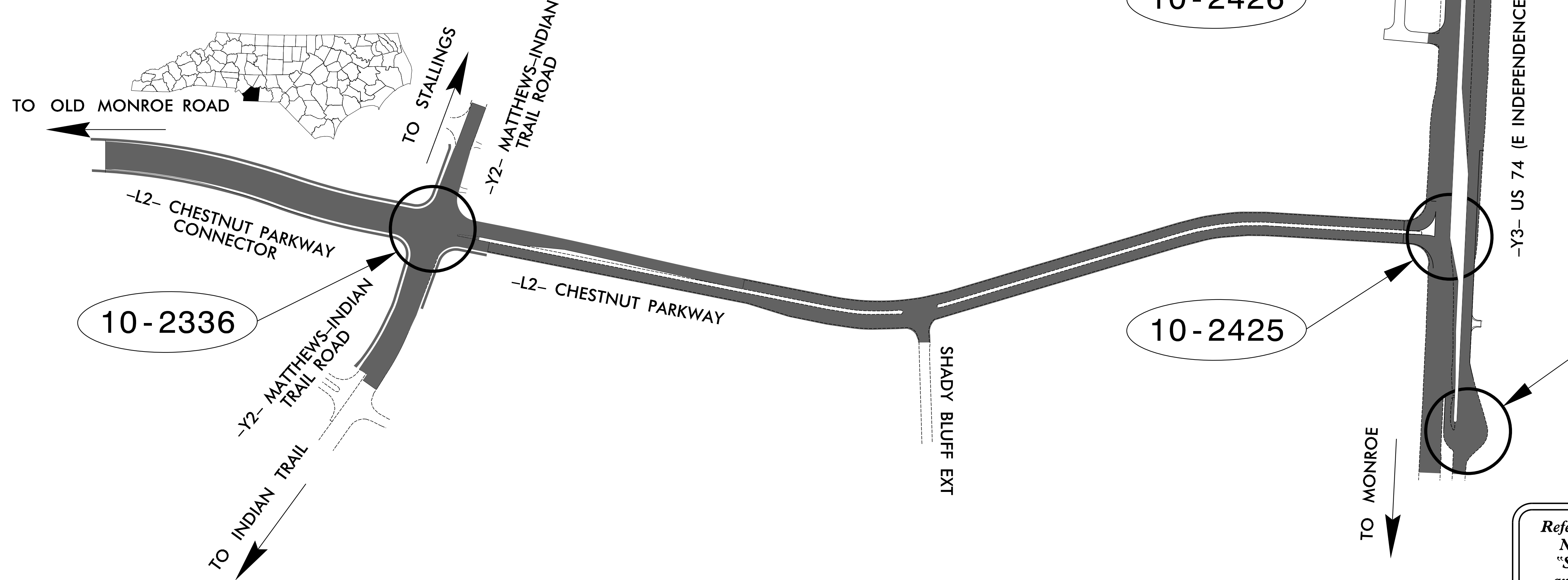
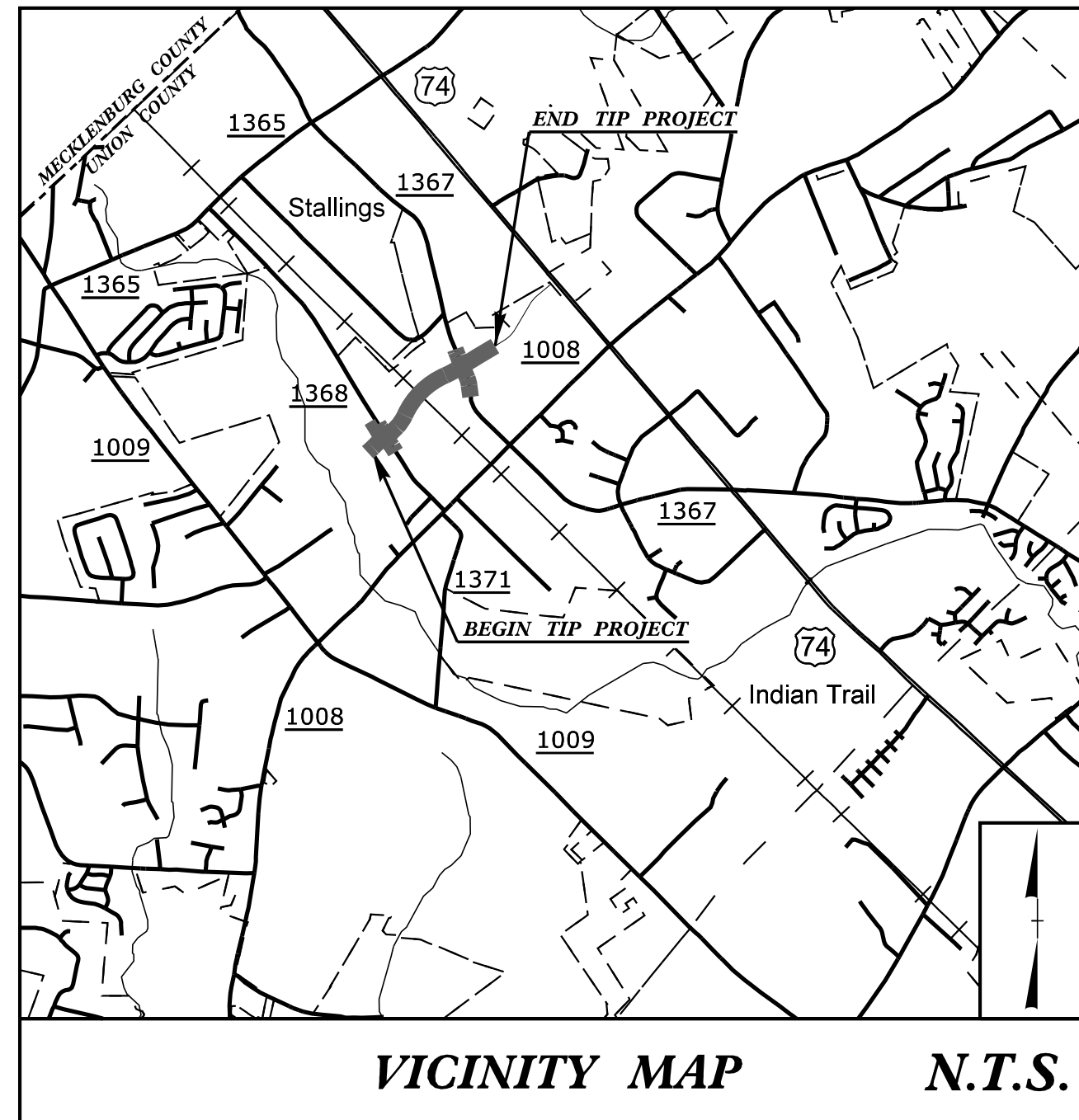
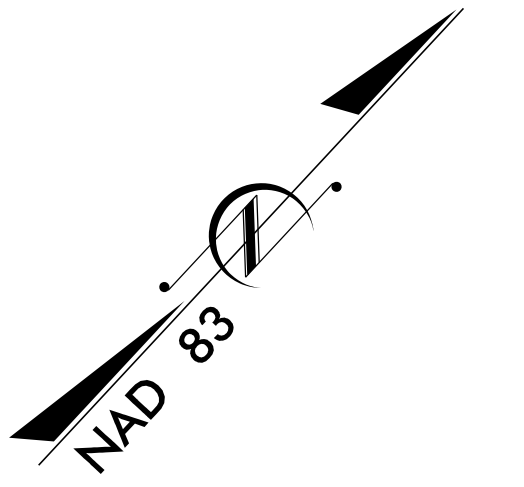


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UNION COUNTY

**LOCATION: SR 1362 (CHESTNUT PARKWAY /CHESTNUT PARKWAY CONNECTOR)
AT SR 1367 (MATTHEWS-INDIAN TRAIL ROAD)**

TYPE OF WORK: PAVING, GRADING, DRAINAGE, STRUCTURES, TRAFFIC SIGNALS AND TRAFFIC SIGNAL COMMUNICATIONS



Sheet #	Reference #	Index of Plans Location/Description
Sig. 1.0	N/A	Title Sheet
Sig. 1.1 - 1.2	N/A	Standard Plate Sheets
Sig. 2.0 - 2.4	10-2426	US 74 (E Independence Blvd) at Westbound U-Turn
Sig. 3.0 - 3.2	10-2425	US 74 (E Independence Blvd) at Chestnut Parkway
Sig. 4.0 - 4.4	10-2424	US 74 (E Independence Blvd) at Eastbound U-Turn
Sig. 5.0 - 5.5	10-2336	Chestnut Parkway Connector /Chestnut Parkway at Matthews-Indian Trail Road
Sig. M1 - M8	N/A	Standard Drawings for All Metal Poles
SCP 1 - SCP 11	N/A	Signal Communication Plans

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

R. Nicholas Zinser, PE - Western Region Signals Engineer
D. Todd Joyce, PE - Signal Equipment Design Engineer
Gregory A. Green - Signal Communications Projects Engineer

Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.

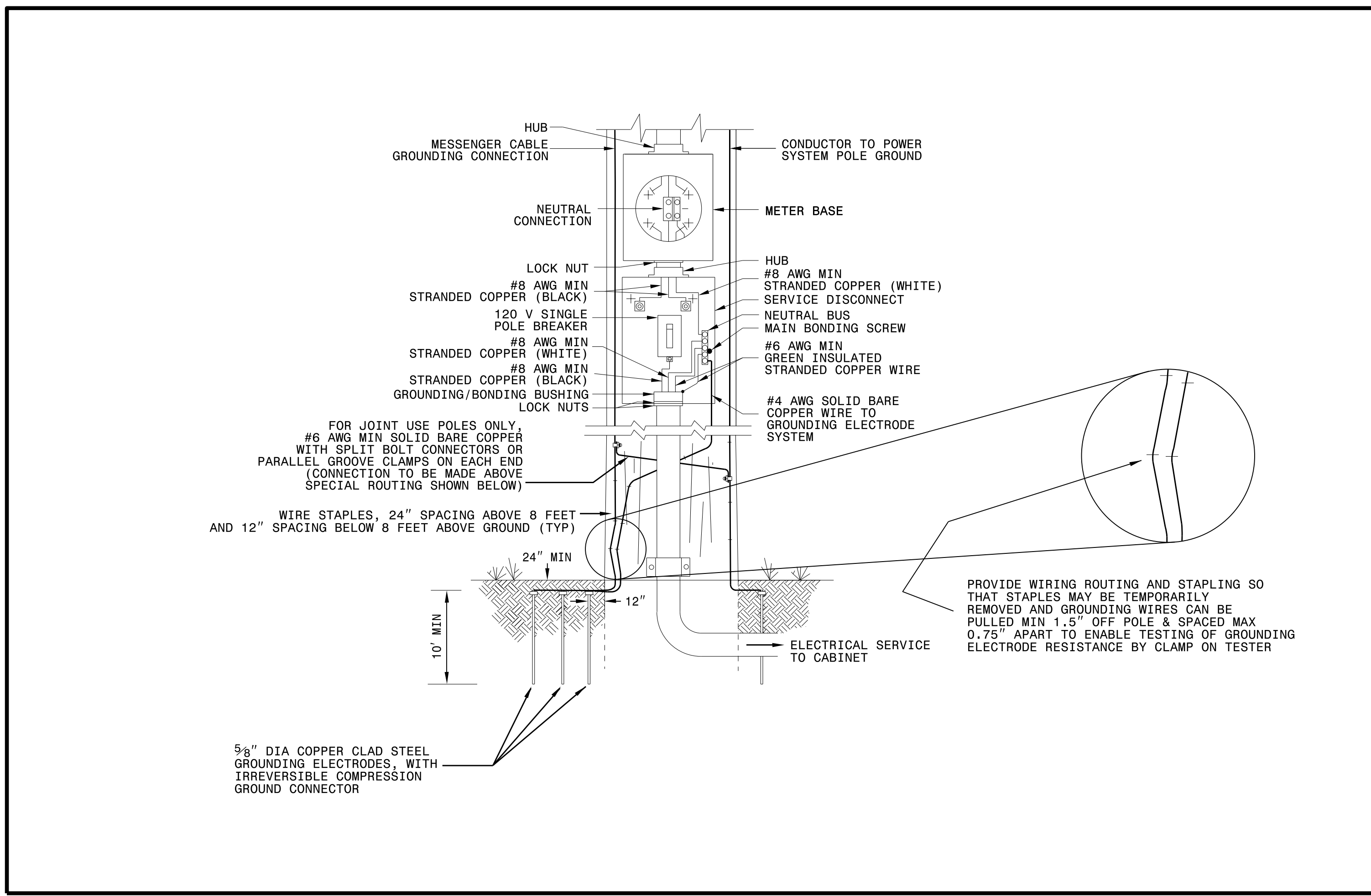
Prepared in the Office of:

RS&H
NC FIRM LICENSE NO. F 5483
 8532 SIX FORKS ROAD, SUITE 400
 ALLEN, NC 27517
 919.750.4000

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

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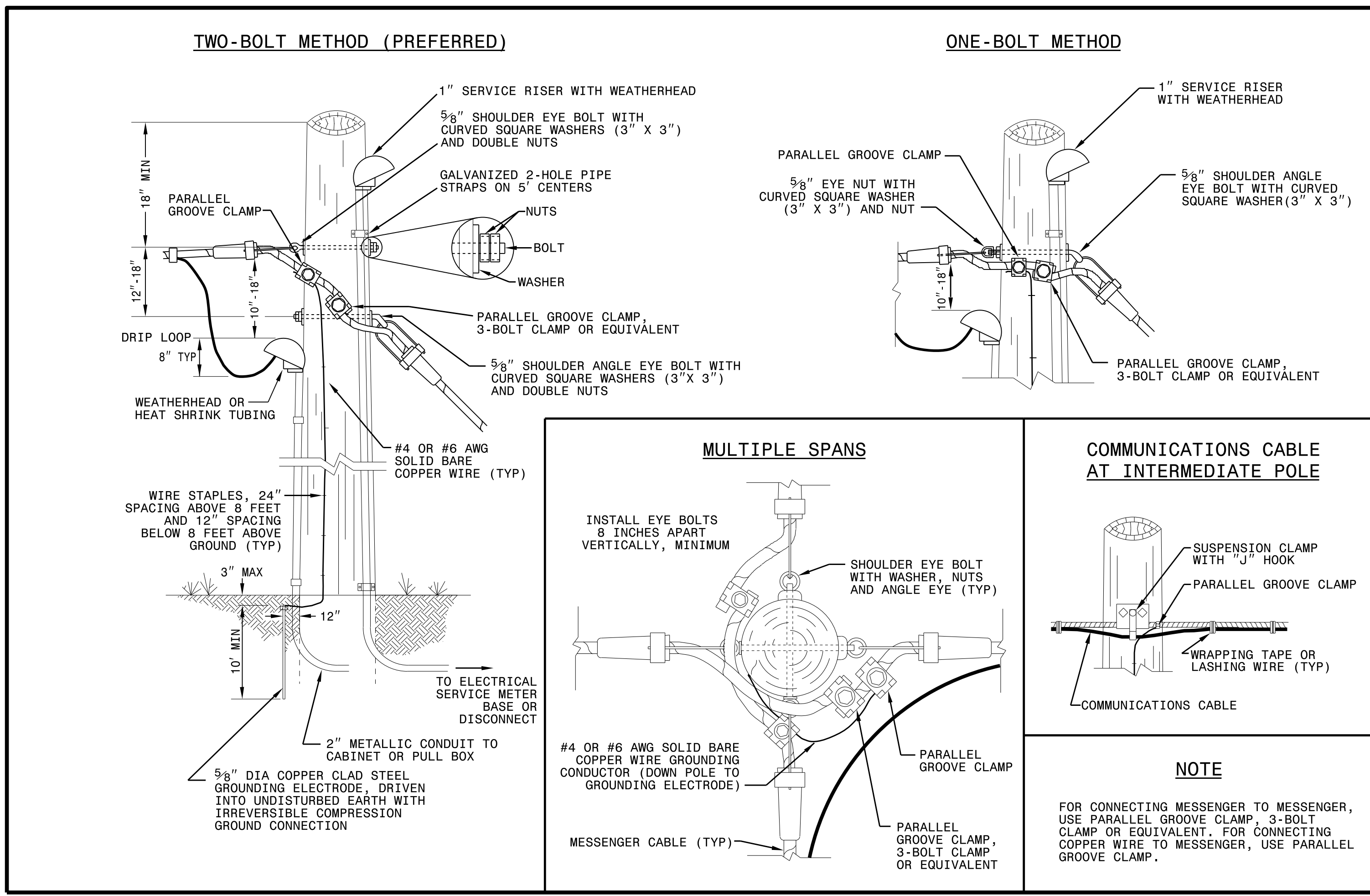


1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

ELECTRICAL SERVICE GROUNDING AND BONDING

SHEET 1 OF 1
1700D01



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

WOOD POLES

METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1
1720D01

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See Plate for Title

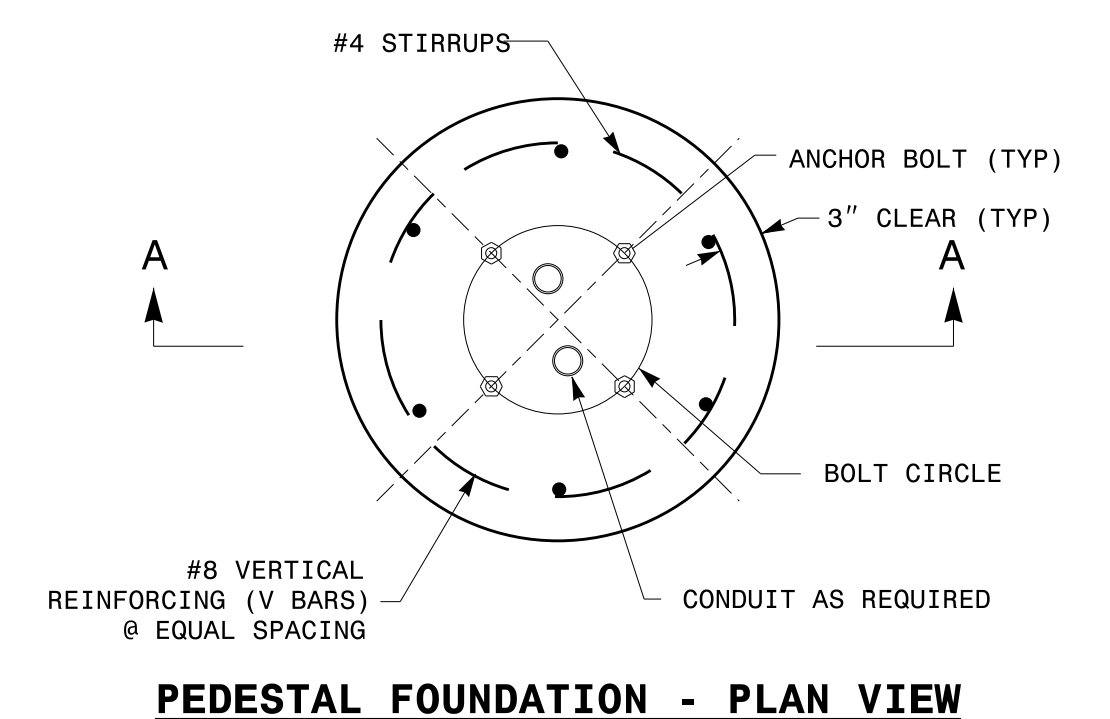
Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
Department of Transportation
ITS & Signals Unit

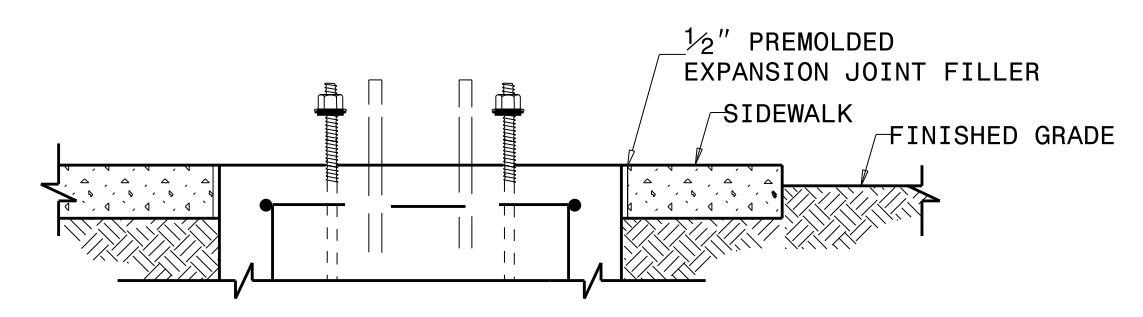
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 032108
MOHD A. ASLAMI

750 N. Greenfield Parkway
Garner, NC 27529

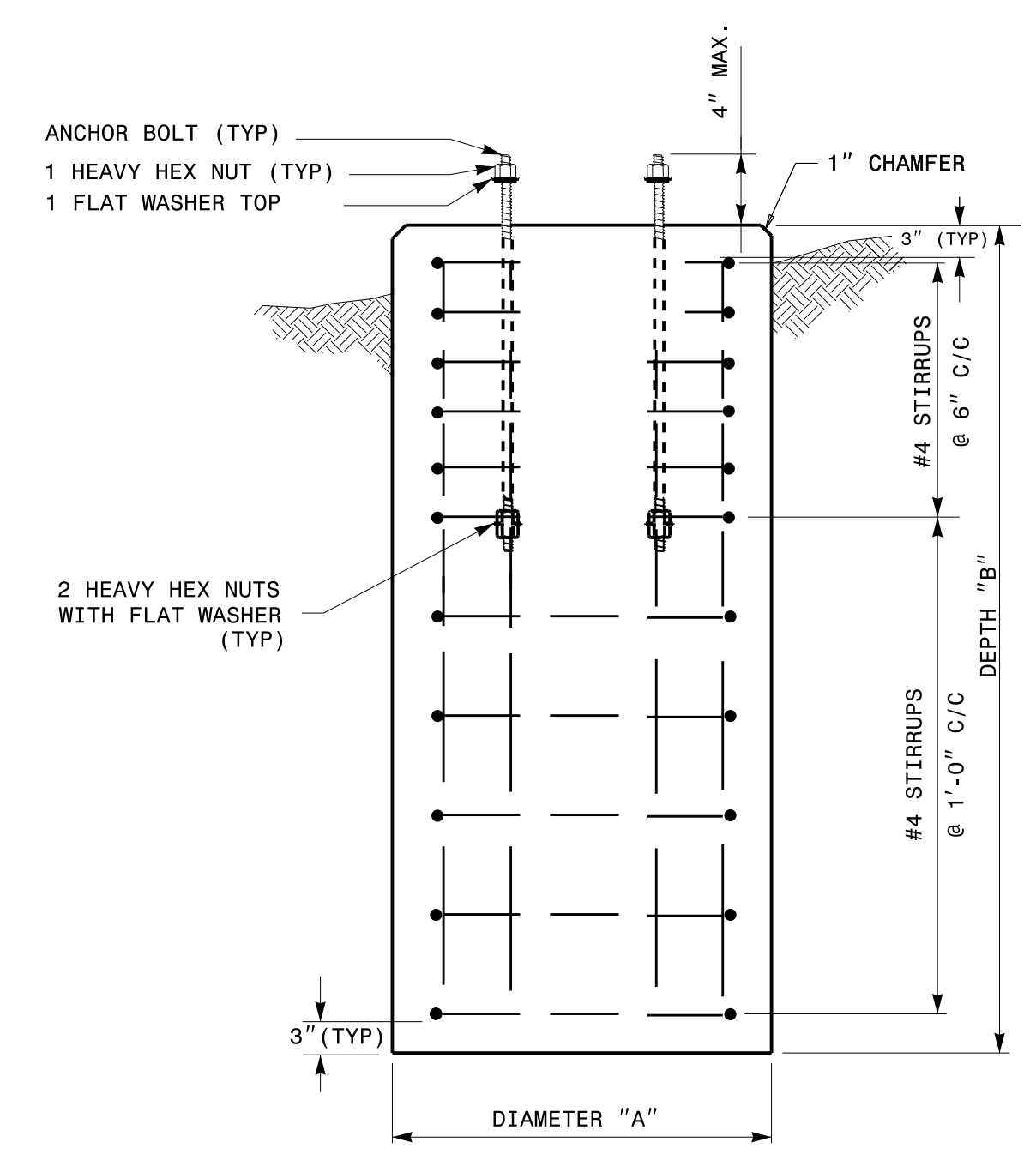
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Mohd Aslami
10/11/2017
DATE



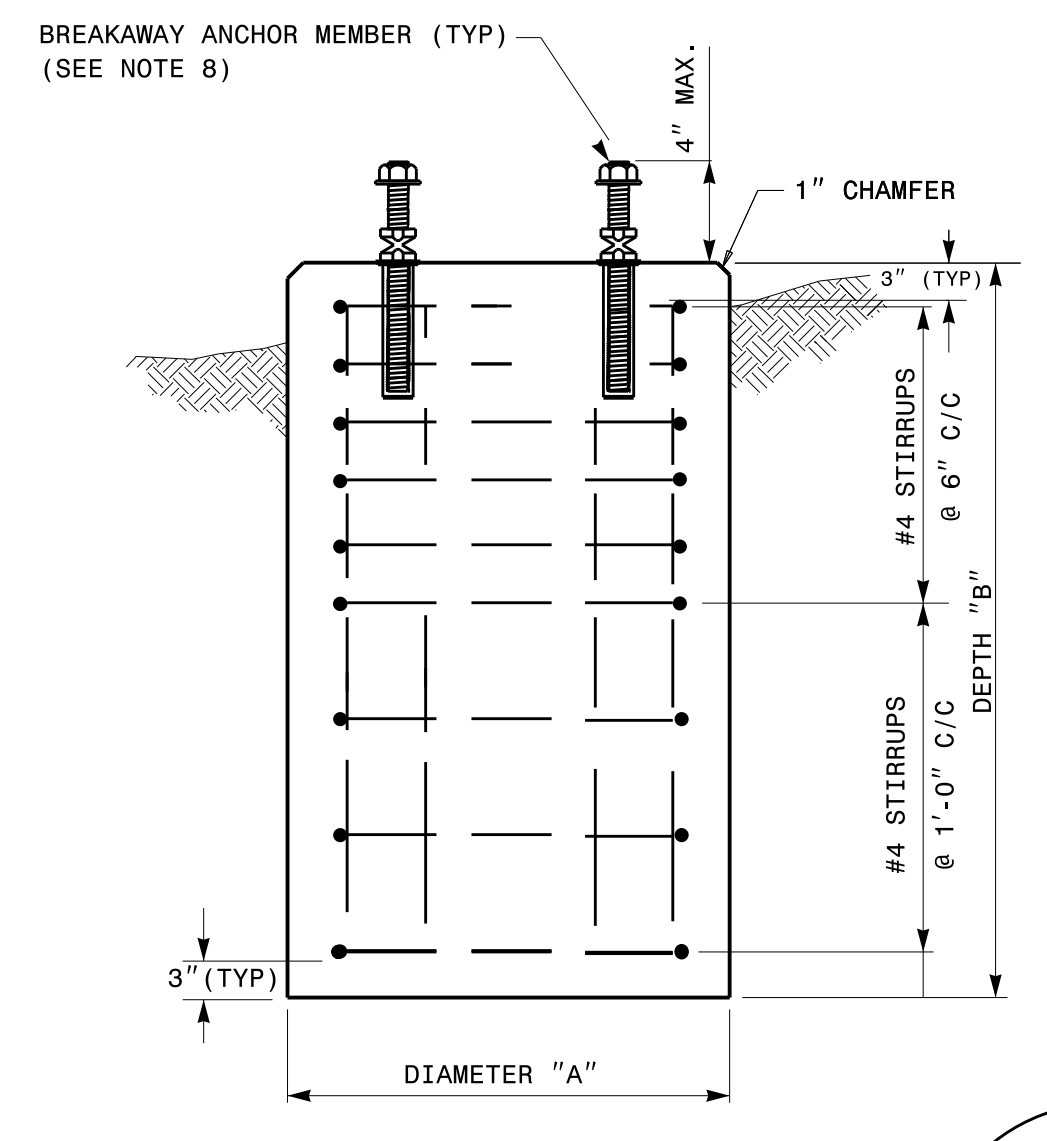
PEDESTAL FOUNDATION - PLAN VIEW



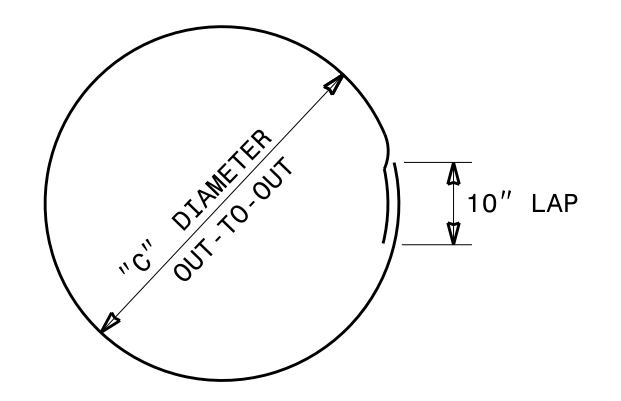
PEDESTAL FOUNDATION DETAILS FOR SIDEWALK



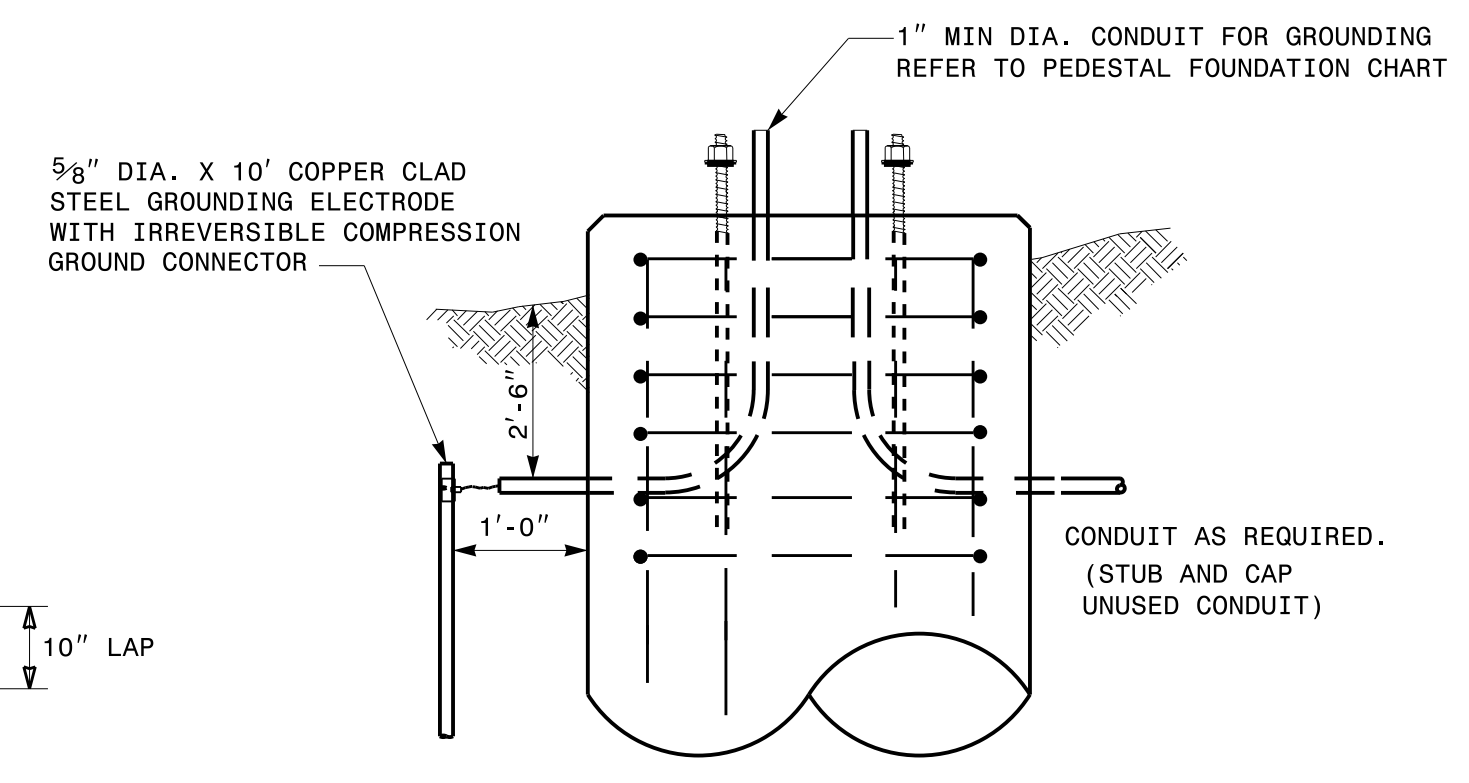
TYPES I, II & III
SECTION A-A



TYPES I & II ONLY
SECTION A-A



CLOSED HOOPS



GROUNDING & CONDUIT DETAIL

NOTES:

- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
- COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
- USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'c = 3000$ PSI (MIN.).
- USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
- GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
 - SANDY TYPE SOIL
 - NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
 - WIND SPEED NOT TO EXCEED 140 MPH
 IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.
- MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
- ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
- USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4 1/2" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6 5/8". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.

PEDESTAL FOUNDATION TYPE AND SIZE							
TYPE	PEDESTAL DESCRIPTION	SIZE			ANCHOR BOLT		INSTALL GROUNDING SYSTEM (YES/NO)
		DIAMETER "A" FT	DEPTH "B" FT	CONCRETE VOLUME CY	DIAMETER (MIN.) IN	LENGTH FT-IN	
I	PEDESTRIAN PUSHBUTTON	2'-0"	3'-6"	.41	1/2	1'-6"	NO
II	NORMAL-DUTY	2'-0"	5'-0"	.58	3/4	2'-0"	YES
III	HEAVY-DUTY	2'-6"	7'-0"	1.27	1	4'-0"	YES

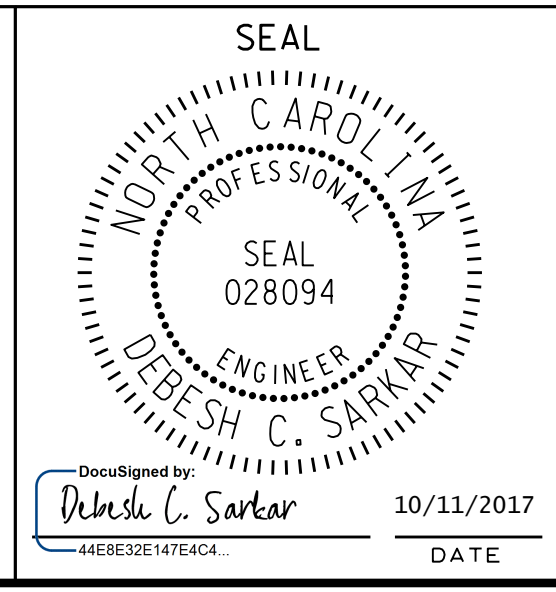
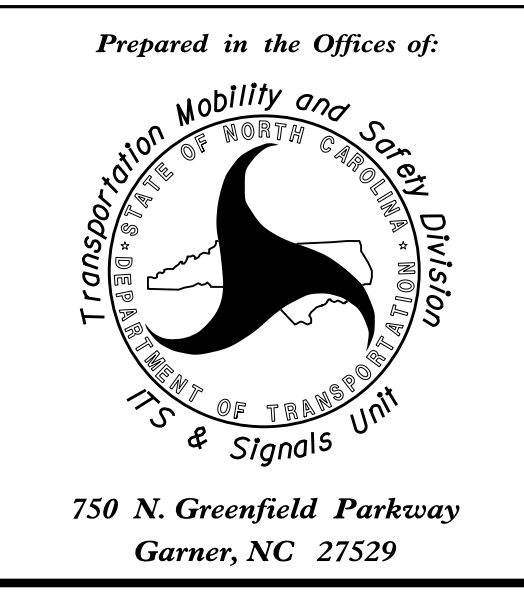
REINFORCING STEEL SCHEDULE												
TYPE	V-BAR				STIRRUP							
	SIZE #	QTY	LENGTH	WEIGHT LBS	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS
					VERTICAL ON 6" CENTERS	ON 12" CENTERS	TOTAL					
I	8	6	3'-0"	56	4	0	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	7'-2"	2'-0"	0'-10"	53	175

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.
 1-18
 ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS
 SHEET 1 OF 1
1743D01

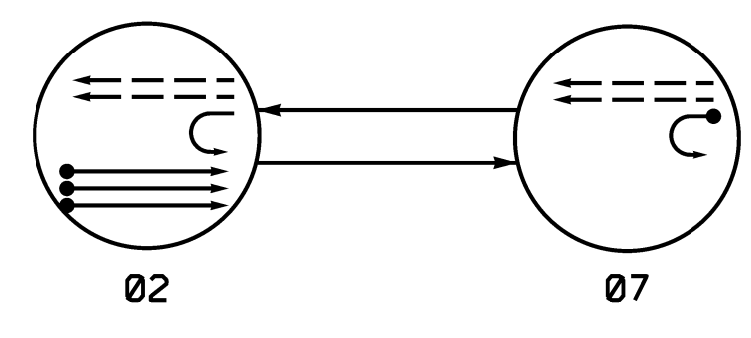
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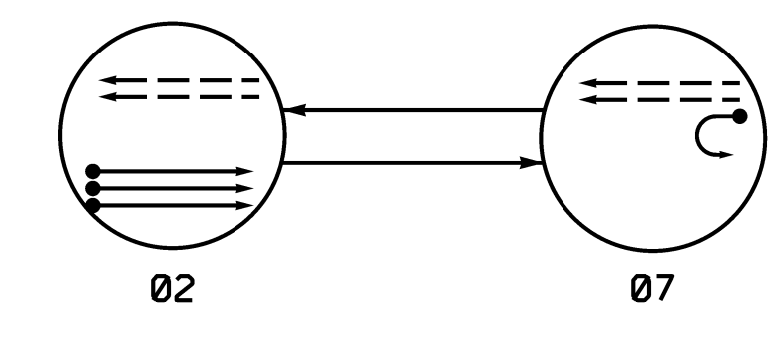
See Plate for Title



DEFAULT PHASING DIAGRAM



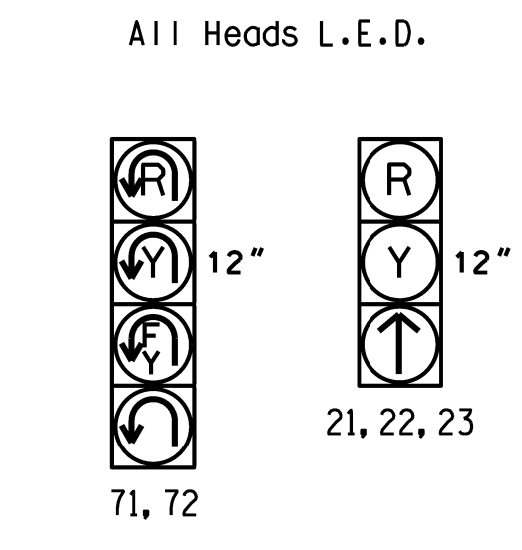
ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02	07	FLASH
21, 22, 23		R	Y
71, 72	(Y)	(R)	(Y)

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02	07	FLASH
21, 22, 23		R	Y
71, 72	(R)	(Y)	(Y)

MAXTIME DETECTOR INSTALLATION CHART

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

* Remove Delay During Alternate Phasing Operation.

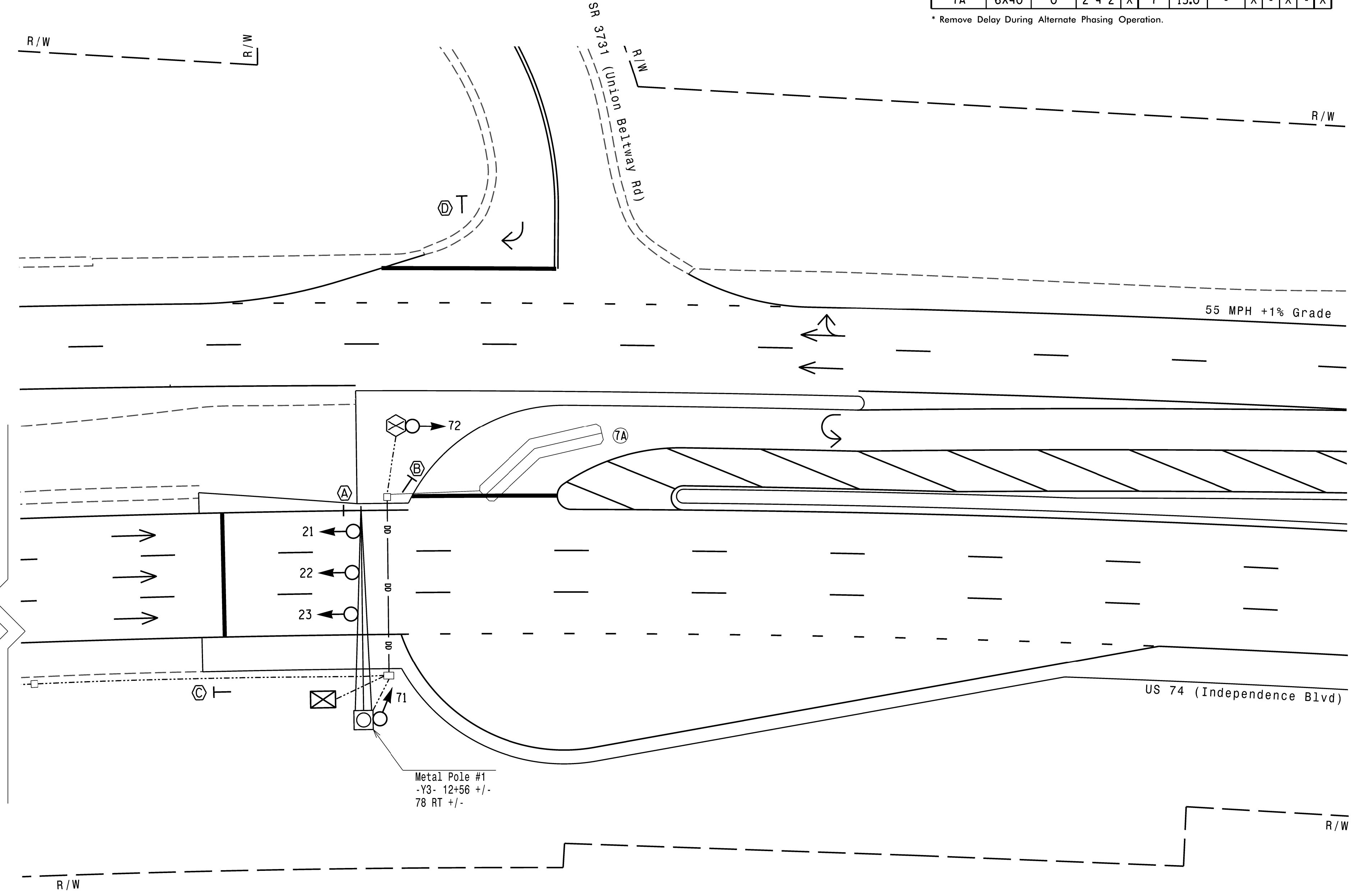
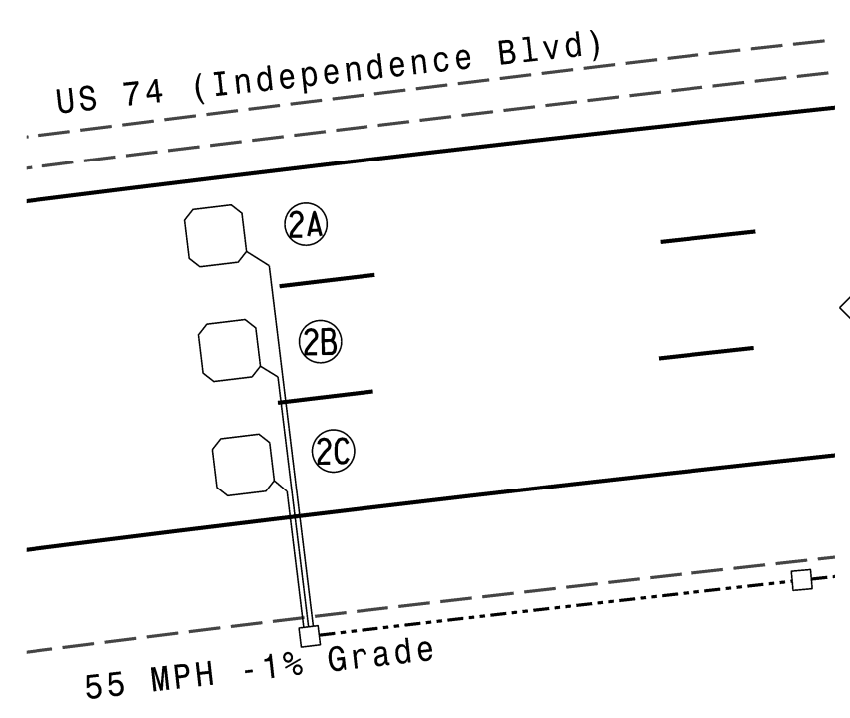
2 Phase Fully Actuated w/ Alternate Phasing Operation US 74 Indian Trail CLS Signal System #11033

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 7 may be lagged.
- Set all detector units to presence mode.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

- | PROPOSED | EXISTING |
|--|-------------------------------------|
| ○ → Traffic Signal Head | ● → N/A |
| ○ → Modified Signal Head | ○ → N/A |
| ○ → Pedestrian Signal Head With Push Button & Sign | ○ → N/A |
| ○ → Signal Pole with Guy | ○ → N/A |
| ○ → Signal Pole with Sidewalk Guy | ○ → N/A |
| ⊗ Inductive Loop Detector | ⊗ Inductive Loop Detector |
| ⊗ Controller & Cabinet | ⊗ Controller & Cabinet |
| □ Junction Box | □ Junction Box |
| □ Oversized Junction Box | □ Oversized Junction Box |
| --- 2-in Underground Conduit | --- 2-in Underground Conduit |
| N/A Right of Way | N/A Right of Way |
| → Directional Arrow | → Directional Arrow |
| ⊗ Type III Signal Pedestal | ⊗ Type III Signal Pedestal |
| ○ Metal Pole with Mastarm | ○ Metal Pole with Mastarm |
| DD Directional Drill | N/A |
| (A) No Left Turn Sign (R3-2) | (A) No Left Turn Sign (R3-2) |
| (B) No Right Turn Sign (R3-1) | (B) No Right Turn Sign (R3-1) |
| (C) "STOP HERE ON RED" Sign (R10-6) | (C) "STOP HERE ON RED" Sign (R10-6) |
| (D) Stop Sign (R1-1) | (D) Stop Sign (R1-1) |



MAXTIME TIMING CHART

FEATURE	PHASE	
	2	7
Walk *	-	-
Ped Clear *	-	-
Min Green	14	7
Passage *	6.0	2.0
Max I *	90	30
Yellow Change	5.3	3.0
Red Clear	1.3	2.8
Added Initial *	1.5	-
Maximum Initial *	46	-
Time Before Reduction *	15	-
Time To Reduce *	40	-
Minimum Gap	3.4	-
Advance Walk	-	-
Non Lock Detector	-	X
Vehicle Recall	MIN. RECALL	-
Dual Entry	-	-

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

New Installation

Prepared For the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27524

US 74 (Independence Boulevard) at WB US 74 U-Turn

Division 10 Union County Indian Trail

PLAN DATE: June 2023 REVIEWED BY: S.G. Haynie

PREPARED BY: P. Koloski REVIEWED BY:

SEAL

SEAL 029531

STEVEN G. HAYNIE

DATE: 6/21/2023

SCALE: 0 20 1"=20'

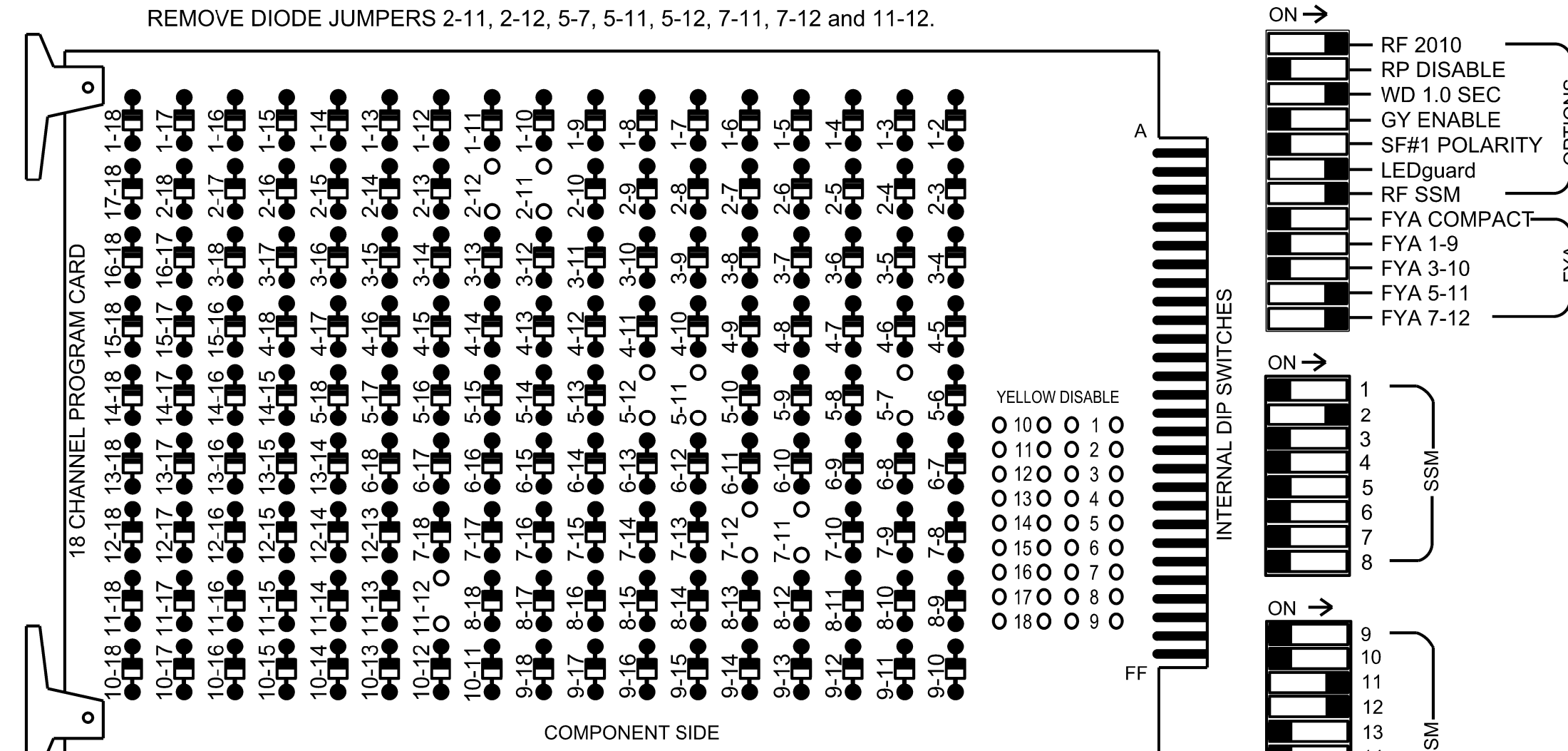
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RS&H
 NC FIRM LICENSE No. F-0493
 8521 SIX FORKS ROAD, SUITE 400
 RALEIGH, NC 27615
 (919) 926-4100

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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program controller to start up in phase 2 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the US 74 Indian Trail CLS Signal System #11033.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheets 2 and 3

SIGNAL HEAD HOOK-UP CHART

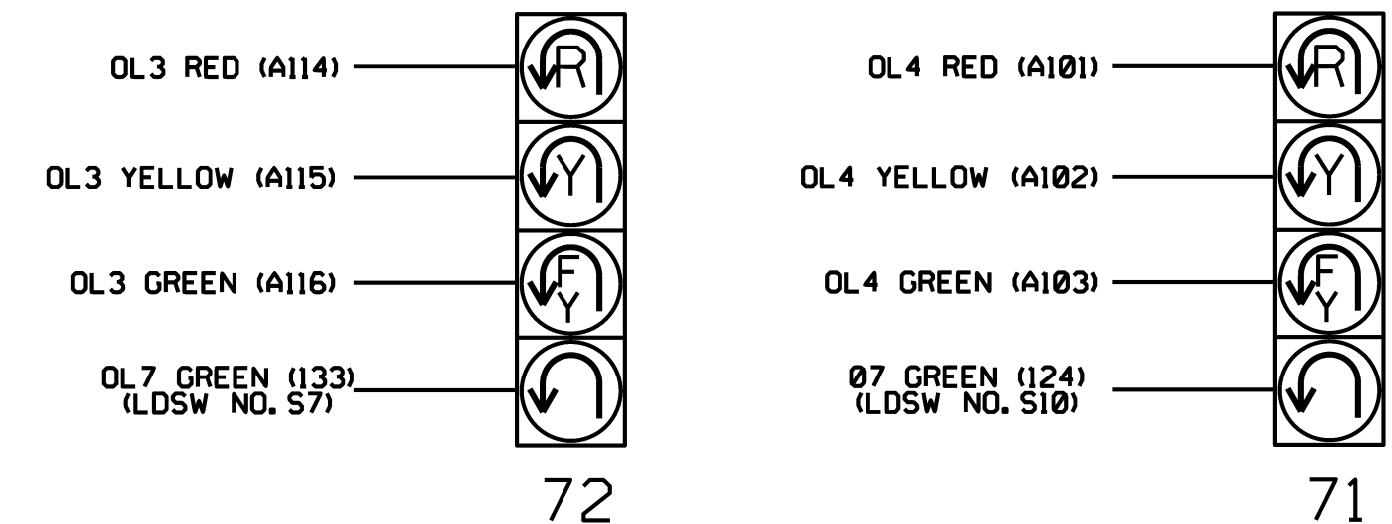
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	OL7	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21, 22,23	NU	NU	NU	NU	72*	NU	NU	71*	NU	NU	NU	NU	NU	72*	71*	NU
RED		128																
YELLOW		129					*			*								
GREEN																		
RED ARROW																	A114	A101
YELLOW ARROW																	A115	A102
FLASHING YELLOW ARROW																	A116	A103
GREEN ARROW		130					133			124								

NU = Not Used

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	∅ 2	∅ 2C	U	U	U	U	U	U	U	U	U	U	FS
	L	∅ 2B	NOT USED	U	U	U	U	U	U	U	U	U	U	DC ISOLATOR
"J"	U	U	U	U	∅ 7	U	U	U	U	U	U	U	U	U
	L	U	U	U	NOT USED	U	U	U	U	U	U	U	U	DC ISOLATOR

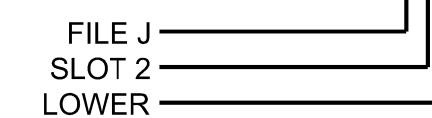
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
2C	TB2-9,10	I3U	63	29	4	2			X	X	X	
7A	TB5-5,6	J5U	57	19	21	7	15.0		X		X	

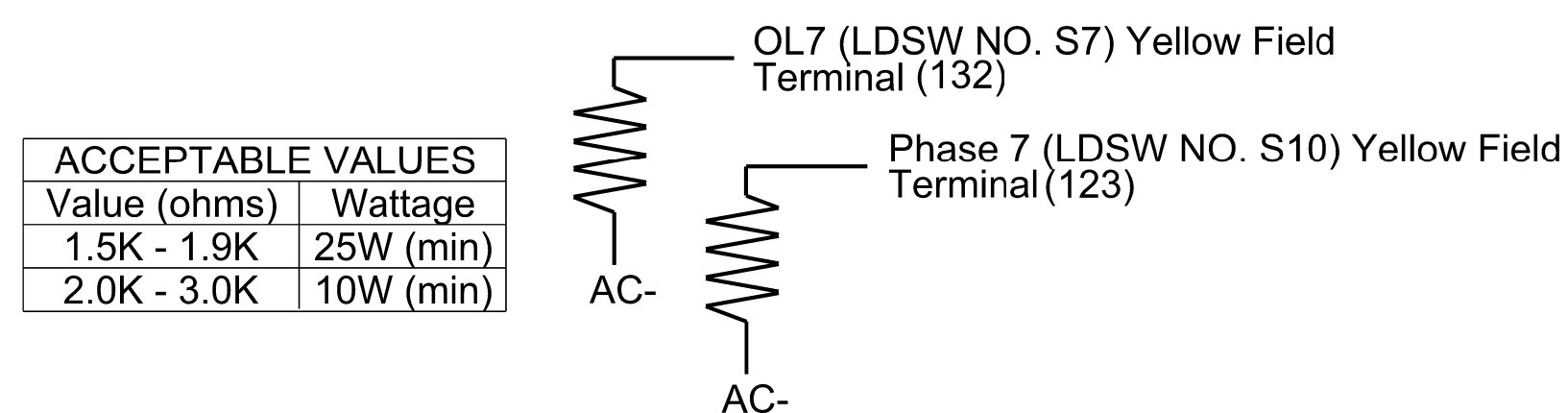
INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2426
DESIGNED: June 2023
SEALED: June 21, 2023
REVISED: _____

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)

Electrical Detail - Sheet 1 of 3
New Installation



Prepared in the Offices of:

US 74 (Independence Boulevard) at WB US 74 U-Turn

Division 10 Union County Indian Trail

PLAN DATE: June 2023 REVIEWED BY: O. Drobny

PREPARED BY: S. G. Haynie REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

DocuSigned by: Steven G. Haynie/21/2023

SIG. INVENTORY NO. 10-2426

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTE CHANGE IN CONTROL TYPE AND SOURCE →

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	3	4	7
Type	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	2	2	7
Modifier Phases	-	7	-
Modifier Overlap	7	-	-
Trail Green	0	0	0
Trail Yellow	0:0	0:0	0:0
Trail Red	0:0	0:0	0:0


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2426
DESIGNED: June 2023
SEALED: June 21, 2023
REVISED: _____

Electrical Detail - Sheet 2 of 3
New Installation

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 11:40:59 AM



Prepared in the Offices of:  Steven G. Haynie Professional Engineer State of North Carolina License No. 029531	Electrical and Programming Details For: US 74 (Independence Boulevard) at WB US 74 U-Turn	
	Division 10 Union County Indian Trail	PLAN DATE: June 2023 REVIEWED BY: O. Drobny
	PREPARED BY: S. G. Haynie REVIEWED BY:	REVISIONS INIT. DATE

Documented by: *Steven G. Haynie* / 6/21/2023
 DATE: _____
 SIG. INVENTORY NO. 10-2426

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	3	4	7
Type	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	.	.	7
Modifier Phases	.	7	.
Modifier Overlap	7	.	.
Trail Green	0	0	0
Trail Yellow	0:0	0:0	0:0
Trail Red	0:0	0:0	0:0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 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.

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector	Call Phase	Delay
21	7	0

7A

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

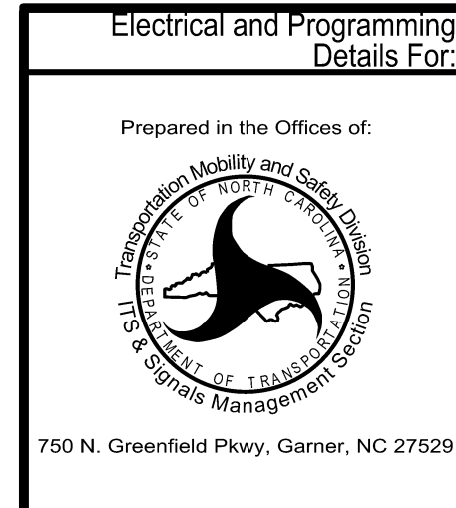
Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2426
DESIGNED: June 2023
SEALED: June 21, 2023
REVISED: _____

Electrical Detail - Sheet 3 of 3
New Installation



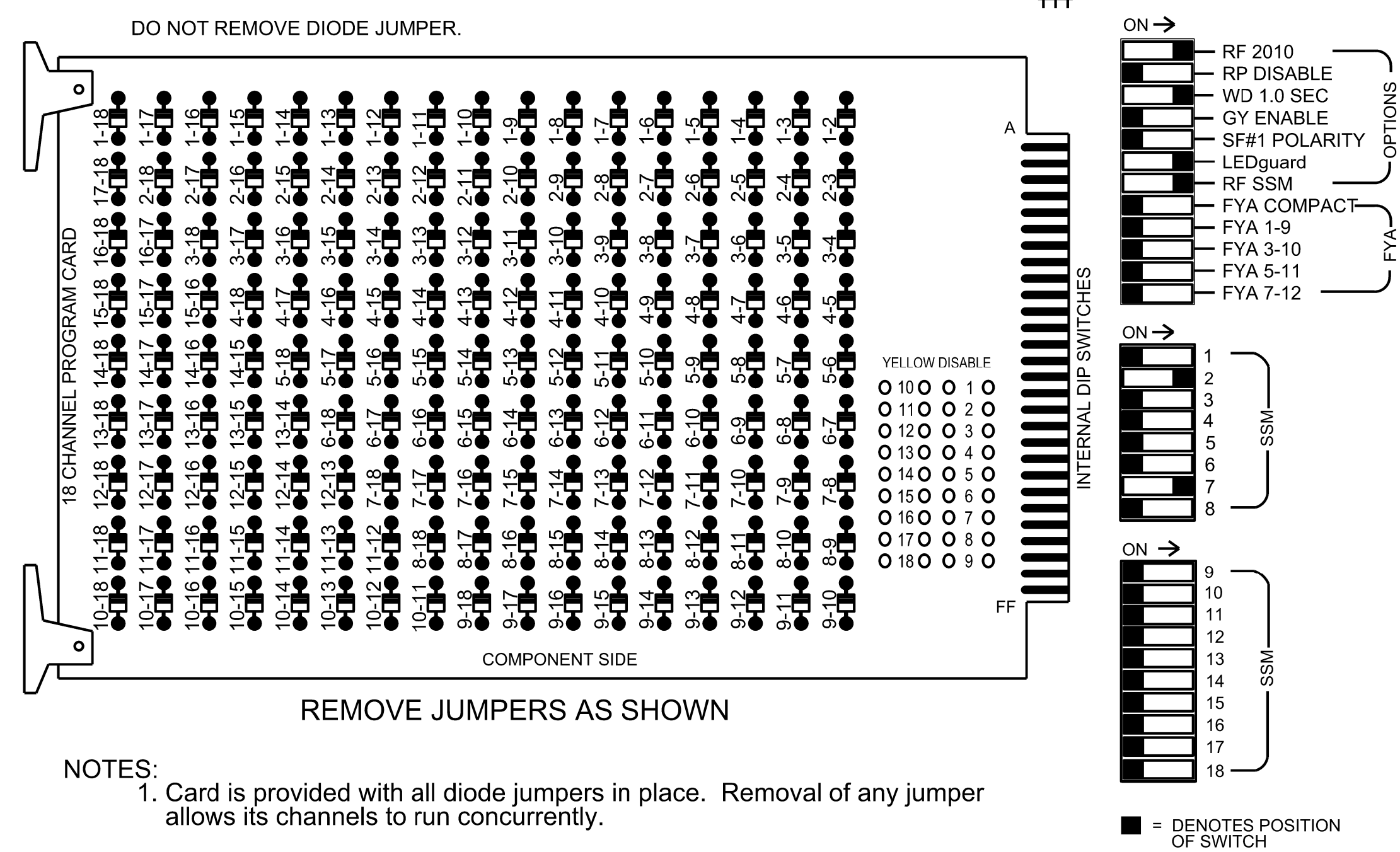
US 74 (Independence Boulevard) at WB US 74 U-Turn	
Division 10	Union County
Indian Trail	
PLAN DATE: June 2023	REVIEWED BY: O. Drobny
PREPARED BY: S. G. Haynie	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER STEVEN G. HAYNIE
DocuSigned by: <i>Steven G. Haynie</i> 6/21/2023
DATE
SIG. INVENTORY NO. 10-2426

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the US 74 Indian Trail CLS Signal System #11033.

EQUIPMENT INFORMATION

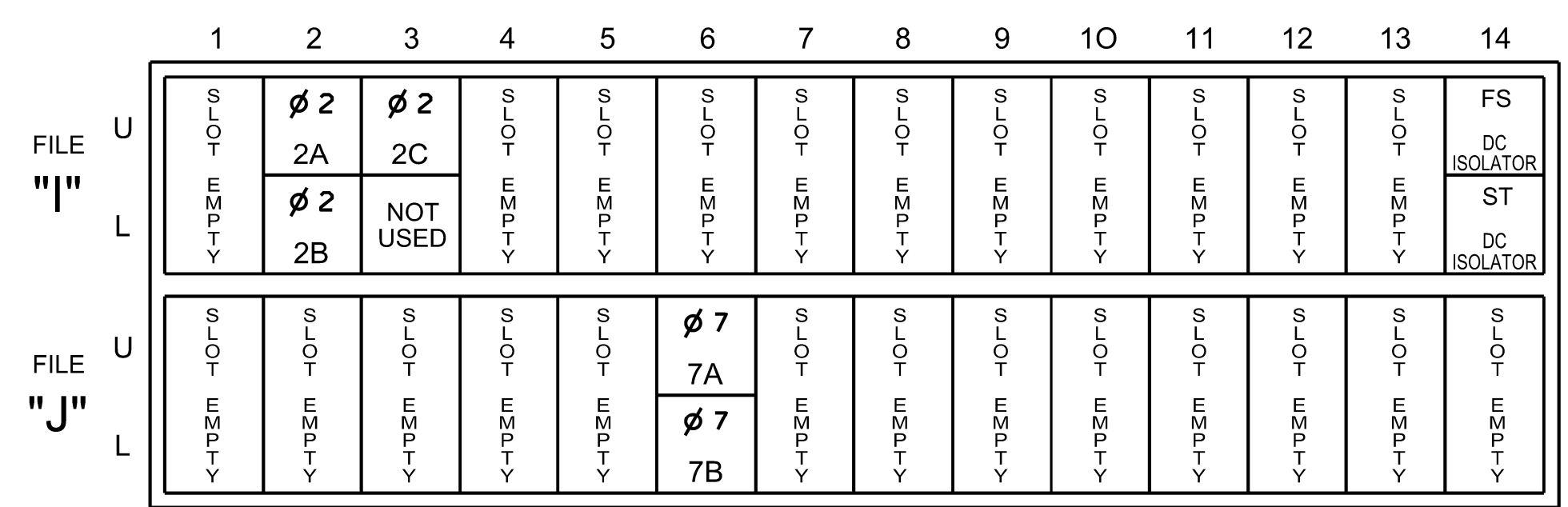
Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....18 With Aux. Output File
 Load Switches Used.....S2, S10
 Phases Used.....2, 7
 Overlaps.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21, 22, 23	NU	NU	NU	NU	NU	NU	NU	71, 72	NU	NU	NU	NU	NU	NU	NU	NU
RED		128								122								
YELLOW		129																
GREEN																		
RED ARROW																		
YELLOW ARROW										123								
FLASHING YELLOW ARROW																		
GREEN ARROW		130								124								

NU = Not Used

INPUT FILE POSITION LAYOUT (front view)

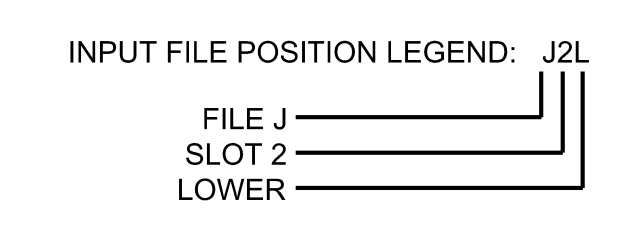


EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
2C	TB2-9,10	I3U	63	29	4	2			X	X	X	
7A	TB5-9,10	J6U	42	4	22	7	15.0		X		X	
7B	TB5-11,12	J6L	46	8	23	7	15.0		X		X	



6/21/2023 8:40:05 AM C:\Users\jcoff\OneDrive\Documents\Sheets\102425_sm.electrical\2022XXXX.dgn 11:33:48 AM

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2425
 DESIGNED: June 2023
 SEALED: June 21, 2023
 REVISED: _____



Electrical Detail
 New Installation

Electrical and Programming Details For:

Prepared in the Offices of:

US 74 (Independence Boulevard) at SR 1362 (Chestnut Parkway)

Division 10 Union County Indian Trail

PLAN DATE: June 2023 REVIEWED BY: O. Drobny

PREPARED BY: S. G. Haynie REVIEWED BY:

REVISIONS	INIT.	DATE

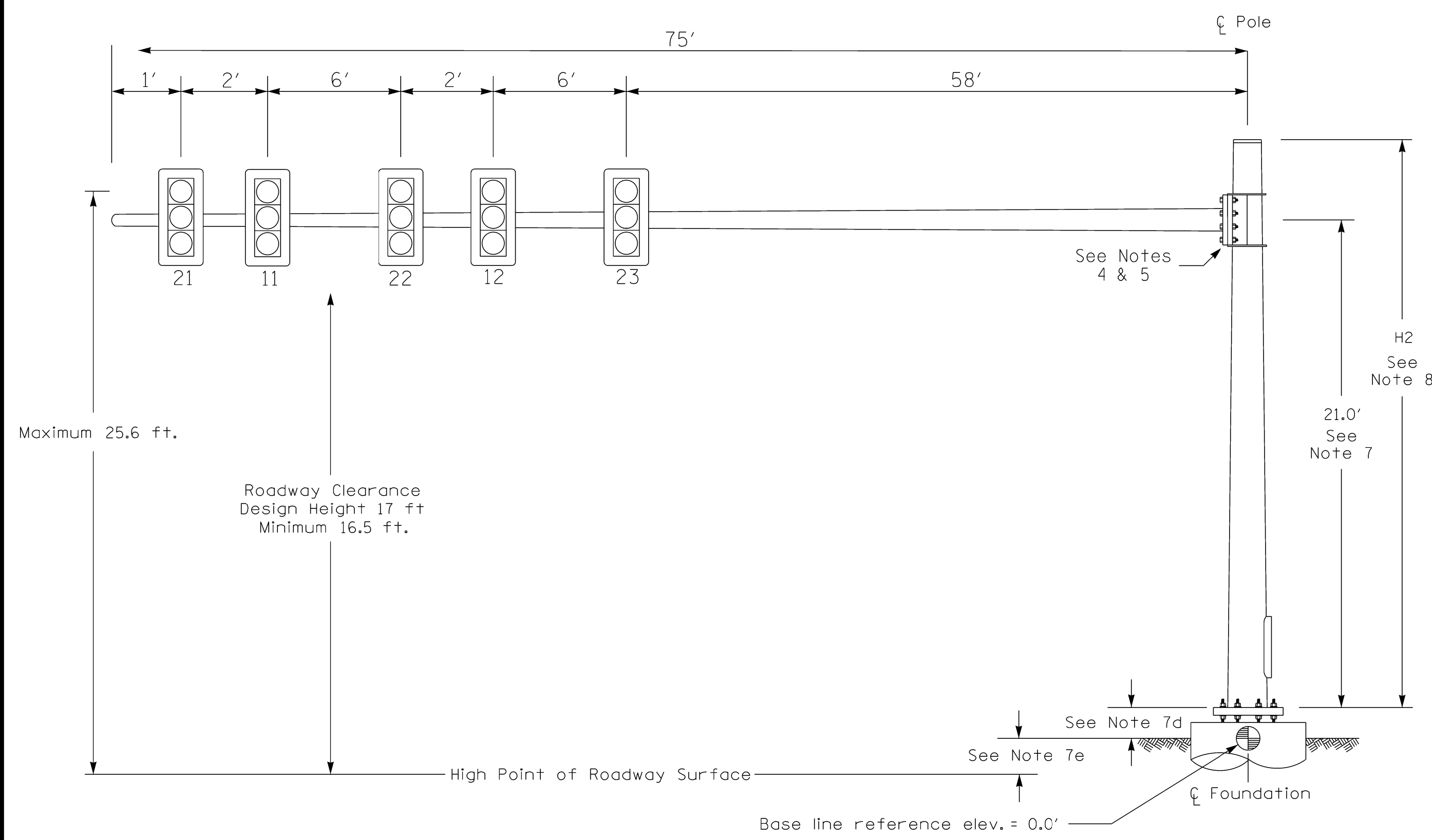
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSigned by: Steven G. Haynie 6/21/2023

SIG. INVENTORY NO. 10-2425

Design Loading for METAL POLE NO. 1



Elevation View

THIS SPACE
INTENTIONALLY
LEFT BLANK

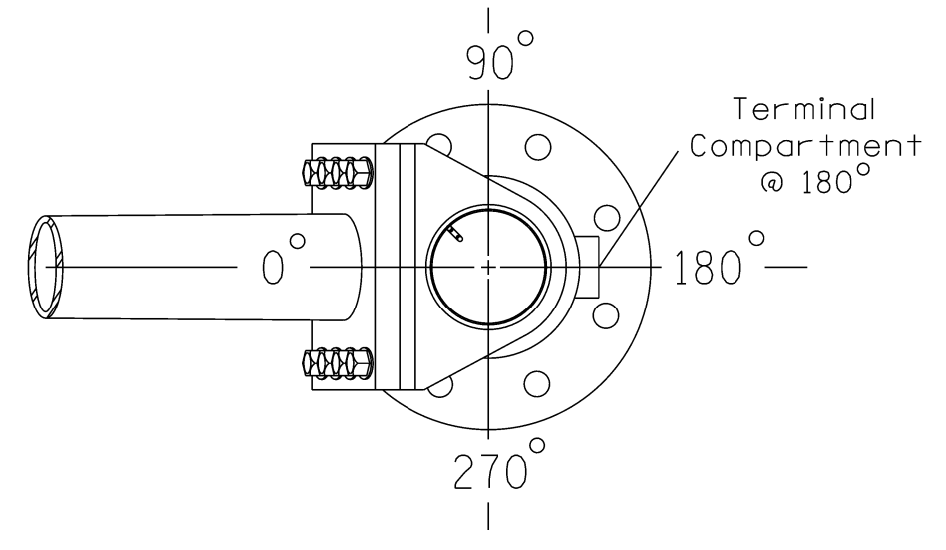
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SPECIAL NOTE

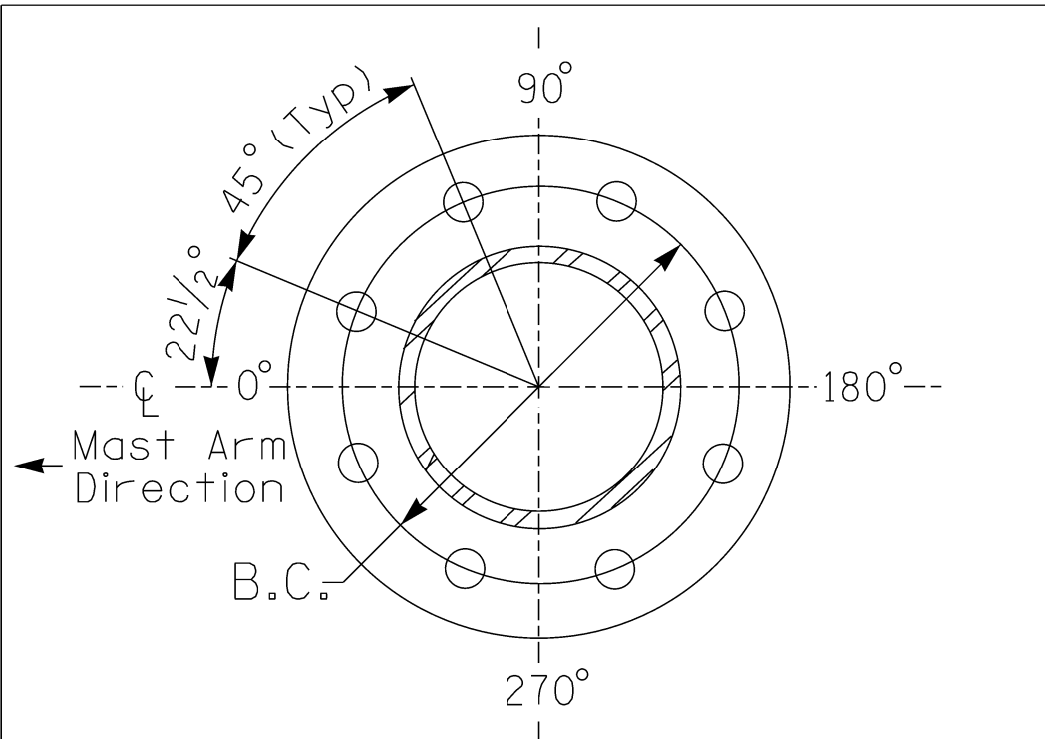
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	N/A
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	N/A
Elevation difference at High point of roadway surface	1.85 ft.	N/A
Elevation difference at Edge of travelway or face of curb	1.12 ft.	N/A

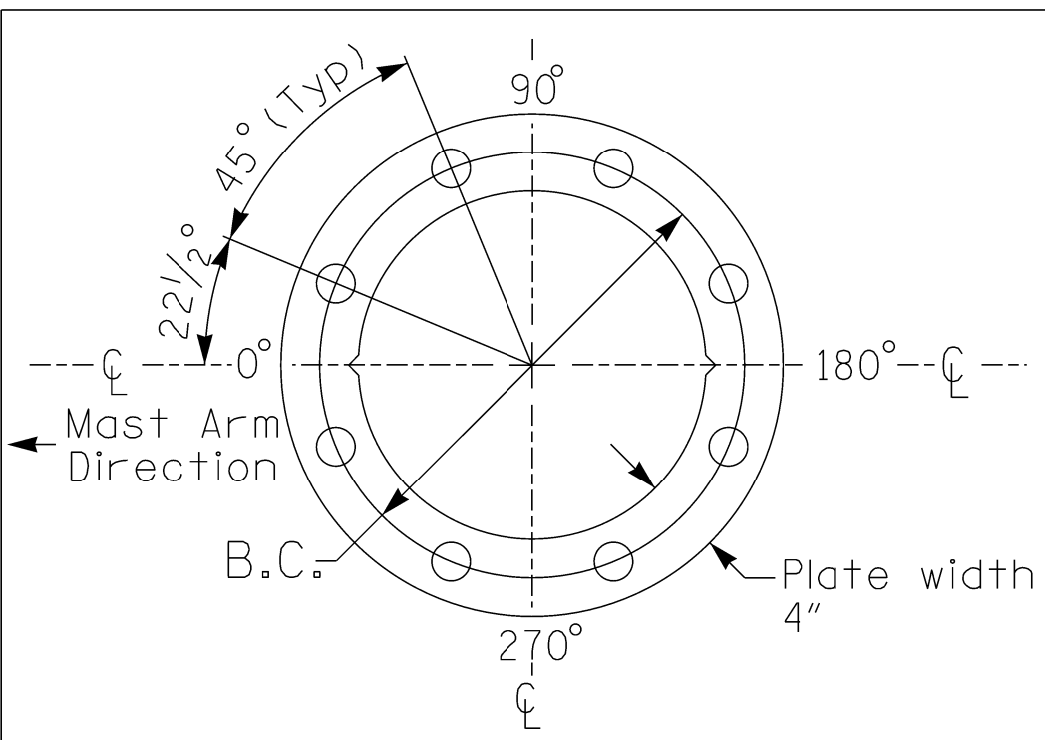


POLE RADIAL ORIENTATION



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.
U-5808	Sig. 3.2

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

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

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

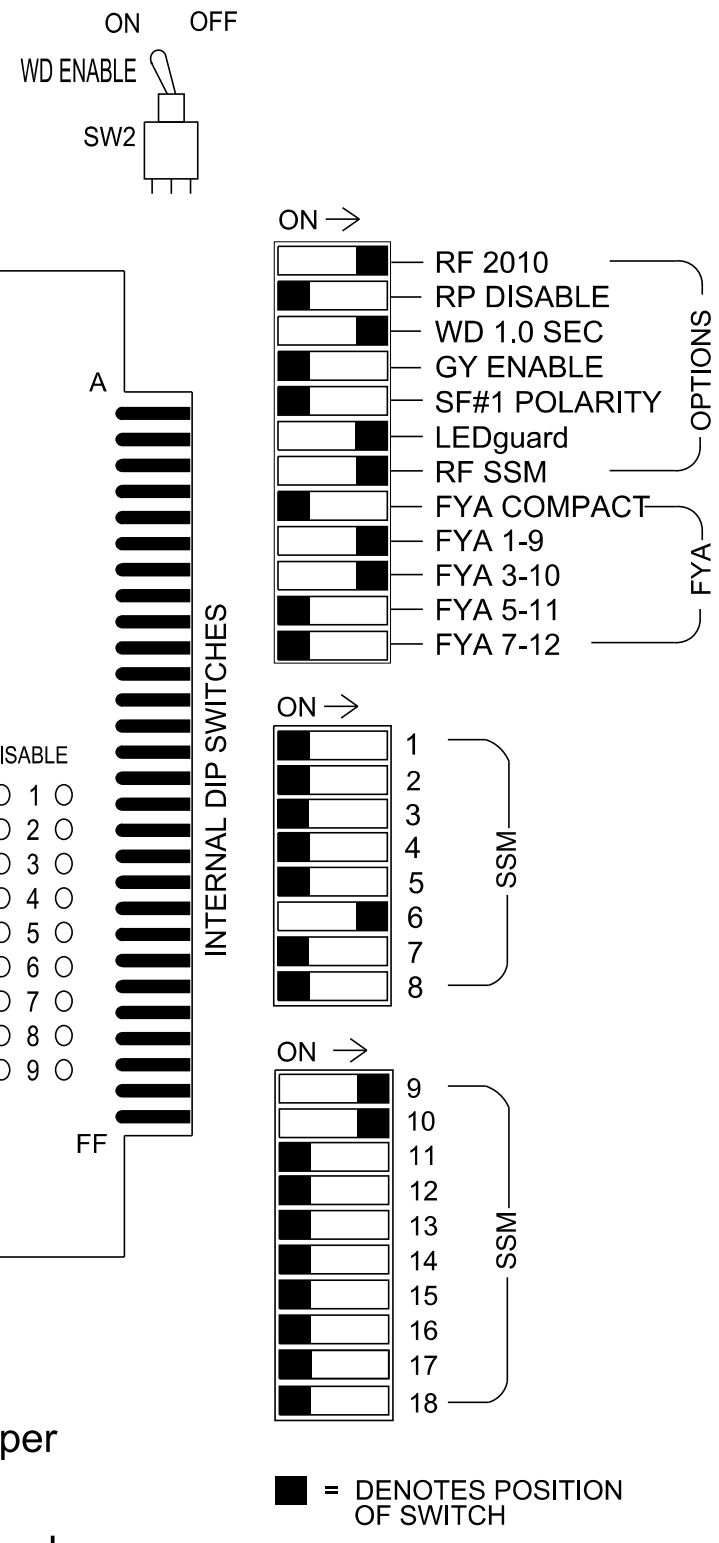
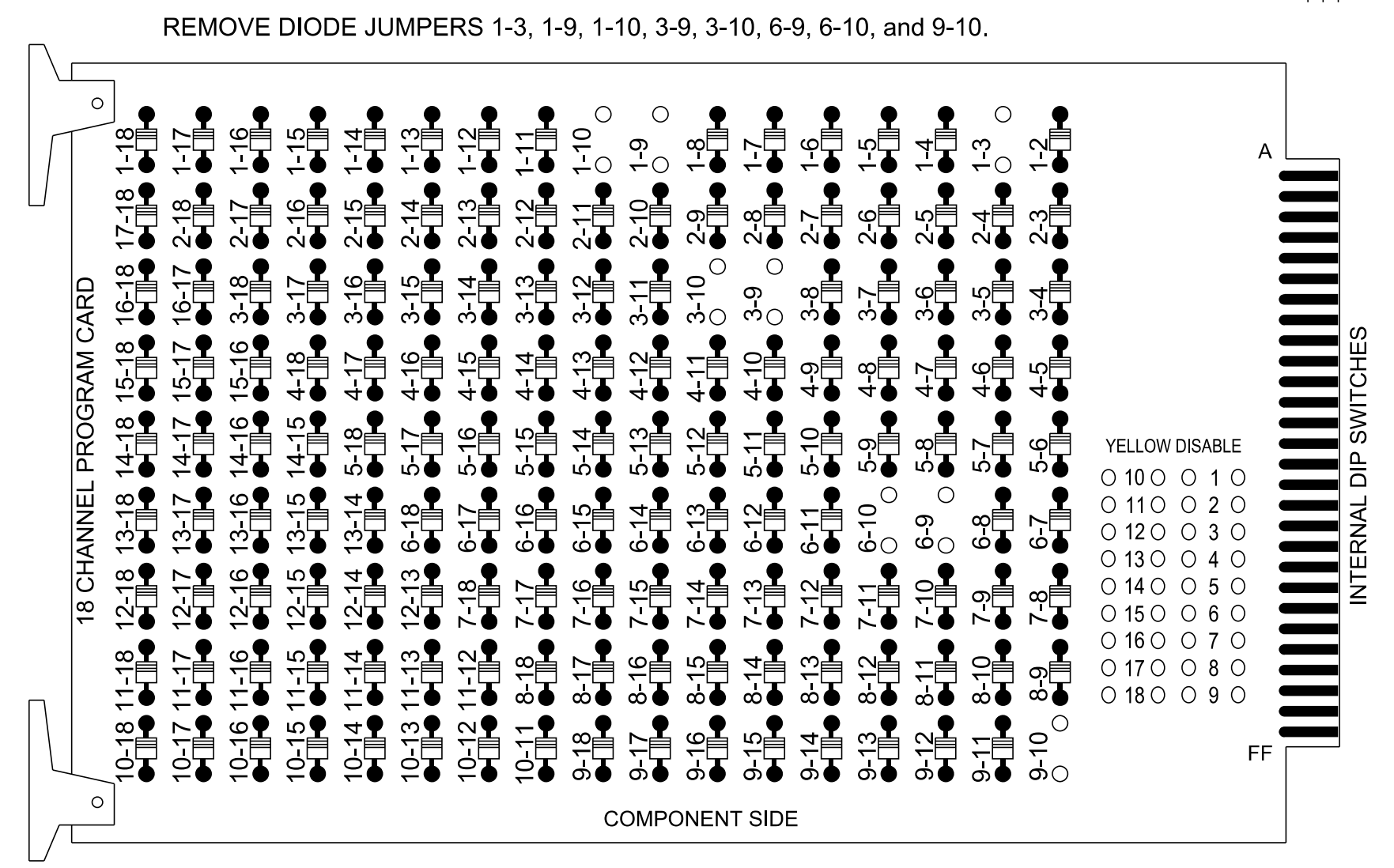
NCDOT Wind Zone 4 (90 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 Prepared in the Offices of: Transportation Mobility and Safety Solutions STATE OF NORTH CAROLINA SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529 NC FIRM LICENSE NO. P-6483 851 N.W. FORK ROAD, SUITE 400 WALETON, NC 27157 919.286.2100	US 74 (Independence Boulevard) at SR 1362 (Chestnut Parkway)	SEAL SEVEN G. HAYNIE ENGINEER 2/21/2023
	Division 10 Union County Indian Trail PLAN DATE: June 2023 REVIEWED BY: S.G. Haynie PREPARED BY: O. Drobny REVIEWED BY:	

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- Program controller to start up in phase 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of the US 74 Indian Trail CLS Signal System #11033.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheets 2 and 3.

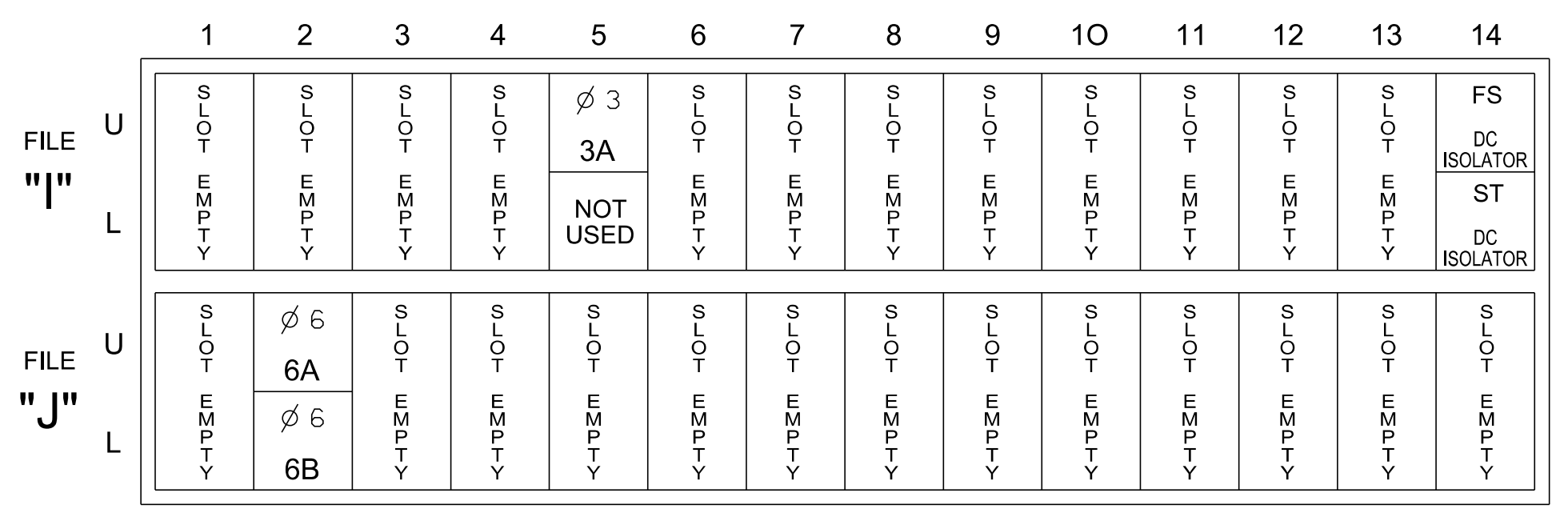
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	OL7	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	31*	NU	NU	32*	NU	NU	NU	61,62	NU	NU	NU	NU	31*	32*	NU	NU	NU	NU
RED								134										
YELLOW	*			*				135										
GREEN																		
RED ARROW													A121	A124				
YELLOW ARROW													A122	A125				
FLASHING YELLOW ARROW													A123	A126				
GREEN ARROW	127			118				136										

NU = Not Used

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

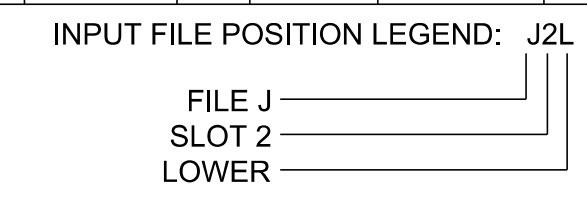
INPUT FILE POSITION LAYOUT (front view)



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

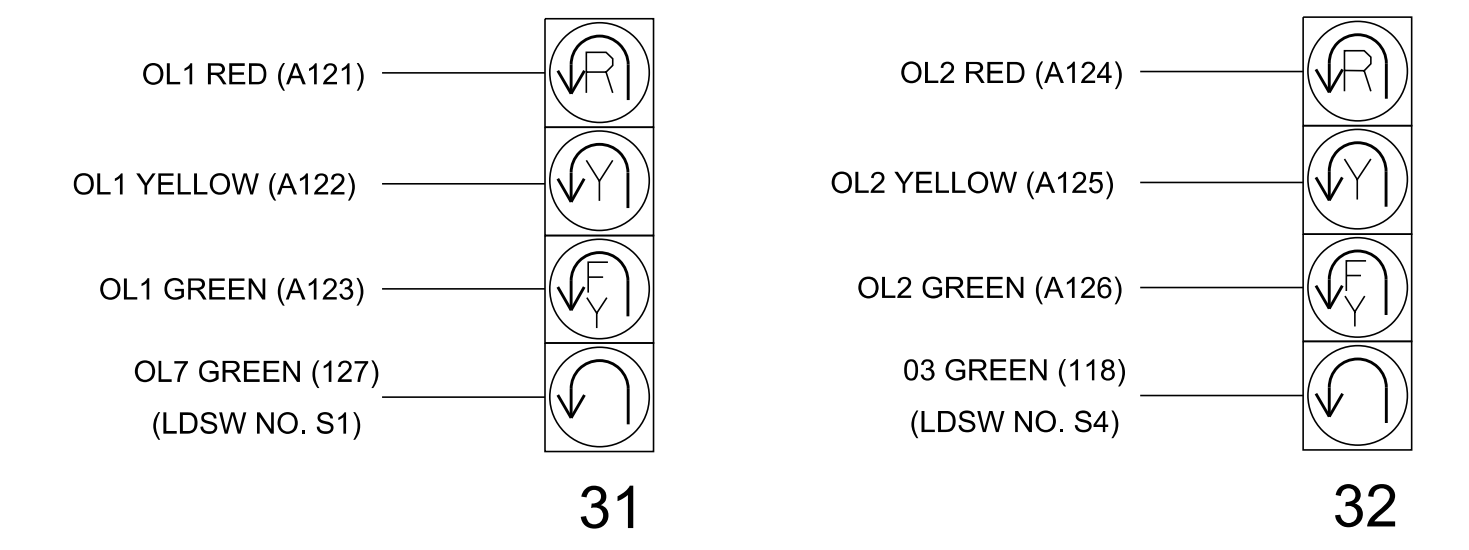
INPUT FILE CONNECTION & PROGRAMMING CHART

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



FYA SIGNAL WIRING DETAIL

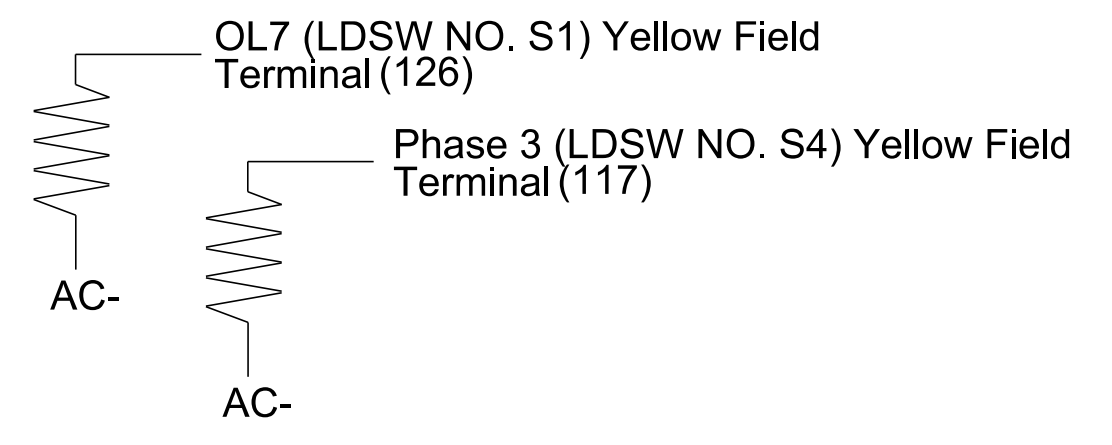
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



Electrical Detail - Sheet 1 of 3
 New installation

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 74 (Independence Boulevard)
 at
 EB US 74 U-Turn

Division 10 Union County Indian Trail

PLAN DATE: July 2023 REVIEWED BY: O. Drobny

PREPARED BY: S. G. Haynie REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSigned by:
 Steven G. Haynie/13/2023

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	7
Type	FYA 4 - Section	FYA 4 - Section	Normal
Included Phases	-	-	3
Modifier Phases	-	3	-
Modifier Overlaps	7	-	-
Trail Green	0	0	0
Trail Yellow	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

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
7	3	0

3A

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

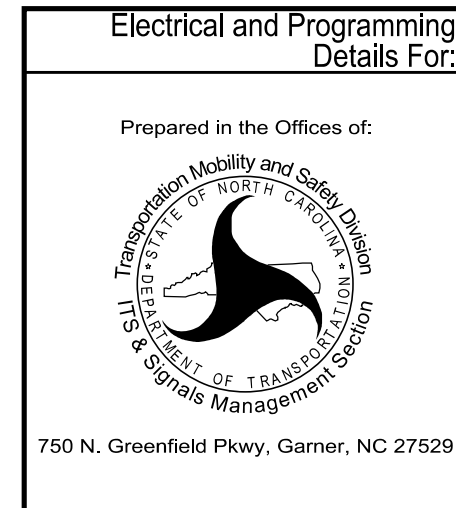
Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2424
DESIGNED: July 2023
SEALED: July 13, 2023
REVISED: _____

Electrical Detail - Sheet 3 of 3
New installation



Electrical and Programming Details For:		US 74 (Independence Boulevard) at EB US 74 U-Turn	
Prepared in the Offices of:	Division 10	Union County	Indian Trail
PLAN DATE: July 2023	REVIEWED BY: S. G. Haynie	REVIEWED BY: O. Drobny	
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

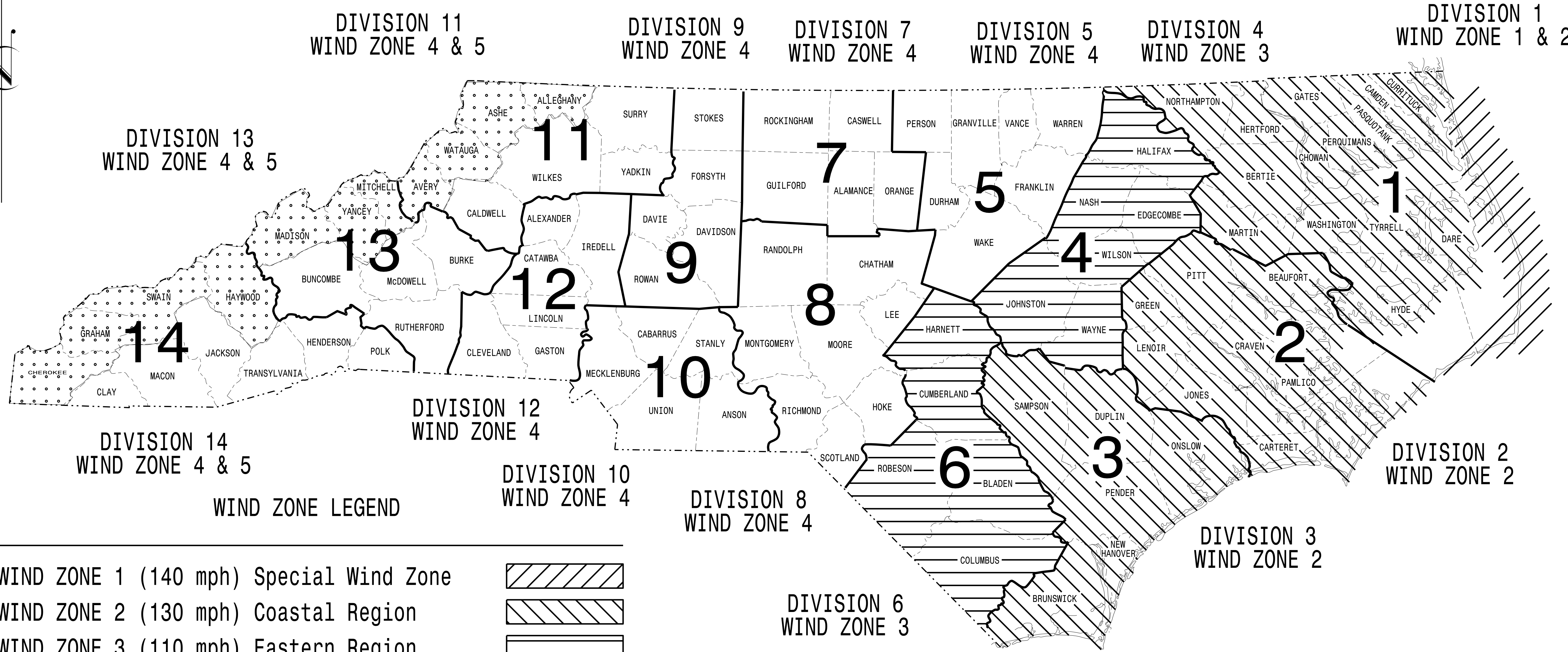
DocuSigned by: Steven G. Haynie 7/13/2023
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SIG. INVENTORY NO. 10 - 2424

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STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO.	SHEET NO.
	Sig.M1

STANDARD DRAWINGS FOR ALL METAL POLES



WIND ZONE LEGEND

WIND ZONE 1 (140 mph) Special Wind Zone		
WIND ZONE 2 (130 mph) Coastal Region		
WIND ZONE 3 (110 mph) Eastern Region		
WIND ZONE 4 (90 mph) Central & Mtn. Region		
WIND ZONE 5 (120 mph) Special Wind Zone		

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

Prepared In the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

Designed in conformance
with the latest
2015 Interim to the
6th Edition 2013
AASHTO
Standard Specifications for
Structural Supports for
Highway Signs, Luminaires,
and Traffic Signals

DRAWING NUMBER	DESCRIPTION
Sig. M 1	Statewide Wind Zone Map
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

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

M.M. MCDIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER

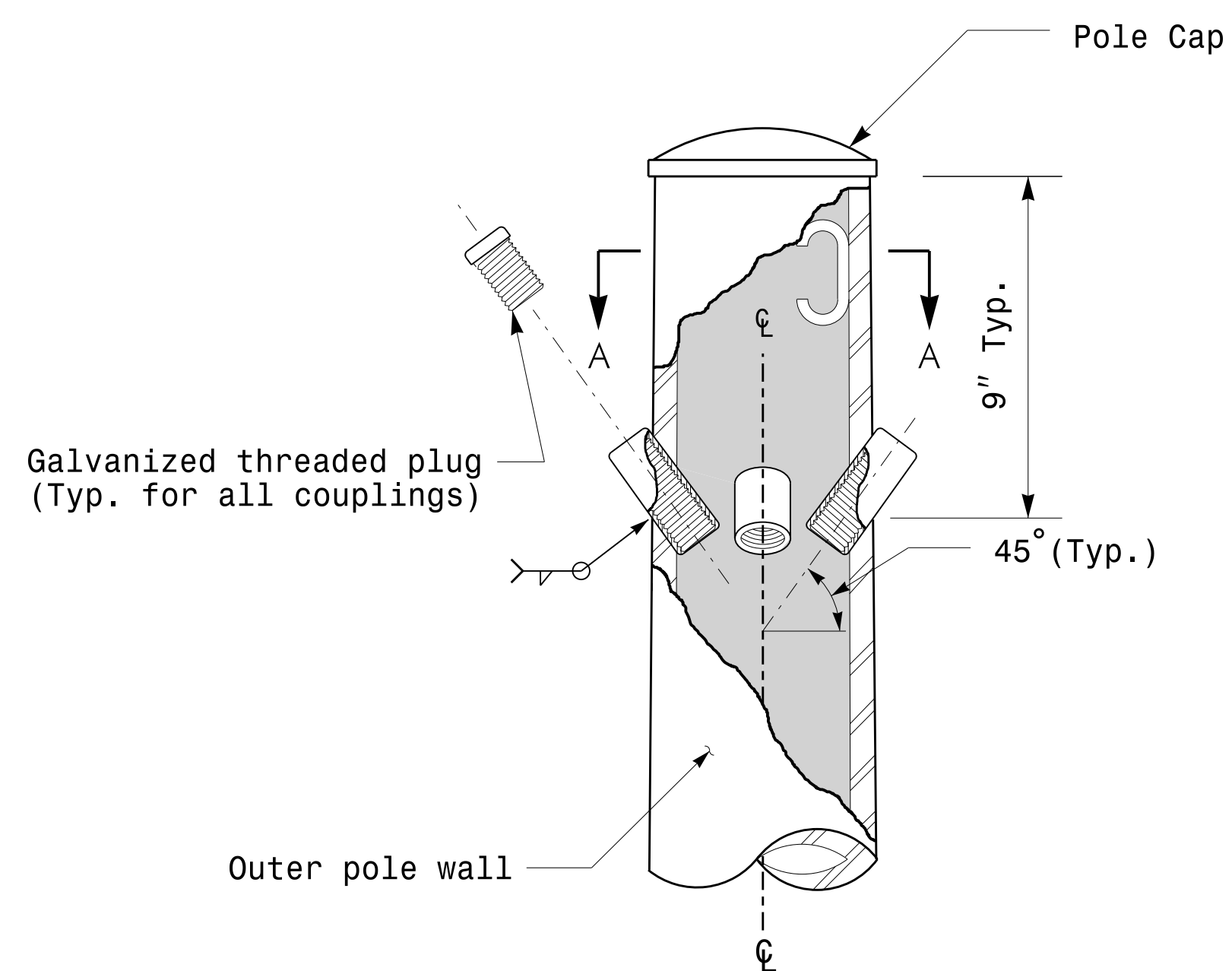
J.P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

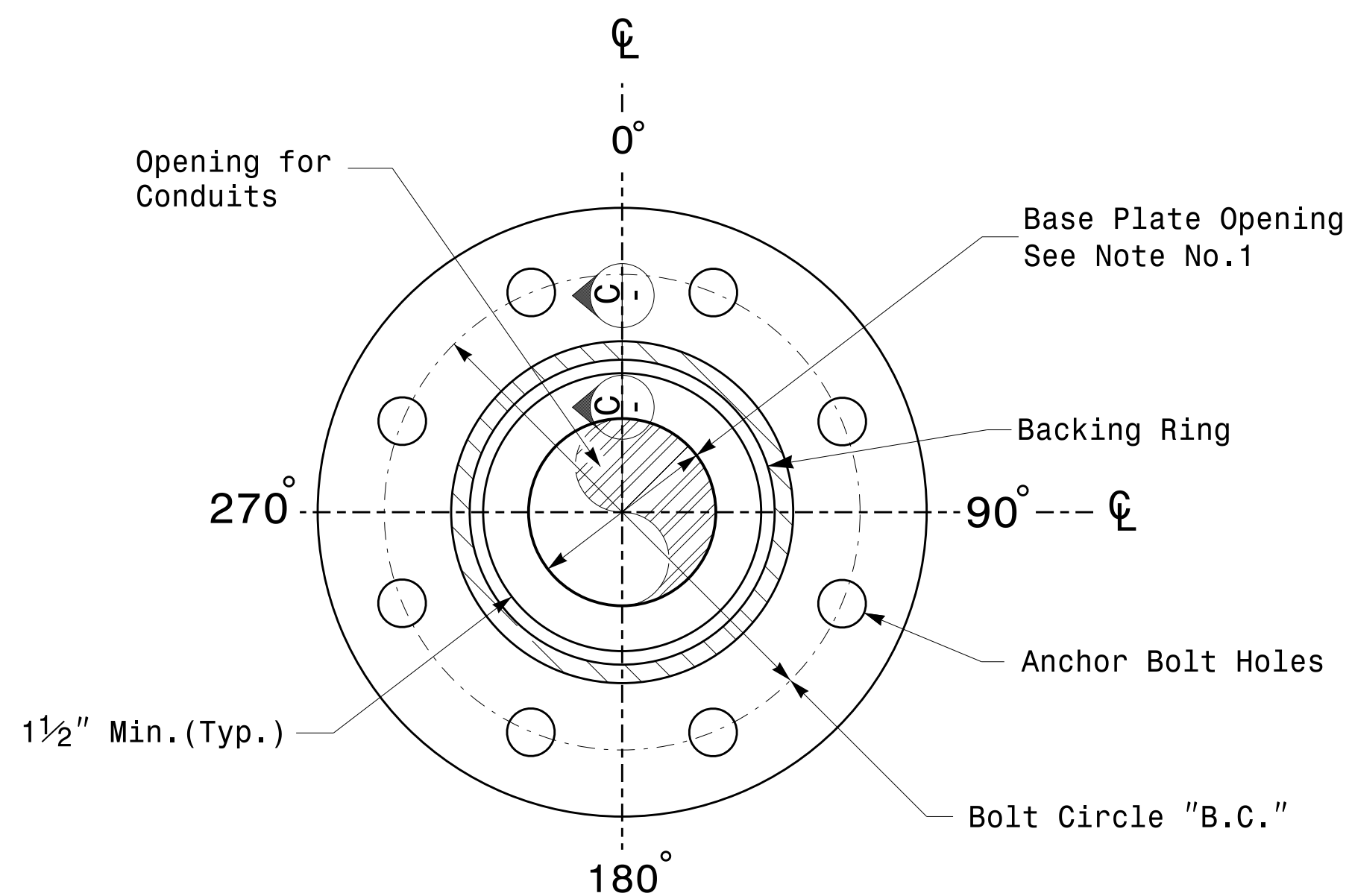
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Debesh C. Sarkar
DATE: 10/11/2017

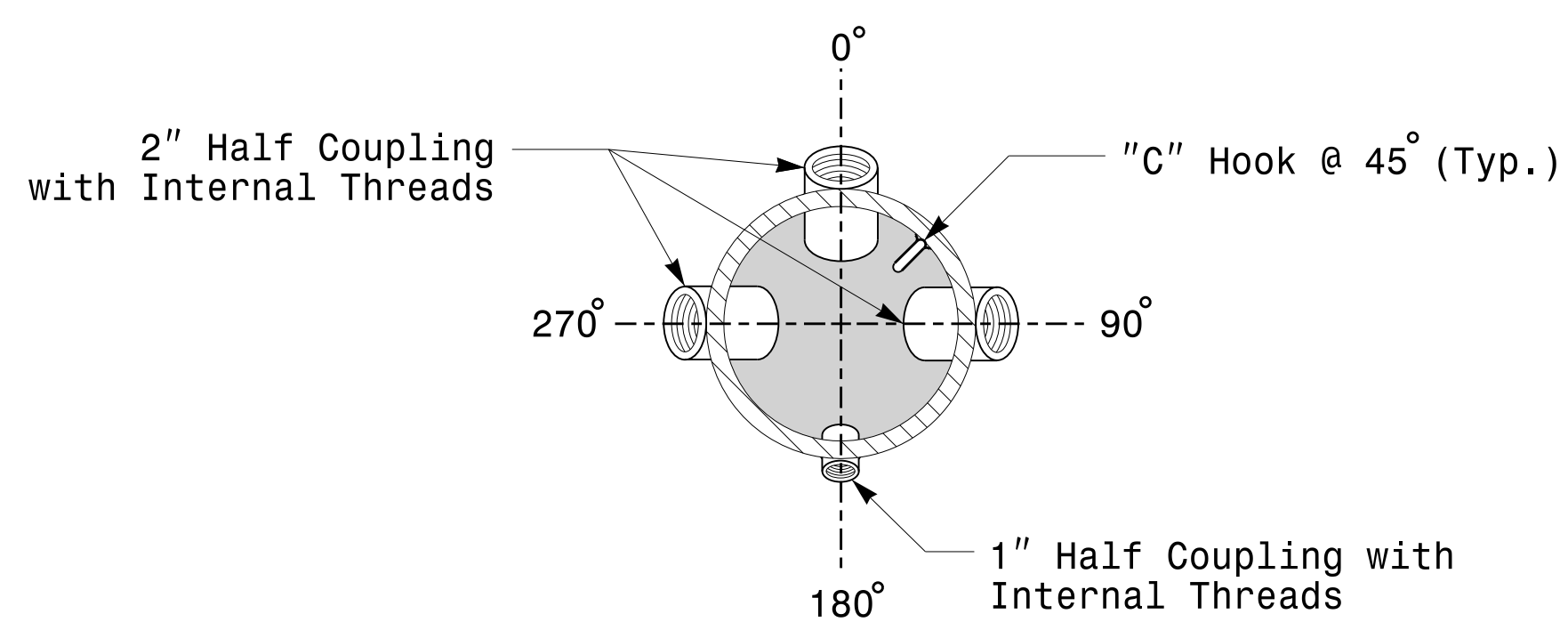
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



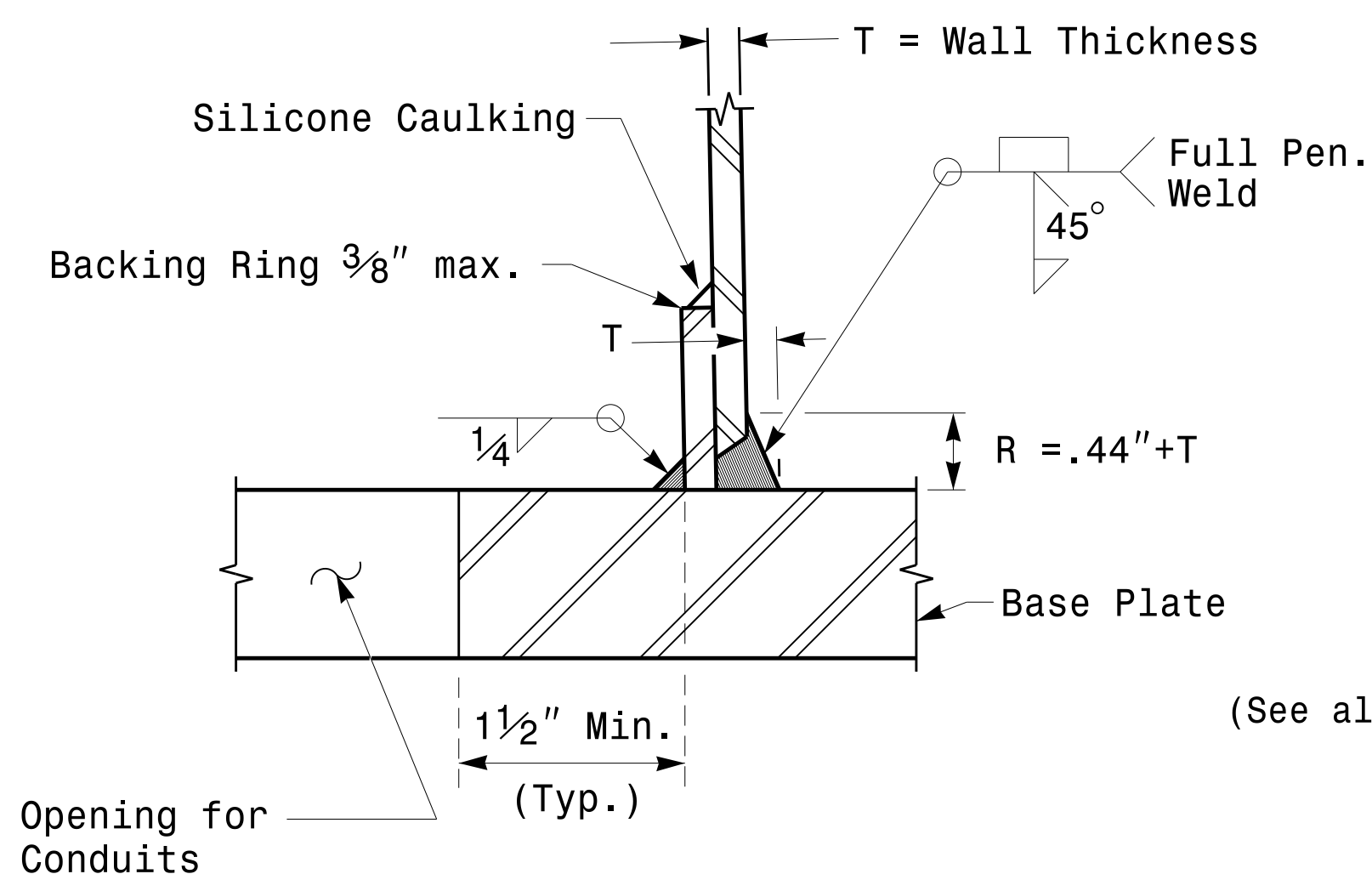
Cable Entrances at Top of Pole



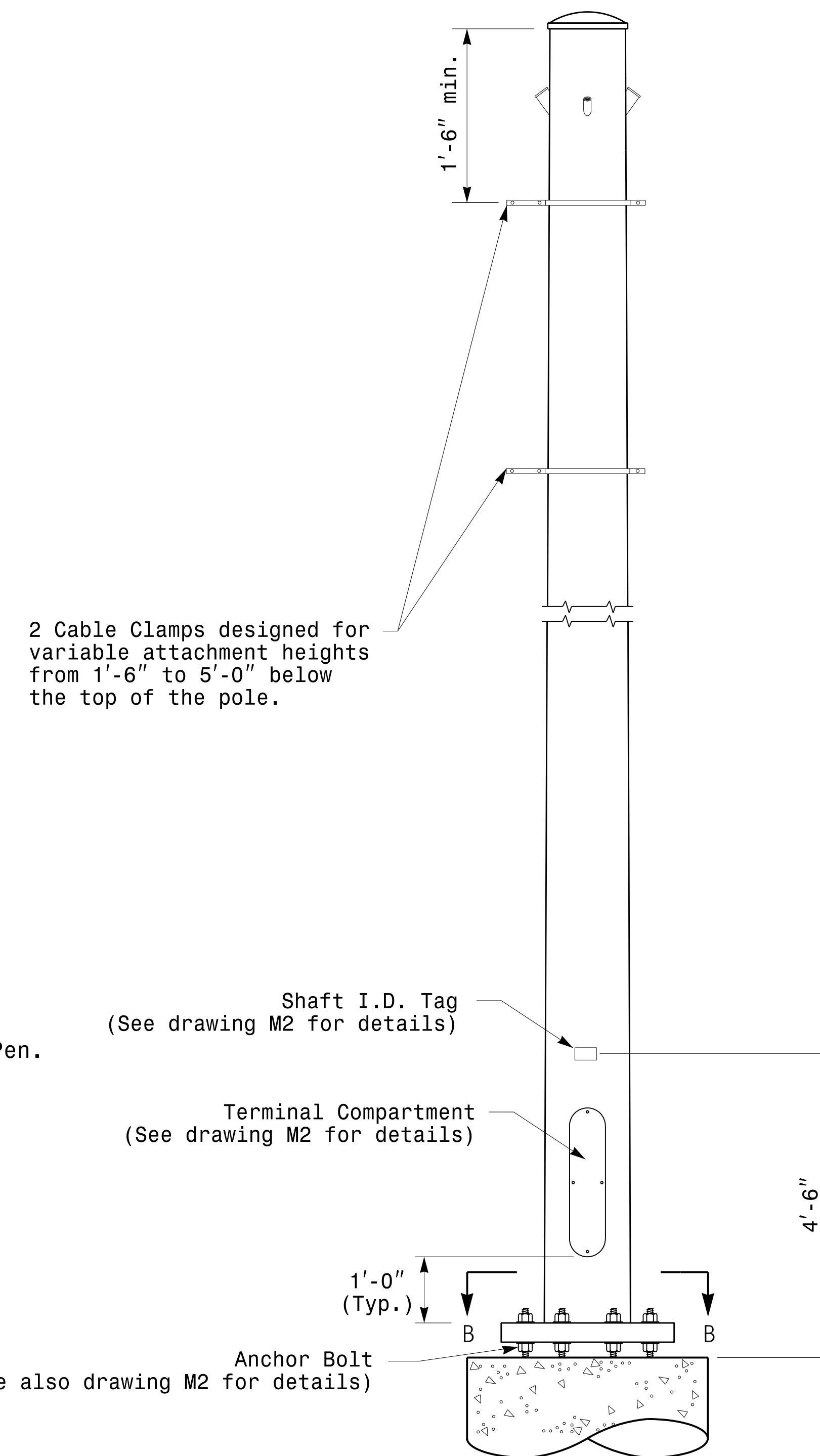
Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)



Section A-A
Radial Orientation for Factory Installed
Accessories at Top of Pole



Section C-C
(Pole Attachment to Base Plate)
Full-Penetration
Groove Weld Detail



Monotube Strain Pole

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

SCALE: 0 NONE

Typical Fabrication Details For Strain Poles

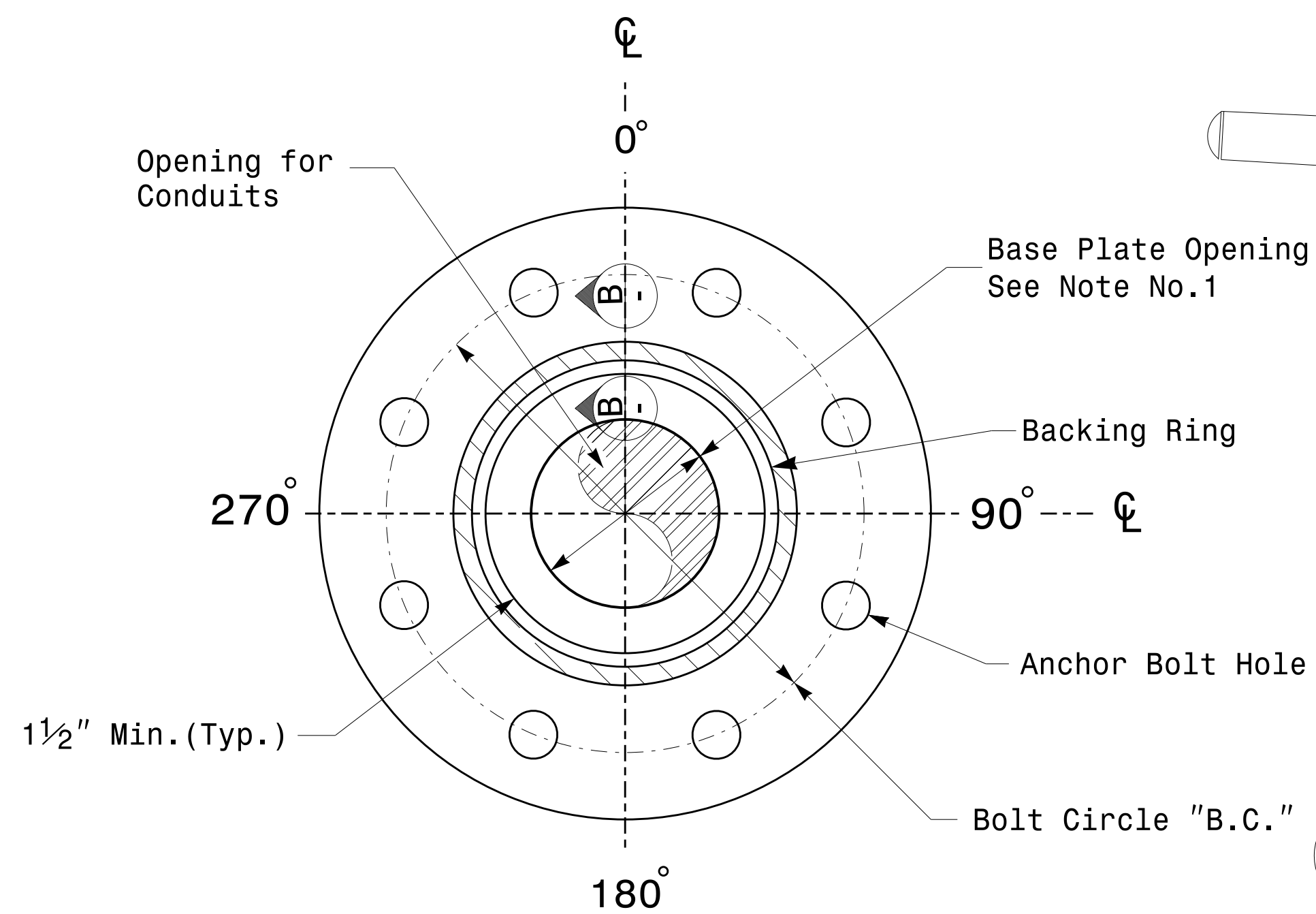
PLAN DATE: OCTOBER 2017	DESIGNED BY: K.C. DURIGON
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 028094
DIPESH C. SARKAR
DocuSigned by: Dipesh C. Sarkar
44EBE7816FA4FURE
10/11/2017
DATE

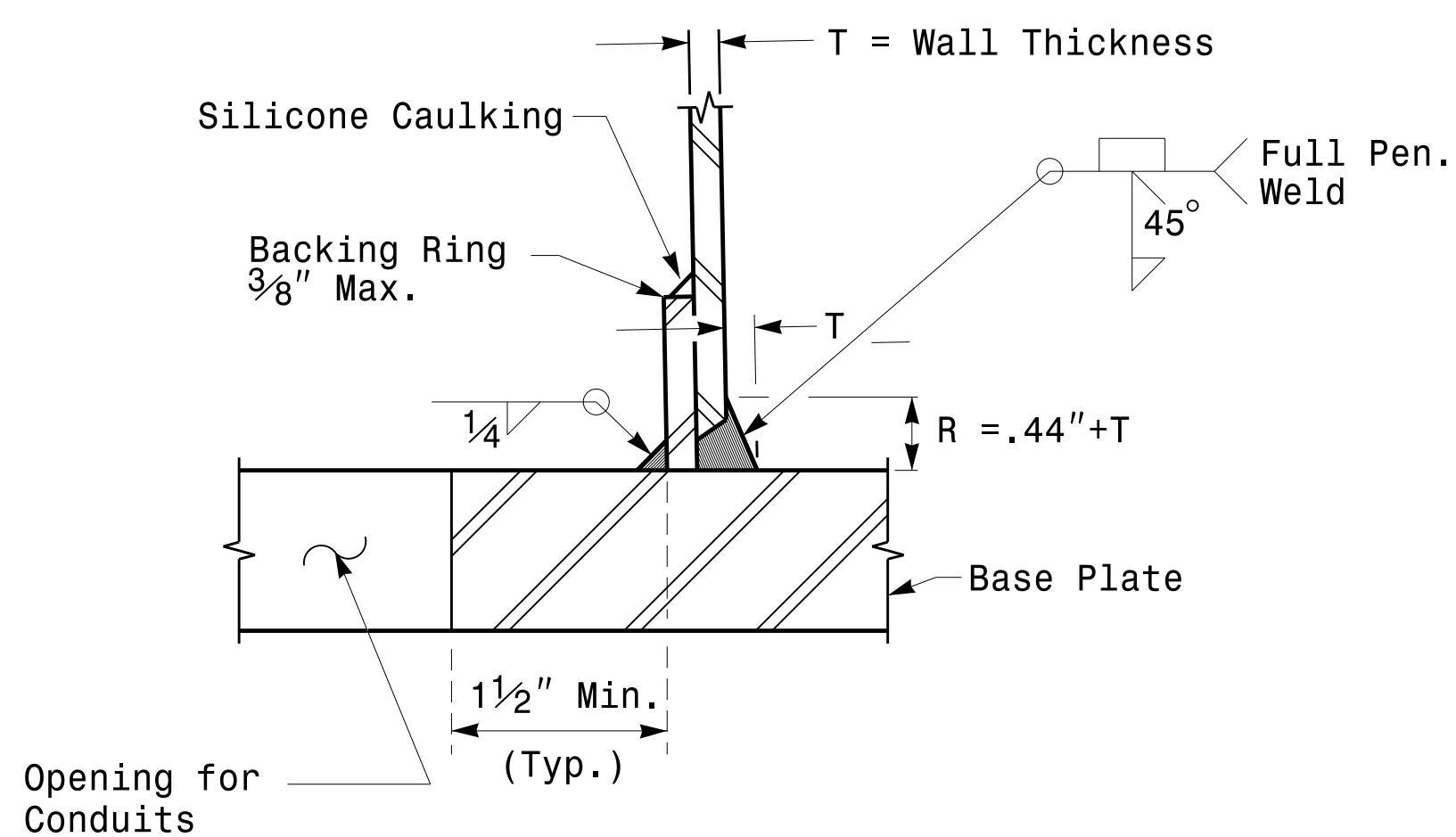
Fabrication Details – Strain Poles

11-001-2017-08225 136504115 Signal&Svcs:gnrc Design Section\Eastern Region\MM Sheets\2016\2014 Sig.M3 Std. Fabrication Details-Strain Poles.dgn 2/21/2017

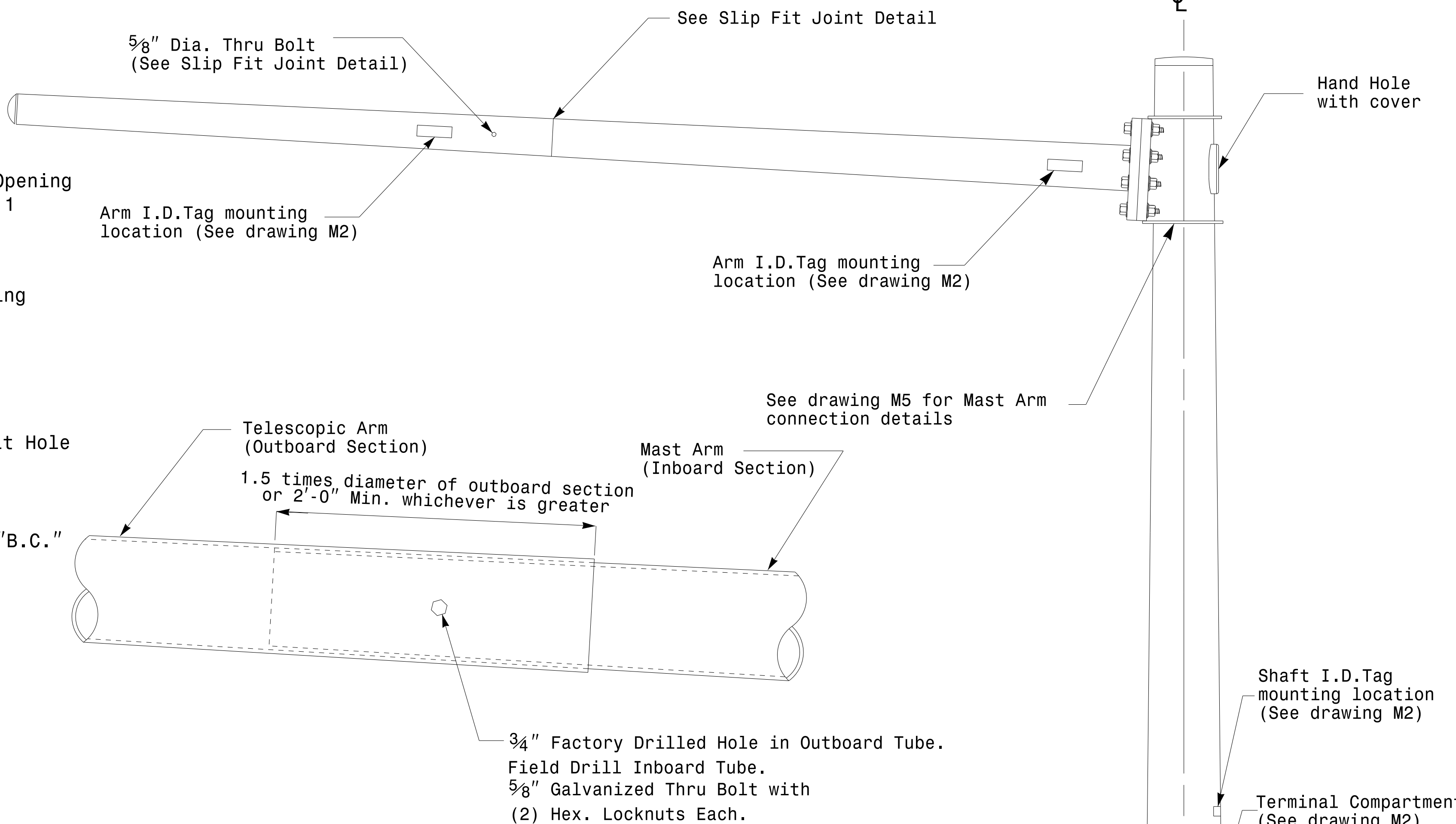
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



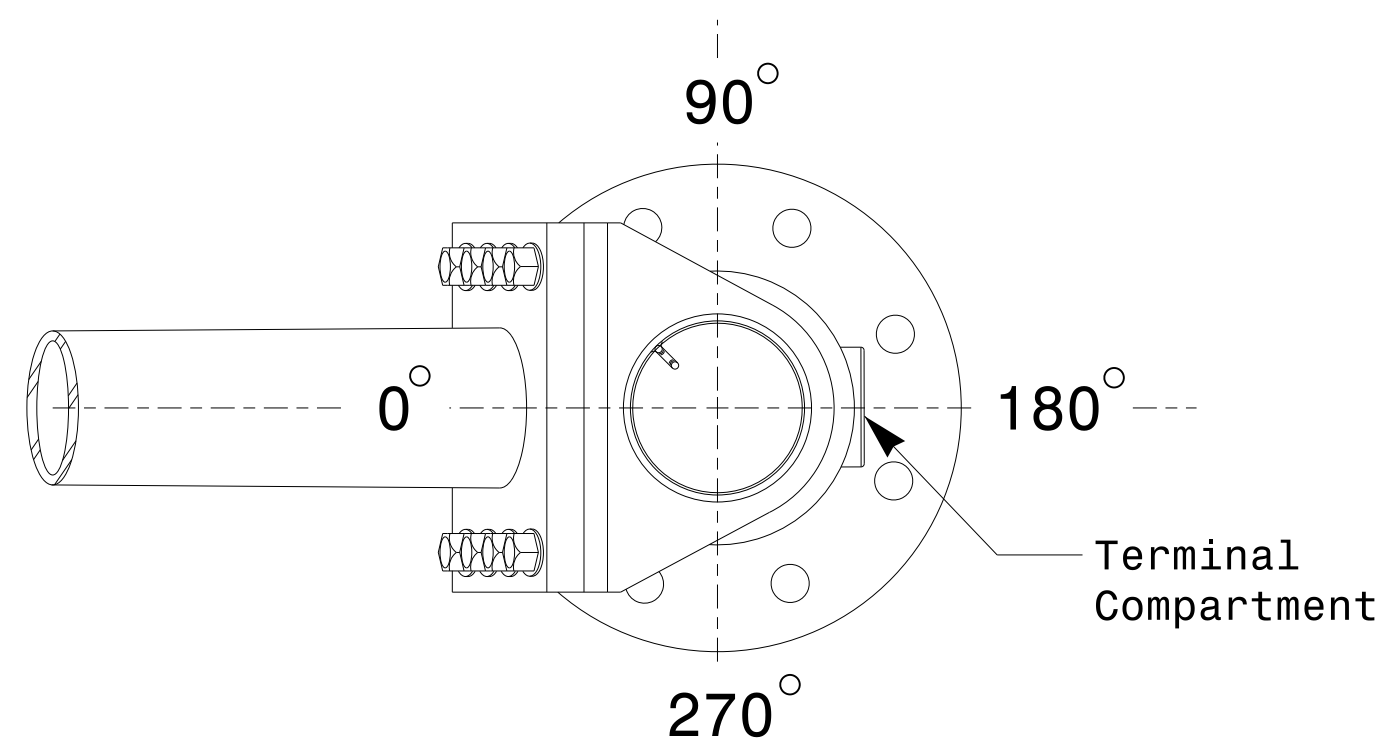
Section A-A
Pole Base Plate Details



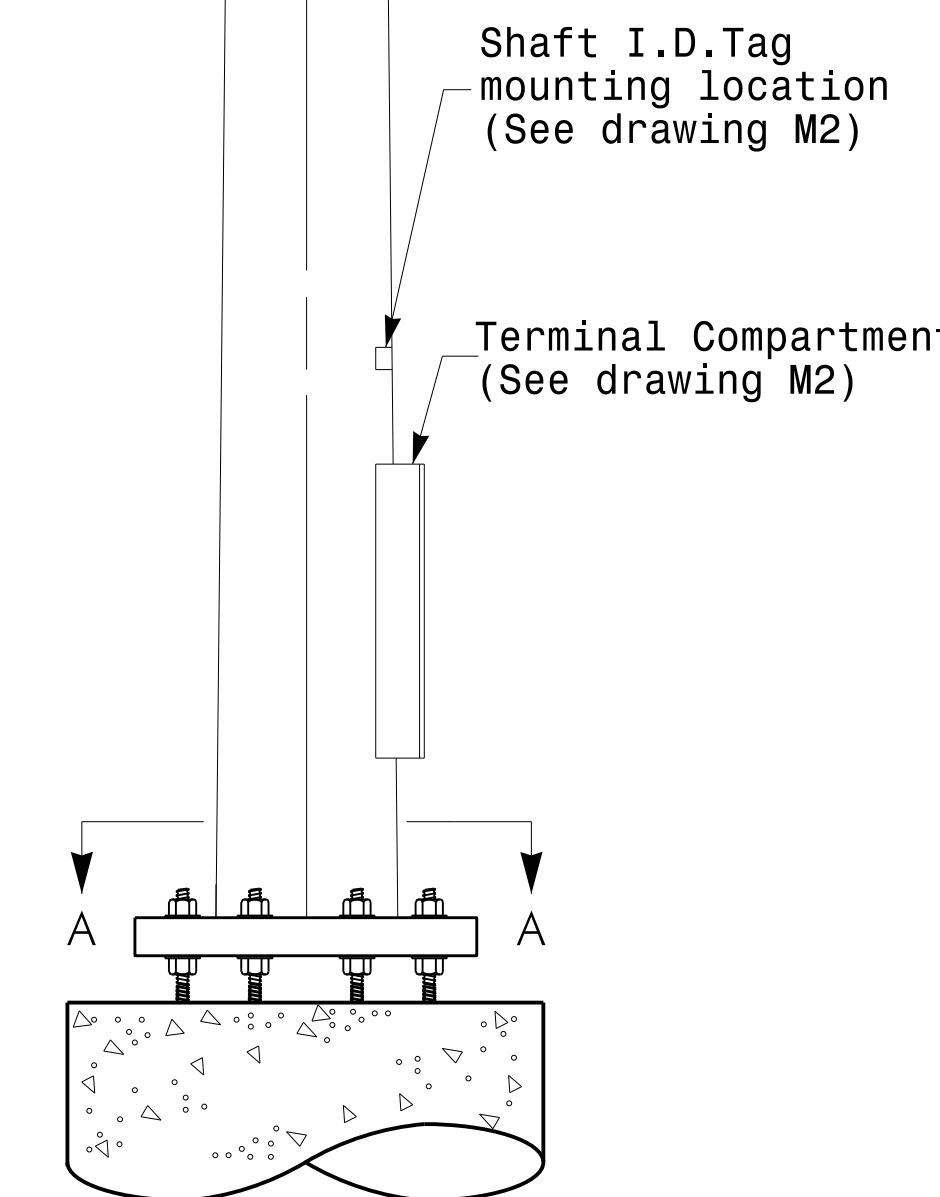
Section B-B
(Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation

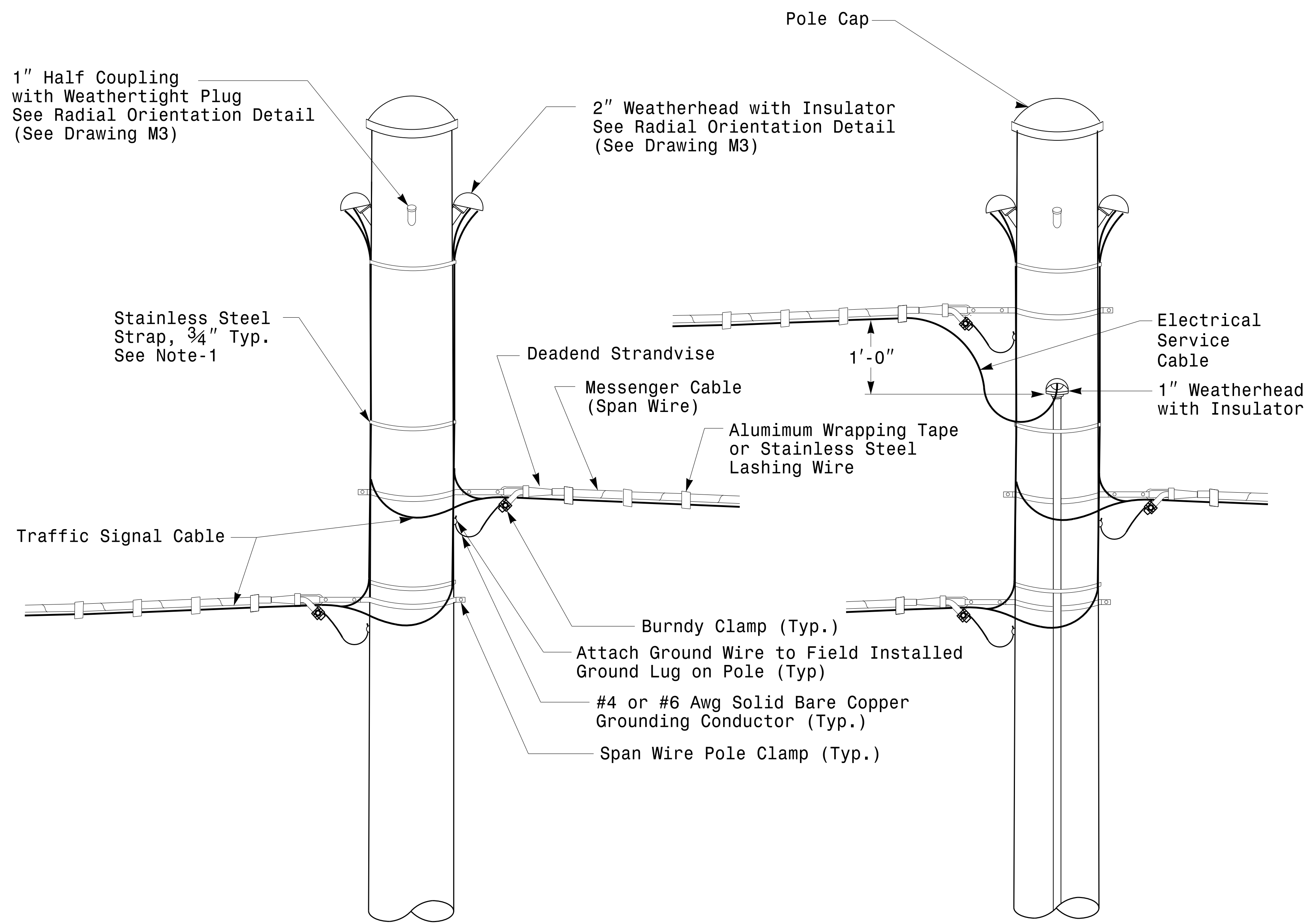


Mast Arm Pole

	Typical Fabrication Details For Mast Arm Poles		SEAL
	PLAN DATE: OCTOBER 2017 PREPARED BY: N. BITTING	DESIGNED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	DocuSigned by: 		10/11/2017 DATE

11-OCT-2017 08:33
 P:\S604115\SIGNALS\61501\Design Section\Eastern Region\4. Signal Design Section\Design\162014_Sig.M4_Std. Fabrication Detail\Mast Arm Poles.dgn
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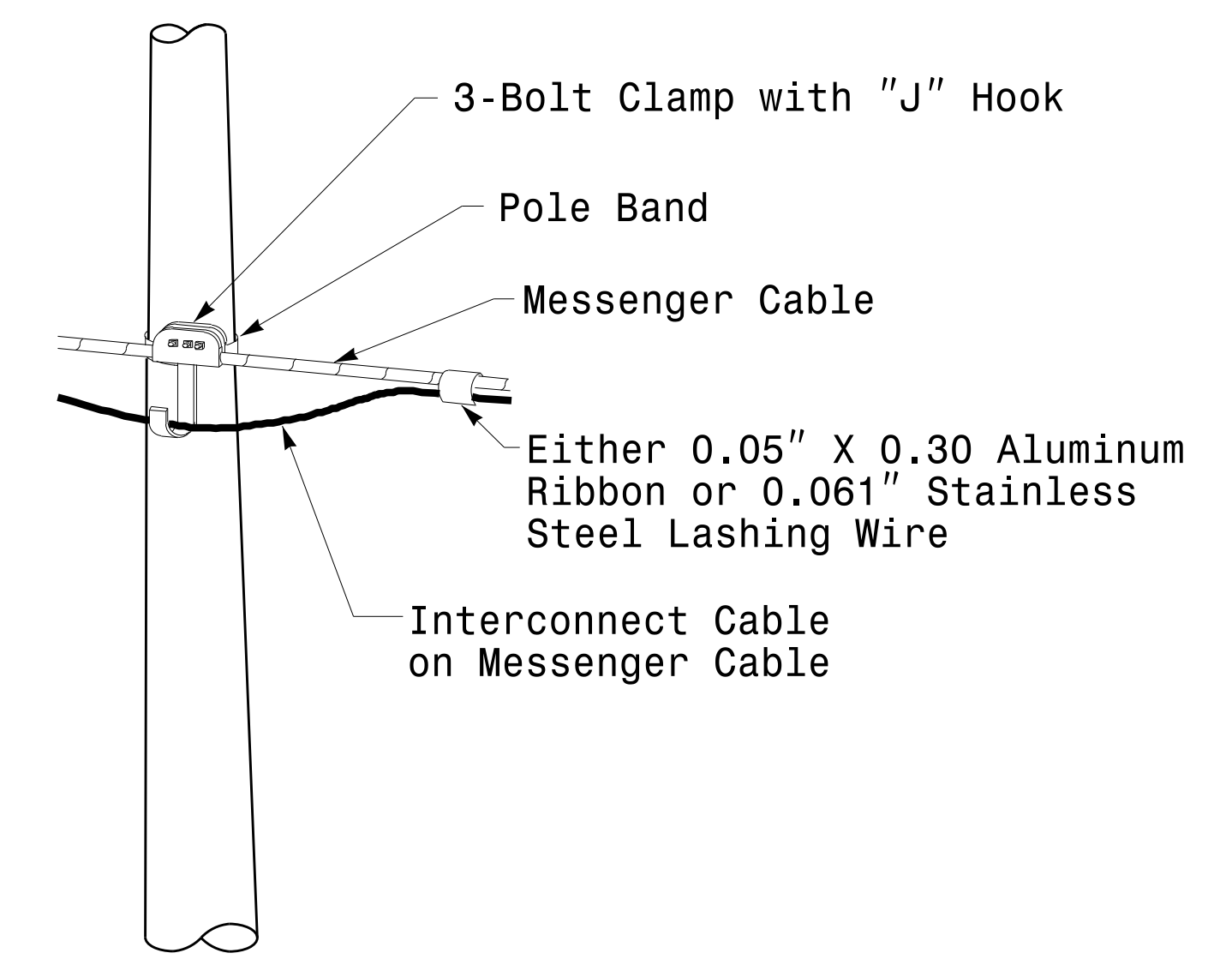
Fabrication Details - Mast Arm Poles



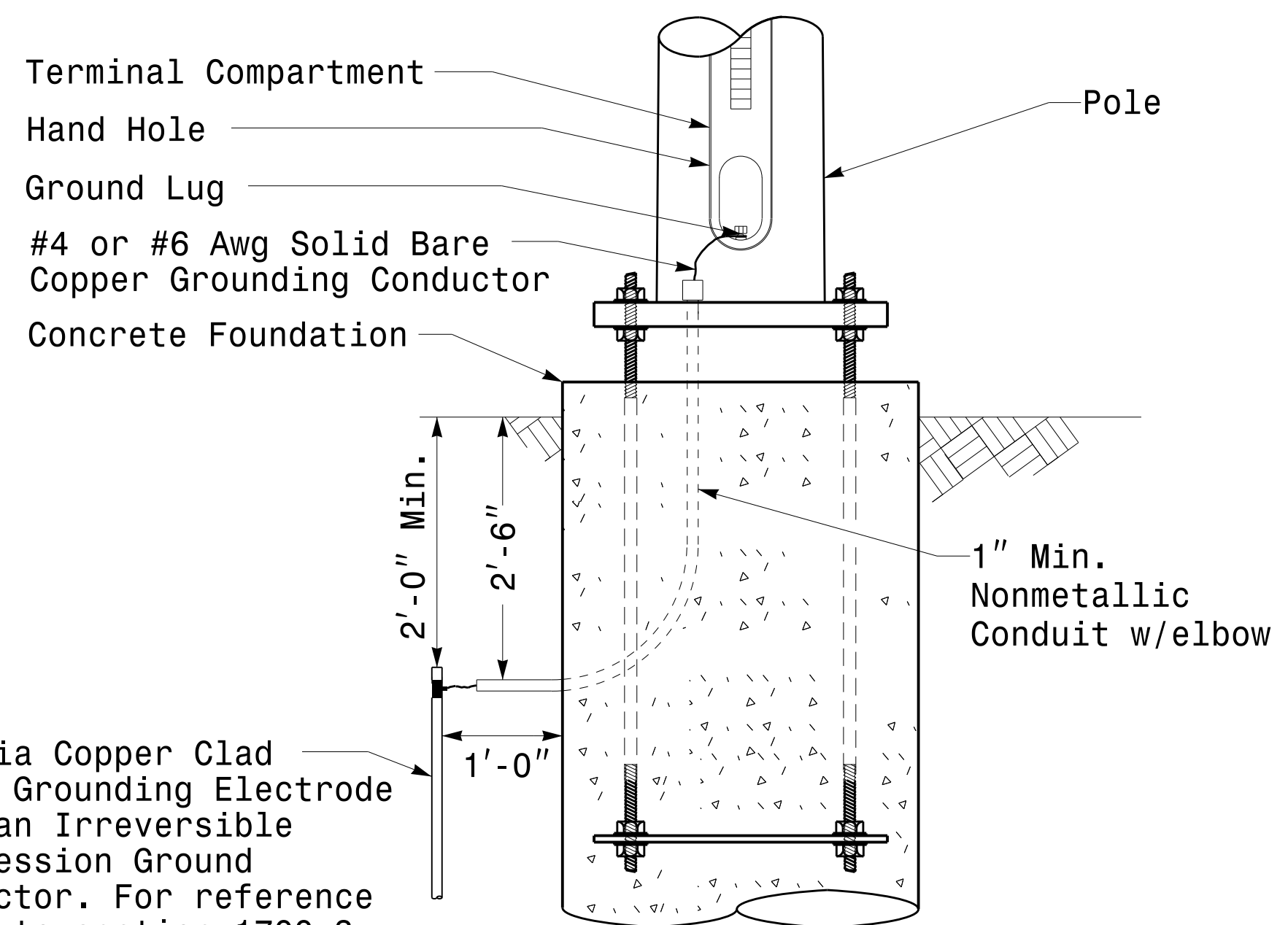
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3'-0".
2. Provide minimum two spanwire 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 2018.



Attachment of Cable to Intermediate Metal Pole



5/8" Dia Copper Clad Steel Grounding Electrode with an Irreversible Compression Ground Connector. For reference refer to section 1700-3 K and L for electrical grounding and bonding requirements, See Note 4.

Metal Pole Grounding Detail For Strain Pole and Mast Arm

11-0CT-2017-08:36 136504115 StrainPole.dgn Design Section Eastern Region 11/16/2014 Sig.M6 Std. Fabrication Detail: Strain Poles.dgn

<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Strain Pole Attachments</p>		
	<p>PLAN DATE: OCTOBER 2017</p>	<p>DESIGNED BY: C.F. ANDREWS</p>	
<p>SCALE: 0 NA NONE</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
			<p>DocuSigned by: D. Sarkar 10/11/2017</p>

SOIL CONDITION

		STANDARD STRAIN POLES					STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) - Feet							Reinforcement				
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base			Clay				Sand			Longitudinal		Stirrups	
					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.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	19	13	10	8	17	14.5	12.5	8	12	4	12
		S30L3	30	25	2	11	300	19.5	13.5	10	8	17.5	15	13	8	14	4	12
		S35L3	35	25	3	11	320	20	13.5	10.5	8	17.5	15	13	8	14	4	12
	HEAVY	S30H3	30	29	3	16	450	24.5	16	12	9	21	17.5	15	8	16	4	6
		S35H3	35	29	4	16	515	26	17	12.5	9.5	22	18.5	16	8	16	4	6
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	16	11.5	8.5	8	15	12.5	11	8	12	4	12
		S30L1	30	22	2	8	205	16.5	11.5	9	8	15	13	11.5	8	12	4	12
		S35L1	35	22	3	8	230	17	12	9	8	15.5	13.5	11.5	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	20.5	13.5	10.5	8	18	15	13.5	8	16	4	6
		S35H1	35	25	4	12	350	21	14	10.5	8.5	18.5	15.5	13.5	8	16	4	6
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6

General Notes:

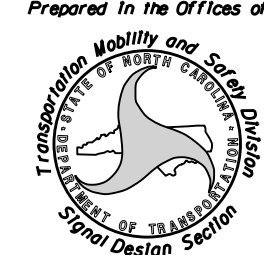

1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from M 1 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 for Reference Drilled Shafts.

Standard Strain Pole Foundation-All Soil Condition

48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Drilled Pier Length

	<p>Standard Strain Pole Foundation for All Soil Conditions</p> <p>PLAN DATE: OCTOBER 2017 DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR</p>							
SCALE: 0 NA NONE	REVISIONS: <table border="1" style="font-size: small;"> <tr> <th>NO.</th> <th>DATE</th> <th>INIT.</th> </tr> <tr> <td>1</td> <td>7/12/2015</td> <td>N.B.</td> </tr> </table>	NO.	DATE	INIT.	1	7/12/2015	N.B.	Documented by: <i>D. C. SARKAR</i> DATE: 10/11/2017
NO.	DATE	INIT.						
1	7/12/2015	N.B.						

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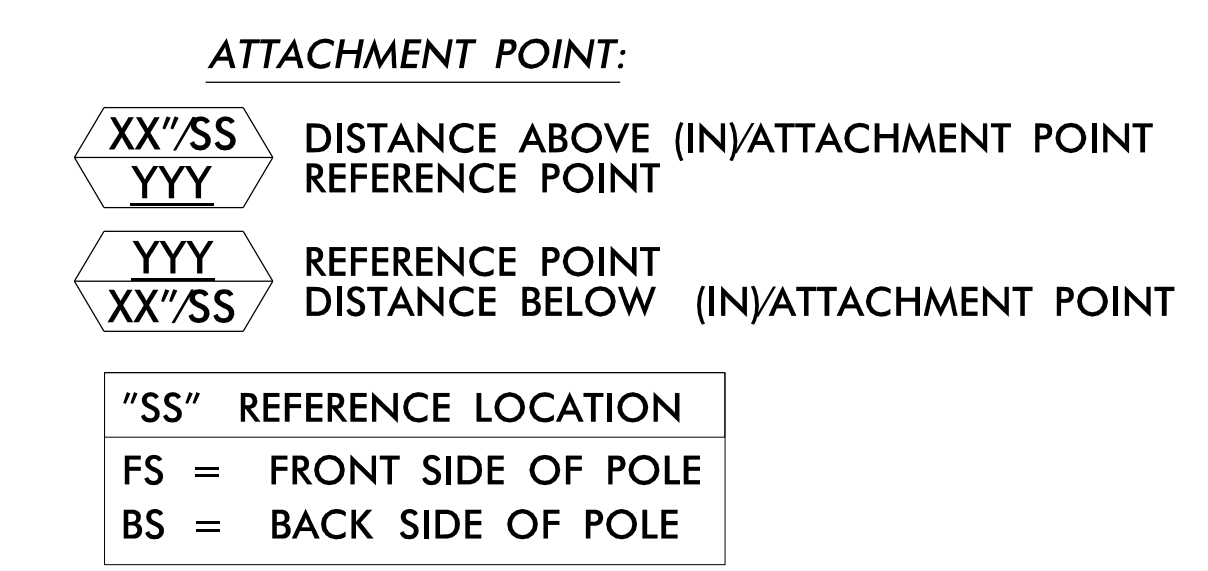
- 1 INSTALL COAX CABLE
- 2 INSTALL ETHERNET CABLE
- 3 EXISTING ETHERNET (OR COAX) CABLE
- 4 INSTALL SMFO CABLE
- 5 EXISTING SMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH
- 9 INSTALL PVC CONDUIT
- 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11 INSTALL RIGID, GALVANIZED 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 50 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
DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS
- 61 BOND RISER AND MESSENGER CABLE TO POLE GROUND
- 62 BOND RISER TO POLE GROUND
- 63 BOND MESSENGER CABLE TO POLE GROUND
- 64 INSTALL HEAT SHRINK TUBING RETROFIT KIT
- 65 INSTALL MOLDABLE DUCT SEAL
- 67 SLACK SPAN

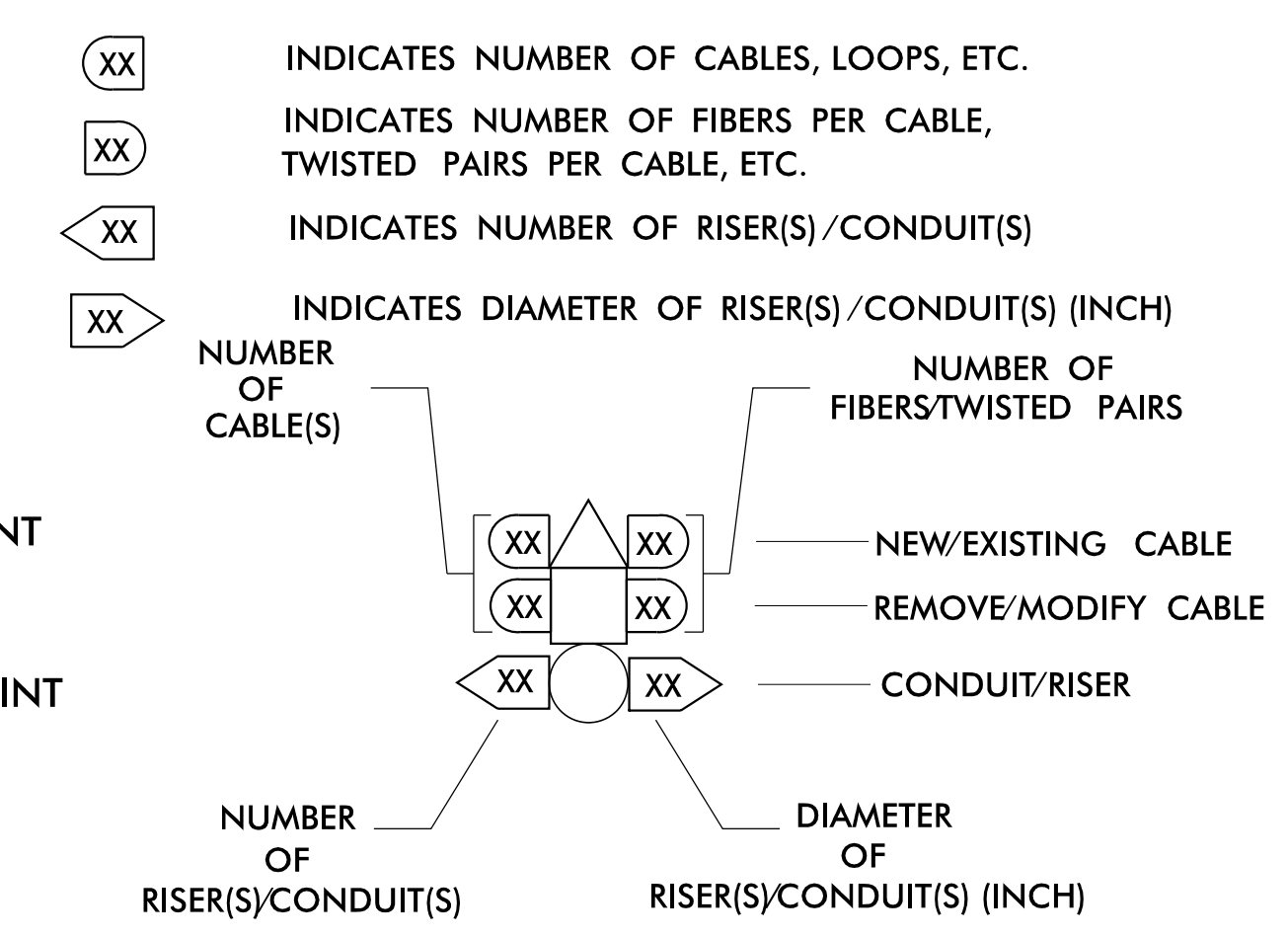
LEGEND

	NEW FIBER OPTIC COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE TO BE REMOVED
	NEW AERIAL GUY ASSEMBLY
	NEW CONDUIT
	EXISTING CONDUIT
	NEW DIRECTIONAL DRILLED CONDUIT

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



CONSTRUCTION NOTE SYMBOLOGY KEY



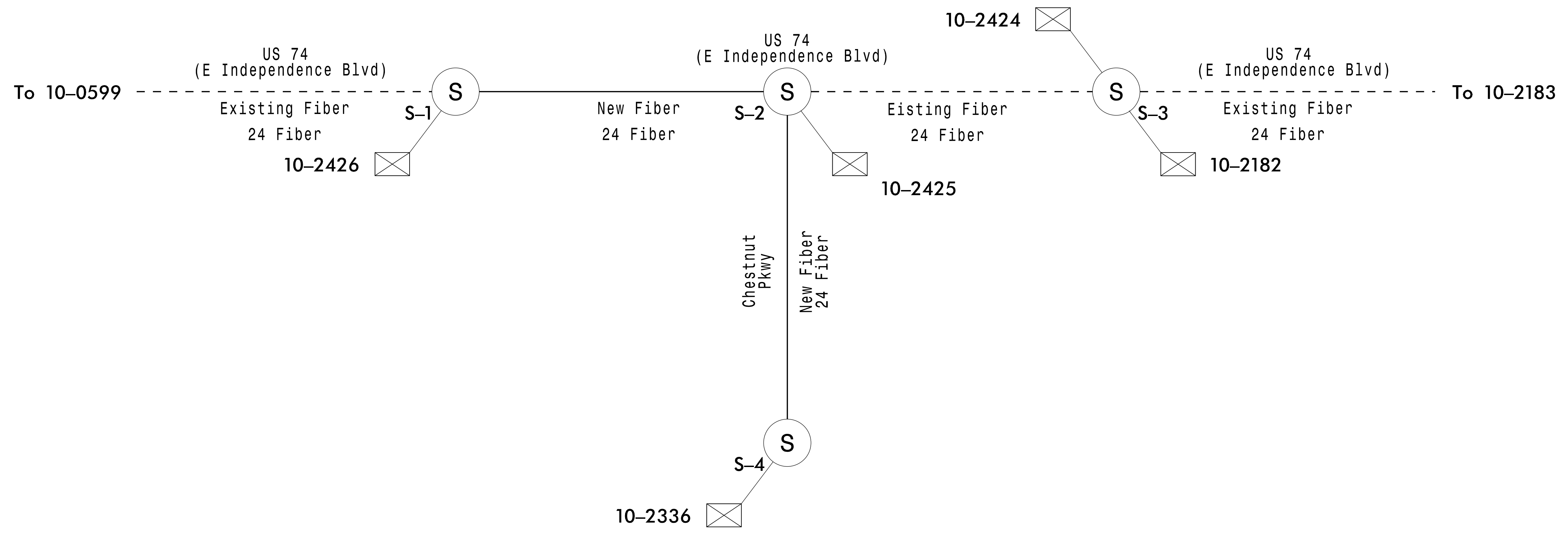
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	CONSTRUCTION NOTES		SEAL
	Division 10 Union County Indian Trail PLAN DATE: May 2023 REVIEWED BY: S.G. Haynie PREPARED BY: O. Drobny REVIEWED BY: V.L. Kaiser		
REVISIONS	INIT.	DATE	DocuSigned by: Steven G. Haynie 18/2023 0633CC854486 SIGNATURE DATE
CADD File name: U-5808sc01.dgn			

FIBER-OPTIC SCHEMATIC



LEGEND

⊗	CABLE-TO-CABLE SPLICE
⊗-⊠	12 FIBER DROP SPLICE TO SIGNAL CABINET
————	NEW FIBER-OPTIC CABLE
-----	EXISTING FIBER-OPTIC CABLE
S-###	SPLICE NUMBER
10-####	STATE SIGNAL INVENTORY NUMBER

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Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529
SCALE: N/A

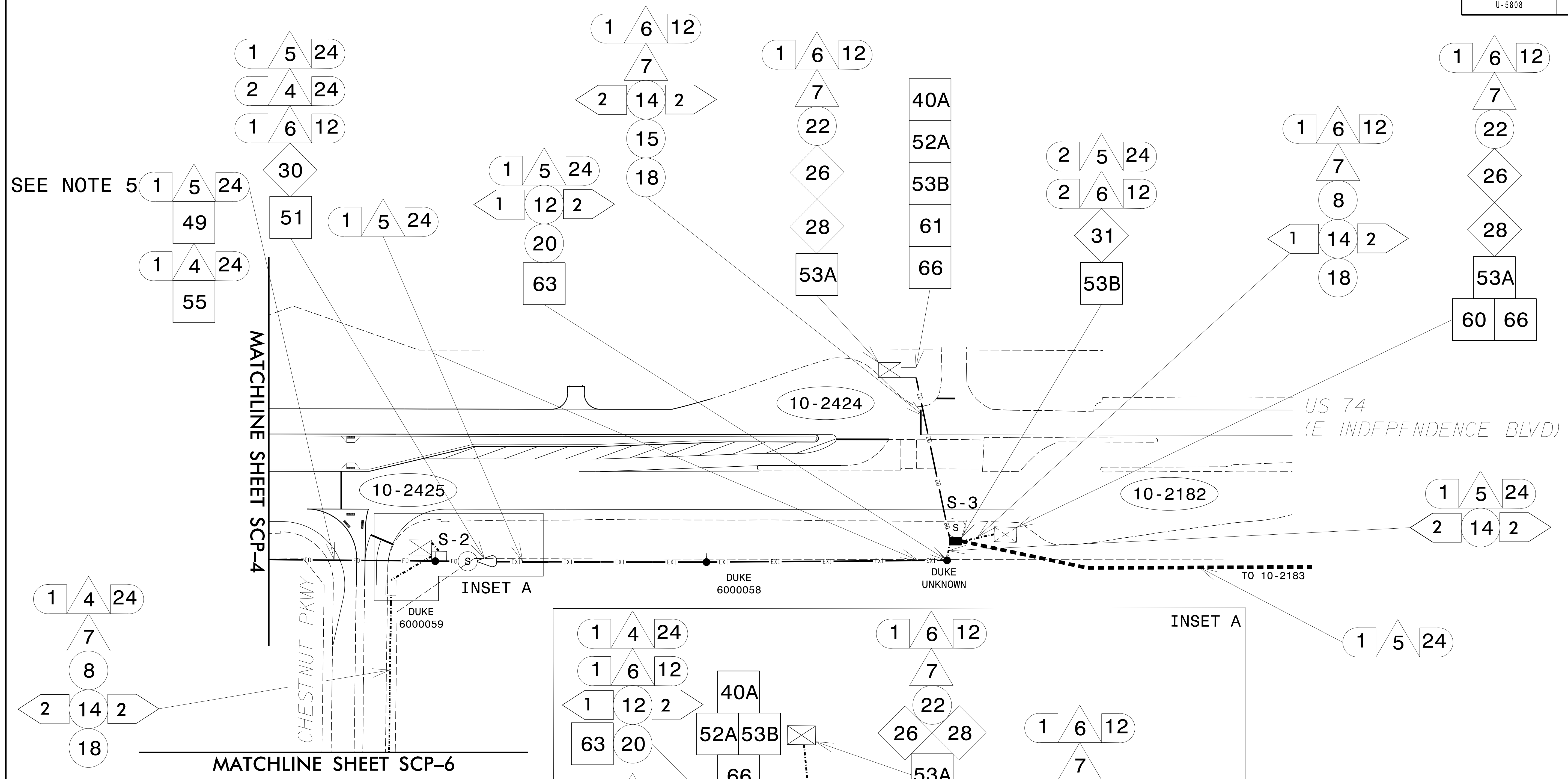
Signal System-D10-33 Indian Trail Fiber-Optic Schematic			
Division 10	Union County	Indian Trail	
PLAN DATE: May 2023	REVIEWED BY: S.G. Haynie		
PREPARED BY: O. Drobny	REVIEWED BY: V. L. Kaiser		
REVISIONS	INIT.	DATE	

SEAL

DocuSigned by:
Steven G. Haynie 5/18/2023

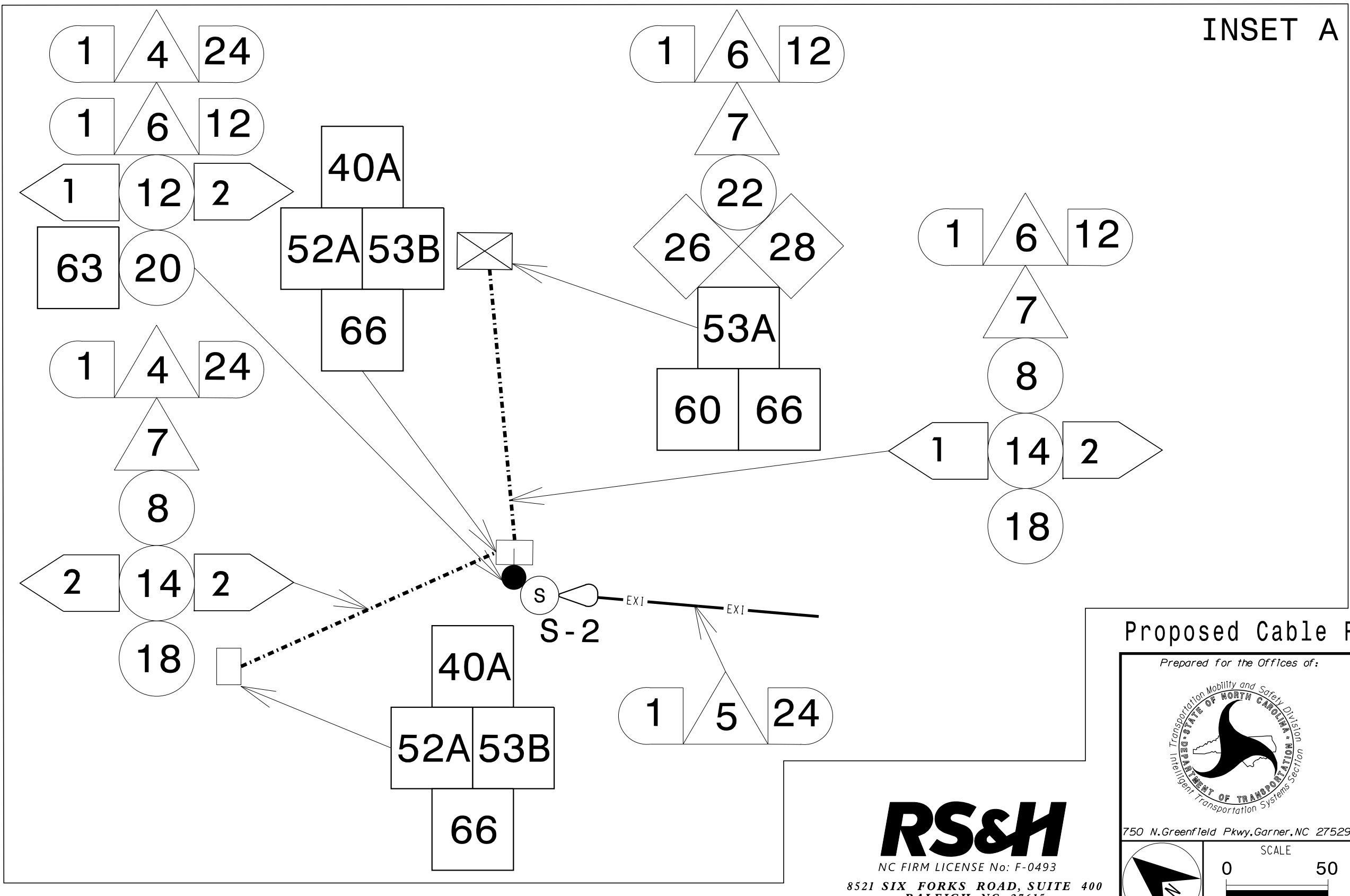
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UNLESS ALL SIGNATURES COMPLETED**



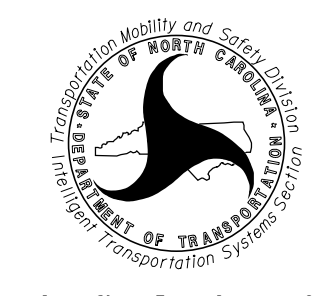
NOTES

1. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE DIVISION TRAFFIC ENGINEER AT (704) 983-4400 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE ENGINEER 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. ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL COMPLY WITH NESC GUIDELINES FOR INSTALLING NCDOT CABLES ON JOINT-USE POLES.
4. 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.
5. CUT EXISTING 24-FIBER MIDWAY BETWEEN S-1 SPLICE ENCLOSURE (SEE SCP-4) AND CHESTNUT PARKWAY. BACK PULL EXISTING 24-FIBER FOR USE IN NEW S-2 SPLICE ENCLOSURE.



Proposed Cable Routing

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For the Offices of:

 Department of Transportation, State of North Carolina

Signal System - D10-033
Indian Trail
Communications Cable and
Conduit Routing Plans

Division 10 Union County Indian Trail
 PLAN DATE: May 2023 REVIEWED BY: S.G. Haynie
 PREPARED BY: O. Drobny REVIEWED BY: V.L. Kaiser

REVISIONS	INIT.	DATE

Designed by: *Steven G. Haynie* 18/2023
 SEAL 029531
 ENGINEER STEVEN G. HAYNIE
 SIGNATURE DATE
 CADD File name: U-5808scpp05.dgn

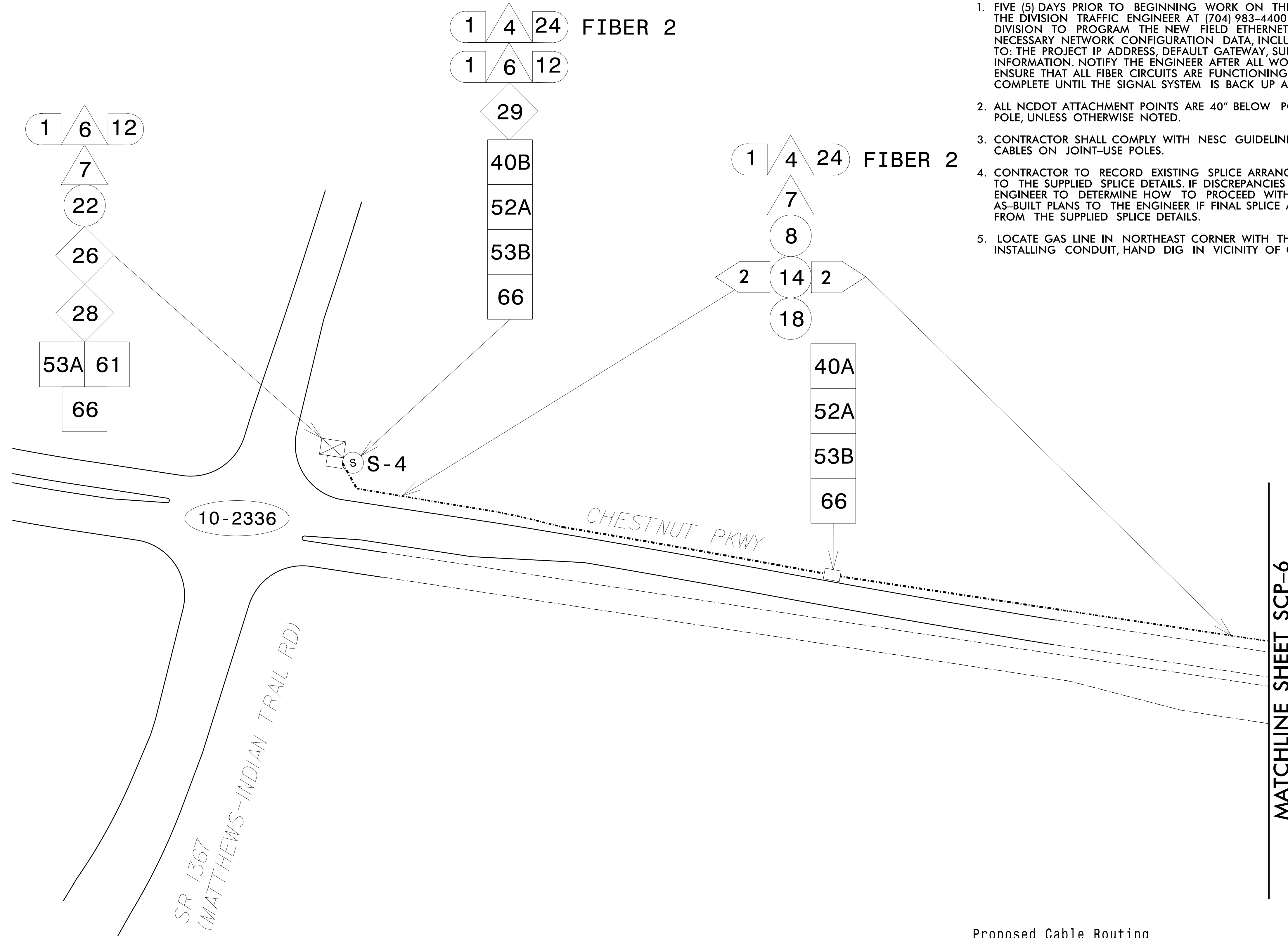
RS&H
 NC FIRM LICENSE No: F-0493
 8521 SIX FORKS ROAD, SUITE 400
 RALEIGH, NC 27615
 (919) 926-4100

750 N. Greenfield Pkwy, Garner, NC 27529
 SCALE
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 1"=50'

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NOTES

1. FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE DIVISION TRAFFIC ENGINEER AT (704) 983-4400 TO ARRANGE FOR THE DIVISION TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE ENGINEER 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. ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL COMPLY WITH NESC GUIDELINES FOR INSTALLING NCDOT CABLES ON JOINT-USE POLES.
4. 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.
5. LOCATE GAS LINE IN NORTHEAST CORNER WITH THE CABINET BEFORE INSTALLING CONDUIT, HAND DIG IN VICINITY OF GAS LINE.



MATCHLINE SHEET SCP-6

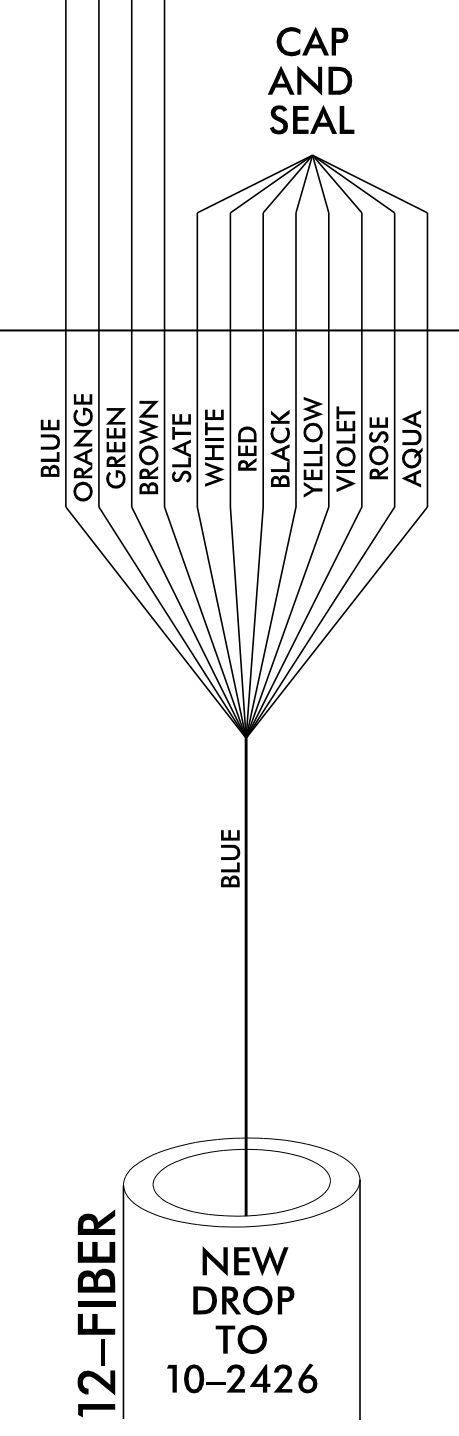
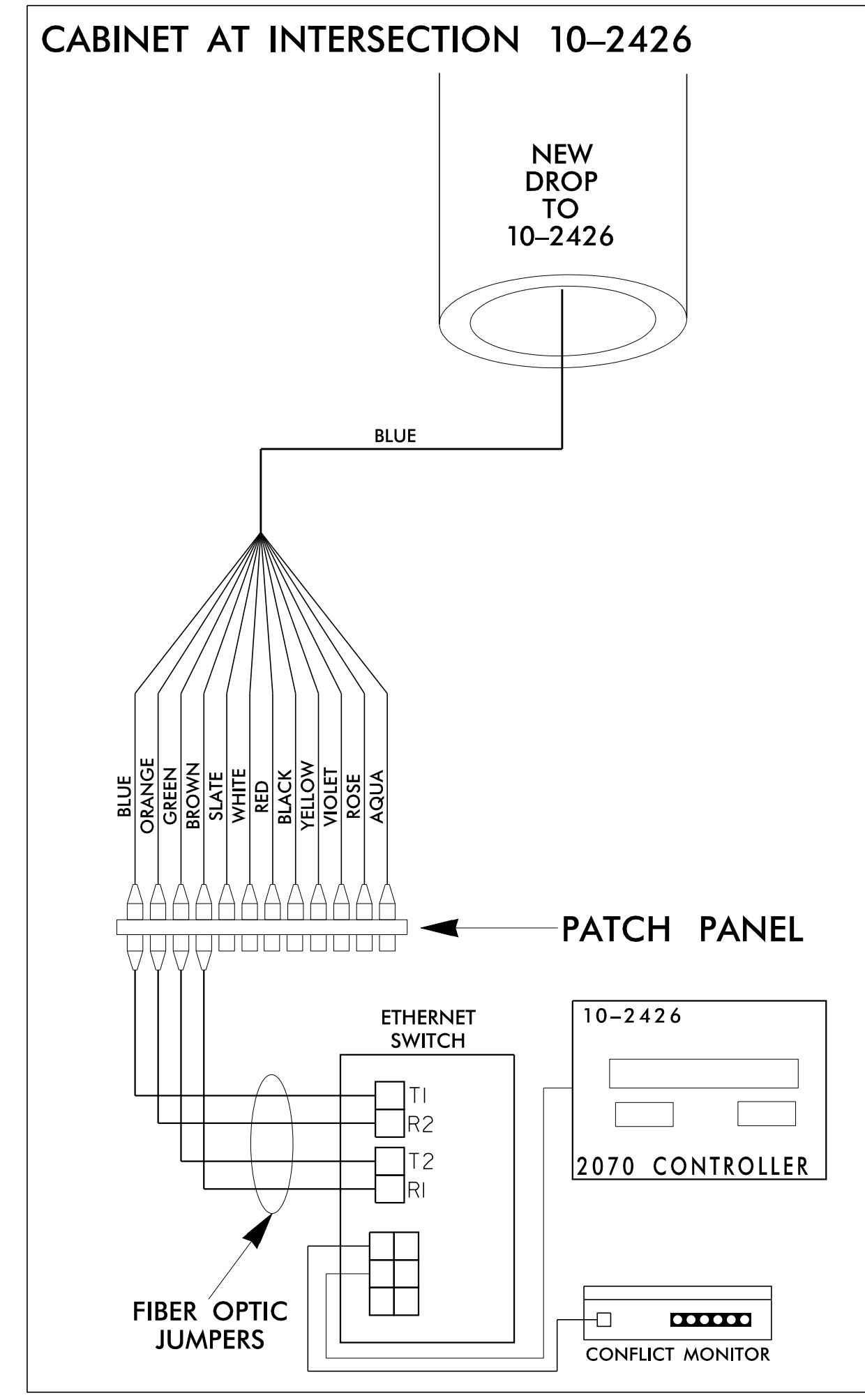
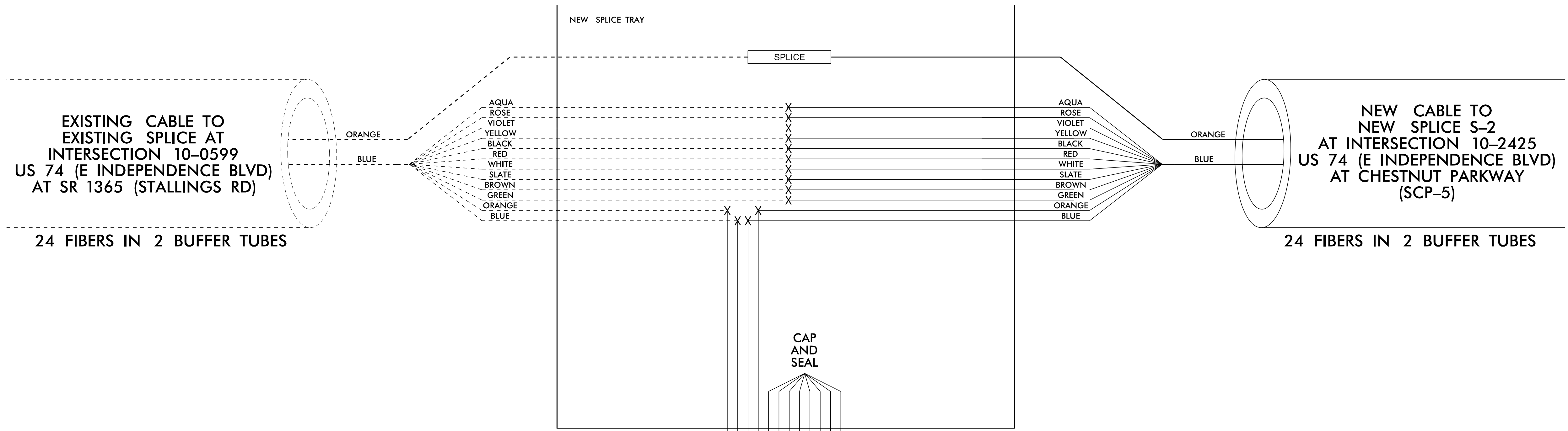
Proposed Cable Routing

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	Signal System - D10-33 Indian Trail Communications Cable and Conduit Routing Plans		
	Division 10 Union County Indian Trail	PLAN DATE: May 2023 REVIEWED BY: S.G. Haynie	
750 N. Greenfield Pkwy, Garner, NC 27529 NC FIRM LICENSE No: F-0493 8521 SIX FORKS ROAD, SUITE 400 RALEIGH, NC 27615 (919) 926-4100	SCALE 0 50 1" = 50'	REVISIONS INIT. DATE	DocuSigned by: Steven G. Haynie 18/2023 SIGNATURE DATE

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New Aerial Splice Enclosure S-1
US 74 (E Independence Blvd) at
Westbound U-Turn
Sig ID 10-2426



COLOR CODE
TIA/EIA 598-C

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

LEGEND

- X - FUSION SPICE
- O - EXISTING SPICE
- - EXPRESS INDIVIDUAL FIBER
- EXPRESS - EXPRESS ENTIRE BUFFER TUBE
- SPLICE - SPLICE ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED

NOTES:

- FIBER INTERCONNECT CENTER RACKS ARE SCHEMATIC ONLY - ACTUAL EQUIPMENT FORM MAY VARY.
- NOTIFY THE DIVISION TRAFFIC ENGINEER AT (704) 983-4400 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEMS COMMUNICATIONS CABLE. NOTIFY THE ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
- CONTRACTOR TO RECORD EXISTING SPICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPICE DETAILS.
- TRANSCIEVER ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.
- INCLUDE ON THE COVER OF EACH SPICE TRAY THE FOLLOWING:
REFERENCE SECTION 1731 "FIBER OPTIC SPICE ENCLOSURE"
1) SPICE LOCATION
2) DATE
3) COMPANY NAME
4) NAME OF INDIVIDUAL PERFORMING THE SPICING

PRIOR TO INSTALLING THE COVER ON THE SPICE TRAY, TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

5/14/2023
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Signal System - D10-33
Indian Trail
Fiber-Optic Splicing Details

Division 10 Union County Indian Trail

PLAN DATE: May 2023 REVIEWED BY: S.G. Hoynie

PREPARED BY: O. Drobny REVIEWED BY: V.L. Kaiser

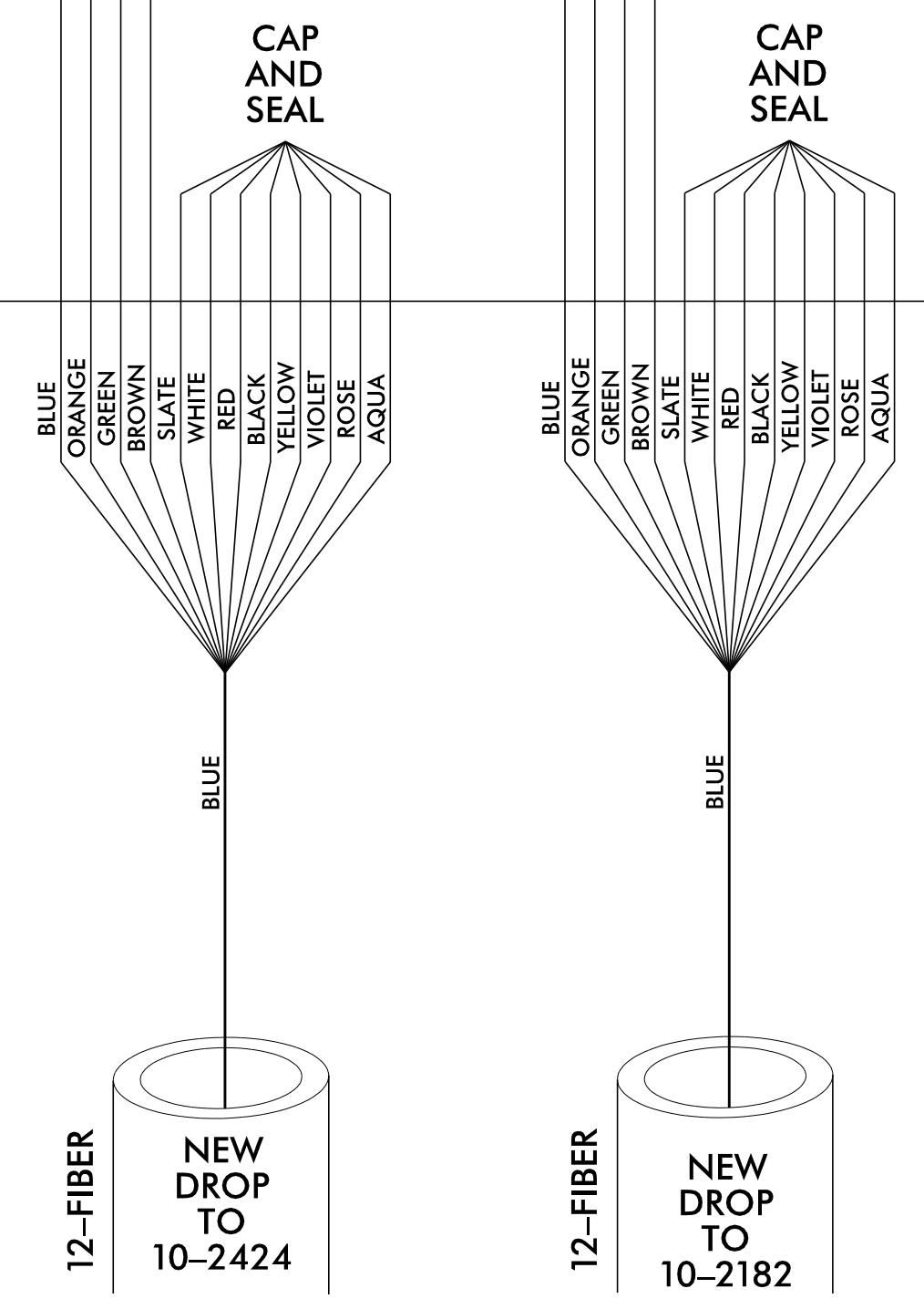
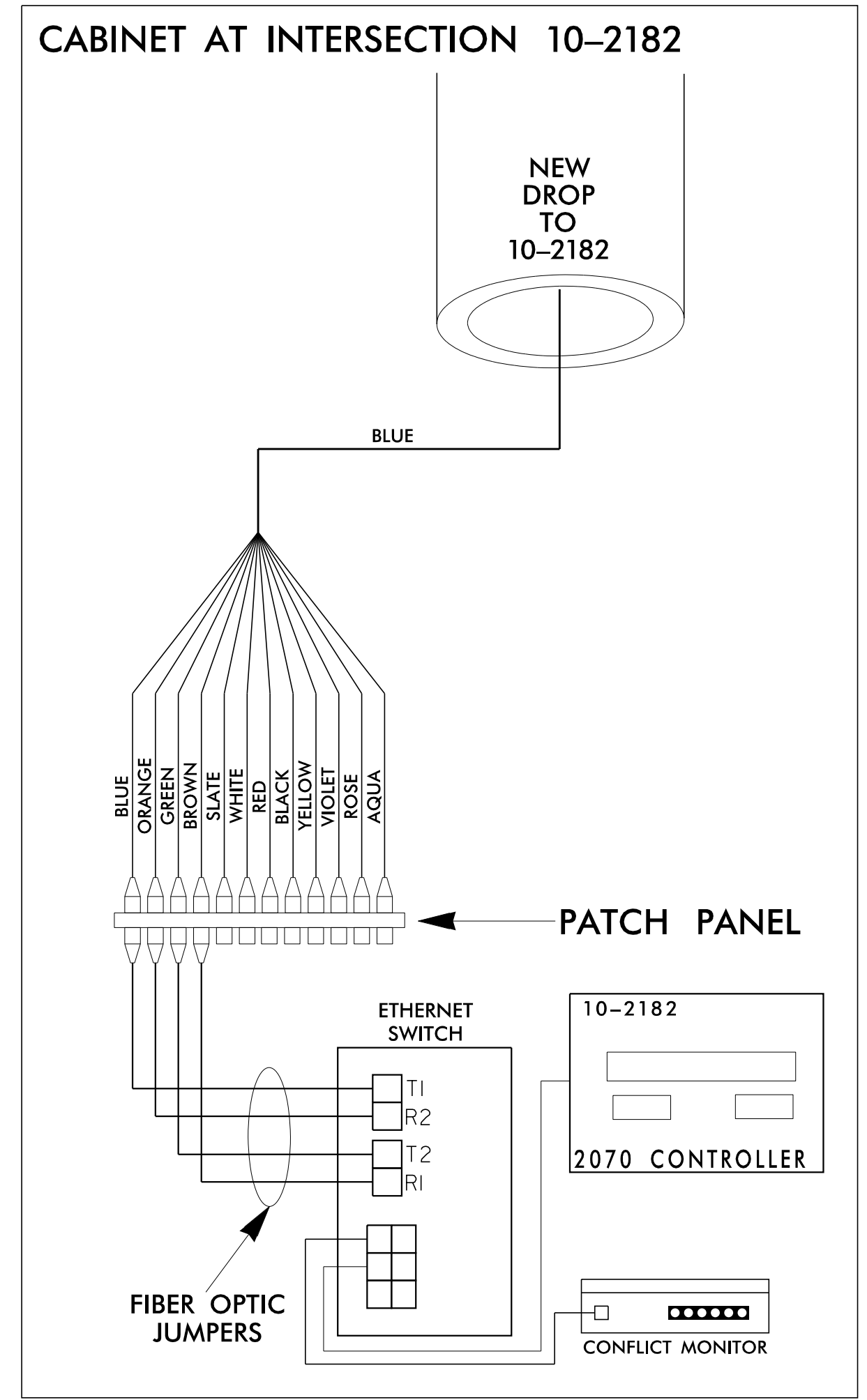
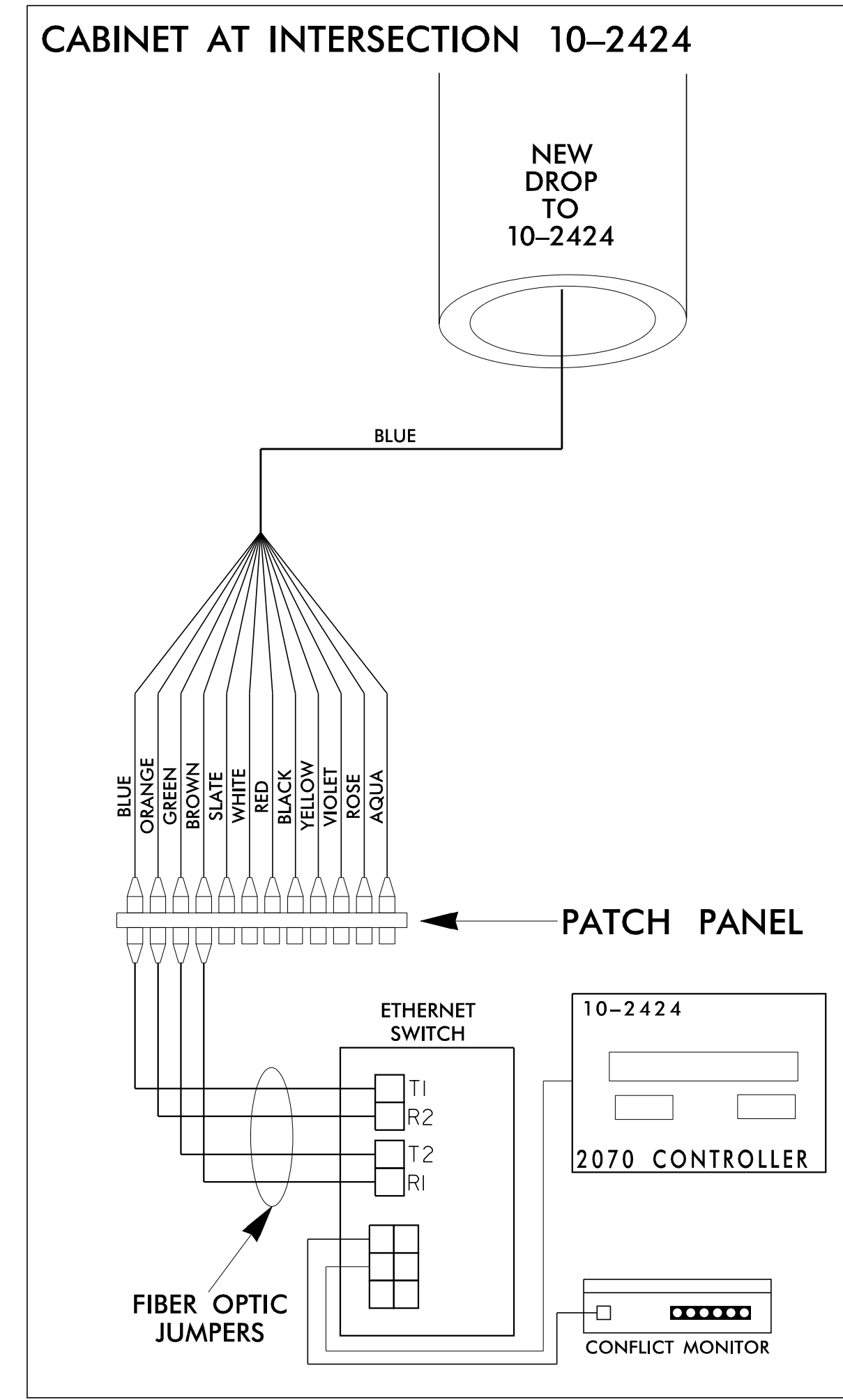
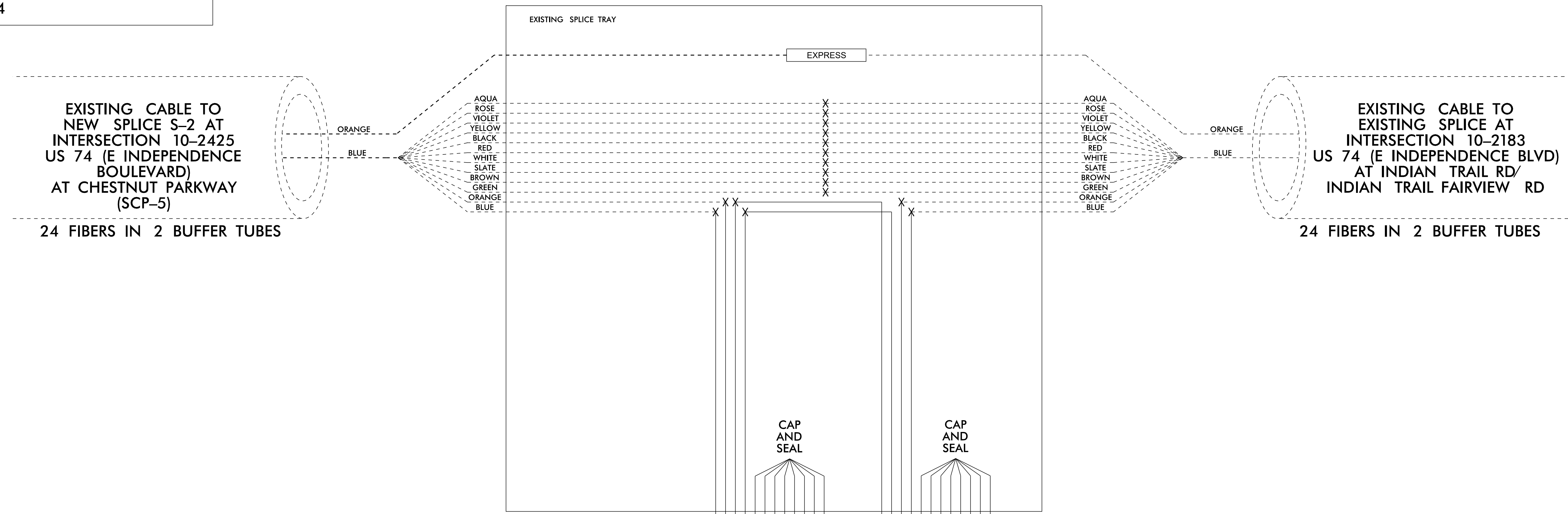
REVISIONS	INIT.	DATE

Seal: Steven G. Hoynie, Professional Engineer, License No. 029531, dated 11/18/2023.

CADD File name: U-5808sc08.dgn

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Existing Underground Splice Enclosure S-3
US 74 (E Independence Blvd) at
Eastbound U-Turn
Sig ID 10-2424



COLOR CODE
TIA/EIA 598-C

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

LEGEND

- X - FUSION SPlice
- O - EXISTING SPlice
- - EXPRESS INDIVIDUAL FIBER
- EXPRESS - EXPRESS ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED
- SPlice - SPlice ENTIRE BUFFER TUBE OR MAINTAIN IF EXISTING EXPRESSED

NOTES:

- FIBER INTERCONNECT CENTER RACKS ARE SCHEMATIC ONLY - ACTUAL EQUIPMENT FORM MAY VARY.
- NOTIFY THE DIVISION TRAFFIC ENGINEER AT (704) 983-4400 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEMS COMMUNICATIONS CABLE. NOTIFY THE ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
- 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.
- TRANSCEIVER ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.
- INCLUDE ON THE COVER OF EACH SPlice TRAY THE FOLLOWING:
REFERENCE SECTION 1731 "FIBER OPTIC SPlice ENCLOSURE"
 - SPlice LOCATION
 - DATE
 - COMPANY NAME
 - NAME OF INDIVIDUAL PERFORMING THE SPlicing

PRIOR TO INSTALLING THE COVER ON THE SPlice TRAY, TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPlice TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Prepared for the Offices of:

**Chestnut Parkway Connector
Fiber-Optic Splicing Details**

Division 10 Union County Indian Trail

PLAN DATE: May 2023 REVIEWED BY: S.G. Haynie

PREPARED BY: O. Drobny REVIEWED BY: V.L. Kaiser

REVISIONS	INIT.	DATE

DocuSigned by:
Steven G. Haynie 18/2023

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL
029531
STEVEN G. HAYNIE

CADD File name: U-5808scp10.dgn

