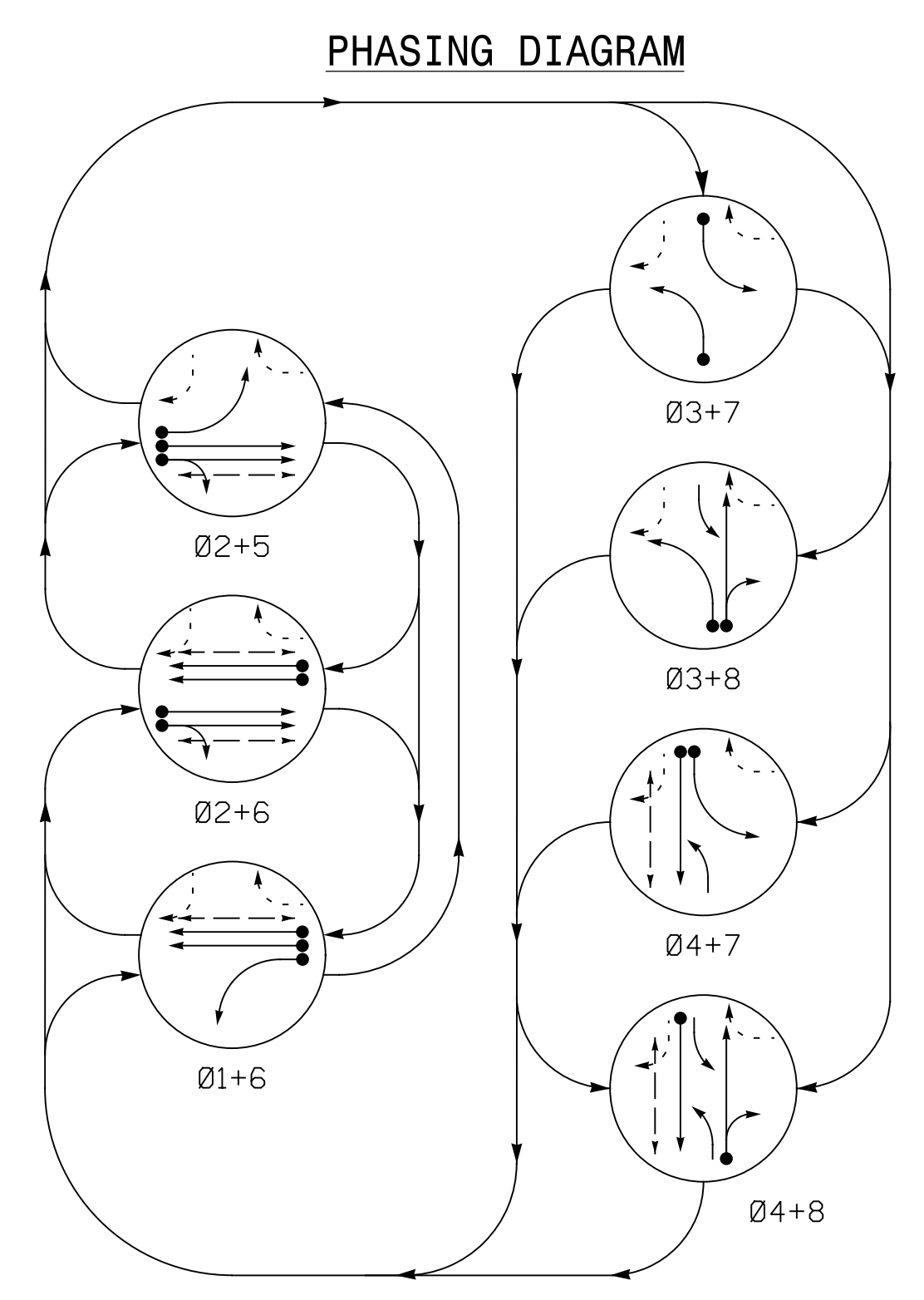


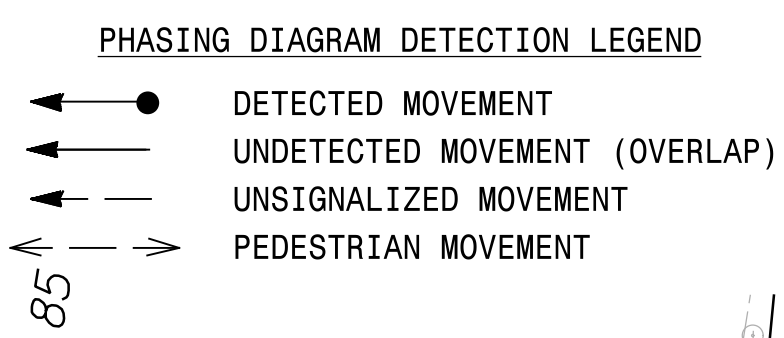
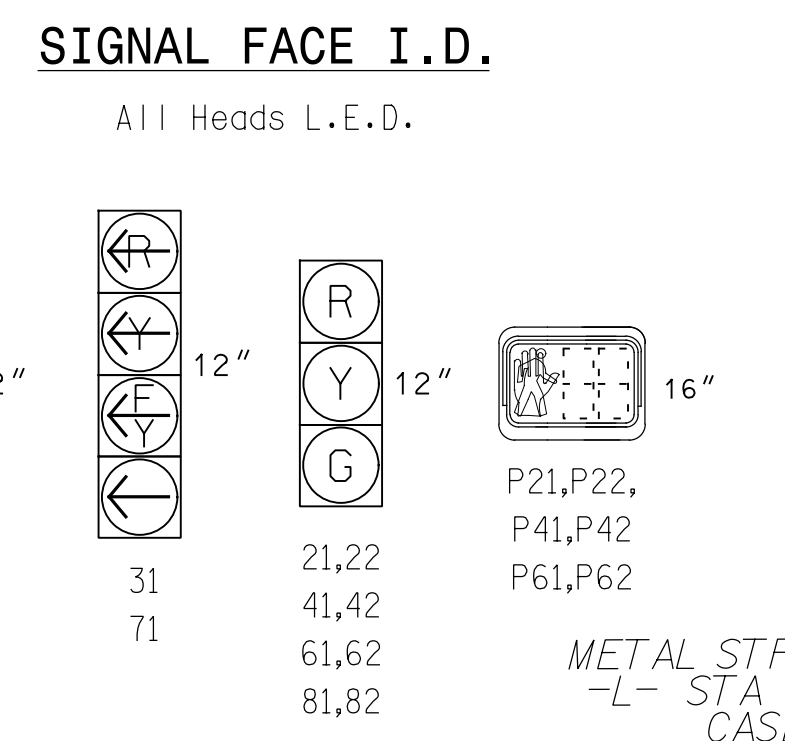
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**This file or an individual page
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SIGNAL FACE	PHASE							
	01+6	02+5	02+6	03+7	03+8	04+7	04+8	01+6
11	←	←	←	←	←	←	←	←
21,22	R	G	G	R	R	R	R	Y
31	←	←	←	←	←	←	←	←
41,42	R	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←	←
61,62	G	G	R	R	R	R	R	Y
71	←	←	←	←	←	←	←	←
81,82	R	R	R	R	G	R	G	R
P21,P22	DW	W	W	DW	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	W	W	DRK
P61,P62	W	W	DW	DW	DW	DW	DRK	DRK

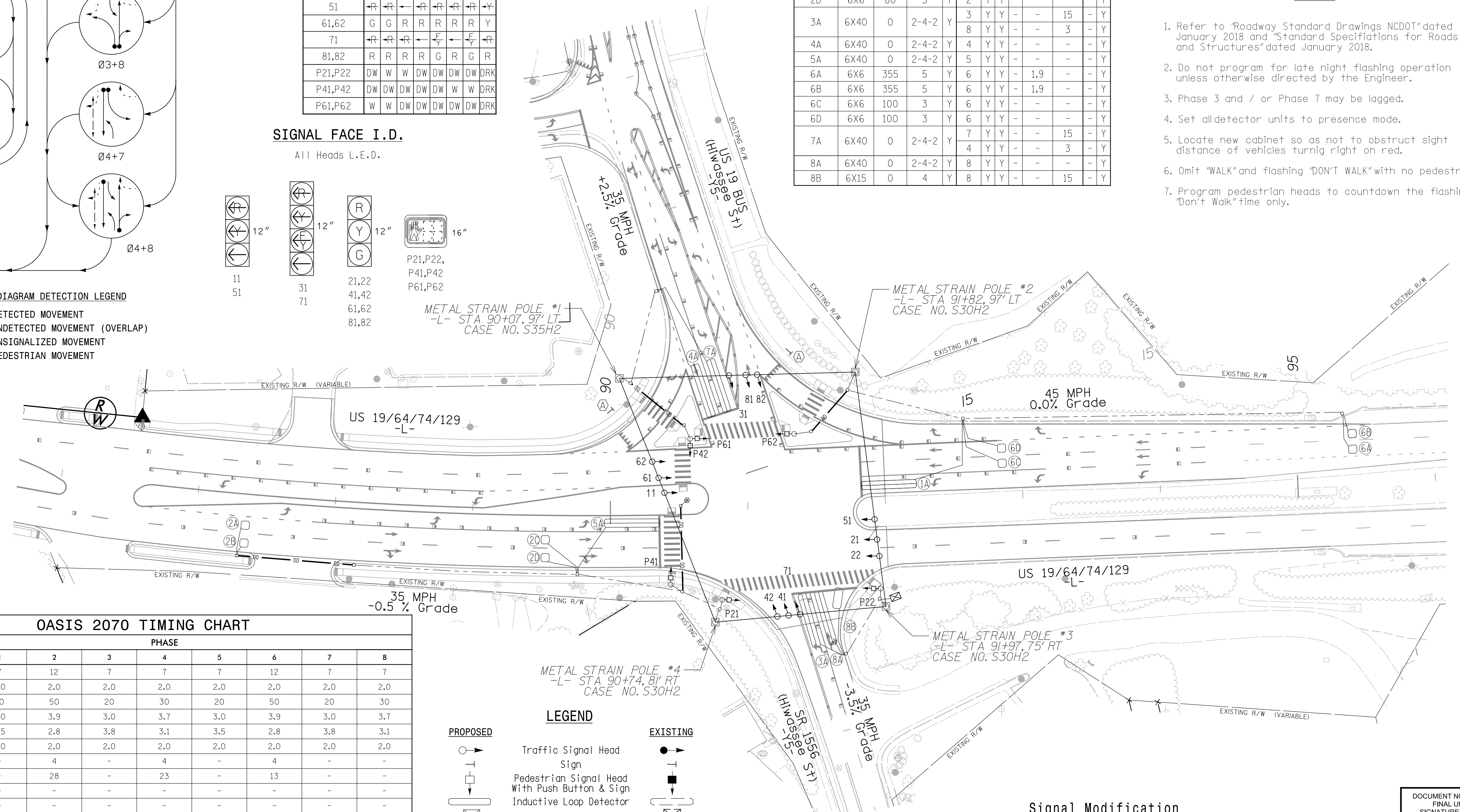


LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY				
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	Y	-
2A	6X6	300	4	Y	2	Y	Y	-	2.3	-	Y	-
2B	6X6	300	4	Y	2	Y	Y	-	2.3	-	Y	-
2C	6X6	80	3	Y	2	Y	Y	-	-	-	Y	-
2D	6X6	80	3	Y	2	Y	Y	-	-	-	Y	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	15	Y	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	Y	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	Y	-
6A	6X6	355	5	Y	6	Y	Y	-	1.9	-	Y	-
6B	6X6	355	5	Y	6	Y	Y	-	1.9	-	Y	-
6C	6X6	100	3	Y	6	Y	Y	-	-	-	Y	-
6D	6X6	100	3	Y	6	Y	Y	-	-	-	Y	-
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	15	Y	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	3	Y	-
8B	6X15	0	4	Y	8	Y	Y	-	-	15	Y	-

7 Phase Fully Actuated Isolated

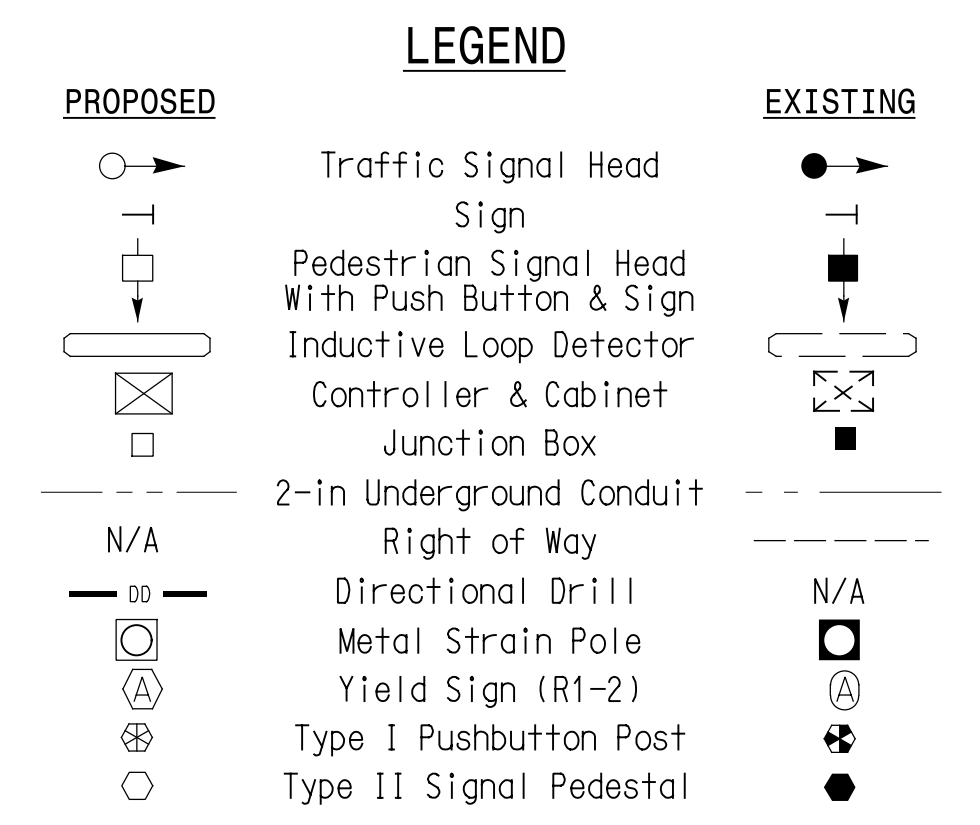
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 3 and / or Phase 7 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.



FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	20	50	20	30	20	50	20	30
Yellow Clearance	3.0	3.9	3.0	3.7	3.0	3.9	3.0	3.7
Red Clearance	3.5	2.8	3.8	3.1	3.5	2.8	3.8	3.1
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	4	-	4	-	4	-	-
Don't Walk 1	-	28	-	23	-	13	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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



Signal Modification

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 Professional Engineer
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 License No. 038970

US 19/64/74/129
 at
 US 19 BUS/SR 1556 (Hiwassee St)
 Division 14 Cherokee County Near Murphy
 PLAN DATE: December 2018 REVIEWED BY: Z HARRIS
 PREPARED BY: K M CORY REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 Kelly M. Cory
 Professional Engineer
 State of North Carolina
 License No. 038970

DocuSigned by:
 Kelly M. Cory
 2/28/2019

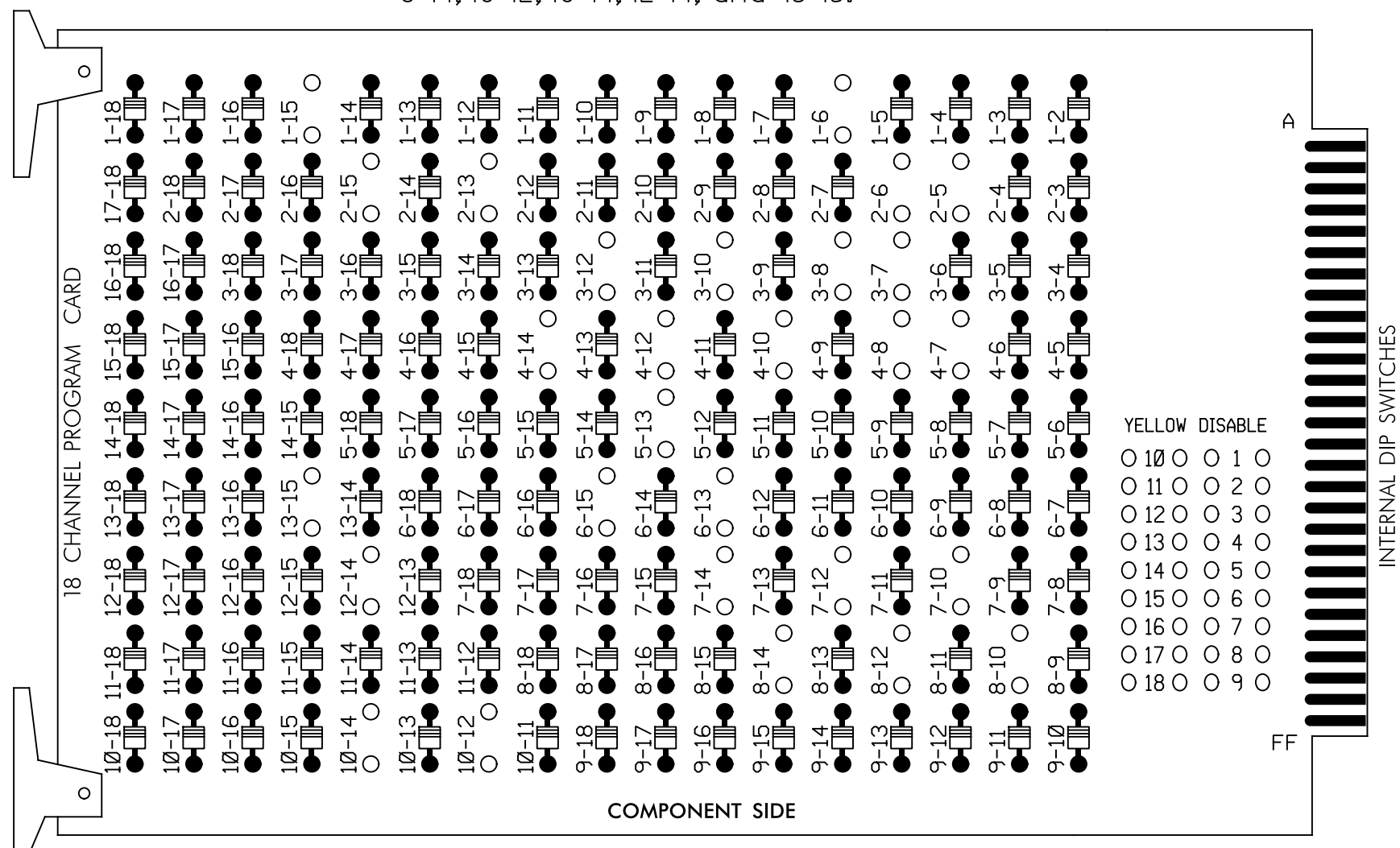
SIG. INVENTORY NO. 14-0021

28-FEB-2019 10:48
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 KMCORY AT CARY/NC

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

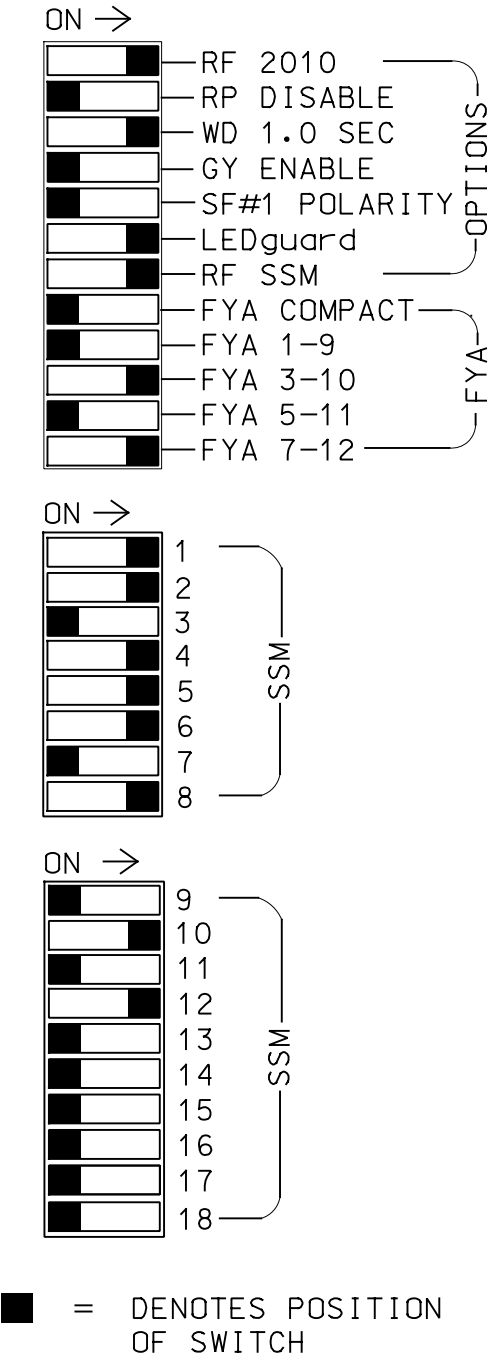
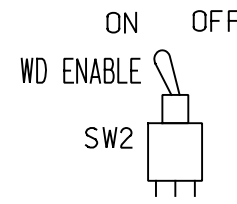
REMOVE DIODE JUMPERS 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 4-14, 5-13, 6-13, 6-15, 7-10, 7-12, 7-14, 8-10, 8-12, 8-14, 10-12, 10-14, 12-14, and 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2, 4 and 6 for Startup Ped Call.
- Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET332 W/ AUX FILE
 SOFTWAREECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,
 S10,S11,AUX S2,AUX S5
 PHASES USED.....1,2,3,4,5,6,7,8,2PED,4PED,6PED
 OVERLAP A.....NOT USED
 OVERLAP B.....3+4
 OVERLAP C.....NOT USED
 OVERLAP D.....7+8

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	31	41,42	P41, P42	51	61,62	P61, P62	71	81,82	NU	31	NU	NU	71	NU	NU
RED	128			101			134			107								
YELLOW	129		*	102			135		*	108								
GREEN	130			103			136			109								
RED ARROW	125						131						A124				A101	
YELLOW ARROW	126						132						A125				A102	
FLASHING YELLOW ARROW													A126				A103	
GREEN ARROW	127			118			133			124								
Hand				113			104			119								
Walker				115			106			121								

NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT (front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
∅ 1	∅ 2	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
1A	2A	2C	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A
NOT USED	∅ 2	∅ 2	NOT USED	NOT USED	∅ 6	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
	2B	2D			6B	6D								

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

FS = FLASH SENSE
 ST = STOP TIME

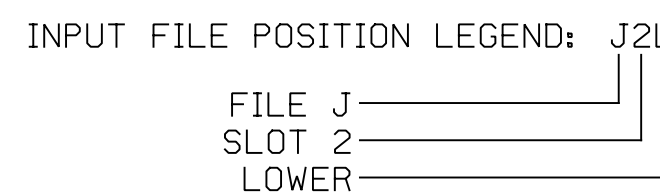
Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

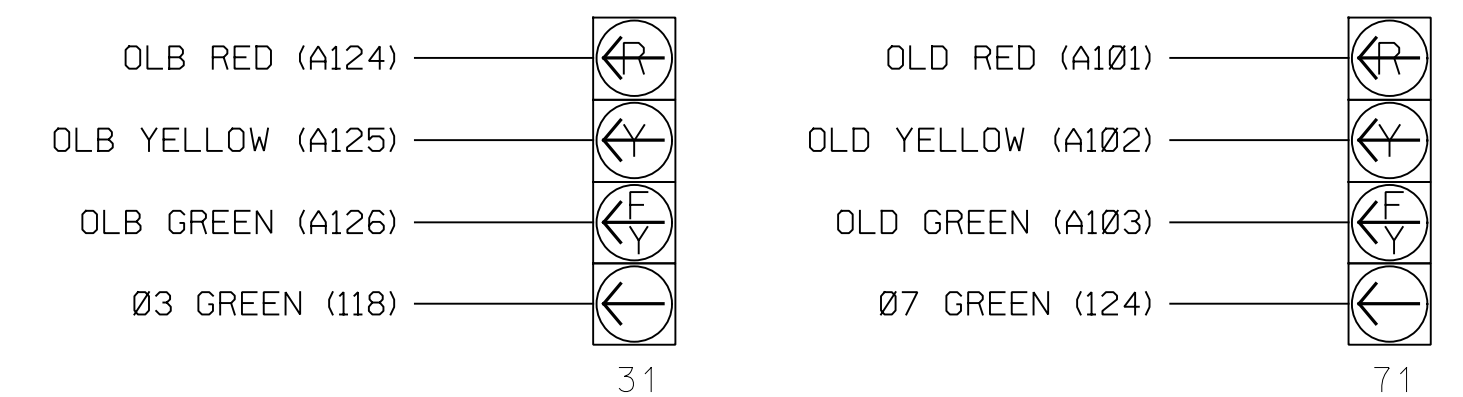
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y	-	-	-
2A	TB2-5,6	I2U	39	1	2	2	Y	Y	-	2.3	-
2B	TB2-7,8	I2L	43	5	12	2	Y	Y	-	2.3	-
2C	TB2-9,10	I3U	63	25	32	2	Y	Y	-	-	-
2D	TB2-11,12	I3L	76	38	42	2	Y	Y	-	-	-
3A ¹	TB4-5,6	I5U	58	20	3	3	Y	Y	-	-	15
4A	TB4-9,10	I6U	41	3	4	4	Y	Y	-	-	-
5A	TB3-1,2	J1U	55	17	5	5	Y	Y	-	-	-
6A	TB3-5,6	J2U	40	2	6	6	Y	Y	-	1.9	-
6B	TB3-7,8	J2L	44	6	16	6	Y	Y	-	1.9	-
6C	TB3-9,10	J3U	64	26	36	6	Y	Y	-	-	-
6D	TB3-11,12	J3L	77	39	46	6	Y	Y	-	-	-
7A ²	TB5-5,6	J5U	57	19	7	7	Y	Y	-	-	15
8A	TB5-9,10	J6U	42	4	8	8	Y	Y	-	-	3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y	-	-	15
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2	PED				
P41,P42	TB8-5,6	I12L	69	31	PED 4	4	PED				
P61,P62	TB8-7,9	I13U	68	30	PED 6	6	PED				

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

- Add jumper from I5-W to J8-W, on rear of input file.
- Add jumper from J5-W to I8-W, on rear of input file.



FYA SIGNAL WIRING DETAIL (wire signal heads as shown)



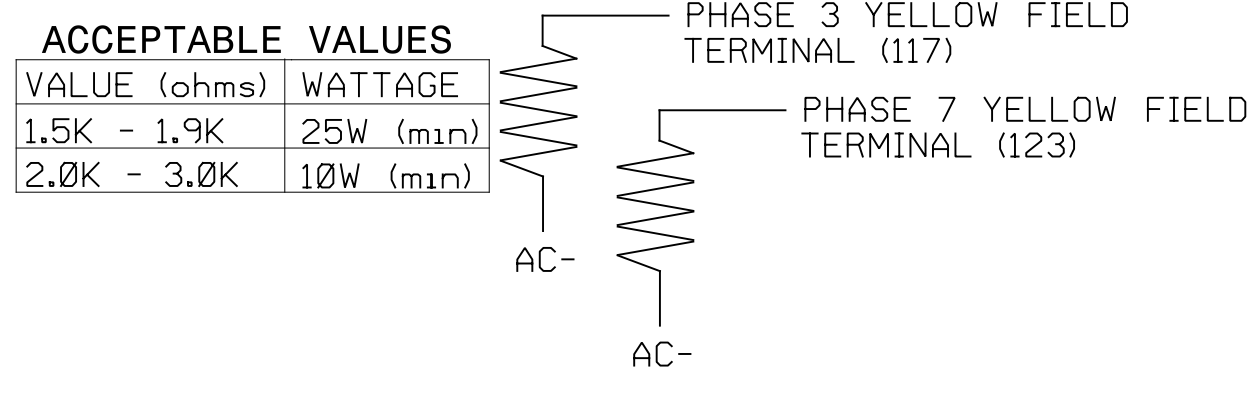
NOTE

- The sequence display for signal heads 31 and 71 requires special logic programming. See sheet 2 of 2 for programming instructions.

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.

LOAD RESISTOR INSTALLATION DETAIL



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0021
 DESIGNED: December 2018
 SEALED: 2/28/2019
 REVISED: N/A

Electrical Details - Sheet 1 of 2 - Signal Modification

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US 19/64/74/129
 at
 US 19 Bus/SR 1556 (Hiwassee St)

Division 14 Cherokee County Near Murphy
 PLAN DATE: December 2018 REVIEWED BY: Z Harris
 PREPARED BY: K M Cory REVIEWED BY:

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 038970
 KELLY M. CORY
 ENGINEER

DocuSigned by:
 Kelly M Cory 2/28/2019
 SIGNATURE DATE
 SIG. INVENTORY NO. 14-0021

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF

↓
PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0021
DESIGNED: December 2018
SEALED: 02/28/2019
REVISED: N/A

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

↓
PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

↓
PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

↓
PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

↓
PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

↓
PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green
OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: |12345678910111213141516
VEH OVL PARENTS: | XX
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: |12345678910111213141516
VEH OVL PARENTS: | XX
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

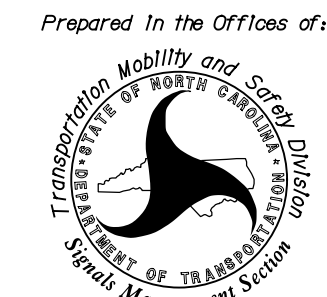
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- REMOVE FLASHER UNIT 2.

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

Electrical Details - Sheet 2 of 2 - Signal Modification

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ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared In the Offices of:

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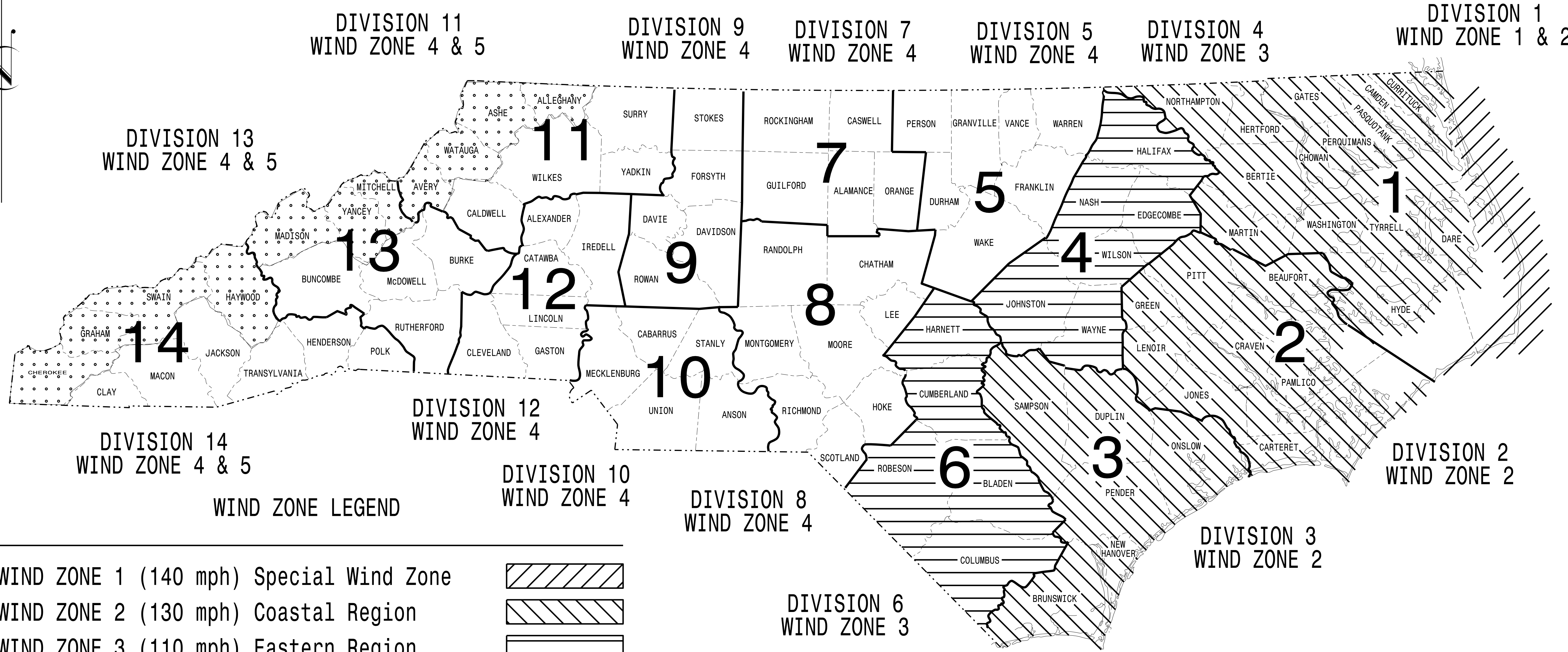
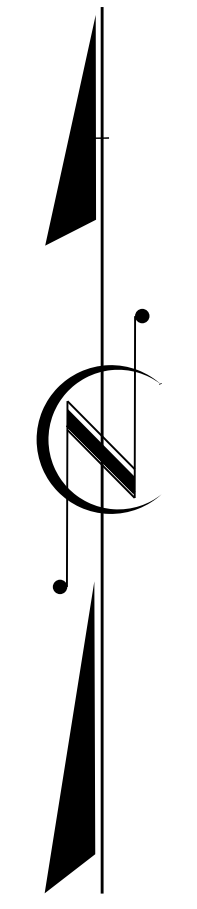
US 19/64/74/129
at
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Division 14 Cherokee County Near Murphy
PLAN DATE: December 2018 REVIEWED BY: Z Harris
PREPARED BY: K M Cory REVIEWED BY:
REVISIONS INIT. DATE
DocuSigned by: Kelly M Cory 2/28/2019
SIGNATURE DATE
SIG. INVENTORY NO. 14-0021

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 038970
KELLY M CORY

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

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

STANDARD DRAWINGS FOR ALL METAL POLES



WIND ZONE LEGEND

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

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

Prepared In the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

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

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

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

G. A. FULLER, P.E. - STATE ITS AND SIGNALS ENGINEER

G. G. MURR, JR., P.E. - STATE SIGNALS ENGINEER

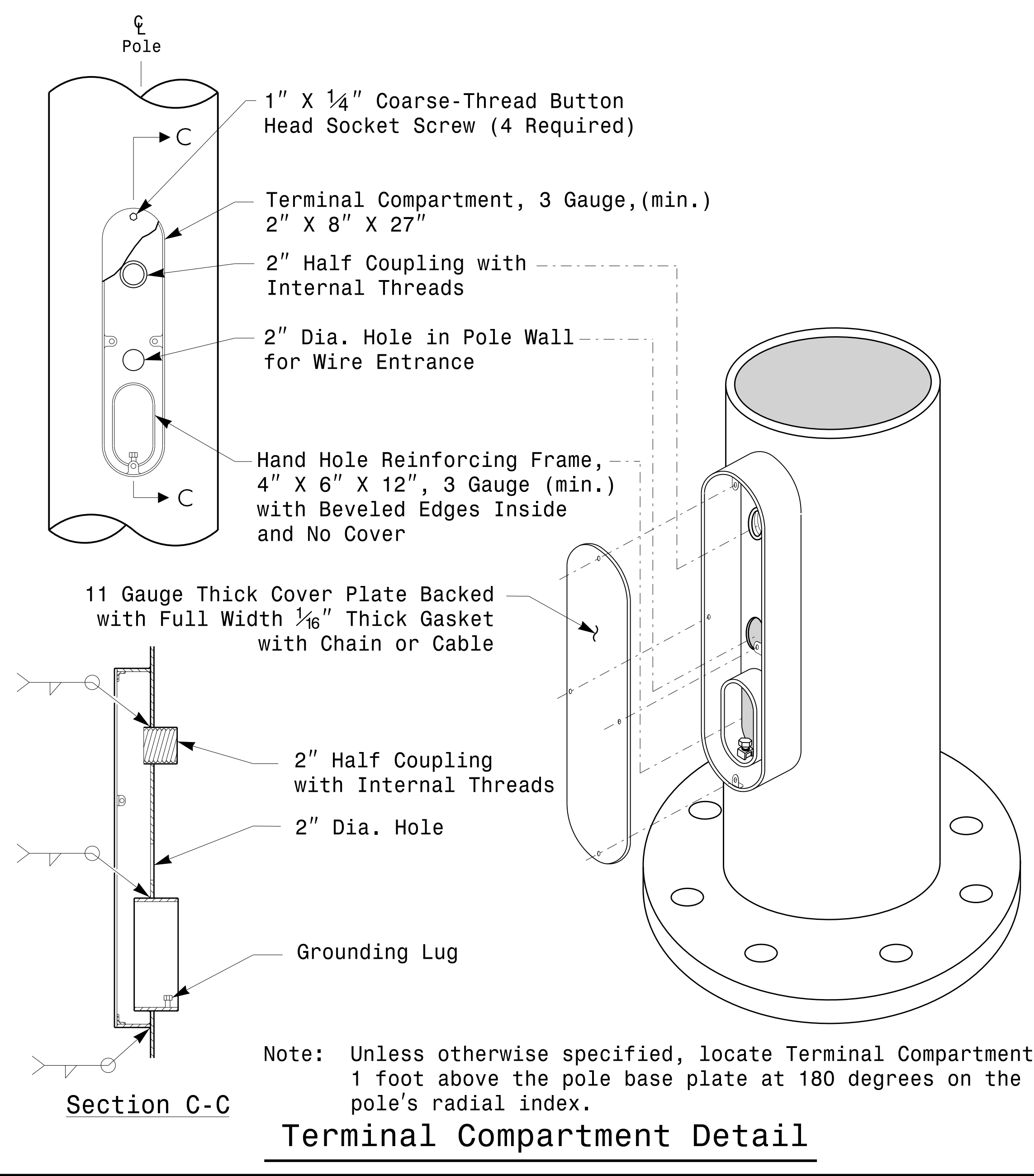
D. C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

C. F. ANDREWS - ITS AND SIGNALS JOURNEY STRUCTURAL ENGINEER

SEAL

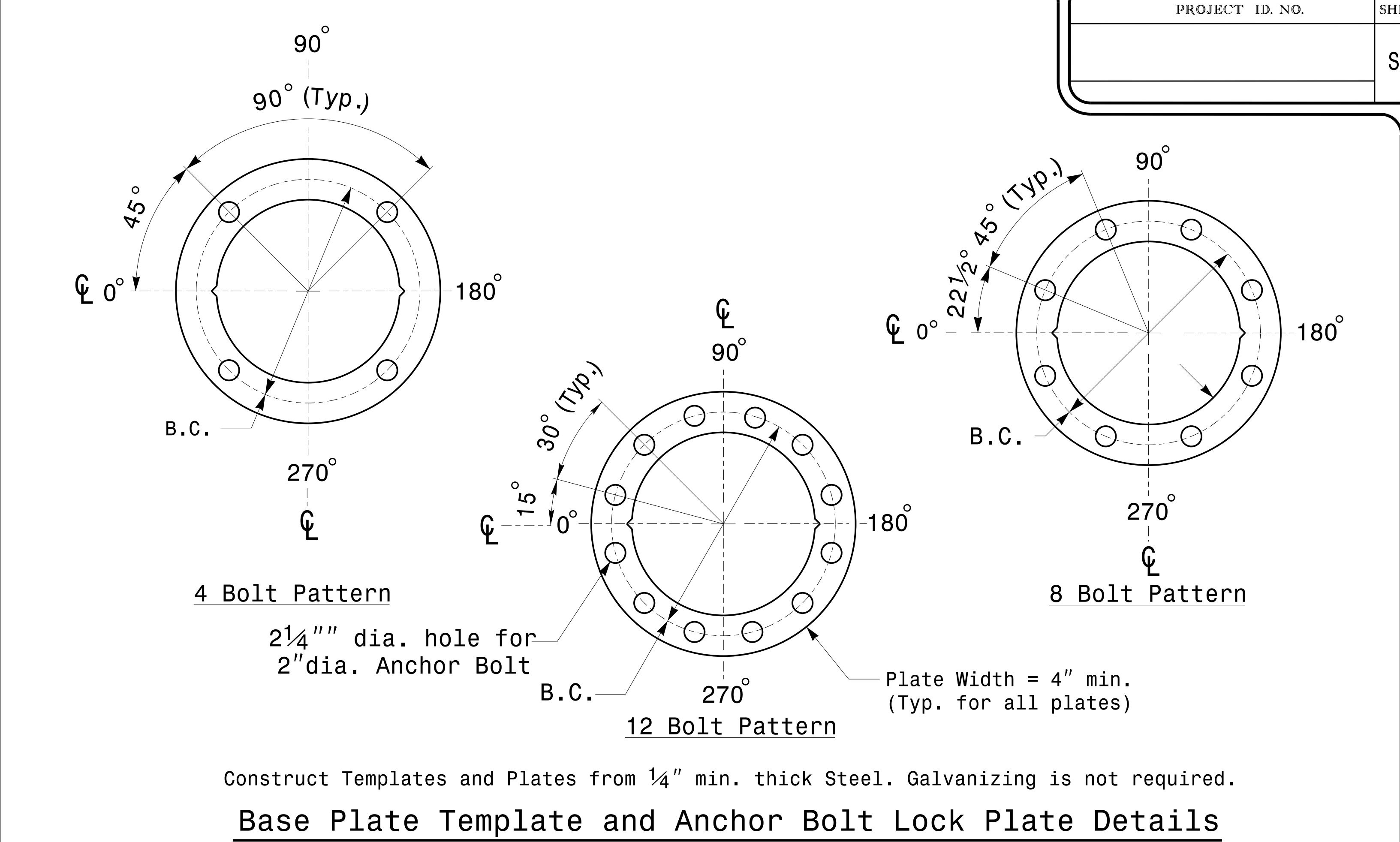
DocuSigned by:
Debesh C. Sarkar

2/17/2016
DATE



Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail



Construct Templates and Plates from 1/4" min. thick Steel. Galvanizing is not required.

Base Plate Template and Anchor Bolt Lock Plate Details

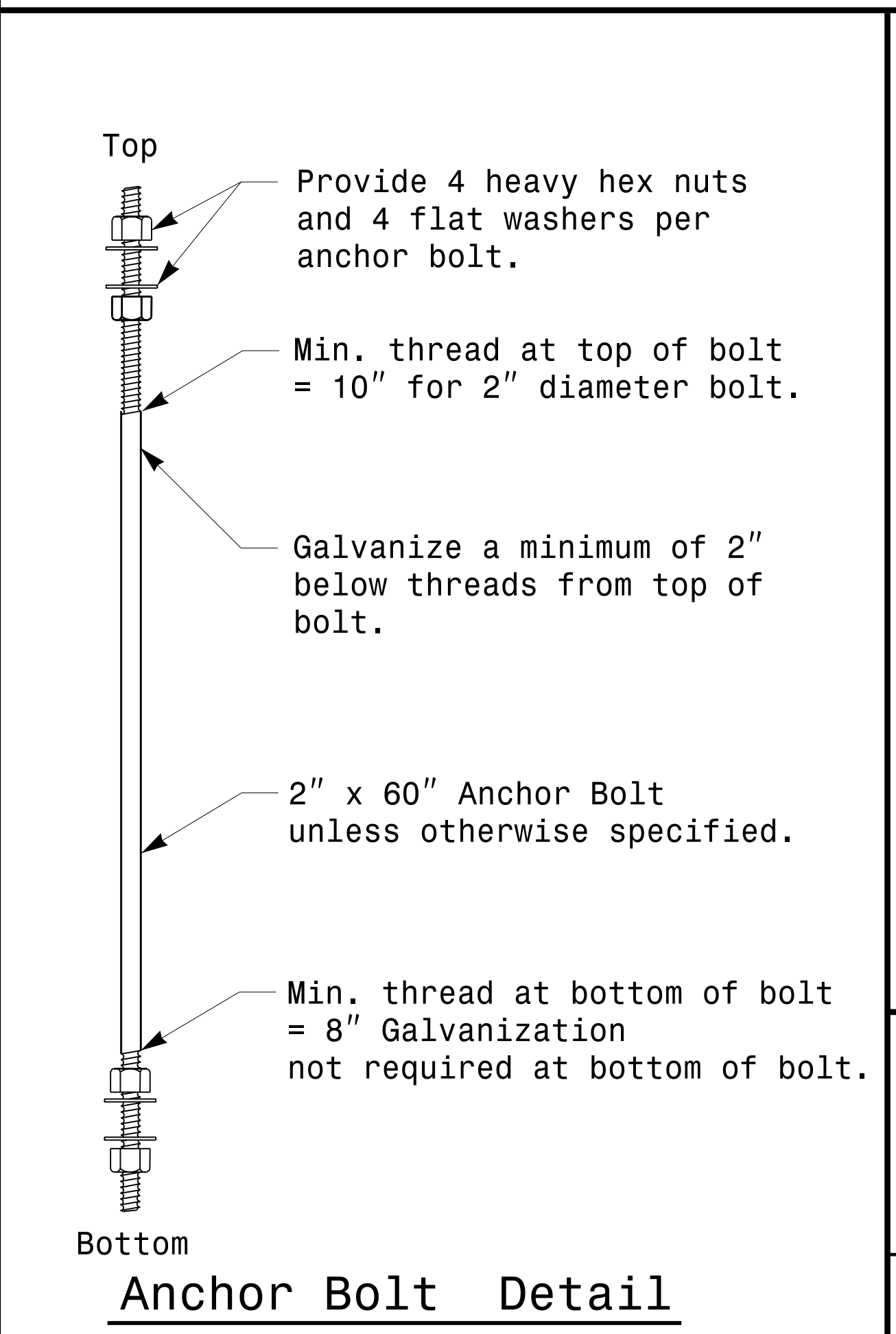
MFG _____ MFG. DATE: MM/YY SHAFT D/T/L/Y _____ ARM-A D/T/L/Y _____ ARM-B D/T/L/Y _____ A.B. DIA./B.C./L/Y _____ NCDOT SIG. INV. NO. _____ NCDOT POLE NO. _____	MFG _____ MFG. DATE:MM/YY SECTION D/T/L/Y _____ NCDOT SIG. INV. NO. _____ NCDOT POLE NO. _____
--	---

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

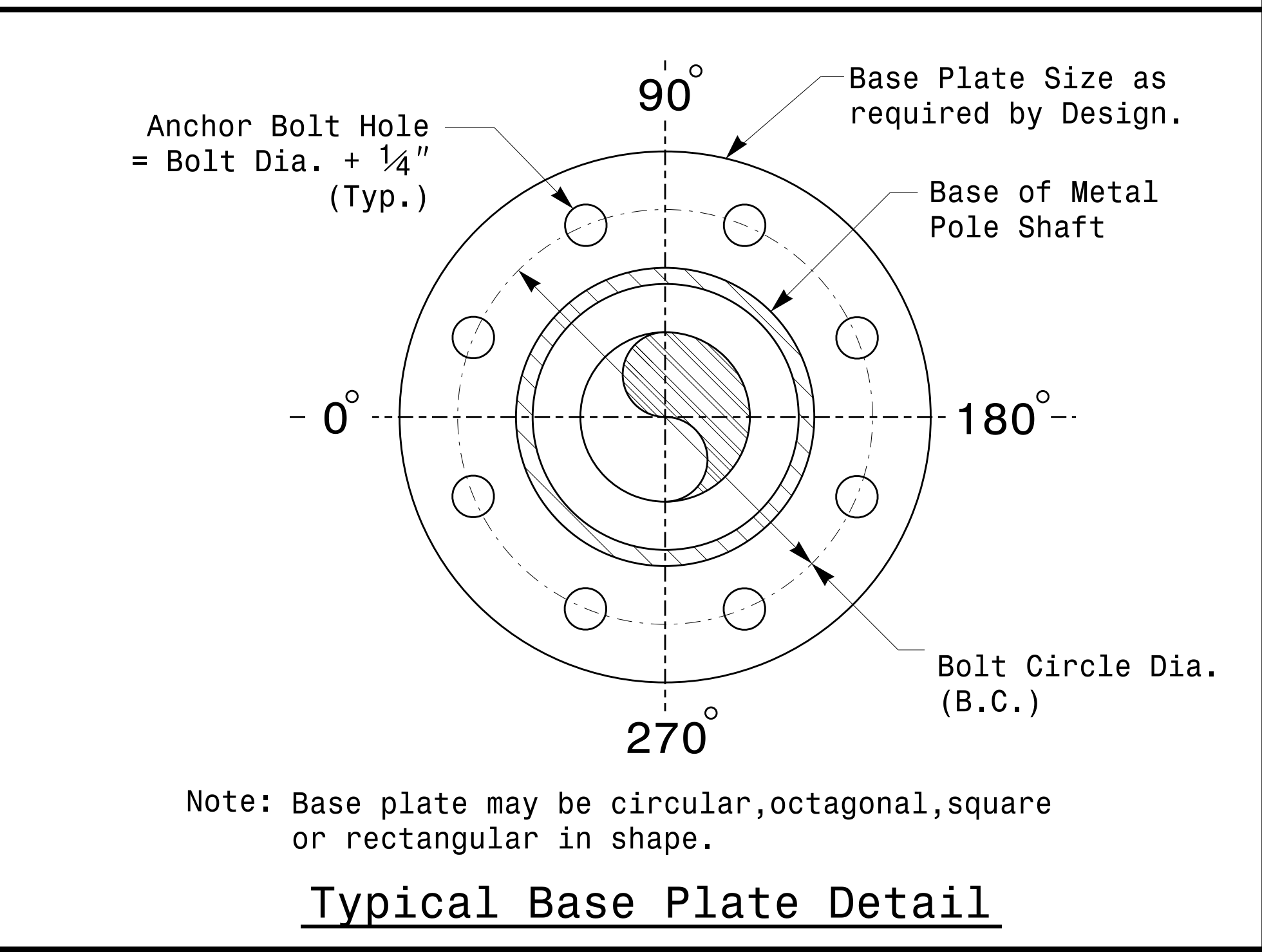
Arm I.D. Tag
(Provide on each section of a multi-section mast arm.)

- 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 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



Anchor Bolt Detail



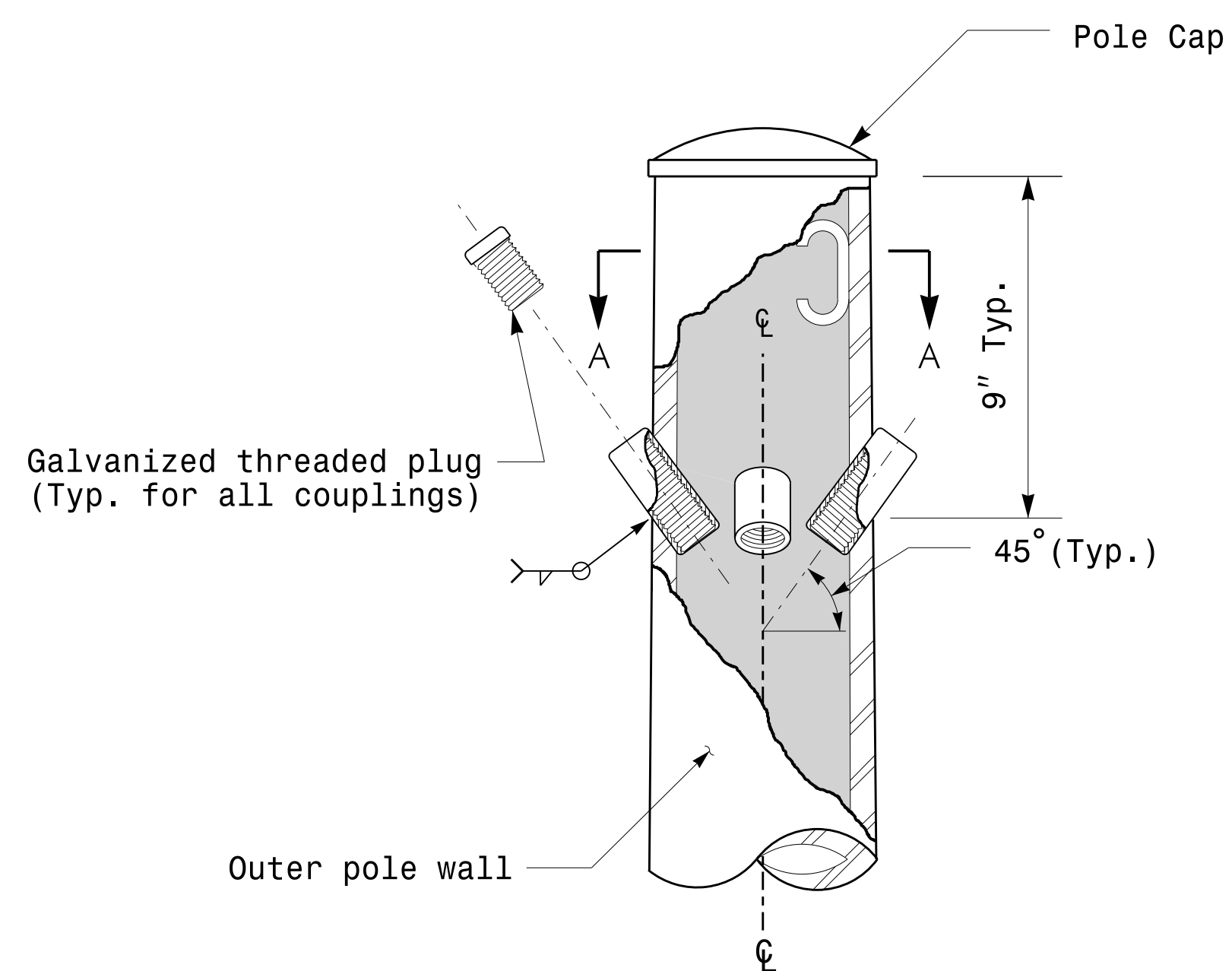
Note: Base plate may be circular, octagonal, square or rectangular in shape.

Typical Base Plate Detail

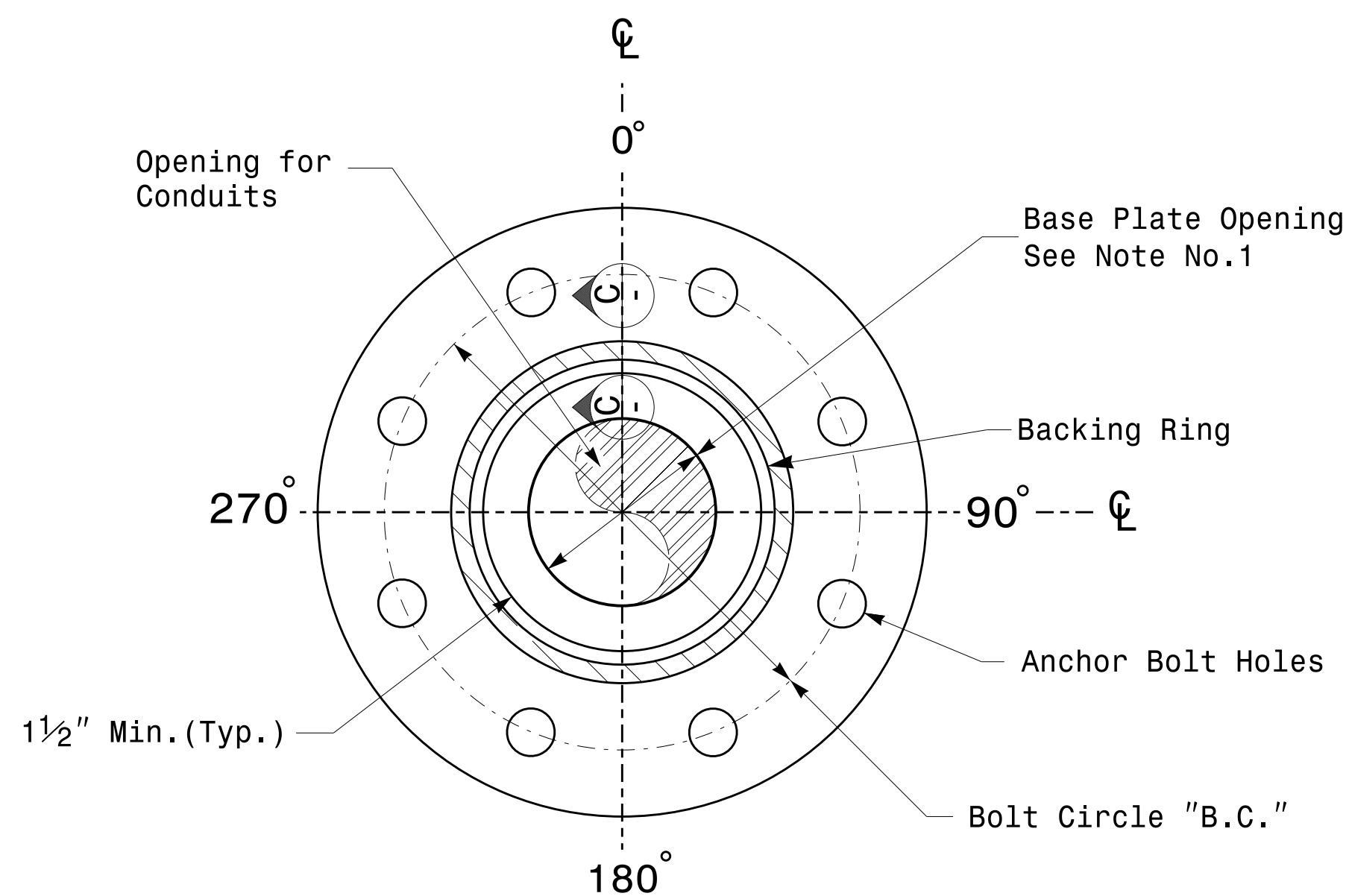
Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	Typical Fabrication Details For All Metal Poles		SEAL DocuSigned by Debesh C. Sarkar 44E8E32E147E4C...
	PLAN DATE: FEBRUARY 2016 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	

17-FEB-2016 16:02:13 TSC04115 Signal Design Section Eastern Region 162014 Sig.M2 Std. Fabrication Detail-1-11 Poles.dgn

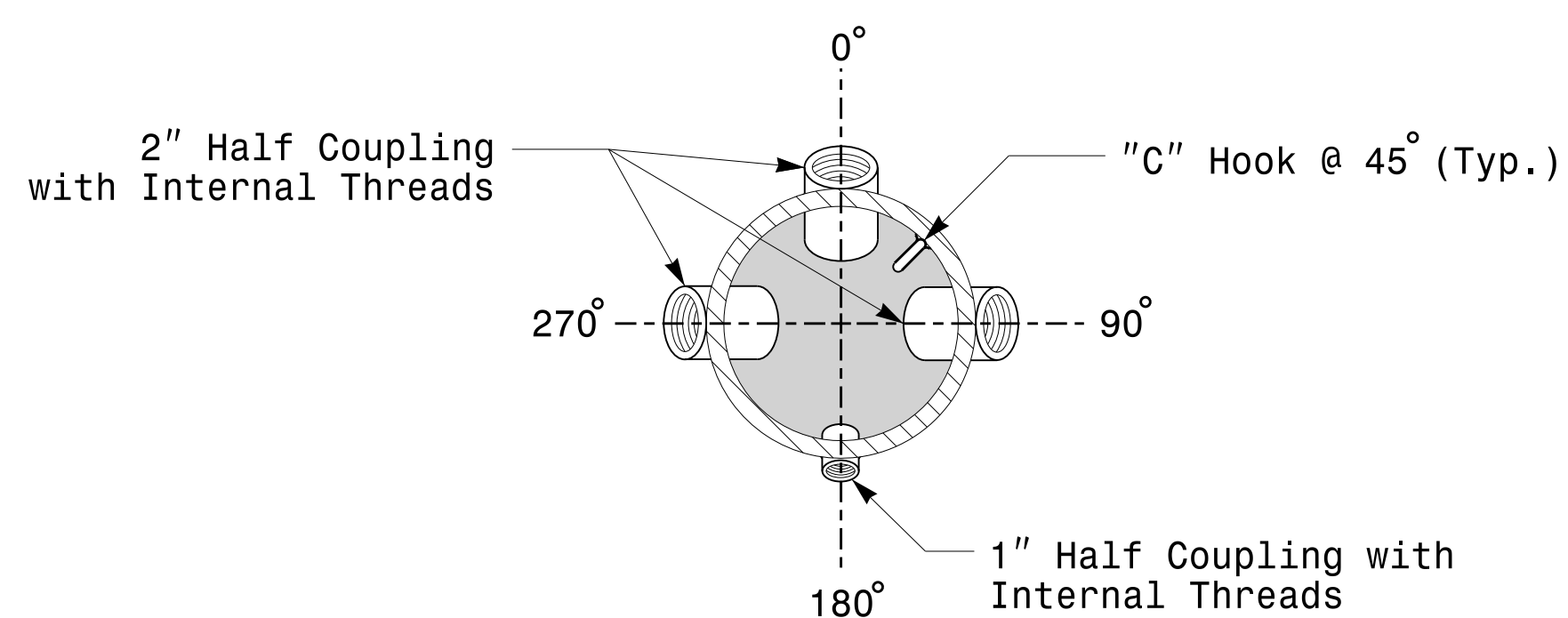
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



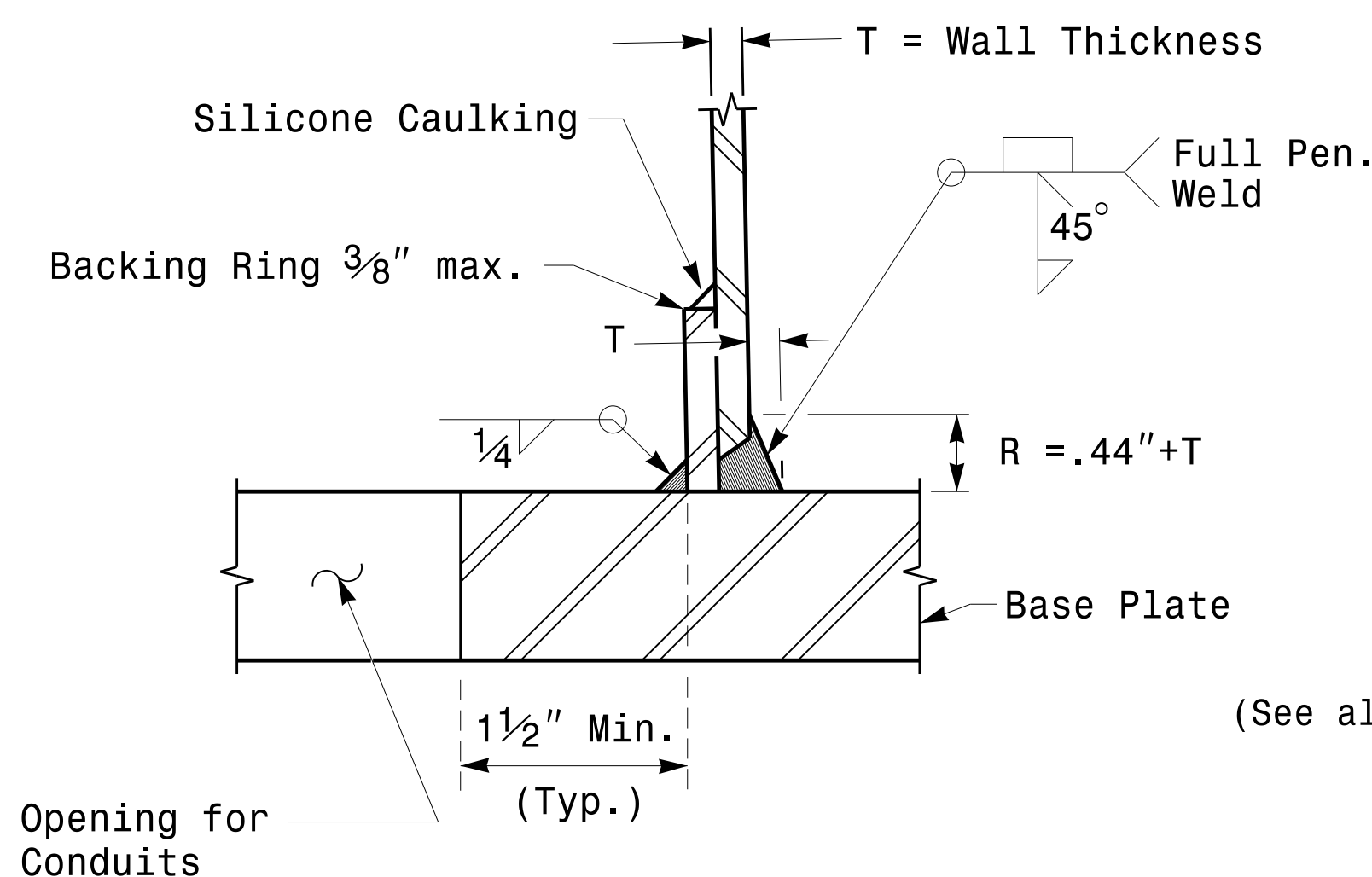
Cable Entrances at Top of Pole



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

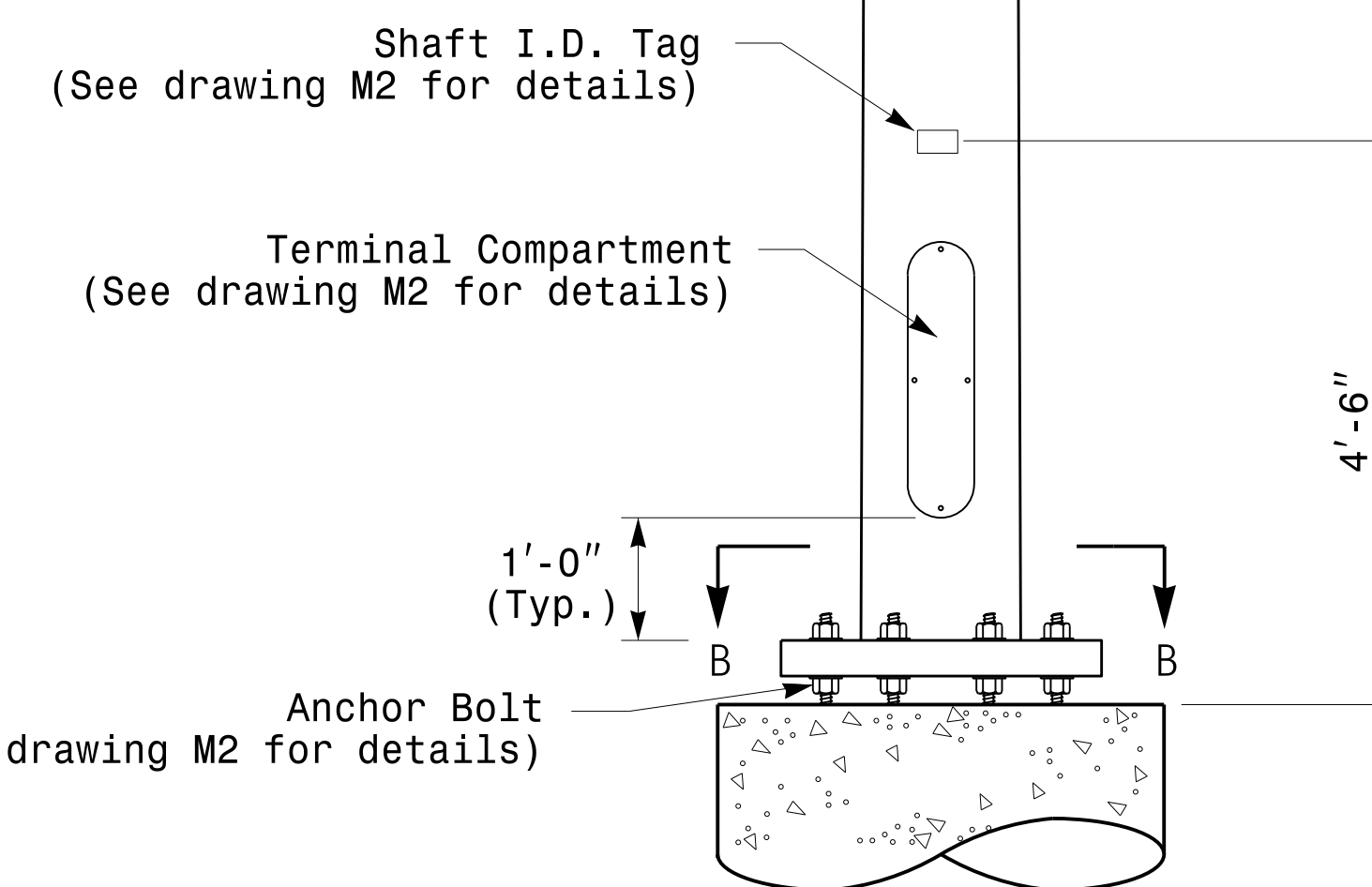


Section A-A
Radial Orientation for Factory Installed
Accessories at Top of Pole



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

2 Cable Clamps designed for variable attachment heights from 1'-6" to 5'-0" below the top of the pole.



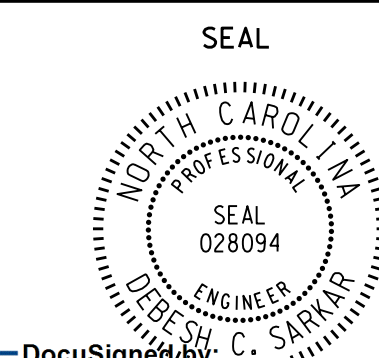
Monotube Strain Pole

Prepared in the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

Typical Fabrication Details For Strain Poles

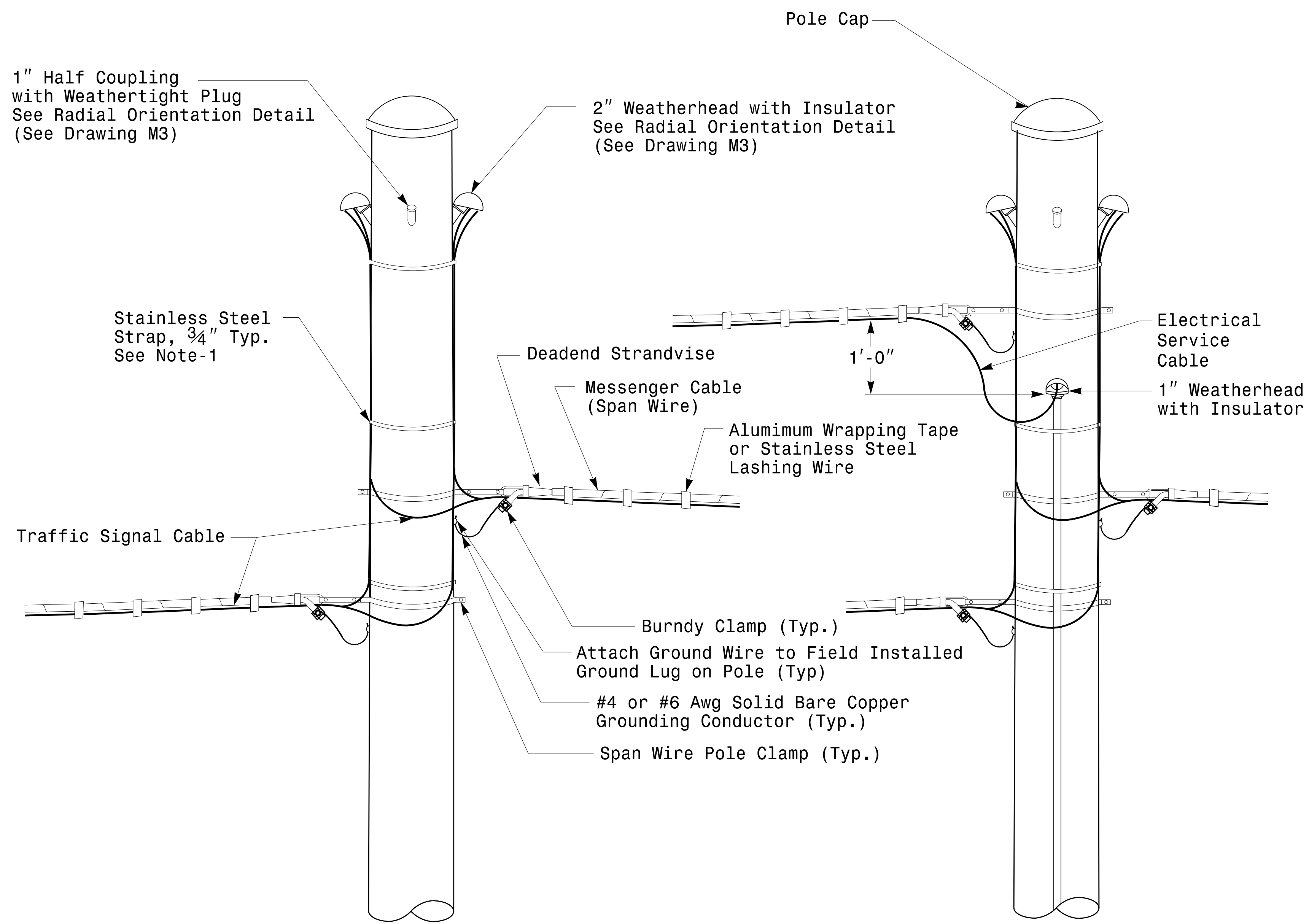
PLAN DATE: FEBRUARY 2016	DESIGNED BY: K.C. DURIGON
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE



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 Debesh C. Sarkar
 SIGNATURE
 44E8E32E147E4C4...

2/17/2016
 DATE

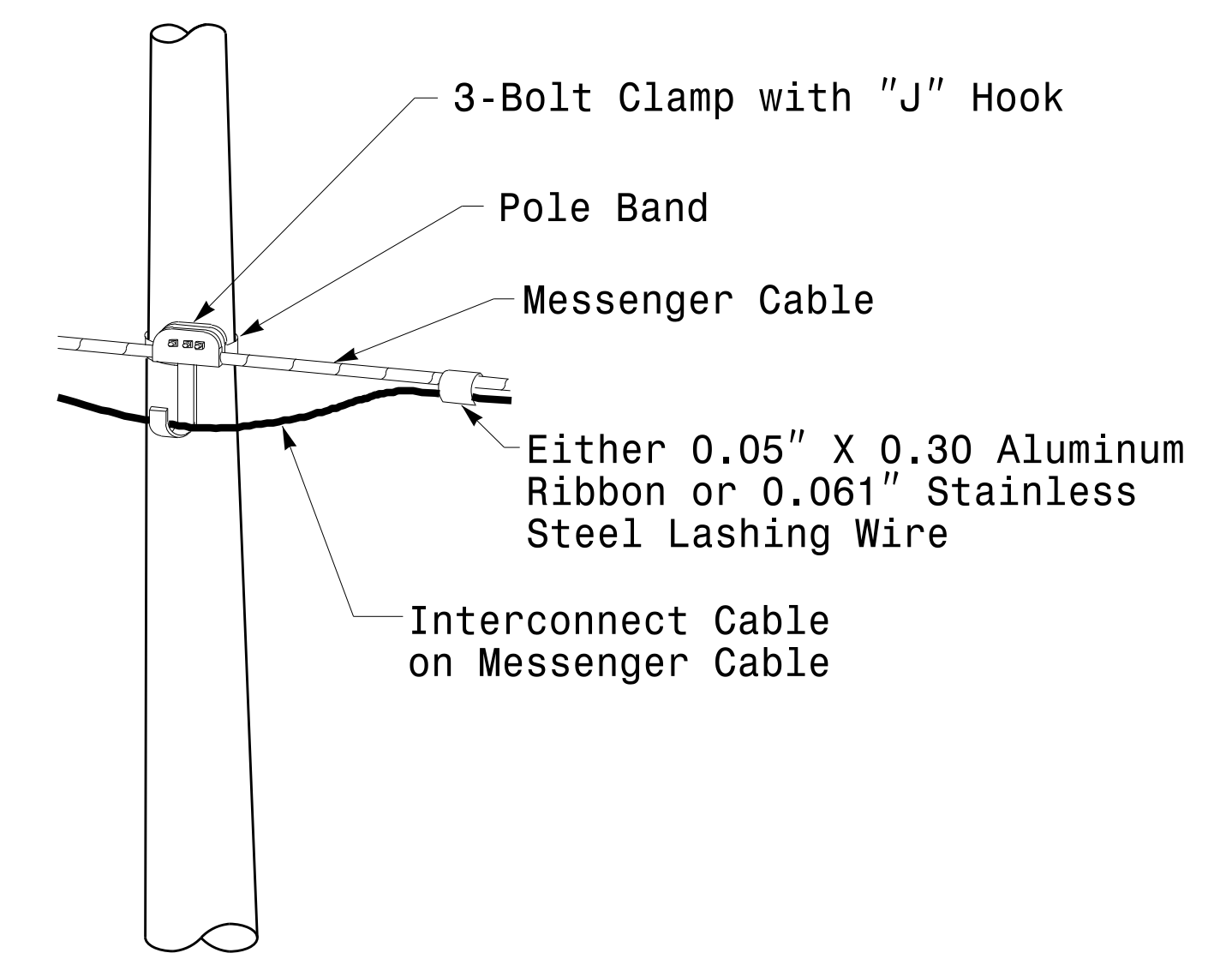
Fabrication Details – Strain Poles



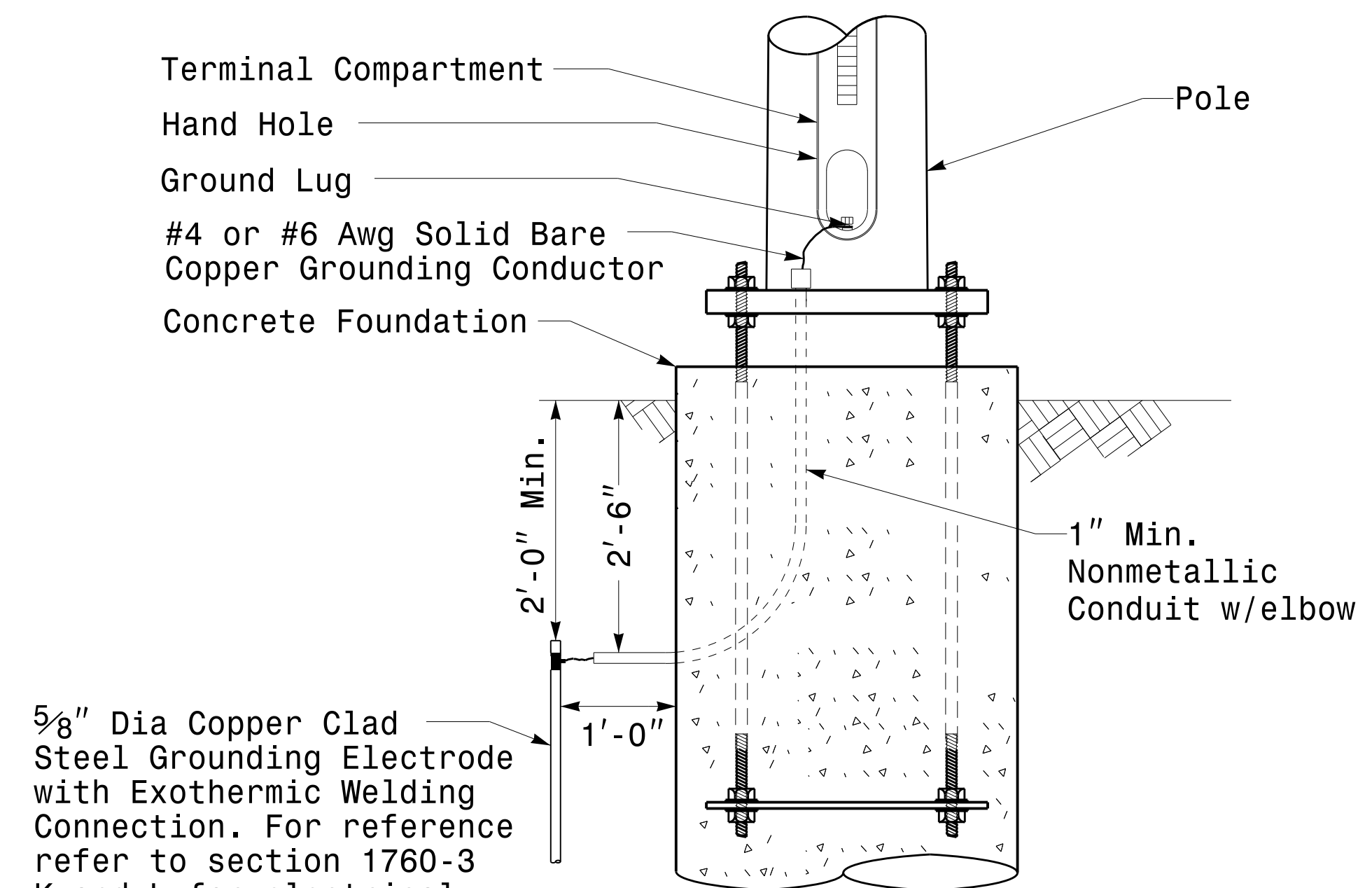
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3'-0".
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For general requirements refer to NCDOT Standard Specifications for Roadway and Structures, January 2012.



Attachment of Cable to Intermediate Metal Pole

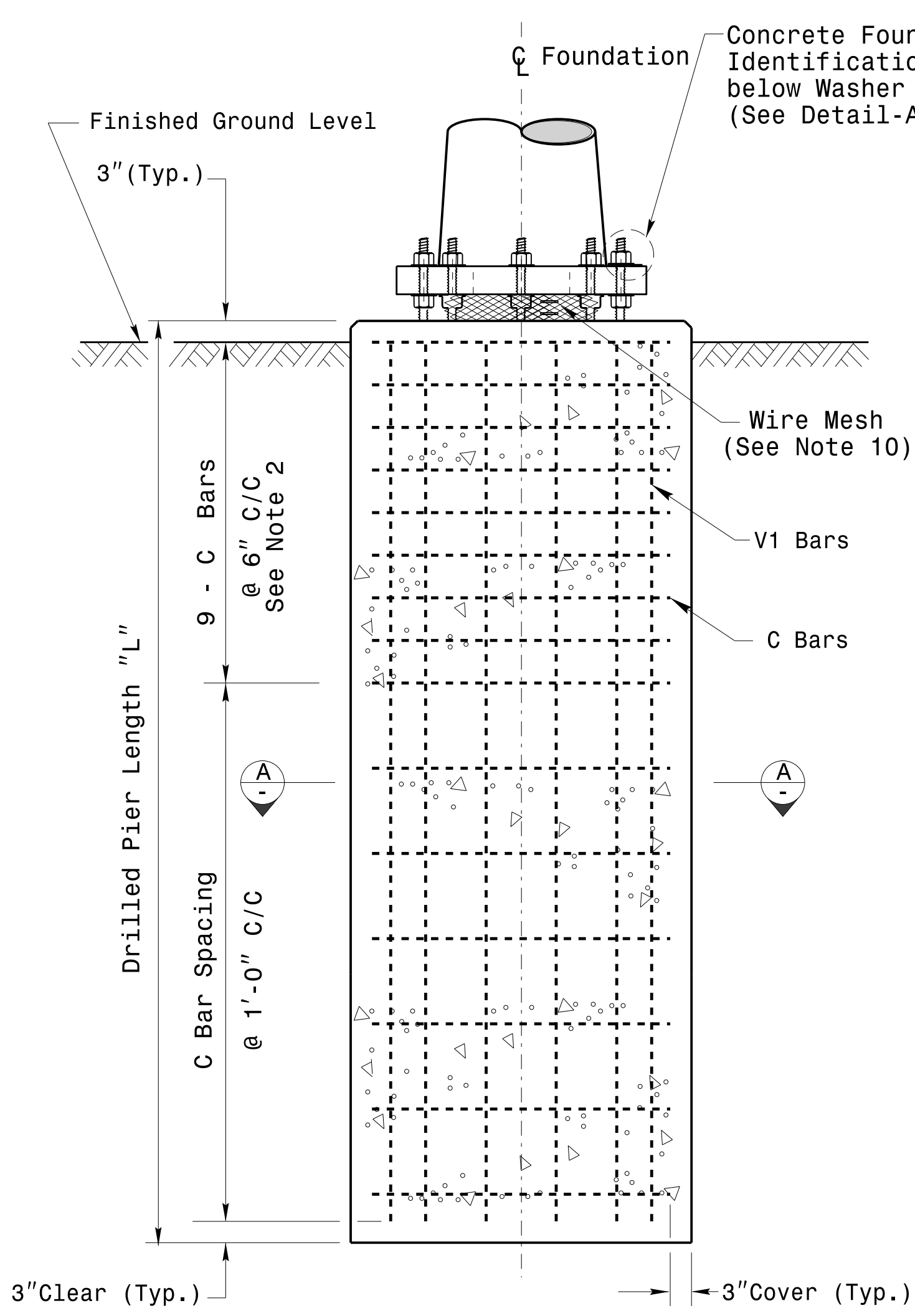


5/8" Dia Copper Clad Steel Grounding Electrode with Exothermic Welding Connection. For reference refer to section 1760-3 K and L for electrical grounding and bonding requirements, See Note 4.

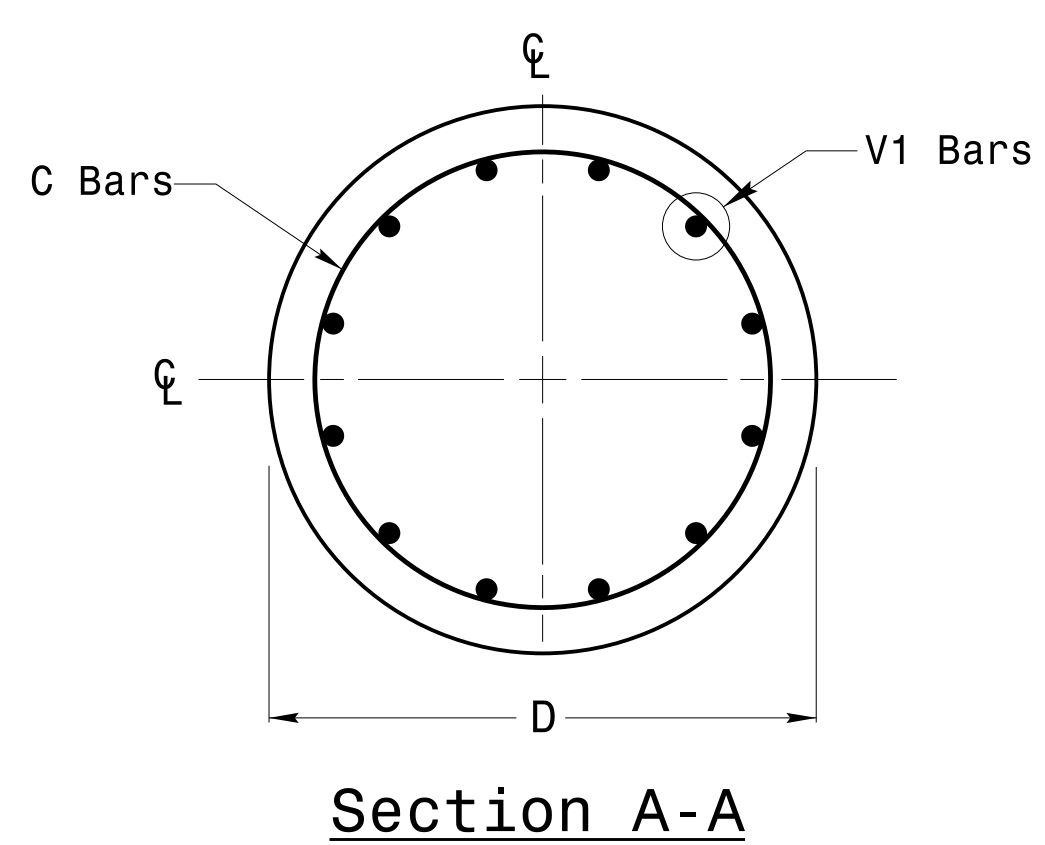
Metal Pole Grounding Detail For Strain Pole and Mast Arm

	Typical Fabrication Details For Strain Pole Attachments		
	PLAN DATE: FEBRUARY 2016 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
750 N. Greenfield Pkwy, Garner, NC 27529		REVISIONS: _____ INIT.: _____ DATE: _____	DocuSigned By: <i>Debash C. Sarkar</i> 44E8E32E147E4C4... DATE: 2/17/2016

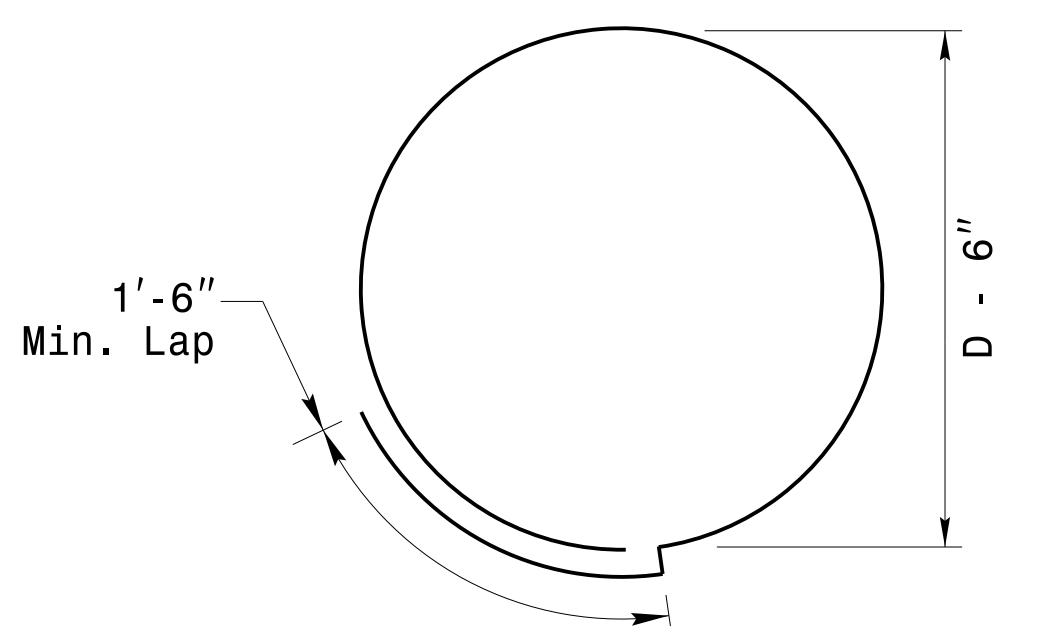
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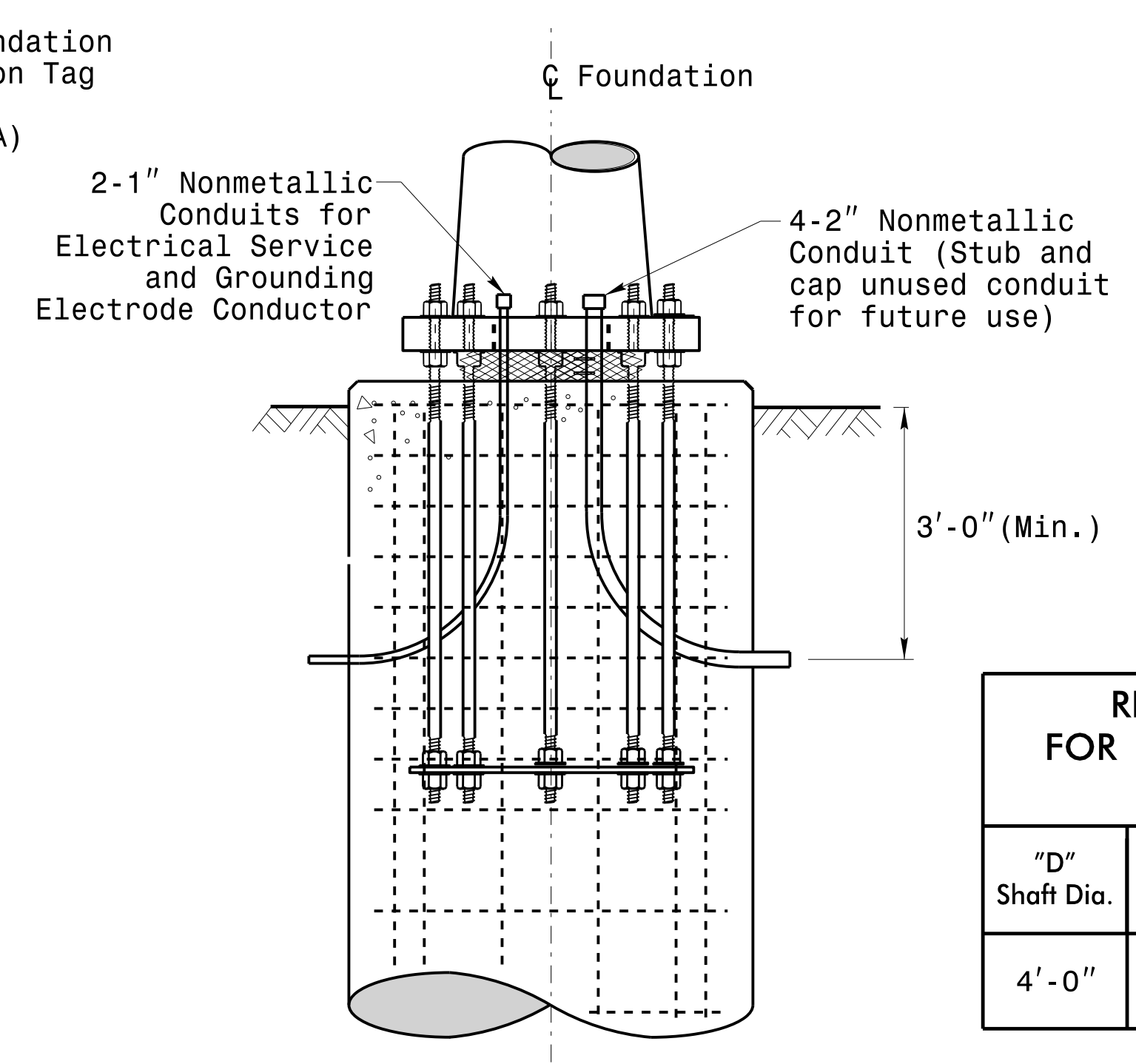
Concrete Shaft Elevation



Section A-A



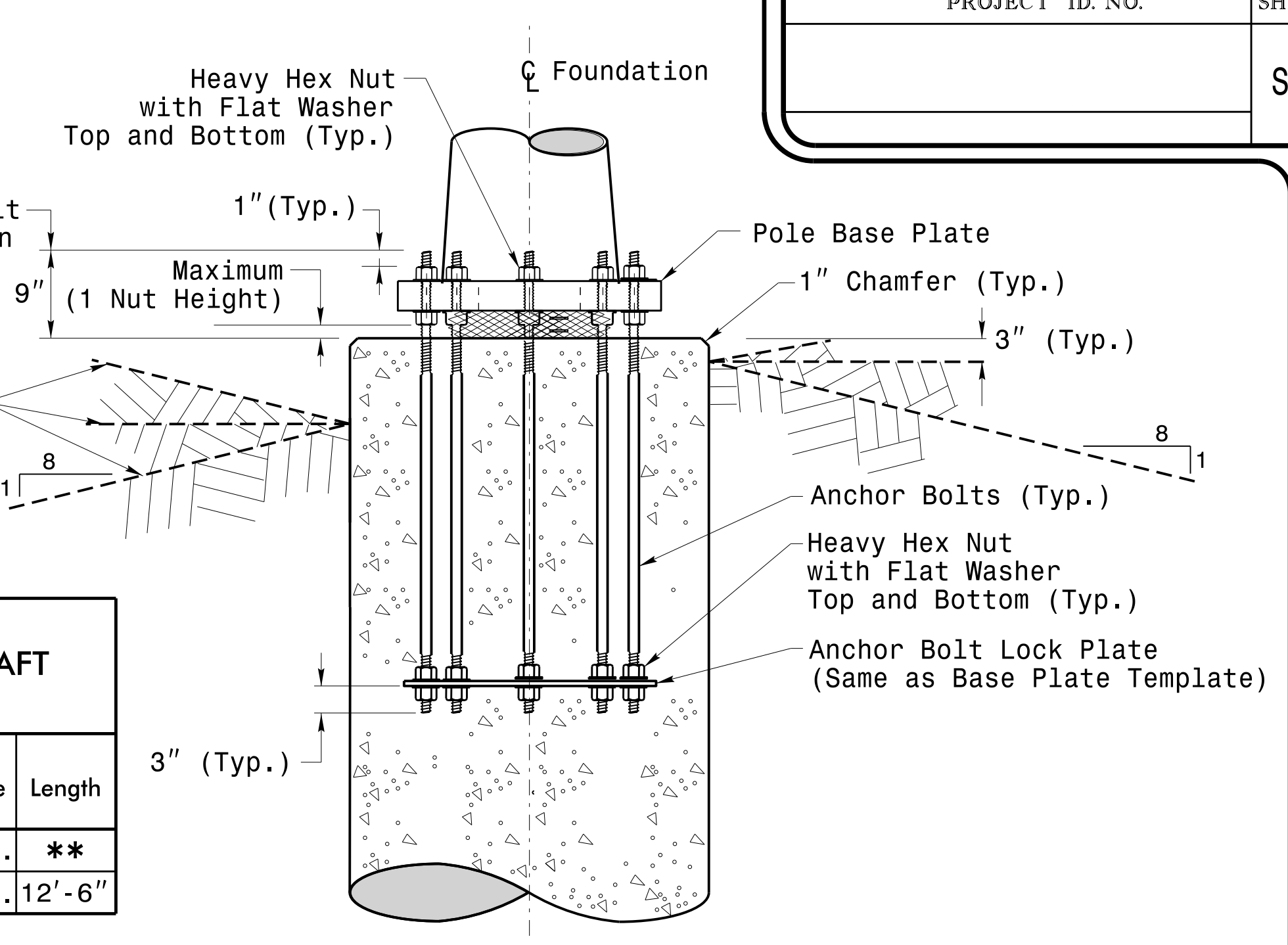
Typical "C" Bar Detail



Typical Foundation Conduit Details

"D" Shaft Dia.	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
4'-0"	.465 x L	V1	-	#8	STR.	**
		C	*	#4	CIR.	12'-6"

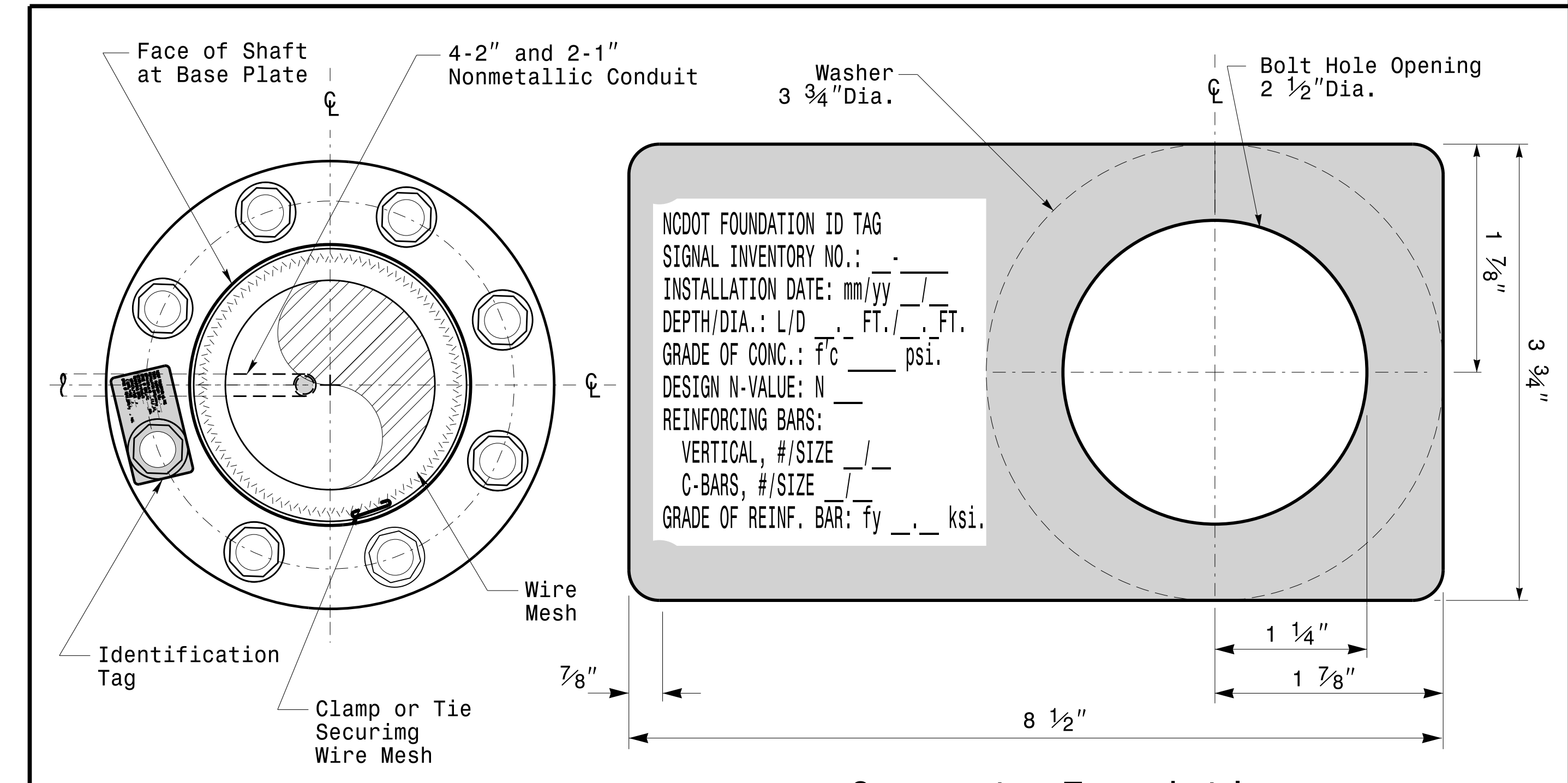
* See Note No. 2
** See Note No. 3



Typical Foundation Anchor Bolt Details
(Reinforcing Cage Not Shown for Clarity)

General Notes:

1. If actual subsurface conditions differ significantly from boring data contact the Engineer before excavating or placing concrete.
2. Circular tie reinforcing rings may be vertically adjusted by +/-3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
3. For standard foundations, see sheet Sig. M8 for details. Vertical reinforcing bars (V1) may be horizontally adjusted by +/-3" to facilitate the installation of electrical conduit entering into the cage.
4. Provide 2" to 5" foundation projection above ground level depending on the ground slope.
5. Unless otherwise shown, foundation designs are based on non-sloping level ground surfaces with slope ratios of 8:1 (H:V) or flatter. If actual ground line slopes are steeper contact the Engineer before excavating or placing concrete.
6. Construct foundations in accordance with NCDOT Standard Provisions SP09 R005- Foundations and Anchor Rod Assemblies for Metal Poles. All applicable 2012 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)
7. Use air entrained AA concrete mix with a compression strength of f'c=4500 psi.(min.) after 28 days.
8. Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3" cover on all reinforcement.
9. Locate the Identification Tag on the top of the base plate, directly above the conduit's entry point.
10. Provide two layers of galvanized welded 23 gauge (0.25) 6" wide 4 mesh wire around pipes under the base plate and secure it with ties if necessary.
11. Preferred location for the I.D. Tag is as shown in Detail-A; directly above the conduit entering the foundation.



Concrete Foundation Identification Tag Details

Detail-A

D = Diameter
L = Length/Depth
mm = Month
yy = Year

	<p>Construction Details For Foundations</p>		
	<p>PLAN DATE: FEBRUARY 2016</p>	<p>DESIGNED BY: C.B. COGDILL</p>	
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVIEWED BY: D.C. SARKAR</p>	<p>DocuSigned by: <i>Debesu C. Sarkar</i></p>
<p>SCALE: NONE</p>	<p>REV. NO. 1</p>	<p>COMMENTS: Revised Foundation Top Details</p>	<p>INIT. N.B. DATE: 5/11/2015</p>
			<p>DATE: 2/17/2016</p>

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Construction Details - Foundations

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:

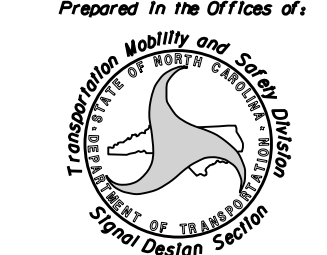
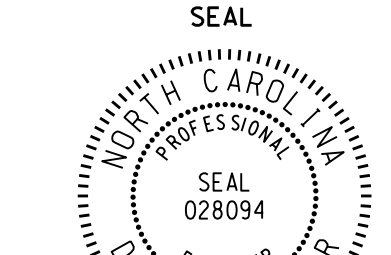

1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

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

 Prepared in the Office of: Transportation Mobility and Safety Division North Carolina Department of Transportation Design Section 750 N. Greenfield Pkwy, Corner, NC 27529	Standard Strain Pole Foundation for All Soil Conditions	SEAL  NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR
PLAN DATE: FEBRUARY 2016 DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	REVISIONS Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn. N.B. 7/12/2015	DocuSigned by:  DEBESH C. SARKAR 44E8E32E147E4C4... 2/17/2016

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STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
R-5735	Sig.SP 1

STANDARD NOTES FOR METAL STRAIN POLES

GENERAL

1. THESE NOTES PROVIDE INFORMATION AND REQUIREMENTS FOR THE DESIGN, FABRICATION, AND INSTALLATION OF STANDARD METAL STRAIN POLES. THEY ARE TO BE USED BY DESIGN ENGINEERS, CONTRACTORS, AND POLE MANUFACTURERS IN THE SELECTION, FABRICATION, AND INSTALLATION OF METAL TRAFFIC SIGNAL SUPPORTS IN NORTH CAROLINA. THE NOTES ARE CATEGORIZED FOR EASE OF USE, AND ARE NUMBERED CHRONOLOGICALLY. NOTES THAT ARE SPECIFIC TO A PARTICULAR SITUATION, DESIGN DETAIL OR REQUIREMENT ARE SHOWN ON THE APPLICABLE PAGE TO CLARIFY INTENT AND UNDERSTANDING.
2. THE FOLLOWING STANDARD DESIGNS ARE BASED ON LIGHT AND HEAVY LOADING CASES. NO VARIATIONS, SUBSTITUTION OR RE-DESIGN OF THE SPECIFIED POLES AND FOUNDATIONS WILL BE PERMITTED UNLESS IT IS APPROVED BY THE ITS AND SIGNALS UNIT.
3. THESE METAL POLE STANDARDS MAKE REFERENCE TO THE NCDOT "ROADWAY STANDARD DRAWINGS" DATED JANUARY 2012 HEREINAFTER REFERRED TO AS THE STANDARD DRAWINGS AND TO THE NCDOT "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2012 HEREINAFTER REFERRED TO AS THE STANDARD SPECIFICATIONS. IF THERE IS A DISCREPANCY BETWEEN THE STANDARD DRAWINGS/SPECIFICATIONS AND THESE STANDARDS, THEN THESE DRAWINGS AND PROJECT SPECIAL SPECIFICATIONS SHALL GOVERN.
4. POLE CASES PREAPPROVED ON THE ITS & SIGNALS QUALIFIED PRODUCTS LIST (QPL) WILL NOT REQUIRE MANUFACTURER'S CALCULATIONS. HOWEVER, CERTIFICATION OF COMPLIANCE WITH THE MANUFACTURER'S PREAPPROVED SHOP DRAWING ON FILE WITH THE DEPARTMENT SHALL BE FURNISHED TO THE ENGINEER. IF POLE CASES ARE NOT ON THE QPL, OR VARIATIONS TO A CASE STANDARD HAS BEEN APPROVED, MANUFACTURER'S SHOP DRAWINGS SHALL BE REQUIRED.

DESIGN CRITERIA

1. THE METAL POLE DESIGN SHALL CONFORM TO THE "2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS" AND LATEST APPROVED INTERIM SPECIFICATIONS. DESIGN WIND PRESSURES AND APPLICATIONS ARE IN ACCORDANCE WITH SECTION 3.8 AND 3.9 OF THE 2013 AASHTO SPECIFICATIONS.
2. 2 PLY POLES ARE NOT ACCEPTABLE. EXCEPTIONS TO THIS DESIGN PARAMETER WILL BE DUE TO THE USE OF DECORATIVE POLES.
3. THESE STRAIN POLE STANDARDS ALLOW FOR SIGNAL HEADS TO BE PLACED ANYWHERE ALONG THE SPANWIRE. THE MOST CRITICAL LOCATIONS ARE SHOWN IN THE TYPICAL INTERSECTION LOADING CASES SHOWN ON DRAWING SP8-SP12 (LOAD CASE AND DESIGN DETAILS SHEET) OF THESE STANDARDS. FOR DESIGN PURPOSES, USE 4% SAG FOR THE SPANWIRE. ROADWAY DESIGN CLEARANCE RANGE FROM BOTTOM OF SIGNAL HEADS TO PAVEMENT IS 17 FEET.
4. PROVISIONS SHALL BE MADE FOR DRAINAGE OF WATER FROM INSIDE THE METAL POLE.

POLE MATERIALS

1. PROVIDE MATERIALS FOR STEEL METAL POLES THAT COMPLY WITH SECTION 1072 AND 1098 OF THE STANDARD SPECIFICATIONS AND PER THE LATEST PROJECT SPECIAL PROVISIONS.
- POLE MONOTUBE SHALL:
- GALVANIZE ALL ITEMS OF THE SIGNAL SUPPORT STRUCTURE PER AASHTO M111.
 - USE ASTM A595 MATERIAL (55 KSI) OR EQUIVALENT AS APPROVED BY THE ENGINEER.
 - HAVE A LINEAR TAPER OF 0.14 IN/FT.

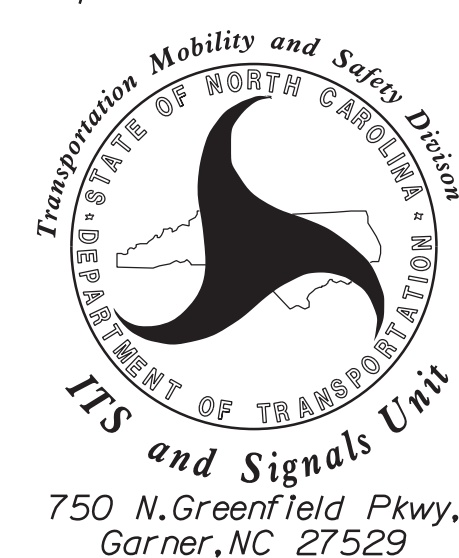
2. BASE PLATE SHALL:
 - CONFORM TO ASTM A572 GR 50 OR EQUIVALENT.
 - MECHANICALLY GALVANIZED IN ACCORDANCE WITH AASHTO M111.
3. ANCHOR BOLTS, NUTS, AND WASHER MATERIAL:
 - ANCHOR BOLTS - USE AASHTO M 314 GRADE 55 MATERIAL OR APPROVED EQUIVALENT.
 - NUTS - USE AASHTO M291 GRADE 2H, DH, OR DH3 MATERIAL OR APPROVED EQUIVALENT.
 - WASHERS - USE AASHTO M293 MATERIAL OR EQUIVALENT.
4. ALL ANCHOR BOLTS, NUTS, WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 OR M298.

POLE FABRICATION

1. ALL OTHER STEEL HARDWARE MATERIAL REQUIRED BUT NOT SPECIFIED ABOVE SHALL COMPLY WITH SECTIONS 1072 AND 1098 OF THE STANDARD SPECIFICATIONS.
2. POLE ASSEMBLIES SHALL BE PERMANENTLY TAGGED OR ENGRAVED WITH THE FOLLOWING:
 - POLE MANUFACTURERS NAME
 - MANUFACTURE DATE
 - POLE CASE NUMBER
 - THICKNESS AND GRADE OF STEEL
3. FOR MANUFACTURING THE METAL POLE THE FOLLOWING CRITERIA MUST BE ADHERED TO:
 - THE METAL POLES SHALL NOT BE SPLICED WITHIN 5 FEET FROM BASE NOR WITHIN 2 FEET FROM ANY CONNECTION.
 - ONLY ONE SPLICE PER UPRIGHT WILL BE PERMITTED.
 - THE QUALITY CONTROL AND WORKMANSHIP OF THE SPLICE WELDS ARE THE SOLE RESPONSIBILITY OF THE POLE MANUFACTURER.
 - CIRCUMFERENTIAL WELDING OF THE POLES IS NOT ALLOWED.
4. ALL WELDS SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF THE AWS D1.1 STRUCTURAL WELDING CODE-STEEL.
5. PROVIDE 2- 3" FACTORY DRILLED HOLES THROUGH THE POLE WALL FOR WIRE ENTRANCE ACCESS TO THE TERMINAL STRIP INSIDE THE TERMINAL COMPARTMENT. THE HOLES SHALL BE IN THE CENTER OF THE TERMINAL COMPARTMENT (0 DEGREES ON THE POLES RADIAL INDEX) LOCATED AT 26" AND 36" FROM THE BASE OF THE POLE. SEE DRAWING Sig.SP4 (POLE FABRICATION DETAILS) OF THESE METAL POLE STANDARDS FOR GRAPHIC DETAILS.
6. THE METAL POLE SHALL BE FABRICATED WITH 3-2" THREADED HALF COUPLINGS AND 1-1" THREADED HALF COUPLING INSTALLED 9" FROM THE TOP OF THE POLE TO RECEIVE THE WEATHERHEADS FOR SIGNAL WIRE ENTRANCES TO THE POLE. THE HALF COUPLINGS SHALL BE WELDED AT NO LESS THAN A 45 DEGREE ANGLE FROM HORIZONTAL TO PROPERLY INSTALL THE WEATHERHEADS. THE 1" HALF COUPLING FOR ELECTRICAL SERVICE ENTRANCE SHALL BE LOCATED AT 0 DEGREES ON THE POLES RADIAL INDEX. ALL OTHER 2" HALF COUPLINGS SHALL BE LOCATED AT 90 DEGREE INCREMENTS. PROVIDE WEATHER TIGHT BUSHING CAPS FOR ALL HALF COUPLINGS. REFER TO DRAWING Sig.SP4 (POLE FABRICATION DETAILS) OF THESE METAL POLE STANDARDS FOR GRAPHIC DETAILS.
7. PROVIDE A FACTORY STANDARD "C" HOOK FOR CABLE SUPPORT WELDED INSIDE THE TOP OF THE POLE AT 225 DEGREES ON THE POLES RADIAL INDEX. REFER TO DRAWING M3 (POLE FABRICATION DETAILS) OF THESE METAL POLE STANDARDS FOR DETAILS.
8. FOR ALL OTHER NON-STRUCTURAL DETAILS AND REQUIREMENTS, REFER TO APPLICABLE SECTIONS OF THESE STANDARDS, THE TRAFFIC SIGNAL PLANS AND SPECIFICATIONS.
9. AT THE TIME OF SHIPMENT FROM THE FACTORY, ENSURE THE POLE IS PACKAGED SO THAT WATER CAN NOT GET INSIDE THE POLE.
10. SHIP ALL POLE ACCESSORIES FOR EACH POLE IN A SEPARATE WATERTIGHT CONTAINER WITH A LABEL THAT IDENTIFIES THE SPECIFIC POLE AND DESCRIBES THE CONTENTS.

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

Prepared In the Offices of:



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

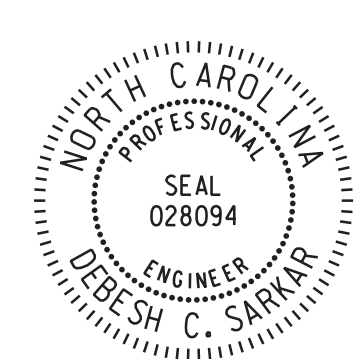
DRAWING No.	DESCRIPTION
Sig.SP 1-2	Standard Strain Pole Notes
Sig.SP 3-7	Statewide Wind Zones
Sig.SP 8	ZONE 1 140 MPH
Sig.SP 9	ZONE 2 130 MPH
Sig.SP 10	ZONE 3 110 MPH
Sig.SP 11	ZONE 4 90 MPH
Sig.SP 12	ZONE 5 120 MPH

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

G. A. FULLER, P.E. - STATE ITS AND SIGNALS ENGINEER
G. G. MURR, JR., P.E. - STATE SIGNALS ENGINEER
D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER
C.F. ANDREWS - ITS AND SIGNALS JOURNEY STRUCTURAL ENGINEER

SEAL



DocuSigned by:

Debesh C Sarkar

8/2/2016

DATE

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STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT NO. R-5735	SHEET NO. Sig.SP 2
-----------------------	-----------------------

STANDARD NOTES FOR METAL STRAIN POLES

SOIL TESTING AND STANDARD POLE FOUNDATIONS

1. THE FOUNDATION SIZE FOR POLES IN THESE METAL POLE STANDARDS IS DETERMINED BY CONDUCTING A SUBSURFACE SOIL INVESTIGATION. FOR DETAILS OF THE SUBSURFACE INVESTIGATION, AND PROPER SELECTION/DETERMINATION OF THE METAL POLE FOUNDATIONS, REFER TO AND COMPLY WITH THE "METAL POLE STANDARD FOUNDATIONS" SPECIAL PROVISION WHICH IS TO BE CONSIDERED AN INTEGRAL PART OF THESE METAL POLE STANDARDS.
2. TO DETERMINE THE CORRECT STANDARD STRAIN POLE FOUNDATION DEPTH, PLEASE ADHERE TO THE FOLLOWING REQUIREMENTS IN CONJUNCTION WITH THE STANDARD M8 DRAWING.
 - a. - USING THE STATEWIDE COUNTY WIND ZONE CHART DERIVE LOAD CASE AND DESIGN DETAILS, MAKE SURE YOU HAVE THE APPROPRIATE WIND ZONE SELECTED.
 - b. - SELECT THE SOIL TYPE THAT BEST DESCRIBES THE SOIL CHARACTERISTICS (EITHER CLAY OR SAND)
 - c. - PERFORM A STANDARD PENETRATION TEST AT EACH PROPOSED FOUNDATION SITE TO DETERMINE "N" VALUE. (NUMBER OF BLOWS PER FOOT FROM STANDARD PENETRATION TEST).
 - d. - GET THE APPROPRIATE POLE CASE LOAD NUMBER FROM THE PLANS OR FROM THE DIVISION TRAFFIC ENGINEER.
 - e. - USING THE PREVIOUSLY DETERMINED SOIL TYPE AND "N" VALUE, SELECT THE APPROPRIATE COLUMN IN THE CHART. SELECT THE APPROPRIATE LINE THAT THE POLE LOAD CASE IS SHOWN ON IN THE CHART. THE CORRECT DEPTH OF THE FOUNDATION IS THE VALUE THAT IS SHOWN WHERE THE COLUMN AND THE LINE INTERSECT.
 - f. - FILL OUT AND SUBMIT FOR APPROVAL TO THE DIVISION THE "STANDARD FOUNDATION SELECTION FORM" FOR EACH PROPOSED FOUNDATION LOCATION.
3. THE "STANDARD FOUNDATION SELECTION FORM" FOR EACH PROPOSED FOUNDATION IS REQUIRED TO BE SUBMITTED AND APPROVED PRIOR TO ANY DRILLING IN THE FIELD. THIS FORM AS WELL AS THE STANDARD FOUNDATION SPECIAL PROVISIONS CAN BE OBTAINED AT THE FOLLOWING WEBSITE:
https://connect.ncdot.gov/resources/Geological/Geotech%20Forms/2012_METAL%20POLES%20-%20Standard%20Foundation%20Selection.pdf
4. COMPLY WITH THE PROVISIONS OF SECTION 1742 OF THE STANDARD SPECIFICATIONS FOR INSTALLATION.
5. REFER TO STANDARD DRAWING 1742.01 FOR FOUNDATION INSTALLATION DETAILS.
6. REINFORCING STEEL SHALL BE DEFORMED AND CONFORM TO ASTM A615 GRADE 60. TIES MAY BE DEFORMED OR PLAIN.
7. 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.
8. THE CONCRETE SHALL BE AIR-ENTRAINED DRILL PIER CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI AT 28 DAYS IN ACCORDANCE WITH SECTION 1000 OF THE NORTH CAROLINA STANDARD SPECIFICATIONS. FOR DETAILS, SEE SPECIAL PROVISIONS.
9. THE TRAFFIC SIGNAL SUPPORT STRUCTURE SHALL NOT BE ERECTED BEFORE THE CONCRETE IN THE FOUNDATION HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.
10. EACH FOUNDATION REQUIRES A FOUNDATION IDENTIFICATION TAG. FOR DETAILS SEE THE STANDARD M7 DRAWINGS.
11. FOR OTHER DETAILS REGARDING CONSTRUCTION OF CONCRETE FOUNDATION, SEE PROJECT SPECIAL PROVISIONS AND M7 DRAWINGS.
12. COMPLY WITH THE PROVISIONS OF SECTION 1072 OF THE STANDARD SPECIFICATIONS FOR INSTALLATION.
13. REFER TO STANDARD DRAWING 1742.01 FOR POLE AND HARDWARE INSTALLATION DETAILS.
14. WHEN ATTACHING POLE TO FOUNDATION, THE DISTANCE BETWEEN THE BOTTOM OF THE LEVELING NUT TO THE TOP OF THE CONCRETE FOUNDATION SHOULD NOT BE GREATER THEN ONE ANCHOR NUT HEIGHT. THE TOP OF EACH ANCHOR BOLT SHOULD NOT EXTEND MORE THAN ONE ANCHOR NUT HEIGHT ABOVE TOP NUT TO FACILITATE THE INSTALLATION OF A THREADED NUT COVER.
15. STRAP ALL SIGNAL CABLES TO THE SIDE OF THE POLE WHEN THE DISTANCE BETWEEN THE SPANWIRE ATTACHMENT CLAMP ON THE POLE AND THE WEATHERHEADS EXCEEDS 36". USE 3/4" STAINLESS STEEL STRAPS TO LASH WIRE TO THE POLE. SEE DRAWING Sig.M6 (POLE FABRICATION DETAILS) OF THESE STANDARDS FOR DETAILS.
16. FOR OTHER DETAILS REGARDING METAL POLE INSTALLATION, SEE LATEST PROJECT SPECIAL PROVISIONS.

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

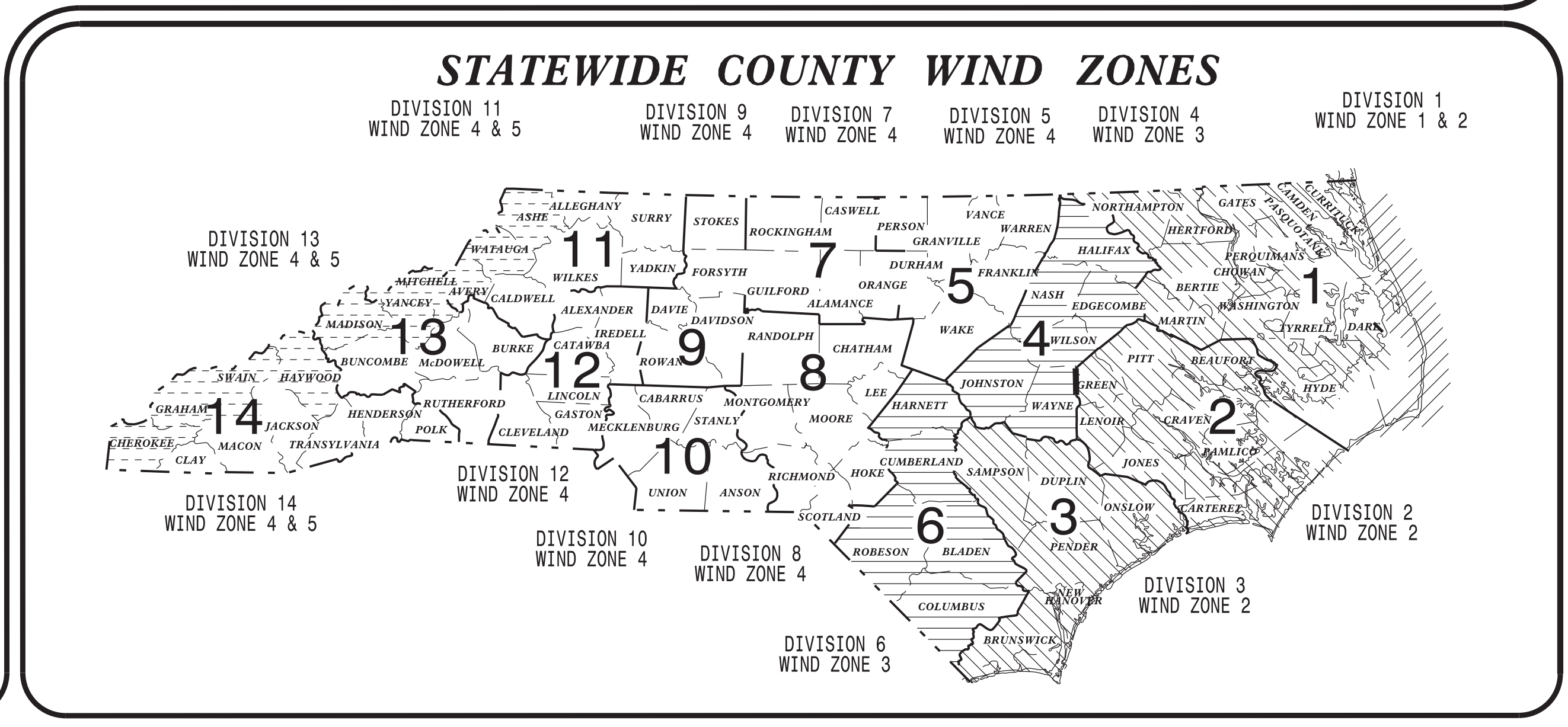
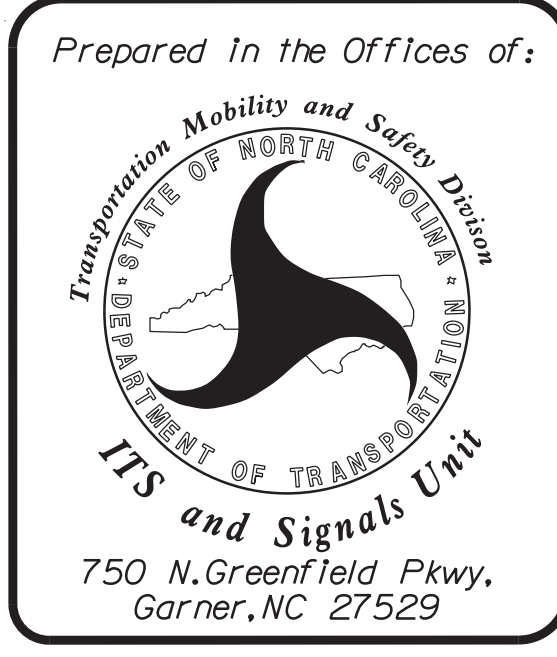


TABLE OF STATEWIDE COUNTY WIND ZONES

ZONE 1 140 mph /63 m/s	ZONE 2 130 mph /58 m/s	ZONE 3 110 mph /49 m/s	ZONE 4 90 mph /40 m/s	ZONE 5 120 mph /58 m/s
CURRITUCK (1) DARE (1) HYDE (1)	BERTIE (1) CAMDEN (1) CHOWAN (1) CURRITUCK (1) DARE (1) GATES (1) HERTFORD (1) HYDE (1) PASQUOTANK (1) NORTHAMPTON (1) MARTIN (1) PERQUIMANS (1) TYRELL (1) WASHINGTON (1)	BEAUFORD (2) CARTERET (2) CHOWAN (1) CRAVEN (2) GREEN (2) JONES (2) LENOIR (2) PAMLICO (2) PITT (2) BRUNSWICK (3) DUPLIN (3) ONSLOW (3) NEW HANOVER (3) PENDER (3) SAMPSON (3)	EDGECOMBE (4) HALIFAX (4) JOHNSON (4) WAYNE (4) WILSON (4) BLADEN (6) COLUMBUS (6) CUMBERLAND (6) HARNETT (6) ROBESON (6) DURHAM (5) FRANKLIN (5) GRANVILLE (5) PERSON (5) VANCE (5) WARREN (5) WAKE (5) ALAMANCE (7) CASWELL (7) GUILFORD (7) ORANGE (7) ROCKINGHAM (7) SCOTLAND (7)	CHATHAM (8) HOKE (8) LEE (8) MONTGOMERY (8) MOORE (8) RANDOLPH (8) RICHMOND (8) DAVIDSON (9) DAVIE (9) FORSYTH (9) ROWAN (9) STOKES (9) ANSON (10) CABARRUS (10) MECKLENBURG (10) STANLY (10) UNION (10) ALLEGHANY (11) ALLEGHANY (11) CALDWELL (11) CATAWBA (12) CLEVELAND (12) GASTON (12) IREDELL (12) LINCOLN (12) BUNCOMBE (13) BURKE (13) MCDOWELL (13) RUTHERFORD (13) CLAY (14) HENDERSON (14) JACKSON (14) MACON (14) POLK (14) TRANSYLVANIA (14) ASHE (11) AVERY (11) WATAUGA (11) MADISON (13) MITCHELL (13) YANCEY (13) CHEROKEE (14) GRAHAM (14) HAYWOOD (14) SWAIN (14)



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

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SEAL

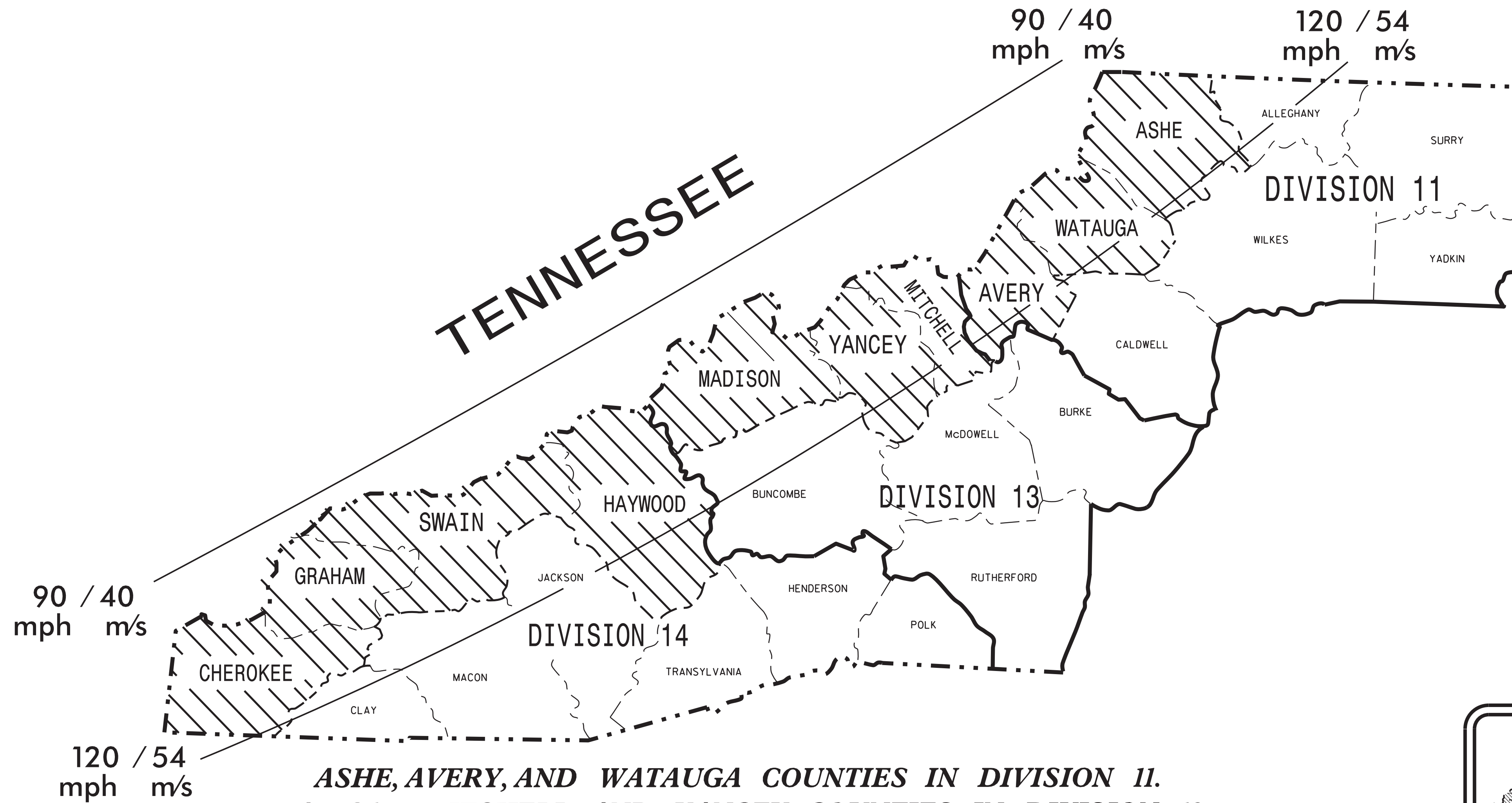
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Debesh C. Sarkar
8/2/2016
DATE

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**STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS**

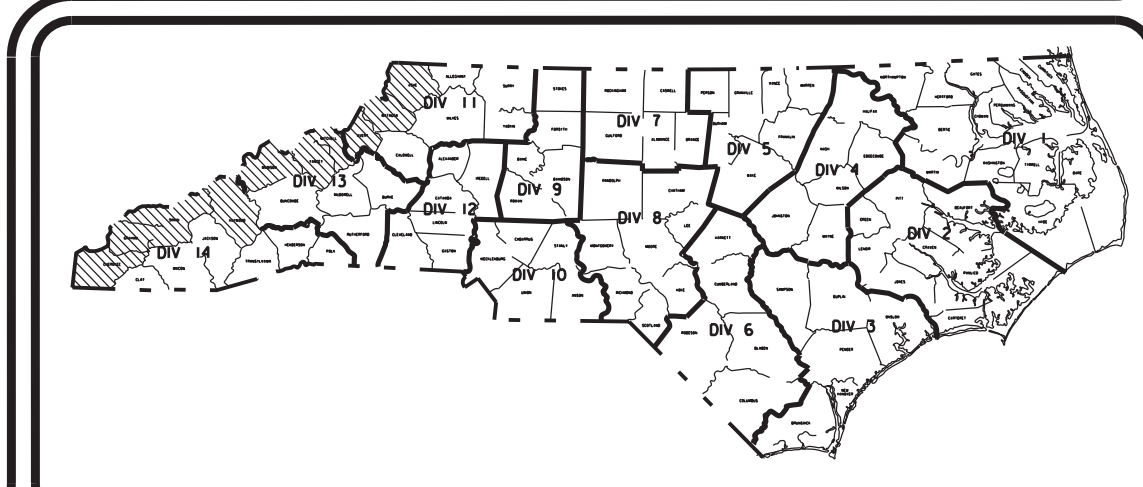
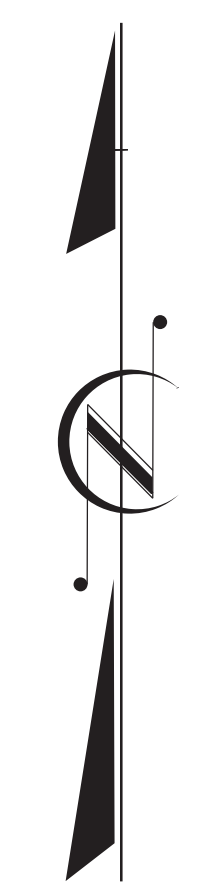
PROJECT ID. NO.	SHEET NO.
R-5735	Sig.SP7

**STANDARD DRAWINGS FOR ALL METAL POLES
ZONE 5 – 120 mph (54 m/s) SPECIAL WIND REGION**

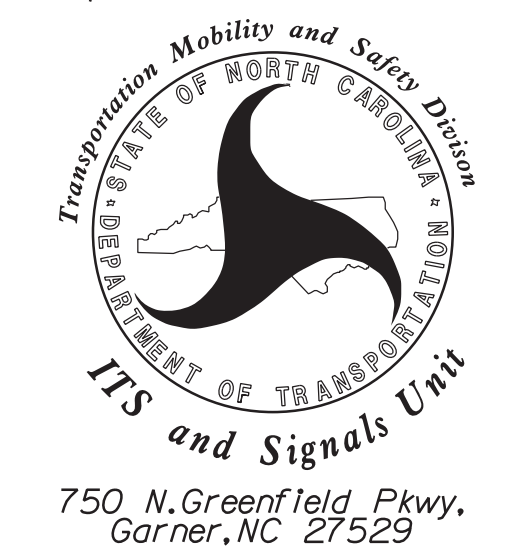


**ASHE, AVERY, AND WATAUGA COUNTIES IN DIVISION 11.
MADISON, MITCHELL, AND YANCEY COUNTIES IN DIVISION 13.
CHEROKEE, GRAHAM, HAYWOOD, AND SWAIN COUNTIES IN DIVISION 14.**

<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
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6th Edition 2013
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Standard Specifications for
Structural Supports for
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C. F. ANDREWS – ITS AND SIGNALS JOURNEY STRUCTURAL ENGINEER

SEAL

DocuSigned by:
Debesh C Sarkar 8/2/2016
DATE

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ZONE 5 (120 MPH) SPECIAL WIND ZONE

PROJECT ID. NO. SHEET NO.

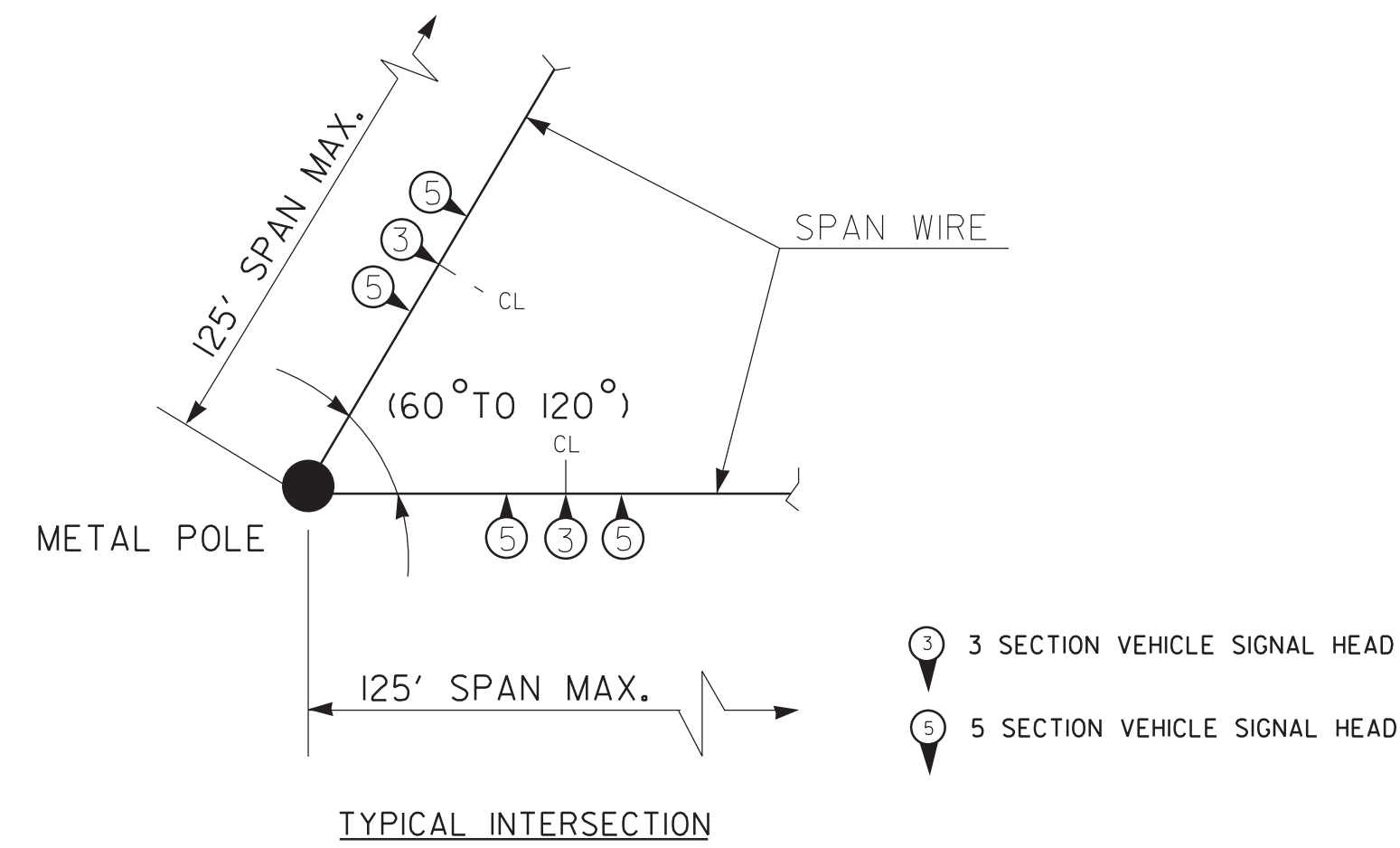
R-5735 Sig.SP 12

LIGHT LOADING

(FOR ONE POLE AND ONE FOUNDATION)

CASE No.	POLE HEIGHT IN (FT.)	METAL POLE		BASE PLATES			ANCHOR BOLTS		CONCRETE FOOTING		
		WALL THICKNESS TH GAGE, (IN.)	BASE DIAMETER (IN.)	D (IN.)	BC (IN.)	T (IN.)	NO. OF BOLTS	DIAMETER X TOTAL LENGTH (IN.)	DIAMETER d (IN.)	DEPTH L (FT.)	VOLUME (CU. YDS.)
S26L2	26	0.3125	16	29	23	2	8	2 X 60	48	*	*
S30L2	30	0.3125	17	29	23	2	8	2 X 60	48	*	*
S35L2	35	0.375	17	29	23	2	8	2 X 60	48	*	*

*SEE NOTE 1 AND 2 "SOIL TESTING AND STANDARD SOIL FOUNDATIONS" ON SHEET Sig.SP2 OF THE STANDARD NOTES.

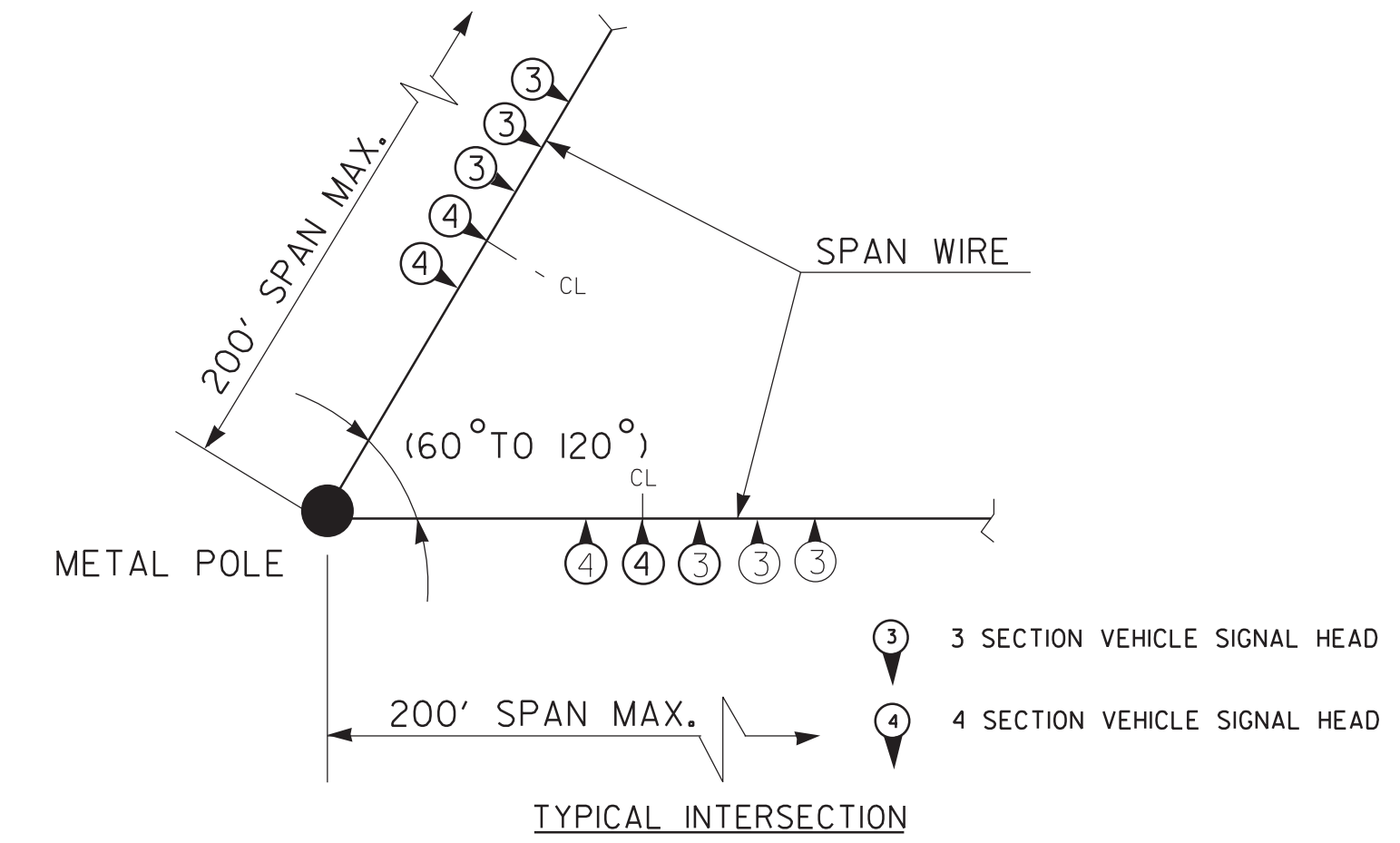


HEAVY LOADING

(FOR ONE POLE AND ONE FOUNDATION)

CASE No.	POLE HEIGHT IN (FT.)	METAL POLE		BASE PLATES			ANCHOR BOLTS		CONCRETE FOOTING		
		WALL THICKNESS TH GAGE, (IN.)	BASE DIAMETER (IN.)	D (IN.)	BC (IN.)	T (IN.)	NO. OF BOLTS	DIAMETER X TOTAL LENGTH (IN.)	DIAMETER d (IN.)	DEPTH L (FT.)	VOLUME (CU. YDS.)
S30H2	30	0.3125	21	35	29	2	12	2 X 60	48	*	*
S35H2	35	0.375	21	35	29	2	12	2 X 60	48	*	*

*SEE NOTE 1 AND 2 "SOIL TESTING AND STANDARD SOIL FOUNDATIONS" ON SHEET Sig.SP2 OF THE STANDARD NOTES.



METAL STRAIN POLES

COUNTY WIND ZONE 5

120 mph / 58 m/s

ASHE
AVERY
WATAUGA
MADISON
MITCHELL
YANCEY
CHEROKEE
GRAHAM
HAYWOOD
SWAIN

Prepared In the Offices of:



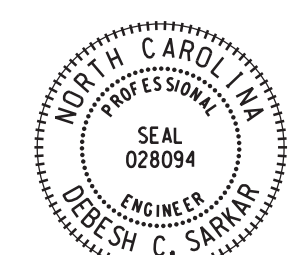
750 N. Greenfield Pkwy, Garner, NC 27529

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

WIND ZONE 5 LOAD CASE AND DESIGN DETAILS

PLAN DATE: JUNE 2016	DESIGNED BY: K.C. DURIGON
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

SEAL



DocuSigned by:

Debesh C Sarkar

8/2/2016

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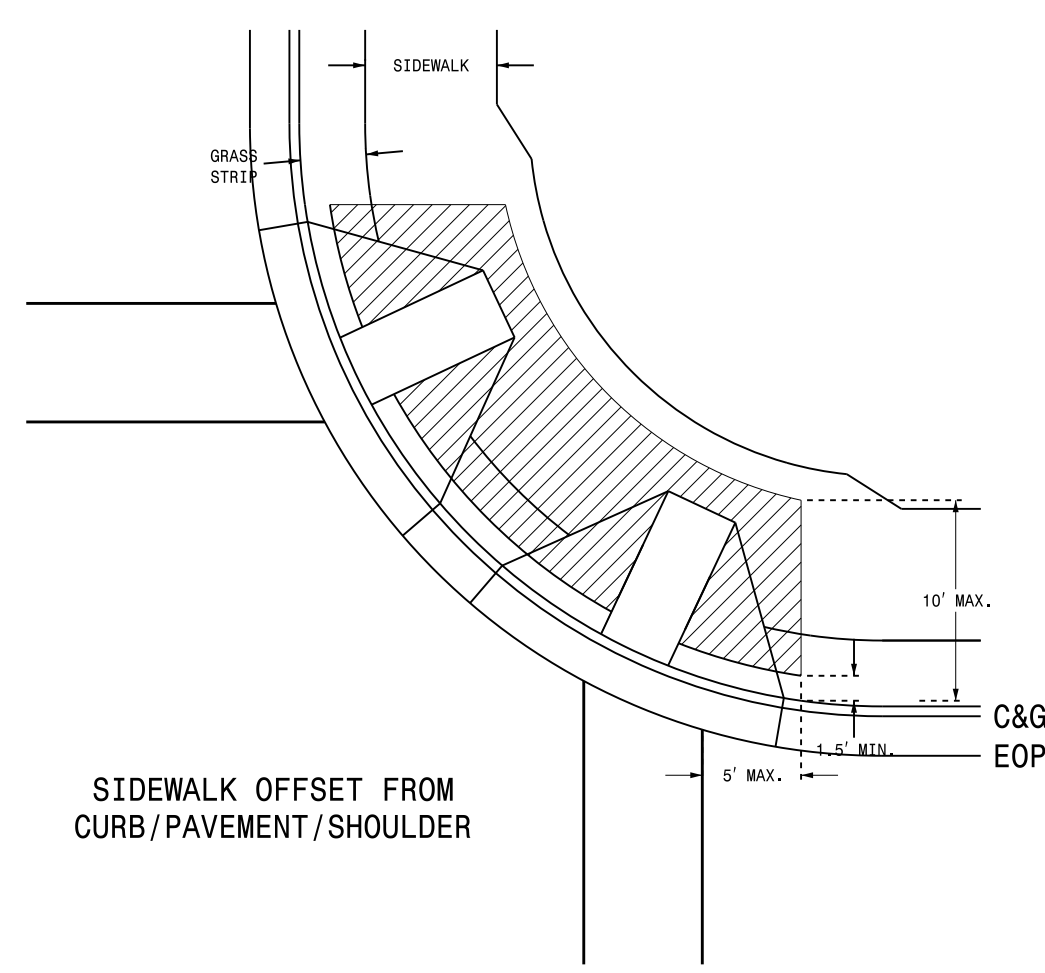
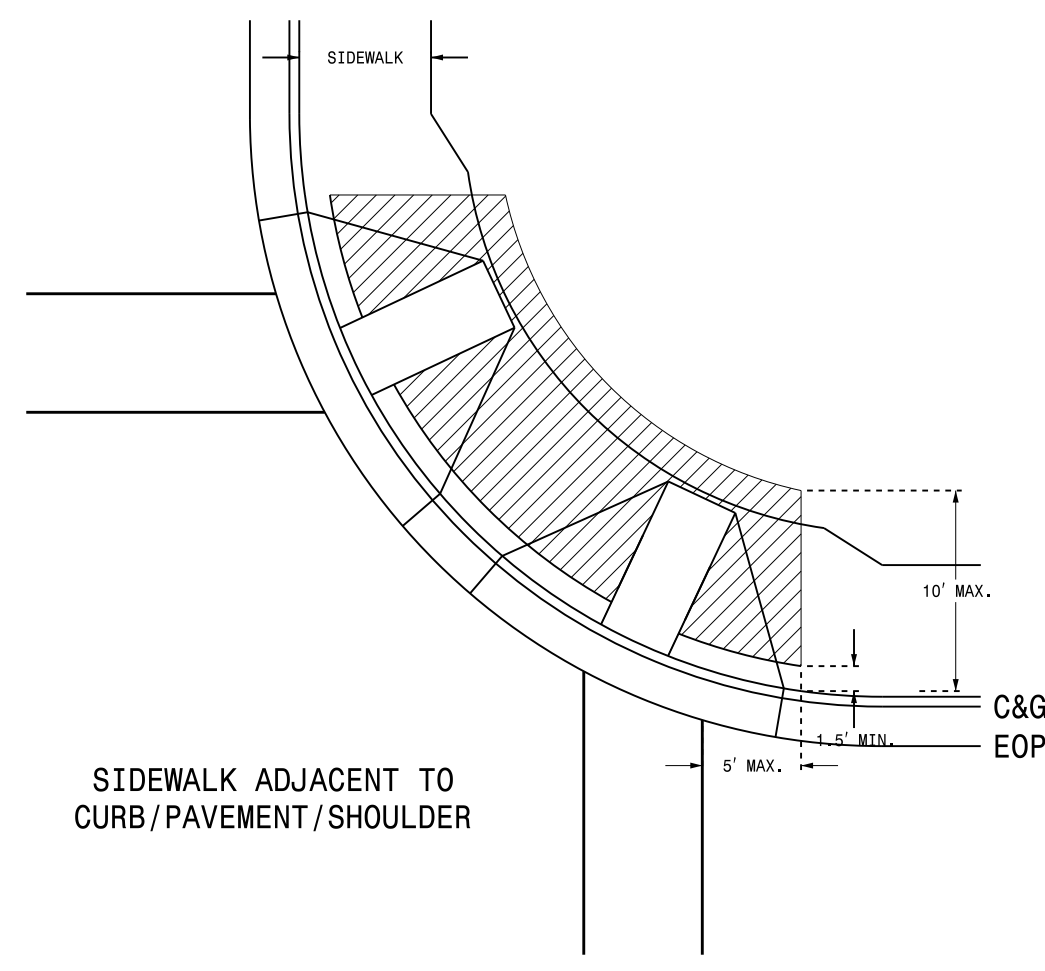
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

06-14

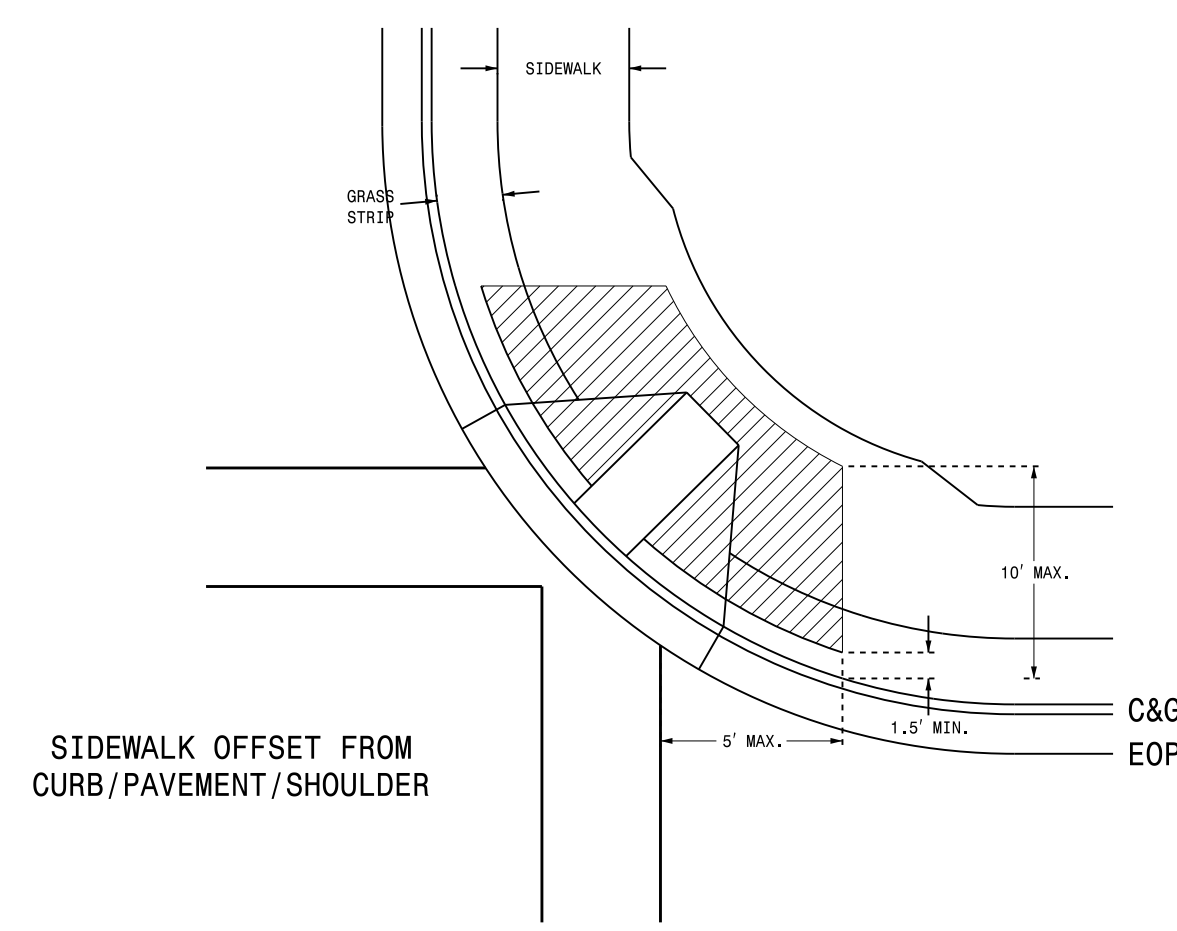
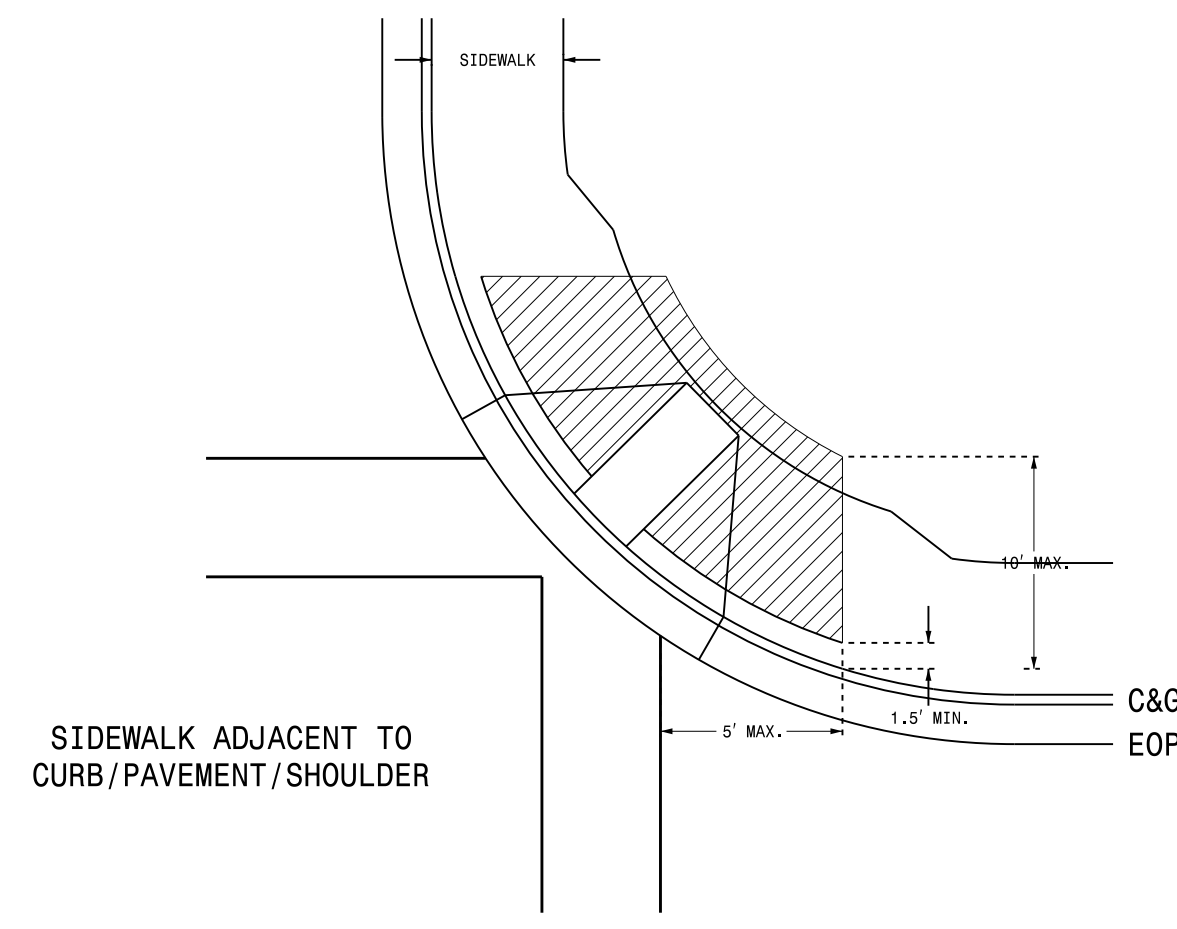
ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

SHEET 1 OF 3
1705D01

PUSHBUTTON PLACEMENT
SEPARATE CURB RAMPS



PUSHBUTTON PLACEMENT
SHARED CURB RAMP



NOTES

1. Pushbutton pedestals should not be located further than 10 feet from the edge of curb, shoulder, or pavement.
2. The face of the pushbutton should be parallel to the applicable crosswalk.
3. Separate pushbuttons used on the same corner should be separated by a distance of at least 10 feet.
4. Pushbuttons shall be installed adjacent to a level surface with a maximum reach distance of 10 inches.
5. Maintain 4 feet of clearance around pedestal if located in sidewalk.
6. Refer to section 1705 of the 2012 NCDOT Roadway Standard Drawings for Pushbutton Assembly details.
7. Refer to section 1743 of the 2012 NCDOT Roadway Standard Drawings for Pedestal details.
8. Contact Division Traffic Engineer for pushbutton location approval prior to installation.
9. Curb ramps are for symbolic use only and may not reflect actual design or field conditions.

LEGEND

- PROPOSED
- Signal Pole
 - Type I Pushbutton Post
 - Type II Signal Pedestal
 - Pushbutton & Sign
 - Pedestrian Signal Head
 - Curb Ramp
 - Pushbutton Location Area

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

06-14

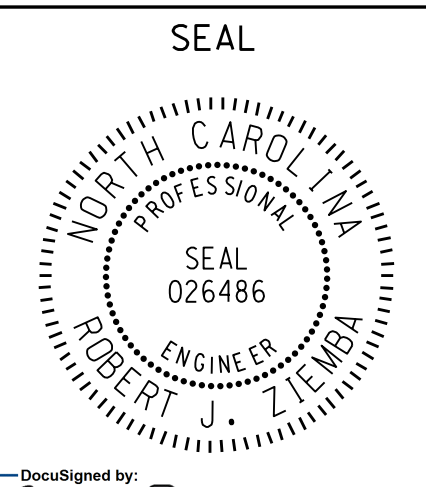
ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

SHEET 1 OF 3
1705D01

See Plate for Title



750 N. Greenfield Parkway
Garner, NC 27529



DocuSigned by:
Robert J. Ziemba
6/17/2014
DATE

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

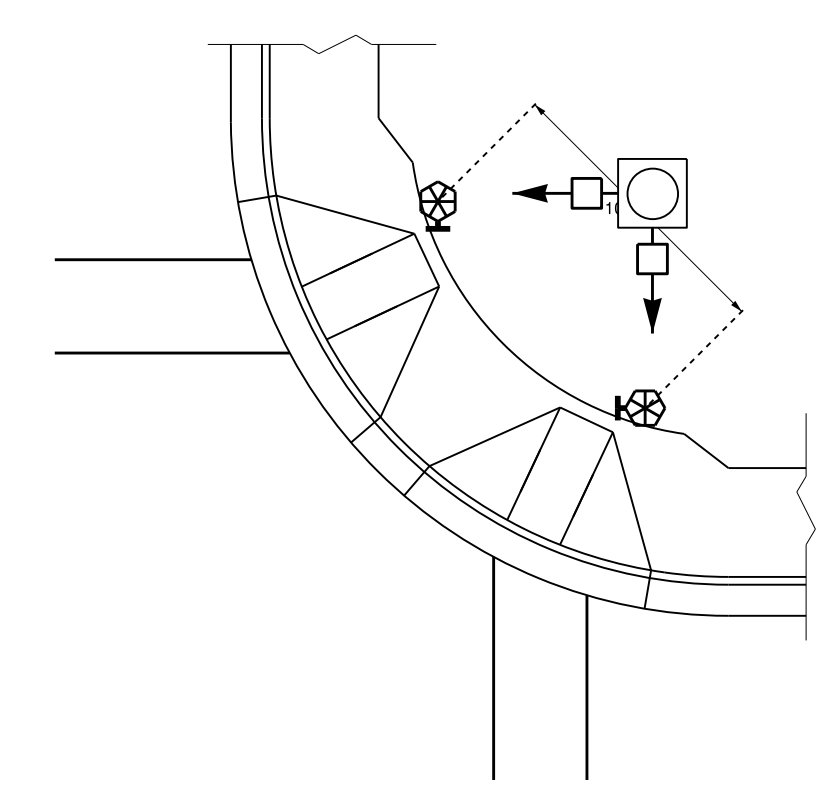
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ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

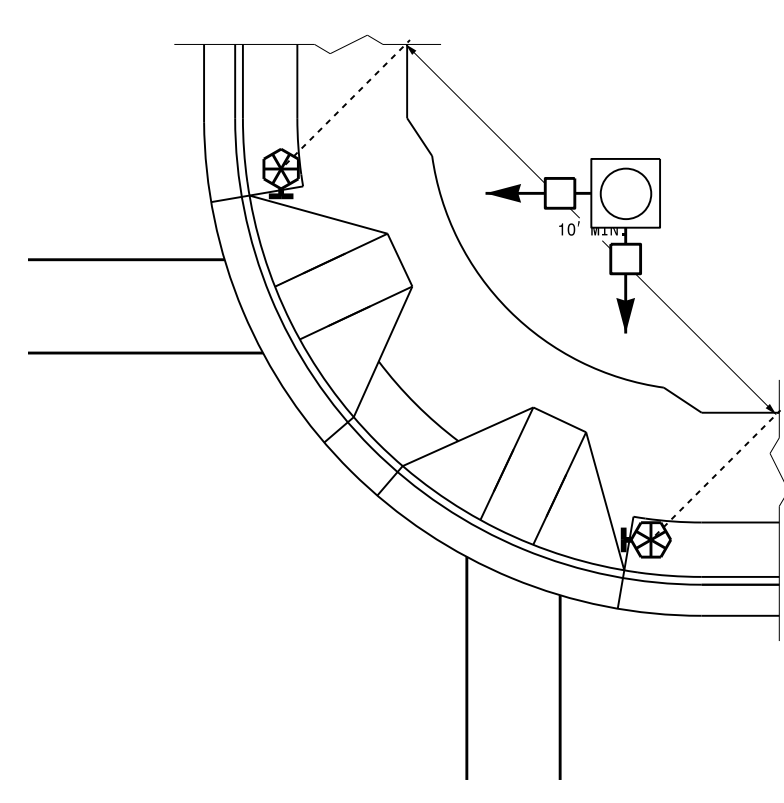
SHEET 2 OF 3
1705D01

TYPICAL PUSHBUTTON LOCATIONS (CASE I)

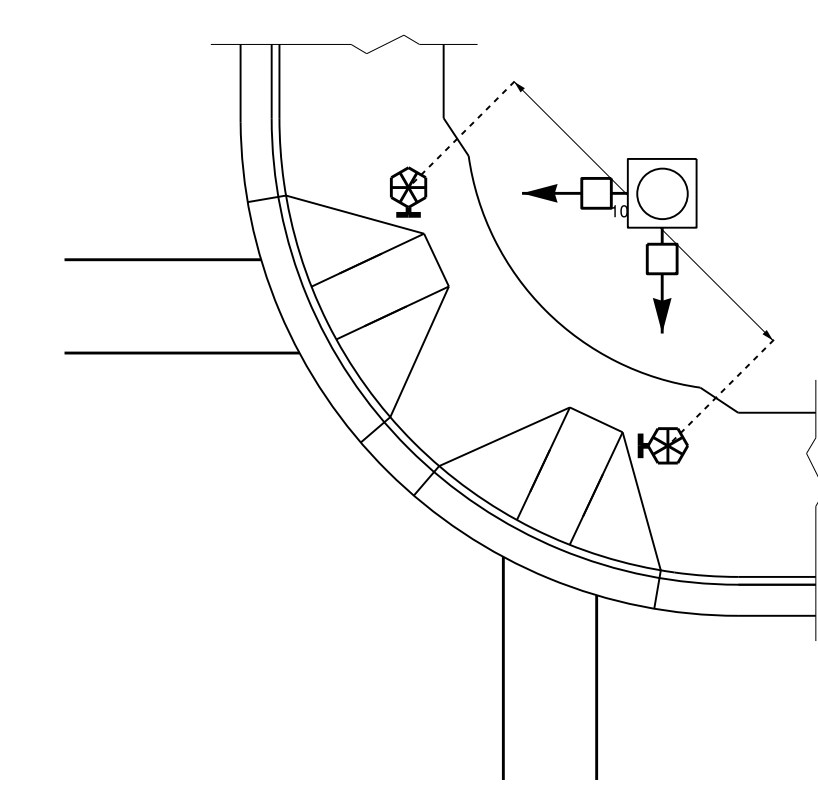
SEPARATE CURB RAMPS W/ TYPE I PEDESTALS



BACK OF SIDEWALK IS WITHIN 10'
OF CURB OR PAVEMENT/SHOULDER



GRASS STRIP PLACEMENT IF BACK
OF SIDEWALK EXCEEDS 10' FROM
CURB OR PAVEMENT/SHOULDER

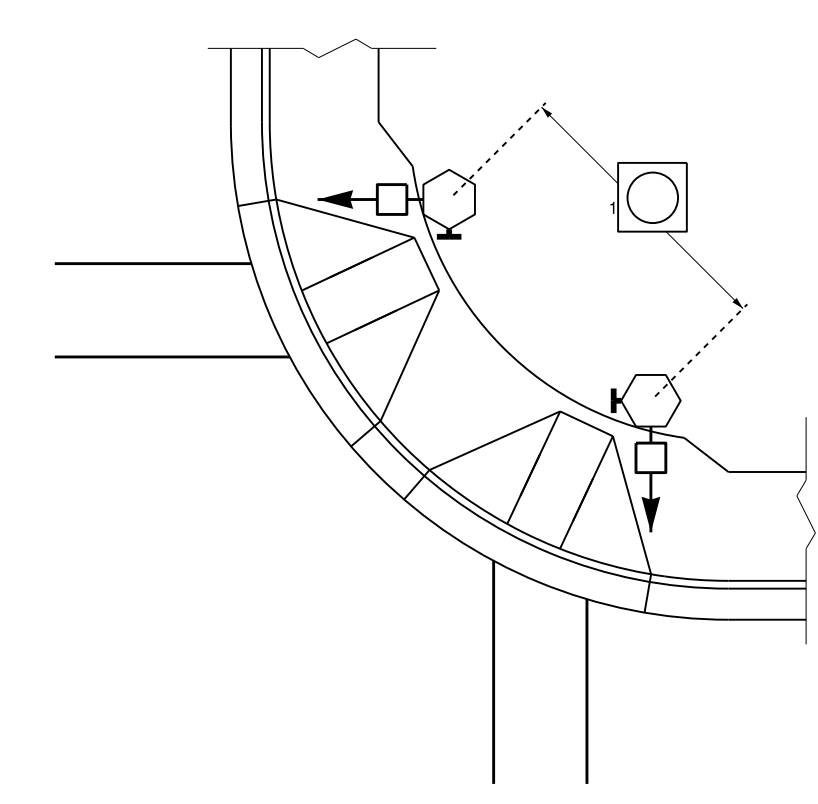


PUSHBUTTON PLACEMENT
IN WIDE SIDEWALK

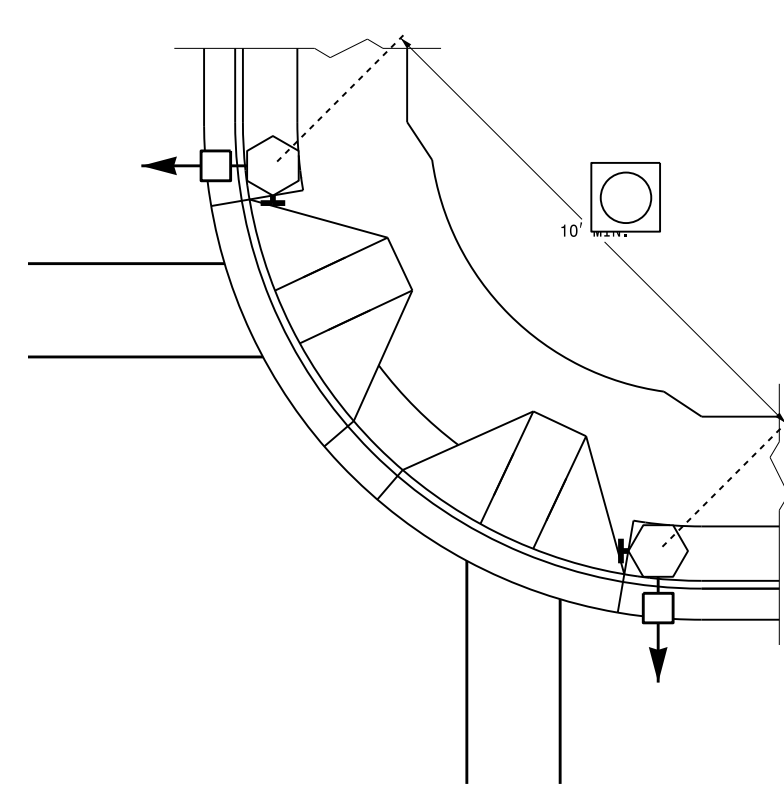
- PROPOSED**
- Signal Pole
 - Type I Pushbutton Post
 - Type II Signal Pedestal
 - Pushbutton & Sign
 - Pedestrian Signal Head
 - Curb Ramp
 - Pushbutton Location Area
- LEGEND**

TYPICAL PUSHBUTTON LOCATIONS (CASE II)

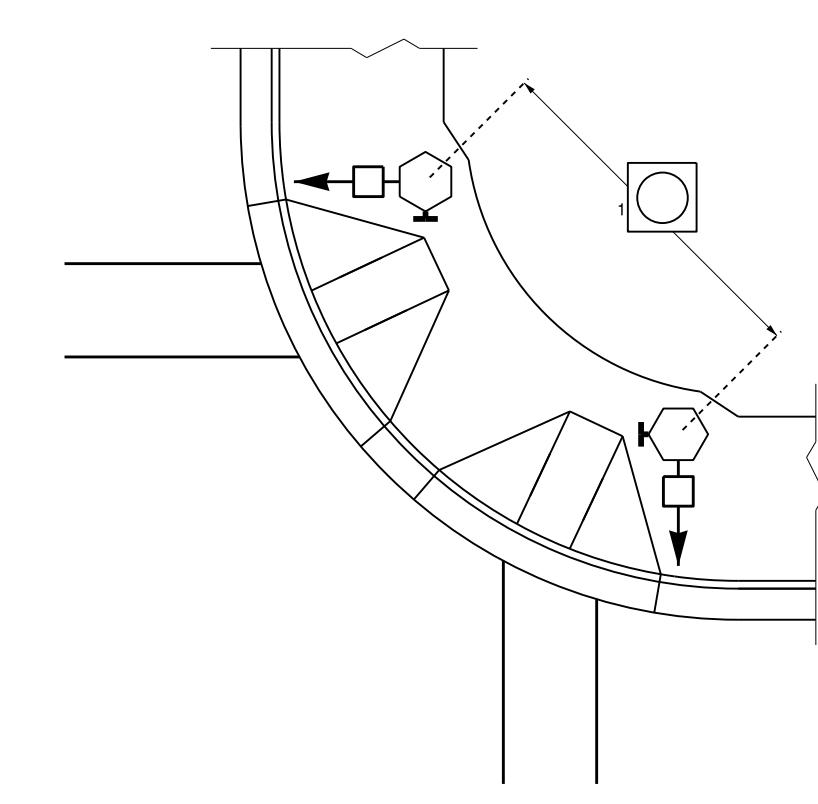
SEPARATE CURB RAMPS W/ TYPE II PEDESTALS



BACK OF SIDEWALK IS WITHIN 10'
OF CURB OR PAVEMENT/SHOULDER



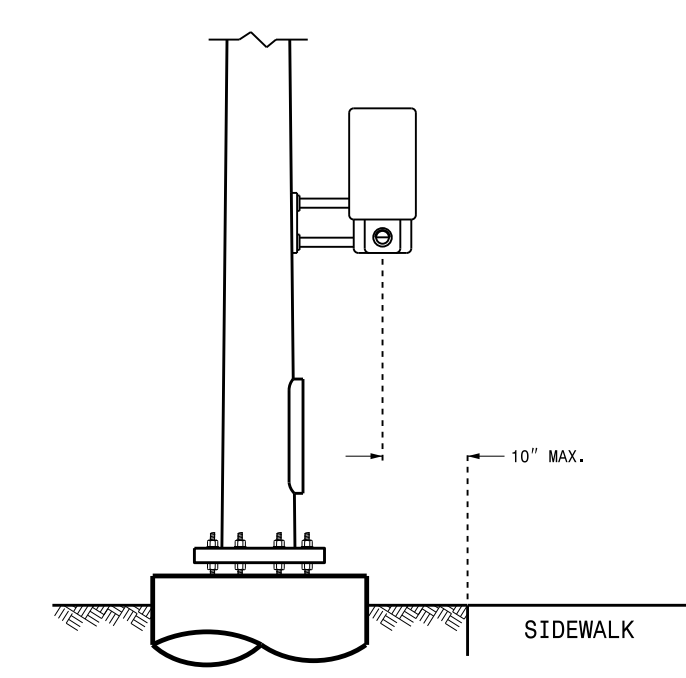
GRASS STRIP PLACEMENT IF BACK
OF SIDEWALK EXCEEDS 10' FROM
CURB OR PAVEMENT/SHOULDER



PUSHBUTTON PLACEMENT
IN WIDE SIDEWALK

OPTIONAL PUSHBUTTON EXTENSION

FACE OF PUSHBUTTON PARALLEL TO
APPLICABLE CROSSWALK



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

06-14

ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

SHEET 2 OF 3
1705D01

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See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

DocuSigned by:
Robert J. Ziemba
6/17/2014
DATE

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

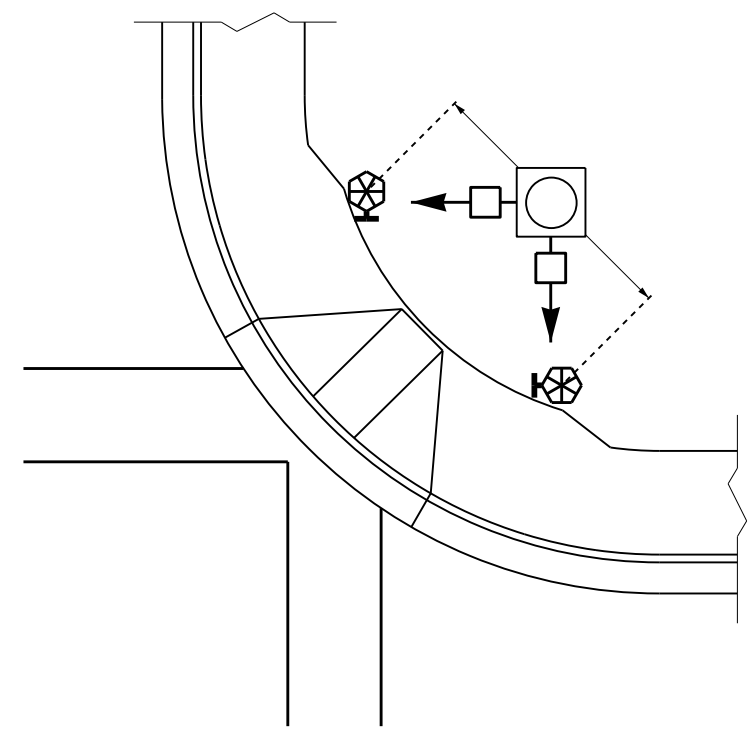
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ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

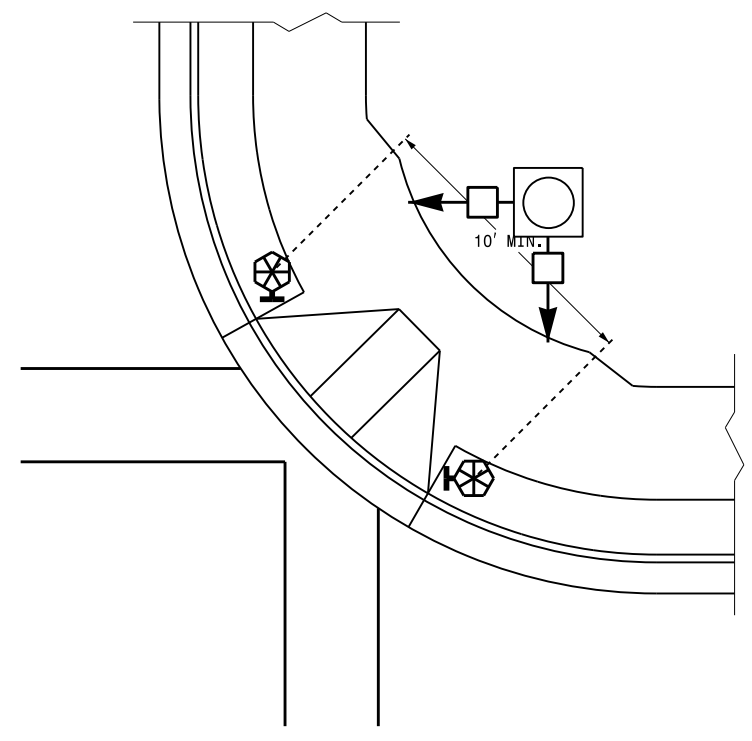
SHEET 3 OF 3
1705D01

TYPICAL PUSHBUTTON LOCATIONS (CASE III)

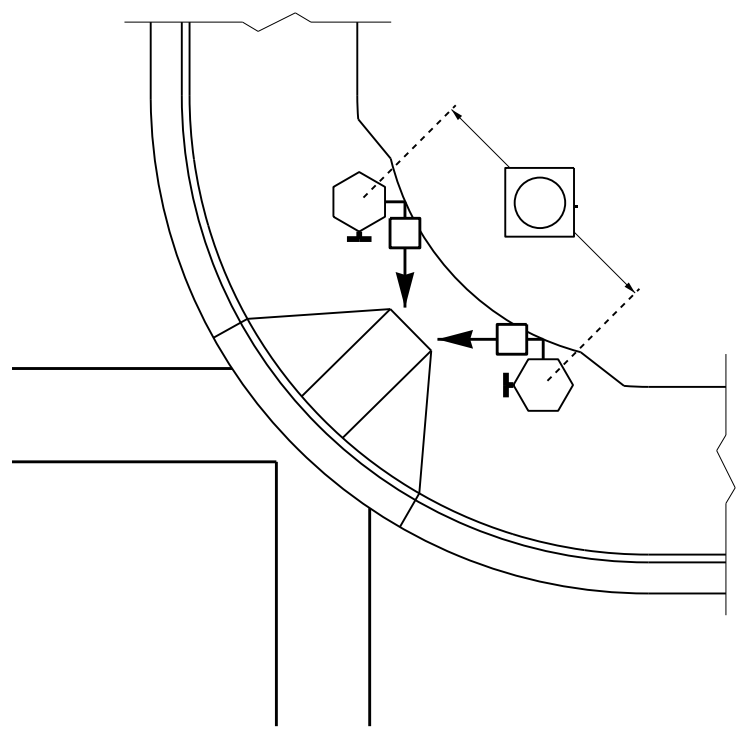
SHARED CURB RAMPS



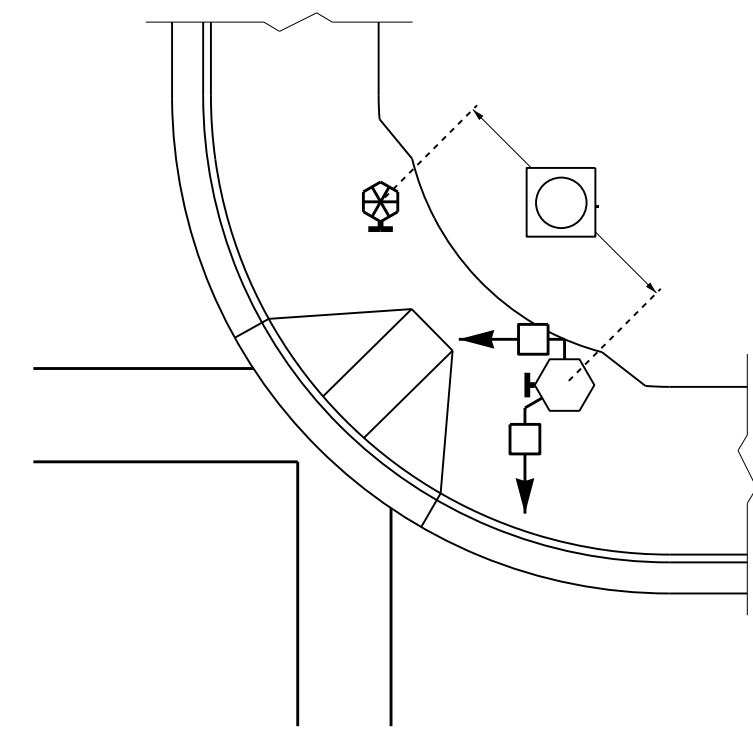
BACK OF SIDEWALK IS WITHIN 10' OF CURB OR PAVEMENT/SHOULDER



GRASS STRIP PLACEMENT IF BACK OF SIDEWALK EXCEEDS 10' FROM CURB OR PAVEMENT/SHOULDER

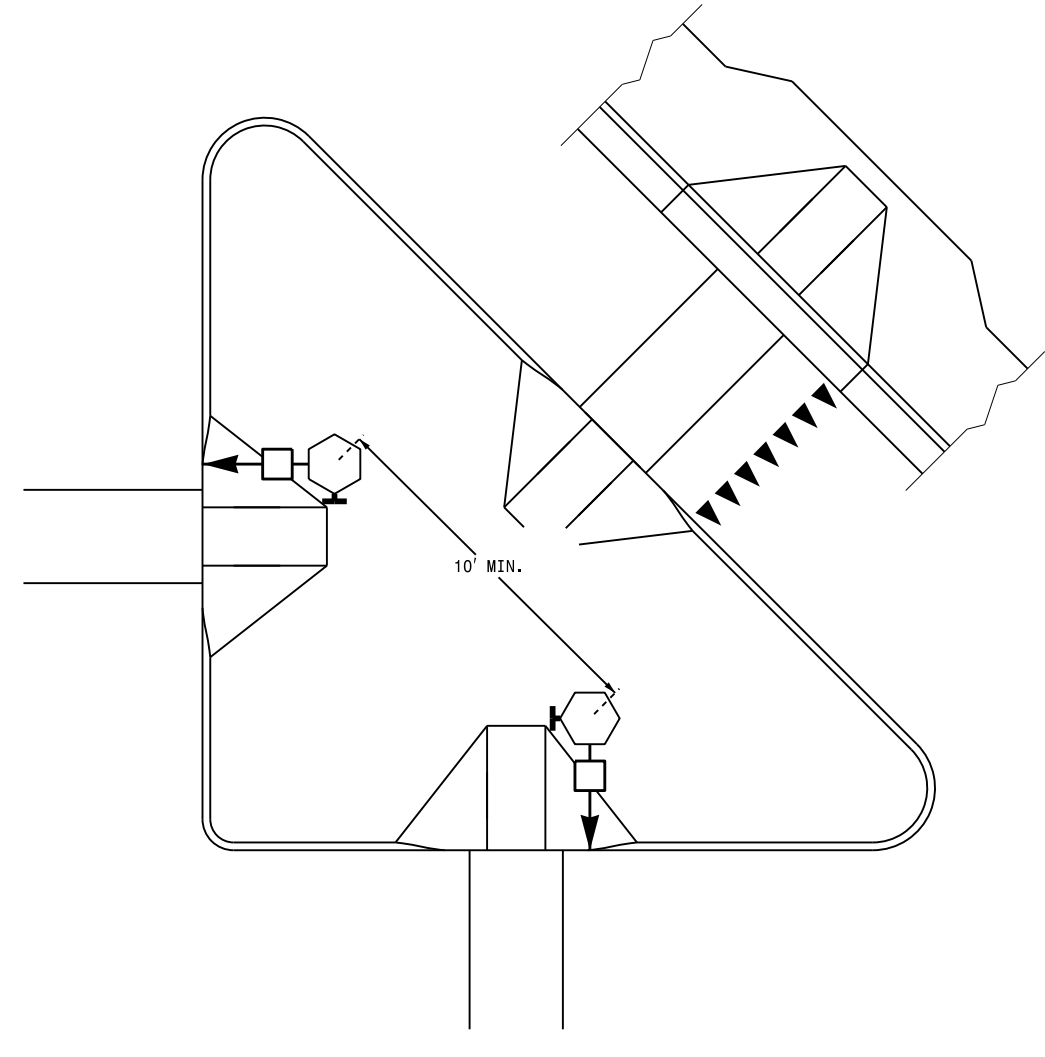


PUSHBUTTON PLACEMENT IN WIDE SIDEWALK (CORRESPONDING PUSHBUTTONS AND SIGNAL HEADS ON DIFFERENT PEDESTALS)

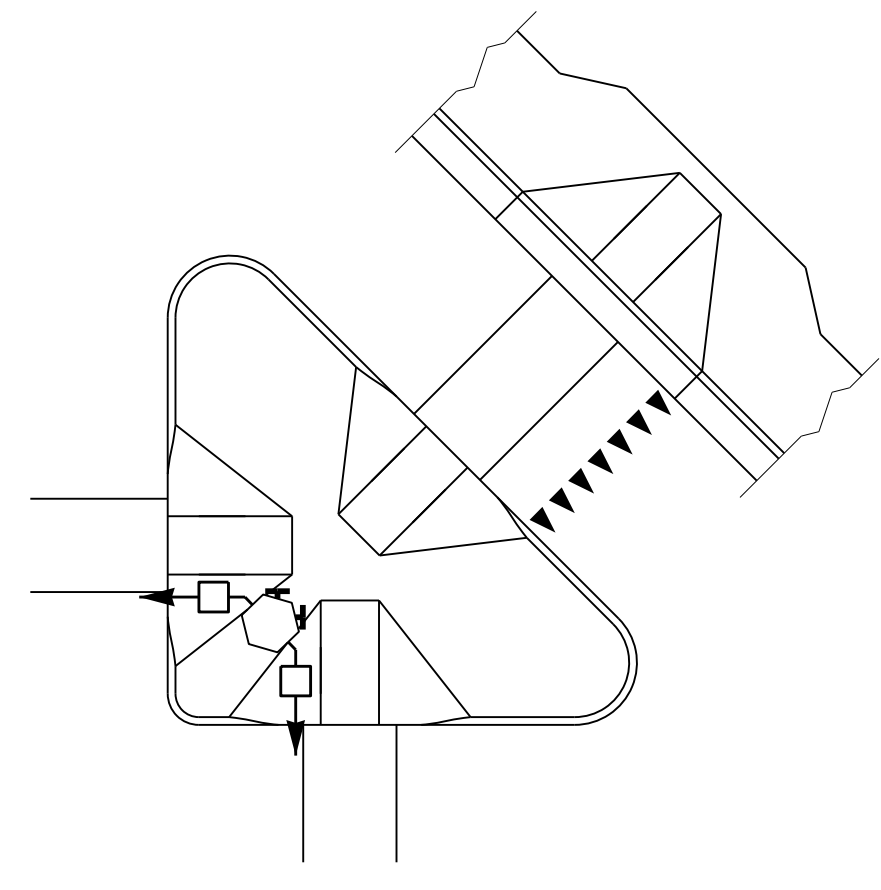


PUSHBUTTON PLACEMENT WITH SHARED TYPE II SIGNAL PEDESTAL AND TYPE I PUSHBUTTON POST

TRAFFIC ISLAND PUSHBUTTON LOCATIONS



PUSHBUTTON PLACEMENT IN LARGE "PORK CHOP ISLAND" WITH SEPARATE PEDESTALS



PUSHBUTTON PLACEMENT IN SMALL "PORK CHOP ISLAND" WITH SHARED PEDESTAL

PUSHBUTTON PLACEMENT IN MEDIAN

TYPE II PEDESTAL (FOR STAGED OR MULTI-PHASE CROSSING)

TYPE I PEDESTAL (FOR COMPLETE CROSSING CURB TO CURB WITH OPTIONAL REFUGE)

PROPOSED

	Signal Pole
	Type I Pushbutton Post
	Type II Signal Pedestal
	Pushbutton & Sign
	Pedestrian Signal Head
	Curb Ramp
	Pushbutton Location Area

LEGEND

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

06-14

ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

SHEET 3 OF 3
1705D01

See Plate for Title

Prepared in the Offices of:

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Garner, NC 27529

SEAL

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ENGINEER
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DocuSigned by:

6/17/2014
DATE

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