

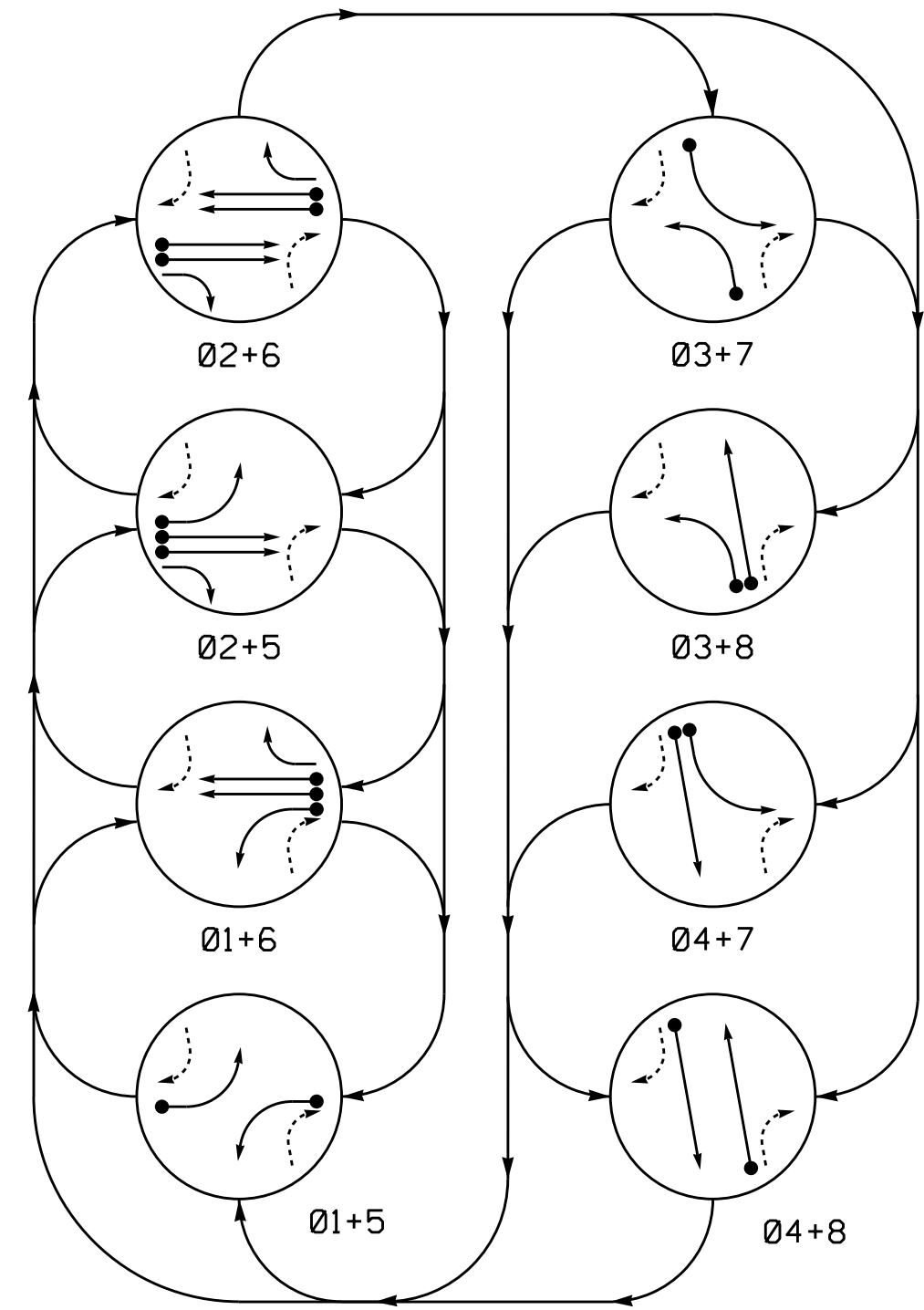
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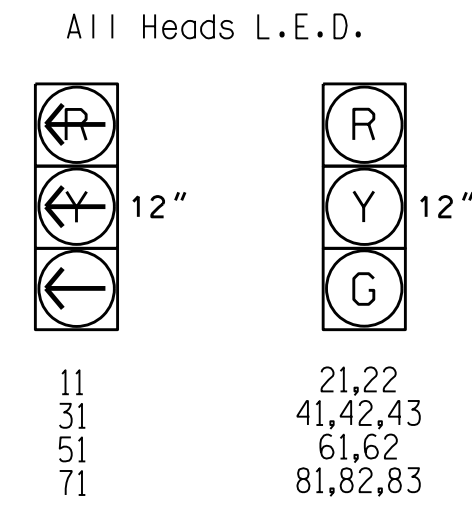
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**PHASING DIAGRAM**



**SIGNAL FACE I.D.**



**TABLE OF OPERATION**

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

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME		
1A	6X60	0	*	*	1	Y	Y	-	-	3	-
2A	6X6	300	*	*	2	Y	Y	-	-	-	-
2B	6X6	300	*	*	2	Y	Y	-	-	-	-
2C	6X60	0	*	*	2	Y	Y	Y	2.0	5	-
2D	6X60	0	*	*	2	Y	Y	Y	2.0	5	-
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-
4A	6X60	0	*	*	4	Y	Y	-	-	-	-
5A	6X60	0	*	*	5	Y	Y	-	-	3	-
6A	6X6	300	*	*	6	Y	Y	-	-	-	-
6B	6X6	300	*	*	6	Y	Y	-	-	-	-
6C	6X60	0	*	*	6	Y	Y	Y	2.0	5	-
6D	6X60	0	*	*	6	Y	Y	Y	2.0	5	-
7A	6X60	0	*	*	7	Y	Y	-	-	-	-
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-

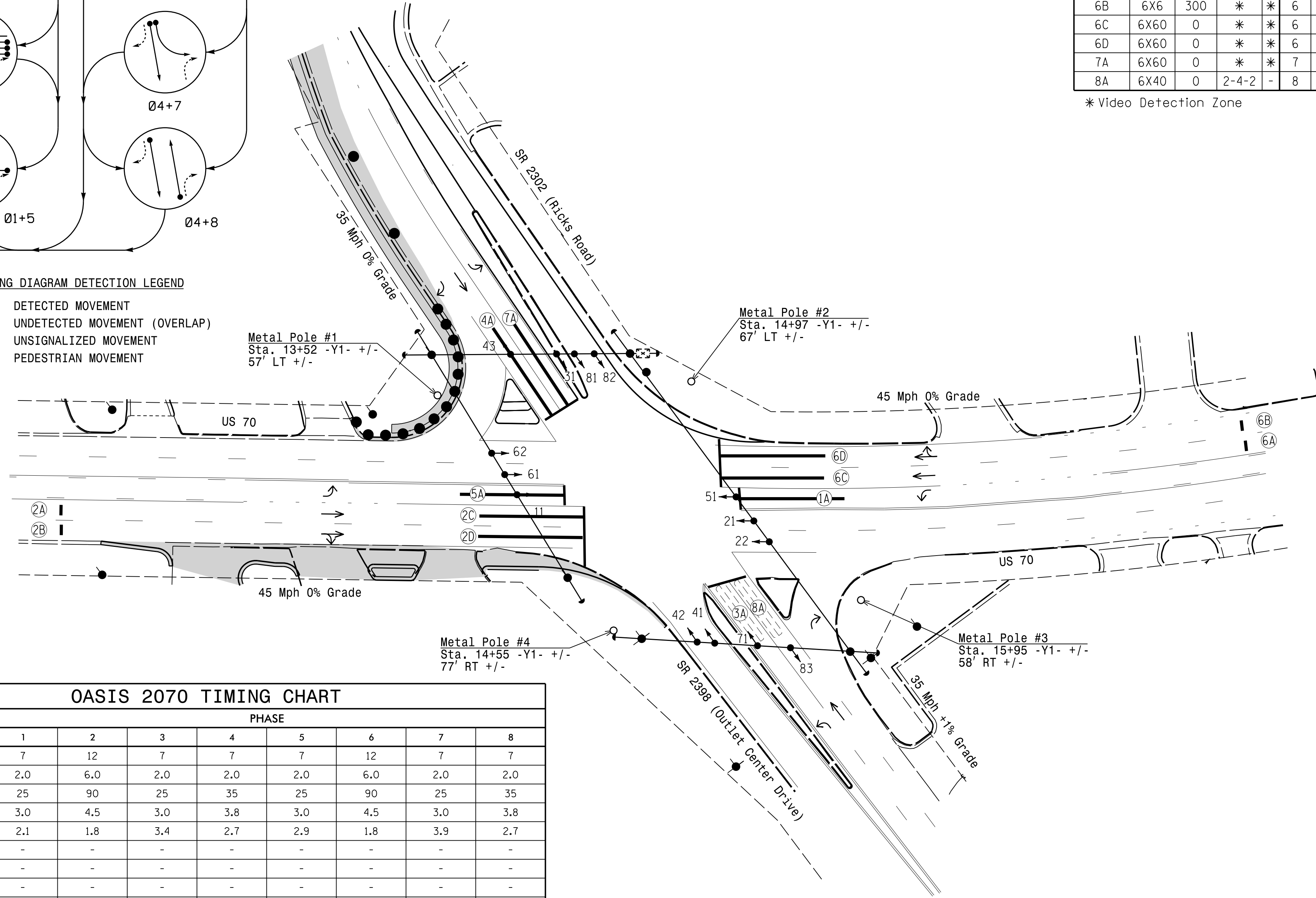
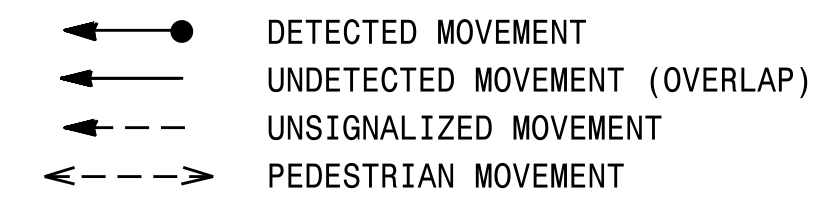
\* Video Detection Zone

8 Phase Fully Actuated US 70 (Selma) CLS

**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 signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Closed loop system data: Master Asset #, Controller Asset #0383.

**PHASING DIAGRAM DETECTION LEGEND**

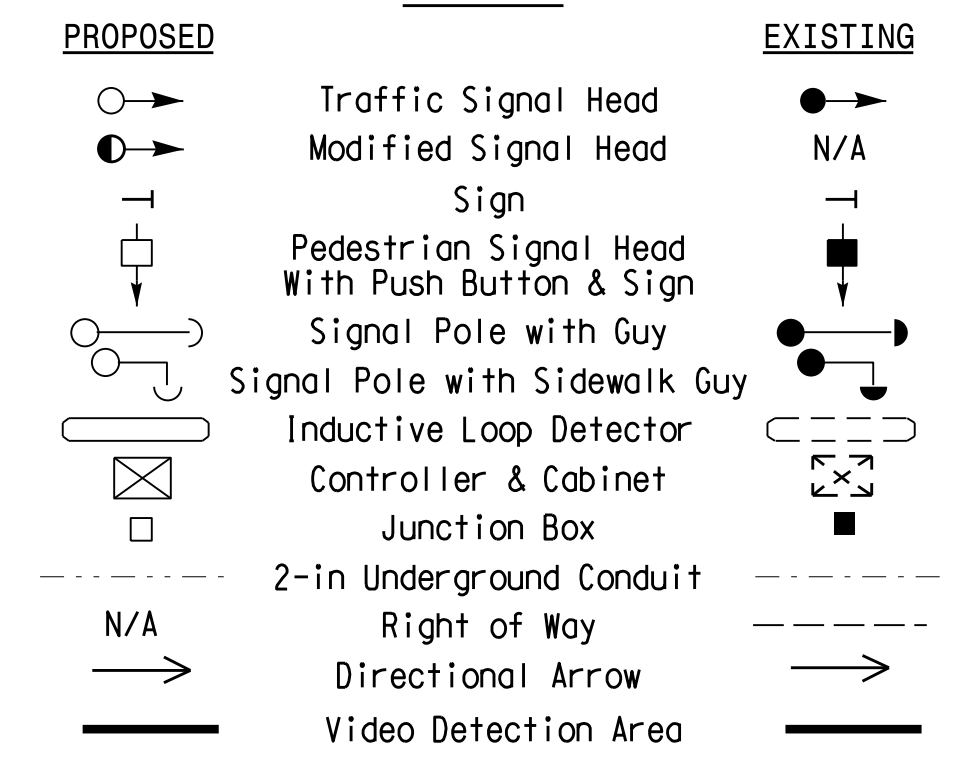


**OASIS 2070 TIMING CHART**

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	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	25	90	25	35	25	90	25	35
Yellow Clearance	3.0	4.5	3.0	3.8	3.0	4.5	3.0	3.8
Red Clearance	2.1	1.8	3.4	2.7	2.9	1.8	3.9	2.7
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
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.

**LEGEND**



Signal Upgrade - TCP Phase I

Prepared in the Offices of:  
  
 750 N. Greenfield Pkwy, Garner, NC 27529

US 70 at SR 2302 (Ricks Road) / SR 2398 (Outlet Center Drive)  
 Division 4 Johnston County Selma

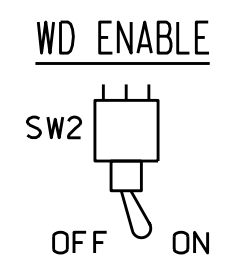
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 PREPARED BY: JPG REVIEWED BY:

REVISIONS: \_\_\_\_\_ INIT. DATE

SEAL: JASON P. GALLAWAY, ENGINEER, No. 029904, State of North Carolina  
 Date: 9/13/2017

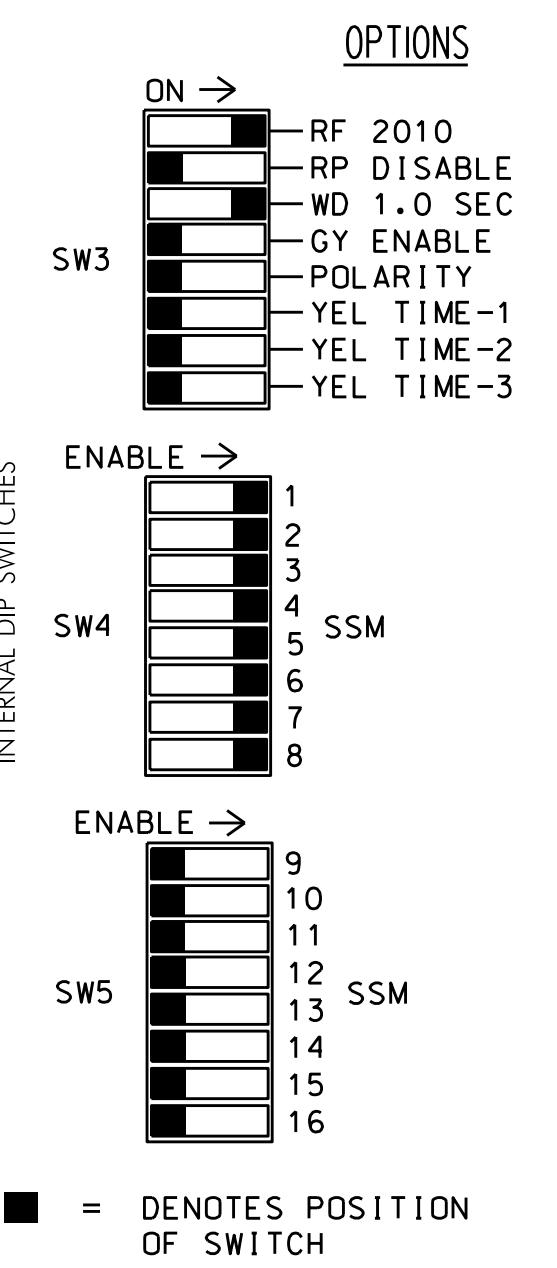
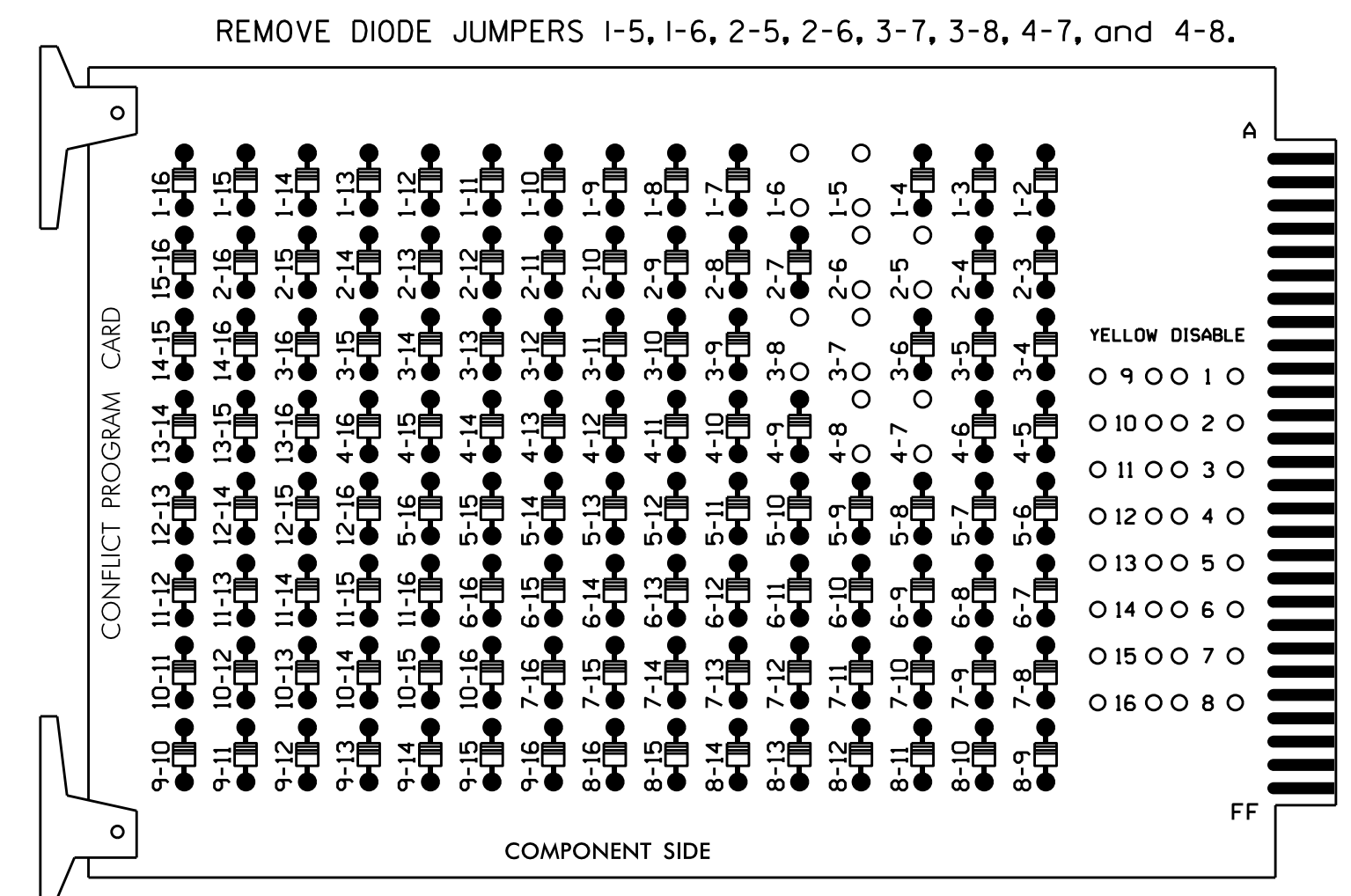
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 SIG. INVENTORY NO. 04-038311

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**EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



**NOTES:**

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Gap Reduction.
5. Program phases 2 and 6 for Startup In Green.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the US 70 (Selma) Closed Loop System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	41,42 43	NU	51	61,62	NU	71	81,82 83	NU
RED		128			101			134				107
YELLOW		129			102			135				108
GREEN		130			103			136				109
RED ARROW	125			116			131			122		
YELLOW ARROW	126			117			132			123		
GREEN ARROW	127			118			133			124		

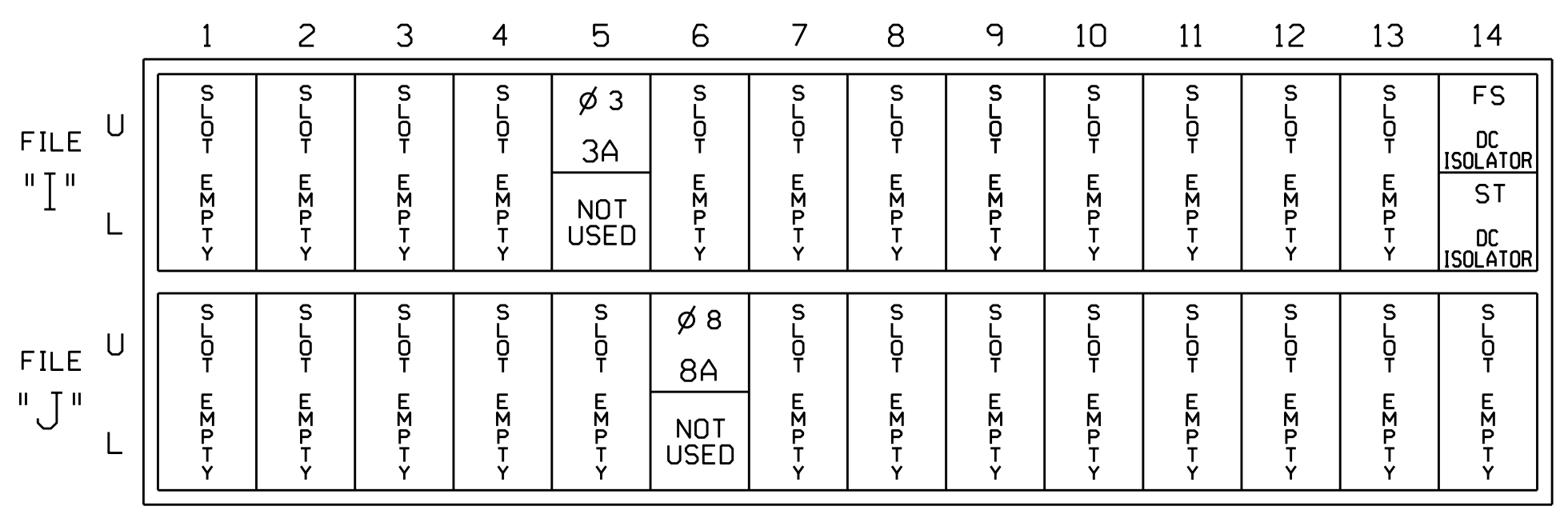
NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....2070  
 CABINET.....332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAPS.....NONE

**INPUT FILE POSITION LAYOUT**

(front view)



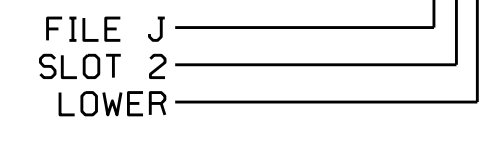
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3A	TB4-5,6	15U	58	20	3	3	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

**INPUT FILE POSITION LEGEND: J2L**



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0383T1  
 DESIGNED: August 2017  
 SEALED: 9/13/17  
 REVISED: N/A

**SPECIAL DETECTOR NOTE**

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans for the following zones:

- 1A, 2A, 2B, 2C, 2D, 4A, 5A, 6A, 6B, 6C, 6D, and 7A.

Electrical Detail - Temporary 1 - TCP Phase I

Electrical and Programming Details for: **US 70 at SR 2302 (Ricks Road)/ SR 2398 (Outlet Center Drive)**

Division 4 Johnston County Selma

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

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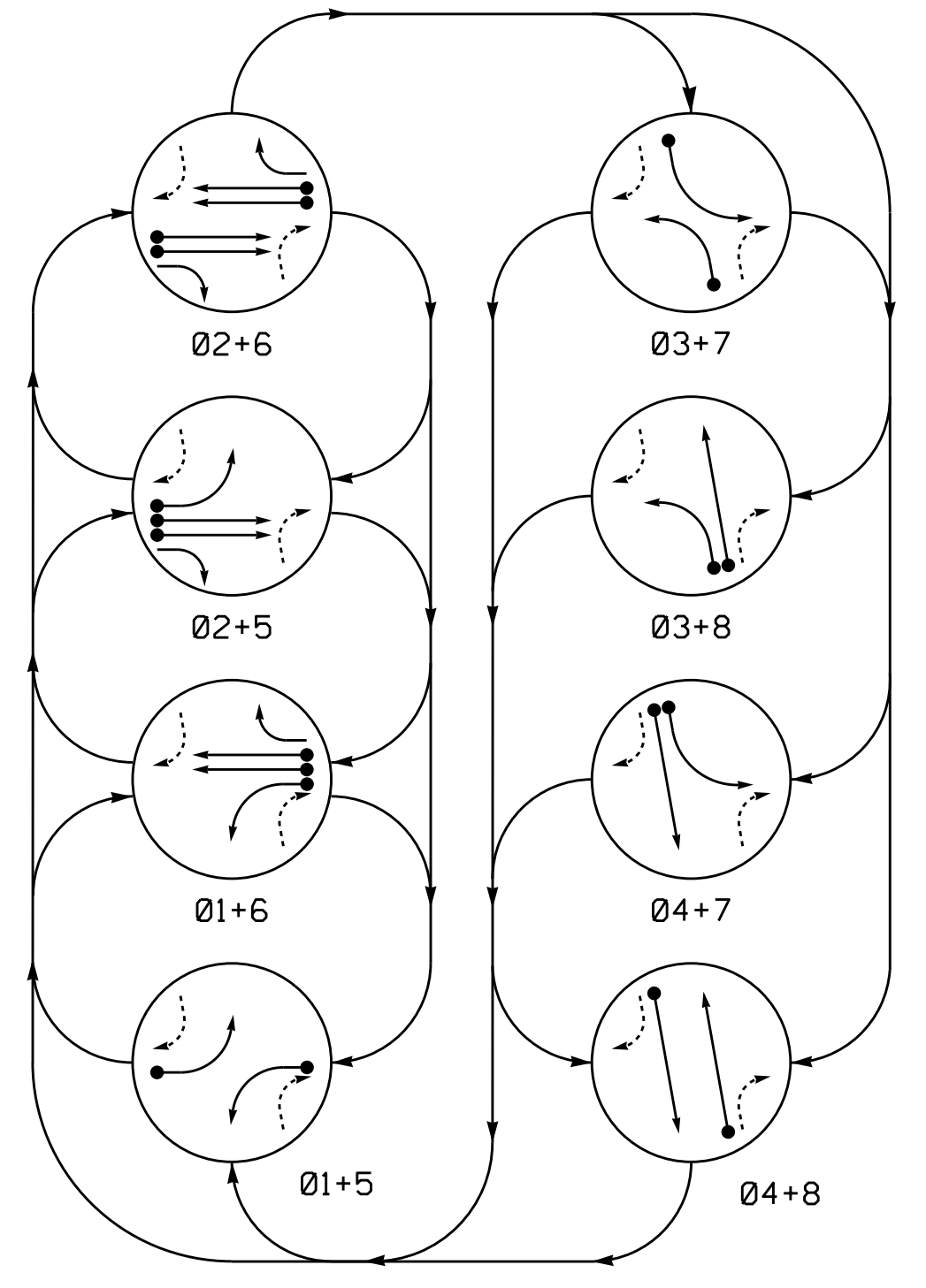
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER KEITH M. MINIS SEAL 036880

DocuSigned by: Keith M. Minis 9/20/2017 2:40:789E8CD3445 DATE

SIG. INVENTORY NO. 04-0383T1

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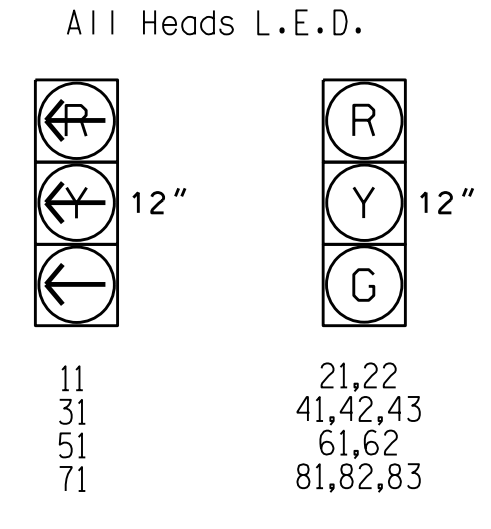
**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

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

**SIGNAL FACE I.D.**



**TABLE OF OPERATION**

SIGNAL FACE	PHASE								FLASH
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 3+7	Ø 3+8	Ø 4+7	Ø 4+8	
11	---	---	---	---	---	---	---	---	---
21,22	R	R	G	G	R	R	R	R	Y
31	---	---	---	---	---	---	---	---	---
41,42,43	R	R	R	R	R	R	G	G	R
51	---	---	---	---	---	---	---	---	---
61,62	R	G	R	G	R	R	R	R	Y
71	---	---	---	---	---	---	---	---	---
81,82,83	R	R	R	R	R	G	R	G	R

**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

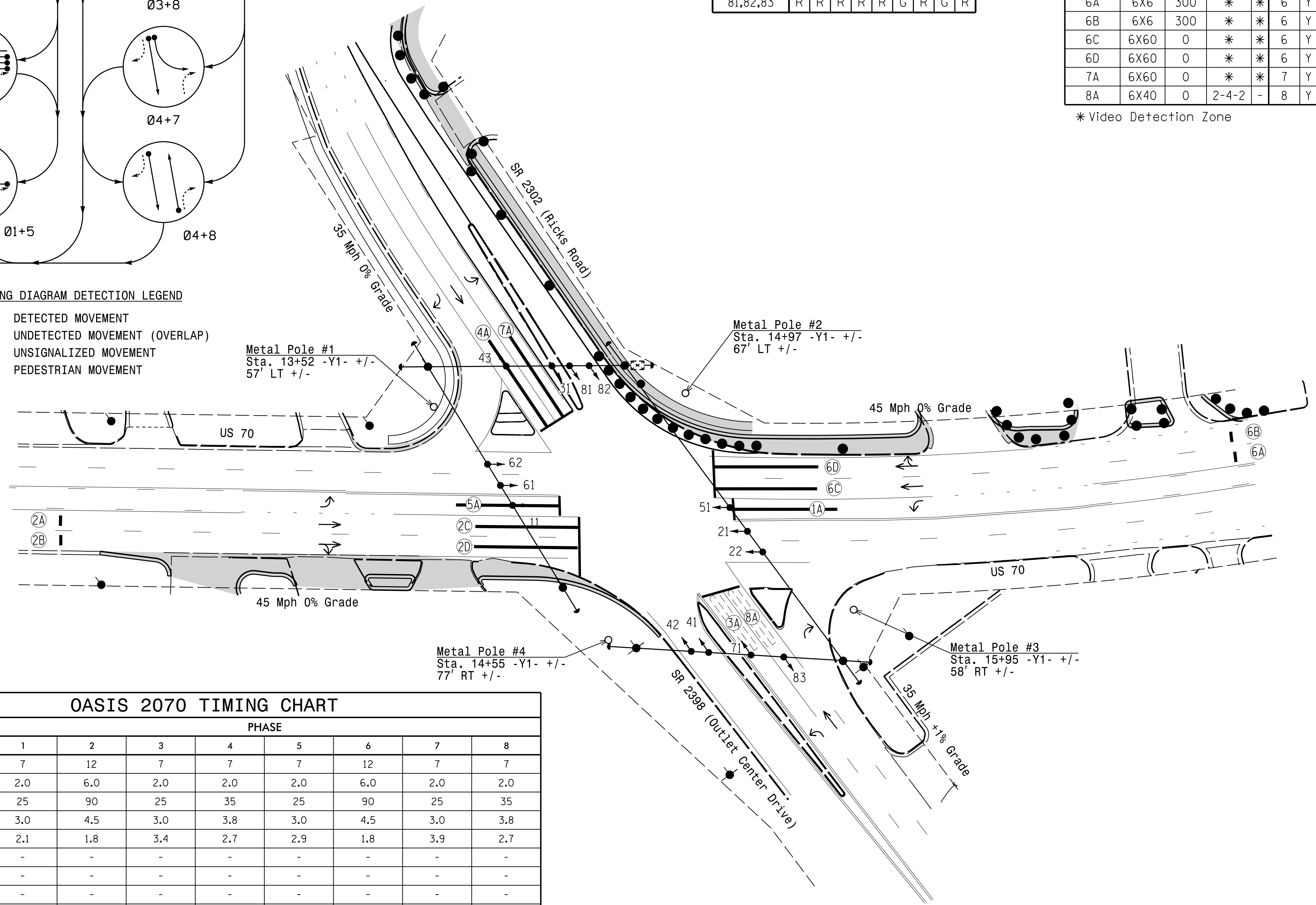
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			
1A	6X60	0	*	*	1	Y	Y	-	-	3	-
2A	6X6	300	*	*	2	Y	Y	-	-	-	-
2B	6X6	300	*	*	2	Y	Y	-	-	-	-
2C	6X60	0	*	*	2	Y	Y	2.0	5	-	-
2D	6X60	0	*	*	2	Y	Y	2.0	5	-	-
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-
4A	6X60	0	*	*	4	Y	Y	-	-	-	-
5A	6X60	0	*	*	5	Y	Y	-	-	3	-
6A	6X6	300	*	*	6	Y	Y	-	-	-	-
6B	6X6	300	*	*	6	Y	Y	-	-	-	-
6C	6X60	0	*	*	6	Y	Y	2.0	5	-	-
6D	6X60	0	*	*	6	Y	Y	2.0	5	-	-
7A	6X60	0	*	*	7	Y	Y	-	-	-	-
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-

\* Video Detection Zone

**8 Phase Fully Actuated US 70 (Selma) CLS**

**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.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #, Controller Asset #0383.



**OASIS 2070 TIMING CHART**

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	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	25	90	25	35	25	90	25	35
Yellow Clearance	3.0	4.5	3.0	3.8	3.0	4.5	3.0	3.8
Red Clearance	2.1	1.8	3.4	2.7	2.9	1.8	3.9	2.7
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
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.

**LEGEND**

- |  |   |  |   |
|--|---|--|---|
|  | PROPOSED Traffic Signal Head                            |  | EXISTING Traffic Signal Head                            |
|  | PROPOSED Modified Signal Head                           |  | EXISTING N/A  |
|  | PROPOSED Sign   |  | EXISTING Sign   |
|  | PROPOSED Pedestrian Signal Head With Push Button & Sign |  | EXISTING Pedestrian Signal Head With Push Button & Sign |
|  | PROPOSED Signal Pole with Guy                           |  | EXISTING Signal Pole with Guy                           |
|  | PROPOSED Signal Pole with Sidewalk Guy                  |  | EXISTING Signal Pole with Sidewalk Guy                  |
|  | PROPOSED Inductive Loop Detector                        |  | EXISTING Inductive Loop Detector                        |
|  | PROPOSED Controller & Cabinet                           |  | EXISTING Controller & Cabinet                           |
|  | PROPOSED Junction Box                                   |  | EXISTING Junction Box                                   |
|  | PROPOSED 2-in Underground Conduit                       |  | EXISTING 2-in Underground Conduit                       |
|  | PROPOSED Right of Way                                   |  | EXISTING Right of Way                                   |
|  | PROPOSED Directional Arrow                              |  | EXISTING Directional Arrow                              |
|  | PROPOSED Video Detection Area                           |  | EXISTING Video Detection Area                           |

**Signal Upgrade - TCP Phase II**

Prepared in the Offices of:  
 Transportation Mobility and Safety Division  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

**US 70**  
 at  
**SR 2302 (Ricks Road) /**  
**SR 2398 (Outlet Center Drive)**

Division 4 Johnston County Selma

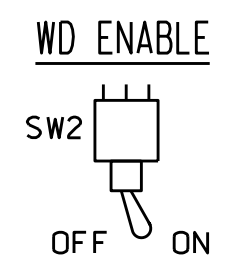
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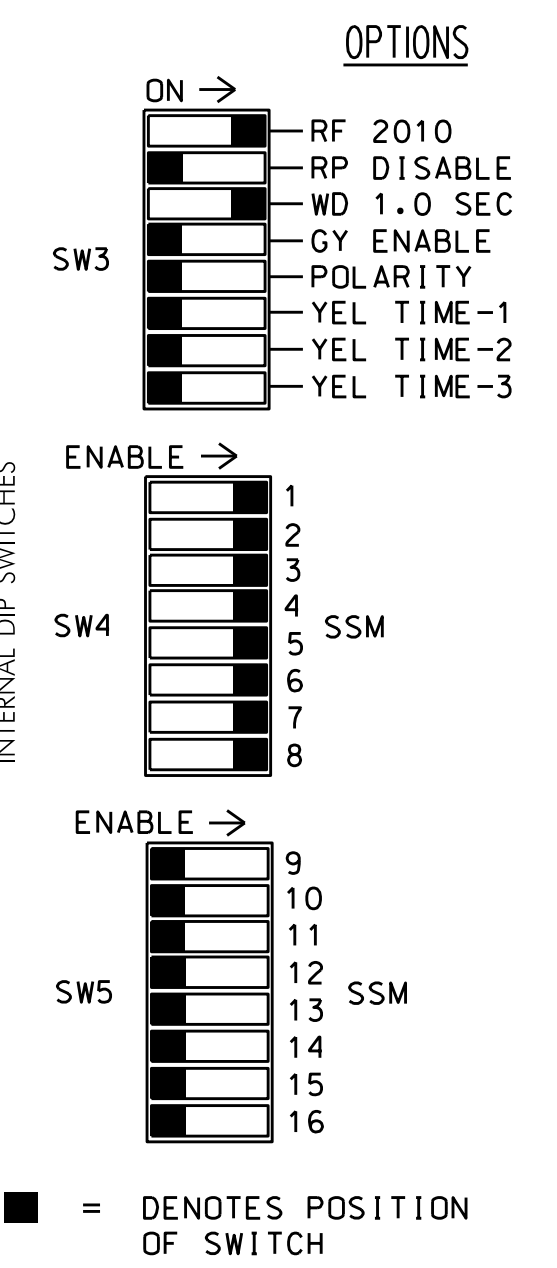
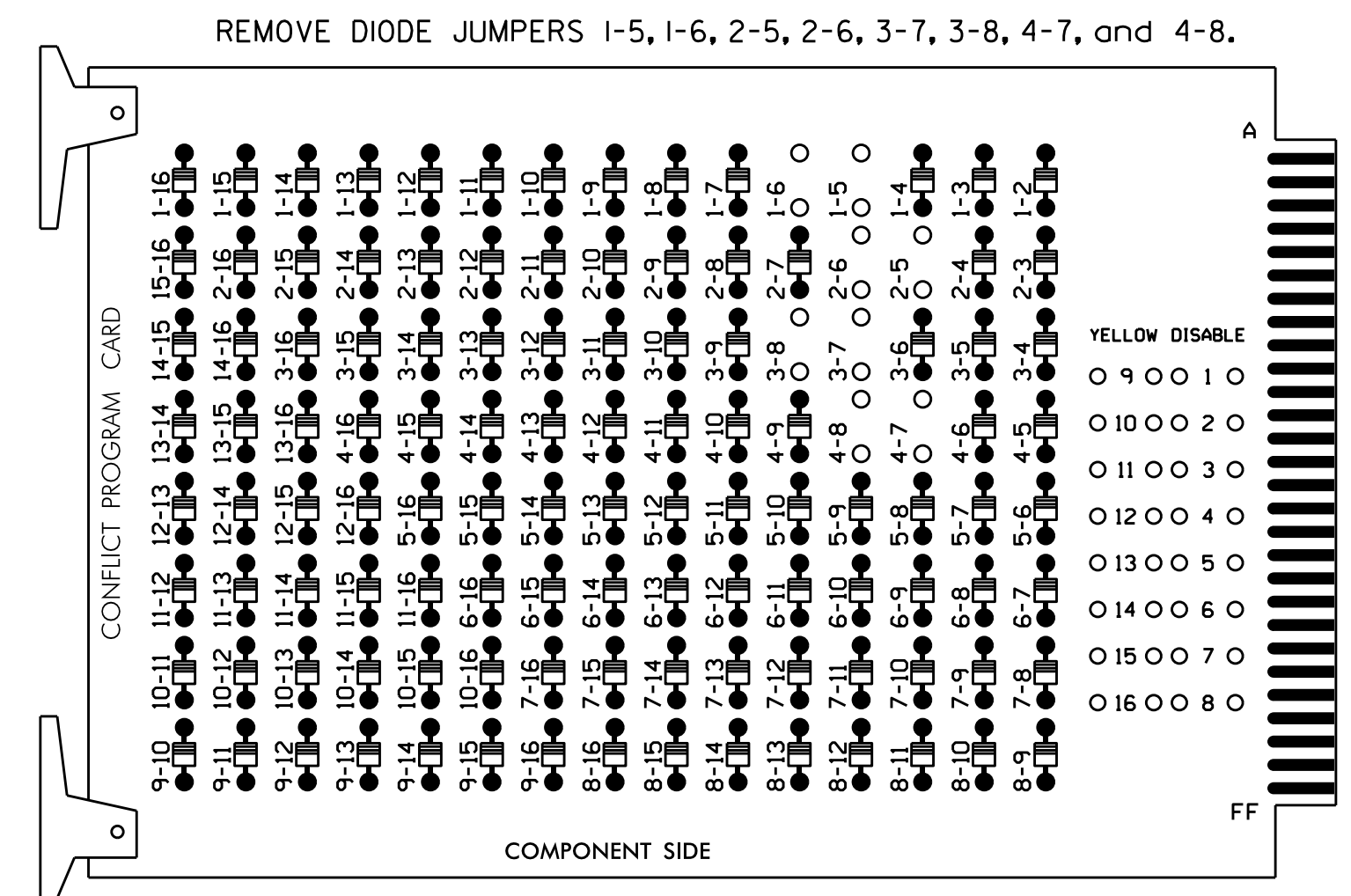
SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 029904  
 JASON P. GALLAWAY  
 DATE 9/13/2017

DATE: 9/13/2017  
 SIG. INVENTORY NO. 04-038312



**EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Make sure jumpers SEL2-SEL5 are present on the monitor board.

**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.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the US 70 (Selma) Closed Loop System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	41,42 43	NU	51	61,62	NU	71	81,82 83	NU
RED		128			101			134				107
YELLOW		129			102			135				108
GREEN		130			103			136				109
RED ARROW	125			116			131			122		
YELLOW ARROW	126			117			132			123		
GREEN ARROW	127			118			133			124		

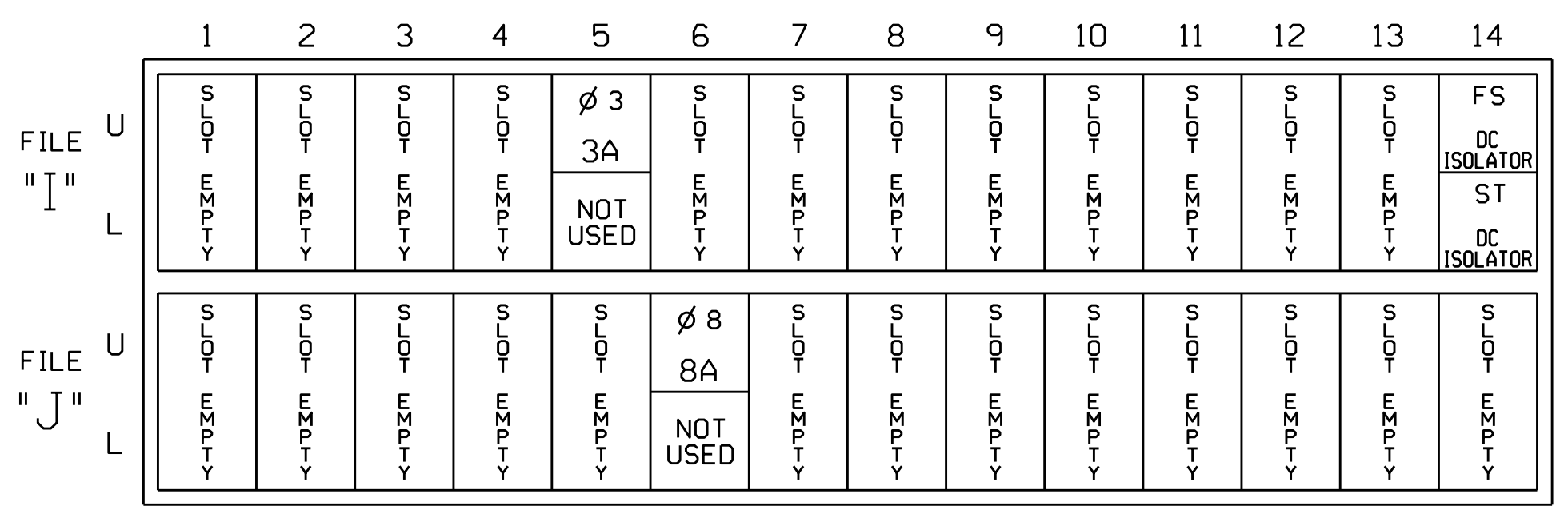
NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....2070  
 CABINET.....332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAPS.....NONE

**INPUT FILE POSITION LAYOUT**

(front view)

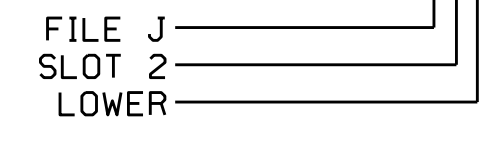


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3A	TB4-5,6	15U	58	20	3	3	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

**INPUT FILE POSITION LEGEND: J2L**



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0383T2  
 DESIGNED: August 2017  
 SEALED: 9/13/17  
 REVISED: N/A

**SPECIAL DETECTOR NOTE**

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans for the following zones:

- 1A, 2A, 2B, 2C, 2D, 4A, 5A, 6A, 6B, 6C, 6D, and 7A.

Electrical Detail - Temporary 2 - TCP Phase II

Prepared In the Offices of:  
 G.L. Transportation, Mobility and Safety Division  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 Signal Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 70 at SR 2302 (Ricks Road)/ SR 2398 (Outlet Center Drive)

Division 4 Johnston County Selma

PLAN DATE: September 2017 REVIEWED BY:  
 PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by:  
 Keith M. Minis 9/20/2017  
 2690766EC03445 DATE

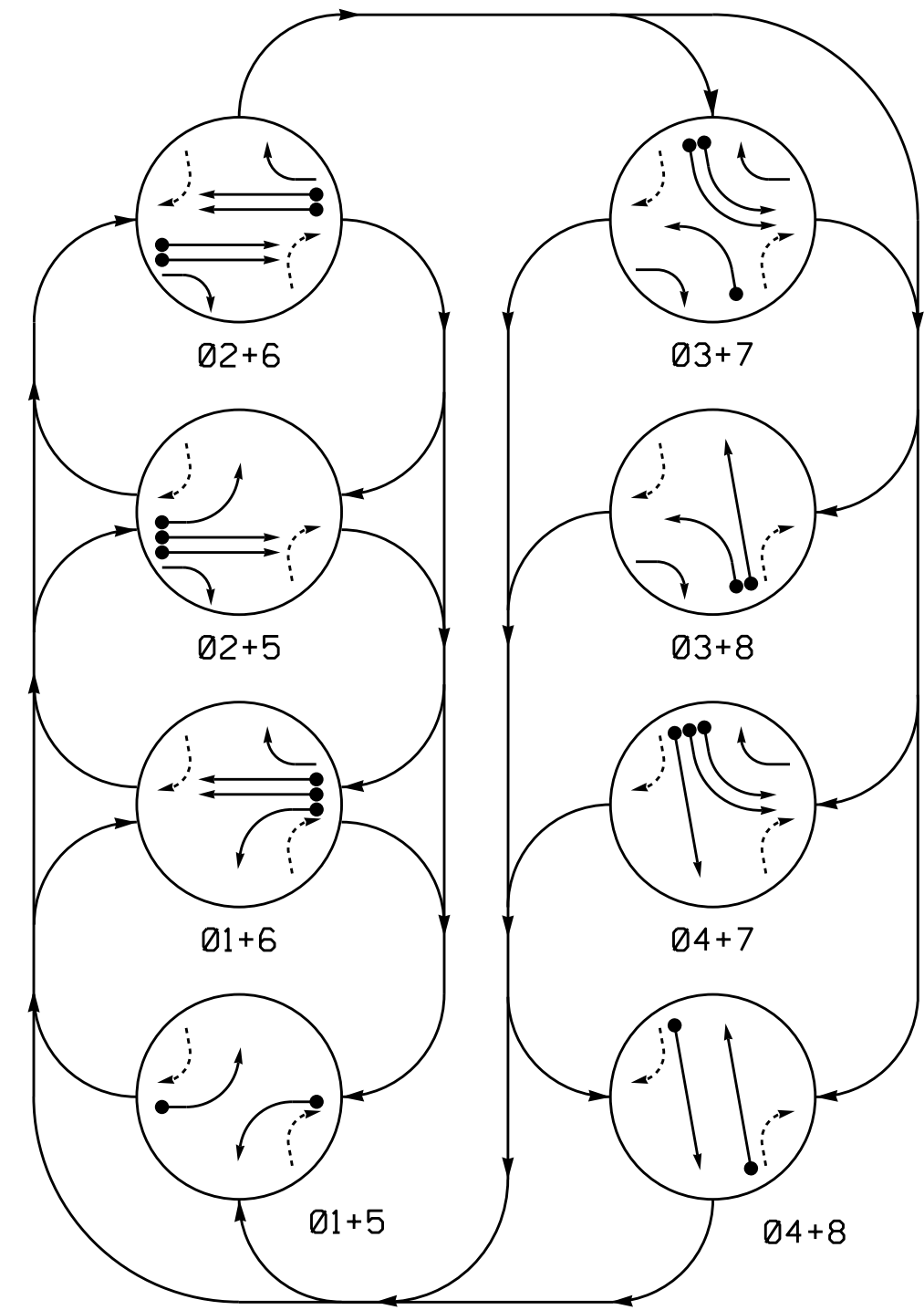
SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 KEITH M. MINIS  
 SEAL 036880

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SIG. INVENTORY NO. 04-0383T2

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**PHASING DIAGRAM**

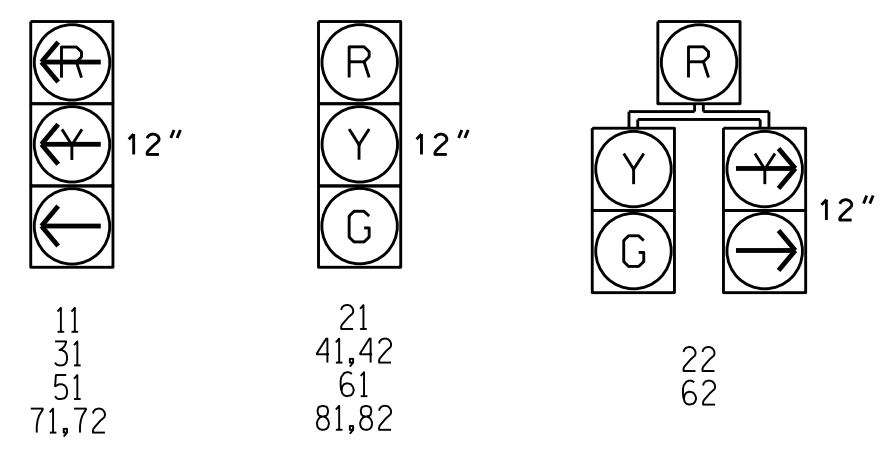


**PHASING DIAGRAM DETECTION LEGEND**

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

**SIGNAL FACE I.D.**

All Heads L.E.D.



**TABLE OF OPERATION**

SIGNAL FACE	PHASE								FLASH
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 3+7	Ø 3+8	Ø 4+7	Ø 4+8	
11	—	—	—R	—R	—R	—R	—R	—R	—
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
31	—R	—R	—	—	—	—	—	—	—
41,42	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
71,72	—R	—R	—	—	—	—	—	—	—
81,82	R	R	R	R	R	G	R	G	R

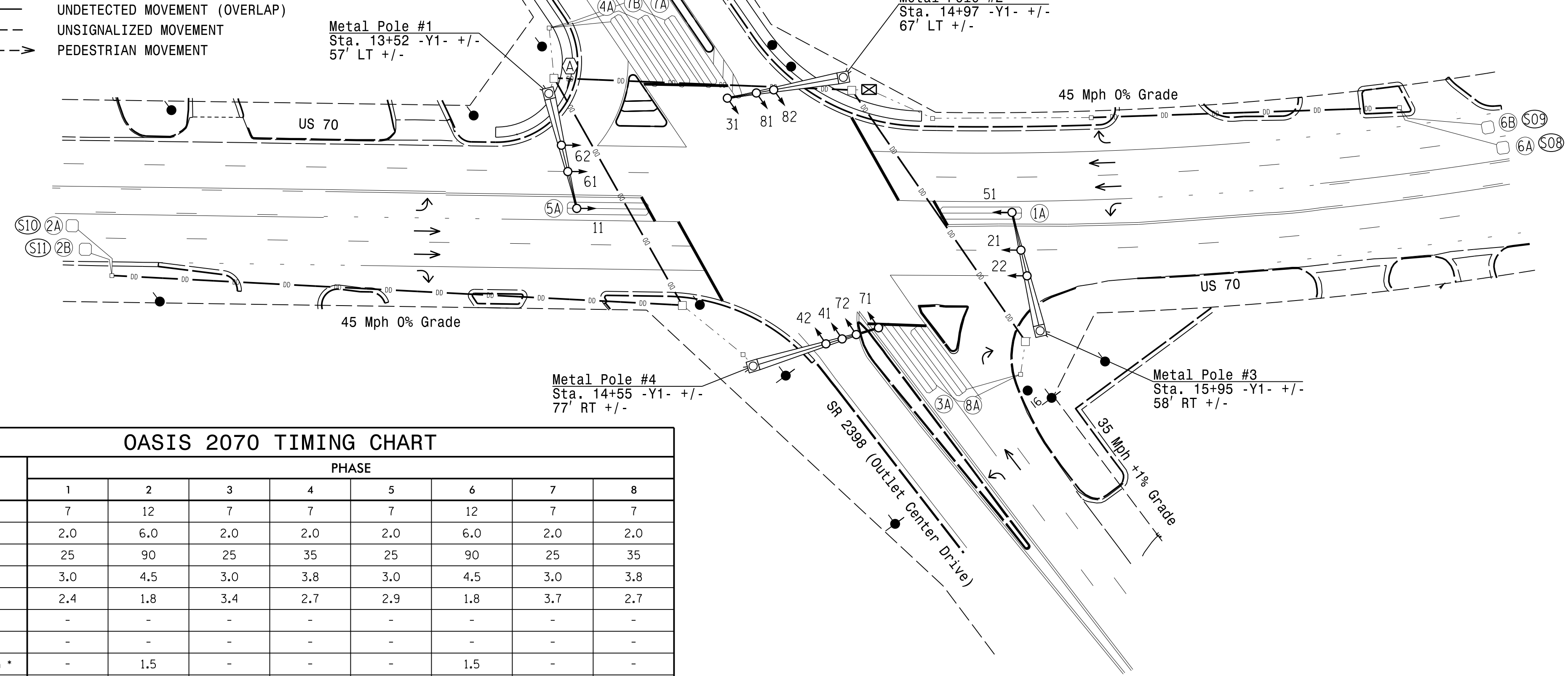
**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	INDUCTIVE LOOPS		DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD		
		DISTANCE FROM STOPBAR (FT)	TURNS	PHASE	CALLING	EXTENSION	FULL TIME DELAY			STRETCH TIME	DELAY TIME
1A	6X40	0	2-4-2	Y	1	Y	Y	-	3	-	Y
2A/S10	6X6	300	5	Y	2	Y	Y	-	-	-	Y
2B/S11	6X6	300	5	Y	2	Y	Y	-	-	-	Y
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	3	Y
6A/S08	6X6	300	5	Y	6	Y	Y	-	-	-	Y
6B/S09	6X6	300	5	Y	6	Y	Y	-	-	-	Y
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	Y
7B	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	Y

8 Phase Fully Actuated US 70 (Selma) CLS

**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.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The cabinet should be designed to include an Auxiliary Output file for future use.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #, Controller Asset #0383.



**OASIS 2070 TIMING CHART**

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	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	25	90	25	35	25	90	25	35
Yellow Clearance	3.0	4.5	3.0	3.8	3.0	4.5	3.0	3.8
Red Clearance	2.4	1.8	3.4	2.7	2.9	1.8	3.7	2.7
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
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.

**LEGEND**

- |  |  |
|--|--|
| <b>PROPOSED</b>                                    | <b>EXISTING</b>                                    |
| ○ → Traffic Signal Head                            | ● → N/A  |
| ○ → Modified Signal Head                           | ○ → N/A  |
| — Sign   | — Sign   |
| □ → Pedestrian Signal Head With Push Button & Sign | □ → Pedestrian Signal Head With Push Button & Sign |
| — Signal Pole with Guy                             | — Signal Pole with Guy                             |
| — Signal Pole with Sidewalk Guy                    | — Signal Pole with Sidewalk Guy                    |
| ⊠ → Inductive Loop Detector                        | ⊠ → Inductive Loop Detector                        |
| ⊠ → Controller & Cabinet                           | ⊠ → Controller & Cabinet                           |
| □ → Junction Box                                   | □ → Junction Box                                   |
| — 2-in Underground Conduit                         | — 2-in Underground Conduit                         |
| N/A → Right of Way                                 | — Right of Way                                     |
| → Directional Arrow                                | → Directional Arrow                                |
| ○ → Metal Pole with Mastarm                        | ○ → Metal Pole with Mastarm                        |
| — Directional Drill                                | — Directional Drill                                |
|  | N/A  |

Signal Upgrade - Final

Prepared in the Offices of:

US 70 at SR 2302 (Ricks Road) / SR 2398 (Outlet Center Drive)

Division 4 Johnston County Selma

PLAN DATE: August 2017 REVIEWED BY: JPG

PREPARED BY: JPG REVIEWED BY: JPG

750 N. Greenleaf Pkwy, Garner, NC 27529

SCALE: 0 40 1"=40'

REVISIONS: INIT. DATE

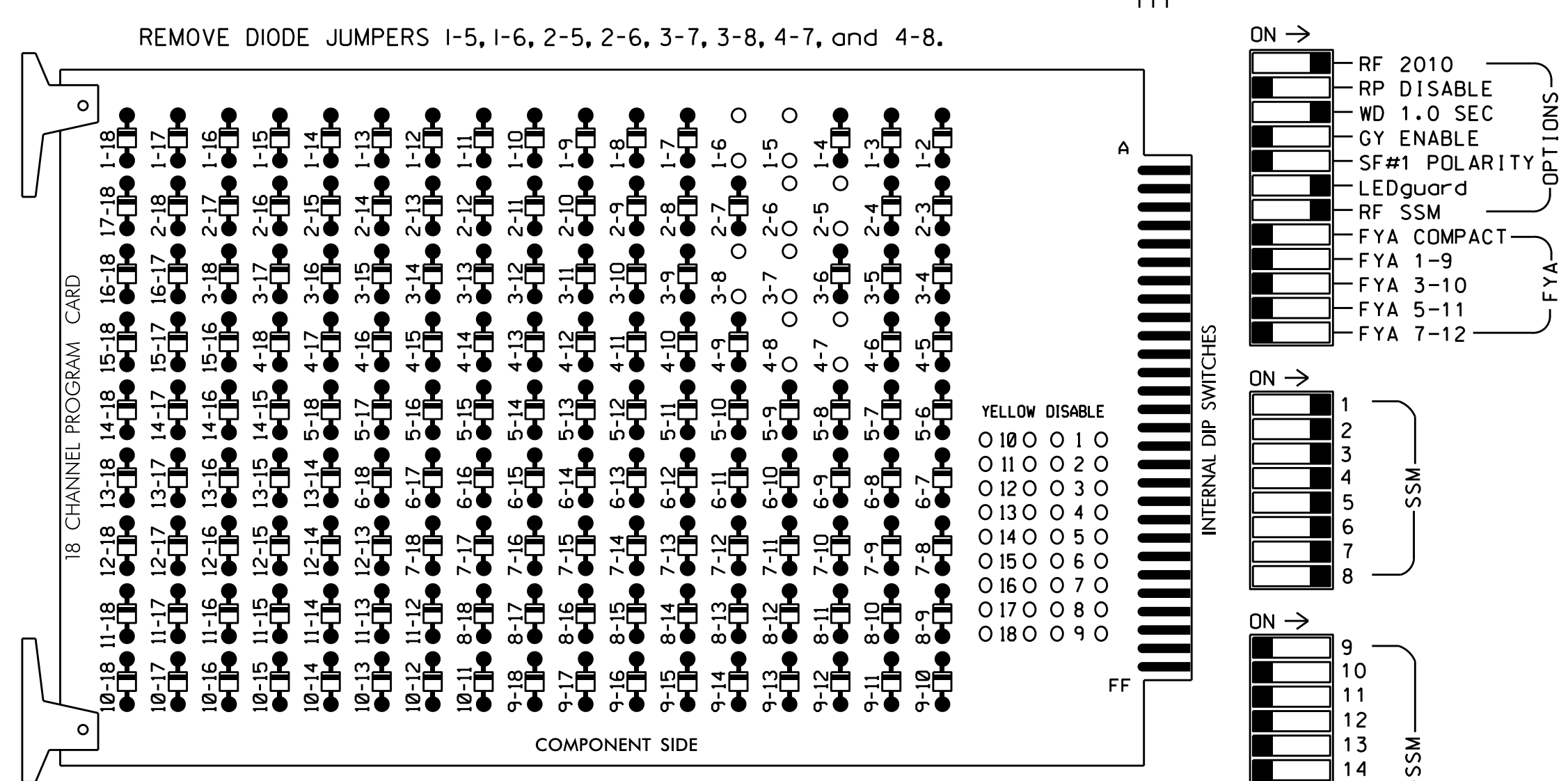
DATE: 9/13/2017

SIG. INVENTORY NO. 04-0383

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the US 70 (Selma) Closed Loop System.

**EQUIPMENT INFORMATION**

CONTROLLER.....2070  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAP 'A'.....NOT USED  
 OVERLAP 'B'.....NOT USED  
 OVERLAP 'C'.....NOT USED  
 OVERLAP 'D'.....NOT USED

**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	NU	22	31	41,42	51	61,62	NU	62	71,72	81,82	NU	NU	NU	NU	NU	NU
RED		128				101		134				107						
YELLOW		129				102		135				108						
GREEN		130				103		136				109						
RED ARROW	125				116			131				122						
YELLOW ARROW	126			117	117			132			123	123						
GREEN ARROW	127			118	118			133			124	124						

NU = Not Used

**INPUT FILE POSITION LAYOUT**

(front view)

FILE U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
∅ 1	∅ 2/SYS	∅ 3	∅ 4											FS
1A	2A/S10	3A	4A											DC ISOLATOR
NOT USED	∅ 2/SYS	NOT USED	NOT USED											ST
	2B/S11													DC ISOLATOR
FILE U	∅ 5	∅ 6/SYS	∅ 7	∅ 8										
5A	6A/S08	7A	8A											
NOT USED	∅ 6/SYS	7B	NOT USED											
	6B/S09													

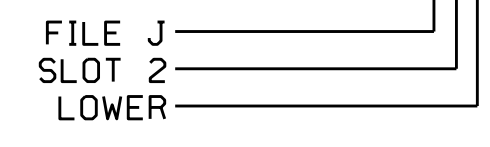
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT 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			3
2A/S10	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S11	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
6A/S08	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S09	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB5-7,8	J5L	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

**INPUT FILE POSITION LEGEND: J2L**



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0383  
 DESIGNED: August 2017  
 SEALED: 9/13/17  
 REVISED: N/A

Electrical Detail - Final

Electrical AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 70 at SR 2302 (Ricks Road)/ SR 2398 (Outlet Center Drive)

Division 4 Johnston County Selma

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

DocuSigned by: Keith M. Minis 9/20/2017 2:50:06 PM

2580786803445 DATE

SIG. INVENTORY NO. 04-0383

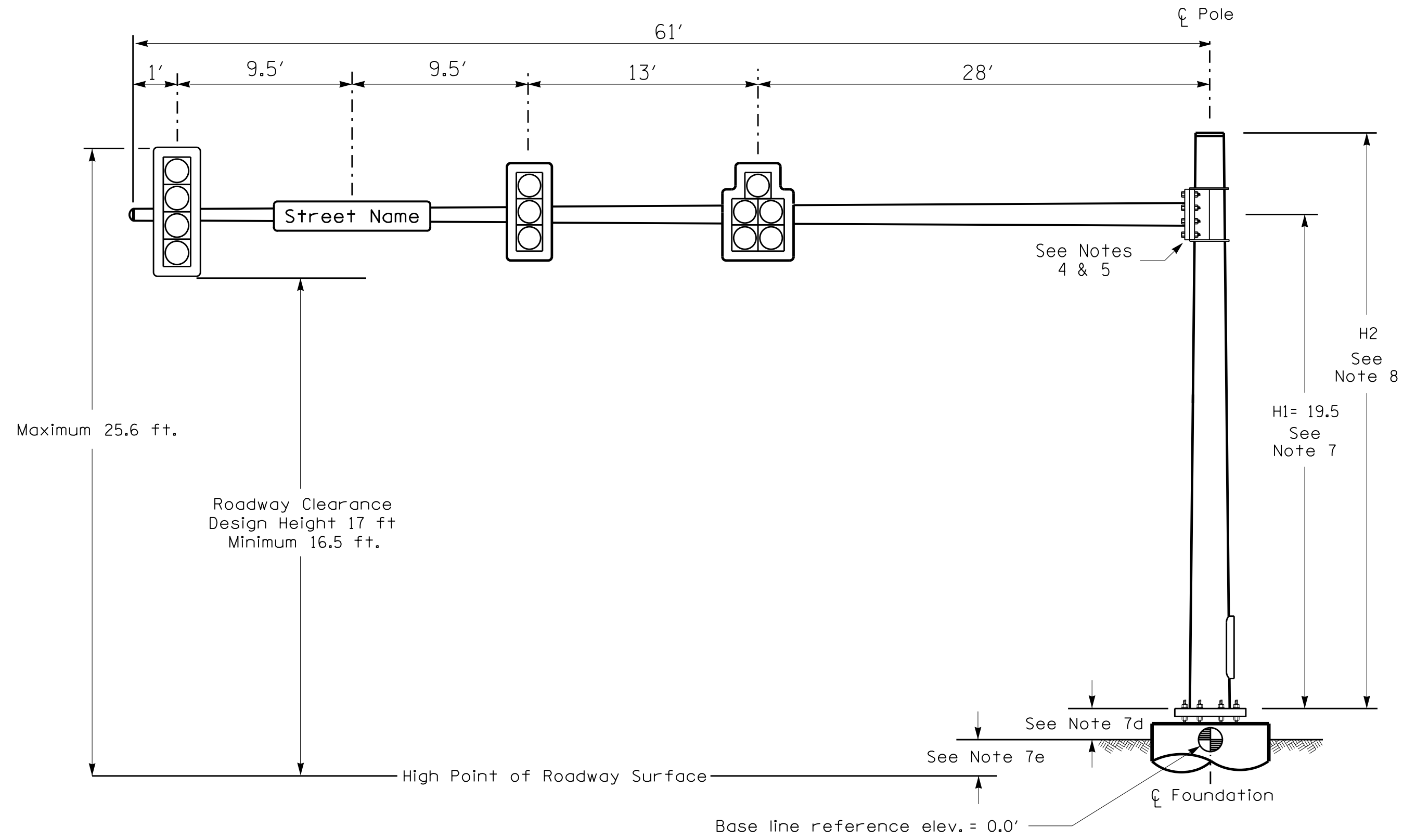
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SEAL

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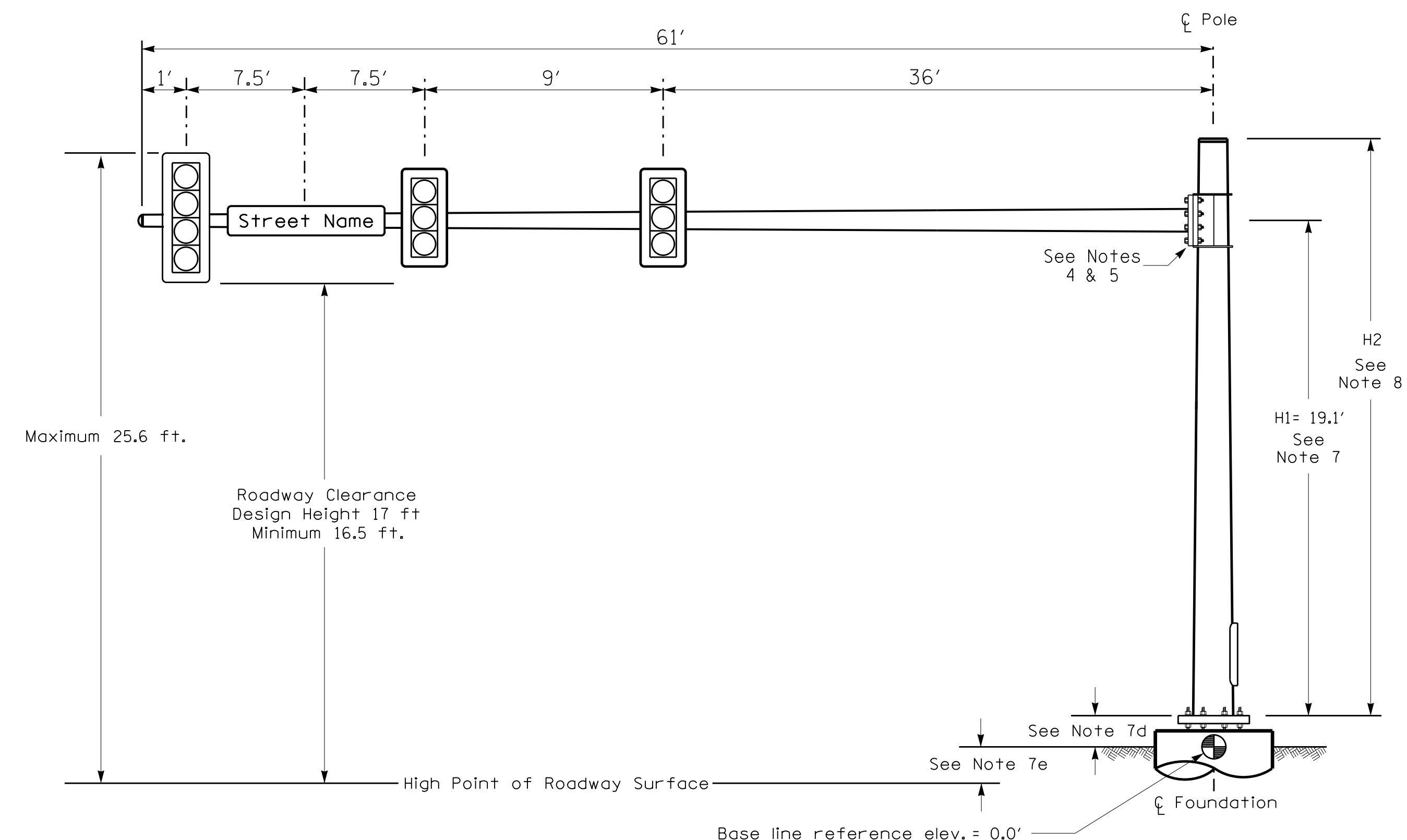


**Design Loading for METAL POLE NO. 1**



**Elevation View**

**Design Loading for METAL POLE NO. 2**



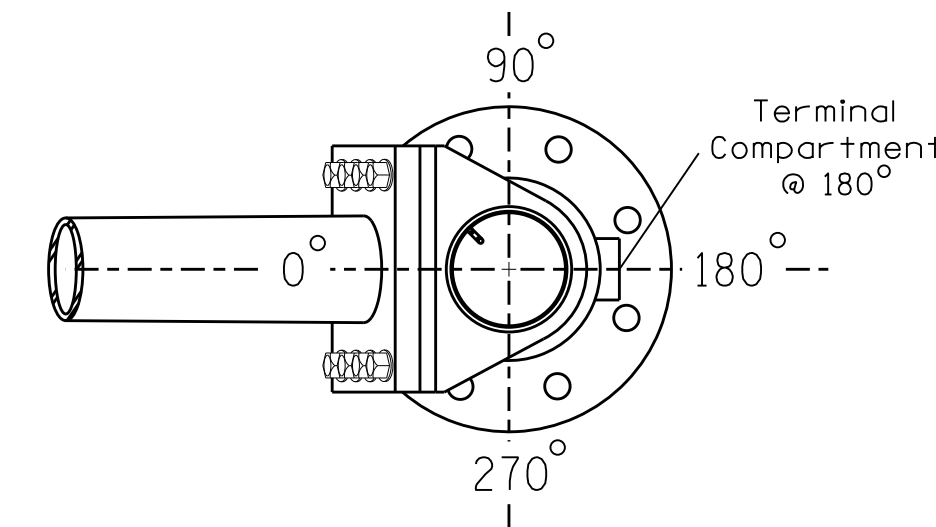
**Elevation View**

**SPECIAL NOTE**

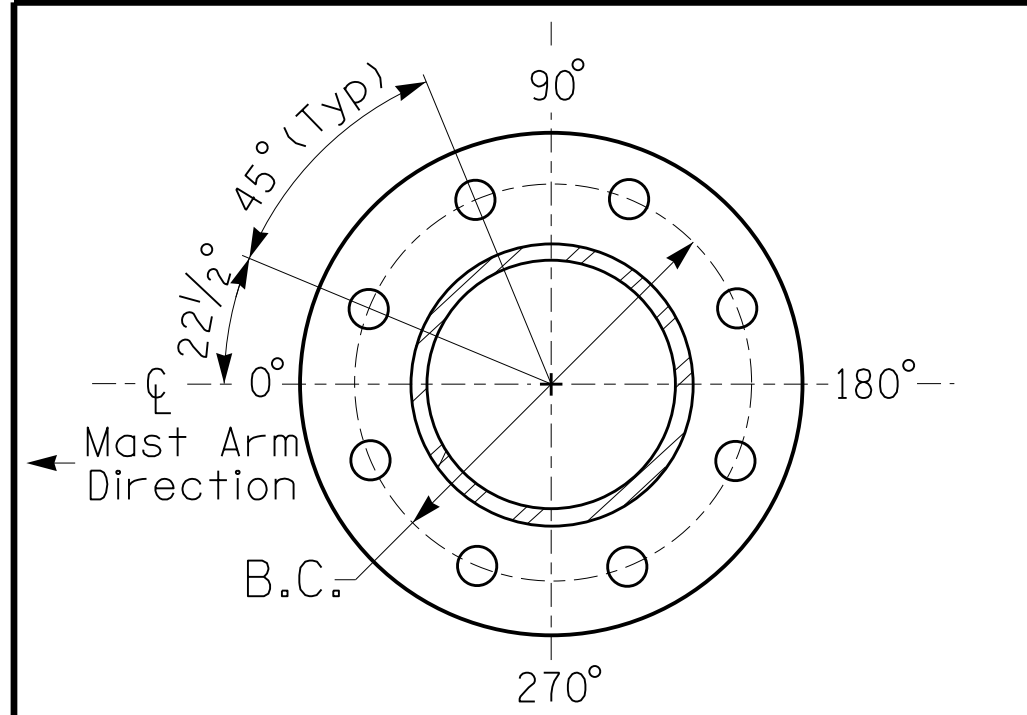
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

**Elevation Data for Mast Arm Attachment (H1)**

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.5 ft.	+0.1ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

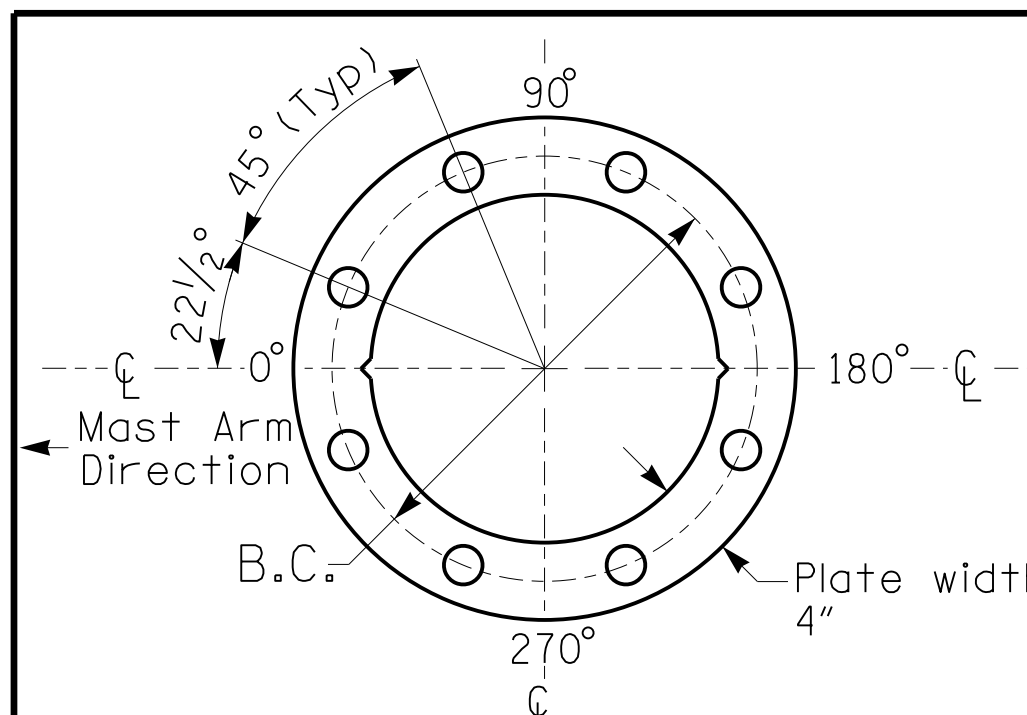


**POLE RADIAL ORIENTATION**



**8 BOLT BASE PLATE DETAIL**

See Note 6



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

**METAL POLE No. 1 and 2**

PROJECT REFERENCE NO.	SHEET NO.
U-5795	Sig. 4.2

**MAST ARM LOADING SCHEDULE**

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0"W X 56.0"L	103 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5"W X 66.0"L	74 LBS
	STREET NAME SIGN RIGID MOUNTED	12.0 S.F.	18.0"W X 96.0"L	27 LBS

**NOTES**

**DESIGN REFERENCE MATERIAL**

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

**DESIGN REQUIREMENTS**

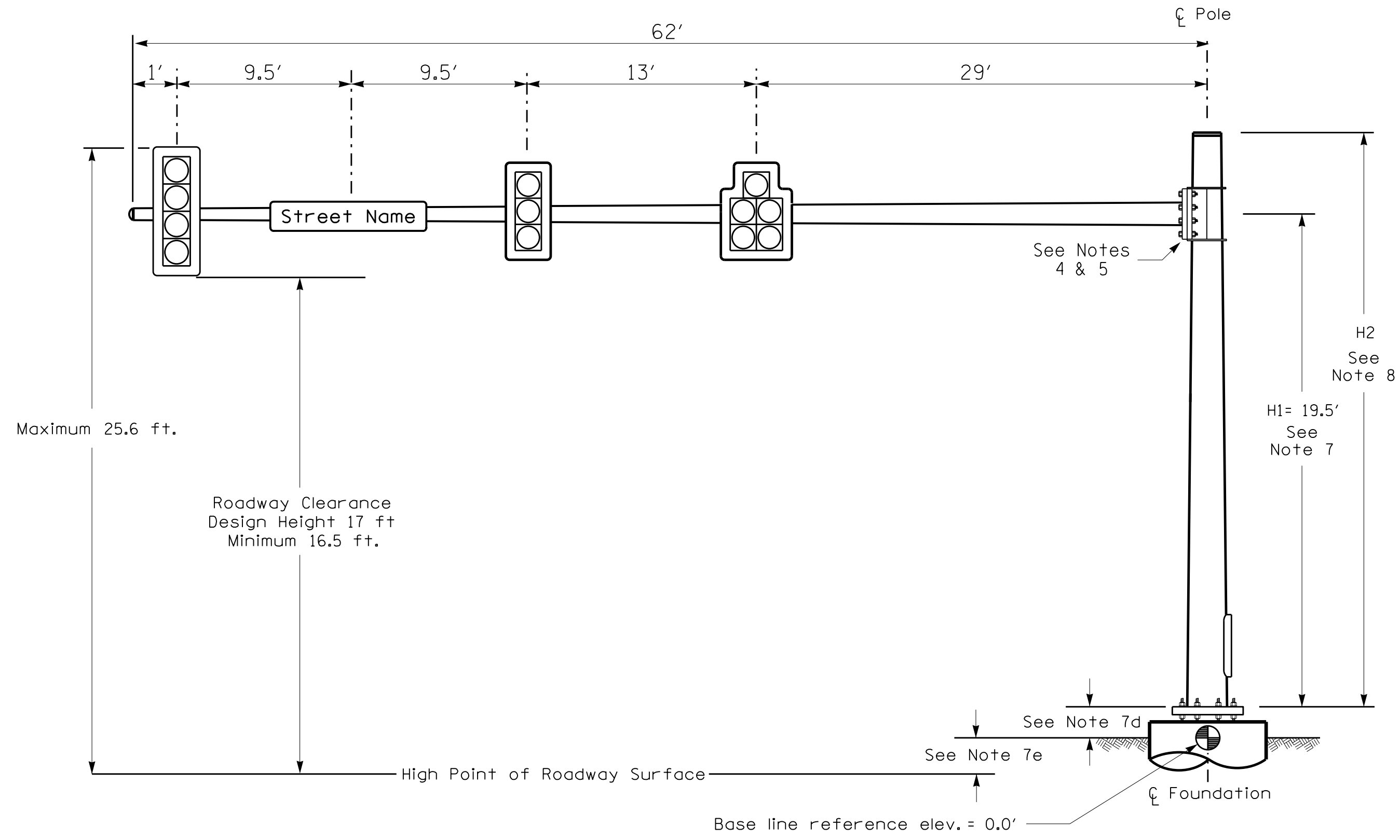
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the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

NCDOT Wind Zone 3 (110 mph)

<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	US 70 at SR 2302 (Ricks Road) / SR 2398 (Outlet Center Drive) Johnston County Selma	<p>SEAL 029904 JASON P. GALLOWAY ENGINEER</p>
	PLAN DATE: September 2017 PREPARED BY: KGP, Jr. REVISIONS: _____ SCALE: 0 N/A N/A	

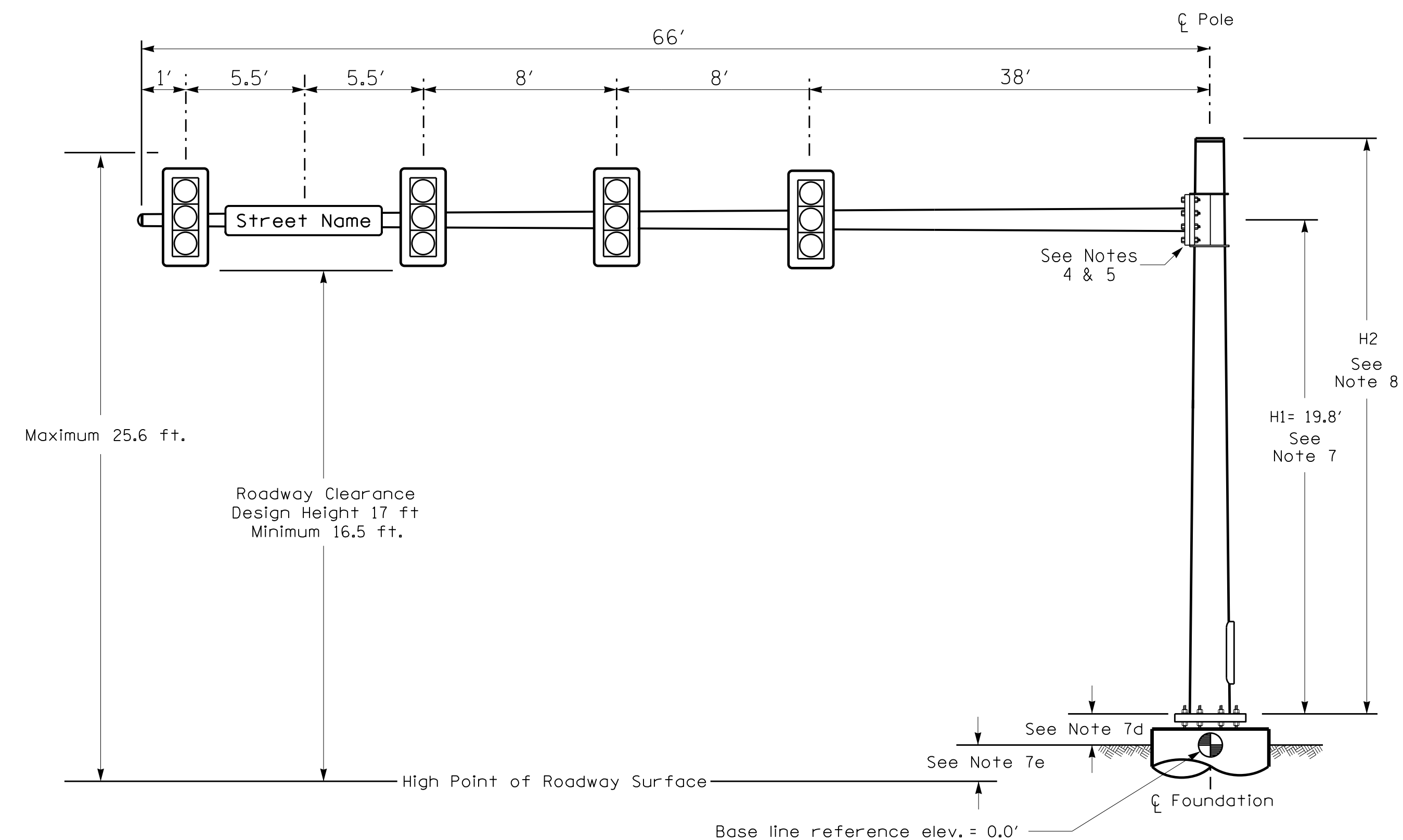
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**Design Loading for METAL POLE NO. 3**



**Elevation View**

**Design Loading for METAL POLE NO. 4**



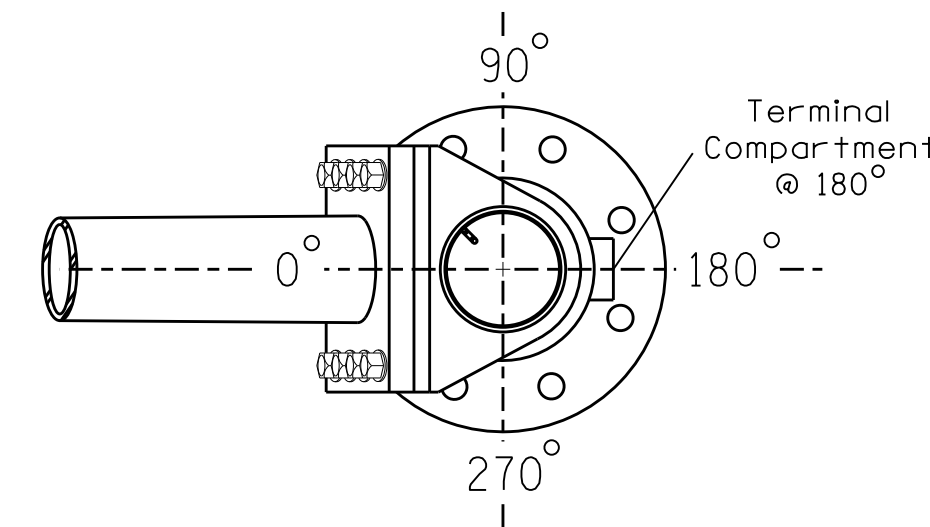
**Elevation View**

**SPECIAL NOTE**

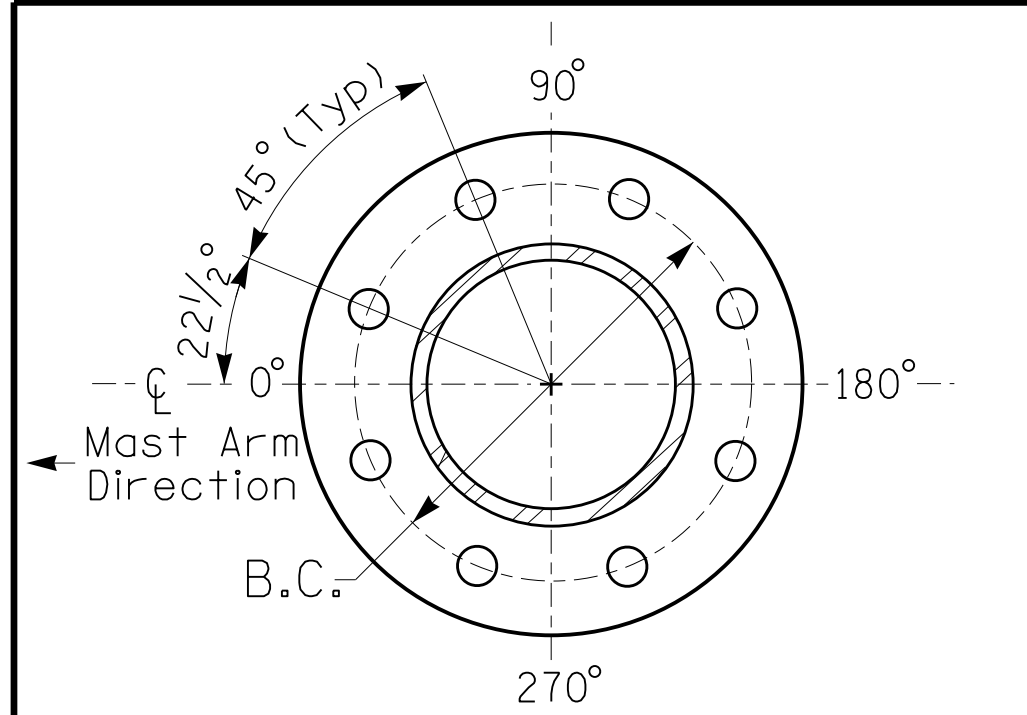
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**Elevation Data for Mast Arm Attachment (H1)**

Elevation Differences for:	Pole 3	Pole 4
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.5 ft.	+0.8 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

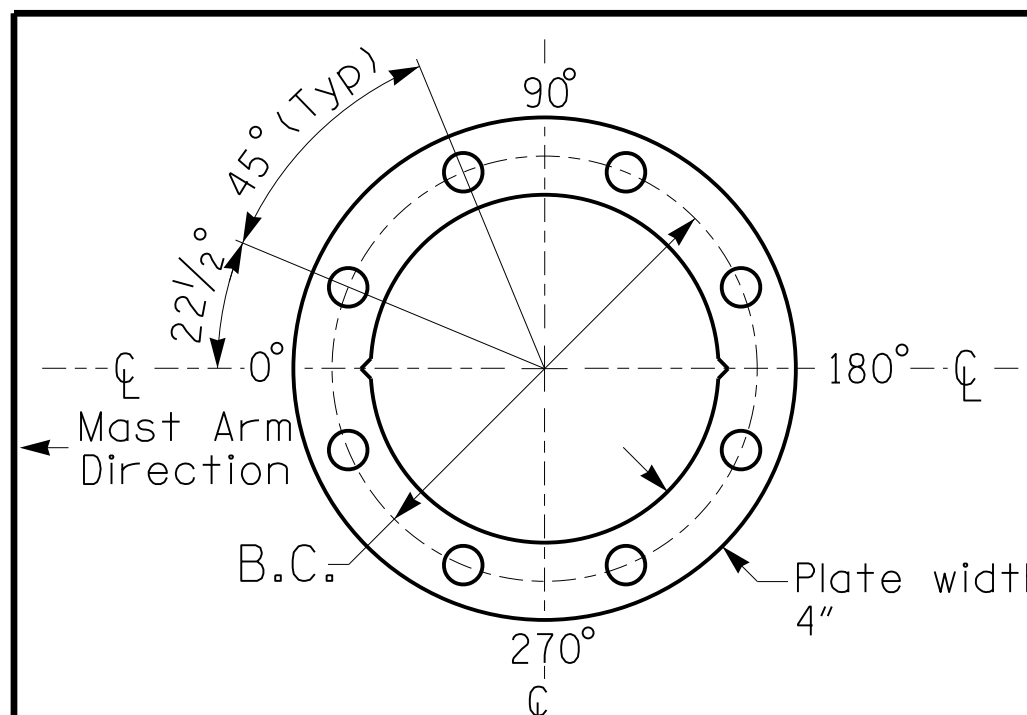


**POLE RADIAL ORIENTATION**



**8 BOLT BASE PLATE DETAIL**

See Note 6



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

**METAL POLE No. 3 and 4**

PROJECT REFERENCE NO.	SHEET NO.
U-5795	Sig. 4.3

**MAST ARM LOADING SCHEDULE**

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	STREET NAME SIGN RIGID MOUNTED	12.0 S.F.	18.0" W X 96.0" L	27 LBS

**NOTES**

**DESIGN REFERENCE MATERIAL**

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

**DESIGN REQUIREMENTS**

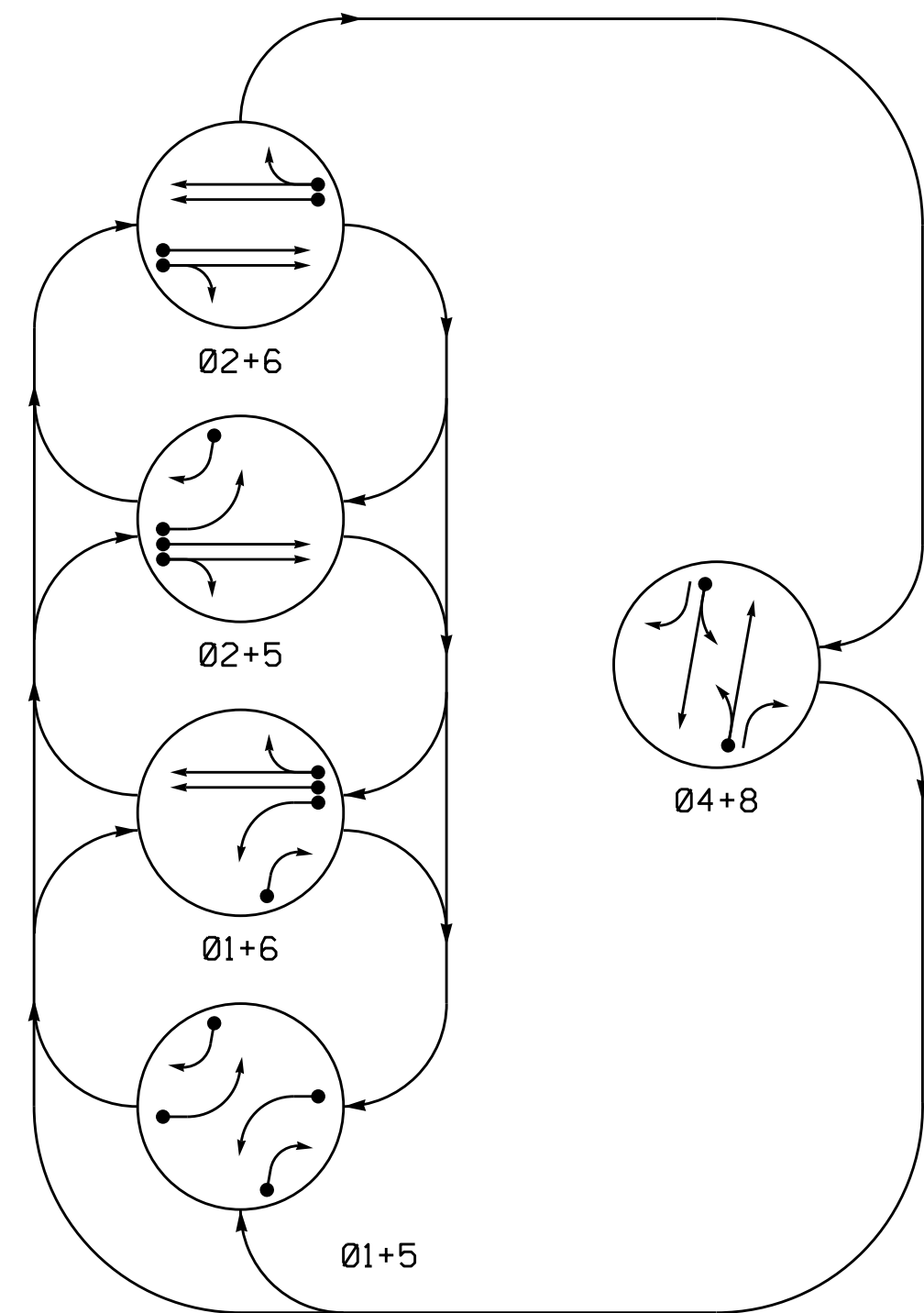
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the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

NCDOT Wind Zone 3 (110 mph)

	US 70 at SR 2302 (Ricks Road) / SR 2398 (Outlet Center Drive) Johnston County, Selma	SEAL 
	PLAN DATE: September 2017 PREPARED BY: KGP, Jr. REVISIONS: _____ SCALE: 0 N/A N/A	

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PHASING DIAGRAM



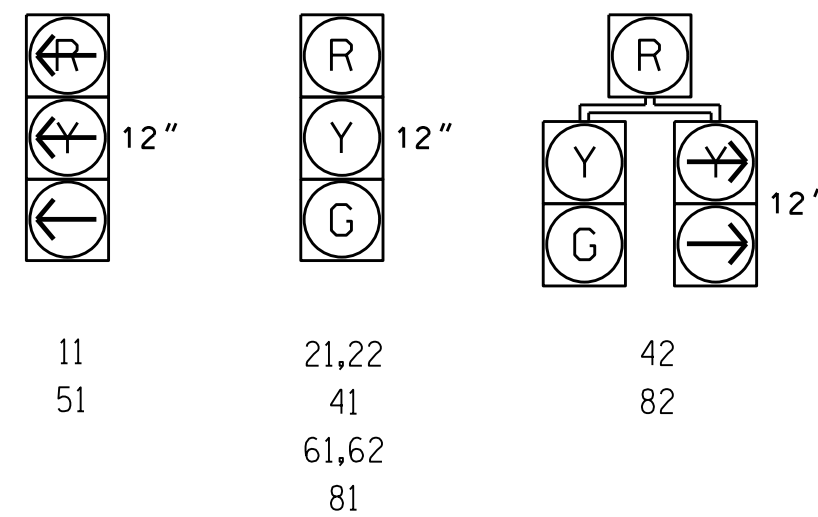
PHASING DIAGRAM DETECTION LEGEND

- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- ←- - -> PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	F
11	←	→	←	→	←	→
21,22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	←	→	←	→	←	→
61,62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



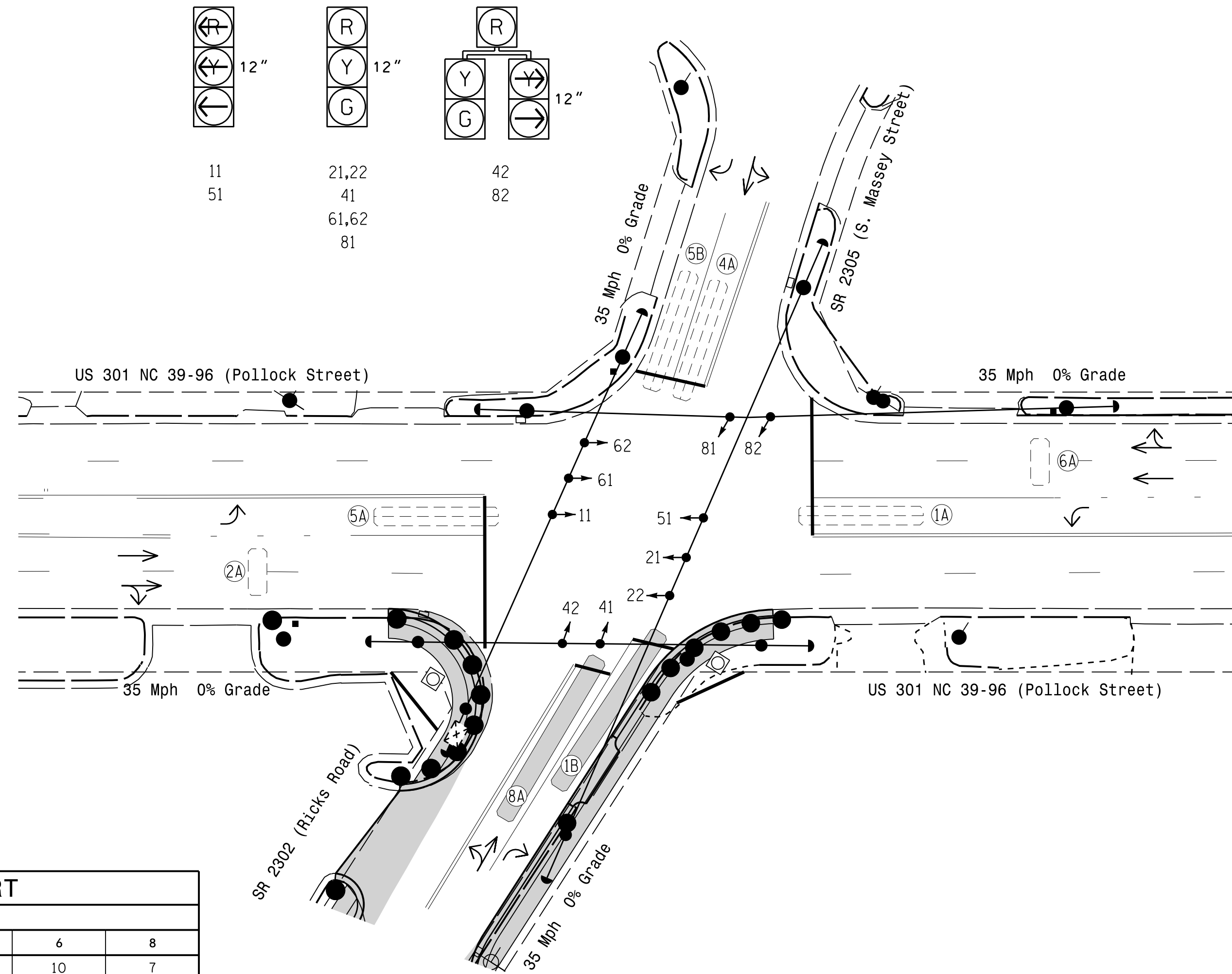
INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	2-4-2	-	1	Y	Y	-	-	3	-	-
1B	6X60	+5	*	*	1	Y	Y	-	-	15	-	-
2A	6X20	70	2	-	2	Y	Y	-	-	-	-	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	3	-	-
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	3	-	-
5B	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X20	70	2	-	6	Y	Y	-	-	-	-	-
8A	6X60	+5	*	*	8	Y	Y	-	-	3	-	-

\* Multizone Microwave Detection

5 Phase Fully Actuated US 301 (Selma) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #, Controller Asset #0392.



FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	1.0	3.0	1.0	1.0	3.0	1.0
Max Green 1 *	15	40	20	20	40	20
Yellow Clearance	3.0	3.8	3.8	3.0	3.8	3.8
Red Clearance	2.9	1.7	2.1	2.9	1.7	2.1
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
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

\* 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.

LEGEND

- | PROPOSED   | EXISTING   |
|--|--|
| ○→ Traffic Signal Head                           | ●→ Traffic Signal Head                           |
| ●→ Modified Signal Head                          | N/A  |
| ⊥ Sign   | ⊥ Sign   |
| ⊥ Pedestrian Signal Head With Push Button & Sign | ⊥ Pedestrian Signal Head With Push Button & Sign |
| ○ Signal Pole with Guy                           | ● Signal Pole with Guy                           |
| ○ Signal Pole with Sidewalk Guy                  | ● Signal Pole with Sidewalk Guy                  |
| ⊠ Inductive Loop Detector                        | ⊠ Inductive Loop Detector                        |
| □ Controller & Cabinet                           | □ Controller & Cabinet                           |
| □ Junction Box                                   | □ Junction Box                                   |
| - - - 2-in Underground Conduit                   | - - - 2-in Underground Conduit                   |
| N/A Right of Way                                 | - - - Right of Way                               |
| → Directional Arrow                              | → Directional Arrow                              |

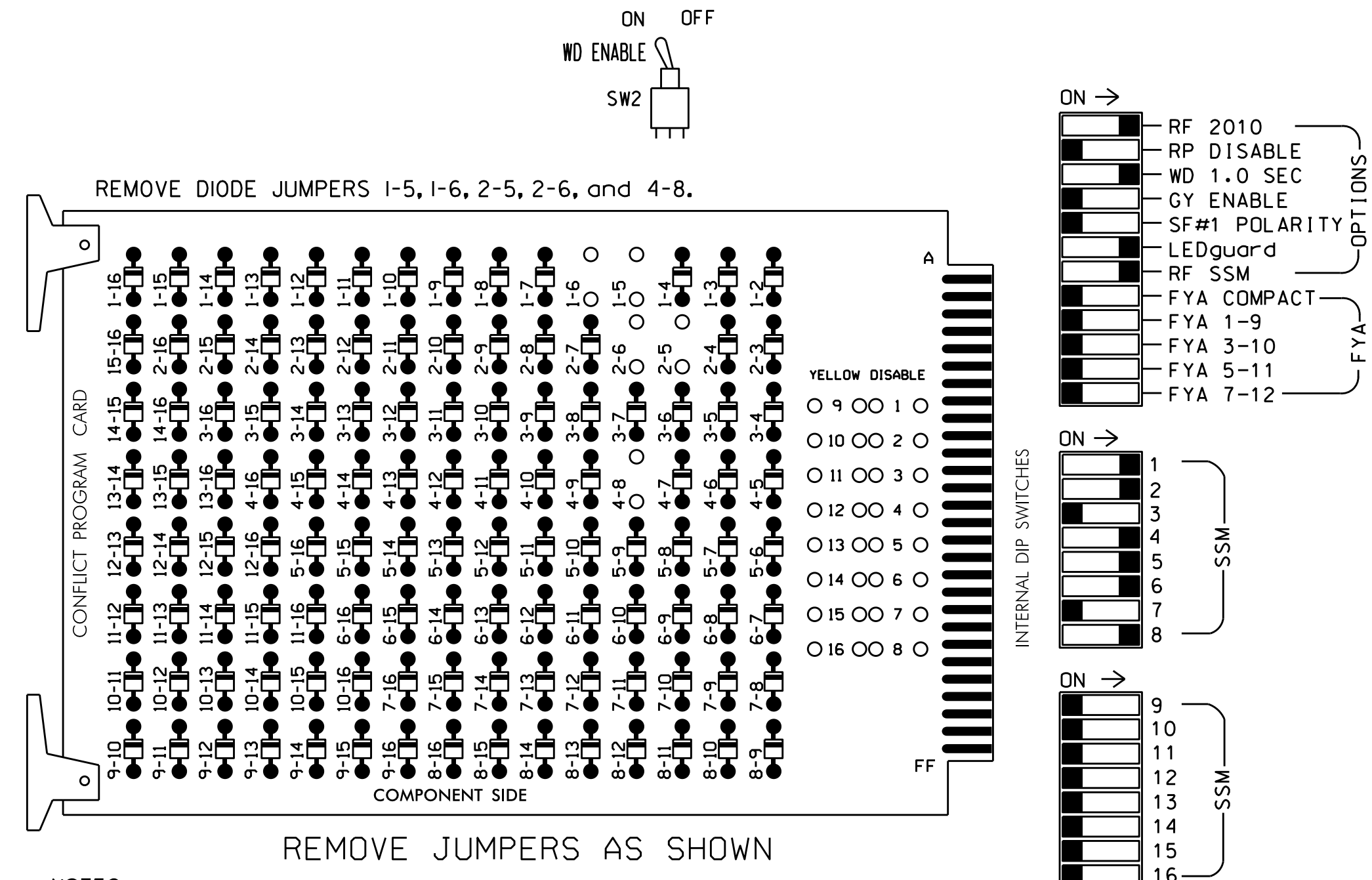
Signal Upgrade - TCP Phases I & II

	US 301 NC 39-96 (Pollock St) at SR 2302 (Ricks Road) / SR 2305 (S. Massey Street)		
	Division 4 Johnston County Selma	Prepared By: JPG	
750 N. Greenfield Pkwy, Garner, NC 27529	PLAN DATE: September 2017	REVISIONS	DATE
0 SCALE 30 1"=30'			
			9/13/2017
			DATE
			SIG. INVENTORY NO. 04-0392T1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

## EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Make sure jumpers SEL2-SEL5 are present on the monitor board.

### 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.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- 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 and 6 for Yellow Flash.
- The cabinet and controller are part of the US 301 (Selma) Closed Loop System.

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	82	21,22	NU	NU	41,42	NU	42	51	61,62	NU	NU
RED			128			101				134		107
YELLOW			129			102				135		108
GREEN			130			103				136		109
RED ARROW	125								131			
YELLOW ARROW	126	126					132	132				
GREEN ARROW	127	127					133	133				

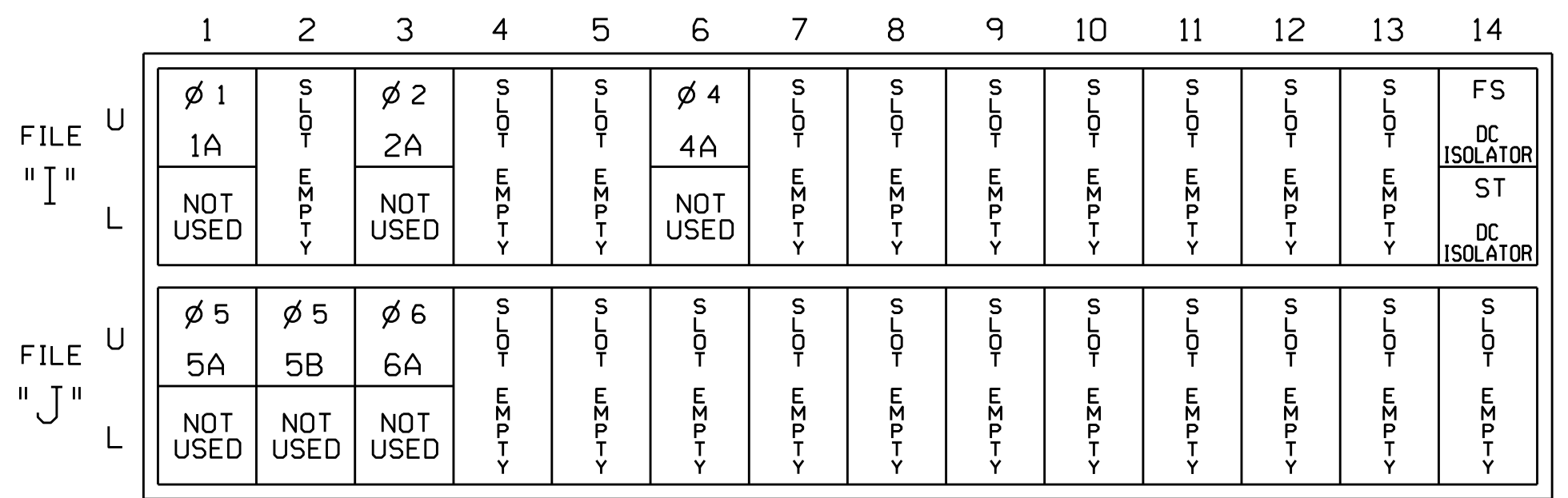
NU = Not Used

### EQUIPMENT INFORMATION

CONTROLLER.....2070  
 CABINET.....332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8  
 PHASES USED.....1,2,4,5,6,8  
 OVERLAPS.....NONE

### INPUT FILE POSITION LAYOUT

(front view)



### 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	11U	56	18	1	1	Y	Y			3
2A	TB2-9,10	13U	63	25	32	2	Y	Y			
4A	TB4-9,10	16U	41	3	4	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L  
 FILE J  
 SLOT 2  
 LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0392T1  
 DESIGNED: September 2017  
 SEALED: 9/13/2017  
 REVISED: N/A

### SPECIAL DETECTOR NOTE

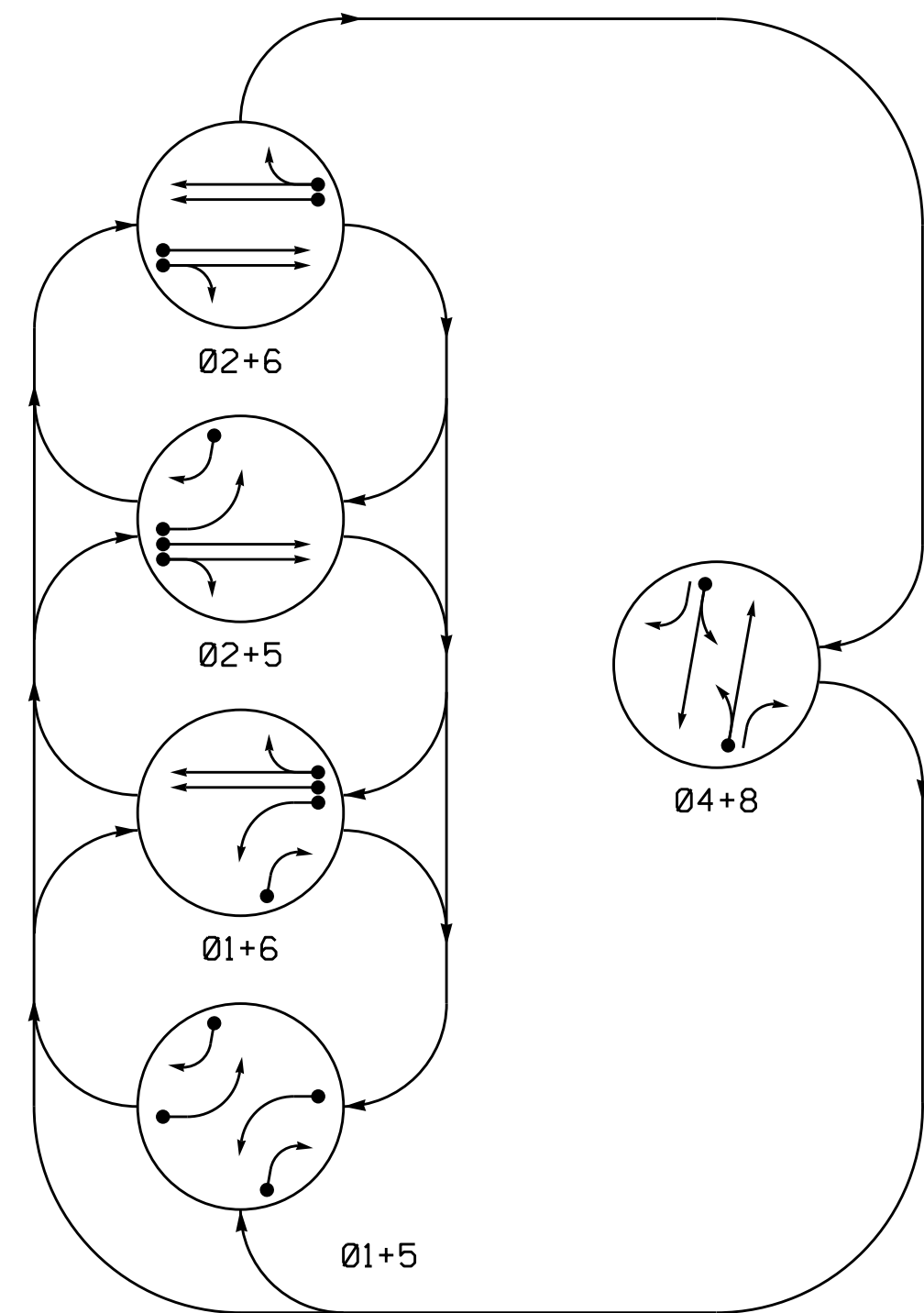
For detection zones 1B & 8A, install a microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

Electrical Detail - Temporary 1 - TCP Phases I and II

ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 301 NC 39-96 (Pollock St.) at SR 2302 (Ricks Road)/ SR 2305 (S. Massey Street)	SEAL
Prepared In the Offices of:  Signal Management Systems, Inc.	Division 4 Johnston County Selma	SEAL 036880 ENGINEER KEITH M. MIMS
PLAN DATE: September 2017	REVIEWED BY:	DATE: 9/20/2017
PREPARED BY: S. Armstrong	REVIEWED BY:	DATE:
REVISIONS	INIT.	DATE
750 N. Greenfield Pkwy, Garner, NC 27529		SIG. INVENTORY NO. 04-0392T1

14-SEP-2017 11:31 S:\IT\SSM\15\Sig\04\work\hgr\040392-sm.elec.xxx.dgn sarmstrong

PHASING DIAGRAM



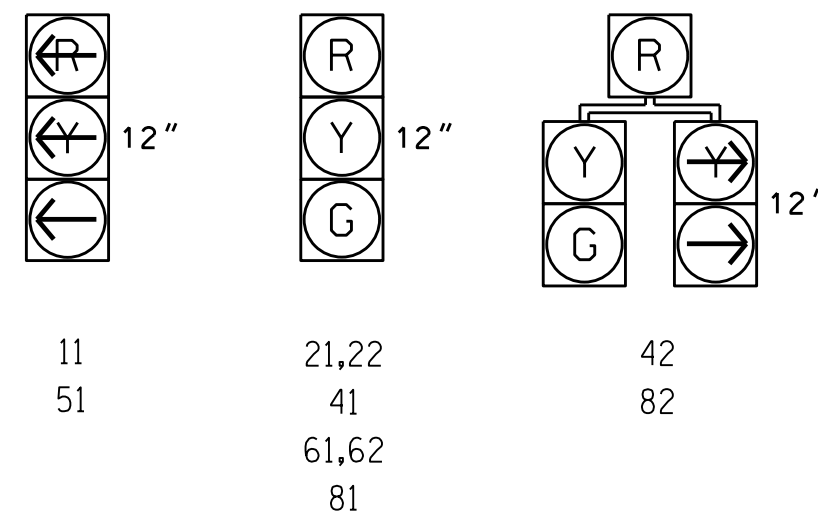
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE					
	Ø1+5	Ø2+5	Ø2+6	Ø4+8	F	P
11	←	←	←	←	←	←
21,22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	←	←	←	←	←	←
61,62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



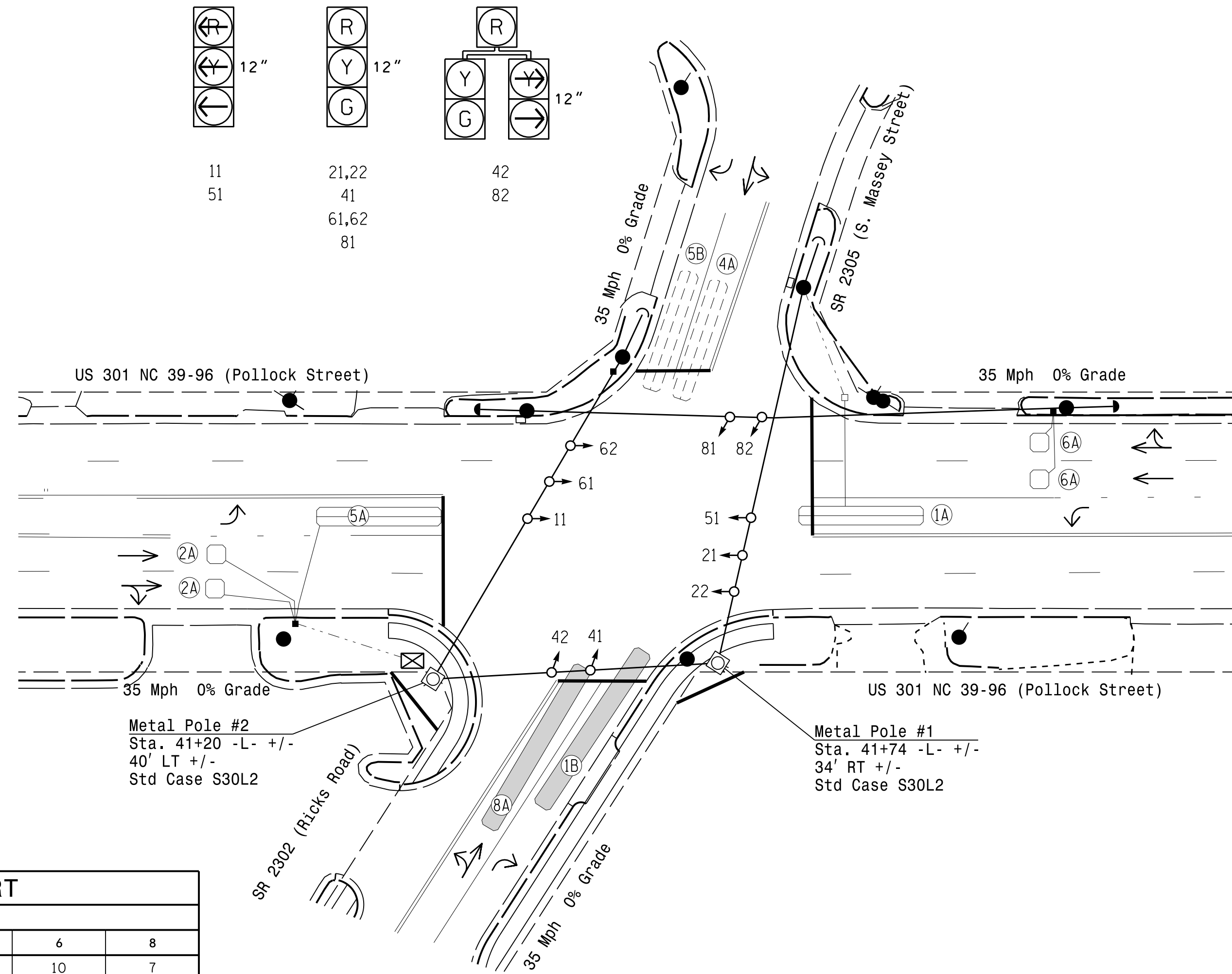
INDUCTIVE LOOPS						DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	2-4-2	Y	1	Y	Y	-	-	3	-	Y
1B	6X60	+10	*	*	1	Y	Y	-	-	15	-	Y
2A,2B	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	3	-	Y
5A	6X40	+5	2-4-2	Y	5	Y	Y	-	-	3	-	Y
5B	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
6A,6B	6X20	70	4	Y	6	Y	Y	-	-	-	-	Y
8A	6X60	+5	*	*	8	Y	Y	-	-	3	-	Y

\* Multizone Microwave Detection

5 Phase Fully Actuated US 301 (Selma) CLS

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.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #, Controller Asset #0392.



FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	2.0	3.0	2.0	2.0	3.0	1.0
Max Green 1 *	15	40	20	20	40	20
Yellow Clearance	3.0	3.8	3.8	3.0	3.8	3.8
Red Clearance	2.9	1.8	2.1	3.1	1.8	2.1
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
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

\* 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.

LEGEND

- |  |  |
|--|--|
| PROPOSED   | EXISTING   |
| ○ → Traffic Signal Head                          | ● → Traffic Signal Head                          |
| ○ → Modified Signal Head                         | N/A  |
| ⊥ Sign   | ⊥ Sign   |
| ⊥ Pedestrian Signal Head With Push Button & Sign | ⊥ Pedestrian Signal Head With Push Button & Sign |
| ○ Signal Pole with Guy                           | ○ Signal Pole with Guy                           |
| ○ Signal Pole with Sidewalk Guy                  | ○ Signal Pole with Sidewalk Guy                  |
| ⊠ Inductive Loop Detector                        | ⊠ Inductive Loop Detector                        |
| ⊠ Controller & Cabinet                           | ⊠ Controller & Cabinet                           |
| ⊠ Junction Box                                   | ⊠ Junction Box                                   |
| ⊠ 2-in Underground Conduit                       | ⊠ 2-in Underground Conduit                       |
| N/A Right of Way                                 | --- Right of Way                                 |
| → Directional Arrow                              | → Directional Arrow                              |
| ⊠ Metal Strain Pole                              | ⊠ Metal Strain Pole                              |

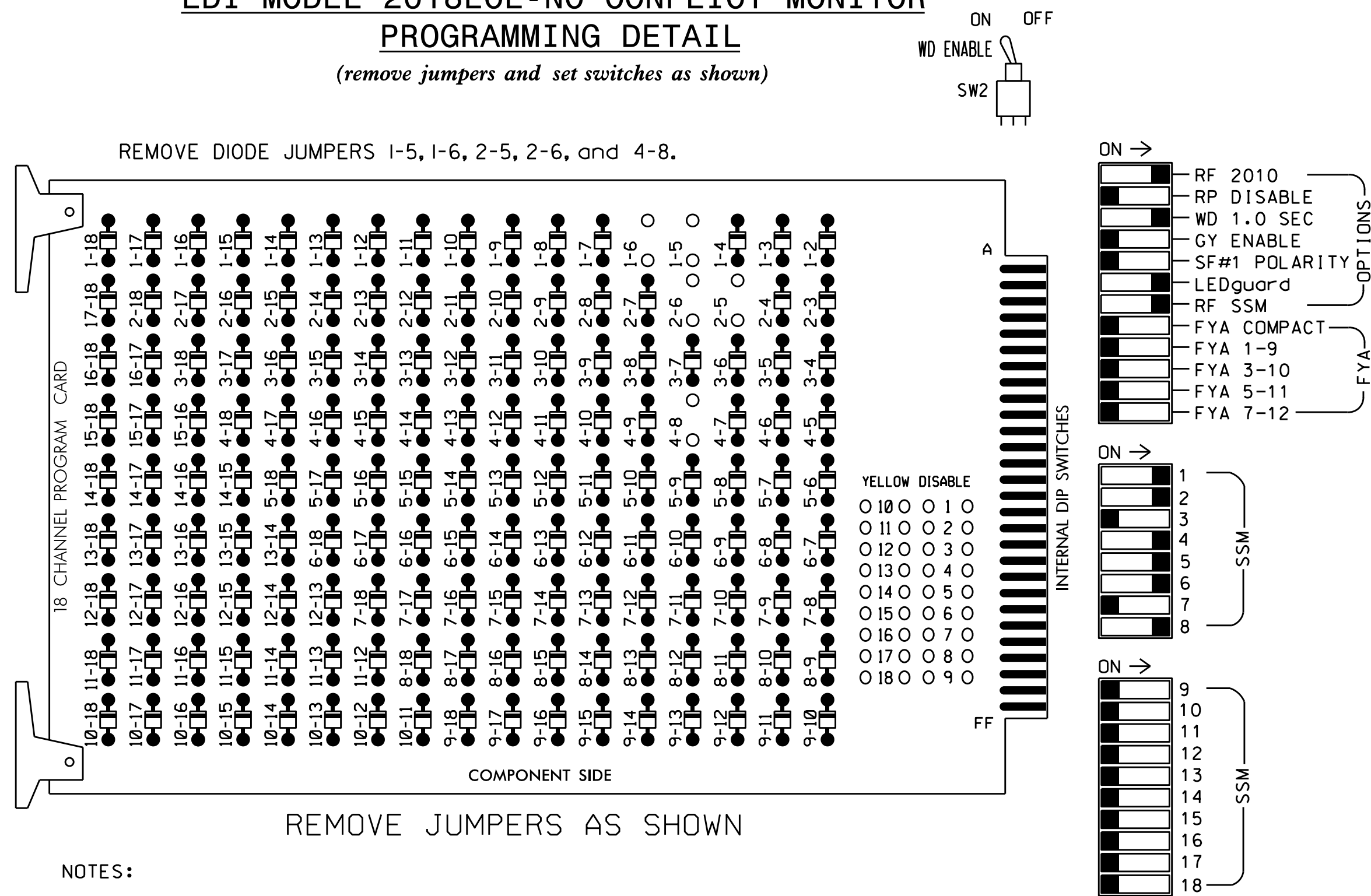
Signal Upgrade - Final

	US 301 NC 39-96 (Pollock St) at SR 2302 (Ricks Road) / SR 2305 (S. Massey Street)		
	Division 4 Johnston County Selma	SEAL 029904	
750 N. Greenfield Pkwy, Garner, NC 27529	PLAN DATE: September 2017	REVIEWED BY: JPG	DATE: 9/13/2017
PREPARED BY: JPG	REVISIONS	INIT.	DATE
		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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**EDI MODEL 2018ECL-NC CONFLICT MONITOR  
PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



**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 and 6 for Yellow Flash.
- The cabinet and controller are part of the US 301 (Selma) Closed System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	82	21,22	NU	NU	41,42	NU	42	51	61,62	NU	81,82
RED			128			101				134		107
YELLOW			129			102				135		108
GREEN			130			103				136		109
RED ARROW	125								131			
YELLOW ARROW	126	126						132	132			
GREEN ARROW	127	127						133	133			

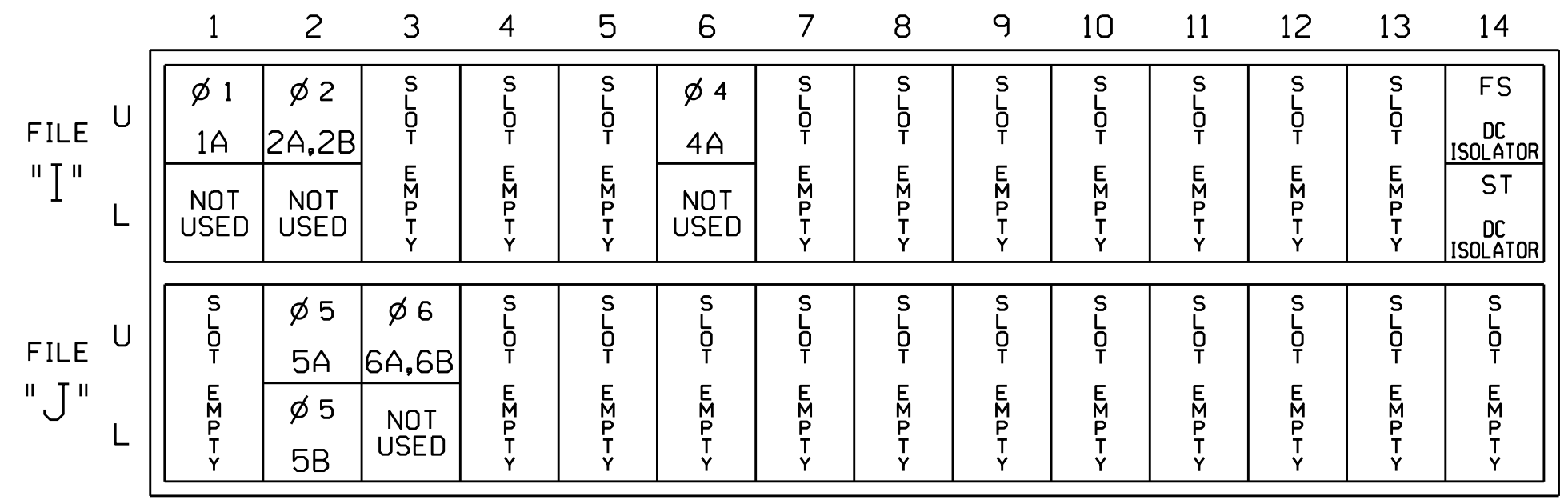
NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....2070  
 CABINET.....332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11  
 PHASES USED.....1,2,4,5,6,8  
 OVERLAPS.....NONE

**INPUT FILE POSITION LAYOUT**

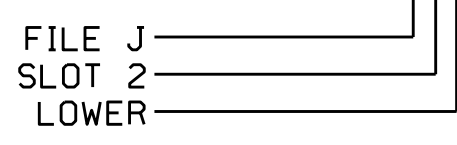
(front view)



**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			3
2A,2B	TB2-5,6	I2U	39	1	2	Y	Y				
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			3
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0392  
 DESIGNED: September 2017  
 SEALED: 9/13/2017  
 REVISED: N/A

**SPECIAL DETECTOR NOTE**

For detection zones 1B & 8A, install a microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

Electrical Detail - Final

Electrical and Programming Details for: US 301 NC 39-96 (Pollock St.) at SR 2302 (Ricks Road)/ SR 2305 (S. Massey Street)

Division 4 Johnston County Selma

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

SEAL 036880

KEITH M. MIMS ENGINEER

DocuSigned by: Keith M. Mims 9/20/2017

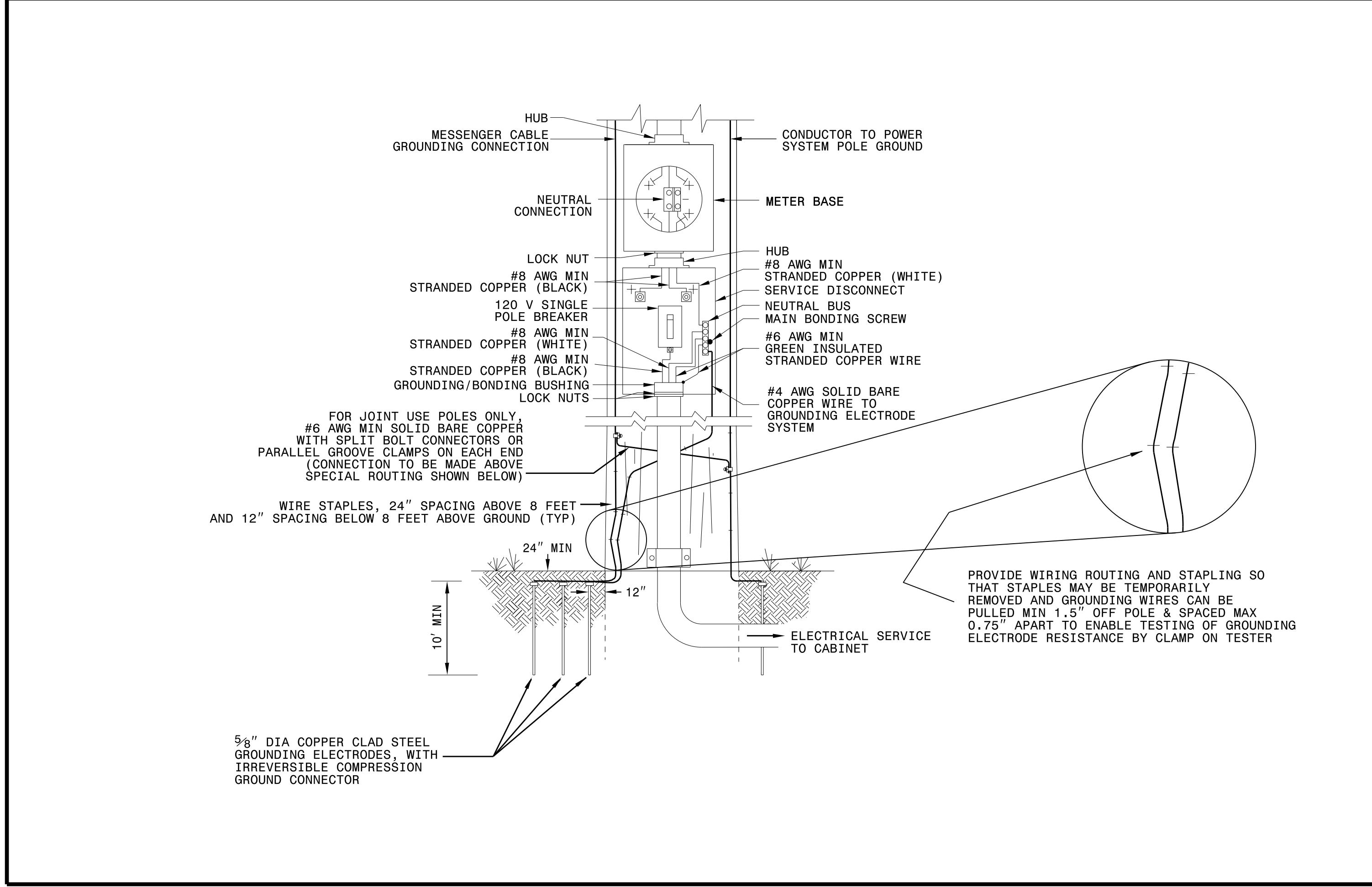
SIG. INVENTORY NO. 04-0392

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

ENGLISH STANDARD DRAWING FOR  
**ELECTRICAL SERVICE GROUNDING**  
GROUNDING AND BONDING

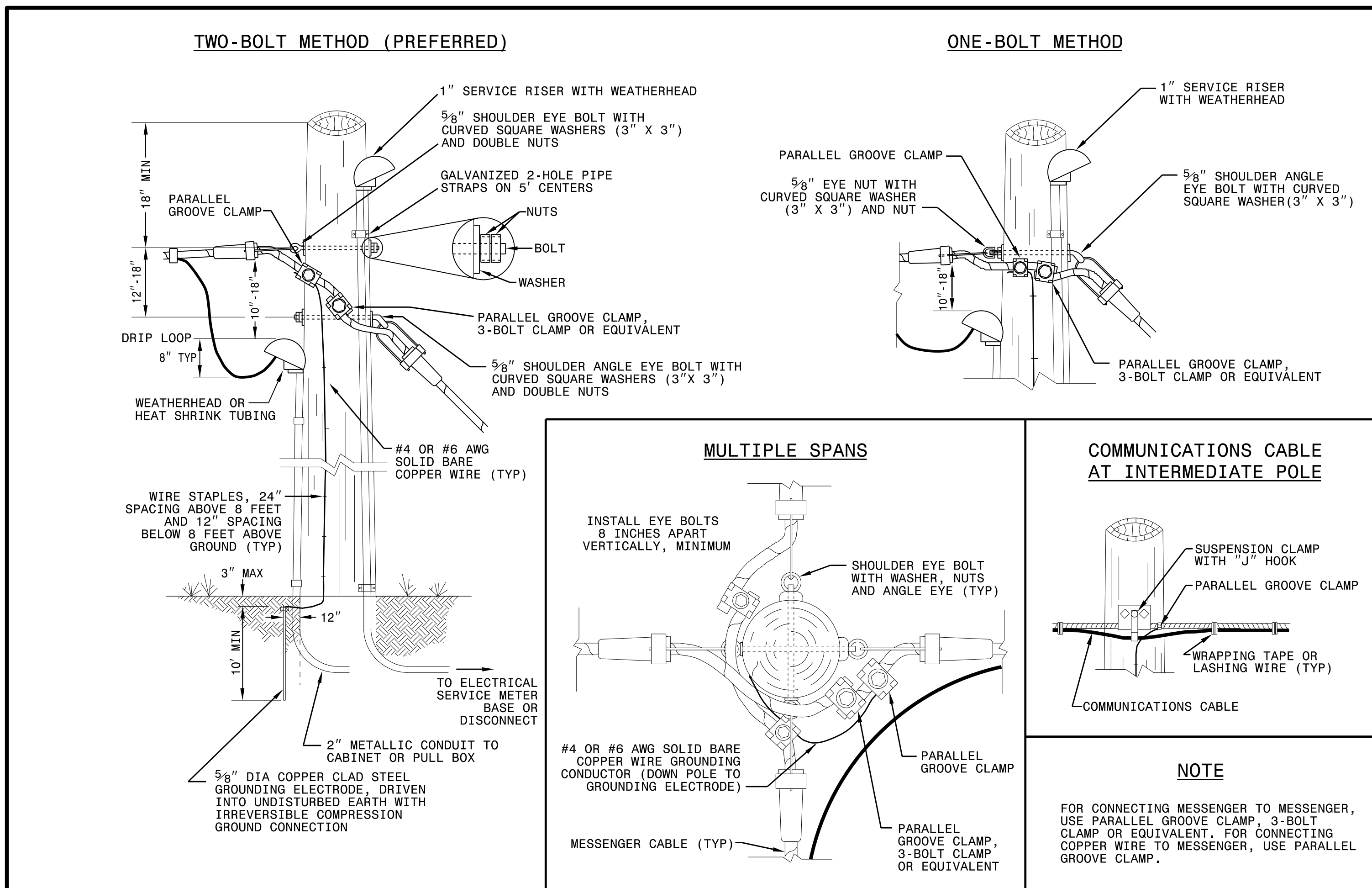
SHEET 1 OF 1  
**1700D01**



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

ENGLISH STANDARD DRAWING FOR  
**WOOD POLES**  
METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1  
**1720D01**



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

See Plate for Title

Prepared in the Offices of:

SEAL

DocuSigned by: Mohd Aslami

10/11/2017

750 N. Greenfield Parkway  
Garner, NC 27529

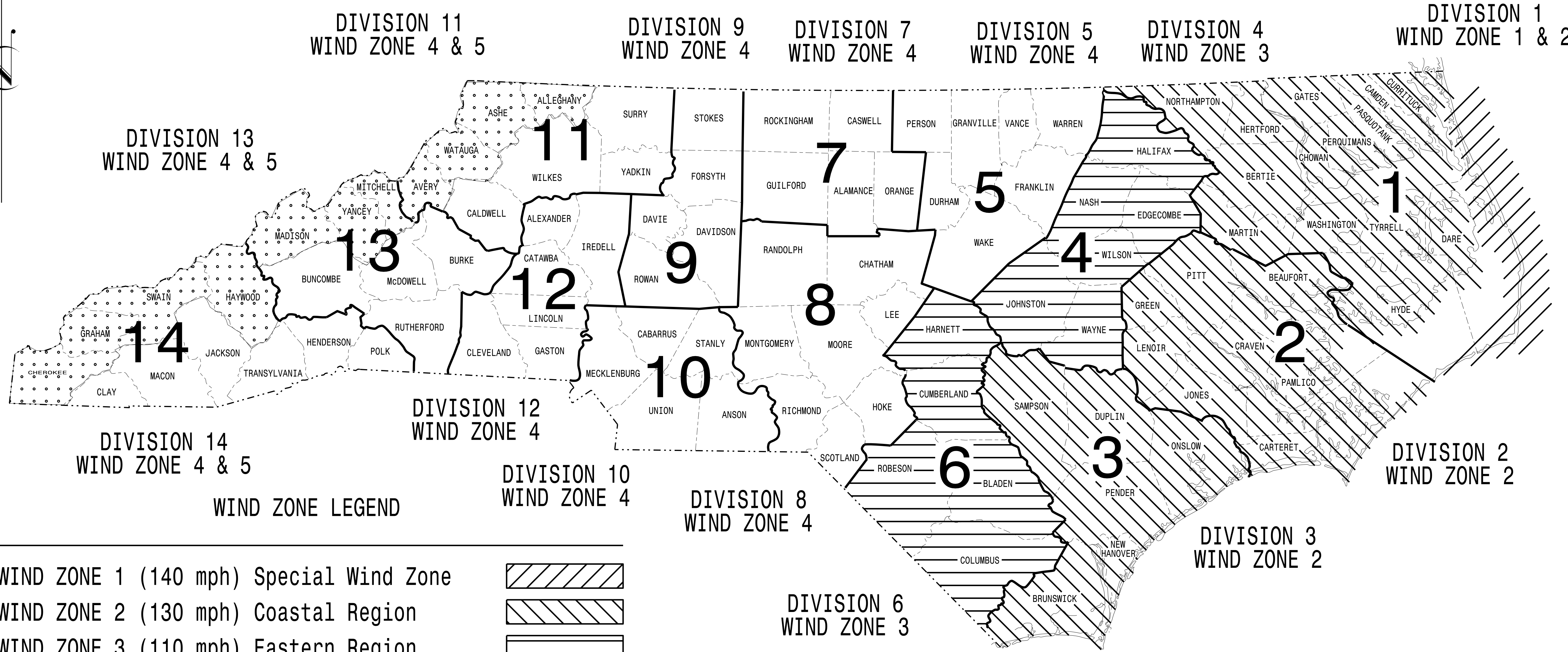
DATE

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# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO. <b>U-5795</b>	SHEET NO. <b>Sig.M1</b>
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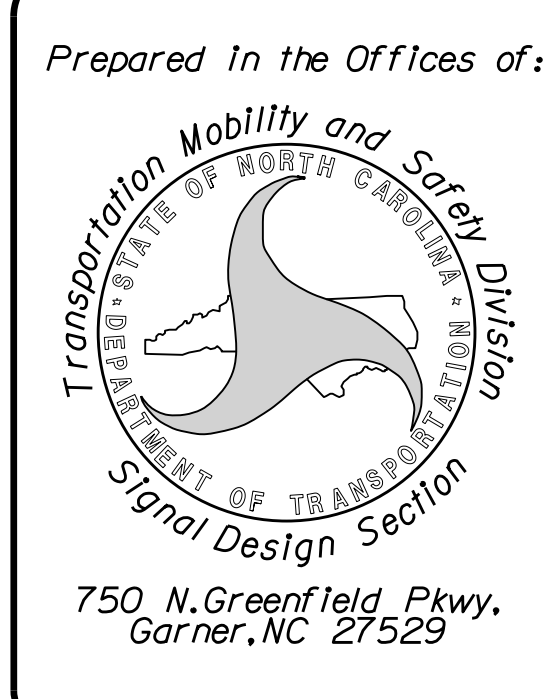
## STANDARD DRAWINGS FOR ALL METAL POLES



**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>



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

**NC DOT 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**

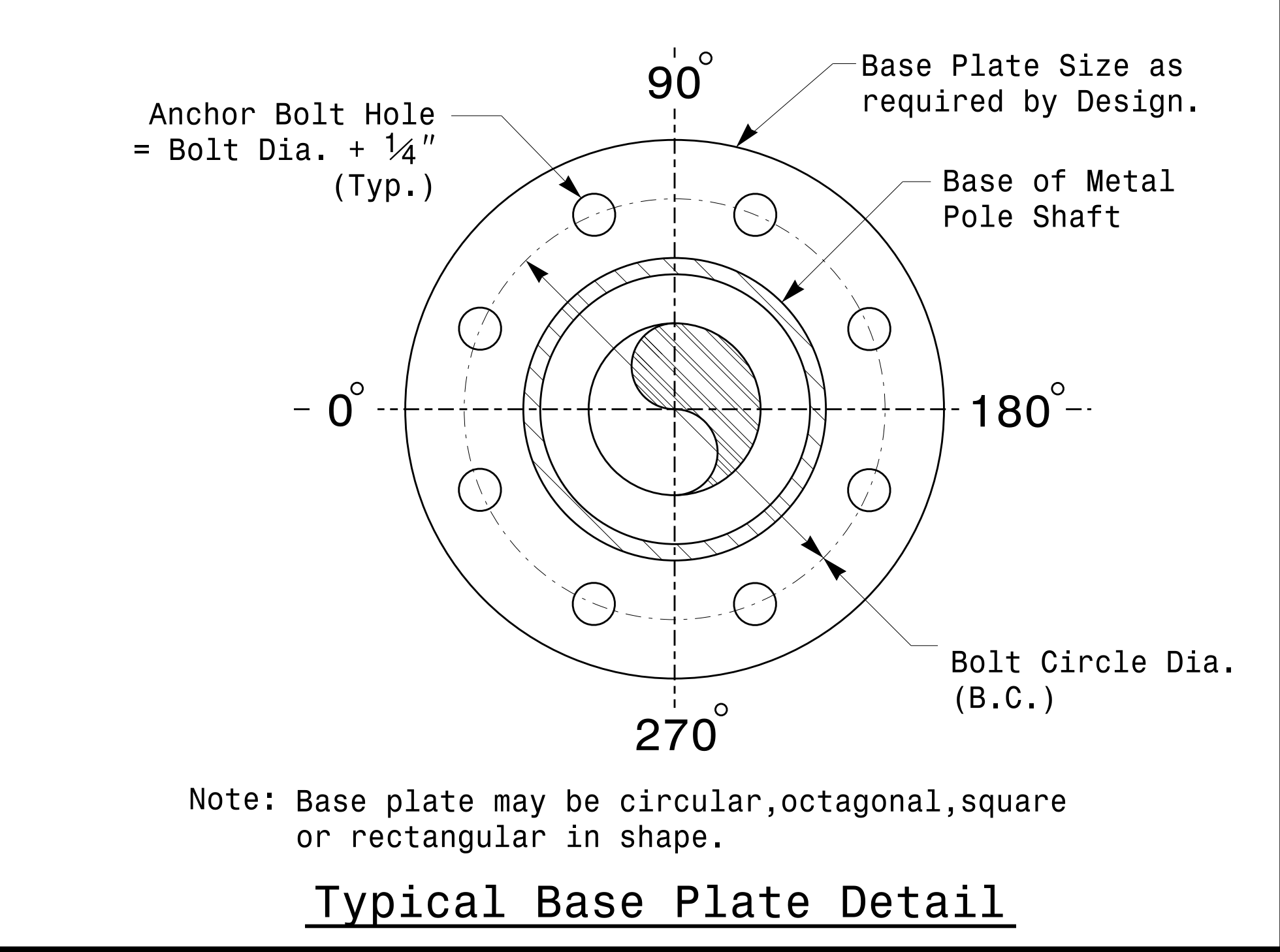
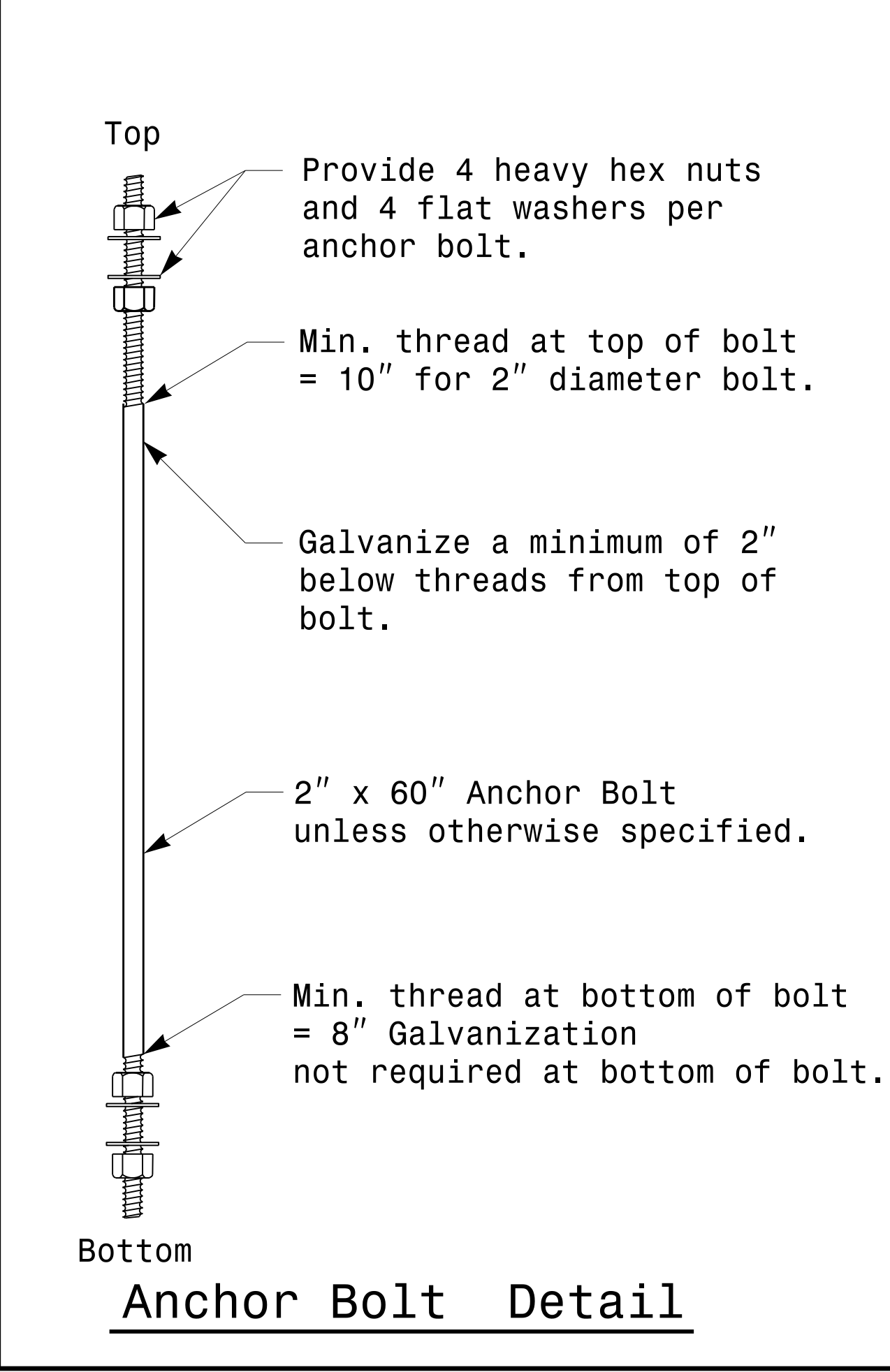
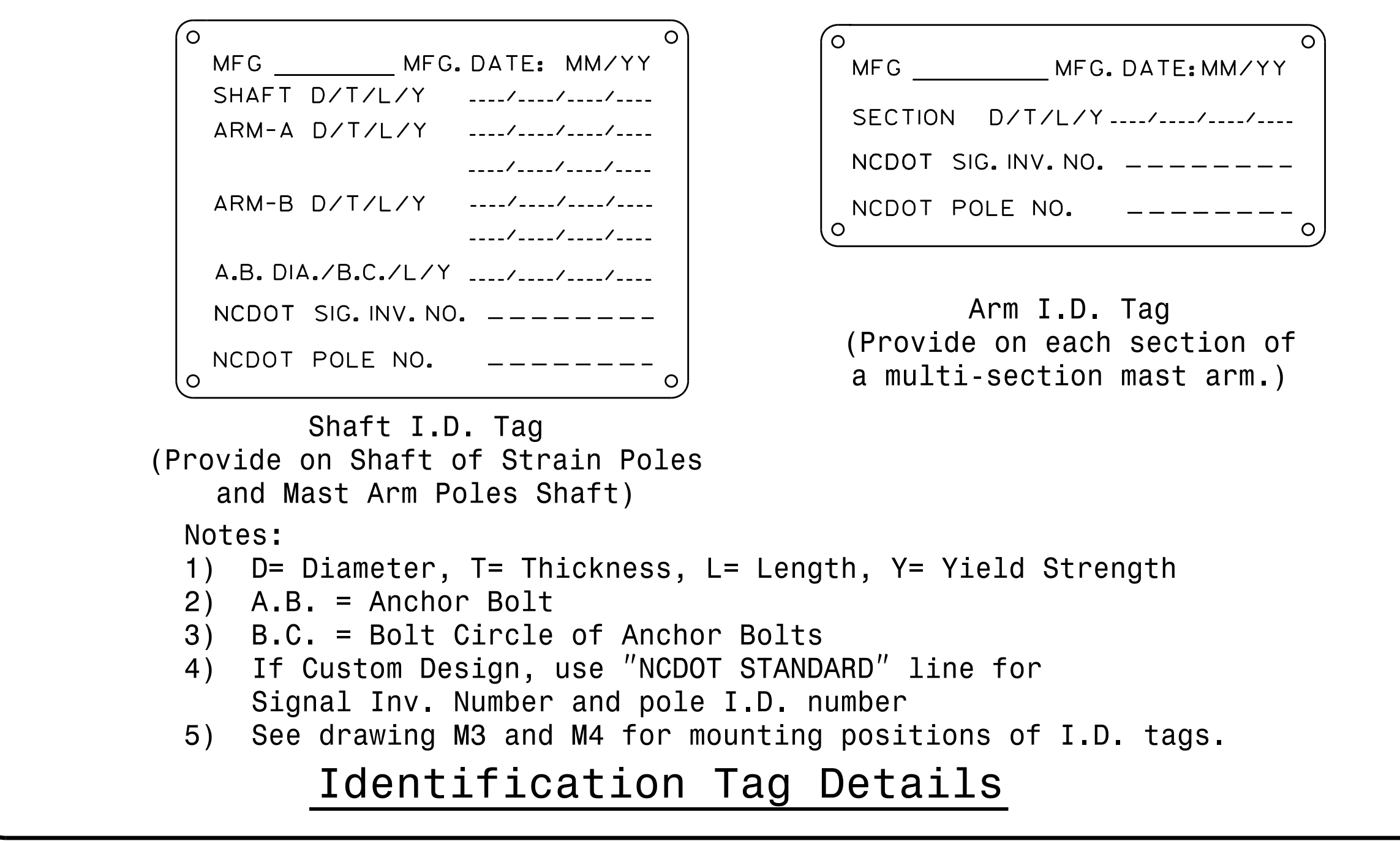
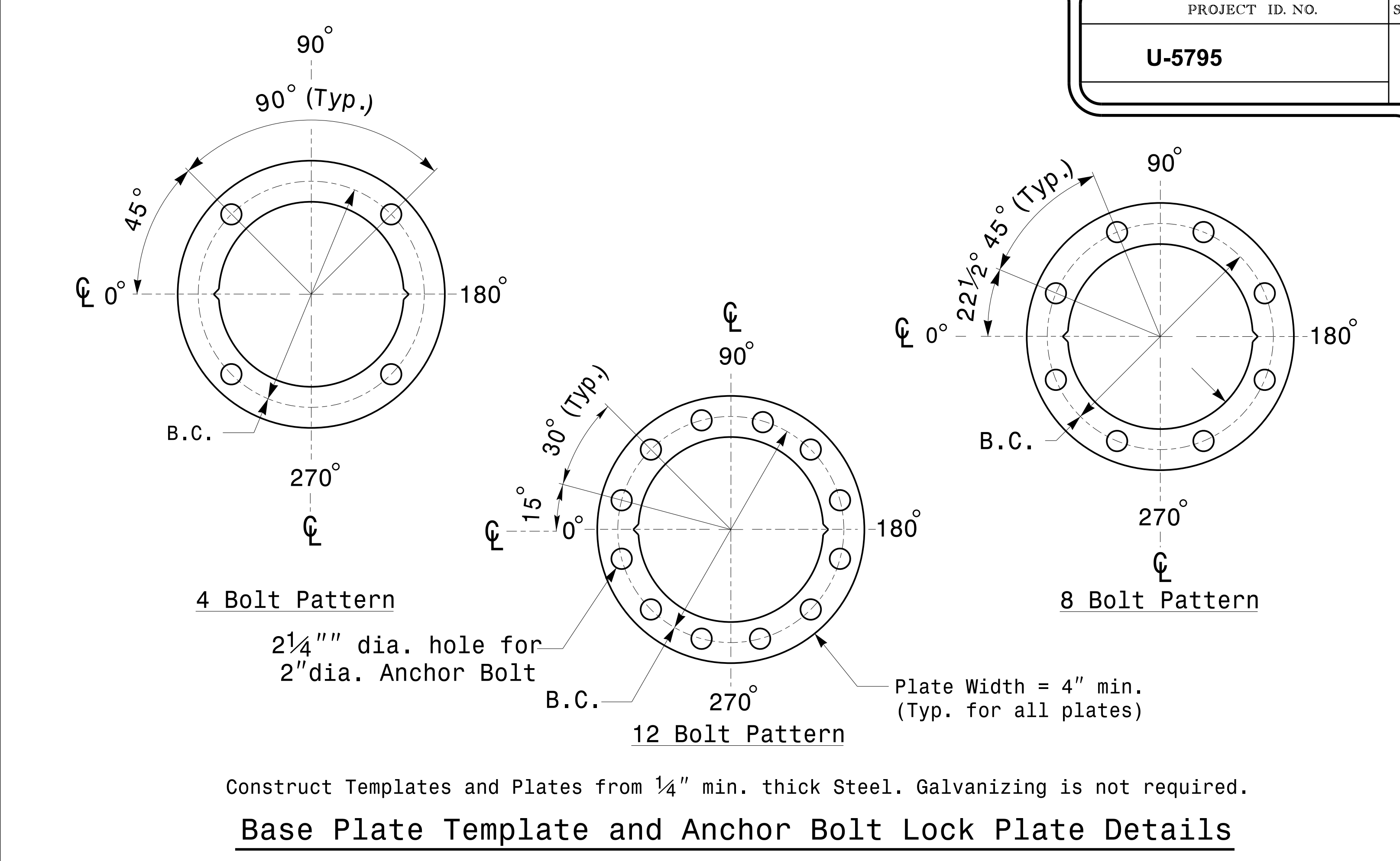
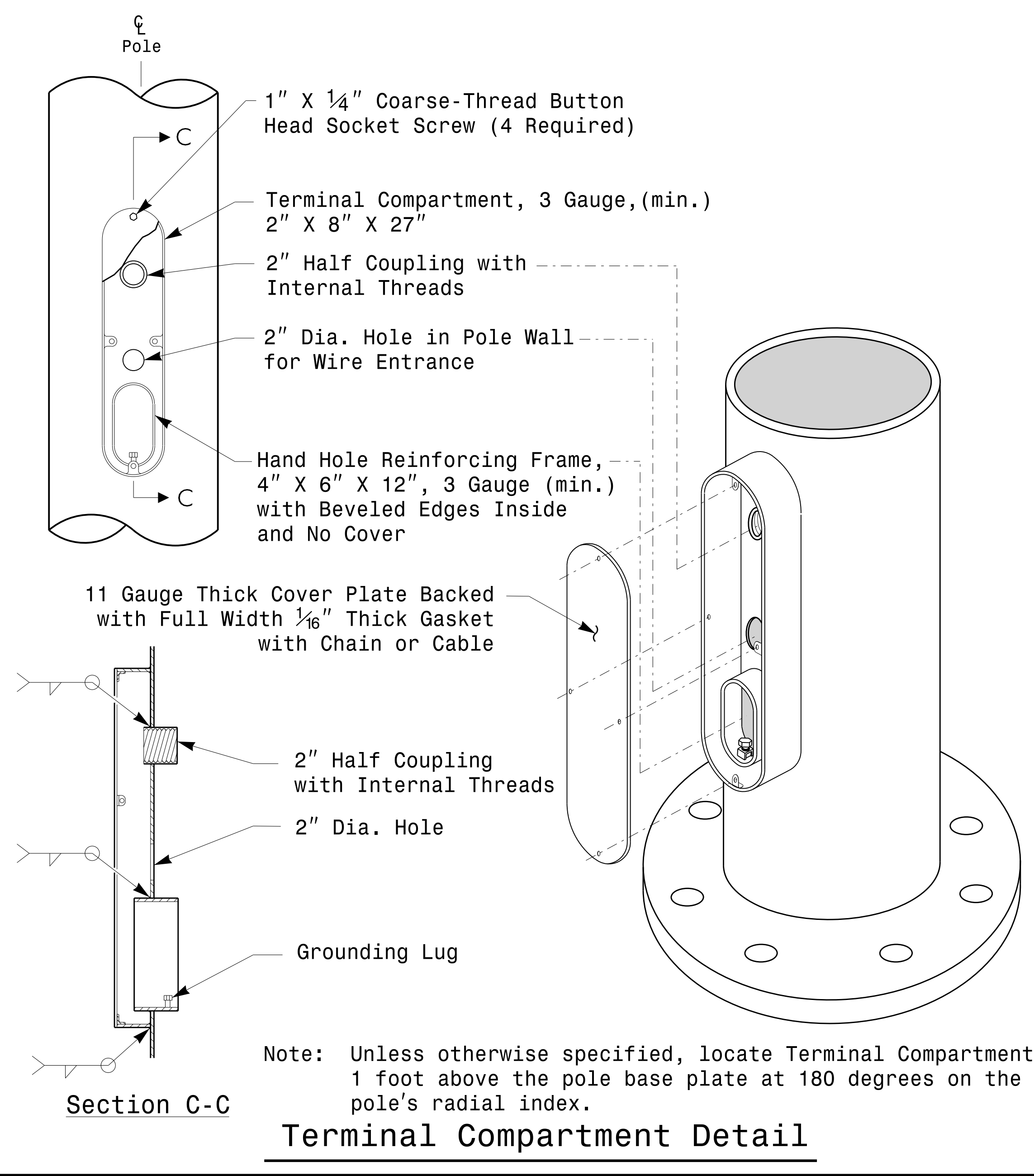
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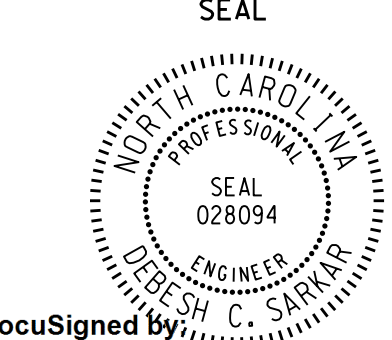

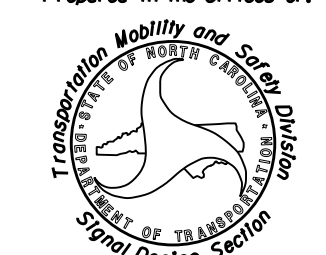
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DocuSigned by:  
*Debesh C. Sarkar*

2/17/2016  
DATE





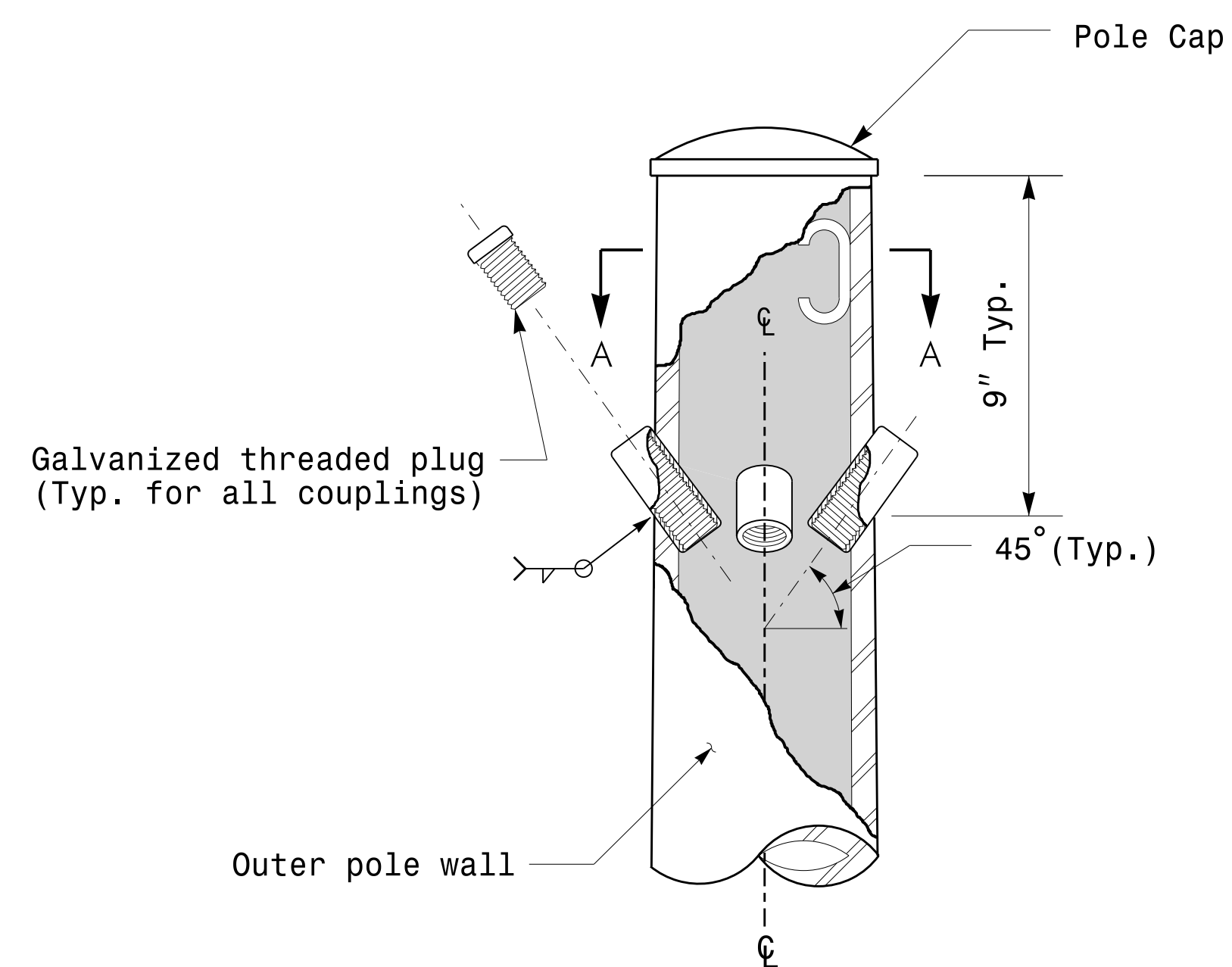
 SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR	<b>Typical Fabrication Details For All Metal Poles</b>		DocuSigned by  DEBESH C. SARKAR 44E8E32E147E4C...
	Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	PLAN DATE: FEBRUARY 2016 DESIGNED BY: C.F. ANDREWS PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	

SCALE: 0 NONE

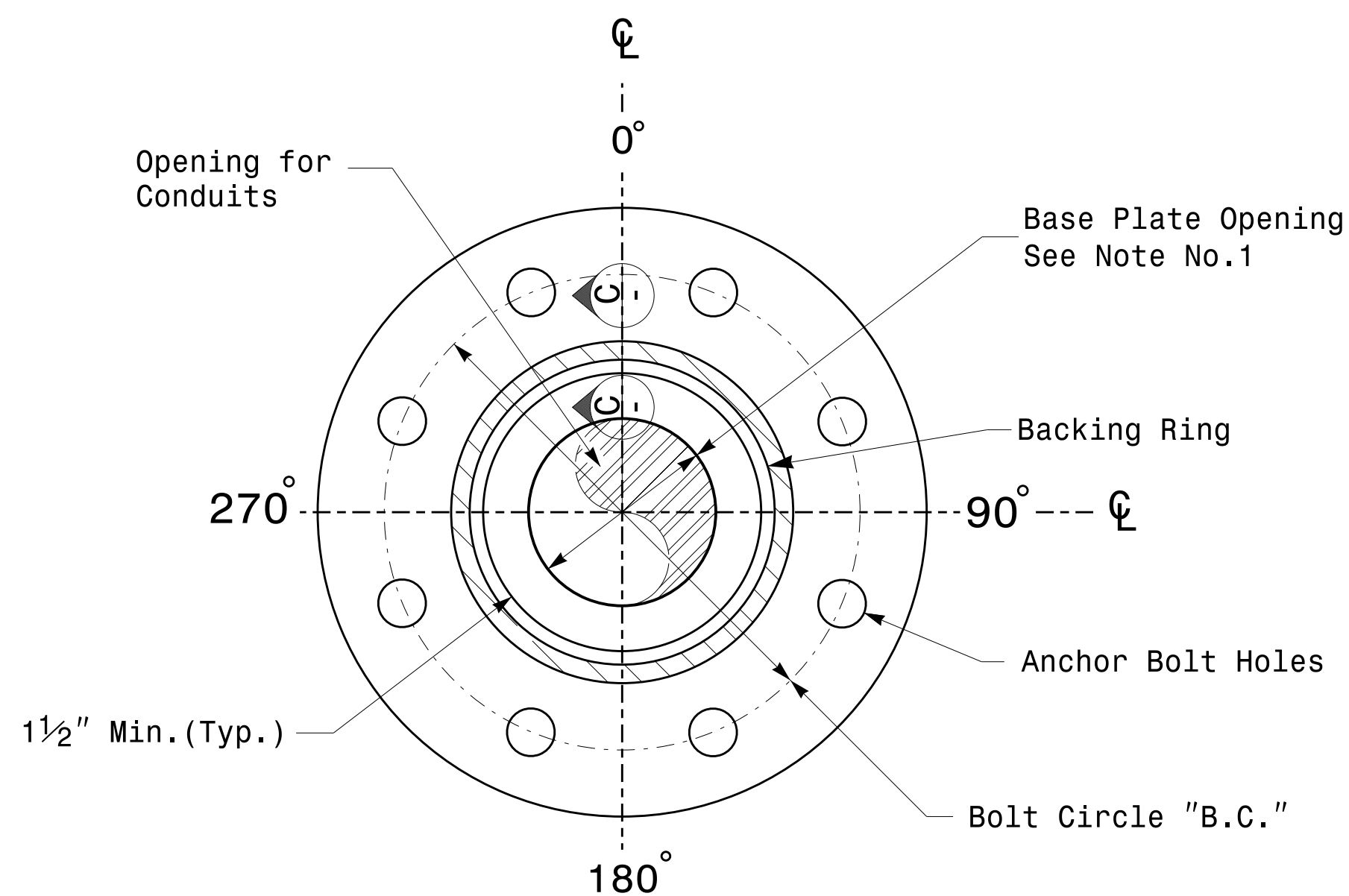
DATE: 2/17/2016

17-FEB-2016 16:02  
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 3/21/2016

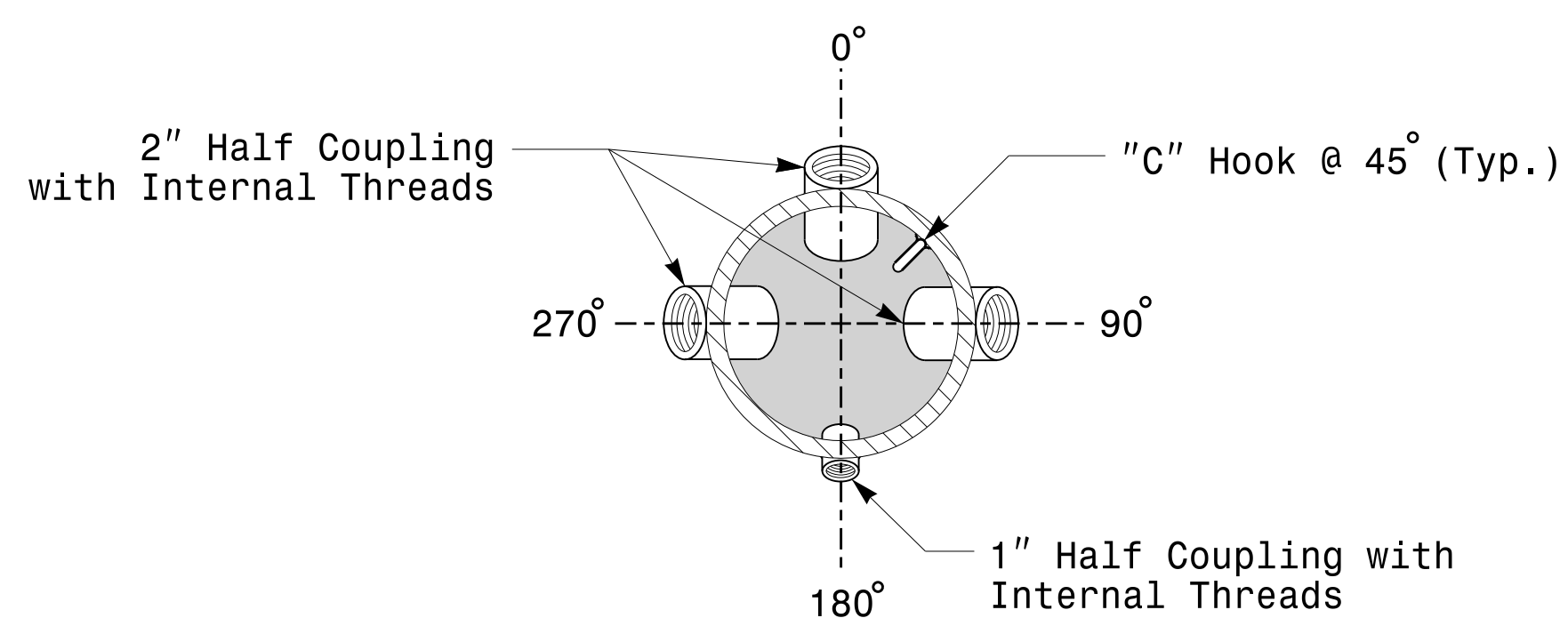
Note:  
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



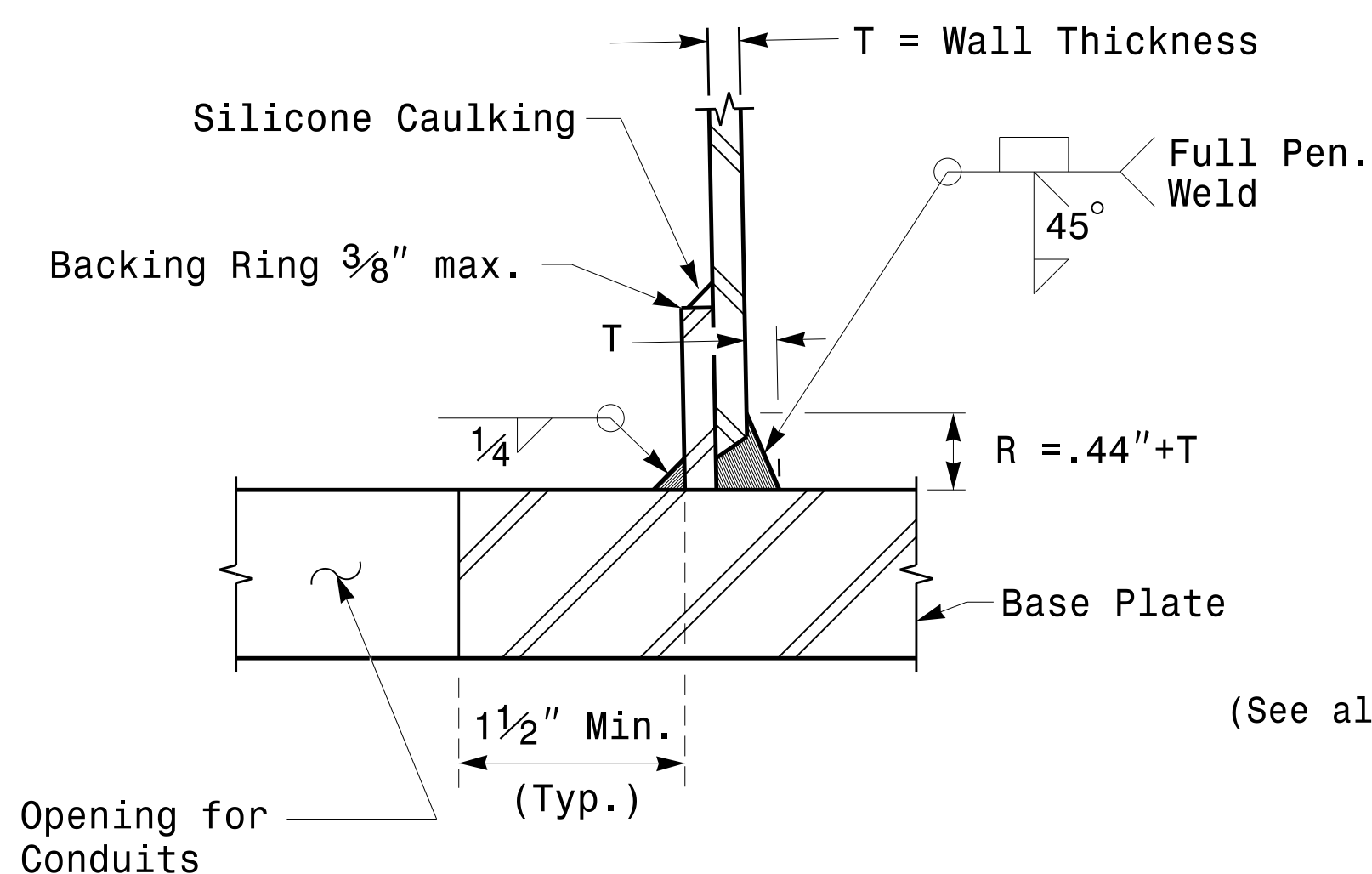
Cable Entrances at Top of Pole



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

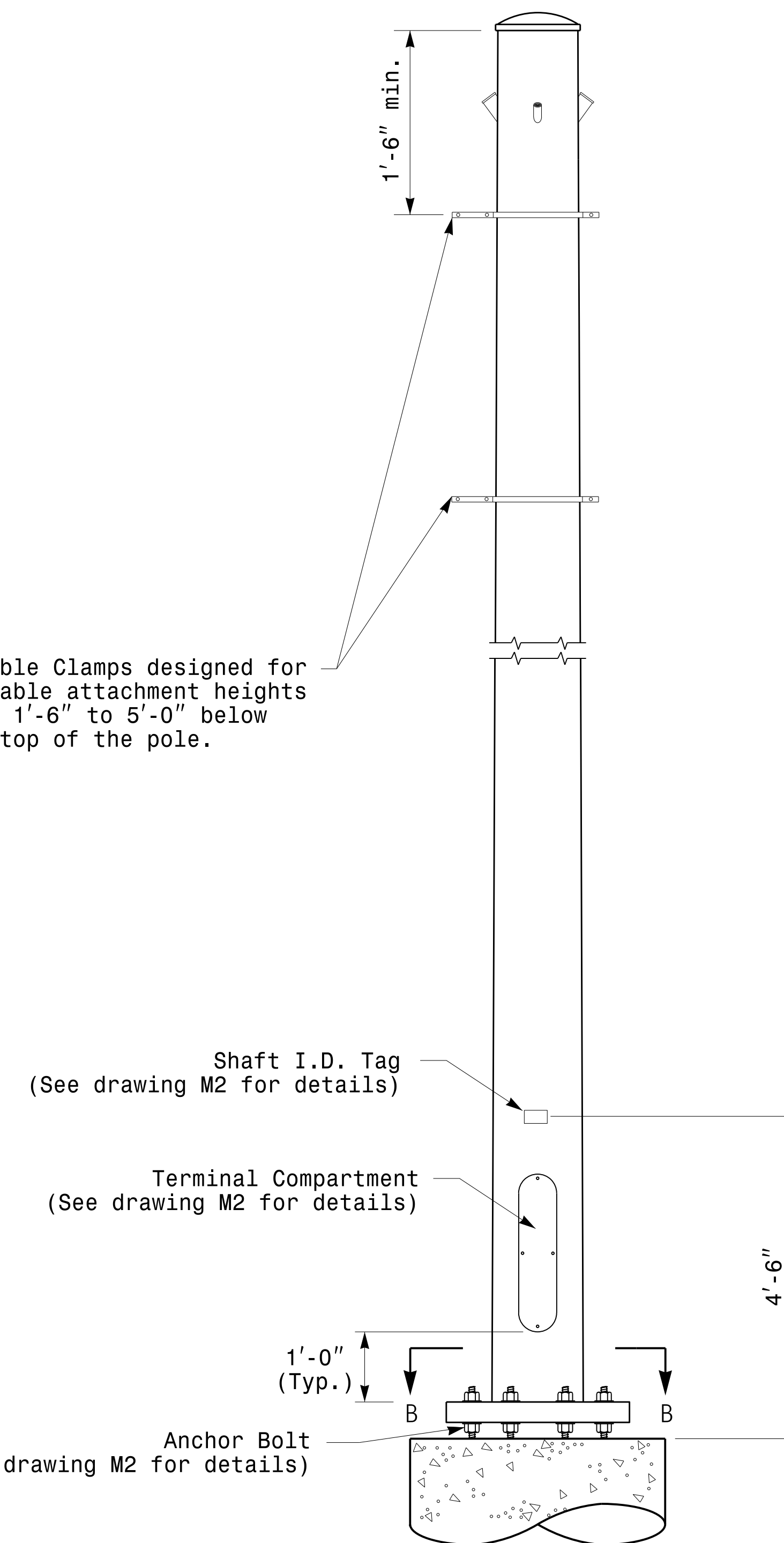


Section A-A  
 Radial Orientation for Factory Installed  
 Accessories at Top of Pole



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

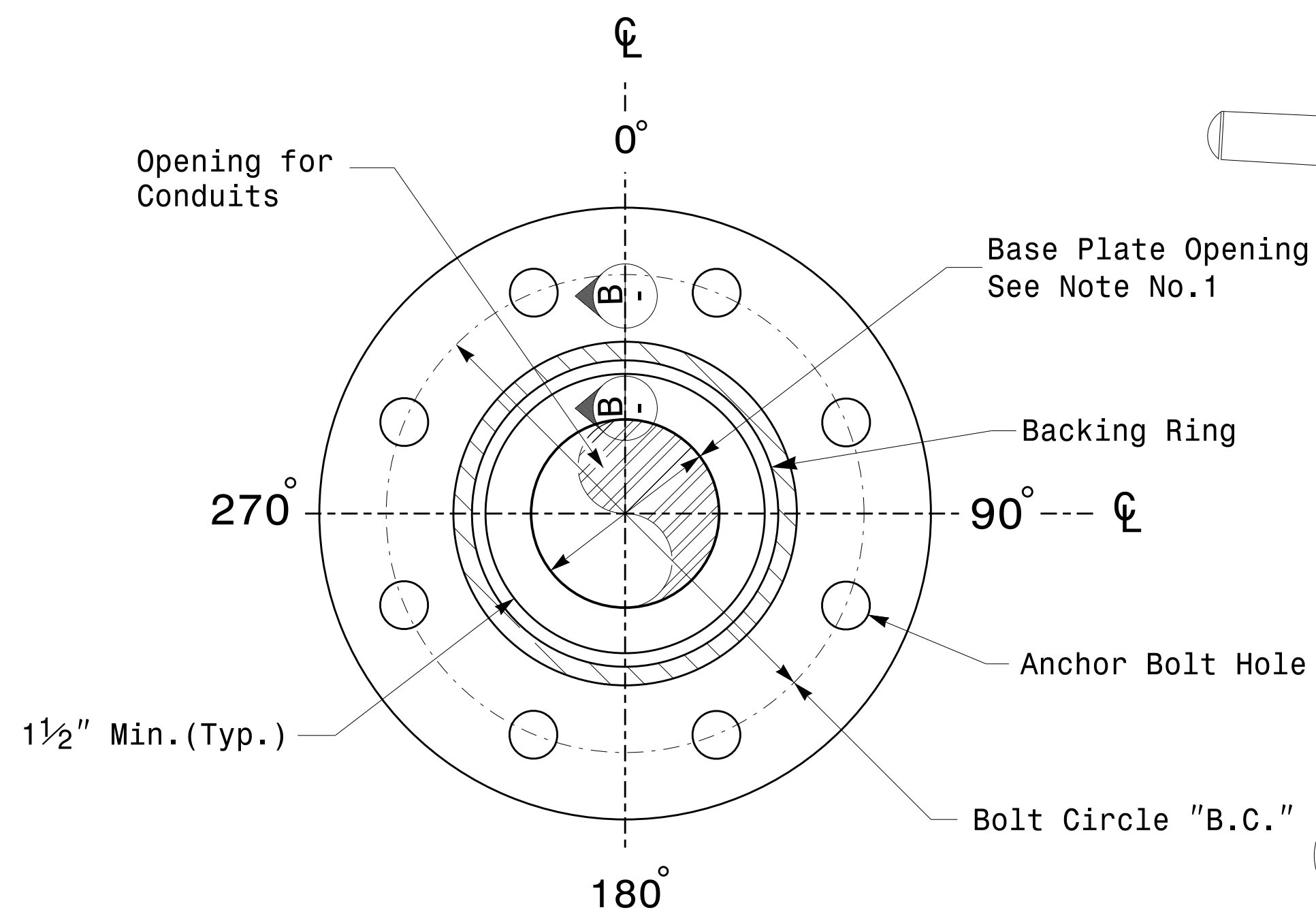
Prepared in the Offices of:  
  
 750 N. Greenfield Pkwy, Garner, NC 27529

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	

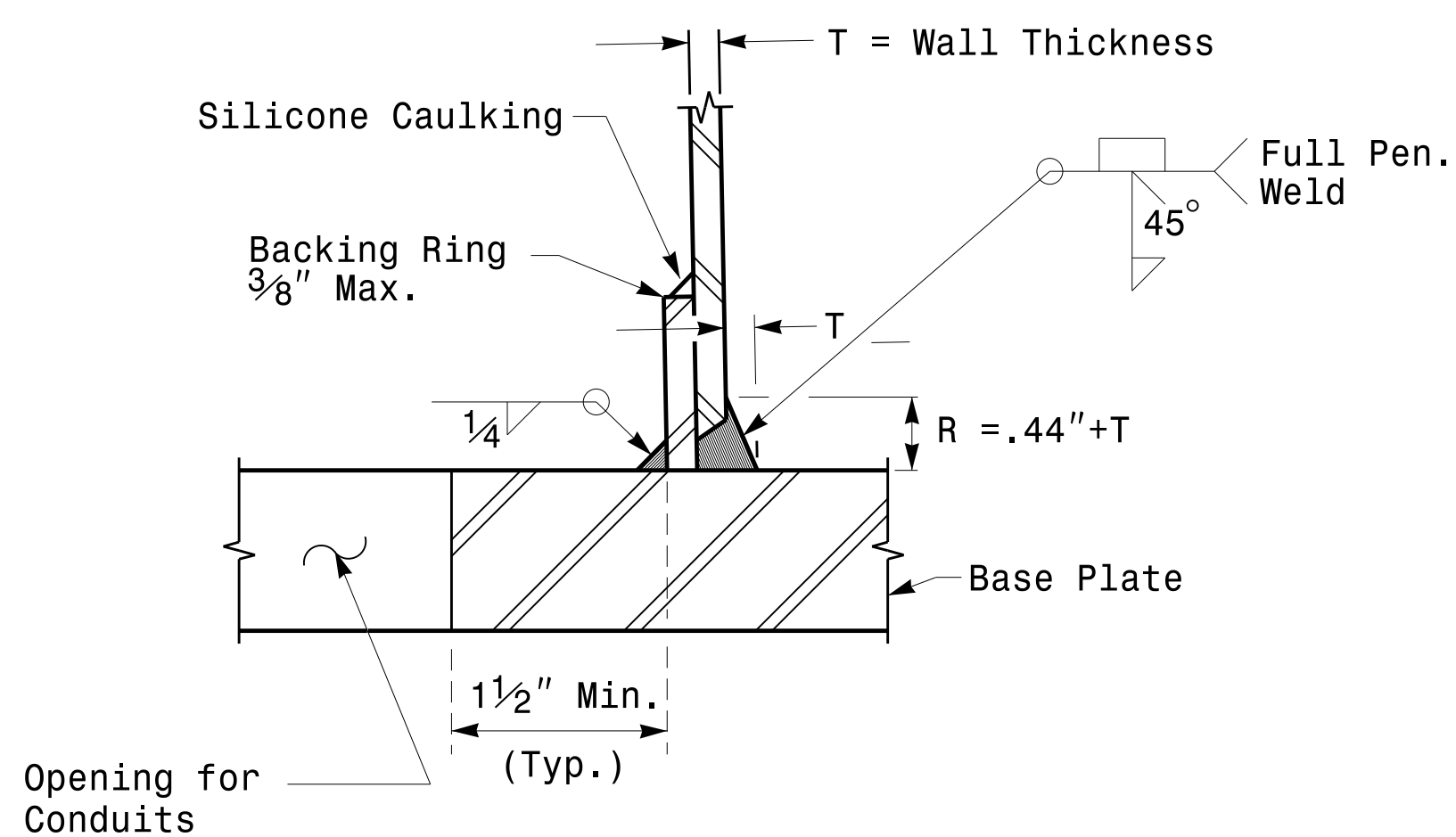
SEAL  
  
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 Debesh C. Sarkar  
 SIGNATURE  
 44E8E32E147E4C4...  
 2/17/2016  
 DATE

Fabrication Details – Strain Poles

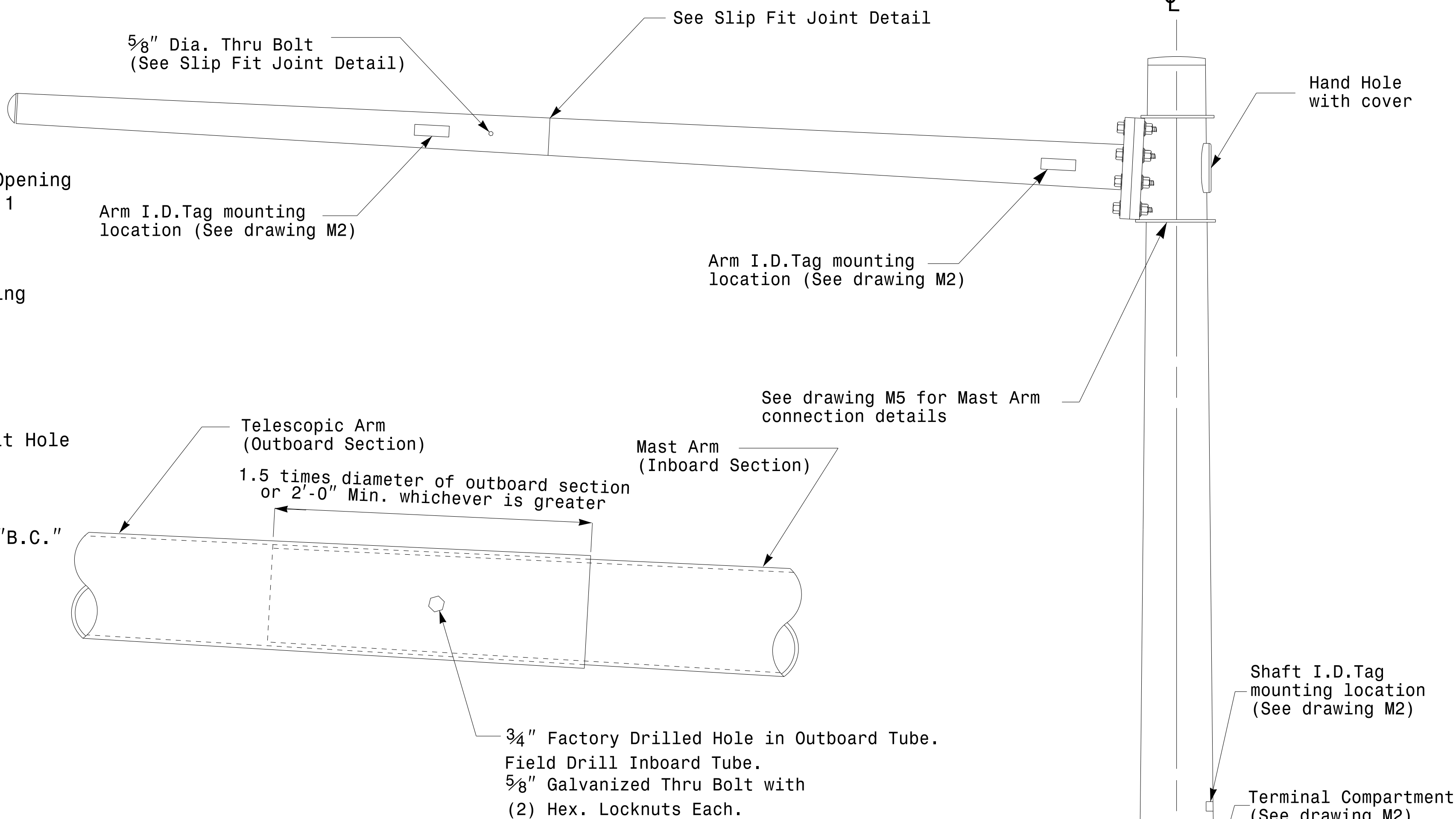
Note:  
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



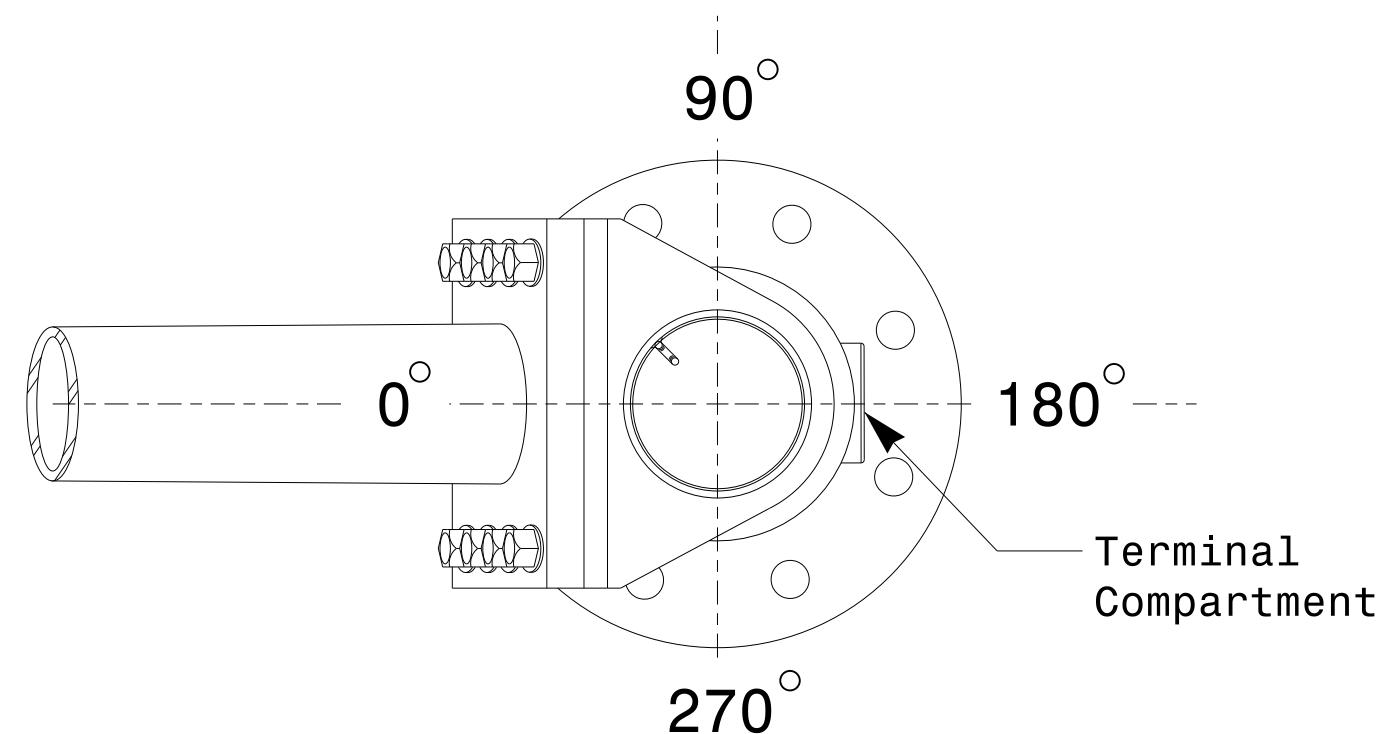
Section A-A  
Pole Base Plate Details



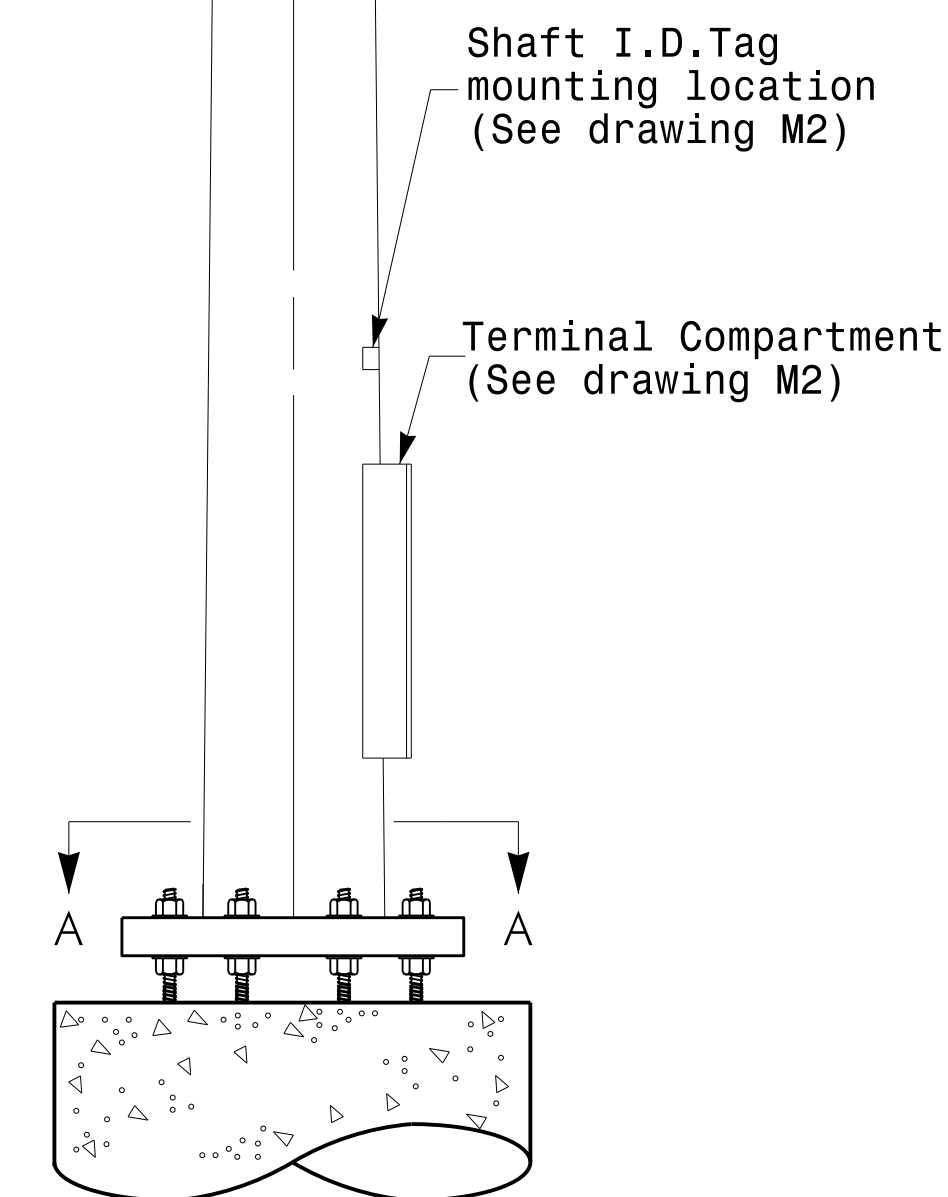
Section B-B  
(Pole Attachment to Base Plate)  
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation



Mast Arm Pole

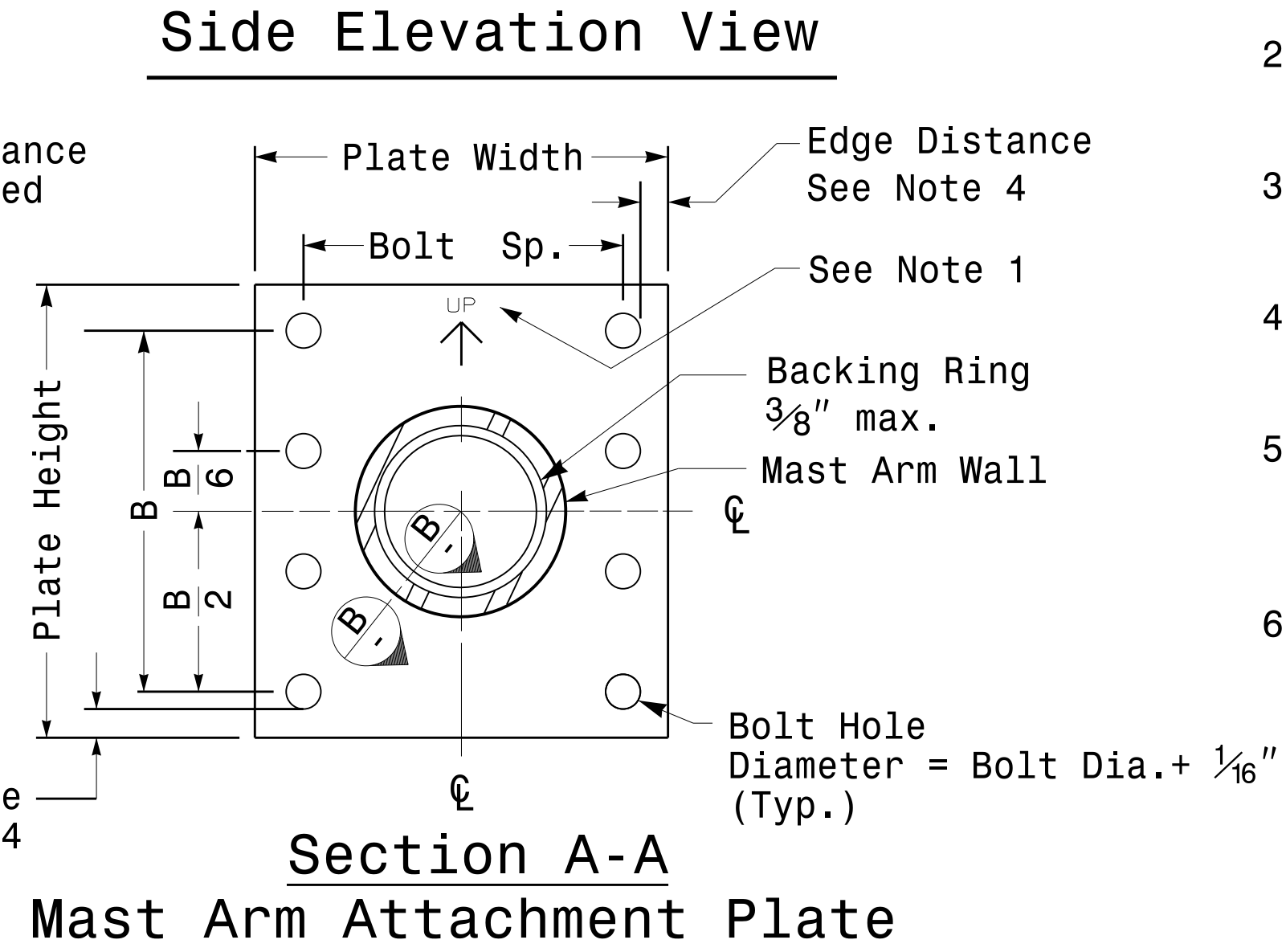
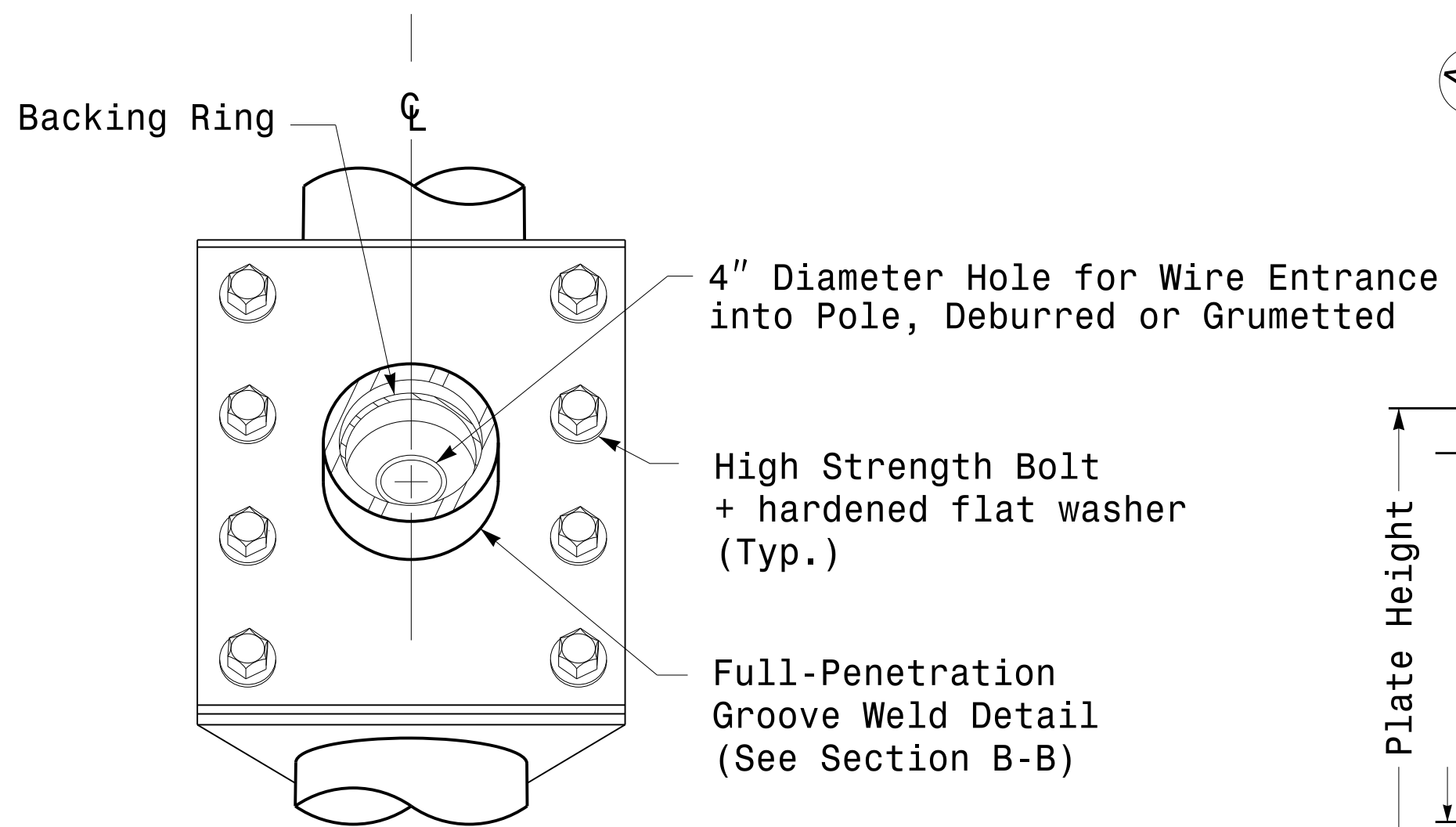
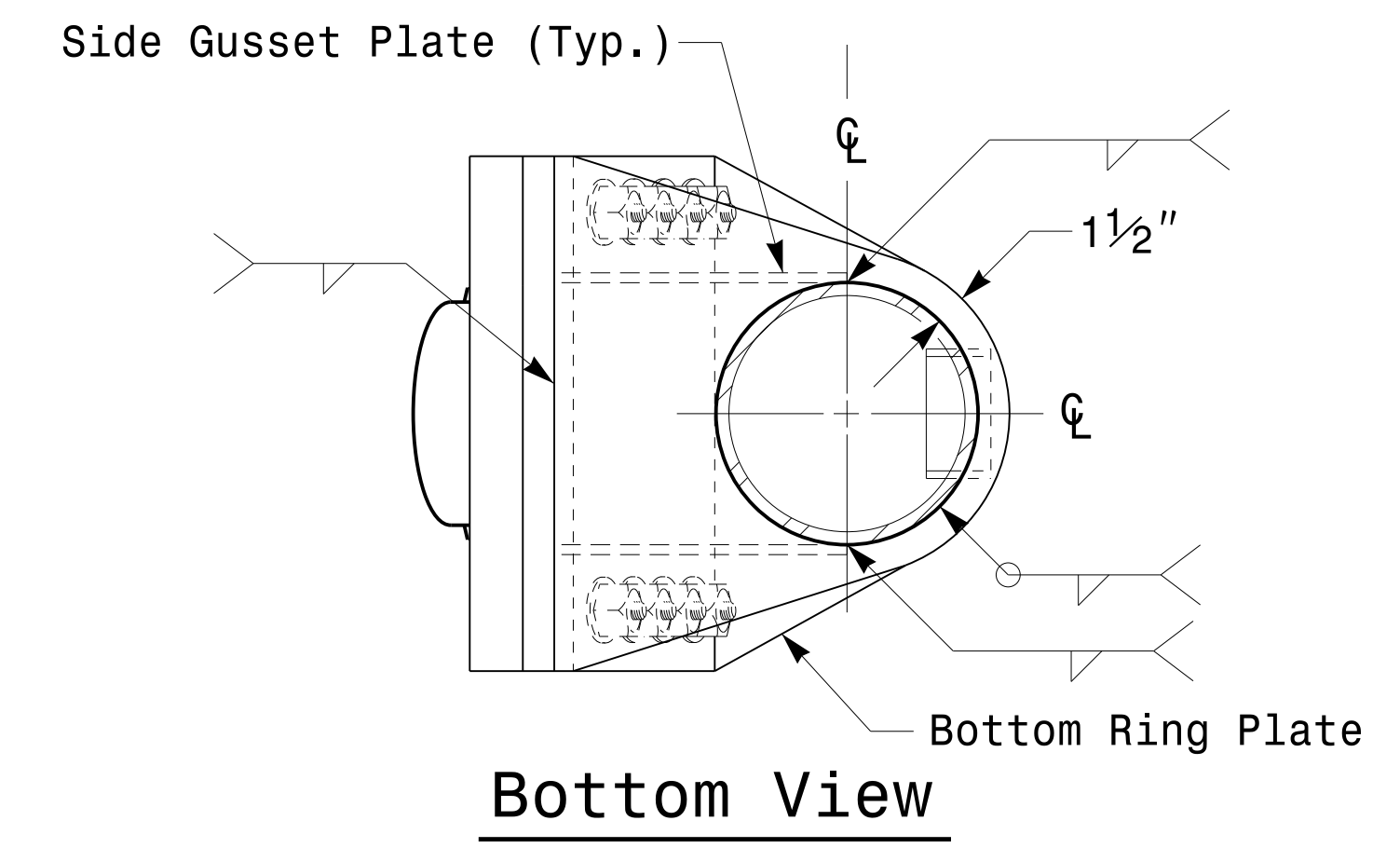
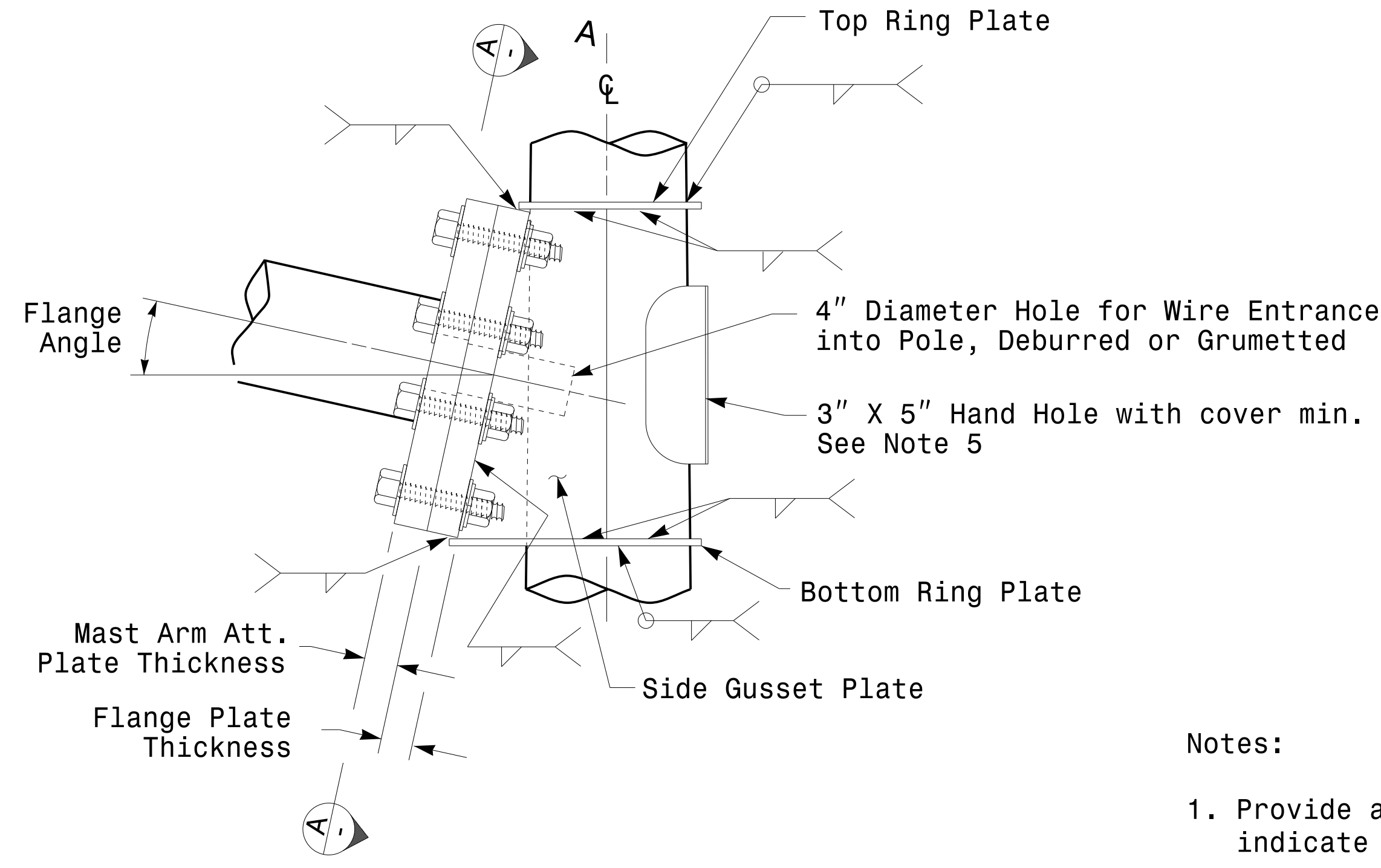
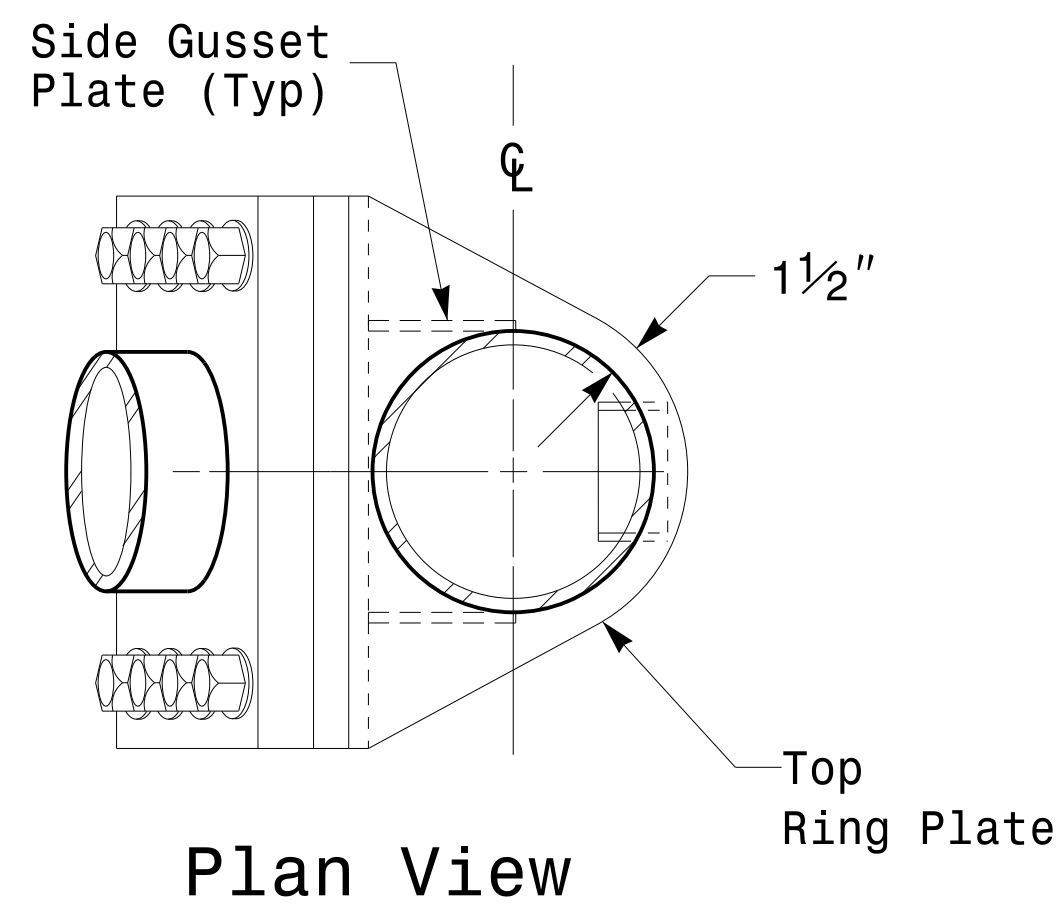
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Fabrication Details - Mast Arm Poles

<p>Prepared in the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Mast Arm Poles</p>		<p>SEAL</p> <p>DocuSigned by <i>Dibesh C. Sarkar</i></p>
	<p>PLAN DATE: FEBRUARY 2016</p>	<p>DESIGNED BY: K.C. DURIGON</p>	
<p>SCALE: 0 NA NONE</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVIEWED BY: D.C. SARKAR</p>	<p>DATE</p>
	<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>

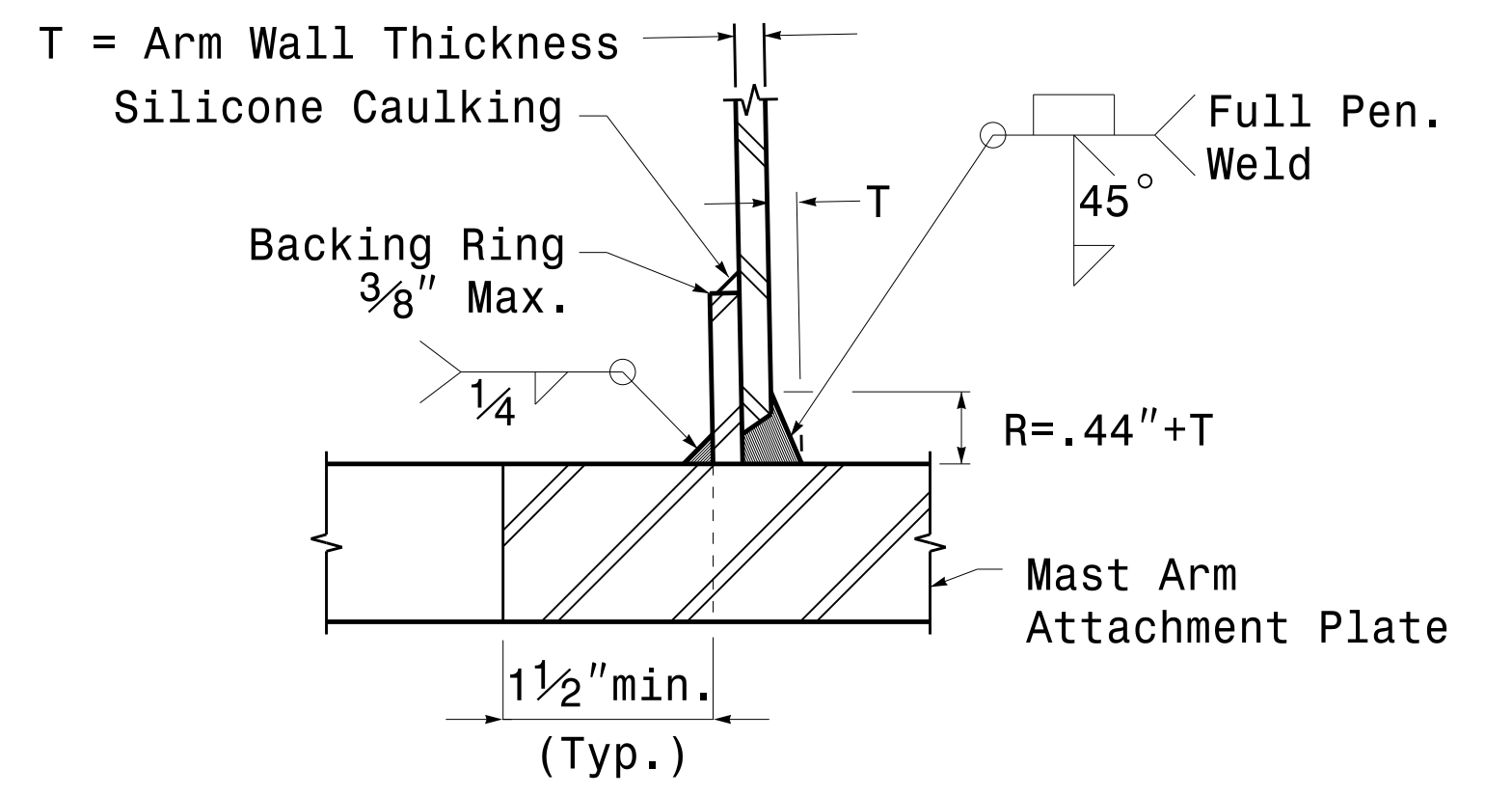
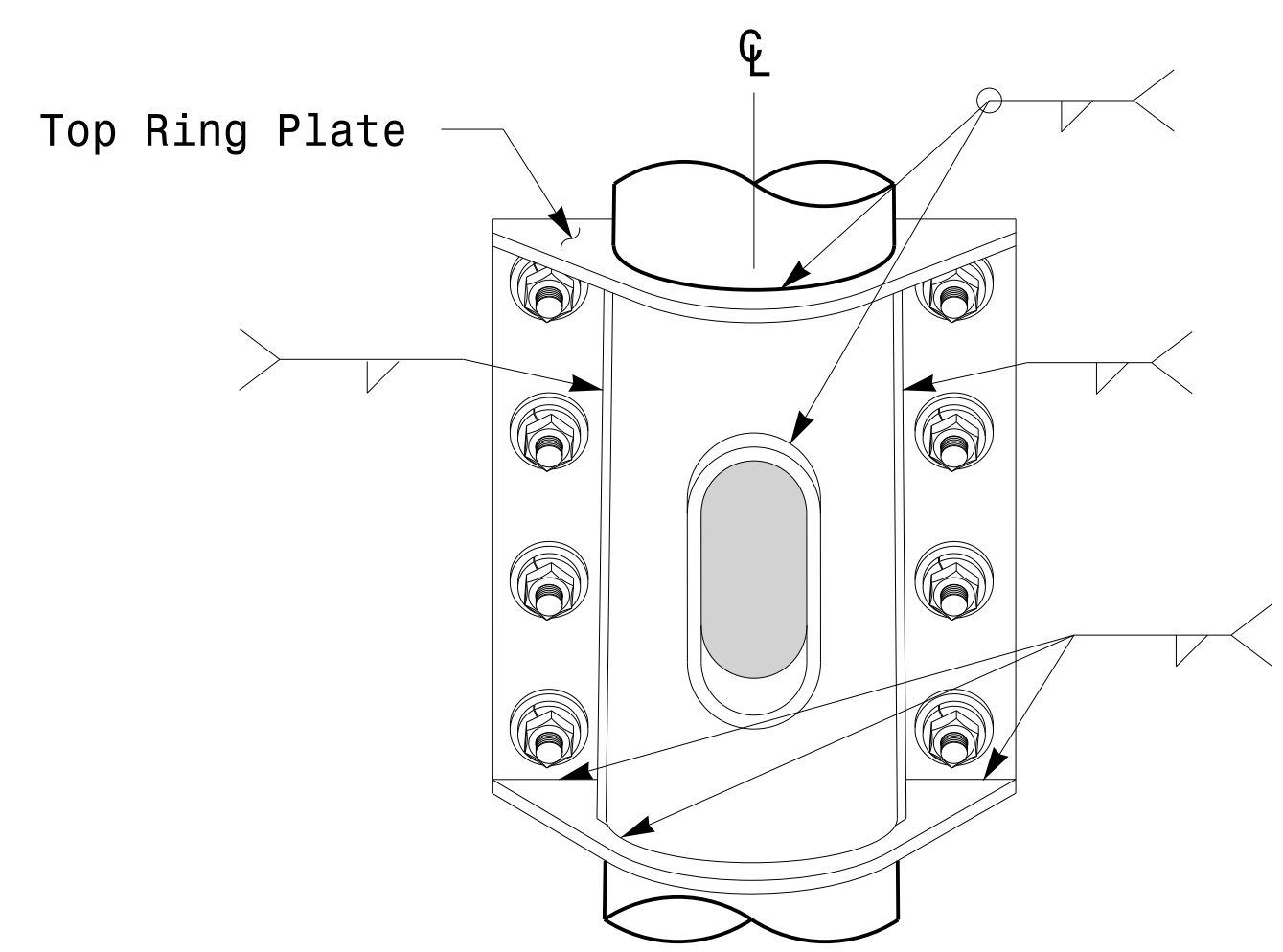
# Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO. <b>U-5795</b>	SHEET NO. <b>Sig.M5</b>
----------------------------------	----------------------------



**Notes:**

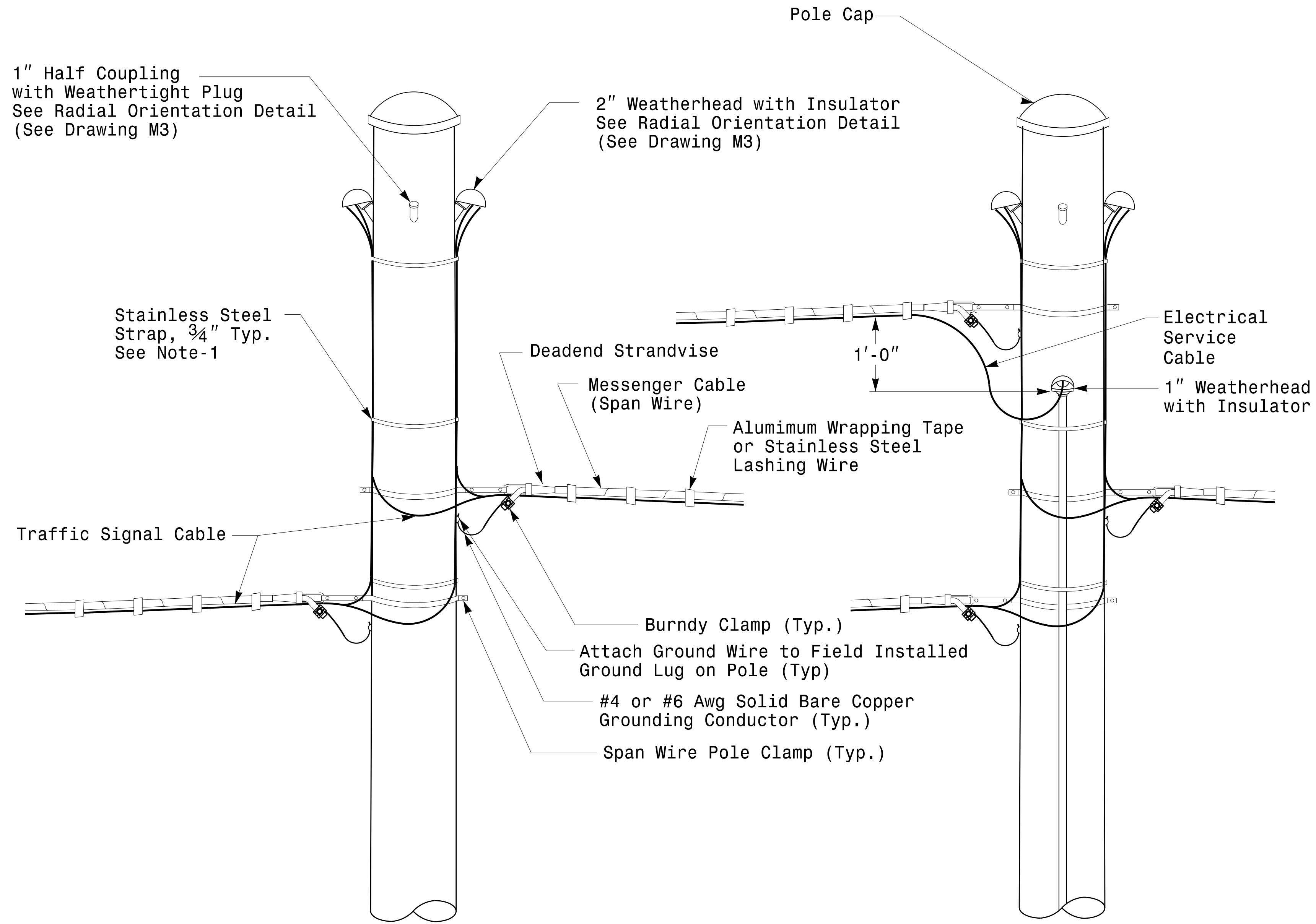
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Fabricator is responsible for providing 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.



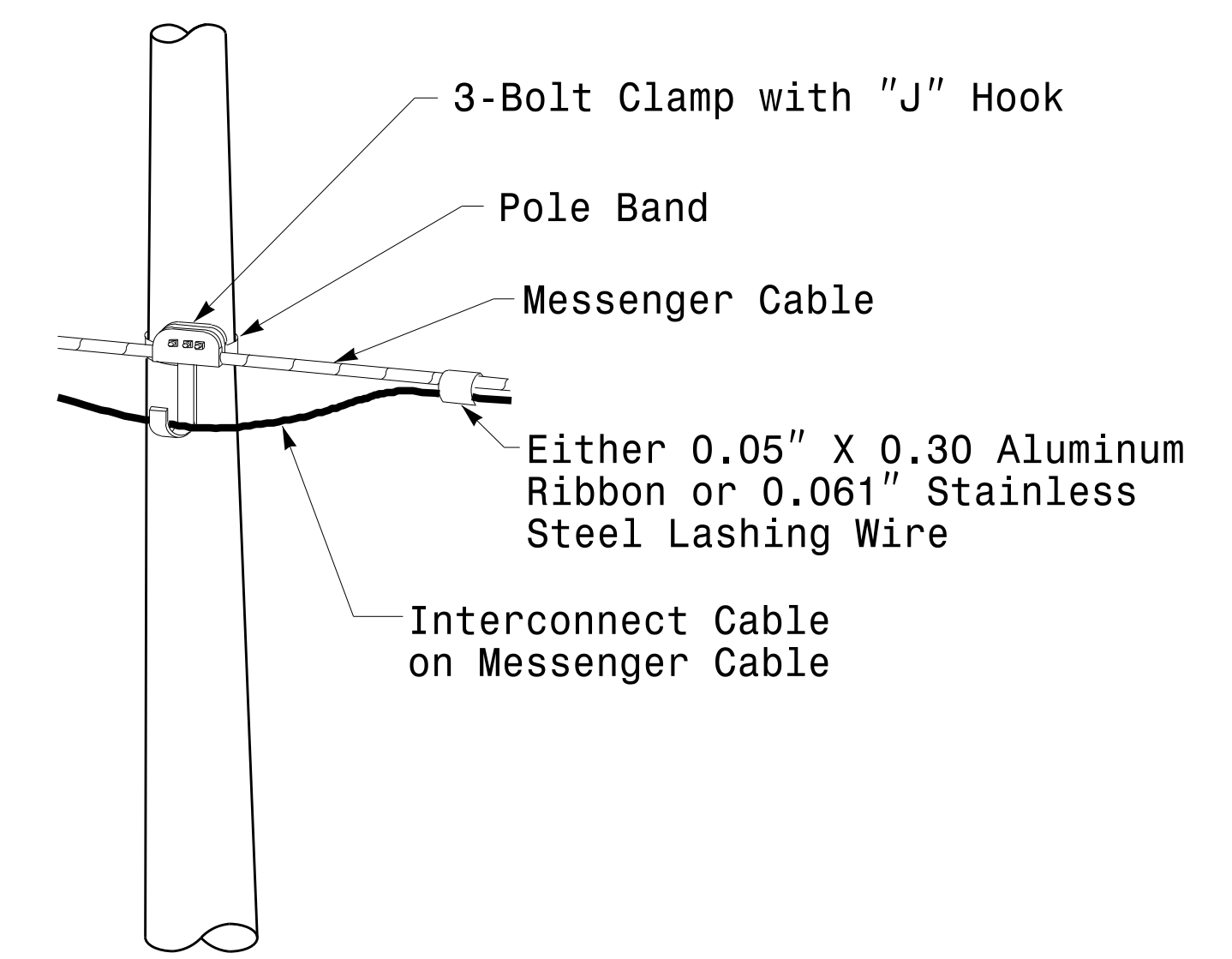
Prepared in the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	Typical Fabrication Details For Mast Arm Connection To Pole		SEAL  DocuSigned by: Debesh C. Sarkar 44E8E32E147E4C4...
	PLAN DATE: FEBRUARY 2016 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE			

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 Design Section\Eastern Region\115\Sig.M5.dgn  
 Connection Fabrication Detail\Mast Arm Pole.dgn  
 3/21/2016

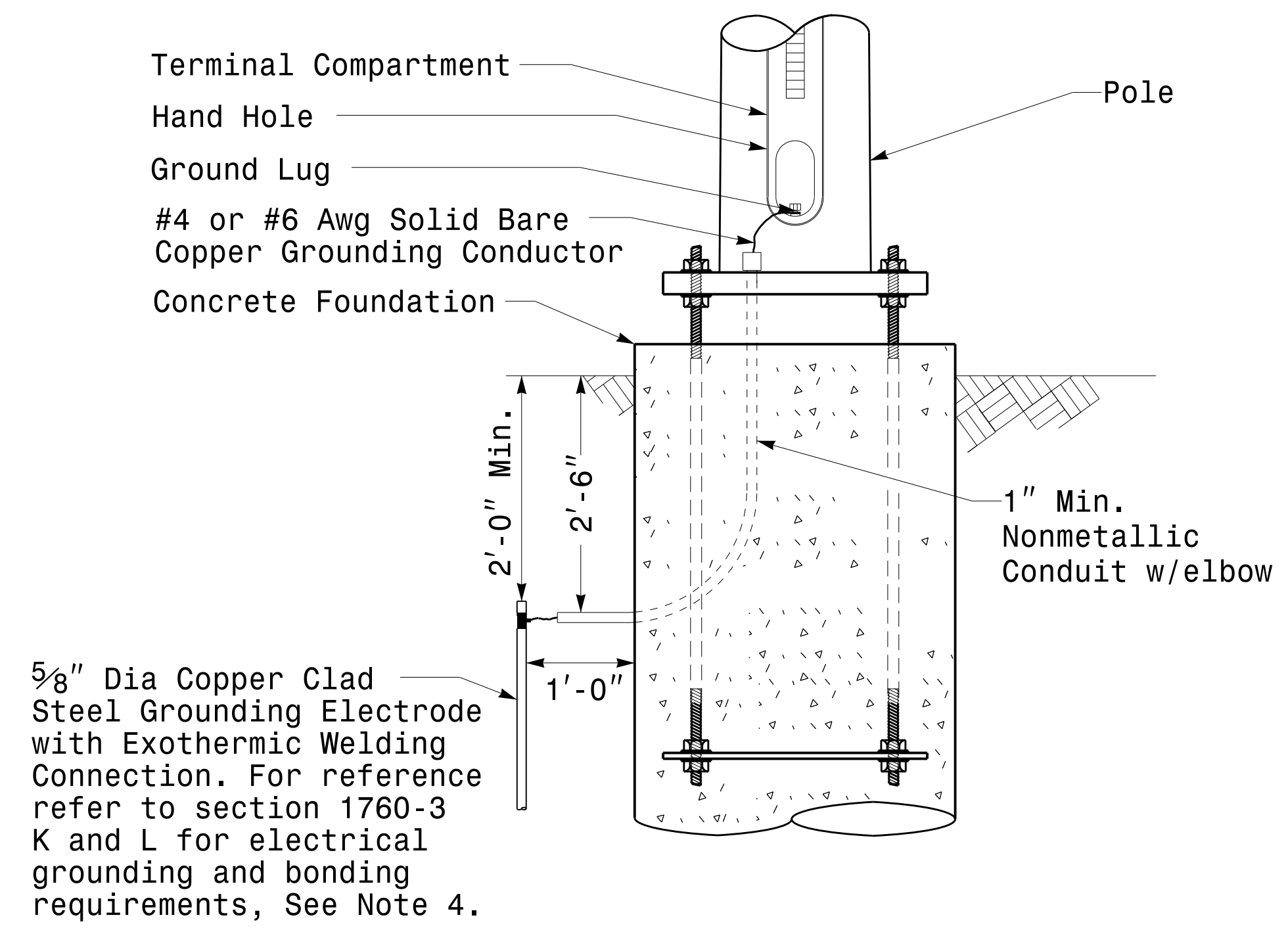
Fabrication Details – Mast Arm Connection



**Strain Pole Attachments**



**Attachment of Cable to Intermediate Metal Pole**



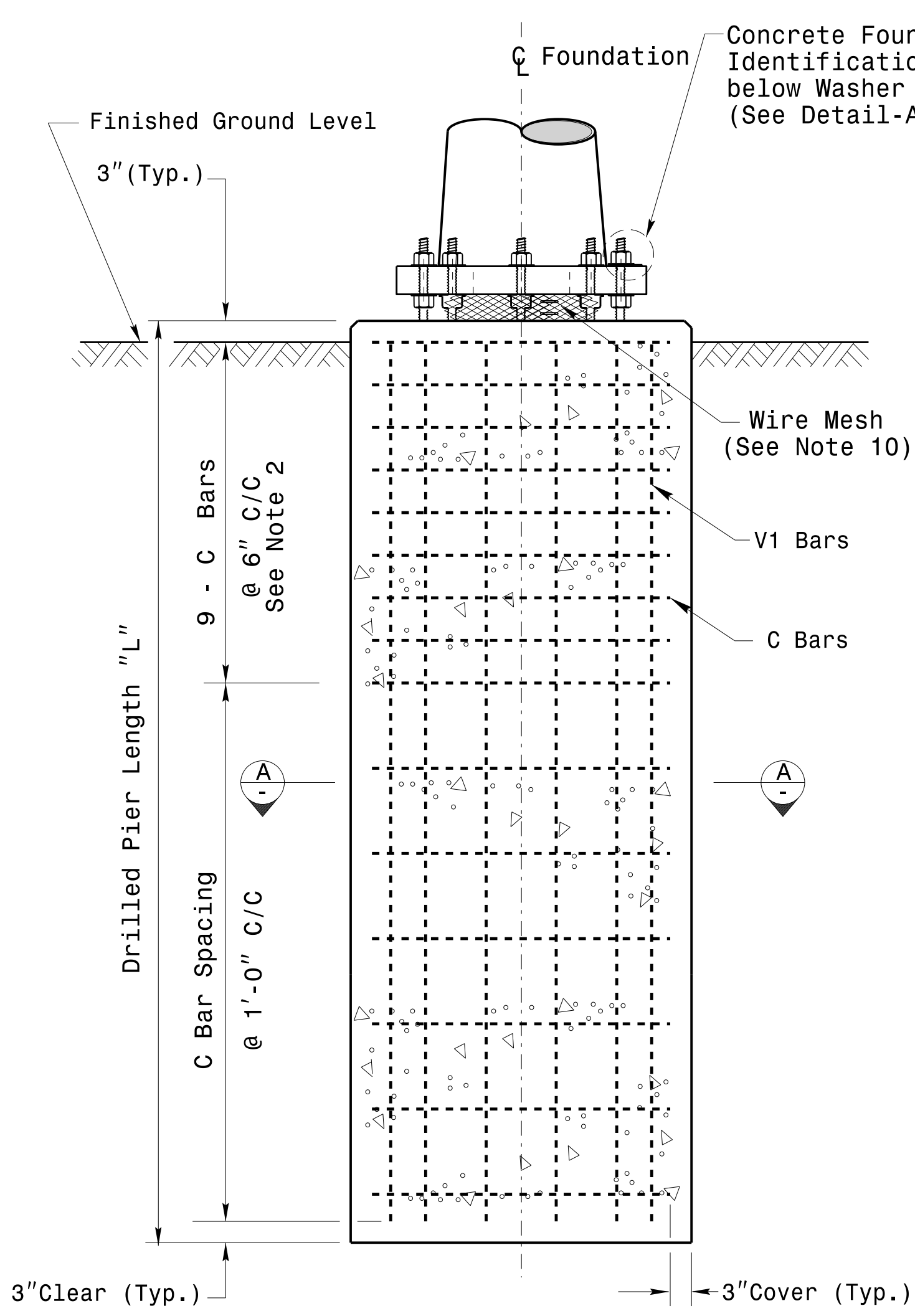
**Metal Pole Grounding Detail For Strain Pole and Mast Arm**

**NOTE:**

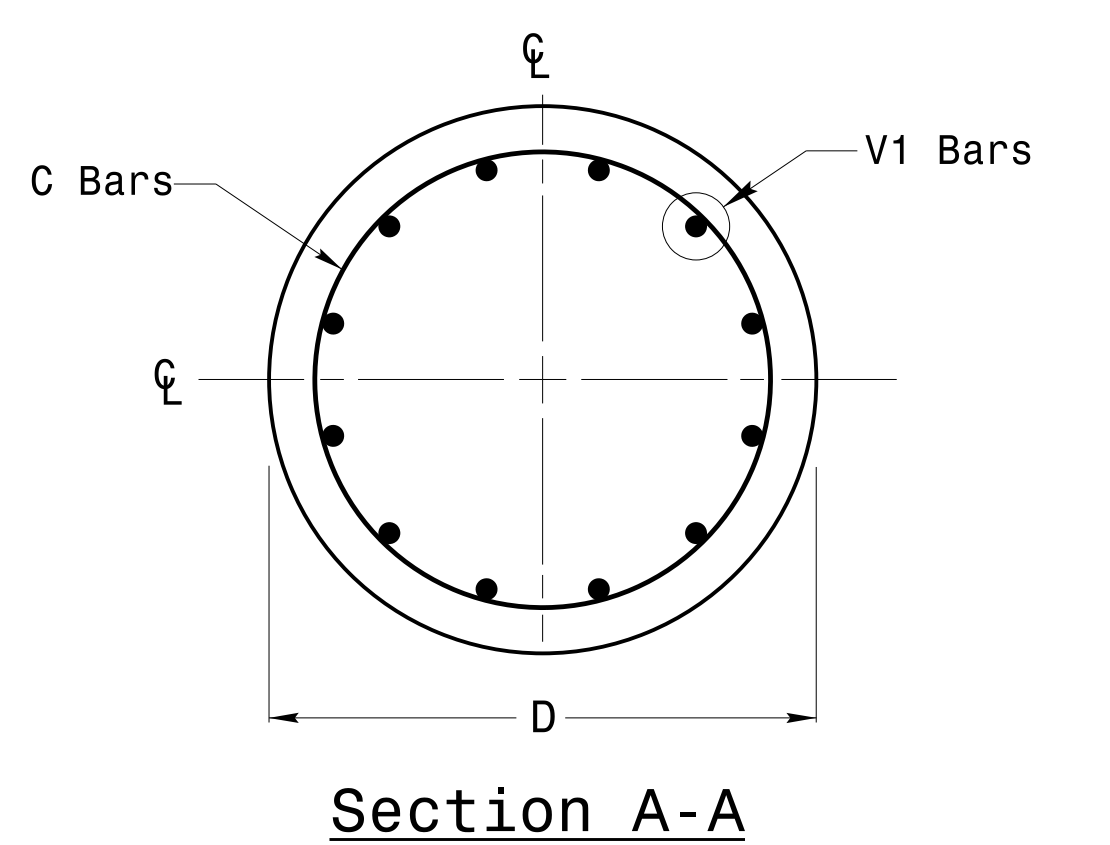
1. Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3'-0".
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For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

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3/21/2016

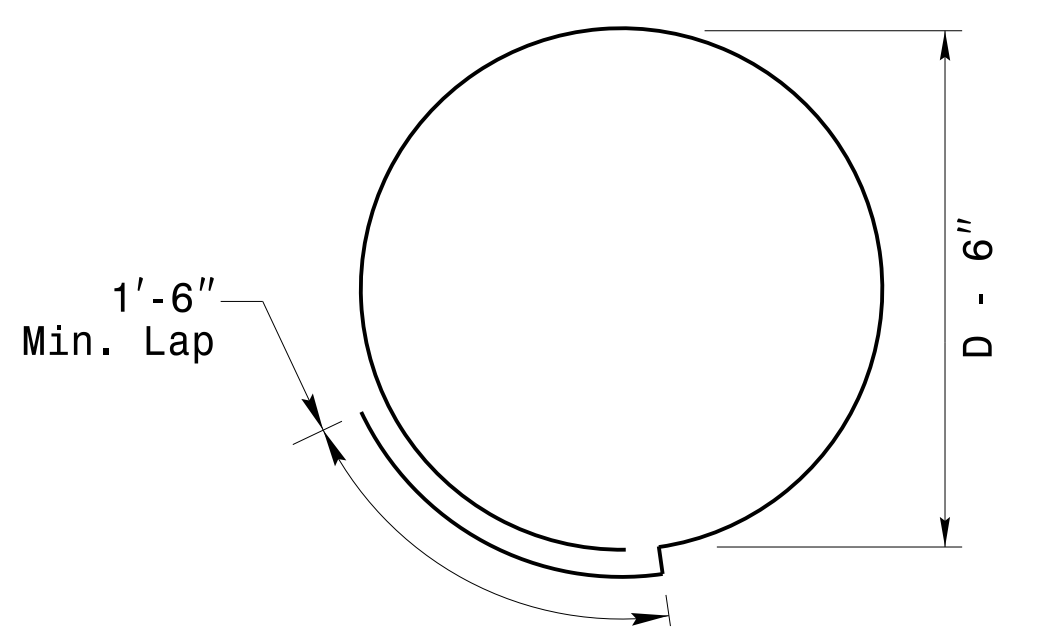
	<p>Typical Fabrication Details For Strain Pole Attachments</p>		
	<p>PLAN DATE: FEBRUARY 2016</p>	<p>DESIGNED BY: C.F. ANDREWS</p>	
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SCALE: NA</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
<p>0 NONE</p>	<p>DocuSigned By: Debesh C. Sarkar</p>	<p>44E8E32E147E4C4...</p>	<p>2/17/2016</p>



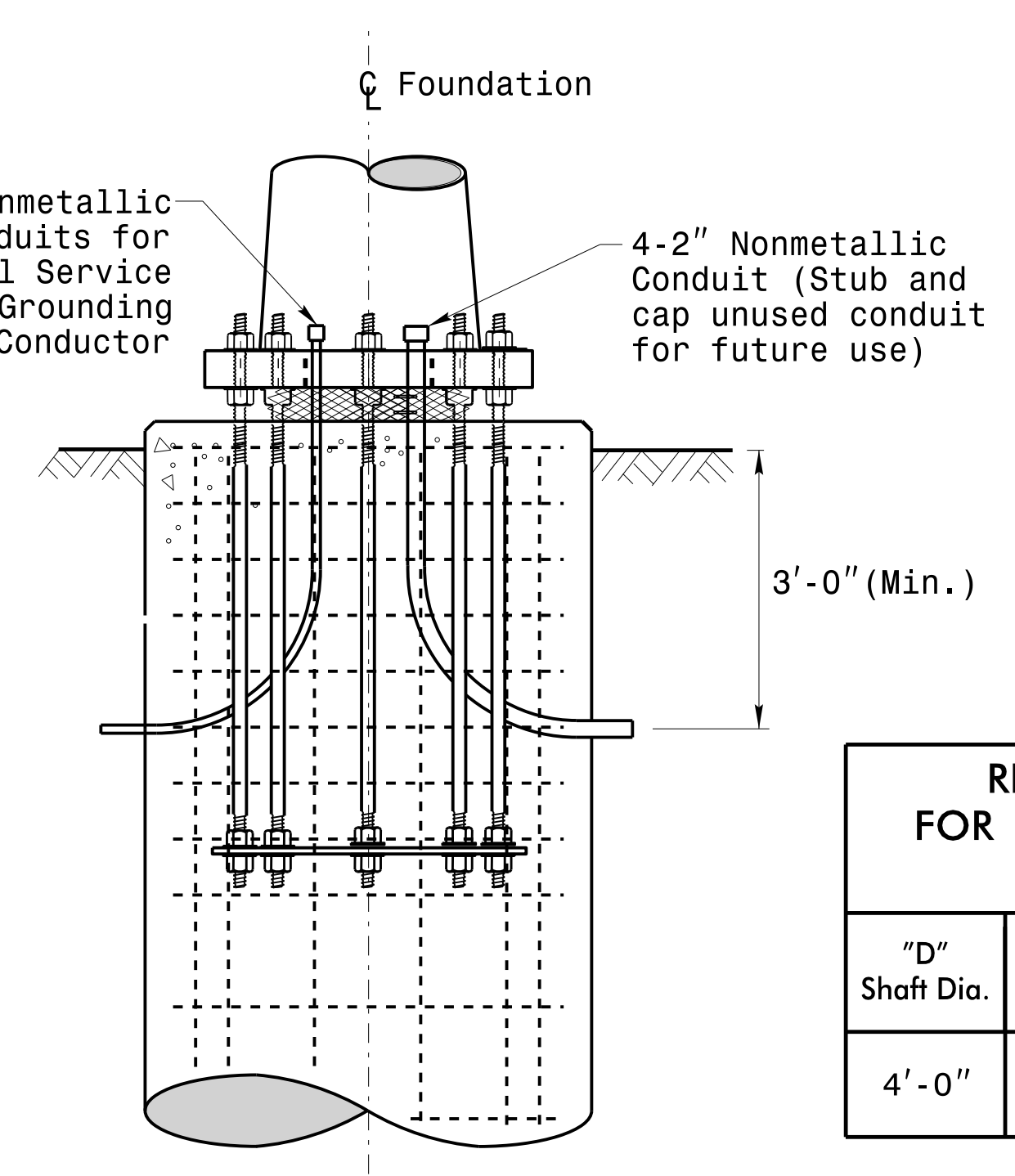
**Concrete Shaft Elevation**



**Section A-A**



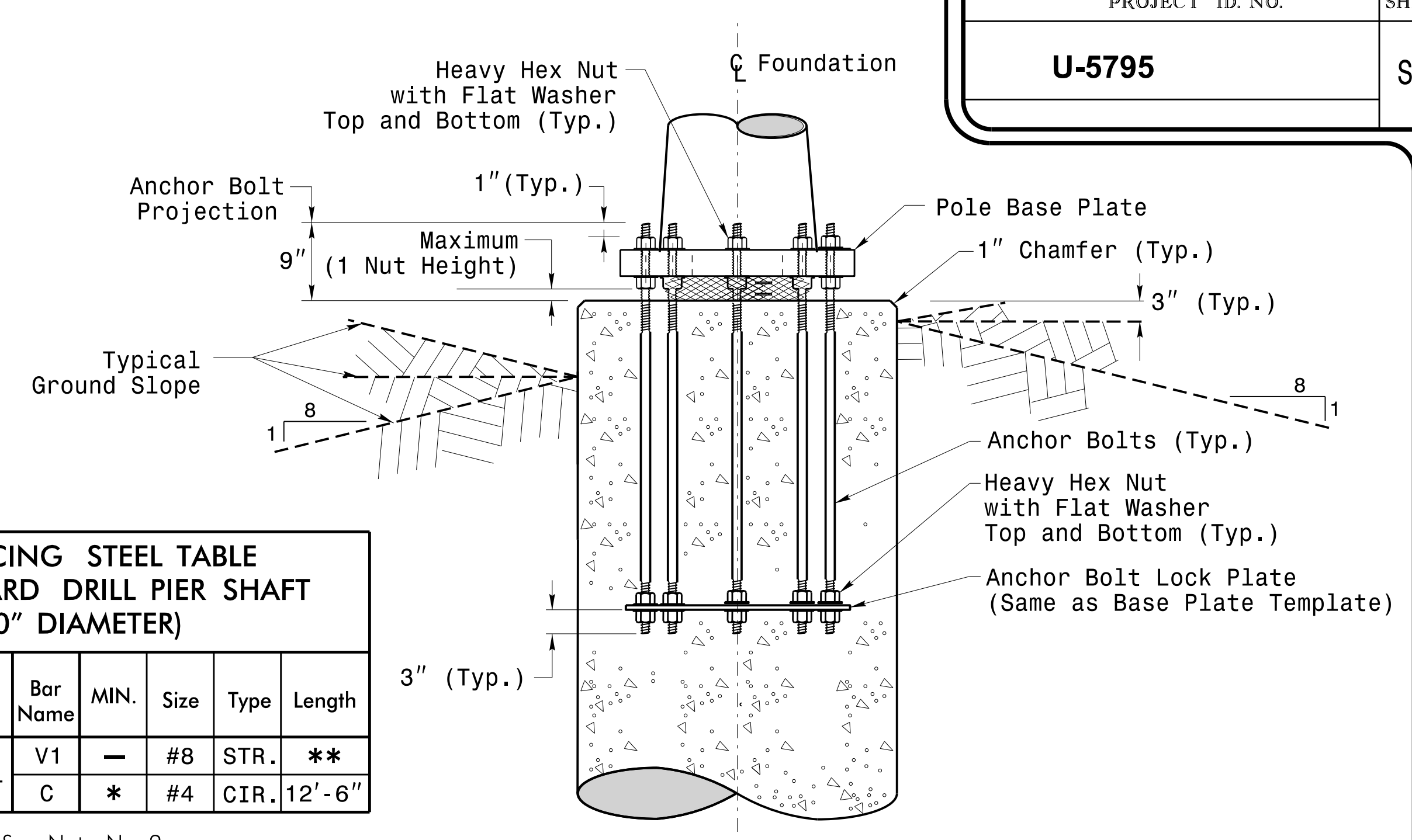
**Typical "C" Bar Detail**



**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

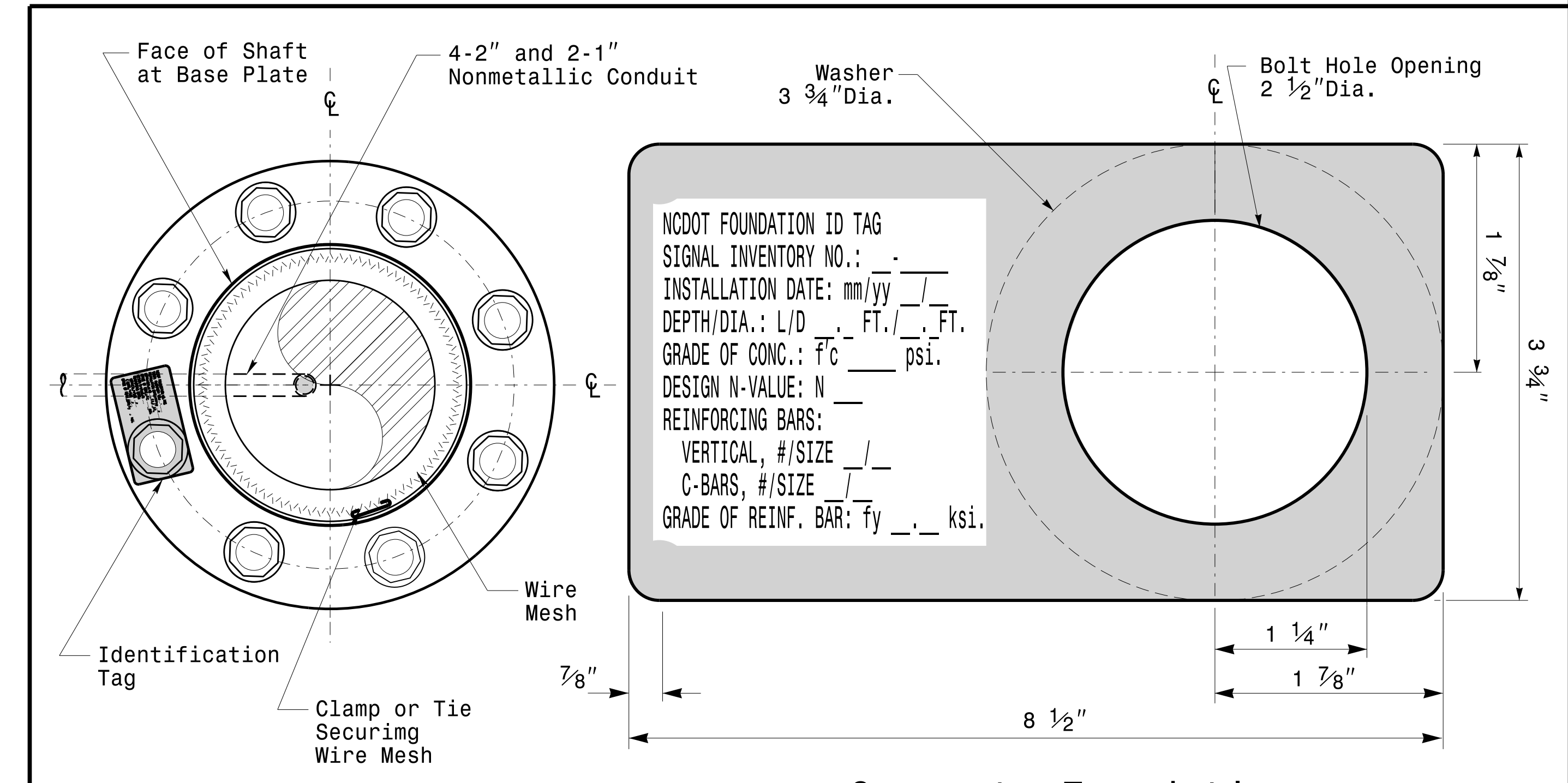


**Typical Foundation Anchor Bolt Details**

(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>
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**

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

**Detail-A**

	<b>Construction Details For Foundations</b>		
	PLAN DATE: FEBRUARY 2016	DESIGNED BY: C.B. COGDILL	
	PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR	
SCALE: NONE	REV. NO. 1	COMMENTS: Revised Foundation Top Details	INIT. N.B. DATE: 5/11/2015
			2/17/2016 DATE

17-FEB-2016 16:11:03 TSCD\W115\Signal\sig\Design\Section\Eastern Region\m7\Sheets\2016\2014\_Sig\_M7\_S1d\_Construction\_Detail\Is-Strain\_Poles.dgn

**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:**


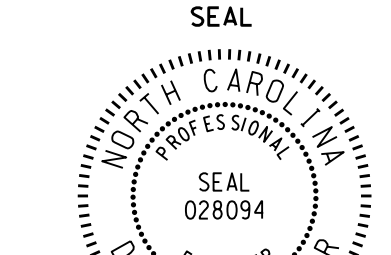
1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

**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.

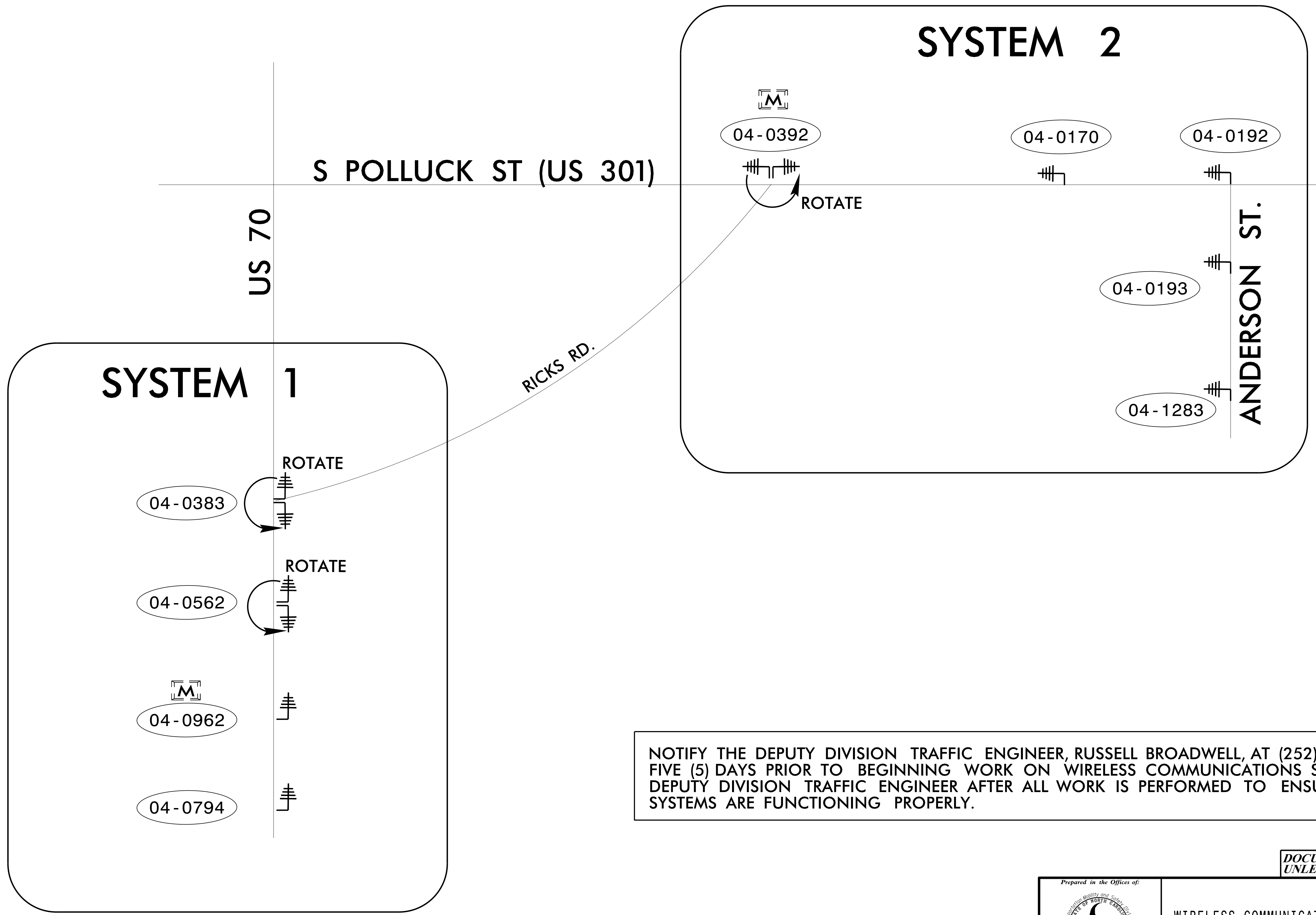
**Standard Strain Pole Foundation-All Soil Condition**

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	<b>Standard Strain Pole Foundation for All Soil Conditions</b> PLAN DATE: FEBRUARY 2016    DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING    REVIEWED BY: D.C. SARKAR	SEAL  DocuSigned by: Debesu C. Sarkar 44E8E32E147E4C4...	2/17/2016 DATE
SCALE: 0 NA NONE	REVISIONS Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn. N.B. 7/12/2015		

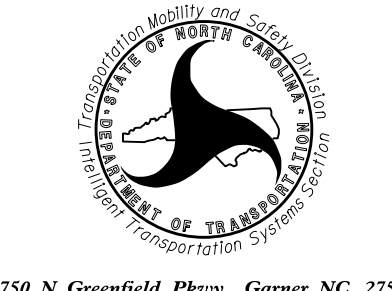

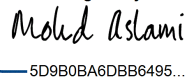
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 Sheets\*2016\*2014 Sig.M8 Std. Strain Pole Found.-Saturated Soil -Cond111on.dgn  
 7/11/2015

# SYSTEM MAP



NOTIFY THE DEPUTY DIVISION TRAFFIC ENGINEER, RUSSELL BROADWELL, AT (252) 640-6507 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON WIRELESS COMMUNICATIONS SYSTEMS. NOTIFY THE DEPUTY DIVISION TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT WIRELESS SYSTEMS ARE FUNCTIONING PROPERLY.

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

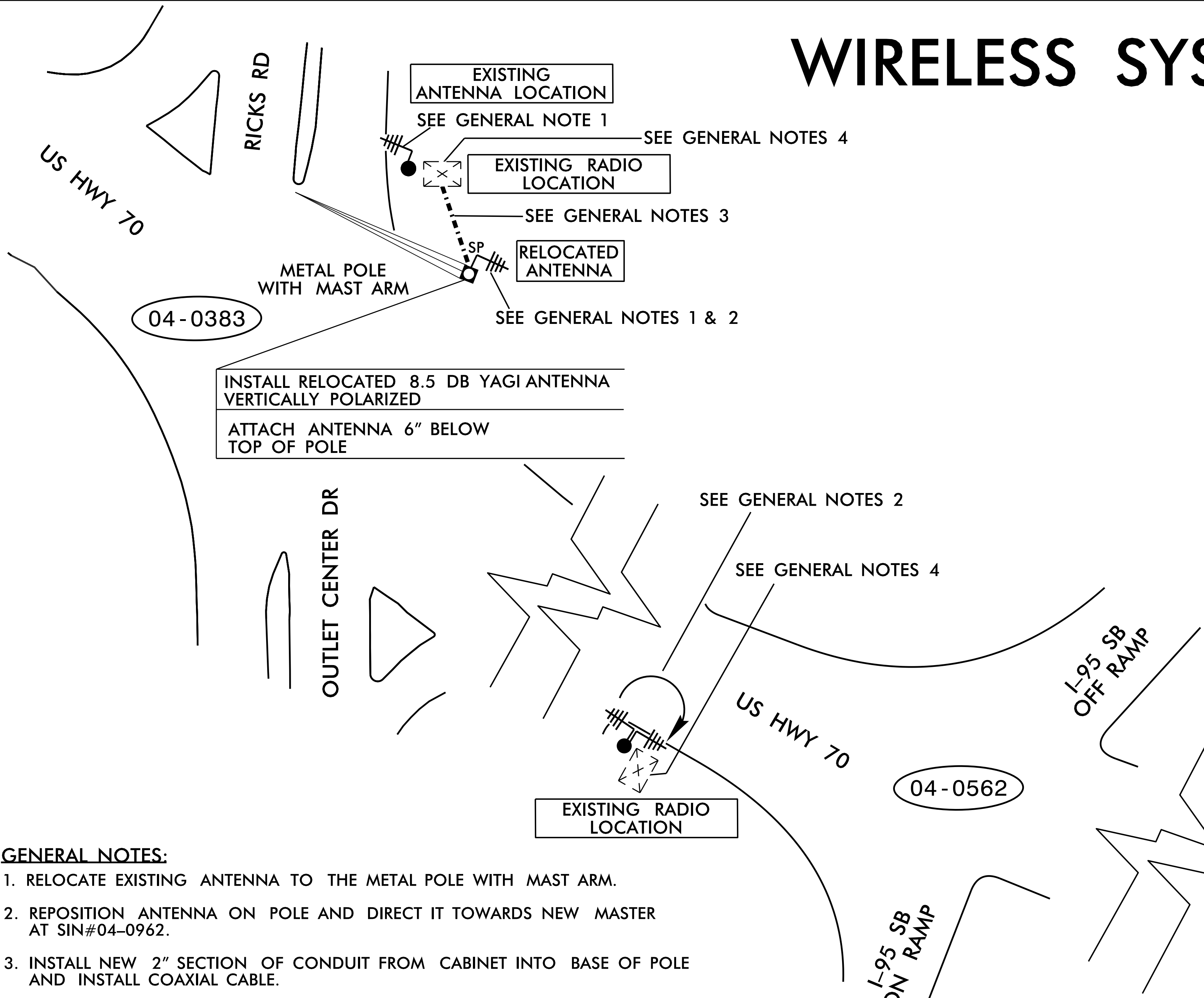
 <small>750 N. Greenfield Pkwy., Garner, NC 27529</small>	<b>WIRELESS COMMUNICATIONS PLAN</b> DIVISION 04      JOHNSTON CO.      SELMA		 SEAL 032108 ENGINEER MOHD A. ASLAMI
	PLAN DATE: SEPTEMBER 2017 PREPARED BY: H. T. BERGGREN	REVIEWED BY: REVIEWED BY:	
DocuSigned by:  MOHD A. ASLAMI		10/2/2017 DATE	



# WIRELESS SYSTEM 1

**LEGEND**

- YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
- YAGI ANTENNA (SINGLE)
- OMNI ANTENNA
- EXISTING CONTROLLER AND CABINET
- EXISTING MASTER CONTROLLER AND CABINET
- SIGNAL INVENTORY NUMBER
- NEW METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- NEW METAL POLE
- SIGNAL POLE
- EXISTING METAL POLE
- NEW OVERSIZED JUNCTION BOX
- EXISTING OVERSIZED JUNCTION BOX
- EXISTING CONDUIT
- NEW CONDUIT
- EXISTING COMMUNICATIONS CABLE



INSTALL RELOCATED 8.5 DB YAGI ANTENNA VERTICALLY POLARIZED  
ATTACH ANTENNA 6" BELOW TOP OF POLE

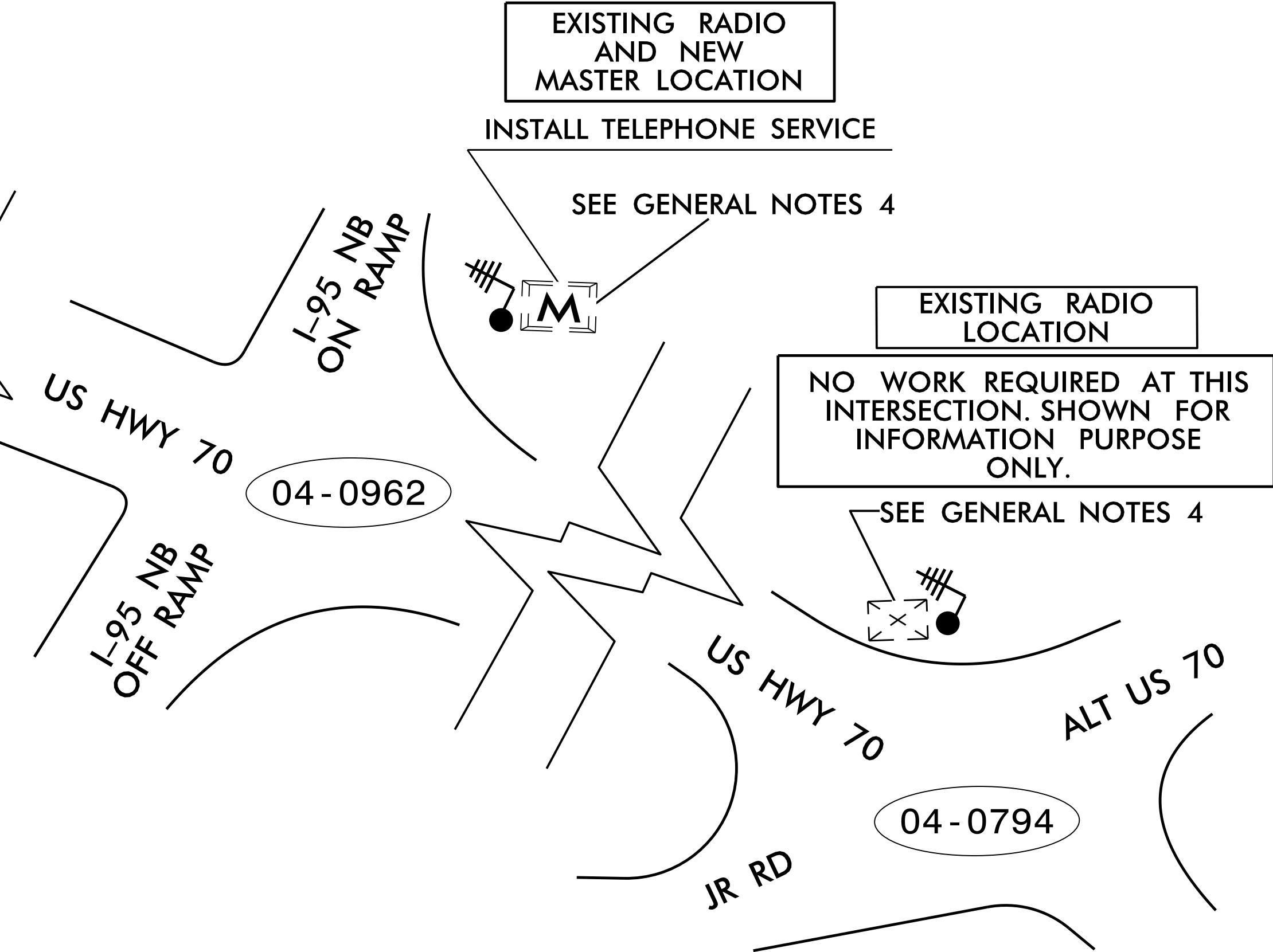
NOTIFY THE DEPUTY DIVISION TRAFFIC ENGINEER, RUSSELL BROADWELL, AT (252) 640-6507 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE WIRELESS COMMUNICATIONS SYSTEMS. NOTIFY THE DEPUTY DIVISION TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT WIRELESS SYSTEMS ARE FUNCTIONING PROPERLY.

**GENERAL NOTES:**

1. RELOCATE EXISTING ANTENNA TO THE METAL POLE WITH MAST ARM.
2. REPOSITION ANTENNA ON POLE AND DIRECT IT TOWARDS NEW MASTER AT SIN#04-0962.
3. INSTALL NEW 2" SECTION OF CONDUIT FROM CABINET INTO BASE OF POLE AND INSTALL COAXIAL CABLE.
4. REPROGRAM EXISTING RADIO AT SIN#04-0962 AS MASTER RADIO AND INCLUDE EXISTING RADIOS AT SIN#04-0383, SIN#04-0562 AND SIN#04-0794 IN NEW "WIRELESS SYSTEM 1".

**NOTES FOR WIRELESS COMMUNICATIONS:**

1. INSTALL COAXIAL CABLE:
  - A. ON WOOD POLES, REQUIRING A NEW RIGID GALVANIZED STEEL RISER, INSTALL A 2" RISER WITH WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
  - B. 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.
  - C. ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
  - D. 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".
2. IF AN EXISTING 2" SPARE RIGID GALVANIZED STEEL RISER IS AVAILABLE, INSTALL THE COAXIAL CABLE IN THE SPARE RISER.
3. INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN.  
(NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
4. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
5. INSTALL WIRELESS SERIAL 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.)
6. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."



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

Prepared in the Offices of:

**WIRELESS COMMUNICATIONS PLAN**

DIVISION 04 JOHNSTON CO. SELMA

PLAN DATE: SEPTEMBER 2017 REVIEWED BY:

PREPARED BY: H. T. BERGGREN REVIEWED BY:

REVISIONS INIT. DATE

SCALE: 1" = 50'

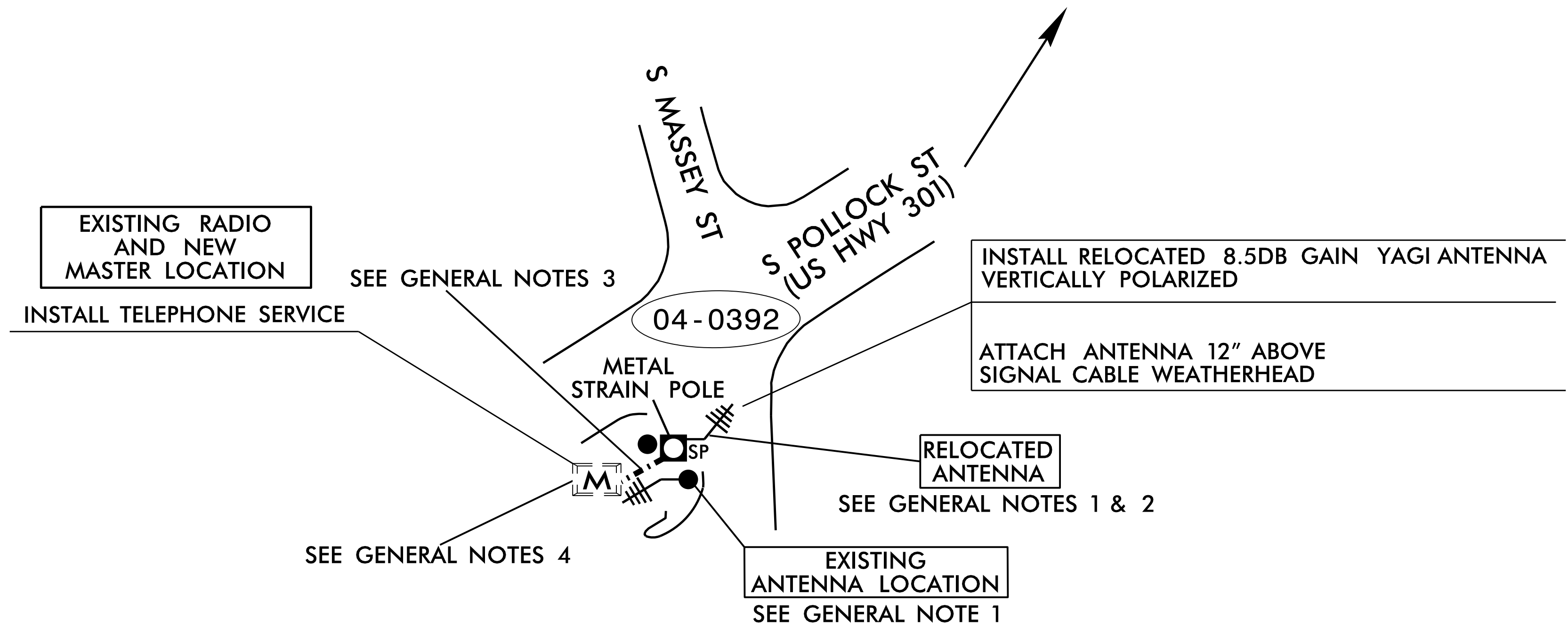
10/2/2017 DATE

# WIRELESS SYSTEM 2

REPROGRAM EXISTING RADIO AT SIN#04-0392 AS MASTER RADIO AND INCLUDE EXISTING RADIOS AT THE FOLLOWING SIGNALS IN NEW WIRELESS SYSTEM:  
 SIN#04-0170  
 SIN#04-0192  
 SIN#04-0193  
 SIN#04-1283

**LEGEND**

- YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
- YAGI ANTENNA (SINGLE)
- OMNI ANTENNA
- EXISTING CONTROLLER AND CABINET
- EXISTING MASTER CONTROLLER AND CABINET
- SIGNAL INVENTORY NUMBER
- NEW METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- NEW METAL POLE
- SIGNAL POLE
- EXISTING METAL POLE
- NEW OVERSIZED JUNCTION BOX
- EXISTING OVERSIZED JUNCTION BOX
- EXISTING CONDUIT
- NEW CONDUIT
- EXISTING COMMUNICATIONS CABLE



NOTIFY THE DEPUTY DIVISION TRAFFIC ENGINEER, RUSSELL BROADWELL, AT (252) 640-6507 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE WIRELESS COMMUNICATIONS SYSTEMS. NOTIFY THE DEPUTY DIVISION TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT WIRELESS SYSTEMS ARE FUNCTIONING PROPERLY.

**GENERAL NOTES:**

1. RELOCATE EXISTING ANTENNA TO THE METAL STRAIN POLE.
2. REPOSITION ANTENNA ON POLE AND DIRECT IT TOWARDS EXISTING RADIOS ALONG S POLLUCK ST. (US HWY 301) (INTERSECTIONS LISTED ABOVE).
3. INSTALL NEW 2" SECTION OF CONDUIT FROM CABINET INTO BASE OF POLE AND INSTALL COAXIAL CABLE.
4. REPROGRAM EXISTING RADIO AT SIN#04-0392 AS MASTER RADIO AND INCLUDE EXISTING RADIOS LOCATED NORTH ALONG S POLLUCK ST. (US HWY 301) AND SOUTH ALONG ANDERSON ST. (INTERSECTIONS LISTED ABOVE) INTO NEW "WIRELESS SYSTEM 2".

**NOTES FOR WIRELESS COMMUNICATIONS:**

1. INSTALL COAXIAL CABLE:
  - A. ON WOOD POLES, REQUIRING A NEW RIGID GALVANIZED STEEL RISER, INSTALL A 2" RISER WITH WEATHERHEAD AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
  - B. 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.
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  - D. 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".
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(NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
4. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
5. INSTALL WIRELESS SERIAL 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.)
6. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

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<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>WIRELESS COMMUNICATIONS PLAN</p>		
	<p>DIVISION 04 JOHNSTON CO. SELMA</p>	<p>SCALE: 1" = 50'</p>	
<p>PLAN DATE: SEPTEMBER 2017</p>	<p>PREPARED BY: H. T. BERGGREN</p>	<p>REVIEWED BY:</p>	<p>SEAL: 032108</p>
<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>	<p>10/2/2017</p>