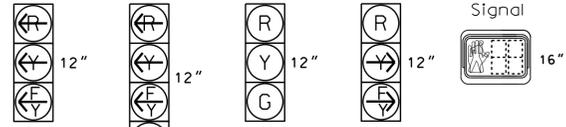


ACCESSIBLE PEDESTRIAN SIGNAL OPERATION			
SIGNAL FACE	VOICE TONES	INTERVAL	SPEECH MESSAGE
P21	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Greylock.
P22	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Greylock.
P41	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross John.
P42	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross John.
P61	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Greylock.
P62	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Greylock.
P81	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross John.
P82	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross John.

SIGNAL FACE I.D.

All Heads L.E.D.

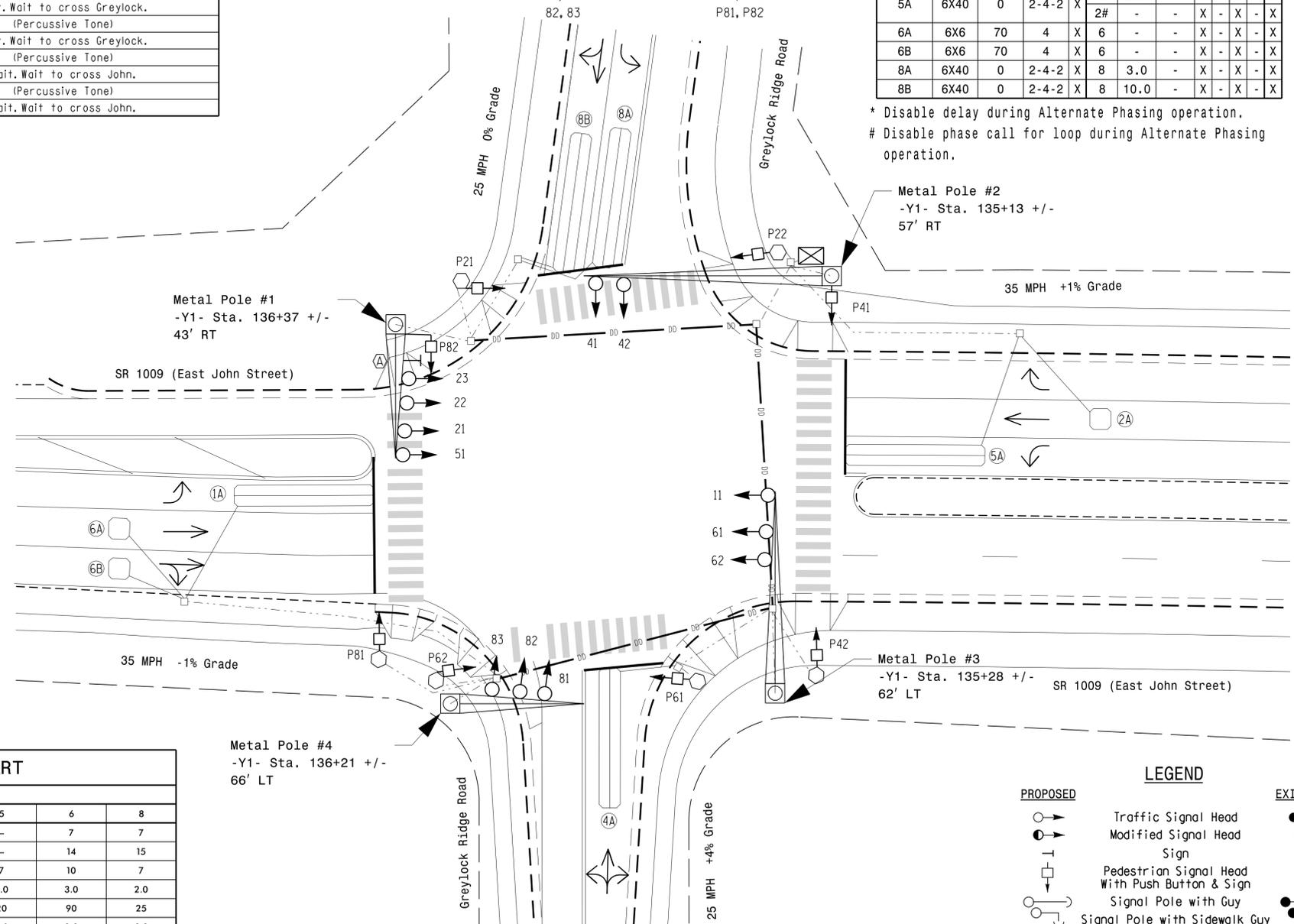


MAXTIME DETECTOR INSTALLATION CHART										
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING					
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND INITIAL	ADDED INITIAL	CALL DURING GREEN
1A	6X40	0	2-4-2	X	1	15.0*	-	X	-	X
2A	6X6	70	4	X	2	-	-	X	-	X
4A	6X40	0	2-4-2	X	4	10.0	-	X	-	X
5A	6X40	0	2-4-2	X	5	15.0*	-	X	-	X
6A	6X6	70	4	X	6	-	-	X	-	X
6B	6X6	70	4	X	6	-	-	X	-	X
8A	6X40	0	2-4-2	X	8	3.0	-	X	-	X
8B	6X40	0	2-4-2	X	8	10.0	-	X	-	X

5 Phase Fully Actuated w/ Alternate Phasing Operation D10-05_Matthews

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- See pavement markings plan for stop bar and crosswalk locations.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- To provide a leading pedestrian interval on phase 2, program FYA heads numbered 11 and 23 to delay for 7 seconds after the start of the phase 2 walk interval. See Electrical Details for programming.



FEATURE	MAXTIME TIMING CHART							
	PHASE							
	1	2	4	5	6	8		
Walk *	-	7	7	-	7	7		
Ped Clear	-	12	17	-	14	15		
Min Green *	7	10	7	7	10	7		
Passage *	2.0	3.0	2.0	2.0	3.0	2.0		
Max 1 *	20	90	25	20	90	25		
Yellow Change	3.0	3.9	3.2	3.0	3.9	3.2		
Red Clear	3.2	2.5	3.2	3.2	2.5	3.2		
Added Initial *	-	-	-	-	-	-		
Maximum Initial *	-	-	-	-	-	-		
Time Before Reduction *	-	-	-	-	-	-		
Time To Reduce *	-	-	-	-	-	-		
Minimum Gap	-	-	-	-	-	-		
Advance Walk	-	-	4	-	7	5		
Non Lock Detector	X	-	X	X	-	X		
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL	-		
Dual Entry	-	-	X	-	-	X		
Simultaneous Start	-	-	X	-	-	X		

Metal Pole #4
-Y1- Sta. 136+21 +/- 66' LT

Metal Pole #3
-Y1- Sta. 135+28 +/- 62' LT

Metal Pole #1
-Y1- Sta. 136+37 +/- 43' RT

Metal Pole #2
-Y1- Sta. 135+13 +/- 57' RT

This plan supersedes the plan signed and sealed on 2/20/23.

LEGEND

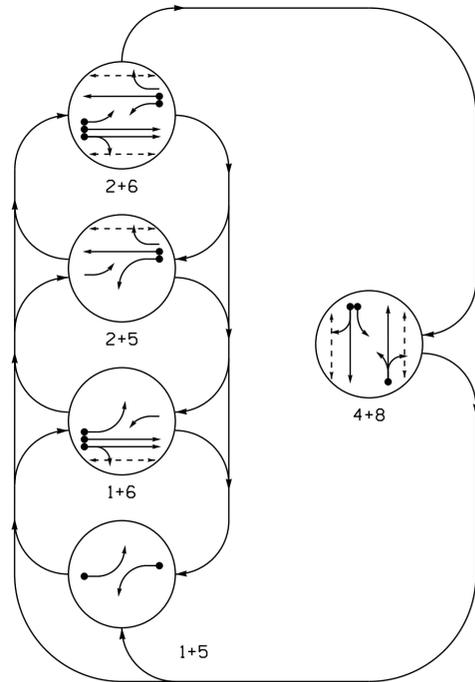
PROPOSED	EXISTING	PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A	--- 2-in Underground Conduit	--- Right of Way
○ → Modified Signal Head		→ Directional Arrow	→ Metal Pole with Mastarm
○ → Sign		--- Directional Drill	○ → Type II Signal Pedestal
○ → Pedestrian Signal Head With Push Button & Sign		○ → "RIGHT TURN SIGNAL" Sign (R10-10R)	○ →
○ → Signal Pole with Guy			
○ → Signal Pole with Sidewalk Guy			
□ → Inductive Loop Detector			
□ → Controller & Cabinet			
□ → Junction Box			

New Installation - Sheet 1 of 2

	SR 1009 (East John Street) at Greylock Ridge Road	
	Division 10 Mecklenburg County Matthews PLAN DATE: February 2024 REVIEWED BY: R.N. Zinser	PREPARED BY: T.A. Kenion REVIEWED BY:
750 N. Greenfield Pkwy, Garner, NC 27529	REVISIONS	INIT. DATE
SCALE: 0 20 1"=20'	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

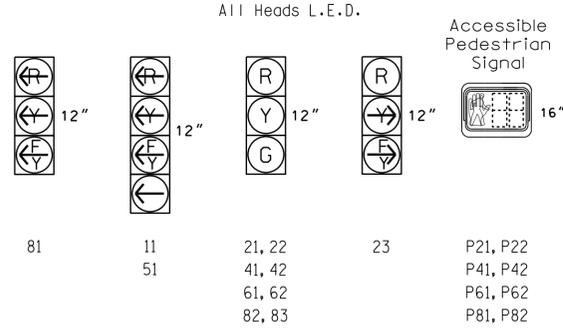
* These values may be field adjusted. Do not adjust Min Green and Passage times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE					FLASH
	1 + 5	1 + 6	2 + 5	2 + 6	4 + 8	
11	---	---	F	F	---	---
21, 22	R	R	G	G	R	R
23	R	R	F	F	R	R
41, 42	R	R	R	R	G	R
51	---	---	F	F	---	---
61, 62	R	G	R	G	R	R
81	---	---	---	---	F	---
82, 83	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

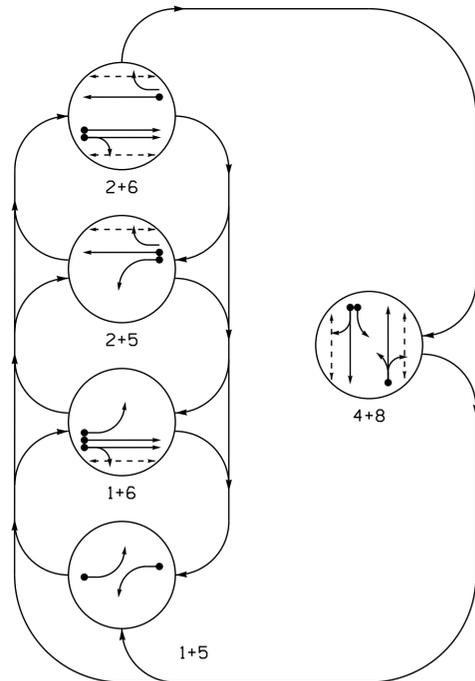


5 Phase Fully Actuated w/ Alternate Phasing Operation D10-05_Matthews

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- See pavement markings plan for stop bar and crosswalk locations.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- Supress FYA for signal heads 11 and 23 for the first 7 seconds of phase 2 ped.

ALTERNATE PHASING DIAGRAM



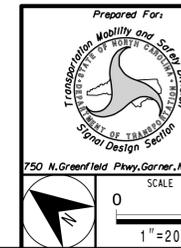
SIGNAL FACE	PHASE					FLASH
	1 + 5	1 + 6	2 + 5	2 + 6	4 + 8	
11	---	---	---	---	---	---
21, 22	R	R	G	G	R	R
23	R	R	F	F	R	R
41, 42	R	R	R	R	G	R
51	---	---	---	---	---	---
61, 62	R	G	R	G	R	R
81	---	---	---	---	F	---
82, 83	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

This plan supersedes the plan signed and sealed on 2/20/23.

PHASING DIAGRAM DETECTION LEGEND

- ←● DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- ←- UN SIGNALIZED MOVEMENT
- ←- - PEDESTRIAN MOVEMENT

New Installation - Sheet 2 of 2



SR 1009 (East John Street) at Greylock Ridge Road

Division 10 Mecklenburg County Matthews
 PLAN DATE: February 2024 REVIEWED BY: R.N. Zinser
 PREPARED BY: T.A. Kenion REVIEWED BY:



REVISIONS	INIT.	DATE

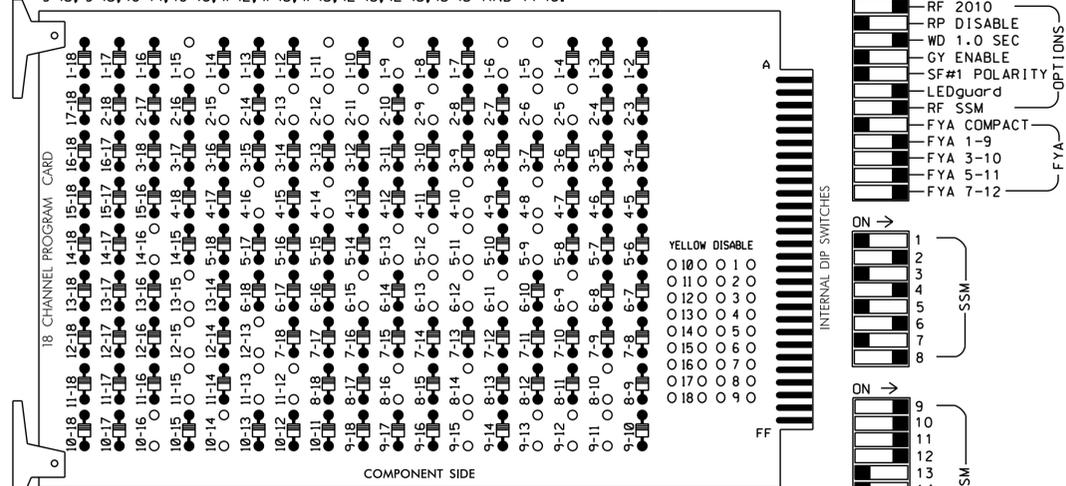
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DocuSigned by: R. Nicholas Zinser 06/10/2024
 SIG. INVENTORY NO. 10-2462

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)
 REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-12, 2-13, 2-15, 4-8, 4-10, 4-14, 4-16, 5-9, 5-11, 5-12, 5-13, 6-9, 6-11, 6-12, 6-13, 6-15, 8-10, 8-14, 8-16, 9-11, 9-12, 9-13, 9-15, 10-14, 10-16, 11-12, 11-13, 11-15, 12-13, 12-15, 13-15 AND 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Start for phases 4 and 8.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the D10-05_Matthews Signal System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S3, S5, S6, S7, S8, S9, S11, S12, AUX S1, AUX S2, AUX S4, AUX S5
 Phases Used.....1, 2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED

Overlap "1".....*
 Overlap "2".....*
 Overlap "3".....*
 Overlap "4".....*

*See overlap programming detail on sheet 2

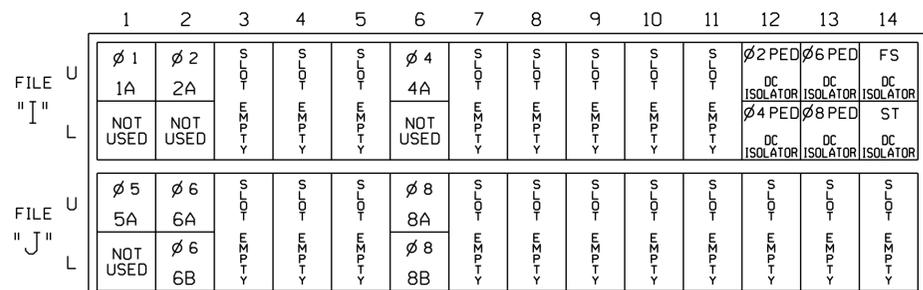
SIGNAL HEAD HOOK-UP CHART

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.	11	21,22	P21, P22	NU	41,42	P41, P42	51	61,62	P61, P62	NU	82,83	P81, P82	11	81	NU	51	23	NU
RED		128			101			134			107							A101
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW																A121	A124	A114
YELLOW ARROW																A122	A125	A115
FLASHING YELLOW ARROW																A123	A126	A116
GREEN ARROW	127							133										
Hand				113					119			110						
Walker				115									112					

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

INPUT FILE POSITION LAYOUT

(front view)



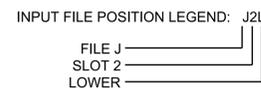
EX.: 1A, 2A, ETC. = LOOP NO.'S

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
1A	TB2-1,2	I1U	56	18	1	1	15		X		X	
2A	TB2-5,6	I2U	39	1	2	2			X		X	
4A	TB4-9,10	I6U	41	3	8	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15	5	15		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
8B	TB5-11,12	J6L	46	8	23	8	10		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

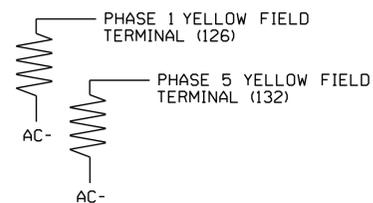
NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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

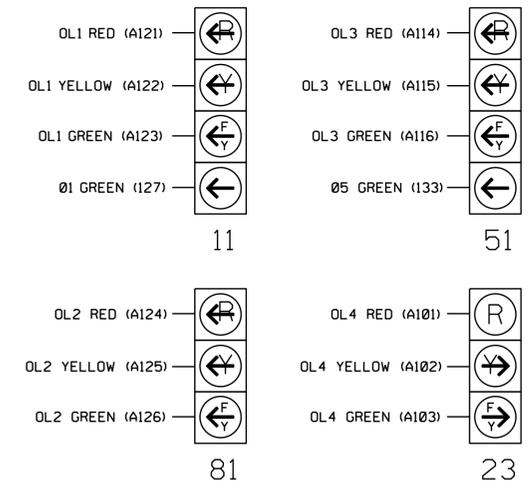


COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

FYA SIGNAL WIRING DETAIL

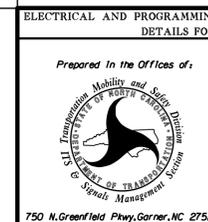
(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2462
 DESIGNED: February 2024
 SEALED: 6/7/2024
 REVISED: N/A

This Plan Supersedes Electrical Detail Sealed on 2/20/2023

Electrical Detail - Sheet 1 of 3



SR 1009 (East John Street) at Greylock Ridge Road	
Division 10	Mecklenburg County
Matthews	
PLAN DATE: June 2024	REVIEWED BY:
PREPARED BY: Zarrar Zafar	REVIEWED BY:
REVISIONS	INIT. DATE

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SIG. INVENTORY NO. 10-2462

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section			
Included Phases	2	4	6	2
Modifier Phases	1	-	5	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0
FYA Ped Delay	7.0	0.0	0.0	7.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section			
Included Phases	-	4	-	2
Modifier Phases	1	-	5	-
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0
FYA Ped Delay	0.0	0.0	0.0	7.0

← NOTICE INCLUDED PHASE

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

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector	Call Phase	Delay
1	1	0
29	0	-

5A

Detector	Call Phase	Delay
15	5	0
31	0	-

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

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.

ALTERNATE PHASING CHANGE SUMMARY

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

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

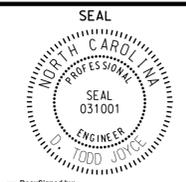
VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2462
DESIGNED: February 2024
SEALED: 6/7/2024
REVISED: N/A

This Plan Supersedes Electrical Detail Sealed on 2/20/2023

Electrical Detail - Sheet 2 of 3

	SR 1009 (East John Street) at Greylock Ridge Road		
	Division 10 Mecklenburg County Matthews	PLAN DATE: June 2024 REVIEWED BY:	
REVISIONS	INIT.	DATE	Documented by: <i>D. Todd Joyce</i> 06/10/2024 DATE
750 N. Greenfield Pkwy, Corner, NC 27529			SIG. INVENTORY NO. 10-2462

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**ACCESSIBLE PEDESTRIAN SIGNAL (APS)
INSTALLATION NOTES**

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

**MAXTIME STARTUP AND SOFTWARE FLASH
PROGRAMMING DETAIL**

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold	6
------------------------	---

Unit Flash Parameters

All Red Flash Exit Time	6
-------------------------	---

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2462
DESIGNED: February 2024
SEALED: 6/7/2024
REVISED: N/A

This Plan Supersedes Electrical
Detail Sealed on 2/20/2023

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared in the Offices of:



750 N. Greenfield Pkwy, Corner, NC 27529

**SR 1009 (East John Street)
at
Greylock Ridge Road**

Division 10 Mecklenburg County Matthews

PLAN DATE: June 2024 REVIEWED BY:

PREPARED BY: Zarrar Zafar REVIEWED BY:

REVISIONS	INIT.	DATE

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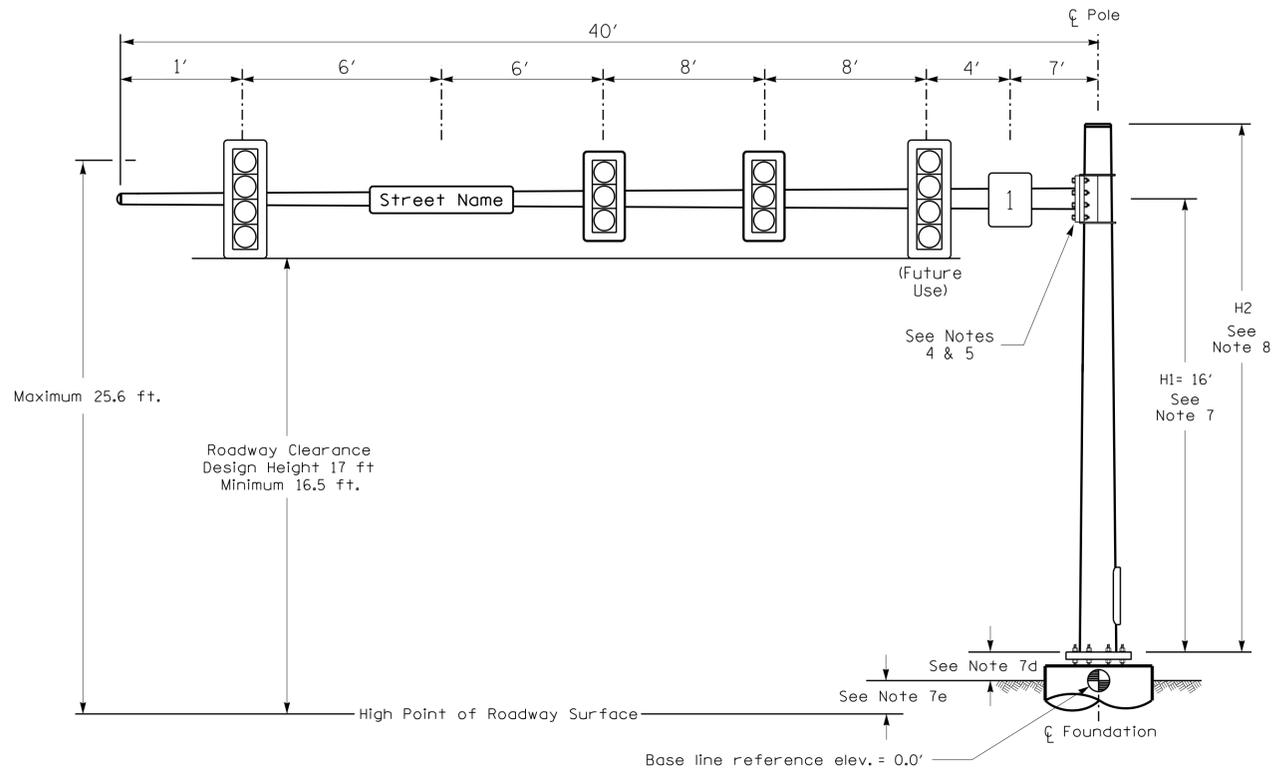
SEAL



DocuSigned by:
Todd Joyce 06/10/2024

SIG. INVENTORY NO. 10-2462

Design Loading for METAL POLE NO. 1



SPECIAL NOTE

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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at ϕ Foundation @ ground level	695.0 ft.	700.0 ft.
Elevation difference at High point of roadway surface	-3.0 ft.	+1.0 ft.
Elevation difference at Edge of travelway or face of curb	-3.0 ft.	+1.0 ft.

METAL POLE No. 1 AND 2

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS
	SIGN RIGID MOUNTED	5.0 S.F.	24.0" W X 30.0" L	11 LBS

NOTES

DESIGN REFERENCE MATERIAL

- 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>

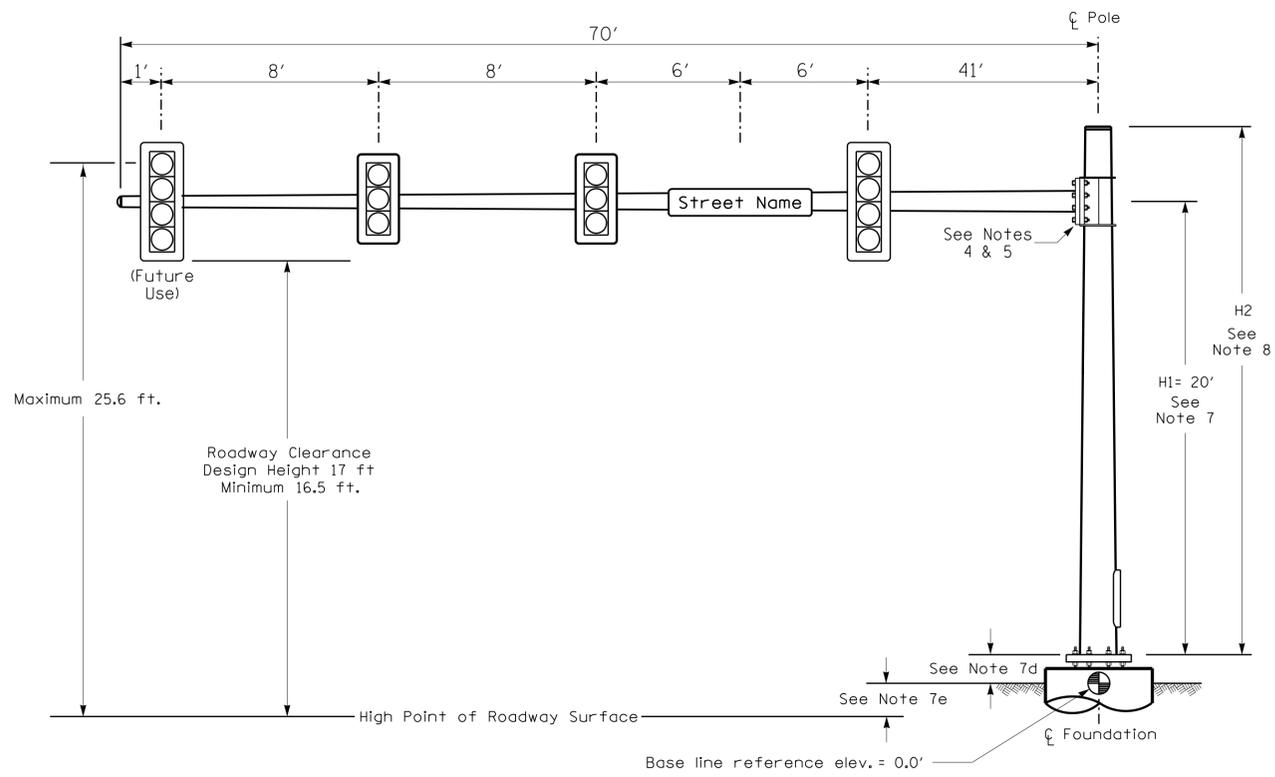
DESIGN REQUIREMENTS

- 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.
- Design all signal supports using force ratios that do not exceed 0.9.
- 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.
- 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.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- 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.
- 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.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

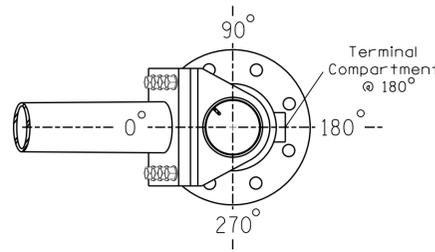
All metal poles and arms should be black in color as specified in the project special provisions.

This plan supersedes the plan signed and sealed on 2/20/23.

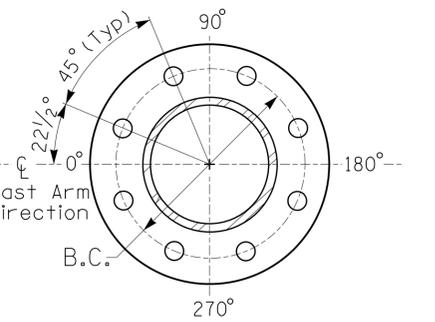
Design Loading for METAL POLE NO. 2



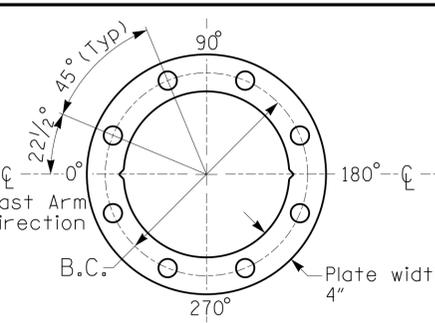
POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate



NCDOT Wind Zone 5 (110mph)

	<p>SR 1009 (East John Street) at Greylock Ridge Road</p>		<p>Division 10 Mecklenburg County Matthews</p>
	<p>PLAN DATE: February 2024</p>	<p>REVIEWED BY: R.N. Zinser</p>	
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>
<p>SCALE: 0 N/A</p>	<p>N/A</p>	<p>06/16/2025</p>	<p>DATE</p>

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

SEAL 043914

RICHARD N. ZINSER

ENGINEER

DocuSigned by: R. Nicholas Zinser 06/16/2025

SIG. INVENTORY NO. 10-2462

13-JUN-2025 14:18 P:\w\ncdot-pw\benf\ey.com\ncdot-pw\01\Documents\NCDOT_TSMO\Signal_Design_Sect\an01\10-10-2462\Signal_Design\2024-02\2024-02\102462_s1.q.m_20240610_DRD_Ref.rvt.dgn

METAL POLE No. 3 AND 4

MAST ARM LOADING SCHEDULE				
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS

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 3	Pole 4
Baseline reference point at ζ Foundation @ ground level	692.0 ft.	684.0 ft.
Elevation difference at High point of roadway surface	-6.0 ft.	+1.0 ft.
Elevation difference at Edge of travelway or face of curb	-3.0 ft.	+2.0 ft.

NOTES

DESIGN REFERENCE MATERIAL

- 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

- 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.
- Design all signal supports using force ratios that do not exceed 0.9.
- 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.
- 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.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- 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.
- 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.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

All metal poles and arms should be black in color as specified in the project special provisions.

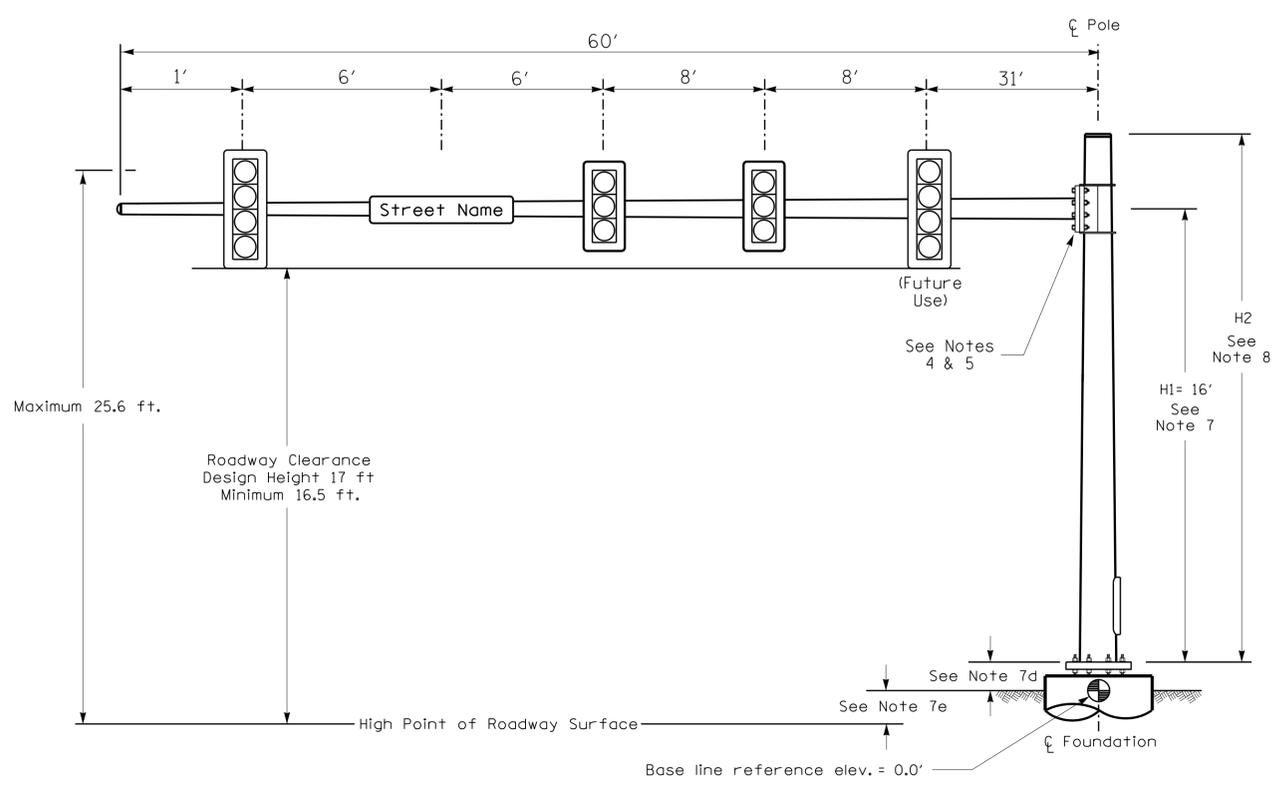
This plan supersedes the plan signed and sealed on 2/20/23.

NCDOT Wind Zone 5 (110mph)

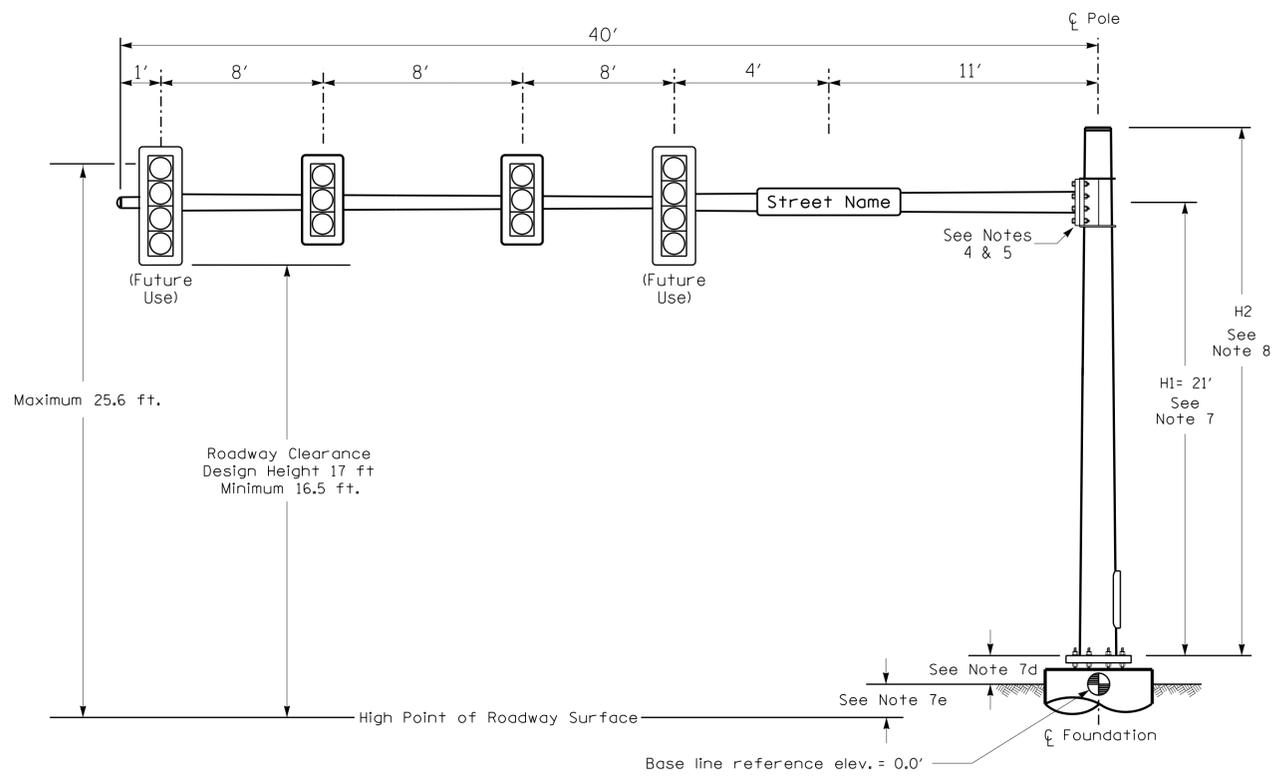
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 1009 (East John Street) at Greylock Ridge Road		
	Division 10 Mecklenburg County Matthews	PLANNED BY: February 2024	
750 N. Greenfield Pkwy, Garner, NC 27529	PREPARED BY: T.A. Kenion	REVIEWED BY:	DocuSigned by: R. Nicholas Zinser 06/16/2025
SCALE: 0 N/A	REVISIONS:	INIT.	DATE
N/A			

Design Loading for METAL POLE NO. 3

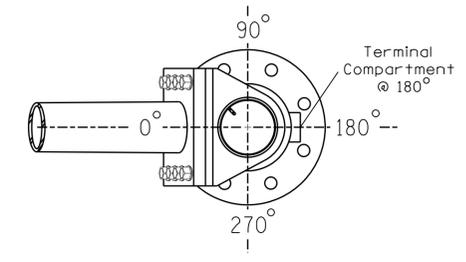


Design Loading for METAL POLE NO. 4



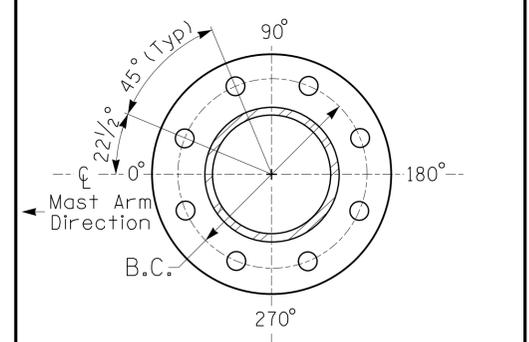
Elevation View

POLE RADIAL ORIENTATION

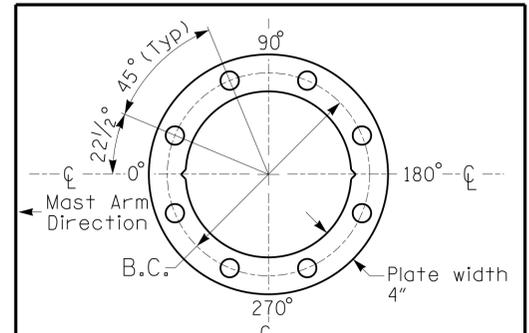


8 BOLT BASE PLATE DETAIL

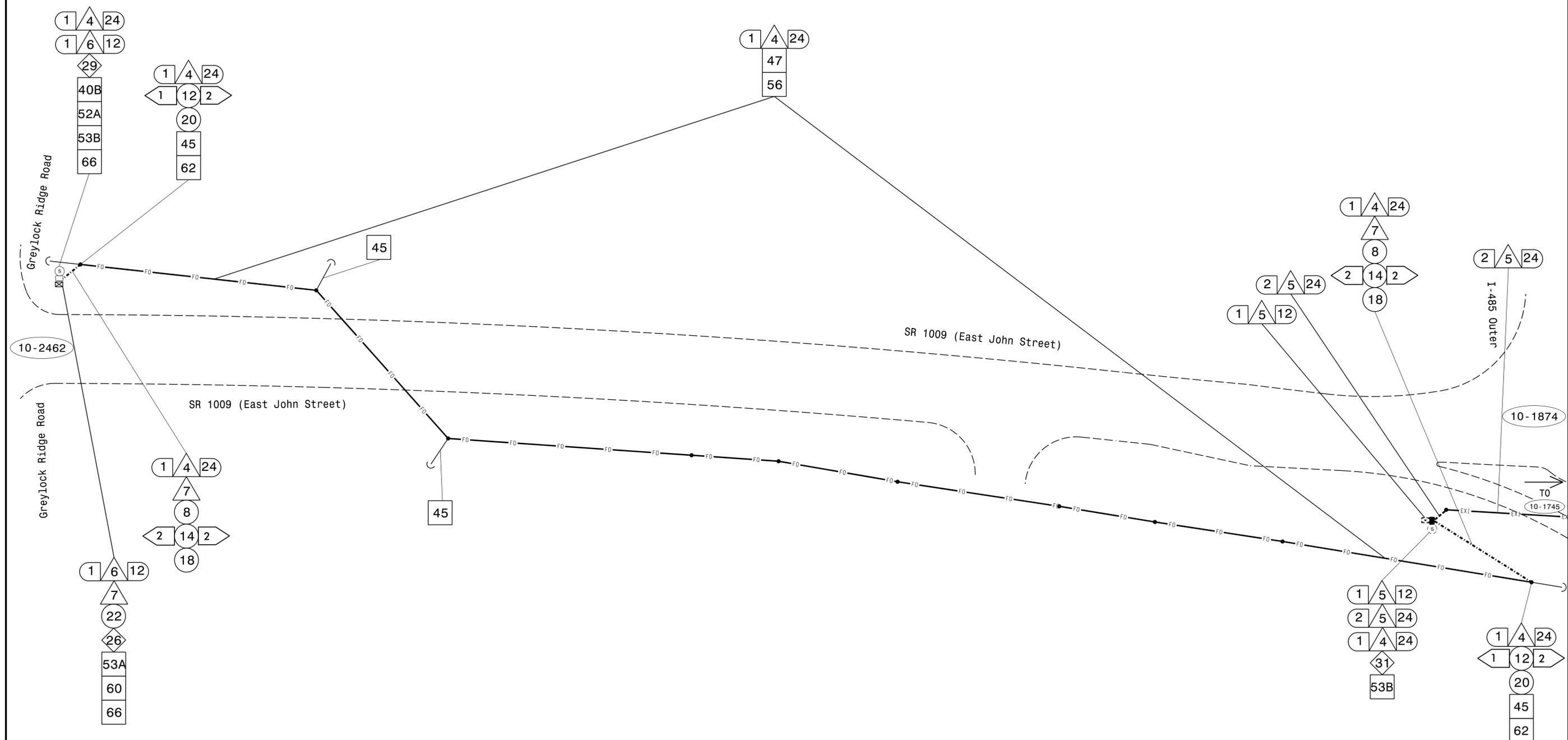
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate

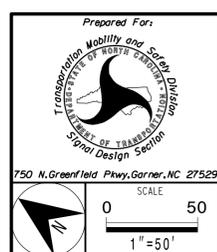


13-UNA-2025.14-18 DWG://ncdot-pw-bentley.com/ncdot-pw-01/Documents/ACDOT TSMO/Signal Design/2024-02/2024-02/102462.sig.qm.20240610.DRD.Refr.dgn



NOTE:

1. NOTIFY THE DIVISION TRAFFIC ENGINEER AT (704) 983-4400 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
2. CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS, IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.
3. UNLESS OTHERWISE NOTED:
 - ATTACH NEW MESSENGER CABLE 12" BELOW LOWEST UTILITY.
 - ATTACH ON FRONT SIDE OF POLE.



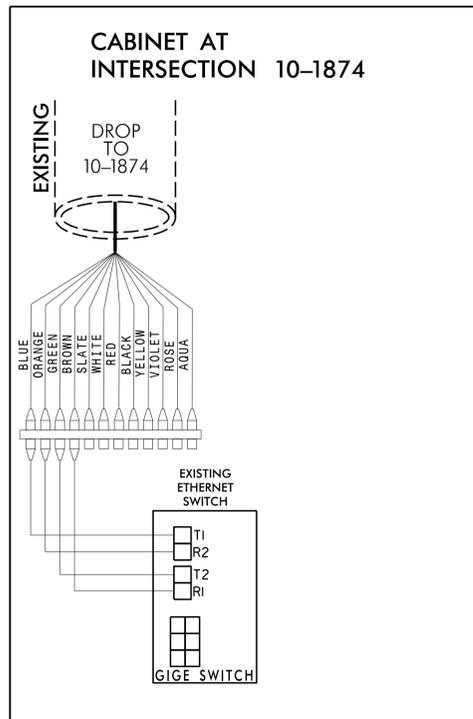
Prepared For: Transportation Mobility and Safety Division STATE OF NORTH CAROLINA SIGNAL DESIGN SECTION		Signal System D10-05 Matthews Cable and Conduit Routing Plans	
Division 10 Mecklenburg County Matthews		REVISIONS	
PLAN DATE: February 2023	REVIEWED BY: TS Popelka	INIT.	DATE
PREPARED BY: JA Wendt	RKA PROJ. NO.: 21547 (041)		
750 N. Greenfield Pkwy, Garner, NC 27529			
SCALE: 0 50 1" = 50'			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	DATE
	02/20/2023
SIGNATURE	DATE

NOTES:

1. NOTIFY THE DIVISION TRAFFIC ENGINEER AT (704) 983-4400 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEMS COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
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3. INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"
 - 1) SPLICE LOCATION
 - 2) DATE
 - 3) COMPANY NAME
 - 4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

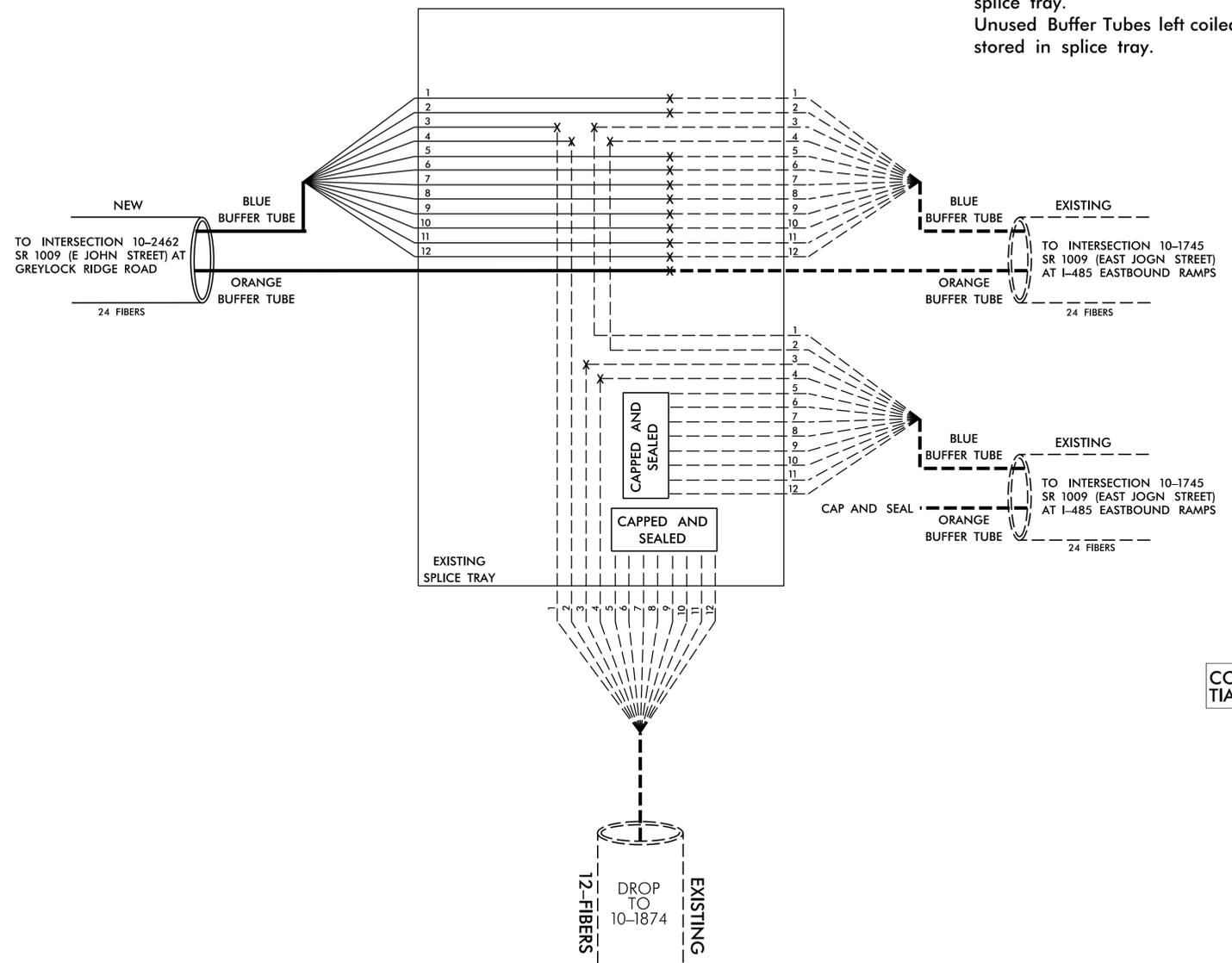
PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.
4. ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING / ENSURING PROPER COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER TERMINATION.



LEGEND
 X = FUSION SPLICE
 C = CAPPED AND SEALED IN TRAY

EXISTING UNDERGROUND SPLICE ENCLOSURE
 SR 1009 (E JOHN ST) AT I-485 WB RAMPS
 SIG ID 10-1874

Notes:
 Unused fibers left coiled and stored in splice tray.
 Unused Buffer Tubes left coiled and stored in splice tray.



COLOR CODE
 TIA/EIA 598-A

- (1) BLUE
- (2) ORANGE
- (3) GREEN
- (4) BROWN
- (5) SLATE
- (6) WHITE
- (7) RED
- (8) BLACK
- (9) YELLOW
- (10) VIOLET
- (11) ROSE
- (12) AQUA

MODIFY EXISTING SPLICE ENCLOSURE



Splice Details	
Division 10 Mecklenburg County	Matthews
PLAN DATE: February 2023	REVIEWED BY: TS Popelka
PREPARED BY: JA Wendt	RKA PROJ. NO.: 21547 (041)
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER

SEAL 051573

TIMOTHY S. POPELKA

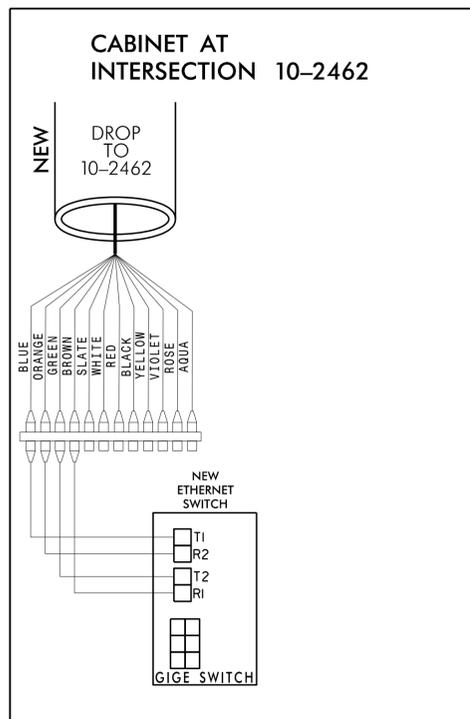
Signature: Timothy S. Popelka

DATE: 02/20/2023

NOTES:

1. NOTIFY THE DIVISION TRAFFIC ENGINEER AT (704) 983-4400 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEMS COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
2. CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.
3. INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"
 - 1) SPLICE LOCATION
 - 2) DATE
 - 3) COMPANY NAME
 - 4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

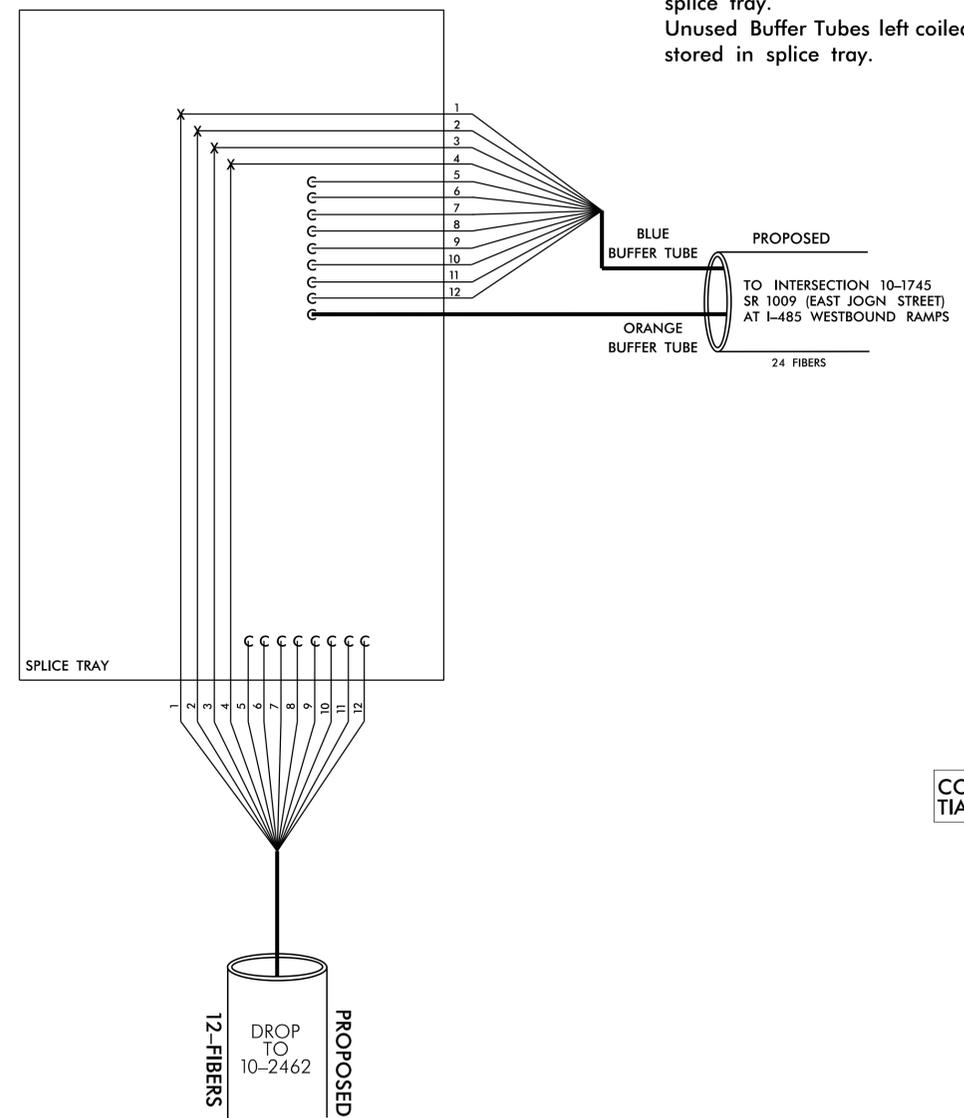
PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.
4. ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING /ENSURING PROPER COMMUNICATIONS CABLE. NOTIFY THE TRAFFIC ENGINEER AFTER TERMINATION.



LEGEND
 X = FUSION SPLICE
 C = CAP IN TRAY

PROPOSED UNDERGROUND SPLICE ENCLOSURE
 SR 1009 (E JOHN ST) AT GREYLOCK RIDGE RD
 SIG ID 10-2462

Notes:
 Unused fibers left coiled and stored in splice tray.
 Unused Buffer Tubes left coiled and stored in splice tray.



COLOR CODE
 TIA/EIA 598-A

- (1) BLUE
- (2) ORANGE
- (3) GREEN
- (4) BROWN
- (5) SLATE
- (6) WHITE
- (7) RED
- (8) BLACK
- (9) YELLOW
- (10) VIOLET
- (11) ROSE
- (12) AQUA

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 RAMEY KEMP ASSOCIATES
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 Raleigh, North Carolina 27609
 Phone: 919-872-5115
 NC License No. F-1489
 www.rkainc.com

Prepared For: 750 N. Greenfield Place, Garner, NC 27529	Splice Details		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL SIGNATURE: <i>Timothy S. Popelka</i> DATE: 02/20/2023
	Division 10 Mecklenburg County Matthews	PLAN DATE: February 2023 REVIEWED BY: TS Popelka	
SCALE: 0 N/A	REVISIONS:	INIT. DATE	DATE