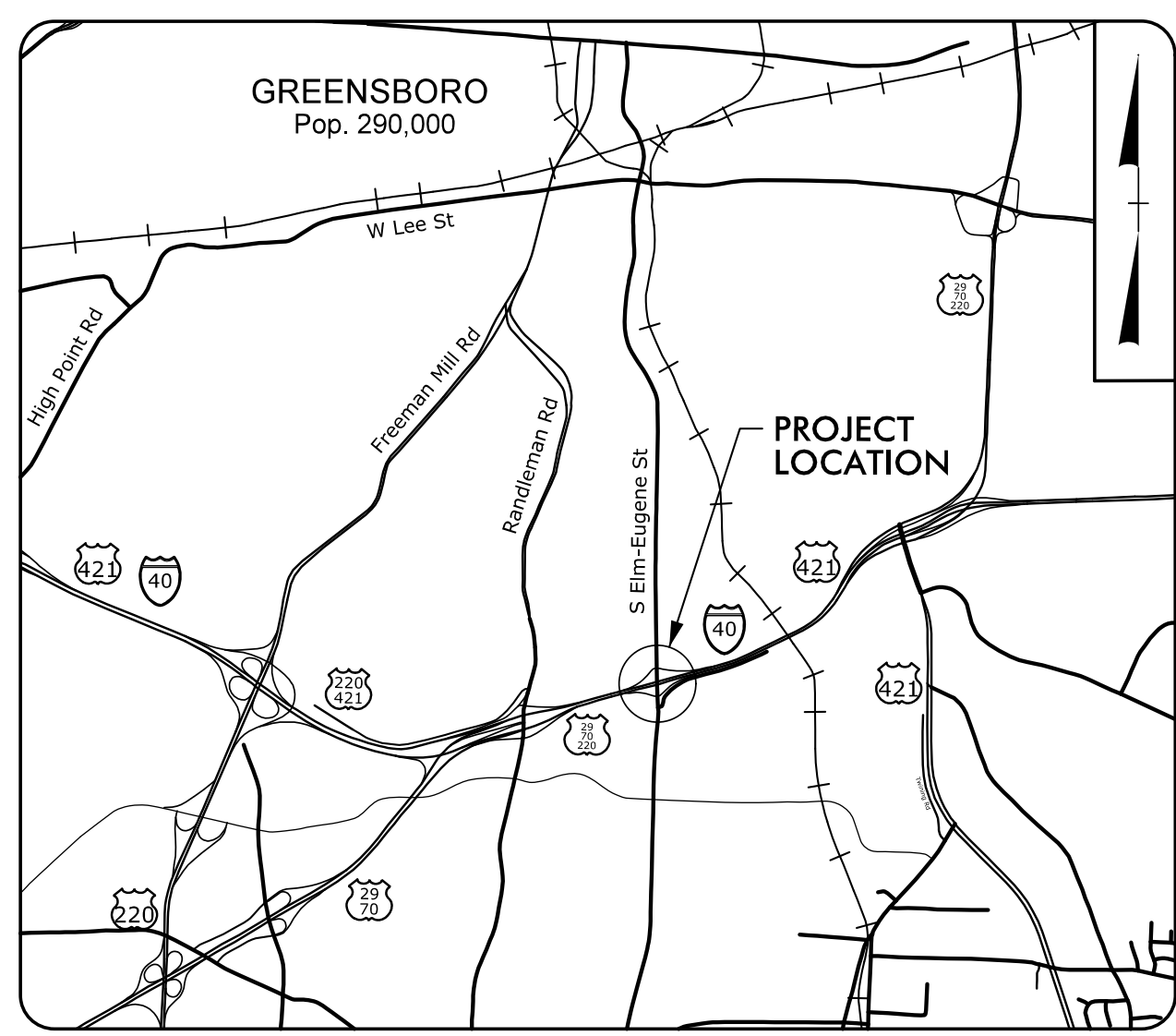


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CONTRACT: DG00491

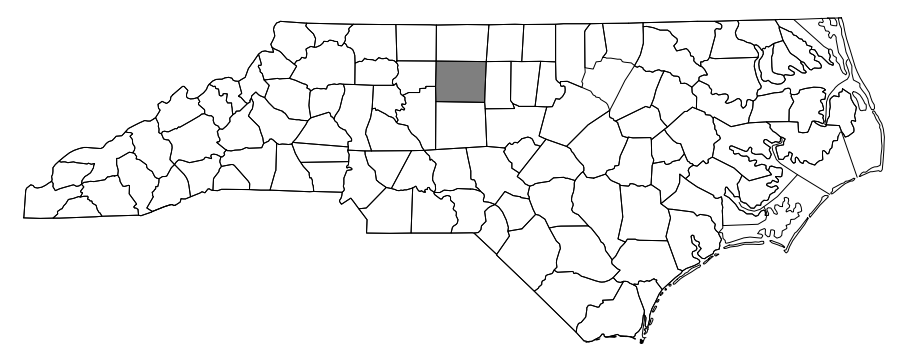
Project No.	Sheet No.
I-5964	Sig. 1.0



VICINITY MAP
NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
GUILFORD COUNTY

LOCATION: I-40 /US 29-220 /SOUTH ELM-EUGENE INTERCHANGE IMPROVEMENTS
TYPE OF WORK: TRAFFIC SIGNALS & SIGNAL COMMUNICATIONS

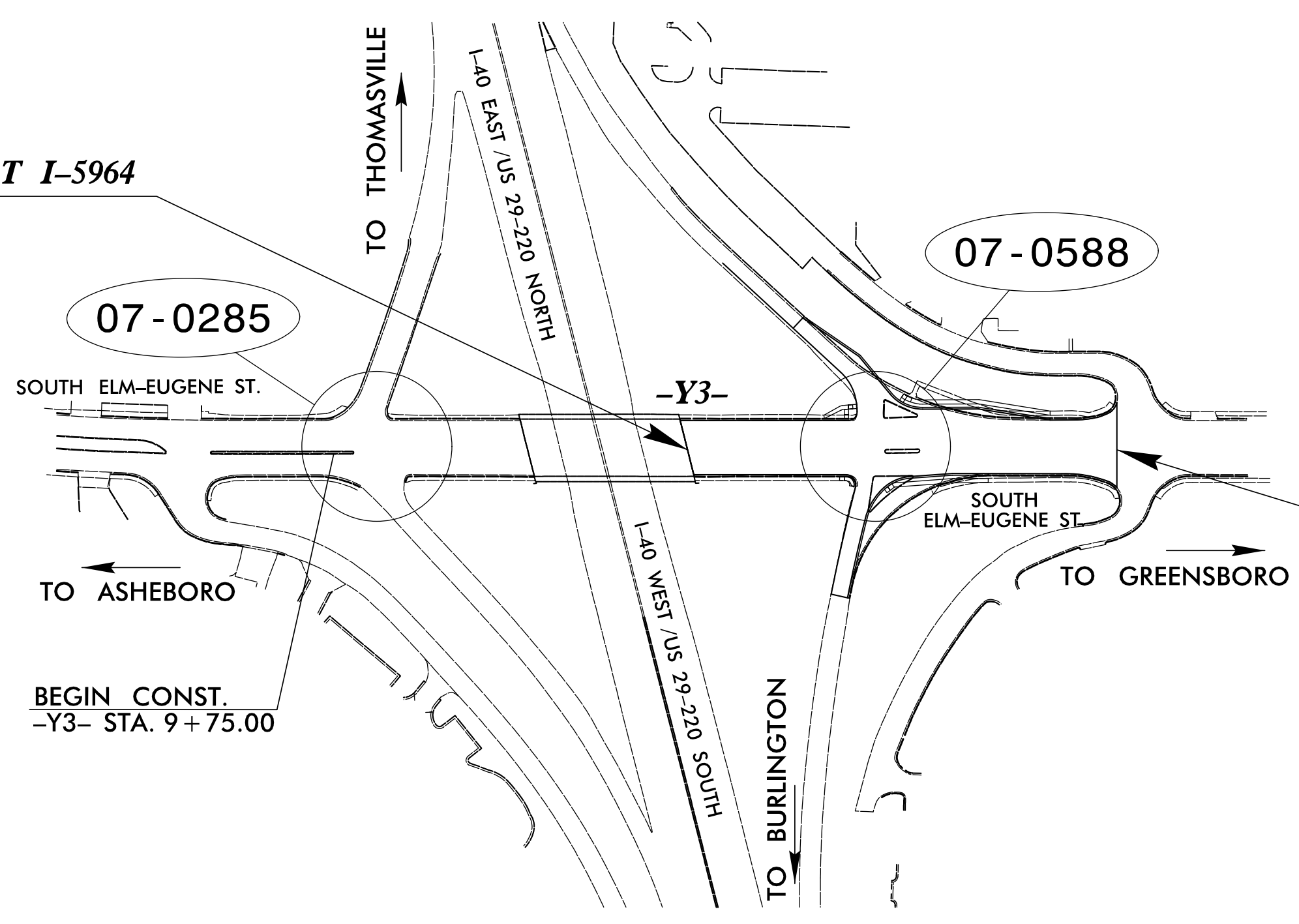


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UNLESS ALL SIGNATURES COMPLETED

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

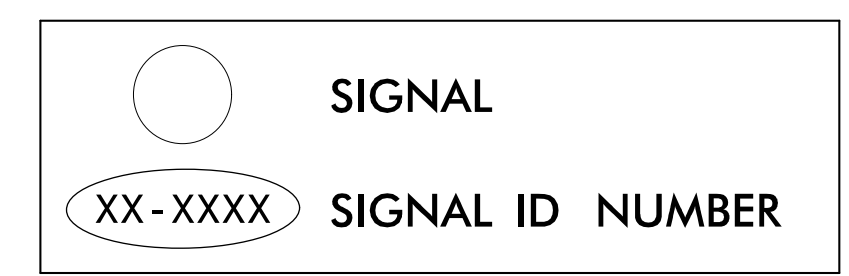


BEGIN TIP PROJECT I-5964
-Y3- STA. 13 + 90.40



END TIP PROJECT I-5964
-Y3- STA. 19 + 00.00

BEGIN CONST.
-Y3- STA. 9 + 75.00



stv
STV Engineers, Inc.
2151 Hawkins Street, Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

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

Sheet #	Reference #	Location/Description
Sig. 1.0	-----	Project Titlesheet
Sig. 2.0-2.5	07-0285	S. Elm-Eugene Street at I-40 EB /US 29-220 NB Ramps
Sig. 3.0-4.5	07-0588	S. Elm-Eugene Street at I-40 WB /US 29-220 SB Ramps
Sig. M1A-M9	-----	Standard Metal Pole Detail Sheets
SCP 1-3	-----	Signal Communication Plans

**NCDOT TRANSPORTATION SYSTEMS
MANAGEMENT & OPERATIONS UNIT**

Contacts:
Robert J. Ziemba, PE - Central Region Signals Engineer
D. Todd Joyce, PE - Signal Equipment Design Review Engineer
Gregg Green - Signal Communications Project Engineer

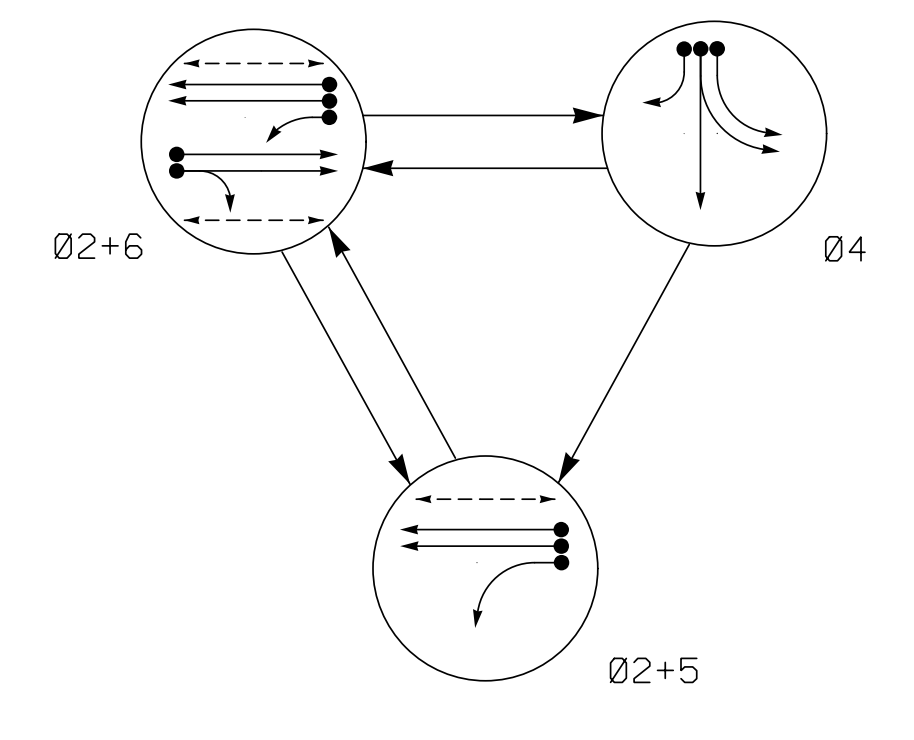
STV Engineers, Inc.

Contacts:
Trent M. Moody, PE - Senior Associate Engineering Director

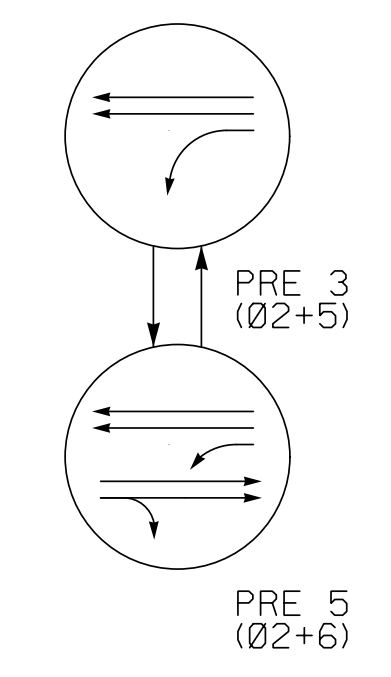
Prepared for the Offices of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY
DIVISION

750 N. Greenfield Parkway, Garner, NC 27529

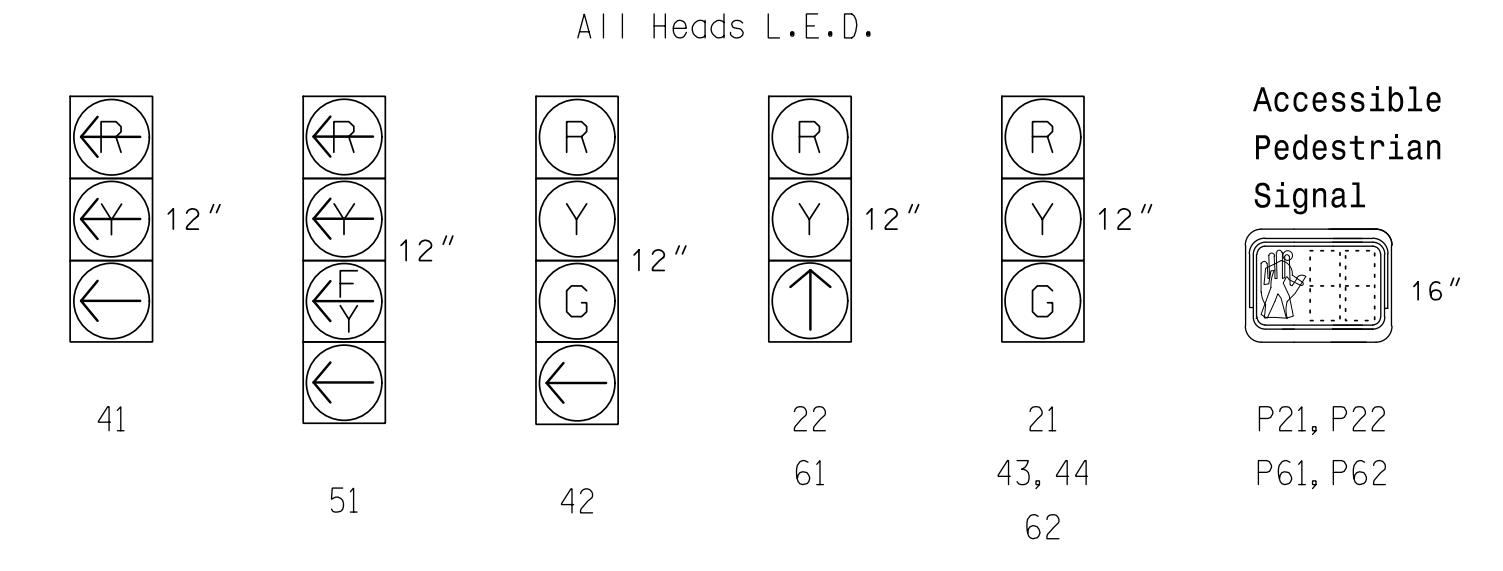
PHASING DIAGRAM



EV PREEMPT PHASES (Medium Priority)



SIGNAL FACE I.D.



LOOP & DETECTOR UNIT INSTALLATION CHART

Table with columns: LOOP/ZONE, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, PHASE, SWITCH (PHASE), DELAY TIME, STRETCH TIME, CALLING, EXTENSION, ADDED INIT., SYSTEM LOOP, NEW CARD. Includes rows for zones 2A*, 2B*, 4A, 4B, 4C, 5A, 6A, 6B.

3 Phase Fully Actuated (Greensboro Signal System)

NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
10. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

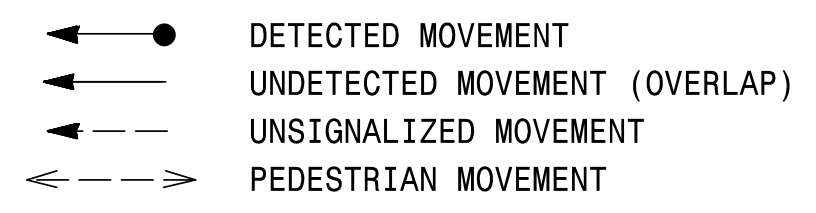
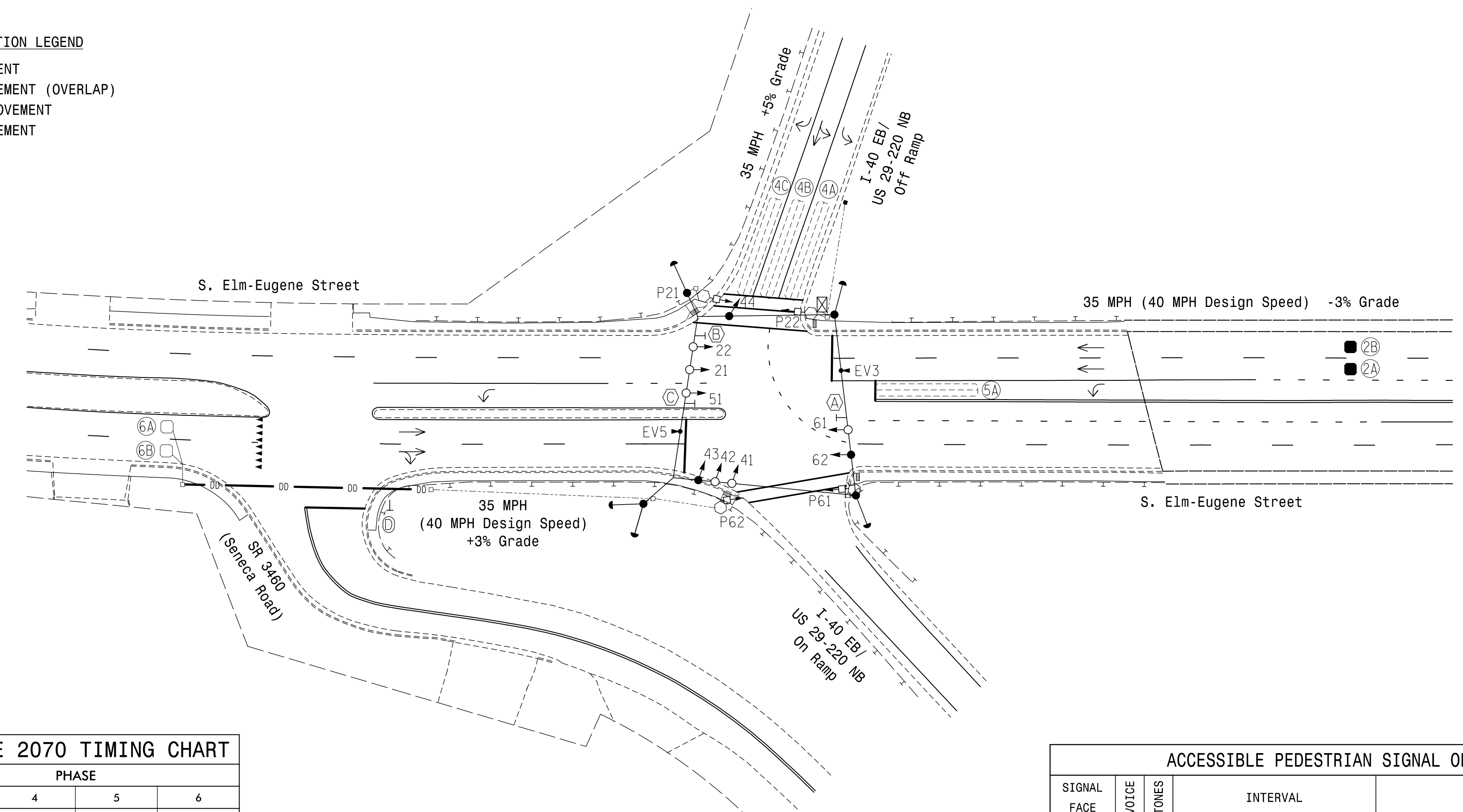


TABLE OF OPERATION

Table with columns: SIGNAL FACE, PHASE (02+5, 02+6, 04, PRE 3, PRE 5, FLSH), and rows for signal faces 21, 22, 41, 42, 43, 44, 51, 61, 62, P21, P22, P61, P62.



TRAFFICWARE APOGEE 2070 TIMING CHART

Timing chart table with columns: FEATURE, PHASE (2, 4, 5, 6), and rows for Min Green, Gap, Extension, Maximum Green 1, Maximum Green 2, Yellow Clear, Red Clear, Walk, Pedestrian Clear, Green/Ped Delay, Added Initial, Maximum Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Recall Mode, Lock Calls, Dual Entry, Simultaneous Gap.

* 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.

EMERGENCY VEHICLE PREEMPTION

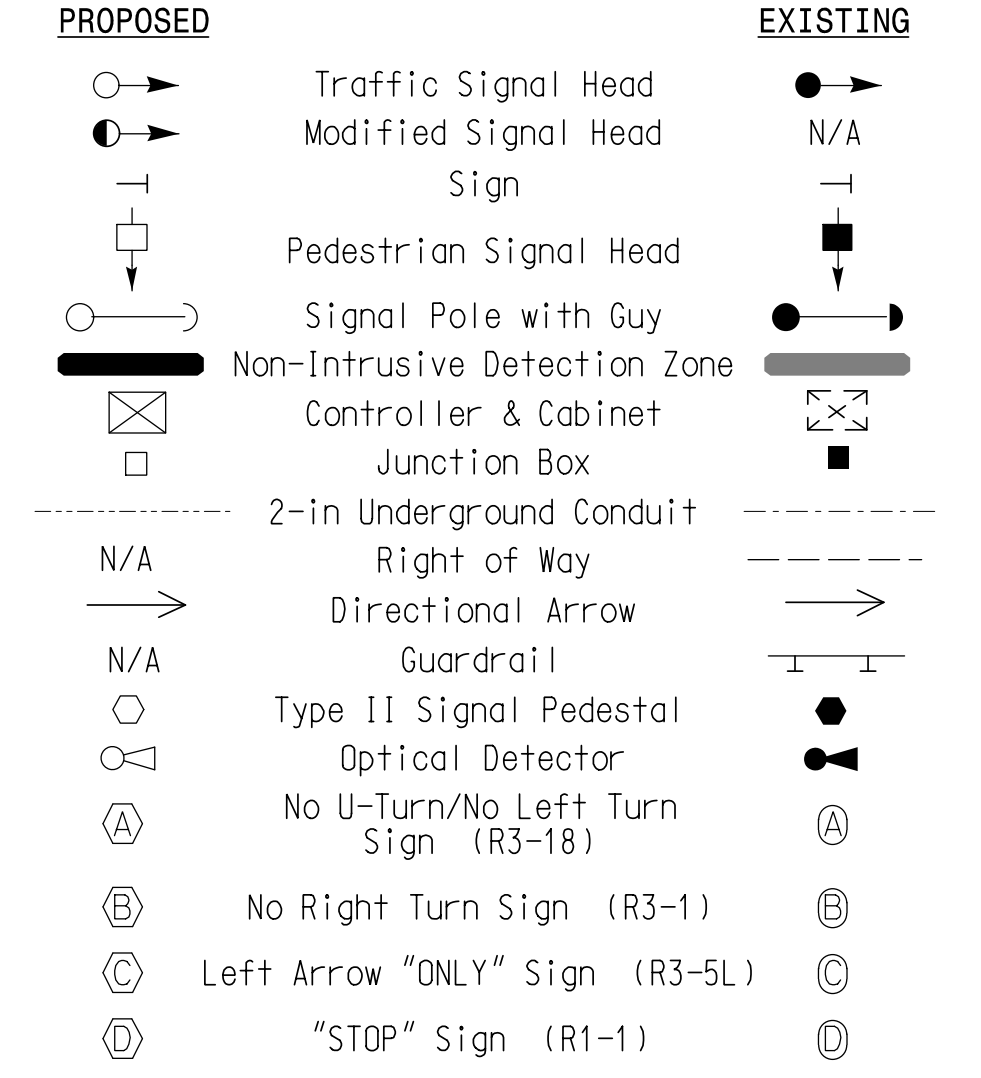
Table with columns: FUNCTION, PRE 3, PRE 5, and rows for Delay Before Preempt, Minimum Duration, Min Green Before Preempt, Min Walk Before Preempt, Ped Clear Before Preempt, Minimum Dwell, Exit Ped Clear, Exit Yellow Change, Exit Red Clear, Enter Yellow Change, Enter Red Clear, All-Red B4 Preempt, Lock Input, Override Higher # Preempt, Exit Preempt To.

* Time defaults to time used for phase during normal operation.

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

Table with columns: SIGNAL FACE, VOICE TONES, INTERVAL, SPEECH MESSAGE, and rows for P21, P22, P61, P62.

LEGEND



STV Engineers, Inc. logo and address: 2151 Hawkins St., Suite 1400, Charlotte, NC 28203, (704) 372-1885, NC License Number F-0991

Signal Upgrade

Professional Engineer seal for Trent M. Moody, State of North Carolina, License No. 45414, dated 10/10/2025.

Project information: S. Elm-Eugene Street at I-40 EB/US 29-220 NB Ramps, Division 7, Guilford County, Greensboro, NC. Plan Date: October 2025. Prepared by: J.C. Grimm. Reviewed by: T.M. Moody.

Document not considered final unless all signatures completed. Includes seal and signature of Trent M. Moody, dated 10/10/2025.

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

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

GREEN DELAY PROGRAMMING DETAIL FOR LEADING PEDESTRIAN INTERVAL OPERATION

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-1

Channel & I/O		
1. Times	4. Ring, Start, Concur	7. Times+
2. Options	5. Call, Inh, Redirect	8. Copy
3. Options+	6. Alt Progs+	9. AdvWarn

PRESS "+" KEY ONCE

Options+	P..1..2..3..4..5..6..7.8 >
Ped Delay -	. . . . .
Red Rest On Gap	. . . . .
Conflicting P	0 0 0 0 0 0 0 0
Grn/Ped Delay	0 0 0 0 0 6 0 0
Omit Yel, Yel P	0 0 0 0 0 0 0 0
Ped Out/OvrIp P	0 0 0 0 0 0 0 0
StartYel, Next P	+ 0 0 0 0 0 0 0 0

CHANNEL & I/O PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR OVERLAP C *

(program controller as shown below)

* NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

Overlaps

1. General Parm
2. Program
3. Status

General Overlap Parameters

Lock Inhibit OFF
Conf Lock Enable OFF
Parent P Clns ON
Extra Included Phases OFF
InhibitLockInterval ALWAYS

PRESS "ESC"

Overlaps

1. General Parm
2. Program
3. Status

Enter Overlap # 3
then press Enter

Overlap C-3

1. Program Parm
2. Conf Prog+
3. Program Parm+

OvrIp C-3	Ps.....
Included Ps	5 0 0 0 0 0 0 0
Modifier Ps	6 0 0 0 0 0 0 0
Type:FYA-4	Grn: 0 Yel: 3.5 Red: 1.5

END OF OVERLAP PROGRAMMING DETAIL

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0285
DESIGNED: October 2025
SEALED: 10/10/2025
REVISED:

STV Engineers, Inc.
2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

Signal Upgrade
Electrical Detail - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

S. Elm-Eugene Street
at
I-40 EB/US 29-220 NB Ramps

Division 7 Guilford County Greensboro

PLAN DATE: October 2025 REVIEWED BY: T.M. Moody

PREPARED BY: J.C. Grimm REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

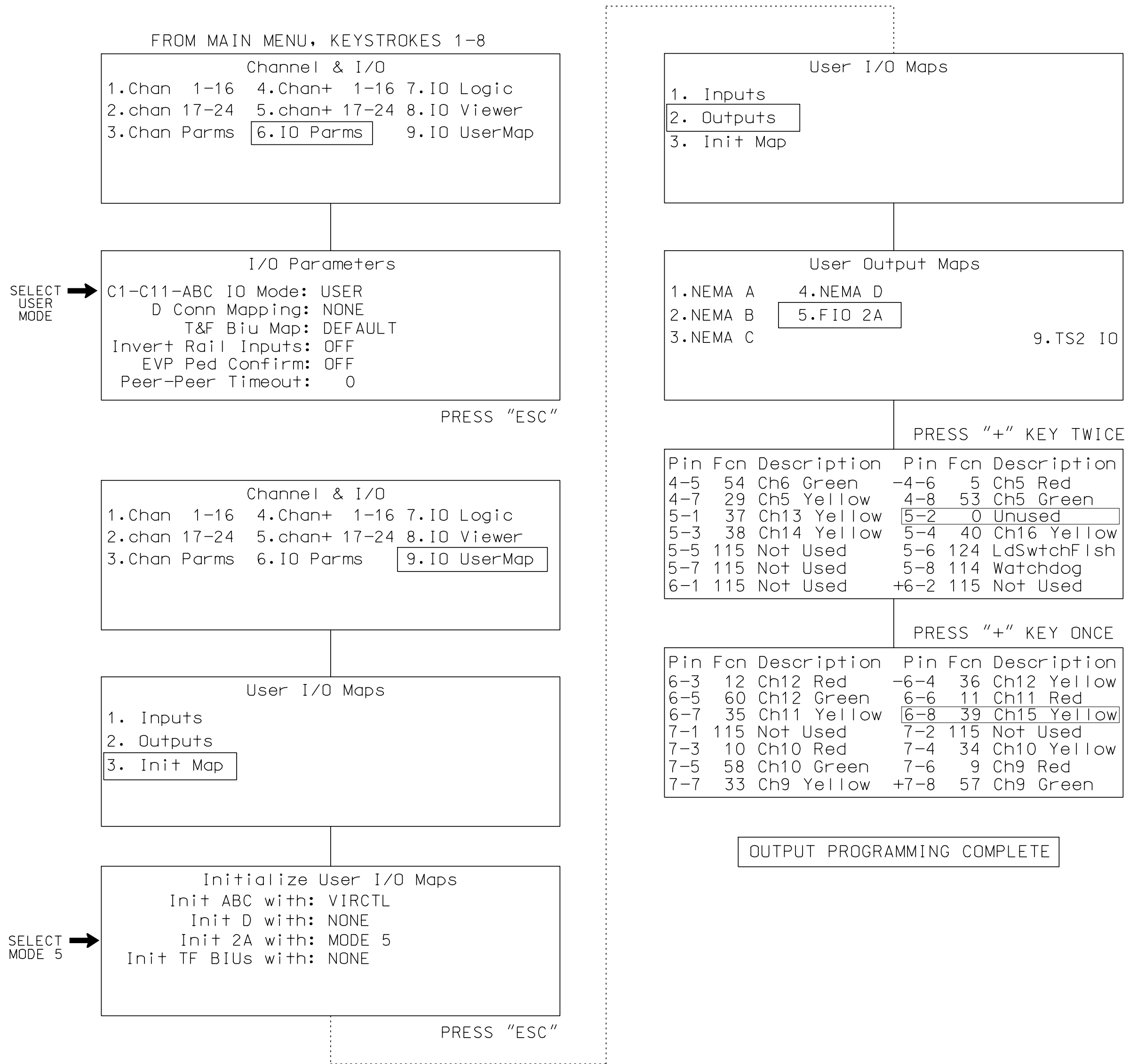
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45EATD8830704ED 10/10/2025
SIGNATURE DATE

SIG. INVENTORY NO. 07-0285

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.



Pin 5-2 (C1 pin 36) = Load Switch S9-Y
 Pin 6-8 (C1 pin 90) = Load Switch AUX S4-G

! Press the "*" key to return to Main Menu. Now
 o go back to "RUN-ENABLE STATUS" and switch to "ON".

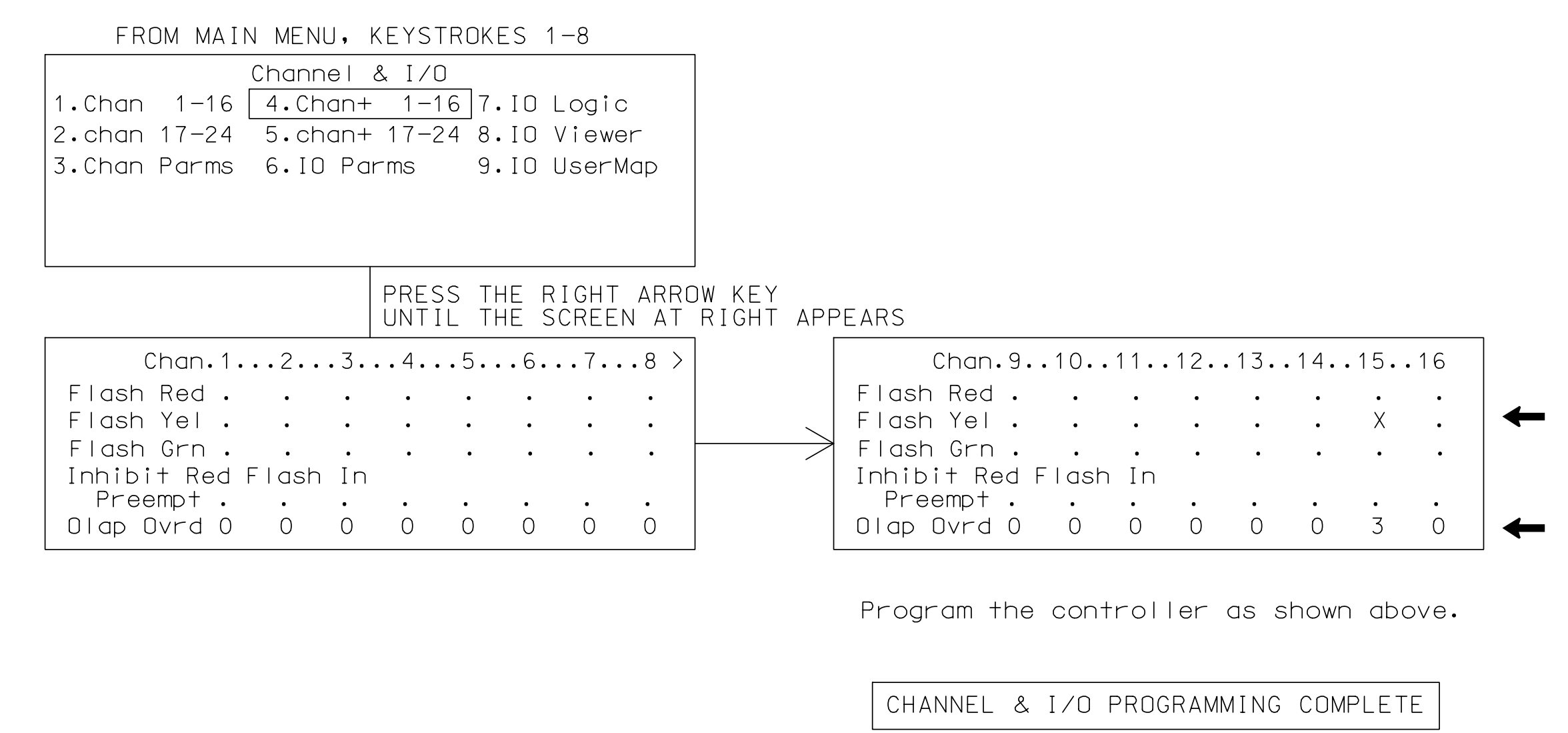
NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.



Programming notes:

Pin	Default Fcn Description	Change To: Fcn Description
5-2	39 Ch15 Yellow	0 Unused

Programming notes:

Pin	Default Fcn Description	Change To: Fcn Description
6-8	59 Ch11 Green	39 Ch15 Yellow

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0285
 DESIGNED: October 2025
 SEALED: 10/10/2025
 REVISED:

Signal Upgrade
 Electrical Detail - Sheet 3 of 5



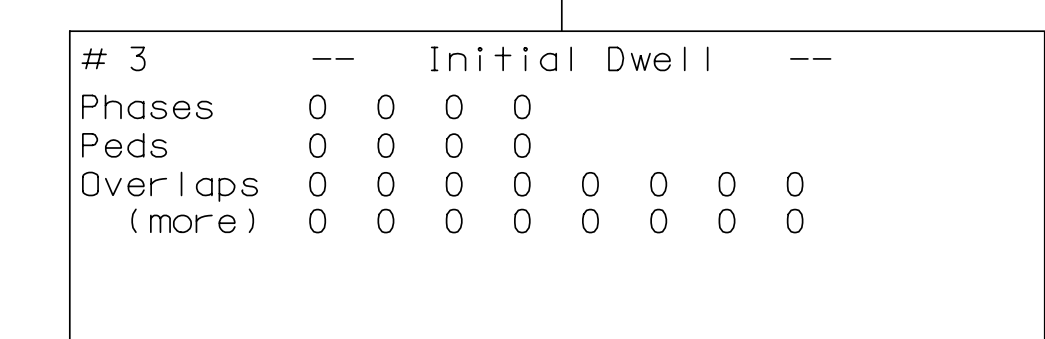
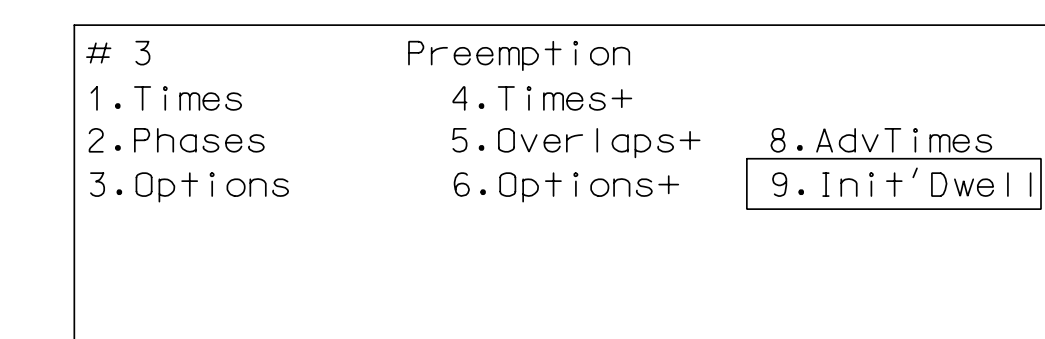
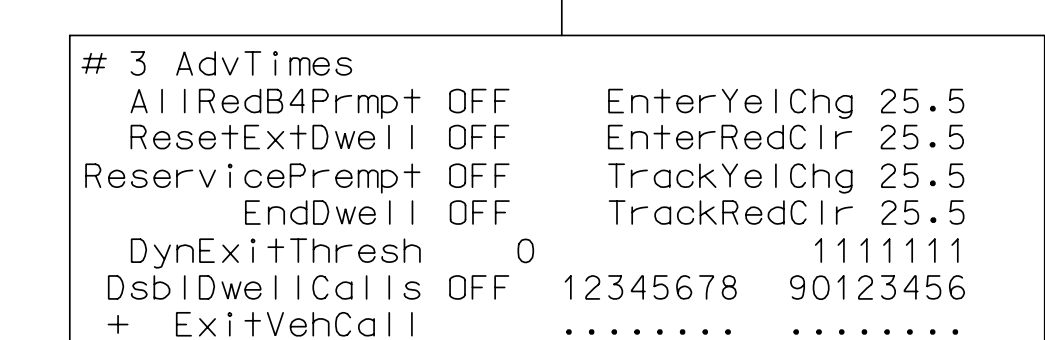
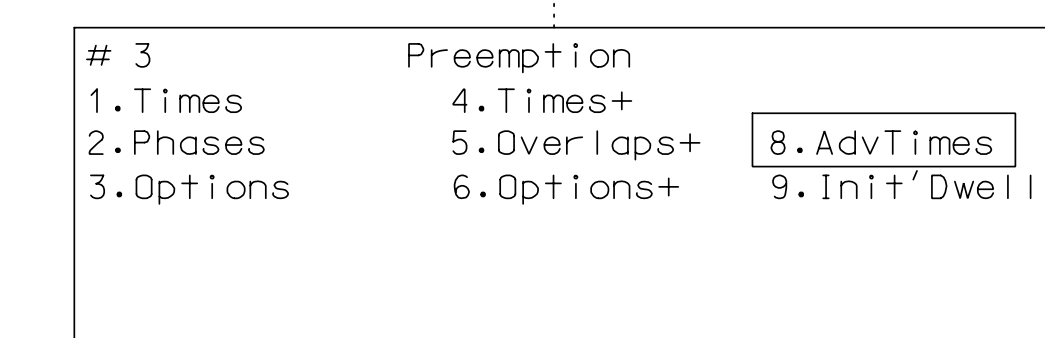
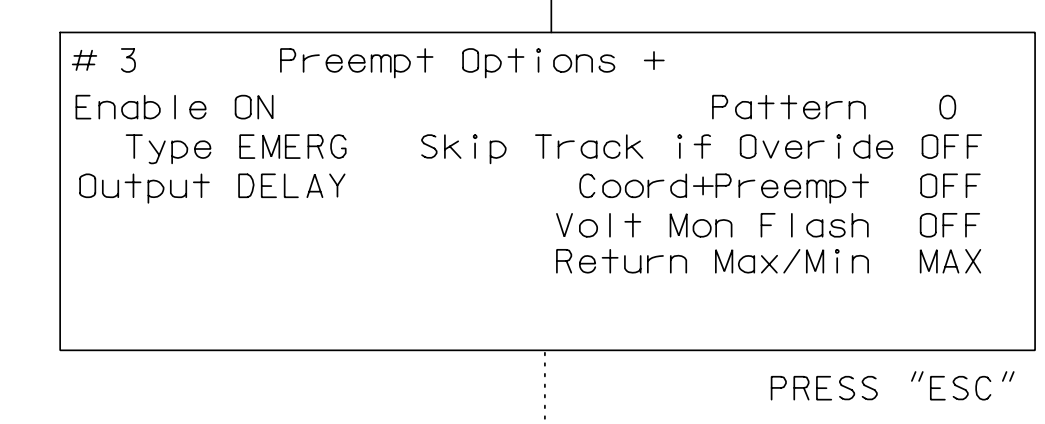
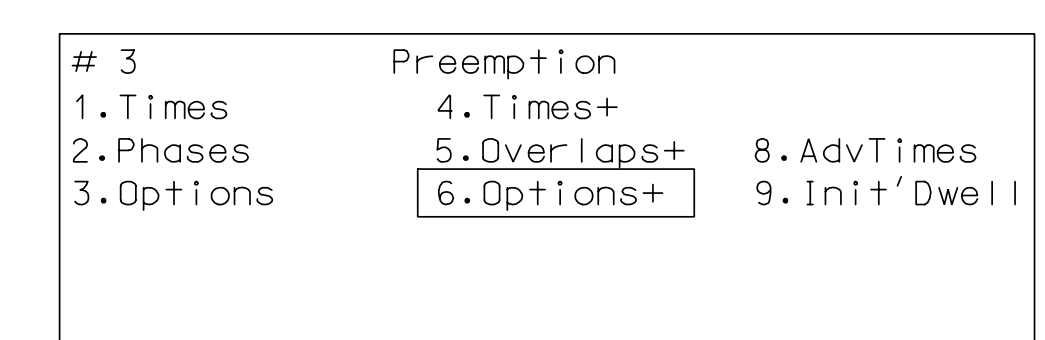
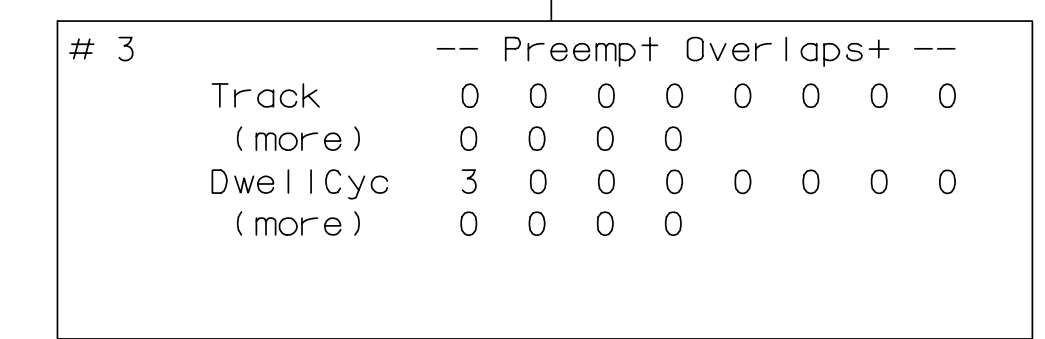
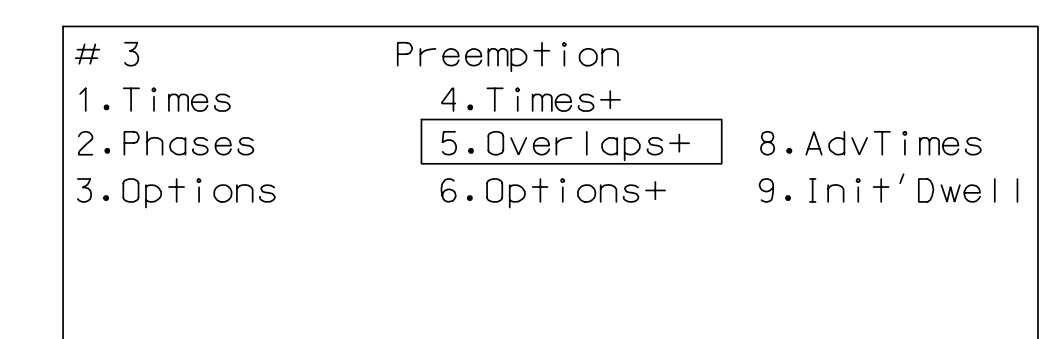
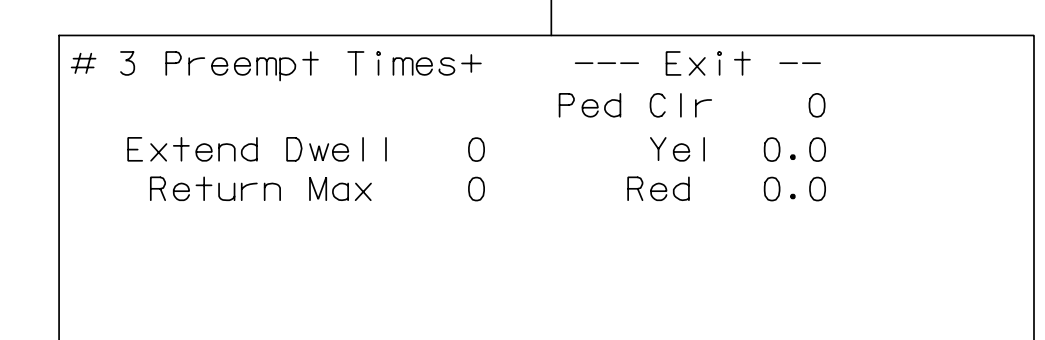
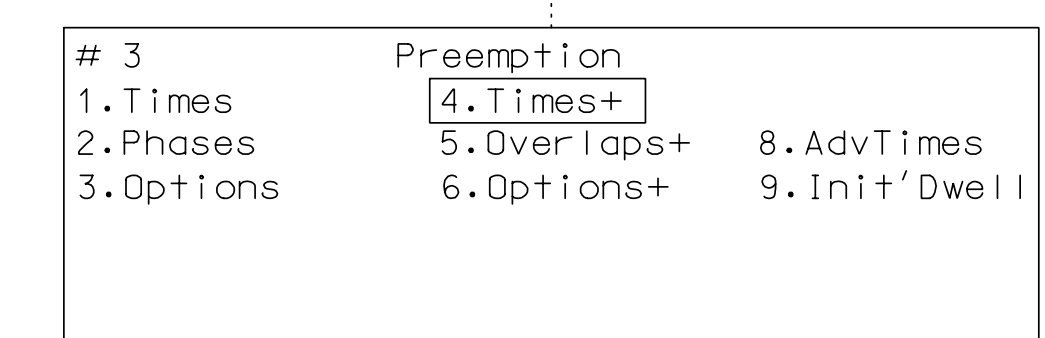
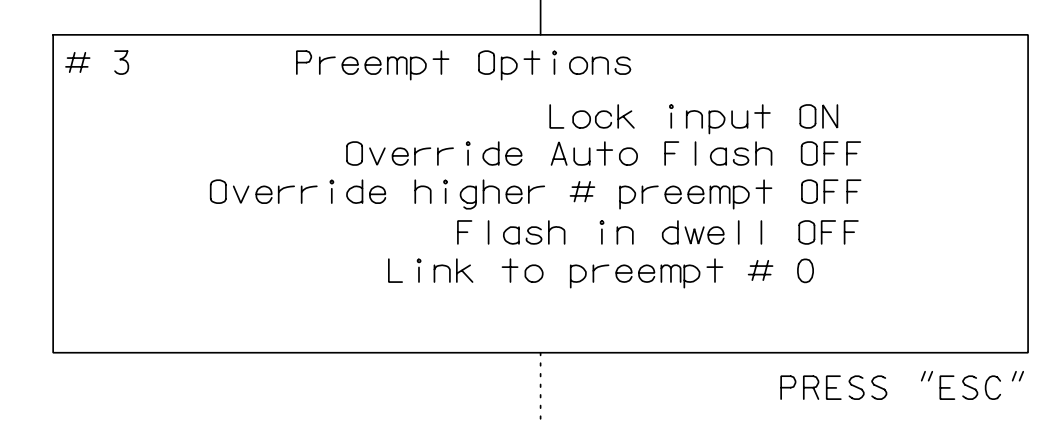
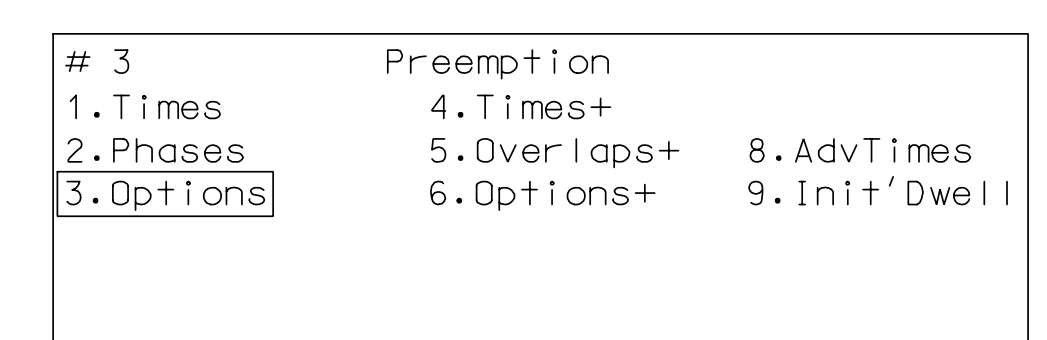
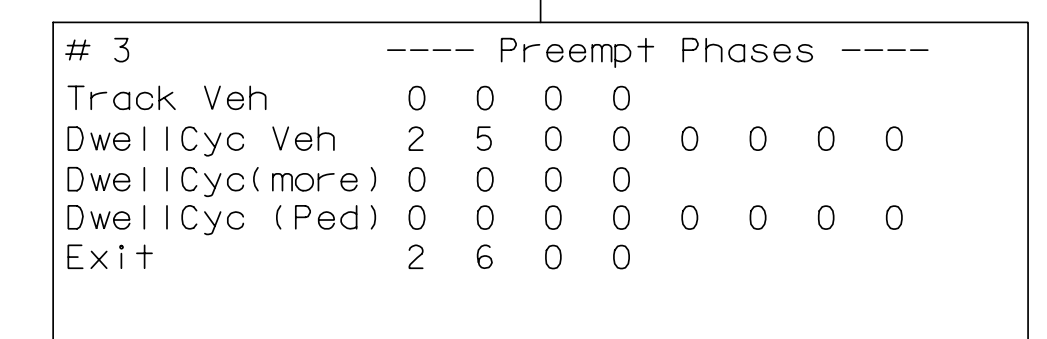
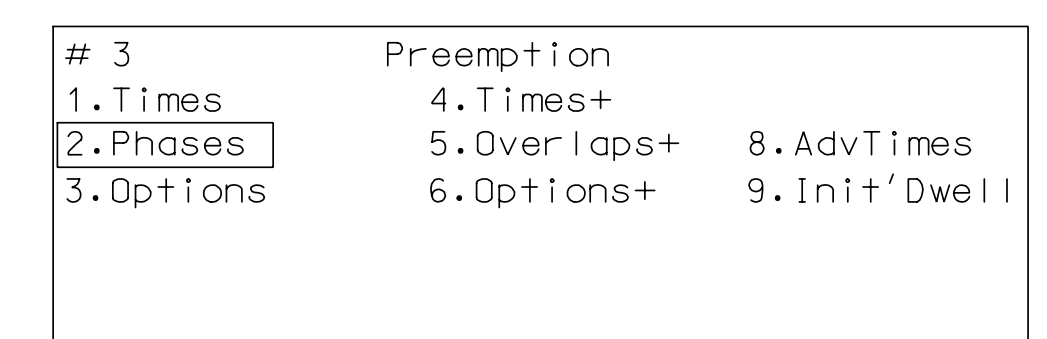
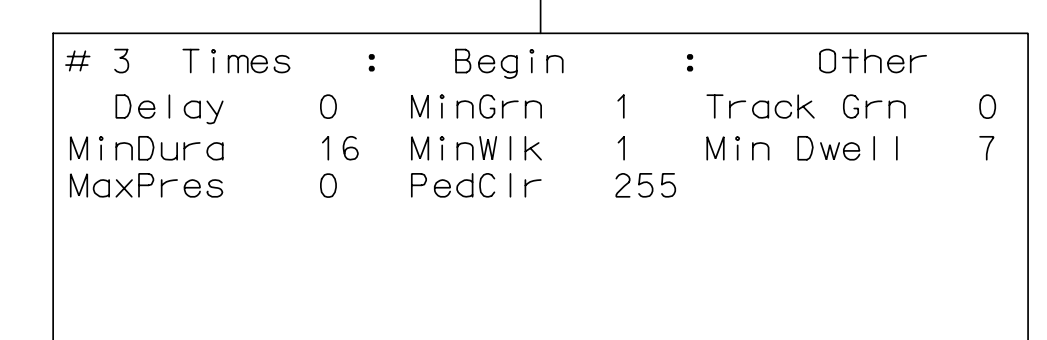
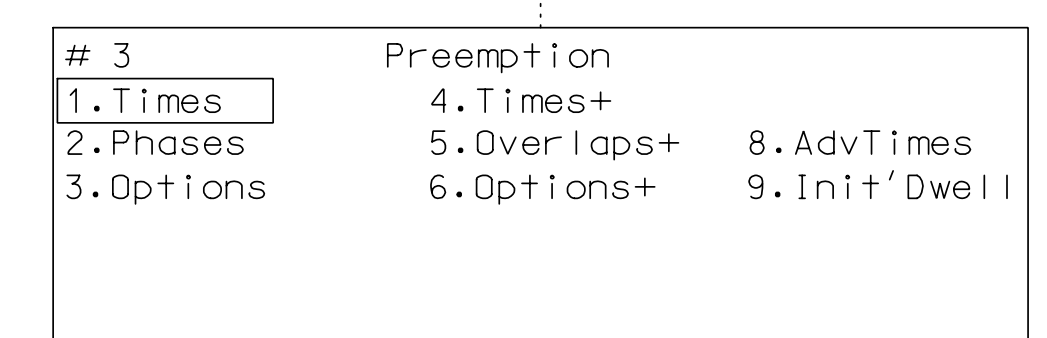
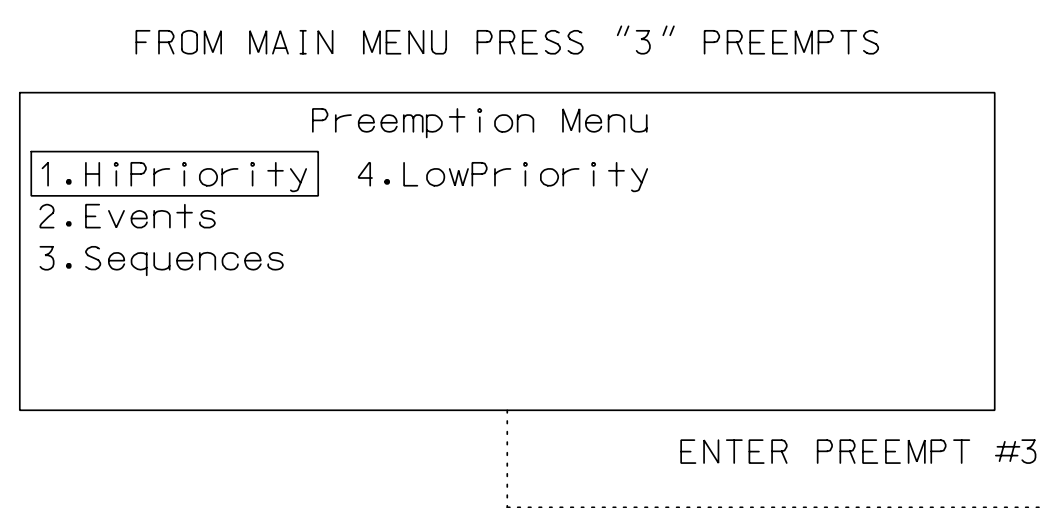
S. Elm-Eugene Street at I-40 EB/US 29-220 NB Ramps	
Division 7	Guilford County Greensboro
PLAN DATE: October 2025	REVIEWED BY: T.M. Moody
PREPARED BY: J.C. Grimm	REVIEWED BY:
REVISIONS	INIT. DATE

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 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 040329
 T.M. MOODY
 DocuSign
 T.M. Moody
 10/10/2025
 SIGNATURE DATE
 SIG. INVENTORY NO. 07-0285

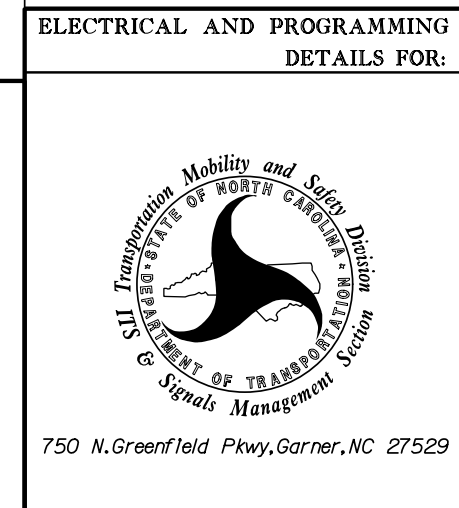
EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 3'

(program controller as shown below)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0285
DESIGNED: October 2025
SEALED: 10/10/2025
REVISED:

Signal Upgrade
Electrical Detail - Sheet 4 of 5



S. Elm-Eugene Street at I-40 EB/US 29-220 NB Ramps	
Division 7	Guilford County Greensboro
PLAN DATE: October 2025	REVIEWED BY: T.M. Moody
PREPARED BY: J.C. Grimm	REVIEWED BY:
REVISIONS	INIT. DATE

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NORTH CAROLINA
PROFESSIONAL
ENGINEER

SEAL
040329

T.M. MOODY

Trent Moody

10/10/2025

DATE

SIGNATURE

SIG. INVENTORY NO. 07-0285

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 5'
(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS

Preemption Menu
1.HiPriority 4.LowPriority
2.Events
3.Sequences

ENTER PREEMPT #5

5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell

5 Times : Begin : Other
Delay 0 MinGrn 1 Track Grn 0
MinDura 16 MinWlk 1 Min Dwell 7
MaxPres 0 PedClr 255

PRESS "ESC"

5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell

5 ---- Preempt Phases ----
Track Veh 0 0 0 0
DwellCyc Veh 2 6 0 0 0 0 0
DwellCyc(more) 0 0 0 0
DwellCyc (Ped) 0 0 0 0 0 0 0
Exit 2 6 0 0

PRESS "ESC"

5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell

5 Preempt Options
Lock input ON
Override Auto Flash OFF
Override higher # preempt OFF
Flash in dwell OFF
Link to preempt # 0

PRESS "ESC"

5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell

5 Preempt Times+ --- Exit ---
Extend Dwell 0 Ped Clr 0
Return Max 0 Red 0.0

PRESS "ESC"

5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell

5 -- Preempt Overlaps+ --
Track 0 0 0 0 0 0 0
(more) 0 0 0 0
DwellCyc 3 0 0 0 0 0 0
(more) 0 0 0 0

PRESS "ESC"

5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell

5 Preempt Options +
Enable ON Pattern 0
Type EMERG Skip Track if Override OFF
Output DELAY Coord+Preempt OFF
Volt Mon Flash OFF
Return Max/Min MAX

PRESS "ESC"

5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell

5 AdvTimes
AllRedB4Prmpt OFF EnterYelChg 25.5
ResetExtDwell OFF EnterRedClr 25.5
ReservicePreempt OFF TrackYelChg 25.5
EndDwell OFF TrackRedClr 25.5
DynExitThresh 0 1111111
DsbIDwellCalls OFF 12345678 90123456
+ ExitVehCall

PRESS "ESC"

5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell

5 -- Initial Dwell --
Phases 0 0 0 0
Peds 0 0 0 0
Overlaps 0 0 0 0 0 0 0
(more) 0 0 0 0 0 0 0

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0285
DESIGNED: October 2025
SEALED: 10/10/2025
REVISED:

Signal Upgrade
Electrical Detail - Sheet 5 of 5

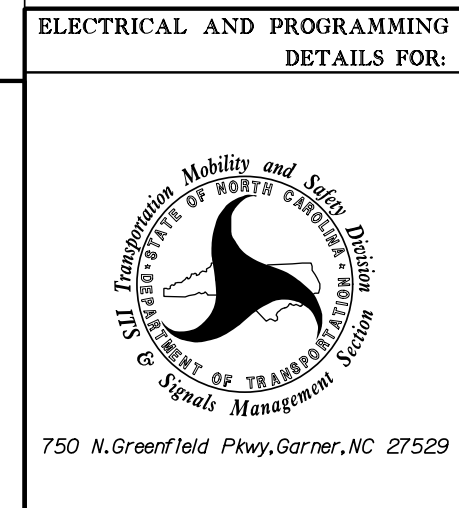
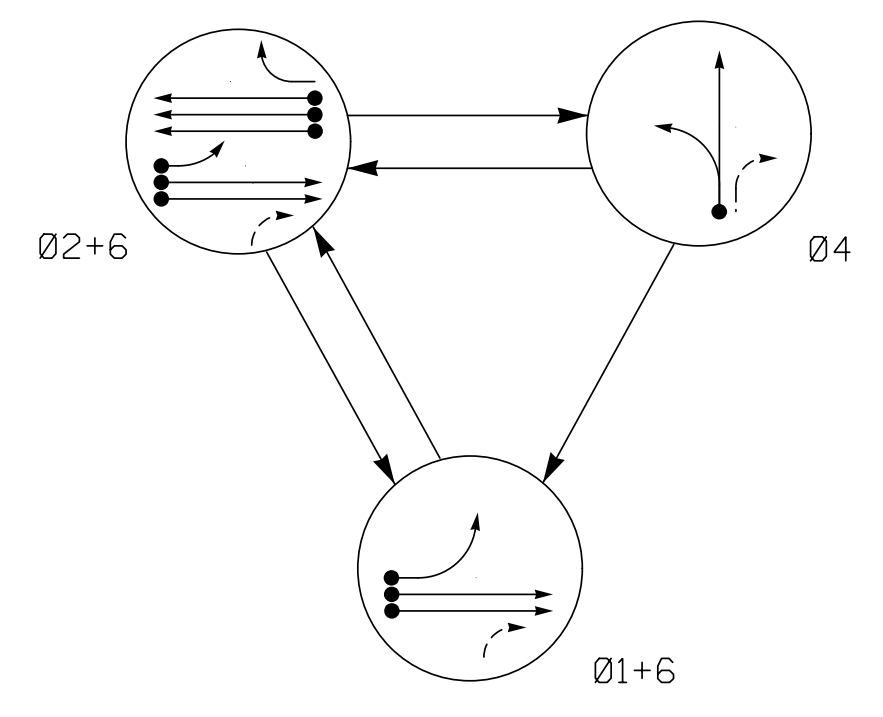


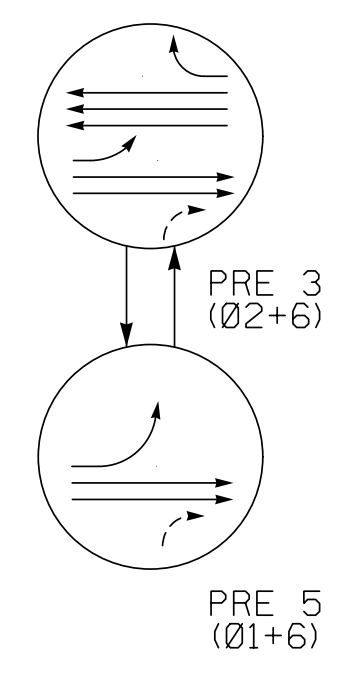
Table with project details: S. Elm-Eugene Street at I-40 EB/US 29-220 NB Ramps, Division 7, Guilford County, Greensboro, Plan Date: October 2025, Prepared by: J.C. Grimm, Reviewed by: T.M. Moody

Professional Engineer seal for Trent M. Moody, License No. 040329, dated 10/10/2025. Includes text: DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PHASING DIAGRAM

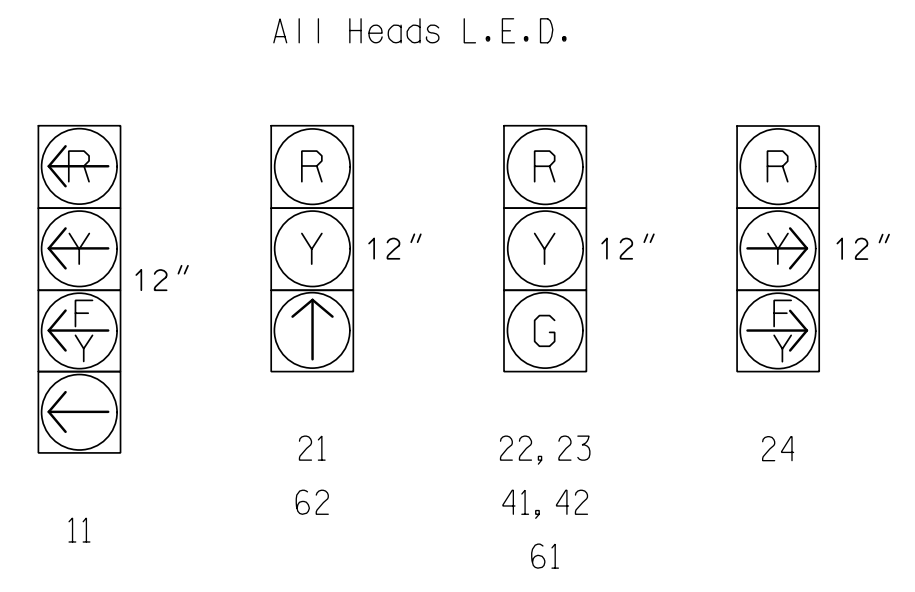


EV PREEMPT PHASES (Medium Priority)



SIGNAL FACE	PHASE							
	01+6	02+6	04	PRE 3	PRE 5	PRE 6	PRE 7	PRE 8
11	←	←	←	←	←	←	←	←
21	R	↑	R	↑	R	↑	R	↑
22, 23	R	G	R	G	R	G	R	G
24	R	←	R	←	R	←	R	←
41, 42	R	R	G	R	R	G	R	R
61	G	G	R	G	G	R	G	G
62	↑	↑	R	↑	↑	R	↑	↑

SIGNAL FACE I.D.



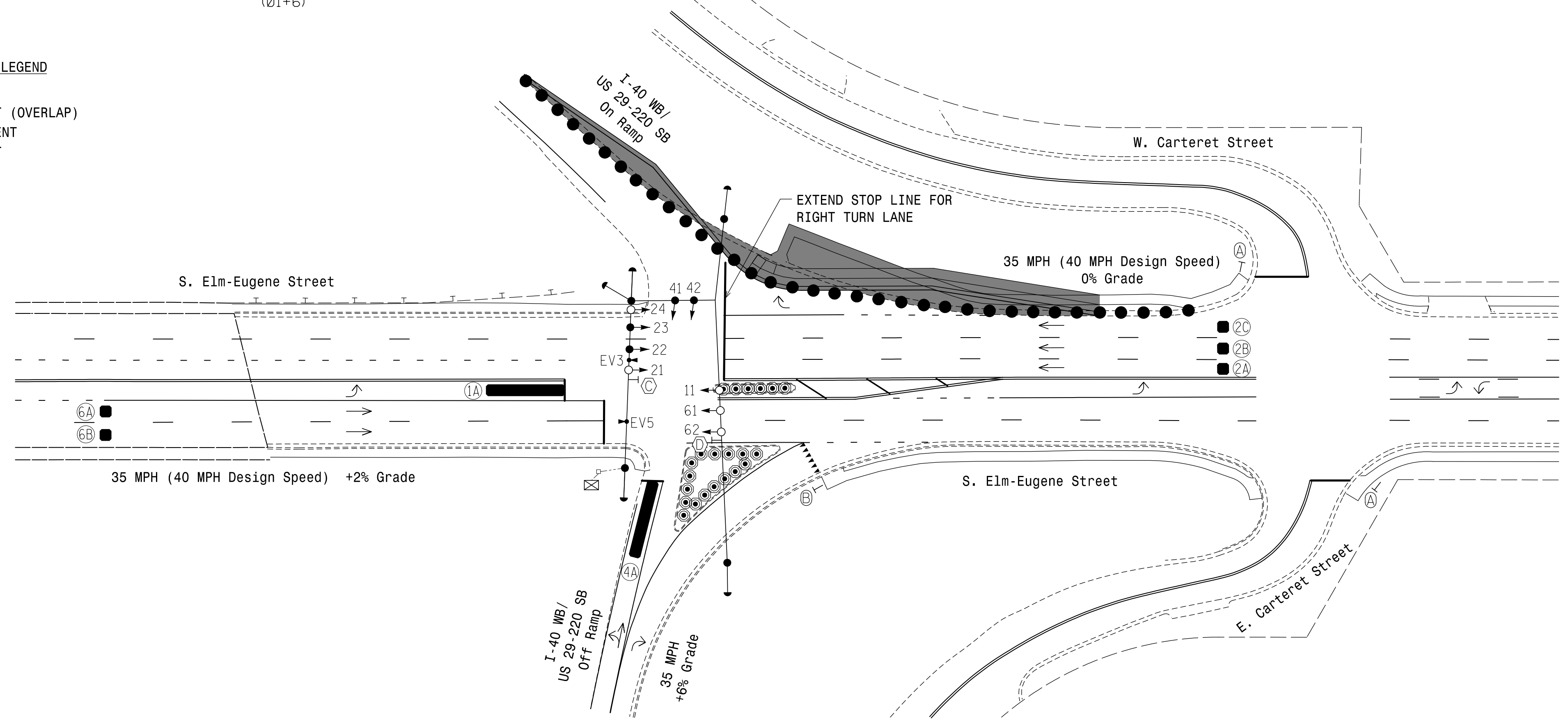
LOOP & DETECTOR UNIT INSTALLATION CHART
TRAFFICWARE APOGEE SOFTWARE 2070 CONTROLLER

LOOP / ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION ADDED INIT.	SYSTEM LOOP	NEW CARD
1A*	6X40	0	*	*	1	-	15.0	-	X	X	-	*
2A*	6X6	250	*	*	2	-	-	-	X	X	X	*
2B*	6X6	250	*	*	2	-	-	-	X	X	X	*
2C*	6X6	250	*	*	2	-	-	-	X	X	X	*
4A*	6X40	0	*	*	4	-	-	-	X	X	-	*
6A*	6X6	250	*	*	6	-	-	-	X	X	X	*
6B*	6X6	250	*	*	6	-	-	-	X	X	X	*

*Video Detection Zone

PHASING DIAGRAM DETECTION LEGEND

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



3 Phase Fully Actuated (Greensboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing unless otherwise noted.
7. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

TRAFFICWARE APOGEE 2070 TIMING CHART

FEATURE	PHASE			
	1	2	4	6
Min Green *	7	10	7	10
Gap, Extension *	2.0	6.0	2.0	6.0
Maximum Green 1 *	20	90	30	90
Maximum Green 2 *	-	-	-	-
Yellow Clear	3.0	3.8	3.5	3.8
Red Clear	2.9	2.2	2.0	2.2
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
GreenPed Delay	-	-	-	-
Added Initial *	-	1.0	-	1.5
Maximum Initial *	-	29	-	29
Time Before Reduction *	-	15	-	15
Time To Reduce *	-	30	-	30
Minimum Gap	-	3.0	-	3.0
Recall Mode	-	MIN RECALL	-	MIN RECALL
Lock Calls	NO	YES	NO	YES
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

EMERGENCY VEHICLE PREEMPTION

FUNCTION	PRE 3	PRE 5
DELAY BEFORE PREEMPT	0	0
MINIMUM DURATION	16	16
MIN GREEN BEFORE PREEMPT	1	1
MIN WALK BEFORE PREEMPT	0	0
PED CLEAR BEFORE PREEMPT	255*	255*
MINIMUM DWELL	7	7
EXIT PED CLEAR	0	0
EXIT YELLOW CHANGE	0.0*	0.0*
EXIT RED CLEAR	0.0*	0.0*
ENTER YELLOW CHANGE	25.5*	25.5*
ENTER RED CLEAR	25.5*	25.5*
ALL-RED B4 PREEMPT	OFF	OFF
LOCK INPUT	ON	ON
OVERRIDE HIGHER # PREEMPT	OFF	OFF
EXIT PREEMPT TO	02+6	02+6

* Time defaults to time used for phase during normal operation.

LEGEND

- | PROPOSED | EXISTING |
|----------------------------------|----------------------------------|
| ○ → Traffic Signal Head | ● → Traffic Signal Head |
| ○ → Modified Signal Head | ○ → Modified Signal Head |
| ○ → Sign | ○ → Sign |
| ○ → Signal Pole with Guy | ○ → Signal Pole with Guy |
| ○ → Non-Intrusive Detection Zone | ○ → Non-Intrusive Detection Zone |
| □ → Controller & Cabinet | □ → Controller & Cabinet |
| □ → Junction Box | □ → Junction Box |
| N/A → Right of Way | N/A → Right of Way |
| → → Directional Arrow | → → Directional Arrow |
| N/A → Guardrail | N/A → Guardrail |
| ○ → Optical Detector | ○ → Optical Detector |
| ● → Cone or Skinny Drum | ● → Cone or Skinny Drum |
| ● → Drum | ● → Drum |
| ■ → Construction Zone | ■ → Construction Zone |
| (A) → "STOP" Sign (R1-1) | (A) → "STOP" Sign (R1-1) |
| (B) → "YIELD" Sign (R1-2) | (B) → "YIELD" Sign (R1-2) |
| (C) → No Left Turn Sign (R3-2) | (C) → No Left Turn Sign (R3-2) |
| (D) → No Right Turn Sign (R3-1) | (D) → No Right Turn Sign (R3-1) |

Signal Upgrade - Temporary Design

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Charlotte, NC 28203
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NC License Number F-0991

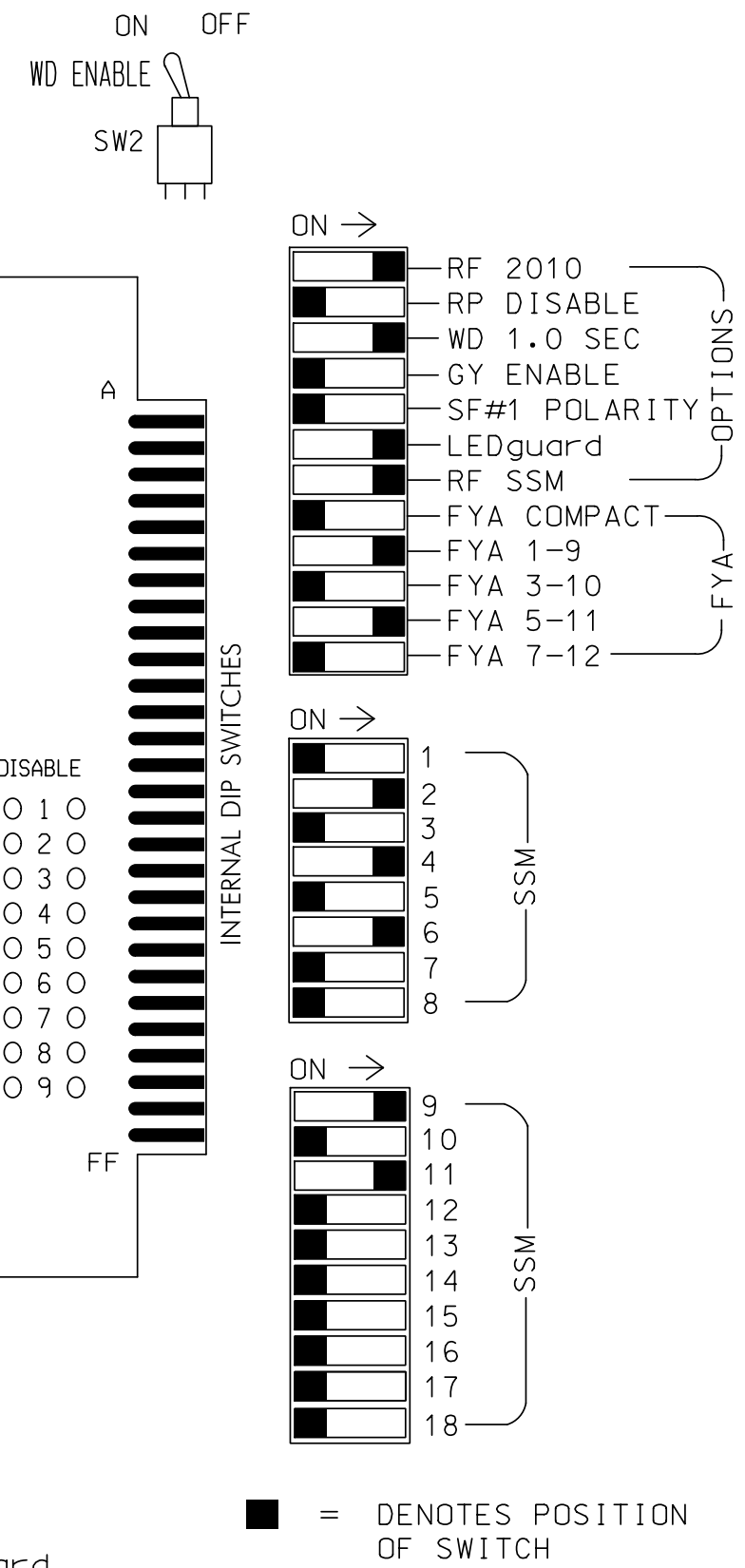
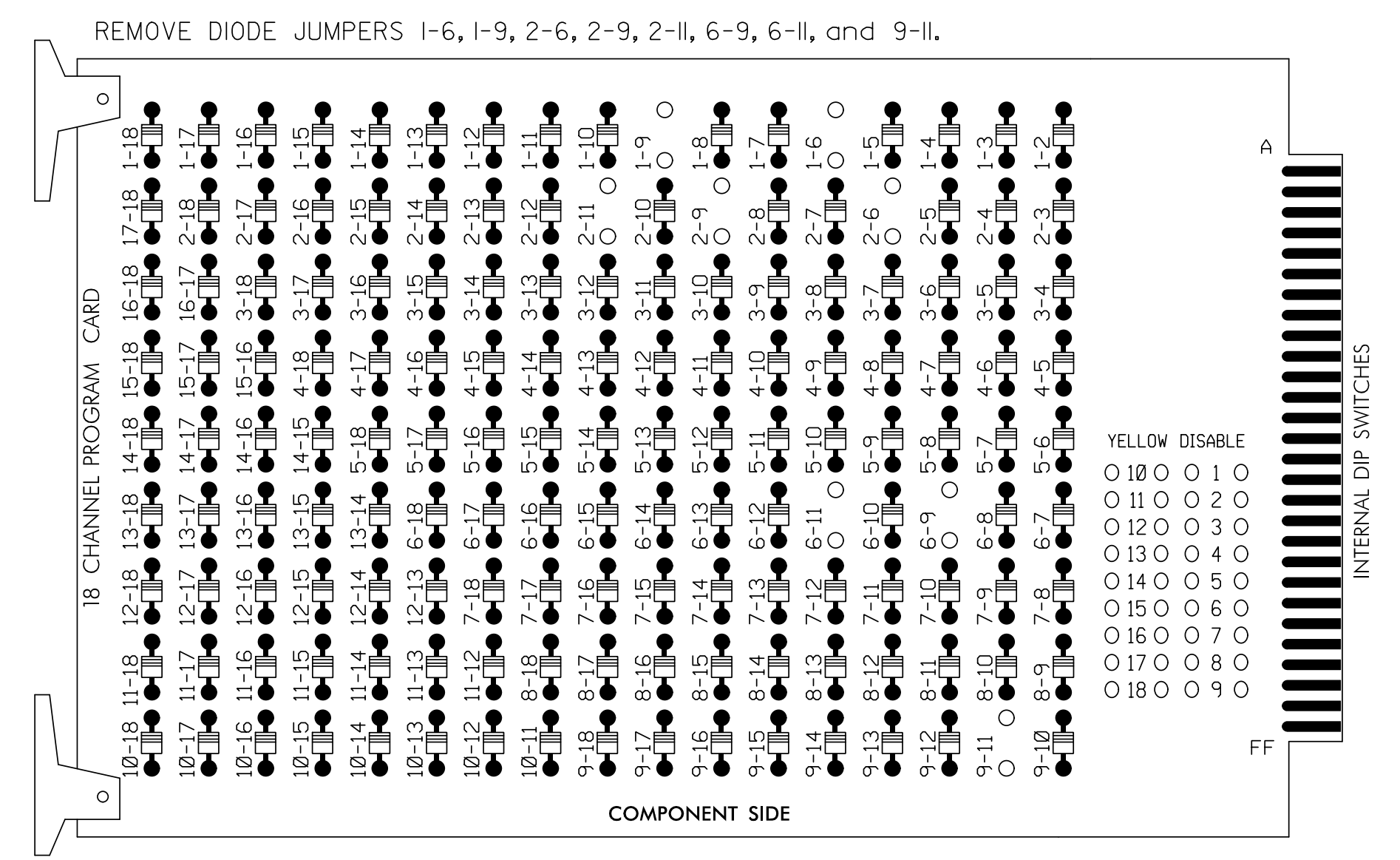
Prepared For the Offices of:
TRANSPORTATION MOBILITY AND SAFETY DIVISION
DEPARTMENT OF TRANSPORTATION
SIGNAL DESIGN SECTION
750 N. Greenfield Pkwy, Garner, NC 27529

S. Elm-Eugene Street at I-40 WB/US 29-220 SB Ramps
Division 7 Guilford County Greensboro
PLAN DATE: October 2025 REVIEWED BY: T.M. Moody
PREPARED BY: J.C. Grimm REVIEWED BY:
REVISIONS INIT. DATE

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Trent M. Moody
10/10/2025
107-0588T

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 Red Enable is active at all times during normal operation.
- Ensure Conflict Monitor Ethernet port is connected to a Switch port located within the cabinet.

NOTES

- 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 Plans.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
- Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
- Program phases 2 and 6 for Start Up In Green.
- Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
- Program "Start Red Time" to 6.0 sec.
- Ensure "Local Flash Start" feature is set to "RSt".
- Ensure "InhFYARedSt" feature is set to "ON".
- Ensure "Flash Mode" is set to "channel" (MM 1-4-1).
- Ensure all channels are programmed to flash Red (MM 1-8-1).
- Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:
FROM MAIN MENU->1->8->7 (I/O LOGIC)

Result Src.Fcn	TimeOp Time
I208 = 0I208	DLY 1
- The cabinet and controller are part of the Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

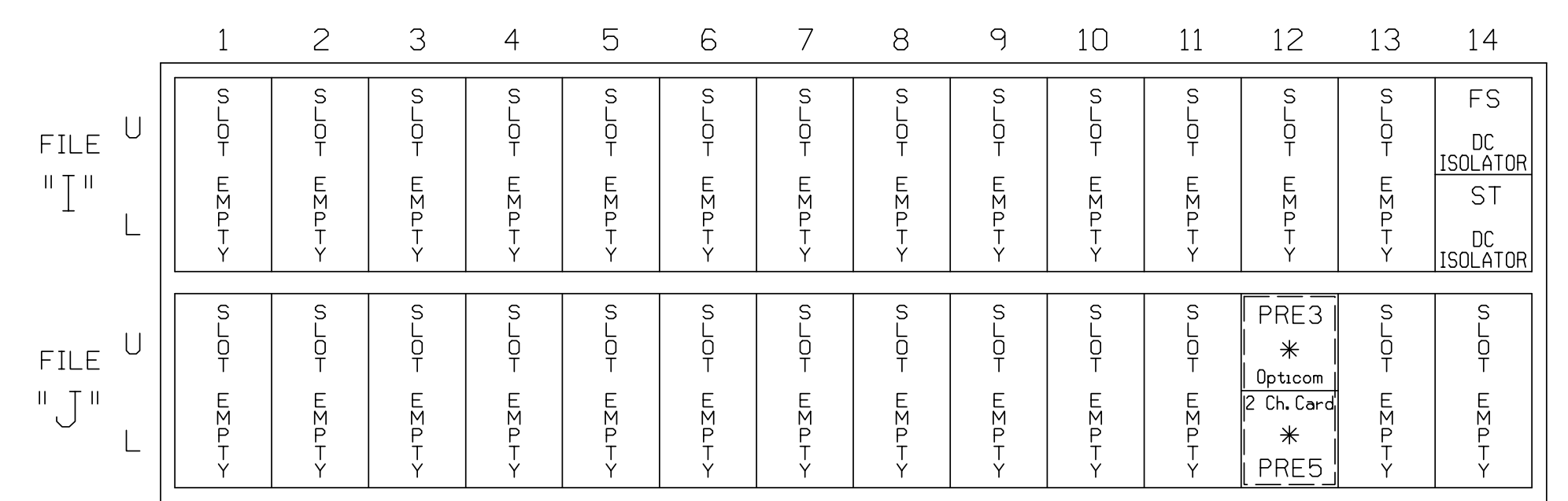
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21	22,23	NU	NU	41,42	NU	NU	61	62	NU	NU	NU	11	NU	NU	24	NU
RED		128	128			101			134	134								A114
YELLOW	*	129	129			102			135	135								
GREEN			130			103			136									
RED ARROW																		A121
YELLOW ARROW																		A122
FLASHING YELLOW ARROW																		A123
GREEN ARROW	127	130								136								A116
Hand																		
Person																		

NU = Not Used

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

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S
* See Opticom Field Wire Detail this sheet.

FS = FLASH SENSE
ST = STOP TIME
PRE3,5 = EV PREEPTS

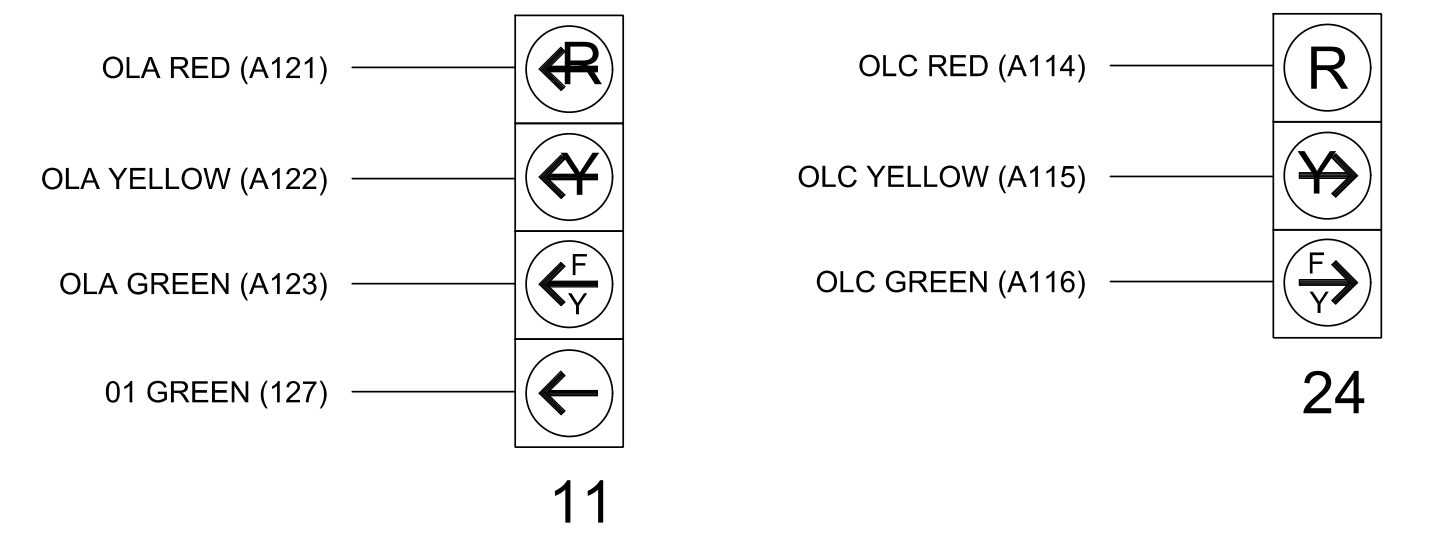
EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332 W/ AUX
 SOFTWARE.....TRAFFICWARE APOGEE
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S1,S2,S5,S8,AUX S1,AUX S4
 PHASES USED.....1,2,4,6
 OVERLAP A.....*
 OVERLAP B.....NOT USED
 OVERLAP C.....*
 OVERLAP D.....NOT USED

* See Sheet 2 of 5 for Overlap Programming Detail.

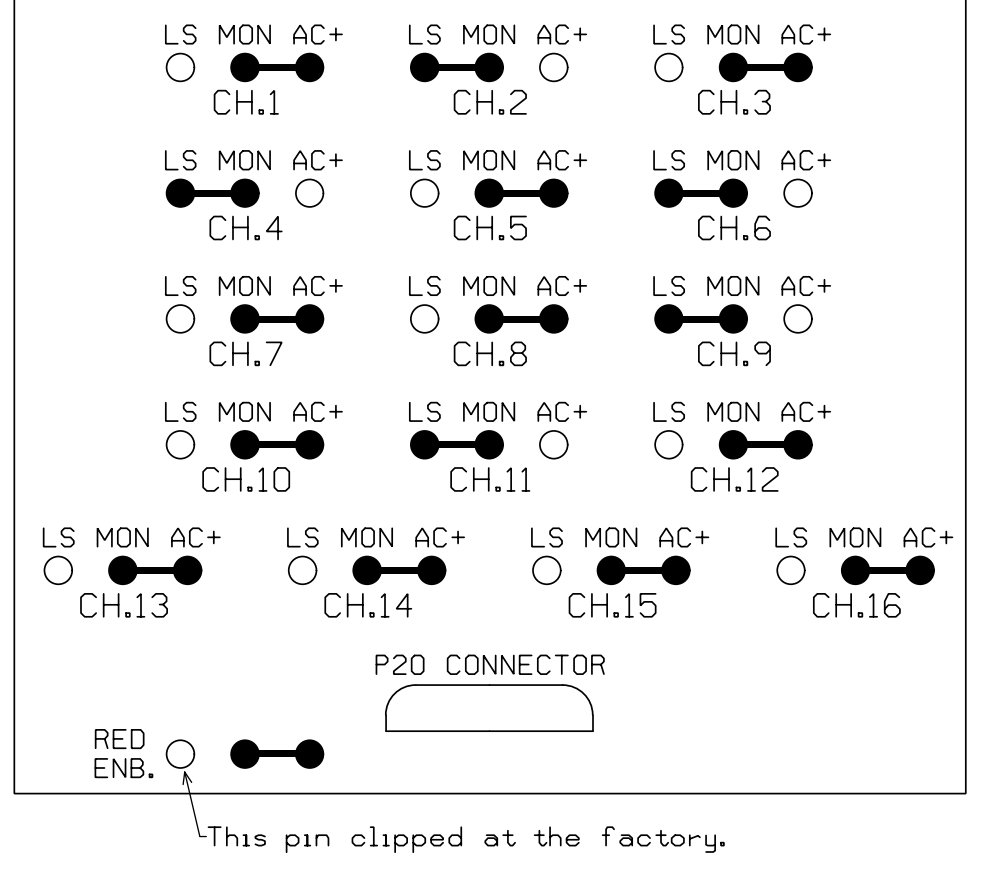
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



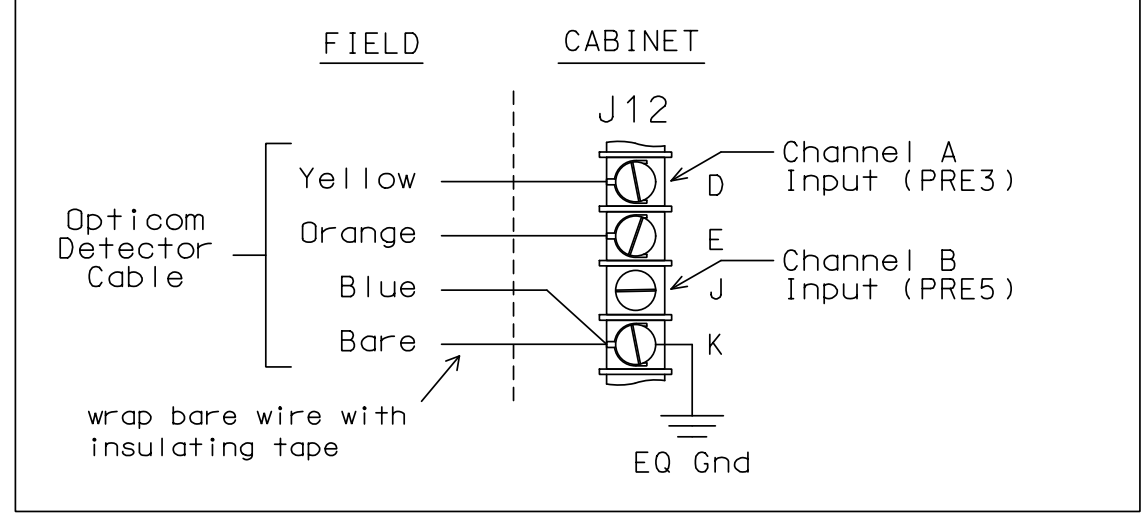
RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



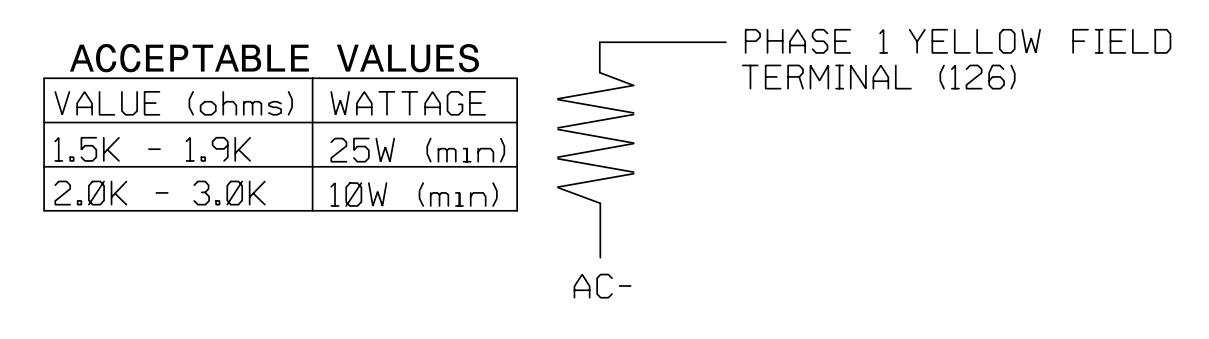
TYPICAL OPTICOM FIELD WIRE DETAIL

(input file, rear view)

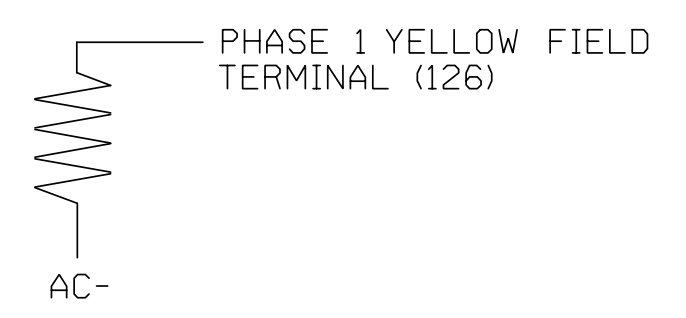


LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



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



VIDEO DETECTOR NOTE

Install a video detection system for vehicle detection for zones 1A, 2A, 2B, 2C, 4A, 6A, and 6B. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

Signal Upgrade - Temporary Design
Electrical Detail - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:



S. Elm Eugene Street
at
I-40 WB/US 29-220 SB Ramps

Division 7 Guilford County Greensboro

PLAN DATE: October 2025 REVIEWED BY: T.M. Moody

PREPARED BY: J.C. Grimm REVIEWED BY:

REVISIONS	INIT.	DATE

10/10/2025

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SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER

SEAL 040329

Trent M. Moody

10/10/2025

SIG. INVENTORY NO. 07-0588T

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 3'

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS

Preemption Menu

1.HiPriority 4.LowPriority
2.Events
3.Sequences

ENTER PREEMPT #3

```
# 3      Preemption
1.Times  4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
```

```
# 3 Times : Begin : Other
Delay 0 MinGrn 1 Track Grn 0
MinDura 16 MinWlk 0 Min Dwell 7
MaxPres 0 PedClr 255
```

PRESS "ESC"

```
# 3      Preemption
1.Times  4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
```

```
# 3      ---- Preempt Phases ----
Track Veh      0 0 0 0
DwellCyc Veh  2 6 0 0 0 0 0 0
DwellCyc(more) 0 0 0 0
DwellCyc (Ped) 0 0 0 0 0 0 0 0
Exit          2 6 0 0
```

PRESS "ESC"

```
# 3      Preemption
1.Times  4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
```

```
# 3      Preempt Options
Lock input ON
Override Auto Flash OFF
Override higher # preempt OFF
Flash in dwell OFF
Link to preempt # 0
```

PRESS "ESC"

```
# 3      Preemption
1.Times  4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
```

```
# 3 Preempt Times+ --- Exit ---
Ped Clr 0
Extend Dwell 0 Yel 0.0
Return Max 0 Red 0.0
```

PRESS "ESC"

```
# 3      Preemption
1.Times  4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
```

```
# 3      -- Preempt Overlaps+ --
Track      0 0 0 0 0 0 0 0
(more)     0 0 0 0
DwellCyc  1 3 0 0 0 0 0 0
(more)     0 0 0 0
```

PRESS "ESC"

```
# 3      Preemption
1.Times  4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
```

```
# 3      Preempt Options +
Enable ON Pattern 0
Type EMERG Skip Track if Override OFF
Output DELAY Coord+Preempt OFF
Volt Mon Flash OFF
Return Max/Min MAX
```

PRESS "ESC"

```
# 3      Preemption
1.Times  4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
```

```
# 3 AdvTimes
AllRedB4Prmpt OFF EnterYelChg 25.5
ResetExtDwell OFF EnterRedClr 25.5
ReservicePreempt OFF TrackYelChg 25.5
EndDwell OFF TrackRedClr 25.5
DynExitThresh 0 1111111
DsbIDwellCalls OFF 12345678 90123456
+ ExitVehCall .....
```

PRESS "ESC"

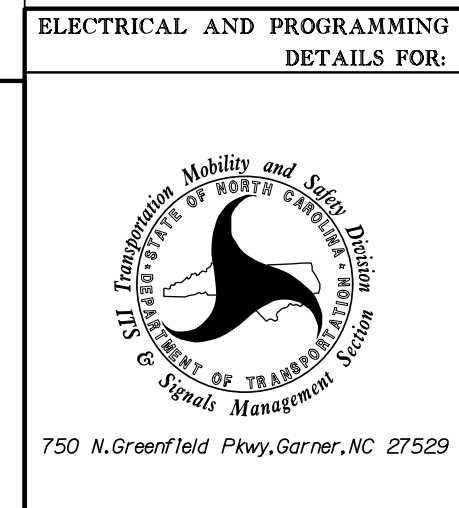
```
# 3      Preemption
1.Times  4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
```

```
# 3      -- Initial Dwell --
Phases 0 0 0 0
Peds 0 0 0 0
Overlaps 0 0 0 0 0 0 0 0
(more) 0 0 0 0 0 0 0 0
```

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0588T
DESIGNED: October 2025
SEALED: 10/10/2025
REVISED:

Signal Upgrade - Temporary Design
Electrical Detail - Sheet 4 of 5



S. Elm Eugene Street at I-40 WB/US 29-220 SB Ramps	
Division 7	Guilford County Greensboro
PLAN DATE: October 2025	REVIEWED BY: T.M. Moody
PREPARED BY: J.C. Grimm	REVIEWED BY:
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SIG. INVENTORY NO. 07-0588T	

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 5'

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS

```

Preemption Menu
1.HiPriority 4.LowPriority
2.Events
3.Sequences
    
```

ENTER PREEMPT #5

```

# 5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
    
```

```

# 5 Times : Begin : Other
Delay 0 MinGrn 1 Track Grn 0
MinDura 16 MinWlk 0 Min Dwell 7
MaxPres 0 PedClr 255
    
```

PRESS "ESC"

```

# 5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
    
```

```

# 5 ---- Preempt Phases ----
Track Veh 0 0 0 0
DwellCyc Veh 1 6 0 0 0 0 0 0
DwellCyc(more) 0 0 0 0
DwellCyc (Ped) 0 0 0 0 0 0 0 0
Exit 2 6 0 0
    
```

PRESS "ESC"

```

# 5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
    
```

```

# 5 Preempt Options
Lock input ON
Override Auto Flash OFF
Override higher # preempt OFF
Flash in dwell OFF
Link to preempt # 0
    
```

PRESS "ESC"

```

# 5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
    
```

```

# 5 Preempt Times+ --- Exit ---
Ped Clr 0
Extend Dwell 0 Yel 0.0
Return Max 0 Red 0.0
    
```

PRESS "ESC"

```

# 5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
    
```

```

# 5 -- Preempt Overlaps+ --
Track 0 0 0 0 0 0 0 0
(more) 0 0 0 0
DwellCyc 1 0 0 0 0 0 0 0
(more) 0 0 0 0
    
```

PRESS "ESC"

```

# 5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
    
```

```

# 5 Preempt Options +
Enable ON Pattern 0
Type EMERG Skip Track if Override OFF
Output DELAY Coord+Preempt OFF
Volt Mon Flash OFF
Return Max/Min MAX
    
```

PRESS "ESC"

```

# 5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
    
```

```

# 5 AdvTimes
AllRedB4Prmpt OFF EnterYelChg 25.5
ResetExtDwell OFF EnterRedClr 25.5
ReservicePreempt OFF TrackYelChg 25.5
EndDwell OFF TrackRedClr 25.5
DynExitThresh 0 1111111
DsbIDwellCalls OFF 12345678 90123456
+ ExitVehCall .....
    
```

PRESS "ESC"

```

# 5 Preemption
1.Times 4.Times+
2.Phases 5.Overlaps+ 8.AdvTimes
3.Options 6.Options+ 9.Init'Dwell
    
```

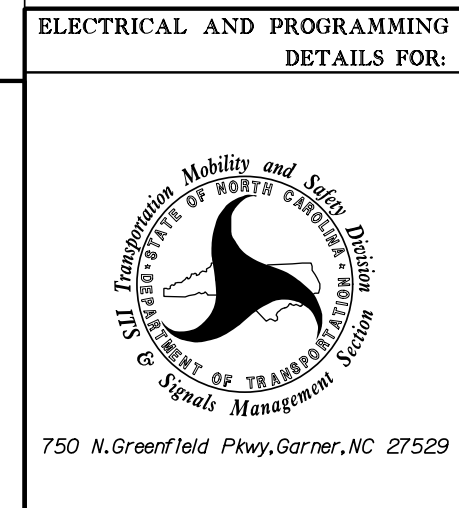
```

# 5 -- Initial Dwell --
Phases 0 0 0 0
Peds 0 0 0 0
Overlaps 0 0 0 0 0 0 0 0
(more) 0 0 0 0 0 0 0 0
    
```

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0588T
DESIGNED: October 2025
SEALED: 10/10/2025
REVISED:

Signal Upgrade - Temporary Design
Electrical Detail - Sheet 5 of 5



S. Elm Eugene Street at I-40 WB/US 29-220 SB Ramps	
Division 7	Greensboro
PLAN DATE: October 2025	REVIEWED BY: T.M. Moody
PREPARED BY: J.C. Grimm	REVIEWED BY:
REVISIONS	INIT. DATE

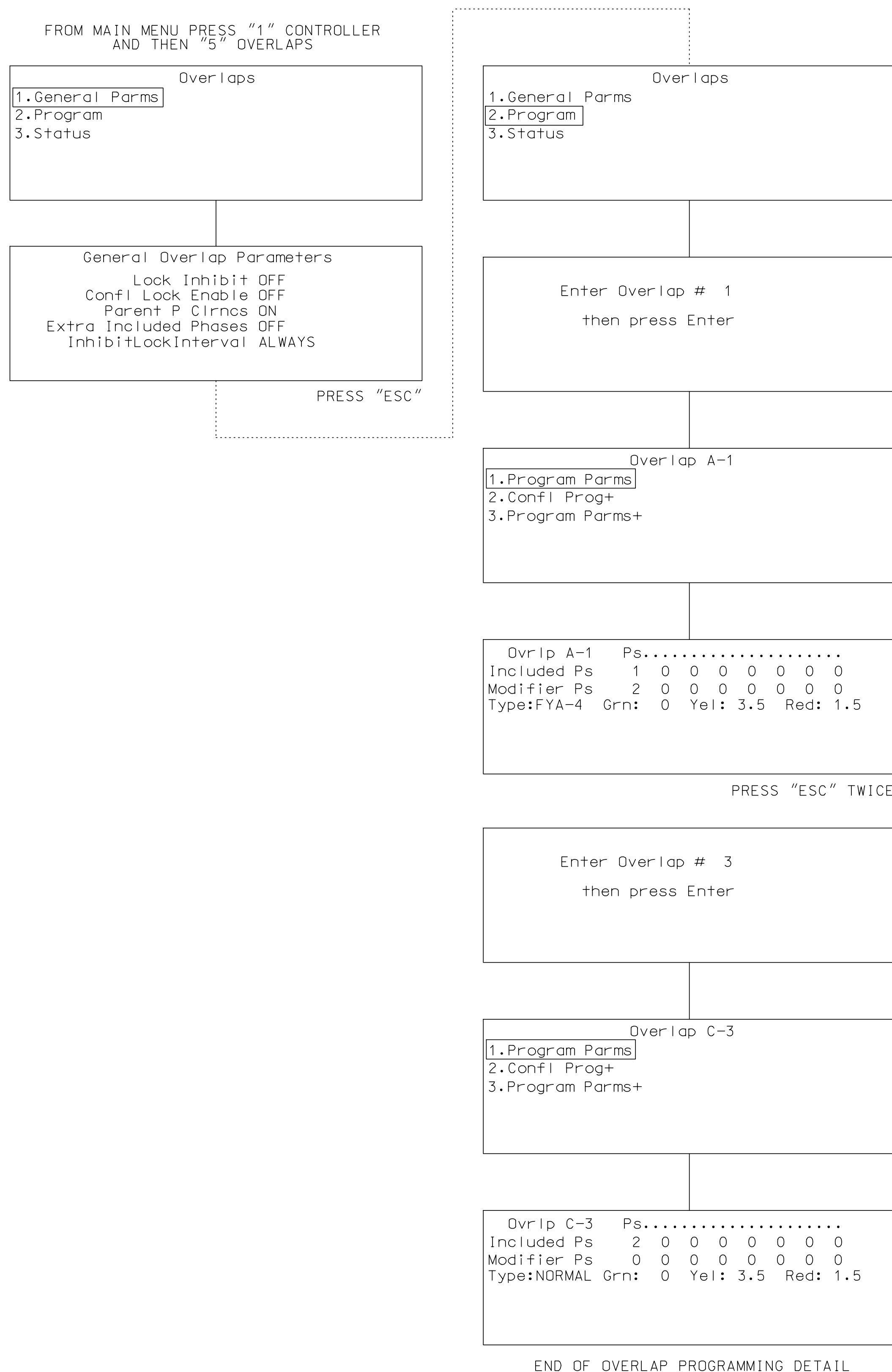
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Trent Moody	DATE
SIGNATURE	DATE
SIG. INVENTORY NO. 07-0588T	

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A AND C *

(program controller as shown below)

* NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.




END OF OVERLAP PROGRAMMING DETAIL

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0588T
DESIGNED: October 2025
SEALED: 10/10/2025
REVISED:

Signal Upgrade - Temporary Design
Electrical Detail - Sheet 2 of 5



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**ELECTRICAL AND PROGRAMMING
DETAILS FOR:**

S. Elm Eugene Street at I-40 WB/US 29-220 SB Ramps	
Division 7	Guilford County Greensboro
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REVISIONS	INIT. DATE

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TRENT M. MOODY
SEAL
040329

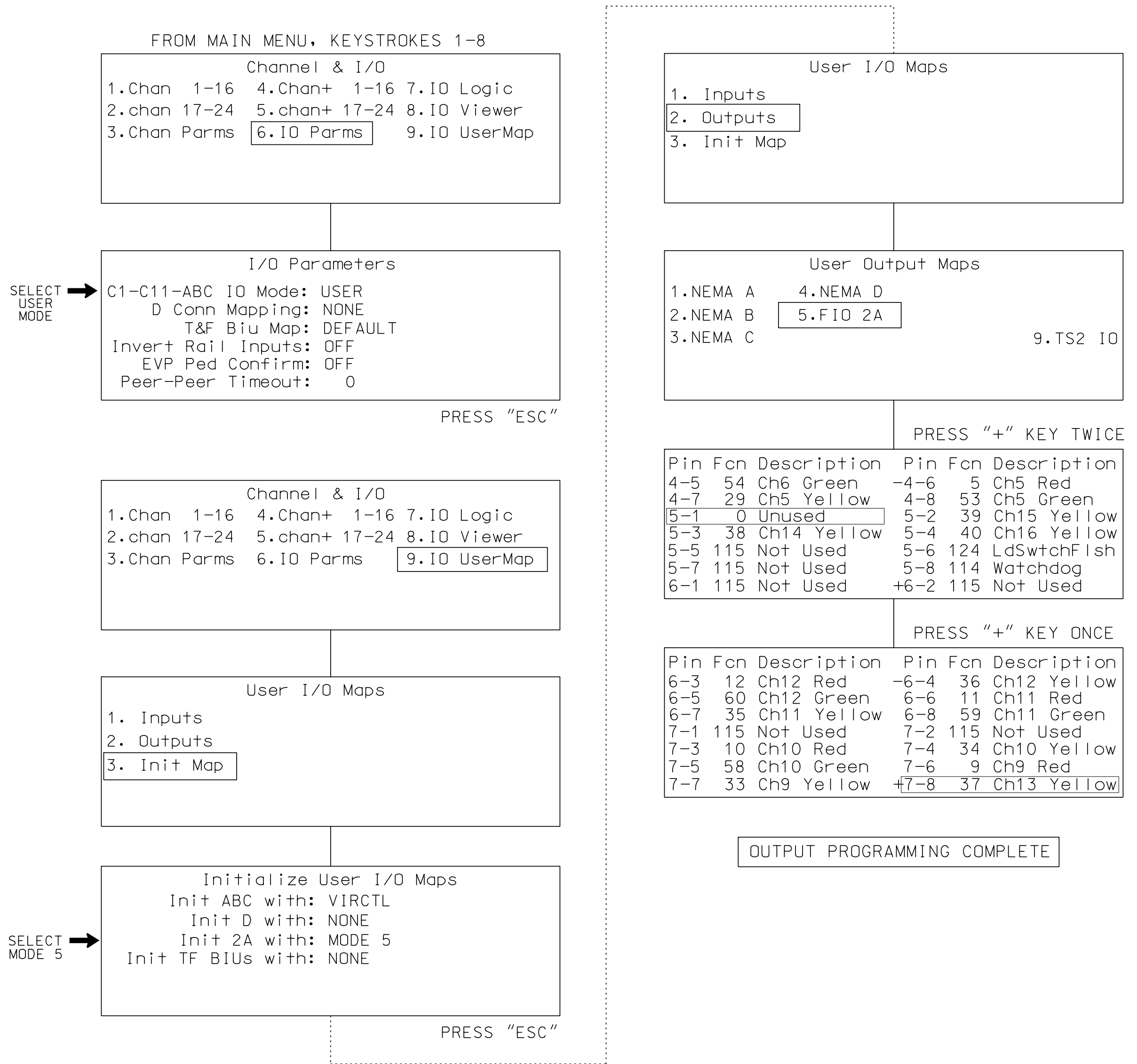
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Trent Moody
10/10/2025
SIGNATURE DATE

SIG. INVENTORY NO. 07-0588T

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

- Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
- The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.



User I/O Maps
 1. Inputs
 2. Outputs
 3. Init Map

User Output Maps
 1.NEMA A 4.NEMA D
 2.NEMA B 5.FIO 2A
 3.NEMA C 9.TS2 IO

PRESS "+" KEY TWICE

Pin	Fcn Description	Pin	Fcn Description
4-5	54 Ch6 Green	-4-6	5 Ch5 Red
4-7	29 Ch5 Yellow	4-8	53 Ch5 Green
5-1	0 Unused	5-2	39 Ch15 Yellow
5-3	38 Ch14 Yellow	5-4	40 Ch16 Yellow
5-5	115 Not Used	5-6	124 LdSwTchFlsh
5-7	115 Not Used	5-8	114 Watchdog
6-1	115 Not Used	+6-2	115 Not Used

PRESS "+" KEY ONCE

Pin	Fcn Description	Pin	Fcn Description
6-3	12 Ch12 Red	-6-4	36 Ch12 Yellow
6-5	60 Ch12 Green	6-6	11 Ch11 Red
6-7	35 Ch11 Yellow	6-8	59 Ch11 Green
7-1	115 Not Used	7-2	115 Not Used
7-3	10 Ch10 Red	7-4	34 Ch10 Yellow
7-5	58 Ch10 Green	7-6	9 Ch9 Red
7-7	33 Ch9 Yellow	+7-8	37 Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-1 (C1 pin 35) = Load Switch S3-Y
 Pin 7-8 (C1 pin 99) = Load Switch AUX S1-G

- ! Press the "*" key to return to Main Menu. Now
- o go back to "RUN-ENABLE STATUS" and switch to "ON".

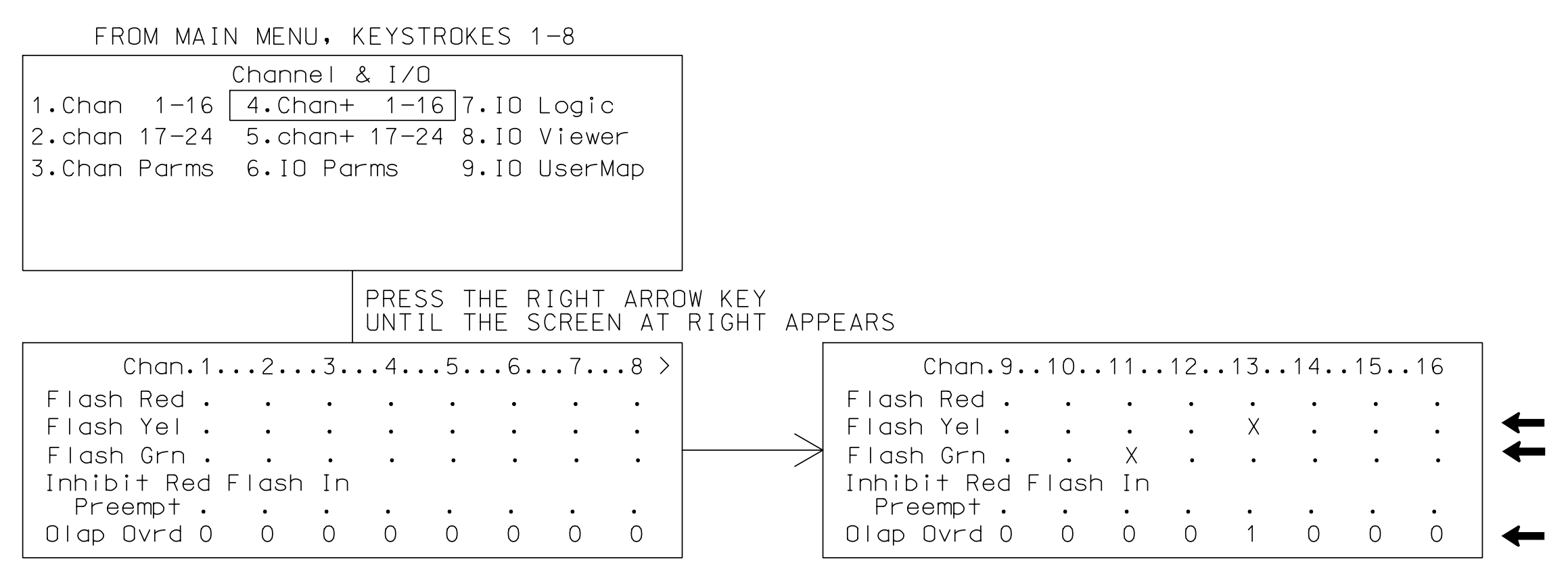
NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.



FROM MAIN MENU, KEYSTROKES 1-8
 Channel & I/O
 1.Chan 1-16 4.Chan+ 1-16 7.I/O Logic
 2.chan 17-24 5.chan+ 17-24 8.I/O Viewer
 3.Chan Parms 6.I/O Parms 9.I/O UserMap

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

Chan.	1	2	3	4	5	6	7	8
Flash Red
Flash Yel
Flash Grn
Inhibit Red Flash In
Preempt
Olap Ovrd	0	0	0	0	0	0	0	0

Chan.	9	10	11	12	13	14	15	16
Flash Red
Flash Yel	.	.	.	X	.	.	.	.
Flash Grn	.	X	.	.	.	.	.	.
Inhibit Red Flash In
Preempt
Olap Ovrd	0	0	0	0	1	0	0	0

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0588T
 DESIGNED: October 2025
 SEALED: 10/10/2025
 REVISED:

Signal Upgrade - Temporary Design
 Electrical Detail - Sheet 3 of 5

S. Elm Eugene Street at I-40 WB/US 29-220 SB Ramps	
Division 7	Guilford County Greensboro
PLAN DATE: October 2025	REVIEWED BY: T.M. Moody
PREPARED BY: J.C. Grimm	REVIEWED BY:
REVISIONS	INIT. DATE

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SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER

SEAL 040329

TRENT M. MOODY

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10/10/2025

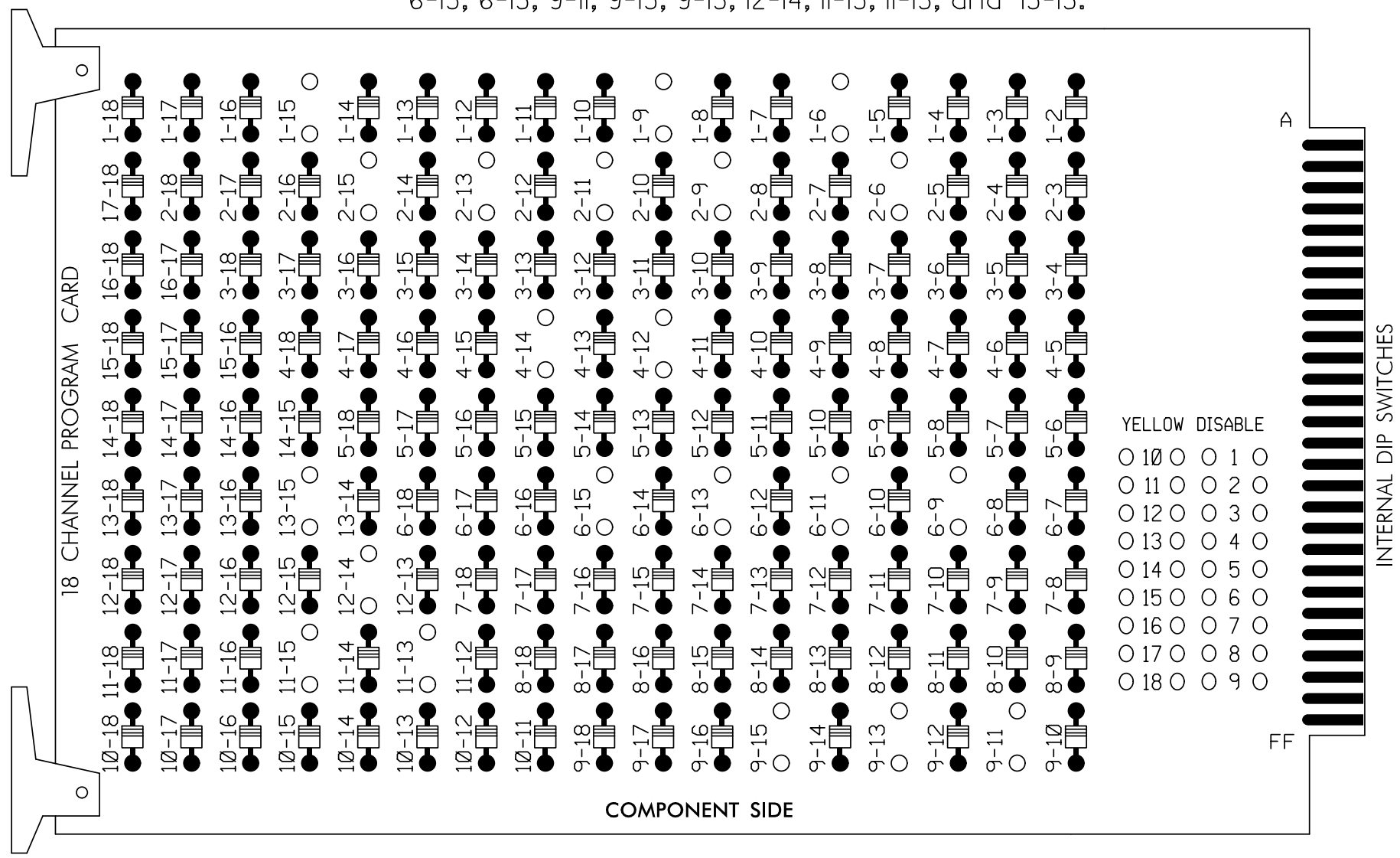
SIGNATURE DATE

SIG. INVENTORY NO. 07-0588T

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

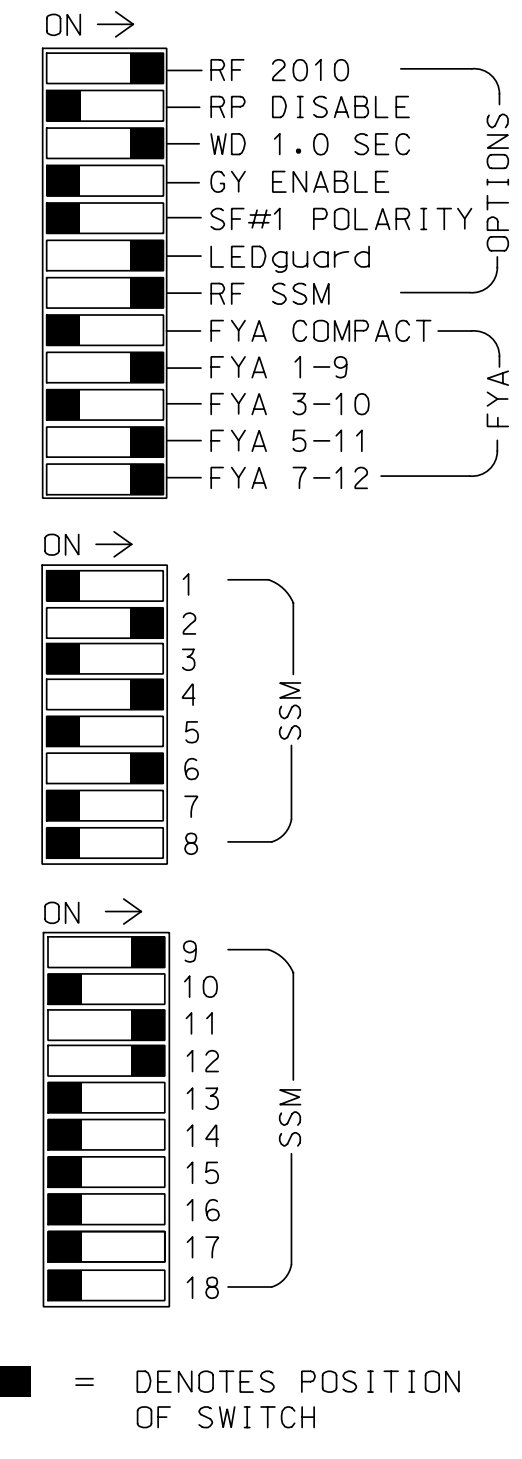
REMOVE DIODE JUMPERS 1-6, 1-9, 1-15, 2-6, 2-9, 2-11, 2-13, 2-15, 4-12, 4-14, 6-9, 6-11, 6-13, 6-15, 9-11, 9-13, 9-15, 12-14, 11-13, 11-15, and 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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



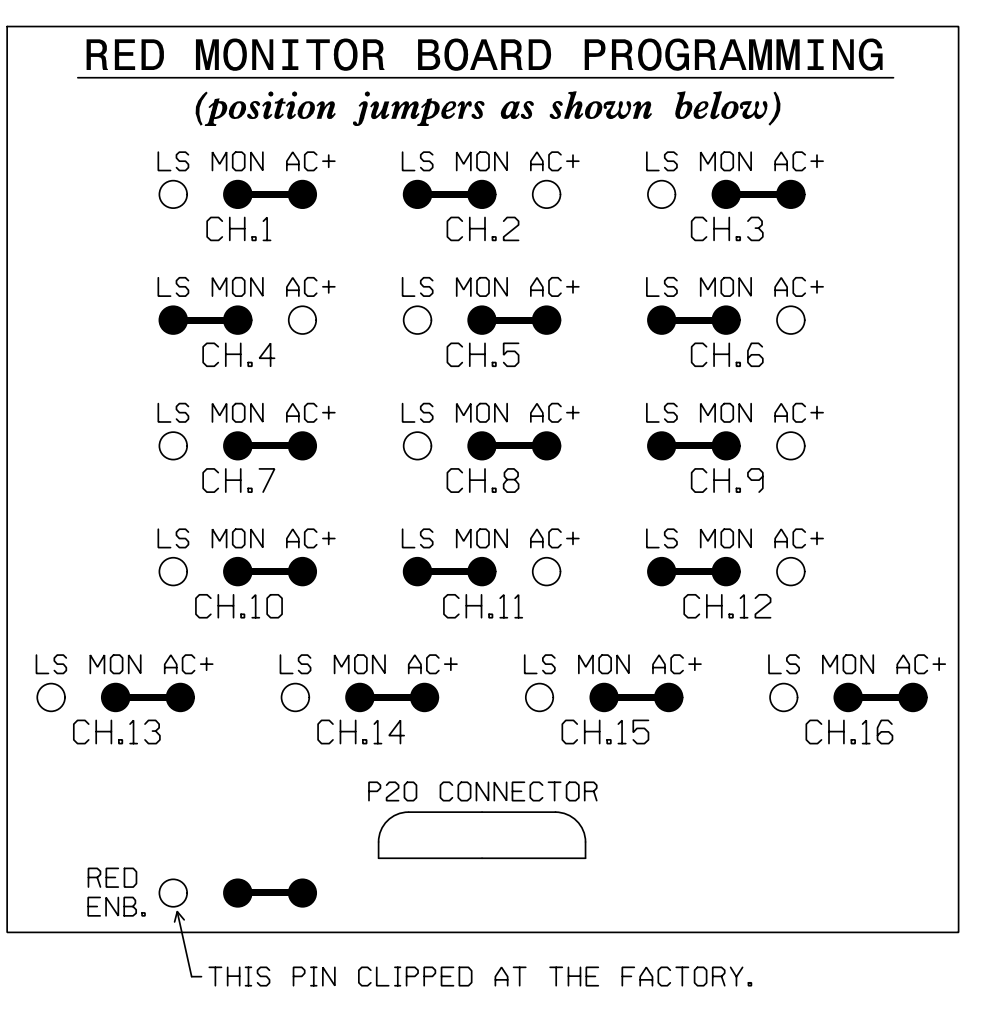
INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 2	-ORS	-ORS	∅ 4	-ORS	-ORS	-ORS	-ORS	-ORS	∅ 2 PED	∅ 6 PED	FS
I	1A	2A	2C	-ORS	-ORS	4A	-ORS	-ORS	-ORS	-ORS	-ORS	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
L	NOT USED	∅ 2	NOT USED	-ORS	-ORS	4B	-ORS	-ORS	-ORS	-ORS	-ORS	∅ 4 PED	NOT USED	ST
U	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	PRE 3	-ORS	-ORS
L	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	-ORS	Opticom 2 Ch. Card	-ORS	-ORS
												PRE 5	-ORS	-ORS

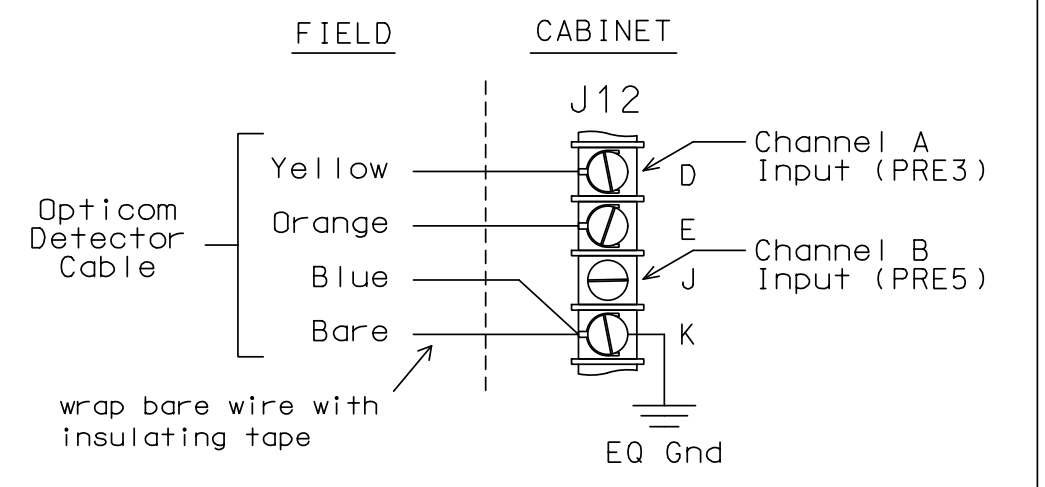
EX.: 1A, 2A, ETC. = LOOP NO.'S
 * See Opticom Field Wire Detail this sheet.
 ⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
 ST = STOP TIME
 PRE3,5 = EV PREEPTS



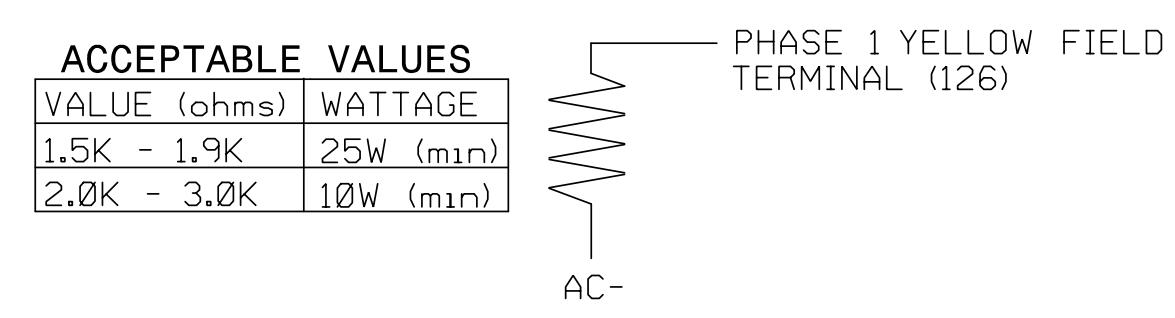
TYPICAL OPTICOM FIELD WIRE DETAIL

(input file, rear view)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



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

NOTES

- To prevent "flash-conflict" problems, insert red flash the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
- Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
- Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
- Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
- Ensure "Local Flash Start" feature is set to "Rst".
- Ensure "InhFYARedSt" feature is set to "ON".
- Ensure "Flash Mode" is set to "channel" (MM 1-4-1).
- Ensure all channels are programmed to flash Red (MM 1-8-1).
- Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

```
FROM MAIN MENU->1->8->7 (I/O LOGIC) Result Src.Fcn TimeOp Time
I208 = 0I208 DLY 1
```
- The cabinet and controller are part of the Greensboro Signal System.

EQUIPMENT INFORMATION

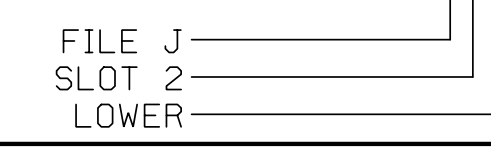
CONTROLLER.....2070
 CABINET.....332 W/ AUX
 SOFTWARE.....TRAFFICWARE APOGEE
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S8,S9,AUX S1, AUX S4,AUX S5
 PHASES USED.....1,2,2PED,4,4PED,6,6PED
 OVERLAP A.....*
 OVERLAP B.....NOT USED
 OVERLAP C.....*
 OVERLAP D.....*

* See Sheet 2 of 5 for Overlap Programming Detail.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
1A ¹	TB2-1,2	I1U	56	1	1		15.0		X	X	
		J4U	48	20	6				X	X	
2A	TB2-5,6	I2U	39	2	2				X	X	X
2B	TB2-7,8	I2L	43	3	2				X	X	X
2C	TB2-9,10	I3U	63	4	2				X	X	X
4A	TB4-9,10	I6U	41	8	4				X	X	
4B	TB4-11,12	I6L	45	9	4		10.0		X	X	
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED						
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED						
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED						

¹Add jumper from I1-W to J4-W, on rear of input file.



NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.
 INPUT FILE POSITION LEGEND: J2L

SIGNAL HEAD HOOK-UP CHART

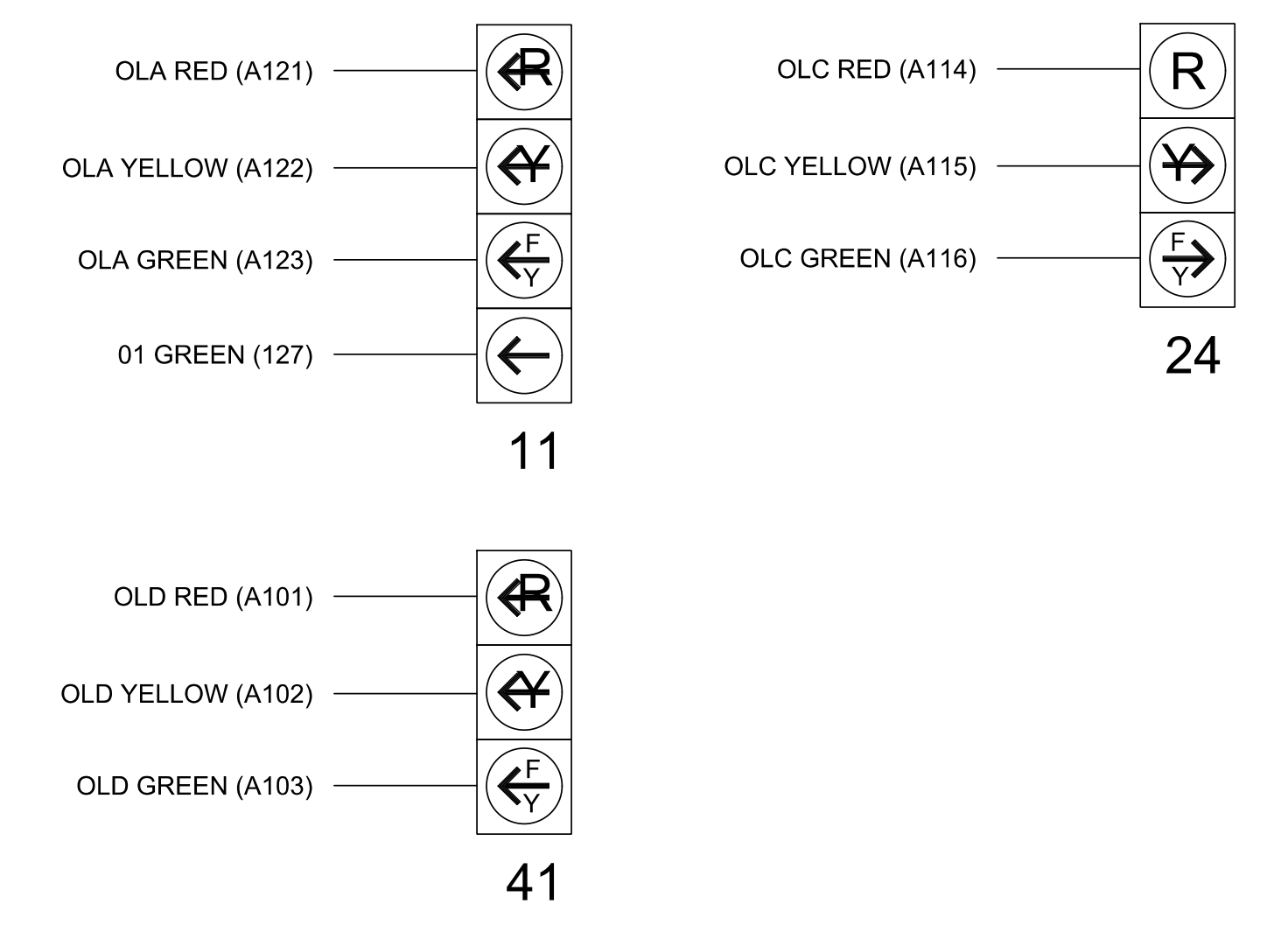
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21	22,23	NU	42,43	P41, P42	NU	61	62	P61, P62	NU	NU	11	NU	NU	24	41	NU
RED		128	128		101			134	134								A114	
YELLOW	*	129	129		102			135	135									
GREEN			130		103			136										
RED ARROW																	A121	
YELLOW ARROW																	A122	A115
FLASHING YELLOW ARROW																	A123	A116
GREEN ARROW	127	130								136								
Hand icon							113		104				119					
Person icon									106									121

NU = Not Used

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0588
 DESIGNED: October 2025
 SEALED: 10/10/2025
 REVISED:

Signal Upgrade - Final Design
 Electrical Detail - Sheet 1 of 5

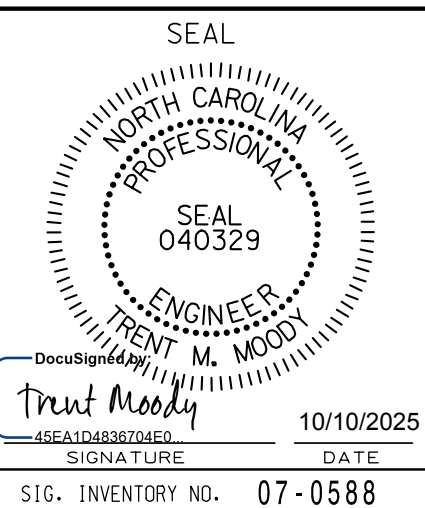
ELECTRICAL AND PROGRAMMING DETAILS FOR:



S. Elm Eugene Street at I-40 WB/US 29-220 SB Ramps

Division 7	Guilford County	Greensboro
PLAN DATE: October 2025	REVIEWED BY: T.M. Moody	
PREPARED BY: J.C. Grimm	REVIEWED BY:	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

GREEN DELAY PROGRAMMING DETAIL FOR LEADING PEDESTRIAN INTERVAL OPERATION

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-1

1. Times	4. Ring, Start, Concur	7. Times+
2. Options	5. Call, Inh, Redirect	8. Copy
3. Options+	6. Alt Progs+	9. AdvWarn

PRESS "+" KEY ONCE

Options+	P..1..2..3..4..5..6..7.8 >
Ped Delay -	. . . . .
Red Rest On Gap	. . . . .
Conflicting P	0 0 0 0 0 0 0 0
Grn/Ped Delay	0 7 0 4 0 0 0 0
Omit Yel, Yel P	0 0 0 0 0 0 0 0
Ped Out/OvrIp P	0 0 0 0 0 0 0 0
StartYel, Next P	+ 0 0 0 0 0 0 0 0

CHANNEL & I/O PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A, C AND D *

(program controller as shown below)

* NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

Overlaps

1. General Parm

2. Program

3. Status

Overlap A-1

1. Program Parm

2. Confl Prog+

3. Program Parm+

OvrIp C-3 Ps.....

Included Ps 2 0 0 0 0 0 0 0

Modifier Ps 0 0 0 0 0 0 0 0

Type:NORMAL Grn: 0 Yel: 3.5 Red: 1.5

General Overlap Parameters

Lock Inhibit OFF

Confl Lock Enable OFF

Parent P Cirncs ON

Extra Included Phases OFF

InhibitLockInterval ALWAYS

PRESS "ESC"

Overlaps

1. General Parm

2. Program

3. Status

Overlap A-1 Ps.....

Included Ps 1 0 0 0 0 0 0 0

Modifier Ps 2 0 0 0 0 0 0 0

Type:FYA-4 Grn: 0 Yel: 3.5 Red: 1.5

PRESS "ESC" TWICE

Enter Overlap # 4

then press Enter

Overlaps

1. General Parm

2. Program

3. Status

Overlap D-4

1. Program Parm

2. Confl Prog+

3. Program Parm+

OvrIp D-4 Ps.....

Included Ps 4 0 0 0 0 0 0 0

Modifier Ps 0 0 0 0 0 0 0 0

Type:NORMAL Grn: 0 Yel: 3.5 Red: 1.5

END OF OVERLAP PROGRAMMING DETAIL

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0588
DESIGNED: October 2025
SEALED: 10/10/2025
REVISED:

Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 5

STV
STV Engineers, Inc.
2151 Hawkins St., Suite 1400
Charlotte, NC 28203
(704) 372-1885
NC License Number F-0991

750 N. Greenfield Pkwy, Garner, NC 27529

S. Elm Eugene Street at I-40 WB/US 29-220 SB Ramps	
Division 7	Guilford County Greensboro
PLAN DATE: October 2025	REVIEWED BY: T.M. Moody
PREPARED BY: J.C. Grimm	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL 040329

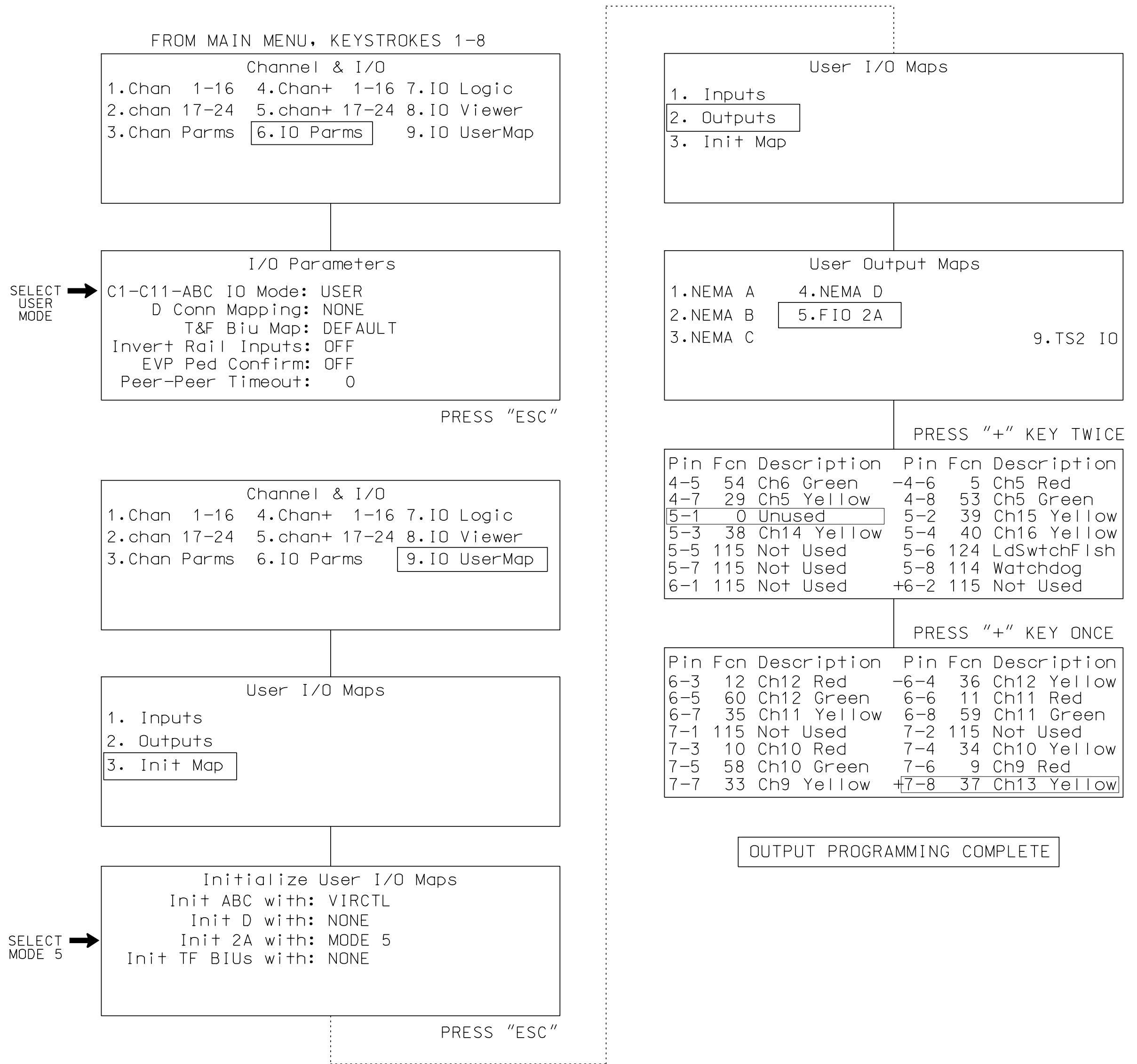
Trent M. Moody
10/10/2025

SIG. INVENTORY NO. 07-0588

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

- Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
- The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.



Pin 5-1 (C1 pin 35) = Load Switch S3-Y
Pin 7-8 (C1 pin 99) = Load Switch AUX S1-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

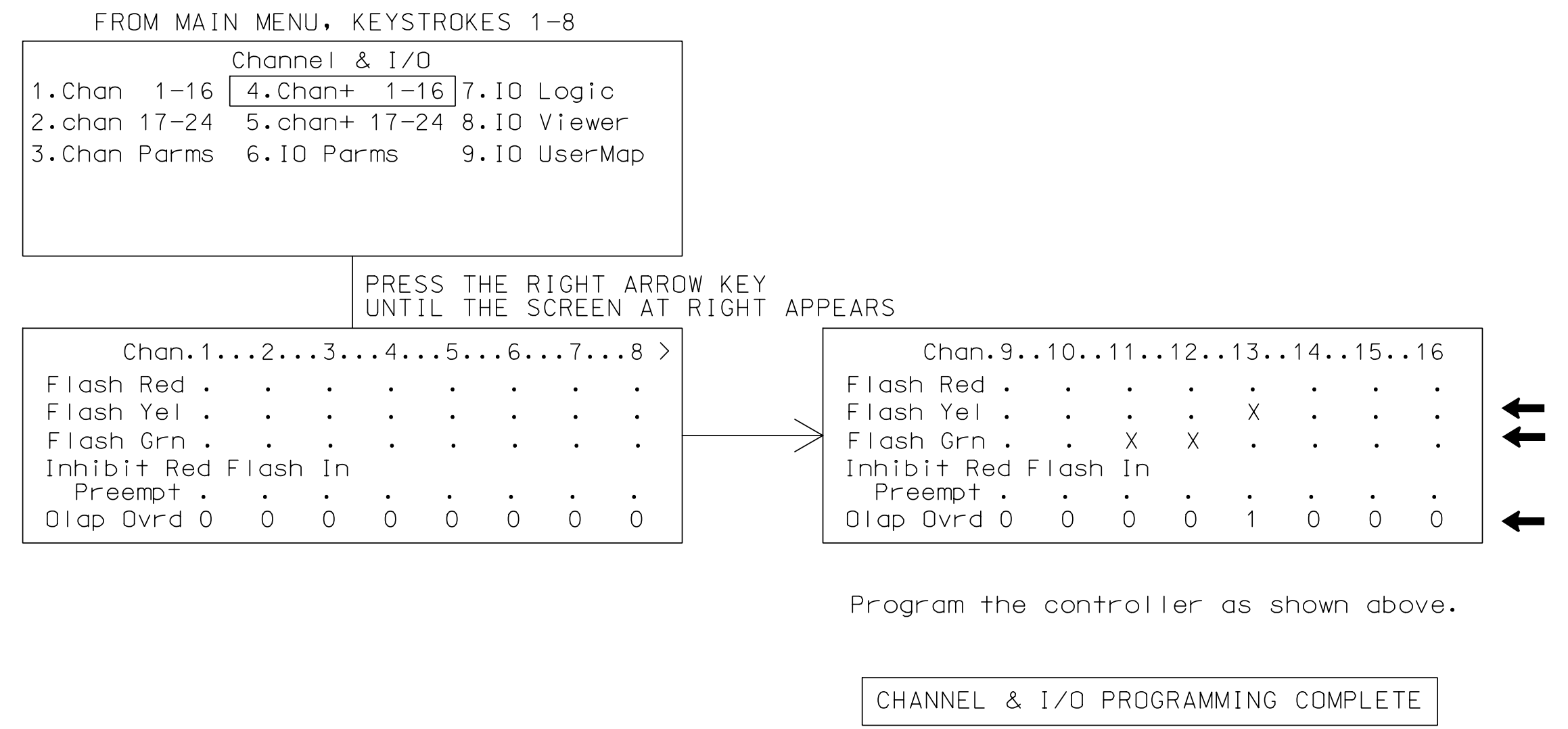
NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.



Programming notes:
Default Change To:
Pin Fcn Description Fcn Description
5-1 37 Ch13 Yellow.....0 Unused

Programming notes:
Default Change To:
Pin Fcn Description Fcn Description
7-8 57 Ch9 Green37 Ch13 Yellow

Program the controller as shown above.

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0588
DESIGNED: October 2025
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Signal Upgrade - Final Design
Electrical Detail - Sheet 3 of 5

S. Elm Eugene Street at I-40 WB/US 29-220 SB Ramps

Division 7 Guilford County Greensboro

PLAN DATE: October 2025 REVIEWED BY: T.M. Moody

PREPARED BY: J.C. Grimm REVIEWED BY:

REVISIONS	INIT.	DATE

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Trent Moody 10/10/2025

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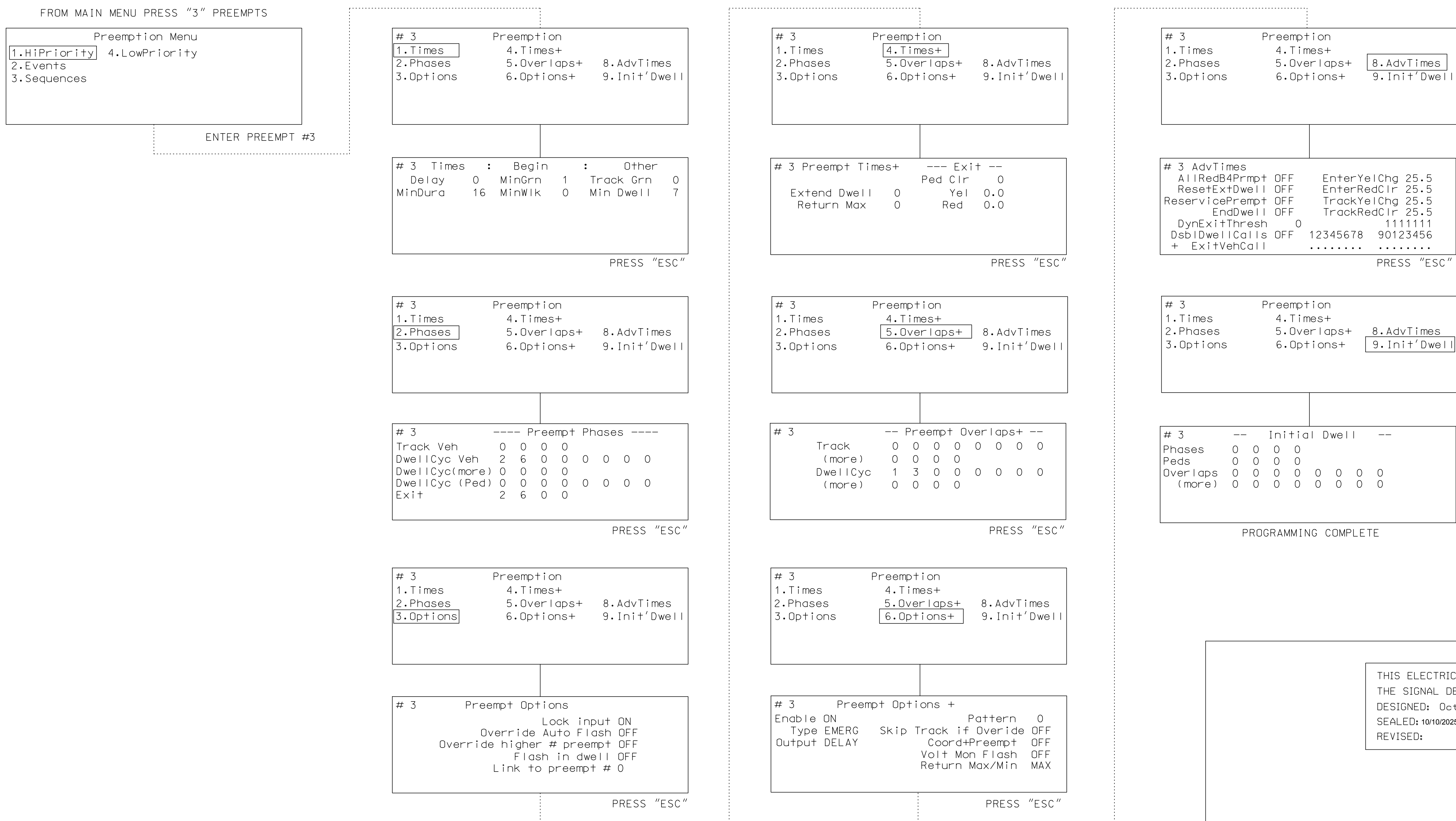
10/10/2025

SIGNATURE DATE

SIG. INVENTORY NO. 07-0588

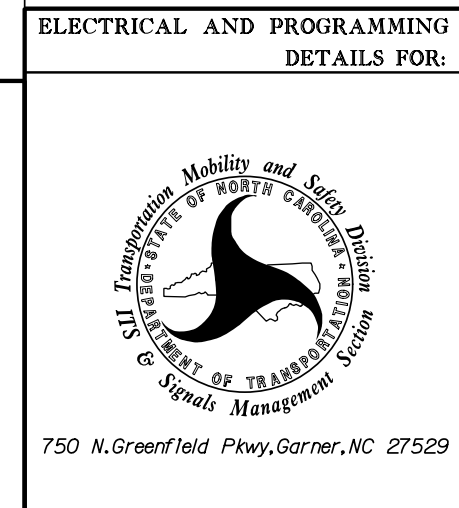
EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 3'

(program controller as shown below)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0588
DESIGNED: October 2025
SEALED: 10/10/2025
REVISED:

Signal Upgrade - Final Design
Electrical Detail - Sheet 4 of 5



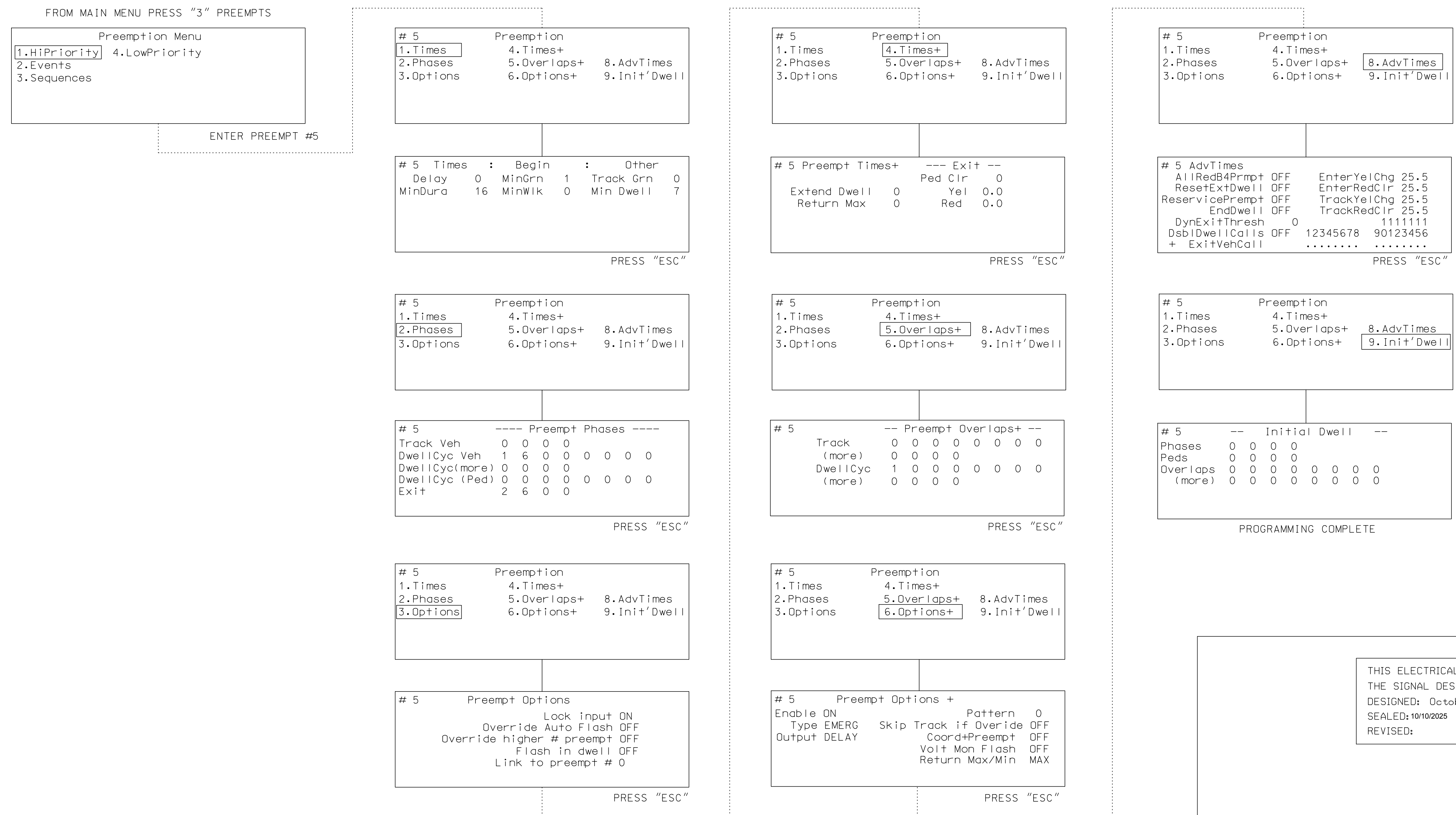
S. Elm Eugene Street at I-40 WB/US 29-220 SB Ramps	
Division 7	Guilford County Greensboro
PLAN DATE: October 2025	REVIEWED BY: T.M. Moody
PREPARED BY: J.C. Grimm	REVIEWED BY:
REVISIONS	INIT. DATE

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SEAL	10/10/2025
Trent M. Moody	SIGNATURE
DATE	10/10/2025
SIG. INVENTORY NO.	07-0588

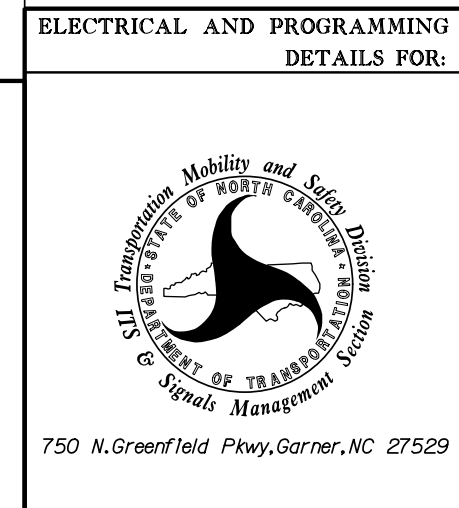
EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL FOR 'PRE 5'

(program controller as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0588
DESIGNED: October 2025
SEALED: 10/10/2025
REVISED:

Signal Upgrade - Final Design
Electrical Detail - Sheet 5 of 5



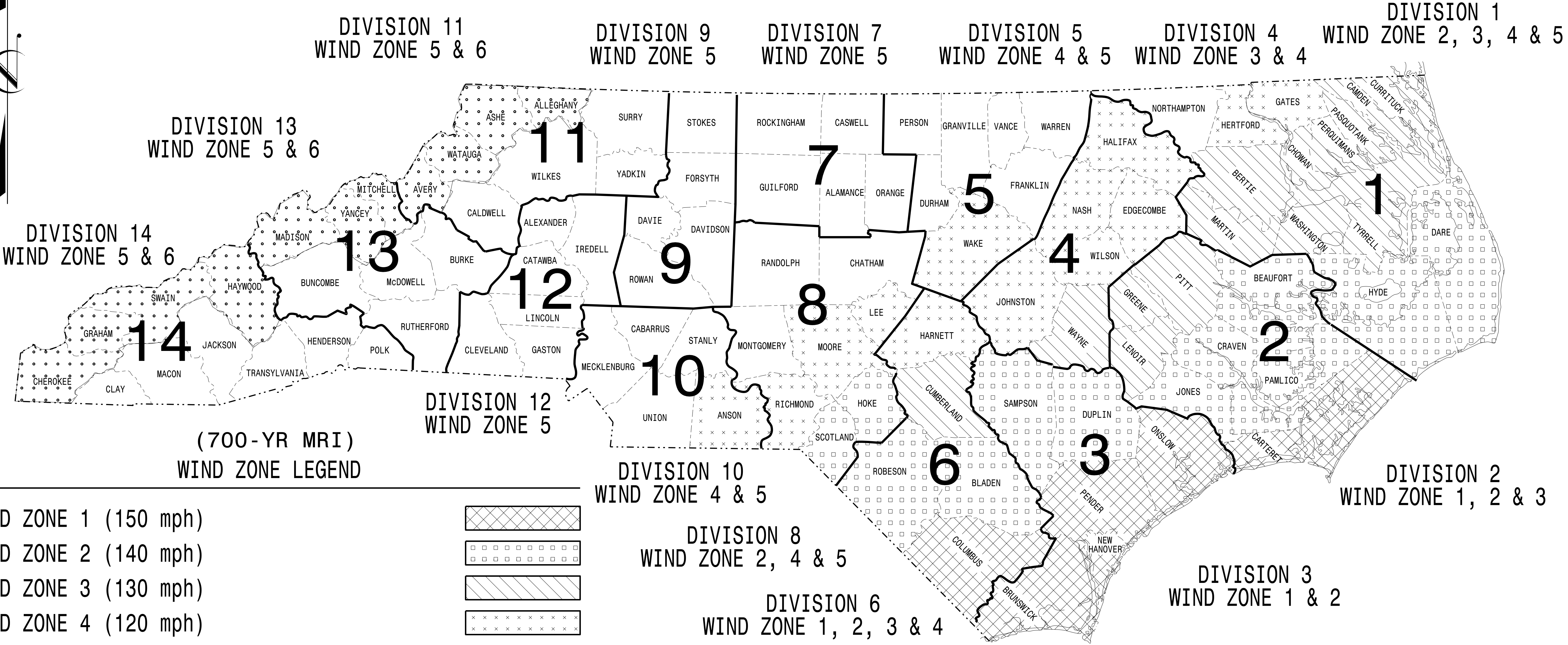
S. Elm Eugene Street at I-40 WB/US 29-220 SB Ramps	
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NORTH CAROLINA PROFESSIONAL ENGINEER Trent M. Moody 040329
DocuSign Trent Moody 10/10/2025
SIG. INVENTORY NO. 07-0588

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)



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>

NC DOT METAL POLE STANDARDS

Prepared in the Offices of:

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

DRAWING NUMBER	INDEX OF PLANS 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

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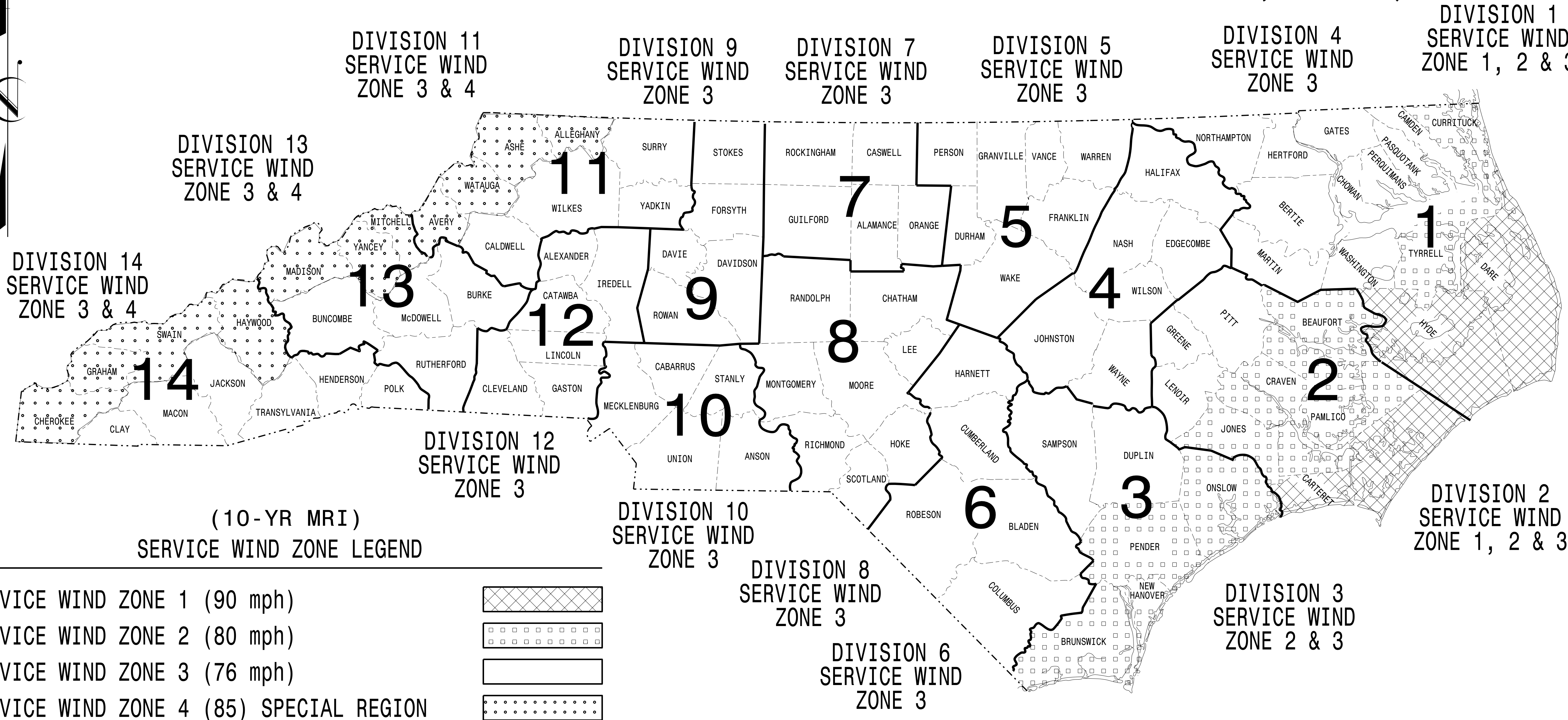
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Kevin Durigon
SIGNATURE
4B23DC79B3764DA

09/21/2023
DATE

03-001-2023 10/07
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Kdurigon

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)



(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>

NC DOT METAL POLE STANDARDS

03-OCT-2023 10:51 S:\IT\AS\14\15\Signal\esign\Drawings\2024_Metal_Pole_Standards\10-yr_MRI1.dgn

Prepared in the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

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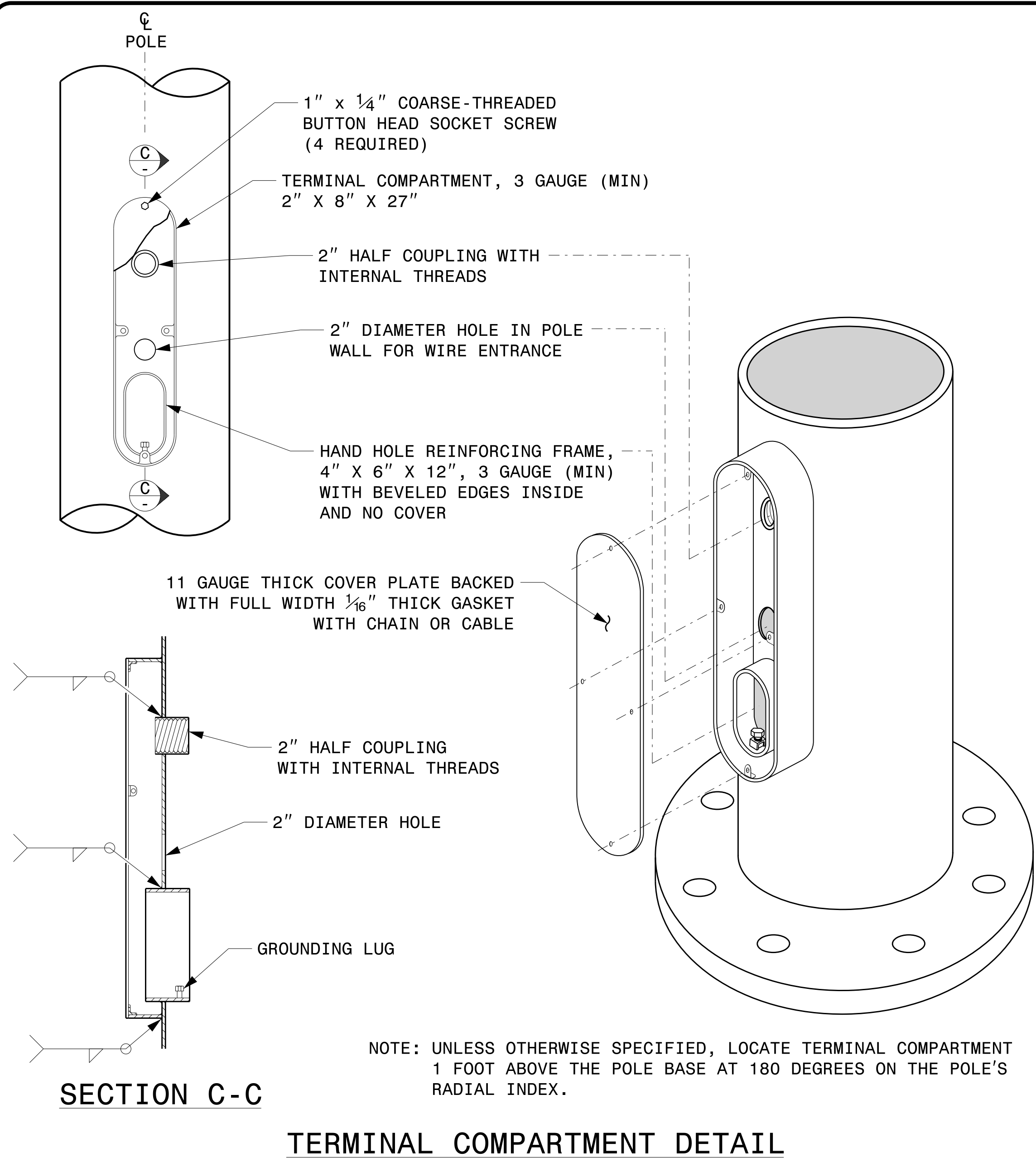
NCDOT CONTACTS:
MOBILITY AND SAFETY DIVISION -
TRANSPORTATION SYSTEMS MANAGEMENT
AND OPERATIONS UNIT

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Kevin Durigon
4B23DC78B3784DA

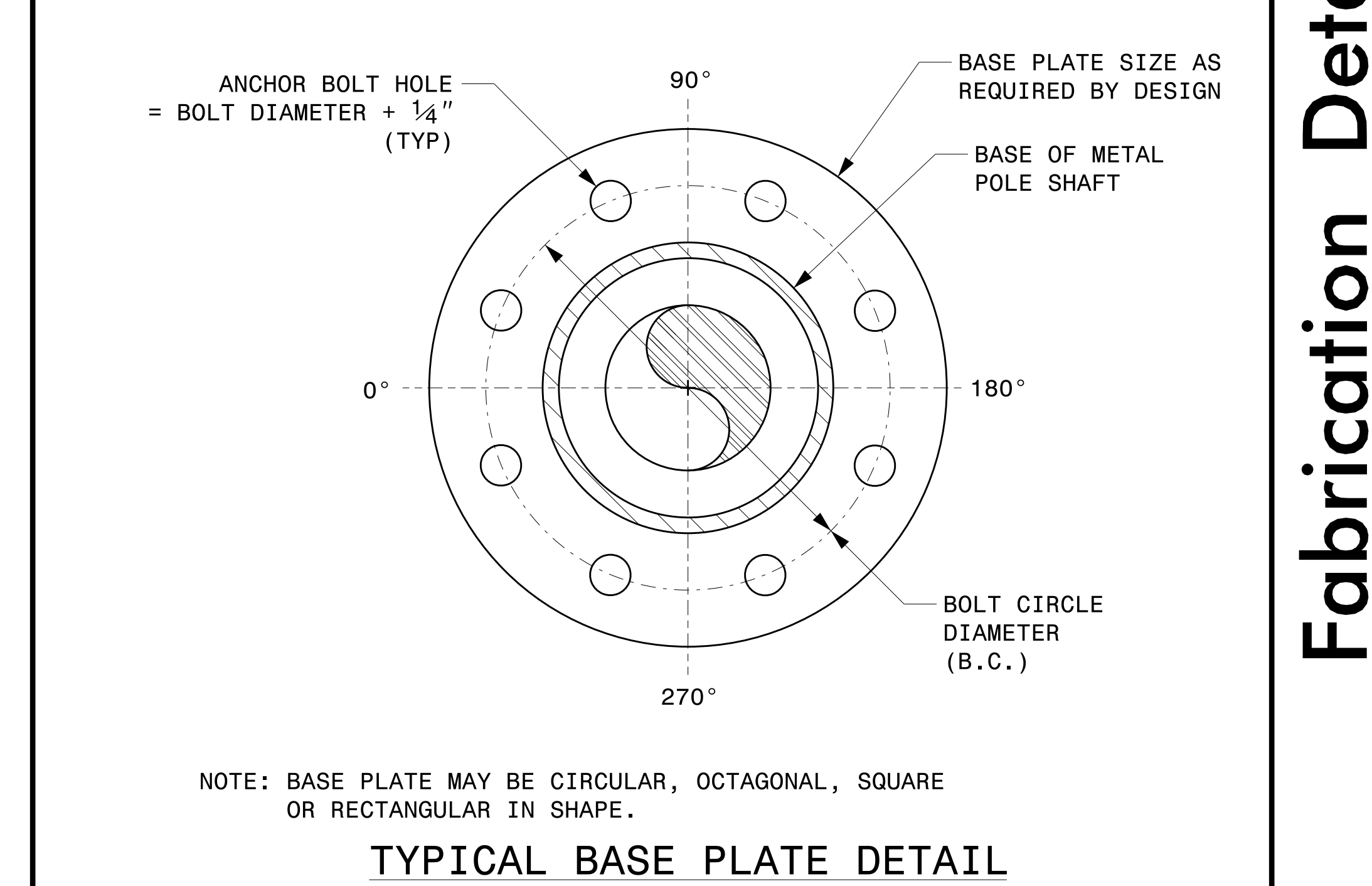
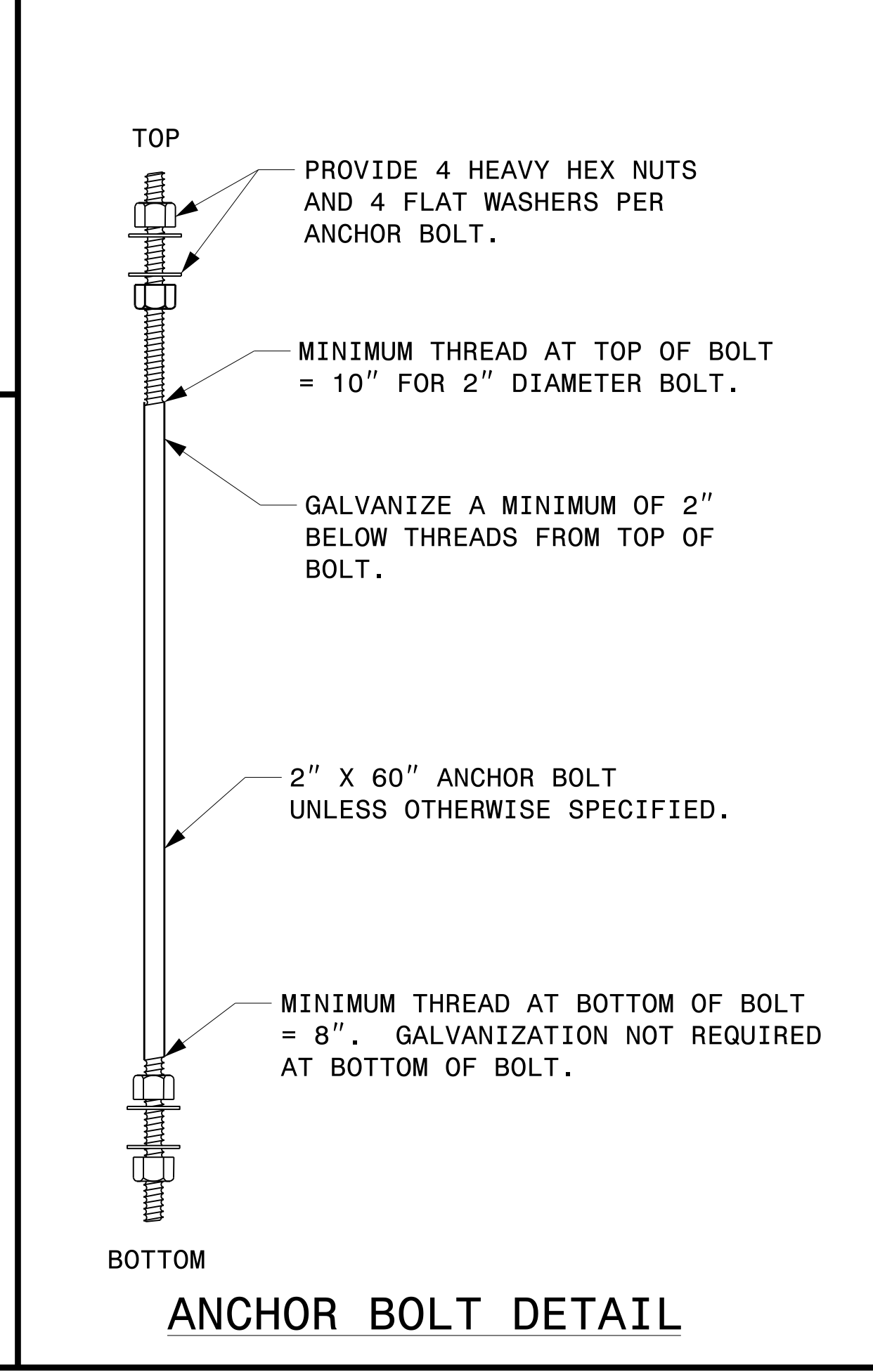
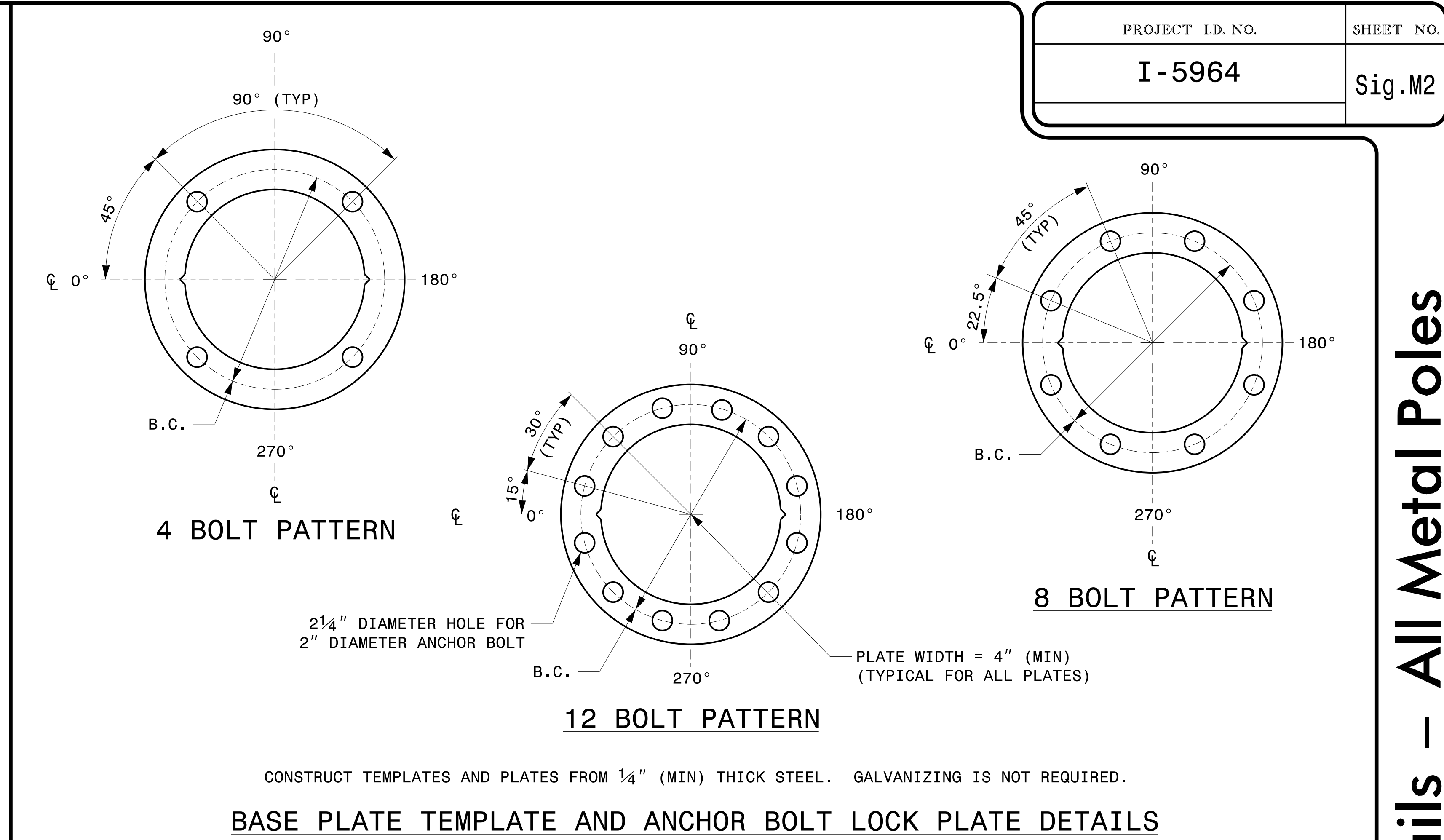
09/21/2023
DATE



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.	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)
--	--

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

- NOTES:**
- D = DIAMETER, T = THICKNESS, L = LENGTH, Y = YIELD STRENGTH
 - A.B. = ANCHOR BOLT
 - B.C. = BOLT CIRCLE OF ANCHOR BOLTS
 - IF STANDARD DESIGN, INCLUDE CASE NUMBER IN ADDITION TO POLE NUMBER ON "NCDOT POLE NO." LINE.
 - SIGNAL INV. NUMBER AND POLE I.D. NUMBER. SEE DRAWING M3 AND M4 FOR MOUNTING POSITIONS OF I.D. TAGS.
- IDENTIFICATION TAG DETAILS**



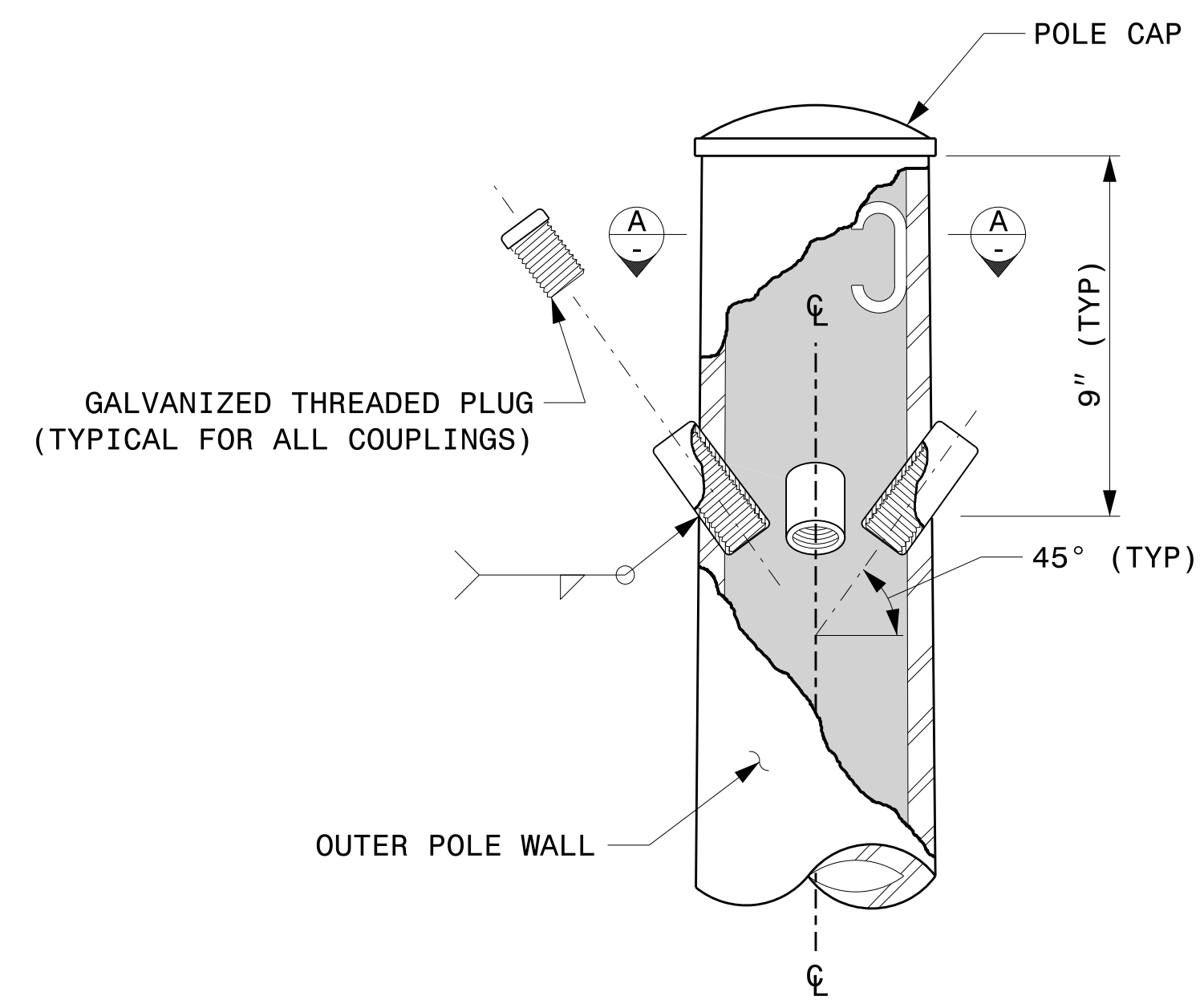
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	Typical Fabrication Details For All Metal Poles		SEAL
	PLAN DATE: SEPTEMBER 2023 DESIGNED BY: C.F. ANDREWS PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR	REVISIONS INIT. DATE	

Fabrication Details – All Metal Poles

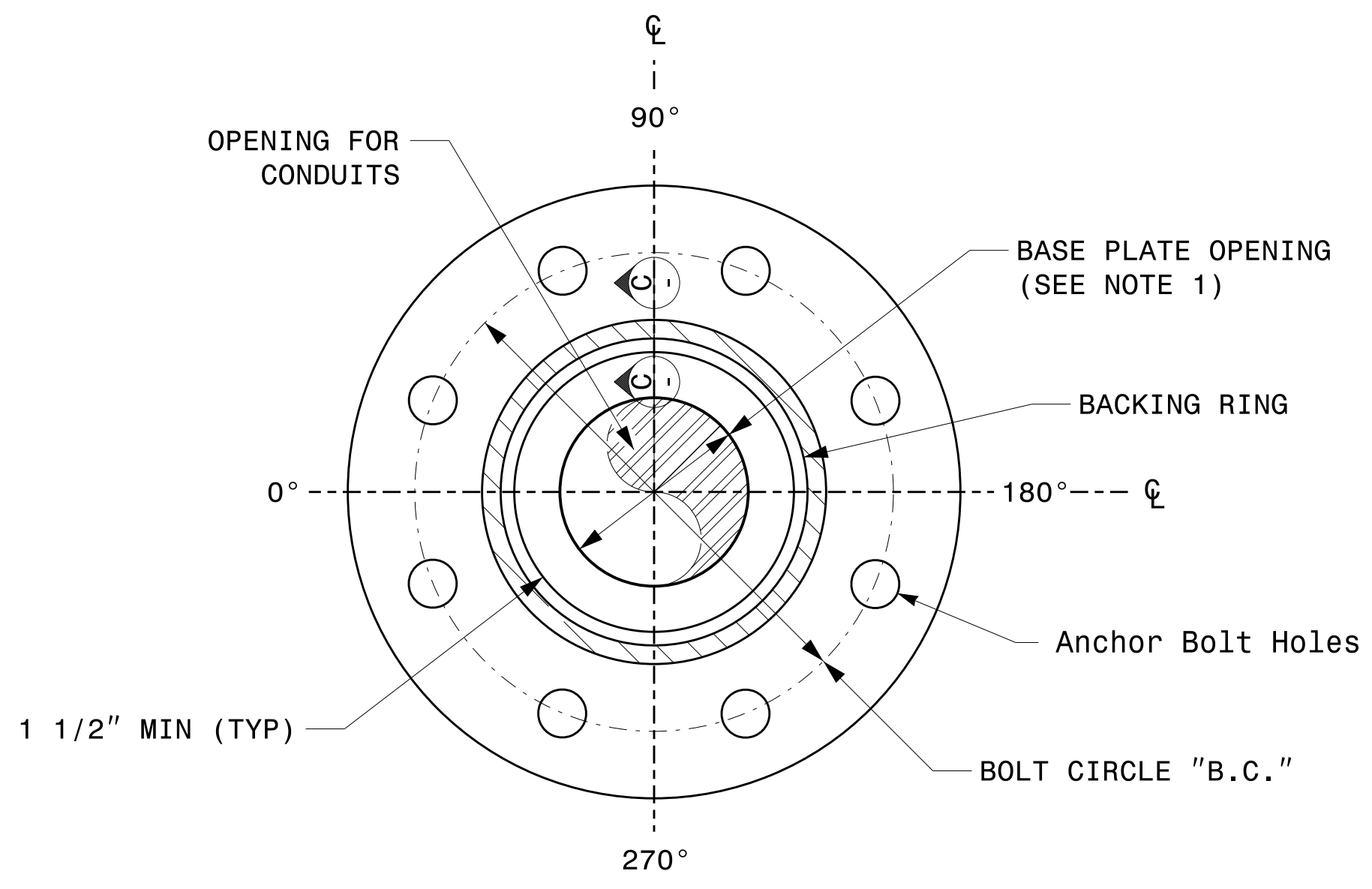
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Kedar Fagan

NOTE:

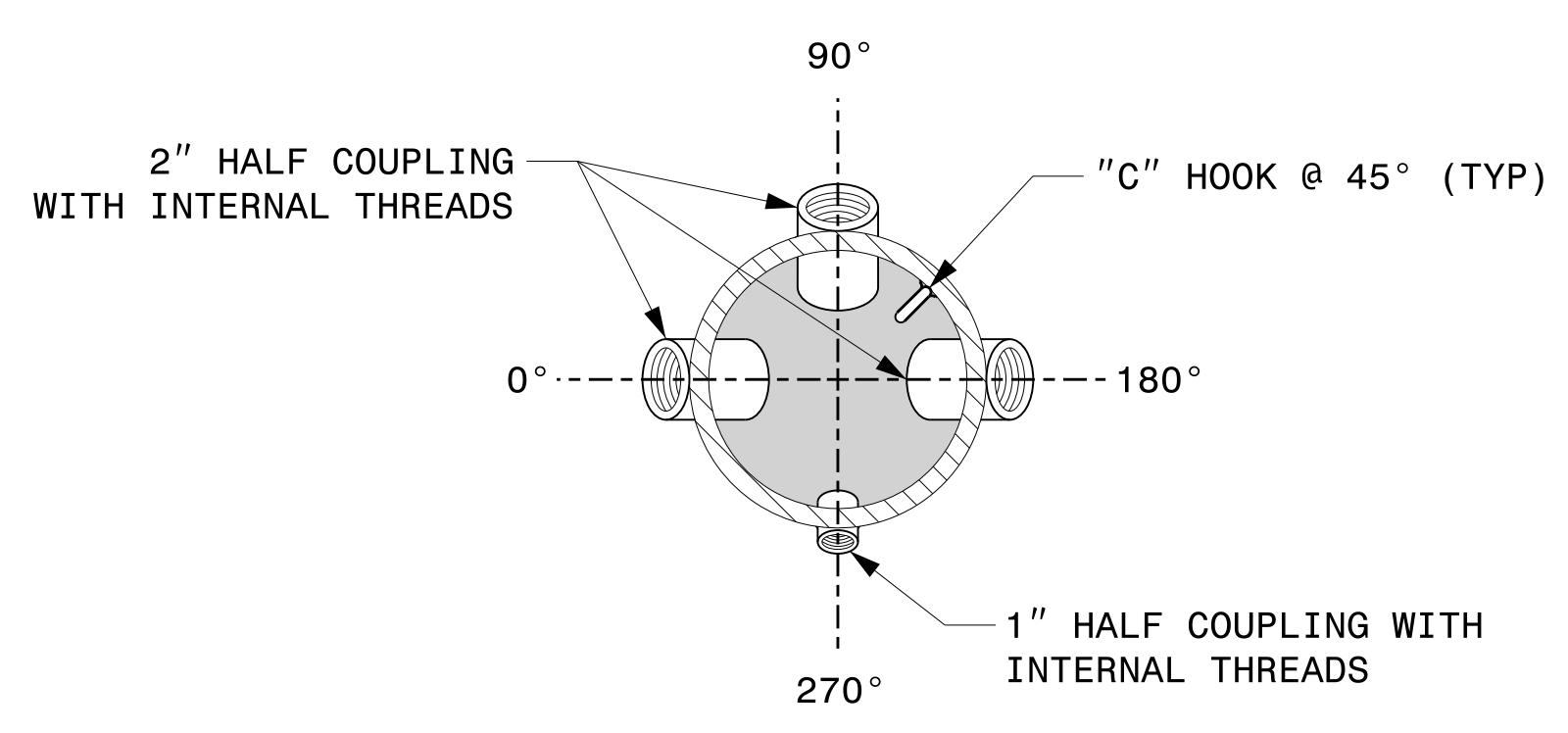
- 1. OPENING IN POLE BASE PLATE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS $3\frac{1}{2}$ " BUT SHALL NOT BE LESS THAN $8\frac{1}{2}$ ".



CABLE ENTRANCES AT TOP OF POLE

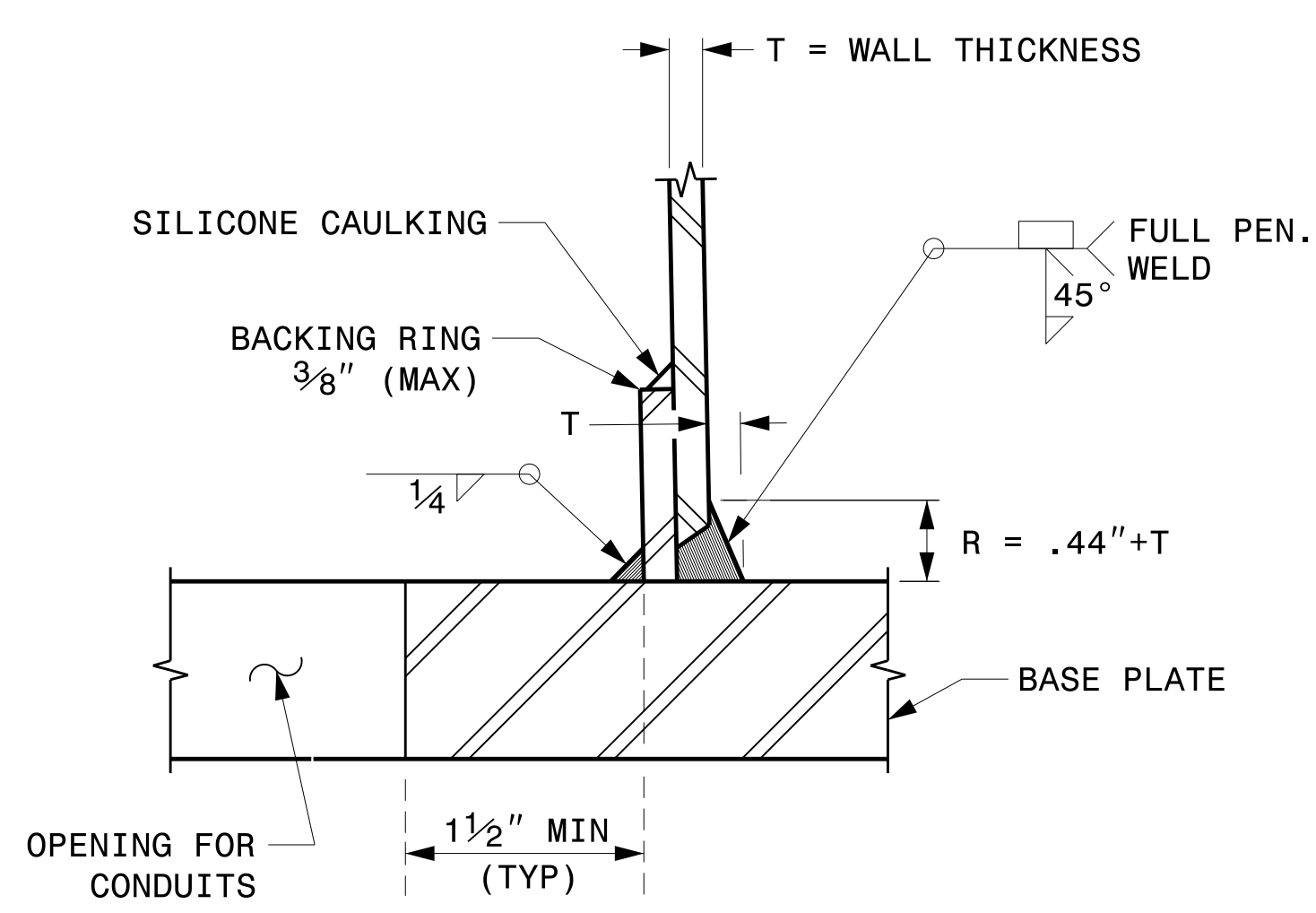


SECTION B-B
POLE BASE PLATE DETAILS
(8 AND 12 BOLT PATTERN)



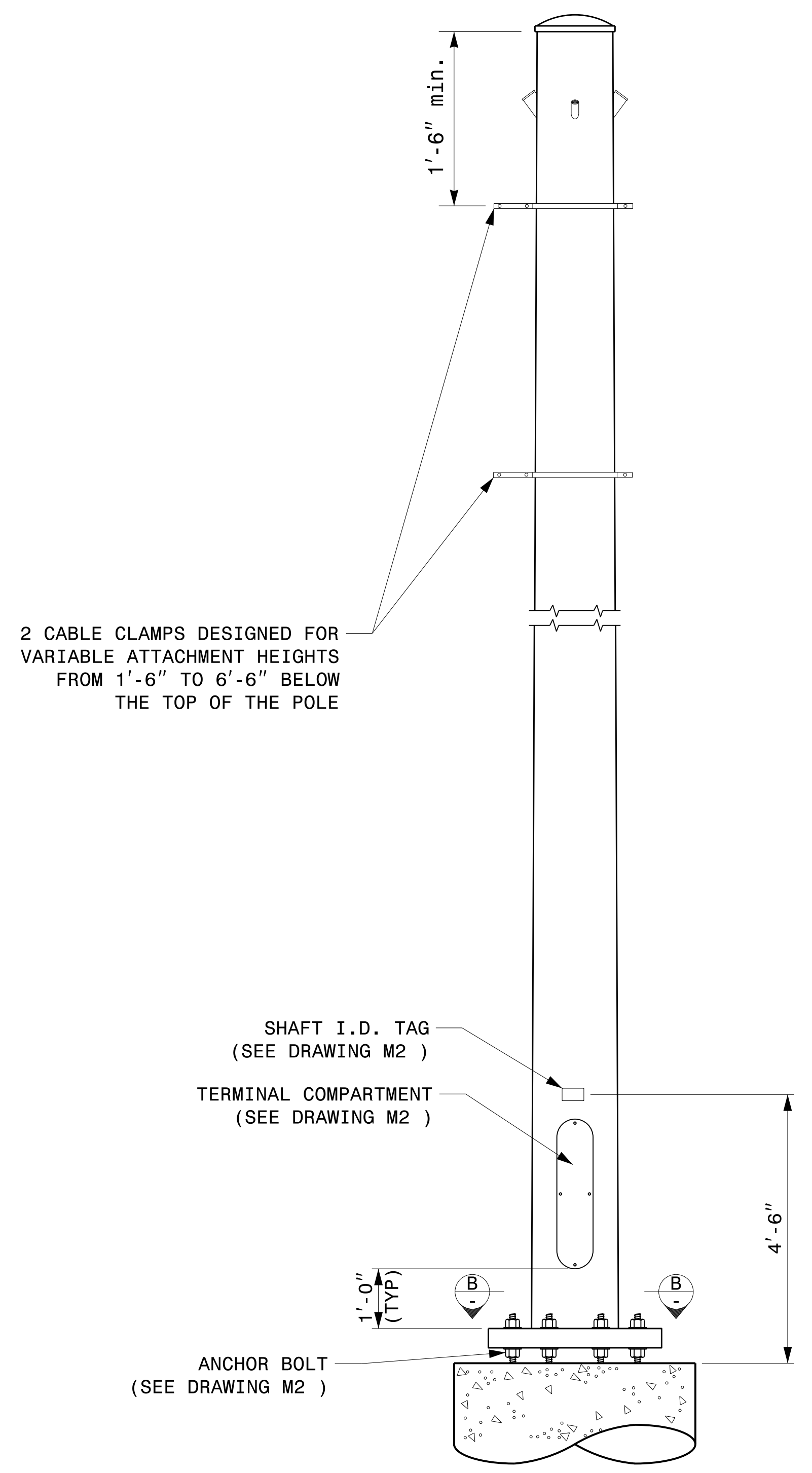
SECTION A-A

RADIAL ORIENTATION OF FACTORY INSTALLED ACCESSORIES AT TOP OF POLE



SECTION C-C
(POLE ATTACHMENT TO BASE PLATE)

FULL-PENETRATION GROOVE WELD DETAIL



2 CABLE CLAMPS DESIGNED FOR VARIABLE ATTACHMENT HEIGHTS FROM 1'-6" TO 6'-6" BELOW THE TOP OF THE POLE

MONOTUBE STRAIN POLE

08-dct-2023 10:37 S:\ISSUES\15 Signal\Signal Design Section\Structures\Drawings\2024 Merol Pole Std Drawings for LRF\02024 Sig.M3 Str. Fabrication Details-Strain Poles.dgn Kedar Tagon

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

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

DocuSigned by:
Kevin Durigon
SIGNATURE

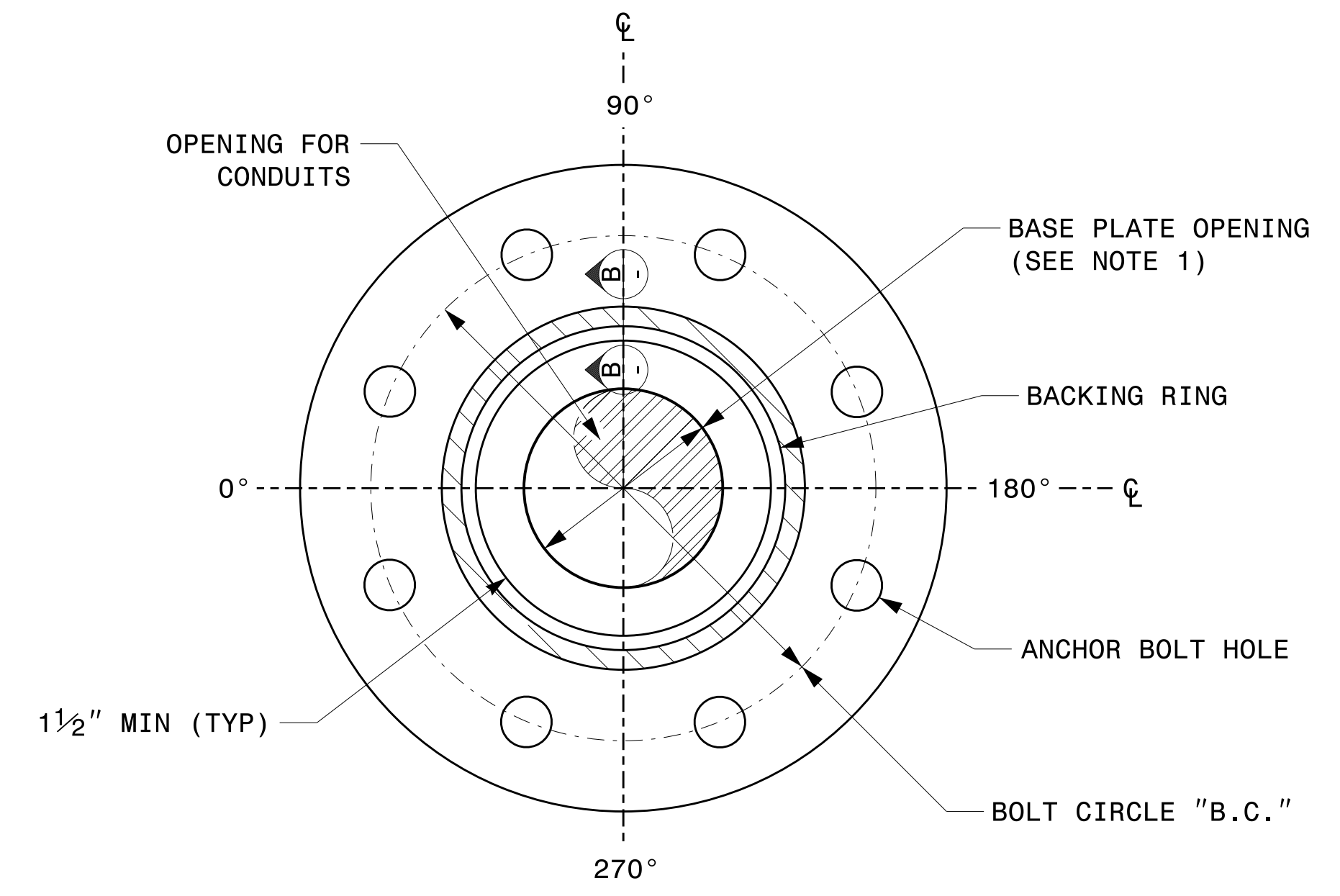
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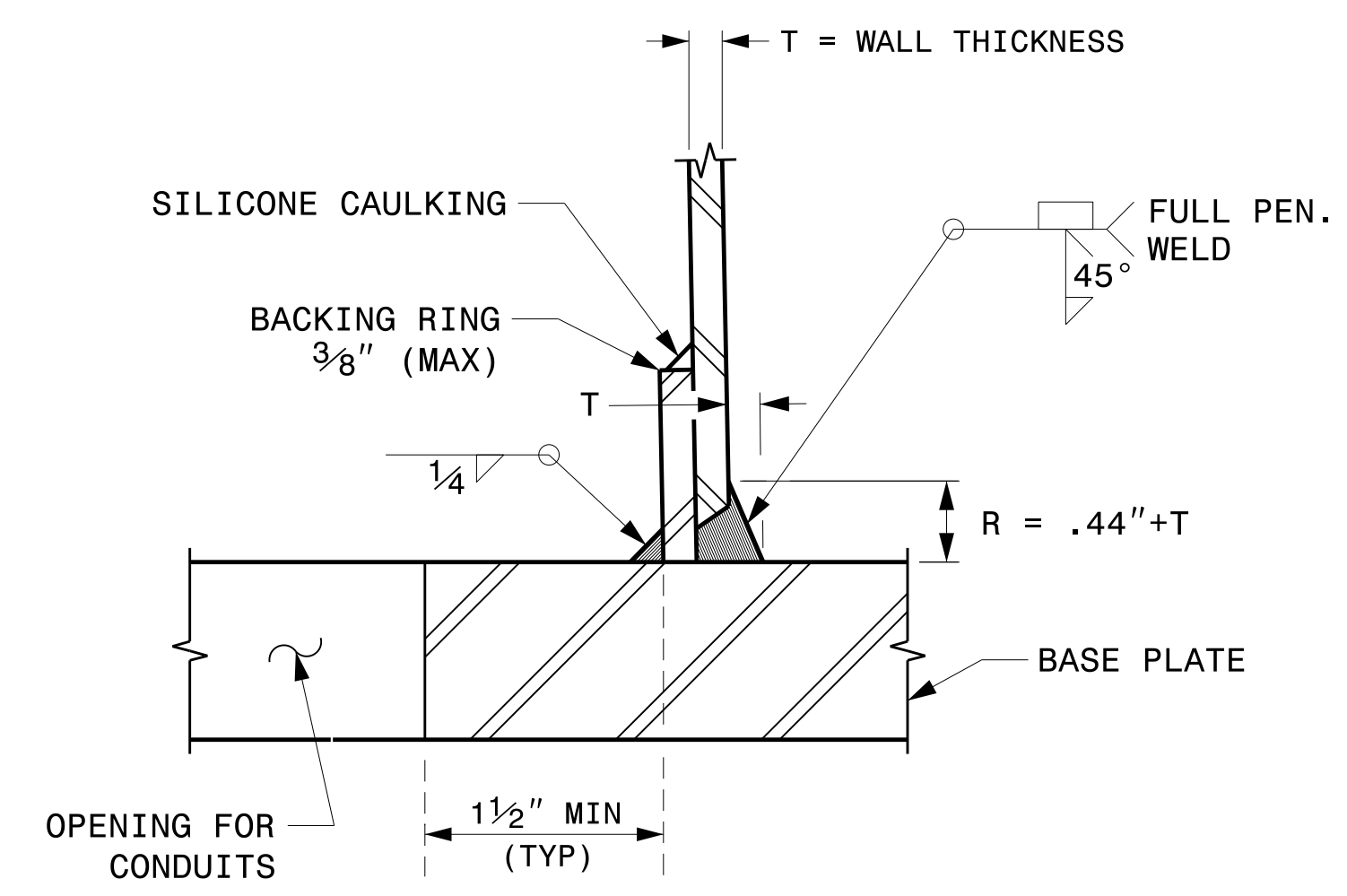
Fabrication Details – Strain Poles

NOTE:

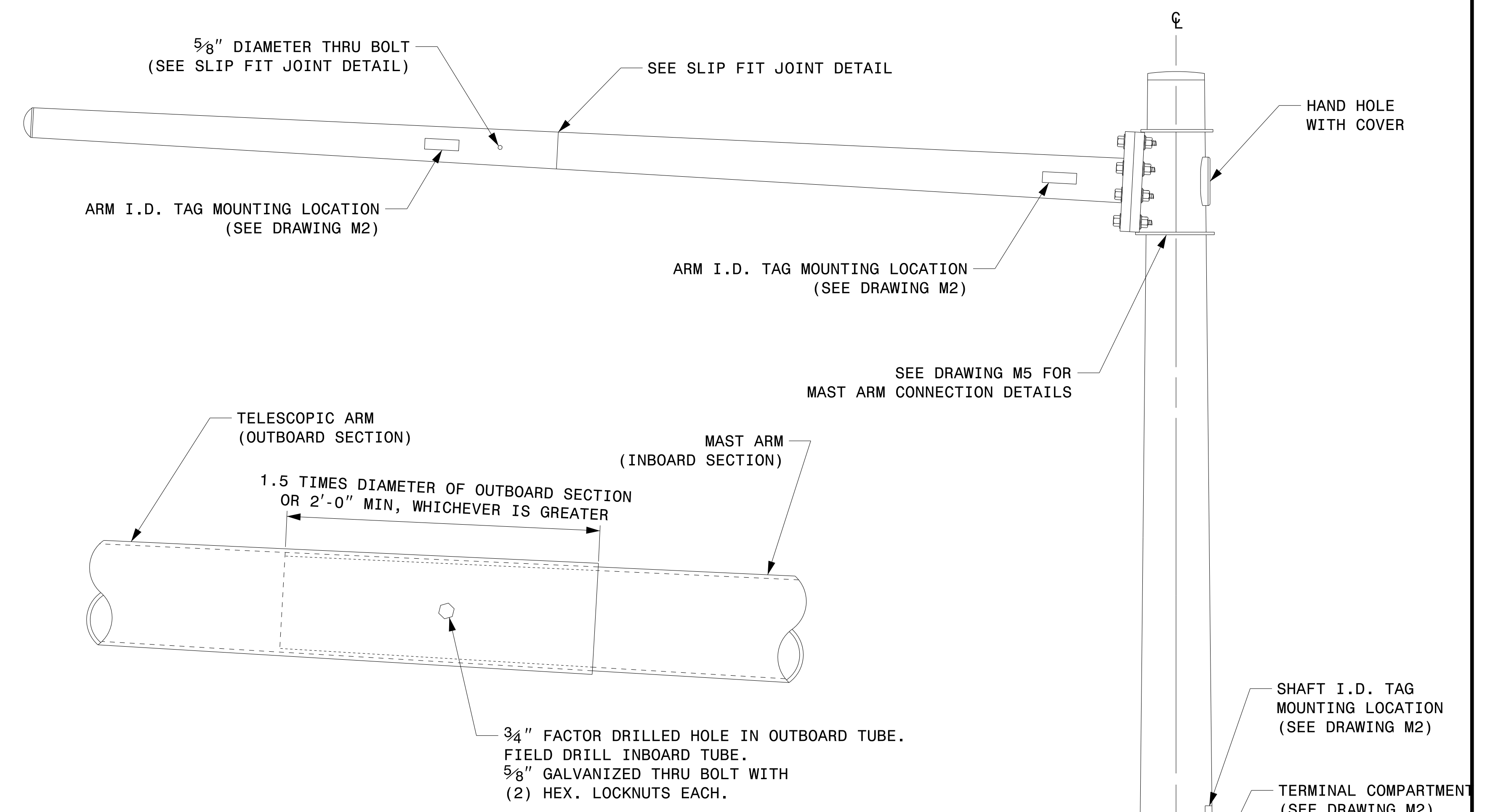
1. OPENING IN POLE BASE PLATE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS 3 1/2" BUT SHALL NOT BE LESS THAN 8 1/2".



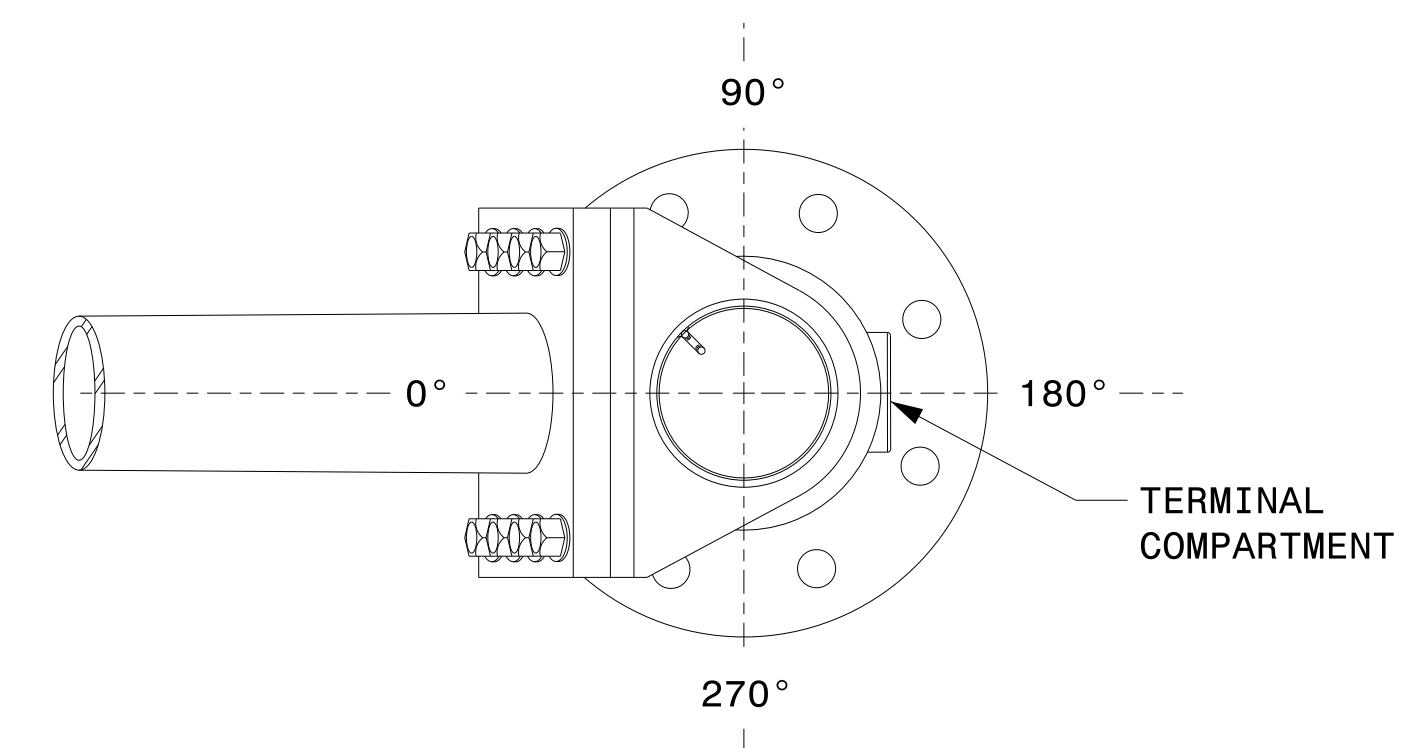
**SECTION A-A
POLE BASE PLATE DETAILS**



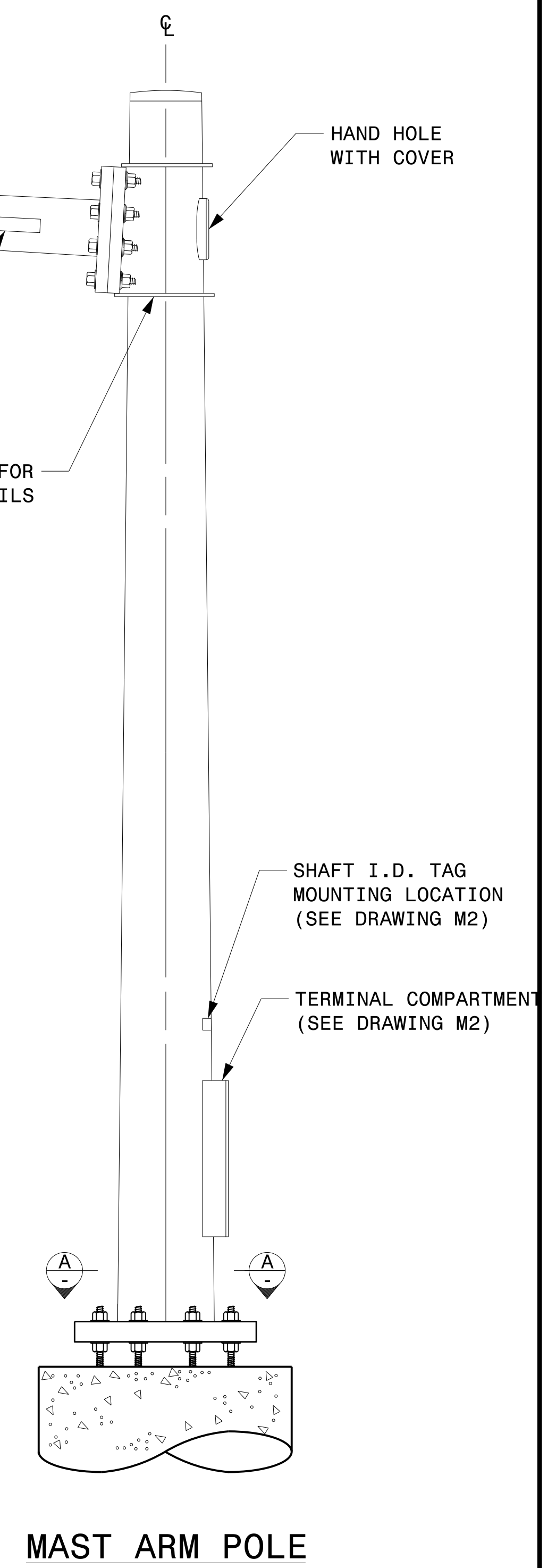
**SECTION B-B
(POLE ATTACHMENT TO BASE PLATE)
FULL-PENETRATION
GROOVE WELD DETAIL**



SLIP FIT JOINT DETAIL FOR MAST ARM



MAST ARM RADIAL ORIENTATION

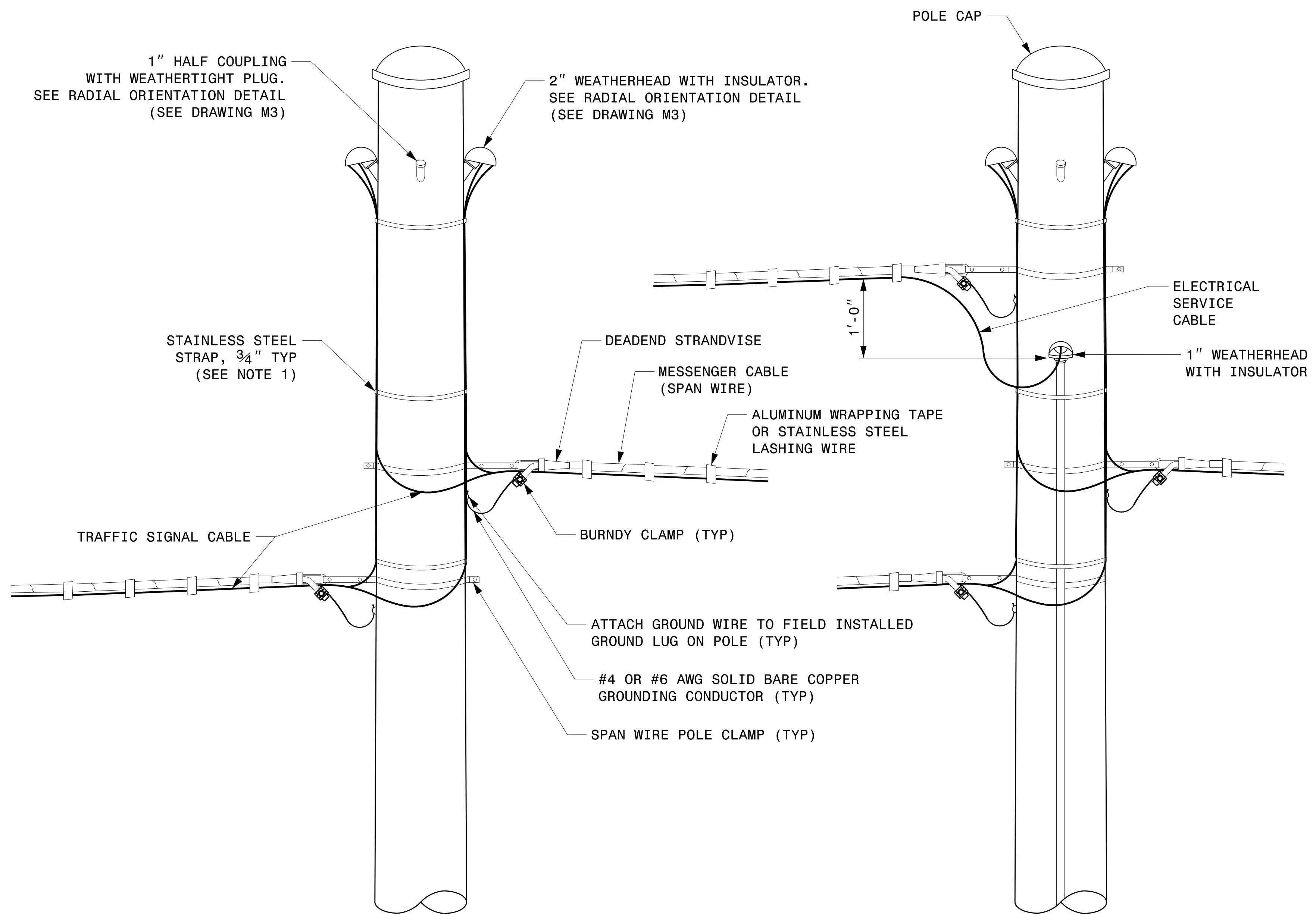


MAST ARM POLE

Fabrication Details – Mast Arm Poles

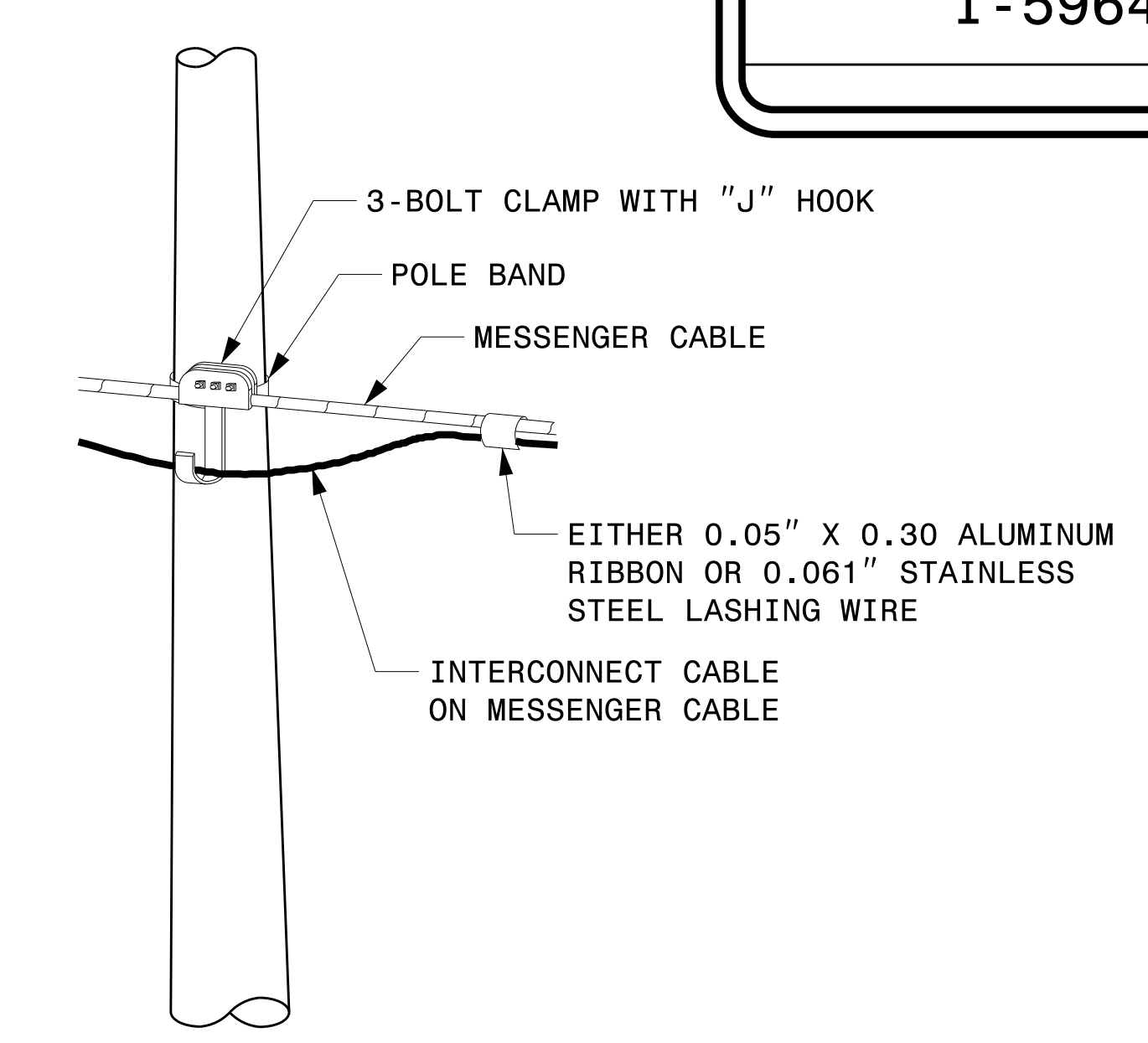
03-df-2023 10-315 S:\SSS\415 Signal\Signal Design\Structures\Drawings\2024 Metal Pole Std Drawings for LRFD\2024 Sig.M4 Str. Fabrication Details-Mast Arm Poles.dgn Kedar Tigon

<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Mast Arm Poles</p>		<p>SEAL</p>					
	<p>PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON</p> <p>PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR</p>	<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE		
REVISIONS	INIT.	DATE						

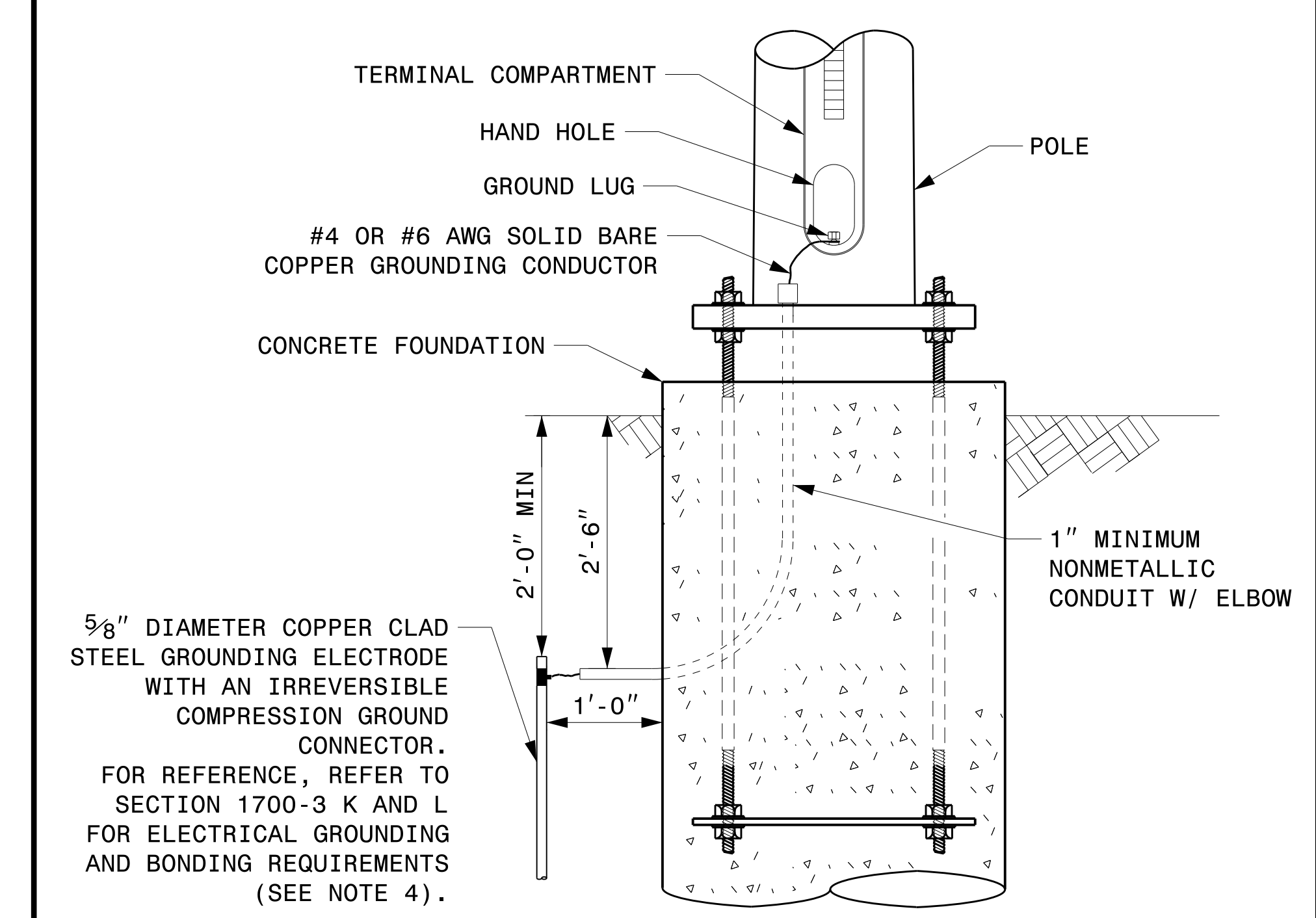


STRAIN POLE ATTACHMENTS

- NOTES:
1. STRAP ALL SIGNAL CABLES TO THE SIDE OF THE POLE WITH 3/4" 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

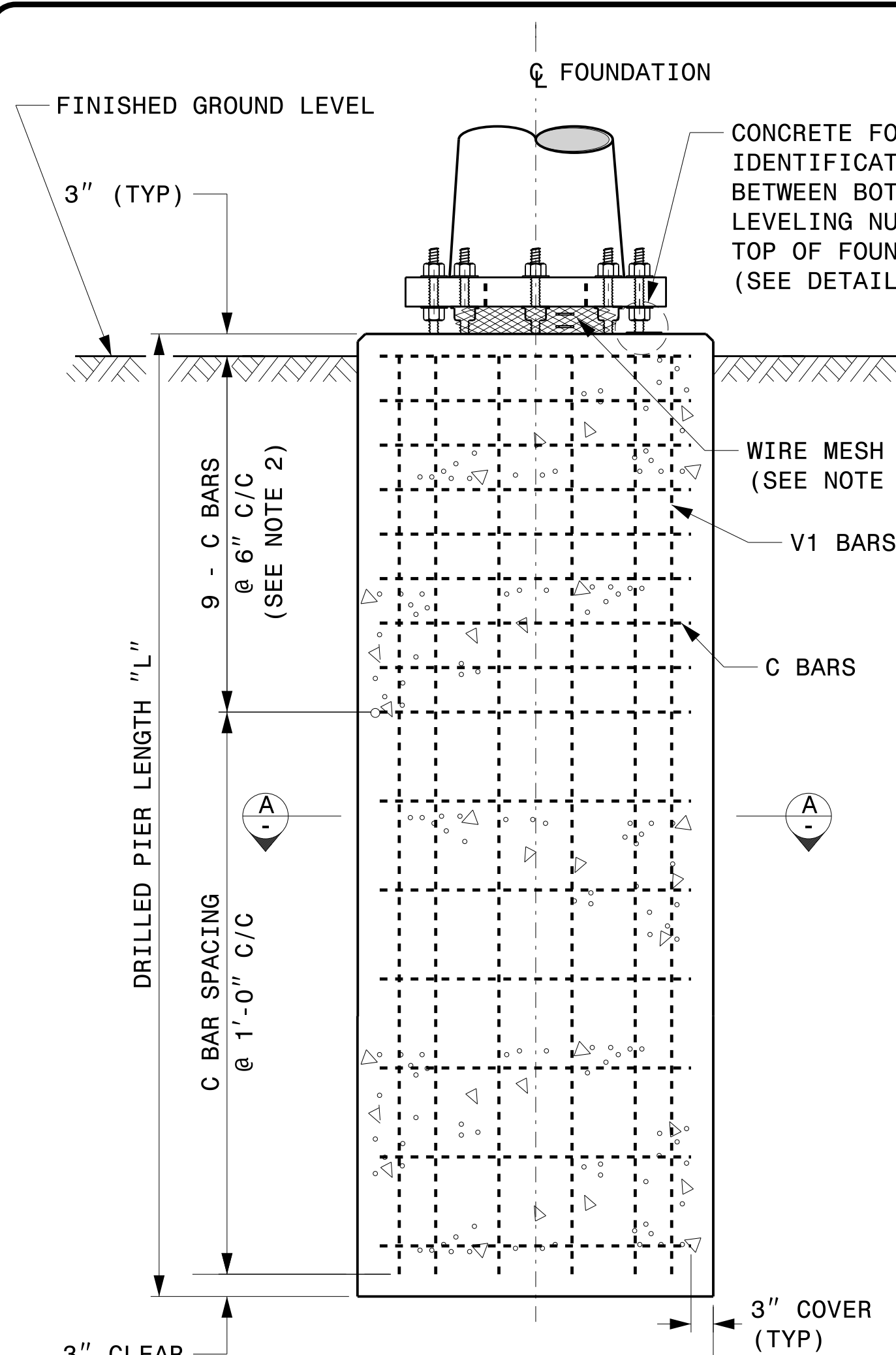


METAL POLE GROUNDING DETAIL FOR STRAIN POLE AND MAST ARM

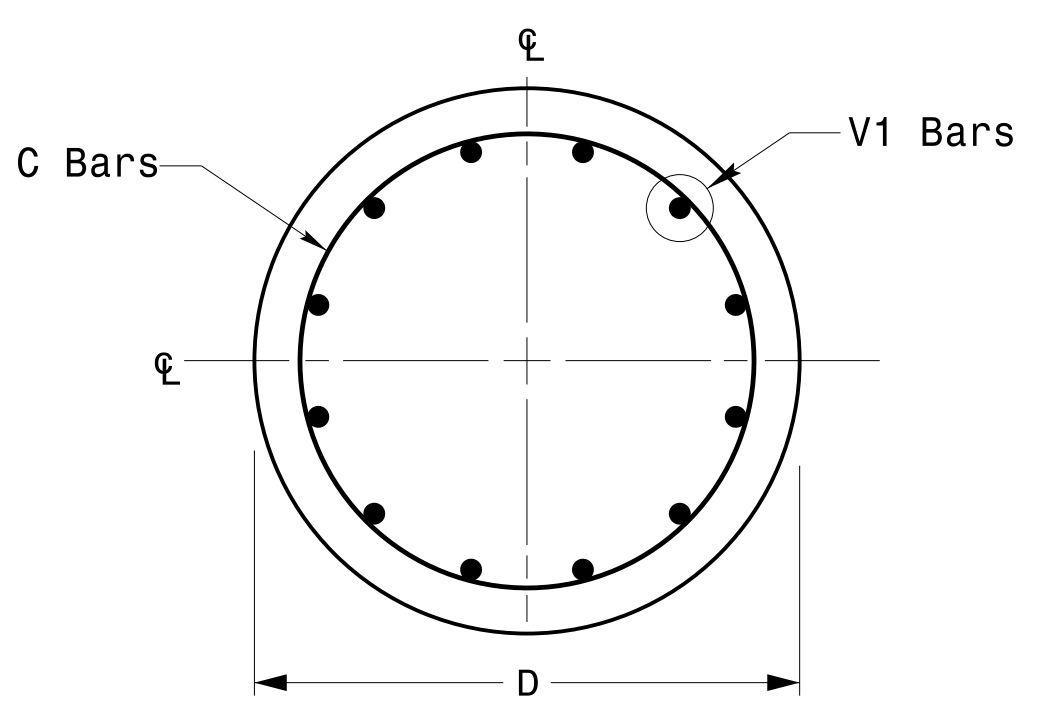
03-dct-2023-10-41
S:\ISS\04115\SIGNAL\Signal Section\Structures\Drawings\2024\Metal Pole Str. Fabrication Details-Strain Poles.dgn
Kedar Tigon

 750 N. Greenfield Pkwy, Garner, NC 27529	Prepared in the Offices of: Typical Fabrication Details For Strain Pole Attachments		SEAL KEVIN C. DURIGON ENGINEER
	PLAN DATE: SEPTEMBER 2023 DESIGNED BY: C.F. ANDREWS PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR	REVISIONS INIT. DATE		DocuSigned by: Kevin Durigon 4B23DC79B3784DA

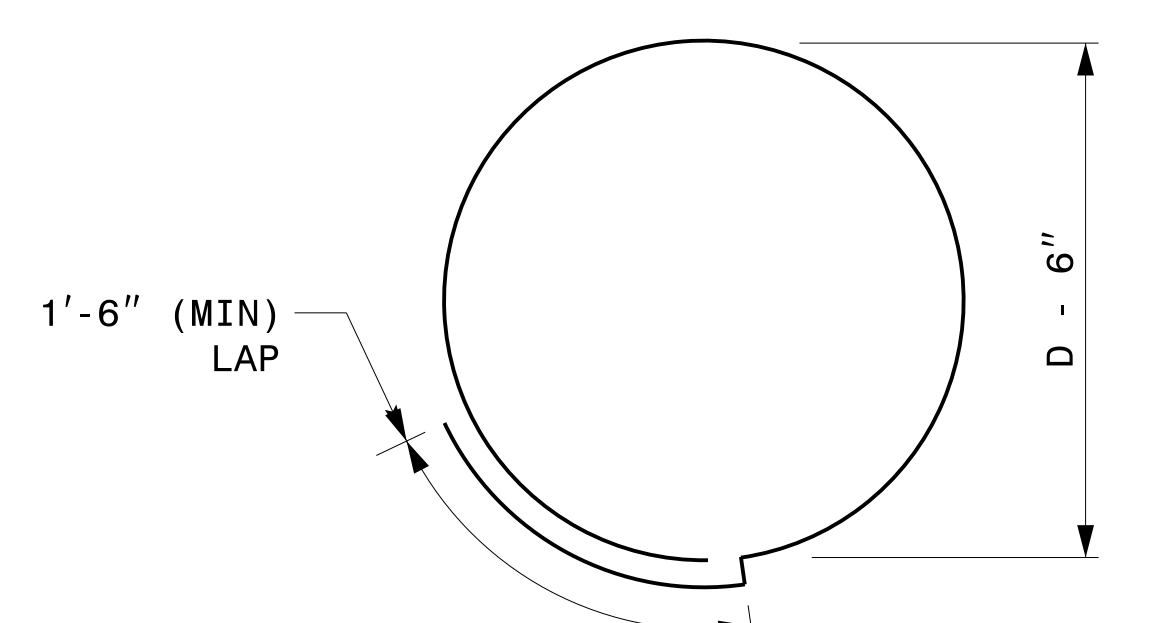
Fabrication Details – Strain Pole Attachments



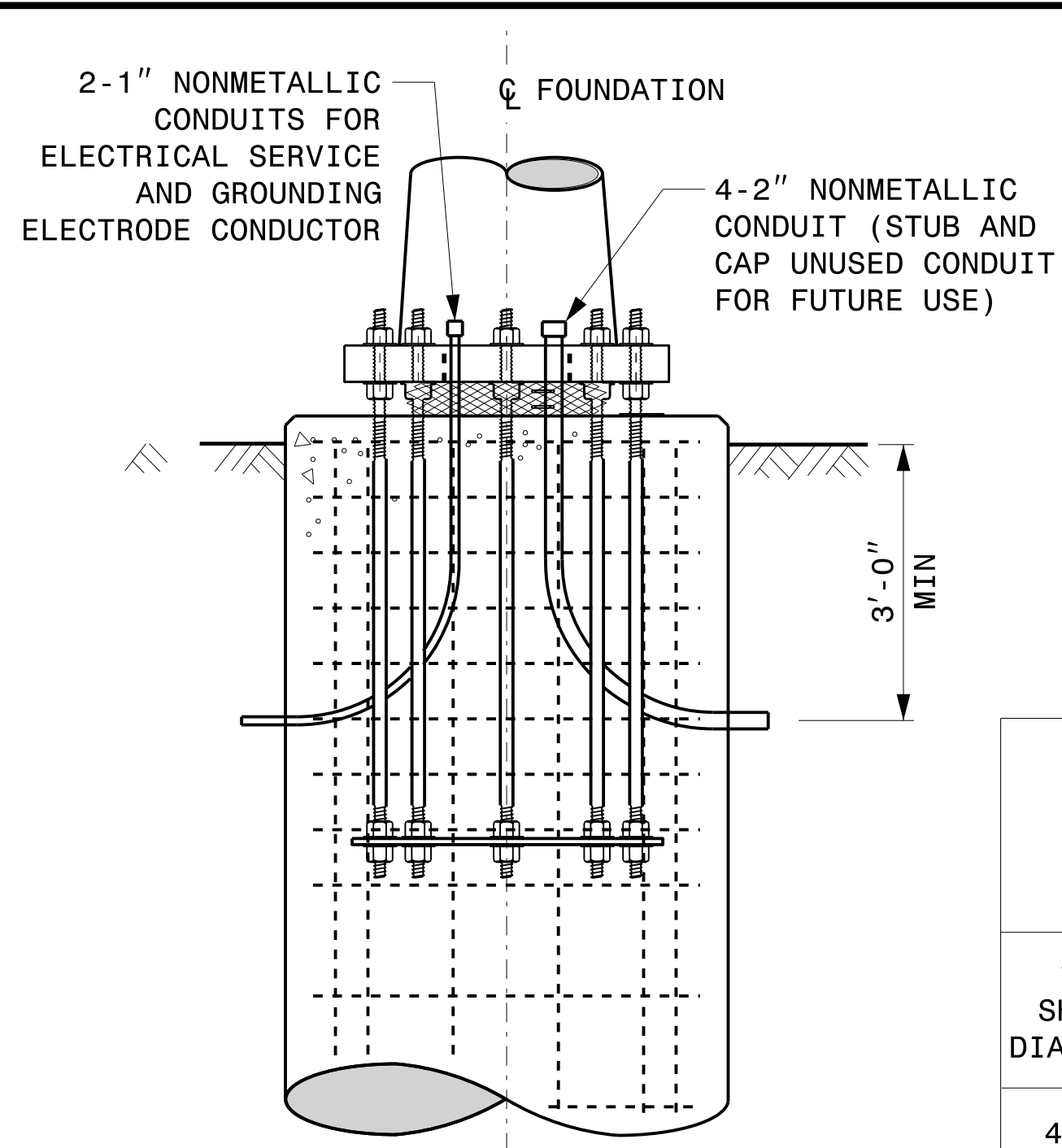
CONCRETE SHAFT ELEVATION



SECTION A-A



TYPICAL "C" BAR DETAIL



TYPICAL FOUNDATION CONDUIT DETAILS

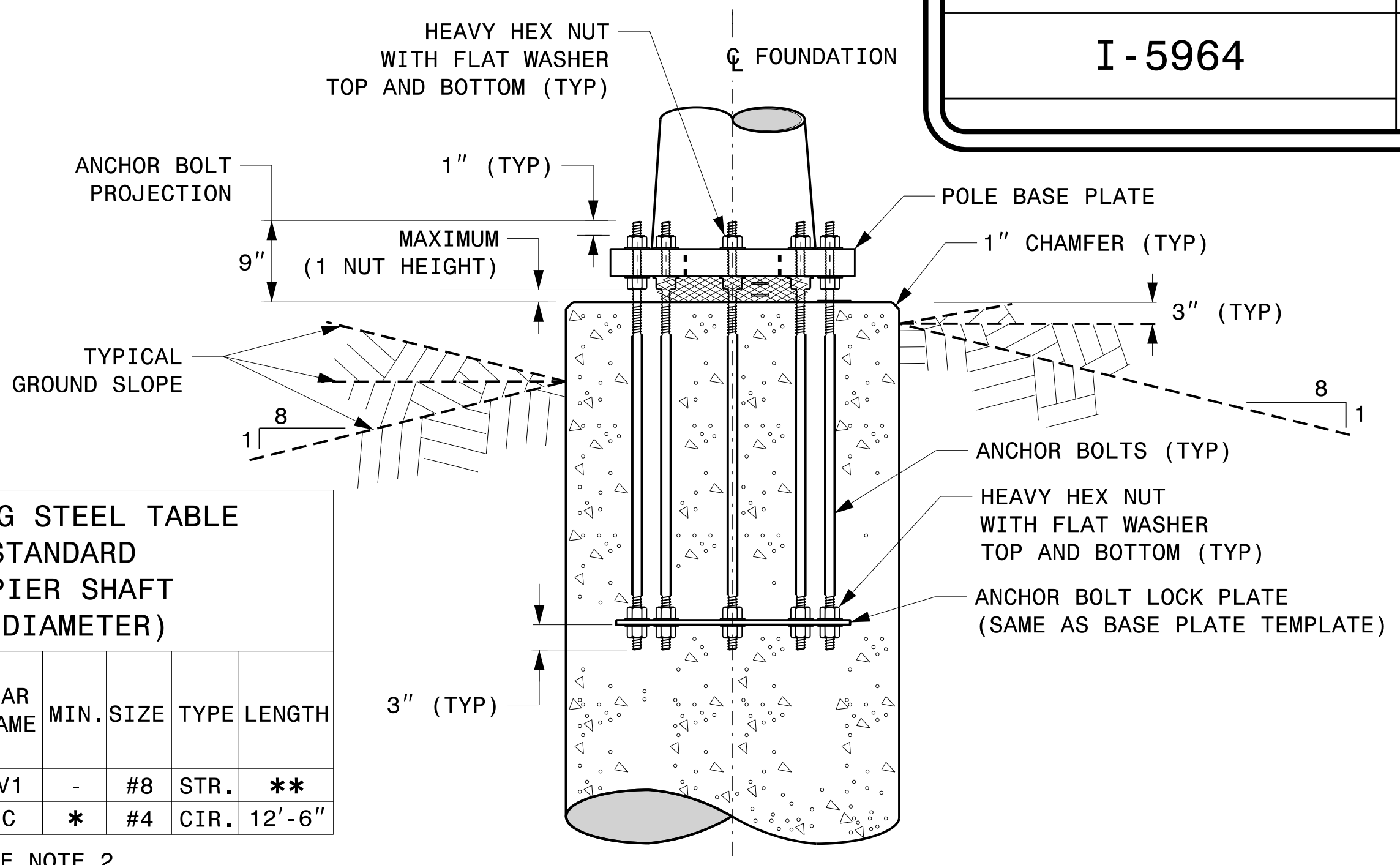
GENERAL NOTES:

- IF ACTUAL SUBSURFACE CONDITIONS DIFFER SIGNIFICANTLY FROM BORING DATA, CONTACT THE ENGINEER BEFORE EXCAVATING OR PLACING CONCRETE.
- 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 INTO THE CAGE.
- 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.
- PROVIDE 2" TO 5" FOUNDATION PROJECTION ABOVE GROUND LEVEL, DEPENDING ON THE GROUND SLOPE.
- 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.
- 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](https://connect.ncdot.gov/resources/Specifications%20and%20Special%20Provisions.aspx)
- USE AIR ENTRAINED AA CONCRETE MIX WITH A COMPRESSION STRENGTH OF f'c=4500 psi (MIN) AFTER 28 DAYS.
- USE ASTM A615 GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL. MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
- LOCATE IDENTIFICATION TAG ON TOP OF THE FOUNDATION, DIRECTLY ABOVE THE CONDUIT'S ENTRY POINT.
- 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.
- PREFERRED LOCATION FOR THE I.D. TAG IS AS SHOWN IN DETAIL-A: DIRECTLY ABOVE THE CONDUIT ENTERING THE FOUNDATION.

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4'-0" DIAMETER)

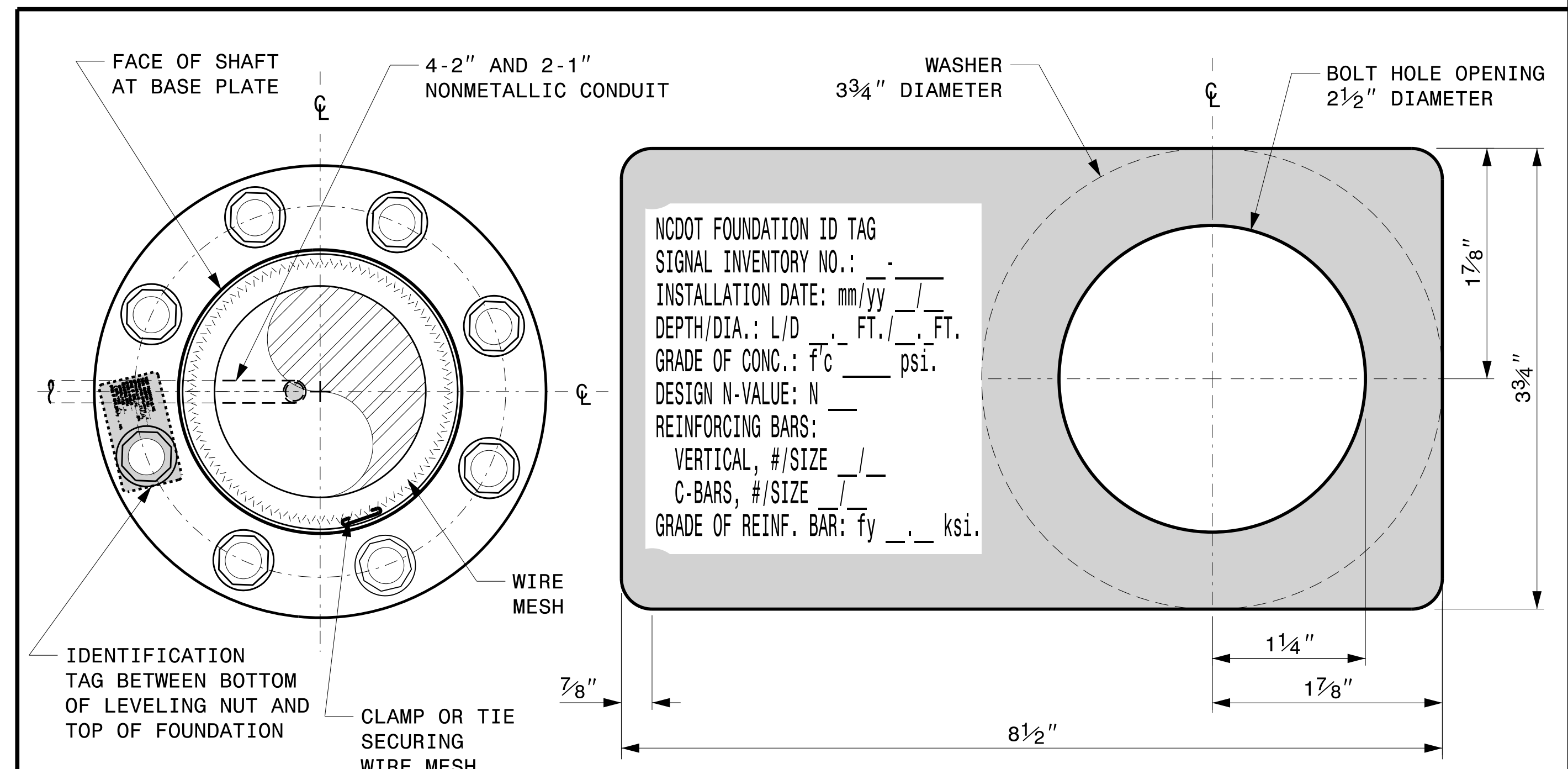
"D" SHAFT DIAMETER	CONCRETE VOLUME (CU. YDS)	BAR NAME	MIN. SIZE	TYPE	LENGTH
4'-0"	.465 X L	V1	-	#8 STR.	**
		C	*	#4 CIR.	12'-6"

* SEE NOTE 2
** SEE NOTE 3



TYPICAL FOUNDATION ANCHOR BOLT DETAILS

(REINFORCING CAGE NOT SHOWN FOR CLARITY)



CONCRETE FOUNDATION IDENTIFICATION TAG DETAILS

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

DETAIL-A

	<p>Construction Details For Foundations</p>	
	<p>PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON</p>	<p>PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR</p>
<p>DocuSigned by: <i>Kevin Durigon</i></p>	<p>4B23DC78F3784DA</p>	<p>09/21/2023</p>

03-dt-2023-10-45
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Kedar Tigon

Construction Details - Foundations

SOIL CONDITION

PROJECT I.D. NO.

SHEET NO.

I - 5964

Sig.M8

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.)
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

GENERAL NOTES:

- 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.
- USE CHAIRS AND SPACERS TO MAINTAIN PROPER CLEARANCE.
- FOR FOUNDATION, ALWAYS USE AIR-ENTRAINED CONCRETE MIX.


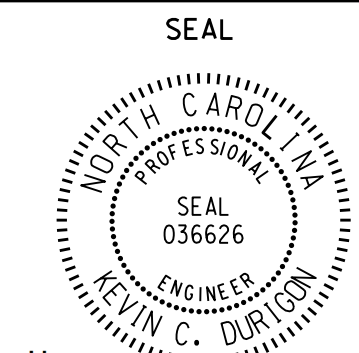
FOUNDATION SELECTION:

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

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

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Standard Strain Pole Foundation – All Soil Conditions

 <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Standard Strain Pole Foundation for All Soil Conditions</p>		<p>SEAL</p> 											
	<p>PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON</p> <p>PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR</p>	<p>REVISIONS</p> <table border="1"> <tr><th>NO.</th><th>DATE</th><th>DESCRIPTION</th></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>		NO.	DATE	DESCRIPTION								
NO.	DATE	DESCRIPTION												
<p>SCALE</p> <p>0 NA</p> <p>NONE</p>	<p>DATE</p> <p>09/21/2023</p>		<p>DATE</p>											

- 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 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
BOND RISER AND MESSENGER CABLE TO POLE GROUND
- 61 BOND RISER TO POLE GROUND
- 62 BOND MESSENGER CABLE TO POLE GROUND
- 63 BOND MESSENGER CABLE 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

	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	
	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	

ATTACHMENT POINT:

'SS
YYY

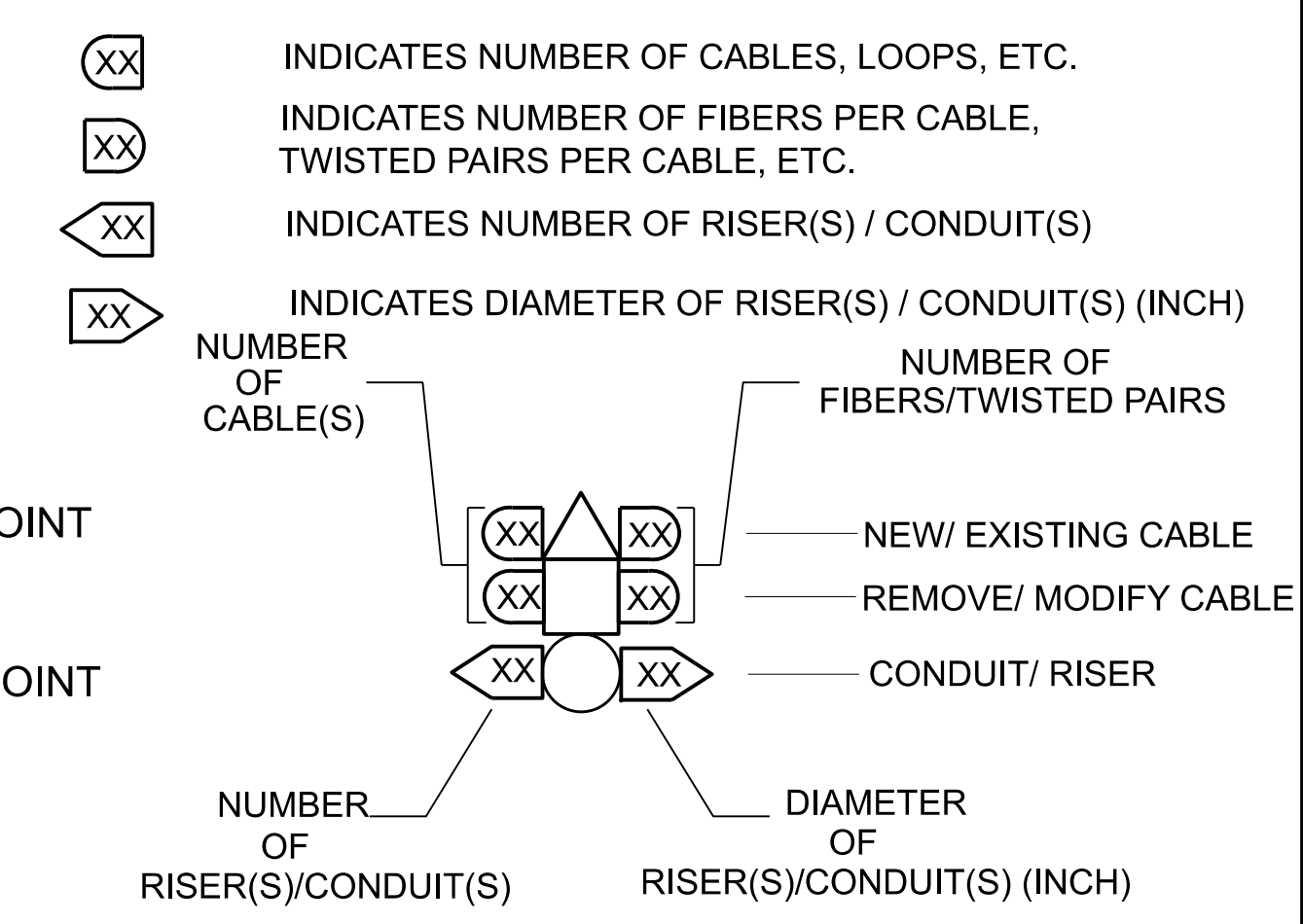
DISTANCE ABOVE (IN)/ATTACHMENT POINT REFERENCE POINT

YYY
XX"/'SS

REFERENCE POINT DISTANCE BELOW (IN)/ATTACHMENT POINT

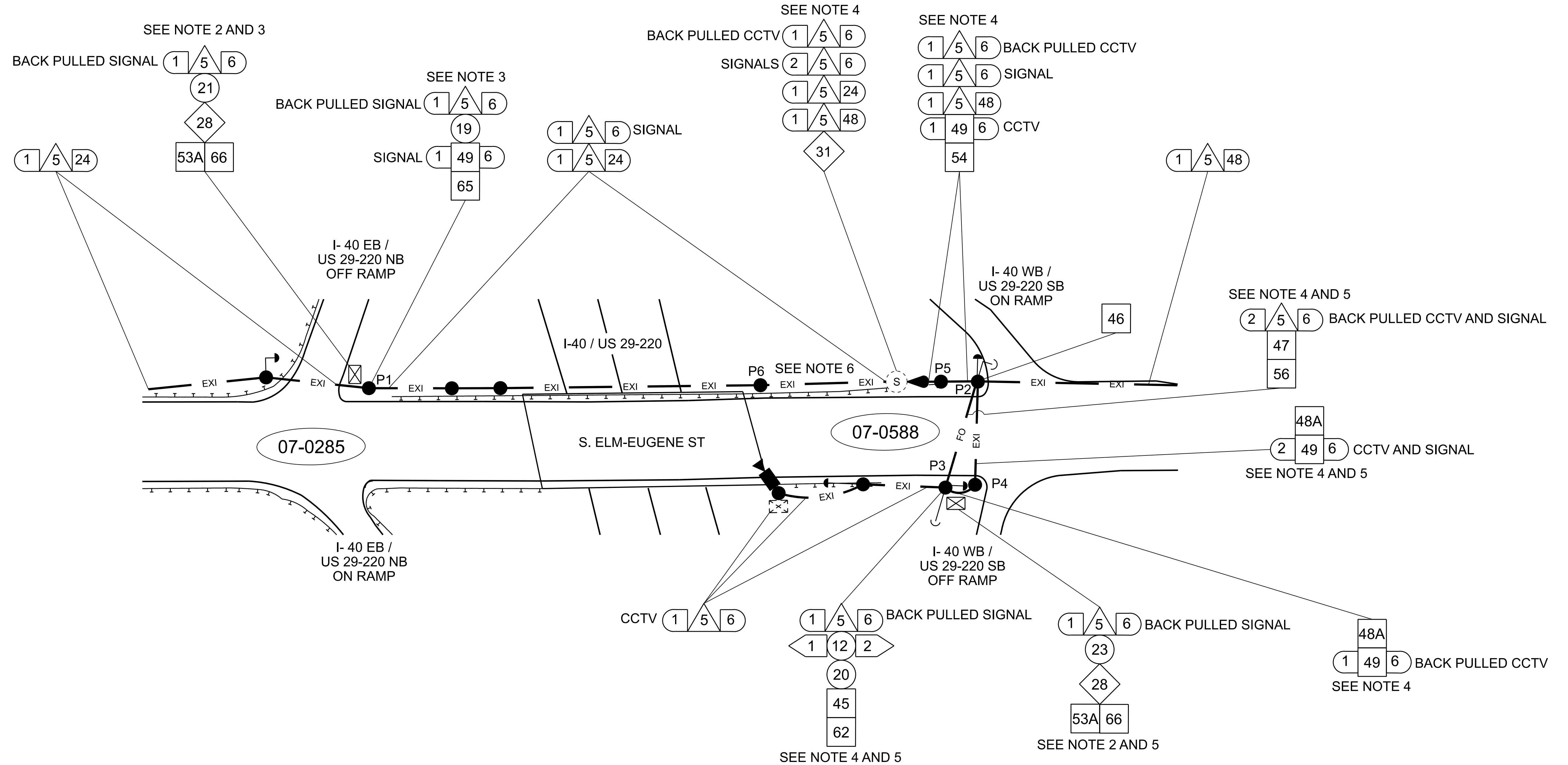
"SS" REFERENCE LOCATION
FS = FRONT SIDE OF POLE
BS = BACK SIDE OF POLE

CONSTRUCTION NOTE SYMBOLOGY KEY



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<p>Prepared in the Offices of: 750 N. Greenfield Pkwy., Garner, NC 27529</p>	CONSTRUCTION NOTES		<p>SEAL</p> <p>NORTH CAROLINA PROFESSIONAL ENGINEERS</p> <p>SEAL 042578</p> <p>MATTHEW T. CARLISLE</p> <p>SIGNATURE: </p> <p>DATE: 10/07/2025</p>
	<p>DIVISION 7 GUILFORD COUNTY GREENSBORO</p> <p>PLAN DATE: OCTOBER 2025 REVIEWED BY: </p> <p>PREPARED BY: M. DIAZ</p>	<p>REVISIONS</p> <p>INIT. DATE</p>	



NOTES:

- FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF GREENSBORO ENGINEERING MANAGER AT 336-433-7218 TO ARRANGE FOR THE CITY 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 ENGINEERING MANAGER 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.
- REMOVE ETHERNET EDGE SWITCH FROM EXISTING CABINETS AND REINSTALL IN NEW CABINETS.
- CUT EXISTING 6-FIBER SIGNAL CABLE SPLICES IN INTERCONNECT CENTER. BACK PULL 6-FIBER DROP CABLE FROM CABINET TO THE TOP OF THE EXISTING RISER ON POLE P1. REROUTE AS SHOWN. RESPLICE IN CABINET AS SHOWN IN SPLICE DETAILS.
- CUT EXISTING 6-FIBER CCTV CABLE SPLICES IN SPLICE ENCLOSURE. BACKPULL 6-FIBER CCTV CABLE FROM SPLICE ENCLOSURE TO POLE P2, BACKPULL FROM POLE P2 TO POLE P4, AND BACKPULL FROM POLE P4 TO POLE P3. REROUTE AS SHOWN. ATTACH NCDOT CABLES ONTO EXISTING ATTACHMENT POINTS. RESPLICE AS SHOWN IN SPLICE DETAILS.
- CUT EXISTING 6-FIBER SIGNAL CABLE SPLICES IN INTERCONNECT CENTER. BACKPULL 6-FIBER SIGNAL DROP CABLE FROM EXISTING CABINET TO POLE P4 AND BACKPULL FROM POLE P4 TO POLE P2. REROUTE AS SHOWN. ATTACH NCDOT CABLES ONTO EXISTING ATTACHMENT POINTS. RESPLICE IN CABINET AS SHOWN IN SPLICE DETAILS.
- TIGHTEN EXISTING SPAN BETWEEN POLES P5 AND P6 TO BE 12" ABOVE SPECTRUM.

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<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>GREENSBORO SIGNAL SYSTEM COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS</p>		
	<p>DIVISION 7 GUILFORD COUNTY GREENSBORO</p> <p>PLAN DATE: OCTOBER 2025 REVIEWED BY: <i>Gary Brun</i></p> <p>PREPARED BY: M. DIAZ</p>	<p>REVISIONS INT. DATE</p>	
<p>SCALE: 0 N/A</p>		<p>SIGNATURE: <i>Matthew T. Carlisle</i></p> <p>DATE: 10/07/2025</p>	

AERIAL SPLICE ENCLOSURE
I- 40 WB/US 29-220 SB RAMPS
AT S ELM-EUGENE ST
SIG. INV. # 07-0285, 07-0588

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

LEGEND

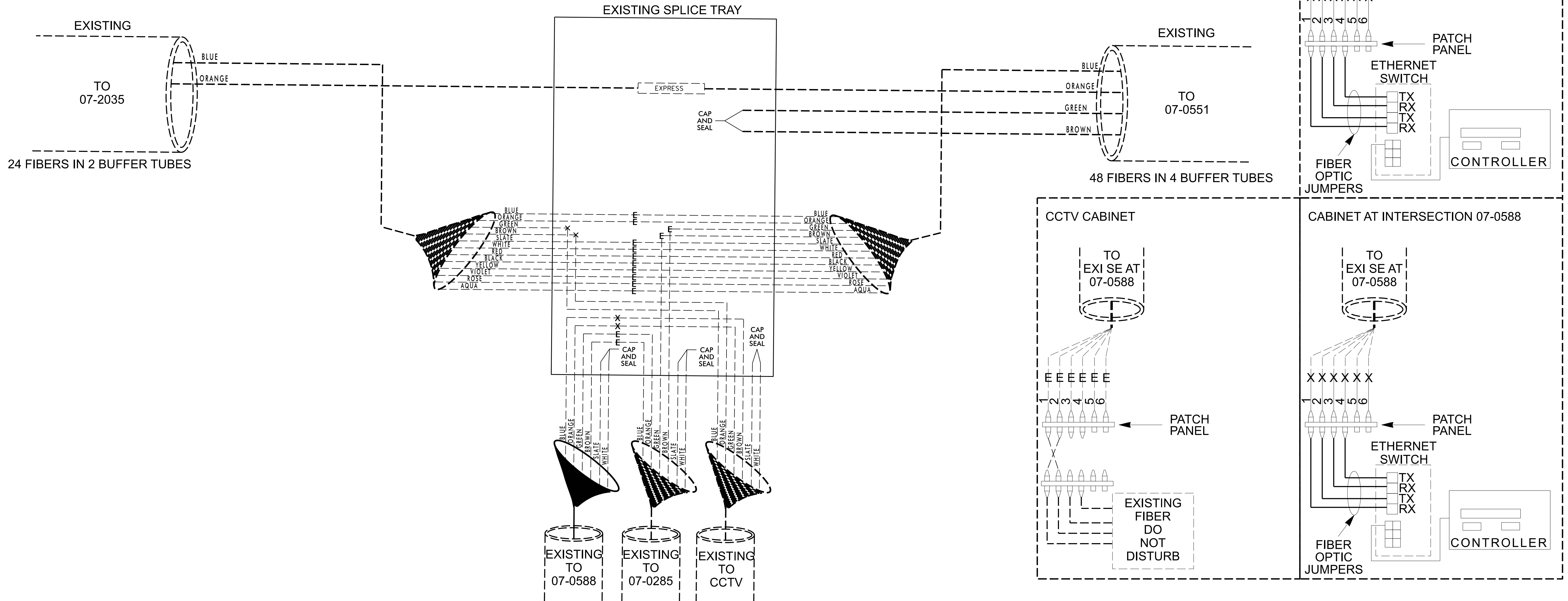
X = FUSION SPLICE
E = EXISTING SPLICE
C = CAP IN TRAY

EXPRESS = EXPRESS ALL FIBERS/
BUFFER TUBES

BUFFER SPLICE = SPLICE ALL FIBERS/
BUFFER TUBES

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 |



NOTES:

- FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF GREENSBORO ENGINEERING MANAGER AT 336-433-7218 TO ARRANGE FOR THE CITY 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 ENGINEERING MANAGER 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
- 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.
- 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"
1) SPLICE LOCATION
2) DATE
3) COMPANY NAME
4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

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

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

	<p>GREENSBORO SIGNAL SYSTEM SPLICE DETAIL</p>		
	<p>DIVISION 7 GUILFORD COUNTY GREENSBORO</p> <p>PLAN DATE: OCTOBER 2025 REVIEWED BY: <i>Greg Gruen</i></p> <p>PREPARED BY: M. DIAZ</p>	<p>REVISIONS INT. DATE</p>	
<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>			<p>SIGNATURE: <i>Matthew T. Carlisle</i></p> <p>DATE: 10/07/2025</p>