

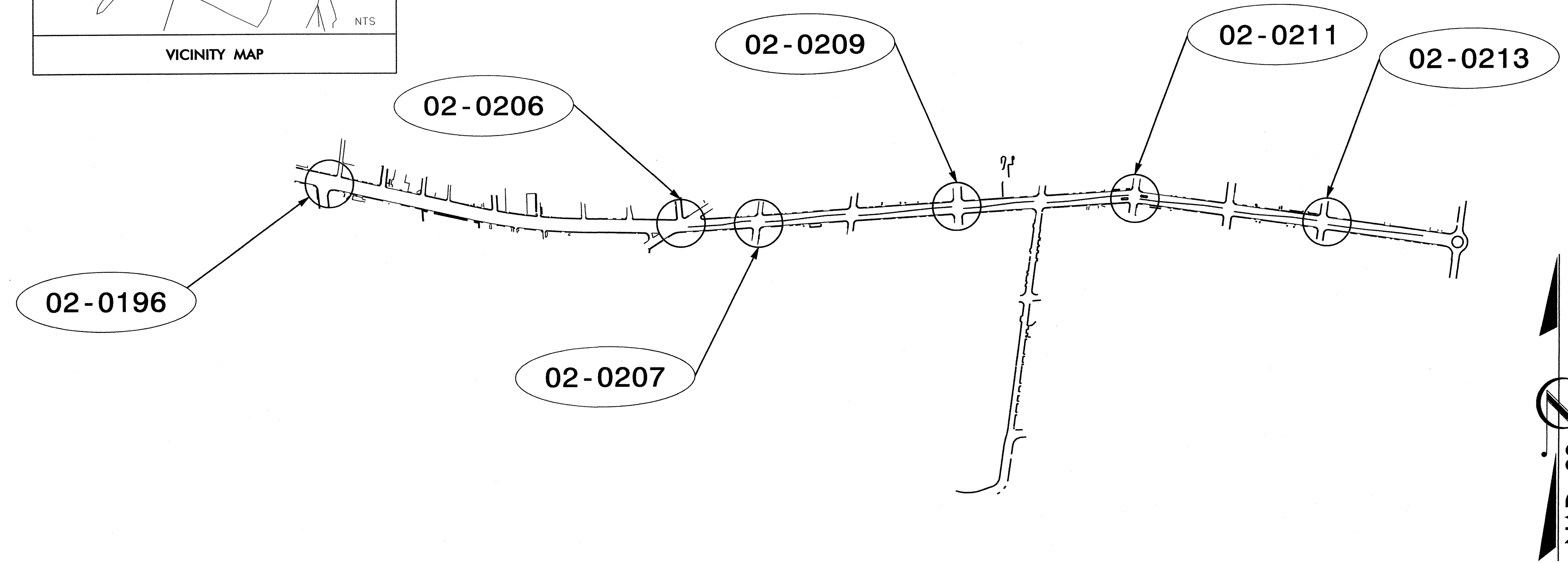
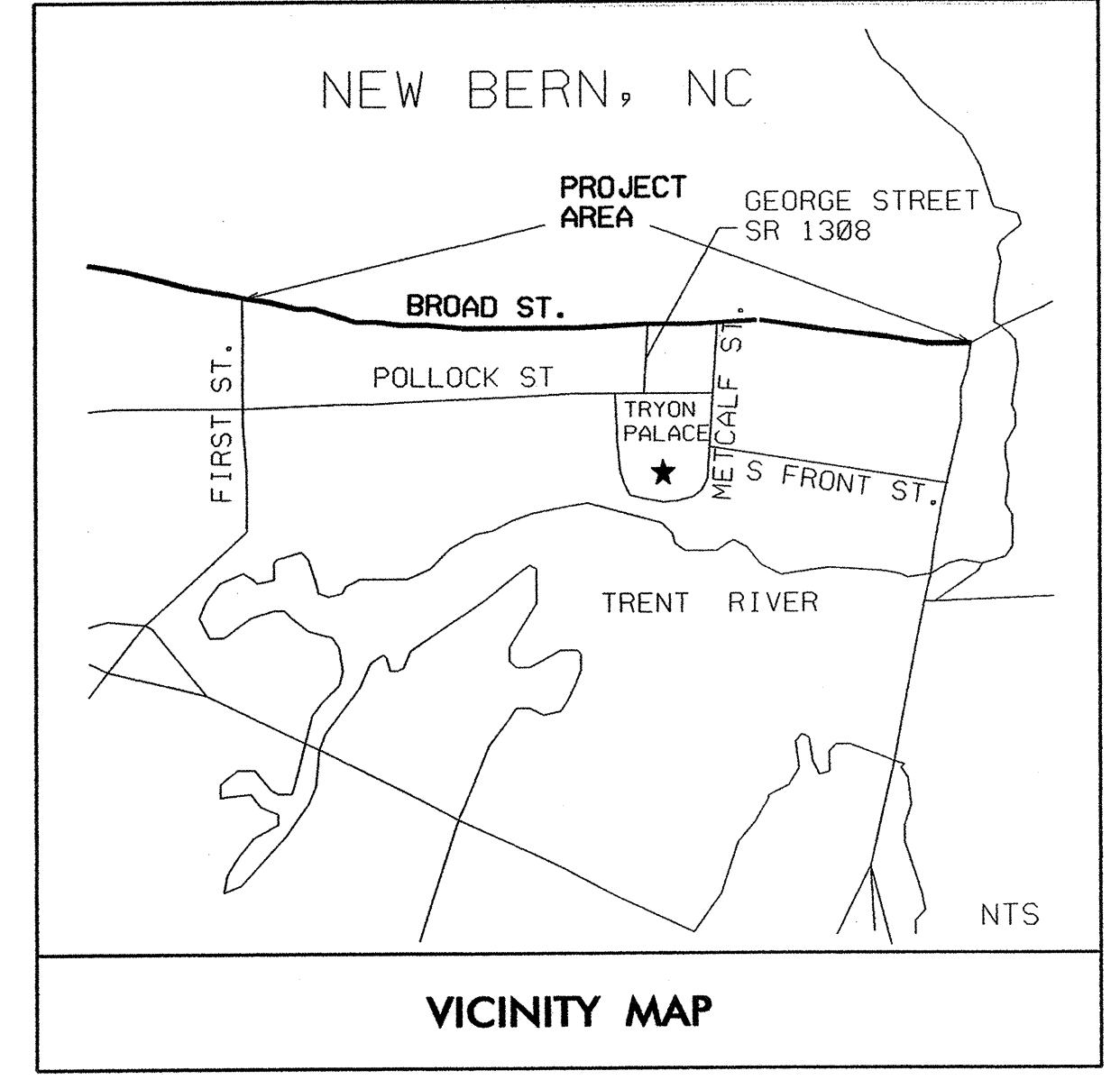
PROJECT: U-4755

STATE	PROJECT NO.	SHEET NO.
N.C.	U-4755	Sig. 1
P.A. PROJ. NO.		
PROJECT ID. NO.		

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CRAVEN COUNTY

LOCATION: NEW BERN - BROAD STREET (US 70) BETWEEN FIRST STREET AND EAST FRONT STREET
TYPE OF WORK: TRAFFIC SIGNALS



INDEX OF PLANS

SHEET NO.	SIGNAL INVENTORY NO.	LOCATION /DESCRIPTION
SIG. 1	N/A	Title Sheet
SIG. 2-5	02-0196	US 17-70 Business/NC 55 (Broad Street) At First Street/Third Avenue
SIG. 6-8	02-0206	US 70 Business/NC 55 (Broad Street) At Queen Street/Roundtree Street
SIG. 9-12	02-0207	US 70 Business/NC 55 (Broad Street) At Fleet Street
SIG. 13-16	02-0209	US 70 Business/NC 55 (Broad Street) At George Street
SIG. 17-21	02-0211	US 70 Business/NC 55 (Broad Street) At Hancock Street
SIG. 22-25	02-0213	US 70 Business/NC 55 (Broad Street) At Craven Street
SIG. 26-30	N/A	Standard Drawings for Metal Poles
SIG. 31-33	N/A	Inductive Detection Loops Details

LEGEND

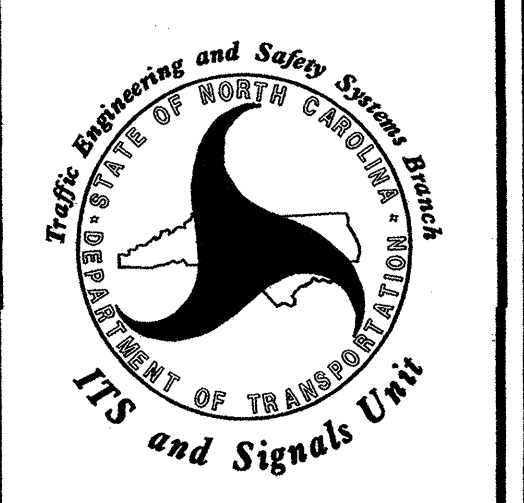
##-#### SIGNAL INVENTORY NUMBER

NCDOT CONTACTS:

INTELLIGENT TRANSPORTATION SYSTEMS & SIGNALS UNIT

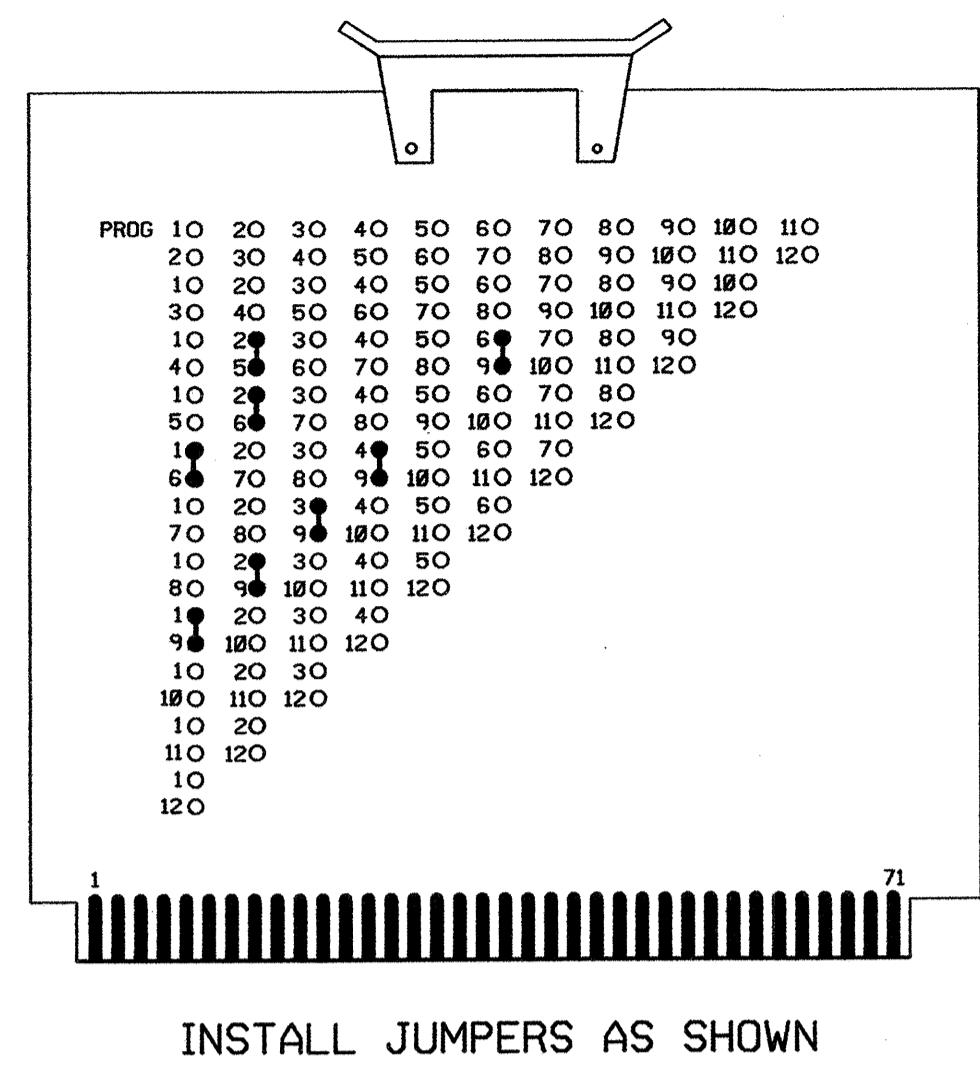
Timothy J. Williams, PE - Signals & Geometrics Contracts Engineer
John T. Rowe Jr., PE - Signal Equipment Design Engineer

Prepared in the Offices of:



750 N. Greenfield Parkway, Garner, NC 27529

NEMA CONFLICT MONITOR

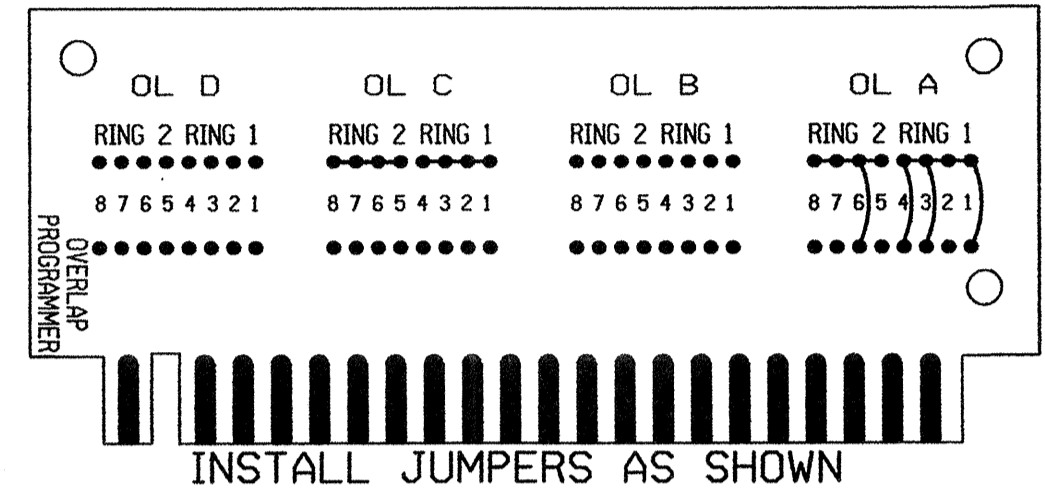


EQUIPMENT INFORMATION

CONTROLLER.....ECONOLITE ASC/2-2100
 CABINET.....ECONOLITE 5300-844
 CABINET MOUNT.....BASE
 LOADBAY POSITIONS.....16
 LOAD SWITCHES USED.....1, 2, 3, 4, 5*, 6, 9
 PHASES USED.....1, 2, 3, 4, 5*, 6
 OL/A.....1+3+4+6
 OL/B.....NOT USED
 OL/C.....NOT USED
 OL/D.....NOT USED

* DENOTES USED IN PREEMPT SEQUENCE ONLY

NEMA OVERLAP CARD



NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, ALL UNUSED PHASES AND OVERLAPS SHALL BE WIRED TO FLASH RED. THE INSTALLER SHALL VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, THE UNUSED VEHICLE LOAD SWITCH RED OUTPUTS 7, 8, 10, 11 AND 12 TO LOAD SWITCH AC+ BY INSERTING A JUMPER PLUG IN THE UNUSED VEHICLE LOAD SWITCH SOCKET FROM PIN 1 (LS AC+) TO PIN 3 (RED OUT). MAKE SURE ALL FLASH TRANSFER RELAYS ARE IN PLACE.
3. THE CONTROLLER SHALL BE PROGRAMMED TO START UP IN PHASES 2 AND 6 GREEN.
4. POWER-UP FLASH TIME SHALL BE SET TO 10 SECONDS AND IMPLEMENTED ON THE CONFLICT MONITOR. CONTROLLER POWER-UP FLASH TIME SHALL BE SET TO 0 SECONDS.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. DETECTORS SHALL BE WIRED IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.

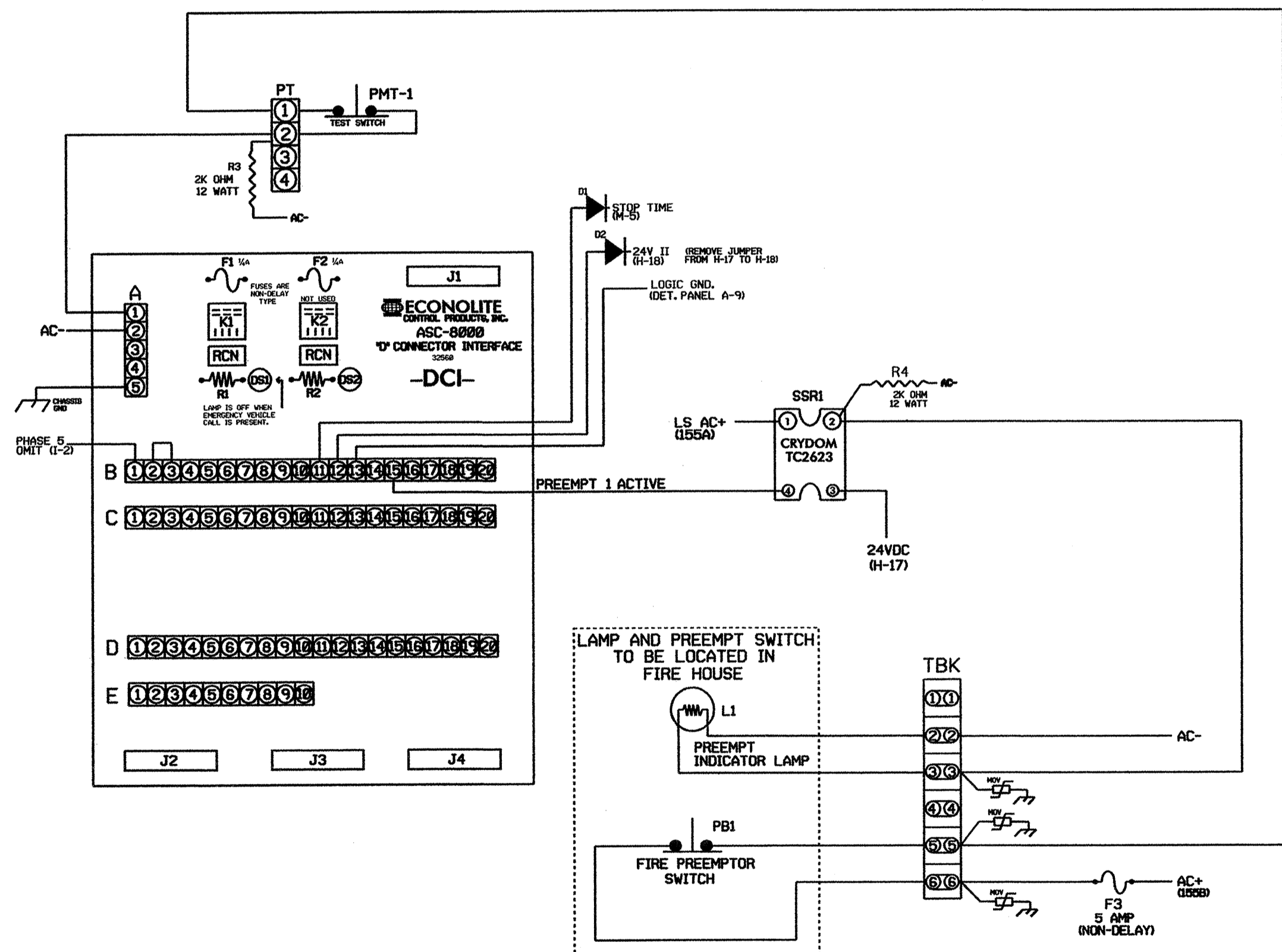
SIGNAL HEAD HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	OLA	OLB	OLC	OLD	2 PED	4 PED	6 PED	8 PED
SIGNAL HEAD NO.	61,32	24,25	25	31	32	41	42	23	61,62	NU	NU	21,22	NU	NU	NU	NU
GREEN		105		109	109	113	113	117	121			201				
YELLOW		106		110	110	114	114	118	122			202				
RED		107		111	111	115	115	119	123			203				
RED ARROW																
YELLOW ARROW	102		110													
GREEN ARROW	101		109	109		113										

NU = NOT USED

FIRE PREEMPTION PANEL WIRING DIAGRAM

(wire relay as shown)



- NOTES
1. THIS CABINET IS WIRED FOR USE WITH AN ECONOLITE ASC/2-2100 TRAFFIC SIGNAL CONTROLLER AND IS WIRED AND PROGRAMMED FOR FIRE PREEMPTION OPERATION.
 2. "D" CONNECTOR INTERFACE BOARD IS FOR AN ECONOLITE ASC/2-2100 TRAFFIC SIGNAL CONTROLLER. ECONOLITE PART NO. 32560G3A (DOT# 5E-01570)
 3. BEWARE!! CABINET IS WIRED SUCH THAT IN THE ABSENCE OF PREEMPTION PROGRAMMING OR IF THE "D" CONNECTOR IS DISCONNECTED, THE INTERSECTION WILL BE PLACED ON FLASH. (WHEN THIS FAILURE OCCURS, THE MONITOR WILL REGISTER A 24VDC(II) FAILURE.)
 4. MOV5 ARE GE V50LA20A (DOT# 06-23975)
 5. RELAY SSR1 IS A SOLID STATE RELAY. (DOT# 5Z-12300, CRYDON #TC2623)
 6. ALL DIODES ARE VALUED AT 600VPIV, 1 AMP. MINIMUM. (RECOMMENDED PART NO. 1N4005)
 7. RESISTORS R3 AND R4 ARE VALUED AT 2K OHM, 12 WATT.
 8. FUSE F3 IS A 5 AMP NON-DELAY TYPE.
 9. PUSHBUTTON PBI IS A NORMALLY CLOSED PUSHBUTTON. (SQUARE D NO. 900IKRIU) WITH NORMALLY CLOSED CONTACT BLOCK (SQUARE D, 900IKA3)
 10. LAMP LI IS A FULL VOLTAGE TYPE INDICATING LAMP WITH 6S6 LAMP AND RED LENS COVER. (SQUARE D 900IAL2)
 11. ALL RELAYS AND ASSOCIATED EQUIPMENT IS TO BE LOCATED IN CONTROLLER CABINET, EXCEPT PUSHBUTTON AND INDICATING LAMP AS SHOWN.

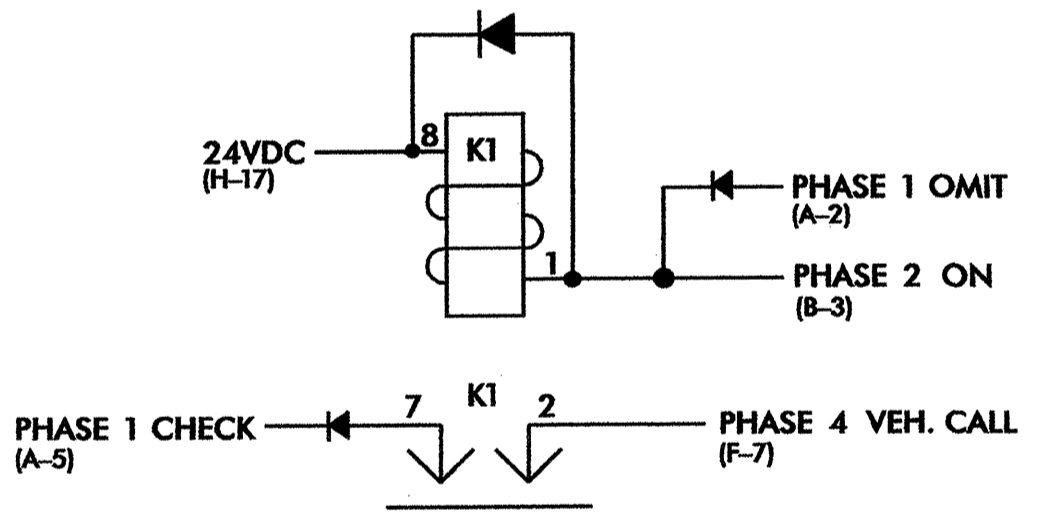
TYPICAL CONNECTION CHART FOR DETECTORS

PIN FUNCTION	LOOP PANEL TERMINATION
AC+	AC+
AC-	AC-
CHASSIS GROUND	CHASSIS GROUND
LOOP INPUT	LOOP
RELAY NORMALLY OPEN	VEHICLE CALL INPUT
RELAY COMMON	LOGIC GROUND
TIMING INHIBIT	ASSOCIATED PHASE GREEN

NOTE: THE TIMING INHIBIT WIRE SHALL BE CONNECTED TO THE ASSOCIATED PHASE GREEN LOAD SWITCH OUTPUT WHEN ONLY DELAY OPERATION IS REQUIRED, UNLESS OTHERWISE SPECIFIED IN LOOP AND DETECTOR UNIT INSTALLATION CHART SHOWN ON SIGNAL DESIGN PLAN.

BACK-UP PROTECTION RELAY WIRING DETAIL

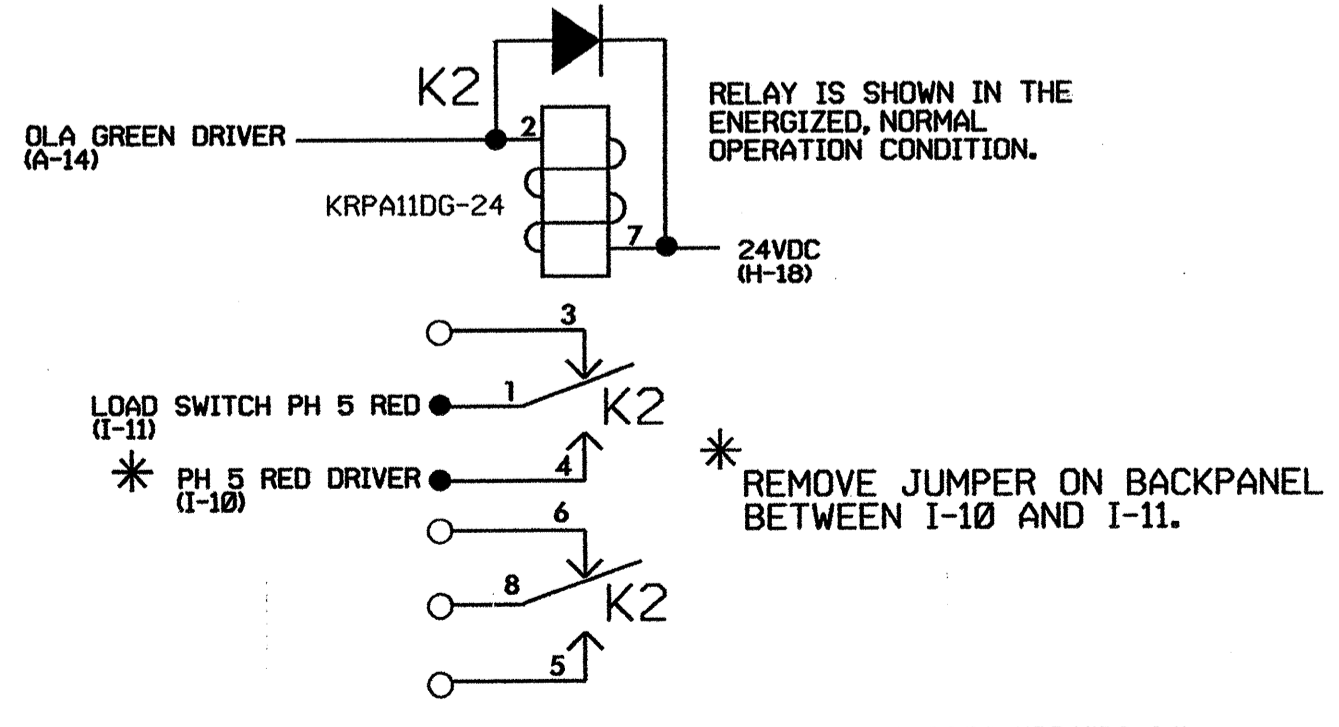
(wire relay as shown)



- NOTES
1. RELAY K1 IS A SPST WITH A 24VDC COIL. (DOT# 5Z-28450, P&B# KRP30H)
 2. ALL DIODES ARE VALUED AT 600VPIV, 1 AMP. MINIMUM. (RECOMMENDED PART NO. 1N4005)
 3. WHEN TRAFFIC CONDITIONS REQUIRE THE CONTROLLER TO BACK-UP FROM PHASE 2+6 TO PHASE 1+6, THIS RELAY LOGIC CIRCUIT WILL FORCE THE CONTROLLER TO CYCLE THROUGH PHASE 4. THE CONTROLLER IS NOT ALLOWED TO BACK-UP DIRECTLY TO PHASE 1+6 FROM PHASE 2+6.

SPECIAL RELAY WIRING DETAIL FOR HEAD 23

(wire relay as shown)



RELAY K2 IS A DPDT WITH A 24VDC COIL. (DOT# 5Z-28605, P&B# KRP410G-24)

IMPORTANT

REMOVE CONFLICT MONITOR WIRE ON I19 (PH 5 RED) FIELD OUTPUT AND CONNECT TO I55A (LS AC+). THIS WILL PREVENT THE POSSIBILITY OF RED FAILURE WHILE ALLOWING HEAD 23 TO REMAIN DARK WHEN PREEMPTION IS NOT ACTIVE.

ECONOLITE ASC/2-2100 EMERGENCY VEHICLE PREEMPTOR

PROGRAMMING DETAIL

(program controller as shown below)

PREEMPTOR SUBMENU		PRIORITY PREEMPTOR 1
1. PRIORITY PMT 1	5. PRIORITY PMT 5	DON'T OVERRIDE FLASH.....
2. PRIORITY PMT 2	6. PRIORITY PMT 6	FLASH ALL OUTPUTS.....
3. PRIORITY PMT 3	7. BUS PREEMPTORS	YELLOW-RED GOES GREEN....
4. PRIORITY PMT 4		ENABLE MAX PREEMPT TIME..
		ACTIVE ONLY DURING HOLD..
		NO CVM IN FLASH.....
		FAST FLASH GRN ON HOLD...
		OUT OF FLASH..... GREEN
		ADDITIONAL PAGE(S)

PRIORITY PREEMPTOR 1	
PHASE.....	1 2 3 4 5 6 7 8 9 0 1 2
TERM PHASE OVLP	
TRK CLR PHASE..	
HOLD PHASES.... X . X	
EXIT PHASES.... X . X	
EXIT CALLS....	
TERM OVERLAP... A: X B: . C: . D: .	
ACTIVE.....YES	PED DARK..... NO
PRIORITY.....YES	PED ACTIVE..... NO
DET LOCK..... NO	ZERO PC TIME... NO
HOLD FLASH..... NO	PC THRU YELLOW.. NO
TERM OVLP ASAP..YES	TERM PHASES.... YES
ADDITIONAL PAGE(S)	

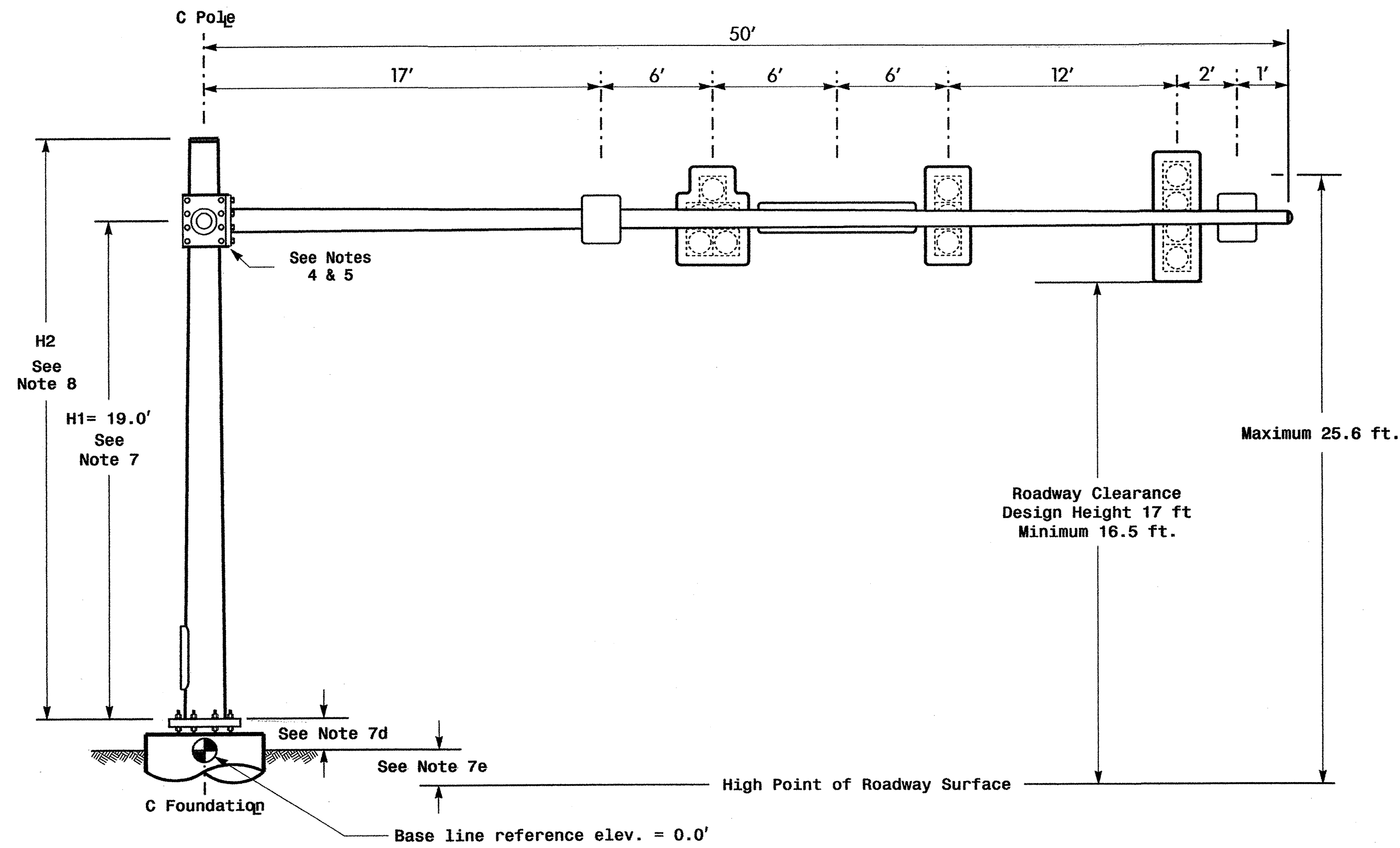
PRIORITY PREEMPTOR 1	
MAX TIME..... 0	DURATION TIME.. 0
MIN HOLD TIME. *	DELAY TIME..... *
MIN PED CLEAR. 0	INHIBIT TIME... 0
EXIT MAX..... 0	HLD DELAY TIME. 0
GRN YEL RED	
MINIMUM..... 1	3.8 3.3
TRACK CLEAR... 0	0.0 0.0
HOLD..... 3.8	1.7
END OF SUBMENU	

* THE DIVISION TRAFFIC ENGINEER WILL DETERMINE THE "DELAY BEFORE PREEMPT" AND "PREEMPT DWELL MIN GREEN FOR THE EMERGENCY VEHICLE PREEMPTION TIMING.

SIGNAL UPGRADE

ELECTRICAL AND PROGRAMMING DETAILS FOR: 	US 17-70 Bus/ NC 55 (Broad Street) At First Street/Third Street Division 02 Craven County New Bern		REVISION SEAL
	PLAN DATE: 6-24-00 PREPARED BY: A Mc Kay	REVIEWED BY: D. T. Joyce REVIEWED BY:	

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

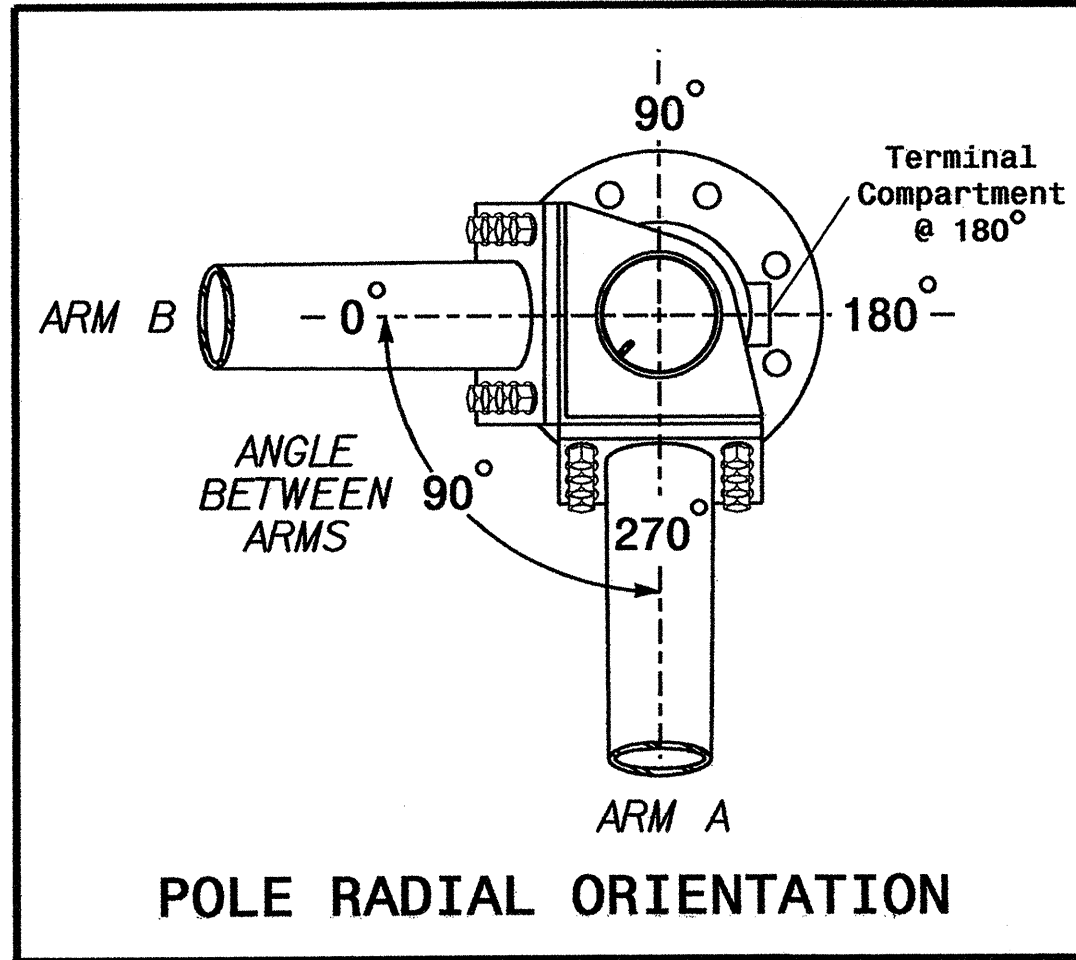


Elevation View @ 270

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

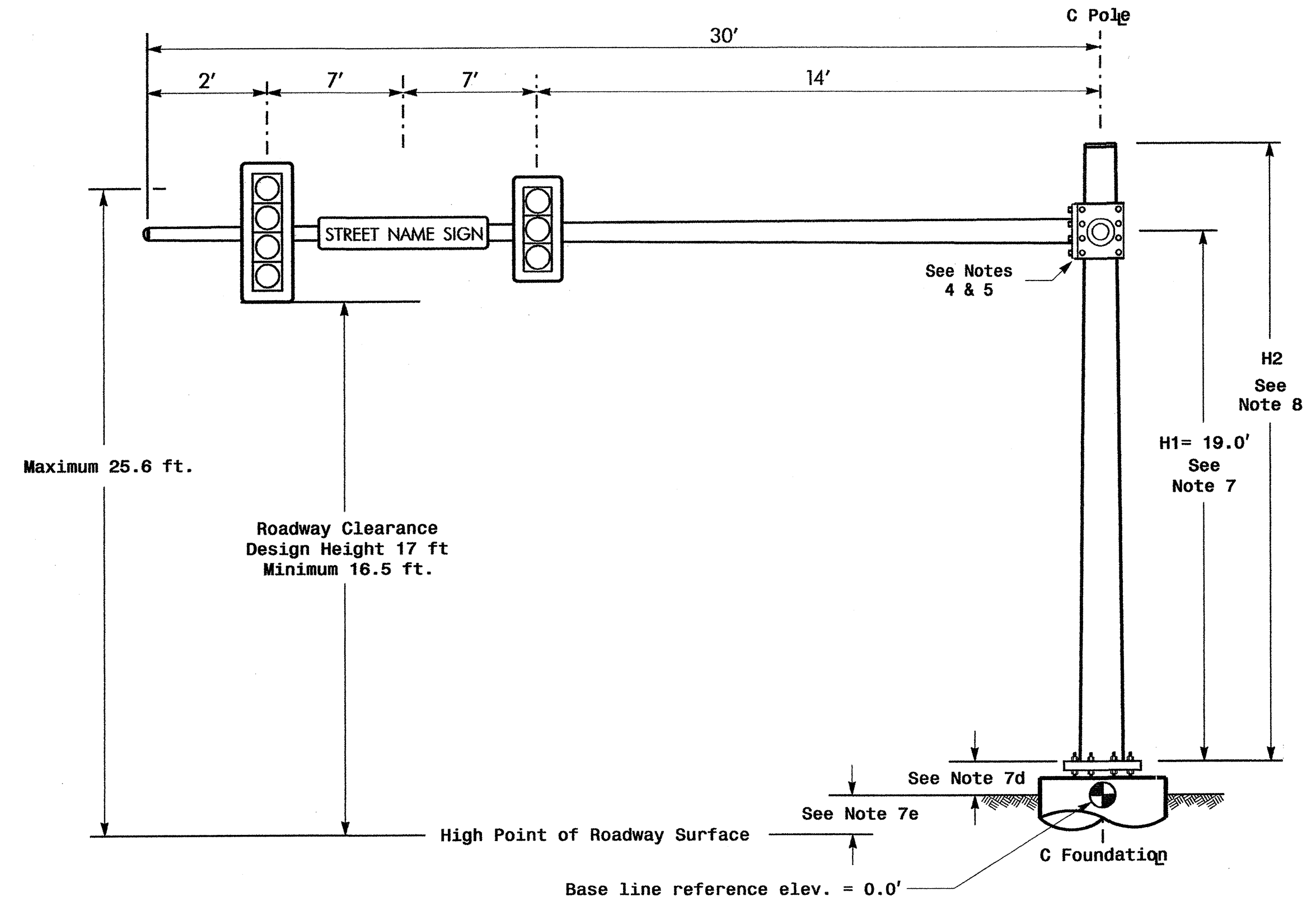
Elevation Data for Mast Arm Attachment (H1)

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

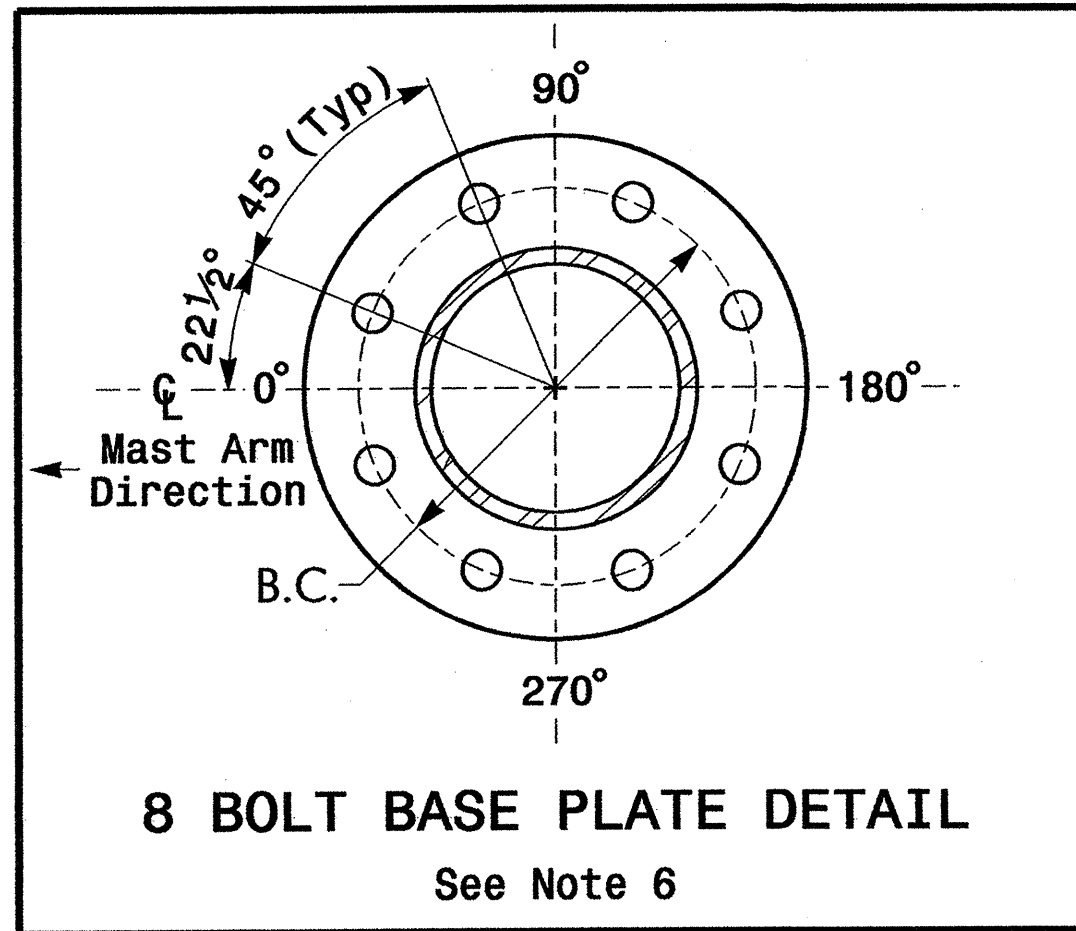


POLE RADIAL ORIENTATION

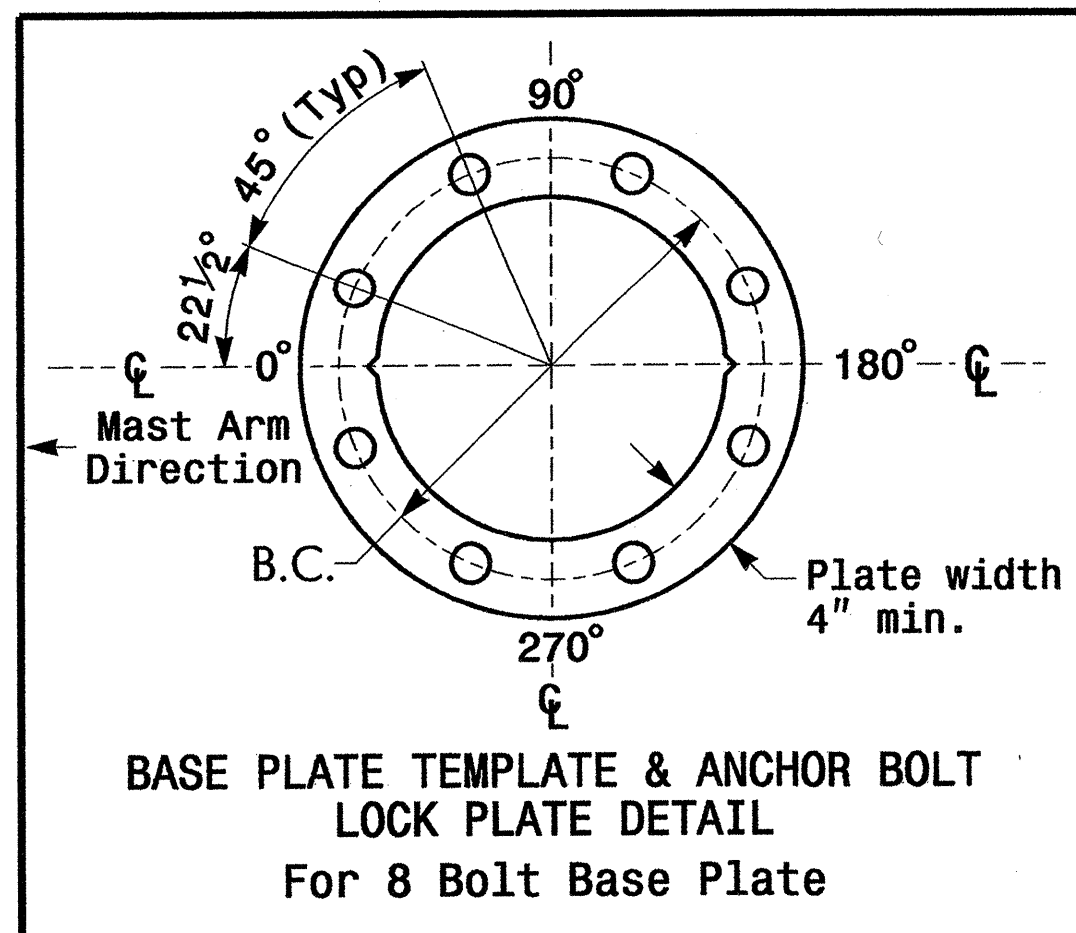
Design Loading for METAL POLE NO. 2, MAST ARM B



Elevation View @ 0



8 BOLT BASE PLATE DETAIL



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

MAST ARM LOADING SCHEDULE				
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION (VERTICAL)-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	7.5 S.F.	30.0" W X 36.0" L	14 LBS

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.

Design Requirements

- Design all signal supports using stress ratios that do not exceed 0.9.
 - The camber design for 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 attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
 - The pole manufacturer will determine the total height (H2) of the 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
 The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

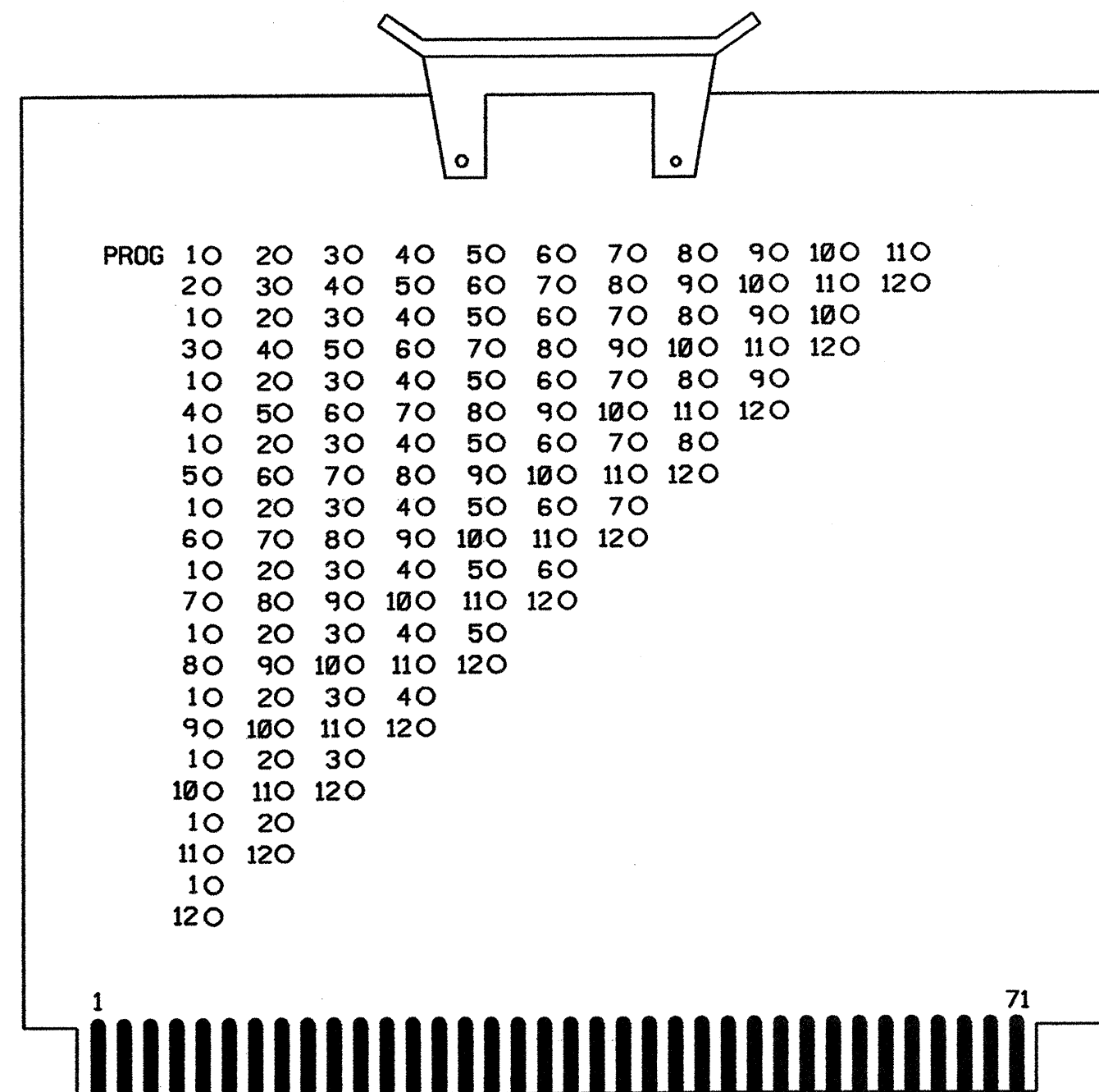
	US 17-70 Business/ NC 55 (Broad Street) at First Street/Third Avenue Division 2 Craven County New Bern			
	PLAN DATE: March 2008 PREPARED BY: I.O. Umuzurike	REVIEWED BY: REVIEWED BY:		3/10/08 DATE
	SCALE: N/A			
	REVISIONS:			
SIGNATURE:		DATE:		

SIG. INVENTORY NO. 02-0196

18-MAR-2008 07:12 s:\its\signalwork\groups\1p_projects\1755es\gnal\sig\02-0196\sig_02-0196.dgn

NEMA CONFLICT MONITOR PROGRAMMING CARD

(leave car blank as shown below)



NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED PHASES AND OVERLAPS TO FLASH RED. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED LOAD SWITCH RED OUTPUT 3 AND 4 ON PANEL A AND 1,2,3,4 ON PANEL B TO LOAD SWITCH AC+ BY INSERTING A JUMPER PLUG IN THE UNUSED LOAD SWITCH SOCKET FROM PIN 1 (LS AC+) TO PIN 3 (RED OUT). MAKE SURE ALL FLASH TRANSFER RELAYS ARE IN PLACE.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE CONFLICT MONITOR. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
5. THE CABINET AND CONTROLLER ARE A PART OF THE NEW BERN CITY SYSTEM.

SIGNAL HEAD HOOK-UP CHART

PHASE	4 PED	2 PED	DLB	DLA	4	3	2	1
SIGNAL HEAD NO.	P41, P42	P21, P22	NU	NU	NU	NU	21,22 23,24	11,12 13,14
PANEL	B	B	B	B	A	A	A	A
TERM. STRIP	TS6	TS6	TS6	TS6	TS6	TS6	TS6	TS6
GREEN							4	1
YELLOW							5	2
RED							6	3
RED ARROW								
YELLOW ARROW								
GREEN ARROW								

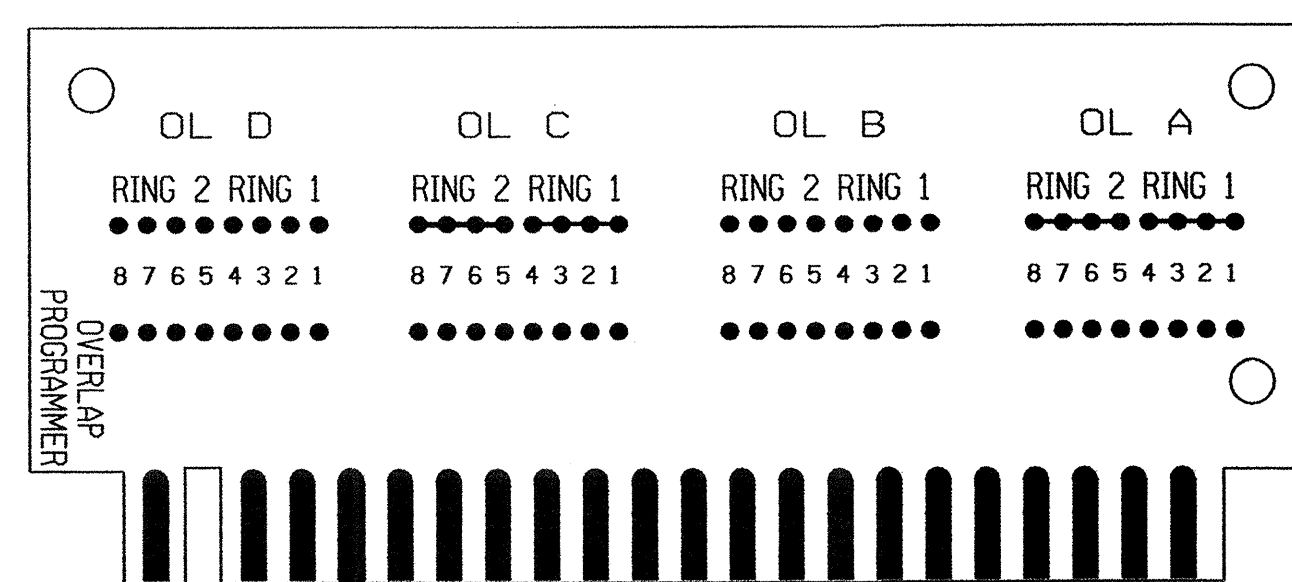
NU = NOT USED

EQUIPMENT INFORMATION

CONTROLLER.....TRACONEX TMP309-4
 CABINET.....SSS
 CABINET MOUNT.....POLE
 LOADBAY POSITIONS.....8
 LOAD SWITCHES USED.....PANEL A: 1,2
 PHASES USED.....1,2
 OVERLAP A.....NOT USED
 OVERLAP B.....NOT USED
 OVERLAP C.....NOT USED
 OVERLAP D.....NOT USED

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 02-0206
 DESIGNED: February 2008
 SEALED: 03-07-08
 REVISED: N/A

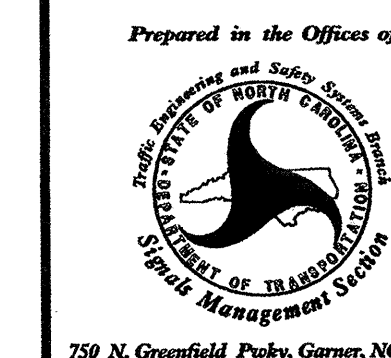
NEMA OVERLAP CARD



OVERLAP CARD SHALL BE COMPLETELY
 BLANK (NO OVERLAPS)

Signal Upgrade

ELECTRICAL AND PROGRAMMING
 DETAILS FOR:



750 N. Greenfield Pkwy, Garner, NC 27529

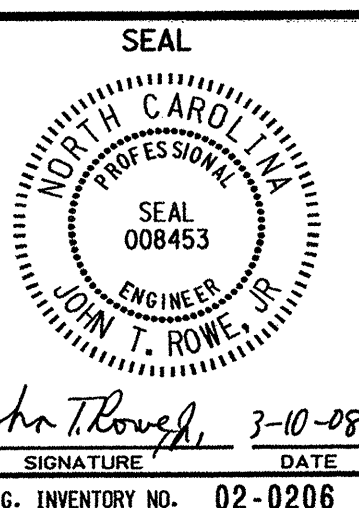
US 70 Business/
 NC 55 (Broad Street)
 at
 Queen Street/Roundtree Street

Division 2 Craven County New Bern

PLAN DATE: March 2008 REVIEWED BY: JTK

PREPARED BY: James Peterson REVIEWED BY:

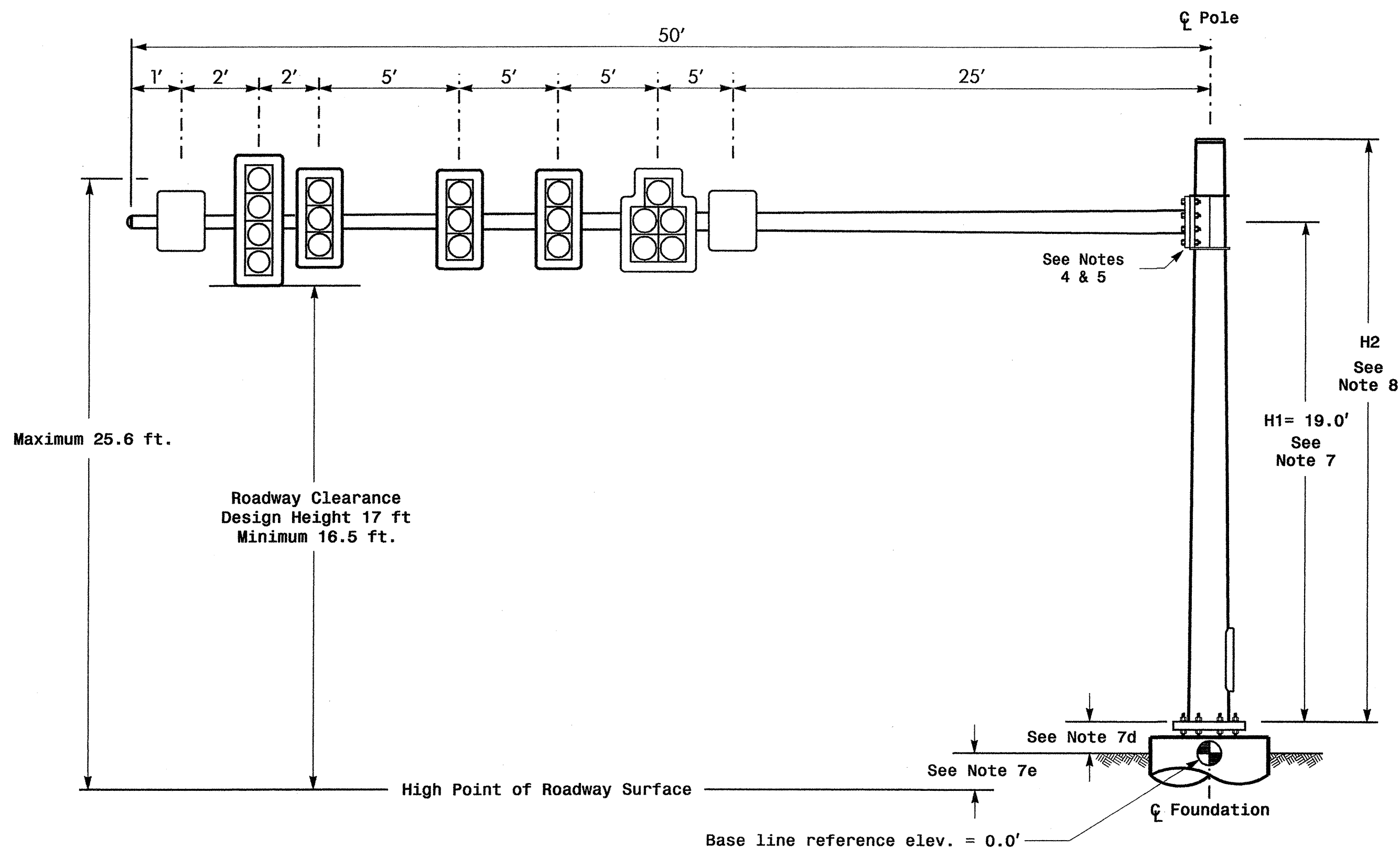
REVISIONS	INIT.	DATE



John T. Rowe 3-10-08
 SIGNATURE DATE

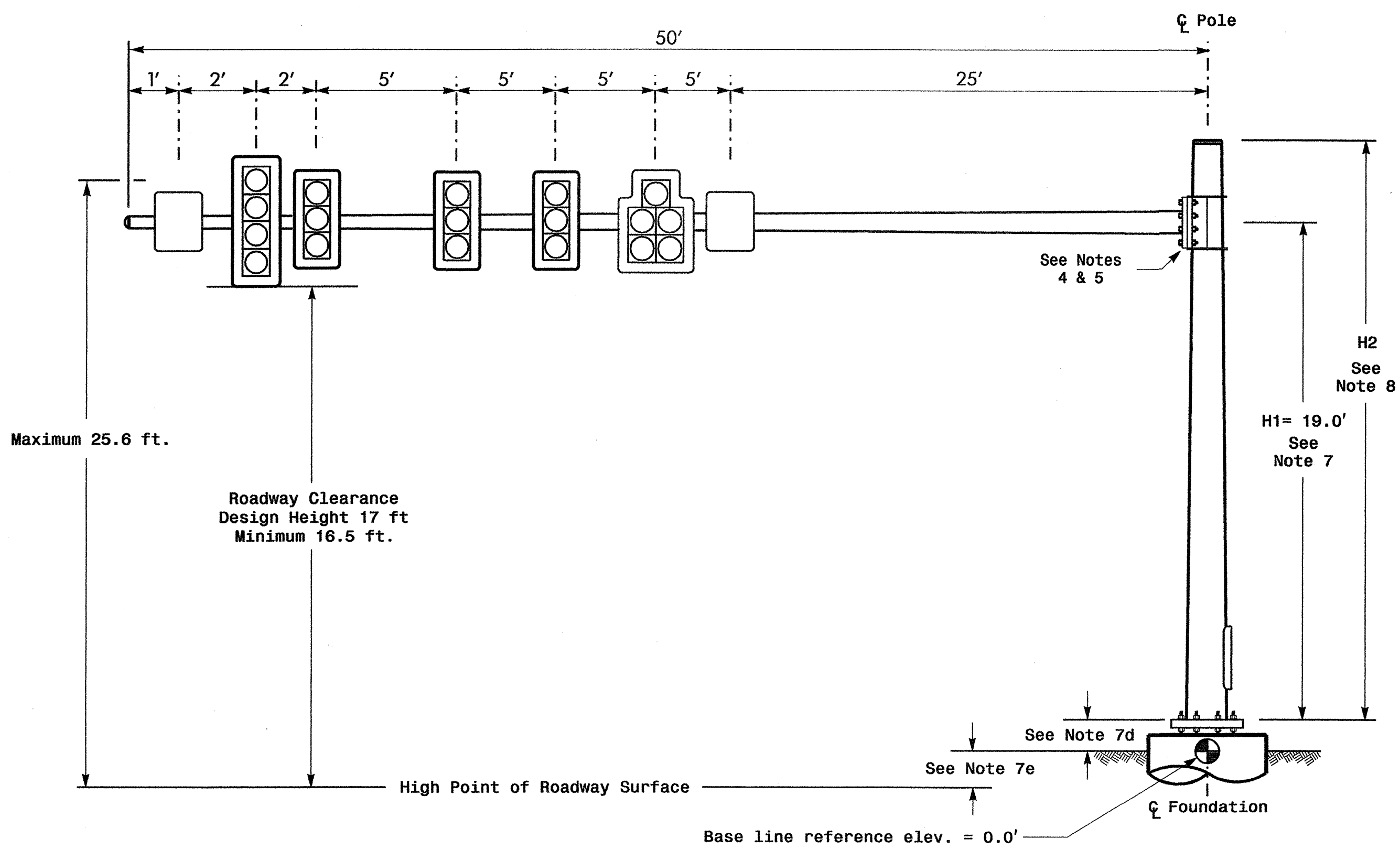
SIG. INVENTORY NO. 02-0206

Design Loading for METAL POLE NO. 3



Elevation View

Design Loading for METAL POLE NO. 4



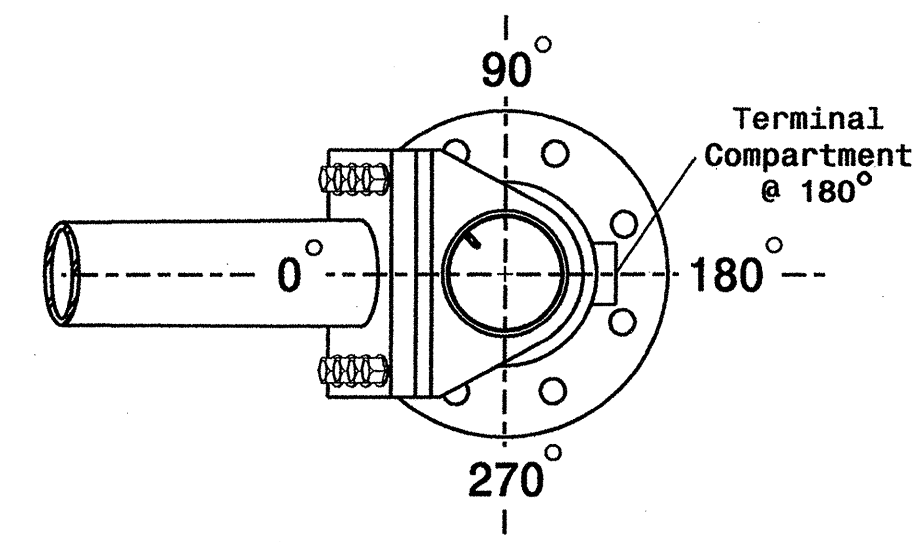
Elevation View

SPECIAL NOTE

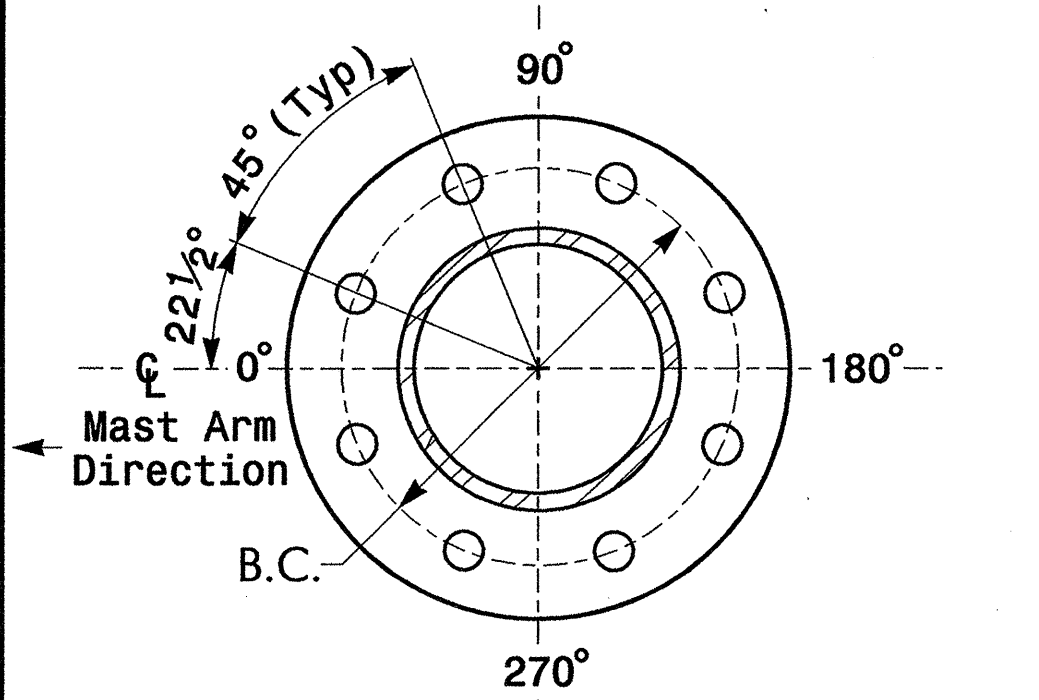
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

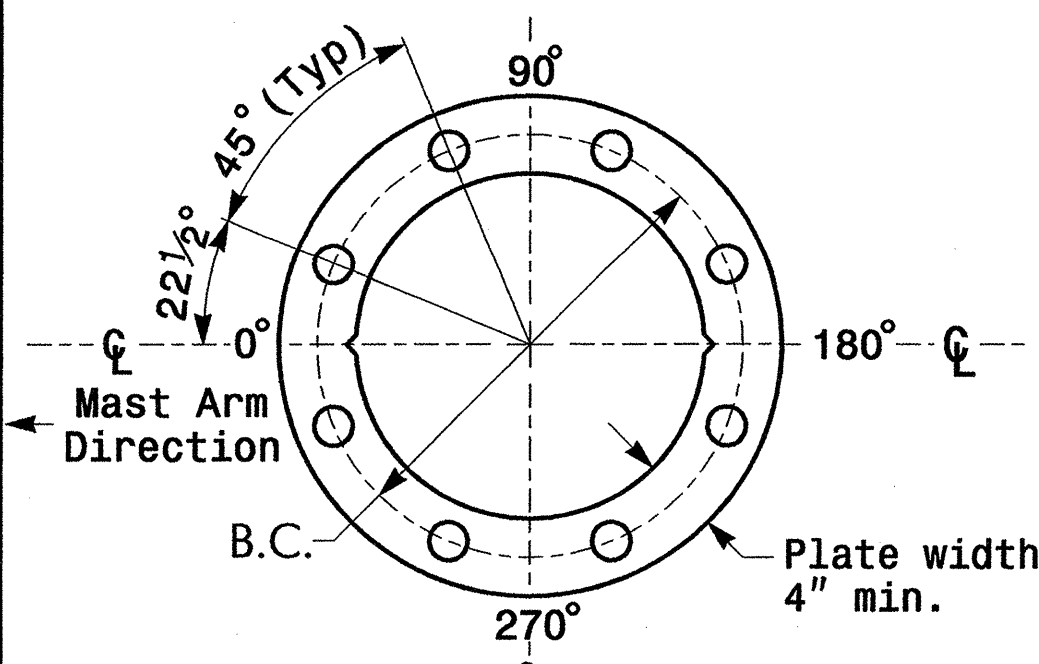
Elevation Differences for:	Pole 3	Pole 4
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.0 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL See Note 6



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

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Symbol]	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
[Symbol]	SIGNAL HEAD 12"-4 SECTION (VERTICAL)-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
[Symbol]	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
[Symbol]	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	7.5 S.F.	30.0" W X 36.0" L	14 LBS

NOTES

Design Reference Material

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 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 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 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 attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on 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 Signals & Geometrics 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.

NCDOT Wind Zone 2 (130 mph)

Prepared in the Office of:
Traffic Signals and Signs Section
SIGNALS & GEOMETRICS DIVISION

759 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 N/A

US 70 Business/
NC 55 (Broad Street)
at
Queen Street/Roundtree Street
Division 2
Craven County
New Bern
PLAN DATE: March 2008
PREPARED BY: I.O. Umzurike

REVISIONS

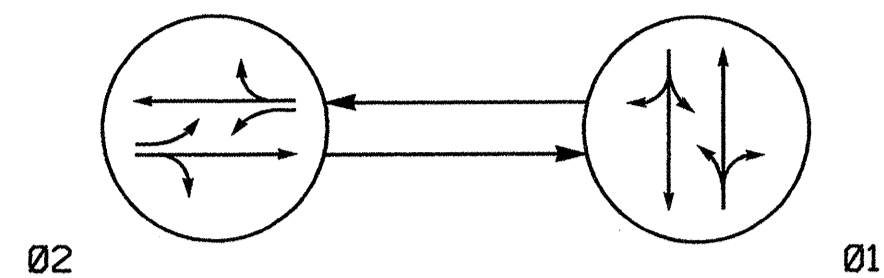
INIT. DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
TIMOTHY G. WILLIAMS
24393

SIGNATURE
3/18/08

SIG. INVENTORY NO. 02-0206

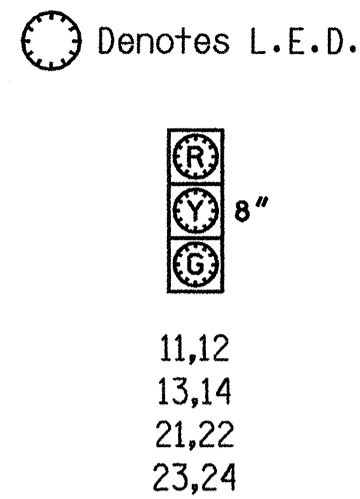
PHASING DIAGRAM



- PHASING DIAGRAM DETECTION LEGEND**
- ◄●► DETECTED MOVEMENT
 - ◄◄◄ UNDETECTED MOVEMENT (OVERLAP)
 - ◄--- UN SIGNALIZED MOVEMENT
 - ◄--- PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE		
	02	01	F
11,12	R	G	R
13,14	R	G	R
21,22	G	R	Y
23,24	G	R	Y

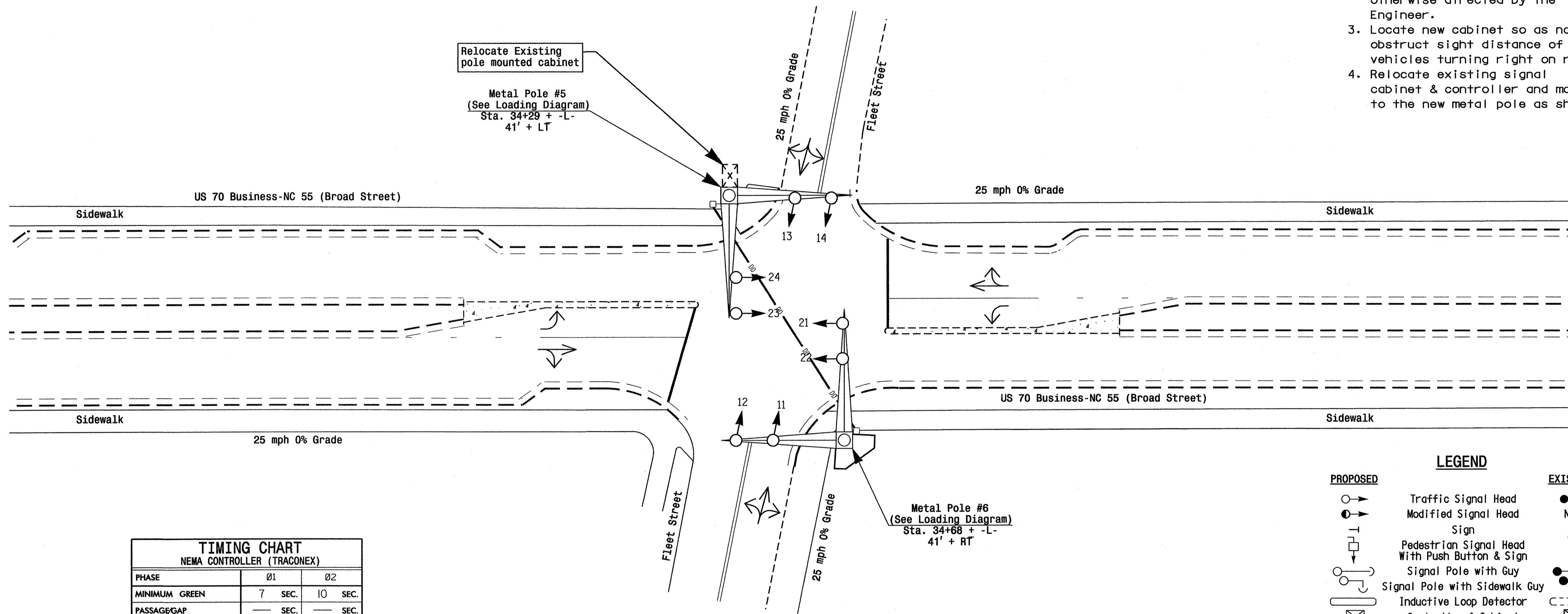
SIGNAL FACE I.D.



**2 Phase
Pre-Timed
(New Bern City System)**

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Relocate existing signal cabinet & controller and mount to the new metal pole as shown.



TIMING CHART NEMA CONTROLLER (TRACONEX)		
PHASE	01	02
MINIMUM GREEN	7 SEC.	10 SEC.
PASSAGE GAP	— SEC.	— SEC.
YELLOW CHANGE INT.	3.2 SEC.	3.2 SEC.
RED CLEARANCE	1.9 SEC.	1.6 SEC.
MAX. 1	30 SEC.	30 SEC.
RECALL POSITION	MAX. RECALL	MAX. RECALL
VEHI. CALL MEMORY	—	—
WALK	— SEC.	— SEC.
FLASHING DON'T WALK	— SEC.	— SEC.
VOLUME DENSITY	OFF	OFF

PROPOSED	LEGEND	EXISTING
○	Traffic Signal Head	●
◐	Modified Signal Head	N/A
⊥	Sign	⊥
⊥	Pedestrian Signal Head With Push Button & Sign	⊥
⊥	Signal Pole with Guy	⊥
⊥	Signal Pole with Sidewalk Guy	⊥
⊥	Inductive Loop Detector	⊥
⊥	Controller & Cabinet	⊥
⊥	Junction Box	⊥
—	2-in Underground Conduit	—
N/A	Right of Way with Marker	△
→	Directional Arrow	→
→	Pavement Marking Arrow	→
⊥	Metal Pole with Mastarm	⊥
—	Directional Drill	N/A

(2-2" Polyethylene Conduits)

Signal Upgrade

	US 70 Business/ NC 55 (Broad Street) at Fleet Street		
	Division 2 Craven County New Bern		
	PLAN DATE: February 2008	REVIEWED BY:	
	PREPARED BY: I. O. Umzurike	REVIEWED BY:	
SCALE: 1" = 20'		REVISIONS:	INIT. DATE:
750 N. Greenfield Place, Garner, NC 27529		SIGNATURE:	DATE: 3/7/08
SIG. INVENTORY NO. 02-0207			

06-MAR-2008 09:36
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 02-0207.dgn

NOTES

1. THE INSTALLER SHALL VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. MAKE SURE ALL FLASH TRANSFER RELAYS ARE IN PLACE.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE CONFLICT MONITOR. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. THE CABINET AND CONTROLLER ARE A PART OF THE NEW BERN CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART				
PHASE	2 PED	1 PED	2	1
SIGNAL HEAD NO.	NU	NU	21,22 23,24	11,12 13,14
PANEL	A	A	A	A
TERMINAL STRIP	TS6	TS6	TS6	TS6
GREEN			4	1
YELLOW			5	2
RED			6	3

NU = NOT USED

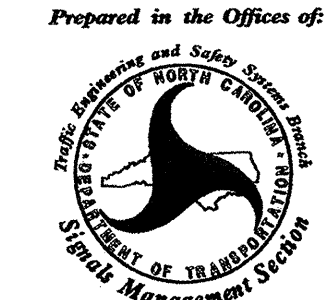
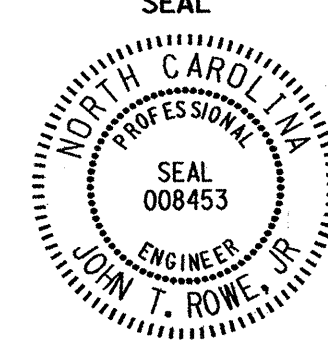
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 02-0207
 DESIGNED: February 2008
 SEALED: 03-07-08
 REVISED: N/A

EQUIPMENT INFORMATION

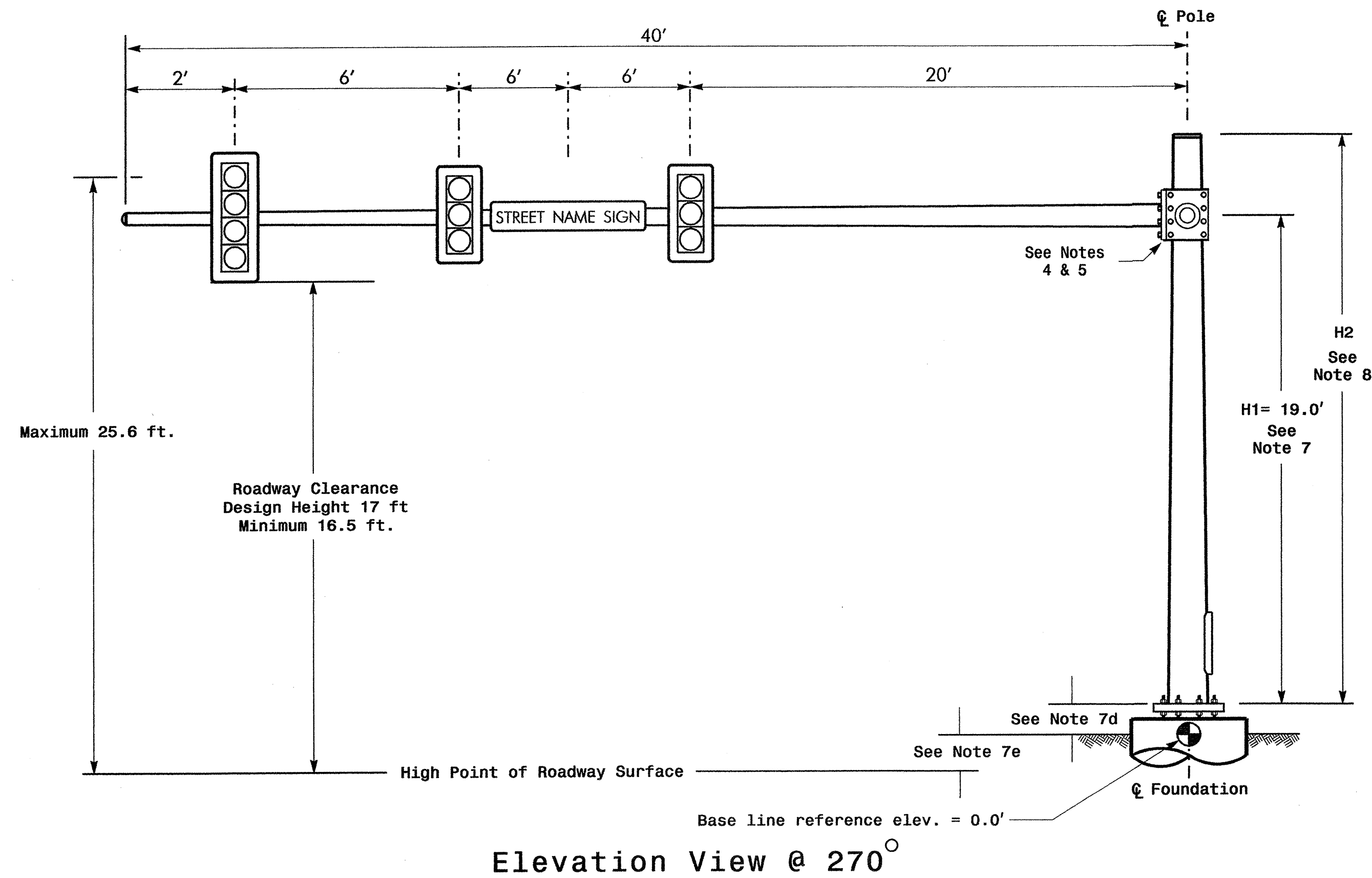
CONTROLLER.....TRACONEX TMP-390
 CABINET.....SOUTHEASTERN SAFETY SUPPLIES (3P-4P-A)
 CABINET MOUNT.....POLE
 LOADBAY POSITIONS.....4
 LOAD SWITCHES USED.....1,2
 PHASES USED.....1,2

10-MAR-2008 09:18
 U:\200707\plan\612-xxx.dgn
 J. Peterson

Signal Upgrade

 Prepared in the Office of: Signal Management Section 750 N. Greenfield Parkway, Garner, NC 27529	US 70 Business/ NC 55 (Broad Street) at Fleet Street		SEAL  SEAL 008453 JOHN T. ROWE, PE	
	Division 2 PLAN DATE: March 2008 PREPARED BY: James Peterson	Craven County REVIEWED BY: JTR REVIEWED BY:	New Bern	
	REVISIONS	INIT.	DATE	
	SIGNATURE: <i>John T. Rowe</i>		DATE: 3-10-08	SIG. INVENTORY NO. 02-0207

Design Loading for METAL POLE NO. 5, MAST ARM A



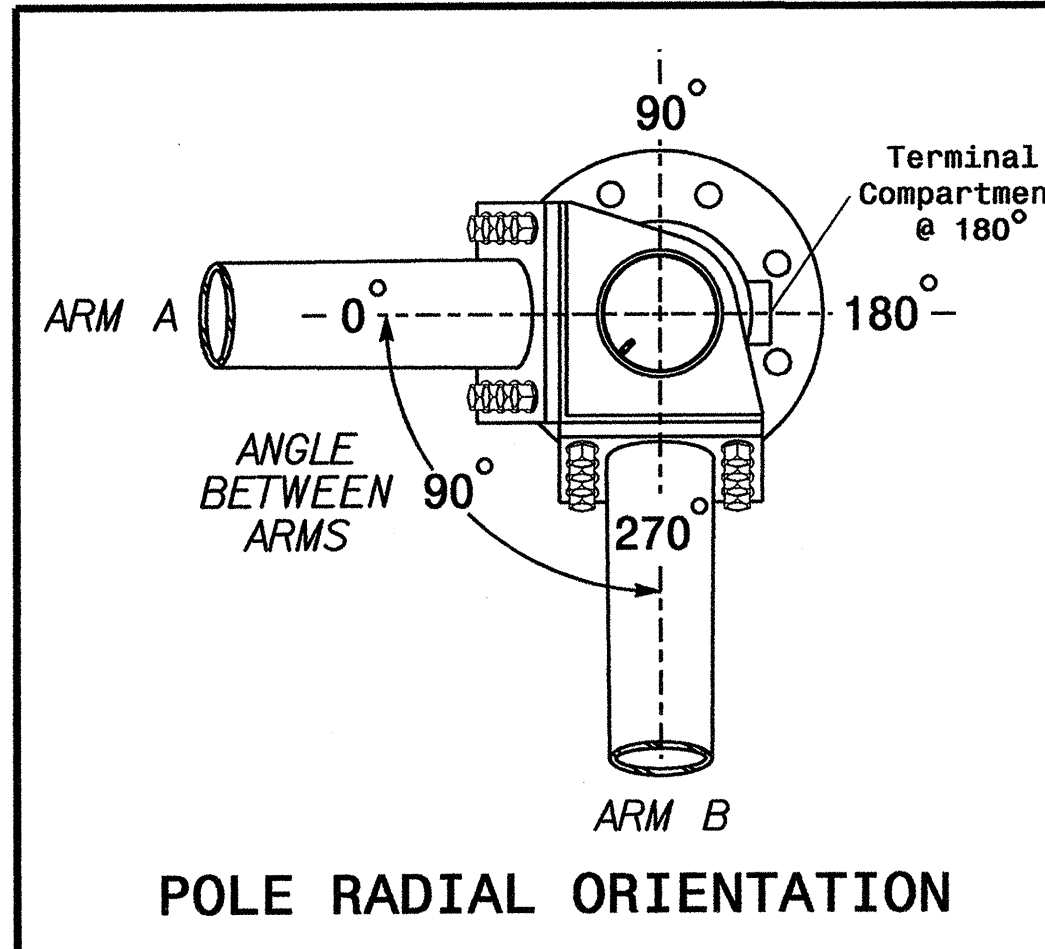
Elevation View @ 270°

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 ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.0 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION

MAST ARM LOADING SCHEDULE

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

NOTES

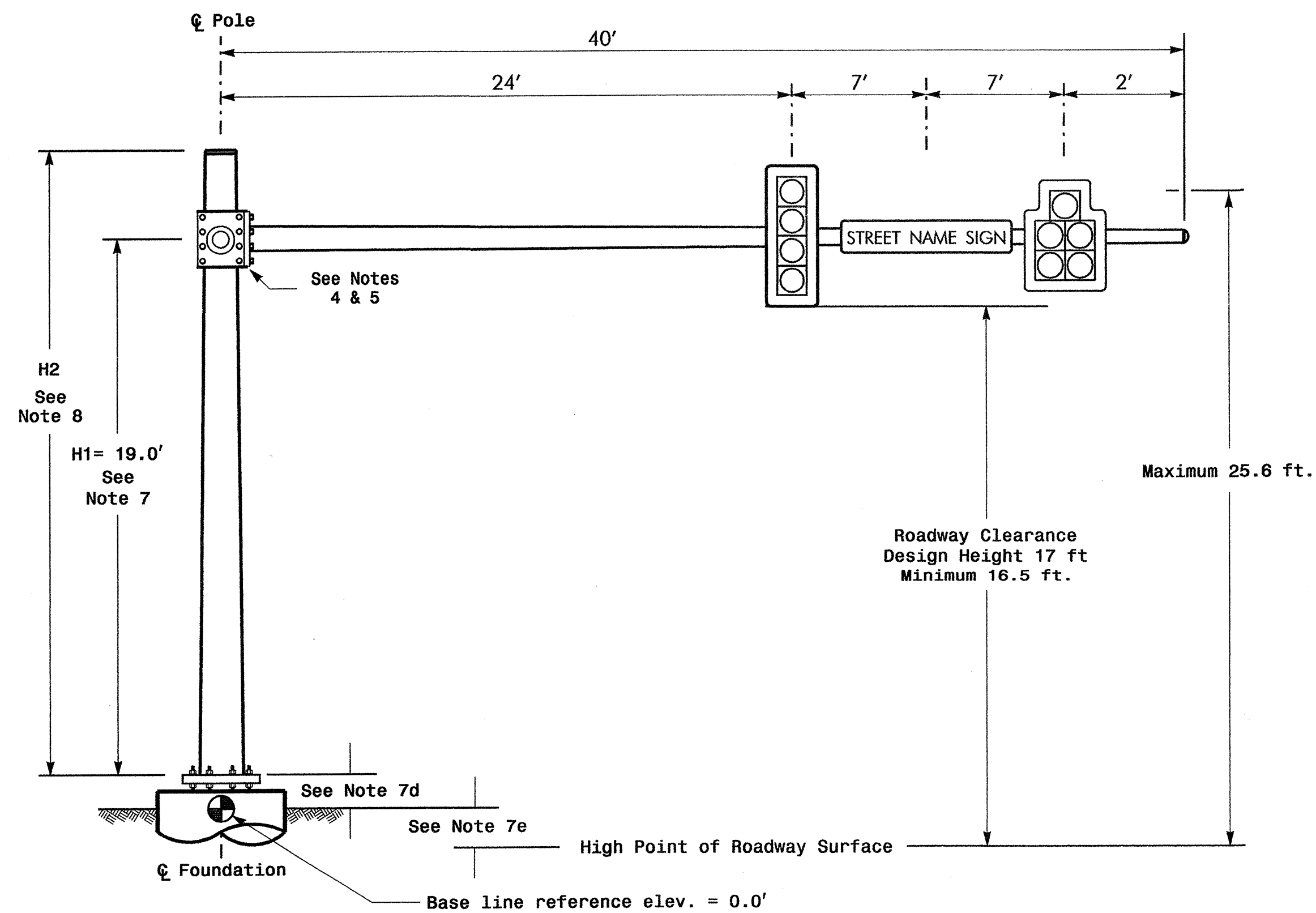
Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.

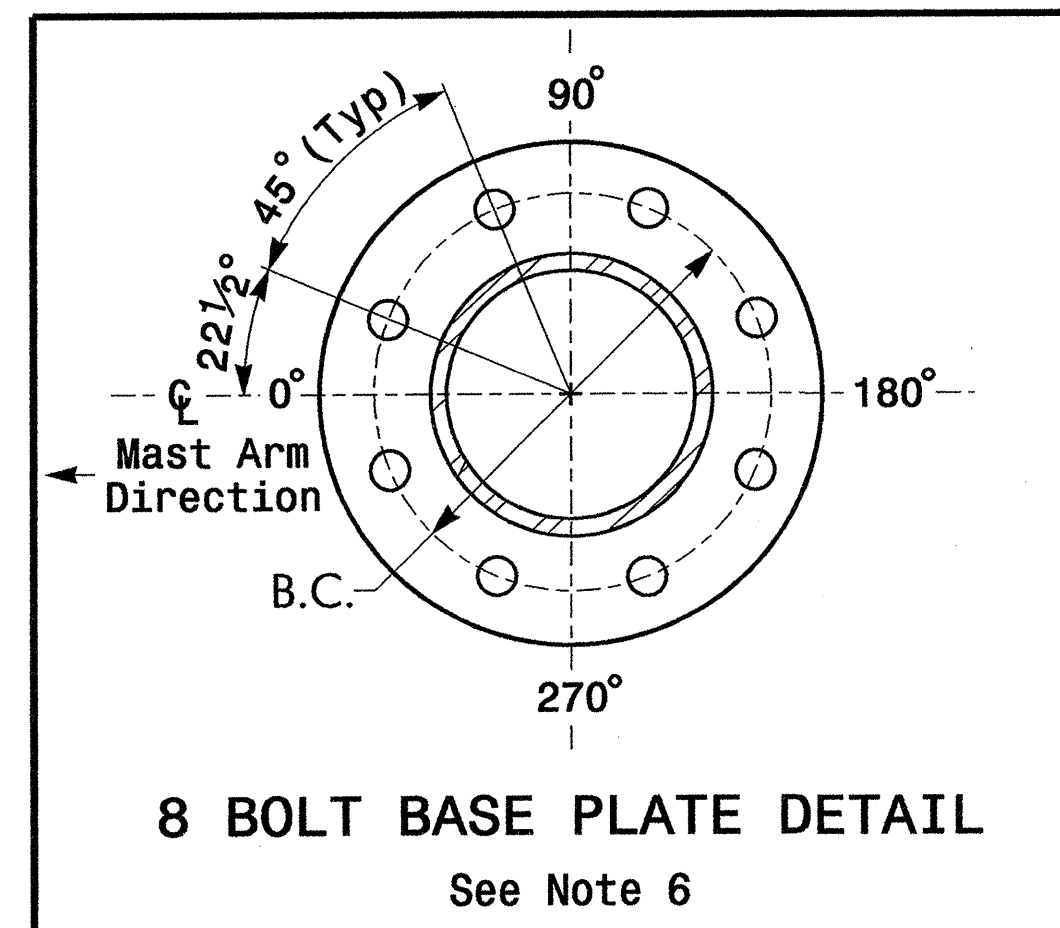
Design Requirements

- 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 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 attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of the 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths 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.

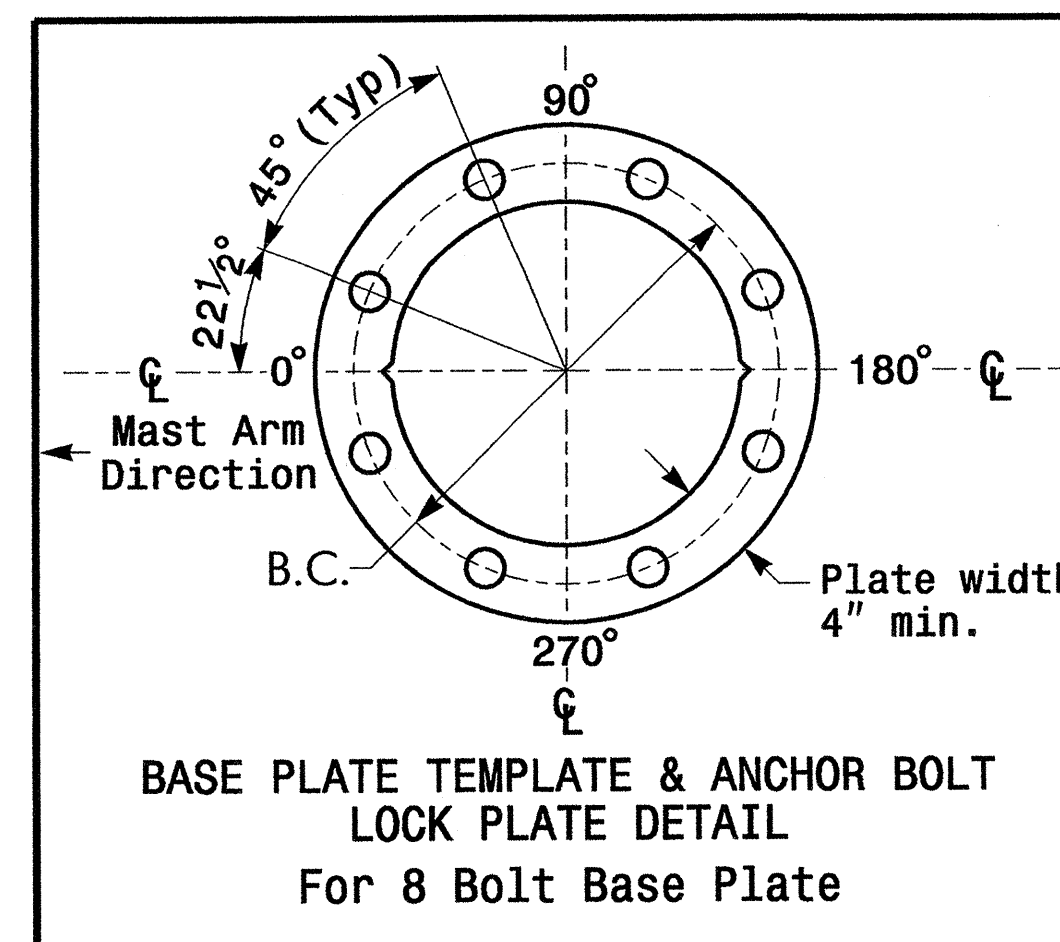
Design Loading for METAL POLE NO. 5, MAST ARM B



Elevation View @ 0°



8 BOLT BASE PLATE DETAIL
See Note 6



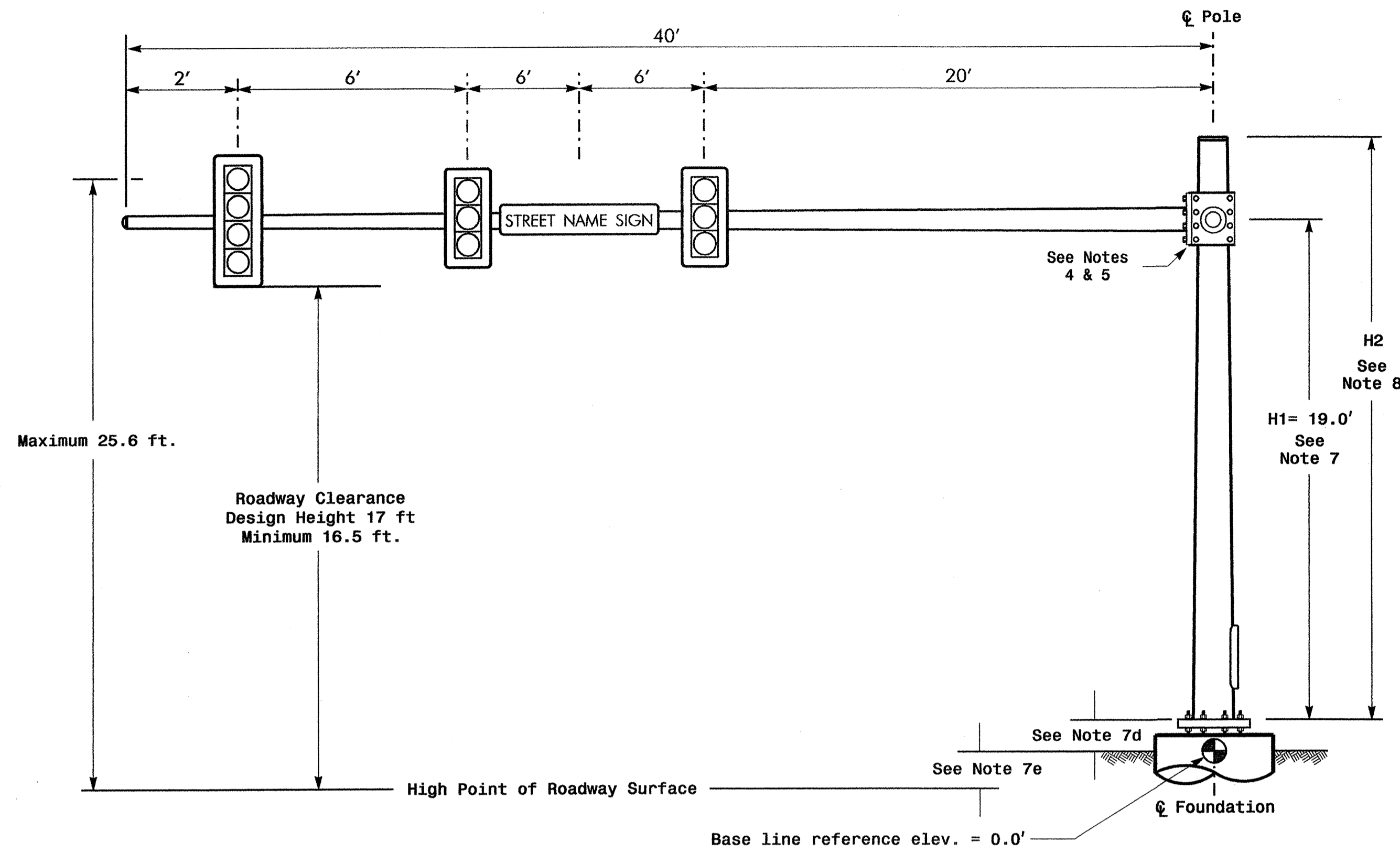
BASE PLATE TEMPLATE & ANCHOR BOLT
LOCK PLATE DETAIL
For 8 Bolt Base Plate

NCDOT Wind Zone 2 (130 mph)

	US 70 Business/ NC 55 (Broad Street) at Fleet Street		
	Division 2 PLAN DATE: March 2008 PREPARED BY: I.O. Umozurike	Craven County REVIEWED BY: REVIEWED BY:	
SCALE 0 N/A N/A	REVISIONS	INIT. DATE	SIGNATURE DATE: 3/18/08 SIG. INVENTORY NO. 02-0207

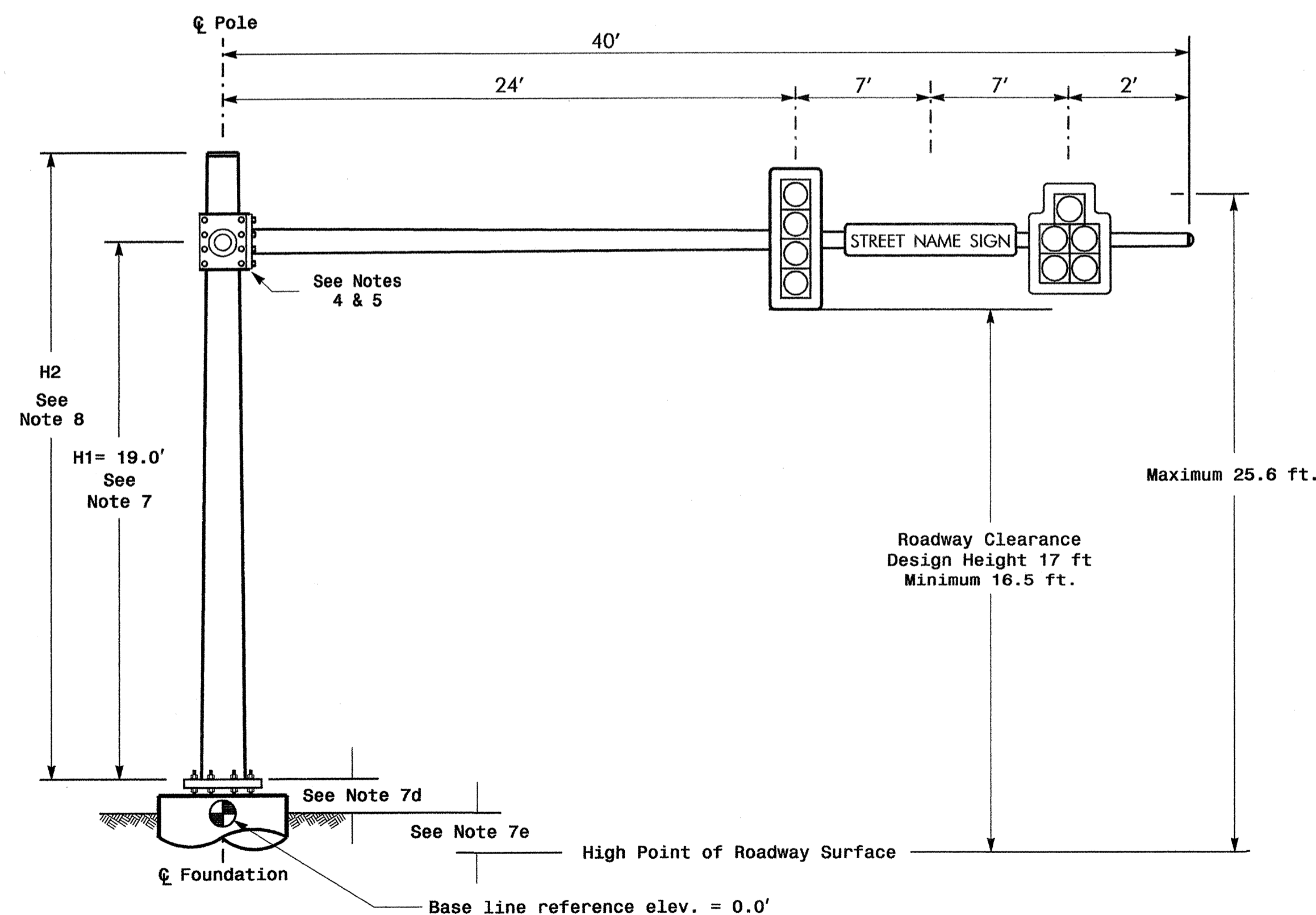
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Design Loading for METAL POLE NO. 6, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 6, MAST ARM B



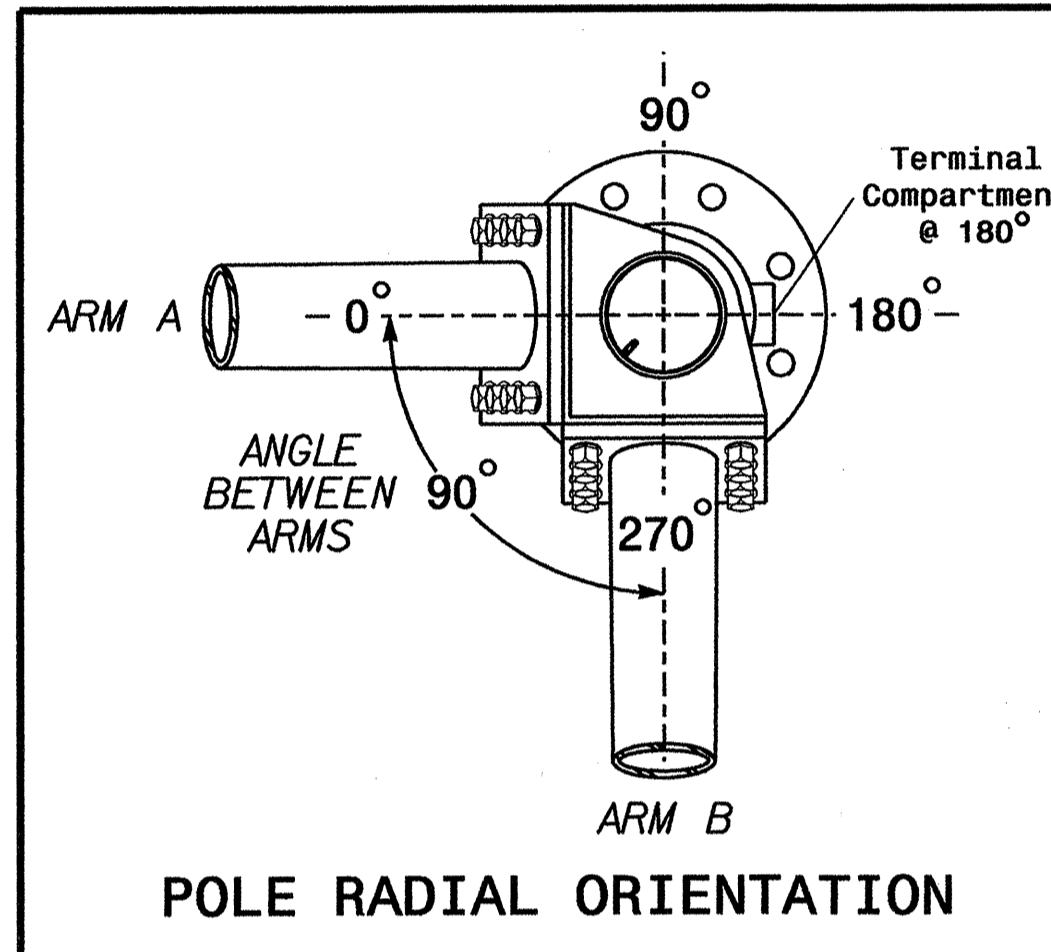
Elevation View @ 0°

SPECIAL NOTE

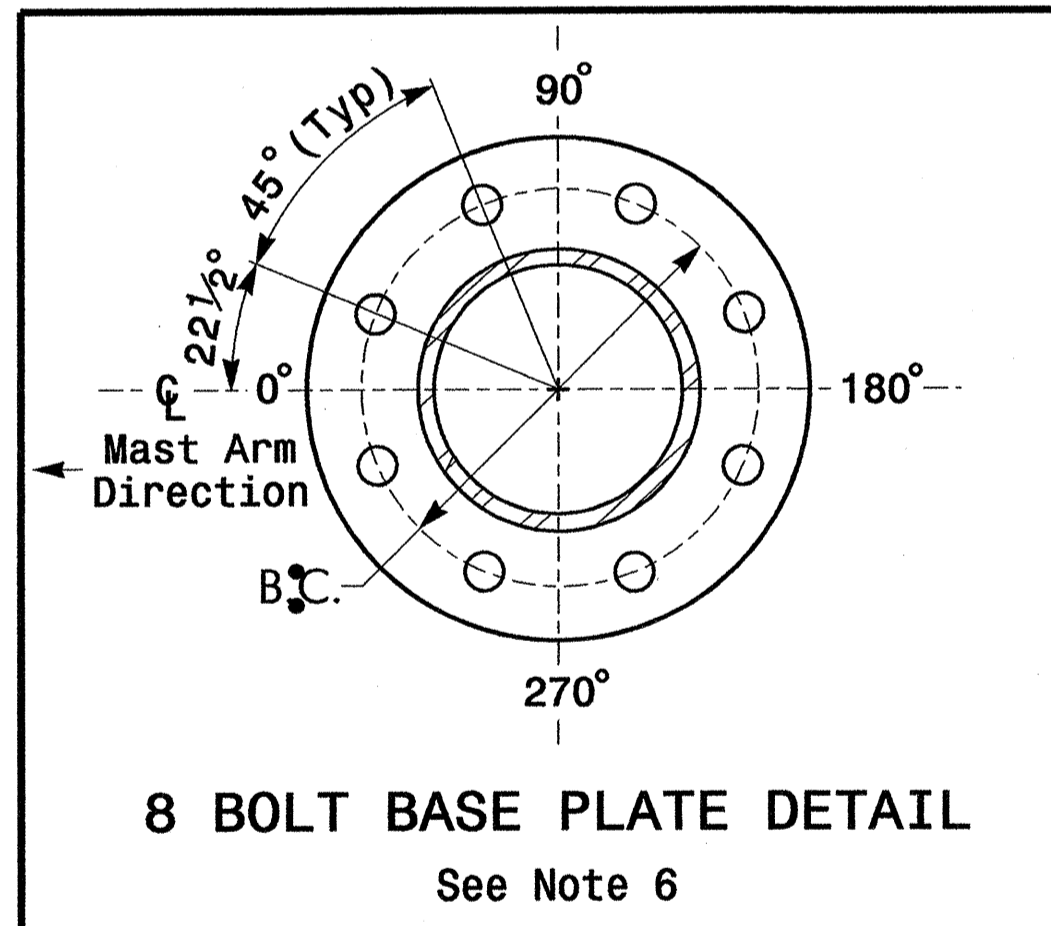
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

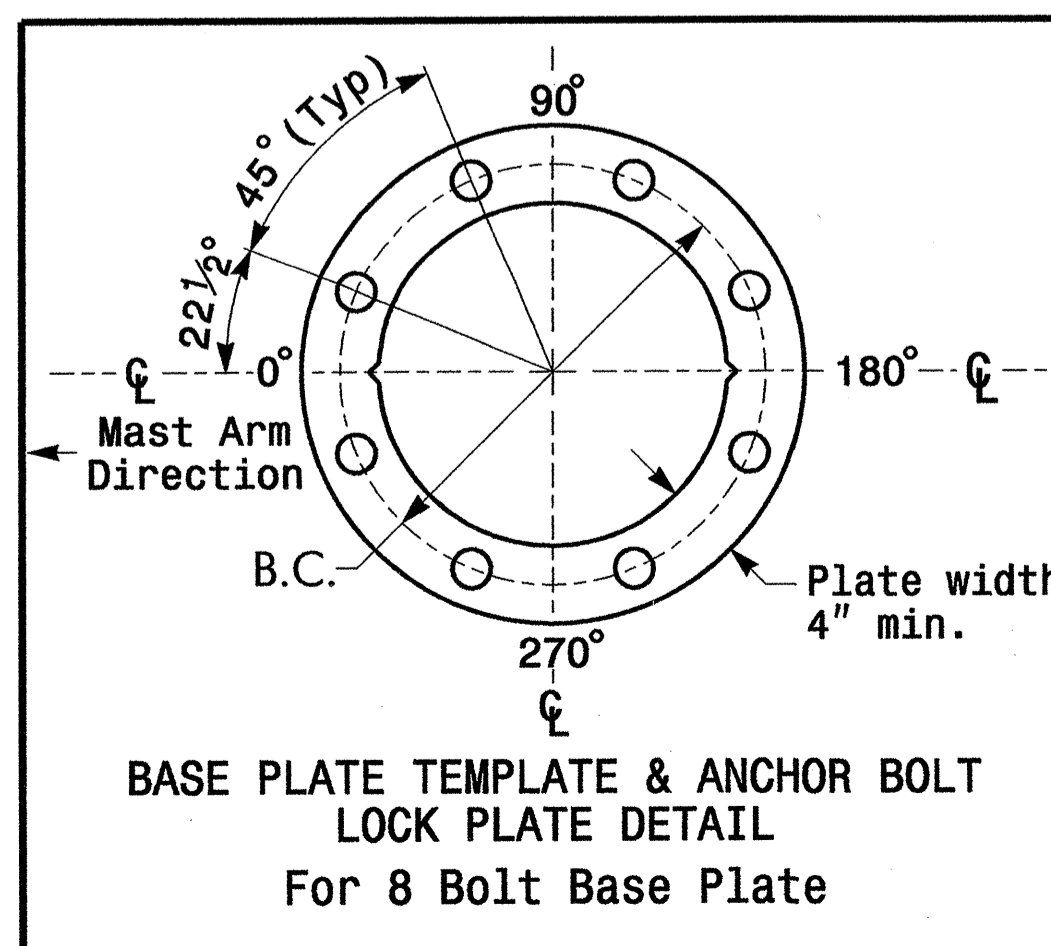
Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.0 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

MAST ARM LOADING SCHEDULE				
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Symbol]	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
[Symbol]	SIGNAL HEAD 12"-4 SECTION (VERTICAL)-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
[Symbol]	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
[Symbol]	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	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 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 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 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 attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of the 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

<p>Prepared in the Offices of: The University of North Carolina School of Transportation Signals and Geometrics Section 759 N. Greenfield Place, Garner, NC 27529</p>	US 70 Business/ NC 55 (Broad Street) at Fleet Street Division 2 Craven County New Bern			
	PLAN DATE: March 2008	REVIEWED BY:		SIGNATURE: <i>T. Williams</i> 3/18/08 DATE:
	PREPARED BY: I.O. Umozurike	REVIEWED BY:		
	SCALE: 0 N/A	REVISIONS:		

PHASING DIAGRAM

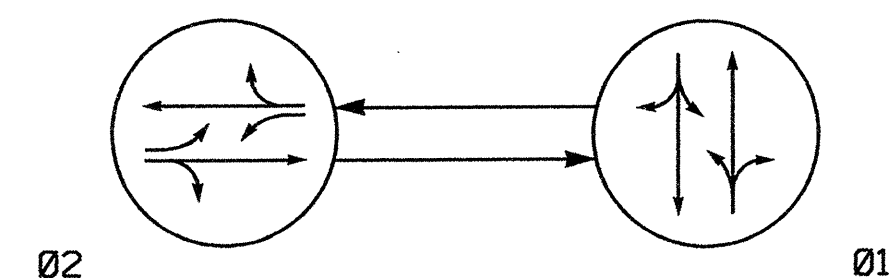
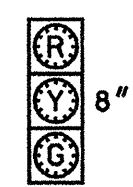


TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø 1	Ø 2	LOCAL
11,12	G	R	R
13,14	G	R	R
21,22	R	G	Y
23,24	R	G	Y

SIGNAL FACE I.D.

⊙ Denotes L.E.D.



11,12
13,14
21,22
23,24

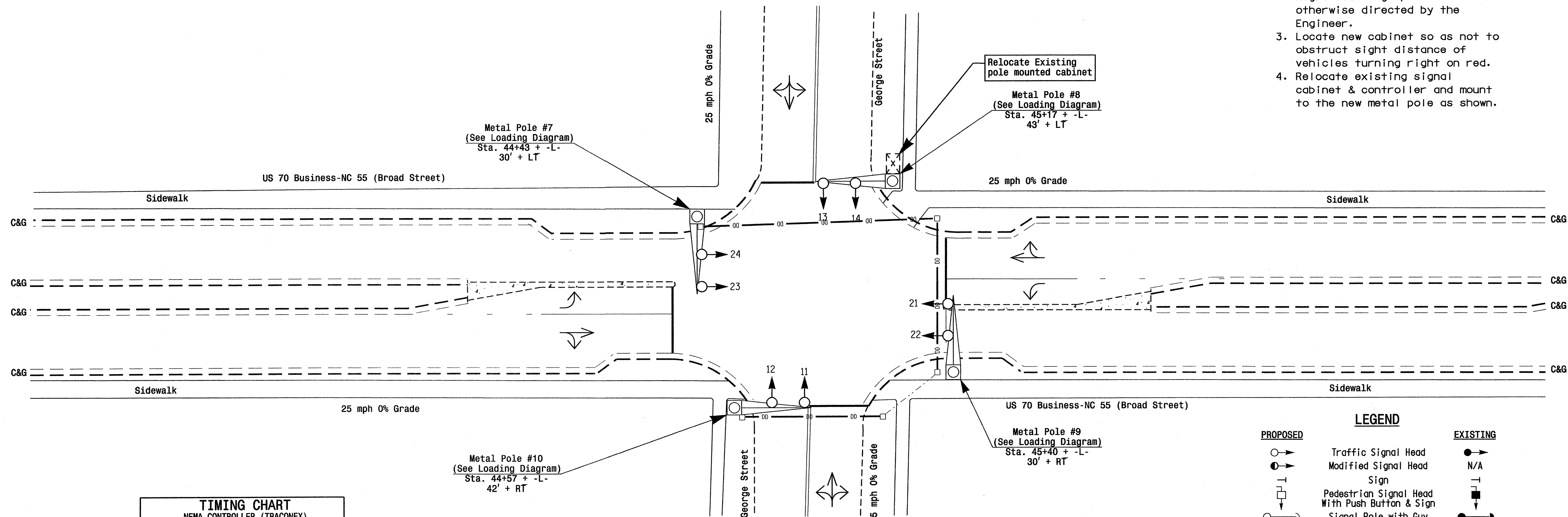
PHASING DIAGRAM DETECTION LEGEND

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

**2 Phase
Pre-Timed
(New Bern City System)**

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Relocate existing signal cabinet & controller and mount to the new metal pole as shown.



TIMING CHART
NEMA CONTROLLER (TRACONEX)

PHASE	Ø1	Ø2
MINIMUM GREEN	7 SEC.	10 SEC.
PASSAGE GAP	—	—
YELLOW CHANGE INT.	3.2 SEC.	3.2 SEC.
RED CLEARANCE	2.1 SEC.	2.1 SEC.
MAX. 1	30 SEC.	30 SEC.
RECALL POSITION	MAX. RECALL	MAX. RECALL
VEHI. CALL MEMORY	—	—
WALK	— SEC.	— SEC.
FLASHING DON'T WALK	— SEC.	— SEC.
VOLUME DENSITY	OFF	OFF

LEGEND

PROPOSED	EXISTING
	(2-2" Polyethylene Conduits)

07-MAR-2008 07:41
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Signal Upgrade

Prepared in the Office of:

 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 Signal and Geometric Section
 750 N. Greenfield Place, Garner, NC 27529

**US 70 Business/
NC 55 (Broad Street)
at
George Street**
New Bern

Division 2
 PLAN DATE: February 2008
 PREPARED BY: I. O. Umzurike
 REVIEWED BY:
 REVISIONS: INIT. DATE

SCALE: 1"=20'

SEAL
 NORTH CAROLINA
 PROFESSIONAL ENGINEER
 SEAL 24393
 J. WILLIAMS
 SIGNATURE:
 DATE: 3/10/08
 SIG. INVENTORY NO. 02-0209

NOTES

1. THE INSTALLER SHALL VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. MAKE SURE ALL FLASH TRANSFER RELAYS ARE IN PLACE.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE CONFLICT MONITOR. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. THE CABINET AND CONTROLLER ARE A PART OF THE NEW BERN CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART				
PHASE	2 PED	1 PED	2	1
SIGNAL HEAD NO.	NU	NU	21,22 23,24	11,12 13,14
PANEL	A	A	A	A
TERMINAL STRIP	TS6	TS6	TS6	TS6
GREEN			4	1
YELLOW			5	2
RED			6	3

NU = NOT USED

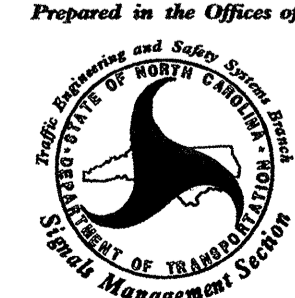
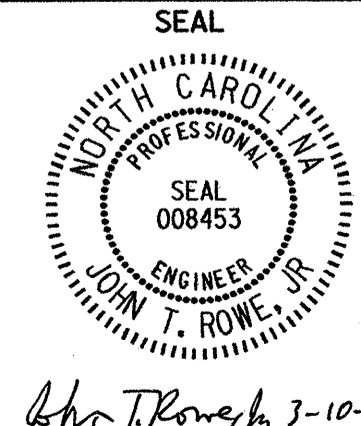
EQUIPMENT INFORMATION

CONTROLLER.....TRACONEX TMP-390
 CABINET.....SOUTHEASTERN SAFETY SUPPLIES (3P-4P-A)
 CABINET MOUNT.....POLE
 LOADBAY POSITIONS.....4
 LOAD SWITCHES USED.....1,2
 PHASES USED.....1,2

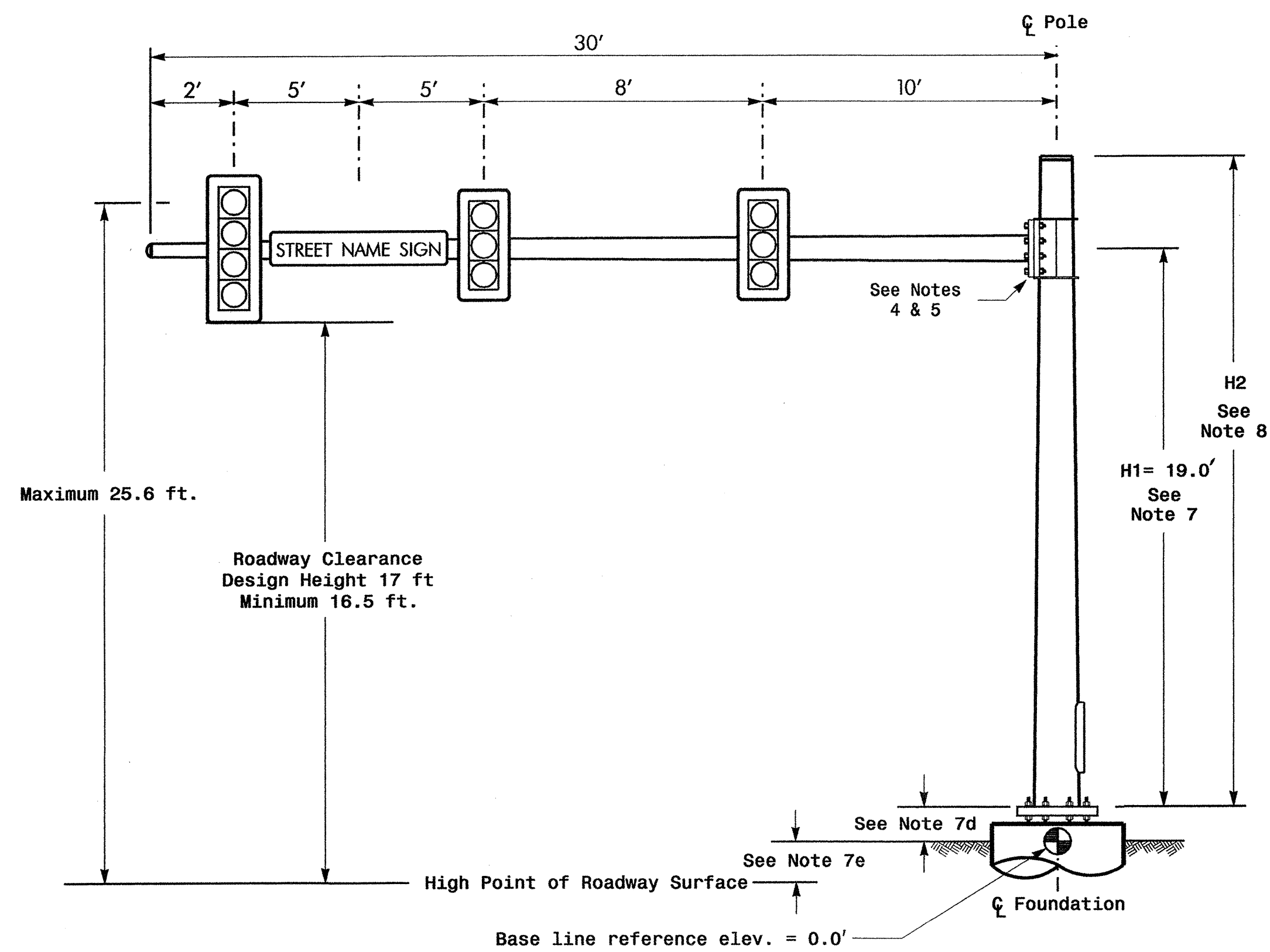
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 THE SIGNAL DESIGN: 02-0209
 DESIGNED: February 2008
 SEALED: 03-07-08
 REVISED: N/A

10-MAR-2008 09:24
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 JPeterson

Signal Upgrade

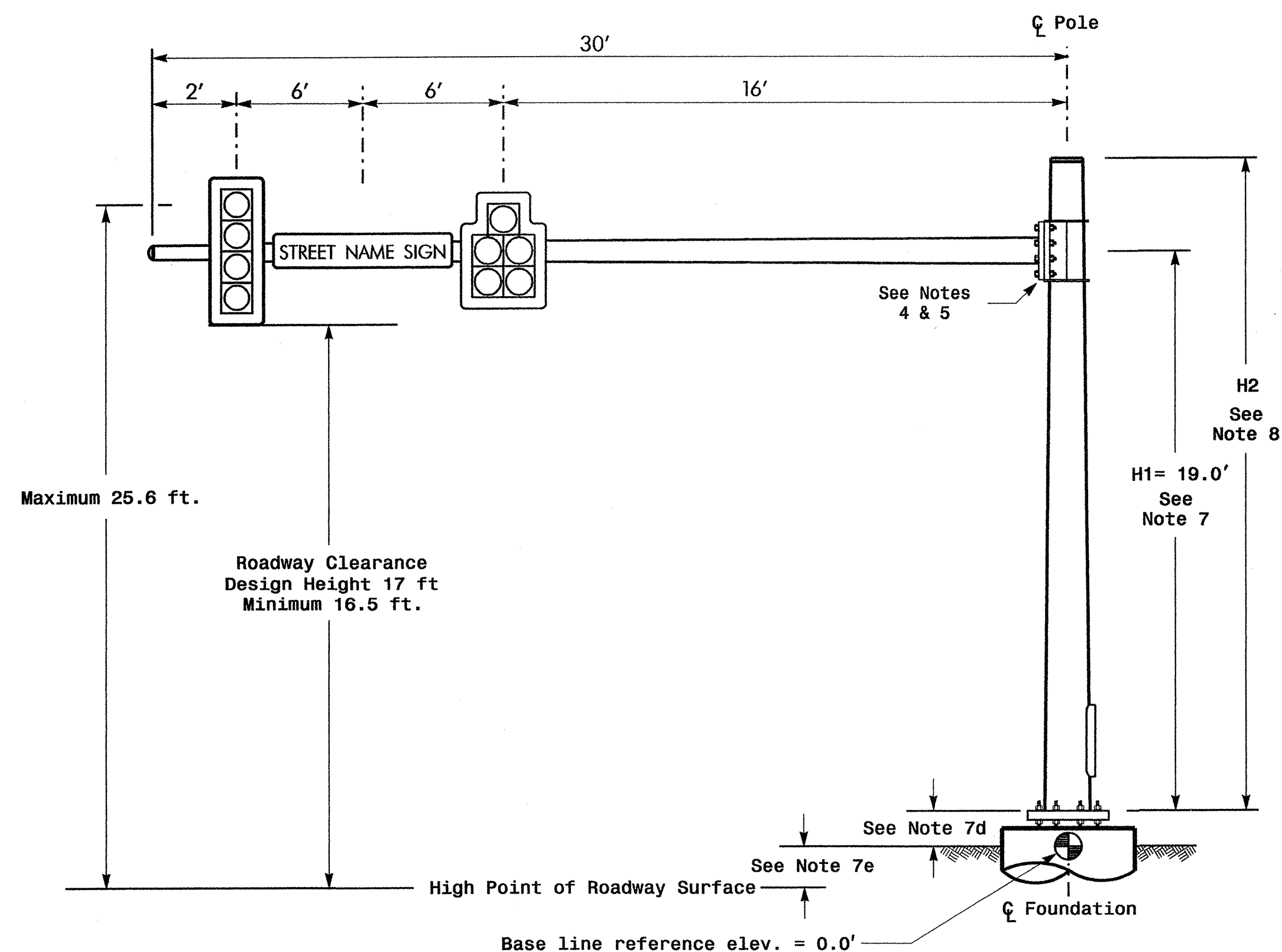
 Prepared in the Offices of: Signal Management Group, Inc. 750 N. Greenfield Pkwy, Garner, NC 27529	ELECTRICAL AND PROGRAMMING DETAILS FOR:		US 70 Business/ NC 55 (Broad Street) at George Street		SEAL 
	Division 2	Craven County	New Bern		
	PLAN DATE: March 2008	REVIEWED BY: JTR			
	PREPARED BY: James Peterson	REVIEWED BY:			
REVISIONS		INIT.	DATE		
				Signature: <i>John T. Rowe</i> 3-10-08 DATE: 3-10-08	
				SIG. INVENTORY NO. 02-0209	

Design Loading for METAL POLE NO. 7



Elevation View

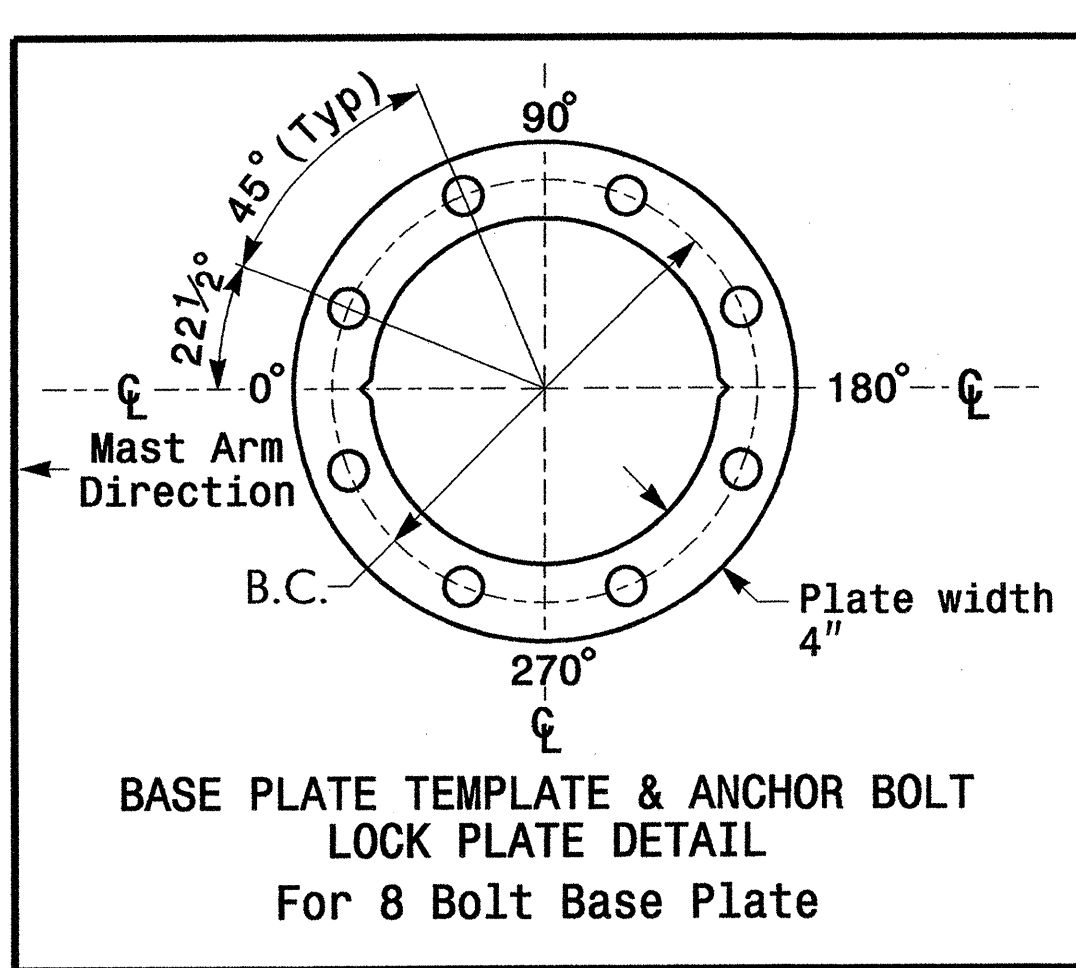
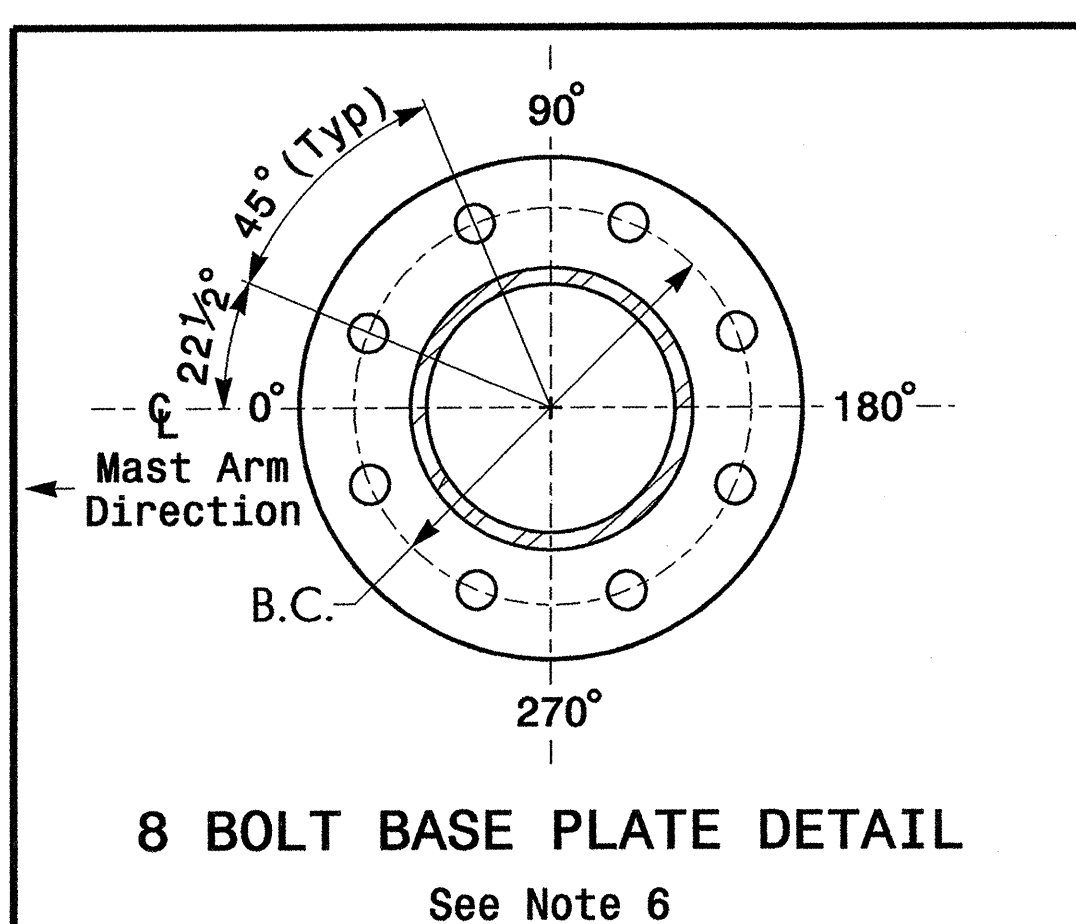
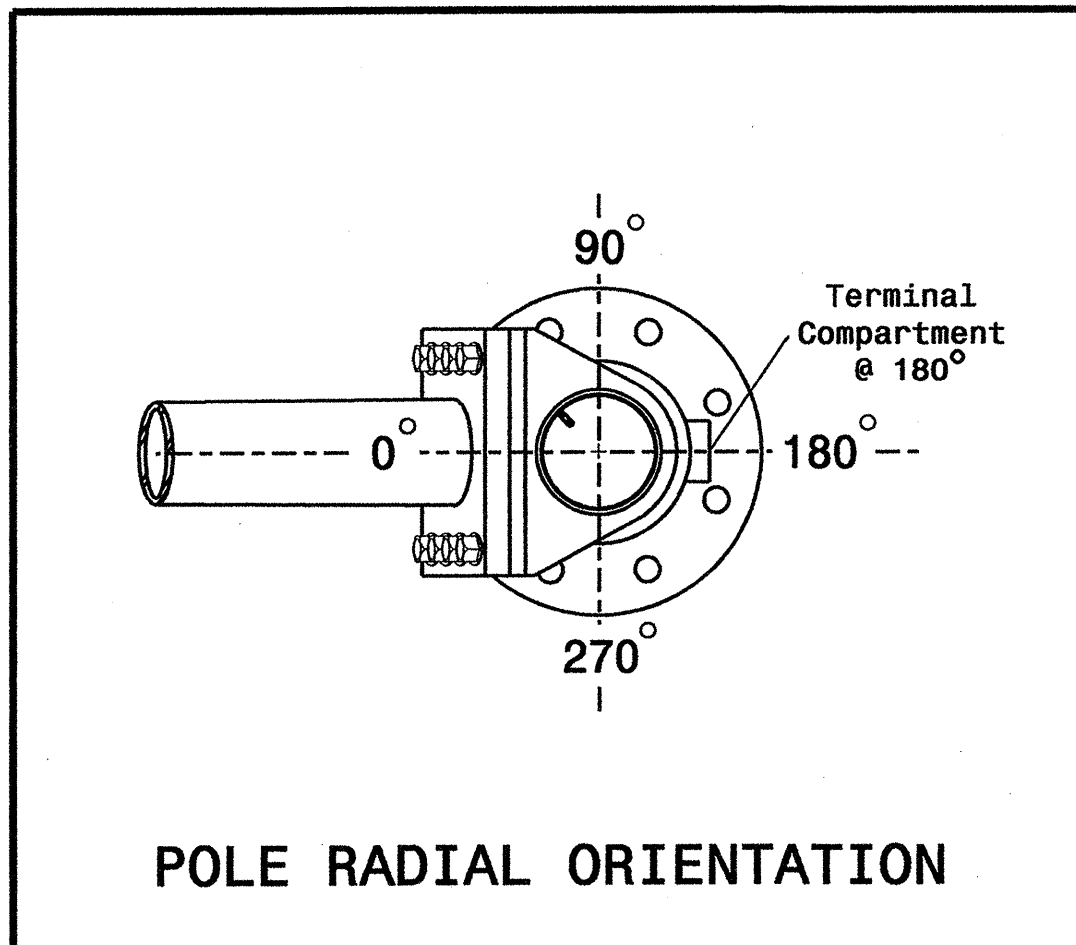
Design Loading for METAL POLE NO. 8



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 Differences for:	Pole 7	Pole 8
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.0 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



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

- NOTES**
- Design Reference Material**
- 1. Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
- Design Requirements**
- 2. 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.
 - 3. Design all signal supports using stress ratios that do not exceed 0.9.
 - 4. The camber design for 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.
 - 5. 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.
 - 6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
 - 7. The mast arm attachment height (H1) shown is based on the following design assumptions:
 - a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - b. Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - c. The roadway clearance height for design is as shown in the elevation views.
 - d. The top of the pole base plate is .75 feet above the ground elevation.
 - e. Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
 - 8. 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.
 - 9. 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
 - 10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
 - 11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

Prepared in the Offices of:

 NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 SIGNALS & GEOMETRICS SECTION
 750 N. Greenfield Place, Garner, NC 27529

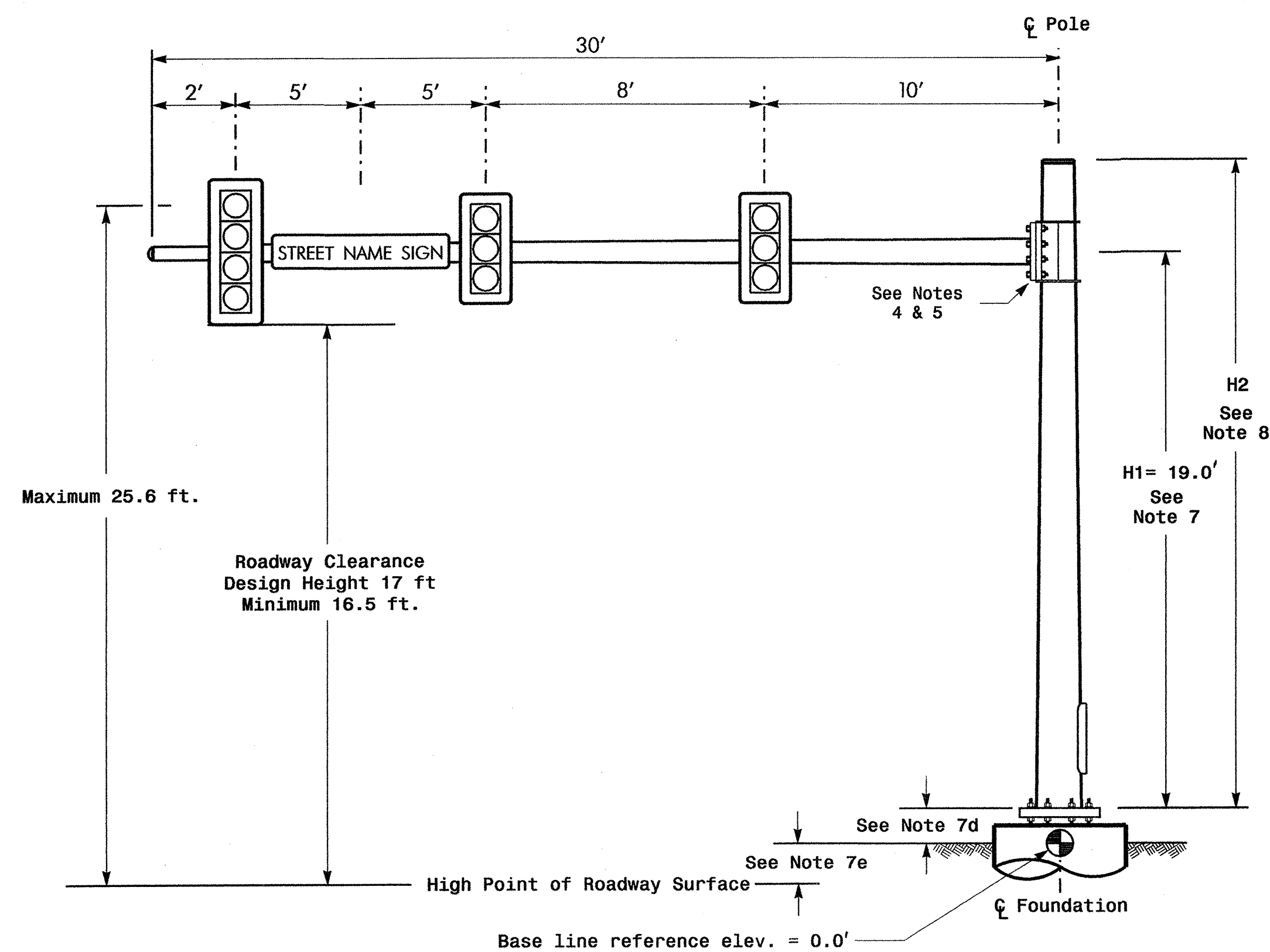
US 70 Business/
 NC 55 (Broad Street)
 at
 George Street
 Division 2 Craven County New Bern
 PLAN DATE: March 2008
 REVIEWED BY:
 PREPARED BY: I.O. Umzurike
 REVIEWED BY:

SCALE
 0 N/A
 N/A

SEAL
 NORTH CAROLINA
 PROFESSIONAL ENGINEER
 SEAL 24393
 TIMOTHY J. WILLIAMS
 SIGNATURE DATE
 3/18/08
 SIG. INVENTORY NO. 02-0209

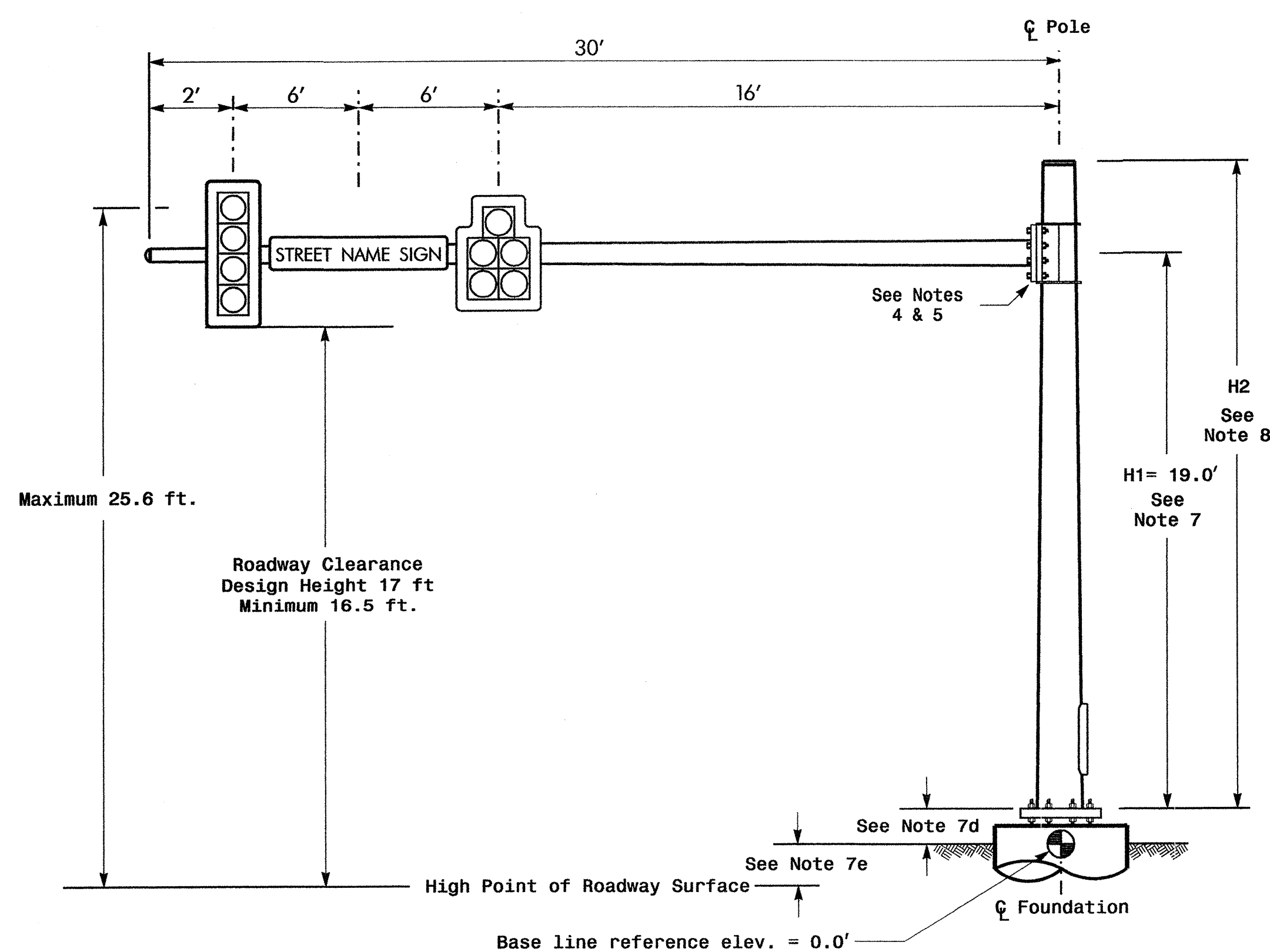
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Design Loading for METAL POLE NO. 9



Elevation View

Design Loading for METAL POLE NO. 10

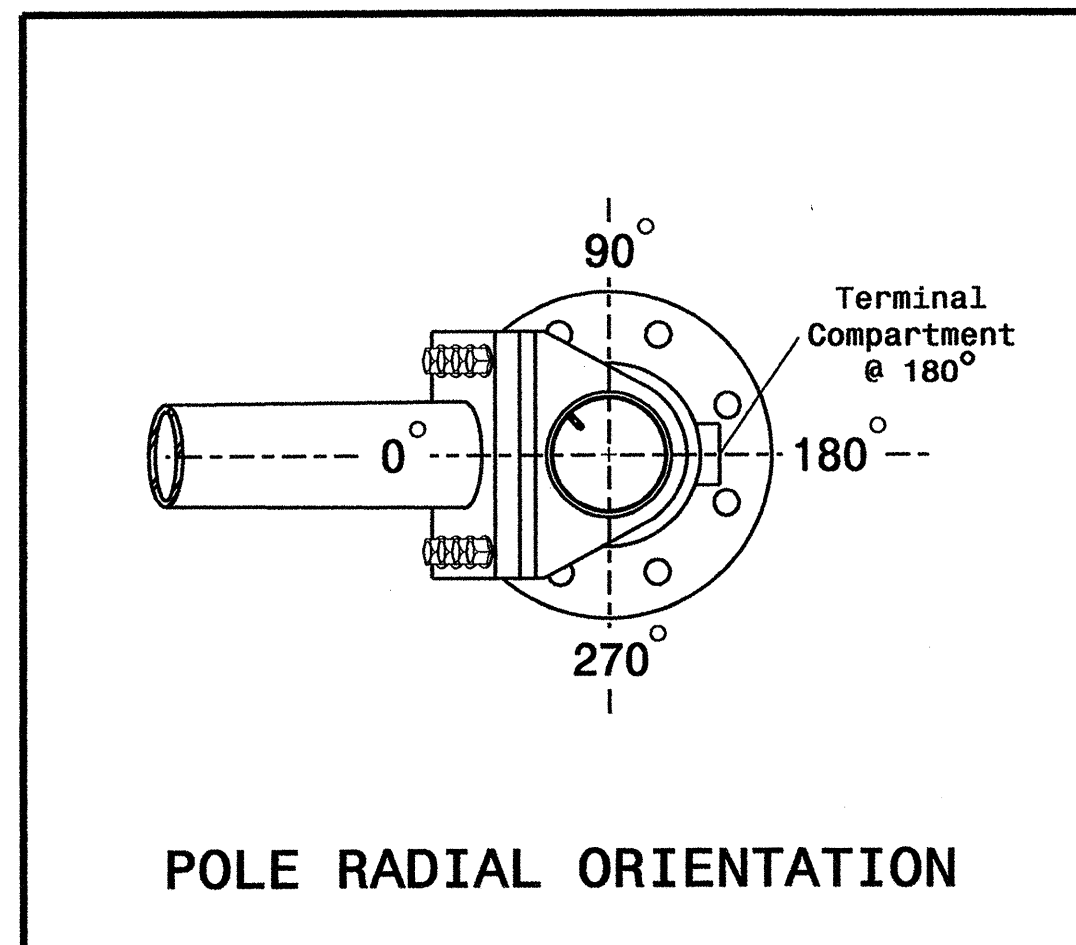


Elevation View

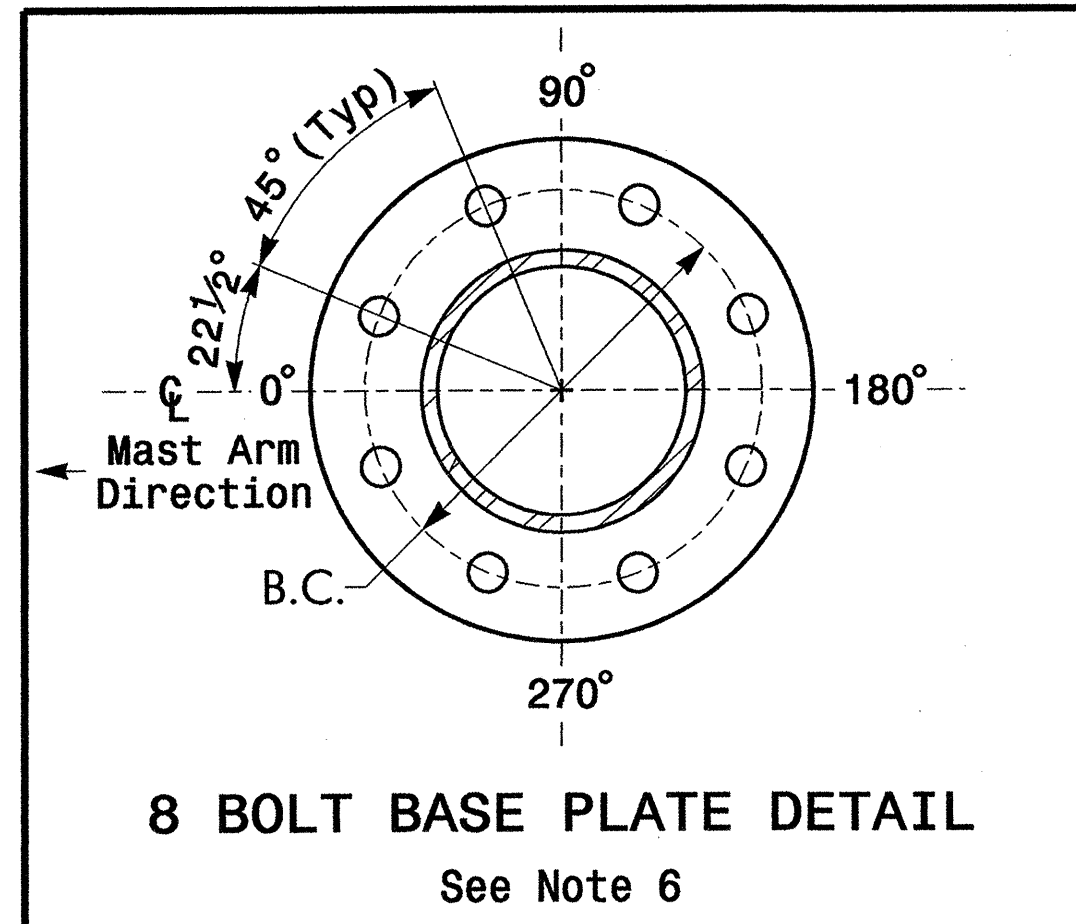
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

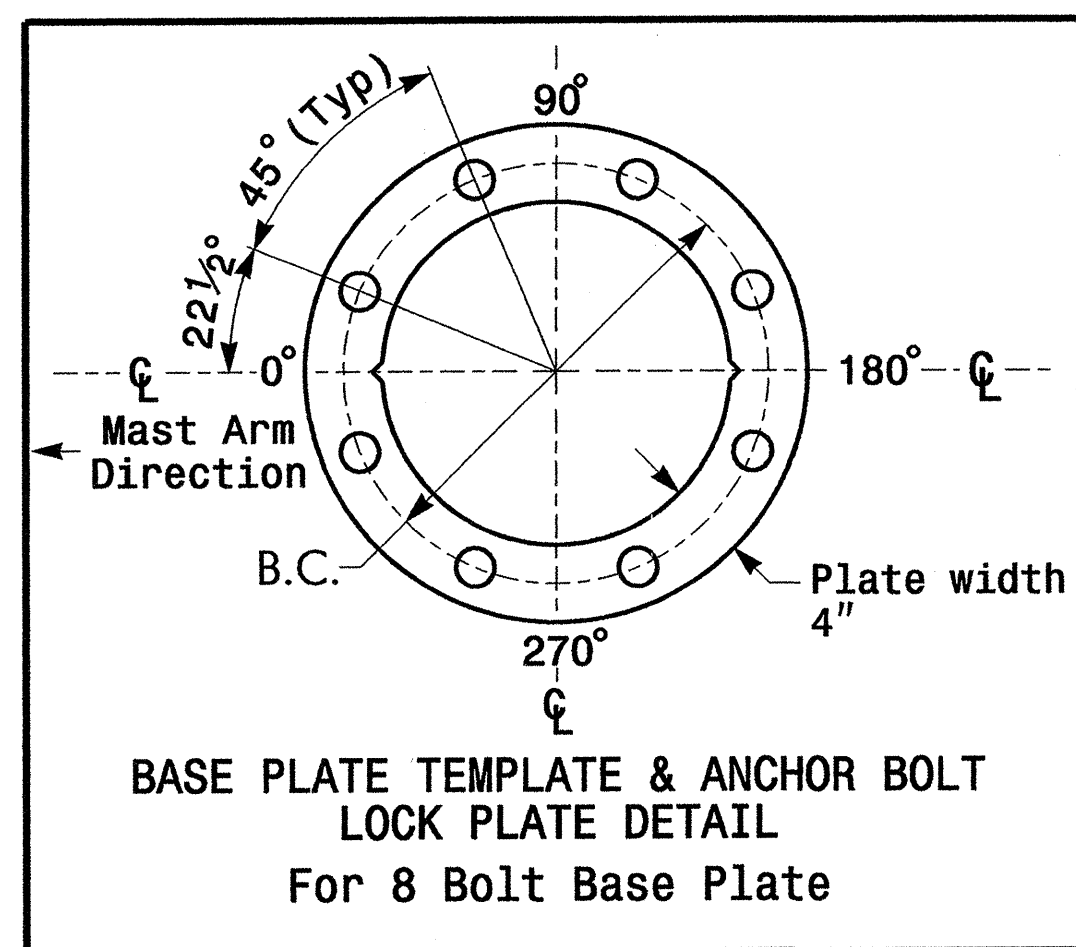
Elevation Differences for:	Pole 9	Pole 10
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.0 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION (VERTICAL)-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	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 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 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 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 attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on 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 Signals & Geometrics 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.

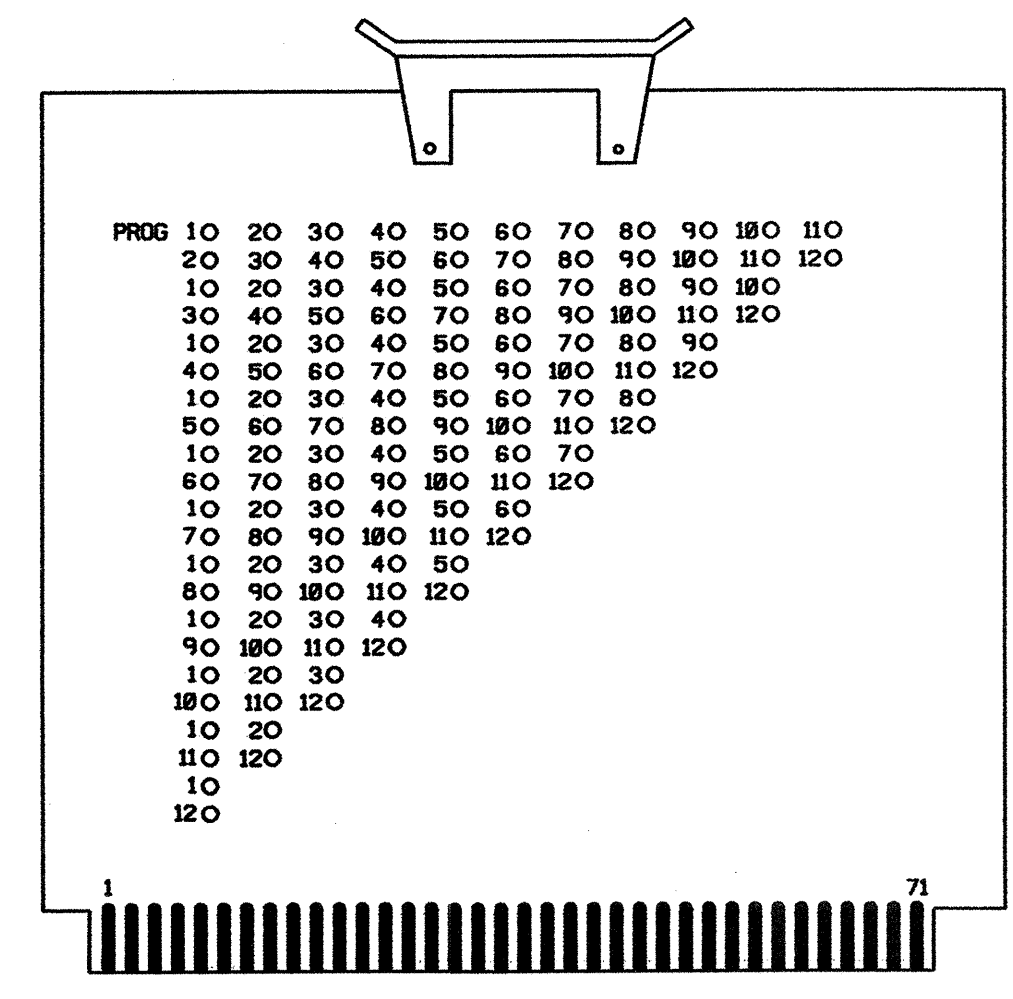
NCDOT Wind Zone 2 (130 mph)

	Prepared in the Offices of: US 70 Business/ NC 55 (Broad Street) at George Street		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 24393 TIMOTHY J. WILLIAMS 3/18/08
	Division 2 Craven County New Bern	PREPARED BY: I.O. UMOZURIKE REVIEWED BY:	
SCALE 0 N/A N/A	PLAN DATE: March 2008 PREPARED BY: I.O. UMOZURIKE REVIEWED BY:	REVISIONS INIT. DATE	SIGNATURE DATE

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 tounzuri

(EXISTING)

**NEMA CONFLICT MONITOR
PROGRAMMING CARD**



MONITOR CARD TO BE COMPLETELY BLANK (NO JUMPERS)

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED PHASES AND OVERLAPS TO FLASH RED. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED VEHICLE LOAD SWITCH RED OUTPUTS: PANEL 'A'-LS3, 4 & PANEL 'B'-LS1, 2, 3, 4 TO LOAD SWITCH AC+ BY INSERTING A JUMPER PLUG IN THE UNUSED VEHICLE LOAD SWITCH SOCKET FROM PIN 1 (LS AC+) TO PIN 3 (RED OUT). MAKE SURE ALL FLASH TRANSFER RELAYS ARE IN PLACE.
3. PROGRAM THE CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE CONFLICT MONITOR. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
5. SET ALL DETECTOR UNIT CHANNELS TO 'PRESENCE' MODE.
6. WIRE DETECTORS IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
7. BE SURE PHASE 1 (CHANNEL 1) FLASH PLUG 'FPP' IS JUMPERED FOR RED FLASH, AND PHASE 2 (CHANNEL 2) FLASH PLUG 'FPP' IS JUMPERED FOR YELLOW FLASH.
8. SEE SHEET 2 OF 2 FOR RAILROAD PREEMPTION CABINET WIRING AND CONTROLLER PROGRAMMING.
9. THIS INTERSECTION IS WITHIN AN EXISTING TIME-BASED COORDINATION SYSTEM. SYSTEM COORDINATION PROGRAMMING AND OPERATION IS TO BE MAINTAINED BY THE DIVISION.

SIGNAL HEAD HOOK-UP CHART

CHANNEL	4	3	2	1	12	11	10	9	4	3	2	1
PHASE	4 PED	3 PED	2 PED	1 PED	OLD	OLC	OLB	OLA	4	3	2	1
SIGNAL HEAD NO.	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU	21,22, 23,24, 25,26	11, 12, 13, 14
PANEL	C	C	C	C	B	B	B	B	A	A	A	A
TERMINAL STRIP	TS6	TS6	TS6	TS6	TS6	TS6	TS6	TS6	TS6	TS6	TS6	TS6
GREEN											4	1
YELLOW		*									5	2
RED											6	3
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = NOT USED

* PANEL 'C' - LOAD SWITCH 3 YELLOW IS USED FOR BLANK-OUT SIGN POWER. SEE RAILROAD PREEMPTION WIRING DETAIL ON SHEET 2 OF 2.

EQUIPMENT INFORMATION

CONTROLLER.....TRACONEX TMP-390-4*

CABINET.....SOUTHEASTERN SAFETY SSS-5B-12P-C*

CABINET MOUNT.....BASE

LOADBAY POSITIONS.....12

LOAD SWITCHES USED.....PANEL 'A'-LS1, LS2, PANEL 'C' LS3. (USED FOR BLANKOUT SIGN CONTROL)

PHASES USED.....1,2

OL/A.....NOT USED

OL/B.....NOT USED

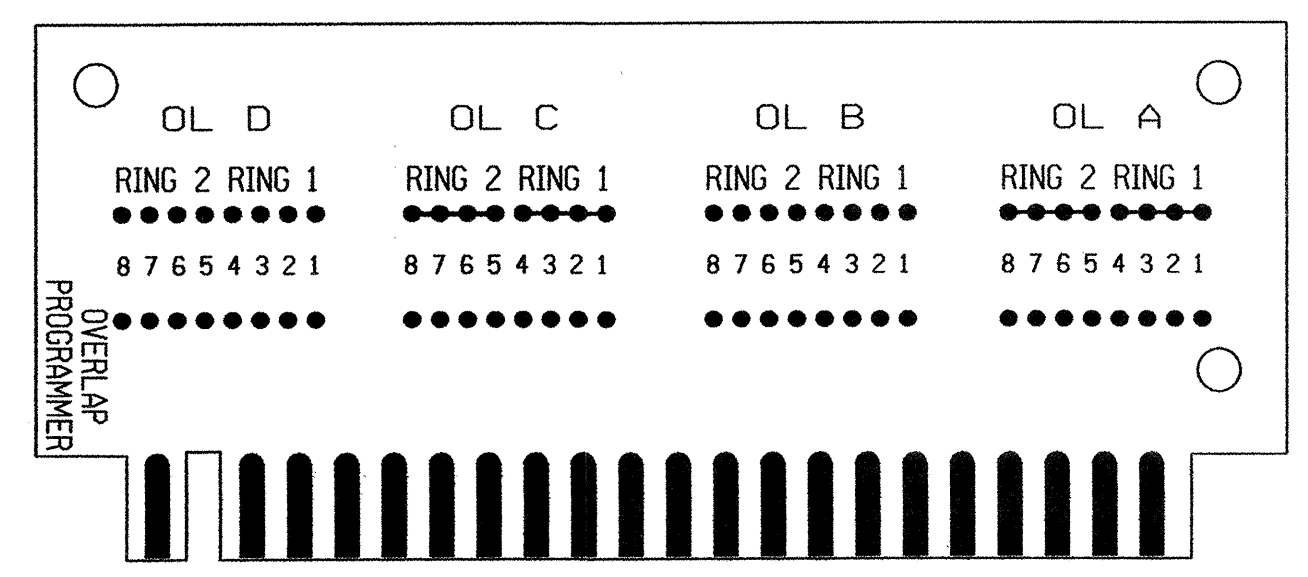
OL/C.....NOT USED

OL/D.....NOT USED

*EXISTING TO REMAIN IN USE

(EXISTING)

NEMA OVERLAP CARD



OVERLAP CARD TO BE COMPLETELY BLANK (NO JUMPERS)

TYPICAL CONNECTION CHART FOR DETECTORS

PIN FUNCTION	LOOP PANEL TERMINATION
AC+	AC+
AC-	AC-
CHASSIS GROUND	CHASSIS GROUND
LOOP INPUT	LOOP
LOOP INPUT	LOOP
RELAY NORMALLY OPEN	VEHICLE CALL INPUT
RELAY COMMON	LOGIC GROUND
TIMING INHIBIT	ASSOCIATED PHASE GREEN

NOTE:
CONNECT THE TIMING INHIBIT WIRE TO THE ASSOCIATED PHASE GREEN LOAD SWITCH OUTPUT WHEN ONLY DELAY OPERATION IS REQUIRED, UNLESS OTHERWISE SPECIFIED IN LOOP AND DETECTOR UNIT INSTALLATION CHART SHOWN ON SIGNAL DESIGN PLAN.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0211
DESIGNED: February 2008
SEALED: 03-12-08
REVISED: N/A

SEE SHEET 2 FOR RAILROAD PREEMPTION WIRING AND CONTROLLER PROGRAMMING

SIGNAL UPGRADE - SHEET 1 of 2

<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p align="center">US 70 BUSINESS (BROAD STREET) at HANCOCK STREET</p> <p align="center">DIVISION 02 CRAVEN COUNTY NEW BERN</p> <p>PLAN DATE: JANUARY 2004 REVIEWED BY: T. JOYCE</p> <p>PREPARED BY: F.E. RUSS REVIEWED BY:</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td>GCB</td> <td>03/26/04</td> </tr> <tr> <td>JTR</td> <td>3-14-08</td> </tr> </table>		INIT.	DATE	GCB	03/26/04	JTR	3-14-08
	INIT.	DATE						
	GCB	03/26/04						
	JTR	3-14-08						
<p>REVISIONS</p> <p>✓ REVISED PREEMPT INTERCONNECT CIRCUIT AND BLANKOUT SIGN RELAY SIGN SIGN RELAY WIRING. ADDED LOAD RESISTOR TO RELAY K1-2. -MR- 3/25/04</p> <p>✓ ADDED METAL POLES AND CHANGED PREEMPT TIMES. (LPI)</p>								
<p>122 N. McDowell St., Raleigh, NC 27603</p>								
<p>Prepared in the Offices of: State of North Carolina Department of Transportation Signal Management Section</p>								

REVISION SEAL

John T. Rowe
SIGNATURE DATE 3-14-08

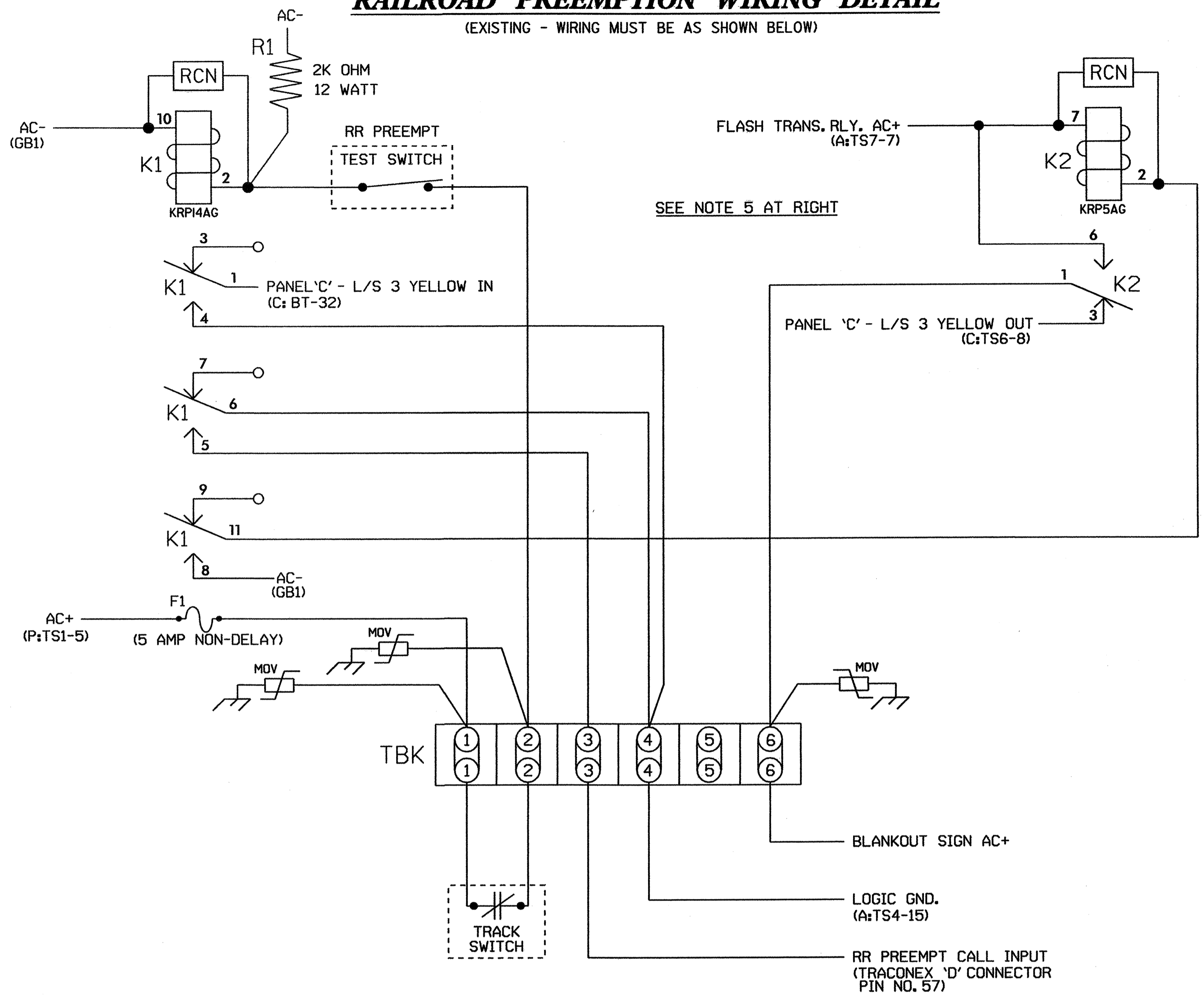
SEAL

Not a certified document as to the Original Document but only as to the Revisions - This document originally issued and sealed by George C. Brown, PE #022013, on 03/26/04. This document is only certified as to the revisions.

SIGNATURE DATE
SIG. INVENTORY NO. 02-0211

RAILROAD PREEMPTION WIRING DETAIL

(EXISTING - WIRING MUST BE AS SHOWN BELOW)



NOTES

1. RELAY 'K1' IS AN EXISTING 3PDT WITH A 120V AC COIL. (DOT# 625028620) (POTTER & BRUMFIELD# KRP14AG-120)
2. RELAY 'K2' IS AN EXISTING SPDT WITH A 120V AC COIL. (DOT# 625028600) (POTTER & BRUMFIELD# KRP5AG-120)
3. THE RC NETWORKS ACROSS THE COILS OF 'K1' AND 'K2' ARE VALUED AT 0.1 MICRO FARAD, 100 OHM. (ITW# 104M06QC100) (DOT# 106018075)
4. MOV'S ARE EXISTING GE VISOLA20A (DOT# 106023975)
5. RELAYS ARE SHOWN IN THE NORMAL OPERATING STATE (NO PREEMPT CALL PRESENT).

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0211
 DESIGNED: February 2008
 SEALED: 03-12-08
 REVISED: N/A

TRACONEX TMP-390 RAILROAD PREEMPTION PROGRAMMING

(CONTROLLER PROGRAMMING MUST BE AS SHOWN BELOW)

RAILROAD PREEMPTION TIMING
 390 MODE - PAGE 1 - PHASE 0

KEY BD. DESIGN	FUNCTION	INTERVAL DISPLAY	VALUE	(SECONDS)
0	RR PED CLEARANCE TIME	TPC	0	(SECONDS)
1	RR YEL CLEARANCE *1	TY1	3.2	(SECONDS)
2	RR RED CLEARANCE *1	TR1	2.6	(SECONDS)
3	TRACK CLEAR MIN GREEN	TCM	0	(SECONDS)
4	TRACK CLEAR GAP TIME	TCG ①	0	(SECONDS)
5	RR YEL CLEARANCE *2	TY2	0	(SECONDS)
6	RR RED CLEARANCE *2	TR2	0	(SECONDS)
7	2ND TRACK CLR MIN GREEN	TCM	0	(SECONDS)
8	2ND TRACK CLR GAP TIME	TCG ①	0	(SECONDS)
9	RR YEL CLEARANCE *3	TY3	0	(SECONDS)
A	RR RED CLEARANCE *3	TR3	0	(SECONDS)
B	RR DWELL MIN GREEN	TPM	7	(SECONDS)
C	RR DWELL GAP TIME	TPG	1	(SECONDS)
D	RR YEL CLEARANCE *4	TY4	3.2	(SECONDS)
E	RR RED CLEARANCE *4	TR4	2.1	(SECONDS)
F				(SECONDS)

① FIXED INTERVAL NOT PROGRAMMABLE

RAILROAD PREEMPTION DISPLAY SECTION
 390 MODE - PAGE 1 - PHASE 1

KEY BD. DESIGN	FUNCTION	INTERVAL DISPLAY	Ø 1
0	PHASE WITH 1ST TRACK GRN	CGR	NONE
1	DL'S ON IN 1ST TRACK GRN	COG ②	NONE
2	PHASE WITH 2ND TRACK GRN	TC2	NONE
3	DL'S ON IN 2ND TRACK GRN	T20 ②	NONE
4	GREEN DWELL PHASES	TGR	1
5	OVERLAP DWELL PHASES	TOG ②	NONE
6	RETURN PHASE AFTER PRE	TRG	2
7	RETURN OVERLAP AFTER PRE	TRO ②	NONE
8	PREEMPT RED REVERT	PRR	2.0
9	PED CALLS AFTER PREEMPT	PPE	NONE
A	VEH CALLS AFTER PREEMPT	PVE	NONE
B	TRACK VEHICLE OMIT	TVO	NONE
C	TRACK PED OMIT	TPO	NONE
D	TRACK OVERLAP OMIT	TOO	NONE
E			
F			

② OVERLAP A=1, OVERLAP B=2, OVERLAP C=3, OVERLAP D=4

SIGNAL UPGRADE - SHEET 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 70 BUSINESS (BROAD STREET) at HANCOCK STREET

DIVISION 02 CRAVEN COUNTY NEW BERN

PLAN DATE: JANUARY 2004 REVIEWED BY: T. JOYCE

PREPARED BY: F.E. RUSS REVIEWED BY:

REVISIONS: INIT. DATE

REVISOR: GCB 03/26/04

REVISION: REVISED PREEMPT INTERCONNECT CIRCUIT AND BLANKOUT SIGN RELAY SIGN SIGN RELAY WIRING. ADDED LOAD RESISTOR TO RELAY AT-2. DATE: 3/26/04

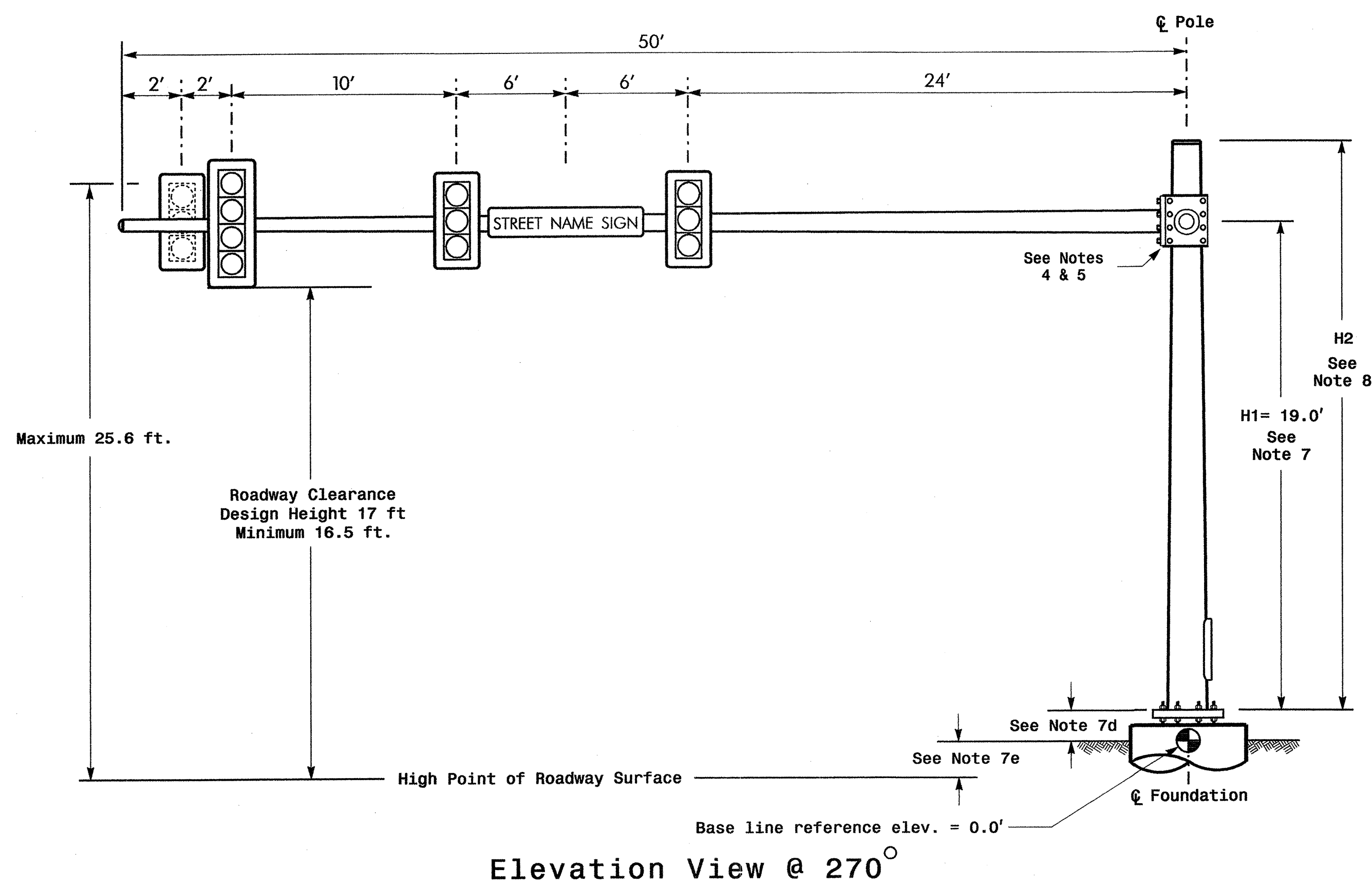
ADDED METAL POLES AND CHANGED PREEMPT TIMES. (LP)

Signature: John T. Rowe, PE, dated 3-14-08

Signature: _____ DATE: _____

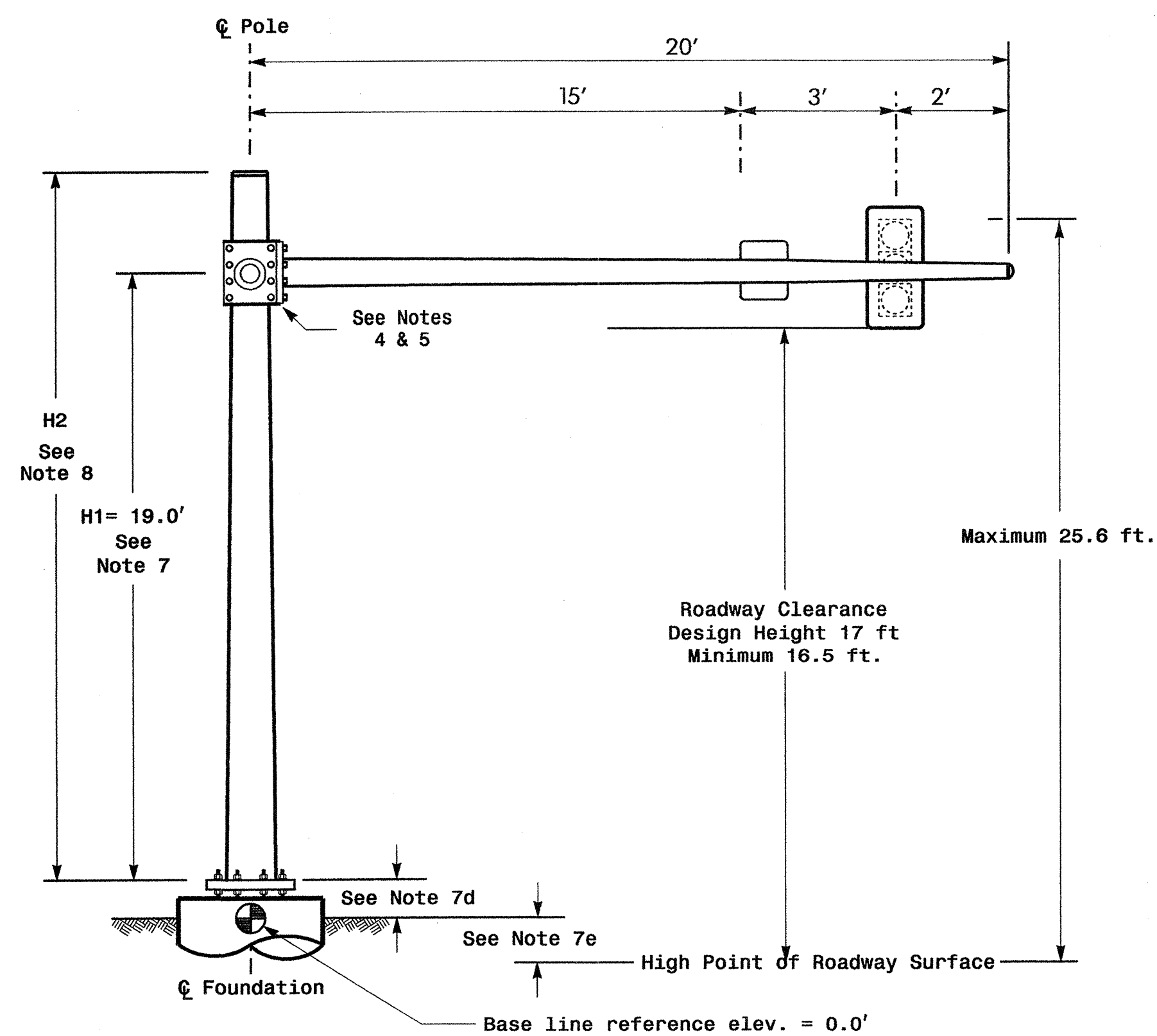
SIG. INVENTORY NO. 02-0211

Design Loading for METAL POLE NO. 11, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 11, MAST ARM B



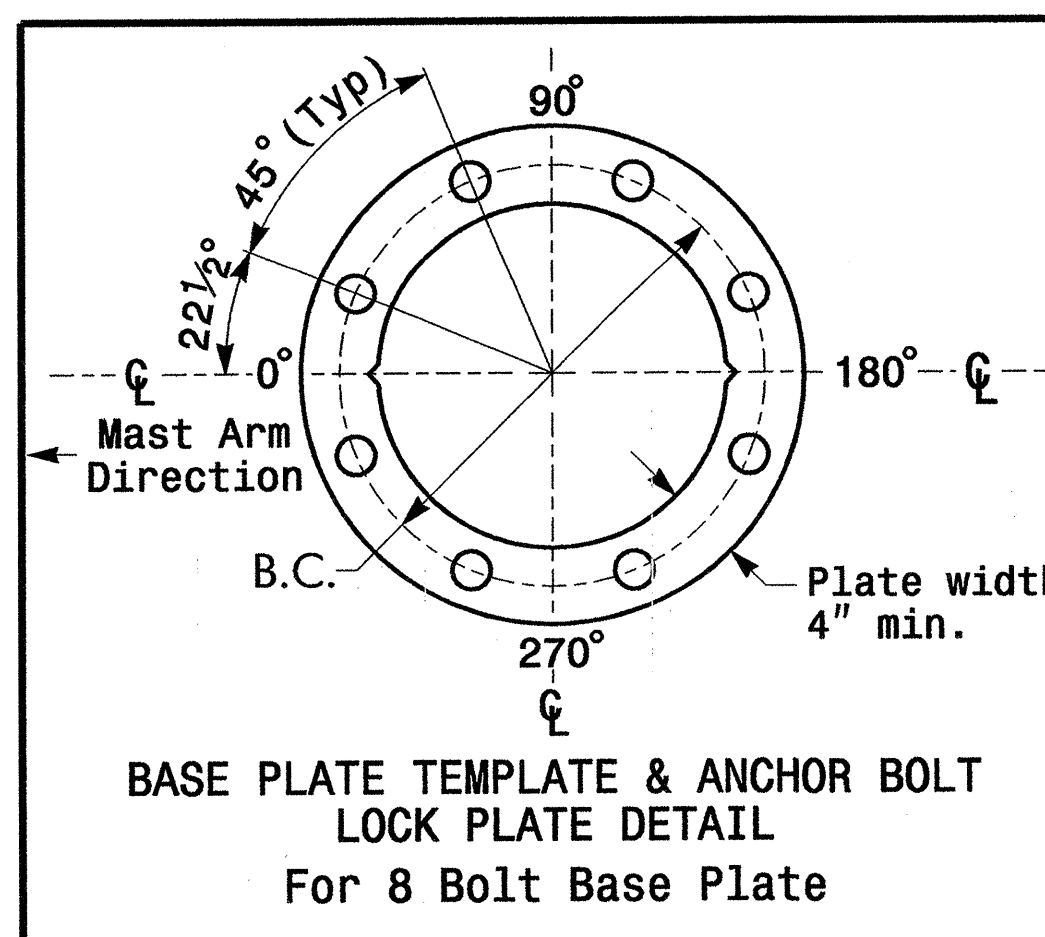
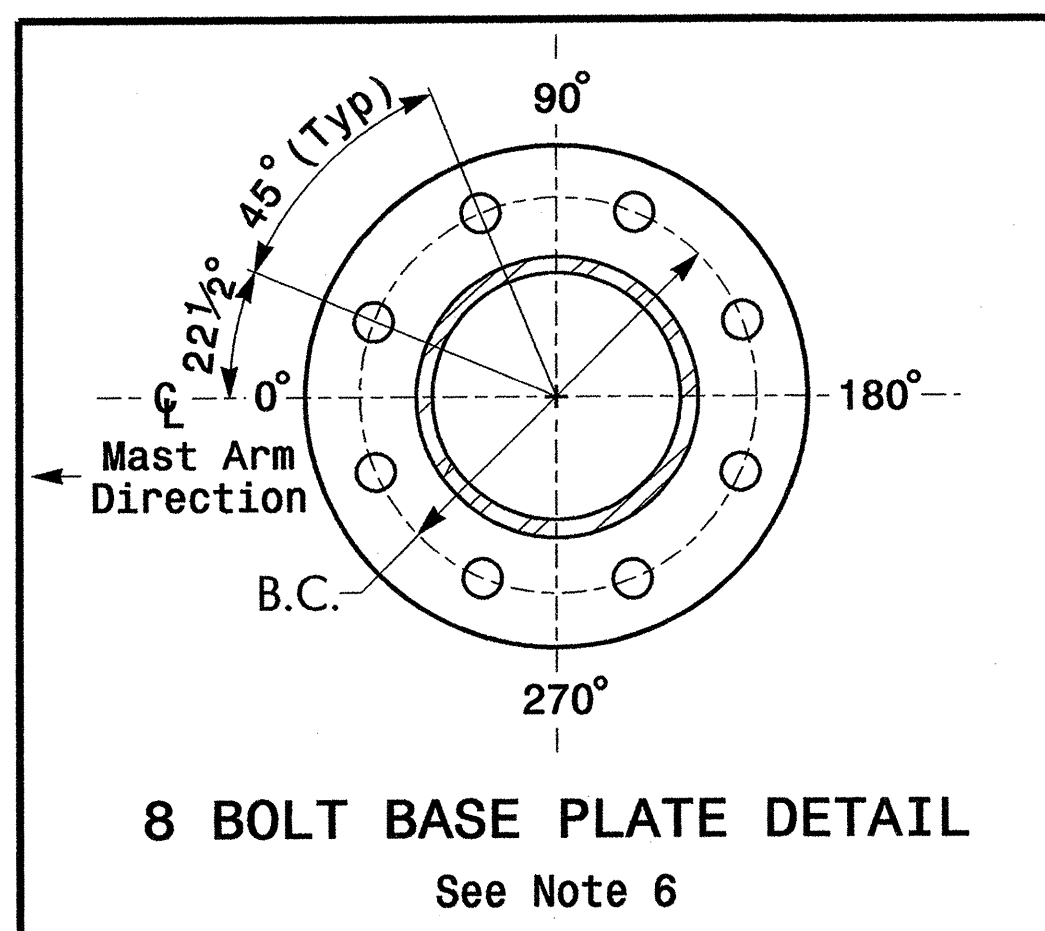
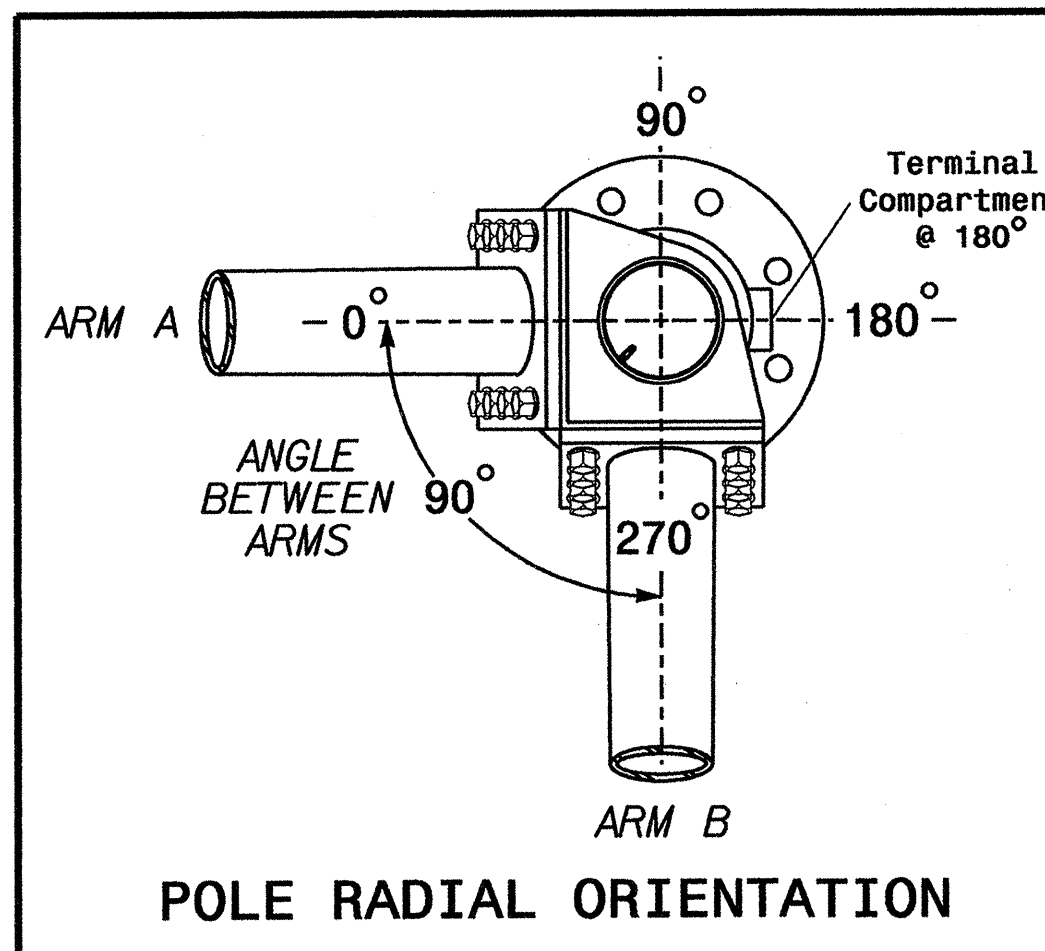
Elevation View @ 0

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	0.0 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



MAST ARM LOADING SCHEDULE				
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-4 SECTION (VERTICAL)-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
	SIGN, L.E.D. BLANKOUT WITH HANGER	5.0 S.F.	24.0" W X 36.0" L	110 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
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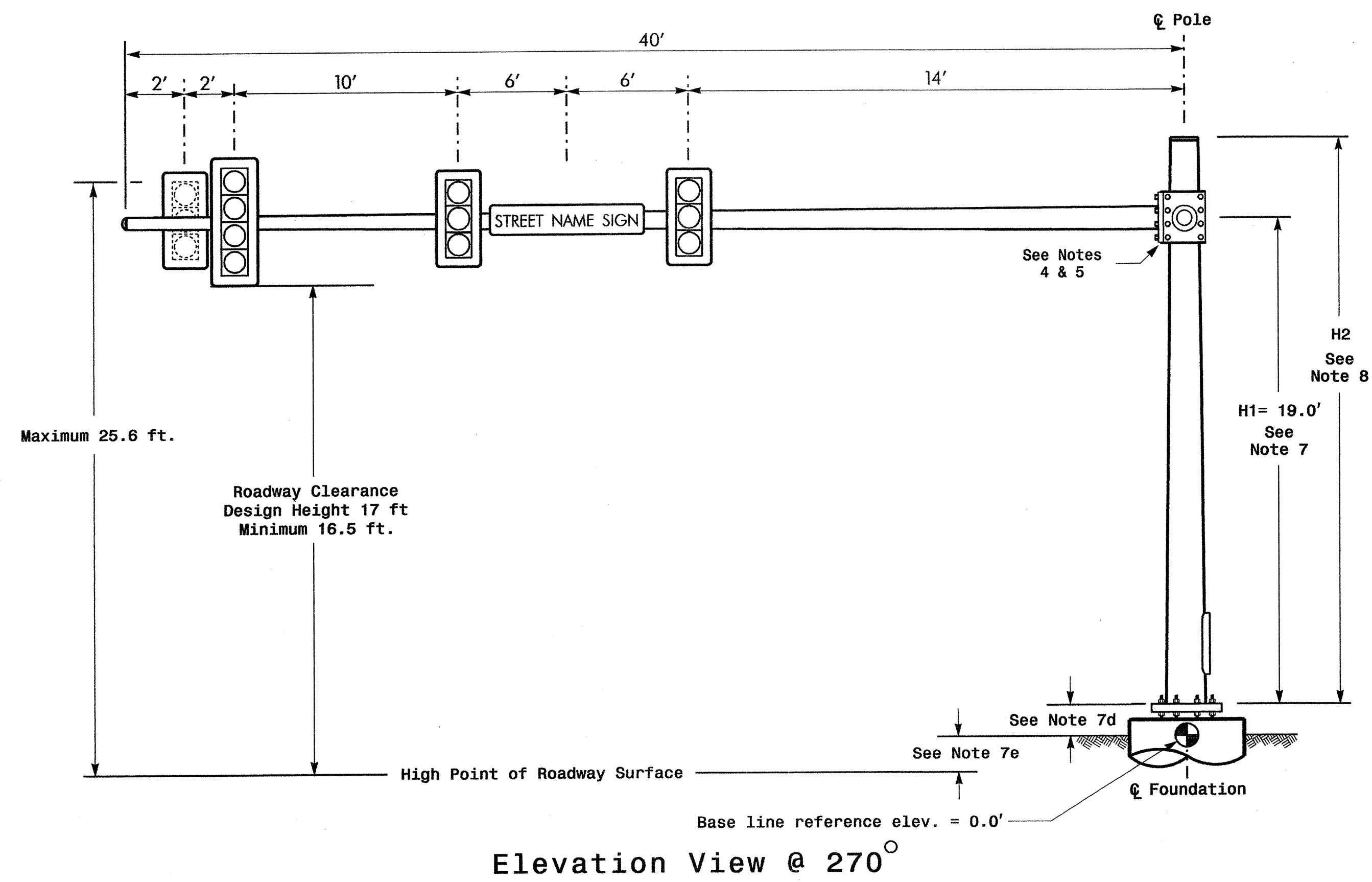
Design Requirements

- 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 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 attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of the 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

	Prepared in the Offices of: US 70 Business NC 55 (Broad Street) At Hancock Street	
	Division 2 Craven County New Bern PLAN DATE: March 2008 PREPARED BY: I.O. Umozurike REVIEWED BY:	
SCALE: 0 N/A N/A	REVISIONS:	INIT. DATE:
SIGNATURE: <i>J. D. Williams</i> 3/18/08 DATE: 3/18/08 SIG. INVENTORY NO. 02-0211		

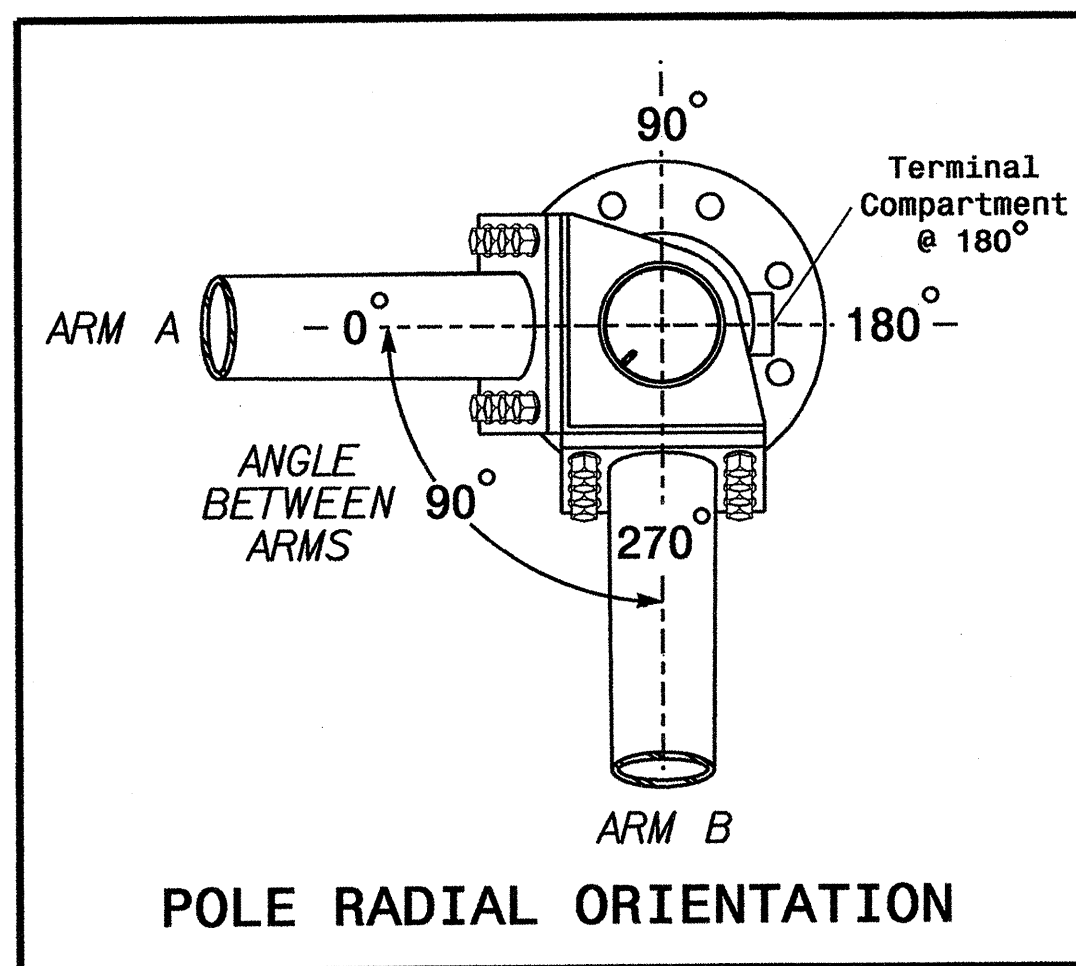
Design Loading for METAL POLE NO. 12, MAST ARM A



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

Elevation Data for Mast Arm Attachment (H1)

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



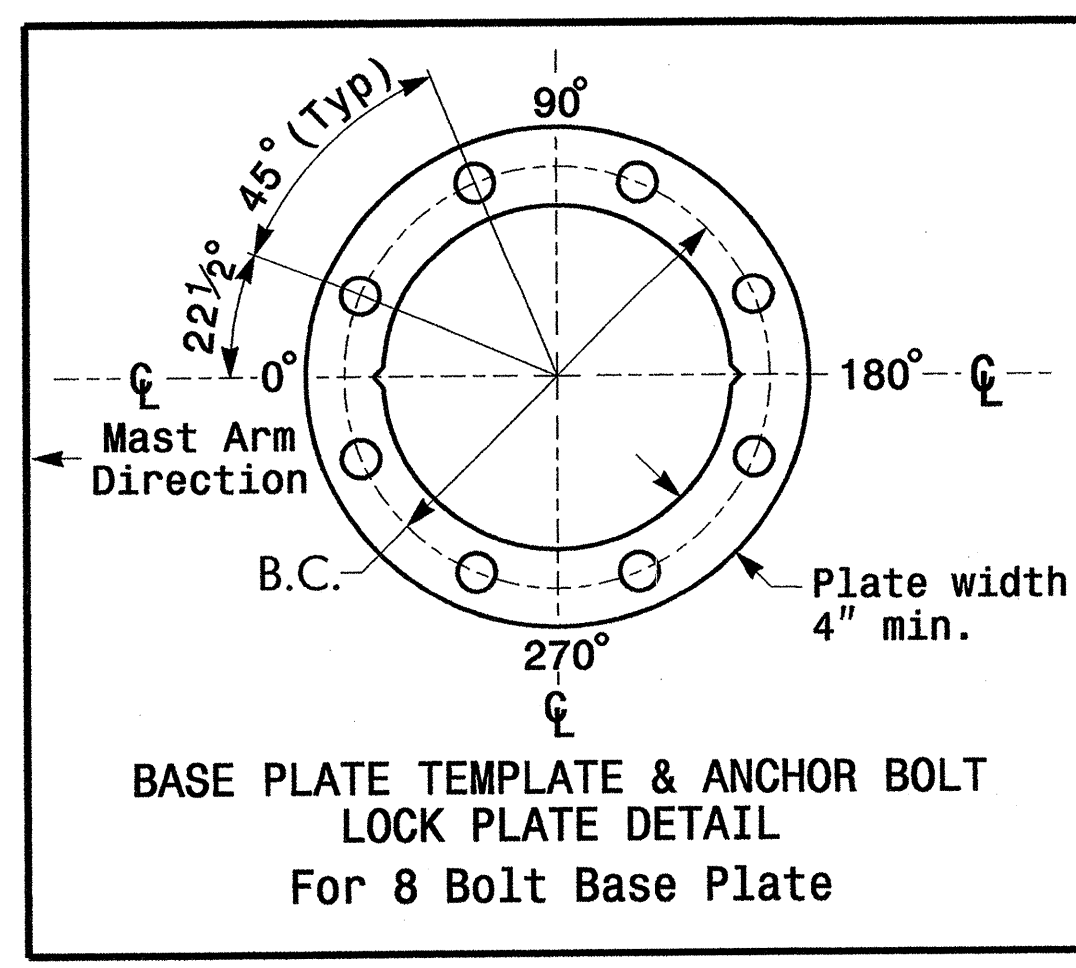
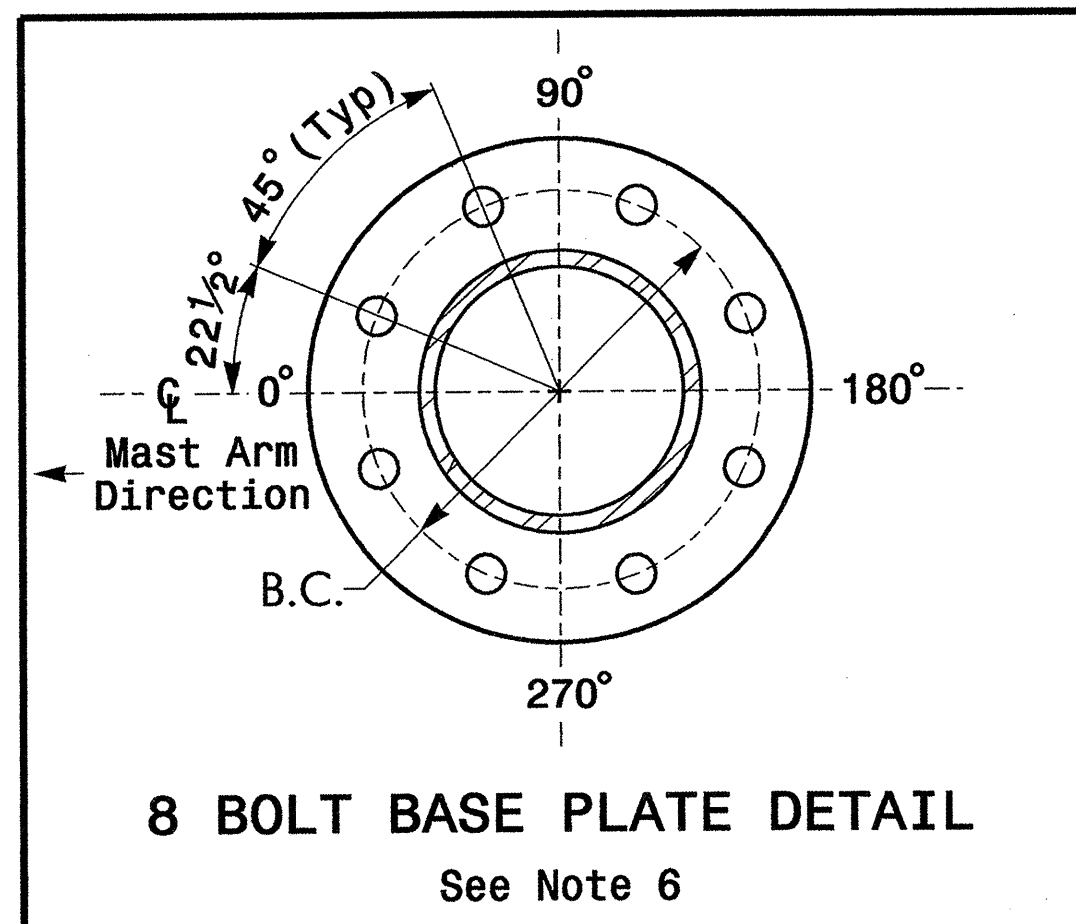
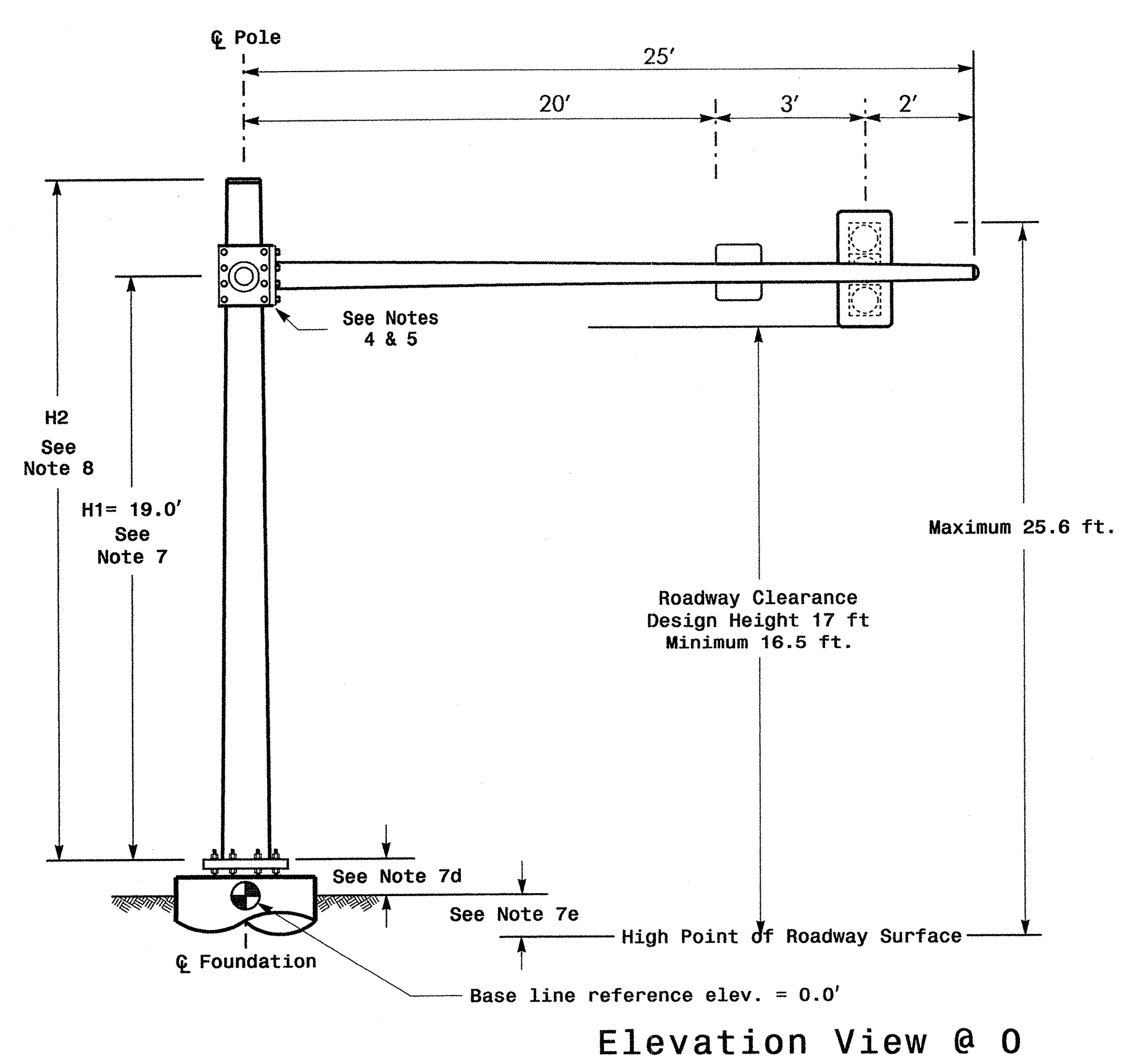
MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Signal Head Symbol]	SIGNAL HEAD 12"-4 SECTION (VERTICAL)-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
[Signal Head Symbol]	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
[Street Name Sign Symbol]	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
[LED Symbol]	SIGN, L.E.D. BLANKOUT WITH HANGER	5.0 S.F.	24.0" W X 36.0" L	110 LBS

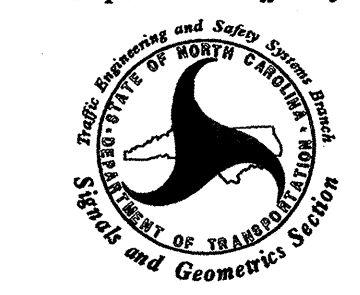
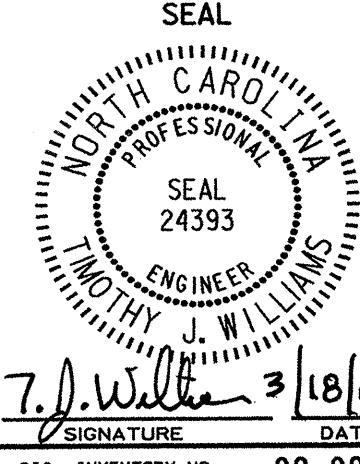
NOTES

- Design Reference Material**
- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 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 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 attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
 - The pole manufacturer will determine the total height (H2) of the 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
 - The contractor is responsible for verifying that the mast arm lengths 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.

Design Loading for METAL POLE NO. 12, MAST ARM B

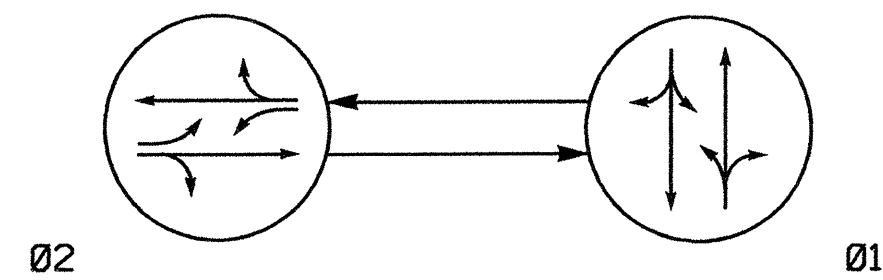


NCDOT Wind Zone 2 (130 mph)

	Prepared in the Offices of: US 70 Business/ NC 55 (Broad Street) at Hancock Street			
	Division 2 Craven County New Bern	PLAN DATE: March 2008		REVIEWED BY:
	PREPARED BY: I.O. Umozurike	REVIEWED BY:		REVISIONS
SCALE: N/A	INIT.	DATE	SIGNATURE: <i>T.J. Williams</i> 3/18/08	
SIG. INVENTORY NO. 02-0211				

17-MAR-2008 17:31 s:\p1s\signal\work\groups\41p_projects\11-1755\sig\12\metal\pole\12\11\sig_mp_2008mtd.dgn

PHASING DIAGRAM



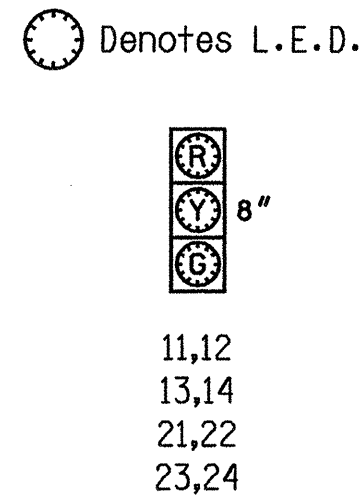
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø 1	Ø 2	F L EIGHT
11,12	G	R	R
13,14	G	R	R
21,22	R	G	Y
23,24	R	G	Y

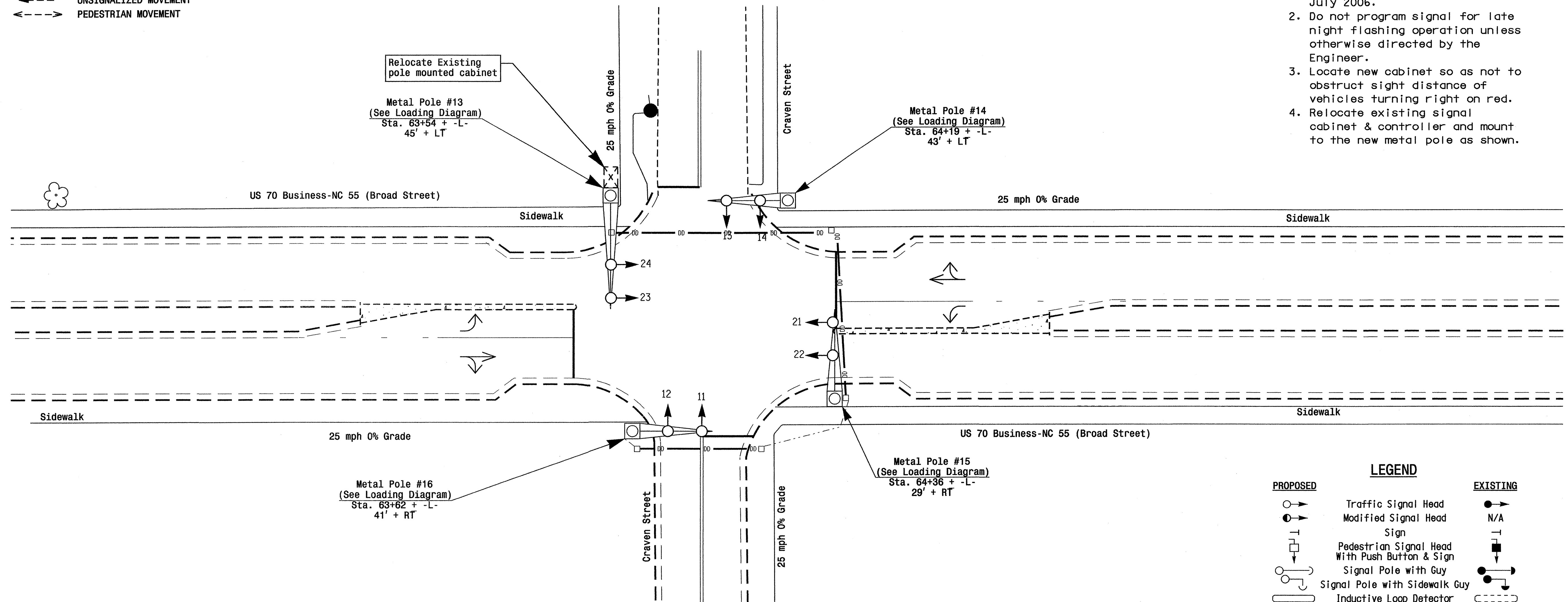
SIGNAL FACE I.D.



**2 Phase
Pre-Timed
(New Bern City System)**

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Relocate existing signal cabinet & controller and mount to the new metal pole as shown.



TIMING CHART
NEMA CONTROLLER (TRACONEX)

PHASE	Ø1	Ø2
MINIMUM GREEN	7 SEC.	10 SEC.
PASSAGE GAP	---	---
YELLOW CHANGE INT.	3.2 SEC.	3.2 SEC.
RED CLEARANCE	2.0 SEC.	2.0 SEC.
MAX. 1	30 SEC.	30 SEC.
RECALL POSITION	MAX. RECALL	MAX. RECALL
VEHI. CALL MEMORY	---	---
WALK	--- SEC.	--- SEC.
FLASHING DON'T WALK	--- SEC.	--- SEC.
VOLUME DENSITY	OFF	OFF

LEGEND

PROPOSED	EXISTING
	N/A
	N/A
	N/A

(2-2" Polyethylene Conduits)

Signal Upgrade

	US 70 Business/ NC 55 (Broad Street) at Craven Street		
	Division 2 Craven County New Bern		
	PLAN DATE: February 2008 PREPARED BY: I. O. Umozurike SCALE: 1" = 20' REVISIONS: _____ INIT. DATE	REVIEWED BY: _____ DATE: 3/7/08 SIGNATURE: _____ DATE: _____	

SIG. INVENTORY NO. 02-0213

NOTES

1. THE INSTALLER SHALL VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. MAKE SURE ALL FLASH TRANSFER RELAYS ARE IN PLACE.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE CONFLICT MONITOR. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. THE CABINET AND CONTROLLER ARE A PART OF THE NEW BERN CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	2 PED	1 PED	2	1
SIGNAL HEAD NO.	NU	NU	21,22 23,24	11,12 13,14
PANEL	A	A	A	A
TERMINAL STRIP	TS6	TS6	TS6	TS6
GREEN			4	1
YELLOW			5	2
RED			6	3

NU = NOT USED

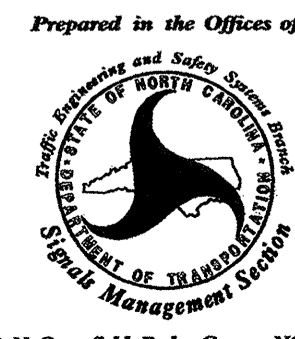
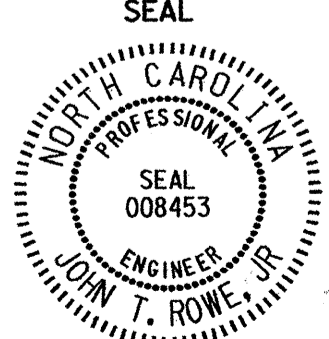
EQUIPMENT INFORMATION

CONTROLLER.....TRACONEX TMP-390
 CABINET.....SOUTHEASTERN SAFETY SUPPLIES (3P-4P-A)
 CABINET MOUNT.....POLE
 LOADBAY POSITIONS.....4
 LOAD SWITCHES USED.....1,2
 PHASES USED.....1,2

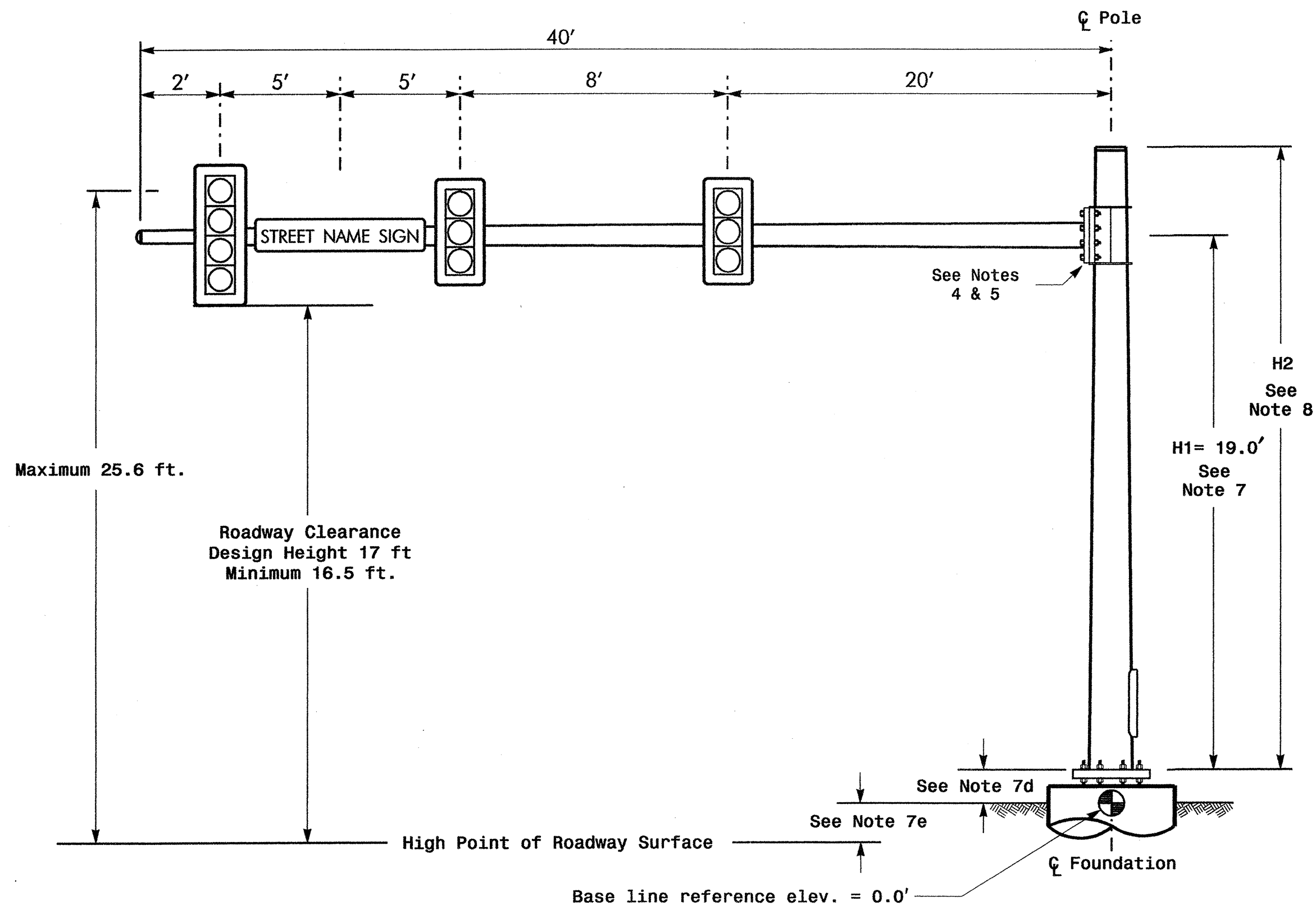
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 02-0213
 DESIGNED: February 2008
 SEALED: 03-07-08
 REVISED: N/A

10-MAR-2008 09:23
 U:\020213.sm\016-xxx.dgn
 JPeterson

Signal Upgrade

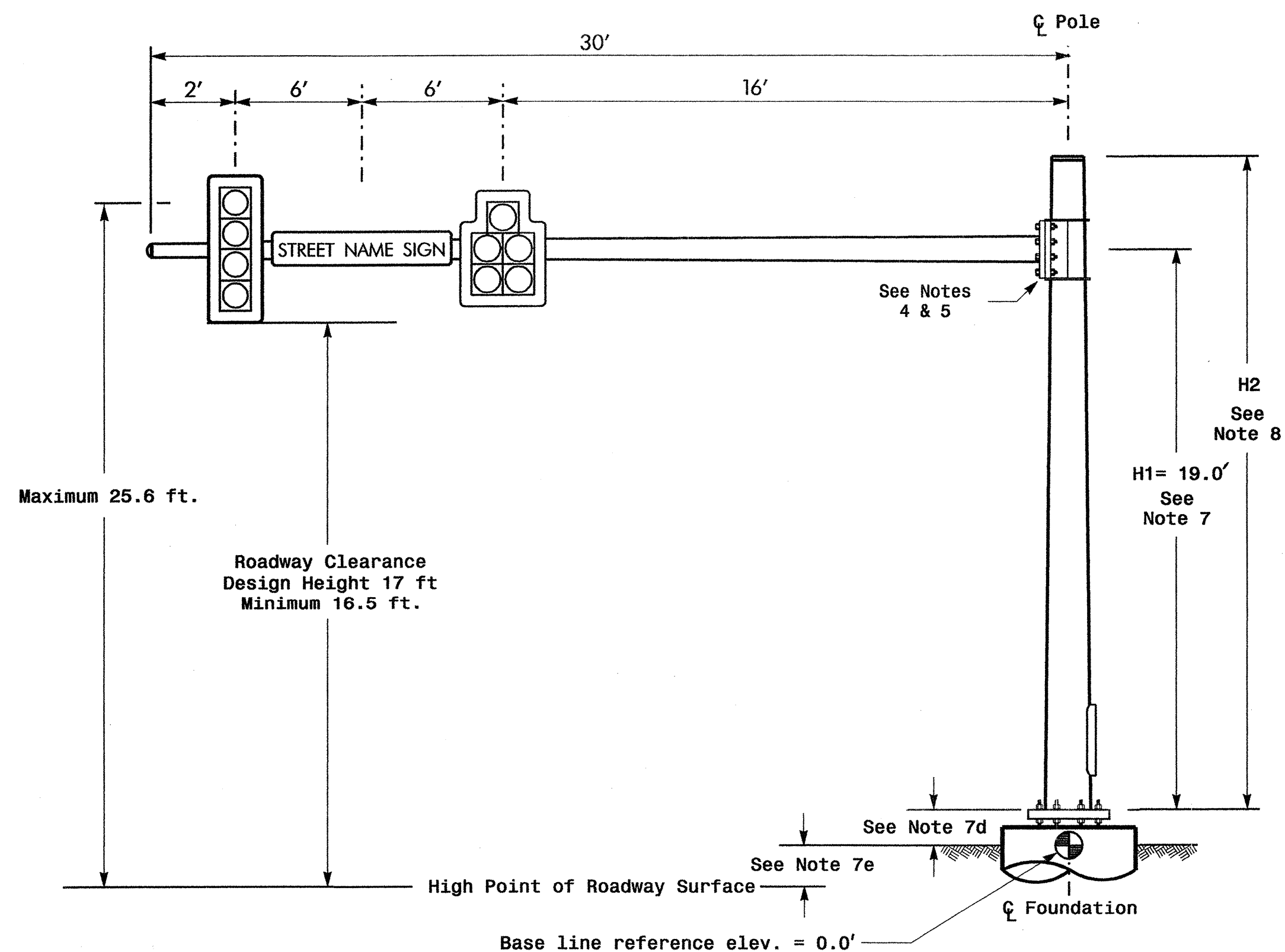
Prepared in the Offices of:  750 N. Greenfield Parkway, Garner, NC 27529	US 70 Business/ NC 55 (Broad Street) at Craven Street		SEAL  SEAL 008453 JOHN T. ROWE, PE
	Division 2 PLAN DATE: March 2008 PREPARED BY: James Peterson	Craven County REVIEWED BY: JTR REVIEWED BY:	New Bern INIT. DATE REVISIONS DATE

Design Loading for METAL POLE NO. 13



Elevation View

Design Loading for METAL POLE NO. 14



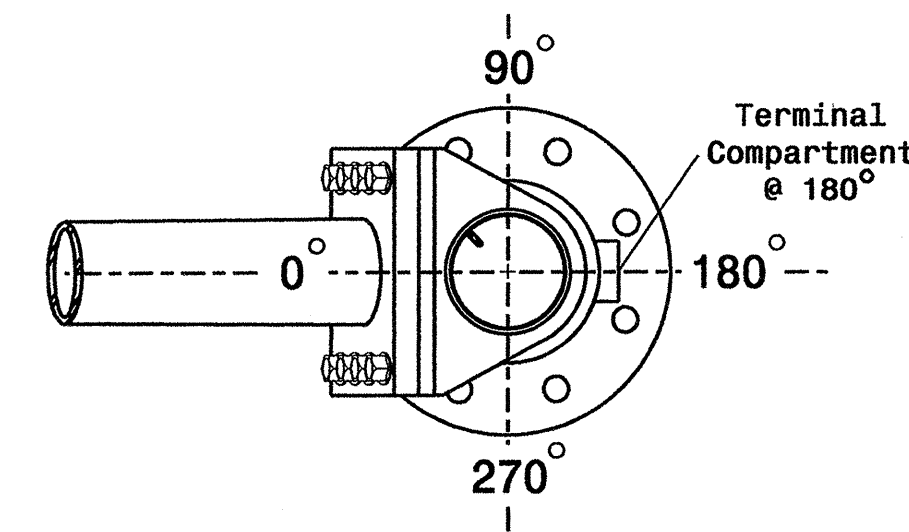
Elevation View

SPECIAL NOTE

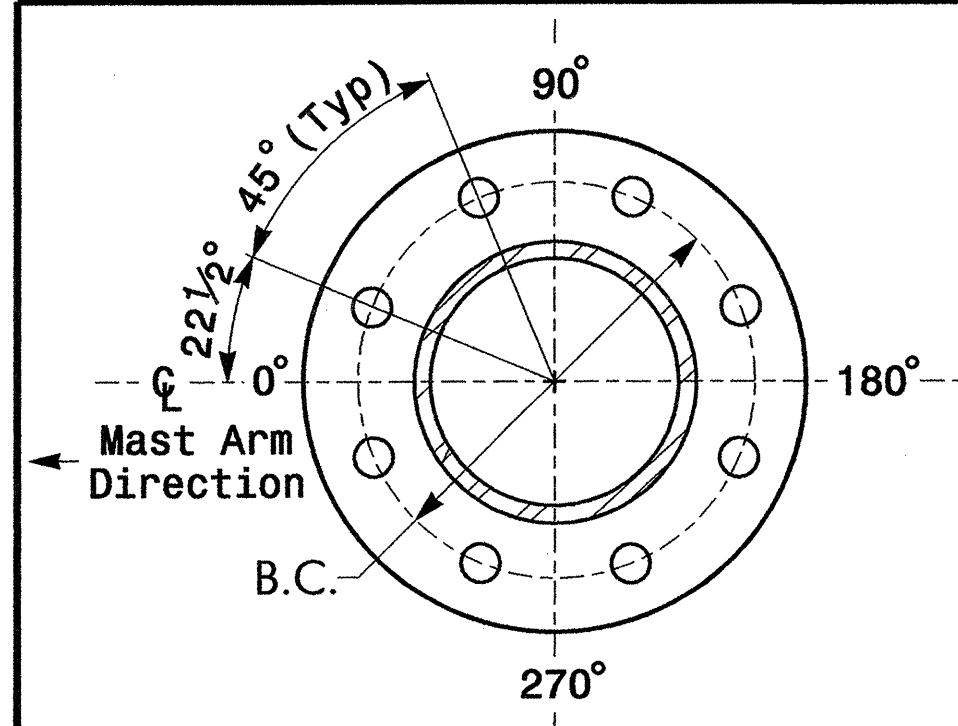
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

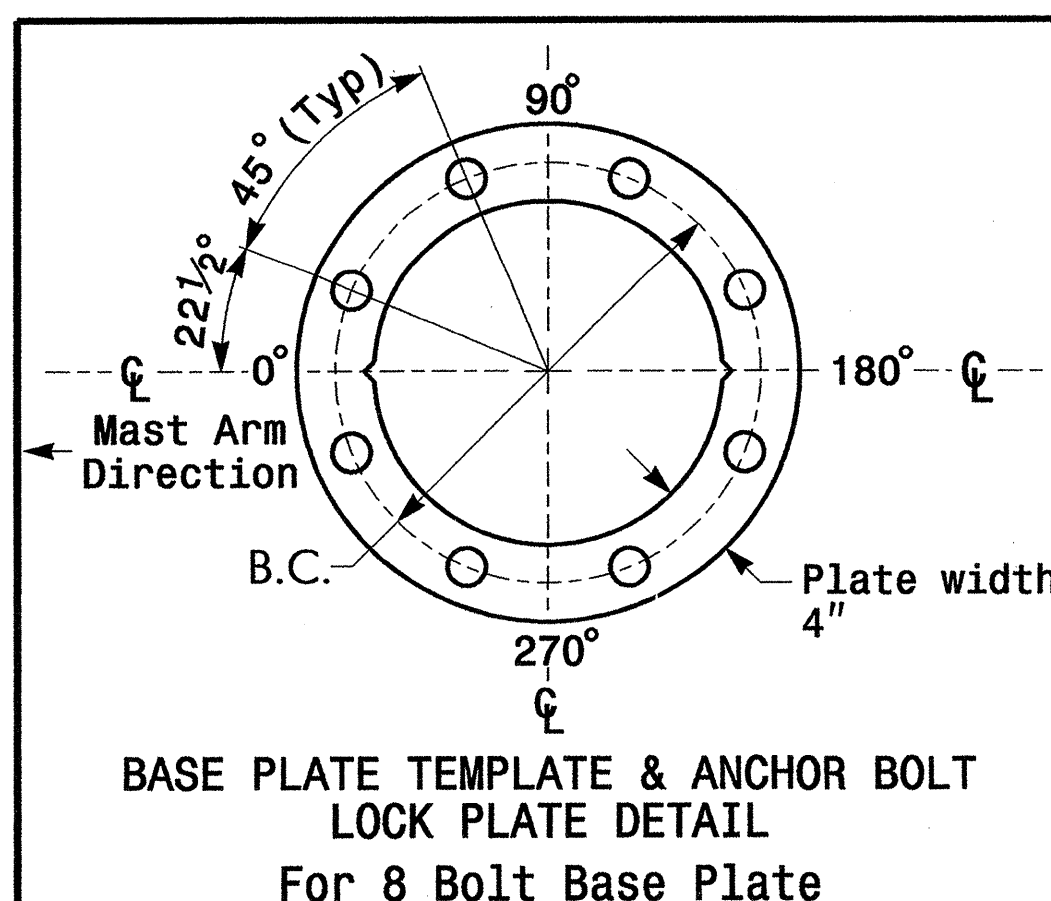
Elevation Differences for:	Pole 13	Pole 14
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.0 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

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

NOTES

Design Reference Material

1. Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.

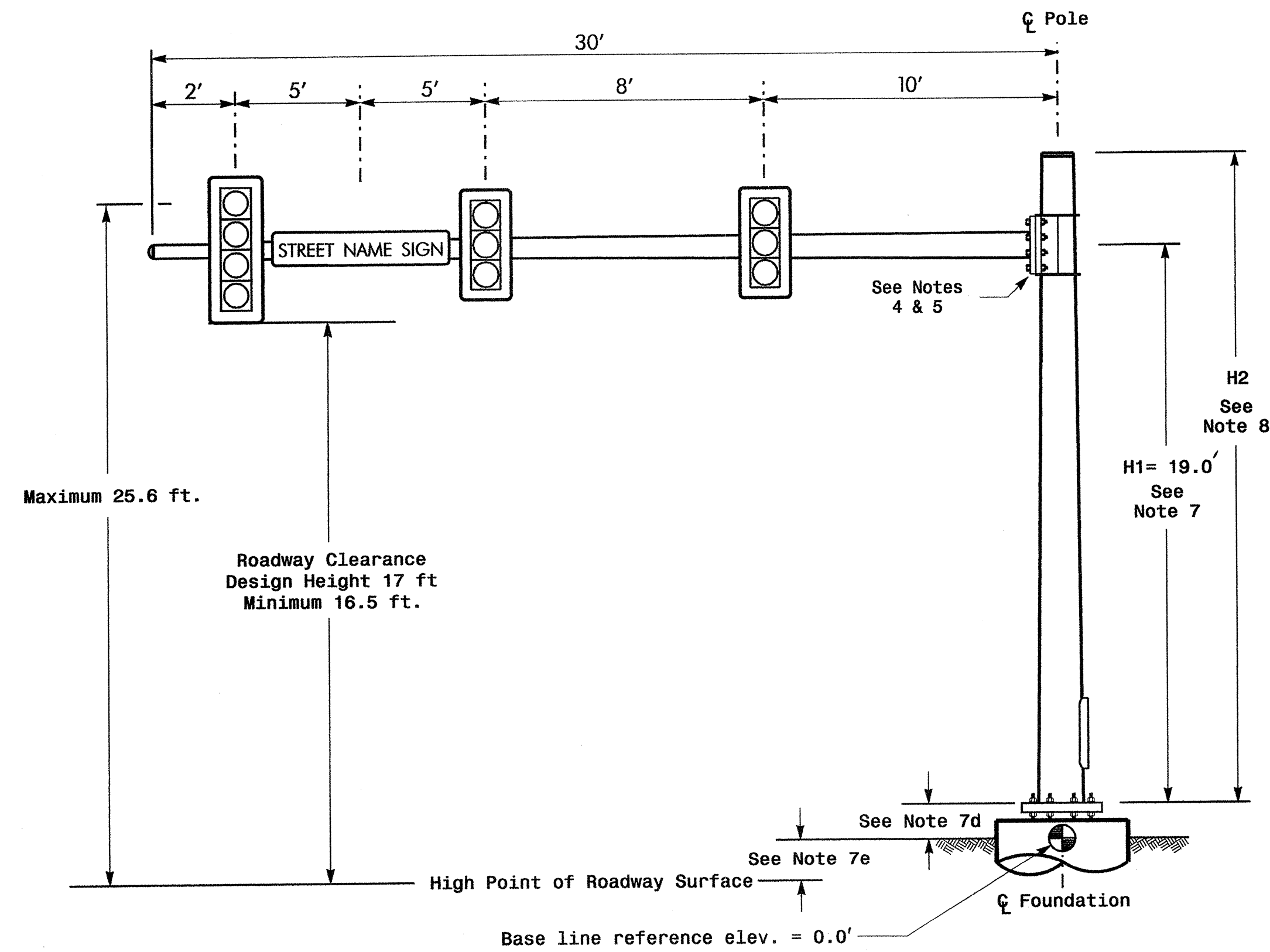
Design Requirements

2. 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.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for 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.
5. 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.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
 - a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - b. Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - c. The roadway clearance height for design is as shown in the elevation views.
 - d. The top of the pole base plate is .75 feet above the ground elevation.
 - e. Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
8. 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.
9. 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

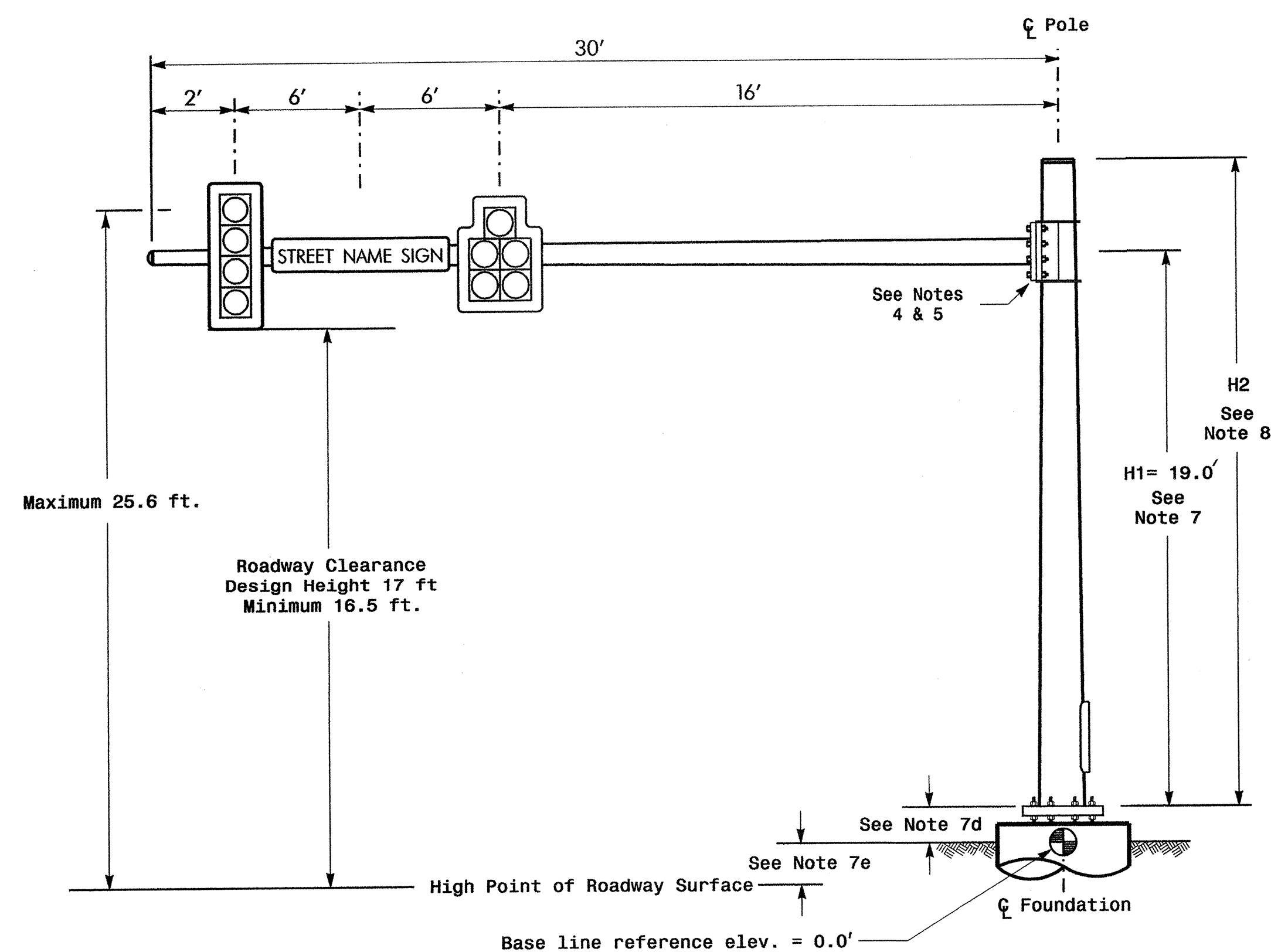
<p>750 N. Greenfield Place, Garner, NC 27529</p>	Prepared in the Offices of: 		SEAL NORTH CAROLINA PROFESSIONAL SEAL 24393 TIMOTHY J. WILLIAMS ENGINEER 3/18/08 SIGNATURE DATE					
	US 70 Business/ NC 55 (Broad Street) at Craven Street							
	Division 2 Craven County New Bern							
	PLAN DATE: March 2008 PREPARED BY: I.O. Umozurike	REVIEWED BY: REVIEWED BY:		REVISIONS <table border="1"> <tr> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	INIT.	DATE		
INIT.	DATE							

Design Loading for METAL POLE NO. 15



Elevation View

Design Loading for METAL POLE NO. 16



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 15	Pole 16
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.0 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

MAST ARM LOADING SCHEDULE

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

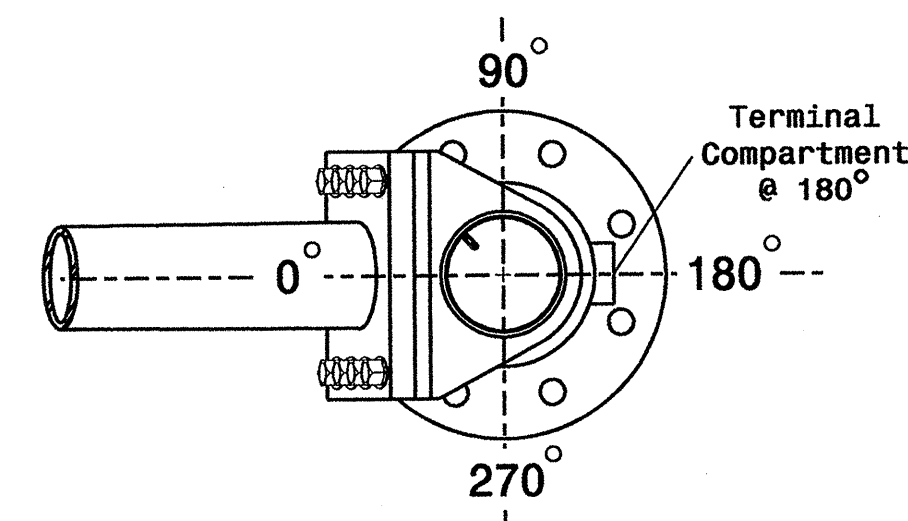
NOTES

Design Reference Material

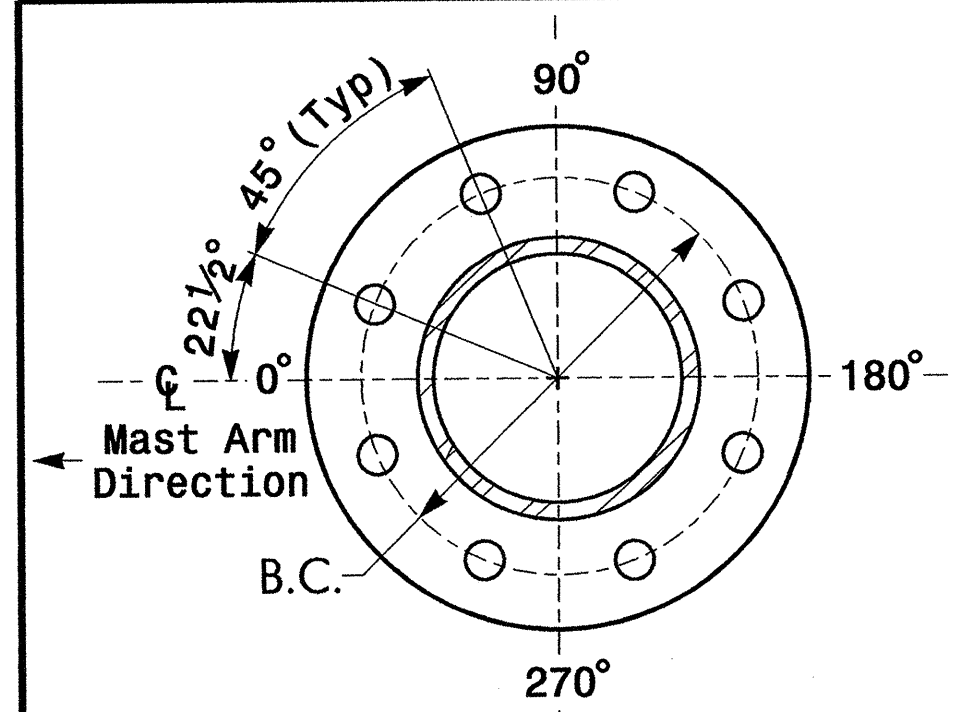
- Design the traffic signal structure and foundation in accordance with:
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 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.

Design Requirements

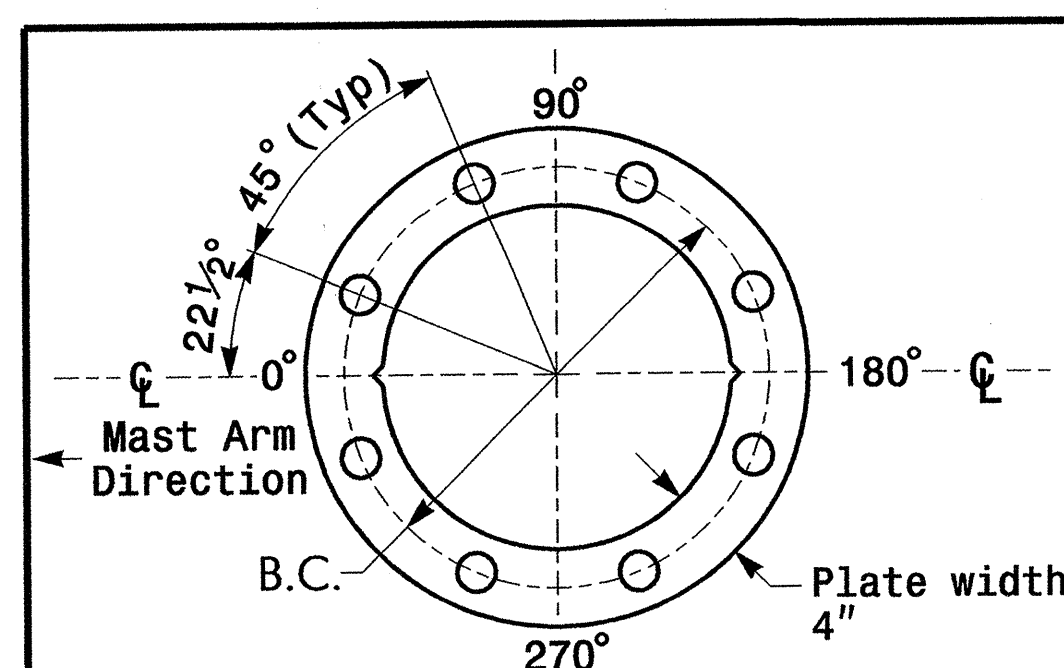
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- Design all signal supports using stress ratios that do not exceed 0.9.
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- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) 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 attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on 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.
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- 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.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

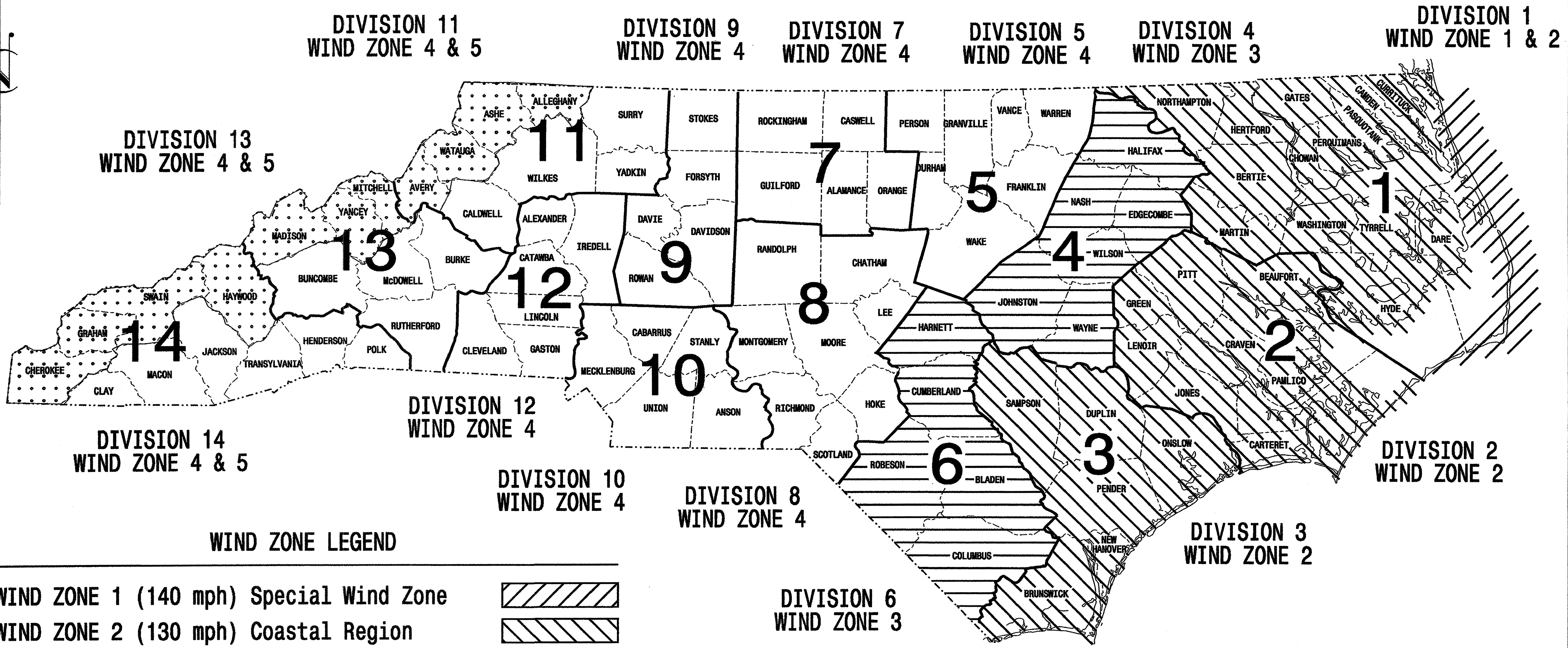
NCDOT Wind Zone 2 (130 mph)

	Prepared in the Offices of: US 70 Business/ NC 55 (Broad Street) at Craven Street Division 2 Craven County New Bern		SEAL
	PLAN DATE: March 2008 PREPARED BY: I.O. UMOZURIKE	REVIEWED BY: REVIEWED BY:	
SCALE: N/A 	REVISIONS:	INIT. DATE	SIG. INVENTORY NO. 02-0213

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	U-4755	Sig. 26
F. A. PROJ. NO.	M 1	
PROJECT ID. NO.		

STANDARD DRAWINGS FOR 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	

<http://www.ncdot.org/doh/preconstruct/traffic/tmsu/ws/default.htm>

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section

122 N. McDowell St., Raleigh, NC 27603

Designed in conformance with the
2002 Interim to the
4th Edition 2001
AASHTO
Standard Specifications for
Structural Supports for
Highway Signs, Luminaires,
and Traffic Signals

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	Standard Strain Poles

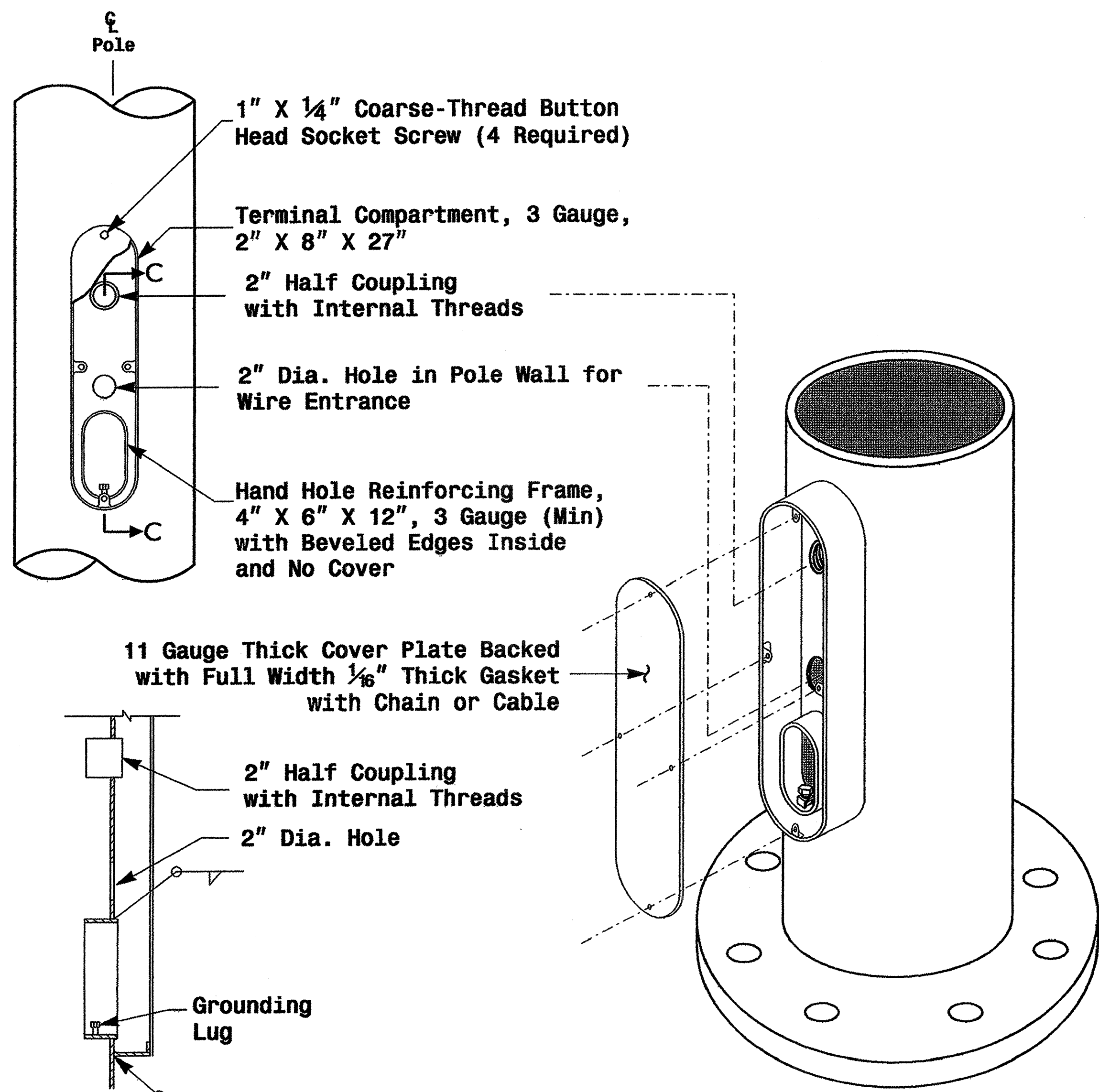
NCDOT CONTACTS:
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

G. A. Fuller, P.E. - State ITS and Signals Engineer
 R. E. Mullinax, P.E. - Signals and Geometrics Engineer
 P. L. Alexander, P.E. - Signals and Geometrics Special Projects Engineer
 D. C. Sarkar, P.E. - Signals and Geometrics Structural Engineer
 A. M. Esposito, P.E. - Signals and Geometrics Project Engineer
 C. F. Andrews, Jr. - Signals and Geometrics Project Engineer

SEAL

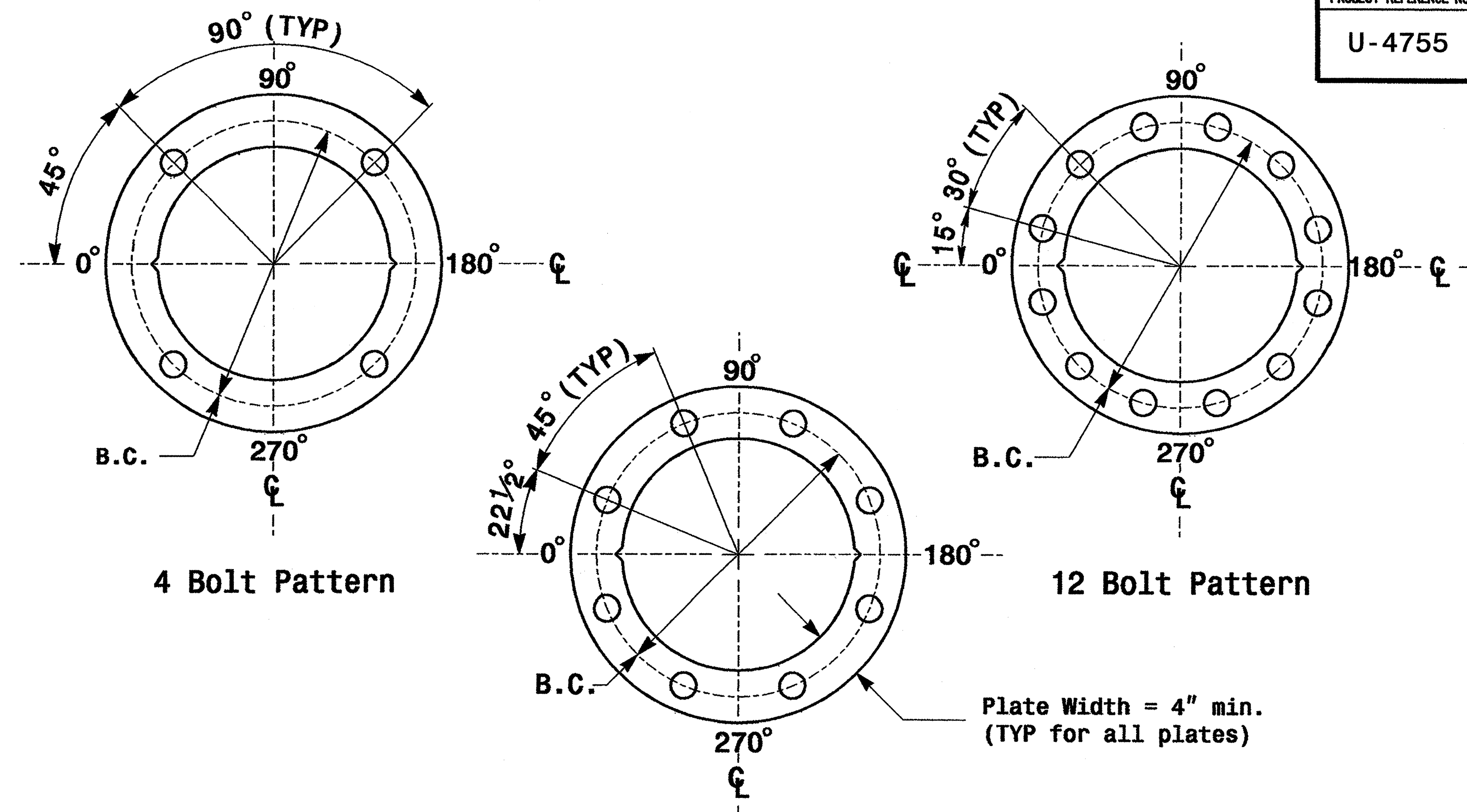
D. C. Sarkar
SIGNATURE

9.2.2005
DATE

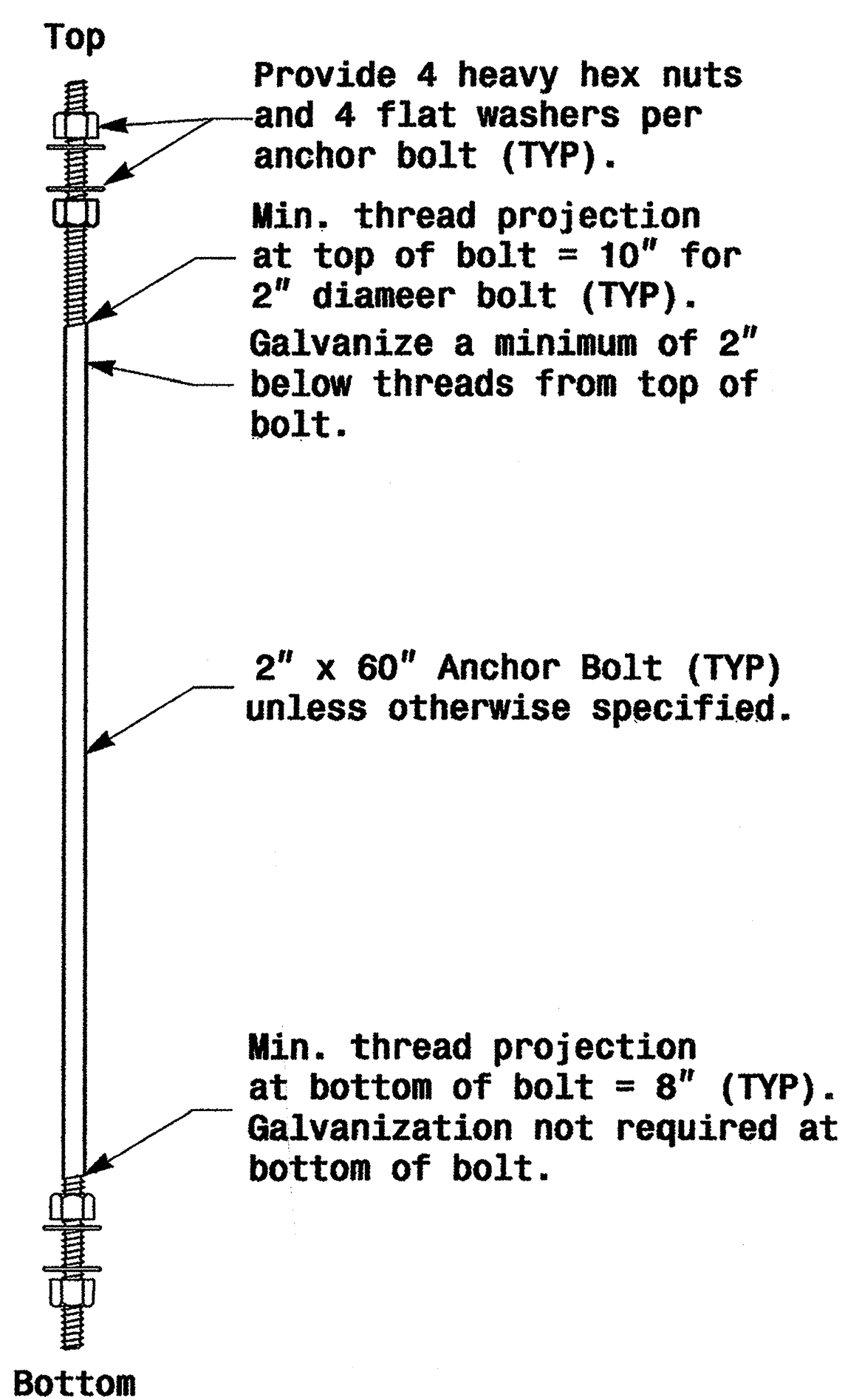


Section C-C Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

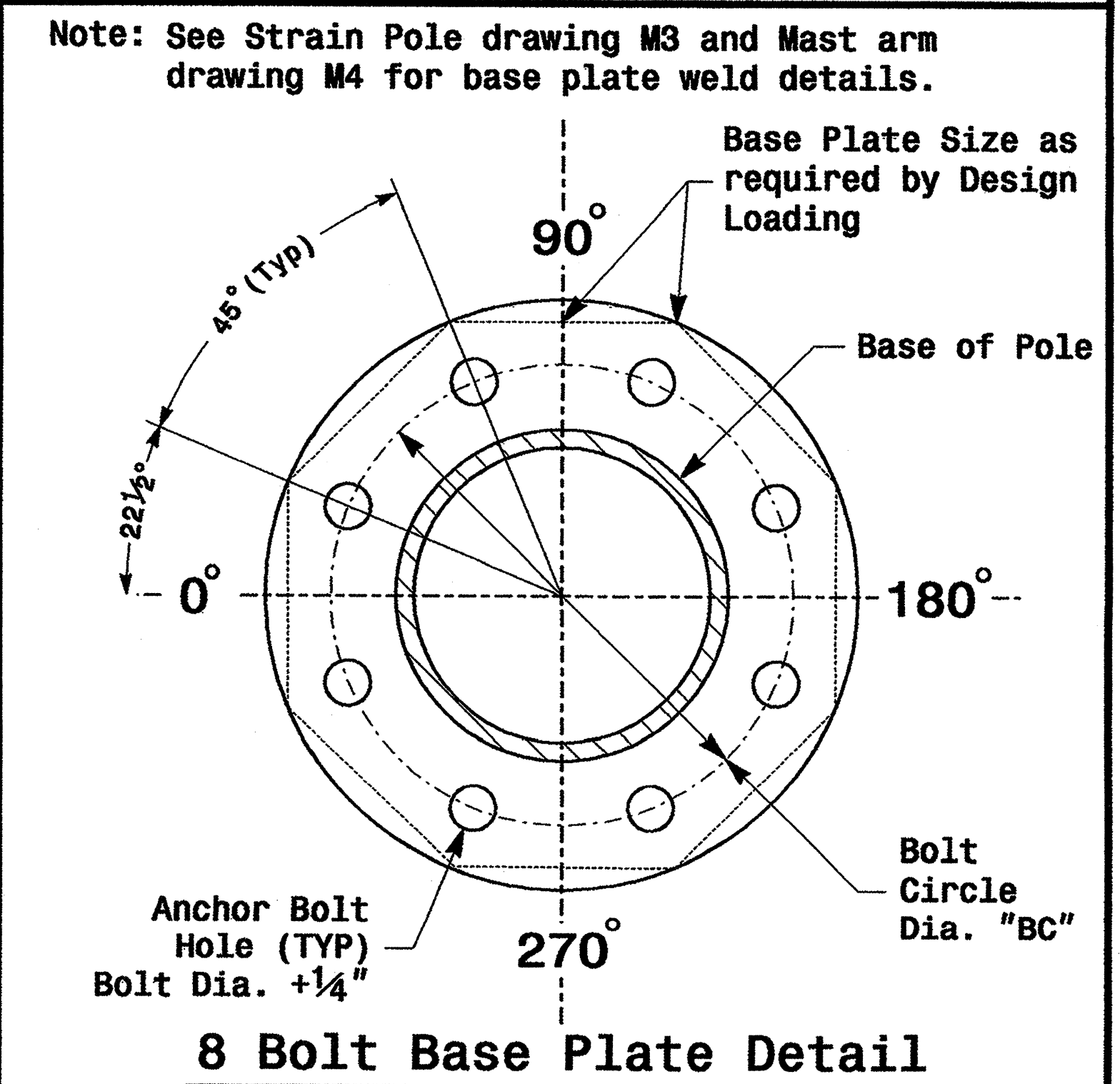
Terminal Compartment Detail



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



Anchor Bolt Detail



8 Bolt Base Plate 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)

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)

- 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 plan pole I.D.
 - 5) See drawing M4 for mounting positions of I.D. tags.

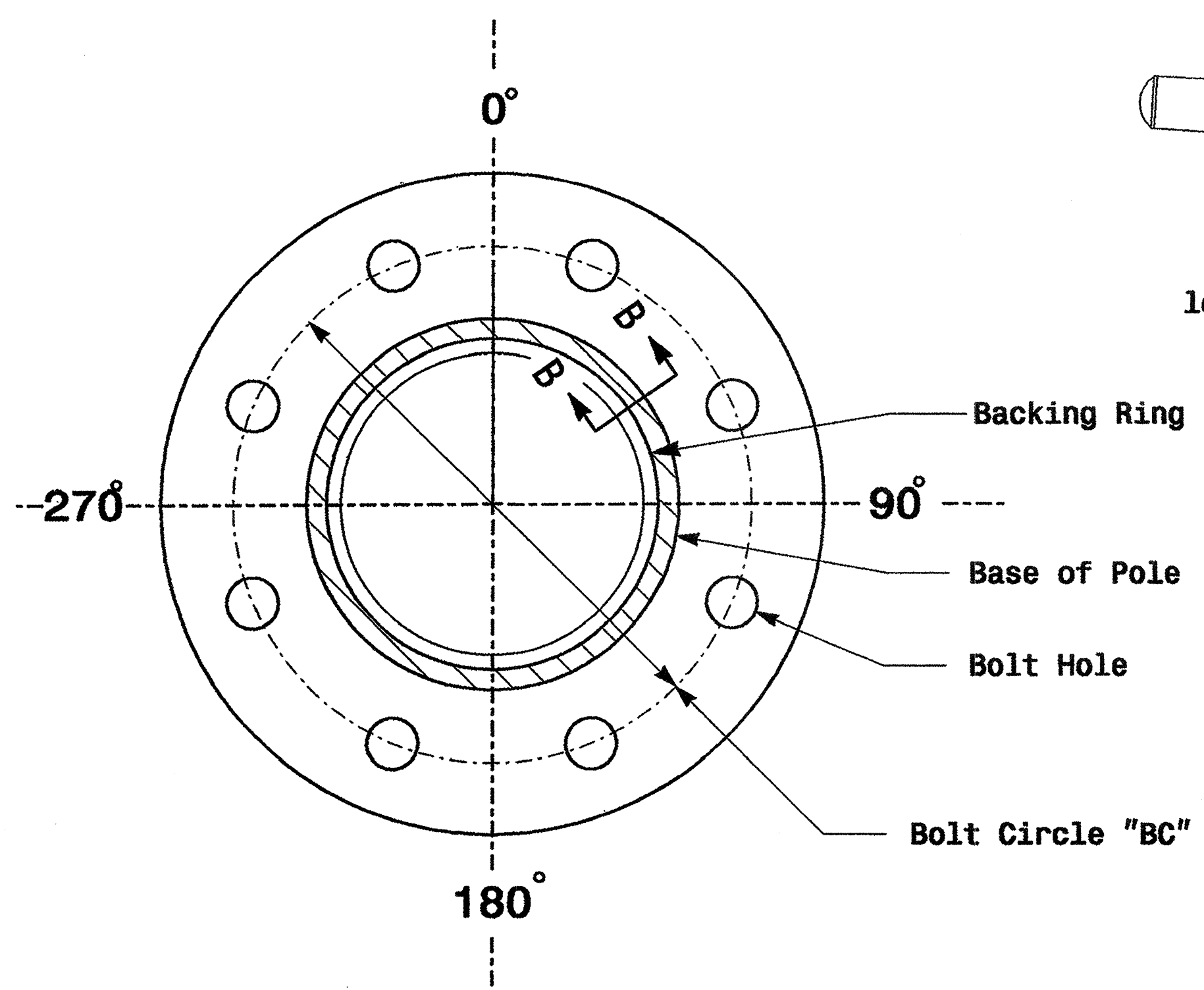
Identification Tag Details

	Typical Fabrication Details Common To All Metal Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander SCALE: NONE	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito INIT. DATE	

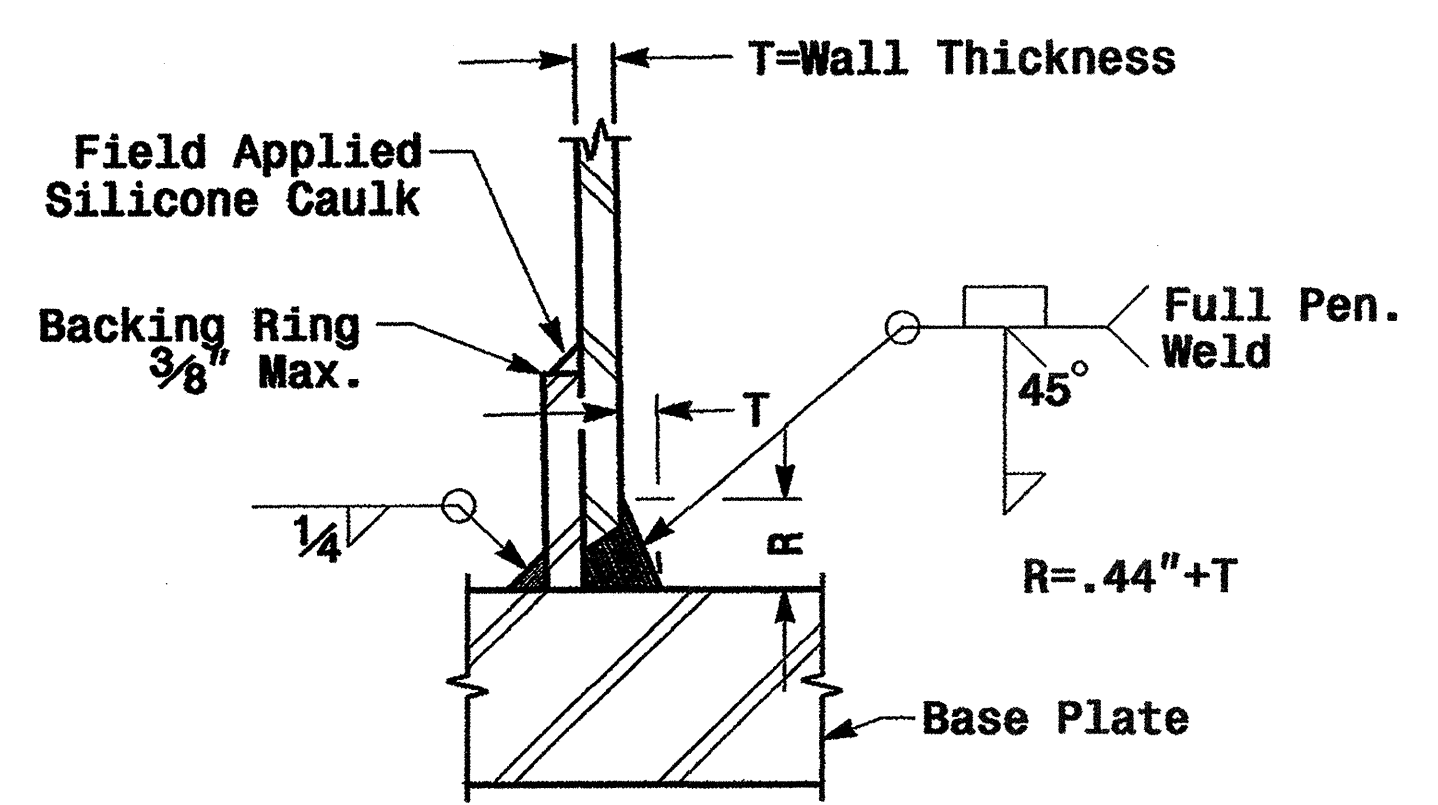
Fabrication Details - All Poles

01-SEP-2005 18:22 D:\2004 Metal Pole Standard.dwg m3 thru m5.dgn

Fabrication Details - Mast Arm Poles

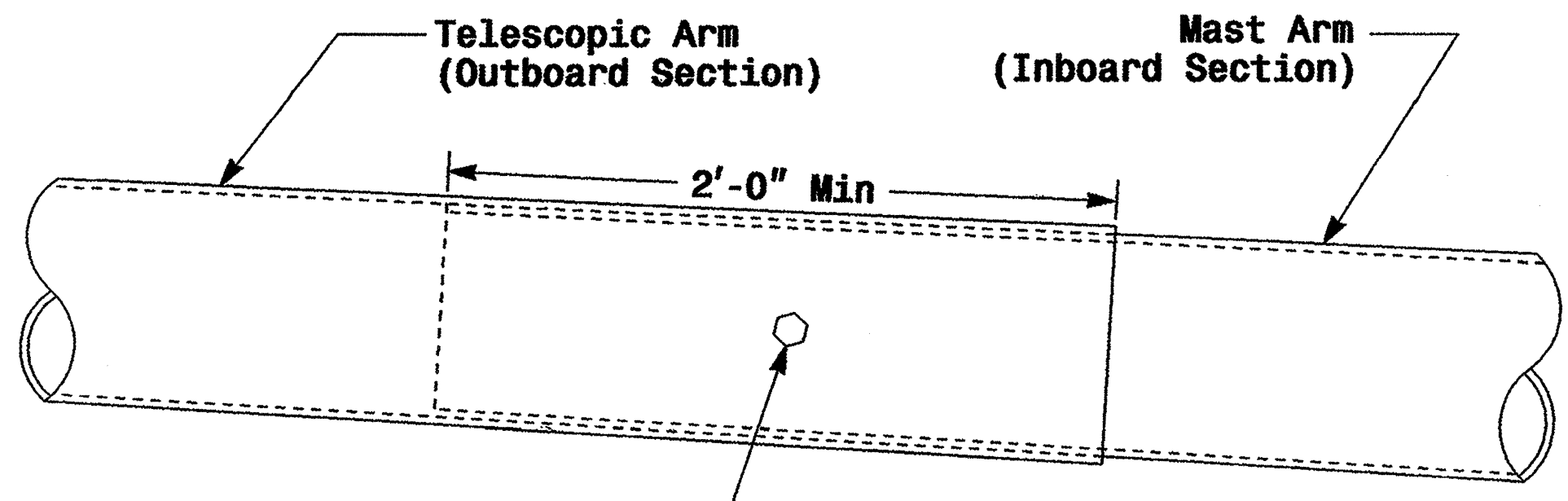
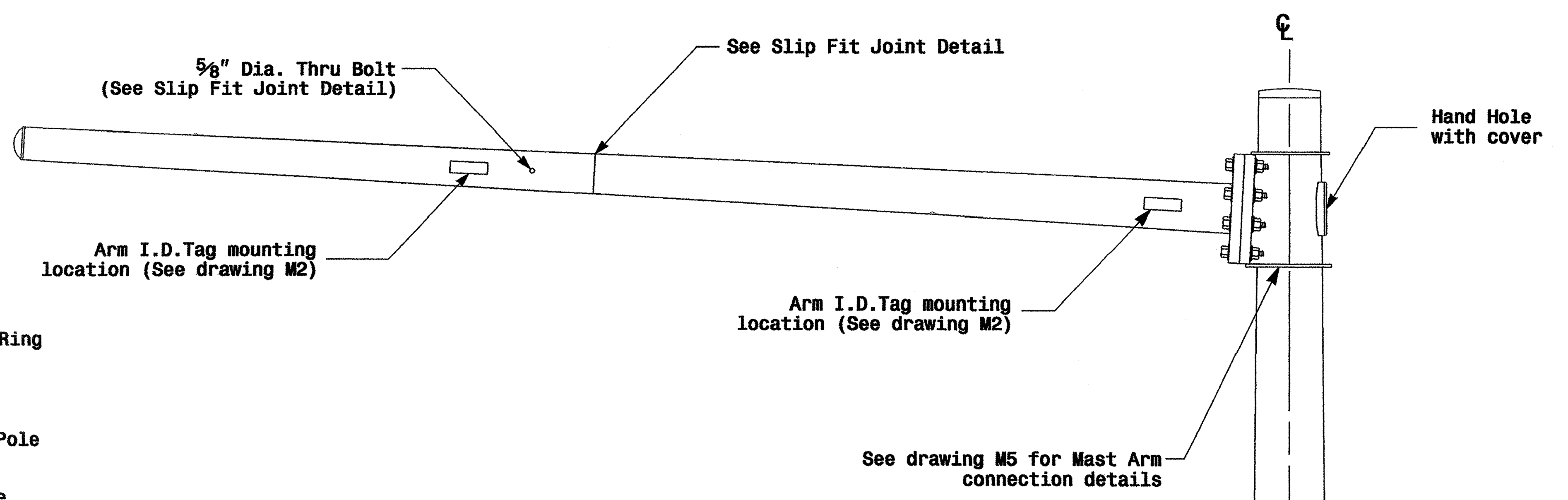


Section A-A
(See drawing M 2)
Pole Base Plate



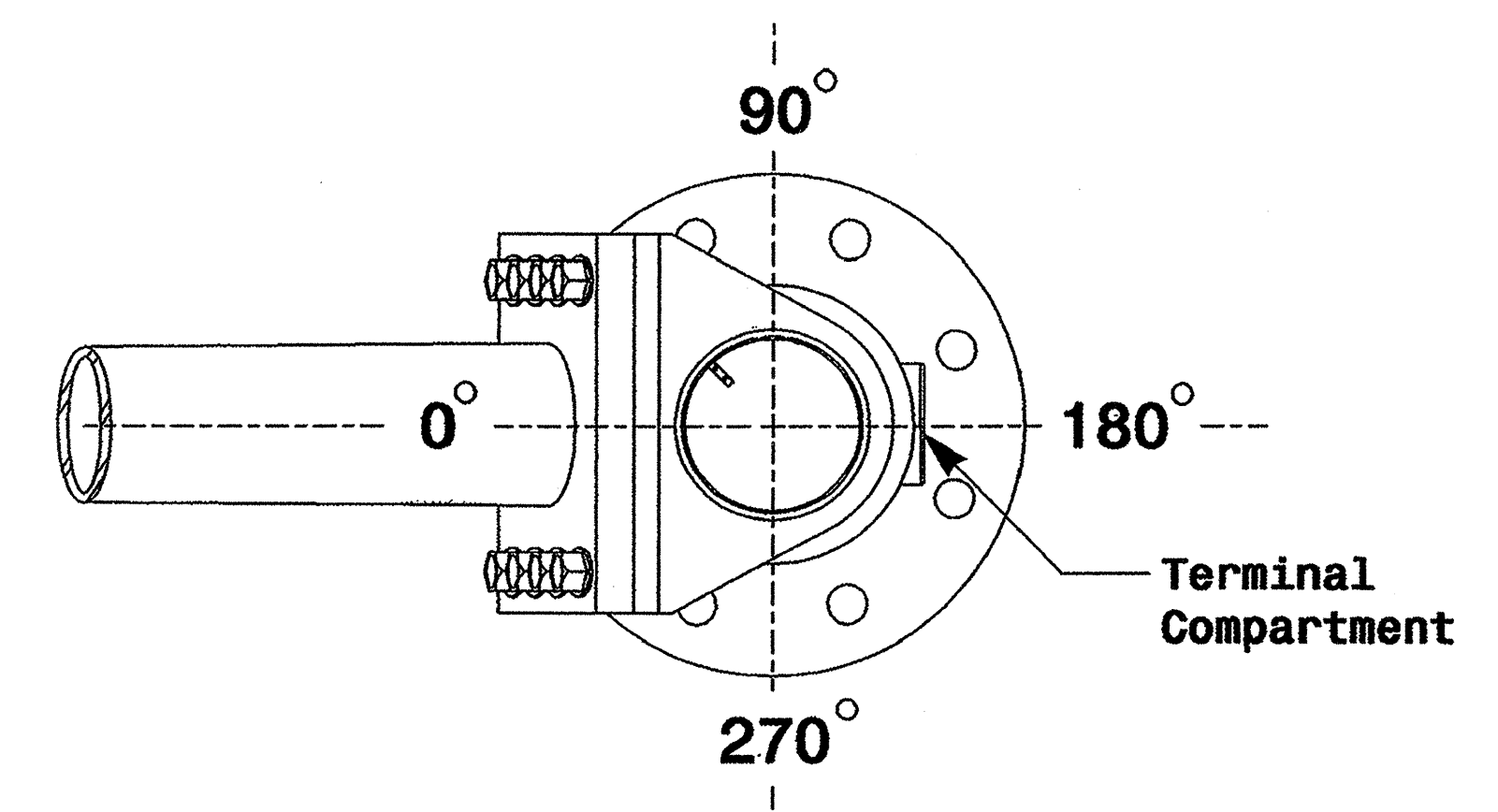
Section B-B
(Pole Attachment to Base Plate)

Full-Penetration Groove Weld Detail

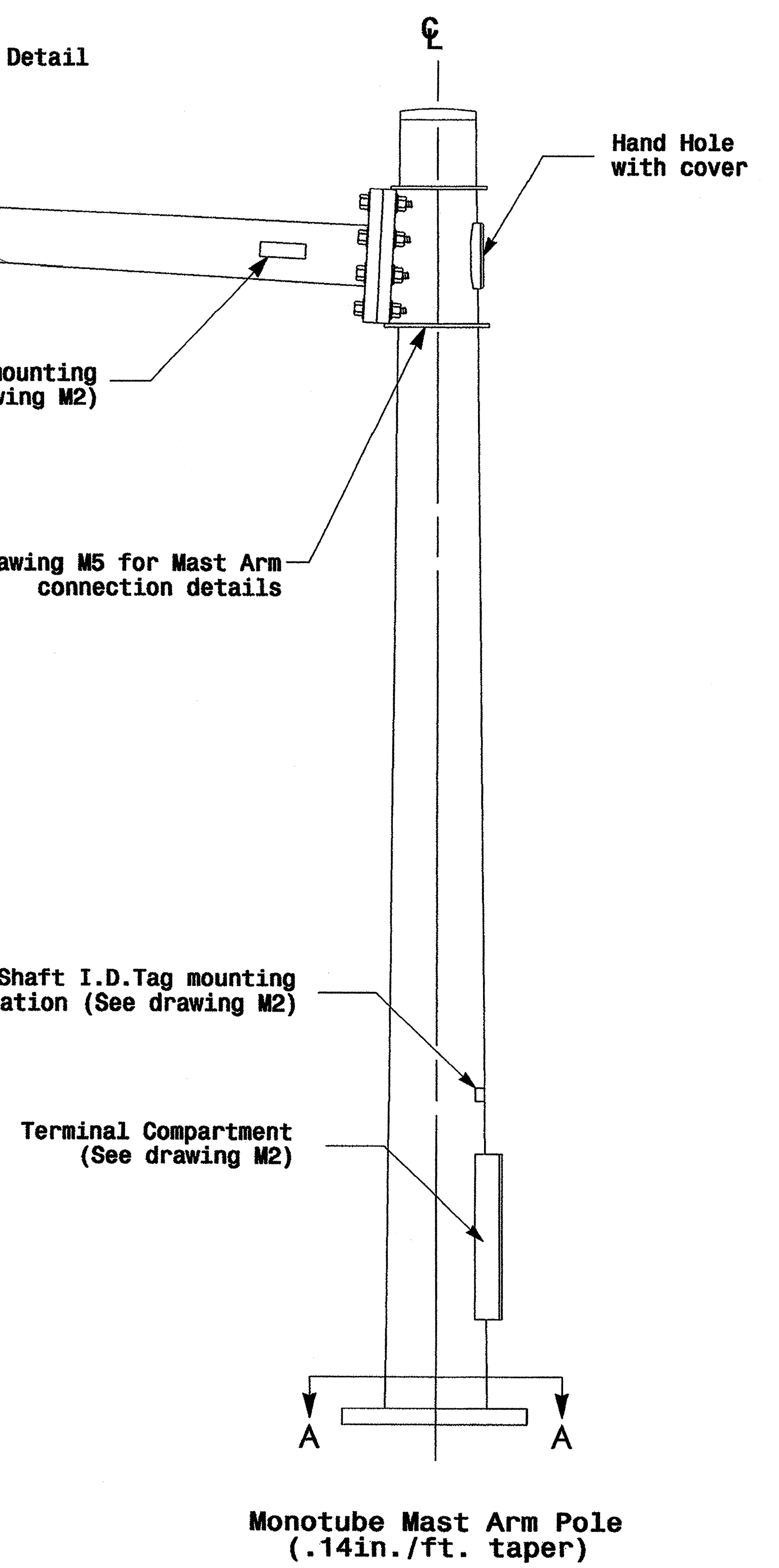


3/4" Factory Drilled Hole in Outboard Tube.
Field Drill Inboard Tube.
5/8" Galvanized Thru Stud with (2) Hex. Locknuts Ea.

Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation

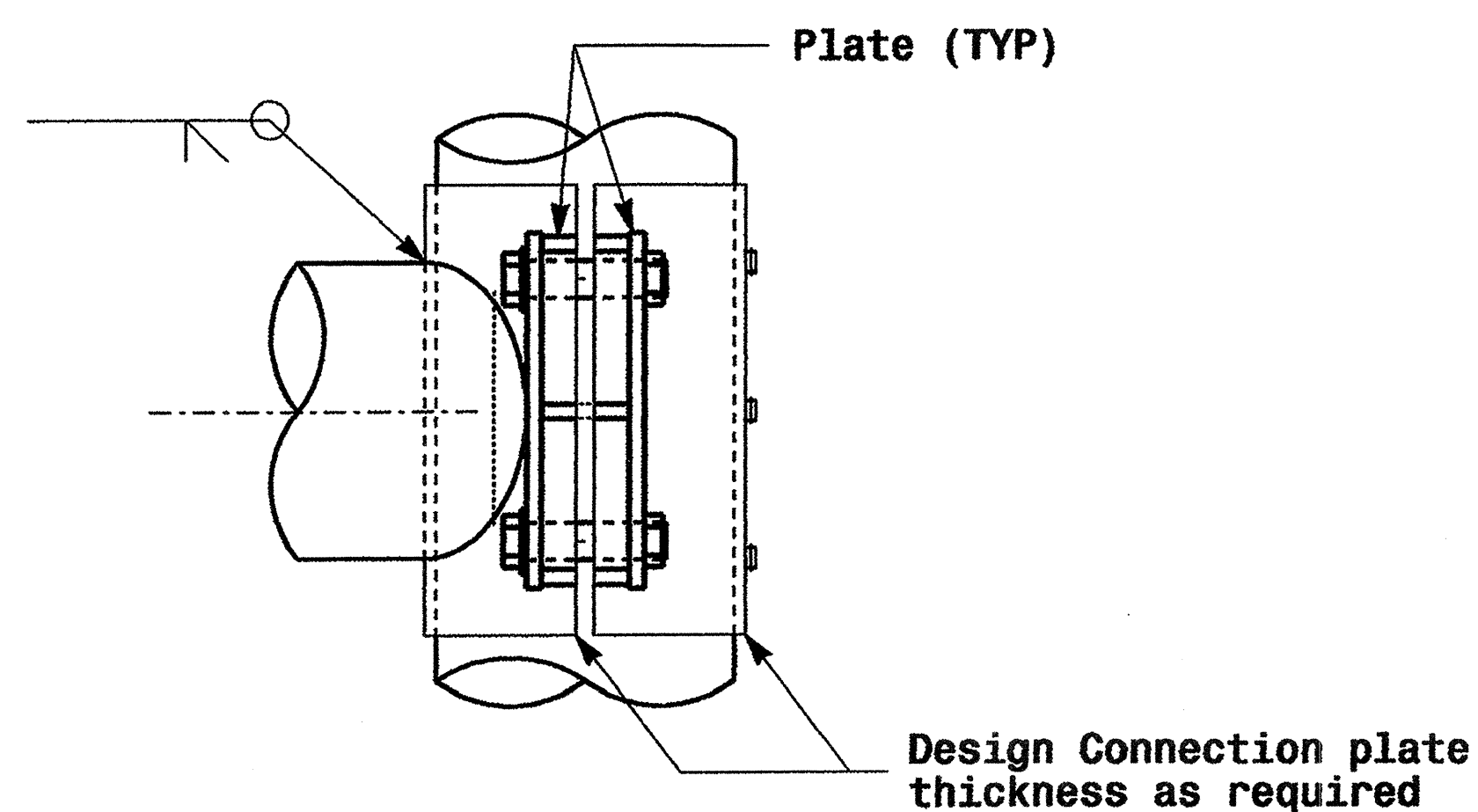


Monotube Mast Arm Pole
(.14in./ft. taper)

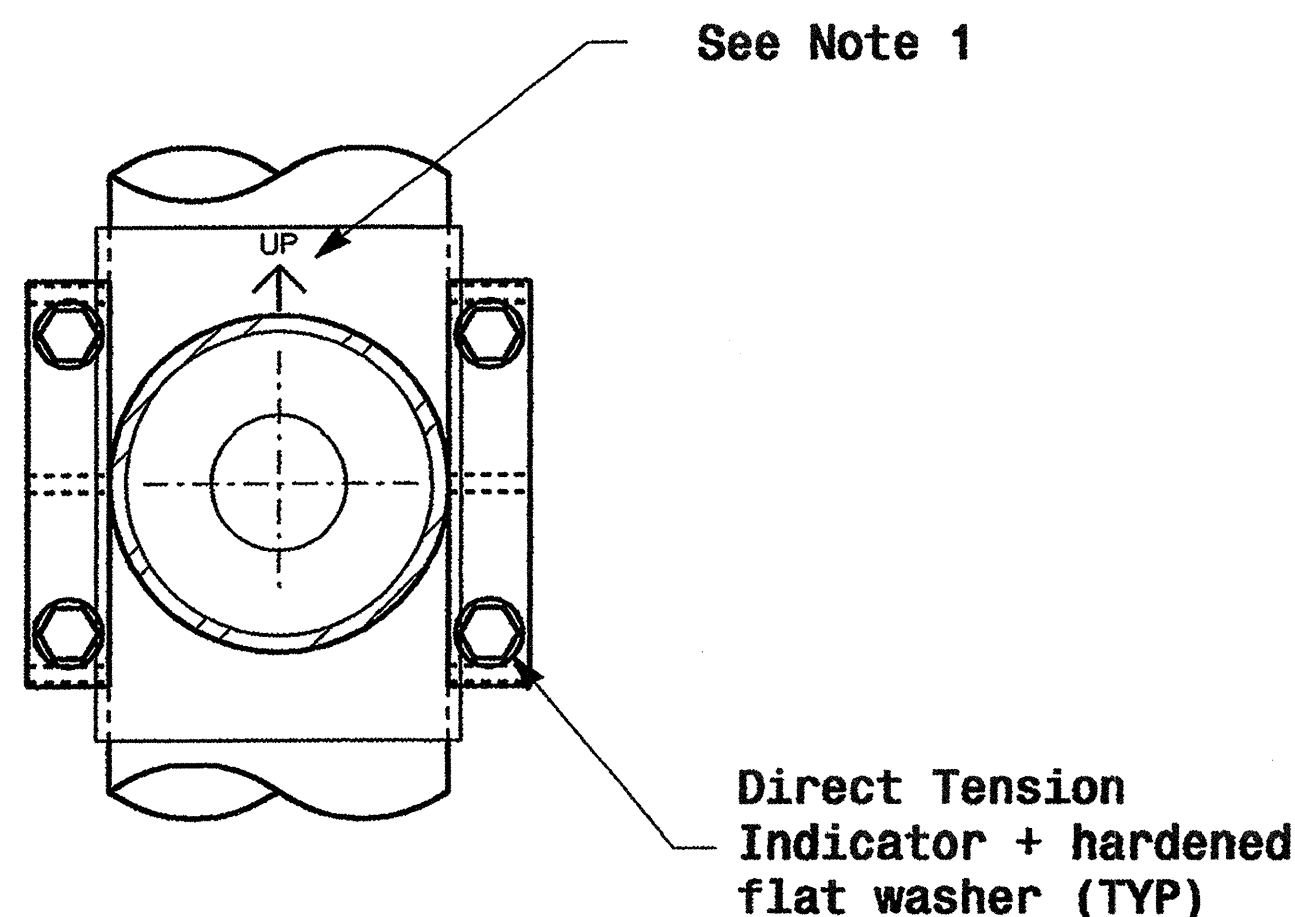
	Typical Fabrication Details for Mast Arm Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito	
SCALE: 0 NA NONE		SIGNATURE: <i>P.L. Alexander</i> DATE: 9.2.2005 STG. INVENTORY NO.	

01-SEP-2005 14:08 ac:raep:lee-un1:hw:kgrouse2004 metol pole stfndordsew004 m.dgn

Adjustable Clamp Type Bolted Mast Arm Connection

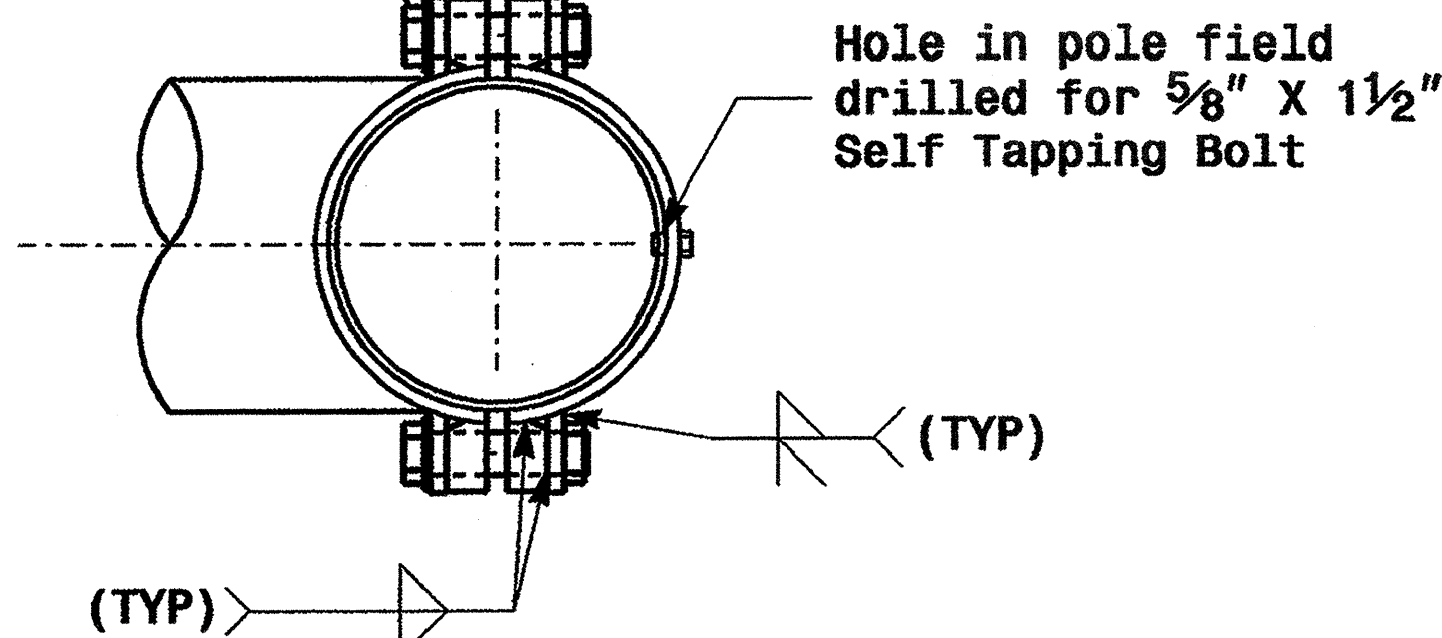


Side Elevation View



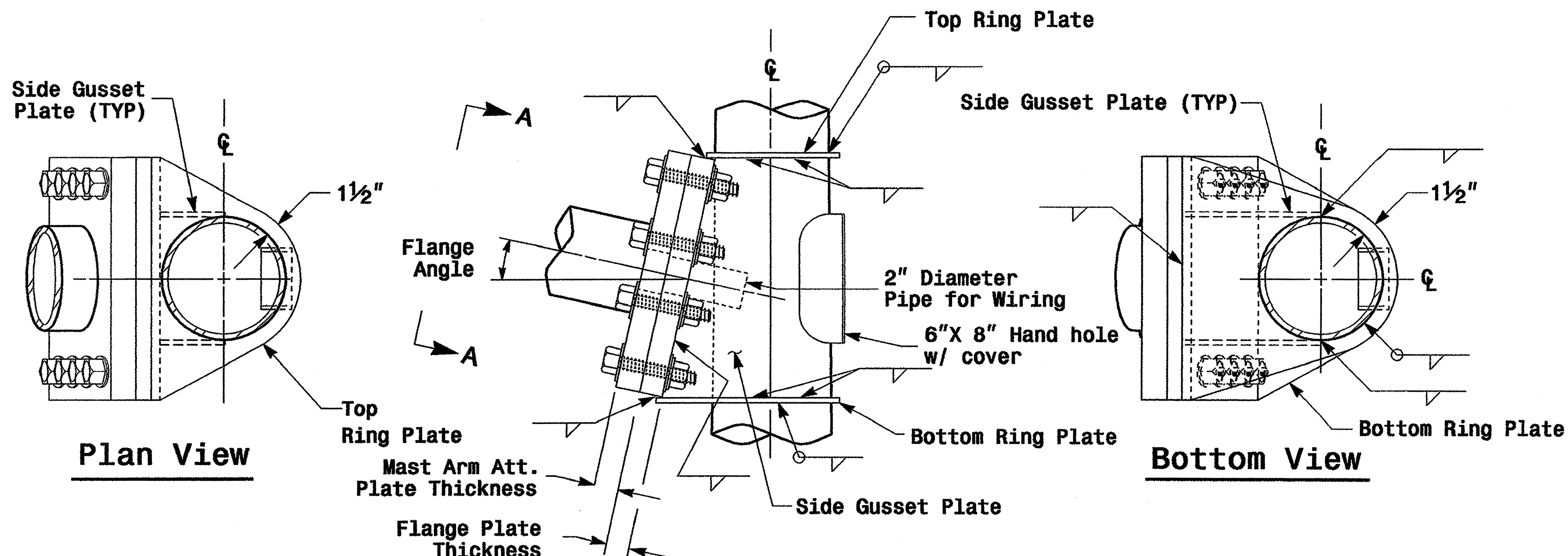
Front Elevation View

(4) - Size "E" Hex Head Bolts with (1) Hex Nuts & Washers

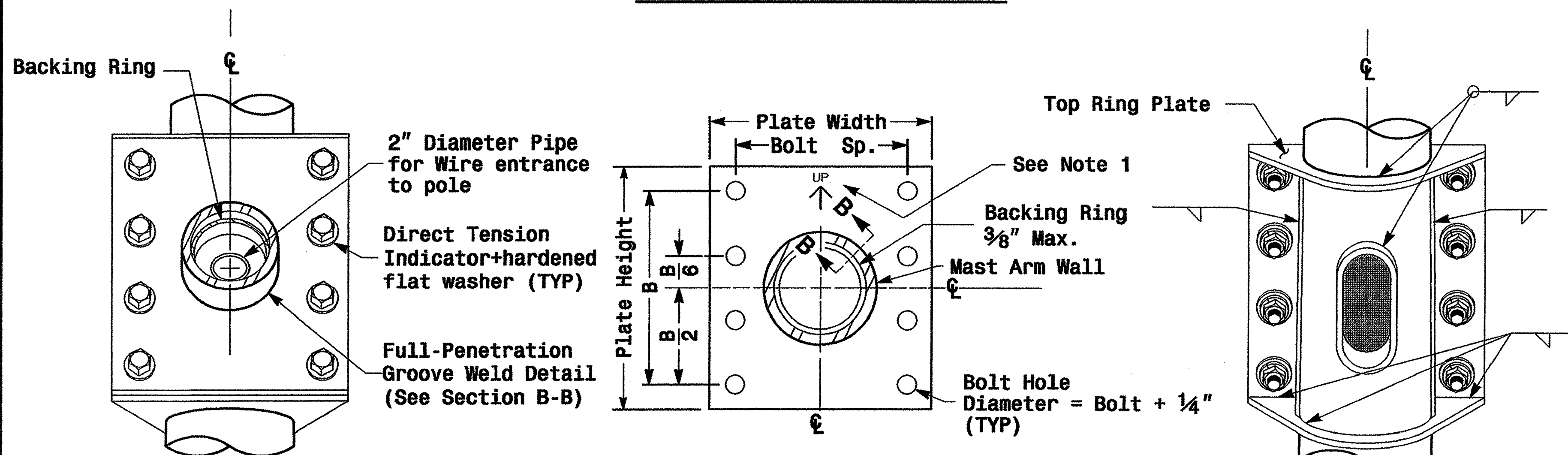


Plan View

Welded Ring Stiffened Mast Arm Connection



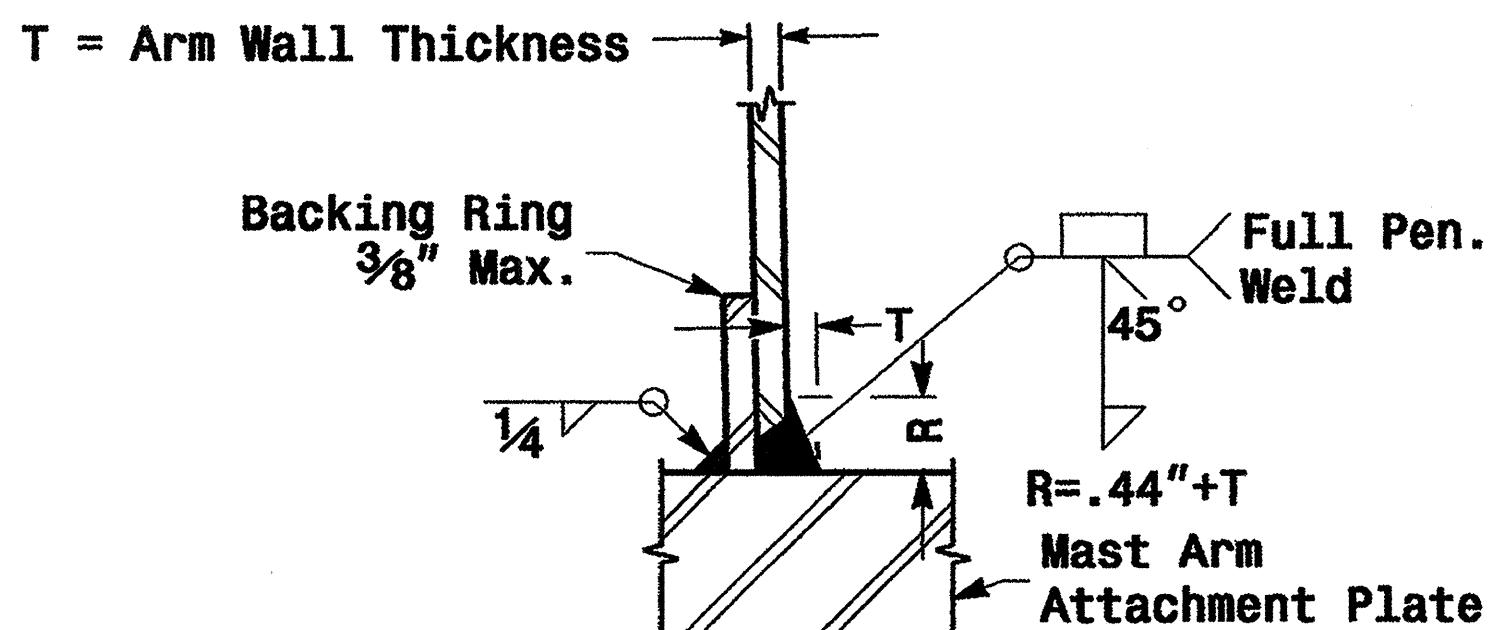
Side Elevation View



Front Elevation View

Section View A-A
Mast Arm Attachment Plate

Back Elevation View



Section B-B

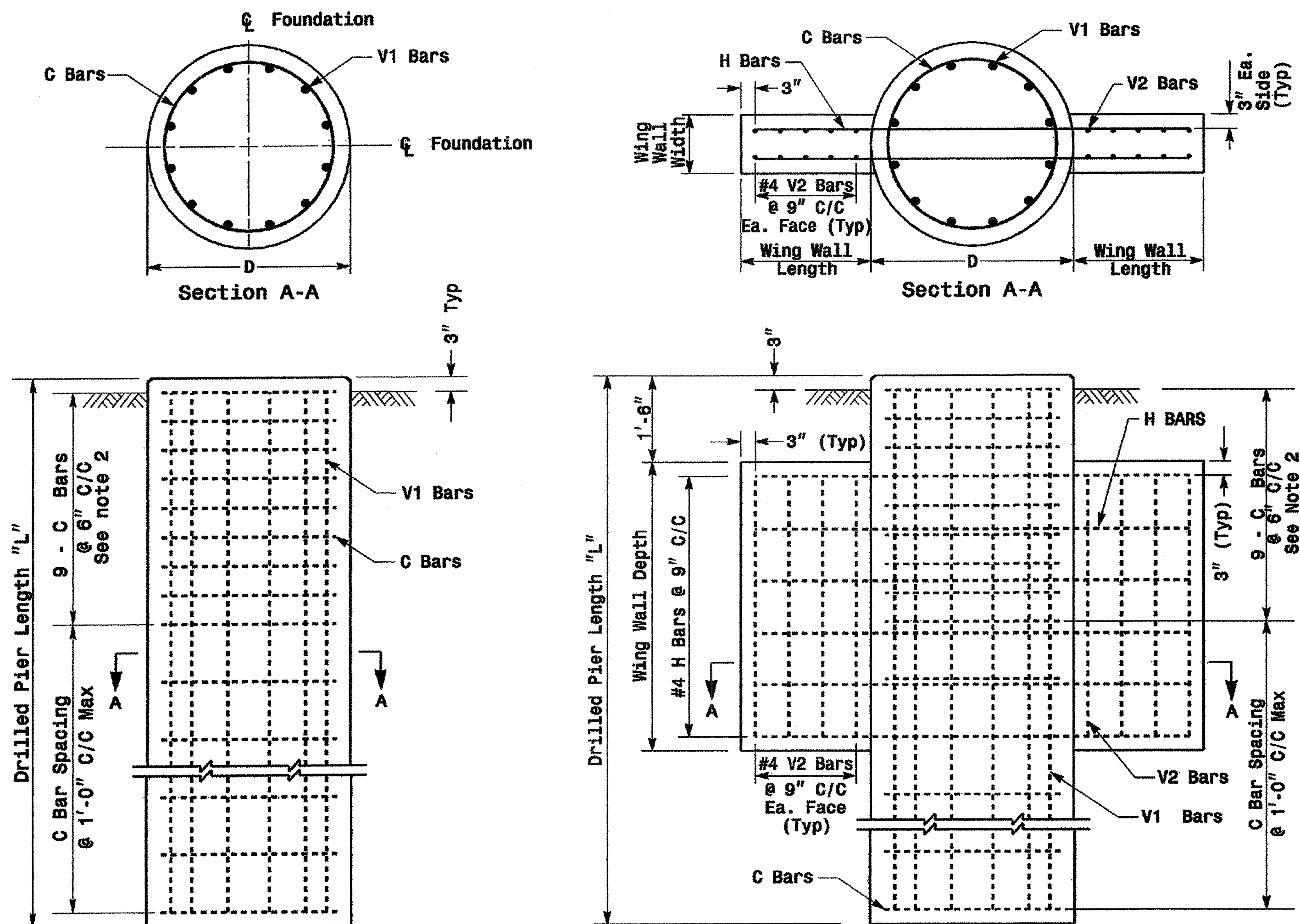
Full-Penetration Groove Weld Detail

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.

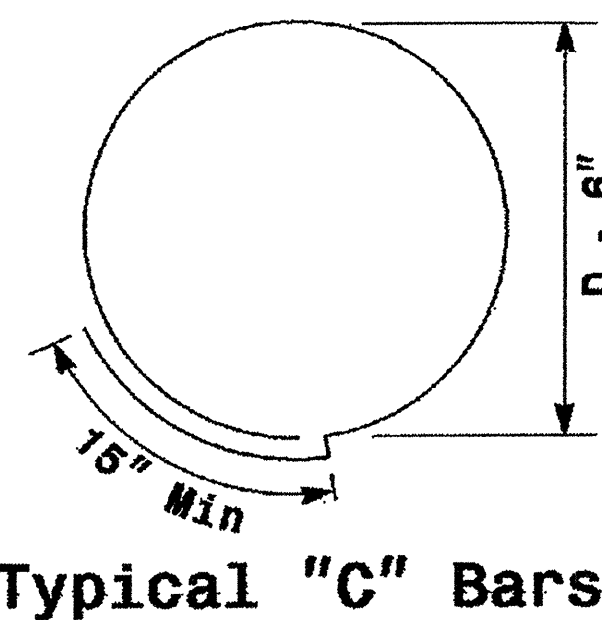
	<p>Fabrication Details For Mast Arm Connection To Pole</p>		
	<p>PLAN DATE: May 2005</p>	<p>REVIEWED BY: C.F. Andrews</p>	
<p>PREPARED BY: P.L. Alexander</p>	<p>REVIEWED BY: A.M. Esposito</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
<p>SIGNATURE: P.L. Alexander</p>		<p>SIGNATURE: D. Sarker</p>	
<p>DATE: 9.2.2005</p>		<p>SIG. INVENTORY NO.</p>	

Reinforcing Steel Bars



Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* See Note No. 1
 ** See Note No. 3



Typical "C" Bars

Wing Wall Type	Drill Pier Shaft Dia. (in.)	Reinforcing Steel					
		Bar Name	No.	Size	Type	Length	
TYPE 1	42"	V1	9	#8	STR.	**	
		V2	12	#4	STR.	2'-6"	
		H	8	#4	STR.	6'-0"	
		C	*	#4	CIR.	10'-9"	
TYPE 2	42"	V1	9	#8	STR.	**	
		V2	16	#4	STR.	4'-6"	
		H	12	#4	STR.	9'-0"	
		C	*	#4	CIR.	10'-9"	
TYPE 2	48"	V1	12	#8	STR.	**	
		V2	16	#4	STR.	4'-6"	
		H	12	#4	STR.	9'-6"	
		C	*	#4	CIR.	12'-6"	

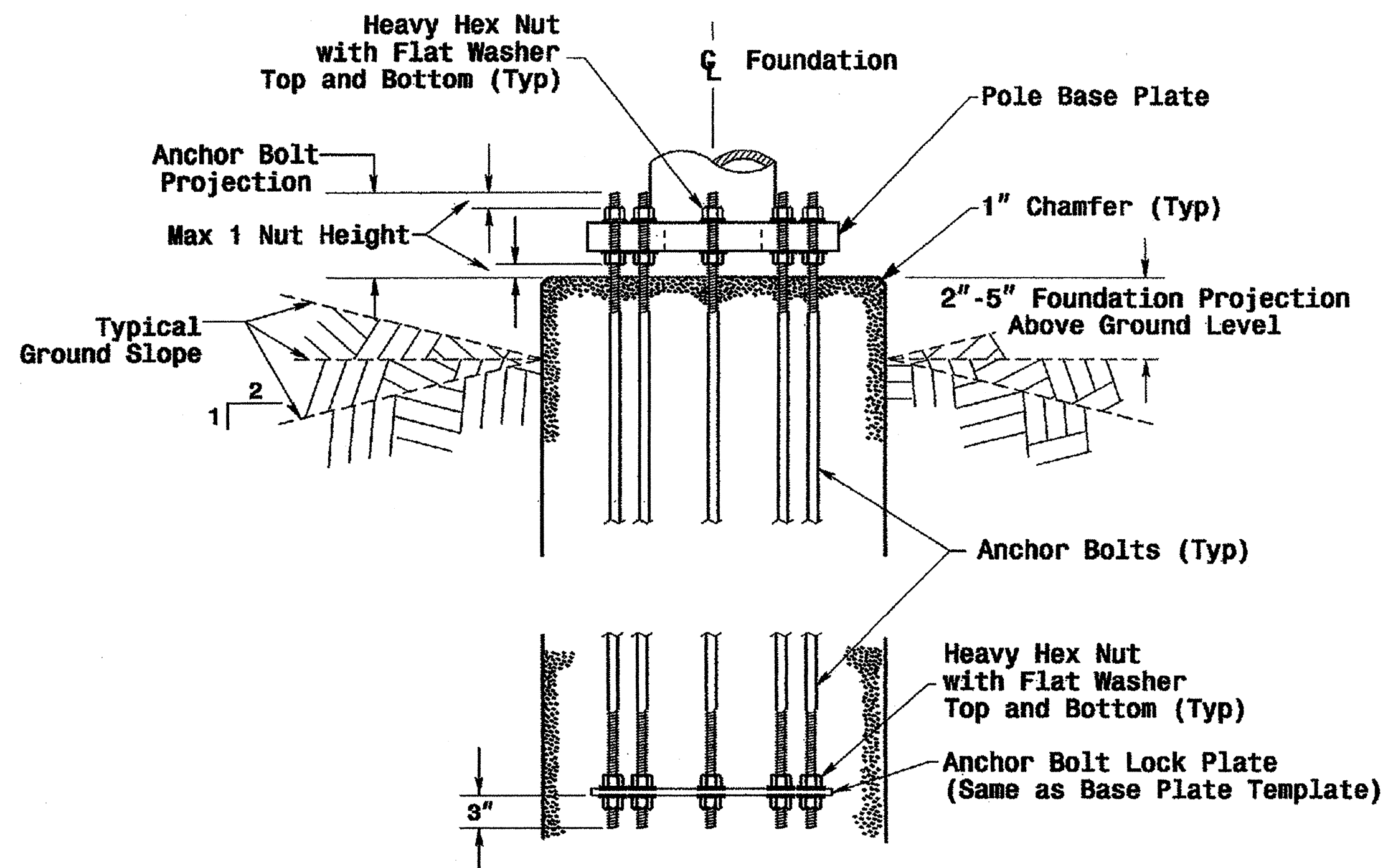
* See Note No. 1
 ** See Note No. 3

Wing Wall Type	Wing Wall Length (Ft.)	Wing Wall Width (Ft.)	Wing Wall Depth (Ft.)	Concrete Volume (Cu. Yds.)
TYPE 1	1'-6"	1'-0"	3'-0"	.4
TYPE 2	3'-0"	1'-0"	5'-0"	1.2

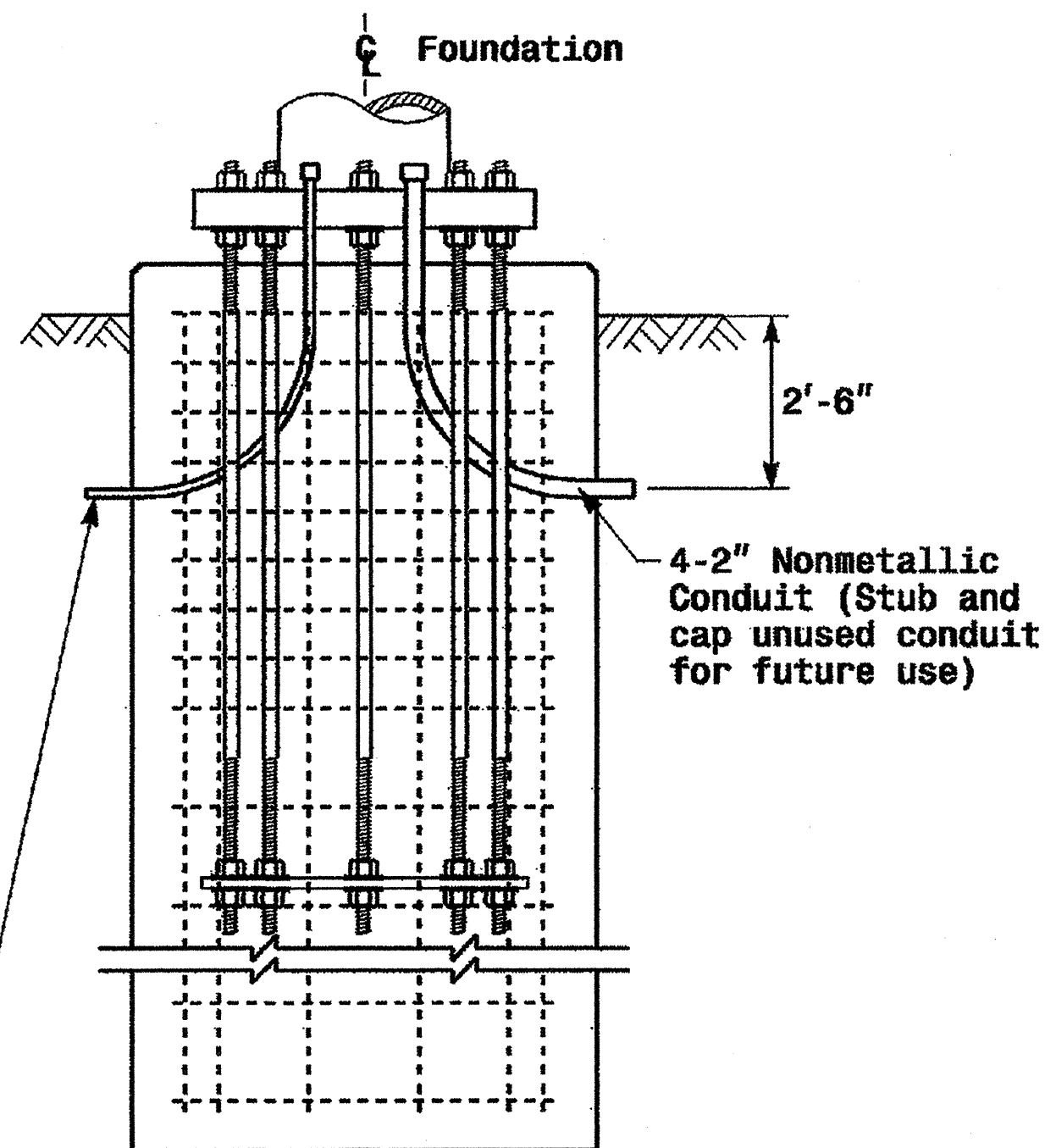
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



2-1" Nonmetallic Conduits for Electrical Service and Grounding Electrode Conductor

Notes

- The number of C-bars is based on foundation depth. For standard foundations, see sheet M 8.
- 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 sheet M 8.
- The quantities for steel and concrete shown in the Wing Wall Details Chart reflect the amount of material for 1 pair of wing walls (2 wing walls per drilled pier shaft.)

Construction Details - Foundations

Prepared in the Office of:

Construction Details Foundations

SCALE: 0 NA NONE

PLANNING DATE: May 2005 REVIEWED BY: P.L. ALEXANDER
 PREPARED BY: C.F. ANDREWS REVIEWED BY: A.W. ESPOSITO

REVISIONS: INIT. DATE

Signature: D. Sarkar 9.2.2005
 DATE: 9.2.2005
 SIG. INVENTORY NO.

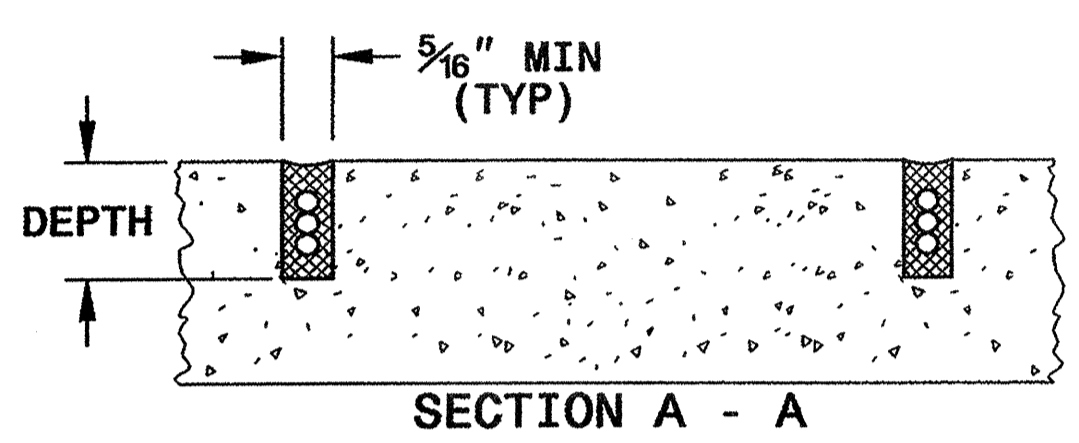
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

INDUCTIVE DETECTION LOOPS
ENGLISH DETAIL DRAWING FOR

SHEET 1 OF 3
1725D01

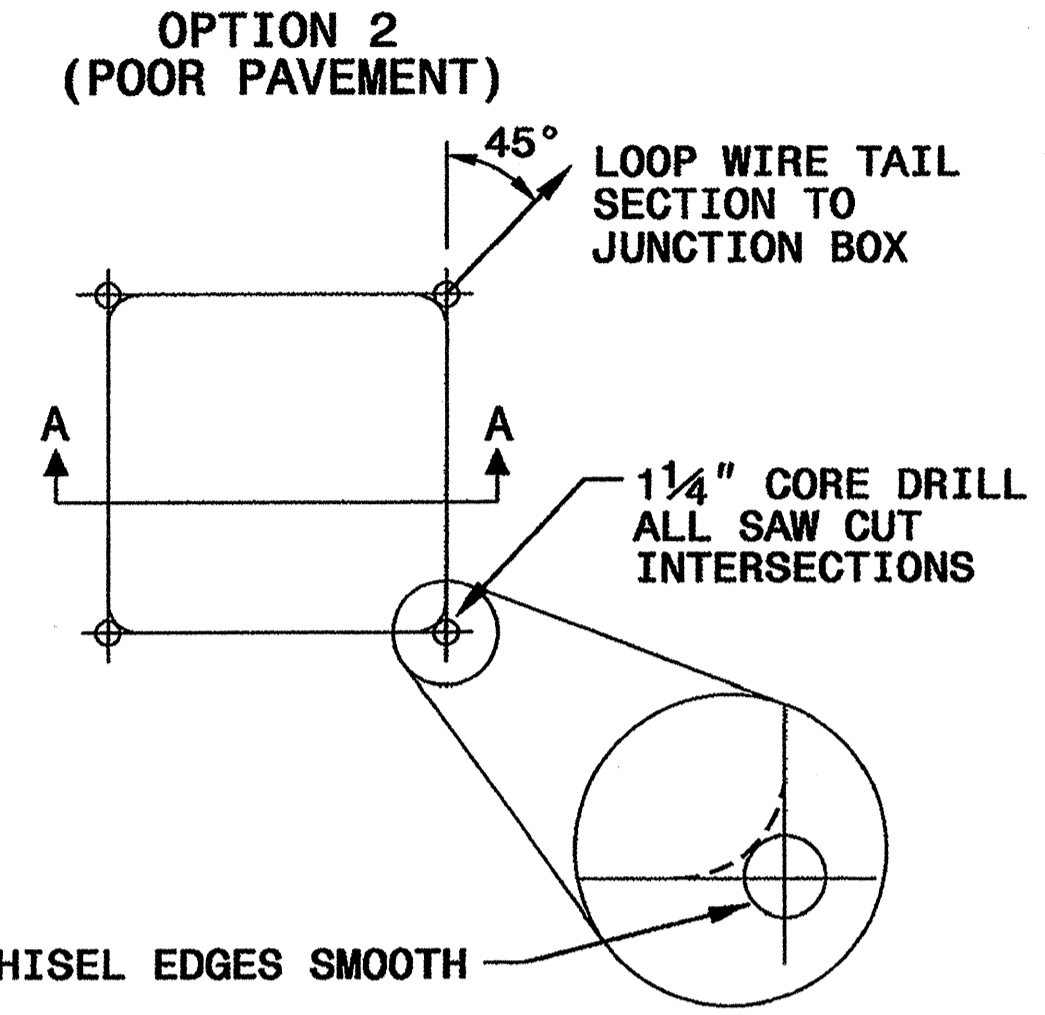
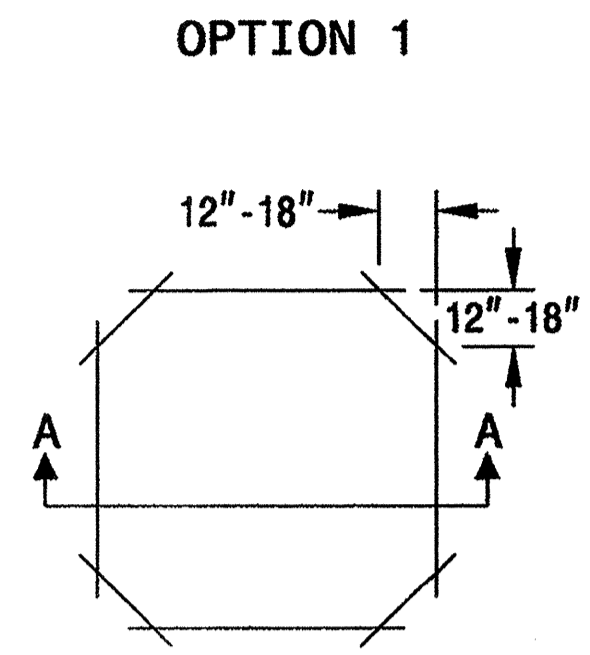
SAW SLOT DEPTH CHART

DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0

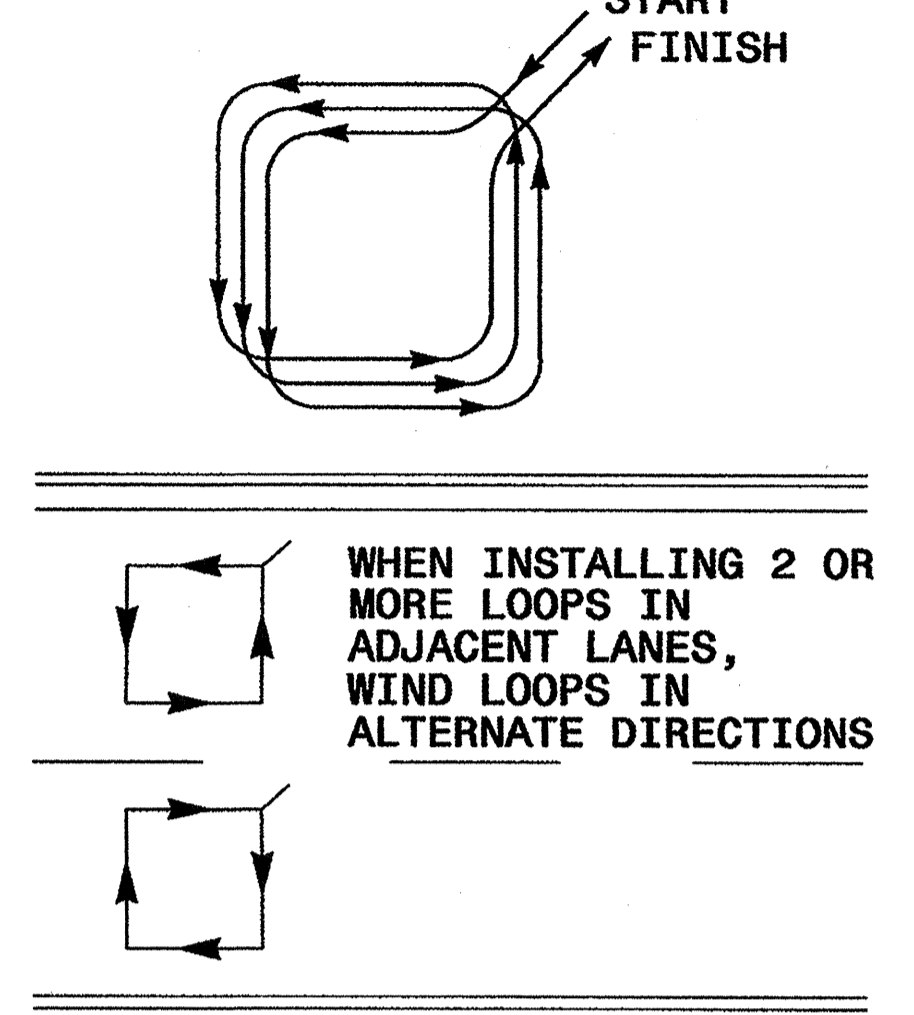


CONVENTIONAL 4-SIDED LOOP

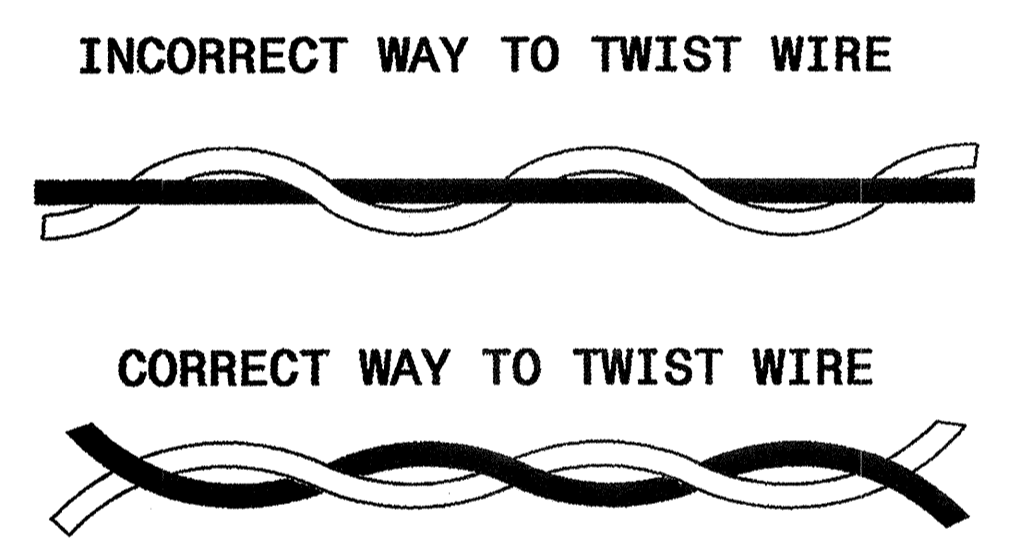
SAW CUT OPTIONS



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

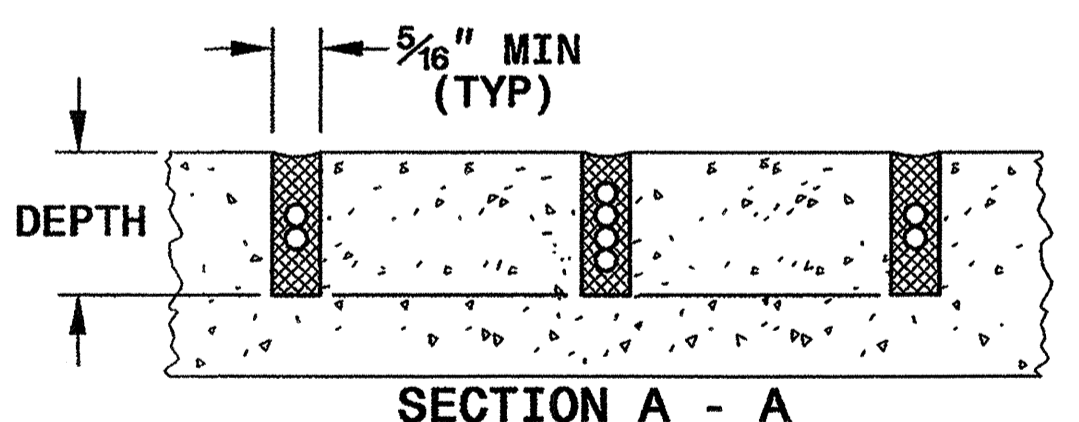
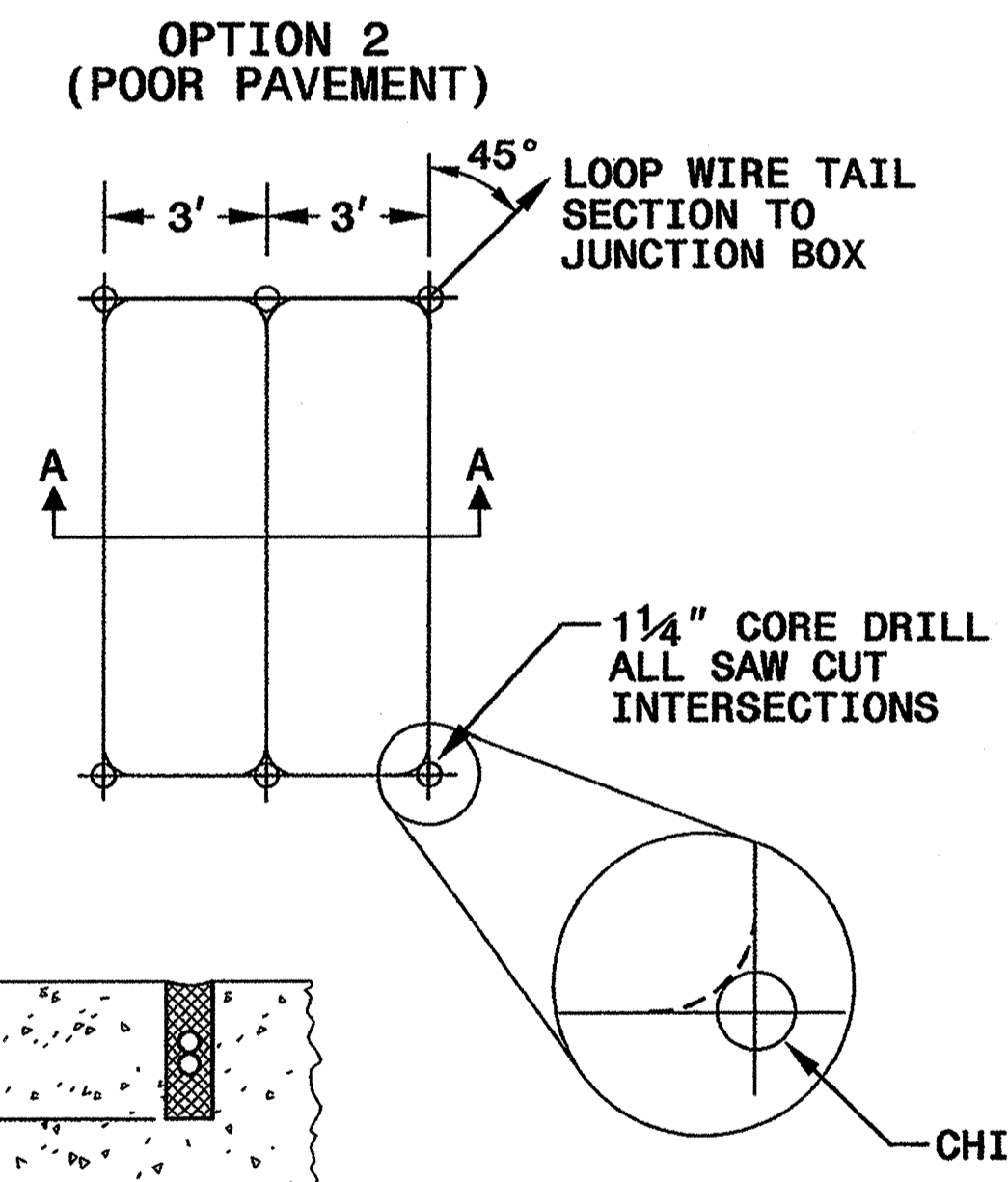
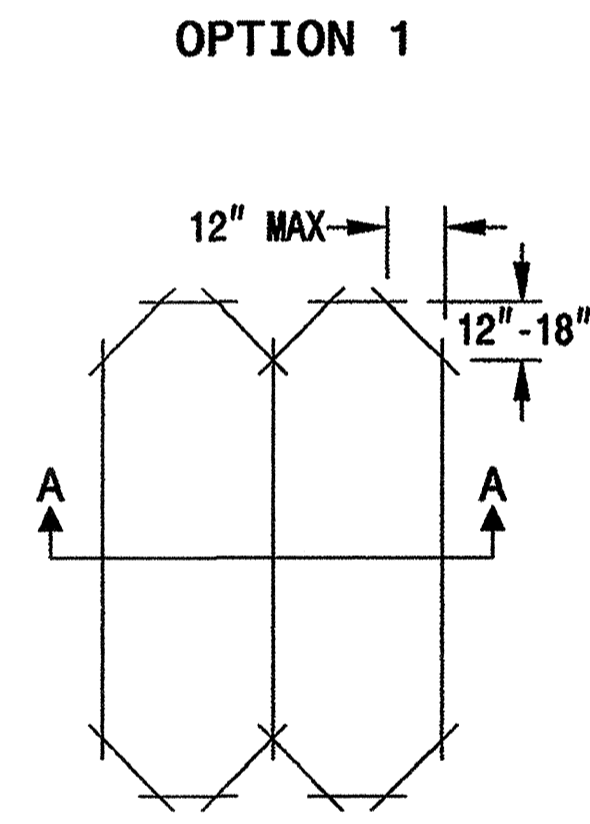


NOTES

1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

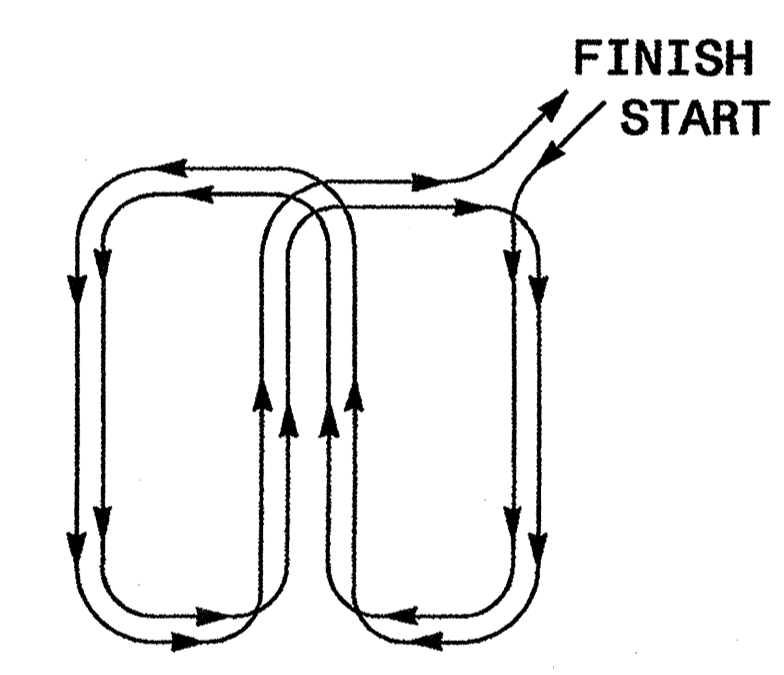
QUADRUPOLE LOOP

SAW CUT OPTIONS



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

LOOP WINDING METHOD



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RALEIGH, N.C.

INDUCTIVE DETECTION LOOPS
ENGLISH DETAIL DRAWING FOR

SHEET 1 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

ENGINEER
MILTON I. DEAN
SEAL 016286

Signature: Milton I. Dean
Date: 9/5/07

05-SEP-2007 14:00 c:\documents and settings\m11116\cor\desk\p\standard metal pole sheets\1725D01.dwg 2/11/16

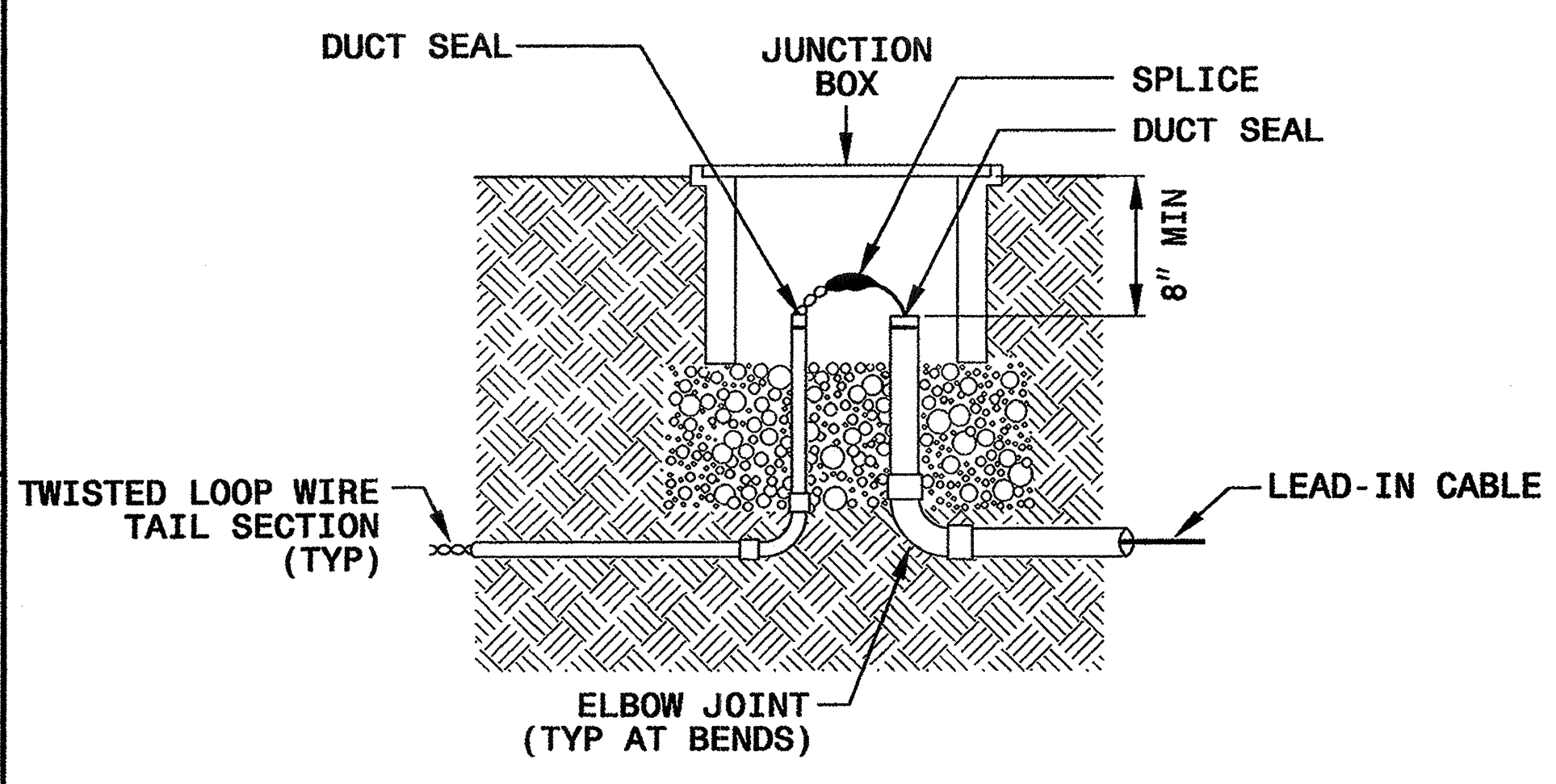
STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
 LOOP WIRE DETAILS

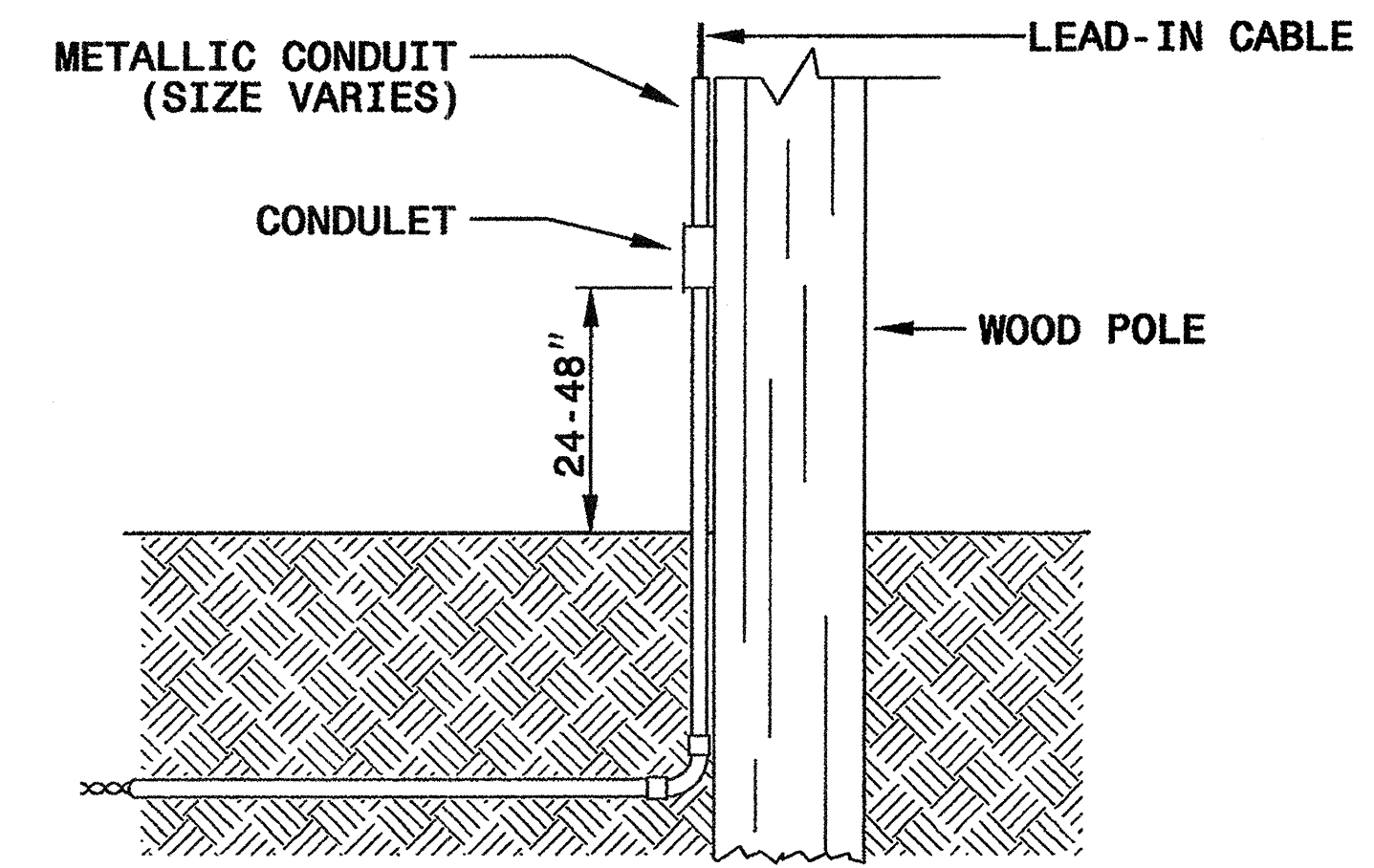
SHEET 2 OF 3
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

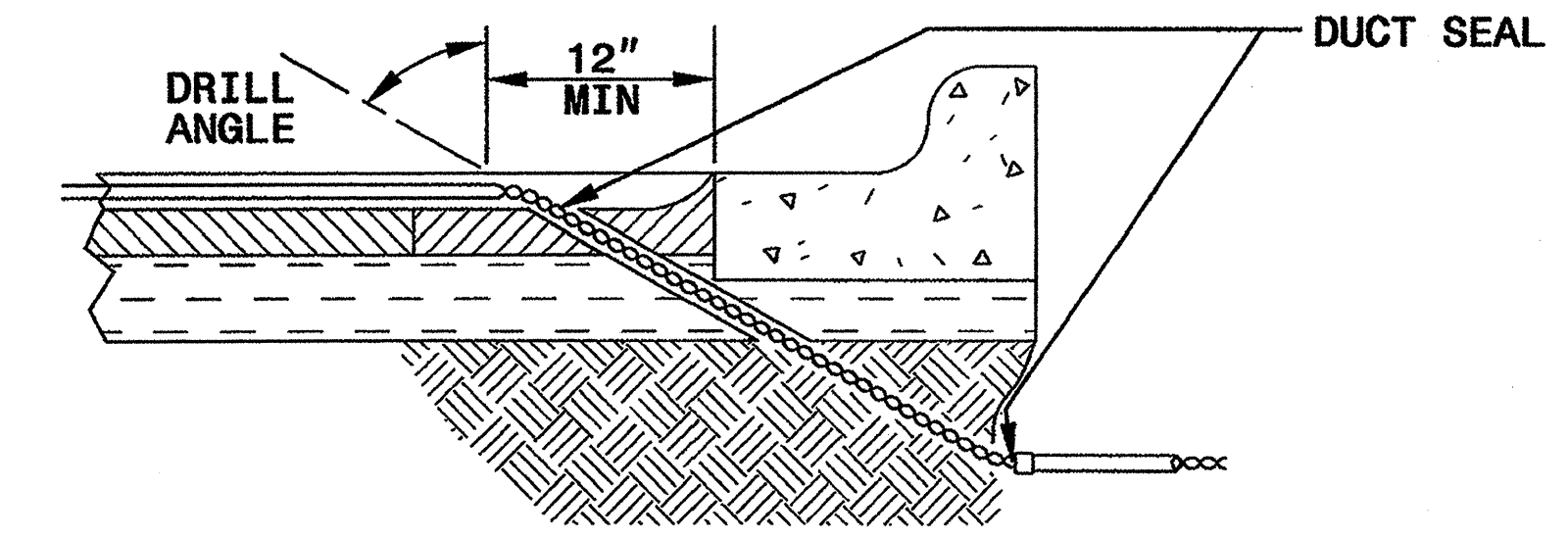


NOTE

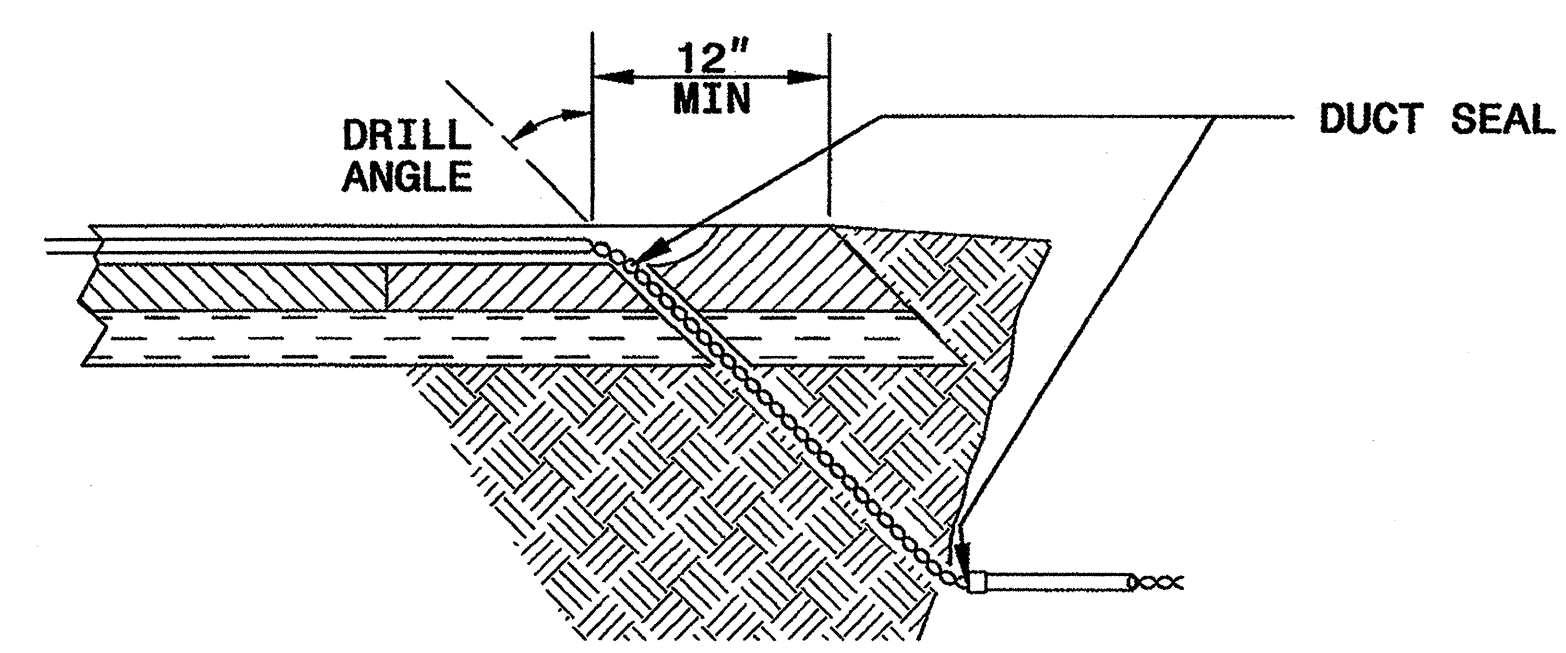
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

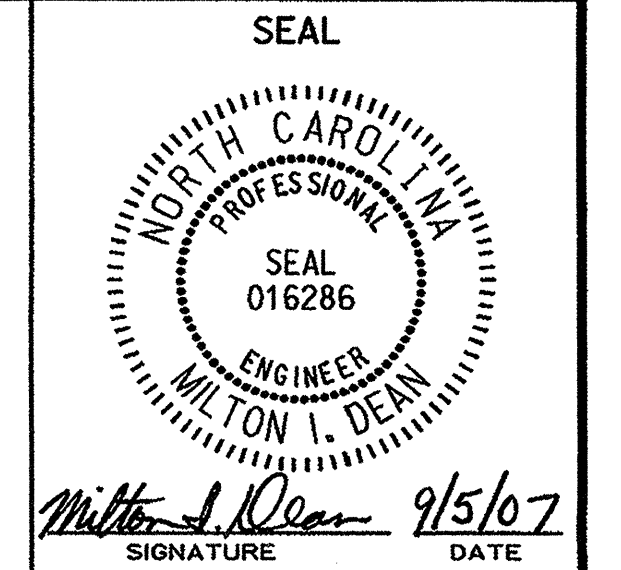
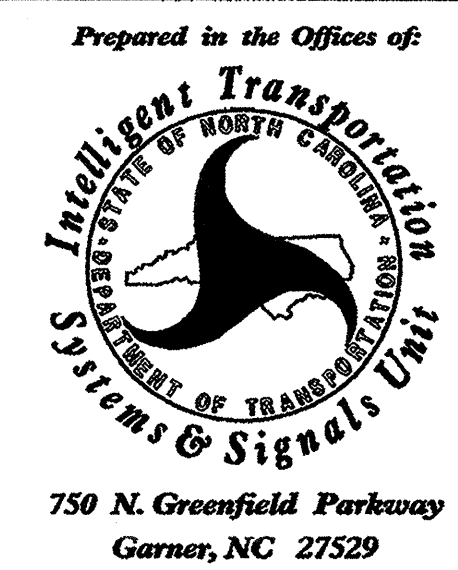
- DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
- TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
- BEFORE SEALING LOOPS, INSTALL DUCT SEAL WHERE LOOP WIRE TAIL SECTION LEAVES SAW CUT IN PAVEMENT AND AT ENTRANCE OF CONDUIT TO JUNCTION BOX.

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ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
 LOOP WIRE DETAILS

SHEET 2 OF 3
1725D01

See Plate for Title



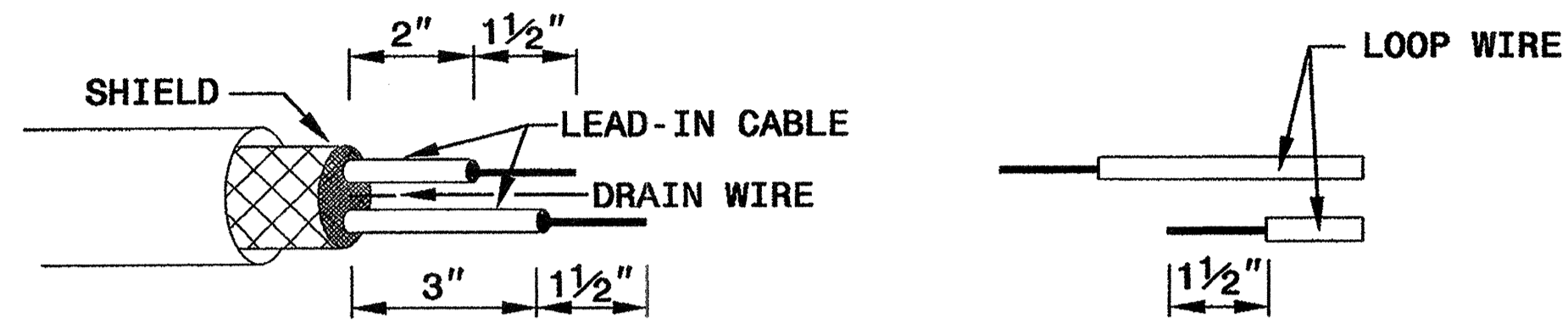
STATE OF
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RALEIGH, N.C.

5-07

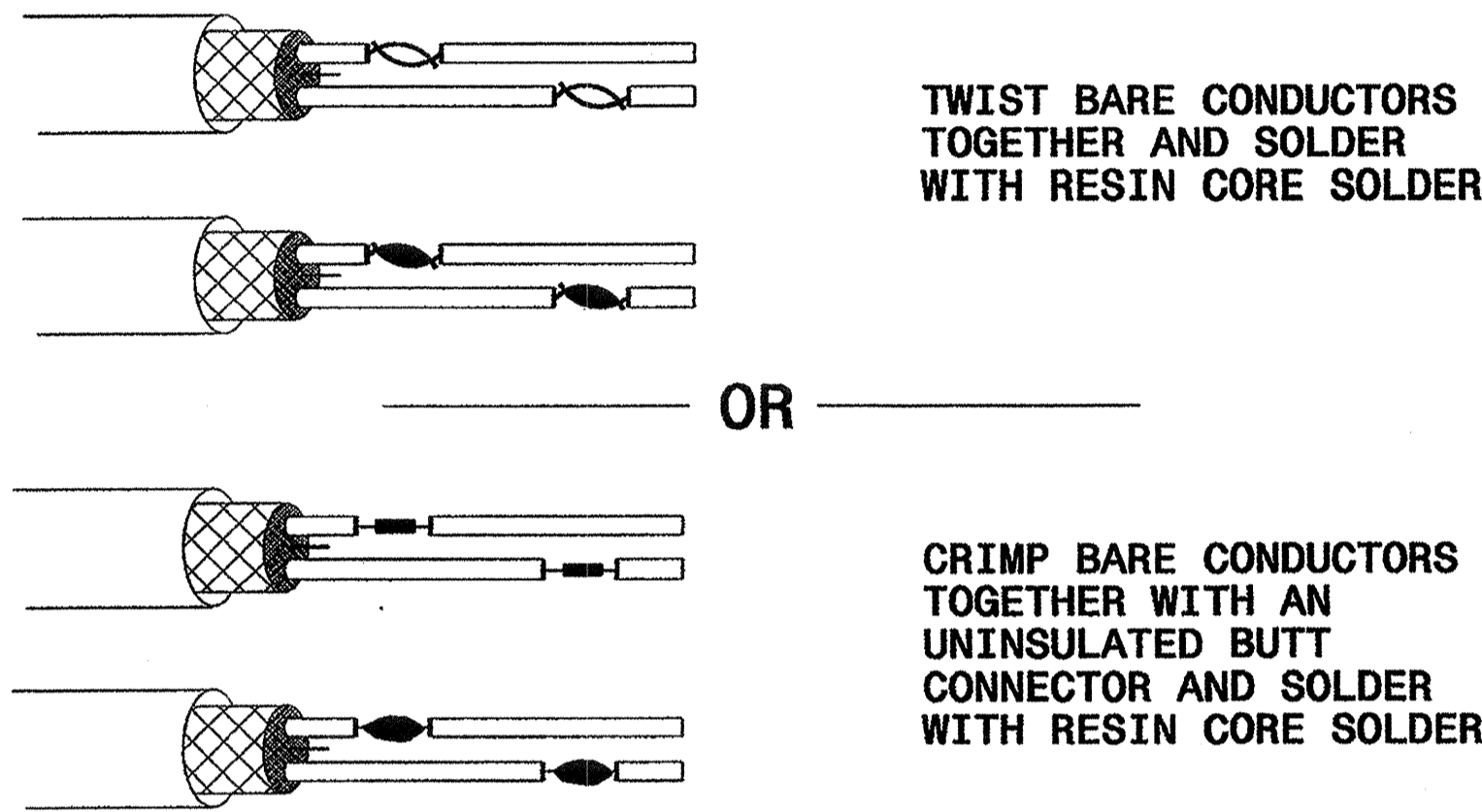
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE

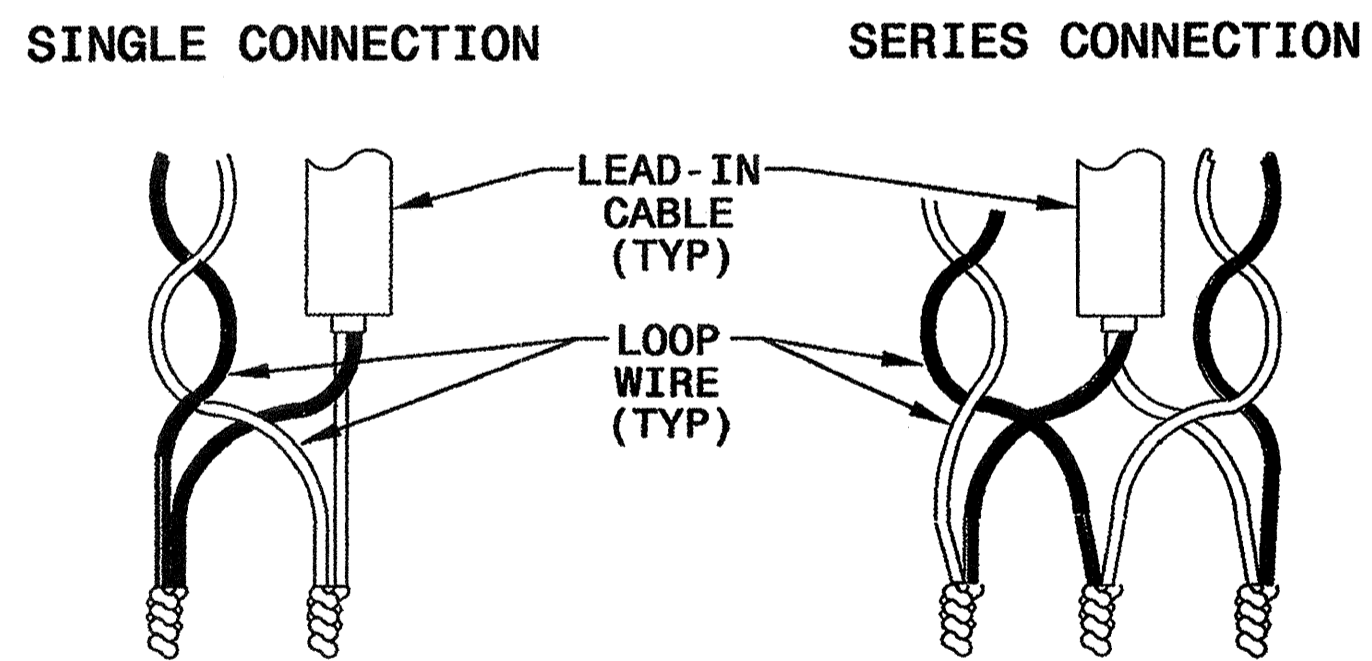


STEP 2. CONNECT AND SOLDER

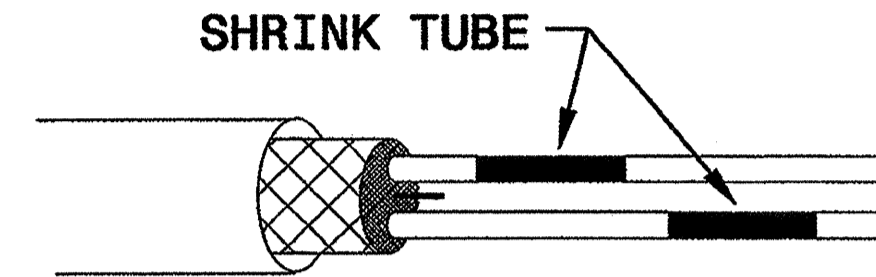


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

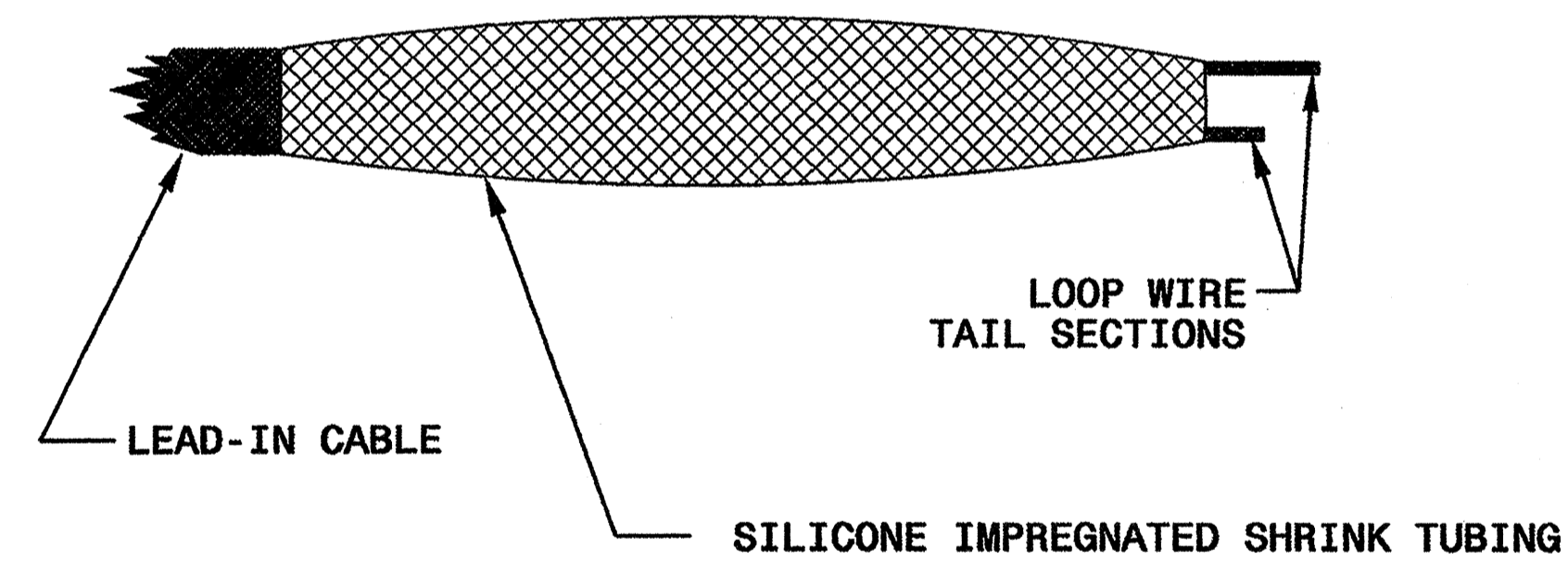
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

Milton I. Dean 9/5/07
SIGNATURE DATE