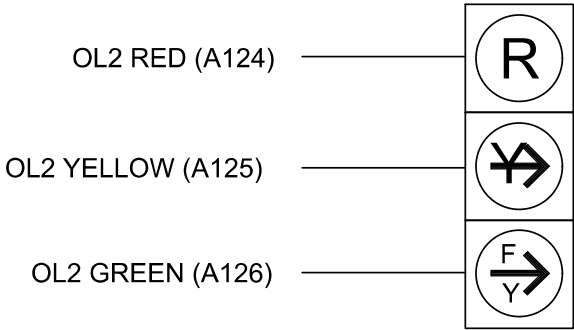
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	NU	63★	NU	NU	NU	NU
RED		128			101			134			107			A124				
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125							131										
YELLOW ARROW	126							132						A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW	127							133										
Hand icon																		
Walking person icon																		

NU = Not Used

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



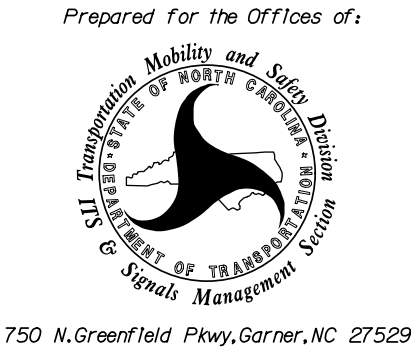
63

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T2
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Temporary Design 2 - TMP Phase III, Step 3
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody	
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 040329
ENGINEER
TRENT M. MOODY
Signed by: *Trent Moody* 2/10/2025
DATE
SIG. INVENTORY NO. 06-0170T2

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More >Channels >Channel Options

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

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

↑ ↑
NOTE: ALL RED FLASH

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T2
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Temporary Design 2 - TMP Phase III, Step 3
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

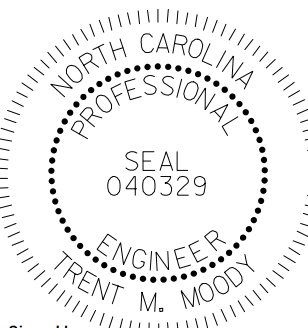


750 N. Greenfield Pkwy, Garner, NC 27529

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody	
REVISIONS	INIT.	DATE

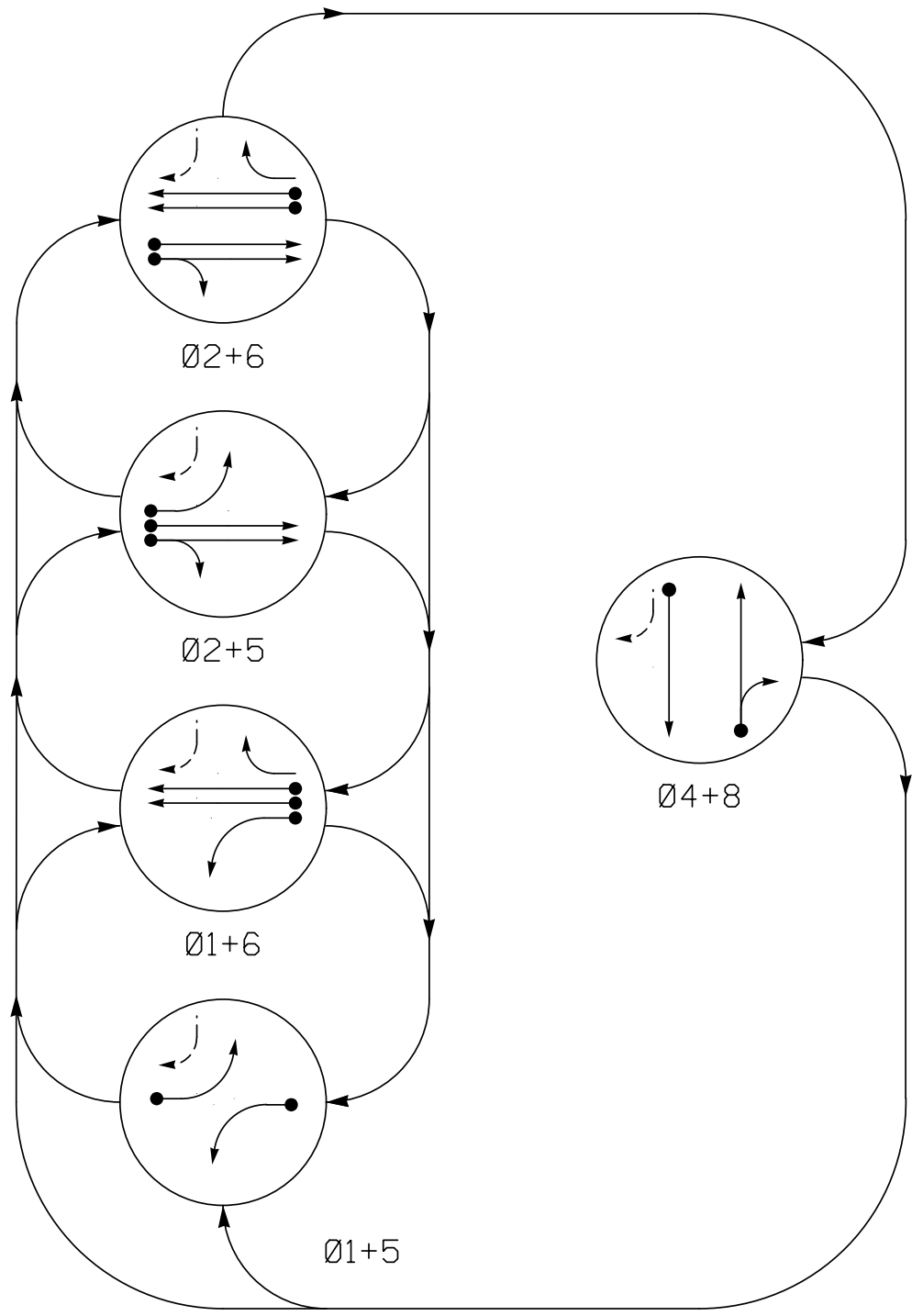
SEAL



DocuSigned by:
 2/10/2025

SIG. INVENTORY NO. 06-0170T2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

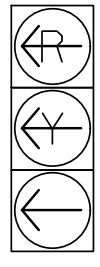
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 4 + 8	Ø 1 + 5
11	←	←	→	→	←	←
21, 22	R	R	G	G	R	R
41, 42	R	R	R	R	G	R
51	←	←	→	→	←	←
61, 62	R	G	R	G	R	R
63	R	Y	R	Y	R	R
81, 82	R	R	R	R	G	R

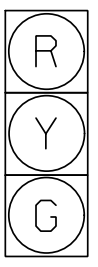
SIGNAL FACE I.D.

All Heads L.E.D.



11

51

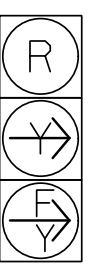


21, 22

41, 42

61, 62

81, 82



63

RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 - (2A)	SENSOR 2 - (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	500 - 100	500 - 100
Enable Speed	Y	Y
Speed Range (mph)	35 - 100	35 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 6.5	2.5 - 6.5

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
1A	6X40	0	*	*	1	3	-	X	-
4A	6X40	0	*	*	4	-	-	X	-
5A	6X40	0	*	*	5	3	-	X	-
8A	6X40	0	*	*	8	10	-	X	-
8B	6X40	0	*	*	8	15	-	X	-

* Multi-zone Microwave Detection Zone

5 Phase
Fully Actuated
Signal System #D06-18 Lumberton
NC 211 (N. Roberts Avenue)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Reposition existing signal heads numbered 41 and 42.
- Reposition existing sign labeled "B".
- Set all detector units to presence mode.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED

- Traffic Signal Head
- Modified 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
- Right of Way
- Directional Arrow
- Microwave Detection Zone
- Construction Zone
- Construction Zone Drums
- "YIELD" Sign (R1-2)
- No Left Turn/No U-Turn Sign (R3-18)

EXISTING

- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A
- N/A

MAXTIME TIMING CHART						
FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-
Min Green	7	12	7	7	12	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	30	20	90	30
Yellow Change	3.0	4.6	3.9	3.0	4.6	3.8
Red Clear	2.4	1.5	2.1	2.4	1.6	2.0
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X

* These values may be field adjusted. Do not adjust Min Green and 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 - TMP Phase V, Step 1

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

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

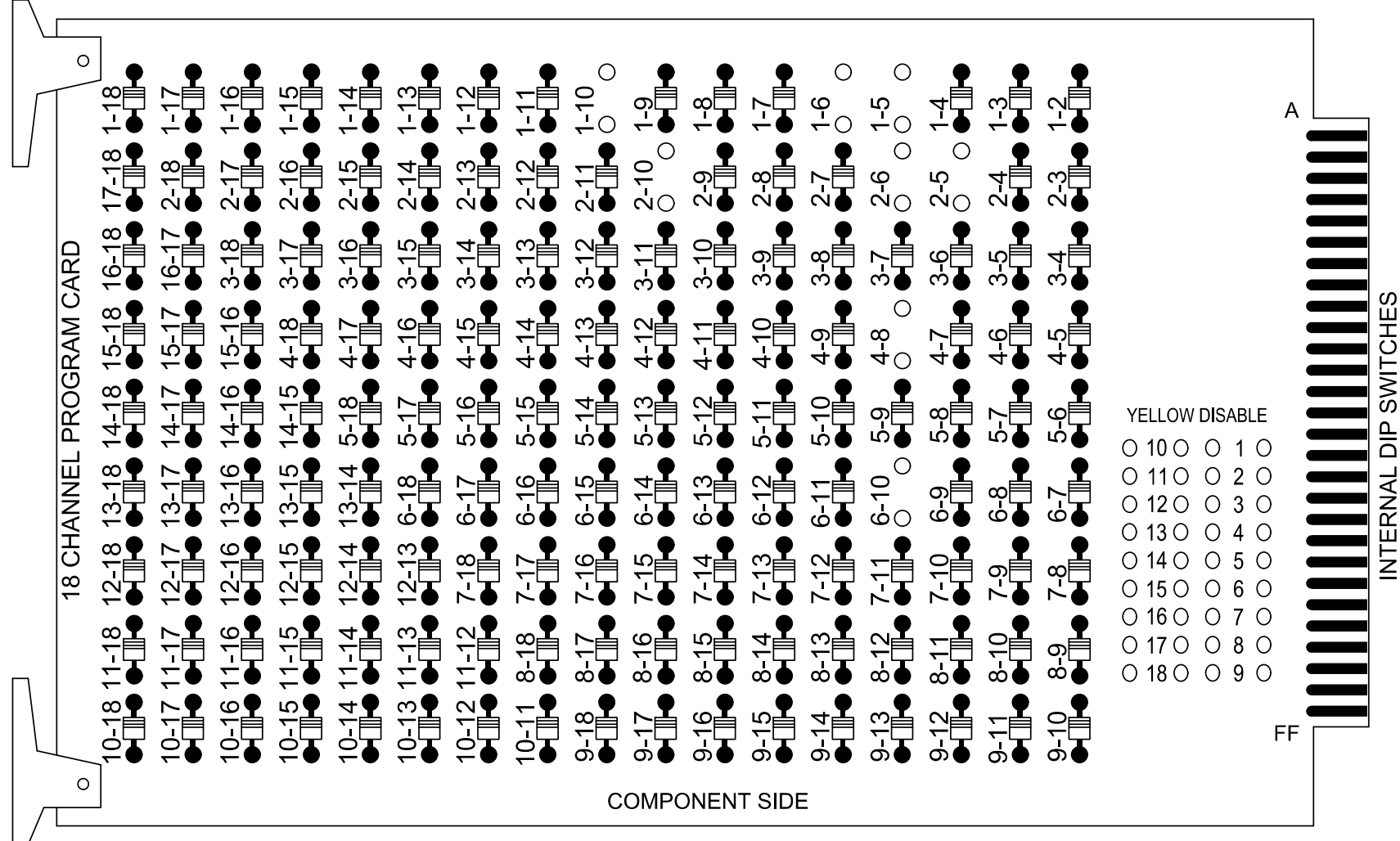
NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)
Division 6 Robeson County Lumberton
PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti
PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody
REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 040329
RENT M. MOODY
2/10/2025
DATE
SIC. INVENTORY NO. 06-017013

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

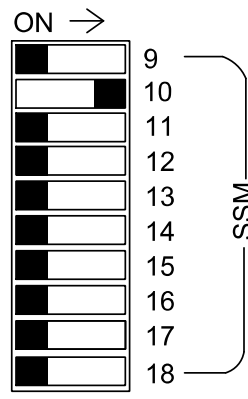
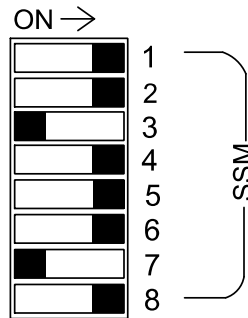
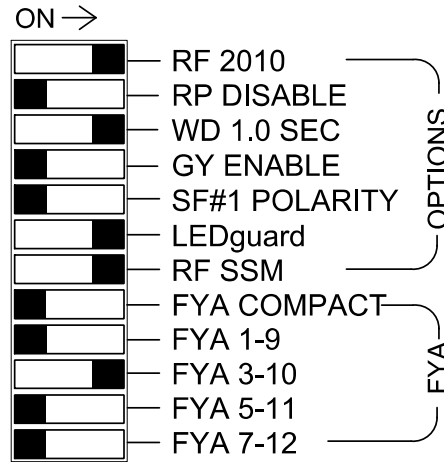
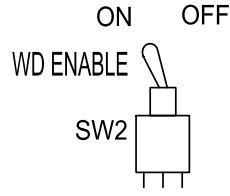
REMOVE DIODE JUMPERS 1-5, 1-6, 1-10, 2-5, 2-6, 2-10, 4-8, AND 6-10.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the #D06-18 Lumberton NC 211 (N. Roberts Avenue) System.

EQUIPMENT INFORMATION

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

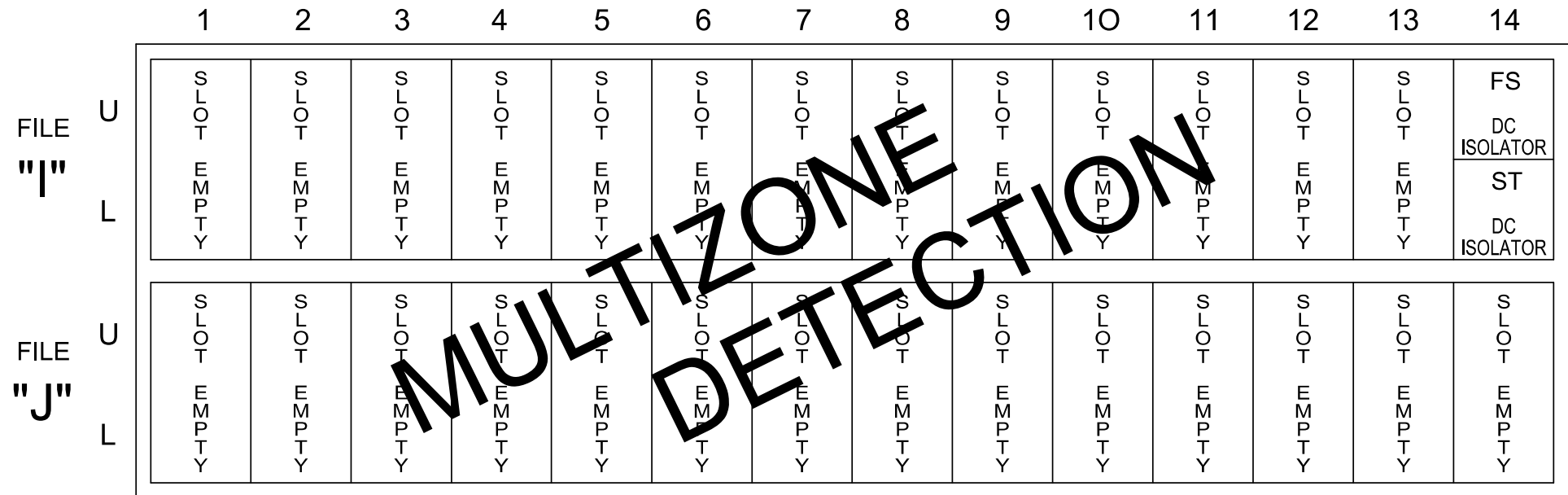
*See overlap programming detail on sheet 2

SPECIAL DETECTOR NOTE

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SIGNAL HEAD HOOK-UP CHART

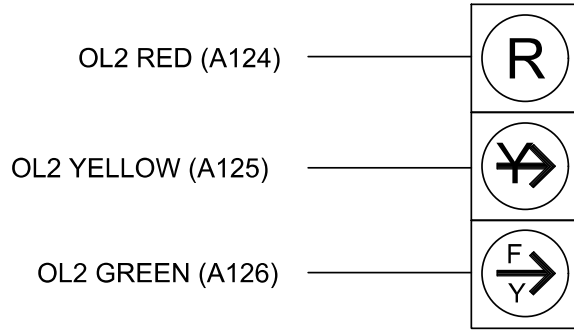
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	NU	63★	NU	NU	NU	NU
RED		128			101			134			107			A124				
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125							131										
YELLOW ARROW	126							132						A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW	127							133										
Hand icon																		
Walking person icon																		

NU = Not Used

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

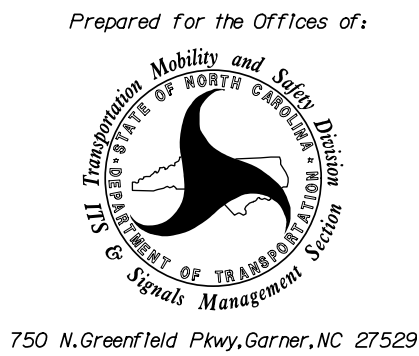


63

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T3
DESIGNED: Feb 2025
SEALED:2/10/2025
REVISED:

Temporary Design 3 - TMP Phase V, Step 1
Electrical Detail - Sheet 1 of 2

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



ELECTRICAL AND PROGRAMMING DETAILS FOR:			
Prepared for the Offices of:			
NC 211 (N. Roberts Avenue) at SR 1997 (Fayetteville Road)			
Division 6	Robeson County	Lumberton	
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti		
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody		
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 040329
ENGINEER
TRENT M. MOODY
Signed by: *Trent Moody* 2/10/2025
DATE
SIG. INVENTORY NO. 06-0170T3

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More >Channels >Channel Options

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

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

↑ ↑
NOTE: ALL RED FLASH

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T3
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Temporary Design 3 - TMP Phase V, Step 1
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

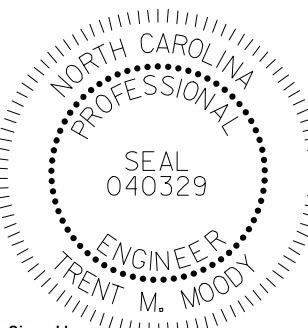
Division 6 Robeson County Lumberton

PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti

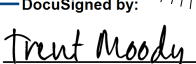
PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody

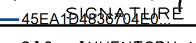
REVISIONS	INIT.	DATE

SEAL



SEAL 040329
ENGINEER
TRENT M. MOODY

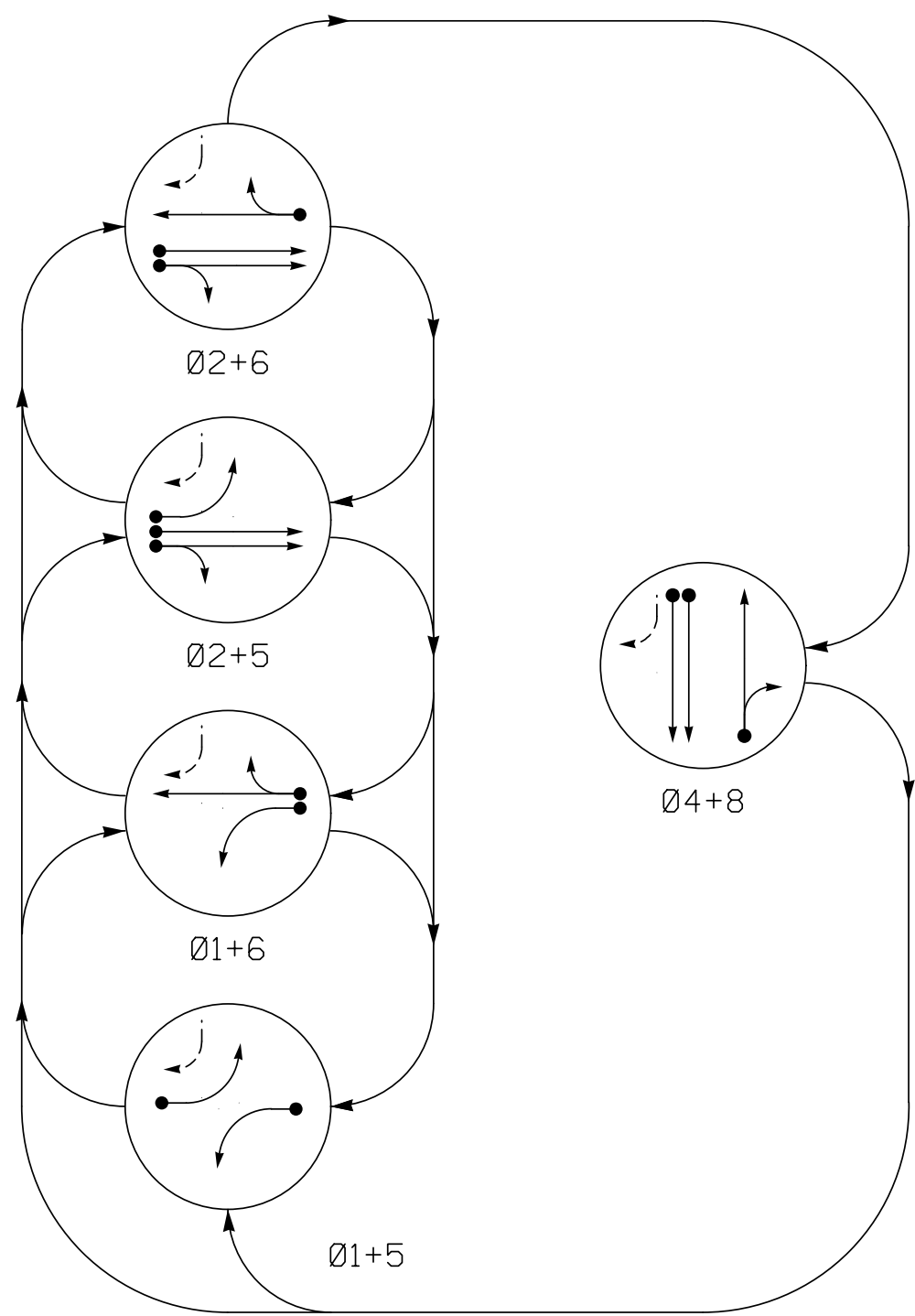
Signed by:  DATE: 2/10/2025

SEALED BY:  DATE: 2/10/2025

SIG. INVENTORY NO. 06-0170T3

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 6.0

PHASING DIAGRAM



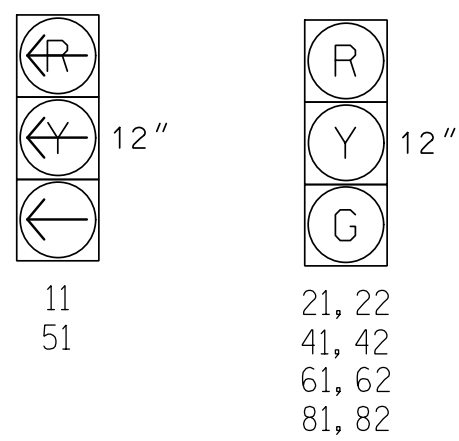
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION						
SIGNAL FACE	PHASE					
	0 1 + 5	0 1 + 6	0 2 + 5	0 2 + 6	0 4 + 8	F L A S H
11	←	←	←	←	←	←
21, 22	R	R	G	G	R	R
41, 42	R	R	R	R	G	R
51	←	←	←	←	←	←
61, 62	R	G	R	G	R	R
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 - ($\hat{2A}$)	SENSOR 2 - ($\hat{6A}$)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	500 – 100	500 –100
Enable Speed	Y	Y
Speed Range (mph)	35 – 100	35 – 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 – 6.5	2.5 – 6.5

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	*	*	1	3	-	X	-	X	-	*
4A	6X40	0	*	*	4	-	-	X	-	X	-	*
4B	6X40	0	*	*	4	-	-	X	-	X	-	*
5A	6X40	0	*	*	5	3	-	X	-	X	-	*
8A	6X40	0	*	*	8	10	-	X	-	X	-	*
8B	6X6	0	*	*	8	15	-	X	-	X	-	*

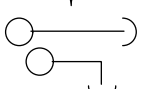
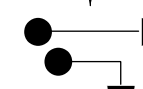
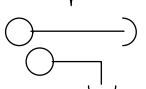
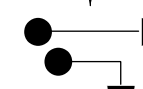
* Multi-zone Microwave Detection Zone

5 Phase
Fully Actuated
Signal System #D06-18 Lumberton
NC 211 (N. Roberts Avenue)

NOTES

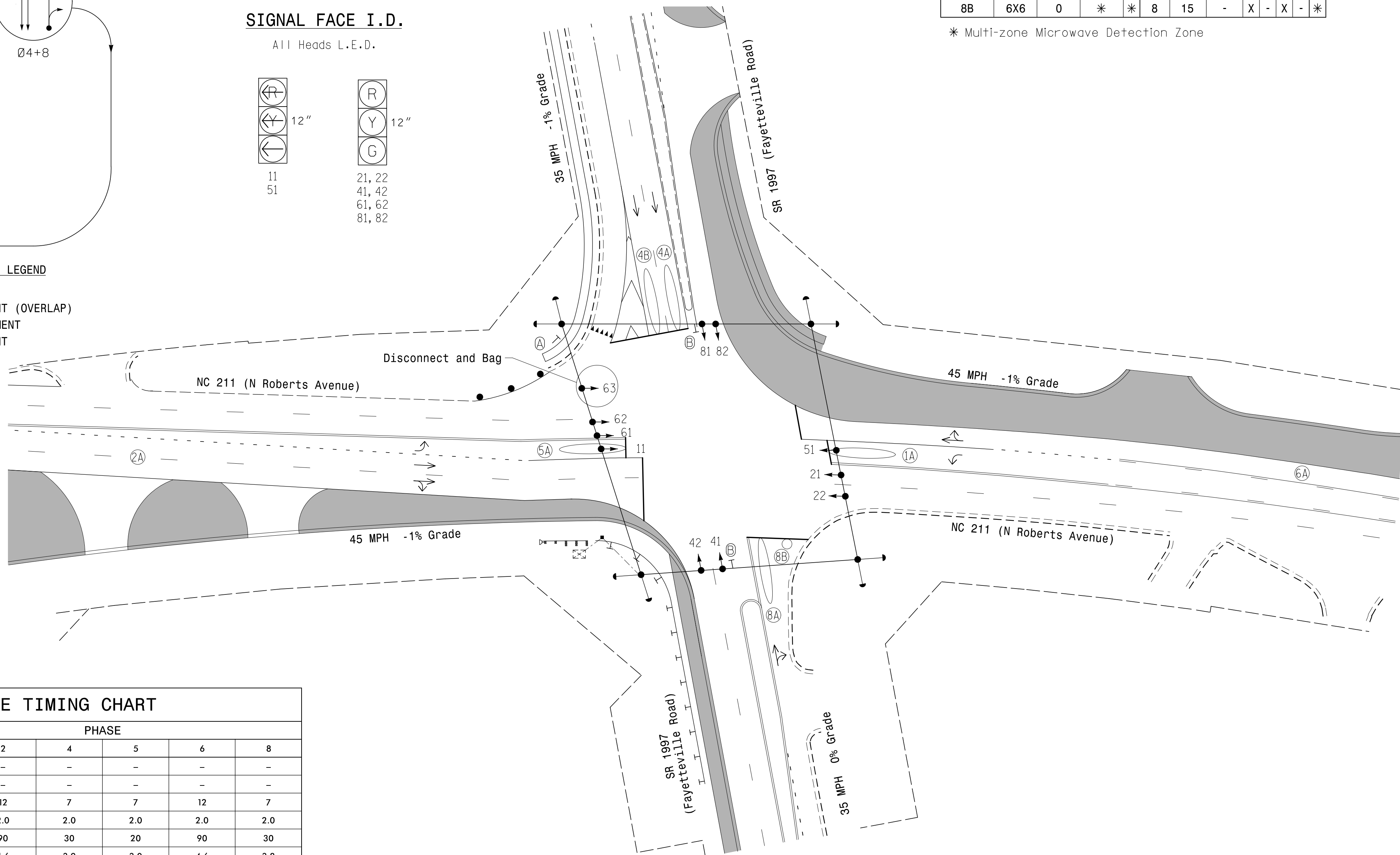
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Reposition existing signal heads numbered 41, 42, 61, 62, 81, and 82.
5. Disconnect and bag existing signal head 63.
6. Reposition existing signs labeled "B".
7. Set all detector units to presence mode.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Signal	
	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	
	Microwave Detection Zone	
	Construction Zone	
	Construction Zone Drums	
	"YIELD" Sign (R1-2)	
	No Left Turn/No U-Turn Sign (R3-18)	

MAXTIME TIMING CHART						
FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	–	–	–	–	–	–
Ped Clear *	–	–	–	–	–	–
Min Green	7	12	7	7	12	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max l *	20	90	30	20	90	30
Yellow Change	3.0	4.6	3.9	3.0	4.6	3.8
Red Clear	2.3	1.5	2.2	2.1	1.6	1.5
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

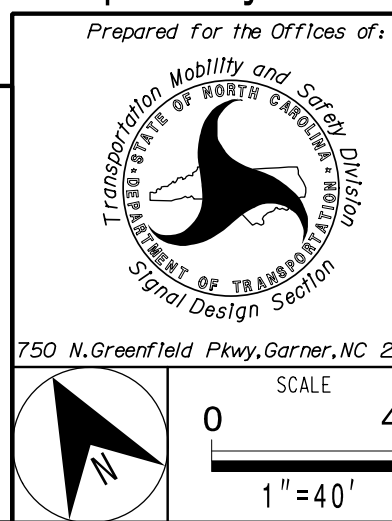
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



Signal Upgrade
Temporary Design 4 - TMP Phase V, Step 2

stv

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

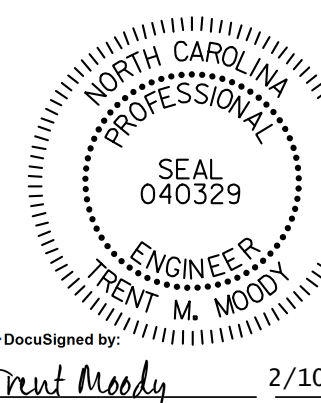


NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6		Robeson County		Lumberton	
PLAN DATE: Feb 2025		REVIEWED BY: H.M. Surti			
PREPARED BY: R.L. Aristondo		REVIEWED BY: T.M. Moody			

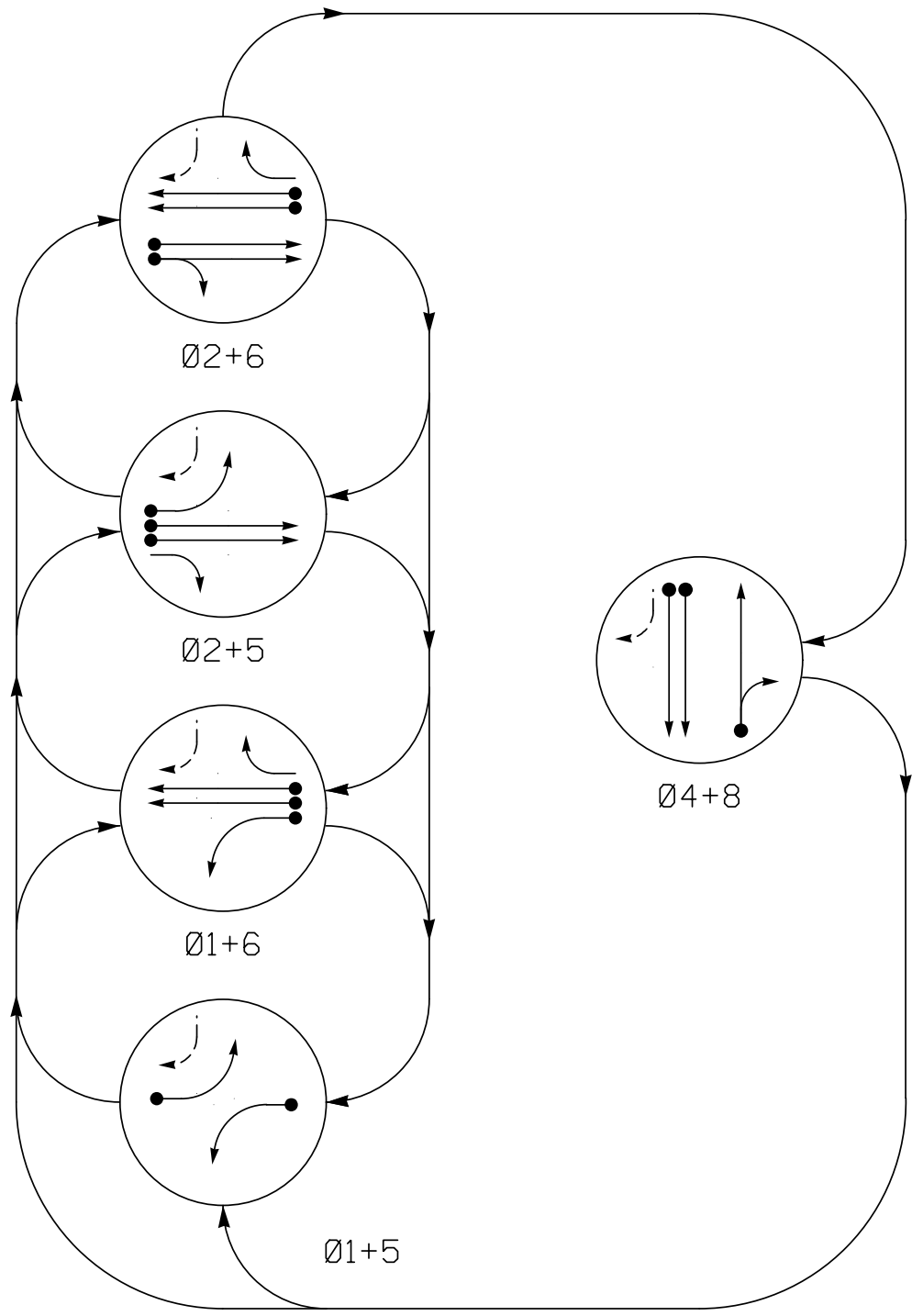
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



DocuSigned by:
rent Moody 2/10/20
45FA1B3C-307E-40E0-90A0-40E0-90A0-40E0
SIG. INVENTORY NO. 06-0170T

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

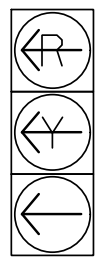
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

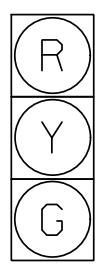
SIGNAL FACE	PHASE					
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 4 + 8	Ø 1 + 5
11	←	←	→	→	←	←
21, 22	R	R	G	G	R	R
41, 42	R	R	R	R	G	R
51	←	→	←	→	←	→
61, 62	R	G	R	G	R	R
63	R	Y	R	Y	R	R
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

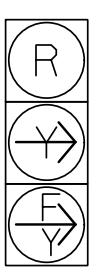
All Heads L.E.D.



11
51



21, 22
41, 42
61, 62
81, 82



63

RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 - (2A)	SENSOR 2 - (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	500 - 100	500 - 100
Enable Speed	Y	Y
Speed Range (mph)	35 - 100	35 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 6.5	2.5 - 6.5

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING				
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND INITIAL	CALL DELAY DURING GREEN
1A	6X40	0	*	*	1	3	-	X	-
4A	6X40	0	*	*	4	-	-	X	-
4B	6X40	0	*	*	4	-	-	X	-
5A	6X40	0	*	*	5	3	-	X	-
8A	6X40	0	*	*	8	10	-	X	-
8B	6X6	0	*	*	8	15	-	X	-

* Multi-zone Microwave Detection Zone

8 Phase
Fully Actuated
Signal System #D06-18 Lumberton
NC 211 (N. Roberts Avenue)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Reposition existing signal heads numbered 51, 61, 62, 81, and 82.
- Reposition existing sign labeled "B".
- Set all detector units to presence mode.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED	EXISTING

MAXTIME TIMING CHART						
FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-
Min Green	7	12	7	7	12	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	30	20	90	30
Yellow Change	3.0	4.6	3.9	3.0	4.6	3.8
Red Clear	2.4	1.5	2.3	2.8	1.6	2.1
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X

* These values may be field adjusted. Do not adjust Min Green and 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 5 - TMP Phase VI, Step 1

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

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

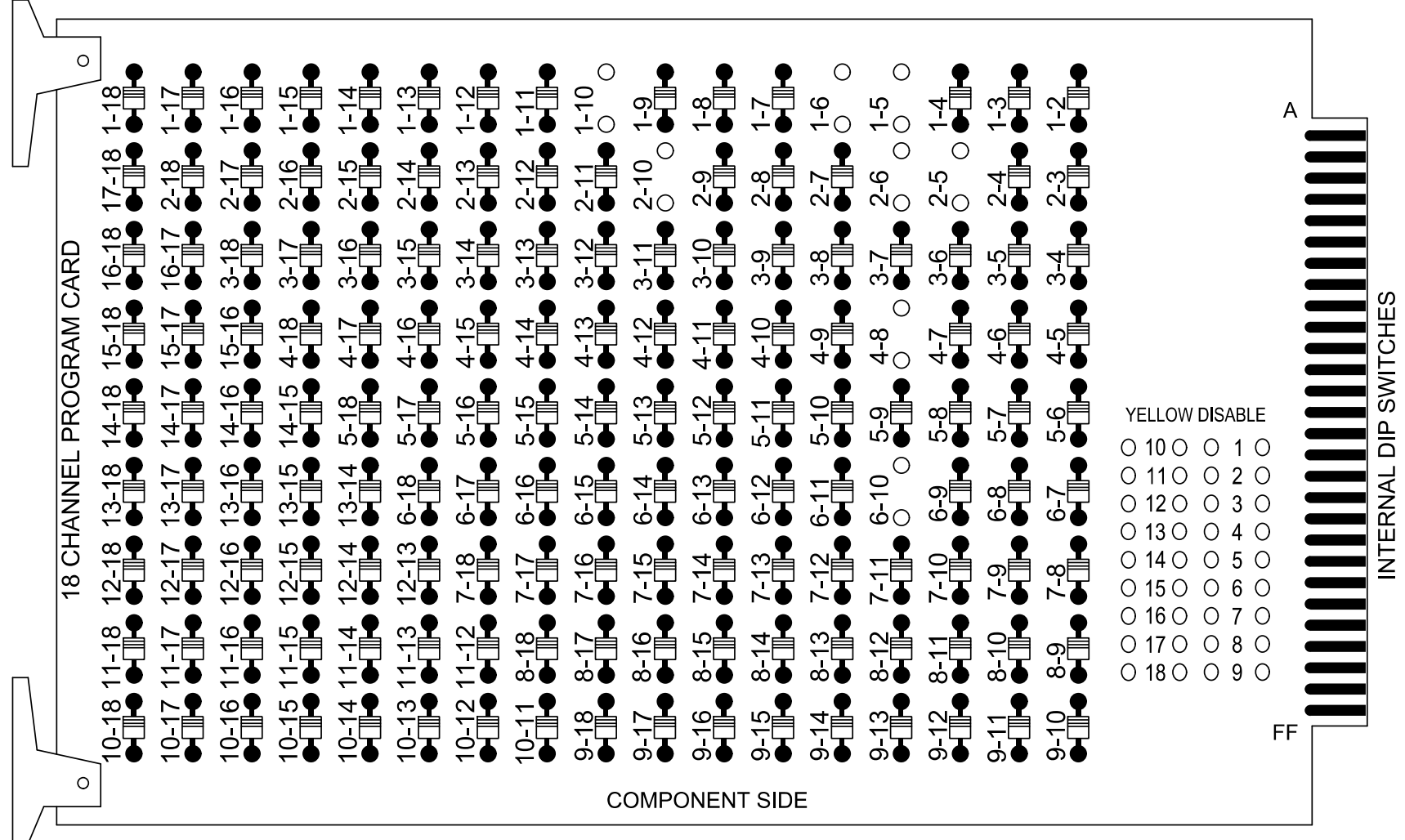
NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)
Division 6 Robeson County Lumberton
PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti
PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody
REVISIONS INIT. DATE
DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED
SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
RENT M. MOODY
2/10/2025
DATE
SIG. INVENTORY NO. 06-017015

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

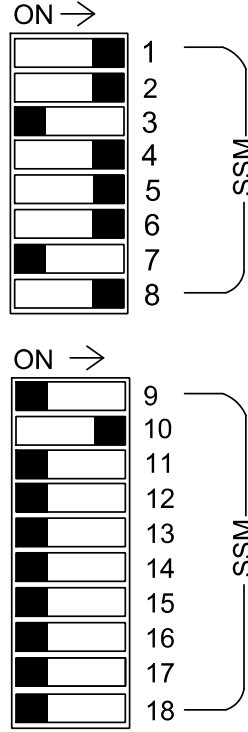
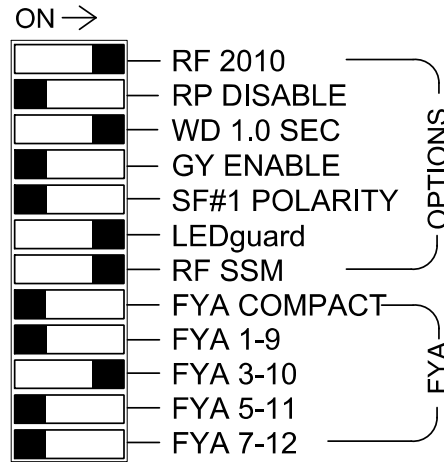
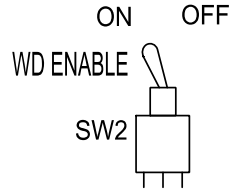
REMOVE DIODE JUMPERS 1-5, 1-6, 1-10, 2-5, 2-6, 2-10, 4-8, AND 6-10.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the #D06-18 Lumberton NC 211 (N. Roberts Avenue) System.

EQUIPMENT INFORMATION

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

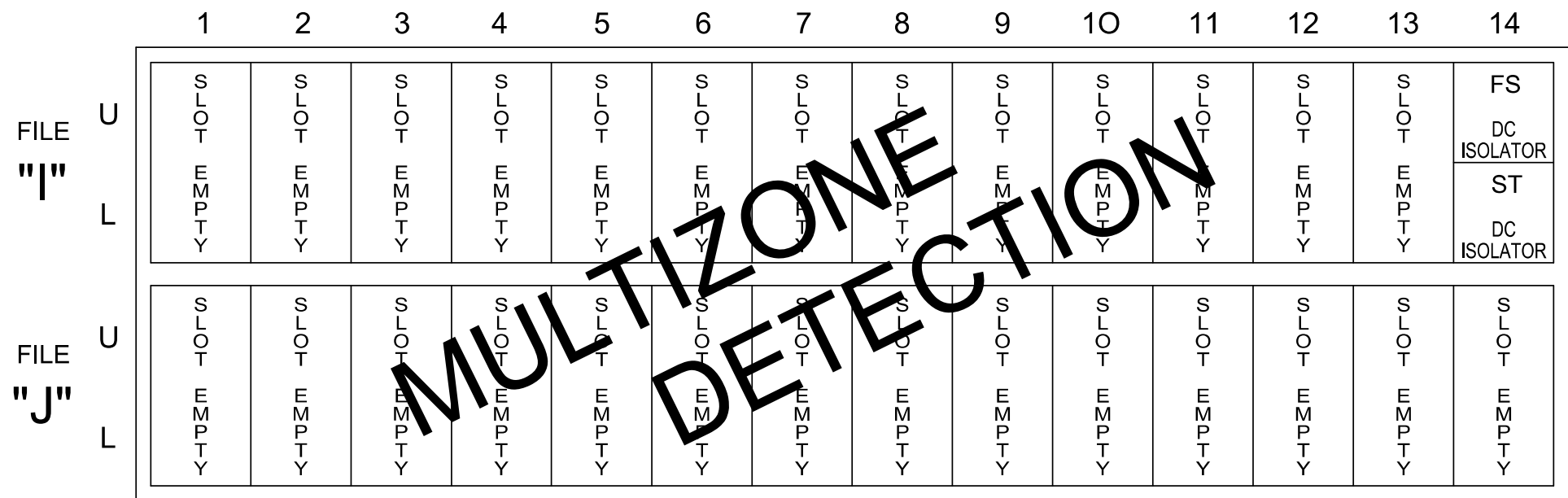
*See overlap programming detail on sheet 2

SPECIAL DETECTOR NOTE

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SIGNAL HEAD HOOK-UP CHART

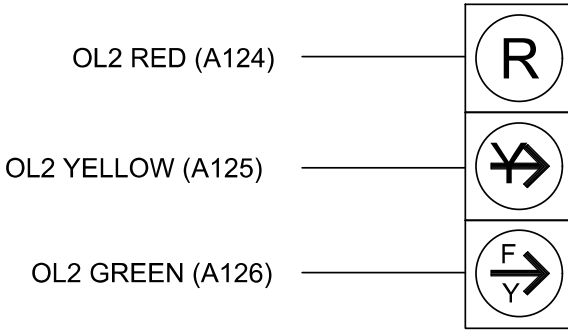
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	NU	63	NU	NU	NU	NU
RED		128			101			134			107			A124				
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125						131											
YELLOW ARROW	126						132							A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW	127						133											
Hand icon																		
Walking person icon																		

NU = Not Used

*See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



63

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T5
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Temporary Design 5 - TMP Phase VI, Step 1
Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6 Robeson County Lumberton

PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti

PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody

REVISIONS INIT. DATE

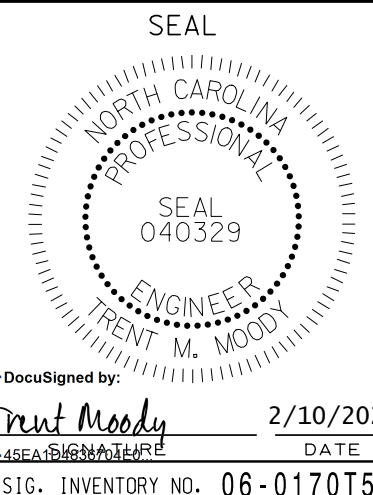
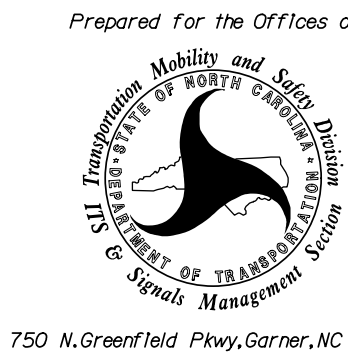
DocuSigned by: 2/10/2025

DATE

SIG. INVENTORY NO. 06-0170T5



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More >Channels >Channel Options

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

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

↑ ↑
NOTE: ALL RED FLASH

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T5
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Temporary Design 5 - TMP Phase VI, Step 1
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6 Robeson County Lumberton

PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti

PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody

REVISIONS INIT. DATE

.....

.....

.....

SEAL

ENGINEER
TRENT M. WOODY

DocuSigned by:

2/10/2025

DATE

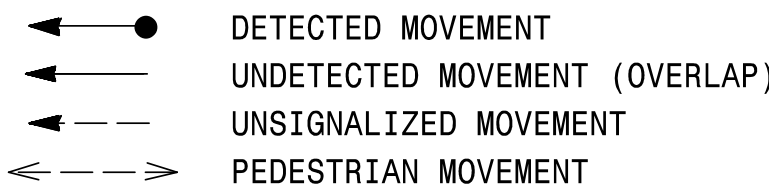
SIG. INVENTORY NO. 06-0170T5



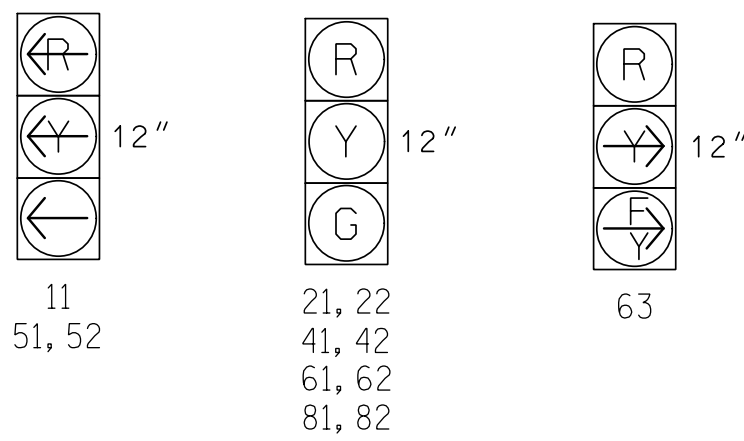
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

750 N. Greenfield Pkwy, Garner, NC 27529

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 and/or phase 5 may be lagged.
4. Reposition existing signal heads numbered 11, 21, 22, 41, 42, 51, 61, 62, and 63.
5. Reposition existing signs labeled "B".
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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



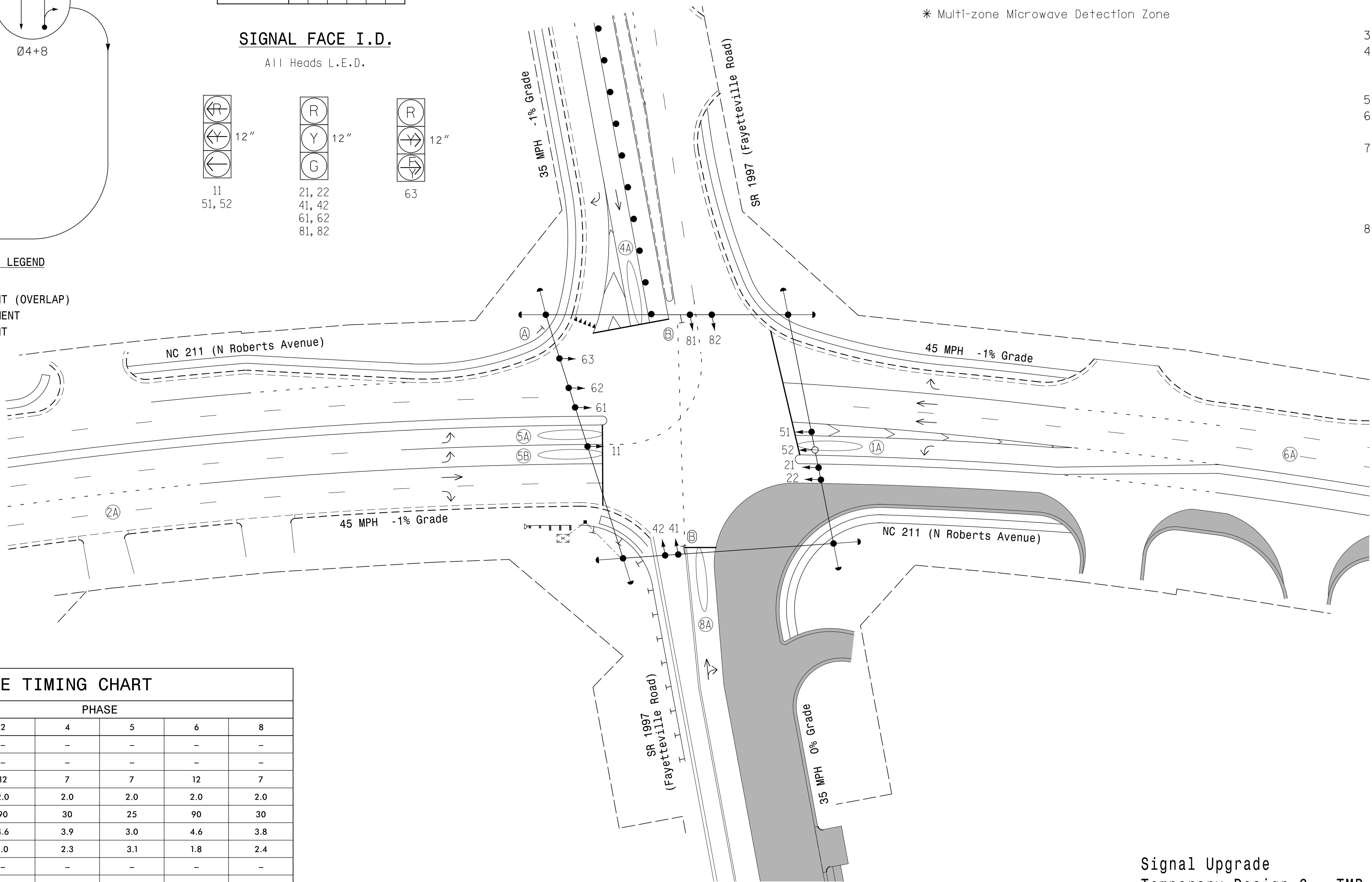
All Heads L.E.D.



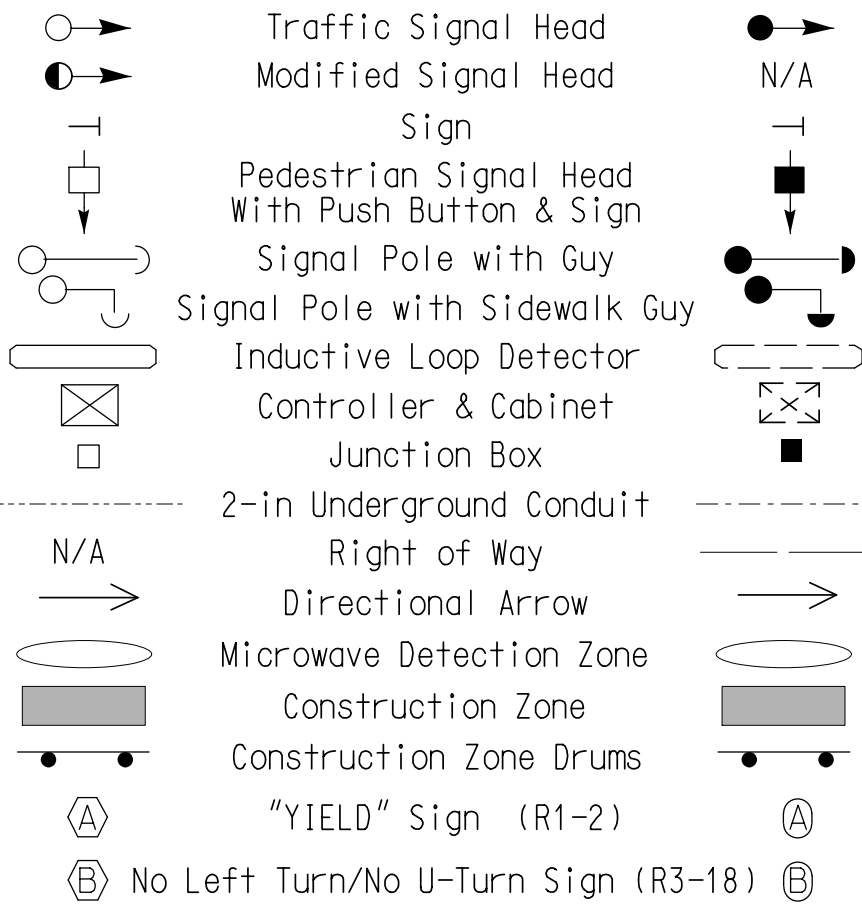
MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	*	*	1	-	-	X	-	X	-	*
4A	6X40	0	*	*	4	-	-	X	-	X	-	*
5A	6X40	0	*	*	5	-	-	X	-	X	-	*
5B	6X40	0	*	*	5	-	-	X	-	X	-	*
8A	6X40	0	*	*	8	10	-	X	-	X	-	*

* Multi-zone Microwave Detection Zone

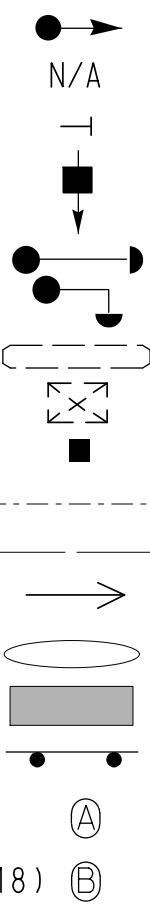
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



PROPOSED



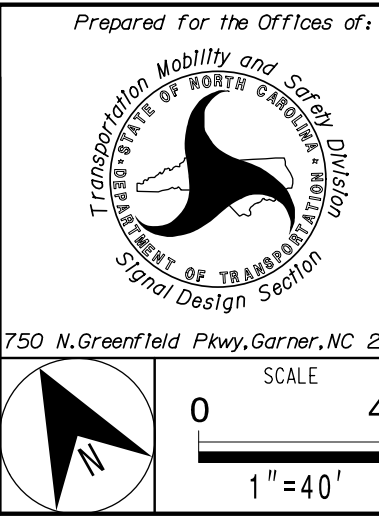
EXISTING



Signal Upgrade
Temporary Design 6 - TMP Phase VI, Step 4

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6 Robeson County Lumberton

PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti
---------------------	-------------------------

PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Moody
-----------------------------	-------------------------

REVISIONS	INIT.	DATE

[illegible][illegible]

SEAL



SEAL
040329
ENGINEER
TRENT M. MOODY

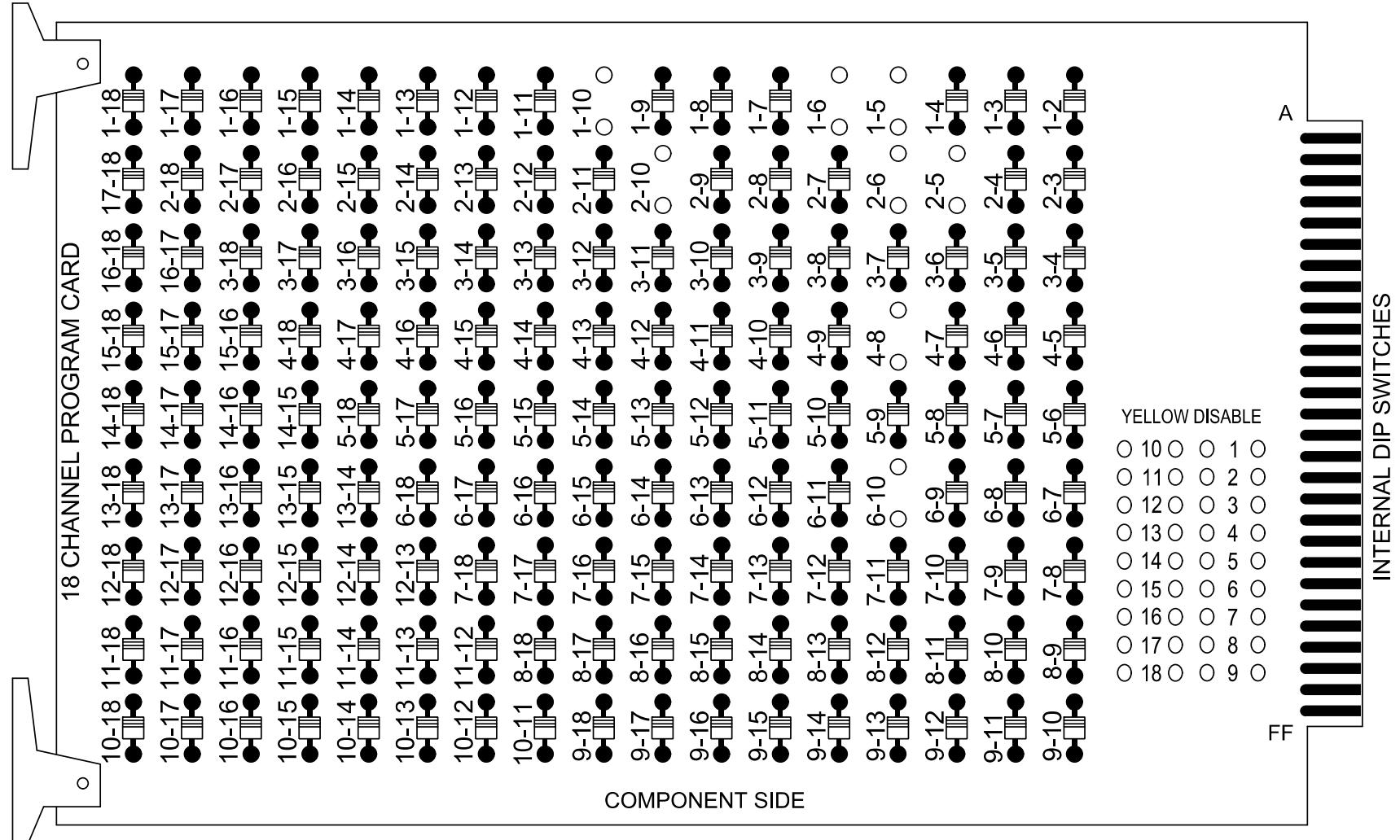
DocuSigned by:
Trent Moody 2/1
E
SIC. INVENTORY NO. 06-0

DocuSigned by: Went Moody 2/10/20
5EA1B9E374E... DATE
SIG. INVENTORY NO. 06-0170T

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

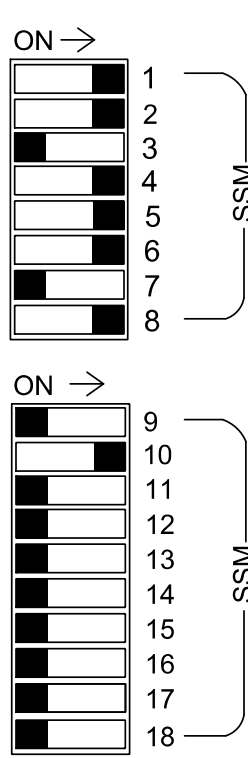
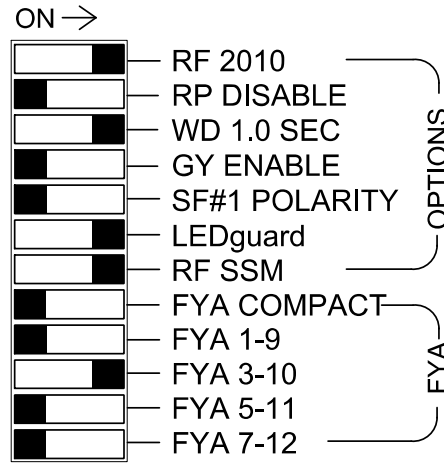
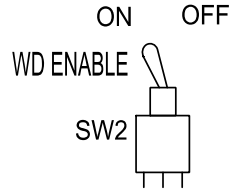
REMOVE DIODE JUMPERS 1-5, 1-6, 1-10, 2-5, 2-6, 2-10, 4-8, AND 6-10.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the #D06-18 Lumberton NC 211 (N. Roberts Avenue) System.

EQUIPMENT INFORMATION

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

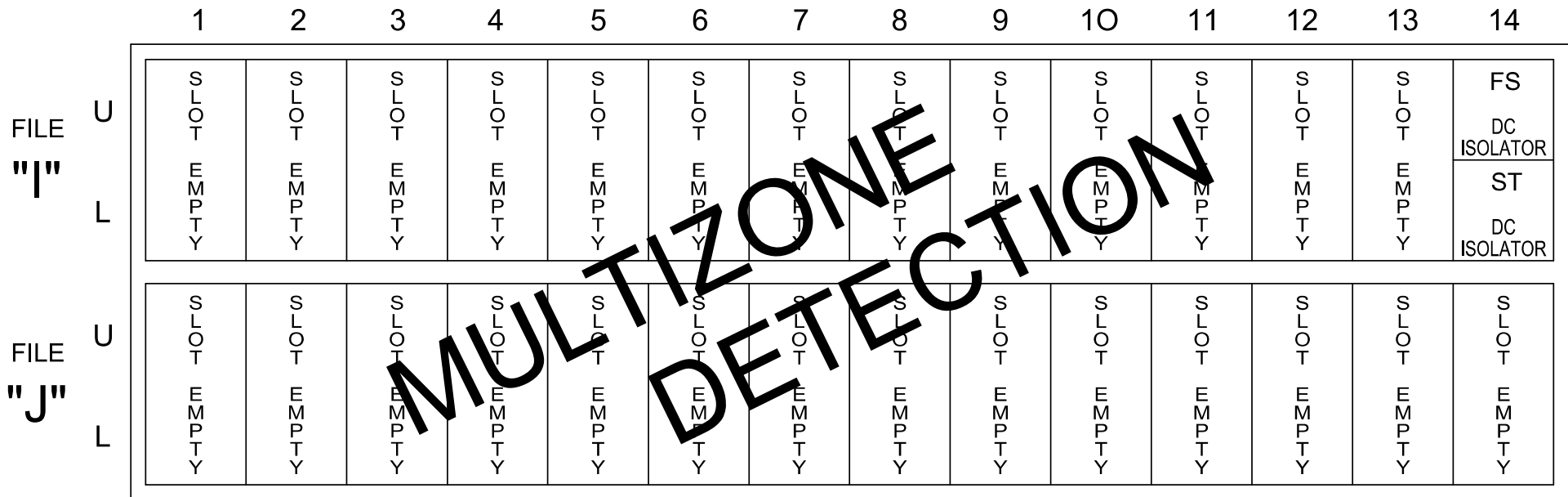
*See overlap programming detail on sheet 2

SPECIAL DETECTOR NOTE

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SIGNAL HEAD HOOK-UP CHART

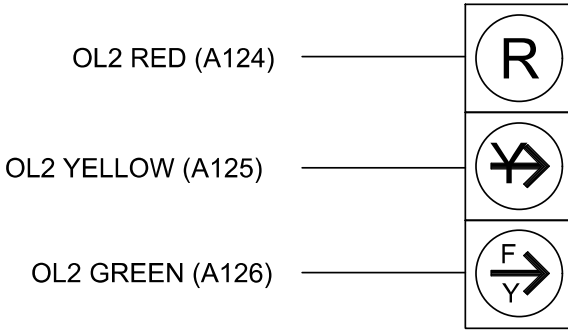
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51,52	61,62	NU	NU	81,82	NU	NU	63	NU	NU	NU	NU
RED		128			101			134			107			A124				
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125						131											
YELLOW ARROW	126						132							A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW	127						133											
Hand icon																		
Walking person icon																		

NU = Not Used

*See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

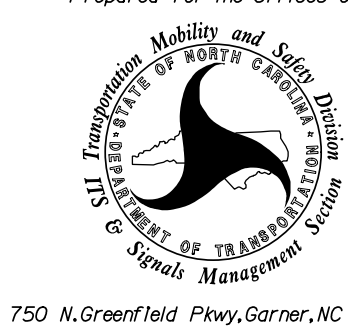


63

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T6
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Temporary Design 6 - TMP Phase VI, Step 4
Electrical Detail - Sheet 1 of 2

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More >Channels >Channel Options

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

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

↑ ↑
NOTE: ALL RED FLASH

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T6
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Temporary Design 6 - TMP Phase VI, Step 4
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6 Robeson County Lumberton

PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti

PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody

REVISIONS INIT. DATE

.....

.....

.....

SEAL

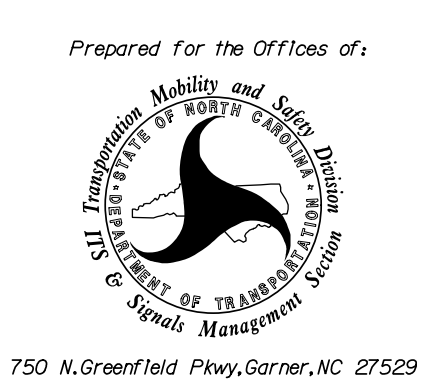
ENGINEER
TRENT M. WOODY

DocuSigned by:

Trent M. Woody

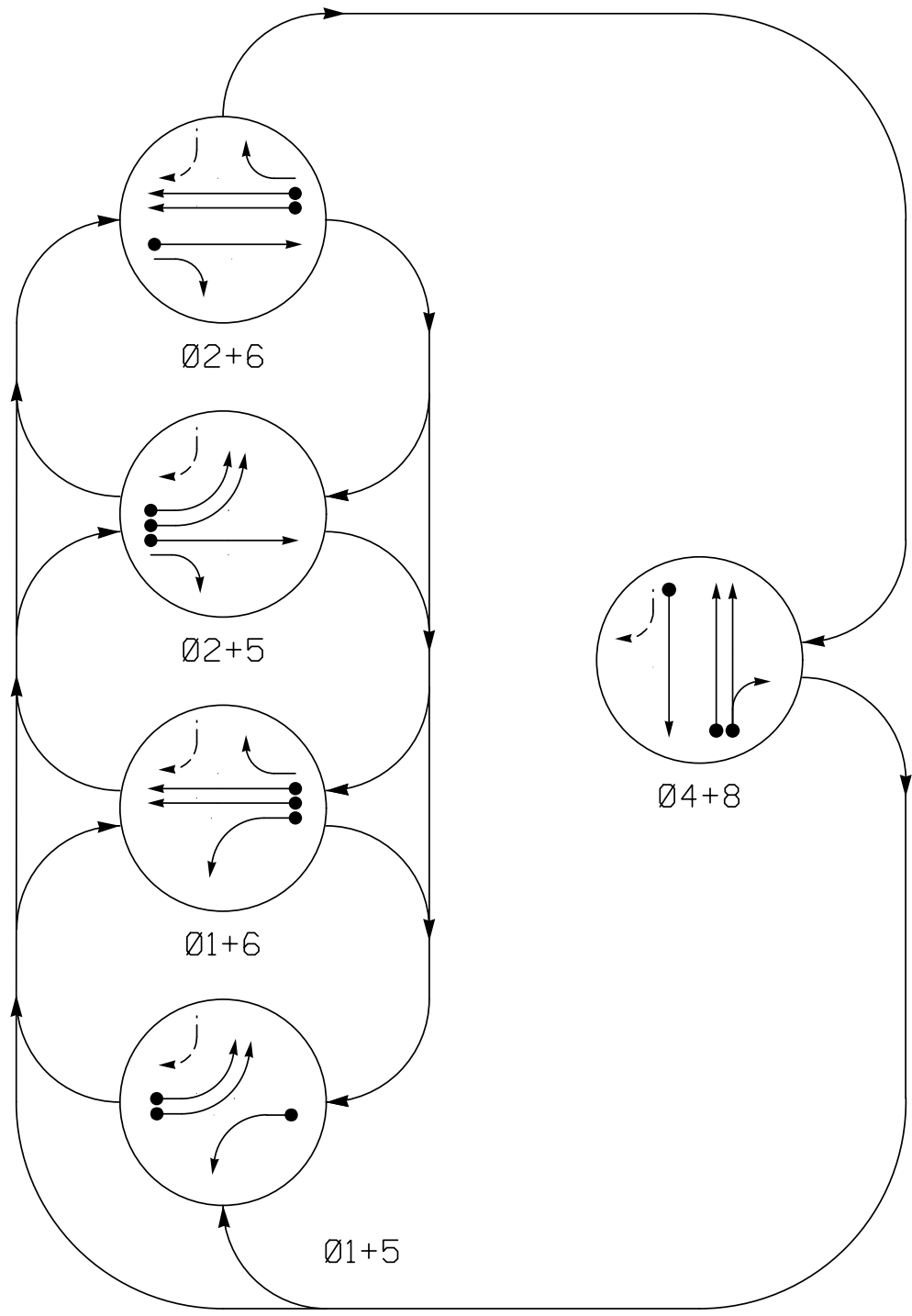
2/10/2025
DATE

SIG. INVENTORY NO. 06-0170T6



750 N. Greenfield Pkwy, Garner, NC 27529

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

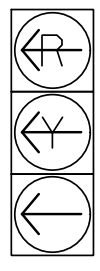
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

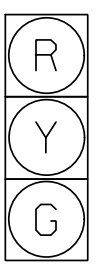
SIGNAL FACE	PHASE					
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 4 + 8	Ø 1 + 5
11	←	←	→	→	→	→
21, 22	R	R	G	G	R	R
41, 42	R	R	R	R	G	R
51, 52	←	←	→	→	→	→
61, 62	R	G	R	G	R	R
63	R	Y	R	Y	R	R
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

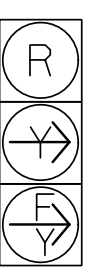
All Heads L.E.D.



11
51, 52



21, 22
41, 42
61, 62
81, 82



63

RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 - (2A)	SENSOR 2 - (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	500 - 100	500 - 100
Enable Speed	Y	Y
Speed Range (mph)	35 - 100	35 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 6.5	2.5 - 6.5

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
1A	6X40	0	*	*	1	-	-	X	-	X
4A	6X40	0	*	*	4	-	-	X	-	X
5A	6X40	0	*	*	5	-	-	X	-	X
5B	6X40	0	*	*	5	-	-	X	-	X
8A	6X40	0	*	*	8	3	-	X	-	X
8B	6X40	0	*	*	8	-	-	X	-	X
8C	6X6	0	*	*	8	15	-	X	-	X

* Multi-zone Microwave Detection Zone

5 Phase
Fully Actuated
Signal System #D06-18 Lumberton
NC 211 (N. Roberts Avenue)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Reposition existing signal heads numbered 21, 22, 41, 42, 81 and 82.
- Reposition existing signs labeled "B".
- Set all detector units to presence mode.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED	EXISTING

MAXTIME TIMING CHART						
FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-
Min Green	7	12	7	7	12	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	30	20	90	30
Yellow Change	3.0	4.6	3.9	3.0	4.6	3.8
Red Clear	2.6	1.7	2.3	3.1	1.8	2.7
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X

* These values may be field adjusted. Do not adjust Min Green and 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 7 - TMP Phase VII

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

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

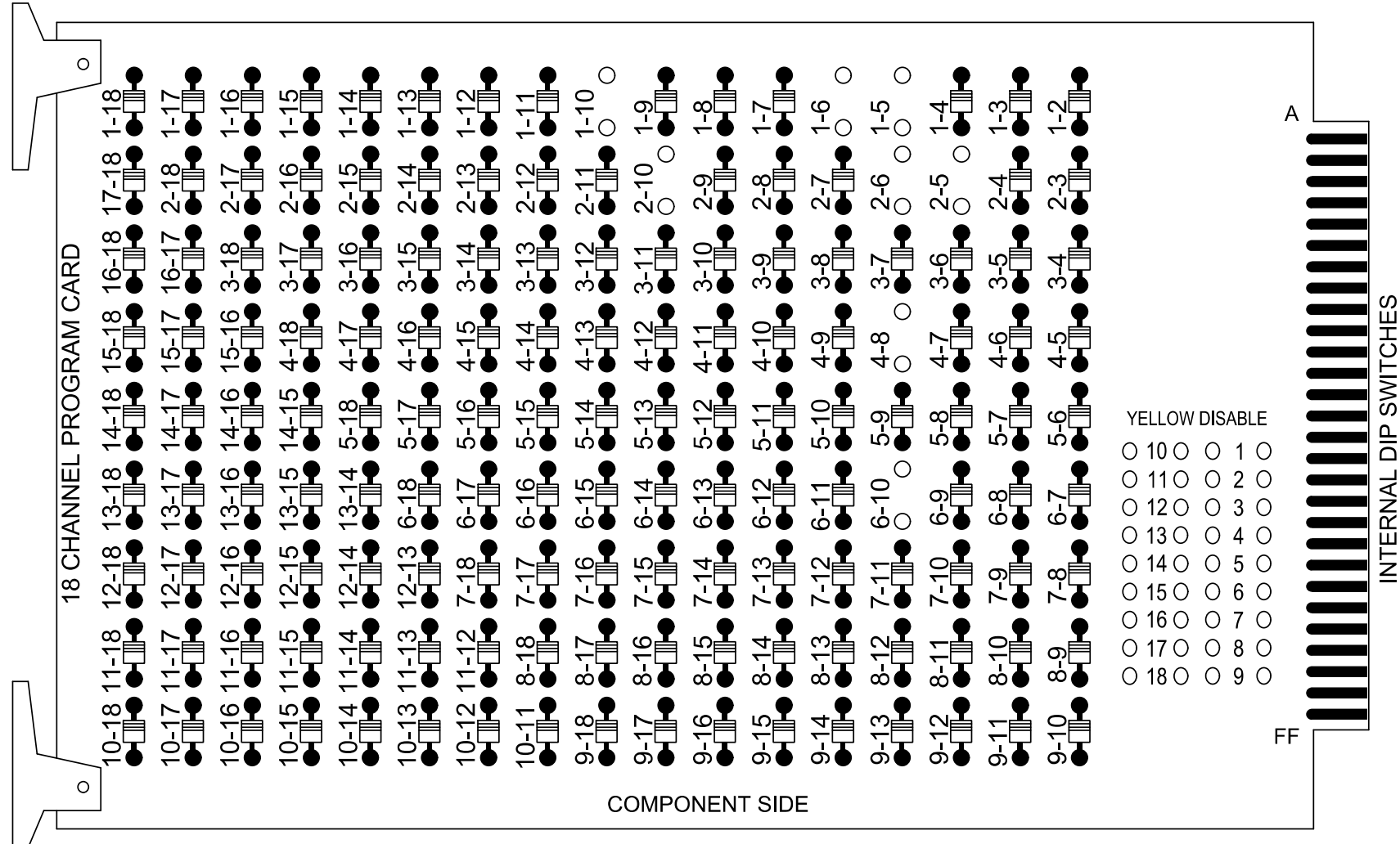
NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)
Division 6 Robeson County Lumberton
PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti
PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody
REVISIONS
INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED
SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
RENT M. MOODY
2/10/2025
DATE
SIC. INVENTORY NO. 06-017017

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

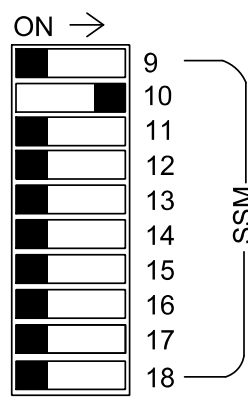
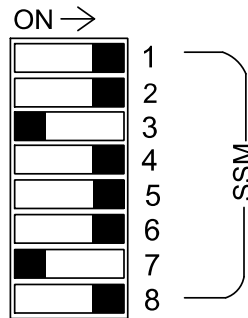
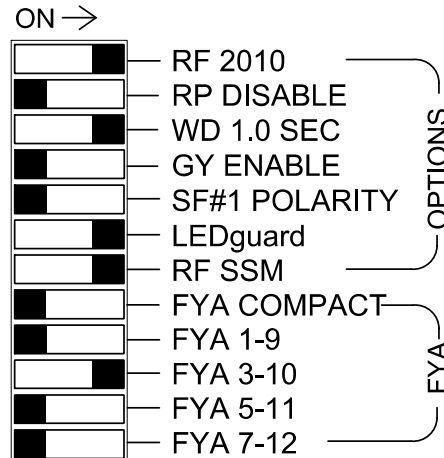
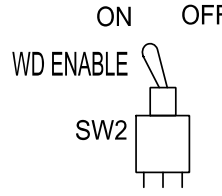
REMOVE DIODE JUMPERS 1-5, 1-6, 1-10, 2-5, 2-6, 2-10, 4-8, AND 6-10.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the #D06-18 Lumberton NC 211 (N. Roberts Avenue) System.

EQUIPMENT INFORMATION

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

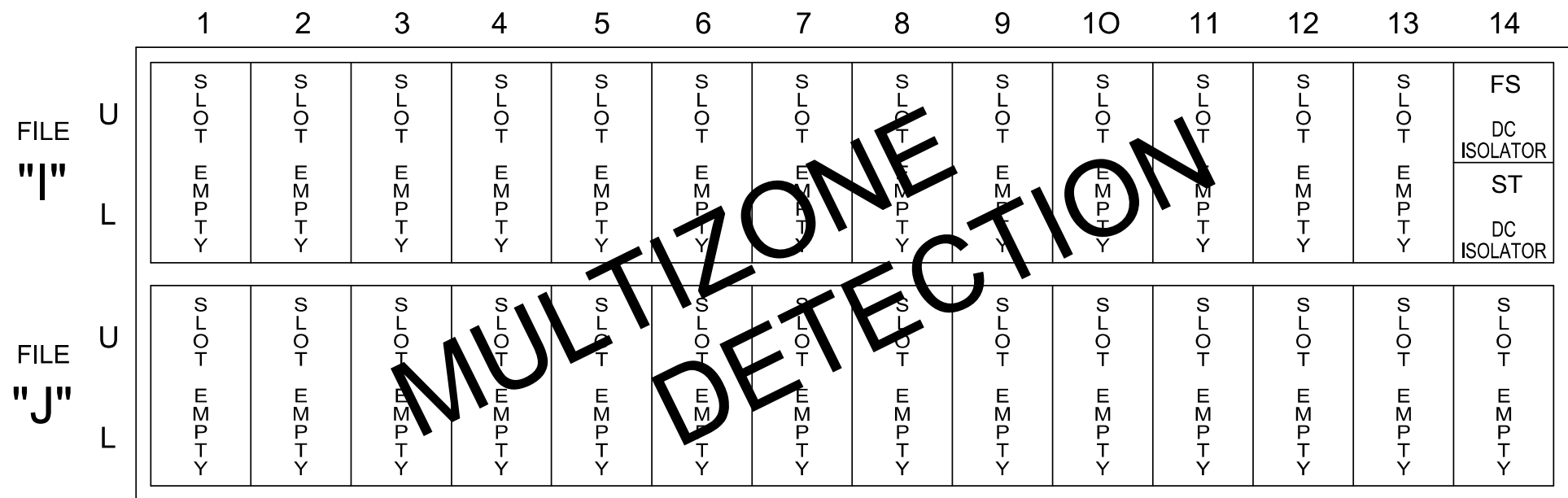
*See overlap programming detail on sheet 2

SPECIAL DETECTOR NOTE

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SIGNAL HEAD HOOK-UP CHART

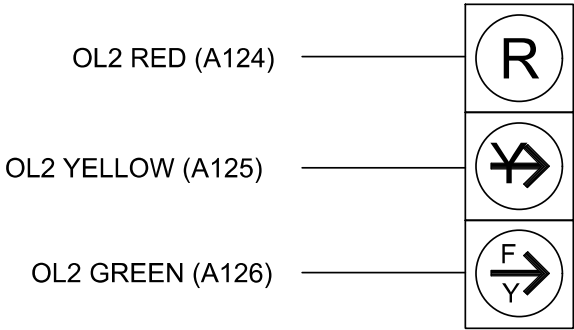
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51,52	61,62	NU	NU	81,82	NU	NU	63★	NU	NU	NU	NU
RED		128			101			134			107			A124				
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125							131										
YELLOW ARROW	126							132						A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW	127							133										
Hand icon																		
Walking person icon																		

NU = Not Used

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

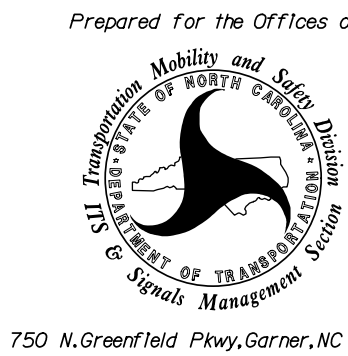


63

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T7
DESIGNED: Feb 2025
SEALED:2/10/2025
REVISED:

Temporary Design 7 - TMP Phase VII
Electrical Detail - Sheet 1 of 2

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
040329
ENGINEER
TRENT M. MOODY

DocuSigned by:
Trent Moody
2/10/2025
DATE

SIG. INVENTORY NO. 06-0170T7

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More >Channels >Channel Options

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

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

↑ ↑
NOTE: ALL RED FLASH

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

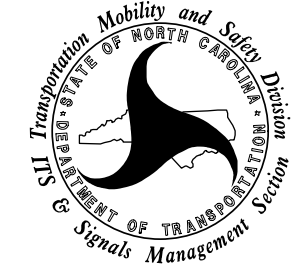
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170T7
DESIGNED: Feb 2025
SEALED:2/10/2025
REVISED:

Temporary Design 7 - TMP Phase VII
Electrical Detail - Sheet 2 of 2



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

750 N.Greenfield Pkwy, Garner, NC 27529

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6Robeson CountyLumberton

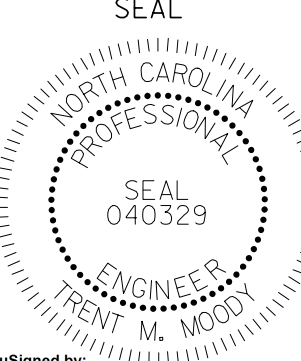
PLAN DATE: Feb 2025REVIEWED BY: H.M. Surti

PREPARED BY: R.L. AristondoREVIEWED BY: T.M. Woody

REVISIONSINIT.DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL

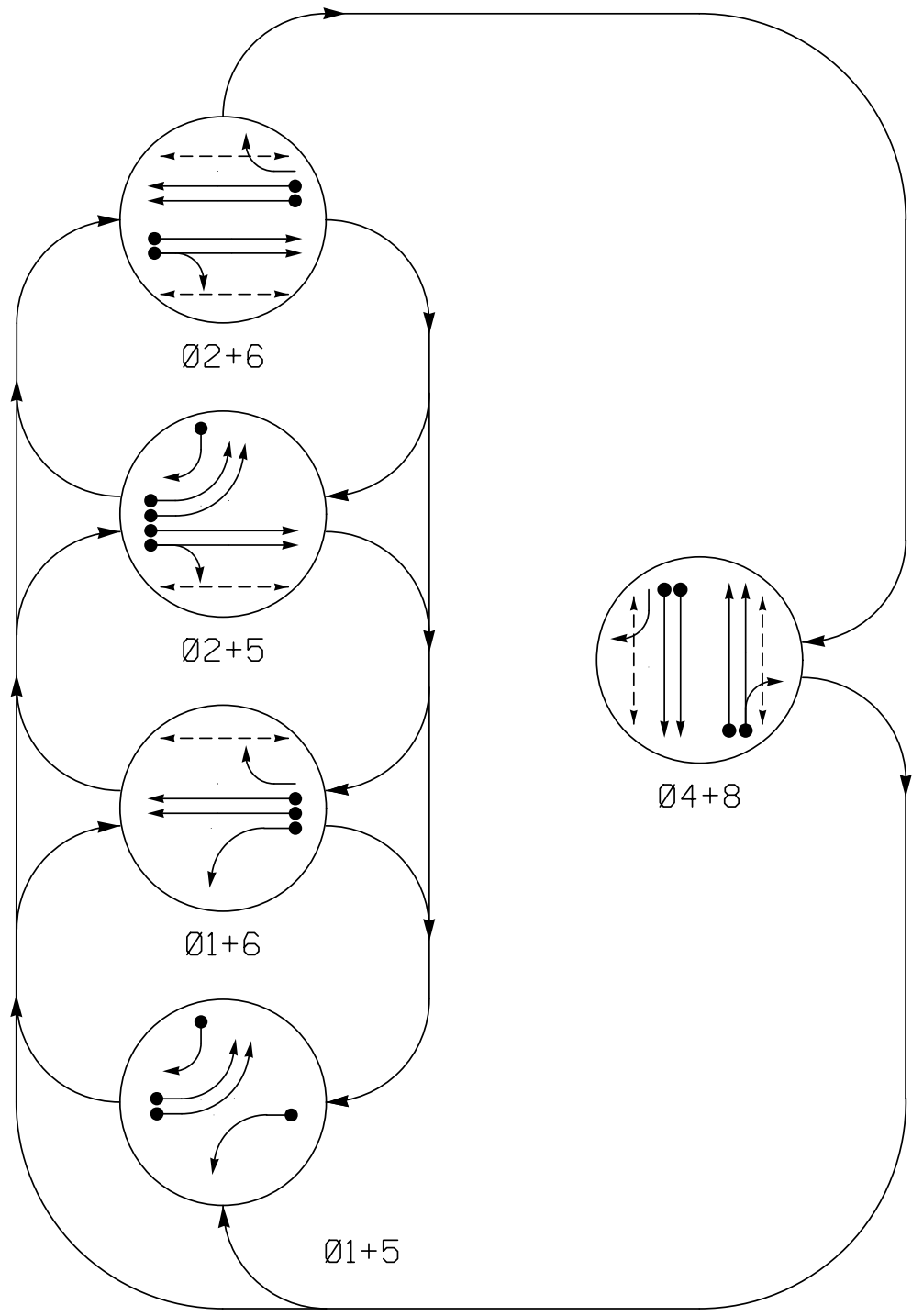


DocuSigned by:
Trent M. Moody

2/10/2025
DATE

SIG. INVENTORY NO. 06-0170T7

DEFAULT PHASING DIAGRAM



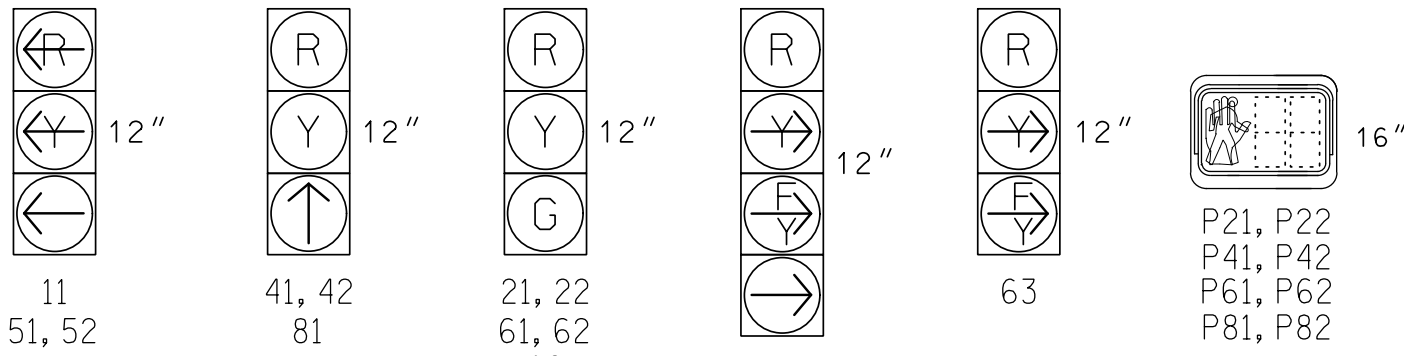
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE				
	Ø 1 + 5	Ø 2 + 6	Ø 3 + 7	Ø 4 + 8	Ø 5 + 9
11	←	←	←	←	←
21, 22	R	R	G	G	R
41, 42	R	R	R	R	↑
43	→	R	→	→	R
51, 52	←	←	←	←	←
61, 62	R	G	R	G	R
63	R	←	R	←	R
81	R	R	R	R	↑
82	R	R	R	R	G
P21, P22	DW	DW	W	W	DW DRK
P41, P42	DW	DW	DW	DW	W DRK
P61, P62	DW	W	DW	W	DW DRK
P81, P82	DW	DW	DW	DW	W DRK

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART										
DETECTOR					PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL
1A	6X40	0	*	*	1	-	-	X	-	X
4A	6X40	0	*	*	4	-	-	X	-	X
4B	6X40	0	*	*	4	-	-	X	-	X
5A	6X40	0	*	*	5	-	-	X	-	X
5B	6X40	0	*	*	5	-	-	X	-	X
5C	6X40	0	*	*	5	15	-	X	-	X
8A	6X40	0	*	*	8	-	-	X	-	X
8B	6X40	0	*	*	8	-	-	X	-	X
8C	6X6	0	*	*	8	15	-	X	-	X

* Multi-zone Microwave Detection Zone

RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 - 2A	SENSOR 2 - 6A
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	500 - 100	500 - 100
Enable Speed	Y	Y
Speed Range (mph)	35 - 100	35 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 6.5	2.5 - 6.5

5 Phase
Fully Actuated
Signal System #D06-18 Lumberton
NC 211 (N. Roberts Avenue)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

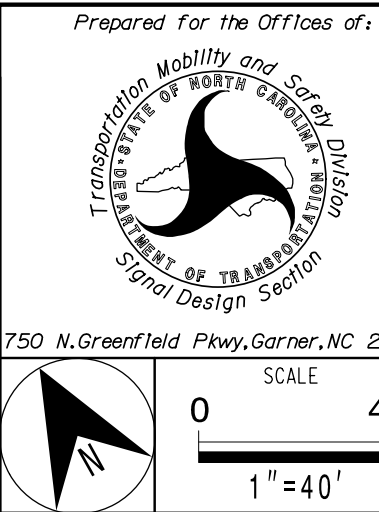
- | PROPOSED | EXISTING |
|----------|----------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

MAXTIME TIMING CHART							
FEATURE	PHASE						
	1	2	4	5	6	8	
Walk *	-	12	13	-	14	14	
Ped Clear *	-	20	30	-	28	33	
Min Green	7	12	7	7	12	7	
Passage *	2.0	2.0	2.0	2.0	2.0	2.0	
Max I *	25	90	30	25	90	30	
Yellow Change	3.0	4.6	3.9	3.0	4.6	3.8	
Red Clear	3.1	1.9	3.1	3.4	1.9	3.1	
Added Initial *	-	-	-	-	-	-	
Maximum Initial *	-	-	-	-	-	-	
Time Before Reduction *	-	-	-	-	-	-	
Time To Reduce *	-	-	-	-	-	-	
Minimum Gap	-	-	-	-	-	-	
Advance Walk	-	5	6	-	7	7	
Non Lock Detector	X	-	X	X	-	X	
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-	
Dual Entry	-	-	X	-	-	X	

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

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6 Robeson County Lumberton

PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti

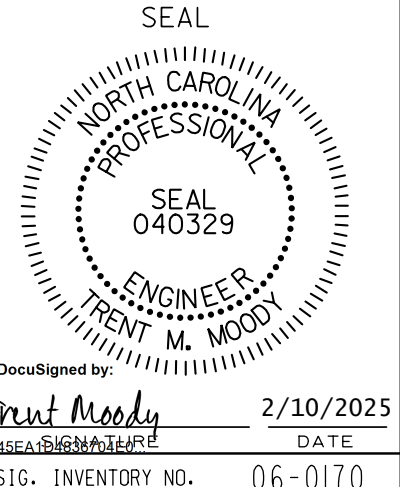
PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody

REVISIONS INIT. DATE

Signed by: Trent Moody DATE: 2/10/2025

SEALED INVENTORY NO. 06-0170

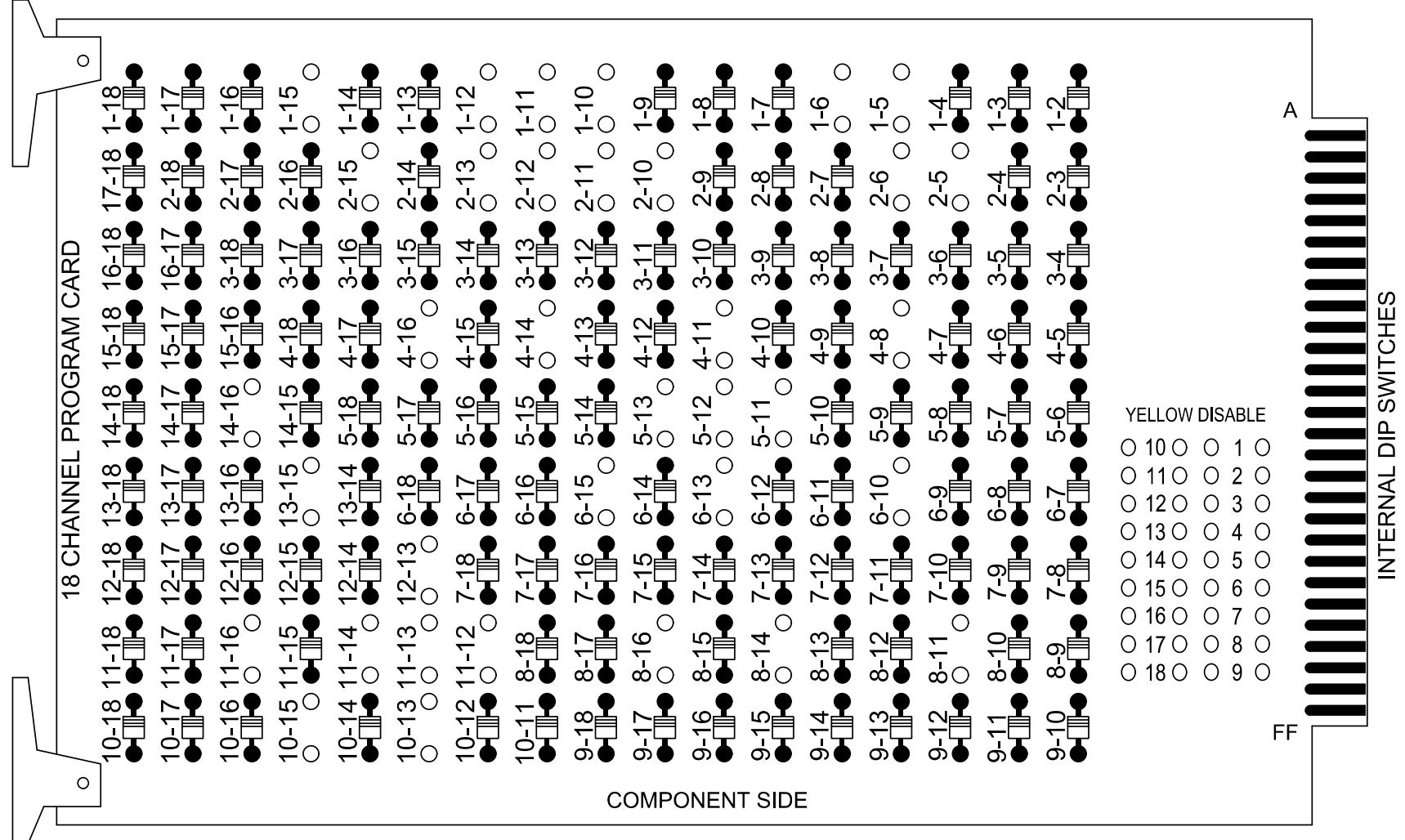
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-10, 1-11, 1-12, 1-15, 2-5, 2-6, 2-10, 2-11, 2-12, 2-13, 2-15, 4-8, 4-11, 4-14, 4-16, 5-11, 5-12, 5-13, 6-10, 6-13, 6-15, 8-11, 8-14, 8-16, 10-13, 10-15, 11-12, 11-13, 11-14, 11-16, 12-13, 13-15, AND 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the #D06-18 Lumberton NC 211 (N. Roberts Avenue) System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 10.1

SIGNAL HEAD HOOK-UP CHART

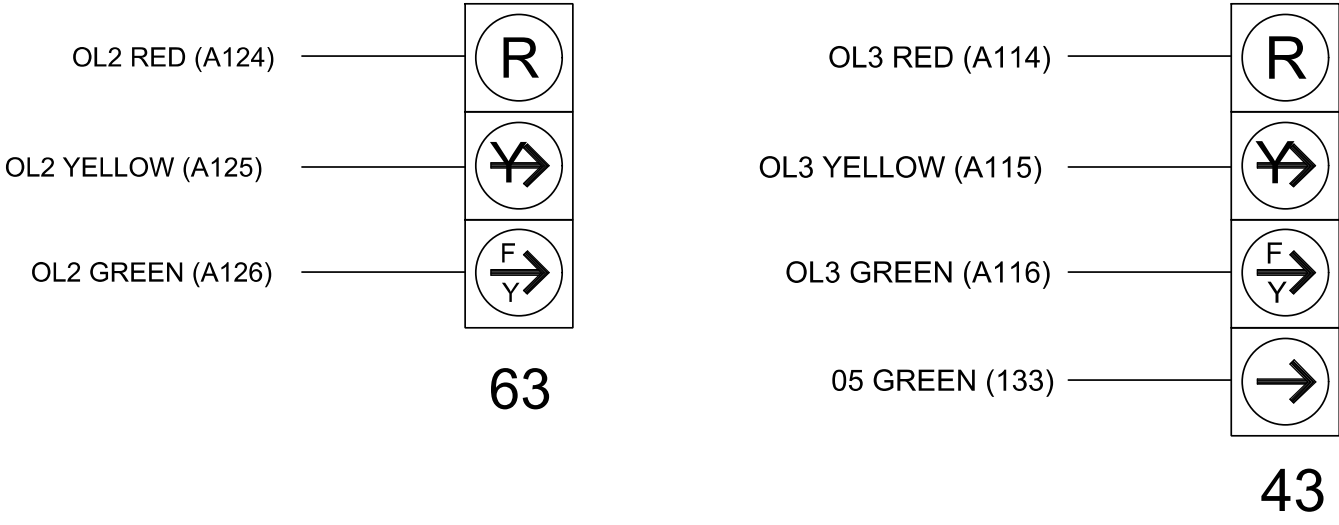
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	41,42	P41, P42	43	61,62	P61, P62	NU	81	82	P81, P82	NU	63	NU	43	51,52
RED		128			101			134			107	107		A124		A114		
YELLOW		129			102		*	135			108	108						
GREEN		130						136				109						
RED ARROW	125																A101	
YELLOW ARROW	126													A125		A115	A102	
FLASHING YELLOW ARROW														A126		A116		
GREEN ARROW	127				103		133				109						A103	
Hand icon			113			104			119			110						
Ped icon			115			106			121			112						

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.
*See pictorial of head wiring in detail this sheet.

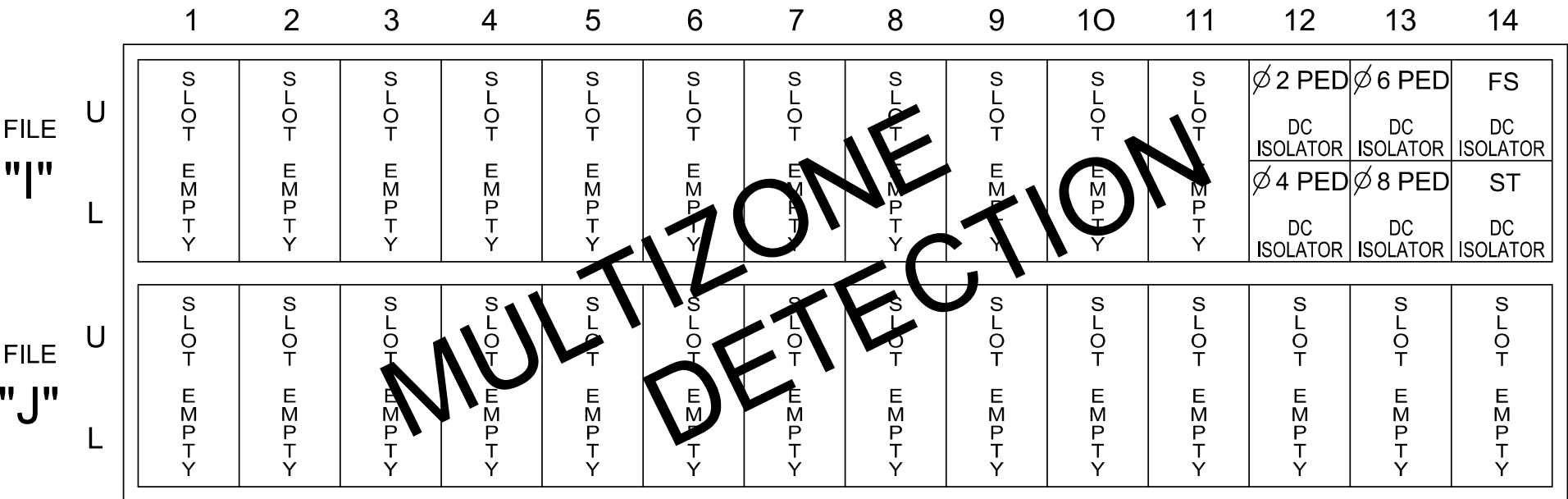
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

SPECIAL DETECTOR NOTE

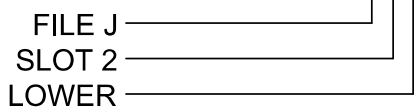
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

INPUT FILE CONNECTION & PROGRAMMING CHART

	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE
PED PUSH BUTTONS						
P21,P22	TB8-4,6	I12U	67	33	2	PED 2
P41,P42	TB8-5,6	I12L	69	35	4	PED 4
P61,P62	TB8-7,9	I13U	68	34	6	PED 6
P81,P82	TB8-8,9	I13L	70	36	8	PED 8

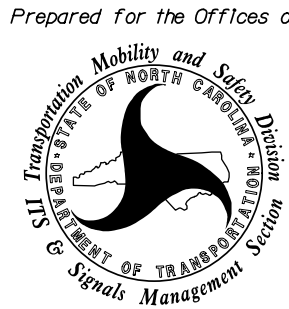
NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: J2L



Final Design
Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6 Robeson County Lumberton

PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti

PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody

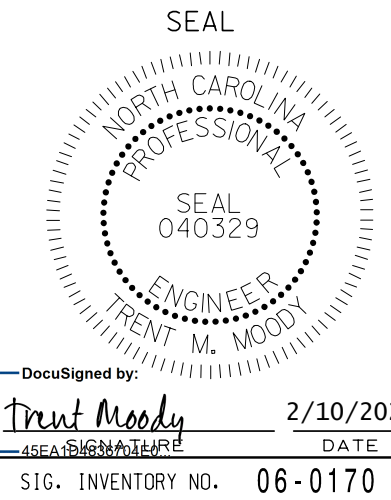
REVISIONS INIT. DATE

DocuSigned by: Trent Moody 2/10/2025

SEALED: 2/10/2025

REVISD: 06-0170

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More >Channels >Channel Options

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

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

↑ ↑
NOTE: ALL RED FLASH

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

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

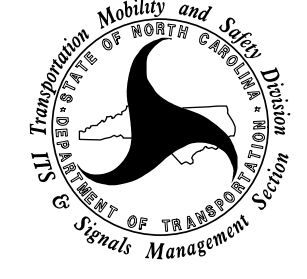
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0170
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Final Design
Electrical Detail - Sheet 2 of 2



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

750 N.Greenfield Pkwy, Garner, NC 27529

NC 211 (N. Roberts Avenue)
at
SR 1997 (Fayetteville Road)

Division 6Robeson CountyLumberton

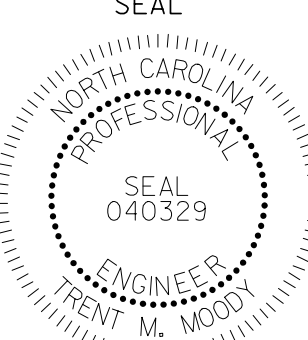
PLAN DATE: Feb 2025REVIEWED BY: H.M. Surti

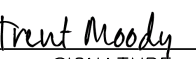
PREPARED BY: R.L. AristondoREVIEWED BY: T.M. Woody

REVISIONSINIT.DAT

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



DocuSigned by:

Trent M. Woody

2/10/2025
DATE

SIG. INVENTORY NO. 06-0170

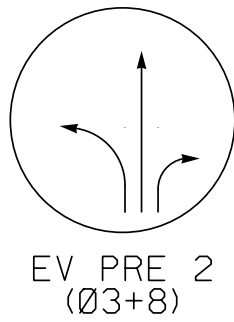
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

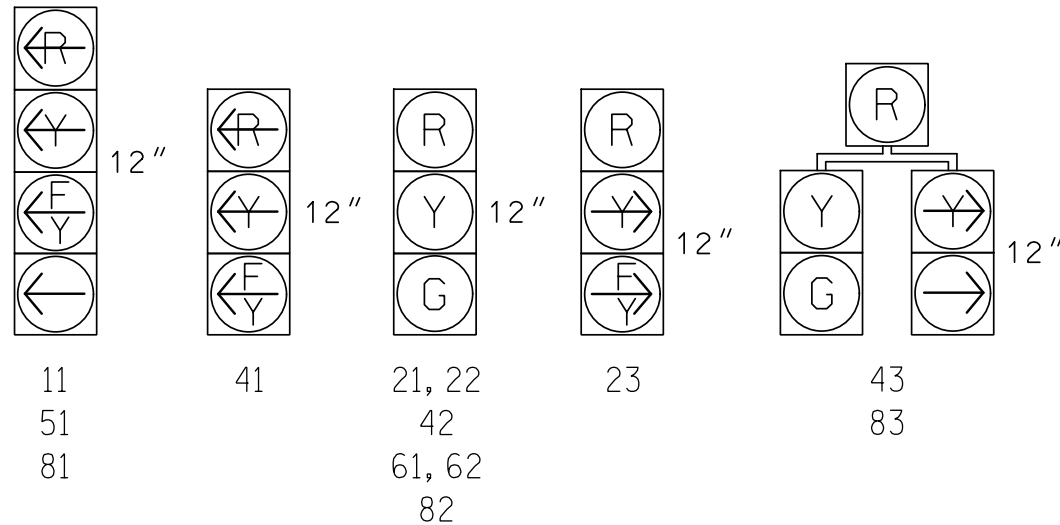
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

EV PREEMPT PHASE
(Medium Priority)



SIGNAL FACE I.D.

All Heads L.E.D.



SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	04+8	PRE 2	FLASH	
11	←	←	←	←	←	←	←	
21, 22	R	R	G	G	R	R	R	
23	R	R	←	←	R	R	R	
41	←	←	←	←	←	←	←	
42	R	R	R	R	G	R	R	
43	←	←	←	←	R	G	R	
51	←	←	←	←	←	←	←	
61, 62	R	G	R	G	R	R	R	
81	←	←	←	←	←	←	←	
82	R	R	R	R	G	G	R	
83	←	←	←	←	R	G	G	

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
1A	6X40	0	*	*	1	15	-	X	-	X
1B	6X40	0	*	*	6	-	-	X	-	X
4A	6X40	0	*	*	1	15	-	X	-	X
4B	6X40	0	*	*	4	3	-	X	-	X
5A	6X40	0	*	*	4	-	-	X	-	X
5B	6X40	0	*	*	5	15	-	X	-	X
8A	6X40	0	*	*	2	-	-	X	-	X
8B	6X40	0	*	*	5	15	-	X	-	X

* Multi-zone Microwave Detection Zone

5 Phase
Fully Actuated with EV Preemption
D06-18 Lumberton NC 211 (N. Roberts Avenue)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The Division Traffic Engineer will determine the Delay Time and Minimum Dwell Time for the emergency vehicle preemption timing.
- This intersection uses microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Emergency vehicle preemption switch is located inside rescue squad building. When switch is actuated, controller will display interval and then emergency preemption phasing.

RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 - 2A	SENSOR 2 - 6A
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	200 - 70	200 - 70
Enable Speed	Y	Y
Speed Range (mph)	25 - 100	25 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 5.5	2.5 - 5.5

MAXTIME TIMING CHART

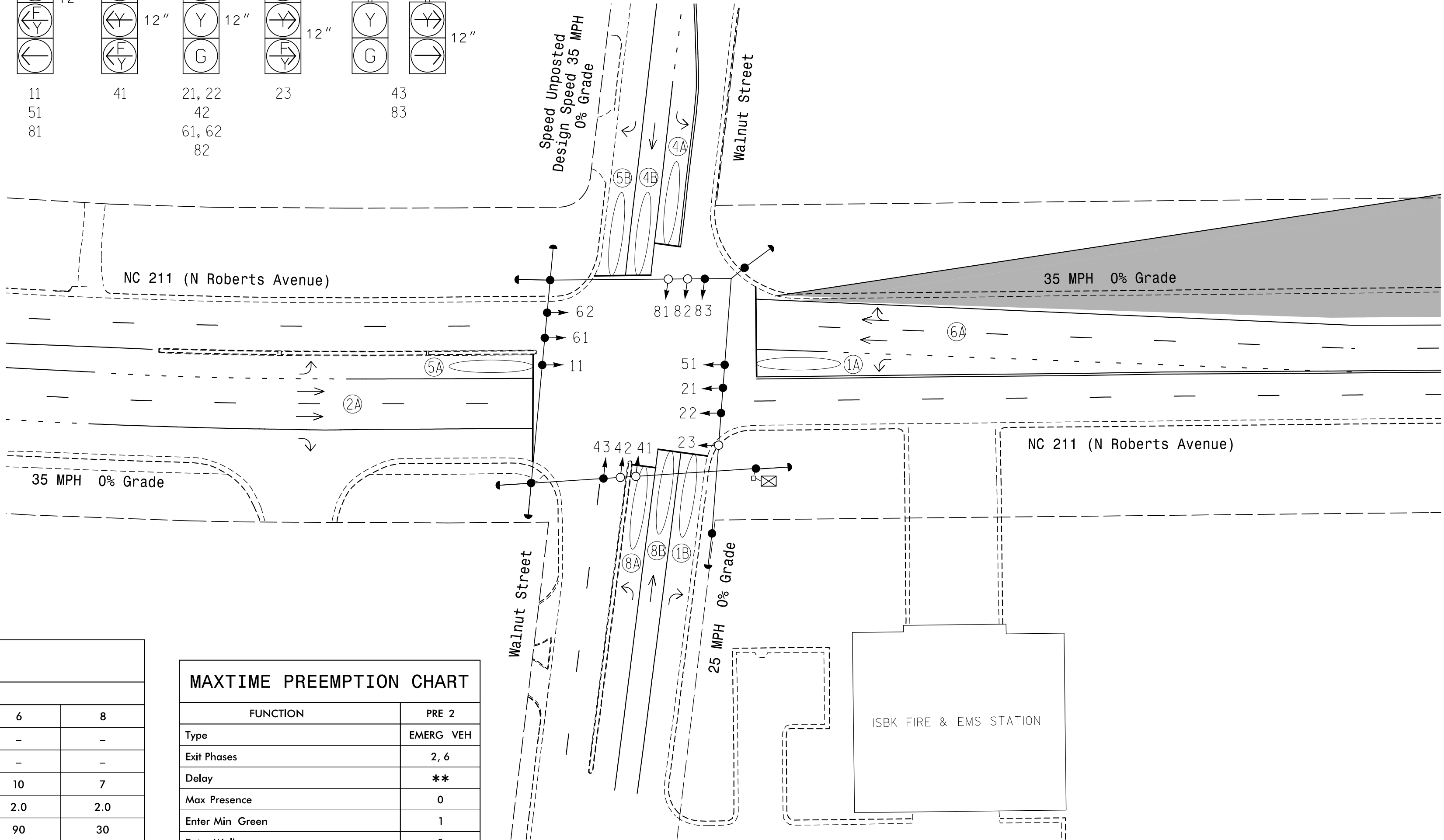
FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-
Min Green	7	10	7	7	10	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	30	20	90	30
Yellow Change	3.0	3.8	3.8	3.0	3.8	3.8
Red Clear	2.8	2.0	2.1	2.8	2.0	2.1
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X

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

MAXTIME PREEMPTION CHART

FUNCTION	PRE 2
Type	EMERG YEH
Exit Phases	2, 6
Delay	**
Max Presence	0
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	25.5 *
Enter Yellow Change	25.5 *
Enter Red Clear	25.5 *
Dwell Green	**
Exit Min Green	25.5 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Call Extend Time	1.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	N
Require All Red Entry	N

* Directs controller to use default phase timing.
** See Note 6.



LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Head, Signal Pole with Guy, Signal Pole with Sidewalk Guy, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Right of Way, Directional Arrow, Microwave Detection Zone, Construction Zone, Left Arrow "ONLY" Sign (R3-5L).
- EXISTING: N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A.

Signal Upgrade
Temporary Design 1 - TMP Phase IV, Step 4

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

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
SCALE: 0' 40'

NC 211 (N Roberts Avenue)
at
Walnut Street

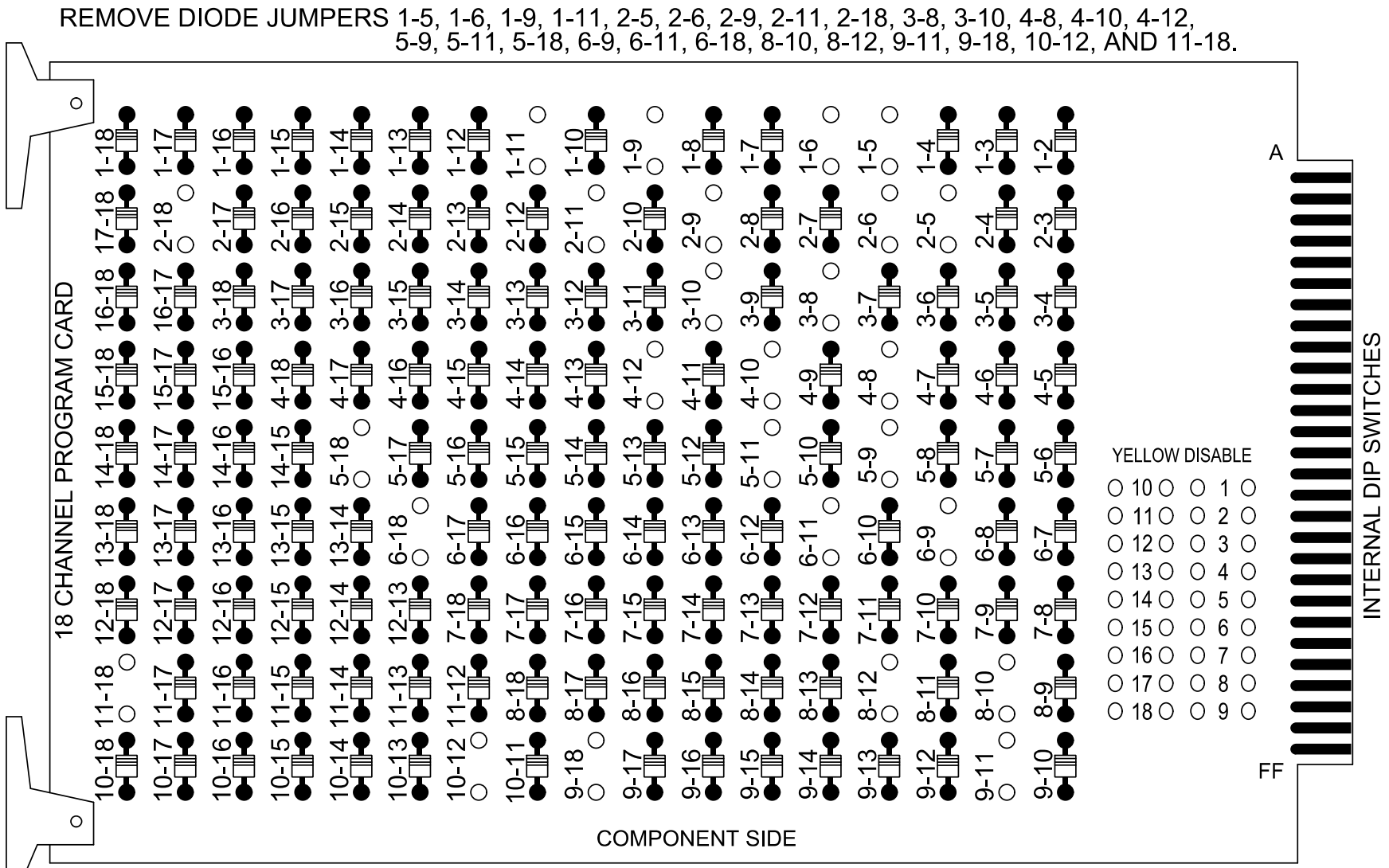
Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Moody	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
T.M. MOODY
040329
3/19/2025
DATE
SIGNATURE
SIC. INVENTORY NO. 06-089711

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

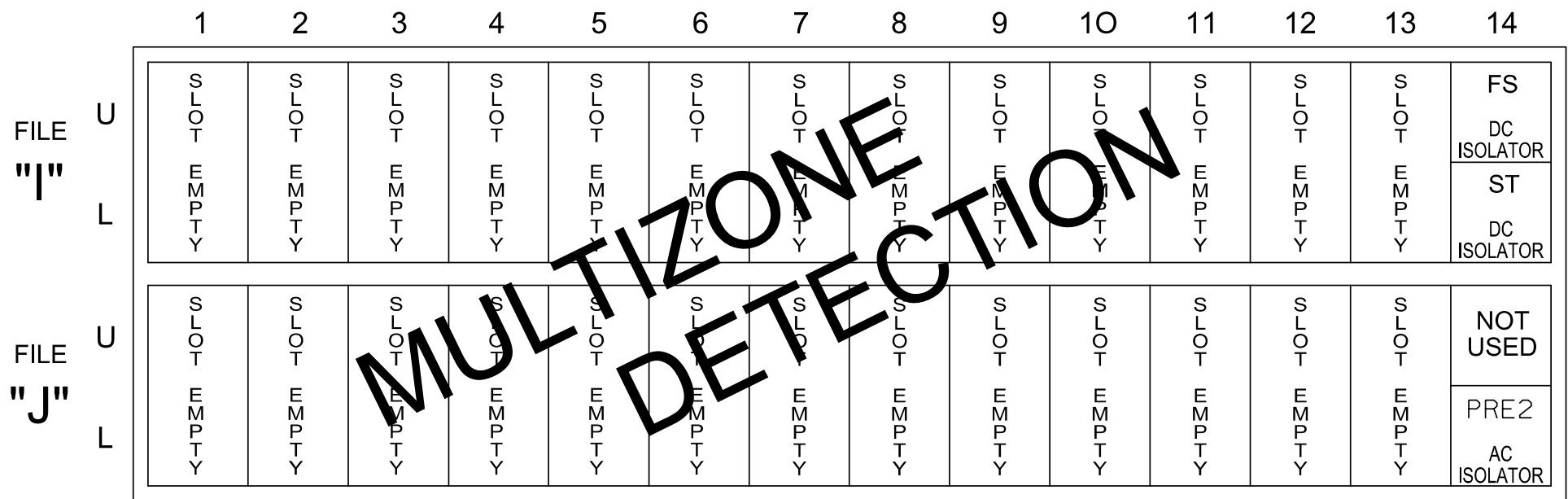


NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phase 4 and phase 8 for Dual Entry.
- Program phase 3 for No Startup Veh Call.
- Program controller to start up in phase 2 Green No Walk, phase 3 Phase Not On, and phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the Signal System #D06-18 Lumberton NC 211 (N. Roberts Avenue).

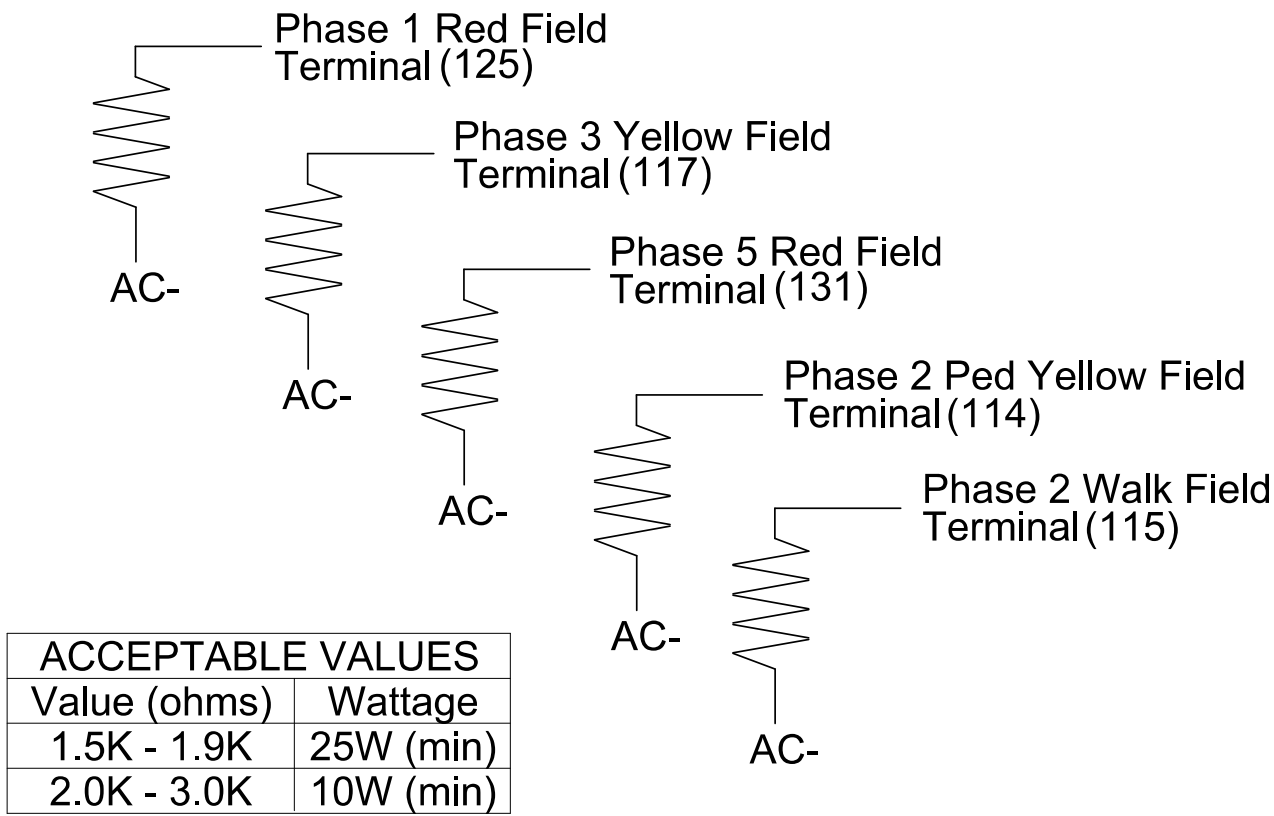
EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2
**Used for Preempt Pilot Lamp control
★Used only during Preempt

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



SIGNAL HEAD HOOK-UP CHART

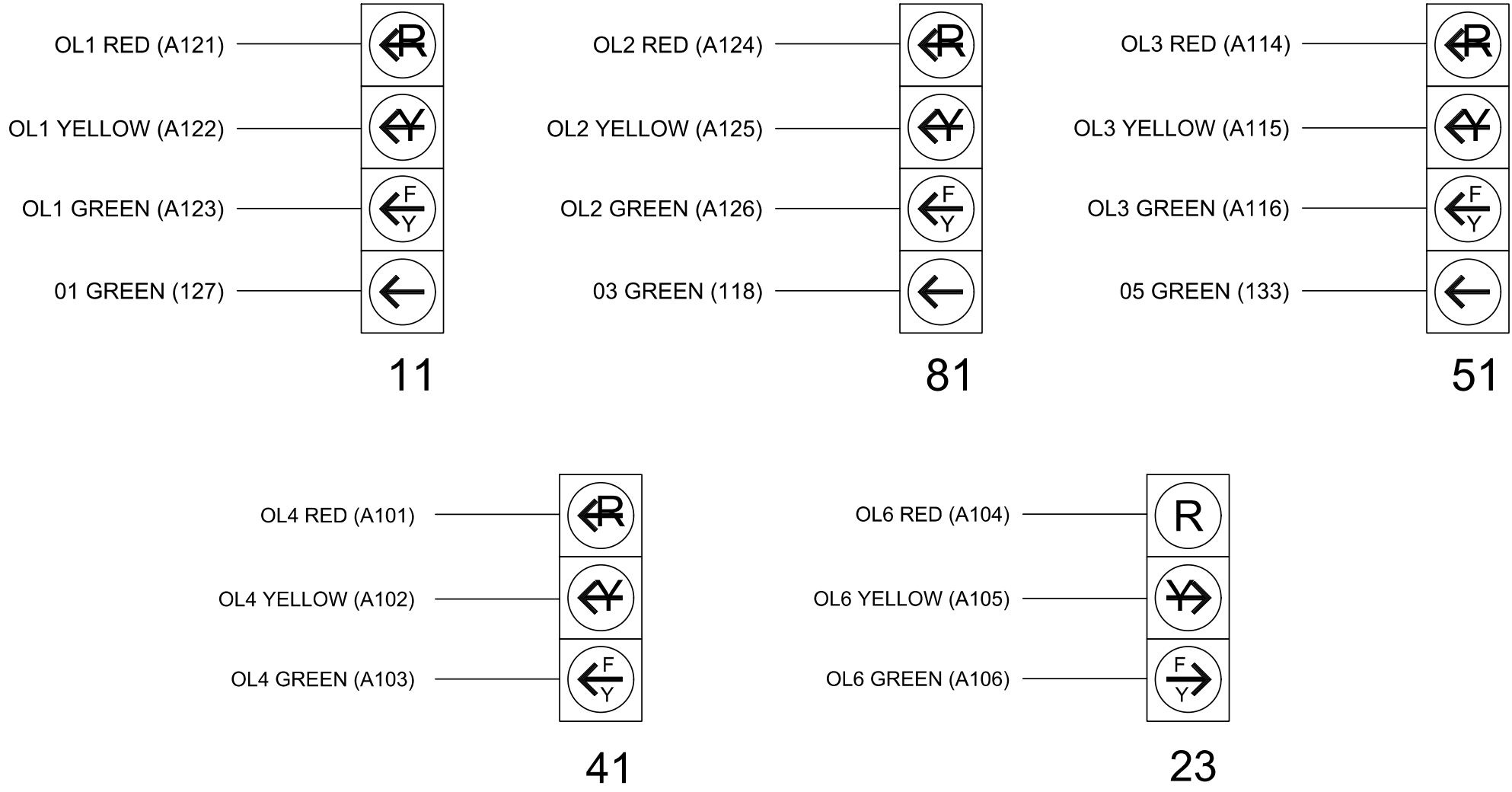
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	11★	83	21,22 EV PILOT LAMP	81★	42,43	NU	51★	43	61,62	NU	82,83	NU	11★	81★	NU	51★	41★	23★
RED	★		128		101		★		134		107							A104
YELLOW			129	★	102				135		108							
GREEN			130		103				136		109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW		126						132					A122	A125		A115	A102	A105
FLASHING YELLOW ARROW													A123	A126		A116	A103	A106
GREEN ARROW	127	127			118		133	133										
PED YELLOW				★														
				★														

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)



Temporary Design 1 - TMP Phase IV, Step 4
Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING
DETAILS FOR:



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

NC 211 (N. Roberts Avenue)
at
Walnut Street

Division 6 Robeson County Lumberton

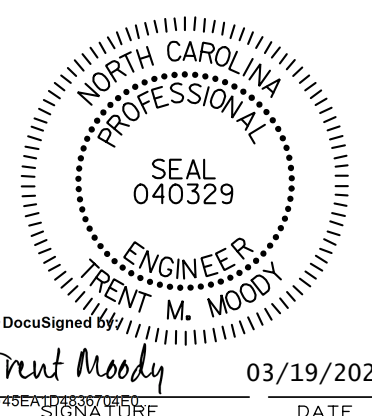
PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti

PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



SIG. INVENTORY NO. 06-0897T1

STV
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

PREEMPTION PROGRAMMING

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

Web Interface
Home >Controller >Preempt Configuration >Preempts

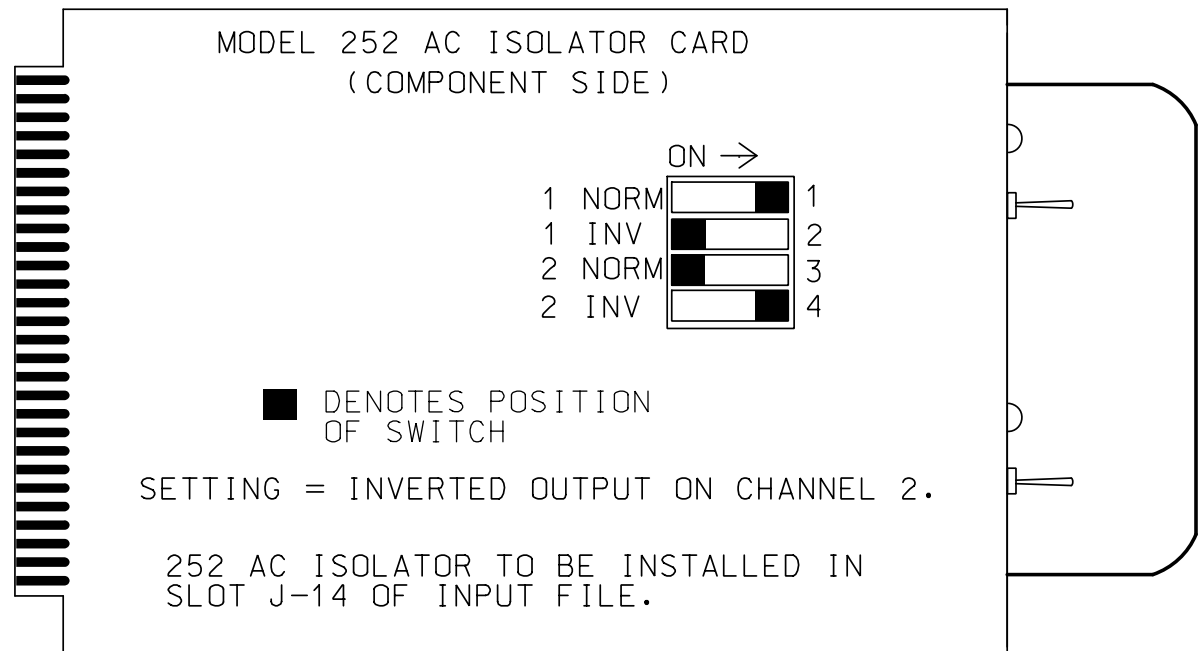
Preempt Configuration

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

* Value to be determined in the field

PREEMPT 2 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

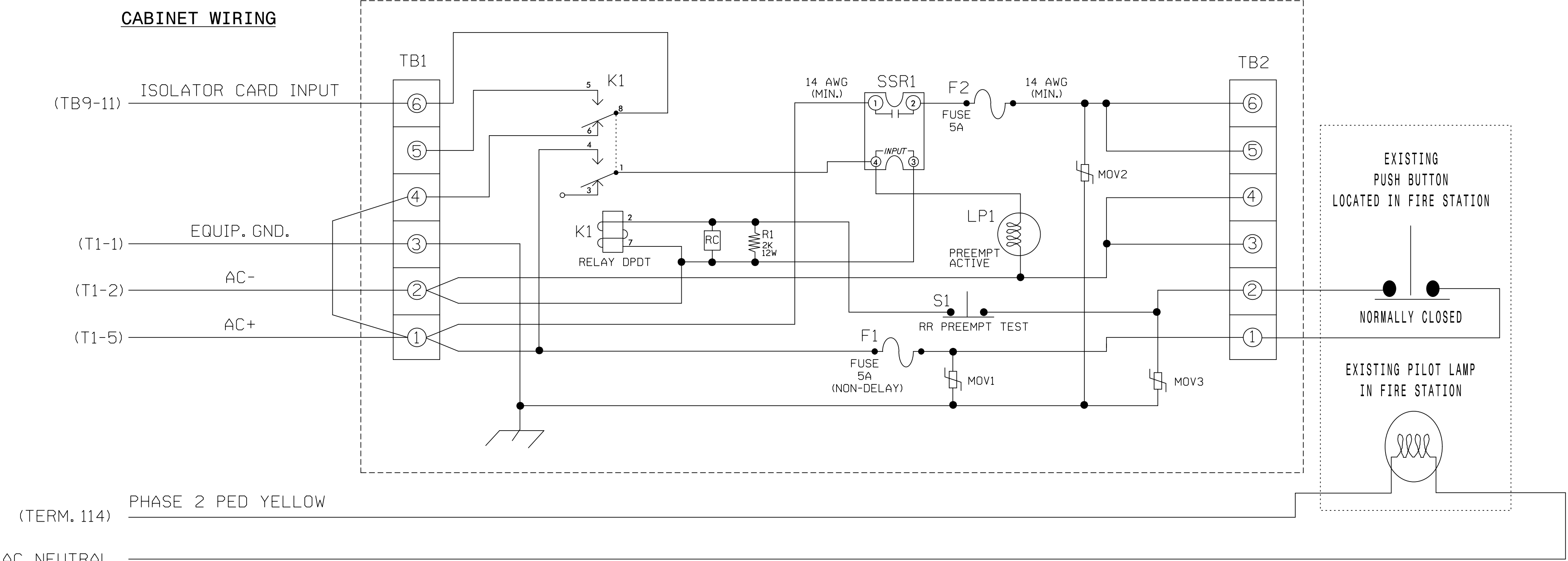


NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

EMERGENCY VEHICLE PREEMPTION WIRING DETAIL

(wire as shown below)

PREEMPTION AND PILOT LAMP CONTROL BOX



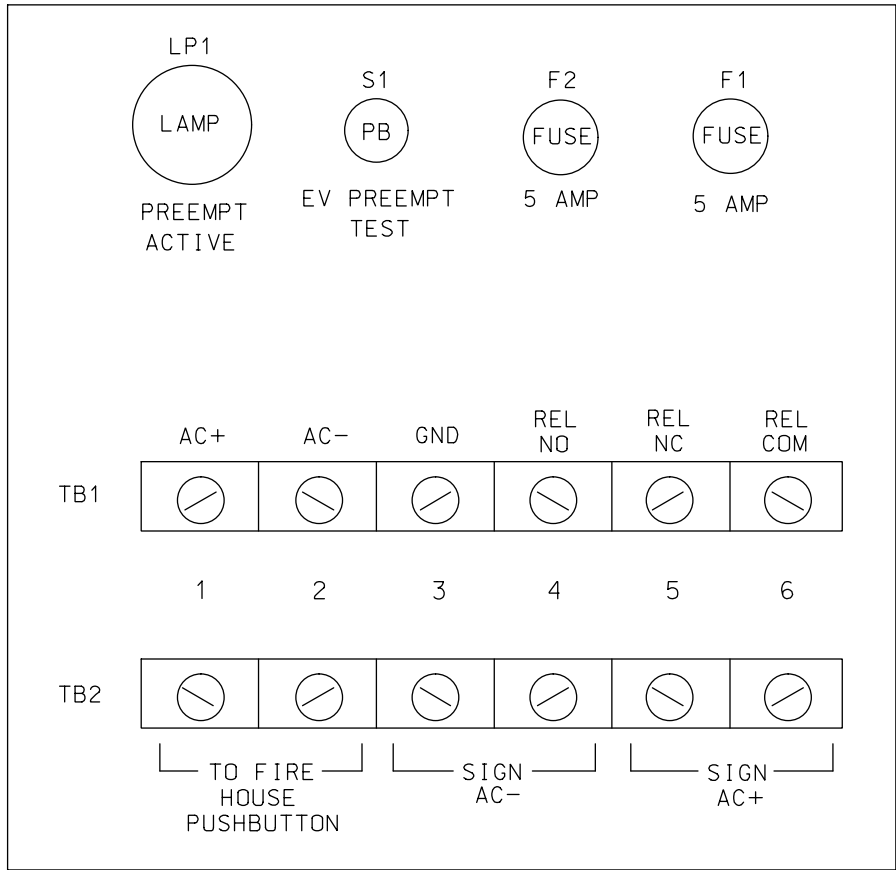
NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT Relay with 120VAC coil and octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this, set invert dip switch on AC Isolator Card.
- Resistor is valued at 2K ohm, 12 watt.
- RC network is valued at .1 microfarad, 100 ohm.
- IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) must be connected to AC neutral (jumper may have to be added).

NOTES

- If field terminal 114 has a conflict monitor wire attached, remove, tape, and label wire.
- Make sure load resistors are in place as shown in the Load Resistor Installation Detail on Sheet 1.
- Install a loadswitch in Output File Slot S3.

FRONT VIEW



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0897T1
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:

Temporary Design 1 - TMP Phase IV, Step 4
Electrical Detail - Sheet 3 of 3

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 211 (N. Roberts Avenue)
at
Walnut Street
Division 6 Robeson County Lumberton
PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti
PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Woody
REVISIONS INIT. DATE
DATE
DATE

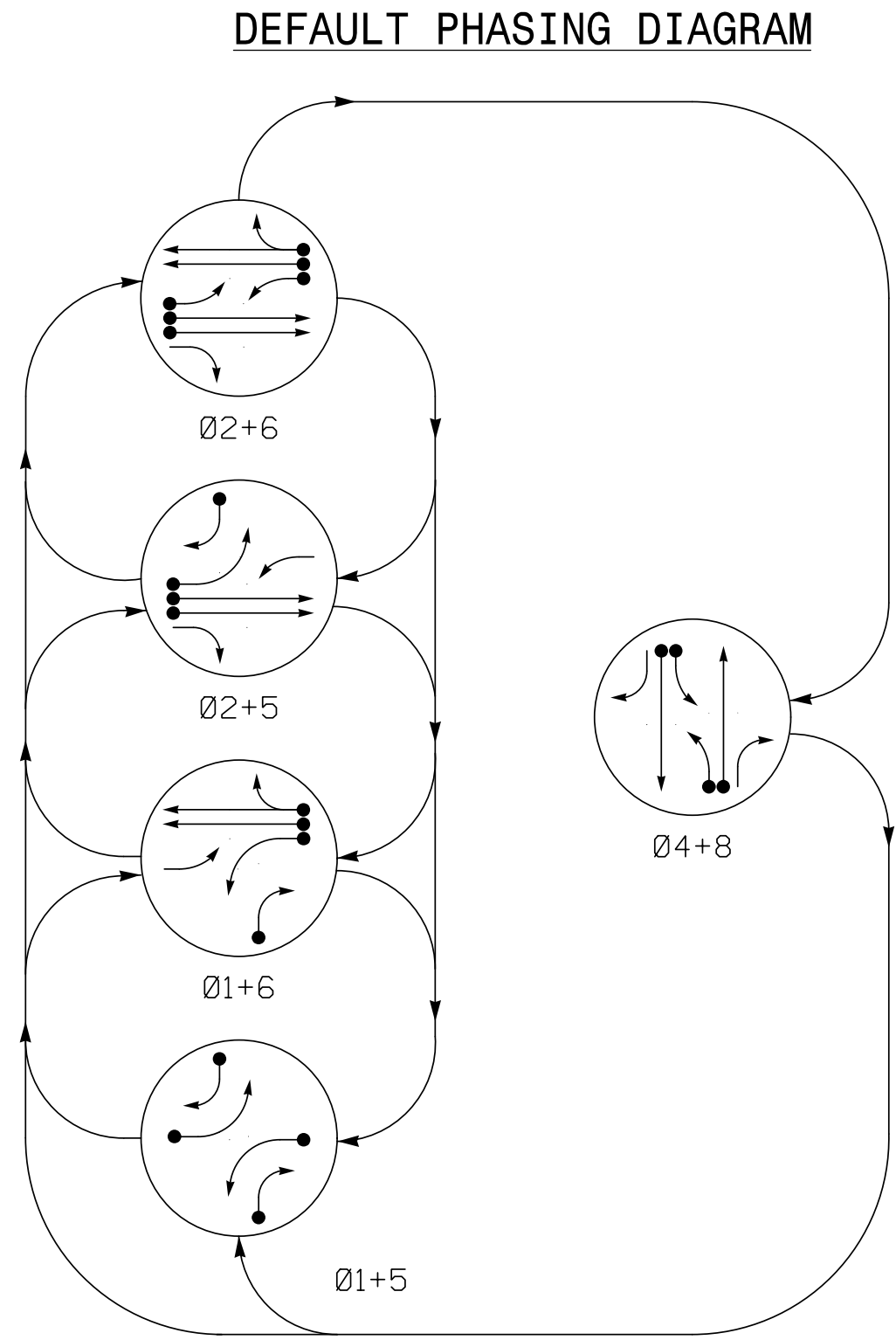
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED
SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
040329
Trout Moody
03/19/2025
DATE
SIG. INVENTORY NO. 06-0897T1

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 12.0

5 Phase
Fully Actuated with EV Preemption
NC 211 Closed Loop System

NOTES

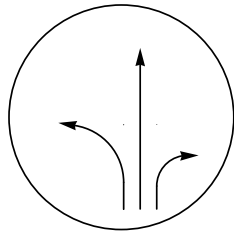
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- The Division Traffic Engineer will determine the Delay Time and Minimum Dwell Time for the emergency vehicle preemption timing.
- This intersection uses microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Emergency vehicle preemption switch is located inside rescue squad building. When switch is actuated, controller will display interval and then emergency preemption phasing.



PHASING DIAGRAM DETECTION LEGEND

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

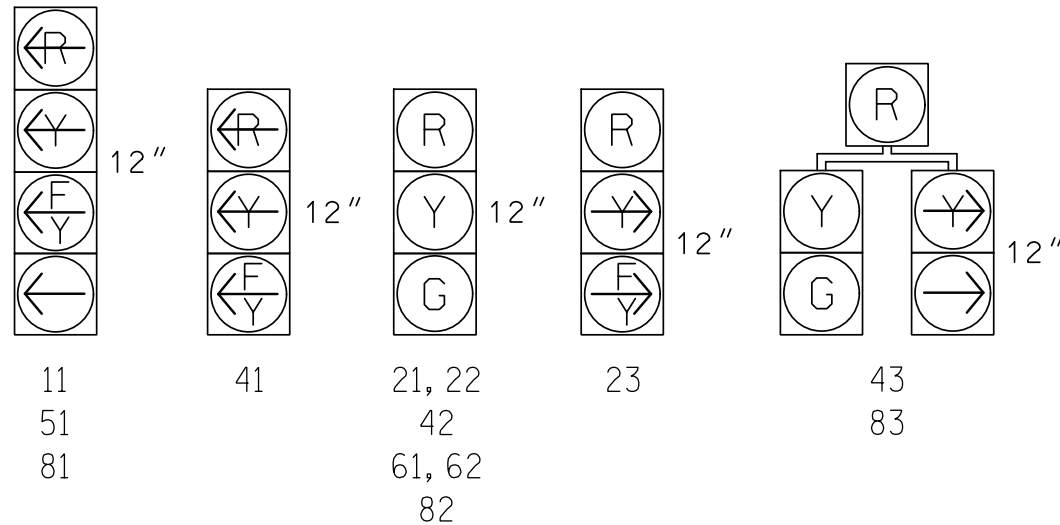
EV PREEMPT PHASE
(Medium Priority)



EV PRE 2
(03+8)

SIGNAL FACE I.D.

All Heads L.E.D.



SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	04+8	PREV	FLASH	
11	←	←	←	←	←	←	←	
21, 22	R	R	G	G	R	R	R	
23	R	R	←	←	R	R	R	
41	←	←	←	←	←	←	←	
42	R	R	R	R	G	R	R	
43	←	←	←	←	R	G	R	
51	←	←	←	←	←	←	←	
61, 62	R	G	R	G	R	R	R	
81	←	←	←	←	←	←	←	
82	R	R	R	R	G	G	R	
83	←	←	←	←	R	G	G	

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

* Multi-zone Microwave Detection Zone

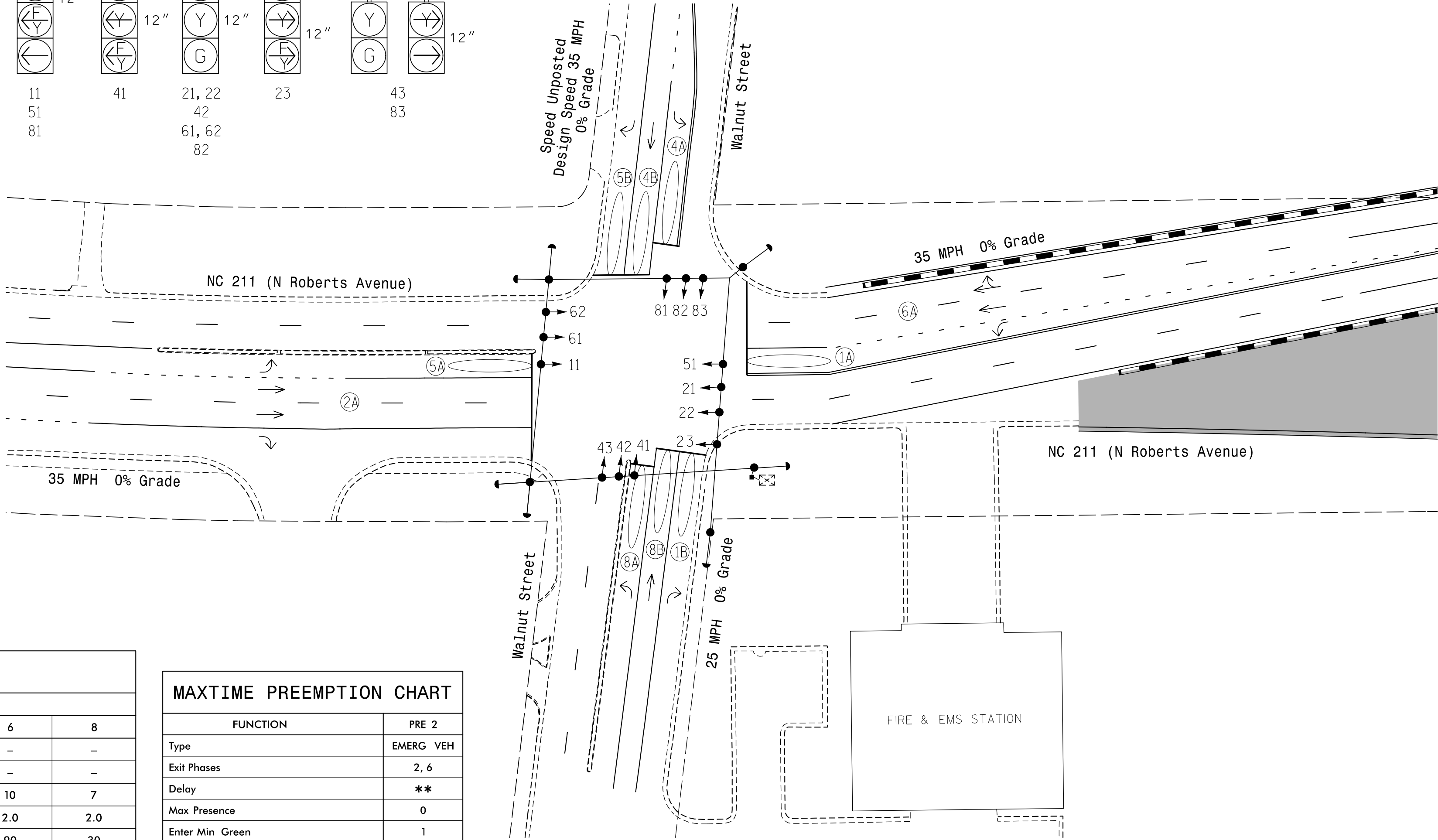
RADAR DETECTION SYSTEM		
FUNCTION	SENSOR 1 - (2A)	SENSOR 2 - (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	200 - 70	200 - 70
Enable Speed	Y	Y
Speed Range (mph)	25 - 100	25 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 5.5	2.5 - 5.5

MAXTIME TIMING CHART						
FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-
Min Green	7	10	7	7	10	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max I *	20	90	30	20	90	30
Yellow Change	3.0	3.8	3.8	3.0	3.8	3.8
Red Clear	2.8	2.0	2.1	2.8	2.0	2.1
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X

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

MAXTIME PREEMPTION CHART	
FUNCTION	PRE 2
Type	EMERG VEH
Exit Phases	2, 6
Delay	**
Max Presence	0
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	255 *
Enter Yellow Change	25.5 *
Enter Red Clear	25.5 *
Dwell Green	**
Exit Min Green	255 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Call Extend Time	1.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	N
Require All Red Entry	N

* Directs controller to use default phase timing.
** See Note 5.



LEGEND

- PROPOSED
- Traffic Signal Head
 - Modified Signal Head
 - Sign
 - Signal Pole with Guy
 - Signal Pole with Sidewalk Guy
 - Inductive Loop Detector
 - Controller & Cabinet
 - Junction Box
 - 2-in Underground Conduit
 - Right of Way
 - Directional Arrow
 - Microwave Detection Zone
 - Construction Zone
 - Portable Barrier
 - Left Arrow "ONLY" Sign (R3-5L)
- EXISTING
- N/A
 - N/A
 - N/A
 - N/A
 - N/A
 - N/A
 - N/A
 - N/A
 - N/A
 - N/A
 - N/A
 - N/A
 - N/A

Signal Upgrade
Temporary Design 2 - TMP Phase V, Step 1

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

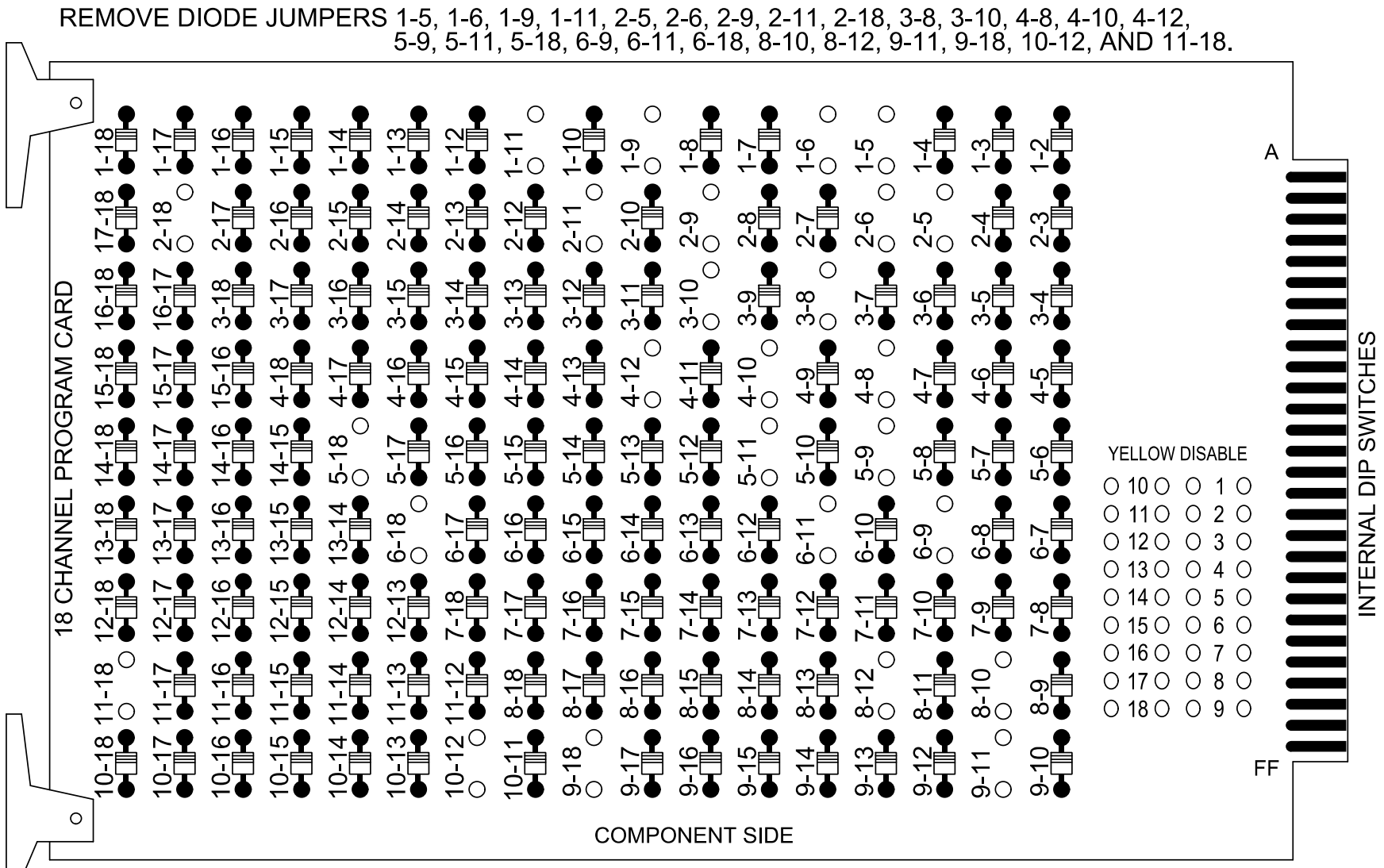
Prepared for the Offices of:
Transportation Mobility and Safety Solutions
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N. Greenfield Pkwy, Garner, NC 27529
SCALE
0 40'

NC 211 (N Roberts Avenue)
at
Walnut Street
Division 6 Robeson County Lumberton
PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti
PREPARED BY: J.C. Grimm REVIEWED BY: T.M. Moody
REVISIONS
INIT. DATE
SIGNATURE DATE
SIC. INVENTORY NO. 06-0897T2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED
SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
040329
T.M. MOODY
3/19/2025
SIC. INVENTORY NO. 06-0897T2

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



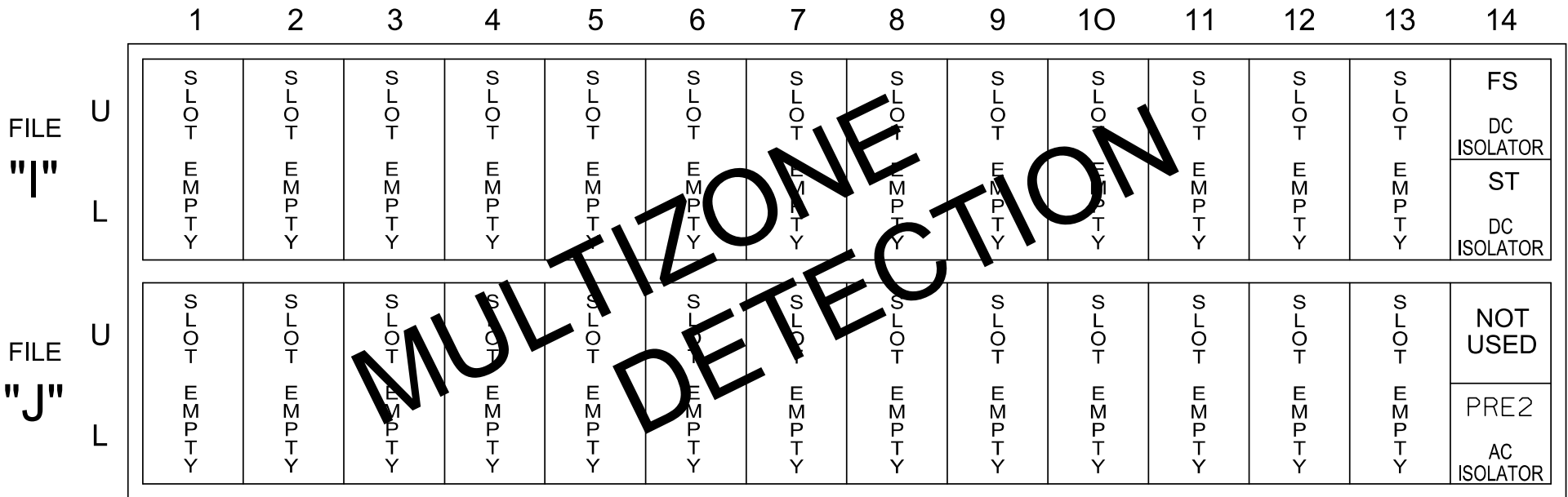
REMOVE JUMPERS AS SHOWN

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phase 4 and phase 8 for Dual Entry.
- Program phase 3 for No Startup Veh Call.
- Program controller to start up in phase 2 Green No Walk, phase 3 Phase Not On, and phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the Signal System #D06-18 Lumberton NC 211 (N. Roberts Avenue).

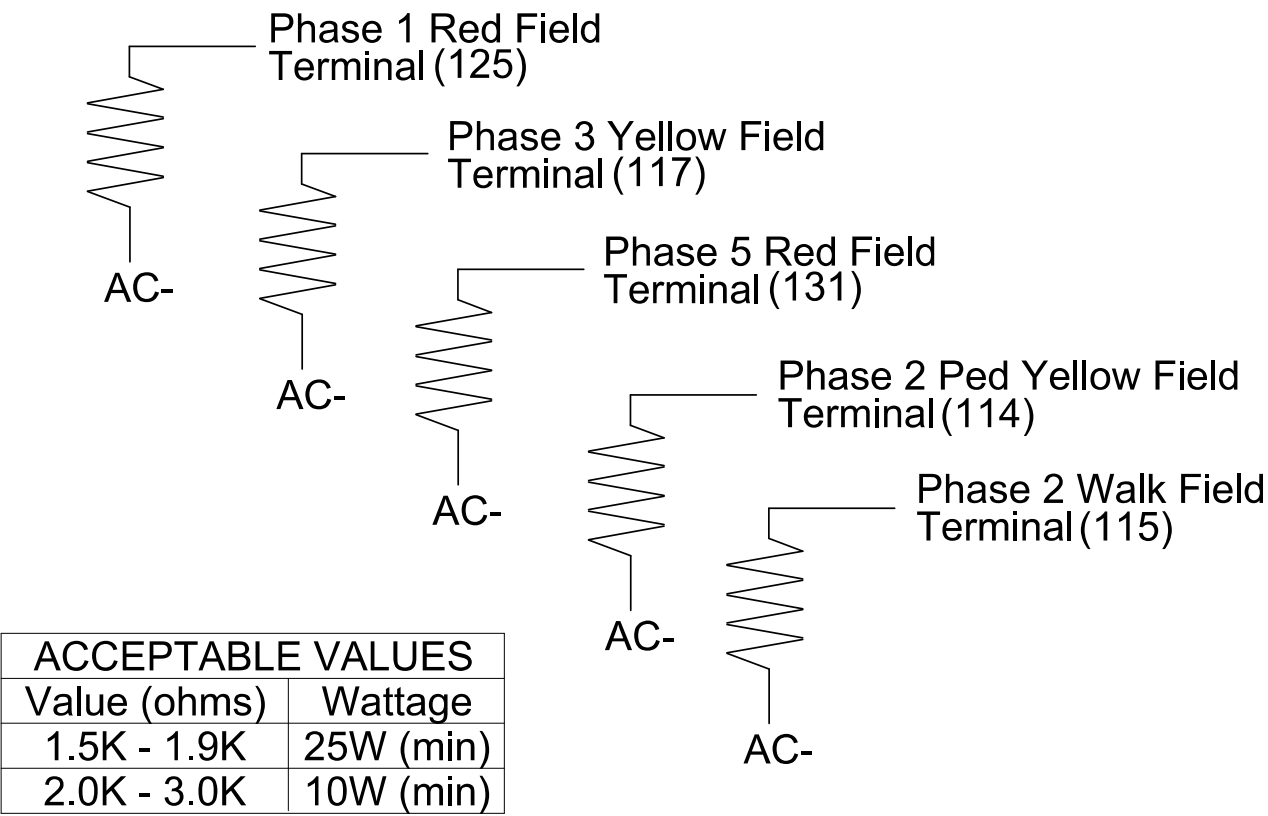
EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2
**Used for Preempt Pilot Lamp control
★Used only during Preempt

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



SIGNAL HEAD HOOK-UP CHART

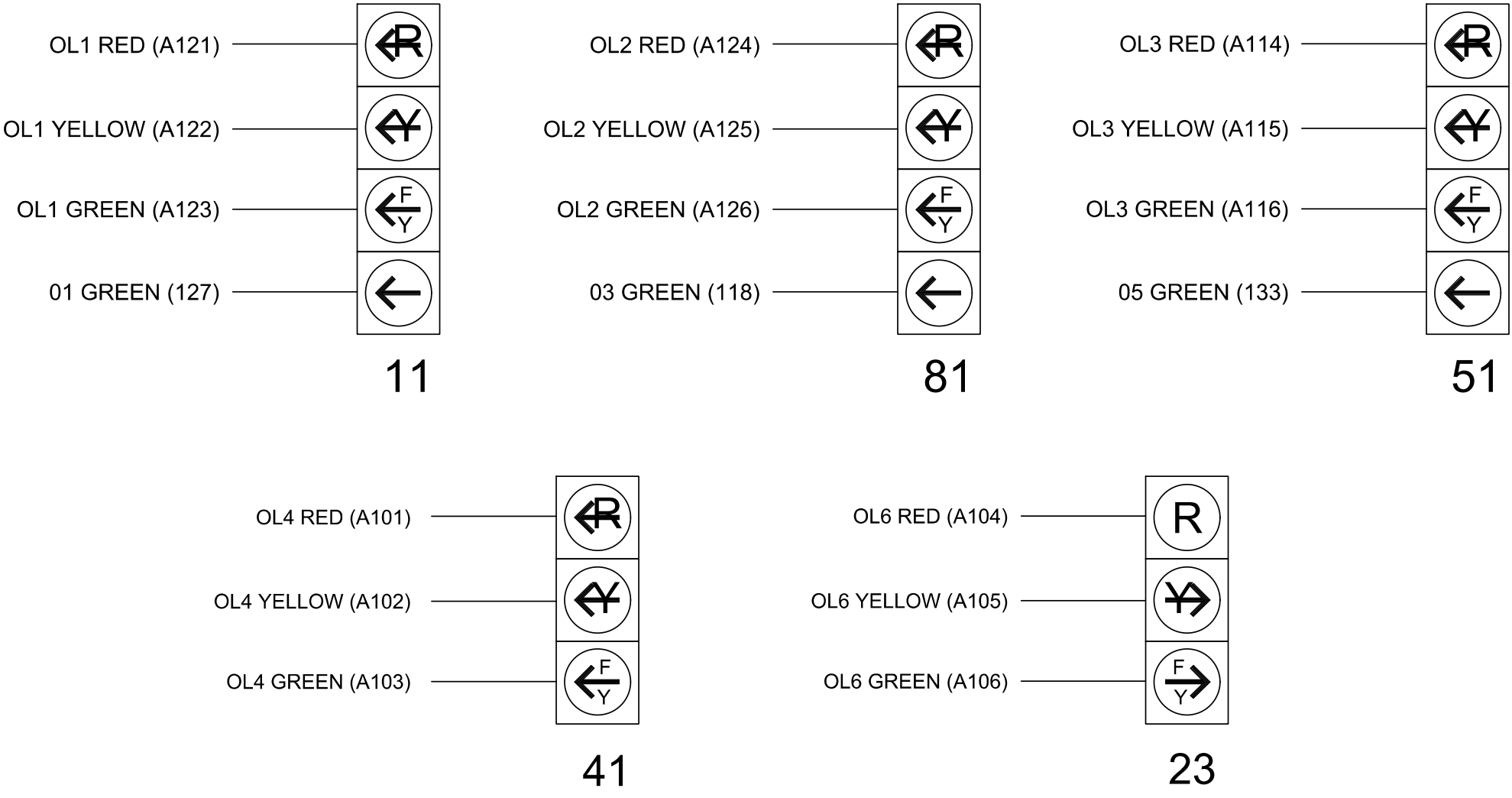
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6	
SIGNAL HEAD NO.	11★	83	21,22	EV PILOT LAMP	81★	42,43	NU	51★	43	61,62	NU	82,83	NU	11★	81★	NU	51★	41★	23★
RED	★		128		101		★		134			107							A104
YELLOW			129	★	102				135			108							
GREEN			130		103				136			109							
RED ARROW													A121	A124		A114	A101		
YELLOW ARROW		126						132					A122	A125		A115	A102	A105	
FLASHING YELLOW ARROW													A123	A126		A116	A103	A106	
GREEN ARROW	127	127			118		133	133											
																			
PED YELLOW				★ 114															
				★															

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)

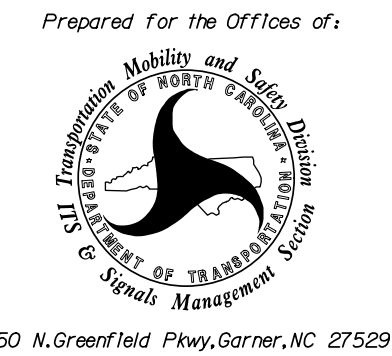


THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0897T2
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:

Temporary Design 2 - TMP Phase V, Step 1
Electrical Detail - Sheet 1 of 3

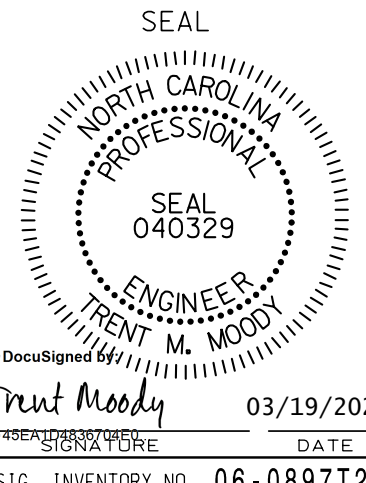
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



NC 211 (N. Roberts Avenue)
at
Walnut Street

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody	
REVISIONS	INIT.	DATE



DocuSigned by
Trent Moody
03/19/2025
DATE
SIC. INVENTORY NO. 06-0897T2

2/21/2025
A:\P\016c1a44016560\4016560_0001\450_Deliverables & Submittals\4016560_5197\MT\Offices\Signal\Temporary\Sig\4016560_0897 (Roberts-Walnut)\060897T2_sml.e, 2024xxxx.dgn
LeonAR

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

↑ ↑
NOTE: ALL RED FLASH

LOGIC PROCESSOR PROGRAMMING

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

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

Program 1

Statement	Result	Index	Operation	Parameter A	Index	Parameter B	Index	Delay	Ext
1	Phase Phase Omit	3	Result=IA	Preempt Input	2	None	0	0.0	0.0
2	Global Variable	33	Result=(A OR B)	Preempt Input	2	Preempt Status	2	0.0	0.0

LOGIC STATEMENT DESCRIPTION

Statement 1 Description: Omits Phase 3 while not in preemption.

Statement 2 Description: Turns Pilot Light on when button is pushed.

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

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

OUTPUT POINTS PROGRAMMING

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

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

IO Module 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Global Variable	33

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0897T2
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:

Temporary Design 2 - TMP Phase V, Step 1
Electrical Detail - Sheet 2 of 3



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:



750 N.Greenfield Pkwy, Garner, NC 27529

NC 211 (N. Roberts Avenue)
at
Walnut Street

Division 6 Robeson County Lumberton

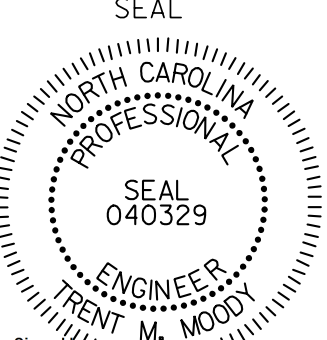
PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti

PREPARED BY: R.L. Aristondo REVIEWED BY: T.M. Moody

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL



DocuSigned by
Trent M. Moody
ENGINEER
03/19/2025

SIG. INVENTORY NO. 06-0897T2

PREEMPTION PROGRAMMING

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

Web Interface
Home >Controller >Preempt Configuration >Preempts

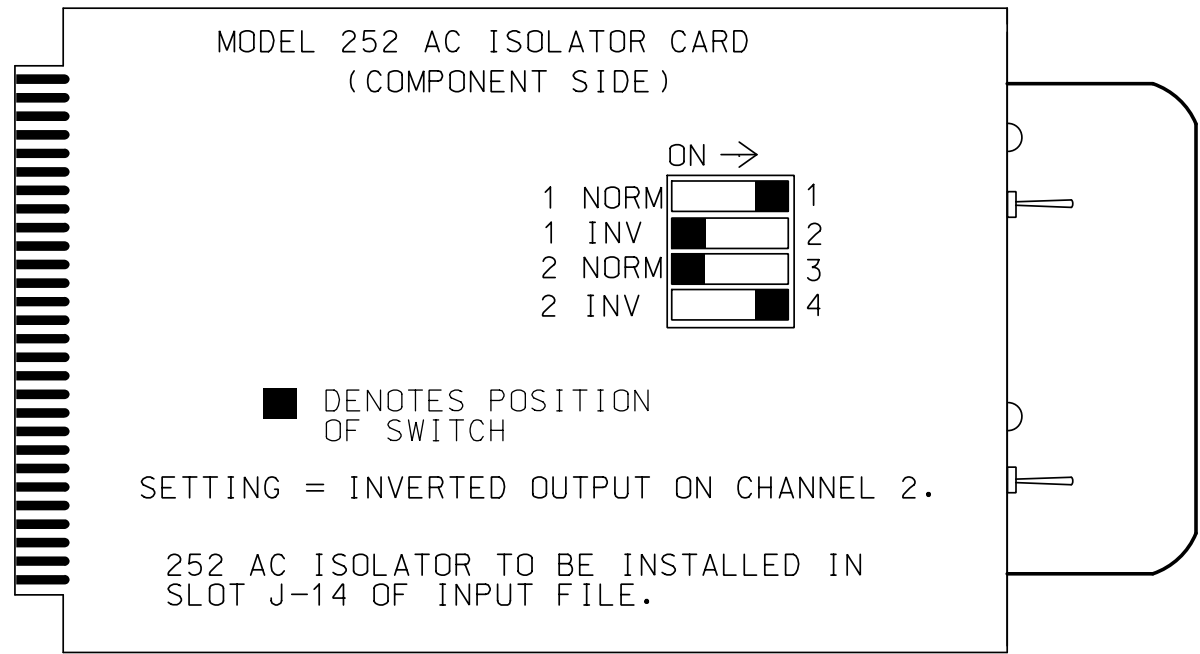
Preempt Configuration

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

* Value to be determined in the field

PREEMPT 2 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

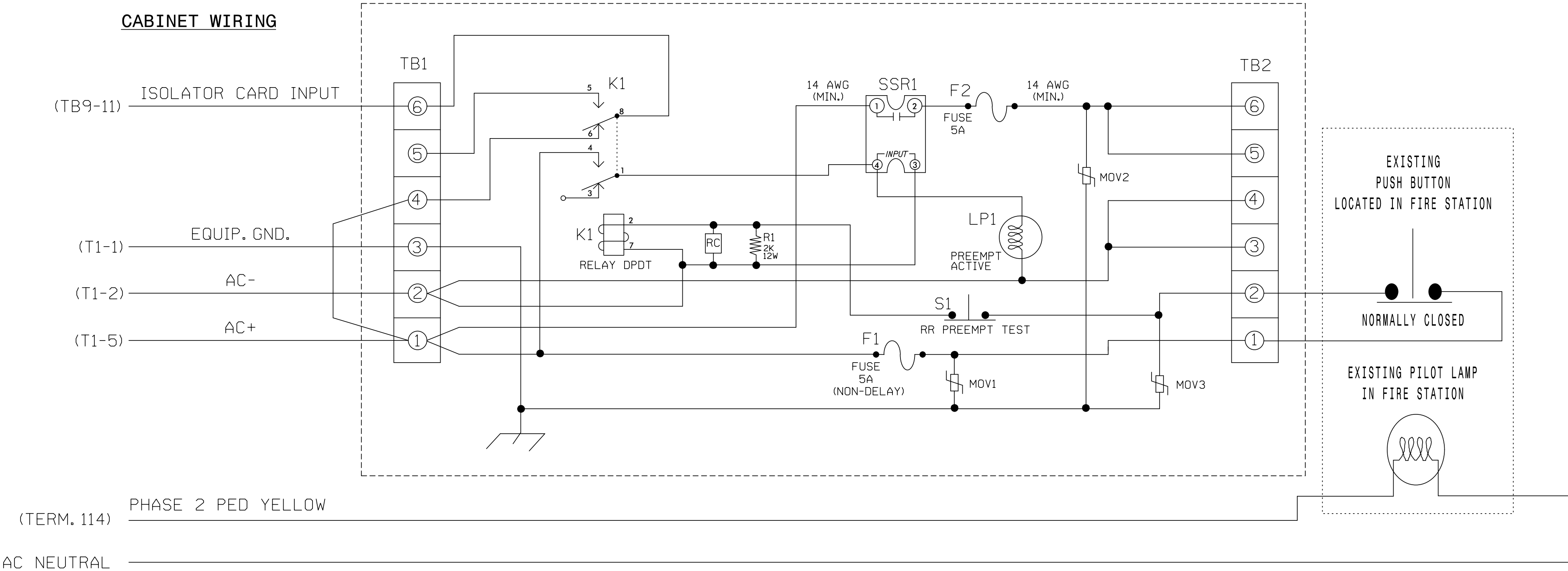


NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

EMERGENCY VEHICLE PREEMPTION WIRING DETAIL

(wire as shown below)

PREEMPTION AND PILOT LAMP CONTROL BOX



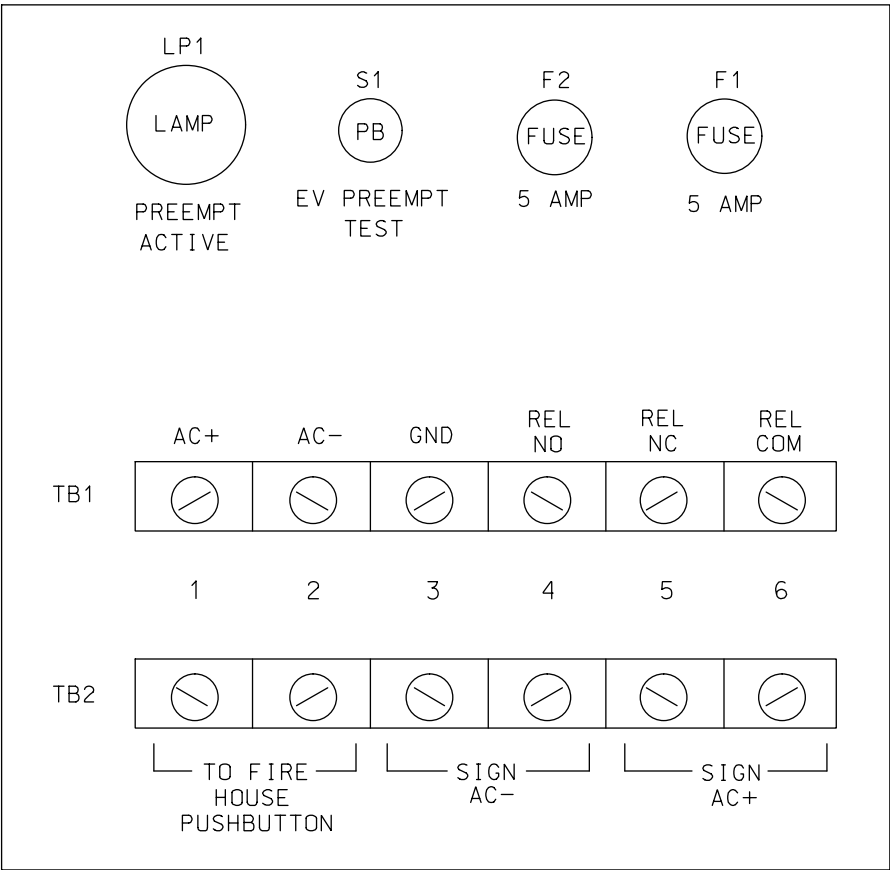
NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT Relay with 120VAC coil and octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this, set invert dip switch on AC Isolator Card.
- Resistor is valued at 2K ohm, 12 watt.
- RC network is valued at .1 microfarad, 100 ohm.
- IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) must be connected to AC neutral (jumper may have to be added).

NOTES

- If field terminal 114 has a conflict monitor wire attached, remove, tape, and label wire.
- Make sure load resistors are in place as shown in the Load Resistor Installation Detail on Sheet 1.
- Install a loadswitch in Output File Slot S3.

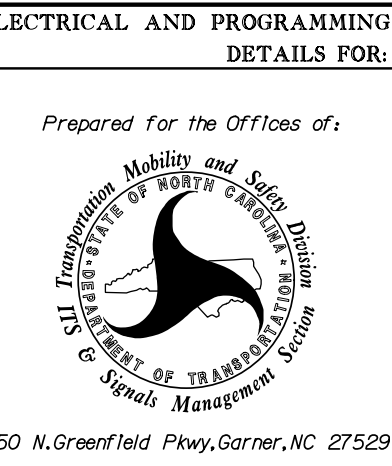
FRONT VIEW



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0897T2
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:

Temporary Design 2 - TMP Phase V, Step 1
Electrical Detail - Sheet 3 of 3

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



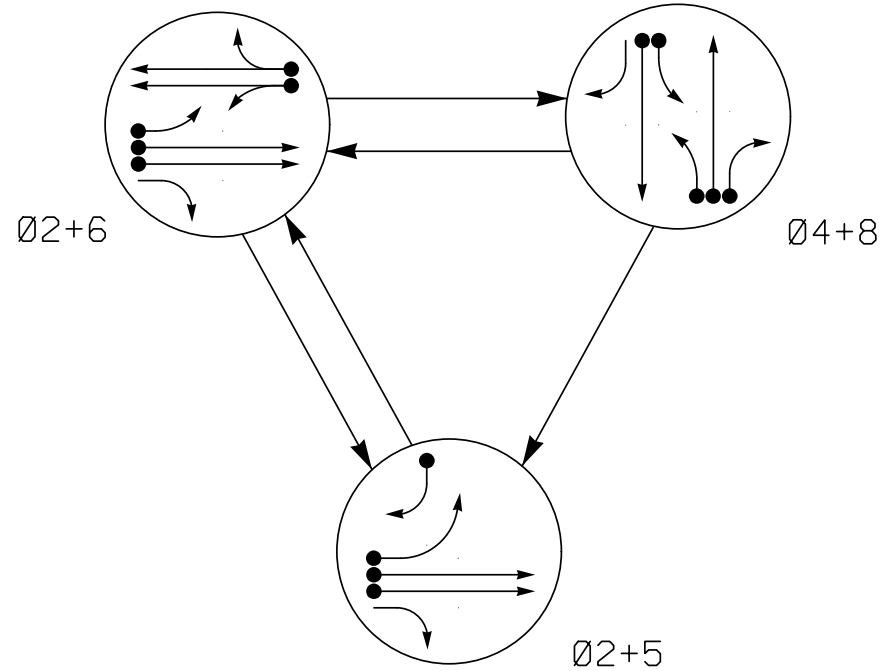
NC 211 (N. Roberts Avenue)
at
Walnut Street

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

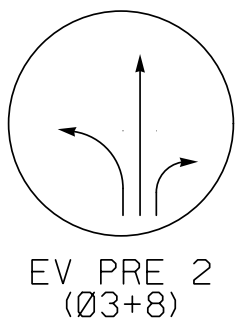
SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
040329
Trant Moody
03/19/2025
DATE
SIG. INVENTORY NO. 06-0897T2

PHASING DIAGRAM



EV PREEMPT PHASE

(Medium Priority)

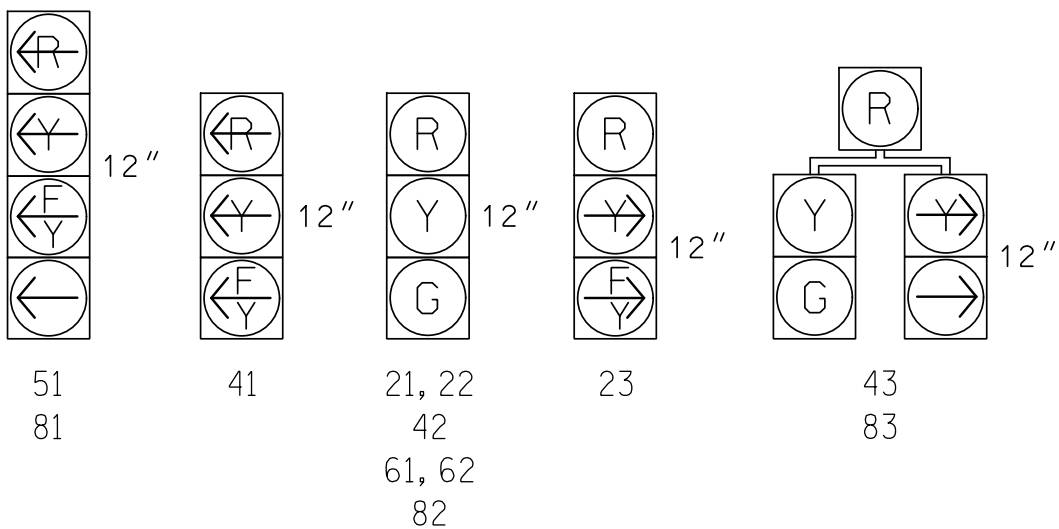


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



SIGNAL FACE	PHASE				
	Ø 2 + 5	Ø 2 + 6	Ø 4 + 8	PRE 2	FLASH
21, 22	G	R	R	R	R
23	F	F	R	R	R
41	R	R	F	R	R
42	R	R	G	R	R
43	R	R	G	R	R
51	F	F	R	R	R
61, 62	R	G	R	R	R
81	R	R	F	R	R
82	R	R	G	G	R
83	R	R	G	G	R

MAXTIME DETECTOR INSTALLATION CHART

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

* Multi-zone Microwave Detection Zone

3 Phase
Fully Actuated with EV Preemption
D06-18 Lumberton NC 211 (N. Roberts Avenue)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Omit phase 5 during phase 6 on.
- Enable Backup Protect to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red display.
- Set all detector units to presence mode.
- The Division Traffic Engineer will determine the Delay Time and Minimum Dwell Time for the emergency vehicle preemption timing.
- This intersection uses microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Disconnect and bag existing signal head numbered 11.
- Disconnect and bag right turn arrows on existing head numbered 83.
- Renumber existing loop 1B to 8C.
- Emergency vehicle preemption switch is located inside rescue squad building. When switch is actuated, controller will display interval and then emergency preemption phasing.

RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 - (2A)	SENSOR 2 - (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	200 - 70	200 - 70
Enable Speed	Y	Y
Speed Range (mph)	25 - 100	25 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 5.5	2.5 - 5.5

MAXTIME TIMING CHART

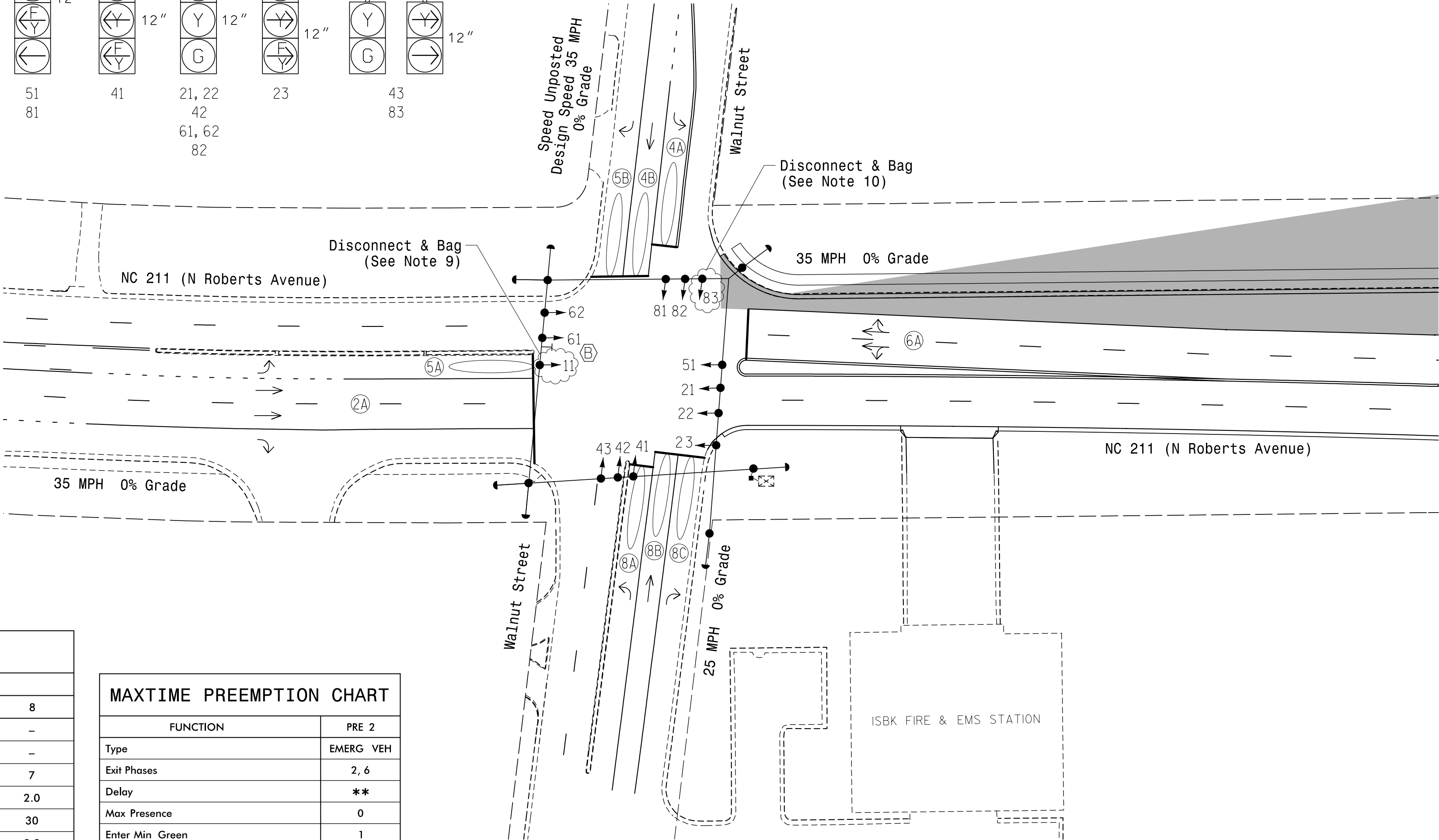
FEATURE	PHASE				
	2	4	5	6	8
Walk *	-	-	-	-	-
Ped Clear *	-	-	-	-	-
Min Green	10	7	7	10	7
Passage *	2.0	2.0	2.0	2.0	2.0
Max 1 *	90	30	20	90	30
Yellow Change	3.8	3.8	3.0	3.8	3.8
Red Clear	2.1	2.1	2.6	2.1	2.1
Red Revert	5.0	2.0	2.0	2.0	2.0
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Advance Walk	-	-	-	-	-
Non Lock Detector	-	X	X	-	X
Vehicle Recall	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	X	-	-	X

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

MAXTIME PREEMPTION CHART

FUNCTION	PRE 2
Type	EMERG VEH
Exit Phases	2, 6
Delay	**
Max Presence	0
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	255 *
Enter Yellow Change	25.5 *
Enter Red Clear	25.5 *
Dwell Green	**
Exit Min Green	255 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Call Extend Time	1.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	N
Require All Red Entry	N

* Directs controller to use default phase timing.
** See Note 6.



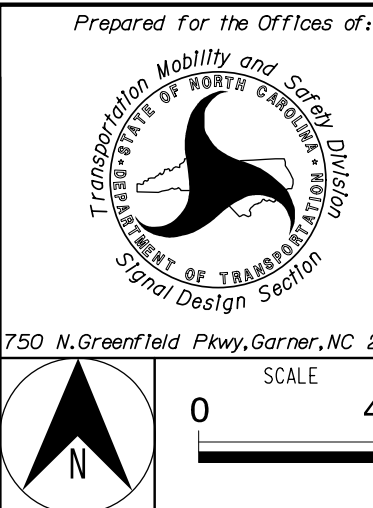
LEGEND

- | PROPOSED | EXISTING |
|--|--|
| Traffic Signal Head | Modified Signal Head |
| Signal Pole with Guy | Signal Pole with Sidewalk Guy |
| Inductive Loop Detector | Controller & Cabinet |
| Junction Box | Junction Box |
| 2-in Underground Conduit | Right of Way |
| Directional Arrow | Microwave Detection Zone |
| Construction Zone | Construction Zone |
| (A) Left Arrow "ONLY" Sign (R3-5L) | (A) Left Arrow "ONLY" Sign (R3-5L) |
| (B) "LEFT TURN YIELD ON GREEN" Sign (R10-12) | (B) "LEFT TURN YIELD ON GREEN" Sign (R10-12) |

Signal Upgrade
Temporary Design 3 - TMP Phase VI, Step 1

stv

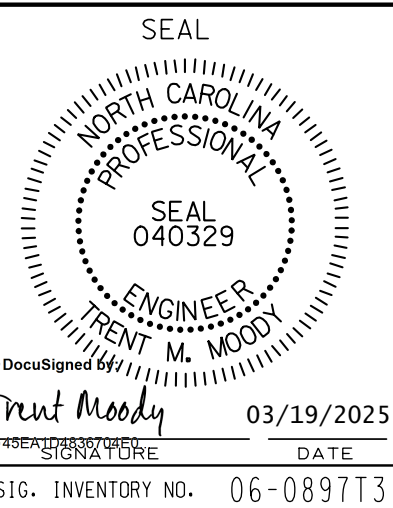
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



NC 211 (N Roberts Avenue)
at
Walnut Street

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: J.C. Grimm	REVIEWED BY: T.M. Moody	
REVISIONS	INIT.	DATE

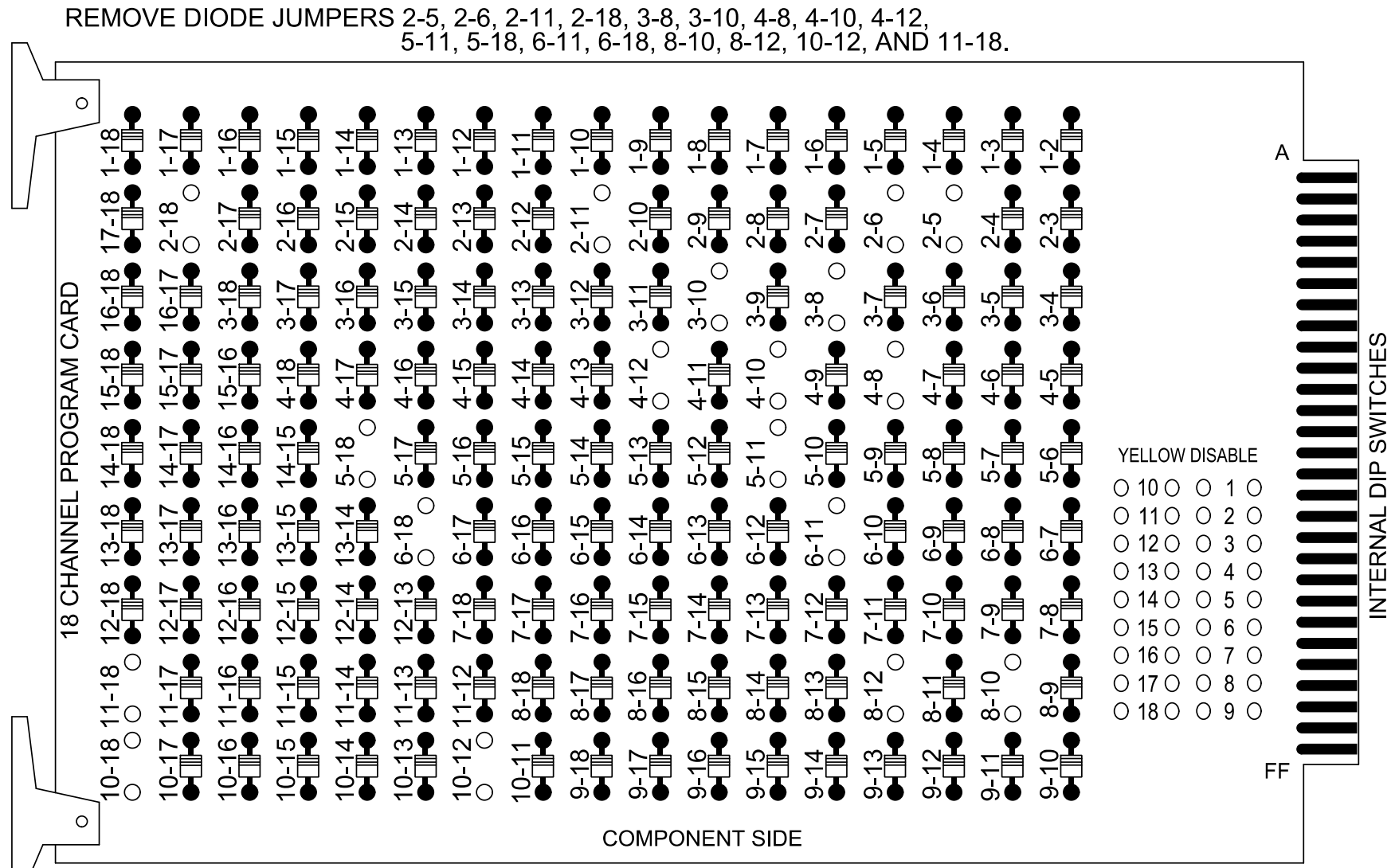
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



Sig. INVENTORY NO. 06-089773

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



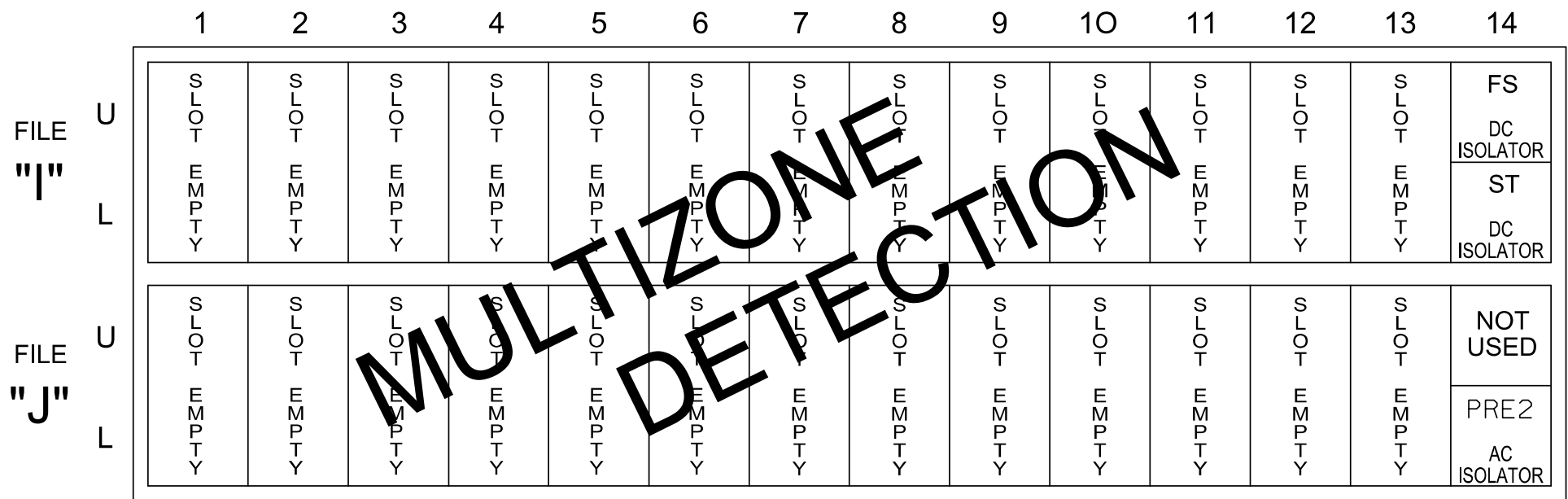
REMOVE JUMPERS AS SHOWN

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

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.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phase 4 and phase 8 for Dual Entry.
- Program phase 3 for No Startup Veh Call.
- Program controller to start up in phase 2 Green No Walk, phase 3 Phase Not On, and phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the Signal System #D06-18 Lumberton NC 211 (N. Roberts Avenue).

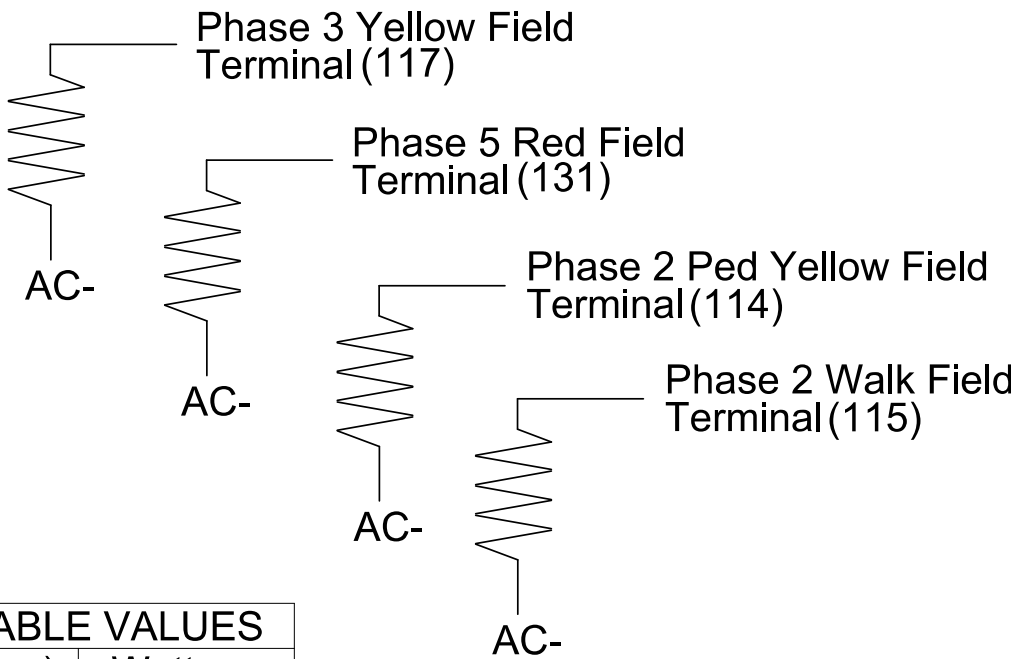
EQUIPMENT INFORMATION

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, S4, S5, S7, S8, S11, AUX S2, AUX S4, AUX S5, AUX S6
Phases Used.....2, 3, 4, 5, 6, 8
Overlap "1".....NOT USED
Overlap "2".....*
Overlap "3".....*
Overlap "4".....*
Overlap "5".....NOT USED
Overlap "6".....*

*See overlap programming detail on sheet 2
**Used for Preempt Pilot Lamp control
★Used only during Preempt

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)

SIGNAL HEAD HOOK-UP CHART

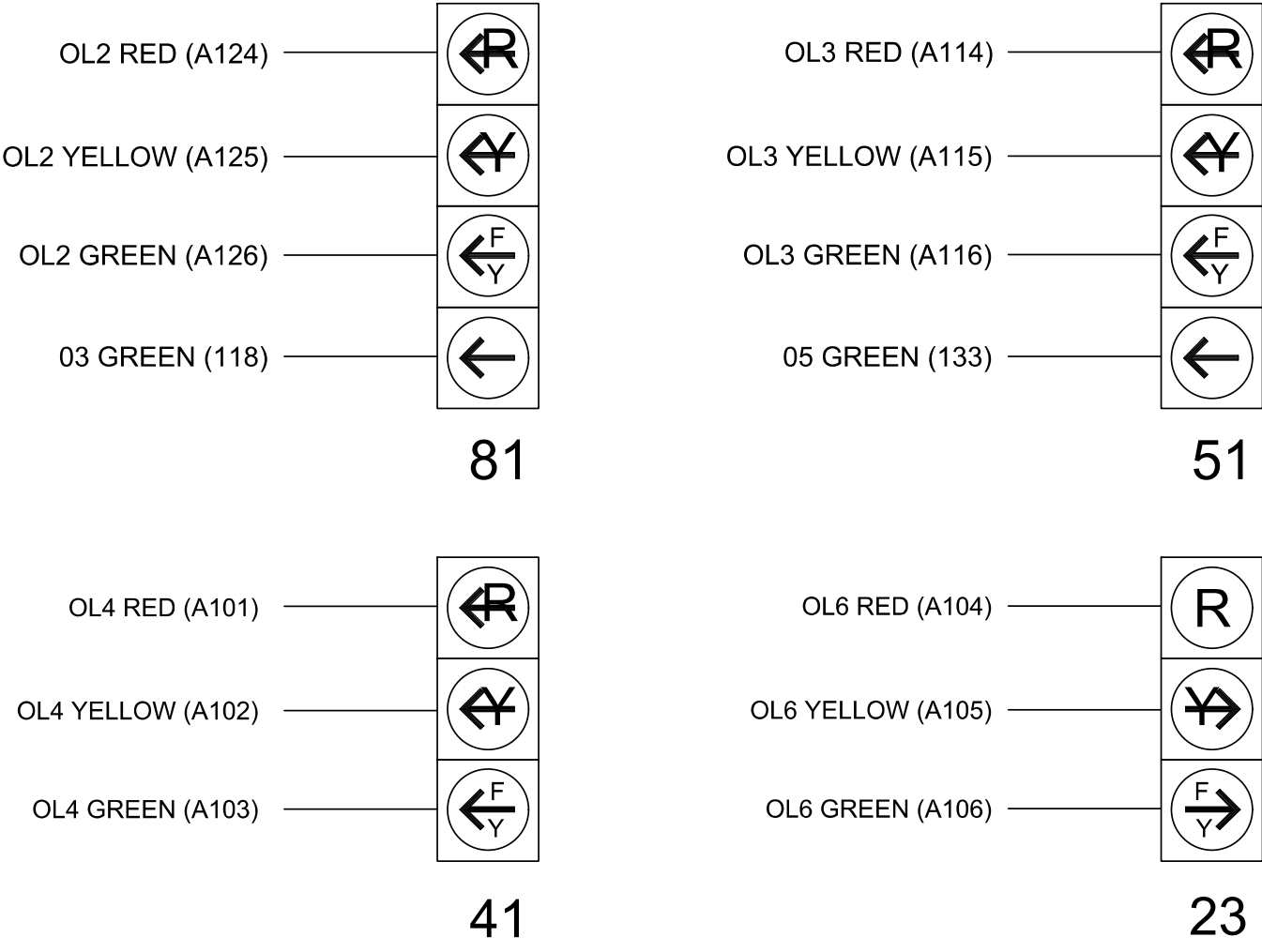
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	21,22	EV PILOT LAMP	81★	42,43	NU	51★	43	61,62	NU	NU	82,83	NU	81★	NU	51★	41★	23★
RED		128			101		★		134		107							A104
YELLOW		129		★	102				135		108							
GREEN		130			103				136		109							
RED ARROW														A124		A114	A101	
YELLOW ARROW								132						A125		A115	A102	A105
FLASHING YELLOW ARROW														A126		A116	A103	A106
GREEN ARROW					118			133	133									
PED YELLOW				★														
				114														
				★														

NU = Not Used

★ Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail this sheet.

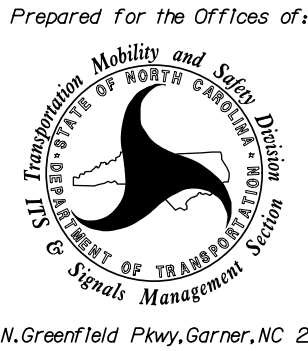
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



Temporary Design 3 - TMP Phase VI, Step 1
Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING
DETAILS FOR:



STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

NC 211 (N. Roberts Avenue)
at
Walnut Street

Division 6		Robeson County		Lumberton	
PLAN DATE:	Feb 2025	REVIEWED BY:	H.M. Surti		
PREPARED BY:	R.L. Aristondo	REVIEWED BY:	T.M. Woody		
REVISIONS		INIT.	DATE		

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL	
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040329	
SIGNATURE	DATE
T.M. Woody	3/19/2025
SIG. INVENTORY NO. 06-0897T3	

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

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

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

MAXTIME OVERLAP PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap	2	3	4	6
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	4	6	8	2
Modifier Phases	3	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

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.

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 13.2

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

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

Statement	Result	Index	Operation	Parameter A	Index	Parameter B	Index	Delay	Ext
1	Phase Phase Omit	3	Result= A	Preempt Input	2	None	0	0.0	0.0
2	Global Variable	33	Result=(A OR B)	Preempt Input	2	Preempt Status	2	0.0	0.0

Statement 1 Description: Omits Phase 3 while not in preemption.

Statement 2 Description: Turns Pilot Light on when button is pushed.

Front Panel
Main Menu >Controller >Unit

Web Interface
Home > Controller > Unit

Modify parameters as shown below and save changes.

StartUp Clearance Hold
6

All Red Flash Exit Time
6

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

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

Output Point	Description	Output Control Type	Index
33	C1-35	Global Variable	33

Front Panel
Main Menu >Controller >Sequence & Phs Config >Backup Prevention >
Backup Protection Plan

Web Interface
Home >Controller> Backup Prevention >Backup Protection Plan

No Backup Phase	1	2	3	4	5	6	7	8
Serve Phase 1	-	-	-	-	-	-	-	-
Serve Phase 2	-	-	-	-	-	-	-	-
Serve Phase 3	-	-	-	-	-	-	-	-
Serve Phase 4	-	-	-	-	-	-	-	-
Serve Phase 5	-	-	-	-	-	-	-	-
Serve Phase 6	-	-	-	-	X	-	-	-
Serve Phase 7	-	-	-	-	-	-	-	-
Serve Phase 8	-	-	-	-	-	-	-	-

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0897T3
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:



Temporary Design 3 - TMP Phase VI, Step 1
Electrical Detail - Sheet 2 of 3

**ELECTRICAL AND PROGRAMMING
DETAILS FOR:**

Prepared for the Offices of



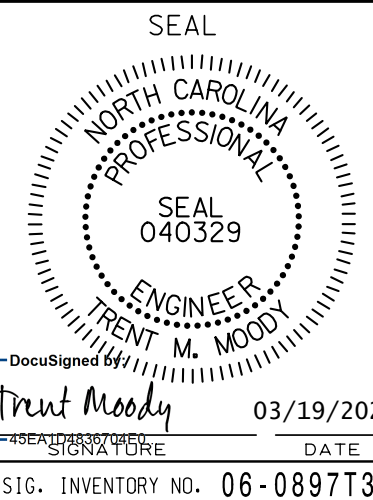
750 N. Greenfield Pkwy, Garner, NC 27524

NC 211 (N. Roberts Avenue)
at
Walnut Street

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Moody	

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

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



PREEMPTION PROGRAMMING

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

Web Interface
Home >Controller >Preempt Configuration >Preempts

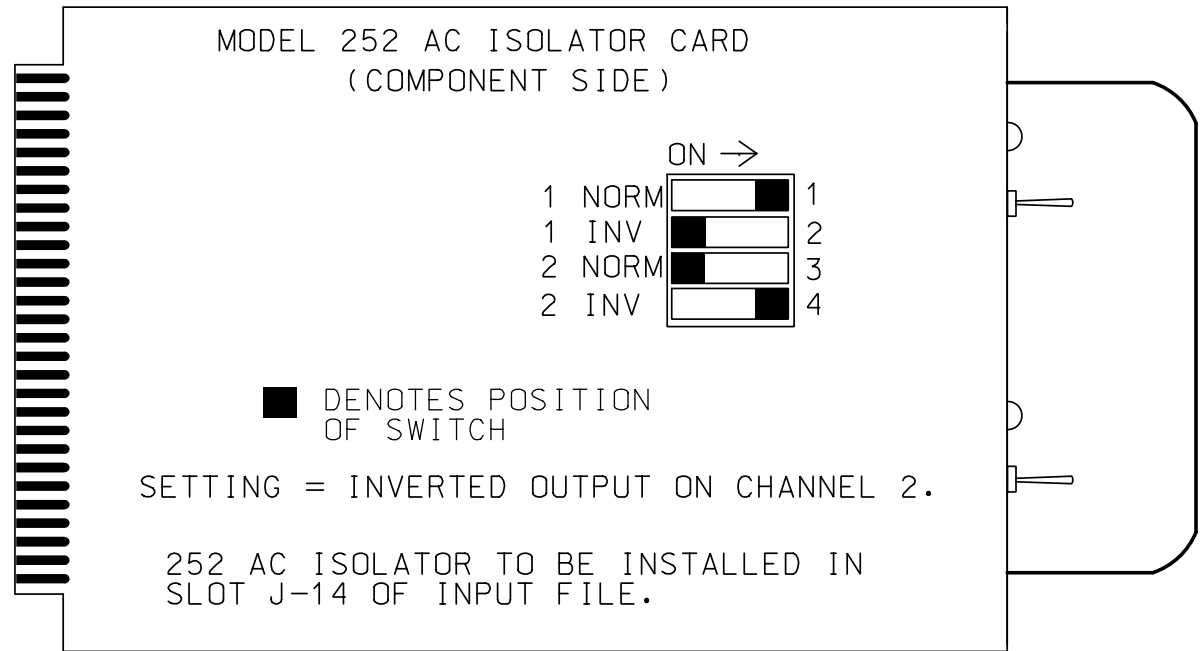
Preempt Configuration

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

* Value to be determined in the field

PREEMPT 2 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

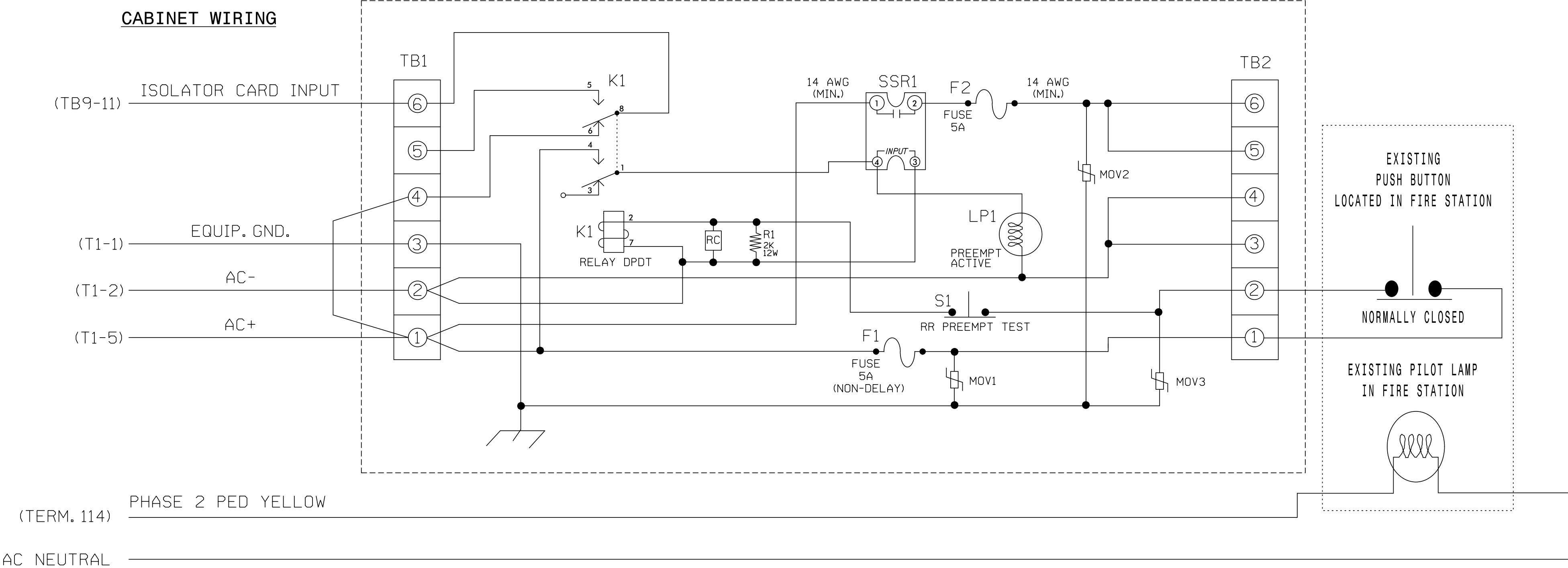


NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

EMERGENCY VEHICLE PREEMPTION WIRING DETAIL

(wire as shown below)

PREEMPTION AND PILOT LAMP CONTROL BOX



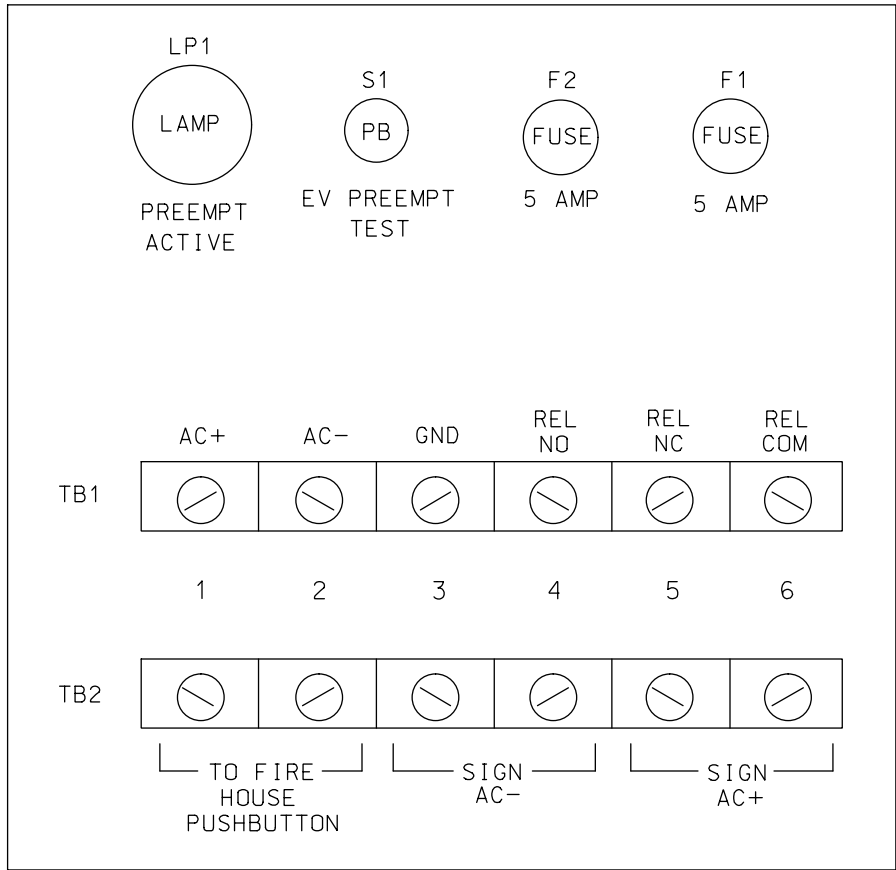
NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT Relay with 120VAC coil and octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this, set invert dip switch on AC Isolator Card.
- Resistor is valued at 2K ohm, 12 watt.
- RC network is valued at .1 microfarad, 100 ohm.
- IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) must be connected to AC neutral (jumper may have to be added).

NOTES

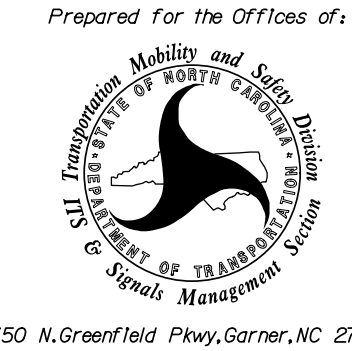
- If field terminal 114 has a conflict monitor wire attached, remove, tape, and label wire.
- Make sure load resistors are in place as shown in the Load Resistor Installation Detail on Sheet 1.
- Install a loadswitch in Output File Slot S3.

FRONT VIEW



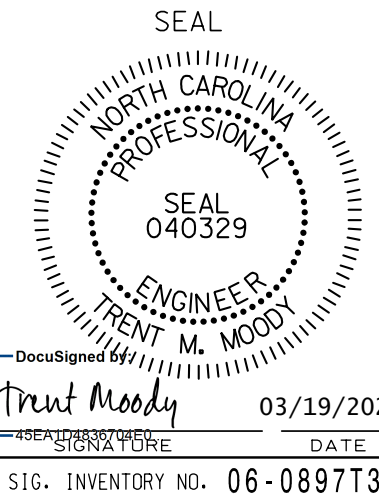
Temporary Design 3 - TMP Phase VI, Step 1
Electrical Detail - Sheet 3 of 3

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

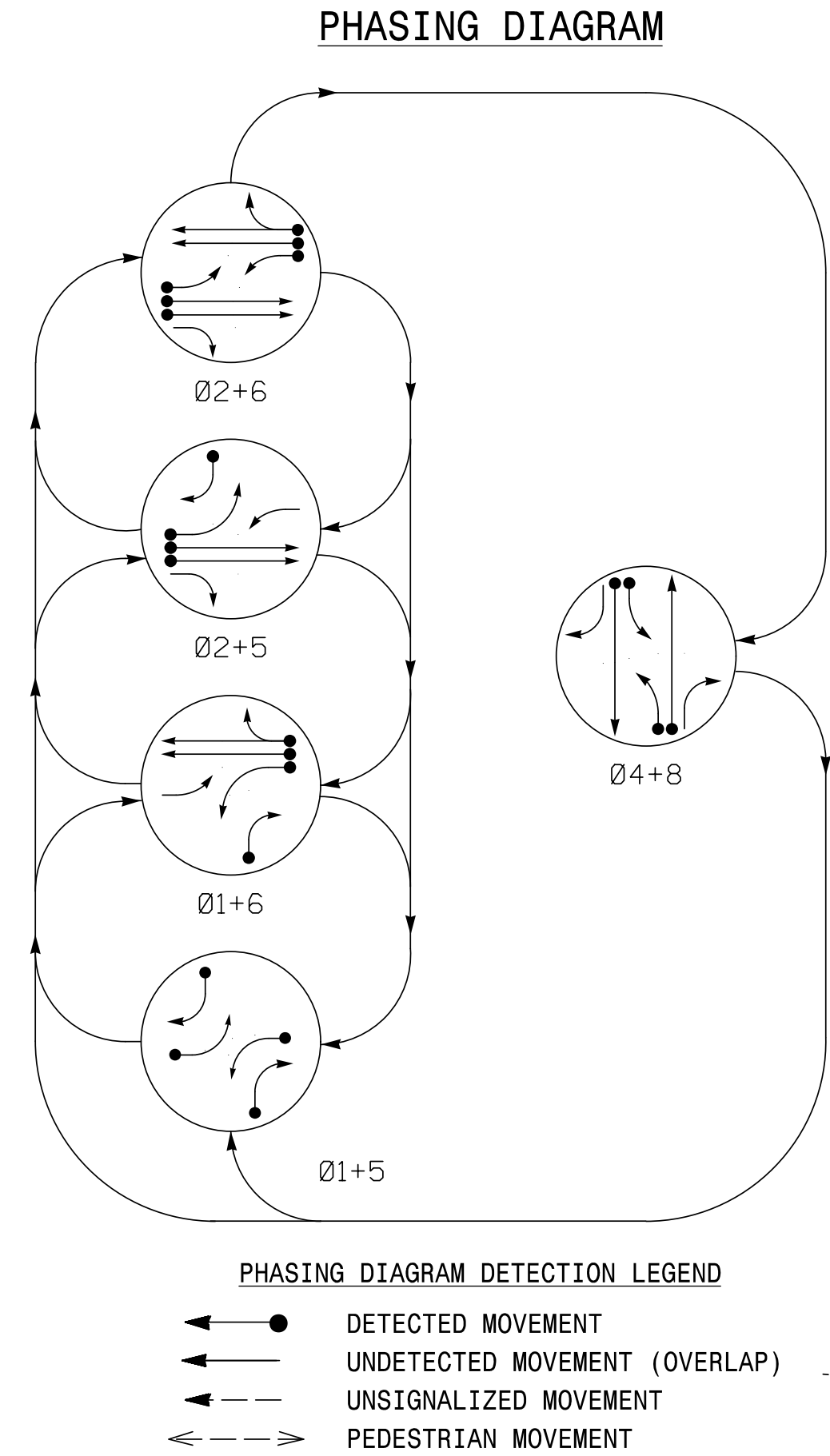


Division 6			Robeson County		Lumberton
PLAN DATE: Feb 2025			REVIEWED BY: H.M. Surti		
PREPARED BY: R.L. Aristondo			REVIEWED BY: T.M. Woody		
REVISIONS			INIT.	DATE	

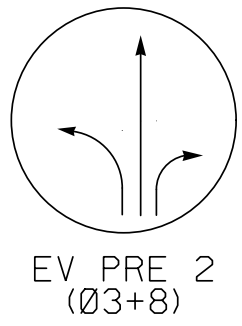
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



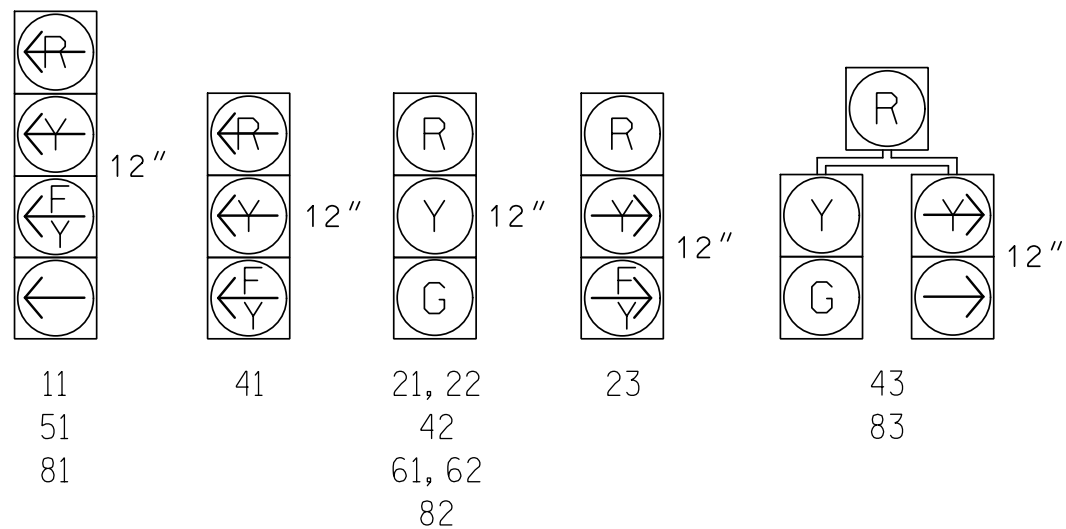
Sig. INVENTORY NO. 06-0897T3



EV PREEMPT PHASE
(Medium Priority)



SIGNAL FACE I.D.
All Heads L.E.D.



SIGNAL FACE	PHASE							
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 4 + 8	PRE 2	FLASH	NEW CARD
11	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	R	R
23	R	R	←	←	R	R	R	R
41	←	←	←	←	←	←	←	←
42	R	R	R	R	G	R	R	R
43	←	←	←	←	R	G	R	R
51	←	←	←	←	←	←	←	←
61, 62	R	G	R	G	R	R	R	R
81	←	←	←	←	←	←	←	←
82	R	R	R	R	G	G	R	R
83	←	←	←	←	R	G	G	R

MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR						PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL DURING GREEN	NEW CARD
1A	6X40	0	*	*	1	15	-	X	-	X	*
1B	6X40	0	*	*	1	15	-	X	-	X	*
4A	6X40	0	*	*	4	3	-	X	-	X	*
4B	6X40	0	*	*	4	-	-	X	-	X	*
5A	6X40	0	*	*	5	15	-	X	-	X	*
5B	6X40	0	*	*	5	15	-	X	-	X	*
8A	6X40	0	*	*	8	-	-	X	-	X	*
8B	6X40	0	*	*	8	-	-	X	-	X	*

* Multi-zone Microwave Detection Zone

RADAR DETECTION SYSTEM		
FUNCTION	SENSOR 1 - (2A)	SENSOR 2 - (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	200 - 70	200 - 70
Enable Speed	Y	Y
Speed Range (mph)	25 - 100	25 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 5.5	2.5 - 5.5

5 Phase
Fully Actuated with EV Preemption
Signal System #D06-18 Lumberton
NC 211 (N. Roberts Avenue)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- The Division Traffic Engineer will determine the Delay before Preempt and Preempt Dwell Min Green time for the emergency vehicle preemption timing.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Remove bag and reconnect signal head numbered 11.
- Remove bag and reconnect right turn arrows on signal head numbered 83.
- Renumber existing loop 8C to 1B.
- Remove existing "LEFT TURN YIELD ON GREEN" sign (R10-12).
- Emergency vehicle preemption switch is located inside rescue squad building. When switch is actuated, controller will display interval and then emergency preemption phasing.

LEGEND

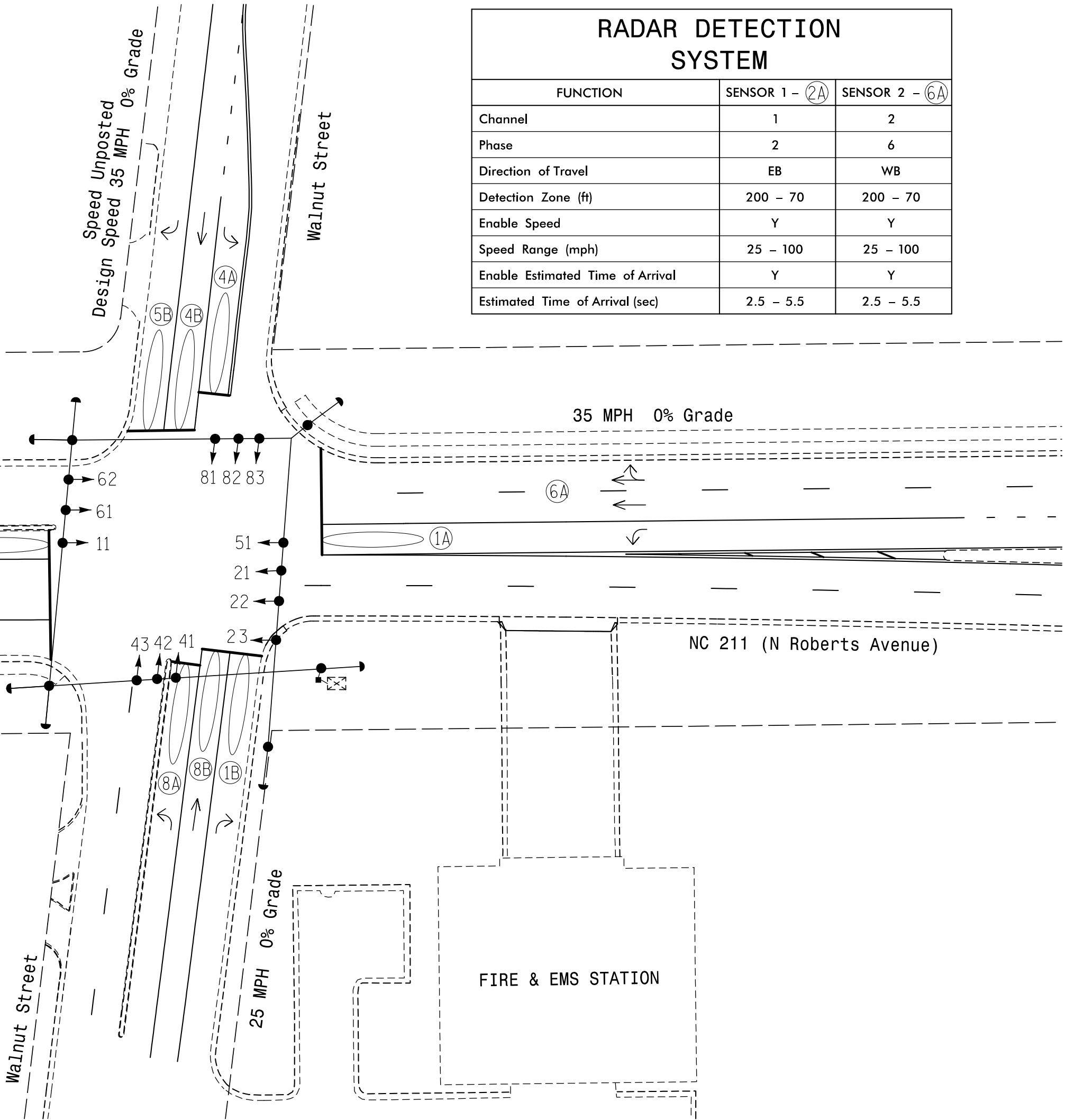
PROPOSED	EXISTING
○→ Traffic Signal Head	●→ N/A
●→ Modified Signal Head	→ Sign
→ Signal Pole with Guy	●→ Signal Pole with Sidewalk Guy
⊗ Inductive Loop Detector	⊗ Controller & Cabinet
□ Junction Box	■
----- 2-in Underground Conduit	----- Right of Way
N/A → Directional Arrow	→ Directional Arrow
○ Microwave Detection Zone	○ Microwave Detection Zone
Ⓐ Left Arrow "ONLY" Sign (R3-5L)	Ⓐ

MAXTIME TIMING CHART						
FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-
Min Green	7	10	7	7	10	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	15	60	20	15	60	20
Yellow Change	3.0	3.8	3.8	3.0	3.8	3.2
Red Clear	2.8	2.0	1.8	2.8	2.0	2.1
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	-	X
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X

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

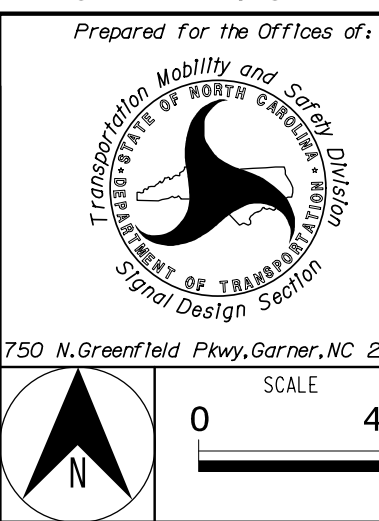
MAXTIME PREEMPTION CHART	
FUNCTION	PRE 2
Type	EMERG VEH
Exit Phases	2, 6
Delay	**
Max Presence	0
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	255 *
Enter Yellow Change	25.5 *
Enter Red Clear	25.5 *
Dwell Green	**
Exit Min Green	255 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Call Extend Time	1.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	N
Require All Red Entry	N

* Directs controller to use default phase timing.
** See Note 5.



Signal Upgrade - Final Design

STV
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



NC 211 (N Roberts Avenue) at Walnut Street			
Division 6	Robeson County	Lumberton	
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti		
PREPARED BY: J.C. Grimm	REVIEWED BY: T.M. Woody		
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JERRY M. MOODY 040329
SIGNATURE DATE 3/19/2025
SIG. INVENTORY NO. 06-0897

PREEMPTION PROGRAMMING

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

Web Interface
Home >Controller >Preempt Configuration >Preempts

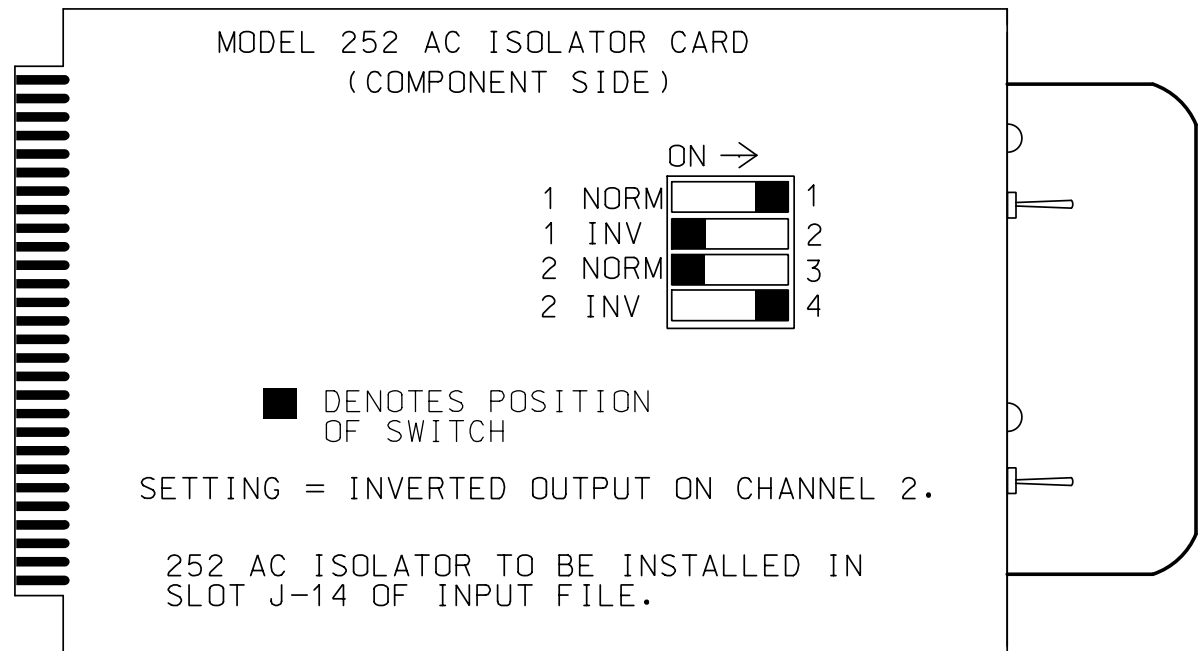
Preempt Configuration

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

* Value to be determined in the field

PREEMPT 2 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

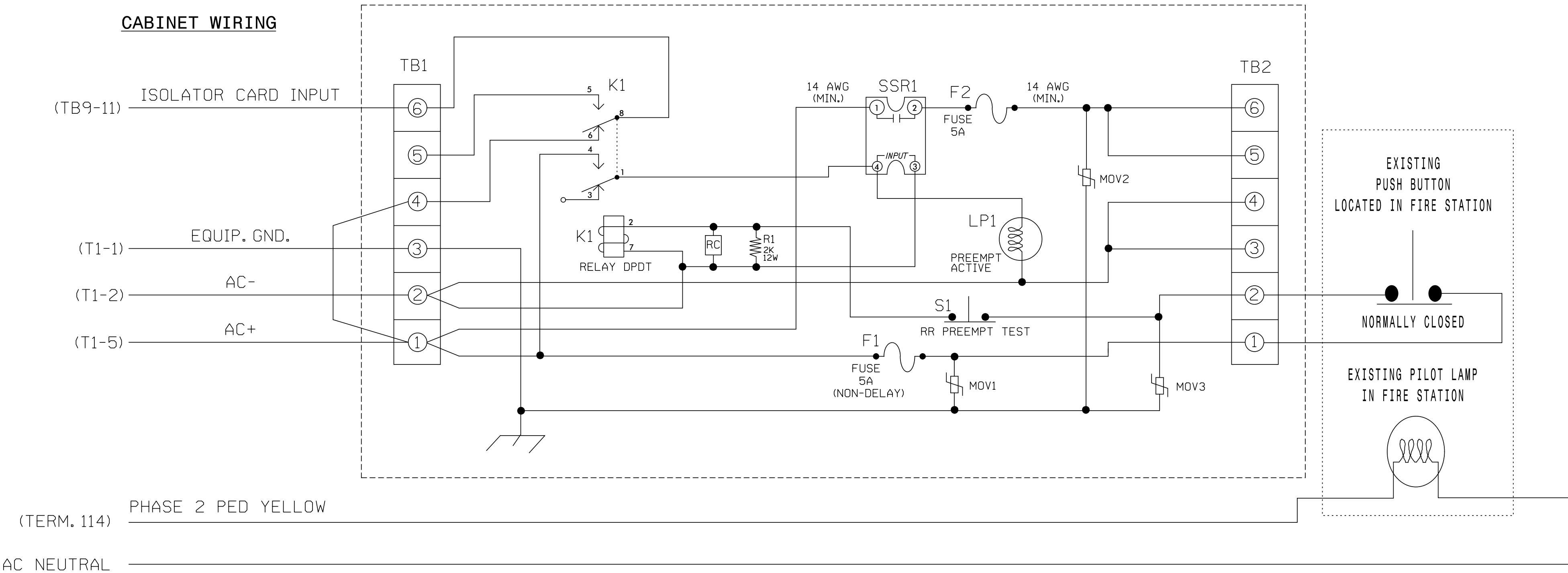


NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

EMERGENCY VEHICLE PREEMPTION WIRING DETAIL

(wire as shown below)

PREEMPTION AND PILOT LAMP CONTROL BOX



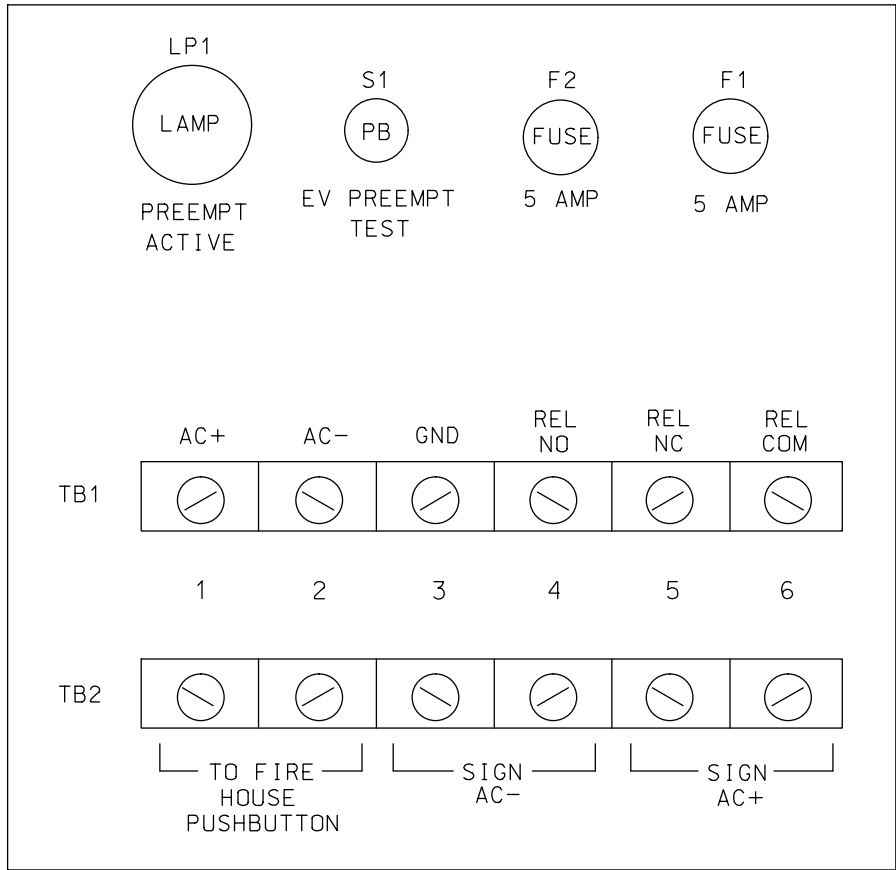
NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT Relay with 120VAC coil and octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this, set invert dip switch on AC Isolator Card.
- Resistor is valued at 2K ohm, 12 watt.
- RC network is valued at .1 microfarad, 100 ohm.
- IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) must be connected to AC neutral (jumper may have to be added).

NOTES

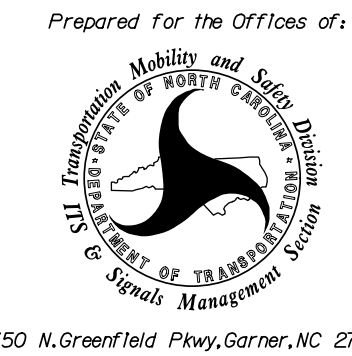
- If field terminal 114 has a conflict monitor wire attached, remove, tape, and label wire.
- Make sure load resistors are in place as shown in the Load Resistor Installation Detail on Sheet 1.
- Install a loadswitch in Output File Slot S3.

FRONT VIEW



Final Design
Electrical Detail - Sheet 3 of 3

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991



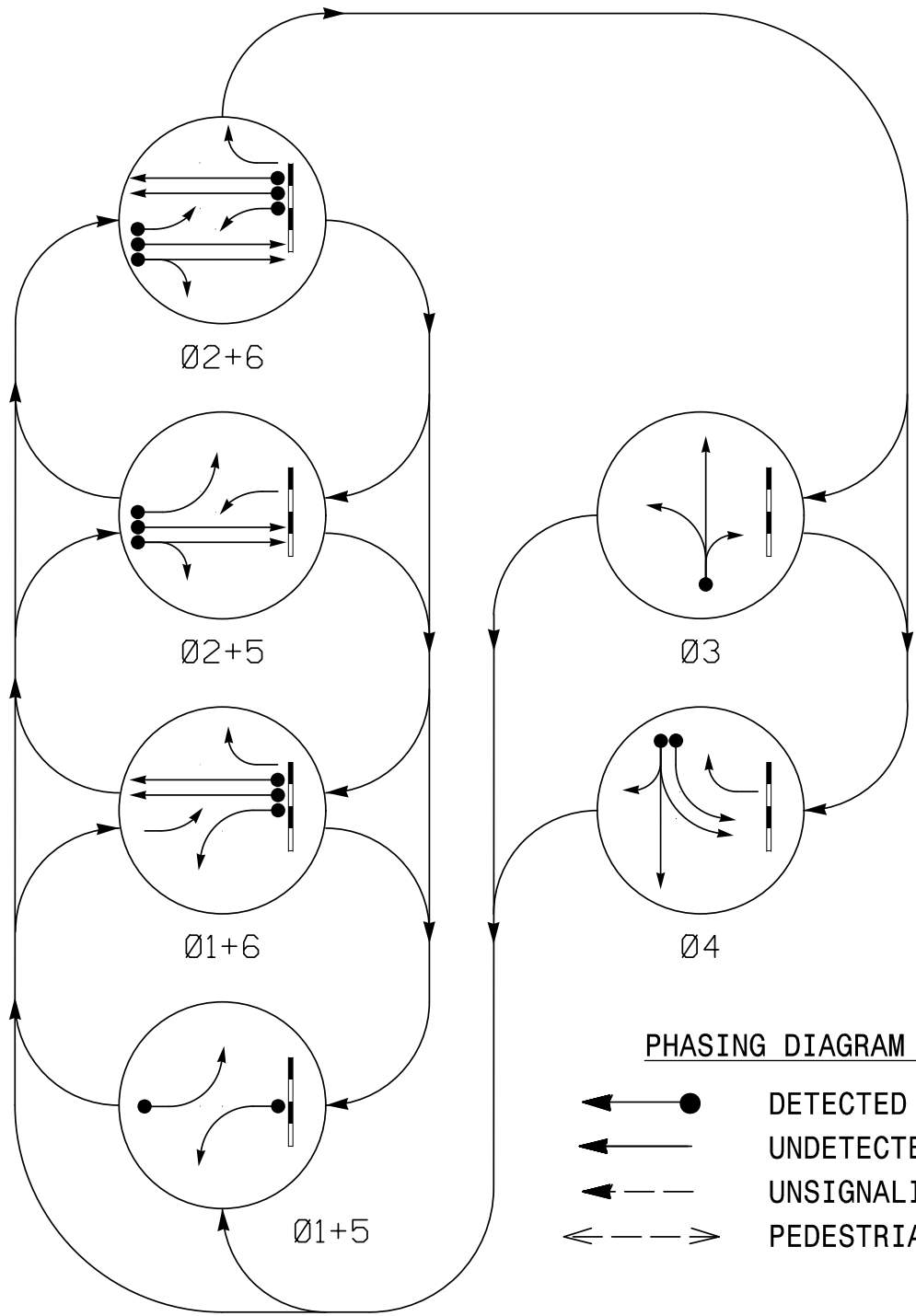
NC 211 (N. Roberts Avenue) at Walnut Street		
Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti	
PREPARED BY: R.L. Aristondo	REVIEWED BY: T.M. Woody	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

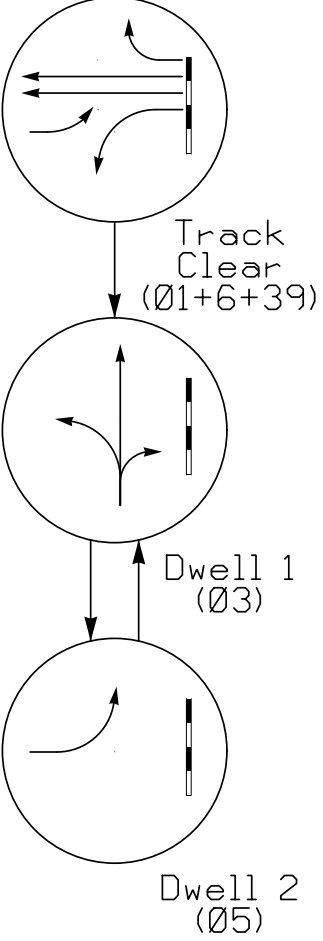
SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL 040329
Trent M. Woody
03/19/2025
DATE
SIGNATURE
SIG. INVENTORY NO. 06-0897

2/21/2025
A:\MP\0616c18a4018560\4018560_0001\450_De1iverables & Submittal\0616c18a4018560\4018560\Signal\Temporary_Signal\0616c18a4018560\4018560_0001\Signal\0616c18a4018560_0001.dgn
LeonAR

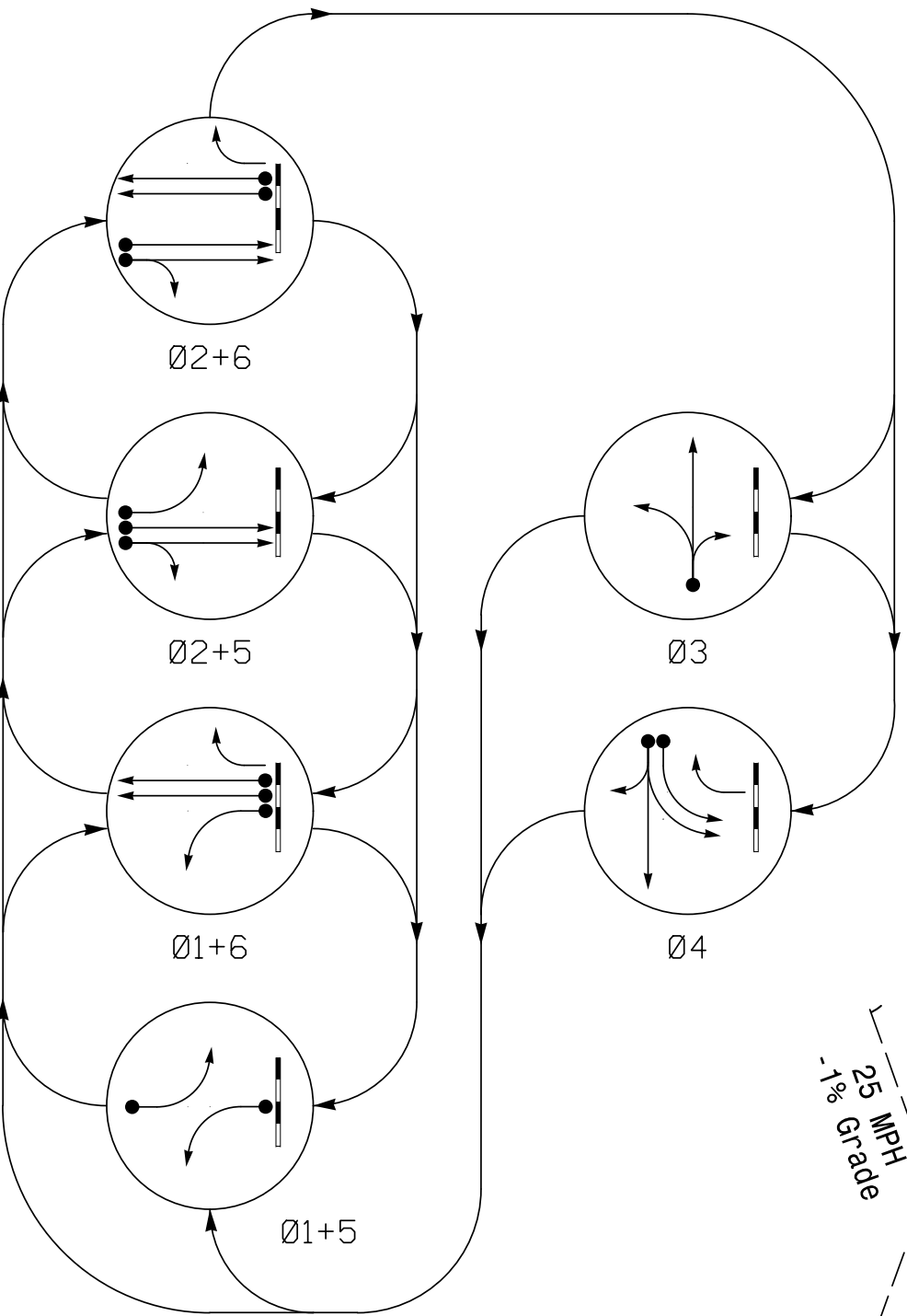
DEFAULT PHASING DIAGRAM



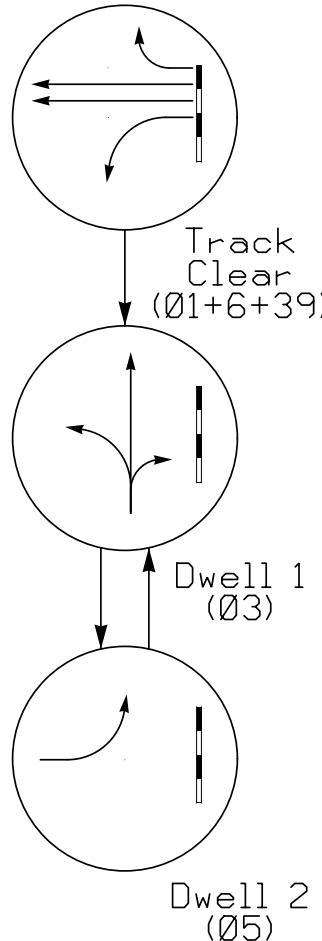
DEFAULT RAIL
PREEMPT PHASES
(High Priority)



ALTERNATE PHASING DIAGRAM



ALTERNATE RAIL
PREEMPT PHASES
(High Priority)



DEFAULT PHASING
TABLE OF OPERATION

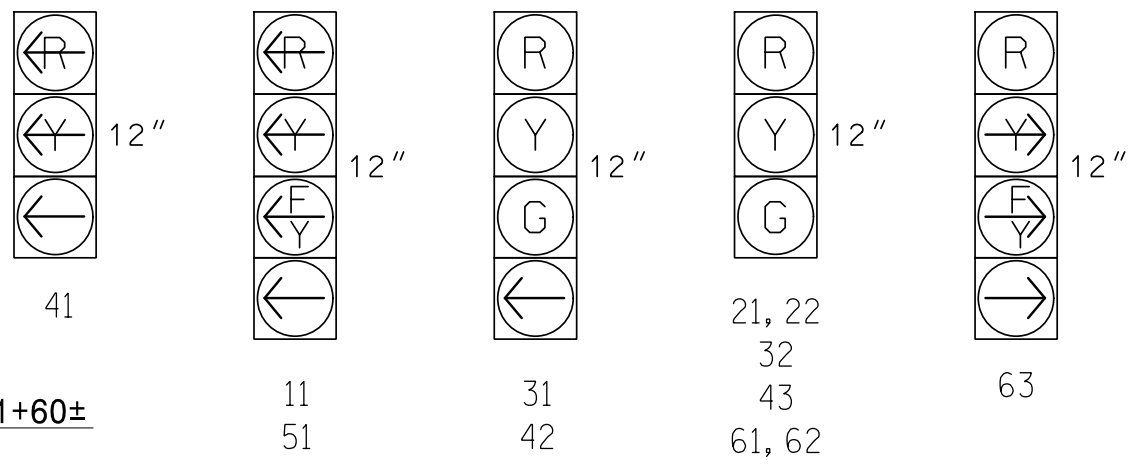
SIGNAL FACE	PHASE											
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 3	Ø 4	R R C L R	D W R E L L 1	D W R E L L 2	F L A S H		
11	←	←	←	←	←	←	←	←	←	←		
21, 22	R	R	G	G	R	R	R	R	R	R		
31	R	R	R	R	G	R	R	G	R	R		
32	R	R	R	R	G	R	R	G	R	R		
41	←	←	←	←	←	←	←	←	←	←		
42	R	R	R	R	R	G	R	R	R	R		
43	R	R	R	R	R	G	R	R	R	R		
51	←	←	←	←	←	←	←	←	←	←		
61, 62	R	G	R	G	R	R	G	R	R	R		
63	R	←	R	←	R	→	←	R	R	R		

ALTERNATE PHASING
TABLE OF OPERATION

SIGNAL FACE	PHASE											
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 3	Ø 4	R R C L R	D W R E L L 1	D W R E L L 2	F L A S H		
11	←	←	←	←	←	←	←	←	←	←		
21, 22	R	R	G	G	R	R	R	R	R	R		
31	R	R	R	R	G	R	R	G	R	R		
32	R	R	R	R	G	R	R	G	R	R		
41	←	←	←	←	←	←	←	←	←	←		
42	R	R	R	R	R	G	R	R	R	R		
43	R	R	R	R	R	G	R	R	R	R		
51	←	←	←	←	←	←	←	←	←	←		
61, 62	R	G	R	G	R	R	G	R	R	R		
63	R	←	R	←	R	→	←	R	R	R		

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME PREEMPTION CHART

FUNCTION	PRE 1
Type	RAIL ROAD
Exit Phases	2, 6
Delay	0.0
Max Presence	0
Enter Min Green	1
Enter Walk	1
Enter Ped Clear	0
Enter Yellow Change	4.6
Enter Red Clear	3.3
Track Green	37
Track Yellow Change	4.6
Track Red Clear	2.6
Dwell Green	7
Exit Min Green	255 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Call Extend Time	1.0
Exit Type	EXIT PHASES
Ped Clear Through Yellow	N
Require All Red Entry	N

* Directs controller to use default phase timing.

MAXTIME TIMING CHART

FEATURE	PHASE							39	40
	1	2	3	4	5	6			
Walk *	-	-	-	-	-	-			
Ped Clear *	-	-	-	-	-	-			
Min Green	7	12	7	7	7	12			
Passage *	2.0	2.0	2.0	2.0	2.0	2.0			
Max 1 *	20	90	30	30	20	90			
Yellow Change	3.0	4.6	3.2	3.2	3.0	4.6	4.6	4.6	
Red Clear	2.6	1.6	2.6	3.3	2.8	1.6	2.6	3.3	
Added Initial *	-	-	-	-	-	-			
Maximum Initial *	-	-	-	-	-	-			
Time Before Reduction *	-	-	-	-	-	-			
Time To Reduce *	-	-	-	-	-	-			
Minimum Gap	-	-	-	-	-	-			
Advance Walk	-	-	-	-	-	-			
Non Lock Detector	X	-	X	X	X	-			
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL			MIN RECALL
Dual Entry	-	-	-	-	-	-			

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

This signal was designed for Advanced Preemption.

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	NEW CARD
1A	6X40	0	*	*	1	15**	-	X	-	X	*
					6 #	-	-	X	-	X	*
3A	6X20	0	*	*	3	5	-	X	-	X	*
4A	6X40	0	*	*	4	-	-	X	-	X	*
4B	6X40	0	*	*	4	5	-	X	-	X	*
5A	6X40	0	*	*	5	15**	-	X	-	X	*
					2 #	-	-	X	-	X	*

* Multi-zone Microwave Detection Zone

** Disable Delay During Alternate Phasing

Disable Phase Call for Loop During Alternate Phasing

RADAR DETECTION
SYSTEM

FUNCTION	SENSOR 1 - (2A)	SENSOR 2 - (6A)
Channel	1	2
Phase	2	6
Direction of Travel	EB	WB
Detection Zone (ft)	500 - 100	500 - 100
Enable Speed	Y	Y
Speed Range (mph)	35 - 100	35 - 100
Enable Estimated Time of Arrival	Y	Y
Estimated Time of Arrival (sec)	2.5 - 6.5	2.5 - 6.5

LEGEND

PROPOSED	EXISTING

New Installation
Temporary Design 1 - TMP Phase III, Step 3

stv
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
(704) 372-1885
NC License Number F-0991

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

NC 211 (N. Roberts Avenue)
at
Boomerang Drive /
Restaurant Driveway
Division 6 Robeson County Lumberton
PLAN DATE: Feb 2025 REVIEWED BY: H.M. Surti
PREPARED BY: J.C. Grimm REVIEWED BY: T.M. Woody
REVISIONS
INIT. DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED
SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
040329
ENGINEER
Trent M. Moody
DocuSigned by
Trent M. Moody
03/19/2025
DATE
SIC. INVENTORY NO. 06-138771