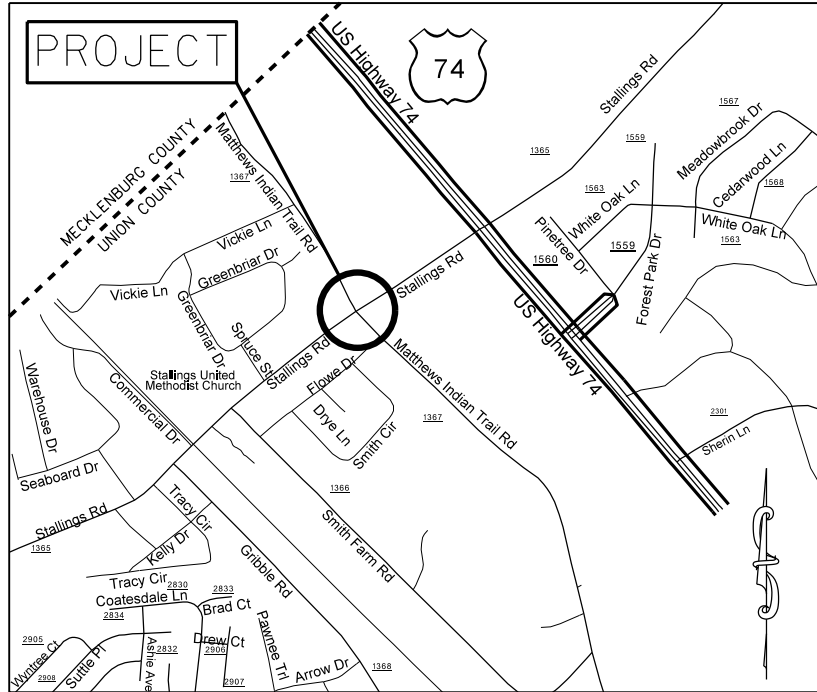


**PROJECT: 45340.3.15 TIP:W-52100**



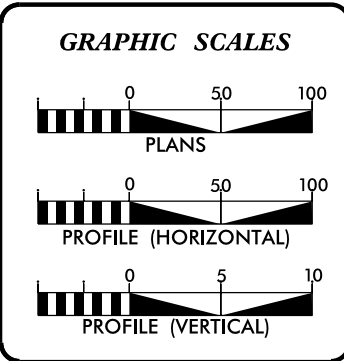
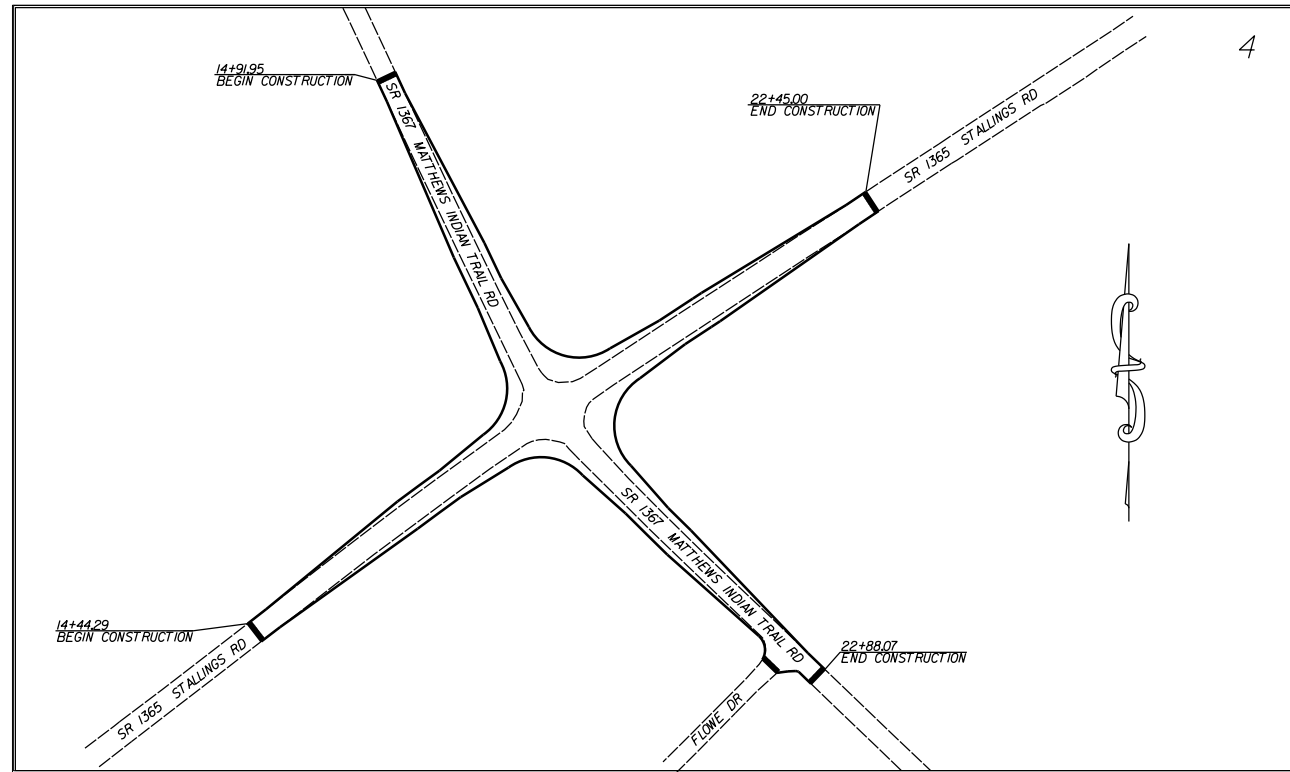
VICINITY MAP NOT TO SCALE

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**UNION COUNTY**

**LOCATION:** INTERSECTION OF STALLINGS ROAD(SR 1365) AND MATTHEWS INDIAN TRAIL ROAD(SR 1367)

**TYPE OF WORK:** GRADING, PAVING, MILLING, DRAINAGE, THERMOPLASTICPAVEMENT MARKING, AND METAL POLE WITH DUAL MAST ARM TRAFFIC SIGNAL.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	45340.3.15	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
45340.1.FD15	HSIP-1365(3)	P.E.	
45340.2.FD15	HSIP-1365(3)	R/W	
45340.3.15	HSIP-1365(003)	CONST.	



**DESIGN DATA**

ADT	=	
ADT	=	
DHV	=	%
D	=	%
T	=	%
V	=	MPH

**PROJECT LENGTH**

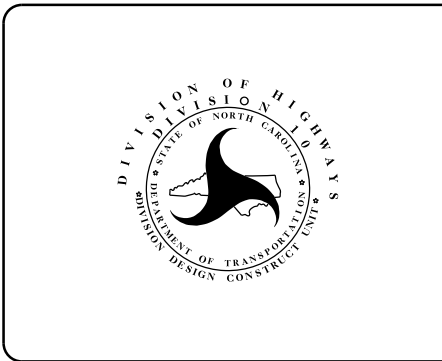
LENGTH OF ROADWAY PROJECT	=	0.30	MILES
TOTAL LENGTH OF STATE PROJECT	=	0.30	MILES

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
DIVISION TEN  
DIVISION DESIGN / CONSTRUCT UNIT

---

2012 STANDARD SPECIFICATIONS

<b>RIGHT OF WAY DATE:</b> December 22, 2015  <b>LETTING DATE:</b> April 20, 2016	<b>RANDY BOWERS</b> PROJECT ENGINEER  <b>DONALD HARWARD</b> PROJECT DESIGN ENGINEER
----------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------

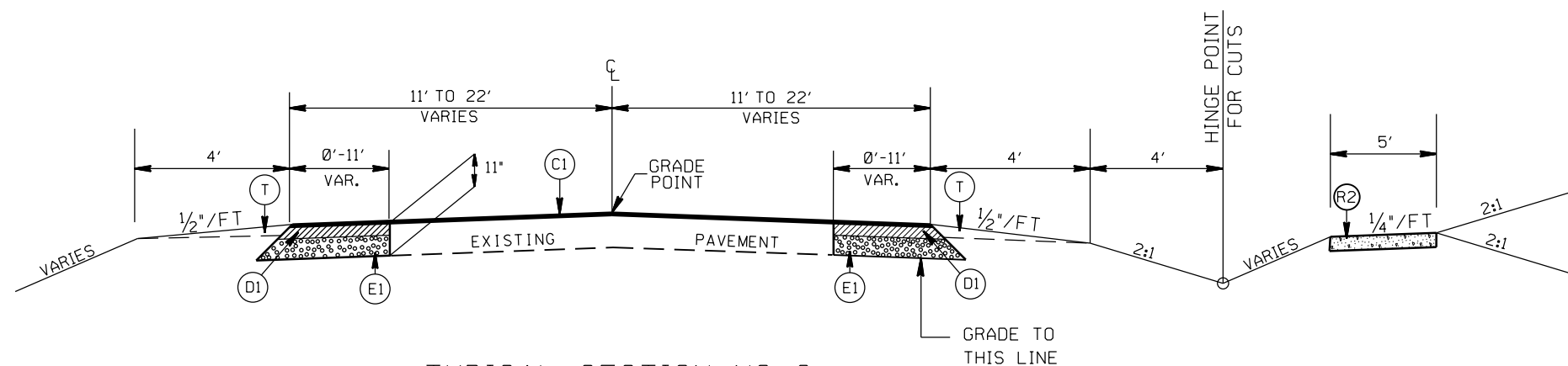


DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

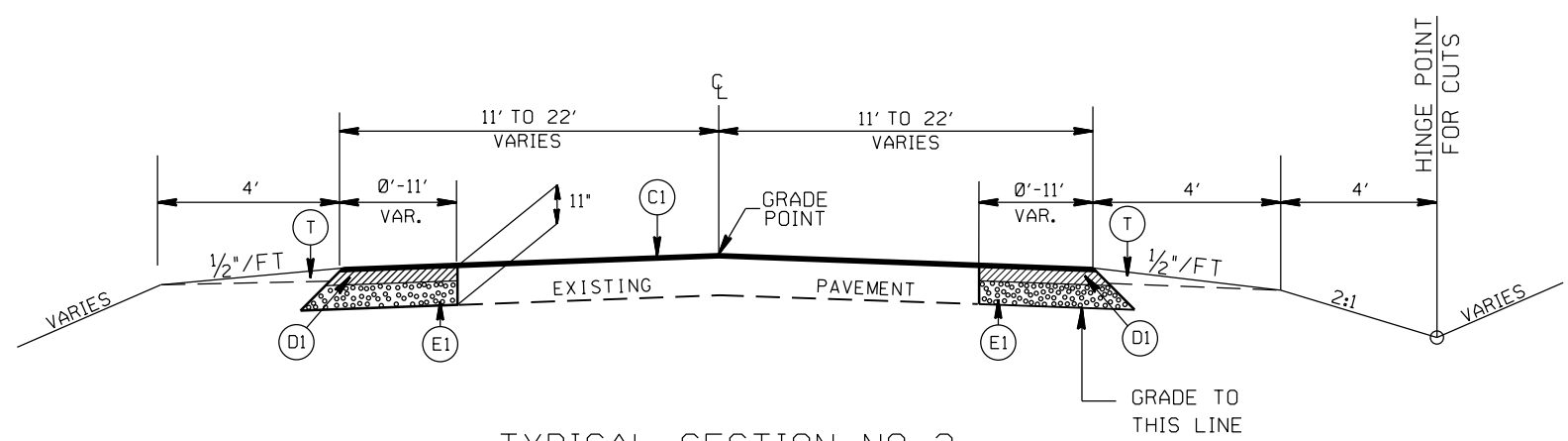
DocuSigned by:  
*Randy Bowers* 3/24/2016

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APPROVED BY  
DDC ENGINEER DATE

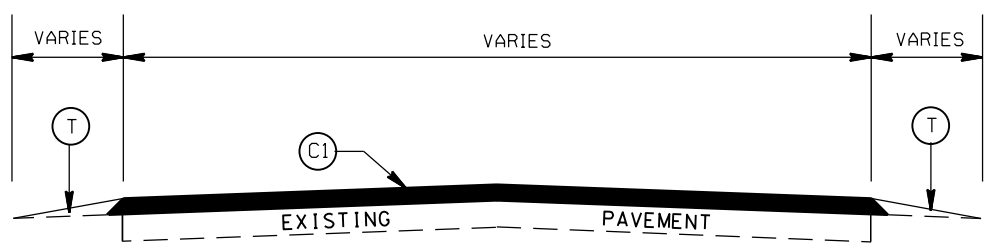
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F.A. PROJECT NO. HSIP-1365(3)			



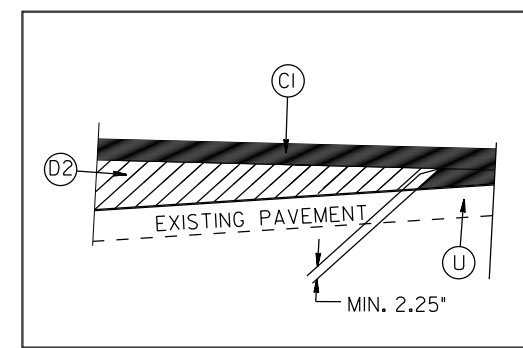
TYPICAL SECTION NO. 3  
STA. 15+50.00 TO 21+82.21 -L-



TYPICAL SECTION NO. 2  
STA. 14+69.29 TO 15+50.00 -L-  
STA. 21+82.21 TO 22+20.00 -L-  
STA. 15+16.95 TO 22+63.07 -Y-



TYPICAL SECTION NO. 1  
STA. 14+44.29 TO 14+69.29 -L-  
STA. 22+20.00 TO 22+45.00 -L-  
STA. 14+91.95 TO 15+16.95 -Y-  
STA. 22+63.07 TO 22+88.07 -Y-



WEDGING DETAIL

PAVEMENT SCHEDULE

(C1)	PROP. APPROX. 1 1/2" ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
(D1)	PROP. APPROX. 4" ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
(D2)	PROP. VARIABLE DEPTH ASPHALT CONC. INTERMEDIATE COURSE.
(E1)	PROP. APPROX. 5.5" ASPHALT CONC. BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
(R2)	PROP. 4" THICK 5' WIDE CONC. SIDEWALK
(T)	EARTH MATERIAL
(U)	EXISTING PAVEMENT

LEFT TURN LANES AT THE  
INTERSECTION OF STALLINGS RD.(SR 1365)  
AND MATTHEWS INDIAN TRIAL RD.(SR 1367)  
IN UNION COUNTY

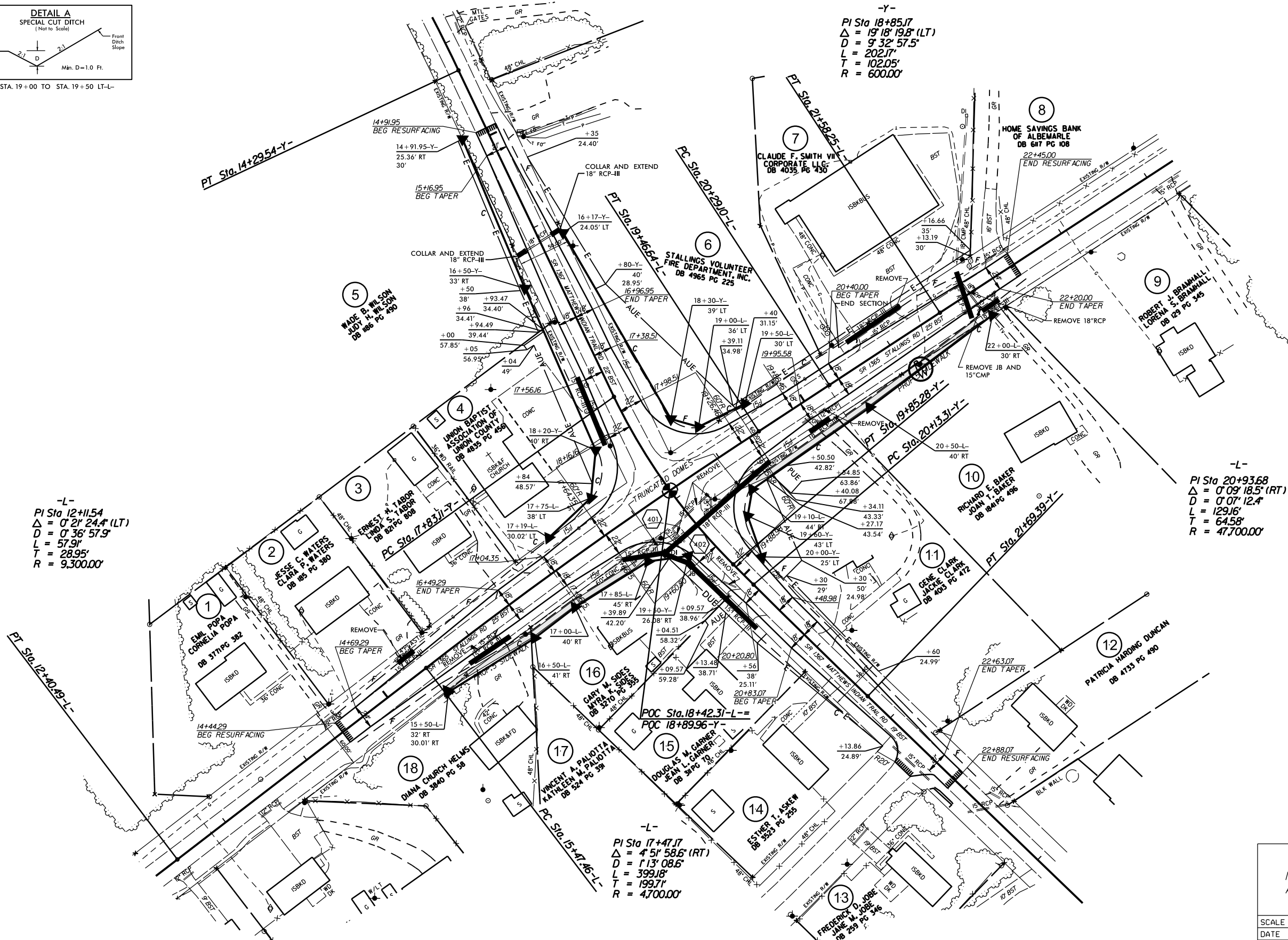
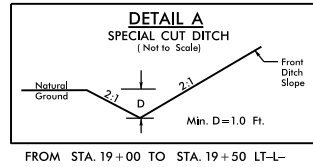
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DATE	01/2015
DWG. BY	TBL
DESIGN BY	JDH
APPROVED	RWB



REVISIONS	



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	45340.3/5	4	
F.A. PROJECT NO. HSIP-1365(3)			



-Y-  
 PI Sta 18+85.77  
 $\Delta = 19' 18" 19.8" (LT)$   
 $D = 9' 32" 57.5"$   
 $L = 202.7'$   
 $T = 102.05'$   
 $R = 600.00'$

-L-  
 PI Sta 12+11.54  
 $\Delta = 0' 21" 24.4" (LT)$   
 $D = 0' 36" 57.9"$   
 $L = 57.9'$   
 $T = 28.95'$   
 $R = 9,300.00'$

-L-  
 PI Sta 20+93.68  
 $\Delta = 0' 09" 18.5" (RT)$   
 $D = 0' 07" 12.4"$   
 $L = 129.16'$   
 $T = 64.58'$   
 $R = 47,700.00'$

-Y-  
 PI Sta 20+91.35  
 $\Delta = 1' 07" 04.2" (LT)$   
 $D = 0' 42" 58.3"$   
 $L = 156.08'$   
 $T = 78.04'$   
 $R = 8,000.00'$

-L-  
 PI Sta 17+47.77  
 $\Delta = 4' 51" 58.6" (RT)$   
 $D = 1' 13" 08.6"$   
 $L = 399.18'$   
 $T = 199.71'$   
 $R = 4,700.00'$

LEFT TURN LANES AT THE  
 INTERSECTION OF STALLINGS RD.(SR 1365)  
 AND MATTHEWS INDIAN TRIAL RD.(SR 1367)  
 IN UNION COUNTY

SCALE	1"=50'		REVISIONS
DATE	02/2015		
DWG. BY	TBL		
DESIGN BY	JDH		
APPROVED	RWB		



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	45340.315	EC-2	
F.A. PROJECT NO. HSIP-1365(3)			



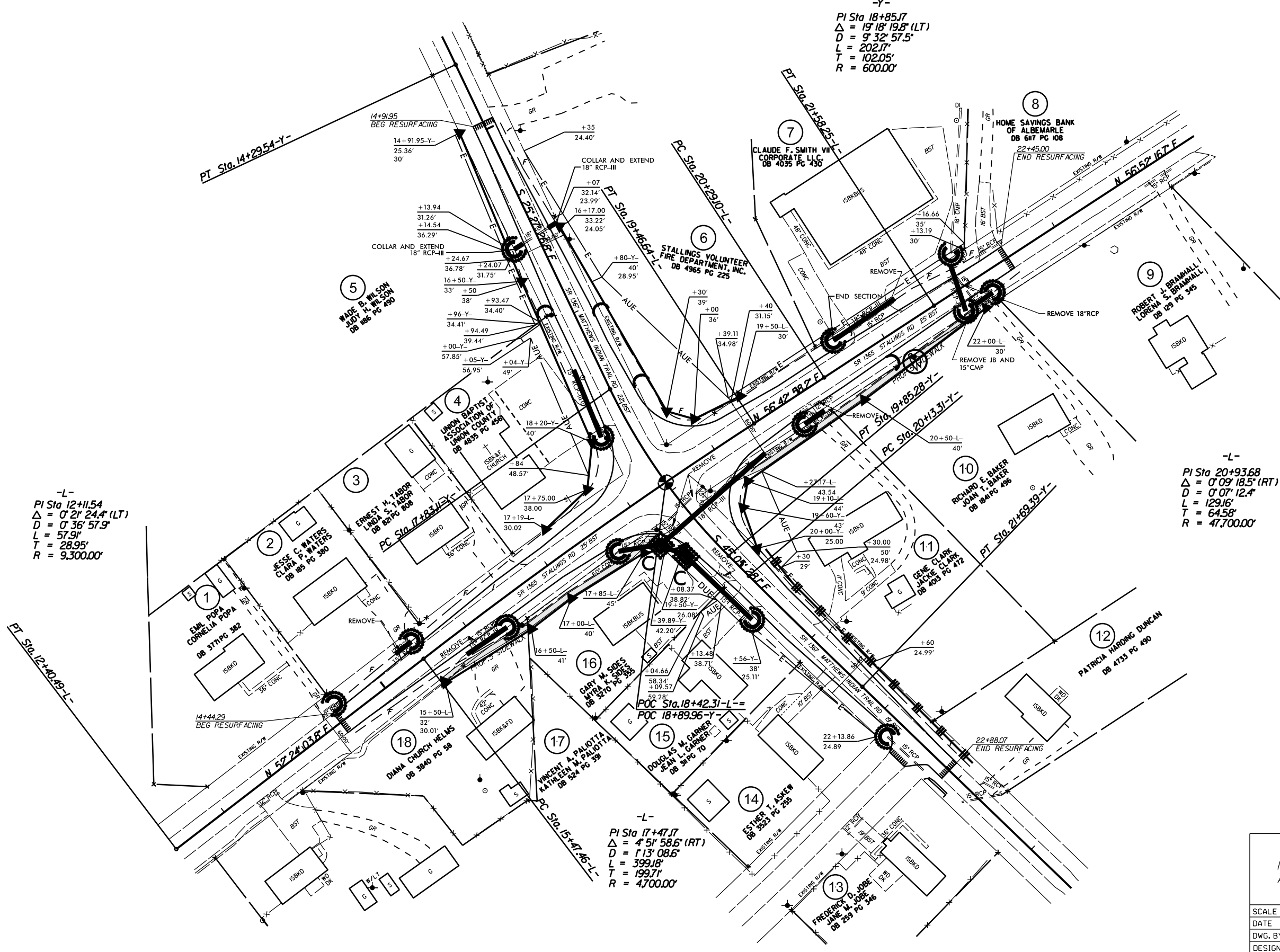
-Y-  
 PI Sta 18+85.77  
 $\Delta = 19' 18" 19.8" (LT)$   
 $D = 9' 32" 57.5"$   
 $L = 202.7'$   
 $T = 102.05'$   
 $R = 600.00'$

-L-  
 PI Sta 20+93.68  
 $\Delta = 0' 09" 18.5" (RT)$   
 $D = 0' 07" 12.4"$   
 $L = 129.16'$   
 $T = 64.58'$   
 $R = 47,700.00'$

-Y-  
 PI Sta 20+91.35  
 $\Delta = 1' 07" 04.2" (LT)$   
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-L-  
 PI Sta 12+11.54  
 $\Delta = 0' 21" 24.4" (LT)$   
 $D = 0' 36" 57.9"$   
 $L = 57.9'$   
 $T = 28.95'$   
 $R = 9,300.00'$

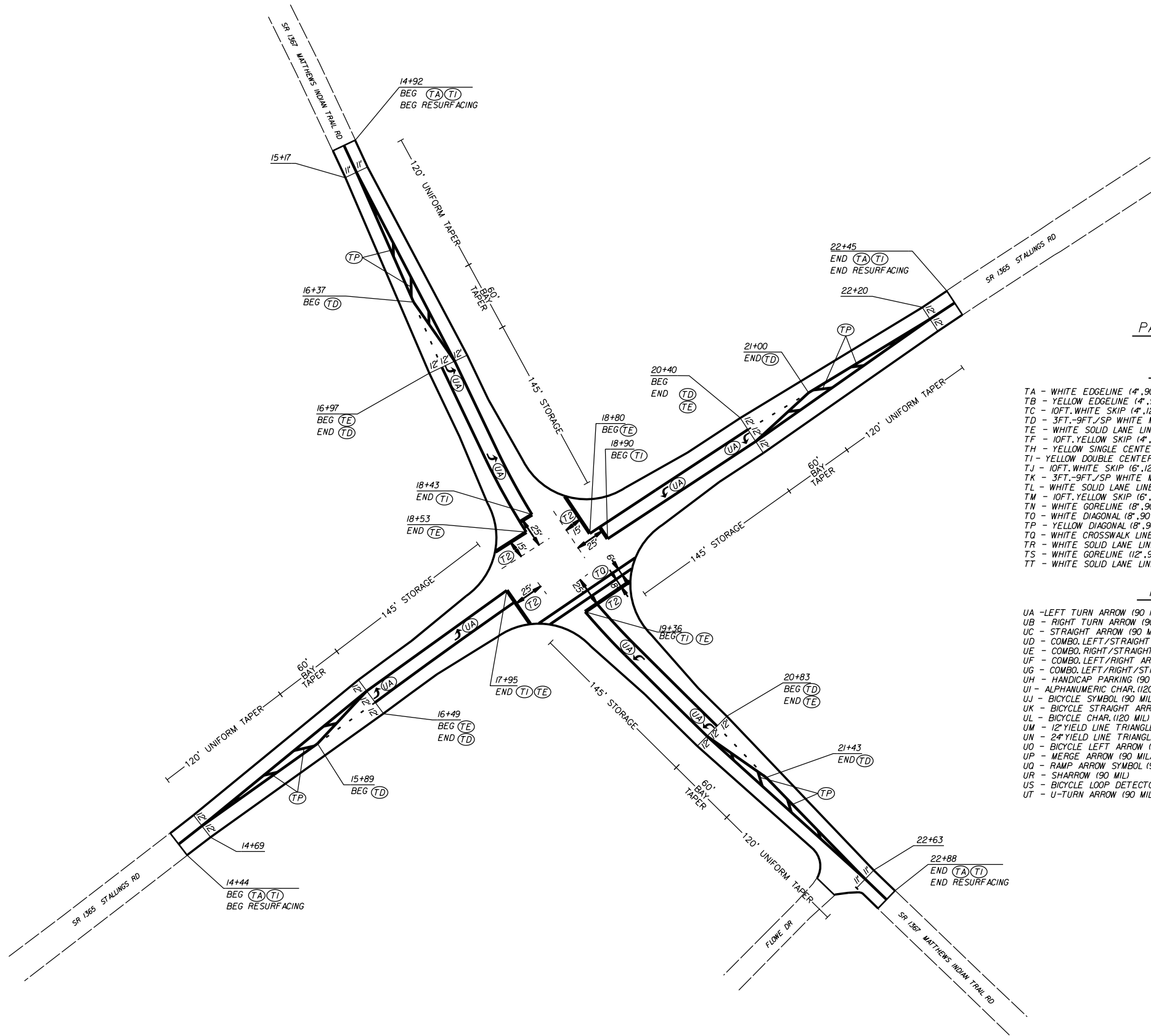
-L-  
 PI Sta 17+47.77  
 $\Delta = 4' 51" 58.6" (RT)$   
 $D = 1' 13" 08.6"$   
 $L = 399.18'$   
 $T = 199.71'$   
 $R = 4,700.00'$



LEFT TURN LANES AT THE  
 INTERSECTION OF STALLINGS RD.(SR 1365)  
 AND MATTHEWS INDIAN TRAIL RD.(SR 1367)  
 IN UNION COUNTY

SCALE	1"=50'		REVISIONS
DATE	02/2015		
DWG. BY	TBL		
DESIGN BY	JDH		
APPROVED	RWB		

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	45340.3/5	PMP-1	
F.A. PROJECT NO. HSIP-1365(3)			



**PAVEMENT MARKING LINES**

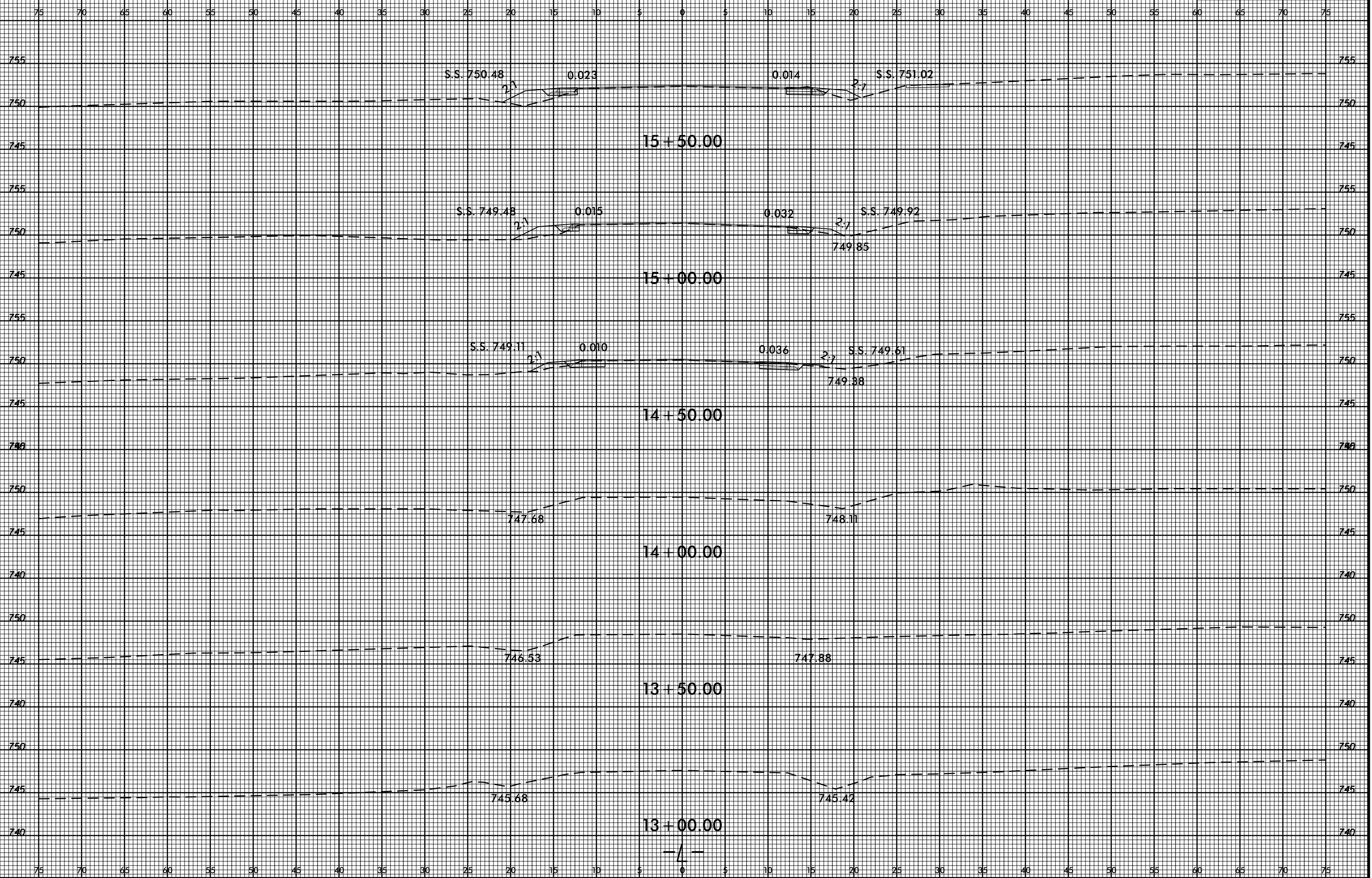
- |                                                |                                                               |
|------------------------------------------------|---------------------------------------------------------------|
| TA - WHITE EDGELINE (4', 90 MIL)               | TU - WHITE DIAGONAL (12', 90 MIL)                             |
| TB - YELLOW EDGELINE (4', 90 MIL)              | TV - YELLOW DIAGONAL (12', 90 MIL)                            |
| TC - 10FT. WHITE SKIP (4', 120 MIL)            | TW - WHITE LINE, R/R X (16', 120 MIL)                         |
| TD - 3FT.-9FT./SP WHITE MINISKIP (4', 120 MIL) | TX - WHITE STOPBAR (24', 120 MIL)                             |
| TE - WHITE SOLID LANE LINE (4', 120 MIL)       | TY - WHITE CROSSWALK LINE (24', 120 MIL)                      |
| TF - 10FT. YELLOW SKIP (4', 120 MIL)           | TZ - WHITE RUMBLE STRIP (4', 240 MIL)                         |
| TH - YELLOW SINGLE CENTER (4', 120 MIL)        | T1 - YELLOW RUMBLE STRIP (4', 240 MIL)                        |
| TI - YELLOW DOUBLE CENTER (4', 120 MIL)        | T2 - WHITE EDGELINE (6', 90 MIL)                              |
| TJ - 10FT. WHITE SKIP (6', 120 MIL)            | T3 - YELLOW EDGELINE (6', 90 MIL)                             |
| TK - 3FT.-9FT./SP WHITE MINISKIP (6', 120 MIL) | T4 - 2FT.-6FT./SP WHITE MINISKIP (4', 120 MIL)                |
| TL - WHITE SOLID LANE LINE (6', 120 MIL)       | T5 - 2FT.-6FT./SP YELLOW MINISKIP (4', 120 MIL)               |
| TM - 10FT. YELLOW SKIP (6', 120 MIL)           | T6 - 3FT.-3FT./SP WHITE MINISKIP (12', 120 MIL)               |
| TN - WHITE DIAGONAL (8', 90 MIL)               | T7 - 2FT.-6FT./SP WHITE MINISKIP (6', 120 MIL)                |
| TO - WHITE DIAGONAL (8', 90 MIL)               | T8 - 2FT.-6FT./SP YELLOW MINISKIP (6', 120 MIL)               |
| TP - WHITE CROSSWALK LINE (8', 120 MIL)        | T9 - 3FT.-9FT./SP WHITE MINISKIP (8', 120 MIL)                |
| TQ - WHITE CROSSWALK LINE (8', 120 MIL)        | T10 - 3FT.-9FT./SP WHITE MINISKIP (12', 120 MIL)              |
| TR - WHITE SOLID LANE LINE (8', 120 MIL)       | T11 - 3FT.-9FT./SP WHITE MINISKIP (12', 120 MIL)              |
| TS - WHITE GORELINE (12', 90 MIL)              | T12 - 3FT.-9FT./SP WHITE MINISKIP (12', 120 MIL)              |
| TT - WHITE SOLID LANE LINE (12', 120 MIL)      | T13 - 3FT.-9FT./SP WHITE MINISKIP (12', 120 MIL)              |
|                                                | T14 - 3FT.-9FT./SP WHITE MINISKIP (12', 120 MIL)              |
|                                                | T15 - YELLOW SINGLE CENTER (6', 120 MIL)                      |
|                                                | T16 - YELLOW DOUBLE CENTER (6', 120 MIL)                      |
|                                                | T17 - 3FT.-3FT./SP WHITE MINISKIP ENTRANCE LINE (8', 120 MIL) |

**PAVEMENT MARKING SYMBOLS**

- |                                                |                                                            |
|------------------------------------------------|------------------------------------------------------------|
| UA - LEFT TURN ARROW (90 MIL)                  | UU - FISH-HOOK STRAIGHT ARROW (90 MIL)                     |
| UB - RIGHT TURN ARROW (90 MIL)                 | UV - FISH-HOOK LEFT/STRAIGHT ARROW (90 MIL)                |
| UC - STRAIGHT ARROW (90 MIL)                   | UW - FISH-HOOK RIGHT/STRAIGHT ARROW (90 MIL)               |
| UD - COMBO. LEFT/STRAIGHT ARROW (90 MIL)       | UX - FISH-HOOK LEFT/RIGHT ARROW (90 MIL)                   |
| UE - COMBO. RIGHT/STRAIGHT ARROW (90 MIL)      | UY - FISH-HOOK LEFT/RIGHT/STRAIGHT ARROW (90 MIL)          |
| UF - COMBO. LEFT/RIGHT ARROW (90 MIL)          | UZ - FISH-HOOK W/CIRCLE STRAIGHT ARROW (90 MIL)            |
| UG - COMBO. LEFT/RIGHT/STRAIGHT ARROW (90 MIL) |                                                            |
| UH - HANDICAP PARKING (90 MIL)                 | WA - FISH-HOOK W/CIRCLE LEFT ARROW (90 MIL)                |
| UI - ALPHANUMERIC CHAR. (120 MIL)              | WB - FISH-HOOK W/CIRCLE LEFT/STRAIGHT ARROW (90 MIL)       |
| UJ - BICYCLE SYMBOL (90 MIL)                   | WC - FISH-HOOK W/CIRCLE LEFT/RIGHT/STRAIGHT ARROW (90 MIL) |
| UK - BICYCLE STRAIGHT ARROW (90 MIL)           |                                                            |
| UL - BICYCLE CHAR. (120 MIL)                   | MA - PERMANENT RAISED MARKER (YELLOW & YELLOW)             |
| UM - 12" YIELD LINE TRIANGLE (90 MIL)          | MB - PERMANENT RAISED MARKER (CRYSTAL & RED)               |
| UN - 24" YIELD LINE TRIANGLE (90 MIL)          | MC - PERMANENT RAISED MARKER (YELLOW & RED)                |
| UO - BICYCLE LEFT ARROW (90 MIL)               | MD - PERMANENT RAISED MARKER (YELLOW)                      |
| UP - MERGE ARROW (90 MIL)                      | ME - SNOWPLOWABLE MARKER (YELLOW & YELLOW)                 |
| UQ - RAMP ARROW SYMBOL (90 MIL)                | MF - SNOWPLOWABLE MARKER (CRYSTAL & RED)                   |
| UR - SHARROW (90 MIL)                          | MG - SNOWPLOWABLE MARKER (YELLOW & RED)                    |
| US - BICYCLE LOOP DETECTOR (90 MIL)            | ML - PERMANENT RAISED MARKER (CRYSTAL & CRYSTAL)           |
| UT - U-TURN ARROW (90 MIL)                     | MO - SNOWPLOWABLE MARKER (CRYSTAL & CRYSTAL)               |

LEFT TURN LANES AT THE INTERSECTION OF STALLINGS RD.(SR 1365) AND MATTHEWS INDIAN TRAIL RD.(SR 1367) IN UNION COUNTY

SCALE	r=50'		REVISIONS
DATE	01/20/15		
DWG. BY	TBL		
DESIGN BY	JDH		
APPROVED	RWB		



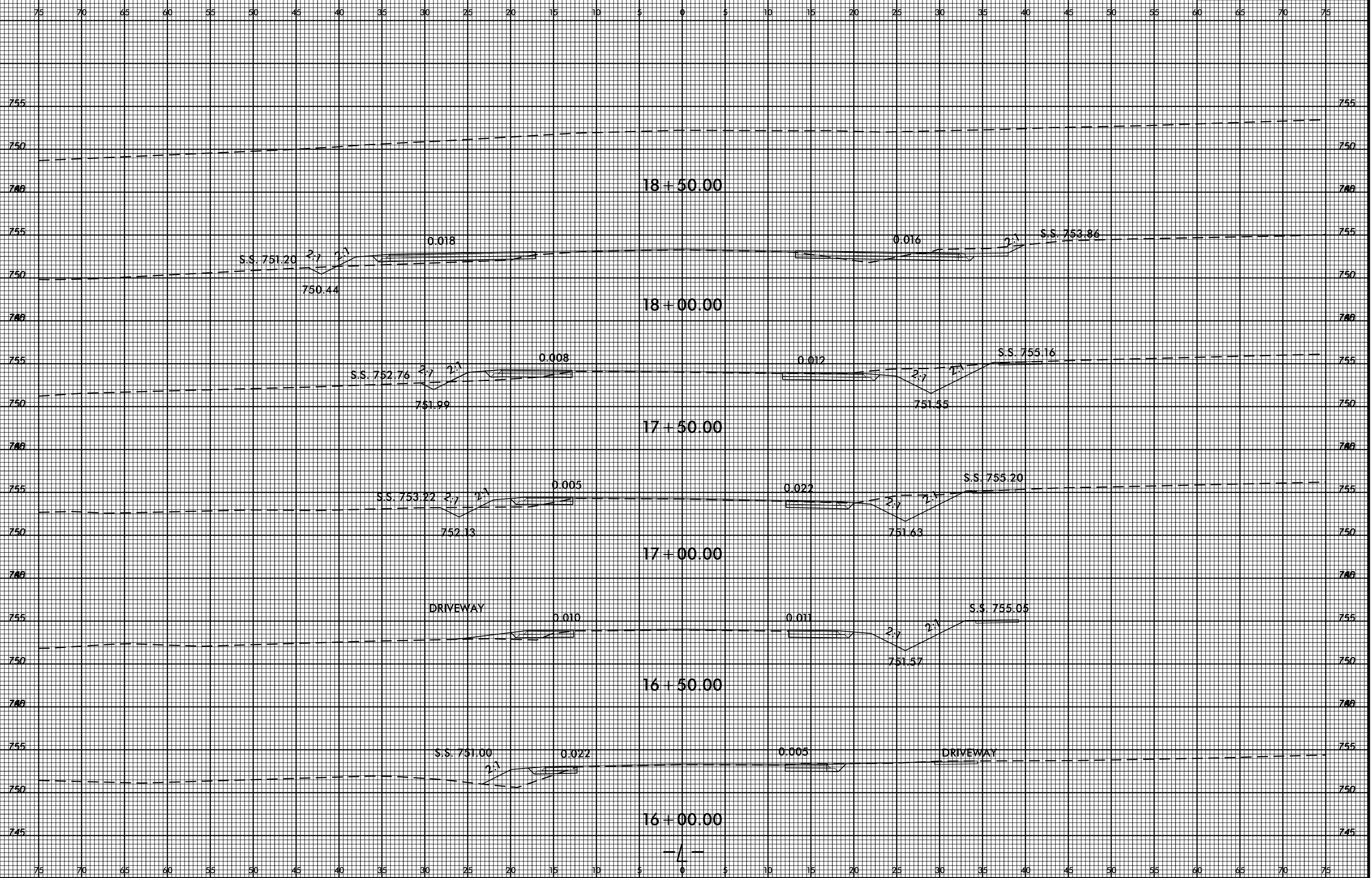


8/23/99



PROJ. REFERENCE NO.  
45340.3.15

SHEET NO.  
X-2



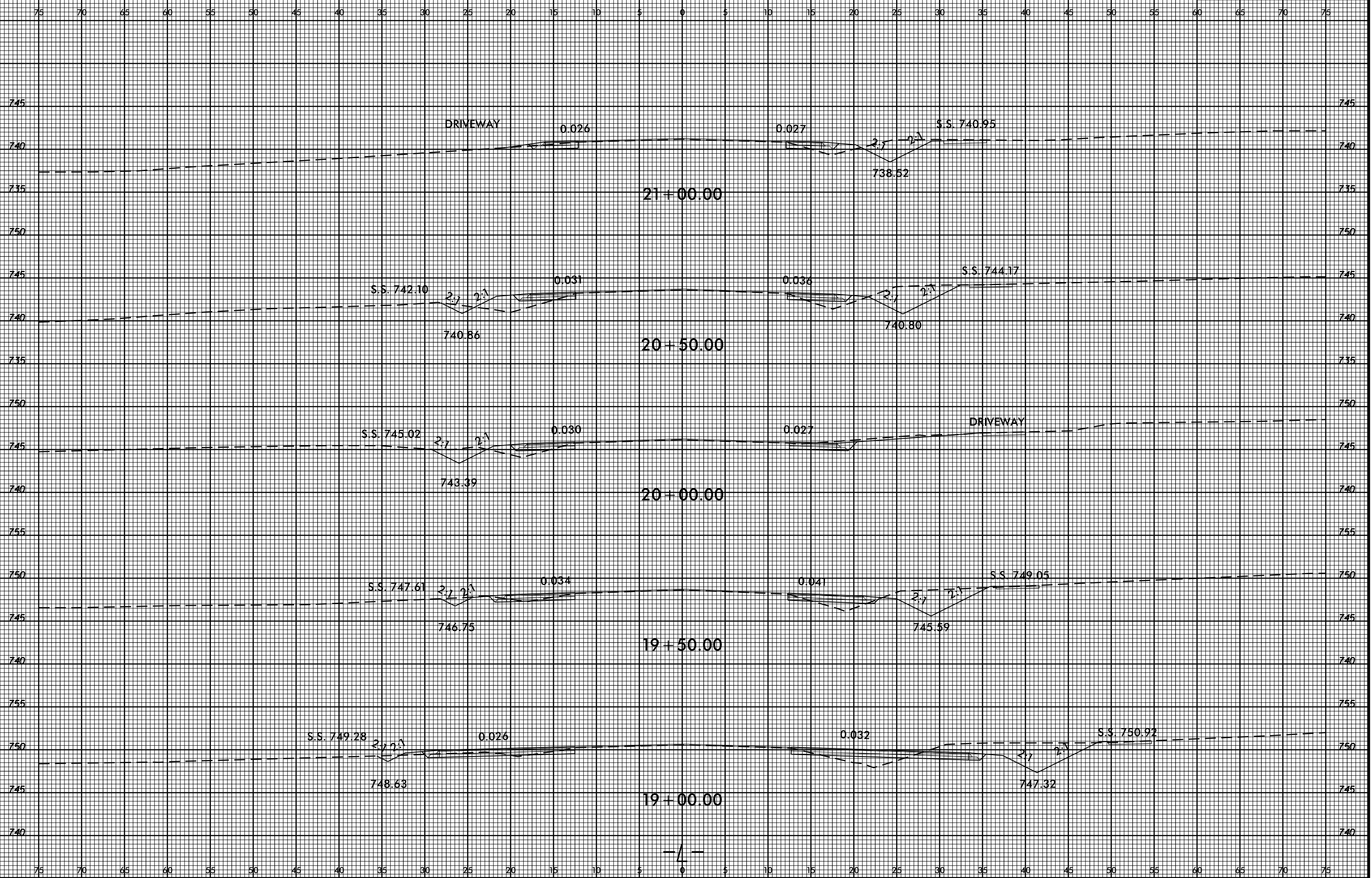
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8/23/99



PROJ. REFERENCE NO.  
45340.3.15

SHEET NO.  
X-3



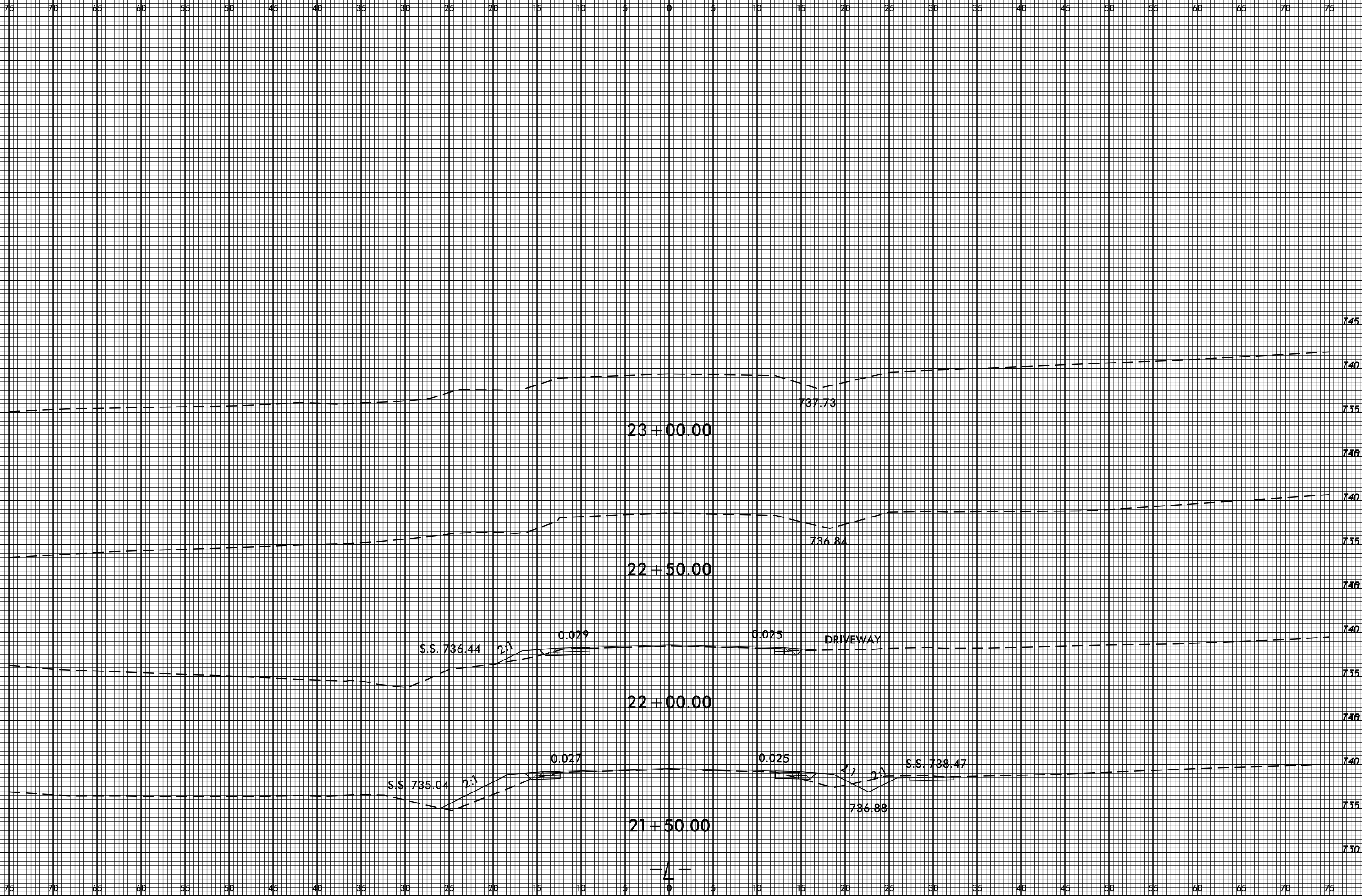
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8/23/99

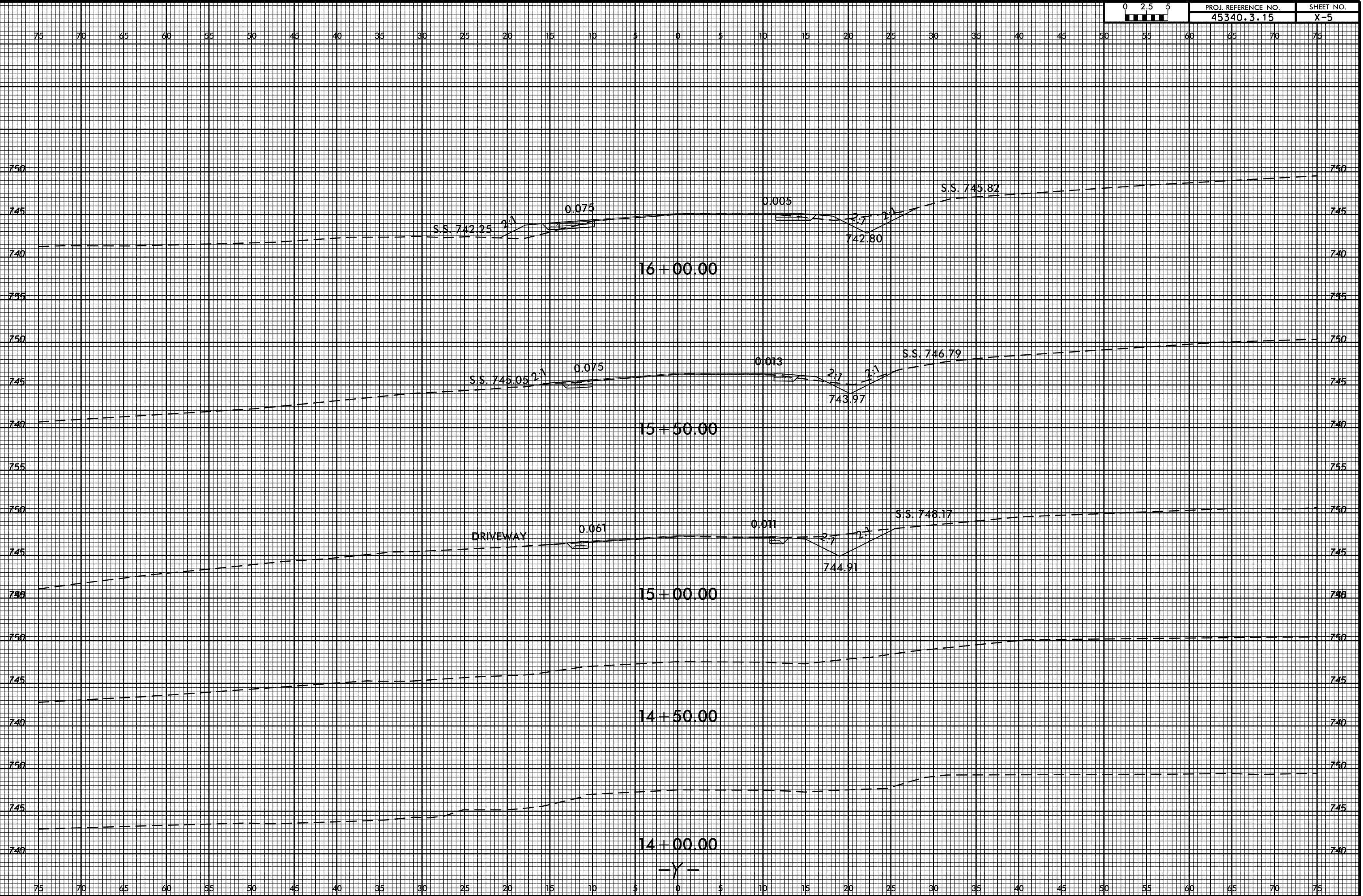


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SHEET NO.  
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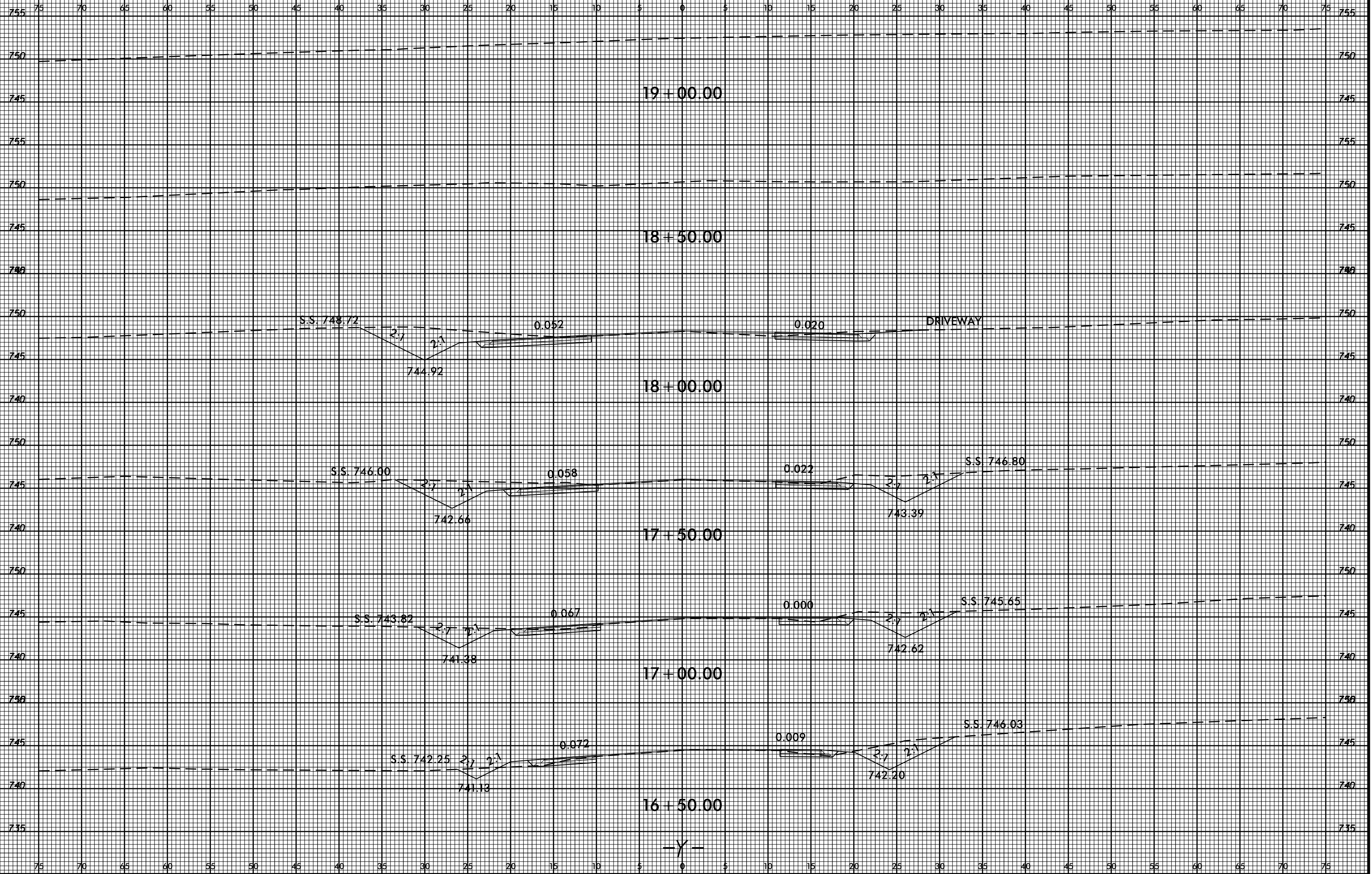
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8/23/99

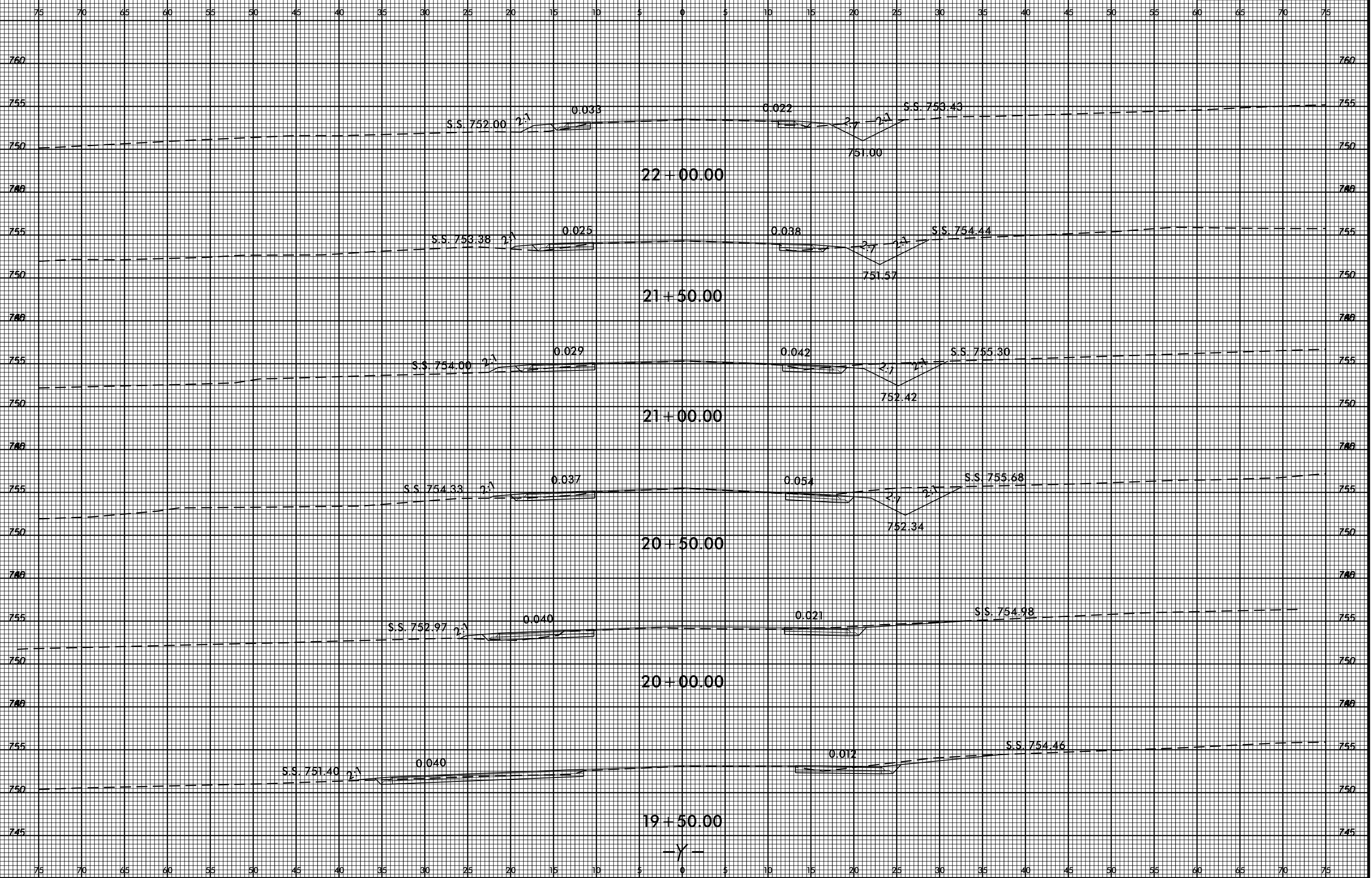


PROJ. REFERENCE NO.  
45340.3.15

SHEET NO.  
X-6



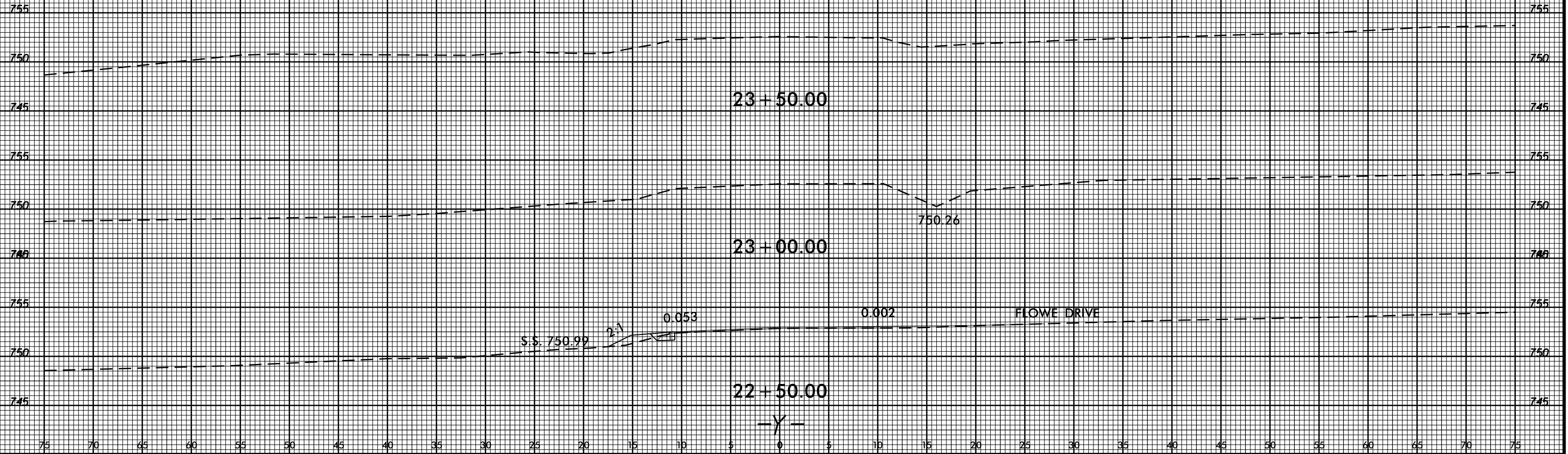
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24-MAR-2016 10:50  
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-Y-

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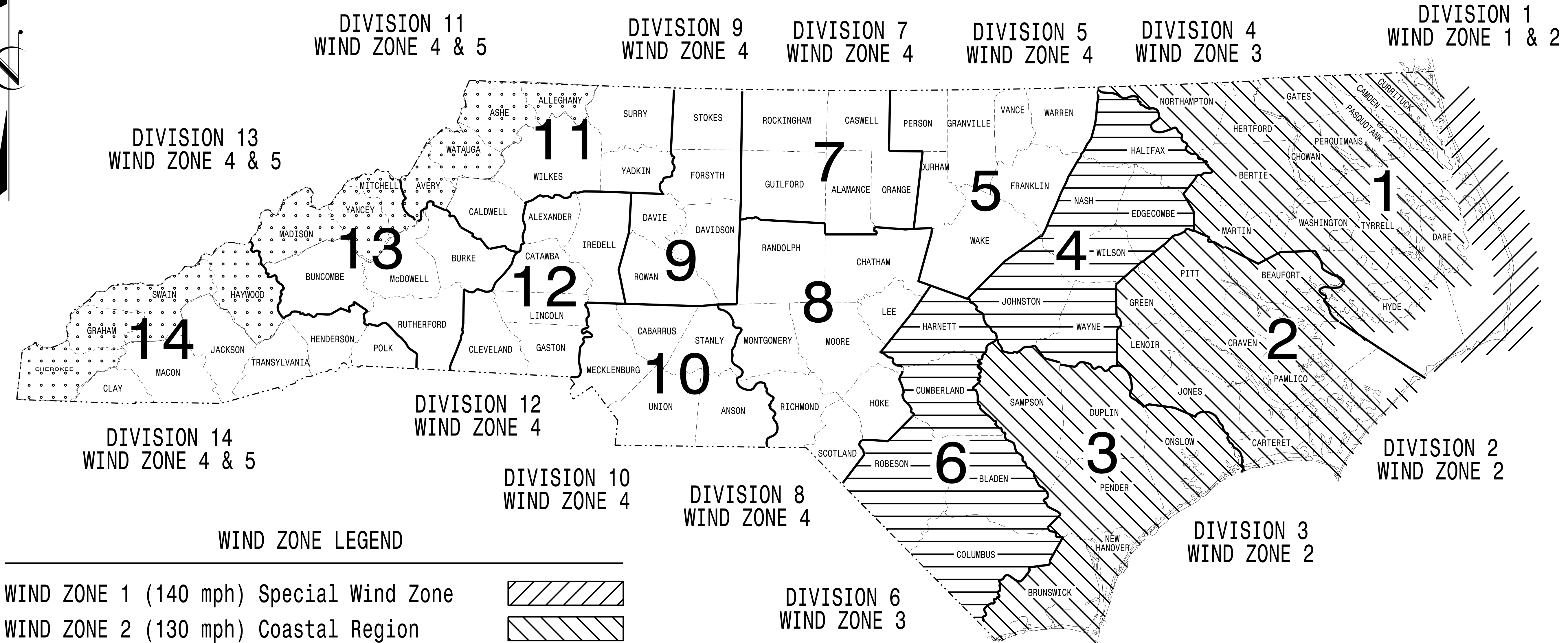


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# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## STANDARD DRAWINGS FOR METAL POLES

**NCDOT METAL POLE STANDARDS**



<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 2012 Interim to the 5th Edition 2009

**AASHTO**

Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS	
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8,9	Standard Strain Pole Foundations

**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**

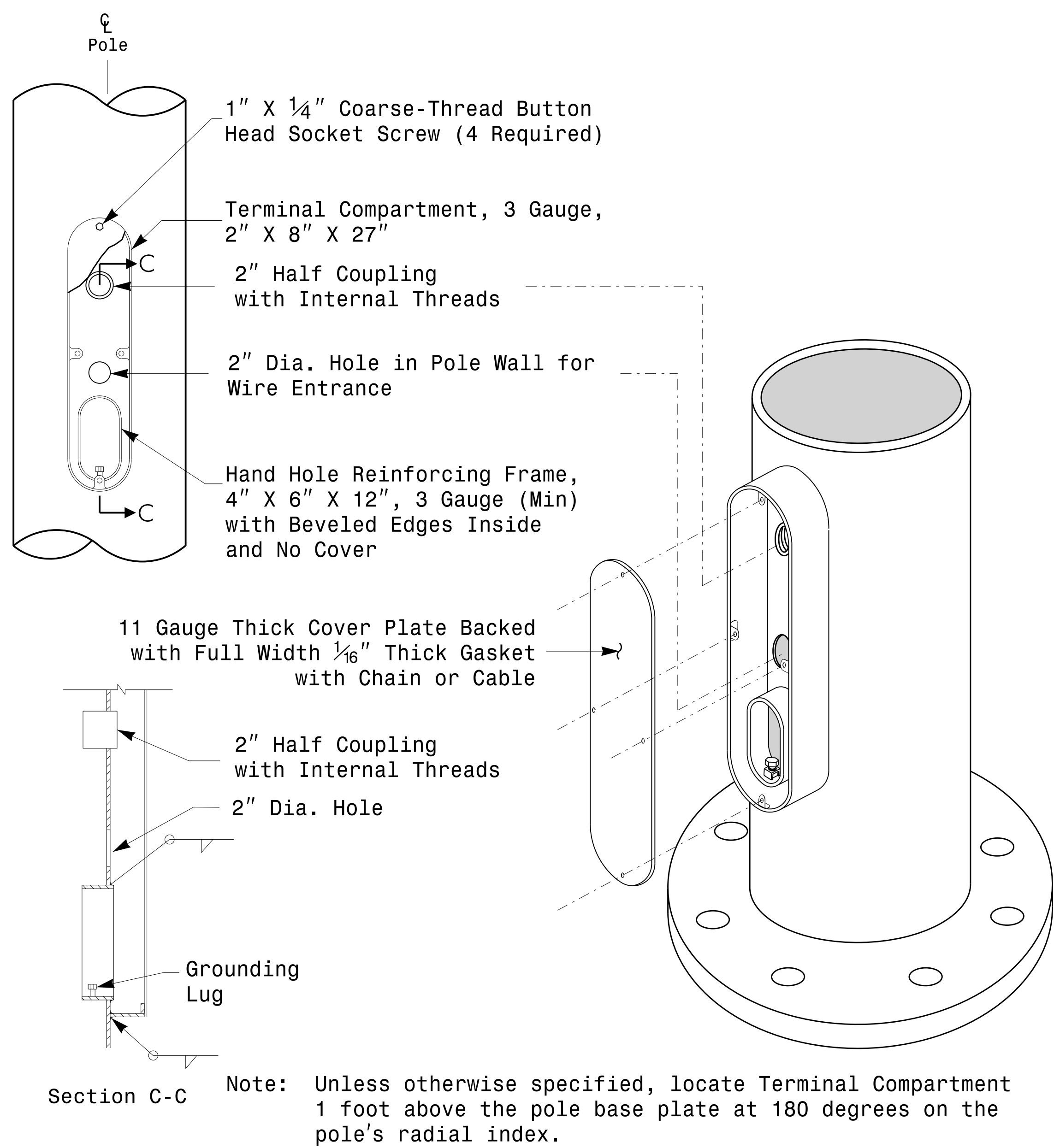
**D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER**

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

SEAL

Designed by: *Debesh C. Sarkar* 8/26/2014  
DATE





**Terminal Compartment Detail**

MFG _____	MFG. DATE: MM/YY _____
SHAFT D/T/L/Y _____	
ARM-A D/T/L/Y _____	
ARM-B D/T/L/Y _____	
A.B. DIA./B.C./L/Y _____	
NCDOT STANDARD _____	

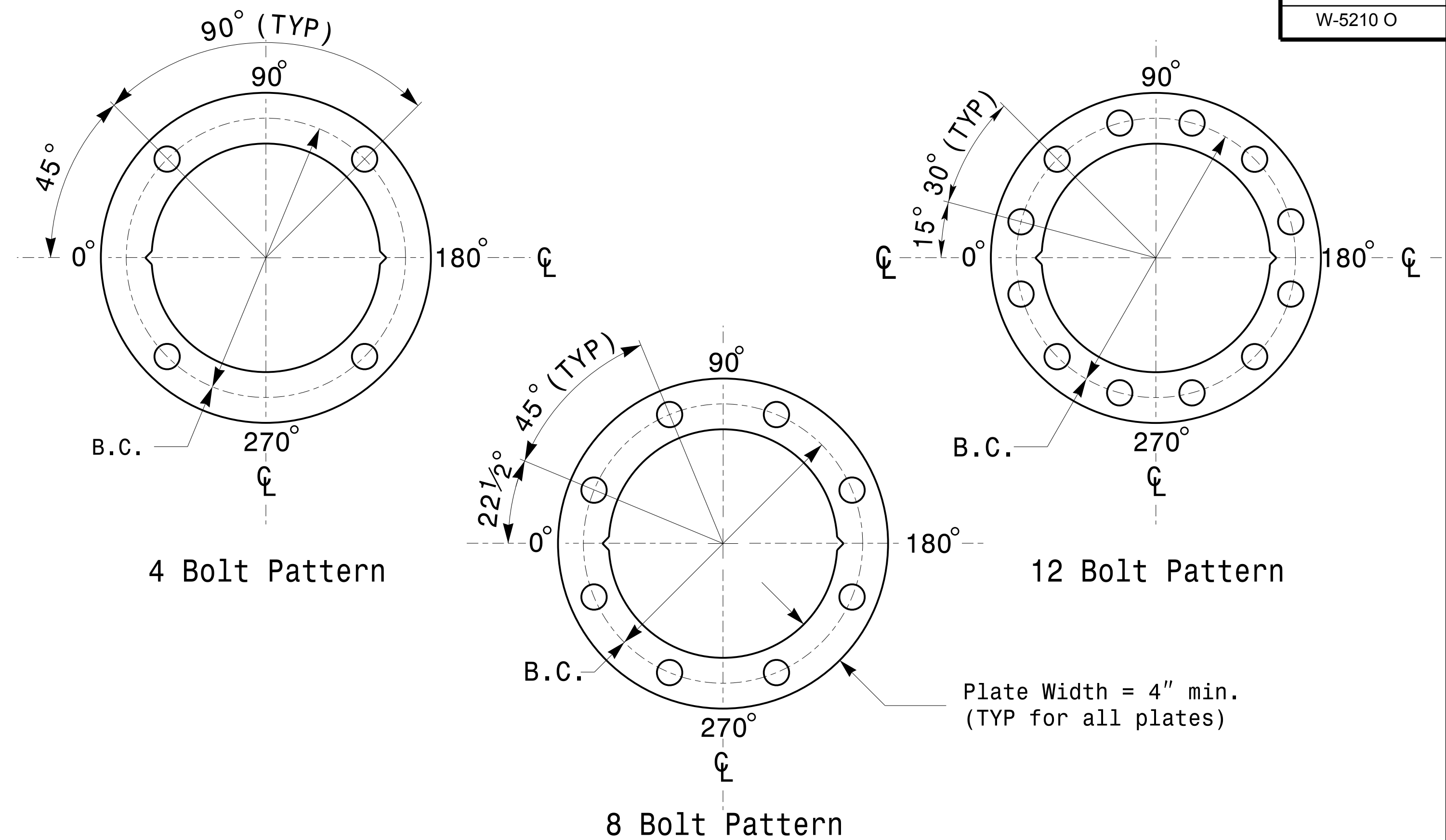
**Shaft I.D. Tag**  
(Provide on Strain Poles and Mast Arm Poles)

- 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 pole I.D. number and Signal Inv. Number.
  - 5) See drawing M4 for mounting positions of I.D. tags.

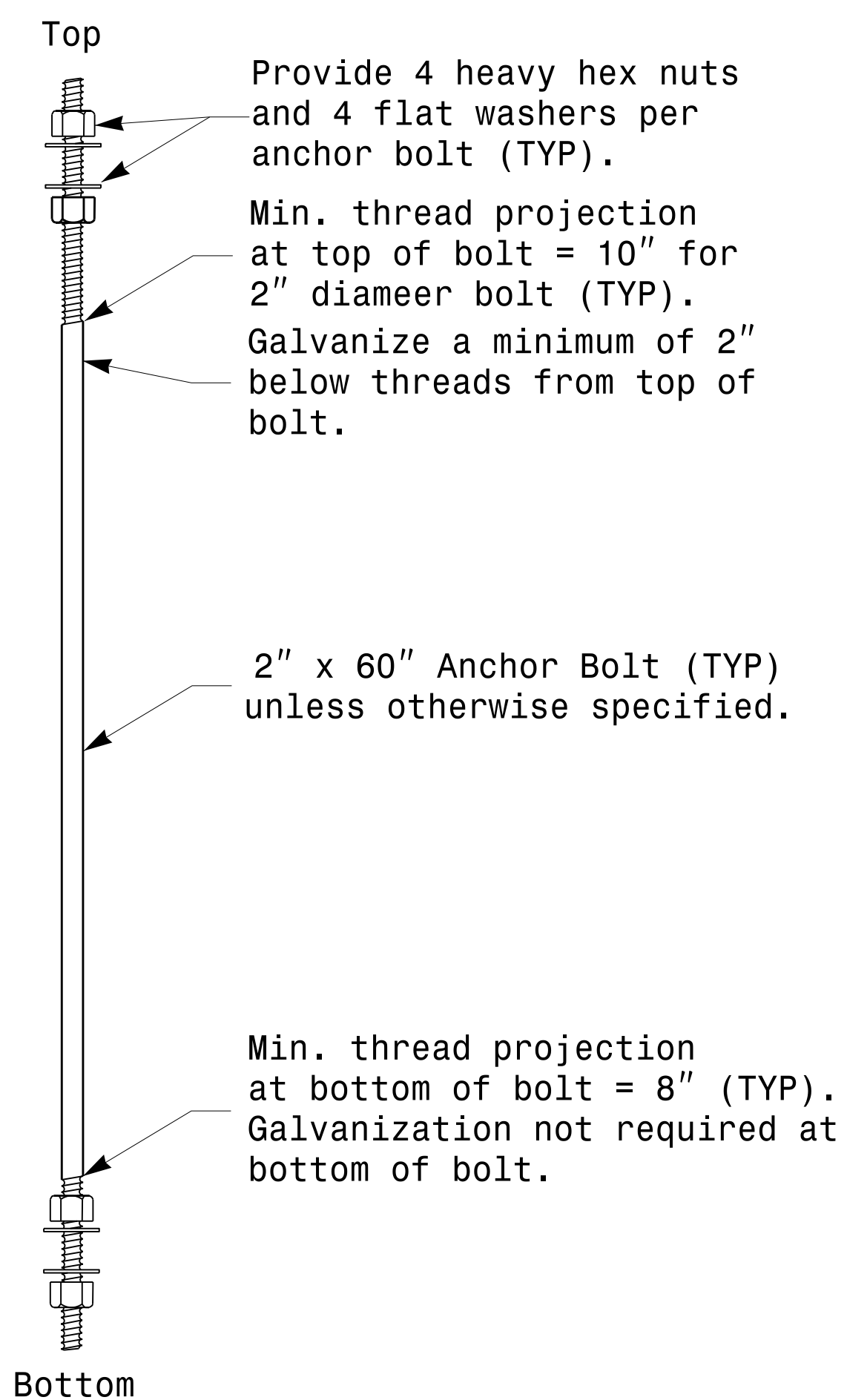
**Identification Tag Details**

MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	
NCDOT STANDARD _____	

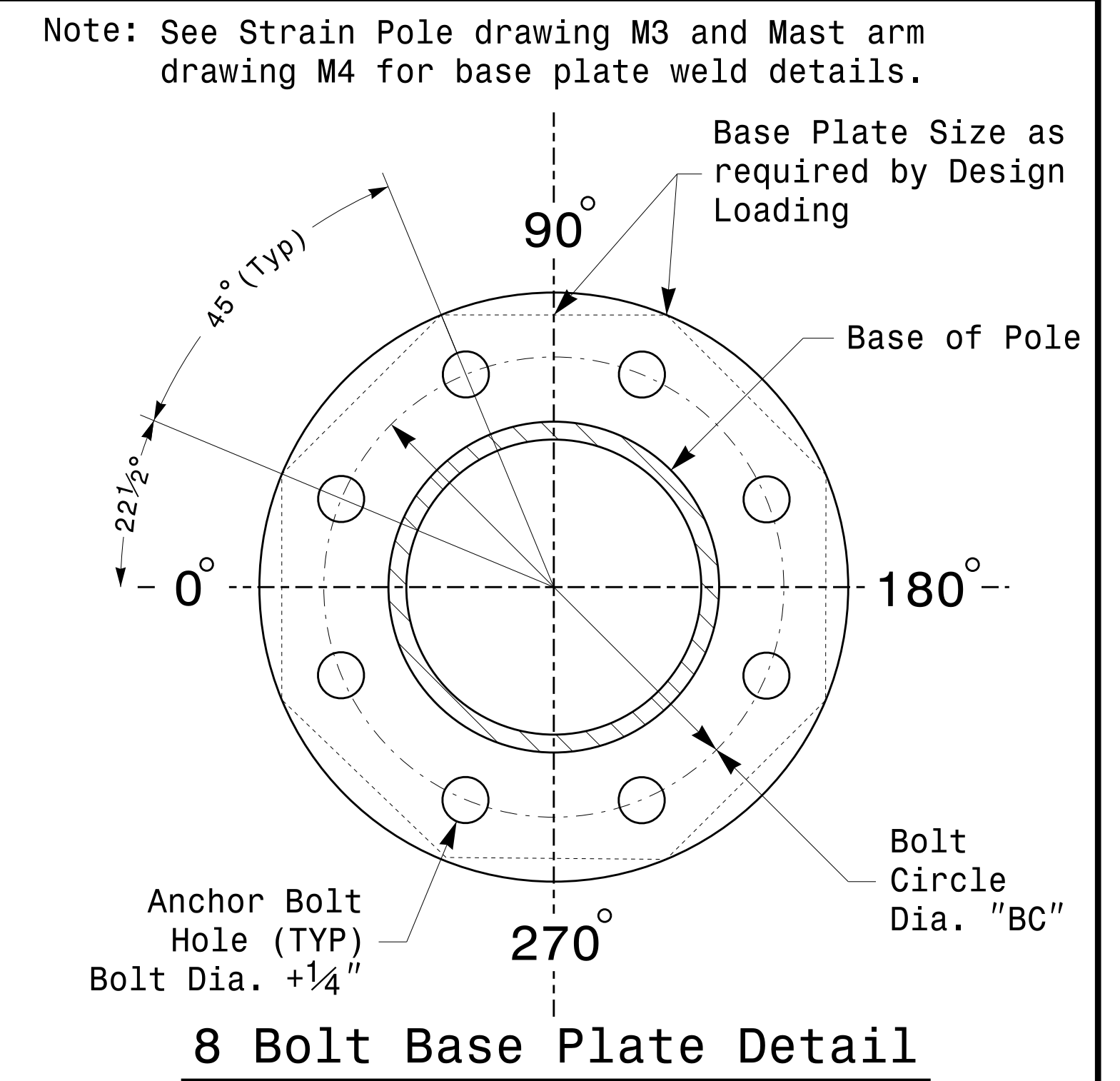
**Arm I.D. Tag**  
(Provide on each section of a multi-section mast arm)



Construct Templates and Plates from 1/4" min. thick Steel. Galvanizing is not required.  
**Base Plate Template and Anchor Bolt Lock Plate Details**



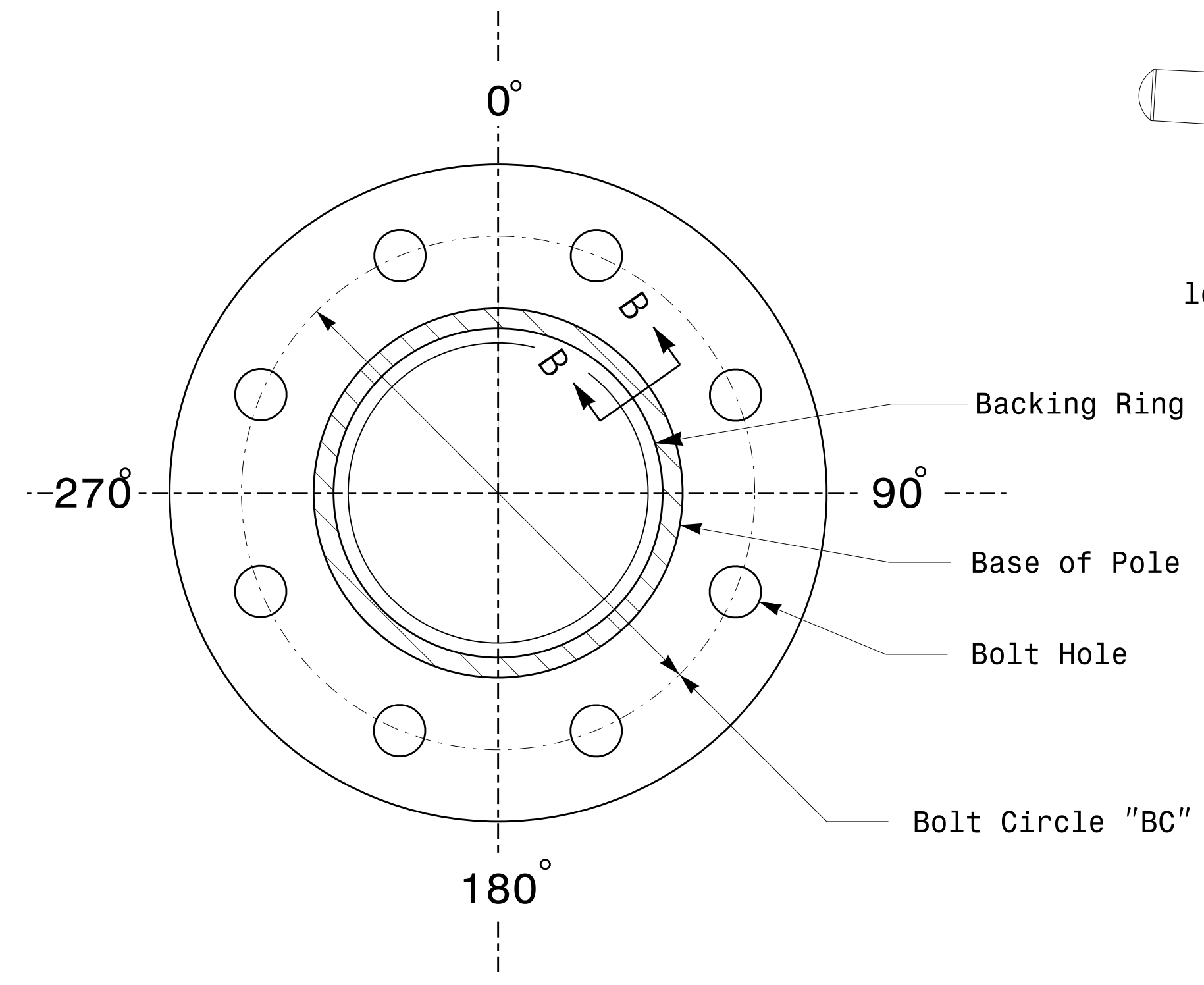
**Anchor Bolt Detail**



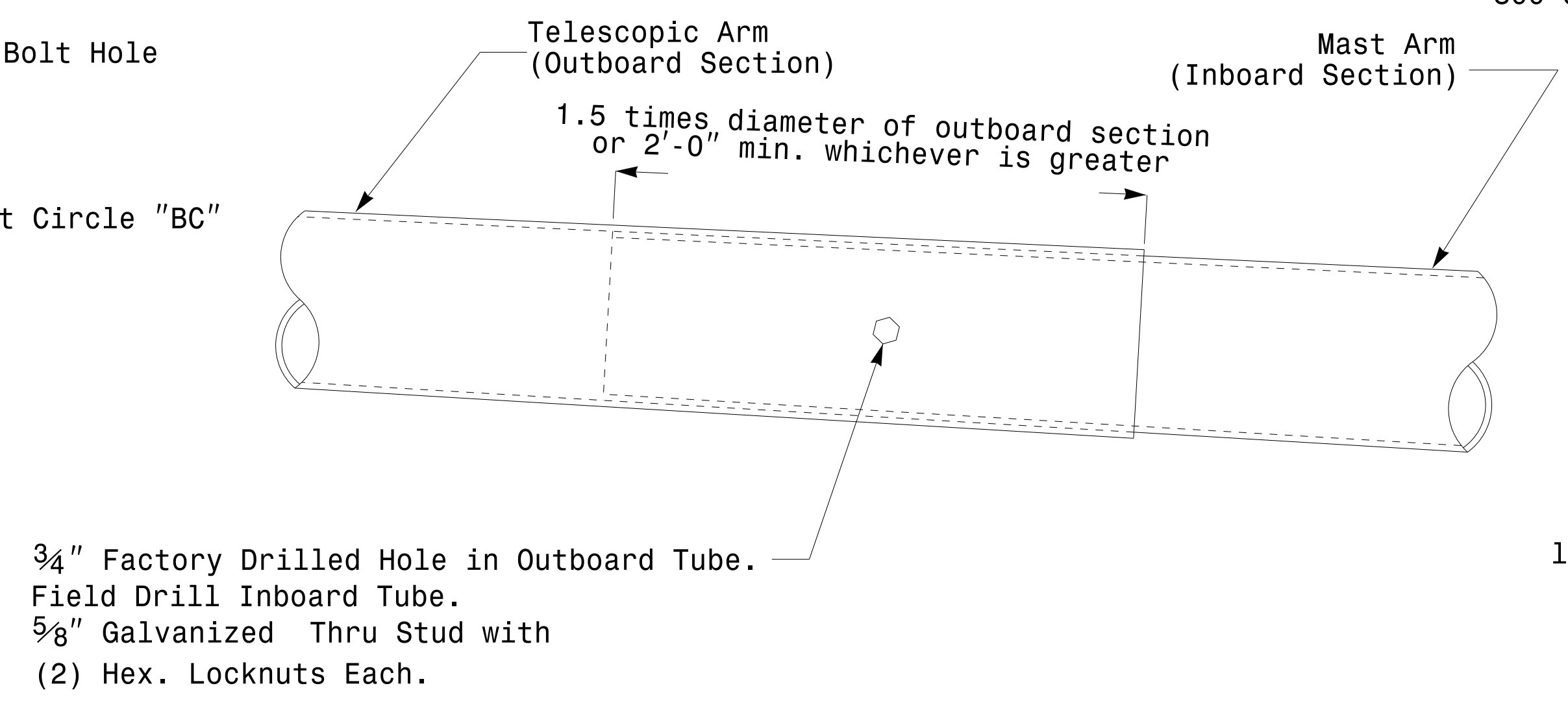
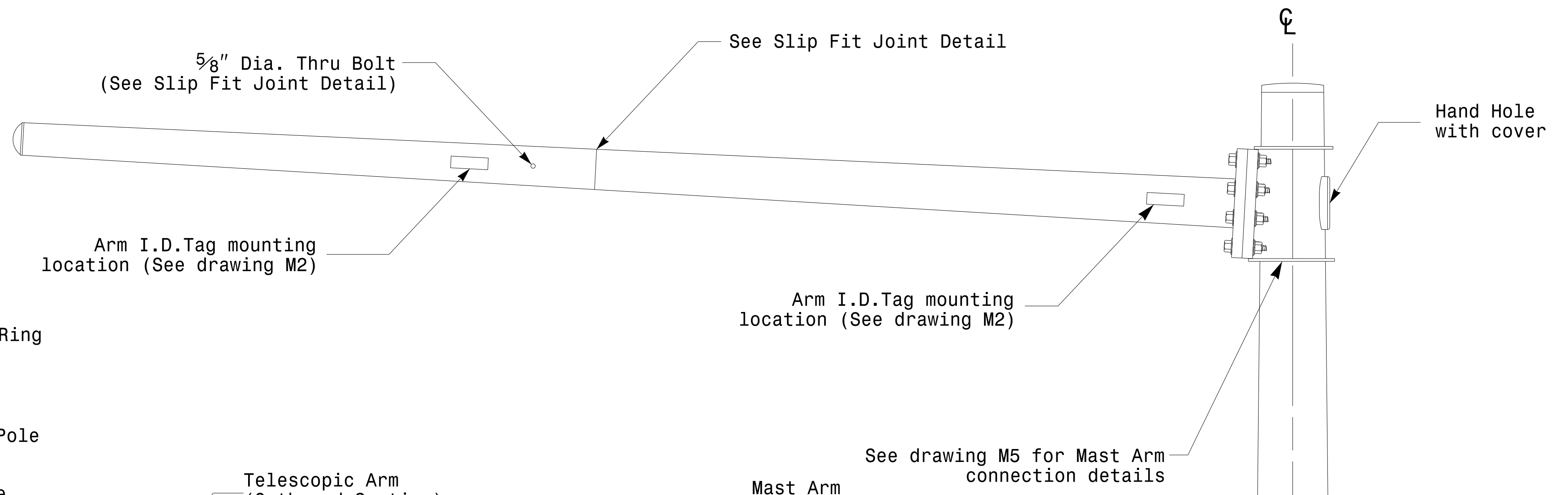
	Typical Fabrication Details Common To All Metal Poles		
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
SCALE: NONE NA	REVISIONS: _____ INIT. DATE _____	DocuSign by: Dinesh C. Sarkar 4486326147644 8/26/2014 DATE	SIG. INVENTORY NO. _____

06-AUG-2014 08:55  
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 Top | Lowy

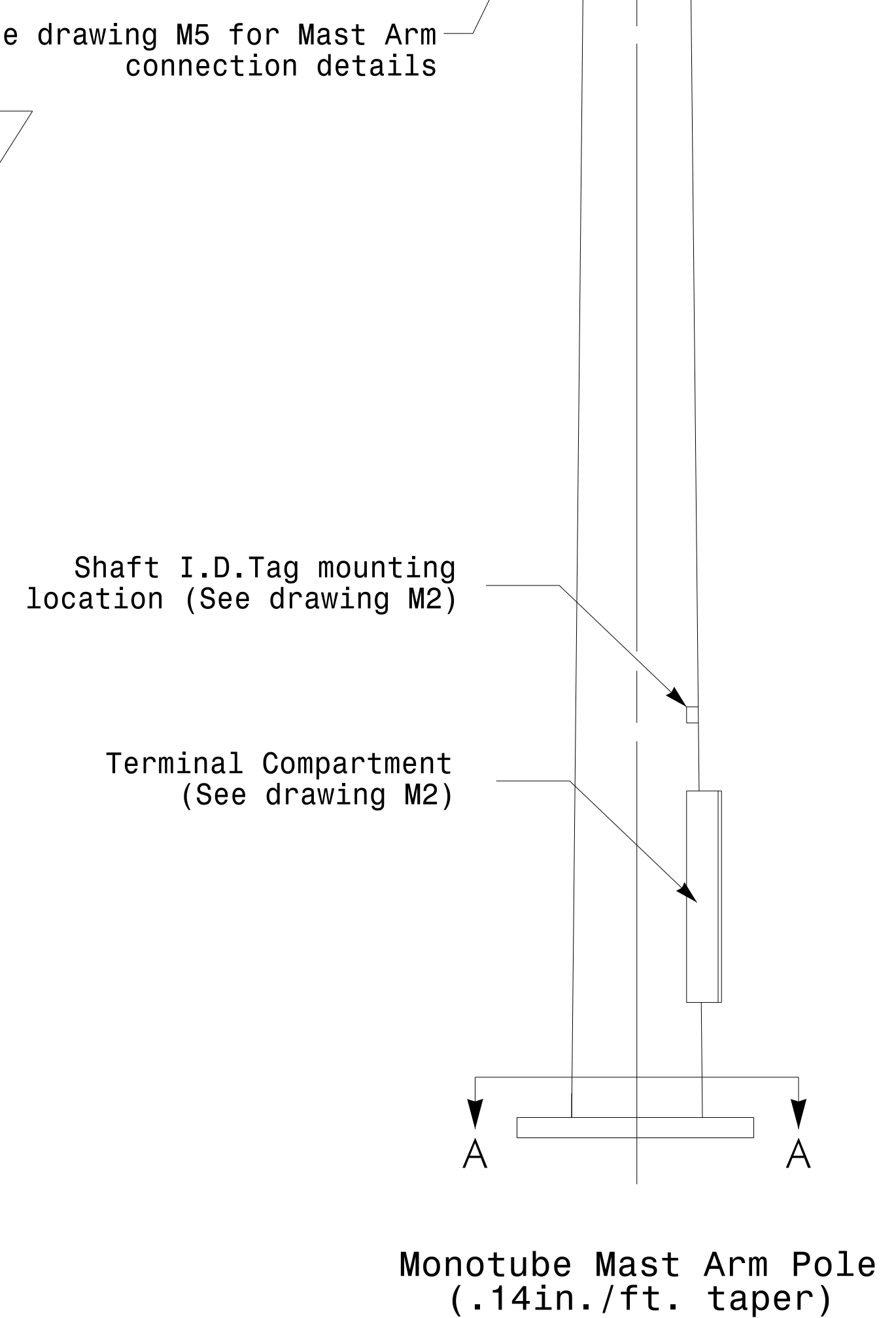
**Fabrication Details – All Poles**



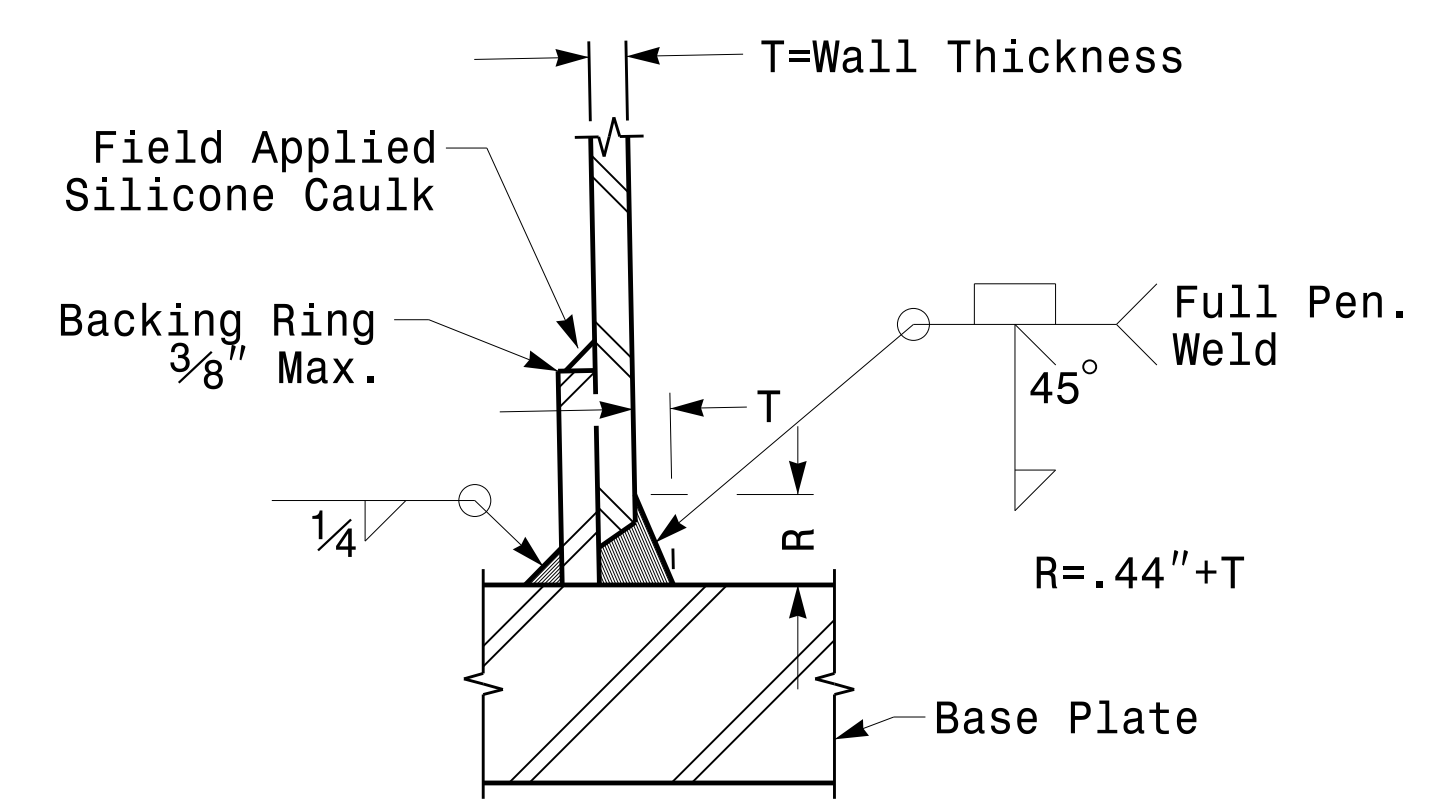
Section A-A  
(See drawing M 2)  
**Pole Base Plate**



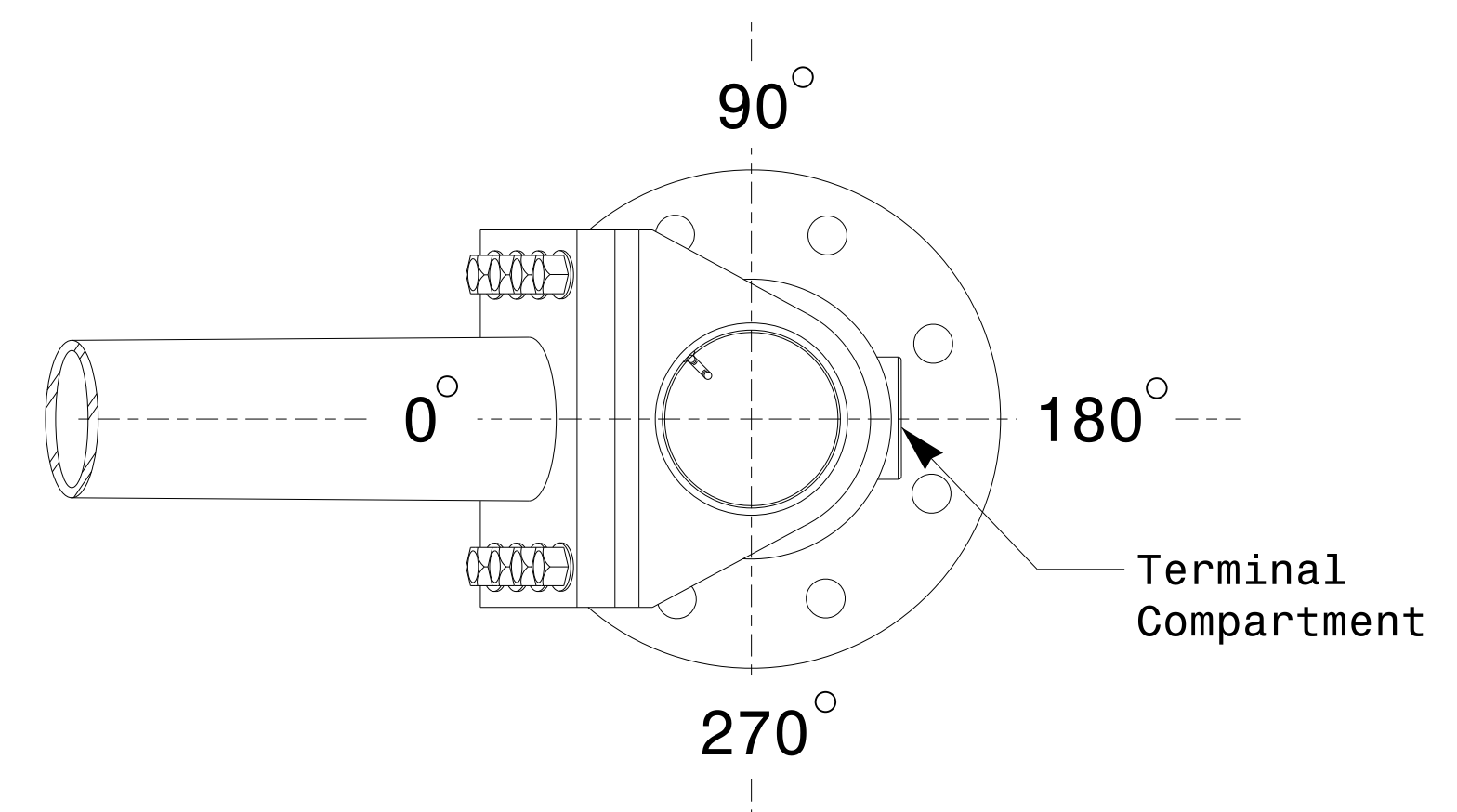
**Slip Fit Joint Detail for Mast Arm**



Monotube Mast Arm Pole  
(.14in./ft. taper)



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



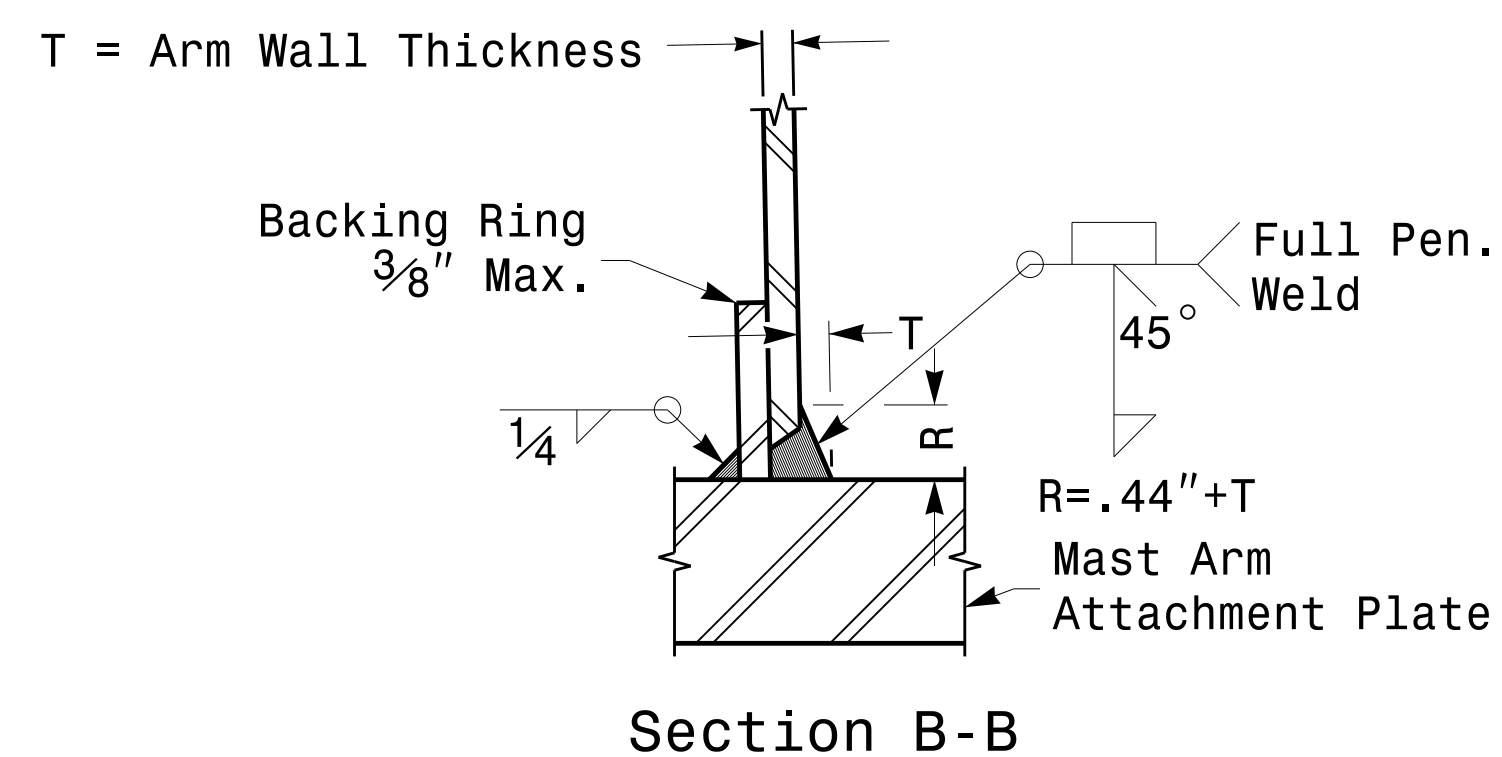
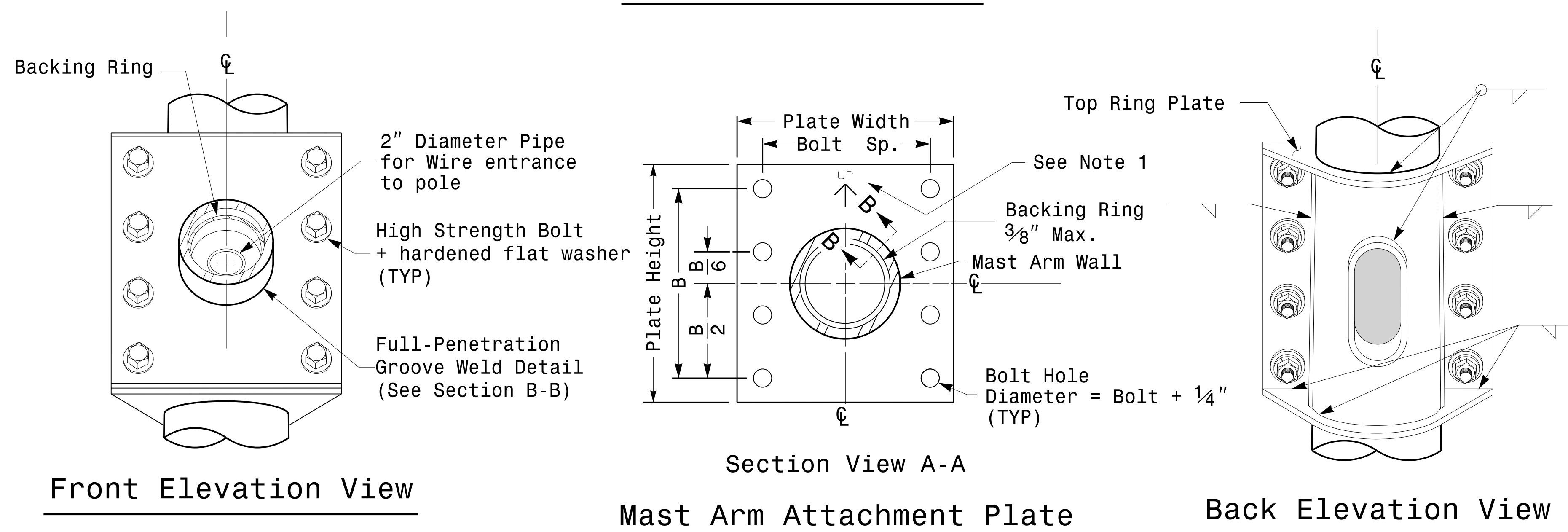
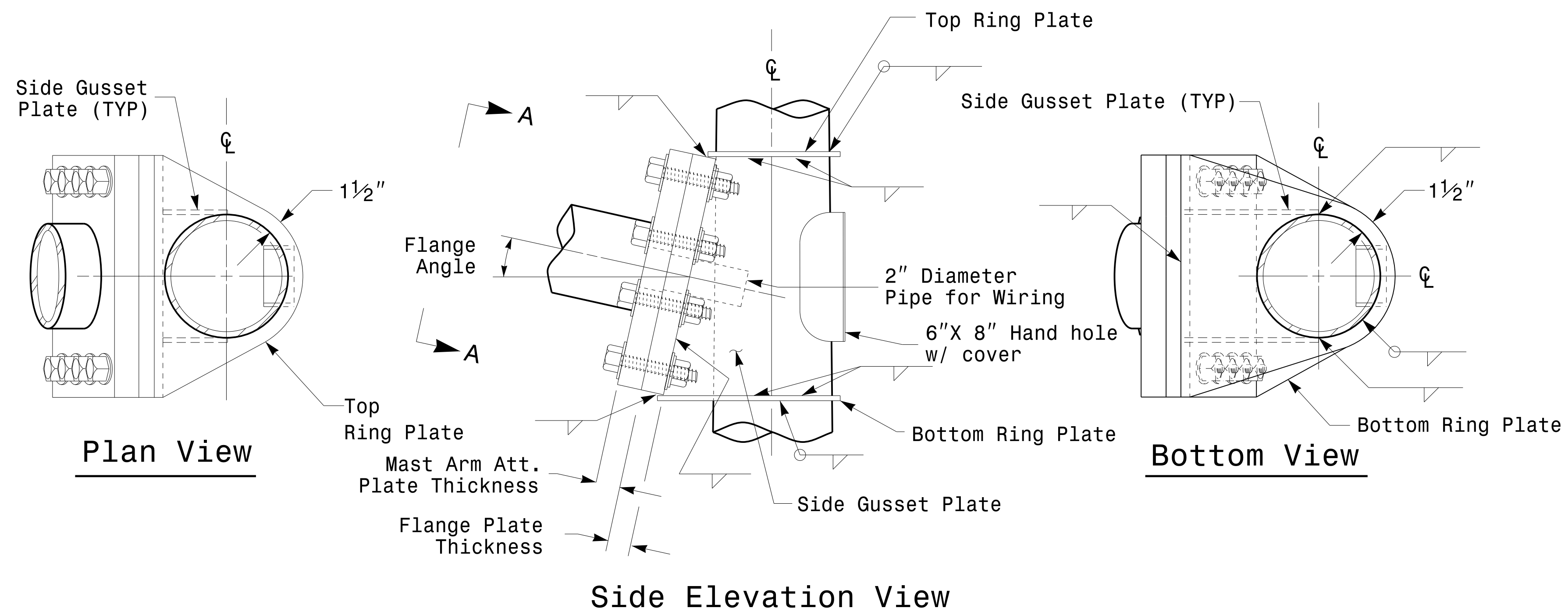
**Mast Arm Radial Orientation**

	Typical Fabrication Details for Mast Arm Poles		
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	REVISIONS	INIT. DATE	SIG. INVENTORY NO.

06-AUG-2014 08:50  
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 7:00:11 am

**Fabrication Details – Mast Arm Poles**

# Welded Ring Stiffened Mast Arm Connection



**Full-Penetration Groove Weld Detail**

**Notes:**

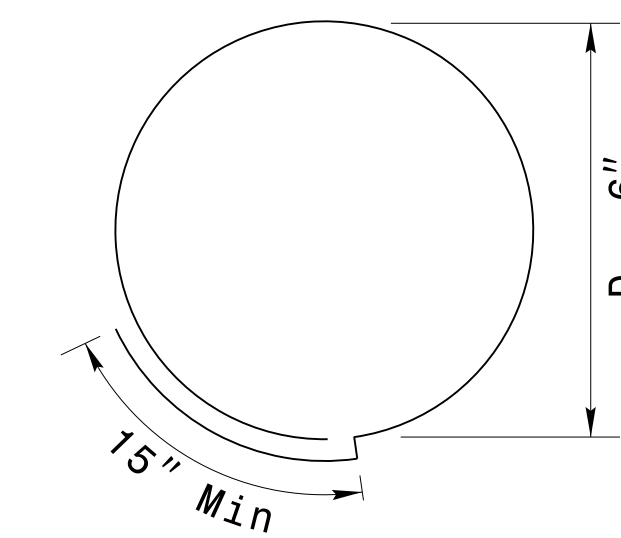
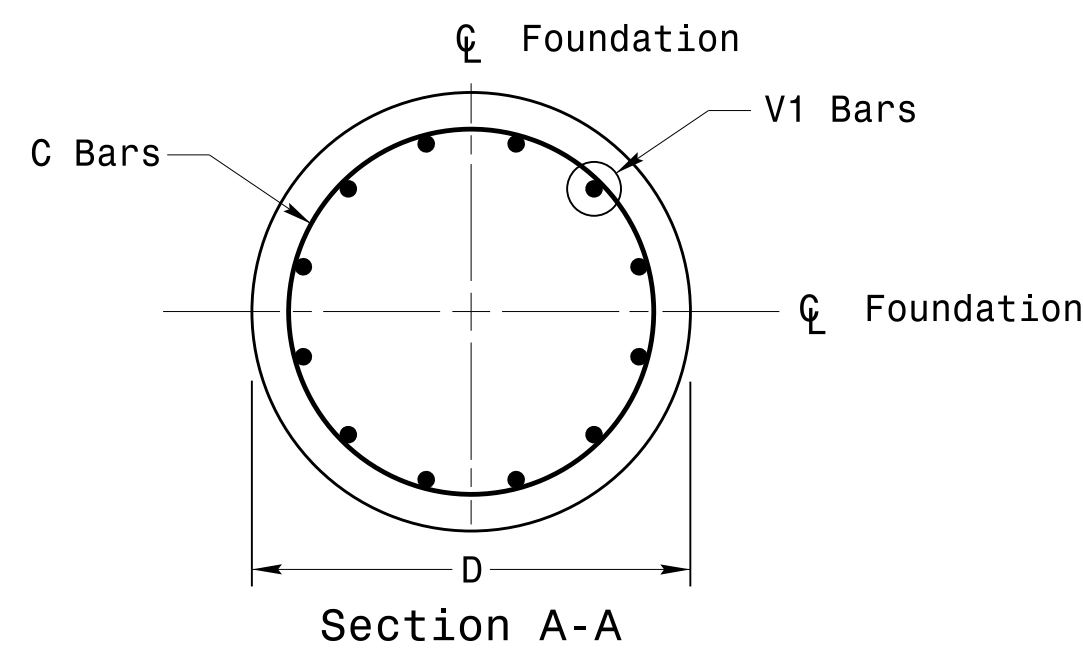
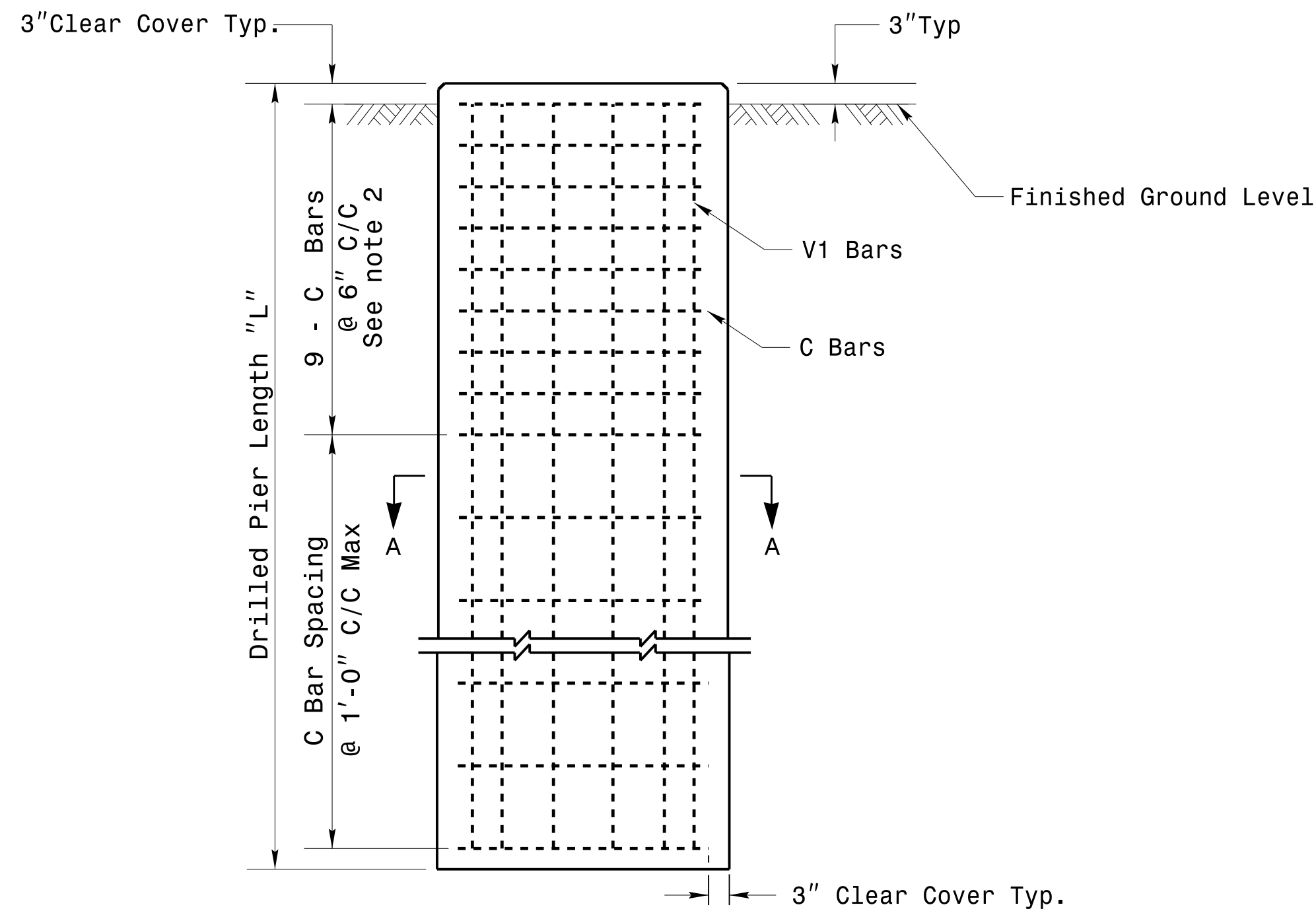
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Designer is responsible for providing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

	<p>Fabrication Details For Mast Arm Connection To Pole</p>		
	<p>PLAN DATE: AUGUST 2013</p>	<p>DESIGNED BY: C.F. ANDREWS</p>	
<p>SCALE: 0 NA NONE</p>	<p>PREPARED BY: N. BITTING</p>	<p>REVIEWED BY: D.C. SARKAR</p>	<p>INIT. DATE</p>
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>DocuSign by: D. C. SARKAR 8/26/2014</p>

06-10-2014 08:47  
 S:\Projects\2013\Signal Design\Section\Eastern Region\MM Sheets\2012\_M5\_Fab\_Details\MastArms.dgn  
 Topiloway

**Fabrication Details – Mast Arm Poles**

### Reinforcing Steel Bars



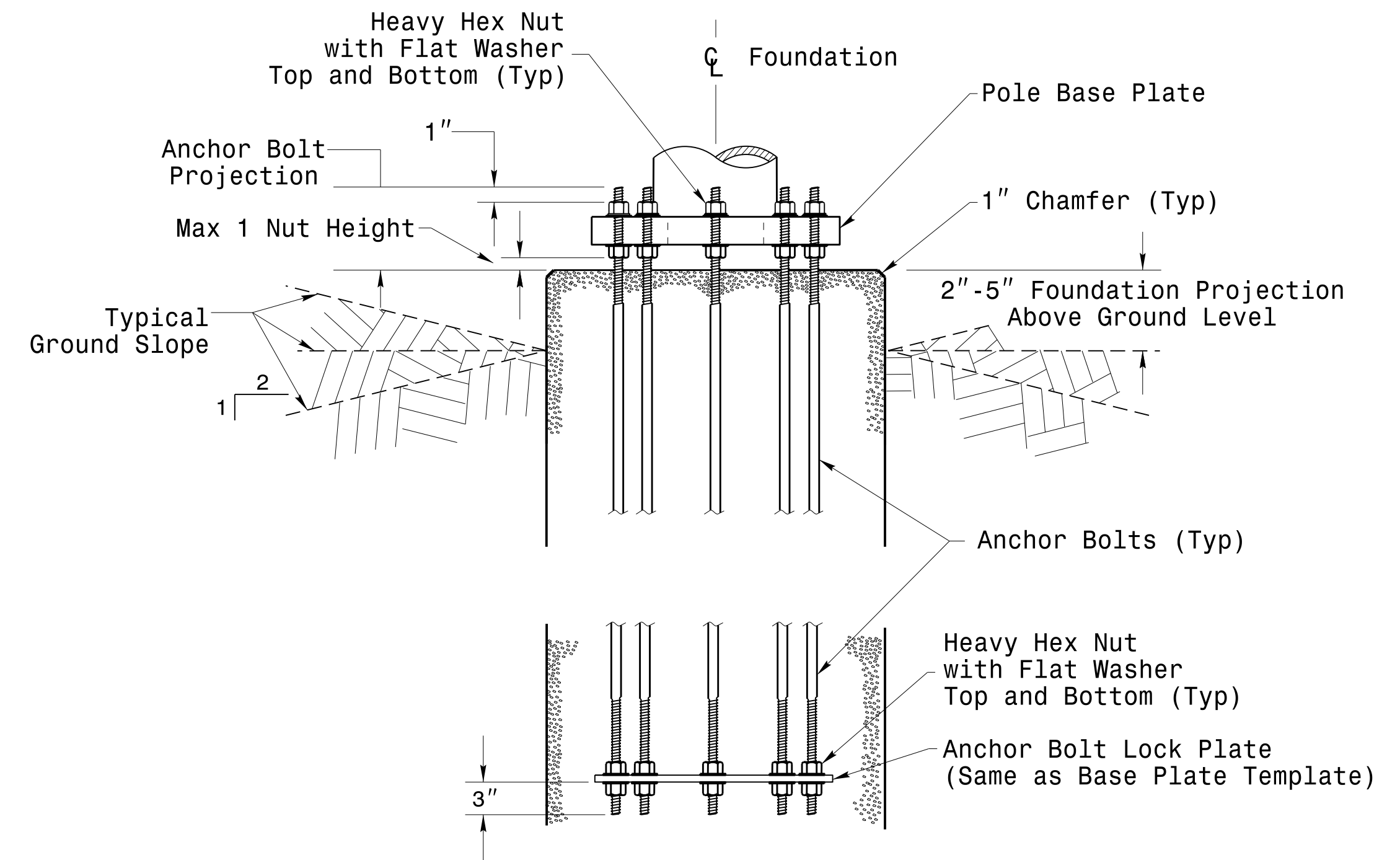
Typical "C" Bars

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4'-0" DIAMETER)						
Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
48"	.465 x L	V1	***	#8	STR.	**
		C	*	#4	CIR.	12'-6"

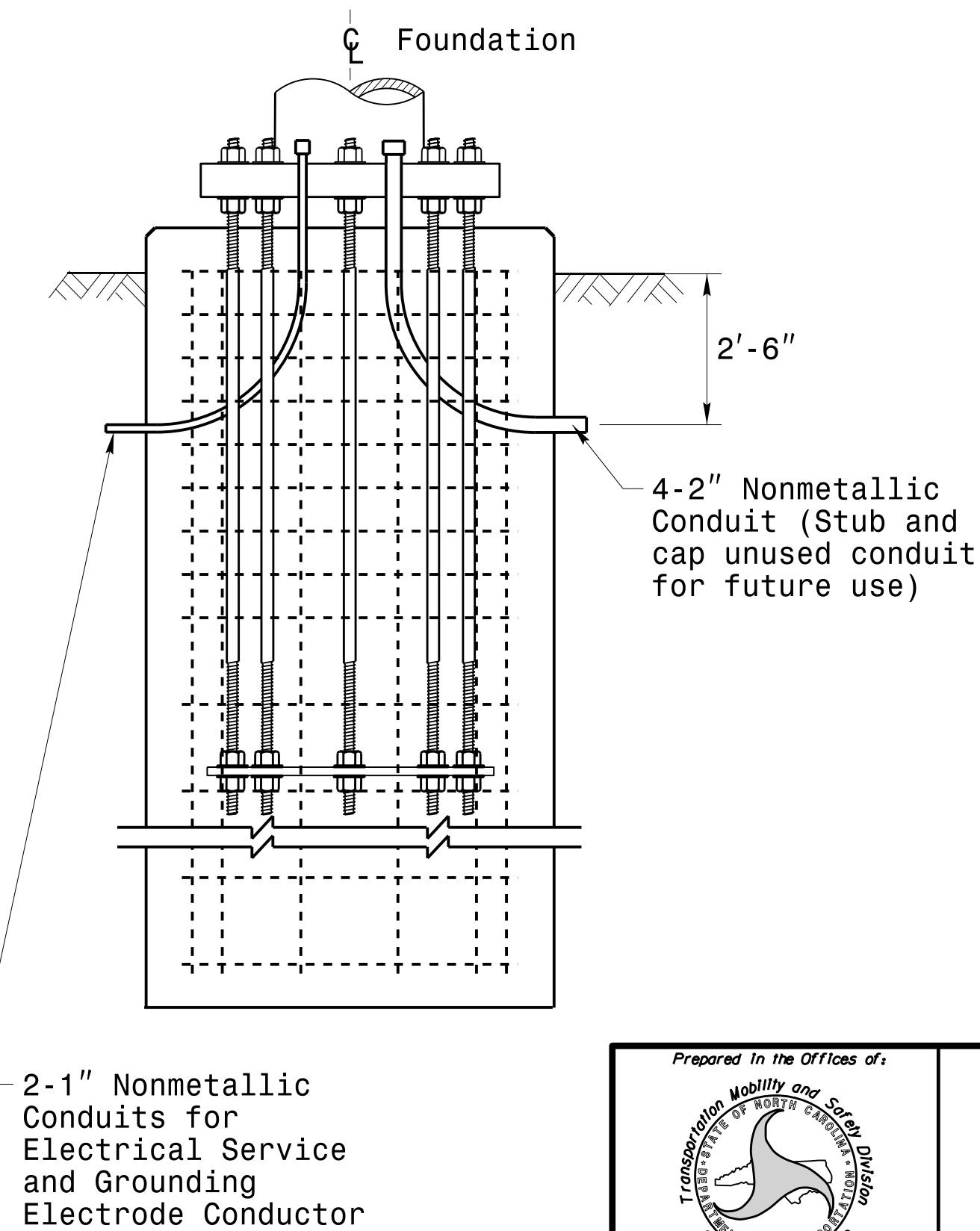
\* See Note No. 1  
 \*\* See Note No. 3  
 \*\*\* See Note No. 4

### Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



### Typical Foundation Conduit Details



### Notes

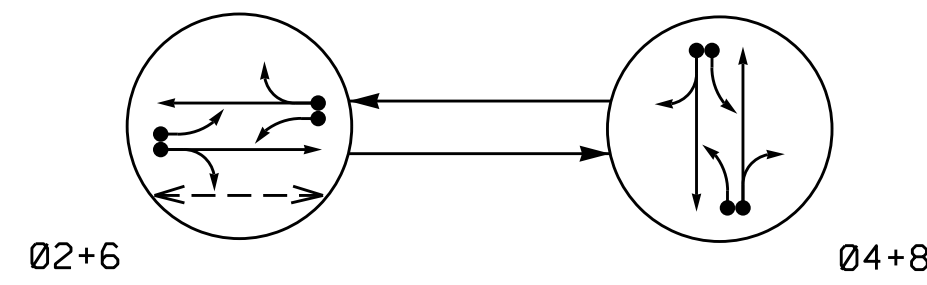
- The number of C-bars is based on foundation depth and/or as required. For standard foundations, see sheets M 8 and M 9 for details.
- Circular tie reinforcing rings may be vertically adjusted by +/- 3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
- The length of V1-bars is based on foundation depth. For standard foundations, see sheets M 8 and M 9 for details. Vertical reinforcing bars (V1) may be horizontally adjusted by +/- 3" to facilitate the installation of electrical conduit entering into the cage.
- Provide vertical reinforcement as required per design. See sheets M 8 and M9 for details.

Construction Details – Foundations

26-AUG-2014 08:44 S:\TDS\115\SIGNAL\SIGNAL Design Section\Eastern Region\M\_Sheets\2012\_M7\_Con\_Details\Foundations.dgn jgallaway

	<b>Construction Details Foundations</b>		
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	REVISIONS:	INIT. DATE:	SIG. INVENTORY NO.:

**PHASING DIAGRAM**

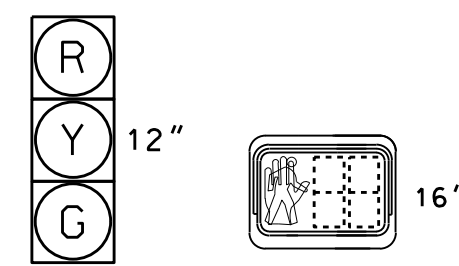


**PHASING DIAGRAM DETECTION LEGEND**

- ● → DETECTED MOVEMENT
- — → UNDETECTED MOVEMENT (OVERLAP)
- - - - → UNSIGNALIZED MOVEMENT
- - - - → PEDESTRIAN MOVEMENT

**SIGNAL FACE I.D.**

All Heads L.E.D.



21, 22 P21, P22  
41, 42  
61, 62  
81, 82

**TABLE OF OPERATION**

SIGNAL FACE	PHASE		
	Ø2+6	Ø4+8	PHASE
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R
P21, P22	W	DW	DRK

W - Walk  
DW - Don't Walk  
DRK - Dark

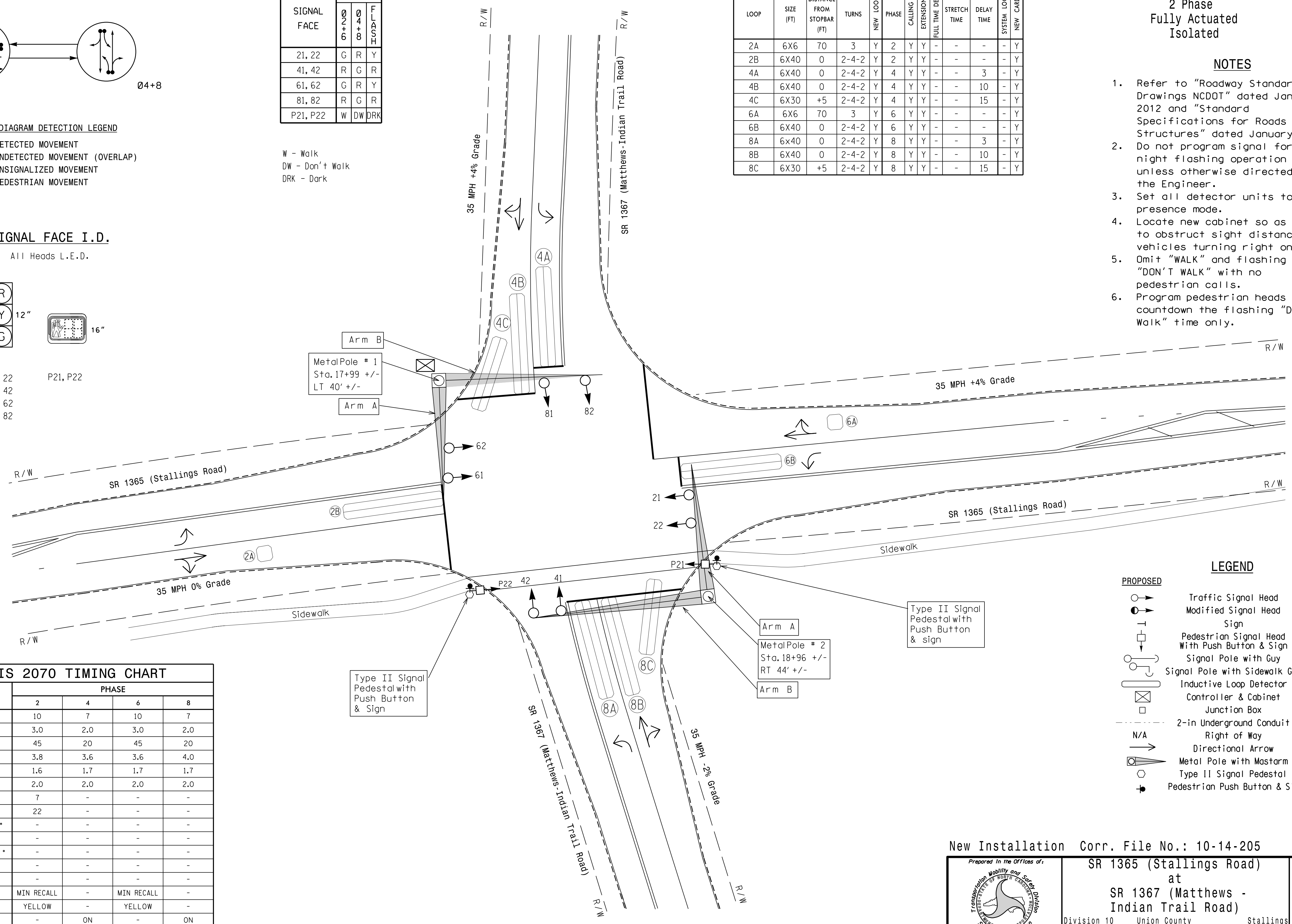
**OASIS 2070 LOOP & DETECTOR INSTALLATION CHART**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	70	3	Y	2	Y	Y	-	-	-	-	Y
2B	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	10	-	Y
4C	6X30	+5	2-4-2	Y	4	Y	Y	-	-	15	-	Y
6A	6X6	70	3	Y	6	Y	Y	-	-	-	-	Y
6B	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
8A	6x40	0	2-4-2	Y	8	Y	Y	-	-	3	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	10	-	Y
8C	6X30	+5	2-4-2	Y	8	Y	Y	-	-	15	-	Y

2 Phase  
Fully Actuated  
Isolated

**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.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.



**OASIS 2070 TIMING CHART**

FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	45	20	45	20
Yellow Clearance	3.8	3.6	3.6	4.0
Red Clearance	1.6	1.7	1.7	1.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	7	-	-	-
Don't Walk 1	22	-	-	-
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

\* 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 Pole with Mastarm                        | ○ Metal Pole with Mastarm                        |
| ○ Type II Signal Pedestal                        | ○ Type II Signal Pedestal                        |
| ⊥ Pedestrian Push Button & Sign                  | ⊥ Pedestrian Push Button & Sign                  |

New Installation Corr. File No.: 10-14-205

SR 1365 (Stallings Road)  
at  
SR 1367 (Matthews - Indian Trail Road)

Division 10 Union County Stallings

PLAN DATE: February 2015 REVIEWED BY: T. Williams

PREPARED BY: M. Mahbooba REVIEWED BY:

SEAL  
NORTH CAROLINA  
PROFESSIONAL ENGINEER  
T. J. WILLIAMS  
024393

DocuSign  
SIGNED BY: T. J. Williams  
DATE: 2/23/2015

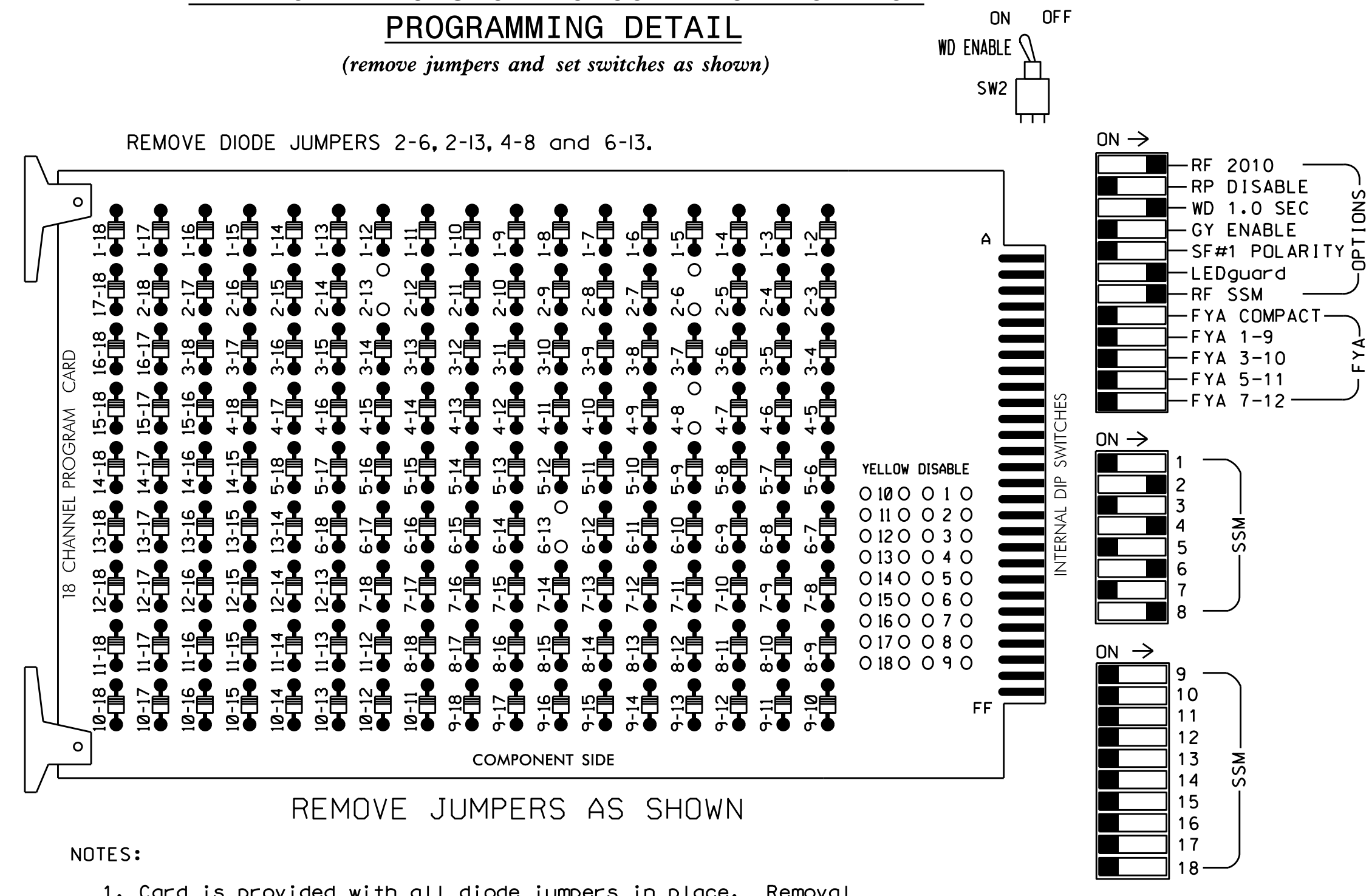
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 1" = 20'

SIG. INVENTORY NO. 10-2181

02-14-2015 08:10  
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**EDI MODEL 2018ECL-NC 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. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
  3. Ensure that Red Enable is active at all times during normal operation.
  4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

- 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. Program phases 4 and 8 for Dual Entry.
  3. Enable Simultaneous Gap-Out for all phases.
  4. Program phases 2 and 6 for Start Up In Green.
  5. Program phase 2 for 'STARTUP PED CALL'.
  6. Program phases 2 and 6 for Yellow Flash.

**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.	NU	21,22	P21, P22	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW																		
YELLOW ARROW																		
GREEN ARROW																		
							113											
							115											

NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 (12 STD; 6 AUX.)  
 LOAD SWITCHES USED.....S2,S3,S5,S8,S11  
 PHASES USED.....2,2 PED,4,6,8  
 OVERLAPS.....NONE

**INPUT FILE POSITION LAYOUT**

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 4	∅ 4	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2 PED	FS	FS
L	2A	2A	2B	2B	4A	4B	NOT USED	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
U	∅ 6	∅ 6	∅ 6	∅ 6	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8
L	6A	6A	6B	6B	8A	8C	NOT USED	ST	ST	ST	ST	ST	ST	ST

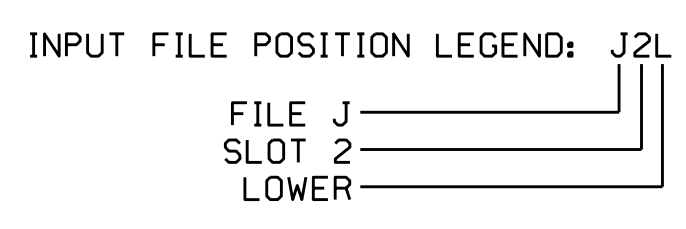
EX.: 1A, 2A, ETC. = LOOP NO.'S

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
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I12



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2181  
 DESIGNED: February 2015  
 SEALED: 2/23/15  
 REVISED: N/A

**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.

**Electrical Detail**

Electrical and Programming Details for: SR 1365 (Stallings Road) at SR 1367 (Matthews - Indian Trail Road) Stallings

Division 10 Union County Stallings

PLAN DATE: February 2015 REVIEWED BY: T. Joyce

PREPARED BY: B. SIMMONS REVIEWED BY:

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

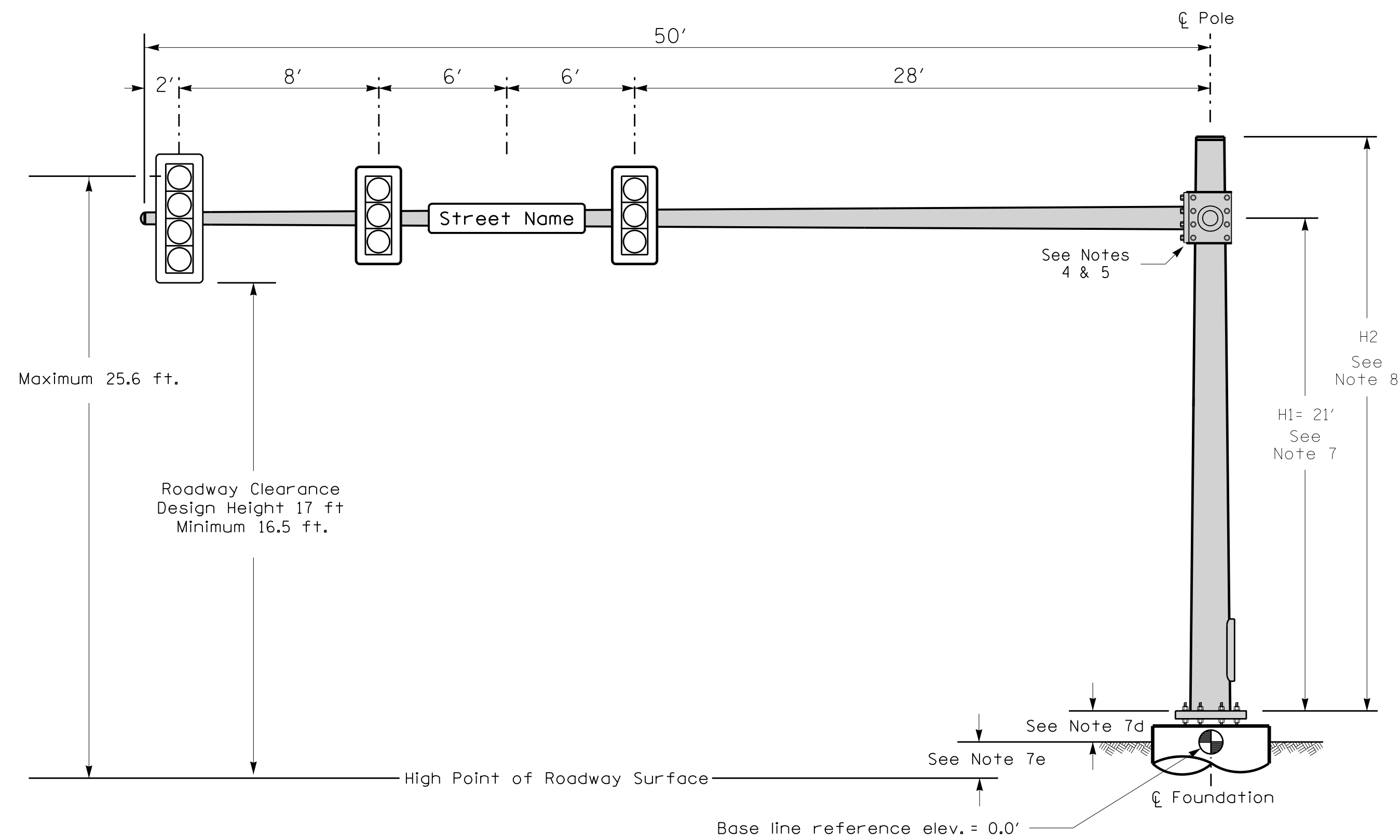
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750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. 10-2181

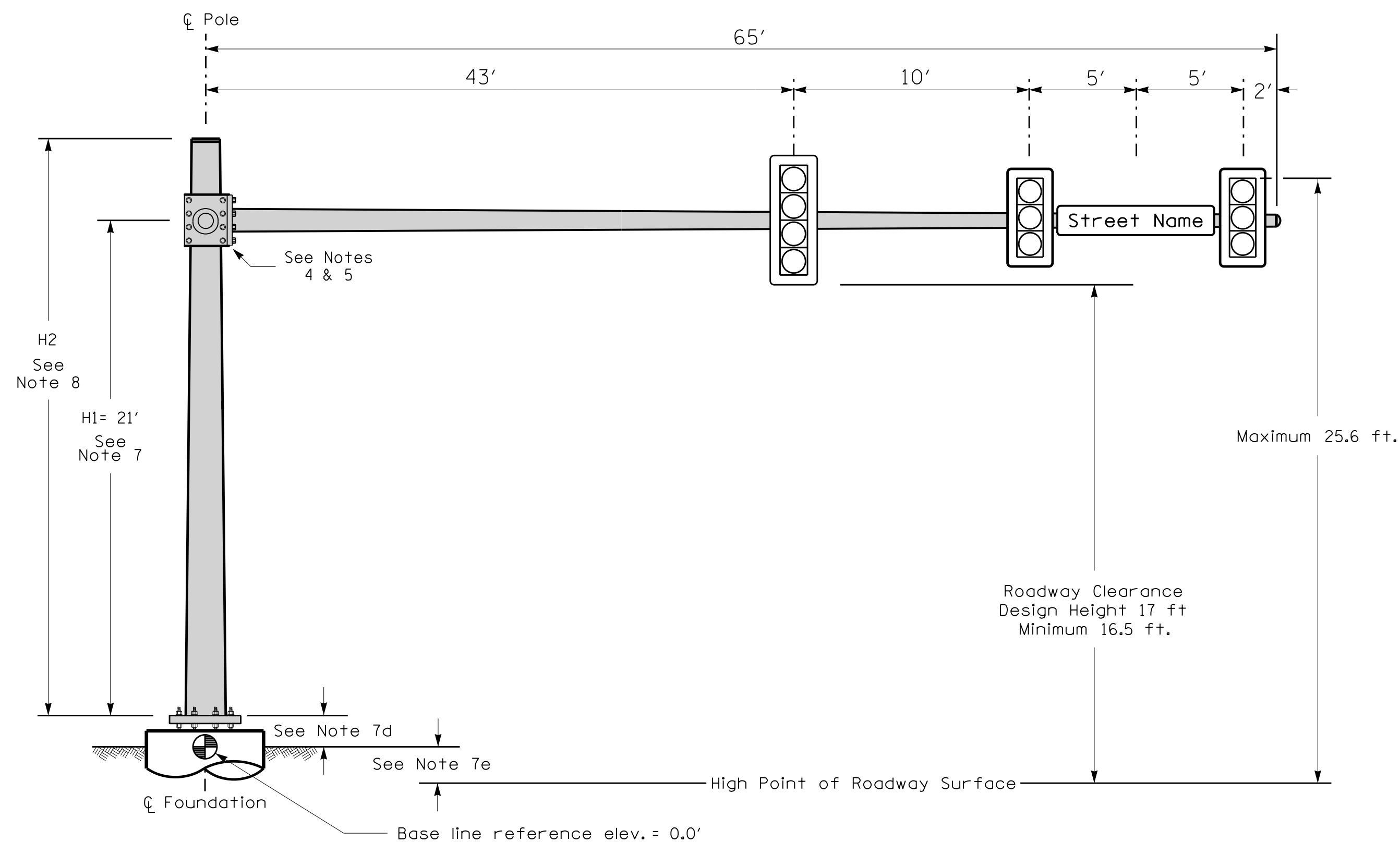
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 bis

**Design Loading for METAL POLE NO. 1, MAST ARM A**



**Elevation View @ 270°**

**Design Loading for METAL POLE NO. 1, MAST ARM B**



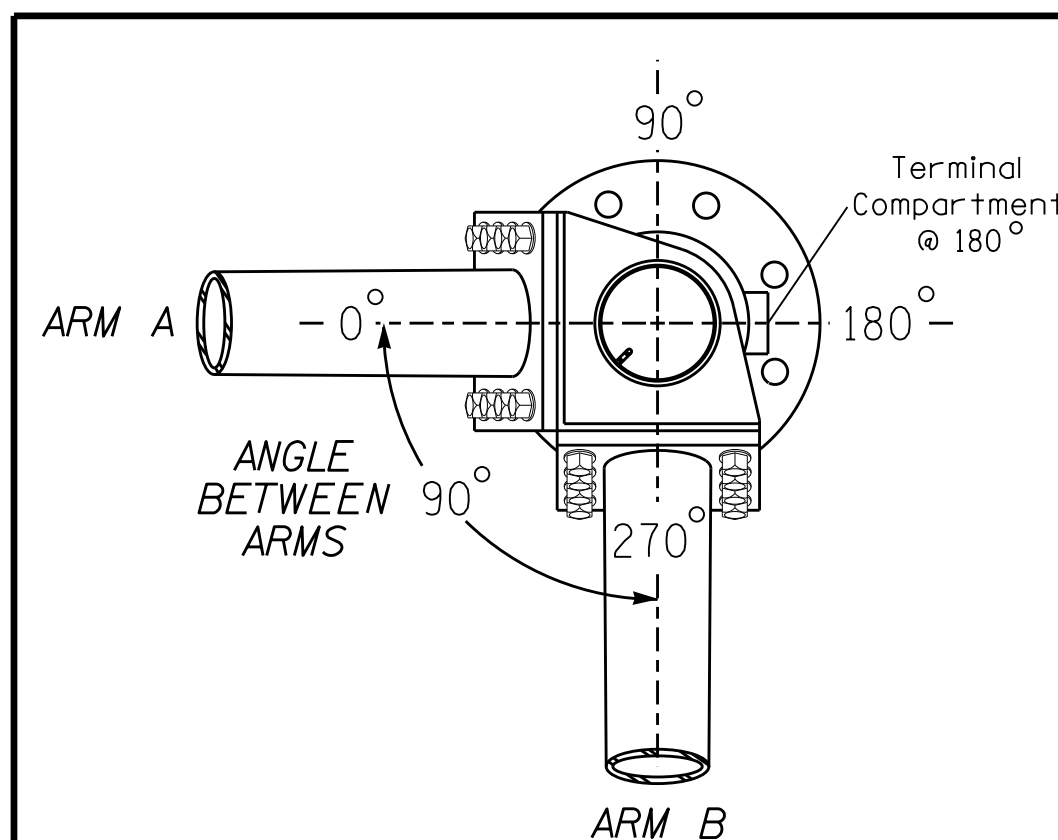
**Elevation View @ 0°**

**SPECIAL NOTE**

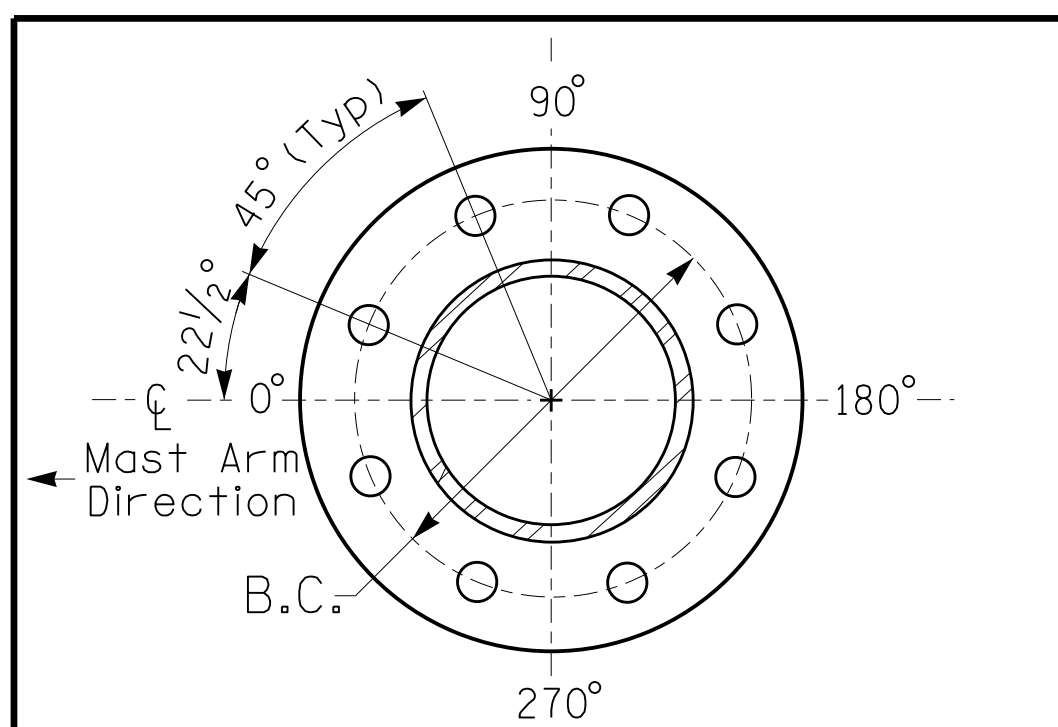
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

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

Elevation Differences for:	Arm A	Arm B
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.6 ft.	-0.9 ft.
Elevation difference at Edge of travelway or face of curb	+0.3 ft.	+0.8 ft.

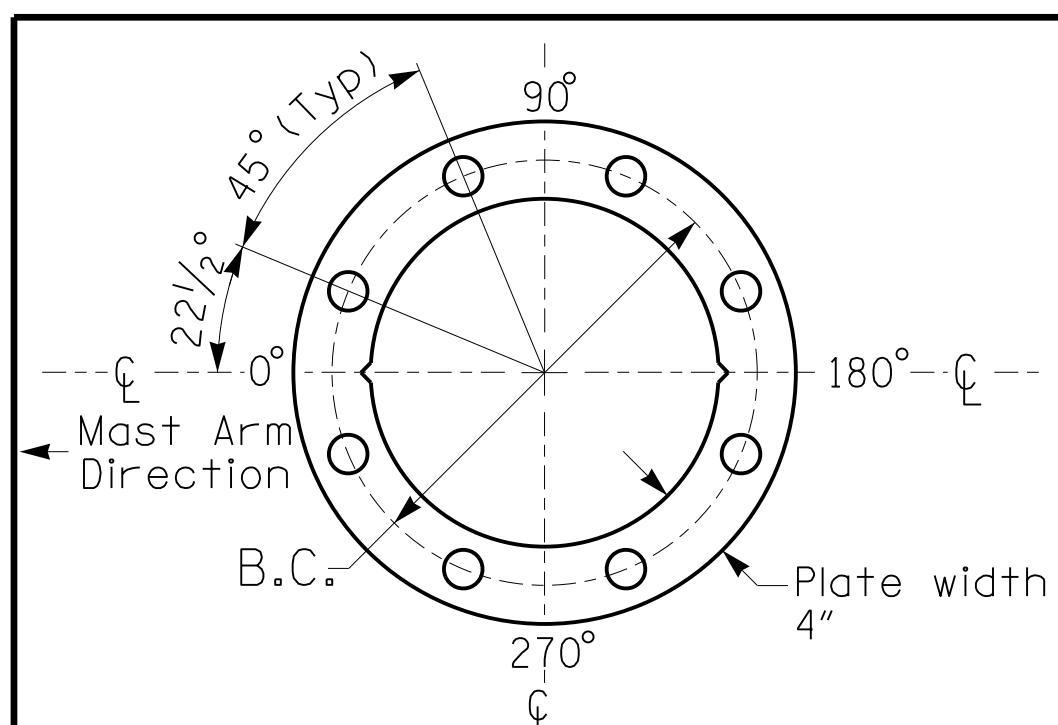


**POLE RADIAL ORIENTATION**



**8 BOLT BASE PLATE DETAIL**

See Note 6



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

**METAL POLE No. 1**

PROJECT REFERENCE NO. W-5210 0 SHEET NO. Sig.3

**MAST ARM LOADING SCHEDULE**

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
[Symbol]	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS

**NOTES**

**DESIGN REFERENCE MATERIAL**

- Design the traffic signal structure and foundation in accordance with:
  - The 5th Edition 2009 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
  - The 2012 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
  - The 2012 NCDOT Roadway Standard Drawings.
  - The traffic signal project plans and special provisions.

**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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
  - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
  - Signal heads are rigidly mounted and vertically centered on the mast arm.
  - The roadway clearance height for design is as shown in the elevation views.
  - The top of the pole base plate is 0.75 feet above the ground elevation.
  - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
  - Mast arm attachment height (H1) plus 2 feet, or
  - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 773-2800.
- 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.

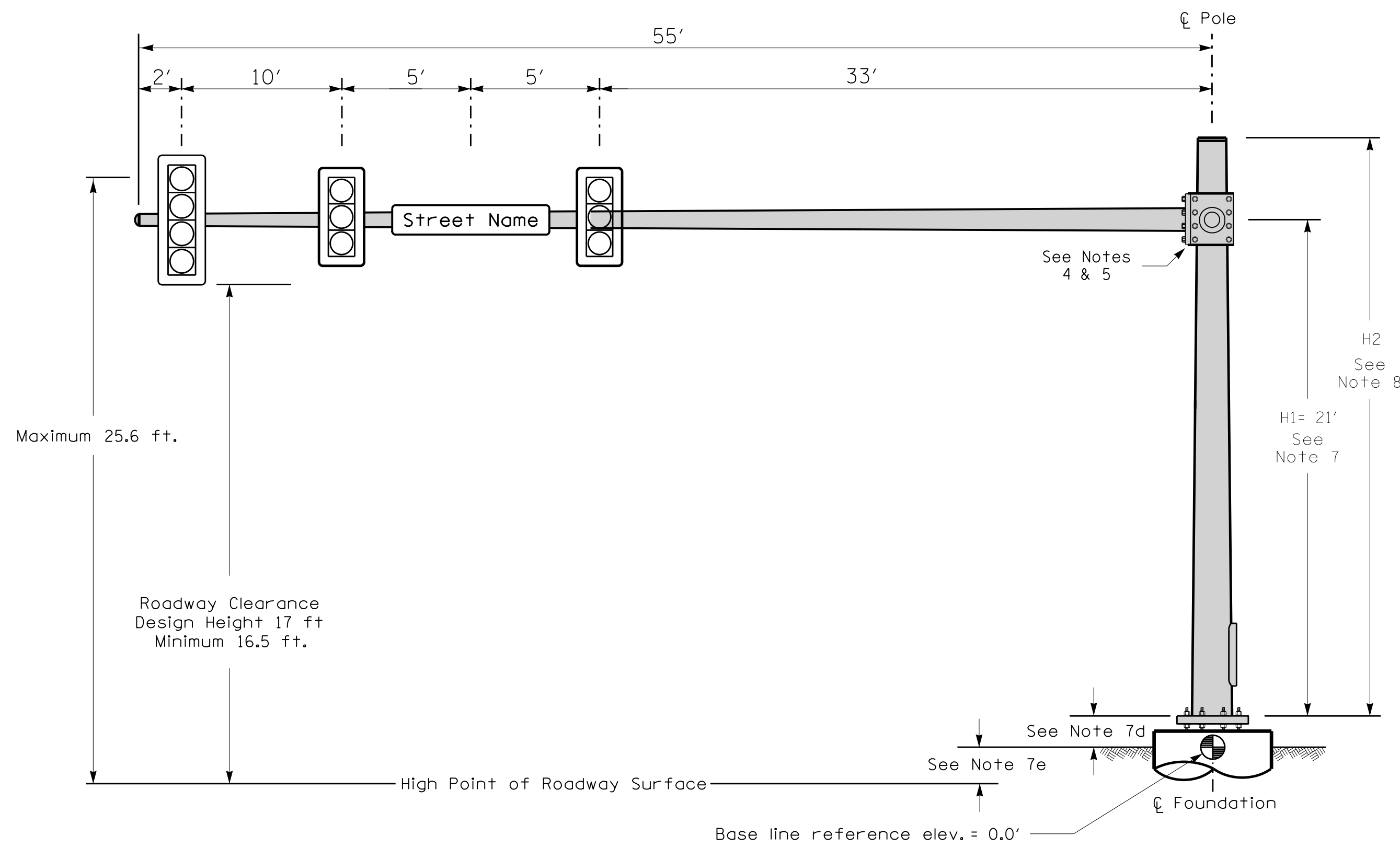
All metal poles and arms should be BLACK in color as specified in the project special provisions.

NCDOT Wind Zone 4 (90 mph)

	SR 1365 (Stallings Road) at SR 1367 (Matthews - Indian Trail Road)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024393 J. WILLIAMS
	Division 10 Union County Stallings PLAN DATE: February 2015 REVIEWED BY: T. Williams PREPARED BY: M. Mahbooba REVIEWED BY:	

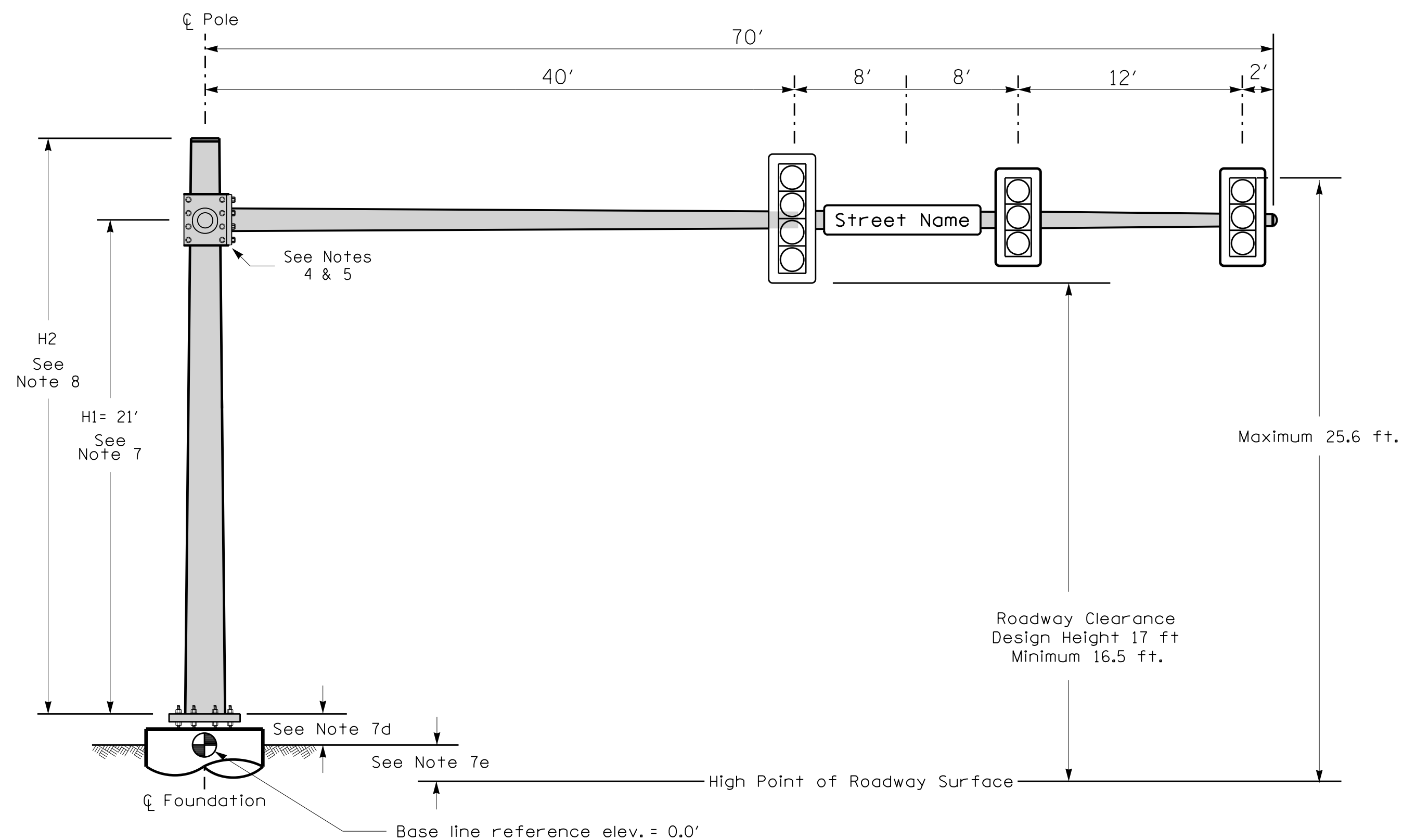
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 mmh00000

**Design Loading for METAL POLE NO. 2, MAST ARM A**



**Elevation View @ 270°**

**Design Loading for METAL POLE NO. 2, MAST ARM B**



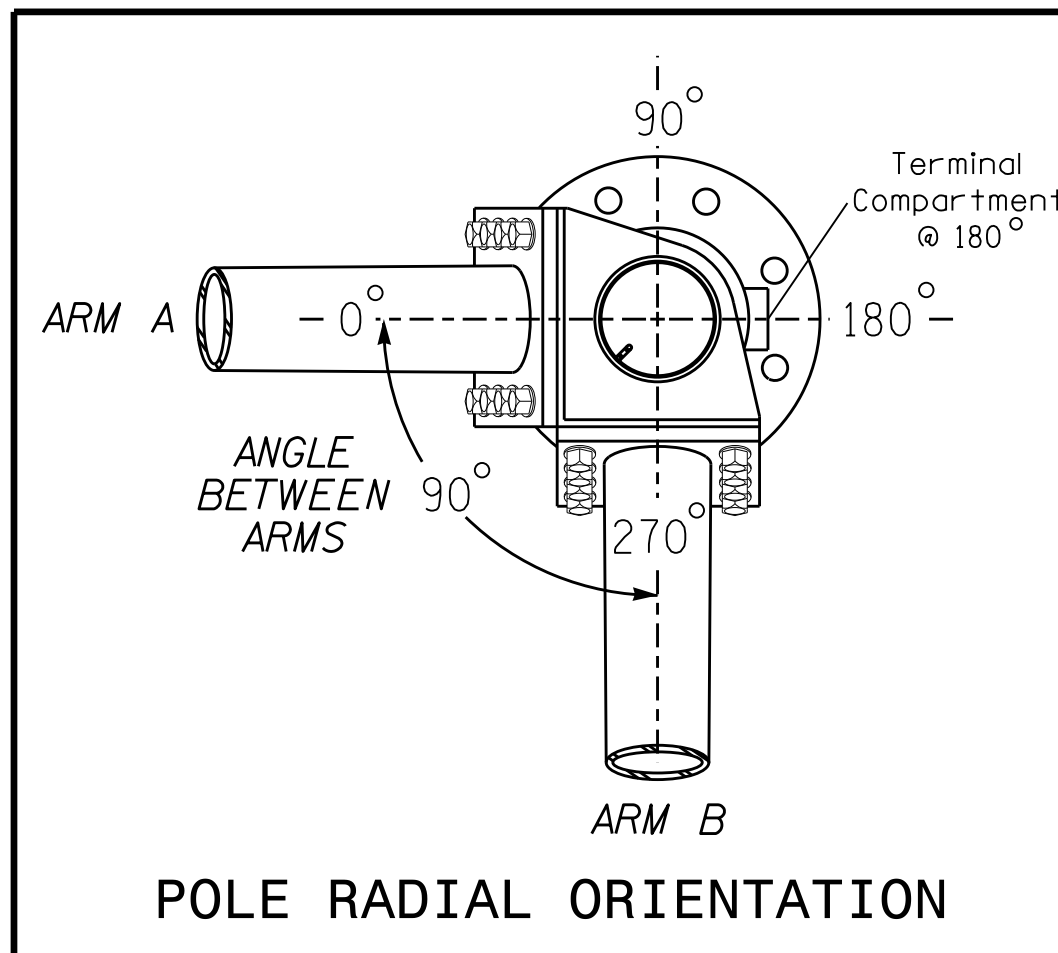
**Elevation View @ 0°**

**SPECIAL NOTE**

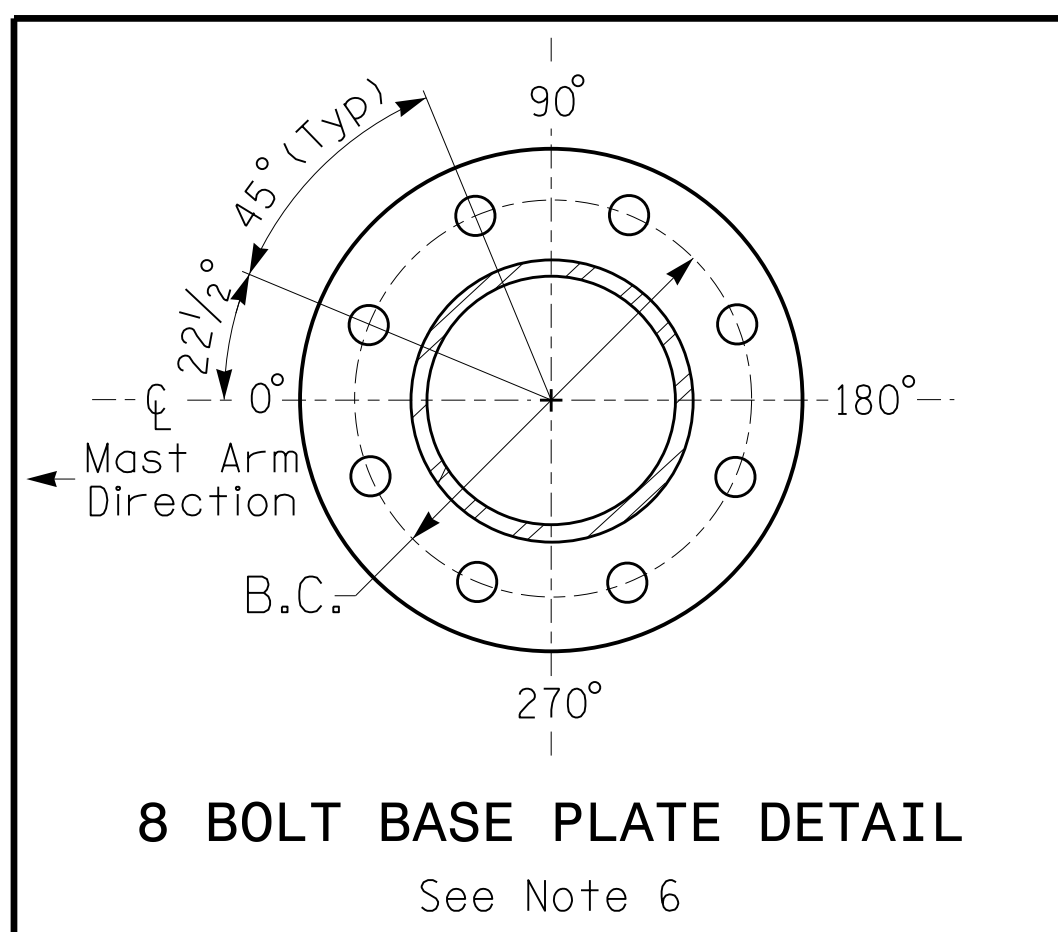
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

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

Elevation Differences for:	Pole A	Pole B
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-1.3 ft.	+1.6 ft.
Elevation difference at Edge of travelway or face of curb	-0.4 ft.	+0.4 ft.

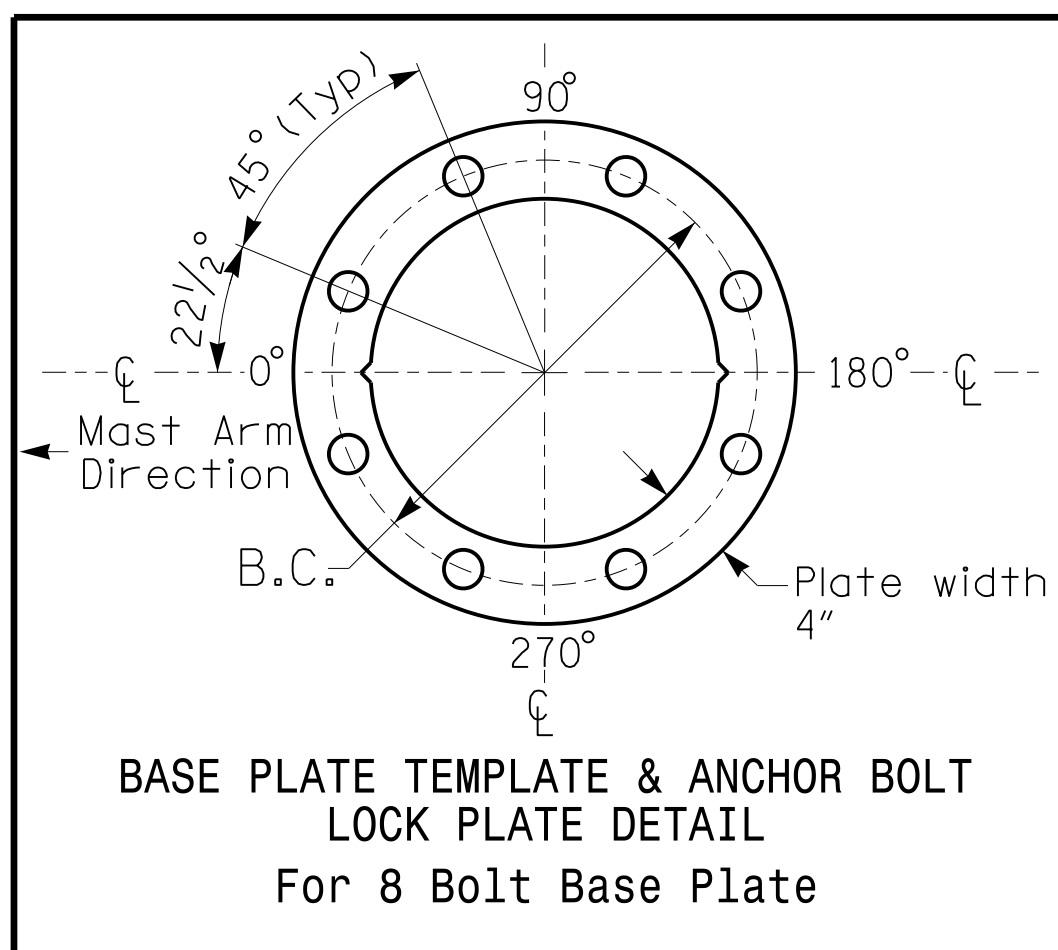


**POLE RADIAL ORIENTATION**



**8 BOLT BASE PLATE DETAIL**

See Note 6



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

**METAL POLE No. 2**

PROJECT REFERENCE NO.	SHEET NO.
W-5210 0	Sig.4

**MAST ARM LOADING SCHEDULE**

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	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	16.0 S.F.	24.0" W X 96.0" L	36 LBS

**NOTES**

**DESIGN REFERENCE MATERIAL**

- Design the traffic signal structure and foundation in accordance with:
  - The 5th Edition 2009 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
  - The 2012 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
  - The 2012 NCDOT Roadway Standard Drawings.
  - The traffic signal project plans and special provisions.

**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. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
  - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
  - Signal heads are rigidly mounted and vertically centered on the mast arm.
  - The roadway clearance height for design is as shown in the elevation views.
  - The top of the pole base plate is 0.75 feet above the ground elevation.
  - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
  - Mast arm attachment height (H1) plus 2 feet, or
  - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 773-2800.
- 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.

All metal poles and arms should be BLACK in color as specified in the project special provisions.

NCDOT Wind Zone 4 (90 mph)

	SR 1365 (Stallings Road) at SR 1367 (Matthews - Indian Trail Road)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024393 J. WILLIAMS
	Division 10 Union County Stallings PLAN DATE: February 2015 REVIEWED BY: T. Williams PREPARED BY: M. Mahbooba REVIEWED BY:	
SCALE 0 N/A N/A	REVISIONS INIT. DATE	SIGNED BY: J. Williams DATE: 3/3/2015 SIG. INVENTORY NO. 10-2181

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