09/08/99

TIP PROJECT: R–5709C

CONTRACT: C204992

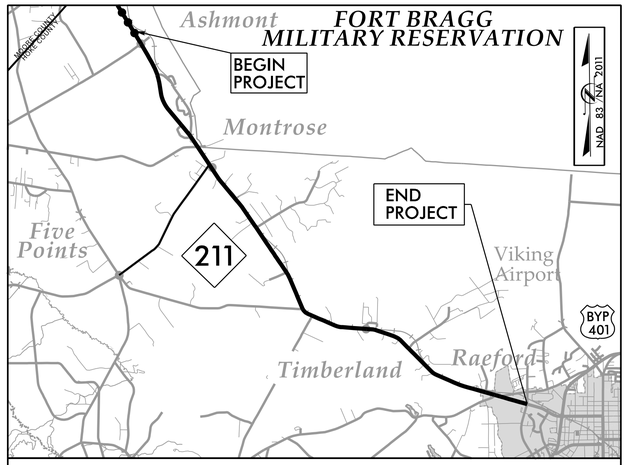
Project No.	Sheet No.
R–5709C	Sig. 1.0

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HOKE COUNTY

LOCATION: *NC 211 FROM 0.40 MILES NORTH OF SR 1225 (ASHEMONT ROAD) TO EAST OF SR 1244 (WEST PALMER STREET)/SR 1311 (MOCKINGBIRD HILL ROAD) IN RAEFORD.*

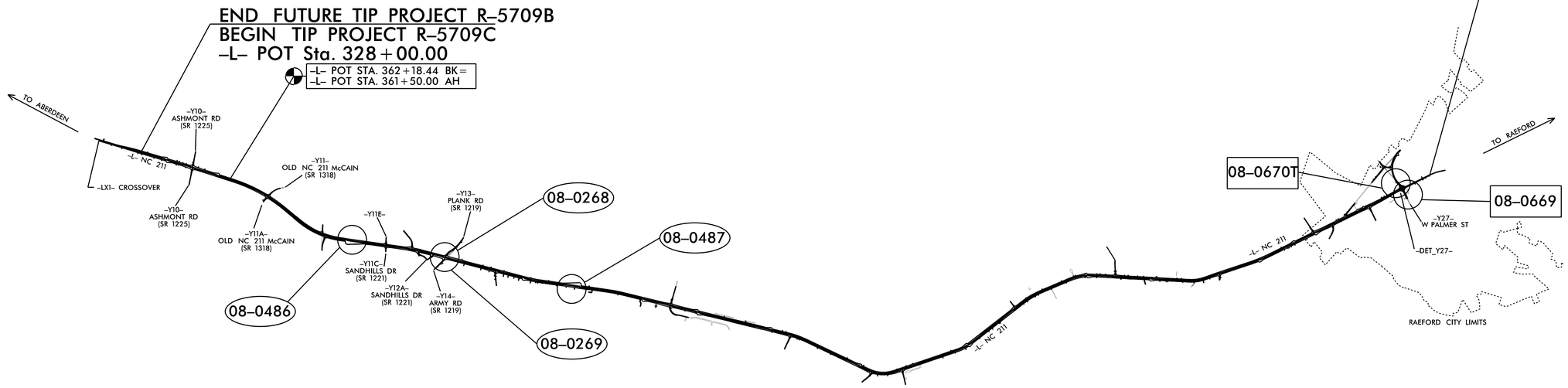
TYPE OF WORK: *TRAFFIC SIGNALS*



VICINITY MAP (NTS)

END FUTURE TIP PROJECT R–5709B
BEGIN TIP PROJECT R–5709C
–L– POT Sta. 328+00.00

END TIP PROJECT R–5709C
–L2B– POC Sta. 835+30.00



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

PLANS PREPARED BY:

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P: (919)878-9560
3621 SW. FORES ROAD, FORUM 1, SUITE 700
RALEIGH, NORTH CAROLINA 27610-3960
NC LICENSE NO. F-0112

FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

WP Erickson–Jones, P.E
PROJECT ENGINEER

Sai Kondapally
PROJECT DESIGN ENGINEER

Index of Plans

Sheet #	*Reference #*	*Location/Description*
Sig. 1.0	----------	*Title Sheet*
Sig. 2.0–2.3	*08–0486*	*NC 211 Eastbound at U–Turn North of SR 1219 (Army Rd)*
Sig. 3.0–4.3	*08–0268*	*NC 211 (Aberdeen Rd) at SR 1219 (Plank Rd)*
Sig. 5.0–6.2	*08–0269*	*NC 211 (Aberdeen Rd) at SR 1219 (Army Rd)*
Sig. 7.0–7.3	*08–0487*	*NC 211 Westbound at U–Turn South of SR 1219 (Plank Rd)*
Sig. 8.0–8.2	*08–0669*	*NC 211 (Aberdeen Rd) at SR 1311 (Mockingbird Hill Rd)/SR 1244 (W Palmer St)*
Sig. 9.0–9.1	*08–0670T*	*NC 211 (Aberdeen Rd) at SR 1244 (W Palmer St)*
Sig. M1A–M9	*N/A*	*Standard Drawings for Metal Poles*

LEGEND

##–#### *SIGNAL INVENTORY NUMBER*

##–#### *SIGNAL TO BE REMOVED*

Transportation Systems Management and Operations Unit

Contacts:

Robert J. Ziemba, P.E. – Central Region Signals Engineer
Ryan W. Hough, P.E. – Signal Equipment Project Engineer

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

Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION • STATE OF NORTH CAROLINA •
TSMO UNIT

750 N. Greenfield Parkway, Garner, NC 27529

9/25/2024
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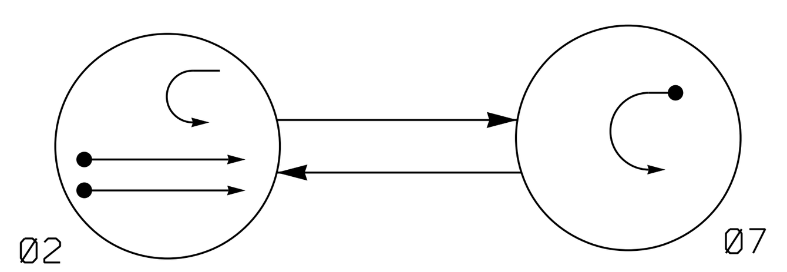
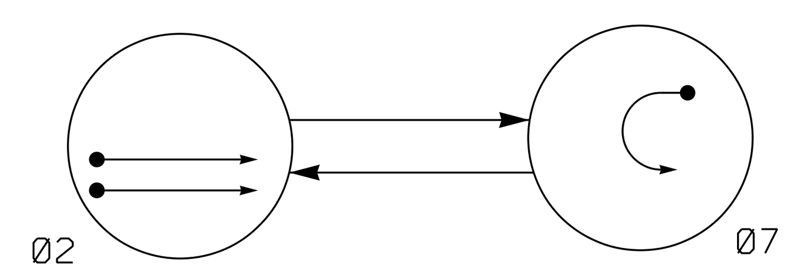
default

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM

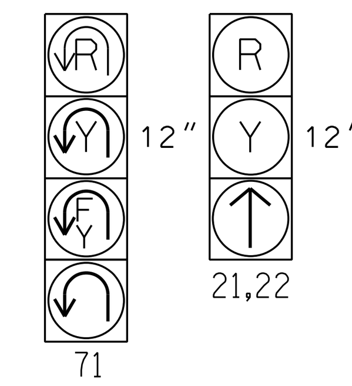


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø7	FLASH
21,22	↑	R	R
71	F Y	∩	R

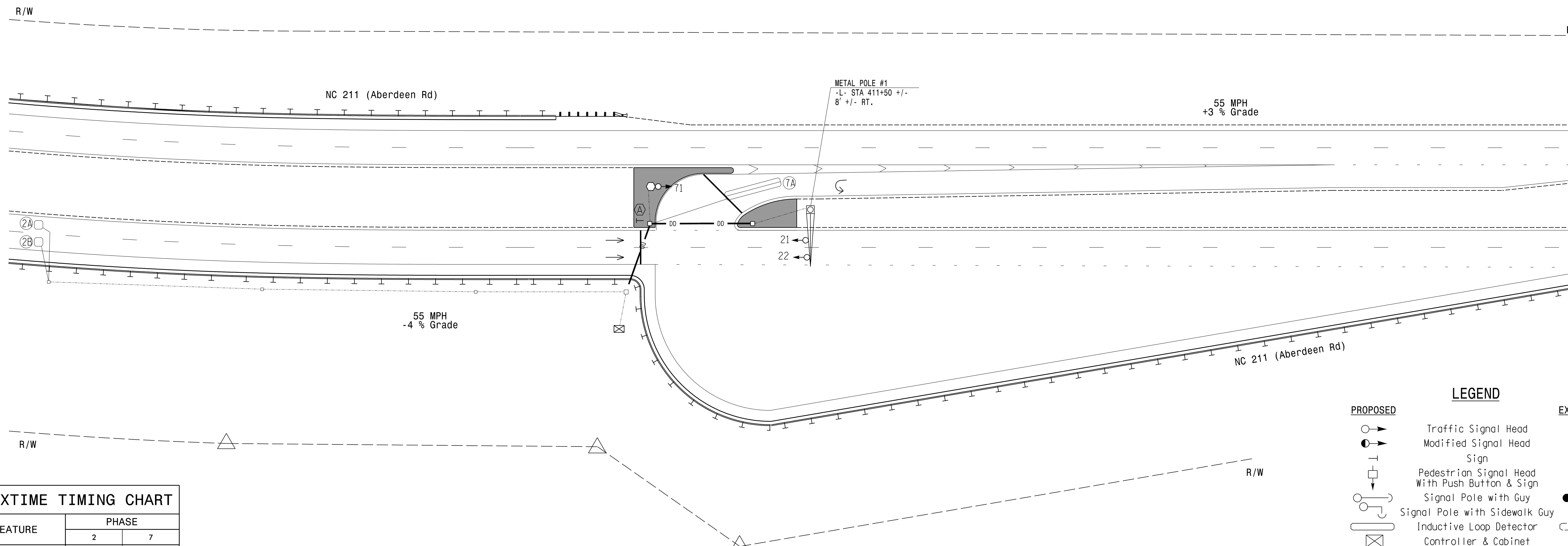
ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø7	FLASH
21,22	↑	R	R
71	R	∩	R

2 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications" 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. The Division Traffic Engineer will determine the hours of use for each phasing plan.



MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 7
Walk *	-	-
Ped Clear *	-	-
Min Green	14	7
Passage *	6.0	2.0
Max 1 *	100	25
Yellow Change	5.6	3.0
Red Clear	1.0	5.1
Added Initial *	1.5	-
Maximum Initial *	46	-
Time Before Reduction *	15	-
Time To Reduce *	30	-
Minimum Gap	3.4	-
Advance Walk	-	-
Non Lock Detector	-	X
Vehicle Recall	MIN RECALL	-
Dual Entry	-	-

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

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	420	5	X	2	-	-	X	X	X	-	X
2B	6X6	420	5	X	2	-	-	X	X	X	-	X
7A	6X40	0	2-4-2	X	7	15.0#	-	X	-	X	-	X

\# Disable Delay Time During Alternate Phasing Operation.

LEGEND

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

New Installation

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

SCALE 0 40
1"=40'

NC 211 Eastbound At U-Turn North of SR 1219 (Army Rd)

Division 8 Hoke County Ashley Heights

PLAN DATE: August 2024	REVIEWED BY: WP Erickson-Jones
PREPARED BY: VS Kondapally	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by:
Porter Jones
D06F13F3A0E0498...
SIGNATURE 8/28/2024 DATE

SIG. INVENTORY NO. 08-0486

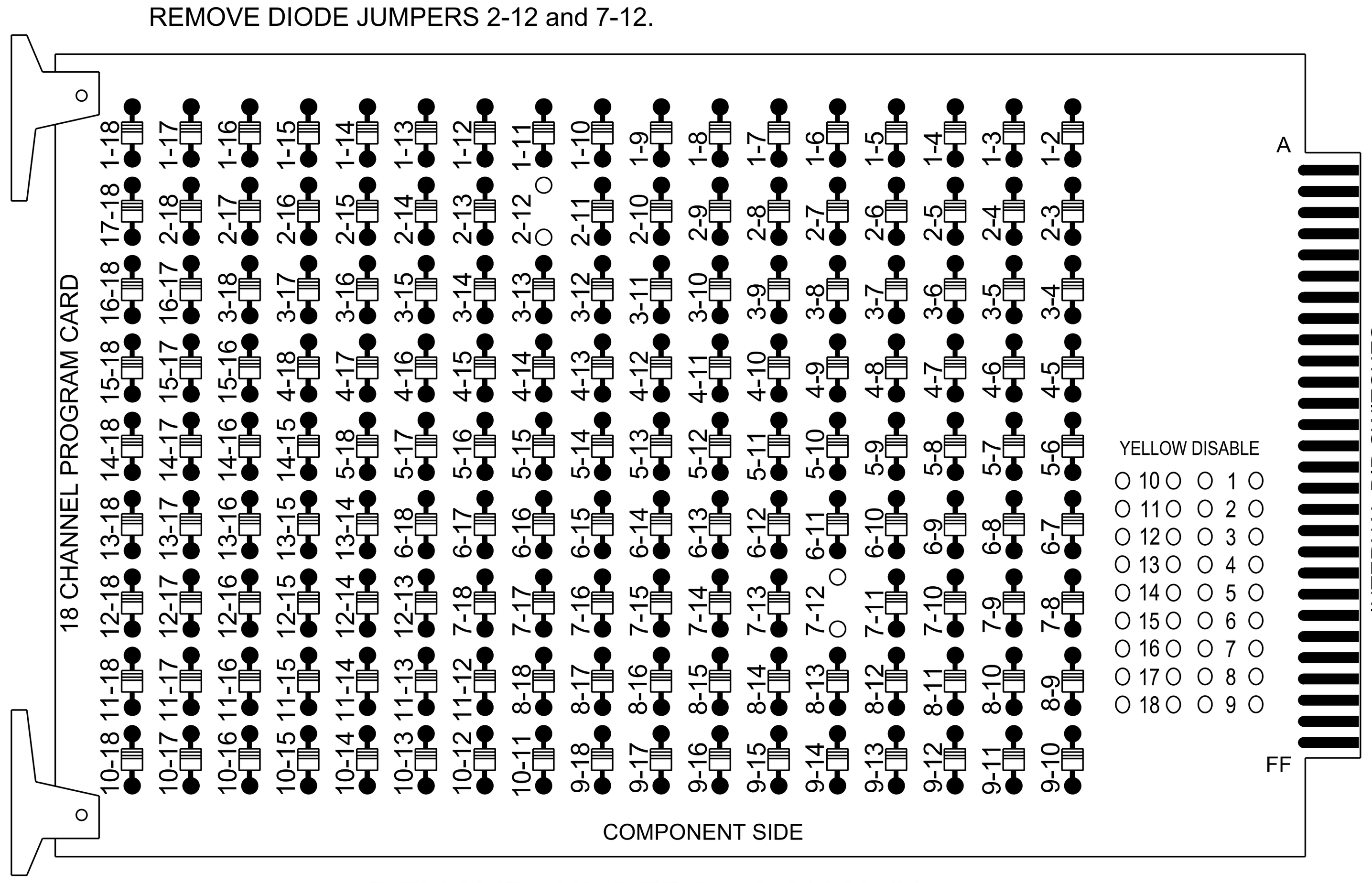
8/27/2024
R:*Traffic*Signals*Design*Signals*Project Split Files*5709C*R-5709_08-0486.dgn
wpjones

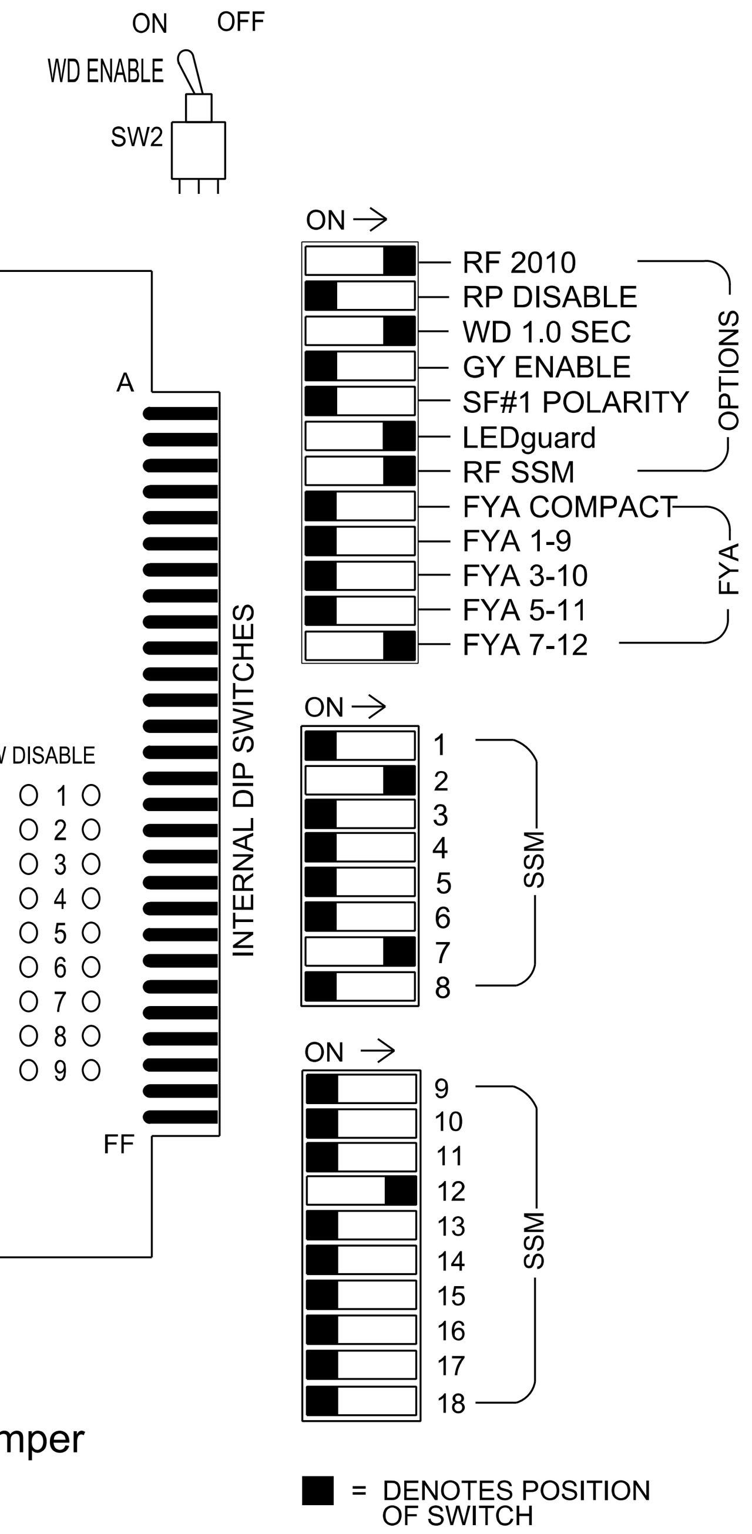
PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 2.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-12 and 7-12.





REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk.
3. Program startup sequence as follows:
   From web Interface: Controller>Unit: set STARTUP CLEARANCE HOLD to 6 sec and ALL RED FLASH EXIT TIME to 6 seconds.
4. Ensure all channels are programmed to flash red on the channel configuration screen. From web Interface: Controller>Advanced IO>Channels>Channel Configuration: program all channels to flash red.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	NU	NU	71★	NU	NU	NU	NU	NU	NU	71★	NU
RED		128																
YELLOW		129								*								
GREEN																		
RED ARROW																	A101	
YELLOW ARROW																	A102	
FLASHING YELLOW ARROW																	A103	
GREEN ARROW		130								124								

NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
7A	TB5-5,6	J5U	57	19	21 ★	7	15.0		X		X	

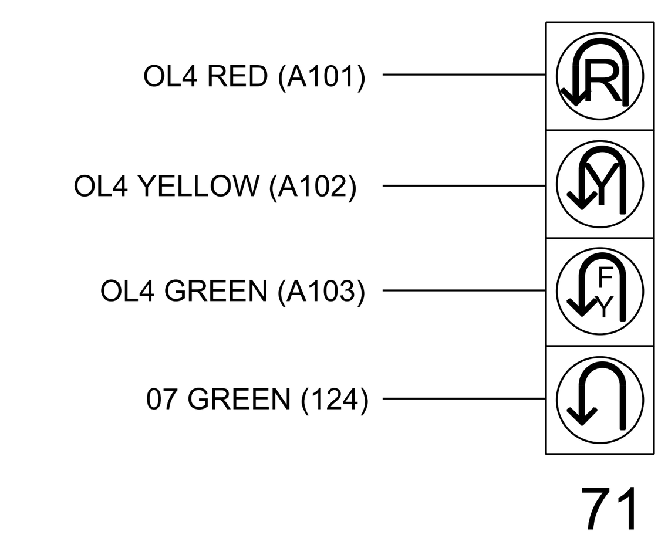
★For the detectors to work as shown on the signal plans, see the vehicle detector setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

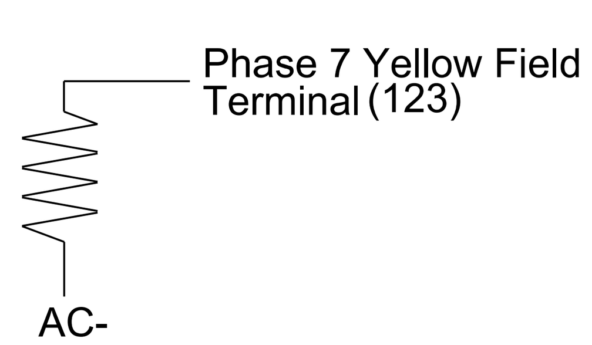
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



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

SEQUENCE DETAIL

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

Web Interface
Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	2,a,7,b
2	

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0486
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

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New Installation-Electrical Detail-Sheet 1 of 2

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Electrical and Programming Details For:

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

NC 211 Eastbound
At
U-Turn North of
SR 1219 (Army Rd)

Division 8 | Moore County | Aberdeen

PLAN DATE: August 2024	REVIEWED BY: DT Sears
PREPARED BY: VS Kondapally	REVIEWED BY: W.P. Erickson-Jones

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by: Porter Jones
D06F13F3A0E0498...
8/28/2024
DATE

SIG. INVENTORY NO. 08-0486

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 2.2

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 71 to run protected turns only.

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

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

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

7A

Detector	Call Phase	Delay
21	7	0

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0486
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Electrical Detail-Sheet 2 of 2

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Electrical and Programming Details For:

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750 N. Greenfield Pkwy, Garner, NC 27529

NC 211 Eastbound
At
U-Turn North of
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Division 8 | Moore County | Aberdeen

PLAN DATE:	August 2024	REVIEWED BY:	DT Sears
PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES
DocuSigned by: Porter Jones D00F13F3A0E0498...
8/28/2024
DATE

SIG. INVENTORY NO. 08-0486

8/27/2024
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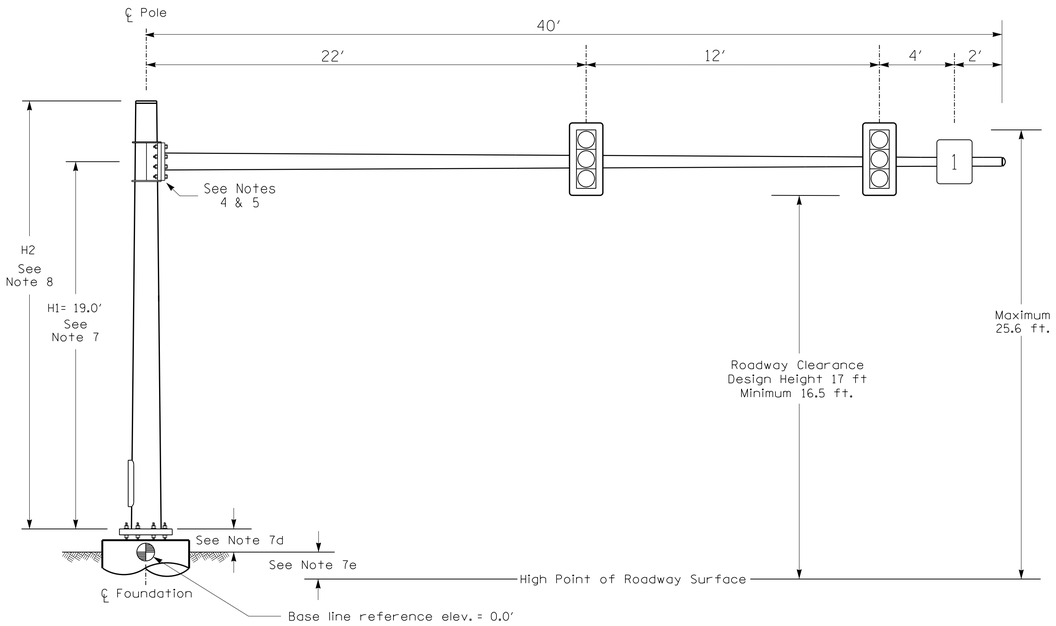
wdjones

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 2.3

Design Loading for METAL POLE NO. 1



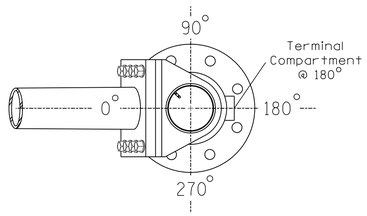
Elevation View

SPECIAL NOTE

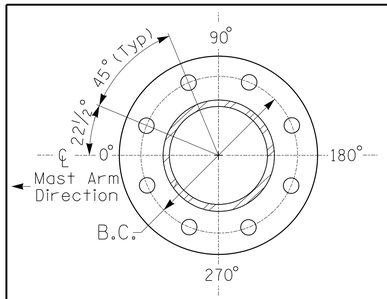
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at ⊕ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+0.3 ft.	
Elevation difference at Edge of travelway or face of curb	+0.3 ft.	

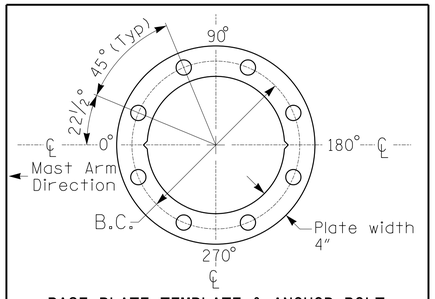


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

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
1	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 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 stress 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.
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.

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NCDOT Wind Zone 4 (120 mph)

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

NC 211 Eastbound
At
U-Turn North of
SR 1219 (Army Rd)

Division 8 Moore County Aberdeen

PLAN DATE:	August 2024	REVIEWED BY:	WP Erickson-Jones
PREPARED BY:	VS Kondapally	REVIEWED BY:	

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by: Porter Jones 8/28/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0486

8/27/2024
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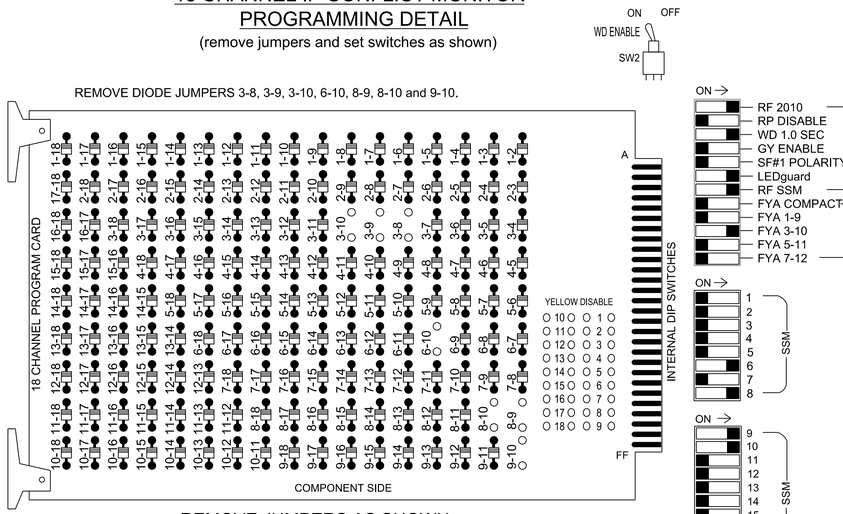
wjones

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 3.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)

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

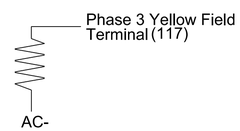
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 6 Green No Walk, 39 Phase Not On, and 40 Green No Walk
3. Program phase 39 for no startup vehicle call.
4. Program startup sequence as follows:
   From web Interface: Controller>Unit: set STARTUP CLEARANCE HOLD to 6 sec and ALL RED FLASH EXIT TIME to 6 seconds.
5. Ensure all channels are programmed to flash red on the channel configuration screen. From web Interface: Controller>Advanced IO>Channels>Channel Configuration: program all channels to flash red.
6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S4, S8, S11, AUX S1, AUX S2
Phases Used.....3, 6, 8, #39, 40
Overlap "1".....*
Overlap "2".....*
Overlap "3".....NOT USED
Overlap "4".....NOT USED
Overlap "7".....*

*See overlap programming detail on sheet 2.
#Phase only used during preemption.

SEQUENCE DETAIL

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

Web Interface
Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	a,3,b
2	6,a,8,b
3	39,c,40,d

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 3A, 6A, 8A and 8B. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	OL7	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31★	NU	NU	NU	61,62	NU	NU	83,84	NU	81,82	31★	NU	NU	NU	NU
RED								134			107		A121					
YELLOW				*				135			108							
GREEN																		
RED ARROW														A124				
YELLOW ARROW													A122	A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW				118				136			109		A123					

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0268T
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Temporary Design
(TMP Phase III Step 2)-Electrical Detail-Sheet 1 of 3

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Electrical and Programming Details For:

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

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Plank Rd)

Division 8 | Hoke County | Ashley Heights

PLAN DATE:	August 2024	REVIEWED BY:	DT Sears
PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER PORTER JONES

DocuSigned by: Porter Jones D09F13F3A0E0498... 8/28/2024
DATE

SIG. INVENTORY NO. 08-0268T

8/27/2024
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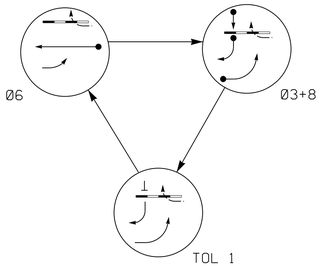
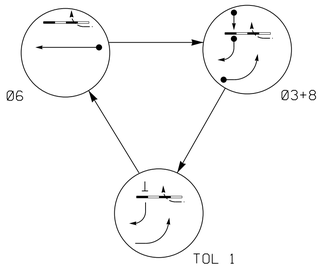
wpjones

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig 3.0

DEFAULT PHASING DIAGRAM

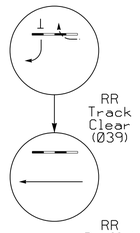


ALTERNATE PHASING DIAGRAM



RAIL PREEMPT PHASES

(High Priority)



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

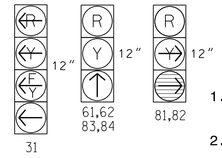
SIGNAL FACE	PHASE Ø6	Ø3+8	TOL1	CLR RR	DWELL1	FLASH
31	~~F Y~~	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~
61,62	↑	R	R	R	↑	R
81,82	R	→	→	→	R	R
83,84	R	↑	R	R	R	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	Ø3+8	TOL1	CLR RR	DWELL1	FLASH
31	~~R~~	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~
61,62	↑	R	R	R	↑	R
81,82	R	→	→	→	R	R
83,84	R	↑	R	R	R	R

SIGNAL FACE I.D.

All Heads L.E.D.
Denotes Louvered Signal Head



2 Phase Fully Actuated (Isolated)

NOTES

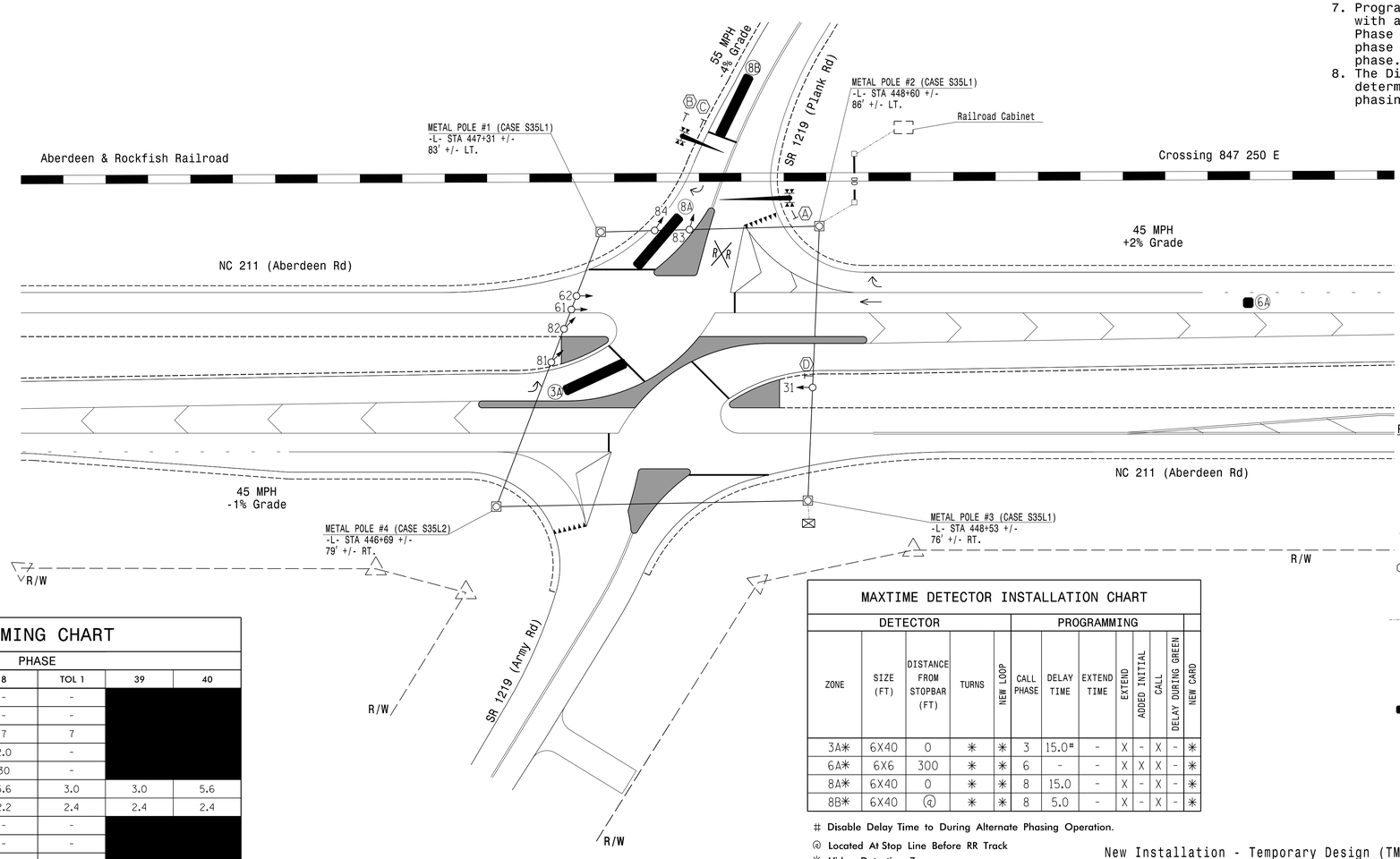
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications" dated January 2024.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Tether signal heads numbered 81 and 82.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Program phase 40 to run concurrently with all phases during normal operation. Phase 39 must be incompatible with phase 40 and included as a track clear phase.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.

MAXTIME PREEMPTION CHART

FUNCTION	PRE 1
Type	RAIL ROAD
Exit Phases	3+8
Delay	0
Max Presence	0
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	5.6 *
Enter Red Clear	2.4 *
Track Green	22
Track Yellow Change	3.0
Track Red Clear	2.4
Dwell Green	0
Exit Min Green	255 *
Exit Yellow Change	25.5 *
Exit Red Clear	25.5 *
Call Extend Time	1.0
Exit Type	EXIT PHASES
Require All Red Entry	–

* Controller uses the lesser of the time shown and the normal time used for phase.

THIS SIGNAL IS DESIGNED FOR ADVANCED PREEMPTION



MAXTIME TIMING CHART

FEATURE	PHASE 3	6	8	TOL 1	39	40
Walk *	-	-	-	-		
Ped Clear *	-	-	-	-		
Min Green	7	12	7	7		
Passage *	2.0	6.0	2.0	-		
Max 1 *	30	90	30	-		
Yellow Change	3.0	4.3	5.6	3.0	3.0	5.6
Red Clear	2.4	1.4	2.2	2.4	2.4	2.4
Added Initial *	-	1.5	-	-		
Maximum Initial *	-	34	-	-		
Time Before Reduction *	-	15	-	-		
Time To Reduce *	-	30	-	-		
Minimum Gap	-	3.0	-	-		
Advance Walk	-	-	-	-		
Non Lock Detector	X	-	X	-		
Vehicle Recall	-	MIN RECALL	-	MIN RECALL		MIN RECALL
Dual Entry	X	-	X	X		

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

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A✳	6X40	0	✳	✳	3	15.0#	-	X	-	X	-	✳
6A✳	6X6	300	✳	✳	6	-	-	X	X	X	-	✳
8A✳	6X40	0	✳	✳	8	15.0	-	X	-	X	-	✳
8B✳	6X40	ⓠ	✳	✳	8	5.0	-	X	-	X	-	✳

\# Disable Delay Time to During Alternate Phasing Operation.
ⓠ Located At Stop Line Before RR Track
✳ Video Detection Zone

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○⤵	Signal Pole with Sidewalk Guy	●⤵
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊡
□	Junction Box	■
	2-in Underground Conduit	
N/A	Right of Way	
→	Directional Arrow	→
N/A	Railroad Gate and Flasher	
◎	Metal Strain Pole	◘
▬	Non-Intrusive Detection Area	▬
N/A	Railroad Tracks	
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	"STOP HERE ON RED" Sign (R10-6)	Ⓑ
Ⓒ	"DO NOT STOP ON TRACKS" Sign (R8-8)	Ⓒ
Ⓓ	"U TURN YIELD TO RIGHT TURN" SIGN (R10-16)	Ⓓ

New Installation - Temporary Design (TMP Phase III Step 2)

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Plank Rd)

Division 8 Hoke County Ashley Heights

PLAN DATE: August 2024 REVIEWED BY: WP Erickson-Jones
PREPARED BY: VS Kondapally REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER PORTER JONES

DocuSigned by: Porter Jones DOOF12F3A0E0438
SIGNATURE 8/28/2024 DATE

SIG. INVENTORY NO. 08-0268T

8/27/2024
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PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 3.2

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	7
Type	Normal	FYA 4 - Section	Normal
Included Phases	8, 39	6	3
Modifier Phases	-	-	-
Modifier Overlaps	-	7	-
Trail Green	7	0	7
Trail Yellow	3.0	0.0	3.0
Trail Red	2.4	0.0	2.4
Trail Green Omit Phases	39	-	-

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 3A.

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

	Detector	Call Phase	Delay
3A	7	3	0

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	7
Type	Normal	FYA 4 - Section	Normal
Included Phases	8, 39	-	3
Modifier Phases	-	-	-
Modifier Overlaps	-	7	-
Trail Green	7	-	7
Trail Yellow	3.0	0.0	3.0
Trail Red	2.4	0.0	2.4
Trail Green Omit Phases	39	-	-

← NOTICE INCLUDED PHASE

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

NOTICE OVERLAP 7 ASSIGNED TO CHANNEL 3 →

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

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 31 to run protected turns only.

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

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0268T
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Temporary Design
(TMP Phase III Step 2)-Electrical Detail-Sheet 2 of 3

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PLAN DATE:	August 2024	REVIEWED BY:	DT Sears
PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by:
Porter Jones
D06F13F3A0E0498...
8/28/2024
DATE

SIG. INVENTORY NO. 08-0268T

8/27/2024
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PREEMPTION PROGRAMMING

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

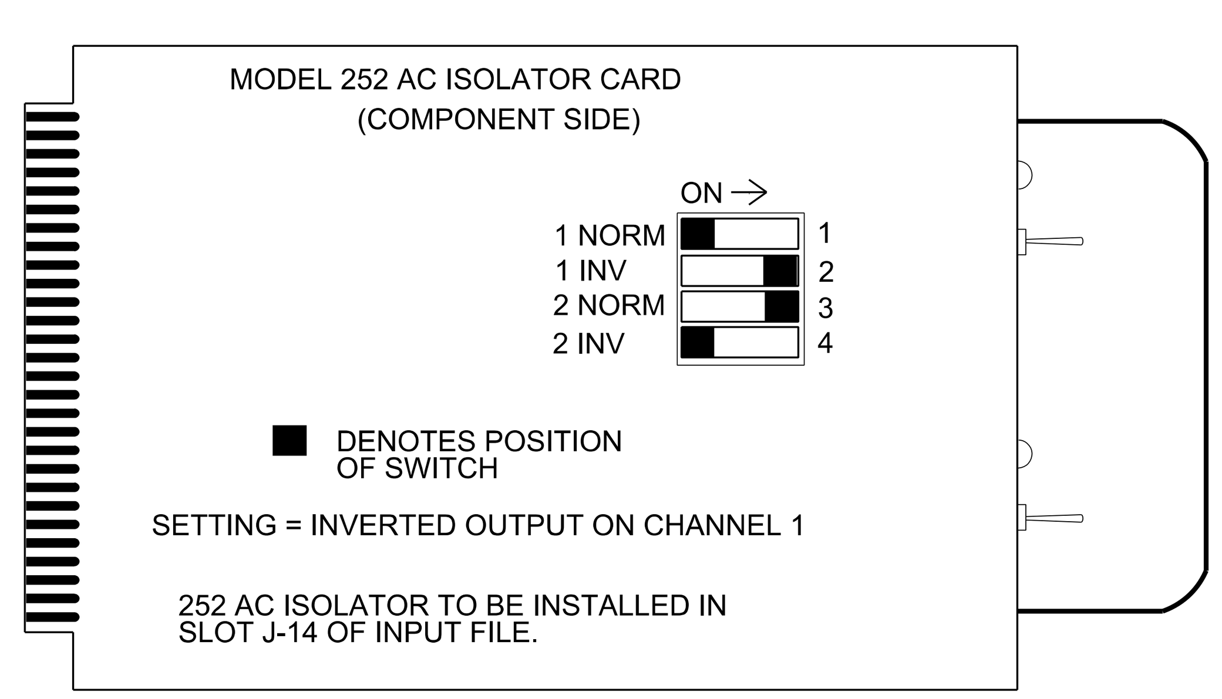
Web Interface
Home >Controller >Preempt Configuration >Preempts

Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	39
Track Overlaps	1
Dwell Phases	6
Dwell Overlaps	-
Cycling Phases	-
Cycling Overlaps	-
Exit Phases	3,8
Exit Overlaps	1,7
Delay	0
Max Presence	0
Max Pres Act	Terminate
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	5.6
Enter Red Clear	2.4
Track Green	22
Track Yellow Clr	3.0
Track Red Clear	2.4
Dwell Green	0
Exit Min Green	255
Exit Yellow Change	25.5
Exit Red Clear	25.5
Call Ext Time	1.0
Exit Type	Exit Phases
Not Ovrd Flash	X
Not Ovrd Nxt Pre	-
Track Clear Ovrd	X
Ped Clr During Yellow	X
Entry Omit OLTG	X
Track Reserve	X

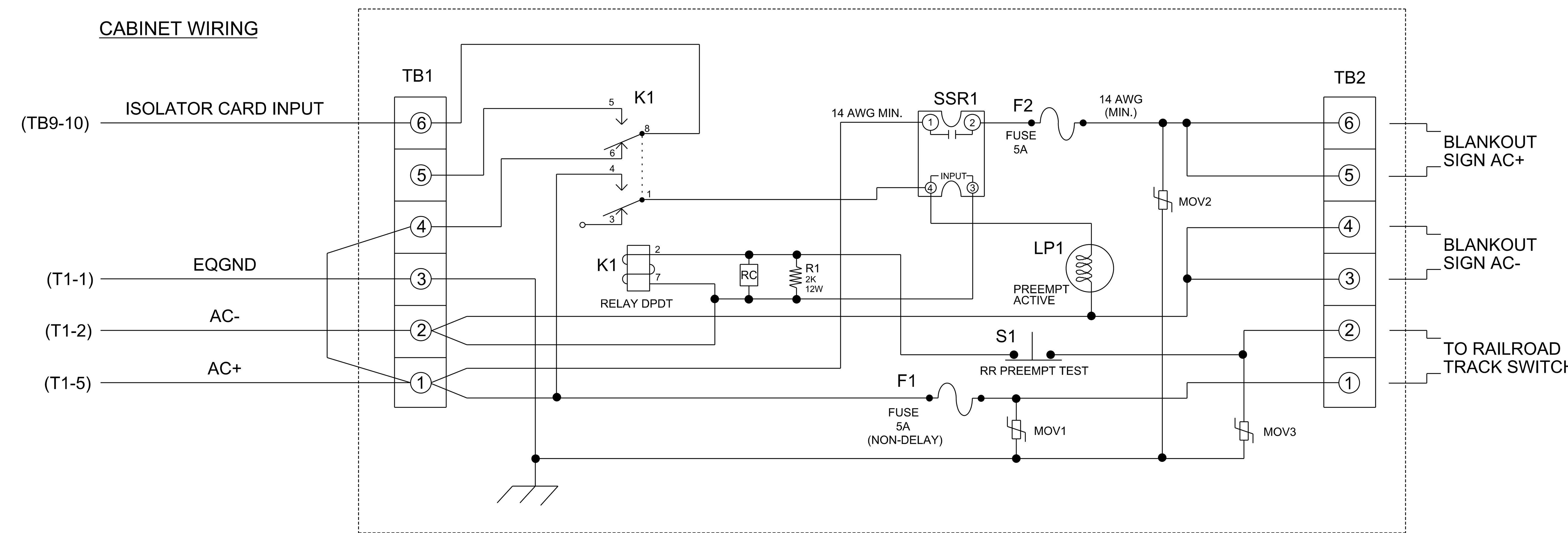
PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)



NOTES

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

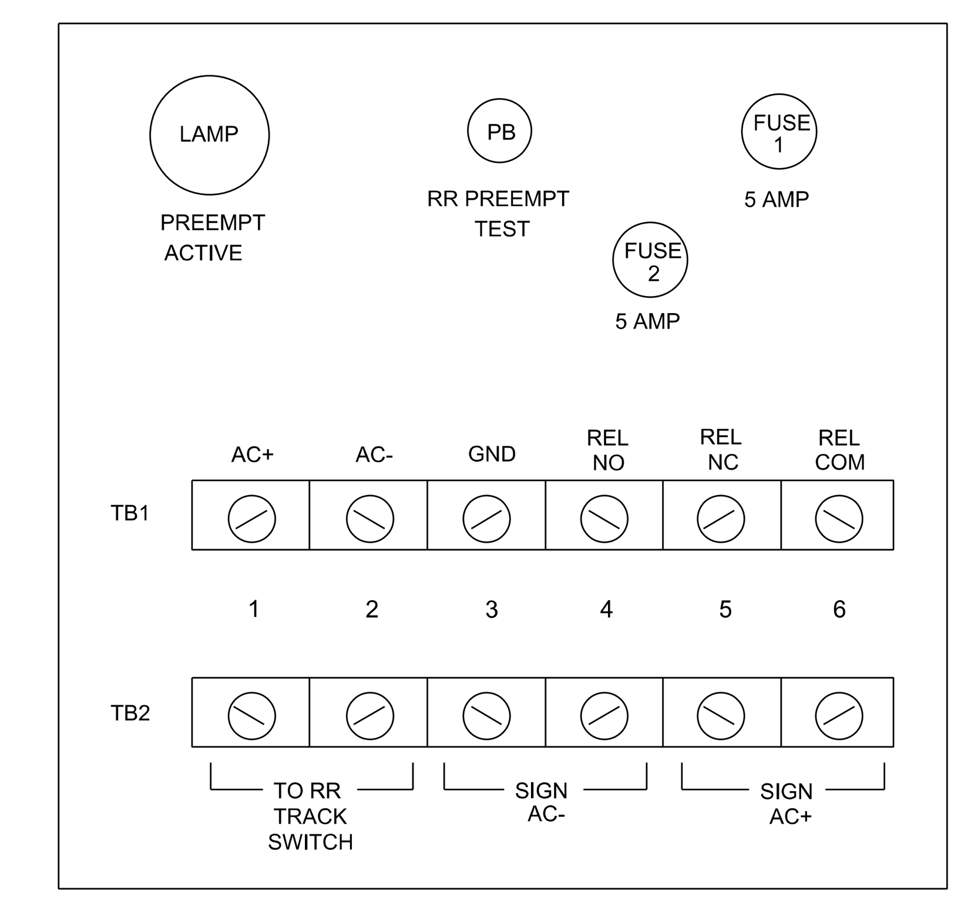
2. Relay K1 is a DPDT with 120VAC coil with octal base.

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

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

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

FRONT VIEW



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0268T
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Temporary Design
(TMP Phase III Step 2)-Electrical Detail-Sheet 3 of 3

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Electrical and Programming Details For:

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

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Plank Rd)

Division 8 Hoke County Ashley Heights

PLAN DATE: August 2024	REVIEWED BY: DT Sears
PREPARED BY: VS Kondapally	REVIEWED BY: W.P. Erickson-Jones

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

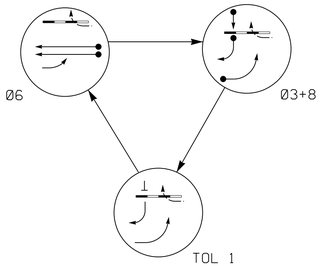
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by: Porter Jones
D06F13F3A0E0498...
8/28/2024
DATE

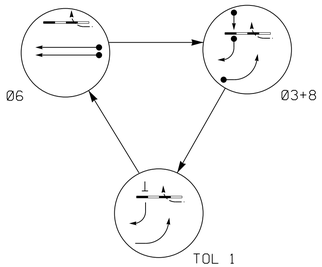
SIG. INVENTORY NO. 08-0268T

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig 4.0

DEFAULT PHASING DIAGRAM

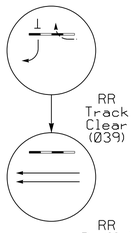


ALTERNATE PHASING DIAGRAM



RAIL PREEMPT PHASES

(High Priority)



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	Ø3+8	TOL1	CLR RR	DWELL RR	FLASH
31	~~FY~~	←	←	~~R~~	~~R~~	~~R~~
61,62	↑	R	R	R	↑	R
81,82	R	→	→	→	R	R
83,84	R	↑	R	R	R	R

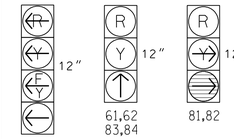
ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	Ø3+8	TOL1	CLR RR	DWELL RR	FLASH
31	~~R~~	←	←	~~R~~	~~R~~	~~R~~
61,62	↑	R	R	R	↑	R
81,82	R	→	→	→	R	R
83,84	R	↑	R	R	R	R

SIGNAL FACE I.D.

All Heads L.E.D.

Denotes Louvered Signal Head



2 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications" dated January 2024.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads numbered 61,62,82,83,84.
4. Set all detector units to presence mode.
5. Program phase 40 to run concurrently with all phases during normal operation. Phase 39 must be incompatible with phase 40 and included as a track clear phase.
6. The Division Traffic Engineer will determine the hours of use for each phasing plan.

MAXTIME PREEMPTION CHART

FUNCTION	PRE 1
Type	RAIL ROAD
Exit Phases	3+8
Delay	0
Max Presence	0
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	5.6 *
Enter Red Clear	2.4 *
Track Green	22
Track Yellow Change	3.0
Track Red Clear	2.4
Dwell Green	0
Exit Min Green	255 *
Exit Yellow Change	25.5*
Exit Red Clear	25.5*
Dwell Extend Time	1.0
Exit Type	EXIT PHASES
Require All Red Entry	–

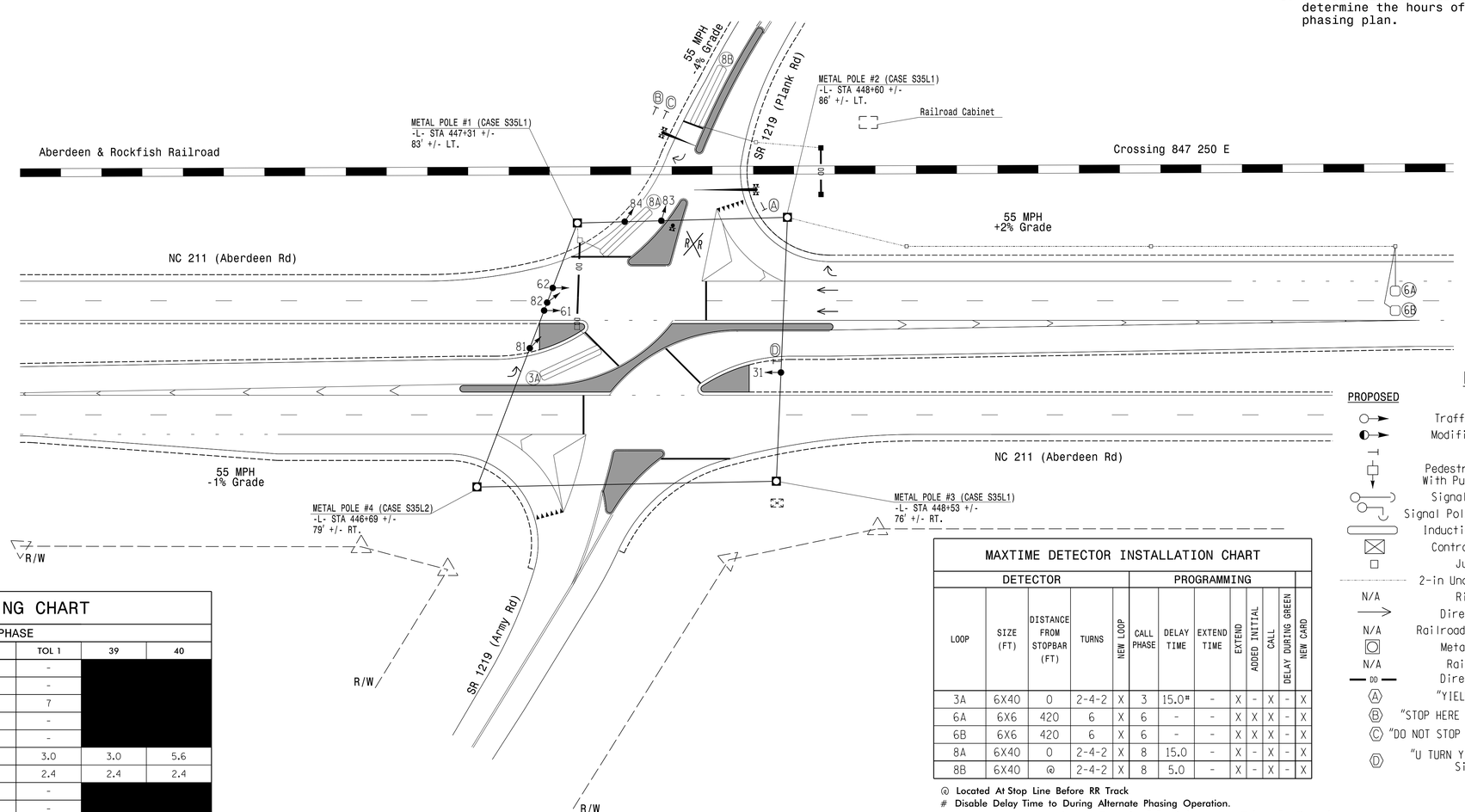
* Controller uses the lesser of the time shown and the normal time used for phase.

THIS SIGNAL IS DESIGNED FOR ADVANCED PREEMPTION

MAXTIME TIMING CHART

FEATURE	PHASE 3	6	8	TOL 1	39	40
Walk *	-	-	-	-		
Ped Clear *	-	-	-	-		
Min Green	7	14	7	7		
Passage *	2.0	6.0	2.0	-		
Max 1 *	30	90	30	-		
Yellow Change	3.0	5.0	5.6	3.0	3.0	5.6
Red Clear	2.4	1.1	2.2	2.4	2.4	2.4
Added Initial *	-	1.5	-	-		
Maximum Initial *	-	46	-	-		
Time Before Reduction *	-	15	-	-		
Time To Reduce *	-	30	-	-		
Minimum Gap	-	3.4	-	-		
Advance Walk	-	-	-	-		
Non Lock Detector	X	-	X	-		
Vehicle Recall	-	MIN RECALL	-	MIN RECALL		MIN RECALL
Dual Entry	X	-	X	X		

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



MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	6X40	0	2-4-2	X	3	15.0#	-	X	-	X	-	X
6A	6X6	420	6	X	6	-	-	X	X	X	-	X
6B	6X6	420	6	X	6	-	-	X	X	X	-	X
8A	6X40	0	2-4-2	X	8	15.0	-	X	-	X	-	X
8B	6X40	@	2-4-2	X	8	5.0	-	X	-	X	-	X

@ Located At Stop Line Before RR Track

Disable Delay Time to During Alternate Phasing Operation.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Gate and Flasher	
	Metal Strain Pole	
N/A	Railroad Tracks	
DD	Directional Drill	DD
(A)	"YIELD" Sign (R1-2)	(A)
(B)	"STOP HERE ON RED" Sign (R10-6)	(B)
(C)	"DO NOT STOP ON TRACKS" Sign (R8-8)	(C)
(D)	"U TURN YIELD TO RIGHT TURN" Sign (R10-16)	(D)

New Installation - Final Design

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

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Plank Rd)

Division 8 Hoke County Ashley Heights

PLAN DATE: August 2024 REVIEWED BY: WP Erickson-Jones
PREPARED BY: VS Kondapally REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER PORTER JONES
DocuSigned by: Porter Jones
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SIGNATURE 8/28/2024 DATE

SIG. INVENTORY NO. 08-0268

8/27/2024
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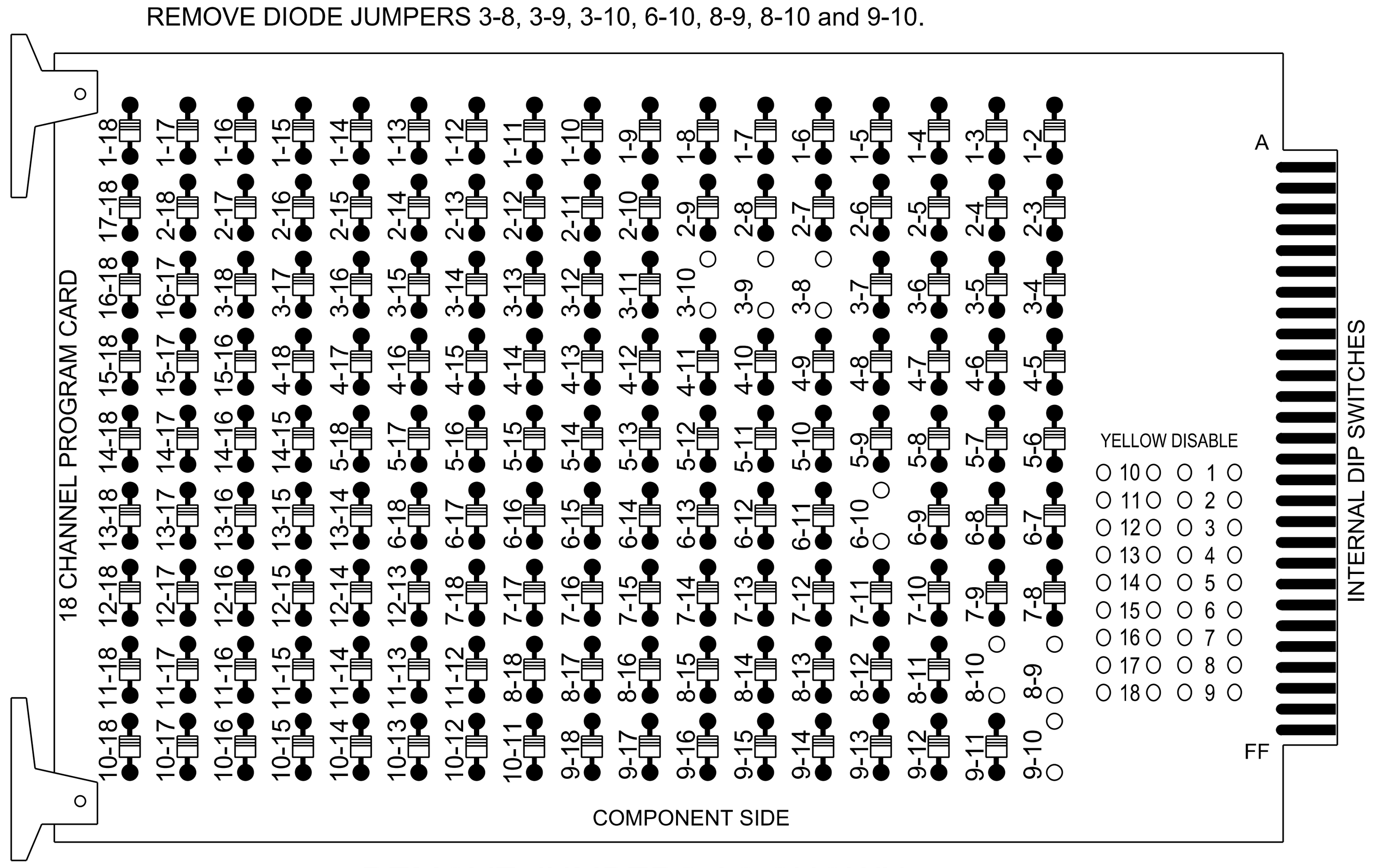
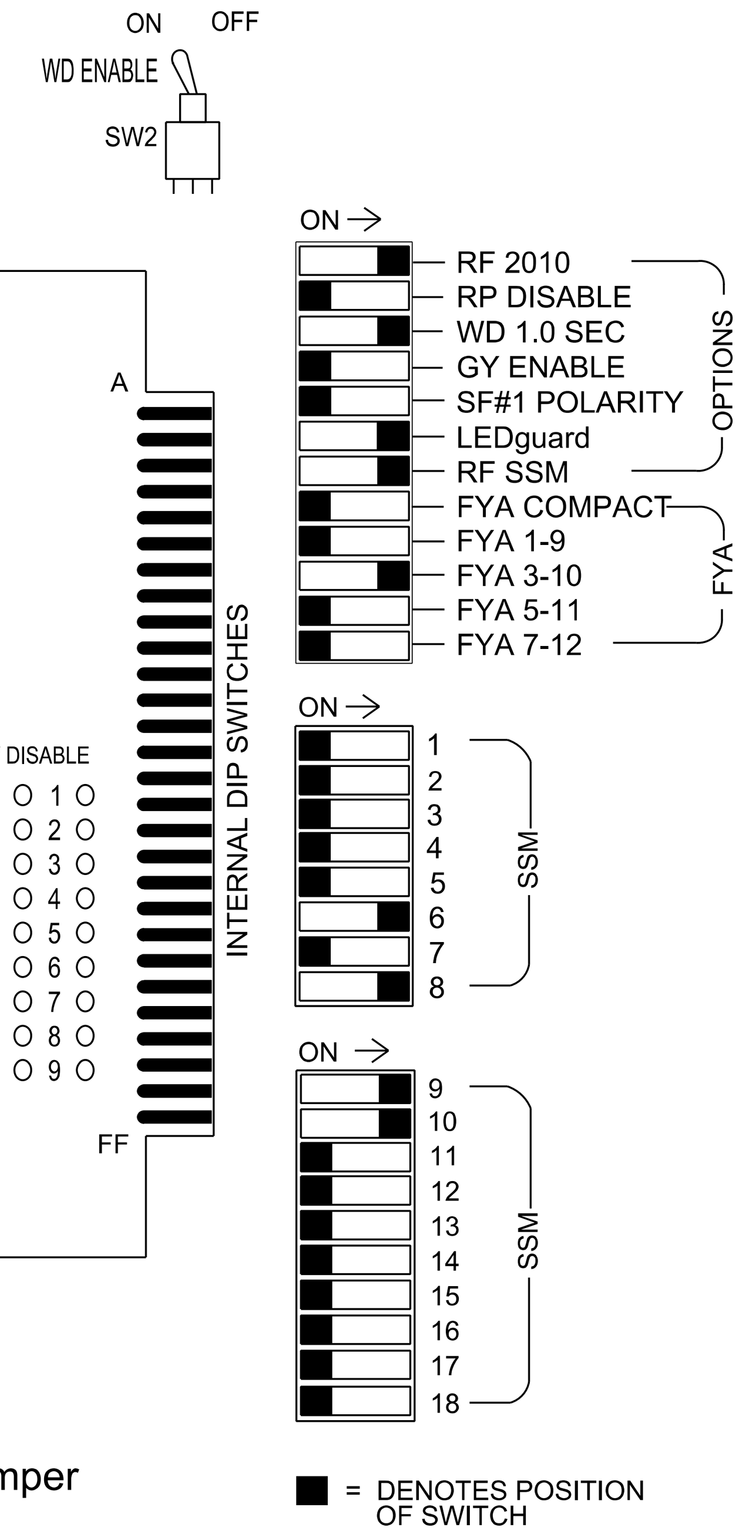
wpjones

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 3-8, 3-9, 3-10, 6-10, 8-9, 8-10 and 9-10.





REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 6 Green No Walk, 39 Phase Not On, and 40 Green No Walk
3. Program phase 39 for no startup vehicle call.
4. Program startup sequence as follows: From web Interface: Controller>Unit: set STARTUP CLEARANCE HOLD to 6 sec and ALL RED FLASH EXIT TIME to 6 seconds.
5. Ensure all channels are programmed to flash red on the channel configuration screen. From web Interface: Controller>Advanced IO>Channels>Channel Configuration: program all channels to flash red.
6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used...........................S4, S8, S11,
AUX S1, AUX S2
Phases Used.......................................3, 6, 8, #39, 40
Overlap "1"..*
Overlap "2"..*
Overlap "3"..NOT USED
Overlap "4"..NOT USED
Overlap "7"..*

*See overlap programming detail on sheet 2.
#Phase only used during preemption.

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 4.1

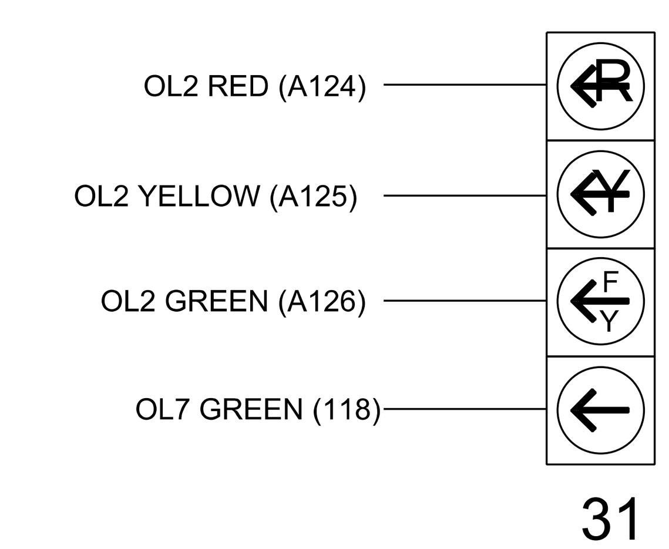
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	OL7	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31★	NU	NU	NU	61,62	NU	NU	83,84	NU	81,82	31★	NU	NU	NU	NU
RED								134			107		A121					
YELLOW				*				135			108							
GREEN																		
RED ARROW														A124				
YELLOW ARROW													A122	A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW				118				136			109		A123					

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

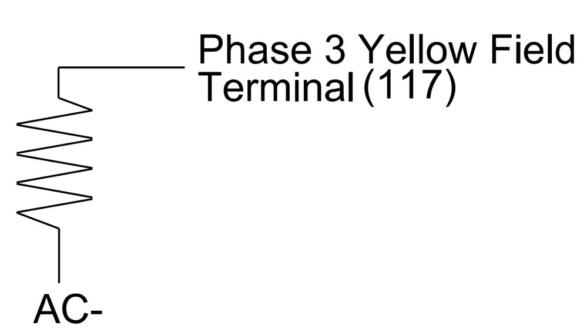
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
3A	TB4-5,6	I5U	58	20	7 ★	3	15.0		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	15.0		X		X	
8B	TB5-11,12	J6L	46	8	23	8	5.0		X		X	

★For the detectors to work as shown on the signal plans, see the vehicle detector setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)

SEQUENCE DETAIL

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

Web Interface
Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	a,3,b
2	6,a,8,b
3	39,c,40,d

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THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0268
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

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

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Electrical and Programming Details For:

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Plank Rd)

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

Division 8 Hoke County Ashley Heights

PLAN DATE:	August 2024	REVIEWED BY:	DT Sears
PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

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DATE

SIG. INVENTORY NO. 08-0268

8/27/2024
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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	7
Type	Normal	FYA 4 - Section	Normal
Included Phases	8, 39	6	3
Modifier Phases	-	-	-
Modifier Overlaps	-	7	-
Trail Green	7	0	7
Trail Yellow	3.0	0.0	3.0
Trail Red	2.4	0.0	2.4
Trail Green Omit Phases	39	-	-

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	7
Type	Normal	FYA 4 - Section	Normal
Included Phases	8, 39	-	3
Modifier Phases	-	-	-
Modifier Overlaps	-	7	-
Trail Green	7	-	7
Trail Yellow	3.0	0.0	3.0
Trail Red	2.4	0.0	2.4
Trail Green Omit Phases	39	-	-

NOTICE INCLUDED PHASE

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 31 to run protected turns only.

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

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 3A.

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

	Detector	Call Phase	Delay
3A	7	3	0

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTICE OVERLAP 7 ASSIGNED TO CHANNEL 3

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0268
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Final Design-Electrical Detail-Sheet 2 of 3

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PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

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SIG. INVENTORY NO. 08-0268

8/27/2024
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wpjones

PREEMPTION PROGRAMMING

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

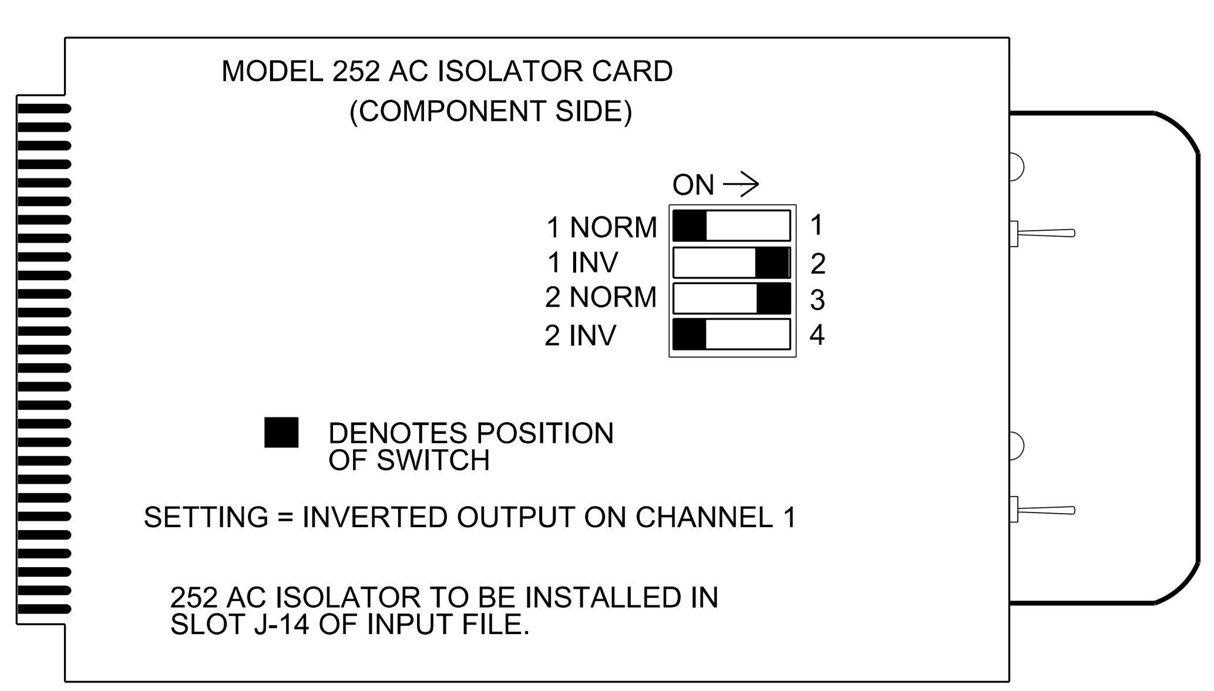
Web Interface
Home >Controller >Preempt Configuration >Preempts

Preempt Configuration

Preempt	1
Enabled	Enabled
Type	Rail Road
Track Phases	39
Track Overlaps	1
Dwell Phases	6
Dwell Overlaps	-
Cycling Phases	-
Cycling Overlaps	-
Exit Phases	3,8
Exit Overlaps	1,7
Delay	0
Max Presence	0
Max Pres Act	Terminate
Enter Min Green	1
Enter Walk	0
Enter Ped Clear	0
Enter Yellow Change	5.6
Enter Red Clear	2.4
Track Green	22
Track Yellow Clr	3.0
Track Red Clear	2.4
Dwell Green	0
Exit Min Green	255
Exit Yellow Change	25.5
Exit Red Clear	25.5
Call Ext Time	1.0
Exit Type	Exit Phases
Not Ovrd Flash	X
Not Ovrd Nxt Pre	-
Track Clear Ovrd	X
Ped Clr During Yellow	X
Entry Omit OLTG	X
Track Reserve	X

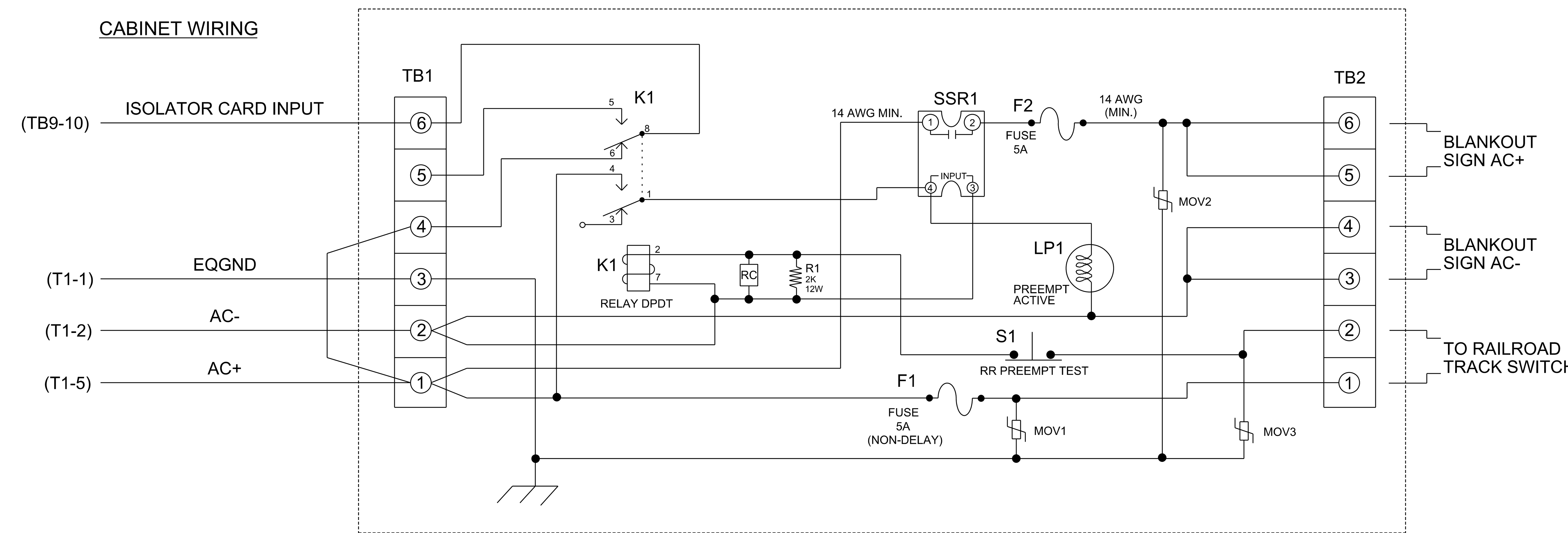
PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



RAILROAD PREEMPTION WIRING DETAIL

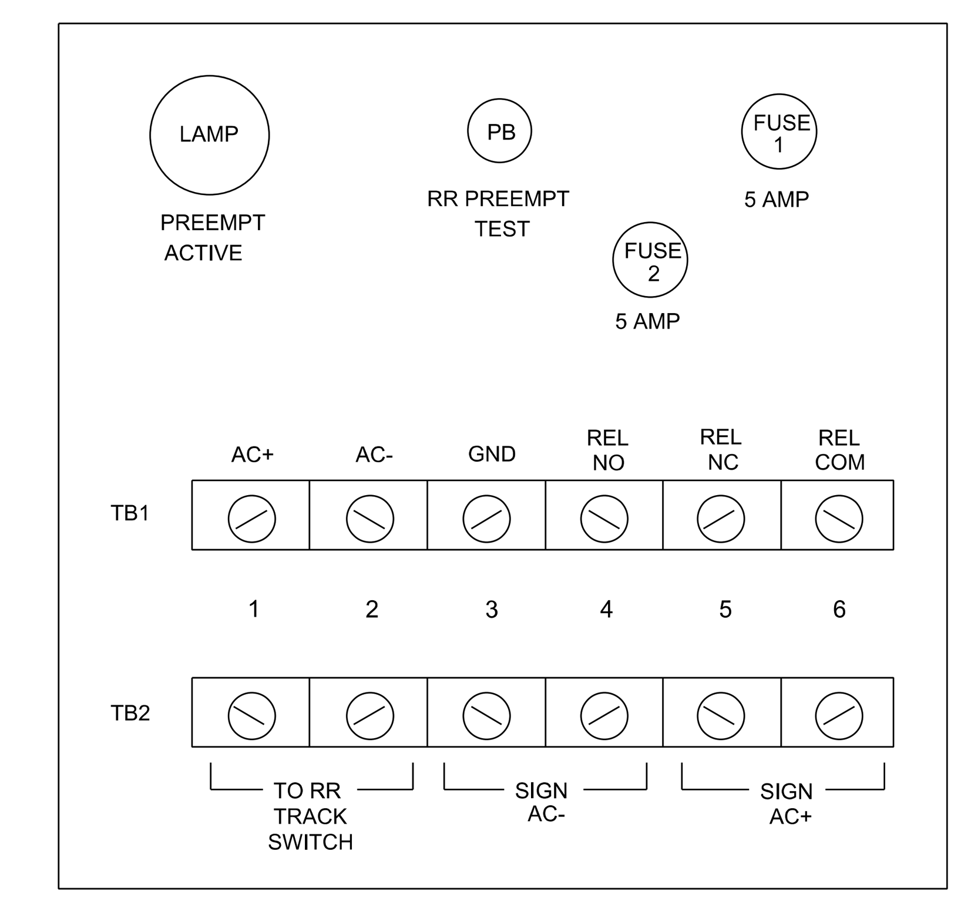
(wire as shown below)



NOTES

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

FRONT VIEW



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0268
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Final Design-Electrical Detail-Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Plank Rd)

Division 8 | Hoke County | Ashley Heights
PLAN DATE: August 2024 | REVIEWED BY: DT Sears
PREPARED BY: VS Kondapally | REVIEWED BY: W.P. Erickson-Jones

REVISIONS | INIT. | DATE

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

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SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 056142
W. PORTER JONES

DocuSigned by: Porter Jones 8/28/2024
DATE

SIG. INVENTORY NO. 08-0268

8/27/2024
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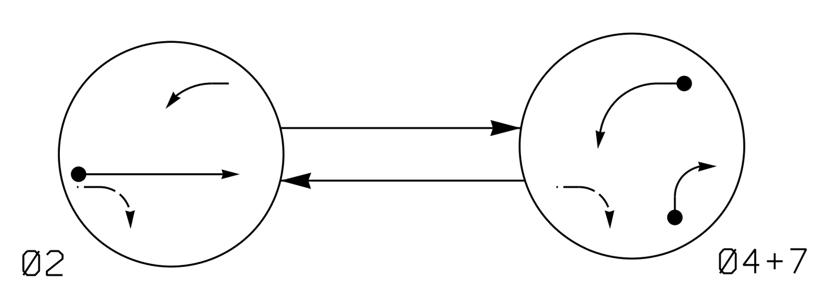
wpjones

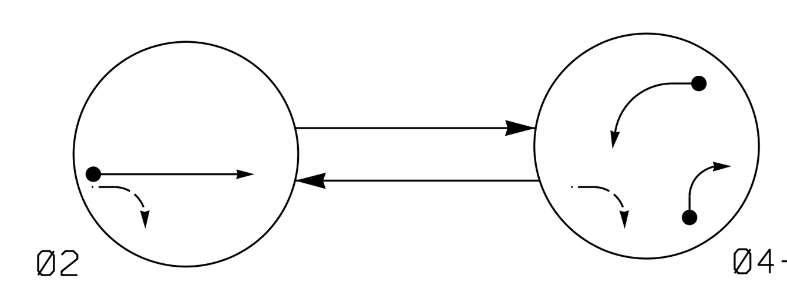
PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig 5.0

2 Phase
Fully Actuated
(Isolated)

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM

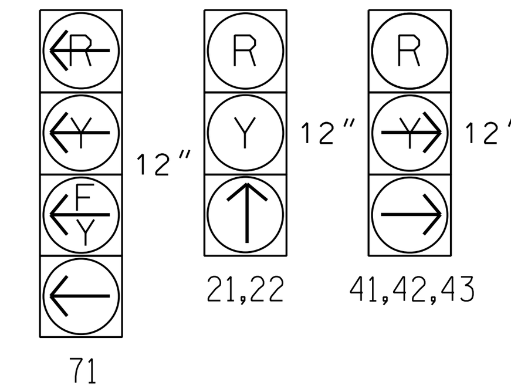


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.

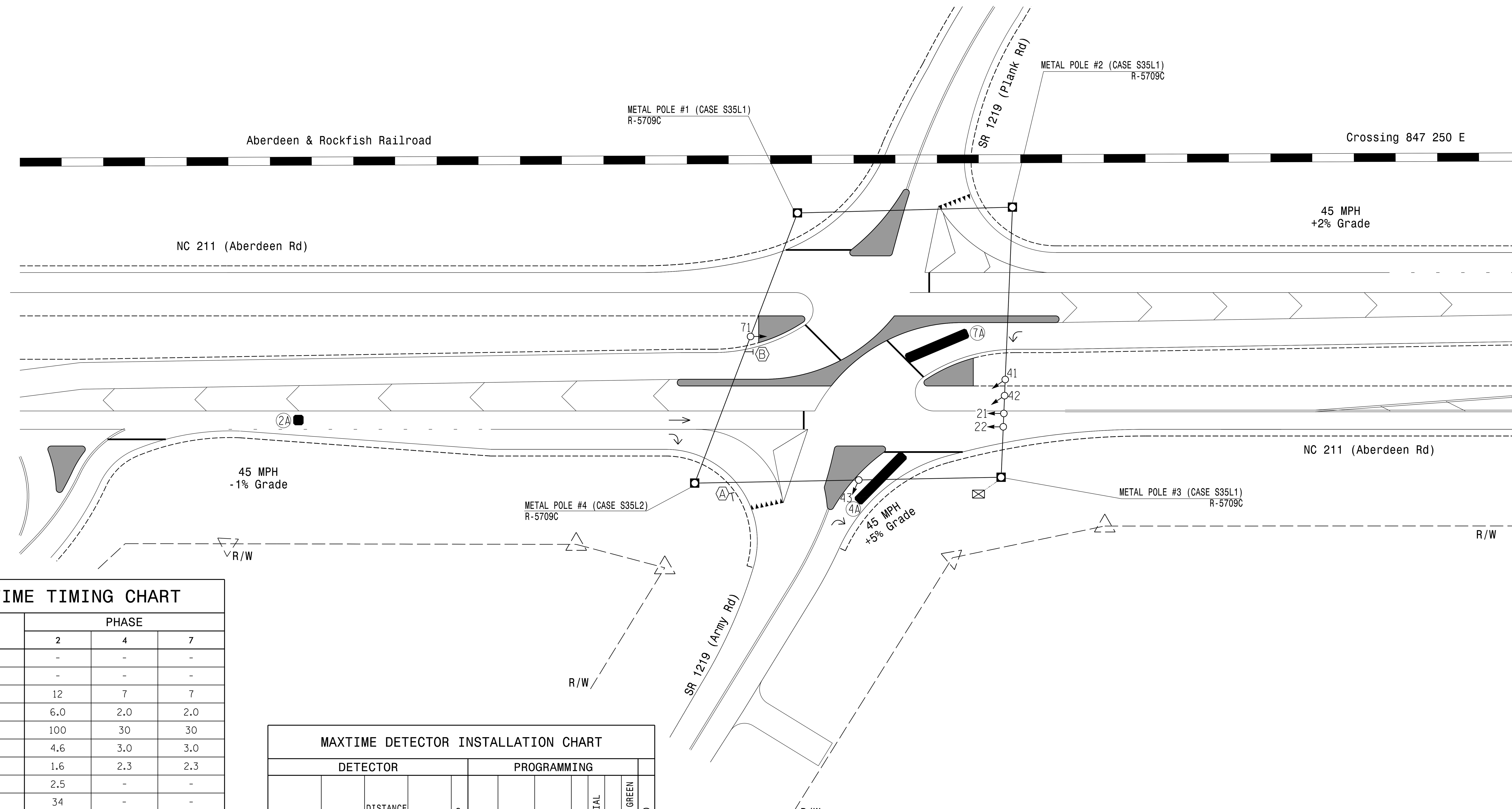


DEFAULT PHASING TABLE OF OPERATION			
SIGNAL FACE	PHASE		
	Ø2	Ø4+7	FLASH
21,22	↑	R	R
41,42,43	R	→	R
71	← FY	←	← R

ALTERNATE PHASING TABLE OF OPERATION			
SIGNAL FACE	PHASE		
	Ø2	Ø4+7	FLASH
21,22	↑	R	R
41,42,43	R	→	R
71	← R	←	← R

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications" dated January 2024.
2. Set all detector units to presence mode.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning red on right.
4. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
5. The Division Traffic Engineer will determine the hours of use for each phasing plan.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Non-Intrusive Detection Zone	
N/A	Railroad Tracks	
A	"YIELD" Sign (R1-2)	A
B	"U TURN YIELD TO RIGHT TURN" Sign (R10-16)	B

MAXTIME TIMING CHART

FEATURE	PHASE		
	2	4	7
Walk *	-	-	-
Ped Clear *	-	-	-
Min Green	12	7	7
Passage *	6.0	2.0	2.0
Max 1 *	100	30	30
Yellow Change	4.6	3.0	3.0
Red Clear	1.6	2.3	2.3
Added Initial *	2.5	-	-
Maximum Initial *	34	-	-
Time Before Reduction *	15	-	-
Time To Reduce *	30	-	-
Minimum Gap	3.0	-	-
Advance Walk	-	-	-
Non Lock Detector	-	X	X
Vehicle Recall	MIN RECALL	-	-
Dual Entry	-	X	X

* 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.

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A✳	6X6	300	✳	✳	2	-	-	X	X	X	-	✳
4A✳	6X40	0	✳	✳	4	15.0	-	X	-	X	-	✳
7A✳	6X40	0	✳	✳	7	15.0#	-	X	-	X	-	✳

Disable Delay Time to During Alternate Phasing Operation.
✳ Video Detection Zone

New Installation - Temporary Design (TMP Phase III Step 2)

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

NC 211 EB (Aberdeen Rd)
At
SR 1219 (Army Rd)

Division 8 Hoke County Ashley Heights

PLAN DATE: August 2024	REVIEWED BY: WP Erickson-Jones
PREPARED BY: VS Kondapally	REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by:
Porter Jones
D06F13F3A0E0498...
SIGNATURE 8/28/2024 DATE

SIG. INVENTORY NO. 08-0269T

8/27/2024
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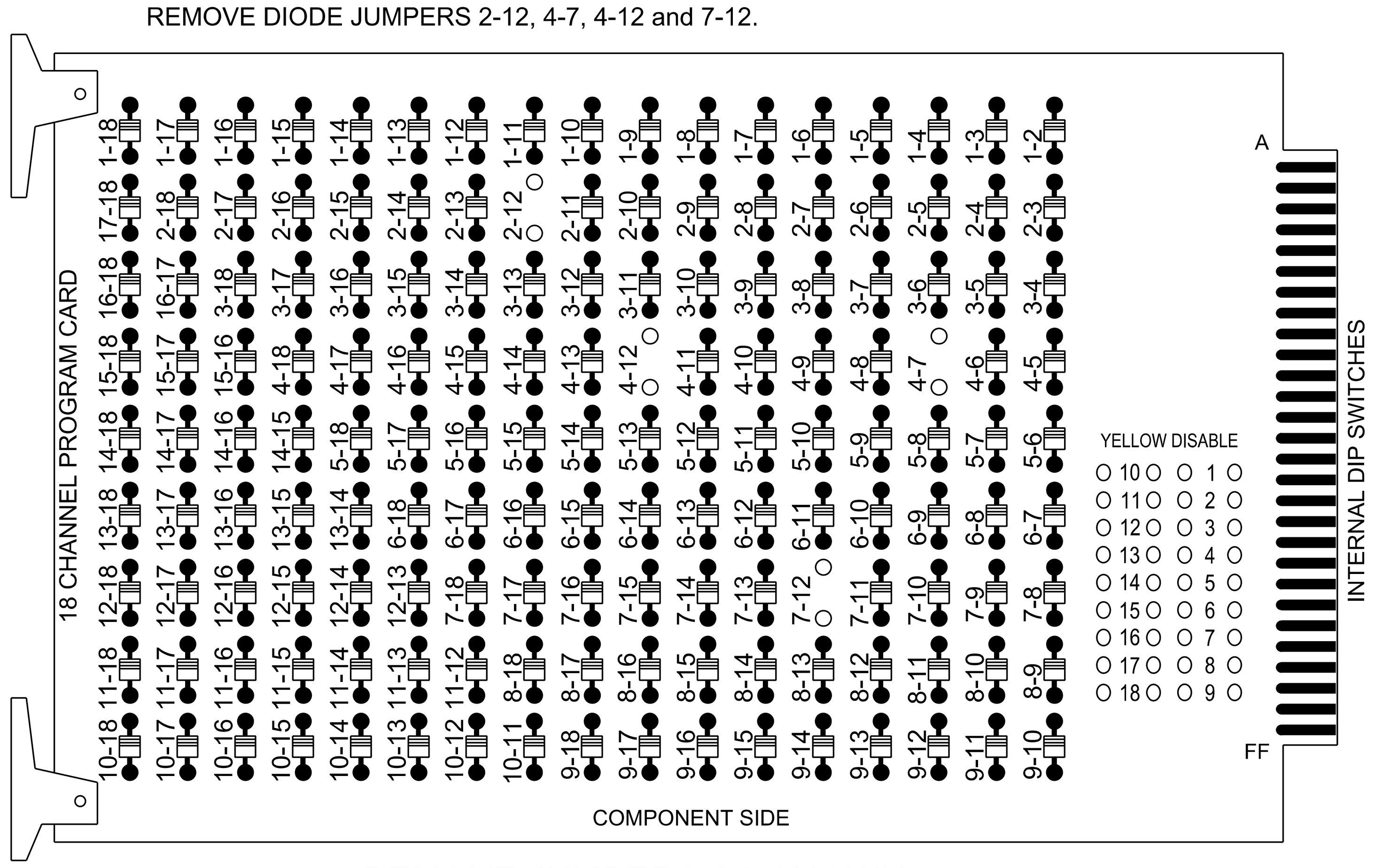
wpjones

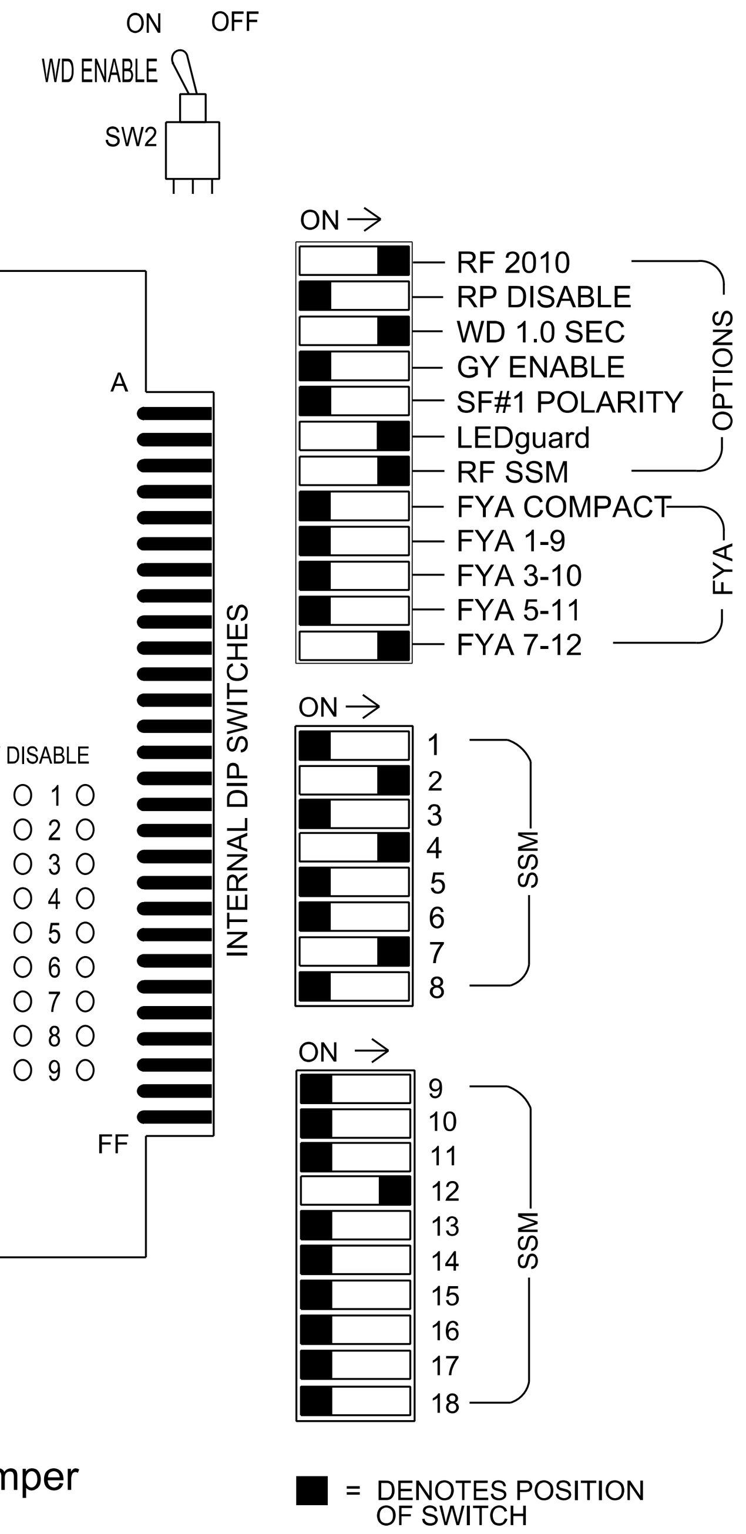
PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 5.1

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.





REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 7 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk.
4. Program startup sequence as follows:
   From web Interface: Controller>Unit: set STARTUP CLEARANCE HOLD to 6 sec and ALL RED FLASH EXIT TIME to 6 seconds.
5. Ensure all channels are programmed to flash red on the channel configuration screen. From web Interface: Controller>Advanced IO>Channels>Channel Configuration: program all channels to flash red.
6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet..332 w/ Aux
Software..Q-Free MAXTIME
Cabinet Mount..Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used..........................S2, 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.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42, 43	NU	NU	NU	NU	71★	NU	NU	NU	NU	NU	NU	71★	NU
RED		128			101													
YELLOW		129								*								
GREEN																		
RED ARROW																	A101	
YELLOW ARROW					102												A102	
FLASHING YELLOW ARROW																	A103	
GREEN ARROW		130			103					124								

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

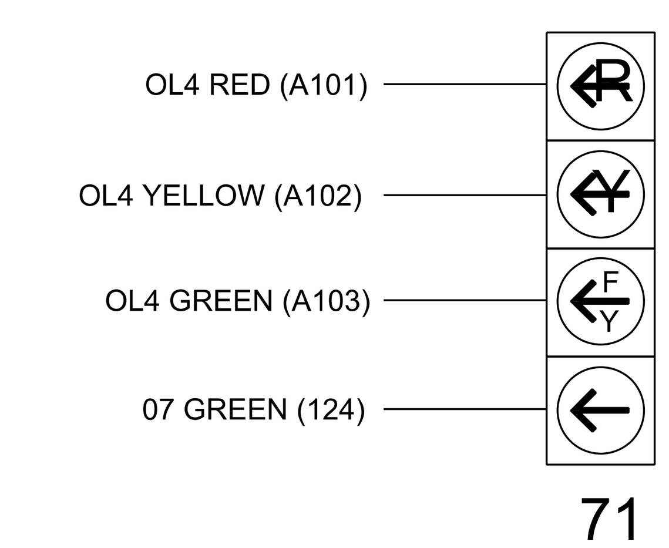
		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT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

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

FS = FLASH SENSE
ST = STOP TIME

FYA SIGNAL WIRING DETAIL

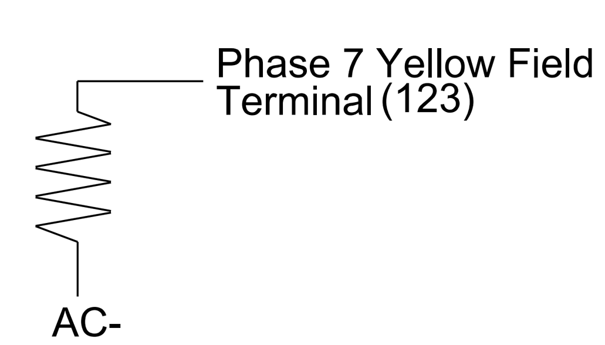
(wire signal heads as shown)



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)



SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 2A, 4A, and 7A. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0269T
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Temporary Design
(TMP Phase III Step 2)-Electrical Detail-Sheet 1 of 2

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Electrical and Programming Details For:

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

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Army Rd)

Division 8 Hoke County Ashley Heights

PLAN DATE: August 2024	REVIEWED BY: DT Sears
PREPARED BY: VS Kondapally	REVIEWED BY: W.P. Erickson-Jones

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by: Porter Jones D06F13F3A0E0498... 8/28/2024
DATE

SIG. INVENTORY NO. 08-0269T

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 5.2

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 71 to run protected turns only.

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

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

7A

Detector	Call Phase	Delay
21	7	0

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0269T
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Temporary Design
(TMP Phase III Step 2)-Electrical Detail-Sheet 2 of 2

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Traffic Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 211 WB (Aberdeen Rd)
At
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Division 8 | Hoke County | Ashley Heights

PLAN DATE:	August 2024	REVIEWED BY:	DT Sears
PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER PORTER JONES

DocuSigned by: Porter Jones D09F13F3A0E0498...
8/28/2024
DATE

SIG. INVENTORY NO. 08-0269T

8/27/2024
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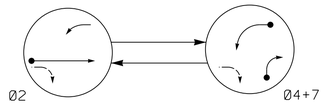
wdjones

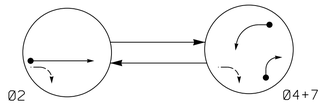
PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 6.0

2 Phase
Fully Actuated
(Isolated)

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM

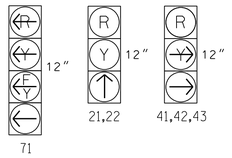


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.

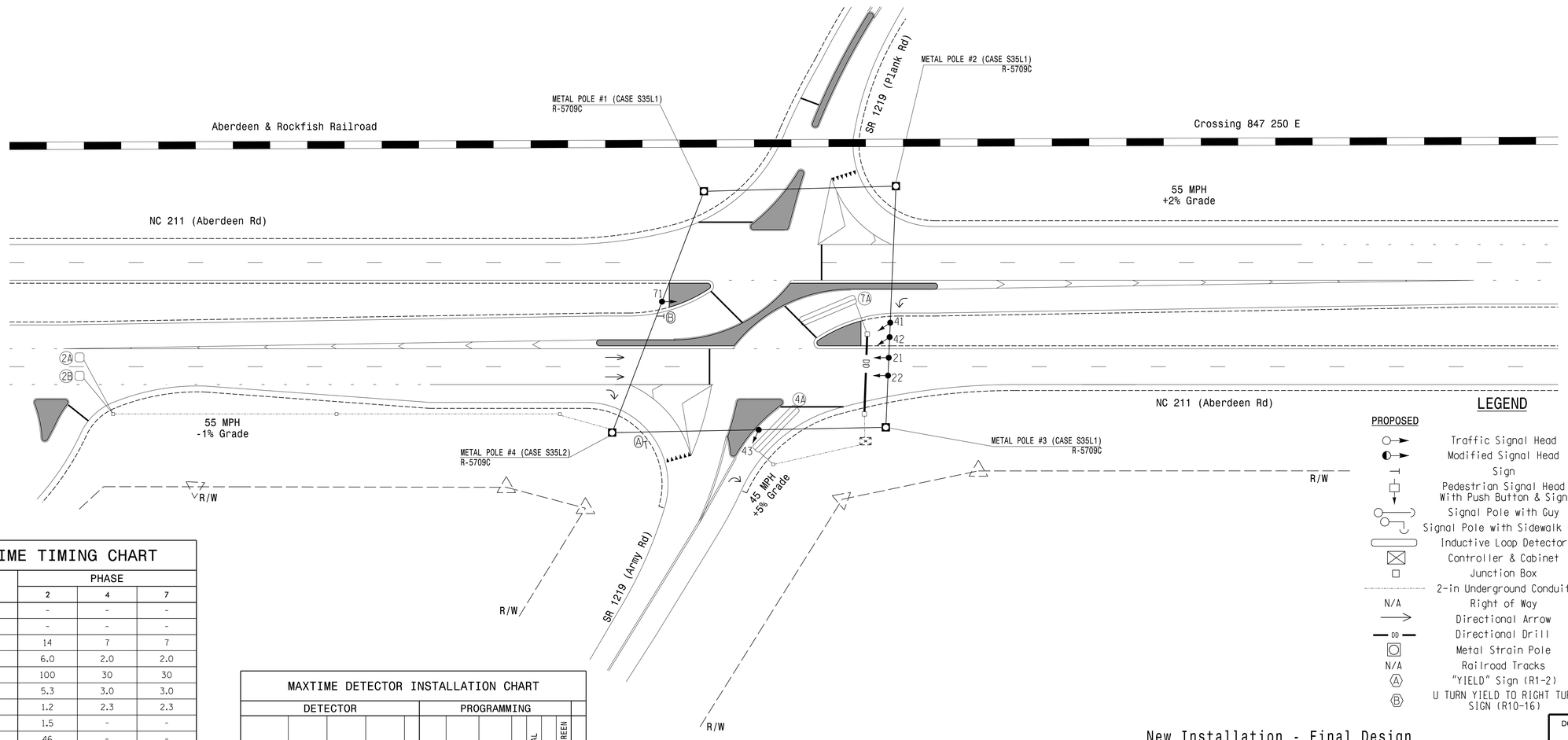


DEFAULT PHASING TABLE OF OPERATION			
SIGNAL FACE	Ø2	Ø4+7	FLASH
21,22	↑	R	R
41,42,43	R	→	R
71	~~F Y~~	←	~~R~~

ALTERNATE PHASING TABLE OF OPERATION			
SIGNAL FACE	Ø2	Ø4+7	FLASH
21,22	↑	R	R
41,42,43	R	→	R
71	~~R~~	←	~~R~~

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications" dated January 2024.
2. Reposition existing signal heads numbered 21 and 22.
3. Set all detector units to presence mode. sight distance of vehicles turning red on right.
4. The Division Traffic Engineer will determine the hours of use for each phasing plan.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○→	Signal Pole with Guy	●→
○↷	Signal Pole with Sidewalk Guy	●↷
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	-----
→	Directional Arrow	→
DD	Directional Drill	N/A
◯	Metal Strain Pole	■
N/A	Railroad Tracks	▬
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	U TURN YIELD TO RIGHT TURN SIGN (R10-16)	Ⓑ

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 7
Walk *	-	-	-
Ped Clear *	-	-	-
Min Green	14	7	7
Passage *	6.0	2.0	2.0
Max 1 *	100	30	30
Yellow Change	5.3	3.0	3.0
Red Clear	1.2	2.3	2.3
Added Initial *	1.5	-	-
Maximum Initial *	46	-	-
Time Before Reduction *	15	-	-
Time To Reduce *	30	-	-
Minimum Gap	3.4	-	-
Advance Walk	-	-	-
Non Lock Detector	-	X	X
Vehicle Recall	MIN RECALL	-	-
Dual Entry	-	X	X

* 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.

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	420	6	X	2	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	X	4	15.0	-	X	-	X	-	X
7A	6X40	0	2-4-2	X	7	15.0#	-	X	-	X	-	X

Disable Delay Time to During Alternate Phasing Operation.

New Installation - Final Design

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Signal Design Section
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SCALE
0 40
1"=40'

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Army Rd)

Division 8 Hoke County Ashley Heights

PLAN DATE: August 2024 REVIEWED BY: WP Erickson-Jones
PREPARED BY: VS Kondapally REVIEWED BY:

REVISIONS	INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER PORTER JONES

DocuSigned by: Porter Jones DOSET3F3ADED4BB... 8/28/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0269

8/27/2024
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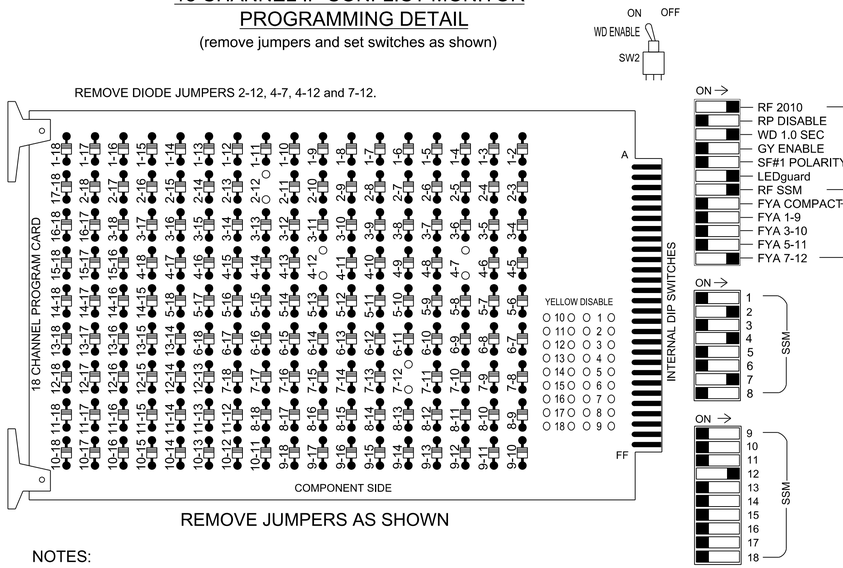
wpjones

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 6.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)

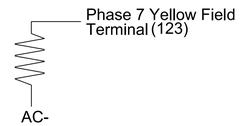
		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	SLOT EMPTY	∅ 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	∅ 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				NOT USED								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	∅ 7 7A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

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

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 7 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk.
4. Program startup sequence as follows:
   From web Interface: Controller>Unit: set STARTUP CLEARANCE HOLD to 6 sec and ALL RED FLASH EXIT TIME to 6 seconds.
5. Ensure all channels are programmed to flash red on the channel configuration screen. From web Interface: Controller>Advanced IO>Channels>Channel Configuration: program all channels to flash red.
6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S2, 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 CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	15.0		X		X	
7A	TB5-5,6	J5U	57	19	21 ★	7	15.0		X		X	

★For the detectors to work as shown on the signal plans, see the vehicle detector setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42 43	NU	NU	NU	NU	71★	NU	NU	NU	NU	NU	NU	71★	NU
RED		128			101													
YELLOW		129								*								
GREEN																		
RED ARROW																	A101	
YELLOW ARROW					102												A102	
FLASHING YELLOW ARROW																	A103	
GREEN ARROW		130			103					124								

NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0269
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

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Signal Upgrade-Final Design-Electrical Detail-Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Army Rd)

Division 8 | Hoke County | Ashley Heights

PLAN DATE:	August 2024	REVIEWED BY:	DT Sears
PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES
DocuSigned by: Porter Jones D06F13F3A0E0498...
8/28/2024
DATE

SIG. INVENTORY NO. 08-0269

8/27/2024
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wjones

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 6.2

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 71 to run protected turns only.

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

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

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 08-0269
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

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

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Electrical and Programming Details For:

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

NC 211 WB (Aberdeen Rd)
At
SR 1219 (Army Rd)

Division 8 | Hoke County | Ashley Heights

PLAN DATE:	August 2024	REVIEWED BY:	DT Sears
PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER PORTER JONES

DocuSigned by:
Porter Jones
D09F13F3A0E0498...
8/28/2024
DATE

SIG. INVENTORY NO. 08-0269

8/27/2024
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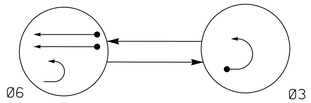
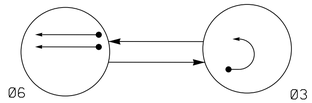
wdjones

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 7.0

DEFAULT PHASING DIAGRAM

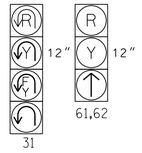


ALTERNATE PHASING DIAGRAM



SIGNAL FACE I.D.

All Heads L.E.D.



DEFAULT PHASING TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø6	PHASE Ø3	PHASE FLASH
31	Y	↑	R
61,62	↑	R	R

ALTERNATE PHASING TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø6	PHASE Ø3	PHASE FLASH
31	R	↑	R
61,62	↑	R	R

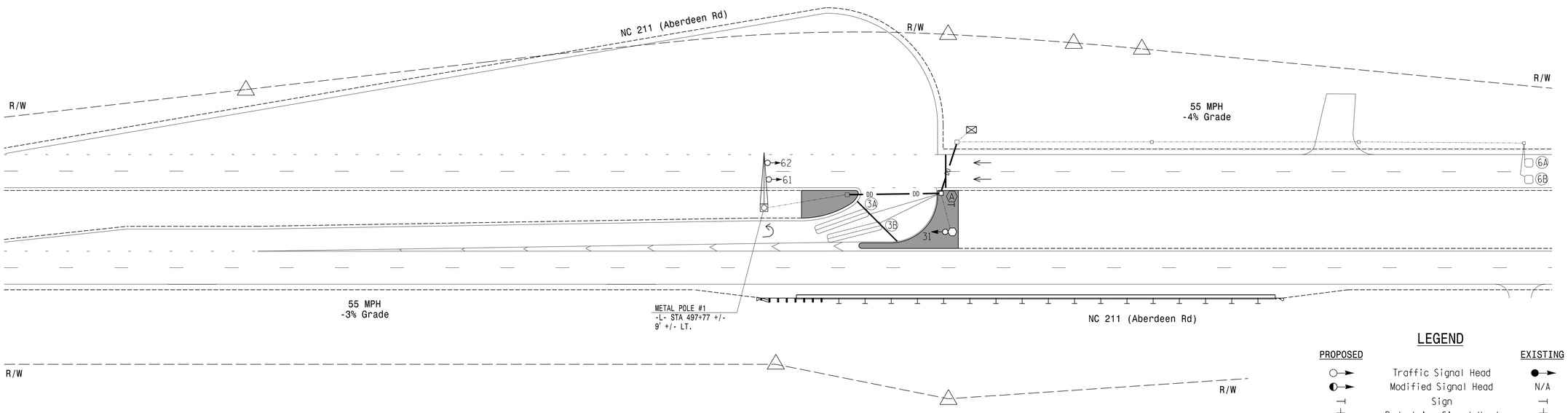
2 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications" 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. The Division Traffic Engineer will determine the hours of use for each phasing plan.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	– – – –
→	Directional Arrow	→
⊙	Metal Pole with Mastarm	⊙
N/A	Guardrail	N/A
DD	Directional Drill	N/A
⬡	Type II Signal Pedestal	⬢
Ⓐ	No Left Turn Sign (R3-2)	Ⓐ

MAXTIME TIMING CHART

FEATURE	PHASE 3	PHASE 6
Walk *	-	-
Ped Clear *	-	-
Min Green	7	14
Passage *	2.0	6.0
Max 1 *	25	100
Yellow Change	3.0	5.6
Red Clear	5.0	1.4
Added Initial *	-	1.5
Maximum Initial *	-	46
Time Before Reduction *	-	15
Time To Reduce *	-	30
Minimum Gap	-	3.4
Advance Walk	-	-
Non Lock Detector	X	-
Vehicle Recall	-	MIN RECALL
Dual Entry	-	-

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

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	6X40	0	2-4-2	X	3	15.0#	-	X	-	X	-	X
3B	6X40	0	2-4-2	X	3	15.0#	-	X	-	X	-	X
6A	6X6	420	5	X	6	-	-	X	X	X	-	X
6B	6X6	420	5	X	6	-	-	X	X	X	-	X

\# Disable Delay Time During Alternate Phasing Operation.

New Installation

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

NC 211 Westbound At U-Turn South of SR 1219 (Plank Rd)

Division 8 Hoke County Ashley Heights

PLAN DATE: August 2024 REVIEWED BY: WP Erickson-Jones
PREPARED BY: VS Kondapally REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER PORTER JONES

DocuSigned by: Porter Jones 8/28/2024
SIGNATURE DATE

SIG. INVENTORY NO. 08-0487

8/27/2024
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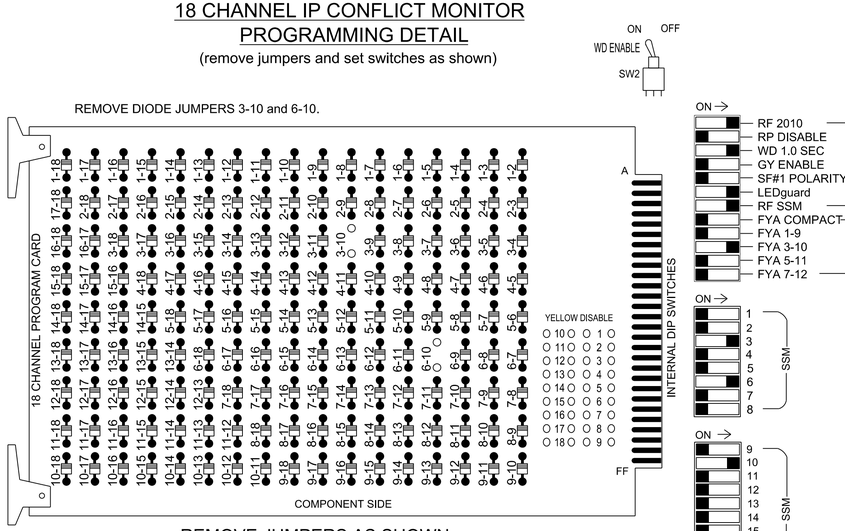
wpjones

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 7.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 6 Green No Walk.
3. Program startup sequence as follows:
   From web Interface: Controller>Unit: set STARTUP CLEARANCE HOLD to 6 sec and ALL RED FLASH EXIT TIME to 6 seconds.
4. Ensure all channels are programmed to flash red on the channel configuration screen. From web Interface: Controller>Advanced IO>Channels>Channel Configuration: program all channels to flash red.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
3A	TB4-5,6	I5U	58	20	7 ★	3	15.0		X		X	
3B	TB4-9,10	I6U	41	3	8 ★	3	15.0		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	

★For the detectors to work as shown on the signal plans, see the vehicle detector setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31 ★	NU	NU	NU	61,62	NU	NU	NU	NU	NU	31 ★	NU	NU	NU	NU
RED								134										
YELLOW				*				135										
GREEN																		
RED ARROW														A124				
YELLOW ARROW														A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW				118				136										

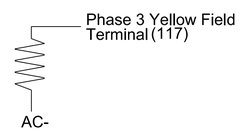
NU = Not Used
*Denotes install load resistor. See load resistor installation detail this sheet.
★See pictorial of head wiring in detail this sheet.

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)

SEQUENCE DETAIL

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

Web Interface
Home >Controller >Sequence

Sequence 1

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 08-0487
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Electrical Detail-Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

Electrical and Programming Details For:

NC 211 Westbound
At
U-Turn South of
SR 1219 (Plank Rd)

Division 8 | Moore County | Aberdeen

PLAN DATE:	August 2024	REVIEWED BY:	DT Sears
PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER WILLIAM PORTER JONES

DocuSigned by: Porter Jones D00F13F3A0E0498... 8/28/2024 DATE

SIG. INVENTORY NO. 08-0487

8/27/2024
R:\Traffic\Signals\Designs\Signals\Projects\Project Split Files\5709C\R-5709_08-0487-ED.dgn
WJones

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 7.2

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 31 to run protected turns only.

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

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

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 3A AND 3B

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

	Detector	Call Phase	Delay
3A	7	3	0
3B	8	3	0

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0487
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Electrical Detail-Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

NC 211 Westbound
At
U-Turn South of
SR 1219 (Plank Rd)

Division 8 Moore County Aberdeen

PLAN DATE: August 2024	REVIEWED BY: DT Sears
PREPARED BY: VS Kondapally	REVIEWED BY: W.P. Erickson-Jones

REVISIONS	INIT.	DATE

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

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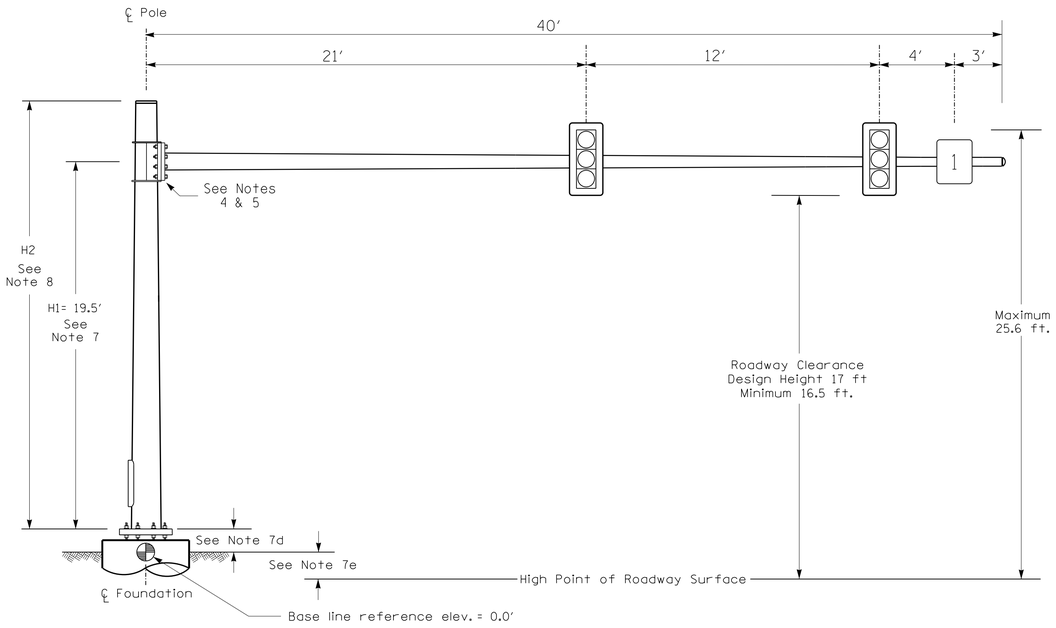
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES
DocuSigned by: Porter Jones
D06F13F3A0E0498...
8/28/2024
DATE

SIG. INVENTORY NO. 08-0487

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 7.3

Design Loading for METAL POLE NO. 1



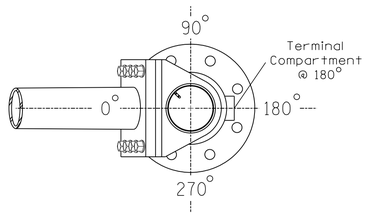
Elevation View

SPECIAL NOTE

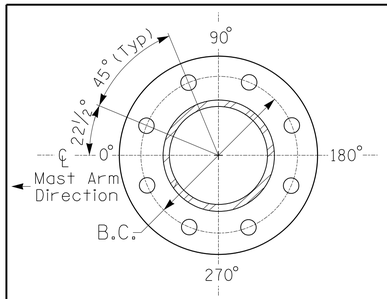
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at ⊕ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+0.8 ft.	
Elevation difference at Edge of travelway or face of curb	+0.8 ft.	

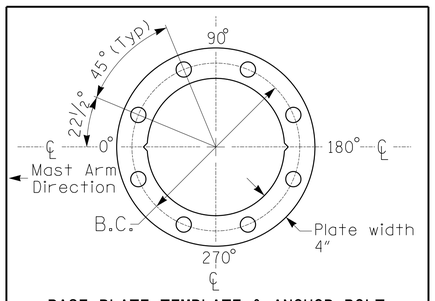


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

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
1	SIGN RIGID MOUNTED	7.5 S.F.	30.0″W X 36.0″L	14 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 stress 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.
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.

NCDOT Wind Zone 4 (120 mph)

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

NC 211 Eastbound
At
U-Turn North of
SR 1219 (Army Rd)

Division 8 Moore County Aberdeen

PLAN DATE:	August 2024	REVIEWED BY:	WP Erickson-Jones
PREPARED BY:	VS Kondapally	REVIEWED BY:	

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER PORTER JONES

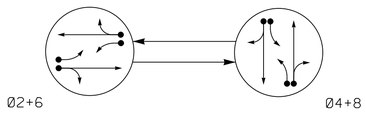
DocuSigned by: Porter Jones DOCUMENT NOT GUARANTEED SIGNATURE — 8/28/2024 DATE

SIG. INVENTORY NO. 08-0487

8/27/2024
R:\RK&K Files\Signals\Designs\Signals\Project Split Files\R-5709C\R-5709_08-0487_Metal_Pole_Diagrams.dgn
wpjones

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 8.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

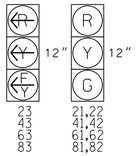
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	PHASE FLASH
21,22	G	R	R
23	~~FY~~	~~R~~	~~R~~
41,42	R	G	R
43	~~R~~	~~FY~~	~~R~~
61,62	G	R	R
63	~~FY~~	~~R~~	~~R~~
81,82	R	G	R
83	~~R~~	~~FY~~	~~R~~

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

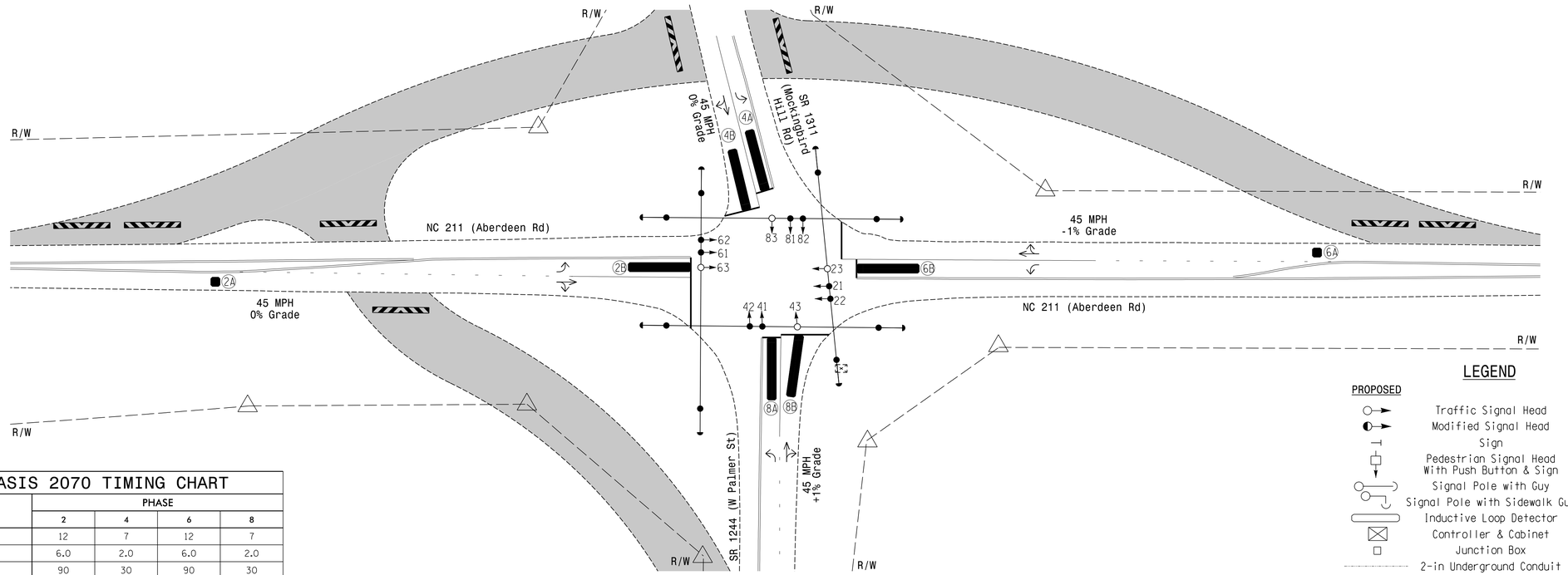
INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A✳	6X6	300	✳	✳	2	Y	Y	-	-	-	-	✳
2B✳	6X40	0	✳	✳	2	Y	Y	Y	-	3	-	✳
4A✳	6X40	0	✳	✳	4	Y	Y	-	-	3	-	✳
4B✳	6X40	0	✳	✳	4	Y	Y	-	-	10	-	✳
6A✳	6X6	300	✳	✳	6	Y	Y	-	-	-	-	✳
6B✳	6X40	0	✳	✳	6	Y	Y	Y	-	3	-	✳
8A✳	6X40	0	✳	✳	8	Y	Y	-	-	3	-	✳
8B✳	6X40	0	✳	✳	8	Y	Y	-	-	10	-	✳

✳ VIDEO DETECTION ZONE

2 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads numbered 41,42,81 and 82.
4. Set all detector units to presence mode.
5. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Construction Zone	
	Non-Intrusive Detection Zone	
	Type III Barricade	

OASIS 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	12	7	12	7
Extension 1 *	6.0	2.0	6.0	2.0
Max Green 1 *	90	30	90	30
Yellow Clearance	4.6	4.5	4.6	4.5
Red Clearance	1.3	1.0	1.3	1.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	2.5	-
Max Variable Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

* 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.

8/27/2024
R:\Traffic\Signals\Design\Signals\Project Split Files\5709C-R-5709_08-0669T1.dgn
kofrancis

Signal Upgrade - Temporary Design (TMP Phase I Step 2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

NC 211 (Aberdeen Rd)
at
SR 1311 (Mockingbird Hill Rd)/
SR 1244 (W Palmer St)

Division 8 Hoke County Raeford

PLAN DATE: August 2024 REVIEWED BY: WP Erickson-Jones
PREPARED BY: VS Kondapally REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

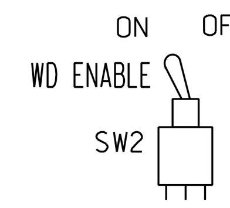
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by: Porter Jones 8/28/2024
SIGNATURE DATE

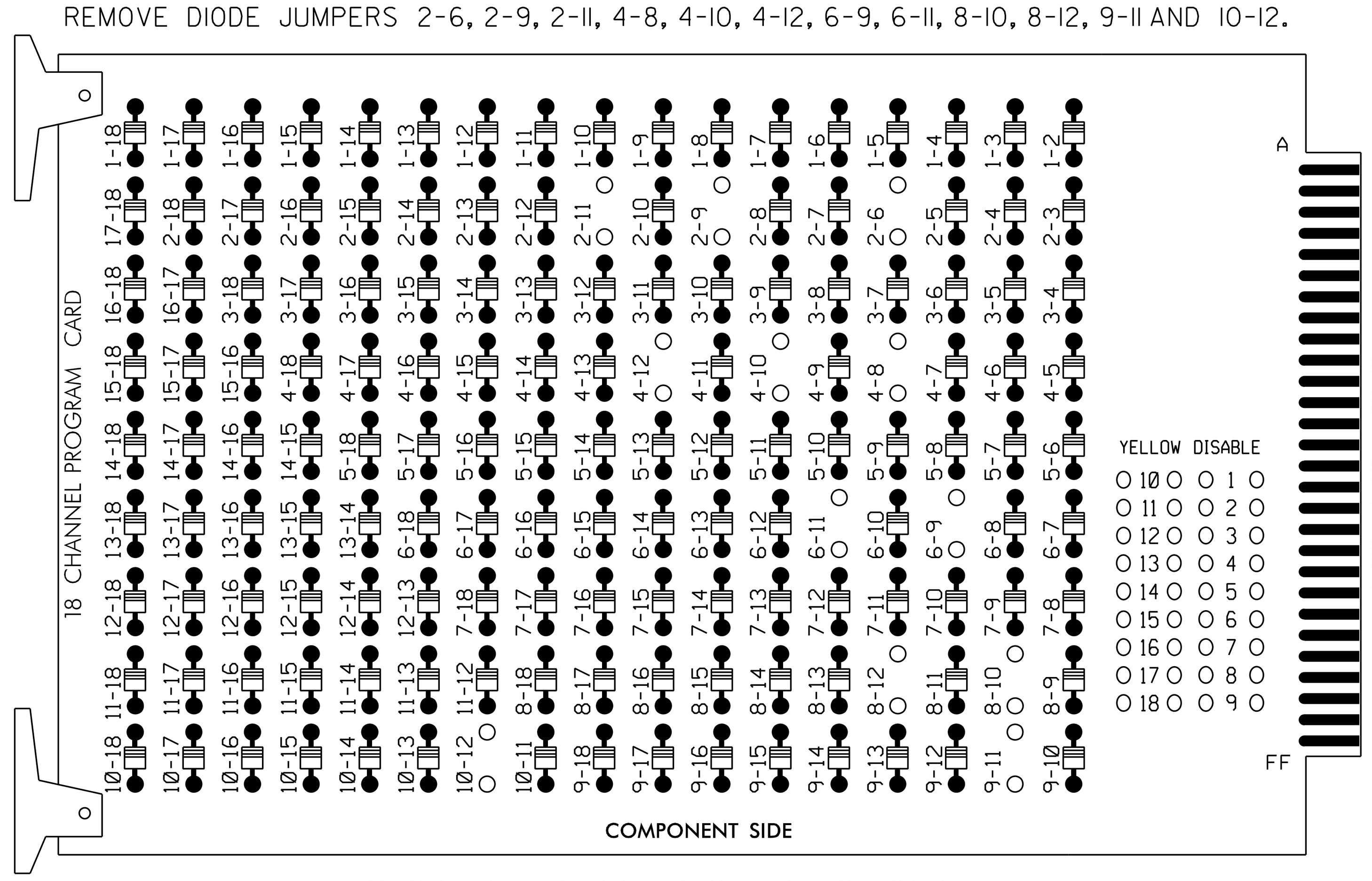
SIG. INVENTORY NO. 08-0669T

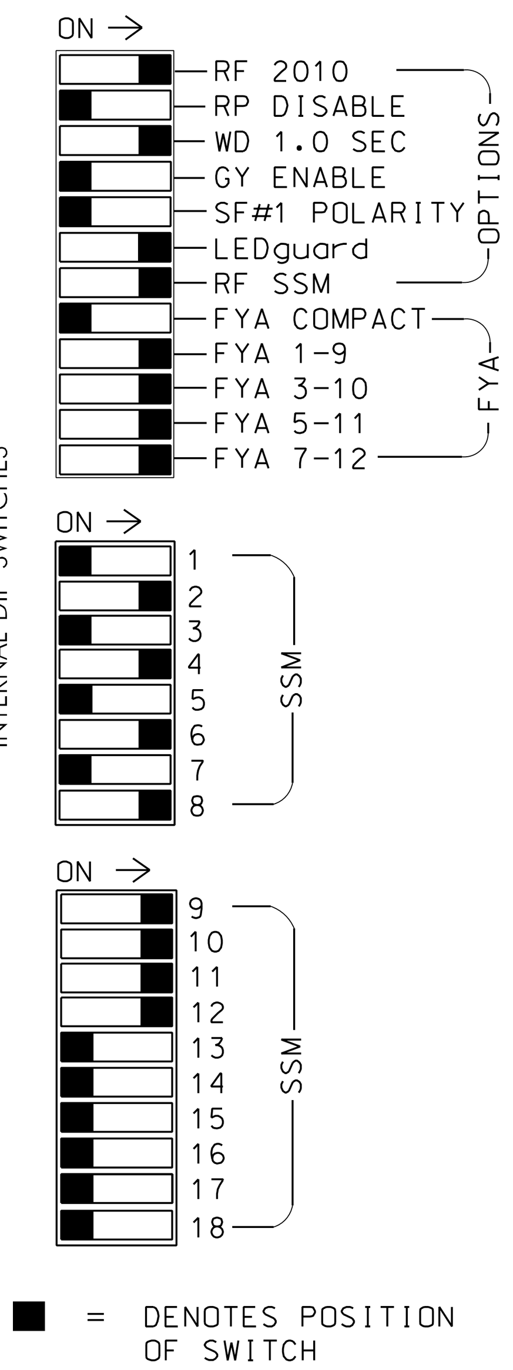
18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 2-6, 2-9, 2-11, 4-8, 4-10, 4-12, 6-9, 6-11, 8-10, 8-12, 9-11 AND 10-12.





REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program Phases 2 and 6 as First Phases.
6. Remove Phases 2 and 6 from Startup in Green.
7. Remove Phases 2 and 6 from yellow flash, and program overlaps 1 and 2 as Wag Overlaps.
8. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

CONTROLLER..............2070
CABINET.................332 W/ AUX
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 (12-STD; 6 AUX)
LOAD SWITCHES USED......S2, S5, S8, S11, AUX S1 AUX S2, AUX S4, AUXS5.
PHASES USED.............2, 4, 6, 8
OVERLAP "A".............2
OVERLAP "B".............4
OVERLAP "C".............6
OVERLAP "D".............8

SIGNAL HEAD HOOK-UP CHART

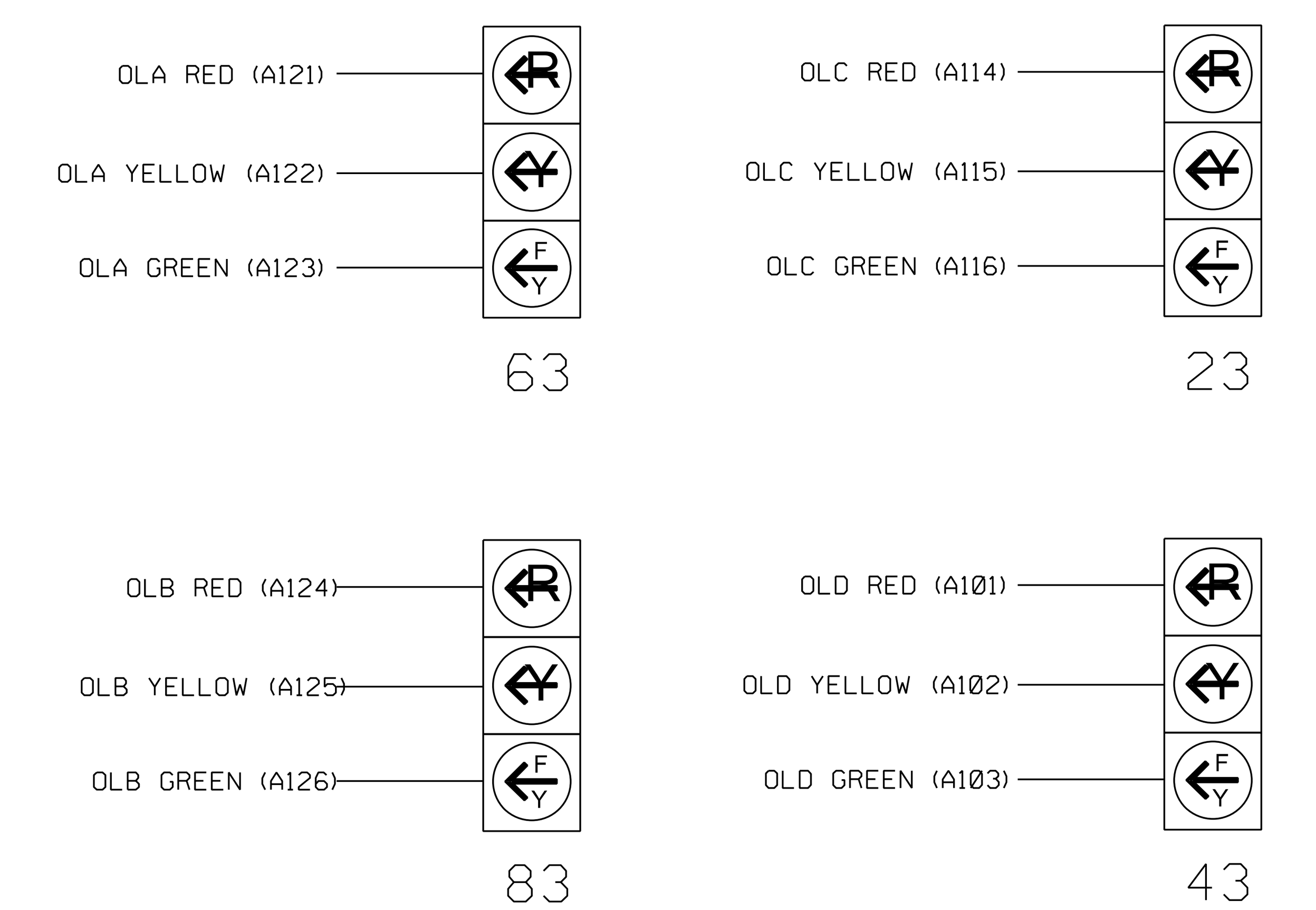
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	63★	83★	NU	23★	43★	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW																		

NU = Not Used

★ See pictorial of head wiring in detail below.

3 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



NOTE

1. The sequence display for these signals require special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection for zones 2A, 2B, 4A, 4B, 6A, 6B, 8A and 8B. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0669T
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

Signal Upgrade-Temporary Design
(TMP Phase I Step 2)-Electrical Detail-Sheet 1 of 2

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Electrical and Programming Details For:

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

NC 211 (Aberdeen Rd)
at
SR 1311 (Mockingbird Hill Rd)/
SR 1244 (W Palmer St)

Division 8 | Hoke County | Raeford

PLAN DATE: August 2024 | REVIEWED BY: DT Sears
PREPARED BY: VS Kondapally | REVIEWED BY: W.P. Erickson-Jones

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES
DocuSigned by: Porter Jones
D06F13F3A0E0498...
8/28/2024
DATE

SIG. INVENTORY NO. 08-0669T

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```
 PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS:¦ X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

PRESS '+'

```
 PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS:¦    X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

PRESS '+'

```
 PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS:¦      X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

PRESS '+'

```
 PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS:¦        X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0669T
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

Signal Upgrade-Temporary Design
(TMP Phase I Step 2)-Electrical Detail-Sheet 2 of 2

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NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
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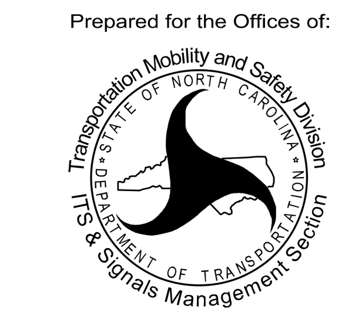
Electrical and Programming Details For:

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

NC 211 (Aberdeen Rd)
at
SR 1311 (Mockingbird Hill Rd)/
SR 1244 (W Palmer St)

Division 8 | Hoke County | Raeford

PLAN DATE:	August 2024	REVIEWED BY:	DT Sears
PREPARED BY:	VS Kondapally	REVIEWED BY:	W.P. Erickson-Jones

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by: Porter Jones
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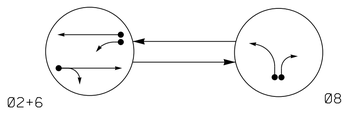
8/28/2024
DATE

SIG. INVENTORY NO. 08-0669T

PROJECT REFERENCE NO.	SHEET NO.
R-5709C	Sig. 9.0

PHASING DIAGRAM



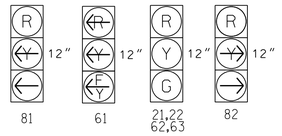
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø2+6	PHASE Ø8	FLASH
21,22	G	R	R
61	~~Y~~	~~R~~	~~R~~
62,63	G	R	R
81	R	←	R
82	R	→	R

SIGNAL FACE I.D.

All Heads L.E.D.



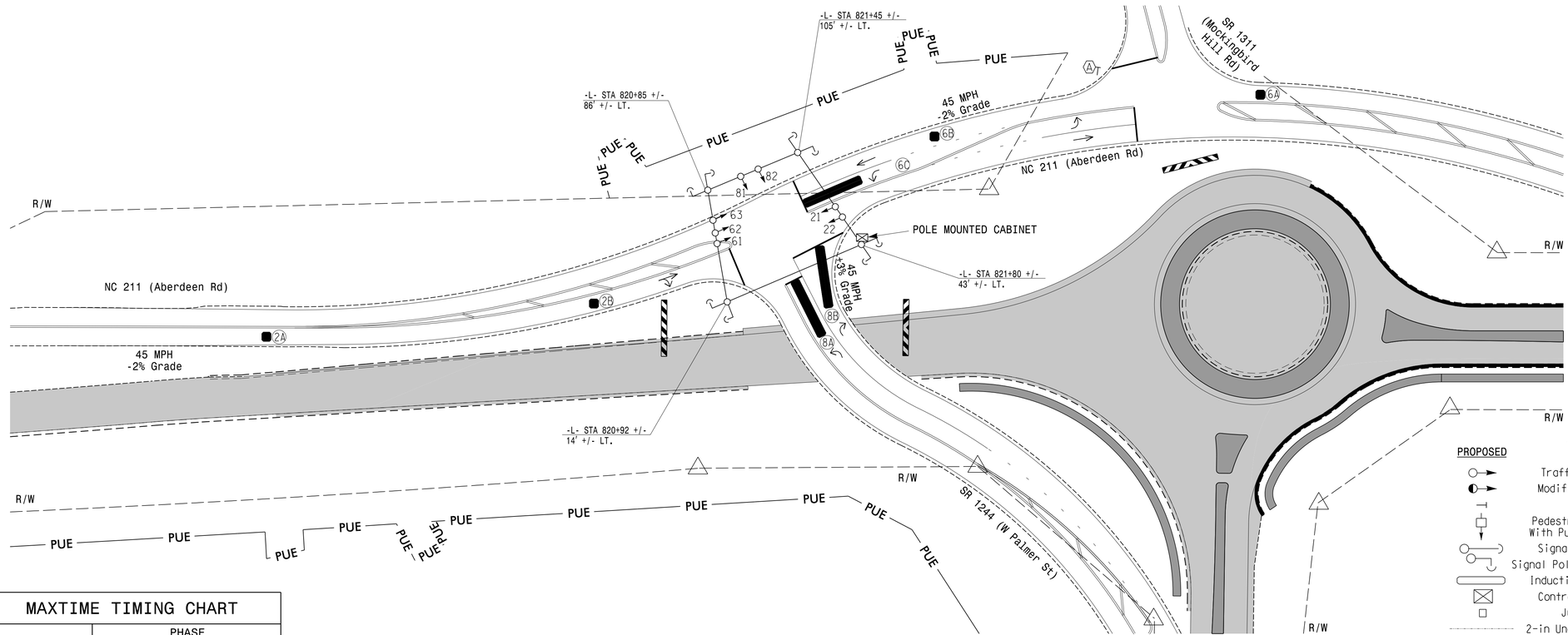
MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A✳	6X6	300	✳	✳	2	-	1.6	X	-	X	-	✳
2B✳	6X6	90	✳	✳	2	-	-	X	-	X	-	✳
6A✳	6X6	300	✳	✳	6	-	1.6	X	-	X	-	✳
6B✳	6X6	90	✳	✳	6	-	-	X	-	X	-	✳
6C✳	6X40	0	✳	✳	6	-	-	X	-	X	-	✳
8A✳	6X40	0	✳	✳	8	3.0	-	X	-	X	-	✳
8B✳	6X40	0	✳	✳	8	15.0	-	X	-	X	-	✳

✳ VIDEO DETECTION ZONE

2 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications" 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. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
↓	Pedestrian Signal Head With Push Button & Sign	■
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	– – – –
→	Directional Arrow	→
▒	Construction Zone	▒
▬	Non-Intrusive Detection Zone	▬
▨	Type III Barricade	▨
Ⓐ	"STOP" Sign (R1-1)	Ⓐ
PUE	Permanent Utility Easement	PUE

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Walk *	-	-	-
Ped Clear *	-	-	-
Min Green	12	12	7
Passage *	2.0	2.0	2.0
Max 1 *	90	90	30
Yellow Change	4.7	4.7	3.0
Red Clear	1.2	1.2	1.9
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Advance Walk	-	-	-
Non Lock Detector	-	-	X
Vehicle Recall	MIN RECALL	MIN RECALL	-
Dual Entry	-	-	-

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

New Installation - Temporary Signal (TMP Phase I Step 3)

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

SCALE 0 40 1"=40'

NC 211 (Aberdeen Rd) at SR 1244 (W Palmer St)

Division 8 Hoke County Raeford

PLAN DATE: August 2024 REVIEWED BY: WP Erickson-Jones

PREPARED BY: VS Kondapally REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

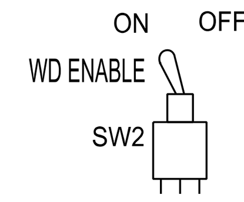
DocuSigned by: Porter Jones DOSE13F3A0ED4BB... SIGNATURE 8/28/2024 DATE

SIG. INVENTORY NO. 08-0670T

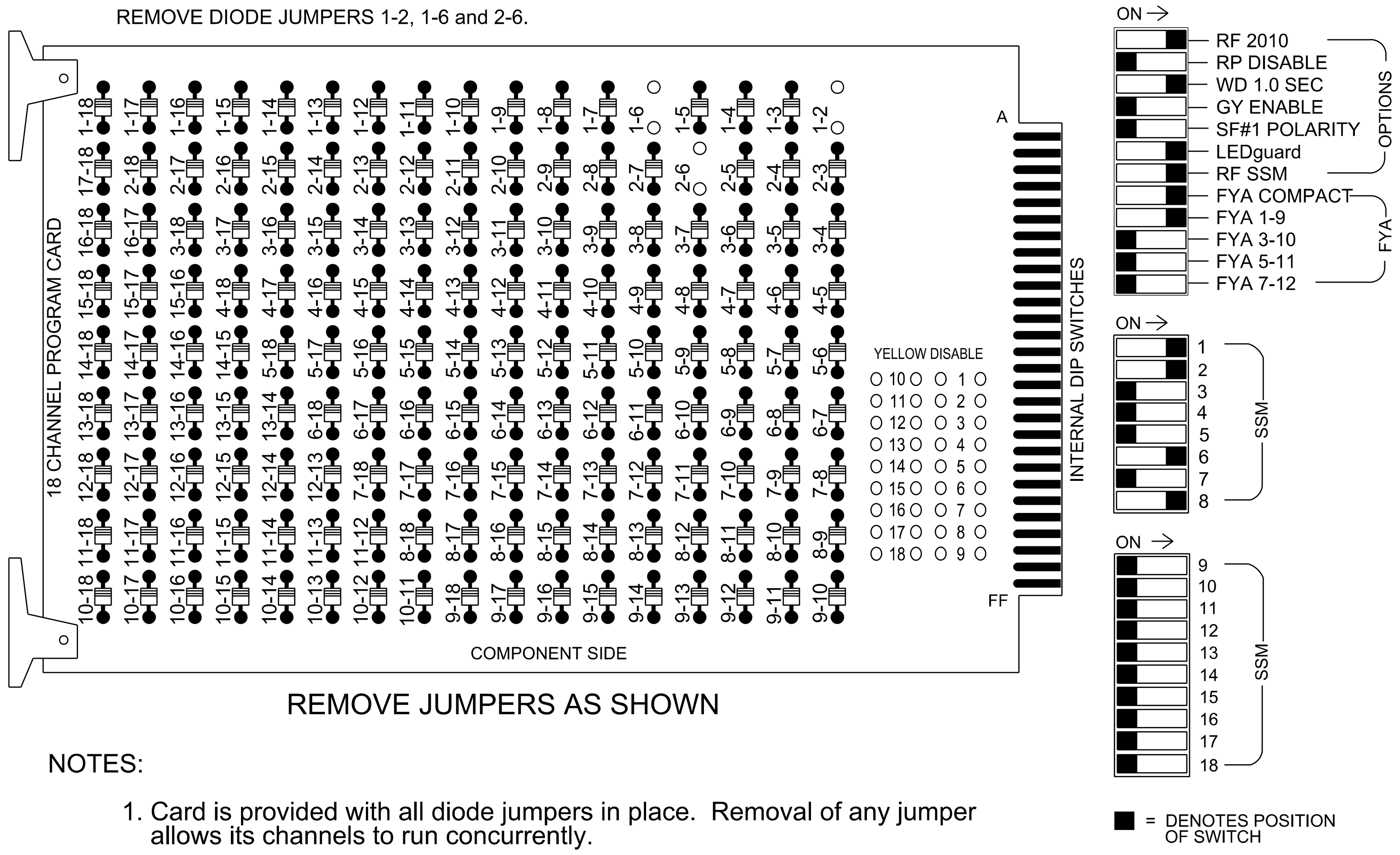
8/27/2024
R:\Traffic\Signals\Design\Signals\Project Split Files\5709E\MR-5709_08-0670T.dgn
WPJONES

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. Program startup sequence as follows:
   From web Interface: Controller>Unit: set STARTUP CLEARANCE HOLD to 6 sec and ALL RED FLASH EXIT TIME to 6 seconds.
4. Ensure all channels are programmed to flash red on the channel configuration screen. From web Interface: Controller>Advanced IO>Channels>Channel Configuration: program all channels to flash red.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet..336
Software...Q-Free MAXTIME
Cabinet Mount....................................Pole
Output File Positions..........................12
Load Switches Used...........................S1, S2, S8, S11
Phases Used.......................................2, 6, 8
Overlap "1"..*
Overlap "2"..NOT USED
Overlap "3"..NOT USED
Overlap "4"..NOT USED

*See overlap programming detail on this sheet.

SIGNAL HEAD HOOK-UP CHART

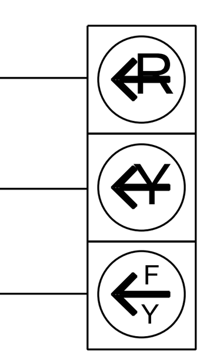
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	OL1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61★	21,22	NU	NU	NU	NU	NU	62,63	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129						135				
GREEN		130						136				
RED ARROW	125											
YELLOW ARROW	126										108	
FLASHING YELLOW ARROW	127											
GREEN ARROW											109	

NU = Not Used

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



61

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

NOTICE OVERLAP 1 ASSIGNED TO CHANNEL 1 →

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

MAXTIME OVERLAP PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1
Type	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 for zones 2A, 2B, 6A, 6B, 6C, 8A and 8B. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0670T
DESIGNED: August 2024
SEALED: August 28, 2024
REVISED: N/A

New Installation-Temporary Design
(TMP Phase I Step 3)-Electrical Detail

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Electrical and Programming Details For:

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

NC 211 (Aberdeen Rd)
at
SR 1244 (W Palmer St)

Division 8 | Hoke County | Raeford

PLAN DATE: August 2024	REVIEWED BY: DT Sears
PREPARED BY: VS Kondapally	REVIEWED BY: W.P. Erickson-Jones

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 056142 ENGINEER W. PORTER JONES

DocuSigned by: Porter Jones D06F13F3A0E0498... 8/28/2024
DATE

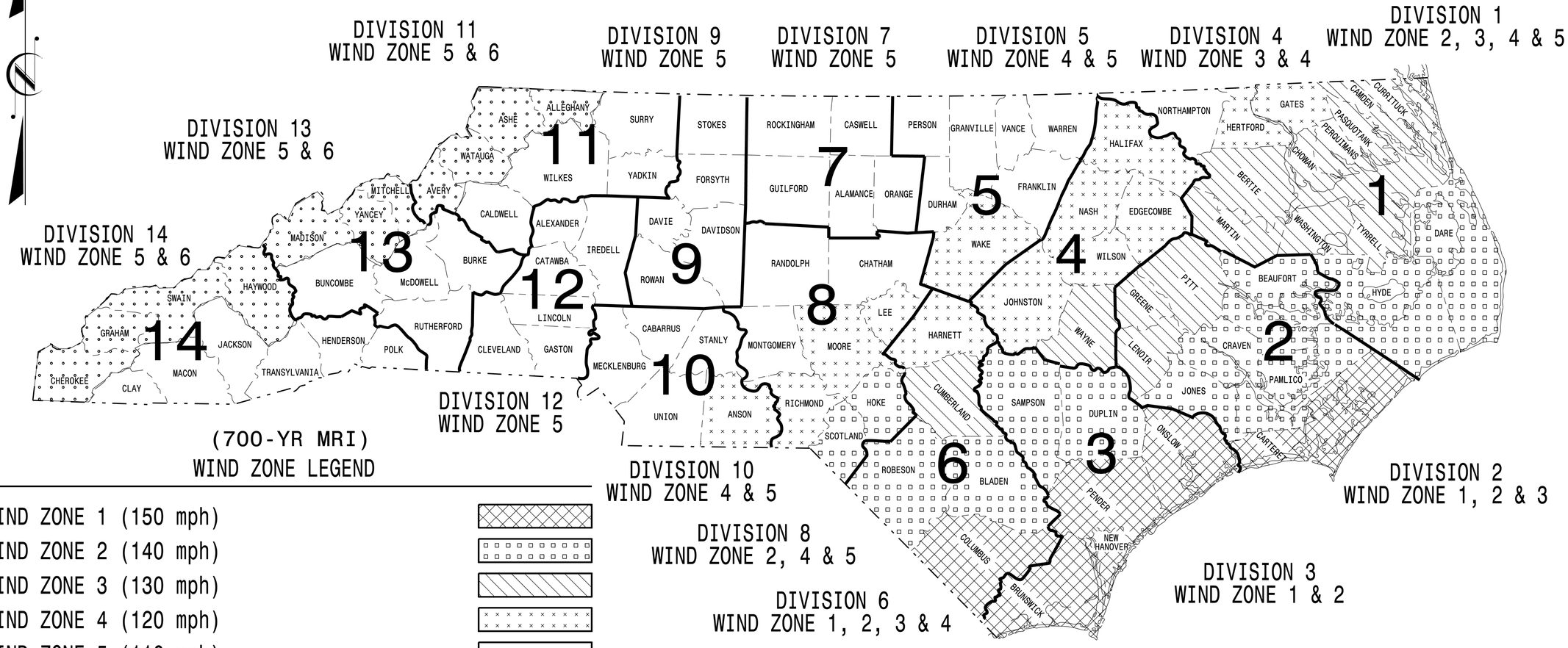
SIG. INVENTORY NO. 08-0670T

PROJECT I.D. NO.	SHEET NO.
R-5709C	Sig.M1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)

NCDOT METAL POLE STANDARDS



(700-YR MRI)
WIND ZONE LEGEND

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

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

Prepared in the Offices of:

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

750 N.Greenfield Pkwy.
Garner, NC 27529

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

AASHTO LRFD

Standard Specifications for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS

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

MOBILITY AND SAFETY DIVISION – TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS UNIT

D.Y. ISHAK – STATE SIGNALS ENGINEER

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

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

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
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09/21/2023
DATE

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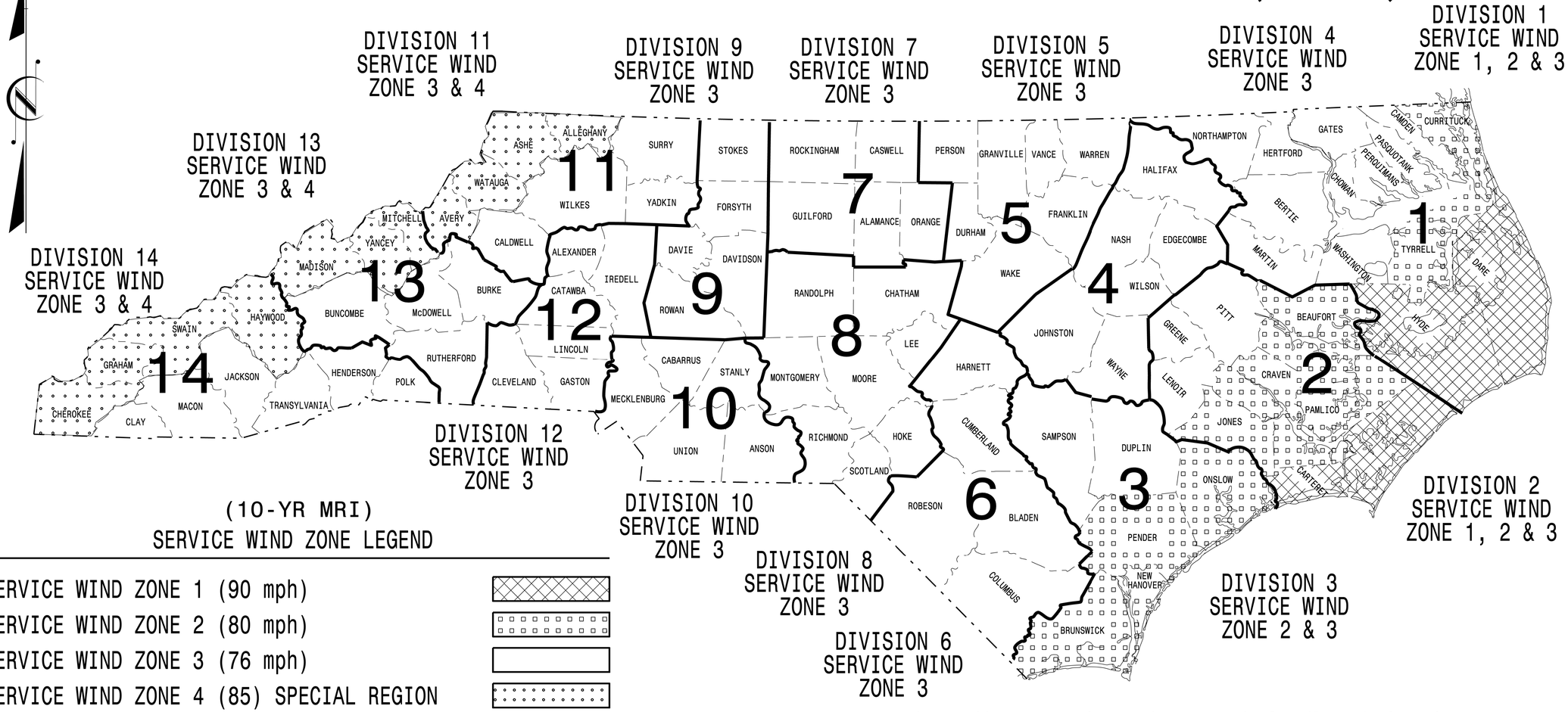
kdurigon

PROJECT I.D. NO.	SHEET NO.
R-5709C	Sig.M1B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)

NCDOT METAL POLE STANDARDS



(10-YR MRI)
SERVICE WIND ZONE LEGEND

SERVICE WIND ZONE 1 (90 mph)	
SERVICE WIND ZONE 2 (80 mph)	
SERVICE WIND ZONE 3 (76 mph)	
SERVICE WIND ZONE 4 (85) SPECIAL REGION	

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

Prepared in the Offices of:

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

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

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NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION - TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS UNIT

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

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

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Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

21-SEP-2023 08:22
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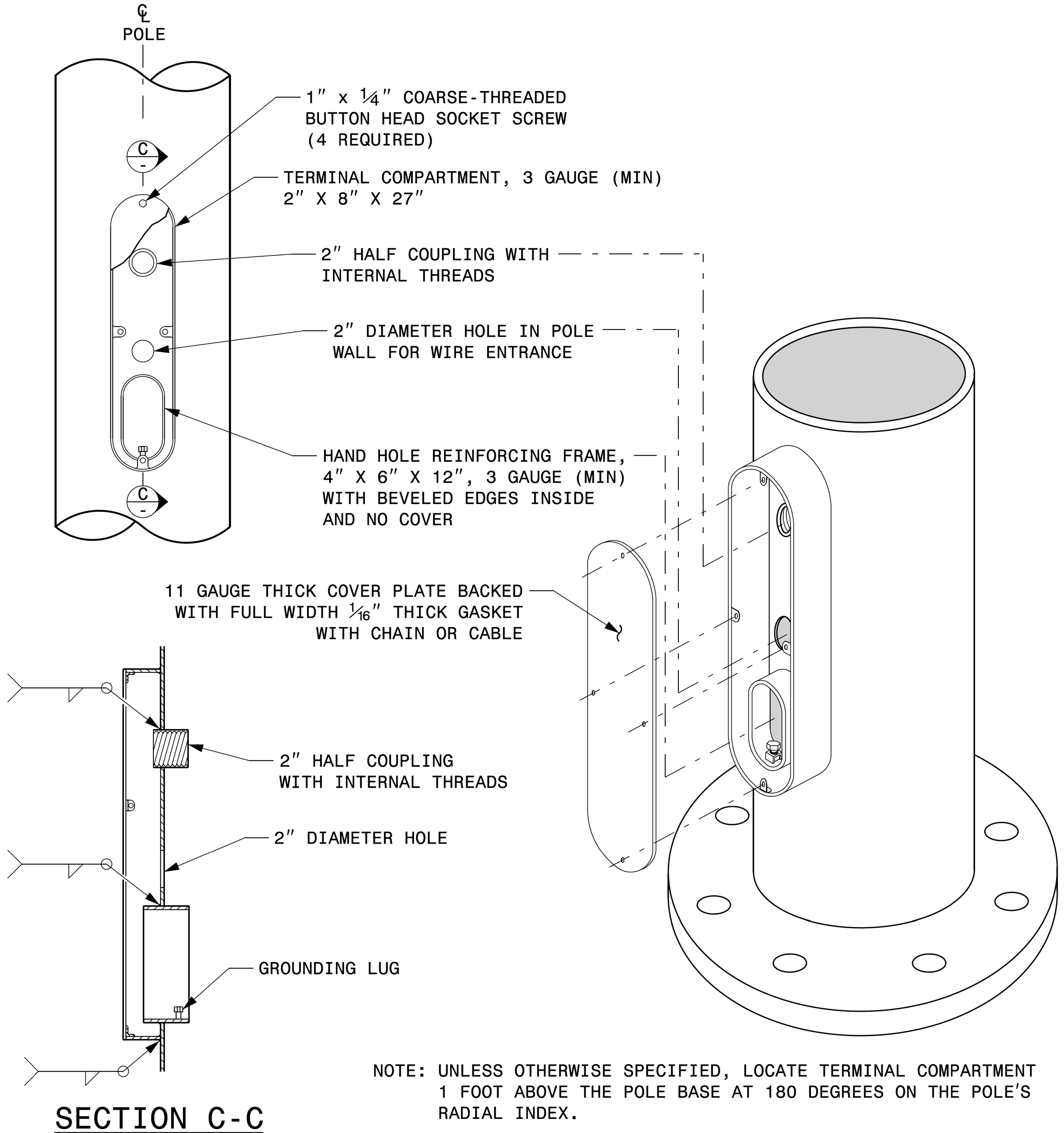
kcdurigon

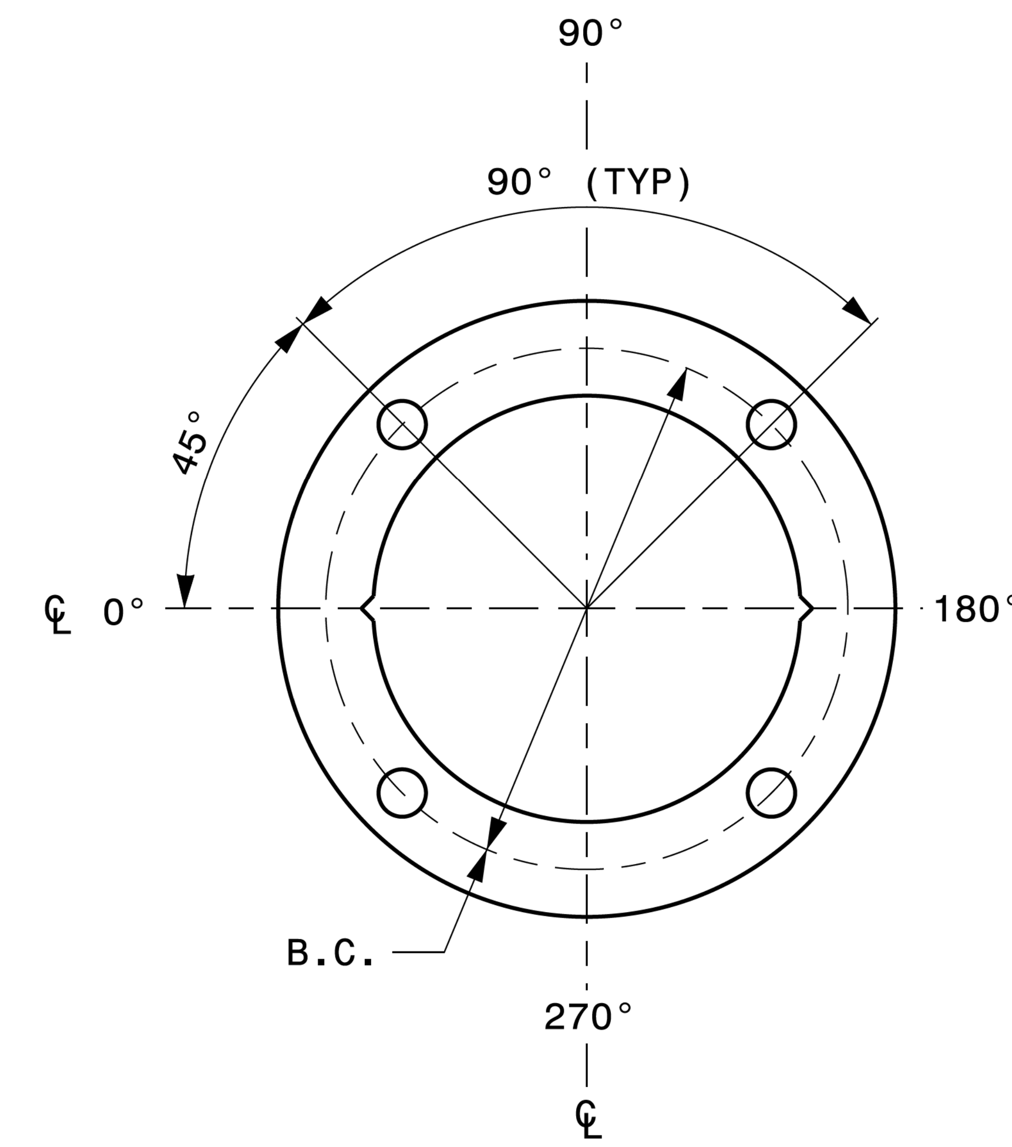
PROJECT I.D. NO.	SHEET NO.
R-5709C	Sig.M2

Fabrication Details – All Metal Poles

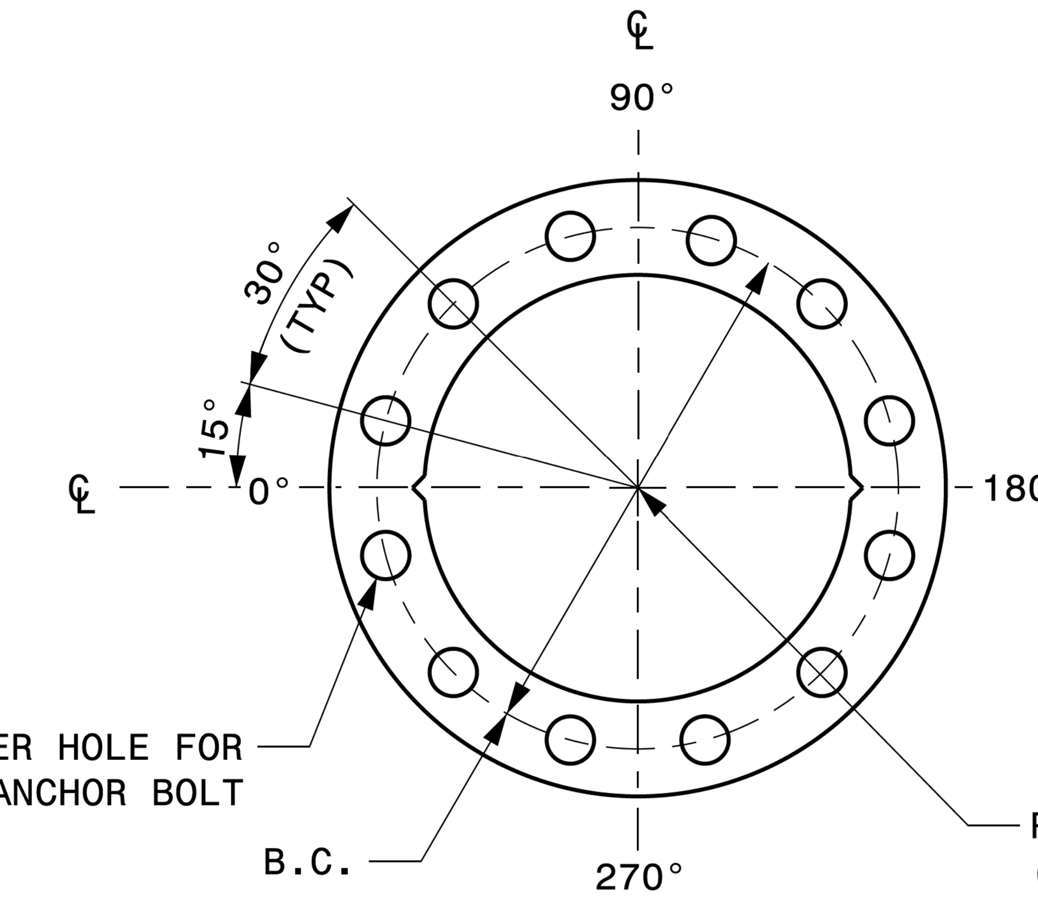


NOTE: UNLESS OTHERWISE SPECIFIED, LOCATE TERMINAL COMPARTMENT 1 FOOT ABOVE THE POLE BASE AT 180 DEGREES ON THE POLE'S RADIAL INDEX.

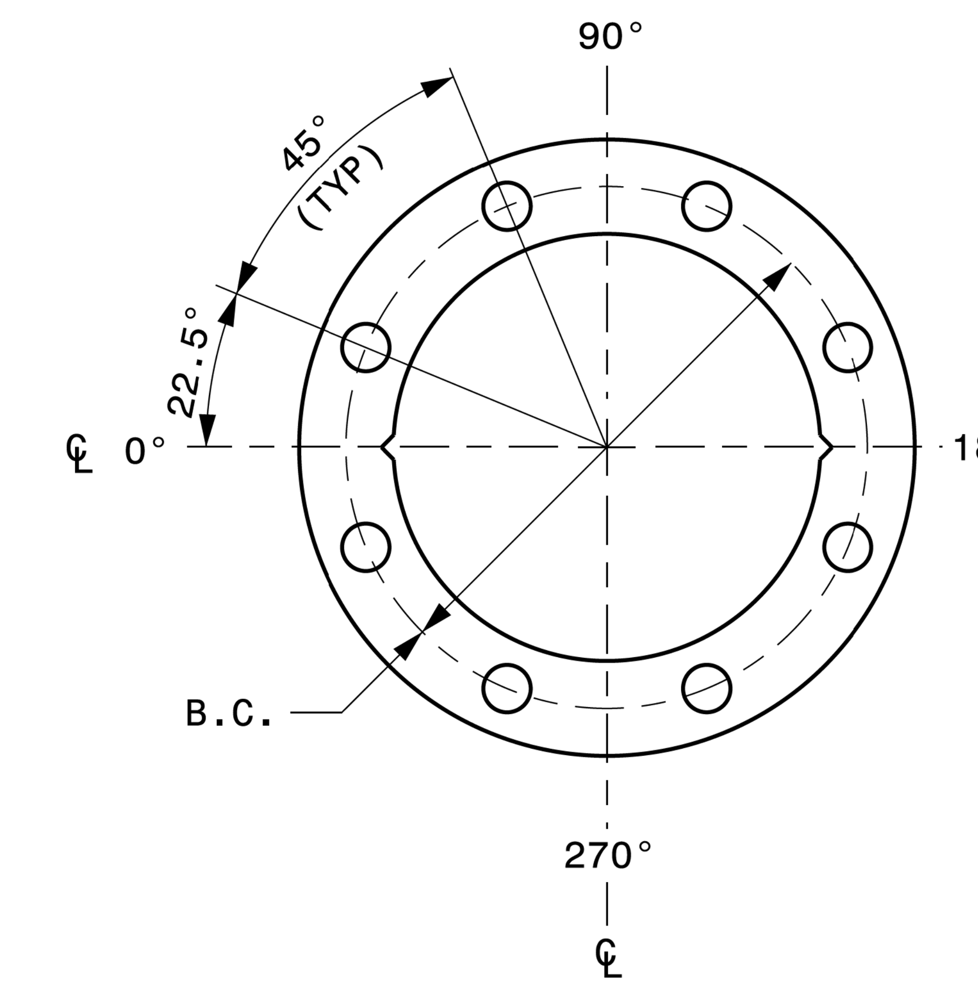
TERMINAL COMPARTMENT DETAIL



4 BOLT PATTERN



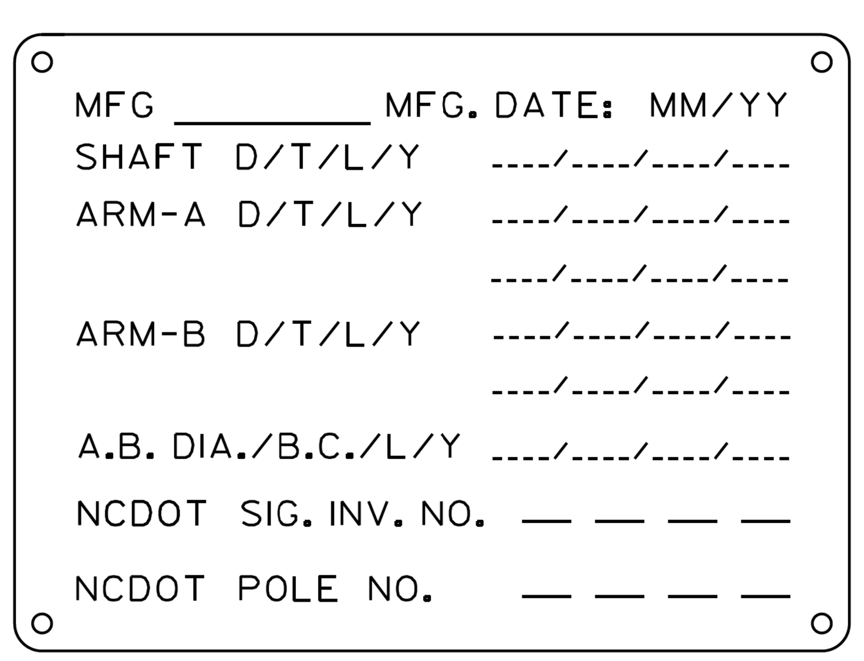
12 BOLT PATTERN



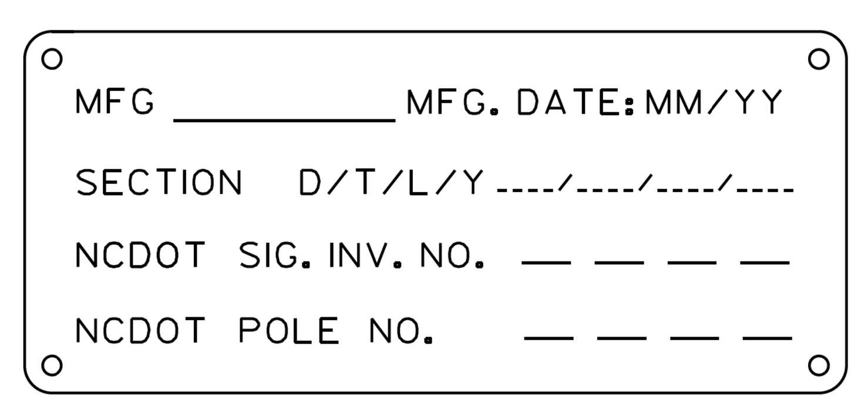
8 BOLT PATTERN

CONSTRUCT TEMPLATES AND PLATES FROM ¼″ (MIN) THICK STEEL. GALVANIZING IS NOT REQUIRED.

BASE PLATE TEMPLATE AND ANCHOR BOLT LOCK PLATE DETAILS



SHAFT I.D. TAG
(PROVIDE ON SHAFT OF STRAIN POLES AND MAST ARM POLE SHAFT)

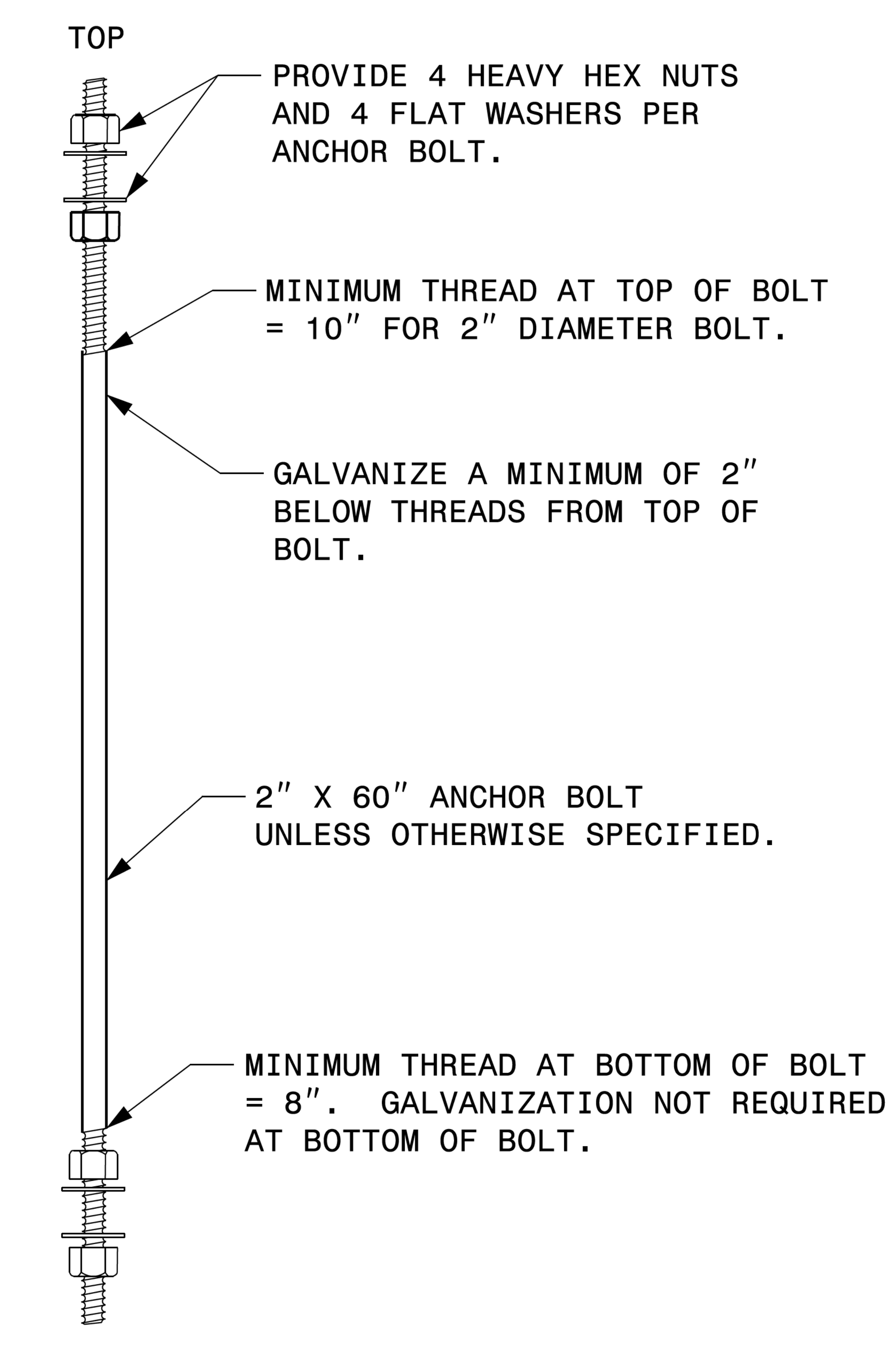


ARM I.D. TAG
(PROVIDE ON EACH SECTION OF A MULTI-SECTION MAST ARM)

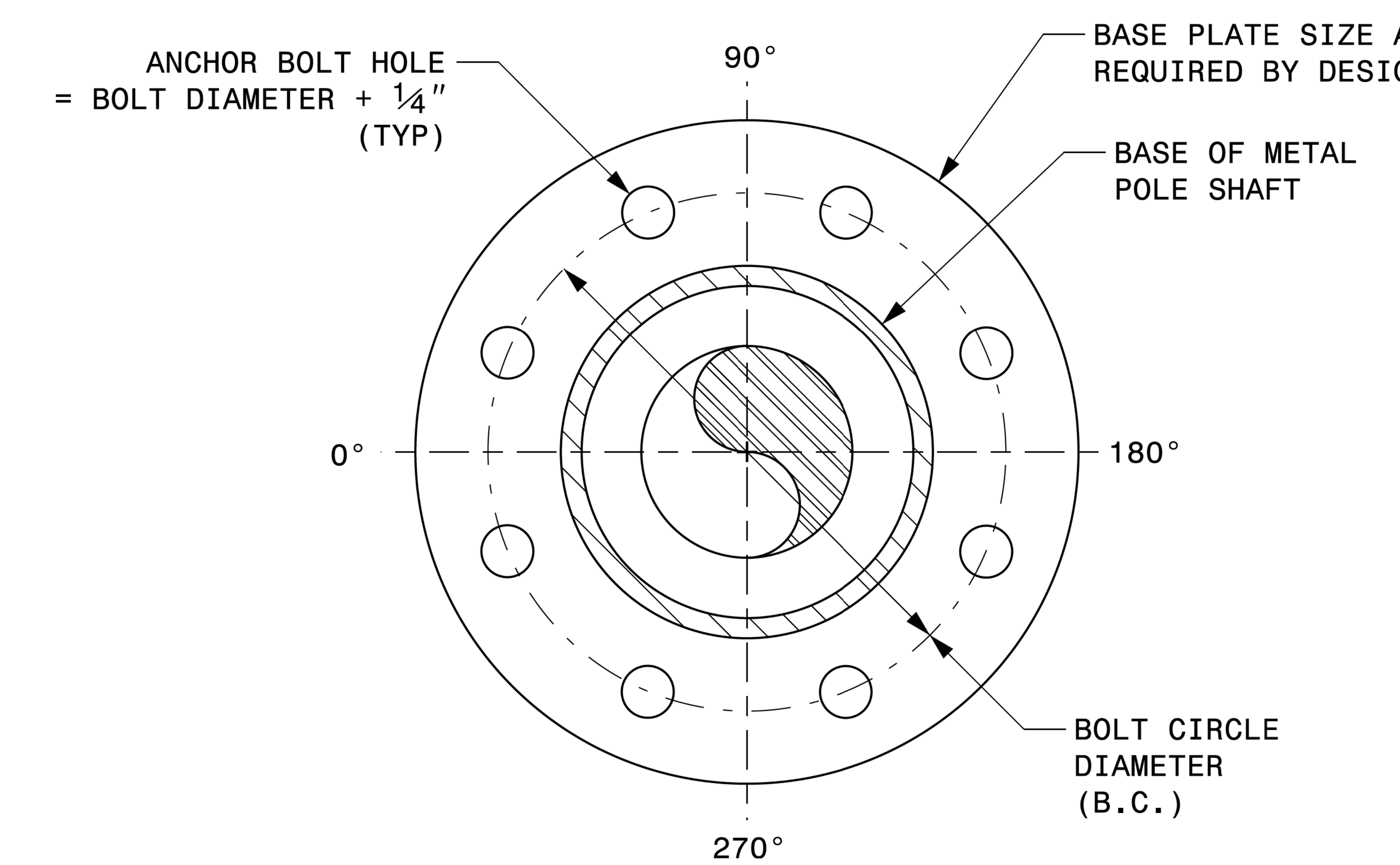
NOTES:

1. D = DIAMETER, T = THICKNESS, L = LENGTH, Y = YIELD STRENGTH
2. A.B. = ANCHOR BOLT
3. B.C. = BOLT CIRCLE OF ANCHOR BOLTS
4. IF STANDARD DESIGN, INCLUDE CASE NUMBER IN ADDITION TO POLE NUMBER ON "NCDOT POLE NO." LINE.
5. SIGNAL INV. NUMBER AND POLE I.D. NUMBER. SEE DRAWING M3 AND M4 FOR MOUNTING POSITIONS OF I.D. TAGS.

IDENTIFICATION TAG DETAILS



ANCHOR BOLT DETAIL



NOTE: BASE PLATE MAY BE CIRCULAR, OCTAGONAL, SQUARE OR RECTANGULAR IN SHAPE.

TYPICAL BASE PLATE DETAIL

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

SCALE 0 NA NONE

Typical Fabrication Details For All Metal Poles

PLAN DATE: SEPTEMBER 2023 DESIGNED BY: C.F.ANDREWS
PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON
DocuSigned by: Kevin Durigon
SIGNATURE
09/21/2023
DATE
4B23DC79B3784DA...

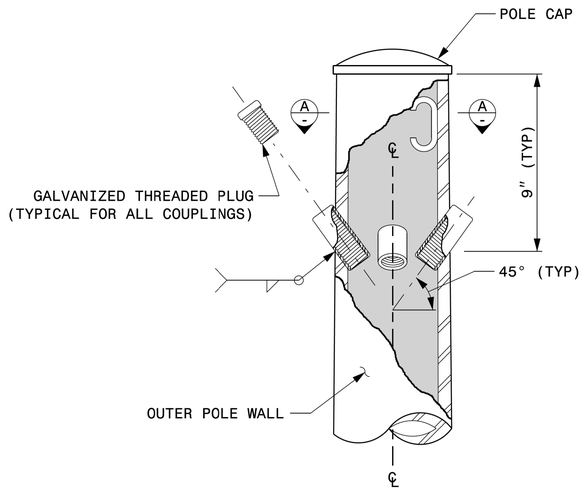
21-SEP-2023 07:56
S:*ITS&SU*ITS Signals*Signal Design Section*Structures*Drawings*2024 Metal Pole Std Drawings for LRFD*2024 Sig.M2 Std. Fabrication Details-All Poles..dgn
kcdurigon

PROJECT I.D. NO.	SHEET NO.
R-5709C	Sig.M3

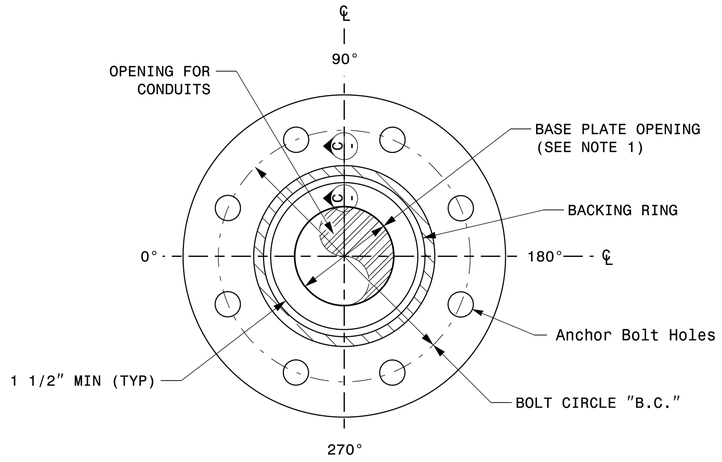
Fabrication Details – Strain Poles

NOTE:

1. OPENING IN POLE BASE PLATE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS 3½" BUT SHALL NOT BE LESS THAN 8½".

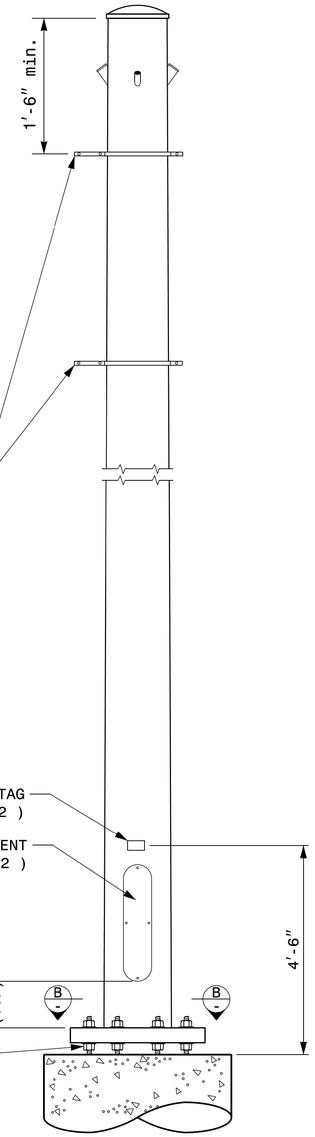


CABLE ENTRANCES AT TOP OF POLE

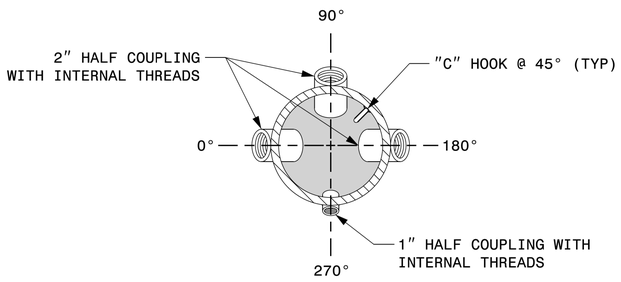


SECTION B-B

POLE BASE PLATE DETAILS
(8 AND 12 BOLT PATTERN)

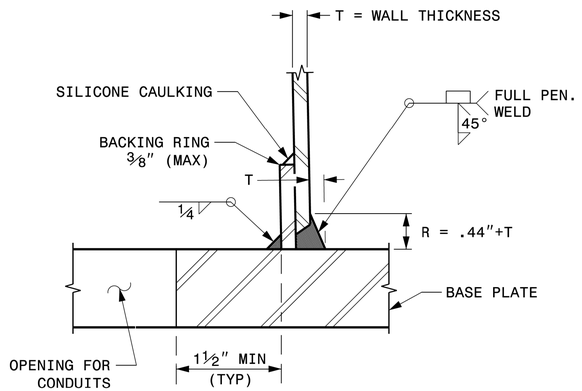


MONOTUBE STRAIN POLE



SECTION A-A

RADIAL ORIENTATION OF FACTORY INSTALLED ACCESSORIES AT TOP OF POLE



SECTION C-C

(POLE ATTACHMENT TO BASE PLATE)

FULL-PENETRATION GROOVE WELD DETAIL

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

SCALE
0 NA
NONE

Typical Fabrication Details
For
Strain Poles

PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	K.C. DURIGON
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
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09/21/2023
DATE

21-SEP-2023 07:58
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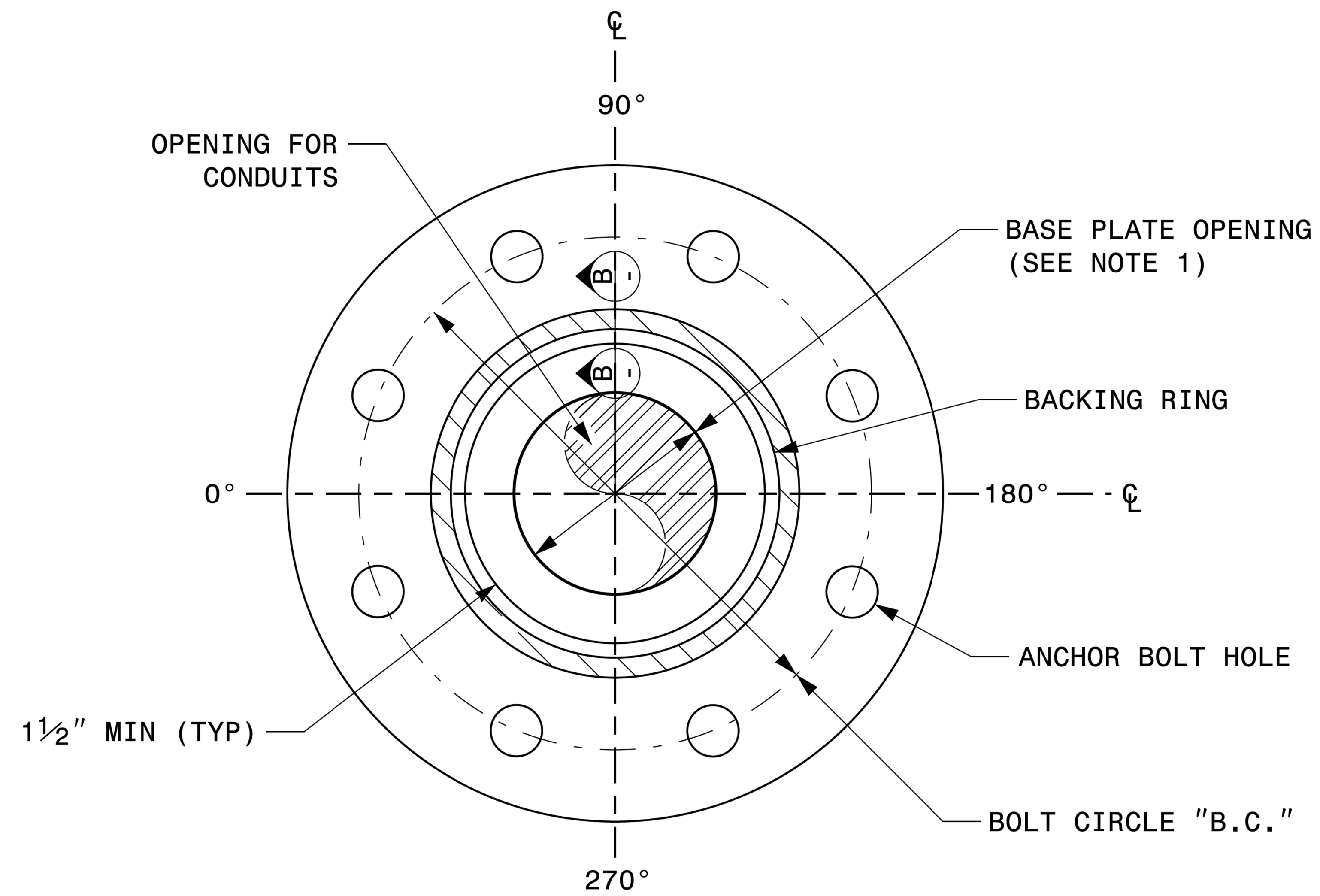
kdurigon

PROJECT I.D. NO.	SHEET NO.
R-5709C	Sig.M4

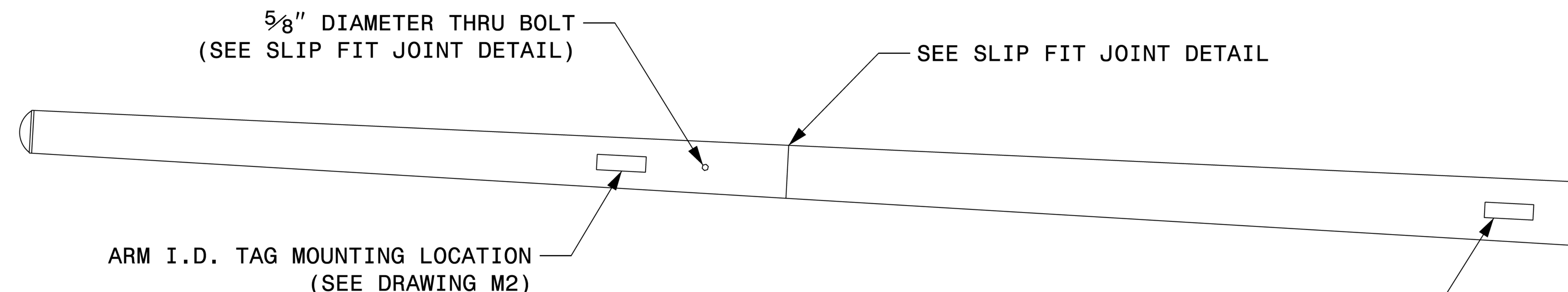
Fabrication Details – Mast Arm Poles

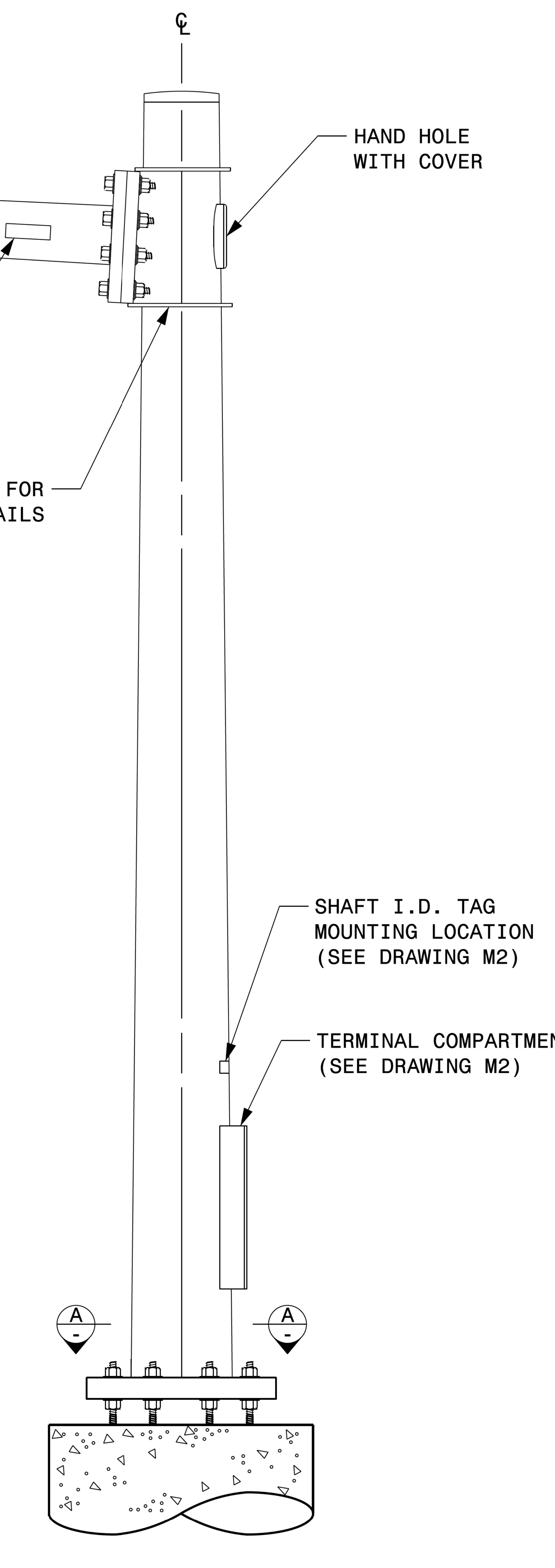
NOTE:

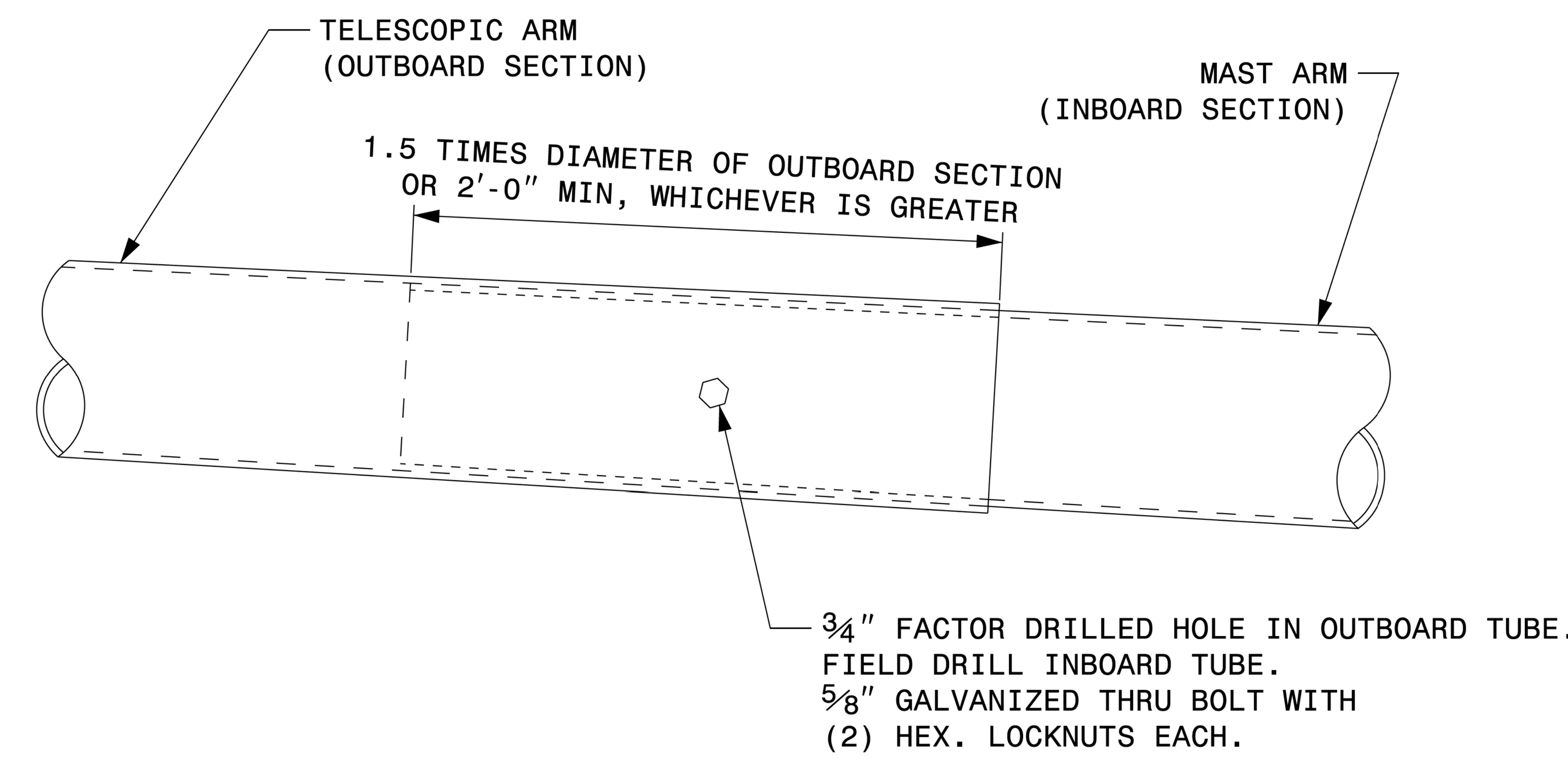
1. OPENING IN POLE BASE PLATE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS 3½" BUT SHALL NOT BE LESS THAN 8½".



SECTION A-A
POLE BASE PLATE DETAILS

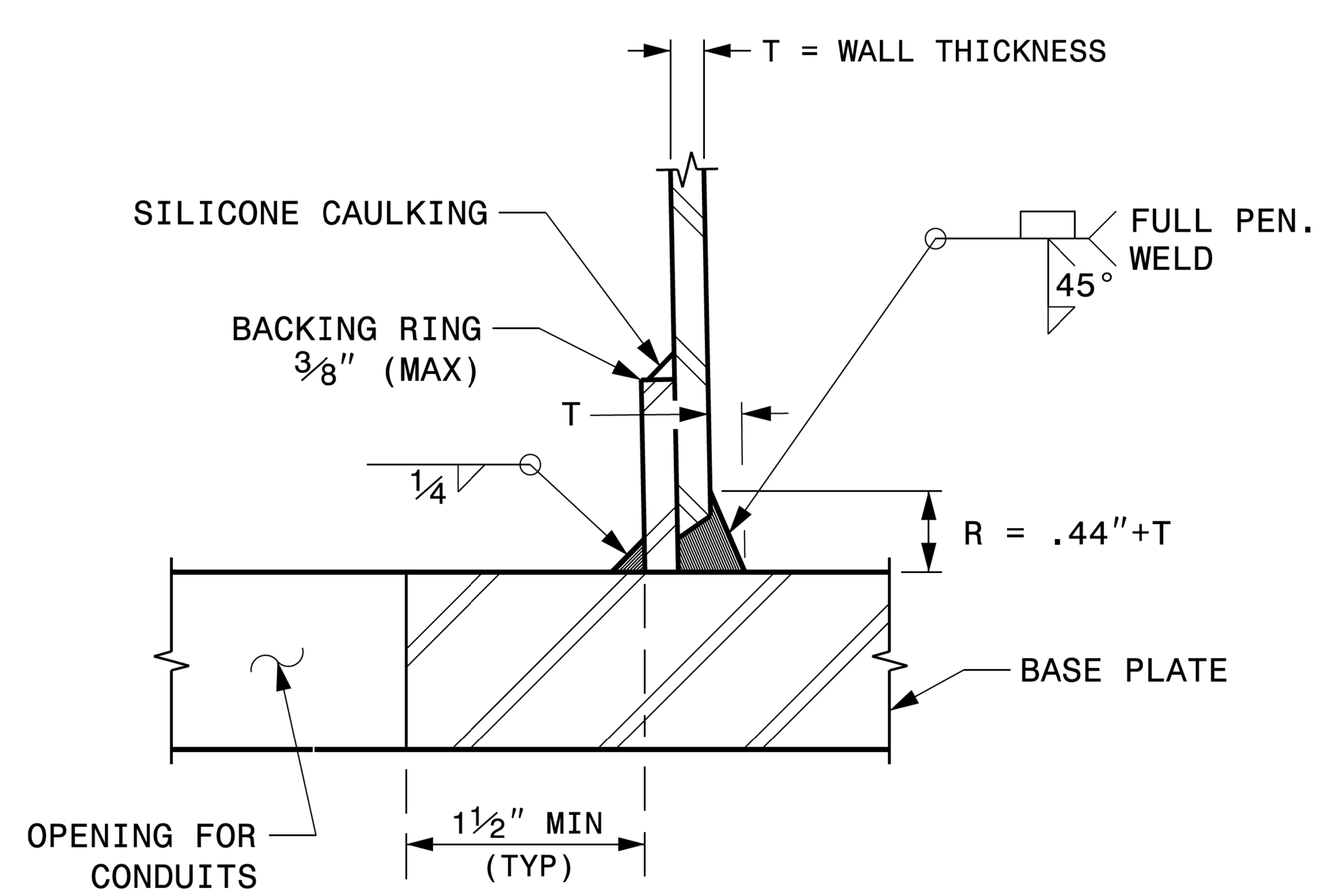






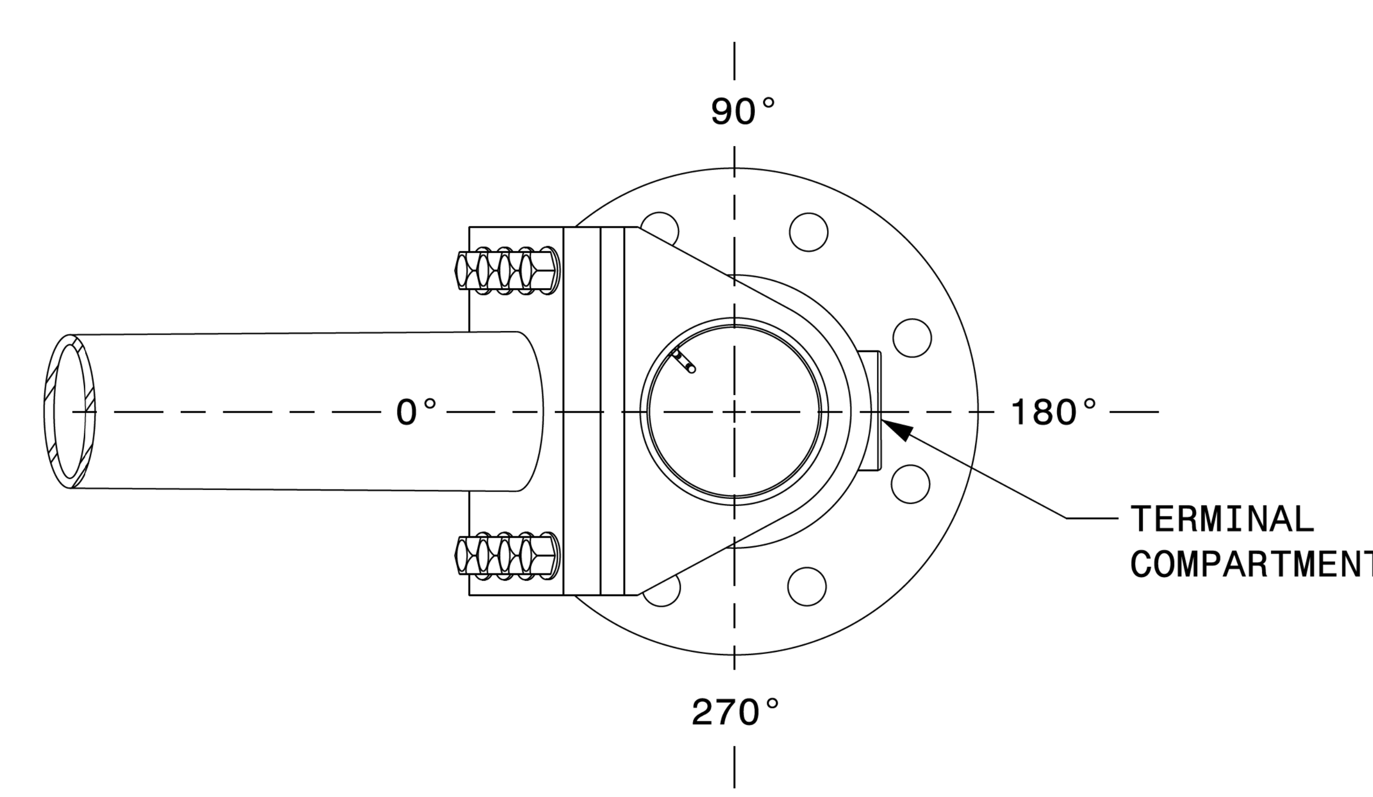
SLIP FIT JOINT DETAIL FOR MAST ARM

MAST ARM POLE



SECTION B-B
(POLE ATTACHMENT TO BASE PLATE)

FULL-PENETRATION GROOVE WELD DETAIL



MAST ARM RADIAL ORIENTATION

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

SCALE
0 NA
NONE

Typical Fabrication Details
For
Mast Arm Poles

PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	K.C. DURIGON
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

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Kevin Durigon
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09/21/2023
DATE

21-SEP-2023 08:00
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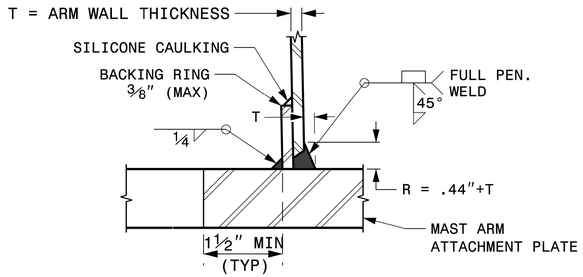
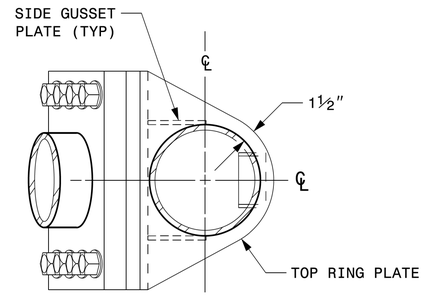
kcdurigon

WELDED RING STIFFENED MAST ARM CONNECTION

PROJECT I.D. NO.	SHEET NO.
R-5709C	Sig.M5



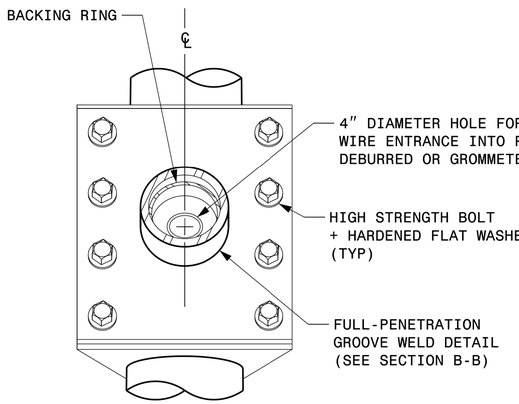
SECTION B-B
FULL-PENETRATION GROOVE WELD DETAIL



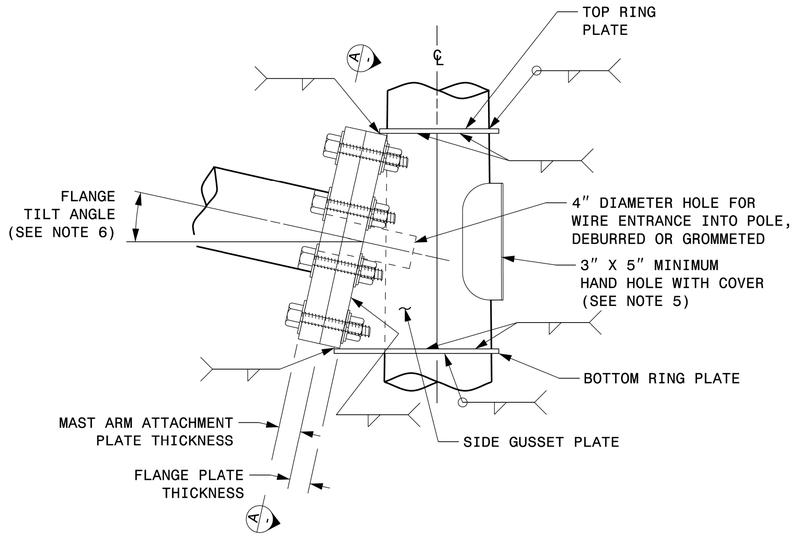
PLAN VIEW

NOTES:

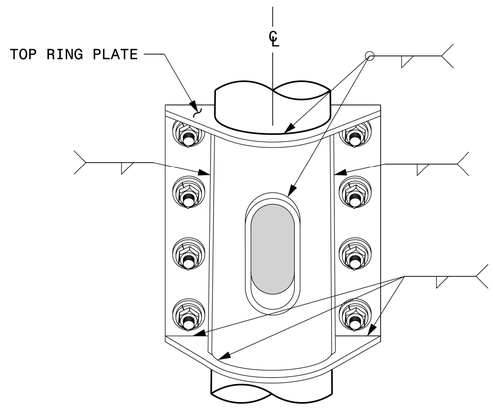
1. PROVIDE A PERMANENT MEANS OF IDENTIFICATION ABOVE THE MAST ARM TO INDICATE PROPER ATTACHMENT ORIENTATION OF THE MAST ARM.
2. DESIGNER WILL DETERMINE THE SIZE OF ALL STRUCTURAL COMPONENTS, PLATES, FASTENERS, AND WELDS SHOWN UNLESS THEY ARE ALREADY SPECIFIED.
3. FABRICATOR IS RESPONSIBLE FOR PROVIDING APPROPRIATE HOLES AT DRAINAGE POINTS TO DRAIN GALVANIZING MATERIALS.
4. FOR MINIMUM EDGE DISTANCE AND NOMINAL BOLT HOLE SIZE, FOLLOW THE LATEST AISC STEEL CONSTRUCTION MANUAL.
5. PROVIDE UPPER HANDHOLE AS NECESSARY WHEN SHAFT EXTENSIONS ARE REQUIRED FOR LUMINAIRE ARMS OR CAMERA. FOR POLES WITHOUT LUMINAIRES/CAMERA, WIRING CAN BE DONE THROUGH THE TOP OF POLE.
6. ALLOWABLE RANGE OF FLANGE TILT ANGLE WILL VARY FROM 0° TO AS REQUIRED.



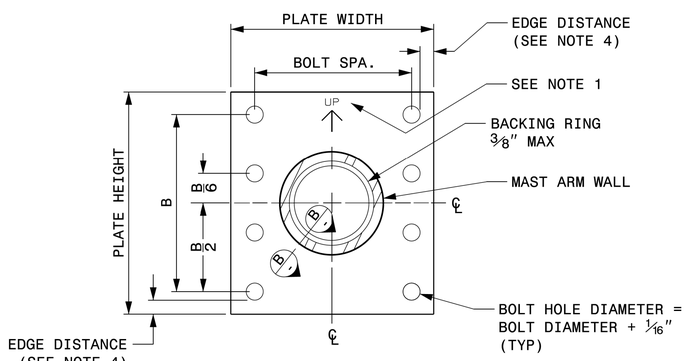
FRONT ELEVATION VIEW



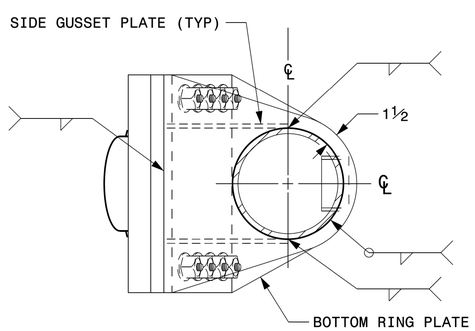
SIDE ELEVATION VIEW



BACK ELEVATION VIEW



SECTION A-A
MAST ARM ATTACHMENT PLATE



BOTTOM VIEW

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

SCALE
0 NA
NONE

Typical Fabrication Details
For
Mast Arm Connection To Pole

PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
036626
ENGINEER
KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
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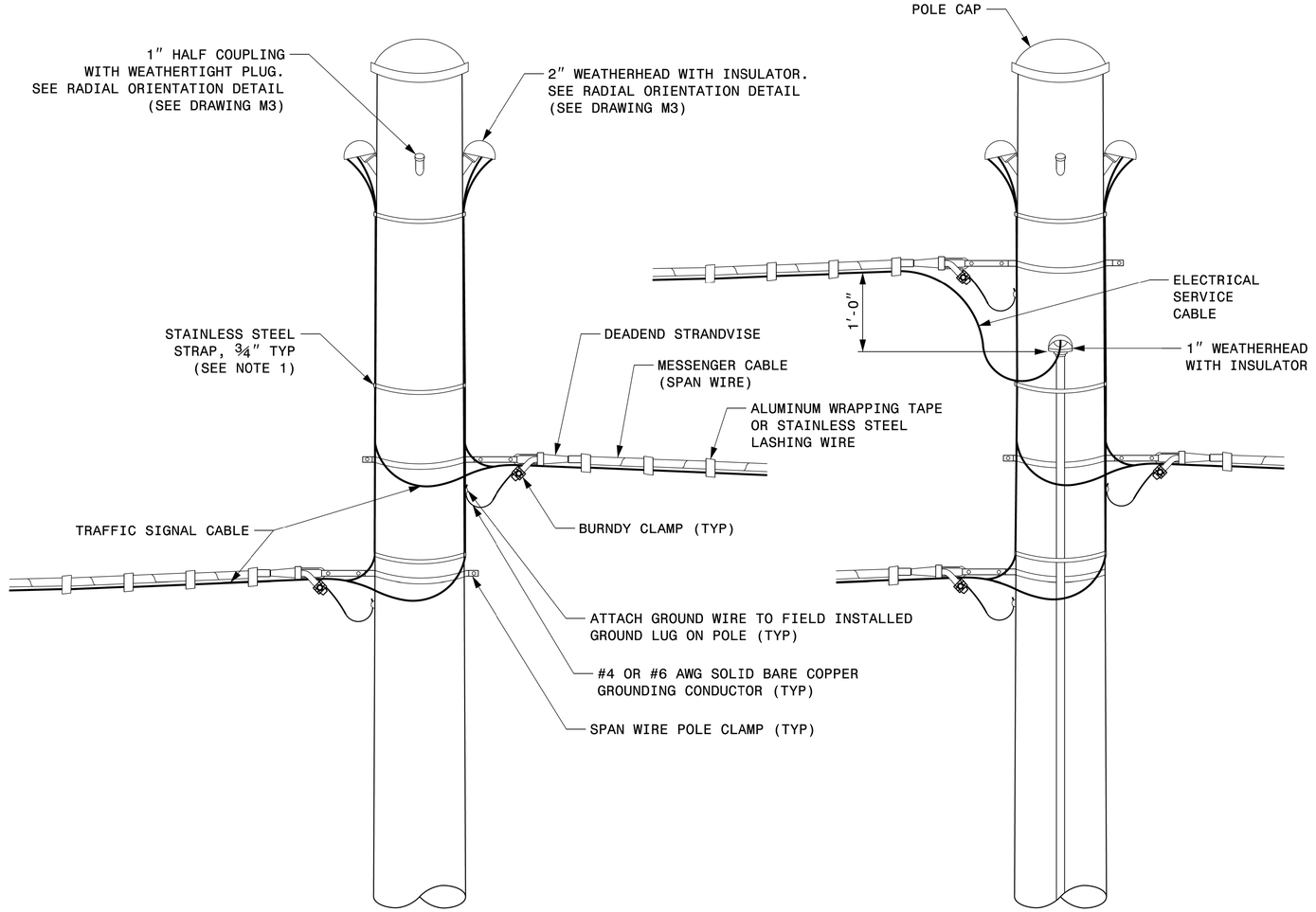
09/21/2023
DATE

Fabrication Details – Mast Arm Connection

PROJECT I.D. NO.	SHEET NO.
R-5709C	Sig.M6

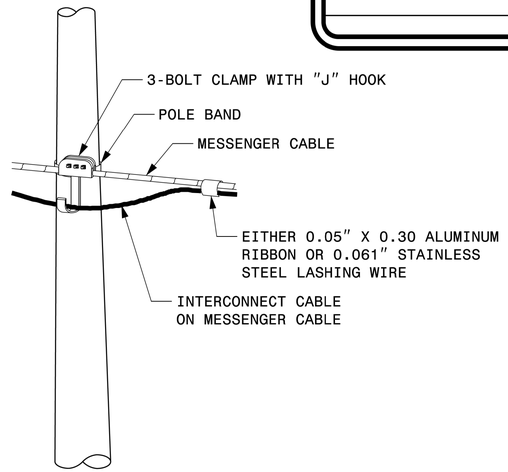
Fabrication Details – Strain Pole Attachments



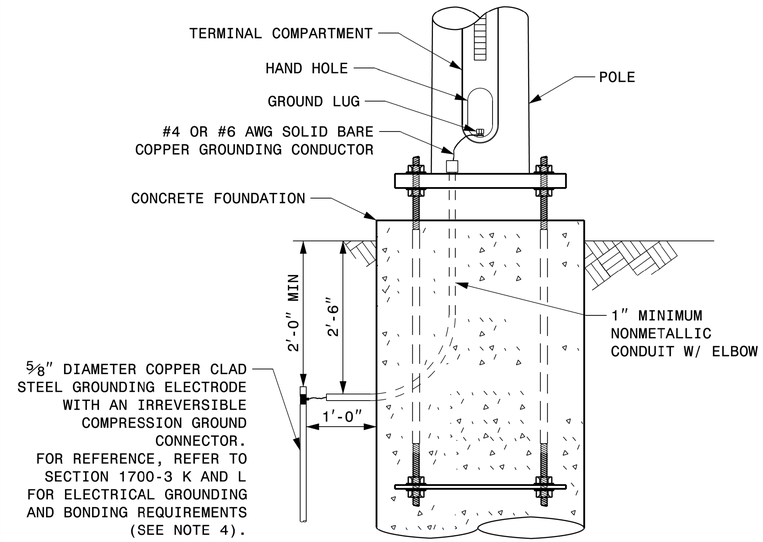
STRAIN POLE ATTACHMENTS

NOTES:

1. STRAP ALL SIGNAL CABLES TO THE SIDE OF THE POLE WITH ¾″ STAINLESS STEEL STRAPS WHEN THE DISTANCE BETWEEN SPAN WIRE ATTACHMENT CLAMP AND WEATHERHEADS EXCEEDS 3′-0″.
2. PROVIDE MINIMUM TWO SPAN WIRE POLE CLAMPS PER POLE.
3. IT IS PROHIBITED TO ATTACH TWO SPAN WIRES AT ONE POLE CLAMP.
4. FOR GENERAL REQUIREMENTS, REFER TO NCDOT STANDARD SPECIFICATIONS FOR ROADWAY AND STRUCTURES, JANUARY 2024.



ATTACHMENT OF CABLE TO INTERMEDIATE METAL POLE



METAL POLE GROUNDING DETAIL FOR STRAIN POLE AND MAST ARM

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

SCALE
0 NA
NONE

Typical Fabrication Details For Strain Pole Attachments

PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
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09/21/2023
DATE

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kcdurigon