(remove jumpers and set switches as shown)

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

ON OFF

= DENOTES POSITION OF SWITCH

WD ENABLE '

REMOVE JUMPERS AS SHOWN

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

COMPONENT SIDE

- 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 Program phases 4 and 8 for Simultaneous Start.
- 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 NC 150 D12-02_Mooresville CLS.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

R-2307B Sig. 47.

				SI	GNA	L	HEA	D F	100	K-l	JP	CHA	٩RT					
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S1Ø	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	1Ø	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.	★	21,22	P21, P22	NU	41,42	NU	51	61,62	P61, P62	NU	81,82	P81, P82	11	★	NU	NU	NU	NU
RED		128			1Ø1			134			107			A124				
YELLOW	*	129			102			135			108							
GREEN		130			103			136			109							
RED ARROW							131						A121					
YELLOW ARROW							132						A122	A125				
FLASHING YELLOW ARROW													A123	A126				
GREEN ARROW	127						133											
*			113						119			110						
Ķ			115						121			112						

NU = Not Used

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

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Ø 1	Ø 2	S L	S L	S L	Ø 4	S L O	S	S L	S L	S	Ø2 PED	Ø6 PED	FS
FILE U	1 🗎	2A	O T	OT	O T	4A	ļ	OT	OT	O T	O T	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
" I "	NOT	Ø 2	E M P	E M P	E M P	Ø 4	E M P	E M P	E M P	E M P	E M P	NUI	Ø8 PED	ST
	USED	2B	T Y	T	T Y	4B	T Y	T	T	T	T	USED	DC ISOLATOR	DC ISOLATOR
1.1	Ø 5	Ø 6	S	S	S L	Ø 8	SLOF	S	S L	S	S	S	S	S
FILE U	5A	6A	ŌŢ	HOL	O T	8A		OT	OT	ÖŢ	Q T	O T	ÖT	O T
"J" L	NOT USED	NOT USED	E M P T Y	EMPHY	E M P T Y	NOT USED	E M P T Y							
l	EX.: 1A, 2A, ETC. = LOOP NO.'S FS = FLASH SENSE ST = STOP TIME												-	

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1 1	TD2 1 2	1411	56	18	1 *	1	15.0		Х		Х	
1A	TB2-1,2	l1U	00	-	29 *	6	3.0		Х		Х	Х
2A	TB2-5,6	I2U	39	1	2	2			Х	Х	Х	
2B	TB2-7,8	I2L	43	5	3	2			Х	Х	Х	
4A	TB4-9,10	I6U	41	3	8	4	3.0		Х		Χ	
4B	TB4-11,12	I6L	45	7	9	4	10.0		Х		Х	
5A	TB3-1,2	J1U	55	17	15	5			Х		Х	
6A	TB3-5,6	J2U	40	2	16	6			Х	Х	Χ	
8A	TB5-9,10	J6U	42	4	22	8	3.0		Х		Х	
PED PUSH BUTTONS							NOTE:					
P21,P22	TB8-4,6	I12U	67	33	2	PED 2	INSTAL	L DC ISOLA IT FILE SLO	TORS			
P61,P62	TB8-7,9	I13U	68	34	6	PED 6	IN INPU		13			
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

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

FILE J SLOT 2 LOWER -

INPUT FILE POSITION LEGEND: J2L

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES VALUE (ohms) WATTAGE |1.5K - 1.9K | 25W (mın)| 2.0K - 3.0K | 10W (mın)

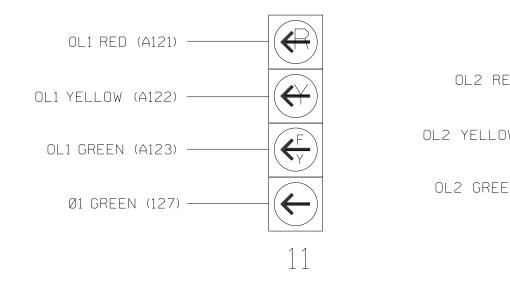


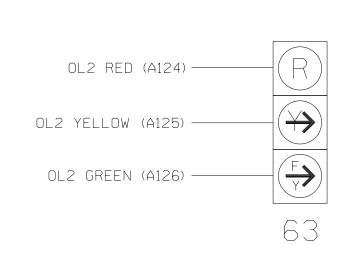
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)





THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1841 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Final Design

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

SR 1467 (Bluefield Road)

Spirits Drive

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

Jason Galloway 5/20/2024

License No. F-0672

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

Stantec

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 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

Veh Det Plan | Overlap Plan 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 1A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Plan 2

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.

Detector	Call Phase	Delay
1	1	0.0
29	0	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2
Туре	FYA 4 - Section	FYA 4 - Section
Included Phases	2	6
Modifier Phases	1	-
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

1	2	
4 - Section	FYA 4 - Section	
-	6	+
1	-	
-	-	
0	0	
0.0	0.0	
0.0	0.0	
	- 1 - 0 0.0	4 - Section FYA 4 - Section - 6 1 0 0 0.0 0.0

NOTICE INCLUDED PHASE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1841 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

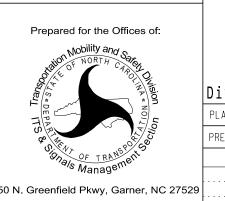
Final Design

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672



SR 1467 (Bluefield Road) Spirits Drive

REVISIONS

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE

Jason Gallowa 5/20/2024 CTG.OP.1/E2B40B4.B46E.1-2-1841

DEFAULT

PHASING DIAGRAM

ALTERNATE

PHASING DIAGRAM

Ø4+8

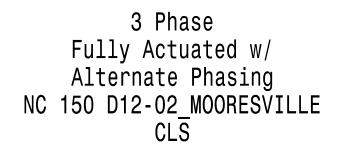
PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

PEDESTRIAN MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

✓ DETECTED MOVEMENT



NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Phase 1 may be lagged 4. Set all detector units to presence mode.

R/W

PROPOSED

 \bigcirc

- 5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on
- 6. The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

Traffic Signal Head

Modified Signal Head

Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet

Junction Box 2-in Underground Conduit Right of Way Directional Arrow

Video Detection Area

Construction Zone

Drums

EXISTING

N/A

N/A

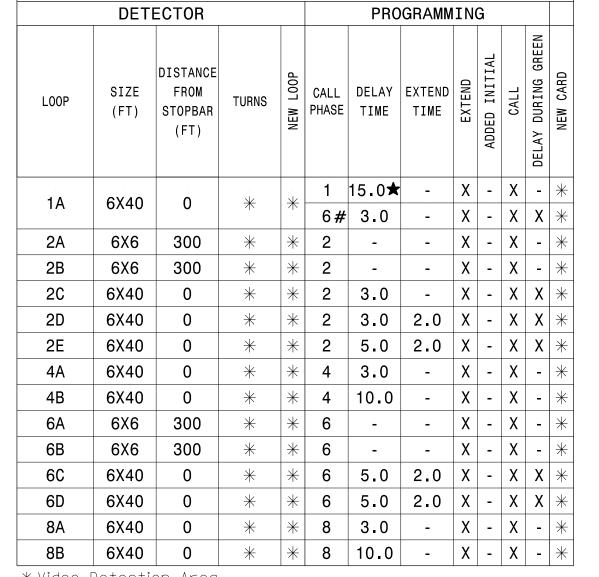
N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CARO

029904

Field adjust temporary poles as needed.



MAXTIME DETECTOR INSTALLATION CHART

Ø2+6 Ø4+8	/ — — i	Temporary Wood Pole -L- Sta. 714+91 ± 48' LT ±	ort City Shopping Center 25 MPH Design Speed 28 Grade	# Disab	Detection Area ra locations should be confidented. The Phase(s) call during Alte	8 3.0 - X - X - * 7. 8 10.0 - X - X - * 8. rmed in the field by the detection of the areas rnate Phasing Operation. Alternate Phasing Operation.
Ø1+6	NC 150			Temporary -L- Sta. 7 61' LT ± 60 21 1A	Wood Pole 16+53 ± 45 MPH +2% Gr	rade GB GA
MAXTIME TIMING CHART	45 MPH +2% Grade	nporary Wood Pole -L- Sta. 714+43 ± 80' RT ±	Lowe's Main Entrance 25 MPH Design Speed +5% Grade	Temporary Wood Pole -L- Sta. 715+90 ± 79' RT ±	NC 150	Retaining Wall

ALTERNATE PHASING

TABLE OF OPERATION

SIGNAL

FACE

41,42

61,62

81,82

PHASE

SIGNAL FACE I.D.

All Heads L.E.D.

DEFAULT PHASING

TABLE OF OPERATION

SIGNAL

FACE

11

21

22,23

41,42

61,62

81,82

PHASE

F F - R

FEATURE			PHASE		
FEATURE	1	2	4	6	8
Walk *	-	-	_	-	_
Ped Clear *	_	_	_	_	_
Min Green	7	12	7	12	7
Passage *	2.0	6.0	2.0	6.0	2.0
Max 1 *	15	90	35	90	35
Yellow Change	3.0	4.3	3.3	4.3	3.0
Red Clear	2.6	1.3	2.6	1.3	2.6
Added Initial *	_	-	-	_	_
Maximum Initial *	_	-	-	_	_
Time Before Reduction *	_	15	-	15	_
Time To Reduce *	_	30	_	30	_
Minimum Gap	_	3.0	ı	3.0	_
Advance Walk	-	_	_	_	_
Non Lock Detector	Χ	X	X	Х	Х
Vehicle Recall	_	MIN RECALL	_	MIN RECALL	_

* 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



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024

www.stantec.com

License No. F-0672



NC 150 Lowe's Main Entrance Port City Shopping Center

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE Jason Galloway 5/20/2024

Dual Entry

50 N.Greenfield Pkwy,Garner,NC 275 1"=40'

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
- 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 NC 150 D12-02_Mooresville CLS.

EQUIPMENT INFORMATION

ControllerCabinet	
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S1, S2, S5, S8, S11, AUX S1, AUX S4
Phases Used	
Overlap "1"	*
Overlap "2"	NOT USED

*See overlap programming detail on sheet 2

Overlap "4".....

SIGNAL HEAD HOOK-UP CHART CMU CHANNEL 2 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 8 | 8 | OL1 | OL2 | SPARE | OL3 | OL4 | SPARE SIGNAL HEAD NO. 22,23 NU NU 41,42 NU NU 61,62 NU NU 81,82 NU RED 101 134 129 102 135 1Ø8 YELLOW 1Ø3 136 109 130 GREEN RED ARROW A121 A114 YELLOW A115 | A122 ARROW FLASHING YELLOW ARROW A123 A116 | GREEN ARROW

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

OL3 RED (A114) —

OL3 YELLOW (A115) —

OL3 GREEN (A116) —

NU = Not Used

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

OL1 RED (A121) —

OL1 YELLOW (A122) —

OL1 GREEN (A123) —

Ø1 GREEN (127) ——

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1 1	TB2-1,2	I1U	56	18	1 *	1	15.0		Х		Χ	
1A	102-1,2	110	30	-	29 *	6	3.0		Х		Χ	Х

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

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

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.

COMPONENT SIDE

REMOVE JUMPERS AS SHOWN

18 CHANNEL IP CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 2-6, 2-9, 2-11, 4-8, 6-9, 6-11, and 9-11.

WD ENABLE

SW2

- RF 2010

- FYA 1-9 - FYA 3-10

– FYA 7-12

FYA 5-11

] 13 14

] 16

___ 18 *−*

ST = STOP TIME

- RP DISABLE ■— WD 1.0 SEC

GY ENABLE

- SF#1 POLARITY ☐

FYA COMPACT—

- 3. Ensure that the Red Enable is active at all times during normal operation.
- 4. Integrate monitor with Ethernet network in cabinet.

INPUT FILE POSITION LAYOUT

(front view)

r	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U	Ø 1 1A NOT USED	SLOT EXPLY	SLOF EXPFY	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPLY	SLOT EXPTY	%_OF M∑PF>	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	S L OT E M P T Y	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y										
	EX.: 14	a, 2A, E	C. = L	UOP NO		FS =	FLASH	SENS						

[⊗] Wired Input - Do not populate slot with detector card

DETECTOR NOTES

- 1. For all loops install a video 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.
- 2. For loop 1A detector card placements and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheet 2 of this electrical detail.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES VALUE (ohms) | WATTAGE 1.5K - 1.9K | 25W (mın) 2.0K - 3.0K | 10W (min)





Stantec Consulting Services Inc. Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672

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

Prepared for the Offices of:

NC 150 Lowe's Main Entrance ,

Port City Shopping Center Division 12 Iredell County Mooresville PLAN DATE: May 2024 REVIEWED BY: J Galloway, PE

THIS ELECTRICAL DETAIL IS FOR

THE SIGNAL DESIGN: 12-1597T1

DESIGNED: MAY 2024

SEALED: 5/20/2024

REVISED: N/A

PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

Jason Gallowa 5/20/2024

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

801 Jones Franklin Road-Suite 300 750 N. Greenfield Pkwy, Garner, NC 27529

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

VEH DET PLAN 2: Disables phase 6 call on loop 1A

for head 11 to run protected turns only.

and reduces delay time for phase 1 call on loop 1A to 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Veh Det Plan Overlap Plan

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

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.

1A

Plan 2		
Detector	Call Phase	Delay
1	1	3.0
29	0	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1597T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 1 - TMP Phase I

Electrical Detail - Sheet 2 of 2 ELECTRICAL AND PROGRAMMING

NC 150

Lowe's Main Entrance , Port City Shopping Center

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE

— DocuSigned by:

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024

Stantec

www.stantec.com License No. F-0672

750 N. Greenfield Pkwy, Garner, NC 27529

REVISIONS

Jason Galloway 5/20/2024 STC1.0P1/E2B40B4B46E2-1597

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Time To Reduce *

Minimum Gap

Advance Walk

Vehicle Recall

Dual Entry

Non Lock Detector

* These values may be field adjusted. Do not adjust Min Green and Extension times for be lower than 4 seconds.

_

Χ

30

3.0

Χ

MIN RECALL

3.0

MIN RECALL

Χ

Stantec

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672



1"=40'

NC 150 Lowe's Main Entrance

Port City Shopping Center Iredell County

May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Hambright | REVIEWED BY: R Muncey, PE REVISIONS

029904 INIT. DATE

Jason Galloway 5/20/2024

CARO

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

ON OFF

− RF 2010

─ WD 1.0 SEC

■— LEDguard _ RF SSM

FYA 1-9

FYA 7-12

12 ີ 13

14

= DENOTES POSITION OF SWITCH

RP DISABLE

GY ENABLE — SF#1 POLARITY

FYA COMPACT—

— FYA 3-10 FYA 5-11

WD ENABLE

SW2

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 2-6, 2-9, 2-11, 4-8, 6-9, 6-11, and 9-11.

REMOVE JUMPERS AS SHOWN

- 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
- 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 NC 150 D12-02_Mooresville CLS.

EQUIPMENT INFORMATION

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

^{*}See overlap programming detail on sheet 2

Overlap "3".....

SIGNAL HEAD HOOK-UP CHART S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 AUX AUX AUX AUX AUX S5 S6 S6 CMU CHANNEL 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | $\begin{bmatrix} 2 \\ PED \end{bmatrix}$ $\begin{bmatrix} 3 \\ 4 \\ PED \end{bmatrix}$ $\begin{bmatrix} 4 \\ PED \end{bmatrix}$ $\begin{bmatrix} 5 \\ 6 \\ PED \end{bmatrix}$ $\begin{bmatrix} 6 \\ PED \end{bmatrix}$ $\begin{bmatrix} 7 \\ 8 \\ PED \end{bmatrix}$ $\begin{bmatrix} 8 \\ PED \end{bmatrix}$ $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$ $\begin{bmatrix}$ 11 ★ NU NU SIGNAL HEAD NO. 22,23 NU NU 41,42 NU NU 61,62 NU NU 81,82 NU 1Ø1 RED 134 107 129 102 135 1Ø8 YELLOW 103 136 109 130 GREEN RED ARROW A121 ∆114 YELLOW A122 A115 | ARROW FLASHING YELLOW ARROW

A123

R-2307B

A116 |

Sig. 49.

NU = Not Used

GREEN

ARROW

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

OL1 RED (A121) —

OL1 YELLOW (A122) —

OL1 GREEN (A123) —

Ø1 GREEN (127) ——

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U	Ø 1 1A NOT USED	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	S L O T E M P T Y	S LOT E M P T Y	SLOT EMPTY TC. = L	SLOT EMPTY	SLOT EMPTY).'S	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	SLOF EXPTY	SLOT EMPTY	SLOT EMPTY ST		S L O T E M P T Y SENSI TIME	S L OT E M P T Y

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1.0	TD2 4.2	1411	EG	18	1 *	1	15.0		Х		Х	
1A TB2-1,2	2-1,2 I1U 56	96	-	29 *	6	3.0		Х		Χ	Х	

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

INPUT FILE POSITION LEGEND: J2L FILE J SLOT 2 LOWER

THE SIGNAL DESIGN: 12-1597T2 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

THIS ELECTRICAL DETAIL IS FOR

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

OL3 RED (A114) —

OL3 YELLOW (A115) —

OL3 GREEN (A116) —

DETECTOR NOTES

- 1. For all loops install a video 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.
- 2. For loop 1A detector card placements and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheet 2 of this electrical detail.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES |VALUE (ohms)| WATTAGE 1.5K - 1.9K | 25W (min) 2.0K - 3.0K | 10W (min)



Stantec

Stantec Consulting Services Inc. License No. F-0672

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

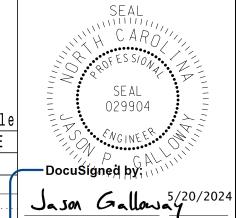
ELECTRICAL AND PROGRAMMING

750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 Prepared for the Offices of: Lowe's Main Entrance ,

Port City Shopping Center Division 12 Iredell County Mooresville PLAN DATE: May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE



----10D1E2BA0B4B46E>.- | 5

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for head 11 to run protected turns only.

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

call on loop 1A to 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Veh Det Plan Overlap Plan

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

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Plan 2

Home >Controller >Detector Configuration >Vehicle Detectors

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

1A

Detector	Call Phase	Delay
1	1	3.0
29	0	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	3
Туре	FYA 4 - Section	FYA 4 - Section
Included Phases	2	6
Modifier Phases	1	-
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

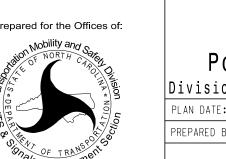
Overlap	1	3	
Туре	FYA 4 - Section	FYA 4 - Section	
Included Phases	-	6	NOTICE INCLUDED PH
Modifier Phases	1	-	
Modifier Overlaps	-	-	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1597T2 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 2 - TMP Phase II

Electrical Detail - Sheet 2 of 2 ELECTRICAL AND PROGRAMMING

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED NC 150



Lowe's Main Entrance / Port City Shopping Center

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE

— DocuSigned by:

Jason Gallowa 5/20/2024 ST.1.0D1/E2B40B4B46E>.- 15 9 7

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024

www.stantec.com

License No. F-0672

Stantec

750 N. Greenfield Pkwy, Garner, NC 27529

REVISIONS

DEFAULT

PHASING DIAGRAM

ALTERNATE

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

 $<\!\!\!<\!\!\!--\!\!\!>$ PEDESTRIAN MOVEMENT

DEFAULT PHASING

TABLE OF OPERATION

SIGNAL

FACE

22,23

41,42

81,82

Ø4+8

PHASE

0 0 0 1

R | G | R | F

R | R | G | R

G | R | R

RRGR

ALTERNATE PHASING

TABLE OF OPERATION

SIGNAL

FACE

22,23

41,42

61,62

81,82

PHASE

R G R

R R G R

SIGNAL FACE I.D.

All Heads L.E.D.

22,23 41,42 61,62 81,82

3 Phase Fully Actuated w/ Alternate Phasing NC 150 D12-02_MOORESVILLE $CL\overline{S}$

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Phase 1 may be lagged. 4. Reposition existing signal heads numbered #11, 21, 22, 23, 61, and 62.
- 5. Set all detector units to presence
- 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.

LEGEND

Traffic Signal Head

Modified Signal Head

Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box

Right of Way

Directional Arrow

Video Detection Area

Construction Zone

Drums

2-in Underground Conduit -----

MAXTIME DETECTOR INSTALLATION CHART DETECTOR PROGRAMMING DISTANCE SIZE FROM | S | CALL | DELAY | EXTEND | S | IN | TURNS ≥ PHASE TIME TIME (FT) STOPBAR | 1 |15.0**★**| - |X|-|X|-|* 1A 0 6# 3.0 - | X | - | X | X | * | * | * | 2 | - | - | X | - | X | - | * 6X6 * |* 2 | - | - |X| - |X|2C * |* 2 | 3.0 | - |X| - |X|X| * 2D * |* 2 | 5.0 | 2.0 |X| - |X|X|** | * | 2 | 5.0 | 2.0 | X | - | X | X | * * |* | 4 | 3.0 | - | X | - | X | - | * | * | * | 4 | 10.0 | - | X | - | X | - | * 6A * |*| 6 | - | - | X|-|X|-|* * | * | 6 | - | - | X | - | X | - | * * |*| 6 | 5.0 | 2.0 |X| - |X|X|** |* 6 | 5.0 | 2.0 |X| - |X|X|*st |st| 8 | 3.0 | - | | | - | | | +

* Video Detection Area Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas

0 | * |*| 8 | 10.0 | - | X | - | X | - | * |

		Aty Shopping Cen 25 MPH Design S -2% Grade	# Disable Phase(s) callduring Alternate Phasing Operation. ★ Reduce delay to 3 sec during Alternate Phasing Operation
R/W	Retaining Wall — NC 150	Sign Speed Retaining Wall —	45 MPH -1% Grade R/W
2A •	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	62 -61 -81 82 -61 -60 -21 -61 -21 -61 -22	6B 6A
R/W- — — — — — — — —		23 - 42 41 88	R/W
	45 MPH -2% Grade	Main Entrance MPH Design Speed +5% Grade	NC 150 — Retaining Wall
ING CHART		Main +5%	

	MAXTIN	ME TIM	ING CH	ART	
FFATURE					
FEATURE	1	2	4	6	8
Walk *	_	_	_	_	_
Ped Clear *	_	_	_	_	_
Min Green	7	12	7	12	7
Passage *	2.0	6.0	2.0	6.0	2.0
Max 1 *	15	90	35	90	35
Yellow Change	3.0	4.7	3.3	4.7	3.0
Red Clear	2.1	1.6	2.1	1.6	2.6
Added Initial *	_	_	_	_	_
Maximum Initial *	_	_	_	_	_
Time Before Reduction *	_	15	_	15	_
Time To Reduce *	_	30	_	30	_
Minimum Gap	_	3.0	_	3.0	_
Advance Walk	_	_	_	_	_
Non Lock Detector	Х	Х	Х	Х	Х
Vehicle Recall	_	MIN RECALL	-	MIN RECALL	_
Dual Entry	_	_	Х	_	Х

* 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.

Temporary Design 3 - TMP Phase II - Step 2

Signal Upgrade

Stantec

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672



NC 150 Lowe's Main Entrance

PROPOSED

N/A

 \bullet

Port City Shopping Center ision 12 Iredell County Moores Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright | REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

1"=40'

DocuSigned by: Jason Galloway 5/20/2024

029904

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EXISTING

—

N/A

N/A

N/A

N/A

ON

SW2

WD ENABLE '

OFF

− RF 2010

─ WD 1.0 SEC GY ENABLE

- FYA 3-10

− FYA 7-12

12

13 14

= DENOTES POSITION OF SWITCH

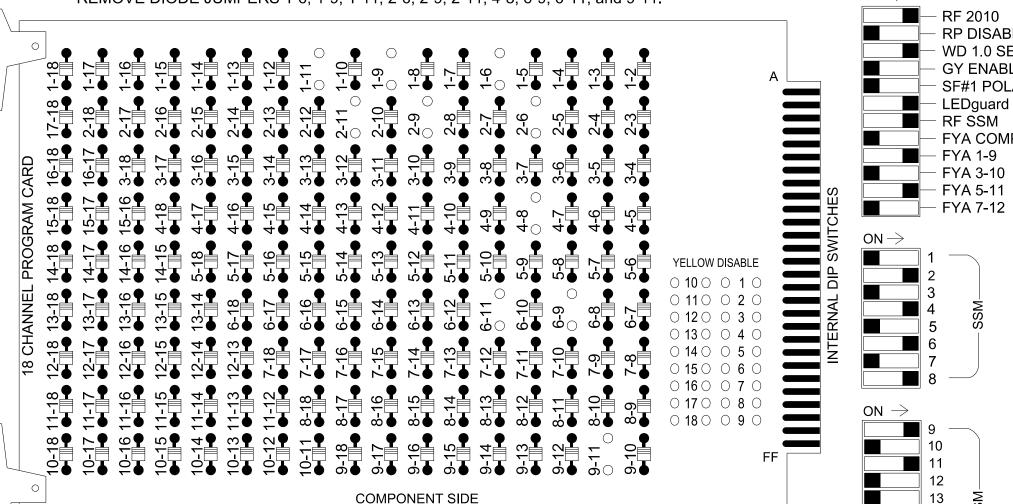
RP DISABLE

SF#1 POLARITY

- FYA COMPACT-

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 2-6, 2-9, 2-11, 4-8, 6-9, 6-11, and 9-11.



REMOVE JUMPERS AS SHOWN

- 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.

- 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
- 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 NC 150 D12-02_Mooresville CLS.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 AUX AUX AUX AUX AUX S5 S6 S6 CMU CHANNEL $\begin{bmatrix} 2 \\ PED \end{bmatrix}$ $\begin{bmatrix} 3 \\ 4 \\ PED \end{bmatrix}$ $\begin{bmatrix} 4 \\ PED \end{bmatrix}$ $\begin{bmatrix} 5 \\ 6 \\ PED \end{bmatrix}$ $\begin{bmatrix} 6 \\ PED \end{bmatrix}$ $\begin{bmatrix} 7 \\ 8 \\ PED \end{bmatrix}$ $\begin{bmatrix} 8 \\ PED \end{bmatrix}$ $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$ $\begin{bmatrix}$ 11 ★ NU NU SIGNAL HEAD NO. \$\ 22,23 NU NU 41,42 NU NU 61,62 NU NU 81,82 NU RED 101 134 129 102 135 1Ø8 YELLOW 1Ø3 136 109 130 GREEN RED ARROW A121 ∆114 YELLOW A115 | A122 ARROW FLASHING YELLOW ARROW A123 A116 | GREEN

NU = Not Used

ARROW

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

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file ^U "I" L	Ø 1 1A NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR								
file U "J" 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
EX.: 1A, 2A, ETC. = LOOP NO.'S										FS =	FLASH	SENS	E	

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.		DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 *	1	15.0		Х		Х	
IA	102-1,2	110	30	-	29 *	6	3.0		Х		Х	Х

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

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

Stantec

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300

Raleigh, NC 27606

Tel. (919) 851-6866

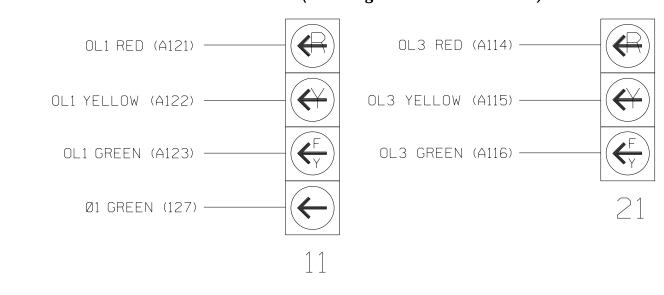
Fax. (919) 851-7024

License No. F-0672

www.stantec.com

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1597T3 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

DETECTOR NOTES

- 1. For all loops install a video 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.
- 2. For loop 1A detector card placements and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheet 2 of this electrical detail.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES VALUE (ohms) | WATTAGE 1.5K - 1.9K | 25W (mın) 2.0K - 3.0K | 10W (min)

ST = STOP TIME



Temporary Design 3 - TMP Phase II Electrical Detail - Sheet 1 of 2 ELECTRICAL AND PROGRAMMING

750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 Prepared for the Offices of:

Lowe's Main Entrance ,

Port City Shopping Center Division 12 Iredell County Mooresville PLAN DATE: May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

Jason Gallowa 5/20/2024

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for head 11 to run protected turns only.

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

call on loop 1A to 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

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.

1A

Plan 2		
Detector	Call Phase	Delay
1	1	3.0
29	0	_

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

Stantec

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300

Raleigh, NC 27606

Tel. (919) 851-6866

Fax. (919) 851-7024

www.stantec.com License No. F-0672

Overlap	1	3	
Туре	FYA 4 - Section	FYA 4 - Section	
Included Phases	-	6	NOTICE INCLUDED PHA
Modifier Phases	1	-	
Modifier Overlaps	-	-	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1597T3 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

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

ELECTRICAL AND PROGRAMMING NC 150 Lowe's Main Entrance / Division 12 Iredell County

Port City Shopping Center Mooresville May 2024 REVIEWED BY: J Galloway, PE

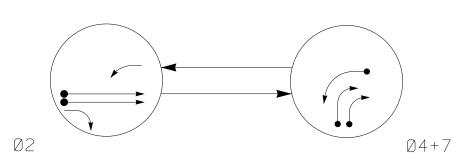
PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE REVISIONS

— DocuSigned by: Jason Gallowa 5/20/2024

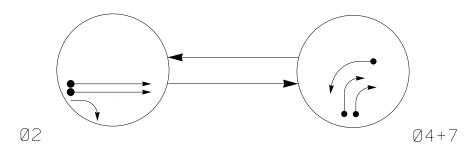
ST.10D1/E2B40B4B46E).-1597

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT UNDETECTED MOVEMENT (OVERLAP) UNSIGNALIZED MOVEMENT

 $<\!\!--\!\!>$ PEDESTRIAN MOVEMENT

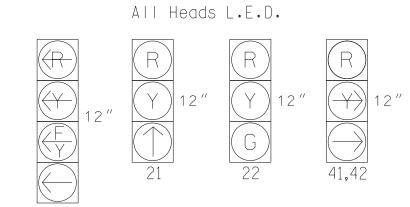
- DEFAULT PHASING TABLE OF OPERATION
- PHASE SIGNAL FACE 21 22 41,42

ALTERNATE PHASING TABLE OF OPERATION

71,72

	Р	HAS	E
SIGNAL FACE	Ø 2	Ø 4 + 7	LUGOI
21	1	R	R
22	G	R	R
41,42	R	-	R
71,72	₩	-	→ R

SIGNAL FACE I.D.



	MAXTIME DETECTOR INSTALLATION CHART											
	DETECTOR						GRAMM	IN	G			
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
2A	6X6	300	*	*	2	-	-	Χ	_	Χ	-	*
2B	6X6	300	*	*	2	-	-	Χ	_	Χ	_	*
2C	6X40	0	*	*	2	5.0	2.0	Χ	_	Χ	Χ	*
2D	6X40	0	*	*	2	5.0	2.0	Χ	_	Χ	Χ	*
4A	6X40	0	*	*	4	15.0	-	Χ	_	Χ	_	*
4B	6X40	0	*	*	4	15.0	-	Χ	-	Χ	-	*
7A	6X40	0	*	*	7	15.0★	-	Χ	-	Χ	-	*

- * Video Detection Area Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.
- ★ Disable delay during Alternate Phasing Operation.

2 Phase Fully Actuated w/ Alternate Phasing NC 150 D12-02_MOORESVILLE CLS

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 head number #22.
- 4. Set all detector units to presence mode. 5. The Division Traffic Engineer will determine
- the hours of use for each phasing plan.
- 6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

Modified Signal Head

Pedestrian Signal Head

With Push Button & Sign Signal Pole with Guy

Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box

> Right of Way Directional Arrow

Video Detection Area

Construction Zone

Drums

No Left Turn Sign (R3-2)

No U-Turn Sign (R3-4)

---- 2-in Underground Conduit

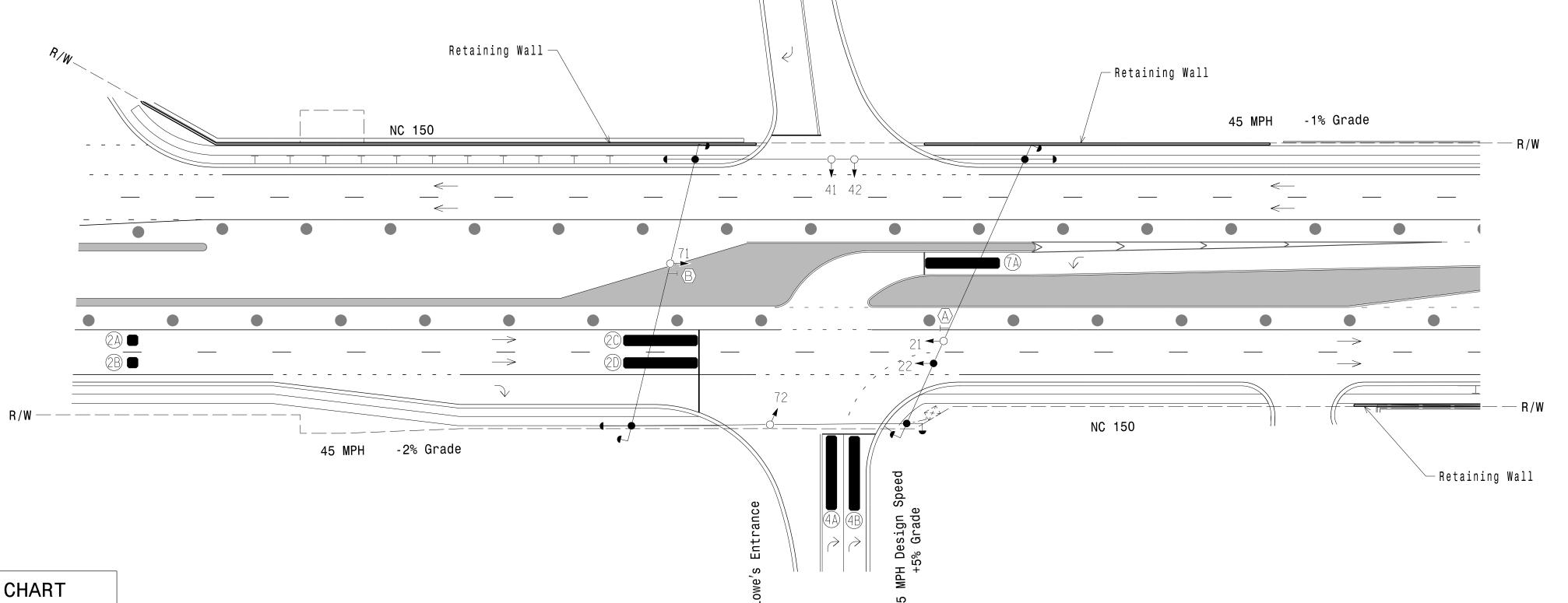
EXISTING

N/A

N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

029904



MAXTIME TIMING CHART									
CEATURE	PHASE								
FEATURE	2	4	7						
Walk *	_	_	_						
Ped Clear *	_	_	_						
Min Green	12	7	7						
Passage *	6.0	2.0	2.0						
Max 1 *	60	30	30						
Yellow Change	4.7	3.0	3.0						
Red Clear	1.5	2.2	3.5						
Added Initial *	_	_	_						
Maximum Initial *	_	_	_						
Time Before Reduction *	15	_	_						
Time To Reduce *	30	_	_						
Minimum Gap	3.0	_	_						
Advance Walk	_	_	_						
Non Lock Detector	Х	Х	Х						
Vehicle Recall	MIN RECALL	_	_						
Dual Entry	_	Х	Х						

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

Signal Upgrade Temporary Design 4 - TMP Phase III



NC 150 Lowe's Main Entrance

PROPOSED

N/A

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE 1"=40'

Stantec

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672

Jason Galloway 5/20/2024

NOTES

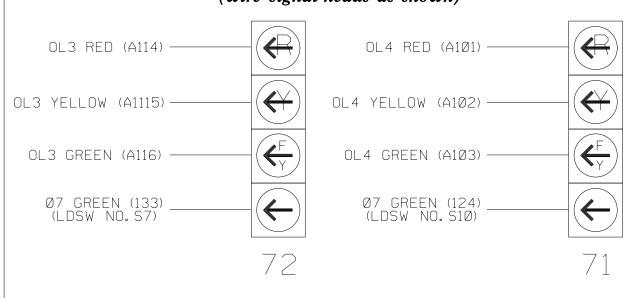
- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- 2. Return controller to factory defaults.
- 3. Program phases 4 and 7 for Dual Entry
- 4. Program controller to start up in phase 2 Green No Walk and 6 Phase Not On.
- 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 NC 150 D12-02_Mooresville CLS.

EQUIPMENT INFORMATION

*See overlap programming detail on sheet 2

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

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1597T4

DESIGNED: MAY 2024

SEALED: 5/20/2024

REVISED: N/A

FYA SIGNAL WIRING DETAIL

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
7A	TB5-5.6	J5U	57	19	21 *	7	15.0		Х		Х	

SLOT 2

(install resistors as shown)

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

Phase 7 (LDSW NO. 7) Yellow Field Terminal (132)

Phase 7 (LDSW NO. 10) Yellow Field Terminal (123)

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

Stantec

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

ELECTRICAL AND PROGRAMMING

CONTROL SOURCE

NC 150 Lowe's Main Entrance

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE

Jason Gallowa 5/20/2024

R-2307B Sig. 51.

				S	IGN	IAL	HE	AD	HC)OK	-UF	C	HAF	RT					
LOAD SWITCH NO.	S1	S	2	S3	S4	S5	S6	S7	S8	S9	S1Ø	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	2 PED	3	4	4 PED	7	6	6 PED	7	8	8 PED	OL1	OL2	SPARE			SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	41,42	NU	★	NU	NU	71 ★	NU	NU	NU	NU	NU	★ 72	71	NU
RED		128	128			1Ø1													
YELLOW		129	129					*			*								
GREEN			13Ø																
RED ARROW																	A114	A1Ø1	
YELLOW ARROW						102											A115	A1Ø2	
FLASHING YELLOW ARROW																	A116	A1Ø3	
GREEN ARROW		130				103		133			124								

NU = Not Used

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

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	Х	1
2	Phase Vehicle	2		Х		2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	7		Х		5
6	Phase Vehicle	6		X	Χ	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	Х	8
9	Overlap	1		X	Х	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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

029904

Perform installation according to manufacturer's directions and REVISIONS License No. F-0672

FILE EX.: 1A, 2A, ETC. = LOOP NO.'S FS = FLASH SENSE ST = STOP TIME INPUT FILE CONNECTION & PROGRAMMING CHART * For the detectors to work as shown on the signal design plan, see the Detector Programming Detail for Alternate Phasing on sheet 2 of 2. LOAD RESISTOR INSTALLATION DETAIL

18 CHANNEL IP CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-11, 2-12, 4-5, 4-7, 4-11, 4-12, 5-7, 5-11, 5-12, 7-11, 7-12, and 11-12.

4. Integrate monitor with Ethernet network in cabinet.

COMPONENT SIDE

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.

INPUT FILE POSITION LAYOUT

3 4 5 6 7 8 9 10 11 12 13 14

(front view)

S S S S S S S S S S FS

REMOVE JUMPERS AS SHOWN

ON

- RF 2010 RP DISABLE

─ WD 1.0 SEC GY ENABLE SF#1 POLARITY

LEDguard − RF SSM

– FYA 1-9 − FYA 3-10 FYA 5-11

FYA 7-12

= DENOTES POSITION OF SWITCH

- FYA COMPACT-

INPUT FILE POSITION LEGEND: J2L **LOWER**

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.

OVERLAP PLAN	VEH DET PLAN
1	1
2	2
	1 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 71,72 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7

call on loop 7A to 0 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern Veh Det Plan Overlap Plan

* 2 2

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

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

an	2	

Detector Call Phase Delay
21 7 0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

NOTICE INCLUDED PHASE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1597T4

DESIGNED: MAY 2024

SEALED: 5/20/2024

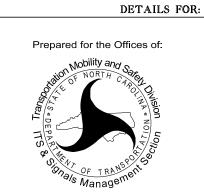
REVISED: N/A

Temporary Design 4 - TMP Phase III Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672



750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 at Lowe's Main Entrance

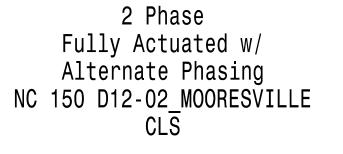
Division 12 Iredell County Mooresville
PLAN DATE: May 2024 REVIEWED BY: J Galloway, PE

PLAN DATE: May 2024 REVIEWED BY: J Galloway, PE
PREPARED BY: J Galloway, PE
REVIEWED BY: R Muncey, PE
REVISIONS INIT. DATE

6:29:35 PM U:*Traffic*Signals*Design*Ele User:jgalloway 02

Ø2





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. Omit "WALK" and flashing "DON'T WALK"
- with no pedestrian calls.
- 5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- 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.
- 8. Pedestrian pedestals are conceptual and shown for reference only. See 2024 NCDOT Roadway Standard Drawings for push button location details.

LEGEND EXISTING Traffic Signal Head Modified Signal Head N/A Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box 2-in Underground Conduit N/A Right of Way Directional Arrow Metal Pole with Mastarm Directional Drill (#) x 2" Conduit Type II Signal Pedestal Oversized Junction Box No Left Turn Sign (R3-2)

No U-Turn Sign (R3-4) (SEE FIGURE 1)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

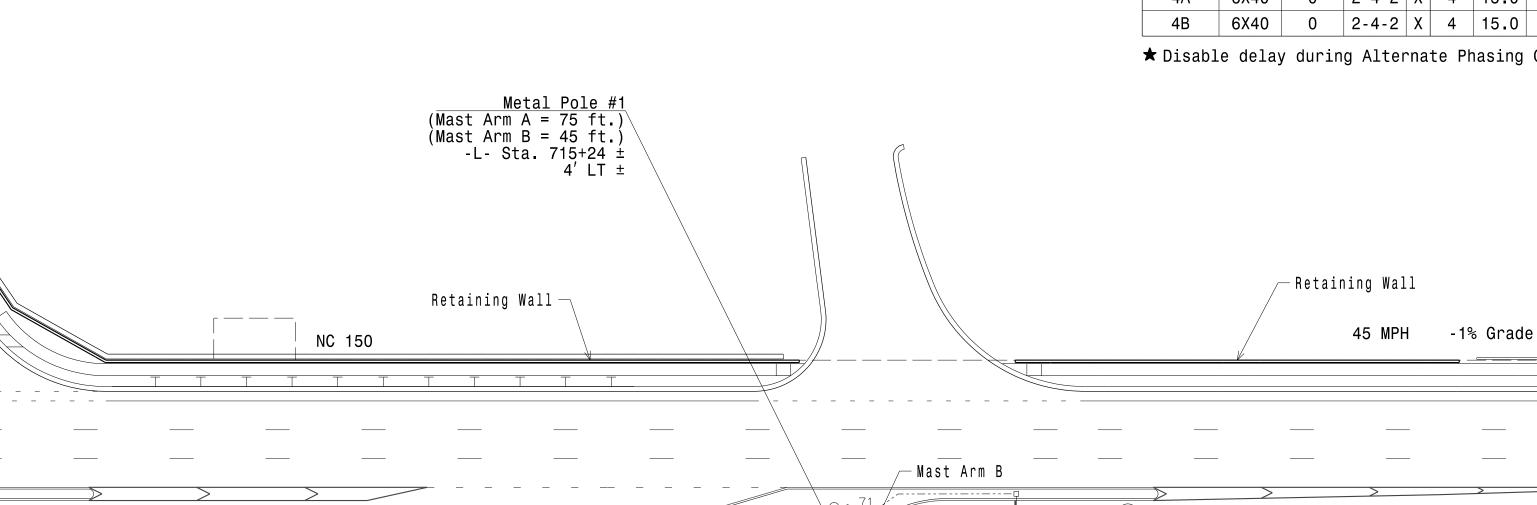
NC 150 Lowe's Main Entrance

Iredell County May 2024

029904 Mooresville REVIEWED BY: J Galloway, PE PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE Jason Galloway 5/20/2024

LOOP SIZE FROM STOPBAR (FT) TURNS STOPBAR (FT) STOPBAR (DET	ECTOR				PRO	GRAMM	IN	G			
2B 6X6 300 5 X 2 X X X - X 2C 6X6 300 5 X 2 X X X X - X 7A 6X40 0 2-4-2 X 7 ★15.0 - X - X - X 4A 6X40 0 2-4-2 X 4 15.0 - X - X - X 4B 6X40 0 2-4-2 X 4 15.0 - X - X - X	L00P		FROM STOPBAR	TURNS					EXTEND		CALL	DURING	NEW CARD
2C 6X6 300 5 X 2 - - X X X - X 7A 6X40 0 2-4-2 X 7 ★15.0 - X - X - X 4A 6X40 0 2-4-2 X 4 15.0 - X - X - X 4B 6X40 0 2-4-2 X 4 15.0 - X - X - X	2A	6X6	300	5	Χ	2	-	-	Χ	Х	Х	_	Χ
7A 6X40 0 2-4-2 X 7 ★15.0 - X - X - X 4A 6X40 0 2-4-2 X 4 15.0 - X - X - X 4B 6X40 0 2-4-2 X 4 15.0 - X - X - X	2B	6X6	300	5	Χ	2	_	_	Χ	Χ	Χ	-	Χ
4A 6X40 0 2-4-2 X 4 15.0 - X - X - X 4B 6X40 0 2-4-2 X 4 15.0 - X - X - X	2C	6X6	300	5	Χ	2	_	-	Χ	Χ	Χ	-	Χ
4B 6X40 0 2-4-2 X 4 15.0 - X - X - X	7A	6X40	0	2-4-2	Χ	7	★ 15.0	-	Χ	-	Χ	-	Χ
	4A	6X40	0	2-4-2	Χ	4	15.0	<u>-</u>	Χ	-	Χ	-	Χ
Pisable delay during Alternate Phasing Operation.	4B	6X40	0	2-4-2	Χ	4	15.0	-	Χ	-	Χ	_	Χ
	isab	le dela	y durin	g Alter	rna	te Ph	nasing	Opera	ıti	on.			

NC 150



23 ←0 <

24 🕶

— Mast Arm A

SIGNAL FACE I.D.

All Heads L.E.D.

MAXTIME TIMING CHART PHASE **FEATURE** 2 4 Ped Clear _ 12 7 7 Min Green Passage * 2.0 2.0 60 30 30 Yellow Change 3.0 4.7 3.0 1.5 2.2 Red Clear 3.5 1.0 Added Initial * 34 Maximum Initial * Time Before Reduction _ 30 Time To Reduce ' 3.0 Minimum Gap _ 7 Advance Walk Non Lock Detector Vehicle Recall MIN RECALL

DEFAULT

PHASING DIAGRAM

ALTERNATE

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

 $<\!\!--\!\!>$ PEDESTRIAN MOVEMENT

DEFAULT PHASING

TABLE OF OPERATION

SIGNAL

FACE

22,23

24

41,42

71,72

P21**,**P22

W DW DRI

ALTERNATE PHASING

TABLE OF OPERATION

SIGNAL

FACE

21

22,23

24

41,42

71,72

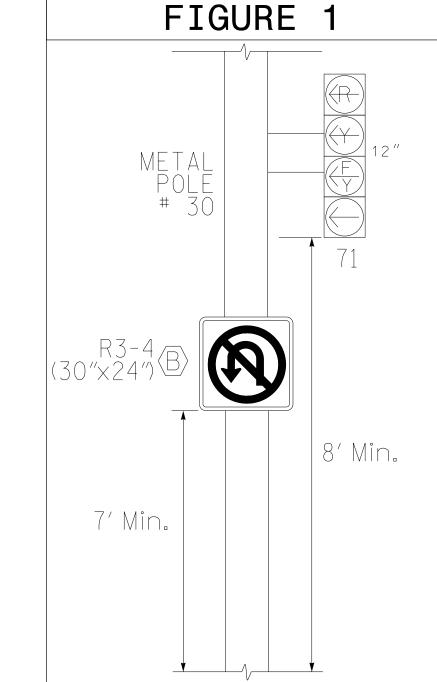
P21**,**P22

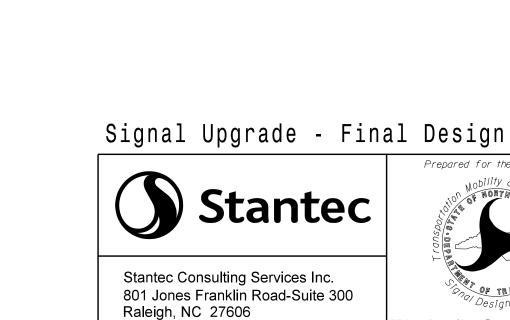
W DW DRK

-2% Grade

45 MPH

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





www.stantec.com

License No. F-0672

Stantec Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300

Tel. (919) 851-6866 Fax. (919) 851-7024

50 N.Greenfield Pkwy,Garner,NC 2

Division 12 1"=40'

2. Program phases 4 and 7 for Dual Entry.

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

5. The cabinet and controller are part of the NC 150 D12-02_Mooresville CLS.

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S2, S3, S5, S7, S10, AUX S1,
	AUX S4, AUX S5
Phases Used	2, 2PED, 4, 7
Overlap "1"	*
Overlap "2"	NOT USED
Overlap "3"	*
Overlap "4"	*

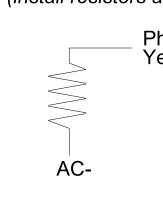
*See overlap programming detail on sheet 2

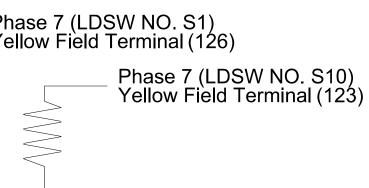
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

for instructions on selecting this feature.

LOAD RESISTOR INSTALLATION DETAIL

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





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

EQUIPMENT INFORMATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual

(install resistors as shown)

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

Phase 7 (LDSW NO. S1) Yellow Field Terminal (126)

www.stantec.com

Final Design Electrical Detail - Sheet 1 of 2

Prepared for the Offices of:

NC 150 Lowe's Main Entrance

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE

INIT. DATE

REVISIONS Jason Gallowa 5/20/2024 750 N. Greenfield Pkwy, Garner, NC 27529

INPUT FILE CONNECTION & PROGRAMMING CHART

INPUT FILE POSITION LAYOUT

3 4 5 6 7 8 9 10 11 12 13 14

(front view)

18 CHANNEL IP CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-4, 1-7, 1-9, 1-12, 2-9, 2-11, 2-12, 2-13, 4-7, 4-9, 4-12, 7-9, 7-12,

4. Integrate monitor with Ethernet network in cabinet.

COMPONENT SIDE

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.

REMOVE JUMPERS AS SHOWN

9-11, 9-12, 9-13, 11-12, 11-13, and 12-13.

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	
2A	TB2-5,6	I2U	39	1	2	2			Х	Х	Χ		
2B	TB2-7,8	I2L	43	5	3	2			Х	Х	Х		
2C	TB2-9,10	I3U	63	29	4	2				Х	Х		
4A	TB4-9,10	I6U	41	3	8	4	15.0		Х		Х		
4B	TB4-11,12	I6L	45	7	9	4	15.0		Х		Х		
7A	TB5-5,6	J5U	57	19	21 *	7	15.0		Х		Х		
PED PUSH BUTTONS													
P21,P22	TB8-4,6	I12U	67	33	2	PED 2	NOTE:						
For the detectors to work as shown on the signal design plan,								DC ISOLAT					

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

INPUT FILE POSITION LEGEND: J2L

FILE J SLOT 2 LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1597

DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

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

FS = FLASH SENSE ST = STOP TIME

ON OFF

- RF 2010 RP DISABLE

- WD 1.0 SEC

- GY ENABLE

- FYA 1-9

─ FYA 5-11

── FYA 7-12

= DENOTES POSITION OF SWITCH

ST

FYA 3-10

─ SF#1 POLARITY 🢆

— FYA COMPACT—

WD ENABLE

SWITCH NO

CMU CHANNEL NO.

RED

YELLOW

GREEN

ARROW

YELLOW ARROW

FLASHING

ARROW

OL3 RED (A114) -

OL3 YELLOW (A115) —

OL3 GREEN (A116) —

128 | 128

129 | 129

127 | 130

130

113

115

★ See pictorial of head wiring in detail this sheet.

1Ø1

102

103

Stantec

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024

License No. F-0672

ELECTRICAL AND PROGRAMMING

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

029904

R-2307B

SIGNAL HEAD HOOK-UP CHART

S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 AUX AUX AUX AUX AUX S5 S6 S6

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

124

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

OL1 RED (A121)

OL1 YELLOW (A122) -

OL1 GREEN (A123) —

07 GREEN (127) ___

A121

OL4 RED (A1Ø1)

OL4 YELLOW (A1Ø2)

OL4 GREEN (A1Ø3) -

Ø7 GREEN (124) (LDSW NO.S1Ø)

21 22,23 P21, NU 41,42 NU NU NU NU T1 NU NU 72 NU NU 24 71

Sig. 52.

| A1Ø1 |

A115 A102

A116 A1Ø3

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 71,72 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

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

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 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector	Call Phase	Delay
21	7	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	3	4
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	2	2
Modifier Phases	7	-	7
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 1into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	3	4	
Туре	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	
Included Phases	=	2	=	NOTICE INCLUDED PHASE
Modifier Phases	7	-	7	
Modifier Overlaps	1	1	1	
Trail Green	0	0	0	
Trail Yellow	0.0	0.0	0.0	
Trail Red	0.0	0.0	0.0	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1597 DESIGNED: MAY 2024

Final Design

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

NC 150 Lowe's Main Entrance

REVISIONS

Iredell County Division 12 May 2024 REVIEWED BY: J Galloway, PE

Mooresville PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE INIT. DATE

Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672

Stantec Stantec Consulting Services Inc.

801 Jones Franklin Road-Suite 300 750 N. Greenfield Pkwy, Garner, NC 27529

SEALED: 5/20/2024

REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

029904

Jason Gallowa 5/20/2024 CTG.OP.1/E2B40B4.B46E1-9-1597

-High Point of Roadway Surface-

See Note 7d

G Foundation

See Note 7e

Base line reference elev. = 870.01'

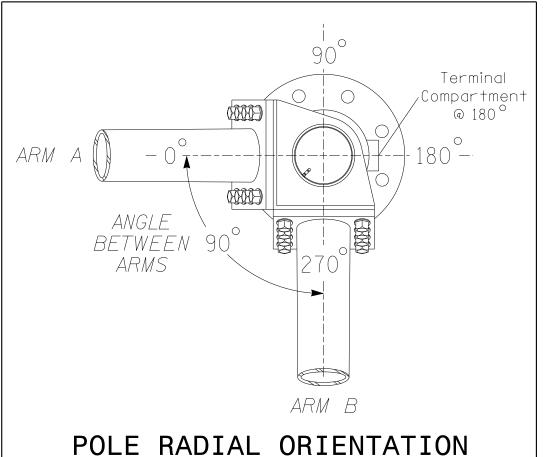
Elevation View @ 270

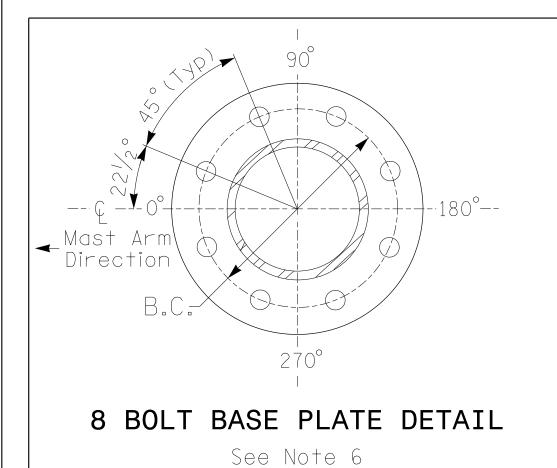
METAL POLE No. 1 SPECIAL NOTE

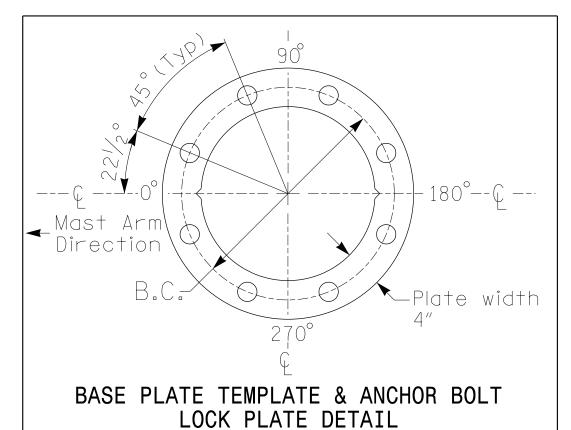
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at © Foundation @ ground level	870.01 ft.	870.01 ft.
Elevation difference at High point of roadway surface	- 1.30 ft.	+0.48 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.







For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE LOADING DESCRIPTION AREA SIZE WEIGHT SYMBOL 25.5" W 74 LBS I 66.0"L RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE 9.3 S.F. 25.5" W 60 LBS J 52.5" L RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE | 7.5 S.F. | 30.0" W | 14 LBS | 36.0" L SIGN RIGID MOUNTED | 16.0 S.F. | 24.0" W | 36 LBS | 96.0"L STREET NAME SIGN Street Name RIGID MOUNTED

R-2307B

Sig. 52.3

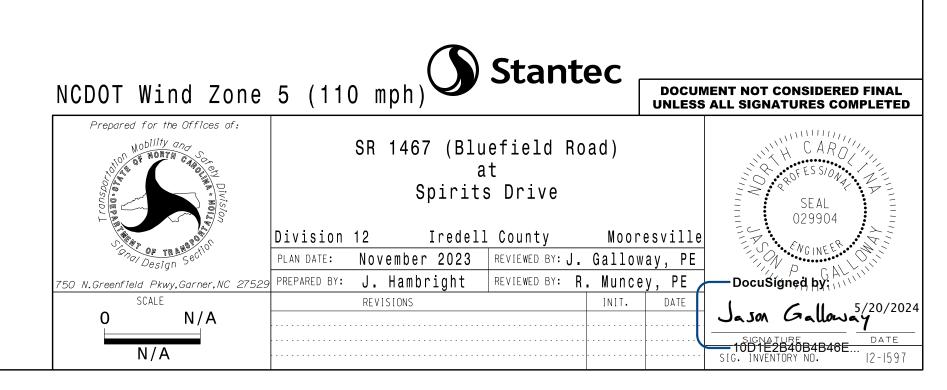
NOTES

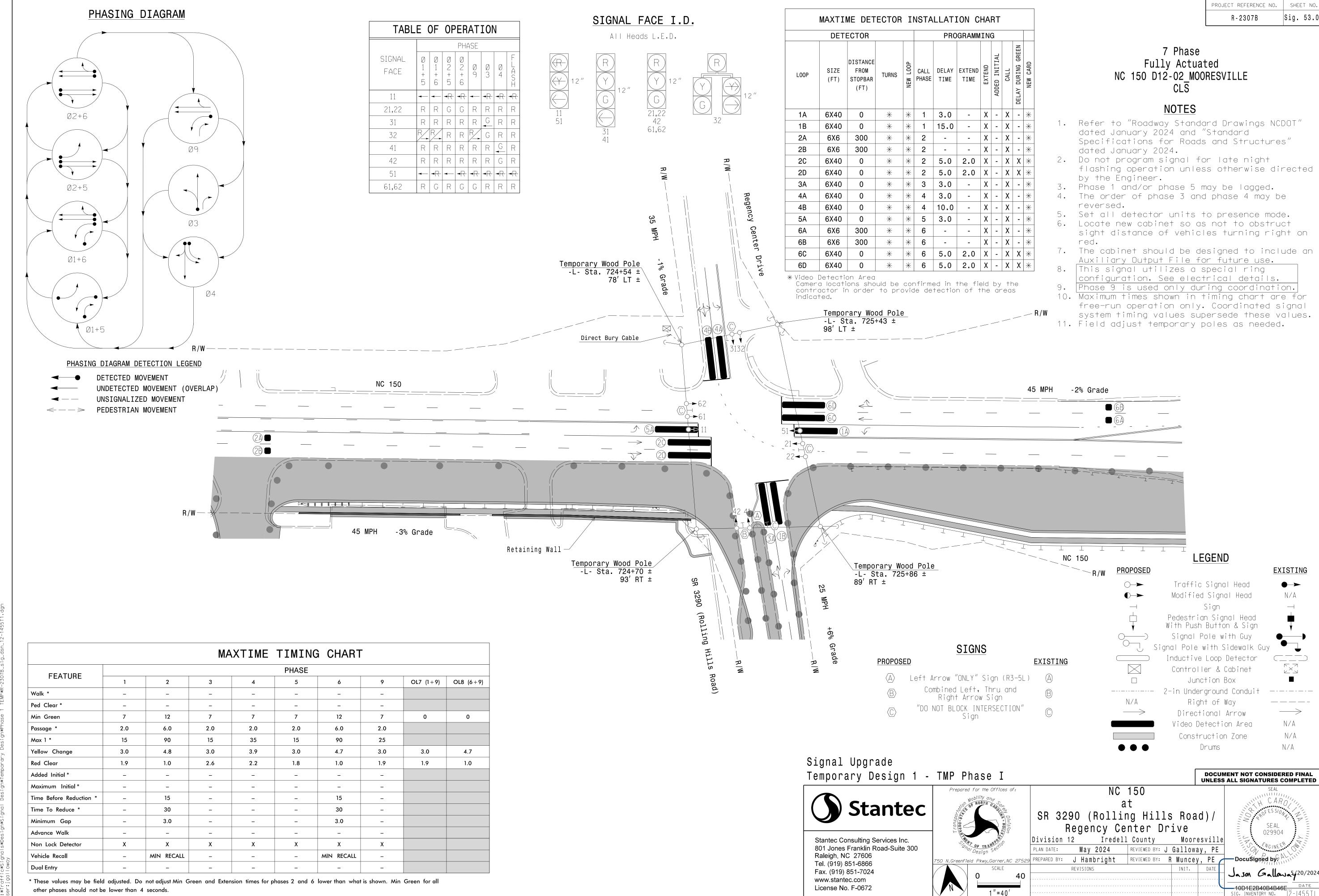
DESIGN REFERENCE MATERIAL

- 1. Design the traffic signal structure and foundation in accordance with:
- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for
- Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions. • The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to
- the specifications can be found in the traffic signal project special provisions.
- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signal project plans and special provisions.
- The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

- 2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation. 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions: a. Mast arm slope and deflection are not considered in determining the arm attachment
- height as they are assumed to offset each other. b. Signal heads are rigidly mounted and vertically centered on the mast arm.
- c. The roadway clearance height for design is as shown in the elevation views.
- d. The top of the pole base plate is 0.75 feet above the ground elevation.
- e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- 8. The pole manufacturer will determine the total height (H2) of each pole using the greater of
- Mast arm attachment height (H1) plus 2 feet, or
- H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- 11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.





SIG. INVENTORY NO. 12-1455T

WD ENABLE (remove jumpers and set switches as shown) SW2 REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6. - 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 12 COMPONENT SIDE 13 REMOVE JUMPERS AS SHOWN 15 ∥ 16 . Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

ON OFF

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 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 NC 150 D12-02_Mooresville

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
Phases Used	1, 2, 3, 4, 5, 6, 9**
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED
Overlap "7"	*
Overlap "8"	*

- *See overlap programming detail on this sheet
- **Used for timing purposes only

SEQUENCE PARAMETERS

Front Panel

= DENOTES POSITION OF SWITCH

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
Seguence 2	

Sequence 2

•	
Ring	Sequence Data
1	1,2,a,9,b,3,4,c
2	5,6,a,b,c
•	

Phase Sequence Plan 2 is for use during coordination only

INPUT FILE POSITION LAYOUT

(front view)

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.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file ^U "I" _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	FS DC ISOLATOR ST DC ISOLATOR
FILE U	S L O T E M P T Y	S LOT E M P T Y	SLOT EMPTY TC.= L	SLOT EMPTY OOP NO	SLOT EMPTY).'S	SLOT EMPTY	SLOH EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY ST	SLOT EMPTY FLASH	SLOT EMPTY SENS TIME	SLOT EMPTY

SPECIAL DETECTOR NOTE

Install a video 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.

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	7	8
Туре	Normal	Normal
Included Phases	1,9	6,9
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	3.0	4.7
Trail Red	1.9	1.0

Stantec

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672

R-2307B Sig. 53.

					S	IGN	1AL	HE	EAD	HC	OK	- UF	CI	HAF	RT						
LOAD SWITCH NO.	S	;1	S2	S3	S	54	S	55	S6	S7	S8	59	S1Ø	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	l	2	13		3	2	4	14	5	6	15	7	8	16	9	1Ø	17	11	12	18
PHASE	OL	_7	2	2 PED		3	2	4	4 PED	5	OL8	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	32	21,22	NU	31	32	41	42	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED			128		116	116	1Ø1	1Ø1			134										
YELLOW			129		117	117	102	102			135										
GREEN			130		118	118	1Ø3	103			136										
RED ARROW	125									131											
YELLOW ARROW	126	126								132											
GREEN ARROW	127	127			118		103			133											

NU = Not Used

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1455T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 1 - TMP Phase I Electrical Detail

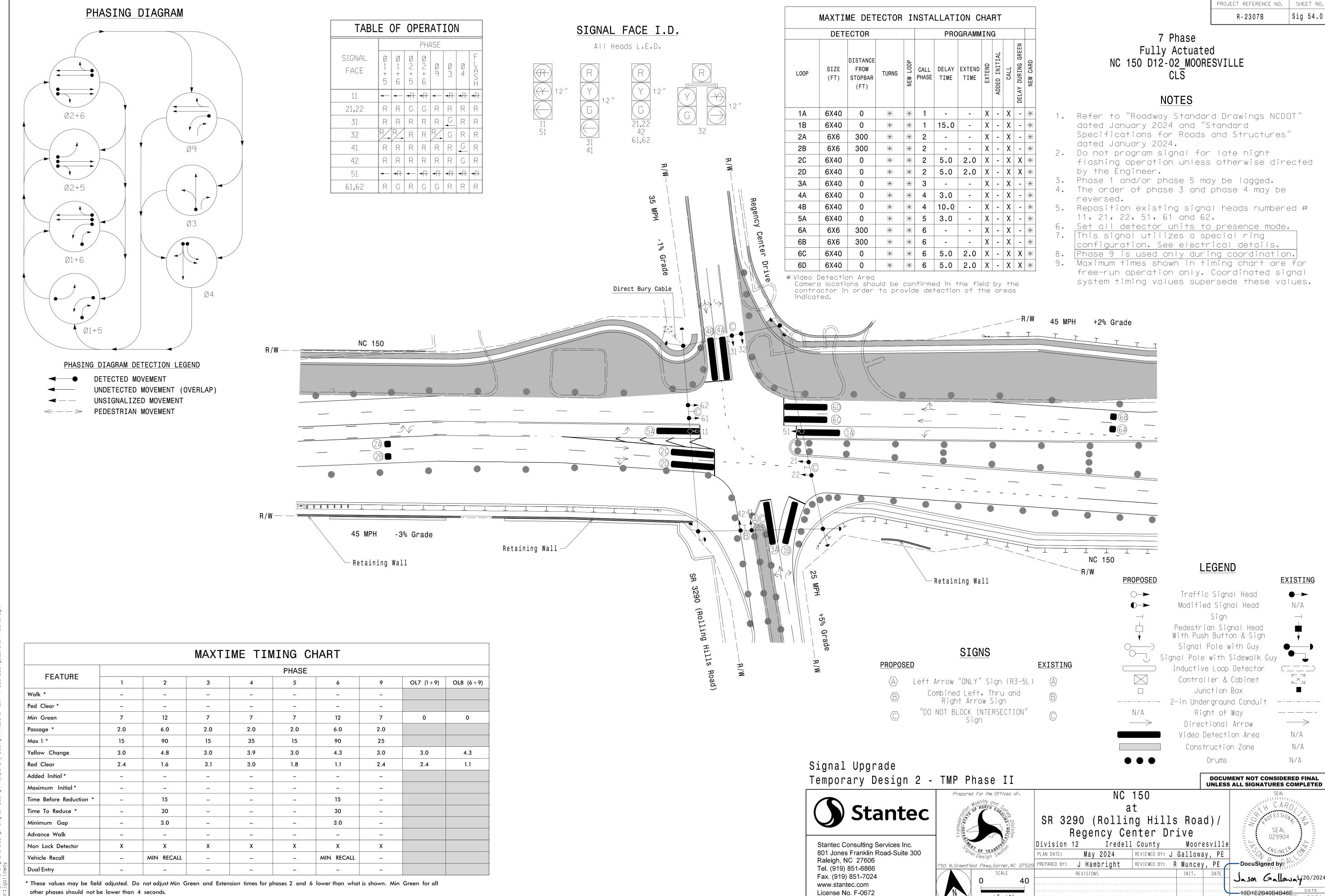
ELECTRICAL AND PROGRAMMING NC 150 SR 3290 (Rolling Hills Road)/ Regency Center Drive Division 12 Iredell County Mooresville PLAN DATE: May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: R M Muncey REVIEWED BY: R Muncey, PE

REVISIONS

DOCUMENT NOT CONSIDERED FINAL

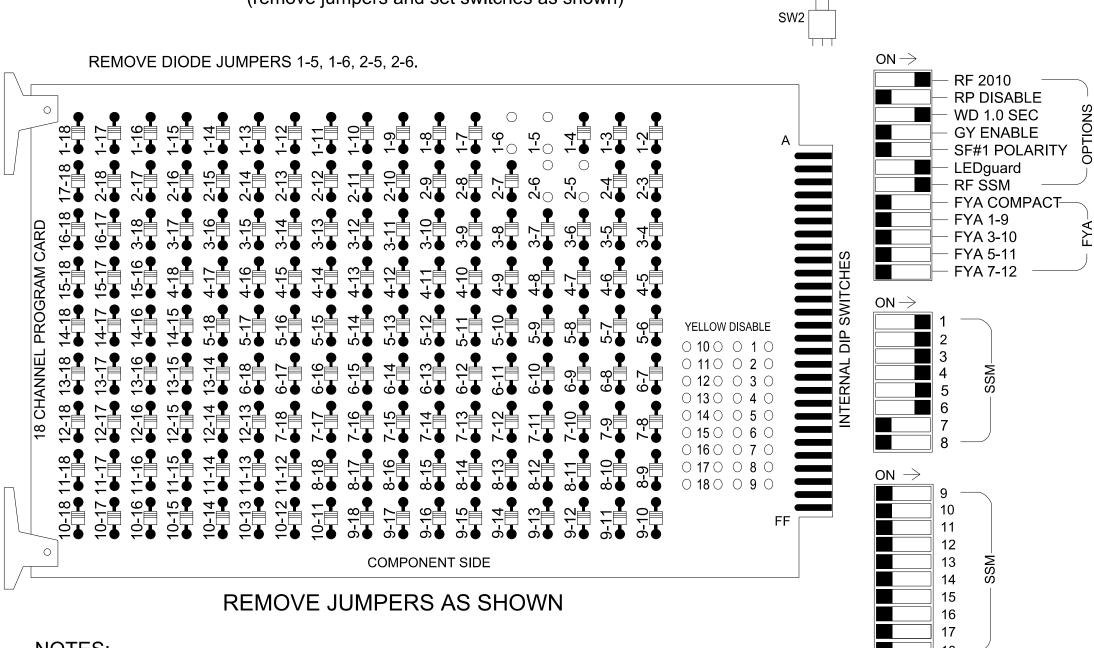
UNLESS ALL SIGNATURES COMPLETED

INIT. DATE Jason Gallowa 5/20/2024



1"=40'

\$\$\$\$\$\$YSDATE\$\$\$\$\$:36:23 PM :*Traffic*Sianals*Desian*Sianal Desian*Temborary (remove jumpers and set switches as shown)



ON OFF

WD ENABLE

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 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 NC 150 D12-02_Mooresville

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
Phases Used	1, 2, 3, 4, 5, 6, 9**
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED
Overlap "7"	*
Overlap "8"	······*

*See overlap programming detail on this sheet

**Used for timing purposes only

SEQUENCE PARAMETERS

Front Panel

= DENOTES POSITION OF SWITCH

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

Sequence 2

Ring	Sequence Data
1	1,2,a,9,b,3,4,c
2	5,6,a,b,c

Phase Sequence Plan 2 is for use during coordination only

INPUT FILE POSITION LAYOUT

(front view)

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.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOF EXPFY	SLOT EMPTY	NIOH EZRHY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	S O T E M P T Y	S LOT E M P T Y	SLOT EMPTY	SLOT EMPTY OOP NO	SLOT EMPTY).'S	SLOT EMPTY ST		S L O T E M P T Y SENS TIME	S LOT E MPTY					

SPECIAL DETECTOR NOTE

Install a video 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.

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	7	8
Туре	Normal	Normal
Included Phases	1,9	6,9
Modifier Phases	-	-
Modifier Overlaps	÷	-
Trail Green	0	0
Trail Yellow	3.0	4.3
Trail Red	2.4	1.1



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672

R-2307B Sig. 54.

					S	IGN	IAL	HE	EAD	HC	OK	-UF	C	HAF	RT.						
LOAD SWITCH NO.	C	\$1	S2	S3	S	4	S	55	S6	S7	S8	S9	S1Ø	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.		1	2	13		3	2	4	14	5	6	15	7	8	16	9	1Ø	17	11	12	18
PHASE	Ol	_7	2	2 PED	()	3	2	4	4 PED	15)	0L8	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	32	21,22	NU	31	32	41	42	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED			128		116	116	1Ø1	1Ø1			134										
YELLOW			129		117	117	102	102			135										
GREEN			13Ø		118	118	103	103			136										
RED ARROW	125									131											
YELLOW ARROW	126	126								132											
GREEN ARROW	127	127			118		103			133											

NU = Not Used

NOTE

NOTE

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
\rightarrow	1	Overlap	7		Х	Х	1
•	2	Phase Vehicle	2	·	Х		2
	3	Phase Vehicle	3	·	Х	Χ	3
	4	Phase Vehicle	4	·	Х		4
	5	Phase Vehicle	5	·	Х		5
\rightarrow	6	Overlap	8	·	Х	Х	6
•	7	Phase Vehicle	7		Х		7
	8	Phase Vehicle	8	·	Х	Х	8
	9	Overlap	1	·	Х	Х	9
	10	Overlap	2	·	Х	X	10
	11	Overlap	3	·	Х		11
	12	Overlap	4	·	Х		12
	13	Phase Ped	2	·	·		13
	14	Phase Ped	4				14
	15	Phase Ped	6	·	·		15
	16	Phase Ped	8	·	·		16
	17	Overlap	5		Χ	X	17
	18	Overlap	6	·	Χ		18

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1455T2 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 2 - TMP Phase II Electrical Detail

ELECTRICAL AND PROGRAMMING NC 150 SR 3290 (Rolling Hills Road)/ Regency Center Drive

Division 12 Iredell County Mooresville PLAN DATE: PREPARED BY:

May 2024 REVIEWED BY: J Galloway, PE REVIEWED BY: R Muncey, PE JPG/RMM REVISIONS INIT. DATE

Jason Gallowa \$\frac{1}{20}/2024

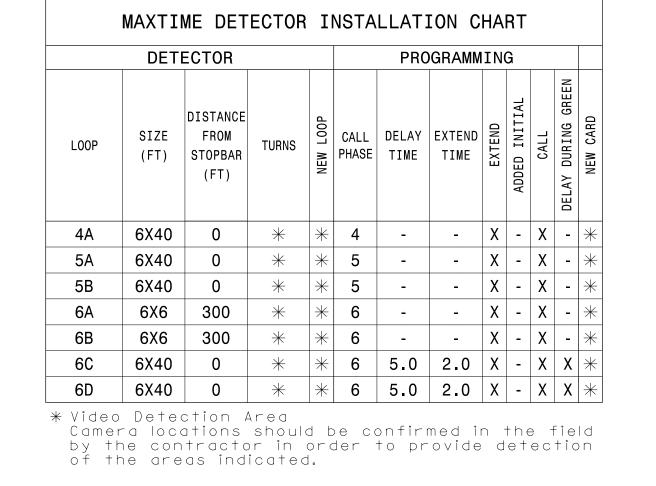
DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. Sig. 55.0 R-2307B 3 Phase NOTES 2. Do not program signal for late night flashing 5. Set all detector units to presence mode. LEGEND **EXISTING** \bigcirc Traffic Signal Head **-**Modified Signal Head N/A Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box 2-in Underground Conduit -----N/A Right of Way \longrightarrow Directional Arrow Video Detection Area N/A N/A Construction Zone Drums N/A "NO TURN ON RED" Sign (R10-11) No Left Turn Sign (R3-2) DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Fully Actuated NC 150 D12-02_MOORESVILLE

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- operation unless otherwise directed by the Engineer.
- 3. Phase 5 may be lagged.
- 4. Reposition existing signal head number #62.
- 6. Maximum times shown in timing chart are for
- free-run operation only. Coordinated signal system timing values supersede these values.



PHASING DIAGRAM DETECTION LEGEND

TABLE OF OPERATION

RGR

SIGNAL

FACE

41,42

51,52

61

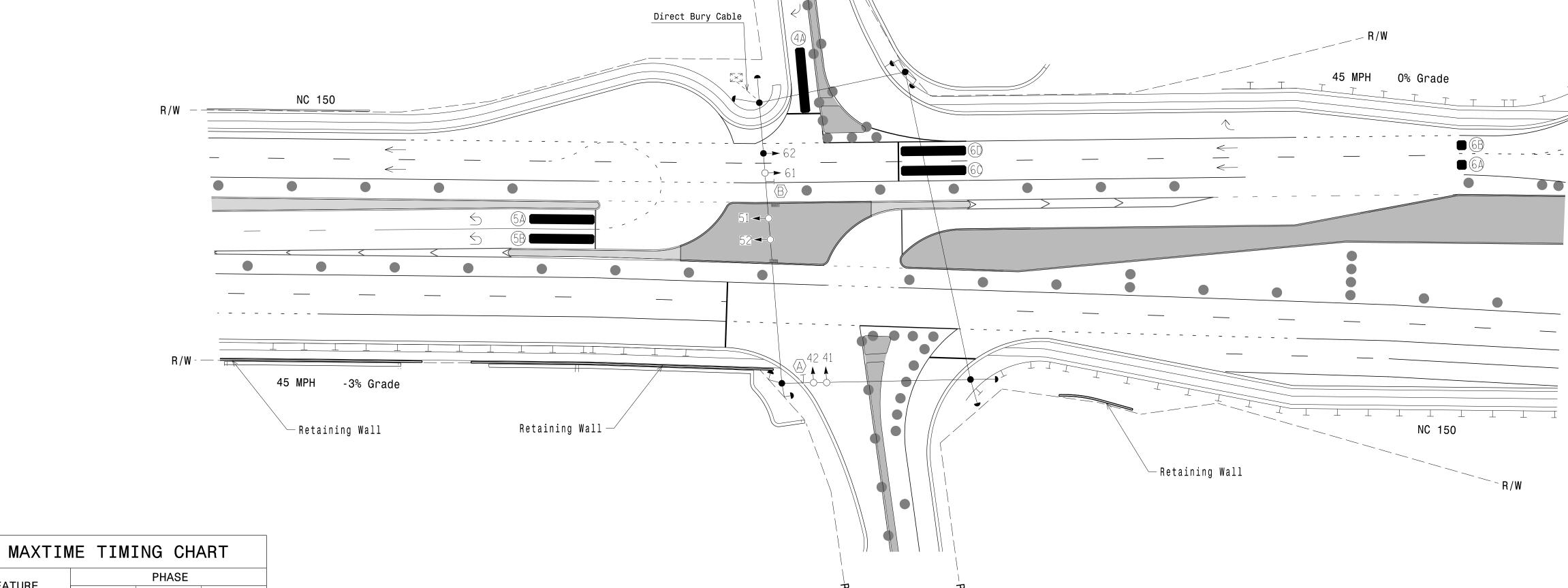
62

UNSIGNALIZED MOVEMENT $<\!\!<\!\!--\!\!>$ PEDESTRIAN MOVEMENT

DETECTED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

PHASING DIAGRAM



SIGNAL FACE I.D.

All Heads L.E.D.

FEATURE 4 5 6 Ped Clear * Min Green 7 12 2.0 2.0 6.0 Passage * 90 15 3.2 3.0 4.5 Yellow Change 1.3 3.9 2.9 Red Clear Added Initial * Maximum Initial * _ _ Time Before Reduction 15 Time To Reduce * 30 _ 3.0 Minimum Gap _ Advance Walk

* 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.

Χ

Χ

_

MIN RECALL

Signal Upgrade Temporary Design 3 - TMP Phase III



801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 O NRGraffinAMettan B.R.W., Garner, NC 27 Tel. (919) 851-6866 Fax. (919) 851-7024

www.stantec.com

License No. F-0672



1"=40'

NC 150 WB at Lowe's U-turn/ Regency Center Drive

Iredell County Division 12 Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE DocuSigned by REVISIONS INIT. Jason Gallowa 5/20/2024 SIG. INVENTORY NO. 12-1455T3

029904

Non Lock Detector

Vehicle Recall

Dual Entry

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.

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

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. Default the controller before programming per this electrical detail.
- 3. Program controller to start up in phase 2 Phase Not On 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 NC 150 D12-02_Mooresville

R-2307B Sig. 55.

				SI	GNA	L	HEA	D ł	100	K-l	JP	CHA	4RT	•					
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S	8	S9	S1Ø	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	(õ	15	7	8	16	9	1Ø	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	(ò	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	NU	NU	41,42	NU	51,52	61	62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED					1Ø1			134	134										
YELLOW								135	135										
GREEN									136										
RED ARROW							131												
YELLOW ARROW					102		132												
GREEN ARROW					103		133	136											

NU = Not Used

EQUIPMENT INFORMATION

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

SEQUENCE DETAIL

Main Menu > Controller > Sequence & Phs Config> Sequences

Web Interface Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	5,6,a,4,b
2	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1455T3 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

SPECIAL DETECTOR NOTE

FS = FLASH SENSE ST = STOP TIME

INPUT FILE POSITION LAYOUT

(front view)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Install a video 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.

ELECTRICAL AND PROGRAMMING

750 N. Greenfield Pkwy, Garner, NC 27529

Stantec Prepared for the Offices of: Stantec Consulting Services Inc.

801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672

Temporary Design 3 - TMP Phase III Electrical Detail

> NC 150 WB at Lowe's U-Turn/

Regency Center Drive

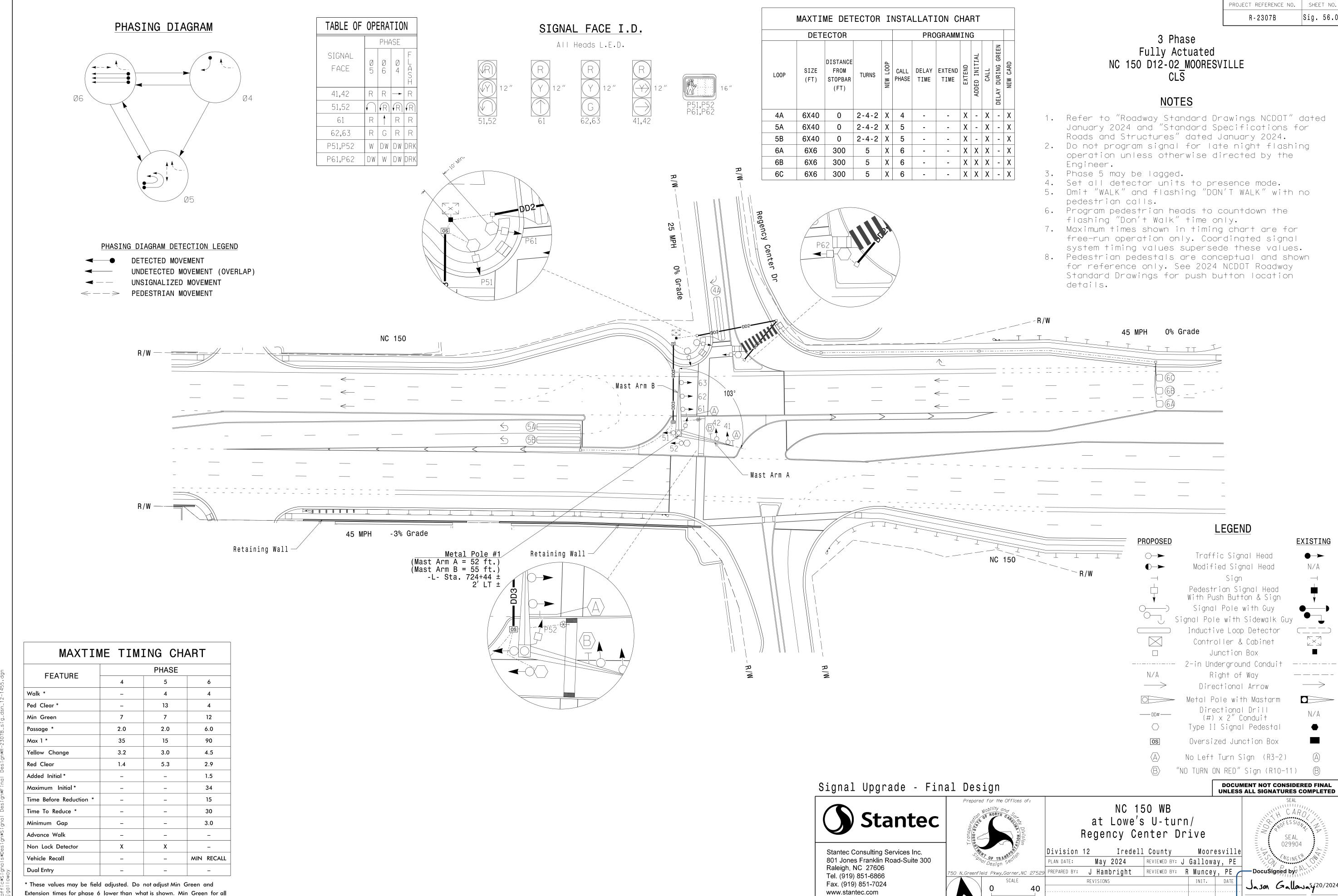
Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: JPG/RMM REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

Jason Gallowa \$\frac{1}{20}/2024

029904

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED



License No. F-0672

1 " = 40'

\$\$\$\$\$\$\$YSDATE\$\$\$\$\$ 6:39:50 PM U:*Traffic*Sianals*Desian*Siar

other phases should not be lower than 4 seconds

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

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.

INPUT FILE POSITION LAYOUT

(front view)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

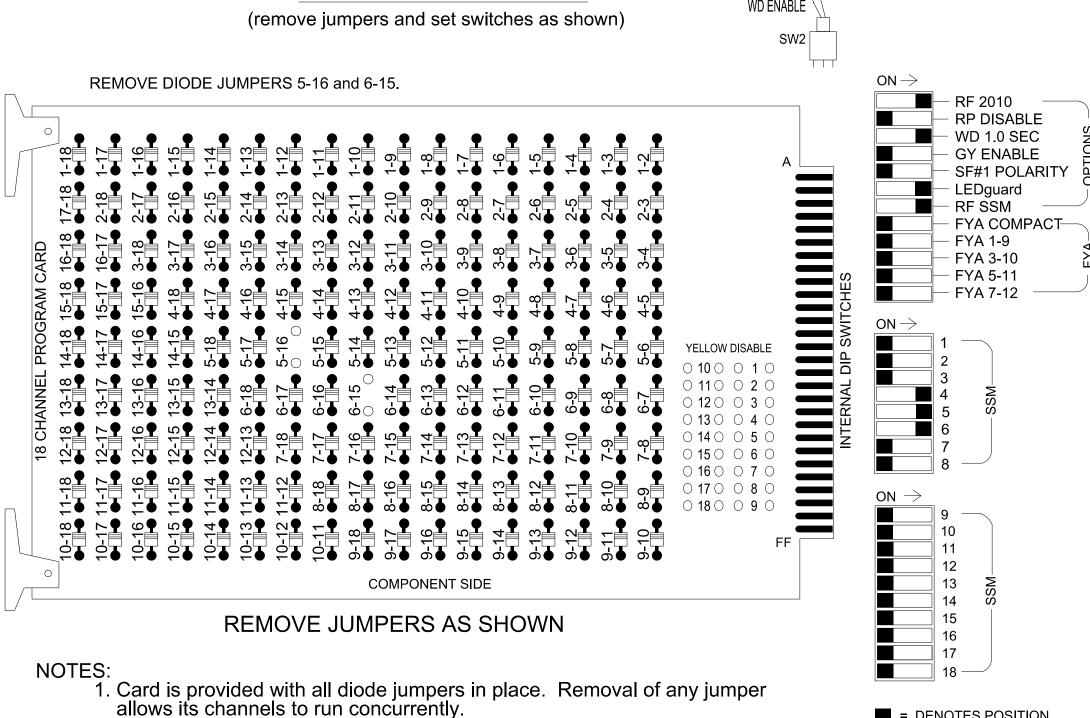
INPUT FILE CONNECTION & PROGRAMMING CHART

NO.

INPUT PIN INPUT DETECTOR CALL DELAY EXTEND ADDED

PHASE TIME

4. Integrate monitor with Ethernet network in cabinet.



ON OFF

= DENOTES POSITION OF SWITCH

Ø5PED ST

GREEN

FS = FLASH SENSE ST = STOP TIME

> Χ Χ Χ

> Χ

Χ

Χ

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 Phase Not On and 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 NC 150 D12-02 Mooresville CLS.

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	S5, S7, S8, S9, S12
Phases Used	4, 5, 5PED, 6, 6PED
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

R-2307B

Sig. 56

				SI	GNA	LH	HEA	D	H00	K-l	JP	CHA	4RT						
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	(68	S9	S1Ø	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	5 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	NU	41,42	NU	51,52	61	62,63	P61, P62	NU	NU	P51, P52	NU	NU	NU	NU	NU	NU
RED					1Ø1			134	134										
YELLOW								135	135										
GREEN									136										
RED ARROW							131												
YELLOW ARROW					102		132												
GREEN ARROW					103		133	136											
*										119			11Ø						
Ķ										121			112						

NU = Not Used

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.

PED 5 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
NOTICE PHASE 5 PED	4		4	0
ASSIGNED TO	6		6	0
DETECTOR 8 PED	8		5	0

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

SEQUENCE DETAIL

Front Panel

Main Menu > Controller > Sequence & Phs Config > Sequences

Web Interface

Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	5,6,a,4,b
2	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1455 DESIGNED: MAY 2024 SEALED: 5/20/2024

NOTICE PHASE 5 PED ASSIGNED TO CHANNEL 16

Stantec Consulting Services Inc.

Raleigh, NC 27606

Tel. (919) 851-6866

Fax. (919) 851-7024

www.stantec.com License No. F-0672

801 Jones Franklin Road-Suite 300

Final Design Electrical Detail ELECTRICAL AND PROGRAMMING

NC 150 WB at Lowe's U-Turn/ Regency Center Drive Iredell County

PREPARED BY: R Muncey REVIEWED BY: R Muncey, PE

Mooresville May 2024 REVIEWED BY: J Galloway, PE REVISIONS INIT.

029904

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

Jason Gallowa 5/20/2024

5B

TB3-9,10 64 30 PED PUSH **BUTTONS** P61,P62 I13U | 68 | 34 P51,P52 I13L 70 36

40

44

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

TB3-3,4

TB3-7,8

TERMINAL | FILE POS. | NO. | POINT

FILE . SLOT 2 LOWER

INPUT FILE POSITION LEGEND: J2L

REVISED: N/A

See Note 8 See Note 7 See Note 7

-High Point of Roadway Surface-

See Note 7e

Base line reference elev.

Elevation View @ 270

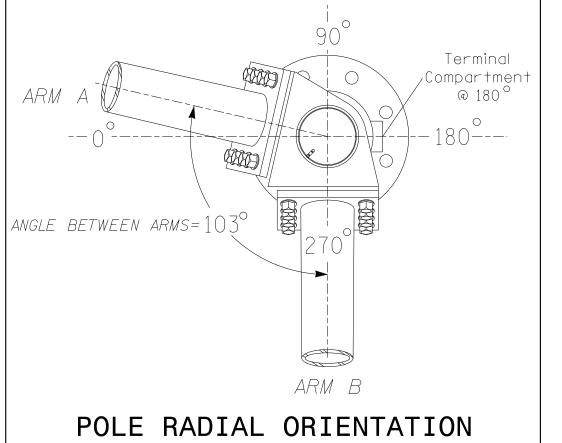
C Foundation

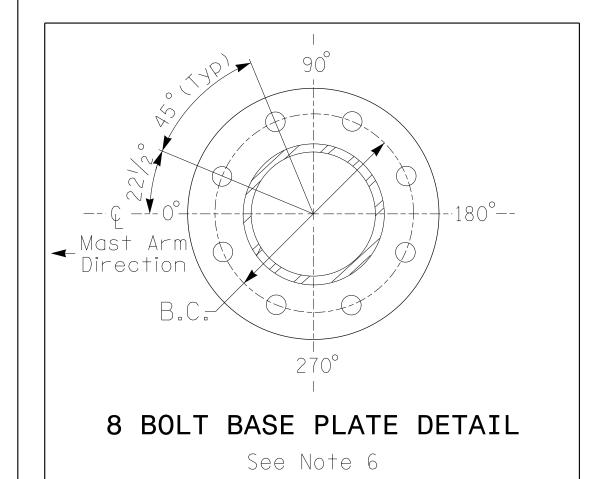
SPECIAL NOTE

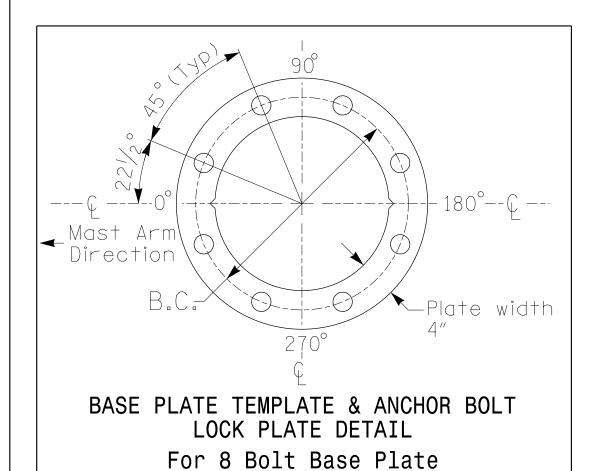
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Legistics difference at		
Elevation difference at High point of roadway surface	860.41 ft.	860.41 ft.
	-0.70 ft.	-0.70 ft.
Elevation difference at Edge of travelway or face of curb +/		+/-0.0 ft.







METAL POLE No. 1

R - 2307B	Sig. 56.2
PROJECT REFERENCE NO.	SHEET NO.

	MAST ARM LOADING SC	HEDU	LE	
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0″W X 56.0″L	103 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5″W X 17.0″L	21 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 LBS

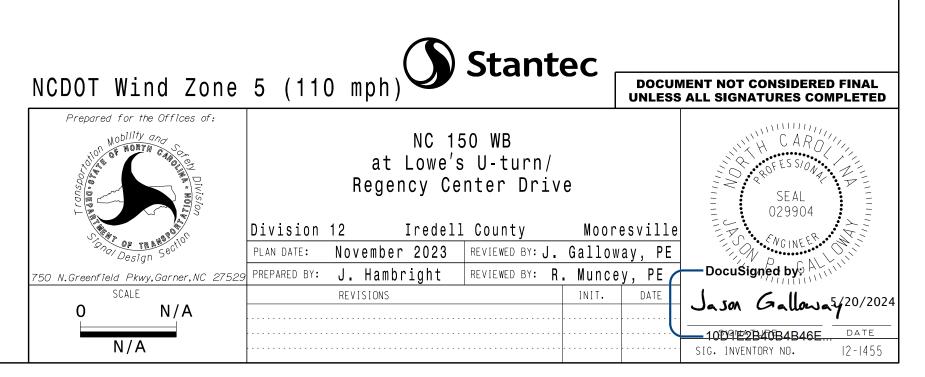
NOTES

DESIGN REFERENCE MATERIAL

- 1. Design the traffic signal structure and foundation in accordance with:
- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for
- Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signal project plans and special provisions.
- The NCDOT "Metal Pole Standards" located at the following NCDOT website:
- https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

- 2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- 6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions: a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
- b. Signal heads are rigidly mounted and vertically centered on the mast arm.
- c. The roadway clearance height for design is as shown in the elevation views.
- d. The top of the pole base plate is 0.75 feet above the ground elevation.
- e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- 8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
- Mast arm attachment height (H1) plus 2 feet, or
- H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- 11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.



2 Phase Fully Actuated w/ Alternate Phasing NC 150 D12-02 MOORESVILLE CLS

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
- 5. Reposition existing signal heads numbered #21
- 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.

LEGEND

Traffic Signal Head

Modified Signal Head

Sign

Pedestrian Signal Head

With Push Button & Sign

Signal Pole with Guy ignal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box

> Right of Way Directional Arrow

Video Detection Area

Construction Zone

Drums

No U-Turn Sign (R3-4) No Left Turn Sign (R3-2)

2-in Underground Conduit -----

EXISTING

 \longrightarrow

N/A

N/A N/A

N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

029904

DETECTOR PROGRAMMING DISTANCE FROM 의 CALL | DELAY | EXTEND | H SIZE -≥ PHASE TIME TIME STOPBAR (FT) * |*| 2 | - | - | X | - | X | - | * * |* | 2 | - | - | X | - | X | - | * * | * | 2 | 5.0 | 2.0 | X | - | X | X | * * |* 2 | 5.0 | 2.0 |X| - |X|X|** |*| 4 | 15.0 | - | X | - | X | - | * * |*| 7 |15.0**★**| - |X|-|X|-|*

MAXTIME DETECTOR INSTALLATION CHART

* Video Detection Area Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

★ Disable delay during Alternate Phasing Operation. 04 + 7PHASING DIAGRAM DETECTION LEGEND Existing Wood Pole See 12-1455T1 Existing Wood Pole
See 12-1455T1 DETECTED MOVEMENT For Details UNDETECTED MOVEMENT (OVERLAP) For Details UNSIGNALIZED MOVEMENT $<\!\!--\!\!>$ PEDESTRIAN MOVEMENT -1% Grade NC 150 000 45 MPH +1% Grade Retaining Wall -Retaining Wall — NC 150 Existing Wood Pole See 12-1455T1 Existing Wood Pole See 12-1455T1 For Details For Details

SIGNAL FACE I.D.

All Heads L.E.D.

41,42

MAXTIM	E TIMI	NG CHA	RT
FFATURE		PHASE	
FEATURE	2	4	7
Walk *	-	_	_
Ped Clear *	_	_	_
Min Green	12	7	7
Passage *	6.0	2.0	2.0
Max 1 *	60	30	30
Yellow Change	4.4	3.0	3.0
Red Clear	3.1	2.1	3.3
Added Initial *	_	_	_
Maximum Initial *	-	_	_
Time Before Reduction *	15	_	_
Time To Reduce *	30	_	_
Minimum Gap	3.0	_	_
Advance Walk	_	_	_
Non Lock Detector	Х	Х	Х
Vehicle Recall	MIN RECALL	_	_
Dual Entry	_	Х	Х

DEFAULT

PHASING DIAGRAM

ALTERNATE

PHASING DIAGRAM

04 + 7

DEFAULT PHASING

TABLE OF OPERATION

SIGNAL

FACE

21

22

41,42

PHASE

ALTERNATE PHASING

TABLE OF OPERATION

SIGNAL

FACE

41,42

PHASE

 $R \rightarrow F$

New Installation Temporary Design 1 - TMP Phase III

Raleigh, NC 27606

Tel. (919) 851-6866

Fax. (919) 851-7024

License No. F-0672

www.stantec.com



NC 150 EB SR 3290 (Rolling Hills Road)

PROPOSED

 \bigcirc

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE DocuSigned by REVISIONS INIT. Jason Gallowa 5/20/2024

Division 12 1"=40'

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

- detector logging for all detectors used at this location.
- 5. The cabinet and controller are part of the NC 150 D12-02_Mooresville CLS.

EQUIPMENT INFORMATION

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

- that signal heads flash in accordance with the signal plan.
- 2. Program phases 4 and 7 for Dual Entry.
- 3. Program controller to start up in phase 2 Green No Walk and 6 Phase Not On.
- 4. If this signal will be managed by an ATMS software, enable controller and

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

*See overlap programming detail on sheet 2

INPUT FILE POSITION LAYOUT

WD ENABLE

SW2

- RP DISABLE ─ WD 1.0 SEC

- GY ENABLE

─ LEDguard

- FYA 1-9 FYA 3-10 FYA 5-11

– FYA 7-12

RF SSM

13 14

15

16

17 18 -

= DENOTES POSITION OF SWITCH

SF#1 POLARITY

FYA COMPACT

(front view)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file ^U "I" L	SLOT EMPTY	SLOH EXRHY	SLOH EXRHY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOH EXPTY	SLOT EMPTY	SLOH EXPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	S O T E M P T Y	SLOT EMPTY A, 2A, E	SLOT EMPTY TC:	SLOT EMPTY OOP NO	Ø 7 7A NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOH EXPTY	SLOT EMPTY ST		S OT E M P T Y SENS TIME	S LOT E M P T Y

18 CHANNEL IP CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-12, 4-7, 4-12, and 7-12.

4. Integrate monitor with Ethernet network in cabinet.

COMPONENT SIDE

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.

REMOVE JUMPERS AS SHOWN

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
7A	TB5-5,6	J5U	57	19	21 *	7	15.0		Х		Х	

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

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

LOAD RESISTOR INSTALLATION DETAIL

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

Phase 7 Yellow Field Terminal (123)

DETECTOR NOTES

- 1. For all loops install a video 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.
- 2. For loop 7A detector card placements and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with time of day instructions located on sheet 2 of this electrical detail.

SIGNAL HEAD HOOK-UP CHART LOAD SWITCH NO. S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 AUX AUX AUX AUX AUX S5 S6 CMU CHANNEL 13 3 4 14 5 6 15 7 8 16 9 10 17 11 12 18 PHASE 21 22 NU NU 41,42 NU NU NU NU 71 NU NU NU NU NU NU SIGNAL HEAD NO. RED 128 | 128 1Ø1 YELLOW 129 | 129 GREEN 130 RED ARROW A1Ø1 YELLOW 102 A1Ø2

124

R-2307B

Sig. 57.

NU = Not Used

ARROW

FLASHING YELLOW ARROW

GREEN ARROW

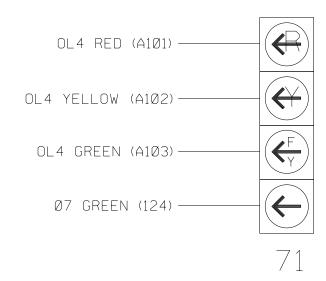
* Denotes install load resistor. See load resistor installation detail this sheet.

103

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1842T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III

DOCUMENT NOT CONSIDERED FINAL Electrical Detail - Sheet 1 of 2 **UNLESS ALL SIGNATURES COMPLETED** ELECTRICAL AND PROGRAMMING NC 150 EB

Prepared for the Offices of:

SR 3290 (Rolling Hills Road)

REVISIONS

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE INIT. DATE Jason Gallowa 5/20/2024

www.stantec.com 750 N. Greenfield Pkwy, Garner, NC 27529

(install resistors as shown)

Stantec

License No. F-0672

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024

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 71 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu > Controller > Coordination > Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern Veh Det Plan Overlap Plan

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

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Plan 2

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.

Detector	Call Phase	Delay
21	7	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	4
Type	FYA 4 - Section
Included Phases	2
Modifier Phases	7
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	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	4	
Туре	FYA 4 - Section	
Included Phases	-	NOTICE INCLUDED PHASE
Modifier Phases	7	
Modifier Overlaps	-	
Trail Green	0	
Trail Yellow	0.0	
Trail Red	0.0	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1842T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

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

ELECTRICAL AND PROGRAMMING NC 150 EB Prepared for the Offices of: SR 3290 (Rolling Hills Road)

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway, PE REVIEWED BY: R Muncey, PE REVISIONS

DocuSigned by Jason Gallowa \$1/20/2024

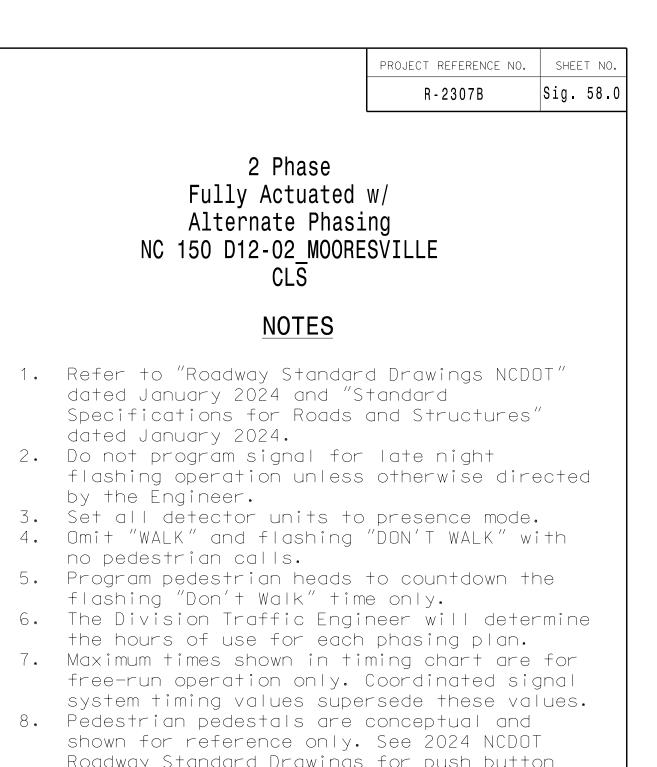
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300

License No. F-0672

Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

Stantec



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

- by the Engineer. 3. Set all detector units to presence mode.
- 4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- flashing "Don't Walk" time only. 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
- 8. Pedestrian pedestals are conceptual and shown for reference only. See 2024 NCDOT Roadway Standard Drawings for push button location details.

	DEFAULT PHASING ALTERNATE PHASING TABLE OF OPERATION	SIGNAL LAGE I.D.	MAXTIME DETECTOR INSTALLATION CHART
DEFAULT	PHASE PHASE	AII Heads L.E.D.	DETECTOR PROGRAMMING
PHASING DIAGRAM	SIGNAL Ø F L A A A A A A A A A A A A A A A A A A	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	LOOP SIZE FROM STOPBAR (FT) TURNS CALL PHASE TIME EXTEND TIME OF TIM
ALTERNATE PHASING DIAGRAM	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	R 71 R N N N N N N N N N N N N N N N N N N N	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
Ø2	P41	Existing Pedestal See 12-1455 For Details	<pre>Metal Pole #1 (Mast Arm A = 50 ft.) (Mast Arm B = 60 ft.) -L- Sta. 726+04 ± 6' RT ±</pre>
R/W————————————————————————————————————	NC 150	Mast Arm "A"	R/W 45 MPH -1% Grade
R/W————————————————————————————————————		DD2	→ → → → → → → → → → → → → → → → → → →
MAXTIME TIMING CHART FEATURE PHASE 2 4 7 Walk * 14 4 - Ped Clear * 32 15 - Min Green 12 7 7 Passage * 6.0 2.0 2.0 Max 1 * 60 30 30 Yellow Change 4.4 3.0 3.0 Red Clear 2.9 2.9 3.3 Added Initial * 1.0 - -	FIGURE 1 71 12" R3-4 (30" x 24")	25 MPH +5% Grade R/W P22 P22 P22 P21 P21 P21 P21 P21	NC 150 R/W

Traffic Signal Head Modified Signal Head N/A Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box 2-in Underground Conduit -----N/A Right of Way \longrightarrow Directional Arrow Metal Pole with Mastarm Directional Drill N/A (#) x 2" Conduit Type I Pushbutton Post Type II Signal Pedestal Oversized Junction Box No U-Turn Sign (R3-4) (SEE FIGURE 1) No Left Turn Sign (R3-2)

LEGEND

EXISTING

CARO

SEAL

PROPOSED



1"=40'

Fax. (919) 851-7024

www.stantec.com License No. F-0672

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED NC 150 EB SR 3290 (Rolling Hills Road)

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

029904 PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE DocuSigned by REVISIONS INIT. Jason Gallowa 5/20/2024

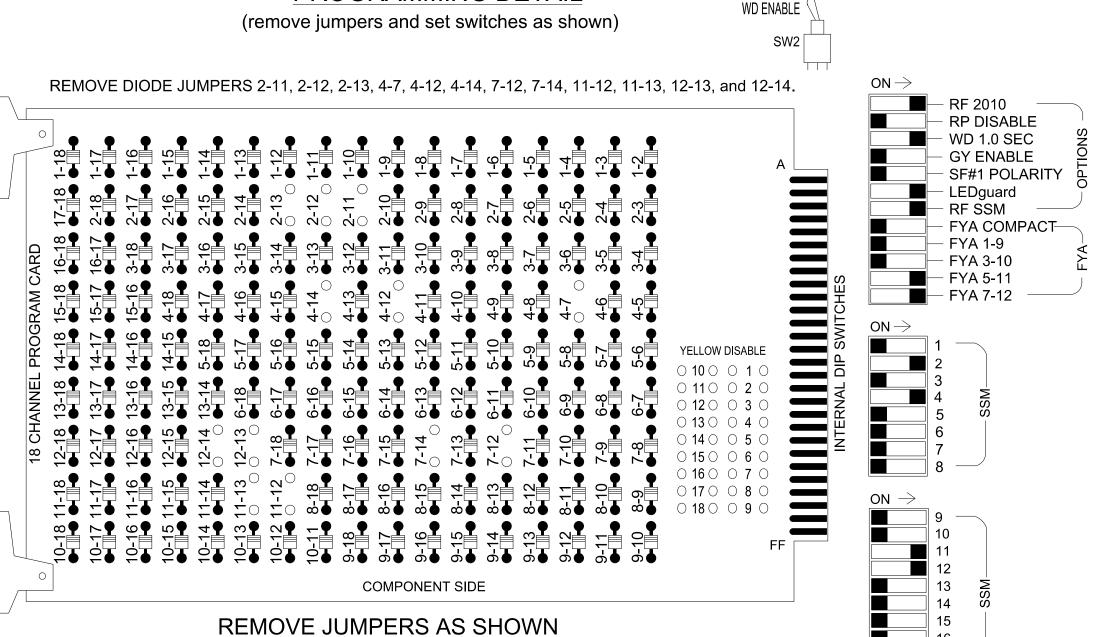
FEATURE		PHASE		
FEATURE	2	4		
Walk *	14	4		
Ped Clear *	32	15		
Min Green	12	7		
Passage *	6.0	2.0		
Max 1 *	60	30		
Yellow Change	4.4	3.0		
Red Clear	2.9	2.9		
Added Initial *	1.0	-		
Maximum Initial *	34	-		
Time Before Reduction *	15	-		
Time To Reduce *	30	-		
Minimum Gap	3.0	<u> </u>		
Advance Walk	7	-		
Non Lock Detector	_	Х		
Vehicle Recall	MIN RECALL	_		
Dual Entry	_	Х		

8′ Min.

7′ Min.

and Extension times for phase 2 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL



Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S2, S3, S5, S6, S10, AUX S4,
	AUX S5
Phases Used	2, 2PED, 4, 4PED, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	*
Overlap "4"	*

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 6 Phase Not On.
- 3. Program phases 4 and 7 for Dual Entry.
- 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 NC 150_D12-02_Mooresville CLS.

EQUIPMENT INFORMATION

Controller	2070LX
Cabinet	332 w/ Aux
Software	.Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	.18 With Aux. Output File
Load Switches Used	S2, S3, S5, S6, S10, AUX S4,
	AUX S5
Phases Used	2, 2PED, 4, 4PED, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	*
Overlap "4"	*

*See overlap programming details on sheets 1 & 2

R-2307B Sig. 58.

	SIGNAL HEAD HOOK-UP CHART																		
LOAD SWITCH NO.	S1	S	2	S3	S4	S5	S6	S7	S8	S9	S1Ø	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 PED	3	4	4 PED	Ŋ	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22,23	P21, P22	NU	41,42	P41, P42	NU	NU	NU	71 ★	NU	NU	NU	NU	NU	24	71 ★	NU
RED		128	128			1Ø1											A114		
YELLOW		129	129								*								
GREEN			130																
RED ARROW																		A1Ø1	
YELLOW ARROW						102											A115	A1Ø2	
FLASHING YELLOW ARROW																	A116	A1Ø3	
GREEN ARROW		13Ø				1Ø3					124								
*				113			104												
×				115			106												

NU = Not Used

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

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

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

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

4. Integrate monitor with Ethernet network in cabinet.

	(front view)													
r	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U "I" L	SLOT EMPTY	ø 2 2A ø 2 2B	Ø 2 2C NOT USED	SLOT EMPTY	SLOT EXPTY	Ø 4 4A Ø 4 4B	SLOT EMPTY	DC ISOLATOR Ø4 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR				
FILE U	S LOT E MPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 7 7A NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
EX.: 1A, 2A, ETC. = LOOP NO.'S												FLASH STOP	SENS TIME	E

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			Х	Х	Χ	
2B	TB2-7,8	I2L	43	5	3	2			Х	Х	Х	
2C	TB2-9,10	I3U	63	29	4	2			Х	Х	Х	
4A	TB4-9,10	I 6U	41	3	8	4	15.0		Х		Х	
4B	TB4-11,12	I6L	45	7	9	4	15.0		Х		Х	
7A	TB5-5,6	J5U	57	19	21 *	7	15.0		Х		Х	
PED PUSH BUTTONS												
P21,P22,PB23	TB8-4,6	I12U	67	33	2	PED 2	NOTE:					
P41,P42	TB8-5,6	I12L	69	35	4	PED 4		. DC ISOLAT FILE SLOT				

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

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

16

17

= DENOTES POSITION OF SWITCH

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

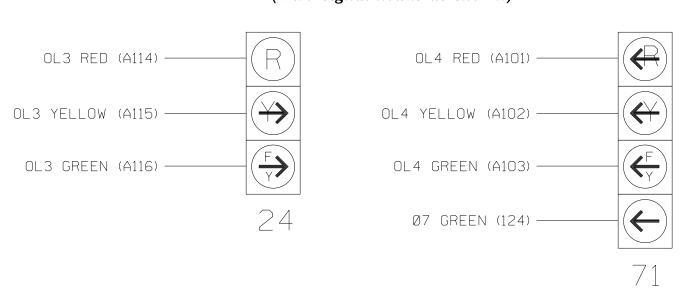
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1842 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

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

Web Interface

FYA SIGNAL WIRING DETAIL

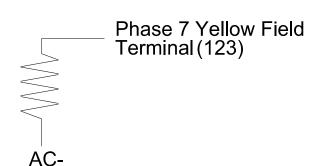
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



Final Design

Stantec

Stantec Consulting Services Inc.

Raleigh, NC 27606

Tel. (919) 851-6866

Fax. (919) 851-7024

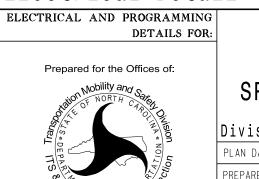
License No. F-0672

www.stantec.com

801 Jones Franklin Road-Suite 300

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 EB SR 3290 (Rolling Hills Road)

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: RMM/JPG REVIEWED BY: R Muncey, PE

REVISIONS INIT. DATE

Jason Gallowa 5/20/2024

029904

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.

OVERLAP PLAN	VEH DET PLAN
1	1
2	2
	OVERLAP PLAN 1 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 71 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu > Controller > Coordination > Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Veh Det Plan | Overlap Plan

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

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

I			
Overlap	3	4	
Туре	FYA 4 - Section	FYA 4 - Section	
Included Phases	2	-	NOTICE INCLUDED PHASE
Modifier Phases	-	7	
Modifier Overlaps	=	-	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector Call Phase Delay 7A 21

> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1842 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Final Design

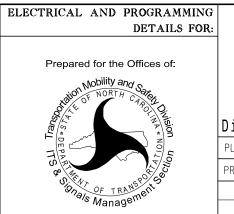
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672



750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 EB SR 3290 (Rolling Hills Road)

REVISIONS

Iredell County Mooresville Division 12 May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: REVIEWED BY: R Muncey, PE RMM/JPG

INIT. DATE Jason Gallowa 5/20/2024

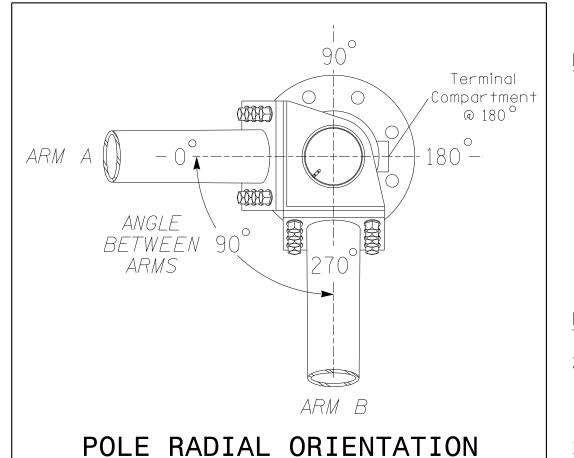
See Notes 4 & 5 Н2 See Note 8 H1= 18.50′ Maximum 25.6 ft. See Note 7 Roadway Clearance Design Height 17 ft Minimum 16.5 ft. See Note 7d See Note 7e -High Point of Roadway Surface-G Foundation Base line reference elev. = 860.06′ Elevation View @ 270

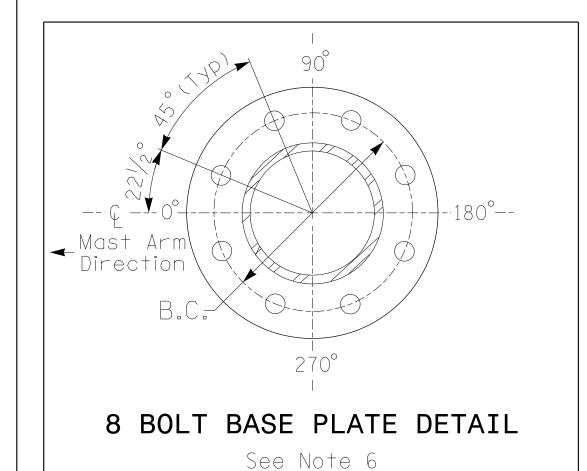
SPECIAL NOTE

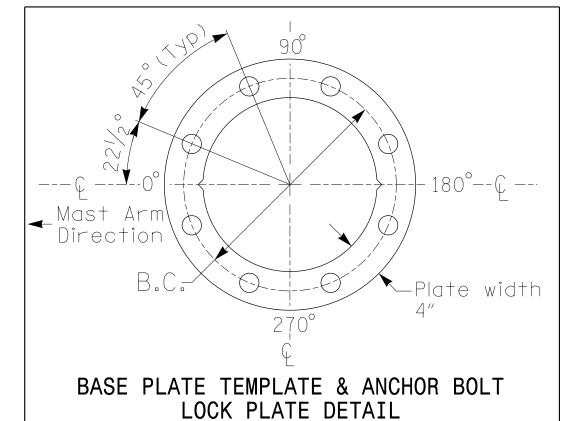
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at © Foundation @ ground level	860.06 ft.	860.06 ft.
Elevation difference at High point of roadway surface	+0.06 ft.	-0.55 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.







For 8 Bolt Base Plate

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET
R - 2307B	Sig. 58

	MAST ARM LOADING SC	HEDU	LE	
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS
	CCTV CAMERA ARM-MOUNTED	1.0 S.F.	11.0" W X 11.0" L	30 LBS

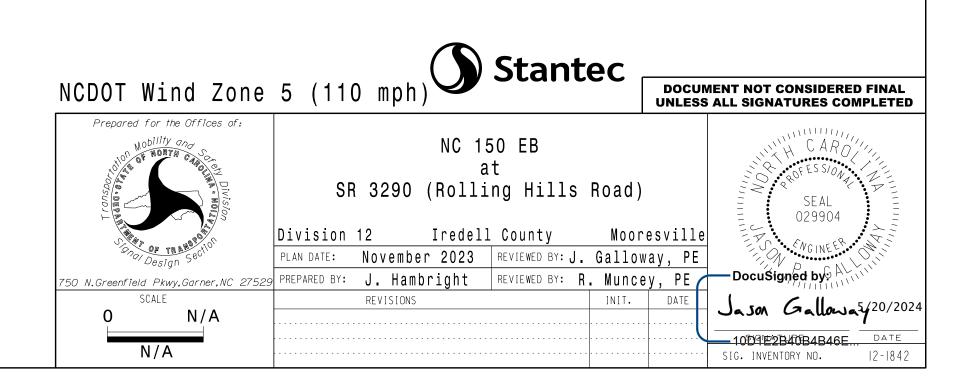
NOTES

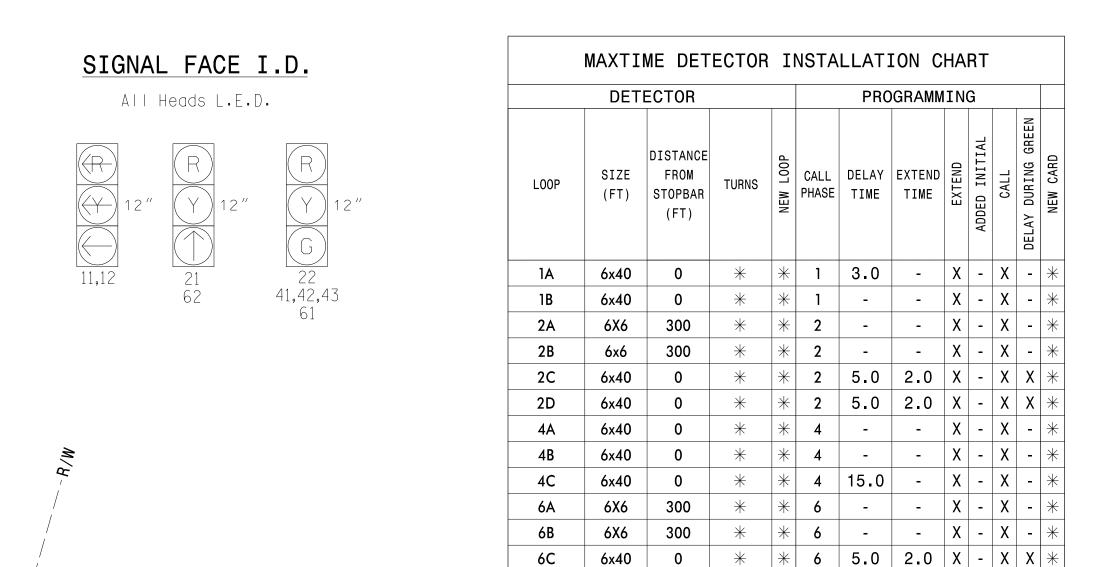
DESIGN REFERENCE MATERIAL

- 1. Design the traffic signal structure and foundation in accordance with:
- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for
- Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signal project plans and special provisions.
- The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

DESIGN REQUIREMENTS

- 2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- 6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions: a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
- b. Signal heads are rigidly mounted and vertically centered on the mast arm.
- c. The roadway clearance height for design is as shown in the elevation views.
- d. The top of the pole base plate is 0.75 feet above the ground elevation.
- e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- 8. The pole manufacturer will determine the total height (H2) of each pole using the following:Mast arm attachment height (H1) plus 10 feet.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- 11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.
- 12. Install the CCTV camera 2 feet below top of pole.
- 13. Install the weatherhead 1 foot below top of pole.





Temporary Wood Pole -L- Sta. 730+80 ±

89' LT ±

45 MPH -1% Grade

NC 150

Temporary Wood Pole -L- Sta. 730+81 ±

101' RT ±

* Video Detection Area
Camera locations should be confirmed in the field
by the contractor in order to provide detection
of the areas indicated. Direct Bury Cable

Temporary Wood Pole -L- Sta. 729+52 ± 101' LT ± NC 150

TABLE OF OPERATION

SIGNAL

FACE

21

22

41,42,43

61

62

PHASE

╾│╺┞│╺┞│╺┞

 $R \mid G \mid R \mid F$

+1% Grade

Temporary Wood Pole -L- Sta. 729+96 ± 117′ RT ±

45 MPH └ Retaining Wall

MAX	KTIME -	TIMING	CHART	
FEATURE		PHA	ASE	
PEATURE	1	2	4	6
Walk *	_	_	_	_
Ped Clear *	_	_	-	_
Min Green	7	12	7	12
Passage *	2.0	6.0	2.0	6.0
Max 1 *	20	90	35	90
Yellow Change	3.0	4.4	3.7	4.6
Red Clear	2.8	1.3	1.7	1.9
Added Initial *	_	_	_	_
Maximum Initial *	_	_	_	_
Time Before Reduction *	_	15	_	15
Time To Reduce *	_	30	-	30
Minimum Gap	_	3.0	-	3.0
Advance Walk	_	_	_	_
Non Lock Detector	Х	Х	Х	Х
Vehicle Recall	_	MIN RECALL	-	MIN RECALL

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

<----> PEDESTRIAN MOVEMENT

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

* 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

* |* 6 | 5.0 | 2.0 |X| - |X|X|*



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672



NC 150

I-77 SB Ramps

PROPOSED

N/A

Division 12 Iredell County May 2024

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE DocuSigned by 1"=40'

NC 150 D12-02 MOORESVILLE

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and
- 2. Do not program signal for late night flashing operation unless otherwise
- 3. Phase 1 may be lagged.
- 4. Set all detector units to presence mode.
- obstruct sight distance of vehicles turning right on red.
- 6. The cabinet should be designed to include an Auxiliary Output File for future use.
- for free-run operation only. Coordinated signal system timing values supersede these values.
- 8. Field adjust temporary poles as needed.

No Right Turn Sign (R3-1)

"YIELD" Sign (R1-2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

029904

Mooresville REVIEWED BY: J Galloway, PE

Jason Gallowa 5/20/2024

Dual Entry

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 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 NC 150 D12-02_Mooresville CLS.

PROJECT REFERENCE NO.	SHEET NO.
R - 2307B	Sig. 59.1

	SIGNAL HEAD HOOK-UP CHART																			
LOAD SWITCH NO.	S1	S	2	S3	S4	S5	S6	S7	S	8	S9	S1Ø	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3	4	14	5	(5	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3	4	4 PED	5	(ò	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	21	22	NU	NU	41,42, 43	NU	NU	61	62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128	128			1Ø1			134	134										
YELLOW		129	129			102			135	135										
GREEN			13Ø			103			136											
RED ARROW	125																			
YELLOW ARROW	126																			
GREEN ARROW	127	13Ø								136										

NU = Not Used

EQUIPMENT INFORMATION

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

(front view)

INPUT FILE POSITION LAYOUT

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

4. Integrate monitor with Ethernet network in cabinet.

ı	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U	S L O T	SLOT	SLOH	SLOT	S L O T	S L O T	FS							
"I" _	E M P T Y	E M P T Y	EMPHY	E M P T Y	E M P T Y	E M P T Y	ST DC ISOLATOR							
file U	S L O T	S L O T	SLOT	S L O T	S L O T	S L O	S L O	S L O T	S L O T	S L O T	S L O	S L O T	S L O T	S L O T
"J" L	E M P T Y	E M P T Y	EMP+y	E M P T Y										
l	EX.: 1	A, 2A, E	TC. = L	OOP NO).′S						FS = ST =	FLASH STOP	SENS TIME	E

SPECIAL DETECTOR NOTE

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

> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1145T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672

Temporary Design 1 - TMP Phase I Electrical Detail

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 I-77 SB Ramps

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PLAN DATE: PREPARED BY:

REVIEWED BY: R Muncey, PE RMM/JPG REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Jason Gallowa 5/20/2024

3 Phase Fully Actuated NC 150 D12-02_MOORESVILLE $CL\overline{S}$

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Phase 1 may be lagged.
- 4. Reposition existing signal heads numbered # 11,12,21,22,61, 62 and Sign 🔘 .
- 5. Set all detector units to presence 6. Maximum times shown in timing chart
- are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

Traffic Signal Head Modified Signal Head

Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box

> Right of Way Directional Arrow

Video Detection Area

Construction Zone

Left Arrow "ONLY" Sign (R3-5L) Combined Through and Left Arrow Sign (R3-6L) No Right Turn Sign (R3-1) No Left Turn Sign (R3-2)

Drums

2-in Underground Conduit -----

EXISTING

N/A

N/A

N/A

N/A

	DETI	ECTOR		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		-	Χ	-	Х	-	*
1B	6x40	0	*	*	1	-	-	Χ	_	Χ	_	*
2A	6X6	300	*	*	2	-	-	Χ	-	Х	_	*
2B	6x6	300	*	*	2	-	-	Χ	-	Χ	-	*
20	6x40	0	*	*	2	5.0	2.0	Χ	-	Χ	Χ	*
2D	6x40	0	*	*	2	5.0	2.0	Χ	_	Χ	Χ	*
4A	6x40	0	*	*	4	_	-	Χ	-	Х	_	*
4B	6x40	0	*	*	4	<u>-</u>	=	Х	-	Х	-	*
4C	6x40	0	*	*	4	15.0	-	Χ	-	Х	-	*
6A	6X6	300	*	*	6	_	_	Χ	-	Х	-	*
6B	6X6	300	*	*	6	_	_	Χ	-	Χ	-	*
6C	6x40	0	*	*	6	5.0	2.0	Χ	-	Χ	Χ	*
6D	6x40	0	*	*	6	5.0	2.0	Χ	_	Х	Х	*

MAXTIME DETECTOR INSTALLATION CHART

✓ UNSIGNALIZED MOVEMENT			6C	6x40 0	* *	6 5.0	2.0 X - X X *	
<pre><> PEDESTRIAN MOVEMENT</pre>		ρ_{6}	6D	6x40 0		6 5.0	2.0 X - X X *	
	NC 150	Design Speed AB AYI Boms I-77 SB EXIT Boms	# Vide Cam by of	6x40 0 so Detection era locations the contract the areas incompany	* *	6 5.0	2.0 X - X X * ed in the field vide detection	
2A	20	43 62 61 12	6D — — — — — — — — — — — — — — — — — — —					
R/W —	2D 2D 45 MPH +1% Grade	42 \41				 	 	
			SB ON PAR					

SIGNAL FACE I.D.

All Heads L.E.D.

TABLE OF OPERATION

SIGNAL

FACE

11,12

21

22

41,42,43,44

61

62

PHASE

RGRR

RRGR

MA	XTIME	TIMING	CHART	
FEATURE		PHA	ASE	
FEATURE	1	2	4	6
Walk *	_	_	_	_
Ped Clear *	_	_	_	_
Min Green	7	12	7	12
Passage *	2.0	6.0	2.0	6.0
Max 1 *	20	90	35	90
Yellow Change	3.0	4.4	3.7	4.6
Red Clear	2.8	1.3	2.7	2.1
Added Initial *	_	_	_	_
Maximum Initial *	_	_	_	_
Time Before Reduction *	_	15	_	15
Time To Reduce *	_	30	_	30
Minimum Gap	_	3.0	_	3.0
Advance Walk	_	_	_	_
Non Lock Detector	Х	X	Х	Х
Vehicle Recall	_	MIN RECALL	_	MIN RECALL
Dual Entry	_	_	_	_

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

* 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



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672



1"=40'

NC 150 I-77 SB Ramps

Iredell County Division 12 Mooresville

May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE DocuSigned by 50 N.Greenfield Pkwy,Garner,NC 27 REVISIONS INIT.

Jason Gallowa 5/20/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CARO

029904

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

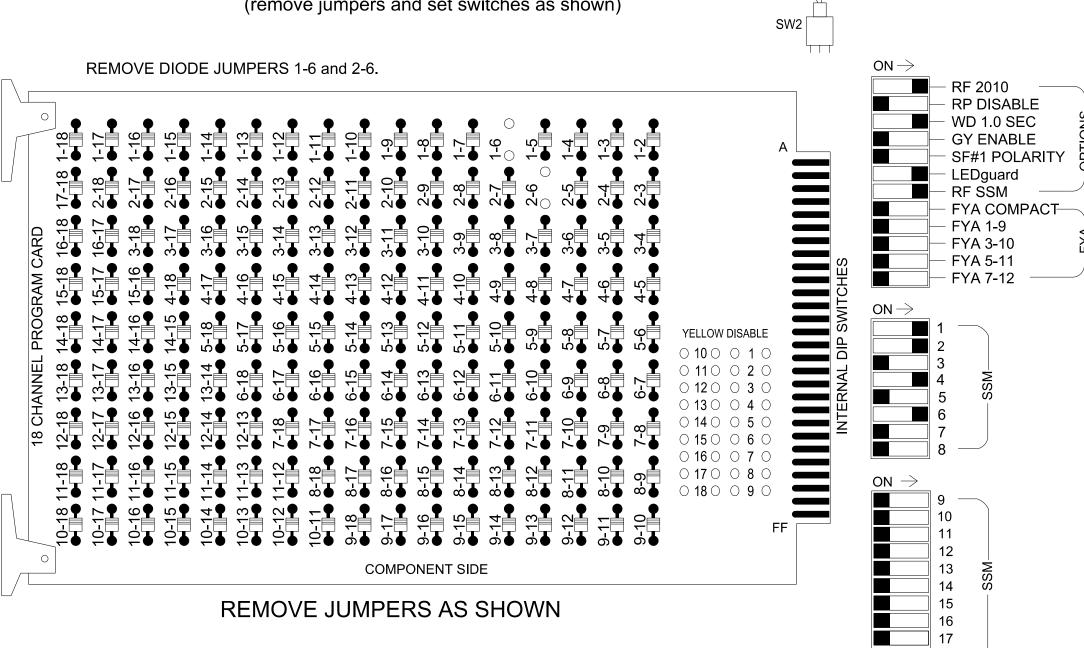
(remove jumpers and set switches as shown)

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.



ON OFF

= DENOTES POSITION OF SWITCH

ST = STOP TIME

WD ENABLE

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 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 NC 150 D12-02_Mooresville CLS.

PROJECT REFERENCE NO.	SHEET NO.
R-2307B	Sig. 60.1

	SIGNAL HEAD HOOK-UP CHART																			
LOAD SWITCH NO.	S1	S	2	S3	S4	S5	S6	S7	S	8	S9	S1Ø	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3	4	14	5	(ò	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2	2 PED	3	4	4 PED	5	(5	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	21	22	Z	NU	41,42, 43,44	NU	NU	61	62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128	128			1Ø1			134	134										
YELLOW		129	129			102			135	135										
GREEN			13Ø			1Ø3			136											
RED ARROW	125																			
YELLOW ARROW	126																			
GREEN ARROW	127	13Ø								136										

NU = Not Used

EQUIPMENT INFORMATION

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

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

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U	SLOH EXP	NIOH EZP	NLOH EMA	SLOH EMP	SLOH EMP	SLOT EMp	SLOT EMp	SLOT EXP	SLOT EMP	SLOT EMP	SLOH EMA	SLOT EMP	SLOT EMP	FS DC ISOLATOR ST
L	T Y	Ť	T	T Y	T Y	TY	T Y	T Y	T Y	T Y	T Y	T	T Y	DC ISOLATOR
FILE U	SLOT E	SLOH E	S_10⊢ ⊩	SLOF E	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	SLOH F	S L O T	S L O T
" J " L	E M P T Y	EMPTY	EMPTY	E M P T Y										
	EX.: 16	A, 2A, E	TC. = L	00P N0).′S						FS =	FLASH	I SENS	 E

SPECIAL DETECTOR NOTE

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

> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1145T2 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672

Temporary Design 2 - TMP Phase II Electrical Detail

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

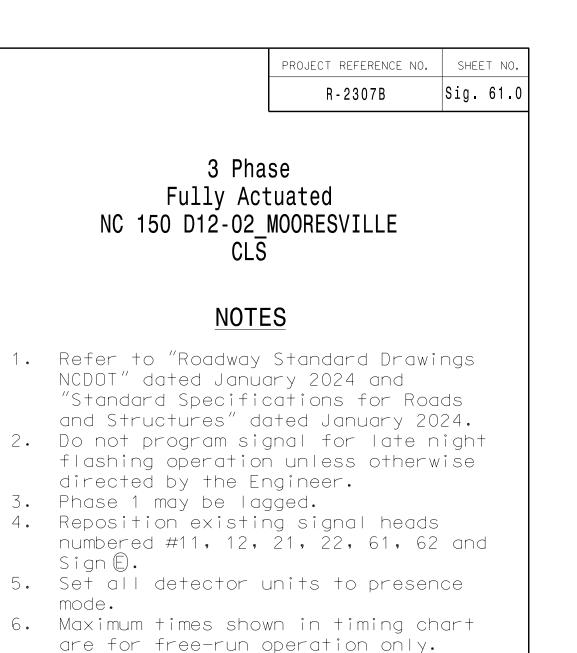
NC 150 I-77 SB Ramps

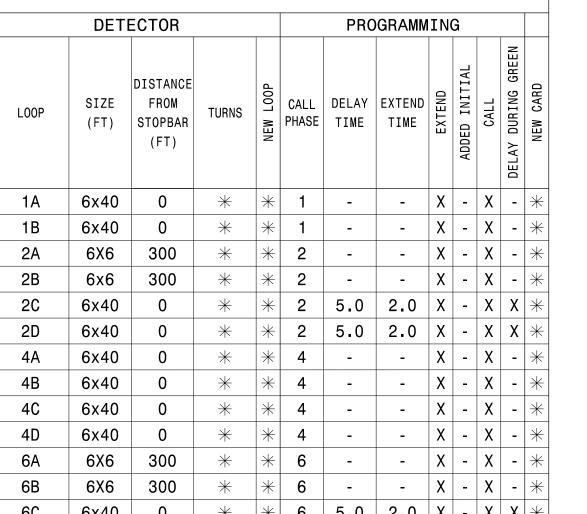
Division 12 Iredell County Mooresville PREPARED BY:

May 2024 REVIEWED BY: J Galloway, PE REVIEWED BY: R Muncey, PE RMM/JPGREVISIONS INIT. DATE

Jason Gallowa \$\frac{1}{20}/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





* | * | 6 | 5.0 | 2.0 | X | - | X | X | * 6x40 * |*| 6 | 5.0 | 2.0 | X | - | X | X | *

MAXTIME DETECTOR INSTALLATION CHART

Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

-1% Grade NC 150 45 MPH +1% Grade

SIGNAL FACE I.D.

All Heads L.E.D.

23,24

44.45

Direct Bury Cable

TABLE OF OPERATION

SIGNAL

FACE

22

23,24

41,42,43

44,45

PHASE

GRF

| R |**-**-|

| R | → | F

GGRRR

LEGEND

Coordinated signal system timing

values supersede these values.

Sign 🖺 .

PROPOSED EXISTING Traffic Signal Head Modified Signal Head Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box ---- 2-in Underground Conduit Right of Way Directional Arrow N/A Video Detection Area N/A Construction Zone N/A Drums Left Arrow "ONLY" Sign (R3-5L) Combined Through and Left Arrow Sign (R3-6L) "NO TURN ON RED" Sign (R10-11) No Right Turn Sign (R3-1)

No Left Turn Sign (R3-2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CARO

Signal Upgrade Temporary Design 3 - TMP Phase III

801 Jones Franklin Road-Suite 300

Raleigh, NC 27606

Tel. (919) 851-6866

Fax. (919) 851-7024

License No. F-0672

www.stantec.com

Stantec Stantec Consulting Services Inc.

50 N.Greenfield Pkwy,Garner,NC 2

1"=40'

NC 150 I-77 SB Ramps

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

029904 Division 12 g PREPARED BY: J Hambright | REVIEWED BY: R Muncey, PE - DocuSigned by REVISIONS INIT. Jason Gallowa 5/20/2024

MAXTIME TIMING CHART PHASE **FEATURE** Walk * Ped Clear ³ 12 12 Min Green 2.0 2.0 6.0 | Passage * 6.0 20 35 90 Max 1 * 90 Yellow Change 3.0 4.4 3.7 4.6 Red Clear 4.0 1.0 3.2 2.0 Added Initial * Maximum Initial * _ 15 15 Time Before Reduction Time To Reduce 30 30 _ 3.0 3.0 Minimum Gap _ Advance Walk Χ Χ Non Lock Detector Χ MIN RECALL Vehicle Recall MIN RECALL Dual Entry

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

PEDESTRIAN MOVEMENT

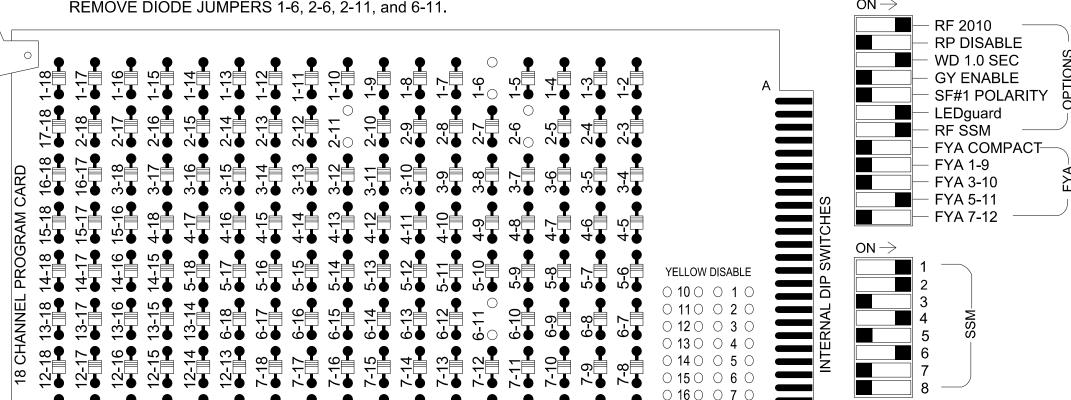
UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

* 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.

(remove jumpers and set switches as shown)

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



INPUT FILE POSITION LAYOUT

(front view)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

ON OFF

12 13 14

15

16 ___ 17 ___ 18 -

= DENOTES POSITION OF SWITCH

FS = FLASH SENSE ST = STOP TIME

SW2

REMOVE JUMPERS AS SHOWN

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

COMPONENT SIDE

- 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.

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

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 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 NC 150 D12-02_Mooresville CLS.

EQUIPMENT INFORMATION

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

*See overlap programming detail on this sheet

R-2307B Sig. 61.

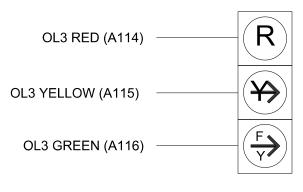
						~ ~ .					1/1										
					SI	GNA		IEA	υн	00	K-U	IP C	HA	ΚI							
LOAD SWITCH NO.	S1	S	32	S3	S4	S	55	S6	S7	S	88	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3	4	4	14	5	(6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2	2 PED	3	2	4	4 PED	5	(ŝ	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	21	22	NU	NU	41,42, 43	44,45	NU	NU	61	62	NU	NU	NU	NU	UИ	NU	NU	23,24	NU	NU
RED		128	128			101	101			134	134								A114		
YELLOW		129	129			102				135	135										
GREEN			130			103				136											
RED ARROW	125																				
YELLOW ARROW	126						102												A115		
FLASHING YELLOW ARROW																			A116		
GREEN ARROW	127	130					103				136										

NU = Not Used

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



23,24

OVERLAP PROGRAMMING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

SPECIAL DETECTOR NOTE

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

> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1145T3 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672

Electrical Detail ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

NC 150 Division 12

Temporary Design 3 - TMP Phase III

I-77 SB Ramps

Iredell County Mooresville May 2024 RMM/JPG REVIEWED BY: R Muncey, PE

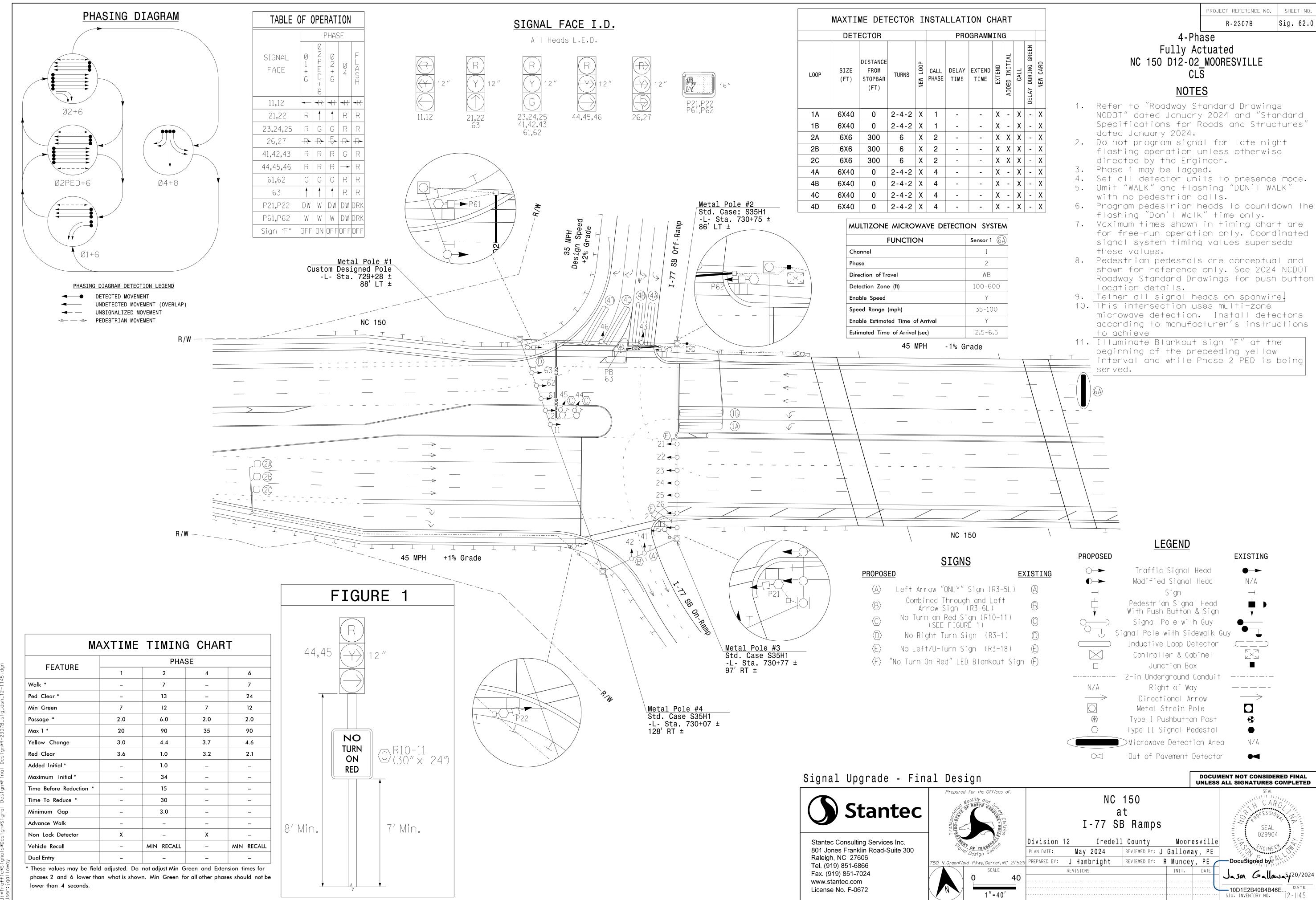
Jason Gallowa \$\frac{1}{20}/2024

029904

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

REVIEWED BY: J Galloway, PE PREPARED BY: REVISIONS INIT. DATE 750 N. Greenfield Pkwy, Garner, NC 27529



ON

SW2

- RF 2010 RP DISABLE

LEDguard

- FYA 1-9 FYA 3-10

FYA 5-11 - FYA 7-12

13

= DENOTES POSITION OF SWITCH

- WD 1.0 SEC - GY ENABLE

SF#1 POLARITY

- FYA COMPACT-

WD ENABLE

(remove jumpers and set switches as shown)

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

REMOVE JUMPERS AS SHOWN

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

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

COMPONENT SIDE

- 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 and 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 NC 150 D12-02_Mooresville CLS.

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	•
	AUX S4
Phases Used	1, 2, 2PED, 4, 6, 6PED
Overlap "1"	NOT USED
Overlap "2"	
Overlap "3"	
Overlap "4"	
- · · · · · · · · · · · · · · · · · · ·	

*See overlap programming detail on this sheet **Use for Peds and Blankout Sign

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.

R-2307B Sig. 62. CICNIAL HEAD HOOK LID CHADT

						SI	GNA	\L F	ILA	DF	100	K-U	IP C	HA	ΚI							
LOAD SWITCH NO.	S1	S	2	S	3	S4	S	55	S6	S7	S	8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	2	13		3	4	4	14	5	6	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2	2 PED		3	4	4	4 PED	5	6	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPAR
SIGNAL HEAD NO.	11,12	21,22	23,24, 25	P21, P22	BLANK OUT SIGN	NU	41,42, 43	44,45, 46	NU	NU	61,62	63	P61, P62	NU	NU	NU	NU	NU	NU	2 6,27	NU	NU
RED		128	128				101	101			134	134										
YELLOW		129	129				102				135	135										
GREEN			130				103				136											
RED ARROW	125																			A114		
YELLOW ARROW	126							102												A115		
FLASHING YELLOW ARROW																				A116		
GREEN ARROW	127	130						103				136										
₩				113									119									
PED YELLOW					** 114																	
Ķ				115									121									

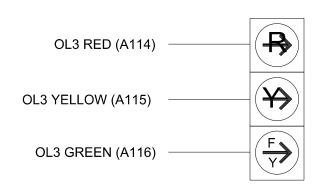
NU = Not Used

★See pictorial of head wiring in detail this sheet.

**Blankout sign is wired to ped yellow 114. See wiring and programming details on sheet 2.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



OVERLAP PROGRAMMING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	3				
Туре	FYA 4 - Section				
Included Phases	2				
Modifier Phases	-				
Modifier Overlaps	-				
Trail Green	0				
Trail Yellow	0.0				
Trail Red	0.0				
Negative Peds	2				

Final Design

750 N. Greenfield Pkwy, Garner, NC 27529

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING NC 150 Prepared for the Offices of: Division 12 May 2024

I-77 SB Ramps Iredell County

Mooresville REVIEWED BY: J Galloway, PE PREPARED BY: REVIEWED BY: R Muncey, PE RMM/JPG REVISIONS INIT.

Jason Gallowa 5/20/2024

029904

INPUT FILE POSITION LAYOUT

(front view) 8 9 10 11 12 13 14 | Ø 1 | Ø 2 | Ø 2 | S Ø2 PEDØ6 PED FS Ø 4 Ø 4 DC DC DC ISOLATOR ISOLATOR FILE \emptyset 4 \emptyset 4 NOT USED USED DC 4B FILE

INPUT FILE CONNECTION & PROGRAMMING CHART

FS = FLASH SENSE ST = STOP TIME

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	
1A	TB2-1,2	I1U	56	18	1	1			Х		Х		
1B	TB2-3,4	I1L	56	18	1	1			Х		Х		
2A	TB2-5,6	I2U	39	1	2	2			Х	Χ	Х		
2B	TB2-7,8	I2L	43	5	3	2			Х	Χ	Х		
2C	TB2-9,10	I3U	63	29	4	2			Х	Х	Х		
4A	TB4-9,10	I6U	41	3	8	4			Х		Х		
4B	TB4-11,12	I6L	45	7	9	4			Х		Х		
4C	TB6-1,2	I7U	65	31	10	4			Х		Х		
4D	TB6-3,4	I7L	78	44	11	4			Х		Х		
PED PUSH BUTTONS													
P21,P22	TB8-4,6	I12U	67	33	2	PED 2	NOTE:						
P61,P62,PB63	TB8-7,9	I13U	68	34	6	PED 6	INSTALL DC ISOLATORS IN INPUT FILE SLOTS						
							I12 AND		0				

SLOT 2

SPECIAL DETECTOR NOTE

Install a multizone microwave detection system for phase 6 vehicle detection. Perform installation according to manufacturer's directions and detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1145 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Stantec

Stantec Consulting Services Inc. Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672

INPUT FILE POSITION LEGEND: J2L LOWER

801 Jones Franklin Road-Suite 300

LOGIC PROCESSOR PROGRAMMING

Front Panel

Main Menu >Controller >More >User Programs >Definition

Web Interface

Home >Controller >User Programs Configuration >User Programs Definition

Program 1

Statement	Result	Index	Operation	Parameter A	Index	Parameter B	Index	Delay	Ext
1	Local Variable	14	Result = (A and B)	Ped Call	2	Phase Next	2	0.0	0.0
2	Local Variable	15	Result = (A or B)	Phase Walk	2	Phase Ped Clearance	2	0.0	0.0
3	Local Variable	16	Result = (A or B)	Local Variable	14	Local Variable	15	0.0	0.0
4	Global Variable	33	Result = A	Local Variable	16	-	-	0.0	0.0

LOGIC STATEMENT DESCRIPTION

Statement 1 Description: Set local variable to be true if there is a Ped Call on Phase 2 and Phase 2 is next

Statement 2 Description: Set local variable to be true if Phase 2 Walk or Ped Clearance is on

Statement 3 Description: Set local variable to be true if either of the local variables from Statements 1 or 2 are true

Statement 4 Description: Set global variable to be true if local variable from Statement 3 is true, and illuminate blankout sign

MAXTIME OUTPUT ASSIGNMENT PROGRAMMING DETAIL

Front Panel

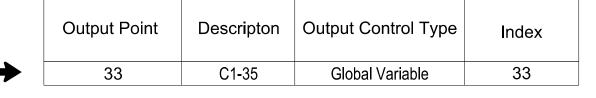
Main Menu >Controller >More>Advanced IO >Output Points>IO Module 1

Web Interface

Home >Controller >Advanced IO >Cabinet Configuration >Output Points>IO Module 1

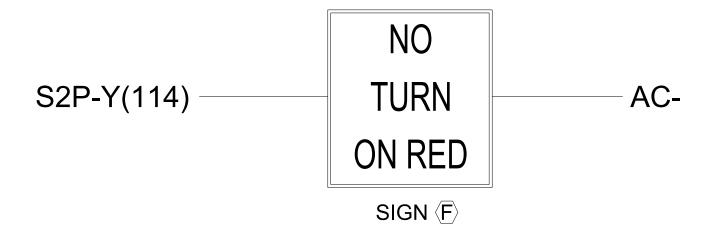
Plan 1

NOTICE OUTPUT 33 WITH INDEX '33'



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1145 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

BLANKOUT SIGN "F" WIRING AND PROGRAMMING DETAIL



NOTE

If Terminal 114 has a conflict monitor wire connected, remove, tape and label wire.

Final Design Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Stantec

Stantec Consulting Services Inc.

Raleigh, NC 27606

Tel. (919) 851-6866

www.stantec.com

Fax. (919) 851-7024

License No. F-0672

801 Jones Franklin Road-Suite 300

NC 150 I-77 SB Ramps

REVISIONS

Iredell County Division 12 May 2024 REVIEWED BY: J Galloway, PE REVIEWED BY: R Muncey, PE PREPARED BY: RMM/JPG

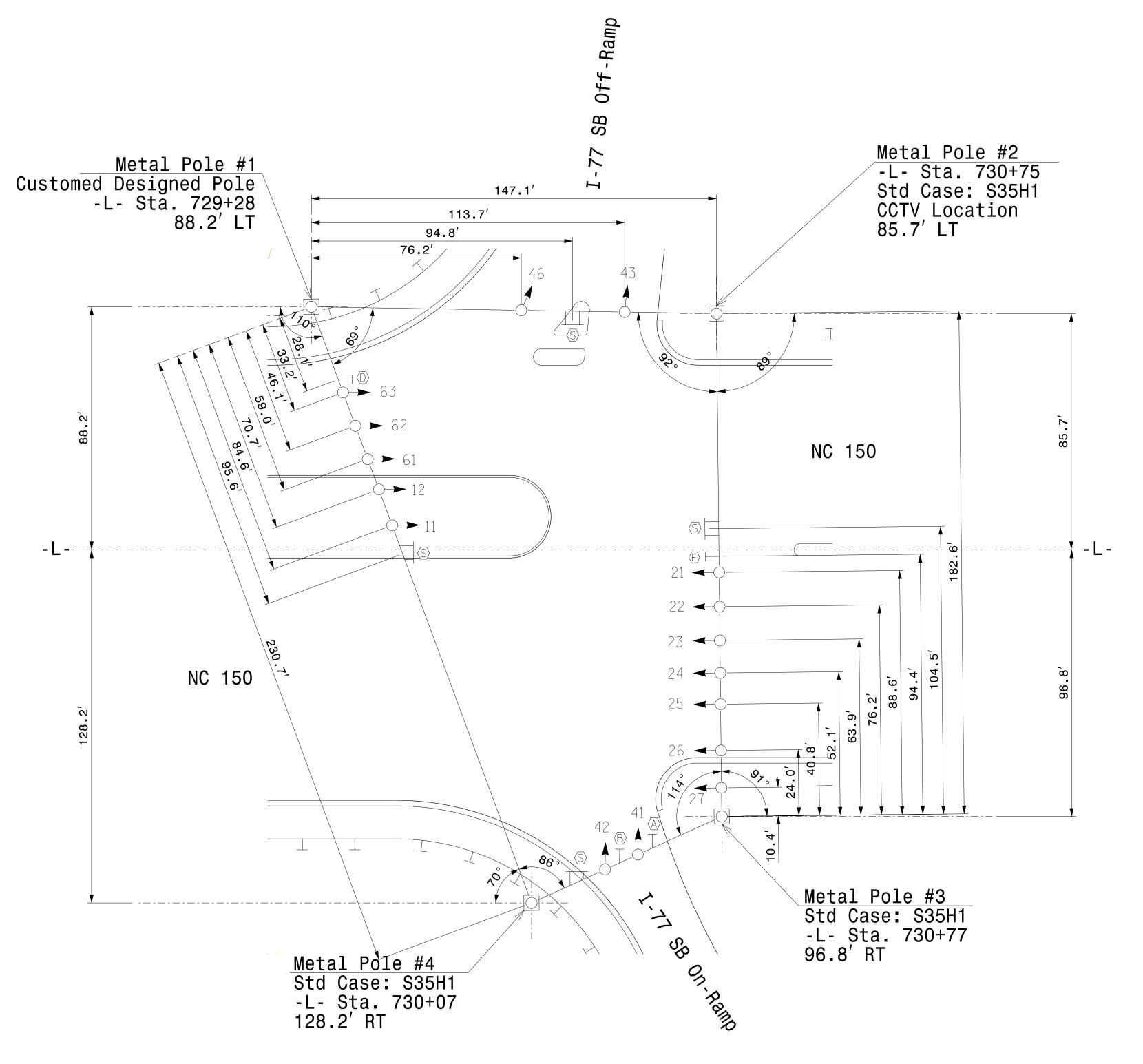
029904 Mooresville

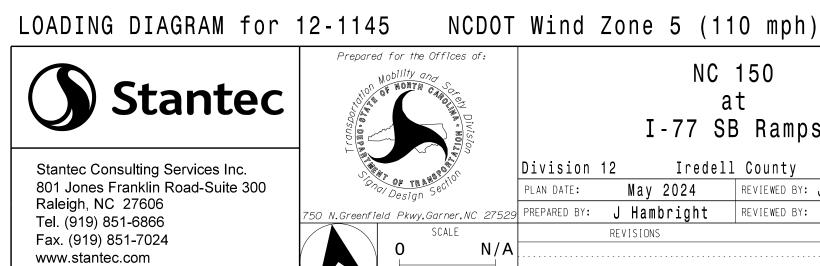
INIT. DATE Jason Gallowa 5/20/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Sig. 62.3 R-2307B

Design Loading for METAL STRAIN POLES





License No. F-0672

NC 150 I-77 SB Ramps

2 Iredell County Mooresville
May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE Docusigned by: G A REVISIONS Jason Galloway 5/20/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO.