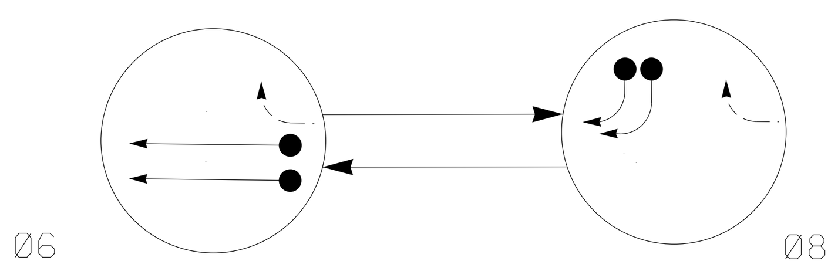
PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 13.0

2 Phase
Fully Actuated
Isolated

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

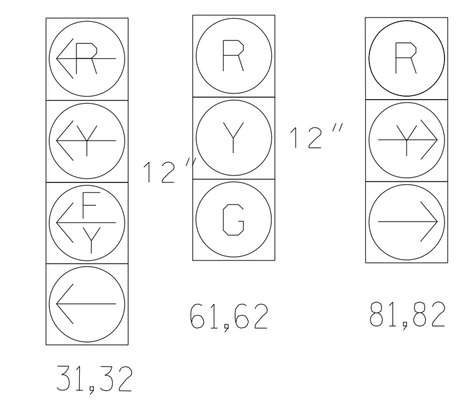
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø8	PHASE FLASH
61,62	G	R	R
81,82	R	→	R

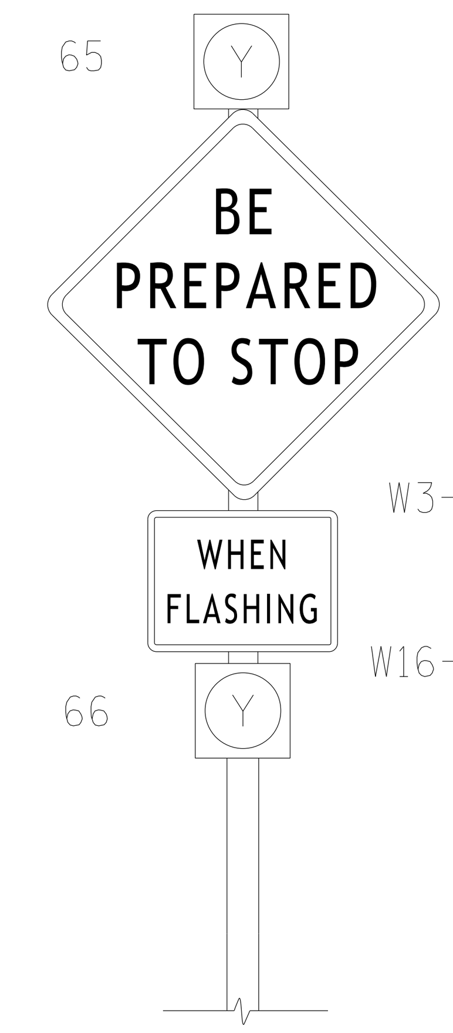
SIGNAL FACE I.D.

All Heads L.E.D.



See Note 5

Figure 1



See notes 7 and 8

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
8A	✳	0	✳	X	8	15	-	X	-	X	-	*

* Multizone microwave detection zone.

TABLE OF OPERATION

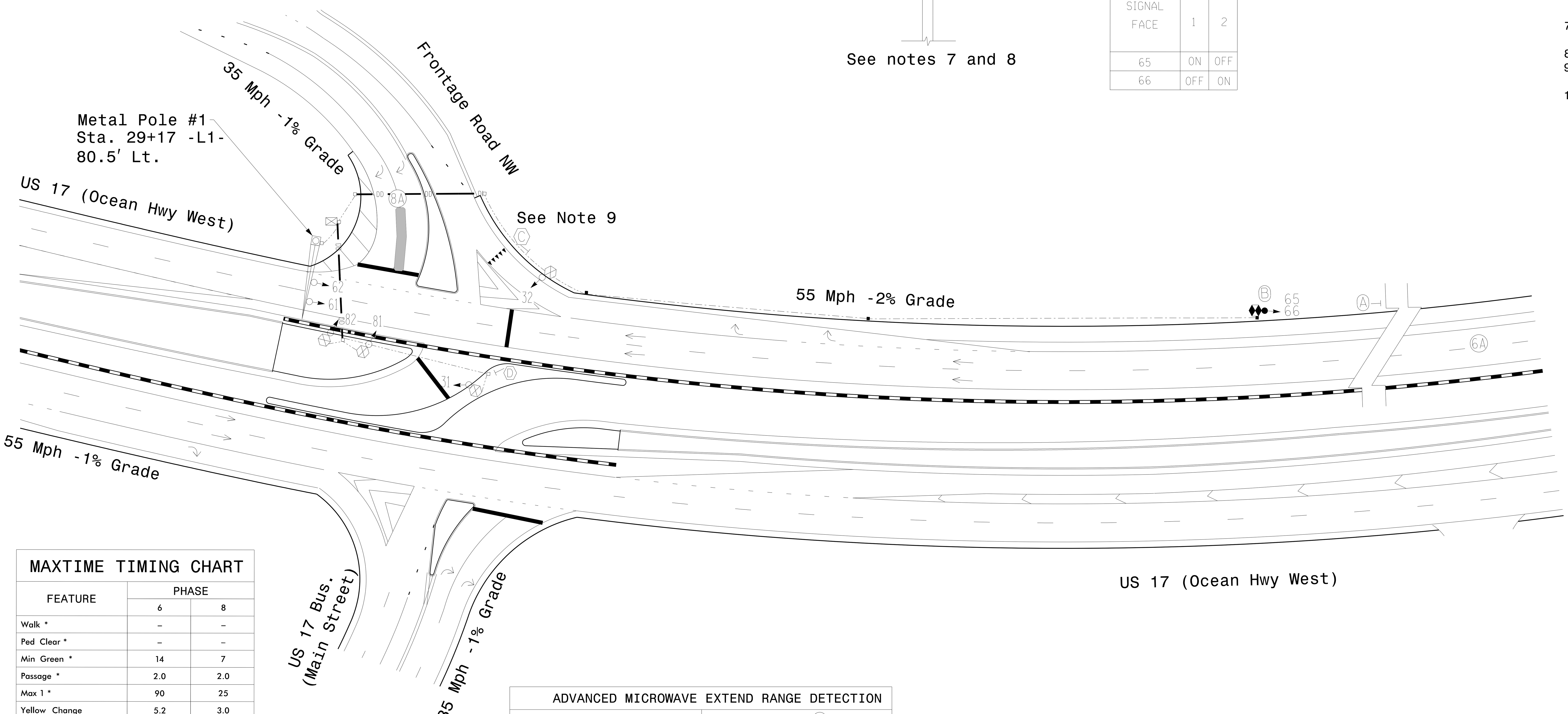
SIGNAL FACE	INTERVAL 1	INTERVAL 2
65	ON	OFF
66	OFF	ON

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Disconnect and bag signal heads 31 and 32 during this phase of construction.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Activate flashers 3 seconds prior to end of phase 6 green.
8. Flash vertically-mounted beacons alternately.
9. Install new conduit as close as possible to edge of pavement.
10. Refer to the Pavement Marking Plans for pavement marking details.

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	
	Type III Signal Pedestal	
	Controller & Cabinet	
	Junction Box	
N/A	Curb Ramp	
	2-in Underground Conduit	
	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
	Detection Zone	
	Temporary Barrier	
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	No U-Turn Sign (R3-4)	Ⓓ



MAXTIME TIMING CHART

FEATURE	PHASE 6	PHASE 8
Walk *	–	–
Ped Clear *	–	–
Min Green *	14	7
Passage *	2.0	2.0
Max 1 *	90	25
Yellow Change	5.2	3.0
Red Clear	1.4	2.1
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	–
Pre-Clearance	3.0	–
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 phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ADVANCED MICROWAVE EXTEND RANGE DETECTION

FUNCTION	Sensor 1 (6A)		
Channel	1		
Phase	6		
Direction of Travel	SB		
Type	PRIORITY		
Level	1	2	QUEUE
Discovery Zone (ft)	>=750	<750	N/A
Range (ft)	100-900	100-600	100-150
Enable Speed	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-

New Installation-Temporary Design 1 (TMP Phase 4)

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TRANSYSTEMS
1 Glenwood Avenue
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License: F-0453

Prepared for:
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'

US 17 (Ocean Highway W)
at
Frontage Rd NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
North Carolina Professional Engineer Seal 14543 Gene G. Murr, Jr.

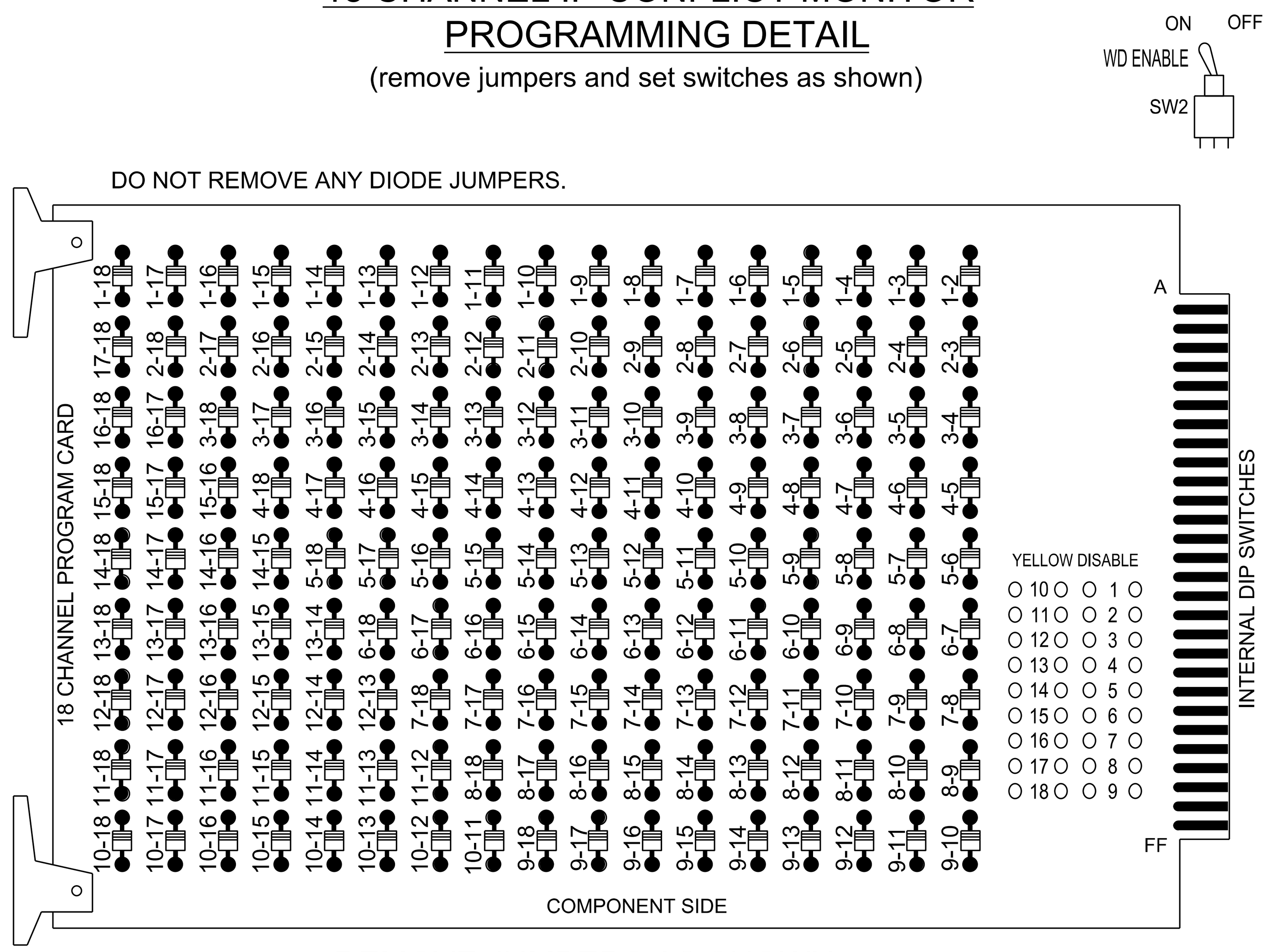
Signed by: Gene G. Murr, Jr. AA6F5076CAB34CF... 3/31/2025

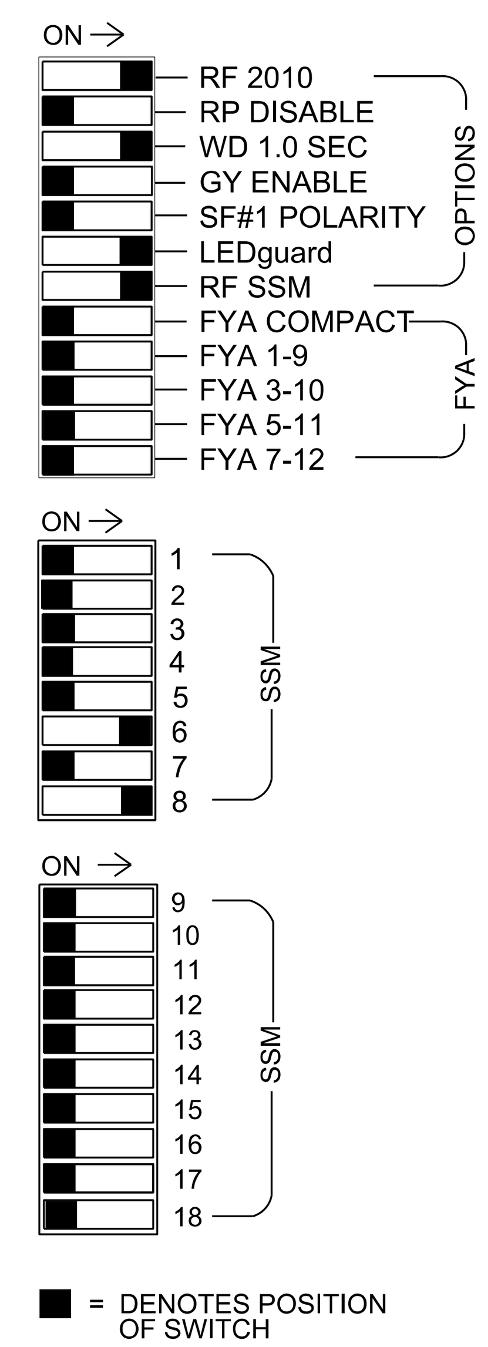
SIG. INVENTORY NO. 03-1249T1

3/31/2025
...\Temp Sig 3\R-5857_SIG_DSN.dgn
USER:ndegbotse

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)





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 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 phases 6 for Advanced Warning.
4. Program phases 6 for 3.0 seconds Pre Clearance.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.13.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6		S7	S8	S9	S10	S11	S12		AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14		5	6	15	7	8	16		9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	ADVANCE BEACON	5	6	6 PED	7	8	8 PED	ADVANCE BEACON	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	NU	NU	NU	NU	NU	65	NU	61,62	NU	NU	81,82	NU	66	NU	NU	NU	NU	NU	NU
RED									134			107								
YELLOW									135											
GREEN									136											
RED ARROW																				
YELLOW ARROW												108								
GREEN ARROW												109								
(Don't Walk hand symbol)																				
PED YELLOW							** 105							** 111						
(Walk symbol)						*							*							

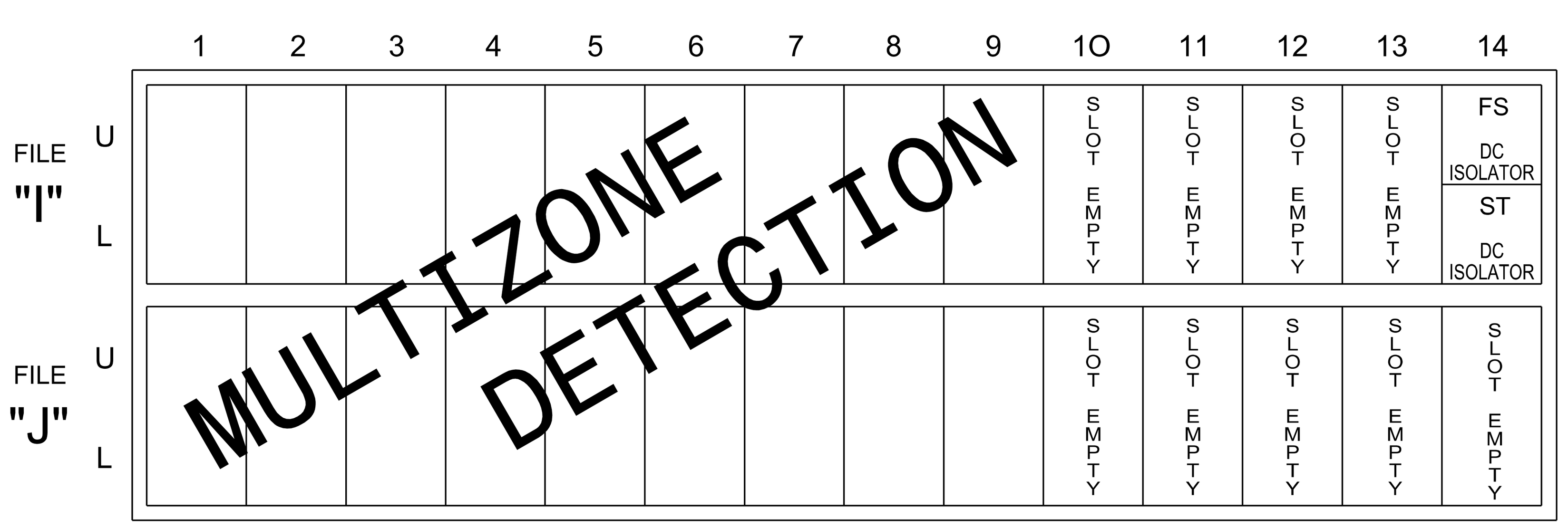
NU = Not Used

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

** Outputs have been reassigned for Advanced Beacons. See Sheet 2 for reassignment programming and wiring details.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

EQUIPMENT INFORMATION

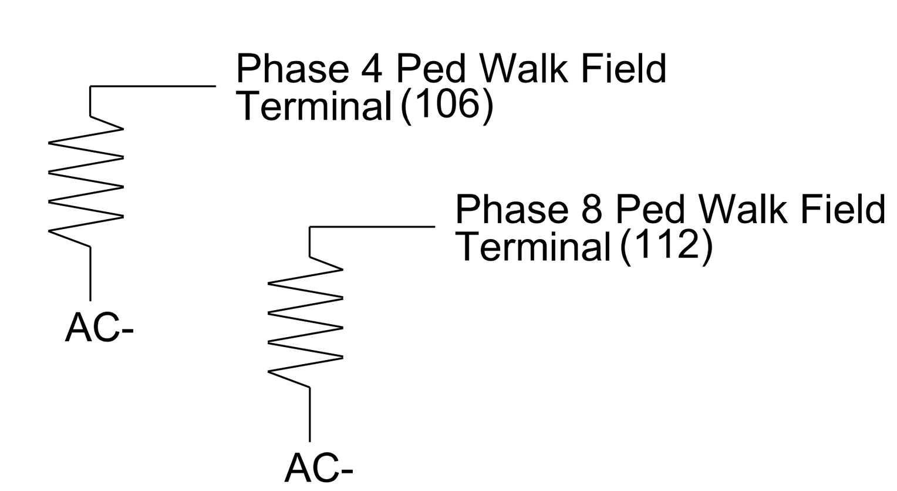
Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used............................S6**, S8, S11, S12**
Phases Used.......................................6,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

**Used for advance beacons only

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1249T1
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

US 17 (Ocean Highway W)
at
Frontage Road NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe REVIEWED BY:

REVISIONS INIT. DATE

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

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License: F-0453

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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.

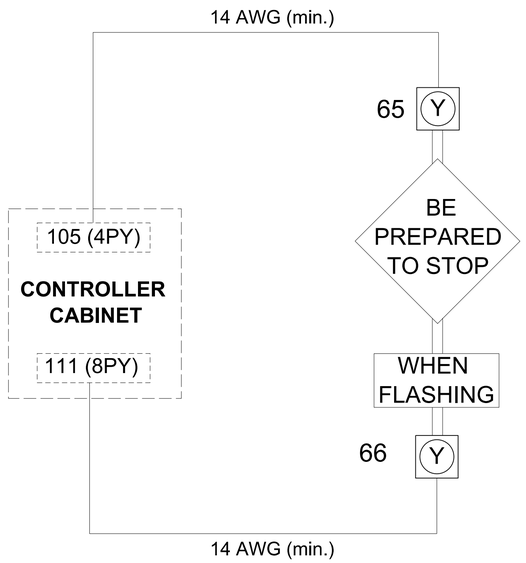
Signed by: John T. Rowe, Jr. 4-1-2025
DATE

SIG. INVENTORY NO. 03-1249T1

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.13.2

ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)



IMPORTANT

1. IF CONNECTED REMOVE, TAPE, AND LABEL CONFLICT MONITOR WIRE ATTACHED TO THE REAR OF TERMINAL 105 (4PY) AND TERMINAL 111 (8PY).

2. INSET LOADSWITCHES FOR S6 AND S12.

3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.

4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 35 AND 36 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 65 & 66

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
35	C1-37	Channel Green Walk Driver	20
36	C1-38	Channel Red Do Not Walk Driver	20

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
NOTICE CHANNEL 2 FLASHES RED →	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
NOTICE CHANNEL 6 FLASHES RED →	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED →	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED →	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
PROGRAM CHANNEL 20 AS	19	None	0				19
ADV. WARNING FLASHER →	20	Adv. Warning Flasher	6				20

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: 03-1249T1
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

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Electrical and Programming Details For:

Prepared in 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

US 17 (Ocean Highway W)
at
Frontage Road NW

Division 3 | Brunswick County | Shallotte

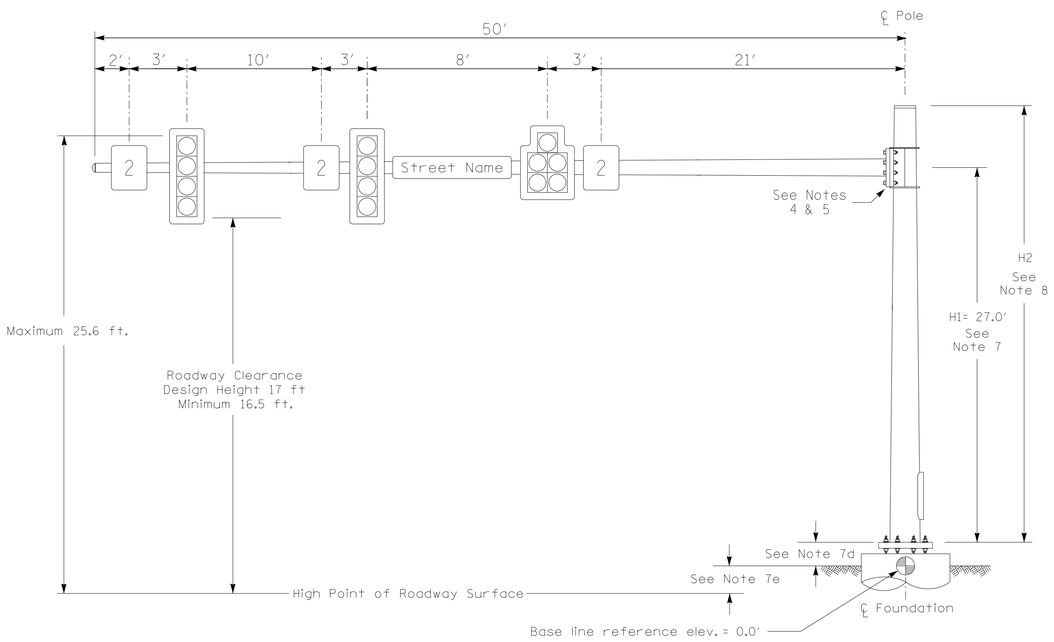
PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
Signed by: John T. Rowe, Jr. 4-1-2025
DEFEB3200BE7A02... DATE

SIG. INVENTORY NO. 03-1249T1

Design Loading for METAL POLE NO. 1 (03-1249)



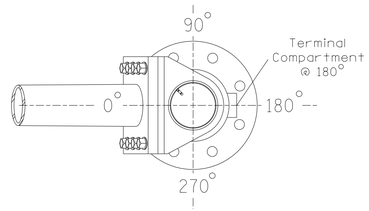
Elevation View

SPECIAL NOTE

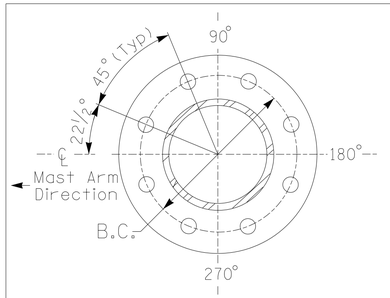
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

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	+5.51 ft.	
Elevation difference at Edge of travelway or face of curb	+4.24 ft.	

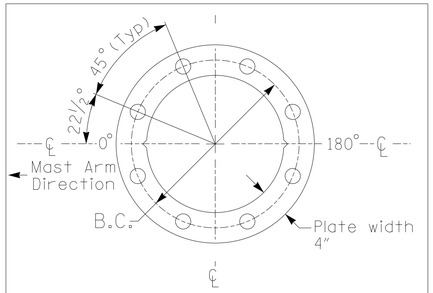


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 13.3

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0" W X 56.0"L	103 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0"L	74 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0"L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

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

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
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 1 (150 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

US 17 (Ocean Highway W)
at
Frontage Rd NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

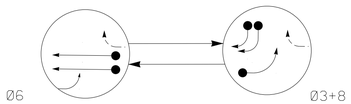
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr, Jr. 3/31/2025
AA6F5076CAB34CF...

SIG. INVENTORY NO. 03-1249T1

3/31/2025
• Mounting Diagram_Single Mast Arm (SB).dgn
USER:ndegbotse

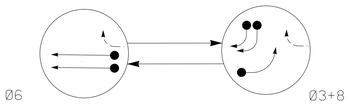
DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø3+8	PHASE FLASH
31,32	FY	←	~~R~~
61,62	G	R	R
81,82	R	→	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø3+8	PHASE FLASH
31,32	~~R~~	←	~~R~~
61,62	G	R	R
81,82	R	→	R

SIGNAL FACE I.D.

All Heads L.E.D.

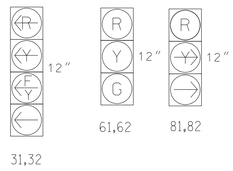
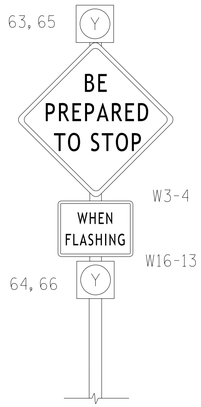


Figure 1



See notes 7 and 8.

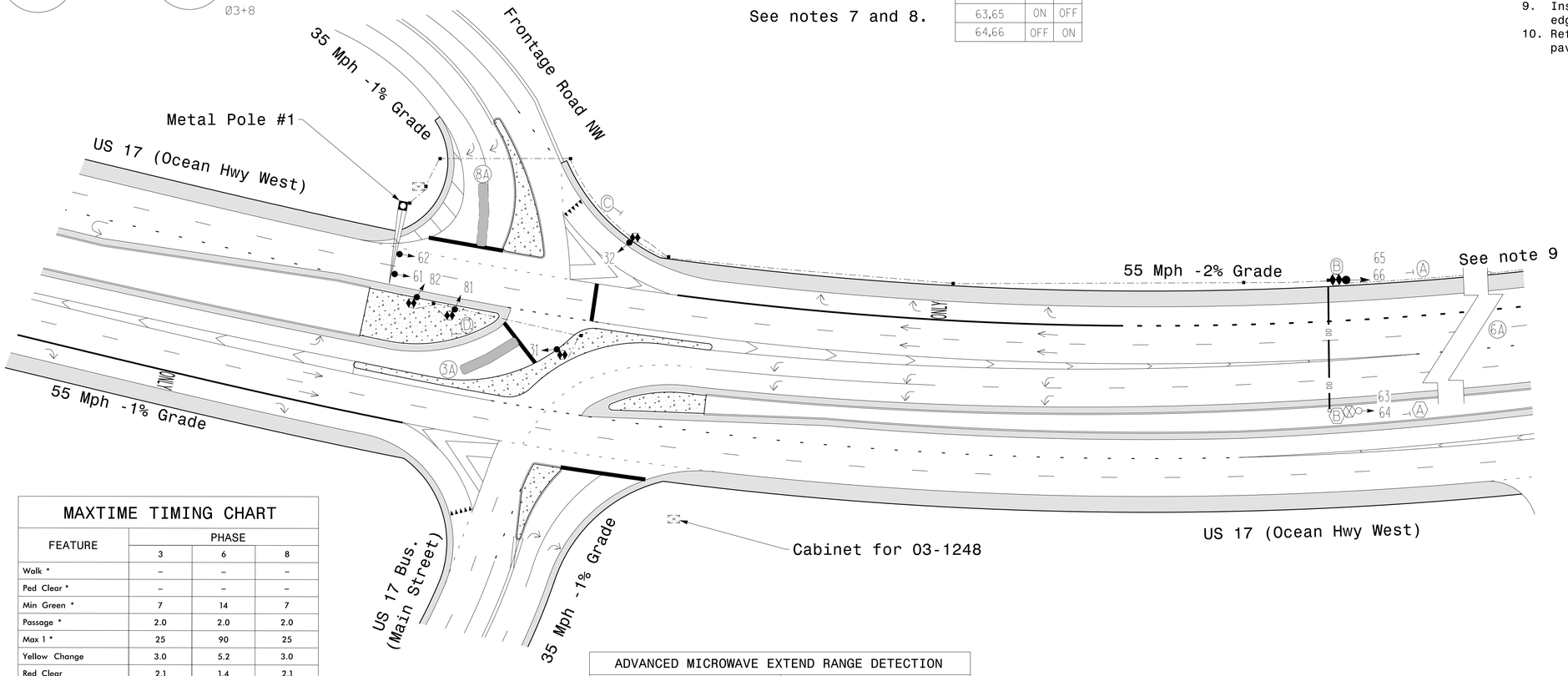
TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
63,65	ON	OFF
64,66	OFF	ON

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	*	0	*	X	3	15**	-	X	-	X	-	*
8A	*	0	*	-	8	15	-	X	-	X	-	*

* Multizone microwave detection zone.
** Disable delay during alternate phasing operation



MAXTIME TIMING CHART

FEATURE	PHASE 3	PHASE 6	PHASE 8
Walk *	–	–	–
Ped Clear *	–	–	–
Min Green *	7	14	7
Passage *	2.0	2.0	2.0
Max 1 *	25	90	25
Yellow Change	3.0	5.2	3.0
Red Clear	2.1	1.4	2.1
Added Initial *	–	–	–
Maximum Initial *	–	–	–
Time Before Reduction *	–	–	–
Time To Reduce *	–	–	–
Minimum Gap	–	–	–
Advance Walk	–	–	–
Pre-Clearance	–	3.0	–
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 phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ADVANCED MICROWAVE EXTEND RANGE DETECTION

FUNCTION	Sensor 1 (6A)		
Channel	1		
Phase	6		
Direction of Travel	NB		
Type	PRIORITY		
Level	1	2	QUEUE
Discovery Zone (ft)	>=750	<750	N/A
Range (ft)	100-900	100-600	100-150
Enable Speed	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 14.0

2 Phase Fully Actuated Signal System #:DO3-14_Shallotte

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector unitS to presence mode.
4. The Division Traffic Engineer will determine the hours of use for each phasing plan.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Activate flashers 3 seconds prior to end of phase 6 green.
8. Flash vertically-mounted beacons alternately.
9. Install new conduit as close as possible to edge of pavement.
10. Refer to the Pavement Marking Plans for pavement marking details.

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	●
⊗	Type III Signal Pedestal	◆
▬	Detection Zone	▬
⊠	Controller & Cabinet	⊠
□	Junction Box	■
N/A	Curb Ramp	◢
----	2-in Underground Conduit	----
—DD—	Directional Drill	N/A
N/A	Right of Way	— — —
→	Directional Arrow	→
○◁	Metal Pole with Mastarm	■◁

Ⓐ Signal Ahead Sign (W3-3)
Ⓑ "BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)
Ⓒ "YIELD" Sign (R1-2)
Ⓓ No U-Turn Sign (R3-4)

Signal Upgrade-Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for: Transportation Mobility and Safety Division, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, Signal Design Section

US 17 (Ocean Highway W) at Frontage Rd NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR JR.
Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 3/31/2025

SIG. INVENTORY NO. 03-1249

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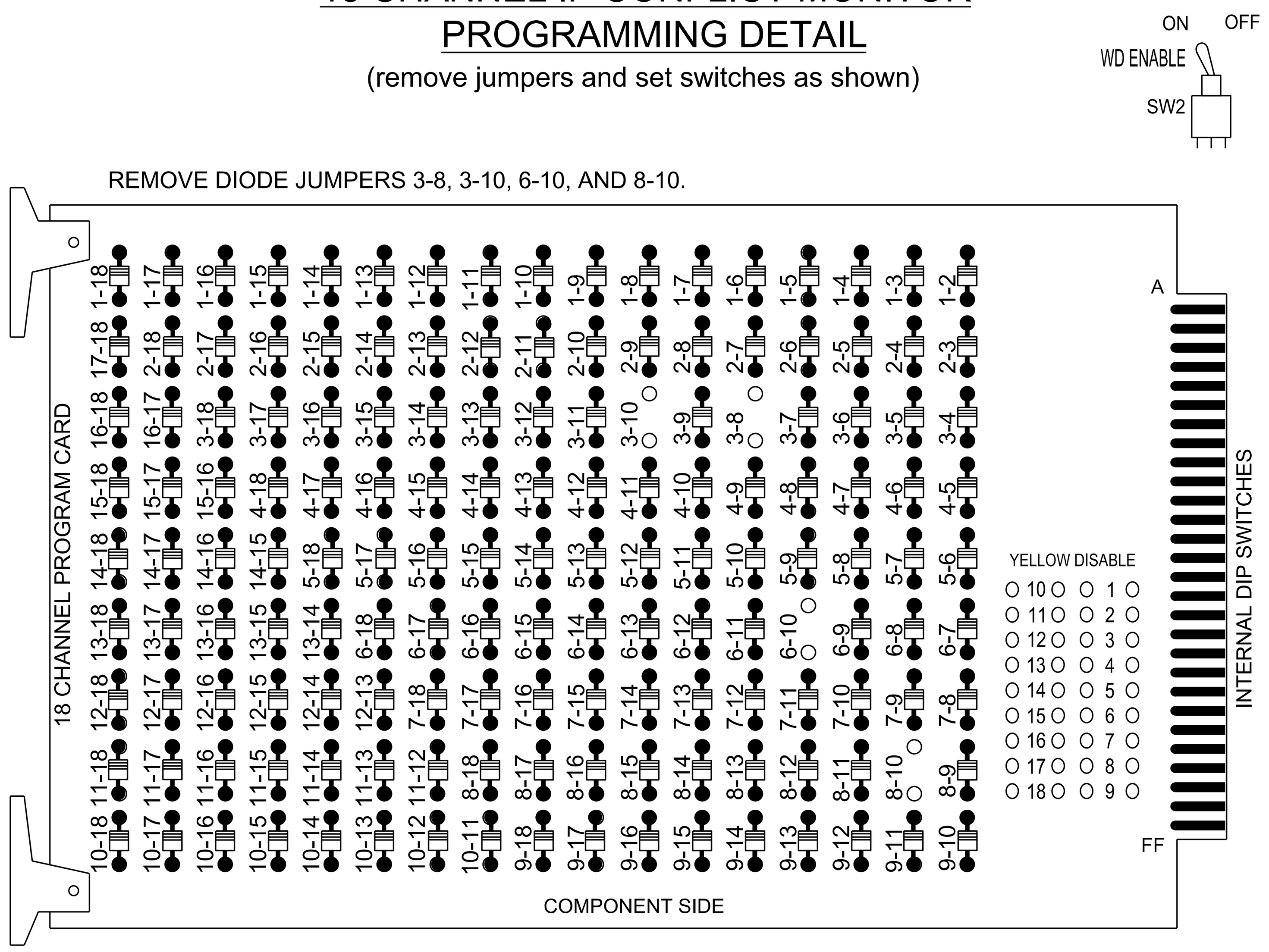
Fax:919.789.9591
License: F-0453
750 N.Greenfield Pkwy,Garner,NC 27529

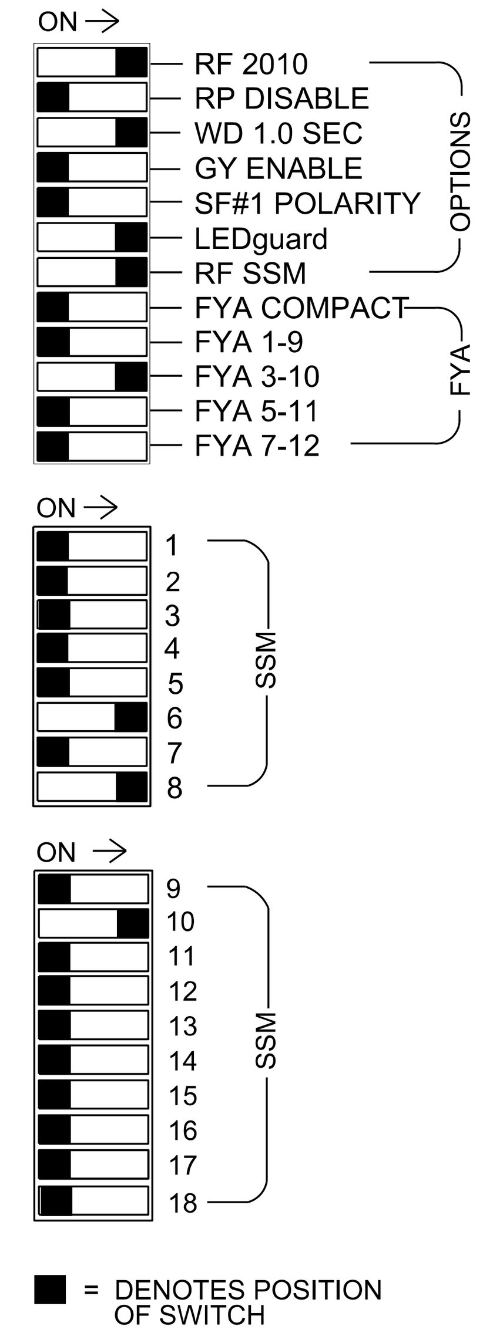
3/31/2025
R-5857_SIG_DSN.dgn
USER:ndegbotse

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 3 and 8 for Dual Entry.
3. Program controller to start up in phase 6 Green No Walk.
4. Program phases 6 for Advanced Warning.
5. Program phases 6 for 3.0 seconds Pre Clearance.
6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
7. The cabinet and controller are part of the D03-14 Shallotte Signal System.

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.14.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2																		
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	ADVANCE BEACON	5	6	6 PED	7	8	8 PED	ADVANCE BEACON	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	NU	NU	★★ 31,32	NU	NU	63,65	NU	61,62	NU	NU	81,82	NU	64,66	NU	★★ 31,32	NU	NU	NU	NU
RED									134			107								
YELLOW				*					135											
GREEN									136											
RED ARROW																A124				
YELLOW ARROW												108				A125				
FLASHING YELLOW ARROW																A126				
GREEN ARROW				118								109								
(hand)																				
PED YELLOW							** 105							** 111						
(walk)						*							*							

NU = Not Used

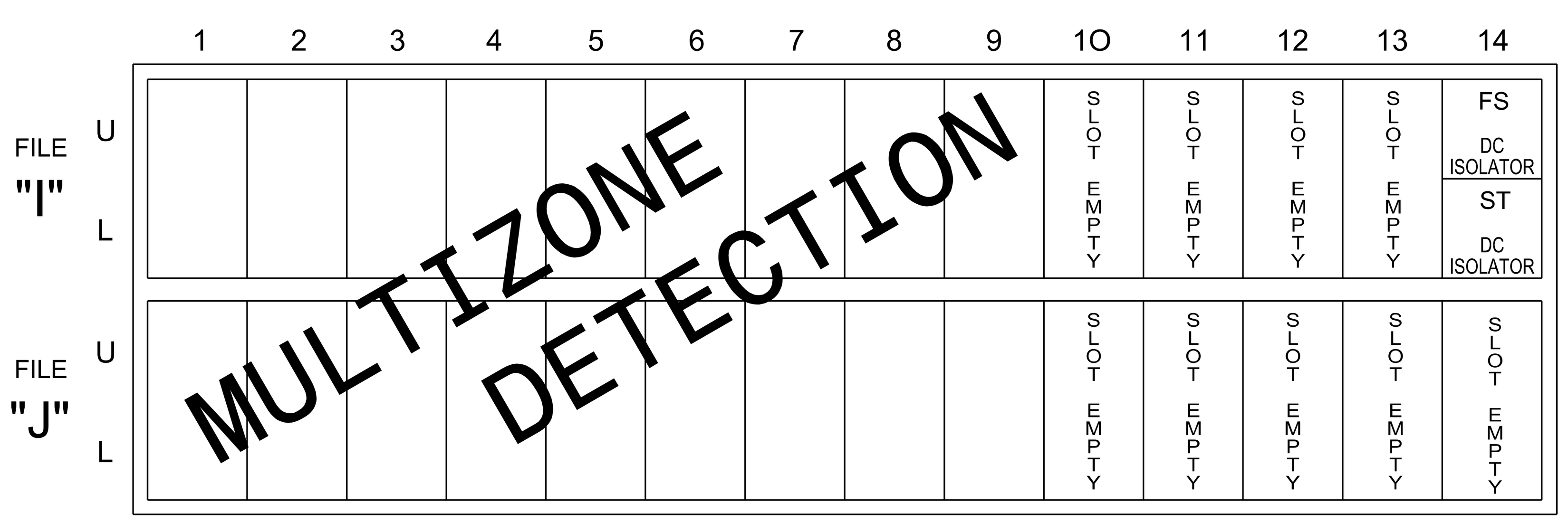
* Denotes install load resistor. See load resistor installation detail this sheet.

** Outputs have been reassigned for Advanced Beacons. See Sheet 3 for reassignment programming and wiring details.

★ See pictorial of head wiring in detail on this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

Alternate Phasing Programming on Sheet 2 assumes default MAXTIME detector assignments and layouts. as shown in the Input File Chart below.

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		X		X	

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

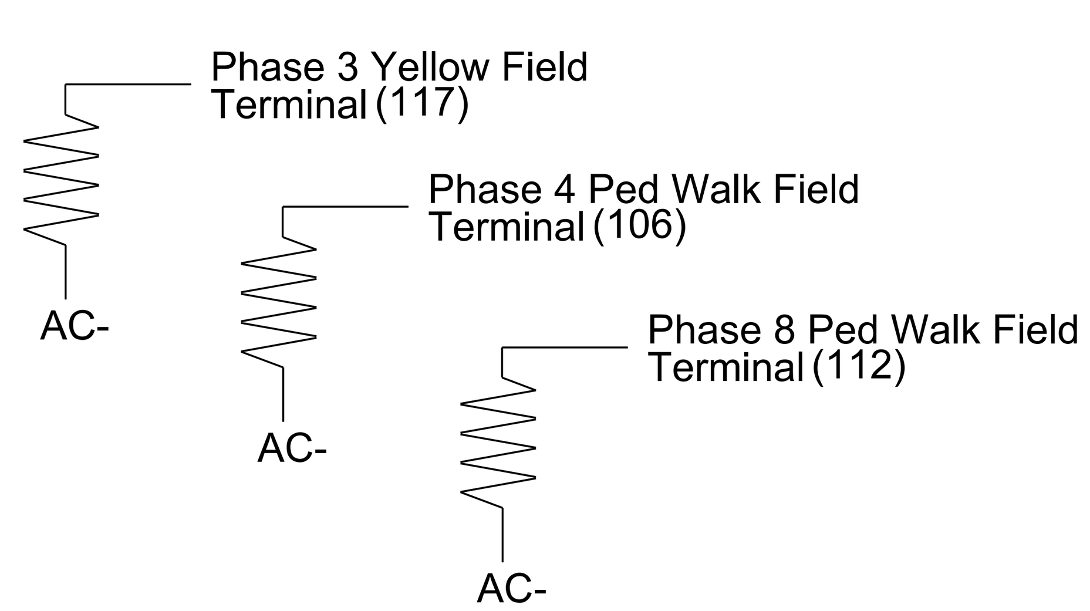
EQUIPMENT INFORMATION

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, S6**, S8, S11, S12**, AUX S2
Phases Used.......................................3, 6, 8
Overlap "1"..NOT USED
Overlap "2"..*
Overlap "3"..NOT USED
Overlap "4"..NOT USED
*See overlap programming detail on sheet 2
**Used for advance beacons only

LOAD RESISTOR INSTALLATION DETAIL

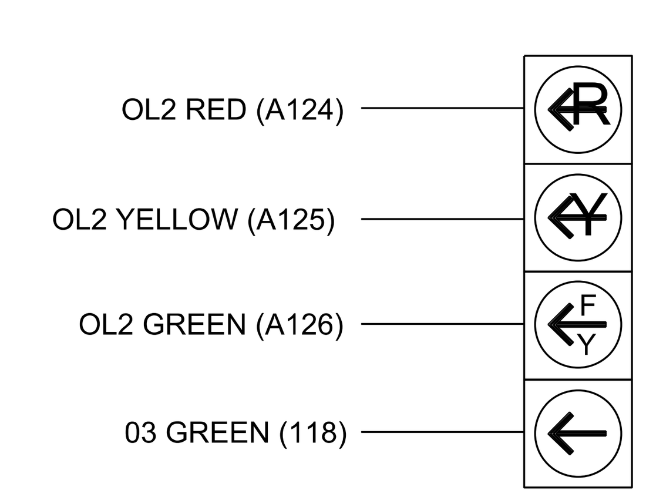
(install resistors as shown)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



31,32

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1249
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical Detail - Sheet 1 of 3

Electrical and Programming Details For:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 17 (Ocean Highway W)
at
Frontage Road NW

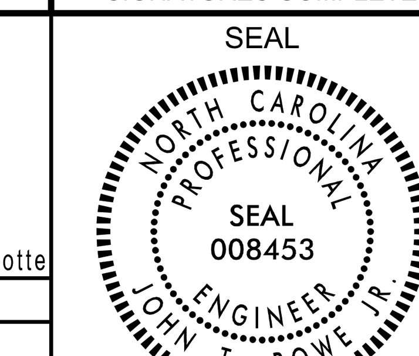
Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025 | REVIEWED BY: GG Murr, Jr.

PREPARED BY: JT Rowe | REVIEWED BY:

REVISIONS | INIT. | DATE

SEAL



Signed by: John T. Rowe, Jr. 4-1-2025

DATE

SIG. INVENTORY NO. 03-1249

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License: F-0453

4/7/2025
...\451249_sm_ele_2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.14.2

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

← NOTICE CHANGES IN INCLUDED PHASE ROW

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

	Detector	Call Phase	Delay
3A	7	3	0

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.

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
NOTICE CHANNEL 2 FLASHES RED →	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
NOTICE CHANNEL 6 FLASHES RED →	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED →	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED →	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
PROGRAM CHANNEL 20 AS	19	None	0				19
ADV. WARNING FLASHER →	20	Adv. Warning Flasher	6				20

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: 03-1249
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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License: F-0453

Electrical and Programming Details For:

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

US 17 (Ocean Highway W)
at
Frontage Road NW)

Division 3 | Brunswick County | Shallotte

	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.

Signed by: John T. Rowe, Jr. 4-1-2025
DEFFA3200BF7407 DATE

SIG. INVENTORY NO. 03-1249

4/1/2025
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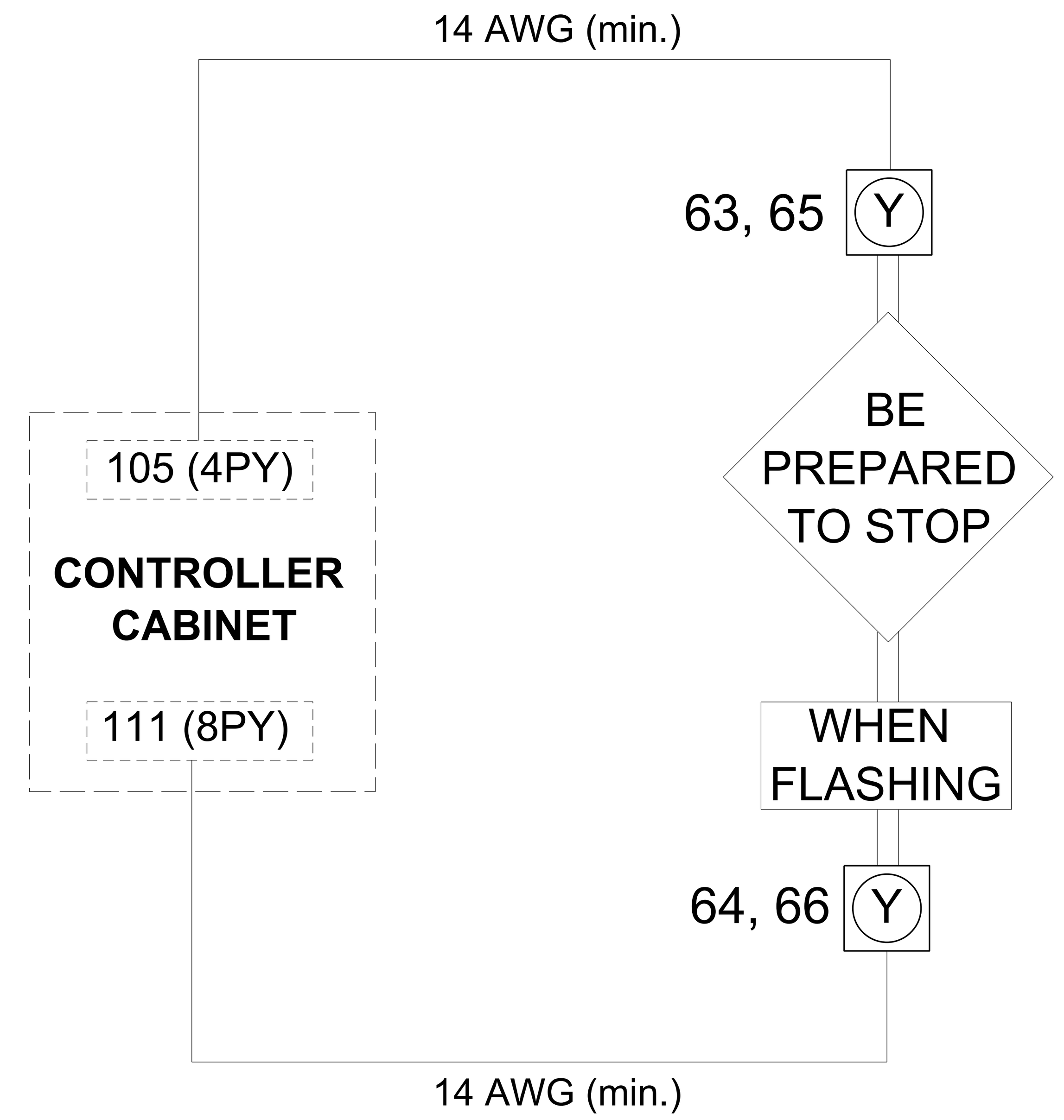
USER:default

ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)



IMPORTANT

1. IF CONNECTED REMOVE, TAPE, AND LABEL CONFLICT MONITOR WIRE ATTACHED TO THE REAR OF TERMINAL 105 (4PY) AND TERMINAL 111 (8PY).

2. INSET LOADSWITCHES FOR S6 AND S12.

3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.

4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 35 AND 36 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 63, 64, 65, & 66

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
35	C1-37	Channel Green Walk Driver	20
36	C1-38	Channel Red Do Not Walk Driver	20

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 DETECTION PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING".

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1249
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 17 (Ocean Highway W)
at
Frontage Road NW

Division 3 | Brunswick County | Shallotte

March 2025 | REVIEWED BY: GG Murr, Jr.

PREPARED BY: JT Rowe | REVIEWED BY:

REVISIONS	INIT.	DATE

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

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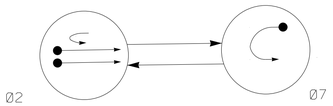
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.
Signed by: John T. Rowe, Jr 4-1-2025
DATE

SIG. INVENTORY NO. 03-1249

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 15.0

2 Phase
Fully Actuated
Signal System #: DO3-14_Shallotte

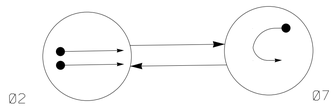
DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø7	PHASE FLASH
21,22	G	R	R
71,72	(Y)		(R)

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø7	PHASE FLASH
21,22	G	R	R
71,72	(R)		(R)

SIGNAL FACE I.D.

All Heads L.E.D.

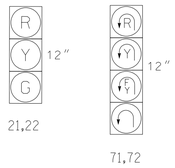
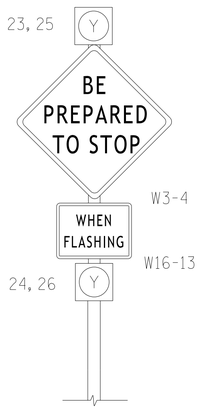


Figure 1



See notes 7 and 8

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
23,25	ON	OFF
24,26	OFF	ON

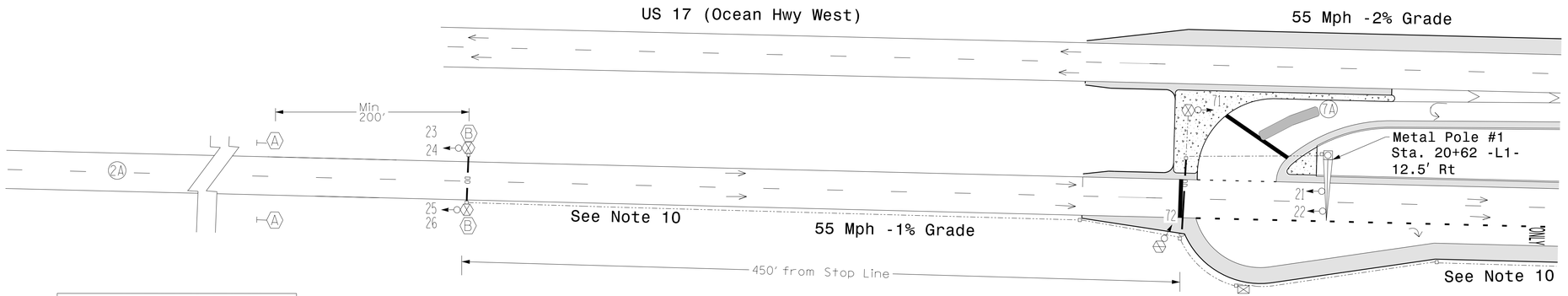
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
7A	*	0	*	X	7	15**	-	X	-	X	-	-

* Multi-zone microwave detection zone
** Disable delay during alternate phasing operation

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. The Division Traffic Engineer will determine the hours of use for each phasing plan.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Activate flashers 3 seconds prior to end of phase 2 green.
8. Flash vertically-mounted beacons alternately.
9. Route conduit back to signal cabinet 03-1248 for electrical service drop.
10. Install new conduit as close as possible to edge of pavement.
11. Refer to the Pavement Marking Plans for pavement markng details.



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	
	Type III Signal Pedestal	
	Detection Zone	
	Controller & Cabinet	
	Junction Box	
N/A	Curb Ramp	
	2-in Underground Conduit	
DD	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
A	Signal Ahead Sign (W3-3)	A
B	"BE PREPARED TO STOP" Sign (W4-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	B

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 7
Walk *	–	–
Ped Clear *	–	–
Min Green *	14	7
Passage *	2.0	2.0
Max 1 *	90	25
Yellow Change	5.3	3.0
Red Clear	1.1	5.0
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	–
Pre-Clearance	3.0	–
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 phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ADVANCED MICROWAVE EXTEND RANGE DETECTION

FUNCTION	Sensor 1 (2A)		
Channel	1		
Phase	2		
Direction of Travel	NB		
Type	PRIORITY		
Level	1	2	QUEUE
Discovery Zone (ft)	>=750	<750	N/A
Range (ft)	100-900	100-600	100-150
Enable Speed	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, NC Department of Transportation
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License: F-0453

US 17 NB (Ocean Highway W) at U-Turn South of US 17 Bus/Frontage Rd NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

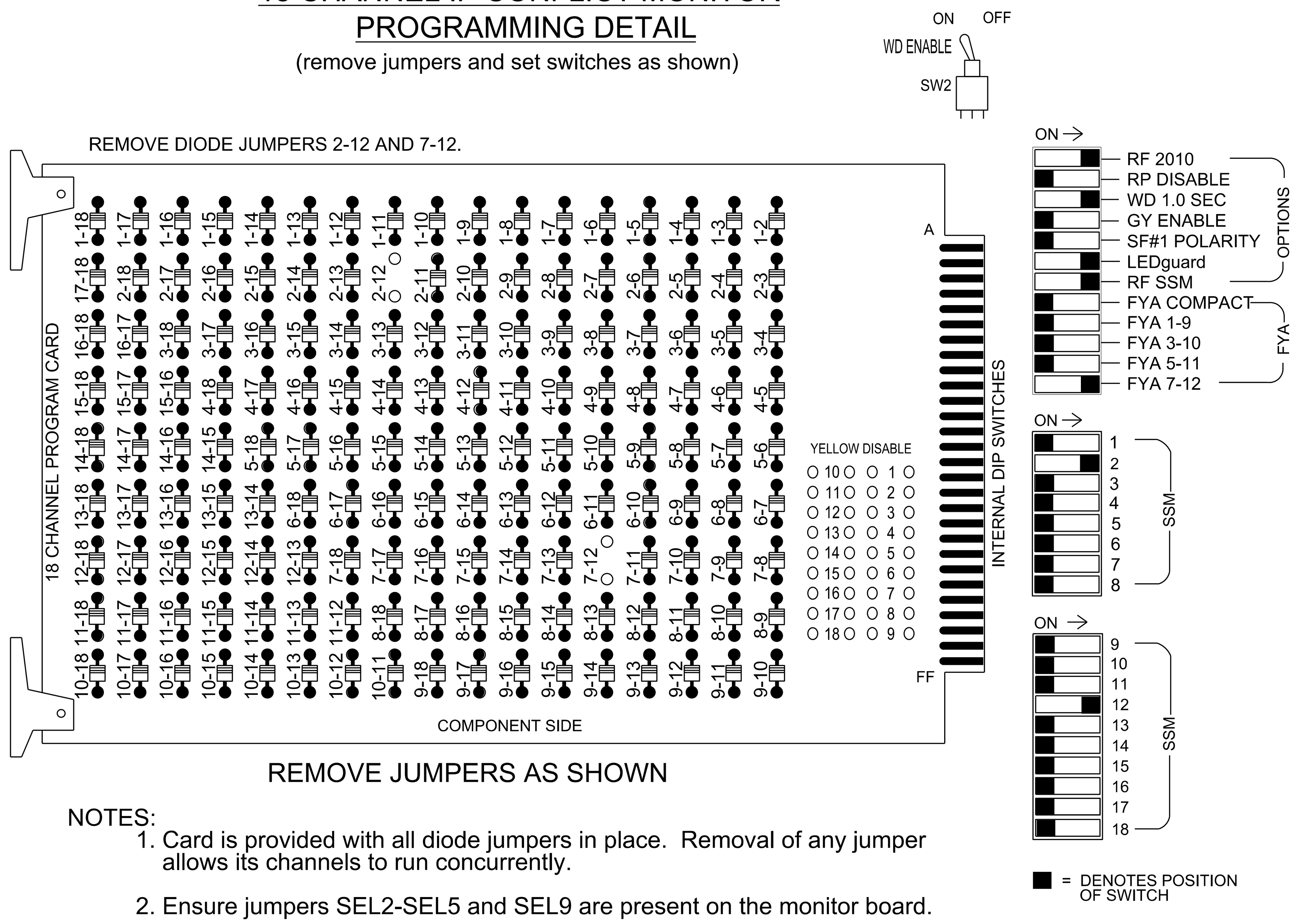
Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 3/31/2025

SIG. INVENTORY NO. 03-1250

3/31/2025
M:\R-5857_SIG_DSN_3.dgn
USER:default

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 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 phases 2 for Advanced Warning.
4. Program phases 2 for 3.0 seconds Pre Clearance.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the D03-14_Shallotte Signal System.

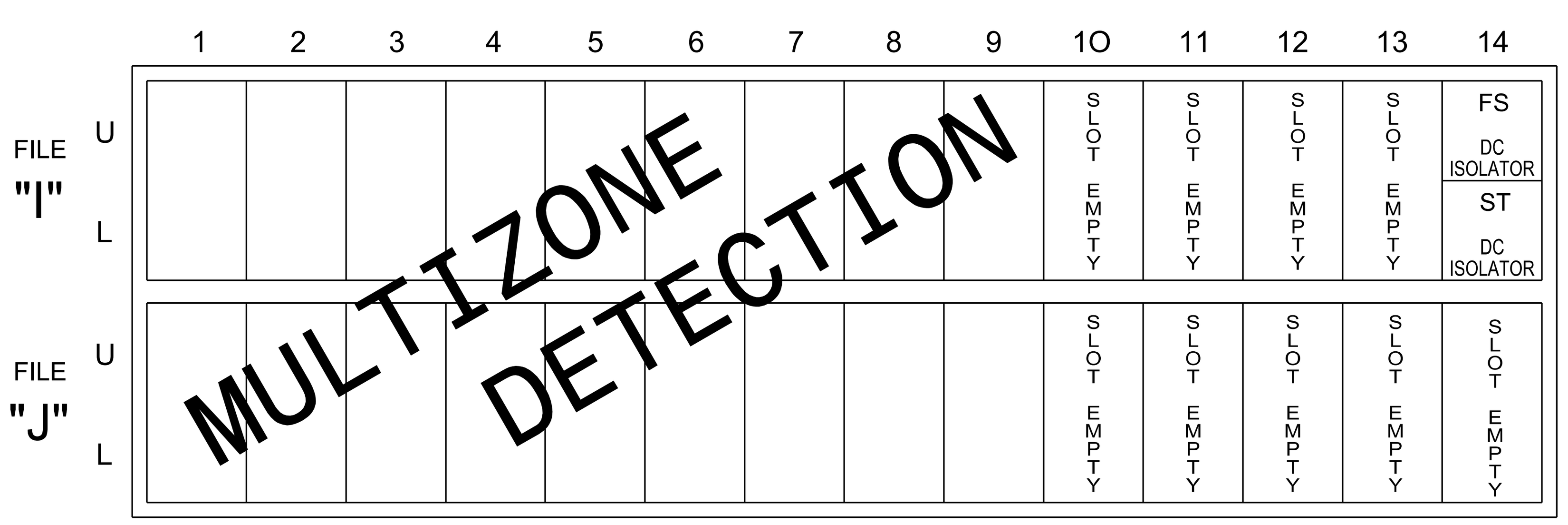
SIGNAL HEAD HOOK-UP CHART

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	ADVANCE BEACON	3	4	4 PED	5	6	6 PED	ADVANCE BEACON	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	21,22	NU	23,25	NU	NU	NU	NU	NU	NU	24,26	★★ 71,72	NU	NU	NU	NU	NU	NU	★★ 71,72	NU
RED		128																		
YELLOW		129										*								
GREEN		130																		
RED ARROW																			A101	
YELLOW ARROW																			A102	
FLASHING YELLOW ARROW																			A103	
GREEN ARROW												124								
(Don't Walk)																				
PED YELLOW				** 114							** 120									
(Walk)			*							*										

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
** Outputs have been reassigned for Advanced Beacons. See Sheet 3 for reassignment programming and wiring details.
★ See pictorial of head wiring in detail on this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

Alternate Phasing Programming on Sheet 2 assumes default MAXTIME detector assignments and layouts, as shown in the Input File Chart below.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
7A	TB5-5,6	J5U	57	19	21	7	15		X		X	

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

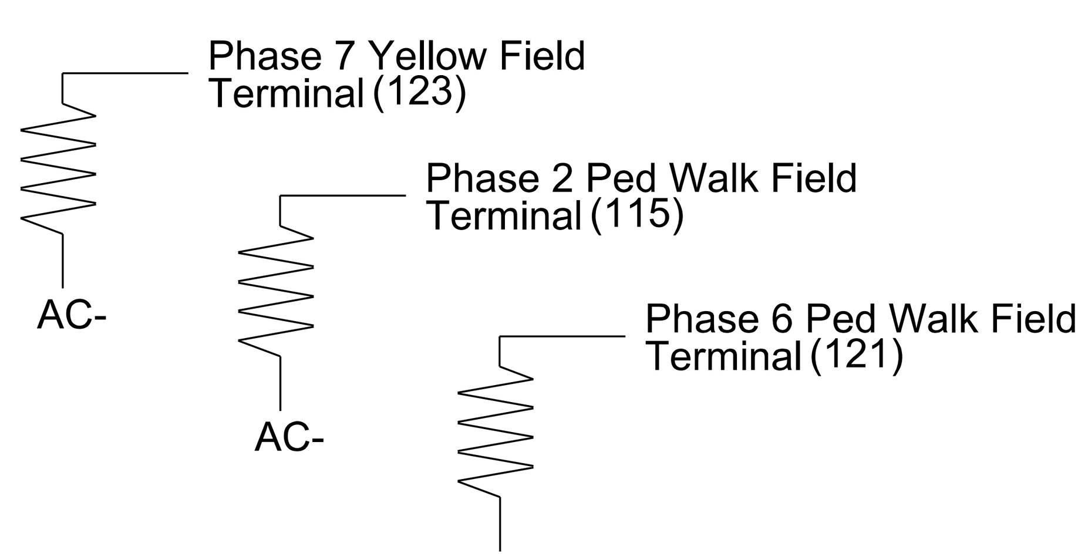
EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S2, S3**, S9**, 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
**Used for advance beacons only

LOAD RESISTOR INSTALLATION DETAIL

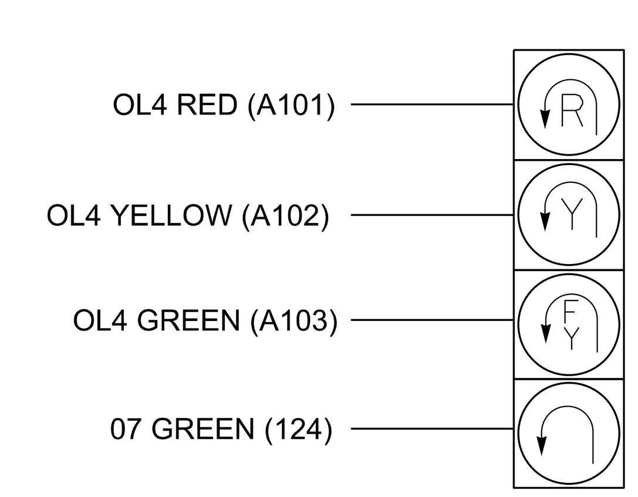
(install resistors as shown)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



71.72

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1250
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical Detail - Sheet 1 of 3

Electrical and Programming Details For:

US 17 NB (Ocean Highway West)
at
U-Turn South of US 17 Bus / Frontage Rd NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe REVIEWED BY:

REVISIONS INIT. DATE

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

TRANSYSTEMS
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License: F-0453

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.
Signed by: John T. Rowe, Jr. 4-1-2025
DATE

SIG. INVENTORY NO. 03-1250

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.15.2

OVERLAP PROGRAMMING 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	Off	Off	Off	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	1	2	3	4	
Type	Off	Off	Off	FYA 4 - Section	
Included Phases					← NOTICE CHANGES IN INCLUDED PHASE ROW
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

	Detector	Call Phase	Delay
7A	21	7	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
NOTICE CHANNEL 2 FLASHES RED →	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
NOTICE CHANNEL 6 FLASHES RED →	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED →	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED →	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
PROGRAM CHANNEL 19 AS ADV. WARNING FLASHER →	19	Adv. Warning Flasher	2				19
	20	None	0				20

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

MAXTIME 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: 03-1250
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Electrical and Programming Details For:

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

US 17 NB (Ocean Highway West)
at
U-Turn South of US 17 Bus / Frontage Rd NW

Division 3 | Brunswick County | Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.

Signed by: John T. Rowe, Jr. 4-1-2025
DEFEA3009F7407 DATE

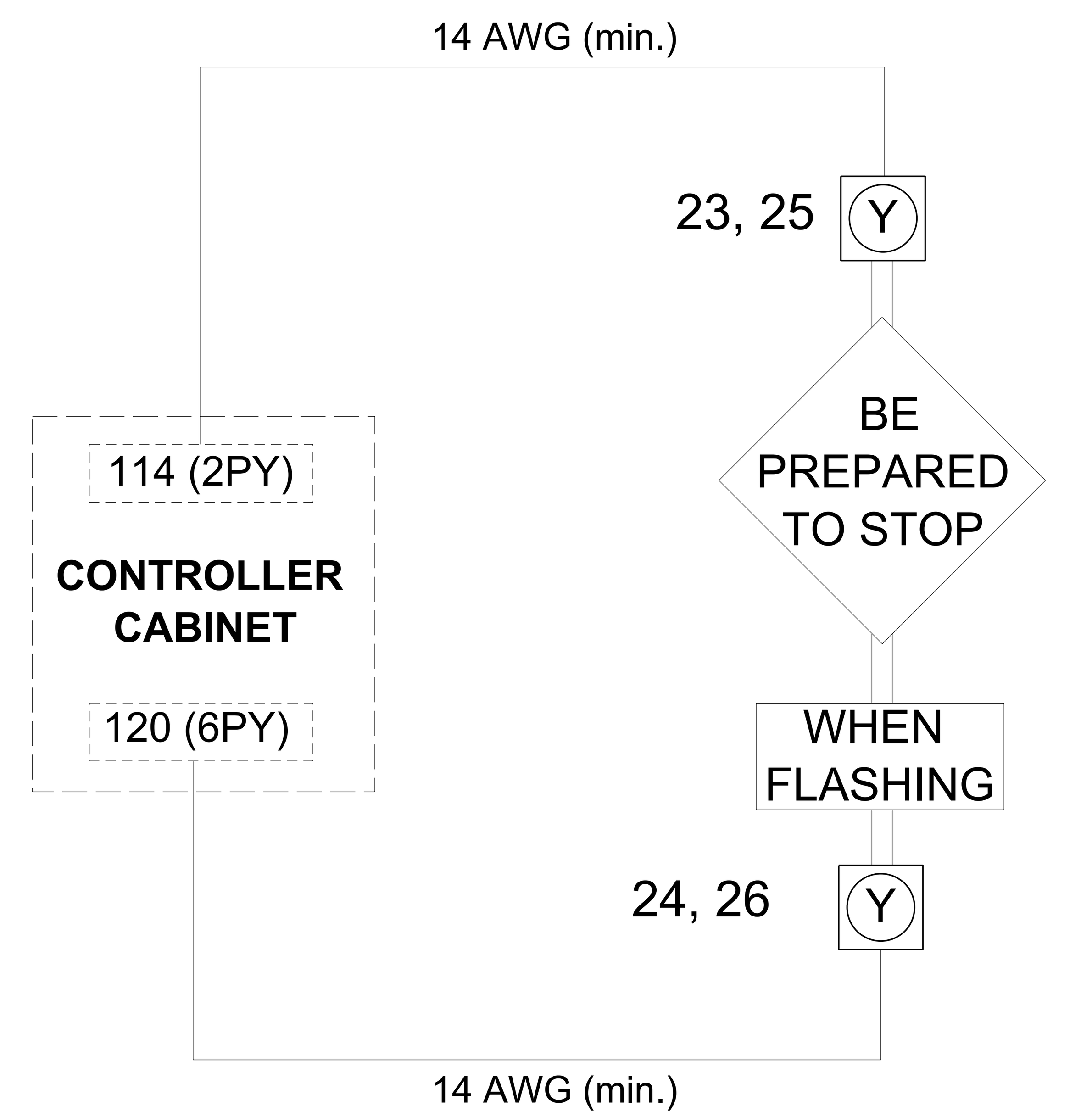
SIG. INVENTORY NO. 03-1250

4/1/2025
R-5857_250_sm_ele_2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.15.3

ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)



IMPORTANT

1. IF CONNECTED REMOVE, TAPE, AND LABEL CONFLICT MONITOR WIRE ATTACHED TO THE REAR OF TERMINAL 114 (2PY) AND TERMINAL 120 (6PY).
2. INSET LOADSWITCHES FOR S3 AND S9.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 33 AND 34 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 23, 24, 25, & 26

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Channel Green Walk Driver	19
34	C1-36	Channel Red Do Not Walk Driver	19

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 71 and 72 to run protected turns only.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1250
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

TRANSYSTEMS
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License: F-0453

Electrical and Programming Details For:

Prepared in 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

US 17 NB (Ocean Highway West)
at
U-Turn South of US 17 Bus / Frontage Rd NW

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.

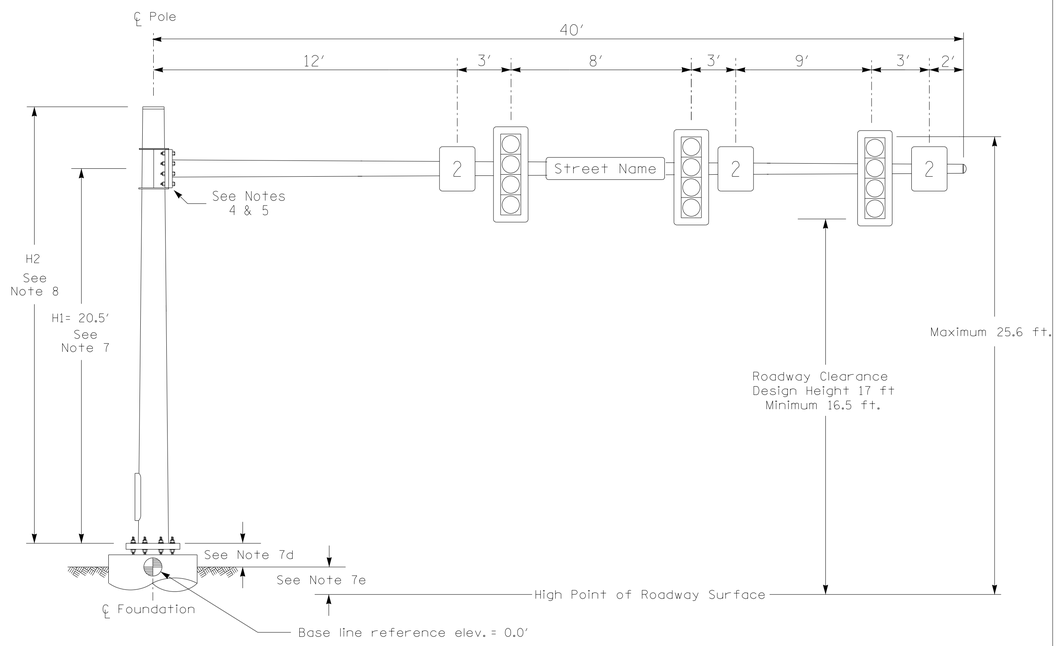
Signed by: John T. Rowe. Jr
DEFE832009E7407
4-1-2025
DATE

SIG. INVENTORY NO. 03-1250

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 15.4

Design Loading for METAL POLE NO. 1 (03-1250)



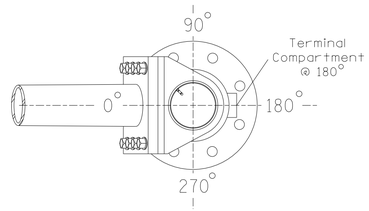
Elevation View

SPECIAL NOTE

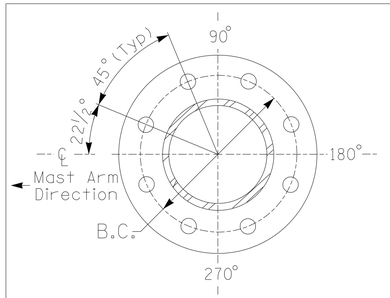
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

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	-0.72 ft.	
Elevation difference at Edge of travelway or face of curb	-0.72 ft.	

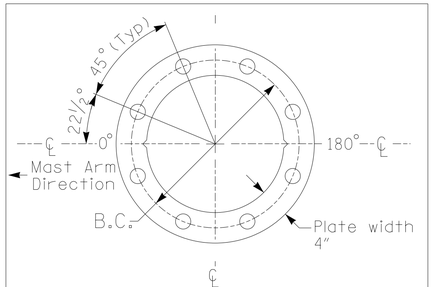


POLE RADIAL ORIENTATION



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″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″ W X 66.0″L	74 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0″ W X 36.0″L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″ W X 96.0″L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

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

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
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 1 (150 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17 NB (Ocean Highway W) at U-Turn South of US 17 Bus/Frontage Rd NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
3/31/2025

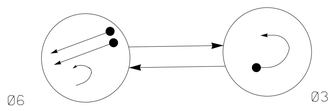
SIG. INVENTORY NO. 03-1250

3/31/2025
M:\Loading Diagram_Single Mast Arm (SB).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.16.0

2 Phase
Fully Actuated
Signal System #: D03-14_Shallotte

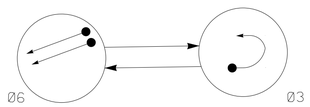
DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø3	PHASE FLASH
31,32	(G)	↶	(R)
61,62	G	R	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø3	PHASE FLASH
31,32	(R)	↶	(R)
61,62	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.

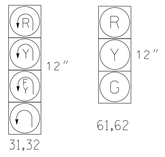
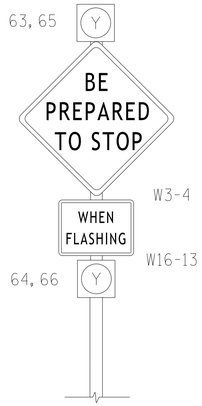


Figure 1



See notes 7 and 8

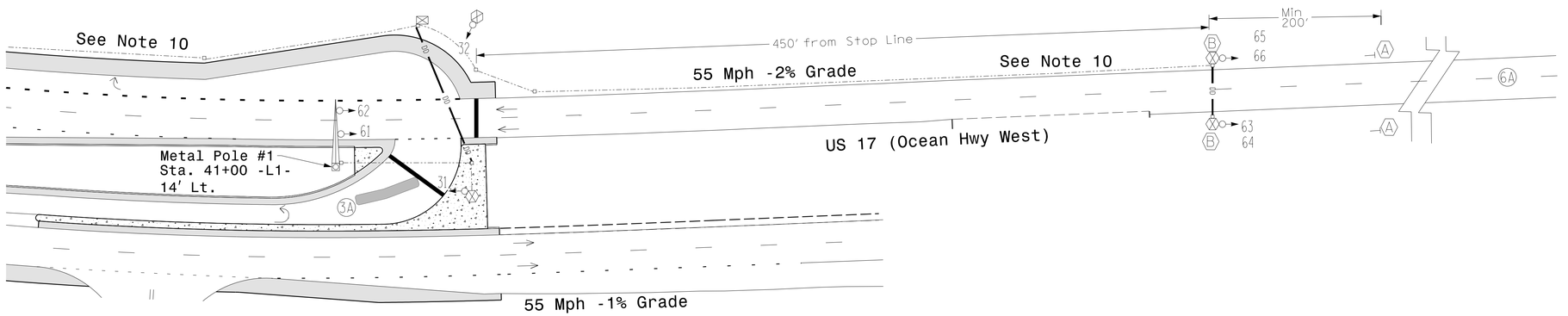
TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
63,65	ON	OFF
64,66	OFF	ON

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	*	0	*	X	3	15**	-	X	-	X	-	-

* Multizone microwave detection zone.
** Disable delay 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	
Ⓧ	Type III Signal Pedestal	Ⓧ
	Detection Zone	
⊠	Controller & Cabinet	⊠
□	Junction Box	■
N/A	Curb Ramp	
	2-in Underground Conduit	
DD	Directional Drill	N/A
N/A	Right of Way	
→	Directional Arrow	→
	Metal Pole with Mastarm	
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	Ⓑ

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. The Division Traffic Engineer will determine the hours of use for each phasing plan.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Activate flashers 3 seconds prior to end of phase 6 green.
8. Flash vertically-mounted beacons alternately.
9. Route conduit back to signal cabinet 03-1249 for electrical service drop.
10. Install new conduit as close as possible to edge of pavement.
11. Refer to the Pavement Marking Plans for pavement marking details.

MAXTIME TIMING CHART

FEATURE	PHASE 3	PHASE 6
Walk *	–	–
Ped Clear *	–	–
Min Green *	7	14
Passage *	2.0	2.0
Max 1 *	25	90
Yellow Change	3.0	5.4
Red Clear	4.6	1.0
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	–
Pre-Clearance	–	3.0
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 phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ADVANCED MICROWAVE EXTEND RANGE DETECTION

FUNCTION	Sensor 1 (6A)		
Channel	1		
Phase	6		
Direction of Travel	SB		
Type	PRIORITY		
Level	1	2	QUEUE
Discovery Zone (ft)	>=750	<750	N/A
Range (ft)	100-900	100-600	100-150
Enable Speed	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17 SB (Ocean Highway W) at U-turn North of US 17 Bus/Frontage RD NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 3/31/2025

SIG. INVENTORY NO. 03-1251

TRANSYSTEMS
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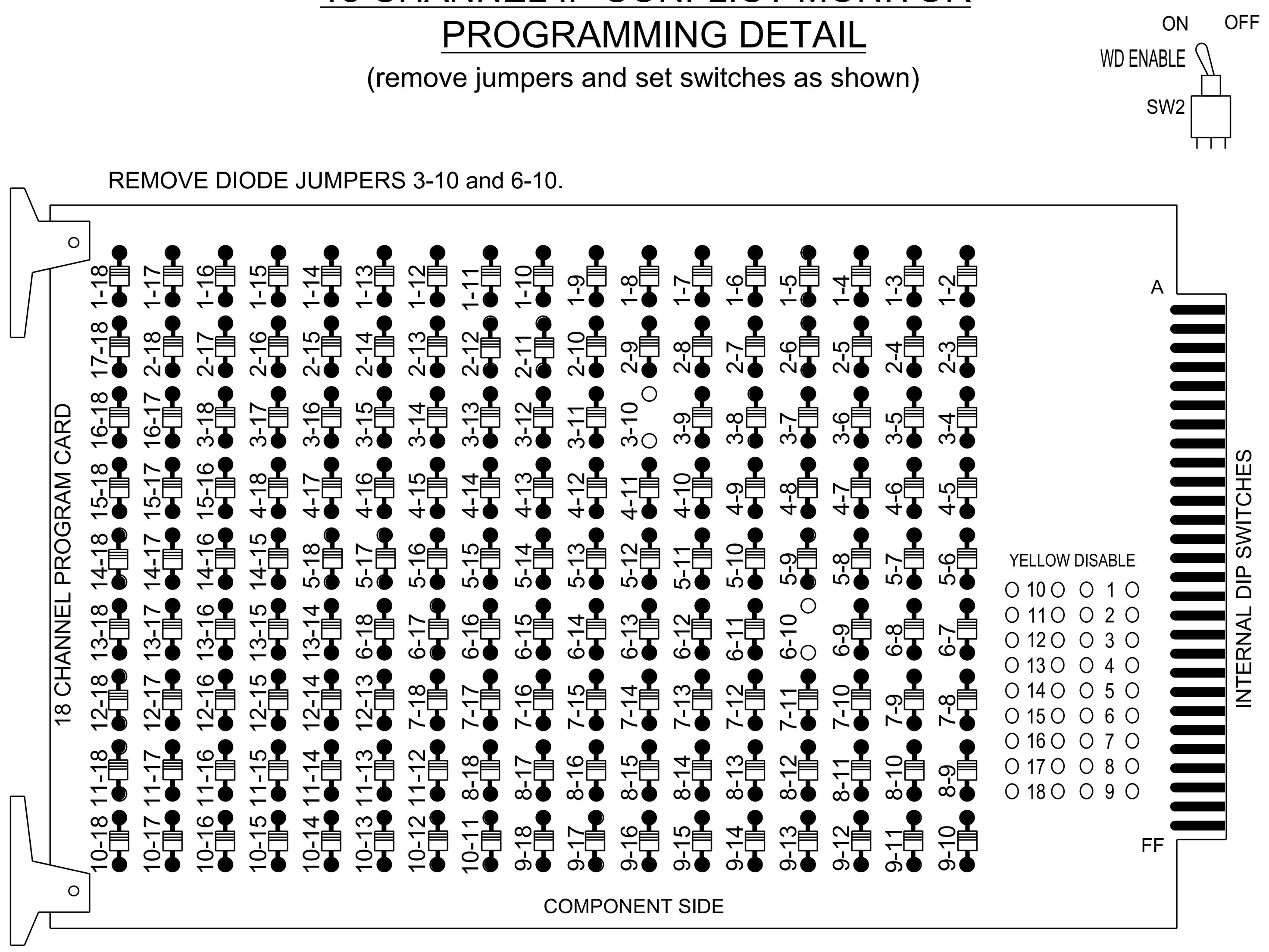
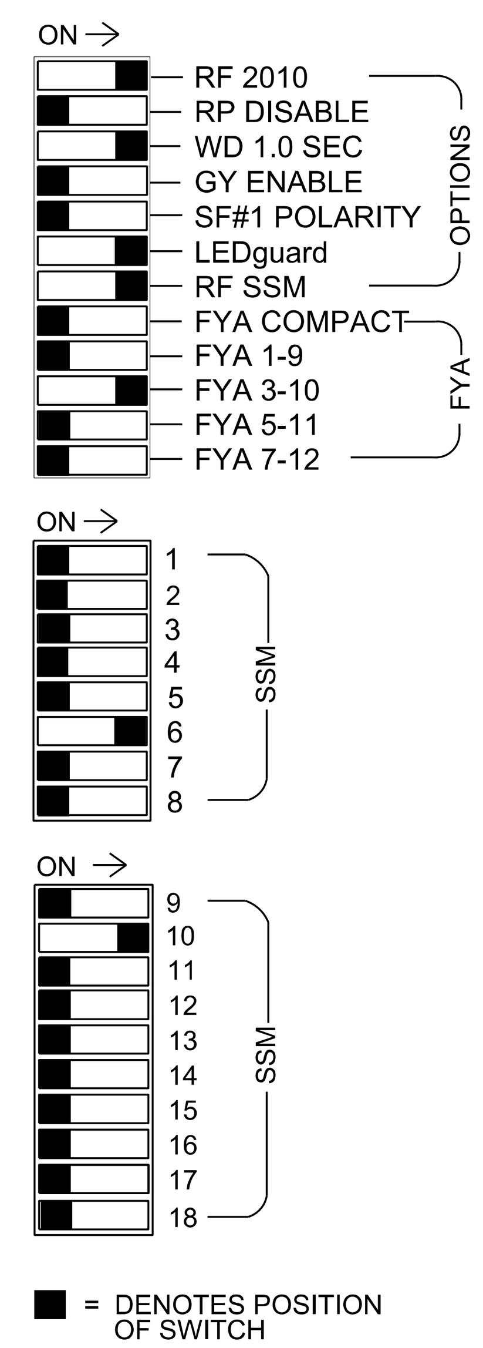
License: F-0453

3/31/2025
...#R-5857_SIG_DSN_4.dgn
USER:default

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)





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 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 phases 6 for Advanced Warning.
4. Program phases 6 for 3.0 seconds Pre Clearance.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the D03-14_Shallotte Signal System.

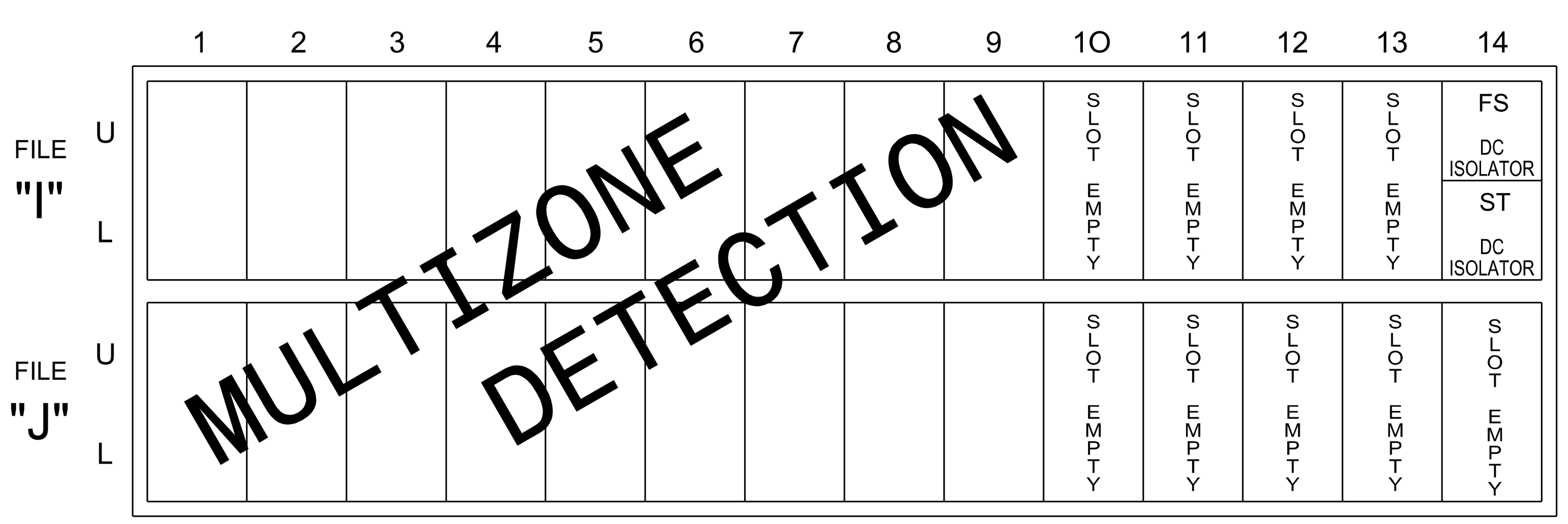
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S6	S7	S8	S9	S10	S11	S12	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	ADVANCE BEACON	5	6	6 PED	7	8	8 PED	ADVANCE BEACON	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	NU	NU	★★ 31,32	NU	NU	63,65	NU	61,62	NU	NU	NU	NU	64,66	NU	★★ 31,32	NU	NU	NU	NU
RED									134											
YELLOW				*					135											
GREEN									136											
RED ARROW																A124				
YELLOW ARROW																A125				
FLASHING YELLOW ARROW																A126				
GREEN ARROW				118																
(Don't Walk hand)																				
PED YELLOW							** 105							** 111						
(Walk person)						*							*							

NU = Not Used
★ Denotes install load resistor. See load resistor installation detail this sheet.
★★ Outputs have been reassigned for Advanced Beacons. See Sheet 3 for reassignment programming and wiring details.
★ See pictorial of head wiring in detail on this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

Alternate Phasing Programming on Sheet 2 assumes default MAXTIME detector assignments and layouts, as shown in the Input File Chart below.

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		X		X	

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

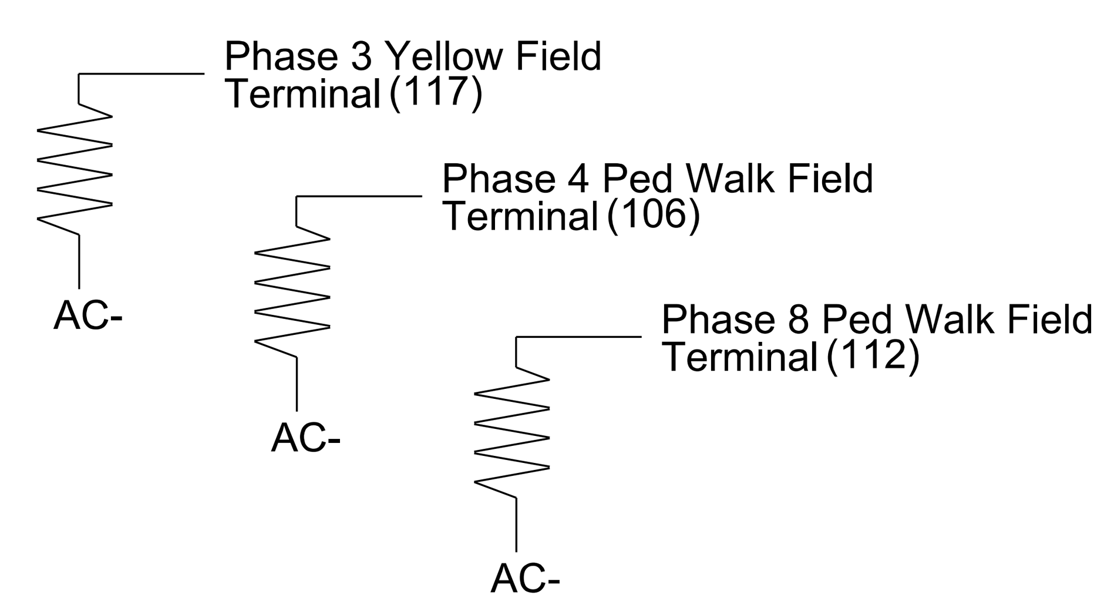
EQUIPMENT INFORMATION

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, S6**, S8, S12**, 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
**Used for advance beacons only

LOAD RESISTOR INSTALLATION DETAIL

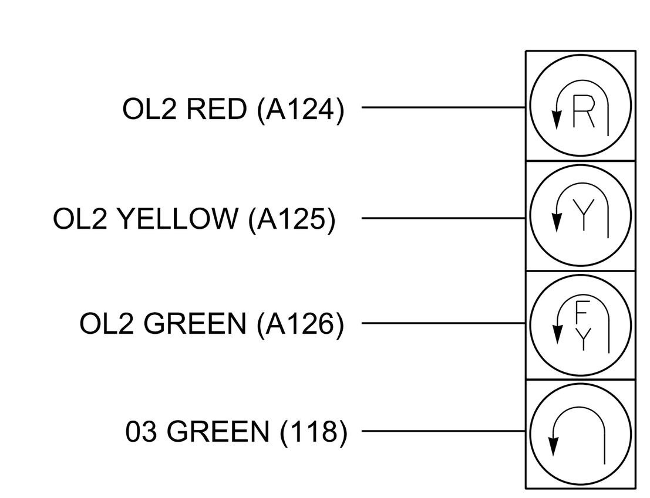
(install resistors as shown)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



31,32

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1251
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 17 SB (Ocean Highway West) at U-Turn North of US 17 Bus / Frontage Rd NW

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025 | REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe | REVIEWED BY:

REVISIONS | INIT. | DATE

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

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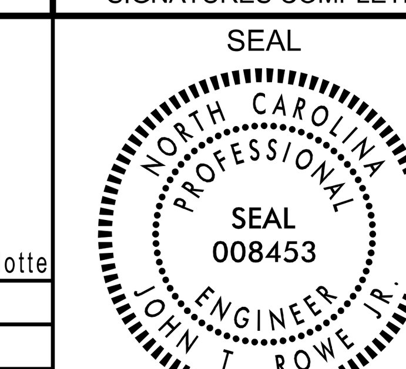
License: F-0453

SEAL



Signed by: John T. Rowe, Jr. 4-1-2025
DATE

SIG. INVENTORY NO. 03-1251

4/1/2025
USER:default

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

NOTICE CHANGES IN INCLUDED PHASE ROW

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

	Detector	Call Phase	Delay
3A	7	3	0

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
NOTICE CHANNEL 2 FLASHES RED	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
NOTICE CHANNEL 6 FLASHES RED	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED	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
	19	None	0				19
PROGRAM CHANNEL 20 AS ADV. WARNING FLASHER	20	Adv. Warning Flasher	6				20

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

MAXTIME 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: 03-1251
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

TRANSYSTEMS
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Electrical and Programming Details For:

US 17 SB (Ocean Highway West) at U-Turn North of US 17 Bus / Frontage Rd NW

Division 3 — Brunswick County — Shallotte

Prepared in 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

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

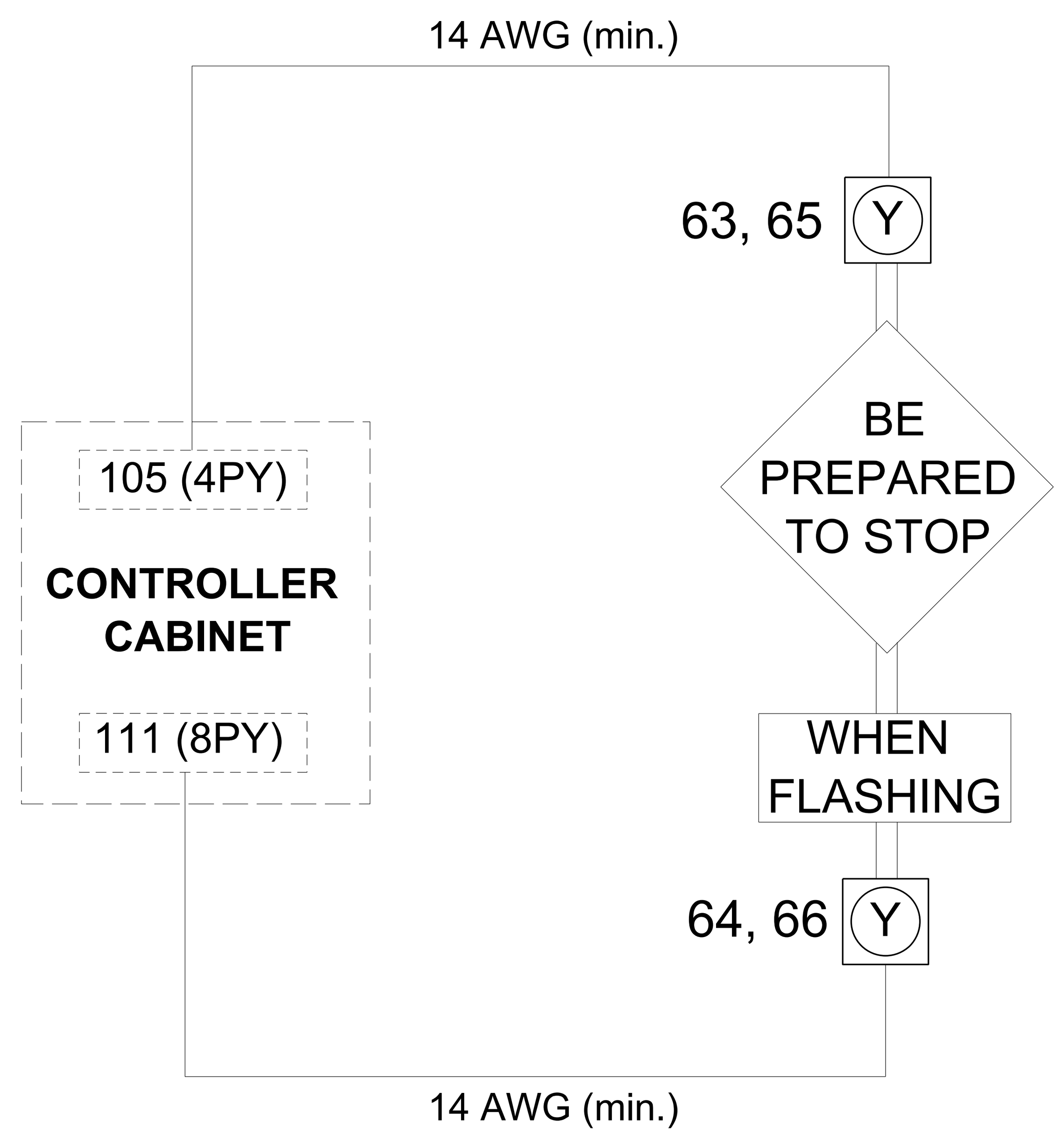
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE JR.
Signed by: John T. Rowe. Jr
DEFEE832009E7407...
4-1-2025
DATE

SIG. INVENTORY NO. 03-1251

ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)



IMPORTANT

1. IF CONNECTED REMOVE, TAPE, AND LABEL CONFLICT MONITOR WIRE ATTACHED TO THE REAR OF TERMINAL 105 (4PY) AND TERMINAL 111 (8PY).

2. INSET LOADSWITCHES FOR S6 AND S12.

3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.

4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 35 AND 36 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 63, 64, 65, & 66

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
35	C1-37	Channel Green Walk Driver	20
36	C1-38	Channel Red Do Not Walk Driver	20

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 DETECTION PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1251
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

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Electrical and Programming Details For:

Prepared in 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

US 17 SB (Ocean Highway West)
at
U-Turn North of US 17 Bus / Frontage Rd NW

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe	REVIEWED BY:

REVISIONS	INIT.	DATE

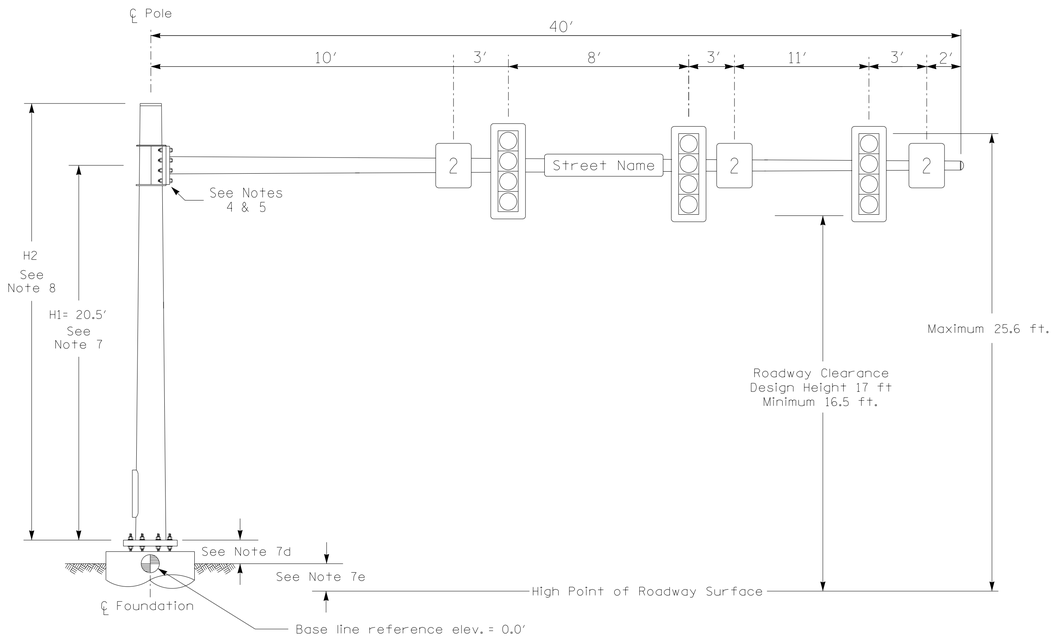
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 008453
JOHN T. ROWE JR.

Signed by:
John T. Rowe. Jr
DEFE832009E7407
4-1-2025
DATE

SIG. INVENTORY NO. 03-1251

4/1/2025
...*031251_sm_ele_2025xxyy.dgn
USER:default

Design Loading for METAL POLE NO. 1 (03-1251)



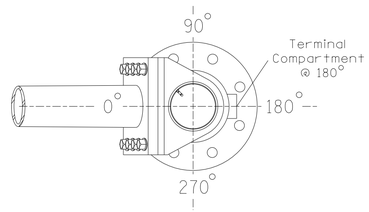
Elevation View

SPECIAL NOTE

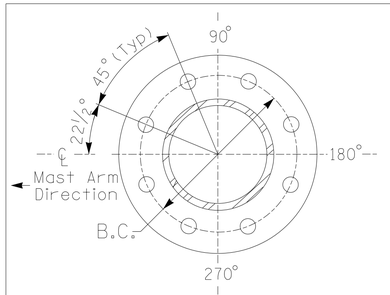
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

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	-0.70 ft.	
Elevation difference at Edge of travelway or face of curb	-0.70 ft.	

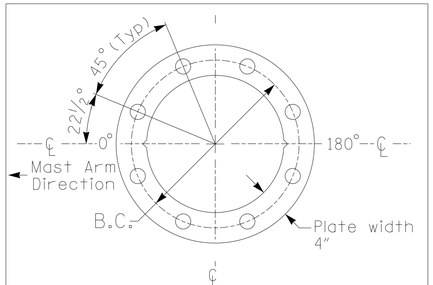


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 16.4

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
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0"L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

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

DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using 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 1 (150 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17 SB (Ocean Highway W) at U-Turn North of US 17 Bus/Frontage RD NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR JR.

Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
3/31/2025

SIG. INVENTORY NO. 03-1251

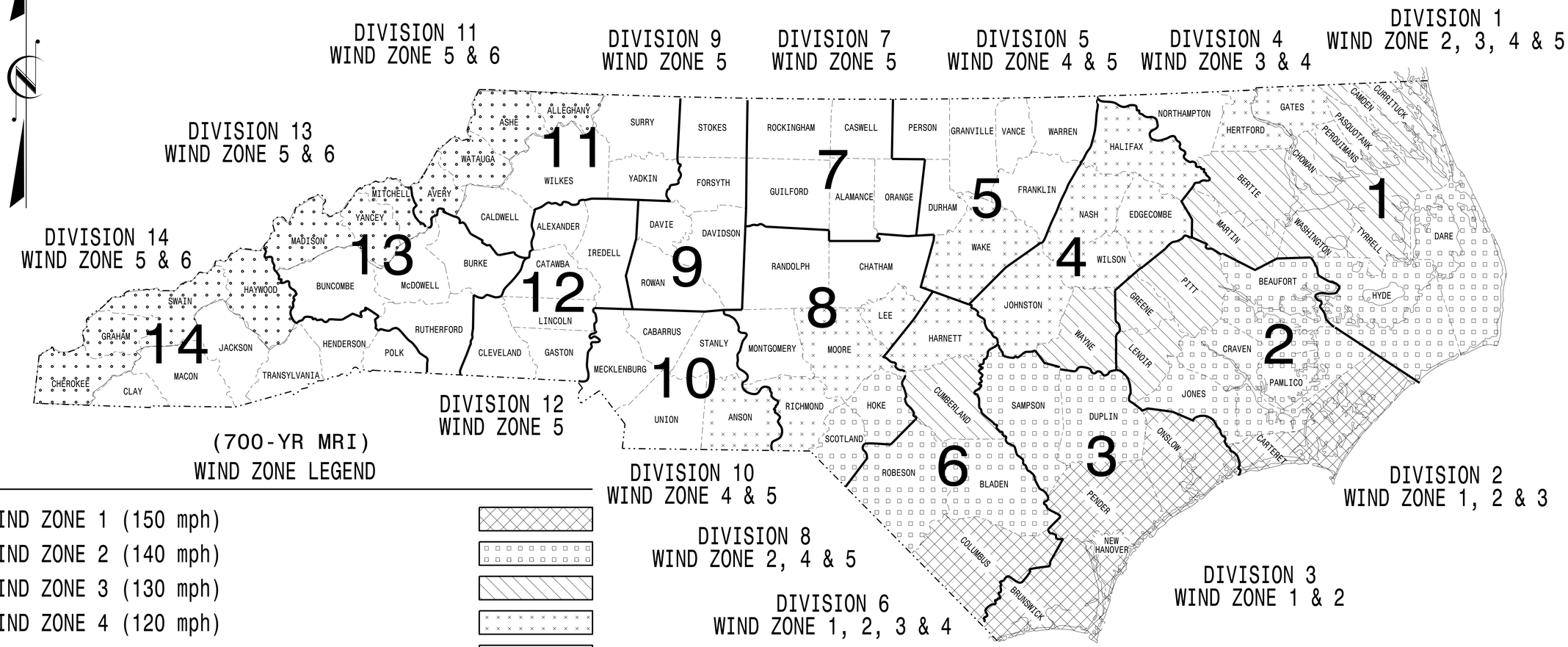
3/31/2025
M:\Detailing Diagram_Single Mast Arm (NB).dgn
USER:ndegbotse

PROJECT I.D.NO.	SHEET NO.
	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
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

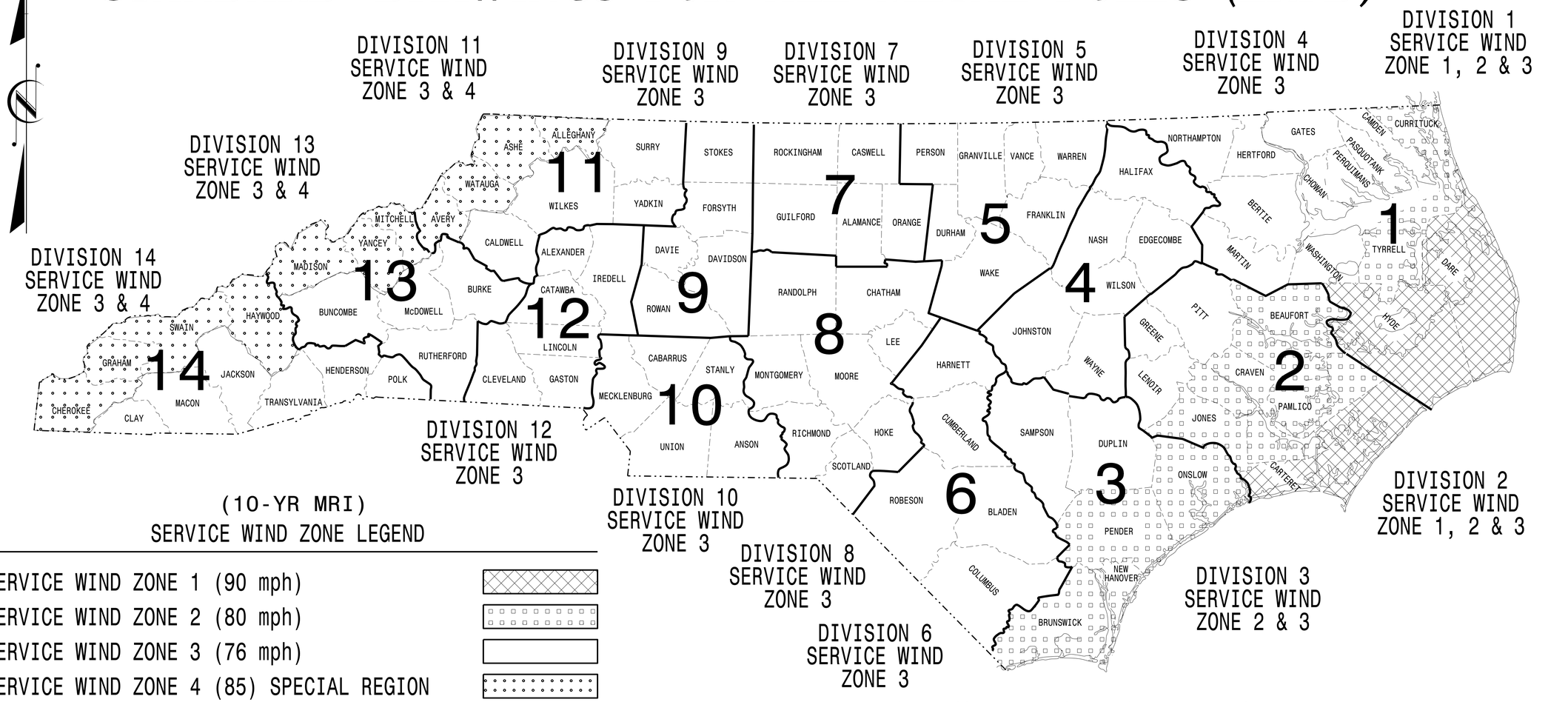
DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

PROJECT I.D.NO.	SHEET NO.
	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

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

NCDOT CONTACTS:

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

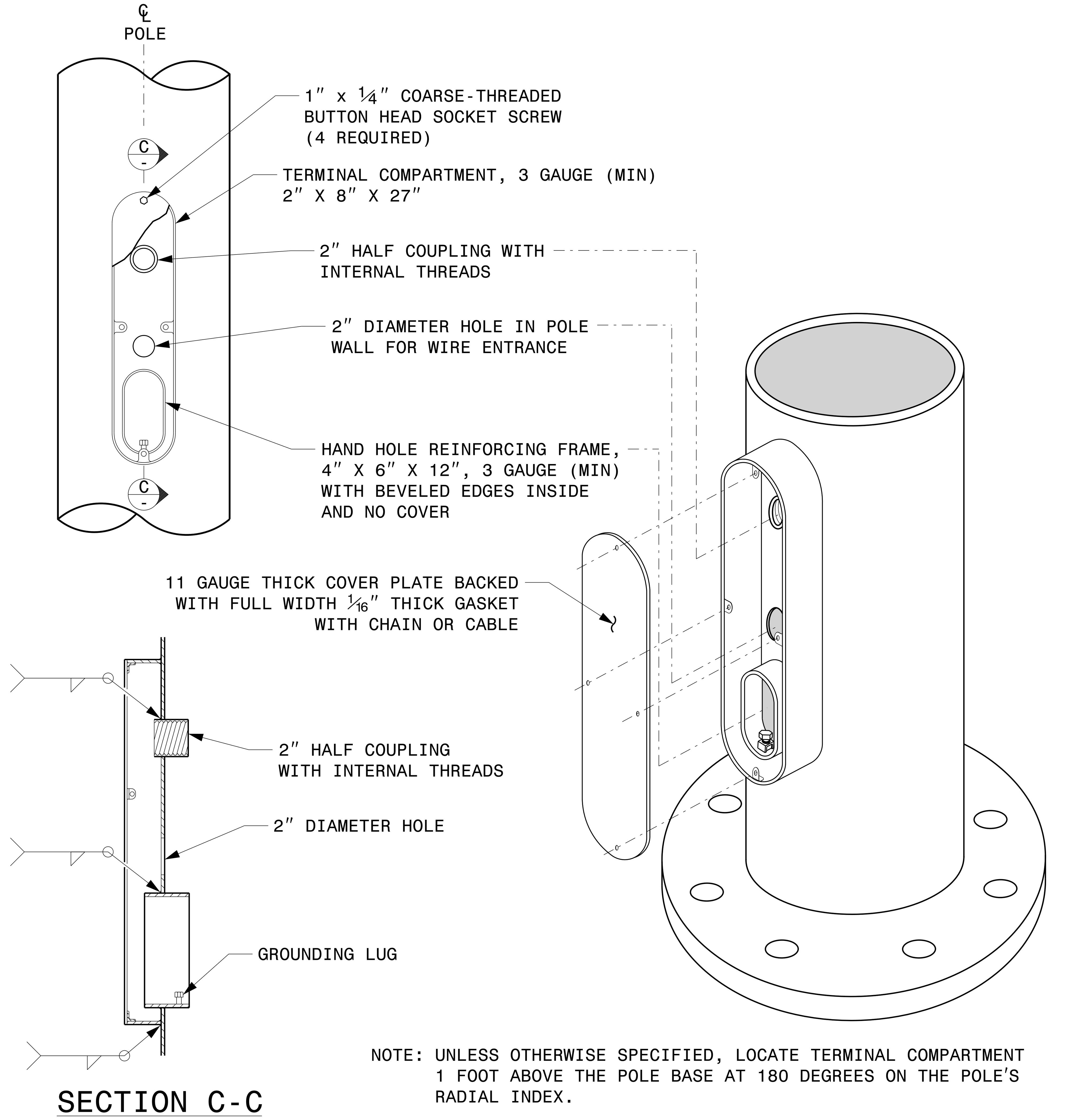
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

03-OCT-2023 12:21
S:\TSSGU\ITS Signals\Signal Design Section\Structures\Drawings\2024 Metal Pole Std Drawings for LRFD\2024 Sig. M1B Standard All Metal Pole (10-yr MRI).dgn
kcdurigon

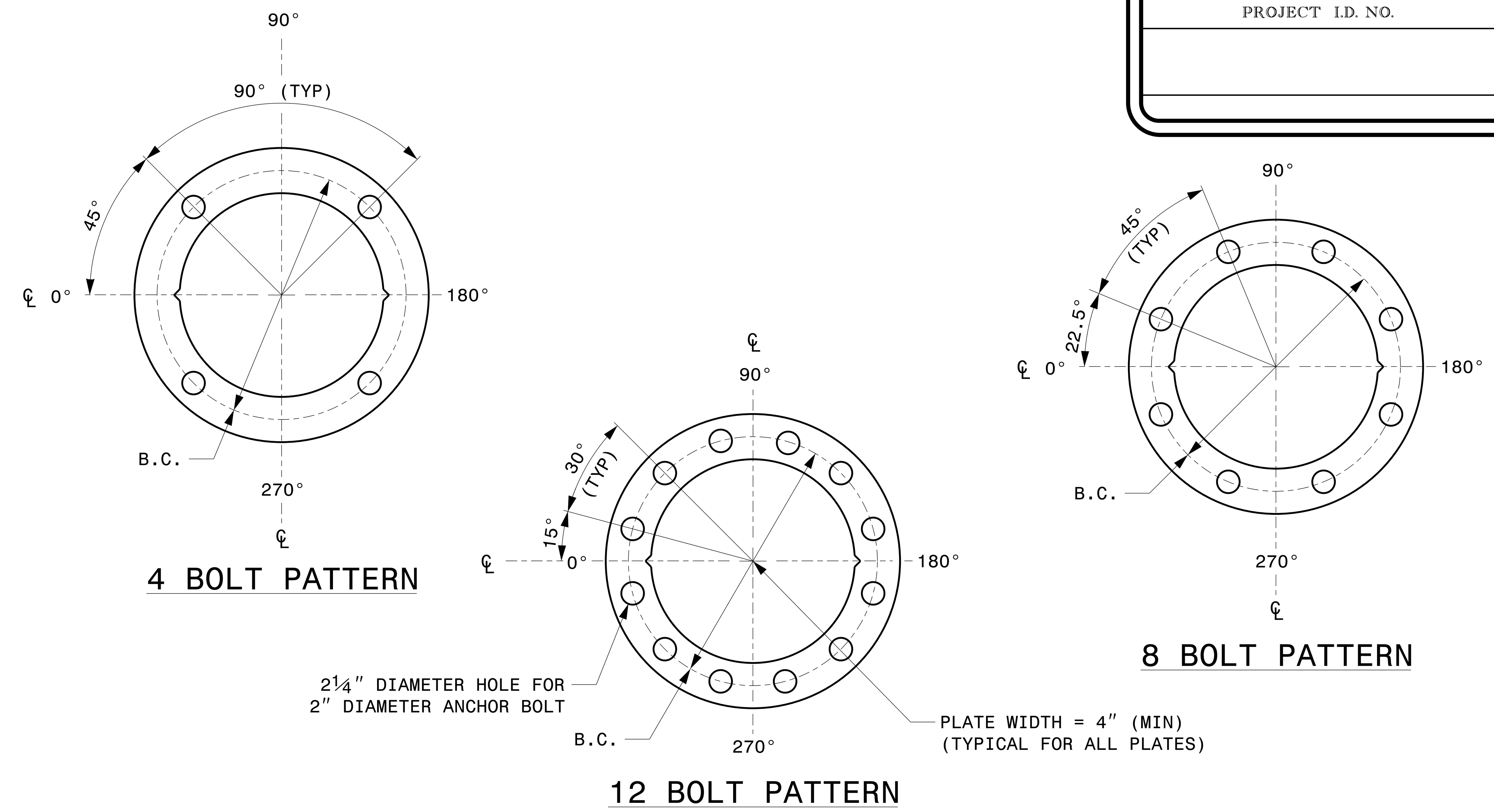
PROJECT I.D. NO.	SHEET NO.
	Sig.M2

Fabrication Details – All Metal Poles



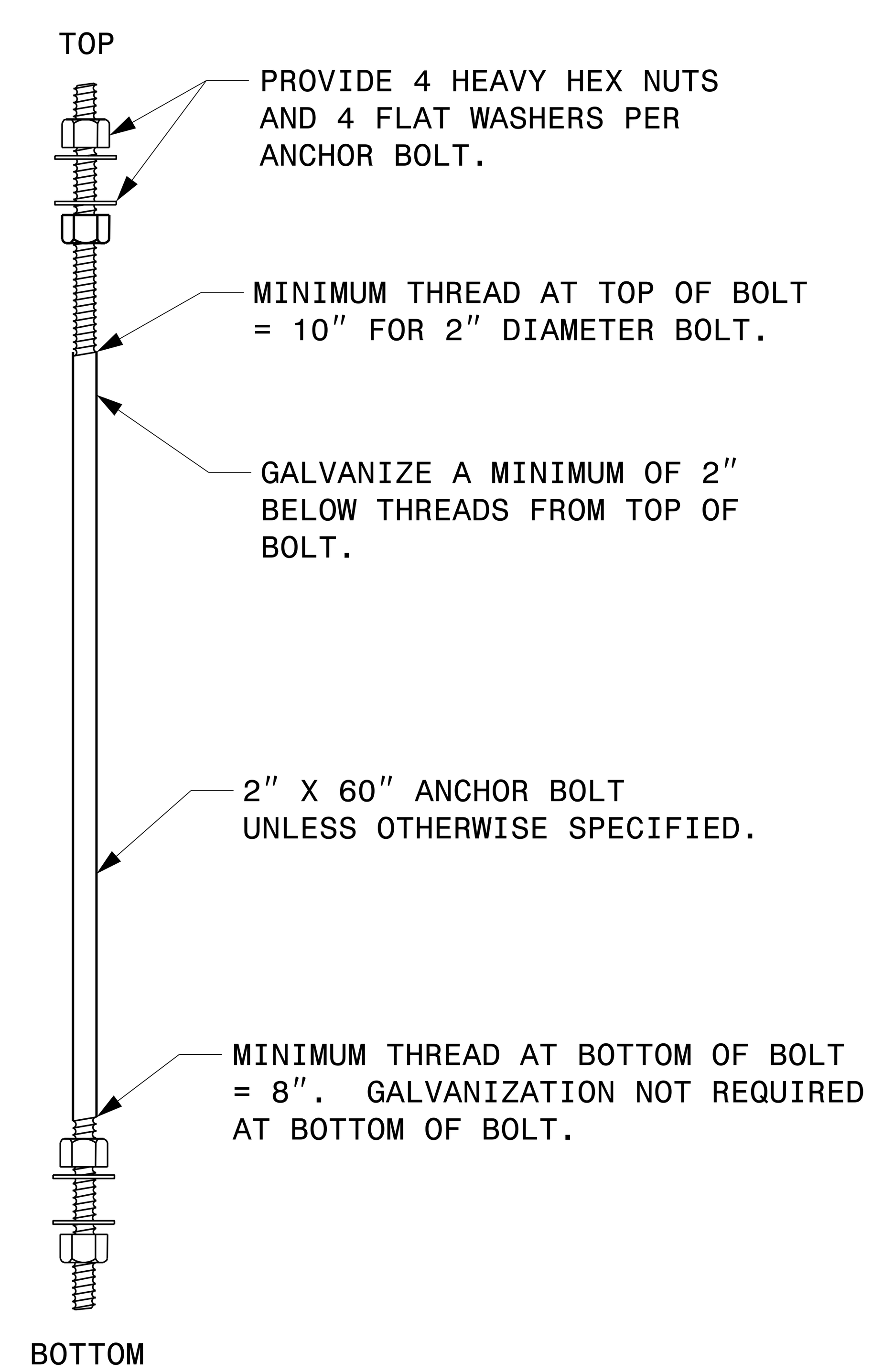
NOTE: UNLESS OTHERWISE SPECIFIED, LOCATE TERMINAL COMPARTMENT 1 FOOT ABOVE THE POLE BASE AT 180 DEGREES ON THE POLE'S RADIAL INDEX.

TERMINAL COMPARTMENT DETAIL

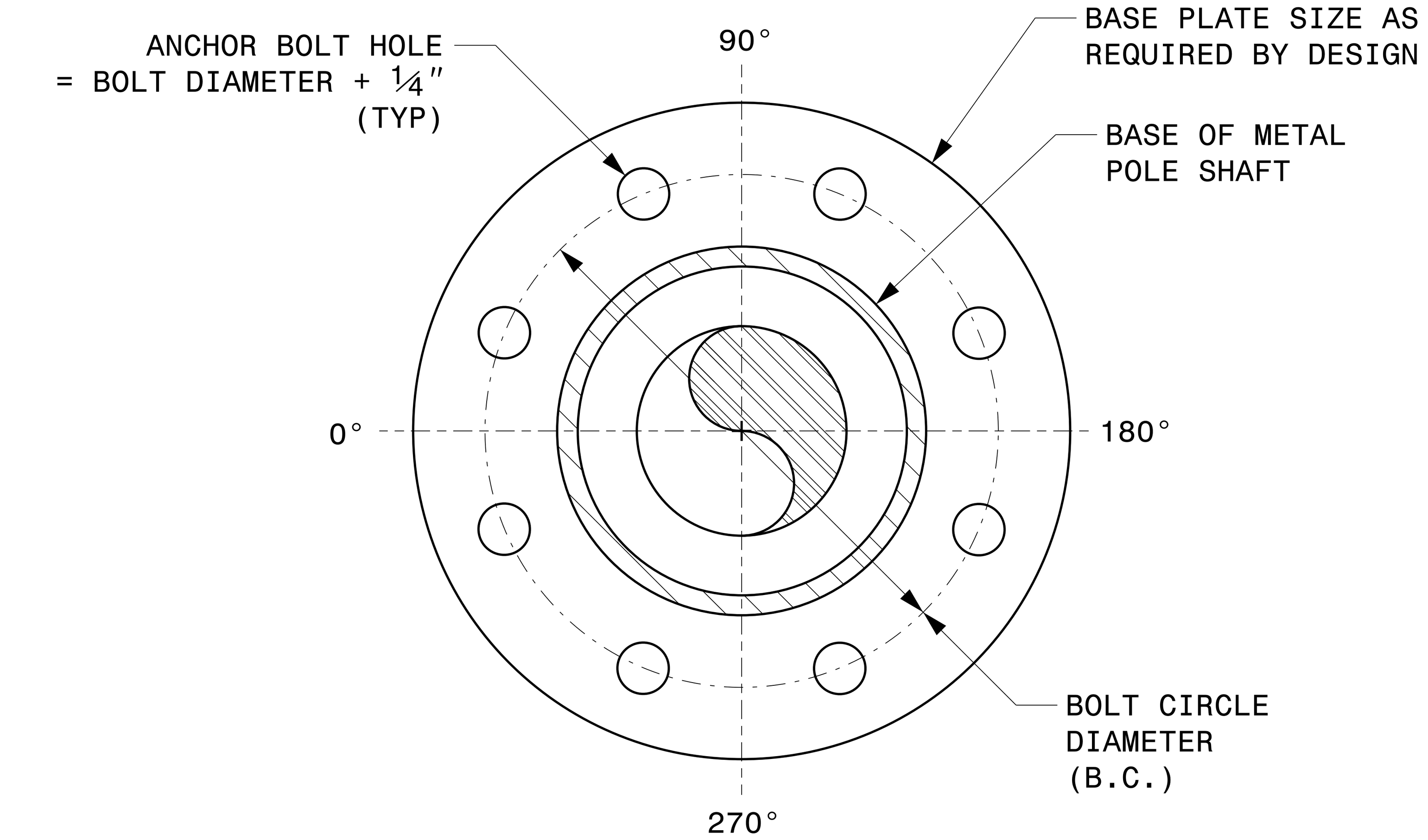


CONSTRUCT TEMPLATES AND PLATES FROM ¼" (MIN) THICK STEEL. GALVANIZING IS NOT REQUIRED.

BASE PLATE TEMPLATE AND ANCHOR BOLT LOCK PLATE DETAILS



ANCHOR BOLT DETAIL



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

TYPICAL BASE PLATE DETAIL

MFG ________	MFG. DATE: MM/YY
SHAFT D/T/L/Y	____/____/____/____
ARM-A D/T/L/Y	____/____/____/____
	____/____/____/____
ARM-B D/T/L/Y	____/____/____/____
	____/____/____/____
A.B. DIA./B.C./L/Y	____/____/____/____
NCDOT SIG. INV. NO.	________
NCDOT POLE NO.	________

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

MFG ________	MFG. DATE: MM/YY
SECTION D/T/L/Y	____/____/____/____
NCDOT SIG. INV. NO.	________
NCDOT POLE NO.	________

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

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

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

SCALE
0 NA
NONE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

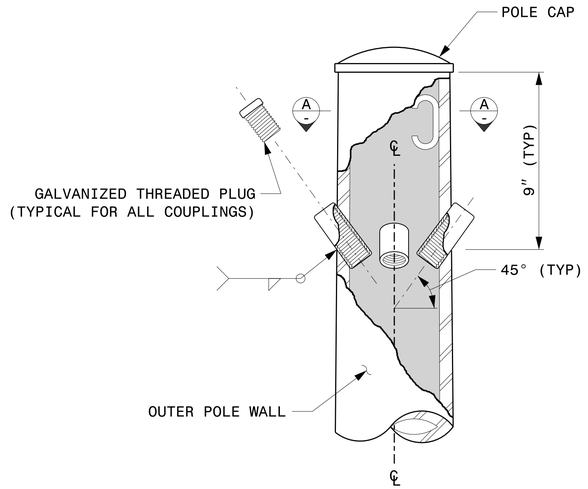
DocuSigned by:
Kevin Durigon
4B23DC79B3784DA...
SIGNATURE
09/21/2023
DATE

PROJECT I.D. NO.	SHEET NO.
	Sig.M3

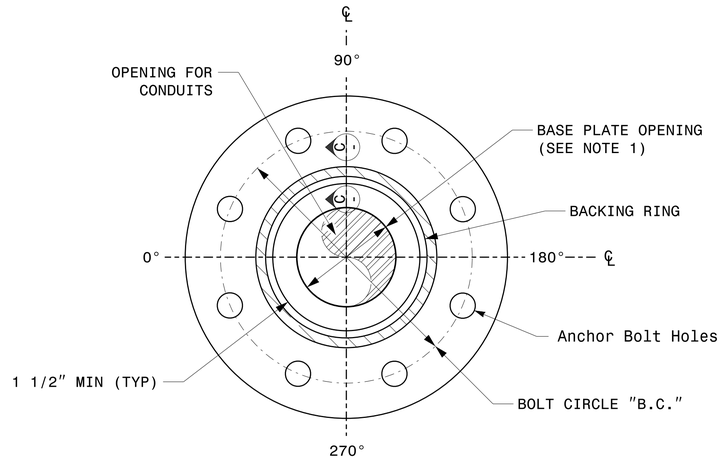
Fabrication Details – Strain Poles

NOTE:

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

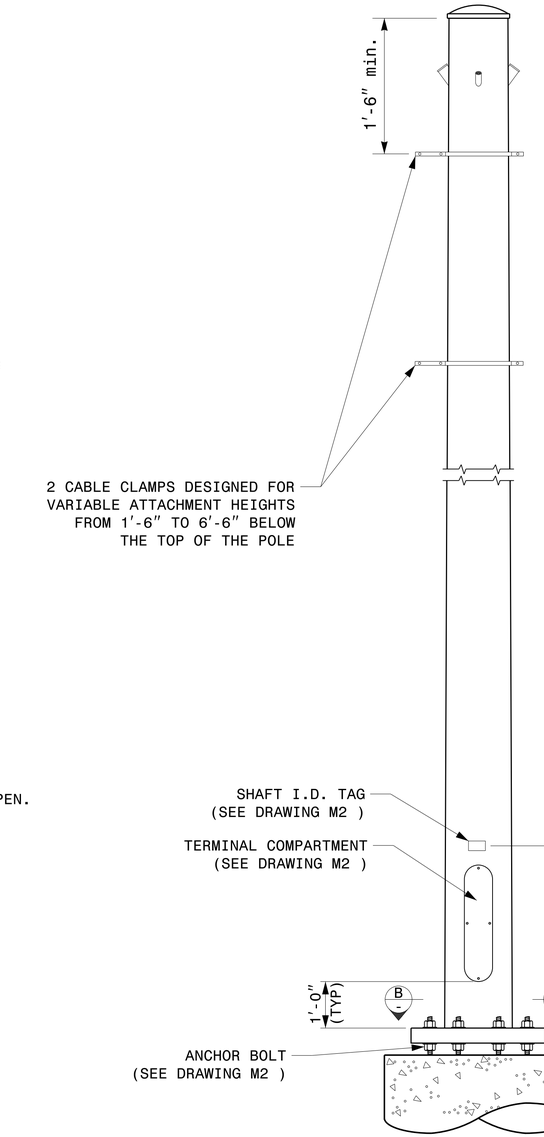


CABLE ENTRANCES AT TOP OF POLE

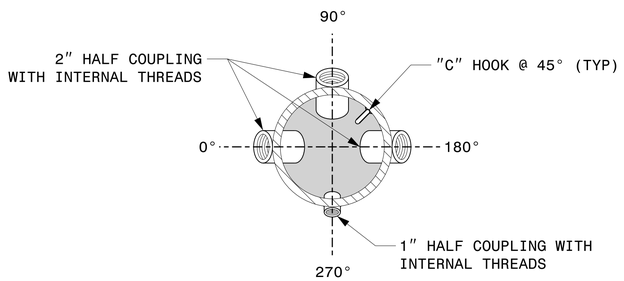


SECTION B-B

POLE BASE PLATE DETAILS
(8 AND 12 BOLT PATTERN)

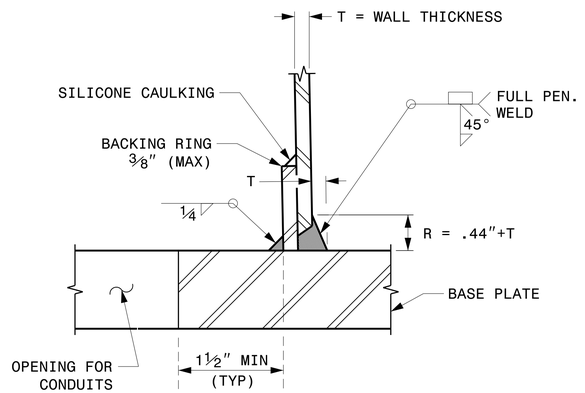


MONOTUBE STRAIN POLE



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
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

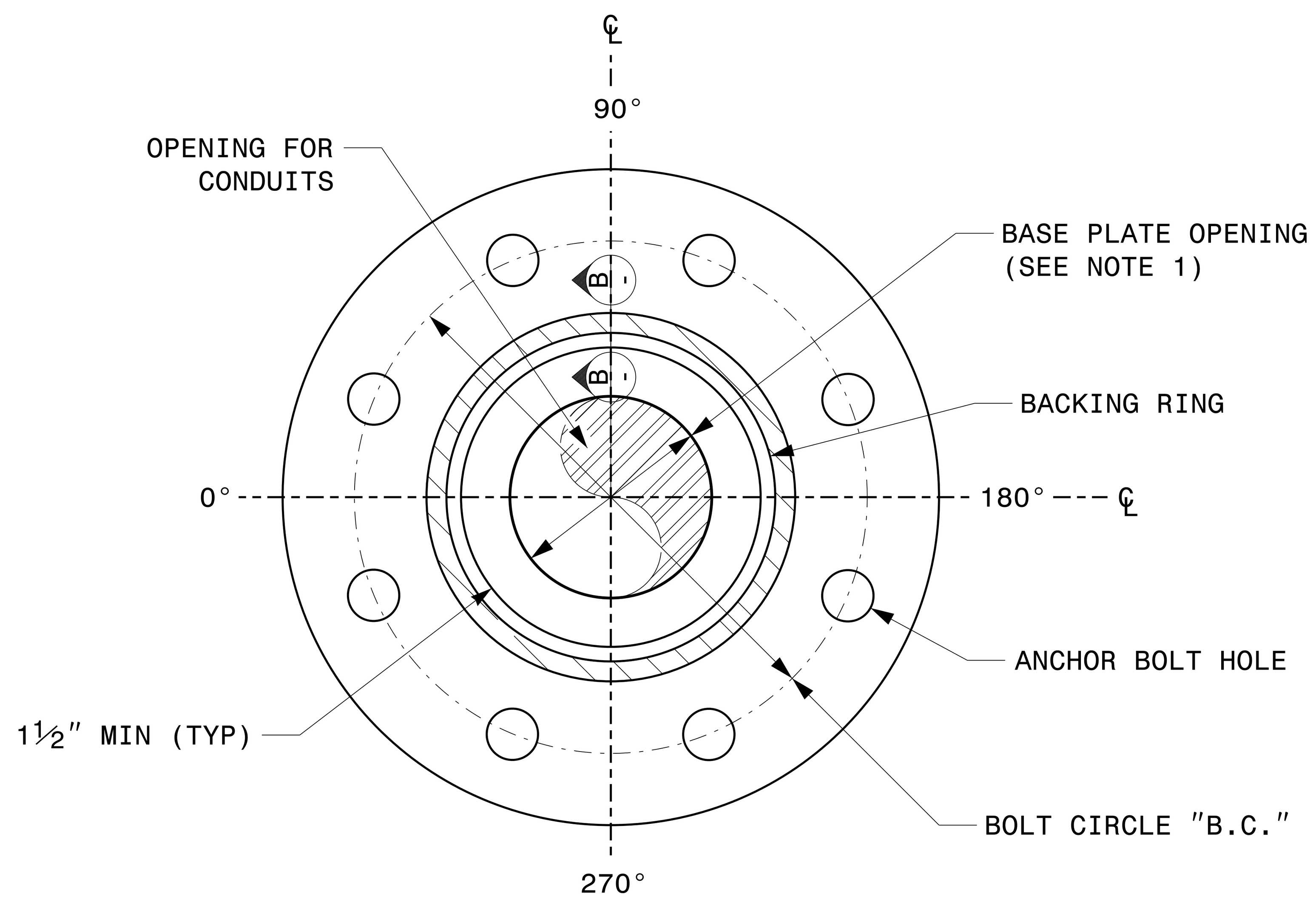
DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

PROJECT I.D. NO.	SHEET NO.
	Sig.M4

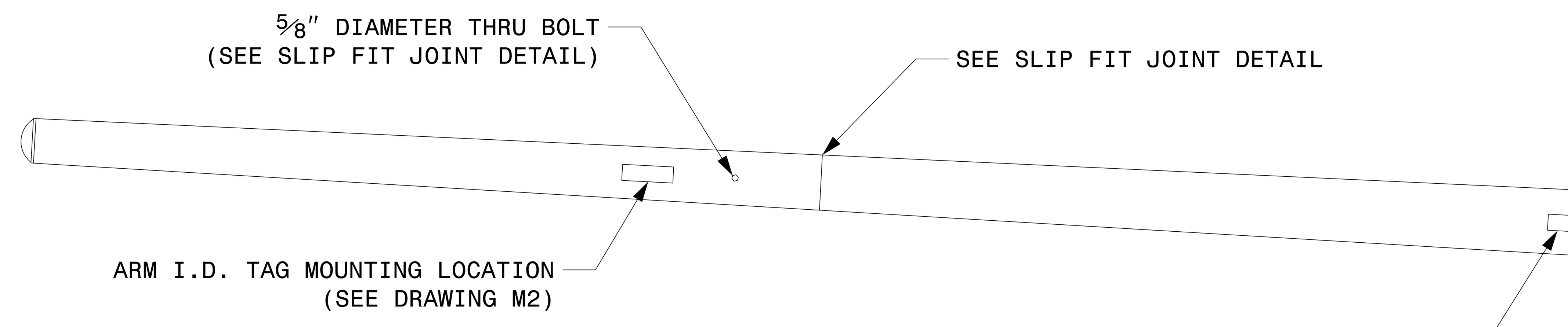
Fabrication Details – Mast Arm Poles

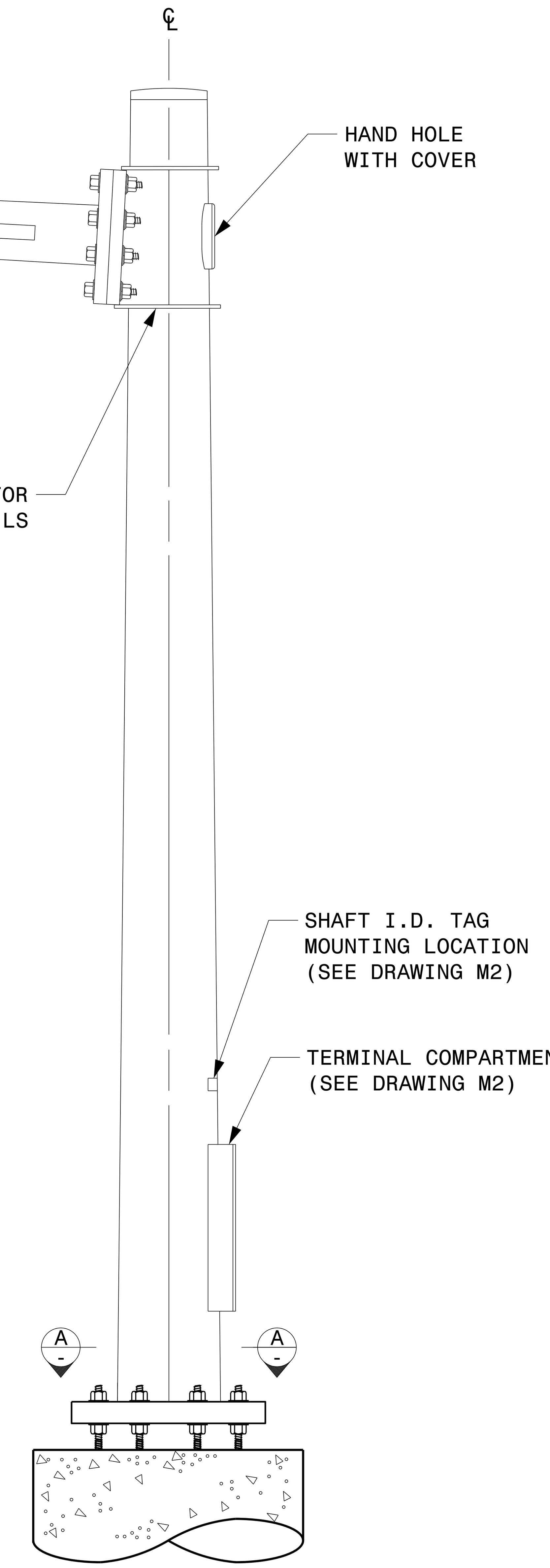
NOTE:

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

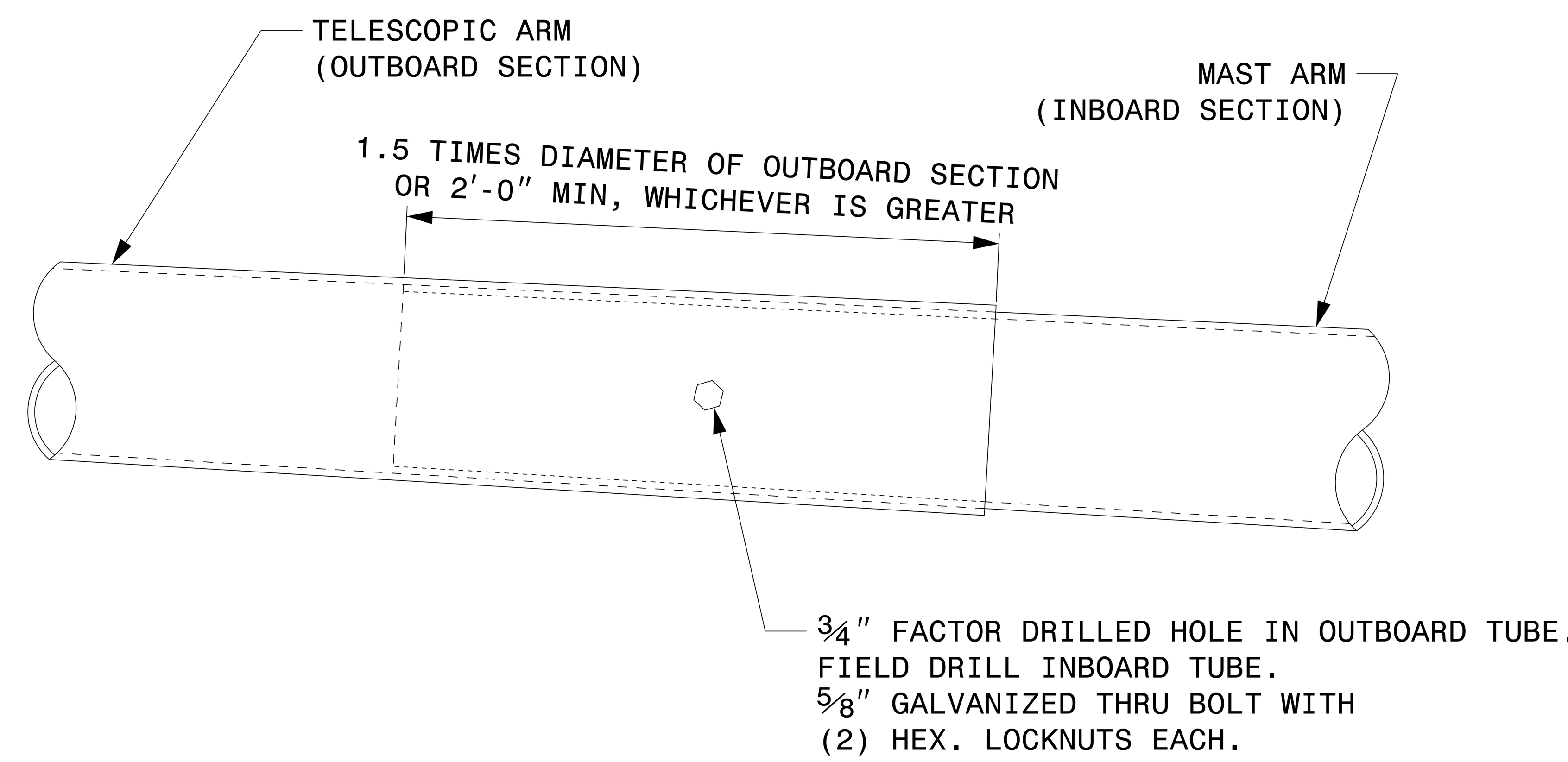


SECTION A-A
POLE BASE PLATE DETAILS

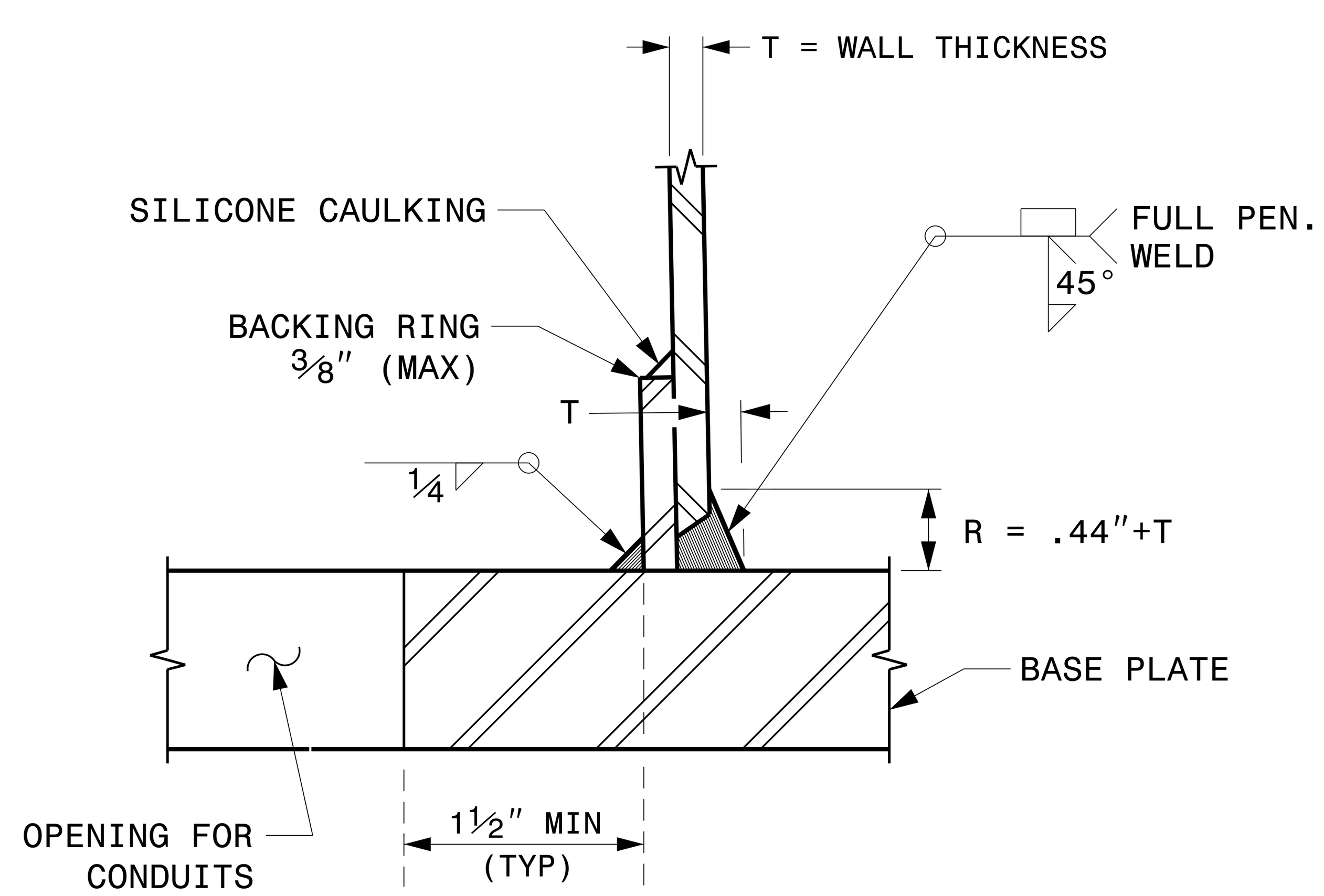




MAST ARM POLE

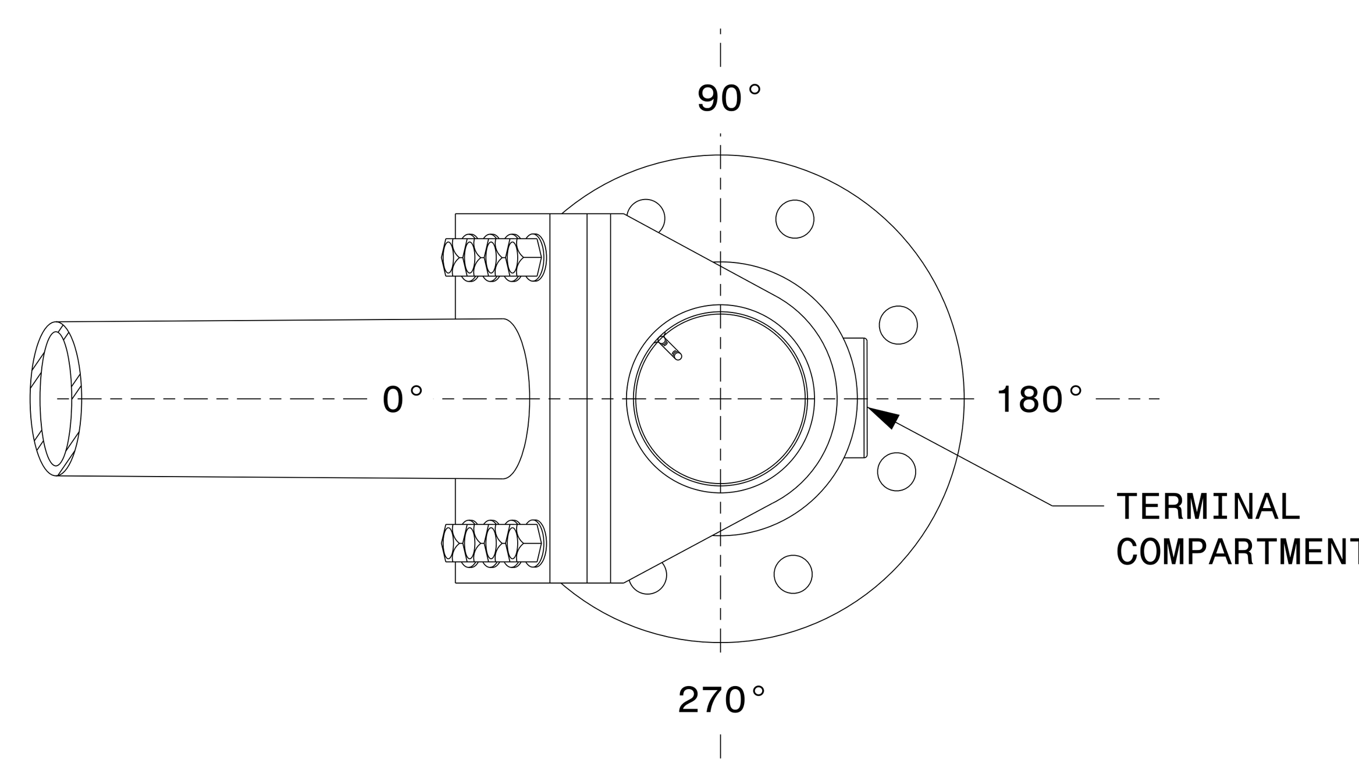


SLIP FIT JOINT DETAIL FOR MAST ARM



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

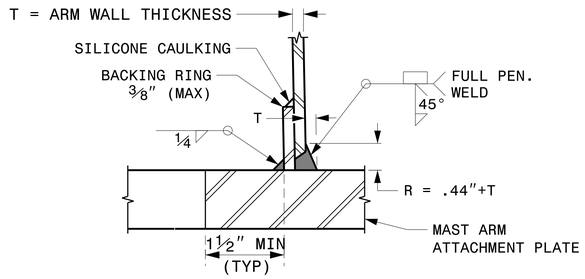
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
4B23DC79B3784DA
SIGNATURE
09/21/2023
DATE

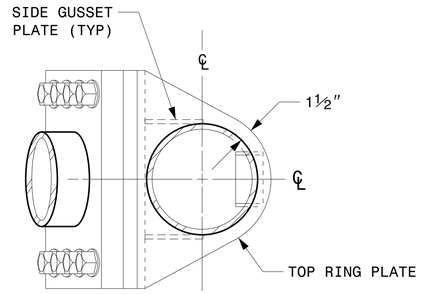
03-OCT-2023 13:25
S:*ITSASU*ITS Signals*Signal Design Section*Structures*Drawings*2024 Metal Pole Std Drawings for LRFD*2024 Sig.M4 Std. Fabrication Details-Mast Arm Poles.dgn
kdurigon

WELDED RING STIFFENED MAST ARM CONNECTION

PROJECT I.D. NO.	SHEET NO.
	Sig.M5



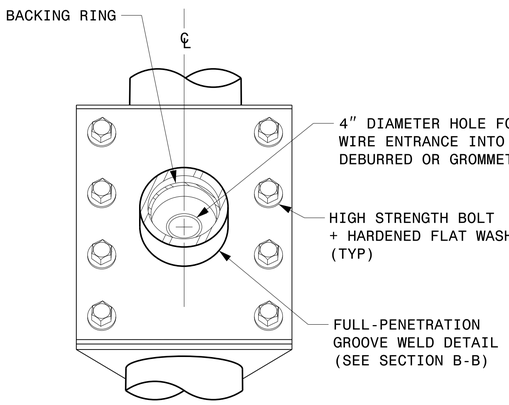
SECTION B-B
FULL-PENETRATION GROOVE WELD DETAIL



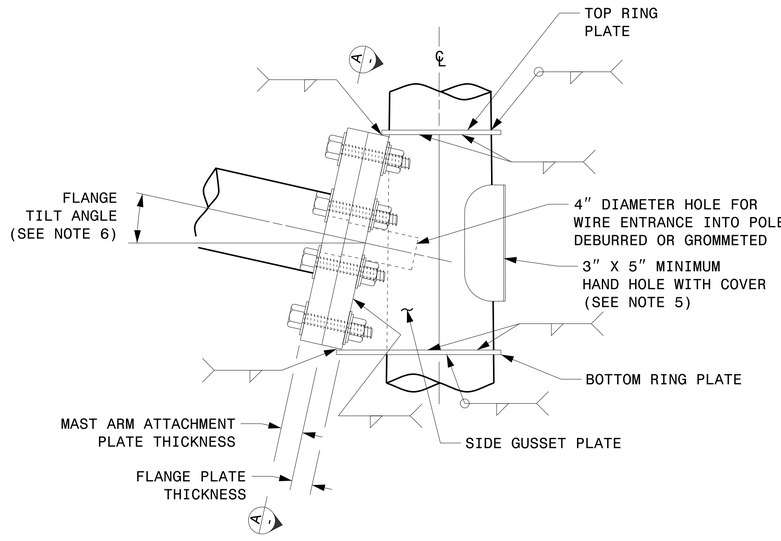
PLAN VIEW

NOTES:

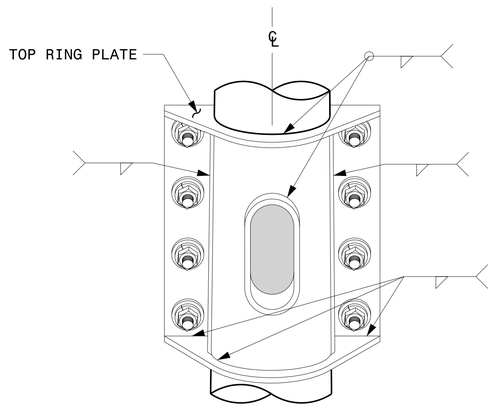
1. PROVIDE A PERMANENT MEANS OF IDENTIFICATION ABOVE THE MAST ARM TO INDICATE PROPER ATTACHMENT ORIENTATION OF THE MAST ARM.
2. DESIGNER WILL DETERMINE THE SIZE OF ALL STRUCTURAL COMPONENTS, PLATES, FASTENERS, AND WELDS SHOWN UNLESS THEY ARE ALREADY SPECIFIED.
3. FABRICATOR IS RESPONSIBLE FOR PROVIDING 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.



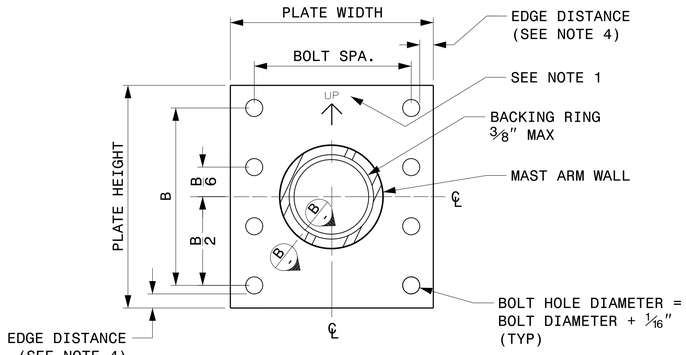
FRONT ELEVATION VIEW



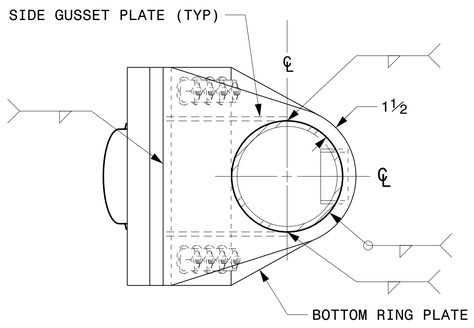
SIDE ELEVATION VIEW



BACK ELEVATION VIEW



SECTION A-A
MAST ARM ATTACHMENT PLATE



BOTTOM VIEW

Prepared in the Offices of:
Transportation Mobility and Safety Division
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

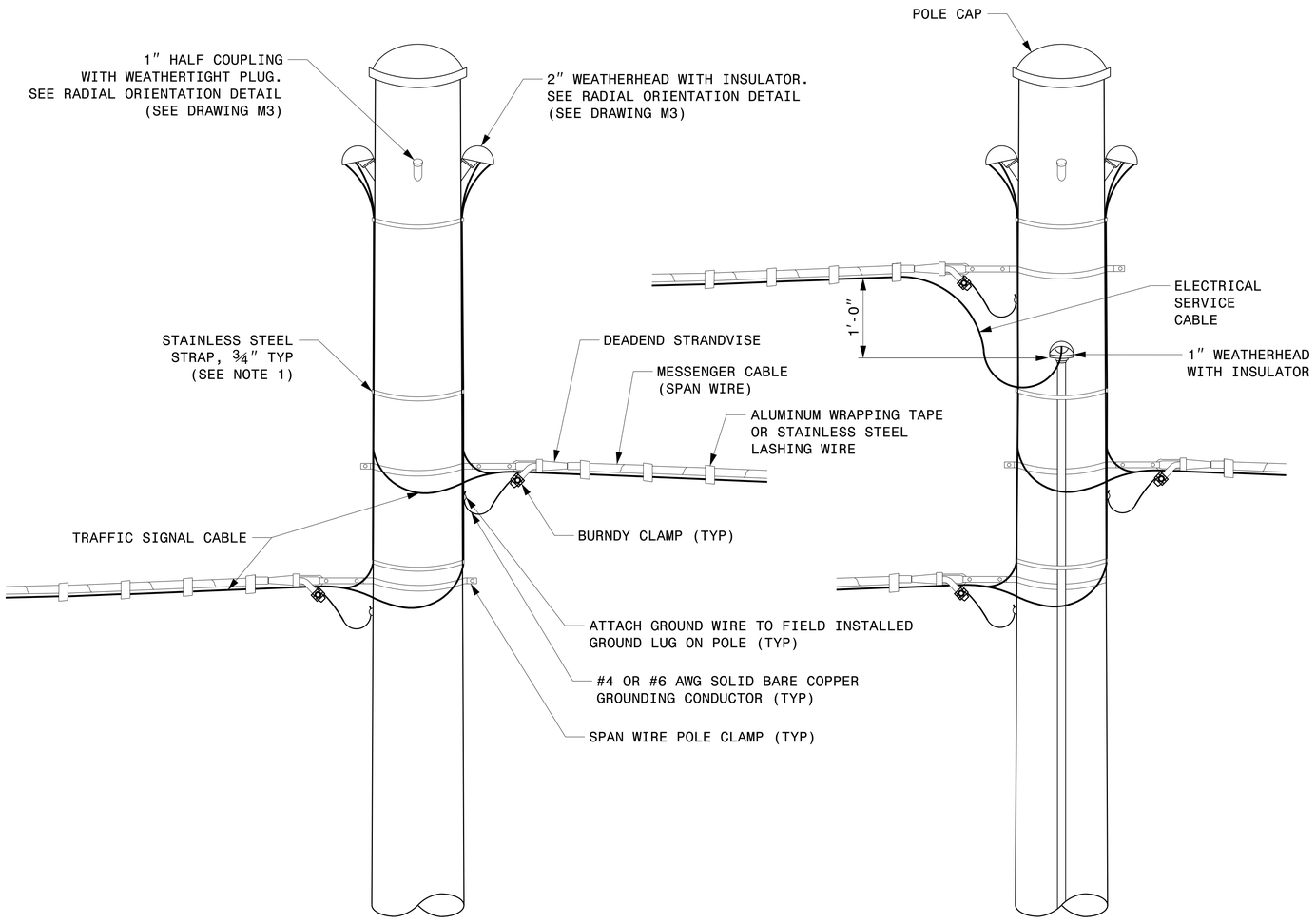
SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
036626
ENGINEER
KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

Fabrication Details – Mast Arm Connection

PROJECT I.D. NO.	SHEET NO.
	Sig.M6

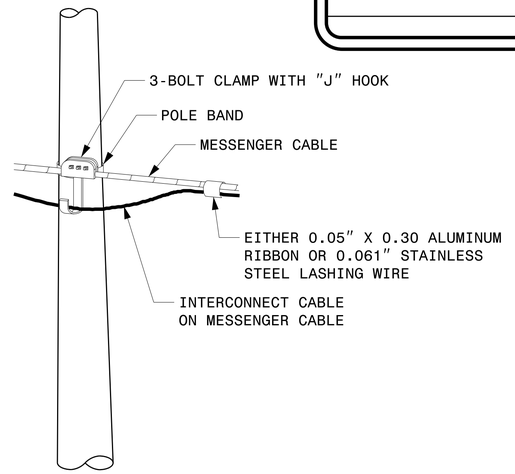
Fabrication Details – Strain Pole Attachments



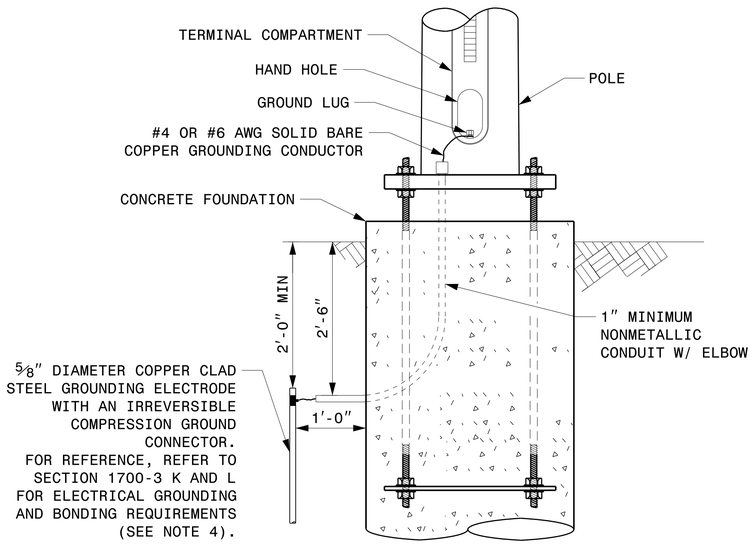
STRAIN POLE ATTACHMENTS

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

SCALE
0 NA
NONE

Typical Fabrication Details
For
Strain Pole Attachments

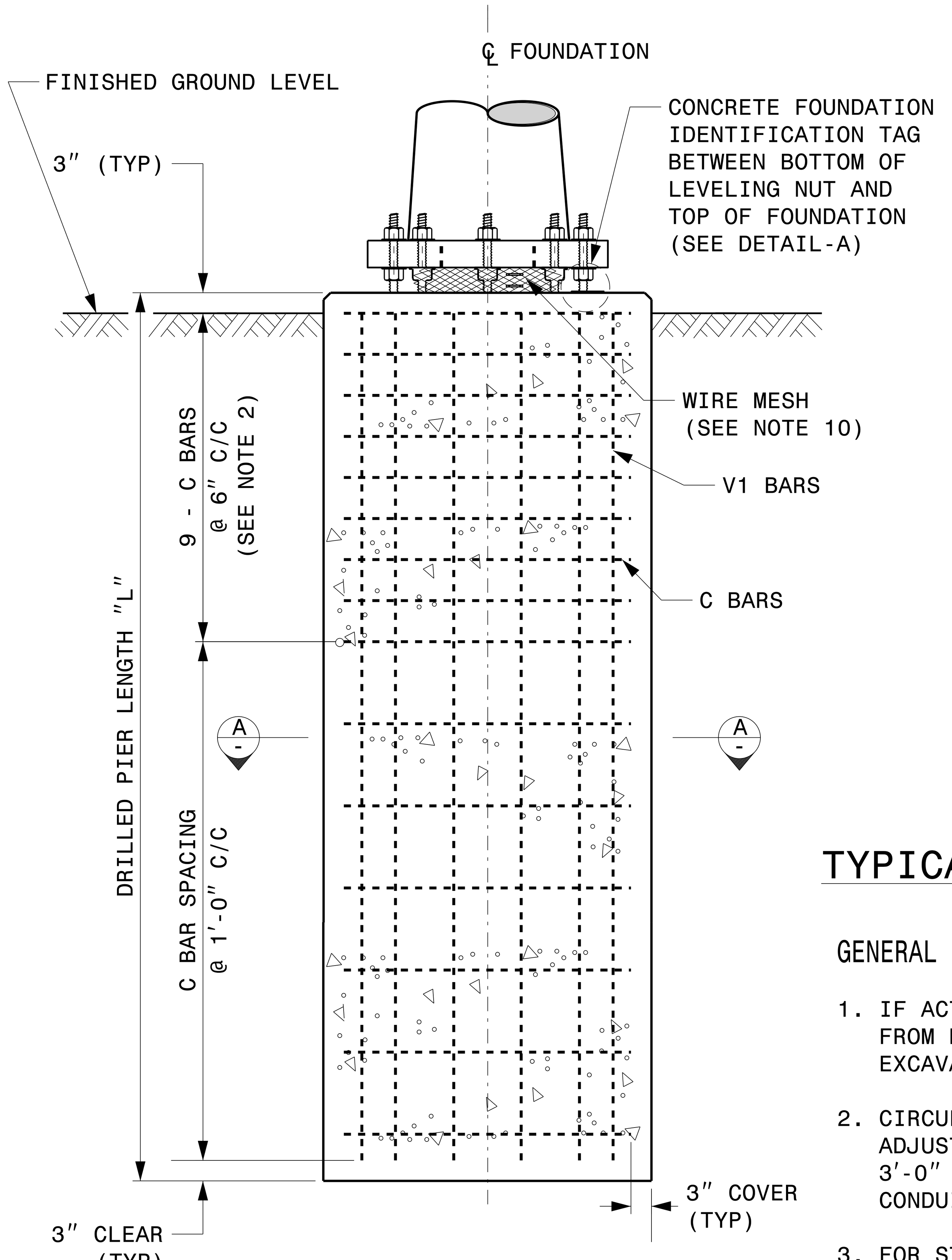
PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

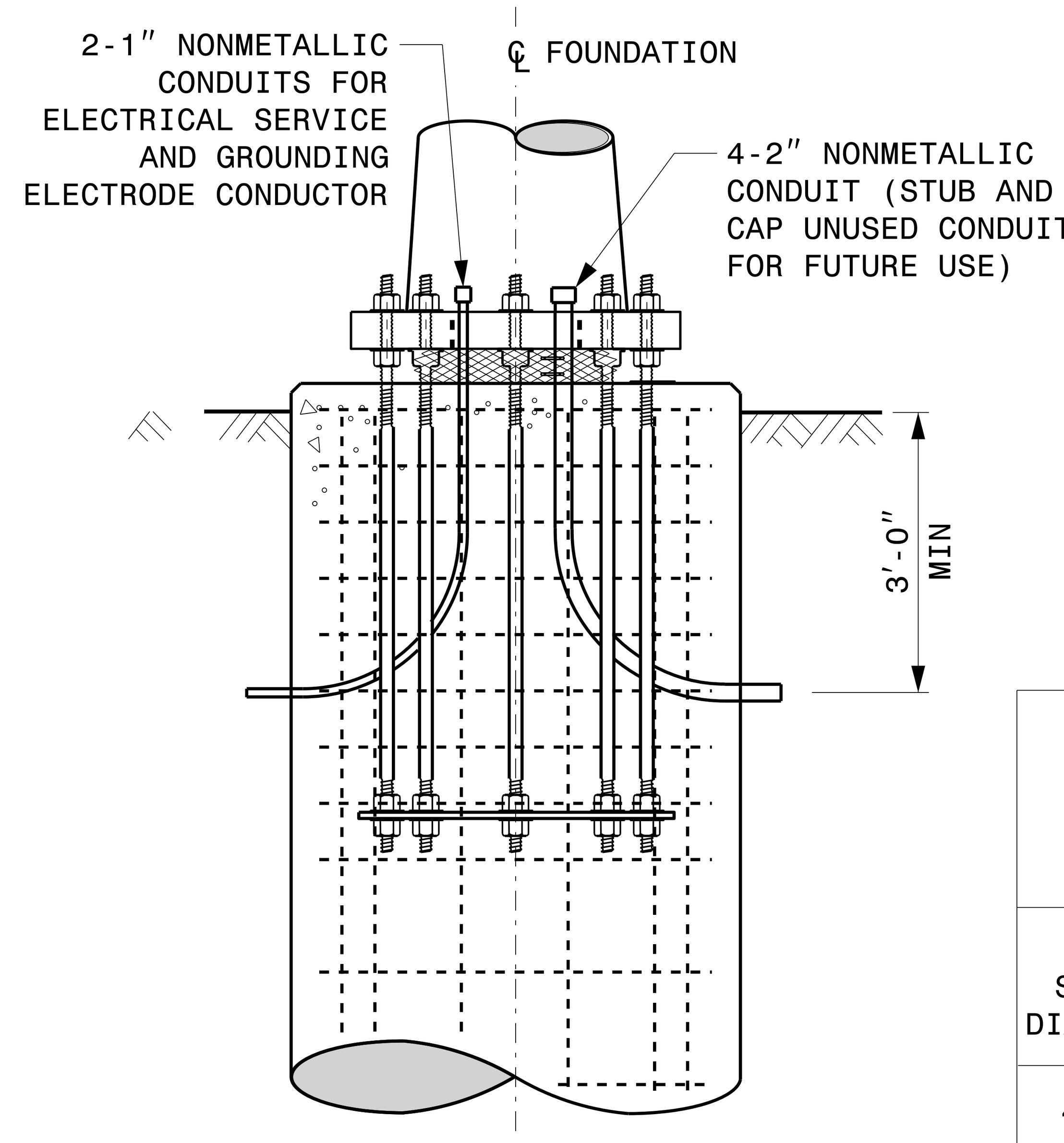
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

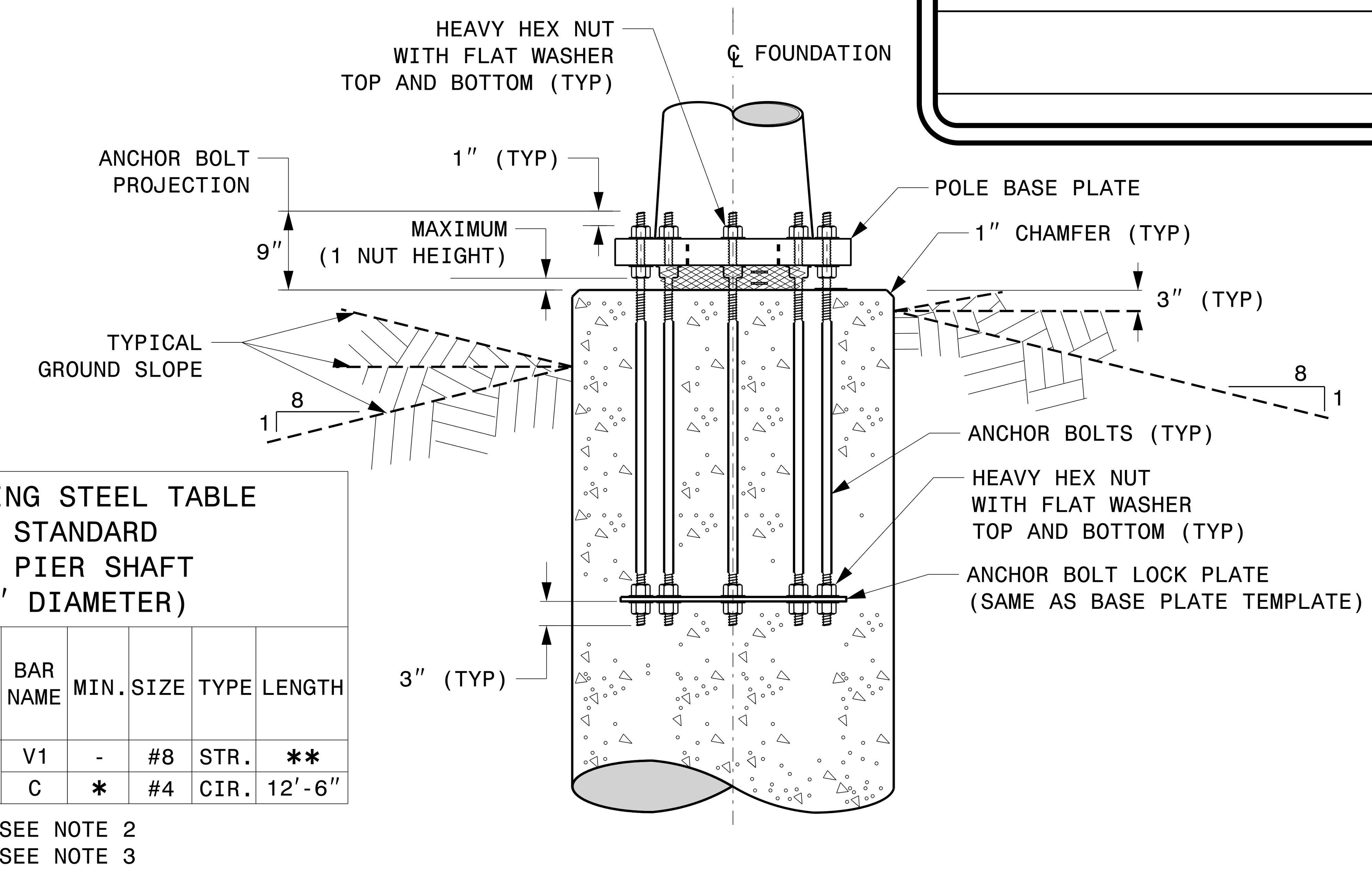
DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE



CONCRETE SHAFT ELEVATION



TYPICAL FOUNDATION CONDUIT DETAILS



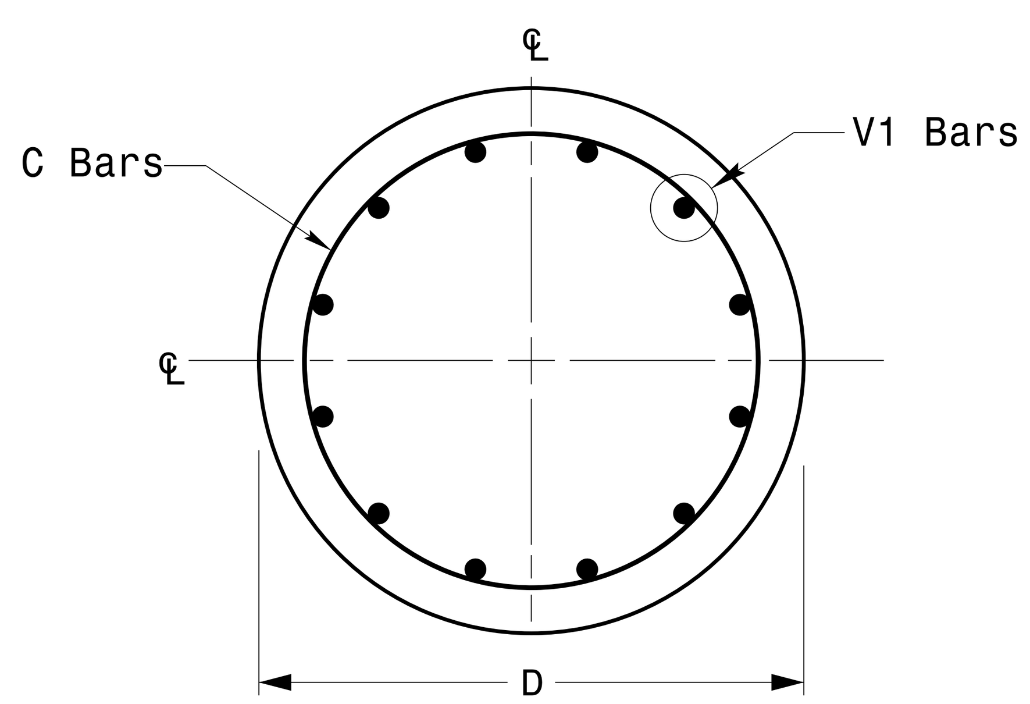
TYPICAL FOUNDATION ANCHOR BOLT DETAILS

(REINFORCING CAGE NOT SHOWN FOR CLARITY)

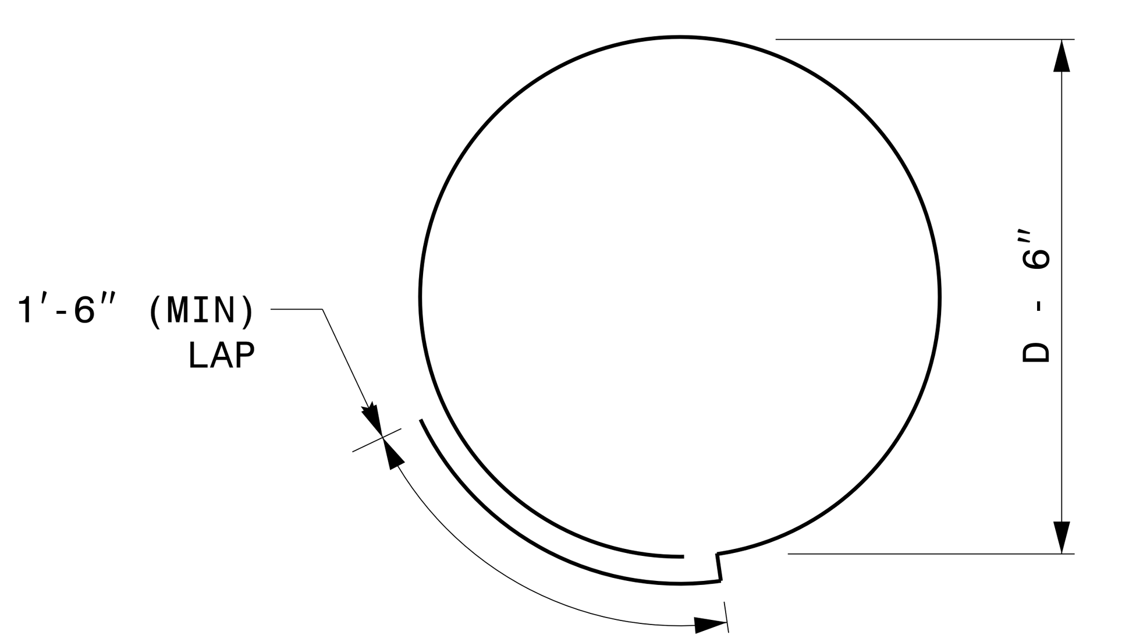
REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4′-0″ DIAMETER)

"D" SHAFT DIAMETER	CONCRETE VOLUME (CU. YDS)	BAR NAME	MIN.	SIZE	TYPE	LENGTH
4′-0″	.465 X L	V1	-	#8	STR.	**
		C	*	#4	CIR.	12′-6″

* SEE NOTE 2
** SEE NOTE 3



SECTION A-A

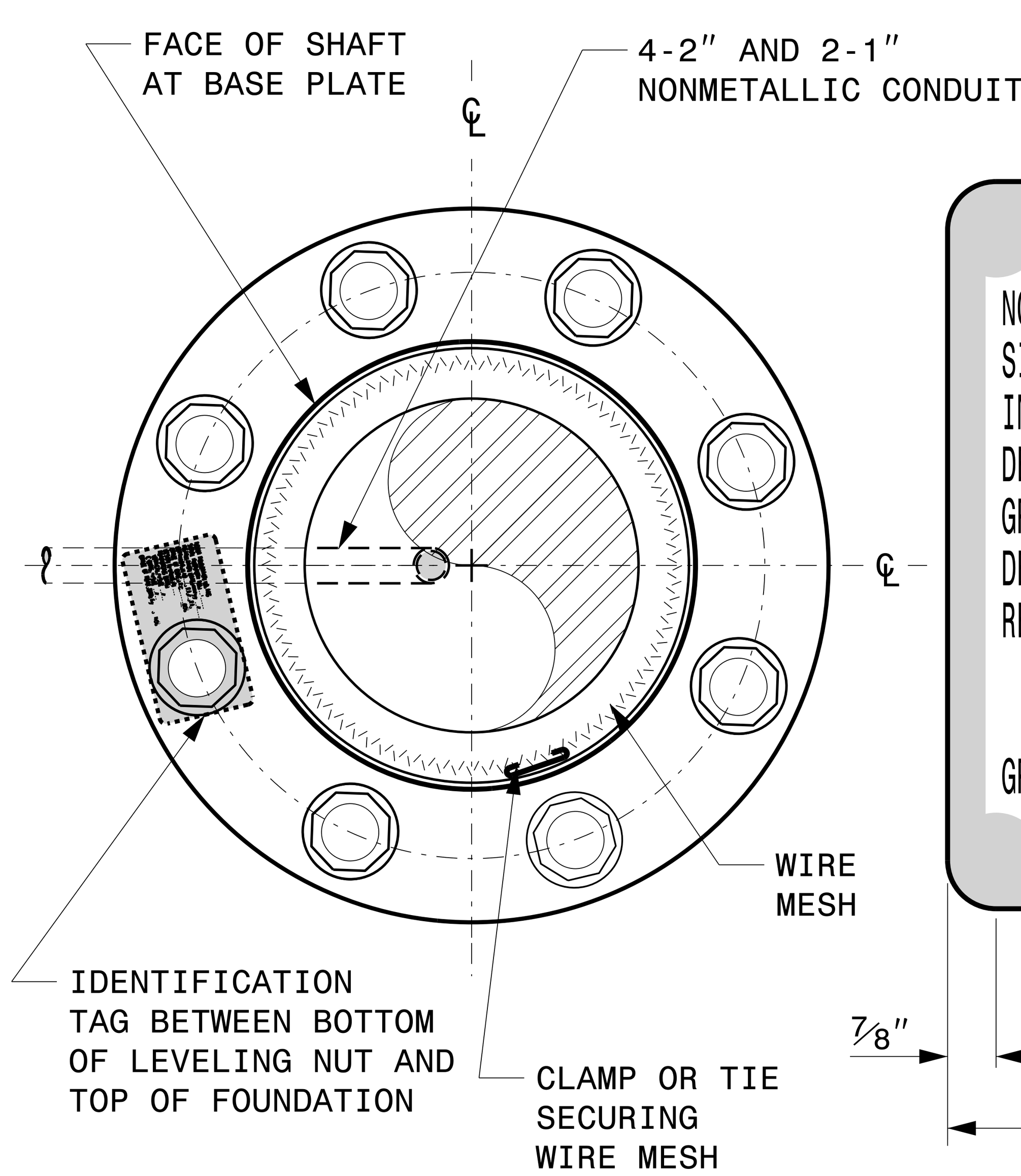


TYPICAL "C" BAR DETAIL

GENERAL NOTES:

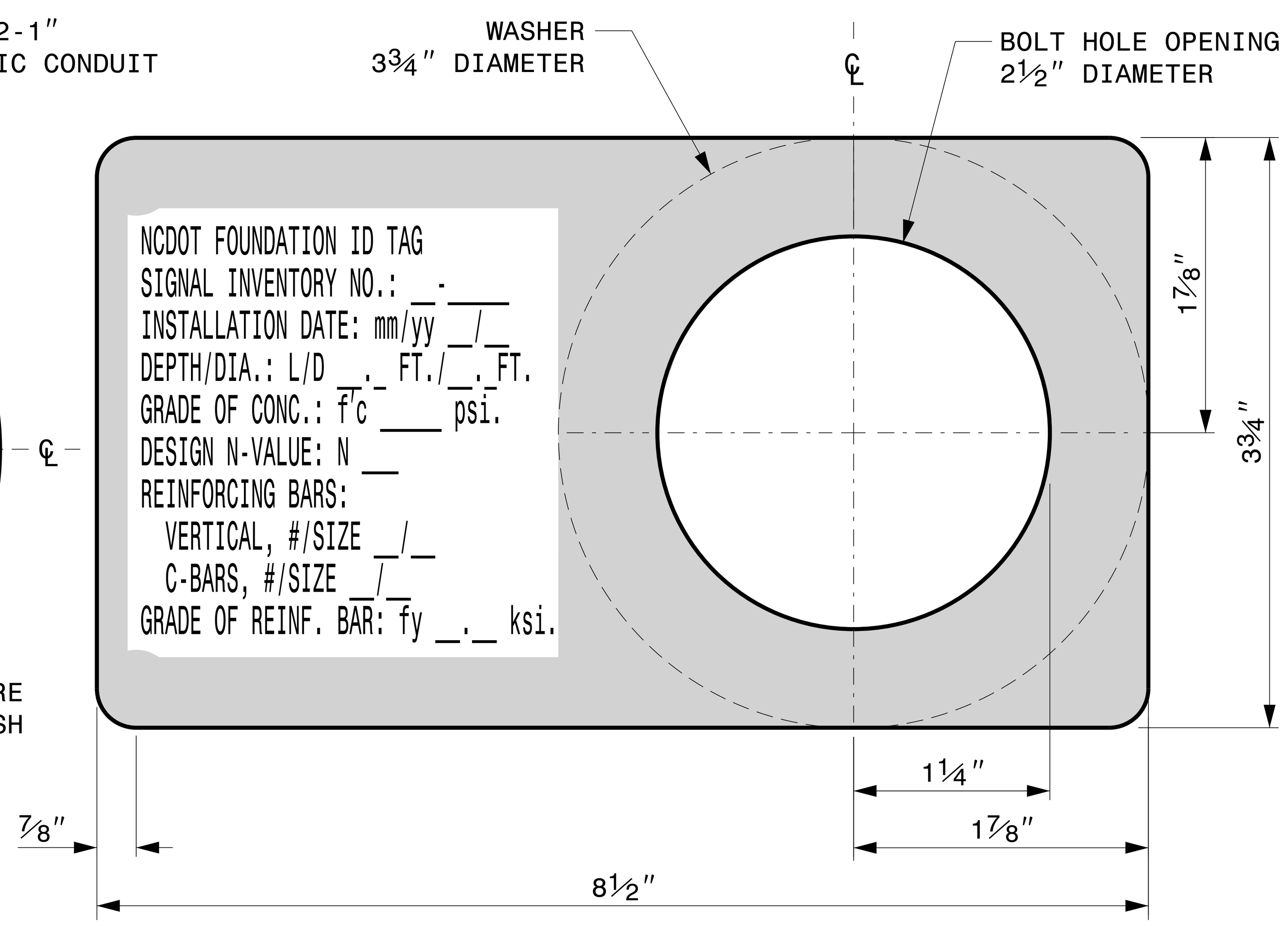
1. IF ACTUAL SUBSURFACE CONDITIONS DIFFER SIGNIFICANTLY FROM BORING DATA, CONTACT THE ENGINEER BEFORE EXCAVATING OR PLACING CONCRETE.
2. CIRCULAR TIE REINFORCING RINGS MAY BE VERTICALLY ADJUSTED BY +/-3″ AT A DEPTH BETWEEN 2′-0″ AND 3′-0″ TO FACILITATE THE INSTALLATION OF ELECTRICAL CONDUIT ENTERING IN THE CAGE.
3. FOR STANDARD FOUNDATIONS, SEE SHEET SIG. M8 FOR DETAILS. VERTICAL REINFORCING BARS (V1) MAY BE HORIZONTALLY ADJUSTED BY +/-3″ TO FACILITATE THE INSTALLATION OF ELECTRICAL CONDUIT ENTERING INTO THE CAGE.
4. PROVIDE 2″ TO 5″ FOUNDATION PROJECTION ABOVE GROUND LEVEL, DEPENDING ON THE GROUND SLOPE.
5. UNLESS OTHERWISE SHOWN, FOUNDATION DESIGNS ARE BASED ON NON-SLOPING LEVEL GROUND SURFACES WITH SLOPE RATIOS OF 8:1 (H:V) OR FLATTER. IF ACTUAL GROUND LINE SLOPES ARE STEEPER, CONTACT THE ENGINEER BEFORE EXCAVATING OR PLACING CONCRETE.
6. CONSTRUCT FOUNDATIONS IN ACCORDANCE WITH NCDOT STANDARD PROVISIONS SP09 R005- FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES. ALL APPLICABLE 2024 NCDOT STANDARD SPECIFICATIONS ARE REFERENCED IN THIS PROVISION. REFER TO THE NCDOT RESOURCES/SPECIFICATIONS PAGE LOCATED ON THE CONNECT NCDOT WEBSITE.

   https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx
7. USE AIR ENTRAINED AA CONCRETE MIX WITH A COMPRESSION STRENGTH OF f′c=4500 psi (MIN) AFTER 28 DAYS.
8. USE ASTM A615 GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL. MAINTAIN AT LEAST 3″ COVER ON ALL REINFORCEMENT.
9. LOCATE IDENTIFICATION TAG ON TOP OF THE FOUNDATION, DIRECTLY ABOVE THE CONDUIT'S ENTRY POINT.
10. PROVIDE TWO LAYERS OF 4 MESH GALVANIZED WELDED 23 GAUGE (0.025) 6″ WIDE AROUND PIPES UNDER THE BASE PLATE AND SECURE IT WITH TIES IF NECESSARY.
11. PREFERRED LOCATION FOR THE I.D. TAG IS AS SHOWN IN DETAIL-A: DIRECTLY ABOVE THE CONDUIT ENTERING THE FOUNDATION.



D = DIAMETER
L = LENGTH / DEPTH
mm = MONTH
yy = YEAR

DETAIL-A



CONCRETE FOUNDATION IDENTIFICATION TAG DETAILS

Construction Details – Foundations

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

SCALE 0 NA
NONE

Construction Details For Foundations

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
4B23DC79B3784DA
09/21/2023
DATE

03-OCT-2023 12:45
S:*ITS&SU*ITS Signals*Signal Design Section*Structures*Drawings*2024 Metal Pole Std Drawings for LRFD*2024 Sig.M7 Std. Construction Details-Strain Poles.dgn
kcdurigon

SOIL CONDITION

STANDARD STRAIN POLES						STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) – Feet							Reinforcement			
			Reactions at the Pole Base			Clay				Sand			Longitudinal		Stirrups	
Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Axial (kip)	Shear (kip)	Moment (ft-kip)	Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30	Bar Size (#)	Quantity (ea.)	Bar Size (#)	Spacing (in.)
S26L1	26	22	2	9	210	19.5	12.5	9	6.5	15.5	14.5	13	8	12	4	12
S26L2	26	23	2	10	240	19.5	12	9	6.5	15.5	14.5	13	8	12	4	12
S26L3	26	25	2	11	260	20.5	12	10	8	16	15	13	8	12	4	12
S30L1	30	22	2	9	230	19	11	9	7	15.5	14	12.5	8	12	4	12
S30L2	30	23	2	10	270	20	12	10	8	16	14.5	13	8	12	4	12
S30L3	30	25	2	11	290	21	12	10	8	17	15	13.5	8	12	4	12
S30H1	30	25	3	13	355	23	13	11	9	18	16.5	14.5	8	12	4	12
S30H2	30	29	3	15	405	25	14	11	9	19	17.5	15.5	8	14	4	12
S30H3	30	29	3	16	430	26	15	12	9	20	18	16	8	14	4	6
S35L1	35	22	3	8	260	19.5	12	10	8	15.5	14.5	13	8	12	4	12
S35L2	35	23	3	10	300	21	12	10	8	16.5	15	13.5	8	12	4	12
S35L3	35	25	3	10	320	21.5	13	10	8	17	15.5	14	8	12	4	12
S35H1	35	25	3	12	390	23.5	14	11	9	18	17	15	8	14	4	12
S35H2	35	29	4	14	460	26	15	12	9	20	18	16	8	14	4	6
S35H3	35	29	4	16	495	28.5	15	13.5	10	21.5	19	17	8	14	4	6

48" DIAMETER FOUNDATION CONCRETE VOLUME (CUBIC YARDS) = (0.465) x DRILLED PIER LENGTH

GENERAL NOTES:

1. VALUES SHOWN IN THE "REACTIONS AT THE POLE BASE" COLUMN REPRESENT THE MINIMUM ACCEPTABLE CAPACITY ALLOWED FOR DESIGN USING A COMBINED FORCE RATIO (CFR) OF 1.00.
2. USE CHAIRS AND SPACERS TO MAINTAIN PROPER CLEARANCE.
3. FOR FOUNDATION, ALWAYS USE AIR-ENTRAINED CONCRETE MIX.

FOUNDATION SELECTION:

1. PERFORM A STANDARD PENETRATION TEST AT EACH PROPOSED FOUNDATION SITE TO DETERMINE "N" VALUE.
2. SELECT THE APPROPRIATE WIND ZONE FROM M1 DRAWING.
3. SELECT THE SOIL TYPE (CLAY OR SAND) THAT BEST DESCRIBES THE SOIL CHARACTERISTICS.
4. GET THE APPROPRIATE STANDARD POLE CASE NUMBER FROM THE PLANS OR FROM THE ENGINEER.
5. SELECT THE APPROPRIATE COLUMN UNDER "STANDARD FOUNDATIONS" BASED ON SOIL TYPE AND "N" VALUE. SELECT THE APPROPRIATE ROW BASED ON THE POLE LOAD CASE.
6. THE FOUNDATION DEPTH IS THE VALUE SHOWN IN THE "STANDARD FOUNDATIONS" CATEGORY WHERE THE COLUMN AND THE ROW INTERSECT.
7. USE CONSTRUCTION PROCEDURES AND DESIGN METHODS PRESCRIBED BY FHWA-NHI-10-016 MANUAL FOR DRILLED SHAFTS.

Standard Strain Pole Foundation – All Soil Conditions

PROJECT I.D. NO. | SHEET NO. Sig.M8

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

SCALE 0 NA — NONE

Standard Strain Pole Foundation for All Soil Conditions

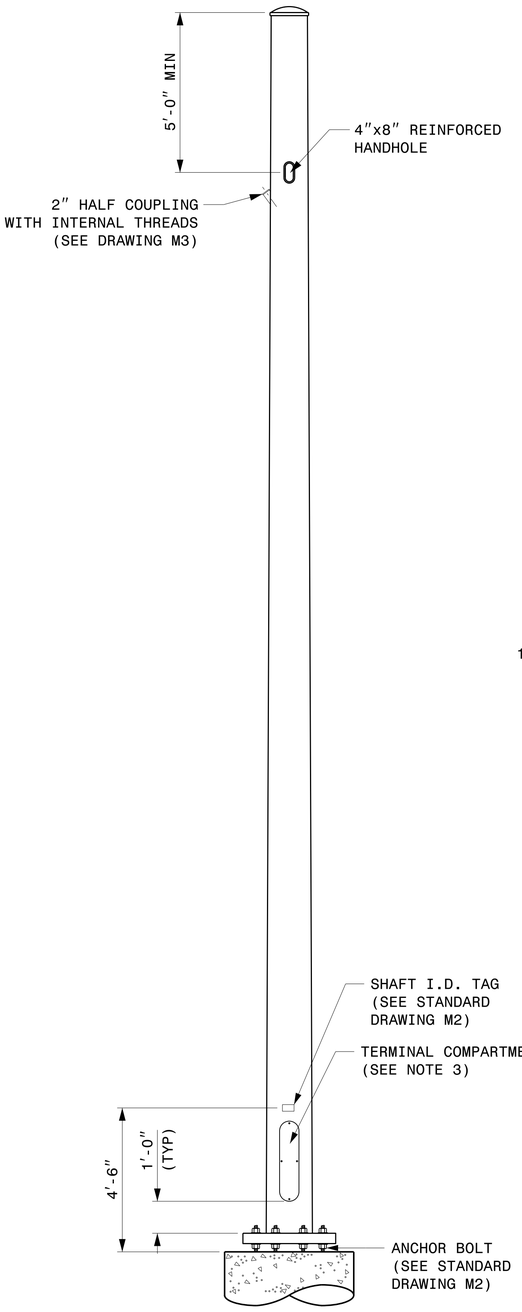
PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON
PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR
REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036626 KEVIN C. DURIGON

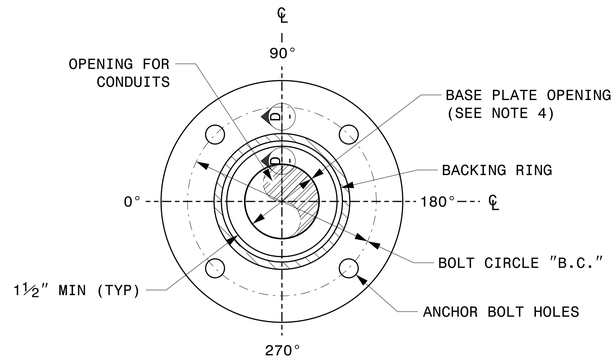
DocuSigned by: Kevin Durigon
4B23DC79B3784DA
SIGNATURE 09/21/2023 DATE

PROJECT I.D. NO.	SHEET NO.
	Sig.M9

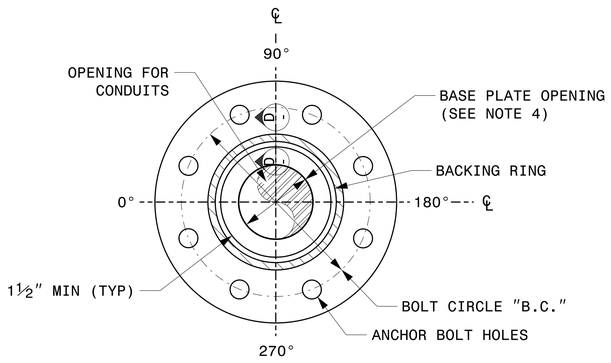
Fabrication Details – CCTV Camera Poles



CCTV CAMERA POLE
(NOT TO SCALE)

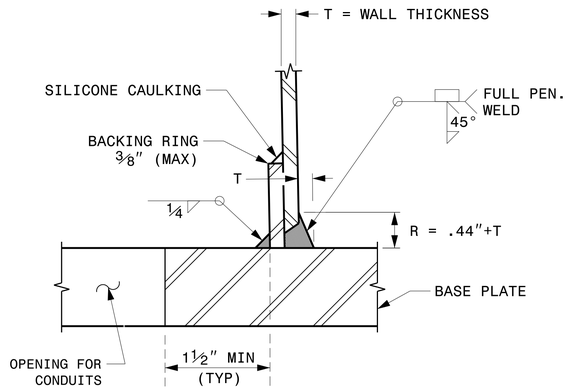


4 BOLT PATTERN
FOR POLES UP TO 40'



8 BOLT PATTERN
FOR POLES TALLER THAN 40'

BASE PLATE DETAILS



SECTION D-D
(POLE ATTACHMENT TO BASE PLATE)

FULL-PENETRATION
GROOVE WELD DETAIL

NOTES:

1. THIS DRAWING PROVIDES BASIC DETAILS FOR CCTV POLES. PROJECT REQUIREMENTS MAY REQUIRE SPECIAL FACTORY PREPS THAT ARE NOT SHOWN ON THESE DETAILS.
2. DETAILS FOR INTERNAL CAMERA LOWERING SYSTEMS ARE NOT SHOWN.
3. POLE MOUNTED CABINETS MAY REQUIRE MODIFICATIONS TO THE LOWER HANDHOLE OPENING TO MOUNT CABINETS. 4" X 8" REINFORCED HANDHOLES ARE ACCEPTABLE OPTIONS, AND MAY BE PREFERRED.
4. OPENING IN POLE BASE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS 3½" BUT SHALL NOT BE LESS THAN 8½".
5. USE COMPACT SECTION CRITERIA D/T RATIO PER AASHTO LTS-LRFD 1ST EDITION SECTION 5.7.2.

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
CCTV Poles

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

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-1

1. INSTALL COAX CABLE
2. INSTALL ETHERNET CABLE
3. EXISTING ETHERNET (OR COAX) CABLE
4. INSTALL SMFO CABLE
5. EXISTING SMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13. INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
14. INSTALL POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER
20. INSTALL CABLE(S) IN NEW RISER
21. INSTALL CABLE(S) IN EXISTING CONDUIT STUB–OUTS
22. INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
23. INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26. INSTALL NEW ETHERNET EDGE SWITCH
27. INSTALL NEW FIBER OPTIC TRANSCEIVER
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPLICE CABLE IN CABINET
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. MODIFY EXISTING INTERCONNECT CENTER /SPLICE ENCLOSURE
32. INSTALL POLE MOUNTED SPLICE CABINET
33. INSTALL BASE MOUNTED SPLICE CABINET

- 34 INSTALL CABINET FOUNDATION
- 35 INSTALL CCTV CAMERA POLE MOUNTED CABINET
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40A INSTALL OVERSIZED JUNCTION BOX
- 40B INSTALL SPECIAL OVERSIZED JUNCTION BOX (36" x 24" x 24")
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48A REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
- 48B REMOVE EXISTING COMMUNICATIONS CABLE
- 49 BACK PULL EXISTING COMMUNICATIONS CABLE
- 50 INSTALL CELL MODEM AND ANTENNA
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52A INSTALL DELINEATOR MARKER
- 52B INSTALL JUNCTION BOX MARKER
- 53A STORE 20 FEET OF COMMUNICATIONS CABLE
- 53B STORE 100 FEET OF EACH COMMUNICATIONS CABLE
- 54 LASH CABLE(S) TO EXISTING COMMUNICATIONS CABLE
- 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56 LASH CABLE(S) TO NEW MESSENGER CABLE
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE
- 59 INSTALL NEW EQUIPMENT CABINET DISCONNECT
- 60 BOND TRACER WIRE TO EQUIPMENT GROUND BUS
- 61 DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS
- 62 BOND RISER AND MESSENGER CABLE TO POLE GROUND
- 63 BOND RISER TO POLE GROUND
- 64 BOND MESSENGER CABLE TO POLE GROUND
- 65 INSTALL HEAT SHRINK TUBING RETROFIT KIT
- 66 INSTALL MOLDABLE DUCT SEAL
- 67 SLACK SPAN

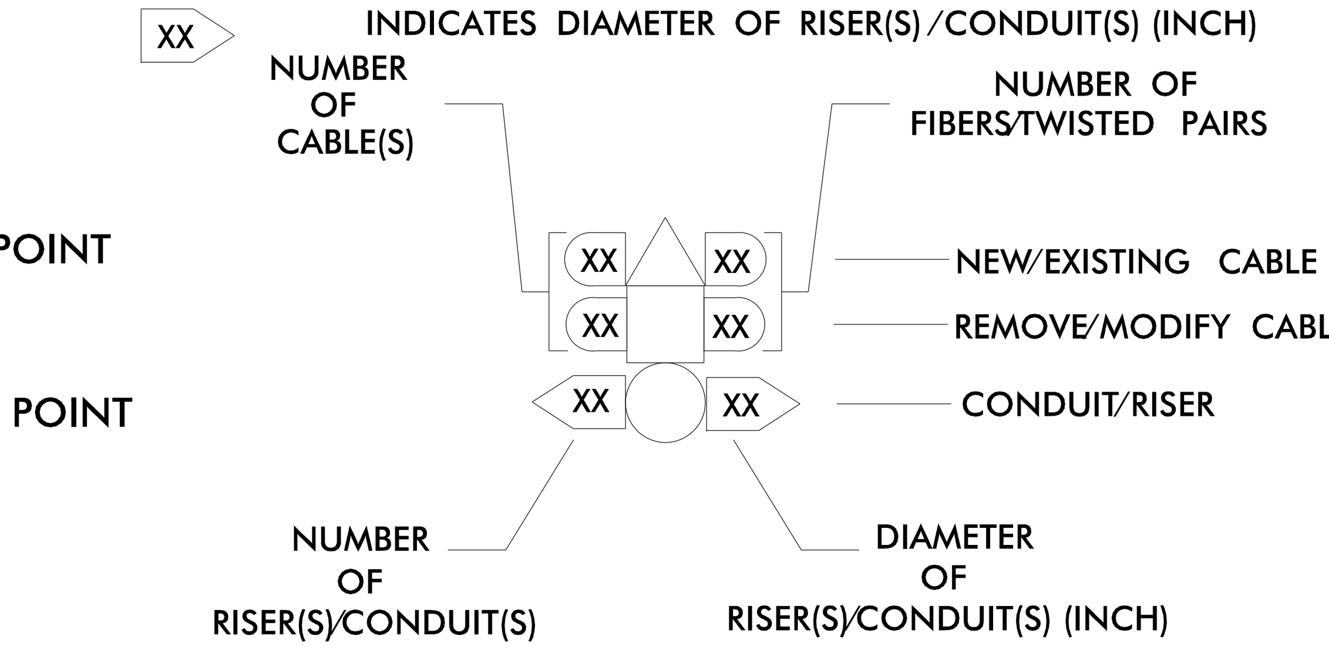
LEGEND

Line	Description
FO	NEW FIBER OPTIC COMMUNICATIONS CABLE
EXI	EXISTING COMMUNICATIONS CABLE
REM	EXISTING COMMUNICATIONS CABLE TO BE REMOVED
	NEW AERIAL GUY ASSEMBLY
	NEW CONDUIT
	EXISTING CONDUIT
DD	NEW DIRECTIONAL DRILLED CONDUIT

NEW		EXISTING
	OVERSIZED JUNCTION BOX	
	WOOD POLE	
S	AERIAL SPLICE ENCLOSURE	S
S	UNDERGROUND SPLICE ENCLOSURE	S
	METAL POLE	
	CCTV ASSEMBLY	
	STANDARD GUY ASSEMBLY	
	SIDEWALK GUY ASSEMBLY	
	CABLE STORAGE RACKS (SNOW SHOES)	
	SIGNAL/EQUIPMENT CABINET	
S	SPLICE CABINET	
	FLAT PANEL ANTENNA (SINGLE)	
	YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION	
	YAGI ANTENNA (SINGLE)	
	OMNI ANTENNA	
SP	SIGNAL POLE	SP
XX–XXXX	SIGNAL INVENTORY NUMBER	XX–XXXX

CONSTRUCTION NOTE SYMBOLOGY KEY

- XX INDICATES NUMBER OF CABLES, LOOPS, ETC.
- XX INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- XX INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- XX INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



ATTACHMENT POINT:

- XX"/SS over YYY — DISTANCE ABOVE (IN)/ATTACHMENT POINT REFERENCE POINT
- YYY over XX"/SS — REFERENCE POINT DISTANCE BELOW (IN)/ATTACHMENT POINT

"SS" REFERENCE LOCATION
FS = FRONT SIDE OF POLE
BS = BACK SIDE OF POLE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
750 N. Greenfield Pkwy., Garner, NC 27529

SIGNAL SYSTEMS: #D03-14_SHALLOTTE AND #D03-38_SHALLOTTE

CONSTRUCTION NOTES

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14543 GENE G. MURR, JR.

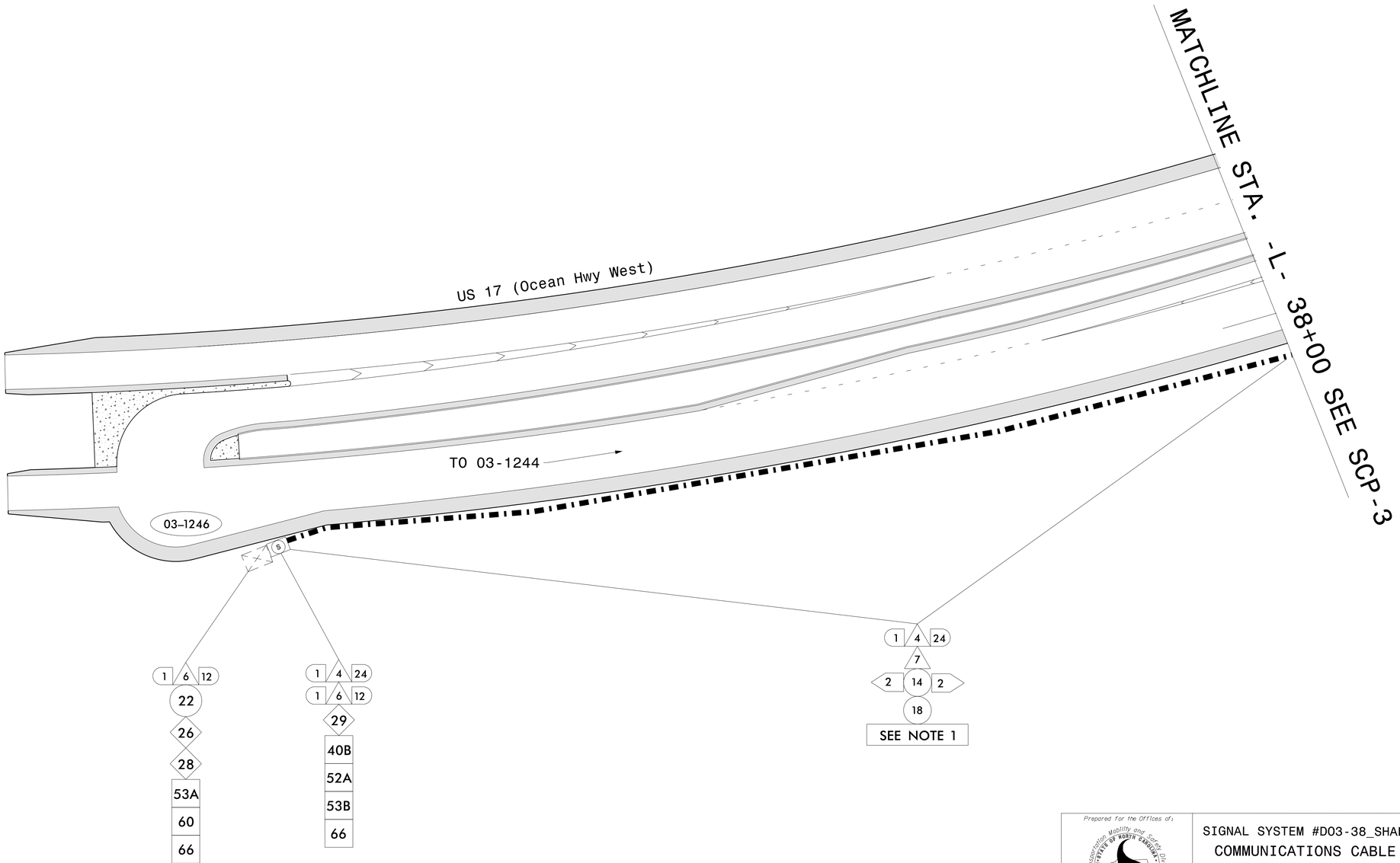
Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
4/1/2025

SIG. INVENTORY NO.

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-2

NOTE

1.FOR NEW CONDUIT PLACED ADJACENT TO THE OUTSIDE ROADWAY PAVED SHOULDER,STAY AS CLOSE AS POSSIBLE TO THE EDGE OF PAVEMENT, BUT MIANTAIN A MINIMUM OF 6′ FROM THE EDGE OF THE TRAVEL LANE.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SIGNAL SYSTEM #D03-38_SHALLOTTE
COMMUNICATIONS CABLE AND CONDUIT ROUTNG PLANS
Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr, Jr. 4/1/2025
AAEF5076CAB3ACF...
SIG. INVENTORY NO.

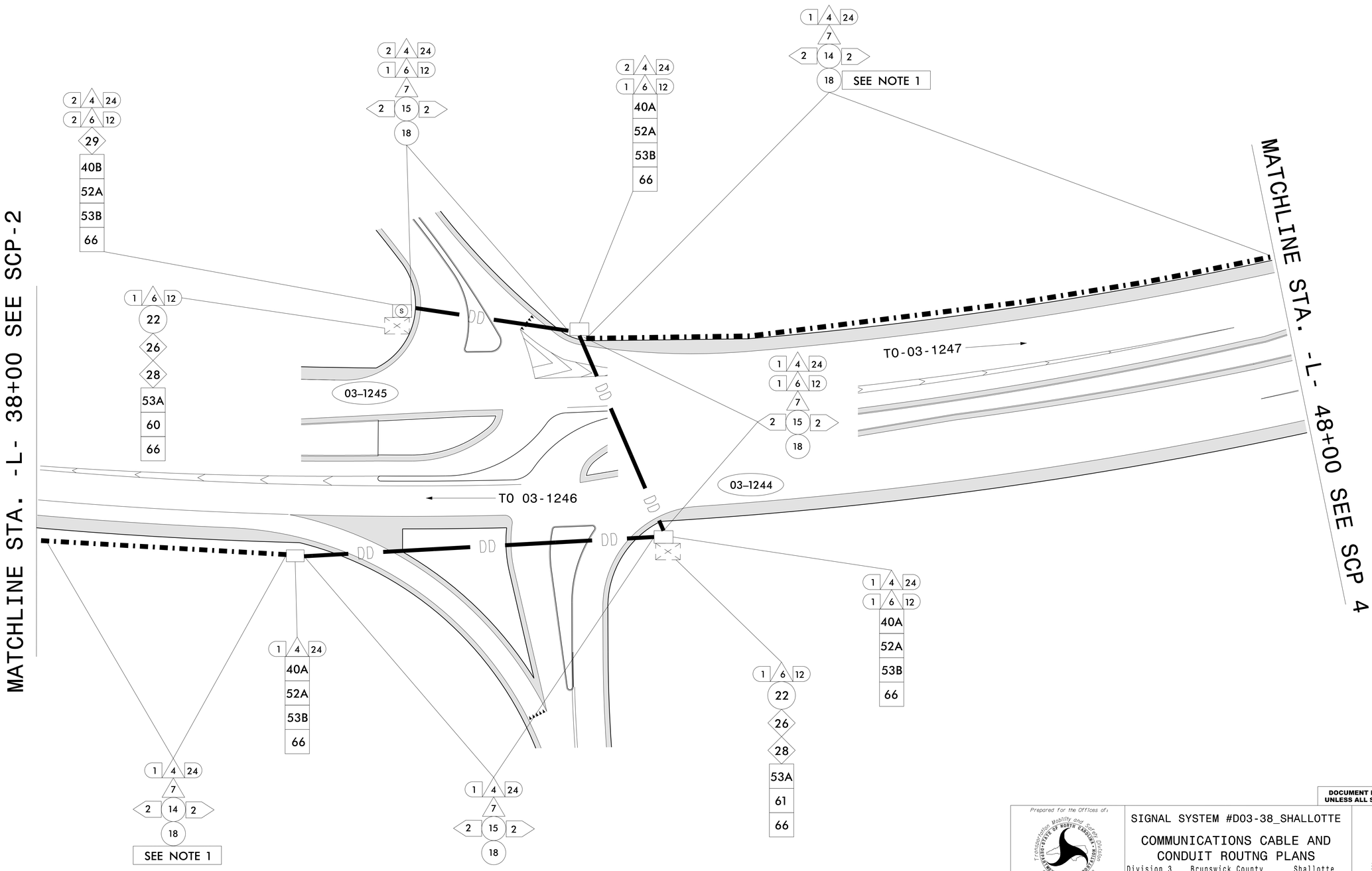
TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

4/1/2025
...#R-5857_SIG_DSN (SCP-2).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-3

NOTE

1. FOR NEW CONDUIT PLACED ADJACENT TO THE OUTSIDE ROADWAY PAVED SHOULDER,STAY AS CLOSE AS POSSIBLE TO THE EDGE OF PAVEMENT, BUT MAINTAIN A MINIMUM OF 6′ FROM THE EDGE OF TRAVEL LANE.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SIGNAL SYSTEM #D03-38_SHALLOTTE

COMMUNICATIONS CABLE AND CONDUIT ROUTNG PLANS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE N/A

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr.
AA6F5078CAB34CF...
4/1/2025

SIG. INVENTORY NO.

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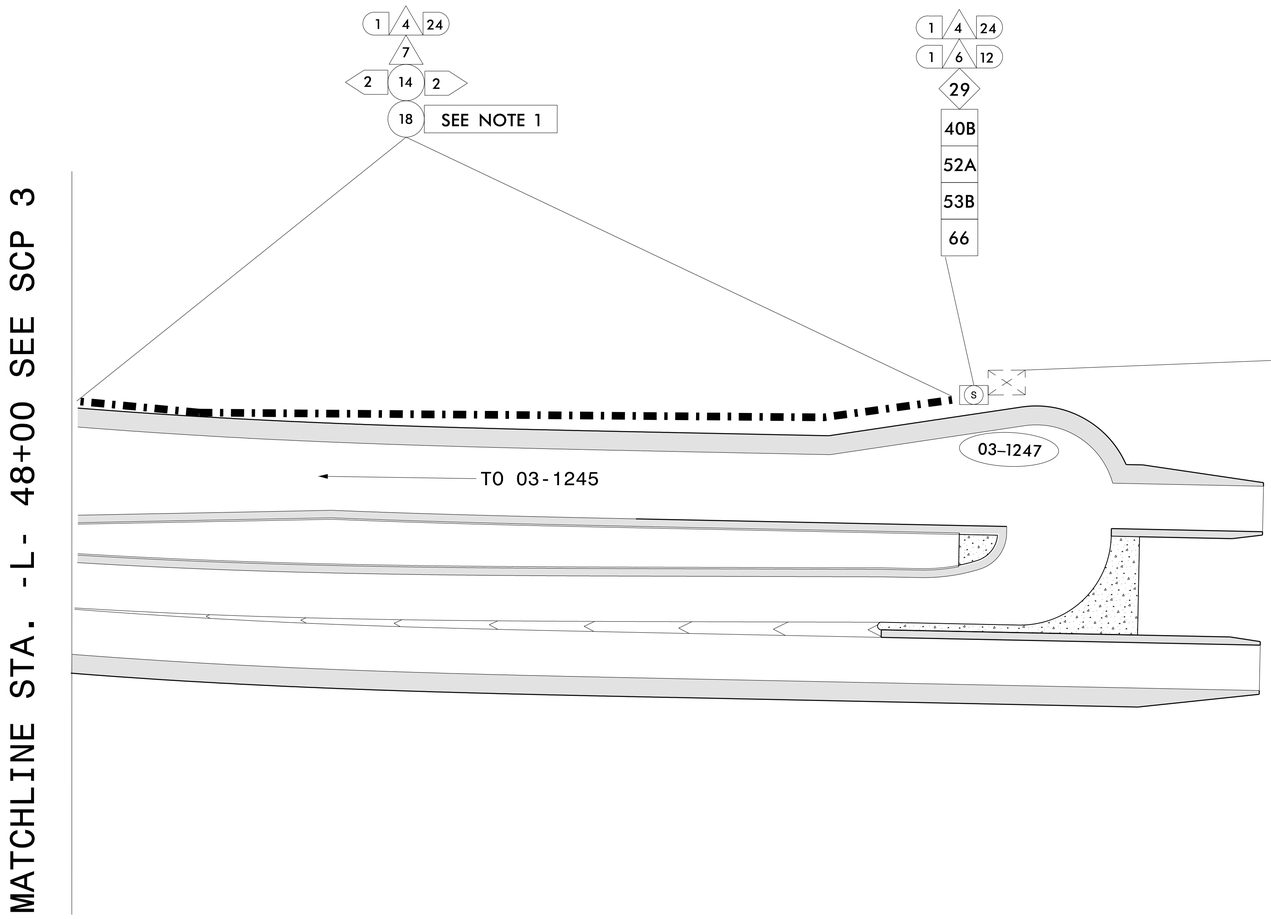
License: F-0453

4/1/2025
R-5857_SIG_DSN_2 (SCP-3).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-4

NOTE

1. FOR NEW CONDUIT PLACED ADJACENT TO THE OUTSIDE ROADWAY PAVED SHOULDER,STAY AS CLOSE AS POSSIBLE TO THE EDGE OF PAVEMENT, BUT MAINTAIN A MINIMUM OF 6′ FROM THE EDGE OF THE TRAVEL LANE.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSYSTEMS
1 Glenwood Avenue
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Tel:919.789.9977
Fax:919.789.9591
License: F-0453

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
N/A

SIGNAL SYSTEM #D03-38_SHALLOTTE

COMMUNICATIONS CABLE AND CONDUIT ROUTNG PLANS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 4/1/2025

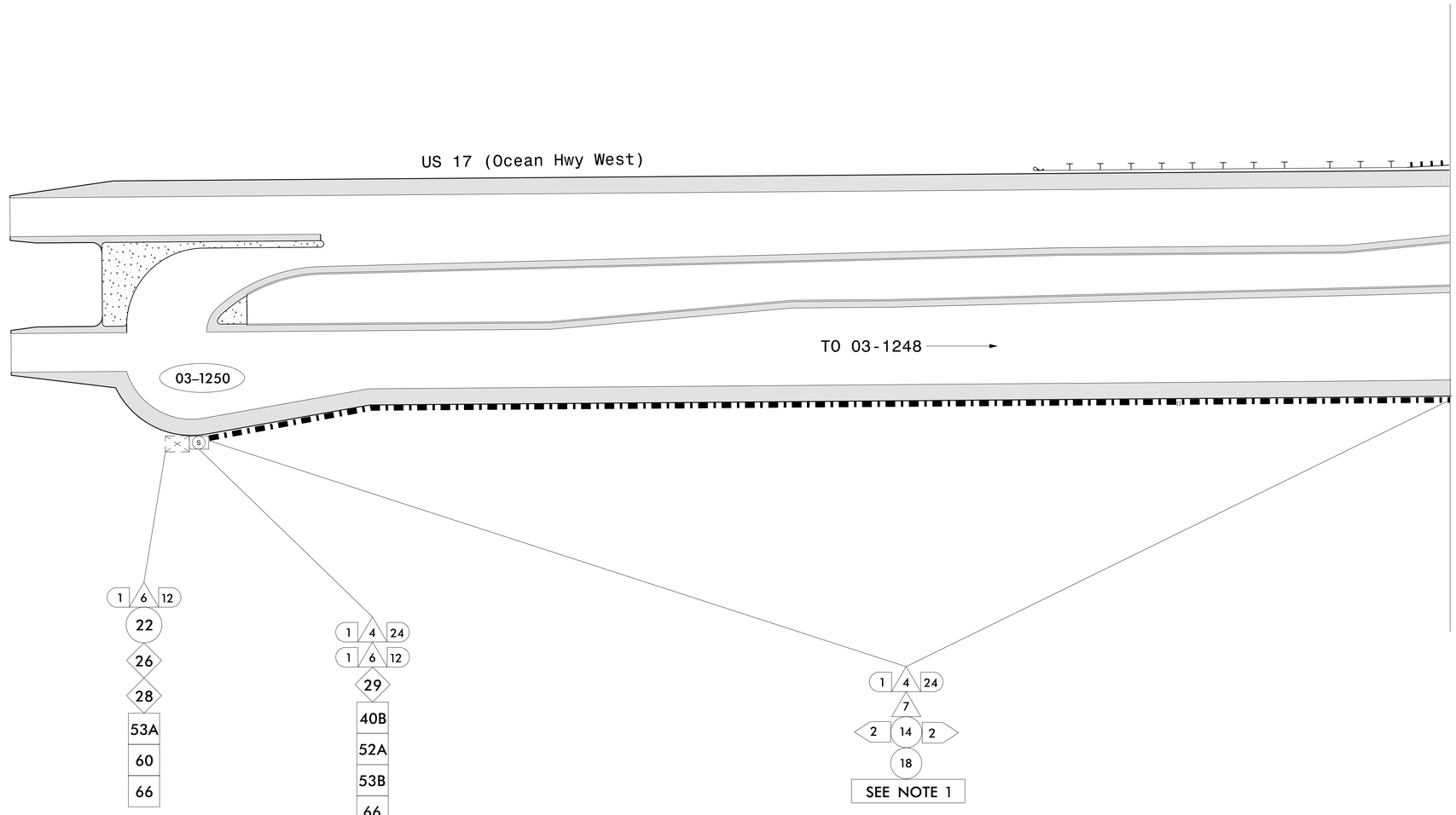
SIG. INVENTORY NO.

4/1/2025
R-5857_SIG_DSN_3 (SCP-4).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-5

NOTE

1. FOR NEW CONDUIT PLACED ADJACENT TO THE OUTSIDE ROADWAY PAVED SHOULDER,STAY AS CLOSE AS POSSIBLE TO THE EDGE OF PAVEMENT, BUT MAINTAIN A MINIMUM OF 6′ FROM THE EDGE OF THE TRAVEL LANE.



MATCHLINE STA. -L- 28+00 SEE SCP-3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

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

SCALE N/A

SIGNAL SYSTEM #D03-14_SHALLOTTE
COMMUNICATIONS CABLE AND CONDUIT ROUTNG PLANS
Division 3 Brunswick County Shallotte

PLAN DATE: March 2025	REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse	REVIEWED BY:

REVISIONS	INIT.	DATE

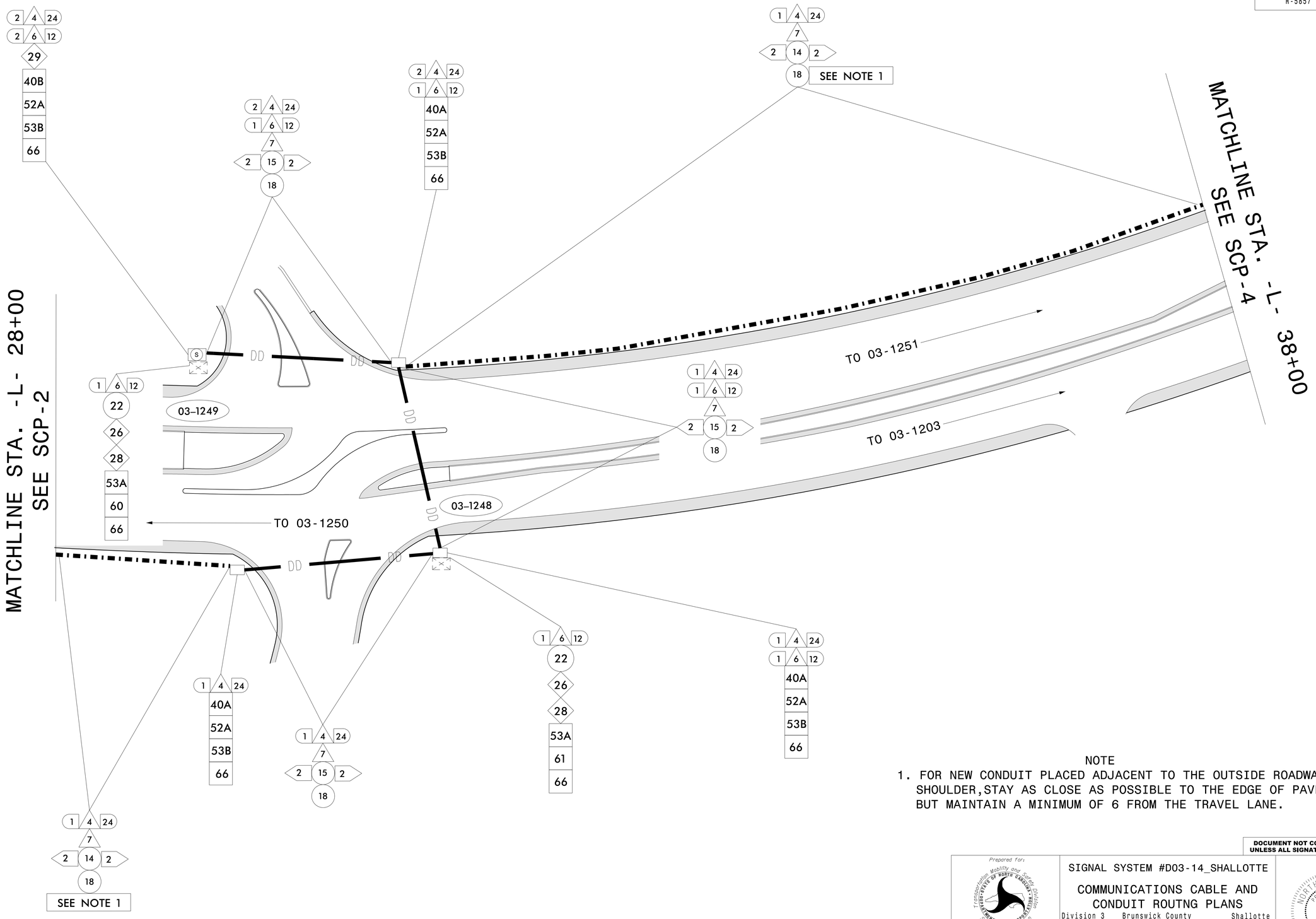
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 4/1/2025

SIG. INVENTORY NO.

4/1/2025
R-5857_SIG_DSN_(SCP-5).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-6



NOTE

1. FOR NEW CONDUIT PLACED ADJACENT TO THE OUTSIDE ROADWAY PAVED SHOULDER,STAY AS CLOSE AS POSSIBLE TO THE EDGE OF PAVEMENT, BUT MAINTAIN A MINIMUM OF 6 FROM THE TRAVEL LANE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

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

SCALE N/A

SIGNAL SYSTEM #D03-14_SHALLOTTE

COMMUNICATIONS CABLE AND CONDUIT ROUTNG PLANS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF... 4/1/2025

SIG. INVENTORY NO.

4/1/2025
R-5857_SIG_DSN_2 (SCP-6).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-7

MATCHLINE STA. -L- 38+00
SEE SCP-3

1 4 24
7
2 14 2
18
SEE NOTE 1

1 4 24
1 6 12
40A
52A
53B
66

1 4 24
1 6 12
7
2 14 2
18
SEE NOTE 1

1 4 24
1 6 12
40A
52A
53B
66

1 4 24
1 6 12
7
2 15 2
18

03–1251

TO 03-1249

TO 03-1248

03–1203

S

RED BUG ROAD

1 6 12
22
26
28
53A
61
66

1 4 24
2 6 12
29
40B
52A
53B
66

1 6 12
22
26
28
53A
60
66

NOTE
1. FOR NEW CONDUIT PLACED ADJACENT TO THE OUTSIDE ROADWAY PAVED SHOULDER,STAY AS CLOSE AS POSSIBLE TO THE EDGE OF PAVEMENT, BUT MAINTAIN A MINIMUM OF 6′ FROM THE EDGE OF THE TRAVEL LANE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSYSTEMS
1 Glenwood Avenue
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Tel:919.789.9977
Fax:919.789.9591
License: F-0453

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

SCALE N/A

SIGNAL SYSTEM #D03-14_SHALLOTTE

COMMUNICATIONS CABLE AND CONDUIT ROUTNG PLANS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR JR.

Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
4/1/2025

SIG. INVENTORY NO.

4/1/2025
...\R-5857_SIG_DSN_3 (SCP-7).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-8

NOTES

1) FIVE DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AT 910–341–2200 TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGUATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION.NOTIFY THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. 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) ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING AND ENSURING PROPER TERMINATIONS.

4) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"
- a) SPLICE LOCATION
- b) DATE
- c) COMPANY NAME
- d) NAME OF INDIVIDUAL PERFORMING THE SPLICING

5) 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.

6) UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY

7) UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE

LEGEND

COLOR CODE TIA/EIA 598–A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
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X = FUSION SPLICE INDIVIDUAL FIBER

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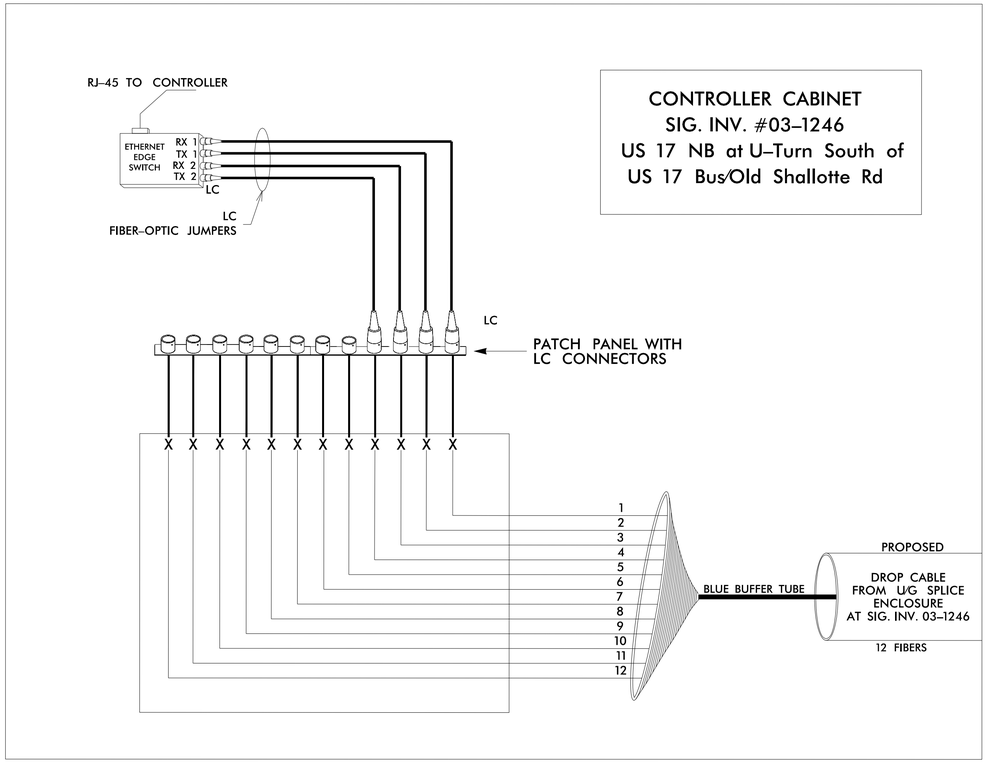
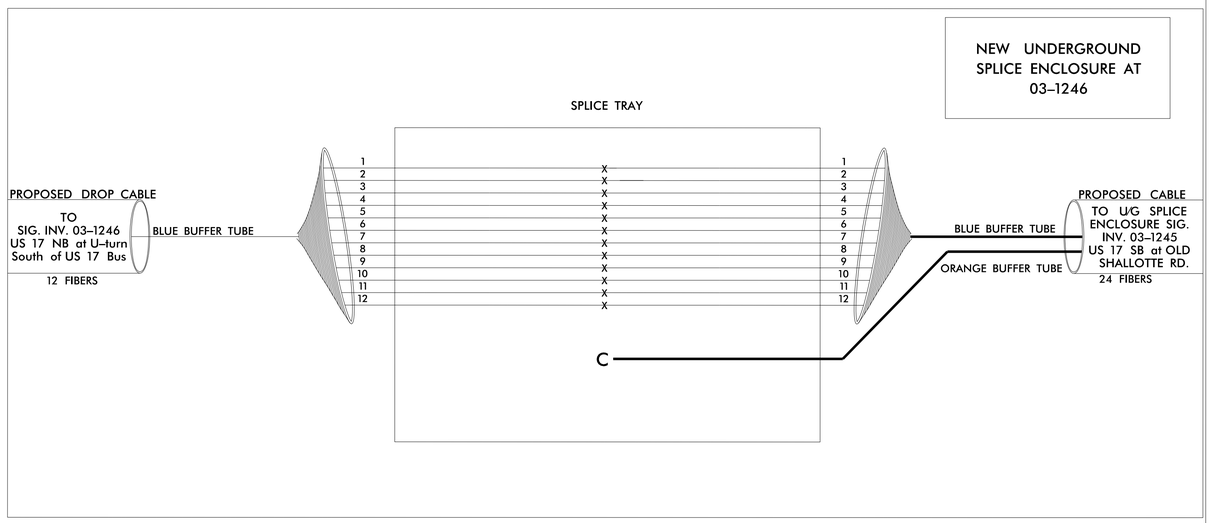


SEE SHEET SCP–2



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

SIGNAL SYSTEM #D03-38_SHALLOTTE

SPLICE DETAILS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025	REVIEWED BY: G.G. Murr, Jr.
PREPARED BY: Nadia Degbotse	REVIEWED BY:

SCALE: N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
4/1/2025

SIG. INVENTORY NO.

4/1/2025
R-5857_1246 South U-turn (scp-8).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-9

NOTES

1) FIVE DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AT 910–341–2200 TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGUATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION.NOTIFY THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

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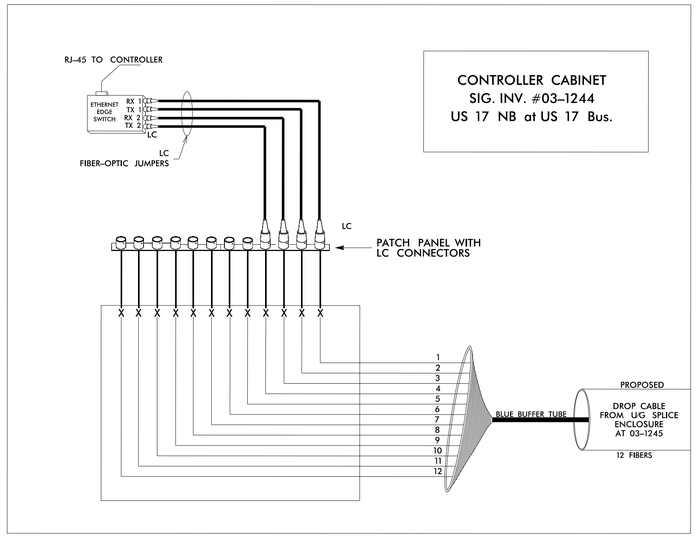
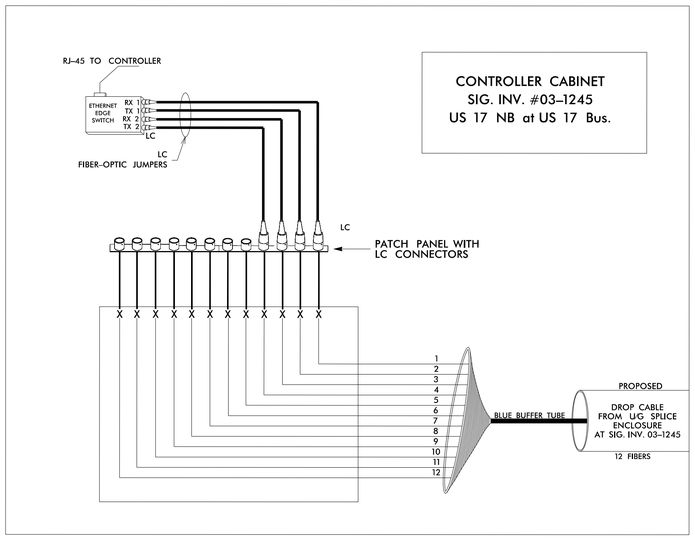
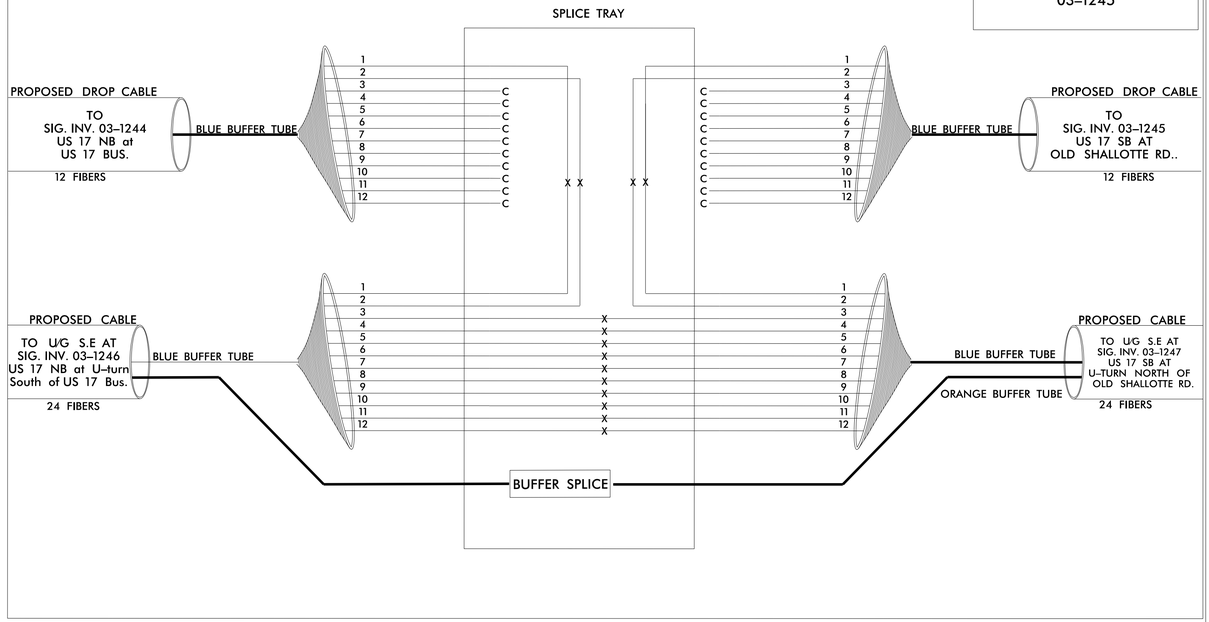
6) UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY

7) UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE



SEE SHEET SCP–3





LEGEND

COLOR CODE TIA/EIA 598–A	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
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DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SIGNAL SYSTEM #D03-38_SHALLOTTE

SPLICE DETAILS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR JR.

Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
4/1/2025

SIG. INVENTORY NO.

4/1/2025
R-5857 1244 NB (scp-9).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-10

NOTES

1) FIVE DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AT 910–341–2200 TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGUATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION.NOTIFY THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

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6) UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY

7) UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE

LEGEND

COLOR CODE TIA/EIA 598–A

(1) BLUE	(7) RED
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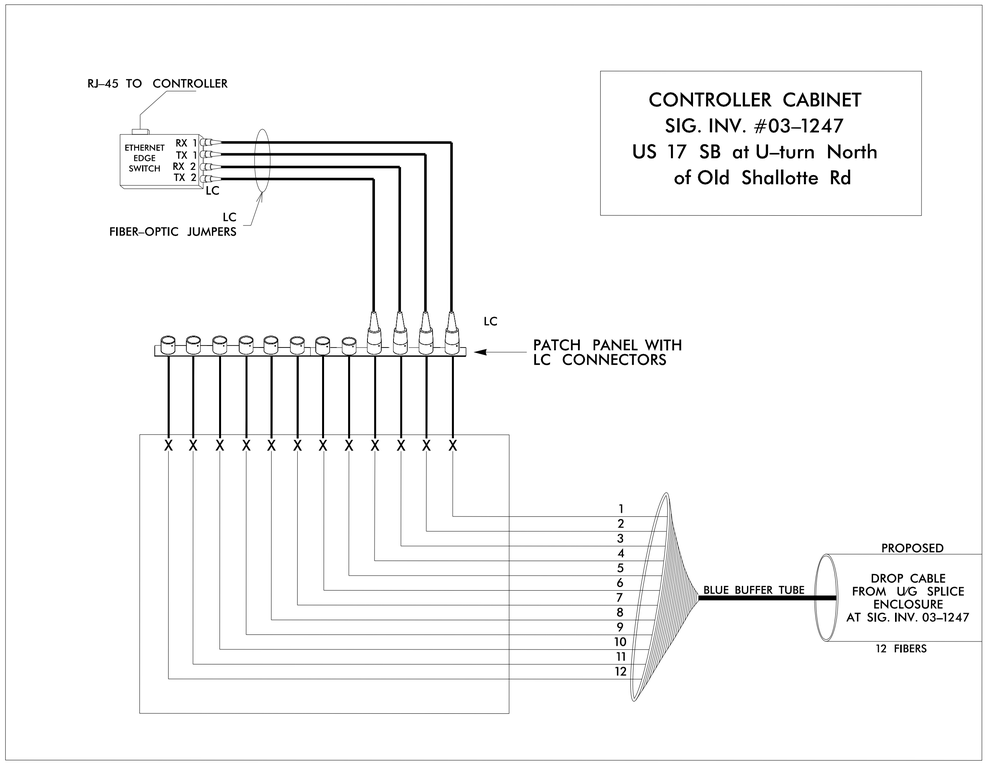
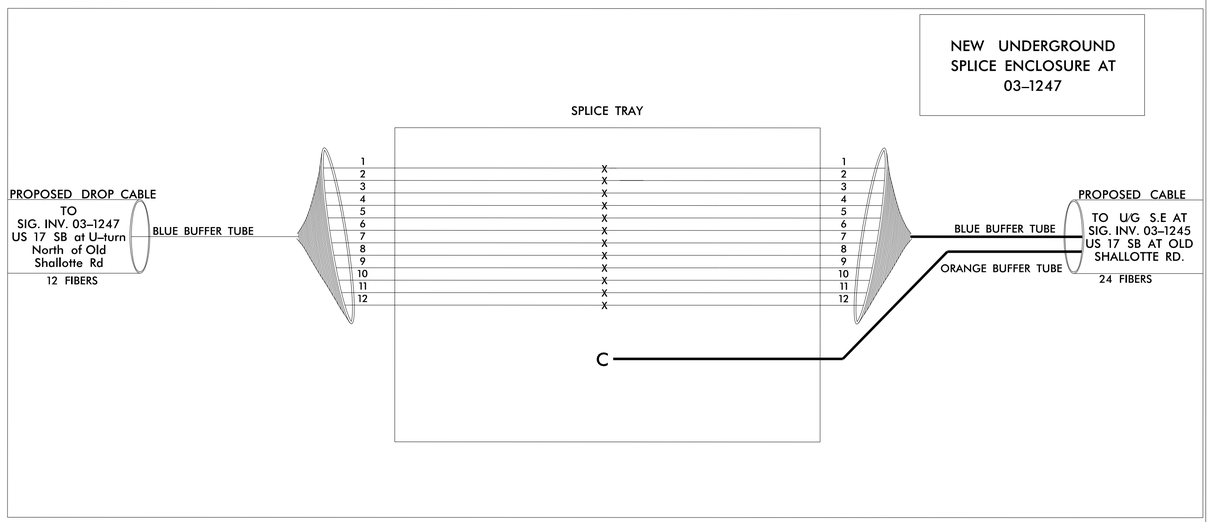


CONTROLLER CABINET
SIG. INV. #03–1247
US 17 SB at U–turn North of Old Shallotte Rd

SEE SHEET SCP–4

NEW UNDERGROUND SPLICE ENCLOSURE AT 03–1247



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

SIGNAL SYSTEM #D03-38_SHALLOTTE

SPLICE DETAILS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr. 4/1/2025
AA8F5076CAB34CF...

SIG. INVENTORY NO.

4/1/2025
R-5857_1247 North U-turn (scp-10).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-11

NOTES

1) FIVE DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AT 910–341–2200 TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGUATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION.NOTIFY THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

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6) UNUSED FIBERS LEFT COILED AND STORED IN SPLICE TRAY

7) UNUSED BUFFER TUBES LEFT COILED AND STORED IN SPLICE ENCLOSURE

LEGEND

COLOR CODE TIA/EIA 598–A

(1) BLUE	(7) RED
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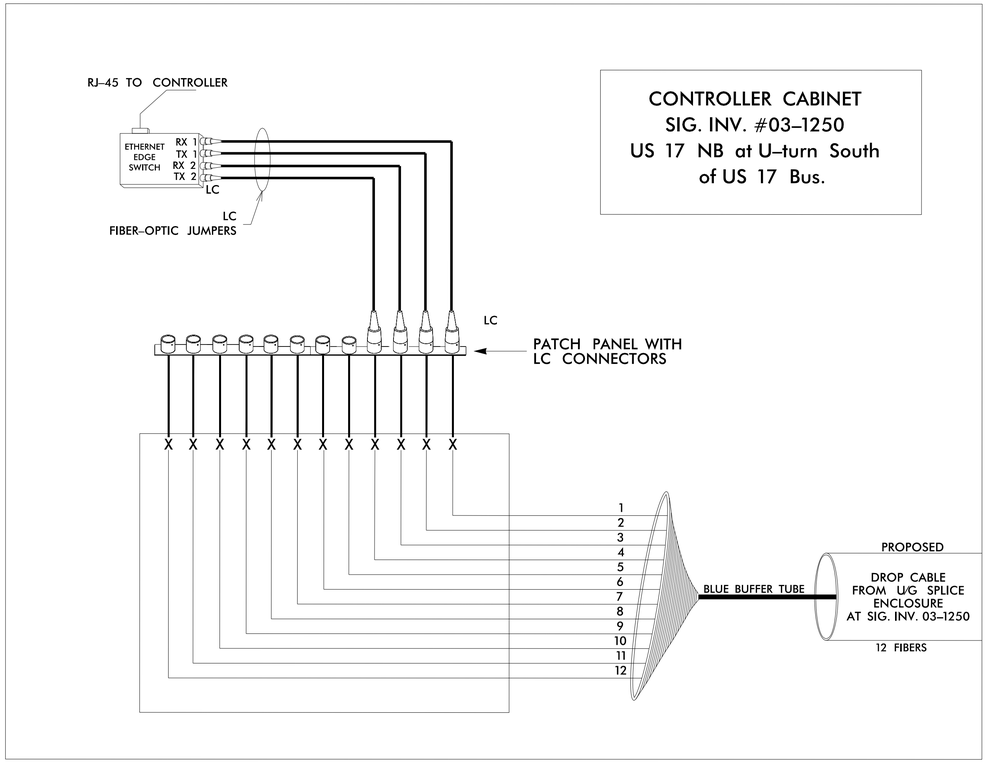
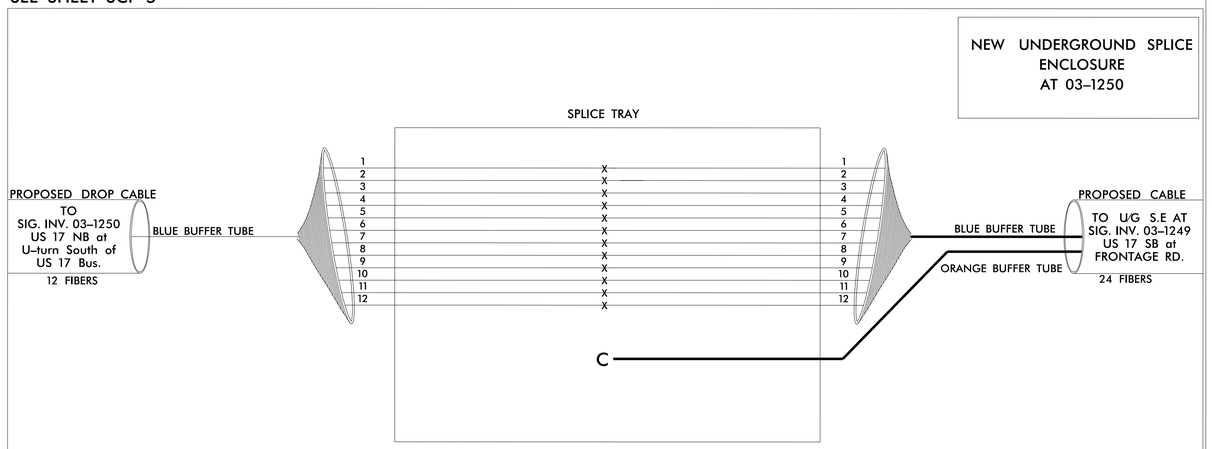


CONTROLLER CABINET
SIG. INV. #03–1250
US 17 NB at U–turn South of US 17 Bus.

SEE SHEET SCP–5

NEW UNDERGROUND SPLICE ENCLOSURE AT 03–1250



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

SIGNAL SYSTEM #D03-14_SHALLOTTE

SPLICE DETAILS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE: N/A

REVISIONS	INIT.	DATE

SIG. INVENTORY NO.

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 4/1/2025

4/1/2025
R-5857_1250 South U-turn (scp-11).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-12

NOTES

1) FIVE DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AT 910–341–2200 TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGUATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION.NOTIFY THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

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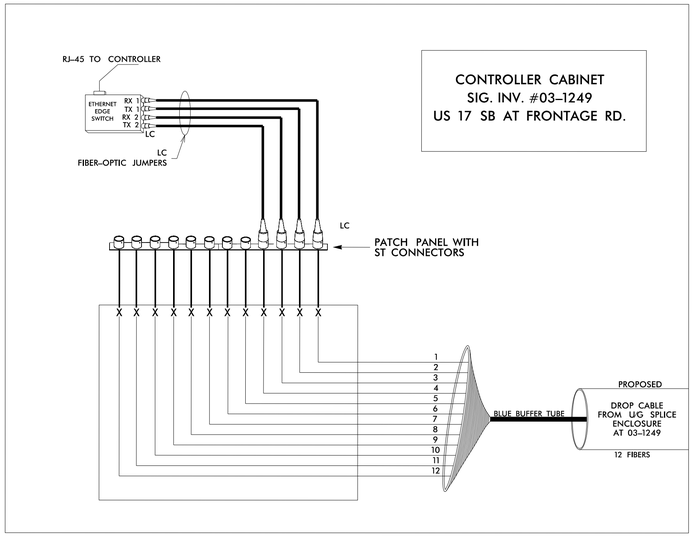
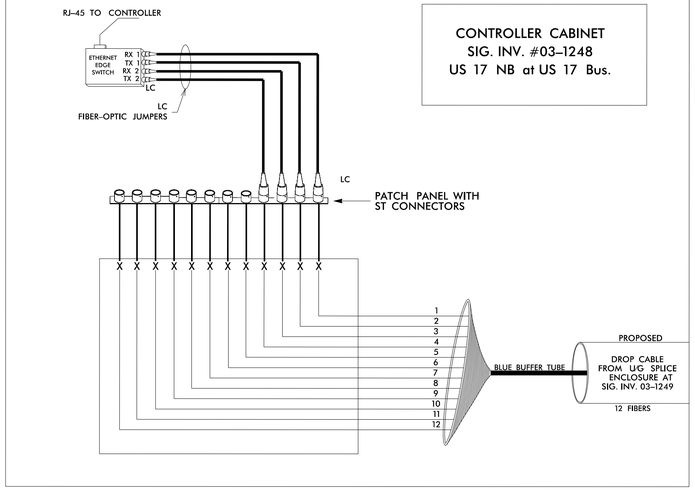
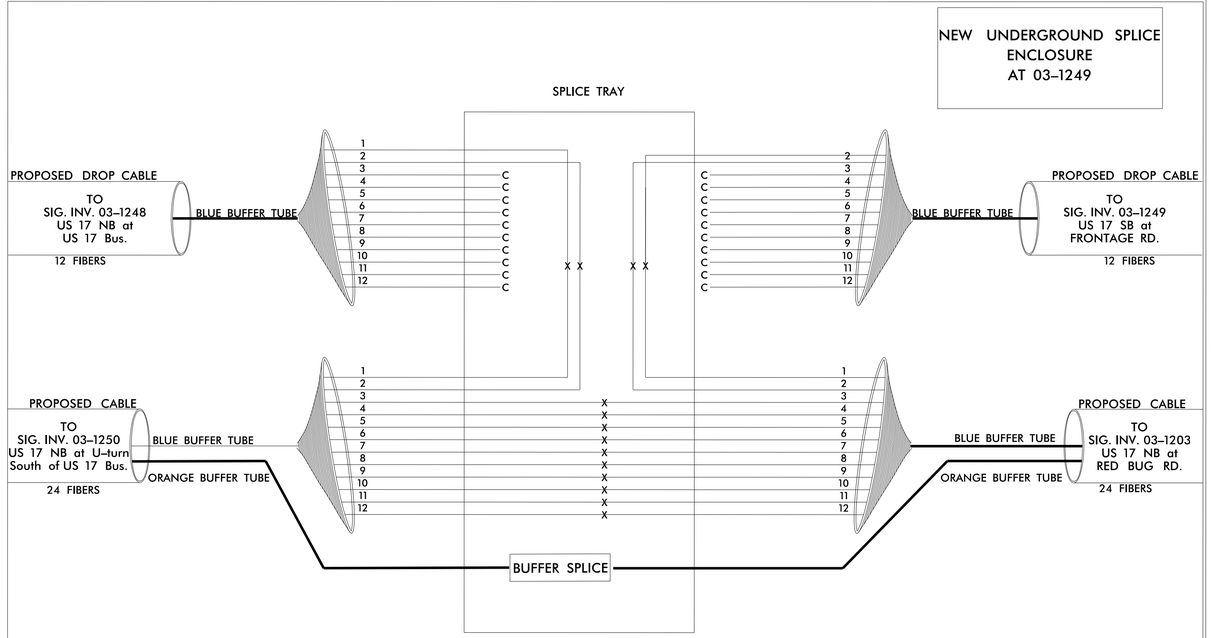


SEE SHEET SCP–6





LEGEND

COLOR CODE TIA/EIA 598–A	
(1) BLUE	(7) RED
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Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE: N/A

SIGNAL SYSTEM #D03-14_SHALLOTTE

SPLICE DETAILS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR JR.

Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 4/1/2025

SIG. INVENTORY NO.

4/1/2025
R-5857 1248 NB (scp-12).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	SCP-13

NOTES

1) FIVE DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AT 910–341–2200 TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGUATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION.NOTIFY THE DIVISION 3 TRAFFIC SIGNAL SUPERVISOR AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

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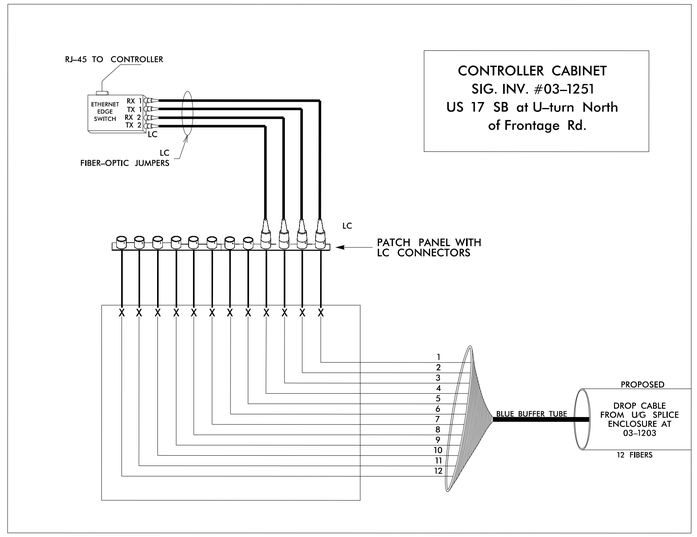
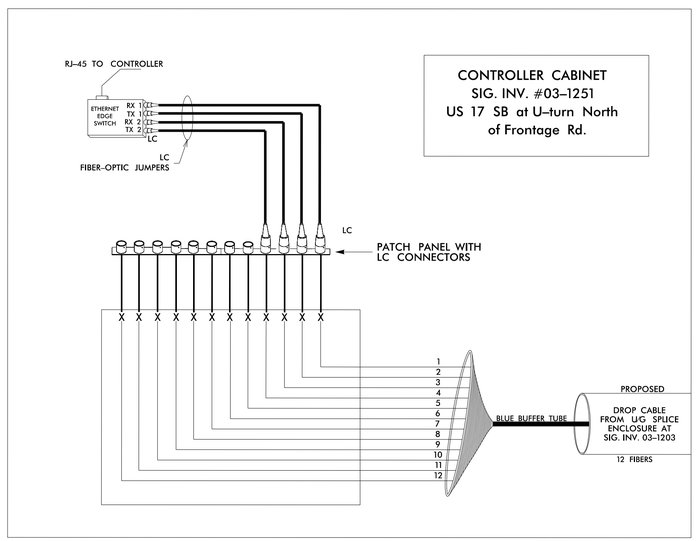
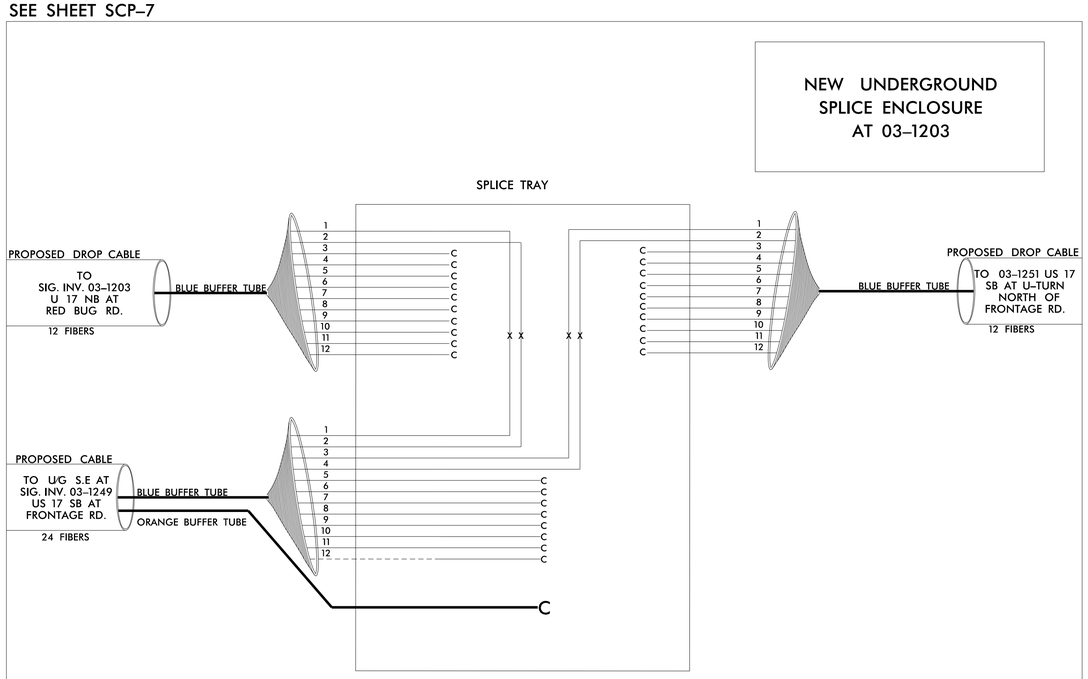


SEE SHEET SCP–7





LEGEND

COLOR CODE TIA/EIA 598–A	
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

X = FUSION SPLICE INDIVIDUAL FIBER

C = CAP AND SEAL

EXPRESS = EXPRESS ENTIRE BUFFER TUBE /FIBERS THROUGH WITHOUT CUTTING

BUFFER SPLICE = SPLICE ALL FIBERS IN BUFFER TUBE COLOR TO COLOR

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
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License: F-0453

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: N/A

SIGNAL SYSTEM #D03-14_SHALLOTTE

SPLICE DETAILS

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR JR.

Signed by: Gene G. Murr Jr. AA6F5076CAB34CF...
4/1/2025

SIG. INVENTORY NO.

4/1/2025
R-5857_1251 North U-turn (scp-13).dgn
USER:ndegbotse