18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL
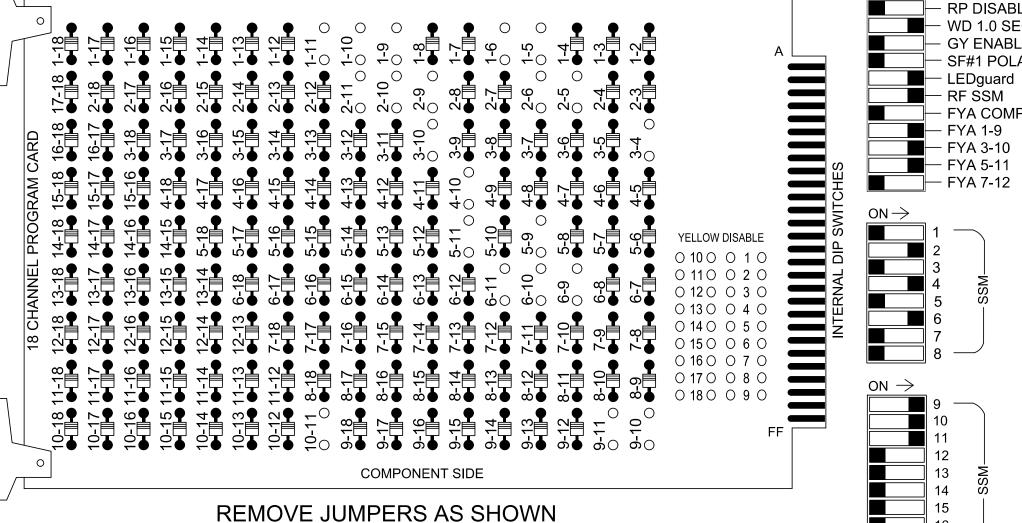(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-10, 1-11, 2-5, 2-6, 2-9, 2-10, 2-11, 3-4, 3-10, 4-10, 5-9, 5-11, 6-9, 6-10, 6-11, 9-10, 9-11, and 10-11.

WD ENABLE ON OFF
SW2

18 CHANNEL PROGRAM CARD

A

FF

COMPONENT SIDE

REMOVE JUMPERS AS SHOWN

OPTIONS
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM

FYA
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

YELLOW DISABLE
- O 10 O 1 O
- O 11 O 2 O
- O 12 O 3 O
- O 13 O 4 O
- O 14 O 5 O
- O 15 O 6 O
- O 16 O 7 O
- O 17 O 8 O
- O 18 O 9 O

INTERNAL DIP SWITCHES

ON →
- 1
- 2
- 3
- 4 SSM
- 5
- 6
- 7
- 8

ON →
- 9
- 10
- 11
- 12
- 13 SSM
- 14
- 15
- 16
- 17
- 18

■ = DENOTES POSITION OF SWITCH

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

NOTES

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

2. Program controller to start up in phase 2 Green No Walk, 6 Green No Walk, 39 Phase Not On, and 40 Green No Walk.

3. Program Phase 39 for No Startup Veh Call.

4. Program phases 2, 6, and 40 for Min Recall.

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

6. The cabinet and controller are part of the #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet..332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount.......................................Base
Output File Positions............................18 With Aux. Output File
Load Switches Used.............................S1, S2, S4, S5, S7, S8, AUX S1, AUX S2, AUX S3, AUX S4
Phases Used...1, 2, 3, 4, 5, 6
Overlap "1"..*
Overlap "2"..*
Overlap "3"..*
Overlap "4"..NOT USED
Overlap "5"..*
Overlap "7"..*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

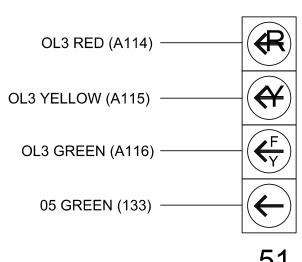| LOAD SWITCH NO.	S1	S2	S3	S4	S5			S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3		AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4			14	5	6	15	7	8	16	9	10	17		11	12	18
PHASE	1	2	2 PED	OL7	4			4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5		OL3	OL4	SPARE
SIGNAL HEAD NO.	11*	21,22	NU	63	41	42	43	NU	51*	61,62	NU	NU	NU	NU	11*	63★	31	32	51★	NU	NU
RED		128			101	101				134							A124	A111	A111		
YELLOW	*	129		*	102	102			*	135							A112	A112			
GREEN		130			103	103				136							A113	A113			
RED ARROW				101															A114		
YELLOW ARROW				102												A122	A125		A115		
FLASHING YELLOW ARROW																A123	A126		A116		
GREEN ARROW	127			118	103	103				133								A113			
✋ (hand)																					
🚶 (walk)																					

NU = Not Used

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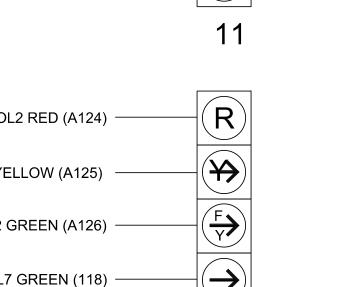★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT
(front view)

	1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I" U	∅1 1A*	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ST DC ISOLATOR
FILE "J" U	∅5 5A*	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
L	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED

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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

* Reflects the detector utilized in the "MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A" on Sheet 2.

(MULTIZONE DETECTION - watermark)

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.

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)

OL1 RED (A121) — R
OL1 YELLOW (A122) — Y
OL1 GREEN (A123) — FYA
01 GREEN (127) — ←
11

OL3 RED (A114) — R
OL3 YELLOW (A115) — Y
OL3 GREEN (A116) — FYA
05 GREEN (133) — ←
51

OL2 RED (A124) — R
OL2 YELLOW (A125) — Y
OL2 GREEN (A126) — →
OL7 GREEN (118) — →
63

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)

Phase 1 Yellow Field Terminal (126)
AC-

OL7 Yellow Field Terminal (117)
AC-

Phase 5 Yellow Field Terminal (132)
AC-

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387T1
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

Electrical and Programming Details For:

Prepared for the Offices of:

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. Moody	

REVISIONS | INIT. | DATE

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA
PROFESSIONAL
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ENGINEER
T.M. MOODY

SIGNATURE: Trent Moody   DATE: 3/19/2025

SIG. INVENTORY NO. 06-1387T1

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 15.2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

NOTE OL7 ASSIGNED TO CHANNEL 3 →

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

↑ ↑

NOTE: ALL RED FLASH

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

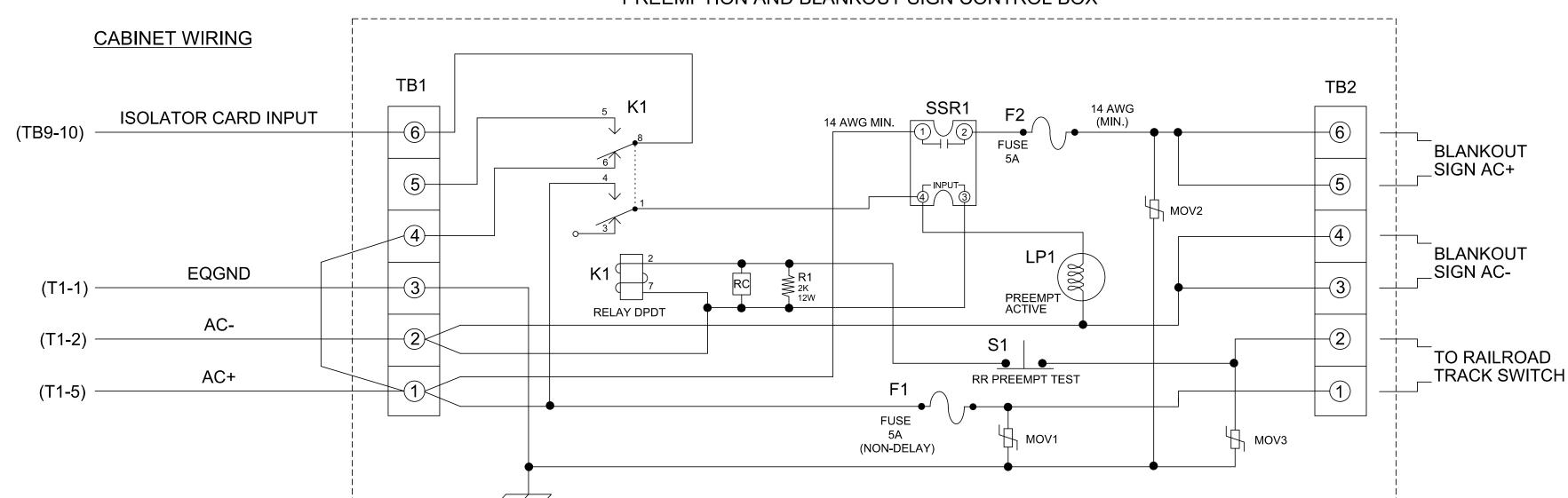Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal	Normal
Included Phases	2	6	6	3	4
Modifier Phases	1	4	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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	3	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal	Normal
Included Phases	-	6	-	3	4
Modifier Phases	1	4	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

← NOTICE INCLUDED PHASE

SEQUENCE DETAIL

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

Web Interface
Home >Controller >Sequence

Sequence 1

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

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

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	-
29	0	-

5A

Detector	Call Phase	Delay
15	5	-
31	0	-

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387T1
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

Temporary Design 1 - TMP Phase III, Step 3
Electrical Detail - Sheet 2 of 4

stv

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Electrical and Programming Details For:

Prepared for the Offices of:

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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. Moody	

REVISIONS	INIT.	DATE

SEAL

SEAL
040329

Trent Moody
SIGNATURE

3/19/2025
DATE

SIG. INVENTORY NO. 06-1387T1

PREEMPTION PROGRAMMING

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

Web Interface
Home >Controller >Preempt Configuration >Preempts

Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	1, 6, 39
Track Overlaps	1, 2, 3
Dwell Phases	3
Dwell Peds	-
Dwell Overlaps	5
Cycling Phases	3, 5
Cycling Peds	-
Cycling Overlaps	3, 5
Exit Phases	2, 6
Exit Overlaps	1, 2, 3
Delay	0
Call Ext Time	1.0
Max Presence	0
Max Pres Act	Terminate
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 Clr	4.6
Track Red Clear	2.6
Dwell Green	7
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	X
Track Reserve	X

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

PREEMPTION AND BLANKOUT SIGN CONTROL BOX

CABINET WIRING

NOTES

1. Relay K1 is shown in the energized (Preempt not active) normal operation state.

2. Relay K1 is a DPDT with 120VAC coil with octal base.

3. Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.

4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.

5. IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW

PREEMPT 1 AC ISOLATOR (MODEL 252)
OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

MODEL 252 AC ISOLATOR CARD
(COMPONENT SIDE)

ON →
1 NORM	1
1 INV	2
2 NORM	3
2 INV	4

■ DENOTES POSITION OF SWITCH

SETTING = INVERTED OUTPUT ON CHANNEL 1

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387T1
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Temporary Design 1 - TMP Phase III, Step 3
Electrical Detail - Sheet 3 of 4

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REVISIONS		INIT.	DATE

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NORTH CAROLINA
PROFESSIONAL
ENGINEER
T.M. MOODY

SIGNATURE   DATE 3/19/2025

SIG. INVENTORY NO. 06-1387T1

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 15.4

MAXTIME ALTERNATE PHASING PATTERN
PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387T1
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Temporary Design 1 - TMP Phase III, Step 3
Electrical Detail - Sheet 4 of 4

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T. M. MOODY

Trent Moody
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DEFAULT PHASING DIAGRAM

Ø2+6
Ø2+5
Ø1+6
Ø1+5
Ø3
Ø4

DEFAULT RAIL PREEMPT PHASES
(High Priority)

Track Clear (Ø1+6+39)
Dwell 1 (Ø3)
Dwell 2 (Ø5)

ALTERNATE PHASING DIAGRAM

Ø2+6
Ø2+5
Ø1+6
Ø1+5
Ø3
Ø4

ALTERNATE RAIL PREEMPT PHASES
(High Priority)

Track Clear (Ø1+6+39)
Dwell 1 (Ø3)
Dwell 2 (Ø5)

PHASING DIAGRAM DETECTION LEGEND

- ●—→ DETECTED MOVEMENT
- —→ UNDETECTED MOVEMENT (OVERLAP)
- --→ UNSIGNALIZED MOVEMENT
- ···→ PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	RRCR	DWELL1	DWELL2	FLASH
11	←	←	F Y	F Y	R	R	R	R	R	R
21, 22	R	R	G	G	R	R	R	R	R	R
31	R	R	R	R	G	R	G	R	R	R
32	R	R	R	R	G	R	R	G	R	R
41	R	R	R	R	←	R	R	R	R	R
42	R	R	R	R	R	G	R	R	R	R
43	R	R	R	R	R	G	R	R	R	R
51	←	F Y		F Y	R	←	R	←	R	R
61, 62	R	G	R	G	R	R	G	R	R	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	RRCR	DWELL1	DWELL2	FLASH
11	R	R	R	R	R	R	R	R	R	R
21, 22	R	R	G	G	R	R	R	R	G	R
31	R	R	R	R	G	R	G	R	R	R
32	R	R	R	R	G	R	R	G	R	R
41	R	R	R	R	←	R	R	R	R	R
42	R	R	R	R	R	G	R	R	R	R
43	R	R	R	R	R	G	R	G	R	R
51	R	R	R	R	R	←	R	R	R	R
61, 62	R	G	R	G	R	R	G	R	R	R

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

41 — 12"
11, 51 — 12"
31, 42 — 12"
21, 22, 32, 43, 61, 62 — 12"
63 — 12"

6 Phase
Fully Actuated w/ Railroad Preemption
#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. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Program phase 40 to run concurrently with all phases during normal operation. Phase 39 must be incompatible with phase 40 and included as a track clear phase.
6. The Division Traffic Engineer will determine the hours of use for each phasing plan.
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.

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.

This signal was designed for Advanced Preemption.

Bag sign A and disconnect signal head 63

NC 211 (N Roberts Avenue)
Boomerang Drive
45 MPH -1% Grade
25 MPH -1% Grade
Restaurant Driveway
Crossing No. 631465D
CSX Transportation
NC 211 (N. Roberts Avenue)

MAXTIME TIMING CHART

FEATURE	1	2	3	4	5	6	39	40
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.

MAXTIME DETECTOR INSTALLATION CHART

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	-	✳
					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

Traffic Signal Head		
Modified Signal Head		N/A
Metal Strain Pole		
Inductive Loop Detector		
Controller & Cabinet		
Junction Box		
2-in Underground Conduit		
Directional Drill		N/A
Right of Way		
Directional Arrow		N/A
Railroad Tracks		N/A
Railroad Gate and Flasher		
Microwave Detection Zone		
Right Arrow "ONLY" Sign (R3-5R) Ⓐ		Ⓐ

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

New Installation
Temporary Design 2 - TMP Phase V, Step 2

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. Moody

PROJECT REFERENCE NO. U-5797
SHEET NO. Sig. 16.0

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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SEAL 040329
ENGINEER
TRENT M. MOODY
Trent Moody
03/19/2025

SCALE
0 — 40
1"=40'

SIG. INVENTORY NO. 06-1387T2

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

WD ENABLE — ON / OFF
SW2

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

18 CHANNEL PROGRAM CARD

COMPONENT SIDE

REMOVE JUMPERS AS SHOWN

A

ON →
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

OPTIONS / FYA

INTERNAL DIP SWITCHES

YELLOW DISABLE
- 10 ○ ○ 1 ○
- 11 ○ ○ 2 ○
- 12 ○ ○ 3 ○
- 13 ○ ○ 4 ○
- 14 ○ ○ 5 ○
- 15 ○ ○ 6 ○
- 16 ○ ○ 7 ○
- 17 ○ ○ 8 ○
- 18 ○ ○ 9 ○

ON →
1 / 2 / 3 / 4 / 5 / 6 / 7 / 8   SSM

ON →
9 / 10 / 11 / 12 / 13 / 14 / 15 / 16 / 17 / 18   SSM

FF

■ = DENOTES POSITION OF SWITCH

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

NOTES

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

2. Program controller to start up in phase 2 Green No Walk, 6 Green No Walk, 39 Phase Not On, and 40 Green No Walk.

3. Program Phase 39 for No Startup Veh Call.

4. Program phases 2, 6, and 40 for Min Recall.

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

6. The cabinet and controller are part of the #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

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, AUX S1, AUX S3, AUX S4
Phases Used	1, 2, 3, 4, 5, 6
Overlap "1"	*
Overlap "2"	NOT USED
Overlap "3"	*
Overlap "4"	NOT USED
Overlap "5"	*

*See overlap programming detail on sheet 2
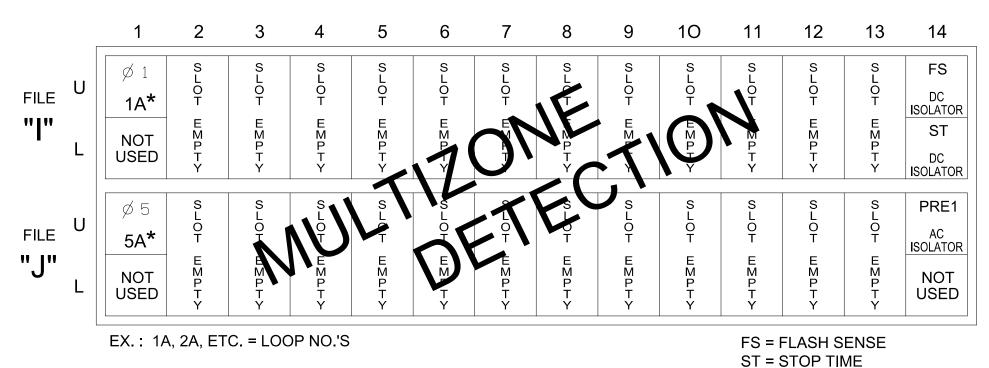
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	SPARE
SIGNAL HEAD NO.	11 ★	21,22	NU	NU	41	NU	51 ★	61,62	NU	NU	NU	NU	11 ★	NU	31	32	51 ★	NU	NU
RED		128			101	101		134							A111	A111		
YELLOW	★	129			102	102	★	135							A112	A112		
GREEN		130			103	103		136							A113	A113		
RED ARROW				101									A121			A114		
YELLOW ARROW				102									A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127			103	103			133							A113			
✋																		
🚶																		

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT
(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	∅ 1 1A*	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L	NOT USED													ST DC ISOLATOR
FILE "J" U	∅ 5 5A*	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
FILE "J" L	NOT USED													NOT USED

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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

* Reflects the detector utilized in the "MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A" on Sheet 2.

MULTIZONE DETECTION

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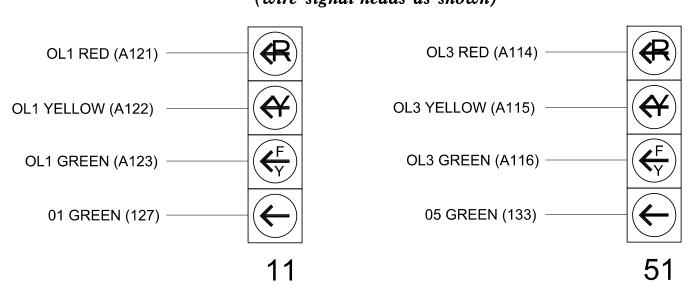
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)

OL1 RED (A121) — (R)
OL1 YELLOW (A122) — (Y)
OL1 GREEN (A123) — (FY)
01 GREEN (127) — (←)

11

OL3 RED (A114) — (R)
OL3 YELLOW (A115) — (Y)
OL3 GREEN (A116) — (FY)
05 GREEN (133) — (←)

51

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

Phase 1 Yellow Field Terminal (126)
Phase 5 Yellow Field Terminal (132)
AC-
AC-

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-1387T2
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

Electrical and Programming Details For:

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

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. Moody	

REVISIONS | INIT. | DATE

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ENGINEER
T.M. MOODY

SIGNATURE: Trent Moody DATE: 3/19/2025

SIG. INVENTORY NO. 06-1387T2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

↑ ↑

NOTE: ALL RED FLASH

MAXTIME OVERLAP PROGRAMMING DETAIL
FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL
FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE INCLUDED PHASE

SEQUENCE DETAIL

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

Web Interface
Home >Controller >Sequence

Sequence 1

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

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

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	-
29	0	-

5A

Detector	Call Phase	Delay
15	5	-
31	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: 06-1387T2
DESIGNED: Feb 2025
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Temporary Design 2 - TMP Phase V, Step 2
Electrical Detail - Sheet 2 of 4

Electrical and Programming
Details For:

Prepared for the Offices of:

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. Moody	

750 N. Greenfield Pkwy, Garner, NC 27529

REVISIONS	INIT.	DATE

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ENGINEER
T.M. MOODY

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SIGNATURES COMPLETED

SIGNATURE: Trent Moody 3/19/2025
DATE

SIG. INVENTORY NO. 06-1387T2

PREEMPTION PROGRAMMING

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

Web Interface
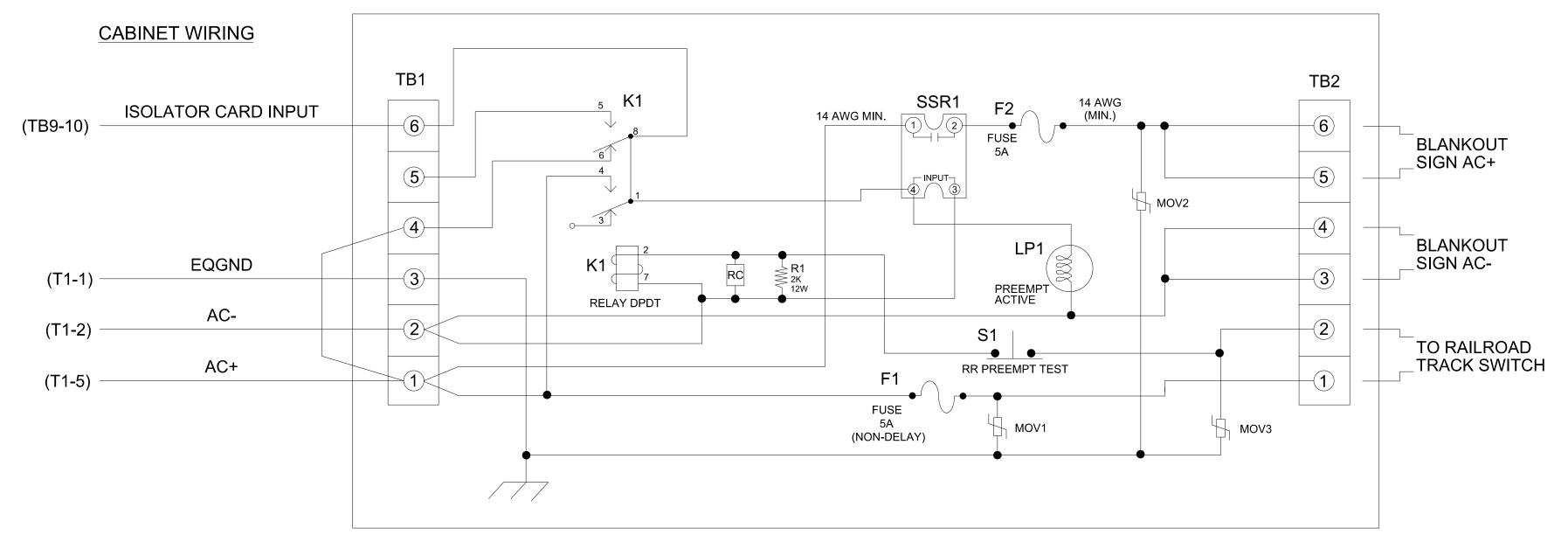Home >Controller >Preempt Configuration >Preempts

Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	1, 6, 39
Track Overlaps	1, 3
Dwell Phases	3
Dwell Peds	-
Dwell Overlaps	5
Cycling Phases	3, 5
Cycling Peds	-
Cycling Overlaps	3, 5
Exit Phases	2, 6
Exit Overlaps	1, 3
Delay	0
Call Ext Time	1.0
Max Presence	0
Max Pres Act	Terminate
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 Clr	4.6
Track Red Clear	2.6
Dwell Green	7
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	X
Track Reserve	X

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

PREEMPTION AND BLANKOUT SIGN CONTROL BOX

CABINET WIRING

NOTES

1. Relay K1 is shown in the energized (Preempt not active) normal operation state.

2. Relay K1 is a DPDT with 120VAC coil with octal base.

3. Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.

4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.

5. IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW

PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

MODEL 252 AC ISOLATOR CARD
(COMPONENT SIDE)

	ON→	
1 NORM		1
1 INV		2
2 NORM		3
2 INV		4

■ DENOTES POSITION OF SWITCH

SETTING = INVERTED OUTPUT ON CHANNEL 1

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

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THE SIGNAL DESIGN: 06-1387T2
DESIGNED: Feb 2025
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Temporary Design 2 - TMP Phase V, Step 2
Electrical Detail - Sheet 3 of 4

Electrical and Programming Details For:

Prepared for the Offices of:

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. Moody	

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DATE

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T.M. MOODY

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387T2
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

Electrical and Programming
Details For:

Prepared for the Offices of:

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DEFAULT PHASING DIAGRAM

Ø2+6
Ø2+5
Ø1+6
Ø1+5

Ø3
Ø4

DEFAULT RAIL PREEMPT PHASES
(High Priority)

Track Clear (Ø1+6+39)
Dwell 1 (Ø3)
Dwell 2 (Ø4)

ALTERNATE PHASING DIAGRAM

Ø2+6
Ø2+5
Ø1+6
Ø1+5

Ø3
Ø4

ALTERNATE RAIL PREEMPT PHASES
(High Priority)

Track Clear (Ø1+6+39)
Dwell 1 (Ø3)
Dwell 2 (Ø5)

PHASING DIAGRAM DETECTION LEGEND

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

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 17.0

6 Phase
Fully Actuated
w/ Railroad Preemption
#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. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal heads numbered 22 and 51.
6. Program phase 40 to run concurrently with all phases during normal operation. Phase 39 must be incompatible with phase 40 and included as a track clear phase.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	RRCR	DWRL1	DWRL2	FLASH
11	←	←	F,Y	F,Y	R	R	←	←	←	
21, 22	R	G	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	R	R	R	R	←	R	R	R	R	R
42	R	R	R	R	R	G	R	R	R	R
43	R	R	R	R	R	G	R	R	R	R
51	F,Y		F,Y	R	R	↑,Y	R	R		R
61, 62	R	G	R	G	R	R	G	R	R	R
63	R	F,Y	R	F,Y	R	←	F,Y	R	R	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	RRCR	DWRL1	DWRL2	FLASH
11	R	R	R	R	R	R	R	R	R	R
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	R	R	R	R	←	R	R	R	R	R
42	R	R	R	R	R	G	R	R	R	R
43	R	R	R	R	R	G	R	R	R	R
51	R	R	R	R	R	R	R	R	R	R
61, 62	R	G	R	G	R	R	G	R	R	R
63	R	F,Y	R	F,Y	R	←	F,Y	R	R	R

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

41 — 11, 51 — 31, 42 — 21, 22, 32, 43, 61, 62 — 63

12"

Boomerang Drive
NC 211 (N Roberts Avenue)
45 MPH -1% Grade
25 MPH -1% Grade
45 MPH -1% Grade

Unbag and reconnect signal head 63

31 32
63
62
61
11
51
21
22
43 42 41

NC 211 (N Roberts Avenue)

Crossing No. 631460D CSX Transportation

Restaurant Driveway

This signal was designed for Advanced Preemption.

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	3.0
Track Green	36
Track Yellow Change	4.6
Track Red Clear	2.8
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							
	1	2	3	4	5	6	39	40
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	2.8	1.6	2.6	3.0	2.8	1.6	2.8	3.0
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	MIN RECALL
Dual Entry	–	–	–	–	–	–		

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

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					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	–	✳
					6#	–	–	X	–	X	–	✳
3A	6X20	0	✳	✳	3	5	–	X	–	X	–	✳
4A	6X40	0	✳	✳	4	5	–	X	–	X	–	✳
4B	6X40	0	✳	✳	4	15	–	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
○─►	Traffic Signal Head	●
◐─►	Modified Signal Head	N/A
▢	Metal Strain Pole	
	Inductive Loop Detector	▢
⊠	Controller & Cabinet	⊠
▢	Junction Box	■
	2-in Underground Conduit	
── DD ──	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
	Microwave Detection Zone	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ

New Installation
Temporary Design 3 - TMP Phase VI, Step 4

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. Moody

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

SCALE 1"=40'

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
040329
ENGINEER
TRENT M. MOODY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Trent Moody 03/19/2025

SIG. INVENTORY NO. 06-1387T3

18 CHANNEL IP CONFLICT MONITOR
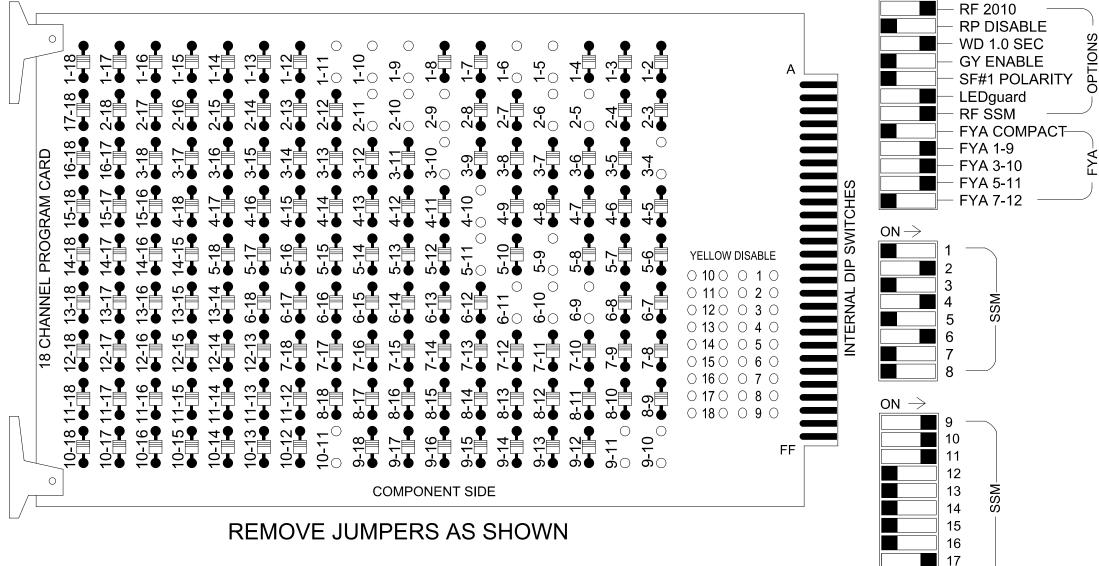## PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

WD ENABLE   ON   OFF
SW2

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-10, 1-11, 2-5, 2-6, 2-9, 2-10, 2-11, 3-4, 3-10, 4-10, 5-9, 5-11, 6-9, 6-10, 6-11, 9-10, 9-11, and 10-11.

18 CHANNEL PROGRAM CARD

A

COMPONENT SIDE

FF

REMOVE JUMPERS AS SHOWN

OPTIONS
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM

FYA
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

YELLOW DISABLE

O 10	O 1	O 0	
O 11	O 2	O 1	
O 12	O 3	O 2	
O 13	O 4	O 3	
O 14	O 5	O 4	
O 15	O 6	O 5	
O 16	O 7	O 6	
O 17	O 8	O 7	
O 18	O 9	O 8	

INTERNAL DIP SWITCHES

ON →
SSM: 1 2 3 4 5 6 7 8

ON →
SSM: 9 10 11 12 13 14 15 16 17 18

■ = DENOTES POSITION OF SWITCH

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

NOTES

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

2. Program controller to start up in phase 2 Green No Walk, 6 Green No Walk, 39 Phase Not On, and 40 Green No Walk.

3. Program Phase 39 for No Startup Veh Call.

4. Program phases 2, 6, and 40 for Min Recall.

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

6. The cabinet and controller are part of the #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

EQUIPMENT INFORMATION

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S4, S5, S7, S8, AUX S1, AUX S2, AUX S3, AUX S4
Phases Used	1, 2, 3, 4, 5, 6
Overlap "1"	*
Overlap "2"	*
Overlap "3"	*
Overlap "4"	NOT USED
Overlap "5"	*
Overlap "7"	*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

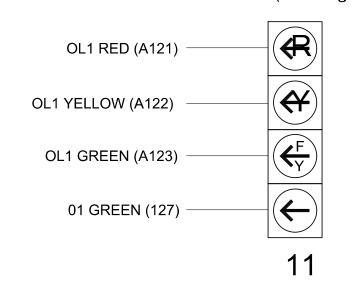| LOAD SWITCH NO.	S1	S2	S3	S4	S5			S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3		AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4			14	5	6	15	7	8	16	9	10	17		11	12	18
PHASE	1	2	2 PED	OL7	4			4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5		OL3	OL4	SPARE
SIGNAL HEAD NO.	11 *	21,22	NU	63	41	42	43	NU	51 *	61,62	NU	NU	NU	NU	11 *	63	31		32	51 *	NU	NU
RED		128			101	101				134						A124	A111	A111			
YELLOW	*	129		*	102	102			*	135						A112	A112				
GREEN		130			103	103				136						A113	A113				
RED ARROW				101											A121			A114			
YELLOW ARROW				102											A122	A125		A115			
FLASHING YELLOW ARROW															A123	A126		A116			
GREEN ARROW	127			118	103	103			133								A113				
✋																					
🚶																					

NU = Not Used

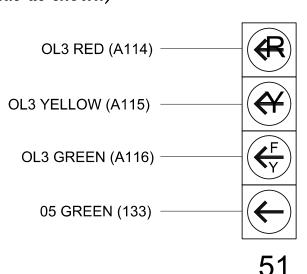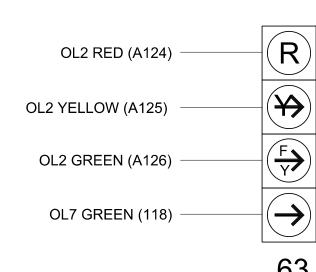* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT
(front view)

	1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I" U	∅ 1 1A*	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS
L	NOT USED													DC ISOLATOR ST DC ISOLATOR
FILE "J" U	∅ 5 5A*	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
L	NOT USED													NOT USED

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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

* Reflects the detector utilized in the "MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A" on Sheet 2.
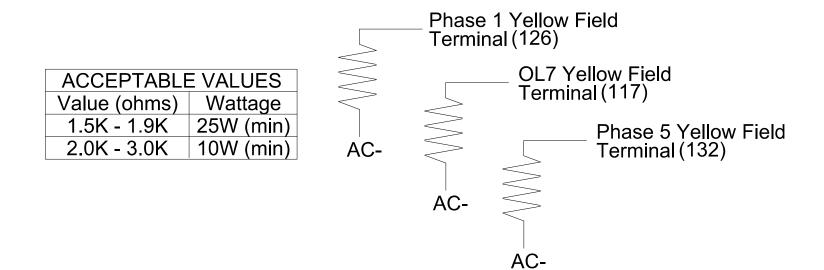
MULTIZONE DETECTION

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.

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)

- OL1 RED (A121) — R
- OL1 YELLOW (A122) — Y
- OL1 GREEN (A123) — FY
- 01 GREEN (127) — ←

11

- OL3 RED (A114) — R
- OL3 YELLOW (A115) — Y
- OL3 GREEN (A116) — FY
- 05 GREEN (133) — ←

51

- OL2 RED (A124) — R
- OL2 YELLOW (A125) — Y
- OL2 GREEN (A126) — →
- OL7 GREEN (118) — →

63

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)

- Phase 1 Yellow Field Terminal (126) — AC-
- OL7 Yellow Field Terminal (117) — AC-
- Phase 5 Yellow Field Terminal (132) — AC-

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387T3
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

Electrical and Programming
Details For:

Prepared for the Offices of:
Transportation Mobility and Safety Division

STV
STV Engineers, Inc.
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Division 6	Robeson County	Lumberton
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PREPARED BY: J.C. Grimm	REVIEWED BY:	T.M. Moody

REVISIONS

750 N. Greenfield Pkwy, Garner, NC 27529

SIGNATURE   DATE   3/19/2025

SIG. INVENTORY NO.   06-1387T3
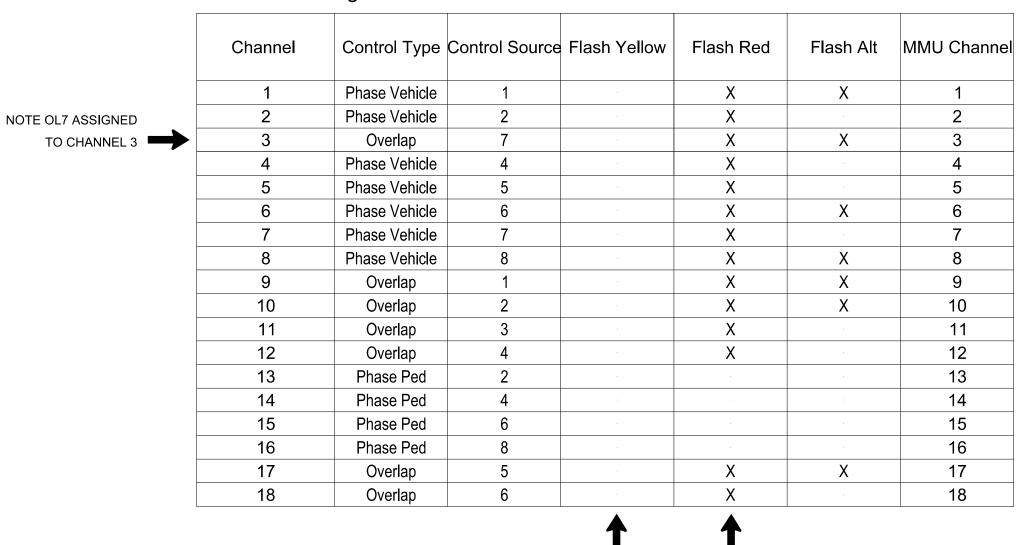
OUTPUT CHANNEL CONFIGURATION

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

NOTE OL7 ASSIGNED TO CHANNEL 3 →

NOTE: ALL RED FLASH

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal	Normal
Included Phases	2	6	6	3	4
Modifier Phases	1	4	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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	3	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal	Normal
Included Phases	-	6	-	3	4
Modifier Phases	1	4	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

← NOTICE INCLUDED PHASE

SEQUENCE DETAIL

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

Web Interface
Home >Controller >Sequence

Sequence 1

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

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

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	-
29	0	-

5A

Detector	Call Phase	Delay
15	5	-
31	0	-

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387T3
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

Temporary Design 3 - TMP Phase VI, Step 4
Electrical Detail - Sheet 2 of 4

Electrical and Programming Details For:

Prepared for the Offices of:

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
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. Moody	

REVISIONS	INIT.	DATE

SIG. INVENTORY NO. 06-1387T3

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750 N. Greenfield Pkwy, Garner, NC 27529

SIGNATURE 3/19/2025
DATE

PREEMPTION PROGRAMMING

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

Web Interface
Home >Controller >Preempt Configuration >Preempts

Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	1, 6, 39
Track Overlaps	1, 2, 3
Dwell Phases	3
Dwell Peds	-
Dwell Overlaps	5
Cycling Phases	3, 5
Cycling Peds	-
Cycling Overlaps	3, 5
Exit Phases	2, 6
Exit Overlaps	1, 2, 3
Delay	0
Call Ext Time	1.0
Max Presence	0
Max Pres Act	Terminate
Enter Min Green	1
Enter Walk	1
Enter Ped Clear	0
Enter Yellow Change	4.6
Enter Red Clear	3.0
Track Green	36
Track Yellow Clr	4.6
Track Red Clear	2.8
Dwell Green	7
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	X
Track Reserve	X

RAILROAD PREEMPTION WIRING DETAIL
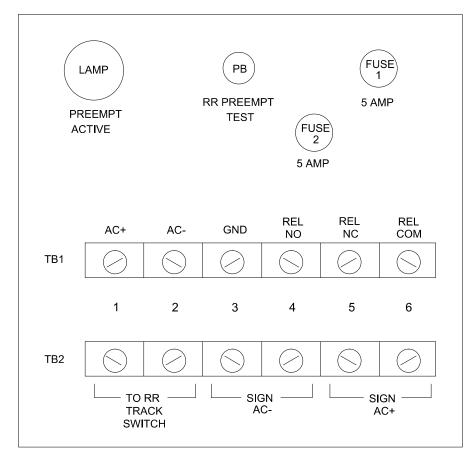
(wire as shown below)

PREEMPTION AND BLANKOUT SIGN CONTROL BOX

CABINET WIRING

NOTES

1. Relay K1 is shown in the energized (Preempt not active) normal operation state.

2. Relay K1 is a DPDT with 120VAC coil with octal base.

3. Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.

4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.

5. IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW

PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

MODEL 252 AC ISOLATOR CARD
(COMPONENT SIDE)

ON →

1 NORM	1
1 INV	2
2 NORM	3
2 INV	4

■ DENOTES POSITION OF SWITCH

SETTING = INVERTED OUTPUT ON CHANNEL 1

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387T3
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

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Electrical and Programming Details For:

Prepared for the Offices of:

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. Moody	

REVISIONS | INIT. | DATE

SIG. INVENTORY NO. 06-1387T3

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387T3
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL

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Electrical and Programming
Details For:

Prepared for the Offices of:

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. Moody	

REVISIONS	INIT.	DATE

SIGNATURE 3/19/2025
DATE

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

750 N. Greenfield Pkwy, Garner, NC 27529

DEFAULT PHASING DIAGRAM

Ø2+6
Ø2+5
Ø1+6
Ø1+5
Ø3
Ø4

DEFAULT RAIL PREEMPT PHASES
(High Priority)

Track Clear (Ø1+6+39)
Dwell 1 (Ø3)
Dwell 2 (Ø5)

ALTERNATE PHASING DIAGRAM

Ø2+6
Ø2+5
Ø1+6
Ø1+5
Ø3
Ø4

ALTERNATE RAIL PREEMPT PHASES
(High Priority)

Track Clear (Ø1+6+39)
Dwell 1 (Ø3)
Dwell 2 (Ø5)

PHASING DIAGRAM DETECTION LEGEND

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

PROJECT REFERENCE NO. U-5797
SHEET NO. Sig. 18.0

6 Phase
Fully Actuated
w/ Railroad Preemption
Signal System #DO6-18 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. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Program phase 40 to run concurrently with all phases during normal operation. Phase 39 must be incompatible with phase 40 and included as a track clear phase.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.
9. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

DEFAULT TABLE OF OPERATION

SIGNAL FACE	Ø01+15	Ø01+16	Ø02+15	Ø02+16	Ø3	Ø4	RRCLR	DW RE RL1	DW RE RL2	FLASH
11						Y	R		R	Y
21, 22	R	R	G	G	R	R	R	R	R	R
31	R	R	R	R	G	R	G	R	G	R
32	R	R	R	R	G	R	R	R	G	R
41	R	R	R	R	R	R	R	R	R	R
42	R	R	R	R	R	G	R	R	R	R
43	R	R	R	R	R	G	R	R	R	R
51						Y	R	R		Y
61, 62	R	G	R	G	R	R	R	R	R	R
63	R	G	R	G	R	Y	R	R	R	R
P31, P32	DW	DW	DW	DW	W	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DW	DRK

ALTERNATE TABLE OF OPERATION

SIGNAL FACE	Ø01+15	Ø01+16	Ø02+15	Ø02+16	Ø3	Ø4	RRCLR	DW RE RL1	DW RE RL2	FLASH
11							R			
21, 22	R	R	G	G	R	R	R	R	R	R
31	R	R	R	R	G	R	G	R	G	R
32	R	R	R	R	G	R	R	R	G	R
41	R	R	R	R	R	R	R	R	R	R
42	R	R	R	R	R	G	R	R	R	R
43	R	R	R	R	R	G	R	R	R	R
51							R			
61, 62	R	G	R	G	R	R	R	R	R	R
63	R	G	R	G	R	Y	R	R	R	R
P31, P32	DW	DW	DW	DW	W	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

41
11 51
31
21, 22 32 43 61, 62
63
P31, P32 P61, P62

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	4
Enter Yellow Change	4.6
Enter Red Clear	3.7
Track Green	37
Track Yellow Change	4.6
Track Red Clear	2.4
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	Y
Require All Red Entry	N

* Directs controller to use default phase timing.

This signal was designed for Advanced Preemption.

-Y2- Sta. 30+52± LT 67'±
-Y2- Sta. 31+52± LT 76'±
-Y2- Sta. 31+62± LT 67'±
Metal Pole #1 Std. Case #S30H2 -Y2- Sta. 30+42± LT 73'±
Metal Pole #2 Std. Case #S30H2 -Y2- Sta. 31+71± LT 71'±
NC 211 (N Roberts Avenue)
45 MPH -1% Grade
Boomerang Drive
25 MPH 0% Grade
45 MPH -1% Grade
25 MPH Design Speed -1% Grade
NC 211 (N Roberts Avenue)
Crossing No. 631465D
CSX Transportation
Metal Pole #4 Std. Case #S35H2 -Y2- Sta. 30+87± RT 55'±
Metal Pole #3 Std. Case #S35H2 -Y2- Sta. 31+63± RT 57'±
-Y2- Sta. 31+70± RT 47'±
Restaurant Driveway

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	39	40
Walk *	–	–	13	–	–	14		
Ped Clear *	–	–	22	–	–	17		
Min Green	7	12	7	7	7	12		
Passage *	2.0	2.0	2.0	2.0	2.0	2.0		
Max 1 *	15	90	20	20	15	90		
Yellow Change	3.0	4.6	3.2	3.2	3.0	4.6	4.6	4.6
Red Clear	2.4	1.8	3.3	3.7	3.4	1.8	2.4	3.7
Added Initial *	–	–	–	–	–	–		
Maximum Initial *	–	–	–	–	–	–		
Time Before Reduction *	–	–	–	–	–	–		
Time To Reduce *	–	–	–	–	–	–		
Minimum Gap	–	–	–	–	–	–		
Advance Walk	–	–	6	–	–	7		
Non Lock Detector	X	–	–	X	X	–		
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL		MIN RECALL
Dual Entry	X	–	–	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 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	-	*
					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
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Directional Drill	N/A
	Out of Pavement Detector	
	Microwave Detection Zone	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
A	Right Arrow "ONLY" Sign (R3-5R)	

Signal Upgrade - Final Design

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. Moody

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Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

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ENGINEER
TRENT M. MOODY

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Trent Moody
03/19/2025

REVISIONS	INIT.	DATE

SCALE
0   40
1"=40'

SIG. INVENTORY NO. 06-1387

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-10, 1-11, 1-15, 2-5, 2-6, 2-9, 2-10, 2-11, 2-15, 3-4, 3-10, 4-10, 5-9, 5-11, 6-9, 6-10, 6-11, 6-15, 9-10, 9-11, 9-15, 10-11, 10-15, 11-15, and 16-17.

WD ENABLE ON OFF
SW2

18 CHANNEL PROGRAM CARD

COMPONENT SIDE

REMOVE JUMPERS AS SHOWN

A

INTERNAL DIP SWITCHES

ON →
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

OPTIONS

FYA

YELLOW DISABLE

10	0	1	0
11	0	2	0
12	0	3	0
13	0	4	0
14	0	5	0
15	0	6	0
16	0	7	0
17	0	8	0
18	0	9	0

ON →
1
2
3
4
5
6
7
8
SSM

ON →
9
10
11
12
13
14
15
16
17
18
SSM

FF

■ = DENOTES POSITION OF SWITCH

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

NOTES

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

2. Program controller to start up in phase 2 Green No Walk, 6 Green No Walk, 39 Phase Not On, and 40 Green No Walk.

3. Program Phase 39 for No Startup Veh Call.

4. Program phases 2, 6, and 40 for Min Recall.

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

6. The cabinet and controller are part of the #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used...........................S1, S2, S4, S5, S7, S8, S9, S12, AUX S1, AUX S2, AUX S3, AUX S4
Phases Used.......................................1, 2, 3, 4, 5, 6, 6PED, 3PED
Overlap "1"..*
Overlap "2"..*
Overlap "3"..*
Overlap "4"..NOT USED
Overlap "5"..*
Overlap "7"..*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART
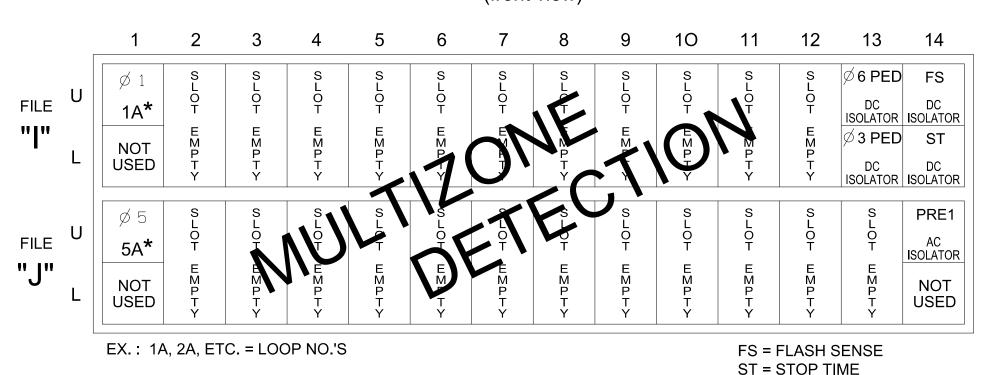
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	OL7	4	4 PED	5	6	6 PED	7	8	3 PED	OL1	OL2	OL5	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	63	41	42	43	NU	51	61,62	P61,P62	NU	NU	P31,P32	11	63	31	32	51	NU	NU
RED		128			101	101			134						A124	A111	A111	
YELLOW	*	129	*		102	102	*		135							A112	A112	
GREEN		130			103	103			136							A113	A113	
RED ARROW				101									A121			A114	
YELLOW ARROW				102									A122	A125		A115	
FLASHING YELLOW ARROW													A123	A126		A116	
GREEN ARROW	127			118	103	103		133							A113	
✋								119		110	
🚶								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)

OL1 RED (A121) → (R)
OL1 YELLOW (A122) → (Y)
OL1 GREEN (A123) → (FY)
01 GREEN (127) → (←)
11

OL3 RED (A114) → (R)
OL3 YELLOW (A115) → (Y)
OL3 GREEN (A116) → (FY)
05 GREEN (133) → (←)
51

OL2 RED (A124) → (R)
OL2 YELLOW (A125) → (Y)
OL2 GREEN (A126) → (↱)
OL7 GREEN (118) → (→)
63

INPUT FILE POSITION LAYOUT
(front view)

	1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I" U	Ø 1 1A*	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 6 PED DC ISOLATOR	FS DC ISOLATOR
L	NOT USED												Ø 3 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J" U	Ø 5 5A*	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
L	NOT USED													NOT USED

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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

* Reflects the detector utilized in the "MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A" on Sheet 2.

INPUT FILE CONNECTION & PROGRAMMING CHART

PED PUSH BUTTONS	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE
P61,P62	TB8-7,9	I13U	68	34	6	PED 6
P31,P32	TB8-8,9	I13L	70	36	8	PED 3

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L
- FILE J
- SLOT 2
- LOWER

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

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

Phase 1 Yellow Field Terminal (126) — AC-
OL7 Yellow Field Terminal (117) — AC-
Phase 5 Yellow Field Terminal (132) — AC-

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

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Final Design
Electrical Details - Sheet 1 of 4

Electrical and Programming Details For:

Prepared for the Offices of:
Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION
ITS & Signals Management 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. Moody	
REVISIONS		INIT.	DATE

SIG. INVENTORY NO. 06-1387

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-1387
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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PROFESSIONAL ENGINEER
T.M. MOODY

Trent Moody
SIGNATURE
3/19/2025

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 18.2

PED 3 PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Detector Configuration >Pedestrian Detector

Plan 1

NOTICE PHASE 3 PED ASSIGNED TO DETECTOR 8 PED →

Detector	Descripton	Call Phase	Call Overlap
2		2	0
4		4	0
6		6	0
8		3	0

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

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

Channel Configuration

NOTE OL7 ASSIGNED TO CHANNEL 3 →

NOTICE PHASE 3 PED ASSIGNED TO CHANNEL 16 →

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

NOTE: ALL RED FLASH

MAXTIME STARTUP AND SOFTWARE FLASH
PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

MAXTIME OVERLAP PROGRAMMING DETAIL
FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal	Normal
Included Phases	2	6	6	3	4
Modifier Phases	1	4	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

MAXTIME OVERLAP PROGRAMMING DETAIL
FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	3	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal	Normal
Included Phases	-	6	-	3	4
Modifier Phases	1	4	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

← NOTICE INCLUDED PHASE

SEQUENCE DETAIL

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

Web Interface
Home >Controller >Sequence

Sequence 1

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

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

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	-
29	0	-

5A

Detector	Call Phase	Delay
15	5	-
31	0	-

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

Final Design
Electrical Details - Sheet 2 of 4

Electrical and Programming
Details For:

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Division 6	Robeson County		Lumberton
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T.M. MOODY

SIGNATURE 3/19/2025
DATE

SIG. INVENTORY NO. 06-1387

PREEMPTION PROGRAMMING

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

Web Interface
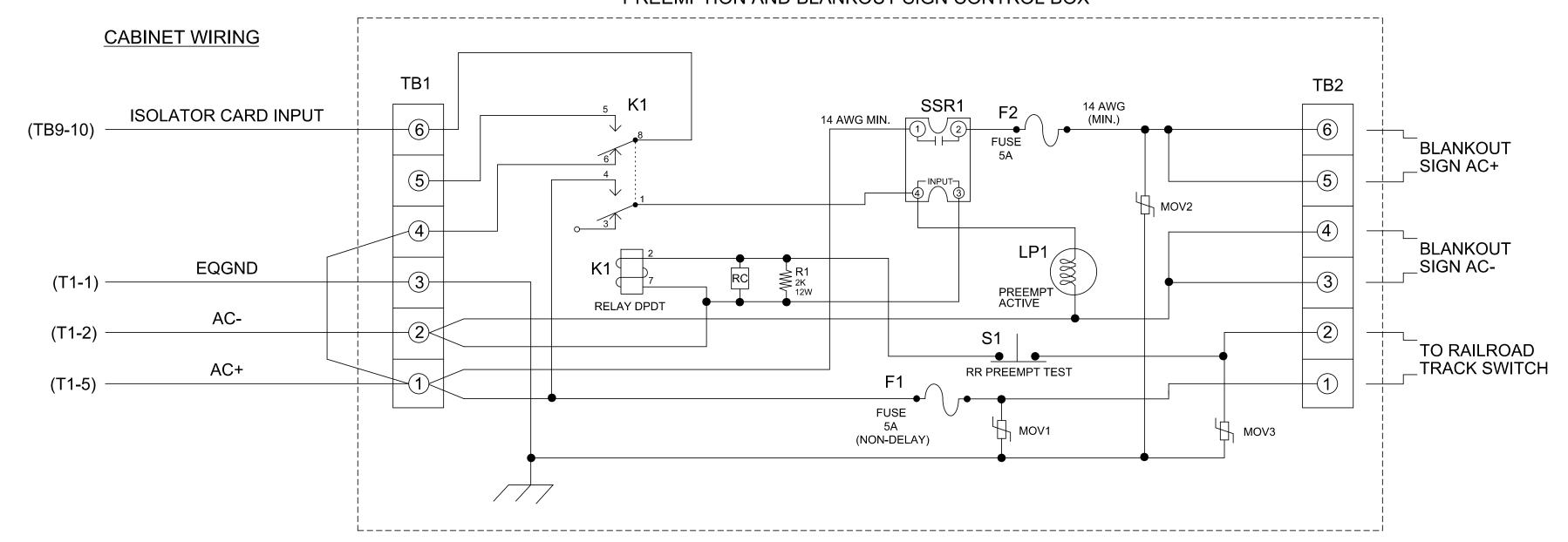Home >Controller >Preempt Configuration >Preempts

Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	1, 6, 39
Track Overlaps	1, 2, 3
Dwell Phases	3
Dwell Peds	-
Dwell Overlaps	5
Cycling Phases	3, 5
Cycling Peds	-
Cycling Overlaps	3, 5
Exit Phases	2, 6
Exit Overlaps	1, 2, 3
Delay	0
Call Ext Time	1.0
Max Presence	0
Max Pres Act	Terminate
Enter Min Green	1
Enter Walk	1
Enter Ped Clear	4
Enter Yellow Change	4.6
Enter Red Clear	3.7
Track Green	37
Track Yellow Clr	4.6
Track Red Clear	2.4
Dwell Green	7
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	X
Require All Red Entry	-
Track Clear Ovrd	X
Ped Clear During Yellow	X
Entry Omit OLTG	X
Track Reserve	X

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

PREEMPTION AND BLANKOUT SIGN CONTROL BOX

CABINET WIRING

NOTES

1. Relay K1 is shown in the energized (Preempt <u>not</u> active) normal operation state.

2. Relay K1 is a DPDT with 120VAC coil with octal base.

3. Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.

4. AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.

5. IMPORTANT!! A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW

PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)

MODEL 252 AC ISOLATOR CARD (COMPONENT SIDE)

	ON →	
1 NORM		1
1 INV		2
2 NORM		3
2 INV		4

■ DENOTES POSITION OF SWITCH

SETTING = INVERTED OUTPUT ON CHANNEL 1

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387
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Final Design
Electrical Details - Sheet 3 of 4

Electrical and Programming
Details For:

Prepared for the Offices of:

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Boomerang Drive / Restaurant Driveway

Division 6	Robeson County	Lumberton
PLAN DATE: Feb 2025	REVIEWED BY:	H.M. Surti
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MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1387
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

Final Design
Electrical Details - Sheet 4 of 4

Electrical and Programming
Details For:

Prepared for the Offices of:

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. Moody

REVISIONS

	INIT.	DATE

SIG. INVENTORY NO.   06-1387

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750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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3/19/2025
DATE

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

- ⟶● DETECTED MOVEMENT
- ⟶ UNDETECTED MOVEMENT (OVERLAP)
- – – – UNSIGNALIZED MOVEMENT
- ⤍ PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	F Y	F Y	R	R	R
21,22	R	R	G	G	R	R
41,42,43	R	R	R	R	G	R
51,52	←	R	←	R	R	R
61,62	R	G	R	G	R	R
63	R	F Y	R	F Y	R	R
81,82	R	R	R	R	G	R
83	R	R	R	F Y	R	R
P21,P22	DW	DW	W	W	DW	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	W	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	R	R	R	R	R
21,22	R	R	G	G	R	R
41,42,43	R	R	R	R	G	R
51,52	←	R	←	R	R	R
61,62	R	G	R	G	R	R
63	R	F Y	R	F Y	R	R
81,82	R	R	R	R	G	R
83	R	R	R	F Y	R	R
P21,P22	DW	DW	W	W	DW	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	W	W	DRK

MAXTIME DETECTOR INSTALLATION CHART

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	-	✳
					6#	-	-	X	-	X	-	
1B	6X40	0	✳	✳	1	15	-	X	-	X	-	✳
4A	6X40	0	✳	✳	4	3	-	X	-	X	-	✳
5A	6X40	0	✳	✳	5	-	-	X	-	X	-	✳
5B	6X40	0	✳	✳	5	-	-	X	-	X	-	✳
8A	6X40	0	✳	✳	8	3	-	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 1 – ⑥A
Channel	1	2
Phase	2	6
Direction of Travel	SB	NB
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
#D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road)

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. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. The Divison Traffic Engineer will determine the hours of use for each phasing plan.
9. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	14	–	–	14	14
Ped Clear *	–	14	–	–	15	32
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	3.9	3.2	3.0	3.9	3.9
Red Clear	3.1	2.3	3.5	3.2	2.3	2.8
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	7	–	–	7	7
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

All Heads L.E.D.

11 | 51,52 | 21,22 41,42,43 61,62 81,82 | 63 | 83 | P21,P22 P61,P62 P81,P82

LEGEND

PROPOSED		EXISTING
○⟶	Traffic Signal Head	●⟶
◐⟶	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
⊠	Controller & Cabinet	⊠
□	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
⟶	Directional Arrow	⟶
	Microwave Detection Zone	
—DD—	Directional Drill	N/A
○	Type II Signal Pedestal	●
Ⓐ	Pedestrian Crossing Sign (W11-2)	Ⓐ
Ⓑ	Downward Diagonal Arrow Plaque (W16-7P)	Ⓑ
Ⓒ	YIELD Sign (R1-2)	Ⓒ
Ⓓ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓓ

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New Installation
Temporary Design - TMP Phase III, Step 3

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

SR 1997 (Fayetteville Road)
at
Boomerang Drive/
Highland Avenue

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

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ENGINEER
TRENT M. MOODY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIGNATURE 3/19/2025
SIG. INVENTORY NO. 06-1388T

Various station labels:
-L- Sta 52+30± RT 92'±
-L- Sta 52+86± RT 48'±
-L- Sta 52+13± RT 69'±
-L- Sta 53+24± RT 93'±
-L- Sta 52+05± RT 64'±
-L- Sta 53+92± RT 62'±
-L- Sta 51+85± RT 57'±
-L- Sta 53+28± LT 67'±
-L- Sta 51+97± LT 73'±
-L- Sta 53+11± LT 79'±
-L- Sta 52+04± LT 75'±
-L- Sta 53+00± LT 96'±
-L- Sta 52+18± LT 82'±
-L- Sta 52+30± LT 109'±

SR 1997 (Fayetteville Road)
Boomerang Drive
Highland Avenue
25 MPH 0% Grade
35 MPH 0% Grade
35 MPH -1% Grade
35 MPH -1% Grade

SCALE 0 40 1"=40'

18 CHANNEL IP CONFLICT MONITOR
PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-3, 1-5, 1-6, 1-9, 1-10, 1-15, 1-17, 2-5, 2-6, 2-9, 2-13, 2-15, 2-17, 3-5, 3-6, 3-9, 3-10, 3-15, 3-17, 4-8, 4-10, 4-16, 5-9, 5-10, 5-13, 6-9, 6-10, 6-13, 6-15, 6-17, 8-10, 8-16, 9-10, 9-13, 9-15, 9-17, 10-15, 10-16, 10-17, 13-15, 13-17, and 15-17.

REMOVE JUMPERS AS SHOWN

18 CHANNEL PROGRAM CARD

COMPONENT SIDE

INTERNAL DIP SWITCHES

ON → OFF
WD ENABLE
SW2

OPTIONS
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM

FYA
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

YELLOW DISABLE

SSM: 1-8, 9-18

A ... FF

■ = DENOTES POSITION OF SWITCH

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

NOTES

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

2. Program phases 4 and 8 for Dual Entry.

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

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

5. The cabinet and controller are part of the #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

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, S9
S11, S12, AUX S1, AUX S2, AUX S3
Phases Used..1, 2, 2PED, 4, 5, 6, 6PED, 8, 8PED
Overlap "1"...*
Overlap "2"...*
Overlap "3"...NOT USED
Overlap "4"...NOT USED
Overlap "5"...*
Overlap "7"...*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	11	16	9	10	17	11	12	18
PHASE	1	2	2 PED	OL7	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	SPARE
SIGNAL HEAD NO.	★11	21,22	P21,P22	★83	★41,42,43	NU	51,52	61,62	P61,P62	NU	81,82	P81,P82	★11	83	★63	NU	NU	NU
RED		128			101			134			107			A124	A111			
YELLOW	★	129		★	102			135			108							
GREEN		130			103			136			109							
RED ARROW							131						A121					
YELLOW ARROW							132						A122	A125	A112			
FLASHING YELLOW ARROW													A123	A126	A113			
GREEN ARROW	127			118			133											
🚶			113						119			110						
🚶 (ped)			115						121			112						

NU = Not Used

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

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)

OL1 RED (A121) — R
OL1 YELLOW (A122) — Y
OL1 GREEN (A123) — F/Y
01 GREEN (127) — ←
11

OL2 RED (A124) — R
OL2 YELLOW (A125) — Y
OL2 GREEN (A126) — F/Y
OL7 GREEN (118) — →
83

OL5 RED (A111) — R
OL5 YELLOW (A112) — Y
OL5 GREEN (A113) — F/Y
63

INPUT FILE POSITION LAYOUT
(front view)

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

MULTIZONE DETECTION

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

FS = FLASH SENSE
ST = STOP TIME

* Reflects the detector utilized in the "MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A" on Sheet 3.

INPUT FILE CONNECTION & PROGRAMMING CHART

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

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

Phase 1 Yellow Field Terminal (126)
OL7 Yellow Field Terminal (117)
AC-
AC-

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

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THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1388T
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1997 (Fayetteville Road)
at
Boomerang Drive/
Highland Avenue

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

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

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 19.2

OUTPUT CHANNEL CONFIGURATION

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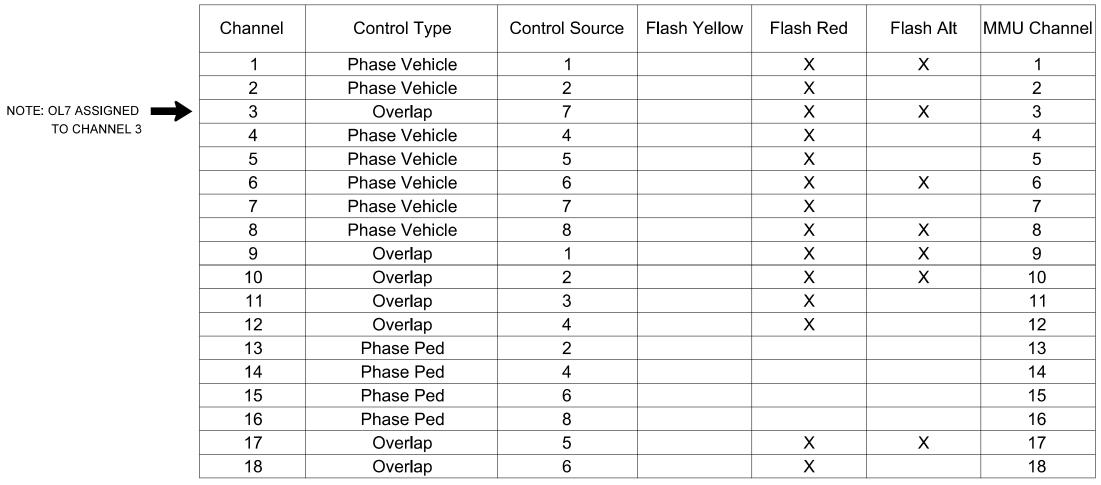Main Menu >Controller >More >Channels >Channel Options

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

NOTE: OL7 ASSIGNED TO CHANNEL 3

NOTE: ALL RED FLASH

MAXTIME OVERLAP PROGRAMMING DETAIL
FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal
Included Phases	2	8	6	1
Modifier Phases	1	1	-	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL
FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal
Included Phases	-	8	6	1
Modifier Phases	1	1	-	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

NOTICE INCLUDED PHASE

MAXTIME STARTUP AND SOFTWARE FLASH
PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1388T
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1997 (Fayetteville Road)
at
Boomerang Drive/
Highland Avenue

Division 6   Robeson County   Lumberton

PLAN DATE:	Feb 2025	REVIEWED BY:	H.M. Surti
PREPARED BY:	J.C. Grimm	REVIEWED BY:	T.W. Moody

REVISIONS	INIT.	DATE

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

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SEAL
NORTH CAROLINA
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SEAL
040329
ENGINEER
TRENT M. MOODY

Trent Moody
03/19/2025
DATE

SIG. INVENTORY NO. 06-1388T

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 19.3

MAXTIME DETECTOR PROGRAMMING DETAIL
FOR ALTERNATE PHASING LOOP 1A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0
29	0	0

MAXTIME ALTERNATE PHASING PATTERN
PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1388T
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:

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

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for:

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1977 (Fayetteville Road)
at
Boomerang Drive/
Highland Avenue

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

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NORTH CAROLINA
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DocuSigned by:
Trent Moody
03/19/2025
SIGNATURE DATE

SIG. INVENTORY NO. 06-1388T

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 20.0

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM

Ø2+6
Ø2+5
Ø1+6
Ø1+5
Ø4+8

PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
‖	←	←E/←F	F	→R	↑R	↓R
21, 22	R	R	G	G	R	R
41, 42, 43	R	R	R	R	G	R
51, 52	←	←R	→	→R	↑R	↓R
61, 62	R	G	R	G	R	R
63	R	↑E/F	R	↑E/F	R	R
81, 82	R	R	R	R	G	R
83	→↑	→	R	R↑E	↓R	R
P21, P22	DW	DW	W	W	DW	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
‖	←	←	→R	→R	↑R	↓R
21, 22	R	R	G	G	R	R
41, 42, 43	R	R	R	R	G	R
51, 52	←	←R	→	→R	↑R	↓R
61, 62	R	G	R	G	R	R
63	R	↑E/F	R	↑E/F	R	R
81, 82	R	R	R	R	G	R
83	→	→	R	R	↓R↑E	R
P21, P22	DW	DW	W	W	DW	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

MAXTIME DETECTOR INSTALLATION CHART

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

✳ Multi-zone Microwave Detection Zone

** Disable Delay During Alternate Phasing

Disable Phase Call for Loop During Alternate Phasing

5 Phase
Fully Actuated
#D06-17 Lumberton US 301 and
SR 1997 (Fayetteville Road)

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. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. The Divison Traffic Engineer will determine the hours of use for each phasing plan.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinate signal system timing values supersede these values.

RADAR DETECTION SYSTEM

FUNCTION	SENSOR 1 – ②A	SENSOR 1 – ⑥A
Channel	1	2
Phase	2	6
Direction of Travel	SB	NB
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

Metal Pole #1
Std. Case S35H2
-L- Sta 53+33±
RT 83'±

Metal Pole #2
Std. Case S30H2
-L- Sta 52+06±
RT 73'±

Metal Pole #4
Std. Case S35H2
-L- Sta 53+27±
LT 75'±

Metal Pole #3
Std. Case S35H2
-L- Sta 52+10±
LT 85'±

SR 1997 (Fayetteville Road)

Boomerang Drive

Highland Avenue

25 MPH 0% Grade

35 MPH 0% Grade

35 MPH -1% Grade

35 MPH -1% Grade

LEGEND

PROPOSED		EXISTING
○—	Traffic Signal Head	●—
◐—	Modified Signal Head	N/A
—	Sign	—
⊡	Pedestrian Signal Head With Push Button & Sign	■
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
— —	2-in Underground Conduit	
	Right of Way	
N/A	Directional Arrow	→
⬯	Microwave Detection Zone	
◎	Metal Strain Pole	■
○	Type II Signal Pedestal	●
— DD —	Directional Drill	N/A
Ⓐ	Pedestrian Crossing Sign (W11-2)	Ⓐ
Ⓑ	Downward Diagonal Arrow Plaque (W16-7P)	Ⓑ
Ⓒ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	14	–	–	14	14
Ped Clear *	–	14	–	–	15	32
Min Green *	7	10	7	7	10	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	70	30	20	70	30
Yellow Change	3.0	3.9	3.2	3.0	3.9	3.9
Red Clear	3.1	2.3	3.5	3.2	2.3	2.8
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	7	–	–	7	7
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	X	–	–	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 FACE I.D.

All Heads L.E.D.

12" — 11

12" — 51,52

12" — 21,22 41,42,43 61,62 81,82

12" — 63

12" — 83

16" — P21,P22 P61,P62 P81,P82

Signal Upgrade - Final Design

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

SR 1997 (Fayetteville Raod) at Boomerang Drive/ Highland Avenue

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

SIG. INVENTORY NO. 06-1388

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ENGINEER
TRENT M. MOODY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Trent Moody
2/10/2025
DATE

SCALE
0 ——— 40
1"=40'

SIG. INVENTORY NO. 06-1388

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-3, 1-5, 1-6, 1-9, 1-10, 1-15, 1-17, 2-5, 2-6, 2-9, 2-13, 2-15, 2-17, 3-5, 3-6, 3-9, 3-10, 3-15, 3-17, 4-8, 4-10, 4-16, 4-16, 5-9, 5-10, 5-13, 6-9, 6-10, 6-13, 6-15, 6-17, 8-10, 8-16, 9-10, 9-13, 9-15, 9-17, 10-15, 10-16, 10-17, 13-15, 13-17, and 15-17.

WD ENABLE ON OFF

SW2

ON →
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

OPTIONS / FYA

A

INTERNAL DIP SWITCHES

YELLOW DISABLE
- 10 ○○ 1 ○
- 11 ○○ 2 ○
- 12 ○○ 3 ○
- 13 ○○ 4 ○
- 14 ○○ 5 ○
- 15 ○○ 6 ○
- 16 ○○ 7 ○
- 17 ○○ 8 ○
- 18 ○○ 9 ○

18 CHANNEL PROGRAM CARD

ON →
1
2
3
4
5
6
7
8
SSM

ON →
9
10
11
12
13
14
15
16
17
18
SSM

FF

COMPONENT SIDE

REMOVE JUMPERS AS SHOWN

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

■ = DENOTES POSITION OF SWITCH

NOTES

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

2. Program phases 4 and 8 for Dual Entry.

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

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

5. The cabinet and controller are part of the #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

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, S9
S11, S12, AUX S1, AUX S2, AUX S3
Phases Used.......................................1, 2, 2PED, 4, 5, 6, 6PED, 8, 8PED
Overlap "1"..*
Overlap "2"..*
Overlap "3"..NOT USED
Overlap "4"..NOT USED
Overlap "5"..*
Overlap "7"..*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	11	16	9	10	17	11	12	18
PHASE	1	2	2 PED	OL7	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	SPARE
SIGNAL HEAD NO.	★11	21,22	P21, P22	★83	★41,42, 43	NU	51,52	61,62	P61, P62	NU	81,82	P81, P82	★11	★83	★63	NU	NU	NU
RED		128			101			134			107			A124	A111			
YELLOW	★	129		★	102			135			108							
GREEN		130			103			136			109							
RED ARROW							131						A121					
YELLOW ARROW							132						A122	A125	A112			
FLASHING YELLOW ARROW													A123	A126	A113			
GREEN ARROW	127			118			133											
🚶		113							119			110						
🚶		115							121			112						

NU = Not Used

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

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	1O	11	12	13	14

FILE "I" — U: ∅1 1A*, SLOT EMPTY ... ∅2 PED, ∅6 PED, FS
FILE "I" — U: NOT USED, DC ISOLATOR, DC ISOLATOR, DC ISOLATOR
L: NOT USED, ∅8 PED, ST
DC ISOLATOR, DC ISOLATOR

FILE "J" — U/L: SLOT EMPTY (all)

MULTIZONE DETECTION

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

FS = FLASH SENSE
ST = STOP TIME

* Reflects the detector utilized in the "MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A" on Sheet 3.

INPUT FILE CONNECTION & PROGRAMMING CHART

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

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

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

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

FYA SIGNAL WIRING DETAIL

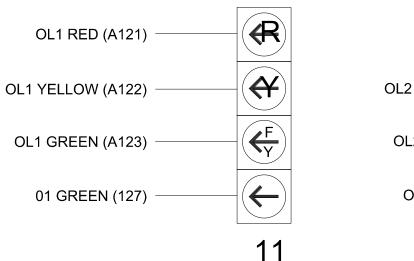(wire signal heads as shown)

OL1 RED (A121) — ⊗R
OL1 YELLOW (A122) — ⊗Y
OL1 GREEN (A123) — ⊗FY
01 GREEN (127) — ⊗←
11

OL2 RED (A124) — R
OL2 YELLOW (A125) — ⊗Y
OL2 GREEN (A126) — ⊗FY
OL7 GREEN (118) — ⊗→
83

OL5 RED (A111) — R
OL5 YELLOW (A112) — ⊗Y
OL5 GREEN (A113) — ⊗FY
63

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

Phase 1 Yellow Field Terminal (126)
OL7 Yellow Field Terminal (117)

AC-
AC-

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1388
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Final Design
Electrical Detail - Sheet 1 of 3

st v
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(704) 372-1885
NC License Number F-0991

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for:
Mobility and Safety Division

SR 1997 (Fayetteville Road)
at
Boomerang Drive/
Highland Avenue

Division 6 — Robeson County — Lumberton

PLAN DATE: Feb 2025	REVIEWED BY: H.M. Surti
PREPARED BY: J.C. Grimm	REVIEWED BY: T.M. Moody

750 N.Greenfield Pkwy,Garner,NC 27529

REVISIONS — INIT. — DATE

SEAL
NORTH CAROLINA
SEAL 040329
PROFESSIONAL ENGINEER
T.M. Moody

Trent Moody — 2/10/2025
DATE

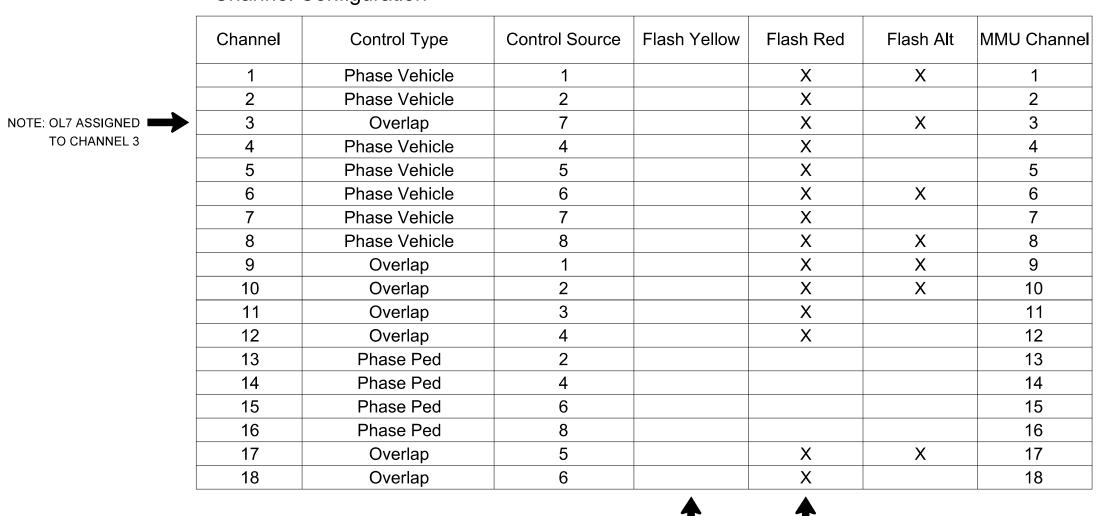SIG. INVENTORY NO. — 06-1388

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

NOTE: OL7 ASSIGNED TO CHANNEL 3 →

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

↑ ↑
NOTE: ALL RED FLASH

MAXTIME OVERLAP PROGRAMMING DETAIL
FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal
Included Phases	2	8	6	1
Modifier Phases	1	1	-	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL
FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	5	7
Type	FYA - 4 Section	FYA - 4 Section	FYA - 4 Section	Normal
Included Phases	-	8	6	1
Modifier Phases	1	1	-	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME STARTUP AND SOFTWARE FLASH
PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1388
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Final Design
Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1997 (Fayetteville Road)
at
Boomerang Drive/
Highland Avenue

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

REVISIONS | INIT. | DATE

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Prepared for:
Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
SEAL
040329
ENGINEER
TRENT M. MOODY

DocuSigned by:
Trent Moody
2/10/2025
DATE

SIG. INVENTORY NO. 06-1388

MAXTIME DETECTOR PROGRAMMING DETAIL
FOR ALTERNATE PHASING LOOP 1A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	0
29	0	0

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

MAXTIME ALTERNATE PHASING PATTERN
PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1388
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

Final Design
Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for:

SR 1977 (Fayetteville Road)
at
Boomerang Drive/
Highland Avenue

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

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SIG. INVENTORY NO.   06-1388

SEAL

SEAL
040329

2/10/2025
DATE

SIG. INVENTORY NO.   06-1388

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 21.0

DEFAULT PHASING DIAGRAM

Ø6   Ø3

ALTERNATE PHASING DIAGRAM

Ø6   Ø3

PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE		FLASH
	Ø3	Ø6	
31	⤾	⟲R	R
32	←	F/Y	R
61, 62	R	G	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE		FLASH
	Ø3	Ø6	
31	⤾	⟲R	R
32	←	F/Y	R
61, 62	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

31   32   61, 62

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	
3A	6X40	0	✳	✳	3	15**	-	X	-	X	-	✳	

✳ Multi-zone Microwave Detection Zone

** Disable Delay During Alternate Phasing

RADAR DETECTION SYSTEM

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

2 Phase
Fully Actuated
#D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road)

NOTES

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

Boomerang Drive

35 MPH 1% Grade

Pole Mounted Cabinet

-L- Sta. 54+65±
RT 61'±

-L- Sta. 54+89±
RT 63'±

SR 1997 (Fayetteville Road)

35 MPH -1% Grade

-L- Sta. 55+04±
LT 54'±

Highland Avenue

SR 1997 (Fayetteville Road)

MAXTIME TIMING CHART

FEATURE	PHASE	
	3	6
Walk *	–	–
Ped Clear *	–	–
Min Green	7	10
Passage *	2.0	2.0
Max 1 *	20	90
Yellow Change	3.0	3.8
Red Clear	3.0	1.0
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	–
Non Lock Detector	X	–
Vehicle Recall	–	MIN RECALL
Dual Entry	–	–

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

LEGEND

PROPOSED		EXISTING
○─►	Traffic Signal Head	●─►
●─►	Modified Signal Head	N/A
○──●	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	▨
Ⓐ	No U-turn/No Left Turn Sign (R3-18)	Ⓐ

STV

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

New Installation
Temporary Design - TMP Phase III, Step 1

SR 1997 (Fayetteville Road)
at
Boomerang Drive
Temporary U-Turn South

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

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ENGINEER
TRENT M. MOODY

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2/10/2025

SIG. INVENTORY NO. 06-1415T

SCALE
0   40
1"=40'

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

WD ENABLE — ON OFF — SW2

REMOVE DIODE JUMPERS 1-3, 1-6, 1-9, 1-10, 3-6, 3-9, 3-10, AND 9-10.

18 CHANNEL PROGRAM CARD

COMPONENT SIDE

INTERNAL DIP SWITCHES

ON →
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

OPTIONS / FYA

YELLOW DISABLE
- O 10 O 1 O
- O 11 O 2 O
- O 12 O 3 O
- O 13 O 4 O
- O 14 O 5 O
- O 15 O 6 O
- O 16 O 7 O
- O 17 O 8 O
- O 18 O 9 O

ON →
1 2 3 4 5 6 7 8   SSM

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

■ = DENOTES POSITION OF SWITCH
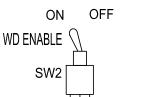
REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

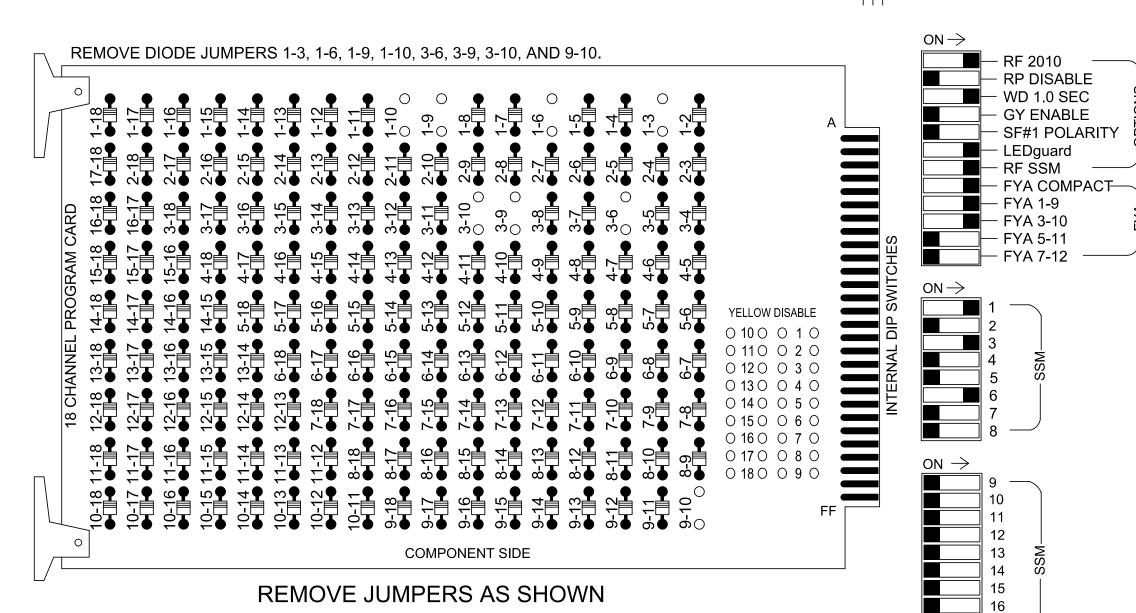2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

3. Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

NOTES

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

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

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

4. The cabinet and controller are part of the Signal System #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

EQUIPMENT INFORMATION

Controller	2070LX
Cabinet	336
Software	Q-Free MAXTIME
Cabinet Mount	Pole
Output File Positions	12
Load Switches Used	S1, S3, S4, S6, S8
Phases Used	1, 2, 3, 6
Overlap "1"	*
Overlap "2"	*
Overlap "3"	NOT USED
Overlap "4"	NOT USED

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	9	13	3	4	10	14	5	6	15	7	8	16
PHASE	OL1	2	3 GRN	2 PED	OL2	4	3 GRN	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	32★	NU	32★	NU	31★	NU	31★	NU	NU	61,62	NU	NU	NU	NU
RED								134				
YELLOW								135				
GREEN								136				
RED ARROW	125			116								
YELLOW ARROW	126			117								
FLASHING YELLOW ARROW	127			118								
(walk icon)												
GREEN ARROW			114			105						
(ped icon)			*			*						

NU = Not Used

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

INPUT FILE POSITION LAYOUT
(front view)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
SLOT EMPTY	SLOT EMPTY	∅ 3 3A* NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS / ST

FILE "I" U L

MULTIZONE DETECTION

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

FS DC ISOLATOR
ST DC ISOLATOR

* Reflects the detector utilized in the "MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A" on Sheet 3.

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

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

Phase 2 Walk Field Terminal (115)
Phase 4 Walk Field Terminal (106)
AC-
AC-

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)

OL2 RED (116) (LOAD SWITCH S4-RED)
OL2 YELLOW (117) (LOAD SWITCH S4-YELLOW)
OL2 GREEN (118) (LOAD SWITCH S4-GREEN)
03 GREEN (105) (LOAD SWITCH S6-YELLOW)
31

OL1 RED (125) (LOAD SWITCH S1-RED)
OL1 YELLOW (126) (LOAD SWITCH S1-YELLOW)
OL1 GREEN (127) (LOAD SWITCH S1-GREEN)
03 GREEN (114) (LOAD SWITCH S3-YELLOW)
32

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-1415T
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for:
Mobility and Safety Division

SR 1997 (Fayetteville Road) at Boomerang Drive Temporary U-Turn South

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

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ENGINEER
TRENT M. MOODY

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DocuSigned by: Trent Moody   2/10/2025   DATE

SIG. INVENTORY NO. 06-1415T

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 21.2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Overlap	1		X	X	1
2	Phase Vehicle	2		X		2
3	Overlap	2		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 OL1 ASSIGNED → TO CHANNEL 1

NOTE OL2 ASSIGNED → TO CHANNEL 3

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE INCLUDED PHASES ON OL1 AND OL2

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

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEADS 31&32

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	Phase Green	3
34	C1-36	Not Active	
35	C1-37	Phase Green	3
36	C1-38	Not Active	

NOTICE OUTPUT REMAPPING →

SEQUENCE DETAIL

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

Web Interface
Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	6,a,3,b
2	-

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1415T
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

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

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SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for:

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900 West Trade St., Suite 715
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(704) 372-1885
NC License Number F-0991

SR 1997 (Fayetteville Road)
at
Boomerang Drive
Temporary U-Turn South

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

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ENGINEER
TRENT M. MOODY

2/10/2025
DATE

SIG. INVENTORY NO. 06-1415T

750 N.Greenfield Pkwy,Garner,NC 27529

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 21.3

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases
for heads 31, and 32 to
run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 3
call on loop 3A to 0 seconds.

PED YELLOW CONFLICT MONITOR WIRING DETAIL
(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode with the 16 or 18 Channel Monitor,
the cabinet must be wired such that the (unused) Ped Yellow load switch
outputs are wired to the conflict monitor as follows: From 2 PY
(field term. 114) to chan. 9 green (monitor pin 13), from 4 PY (field
term. 105) to chan. 9 yellow (monitor pin 16).

Follow the instructions below to make appropriate connections:
STEP 1: Fold down rear panel of output file.
STEP 2: Find unused wiring harness fom conflict monitor card edge
connector (which should be tied and bundled together).
STEP 3: Find the connector that correspond to the folloeing conflict
monitor card edge pins and solder wire the the appropiate
terminal on the rear of the output file shown below:

CMU-13 ---------------------------2PY (term. 114)
CMU-16 ---------------------------4PY (term. 105)

NOTE: Some cabinet manufacturers use keyed connectors to accomlplish
this wiring configuration. If connectors are used, fold down the
rear panel of the output file and find the set of 3 keyed connectors
and connect them as shown below:

1 - 2PY	------------	1- CMU-13
2 - 4PY	------------	2- CMU-16
3 - 6PY	------------	3- CMU-R
4 - 8PY	------------	4- CMU-U

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

MAXTIME DETECTOR PROGRAMMING DETAIL
FOR ALTERNATE PHASING LOOP 3A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

	Detector	Call Phase	Delay
3A	7	3	0

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-1415T
DESIGNED: Feb 2025
SEALED: 2/10/2025
REVISED:

DOCUMENT NOT CONSIDERED
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Temporary Design - TMP Phase III, Step 1
Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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900 West Trade St., Suite 715
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NC License Number F-0991

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

SR 1997 (Fayetteville Road)
at
Boomerang Drive
Temporary U-Turn South

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

REVISIONS	INIT.	DATE

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TRENT M. MOODY

Trent Moody   2/10/2025
DATE

SIG. INVENTORY NO. 06-1415T

PHASING DIAGRAM

Ø2+6

Ø3

Ø2+5

Ø4 Ped

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø2+5	Ø2+6	Ø3	Ø4 PED	FLASH
21, 22	G	G	R	R	R
31, 32	R	R	G	R	R
33	→	R	F→	R	R
51	→	R	R	R	R
61, 62	R	G	R	R	R
P41, P42	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

R / Y / ← 12"
31, 32 51

R / Y / G 12"
21, 22 61, 62

R / R / R / ↑ / ↓ 12"
33

P41, P42 16"

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	
3A	6X40	0	✳	✳	3	3	-	X	-	X	-	✳	
3B	6X40	0	✳	✳	3	-	-	X	-	X	-	✳	
5A	6X40	0	✳	✳	5	3	-	X	-	X	-	✳	
5B	6X40	0	✳	✳	5	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

4 Phase
Fully Actuated
Signal System #D06-17 Lumberton
US 301 and SR 1997 (Fayetteville Road)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Bag and disconnect existing pedestrian signal heads numbered P31 and P62.

45 MPH -1% Grade

SR 1984 (Linkhaw Road)

5B 3B 3A

-L- Sta. 69+55±
RT 76'±

Disconnect & Bag
(See Note 12)

-L- Sta. 68+08±
RT 84'±

45 MPH -1% Grade

P62

SCHOOL

SR 1997 (Fayetteville Road)

62
61

6A

5A

2A

51
21
22

P31

Disconnect & Bag
(See Note 12)

P42

SR 1997 (Fayetteville Road)

45 MPH -1% Grade

33 32 31

-L- Sta. 69+56±
LT 68'±

-L- Sta. 68+33±
LT 68'±

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy Sign	
	Metal Strain Pole	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
	Type II Signal Pedestal	
N/A	Curb Ramp	
	Construction Zone	
	Pedestrian Barricade	
	Portable Barrier	
	Microwave Detection Zone	

MAXTIME TIMING CHART

FEATURE	PHASE				
	2	3	4 (PED)	5	6
Walk *	–	–	7	–	–
Ped Clear *	–	–	21	–	–
Min Green	12	7	7	7	12
Passage *	2.0	2.0	–	2.0	2.0
Max 1 *	90	30	31	20	90
Yellow Change	4.6	3.0	3.0	3.0	4.6
Red Clear	1.6	3.4	1.0	2.3	1.6
Added Initial *	–	–	–	–	–
Maximum Initial *	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–
Time To Reduce *	–	–	–	–	–
Minimum Gap	–	–	–	–	–
Advance Walk	–	–	–	–	–
Non Lock Detector	–	X	X	X	–
Vehicle Recall	MIN RECALL	–	–	–	MIN RECALL
Dual Entry	–	–	–	–	–

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

Signal Upgrade
Temporary Design 1 - TMP Phase I

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw 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

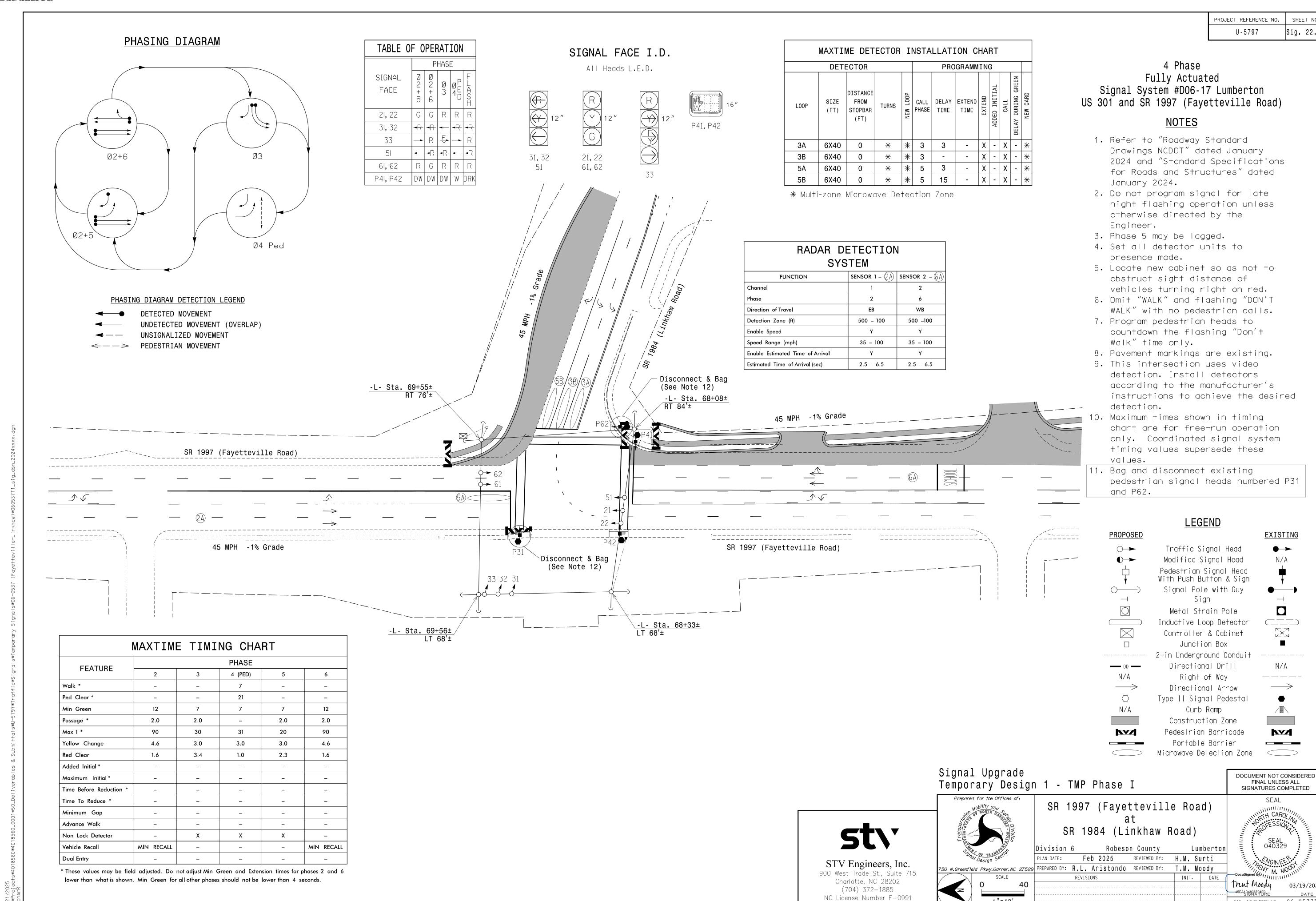SCALE
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1"=40'

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FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
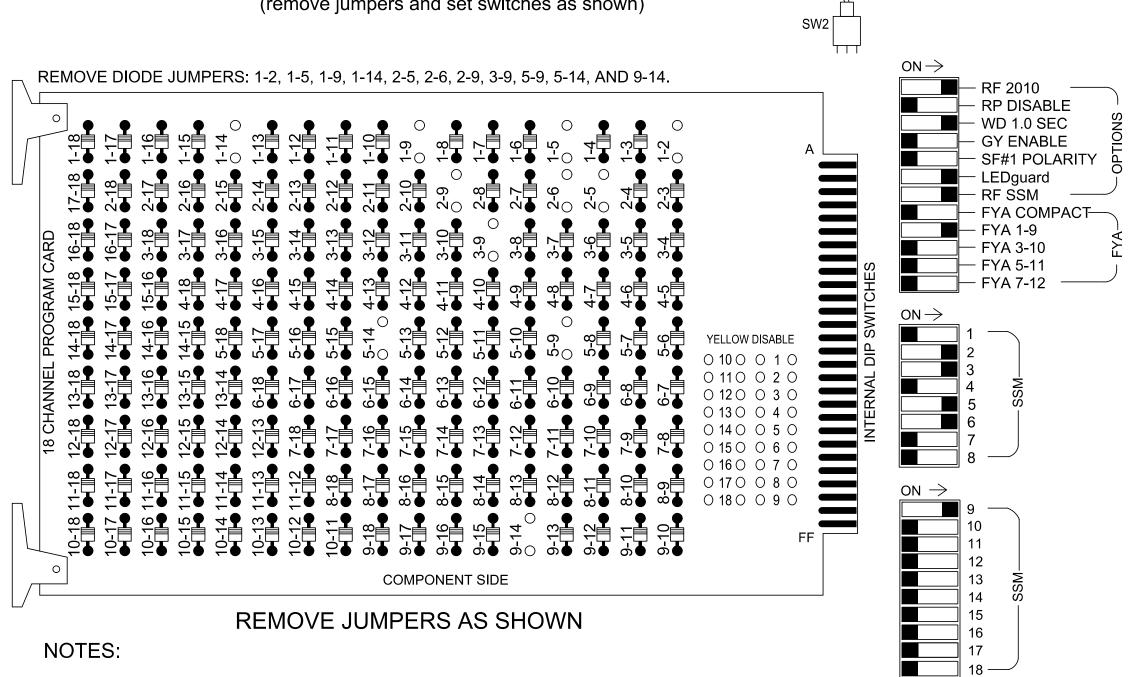PROFESSIONAL
SEAL
040329
ENGINEER
TRENT M. MOODY

Trent Moody
03/19/2025
SIGNATURE | DATE

SIG. INVENTORY NO. 06-0537TI

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

ON   OFF
WD ENABLE
SW2

REMOVE DIODE JUMPERS: 1-2, 1-5, 1-9, 1-14, 2-5, 2-6, 2-9, 3-9, 5-9, 5-14, AND 9-14.

ON →
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

OPTIONS / FYA

18 CHANNEL PROGRAM CARD

INTERNAL DIP SWITCHES

A

FF

COMPONENT SIDE

ON →
1
2
3
4
5
6
7
8
SSM

YELLOW DISABLE
O 10 O 1 O
O 11 O 2 O
O 12 O 3 O
O 13 O 4 O
O 14 O 5 O
O 15 O 6 O
O 16 O 7 O
O 17 O 8 O
O 18 O 9 O

ON →
9
10
11
12
13
14
15
16
17
18
SSM

REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

3. Ensure that the Red Enable is active at all times during normal operation.

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

■ = DENOTES POSITION OF SWITCH

NOTES

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

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

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

4. The cabinet and controller are part of the Signal System #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

EQUIPMENT INFORMATION

Controller...2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount......................................Base
Output File Positions.........................18 With Aux. Output File
Load Switches Used..........................S1, S2, S4, S6, S7, S8, AUX S1
Phases Used.......................................2, 3, **4, 4PED, 5, 6
Overlap "1"..*
Overlap "2"..NOT USED
Overlap "3"..NOT USED
Overlap "4"..NOT USED
Overlap "7"..*
Overlap "8"..*

*See overlap programming detail on sheet 2
**Phase used for timing purposes

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	OL7	2	2 PED	3	4	4 PED	OL8	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	33★	21,22	NU	31,32	NU	P41 P42	51	61,62	NU	NU	NU	NU	33★	NU	NU	NU	NU	NU
RED		128						134					A121					
YELLOW	✱	129						135										
GREEN		130						136										
RED ARROW				116		131												
YELLOW ARROW				117		132							A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127			118		133												
🖐					104													
🚶					106													

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

INPUT FILE POSITION LAYOUT
(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L												Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J" U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
FILE "J" L														

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE
PED PUSH BUTTONS						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

OL7 Yellow Field Terminal (126)

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

AC-

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)

OL1 RED (A121) → R
OL1 YELLOW (A122) → Y
OL1 GREEN (A123) → FYA
OL7 GREEN (127) → →

33

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0537T1
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1997 (Fayetteville Road) at SR 1984 (Linkhaw Road)

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

REVISIONS   INIT.   DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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040329
ENGINEER
T.M. MOODY

SIGNATURE   3/19/2025
DATE

SIG. INVENTORY NO. 06-0537T1

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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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

NOTICE OL7 ASSIGNED TO CHANNEL 1 ➡

NOTICE OL8 ASSIGNED TO CHANNEL 5 ➡

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

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	7	8
Type	FYA 4 - Section	Normal	Normal
Included Phases	3	4,5	4,5
Modifier Phases	4,5	-	-
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

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0537T1
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:

Temporary Design 1 - TMP Phase I
Electrical Detail - Sheet 2 of 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw 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

SIG. INVENTORY NO. 06-0537T1

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TRENT M. MOODY

Trent Moody
03/19/2025
SIGNATURE DATE

SIG. INVENTORY NO. 06-0537T1

PHASING DIAGRAM

Ø2+6

Ø3

Ø2+5

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø2+5	Ø2+6	Ø3	FLASH
21, 22	G	G	R	R
31, 32	R	R	R	R
33	→	R	F Y	R
51	←	R	R	R
61, 62	R	G	R	R
63	R	F Y	R	R
P61, P62	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

R / Y / ← 12"

31, 32
51

R / Y / G 12"

21, 22
61, 62

R / →↑ / F→ / →↓ 12"

33
63

P61, P62 16"

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
3A	6X40	0	✱	✱	3	3	-	X	-	X	-	✱
3B	6X40	0	✱	✱	3	-	-	X	-	X	-	✱
5A	6X40	0	✱	✱	5	3	-	X	-	X	-	✱
5B	6X40	0	✱	✱	5	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

3 Phase
Fully Actuated
Signal System #D06-17 Lumberton
US 301 and SR 1997 (Fayetteville Road)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Pavement markings are existing.
8. This intersection uses video 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.
10. Bag and disconnect existing pedestrian signal head numbered P41.

Map labels

45 MPH -1% Grade

SR 1984 (Linkhaw Road)

-L- Sta. 69+49±
RT 81'±

Disconnect & Bag
(See Note 10)

45 MPH -1% Grade

SR 1997 (Fayetteville Road)

SCHOOL SCHOOL

SR 1997 (Fayetteville Road)

45 MPH -1% Grade

P61, P62, P41

5B 3B 3A

63, 62, 61

51, 21, 22

33 32 31

⑥A

⑤A

②A

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
□	Pedestrian Signal Head With Push Button & Sign	■
○	Signal Pole with Guy	●
◎	Metal Strain Pole	□
⬭	Inductive Loop Detector	⬭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
	2-in Underground Conduit	
-- oo --	Directional Drill	N/A
	Right of Way	
→	Directional Arrow	N/A
○	Type II Signal Pedestal	●
	Curb Ramp	N/A
	Guardrail	N/A
	Construction Zone	
▼◀▼	Pedestrian Barricade	▼◀▼
	Portable Barrier	
～～	Temporary Shoring	～～
⬭	Microwave Detection Zone	

MAXTIME TIMING CHART

FEATURE	PHASE			
	2	3	5	6
Walk *	–	–	–	14
Ped Clear *	–	–	–	22
Min Green	12	7	7	12
Passage *	2.0	2.0	2.0	2.0
Max 1 *	90	30	20	90
Yellow Change	4.6	3.0	3.0	4.6
Red Clear	1.7	3.3	2.9	1.7
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap *	–	–	–	–
Advance Walk	–	–	–	7
Non Lock Detector	–	X	X	–
Vehicle Recall	MIN RECALL			MIN RECALL
Dual Entry	–	–	–	–

* 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 II, Step 3

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

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw 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

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ENGINEER
TRENT M. MOODY

Trent Moody
03/19/2025

SIG. INVENTORY NO. 06-0537T2

SCALE
0 ___ 40
1"=40'

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 23.1

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

ON   OFF
WD ENABLE
SW2

REMOVE DIODE JUMPERS: 1-2, 1-5, 1-9, 2-5, 2-6, 2-9, 2-10, 2-15, 3-8, 3-9, 3-10, 5-9, 6-10, 6-15, 8-9, 8-10, 9-10, AND 10-15.

ON →
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

OPTIONS
FYA

18 CHANNEL PROGRAM CARD
INTERNAL DIP SWITCHES

A

FF

YELLOW DISABLE
O 10 O O 1 O
O 11 O O 2 O
O 12 O O 3 O
O 13 O O 4 O
O 14 O O 5 O
O 15 O O 6 O
O 16 O O 7 O
O 17 O O 8 O
O 18 O O 9 O

ON →
1
2
3
4
5
6
7
8
SSM

ON →
9
10
11
12
13
14
15
16
17
18
SSM

COMPONENT SIDE

REMOVE JUMPERS AS SHOWN

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

■ = DENOTES POSITION OF SWITCH

NOTES

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

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

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

4. The cabinet and controller are part of the Signal System #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

EQUIPMENT INFORMATION

Controller...2070LX
Cabinet..332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions.........................18 With Aux. Output File
Load Switches Used..........................S1, S2, S4, S7, S8, S9, S11
                                                        AUX S1, AUX S2
Phases Used.......................................2, 3, 5, 6, 6PED
Overlap "1"...*
Overlap "2"...*
Overlap "3"...NOT USED
Overlap "4"...NOT USED
Overlap "7"...*
Overlap "8"...*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	OL7	2	2 PED	3	4 PED	5	6	6 PED	7	OL8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	33	21,22	NU	63	NU	NU	51	61,62	P61 P62	NU	31,32	NU	33	63	NU	NU	NU	NU
RED		128						134					A121	A124				
YELLOW	*	129	*					135										
GREEN		130						136										
RED ARROW							131				116							
YELLOW ARROW							132				117		A122	A125				
FLASHING YELLOW ARROW													A123	A126				
GREEN ARROW	127			118			133				118							
✋											119							
🚶											121							

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

INPUT FILE POSITION LAYOUT
(front view)

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

MULTIZONE DETECTION

SPECIAL DETECTOR NOTE

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE
PED PUSH BUTTONS						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)

OL1 RED (A121) — (R)
OL1 YELLOW (A122) — (⌖)
OL1 GREEN (A123) — (⌖)
OL7 GREEN (127) — (→)

33

OL2 RED (A124) — (R)
OL2 YELLOW (A125) — (⌖)
OL2 GREEN (A126) — (⌖)
03 GREEN (118) — (→)

63

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

OL7 Yellow Field Terminal (126)
Phase 3 Yellow Field Terminal (117)

AC-

AC-

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0537T2
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw 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

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ENGINEER
T. M. MOODY

SIGNATURE   3/19/2025
DATE

SIG. INVENTORY NO. 06-0537T2

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750 N.Greenfield Pkwy,Garner,NC 27529

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

NOTICE OL7 ASSIGNED TO CHANNEL 1 ➡

NOTICE OL8 ASSIGNED TO CHANNEL 8 ➡

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Overlap	7		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	Overlap	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

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	7	8
Type	FYA 4 - Section	FYA 4 - Section	Normal	Normal
Included Phases	3	6	5	3
Modifier Phases	5	3	-	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0537T2
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw 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

750 N.Greenfield Pkwy,Garner,NC 27529

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Trent Moody
SIGNATURE
3/19/2025
DATE

SIG. INVENTORY NO. 06-0537T2

PHASING DIAGRAM

Ø6   Ø3

PHASING DIAGRAM DETECTION LEGEND

● DETECTED MOVEMENT
◀ UNDETECTED MOVEMENT (OVERLAP)
◀- - - UNSIGNALIZED MOVEMENT
◀----▶ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	Ø3	FLASH
✳✳ 33	R	FY	R
34	R	FY	R
61, 62	G	R	R
63	FY	R	R
P61, P62	W	DW	DRK

✳✳ Bag Green Arrow on
Head 33 during
this Construction Phase

SIGNAL FACE I.D.

All Heads L.E.D.

R / Y / G   61, 62
R / Y(12")   34 (12")
R / Y / (12")   33 63

P61, P62 (16")

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
3A	6X40	0	✳	✳	3	15	-	X	-	X	-	✳
3B	6X40	0	✳	✳	3	15	-	X	-	X	-	✳

✳ Multi-zone Microwave Detection Zone

2 Phase
Fully Actuated
Signal System #D06-17 Lumberton
US 301 and SR 1997 (Fayetteville Road)
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. Reposition existing signal heads numbered 31, 32, and 33.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Bag and disconnect existing signal heads numbered 21, 22, 31, 32, and 51.
10. Bag and disconnect green arrow on signal head numbered 33.

RADAR DETECTION SYSTEM

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

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Pedestrian Signal Head With Push Button & Sign	
	Sign	
	Metal Strain Pole	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Type II Signal Pedestal	
N/A	Curb Ramp	
N/A	Guardrail	
	Construction Zone	
	Portable Barrier	
	Temporary Shoring	
	Microwave Detection Zone	
	Construction Zone Drums	
Ⓐ	Right "TURNING VEHICLES" Yield "TO" Pedestrians Sign R10-15R	Ⓐ
Ⓑ	No Left Turn Sign R3-2	Ⓑ

MAXTIME TIMING CHART

FEATURE	PHASE 3	6
Walk *	–	14
Ped Clear *	–	29
Min Green *	7	12
Passage *	2.0	2.0
Max 1 *	30	90
Yellow Change	3.2	4.6
Red Clear	2.1	2.0
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	7
Non Lock Detector	X	–
Vehicle Recall	–	MIN RECALL
Dual Entry	–	–

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

Disconnect & Bag (See Note 9)
Disconnect & Bag (See Note 10)
Disconnect & Bag (See Note 9)

✳ Signal heads to remain bagged

45 MPH -1% Grade
SR 1997 (Fayetteville Road)
SR 1984 (Linkhaw Road)
45 MPH -1% Grade
45 MPH -1% Grade
Apartment Driveway
SCHOOL

STV
STV Engineers, Inc.
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Signal Upgrade
Temporary Design 3 - TMP Phase III, Step 1

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

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw 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

SCALE
0 ___ 40
1"=40'

SIG. INVENTORY NO. 06-0537T3

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

WD ENABLE — ON OFF — SW2

REMOVE DIODE JUMPERS: 3-9, 3-10, 3-11, 6-10, 6-15, 9-10, 9-11, 10-11 AND 10-15.

18 CHANNEL PROGRAM CARD — COMPONENT SIDE

ON →
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

OPTIONS / FYA

INTERNAL DIP SWITCHES

YELLOW DISABLE
O 10 O O 1 O
O 11 O O 2 O
O 12 O O 3 O
O 13 O O 4 O
O 14 O O 5 O
O 15 O O 6 O
O 16 O O 7 O
O 17 O O 8 O
O 18 O O 9 O

ON →
1
2
3
4
5
6
7
8
SSM

ON →
9
10
11
12
13
14
15
16
17
18
SSM

■ = DENOTES POSITION OF SWITCH

REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

3. Ensure that the Red Enable is active at all times during normal operation.

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

NOTES

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

2. Program controller to start up in phase 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 Signal System #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount.....................................Base
Output File Positions............................18 With Aux. Output File
Load Switches Used............................S4, S8, S9, AUX S1, AUX S2, AUX S4
Phases Used.......................................3, 6, 6PED
Overlap "1"...*
Overlap "2"...*
Overlap "3"...*
Overlap "4"...NOT USED
Overlap "7"...*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	63★	NU	NU	NU	61,62	P61 P62	NU	NU	NU	33★	63★	SPARE	34★	NU	NU
RED								134					A121	A124		A114		
YELLOW			★					135										
GREEN								136										
RED ARROW																		
YELLOW ARROW													A122	A125		A115		
FLASHING YELLOW ARROW													A123	A126		A116		
GREEN ARROW			118															
✋									119									
🚶									121									

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT
(front view)

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

MULTIZONE DETECTION

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

Phase 3 Yellow Field Terminal (132)

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

AC-

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE
PED PUSH BUTTONS						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L
- FILE J
- SLOT 2
- LOWER

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)

OL1 RED (A121) — R
OL1 YELLOW (A122) — Y (flashing)
OL1 GREEN (A123) — F/Y
BAGGED AND DISCONNECTED — →
33

OL3 RED (A114) — R
OL3 YELLOW (A115) — Y (flashing)
OL3 GREEN (A116) — F/Y
34

OL2 RED (A124) — R
OL2 YELLOW (A125) — Y (flashing)
OL2 GREEN (A126) — F/Y
03 GREEN (118) — →
63

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw Road)

Division 6   Robeson County   Lumberton

PLAN DATE:	Feb 2025	REVIEWED BY:	H.W. Surti
PREPARED BY:	R.L. Aristondo	REVIEWED BY:	T.M. Moody
REVISIONS		INIT.	DATE

SIG. INVENTORY NO. 06-0537T3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL 040329
Trent Moody
3/19/2025
SIGNATURE   DATE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0537T3
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 24.2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

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	1	2	3
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	3	6	3
Modifier Phases	-	3	-
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

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0537T3
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw 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

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STV Engineers, Inc.
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DOCUMENT NOT CONSIDERED
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NORTH CAROLINA
PROFESSIONAL
SEAL
040329
ENGINEER
T. M. MOODY

Trent Moody

SIGNATURE

3/19/2025
DATE

SIG. INVENTORY NO. 06-0537T3

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 25.0

PHASING DIAGRAM

Ø2+6   Ø3

Ø2+5

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø2+5	Ø2+6	Ø3	FLASH
21, 22	G	G	R	R
31, 32	R	R	G	R
33	R	R	G	R
51	R	R	R	R
61, 62	R	G	R	R
P31, P32	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

31, 32   21, 22   33
51   61, 62

P31, P32

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	NEW CARD
3A	6X40	0	✳	✳	3	3	-	X	-	X	-	✳
5A	6X40	0	✳	✳	5	-	-	X	-	X	-	✳
5B	6X40	0	✳	✳	5	15	-	X	-	X	-	✳

✳ Multi-zone Microwave Detection Zone

3 Phase
Fully Actuated
Signal System #D06-17 Lumberton
US 301 and SR 1997 (Fayetteville Road)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Remove existing signal head numbered 34.
4. Reposition existing signal heads numbered 31, 32, 33, 51, 61, and 62.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Bag and disconnect existing signal head numbered 63.
11. Remove bags and reconnect signal heads numbered 31, 32 and 51.
12. Bag and disconnect existing pedestrian signal head numbered P61.

MAXTIME TIMING CHART

FEATURE	PHASE			
	2	3	5	6
Walk *	–	14	–	–
Ped Clear *	–	31	–	–
Min Green	12	7	12	12
Passage *	2.0	2.0	2.0	2.0
Max 1 *	90	36	20	90
Yellow Change	4.6	3.0	3.0	4.6
Red Clear	1.3	3.9	1.9	1.1
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	–	7	–	–
Non Lock Detector	–	X	X	–
Vehicle Recall	MIN RECALL	–	–	MIN RECALL
Dual Entry	–	–	–	–

* 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.

SR 1984 (Linkhaw Road)

SR 1997 (Fayetteville Road)

45 MPH -1% Grade

Disconnect & Bag (See Note 12)

Disconnect & Bag (See Note 10)

P32 P61

63

62
61

33 32 31
P31

SCHOOL

51
21
22

6A

5B 3A

2A

5A

A

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●
●→	Modified Signal Head	N/A
⊣	Sign	■
⊡	Pedestrian Signal Head With Push Button & Sign	◻
▭	Metal Strain Pole	□
⊠	Inductive Loop Detector	⊠
	Controller & Cabinet	
■	Junction Box	■
	2-in Underground Conduit	
⚬⚬	Directional Drill	N/A
	Right of Way	
→	Directional Arrow	→
○	Type II Signal Pedestal	●
	Curb Ramp	N/A

LEGEND

PROPOSED		EXISTING
N/A	Guardrail	⊤⊤
▬	Construction Zone	▬
⬭	Microwave Detection Zone	⬭
	Portable Barrier	
▨	Pedestrian Barricade	▨
	Temporary Shoring	
Ⓐ	"NO TURN ON RED" Sign (R10-11)	Ⓐ

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

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

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw 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

SEAL
NORTH CAROLINA
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040329
ENGINEER
TRENT M. MOODY

Trent Moody
03/19/2025
SIGNATURE   DATE

SIG. INVENTORY NO. 06-0537T4

SCALE
0   40
1"=40'

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

ON   OFF
WD ENABLE
SW2

REMOVE DIODE JUMPERS: 1-2, 1-5, 1-9, 2-5, 2-6, 2-9, 3-9, 3-16, 5-9, AND 9-16.

ON →
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- SF#1 POLARITY
- LEDguard
- RF SSM
- FYA COMPACT
- FYA 1-9
- FYA 3-10
- FYA 5-11
- FYA 7-12

OPTIONS / FYA

18 CHANNEL PROGRAM CARD
INTERNAL DIP SWITCHES
A
FF

YELLOW DISABLE
O 10 O 1 O
O 11 O 2 O
O 12 O 3 O
O 13 O 4 O
O 14 O 5 O
O 15 O 6 O
O 16 O 7 O
O 17 O 8 O
O 18 O 9 O

ON →
1
2
3
4
5
6
7
8
SSM

ON →
9
10
11
12
13
14
15
16
17
18
SSM

COMPONENT SIDE

REMOVE JUMPERS AS SHOWN

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

■ = DENOTES POSITION OF SWITCH

NOTES

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

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

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

4. The cabinet and controller are part of the Signal System #D06-17 Lumberton US 301 and SR 1997 (Fayetteville Road).

EQUIPMENT INFORMATION

Controller...2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S4, S7, S8, S12, AUX S1
Phases Used..2, 3, 3PED, 5, 6
Overlap "1"...*
Overlap "2"...NOT USED
Overlap "3"...NOT USED
Overlap "4"...NOT USED
Overlap "7"...*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART
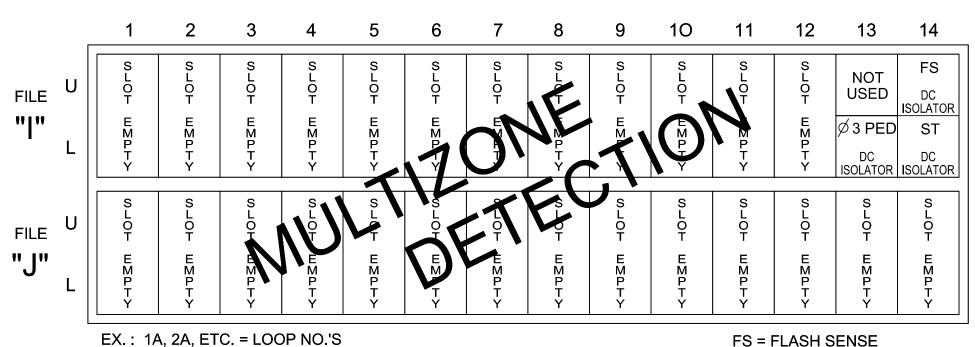
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	OL7	2	2 PED	3	4 PED	4	5	6	6 PED	7	8	3 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	33 ★	21,22	NU	31,32	NU	NU	51	61,62	NU	NU	NU	P31 P32	33 ★	NU	NU	NU	NU	NU
RED		128						134					A121					
YELLOW	★	129						135										
GREEN		130						136										
RED ARROW				116		131												
YELLOW ARROW				117		132							A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127			118		133												
✋													110					
🚶													112					

NU = Not Used

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT
(front view)

MULTIZONE DETECTION

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

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

SPECIAL DETECTOR NOTE

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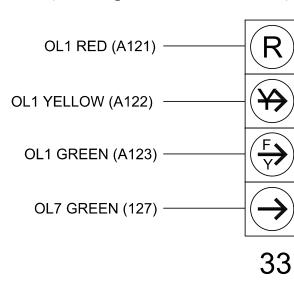
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE
PED PUSH BUTTONS						
P31,P32	TB8-8,9	I13L	70	36	8	PED 3

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.

INPUT FILE POSITION LEGEND: J2L
- FILE J
- SLOT 2
- LOWER

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)

OL1 RED (A121) — (R)
OL1 YELLOW (A122) — (⤸ arrow)
OL1 GREEN (A123) — (F ⟶)
OL7 GREEN (127) — (⟶)

33

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

OL7 Yellow Field Terminal (126)

AC-

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0537T4
DESIGNED: Feb 2025
SEALED: 3/19/2025
REVISED:

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

SR 1997 (Fayetteville Road) at SR 1984 (Linkhaw 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

750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
040329
ENGINEER
T.M. MOODY

SIGNATURE   3/19/2025   DATE

SIG. INVENTORY NO. 06-0537T4

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(704) 372-1885
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-5797	Sig. 25.2

PED 3 PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Detector Configuration >Pedestrian Detector

Plan 1

Detector	Descripton	Call Phase	Call Overlap
2	·	2	0
4	·	4	0
6		6	0
8	P31, P32	3	0

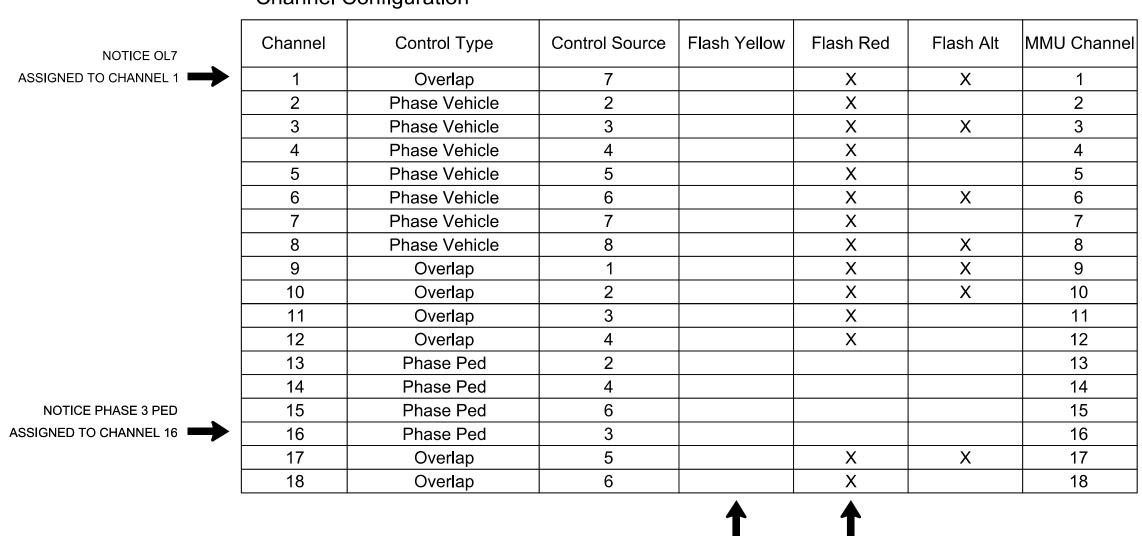NOTICE PHASE 3 PED ASSIGNED TO DETECTOR 8 PED ➤

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

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

Channel Configuration

NOTICE OL7 ASSIGNED TO CHANNEL 1 ➤

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Overlap	7		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	3				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

NOTICE PHASE 3 PED ASSIGNED TO CHANNEL 16 ➤

NOTE: ALL RED FLASH

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

MAXTIME OVERLAP PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	7
Type	FYA 4 - Section	Normal
Included Phases	3	5
Modifier Phases	5	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0537T4
DESIGNED: Feb 2025
SEALED: 03/19/2025
REVISED:

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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

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ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw Road)

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

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
040329
ENGINEER
TRENT M. MOODY

Trent Moody
03/19/2025
SIGNATURE   DATE
SIG. INVENTORY NO. 06-0537T4

PHASING DIAGRAM

Ø2+6

Ø2+5   Ø3

Ø1+6   Ø4 PED

Ø1+5

PHASING DIAGRAM DETECTION LEGEND

- ●——► DETECTED MOVEMENT
- ——► UNDETECTED MOVEMENT (OVERLAP)
- ––► UNSIGNALIZED MOVEMENT
- ––► PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4 PED	FLASH
11							
21, 22, 23	R	R	G	G	R	R	R
31, 32	R	R	R	R	R	R	R
33	→	R	→	R	↑	→	R
51	→	→	R	R	R	→	R
61, 62, 63	R	G	R	G	R	R	R
64	R	↑	R	↑	R	R	R
P31, P32	DW	DW	DW	DW	W	DW	DRK
P41, P42	DW	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

11   31, 32 51   21, 22, 23 61, 62, 63   33 64   P31, P32 P41, P42 P61, P62

MAXTIME DETECTOR INSTALLATION CHART

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	-	*
3A	6X40	0	*	*	3	3	-	X	-	X	-	*
3B	6X40	0	*	*	3	-	-	X	-	X	-	*
5A	6X40	0	*	*	5	-	-	X	-	X	-	*
5B	6X40	0	*	*	5	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

6 Phase
Fully Actuated
Signal System #D06-17 Lumberton
US 301 and SR 1997 (Fayetteville Road)

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. Reposition existing signal heads numbered 21, 22, 31, 32, 33, 51, 61, 62, and 64.
4. Signal head 63 was renumbered to 64.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Remove bags and reconnect pedestrian signal head numbered P61.

Plan labels: SR 1997 (Fayetteville Road), SR 1984 (Linkhaw Road), 45 MPH -1% Grade, 45 MPH 0% Grade, 45 MPH -1% Grade, -L- Sta. 67+97± RT 79'±, -L- Sta. 68+26± LT 60'±, SCHOOL, signal heads 64, 63, 62, 61, 11, 51, 21, 22, 23, 33, 32, 31, P31, P32, P41, P42, P61, P62, 5B, 3B, 3A, 5A, 2A, 1A, 6A.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Pedestrian Signal Head With Push Button & Sign	
	Metal Strain Pole	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	N/A
	Type I Pushbutton Post	
	Type II Signal Pedestal	
N/A	Curb Ramp	
N/A	Guardrail	
	Construction Zone	
	Portable Barrier	
	Pedestrian Barricade	
	Microwave Detection Zone	

MAXTIME TIMING CHART

FEATURE	1	2	3	4 (PED)	5	6
Walk *	–	–	14	13	–	14
Ped Clear *	–	–	31	31	–	31
Min Green *	7	12	7	7	7	12
Passage *	2.0	2.0	2.0	–	2.0	2.0
Max 1 *	20	90	30	39	20	90
Yellow Change	3.0	4.6	3.0	3.0	3.0	4.5
Red Clear	3.9	1.9	3.7	1.0	3.3	2.1
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk *	–	–	7	6	–	7
Non Lock Detector	X	–	X	X	X	–
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL
Dual Entry	–	–	–	–	–	–

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

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Signal Upgrade
Temporary Design 5 - TMP Phase IV, Step 2

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

SR 1997 (Fayetteville Road)
at
SR 1984 (Linkhaw Road)

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

REVISIONS | INIT. | DATE

SCALE
0   40
1"=40'

Docusigned by: Trent Moody   6/11/2025

SIG. INVENTORY NO. 06-0537T5