

Project: U-3613 B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

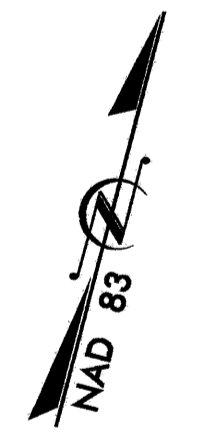
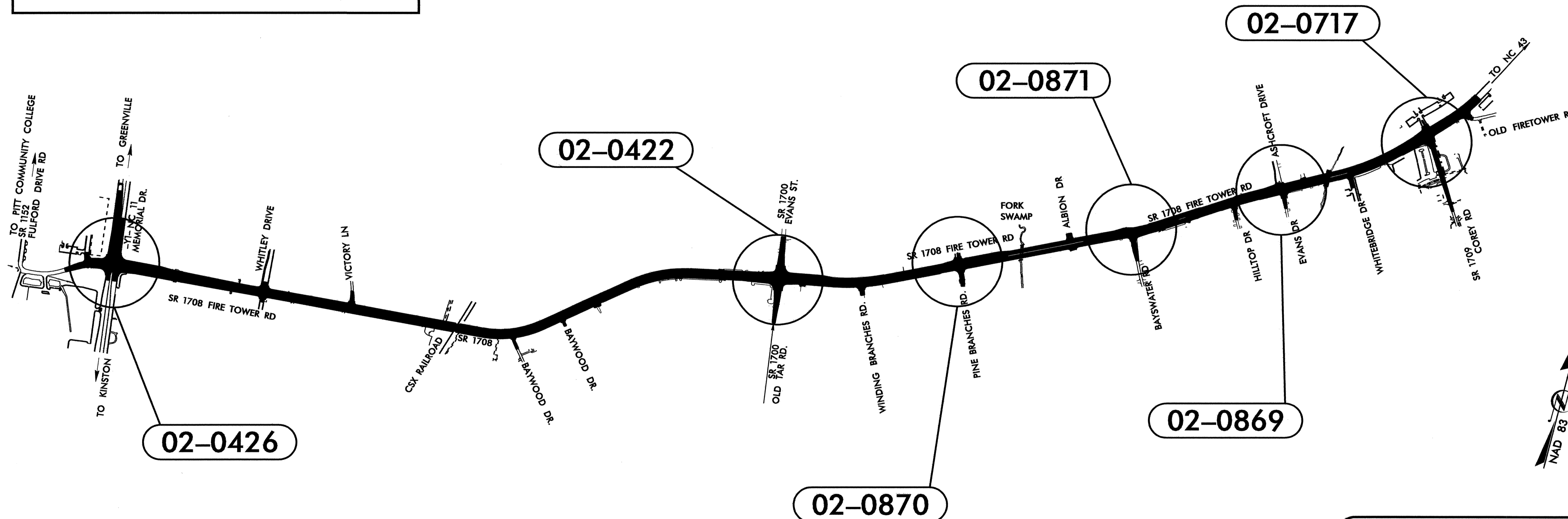
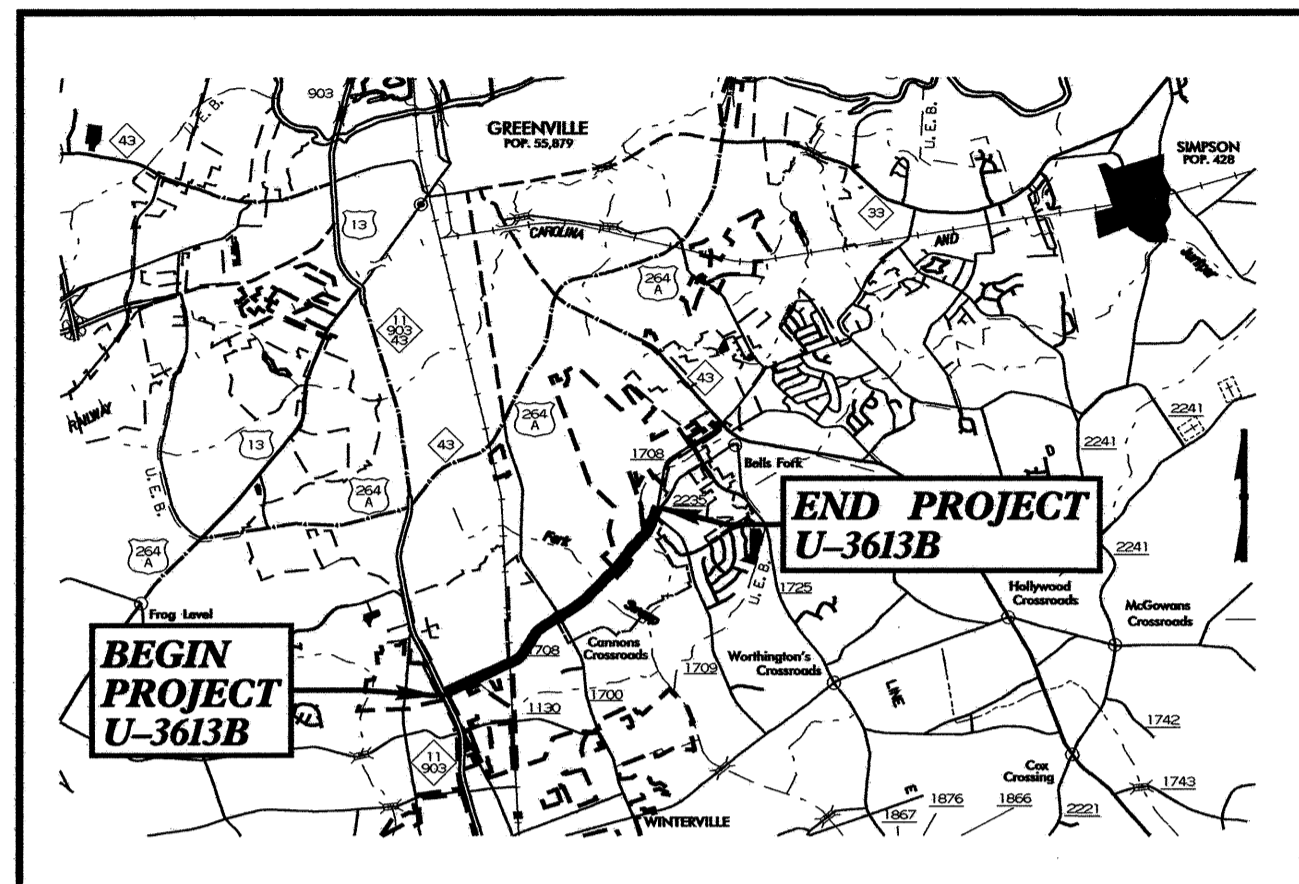
Project No.	Sheet No.
U-3613 B	Sig. 1

PITT COUNTY

LOCATION: GREENVILLE- SR 1708 (FIRE TOWER ROAD) FROM WEST OF NC 11-903 TO EAST OF SR 1709 (COREY ROAD)

TYPE OF WORK: TRAFFIC SIGNALS AND FIBER OPTIC COMMUNICATIONS CABLE

Vicinity



Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.

Sheet #	Signal Inventory #	Index of Plans Location/Description
Sig. 1		Title Sheet
Sig. 2	02-0426	NC 11-903 (Memorial Drive) at SR 1152 (Dr. Fulford Drive Road)/SR 1708 (Fire Tower Road)
Sig. 10	02-0422	SR 1708 (Fire Tower Road) at SR 1700 (Old Tar Road/Evans Street)
Sig. 18	02-0870	SR 1708 (Fire Tower Road) at Pine Branches Road and Entrance to Paramore Farms
Sig. 22	02-0871	SR 1708 (Fire Tower Road) at Bayswater Road
Sig. 26	02-0869	SR 1708 (Fire Tower Road) at Evans Drive/Ashcroft Drive
Sig. 30	02-0717	SR 1708 (Fire Tower Road) at SR 1709 (Corey Road) and Entrance to Apartments
Sig. 40		Communications Cable Routing Plans
Sig. 51		Metal Pole Details

TRAFFIC MANAGEMENT AND SIGNAL SYSTEMS UNIT
Contacts:
D. Y. Ishak - Signals and Geometrics Contracts Engineer
G. C. Brown, PE - Signal Equipment Design Engineer
G. G. Murr, Jr., PE - Traffic Management Systems Engineer

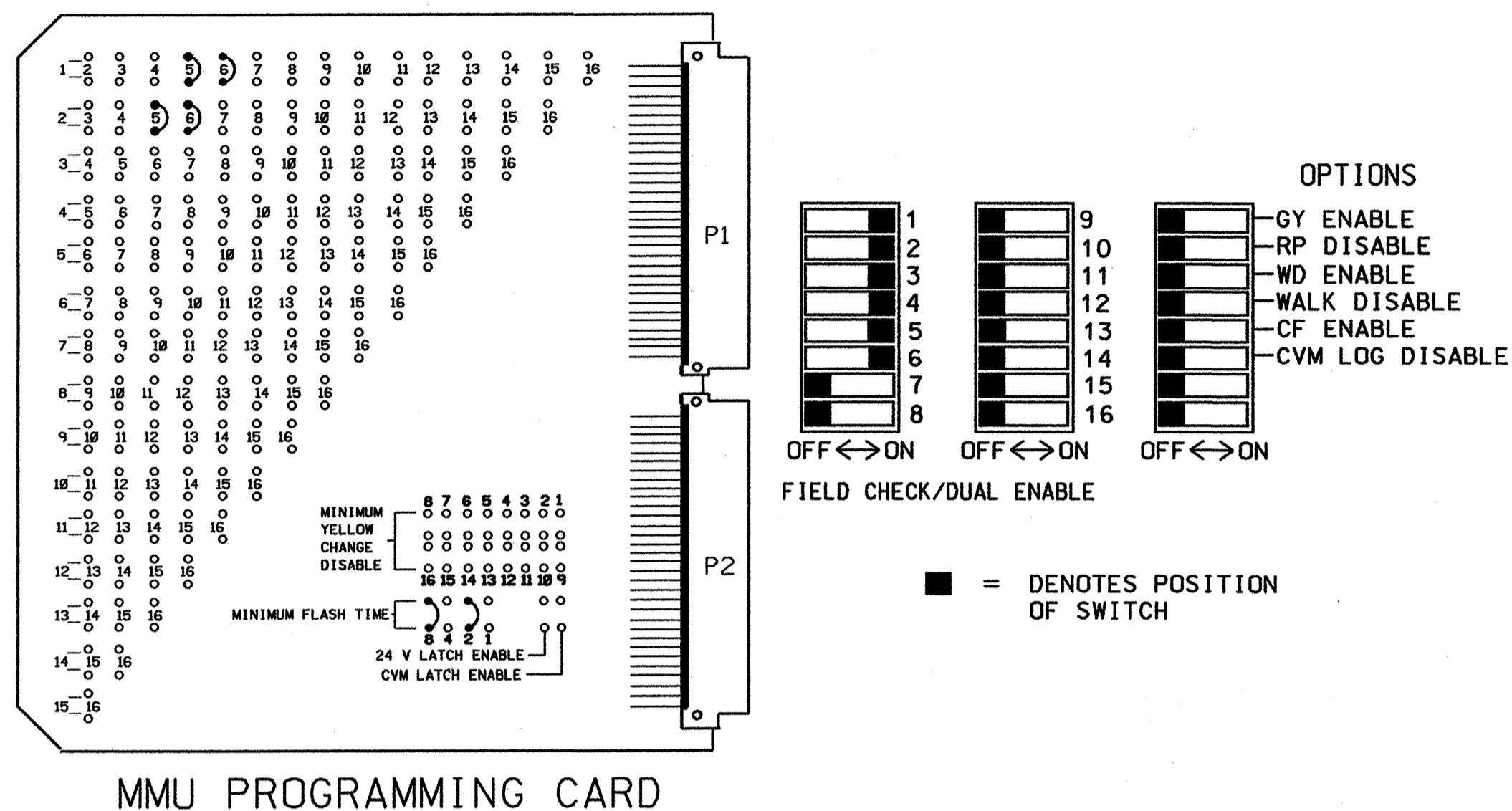
Prepared In the Office of:
DIVISION OF HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

122 N. McDowell St., Raleigh, NC 27603

11-MAY-2006 14:59 s:\sig signals\workgroups\tp_projects\U-3613b\U3613b-sig-tsh-20060307.dgn

**EDI MODEL MMU-16E
MALFUNCTION MANAGEMENT UNIT
PROGRAMMING DETAIL**

(program card and set switches as shown below)



- NOTES**
- TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES TO FLASH RED. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
 - TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED LOAD SWITCH RED OUTPUTS 7, 8, 9, 10, 11, 12, 13, 14, 15 AND 16 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.
 - PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
 - SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
 - ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
 - PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
 - PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
 - SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
 - PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
 - THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	11	21,22	31	32	41	42	42	51	61,62	NU	NU	NU	NU	NU	NU	NU
RED		2R	3R	3R	4R	4R			6R							
YELLOW		2Y	3Y	3Y	4Y	4Y			6Y							
GREEN		2G	3G	3G	4G	4G			6G							
RED ARROW	1R							5R								
YELLOW ARROW	1Y							5Y	5Y							
GREEN ARROW	1G		3G		4G			5G	5G							

NU = Not Used

DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
1A	L1A.L1B
	L2A.L2B
	L3A.L3B
	L4A.L4B
2A	L5A.L5B
2B	L6A.L6B
	L7A.L7B
	L8A.L8B
3A	L9A.L9B
	L10A.L10B
	L11A.L11B
4B	L12A.L12B
5A	L13A.L13B
5B	L14A.L14B
6A	L15A.L15B
6B	L16A.L16B
6C	L17A.L17B
	L18A.L18B
	L19A.L19B
	L20A.L20B
	L21A.L21B
	L22A.L22B
	L23A.L23B
	L24A.L24B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME(SEC)
1	∅ 1		
2			
3			
4			
5	∅ 2		
6	∅ 2		
7			
8			
9	∅ 3	DELAY	5
10			
11			
12	∅ 4	DELAY	3
13	∅ 5		
14	∅ 5	DELAY	15
15	∅ 6		
16	∅ 6		
17	∅ 6		
18			
19			
20			
21			
22			
23			
24			

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED
 CABINETCONTRACTOR SUPPLIED [TS-2] NC-8A
 CABINET MOUNT.....BASE
 LOADBAY POSITIONS.....16
 LOAD SWITCHES USED.....1,2,3,4,5,6
 PHASES USED.....1,2,3,4,5,6
 OLA.....NOT USED
 OLB.....NOT USED
 OLC.....NOT USED
 OLD.....NOT USED

DETECTOR RACK #1

BIU	SLOT	CH1	SLOT	CH1	CH1	CH1	CH1	CH1	SLOT	SLOT	SLOT
		L1		L5	NOT	L9	L15	L13			
		∅ 1		∅ 2	USED	∅ 3	∅ 6	∅ 5			
BIU	EMPTY	CH2	EMPTY	CH2	CH2	CH2	CH2	CH2	EMPTY	EMPTY	EMPTY
		NOT		L6	L12	NOT	L16	L14			
		USED		∅ 2	∅ 4	USED	∅ 6	∅ 5			

DETECTOR RACK #2

BIU	SLOT	CH1	SLOT	SLOT
		L17		
		∅ 6		
BIU	EMPTY	CH2	EMPTY	EMPTY
		NOT		
		USED		

LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	∅ 1
2	∅ 2
3	∅ 3
4	∅ 4
5	∅ 5
6	∅ 6
7	∅ 7
8	∅ 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

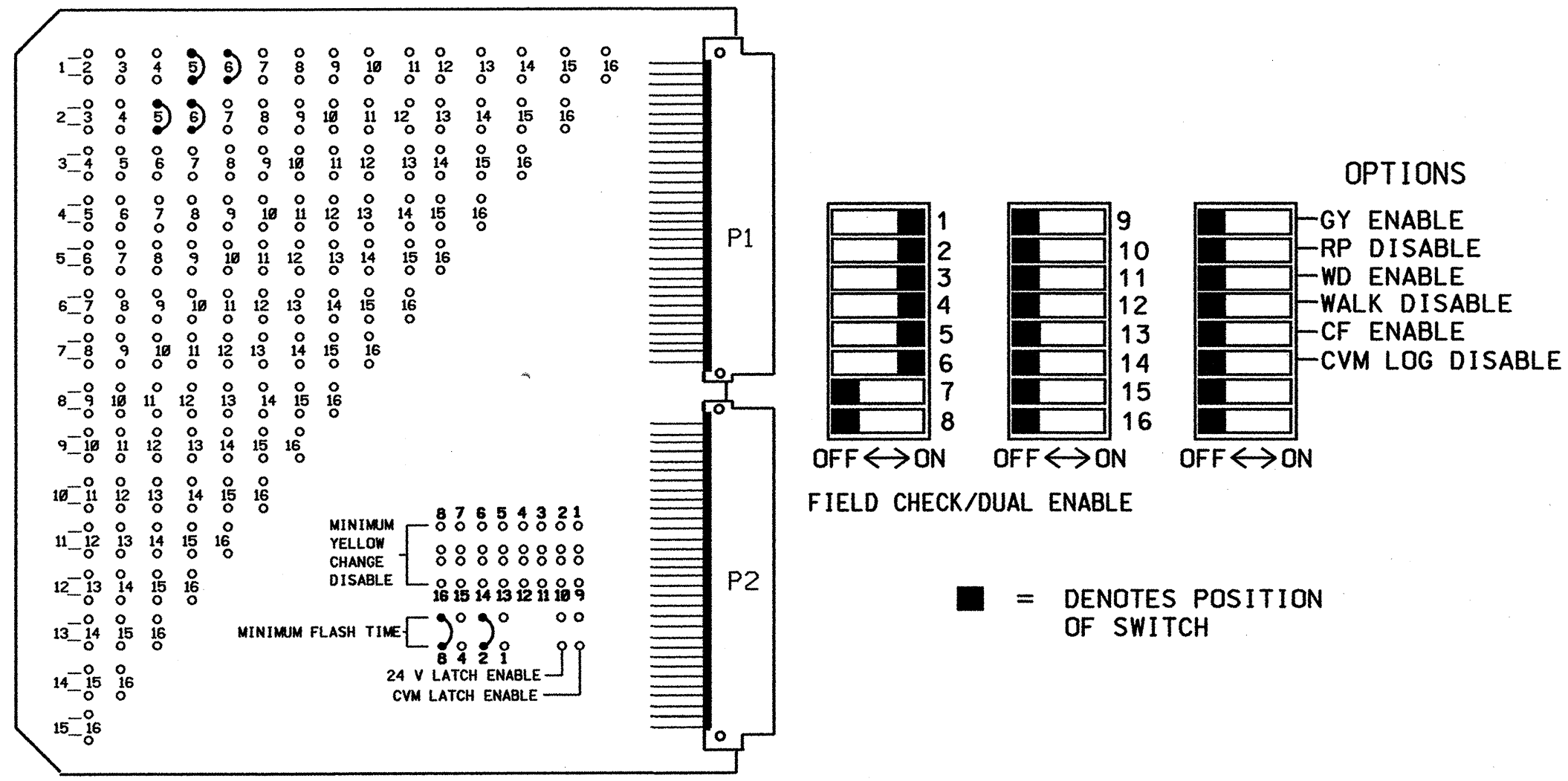
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0426 T1
 DESIGNED: January 2006
 SEALED: 03-03-06
 REVISED: NA

Signal Upgrade - Temporary 1

	ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 11 - 903 (Memorial Drive) at SR 1152 (Dr. Fulford Drive Rd.) SR 1708 (Fire Tower Rd.)
	Division 2 Pitt County Greenville PLAN DATE: February 2006 REVIEWED BY: JWA PREPARED BY: James Peterson REVIEWED BY:
REVISIONS INIT. DATE	SIGNATURE: John T. Rowe 3-8-06 DATE: 3-8-06 SIG. INVENTORY NO. 02-0426 T1

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

**EDI MODEL MMU-16E
MALFUNCTION MANAGEMENT UNIT
PROGRAMMING DETAIL**
(program card and set switches as shown below)



MMU PROGRAMMING CARD

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES 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 OUTPUTS 7, 8, 9, 10, 11, 12, 13, 14, 15 AND 16 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 MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
7. PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
8. SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
9. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
10. THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	11	32	21,22	31	32	41	42,43	63	43	51	61	62,63	NU	NU	NU	NU
RED		2R	3R	3R	4R	4R					6R					
YELLOW		2Y	3Y	3Y	4Y	4Y					6Y					
GREEN		2G	3G	3G	4G	4G					6G					
RED ARROW	1R									5R						
YELLOW ARROW	1Y	1Y				4Y	5Y	5Y								
GREEN ARROW	1G	1G	3G	4G	4G	5G	5G									

NU = Not Used

DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
	L1A,L1B
1B	L2A,L2B
1C	L3A,L3B
1D	L4A,L4B
2A	L5A,L5B
2B	L6A,L6B
	L7A,L7B
	L8A,L8B
3A	L9A,L9B
	L10A,L10B
	L11A,L11B
	L12A,L12B
5A	L13A,L13B
5B	L14A,L14B
6A	L15A,L15B
6B	L16A,L16B
6C	L17A,L17B
7A	L18A,L18B
	L19A,L19B
8B	L20A,L20B
	L21A,L21B
	L22A,L22B
	L23A,L23B
	L24A,L24B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME(SEC)
1			
2	∅ 1		
* 3	∅ 3	DC/EC	5/2
4	∅ 3	DELAY	15
5	∅ 2		
6	∅ 2		
7			
8			
9	∅ 3	DELAY	100
10			
11			
12			
13	∅ 5		
14	∅ 5	DELAY	15
15	∅ 6		
16	∅ 6		
17	∅ 6		
18	∅ 4	DELAY	3
19			
20	∅ 3	DELAY	3
21			
22			
23			
24			

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED
 CABINETCONTRACTOR SUPPLIED [TS-2] NC-8A
 CABINET MOUNT.....BASE
 LOADBAY POSITIONS.....16
 LOAD SWITCHES USED.....1,2,3,4,5,6
 PHASES USED.....1,2,3,4,5,6
 OLA.....NOT USED
 OLB.....NOT USED
 OLC.....NOT USED
 OLD.....NOT USED

DETECTOR RACK #1

BIU	CH1	CH1	SLOT	CH1	SLOT	CH1	CH1	CH1	SLOT	SLOT	SLOT
	L3	NOT USED		L5		L9	L15	L13			
	∅ 3			∅ 2		∅ 3	∅ 6	∅ 5			
	*										
BIU	CH2	CH2	EMPTY	CH2	EMPTY	CH2	CH2	CH2	EMPTY	EMPTY	EMPTY
	L4	L2		L6		NOT USED	L16	L14			
	∅ 3	∅ 1		∅ 2		∅ 6	∅ 5				

DETECTOR RACK #2

BIU	CH1	CH1	SLOT	SLOT
	NOT USED	L17		
		∅ 6		
BIU	CH2	CH2	EMPTY	EMPTY
	L20	L18		
	∅ 3	∅ 4		

LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	∅ 1
2	∅ 2
3	∅ 3
4	∅ 4
5	∅ 5
6	∅ 6
7	∅ 7
8	∅ 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0426 T2
 DESIGNED: January 2006
 SEALED: 03-03-06
 REVISED: NA

Signal Upgrade - Temporaray 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
 Traffic Engineering and Signal Systems
 DIVISION OF TRANSPORTATION
 Signal Management Section
 122 N. McDowell St., Raleigh, NC 27603

NC 11 - 903 (Memorial Drive) at SR 1152 (Dr. Fulford Drive Rd.) SR 1708 (Fire Tower Rd.)

Division 2 Pitt County Greenville
 PLAN DATE: February 2006 REVIEWED BY: JLP
 PREPARED BY: James Peterson REVIEWED BY:

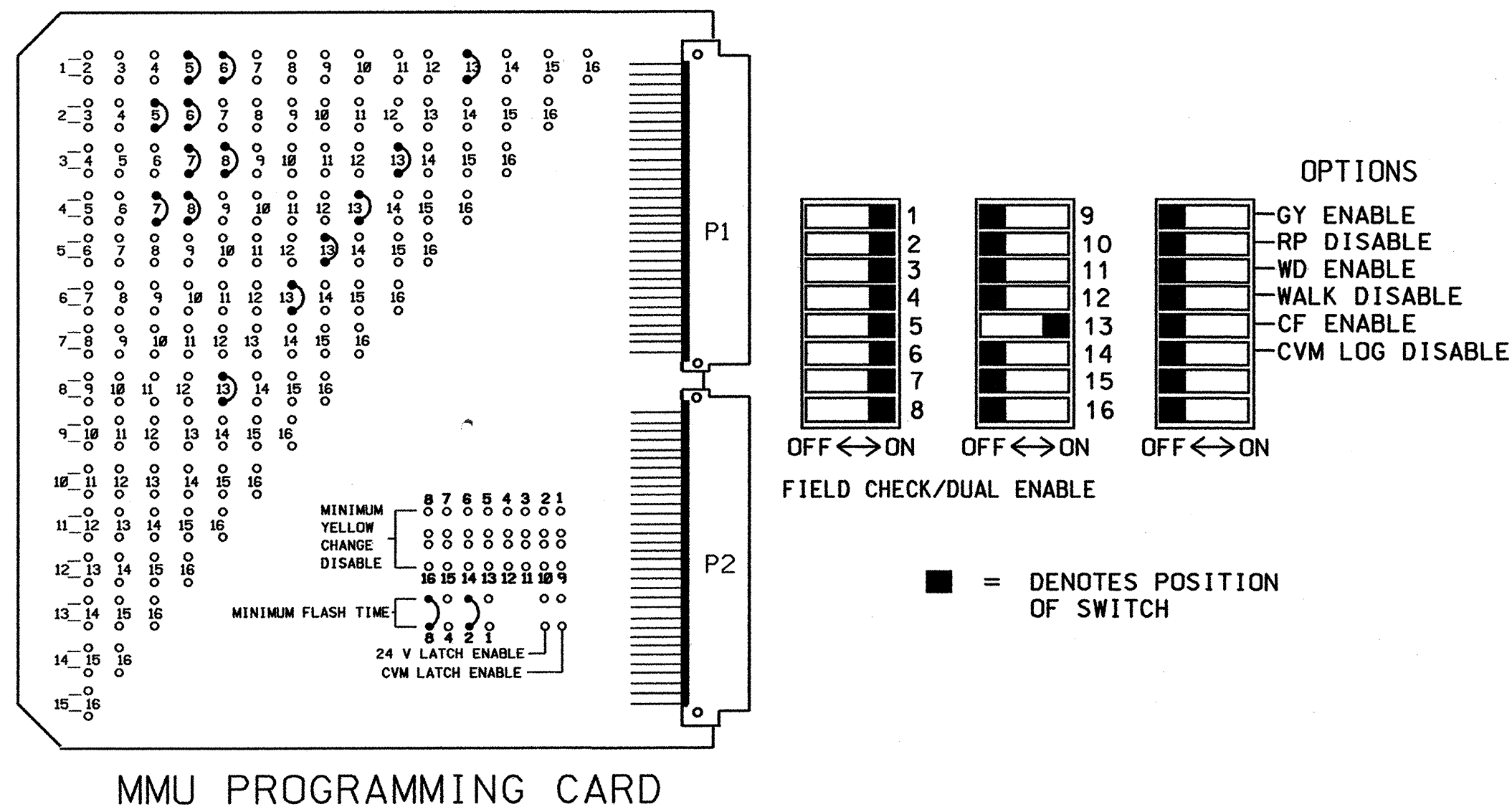
REVISIONS: INIT. DATE

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 008453
 JOHN T. ROWE, JR.
 Signature: John T. Rowe, Jr. 3-8-06
 DATE: 3-8-06
 SIG. INVENTORY NO. 02-0426 T2

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

**EDI MODEL MMU-16E
MALFUNCTION MANAGEMENT UNIT
PROGRAMMING DETAIL**

(program card and set switches as shown below)



NOTES

- TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES TO FLASH RED. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED LOAD SWITCH RED OUTPUTS 9,10,11,12,14,15 & 16 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.
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- SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
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- PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
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- PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
- THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD		
SIGNAL HEAD NO.	11,12	21,22	31,32	41,42	42	51	61, 62,63	63	71	81,82	NU	NU	NU	NU	13,14	NU	NU	NU
RED		2R		4R			6R			8R								
YELLOW		2Y		4Y			6Y			8Y								
GREEN		2G		4G			6G			8G								
RED ARROW	1R		3R			5R			7R					13R				
YELLOW ARROW	1Y		3Y		5Y	5Y		7Y	7Y					13Y				
GREEN ARROW	1G		3G		5G	5G		7G	7G					13G				

NU = Not Used

**ECONOLITE ASC/2-2100 OVERLAP
PROGRAMMING DETAIL**

(program controller as shown)

FROM MAIN MENU SELECT 2 (CONTROLLER) AND THEN 5 (OVERLAP DATA)

OVERLAP A

CONTROLLER OVERLAP DATA												
OVERLAP A	1	2	3	4	5	6	7	8	9	0	1	1
STANDARD		X									X	
PROTECTED												
PERMITTED												
ENABLE LAG												
ENABLE LEAD												
SPARE												
ADVANCE GREEN TIMER											0.0	
LAG/LEAD GREEN TIMER											0.0	
LAG/LEAD YELLOW TIMER											0.0	
LAG/LEAD RED TIMER											0.0	

END OF PROGRAMMING

DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
1A	L1A,L1B
1B	L2A,L2B
1C	L3A,L3B
1D	L4A,L4B
2A	L5A,L5B
2B	L6A,L6B
2C	L7A,L7B
	L8A,L8B
3A	L9A,L9B
3B	L10A,L10B
4A	L11A,L11B
4B	L12A,L12B
5A	L13A,L13B
5B	L14A,L14B
6A	L15A,L15B
6B	L16A,L16B
6C	L17A,L17B
7A	L18A,L18B
8A	L19A,L19B
8B	L20A,L20B
S1	L21A,L21B
S2	L22A,L22B
	L23A,L23B
	L24A,L24B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

ASSIGN CONTROLLER SYSTEM DETECTOR TO LOCAL CONT. DET. NUMBERS AS SHOWN IN CHART BELOW

CONTROLLER SYS. DET. NO.	LOCAL CONT. DETECTOR NO.
1	21
2	22
3	
4	
5	
6	
7	
8	

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME(SEC)
1	∅ 1		
2	∅ 1		
3	∅ 1	DELAY	15
4	∅ 1	DELAY	15
5	∅ 2		
6	∅ 2		
7	∅ 2		
8			
9	∅ 3		
10	∅ 3		
11	∅ 4		
12	∅ 4		
13	∅ 5		
14	∅ 5	DELAY	15
15	∅ 6		
16	∅ 6		
17	∅ 6		
18	∅ 7	DELAY	3
19	∅ 8	DELAY	100
* 20	∅ 8	DC/EC	5/2
21	SYS		
22	SYS		
23			
24			

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED
 CABINETCONTRACTOR SUPPLIED **TS-2** NC-8A
 CABINET MOUNT.....BASE
 LOADBAY POSITIONS.....16
 LOAD SWITCHES USED.....1,2,3,4,5,6,7,8,13
 PHASES USED.....1,2,3,4,5,6,7,8
 OLA.....1+8
 OLB.....NOT USED
 OLC.....NOT USED
 OLD.....NOT USED

DETECTOR RACK #1

CH1	CH1	CH1	CH1	CH1	CH1	CH1	CH1			
L3	L1	L7	L5	L11	L9	L15	L13	SLOT	SLOT	SLOT
∅ 1	∅ 1	∅ 2	∅ 2	∅ 4	∅ 3	∅ 6	∅ 5	EMPTY	EMPTY	EMPTY

DETECTOR RACK #2

CH1	CH1		CH1
L19	L17	SLOT	L21
∅ 8	∅ 6		SYS DET
		EMPTY	
CH2	CH2		CH2
L20	L18		L22
∅ 8	∅ 7		SYS DET
*			

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0426
 DESIGNED: January 2006
 SEALED: 03-03-06
 REVISED: NA

Signal Upgrade - Final

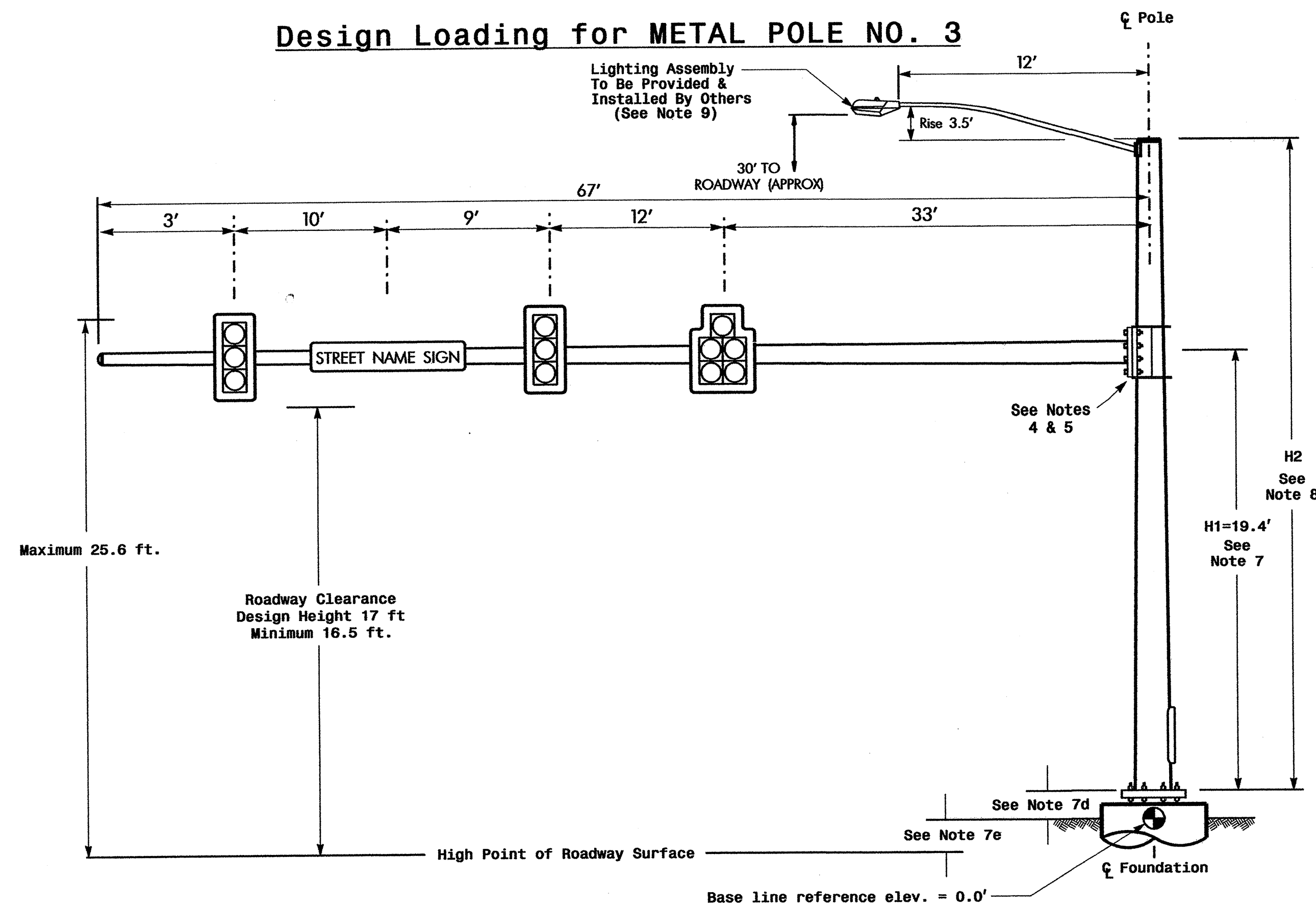
ELECTRICAL AND PROGRAMMING DETAILS FOR: **NC 11 - 903 (Memorial Drive)**
 at
SR 1152 (Dr. Fulford Drive Rd.)
SR 1708 (Fire Tower Rd.)

Division 2 Pitt County Greenville
 PLAN DATE: February 2006 REVIEWED BY: *JKH*
 PREPARED BY: James Peterson REVIEWED BY:
 REVISIONS INIT. DATE

122 N. McDowell St., Raleigh, NC 27603

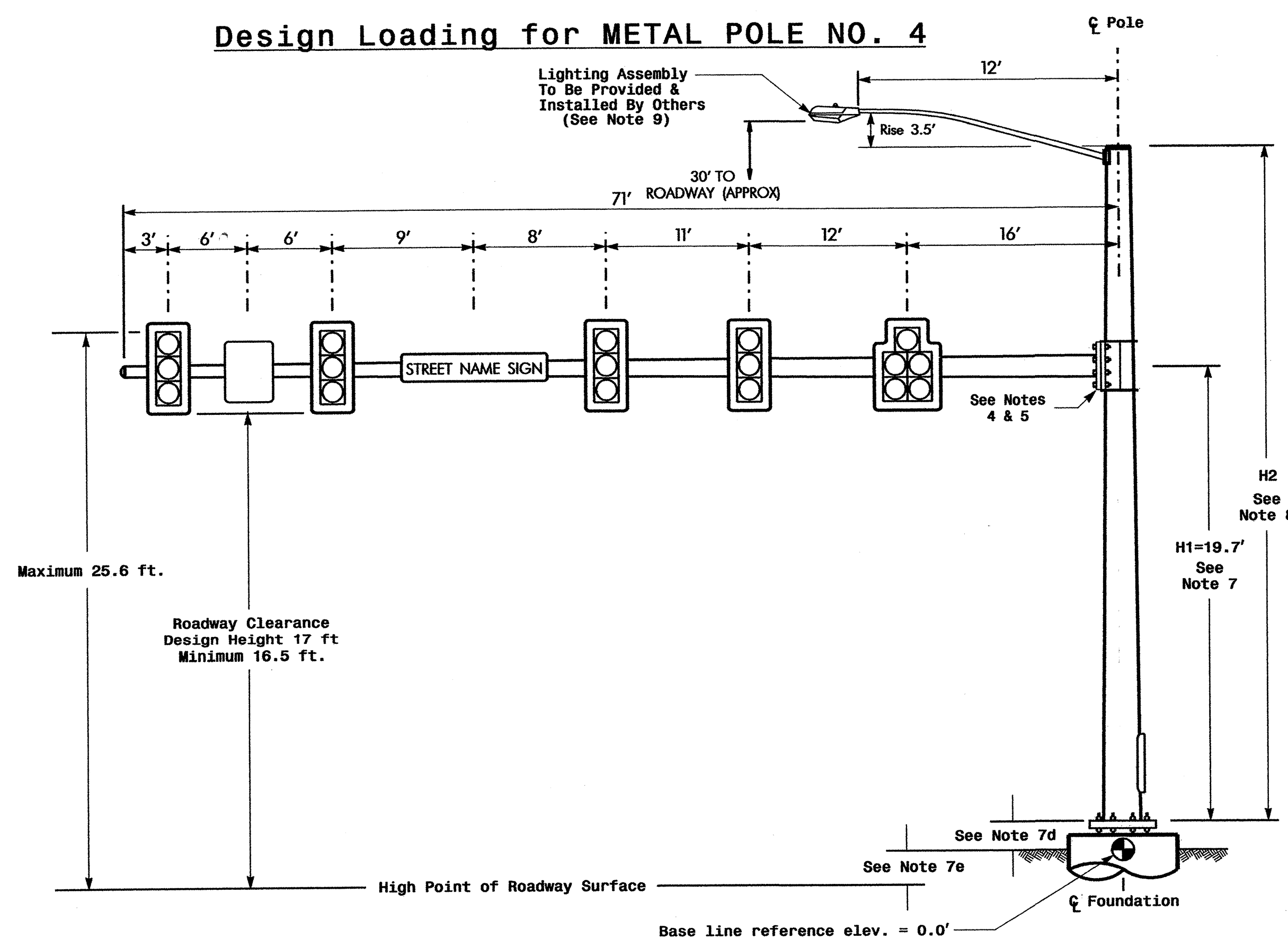
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 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 008453
 JOHN T. ROWE, JR.
 SIGNATURE DATE
 02-0426

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	+0.8 ft.	+1.1 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
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 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

	LUMINAIRE OVX DROP PRISMATIC REFRACTOR	EPA 0.87 S.F.	13.25" W X 26.25" L	35 LBS
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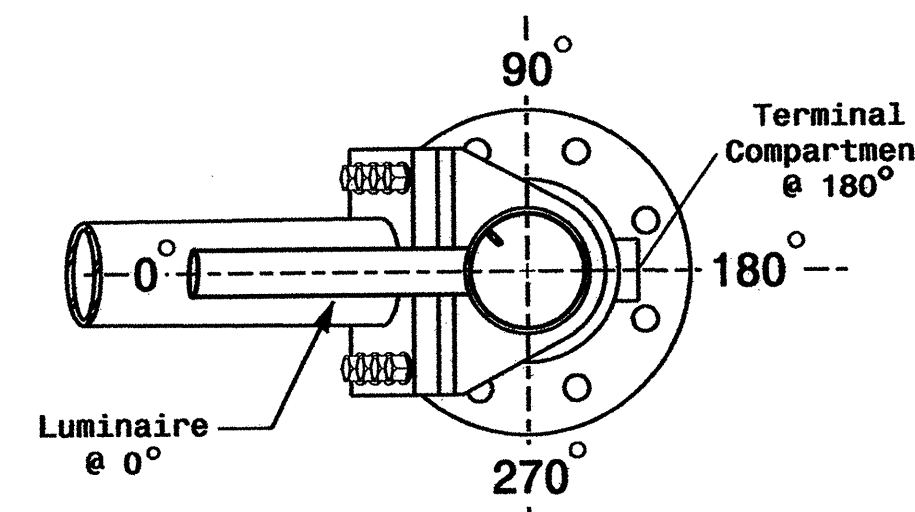
NOTES

Design Reference Material

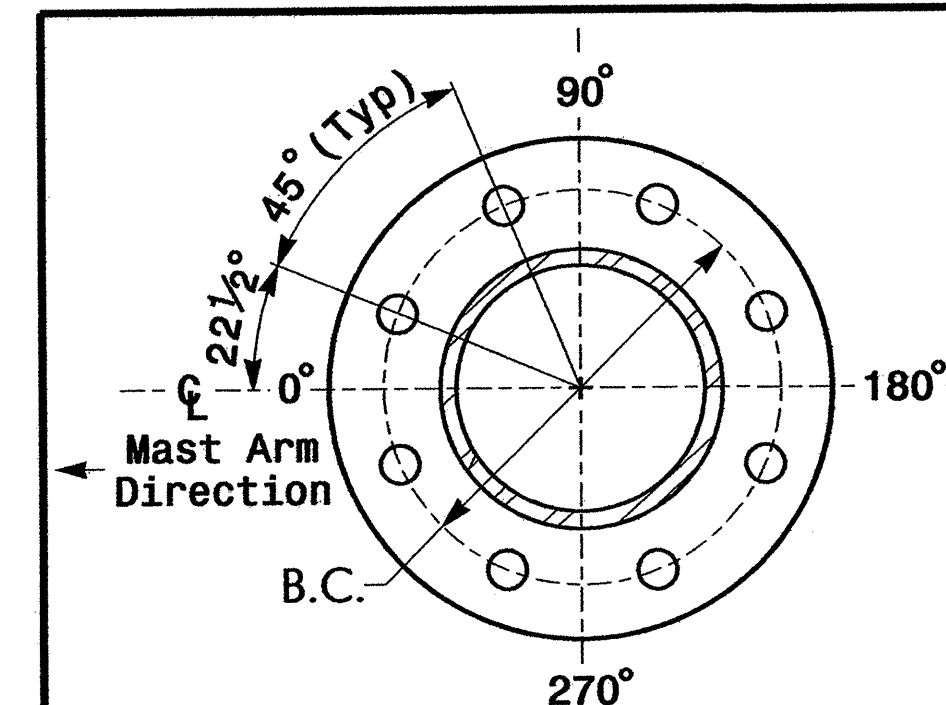
- Design the traffic signal structure and foundation in accordance with: The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions. The 2002 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions. The 2002 NCDOT Roadway Standard Drawings. The traffic signal project plans and special provisions. The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.doh.state.nc.us/preconstruct/traffic/tmssu/ws/mpoles/poles.htm>

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.
- Maximum allowable CSR for all signal supports is 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 is a high strength connection. Use Direct Tension Indicators (ASTM F959) for each bolt.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 66 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 based on the luminaire height requirement of 30 feet.
- Design the luminaire support arm using design dimensions as shown on elevation views. Refer to the Radial Orientation Detail for attachment to the signal pole. Elevation arm end for a nominal 2 inch slip fit socket connection for light assembly.
- 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) 733-3915.
- 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.

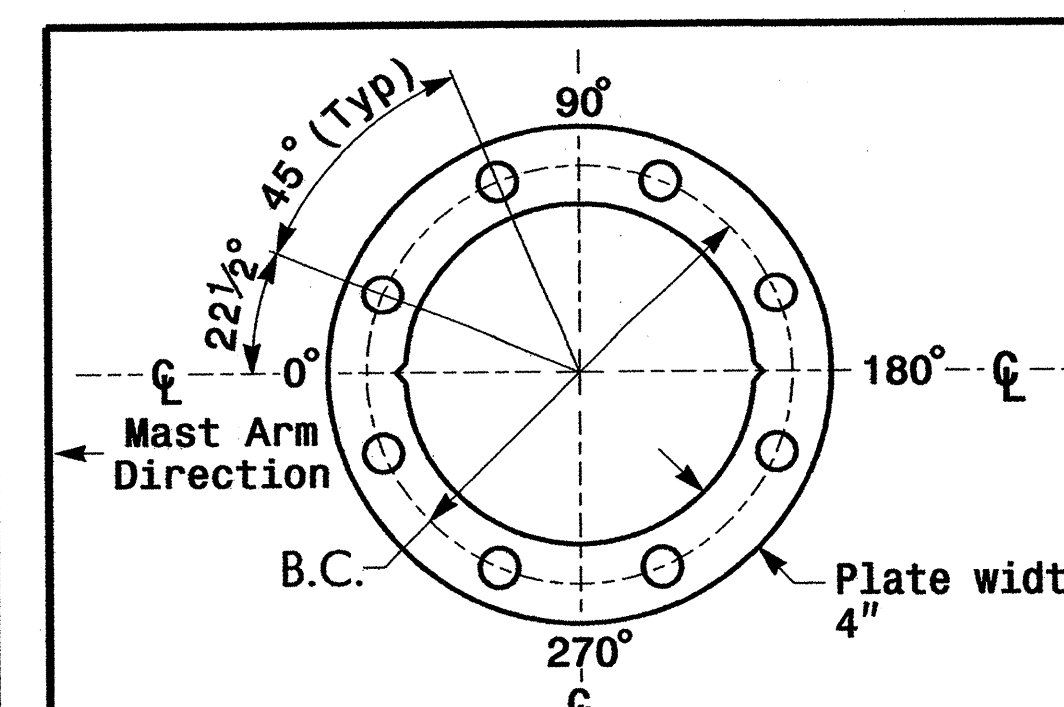


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

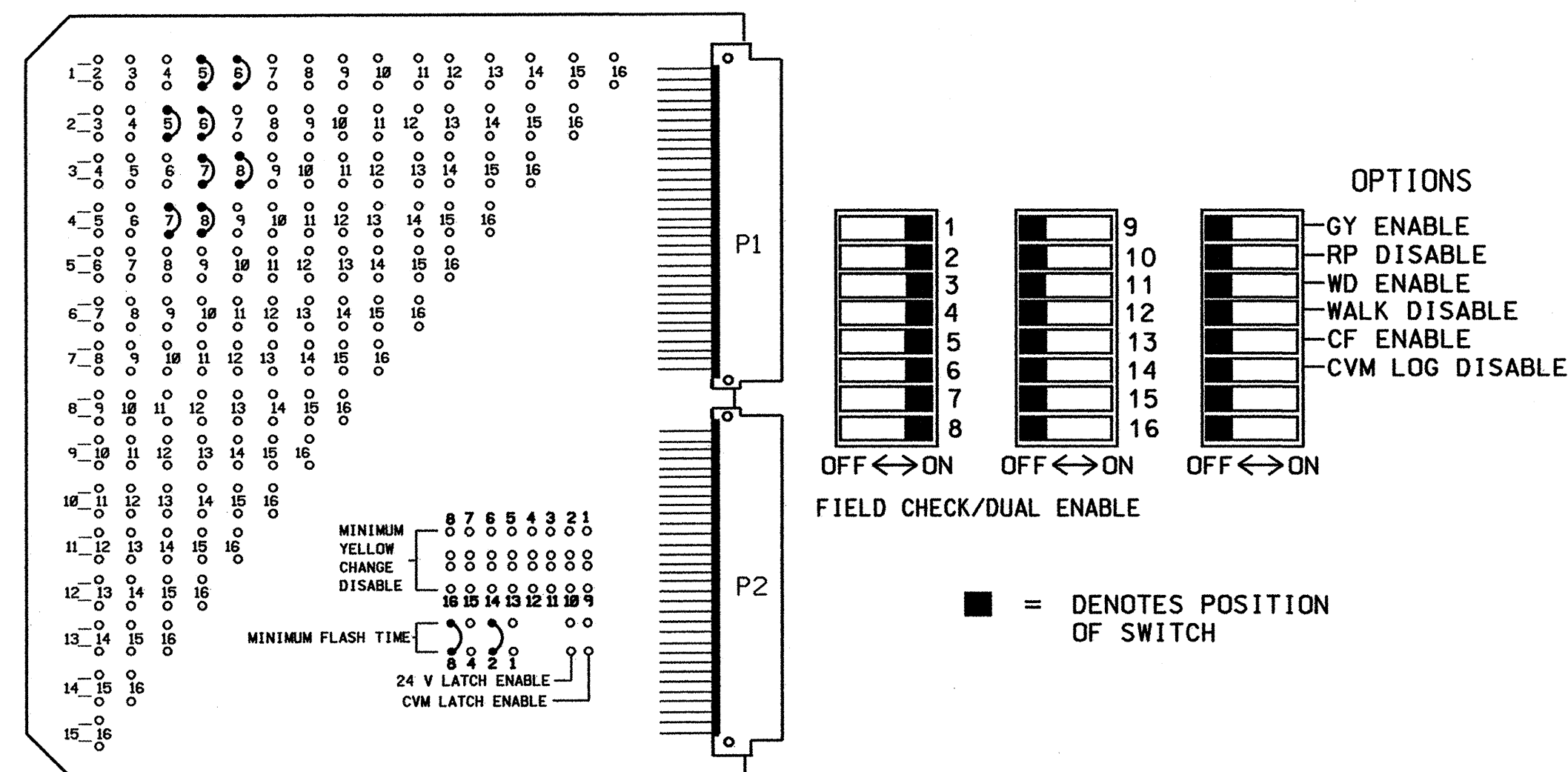
NCDOT Wind Zone 2 (130 mph)

	Prepared in the Office of: NC 11-903 (Memorial Drive) at SR 1152 (Dr. Fulford Drive Rd.) / SR 1708 (Fire Tower Rd.) Division 2 Pitt County Greenville		
	PLAN DATE: February 2006 PREPARED BY: TS Thigpen	REVIEWED BY: RM Duffy REVISIONS:	
SCALE: 0 N/A 		INVENTORY NO. 02-0426	

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 11-903.dgn

EDI MODEL MMU-16E MALFUNCTION MANAGEMENT UNIT PROGRAMMING DETAIL

(program card and set switches as shown below)



MMU PROGRAMMING CARD

- #### NOTES
1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES 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 OUTPUTS 9, 10, 11, 12, 13, 14, 15 AND 16 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 MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
 5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
 6. PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
 7. PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
 8. SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
 9. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
 10. PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DUAL ENTRY.
 11. THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	61	21,22	81	41,42	21	61,62	41	81,82	NU	NU	NU	NU	NU	NU	NU	NU
RED	*	2R	*	4R	*	6R	*	8R								
YELLOW		2Y		4Y		6Y		8Y								
GREEN		2G		4G		6G		8G								
RED ARROW																
YELLOW ARROW	1Y		3Y		5Y		7Y									
GREEN ARROW	1G		3G		5G		7G									
Hand icon																
Person icon																

NU = NOT USED
* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED
CABINETCONTRACTOR SUPPLIED TS-2 NC-8A
CABINET MOUNT.....BASE
LOADBAY POSITIONS.....16
LOAD SWITCHES USED.....1,2,3,4,5,6,7,8
PHASES USED.....1,2,3,4,5,6,7,8
OLA.....NOT USED
OLB.....NOT USED
OLC.....NOT USED
OLD.....NOT USED

DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

BIU	CH1	CH1	CH1	CH1	CH1	CH1	CH1	SLOT	SLOT	SLOT
	L3	L1	L7	L5	L11	L9	L15			
	∅ 2	∅ 1	∅ 4	∅ 3	∅ 6	∅ 5	∅ 8	∅ 7		
	CH2 NOT USED	CH2 L2	CH2 L8	CH2 L6	CH2 NOT USED	CH2 L10	CH2 L16	CH2 L14	EMPTY	EMPTY
		*	*		*	*				

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
1A	L1A,L1B
	L2A,L2B
2A	L3A,L3B
	L4A,L4B
3A	L5A,L5B
	L6A,L6B
4A	L7A,L7B
	L8A,L8B
5A	L9A,L9B
	L10A,L10B
6A	L11A,L11B
	L12A,L12B
7A	L13A,L13B
	L14A,L14B
8A	L15A,L15B
	L16A,L16B

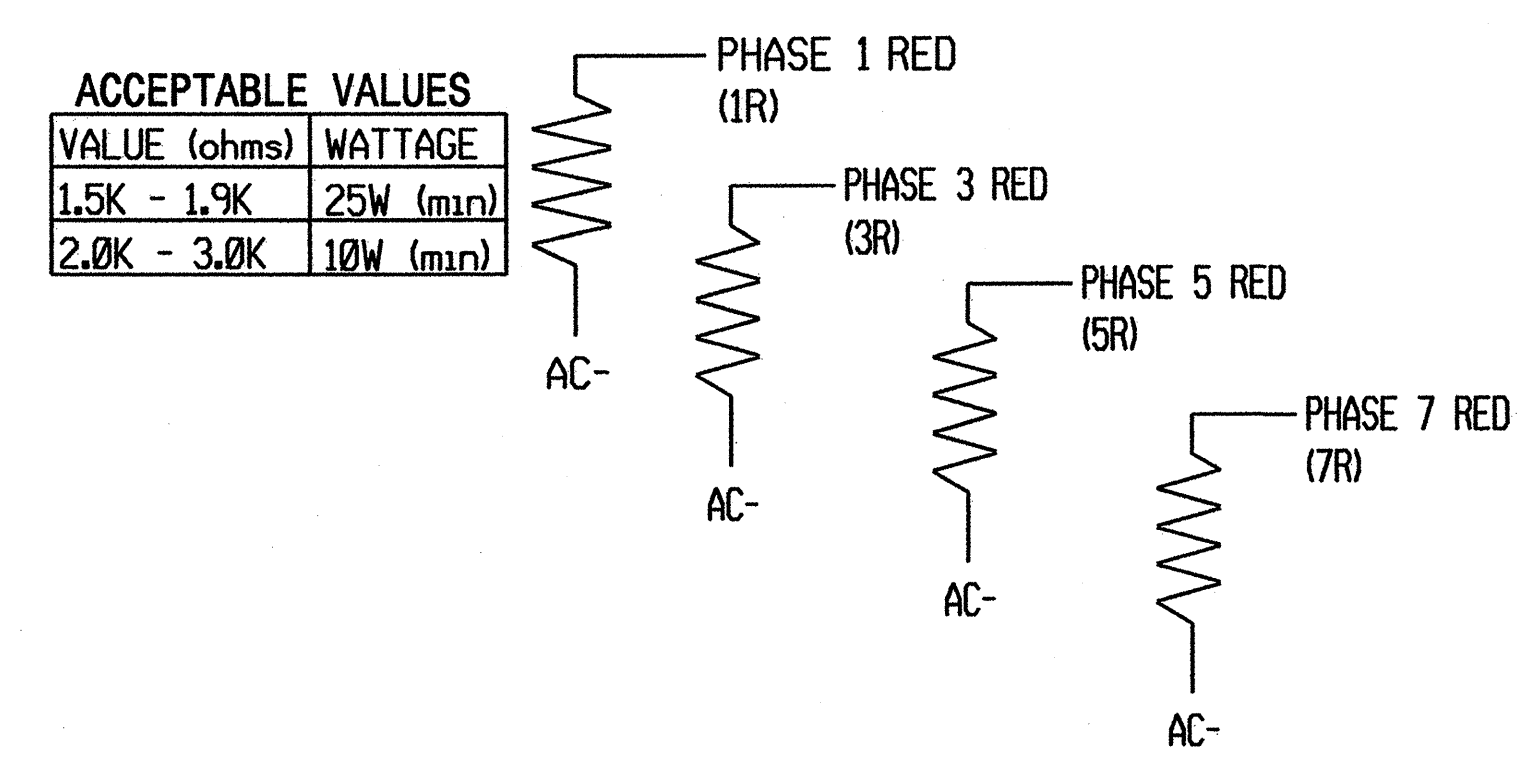
NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME(SEC)
1	∅ 1	DELAY	15
* 2	∅ 6	DELAY	3
3	∅ 2		
4			
5	∅ 3	DELAY	15
6	∅ 8	DELAY	3
7	∅ 4	DELAY	100
* 8	∅ 4	DC/EC	5/2
9	∅ 5	DELAY	15
* 10	∅ 2	DELAY	3
11	∅ 6		
12			
13	∅ 7	DELAY	15
14	∅ 4	DELAY	3
15	∅ 8	DELAY	100
* 16	∅ 8	DC/EC	5/2

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

LOAD RESISTOR INSTALLATION DETAIL



VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

NOTE: THE PURPOSE OF THIS RESISTOR IS TO LOAD THE CHANNEL RED MONITOR INPUT IN ORDER FOR THE MALFUNCTION MANAGEMENT UNIT TO USE THE FULL SIGNAL SEQUENCE MONITORING CAPABILITY ON PHASES THAT DO NOT USE THE RED DISPLAY IN THE FIELD.

LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	∅ 1
2	∅ 2
3	∅ 3
4	∅ 4
5	∅ 5
6	∅ 6
7	∅ 7
8	∅ 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0422 T1
DESIGNED: January 2006
SEALED: 03-03-06
REVISED: NA

SPECIAL BACK-UP PROTECTION NOTES

1. PROGRAM CONTROLLER TO OMIT PHASE 1 DURING PHASE 2 ON, AND TO OMIT PHASE 5 DURING PHASE 6 ON, AND TO OMIT PHASE 3 DURING PHASE 7 ON, AND TO OMIT PHASE 7 DURING PHASE 8 ON.
2. TO ACCOMPLISH BACK-UP FEATURE DESCRIBED IN NOTE 1, ENABLE 'BACK-UP PROTECTION GROUP 1' AND 'BACK-UP PROTECTION GROUP 2' UNDER CONTROLLER SUBMENU 9: 'OPTION DATA'.
3. IT IS REQUIRED FOR THE CONTROLLER TO BE PROGRAMMED SUCH THAT IF IT IS IN PHASE 2+6, THEN PHASE 1 AND/OR 5 CANNOT BE SERVED NEXT WITHOUT FIRST PROGRESSING THROUGH PHASE 4. THIS ADDITIONAL BACK-UP PROTECTION FEATURE SHALL BE IMPLEMENTED IN THE WRITE-PROTECT AREA OF THE CONTROLLER SOFTWARE. FOR DIRECTIONS ON HAVING THIS FEATURE INSTALLED, CONTACT THE NCDOT TRAFFIC ELECTRONICS REPAIR CENTER AT: (919) 233-0884.

Signal Upgrade - Temporary 1

Electrical and Programming Details For: SR 1708 (Fire Tower Road) at SR 1700 (Old Tar Road/ Evans Street)

Division 2 Pitt County Greenville

PLAN DATE: February 2006 REVIEWED BY: JWP

PREPARED BY: James Peterson REVIEWED BY:

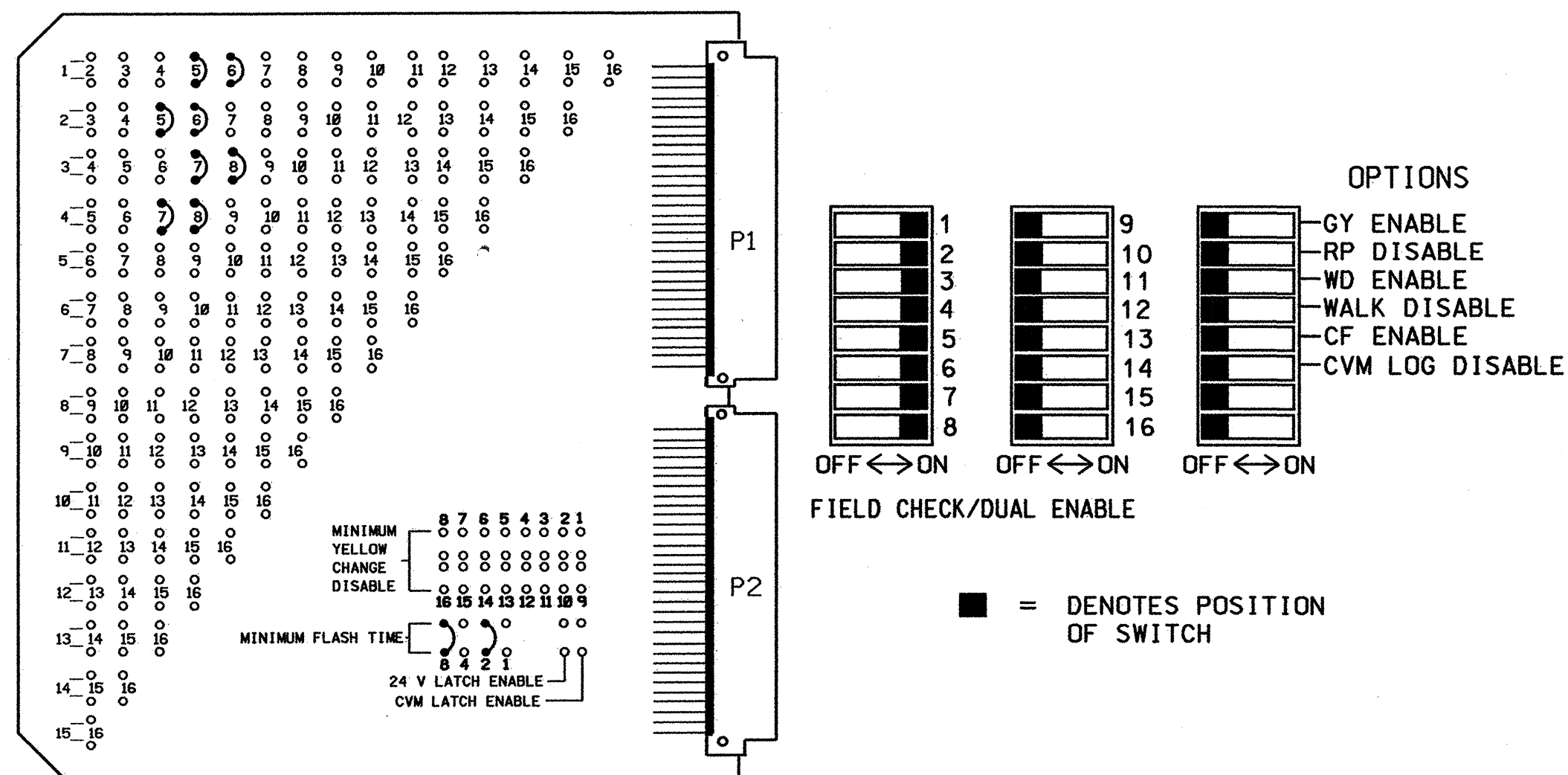
Signature: James Peterson 3-7-06

Seal: North Carolina Professional Engineer 008453

122 N. McDowell St., Raleigh, NC 27603

SIG. INVENTORY NO. 02-0422 T1

**EDI MODEL MMU-16E
MALFUNCTION MANAGEMENT UNIT
PROGRAMMING DETAIL**
(program card and set switches as shown below)



NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES 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 OUTPUTS 9, 10, 11, 12, 13, 14, 15 AND 16 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 MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
7. PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
8. SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
9. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
10. PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DUAL ENTRY.
11. THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	61,82	21,22	81	41,42	21,42	61,62	41,62	81,82	NU	NU	NU	NU	NU	NU	NU	NU
RED	*	2R	*	4R	*	6R	*	8R								
YELLOW		2Y		4Y		6Y		8Y								
GREEN		2G		4G		6G		8G								
RED ARROW																
YELLOW ARROW	1Y		3Y		5Y		7Y									
GREEN ARROW	1G		3G		5G		7G									

NU = NOT USED
 * Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED
 CABINETCONTRACTOR SUPPLIED **TS-2** NC-8A
 CABINET MOUNT.....BASE
 LOADBAY POSITIONS.....16
 LOAD SWITCHES USED.....1,2,3,4,5,6,7,8
 PHASES USED.....1,2,3,4,5,6,7,8
 OLA.....NOT USED
 OLB.....NOT USED
 OLC.....NOT USED
 OLD.....NOT USED

DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

BIU	CH1	CH1	CH1	CH1	CH1	CH1	CH1	CH1	SLOT	SLOT	SLOT
	L3	L1	L7	L5	L11	L9	L15	L13			
	∅ 2	∅ 1	∅ 4	∅ 3	∅ 5	∅ 5	∅ 8	∅ 7			
									EMPTY	EMPTY	EMPTY
	CH2	CH2	CH2	CH2	CH2	CH2	CH2	CH2			
	L4	L2	L8	L6	L12	L10	L16	L14			
	∅ 1	∅ 6	∅ 4	∅ 8	∅ 6	∅ 2	∅ 8	∅ 4			
		*	*			*	*				

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
1A	L1A,L1B L2A,L2B
2A	L3A,L3B L4A,L4B
1B	L4A,L4B
3A	L5A,L5B L6A,L6B
4A	L7A,L7B L8A,L8B
4B	L8A,L8B
5A	L9A,L9B L10A,L10B
5B	L11A,L11B L12A,L12B
6B	L12A,L12B
7A	L13A,L13B L14A,L14B
8A	L15A,L15B L16A,L16B
8B	L16A,L16B

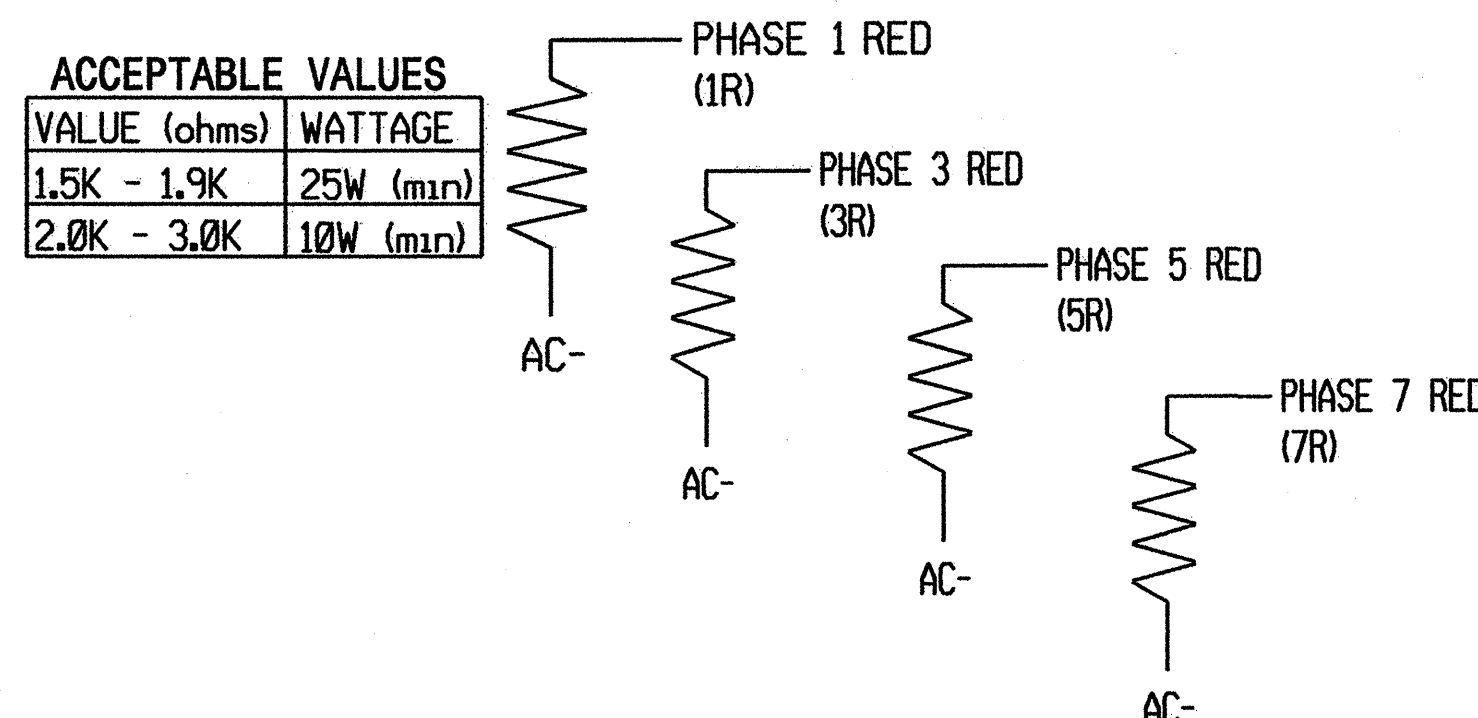
NOTE
 BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME(SEC)
1	∅ 1	DELAY	15
* 2	∅ 6	DELAY	3
3	∅ 2		
4	∅ 1	DELAY	15
5	∅ 3	DELAY	15
6	∅ 8	DELAY	3
7	∅ 4	DELAY	100
* 8	∅ 4	DC/EC	5/2
9	∅ 5	DELAY	15
* 10	∅ 2	DELAY	3
11	∅ 5	DELAY	15
12	∅ 6		
13	∅ 7	DELAY	15
14	∅ 4	DELAY	3
15	∅ 8	DELAY	100
* 16	∅ 8	DC/EC	5/2

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

LOAD RESISTOR INSTALLATION DETAIL



NOTE: THE PURPOSE OF THIS RESISTOR IS TO LOAD THE CHANNEL RED MONITOR INPUT IN ORDER FOR THE MALFUNCTION MANAGEMENT UNIT TO USE THE FULL SIGNAL SEQUENCE MONITORING CAPABILITY ON PHASES THAT DO NOT USE THE RED DISPLAY IN THE FIELD.

LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	∅ 1
2	∅ 2
3	∅ 3
4	∅ 4
5	∅ 5
6	∅ 6
7	∅ 7
8	∅ 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0422 T2
 DESIGNED: January 2006
 SEALED: 03-03-06
 REVISED: NA

SPECIAL BACK-UP PROTECTION NOTES

1. PROGRAM CONTROLLER TO OMIT PHASE 1 DURING PHASE 2 ON, AND TO OMIT PHASE 5 DURING PHASE 6 ON, AND TO OMIT PHASE 3 DURING PHASE 7 ON, AND TO OMIT PHASE 7 DURING PHASE 8 ON.
2. TO ACCOMPLISH BACK-UP FEATURE DESCRIBED IN NOTE 1, ENABLE 'BACK-UP PROTECTION GROUP 1' AND 'BACK-UP PROTECTION GROUP 2' UNDER CONTROLLER SUBMENU 9: 'OPTION DATA'.
3. IT IS REQUIRED FOR THE CONTROLLER TO BE PROGRAMMED SUCH THAT IF IT IS IN PHASE 2+6, THEN PHASE 1 AND/OR 5 CANNOT BE SERVED NEXT WITHOUT FIRST PROGRESSING THROUGH PHASE 4. THIS ADDITIONAL BACK-UP PROTECTION FEATURE SHALL BE IMPLEMENTED IN THE WRITE-PROTECT AREA OF THE CONTROLLER SOFTWARE. FOR DIRECTIONS ON HAVING THIS FEATURE INSTALLED, CONTACT THE NCDOT TRAFFIC ELECTRONICS REPAIR CENTER AT: (919) 233-0884.

Signal Upgrade - Temporary 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1708 (Fire Tower Road) at SR 1700 (Old Tar Road/ Evans Street)

Division 2 Pitt County Greenville

PLAN DATE: February 2006 REVIEWED BY: *[Signature]*

PREPARED BY: James Peterson REVIEWED BY: *[Signature]*

REVISIONS: _____ INIT. DATE

Signature: *[Signature]* 3-7-06

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453

122 N. McDowell St., Raleigh, NC 27603

SIG. INVENTORY NO. 02-0422 T2

8 Phase Fully Actuated (Greenville City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Install backplates for all new signal heads.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Intersection Zone Number: 7, System Address Number: 81

PHASING DIAGRAM

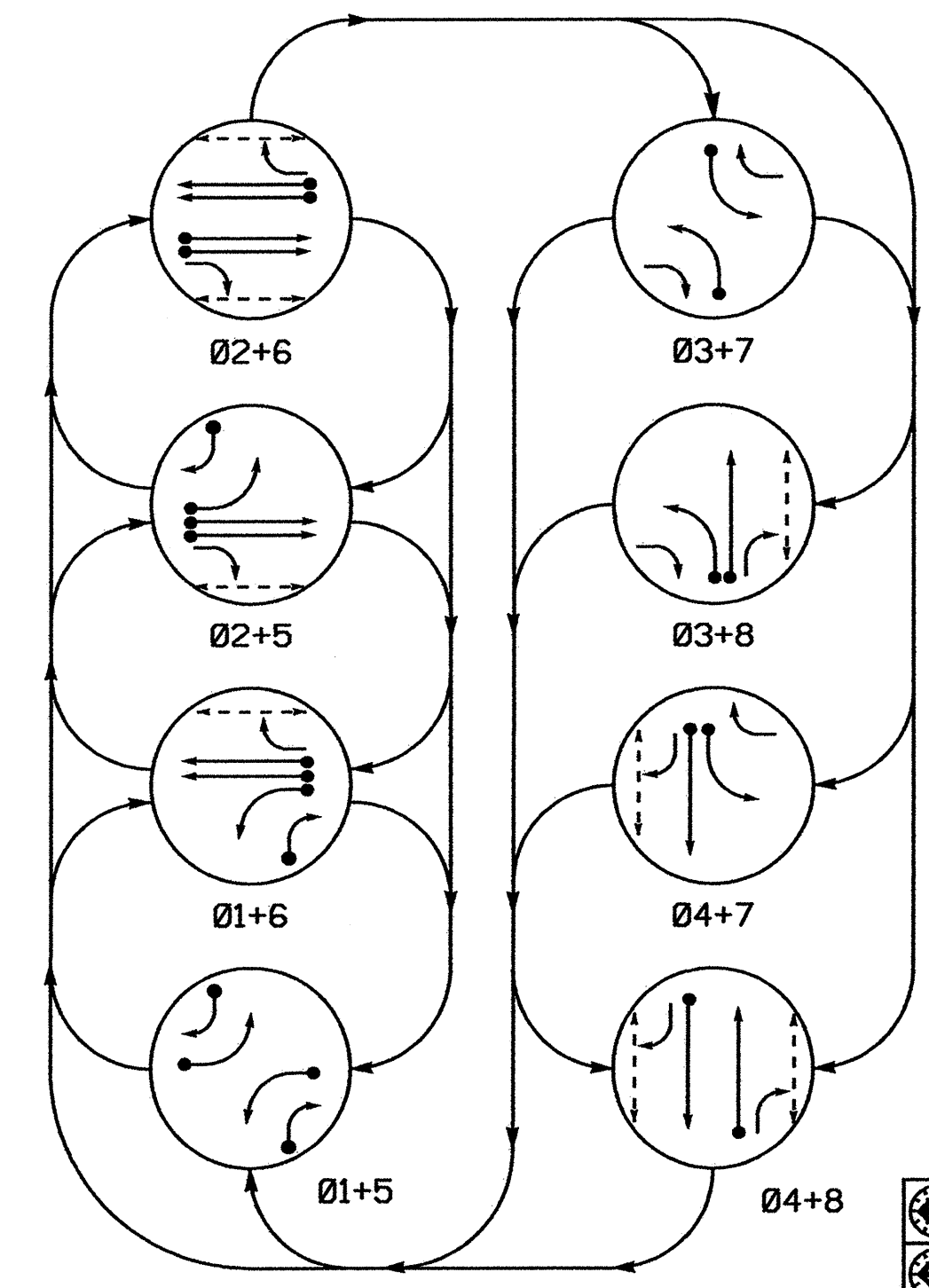
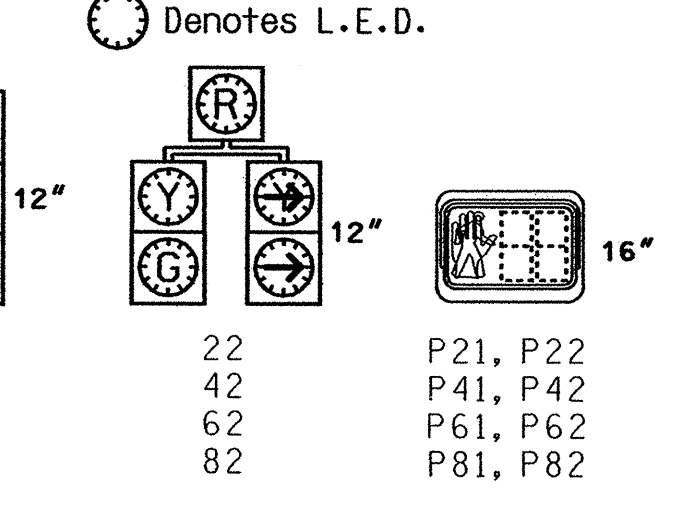


TABLE OF OPERATION

SIGNAL FACE	PHASE							
	Ø1+5	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	R	R	R	R	R	R	R	R
21	R	R	G	G	R	R	R	Y
22	R	R	G	G	R	R	R	Y
31	R	R	R	R	R	R	R	R
41	R	R	R	R	R	R	G	G
42	R	R	R	R	R	R	G	G
51	R	R	R	R	R	R	R	R
61	R	G	R	G	R	R	R	Y
62	R	G	R	G	R	R	R	Y
71	R	R	R	R	R	R	R	R
81	R	R	R	R	R	G	R	G
82	R	R	R	R	R	G	R	G
P21, P22	DW	DW	W	W	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	W	DRK

SIGNAL FACE I.D.

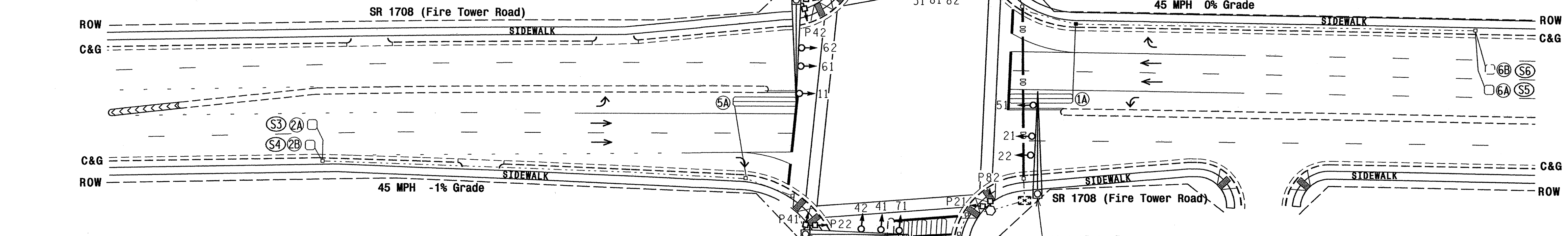


PHASING DIAGRAM DETECTION LEGEND

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

LOOP & DETECTOR UNIT INSTALLATION CHART

LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	INDUCTIVE LOOPS		DETECTOR UNITS		TIMING	PLACE CALL DURING PHASE	INHIBIT DELAY DURING GREEN?
				EXISTING	NEW	EXISTING	NEW			
1A	6X40	2-4-2	0	X		1	X	DELAY 3 SEC.	ALL	YES
1B	6X40	2-4-2	0	X		1	X	DELAY 15 SEC.	ALL	YES
2A/S3	6X6	6	300	X		2	X	- SEC.	ALL	NO
2B/S4	6X6	6	300	X		2	X	- SEC.	ALL	NO
3A	6X40	2-4-2	0	X		3	X	- SEC.	ALL	NO
4A	6X6	6	300	X		4	X	DELAY 100 SEC.	ALL	YES
4B	6X40	2-4-2	0	X		4	X	DC/EC 5/2 SEC.	ALL	NO
5A	6X40	2-4-2	0	X		5	X	DELAY 3 SEC.	ALL	YES
5B	6X40	2-4-2	0	X		5	X	DELAY 15 SEC.	ALL	YES
6A/S5	6X6	6	300	X		6	X	- SEC.	ALL	NO
6B/S6	6X6	6	300	X		6	X	- SEC.	ALL	NO
7A	6X40	2-4-2	0	X		7	X	- SEC.	ALL	NO
8A	6X6	6	300	X		8	X	DELAY 100 SEC.	ALL	YES
8B	6X40	2-4-2	0	X		8	X	DC/EC 5/2 SEC.	ALL	NO



TIMING CHART NEMA CONTROLLER

PHASE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM GREEN	7 SEC.	12 SEC.	7 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.	7 SEC.
PASSAGE/GAP	2.0 SEC.	6.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.	6.0 SEC.	2.0 SEC.	6.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.6 SEC.	3.0 SEC.	4.5 SEC.	3.0 SEC.	4.5 SEC.	3.0 SEC.	4.5 SEC.
RED CLEARANCE	3.3 SEC.	1.9 SEC.	3.3 SEC.	2.3 SEC.	3.5 SEC.	2.0 SEC.	3.3 SEC.	2.3 SEC.
MAX. I	20 SEC.	90 SEC.	20 SEC.	45 SEC.	20 SEC.	90 SEC.	20 SEC.	45 SEC.
RECALL POSITION	NONE	MIN. RECALL	NONE	NONE	NONE	MIN. RECALL	NONE	NONE
VEH. CALL MEMORY	NONLOCK	LOCK	NONLOCK	NONLOCK	NONLOCK	LOCK	NONLOCK	NONLOCK
WALK	- SEC.	7 SEC.	- SEC.	7 SEC.	- SEC.	7 SEC.	- SEC.	7 SEC.
FLASHING DON'T WALK	- SEC.	21 SEC.	- SEC.	27 SEC.	- SEC.	16 SEC.	- SEC.	25 SEC.
VOLUME DENSITY	OFF	ON	OFF	ON	OFF	ON	OFF	ON
ACTUATION B4 ADD	- VEH.	0 VEH.	- VEH.	- VEH.	- VEH.	0 VEH.	- VEH.	- VEH.
SEC. PER ACTUATION	- SEC.	1.5 SEC.	- SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.	- SEC.
MAX. INITIAL	- SEC.	34 SEC.	- SEC.	- SEC.	- SEC.	34 SEC.	- SEC.	- SEC.
TIME B4 REDUCTION	- SEC.	15 SEC.	- SEC.	0 SEC.	- SEC.	15 SEC.	- SEC.	0 SEC.
TIME TO REDUCE	- SEC.	30 SEC.	- SEC.	15 SEC.	- SEC.	30 SEC.	- SEC.	15 SEC.
MINIMUM GAP	- SEC.	3.0 SEC.	- SEC.	3.0 SEC.	- SEC.	3.0 SEC.	- SEC.	3.0 SEC.

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

LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Directional Arrow, Pavement Marking Arrow, Wheelchair Ramp, Metal Pole with Mastarm, Directional Drill.
- EXISTING: N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A.

Signal Upgrade Final Design

SR 1708 (Fire Tower Road) at SR 1700 (Old Tar Road/ Evans Street)

Division 2 Pitt County Greenville

PLAN DATE: January 2006 REVIEWED BY: RM Duffin

PREPARED BY: TS Thippen REVIEWED BY: [Signature]

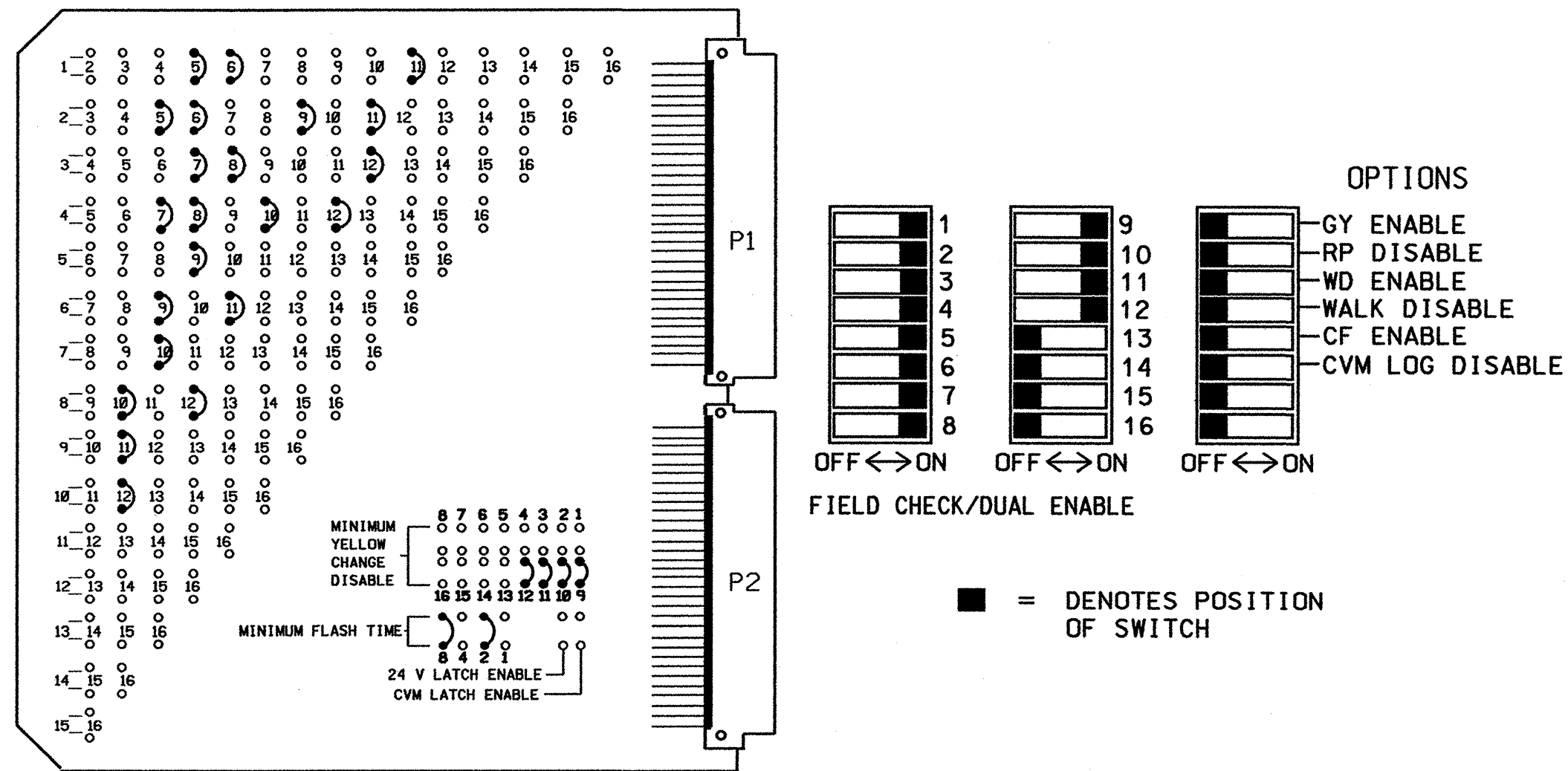
REVISIONS: [Table]

SCALE: 1"=40'

SIG. INVENTORY NO. 02-0422

10-MAY-2006 16:15 s:\p1\signal\work\grcupse\p1\p1\0\ects\au-3613\0422\020422.s1g.dsn_2005xxxx.dgn

**EDI MODEL MMU-16E
MALFUNCTION MANAGEMENT UNIT
PROGRAMMING DETAIL**
(program card and set switches as shown below)



MMU PROGRAMMING CARD

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES 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 OUTPUTS 13, 14, 15 AND 16 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 MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
7. PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
8. SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
9. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
10. PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DUAL ENTRY.
11. BE SURE 'BACK-UP PROTECTION GROUP 1' AND 'BACK-UP PROTECTION GROUP 2' UNDER SUBMENU 9: 'OPTION DATA' ARE DISABLED.
12. THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

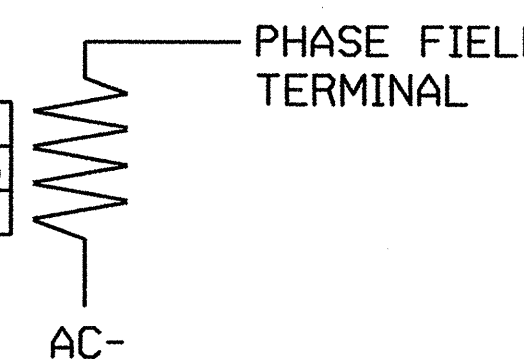
PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD					
SIGNAL HEAD NO.	11	82	21,22	22	31	41,42	42	51	61,62	62	71	81,82	P21, P22	P41, P42	P61, P62	P81, P82	NU	NU	NU	NU	
RED			2R		4R				6R			8R									
YELLOW			2Y		4Y				6Y			8Y	*	*	*	*					
GREEN			2G		4G				6G			8G									
RED ARROW	1R			3R		5R			7R												
YELLOW ARROW	1Y	1Y		3Y	3Y	5Y	5Y		7Y	7Y											
GREEN ARROW	1G	1G		3G	3G	5G	5G		7G	7G											
Hand													9R	10R	11R	12R					
Person													9G	10G	11G	12G					

NU = NOT USED
* INSTALL LOAD RESISTORS TO UNUSED FIELD TERMINALS 9Y, 10Y, 11Y AND 12Y, IF NOT ALREADY PRESENT. SEE LOAD RESISTOR INSTALLATION DETAIL THIS PAGE.

TYPICAL LOAD RESISTOR INSTALLATION DETAIL

REMOVE LOAD RESISTORS ON FIELD TERMINALS 1R, 3R, 5R AND 7R.

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

BIU	CH1	CH1	CH1	CH1	CH1	CH1	CH1	CH1	SLOT	SLOT	SLOT
	L3	L1	L7	L5	L11	L9	L15	L13			
	ø2/SYS	ø 1	ø 4	ø 3	ø6/SYS	ø 5	ø 8	ø 7			
	CH2	CH2	CH2	CH2	CH2	CH2	CH2	CH2	EMPTY	EMPTY	EMPTY
	L4	L2	L8	NOT USED	L12	L10	L16	NOT USED			
	ø2/SYS	ø 1	ø 4	*	ø6/SYS	ø 5	ø 8	*			

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
1A	L1A, L1B
1B	L2A, L2B
2A/S3	L3A, L3B
2B/S4	L4A, L4B
3A	L5A, L5B
	L6A, L6B
4A	L7A, L7B
4B	L8A, L8B
5A	L9A, L9B
5B	L10A, L10B
6A/S5	L11A, L11B
6B/S6	L12A, L12B
7A	L13A, L13B
	L14A, L14B
8A	L15A, L15B
8B	L16A, L16B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

ASSIGN CONTROLLER SYSTEM DETECTOR TO LOCAL CONT. DET. NUMBERS AS SHOWN IN CHART BELOW

CONTROLLER SYS. DET. NO.	LOCAL CONT. DETECTOR NO.
1	3
2	4
3	11
4	12
5	
6	
7	
8	

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME (SEC)
1	ø 1	DELAY	3
2	ø 1	DELAY	15
3	ø 2		
4	ø 2		
5	ø 3		
6			
7	ø 4	DELAY	100
* 8	ø 4	DC/EC	5/2
9	ø 5	DELAY	3
10	ø 5	DELAY	15
11	ø 6		
12	ø 6		
13	ø 7		
14			
15	ø 8	DELAY	100
* 16	ø 8	EC/DC	5/2

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED
CABINETCONTRACTOR SUPPLIED [TS-2] NC-8A
CABINET MOUNT.....BASE
LOADBAY POSITIONS.....16
LOAD SWITCHES USED.....1,2,3,4,5,6,7,8,9,10,11,12
PHASES USED.....1,2,3,4,5,6,7,8,2 PED,4 PED,6 PED,8 PED
OLA.....NOT USED
OLB.....NOT USED
OLC.....NOT USED
OLD.....NOT USED

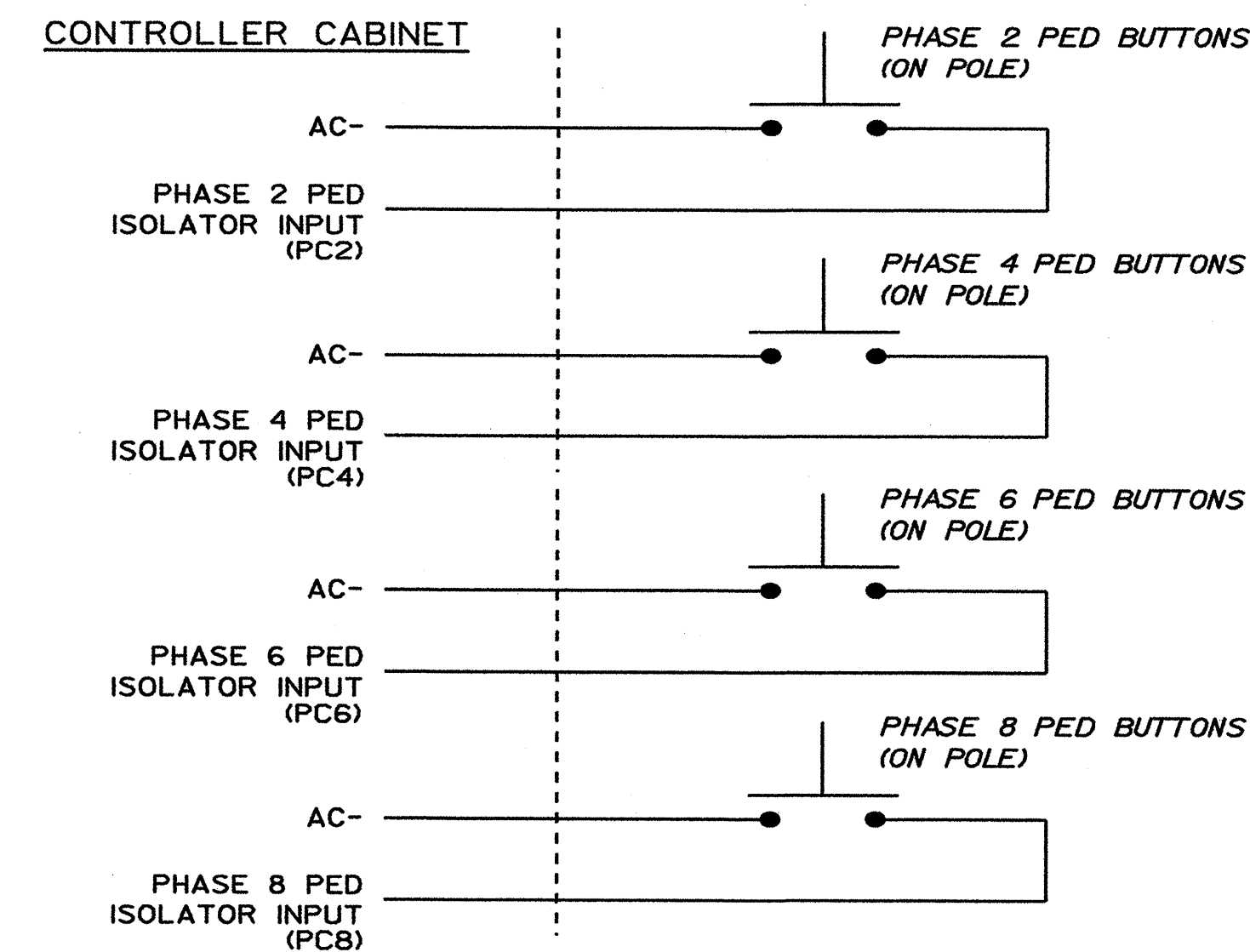
LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	ø 1
2	ø 2
3	ø 3
4	ø 4
5	ø 5
6	ø 6
7	ø 7
8	ø 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

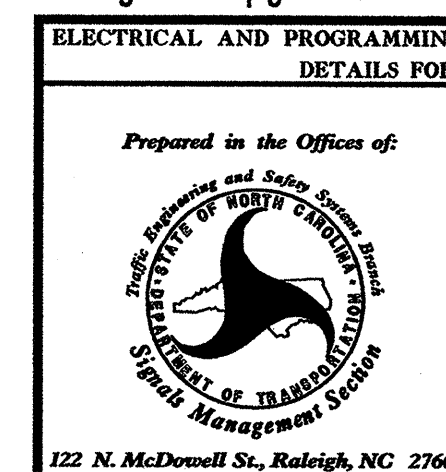
PEDESTRIAN PUSH-BUTTON WIRING DETAIL

(wire push-buttons as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0422
DESIGNED: January 2006
SEALED: 03-03-06
REVISED: NA

Signal Upgrade - Final



SR 1708 (Fire Tower Road)
at
SR 1700 (Old Tar Road/
Evans Street)

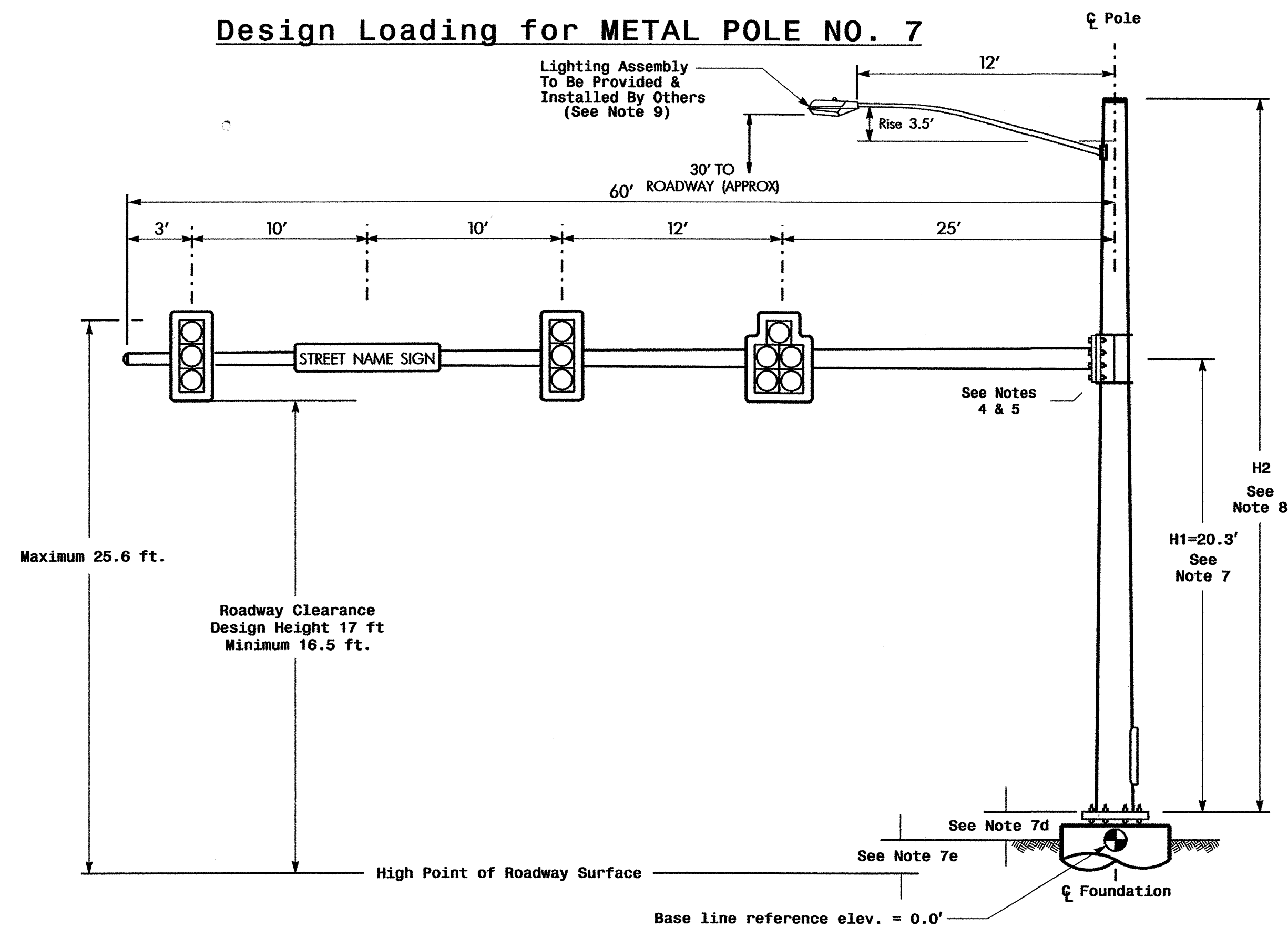
Division 2 Pitt County Greenville
PLAN DATE: February 2006 REVIEWED BY: [Signature]
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL 008453
JOHN T. ROWE, JR.
[Signature]
3-7-06

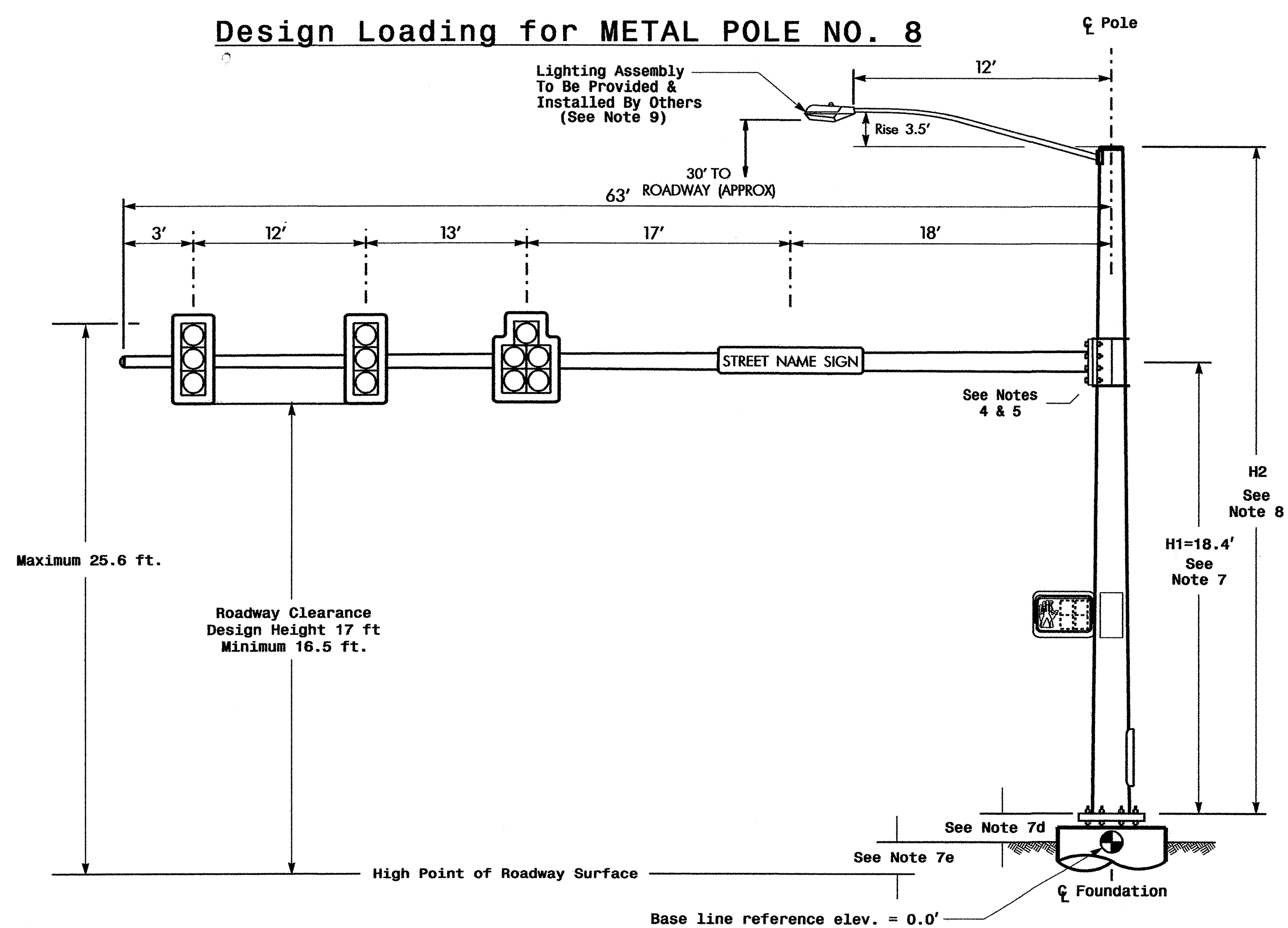
SIG. INVENTORY NO. 02-0422

Design Loading for METAL POLE NO. 7



Elevation View

Design Loading for METAL POLE NO. 8



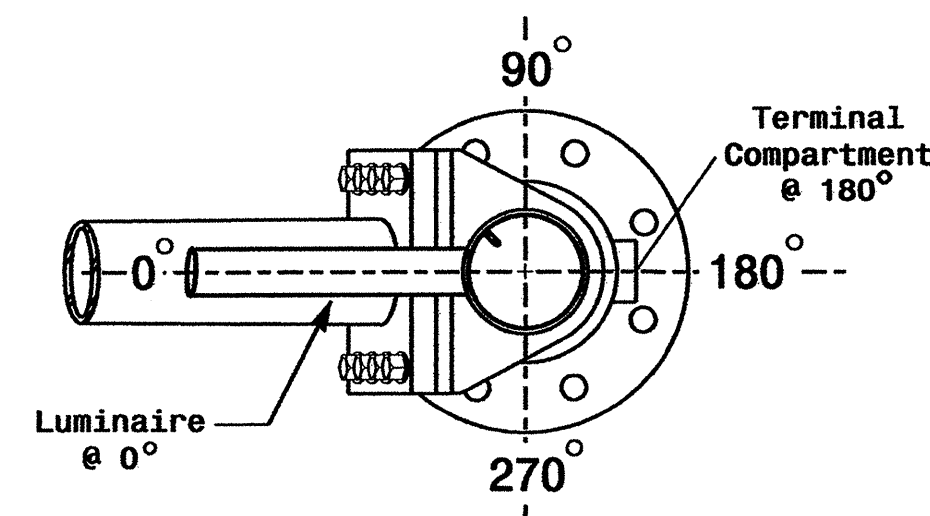
Elevation View

SPECIAL NOTE

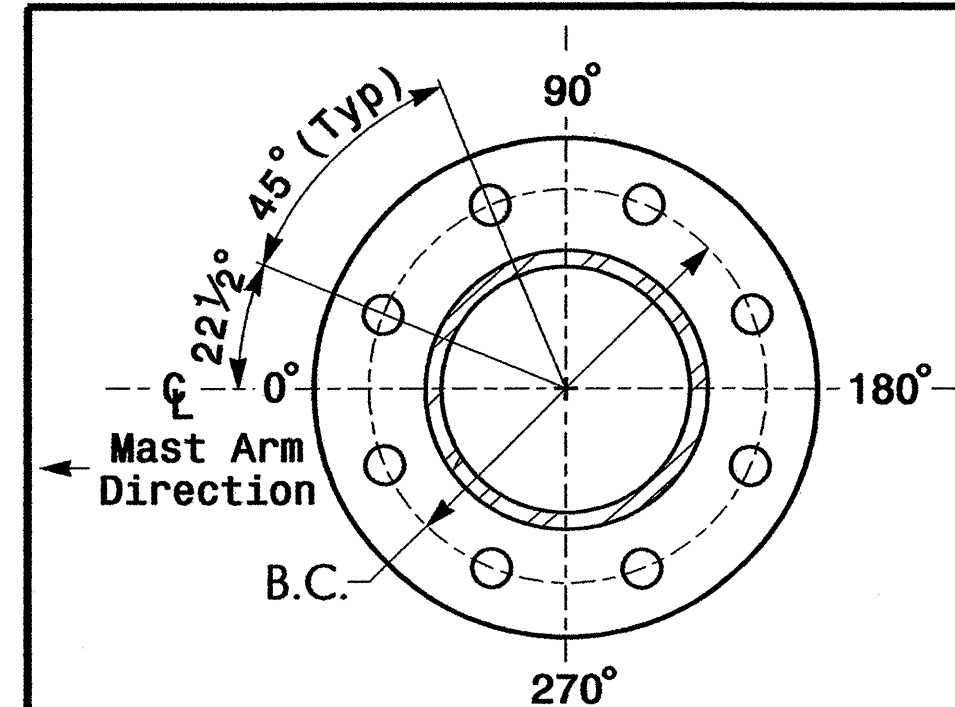
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

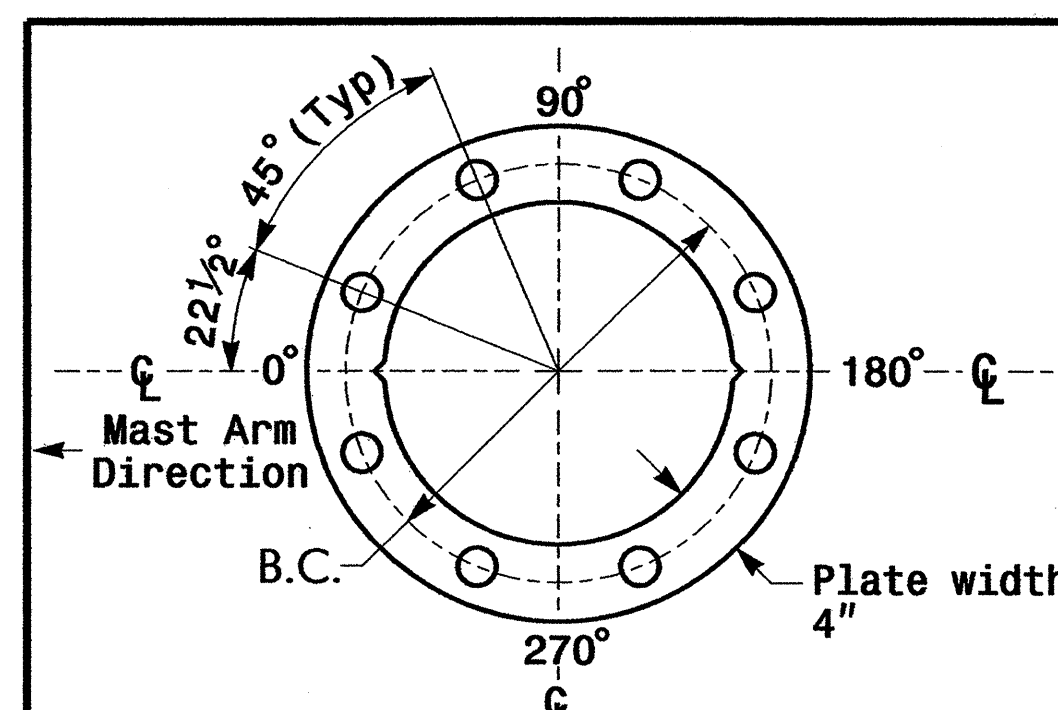
Elevation Differences for:	Pole 7	Pole 8
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.7 ft.	-0.2 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



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"-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
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5" W X 17.0" L	21 LBS

	LUMINAIRE OVX DROP PRISMATIC REFRACTOR	EPA 0.87 S.F.	13.25" W X 26.25" L	35 LBS
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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 2002 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions. The 2002 NCDOT Roadway Standard Drawings. The traffic signal project plans and special provisions. The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.doh.state.nc.us/preconstruct/traffic/tmsu/ws/mpoles/poles.htm>

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.
- Maximum allowable CSR for all signal supports is 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 is a high strength connection. Use Direct Tension Indicators (ASTM F959) for each bolt.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 66 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 based on the luminaire height requirement of 30 feet.
- Design the luminaire support arm using design dimensions as shown on elevation views. Refer to the Radial Orientation Detail for attachment to the signal pole. Design arm end for a nominal 2 inch slip fit socket connection for light assembly.
- 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) 733-3915.
- 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.

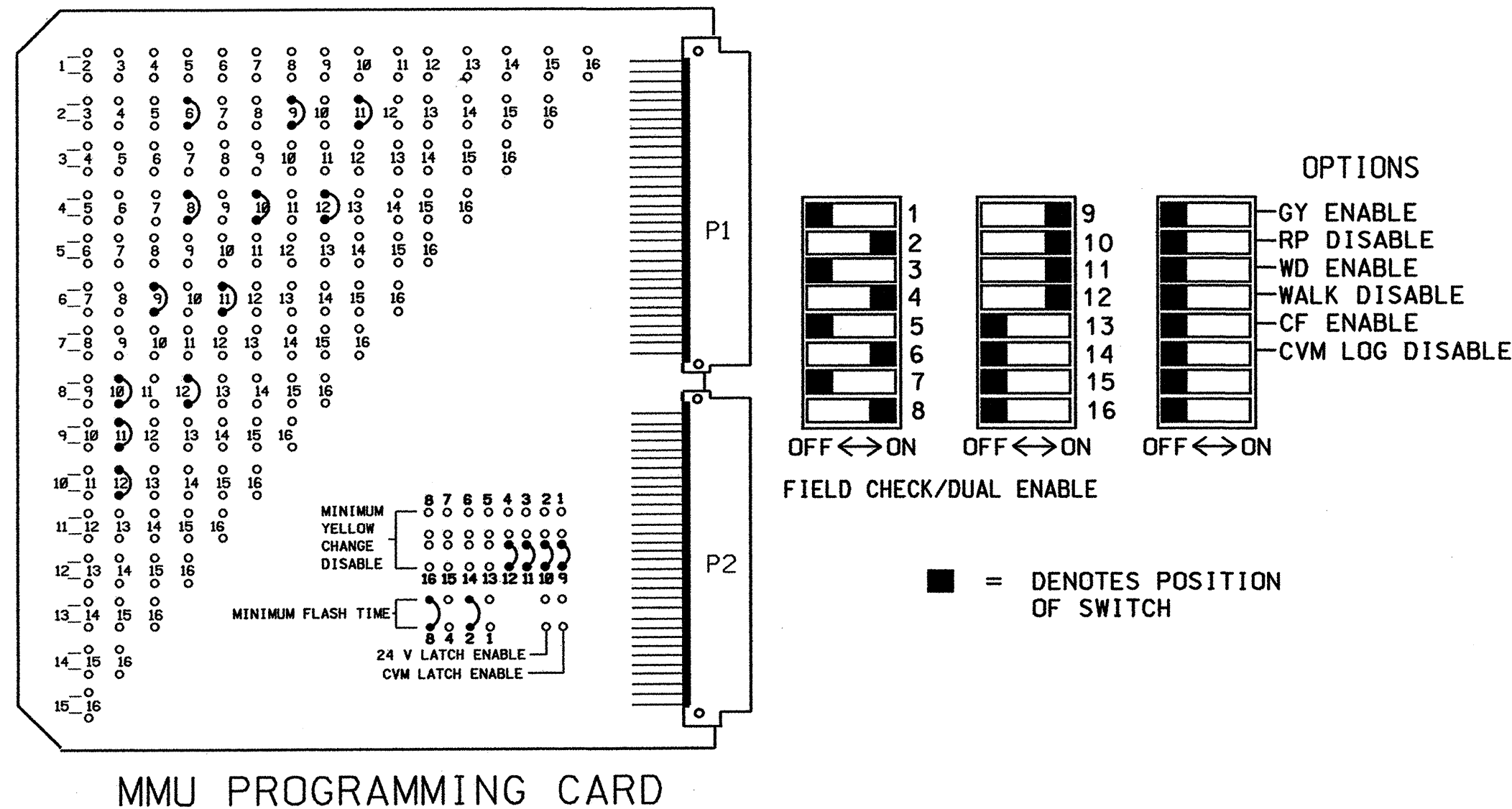
NCDOT Wind Zone 2 (130 mph)

	SR 1708 (Fire Tower Road) at SR 1700 (Old Tar Road/ Evans Street)	SEAL
	Division 2 Pitt County Greenville PLAN DATE: March 2006 REVIEWED BY: RM Duffey PREPARED BY: TS Thigpen REVIEWED BY: [Signature]	
SCALE 0 N/A N/A	REVISIONS INT. DATE	SIGNATURE DATE SIG. INVENTORY NO. 02-0422

11-MAY-2006 09:13 s:\m\ts\signal\work\groups*ip\projects\m\3613b\m02\2020422.sig_md2_2006xxxx.dgn

**EDI MODEL MMU-16E
MALFUNCTION MANAGEMENT UNIT
PROGRAMMING DETAIL**

(program card and set switches as shown below)



NOTES

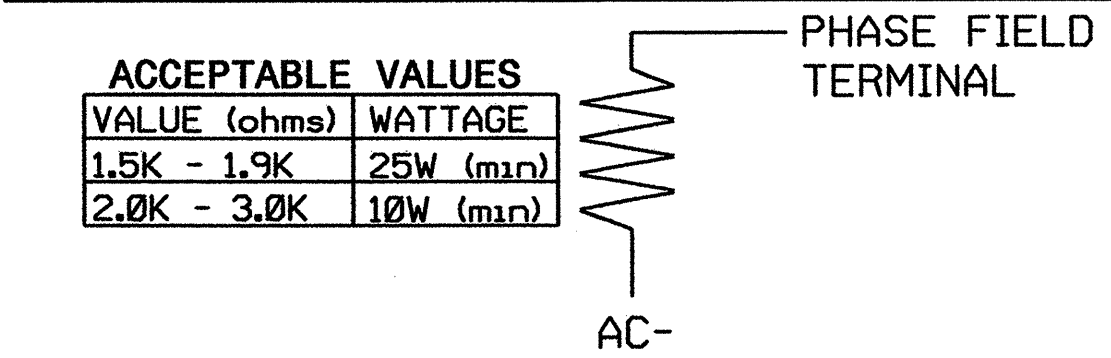
- TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES TO FLASH RED. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED LOAD SWITCH RED OUTPUTS 1, 3, 5, 7, 13, 14, 15 AND 16 TO LOAD SWITCH AC+ BY INSERTING 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.
- PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
- SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
- ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
- PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
- PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
- SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
- PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
- PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DUAL ENTRY.
- THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	NU	21,22	NU	41,42	NU	61,62,63	NU	81,82	P21, P22	P41, P42	P61, P62	P81, P82	NU	NU	NU	NU
RED		2R		4R		6R		8R								
YELLOW		2Y		4Y		6Y		8Y	*	*	*	*				
GREEN		2G		4G		6G		8G								
RED ARROW																
YELLOW ARROW																
GREEN ARROW																
Hand									9R	10R	11R	12R				
Foot									9G	10G	11G	12G				

NU = NOT USED
 *INSTALL LOAD RESISTORS TO UNUSED FIELD TERMINALS 9Y, 10Y, 11Y AND 12Y, IF NOT ALREADY PRESENT. SEE LOAD RESISTOR INSTALLATION DETAIL THIS PAGE.

TYPICAL LOAD RESISTOR INSTALLATION DETAIL



DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

BIU	CH1	CH1	CH1	CH1	S L O T	CH1	S L O T	S L O T	S L O T	S L O T
	L3	L1	L7	L5		L9				
	∅ 2	∅ 2	∅ 6	∅ 4		∅ 8				
	*									
	CH2	CH2	CH2	CH2	E M P T Y	CH2	E M P T Y	E M P T Y	E M P T Y	E M P T Y
	L4	L2	L8	L6		L10				
	∅ 4	∅ 2	∅ 6	∅ 6		∅ 8				
			*							

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
2A	L1A,L1B
2B	L2A,L2B
2C	L3A,L3B
4A	L4A,L4B
4B	L5A,L5B
6A	L6A,L6B
6B	L7A,L7B
6C	L8A,L8B
8A	L9A,L9B
8B	L10A,L10B
	L11A,L11B
	L12A,L12B
	L13A,L13B
	L14A,L14B
	L15A,L15B
	L16A,L16B

NOTE
 BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME (SEC)
1	∅ 2		
2	∅ 2		
* 3	∅ 2	DELAY	3
4	∅ 4		
5	∅ 4	DELAY	10
6	∅ 6		
7	∅ 6		
* 8	∅ 6	DELAY	3
9	∅ 8	DELAY	3
10	∅ 8	DELAY	10
11			
12			
13			
14			
15			
16			

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED
 CABINETCONTRACTOR SUPPLIED [TS-2] NC-8A
 CABINET MOUNT.....BASE
 LOADBAY POSITIONS.....16
 LOAD SWITCHES USED.....2,4,6,8,9,10,11,12
 PHASES USED.....2,4,6,8,2 PED,4 PED,6 PED,8 PED
 OLA.....NOT USED
 OLB.....NOT USED
 OLC.....NOT USED
 OLD.....NOT USED

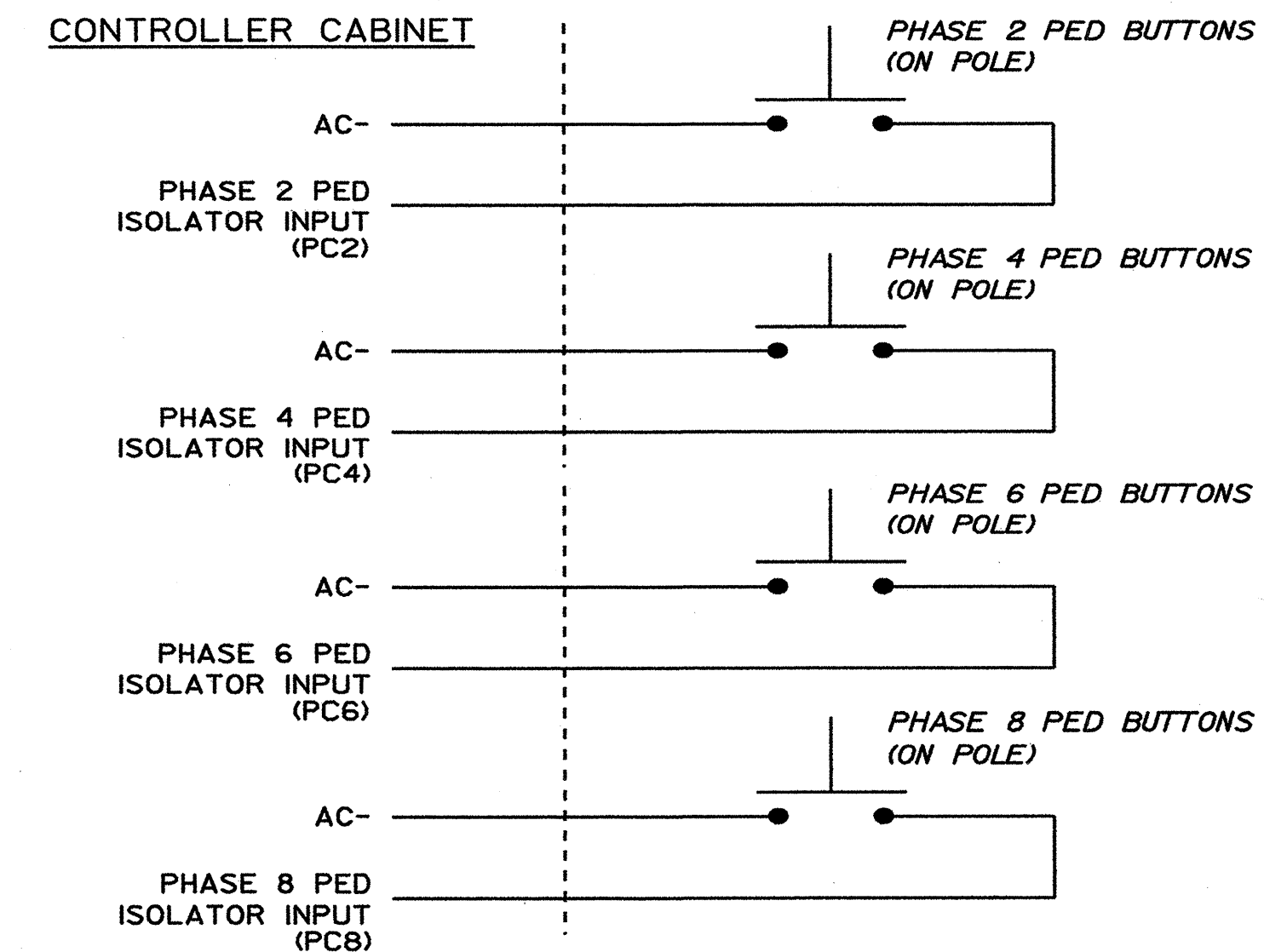
LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	∅ 1
2	∅ 2
3	∅ 3
4	∅ 4
5	∅ 5
6	∅ 6
7	∅ 7
8	∅ 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

PEDESTRIAN PUSH-BUTTON WIRING DETAIL

(wire push-buttons as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0870
 DESIGNED: January 2006
 SEALED: 03-03-06
 REVISED: NA

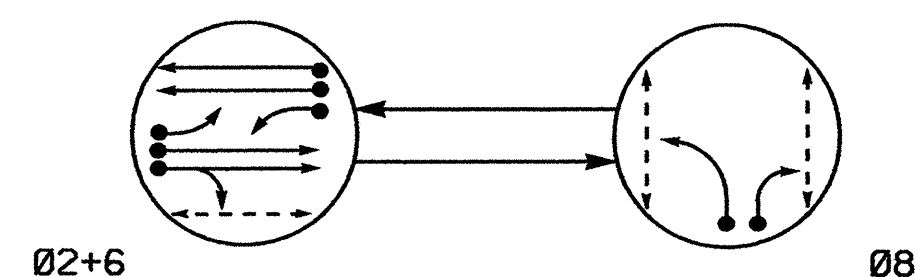
New Installation

Electrical and Programming Details For: SR 1708 (Fire Tower Road) at Pine Branches Road/Pinemore Farms Entrance

Division 2 Pitt County Greenville
 PLAN DATE: February 2006 REVIEWED BY: JWH
 PREPARED BY: James Peterson REVIEWED BY:

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 JOHN T. ROWE, JR.
 SIGNATURE DATE
 SIG. INVENTORY NO. 02-0870

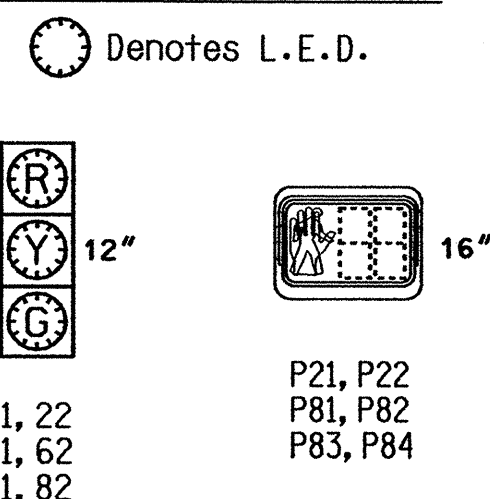
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND
 ←● DETECTED MOVEMENT
 ← UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 ← - - - PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE		
	Ø2+6	Ø6	Ø8
21, 22	G	R	Y
61, 62	G	R	Y
81, 82	R	G	R
P21, P22	W	DW	DRK
P81, P82	DW	W	DRK
P83, P84	DW	W	DRK

SIGNAL FACE I.D.



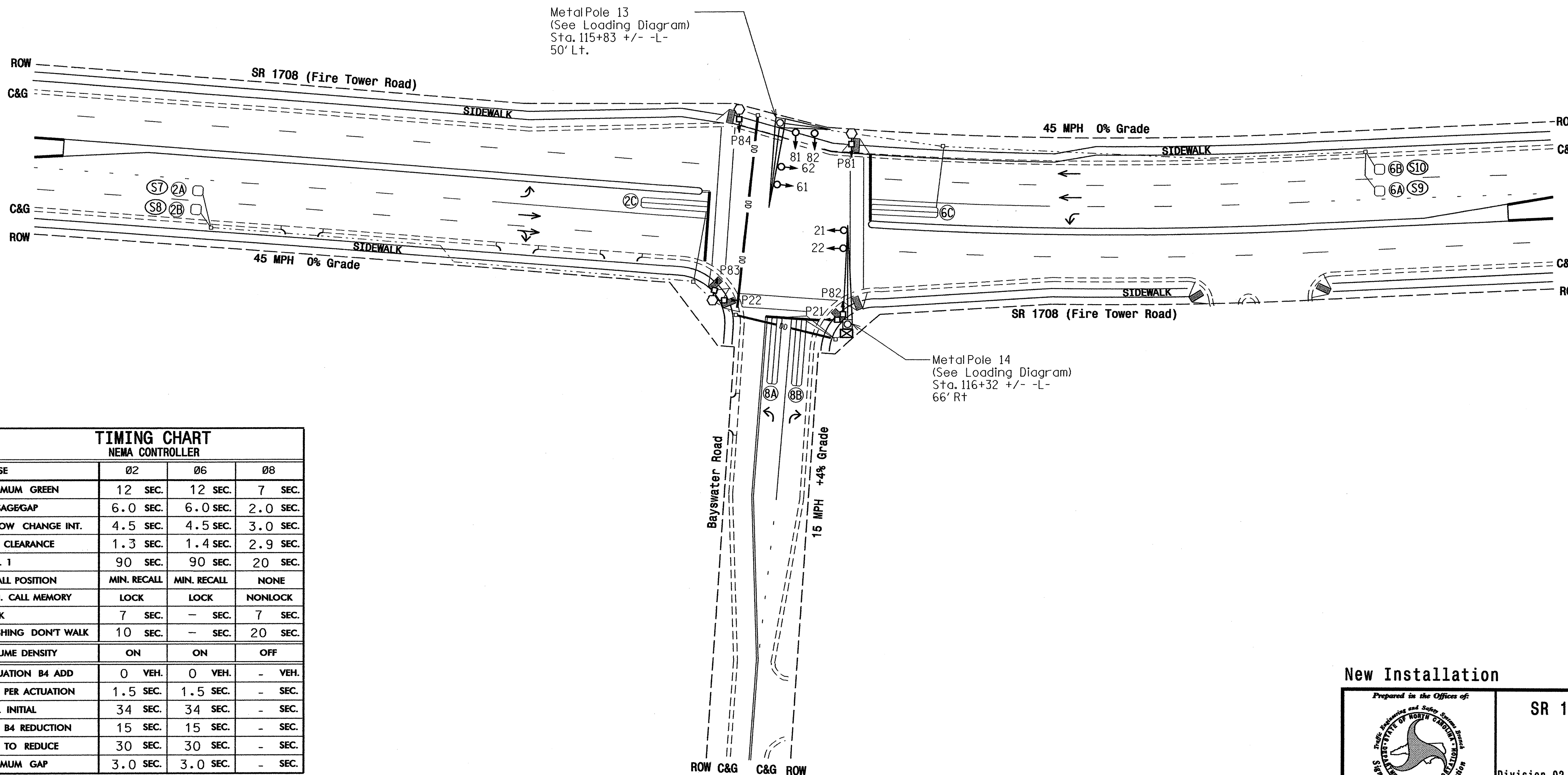
LOOP & DETECTOR UNIT INSTALLATION CHART
NEMA CONTROLLER WITH TS-2 CABINET

LOOP NO.	INDUCTIVE LOOPS			DETECTOR UNITS								
	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	NEW	EXISTING	TIMING FEATURE	TIME	PLACE CALL DURING PHASE	INHIBIT DELAY DURING GREEN?
2A/ST	6X6	6	300	X		2	X		-	- SEC.	ALL	NO
									System Detector			
2B/S8	6X6	6	300	X		2	X		-	- SEC.	ALL	NO
									System Detector			
2C	6X40	2-4-2	0	X		2	X		DELAY	3 SEC.	ALL	NO
6A/S9	6X6	6	300	X		6	X		-	- SEC.	ALL	NO
									System Detector			
6B/S10	6X6	6	300	X		6	X		-	- SEC.	ALL	NO
									System Detector			
6C	6X40	2-4-2	0	X		6	X		DELAY	3 SEC.	ALL	NO
8A	6X40	2-4-2	0	X		8	X		DELAY	3 SEC.	ALL	YES
8B	6X40	2-4-2	0	X		8	X		DELAY	15 SEC.	ALL	YES

2 Phase Fully Actuated (Greenville City System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Intersection Zone Number: 7, System Address Number: 123



TIMING CHART NEMA CONTROLLER			
PHASE	Ø2	Ø6	Ø8
MINIMUM GREEN	12 SEC.	12 SEC.	7 SEC.
PASSAGE GAP	6.0 SEC.	6.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	4.5 SEC.	4.5 SEC.	3.0 SEC.
RED CLEARANCE	1.3 SEC.	1.4 SEC.	2.9 SEC.
MAX. I	90 SEC.	90 SEC.	20 SEC.
RECALL POSITION	MIN. RECALL	MIN. RECALL	NONE
VEHI. CALL MEMORY	LOCK	LOCK	NONLOCK
WALK	7 SEC.	- SEC.	7 SEC.
FLASHING DON'T WALK	10 SEC.	- SEC.	20 SEC.
VOLUME DENSITY	ON	ON	OFF
ACTUATION B4 ADD	0 VEH.	0 VEH.	- VEH.
SEC. PER ACTUATION	1.5 SEC.	1.5 SEC.	- SEC.
MAX. INITIAL	34 SEC.	34 SEC.	- SEC.
TIME B4 REDUCTION	15 SEC.	15 SEC.	- SEC.
TIME TO REDUCE	30 SEC.	30 SEC.	- SEC.
MINIMUM GAP	3.0 SEC.	3.0 SEC.	- SEC.

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

PROPOSED	EXISTING
	N/A
	N/A

New Installation

Prepared in the Office of:
 THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 Signal and Geometric Section

122 N. McDowell St., Raleigh, NC 27603

SR 1708 (Fire Tower Road) at Bayswater Road

Division 02 Pitt County Greenville

PLAN DATE: January 2006 REVIEWED BY: RM Duffy

PREPARED BY: TS Thigpen REVIEWED BY: [Signature]

REVISIONS: _____ INIT. DATE

SCALE: 1"=40'

SEAL

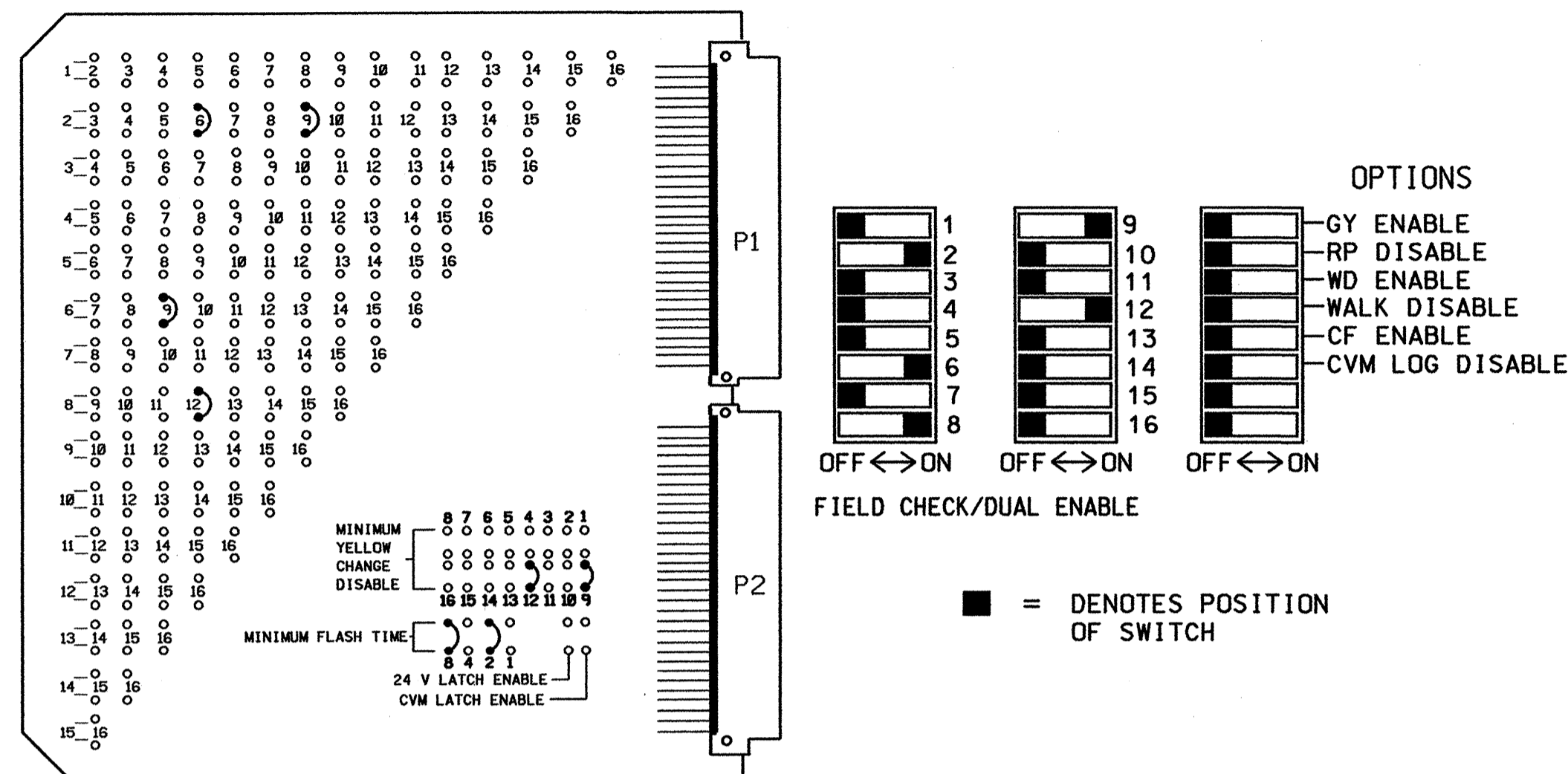
3 MARCH 2006

SIGNATURE DATE

SIG. INVENTORY NO. 02-0871

EDI MODEL MMU-16E MALFUNCTION MANAGEMENT UNIT PROGRAMMING DETAIL

(program card and set switches as shown below)



MMU PROGRAMMING CARD

NOTES

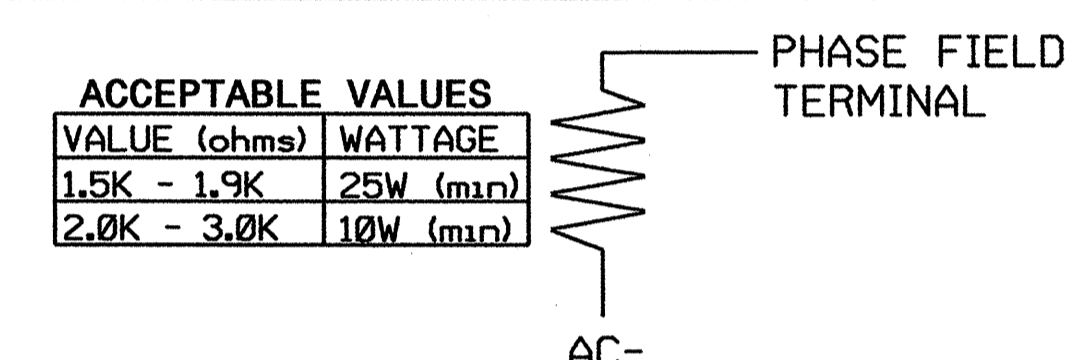
- TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES TO FLASH RED. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED LOAD SWITCH RED OUTPUTS 1, 3, 4, 5, 7, 10, 11, 13, 14, 15 AND 16 TO LOAD SWITCH AC+ 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.
- PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
- SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
- ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
- PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
- PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
- SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
- PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
- THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	61,62	NU	81,82	P21, P22	NU	NU	P81, P82, P83, P84	NU	NU	NU	NU
RED		2R				6R		8R								
YELLOW		2Y				6Y		8Y	*			*				
GREEN		2G				6G		8G								
RED ARROW																
YELLOW ARROW																
GREEN ARROW																
									9R			12R				
									9G			12G				

NU = NOT USED
* INSTALL LOAD RESISTORS TO UNUSED FIELD TERMINALS 9Y AND 12Y, IF NOT ALREADY PRESENT. SEE LOAD RESISTOR INSTALLATION DETAIL THIS PAGE.

TYPICAL LOAD RESISTOR INSTALLATION DETAIL



DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

BIU	CH1	CH1	CH1	CH1	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L3	L1	L7	L5							
	φ 2	φ 2/SYS	φ 8	φ 6/SYS							
	*										
	CH2	CH2	CH2	CH2	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L4	L2	L8	L6							
	φ 6/SYS	φ 2/SYS	φ 8	φ 6							
				*							

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
2A/S7	L1A, L1B
2B/S8	L2A, L2B
2C	L3A, L3B
6A/S9	L4A, L4B
6B/S10	L5A, L5B
6C	L6A, L6B
8A	L7A, L7B
8B	L8A, L8B
	L9A, L9B
	L10A, L10B
	L11A, L11B
	L12A, L12B
	L13A, L13B
	L14A, L14B
	L15A, L15B
	L16A, L16B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

ASSIGN CONTROLLER SYSTEM DETECTOR TO LOCAL CONT. DET. NUMBERS AS SHOWN IN CHART BELOW

CONTROLLER SYS. DET. NO.	LOCAL CONT. DETECTOR NO.
1	1
2	2
3	4
4	5
5	
6	
7	
8	

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME (SEC)
1	φ 2		
2	φ 2		
* 3	φ 2	DELAY	3
4	φ 6		
5	φ 6		
* 6	φ 6	DELAY	3
7	φ 8	DELAY	3
8	φ 8	DELAY	15
9			
10			
11			
12			
13			
14			
15			
16			

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED
CABINETCONTRACTOR SUPPLIED TS-2 NC-8A
CABINET MOUNT.....BASE
LOADBAY POSITIONS.....16
LOAD SWITCHES USED.....2,6,8,9,12
PHASES USED.....2,6,8,2 PED,8 PED
OLA.....NOT USED
OLB.....NOT USED
OLC.....NOT USED
OLD.....NOT USED

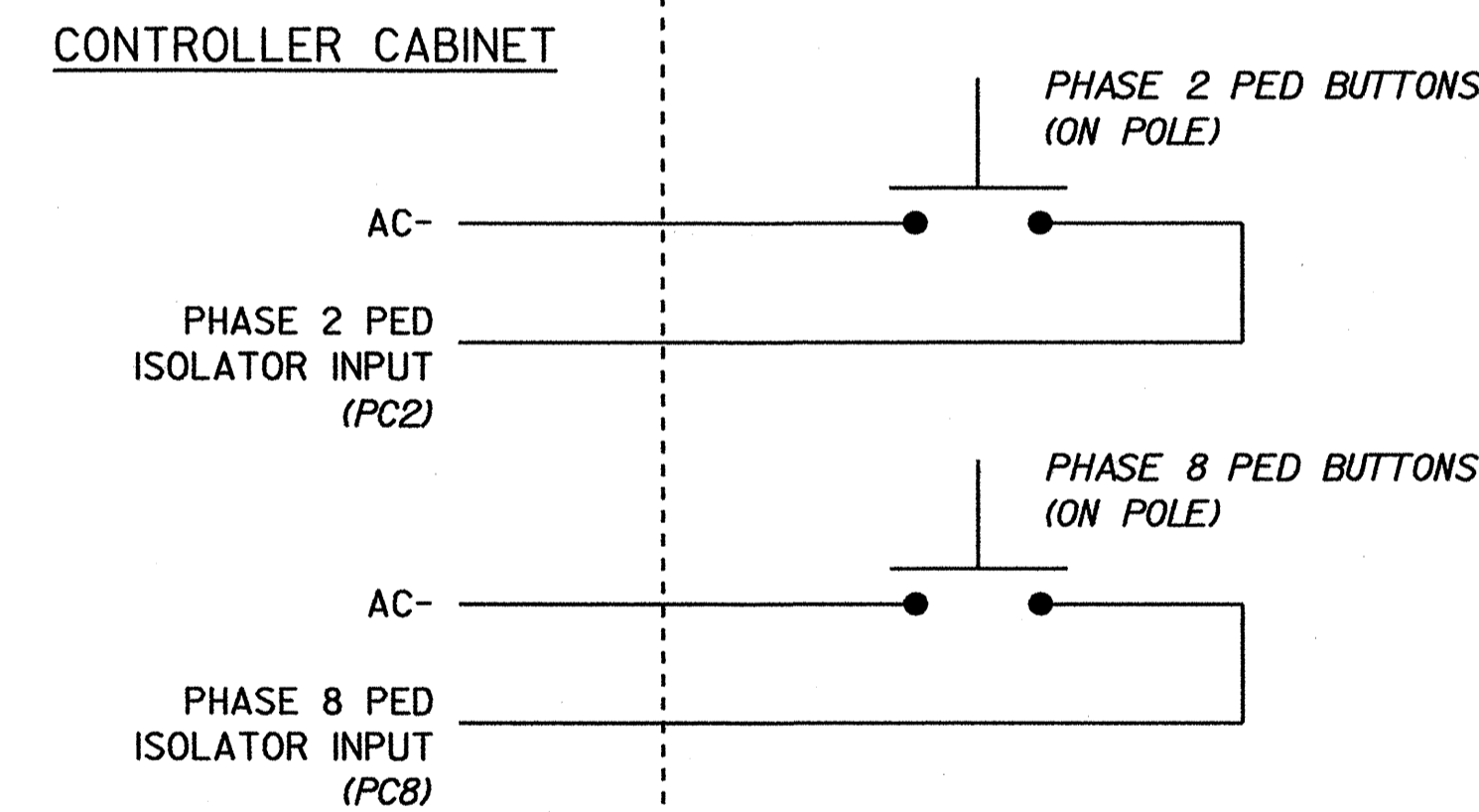
LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	φ 1
2	φ 2
3	φ 3
4	φ 4
5	φ 5
6	φ 6
7	φ 7
8	φ 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

PEDESTRIAN PUSH-BUTTON WIRING DETAIL

(wire push-buttons as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0871
DESIGNED: January 2006
SEALED: 03-03-06
REVISED: NA

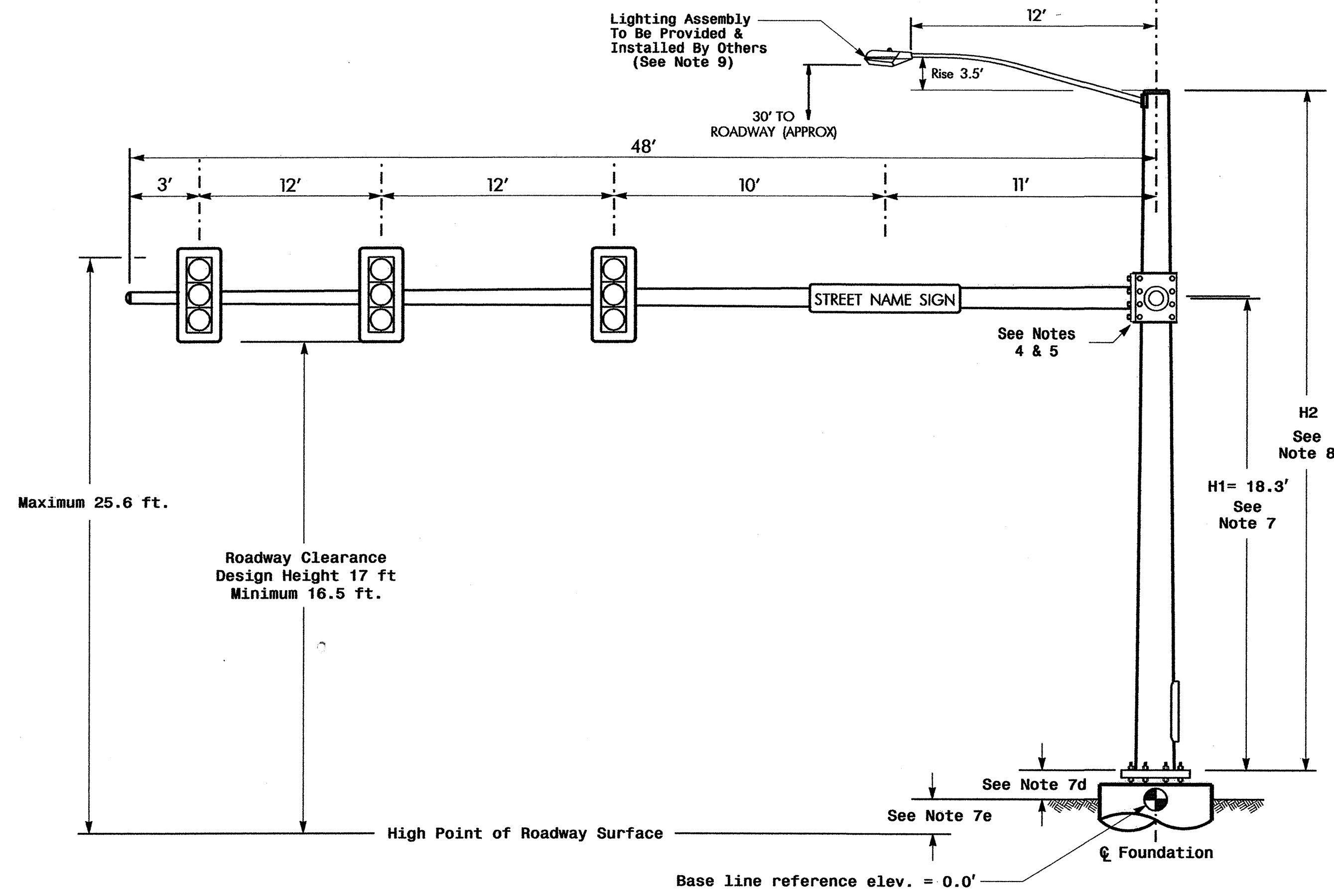
New Installation

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared in the Offices of:
SIGNAL MANAGEMENT GROUP
122 N. McDowell St., Raleigh, NC 27603

SR 1708 (Fire Tower Road) at Evans Drive / Ashcroft Drive
Division 2 Pitt County Greenville
PLAN DATE: February 2006 REVISIONS: 1/04
PREPARED BY: James Peterson REVISIONS: 3-8-06

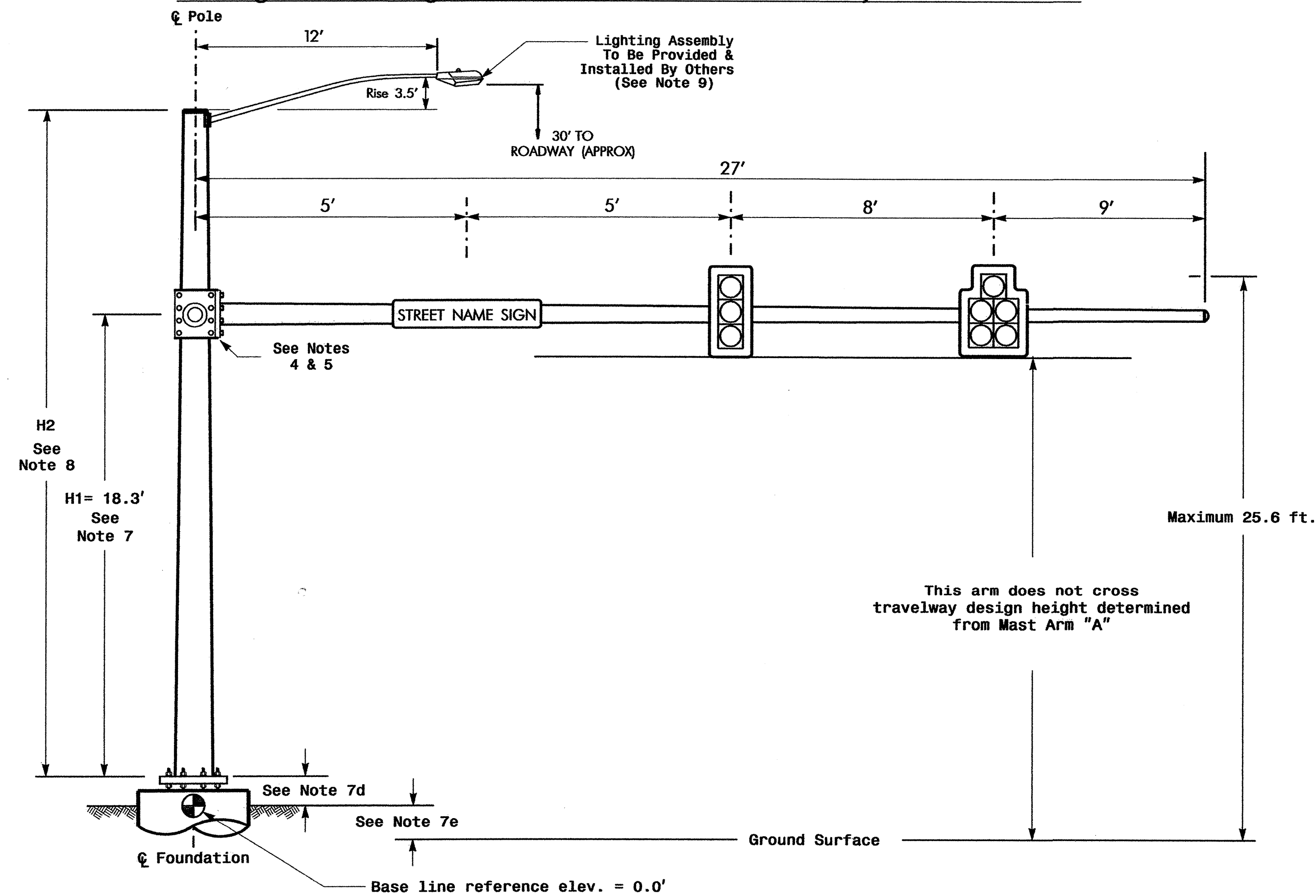
SEAL
JOHN T. ROWE, JR.
ENGINEER
SIGNAL MANAGEMENT GROUP
DATE: 3-8-06
SIG. INVENTORY NO. 02-0871

Design Loading for METAL POLE NO. 13, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 13, MAST ARM B

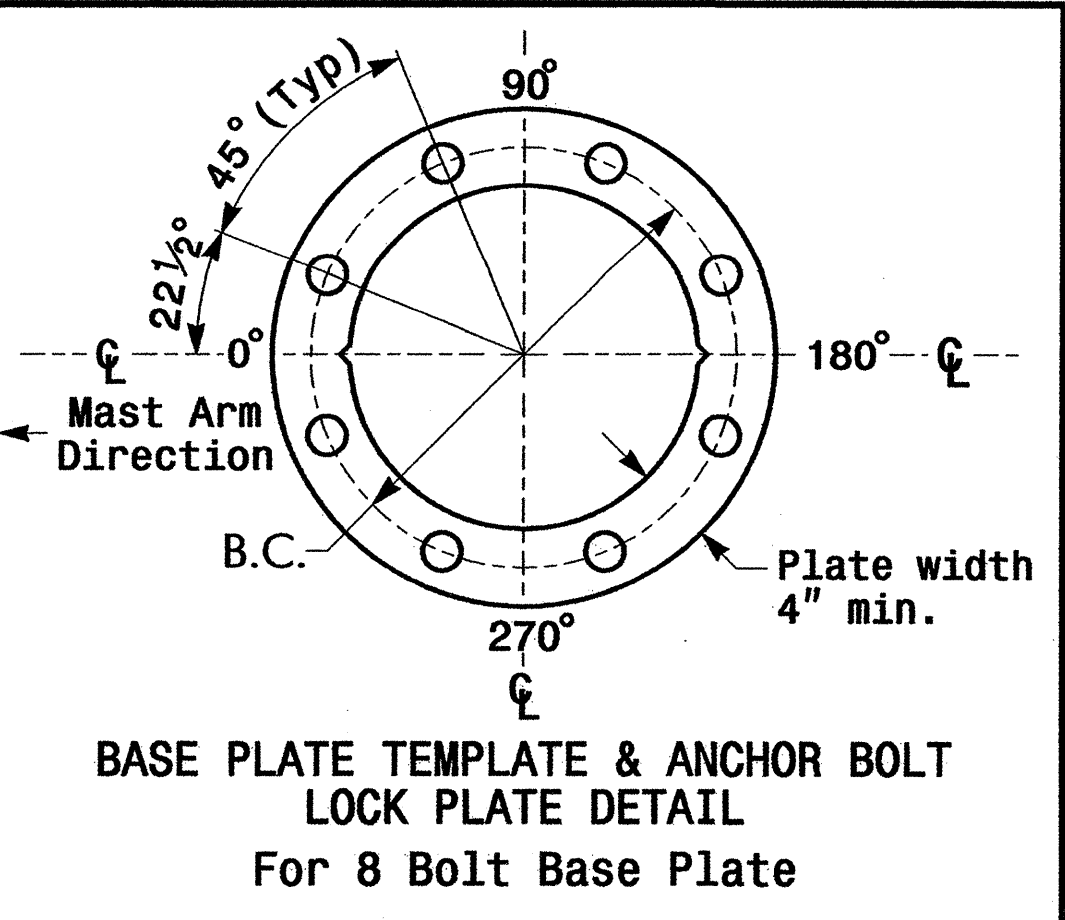
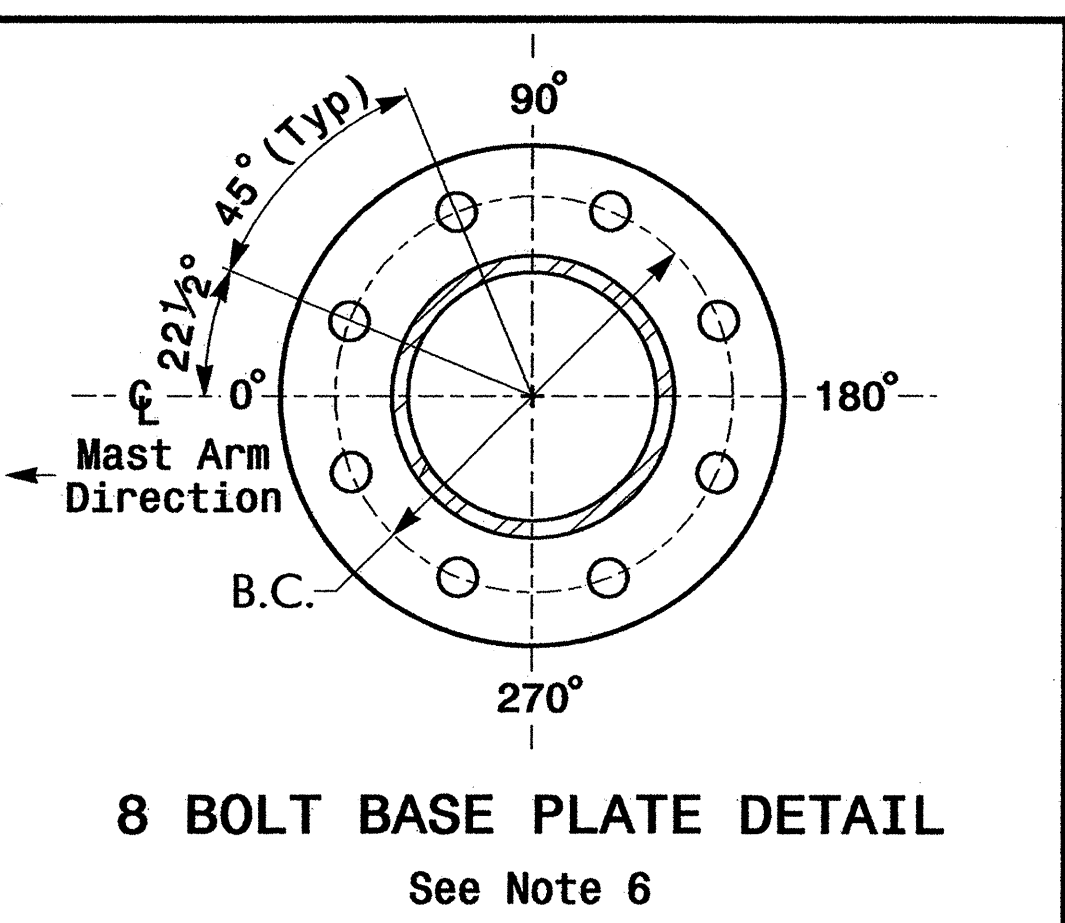
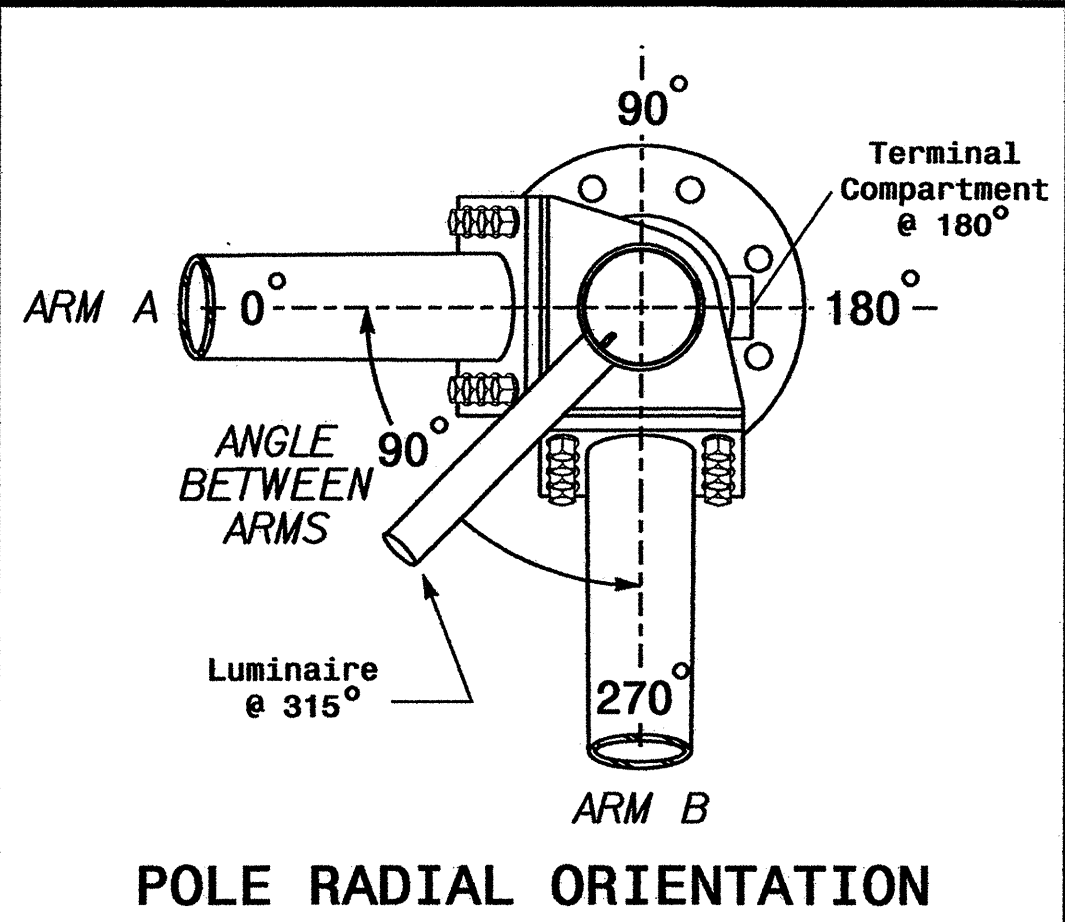


Elevation View @ 0°

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	-0.3 ft.	N/A
Elevation difference at Edge of travelway or face of curb	N/A	N/A



METAL POLE NO. 13

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	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
	LUMINAIRE OVX DROP PRISMATIC REFRACTOR	0.87 S.F.	13.25" W X 26.25" L	35 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 2002 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2002 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.ncdot.org/doh/preconstruct/traffic/tmsu/ws/mpoles/poles.htm>

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.
- Maximum allowable CSR for all signal supports is 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. The arm-to-pole attachment is a high strength connection. Use Direct Tension Indicators (ASTM F959) for each bolt.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 66 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 based on the luminaire height required of 30 feet.
- Design the luminaire support arm using design dimensions as shown on elevation views. Refer to the Radial Orientation Detail for attachment to the signal pole. Design arm end for a nominal 2 inch slip fit socket connection for light assembly.
- 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) 733-3915.
- 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.

NOTES

NCDOT Wind Zone 2 (130 mph)

Prepared in the Offices of:
SR 1708 (Fire Tower Road) at Bayswater Road
 Division 2 Pitt County Greenville
 PLAN DATE: March 2006 REVIEWED BY: RM Duffy
 PREPARED BY: TS Thigpen REVIEWED BY:

122 N. McDowell St., Raleigh, NC 27603
 SCALE: N/A
 REVISIONS: INIT. DATE
 SIGNATURE: DATE
 SIG. INVENTORY NO. 02-0871

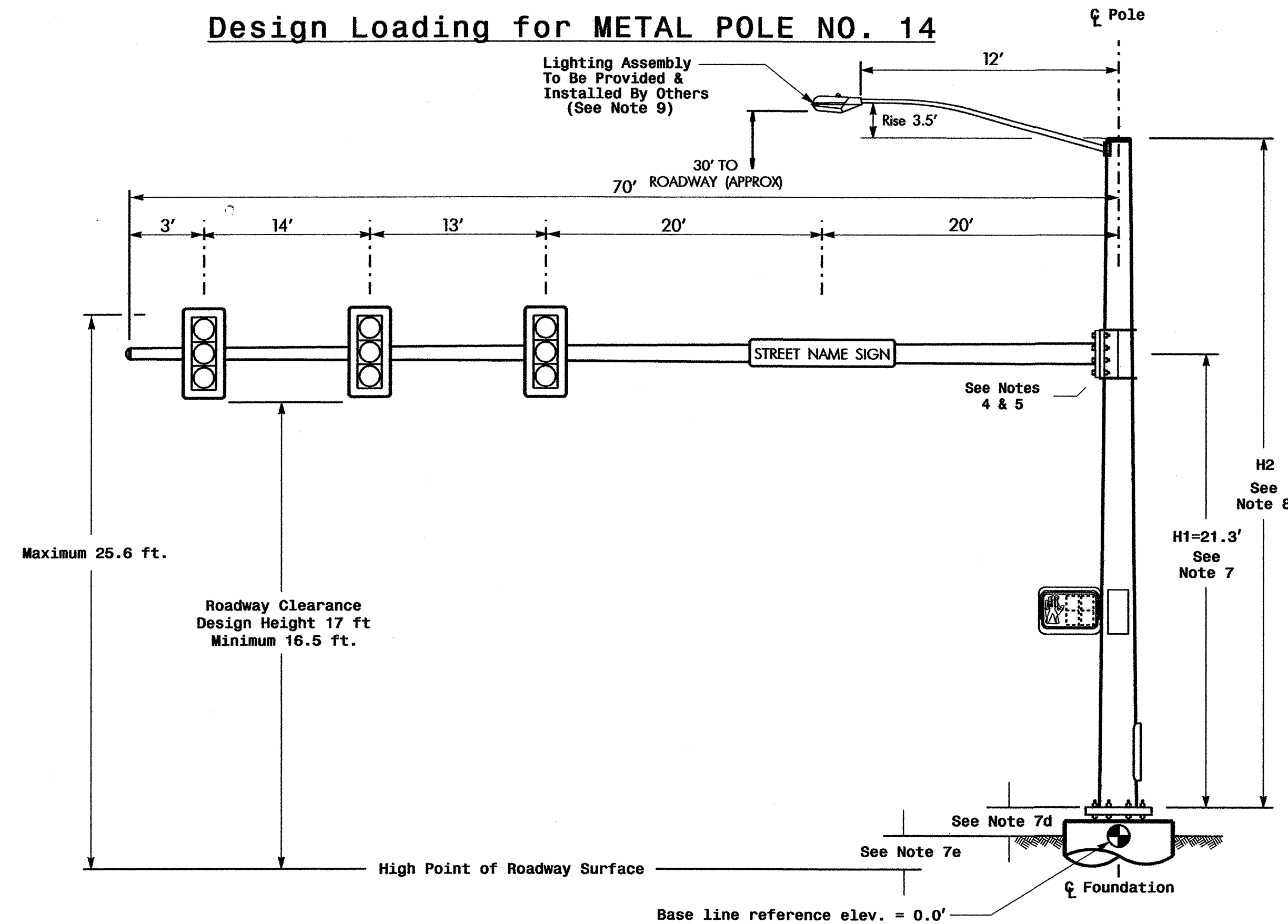
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SPECIAL NOTE
 The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was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

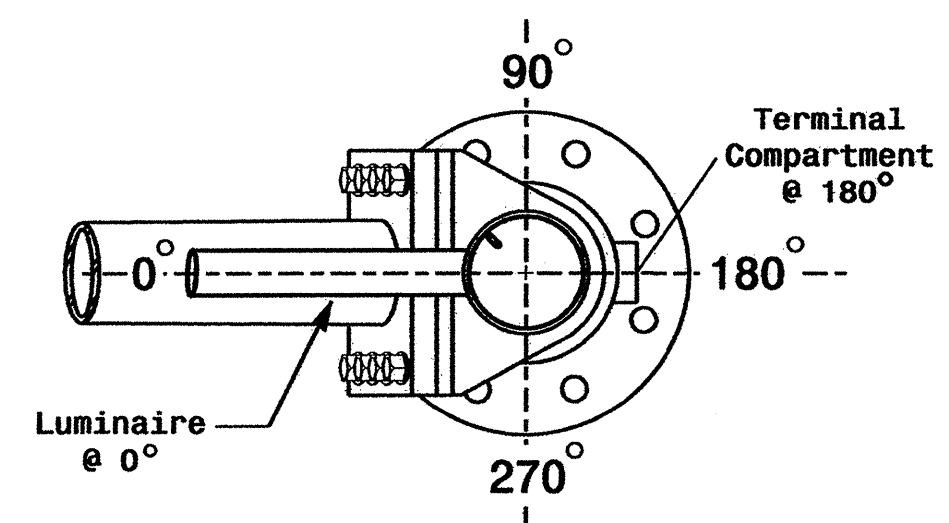
Elevation Data for Mast Arm Attachment (H1)	
Elevation Differences for:	Pole 14
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+2.7 ft.
Elevation difference at Edge of travelway or face of curb	N/A

MAST ARM LOADING SCHEDULE				
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	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
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5" W X 17.0" L	21 LBS
	LUMINAIRE OVX DROP PRISMATIC REFRACTOR	EPA 0.87 S.F.	13.25" W X 26.25" L	35 LBS

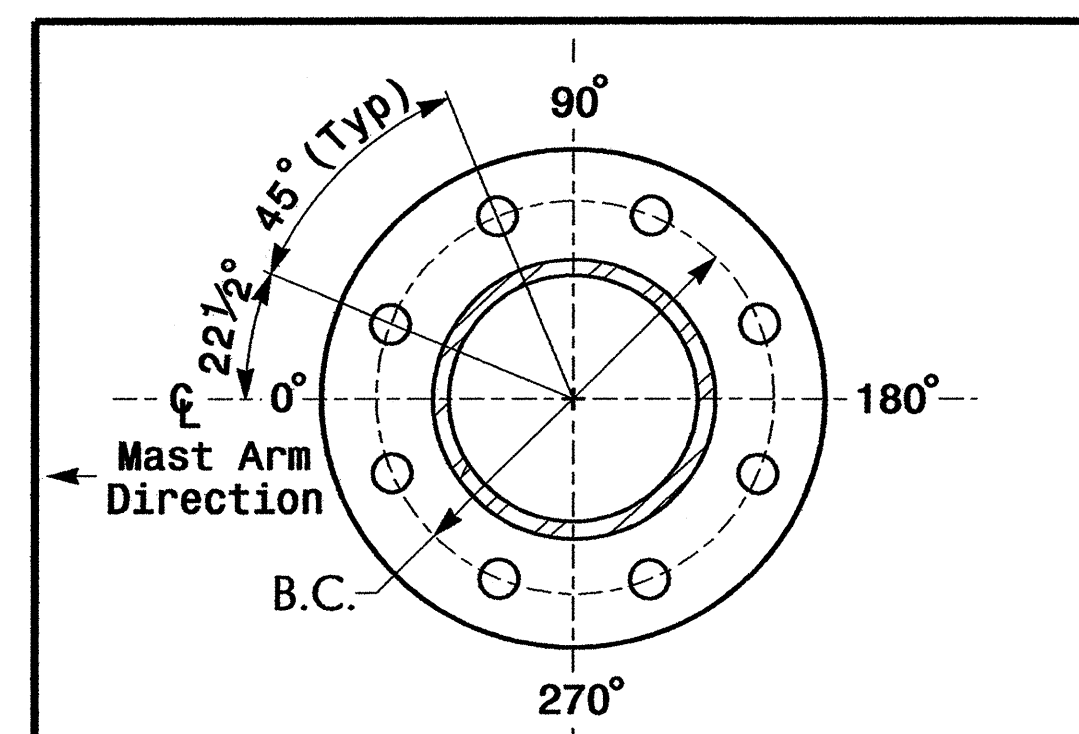
Design Loading for METAL POLE NO. 14



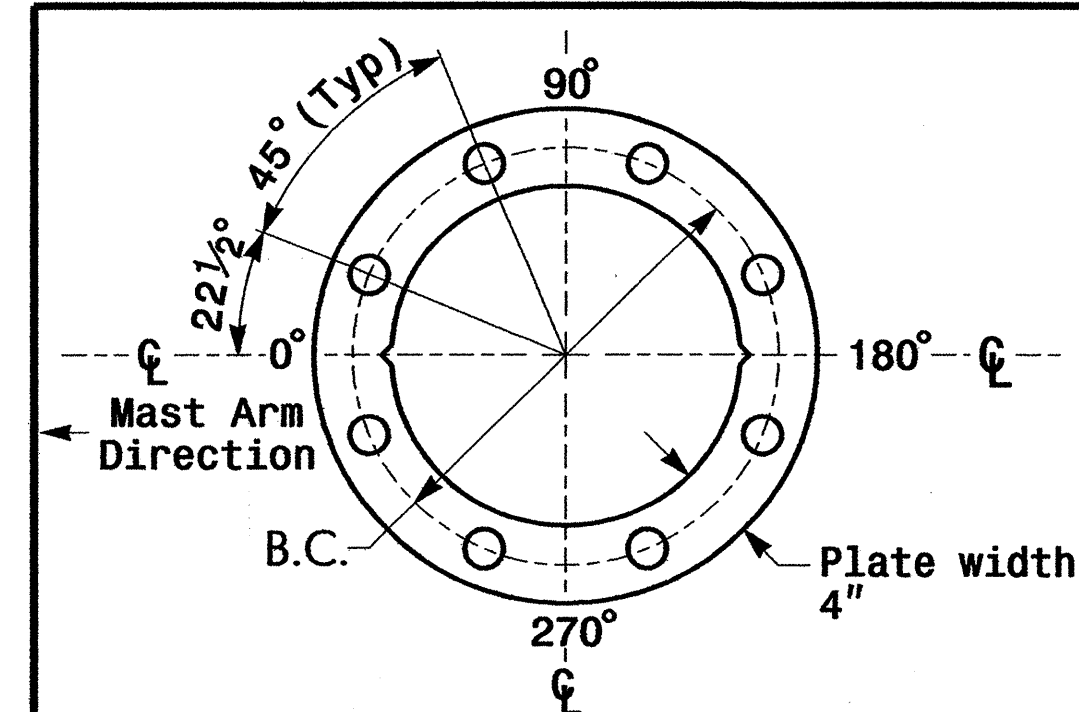
Elevation View



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

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 2002 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions. The 2002 NCDOT Roadway Standard Drawings. The traffic signal project plans and special provisions. The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.doh.dot.state.nc.us/preconstruct/traffic/tmsu/ws/mpoles/poles.htm>

Design Requirements

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- Maximum allowable CSR for all signal supports is 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 is a high strength connection. Use Direct Tension Indicators (ASTM F959) for each bolt.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 6 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 based on the luminaire height requirement of 30 feet.
- Design the luminaire support arm using design dimensions as shown on elevation views. Refer to the Radial Orientation Detail for attachment to the signal pole. Design arm end for a nominal 2 inch slip fit socket connection for light assembly.
- 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) 733-3915.
- 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)

	SR 1708 (Fire Tower Road) at Bayswater Road		
	Division 2 Pitt County Greenville	PLAN DATE: March 2006 REVIEWED BY: RM Duffy	
SCALE: N/A	REVISIONS:	INIT. DATE	SIGNATURE: [Signature] DATE: 10 MAY 2006
SIG. INVENTORY NO. 02-0871			

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 rduffy

2 Phase Fully Actuated (Greenville City System)

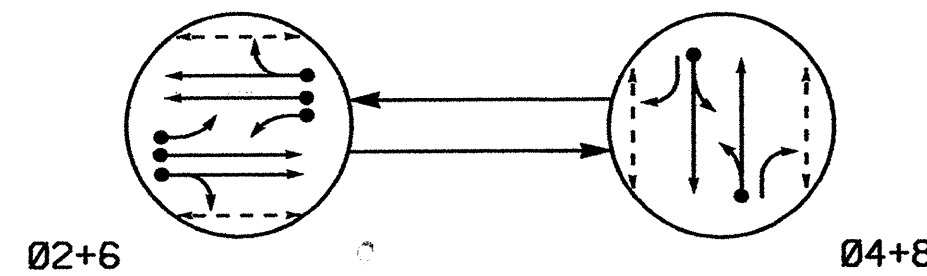
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Program phase 4 and phase 8 for dual entry.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Intersection Zone Number: 7, System Address Number: 124

LOOP & DETECTOR UNIT INSTALLATION CHART NEMA CONTROLLER WITH TS-2 CABINET											
INDUCTIVE LOOPS						DETECTOR UNITS					
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW EXISTING	NEMA PHASE	TIMING		PLACE CALL DURING PHASE	INHIBIT DELAY DURING GREEN?		
						FEATURE	TIME				
2A	6X6	6	300	X	2	X	-	-	SEC.	ALL	NO
2B	6X6	6	300	X	2	X	-	-	SEC.	ALL	NO
2C	6X40	2-4-2	0	X	2	X	DELAY	3	SEC.	ALL	NO
4A	6X40	2-4-2	0	X	4	X	-	-	SEC.	ALL	NO
4B	6X40	2-4-2	0	X	4	X	DELAY	10	SEC.	ALL	YES
6A	6X6	6	300	X	6	X	-	-	SEC.	ALL	NO
6B	6X6	6	300	X	6	X	-	-	SEC.	ALL	NO
6C	6X40	2-4-2	0	X	6	X	DELAY	3	SEC.	ALL	NO
8A	6X40	2-4-2	0	X	8	X	DELAY	3	SEC.	ALL	YES
8B	6X40	2-4-2	0	X	8	X	DELAY	10	SEC.	ALL	YES

SIGNAL FACE	PHASE		
	Ø2+6	Ø4+8	Ø6
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK

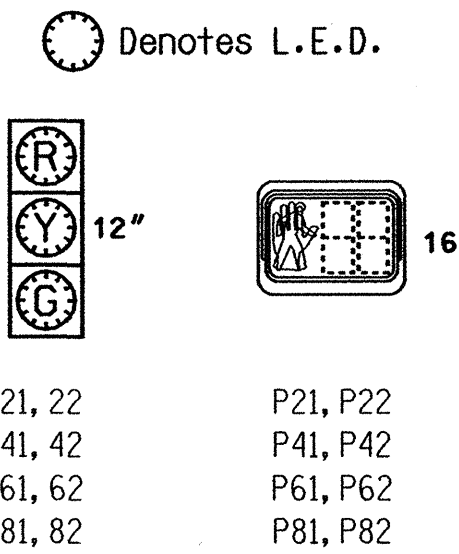
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

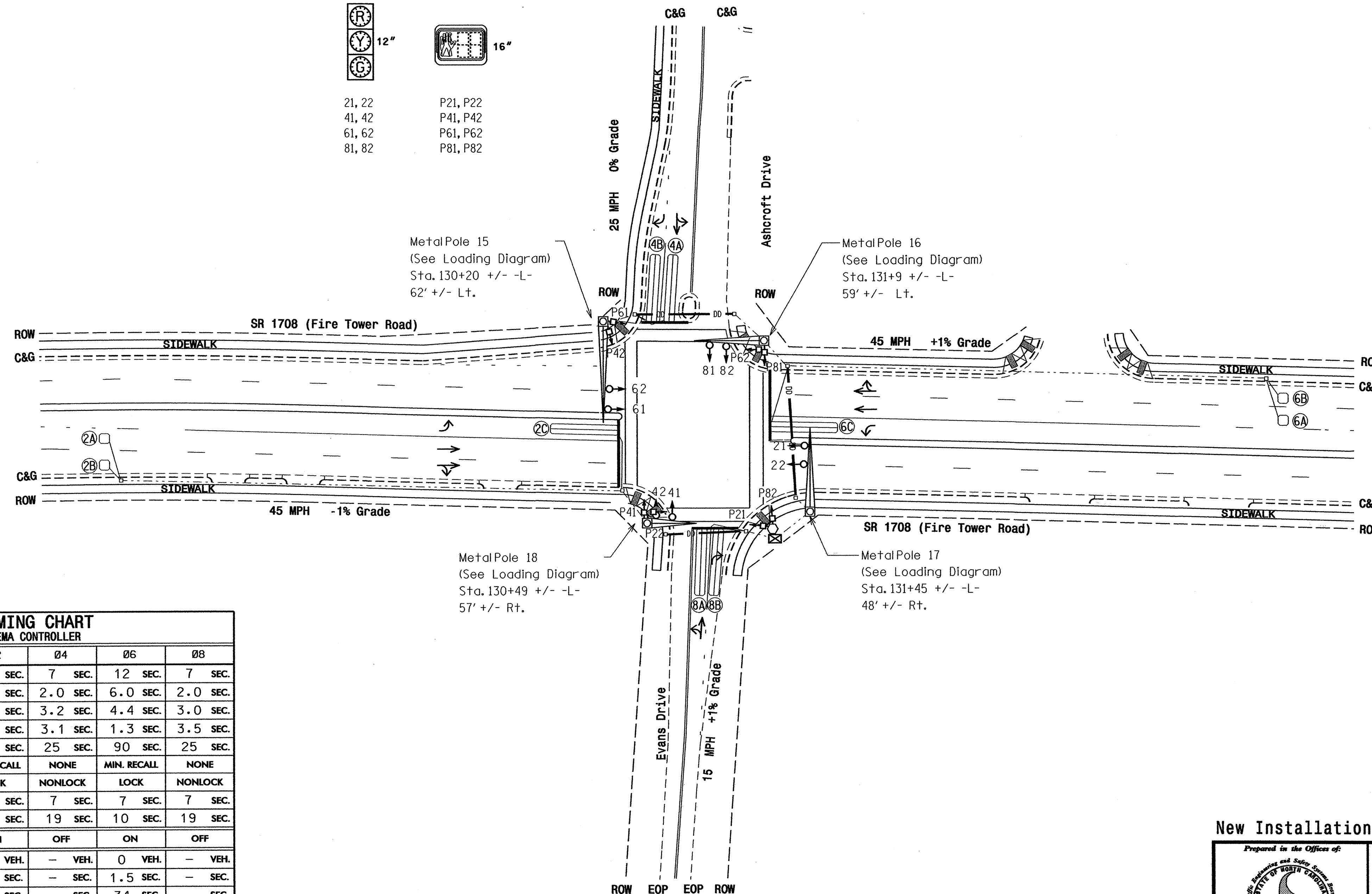
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.



TIMING CHART NEMA CONTROLLER				
PHASE	Ø2	Ø4	Ø6	Ø8
MINIMUM GREEN	12 SEC.	7 SEC.	12 SEC.	7 SEC.
PASSAGE GAP	6.0 SEC.	2.0 SEC.	6.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	4.6 SEC.	3.2 SEC.	4.4 SEC.	3.0 SEC.
RED CLEARANCE	1.3 SEC.	3.1 SEC.	1.3 SEC.	3.5 SEC.
MAX. 1	90 SEC.	25 SEC.	90 SEC.	25 SEC.
RECALL POSITION	MIN. RECALL	NONE	MIN. RECALL	NONE
VEH. CALL MEMORY	LOCK	NONLOCK	LOCK	NONLOCK
WALK	7 SEC.	7 SEC.	7 SEC.	7 SEC.
FLASHING DON'T WALK	8 SEC.	19 SEC.	10 SEC.	19 SEC.
VOLUME DENSITY	ON	OFF	ON	OFF
ACTUATION B4 ADD	0 VEH.	- VEH.	0 VEH.	- VEH.
SEC. PER ACTUATION	1.5 SEC.	- SEC.	1.5 SEC.	- SEC.
MAX. INITIAL	34 SEC.	- SEC.	34 SEC.	- SEC.
TIME B4 REDUCTION	15 SEC.	- SEC.	15 SEC.	- SEC.
TIME TO REDUCE	30 SEC.	- SEC.	30 SEC.	- SEC.
MINIMUM GAP	3.0 SEC.	- SEC.	3.0 SEC.	- SEC.

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



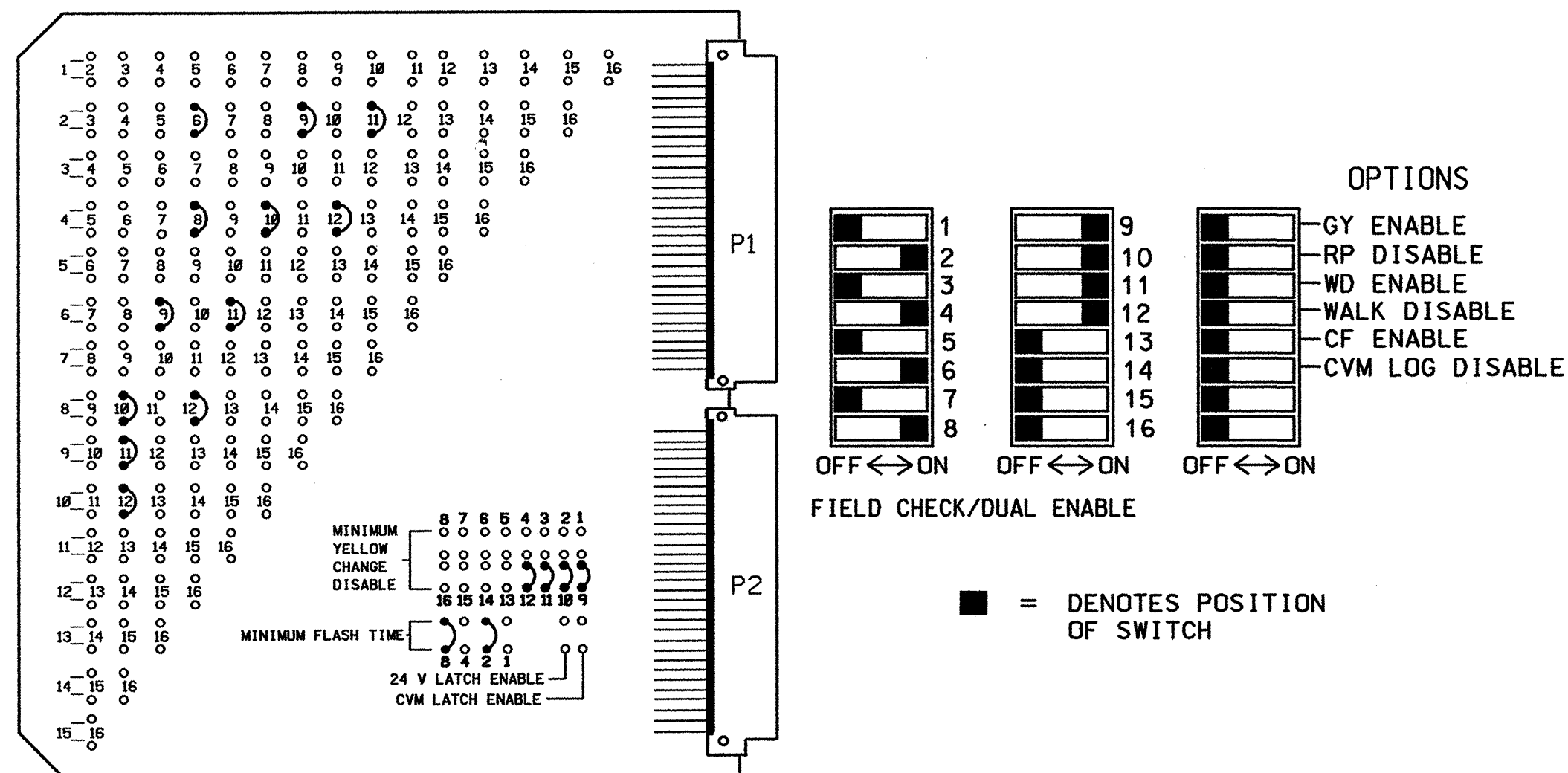
LEGEND

- | PROPOSED | EXISTING |
|--|--|
| ○ Traffic Signal Head | ● Traffic Signal Head |
| ○ Modified Signal Head | N/A |
| ⊥ Sign | ⊥ Sign |
| ⊥ Pedestrian Signal Head With Push Button & Sign | ⊥ Pedestrian Signal Head With Push Button & Sign |
| ⊥ Signal Pole with Guy | ⊥ Signal Pole with Guy |
| ⊥ Signal Pole with Sidewalk Guy | ⊥ Signal Pole with Sidewalk Guy |
| ⊥ Inductive Loop Detector | ⊥ Inductive Loop Detector |
| ⊥ Controller & Cabinet | ⊥ Controller & Cabinet |
| ⊥ Junction Box | ⊥ Junction Box |
| --- 2-in Underground Conduit | --- 2-in Underground Conduit |
| N/A Right of Way | --- Right of Way |
| → Directional Arrow | → Directional Arrow |
| → Pavement Marking Arrow | → Pavement Marking Arrow |
| N/A Wheelchair Ramp | → Wheelchair Ramp |
| --- Directional Drill (2) 2-in Poly. Conduit | N/A |
| ⊥ Metal Pole with Mastarm | ⊥ Metal Pole with Mastarm |

New Installation

	SR 1708 (Fire Tower Road) at Evans Drive /Ashcroft Drive		
	Division 2 Pitt County Greenville PLAN DATE: January 2006 REVIEWED BY: RM Duffy PREPARED BY: TS Thigpen REVIEWED BY: [Signature]	SCALE: 1" = 40' REVISIONS:	
222 N. McDowell St., Raleigh, NC 27603		SIGNATURE: [Signature] DATE: 3/1/2006 SIG. INVENTORY NO. 02-0869	

**EDI MODEL MMU-16E
MALFUNCTION MANAGEMENT UNIT
PROGRAMMING DETAIL**
(program card and set switches as shown below)



NOTES

- TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES TO FLASH RED. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED LOAD SWITCH RED OUTPUTS 1, 3, 5, 7, 13, 14, 15 AND 16 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.
- PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
- SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
- ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
- PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
- PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
- SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
- PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
- PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DUAL ENTRY.
- THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

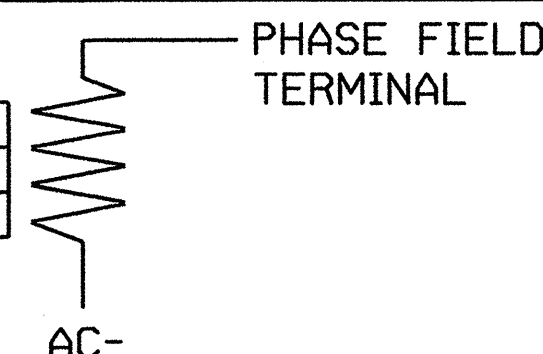
FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	NU	21,22	NU	41,42	NU	61,62	NU	81,82	P21, P22	P41, P42	P61, P62	P81, P82	NU	NU	NU	NU
RED		2R		4R		6R		8R								
YELLOW		2Y		4Y		6Y		8Y	*	*	*	*				
GREEN		2G		4G		6G		8G								
RED ARROW																
YELLOW ARROW																
GREEN ARROW																
Hand									9R	10R	11R	12R				
Person									9G	10G	11G	12G				

NU = NOT USED
* INSTALL LOAD RESISTORS TO UNUSED FIELD TERMINALS 9Y, 10Y, 11Y AND 12Y, IF NOT ALREADY PRESENT. SEE LOAD RESISTOR INSTALLATION DETAIL THIS PAGE.

TYPICAL LOAD RESISTOR INSTALLATION DETAIL

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

BIU	CH1	CH1	CH1	CH1	SLOT	CH1	SLOT	SLOT	SLOT	SLOT
	L3	L1	L7	L5		L9				
	∅ 2	∅ 2	∅ 6	∅ 4		∅ 8				
	*									
	CH2	CH2	CH2	CH2	EMPTY	CH2	EMPTY	EMPTY	EMPTY	EMPTY
	L4	L2	L8	L6		L10				
	∅ 4	∅ 2	∅ 6	∅ 6		∅ 8				
			*							

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
2A	L1A,L1B
2B	L2A,L2B
2C	L3A,L3B
4A	L4A,L4B
4B	L5A,L5B
6A	L6A,L6B
6B	L7A,L7B
6C	L8A,L8B
8A	L9A,L9B
8B	L10A,L10B
	L11A,L11B
	L12A,L12B
	L13A,L13B
	L14A,L14B
	L15A,L15B
	L16A,L16B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME (SEC)
1	∅ 2		
2	∅ 2		
* 3	∅ 2	DELAY	3
4	∅ 4		
5	∅ 4	DELAY	10
6	∅ 6		
* 8	∅ 6	DELAY	3
	∅ 8	DELAY	3
10	∅ 8	DELAY	10
11			
12			
13			
14			
15			
16			

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED
CABINETCONTRACTOR SUPPLIED TS-2 NC-8A
CABINET MOUNT.....BASE
LOADBAY POSITIONS.....16
LOAD SWITCHES USED.....2,4,6,8,9,10,11,12
PHASES USED.....2,4,6,8,2 PED,4 PED,6 PED,8 PED
OLA.....NOT USED
OLB.....NOT USED
OLC.....NOT USED
OLD.....NOT USED

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

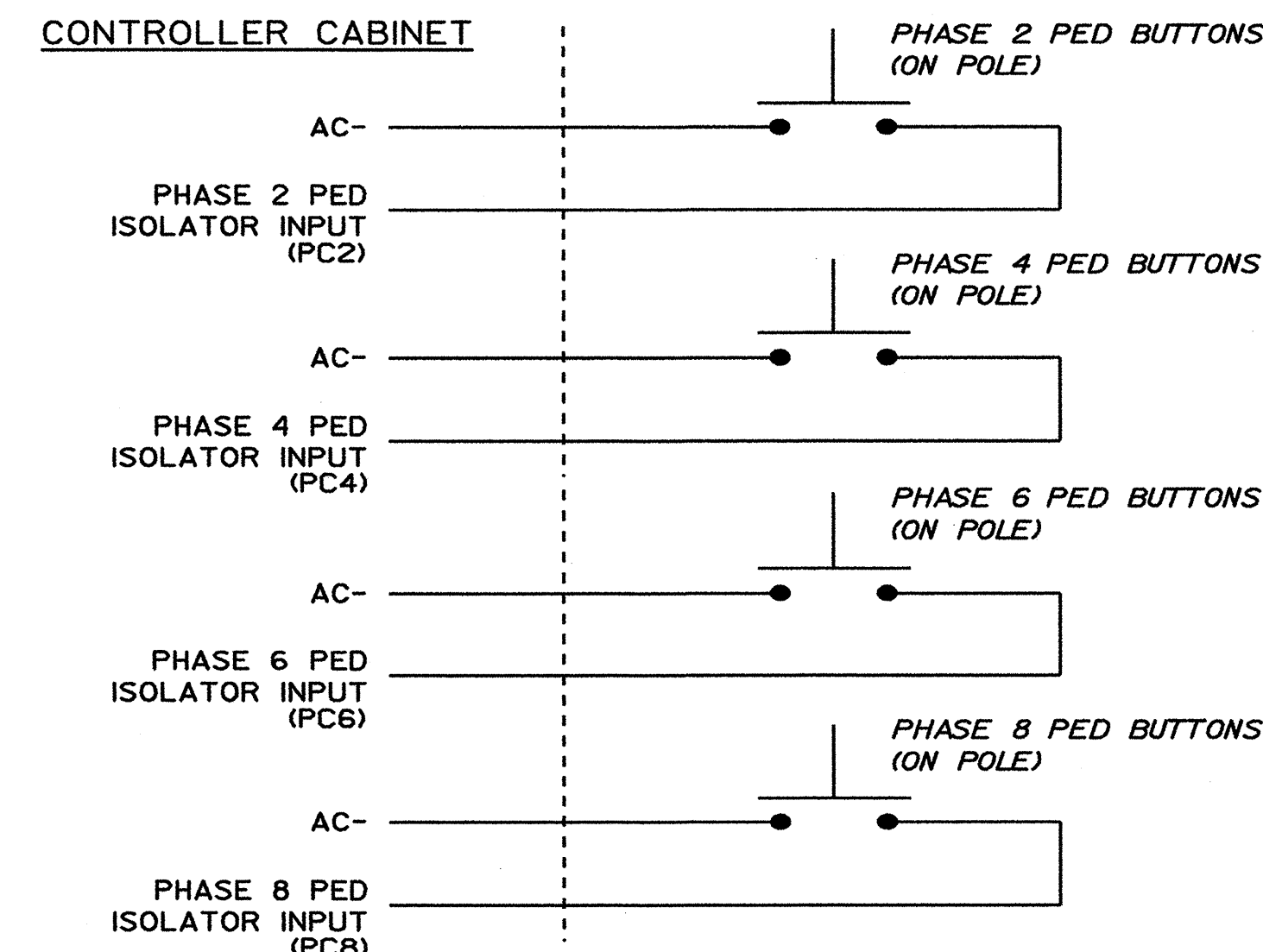
LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	∅ 1
2	∅ 2
3	∅ 3
4	∅ 4
5	∅ 5
6	∅ 6
7	∅ 7
8	∅ 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

PEDESTRIAN PUSH-BUTTON WIRING DETAIL

(wire push-buttons as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0869
DESIGNED: January 2006
SEALED: 03-03-06
REVISED: NA

New Installation

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared in the Offices of:
122 N. McDowell St., Raleigh, NC 27603

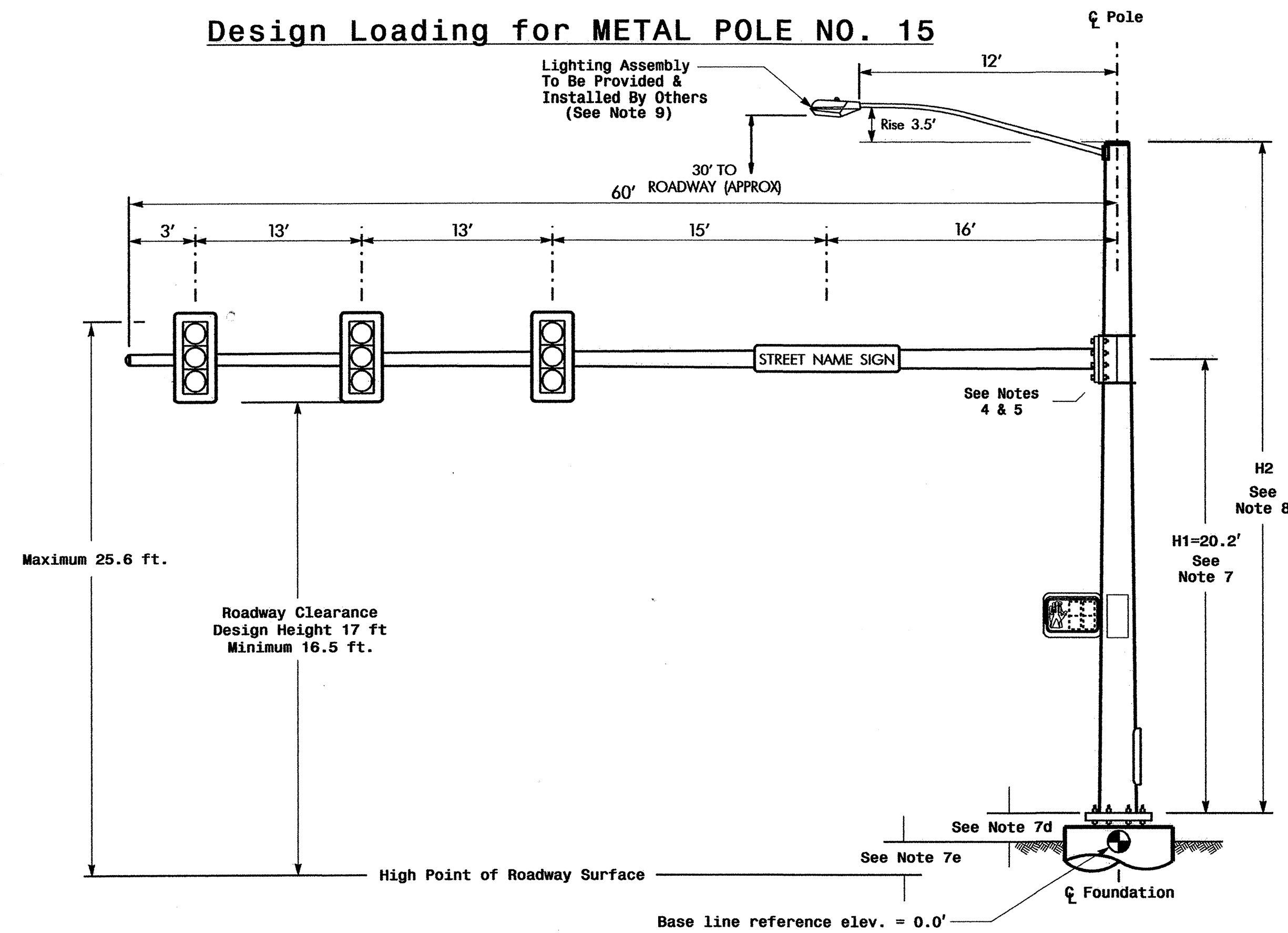
SR 1708 (Fire Tower Road) at Evans Drive / Ashcroft Drive

Division 2 Pitt County Greenville
PLAN DATE: February 2006 REVIEWED BY: [Signature]
PREPARED BY: James Peterson REVIEWED BY: [Signature]

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 008453
JOHN T. ROWE, P.E.
3-7-06
DATE

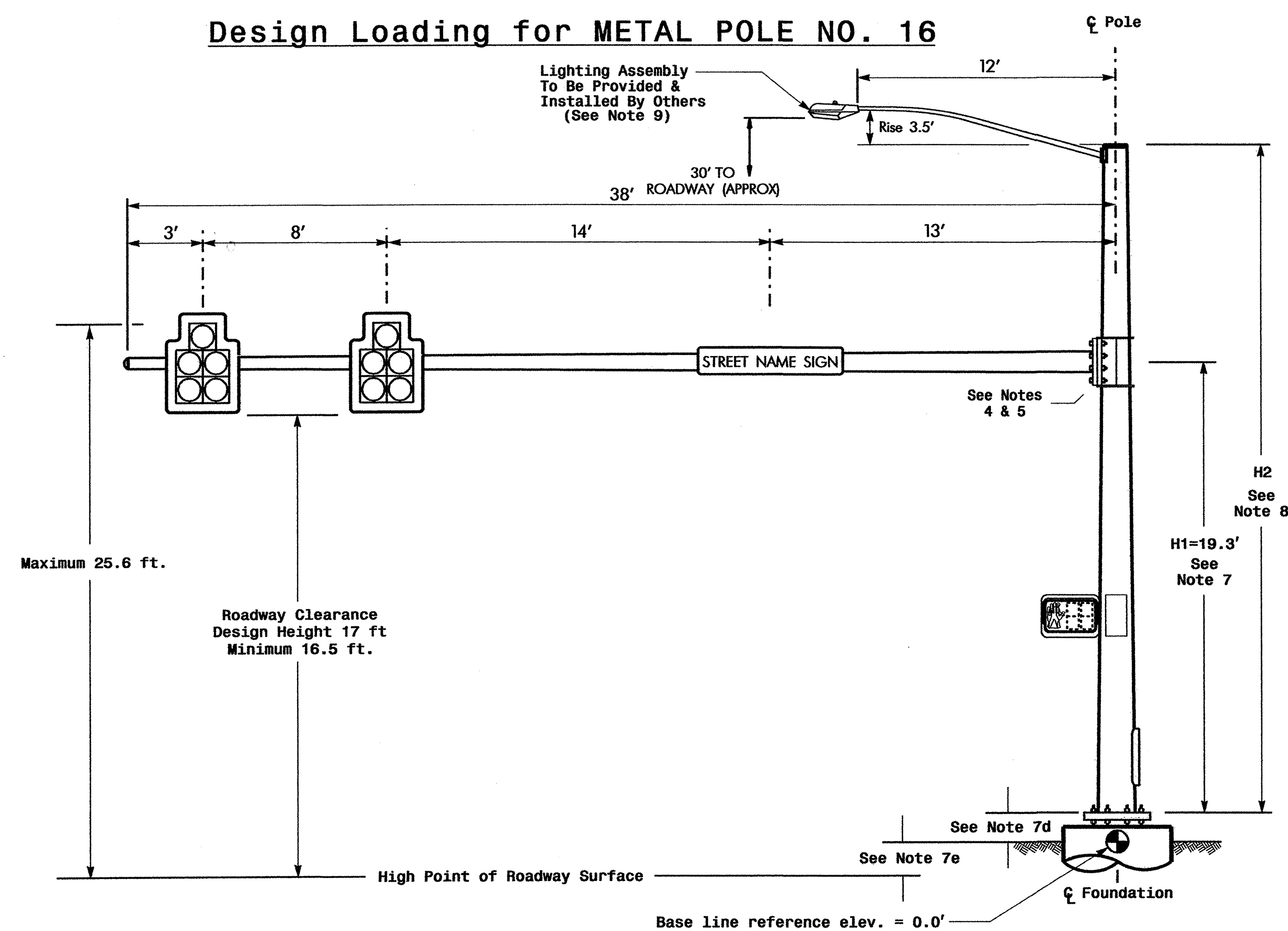
SIG. INVENTORY NO. 02-0869

Design Loading for METAL POLE NO. 15



Elevation View

Design Loading for METAL POLE NO. 16

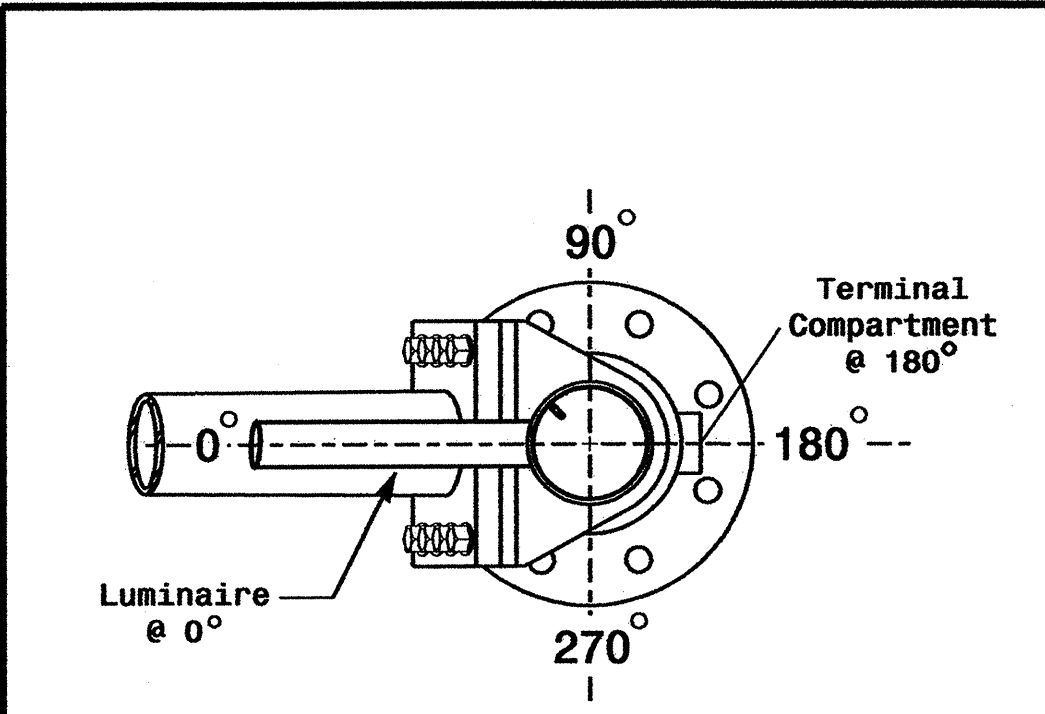


Elevation View

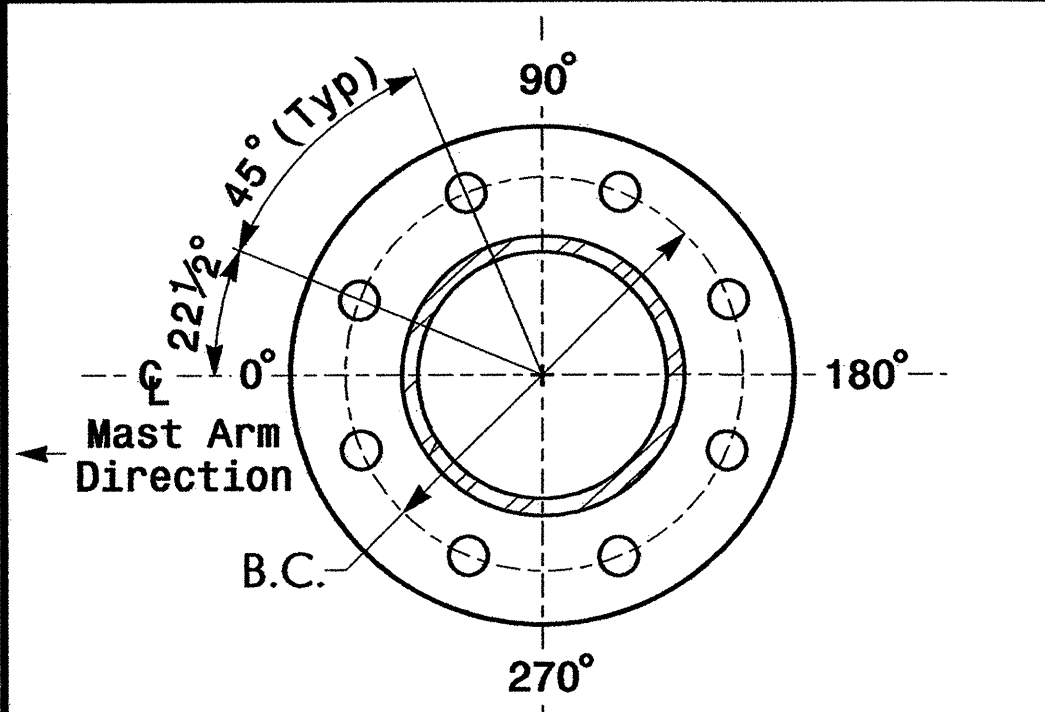
SPECIAL NOTE
 The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 15	Pole 16
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.6 ft.	+0.8 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

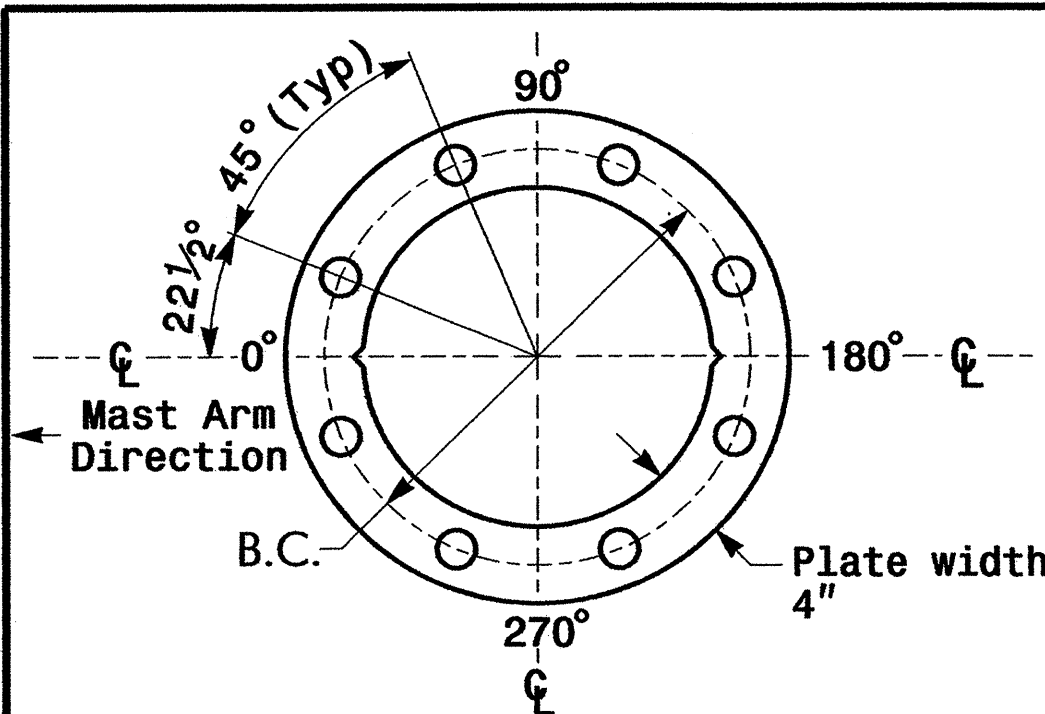


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

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"-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
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5" W X 17.0" L	21 LBS
	LUMINAIRE OVX DROP PRISMATIC REFRACTOR	EPA 0.87 S.F.	13.25" W X 26.25" L	35 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 2002 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions. The 2002 NCDOT Roadway Standard Drawings. The traffic signal project plans and special provisions. The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.doh.dot.state.nc.us/preconstruct/traffic/tmssu/ws/mpoles/poles.htm>

Design Requirements

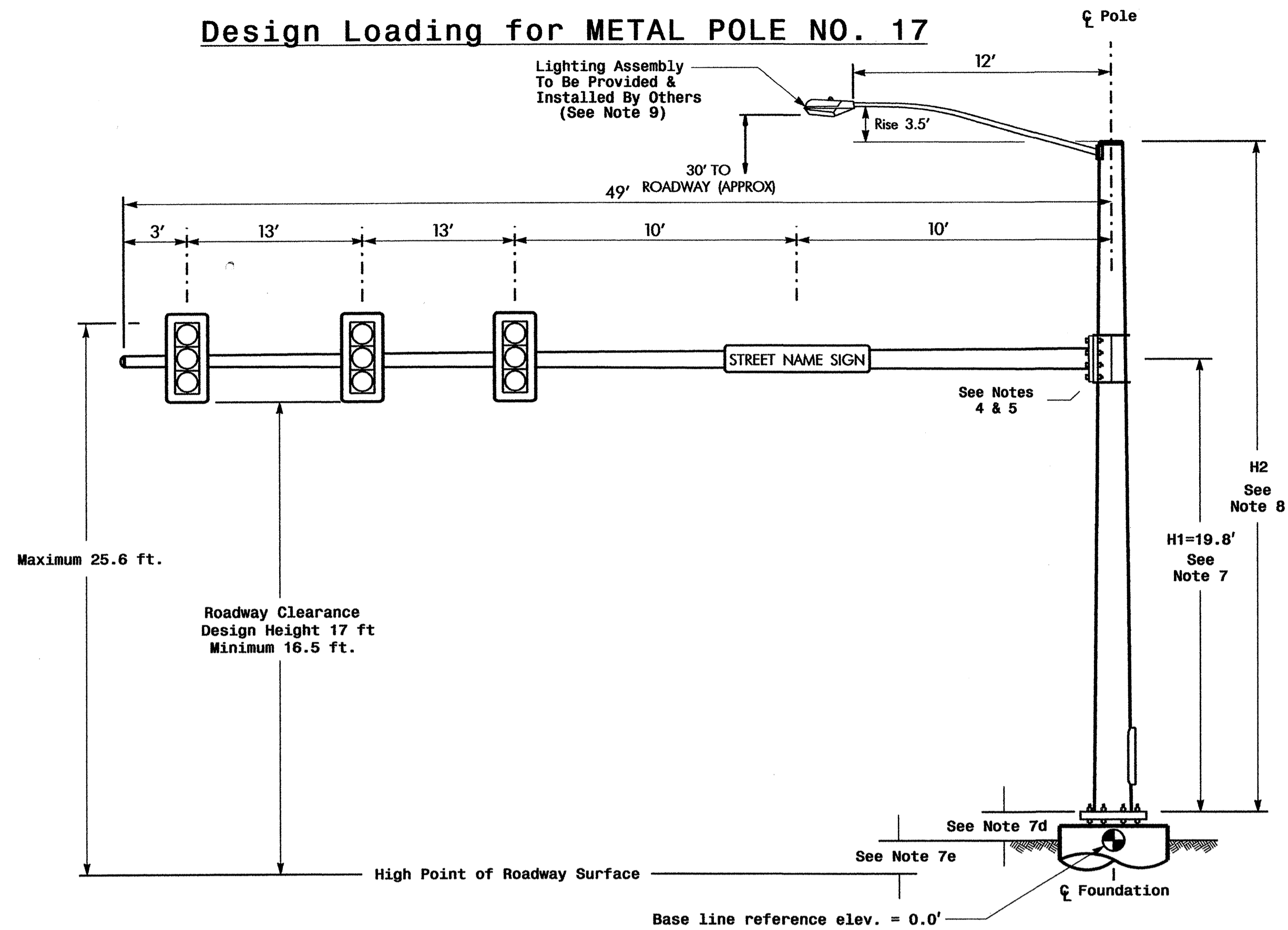
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Maximum allowable CSR for all signal supports is 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 is a high strength connection. Use Direct Tension Indicators (ASTM F959) for each bolt.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 66 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 based on the luminaire height requirement of 30 feet.
- Design the luminaire support arm using design dimensions as shown on elevation views. Refer to the Radial Orientation Detail for attachment to the signal pole. Design arm end for a nominal 2 inch slip fit socket connection for light assembly.
- 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) 733-3915.
- 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)

	<p>SR 1708 (Fire Tower Road) at Evans Drive/Ashcroft Drive</p>		
	<p>Division 2 Pitt County Greenville</p>	<p>PLANNED BY: March 2006</p>	
<p>SCALE: N/A</p>	<p>PREPARED BY: TS Thippen</p>	<p>REVIEWED BY: [Signature]</p>	<p>SIGNATURE: [Signature] DATE: 10 Mar 2006</p>
<p>0 N/A</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>SIG. INVENTORY NO. 02-0869</p>

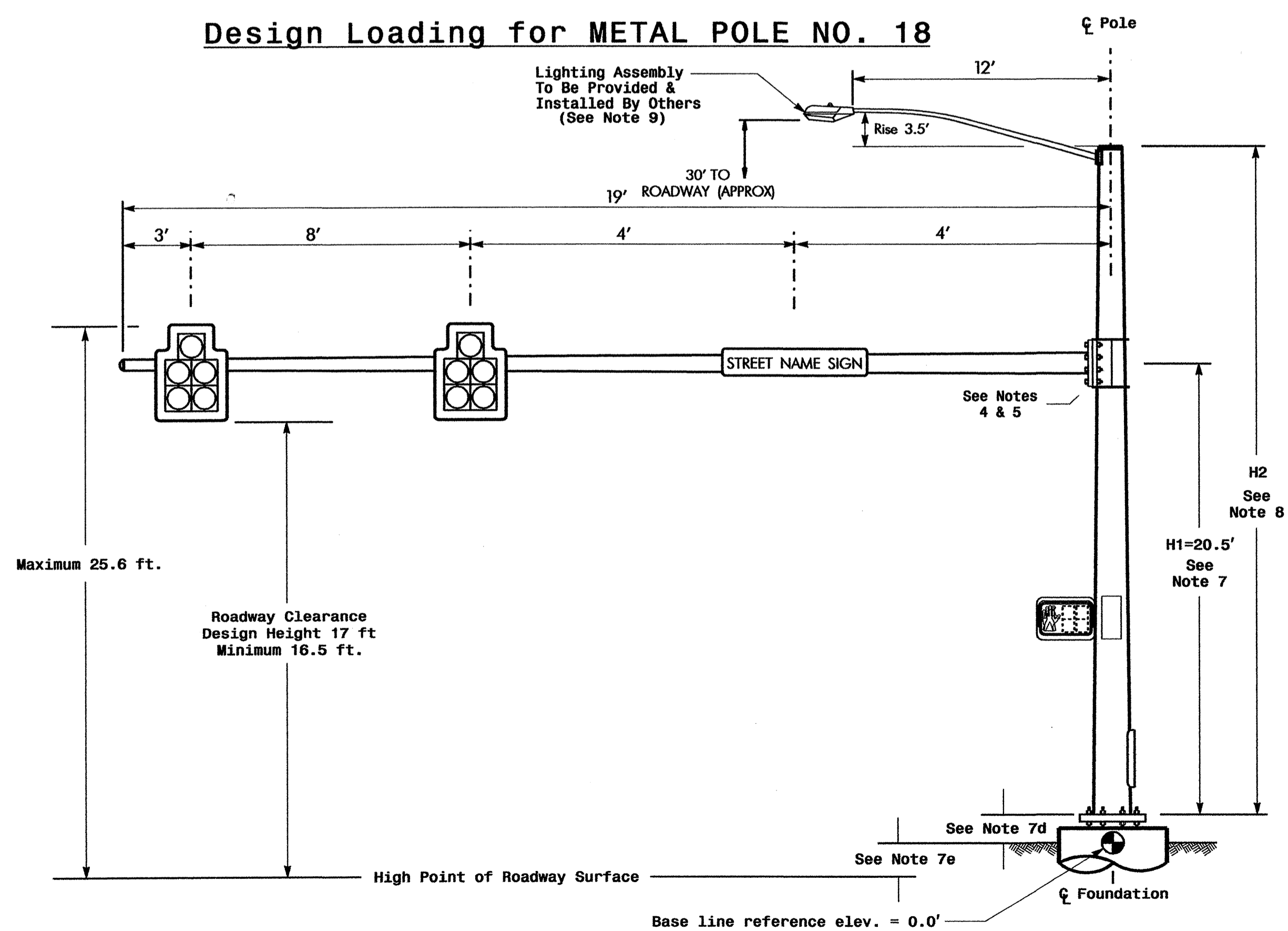
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Design Loading for METAL POLE NO. 17



Elevation View

Design Loading for METAL POLE NO. 18

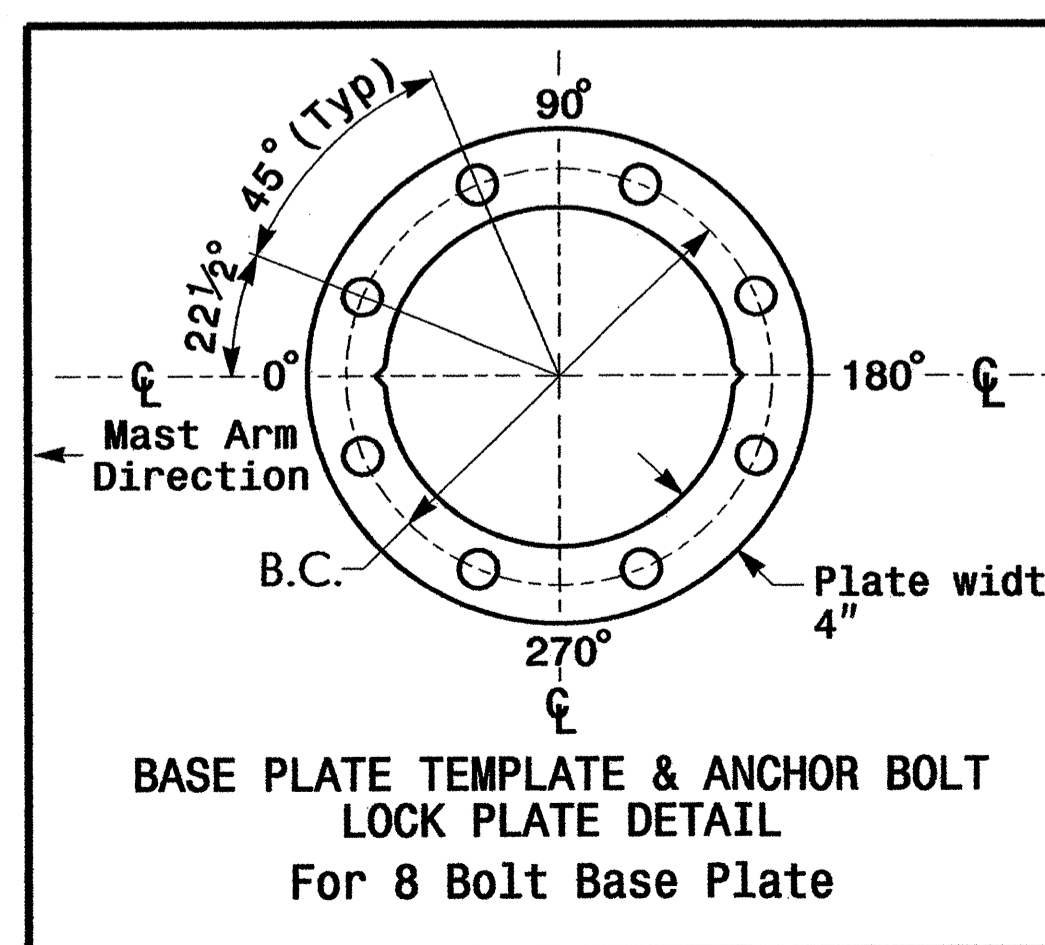
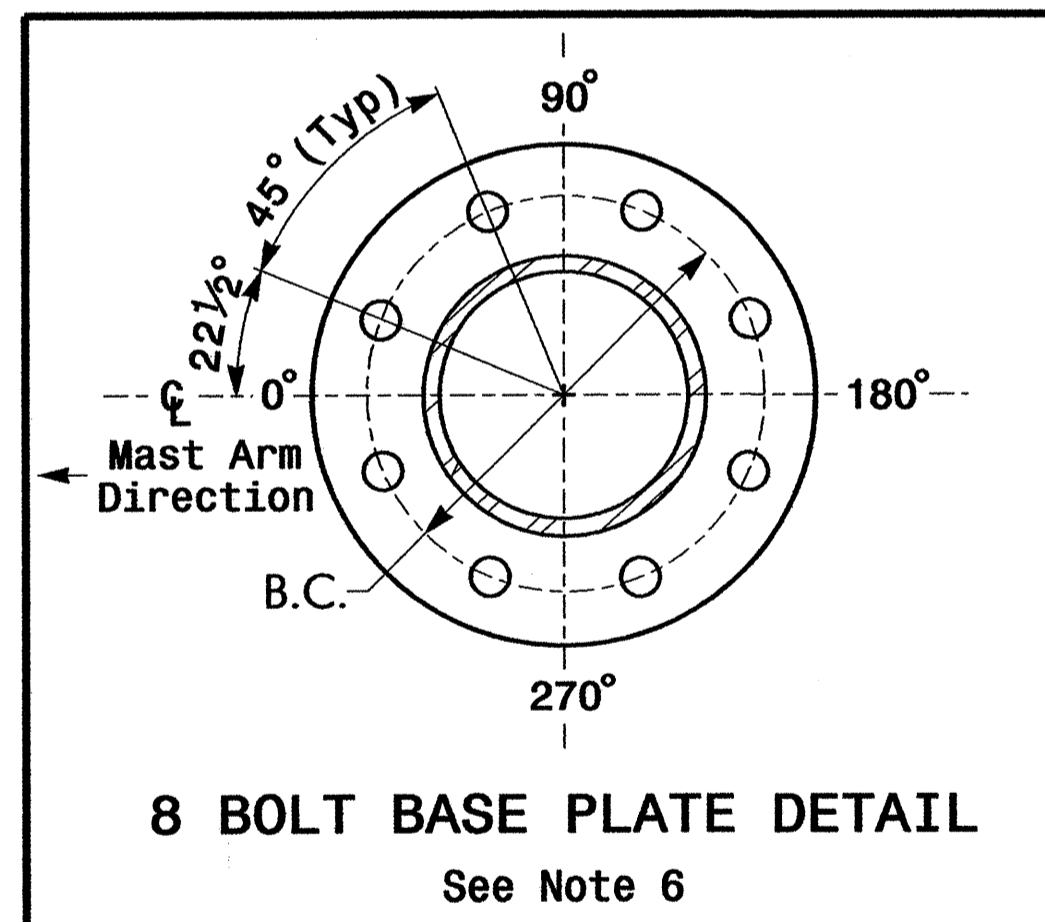
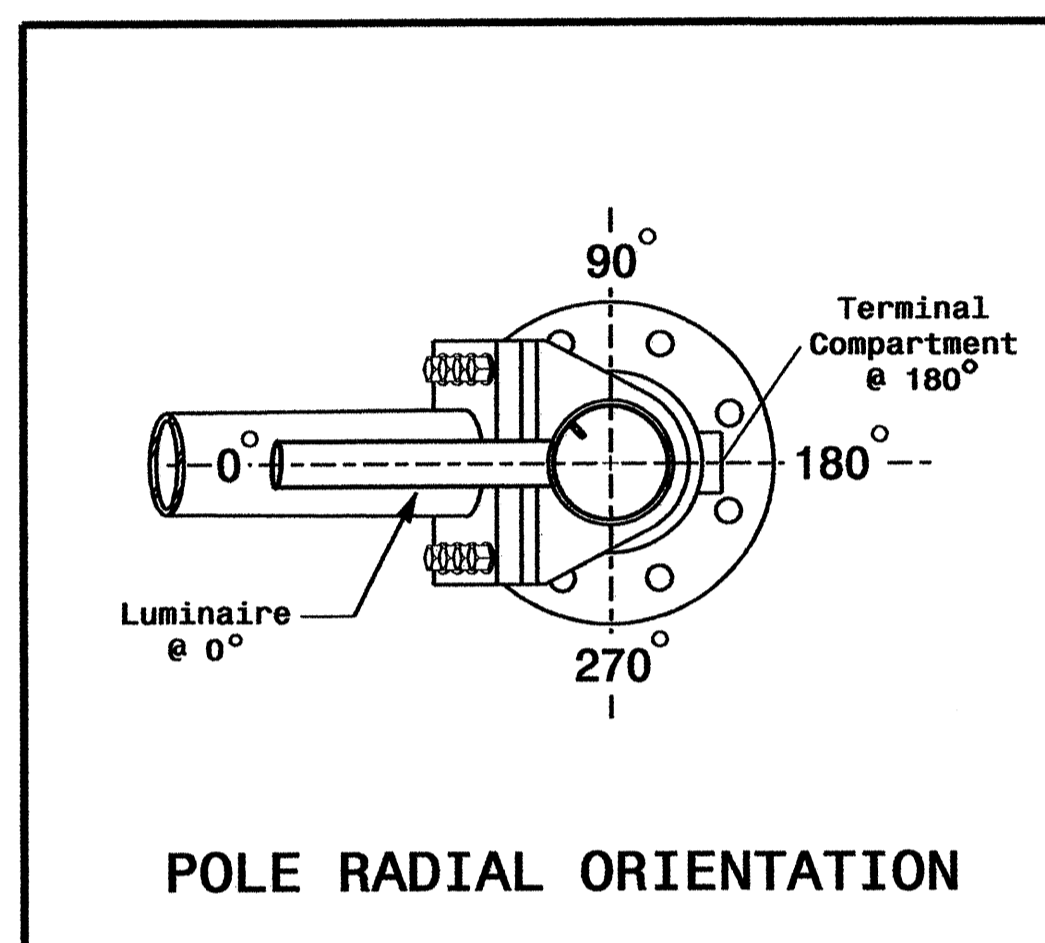


Elevation View

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 17	Pole 18
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.2 ft.	+1.9 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
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	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5" W X 17.0" L	21 LBS
	LUMINAIRE OVX DROP PRISMATIC REFRACTOR	EPA 0.87 S.F.	13.25" W X 26.25" L	35 LBS

NOTES

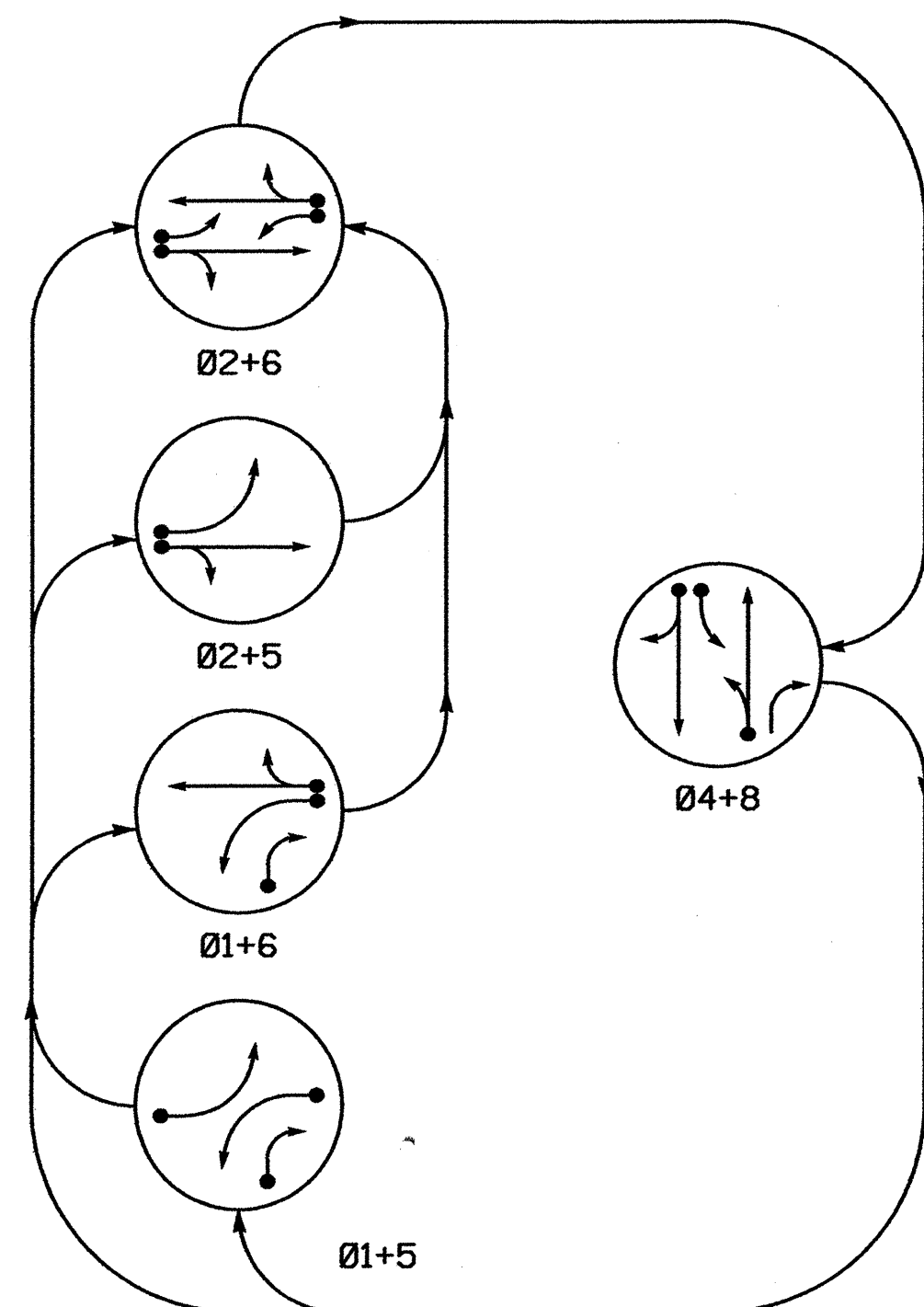
- Design Reference Material**
- Design the traffic signal structure and foundation in accordance with:
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 - The 2002 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2002 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.doh.state.nc.us/preconstruct/traffic/tmssu/ws/mpoles/poles.htm>
 - 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.
 - Maximum allowable CSR for all signal supports is 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 is a high strength connection. Use Direct Tension Indicators (ASTM F959) for each bolt.
 - Design base plate with 8 anchor bolt holes. Provide 2 inch x 66 inch anchor bolts.
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 - 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 based on the luminaire height requirement of 30 feet.
 - Design the luminaire support arm using design dimensions as shown on elevation views. Refer to the Radial Orientation Detail for attachment to the signal pole. Design arm end for a nominal 2 inch slip fit socket connection for light assembly.
 - 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) 733-3915.
 - 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)

	<p>SR 1708 (Fire Tower Road) at Evans Drive/Ashcroft Drive</p>		<p>SEAL</p>		
	<p>Division 2 Pitt County Greenville</p> <p>PLAN DATE: March 2006 REVIEWED BY: RM Duffy</p> <p>PREPARED BY: TS Thigpen REVIEWED BY: [Signature]</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> </tr> </table>		INIT.	DATE
INIT.	DATE				
<p>SCALE: 0 N/A</p>		<p>SIGNATURE DATE</p> <p>SIG. INVENTORY NO. 02-0869</p>			

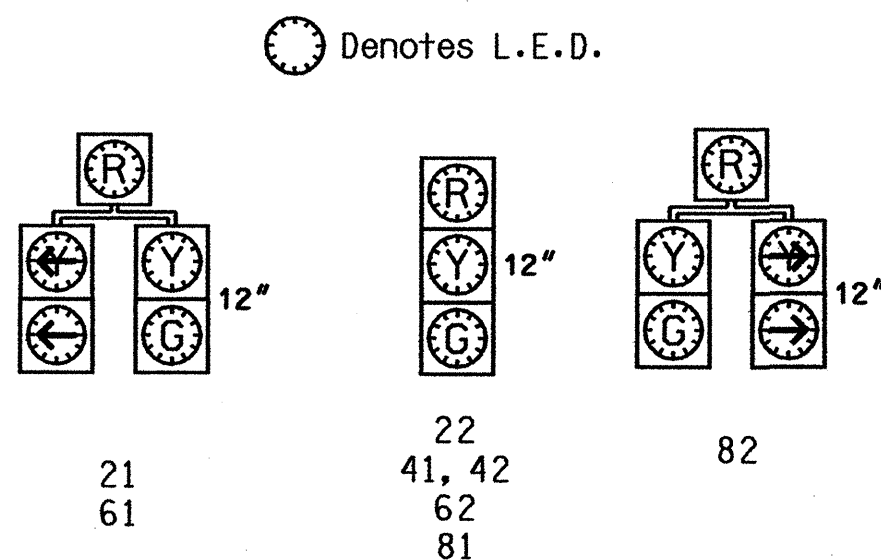
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PHASING DIAGRAM



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

SIGNAL FACE I.D.



LOOP NO.	SIZE (ft)	DIST. FROM STOPBAR (ft)	INDUCTIVE LOOPS		DETECTOR UNITS			
			TURNS	NEW/EXISTING	NEMA PHASE	NEW/EXISTING	TIMING (FEATURE/TIME)	INHIBIT DELAY DURING GREEN?
1A	6X40	0	2-4-2	X	1	X	DELAY 15	YES
1B	6X40	0	2-4-2	X	6	X	DELAY 3	NO
2A	6X6	300	6	X	1	X	DELAY 15	YES
4A	6X40	0	2-4-2	X	4	X	DELAY 3	YES
4B	6X40	0	2-4-2	X	4	X	DELAY 10	YES
5A	6X40	0	2-4-2	X	5	X	DELAY 15	YES
6A	6X6	300	6	X	2	X	DELAY 3	NO
8A	6X40	0	2-4-2	X	8	X	DELAY 3	YES

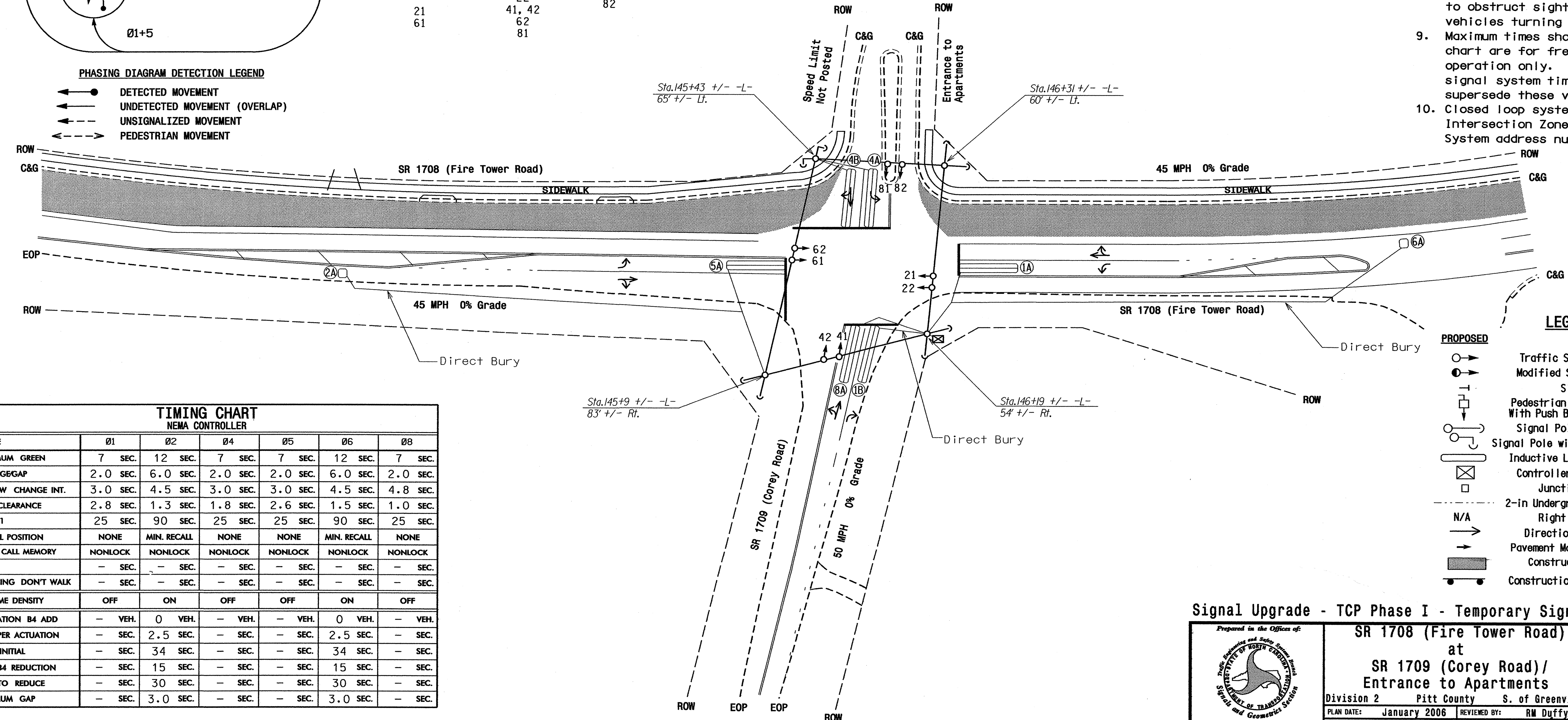
5 Phase Fully Actuated (Greenville City System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Omit phase 1 during phase 2 on.
- Omit phase 5 during phase 6 on.
- Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (see Electrical Details).
- Program phase 4 and phase 8 for dual entry.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Intersection Zone Number: 7 System address number: 82

PHASING DIAGRAM DETECTION LEGEND

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



TIMING CHART NEMA CONTROLLER

PHASE	Ø1	Ø2	Ø4	Ø5	Ø6	Ø8
MINIMUM GREEN	7 SEC.	12 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.
PASSAGE GAP	2.0 SEC.	6.0 SEC.	2.0 SEC.	2.0 SEC.	6.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.5 SEC.	3.0 SEC.	3.0 SEC.	4.5 SEC.	4.8 SEC.
RED CLEARANCE	2.8 SEC.	1.3 SEC.	1.8 SEC.	2.6 SEC.	1.5 SEC.	1.0 SEC.
MAX. 1	25 SEC.	90 SEC.	25 SEC.	25 SEC.	90 SEC.	25 SEC.
RECALL POSITION	NONE	MIN. RECALL	NONE	NONE	MIN. RECALL	NONE
VEH. CALL MEMORY	NONLOCK	NONLOCK	NONLOCK	NONLOCK	NONLOCK	NONLOCK
WALK	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
VOLUME DENSITY	OFF	ON	OFF	OFF	ON	OFF
ACTUATION B4 ADD	- VEH.	0 VEH.	- VEH.	- VEH.	0 VEH.	- VEH.
SEC. PER ACTUATION	- SEC.	2.5 SEC.	- SEC.	- SEC.	2.5 SEC.	- SEC.
MAX. INITIAL	- SEC.	34 SEC.	- SEC.	- SEC.	34 SEC.	- SEC.
TIME B4 REDUCTION	- SEC.	15 SEC.	- SEC.	- SEC.	15 SEC.	- SEC.
TIME TO REDUCE	- SEC.	30 SEC.	- SEC.	- SEC.	30 SEC.	- SEC.
MINIMUM GAP	- SEC.	3.0 SEC.	- SEC.	- SEC.	3.0 SEC.	- SEC.

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

Signal Upgrade - TCP Phase I - Temporary Signal 1

SR 1708 (Fire Tower Road) at SR 1709 (Corey Road) / Entrance to Apartments

Division 2 Pitt County S. of Greenville

PLANNED BY: January 2006 REVIEWED BY: RM Duffy

PREPARED BY: TS Thigpen REVIEWED BY: [Signature]

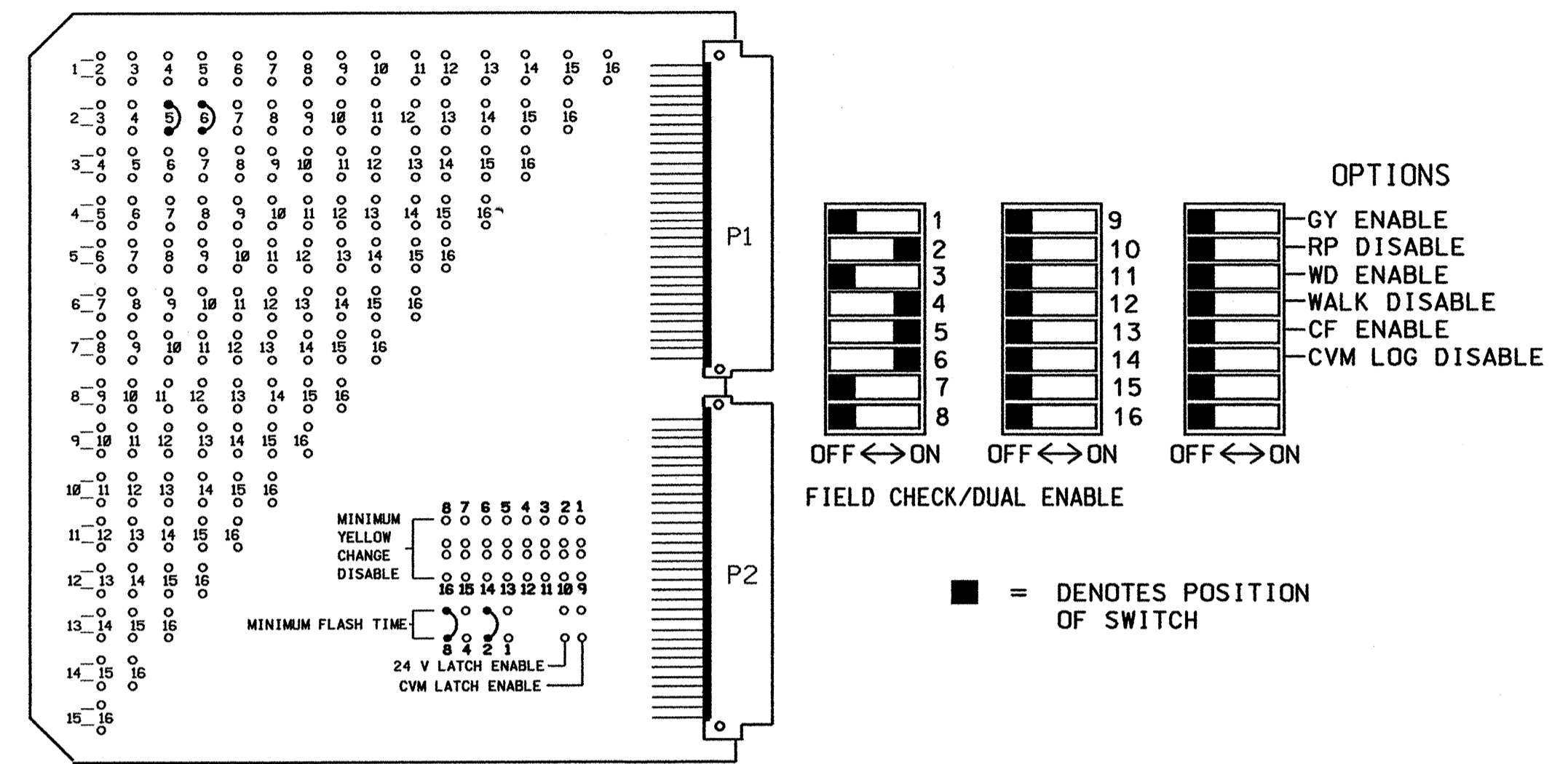
SCALE: 1"=40'

03-MAR-2006 07:45 s:\p14\signal\work\p14\proj\proj\3613b\0717\020717.dwg den_2005xxxx.dgn

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

**EDI MODEL MMU-16E
MALFUNCTION MANAGEMENT UNIT
PROGRAMMING DETAIL**

(program card and set switches as shown below)



MMU PROGRAMMING CARD

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES 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 OUTPUTS 1,3,7,8,9,10,11,12,13,14, 15 AND 16 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 MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
7. PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
8. SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
9. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
10. BE SURE THAT 'BACK-UP PROTECTION GROUP 1' UNDER CONTROLLER SUB-MENU 9: 'OPTION DATA' IS DISABLED.
11. THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD
SIGNAL HEAD NO.	NU	21,22	NU	41,42	21	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		2R		4R	*	6R										
YELLOW		2Y		4Y		6Y										
GREEN		2G		4G		6G										
RED ARROW																
YELLOW ARROW					5Y											
GREEN ARROW						5G										

NU = NOT USED
* DENOTES INSTALL LOAD RESISTOR. SEE LOAD RESISTOR INSTALLATION DETAIL THIS PAGE.

DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

BIU	SLOT	SLOT	CH1	CH1	CH1	CH1	SLOT	SLOT	SLOT	SLOT	SLOT
			L7	L5	NOT USED	L9					
	EMPTY	EMPTY	CH2	CH2	CH2	CH2	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
			L8	NOT USED	L12	L10					
			ø 4	ø 2	ø 6	ø 2					*

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
	L1A,L1B
	L2A,L2B
	L3A,L3B
	L4A,L4B
2A	L5A,L5B
	L6A,L6B
4A	L7A,L7B
4B	L8A,L8B
5A	L9A,L9B
	L10A,L10B
	L11A,L11B
6B	L12A,L12B
	L13A,L13B
	L14A,L14B
	L15A,L15B
	L16A,L16B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME (SEC)
1			
2			
3			
4			
5	ø 2		
6			
7	ø 4		
8	ø 4	DELAY	15
9	ø 5	DELAY	15
* 10	ø 2	DELAY	3
11			
12	ø 6		
13			
14			
15			
16			

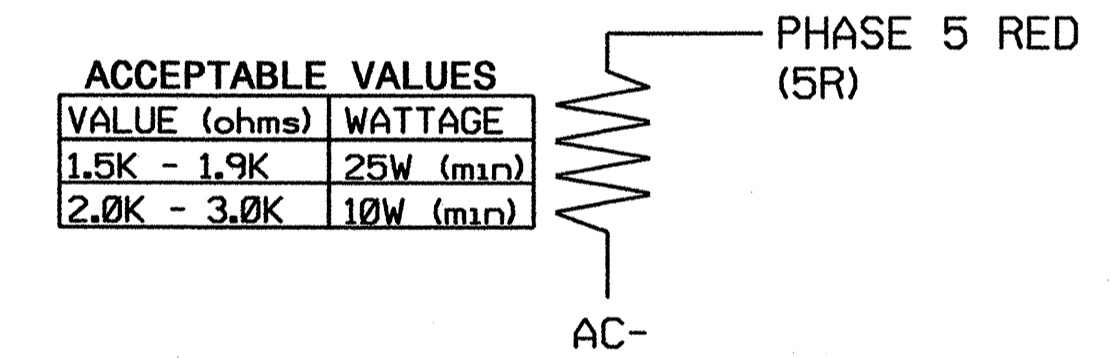
ADD JUMPERS FROM: L9A TO L10A, AND L9B TO L10B

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED ECONOLITE
CABINETCONTRACTOR SUPPLIED TS-2
CABINET MOUNT.....BASE
LOADBAY POSITIONS.....16
LOAD SWITCHES USED.....2,4,5,6
PHASES USED.....2,4,5,6
OLA.....NOT USED
OLB.....NOT USED
OLC.....NOT USED
OLD.....NOT USED

LOAD RESISTOR INSTALLATION DETAIL



NOTE: THE PURPOSE OF THIS RESISTOR IS TO LOAD THE CHANNEL RED MONITOR INPUT IN ORDER FOR THE MALFUNCTION MANAGEMENT UNIT TO USE THE FULL SIGNAL SEQUENCE MONITORING CAPABILITY ON PHASES THAT DO NOT USE THE RED DISPLAY IN THE FIELD.

LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	ø 1
2	ø 2
3	ø 3
4	ø 4
5	ø 5
6	ø 6
7	ø 7
8	ø 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0717 T3
DESIGNED: January 2006
SEALED: 03-03-06
REVISED: NA

Signal Upgrade - Temporary 3

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1708 (Fire Tower Road) at SR 1709 (Corey Road)/ Entrance to Apartments

Division 2 Pitt County S. of Greenville
PLAN DATE: February 2006 REVIEWED BY: JWP
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

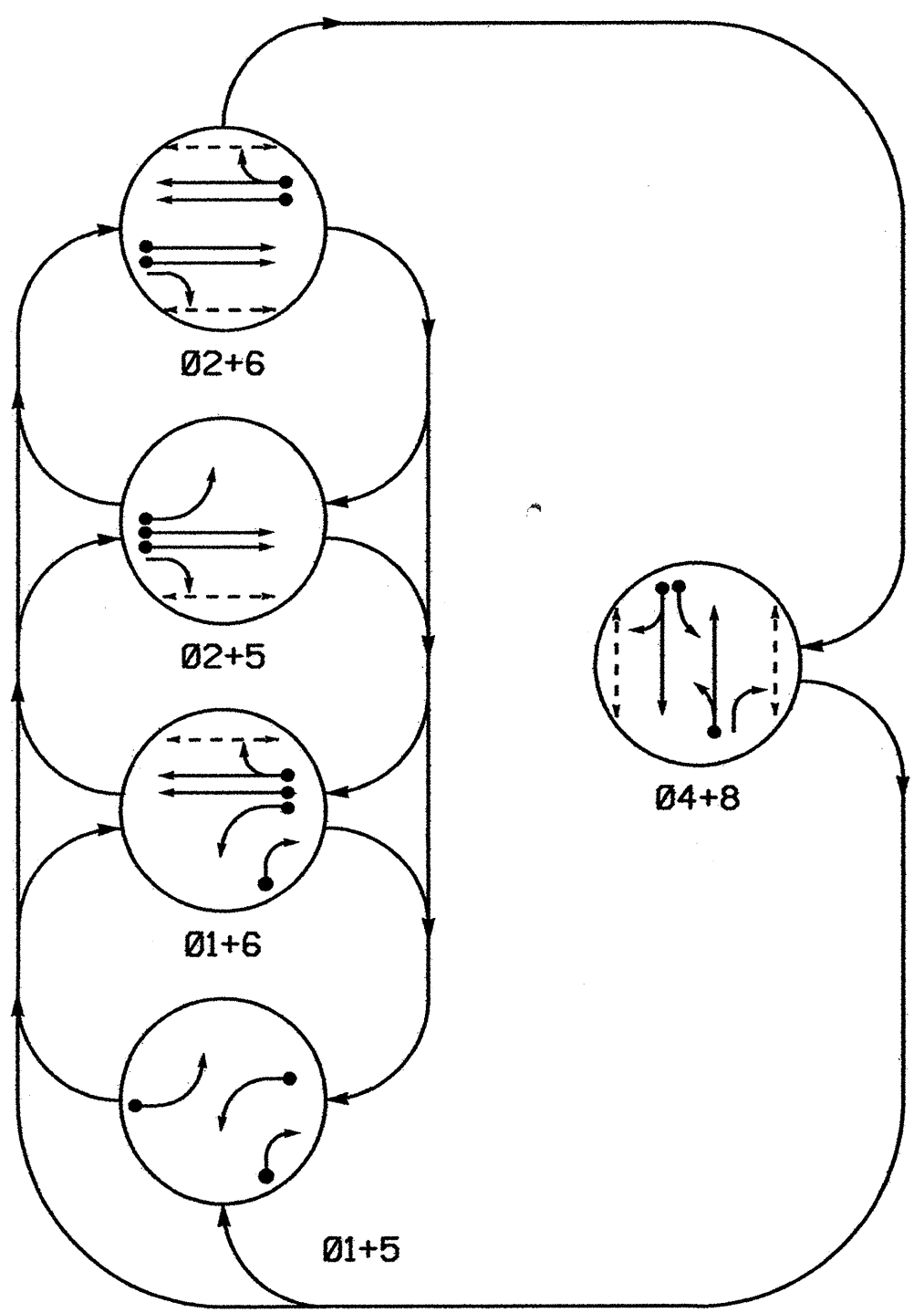
122 N. McDowell St., Raleigh, NC 27603

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JOHN T. ROWE, III

SIGNATURE DATE

SIG. INVENTORY NO. 02-0717 T3

PHASING DIAGRAM



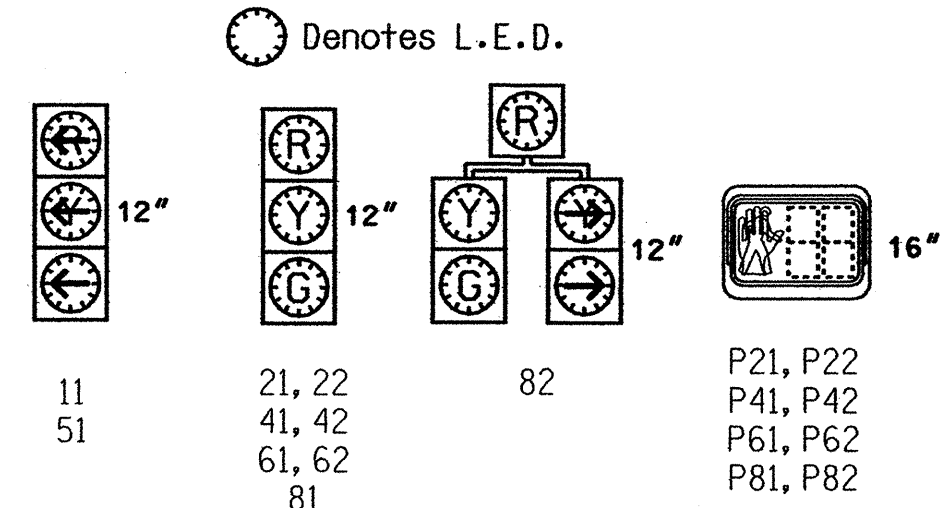
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø1 +5	Ø1 +6	Ø2 +5	Ø2 +6	Ø4 +8	F ASH
11	—	—	R	R	R	R
21, 22	R	R	G	G	G	Y
41, 42	R	R	R	R	R	R
51	—	—	R	R	R	R
61, 62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.



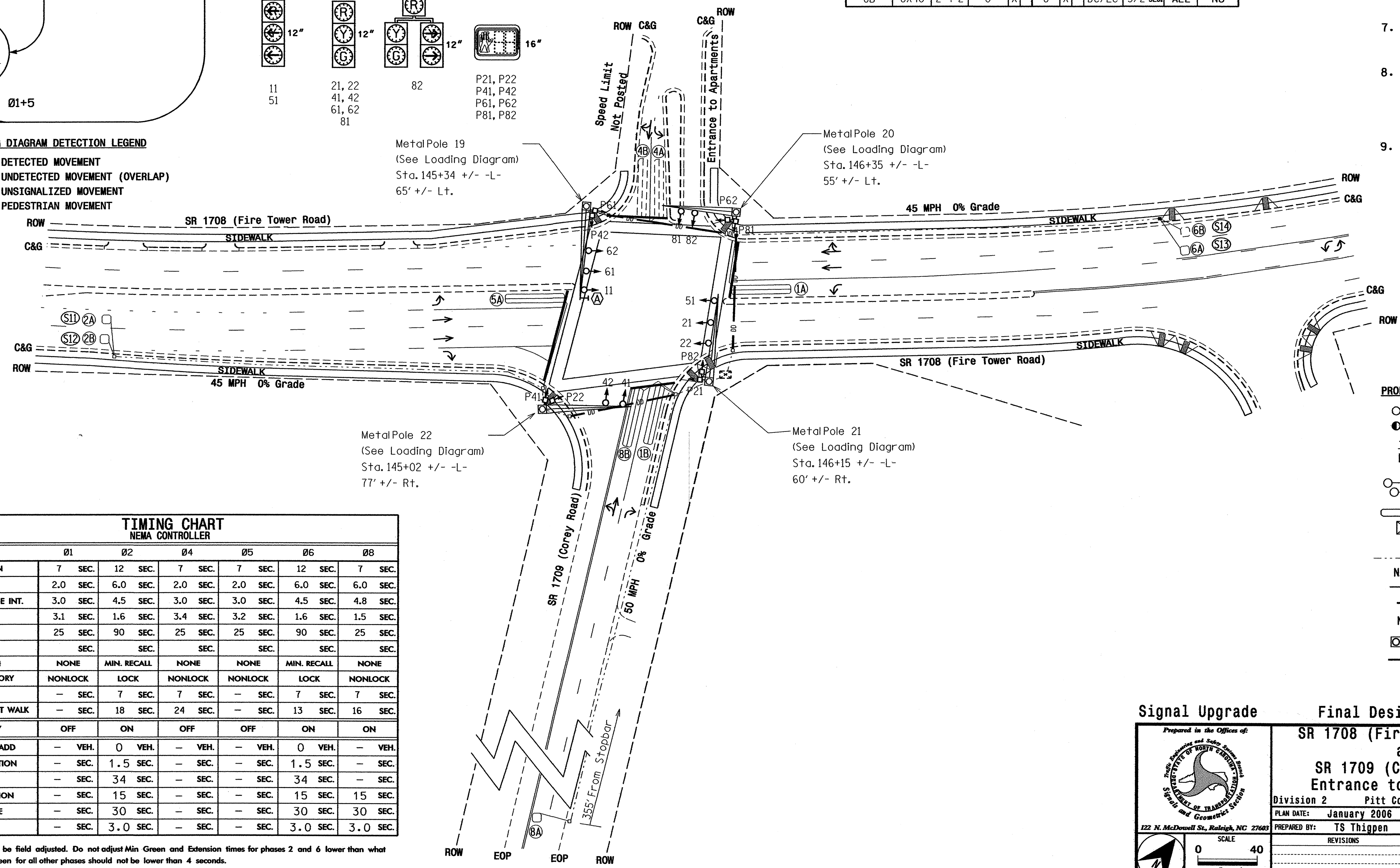
LOOP & DETECTOR UNIT INSTALLATION CHART
NEMA CONTROLLER WITH TS-2 CABINET

LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE		TIMING		PLACE CALL DURING PHASE	INHIBIT DELAY DURING GREEN
						NEW	EXISTING	FEATURE	TIME		
1A	6X40	2-4-2	0	X	X	1	X	-	- SEC.	ALL	NO
1B	6X40	2-4-2	0	X	X	1	X	DELAY	15 SEC.	ALL	YES
2A/S11	6X6	6	300	X	X	2	X	-	- SEC.	ALL	NO
						-	X	System Detector			
2B/S12	6X6	6	300	X	X	2	X	-	- SEC.	ALL	NO
						-	X	System Detector			
4A	6X40	2-4-2	0	X	X	4	X	-	- SEC.	ALL	NO
4B	6X40	2-4-2	0	X	X	4	X	DELAY	10 SEC.	ALL	YES
5A	6X40	2-4-2	0	X	X	5	X	-	- SEC.	ALL	NO
6A/S13	6X6	6	300	X	X	6	X	-	- SEC.	ALL	NO
						-	X	System Detector			
6B/S14	6X6	6	300	X	X	6	X	-	- SEC.	ALL	NO
						-	X	System Detector			
8A	6X6	6	355	X	X	8	X	DELAY	100 SEC.	ALL	YES
8B	6X40	2-4-2	0	X	X	8	X	DC/EC	5/2 SEC.	ALL	NO

5 Phase Fully Actuated (Greenville City System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- Program phase 4 and phase 8 for dual entry.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Intersection Zone Number: 7, System Address Number: 82



TIMING CHART
NEMA CONTROLLER

PHASE	Ø1	Ø2	Ø4	Ø5	Ø6	Ø8
MINIMUM GREEN	7 SEC.	12 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.
PASSAGE GAP	2.0 SEC.	6.0 SEC.	2.0 SEC.	2.0 SEC.	6.0 SEC.	6.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.5 SEC.	3.0 SEC.	3.0 SEC.	4.5 SEC.	4.8 SEC.
RED CLEARANCE	3.1 SEC.	1.6 SEC.	3.4 SEC.	3.2 SEC.	1.6 SEC.	1.5 SEC.
MAX. 1	25 SEC.	90 SEC.	25 SEC.	25 SEC.	90 SEC.	25 SEC.
MAX. 2	SEC.	SEC.	SEC.	SEC.	SEC.	SEC.
RECALL POSITION	NONE	MIN. RECALL	NONE	NONE	MIN. RECALL	NONE
VEH. CALL MEMORY	NONLOCK	LOCK	NONLOCK	NONLOCK	LOCK	NONLOCK
WALK	- SEC.	7 SEC.	7 SEC.	- SEC.	7 SEC.	7 SEC.
FLASHING DON'T WALK	- SEC.	18 SEC.	24 SEC.	- SEC.	13 SEC.	16 SEC.
VOLUME DENSITY	OFF	ON	OFF	OFF	ON	ON
ACTUATION B4 ADD	- VEH.	0 VEH.	- VEH.	- VEH.	0 VEH.	- VEH.
SEC. PER ACTUATION	- SEC.	1.5 SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.
MAX. INITIAL	- SEC.	34 SEC.	- SEC.	- SEC.	34 SEC.	- SEC.
TIME B4 REDUCTION	- SEC.	15 SEC.	- SEC.	- SEC.	15 SEC.	15 SEC.
TIME TO REDUCE	- SEC.	30 SEC.	- SEC.	- SEC.	30 SEC.	30 SEC.
MINIMUM GAP	- SEC.	3.0 SEC.	- SEC.	- SEC.	3.0 SEC.	3.0 SEC.

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
○ → Pedestrian Signal Head With Push Button & Sign	○ → N/A
○ → Signal Pole with Guy	○ → N/A
○ → Inductive Loop Detector	○ → N/A
○ → Controller & Cabinet	○ → N/A
○ → Junction Box	○ → N/A
○ → 2-in Underground Conduit	○ → N/A
○ → Right of Way	○ → N/A
○ → Directional Arrow	○ → N/A
○ → Pavement Marking Arrow	○ → N/A
○ → Wheelchair Ramp	○ → N/A
○ → Metal Pole with Mastarm	○ → N/A
○ → Directional Drill	○ → N/A
○ → "U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	○ → N/A

Signal Upgrade Final Design

SR 1708 (Fire Tower Road) at SR 1709 (Corey Road)/ Entrance to Apartments

Division 2 Pitt County Greenville

PLAN DATE: January 2006 REVIEWED BY: RM Duffy

PREPARED BY: TS Thigpen REVIEWED BY: [Signature]

REVISIONS: [Table]

SCALE: 1"=40'

SEAL: [Professional Engineer Seal]

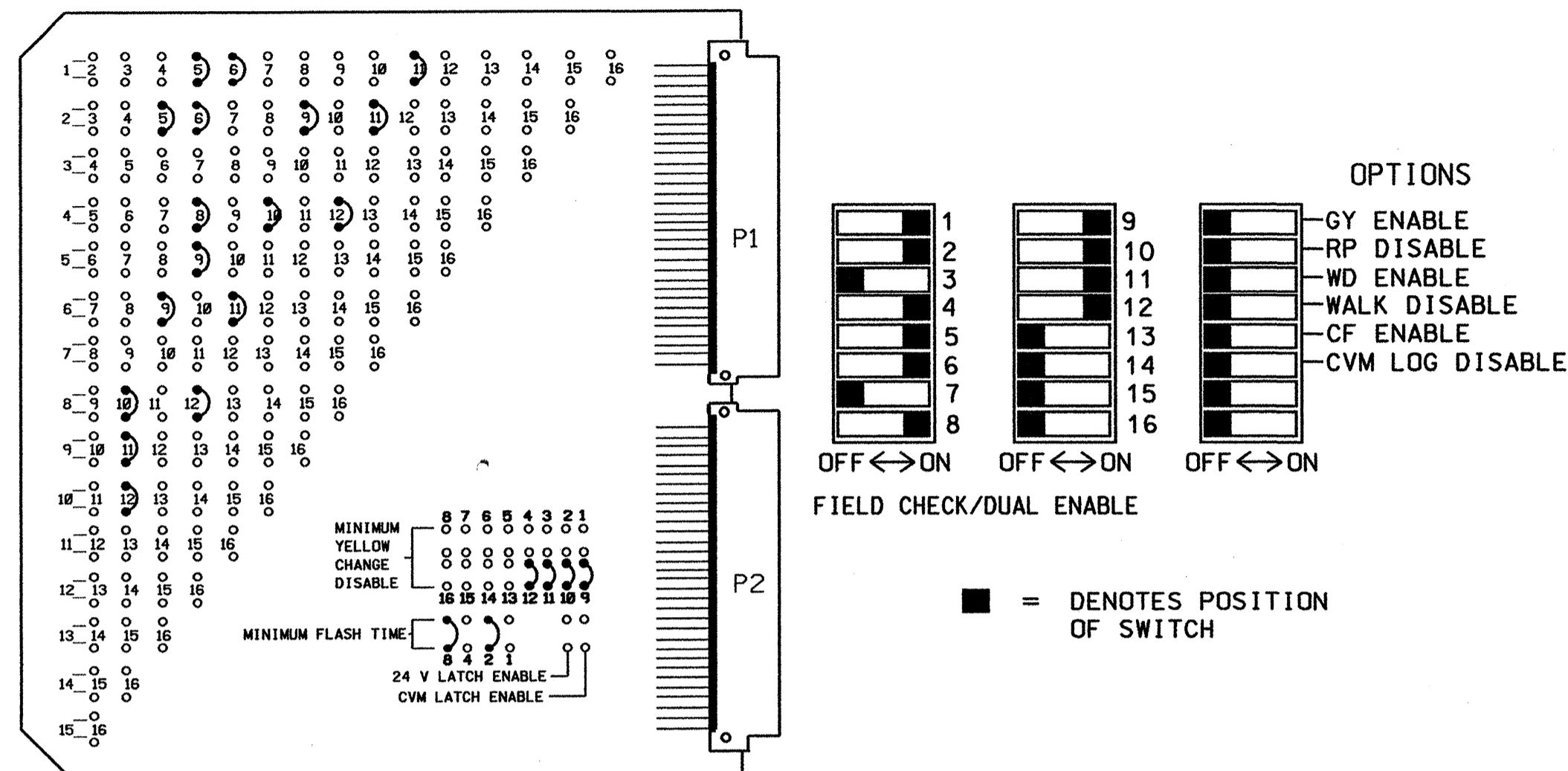
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* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

EDI MODEL MMU-16E MALFUNCTION MANAGEMENT UNIT PROGRAMMING DETAIL

(program card and set switches as shown below)



MMU PROGRAMMING CARD

NOTES

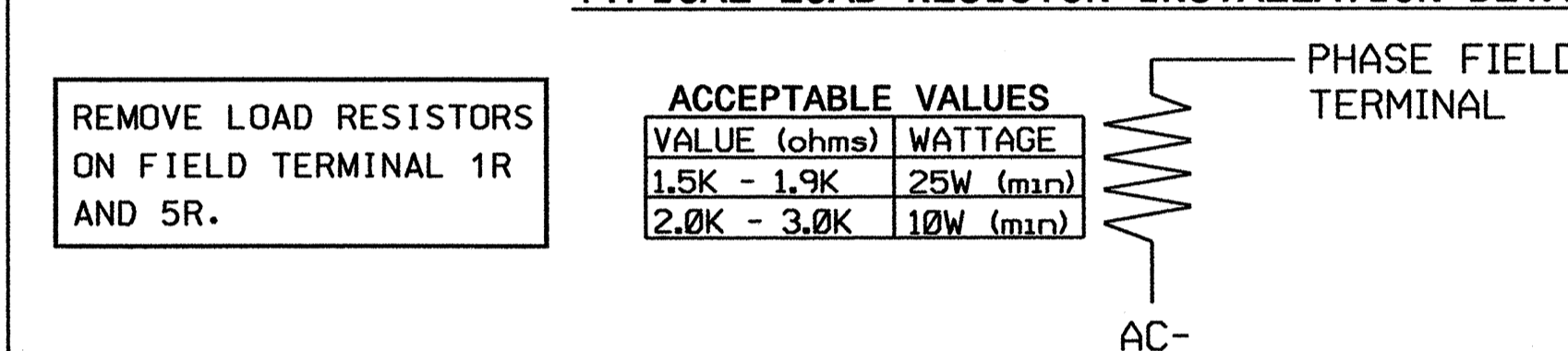
- TO PREVENT "FLASH-CONFLICT" PROBLEMS, WIRE ALL UNUSED LOAD SWITCHES TO FLASH RED. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED LOAD SWITCH RED OUTPUTS 3, 7, 13, 14, 15 AND 16 TO LOAD SWITCH AC+ BY INSERTING A JUMPER 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.
- PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
- SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT ON THE MALFUNCTION MANAGEMENT UNIT. SET CONTROLLER POWER-UP FLASH TIME TO 0 SECONDS.
- ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
- PROGRAM DETECTORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO ACCOMPLISH THE DETECTION SCHEMES SHOWN ON THE SIGNAL DESIGN PLANS.
- PROGRAM DETECTOR CALL DELAY AND EXTENSION TIMING ON THE CONTROLLER, UNLESS OTHERWISE SPECIFIED.
- SET ALL DETECTOR CARD UNIT CHANNELS TO "PRESENCE" MODE.
- PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
- PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DUAL ENTRY.
- THE CABINET AND CONTROLLER ARE A PART OF THE GREENVILLE CITY SYSTEM.

FIELD CONNECTION HOOK-UP CHART

PHASE	1	2	3	4	5	6	7	8	2 PED	4 PED	6 PED	8 PED	OLA	OLB	OLC	OLD	
SIGNAL HEAD NO.	11	82	21,22	NU	41,42	51	61,62	NU	81,82	P21, P22	P41, P42	P61, P62	P81, P82	NU	NU	NU	NU
RED			2R	4R	6R	8R											
YELLOW			2Y	4Y	6Y	8Y	*	*	*	*							
GREEN			2G	4G	6G	8G											
RED ARROW	1R				5R												
YELLOW ARROW	1Y	1Y			5Y												
GREEN ARROW	1G	1G			5G												
									9R	10R	11R	12R					
									9G	10G	11G	12G					

NU = NOT USED
*INSTALL LOAD RESISTORS TO UNUSED FIELD TERMINALS 9Y, 10Y, 11Y AND 12Y, IF NOT ALREADY PRESENT. SEE LOAD RESISTOR INSTALLATION DETAIL THIS PAGE.

TYPICAL LOAD RESISTOR INSTALLATION DETAIL



DETECTOR RACK SET-UP DETAIL

INSERT DETECTOR CARDS IN RACK ACCORDING TO THE DETAIL SHOWN BELOW. PARTICULAR DETECTOR CHANNELS WILL CALL PHASES INDICATED.

SLOT	CH1	CH1	CH1	CH1	CH1	SLOT	CH1	SLOT	SLOT	SLOT
	L1	L7	L5	L11	L9		L13			
BIU	∅ 1	∅ 4	∅ 2/SYS	∅ 6/SYS	∅ 5	BIU	∅ 8	BIU	BIU	BIU
	CH2	CH2	CH2	CH2	CH2		CH2			
EMPTY	L2	L8	L6	L12	NOT USED	EMPTY	L14	EMPTY	EMPTY	EMPTY
	∅ 1	∅ 4	∅ 2/SYS	∅ 6/SYS	USED		∅ 8			
							*			

WIRE LOOPS TO TERMINALS ON LOOP PANEL AS SHOWN IN THE CHART BELOW

LOOP NO.	LOOP PANEL TERMINALS
1A	L1A, L1B
1B	L2A, L2B
	L3A, L3B
	L4A, L4B
2A/S11	L5A, L5B
2B/S12	L6A, L6B
4A	L7A, L7B
4B	L8A, L8B
5A	L9A, L9B
	L10A, L10B
6A/S13	L11A, L11B
6B/S14	L12A, L12B
8A	L13A, L13B
8B	L14A, L14B
	L15A, L15B
	L16A, L16B

NOTE
BE SURE TO PROGRAM DETECTOR TYPES AND TIMERS (EXTEND AND DELAY) AS SHOWN ON THE SIGNAL PLANS.

ASSIGN CONTROLLER SYSTEM DETECTOR TO LOCAL CONT. DET. NUMBERS AS SHOWN IN CHART BELOW

CONTROLLER SYS. DET. NO.	LOCAL CONT. DETECTOR NO.
1	5
2	6
3	11
4	12
5	
6	
7	
8	

PROGRAM CONTROLLER DETECTORS ACCORDING TO THE SCHEDULE SHOWN IN THE CHART BELOW

CONTROLLER DETECTOR NO.	FUNCTION	TIMING	
		FEATURE	TIME (SEC)
1	∅ 1		
2	∅ 1	DELAY	15
3			
4			
5	∅ 2		
6	∅ 2		
7	∅ 4		
8	∅ 4	DELAY	10
9	∅ 5		
10			
11	∅ 6		
12	∅ 6		
13	∅ 8	DELAY	100
* 14	∅ 8	DC/EC	5/2
15			
16			

* THIS DETECTOR IS EQUIPPED WITH DELAY AND EXTEND TIMERS. PROGRAM THE TIMING REQUIRED FOR THIS DETECTOR CHANNEL ON THE DETECTOR UNIT, NOT THE CONTROLLER.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED ECONOLITE
CABINETCONTRACTOR SUPPLIED [TS-2]
CABINET MOUNT.....BASE
LOADBAY POSITIONS.....16
LOAD SWITCHES USED.....1,2,4,5,6,8,9,10,11,12
PHASES USED.....1,2,4,5,6,8,2 PED,4 PED,6 PED,8 PED
OLA.....NOT USED
OLB.....NOT USED
OLC.....NOT USED
OLD.....NOT USED

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

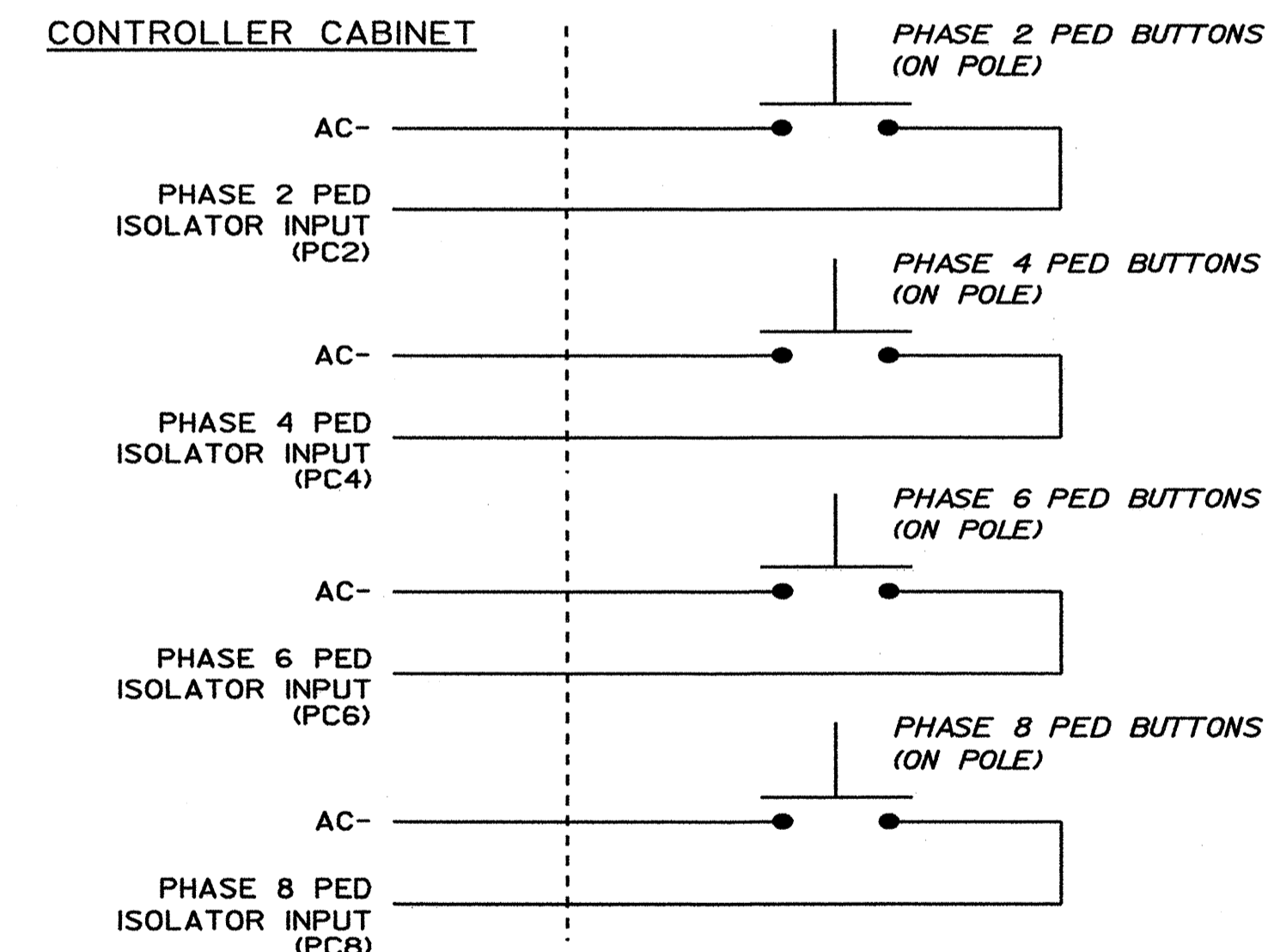
LOAD SWITCH ASSIGNMENT DETAIL

(program controller according to schedule in chart below)

LOAD SWITCH NUMBER	FUNCTION
1	∅ 1
2	∅ 2
3	∅ 3
4	∅ 4
5	∅ 5
6	∅ 6
7	∅ 7
8	∅ 8
9	2 PED
10	4 PED
11	6 PED
12	8 PED
13	OLA
14	OLB
15	OLC
16	OLD

PEDESTRIAN PUSH-BUTTON WIRING DETAIL

(wire push-buttons as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0717
DESIGNED: January 2006
SEALED: 03-03-06
REVISED: NA

Signal Upgrade - Final

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1708 (Fire Tower Road) at SR 1709 (Corey Road) / Entrance to Apartments

Division 2 Pitt County S. of Greenville

PLAN DATE: February 2006 REVIEWED BY: [Signature]

PREPARED BY: James Peterson REVIEWED BY: [Signature]

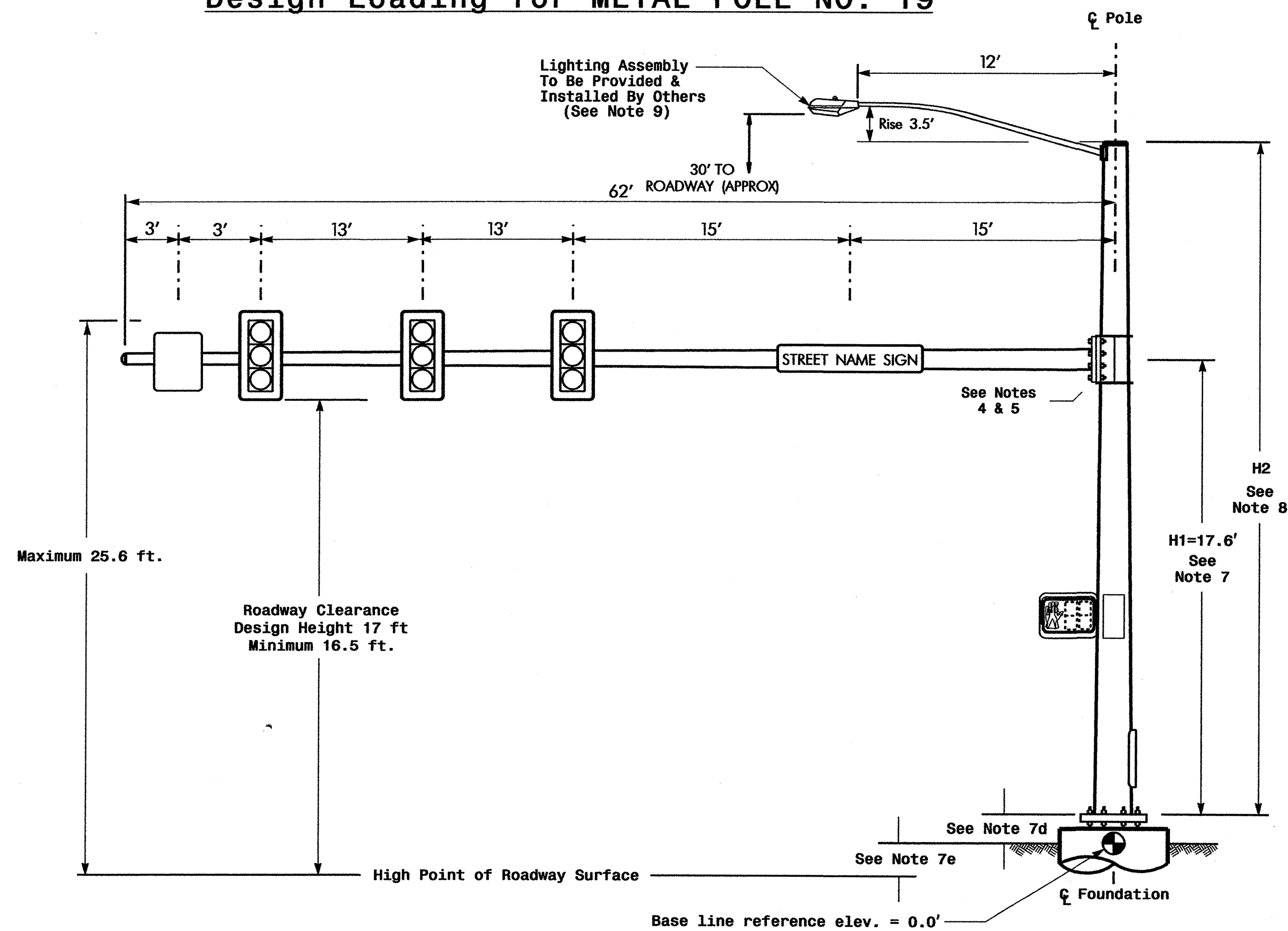
122 N. McDowell St., Raleigh, NC 27603

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR.

SIGNATURE: John T. Rowe, Jr. DATE: 3-8-06

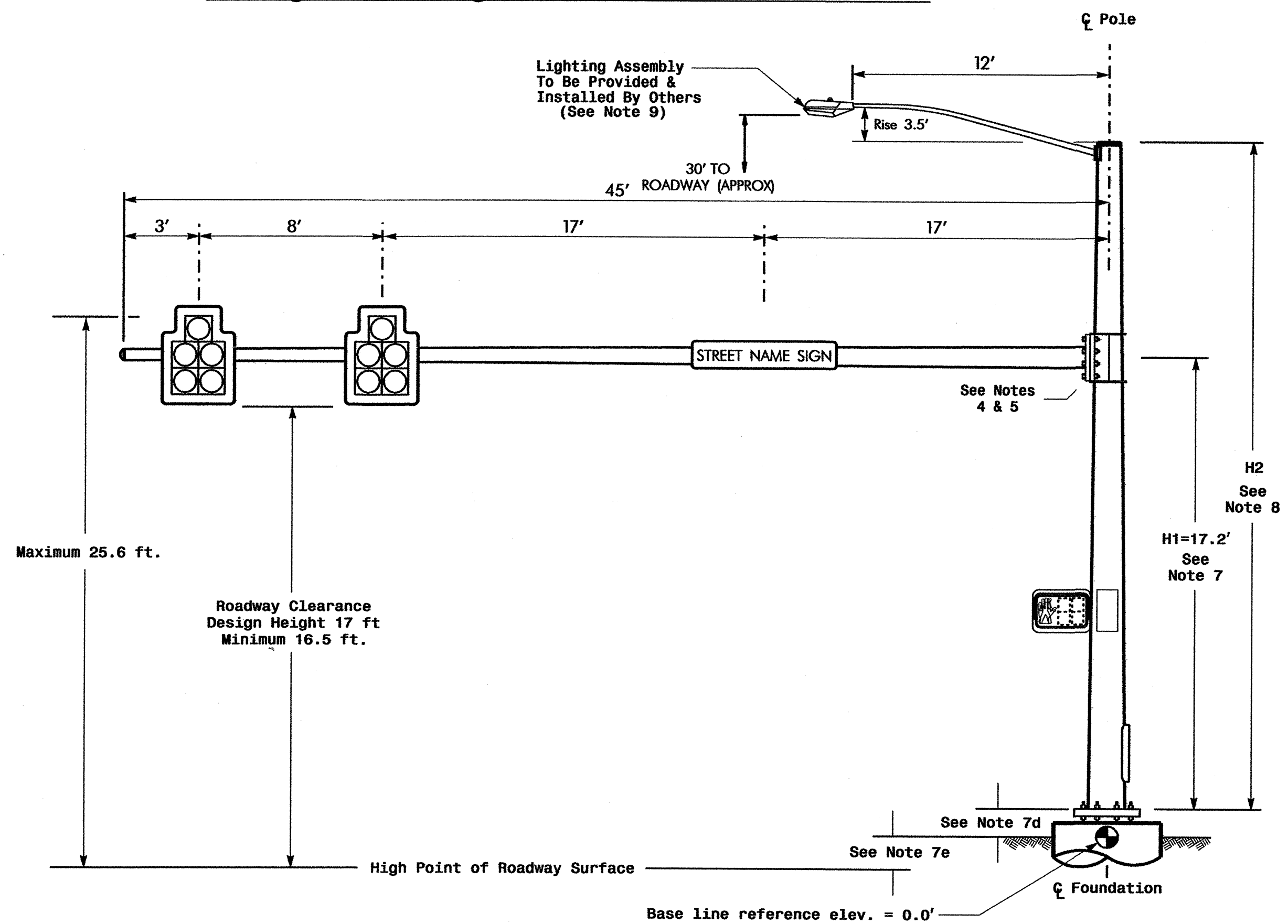
SIG. INVENTORY NO. 02-0717

Design Loading for METAL POLE NO. 19



Elevation View

Design Loading for METAL POLE NO. 20



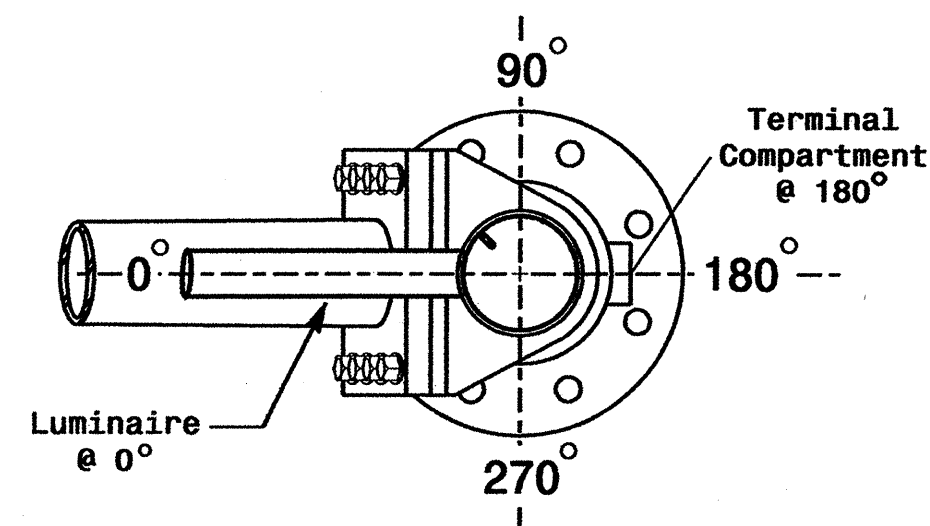
Elevation View

SPECIAL NOTE

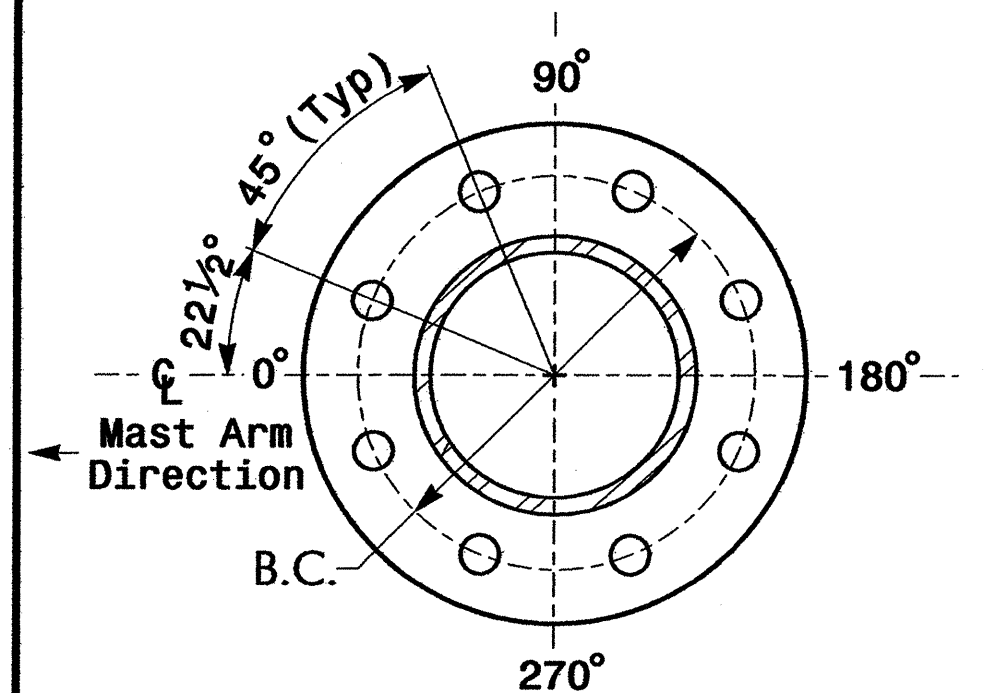
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

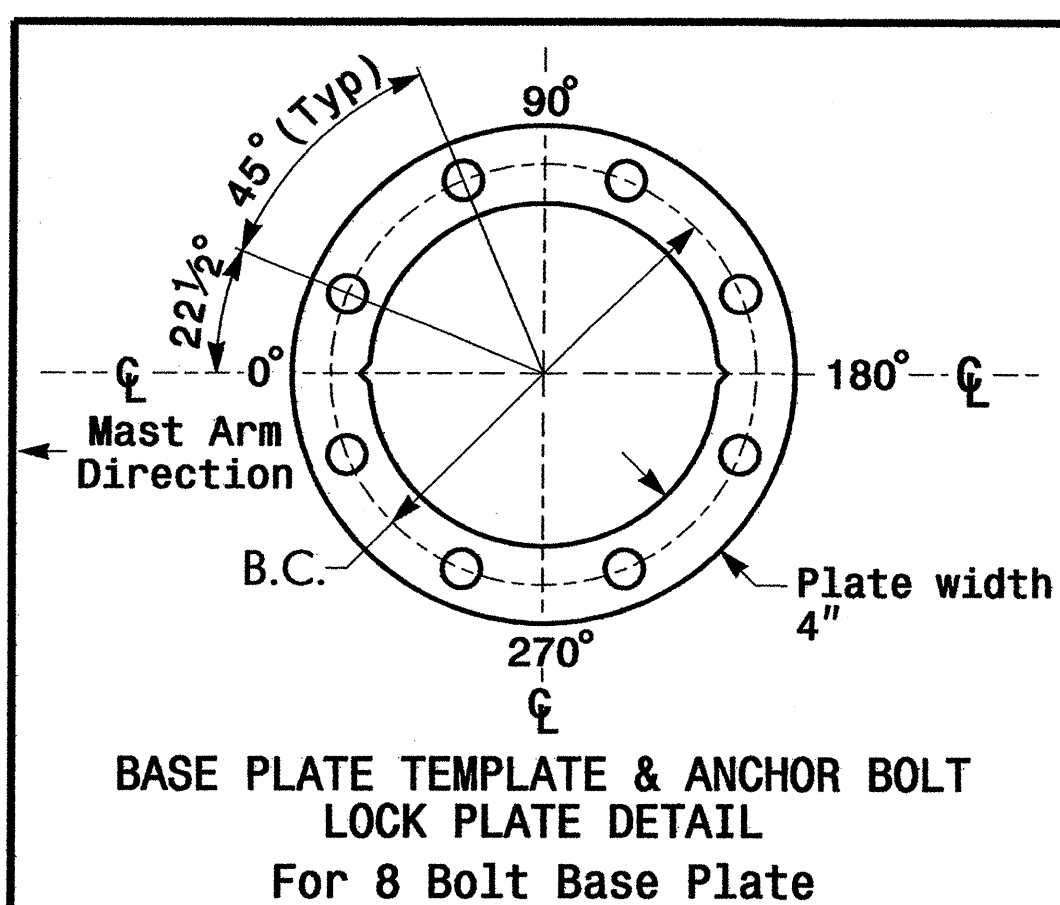
Elevation Differences for:	Pole 19	Pole 20
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-0.9 ft.	-1.3 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

METAL POLE No. 19 and 20

PROJECT REFERENCE NO. U-3613 B SHEET NO. sig.38

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"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5" W X 17.0" L	21 LBS
	LUMINAIRE OVX DROP PRISMATIC REFRACTOR	EPA 0.87 S.F.	13.25" W X 26.25" L	35 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 2002 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions. The 2002 NCDOT Roadway Standard Drawings. The traffic signal project plans and special provisions. The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.doh.dot.state.nc.us/preconstruct/traffic/tmsu/ws/mpoles/poles.htm>

Design Requirements

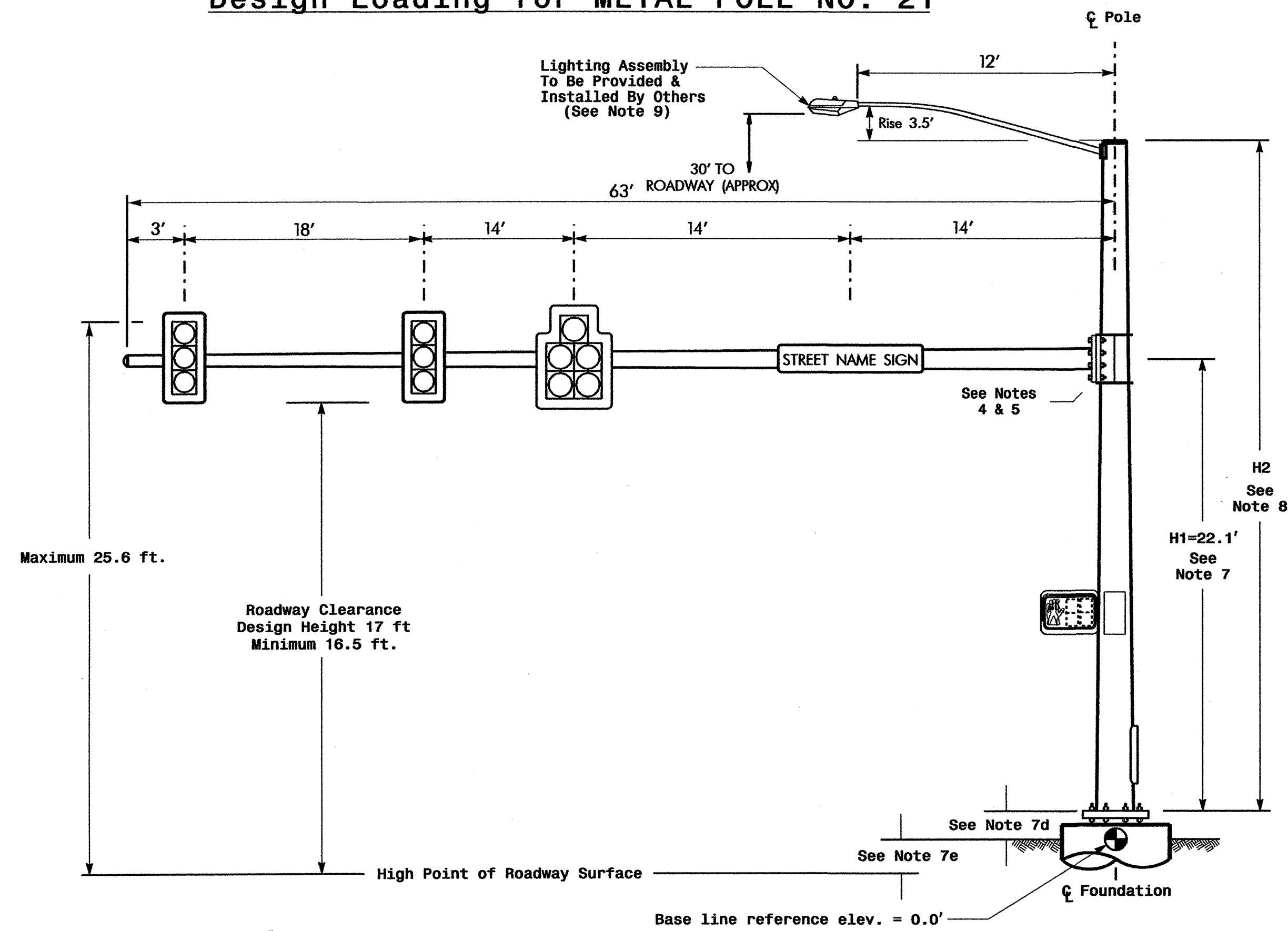
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Maximum allowable CSR for all signal supports is 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 is a high strength connection. Use Direct Tension Indicators (ASTM F959) for each bolt.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 66 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 based on the luminaire height requirement of 30 feet.
- Design the luminaire support arm using design dimensions as shown on elevation views. Refer to the Radial Orientation Detail for attachment to the signal pole. Design arm end for a nominal 2 inch slip fit socket connection for light assembly.
- 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) 733-3915.
- 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)

<p>122 N. McDowell St., Raleigh, NC 27603</p>	<p>SR 1708 (Fire Tower Road) at SR 1709 (Corey Road)/ Entrance to Apartments</p>		<p>SEAL</p>
	<p>Division 2 Pitt County Greenville</p> <p>PLANNED BY: March 2006 REVIEWED BY: R W Duffy</p> <p>PREPARED BY: TS Thigpen REVIEWED BY: [Signature]</p>	<p>SCALE: 0 N/A</p> <p>REVISIONS:</p>	

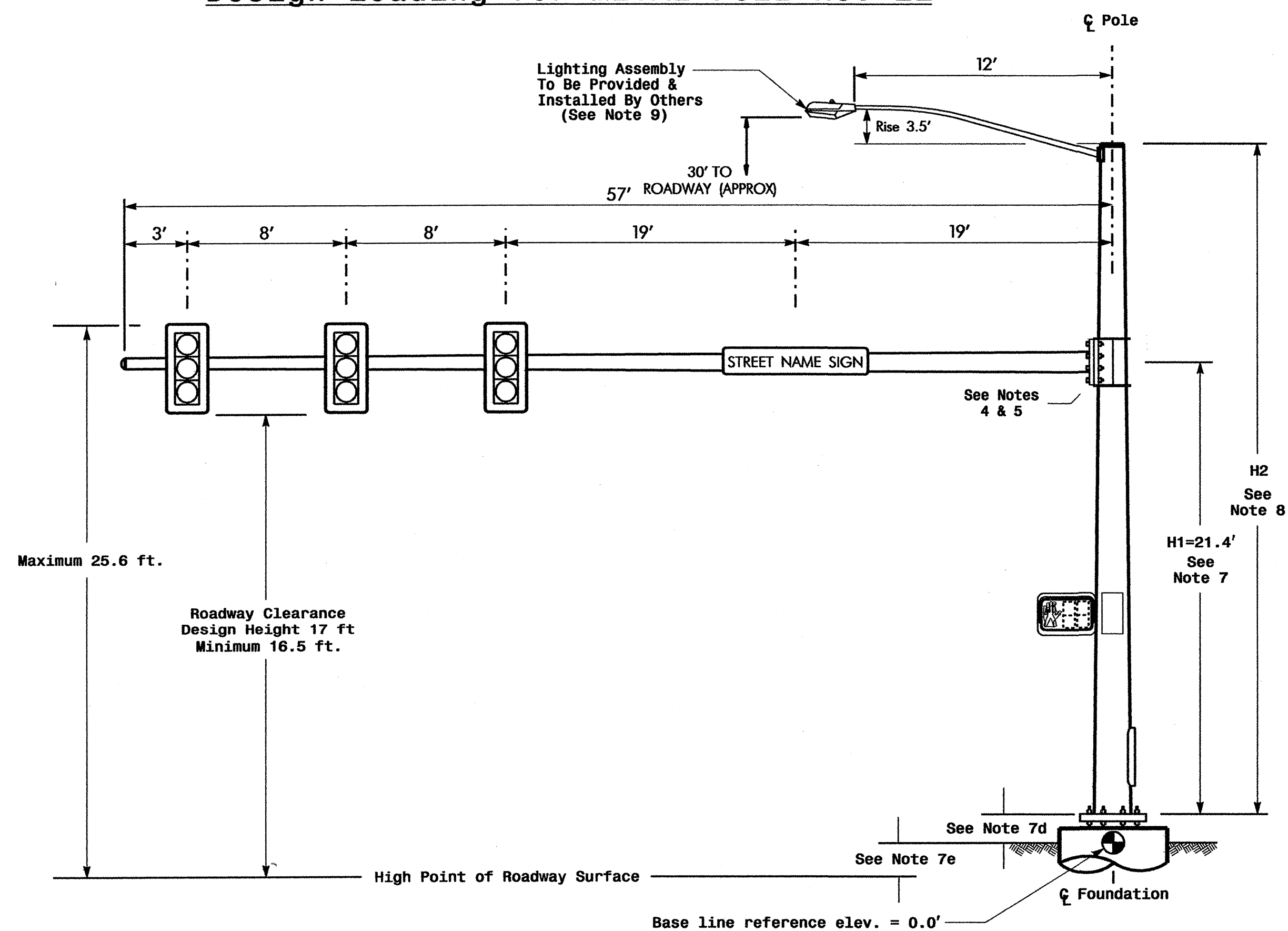
06-MAR-2006 09:05
 11111 Signal\mcr\p\cupsest1p\p\c\electr\m-3613\m017\sig.npl_2006xxx.dgn
 R. Duffy

Design Loading for METAL POLE NO. 21



Elevation View

Design Loading for METAL POLE NO. 22



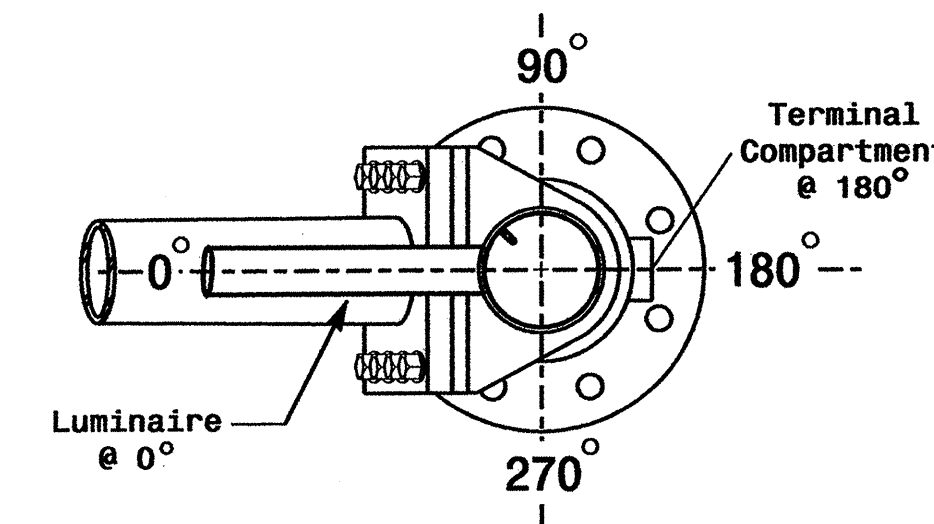
Elevation View

SPECIAL NOTE

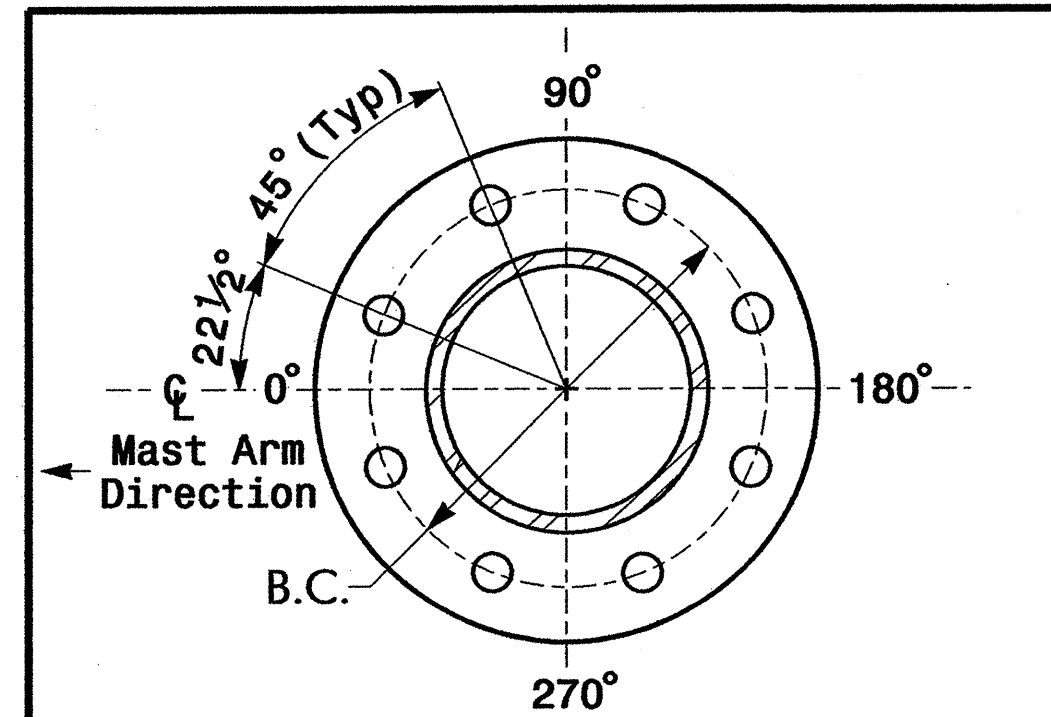
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Elevation Data for Mast Arm Attachment (H1)

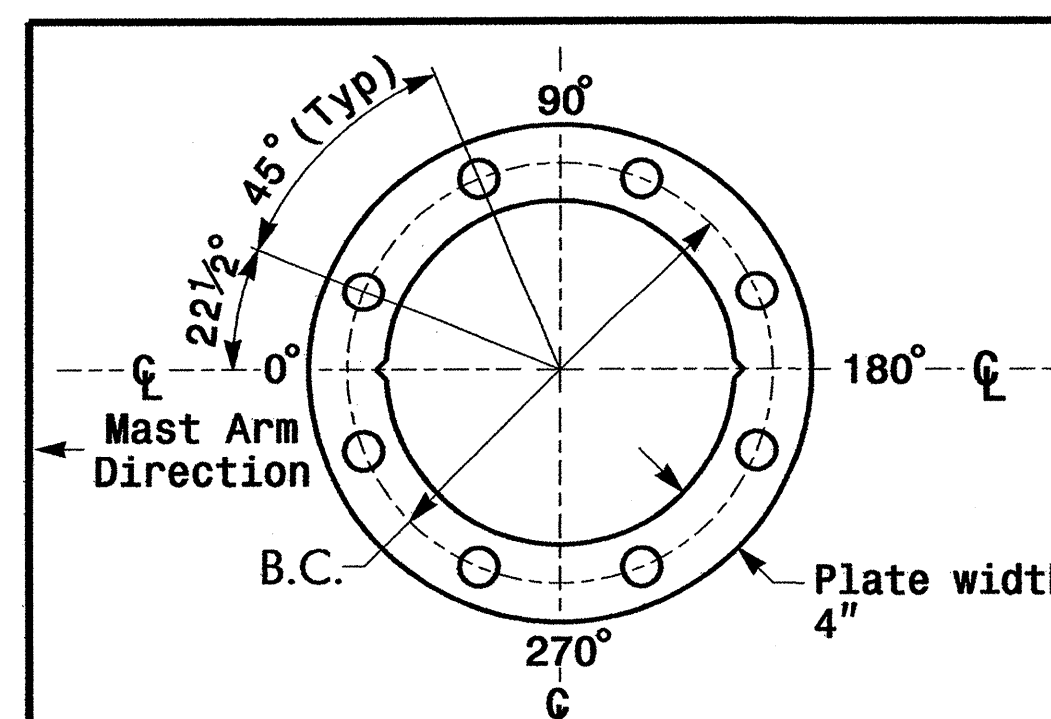
Elevation Differences for:	Pole 21	Pole 22
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+3.5 ft.	+2.9 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



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
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Design Requirements

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NCDOT Wind Zone 2 (130 mph)

	SR 1708 (Fire Tower Road) at SR 1709 (Corey Road)/ Entrance to Apartments Division 2 Pitt County Greenville	SEAL
	PLAN DATE: March 2006 PREPARED BY: TS Thigpen	
SCALE: N/A 	REVISIONS: _____ INIT. DATE: _____	REVIEWED BY: R M. Duffy REVIEWED BY: _____
122 N. McDowell St., Raleigh, NC 27603		SIGNATURE: _____ DATE: _____ SIG. INVENTORY NO. 02-0717

U - 3613B

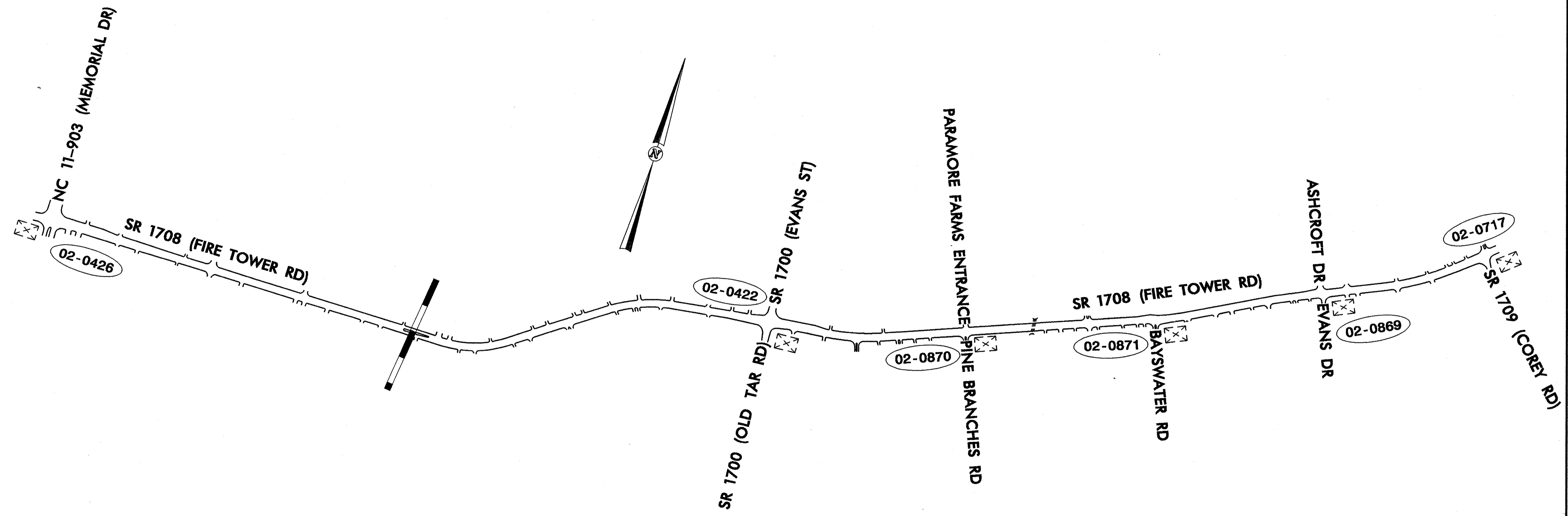
PROJECT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

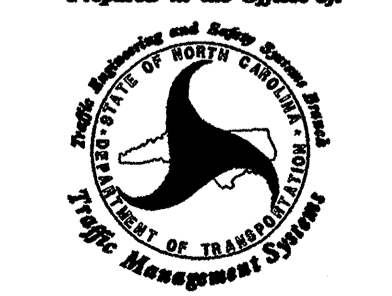
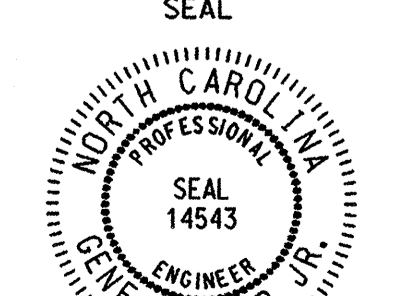

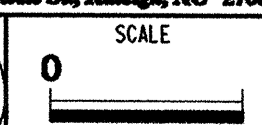
PITT COUNTY

**LOCATION: SR 1708 (FIRE TOWER ROAD) FROM NC 11-903 (MEMORIAL DRIVE)
TO SR 1709 (COREY DRIVE)**

TYPE OF WORK: COMMUNICATIONS CABLE AND CONDUIT ROUTING



NC DOT CONTACT:
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
G.G. MURR, JR., PE - INTELLIGENT TRANSPORTATION SYSTEMS ENGINEER

 <small>Prepared in the Office of: The State of North Carolina Department of Transportation Traffic Management Systems</small> <small>122 N. McDowell St., Raleigh, NC 27603</small>	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS		 <small>SEAL 14543 G.G. MURR, JR. ENGINEER</small>								
	<small>DIVISION 02</small> <small>PITT CO.</small> <small>GREENVILLE</small> <small>PLAN DATE: MARCH 2006</small> <small>REVIEWED BY: I.N. AVERY</small> <small>PREPARED BY: S.C. WARDLE</small> <small>REVIEWED BY: G.G. MURR</small>	<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE					
REVISIONS	INIT.	DATE									
 	<small>SIGNATURE: G.G. Murr, Jr.</small> <small>DATE: 3-8-06</small>		<small>CADD Filename:</small>								

- 1 INSTALL REA, PE - 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL REA, PE - 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 3 INSTALL REA, PE - 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH
- 9 INSTALL PVC CONDUIT
- 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
- 13 INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
- 14 INSTALL POLYETHYLENE CONDUIT
- 15 DIRECTIONAL DRILL CONDUIT
- 16 BORE AND JACK CONDUIT
- 17 INSTALL CABLE(S) IN EXISTING CONDUIT
- 18 INSTALL CABLE(S) IN NEW CONDUIT
- 19 INSTALL CABLE(S) IN EXISTING RISER
- 20 INSTALL CABLE(S) IN NEW RISER
- 21 INSTALL CABLE(S) IN EXISTING CONDUIT STUB-OUTS
- 22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 24 INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
- 25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26 TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 27 INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPlice CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPlice ENCLOSURE
- 30 INSTALL AERIAL SPlice ENCLOSURE
- 31 INSTALL POLE MOUNTED SPlice CABINET
- 32 INSTALL BASE MOUNTED SPlice CABINET
- 33 REMOVE EXISTING SPlice CABINET

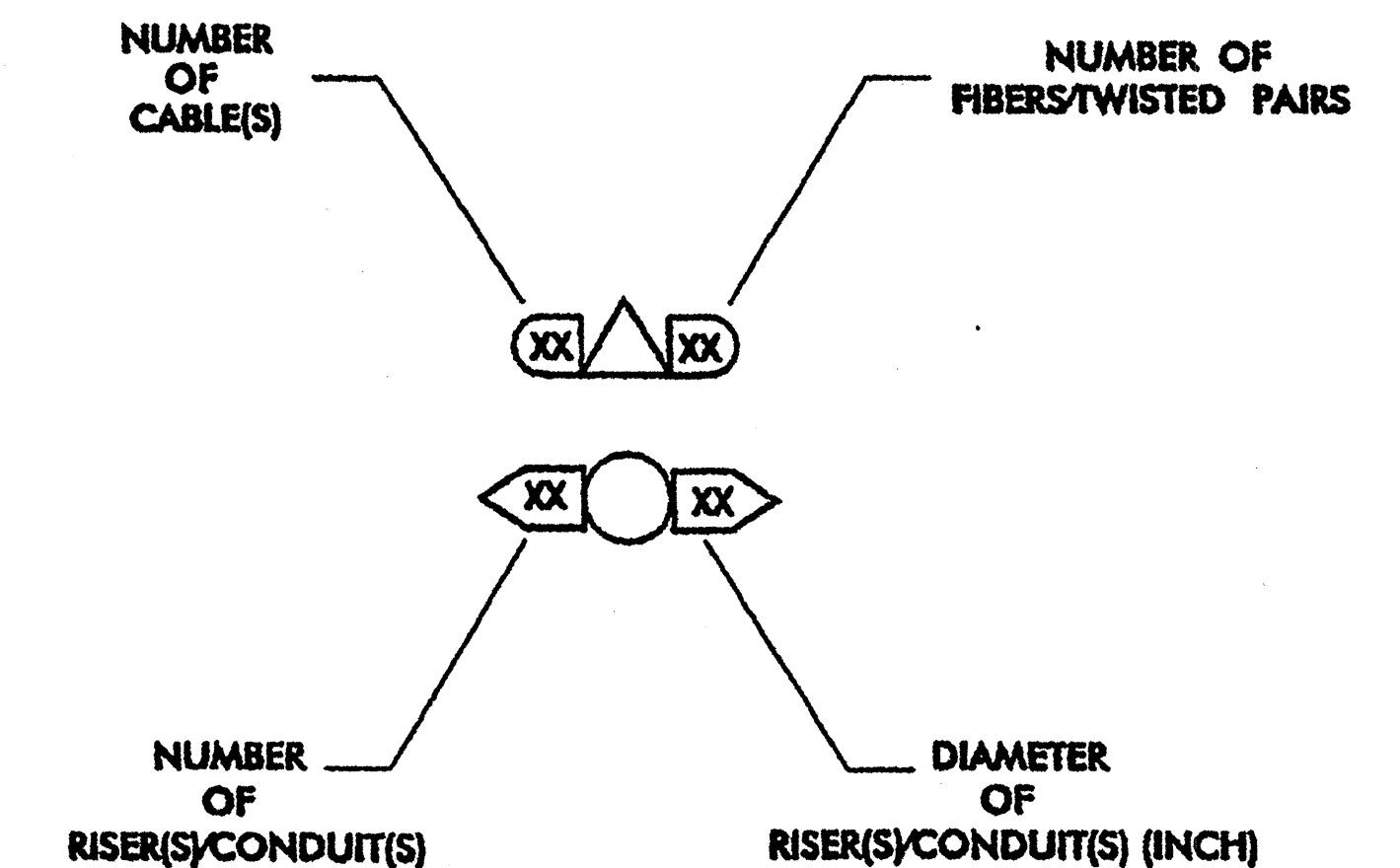
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48 REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
- 49 REMOVE EXISTING MESSENGER CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 20 FEET OF COMMUNICATIONS CABLE
- 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56 LASH CABLE(S) TO NEW MESSENGER CABLE
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE

LEGEND

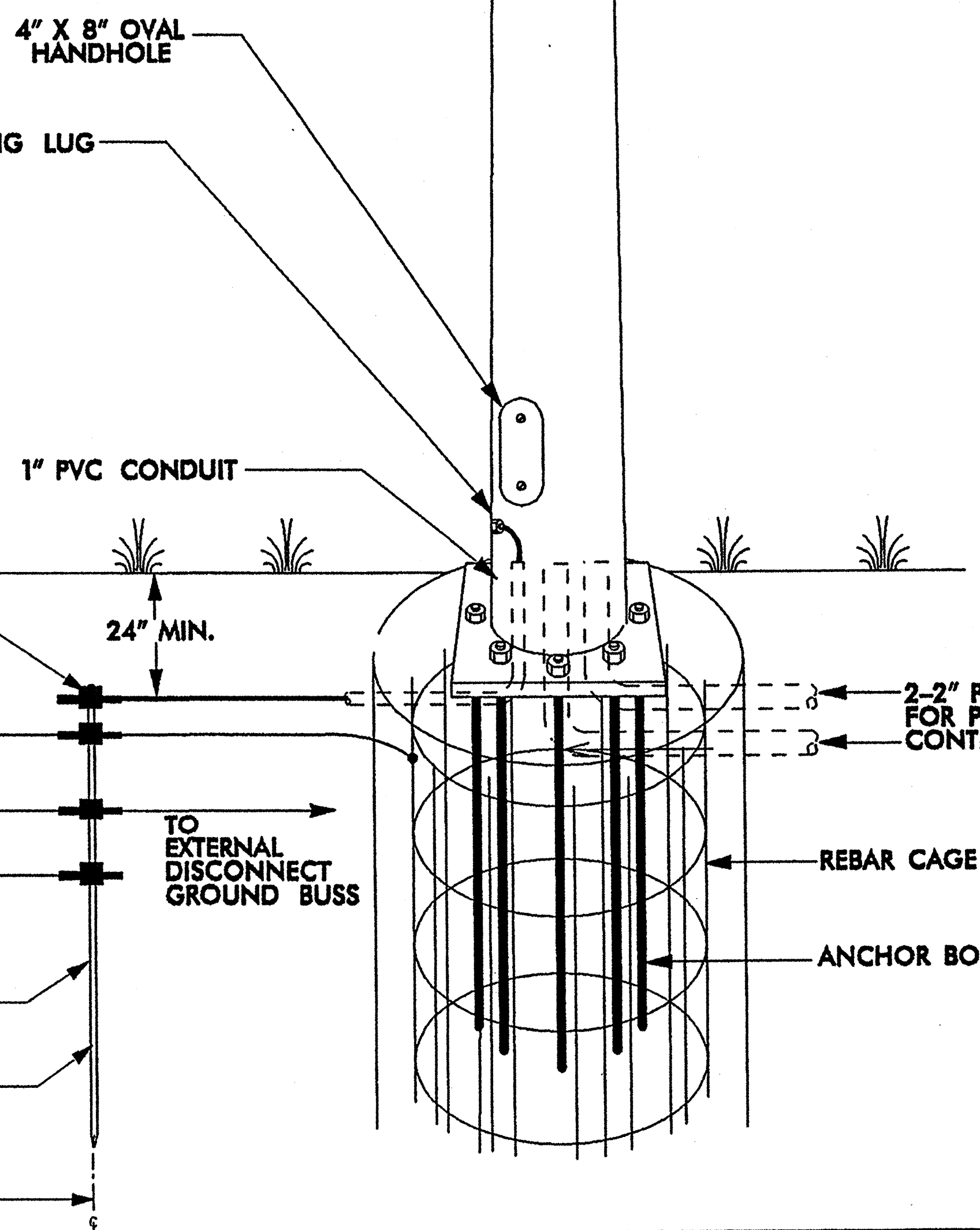
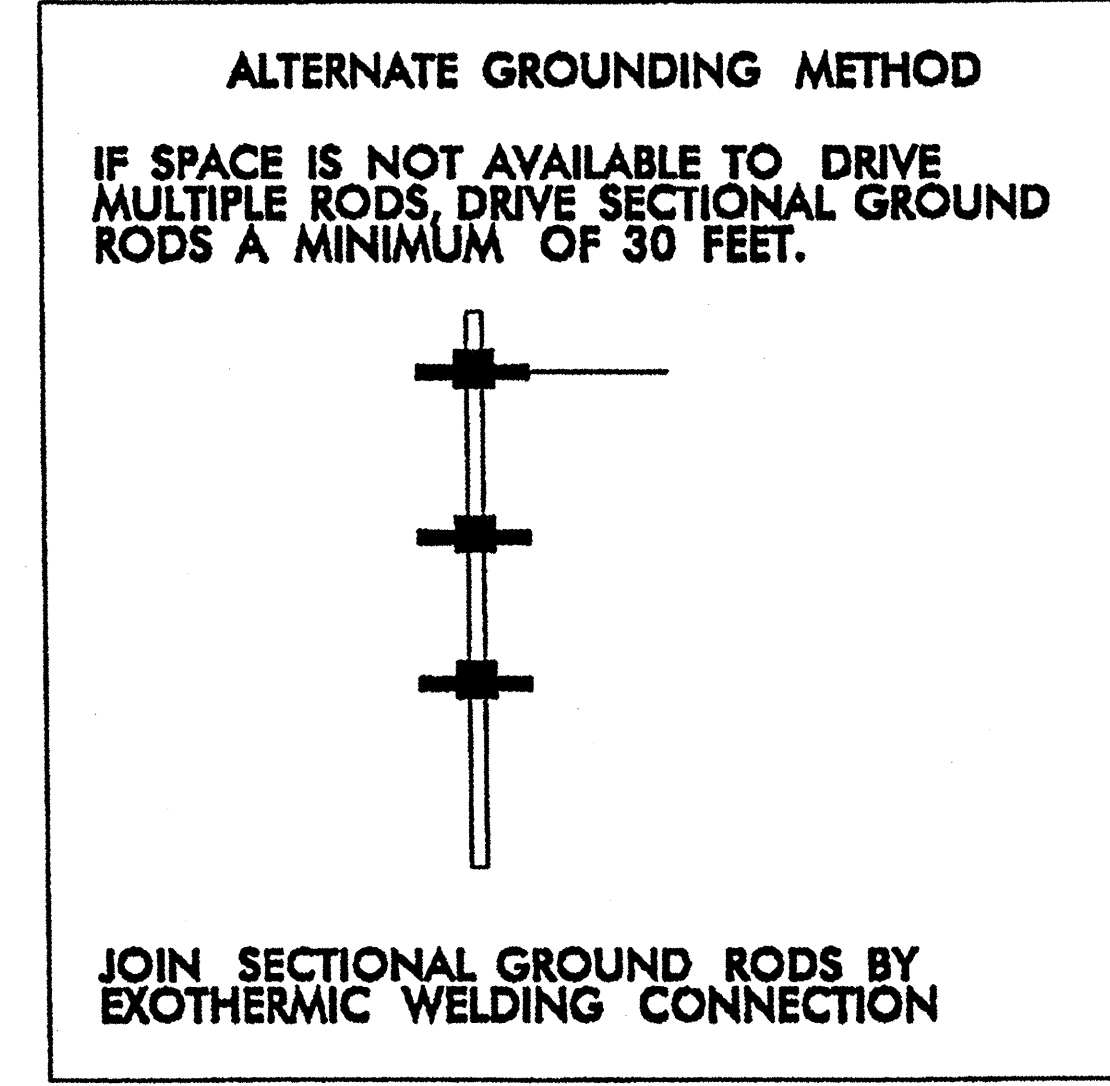
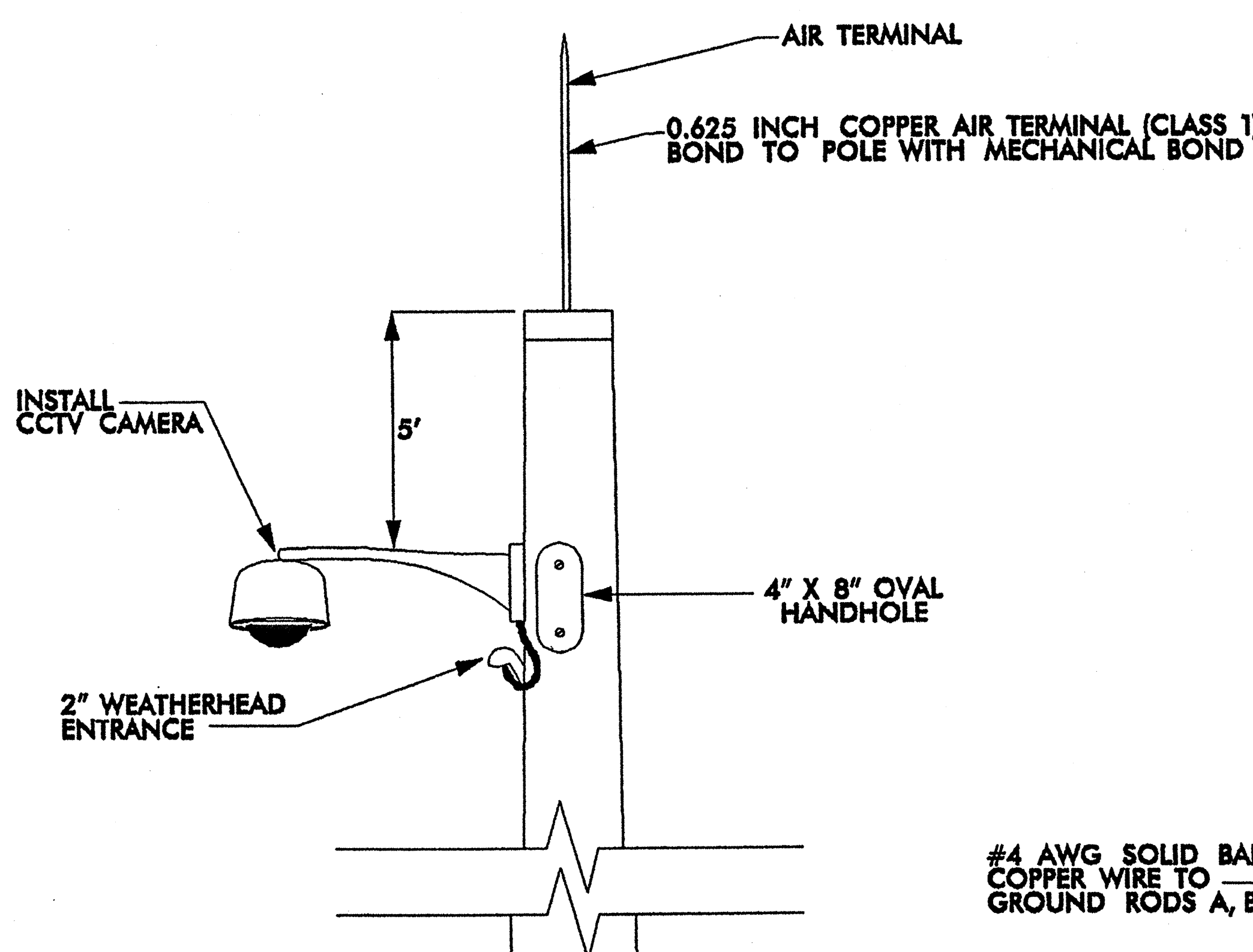
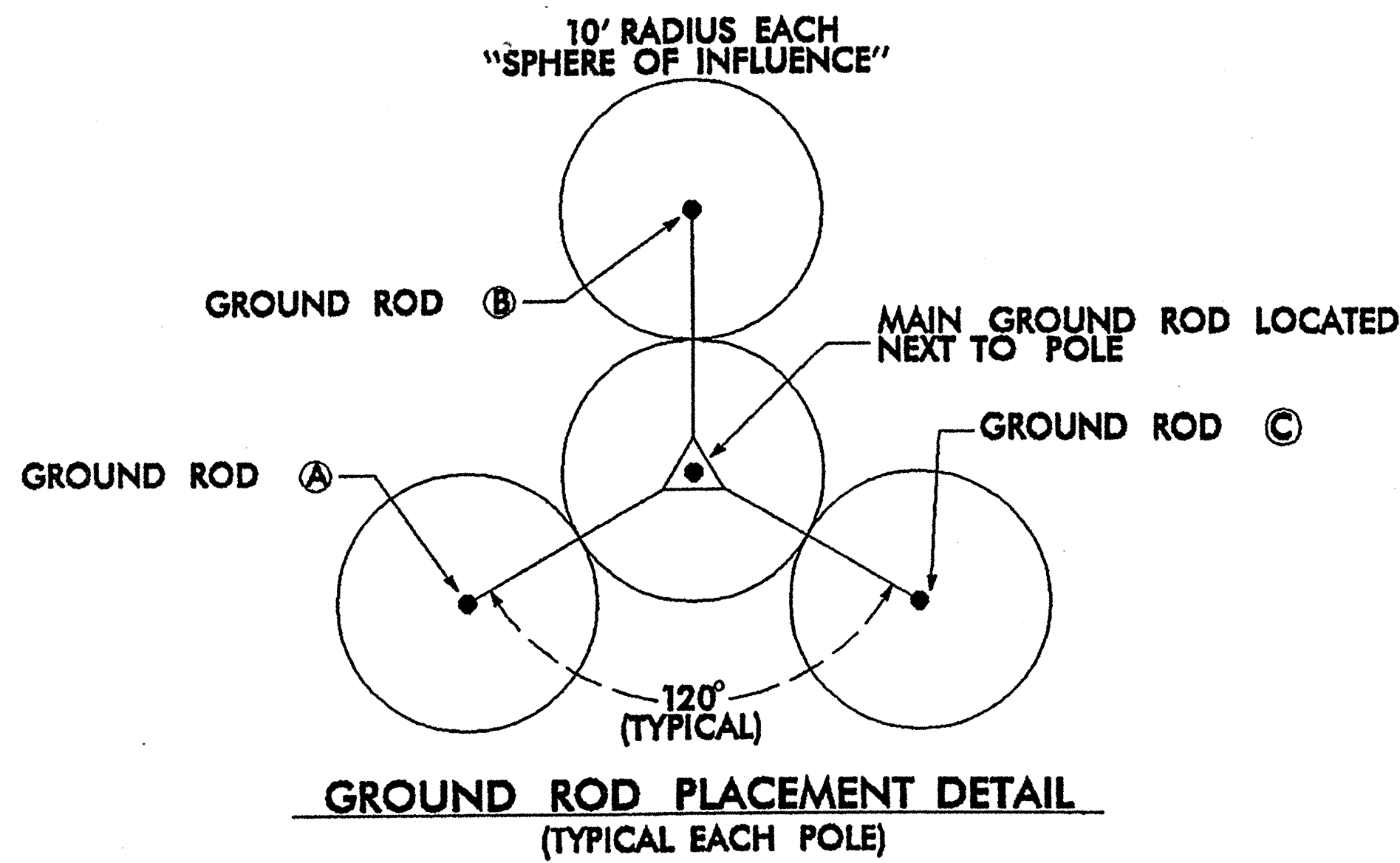
- FO NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI EXISTING COMMUNICATIONS CABLE
- REM EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD NEW DIRECTIONAL DRILLED CONDUIT
- B&J NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- AERIAL SPlice ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CONTROLLER AND CABINET
- EXISTING SPlice CABINET
- NEW SPlice CABINET
- SP SIGNAL POLE
- XX-XXXX SIGNAL INVENTORY NUMBER

CONSTRUCTION NOTE SYMBOLOGY KEY

- XX INDICATES NUMBER OF CABLES, LOOPS, ETC.
- XX INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- XX INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- XX INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)

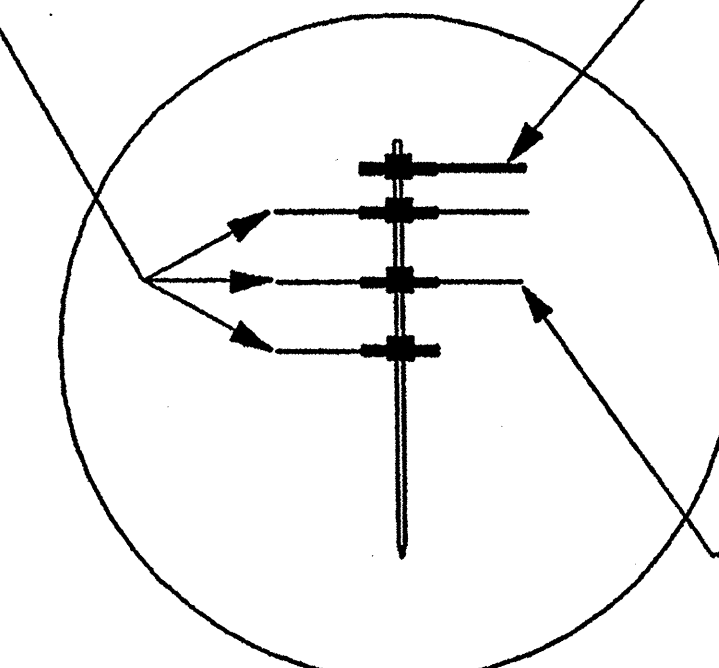


	CONSTRUCTION NOTES		
	PLAN DATE: _____ PREPARED BY: _____ SCALE: _____	REVIEWED BY: G. A. FULLER REVIEWED BY: _____ DATE: _____	
Signature: <i>G. A. Fuller</i> 10/31/02 DATE: _____ CADD File name: _____			SEAL

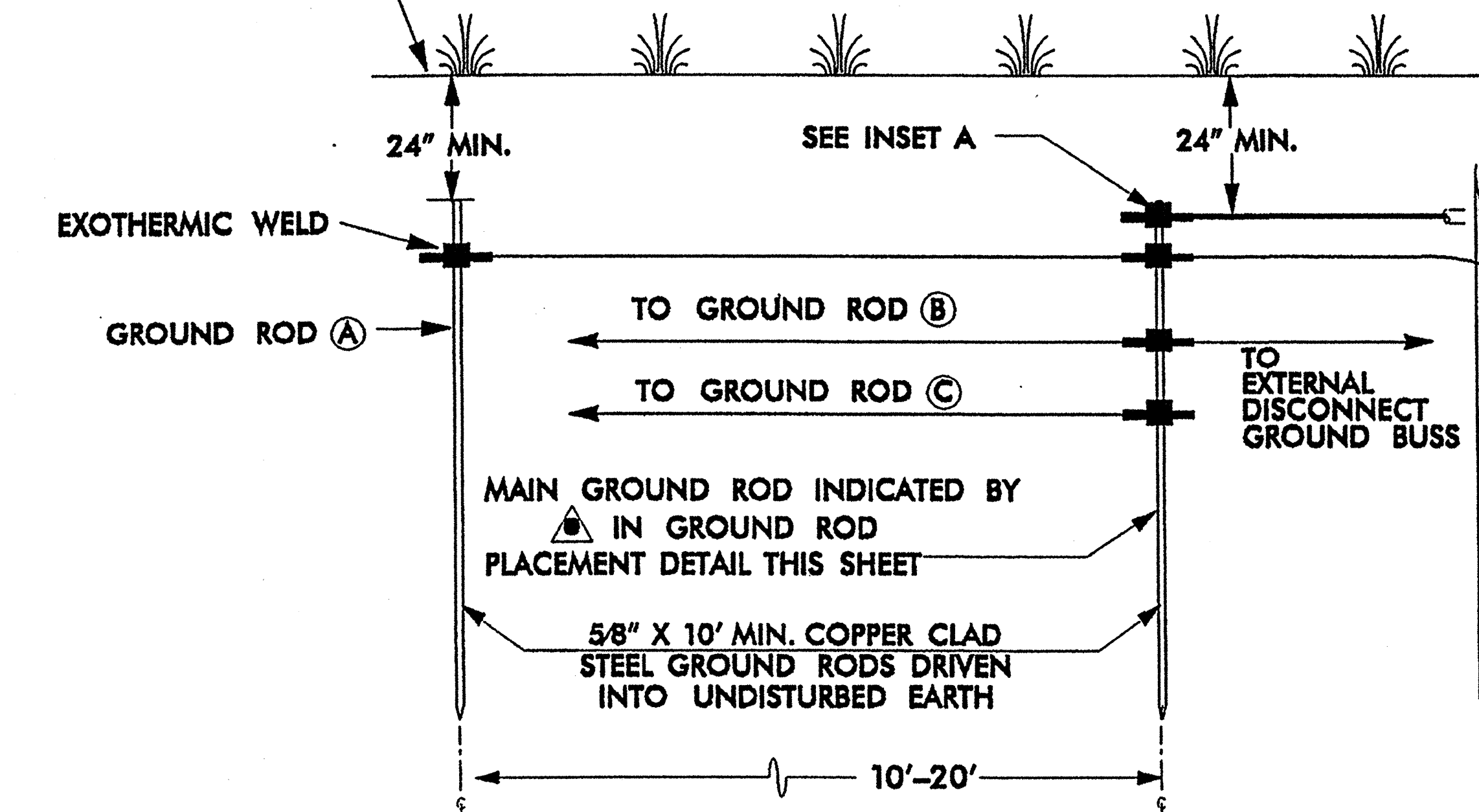


#4 AWG SOLID BARE COPPER WIRE TO GROUND RODS A, B, AND C

4 / 0 AWG 19 STRAND BARE COPPER WIRE TO BASE OF POLE



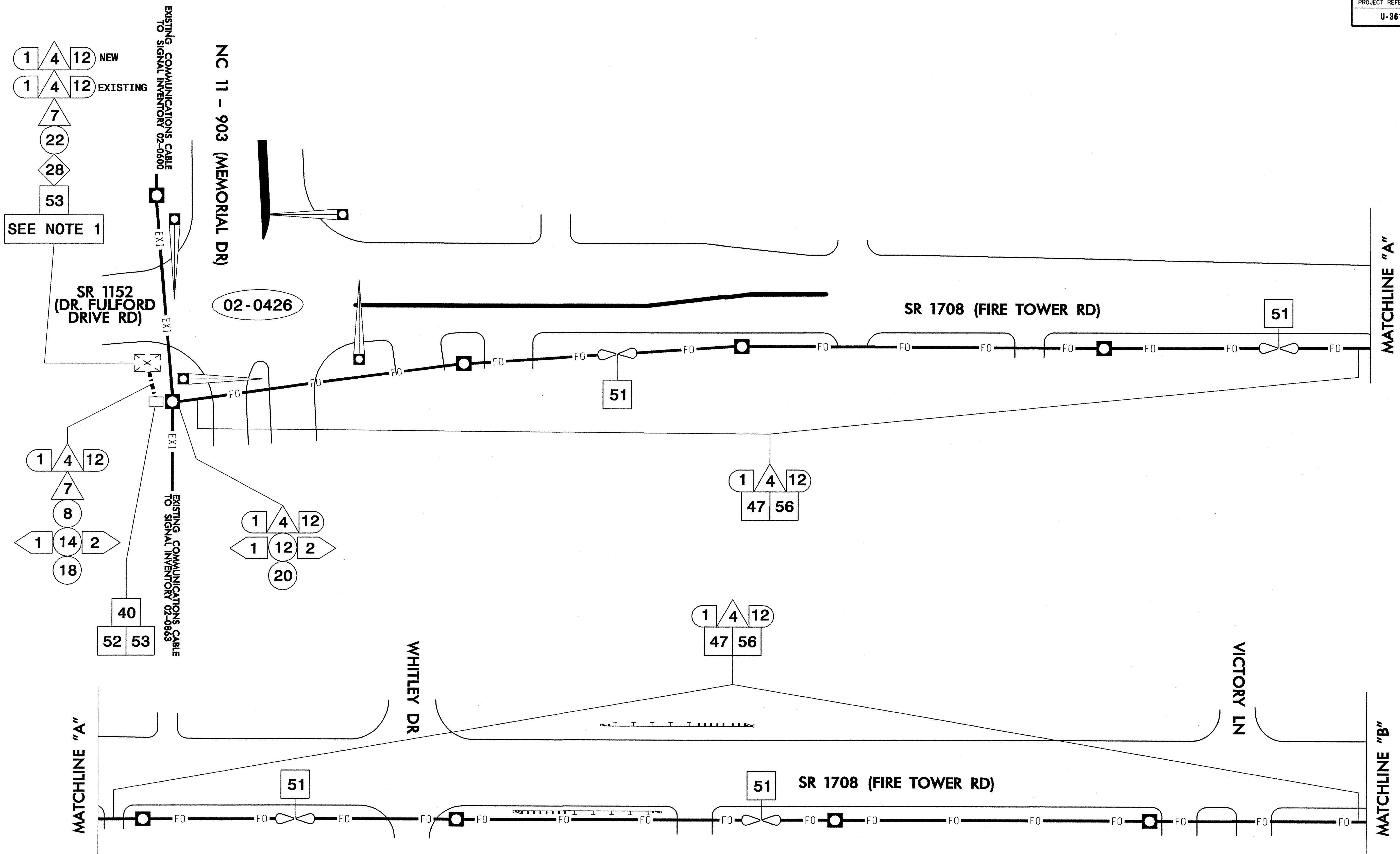
FINISHED GRADE



NOTES

1. BOND 4 / 0 AWG 19 STRAND BARE COPPER WIRE TO THE MAIN GROUND ROD BY AN EXOTHERMIC WELD METHOD.
2. EXOTHERMICALLY WELD ALL CONNECTIONS TO GROUND RODS.
3. BOND #4 AWG SOLID BARE COPPER WIRE TO REBAR CAGE AND THE MAIN GROUND ROD BY AN EXOTHERMIC WELD METHOD
4. ENSURE CAMERA HOUSING, CAMERA, AND PAN -TILT UNIT ARE BONDED TO POLE
5. THE CONTRACTOR MAY, UPON APPROVAL OF THE ENGINEER, INSTALL A 30-FOOT SECTIONAL GROUND ROD WHEN CONDITIONS WILL NOT ALLOW FOR THE INSTALLATION OF THE 3-AUXILIARY GROUND RODS.
6. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12".

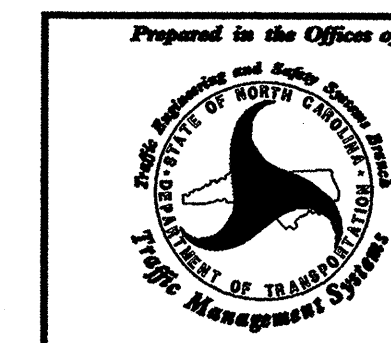
	CCTV CAMERA INSTALLATION FOR METAL POLES TYPICAL DETAIL		
	PLAN DATE: MARCH 2004 PREPARED BY: J. HOOKER	REVIEWED BY: T. G. PARKER REVIEWED BY: G. A. FULLER	



NOTES:

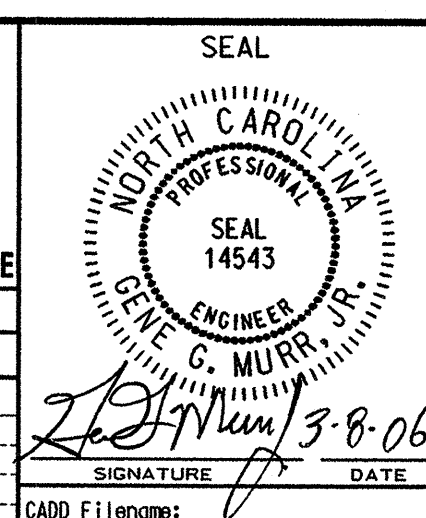
1. BOND TRACER WIRE TO EQUIPMENT GROUND BUS.

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.
 SEAL ALL CONDUIT ENDS WITH MECHANICAL SEALING DEVICES AT ALL JUNCTION BOX & SIGNAL CABINET ENTRANCES.

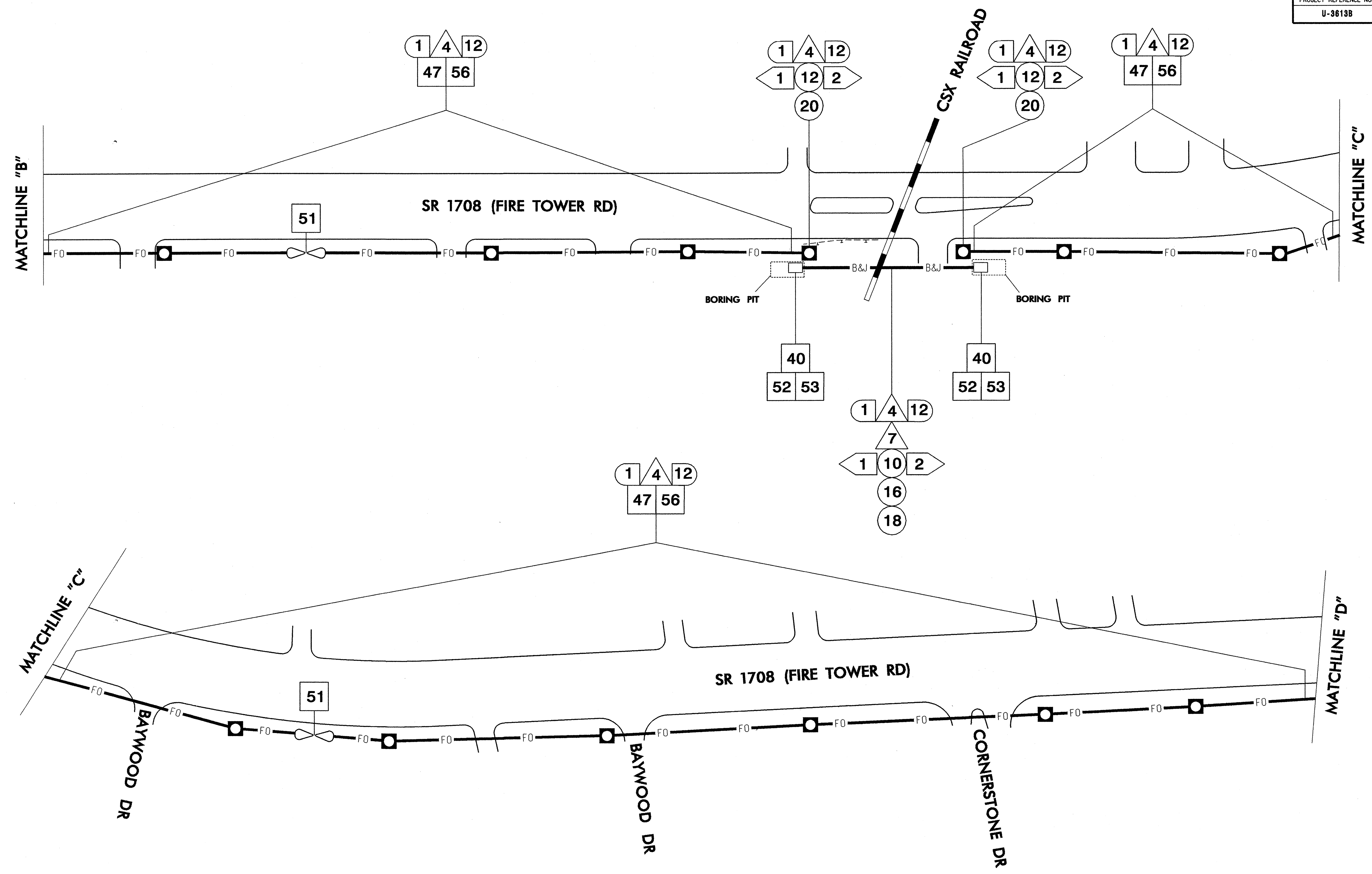


122 N. McDowell St., Raleigh, NC 27603
 SCALE 0

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS	
DIVISION 02	PITT CO. GREENVILLE
PLAN DATE: MARCH 2006	REVIEWED BY: I.N. AVERY
PREPARED BY: S.C. WARDLE	REVIEWED BY: G.G. MURR
REVISIONS	INIT. DATE



SIGNATURE: *G.G. Murr* DATE: 3-8-06
 CADD Filename:

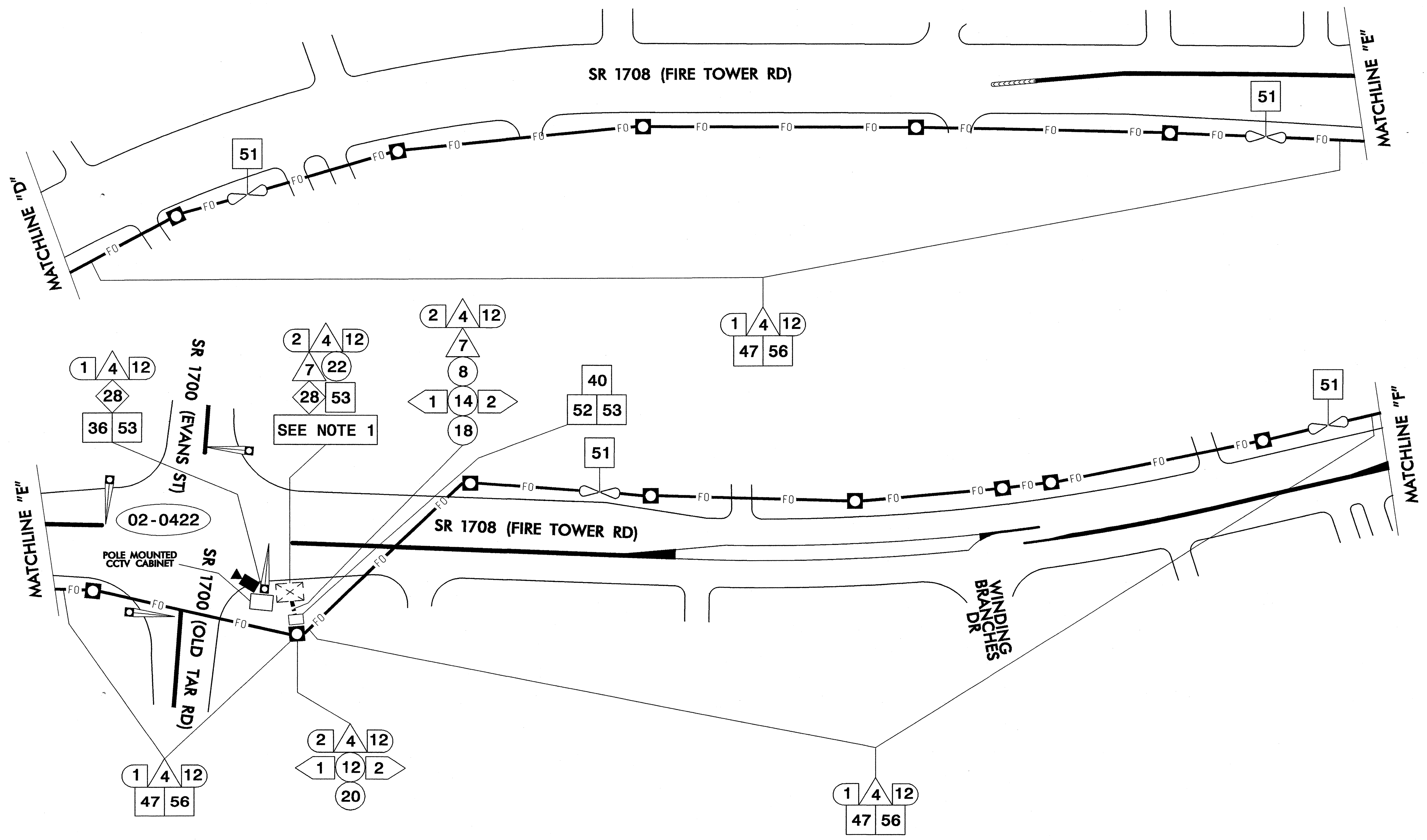


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 SEAL ALL CONDUIT ENDS WITH MECHANICAL SEALING DEVICES AT ALL JUNCTION BOX & SIGNAL CABINET ENTRANCES.

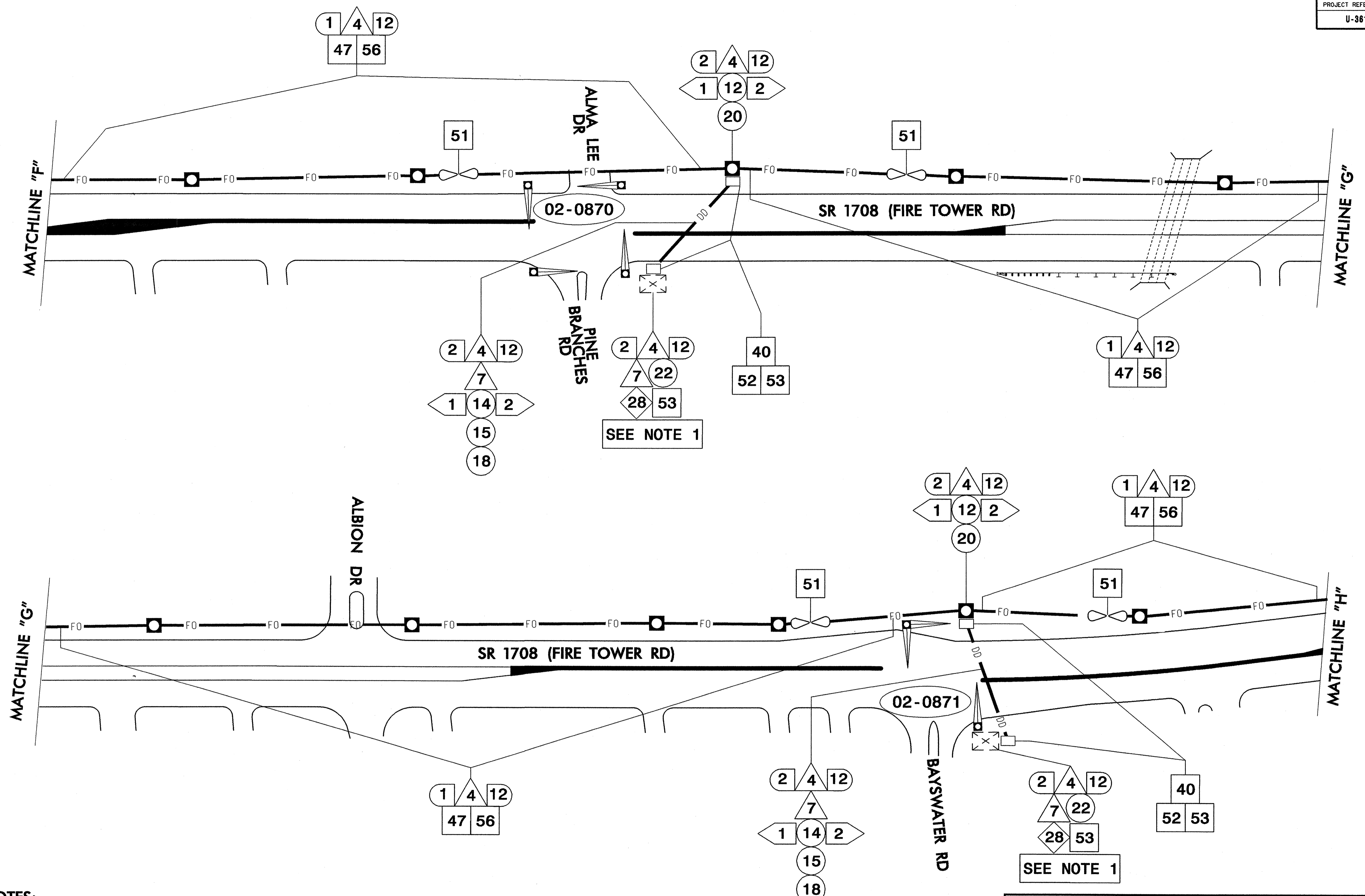
<p>222 N. McDowell St., Raleigh, NC 27603</p>	<p>COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS</p>									
	<p>DIVISION 02 PITT CO. GREENVILLE</p> <p>PLAN DATE: MARCH 2006 REVIEWED BY: I. N. AVERY</p> <p>PREPARED BY: S. C. WARDLE REVIEWED BY: G. G. MURR</p>	<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		NO.	DATE	INIT.	DATE			
NO.	DATE	INIT.	DATE							
<p>SCALE: 0' = 1" (indicated by a scale bar)</p>		<p>SIGNATURE: <i>G. G. Murr</i> DATE: 3-8-06</p> <p>CADD Filepoint</p>								



1. BOND TRACER WIRE TO EQUIPMENT GROUND BUS.

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.
 SEAL ALL CONDUIT ENDS WITH MECHANICAL SEALING DEVICES AT ALL JUNCTION BOX & SIGNAL CABINET ENTRANCES.

<p>Prepared in the Office of: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Traffic Management Systems</p>	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS		
	DIVISION 02 PITT CO. GREENVILLE		
PLAN DATE: MARCH 2006 REVIEWED BY: I.M. AVERY			SEAL 14543 GENE G. MURR ENGINEER 3-8-06
PREPARED BY: S.G. WARDLE REVIEWED BY: G.G. MURR			
122 N. McDowell St., Raleigh, NC 27603	SCALE: 0' = 1"	REVISIONS:	INIT. DATE
CADD File Name:			SIGNATURE: <i>Gene G. Murr</i> DATE:

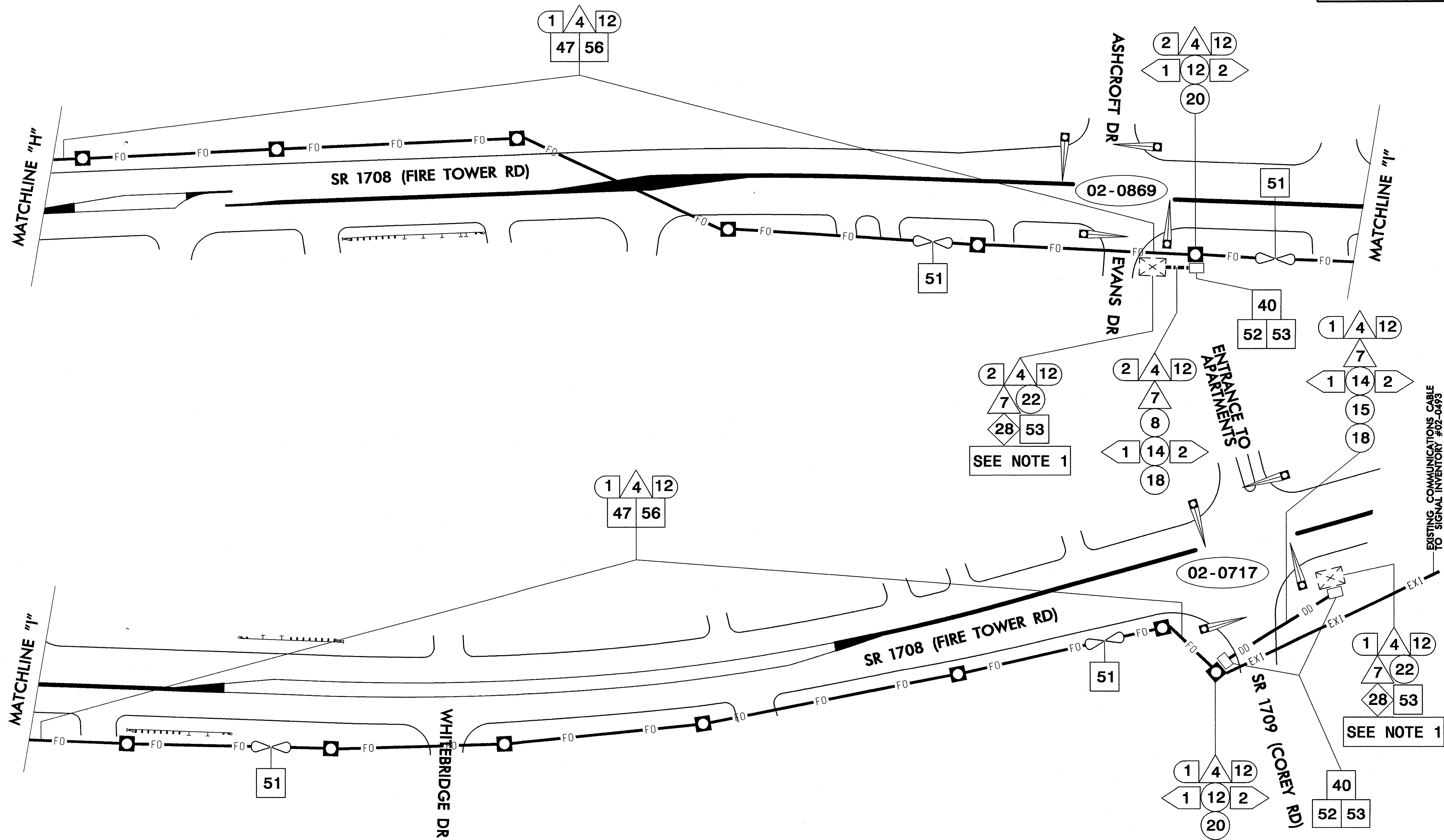


NOTES:

1. BOND TRACER WIRE TO EQUIPMENT GROUND BUS.

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.
 SEAL ALL CONDUIT ENDS WITH MECHANICAL SEALING DEVICES AT ALL JUNCTION BOX & SIGNAL CABINET ENTRANCES.

	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS		
	DIVISION 02 PITT CO. GREENVILLE PLAN DATE: MARCH 2006 REVIEWED BY: I.N. AVERY PREPARED BY: S.C. WARDLE REVIEWED BY: G.G. MURR	REVISIONS INIT. DATE _____ _____ _____	
SCALE 	SIGNATURE: <i>[Signature]</i> DATE: 3-8-06 CADD File name:		SEAL



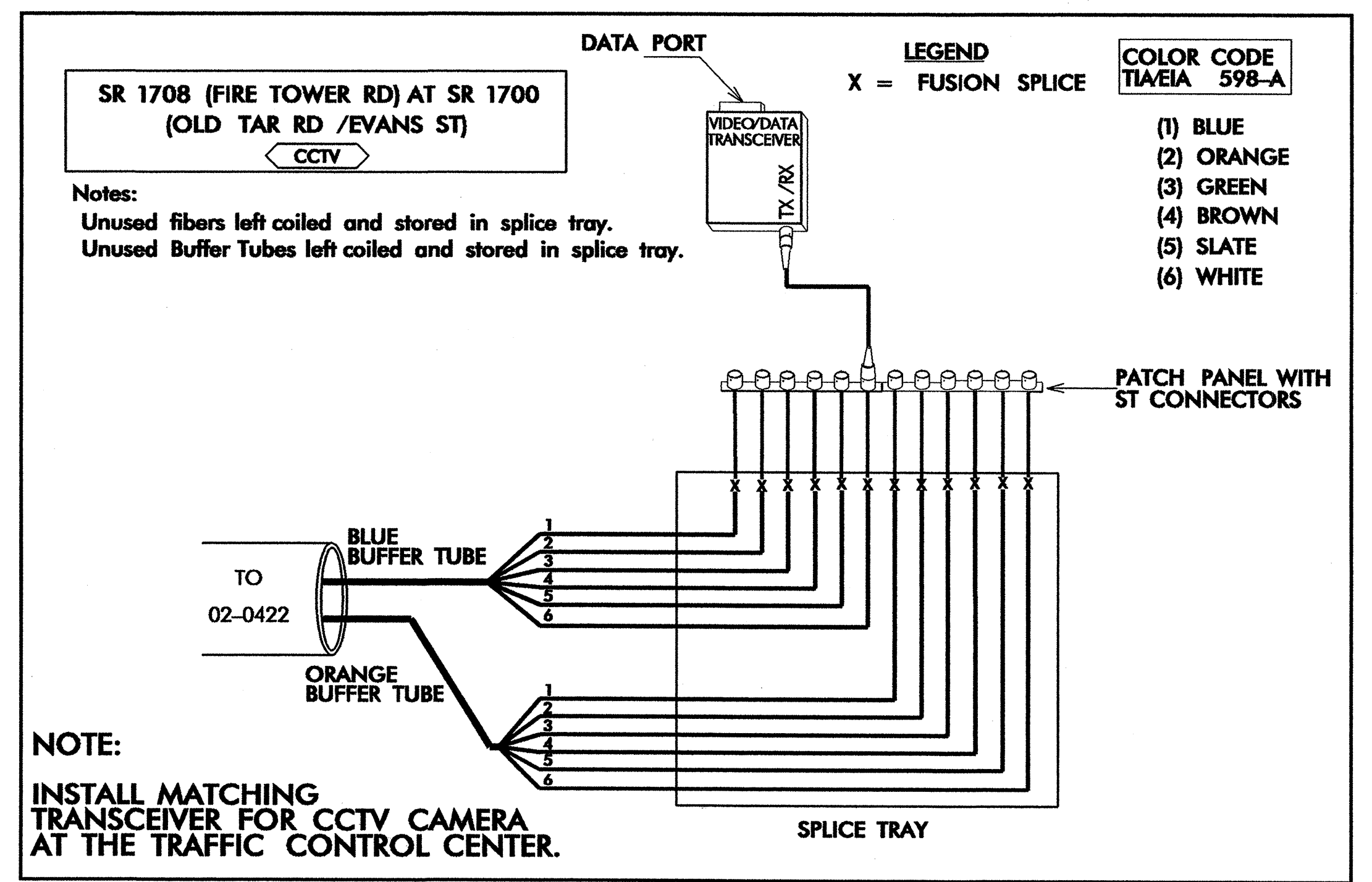
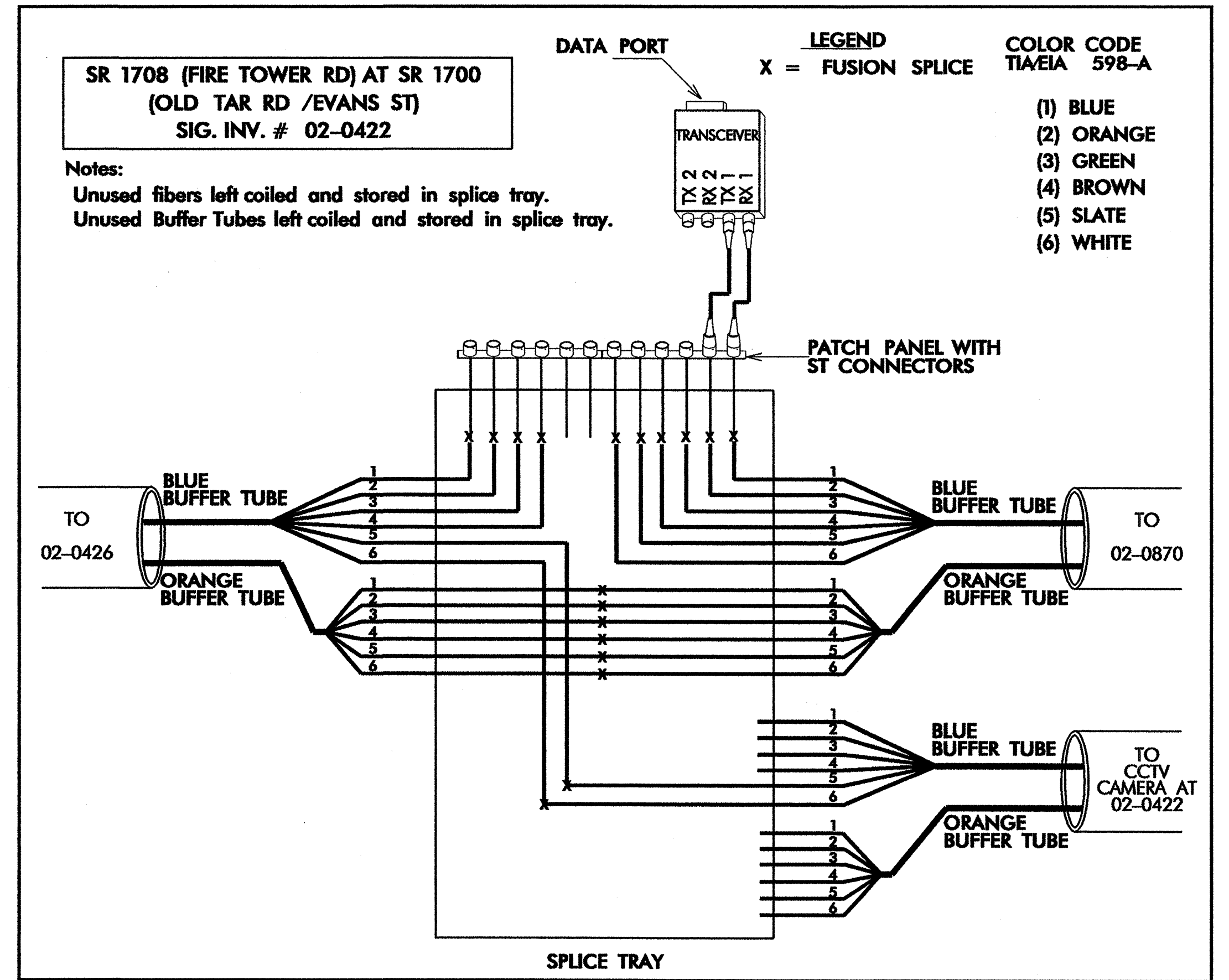
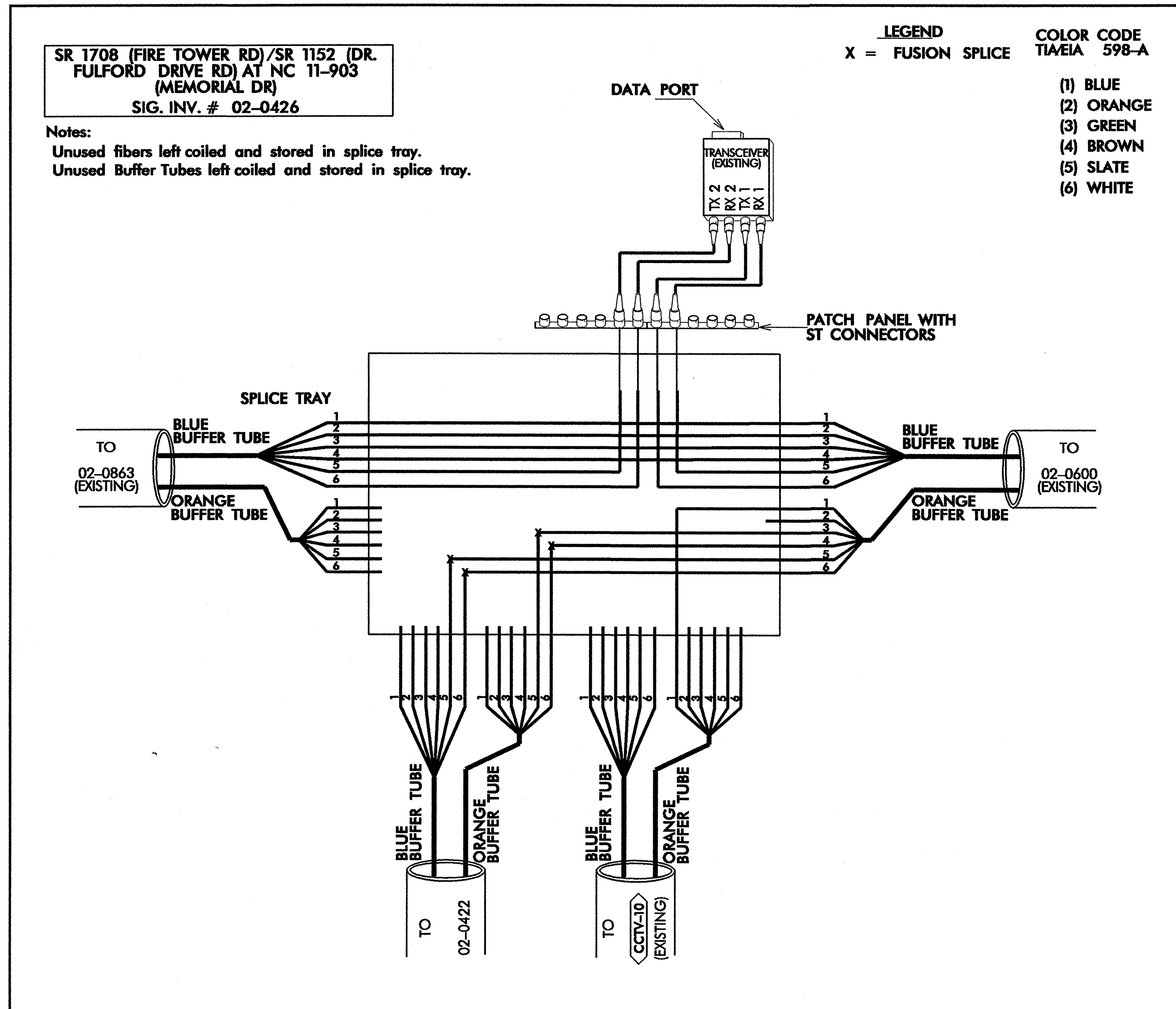
NOTES:

1. BOND TRACER WIRE TO EQUIPMENT GROUND BUS.

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.
 SEAL ALL CONDUIT ENDS WITH MECHANICAL SEALING DEVICES AT ALL JUNCTION BOX & SIGNAL CABINET ENTRANCES.

<p>Prepared in the Office of: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Traffic Management System 122 N. McDowell St., Raleigh, NC 27603</p>	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS		
	DIVISION 02 PITT CO. GREENVILLE PLAN DATE: MARCH 2006 REVIEWED BY: I.W. AVERY PREPARED BY: S.C. WARDLE REVIEWED BY: G.G. MURR	REVISIONS INIT. DATE _____ _____	
	SCALE: 0' = _____ DATE: 3-8-06 SIGNATURE: <i>G.G. Murr</i> CADD Filename:		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER G.G. MURR, J.E. No. 14543

FIBER OPTIC CABLE

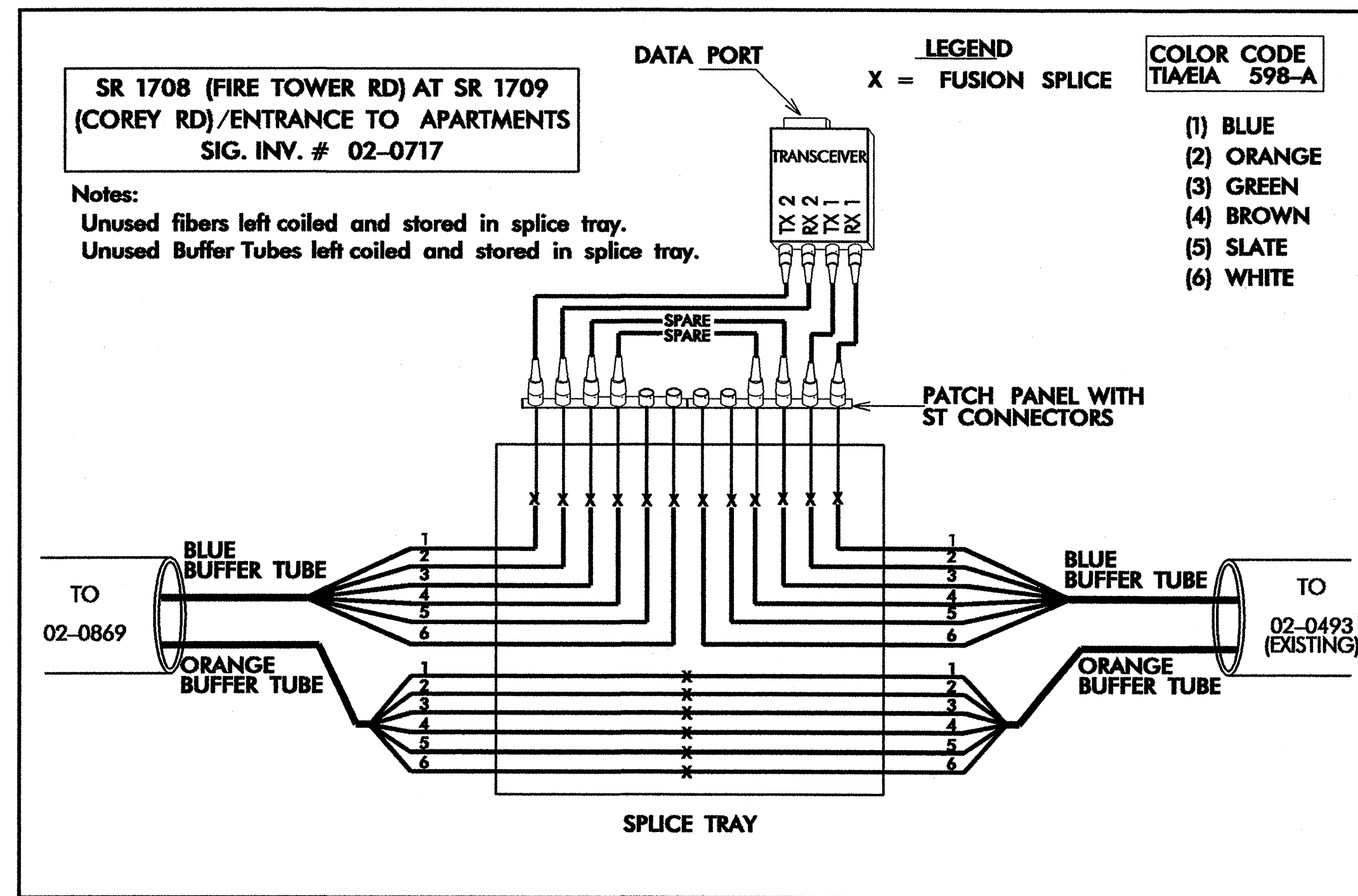
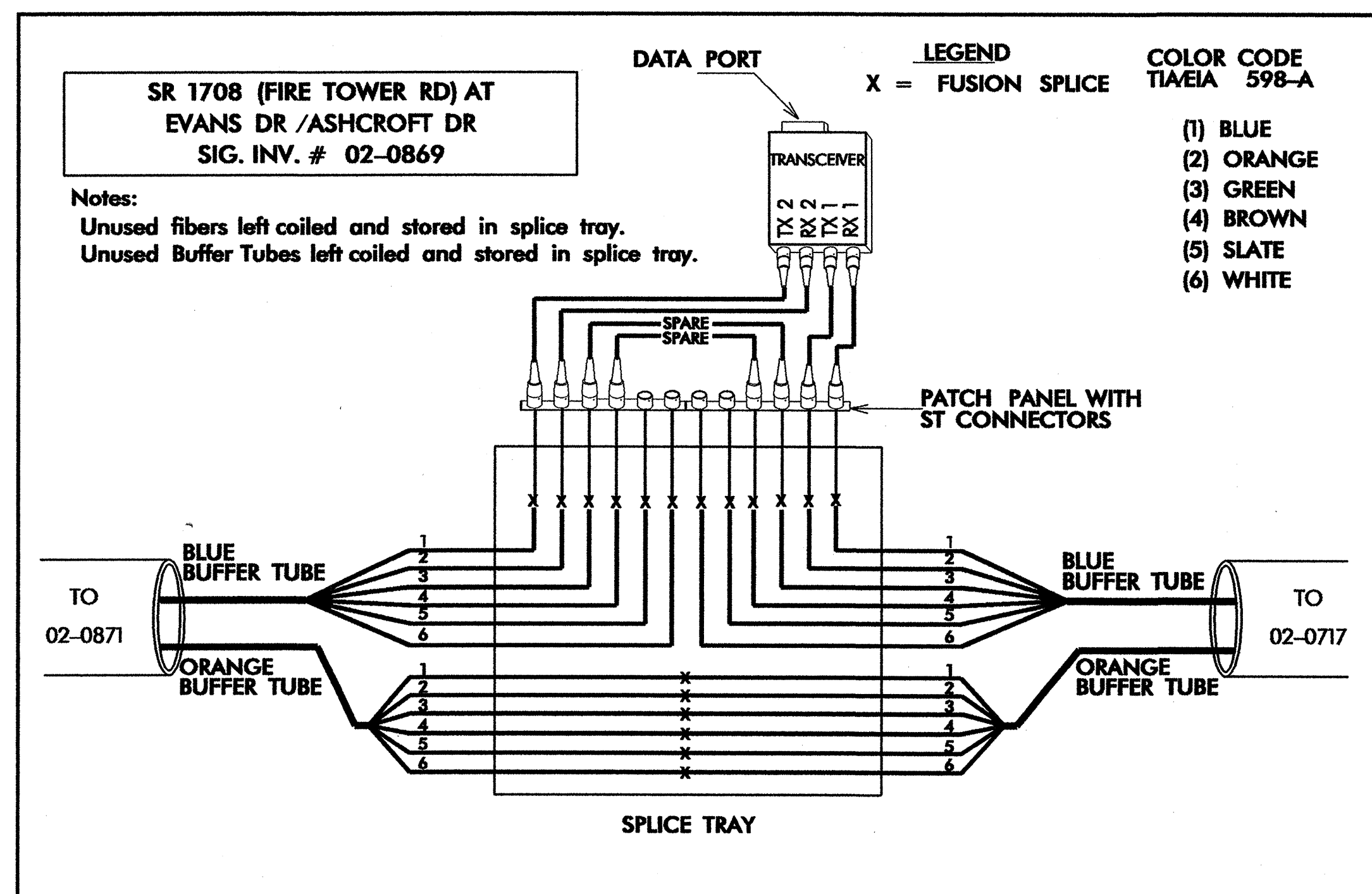
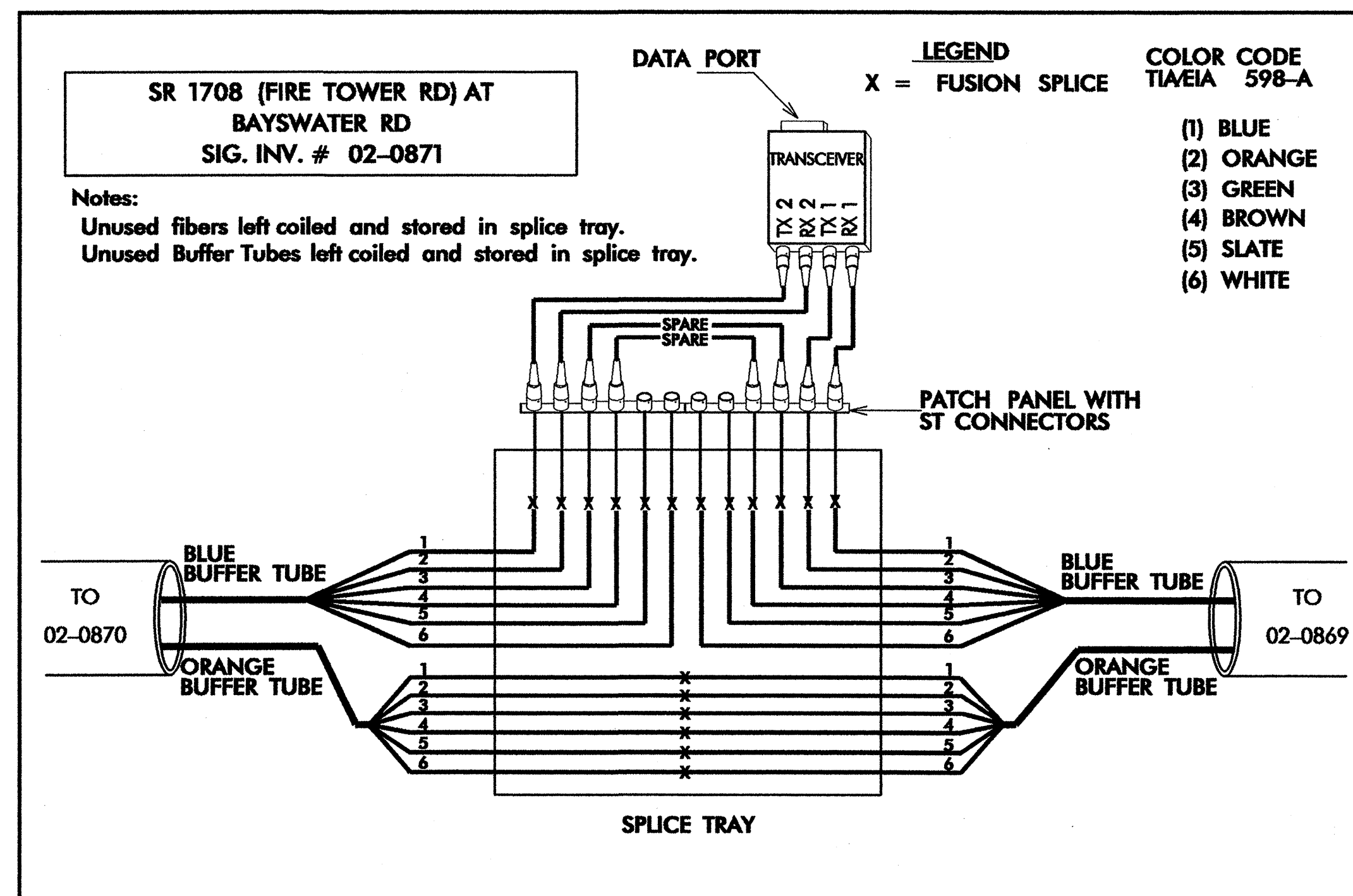
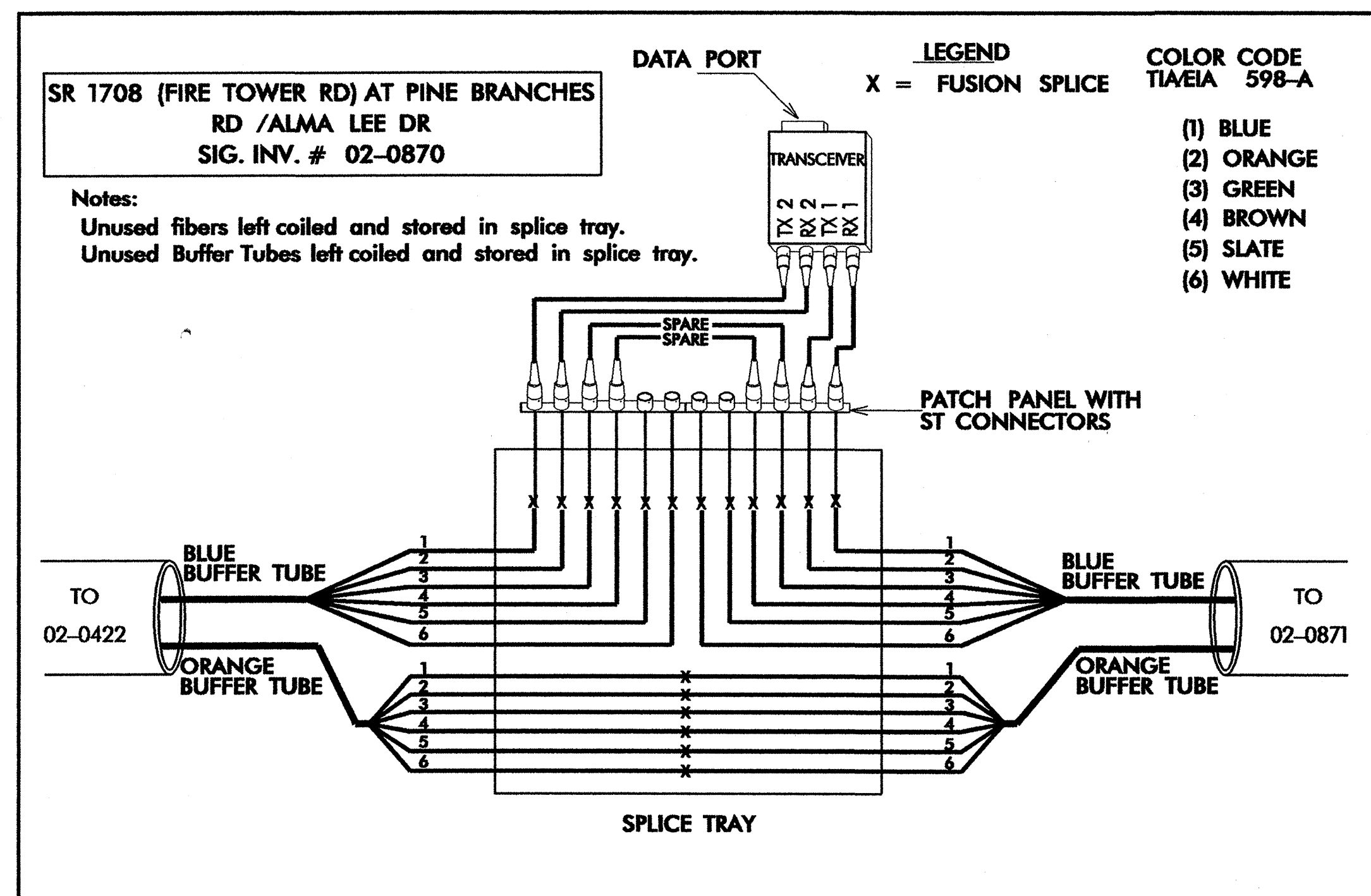


NOTE: FURNISH IFS D-9130 MODEL TRANSCEIVERS OR AN APPROVED EQUIVALENT.

TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS

<p>Prepared in the Office of: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Traffic Management Systems</p>	SPLICE PLAN		
	DIVISION 02 PITT CO. GREENVILLE PLAN DATE: MARCH 2006 REVIEWED BY: I.N. AVERY PREPARED BY: S.C. WARDLE REVIEWED BY: G.G. MURR	SCALE: 0 REVISIONS: INIT. DATE	
SIGNATURE: <i>G.G. Murr</i> 3-8-06 DATE			SEAL

FIBER OPTIC CABLE



NOTE:
02-0493 SPLICING NOT SHOWN. NO WORK REQUIRED AT THIS CABINET.

NOTE: FURNISH IFS D-9130 MODEL TRANSCEIVERS OR AN APPROVED EQUIVALENT.

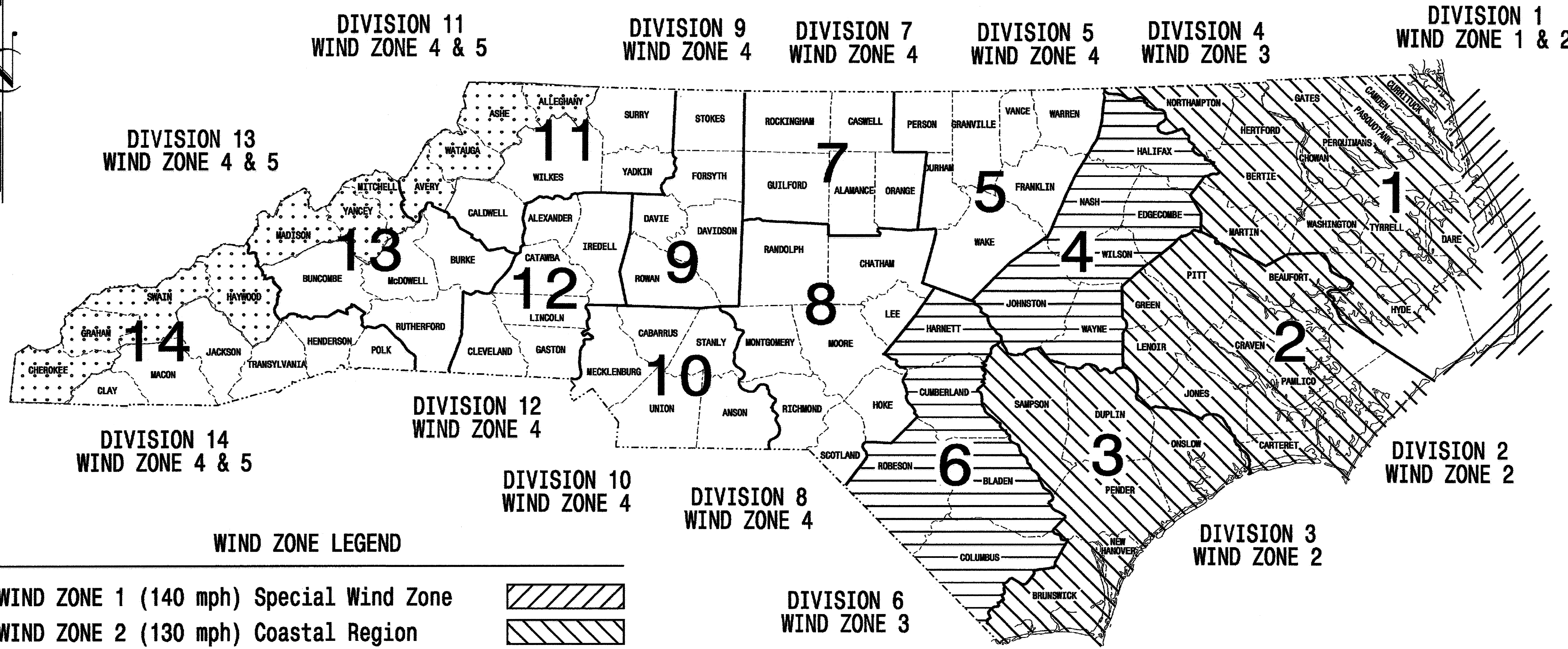
TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS

<p>Prepared in the Office of: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Traffic Management System 222 N. McDowell St., Raleigh, NC 27603</p>	SPLICE PLAN		
	DIVISION 02 PITT CO. GREENVILLE PLAN DATE: MARCH 2006 REVIEWED BY: I.N. AVERY PREPARED BY: S.C. WARDLE REVIEWED BY: G.G. MURR	REVISIONS INIT. DATE SCALE: 0	
SIGNATURE: <i>G.G. Murr</i> 3-8-06 DATE:			SEAL:

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	U - 3613B	Sig. 51
F. A. PROJ. NO.	M 1	
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES

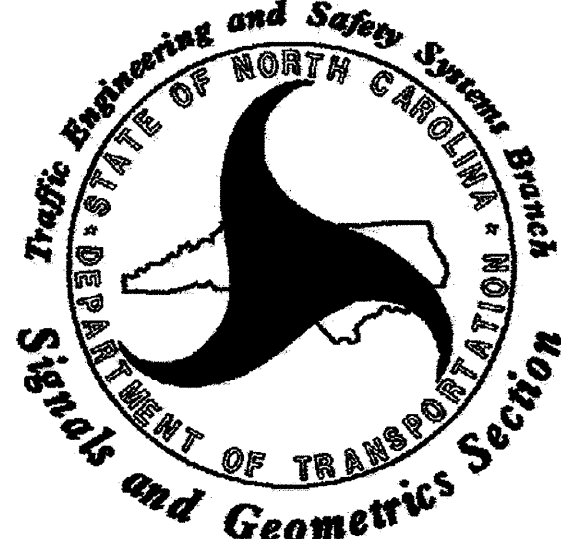


WIND ZONE LEGEND

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/tmssu/ws/default.htm>

Prepared in the Offices of:



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

INDEX OF PLANS

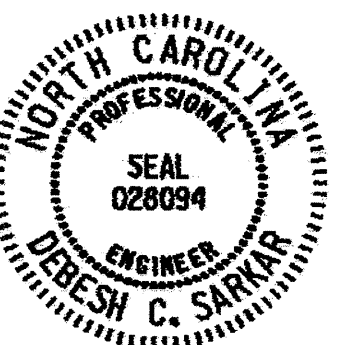
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

NCDOT CONTACTS:

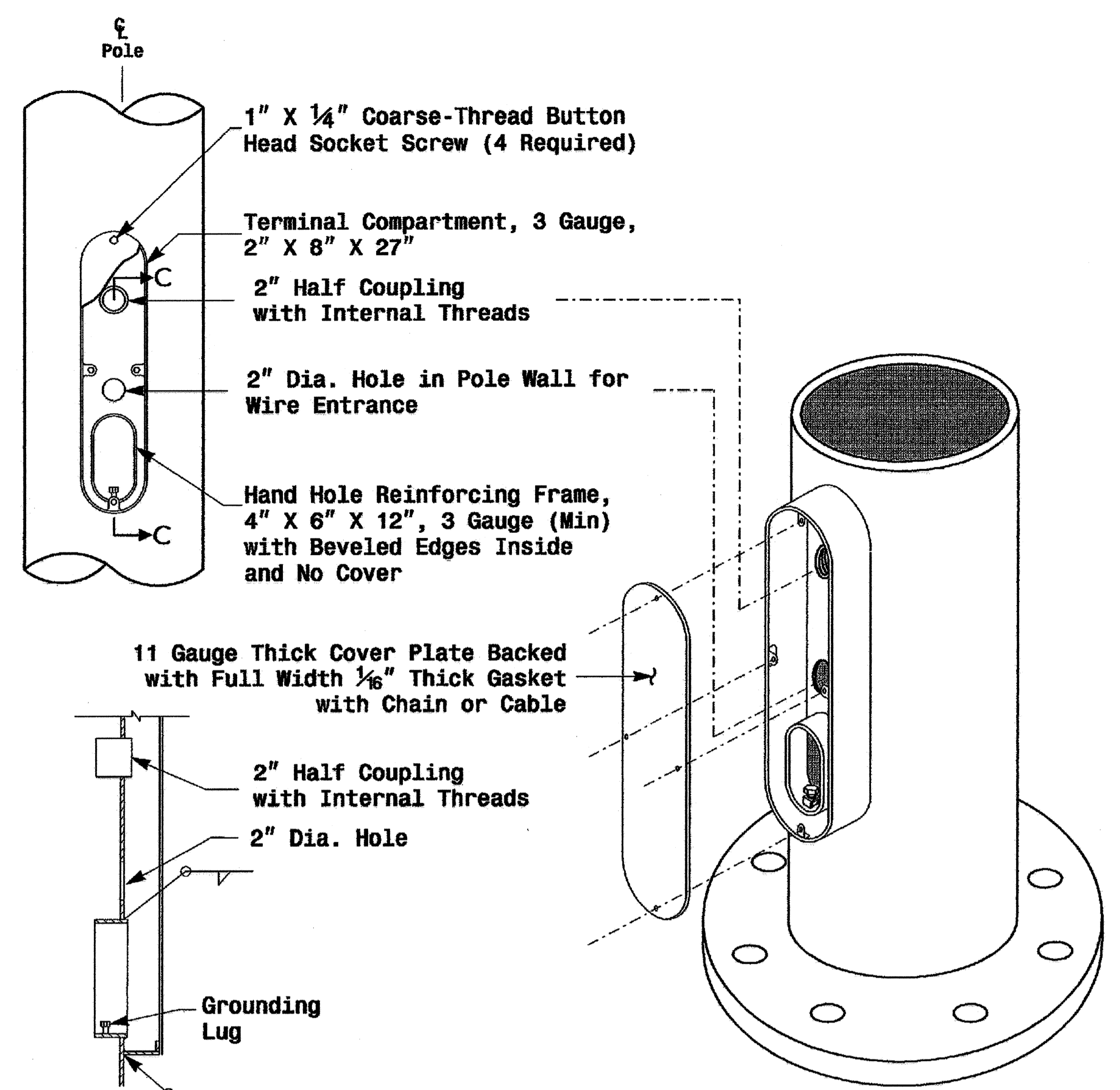
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

- 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

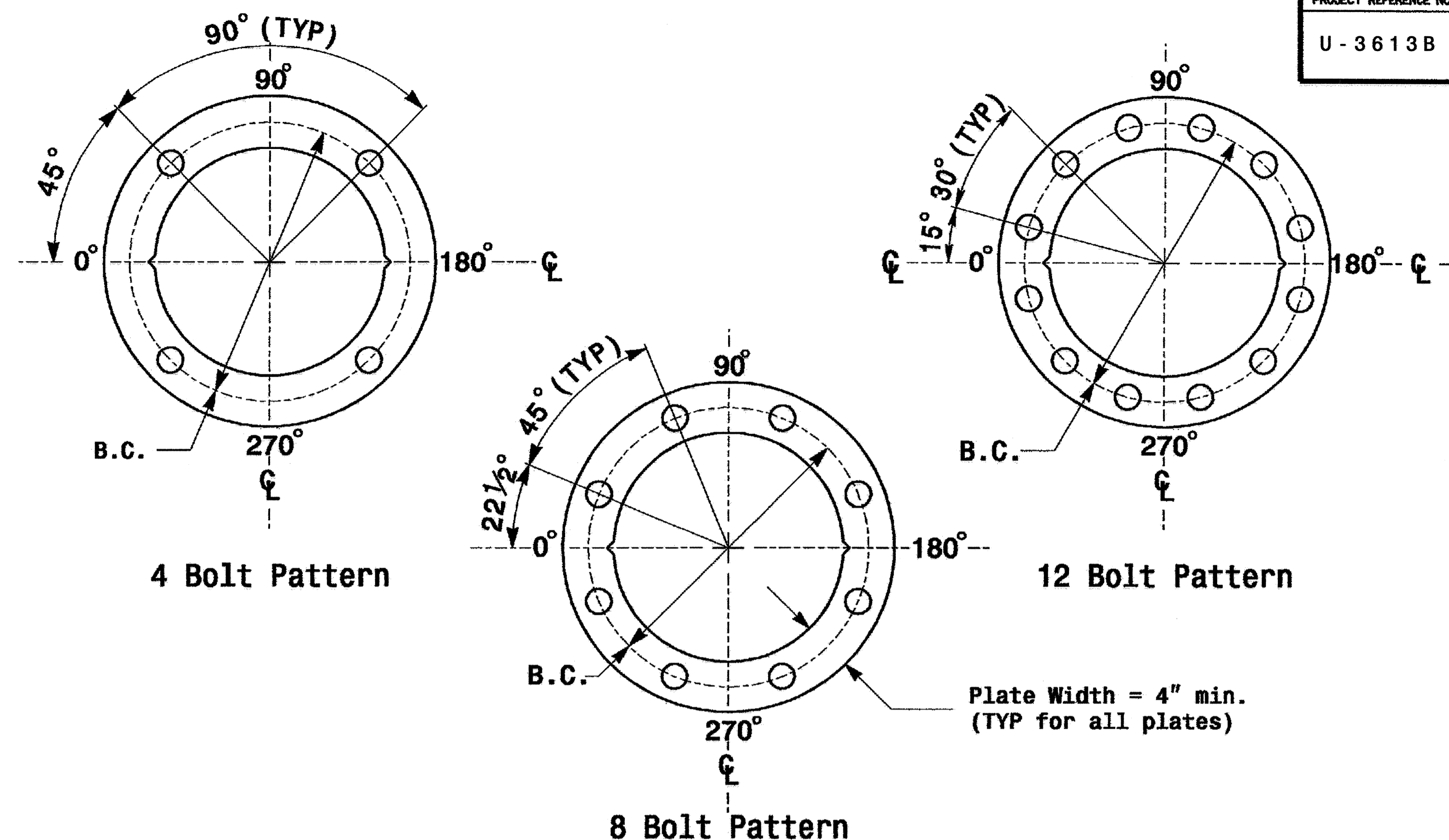


D. Sarkar 9/2/2005
SIGNATURE DATE



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

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 _____	

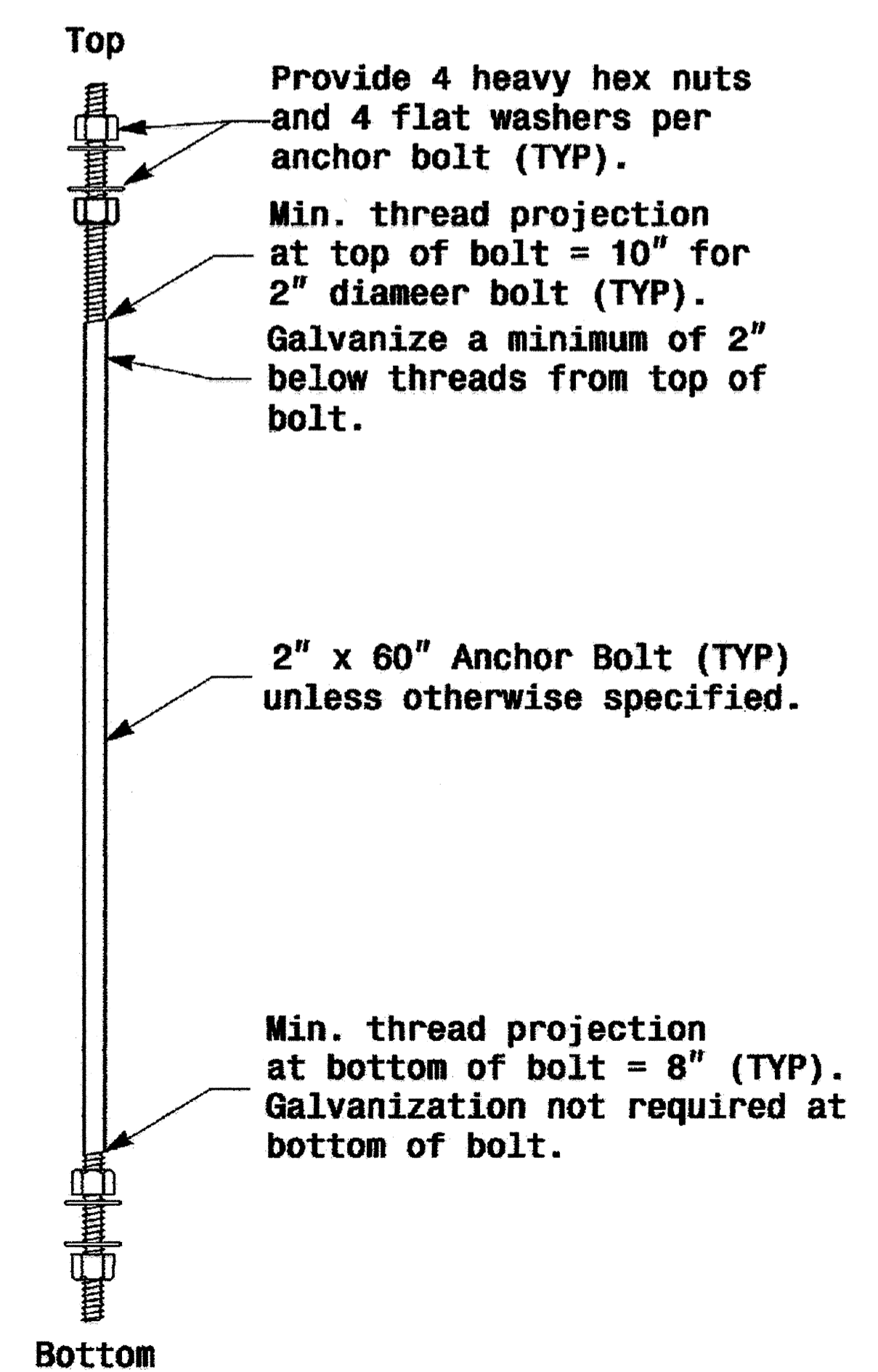
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

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

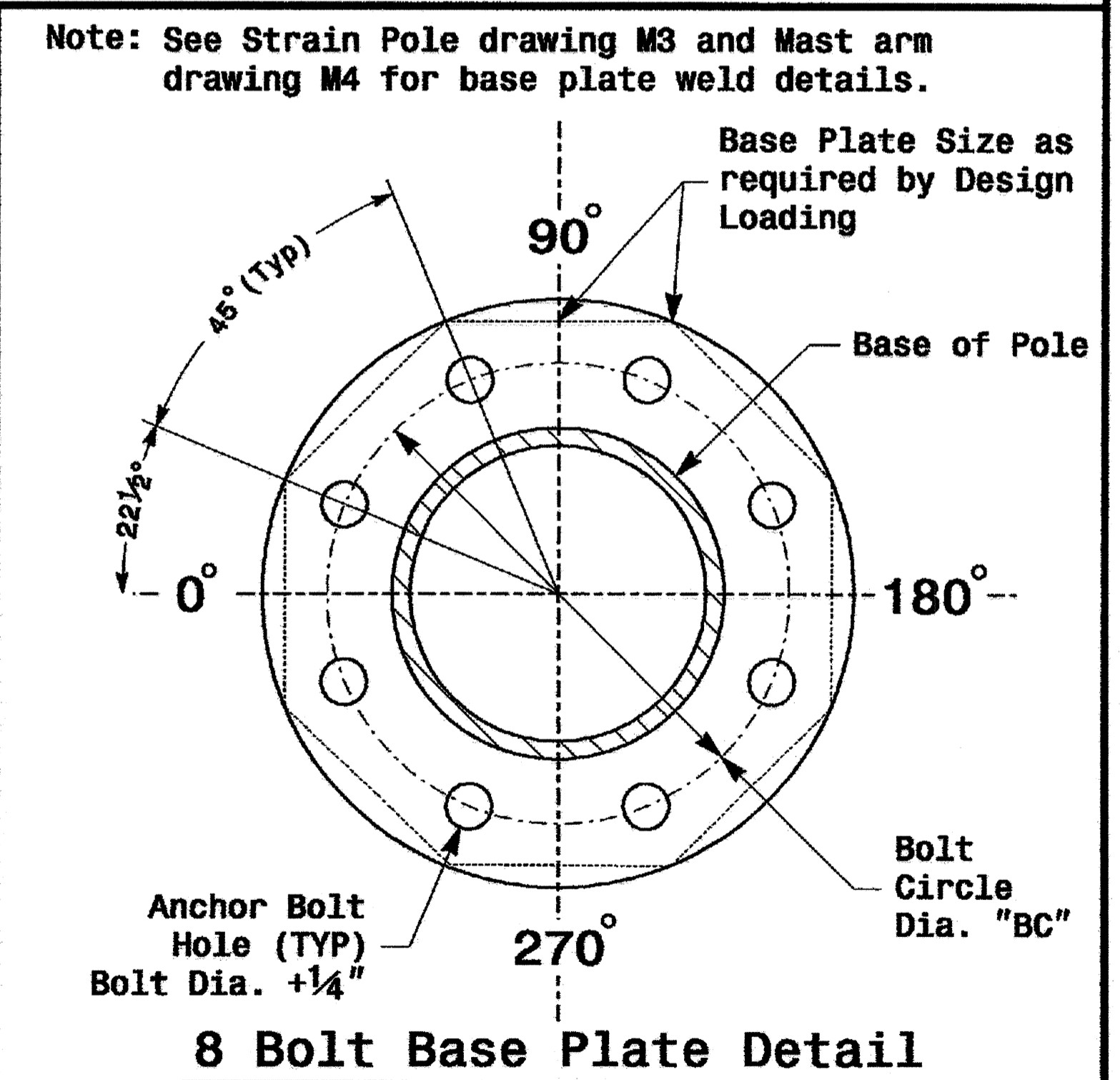
Arm I.D. Tag
(Provide on each section of a multi-section mast arm)

- 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



Anchor Bolt Detail

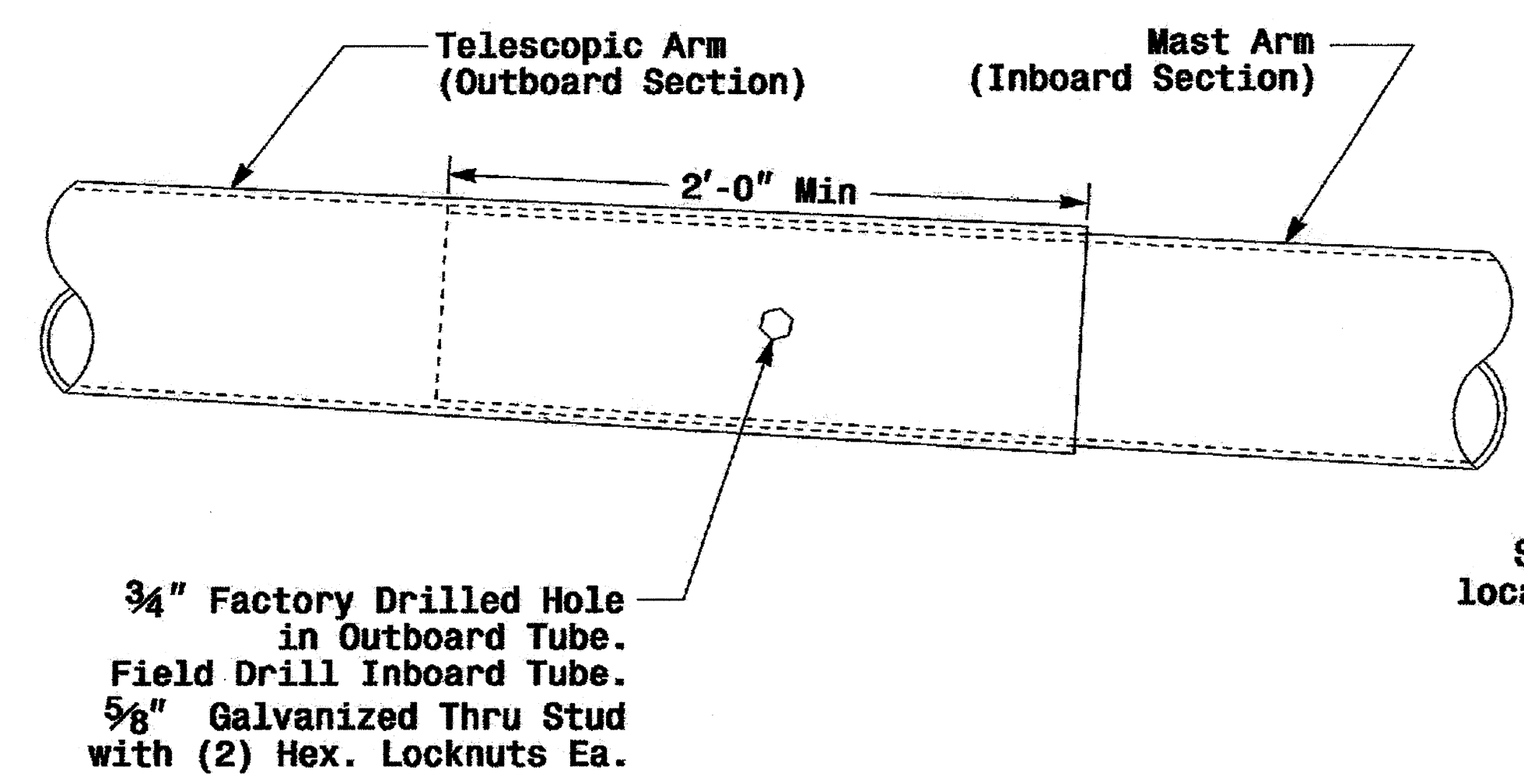
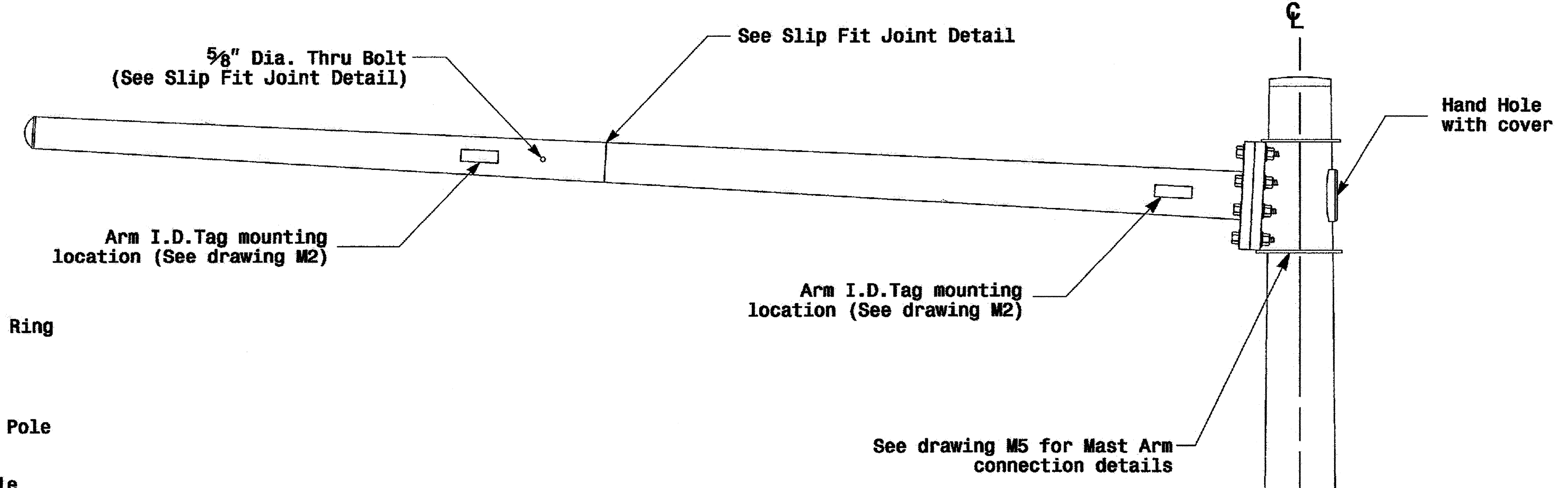
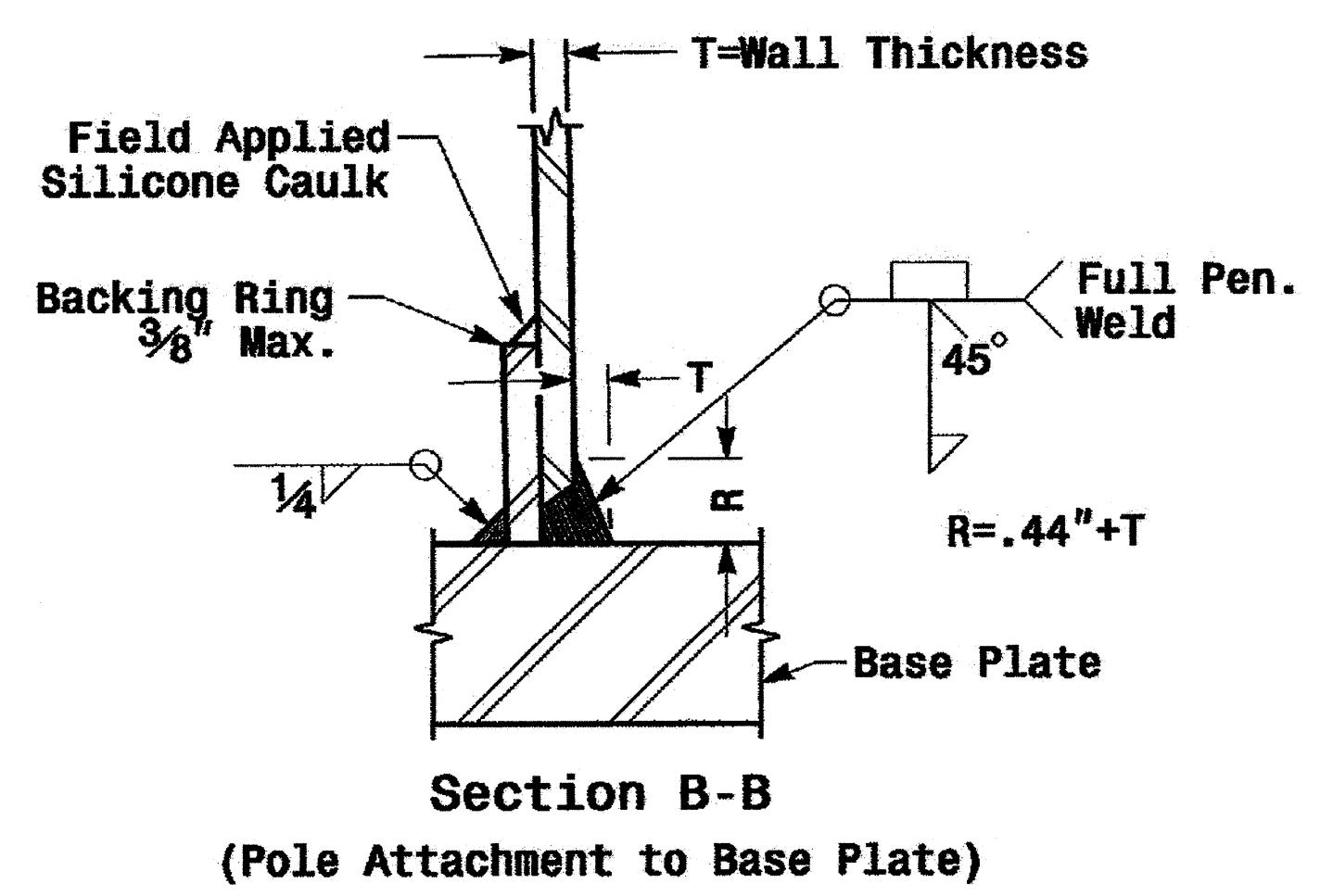
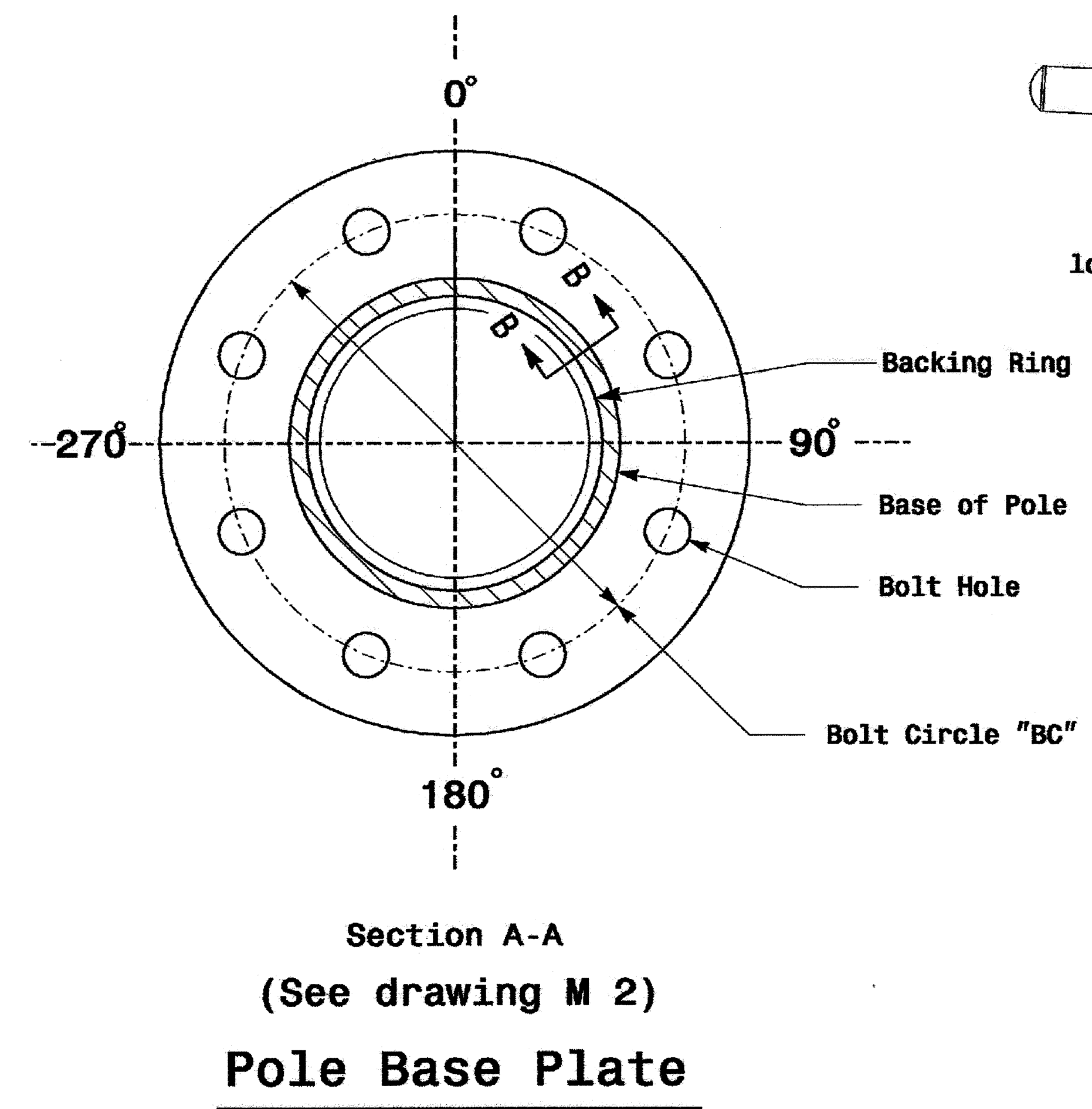


8 Bolt Base Plate Detail

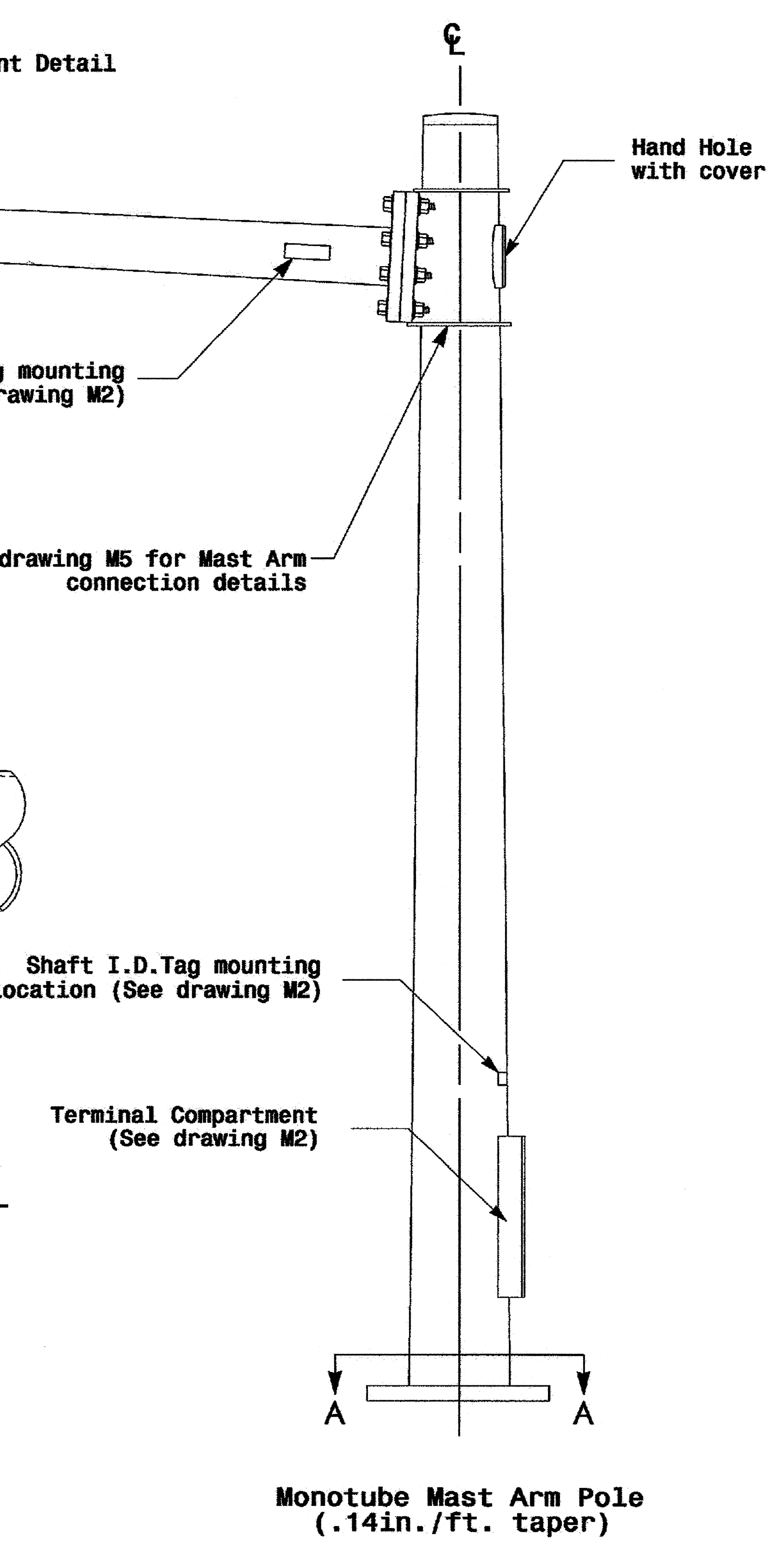
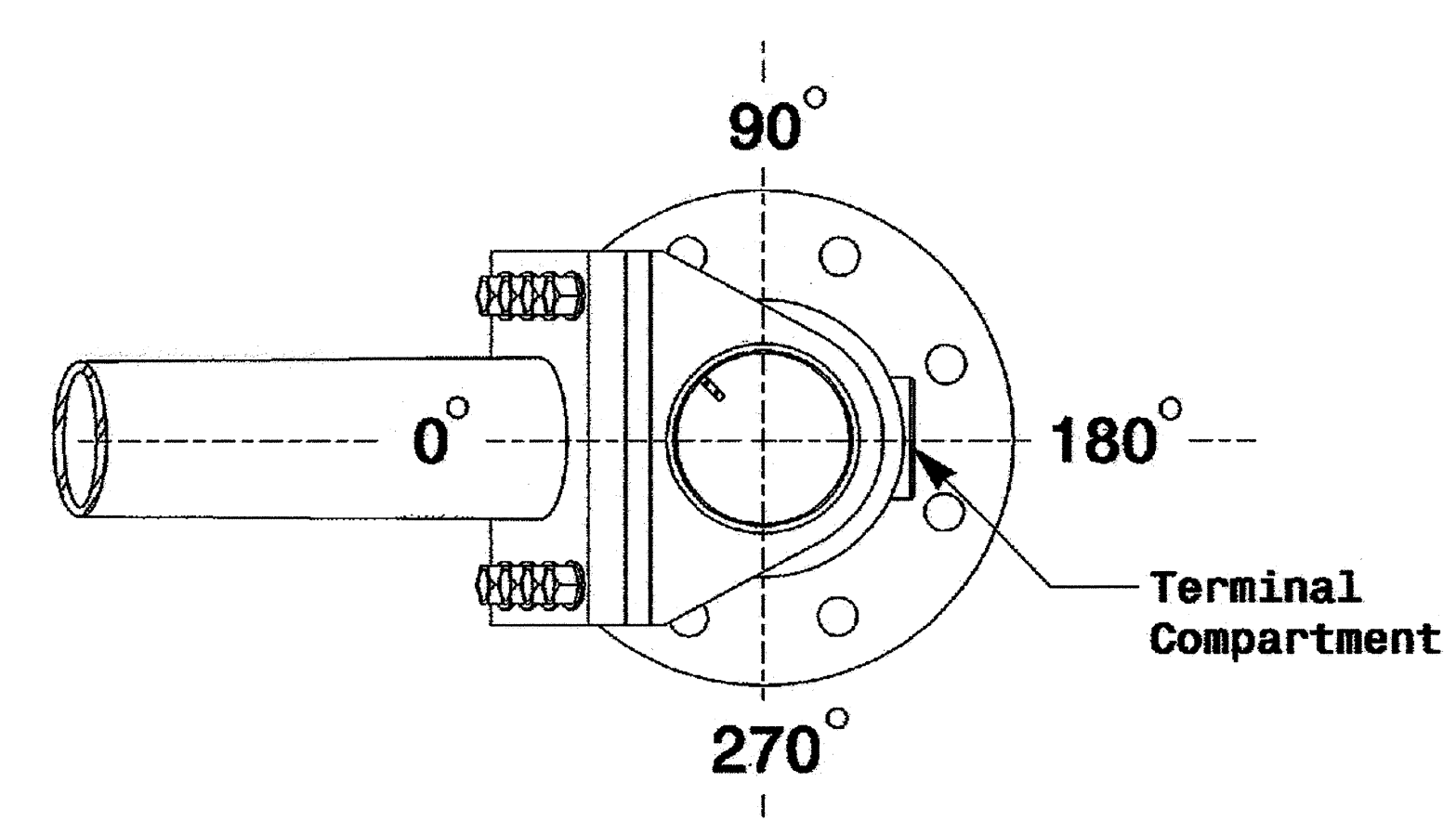
	Typical Fabrication Details Common To All Metal Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander REVISIONS: _____	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito INIT. DATE	

Fabrication Details - All Poles

01-SEP-2005 16:22 D:\eg004\Info1\Pole_Standards\eg004.rvt rfr: rfg.dgn



Slip Fit Joint Detail for Mast Arm

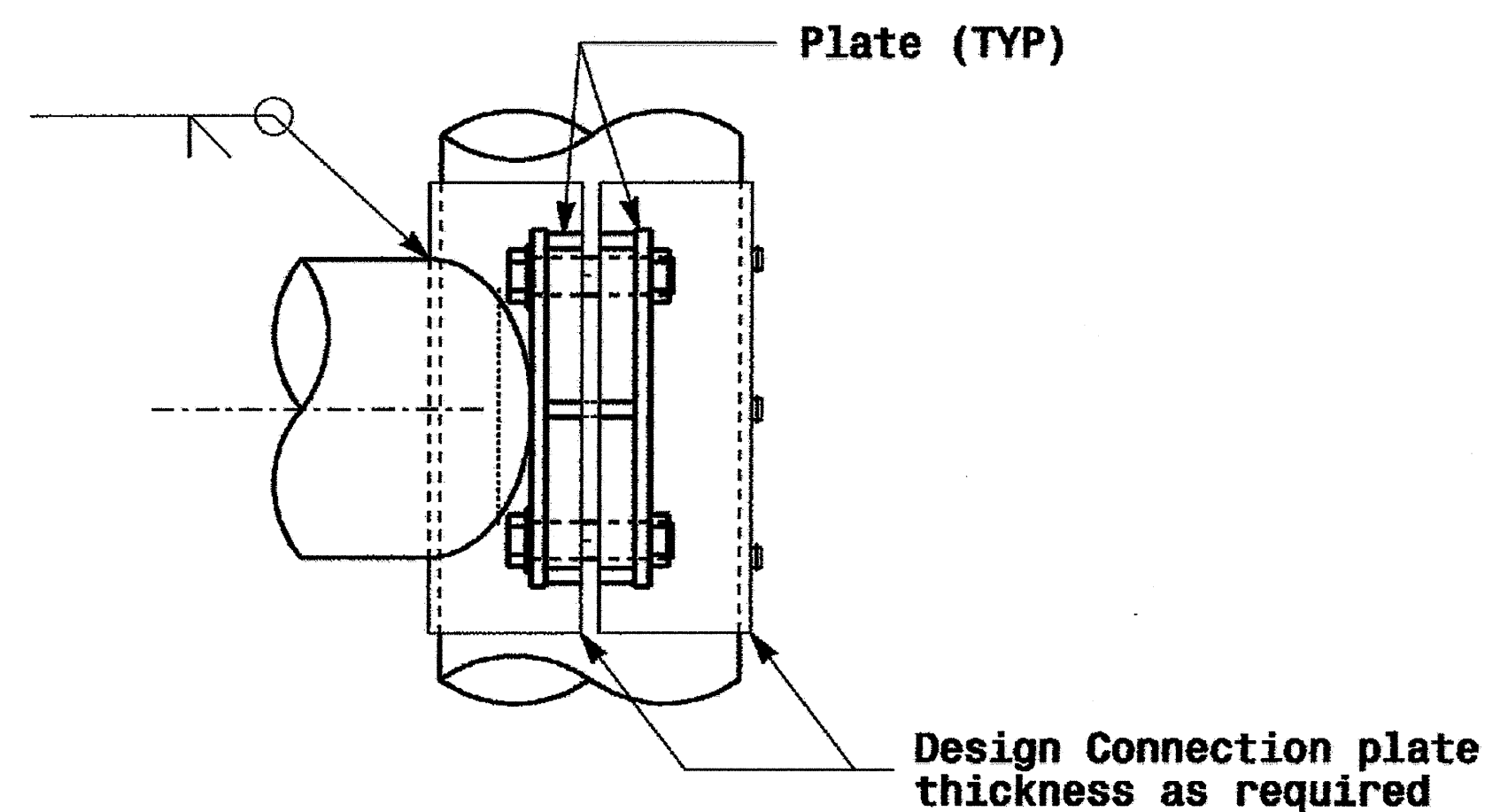


Fabrication Details - Mast Arm Poles

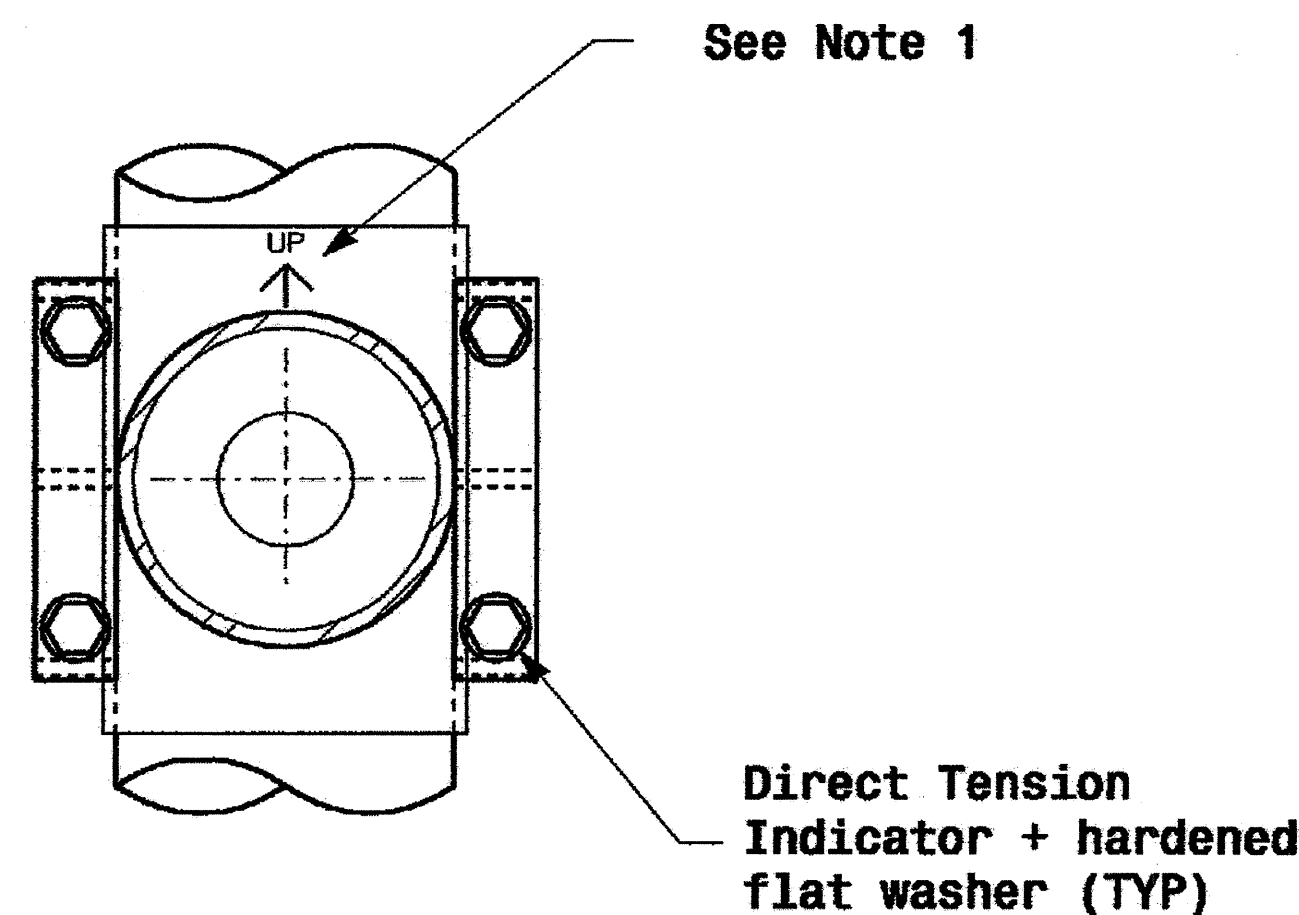
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	Typical Fabrication Details for Mast Arm Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.W. Esposito	
REVISIONS:		INIT.:	DATE:
SIGNATURE: <i>P.L. Alexander</i>		DATE: 9.2.2005	SIG. INVENTORY NO.:

Adjustable Clamp Type Bolted Mast Arm Connection

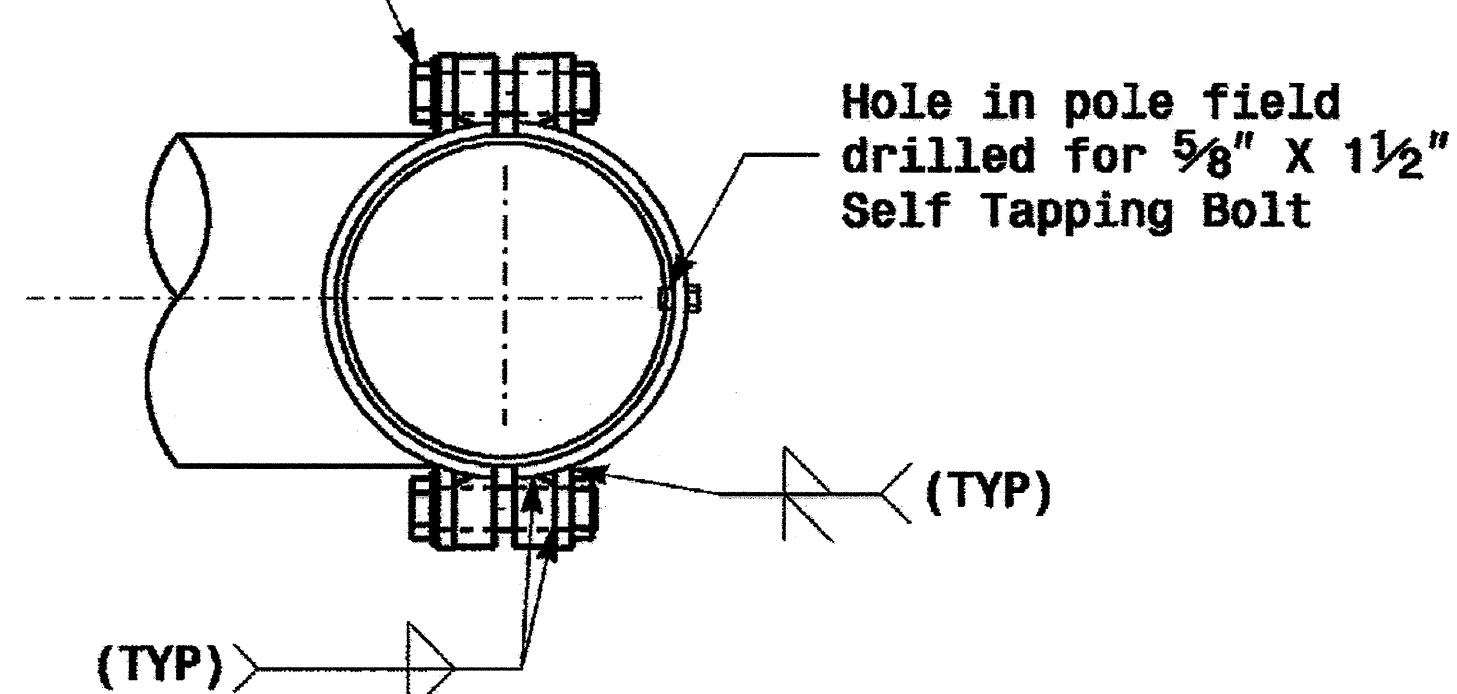


Side Elevation View



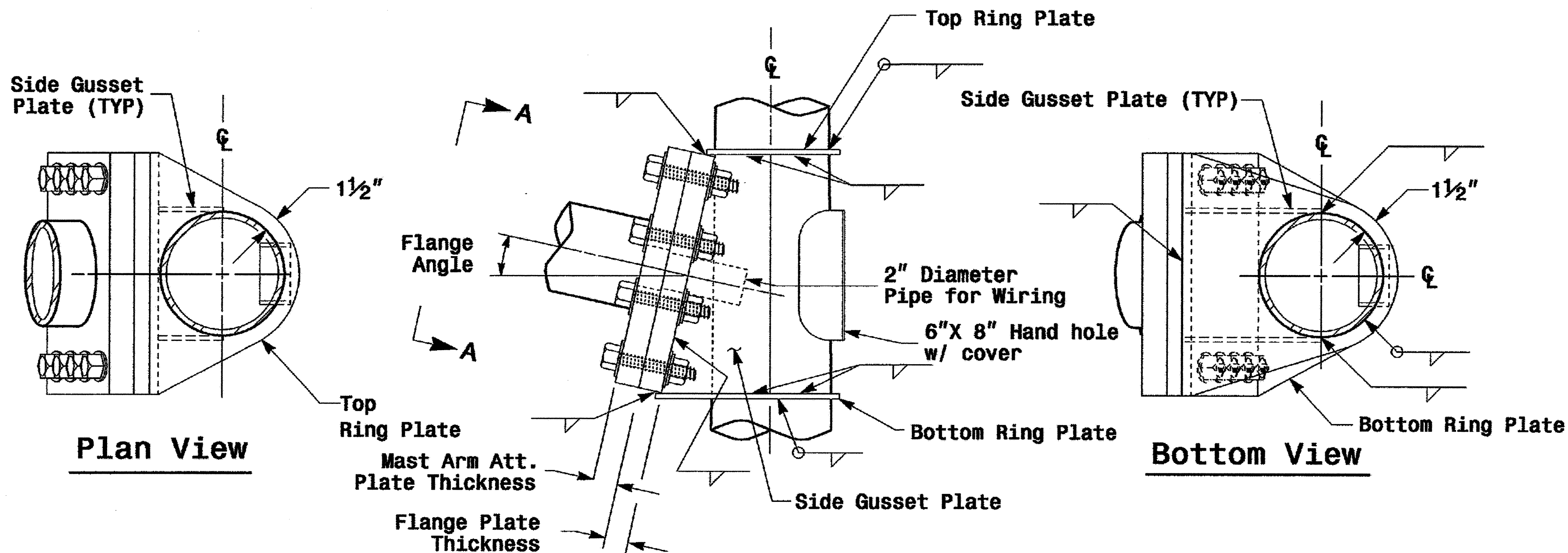
Front Elevation View

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

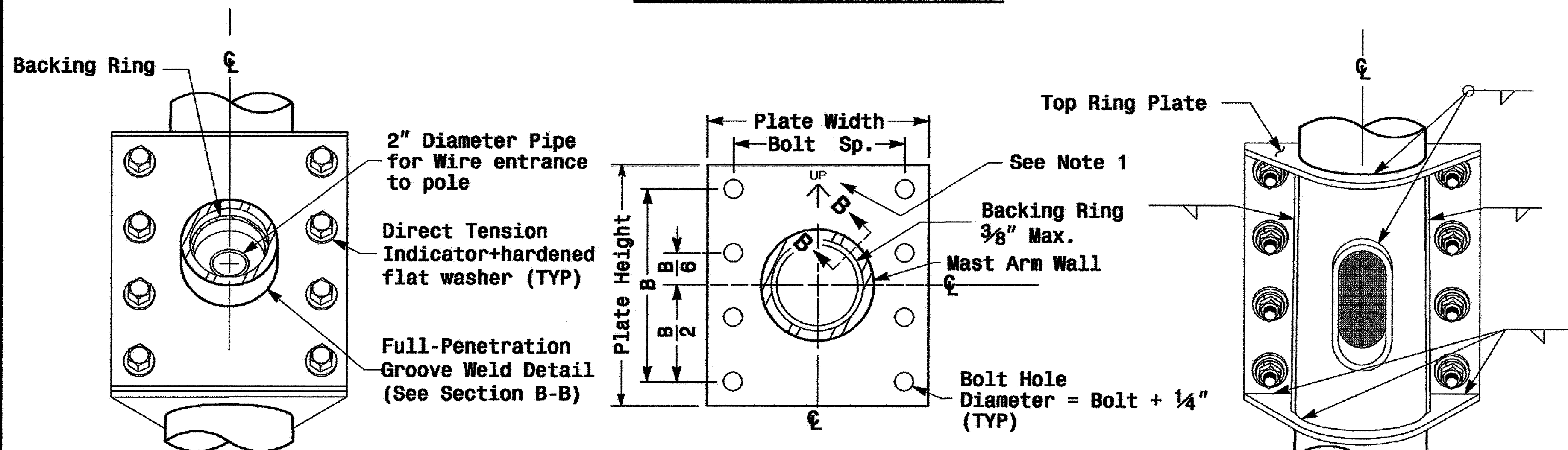


Plan View

Welded Ring Stiffened Mast Arm Connection



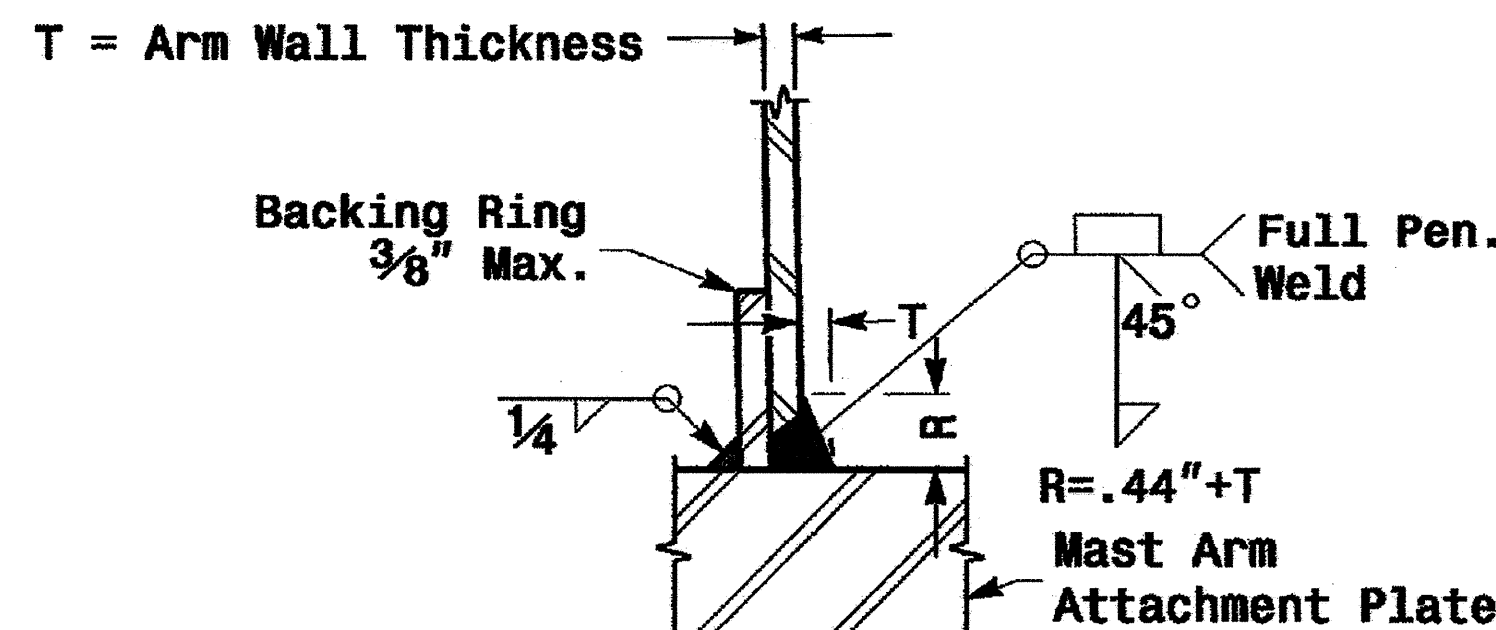
Side Elevation View



Front Elevation View

Mast Arm Attachment Plate

Back Elevation View



Section B-B

Full-Penetration Groove Weld Detail

Notes:

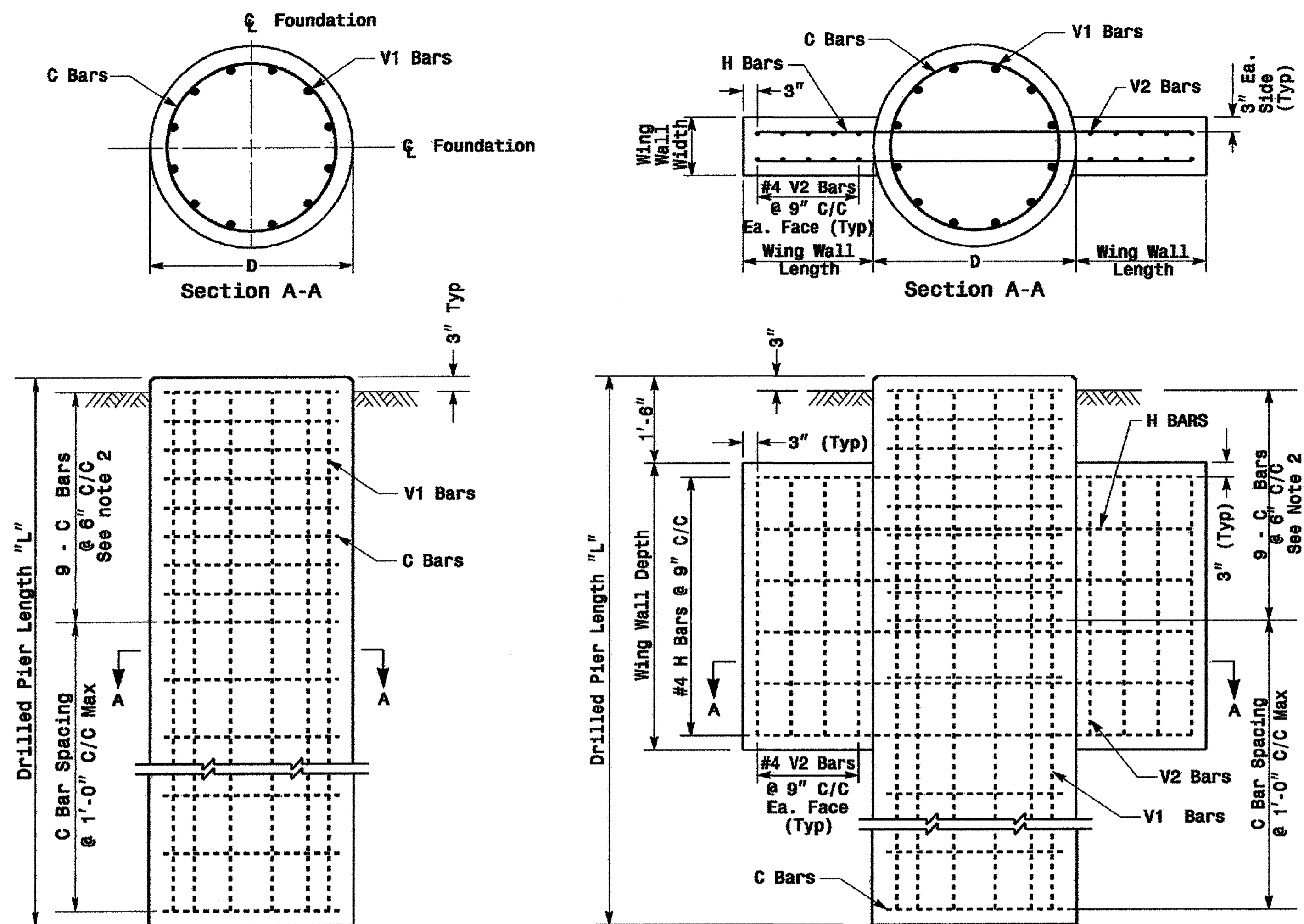
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Designer is responsible for providing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

01-SEP-2005 14:11 v:\p0401\ee-01\harcig\p0401\metal_pole_standoff.dwg

	Fabrication Details For Mast Arm Connection To Pole		
	PLAN DATE: May 2005	REVIEWED BY: C.F. Andrews	
SCALE: NONE	REVISIONS:	INIT.:	DATE:
Signature: <i>P.L. Alexander</i>		Date: 9.2.2005	SIG. INVENTORY NO.:

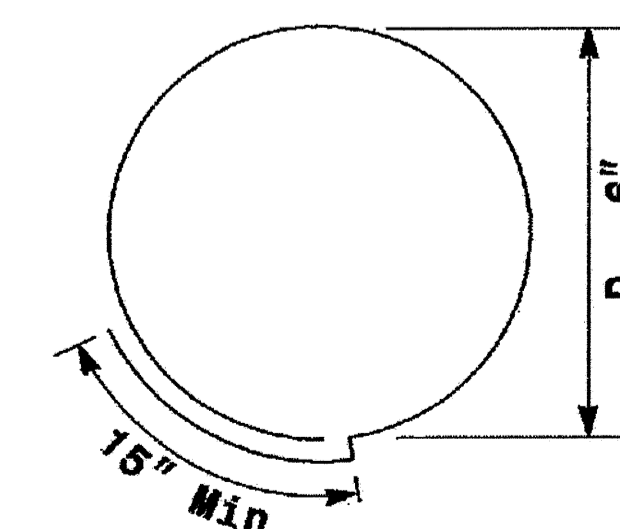
Fabrication Details - Mast Arm Poles

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"

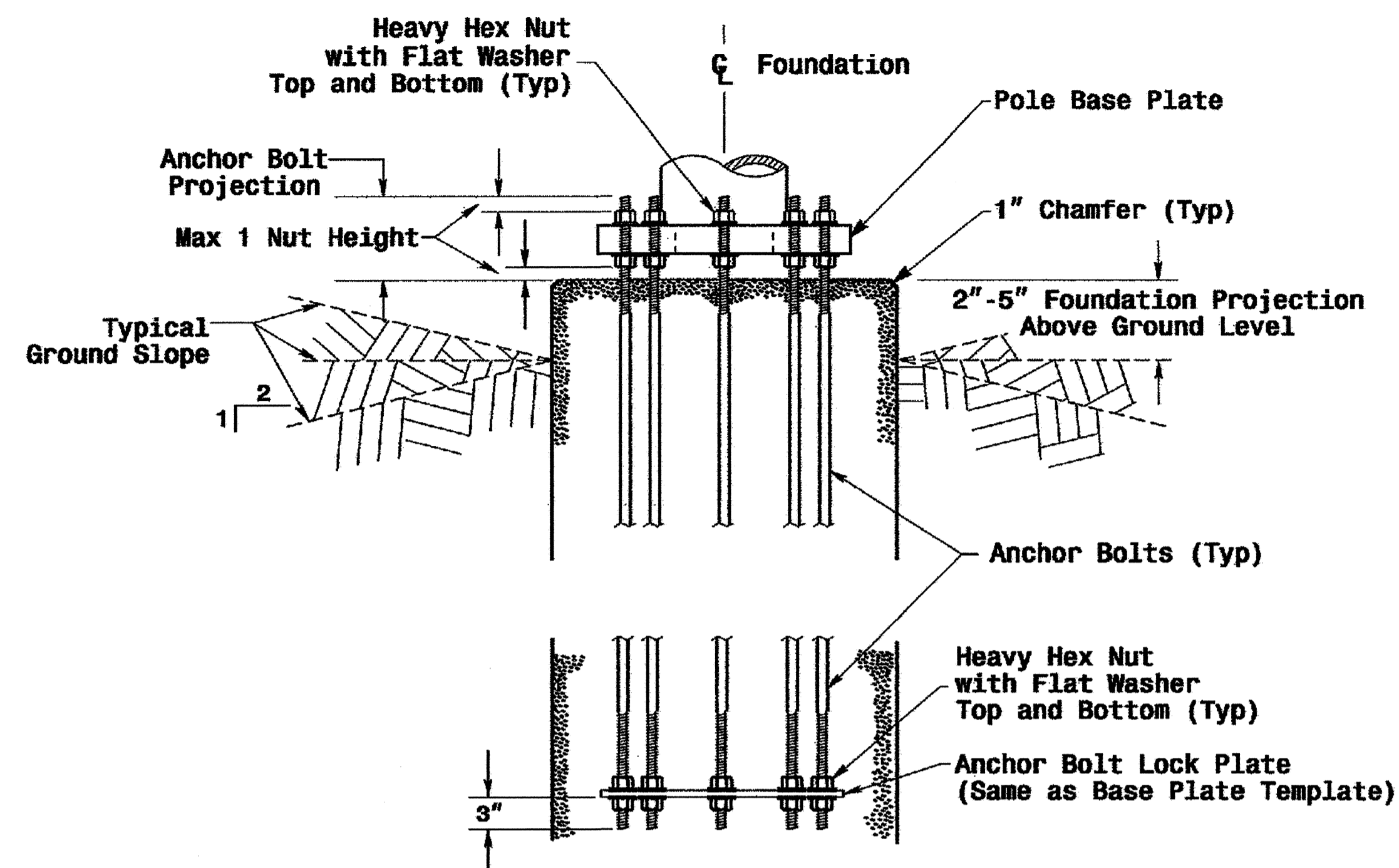
* See Note No. 1
** See Note No. 3

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

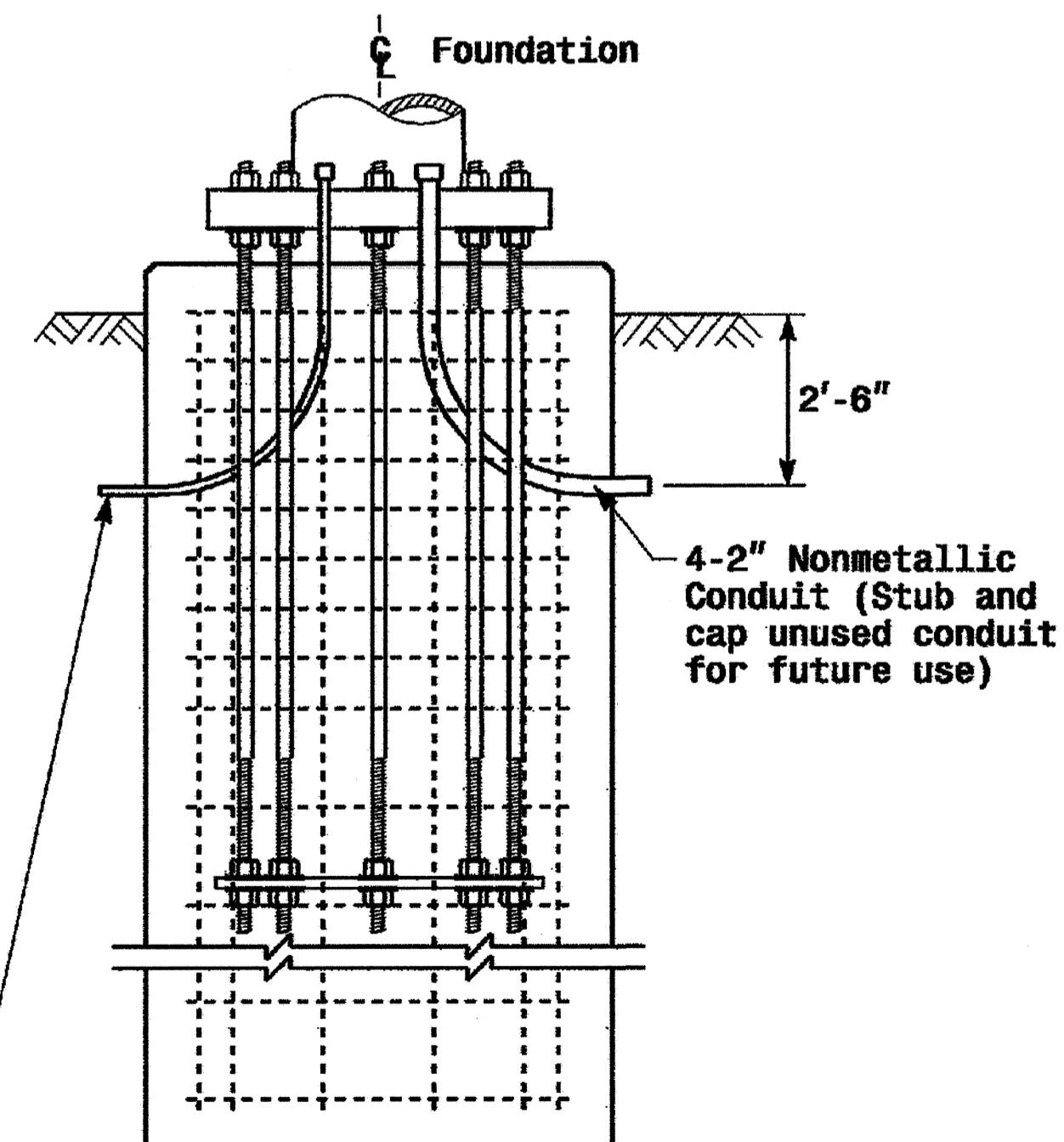
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



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.)

PROJECT REFERENCE NO. U-3613B
SHEET NO. Sig.55 M 7

Construction Details - Foundations

	Construction Details Foundations		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028054 DEEESH C. SANKAR
	Prepared in the Office of 222 N. McDowell St., Raleigh, NC 27603	PLAN DATE: May 2005 PREPARED BY: C.F. ANDREWS	REVIEWED BY: P.L. ALEXANDER REVIEWED BY: A.M. ESPOSITO
REVISIONS		INIT. DATE	SIGNATURE: D. Sankar 9.2.2005 DATE
SIG. INVENTORY NO.			DATE