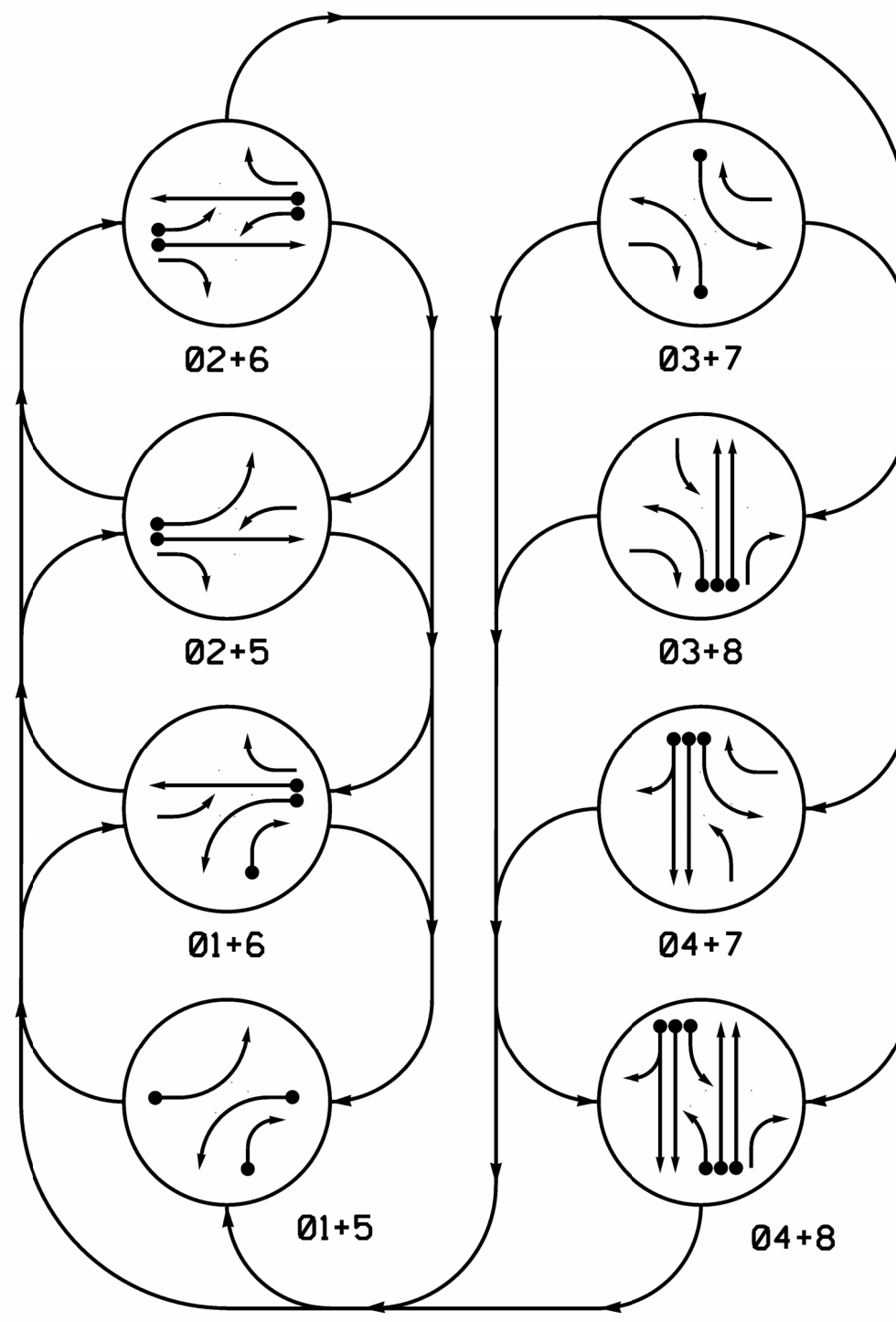


DEFAULT PHASING DIAGRAM



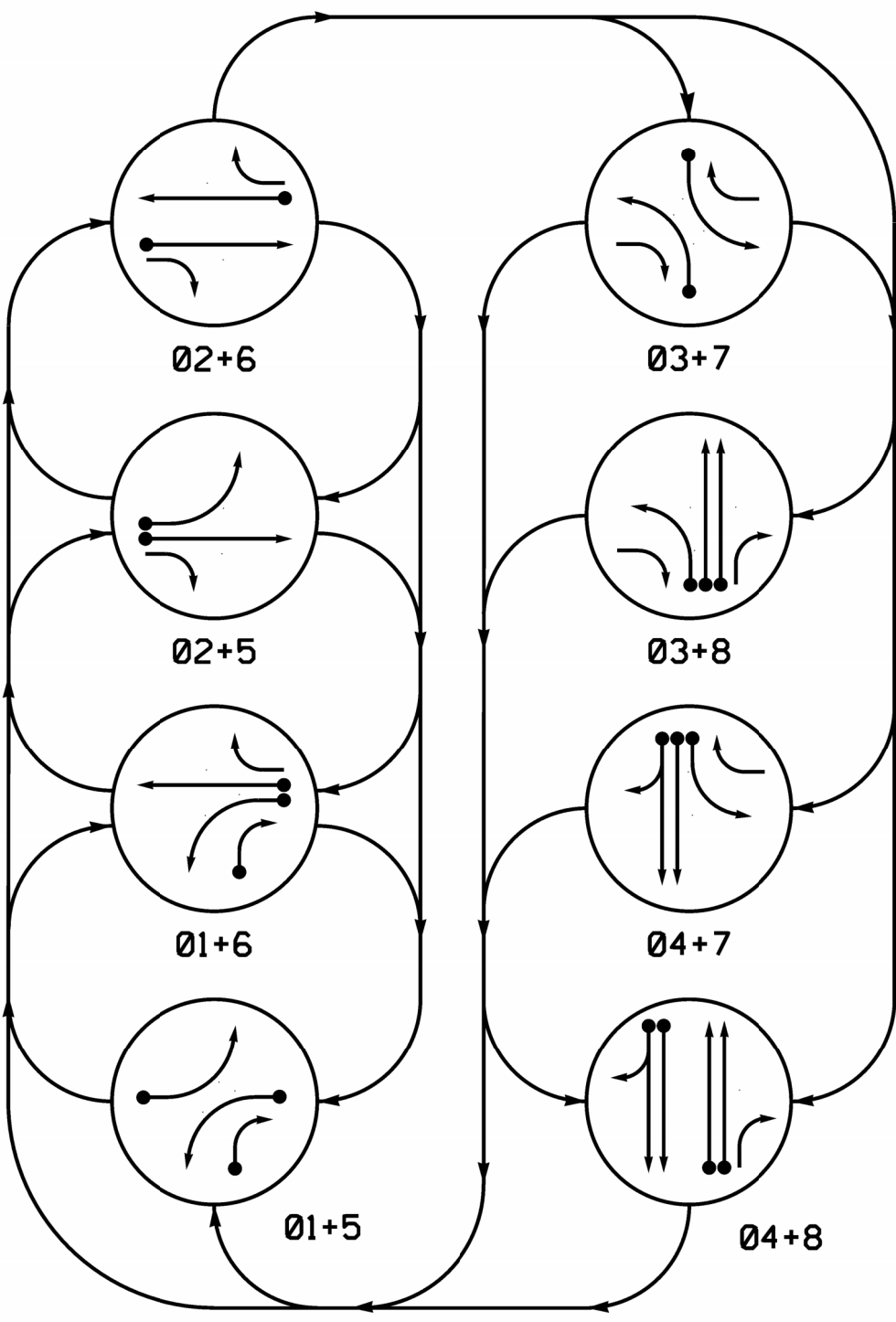
DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE								FLASH	
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8		
11										
21	R	R	G	G	R	R	R	R	Y	
22	R	R	G	G	R	R	R	R	Y	
31	R	R	R	R						
41,42,43	R	R	R	R	R	R	G	G	R	
51										
61	R	G	R	G	R	R	R	R	Y	
62	R	G	R	G	R	R	R	R	Y	
71	R	R	R	R						
81,83	R	R	R	R	R	G	R	G	R	
82	R	R	R	R	R	G	R	G	R	

PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE								FLASH	
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8		
11										
21	R	R	G	G	R	R	R	R	Y	
22	R	R	G	G	R	R	R	R	Y	
31	R	R	R	R						
41,42,43	R	R	R	R	R	R	G	G	R	
51										
61	R	G	R	G	R	R	R	R	Y	
62	R	G	R	G	R	R	R	R	Y	
71	R	R	R	R						
81,83	R	R	R	R	R	G	R	G	R	
82	R	R	R	R	R	G	R	G	R	

MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	
1A	6X40	0	2-4-2	X	1	15.0★	-	X	-	X	-	X
1B	6X40	0	2-4-2	X	1	15.0	-	X	-	X	-	X
1C	6X6	0	6	X	1	15.0	-	X	-	X	-	X
2A	6X6	420	6	X	2	-	-	X	X	X	-	X
3A	6X40	0	2-4-2	X	3	15.0★	-	X	-	X	-	X
4A	6X40	0	2-4-2	X	4	-	-	X	-	X	-	X
4B	6X40	0	2-4-2	X	4	5.0	-	X	-	X	-	X
* 4C	6X20	0	2-4-2	X	4	10.0	-	X	-	X	-	X
5A	6X40	0	2-4-2	X	5	15.0★	-	X	-	X	-	X
6A	6X6	420	6	X	6	-	-	X	X	X	-	X
7A	6X40	0	2-4-2	X	7	15.0	-	X	-	X	-	X
8A	6X40	0	2-4-2	X	8	-	-	X	-	X	-	X
8B	6X40	0	2-4-2	X	8	-	-	X	-	X	-	X
S7	6X6	+200	6	X	-	-	-	-	-	-	-	X
S8	6X6	+200	6	X	-	-	-	-	-	-	-	X
S9	6X6	+200	6	X	-	-	-	-	-	-	-	X
S10	6X6	+200	6	X	-	-	-	-	-	-	-	X

- * Set Sensitivity to appropriate level to detect a bicycle.
- ★ Reduce Delay to 3 seconds during Alternate Phasing Operation.
- ** Disable Delay during Alternate Phasing Operation.
- # Disable Phase Call for loop During Alternate Phasing Operation.

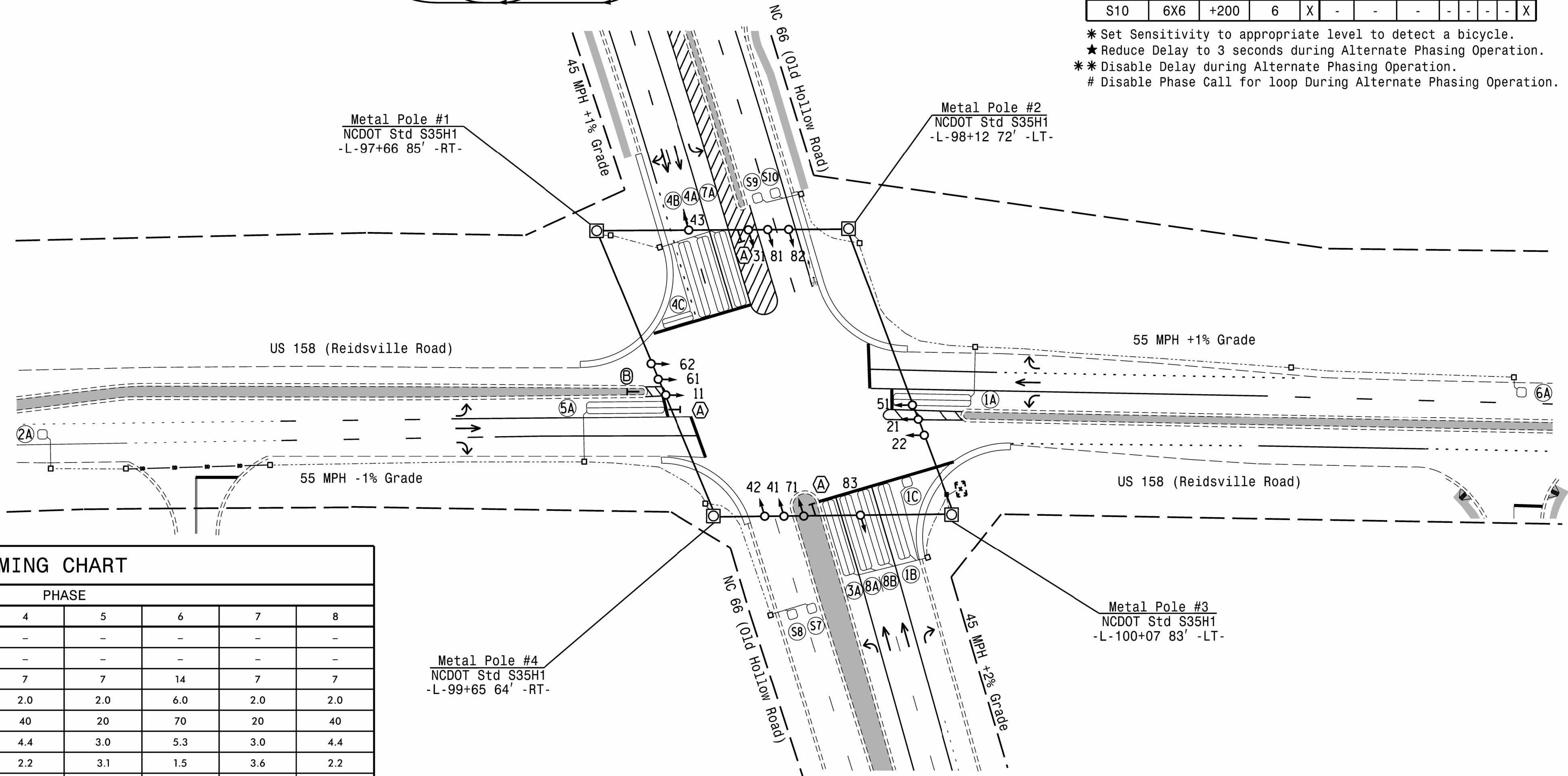
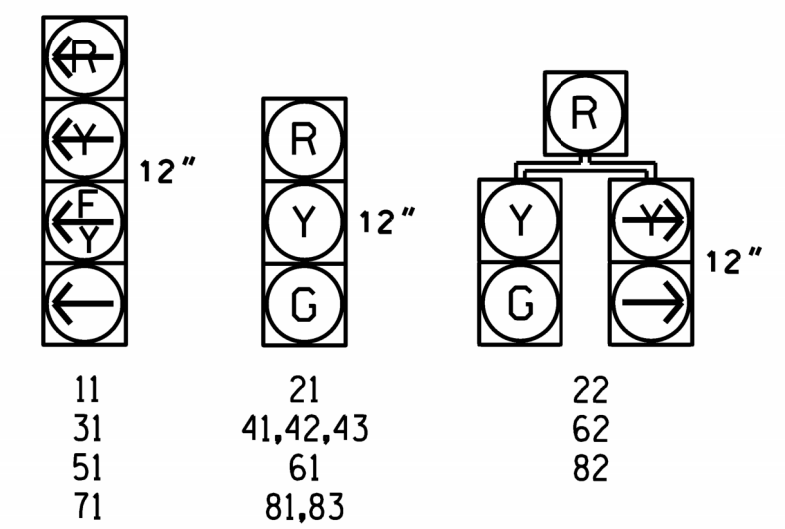
8 Phase Fully Actuated (Old Hollow Road CLS) Signal System #: D09-29_Walkertown

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Walk *	-	-	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-	-	-
Min Green *	7	14	7	7	7	14	7	7
Passage *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max I *	20	70	20	40	20	70	20	40
Yellow Change	3.0	5.3	3.0	4.4	3.0	5.3	3.0	4.4
Red Clear	3.1	1.5	3.4	2.2	3.1	1.5	3.6	2.2
Added Initial *	-	3.0	-	-	-	3.0	-	-
Maximum Initial *	-	46	-	-	-	46	-	-
Time Before Reduction *	-	20	-	-	-	20	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.4	-	-	-	3.4	-	-
Advance Walk	-	-	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-	X	X
Vehicle Recall	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X

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

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
○ → Pedestrian Signal Head With Push Button & Sign	○ → N/A
○ → Metal Strain Pole	○ → N/A
□ → Inductive Loop Detector	□ → N/A
□ → Controller & Cabinet	□ → N/A
□ → Junction Box	□ → N/A
--- → 2-in Underground Conduit	--- → N/A
--- → Directional Drill	--- → N/A
N/A → Right of Way	N/A → N/A
N/A → Directional Arrow	N/A → N/A
N/A → Curb Ramp	N/A → N/A
⊕ → "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	⊕ → N/A
⊖ → No U-Turn Sign (R3-4)	⊖ → N/A

Signal Upgrade - Final Design

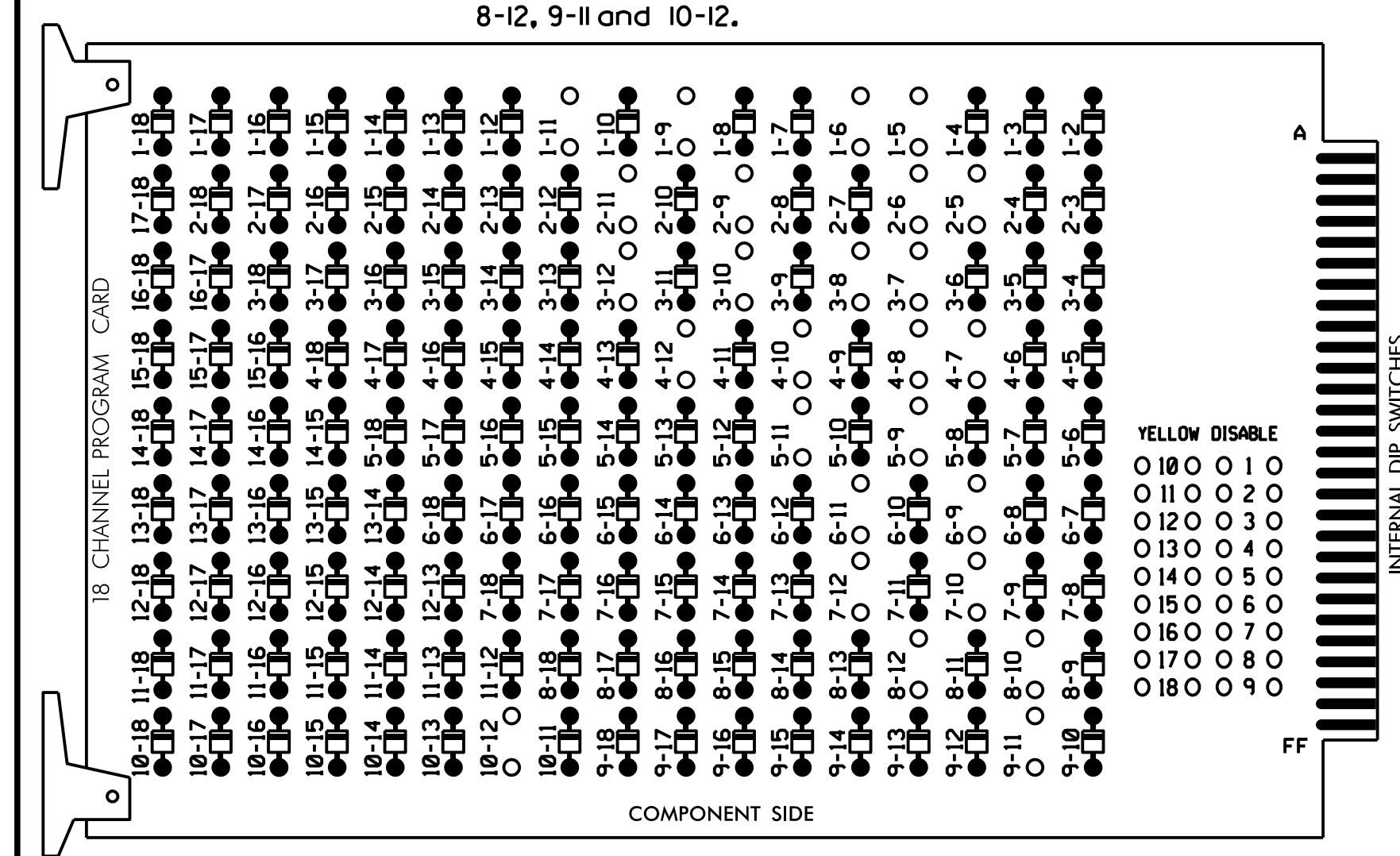
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: NC FIRM LICENSE No: P-0339 320 Executive Court Hillsborough, NC 27278 (919) 732-3883 (919) 732-6676 (FAX)		US 158 (Reidsville Road) at NC 66 (Old Hollow Road)	
		Division 9 Forsyth County Walkertown PLAN DATE: August 2023 REVIEWED BY: E. Sirgany PREPARED BY: J. Smith REVIEWED BY:	REVISIONS INIT. DATE

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11 and 10-12.



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all enabled detectors.
- The cabinet and controller are part of the Old Hollow Road Closed Loop System.
Signal System #: D09-29_Walkertown

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....Q-FREE MAXTIME
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11,
 AUX S1,AUX S2,AUX S4,AUX S5
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAP "1".....*
 OVERLAP "2".....*
 OVERLAP "3".....*
 OVERLAP "4".....*
 * See overlap programming detail on sheet 2.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	82	21,22	22	31	41,42, 43	51	61,62	62	71	81,82, 83	91	11	31	NU	51	71	NU
RED	*	128		*	101		134		*	107								
YELLOW		129			102		* 135			108								
GREEN		130			103		136			109								
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW	126			117						123			A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127	127		118	118		133		124	124								

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

INPUT FILE POSITION LAYOUT

(front view)

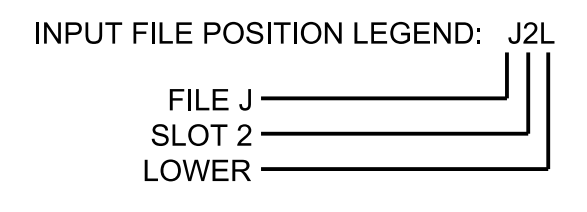
FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 2	S	∅ 3	∅ 4	∅ 4	S	SYS. DET. S7	S	S	S	S	FS
L	NOT USED	∅ 1	NOT USED	Y	NOT USED	∅ 4	NOT USED	Y	SYS. DET. S8	E	E	E	E	DC ISOLATOR
U	∅ 5	∅ 6	S	∅ 7	∅ 8	S	S	S	SYS. DET. S9	S	S	S	S	ST
L	NOT USED	NOT USED	Y	NOT USED	∅ 8	Y	Y	Y	SYS. DET. S10	E	E	E	E	DC ISOLATOR

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

INPUT FILE CONNECTION & PROGRAMMING CHART

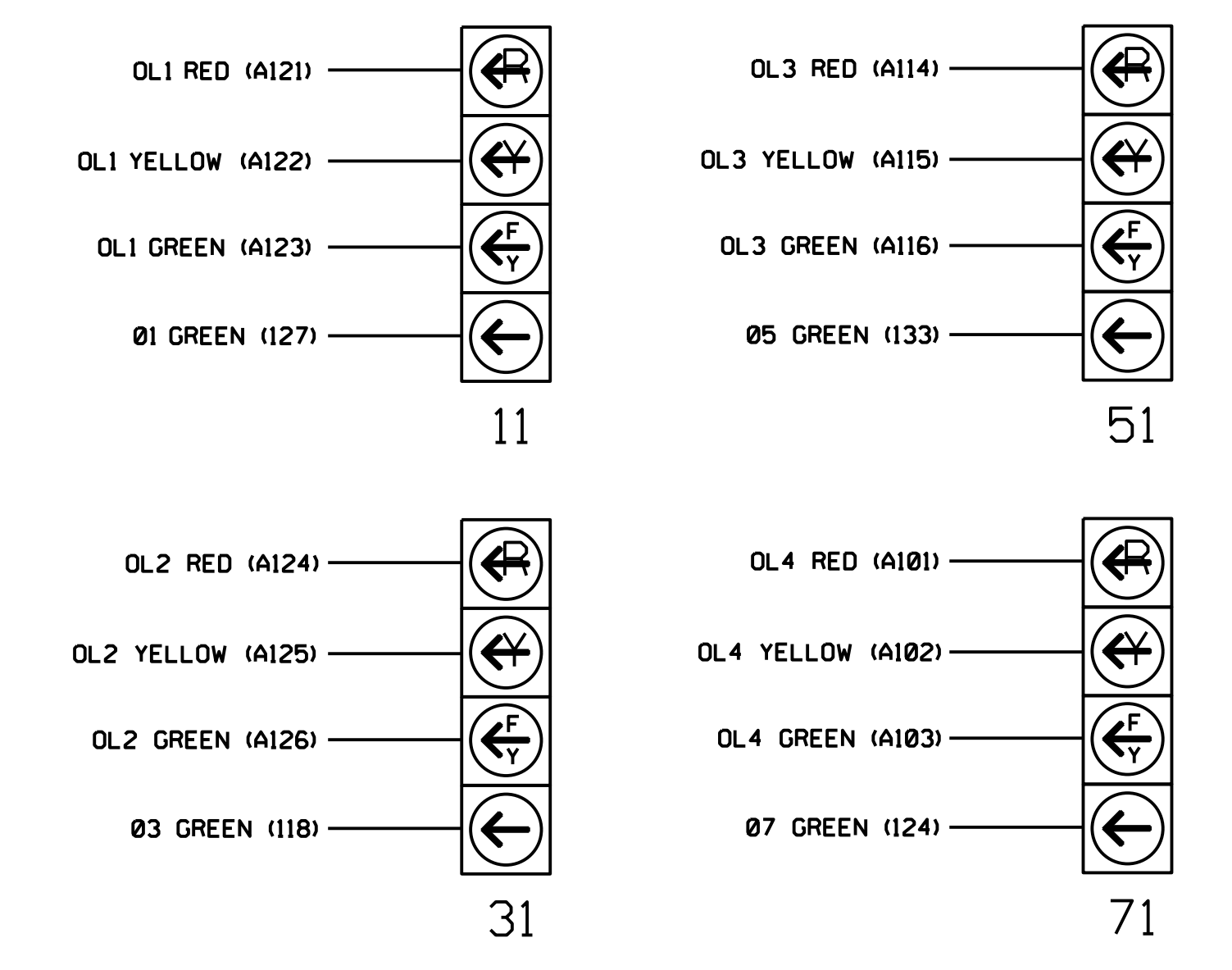
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1	15.0		X		X	
1B	TB2-5,6	I2U	39	-	29	6	3.0		X		X	X
1C	TB2-7,8	I2L	43	5	3	1	15.0		X		X	
2A	TB2-9,10	I3U	63	29	4	2			X	X	X	
3A	TB4-5,6	I5U	58	20	7	3	15.0		X		X	
4A	TB4-9,10	I6U	41	3	8	4			X		X	
4B	TB4-11,12	I6L	45	7	9	4	5.0		X		X	
4C	TB6-1,2	I7U	65	31	10	4	10.0		X		X	
5A	TB3-1,2	J1U	55	17	15	5	15.0		X		X	
6A	TB3-5,6	J2U	40	2	16	6	3.0		X	X	X	X
7A	TB5-5,6	J5U	57	19	21	7	15.0		X		X	
8A	TB5-9,10	J6U	42	4	22	8			X		X	
8B	TB5-11,12	J6L	46	8	23	8			X		X	
* S7	TB6-9,10	I9U	60	22	13	SYS						
* S8	TB6-11,12	I9L	62	24	14	SYS						
* S9	TB7-9,10	J9U	59	21	27	SYS						
* S10	TB7-11,12	J9L	61	23	28	SYS						

* System detector only. Remove any assigned vehicle phase.
 * For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on Sheet 2.



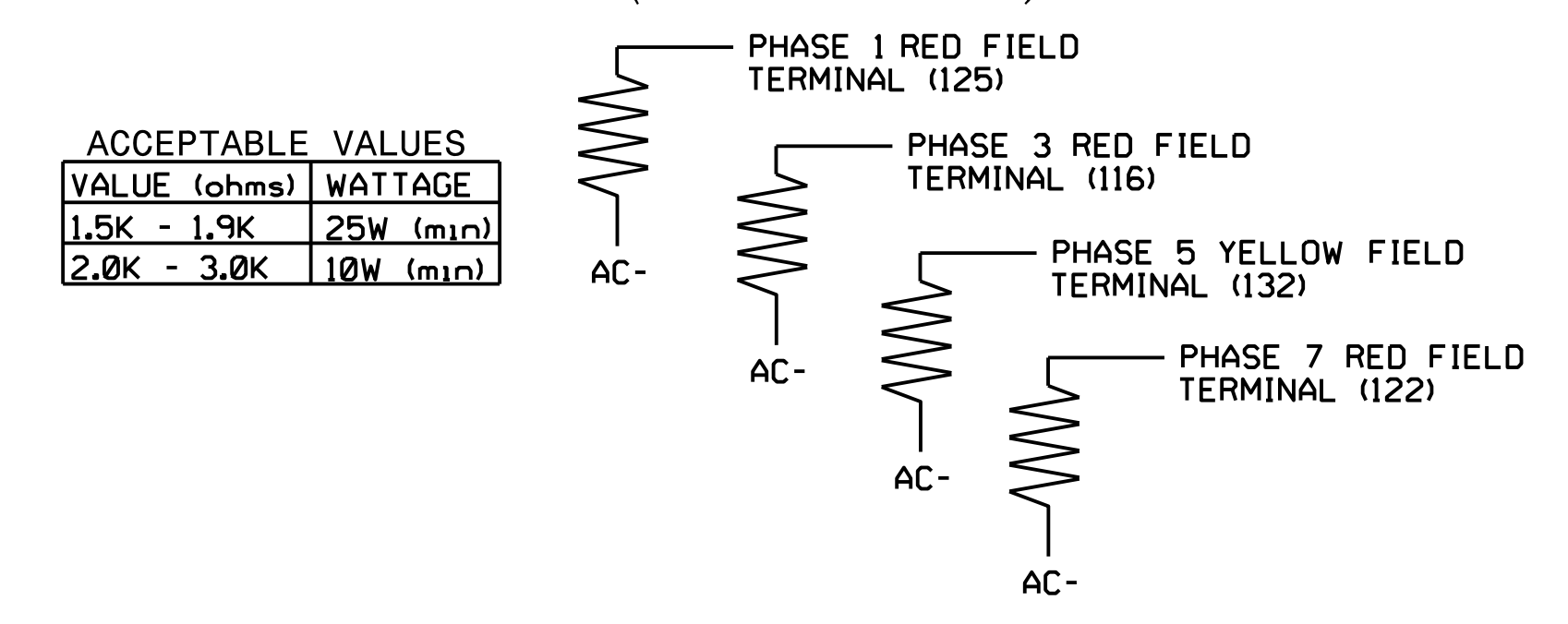
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



Electrical Detail - Final Design - Sheet 1 of 2

Electrical and Programming Details For:

US 158 (Reidsville Road) at NC 66 (Old Hollow Road)

Division 9 Forsyth County Walkertown

Plan Date: August 2023 Reviewed By: E. Sirgany

Prepared By: J. Smith Reviewed By:

REVISIONS INIT. DATE

Prepared For: North Carolina Department of Transportation

750 N. Greenfield Pkwy, Corner, NC 27529

Prepared in the Office of: SUMMIT DESIGN AND ENGINEERING SERVICES

NC FIRM LICENSE No: P-0339
 320 Executive Court Hillsborough, NC 27278
 (919) 732-3883
 (919) 732-6676 (FAX)

Document Not Considered Final Unless All Signatures Completed

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER EDWARD W. SIRGANY 018174

DocSigned by: Edward W. Sirgany 9/7/2023

SIG. INVENTORY NO. 09-0264

MATIME OVERLAP PROGRAMMING FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps
Overlap Plan 1

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8
Modifier Phases	1	3	5	7
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	2	3	4
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	-	-	-
Modifier Phases	1	3	5	7
Modifier Overlaps	-	-	-	-
Trail Green	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 3A, 5A & 7A

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

	Detector	Call Phase	Delay
1A	1	1	3.0
	29	0	3.0
3A	7	3	0.0
	30	0	0.0
5A	15	5	3.0
	31	0	3.0
7A	21	7	0.0
	32	0	0.0

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 11, 31, 51, and 71 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3.0 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 0.0 seconds.

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

Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 0.0 seconds.

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 Traffic Engineer.

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

Electrical Detail - Final Design - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED

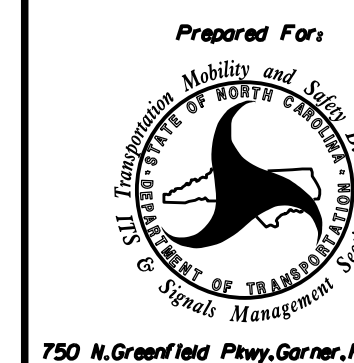
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0264
DESIGNED: August 2023
SEALED: 9/7/2023
REVISED: N/A

Prepared in the Office of:



NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

ELECTRICAL AND PROGRAMMING
DETAILS FOR:



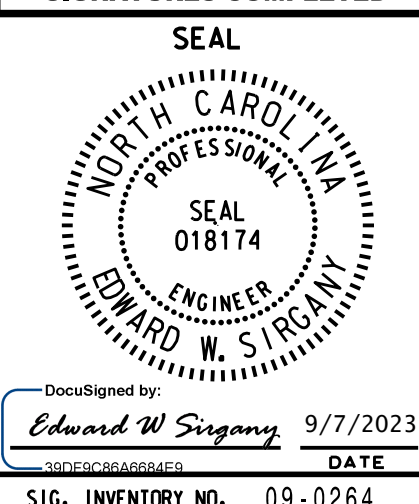
US 158 (Reidsville Road)
at
NC 66 (Old Hollow Road)

Division 9 Forsyth County Walkertown

PLAN DATE: August 2023 REVIEWED BY: E. Sirgany

PREPARED BY: J. Smith REVIEWED BY:

REVISIONS INIT. DATE

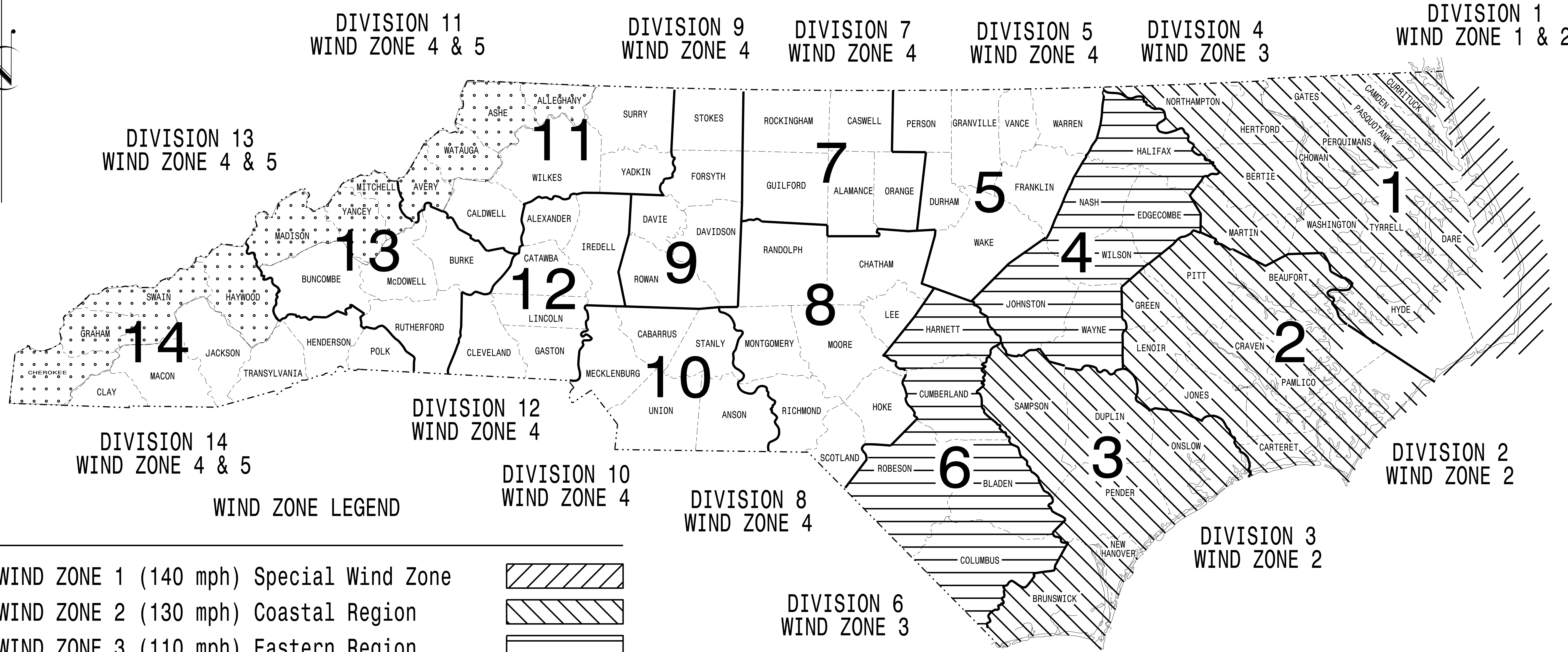


DocuSigned by:
Edward W. Sirgany 9/7/2023
DATE
SIG. INVENTORY NO. 09-0264

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO.	SHEET NO.
U-5824	Sig.M1

STANDARD DRAWINGS FOR ALL METAL POLES



WIND ZONE LEGEND

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

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

Prepared In the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

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

INDEX OF PLANS

DRAWING NUMBER	DESCRIPTION
Sig. M 1	Statewide Wind Zone Map
Sig. M 2	Typical Fabrication Details-All Metal Poles
Sig. M 3	Typical Fabrication Details-Strain Poles
Sig. M 4	Typical Fabrication Details-Mast Arm Poles
Sig. M 5	Typical Fabrication Details-Mast Arm Connection
Sig. M 6	Typical Fabrication Details-Strain Pole Attachments
Sig. M 7	Construction Details-Foundations
Sig. M 8	Standard Strain Pole Foundation-All Soil Conditions

NC DOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

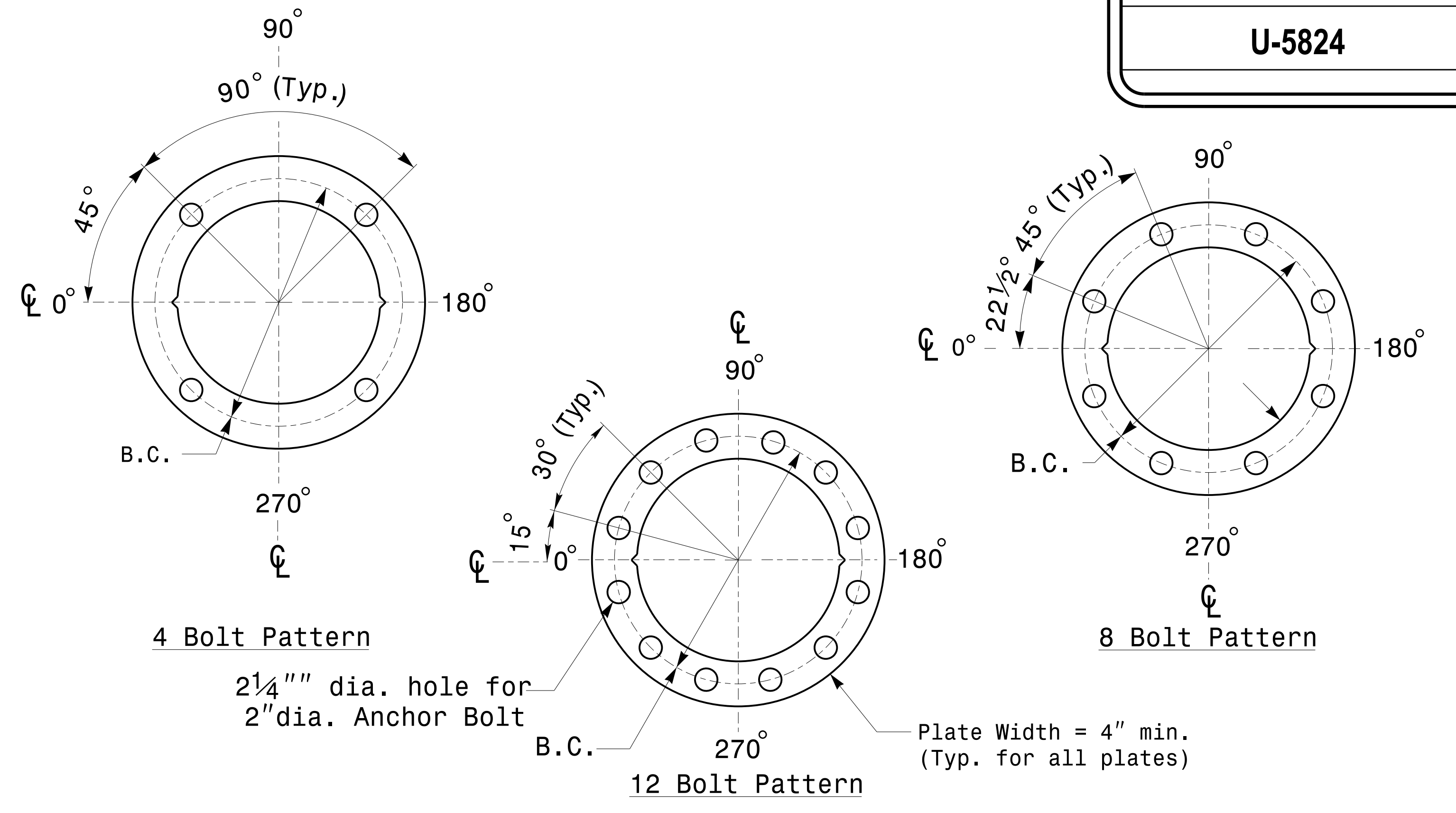
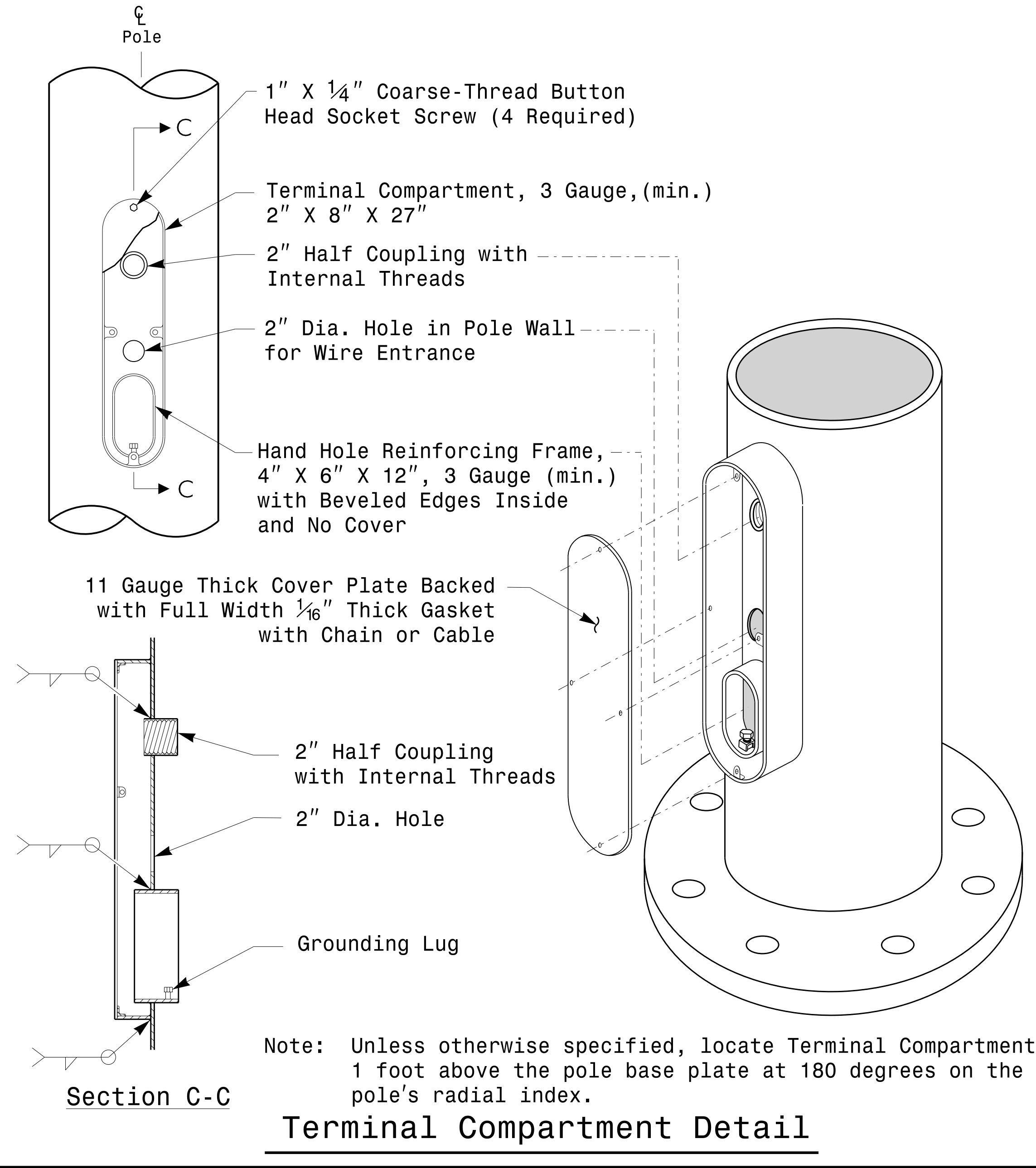
M.M. MCDIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER

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

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

SEAL

DocuSigned by:
Debesh C. Sarkar
DATE: 10/11/2017



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. _____	

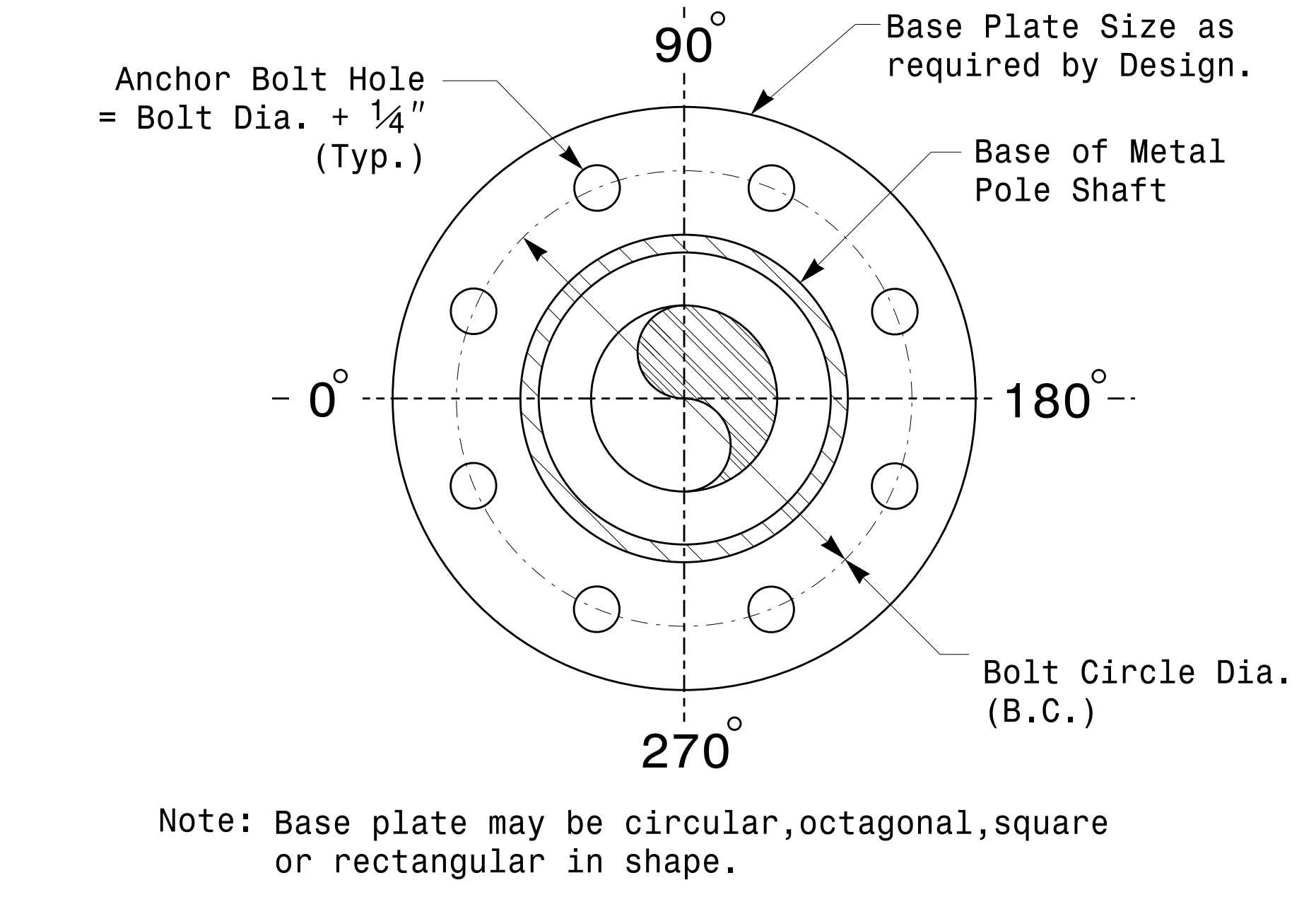
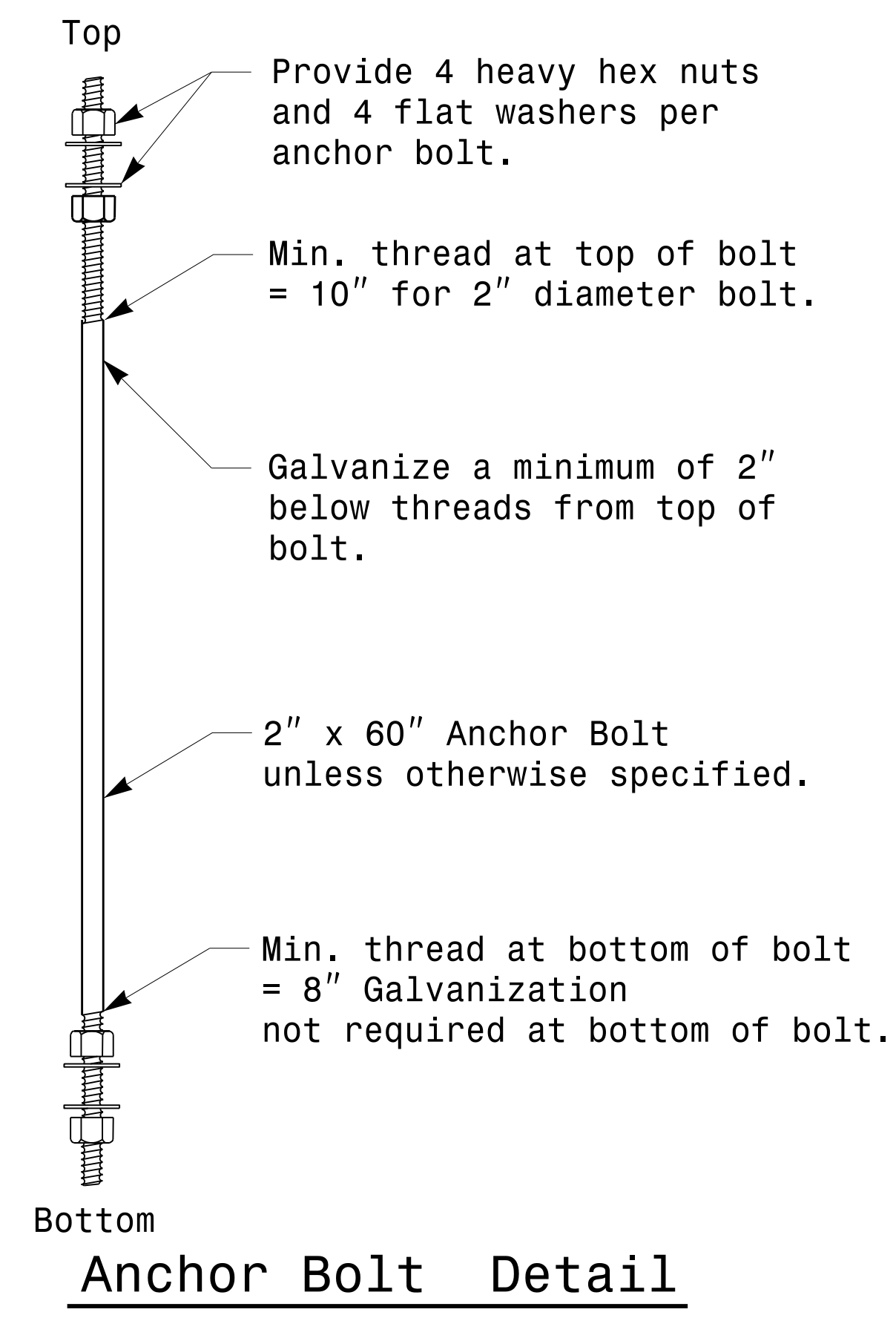
Shaft I.D. Tag
(Provide on Shaft of Strain Poles and Mast Arm Poles Shaft)

- 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 Custom Design, use "NCDOT STANDARD" line for Signal Inv. Number and pole I.D. number
 - 5) See drawing M3 and M4 for mounting positions of I.D. tags.

Identification Tag Details

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.)



Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

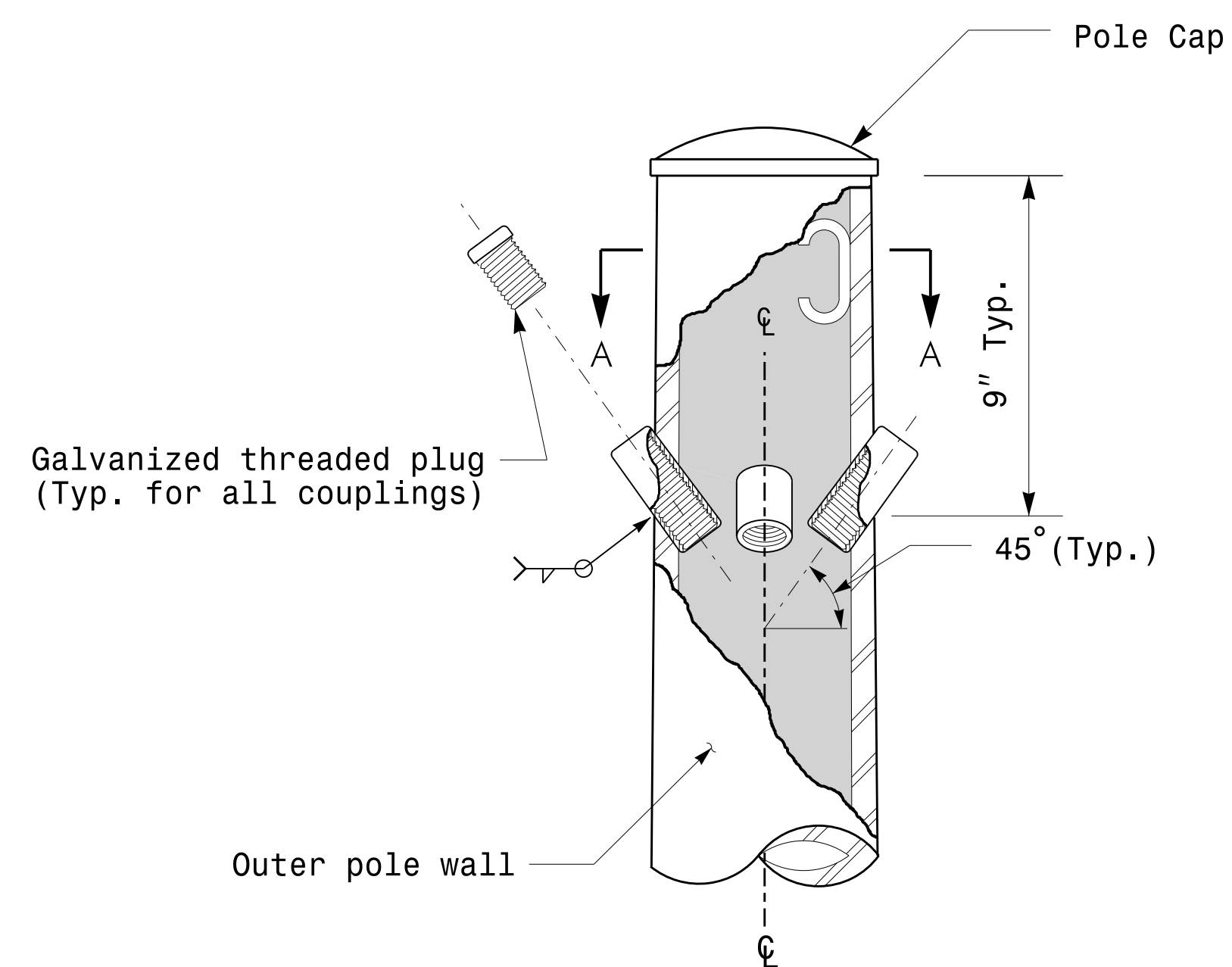
Typical Fabrication Details For All Metal Poles	
PLAN DATE: OCTOBER 2017	DESIGNED BY: C.F. ANDREWS
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

SEAL

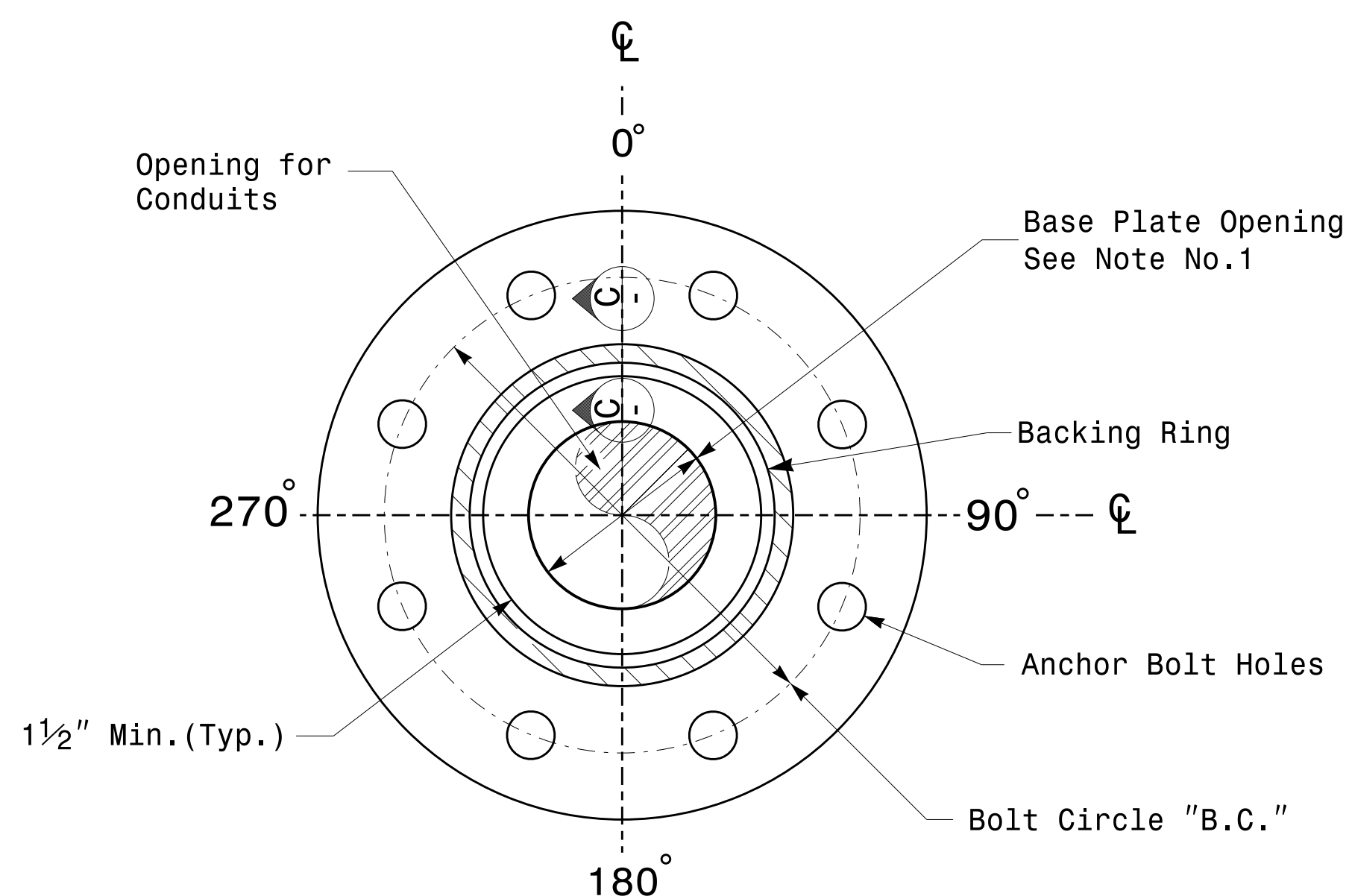
DocuSign by: D. C. Sarkar 10/11/2017

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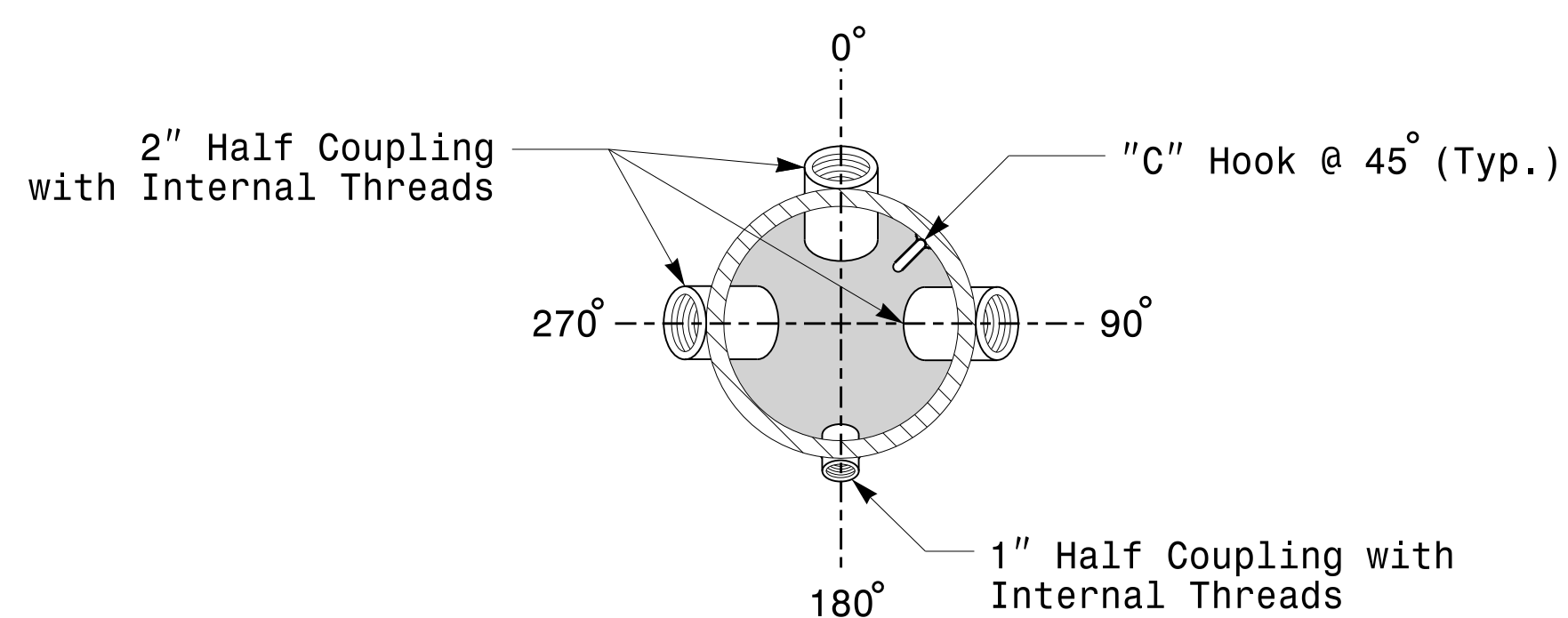
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



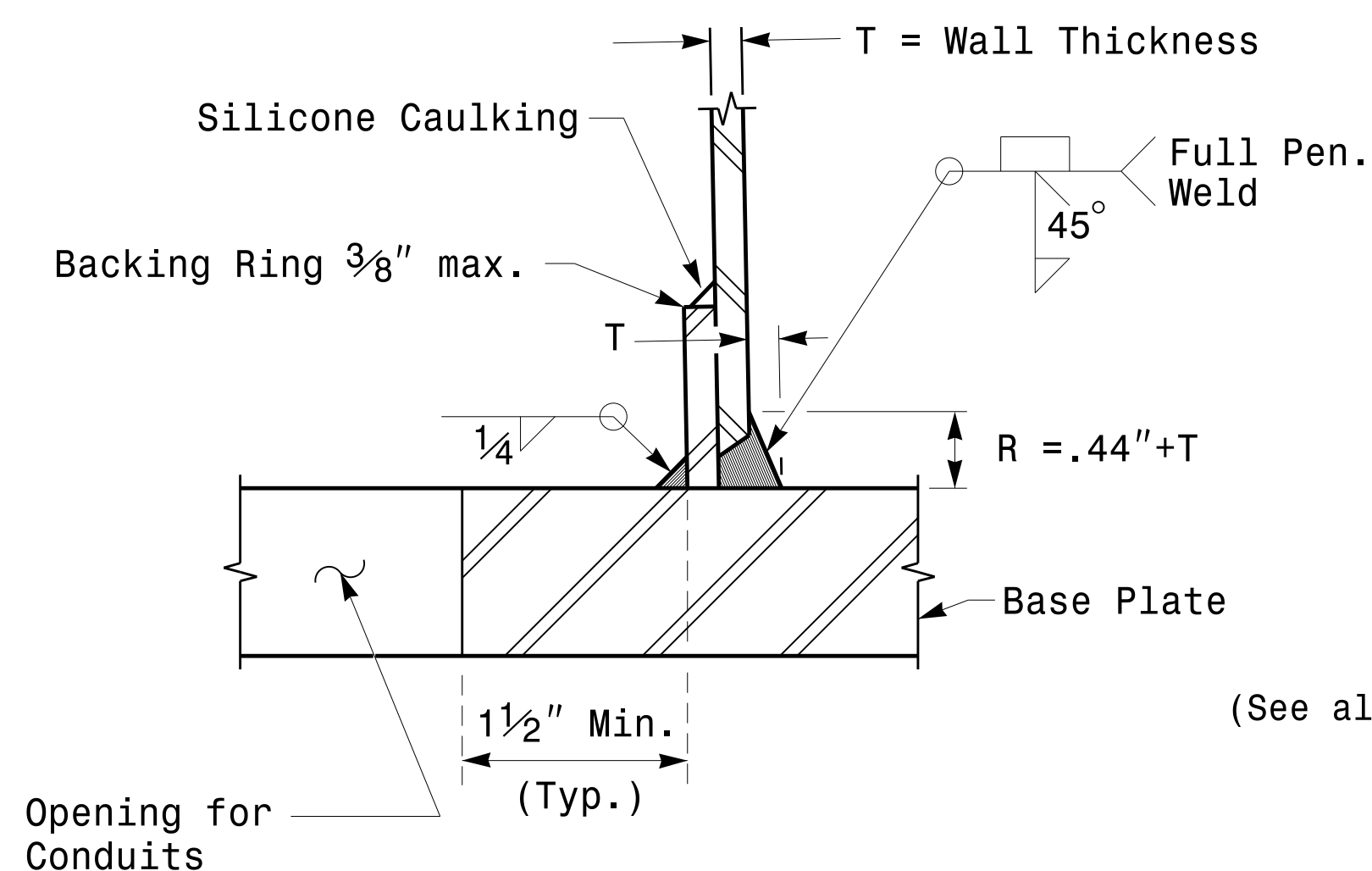
Cable Entrances at Top of Pole



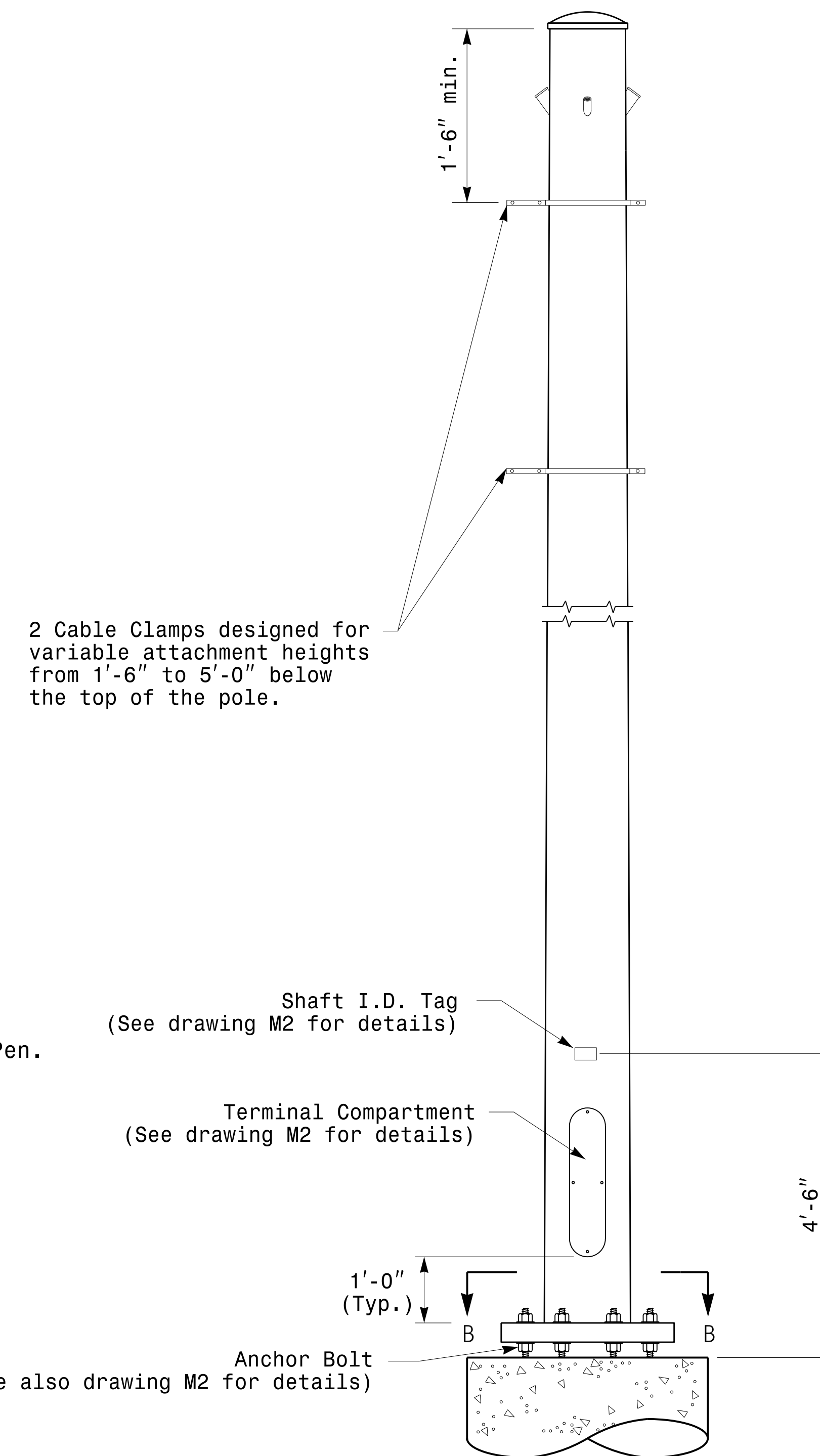
Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)



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



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



Monotube Strain Pole

Prepared in the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 NONE

Typical Fabrication Details For Strain Poles

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

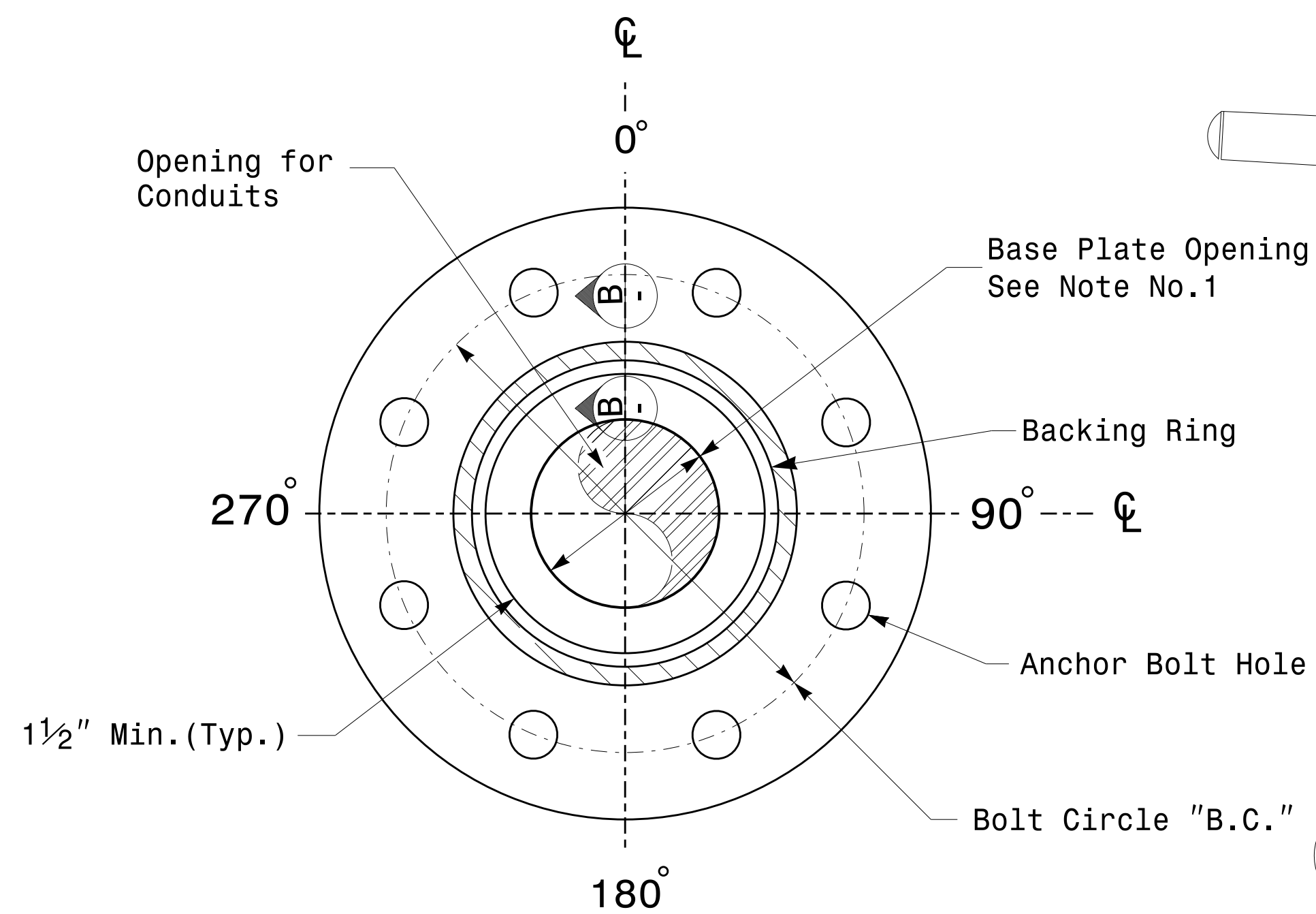
SEAL

DocuSigned by:
 Debesh C. Sarkar
 44EB87816FA4F49E

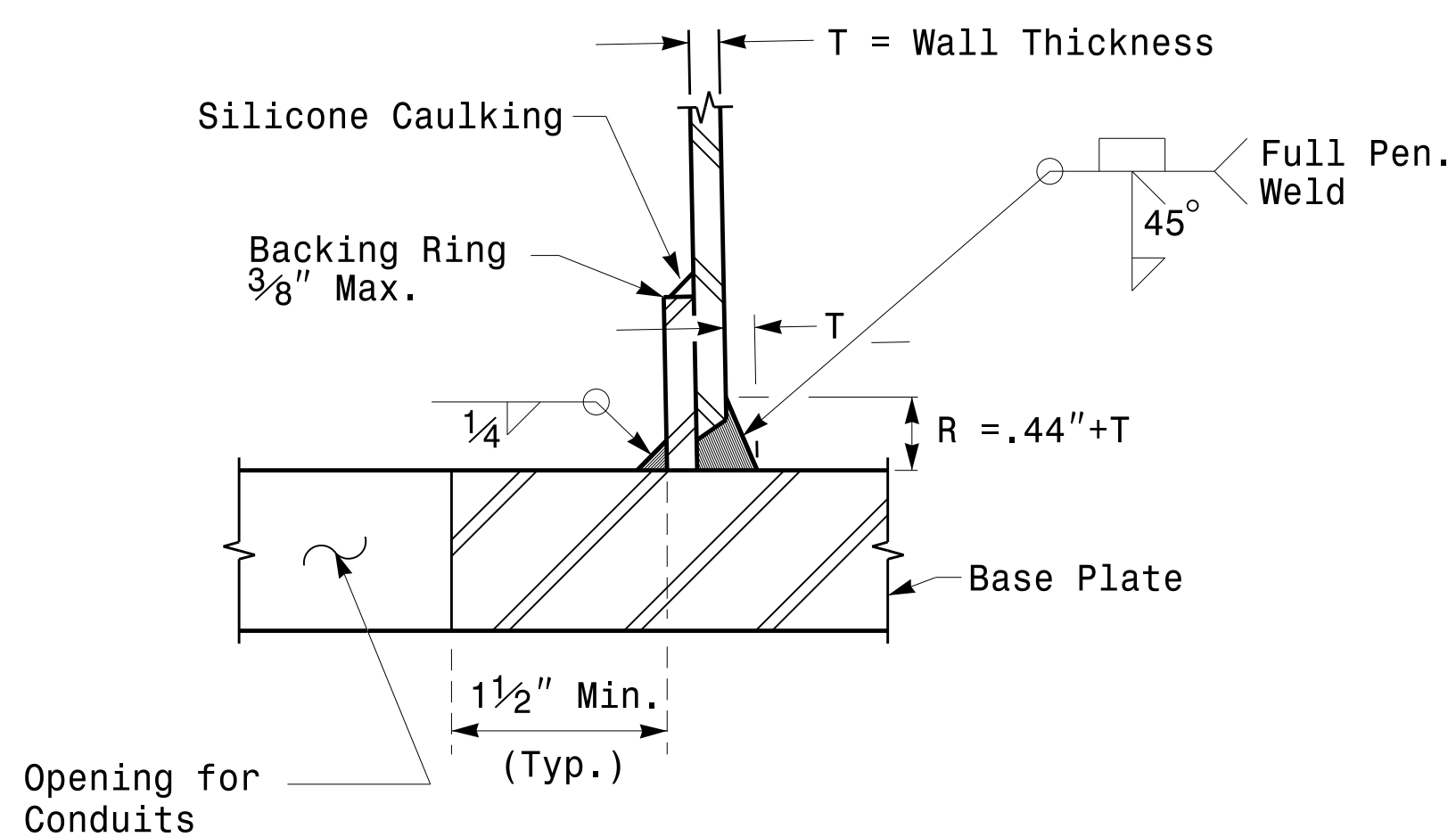
10/11/2017
 DATE

Fabrication Details – Strain Poles

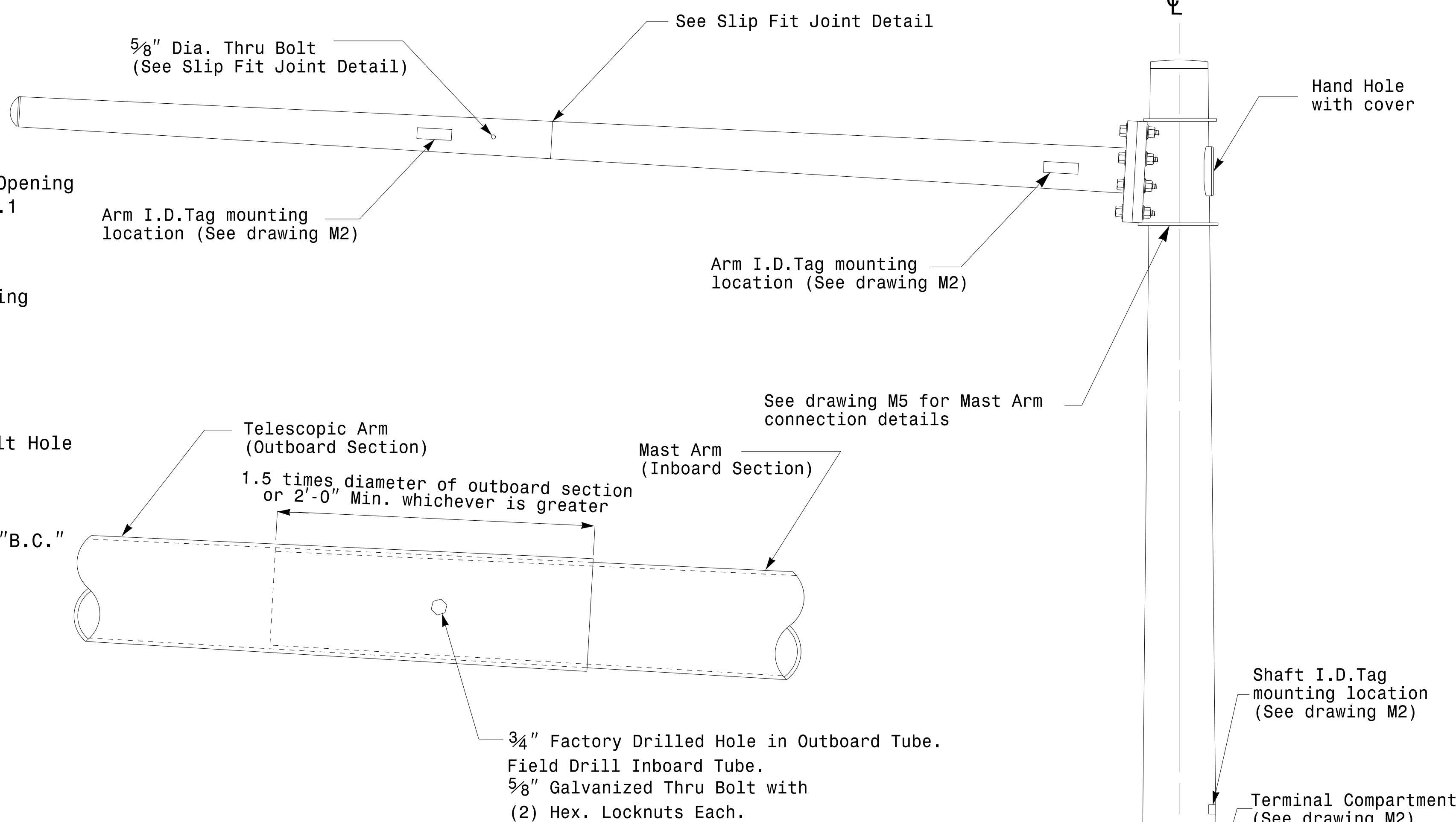
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



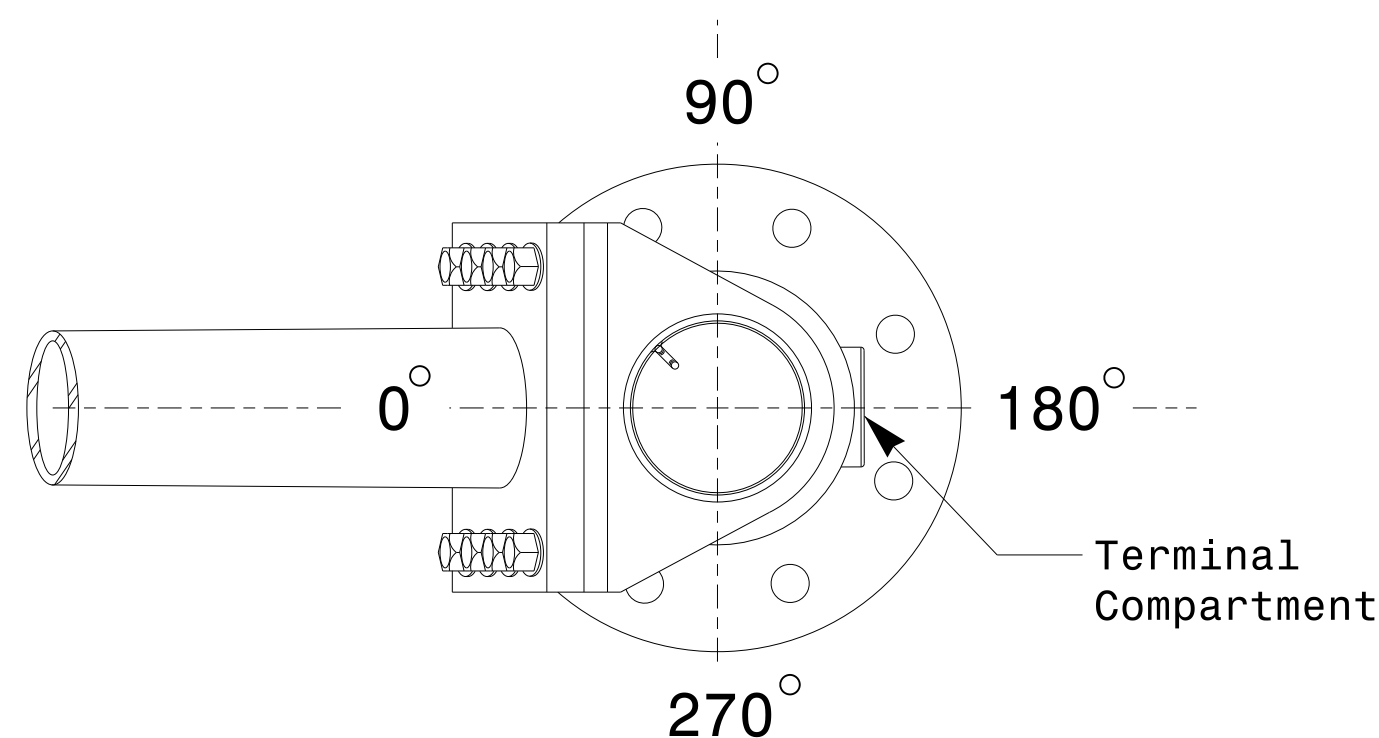
Section A-A
 Pole Base Plate Details



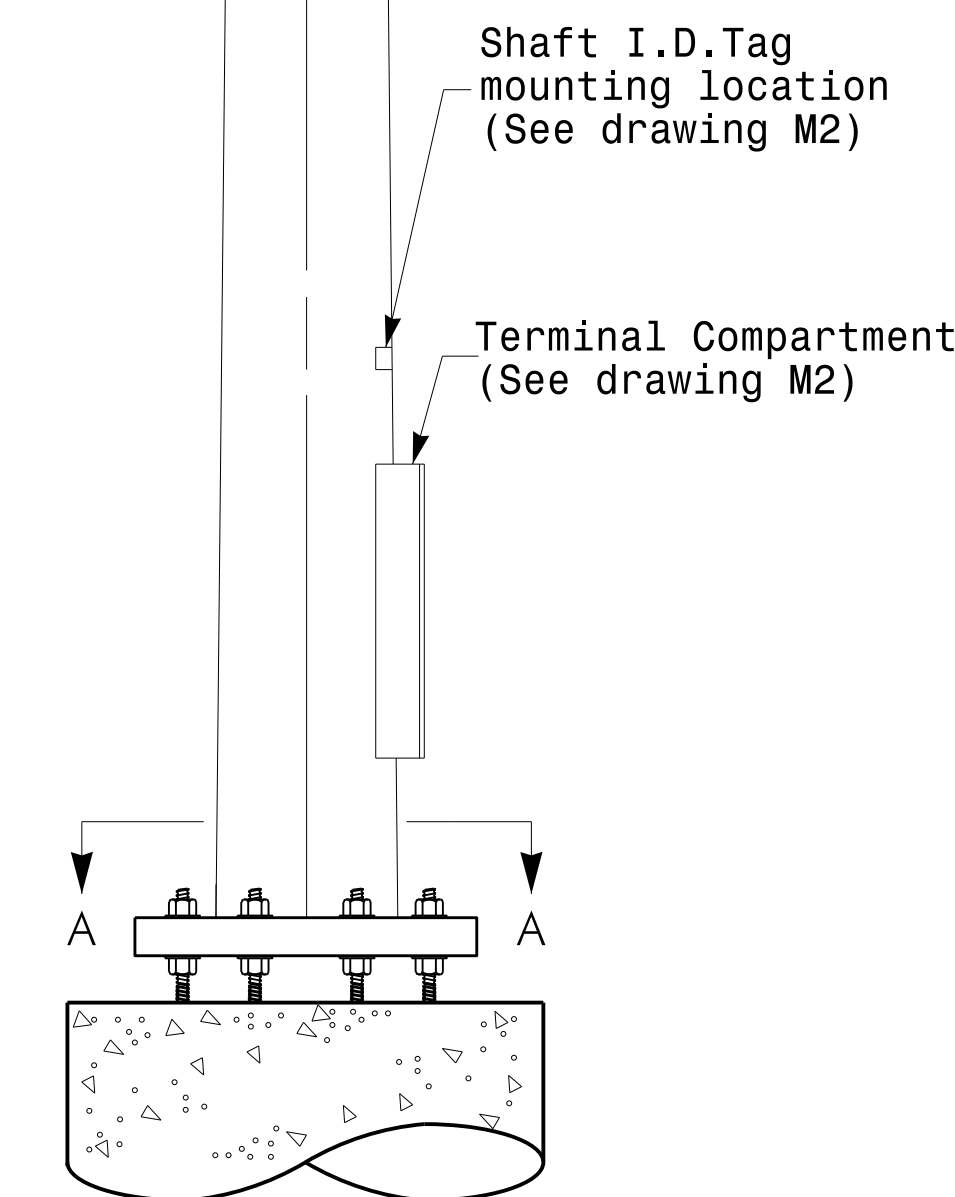
Section B-B
 (Pole Attachment to Base Plate)
 Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation



Mast Arm Pole

Fabrication Details - Mast Arm Poles

Prepared in the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	Typical Fabrication Details For Mast Arm Poles		SEAL D. C. SARKAR
	PLAN DATE: OCTOBER 2017 PREPARED BY: N. BITTING	DESIGNED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR	
SCALE 0 NA NONE	DocuSigned by: Dinesh C. Sarkar		10/11/2017 DATE

11-OCT-2017 08:33
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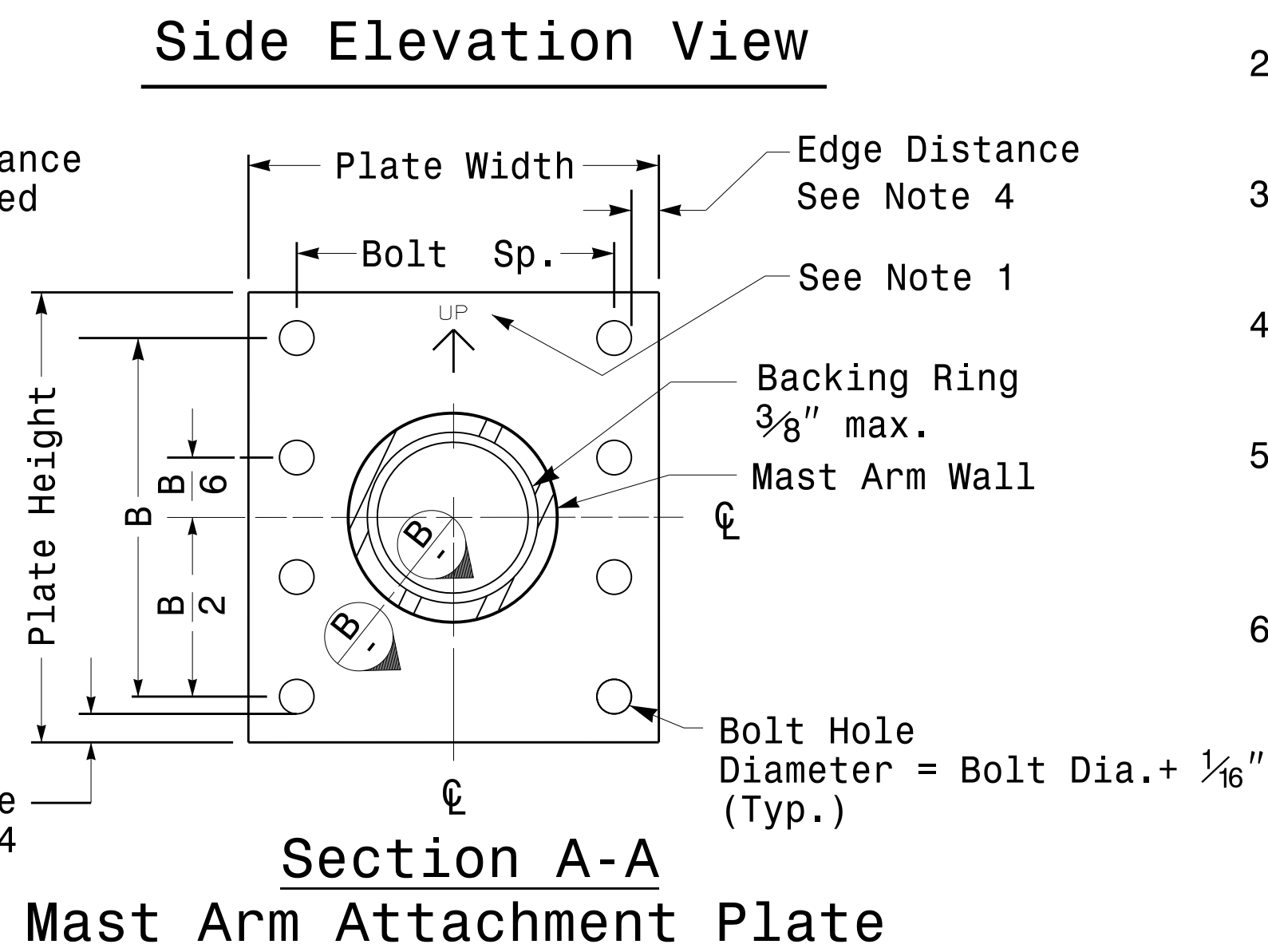
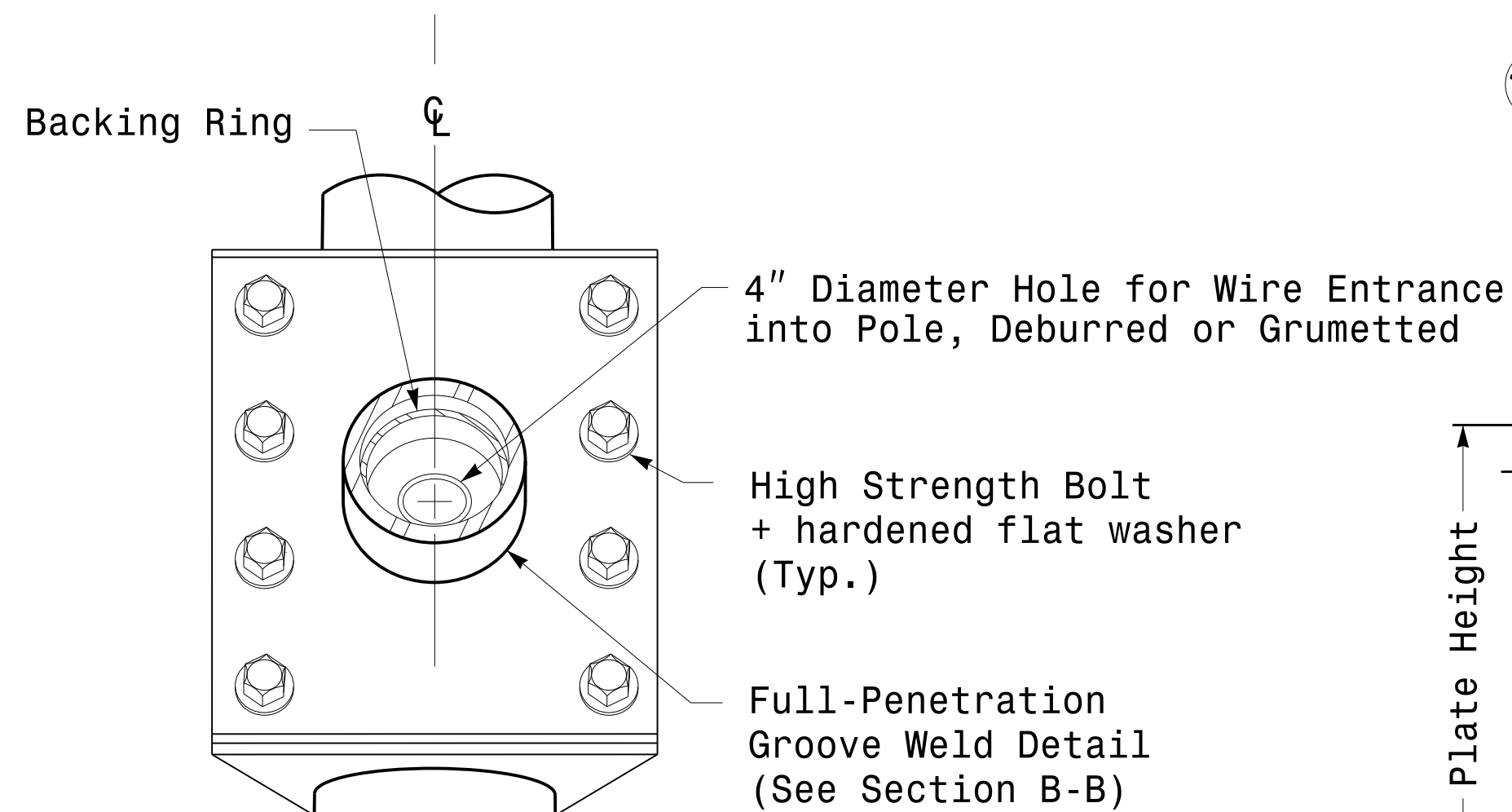
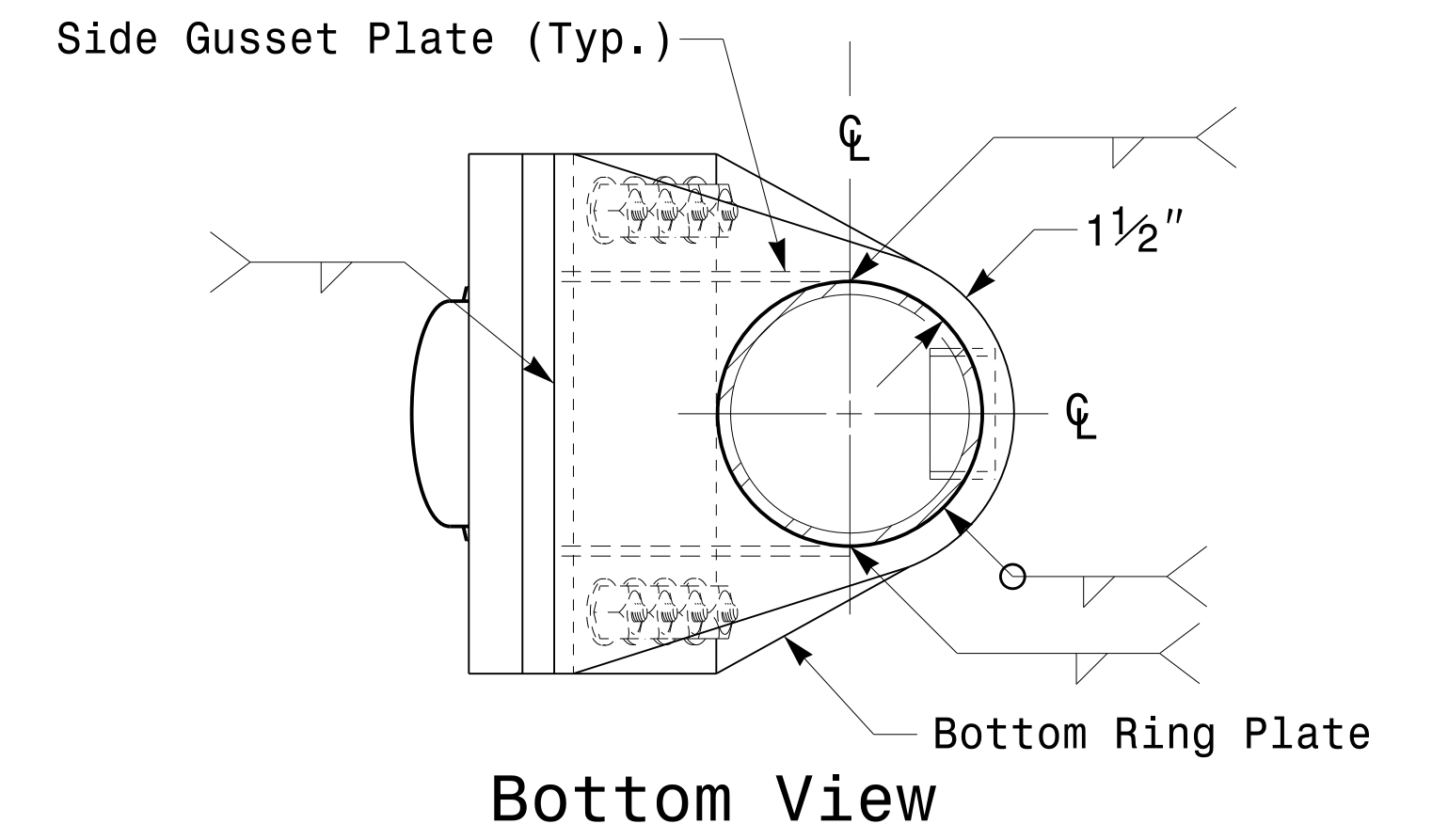
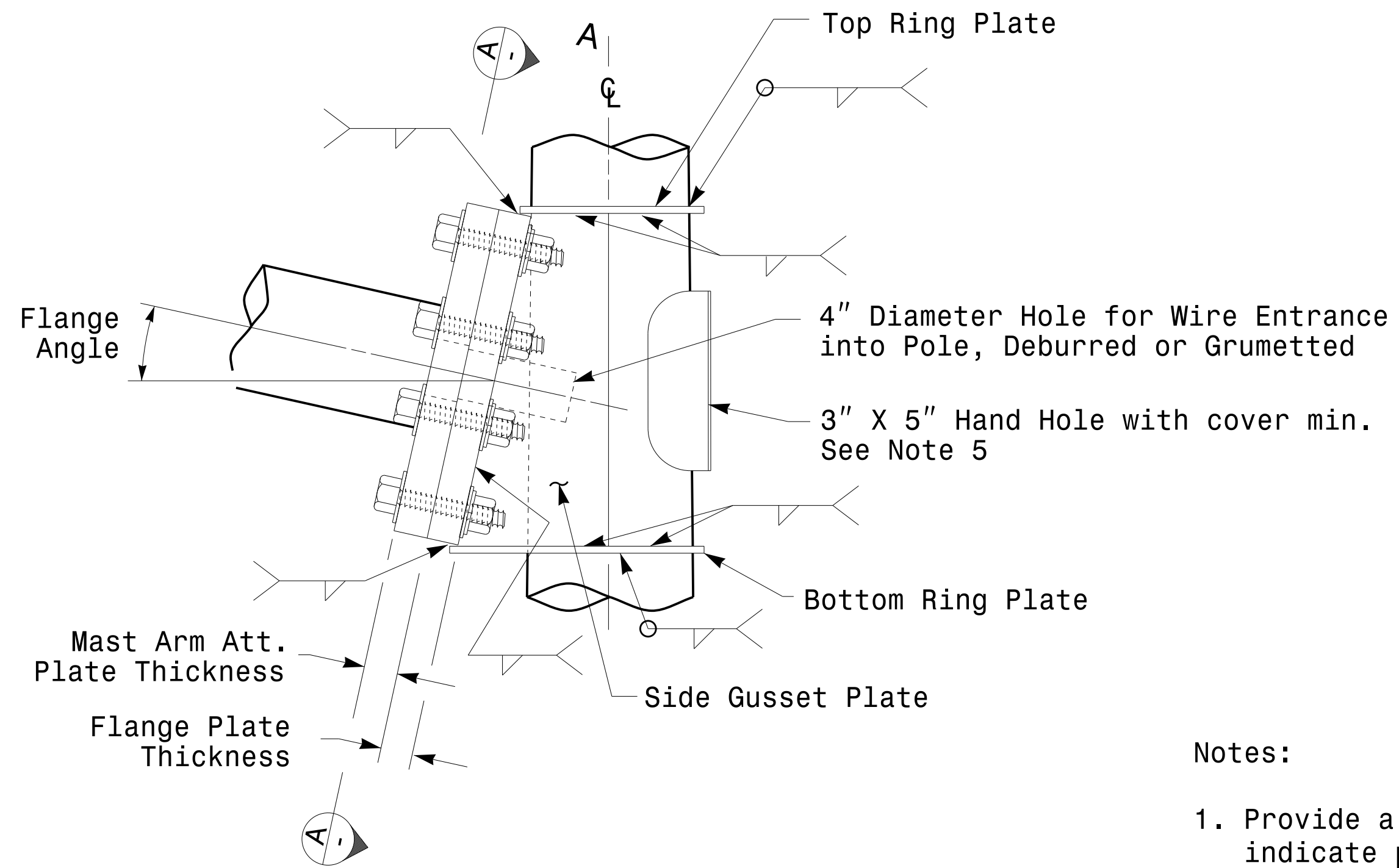
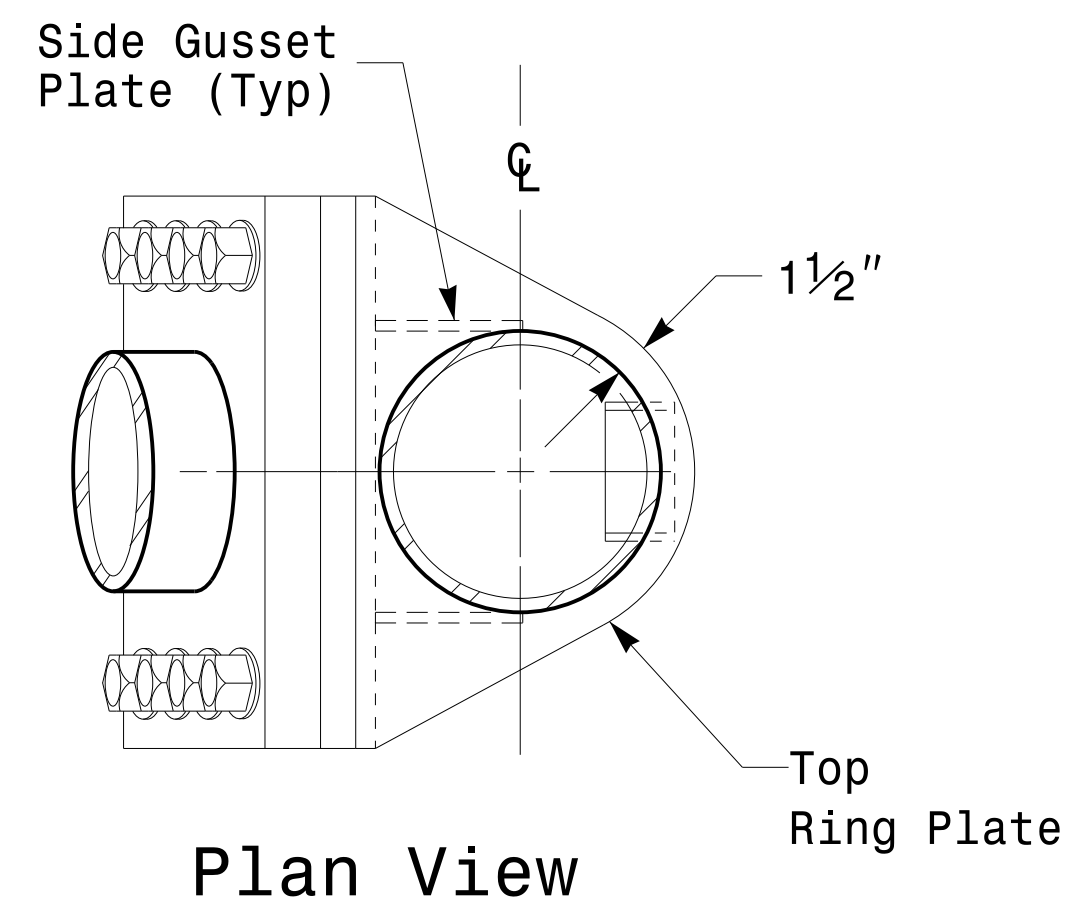
Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.

SHEET NO.

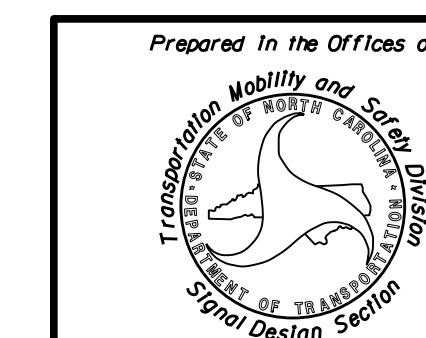
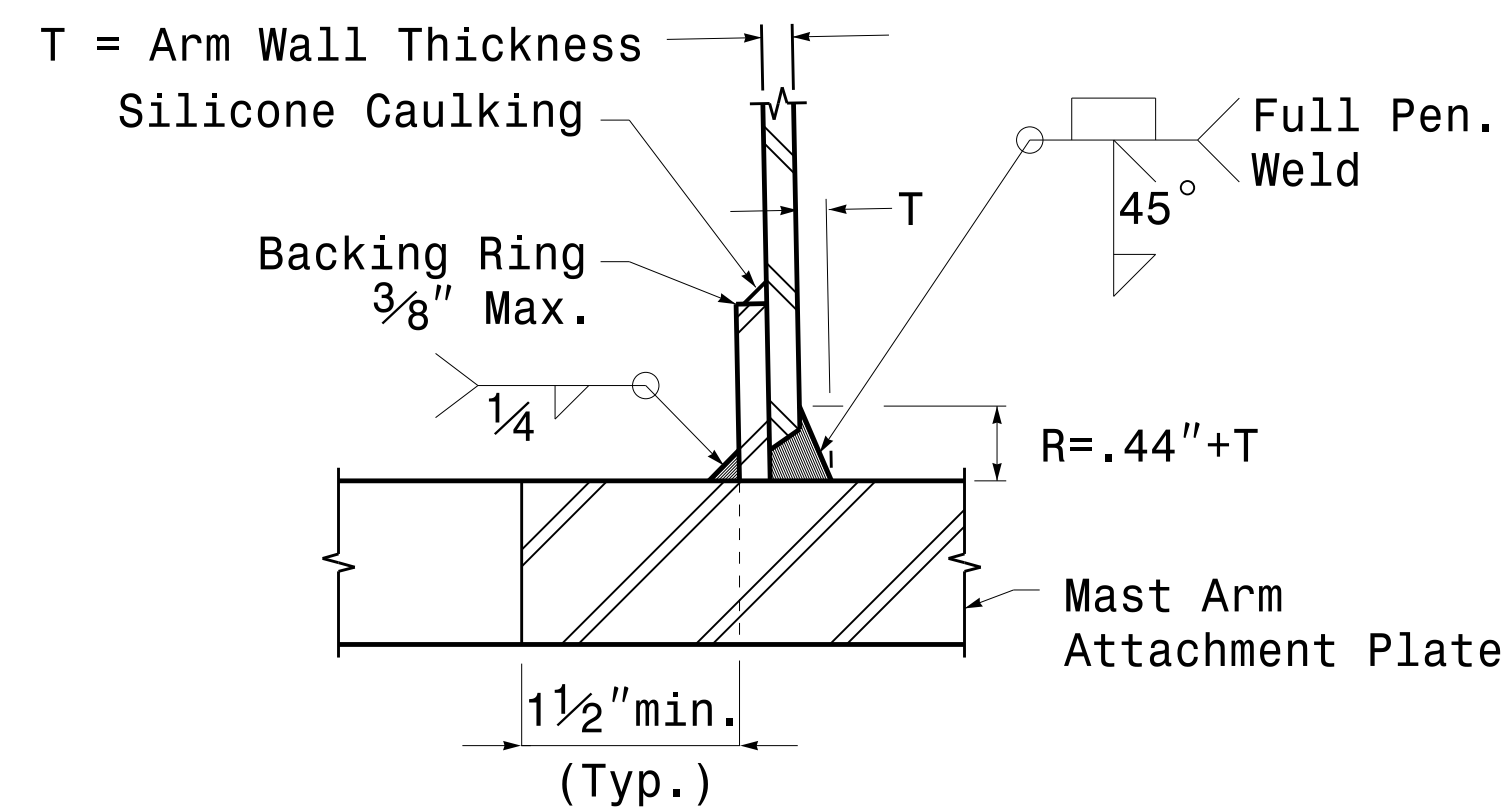
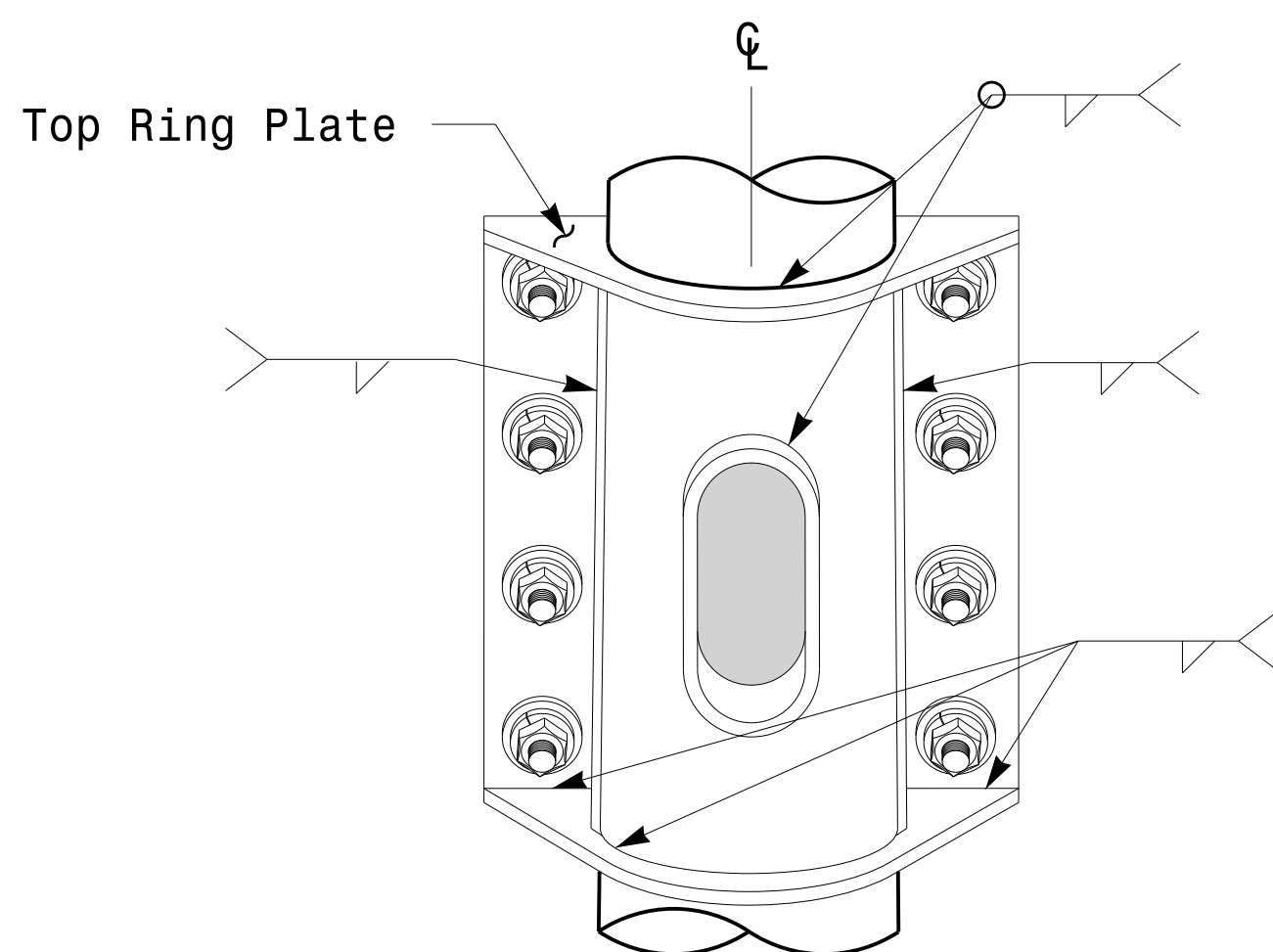
U-5824

Sig.M5



Notes:

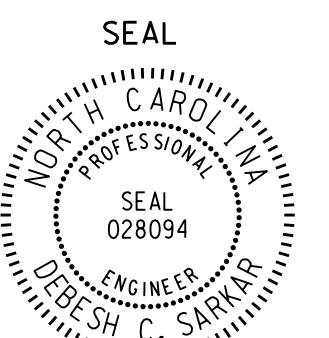
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Fabricator is responsible for providing appropriate holes at drainage points to drain galvanizing materials.
4. For minimum edge distance follow AISC Table J3.4 and J3.5. For nominal bolt hole size use Table J3.3.
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.



**Typical Fabrication Details
For
Mast Arm Connection To Pole**

PLAN DATE: OCTOBER 2017 DESIGNED BY: C.F. ANDREWS
PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR

750 N. Greenfield Pkwy, Garner, NC 27529
SCALE: 0 = NA
NONE

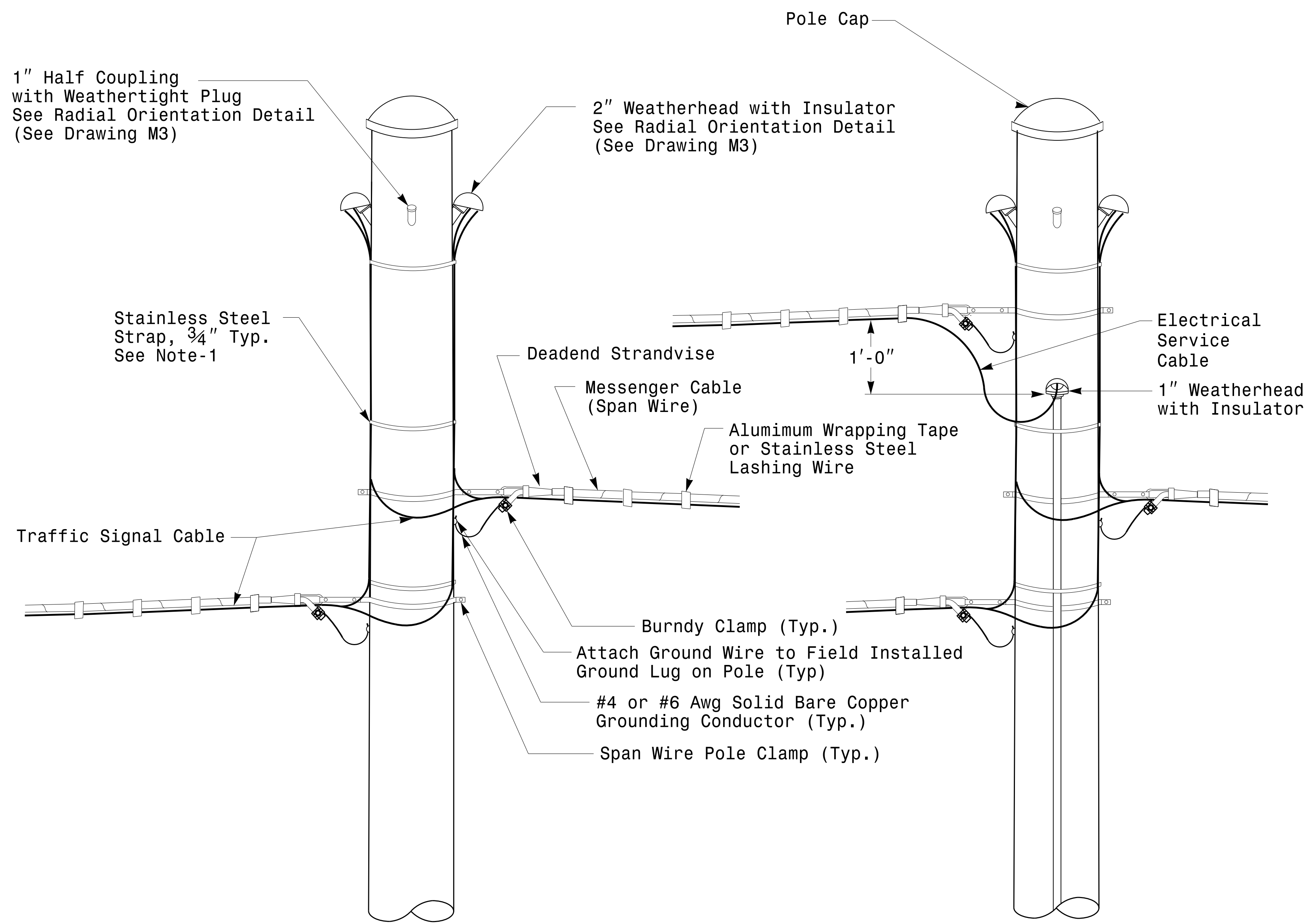


Designed by:
Debesh C. Sarkar
SIGNATURE

10/11/2017
DATE

Fabrication Details – Mast Arm Connection

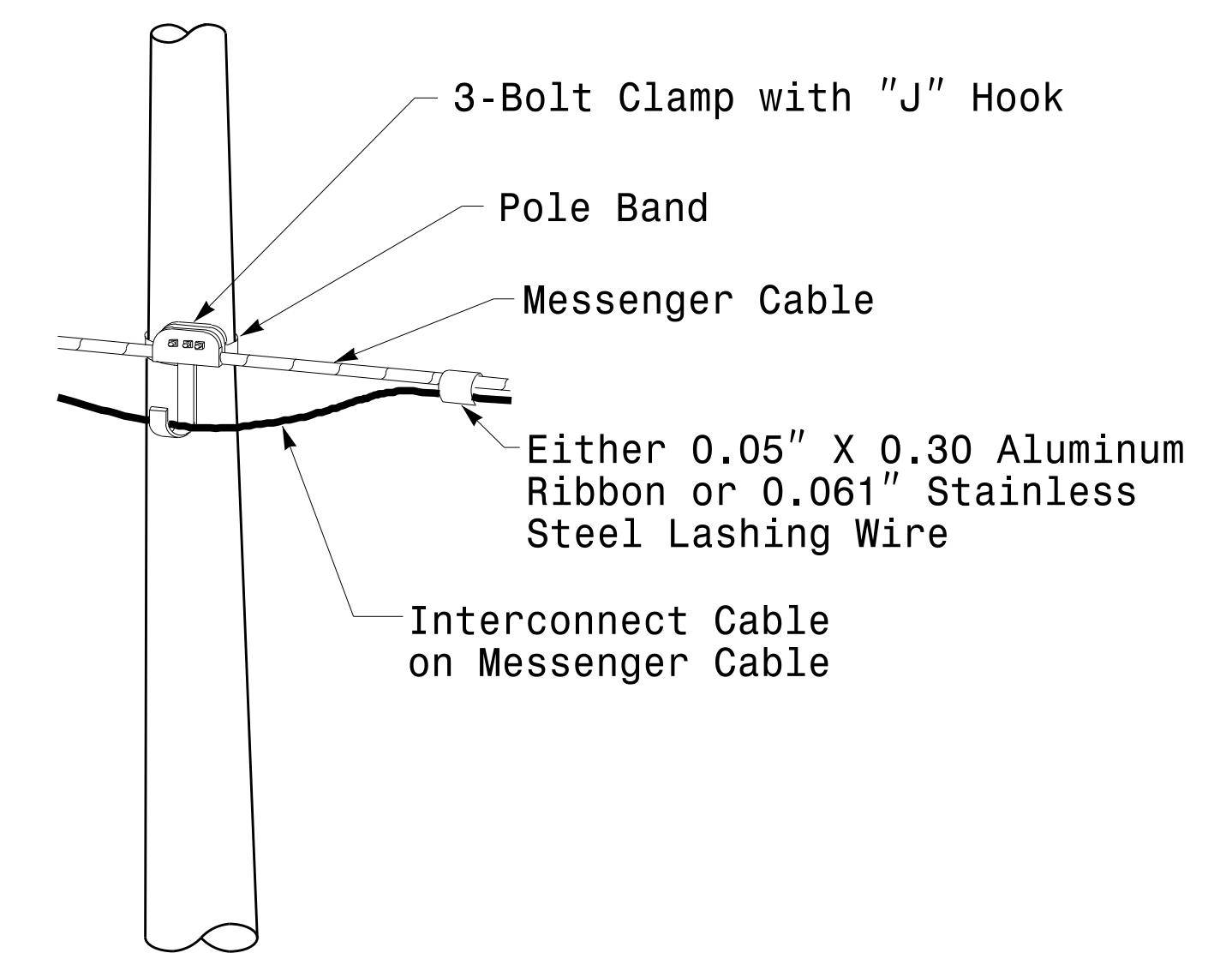
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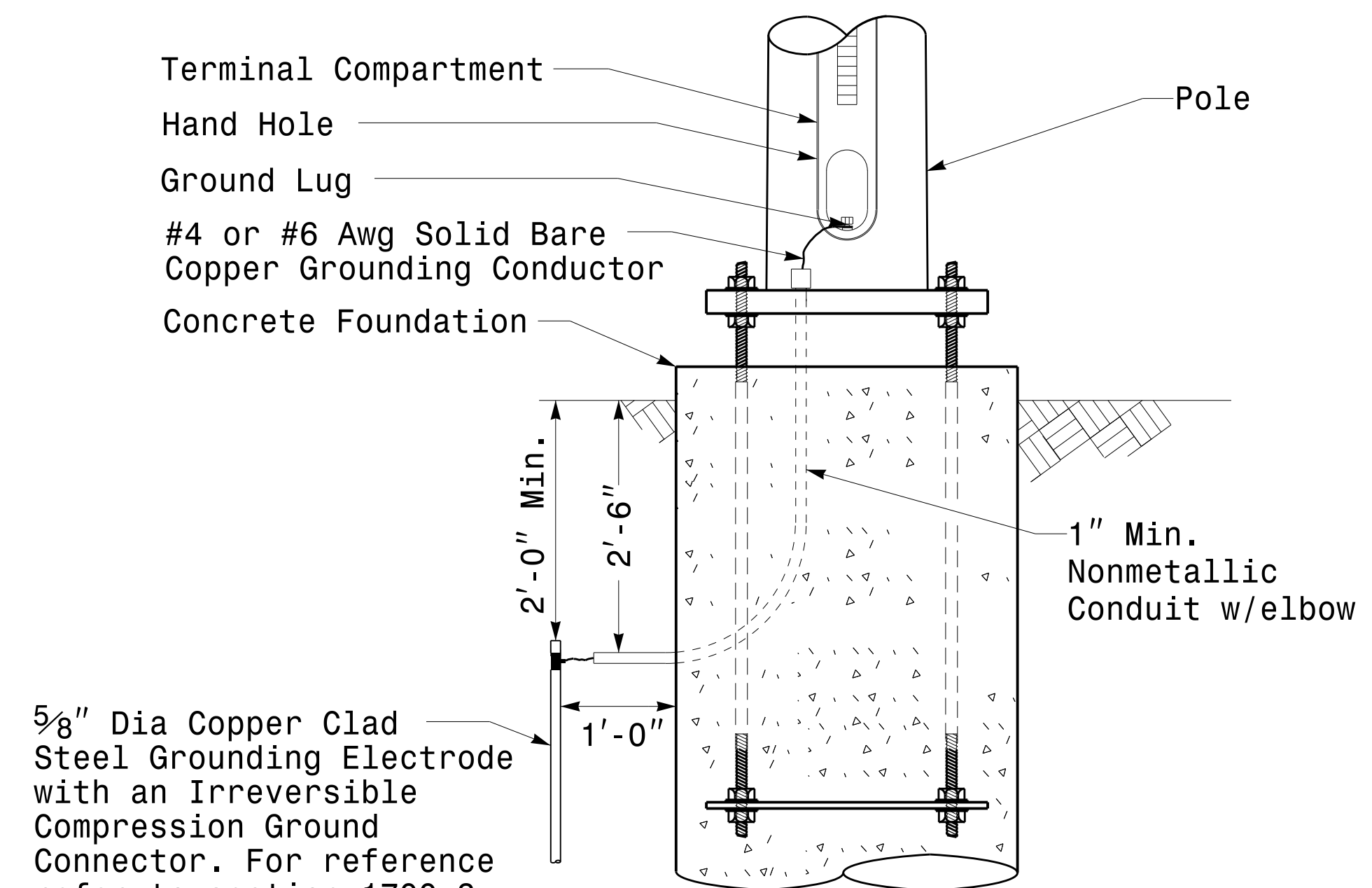
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3'-0".
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For general requirements refer to NCDOT Standard Specifications for Roadway and Structures, January 2018.



Attachment of Cable to Intermediate Metal Pole



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

Metal Pole Grounding Detail For Strain Pole and Mast Arm

<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Strain Pole Attachments</p>		<p>SEAL</p> <p>DocuSigned by: <i>Deshi C. Sarkar</i> DATE: 10/11/2017</p>					
	<p>PLAN DATE: OCTOBER 2017</p>	<p>DESIGNED BY: C.F. ANDREWS</p>		<p>REVISIONS</p> <table border="1"> <tr> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> </tr> </table>	INIT.	DATE		
	INIT.	DATE						
<p>PREPARED BY: N. BITTING</p>	<p>REVIEWED BY: D.C. SARKAR</p>	<p>DATE</p>						

11-OCT-2017 08:36 136504115 Strain Pole Attachments Design Section Eastern Region 0162014 Sig.M6 Std. Fabrication Detail: Strain Poles.dgn

SOIL CONDITION

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

General Notes:

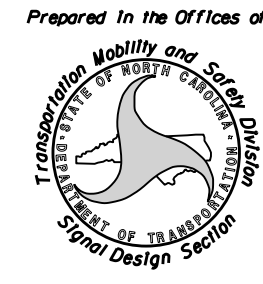
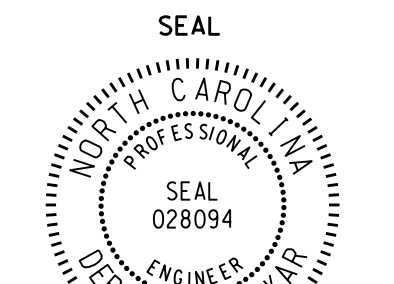
1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from M 1 drawing.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate standard pole case number from the plans or from the Engineer.
5. Select the appropriate column under "Standard Foundations" based on soil type and "N" value. Select the appropriate row based on the pole load case.
6. The foundation depth is the value shown in the "Standard Foundations" category where the column and the row intersect.
7. Use Construction Procedures and Design Methods prescribed by FHWA-NHI-10-016 for Reference Drilled Shafts.

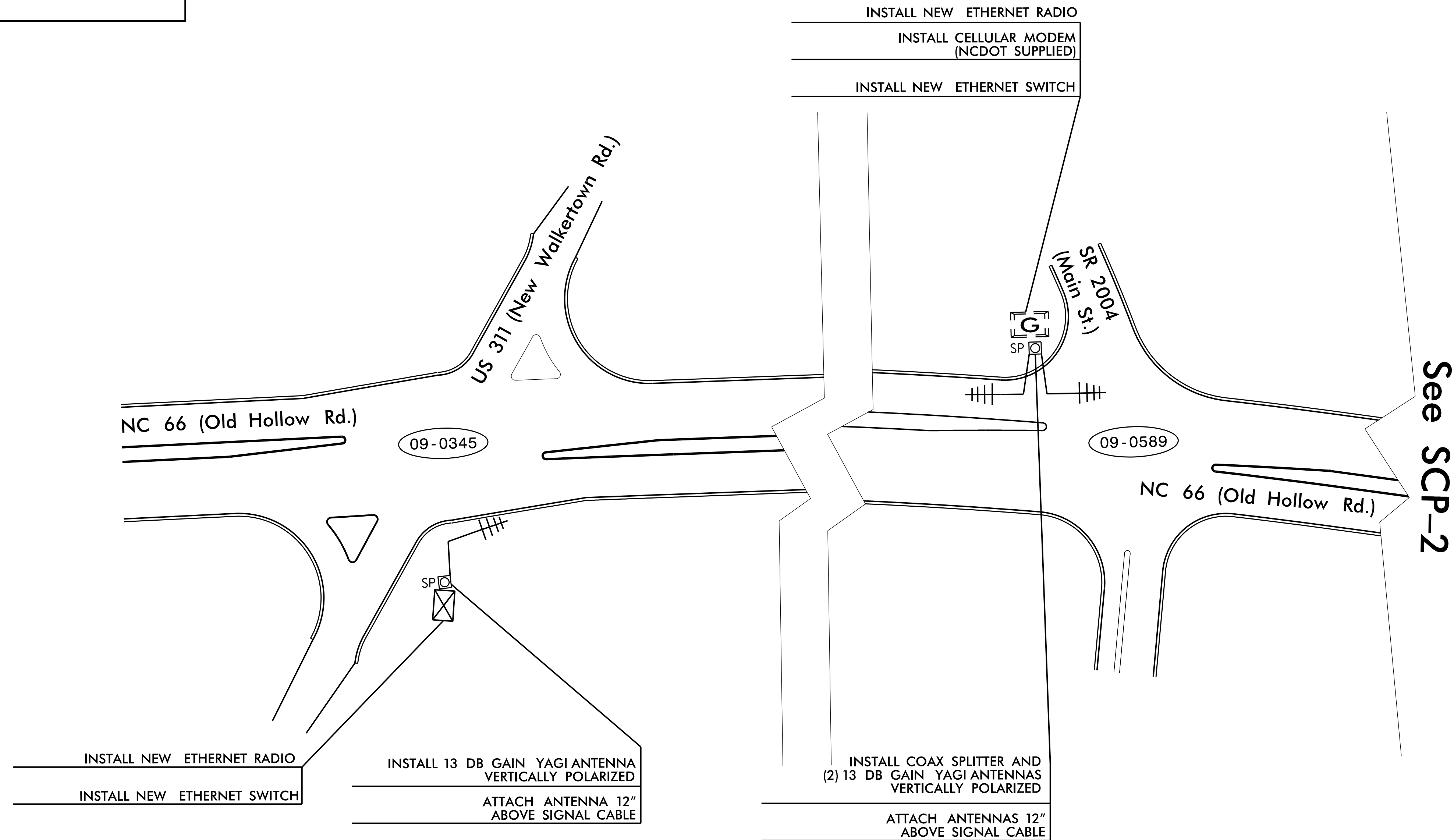
Standard Strain Pole Foundation-All Soil Condition

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

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

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LEGEND	
	YAGI ANTENNA (SINGLE)
	NEW CONTROLLER AND CABINET
	EXISTING CONTROLLER AND CABINET
	GATEWAY RADIO LOCATION
	SIGNAL INVENTORY NUMBER
	NEW WOOD POLE
	EXISTING WOOD POLE
	NEW METAL POLE
	SIGNAL POLE












NOTES FOR WIRELESS COMMUNICATIONS:

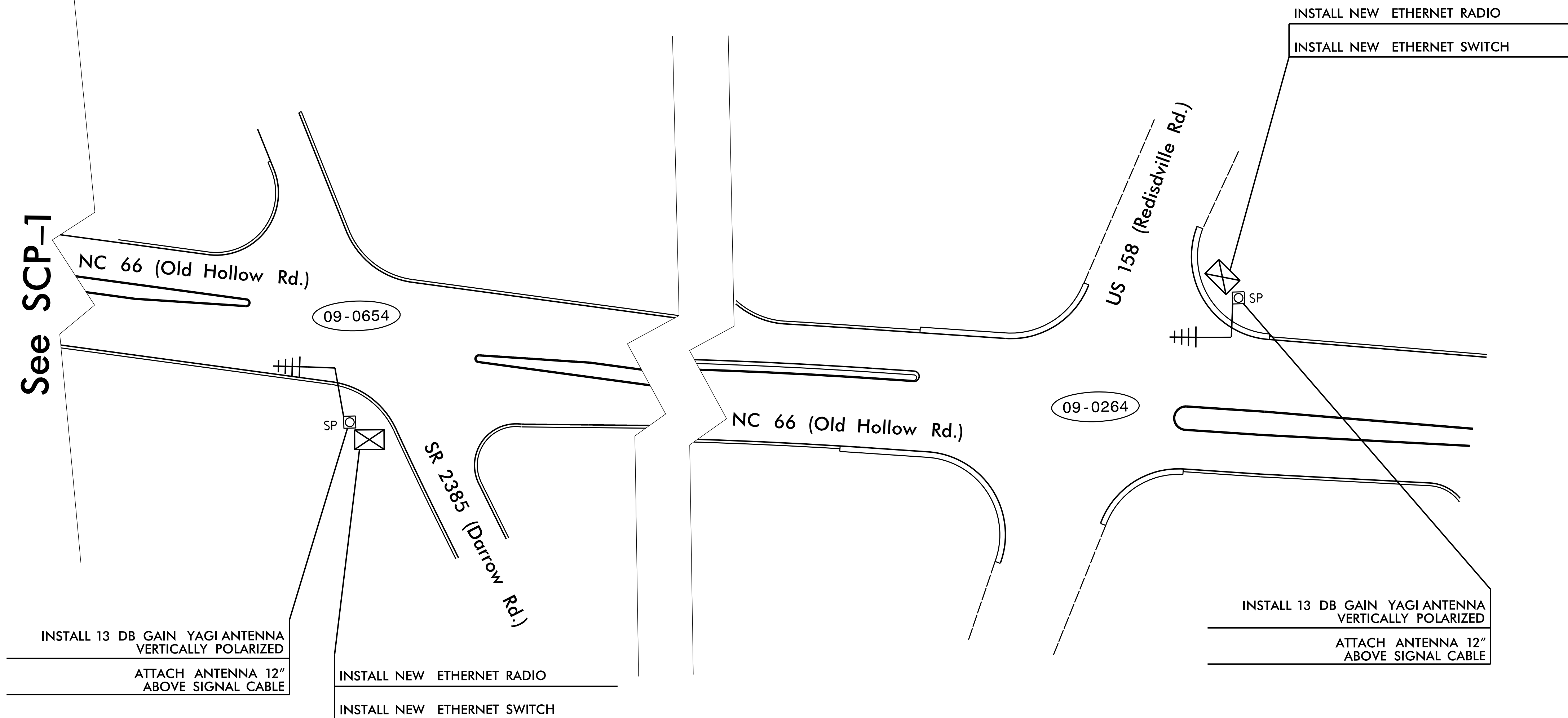
- INSTALL COAXIAL CABLE:
 - ON WOOD POLES, REQUIRING A NEW RIGID GALVANIZED STEEL RISER, INSTALL A 2" RISER WITH WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - ON METAL POLES WITH MAST ARMS, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL A 12" HOLE UP THROUGH THE BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
 - ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - BETWEEN THE POINT OF EXITING THE RISER, METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
- IF AN EXISTING 2" SPARE RIGID GALVANIZED STEEL RISER IS AVAILABLE, INSTALL THE COAXIAL CABLE IN THE SPARE RISER AND SEAL RISER WITH HEAT SHRINK TUBING RETROFIT KIT.
- INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN.
(NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
- MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
- INSTALL WIRELESS SERIALETHERNET RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET.
(NOTE: RF ANTENNA DISCONNECT SWITCH AND DECAL ARE NOT REQUIRED WHEN THE ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
- REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."
- CELL MODELS TO BE SUPPLIED BY THE DEPARTMENT. CONTACT THE DIVISION TRAFFIC ENGINEER AR (336) 747-7800 TO REQUEST THE CELL MODEM. ALLOW 8 WEEKS LEAD TIME BEFORE ANTICIPATED DEPLOYMENT.

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

Prepared in the Office of: NC FIRM LICENSE No: P-0339 320 Executive Court Hillsborough, NC 27278 (919) 732-3883 (919) 732-6676 (FAX)	Prepared For: 750 N. Greenfield Pkwy., Garner, NC 27529 SCALE N.T.S.	Signal System ID #: D09-29 Walkertown Wireless Communication Plans	 SEAL EDWARD W. SIRGANY ENGINEER NORTH CAROLINA 018174
		Division 9 Forsyth County Walkertown PLAN DATE: August 2023 REVIEWED BY: T. Parker PREPARED BY: M. Parker/J. Smith REVIEWED BY: E. Sirgany	
REVISIONS INIT. DATE		DocuSigned by: Edward W. Sirgany 9/7/2023 CADD File name:	

LEGEND


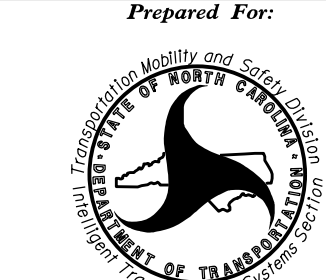
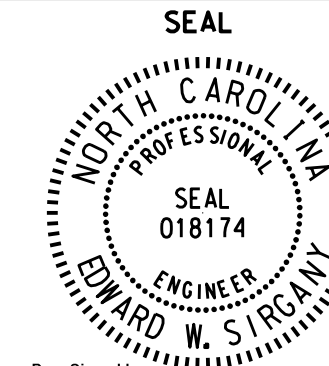
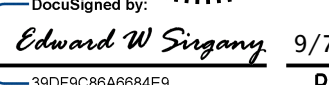
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	NEW CONTROLLER AND CABINET
	EXISTING CONTROLLER AND CABINET
	GATEWAY RADIO LOCATION
	SIGNAL INVENTORY NUMBER
	NEW WOOD POLE
	EXISTING WOOD POLE
	NEW METAL POLE
	SIGNAL POLE



NOTES FOR WIRELESS COMMUNICATIONS:

- INSTALL COAXIAL CABLE:
 - ON WOOD POLES, REQUIRING A NEW RIGID GALVANIZED STEEL RISER, INSTALL A 2" RISER WITH WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - ON METAL POLES WITH MAST ARMS, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL A 1/2" HOLE UP THROUGH THE BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
 - ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - BETWEEN THE POINT OF EXITING THE RISER, METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
- IF AN EXISTING 2" SPARE RIGID GALVANIZED STEEL RISER IS AVAILABLE, INSTALL THE COAXIAL CABLE IN THE SPARE RISER AND SEAL RISER WITH HEAT SHRINK TUBING RETROFIT KIT.
- INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN.
(NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
- MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
- INSTALL WIRELESS SERIAL ETHERNET RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET.
(NOTE: RF ANTENNA DISCONNECT SWITCH AND DECAL ARE NOT REQUIRED WHEN THE ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
- REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."
- CELL MODELS TO BE SUPPLIED BY THE DEPARTMENT. CONTACT THE DIVISION TRAFFIC ENGINEER AR (336) 747-7800 TO REQUEST THE CELL MODEM. ALLOW 8 WEEKS LEAD TIME BEFORE ANTICIPATED DEPLOYMENT.

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

Prepared in the Office of:  NC FIRM LICENSE No: P-0339 504 Meadowlands Drive Hillsborough, NC 27278 (919) 732-3883 (919) 732-6676 (FAX)	Prepared For:  250 N. Greenfield Pkwy., Garner, NC 27529 SCALE N.T.S.	Signal System ID #: D09-29 Walkertown Wireless Communication Plans	SEAL  SEAL 018174 EDWARD W. SIRGANY ENGINEER					
		Division 9 Forsyth County Walkertown PLAN DATE: August 2023 REVIEWED BY: T. Parker PREPARED BY: M. Parker/J. Smith REVIEWED BY: E. Sirgany						
<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				DocuSigned by:  9/7/2023 DATE
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