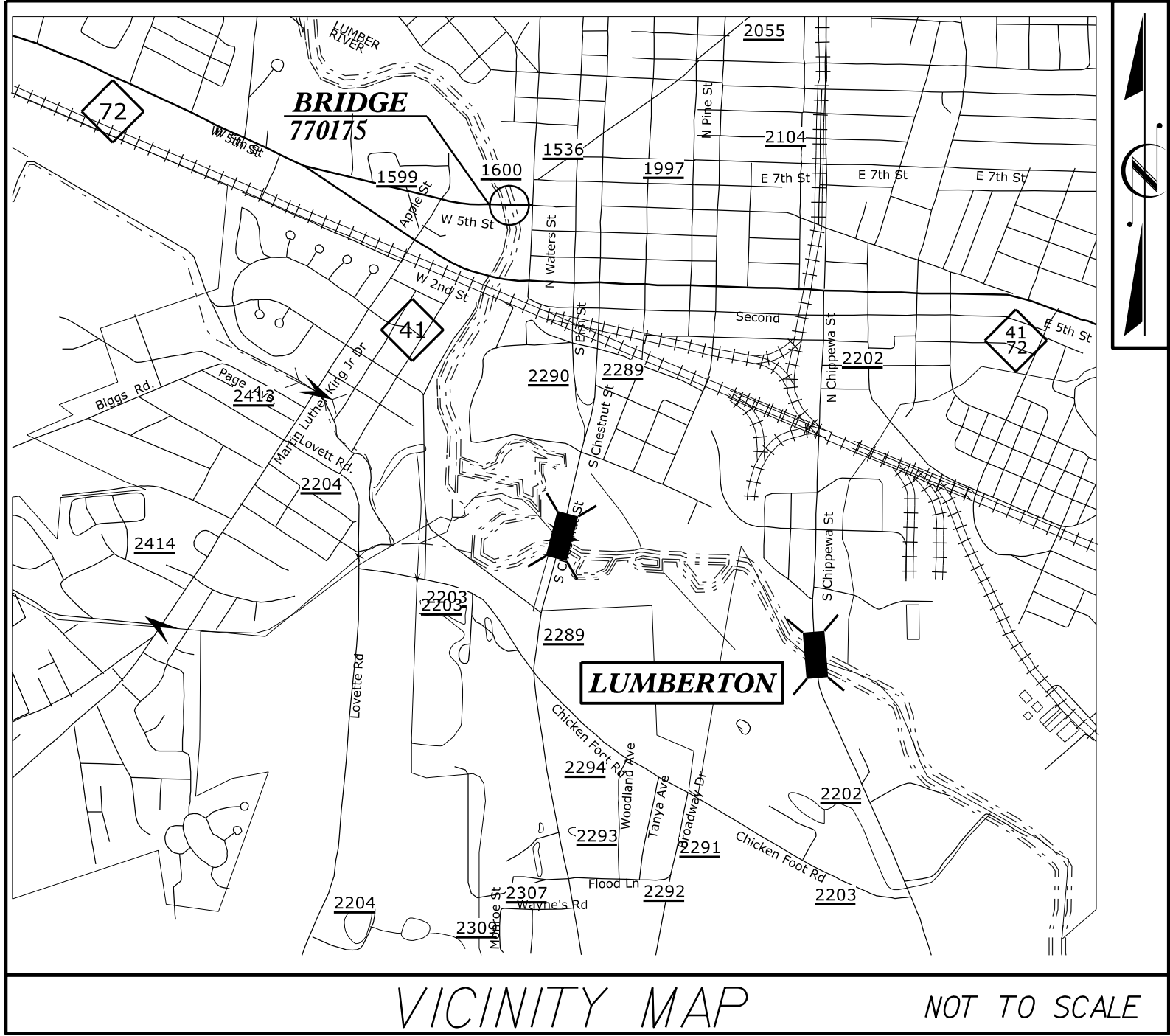


TIP PROJECT: B-5985B

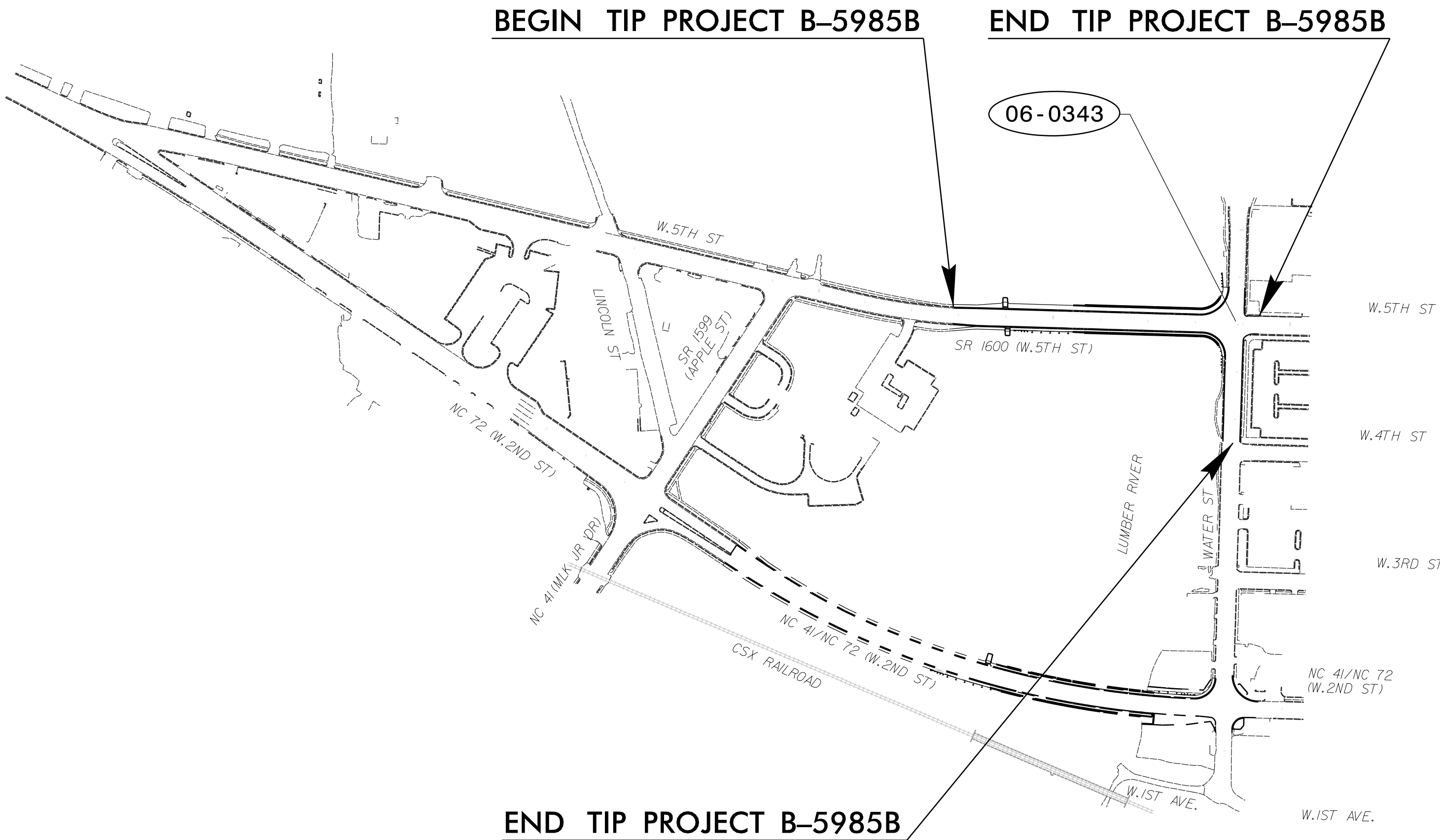
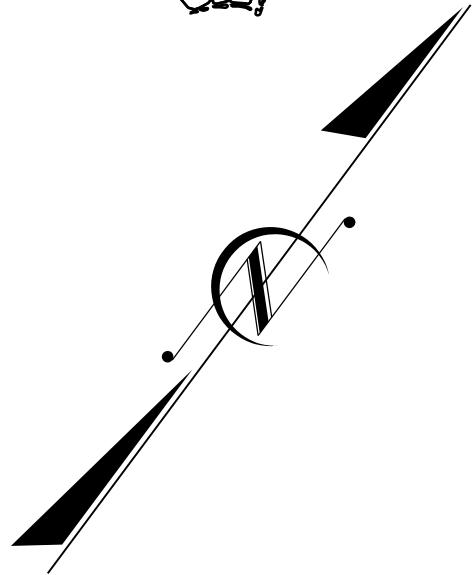
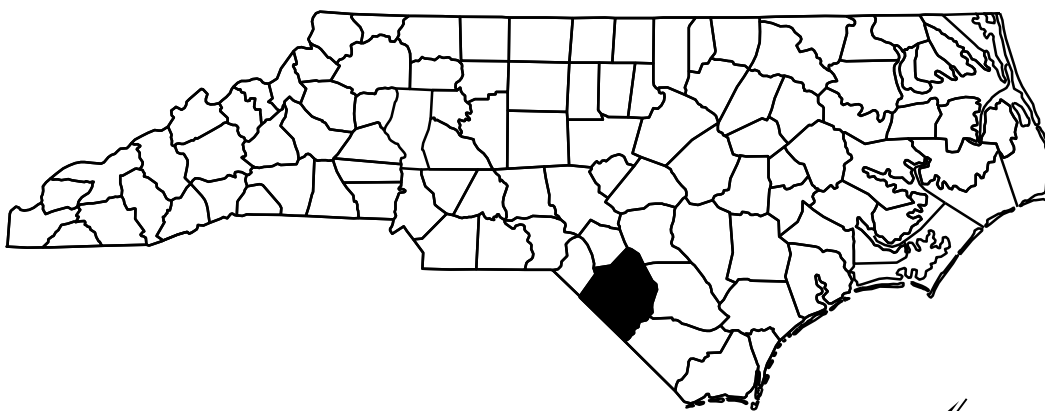
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User: jgalloway



VICINITY MAP NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROBESON COUNTY

LOCATION: BRIDGE NO. 770175 OVER LUMBER RIVER ON SR 1600
TYPE OF WORK: TRAFFIC SIGNALS



Index of Plans	
Sheet #	Location/Description
SIG 1.0	Title Sheet
SIG 2.0 to SIG 2.5	06-0343 - SR 1600 (West 5th Street) @ SR 1536 (Water Street)
MIA to M9	Metal Pole Standards

LEGEND

XX-XXXX - SIGNAL INVENTORY NUMBER

XX-XXXX - SIGNAL REMOVAL

TRANSPORTATION SYSTEMS
MANAGEMENT & OPERATION UNIT

Contacts:

Zachary Little, PE

Signals Engineer, Eastern Region

D. Todd Joyce, PE

Signal Equipment Design Review Engineer

Gregory A. Green

Signal Communication Project Engineer

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

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Regina Muncey, PE

Senior Transportation Engineer

Jason Galloway, PE

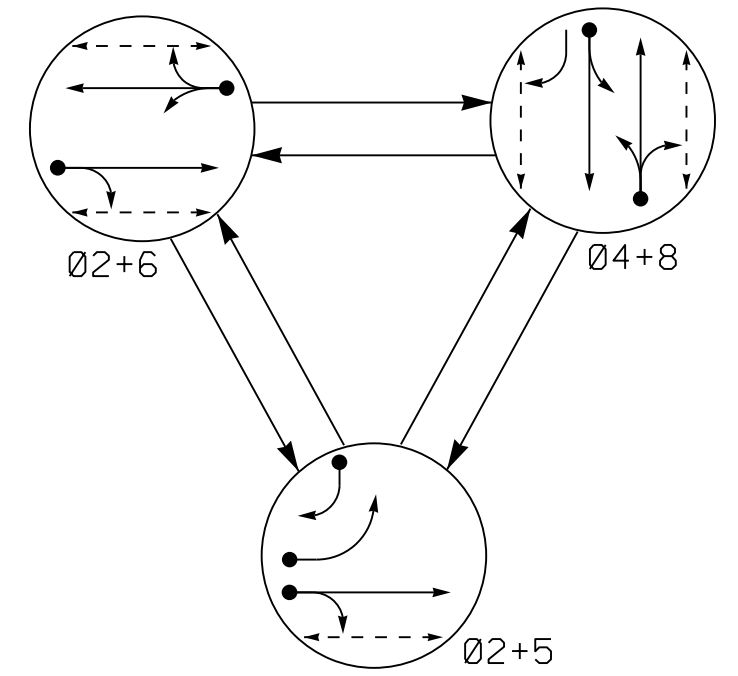
Senior Traffic Engineer

James Hambright

Senior Transportation Technician

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

ALTERNATE PHASING DIAGRAM



35 MPH (-1% Grade)

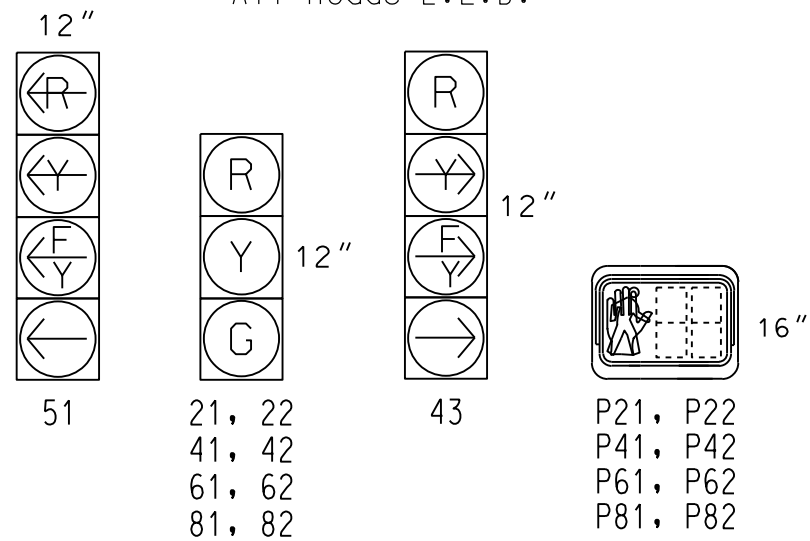
ONLY

R/W

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6x6	70	*	X	2	-	-	X	-	X	-	*
4A	6x40	0	2-4-2	X	4	3.0	-	X	-	X	-	*
5A	6x40	0	*	X	5 #2	★15.0 3.0	-	X	-	X	-	*
5B	6x40	0	2-4-2	X	5	15.0	-	X	-	X	-	X
6A	6x6	70	3	X	6	-	-	X	-	X	-	X
8A	6x40	0	2-4-2	X	8	10.0	-	X	-	X	-	X

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. Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red display.
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. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. This intersection uses multizone microwave detection. Install detectors according to 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.
10. Relocate existing wireless radio, antenna, and any additional communication equipment and/or cabling to new cabinet.
11. Closed Loop System Data:
Controller Asset #: 0343,
Master Asset #10624.

All Heads L.E.D.



MAXTIME TIMING CHART					
FEATURE	PHASE				
	2	4	5	6	8
Walk *	12	14	–	11	13
Ped Clear	8	12	–	8	8
Min Green *	10	7	7	10	7
Passage *	3.0	2.0	2.0	3.0	2.0
Max 1 *	40	15	25	40	15
Yellow Change	4.0	3.9	3.0	4.0	3.9
Red Clear	2.5	2.2	3.2	2.5	2.2
Red Revert	5.0	2.0	2.0	2.0	2.0
Added Initial *	–	–	–	–	–
Maximum Initial *	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–
Time To Reduce *	–	–	–	–	–
Minimum Gap	–	–	–	–	–
Advance Walk	5	7	–	4	6
Non Lock Detector	–	X	X	–	X
Vehicle Recall	SOFT RECALL	–	–	SOFT RECALL	–
Dual Entry	–	X	–	–	X

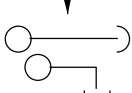
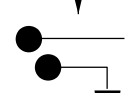
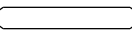
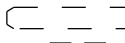
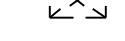
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

SEE NOTE 12,
13, & 14

Special Notes

12. Signal equipment shown on the bridge is for location purposes only. Install requires signal equipment mounted on the bridge rail as shown in the structure plans. Route required wiring that connects this equipment to the signal cabinet through conduit shown on E1 and E2 of the Electrical plans.
13. Pedestrian signal pushbutton to be mounted on bridge rail per structure drawings.
14. Modified Type II Signal Pedestals to be mounted on bridge rail per structure drawings. Mount pedestrian signal heads so the bottom of the signal housing, including brackets, is not less than 7 feet or more than 10 feet above sidewalk level.

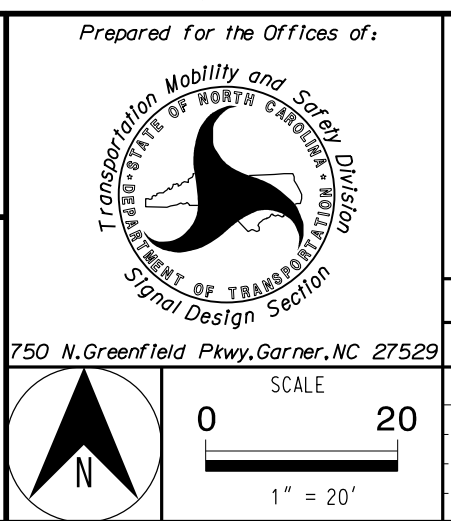
LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Oversized Junction Box	
	Junction Box	
-----	2-in Underground Conduit	-----
N/A	Right of Way	-----
	Directional Arrow	
	Metal Pole with Mastarm	
	Directional Drill	N/A
	Microwave Detection Area	N/A
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Combined Thru and Left Arrow	
	Right Arrow "ONLY" Sign (R3-5R)	
	Right "TURNING VEHICLES" Yield "TO" Pedestrians Sign (R10-15R)	
	Out of Pavement Detector	
N/A	Curb Ramp	

Signal Upgrade - Final Design



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SR 1600 (West 5th Street)
at
Water Street

Division 6 Robeson County Lumberton

PLAN DATE: January 2025	REVIEWED BY: J Galloway
-------------------------	-------------------------

PREPARED BY: J. Hambright		REVIEWED BY: R M Muncey	
REVISIONS		DATE	

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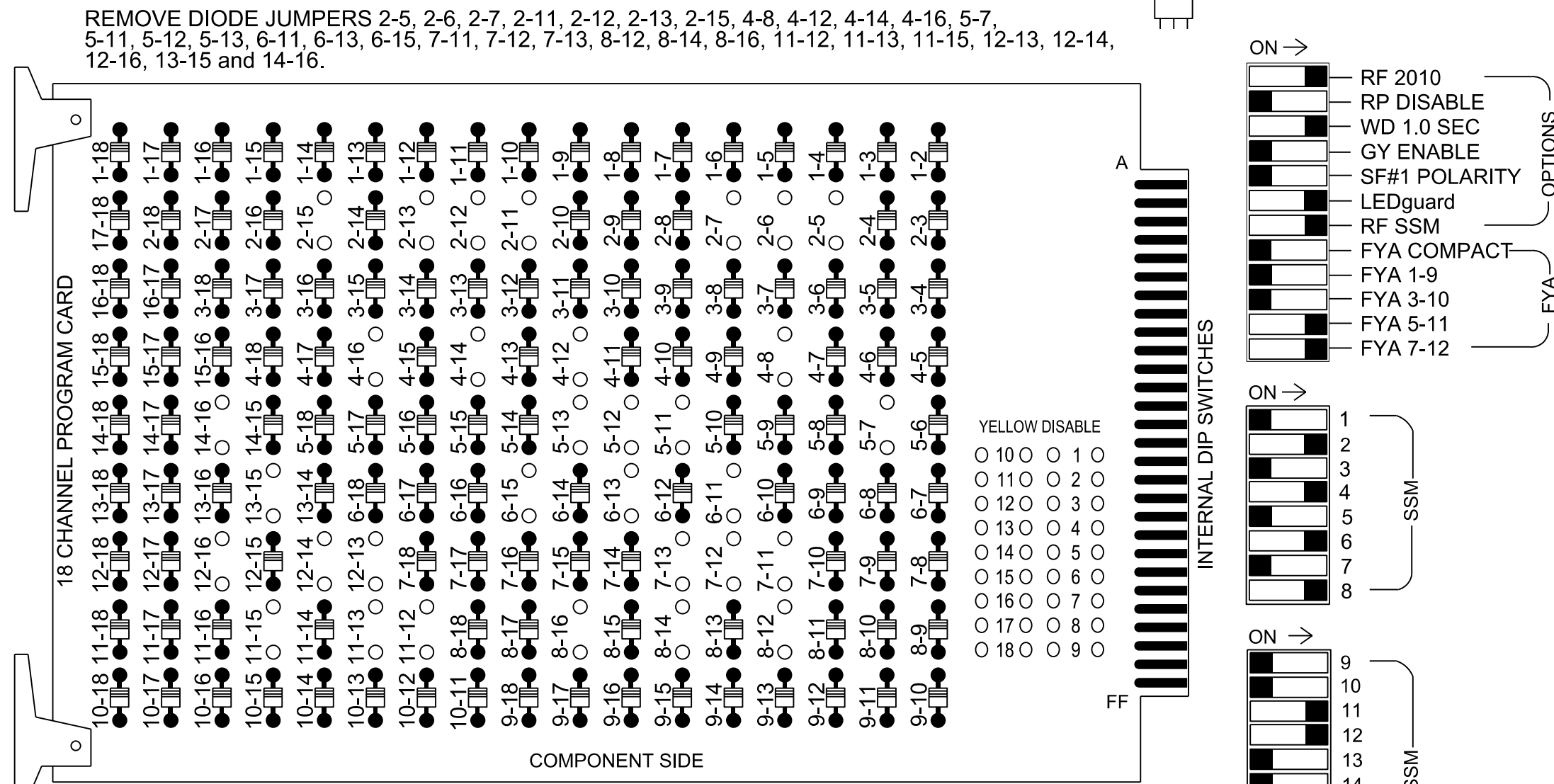
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DocuSigned by:
Regina M. Muncey 1/8/2025
SIGNATURE DATE
CTREF:0034456...
SIG. INVENTORY NO. 06-0343

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



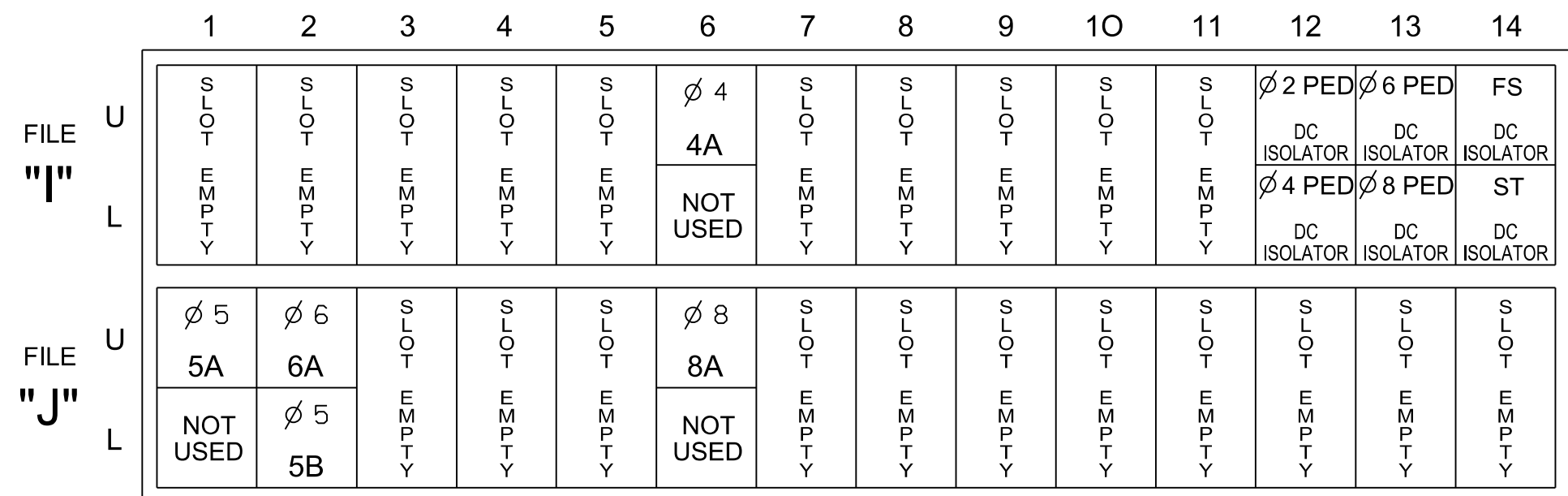
REMOVE JUMPERS AS SHOWN

NOTES:

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

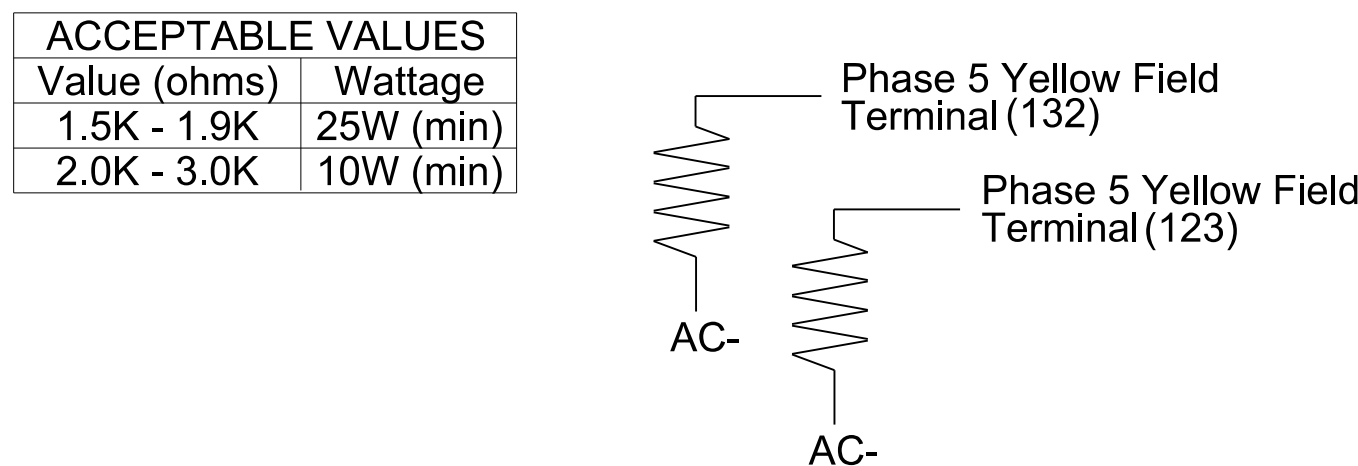
INPUT FILE POSITION LAYOUT

(front view)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program phase 2, 4, 6, and 8 for Simultaneous Start.
4. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the D06-24 _Lumberton System.

EQUIPMENT INFORMATION

Controller.....	2070LX
Cabinet.....	332 w/ Aux
Software.....	Q-Free MAXTIME
Cabinet Mount.....	Base
Output File Positions.....	18 With Aux. Output File
Load Switches Used.....	S2, S3, S5, S6, S7, S8, S9 S10, S11, S12, AUX S4, AUX S5
Phases Used.....	2, 2PED, 4, 4PED, 5, 6, 6PED, 8, 8PED
Overlap "1".....	Not Used
Overlap "2".....	Not Used
Overlap "3".....	*
Overlap "4".....	*

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
4A	TB4-9,10	I6U	41	3	8	4	3.0		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0		X		X	
				-	31 ★	2	3.0		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X		X	
5B	TB3-7,8	J2L	44	6	17	5	15.0		X		X	
8A	TB5-9,10	J6U	42	4	22	8	10.0		X		X	
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2	NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.					
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						
P81,P82	TB8-8,9	I13L	70	36	8	PED 8						

*For the detectors to work as shown on the signal design plan see the Detector Programming Detail for Alternate Phasing on sheet 2 of 3.

SPECIAL DETECTOR NOTE

For Zones 2A and 5A, install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

For Detection Zone 5A, the equipment placement is typical for a NCDOT installation. Inputs associated with these slots are compatible with alternate operation programming located on the following sheets of this electrical detail.

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	5	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	51★	61,62	P61, P62	43★	81,82	P81, P82	NU	NU	NU	51★	43★	NU
RED		128			101			134			107						A101	
YELLOW		129			102		★	135		★	108							
GREEN		130			103			136			109							
RED ARROW																A114		
YELLOW ARROW																A115	A102	
FLASHING YELLOW ARROW																A116	A103	
GREEN ARROW							133			124								
			113			104			119			110						
			115			106			121			112						

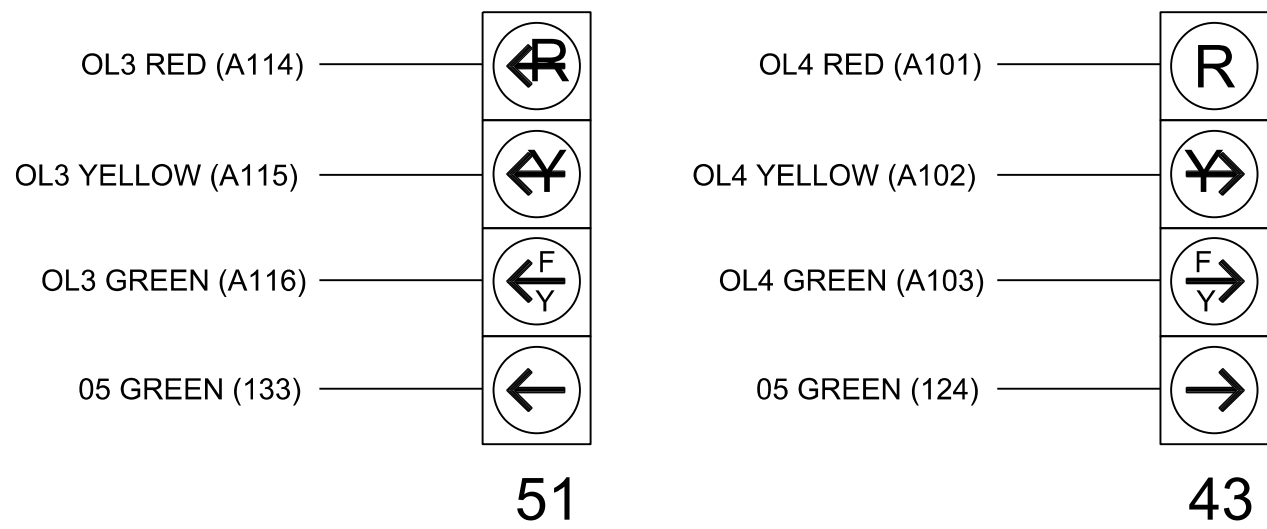
NU = Not Used

* 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)



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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0343
DESIGNED: January 2025
SEALED: 1/8/2025
REVISED: N/A

Final Design
Electrical Detail - Sheet 1 of 3



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ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:



SR 1600 (West 5th Street)
at
Water Street

Division 6 Robeson County Lumberton

PLAN DATE: January 2025	REVIEWED BY: R M Muncey
-------------------------	-------------------------

PREPARED BY: J Galloway	REVIEWED BY:
-------------------------	--------------

REVISIONS	INIT.	DATE
-----------	-------	------



Signed by: Jason Galloway 1/9/2024

DATE

SIG. INVENTORY NO. 06-034

SIG. INVENTORY NO. 06-034

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2		X		2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6		X	X	6
7	Phase Vehicle	5		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 →

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
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	6	4
Modifier Phases	5	5
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL
FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	3	4
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	-	4
Modifier Phases	5	5
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

← NOTICE INCLUDED PHASE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0343
DESIGNED: January 2025
SEALED: 1/8/2025
REVISED: N/A

MAXTIME DETECTOR PROGRAMMING DETAIL
FOR ALTERNATE PHASING LOOP 5A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector	Call Phase	Delay
15	5	3.0
31	0	-

5A

MAXTIME STARTUP AND SOFTWARE FLASH
PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

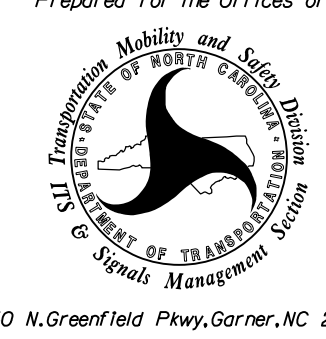
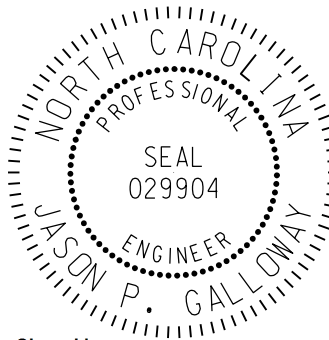
Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

Final Design
Electrical Detail - Sheet 2 of 3

Stantec Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672		ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	SR 1600 (West 5th Street) at Water Street Division 6 Robeson County Lumberton <table><tr><td>PLAN DATE: January 2025</td><td>REVIEWED BY: R M Muncey</td></tr><tr><td>PREPARED BY: J Galloway</td><td>REVIEWED BY:</td></tr><tr><td>REVISIONS</td><td>INIT.</td><td>DATE</td></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>	PLAN DATE: January 2025	REVIEWED BY: R M Muncey	PREPARED BY: J Galloway	REVIEWED BY:	REVISIONS	INIT.	DATE										 Signed by: <u>Jason Galloway</u> 1/9/2025 1001E2B40B4B4E DATE SIG. INVENTORY NO. 06-0343
PLAN DATE: January 2025	REVIEWED BY: R M Muncey																			
PREPARED BY: J Galloway	REVIEWED BY:																			
REVISIONS	INIT.	DATE																		

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO <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 head 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3.0 seconds.

ALL RED BACKUP PROGRAMMING

Front Panel
Main Menu >Controller >Sequence & Phs Config>Backup Prevention > Backup Through Red

Web Interface
Home >Controller >Backup Prevention >Backup Calls Phase Plans > (scroll down) to Backup Through Red

Backup Through All Red

Sequence	Backup Through All Red
1	YES

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.

PROJECT REFERENCE NO.	SHEET NO.
B-5985B	SIG-2.3

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

BACKUP PREVENTION PROGRAMMING

Front Panel
Main Menu >Controller >Sequence & Phs Config >Backup Prevention > Backup Protection Plan

Web Interface
Home >Controller> Backup Prevention >Backup Protection Plan

Sequence 1

No Backup Phase	1	2	3	4	5	6	7	8
Serve Phase 1	-	-	-	-	-	-	-	-
Serve Phase 2	-	-	-	-	-	-	-	-
Serve Phase 3	-	-	-	-	-	-	-	-
Serve Phase 4	-	-	-	-	-	-	-	-
Serve Phase 5	-	-	-	-	-	-	-	-
Serve Phase 6	-	-	-	-	X	-	-	-
Serve Phase 7	-	-	-	-	-	-	-	-
Serve Phase 8	-	-	-	-	-	-	-	-

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0343
DESIGNED: January 2025
SEALED: 1/8/2025
REVISED: N/A

Final Design
Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

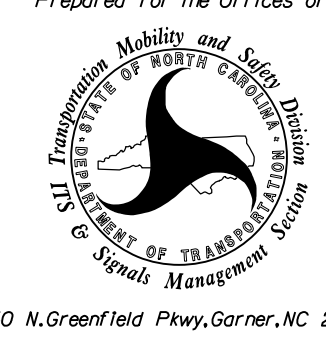
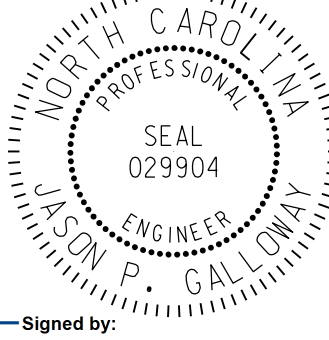
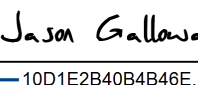
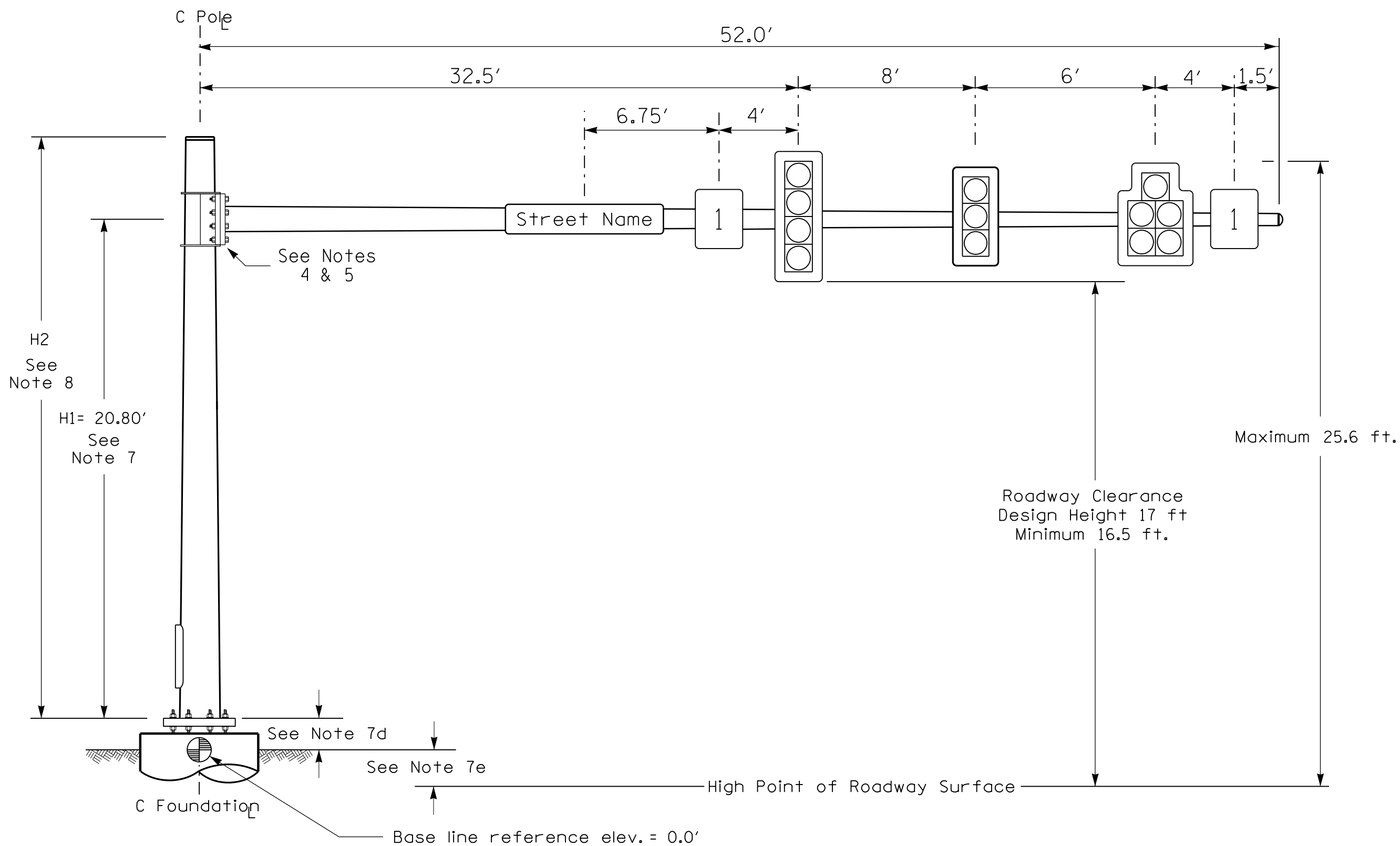
 Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672	ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N.Greenfield Pkwy, Garner, NC 27529	SR 1600 (West 5th Street) at Water Street Division 6Robeson CountyLumberton PLAN DATE: January 2025REVIEWED BY: R M Muncey PREPARED BY: J GallowayREVIEWED BY: <table><tr><td>REVISIONS</td><td>INIT.</td><td>DATE</td></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><tr><td> </td><td> </td><td> </td></tr></table>	REVISIONS	INIT.	DATE													 Signed by:  1001E2R40R4B46E1/9/2025 SIG. INVENTORY NO. 06-0343
REVISIONS	INIT.	DATE																

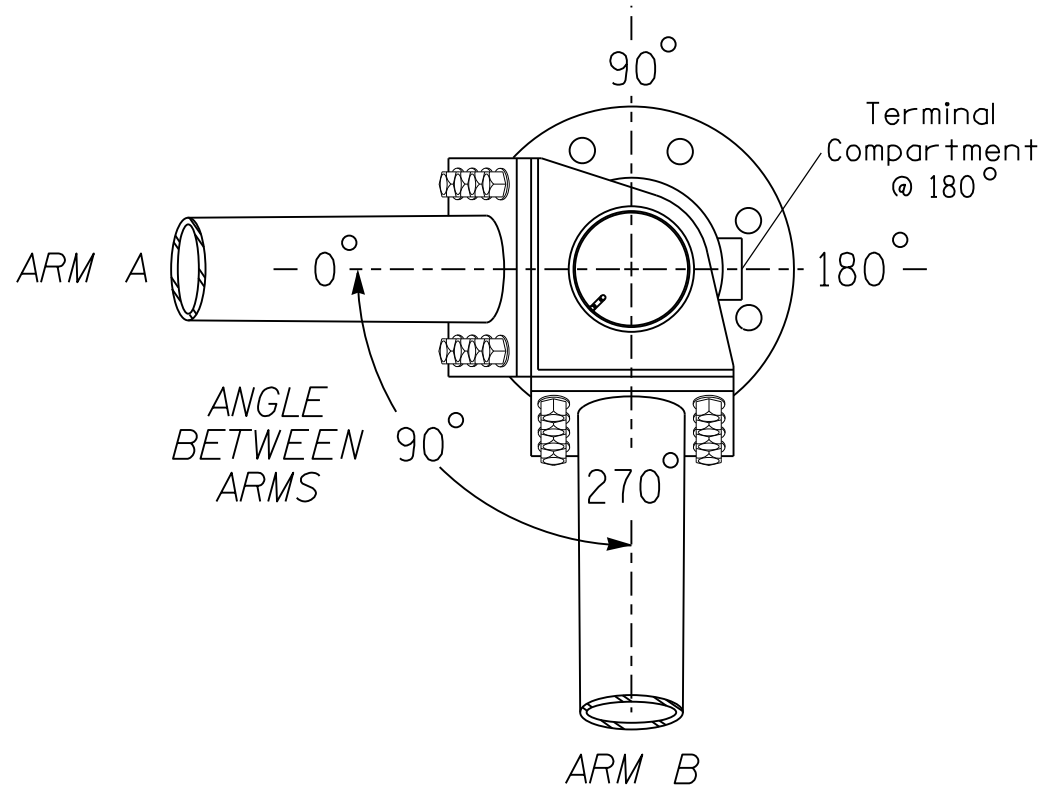
Diagram illustrating the layout and dimensions of a street lighting system. The total length of the lighting fixture assembly is 68.0'. The layout includes a 1.5' section, followed by a 4' section, an 8' section, a 6' section, a 4' section, and a 6.75' section. The distance from the end of the fixture assembly to the pole is 52.5'. The fixture assembly consists of a 4-lamp fixture, a 1-lamp fixture, a 2-lamp fixture, and a 1-lamp fixture. The pole is labeled "Pole" and the foundation is labeled "Foundation". The diagram also shows the "High Point of Roadway Surface" and the "Base line reference elev. = 0.0'". The maximum height of the pole is 25.6 ft. The roadway clearance design height is 17 ft, and the minimum height is 16.5 ft. The pole height is H2, and the foundation height is H1 = 20.20'. The diagram also includes references to "See Notes 4 & 5", "See Note 7d", and "See Note 7e".

Design Loading for METAL POLE NO. 1, Mast Arm "B"

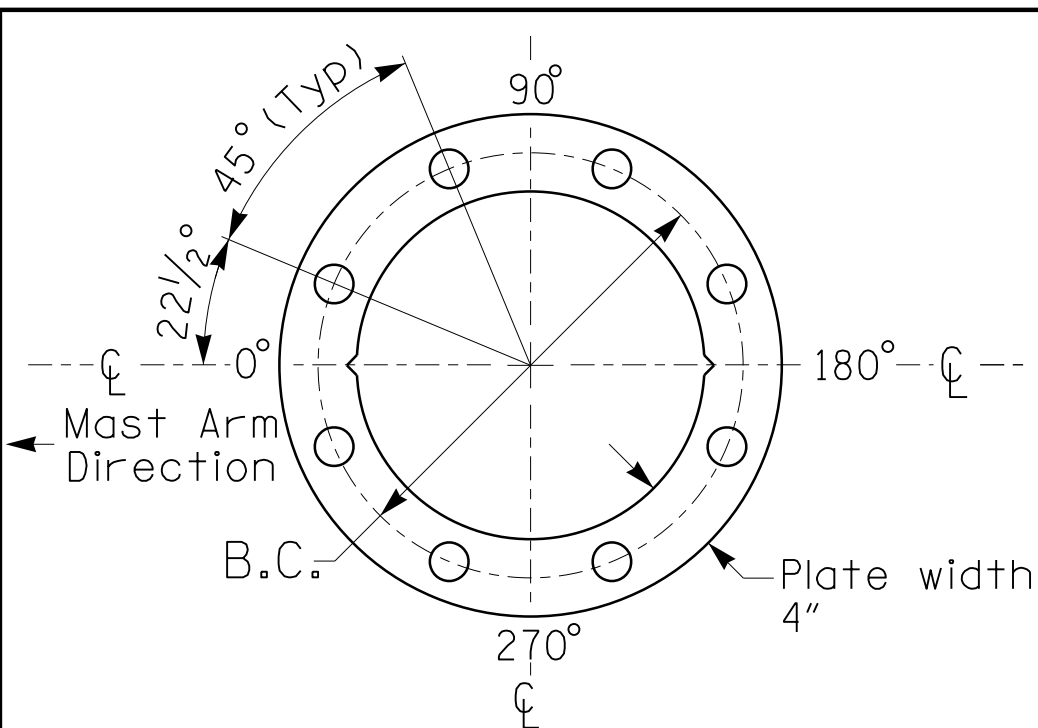


The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ① Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	- 0.83 ft.	- 0.22 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.



See Note 6



PROJECT REFERENCE NO.	SHEET NO.
B-5985B	SIG.-2.4

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12\"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5\" W X 66.0\" L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12\"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5\" W X 52.5\" L	60 LBS
	RIGID MOUNTED SIGNAL HEAD 12\"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0\" W X 56.0\" L	103 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0\" W X 96.0\" L	36 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0\" W X 36.0\" L	14 LBS

DESIGN REFERENCE MATERIAL

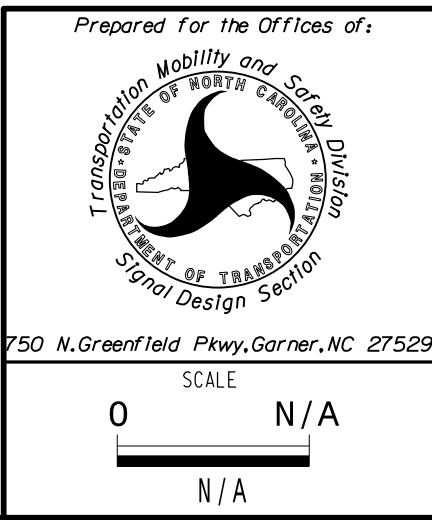
1. Design the traffic signal structure and foundation in accordance with:
 - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2024 NCDOT "Standard Specifications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

DESIGN REQUIREMENTS

3. 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.
4. All signal supports using force ratios that do not exceed 0.9.
5. 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.
6. 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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
7. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
8. The mast arm attachment height (H1) shown is based on the following design assumptions:
 - a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - b. Signal heads are rigidly mounted and vertically centered on the mast arm.
 - c. The roadway clearance height for design is as shown in the elevation views.
 - d. The top of the pole base plate is 0.75 feet above the ground elevation.
 - e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
9. 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.
10. 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.
11. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
12. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (140 mph)

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



SR 1600 (West 5th Street)
at
Water Street

Division 6 Robeson County Lumberton

PLAN DATE: January 2025	REVIEWED BY: R M Muncey
-------------------------	-------------------------

PREPARED BY: J Hambright	REVIEWED BY:		
--------------------------	--------------	--	--

REVISIONS	INIT.	DATE

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SEAL

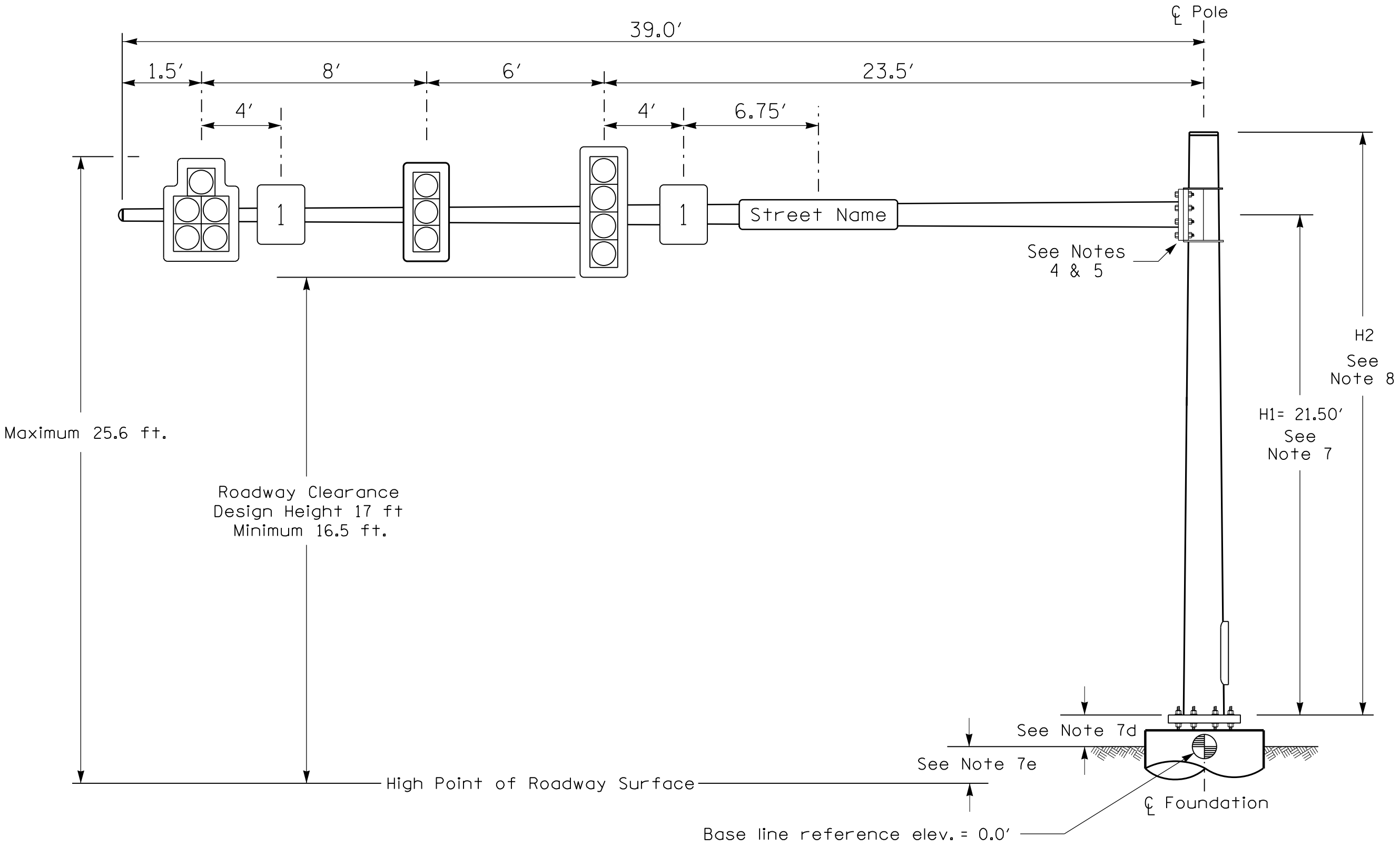
NORTH CAROLINA
PROFESSIONAL
SEAL
43239
ENGINEER
REGINA M. MUNCEY

DocuSigned by:

Regina M. Muncy 1/8/

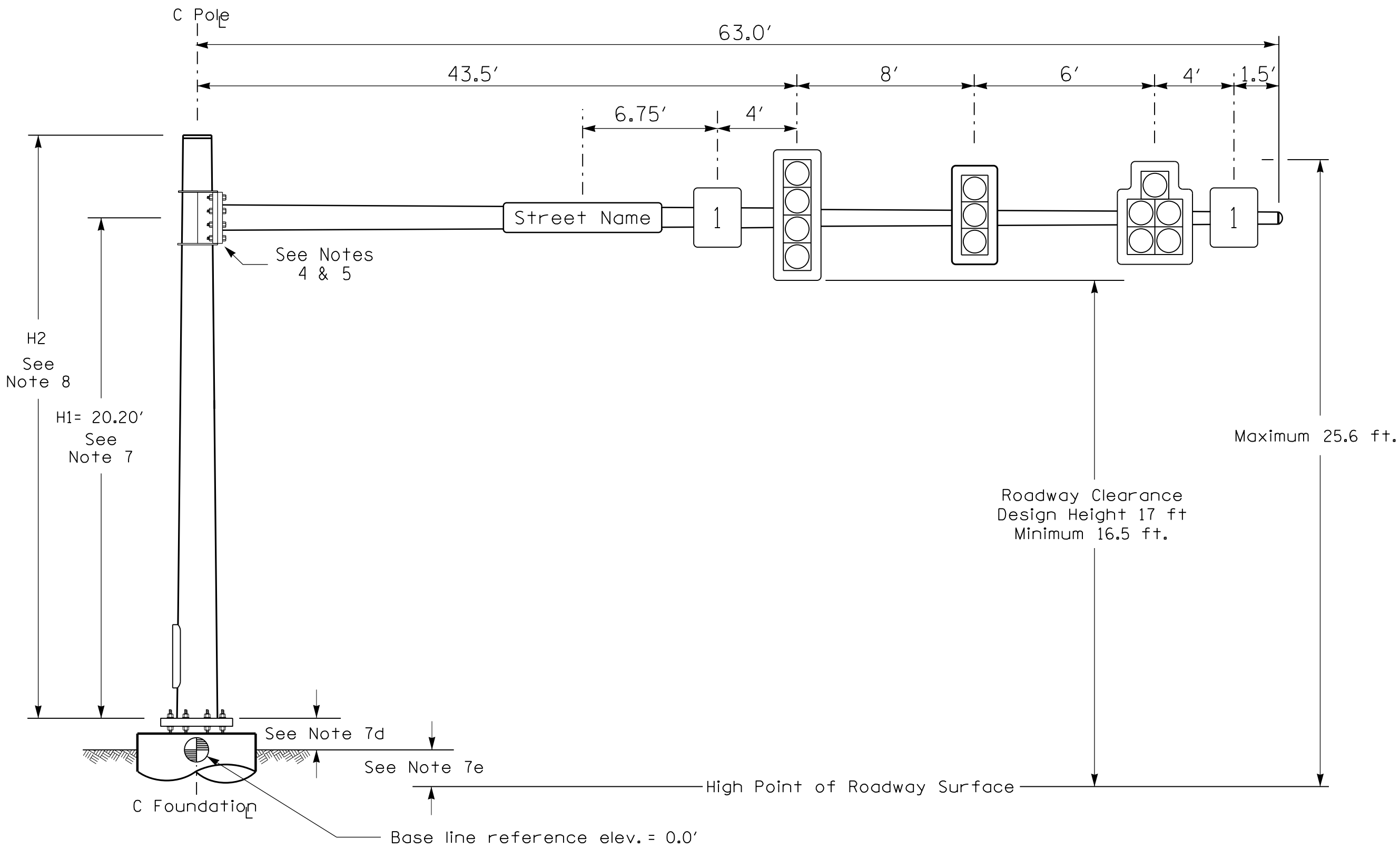
SIG. INVENTORY NO. 06-0

Design Loading for METAL POLE NO. 2, Mast Arm "A"



Elevation View

Design Loading for METAL POLE NO. 2, Mast Arm "B"



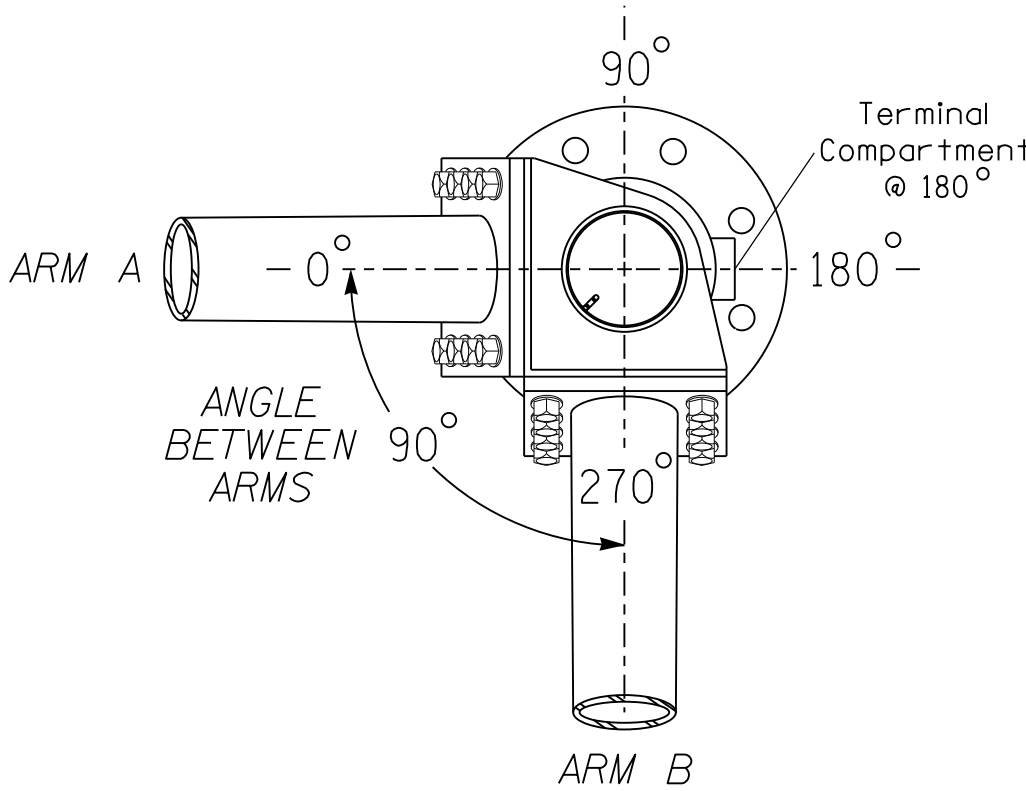
Elevation View

SPECIAL NOTE

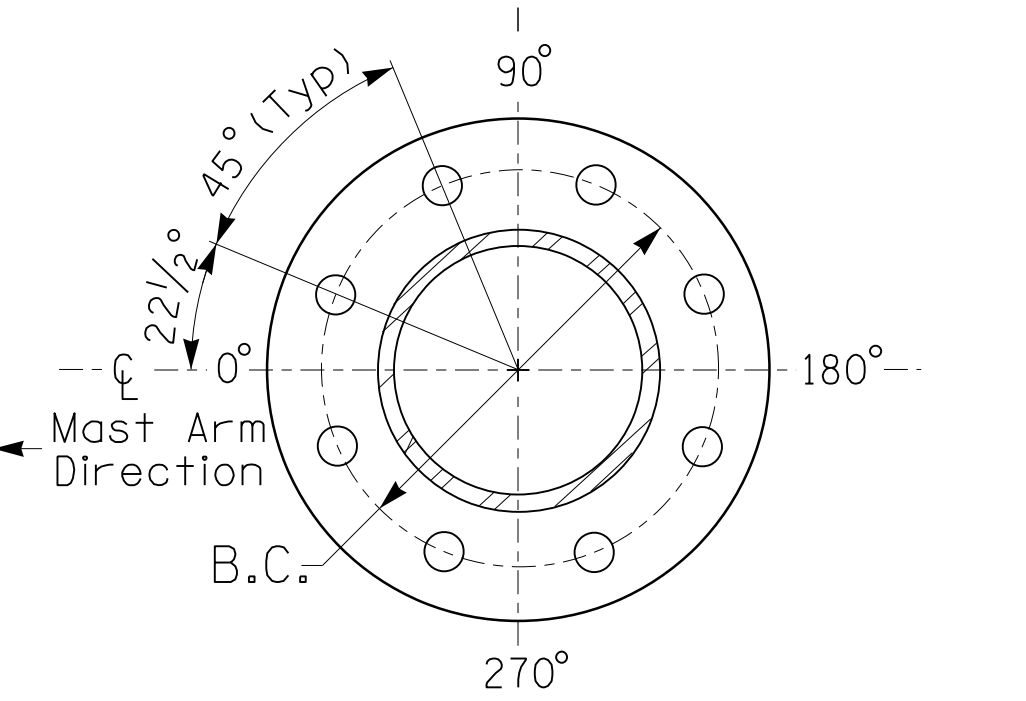
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ¢ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+ 0.43 ft.	- 0.80 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.

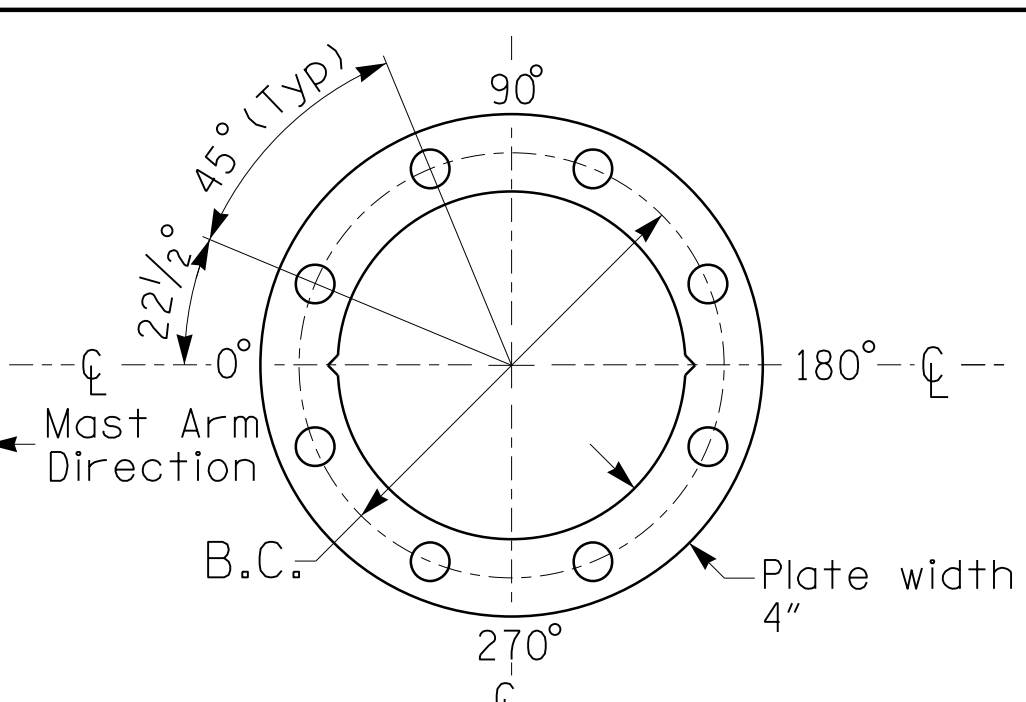


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

METAL POLE No. 2

PROJECT REFERENCE NO.	SHEET NO.
B-5985B	SIG.-2.5

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5"W X 66.0"L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0"W X 56.0"L	103 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 LBS

NOTES

DESIGN REFERENCE MATERIAL

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

DESIGN REQUIREMENTS

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

NCDOT Wind Zone 2 (140 mph)

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

 750 N. Greenfield Pkwy, Garner, NC 27529 SCALE 0 N/A N/A	Prepared for the Offices of: SR 1600 (West 5th Street) at Water Street		 SEAL 43239 REGINA M. MUNCEY ENGINEER
	Division 6 Robeson County Lumberton PLAN DATE: January 2025 REVIEWED BY: R M Muncey PREPARED BY: J Hambricht REVIEWED BY: REVISIONS INIT. DATE		
DocuSigned by: Regina M. Muncey SIGNATURE DATE		1/8/2025 DATE	
SIG. INVENTORY NO.		06-0343	

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kedar.ign

NCDOT METAL POLE STANDARDS

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

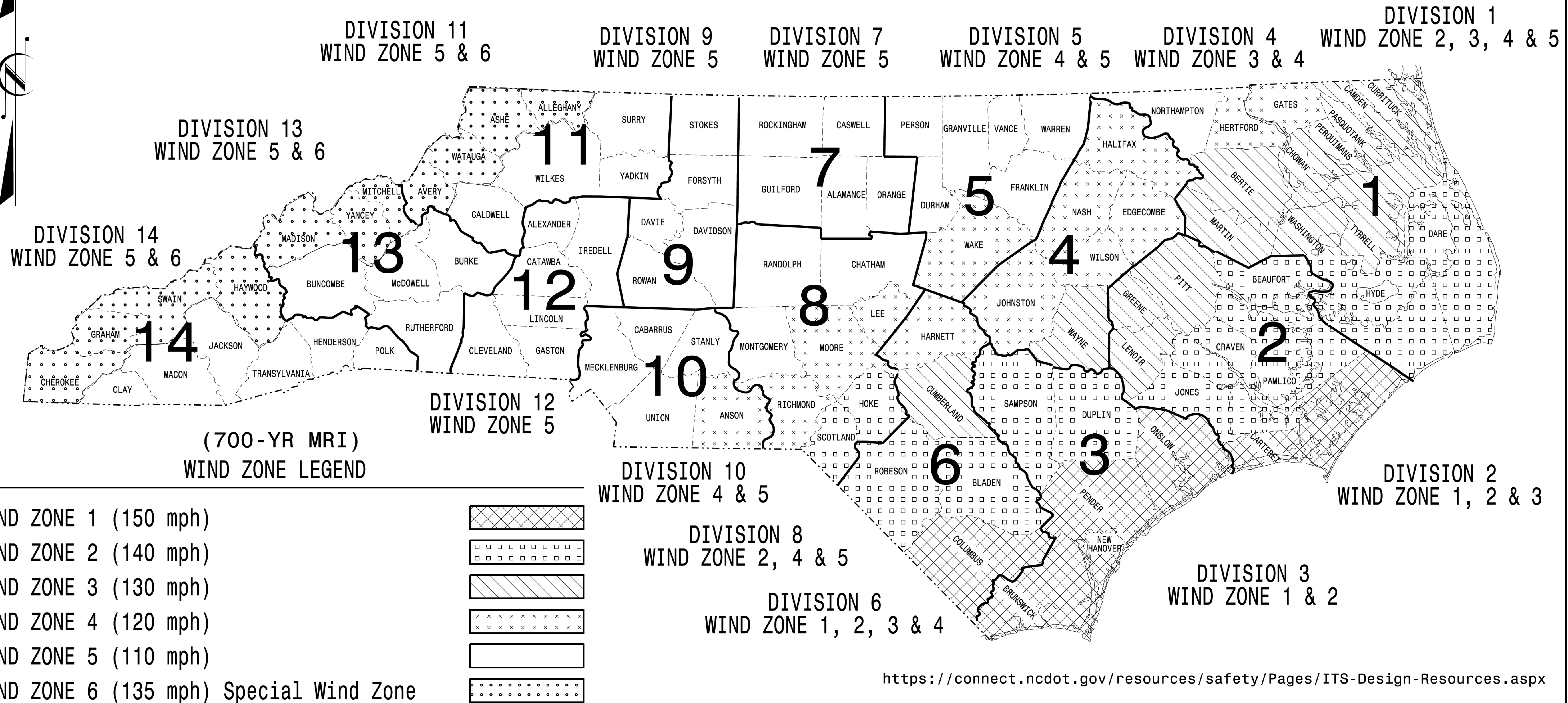
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SHEET NO.

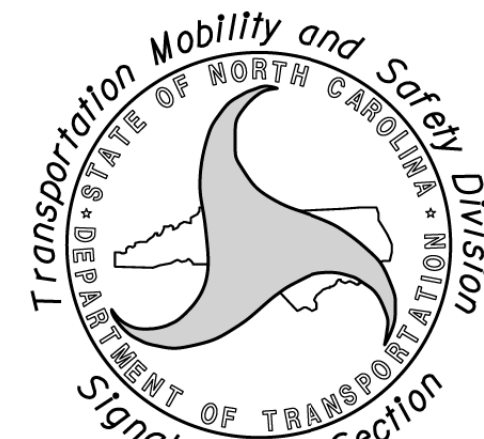
B-5985B

Sig.M1A

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)



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	

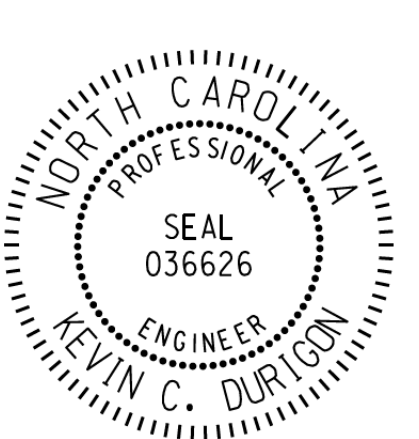
MOBILITY AND SAFETY DIVISION -
TRANSPORTATION SYSTEMS MANAGEMENT
AND OPERATIONS UNIT

D.Y. ISHAK - STATE SIGNALS ENGINEER

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

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

SEAL



DocuSigned by:

Kevin Durigon
SIGNATURE
4B23DC79B3784DA

09/21/2023
DATE

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kedar.ign

NCDOT METAL POLE STANDARDS

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

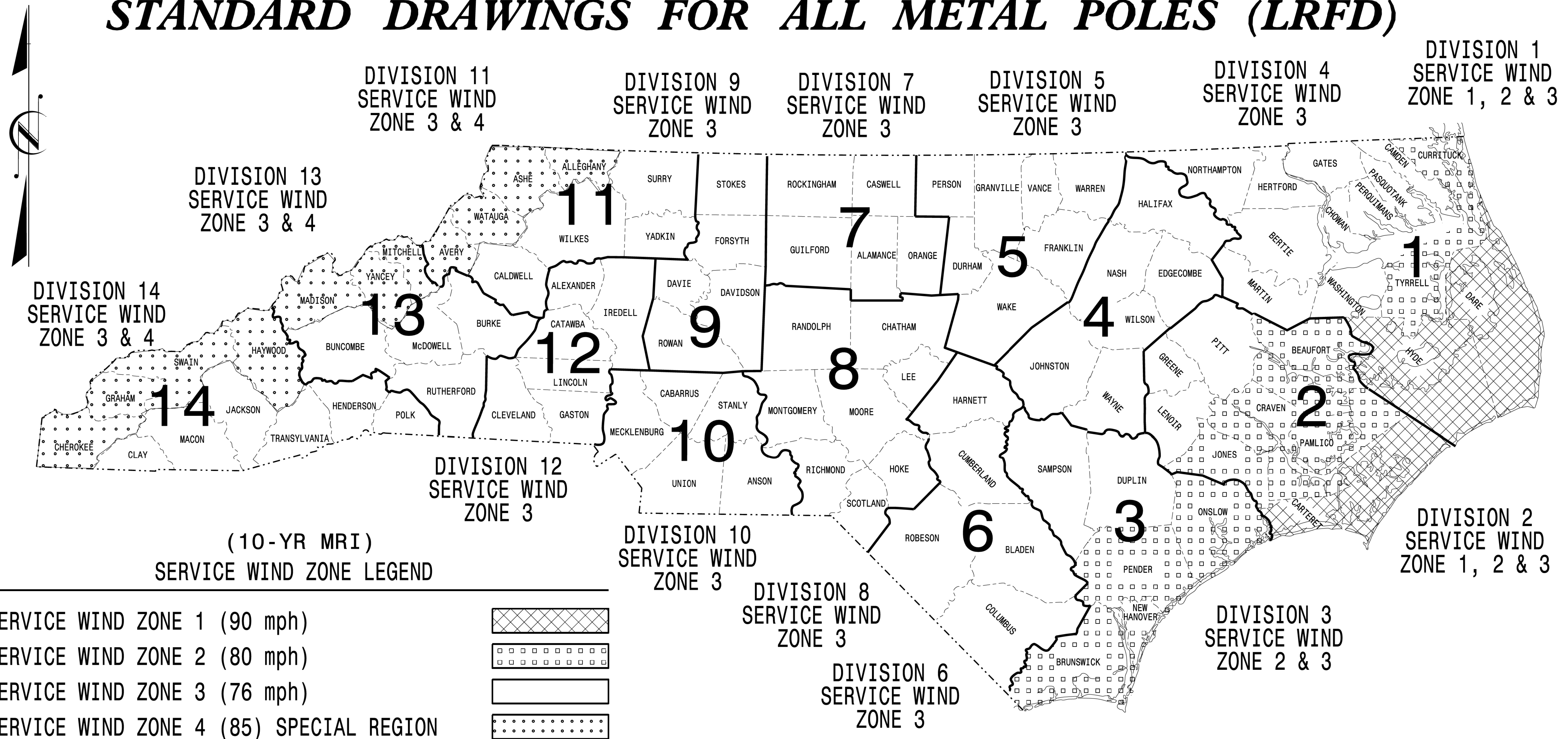
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SHEET NO.

B-5985B

Sig.M1B

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)

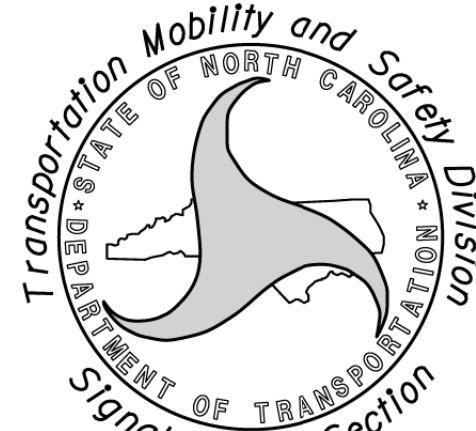


(10-YR MRI)
SERVICE WIND ZONE LEGEND

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>

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

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

INDEX OF PLANS DESCRIPTION

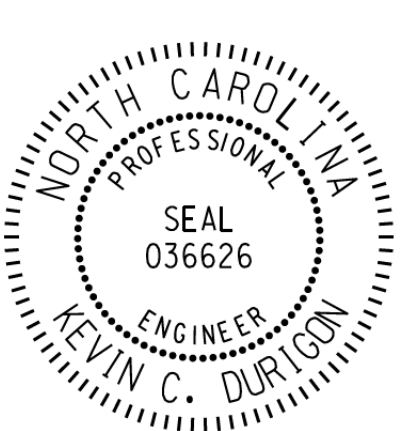
NCDOT CONTACTS: MOBILITY AND SAFETY DIVISION - TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS UNIT

D.Y. ISHAK - STATE SIGNALS ENGINEER

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

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

SEAL



DocuSigned by:

Kevin Durigon

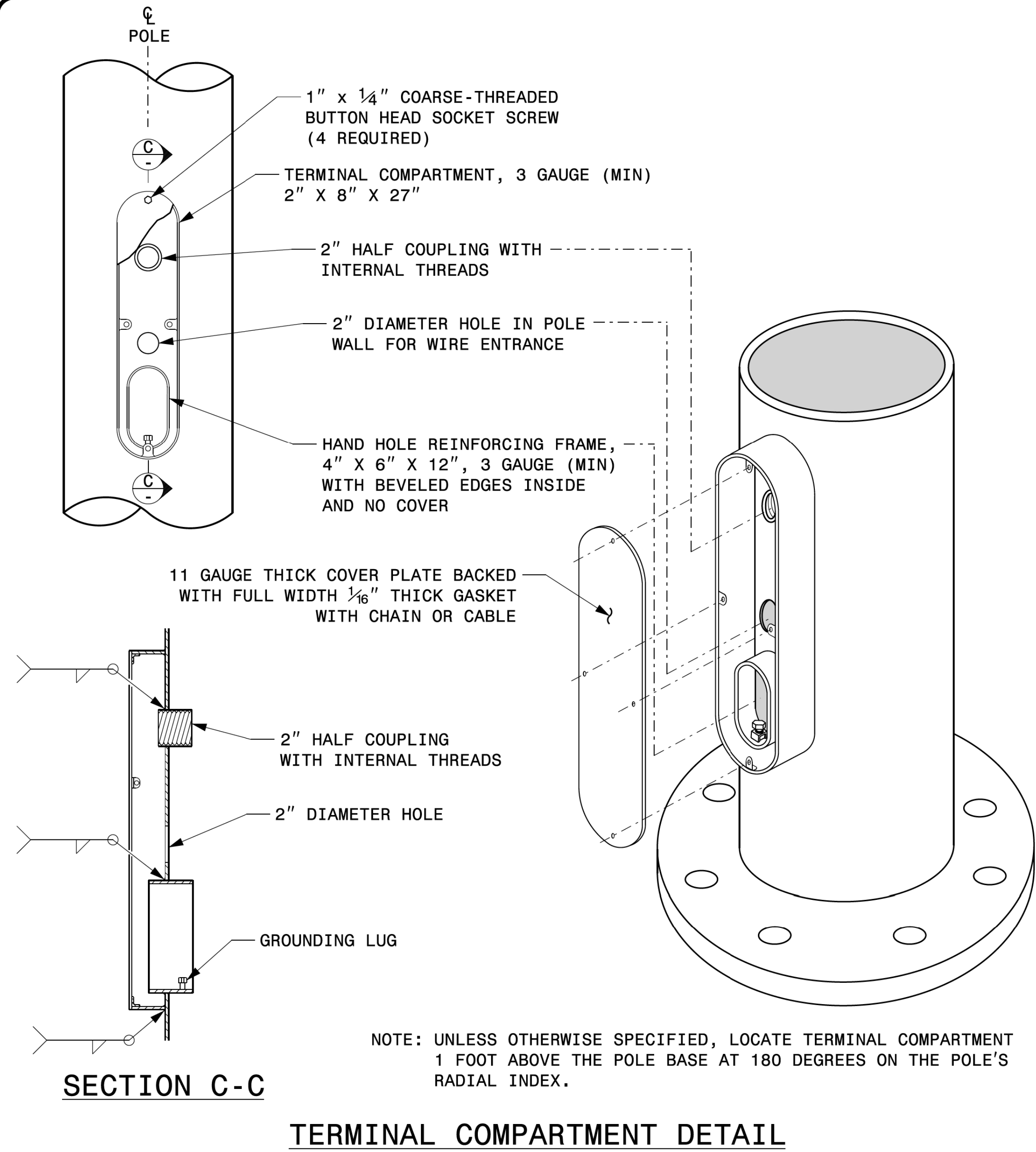
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09/21/2023

DATE

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SECTION C-C

TERMINAL COMPARTMENT DETAIL

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

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

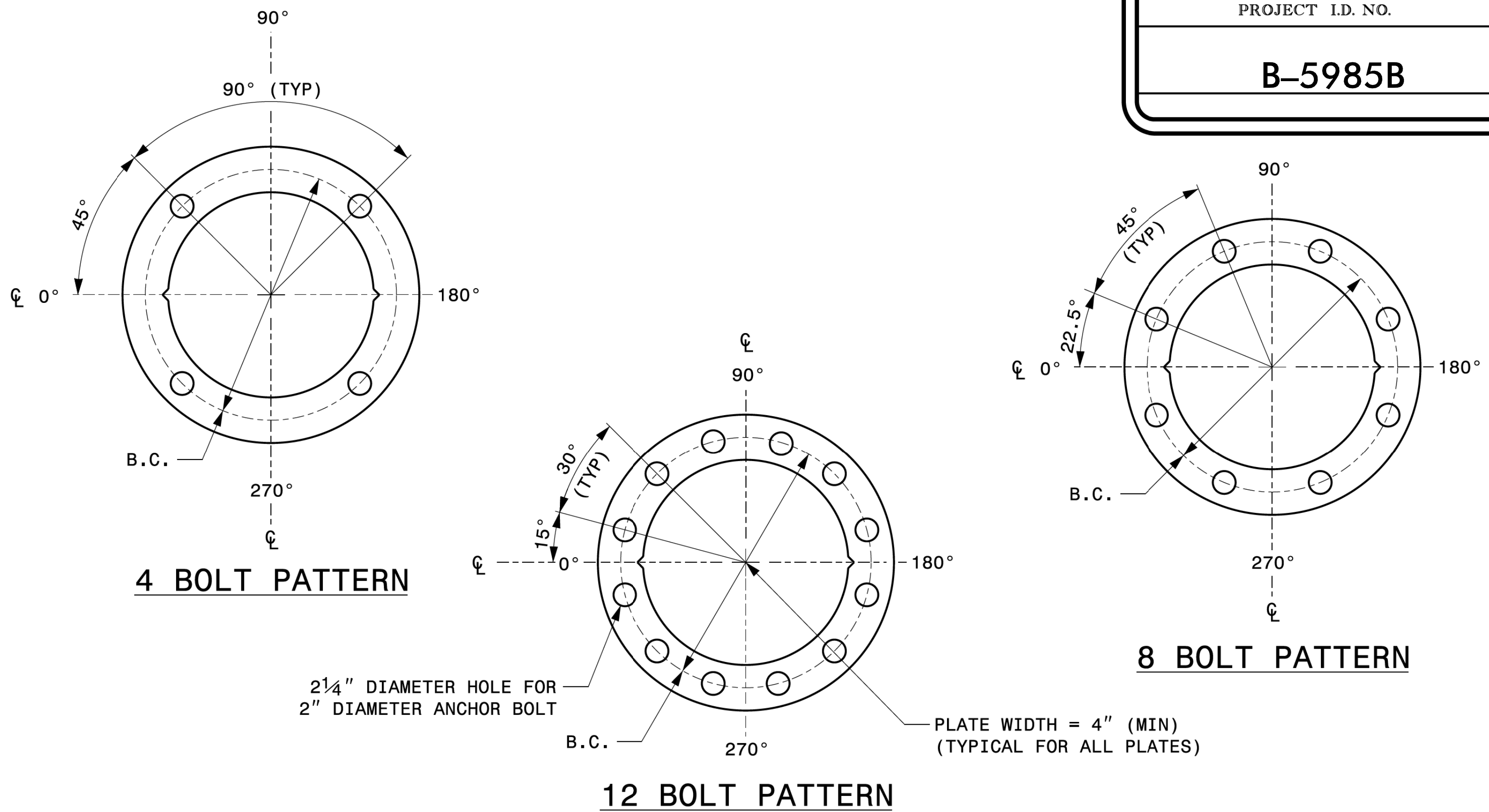
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	_____
NCDOT SIG. INV. NO. _____	_____
NCDOT POLE NO. _____	_____

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

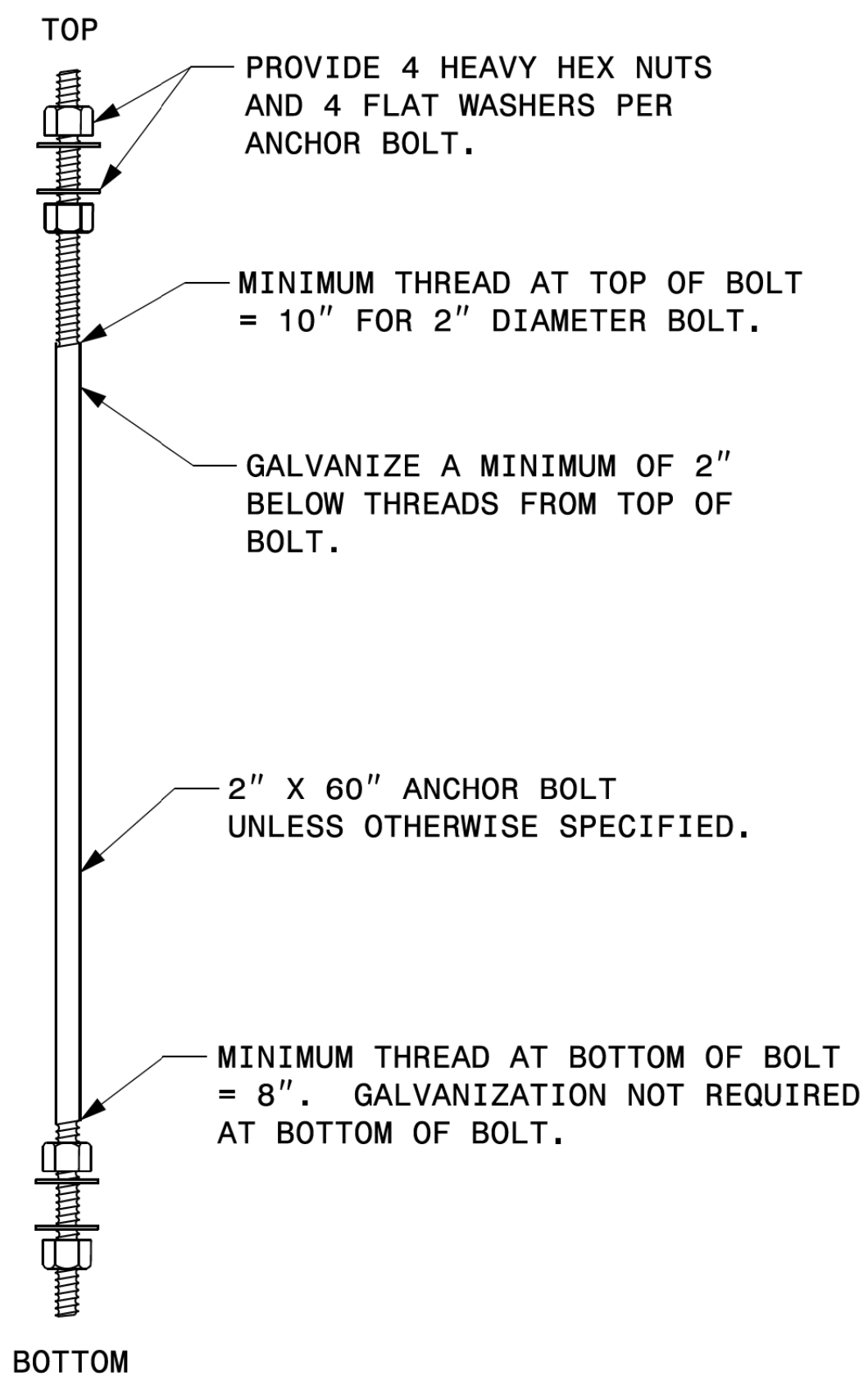
NOTES:

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

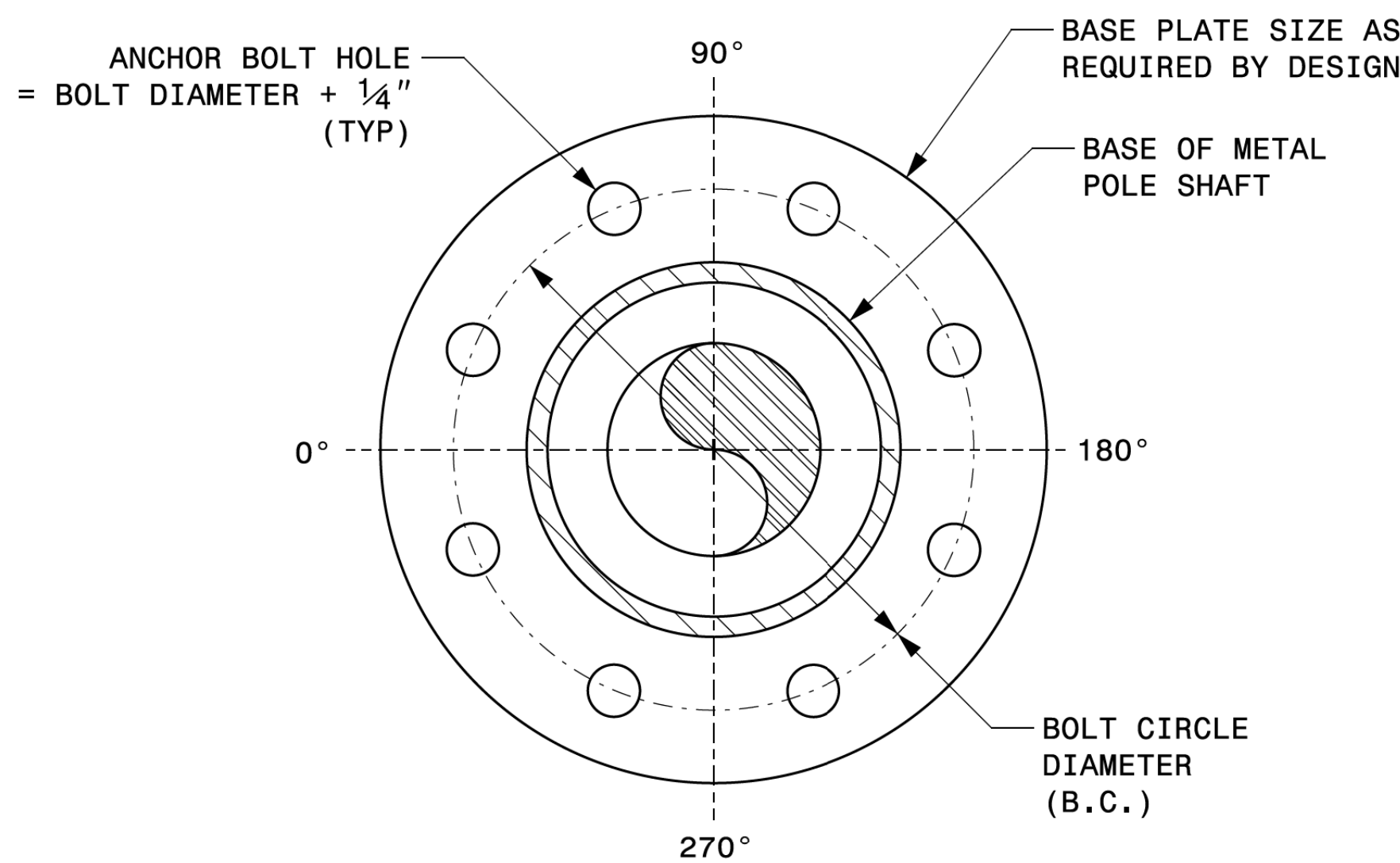
IDENTIFICATION TAG DETAILS



CONSTRUCT TEMPLATES AND PLATES FROM 1/4" (MIN) THICK STEEL. GALVANIZING IS NOT REQUIRED.
BASE PLATE TEMPLATE AND ANCHOR BOLT LOCK PLATE DETAILS



ANCHOR BOLT DETAIL



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

TYPICAL BASE PLATE DETAIL

Prepared In the Offices of:

TRANSPORTATION MOBILITY AND SAFETY DIVISION
DEPARTMENT OF TRANSPORTATION
SIGNAL DESIGN SECTION

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 NA NONE

Typical Fabrication Details
For
All Metal Poles

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

REVISIONS	INIT.	DATE

SEAL

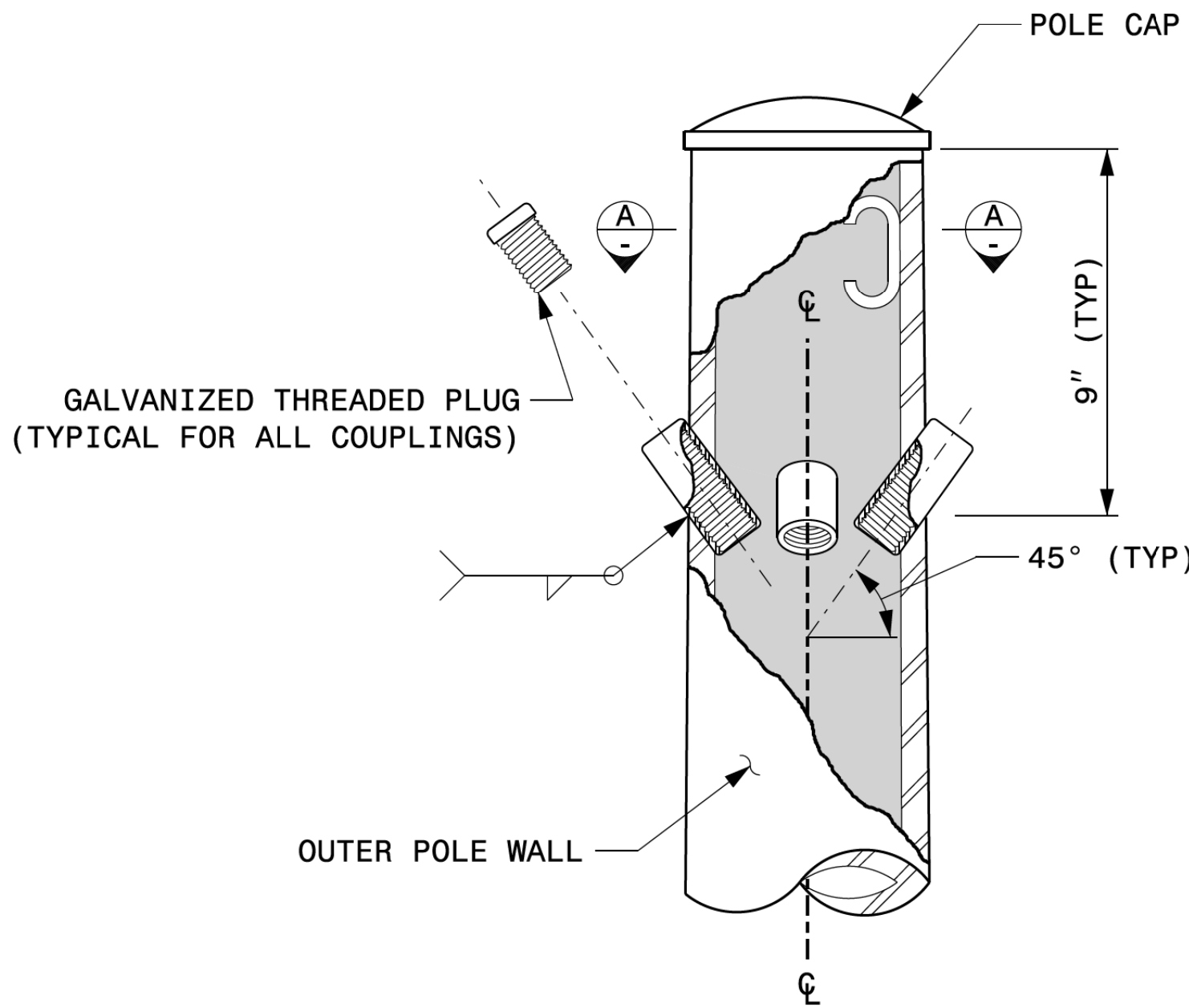
SEAL
036626
ENGINEER
KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
4B23DC79B3784DA

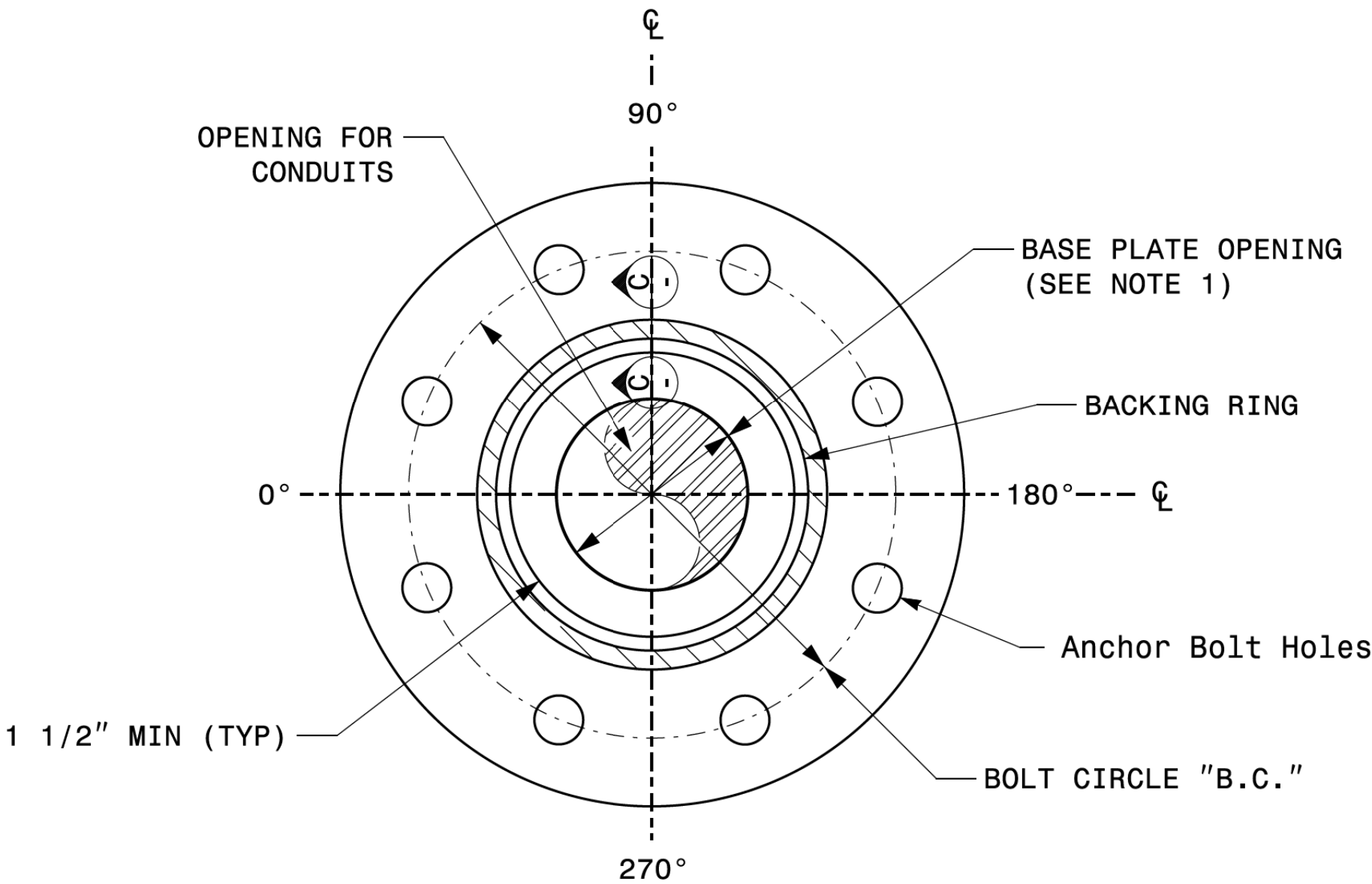
09/21/2023
DATE

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 $8\frac{1}{2}$ ".

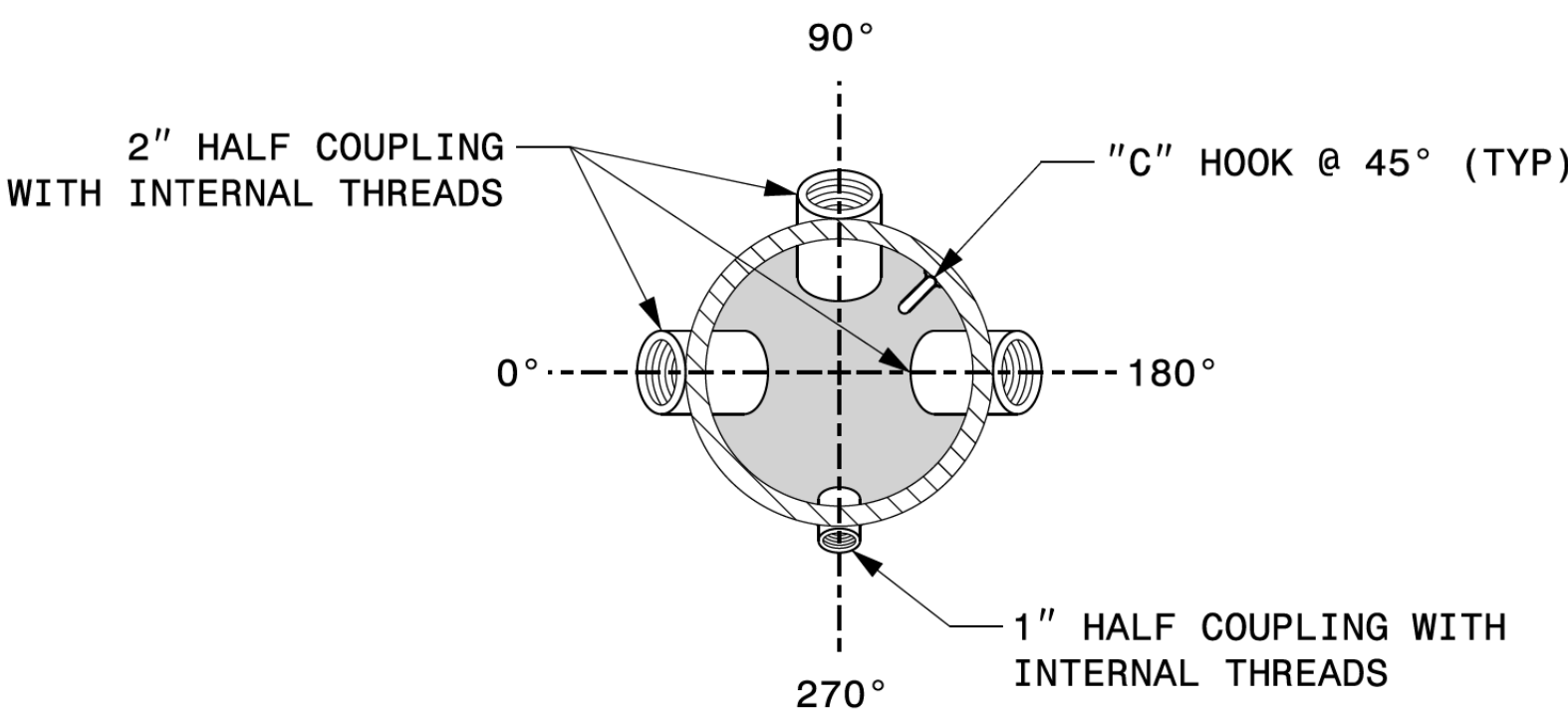


CABLE ENTRANCES AT TOP OF POLE



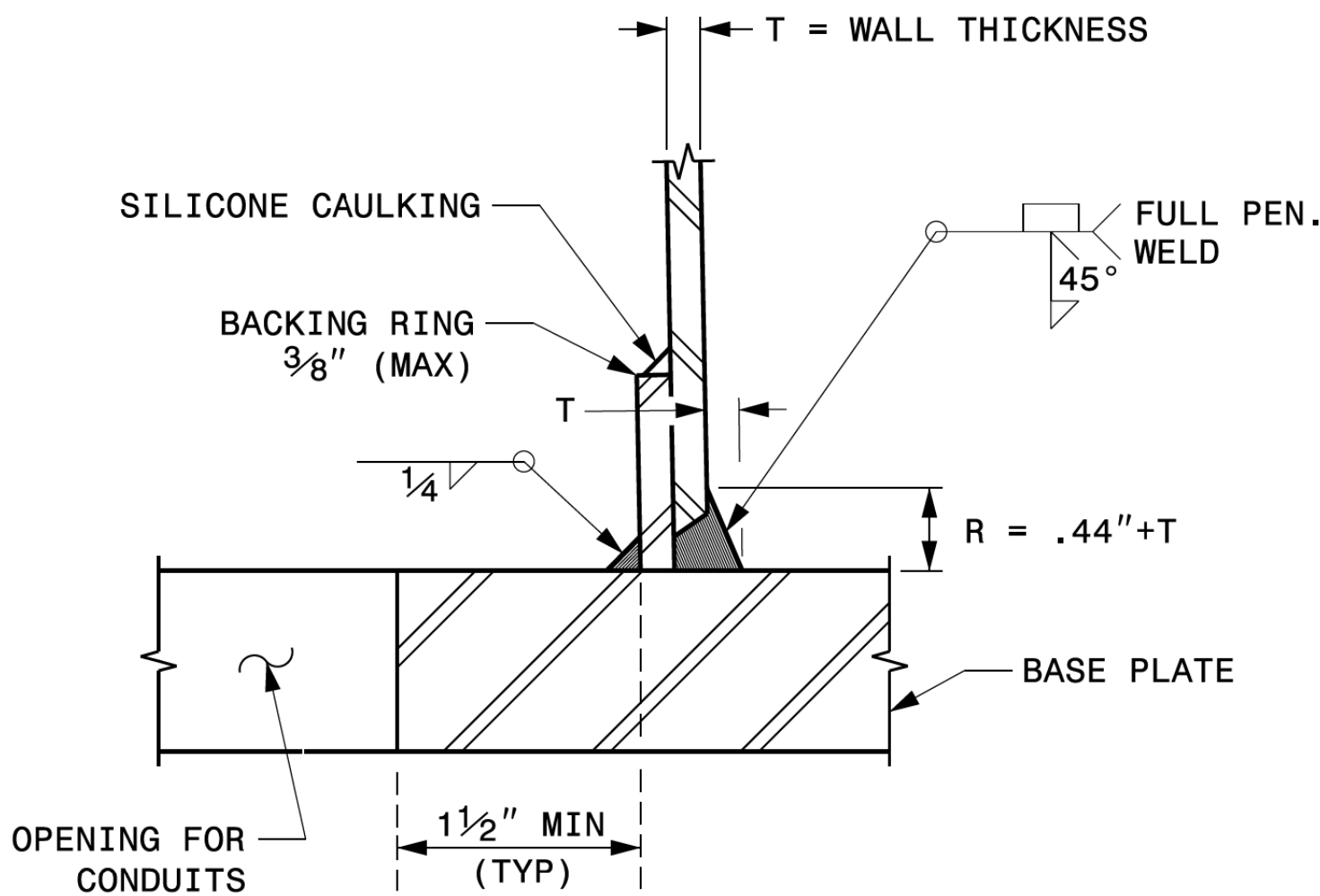
SECTION B-B

POLE BASE PLATE DETAILS
(8 AND 12 BOLT PATTERN)



SECTION A-A

RADIAL ORIENTATION OF FACTORY INSTALLED
ACCESSORIES AT TOP OF POLE

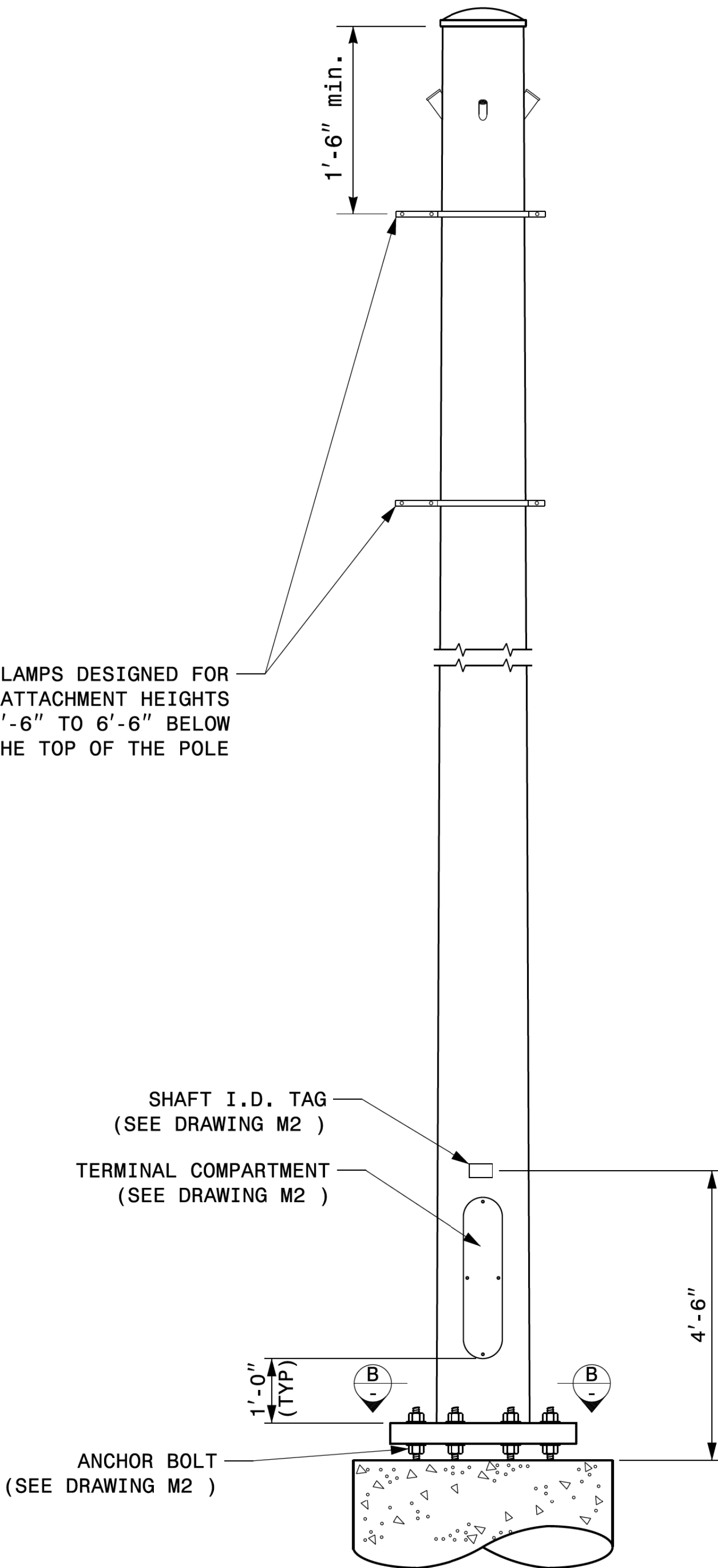


SECTION C-C

(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

Prepared In the Offices of:

TRANSPORTATION MOBILITY AND SAFETY DIVISION
DEPARTMENT OF TRANSPORTATION
Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: NA
NONE

Typical Fabrication Details
For
Strain Poles

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

REVISIONS	INIT.	DATE

SEAL

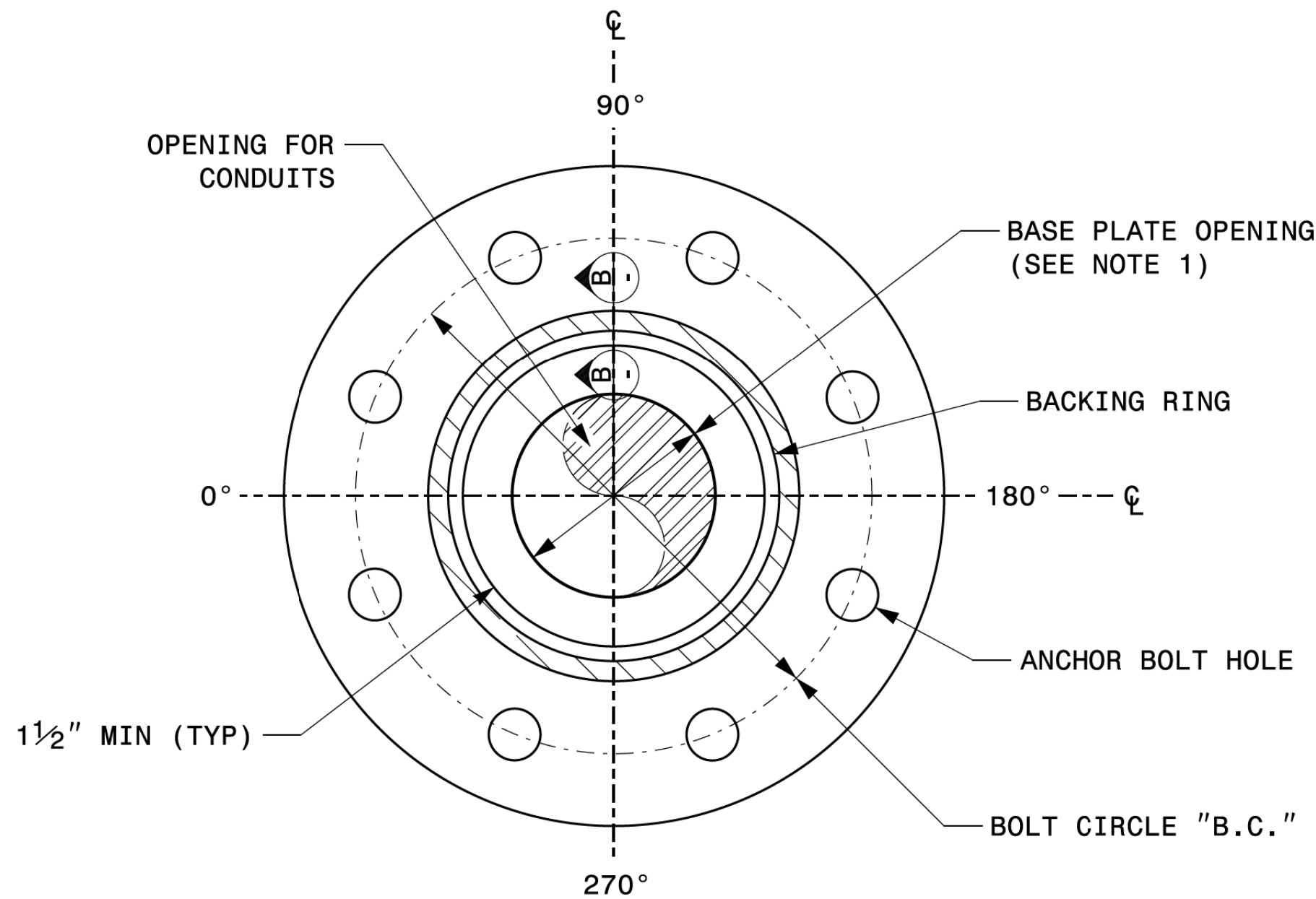
NORTH CAROLINA
PROFESSIONAL
ENGINEER
KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
4B23DC78B3784DA

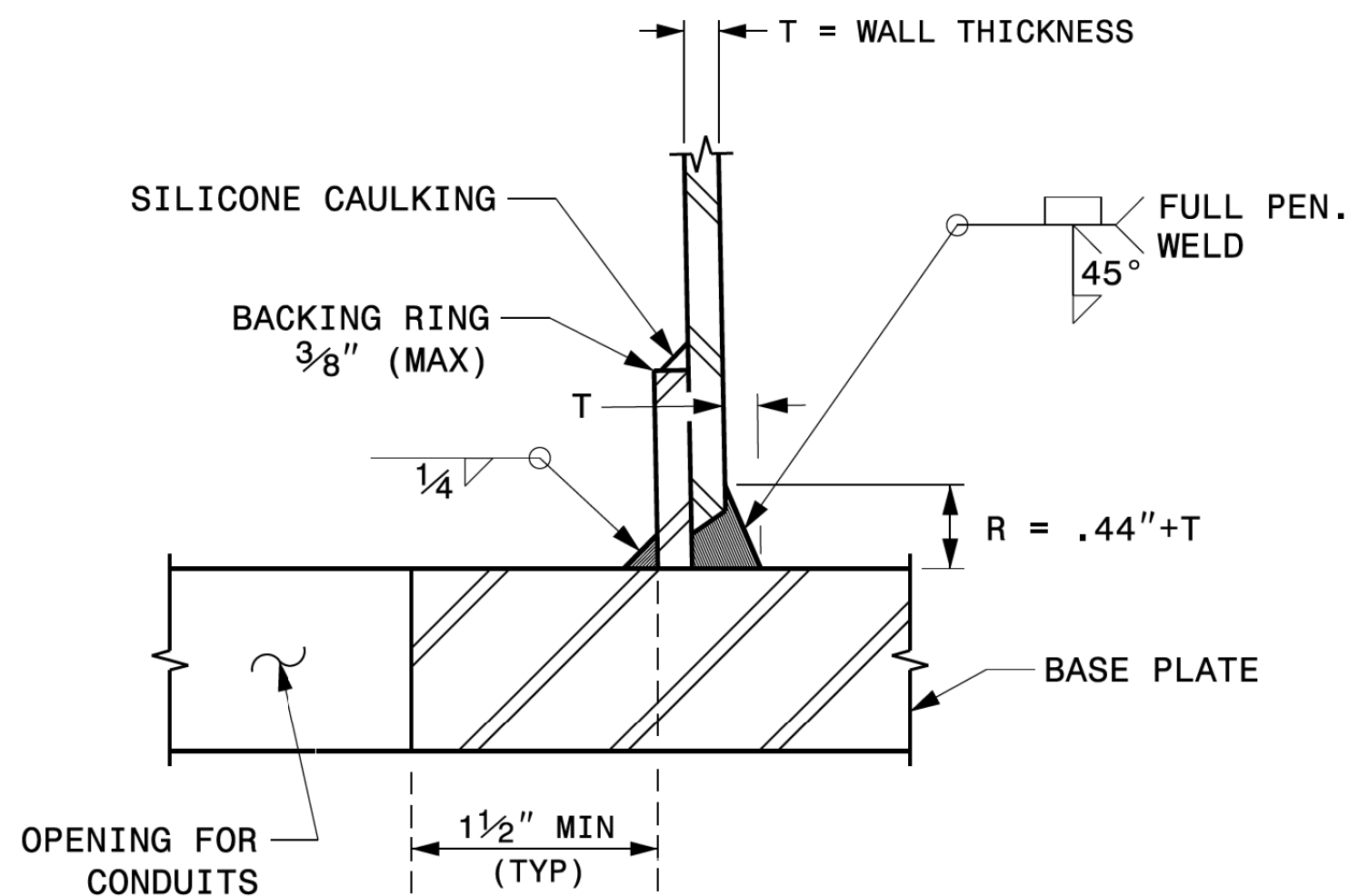
09/23/2023
DATE

NOTE:

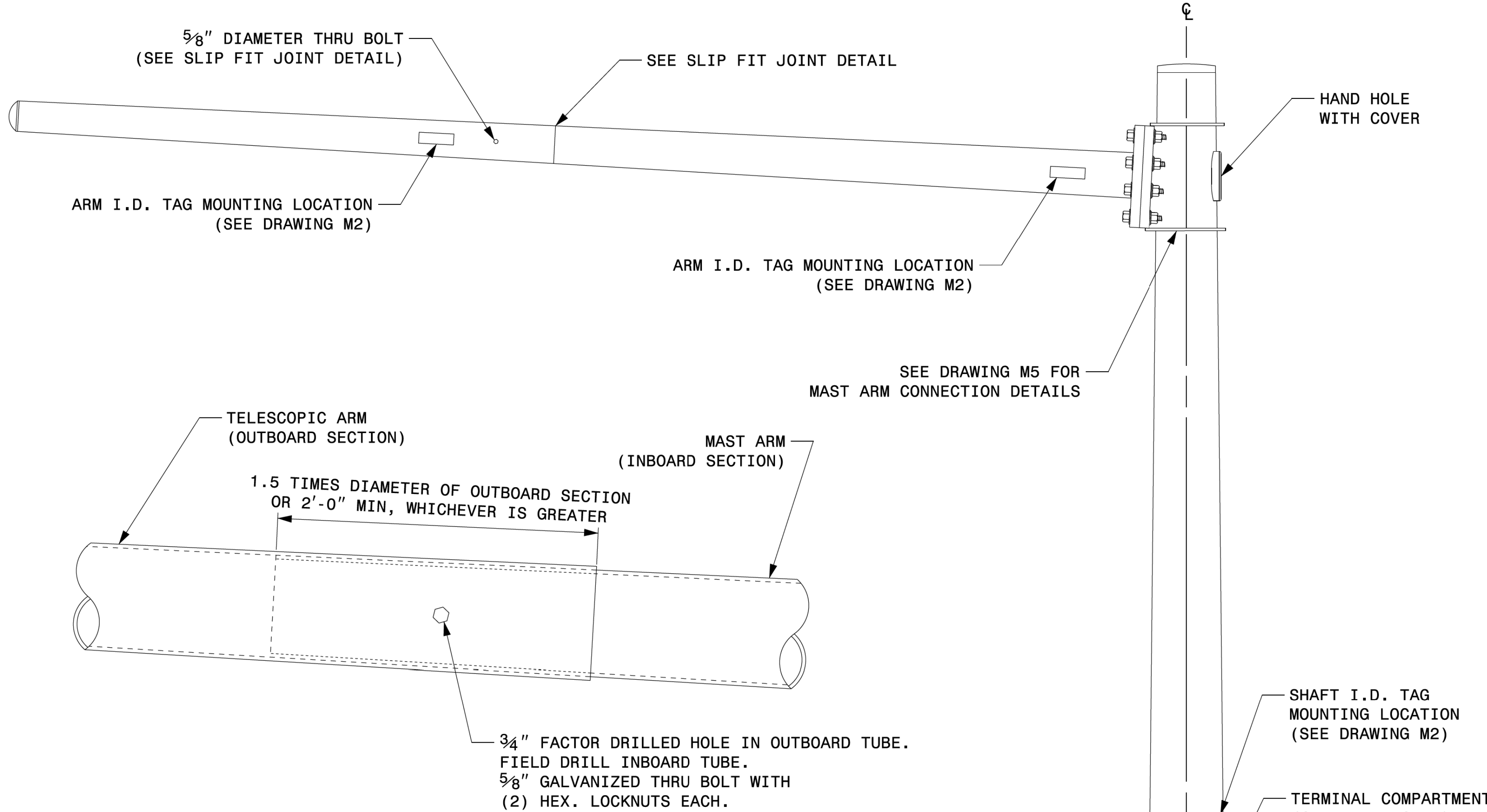
1. OPENING IN POLE BASE PLATE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS $3\frac{1}{2}$ " BUT SHALL NOT BE LESS THAN $8\frac{1}{2}$ ".



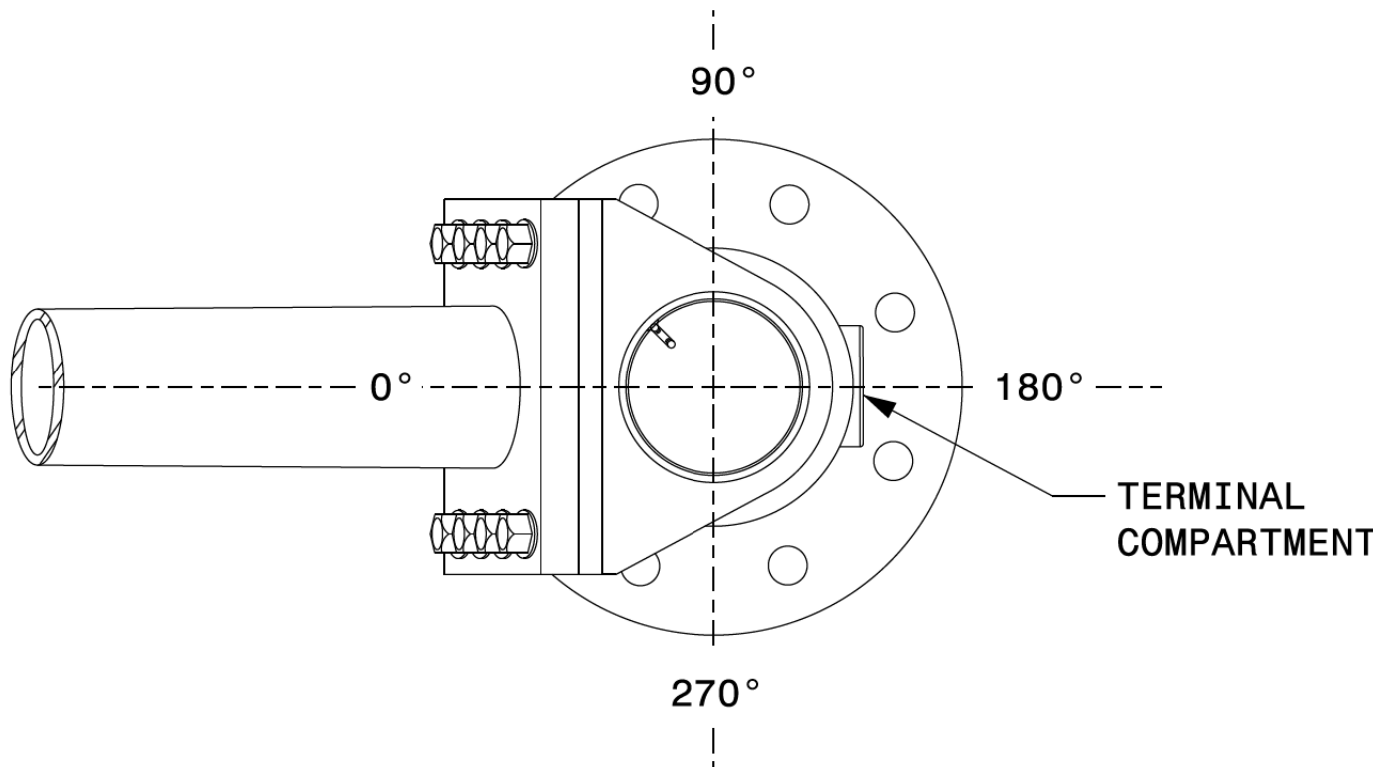
SECTION A-A
POLE BASE PLATE DETAILS



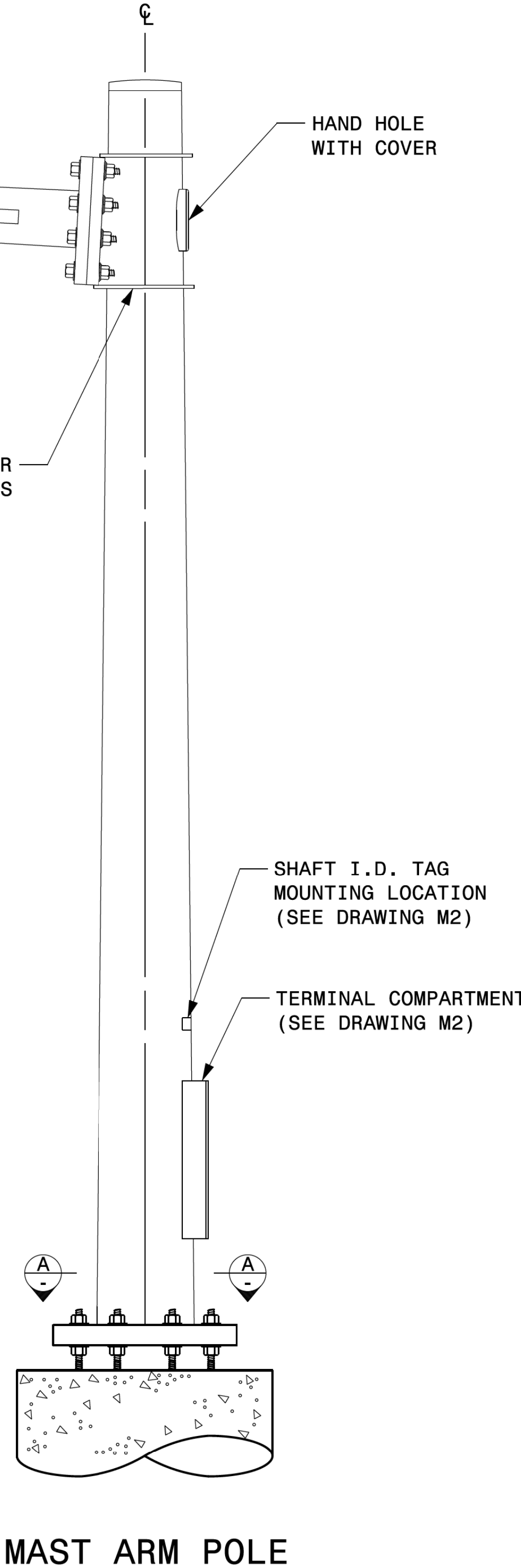
SECTION B-B
(POLE ATTACHMENT TO BASE PLATE)
FULL-PENETRATION
GROOVE WELD DETAIL



SLIP FIT JOINT DETAIL FOR MAST ARM



MAST ARM RADIAL ORIENTATION



	Typical Fabrication Details For Mast Arm Poles		
	PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR	REVISIONS INIT. DATE	
SCALE 0 NA NONE			09/21/2023 DATE

Sig.M5

SECTION B-B
FULL-PENETRATION GROOVE WELD DETAIL

PLAN VIEW

NOTES:

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

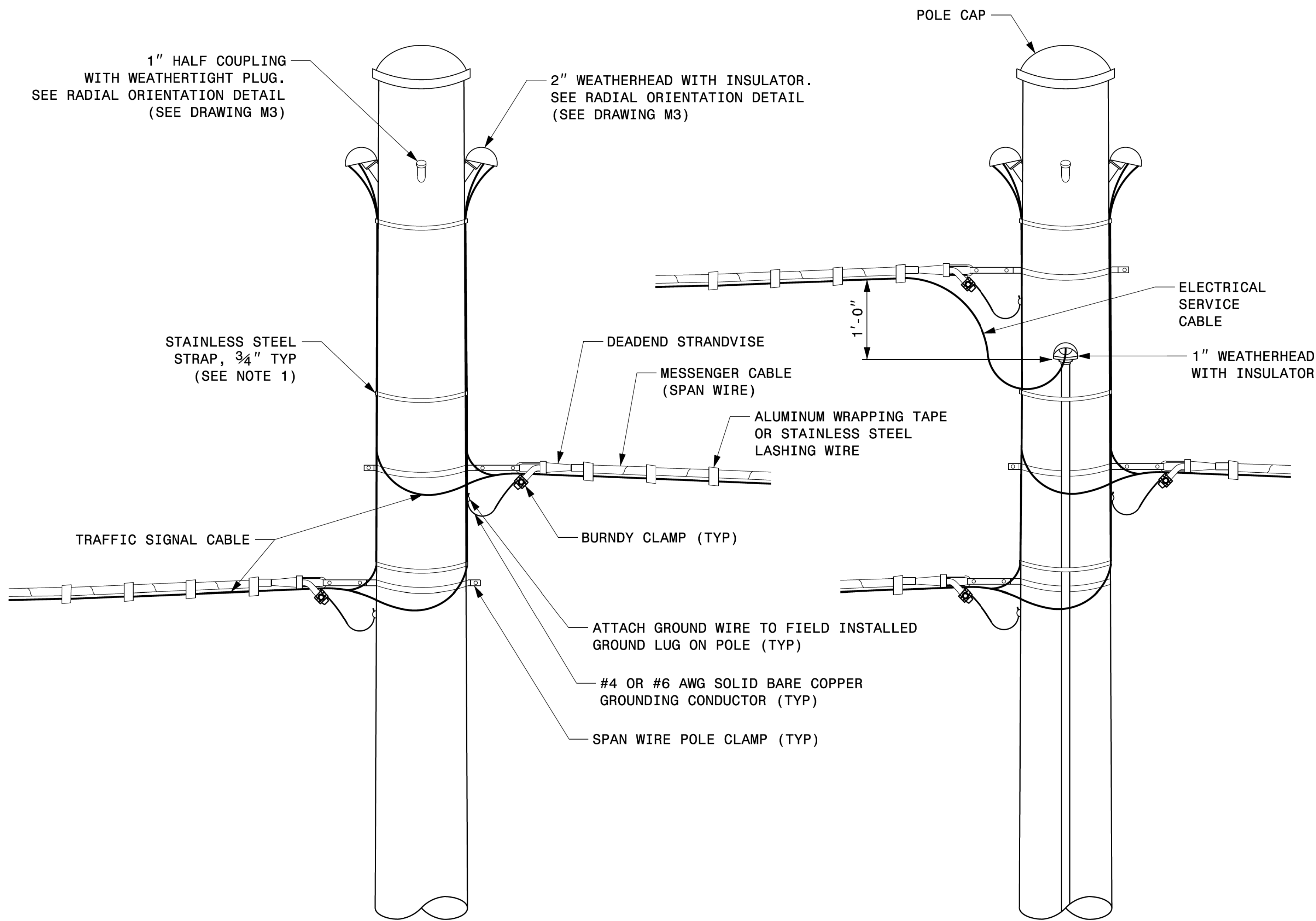
FRONT ELEVATION VIEW

SIDE ELEVATION VIEW

BACK ELEVATION VIEW

BOTTOM VIEW

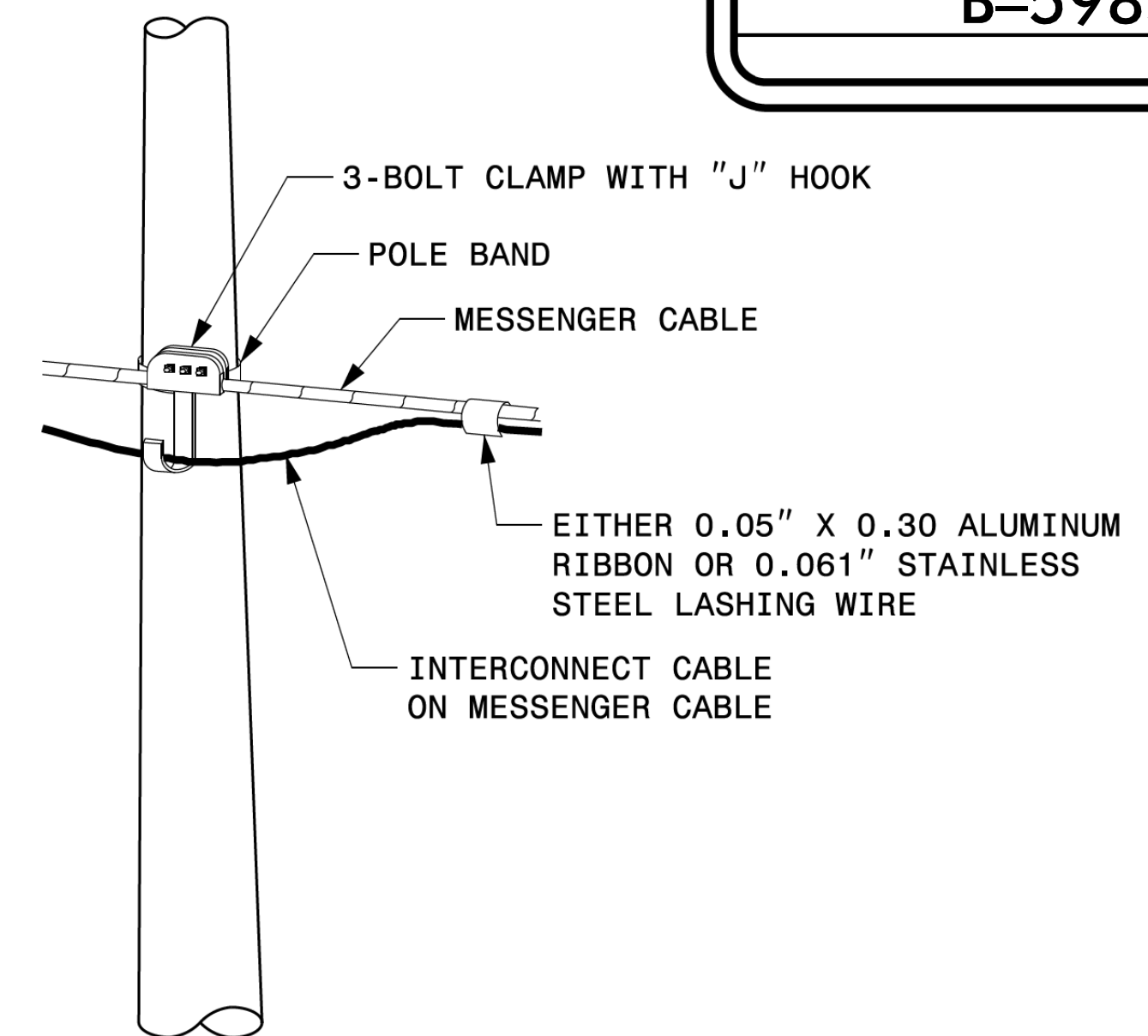
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Kodu F-1000



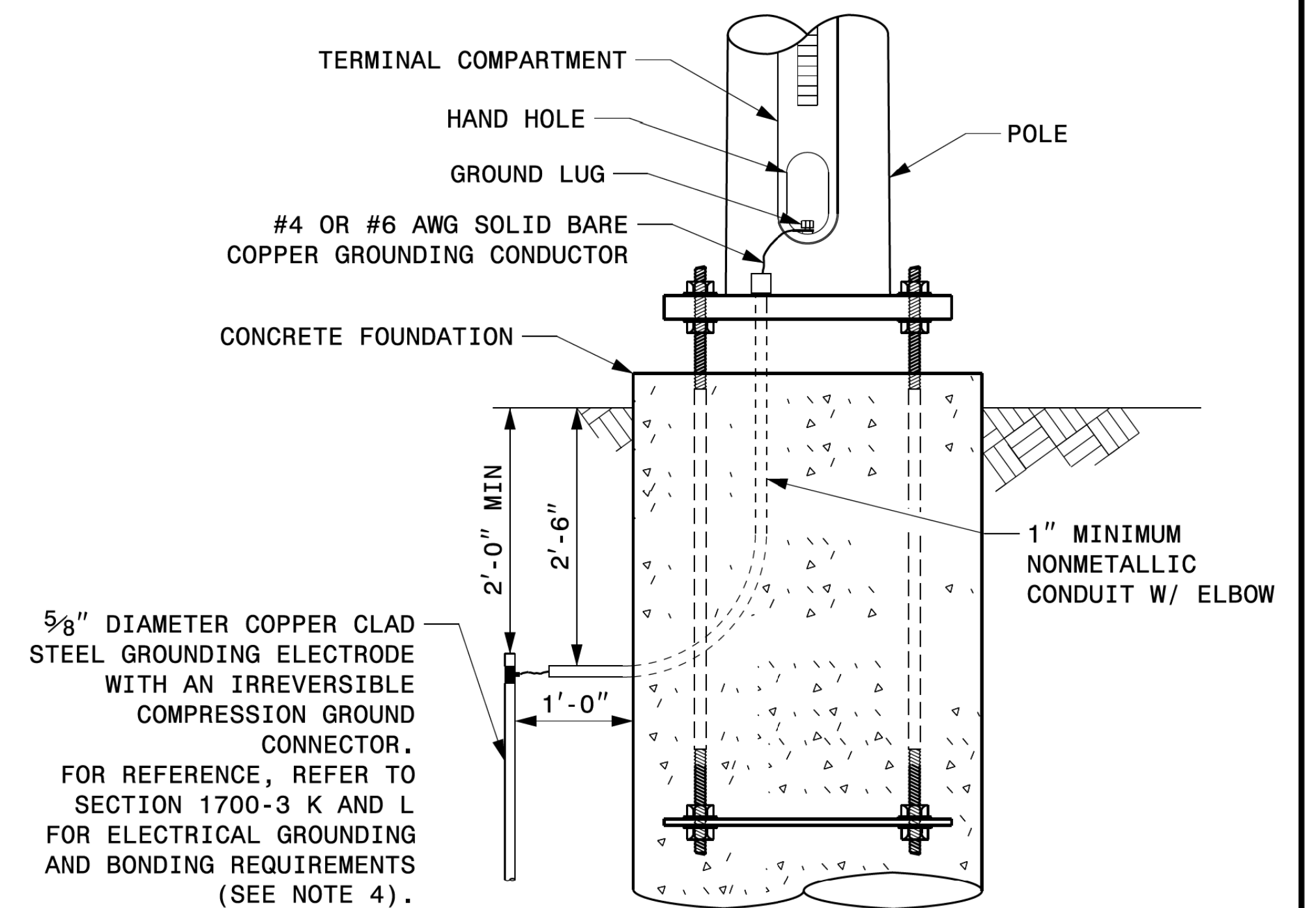
STRAIN POLE ATTACHMENTS

NOTES:

1. STRAP ALL SIGNAL CABLES TO THE SIDE OF THE POLE WITH $\frac{3}{4}$ " 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

Prepared In the Offices of:



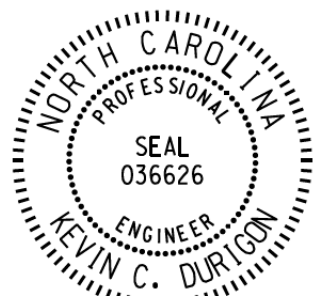
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: NA
NONE

Typical Fabrication Details
For
Strain Pole Attachments

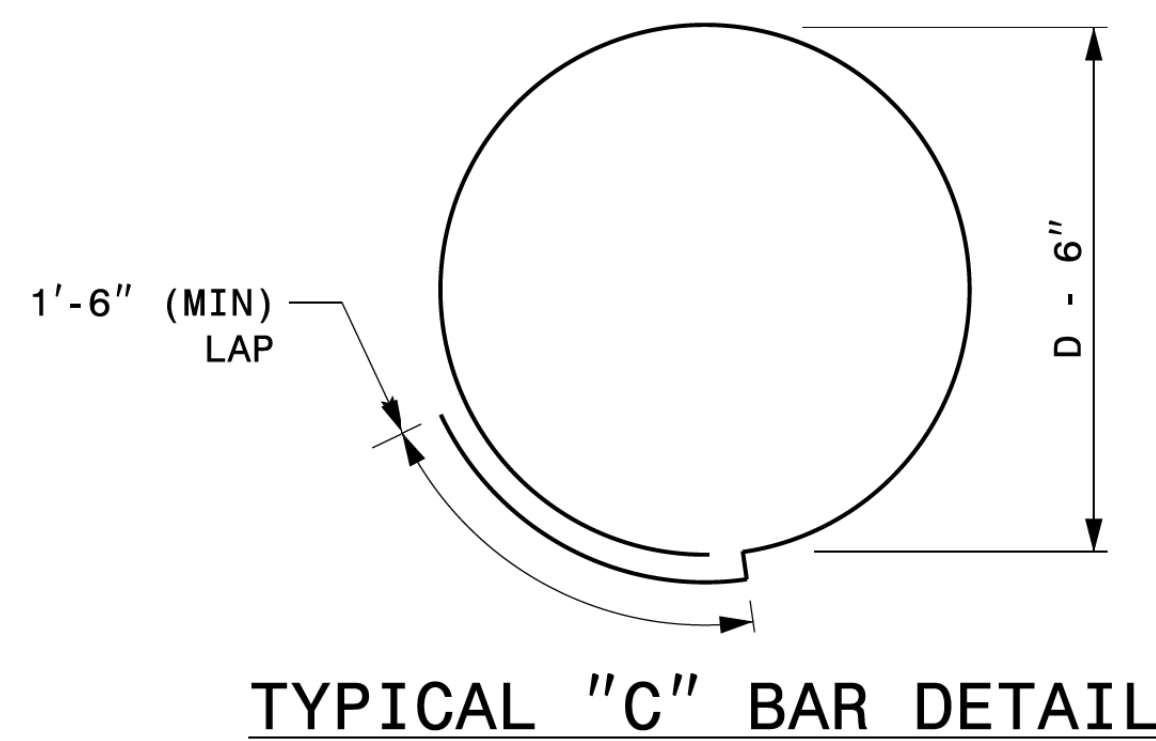
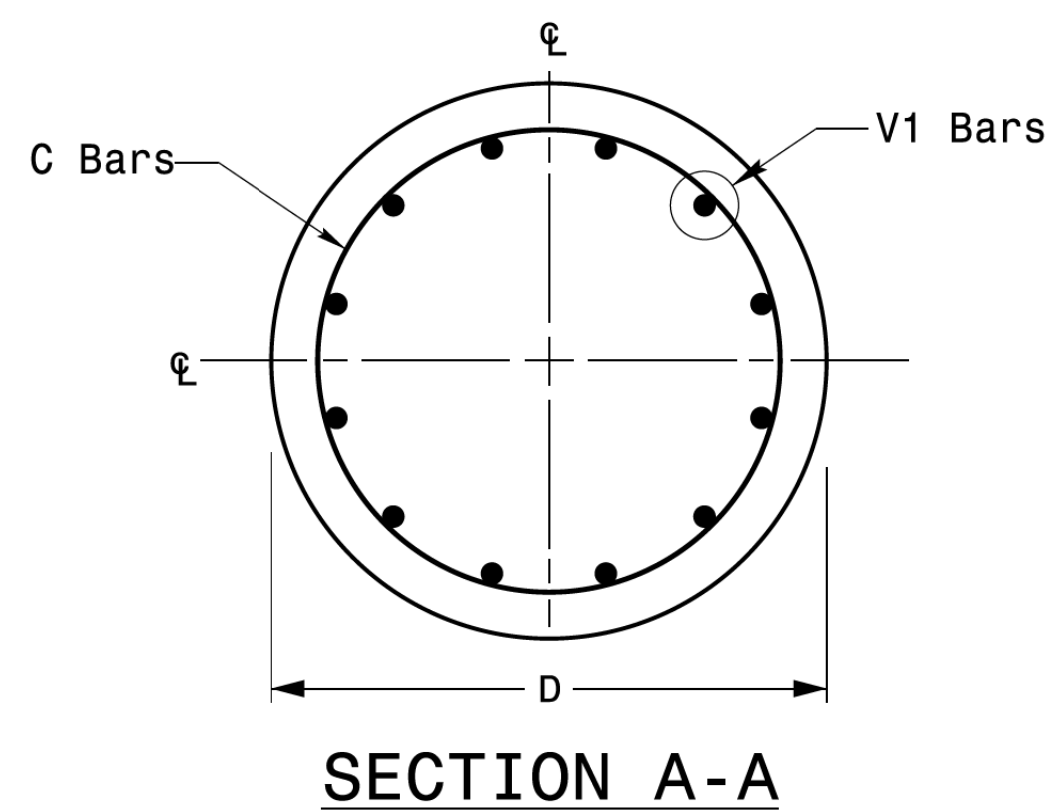
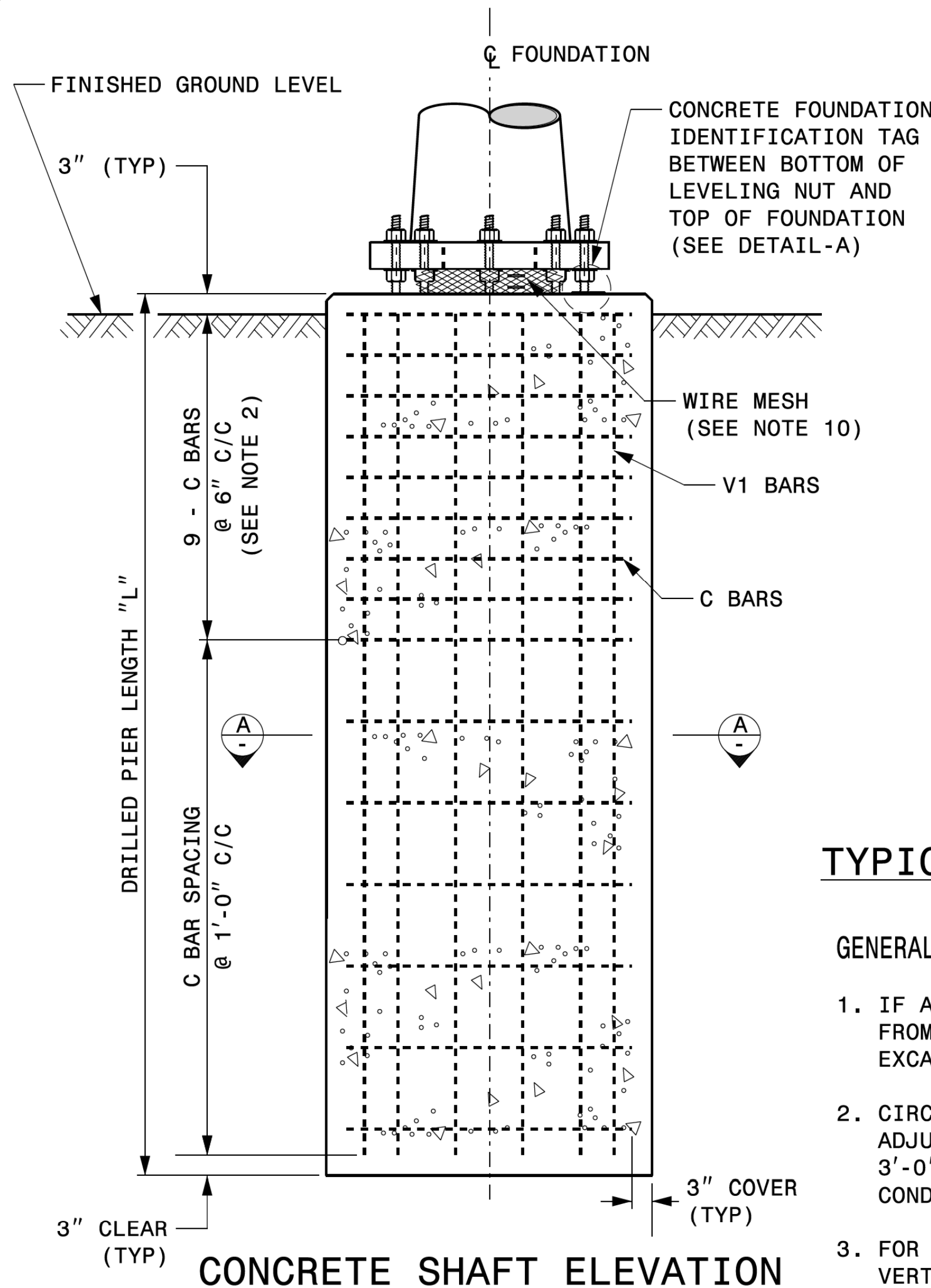
PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR
REVISIONS	INIT.	DATE	

SEAL



DocuSigned by:
Kevin Durigon
4B23DC79B3784DA

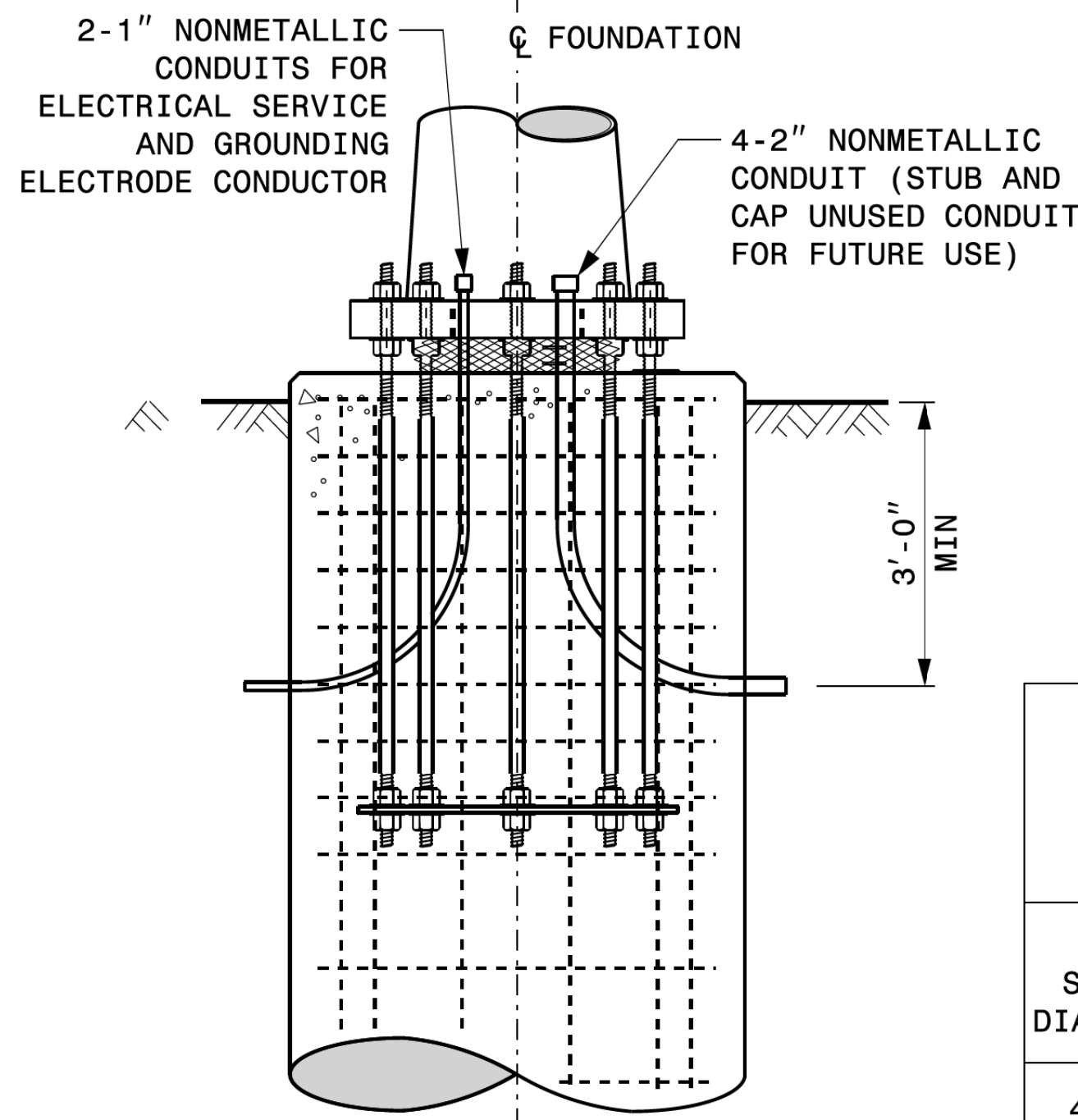
09/21/2023
DATE



TYPICAL FOUNDATION CONDUIT DETAILS

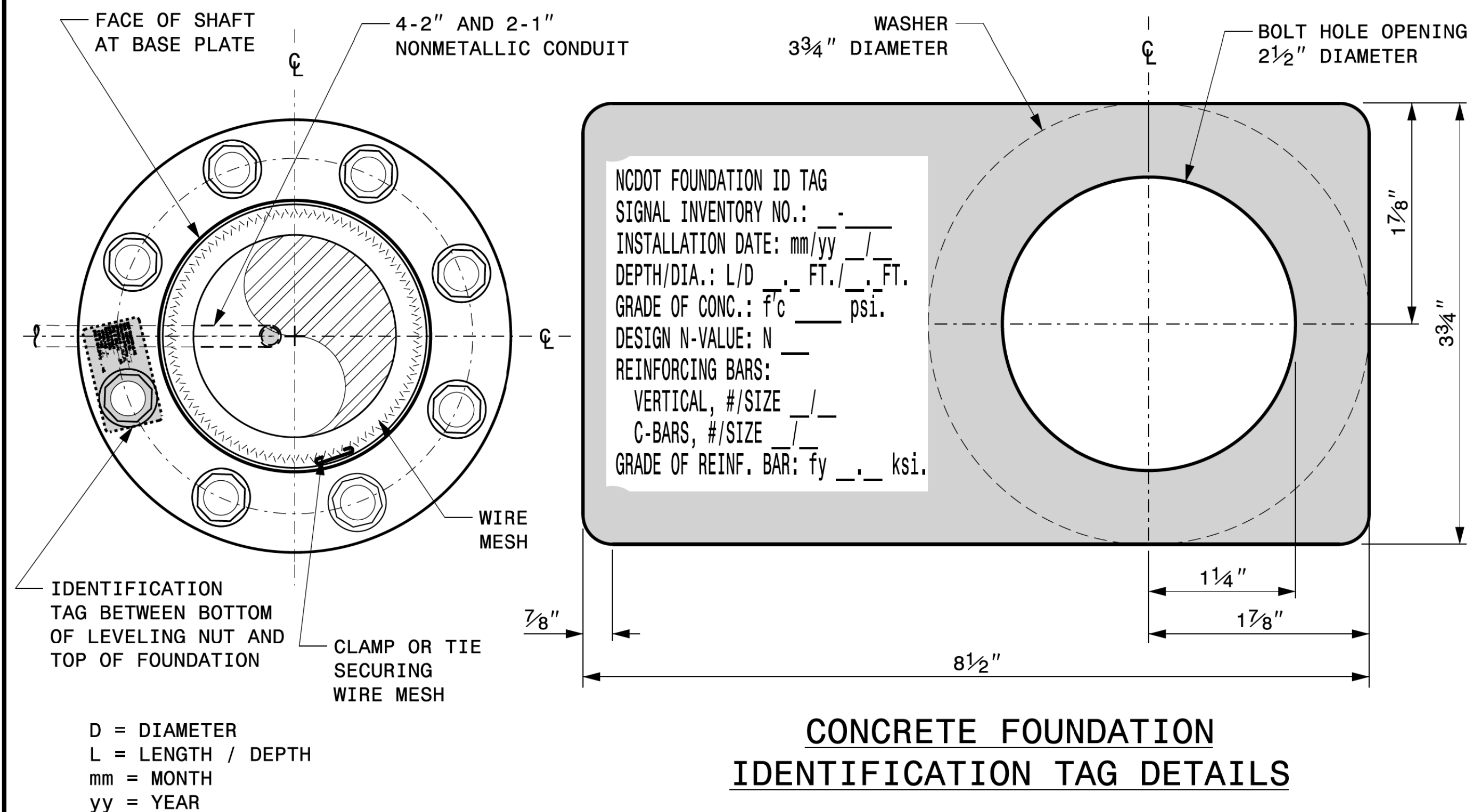
GENERAL NOTES:

- 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 IN 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 C	- *	#8 CIR.	STR. **	12'-6"

* SEE NOTE 2
** SEE NOTE 3



DETAIL-A

	Construction Details For Foundations		
	PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR	REVISIONS INIT. DATE	
SCALE 0 NA NONE			09/23/2023 DATE

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Koduuri-1000

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.)
S26L1	26	22	2	9	210	19.5	12.5	9	6.5	15.5	14.5	13	8	12	4	12
S26L2	26	23	2	10	240	19.5	12	9	6.5	15.5	14.5	13	8	12	4	12
S26L3	26	25	2	11	260	20.5	12	10	8	16	15	13	8	12	4	12
S30L1	30	22	2	9	230	19	11	9	7	15.5	14	12.5	8	12	4	12
S30L2	30	23	2	10	270	20	12	10	8	16	14.5	13	8	12	4	12
S30L3	30	25	2	11	290	21	12	10	8	17	15	13.5	8	12	4	12
S30H1	30	25	3	13	355	23	13	11	9	18	16.5	14.5	8	12	4	12
S30H2	30	29	3	15	405	25	14	11	9	19	17.5	15.5	8	14	4	12
S30H3	30	29	3	16	430	26	15	12	9	20	18	16	8	14	4	6
S35L1	35	22	3	8	260	19.5	12	10	8	15.5	14.5	13	8	12	4	12
S35L2	35	23	3	10	300	21	12	10	8	16.5	15	13.5	8	12	4	12
S35L3	35	25	3	10	320	21.5	13	10	8	17	15.5	14	8	12	4	12
S35H1	35	25	3	12	390	23.5	14	11	9	18	17	15	8	14	4	12
S35H2	35	29	4	14	460	26	15	12	9	20	18	16	8	14	4	6
S35H3	35	29	4	16	495	28.5	15	13.5	10	21.5	19	17	8	14	4	6

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

PROJECT I.D. NO.	SHEET NO.
B-5985B	Sig.M8

GENERAL NOTES:

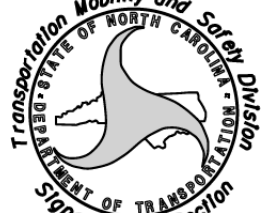
1. VALUES SHOWN IN THE "REACTIONS AT THE POLE BASE" COLUMN REPRESENT THE MINIMUM ACCEPTABLE CAPACITY ALLOWED FOR DESIGN USING A COMBINED FORCE RATIO (CFR) OF 1.00.
2. USE CHAIRS AND SPACERS TO MAINTAIN PROPER CLEARANCE.
3. FOR FOUNDATION, ALWAYS USE AIR-ENTRAINED CONCRETE MIX.

FOUNDATION SELECTION:

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

Standard Strain Pole Foundation – All Soil Conditions

Prepared In the Offices of:



750 N.Greenfield Pkwy, Garner, NC 27529

SCALE

0 NONE NA

Standard Strain Pole Foundation for All Soil Conditions

PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON

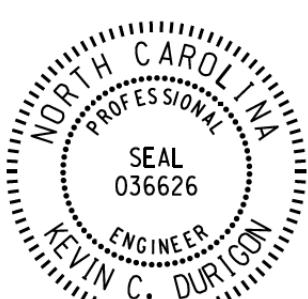
PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR

REVISIONS

INIT.

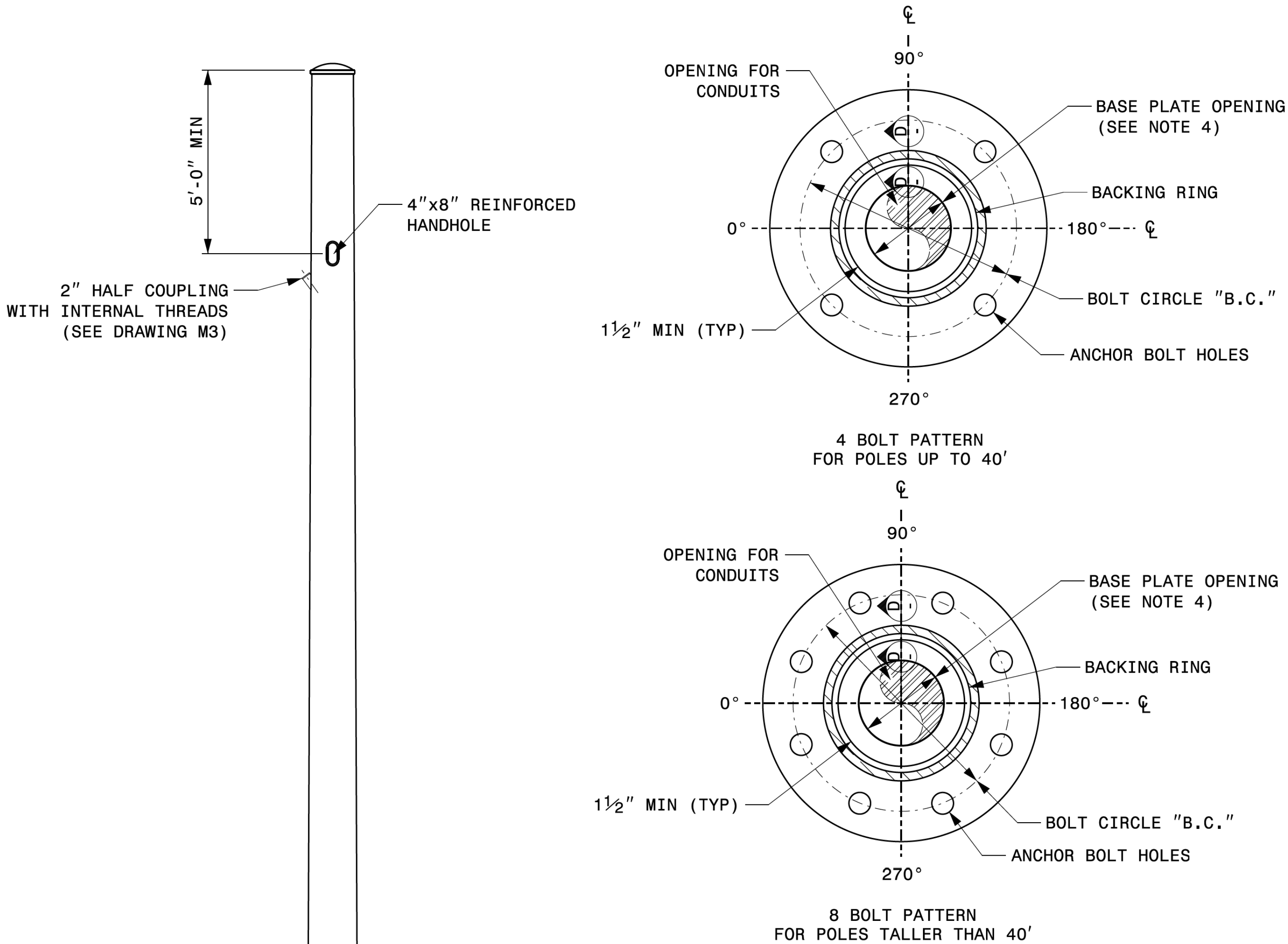
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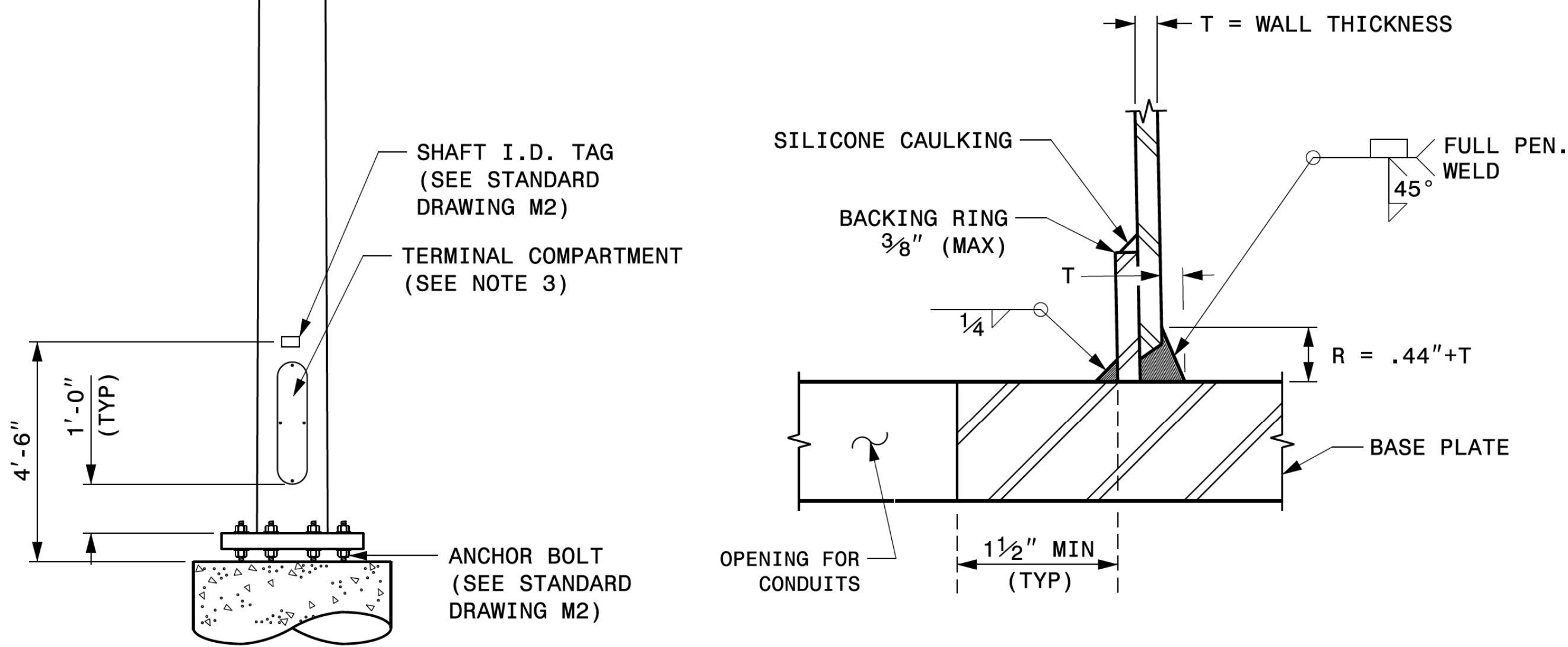


DocuSigned by: Kevin Durigon 4B23DC79B3784DA

09/21/2023 DATE



BASE PLATE DETAILS



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

NOTES:

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

CCTV CAMERA POLE
(NOT TO SCALE)

Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	Typical Fabrication Details For CCTV Poles		SEAL DocuSigned by: <i>Kevin Durigon</i> 4B23DC79B3784DA	
	PLAN DATE: SEPTEMBER 2023	DESIGNED BY: K.C. DURIGON		
	PREPARED BY: K.C. DURIGON	REVIEWED BY: C.F. ANDREWS		
SCALE 0 NA NONE	REVISIONS	INIT. DATE		