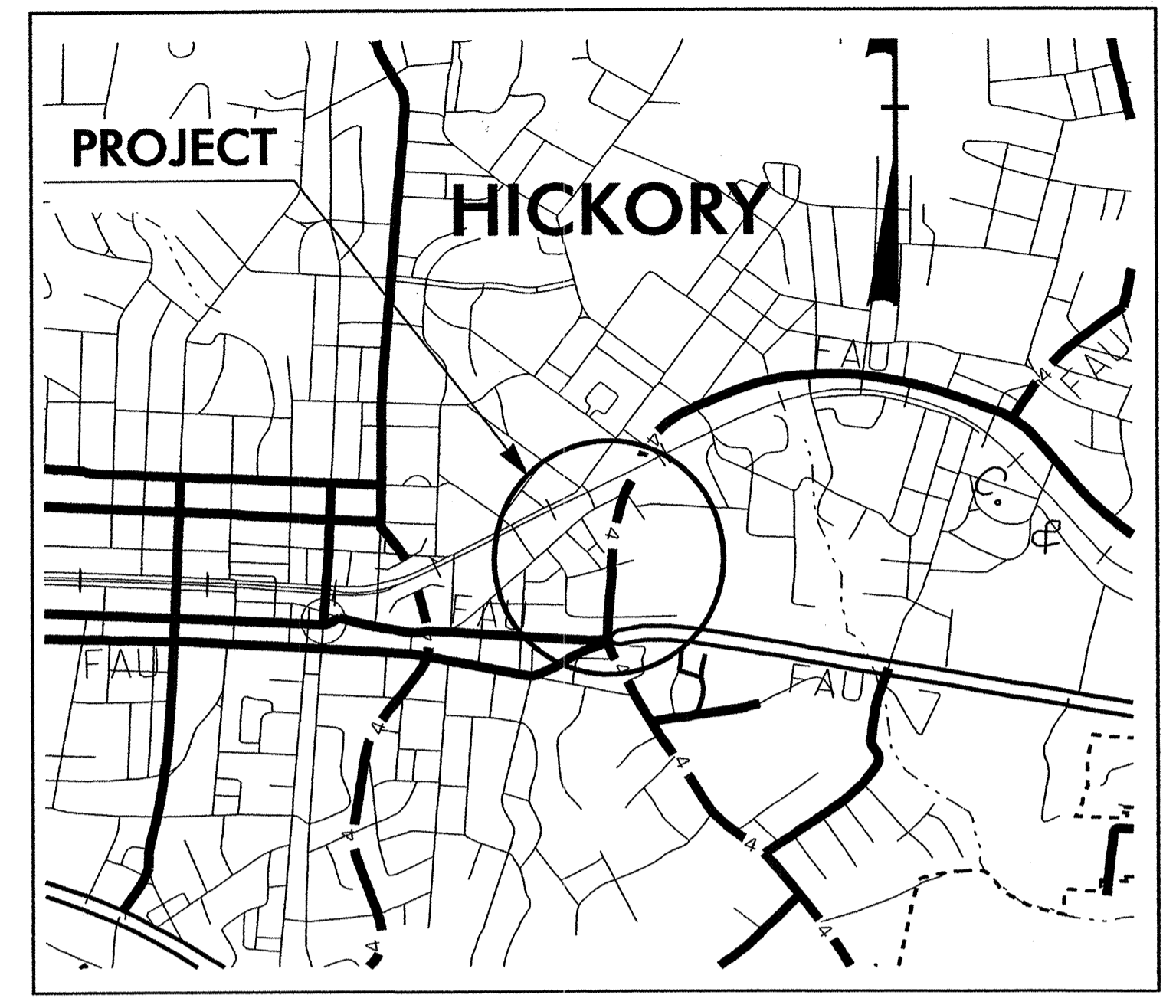
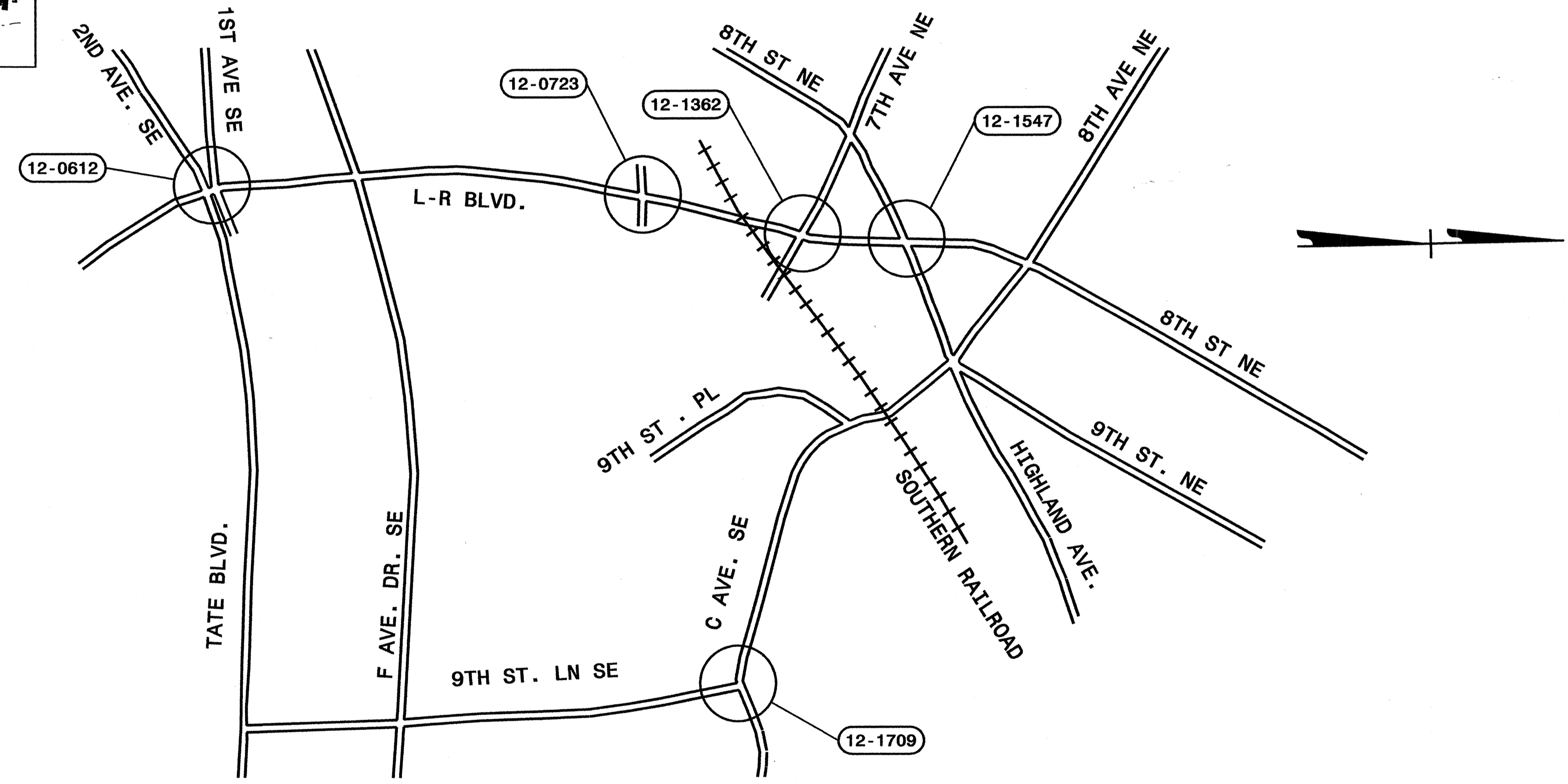


STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS
CATAWBA

Project Description: Lenoir Rhyne Blvd from Tate Blvd to 7th Ave NE
 in Hickory
Type of Work: Traffic Signals and Fiber Optic Communications Cable



Vicinity Map



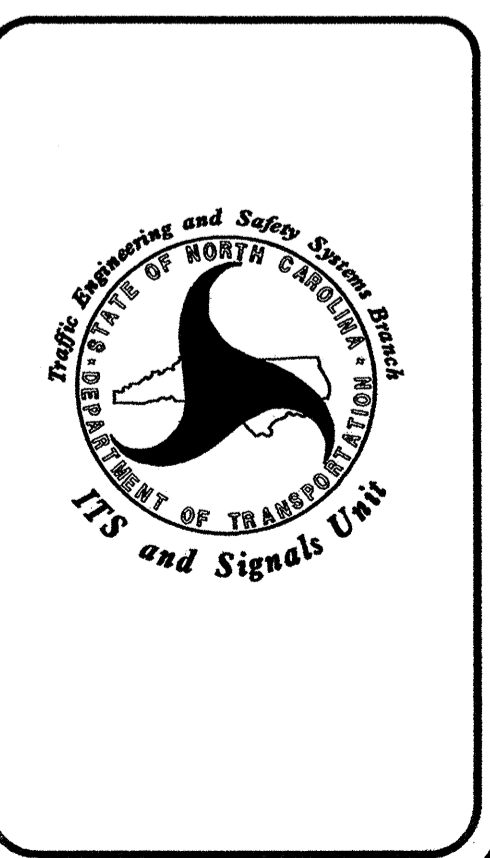
PROJECT: U-2306 A

INDEX OF PLANS		
SHEET NUMBER	SIGNAL INVENTORY NUMBER	LOCATION /DESCRIPTION
<i>Title Sheet</i>		
SIG. 1	---	SR 1007 (Lenoir Rhyne Blvd SE) at SR 1692 (Tate Blvd. SE)2nd Ave
SIG. 2-7	12-0612	SR 1007 (Lenoir Rhyne Blvd SE) at SR 1007 (Highland Avenue SE)8th St Place SE
SIG. 8-11	12-0723	SR 1007 (Lenoir Rhyne Blvd NE) at 7th Avenue NE
SIG. 12-15	12-1362	SR 1007 (Lenoir Rhyne Blvd NE)/SR 1007 (Highland Avenue NE) at SR 2319 (8th Street NE)
SIG. 16-17	12-1547	C Avenue SE at 9th Street Lane SE
SIG. 18-19	12-1709	Metal Poles Typicals
SIG. 20-24	---	Communications Cable Routing Plans
SIG. 25-31	---	

LEGEND
 ##-#### SIGNAL INVENTORY NUMBER

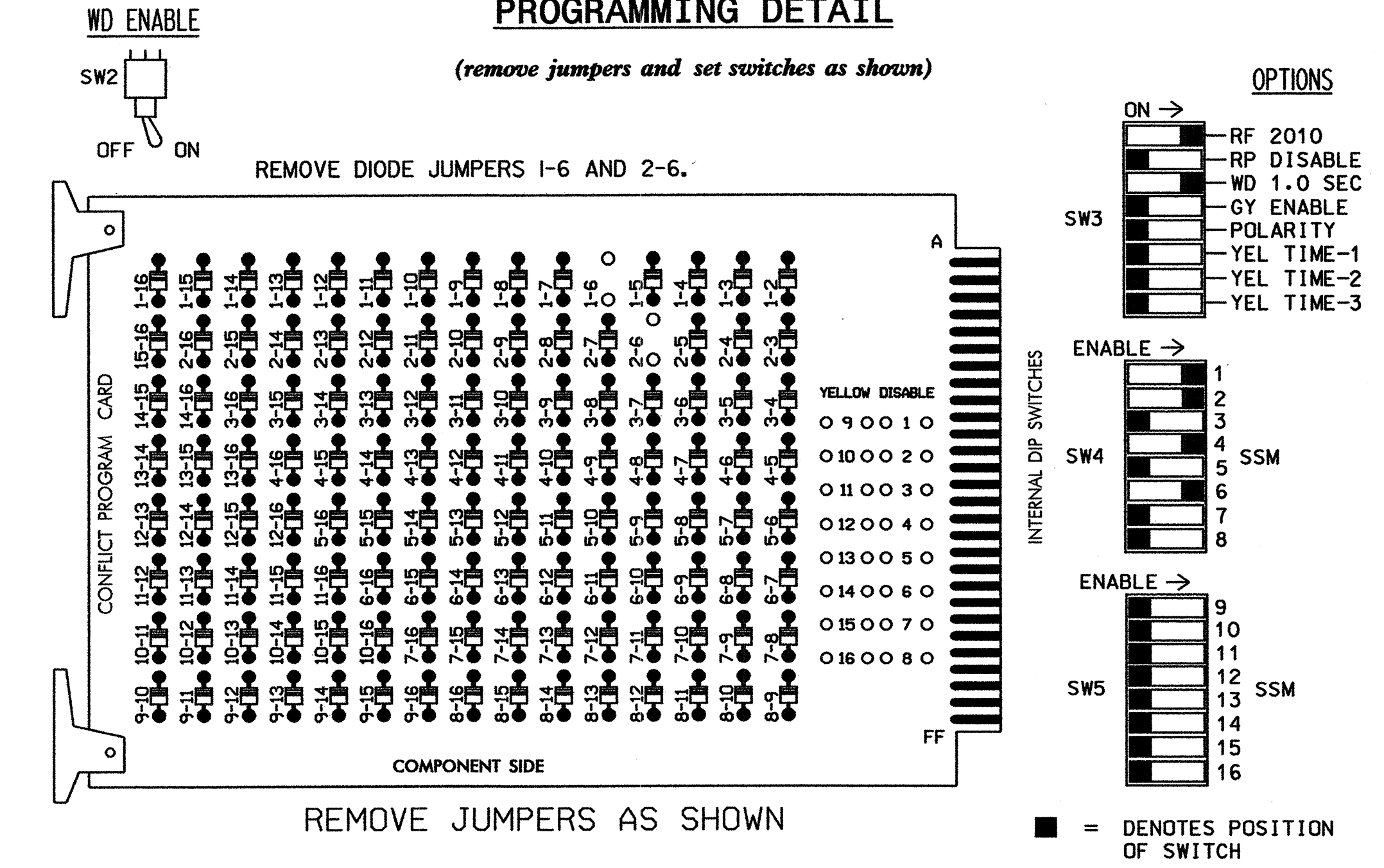
NCDOT CONTACTS:
 INTELLIGENT TRANSPORTATION SYSTEMS AND SIGNALS UNIT

TIMOTHY J. WILLIAMS, PE - S & G CONTRACTS & PEF SUPPORT ENGINEER
 GEORGE C. BROWN, PE - SIGNAL EQUIPMENT DESIGN ENGINEER
 G.G. MURR JR., PE - INTELLIGENT TRANSPORTATION SYSTEMS ENGINEER



EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



- NOTES:
- CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
 - MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

NOTES

- TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 3,5,7, 8,9,10,11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
- PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
- SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
- ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
- PROGRAM PHASE 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.
- THE CABINET AND CONTROLLER ARE PART OF THE CITY OF HICKORY SIGNAL SYSTEM: # 1116

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 170E
 CABINETCONTRACTOR SUPPLIED 332
 SOFTWAREBI TRANS 233NC2
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S1,S2,S4,S6
 PHASES USED.....1,2,4,6
 OVERLAPS.....NONE

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	42	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU
GREEN			130			103			136									
YELLOW			129			102			135									
RED			128			101			134									
RED ARROW	125																	
YELLOW ARROW	126	126																
GREEN ARROW	127	127																

NU = NOT USED

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	S	S	FUTURE USE	∅ 4	∅ 4	S	S	S	S	S	FUTURE USE DC ISOLATOR	FS DC ISOLATOR
L	NOT USED	∅ 2	F	F	NOT USED	∅ 4	NOT USED	F	F	F	F	F	NOT USED	ST DC ISOLATOR
U	FUTURE USE	∅ 6	FUTURE USE	S	FUTURE USE	FUTURE USE	FUTURE USE	FUTURE USE	S	S	S	S	FUTURE USE AC ISOLATOR	FUTURE USE AC ISOLATOR
L	NOT USED	∅ 6	FUTURE USE	F	FUTURE USE	FUTURE USE	NOT USED	F	F	F	F	F	FUTURE USE AC ISOLATOR	FUTURE USE AC ISOLATOR

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
1A	TB2-1,2	I1U	1	56	5 7	1
2A	TB2-5,6	I2U	2	39	5 7	2
2B	TB2-7,8	I2L	3	43	5 7	2
4A	TB4-9,10	I6U	4	41	5 7	4
4B	TB4-11,12	I6L	5	45	5 7	4
4C	TB6-1,2	I7U	6	65	5 7	4
6A	TB3-5,6	J2U	7	40	4 5 7	6
6B	TB3-7,8	J2L	8	44	4 5 7	6

NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

- INPUT FILE POSITION LEGEND: J2L
 FILE J
 SLOT 2
 LOWER
- DETECTOR ATTRIBUTES LEGEND:
 1-FULL TIME DELAY
 2-PED CALL
 3-RESERVED
 4-COUNTING
 5-EXTENSION
 6-TYPE 3
 7-CALLING
 8-ALTERNATE

THIS ELECTRICAL DETAIL IS FOR THE TEMPORARY SIGNAL DESIGN: 12-0612T
 DESIGNED: FEBRUARY 2006
 SEALED: 4/21/06
 REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED MAY 2004 AND SEALED 6/4/04

TEMPORARY DESIGN

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1007 (LENOIR RHYNE BLVD SE) at SR 1692 (TATE BLVD SE)/2nd AVE

Prepared in the Offices of:

122 N. McDowell St., Raleigh, NC 27603

DIVISION 12 CATAMBA COUNTY HICKORY
 PLAN DATE: APRIL 2006 REVIEWED BY: T. Lopez
 PREPARED BY: F.E. RUSS REVIEWED BY:

REVISIONS INIT. DATE

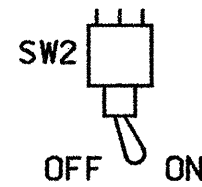
SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN
 SIGNATURE DATE 4/28/06
 SIG. INVENTORY NO. 12-0612T

27-APR-2006 09:44
 C:\pwworking\17000000\200612\encl\12-0612\04-xx.dgn

EDI MODEL 2010ECL CONFLICT MONITOR

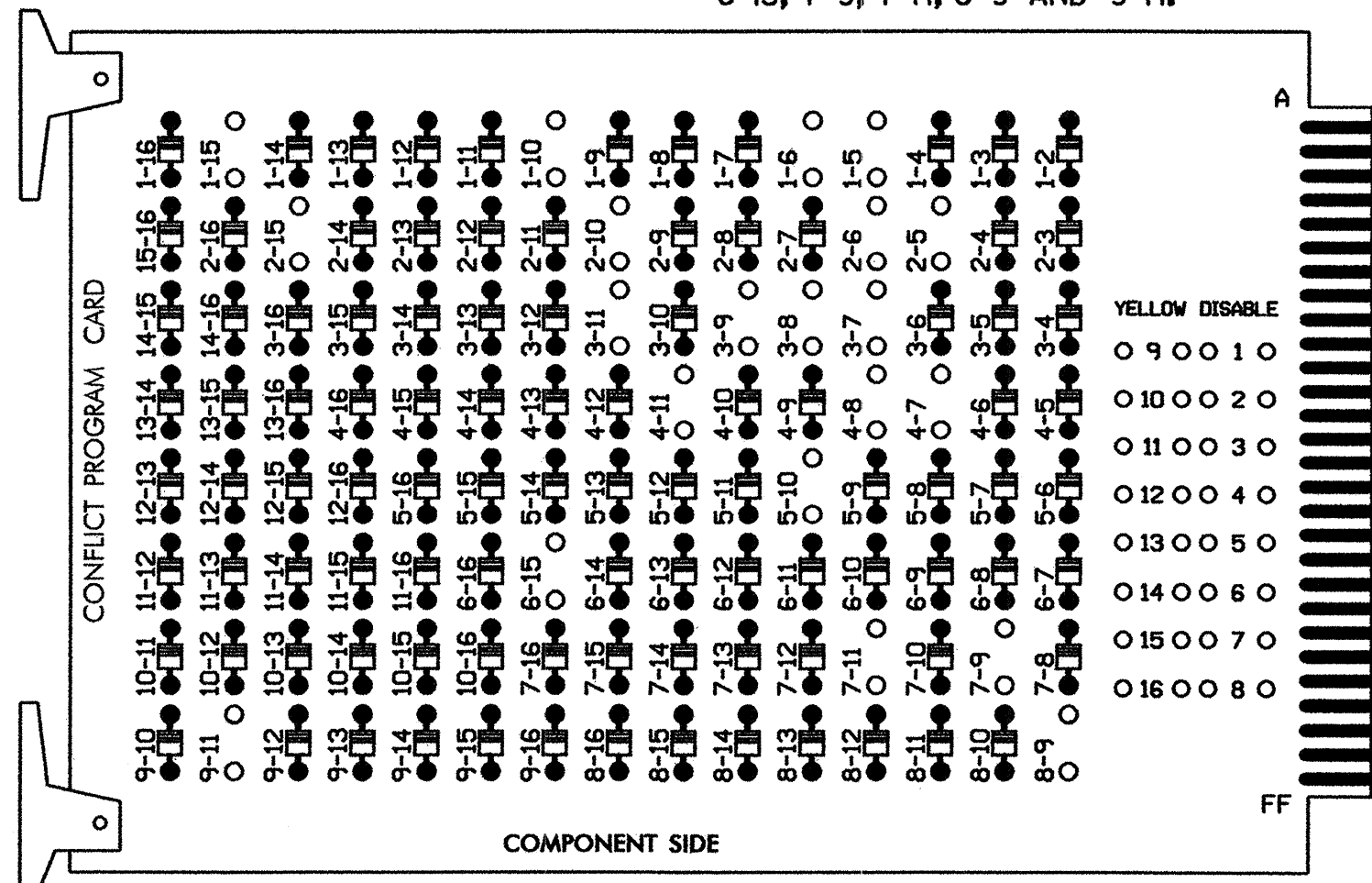
PROGRAMMING DETAIL

WD ENABLE



(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-10, 1-15, 2-5, 2-6, 2-10, 2-15, 3-7, 3-8, 3-9, 3-11, 4-7, 4-8, 4-11, 5-10, 6-15, 7-9, 7-11, 8-9 AND 9-11.

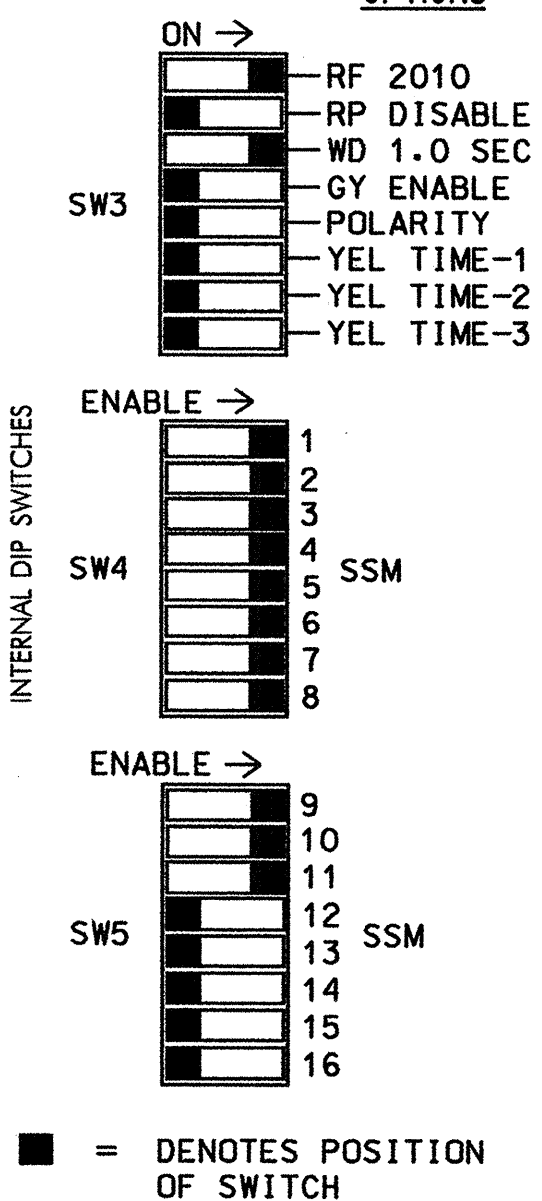


REMOVE JUMPERS AS SHOWN

NOTES:

- CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
- MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

OPTIONS



■ = DENOTES POSITION OF SWITCH

NOTES

- TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 12, 13, 14, 15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
- PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
- SET POWER-UP FLASH TIME FOR 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
- ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
- PROGRAM PHASE 2, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION. REMOVE VOLUME DENSITY PROGRAMMING FROM PHASE 6.
- THE CABINET AND CONTROLLER ARE PART OF THE CITY OF HICKORY SIGNAL SYSTEM: # 1116

* SEE 'LOAD RESISTOR INSTALLATION DETAIL'

** SEE 'COUNTDOWN PEDESTRIAN SIGNAL OPERATION' NOTE

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31	41,42	NU	51,52	61,62	P61, P62	71,72	81,82	NU	22	42	NU	62	NU	NU
GREEN	130			103				136			109							
YELLOW	129			102				135			108							
RED	128			101				134			107		*	*		*		
RED ARROW	125			116				131			122							
YELLOW ARROW	126			117				132			123		A122	A125		A115		
GREEN ARROW	127			118				133			124		A123	A126		A116		
											121							
											119							

NU = NOT USED

EQUIPMENT INFORMATION

* CONTROLLER.....CONTRACTOR SUPPLIED 170E
 * CABINETCONTRACTOR SUPPLIED 332
 SOFTWAREBI TRANS 233NC2
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S6P,S7,S8,S9,S10,S12
 PHASES USED.....1,2,3,4,5,6,7,8,6PED
 OVERLAPS.....OL1=ø3, OL2=ø5, OL3=ø7

EXISTING FROM TEMPORARY DESIGN INSTALLATION*

OVERLAP PROGRAMMING NOTES

- TO ASSURE THAT LOAD SWITCH S9 IS ASSIGNED AS OVERLAP 1, PROGRAM CONTROLLER AT KEYPAD INPUT E/29+1+0=9
- TO ASSURE THAT LOAD SWITCH S10 IS ASSIGNED AS OVERLAP 2, PROGRAM CONTROLLER AT KEYPAD INPUT E/29+2+0=10
- TO ASSURE THAT LOAD SWITCH S12 IS ASSIGNED AS OVERLAP 3, PROGRAM CONTROLLER AT KEYPAD INPUT E/29+3+0=11
- TO SET THE PARENT PHASE FOR OVERLAP 1 (VEH. SET 1) AS PHASE 3, PROGRAM CONTROLLER AT KEYPAD INPUT E/29+1+1=ø3
- TO SET THE PARENT PHASE FOR OVERLAP 2 (VEH. SET 1) AS PHASE 5, PROGRAM CONTROLLER AT KEYPAD INPUT E/29+2+1=ø5
- TO SET THE PARENT PHASE FOR OVERLAP 3 (VEH. SET 1) AS PHASE 7, PROGRAM CONTROLLER AT KEYPAD INPUT E/29+3+1=ø7
- TO SET THE PARENT PHASES FOR OVERLAPS 1 & 2 (VEH. SET 2) AND OVERLAP 3 (VEH. SET 3) AS NONE, NO PROGRAMMING IS REQUIRED.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	ø1	ø2	S	S	ø3	ø4	S	S	S	S	S	S	ø6 PED	FS
L	NOT USED	ø2	Y	Y	NOT USED	ø4	Y	Y	Y	Y	Y	Y	DC ISOLATOR	DC ISOLATOR
U	ø5	ø6	ø5	S	ø7	ø8	ø8	ø8	S	S	S	S	EVA *	EVB *
L	NOT USED	ø6	ø5	Y	ø7	ø8	ø8	NOT USED	Y	Y	Y	Y	EVC *	EVD *
		6B	5C	Y	7B	8B	8D		Y	Y	Y	Y	DC ISOLATOR	DC ISOLATOR

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

FS = FLASH SENSE
 ST = STOP TIME
 EV = EMERG. VEH. PREEMPT

EVA - CHANNEL 1 - PIN 71
 EVB - CHANNEL 2 - PIN 72
 EVC - CHANNEL 3 - PIN 73
 EVD - CHANNEL 4 - PIN 74

* NOTE: WIRE OPTICAL DETECTORS TO INPUT FILE PER MANUFACTURER'S INSTRUCTIONS.

INPUT FILE POSITION LEGEND: J2L
 FILE J
 SLOT 2
 LOWER

DETECTOR ATTRIBUTES LEGEND:

- FULL TIME DELAY
- PED CALL
- RESERVED
- COUNTING
- EXTENSION
- TYPE 3
- CALLING
- ALTERNATE

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
1A	TB2-1,2	I1U	1	56	5 7 1	1
2A	TB2-5,6	I2U	2	39	4 5 7 2	2
2B	TB2-7,8	I2L	3	43	4 5 7 2	2
3A	TB4-5,6	I5U	4	58	5 7 3	3
4A	TB4-9,10	I6U	5	41	5 7 4	4
4B	TB4-11,12	I6L	6	45	5 7 4	4
5A	TB3-1,2	J1U	7	55	5 7 5	5
5B	TB3-9,10	J3U	8	64	5 7 5	5
5C	TB3-11,12	J3L	9	77	5 7 5	5
6A	TB3-5,6	J2U	10	40	5 7 6	6
6B	TB3-7,8	J2L	11	44	5 7 6	6
7A	TB5-5,6	J5U	12	57	5 7 7	7
7B	TB5-7,8	J5L	13	57	5 7 7	7
8A	TB5-9,10	J6U	14	42	5 8	8
8B	TB5-11,12	J6L	15	46	5 8	8
8C	TB7-1,2	J7U	16	66	5 7 8	8
8D	TB7-3,4	J7L	17	79	5 7 8	8
8E	TB7-5,6	J8U	18	50	5 7 8	8
PED PUSH BUTTONS						
P61, P62	TB8-7,9	I13U	19	68	2	6

NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

OVERLAP TIMING PROGRAMMING CHART

OVERLAP	GREEN CLEAR	YELLOW CHANGE INTERVAL	RED CLEARANCE
OL1	E/29+1+D=0.0 (SEC.)	E/29+1+E=3.0 (SEC.)	E/29+1+F=3.8 (SEC.)
OL2	E/29+2+D=0.0 (SEC.)	E/29+2+E=3.1 (SEC.)	E/29+2+F=3.8 (SEC.)
OL3	E/29+3+D=0.0 (SEC.)	E/29+3+E=3.0 (SEC.)	E/29+3+F=3.7 (SEC.)

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.

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN 6P OUTPUT AT KEYPAD INPUT E/125+F+6=ø6.

PEDESTRIAN CLEAR BEFORE PREEMPT TIMING

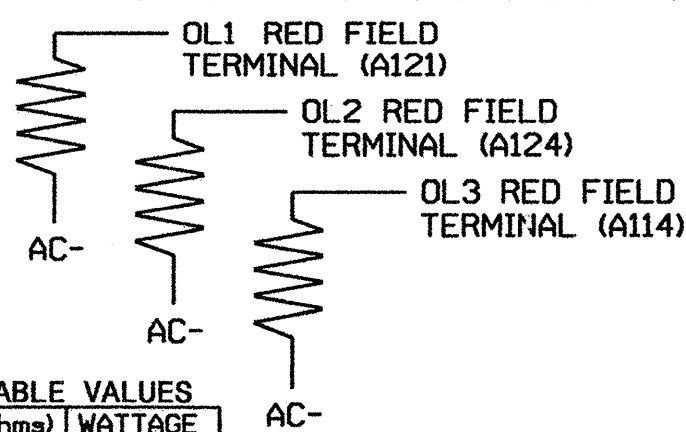
PROGRAM PED. PHASE 6 MIN. CLEAR BEFORE PREEMPT AT F/1+6+B= 17 (SEC.)

EMERGENCY VEHICLE PREEMPTION PROGRAMMING CHART

E. V. PREEMPT	OPTICAL DET. NO.	INPUT PIN	CLEARANCE PHASES LOCATION	DELAY TIME LOCATION	CLEAR TIME LOCATION
EVA	A	E/126+F+1=71	E/125+E+A=ø1,6	F/1+E+2=0	F/1+E+3= 1 (SEC.)
EVB	B	E/126+F+2=72	E/125+E+B=ø2,5	F/1+E+4=0	F/1+E+5= 1 (SEC.)
EVC	C	E/126+F+3=73	E/125+E+C=ø3,8	F/1+E+6=0	F/1+E+7= 1 (SEC.)
EVD	D	E/126+F+4=74	E/125+E+D=ø4,7	F/1+E+8=0	F/1+E+9= 1 (SEC.)

- PROGRAM MINIMUM GREEN BEFORE PREEMPT AT: F/1+0+8= 1 (SEC.)
- FOR PREEMPTION IMMEDIATE RESPONSE, DISABLE MIN. WALK AT: E/125+F+3=3
- PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

LOAD RESISTOR INSTALLATION DETAIL



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

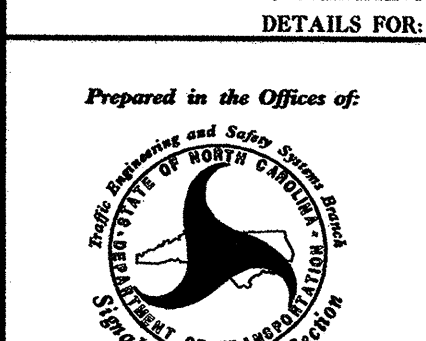
NOTE: THE PURPOSE OF THESE RESISTORS IS TO LOAD THE CHANNEL RED MONITOR INPUTS IN ORDER FOR THE SIGNAL SEQUENCE MONITOR TO USE THE FULL SIGNAL SEQUENCE MONITORING CAPABILITY ON CHANNELS THAT DO NOT USE THE RED DISPLAY IN THE FIELD.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-0612
 DESIGNED: FEBRUARY 2006
 SEALED: 4/28/06
 REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED JULY 2004 AND SEALED 7/29/04

FINAL DESIGN

ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 1007 (LENOIR RHYNE BLVD SE)
 at
 SR 1692 (TATE BLVD SE)/2nd AVE

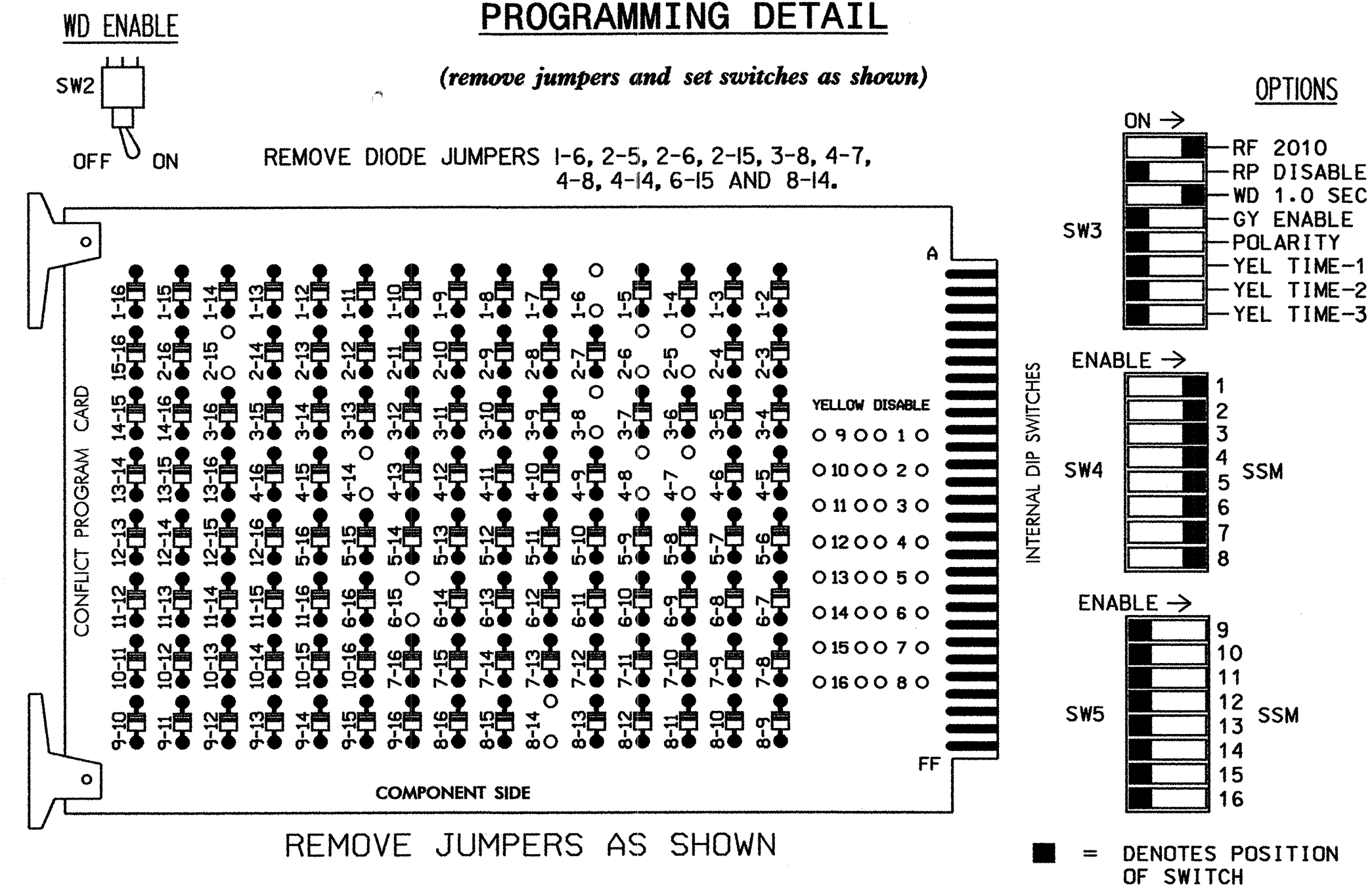
DIVISION 12 CATAWBA COUNTY HICKORY
 PLAN DATE: APRIL 2006 REVIEWED BY:
 PREPARED BY: F. E. RUSS REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
 GEORGE C. BROWN
 ENGINEER
 STATE OF NORTH CAROLINA
 SEAL 022013

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



NOTES:

- CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
- MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

NOTES

- TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 9,10, 11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
- PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
- SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
- ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
- PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DOUBLE ENTRY.
- THE CABINET AND CONTROLLER ARE PART OF THE CITY OF HICKORY SIGNAL SYSTEM: # 1101

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 170E
CABINETCONTRACTOR SUPPLIED 332
SOFTWAREBI TRANS 233NC2
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S4P,S5,S6,S6P,S7,S8
PHASES USED.....1*,2,3*,4,5*,6,7*,8,4PED,6PED
OVERLAPS.....NONE

*USED ONLY IN E.V. PREEMPTION

* DENOTES INSTALL LOAD RESISTOR. SEE LOAD RESISTOR INSTALLATION DETAIL THIS SHEET.

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	NU	81	41,42	P41, P42	21	61,62	P61, P62	41	81,82	NU
GREEN		130			103			136			109	
YELLOW		129			102			135			108	
RED	*	128		*	101		*	134		*	107	
RED ARROW												
YELLOW ARROW	126			117			132			123		
GREEN ARROW	127			118			133			124		
**							106			121		
**							104			119		

NU = NOT USED

** SEE 'COUNTDOWN PEDESTRIAN SIGNAL OPERATION' NOTE THIS SHEET.

BACK-UP PROTECTION NOTE

PROGRAM PHASES 1, 3, 5, AND 7 AS PROTECTED/PERMITTED AT KEYPAD INPUT E/125+E+4=Ø1, 3, 5, 7

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN 4P OUTPUT AT KEYPAD INPUT E/125+F+7=Ø4.
PROGRAM PEDESTRIAN 6P OUTPUT AT KEYPAD INPUT E/125+F+6=Ø6.

POWER-UP/RE-START PROGRAMMING NOTE

IN ORDER FOR PHASES USED ONLY IN NORMAL OPERATION TO BE SERVED AFTER A POWER-UP OR RESTART, PROGRAM "START VEHICLE CALL" AND "START PED CALL" ON I70E CONTROLLER AS FOLLOWS:

VEH - F/2+F+E=Ø2, 4, 6, 8
PED - F/2+F+F=Ø4, 6

RED REVERT TIMER PROGRAMMING

PROGRAM RED REVERT TIMING AT KEYPAD INPUT F/1+0+F= 1.5 (SEC.)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-0723
DESIGNED: FEBRUARY 2006
SEALED: 4/28/06
REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED MAY 2004 AND SEALED 6/7/04

INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	Ø2	Ø2				Ø4	SYS. SD1101-1						Ø6PED	FS
L	2A	2C				4A							DC ISOLATOR	DC ISOLATOR
U	Ø6	Ø6				Ø8	SYS. SD1101-3						EVA	EVB
L	6A	6C				8A							AC ISOLATOR	AC ISOLATOR
U	Ø6	NOT USED				NOT USED	SYS. SD1101-4						EVC	EVD
L	6B					NOT USED							AC ISOLATOR	AC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME
EV = EMERG. VEH. PREEMPT

DETECTOR ATTRIBUTES LEGEND:

- FULL TIME DELAY
- PED CALL
- RESERVED
- COUNTING
- EXTENSION
- TYPE 3
- CALLING
- ALTERNATE

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
2A	TB2-5,6	I2U	1	39	5 7	2
2B	TB2-7,8	I2L	2	43	5 7	2
2C	TB2-9,10	I3U	3	63	5 7	2
4A	TB4-9,10	I6U	4	41	5 7 4	4
4B	TB4-11,12	I6L	5	45	5 7 4	4
6A	TB3-5,6	J2U	6	40	5 7 6	6
6B	TB3-7,8	J2L	7	44	5 7 6	6
6C	TB3-9,10	J3U	8	64	5 7 6	6
8A	TB5-9,10	J6U	9	42	5 7 8	8
PED PUSH BUTTONS						
P41, P42	TB8-5,6	I12L	10	69	2	4
P61, P62	TB8-7,9	I13U	11	68	2	6
SYSTEM LOOPS						
SD1101-1	TB6-1,2	I7U		65		SYS1 *
SD1101-2	TB6-3,4	I7L		78		SYS2 *
SD1101-3	TB7-1,2	J7U		66		SYS3 *
SD1101-4	TB7-3,4	J7L		79		SYS4 *

NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

***SYSTEM DETECTOR PROGRAMMING NOTES**

IN ORDER FOR SYSTEM LOOPS TO OPERATE PROPERLY, THEIR PIN ASSIGNMENTS WILL HAVE TO BE RE-ASSIGNED ON I70E CONTROLLER AS DESCRIBED BELOW.

A. IN ORDER TO ASSURE THAT THESE PINS ARE CLEARED FROM THEIR DEFAULT FUNCTION, PROGRAM AS FOLLOWS:

PIN 65 - E/126+4+6=0 PIN 66 - E/126+4+7=0
PIN 78 - E/126+4+E=0 PIN 79 - E/126+4+F=0

B. AFTER FOLLOWING STEP 'A' ABOVE, PROGRAM PINS FOR SYSTEM DETECTORS AS FOLLOWS:

SYS1 - E/126+B+1=65 SYS3 - E/126+B+3=66
SYS2 - E/126+B+2=78 SYS4 - E/126+B+4=79

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.

PEDESTRIAN CLEAR BEFORE PREEMPT TIMING

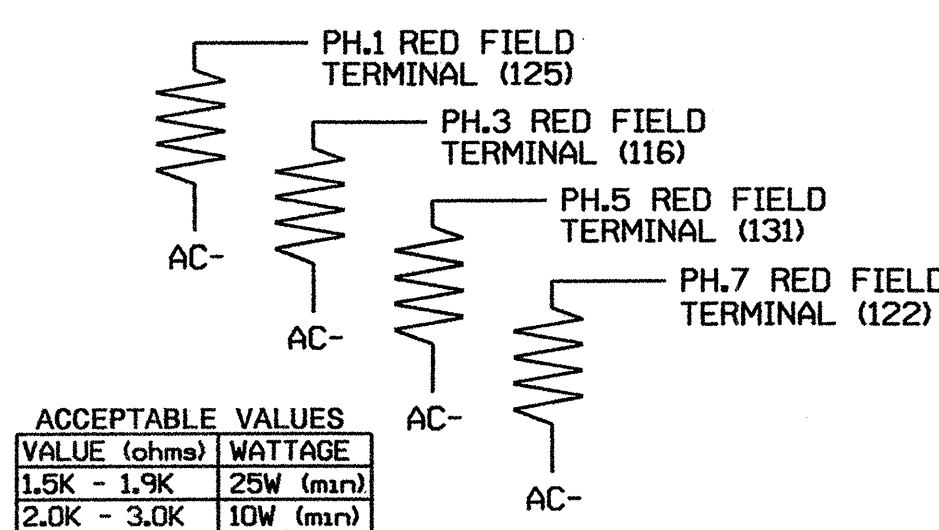
PROGRAM PED. PHASE 4 MIN. CLEAR BEFORE PREEMPT AT F/1+4+B= 9 (SEC.)
PROGRAM PED. PHASE 6 MIN. CLEAR BEFORE PREEMPT AT F/1+6+B= 9 (SEC.)

EMERGENCY VEHICLE PREEMPTION PROGRAMMING CHART

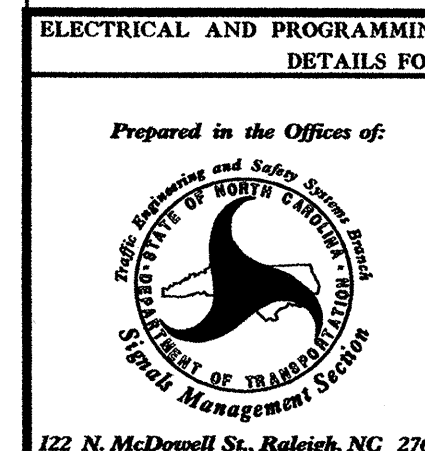
E. V. PREEMPT	OPTICAL DET. NO.	INPUT PIN	CLEARANCE PHASES LOCATION	DELAY TIME LOCATION	CLEAR TIME LOCATION
EVA	A	E/126+F+1=71	E/125+E+A=Ø2,5	F/1+E+2=0	F/1+E+3= 1 (SEC.)
EVB	B	E/126+F+2=72	E/125+E+B=Ø4,7	F/1+E+4=0	F/1+E+5= 1 (SEC.)
EVC	C	E/126+F+3=73	E/125+E+C=Ø1,6	F/1+E+6=0	F/1+E+7= 1 (SEC.)
EVD	D	E/126+F+4=74	E/125+E+D=Ø3,8	F/1+E+8=0	F/1+E+9= 1 (SEC.)

- PROGRAM MINIMUM GREEN BEFORE PREEMPT AT: F/1+0+B= 1 (SEC.)
- FOR PREEMPTION IMMEDIATE RESPONSE, DISABLE MIN. WALK AT: E/125+F+F=3
- PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

LOAD RESISTOR INSTALLATION DETAIL



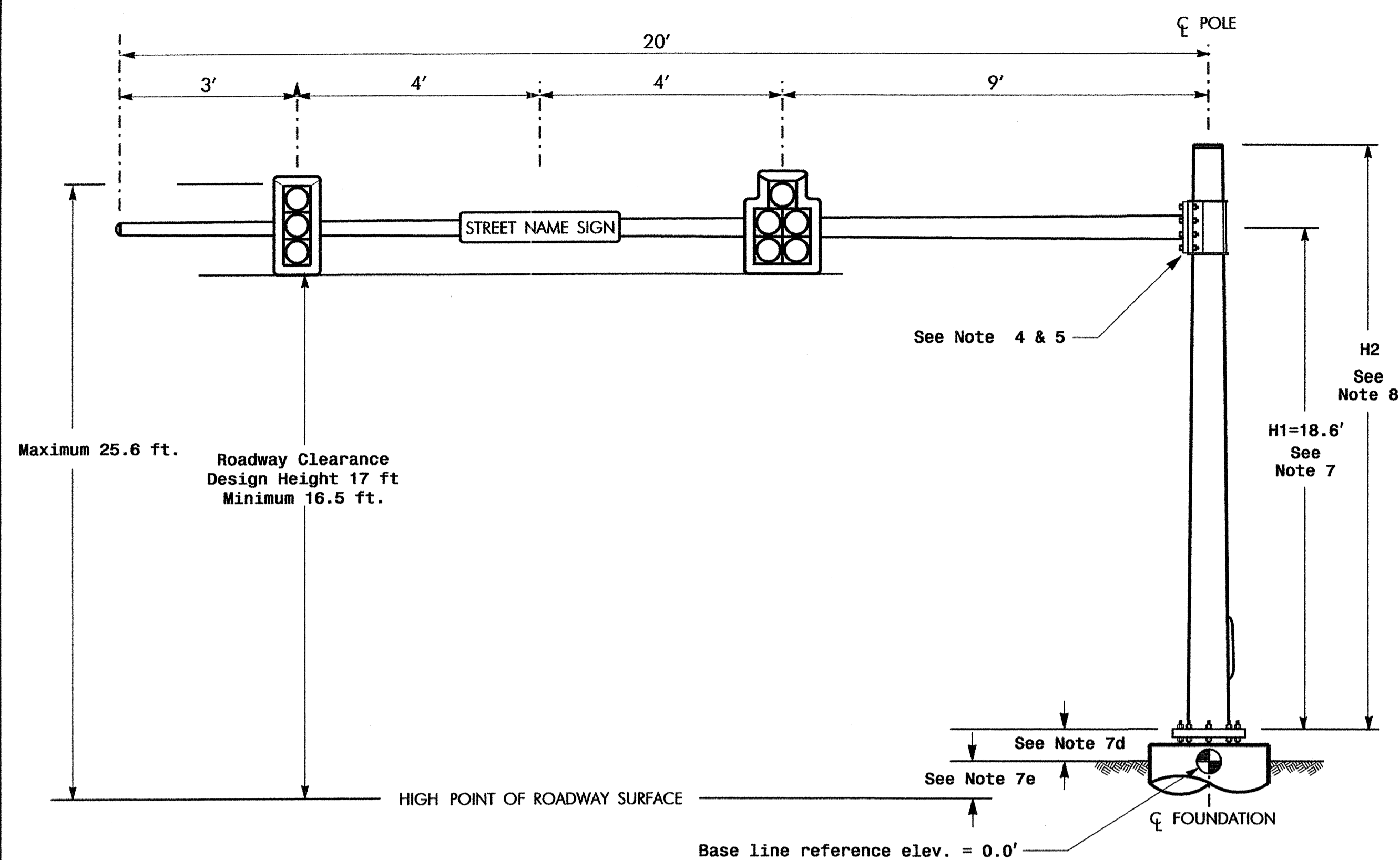
NOTE: THE PURPOSE OF THESE RESISTORS IS TO LOAD THE CHANNEL RED MONITOR INPUTS IN ORDER FOR THE SIGNAL SEQUENCE MONITOR TO USE THE FULL SIGNAL SEQUENCE MONITORING CAPABILITY ON CHANNELS THAT DO NOT USE THE RED DISPLAY IN THE FIELD.



ELECTRICAL AND PROGRAMMING DETAILS FOR:
SR 1007 (LENOIR RHYNE BLVD SE)
at
SR 1007 (HIGHLAND AVENUE SE) / 8th ST PLACE SE
DIVISION 12 CATAWBA COUNTY HICKORY
PLAN DATE: APRIL 2006 REVIEWED BY:
PREPARED BY: F.E. RUSS REVIEWED BY:
REVISIONS INIT. DATE
DATE
SIGNATURE
DATE

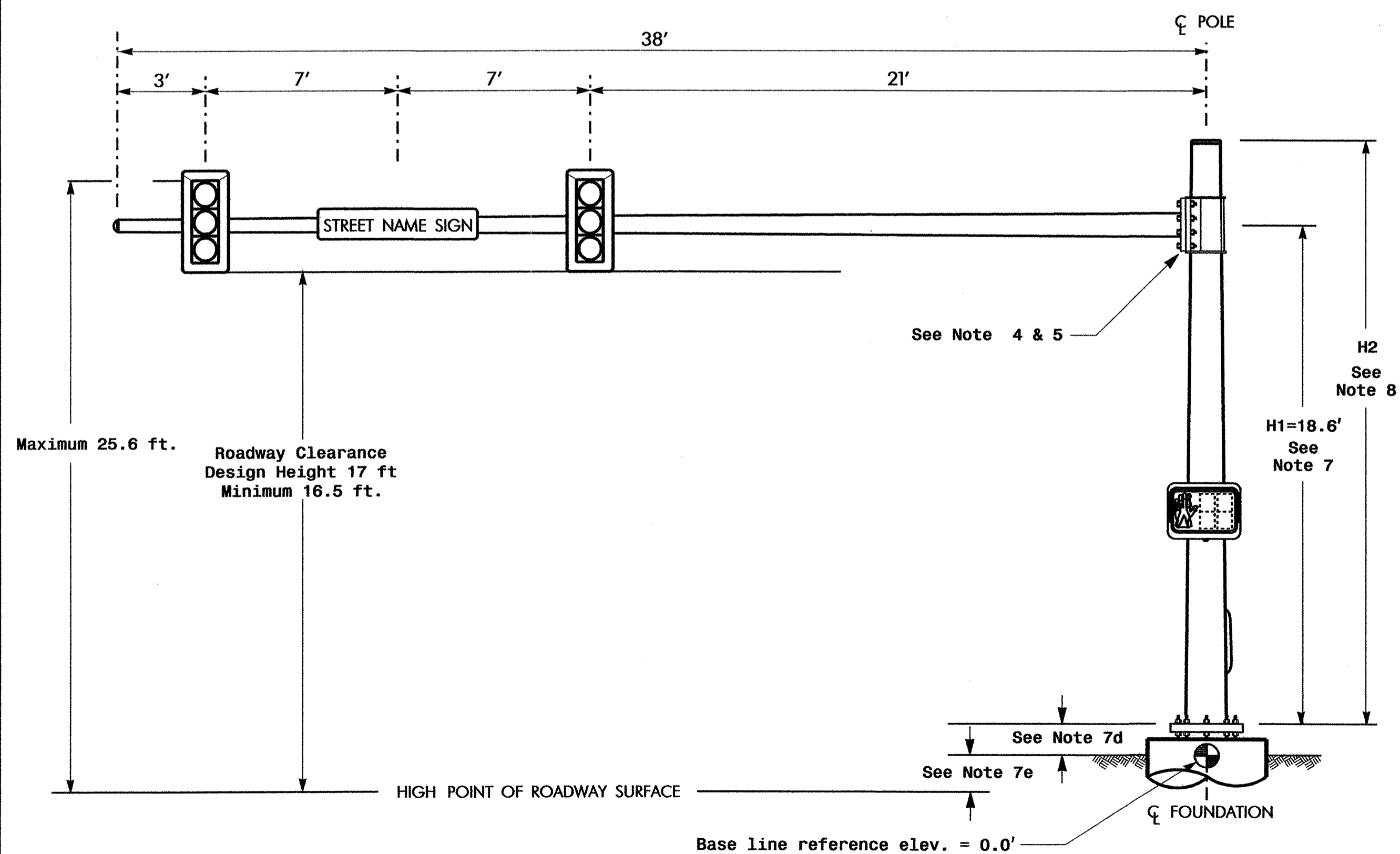
SEAL
STATE OF NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL 022013
ENGINEER
GEORGE C. BROWN
DATE
DATE
SIG. INVENTORY NO. 12-0723

Design Loading for METAL POLE NO. 9



ELEVATION VIEW

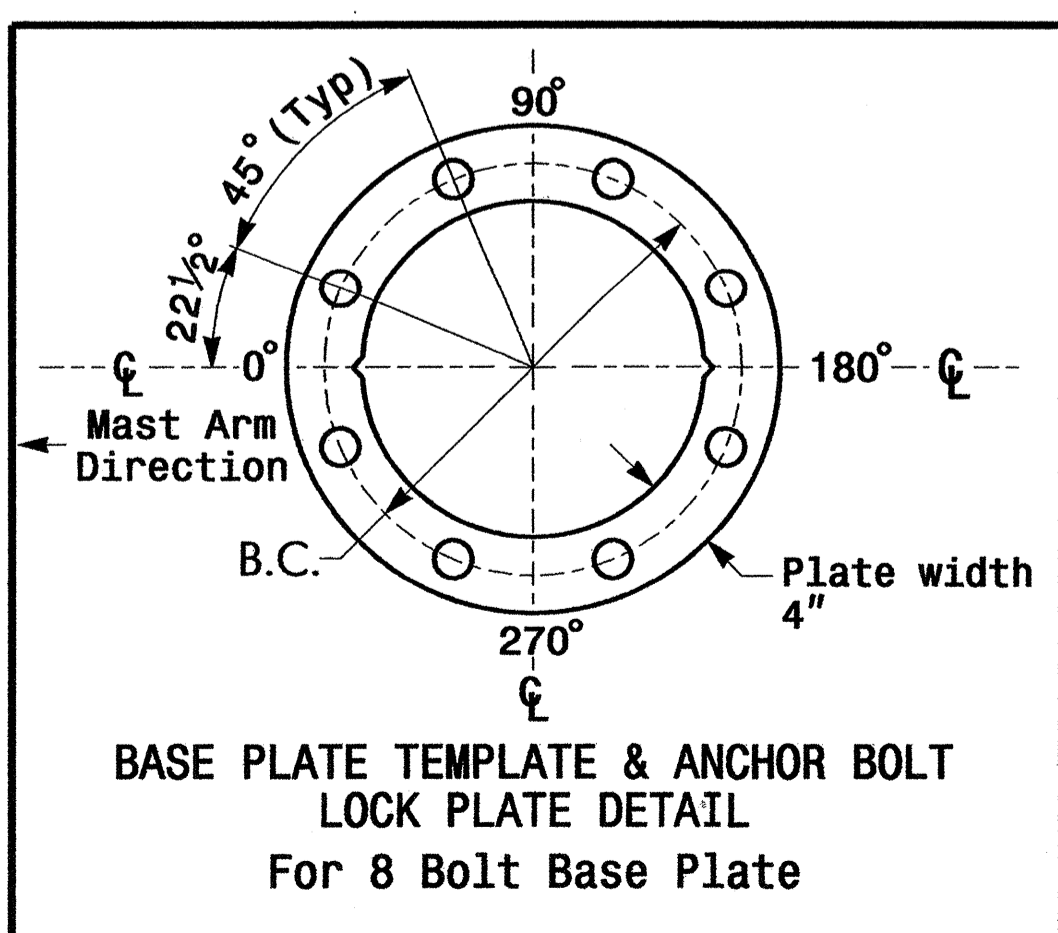
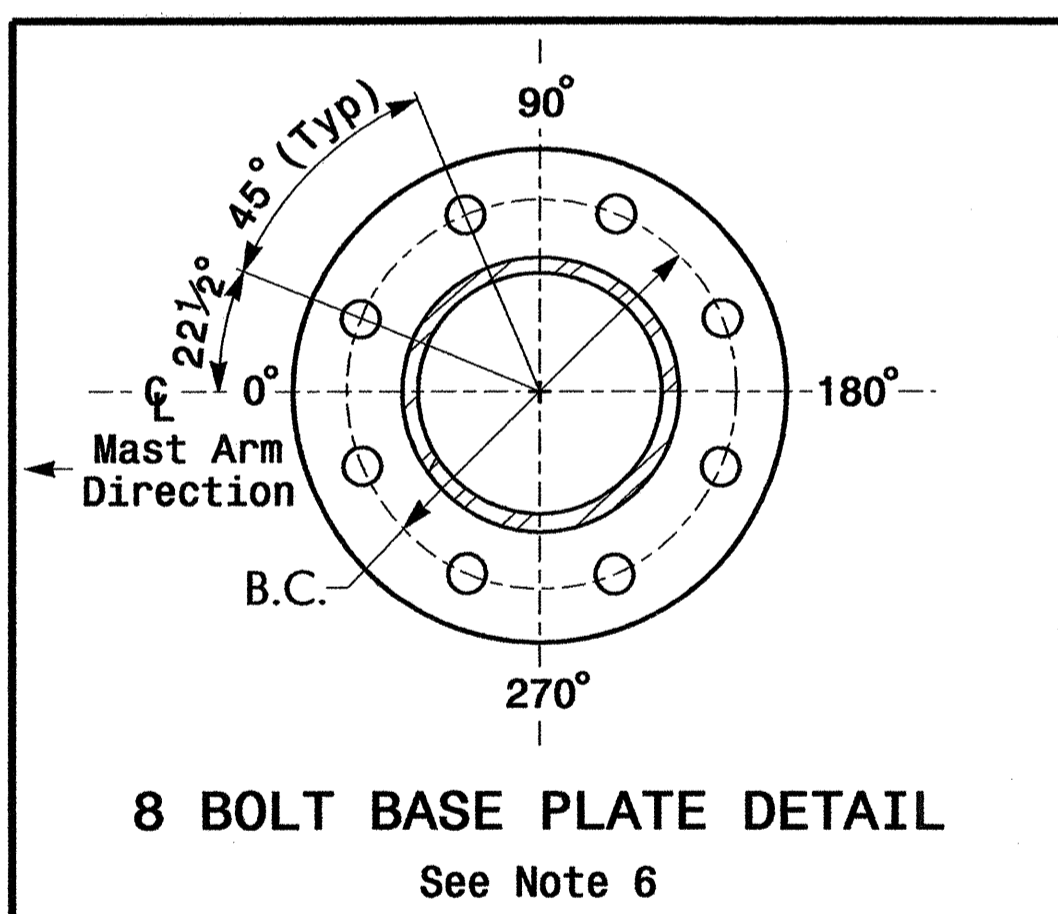
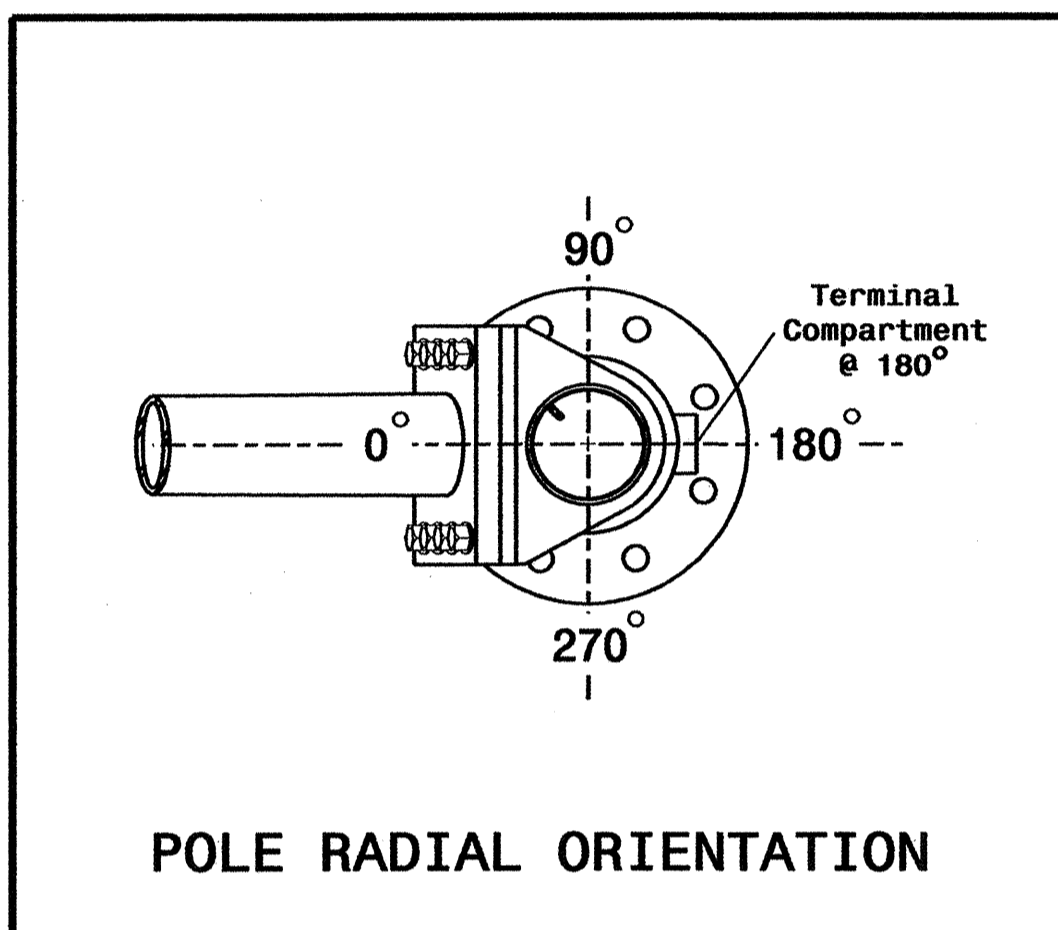
Design Loading for METAL POLE NO. 10



ELEVATION VIEW

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

Elevation Data for Mast Arm Attachment (H1)		
Elevation Differences for:	Pole 9	Pole 10
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	0.0	0.0
Elevation difference at Edge of travelway or face of curb	N/A	N/A



MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-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

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.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 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 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 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 4 (90 mph)

	SR 1007 (Lenoir Rhyne Blvd NE) at 7th Avenue NE	
	Division 12 Catawba County Hickory PLAN DATE: February 2006 REVIEWED BY: I.O. Umozurik PREPARED BY: Luhr REVIEWED BY:	
SCALE 0 N/A N/A	REVISIONS INIT. DATE	SIGNATURE DATE SIG. INVENTORY NO. 12-1362

23-APR-2006 15:37
 S:\115 61901\work\p06\p06.dgn
 I:\UHF

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.

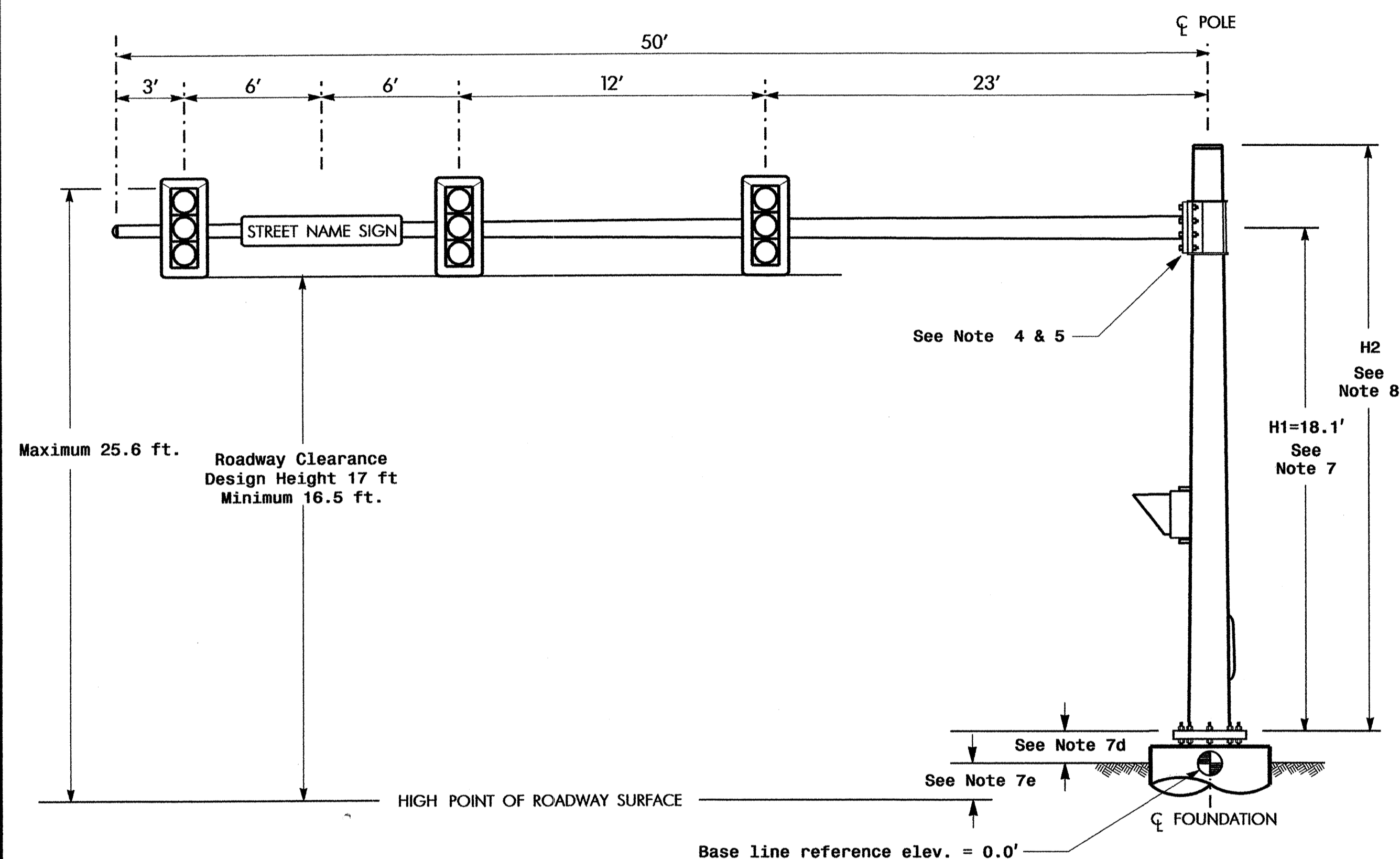
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 11
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	-0.5 ft.
Elevation difference at Edge of travelway or face of curb	N/A

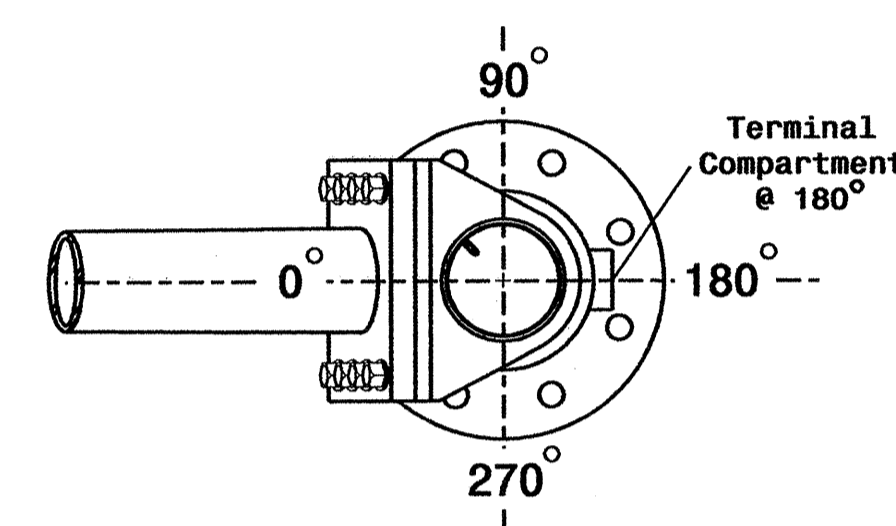
MAST ARM LOADING SCHEDULE

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

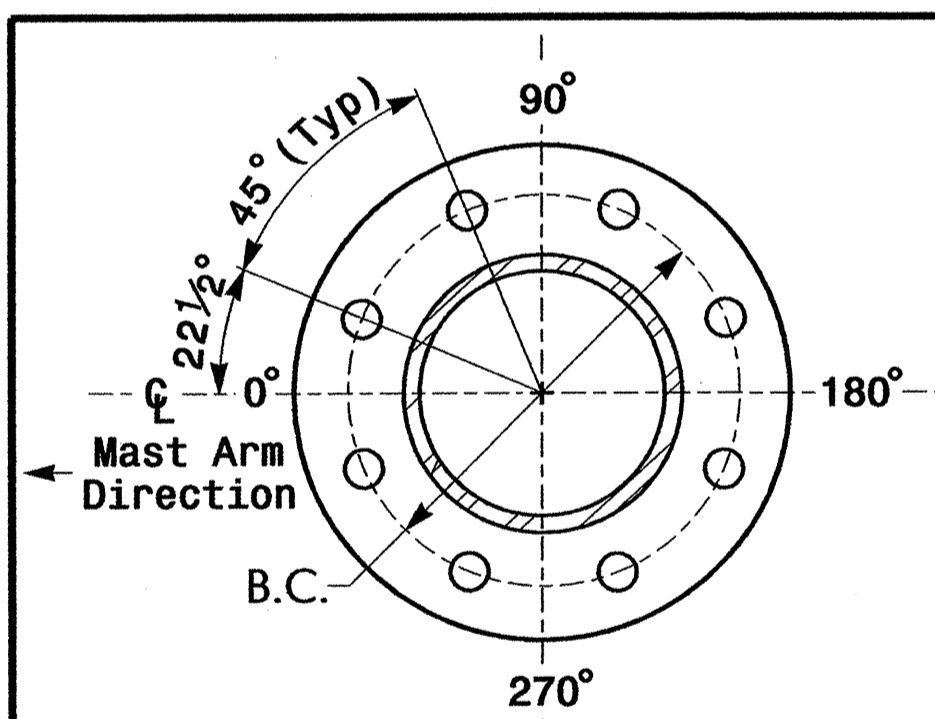
Design Loading for METAL POLE NO. 11



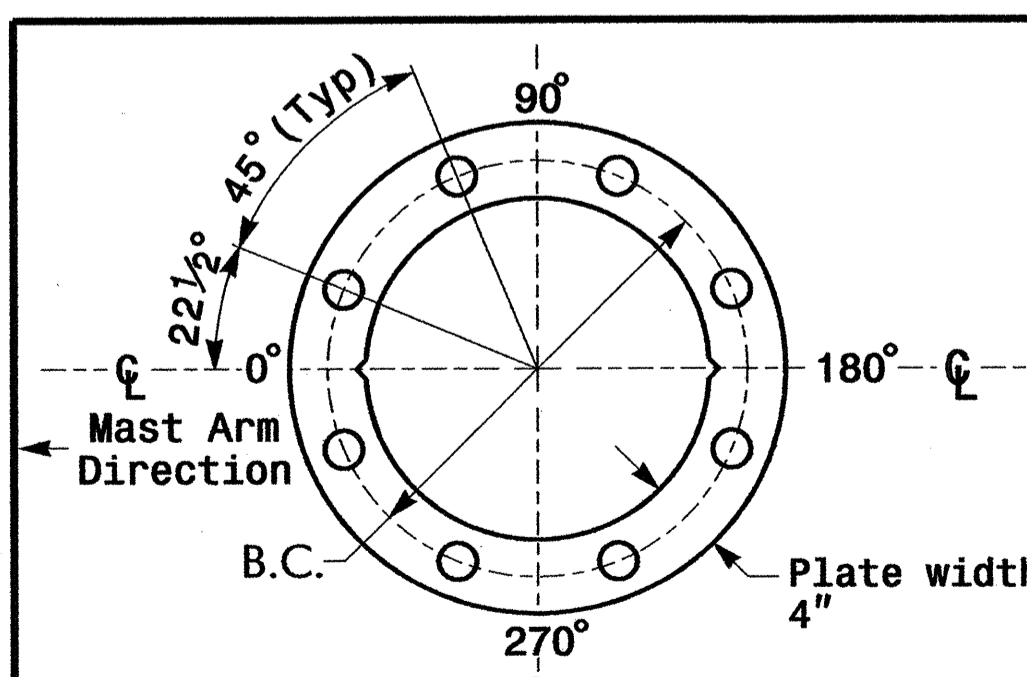
ELEVATION VIEW



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



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.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 is a high strength connection. Use Direct Tension Indicators (ASTM F950) for each bolt.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 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.

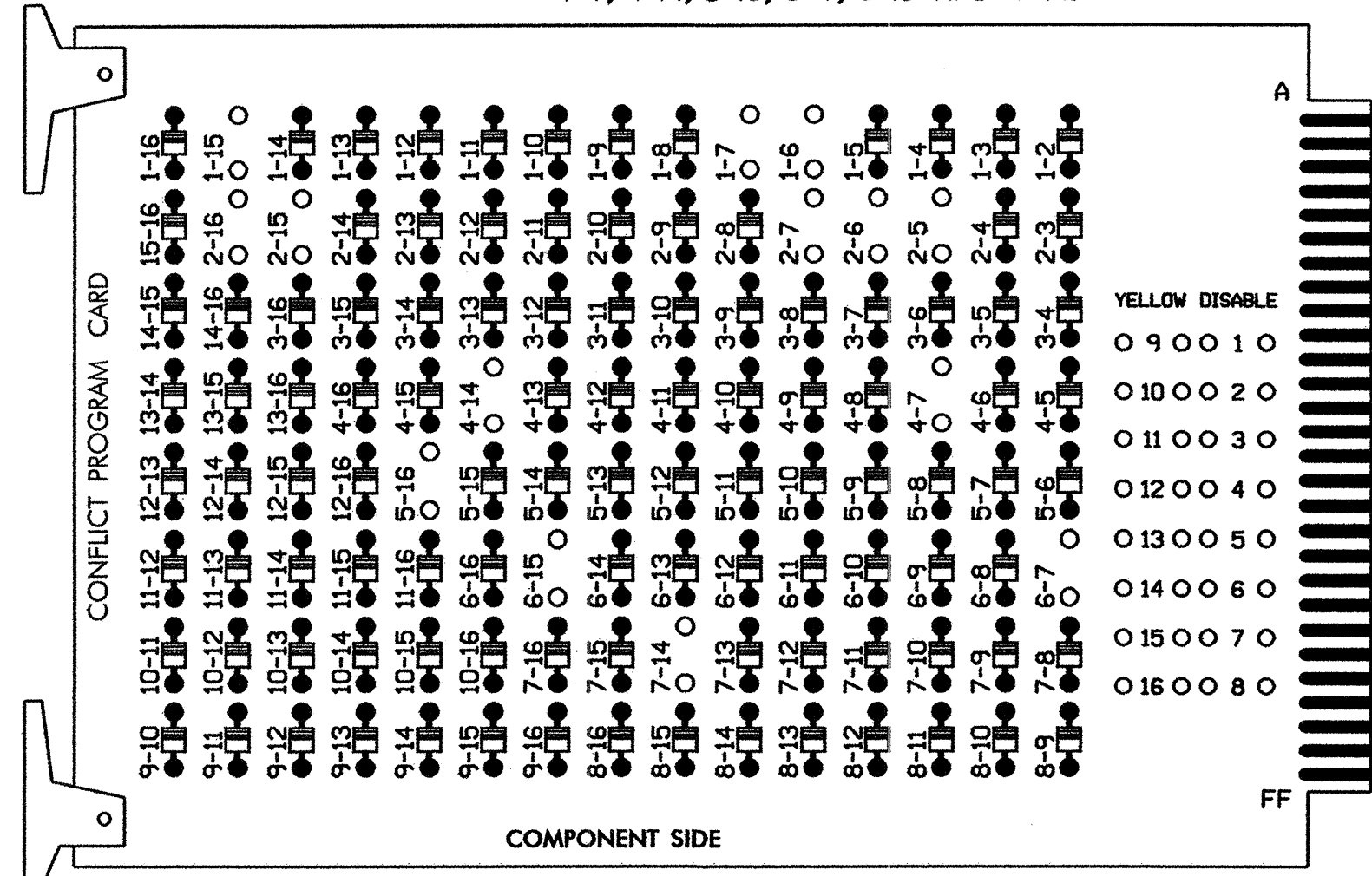
NCDOT Wind Zone 4 (90 mph)

	SR 1007 (Lenoir Rhyne Blvd NE) at 7th Avenue NE Division 12 Catawba County Hickory	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER TIMOTHY J. WILLIAMS 24393
	PLAN DATE: February 2006 PREPARED BY: Luhr SCALE: 0 N/A REVIEWED BY: I.O. Umozurik REVIEWED BY:	
122 N. McDowell St., Raleigh, NC 27603		DATE: 5/1/06 SIGNATURE: [Signature] DATE:

EDI MODEL 210ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

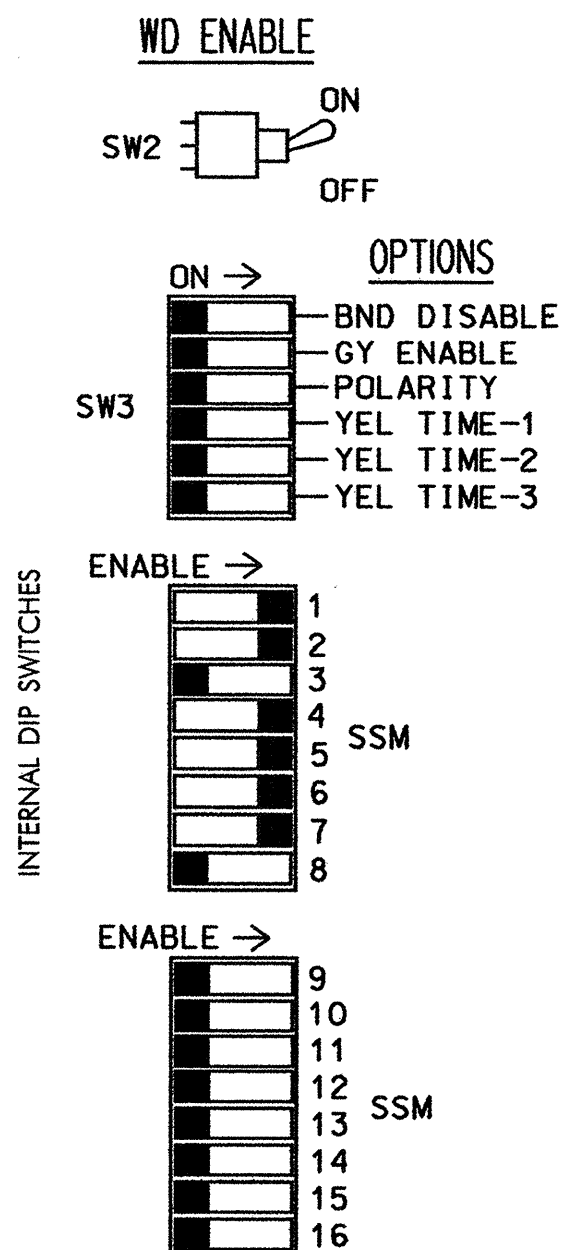
REMOVE DIODE JUMPERS 1-6, 1-7, 1-15, 2-5, 2-6, 2-7, 2-15, 2-16, 4-7, 4-14, 5-16, 6-7, 6-15 AND 7-14.



REMOVE JUMPERS AS SHOWN*

*CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.

ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION.



■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1 1A	∅ 2 2A	S	S	S	∅ 4 4A	∅ 4 4C	∅ 4 4E	SYS. SD1103-5	S	S	NOT USED	∅ 6 PED ISOLATOR	FS
L	NOT USED	∅ 2 2B	Y	Y	Y	∅ 4 4B	∅ 4 4D	NOT USED	SYS. SD1103-6	Y	Y	Y	∅ 4 PED ISOLATOR	ST
FILE "J"	∅ 5 5A	∅ 6 6A	S	S	S	SYS. SD1103-1	SYS. SD1103-3	S	S	S	S	S	SEE NOTE BELOW	S
U	NOT USED	NOT USED	Y	Y	Y	SYS. SD1103-2	SYS. SD1103-4	Y	Y	Y	Y	Y	Y	Y
L														

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

FS = FLASH SENSE
ST = STOP TIME

EVA - CHANNEL 1 - PIN 71
EVB - CHANNEL 2 - PIN 72
EVC - CHANNEL 3 - PIN 73
CHANNEL 4 - SPARE

** NOTE: WIRE OPTICAL DETECTORS TO INPUT FILE PER MANUFACTURER'S INSTRUCTIONS.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN 4P OUTPUT AT KEYPAD INPUT E/125+F+7=∅4.
PROGRAM PEDESTRIAN 6P OUTPUT AT KEYPAD INPUT E/125+F+6=∅6.
PROGRAM PEDESTRIAN 8P OUTPUT AT KEYPAD INPUT E/125+F+8=∅5.

PEDESTRIAN CLEAR BEFORE PREEMPT TIMING

PROGRAM PED. PHASE 4 MIN. CLEAR BEFORE PREEMPT AT F/1+4+B= 11 (SEC.)
PROGRAM PED. PHASE 5 MIN. CLEAR BEFORE PREEMPT AT F/1+5+B= 11 (SEC.)
PROGRAM PED. PHASE 6 MIN. CLEAR BEFORE PREEMPT AT F/1+6+B= 11 (SEC.)

EMERGENCY VEHICLE PREEMPTION PROGRAMMING CHART

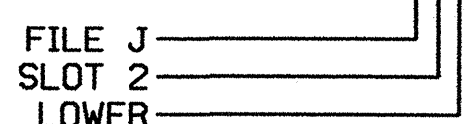
E. V. PREEMPT	OPTICAL DET. NO.	INPUT PIN	CLEARANCE PHASES LOCATION	DELAY TIME LOCATION	CLEAR TIME LOCATION
EVA	A	E/126+F+1=71	E/125+E+A=∅2,5	F/1+E+2=0	F/1+E+3= 1 (SEC.)
EVB	B	E/126+F+2=72	E/125+E+B=∅1,6	F/1+E+4=0	F/1+E+5= 1 (SEC.)
EVC	C	E/126+F+3=73	E/125+E+C=∅4	F/1+E+6=0	F/1+E+7= 1 (SEC.)

- PROGRAM MINIMUM GREEN BEFORE PREEMPT AT: F/1+0+8= 1 (SEC.)
- FOR PREEMPTION IMMEDIATE RESPONSE, DISABLE MIN. WALK AT: E/125+F+3
- PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

DETECTOR ATTRIBUTES LEGEND:

- 1-FULL TIME DELAY
- 2-PED CALL
- 3-RESERVED
- 4-COUNTING
- 5-EXTENSION
- 6-TYPE 3
- 7-CALLING
- 8-ALTERNATE

INPUT FILE POSITION LEGEND:



NOTES

- TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 3,8,9,10,11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER CABINET MANUFACTURER'S INSTRUCTIONS.
- PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
- SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
- ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
- PROGRAM "RECALL POSITION" AND "VEHICLE CALL MEMORY" AS [NONE] FOR ALL PHASES.
- THE CABINET AND CONTROLLER ARE PART OF THE CITY OF HICKORY SIGNAL SYSTEM: # 1103

SPECIAL SEQUENCE: LAGGING PHASE 1 OPERATION

THE PHASING PROGRESSION DESIGN OF THIS SIGNAL REQUIRES PHASE 1 TO LAG PHASE 2. PROGRAM PHASE 1 TO LAG IN ALL COORDINATION PLANS AS WELL AS FREE-RUN OPERATION. ALL PHASE PAIRS MUST BE COVERED IN LAG PLANS. FLAG THE FOLLOWING PHASES IN ALL LAG PLANS: 1, 4, 6, 8.

EQUIPMENT INFORMATION

*CONTROLLER.....McCain TRAFFIC TYPE 170E
*CABINETMcCain TRAFFIC MODEL 332 (DWG.NO.MDR3280 SOFTWAREBI TRANS 233NC2 REV.B)
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S4P,S5,S6,S6P,S7,S8P
PHASES USED.....1,2,4,5,6,4PED,5PED,6PED
OVERLAPS.....OL1= 4+6

EXISTING TO REMAIN IN USE*

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
1A	TB2-1,2	I1U	1	56	5 7	1
2A	TB2-5,6	I2U	2	39	5 7	2
2B	TB2-7,8	I2L	3	43	5 7	2
4A	TB4-9,10	I6U	4	41	5 7	4
4B	TB4-11,12	I6L	5	45	5 7	4
4C	TB6-1,2	I7U	6	65	5 7	4
4D	TB6-3,4	I7L	7	78	5 7	4
4E	TB6-5,6	I8U	8	49	5 7	4
5A	TB3-1,2	J1U	9	55	5 7	5
6A	TB3-5,6	J2U	10	40	5 7	6
PED PUSH BUTTONS						
P41, P42	TB8-5,6	I12L	11	69	2	4
P51, P52	TB8-8,9	I13L	12	70	2	5
P61, P62	TB8-7,9	I13U	13	68	2	6
SYSTEM LOOPS						
SD1103-1	TB5-9,10	J6U	—	42	—	SYS1 *
SD1103-2	TB5-11,12	J6L	—	46	—	SYS2 *
SD1103-3	TB7-1,2	J7U	—	66	—	SYS3 *
SD1103-4	TB7-3,4	J7L	—	79	—	SYS4 *
SD1103-5	TB10-1,2	I9U	—	60	—	SYS5 *
SD1103-6	TB10-3,4	I9L	—	62	—	SYS6 *

NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

***SYSTEM DETECTOR PROGRAMMING NOTES**

IN ORDER FOR SYSTEM LOOPS TO OPERATE PROPERLY, THEIR PIN ASSIGNMENTS WILL HAVE TO BE RE-ASSIGNED ON I70E CONTROLLER AS DESCRIBED BELOW.

A. IN ORDER TO ASSURE THAT THESE PINS ARE CLEARED FROM THEIR DEFAULT FUNCTION, PROGRAM AS FOLLOWS:

- PIN 42 - E/126+0+3=0
- PIN 46 - E/126+0+7=0
- PIN 66 - E/126+4+7=0
- PIN 79 - E/126+4+F=0
- PIN 60 - E/126+4+1=0
- PIN 62 - E/126+4+3=0

B. AFTER FOLLOWING STEP 'A' ABOVE, PROGRAM PINS FOR SYSTEM DETECTORS AS FOLLOWS:

- SYS1 - E/126+B+1=42
- SYS2 - E/126+B+2=46
- SYS3 - E/126+B+3=66
- SYS4 - E/126+B+4=79
- SYS5 - E/126+B+5=60
- SYS6 - E/126+B+6=62

*SEE 'OVERLAP PROGRAMMING NOTES' BELOW
**SEE 'COUNTDOWN PEDESTRIAN SIGNAL OPERATION' NOTE

PROJECT REFERENCE NO. U-2306 A	SHEET NO. Sig.17
-----------------------------------	---------------------

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	* OL1	8	5 PED
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	P41, P42	51	61,62	P61, P62	43,44	NU	P51, P52
GREEN					103			136				
YELLOW					102			135				
RED					101			134				
RED ARROW	125	128					131			122		
YELLOW ARROW	126	129					132			123		
GREEN ARROW	127	130					133			124		
							106			121		112
							104			119		110

NU = NOT USED

OVERLAP PROGRAMMING NOTES

TO ASSURE THAT LOADSWITCH S7 IS ASSIGNED AS OVERLAP 1, PROGRAM CONTROLLER AT KEYPAD INPUT E/29+1+0=7

TO SET THE PARENT PHASES FOR OVERLAP 1 (VEH. SET 1) AS PHASES 4 AND 6, PROGRAM CONTROLLER AT KEYPAD INPUT E/29+1+1=∅4, 6

TO SET THE PARENT PHASE FOR OVERLAP 1 (VEH. SET 2) AS NONE, NO PROGRAMMING IS REQUIRED.

PROGRAM TIMING FOR OVERLAP 1 AS FOLLOWS:
GREEN CLEAR - E/29+1+D=0.0 (SEC.)
YELLOW CHANGE INTERVAL - E/29+1+E=3.8 (SEC.)
RED CLEARANCE - E/29+1+F=2.8 (SEC.)

HEADS 43 & 44 (OL1) OPERATION DURING PREEMPTION

IN ORDER FOR E.V. PREEMPT 'C' TO OPERATE AS PHASE 4 WITHOUT SIGNAL HEADS 43 & 44 (OVERLAP 'OL1'), THE FOLLOWING PROGRAMMING MUST BE IN PLACE:

ASSIGN O/L VEH. SET 2 INPUT AT E/126+D+C= 200
ASSIGN E.V. PREEMPT EVC OUTPUT AT E/127+D+A= 200

200 = ASSIGNABLE PSEUDO-PIN (SOFTWARE)

OVERLAP NEGATIVE PEDESTRIAN PHASE PROGRAMMING

OVERLAP 1 MUST BE OMITTED DURING PED CALL ON ∅6 (PED PUSHBUTTONS P61, P62). TO ACCOMPLISH THIS, PROGRAM CONTROLLER AT KEYPAD INPUT E/29+1+5=∅6 (PED).

RESTRICTED PHASES PROGRAMMING

IN ORDER TO PROHIBIT PHASES 1 AND 5 FROM BEING SERVED TOGETHER, THEY MUST BE PROGRAMMED AS RESTRICTED PHASES. THIS IS ACCOMPLISHED BY PROGRAMMING CONTROLLER AT KEYPAD INPUT E/125+F+E= ∅1, 5

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1547
DESIGNED: FEBRUARY 2006
SEALED: 4/21/06
REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED MAY 2004 AND SEALED 6/7/04

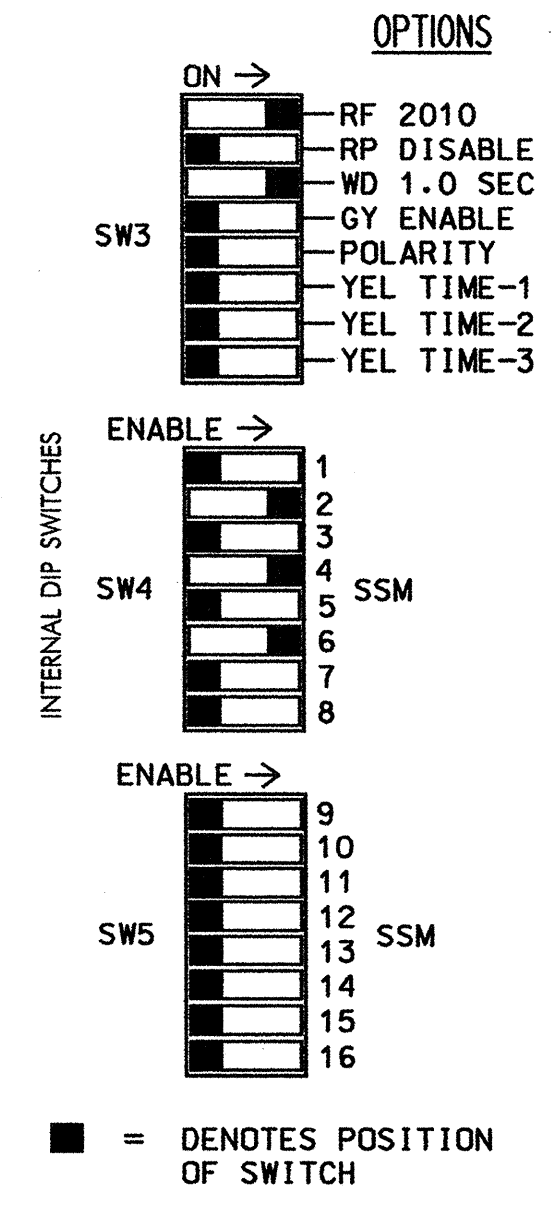
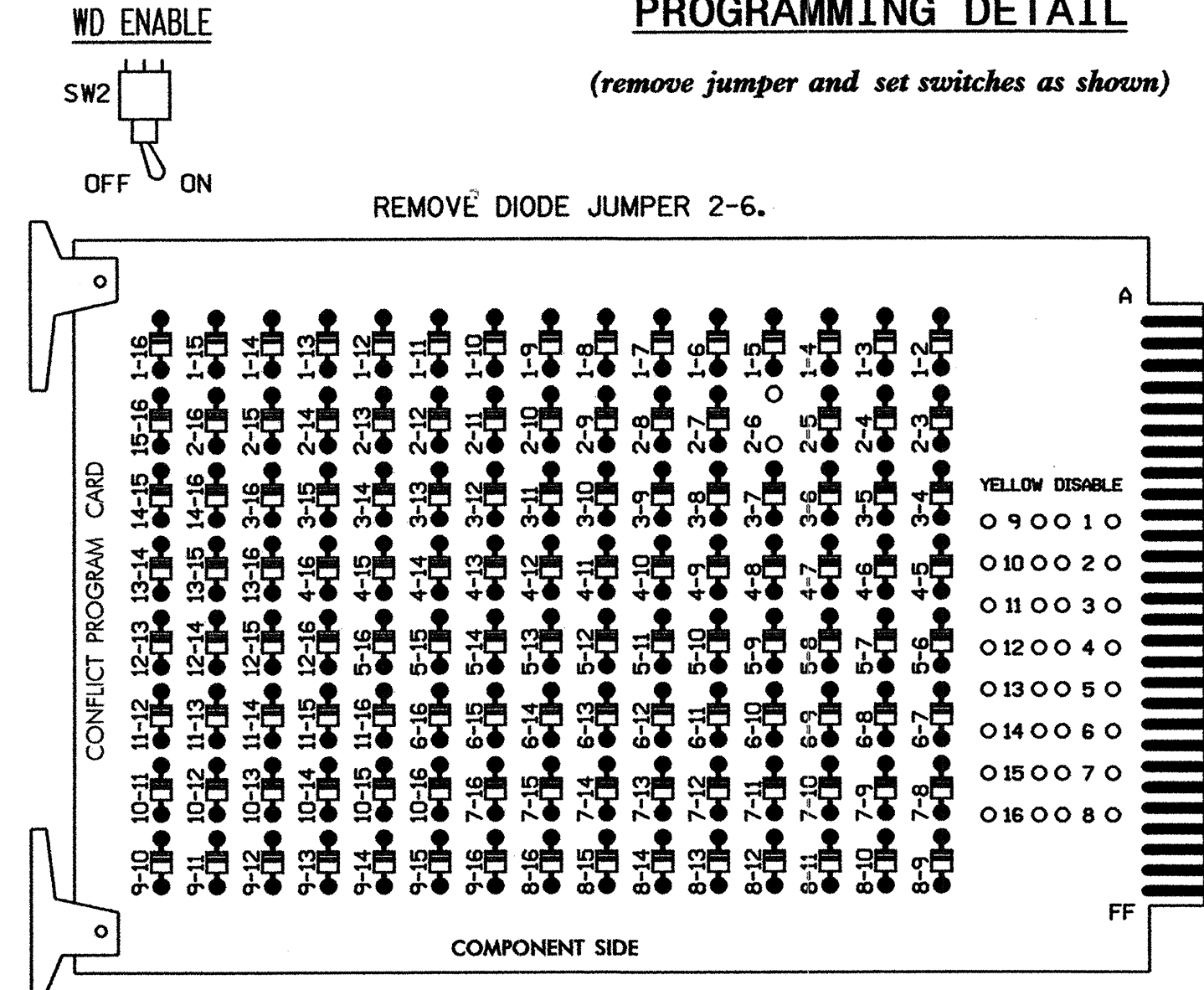
ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared in the Offices of:
City of Raleigh
Department of Transportation
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

SR 1007 (LENOX RHYNE BLVD NE) / SR 1007 (HIGHLAND AVENUE NE)		at SR 2319 (8th STREET NE)	
DIVISION 12	CATAMBA COUNTY	HICKORY	
PLAN DATE: APRIL 2006	REVIEWED BY: T. Joyce		
PREPARED BY: F.E. RUSS	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
Professional Engineer
George C. Brown
12-1547

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



NOTES:

- CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
- MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

NOTES

- TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
- ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 1,3,5,7,8,9,10,11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
- PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
- SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
- ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 170E
 CABINETCONTRACTOR SUPPLIED 332
 SOFTWAREBI TRANS 233NC2
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S4,S6
 PHASES USED.....2,4,6
 OVERLAPS.....NONE

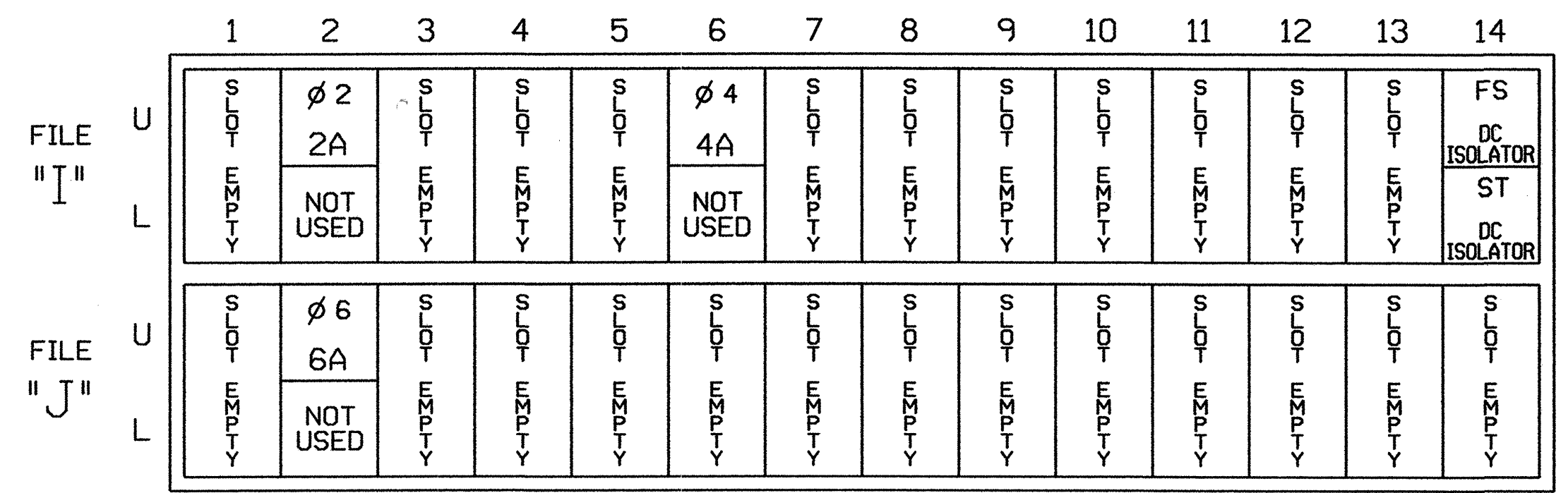
FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22,23	NU	NU	41,42	NU	NU	61,62,63	NU	NU	NU	NU
GREEN		130			103			136				
YELLOW		129			102			135				
RED		128			101			134				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = NOT USED

INPUT FILE POSITION LAYOUT

(front view)

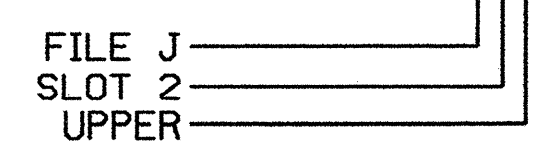


INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
2A	TB2-5,6	I2U	1	39	5 7	2
4A	TB4-9,10	I6U	2	41	5 7	4
6A	TB3-5,6	J2U	3	40	5 7	6

NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

INPUT FILE POSITION LEGEND: J2U



DETECTOR ATTRIBUTES LEGEND:

- 1-FULL TIME DELAY
- 2-PED CALL
- 3-RESERVED
- 4-COUNTING
- 5-EXTENSION
- 6-TYPE 3
- 7-CALLING
- 8-ALTERNATE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1709
 DESIGNED: FEBRUARY 2006
 SEALED: 4/21/06
 REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED JULY 2004 AND SEALED 7/13/04

TEMPORARY SIGNAL - To Be Removed Upon Project Completion

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

 122 N. McDowell St., Raleigh, NC 27603

**C AVE SE
 at
 9th ST. LN SE**

DIVISION 12 CATAWBA COUNTY HICKORY
 PLAN DATE: APRIL 2006 REVIEWED BY: T. Vajda
 PREPARED BY: F.E. RUSS REVIEWED BY:
 REVISIONS INIT. DATE

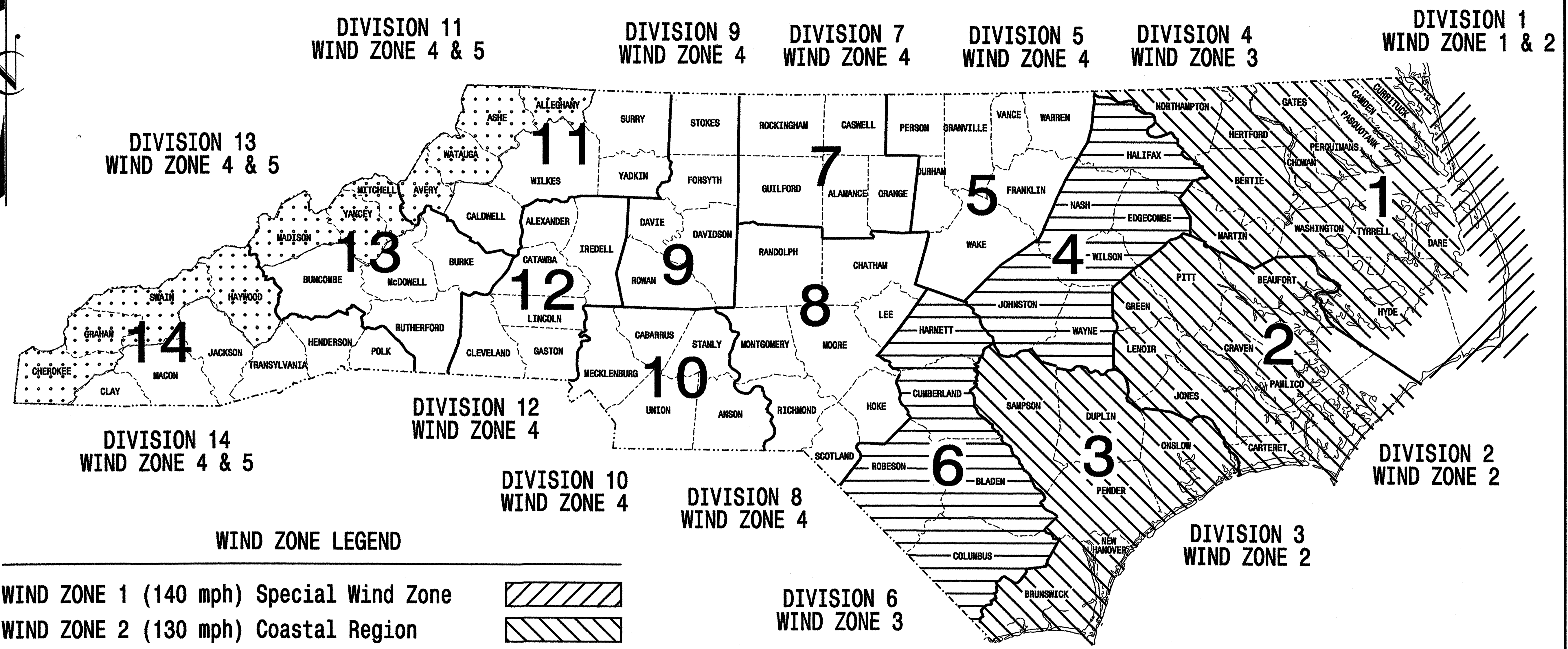
SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN
 SIGNATURE DATE
 SIG. INVENTORY NO. 12-1709

27-APR-2006 10:39
 Engineering121709-sm.e-200604-001.dgn
 FERRISS

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	U-2306A	Sig. 20
F. A. PROJ. NO.	M 1	
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES



WIND ZONE LEGEND

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

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

Prepared in the Offices of:

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

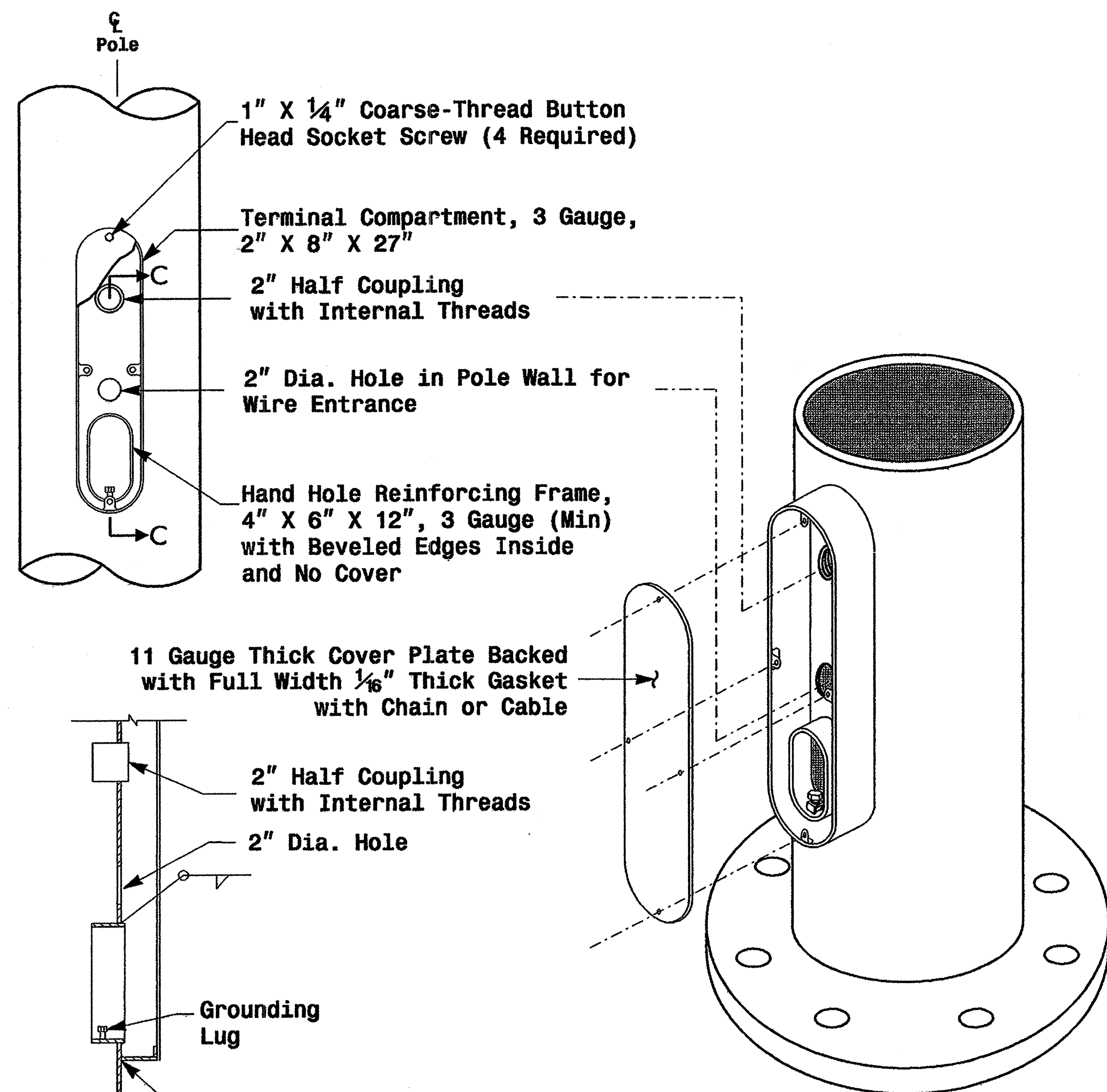
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

NGDOT 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

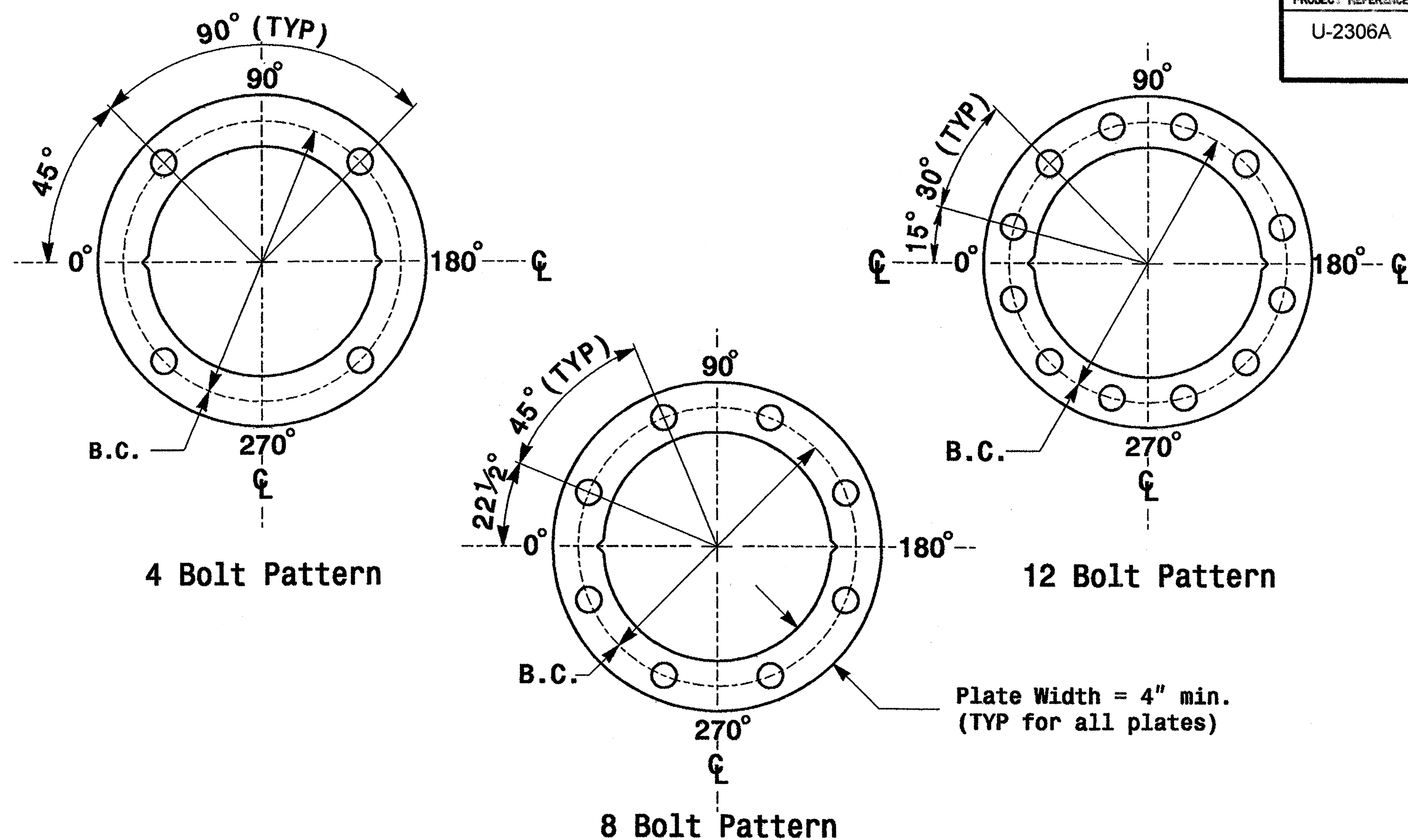
SEAL

SIGNATURE: *D. Sarkar* DATE: 9.2.2005



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 _____	

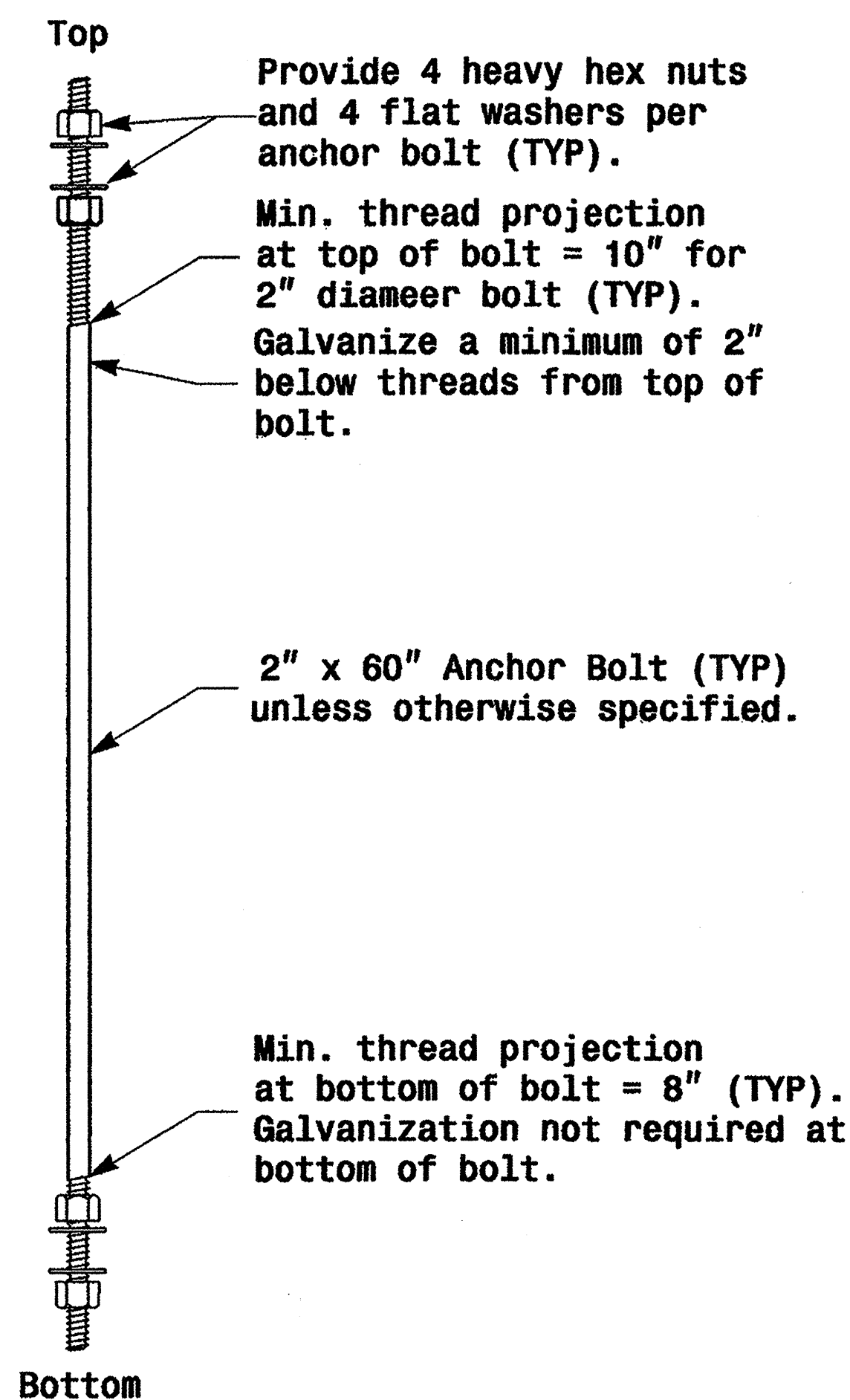
Shaft I.D. Tag
 (Provide on Strain Poles and Mast Arm Poles)

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

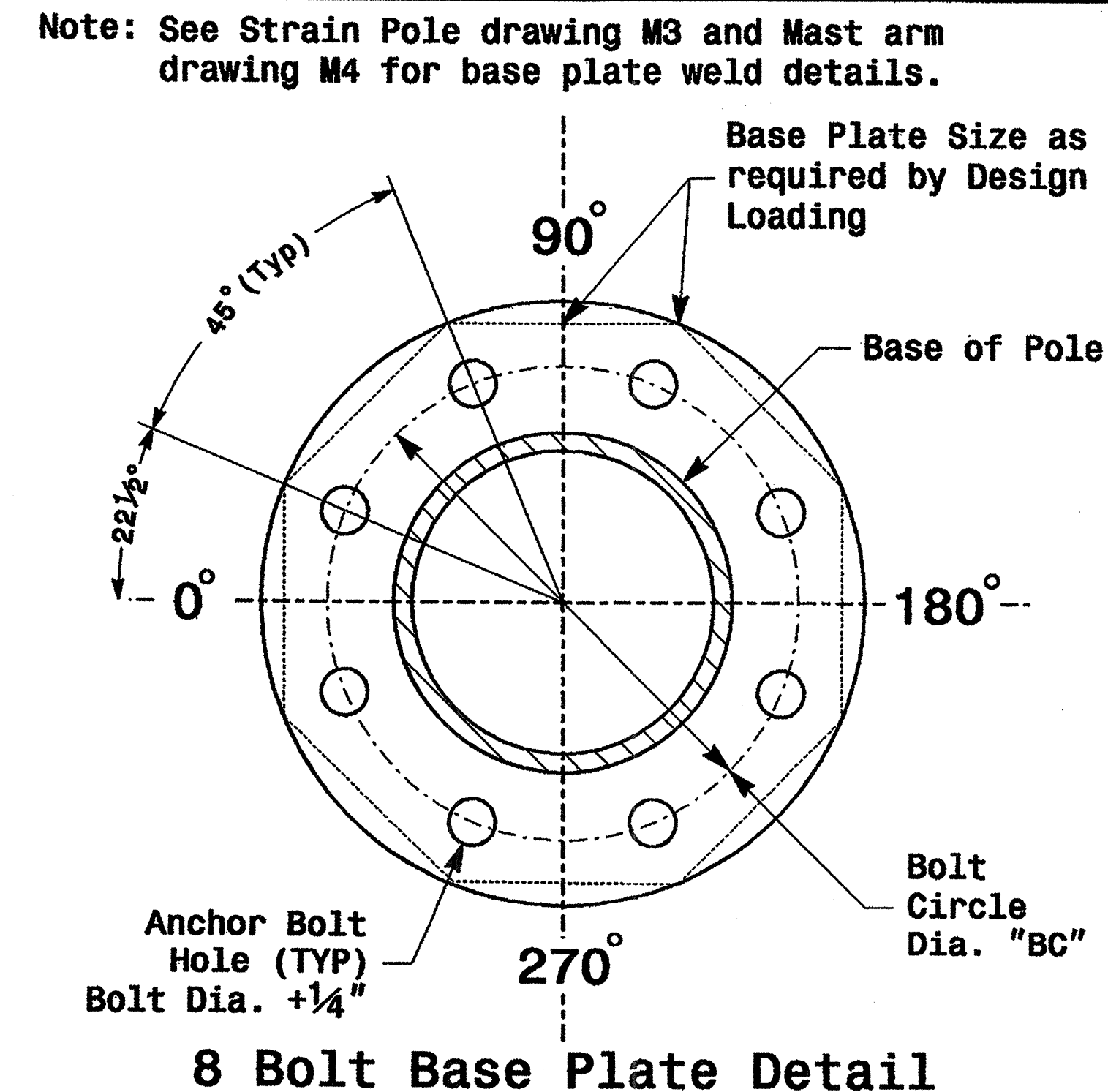
Arm I.D. Tag
 (Provide on each section of a multi-section mast arm)

- 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

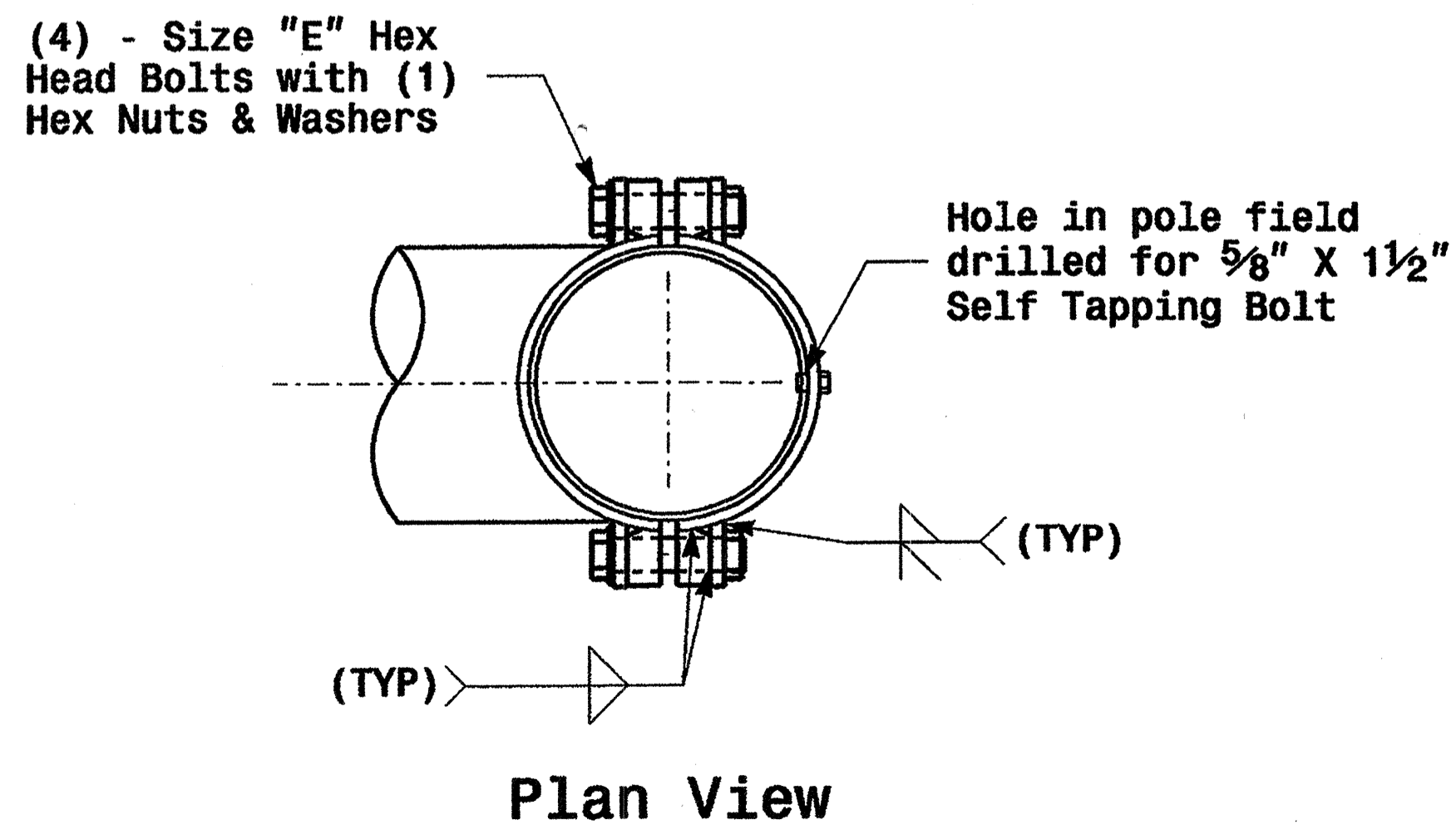
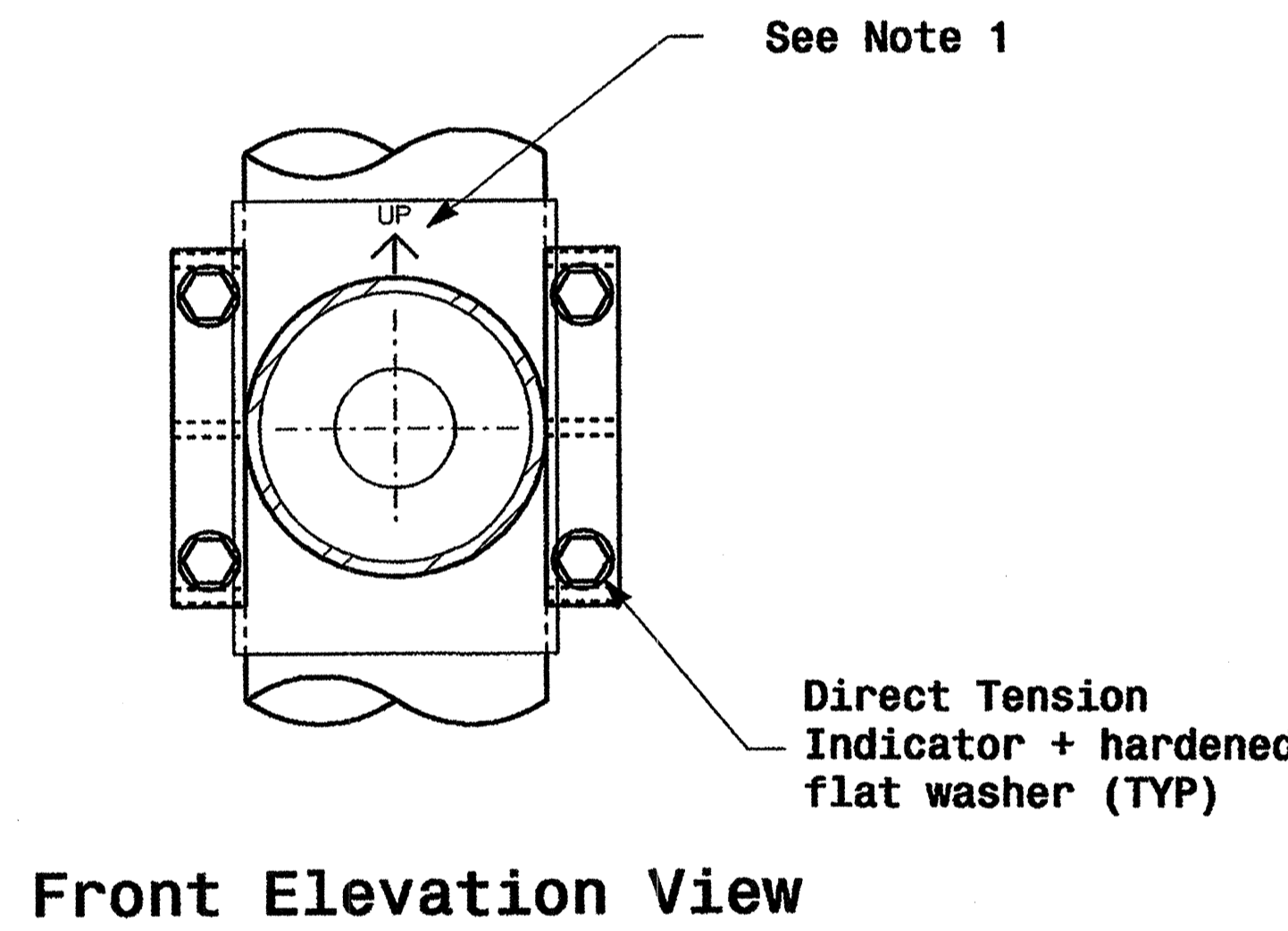
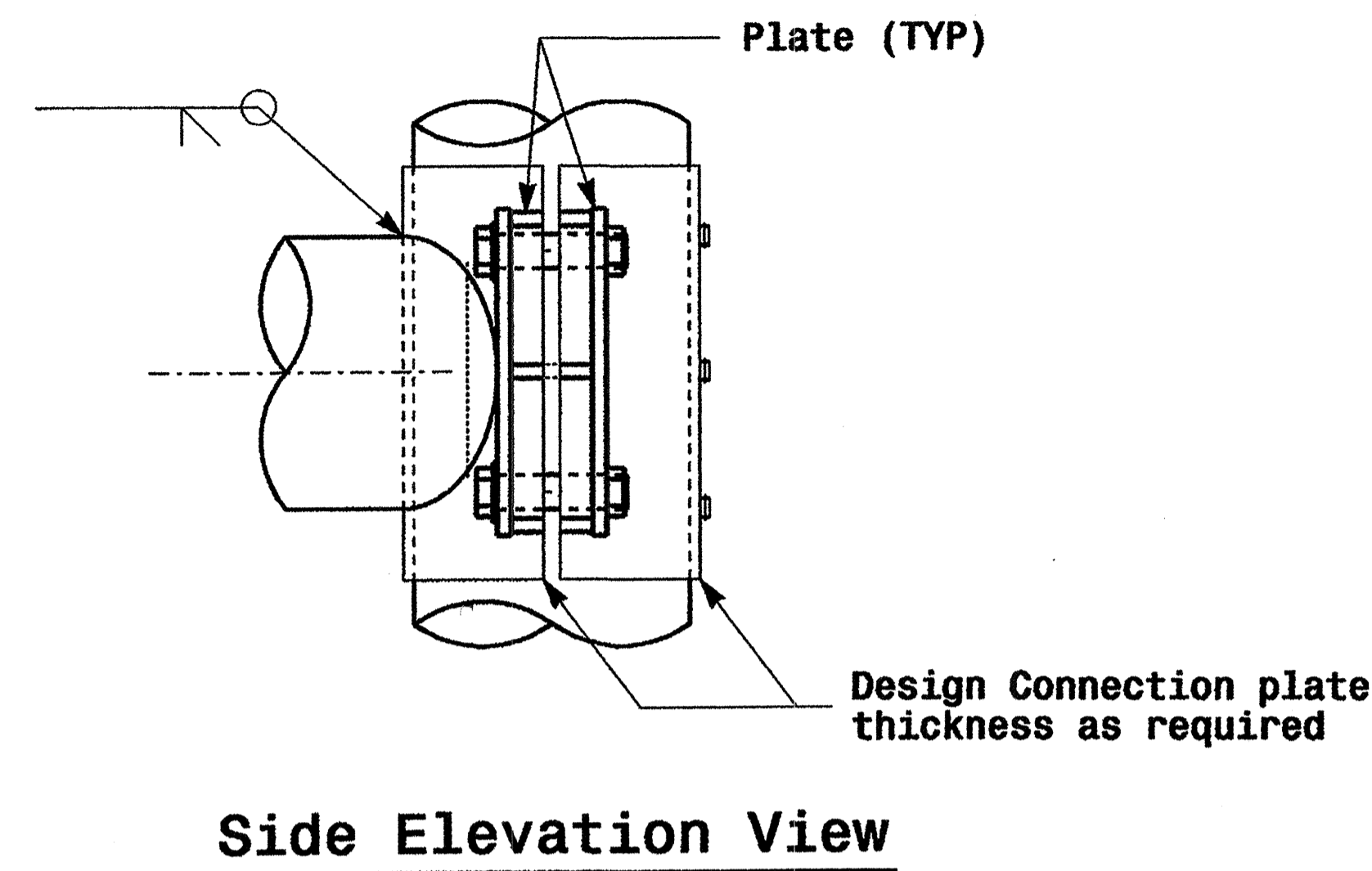


8 Bolt Base Plate Detail

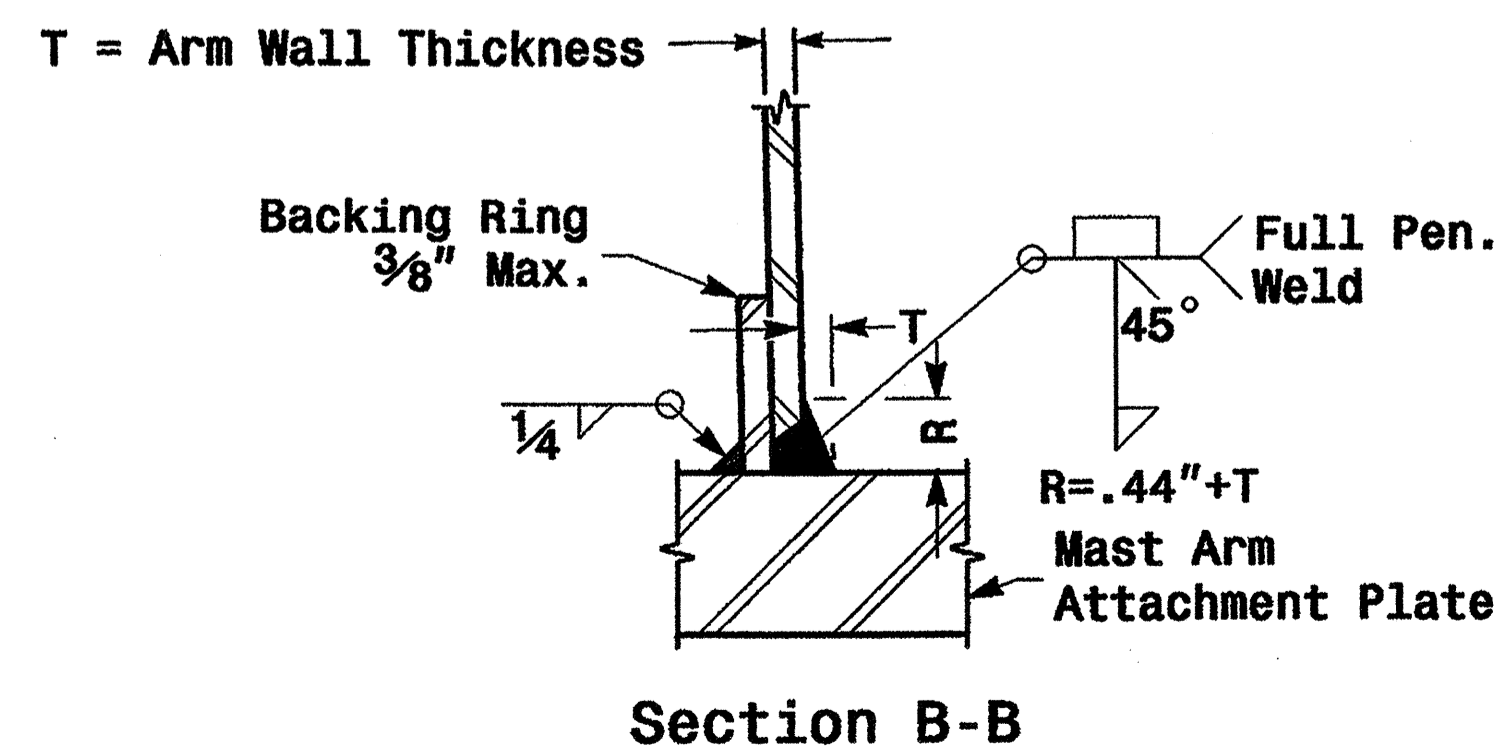
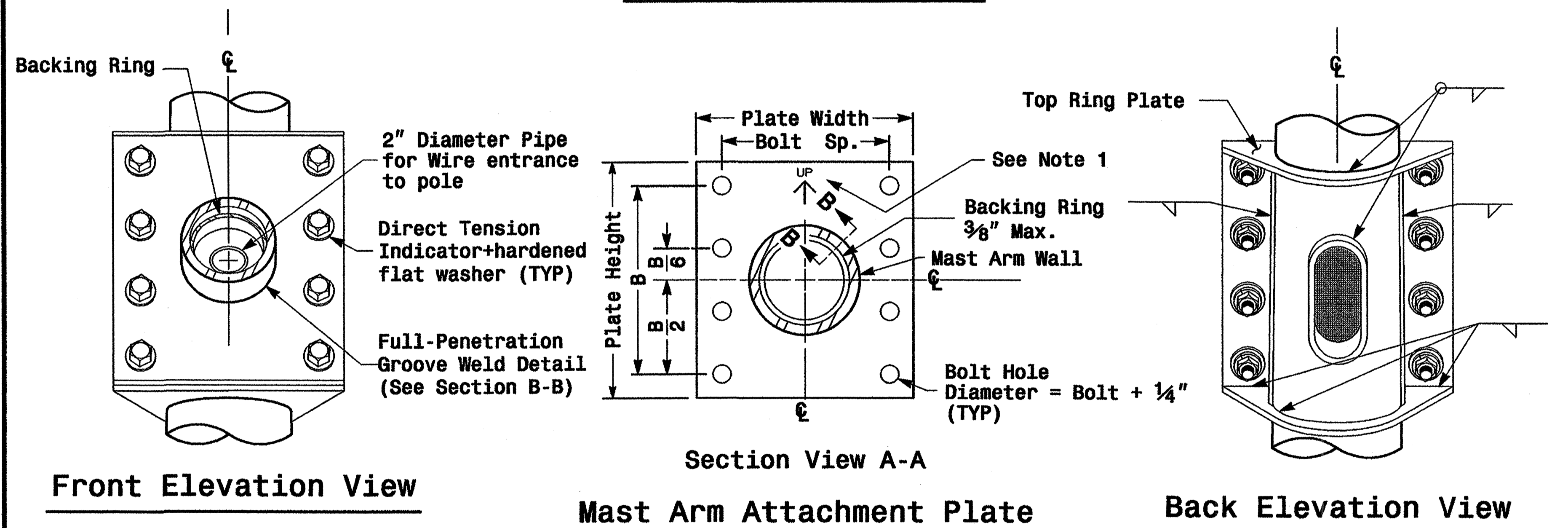
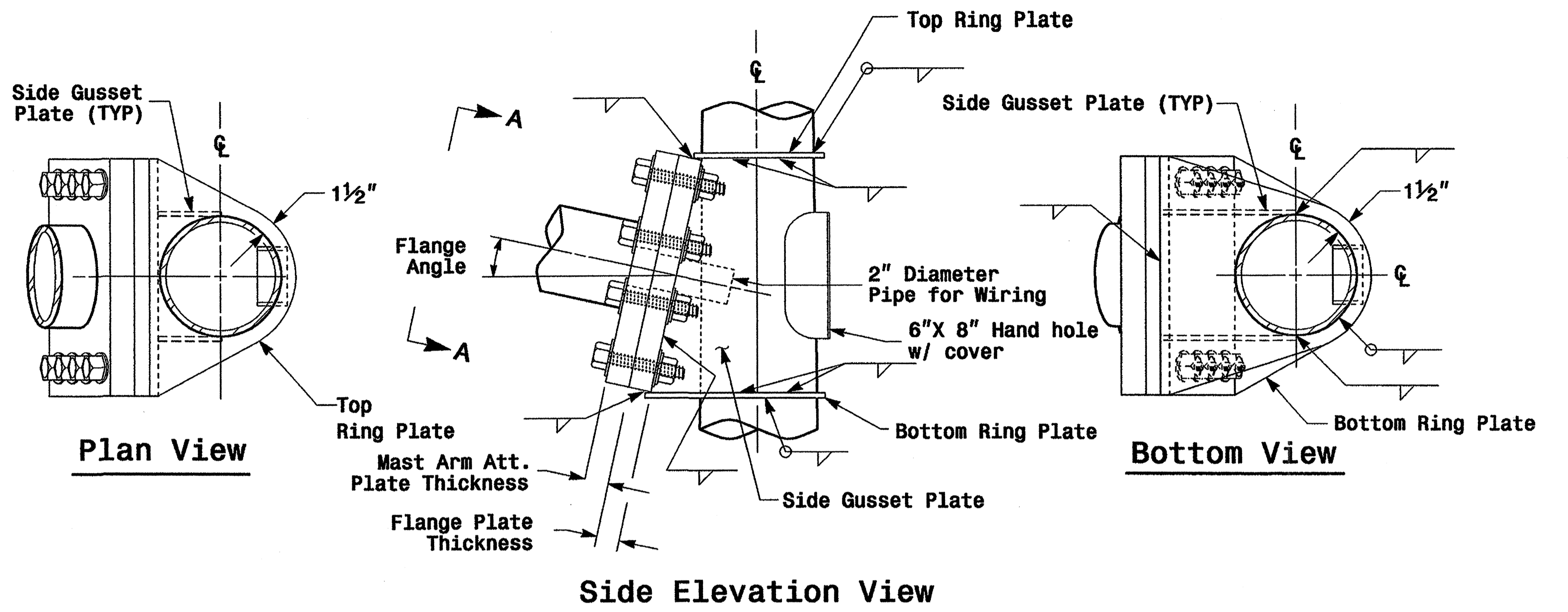
	<p>Typical Fabrication Details Common To All Metal Poles</p>		<p>SEAL</p>
	<p>PLAN DATE: May 2005</p>	<p>REVIEWED BY: C.F. Andrews</p>	
<p>SCALE: NA</p>	<p>PREPARED BY: P.L. Alexander</p>	<p>REVIEWED BY: A.M. Esposito</p>	<p>SIGNATURE: J. Sankar 9.2.2005</p>
<p>NONE</p>	<p>DATE</p>	<p>DATE</p>	<p>SIG. INVENTORY NO.</p>

Fabrication Details – All Poles

Adjustable Clamp Type Bolted Mast Arm Connection



Welded Ring Stiffened Mast Arm Connection



Notes:

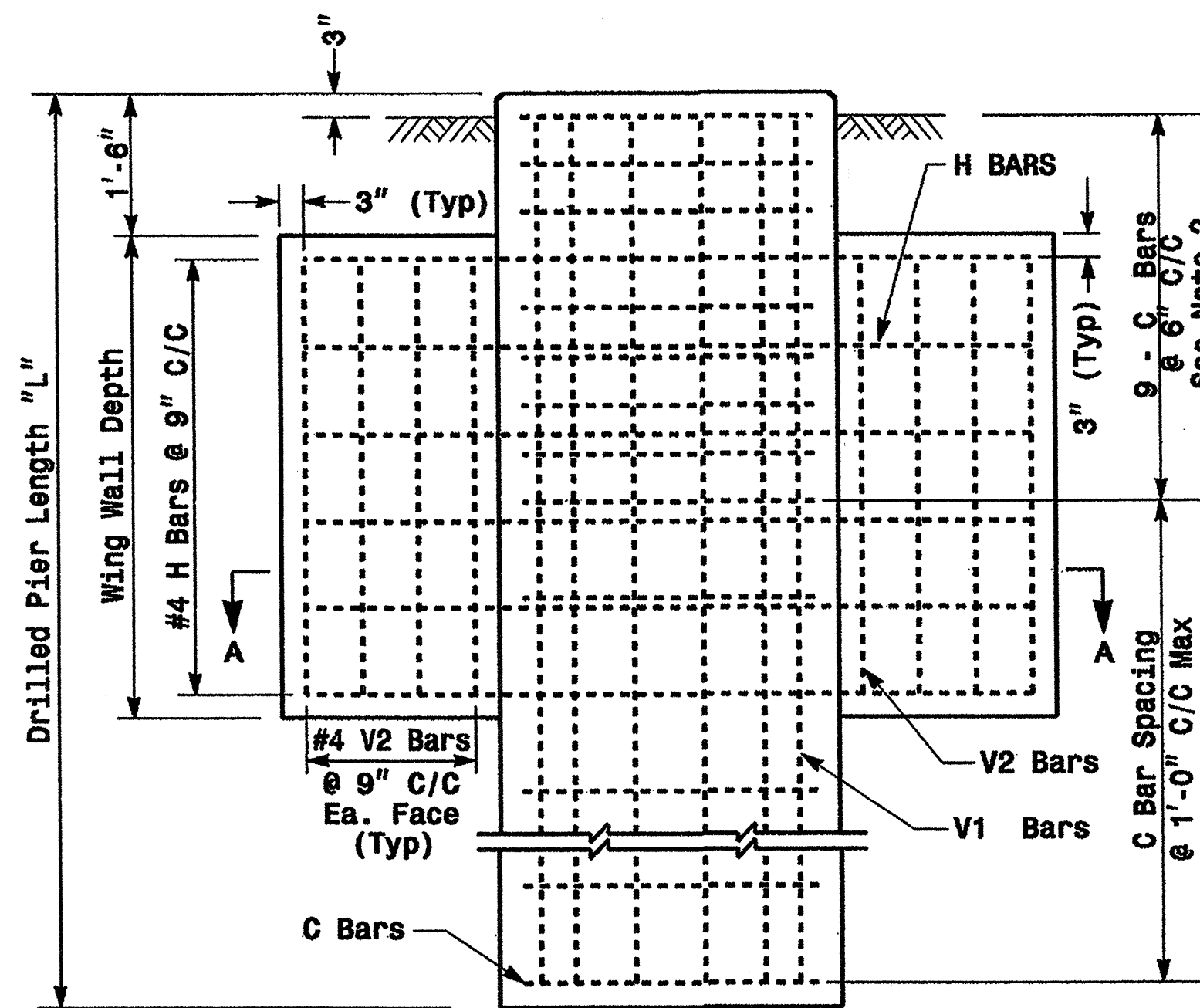
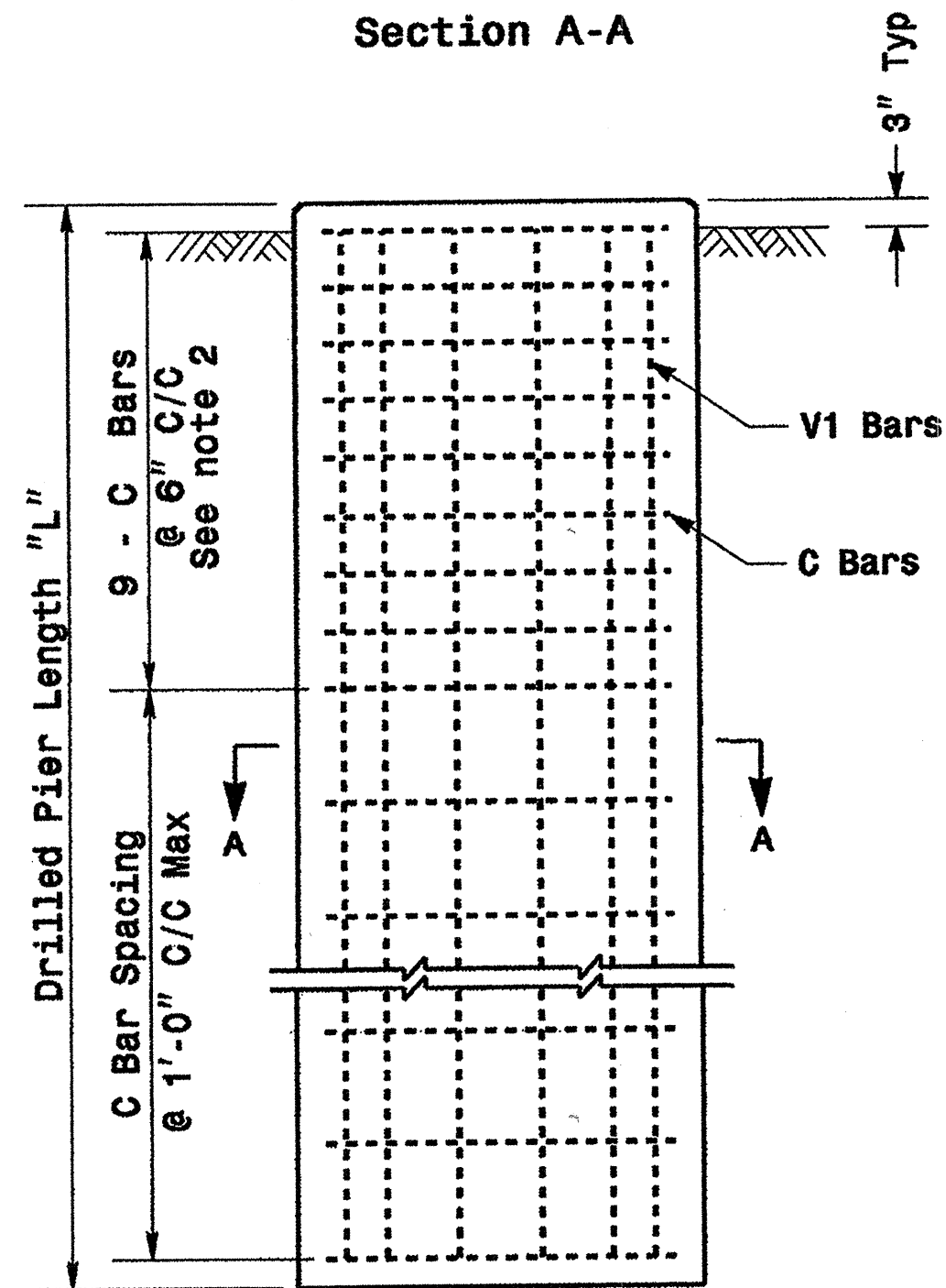
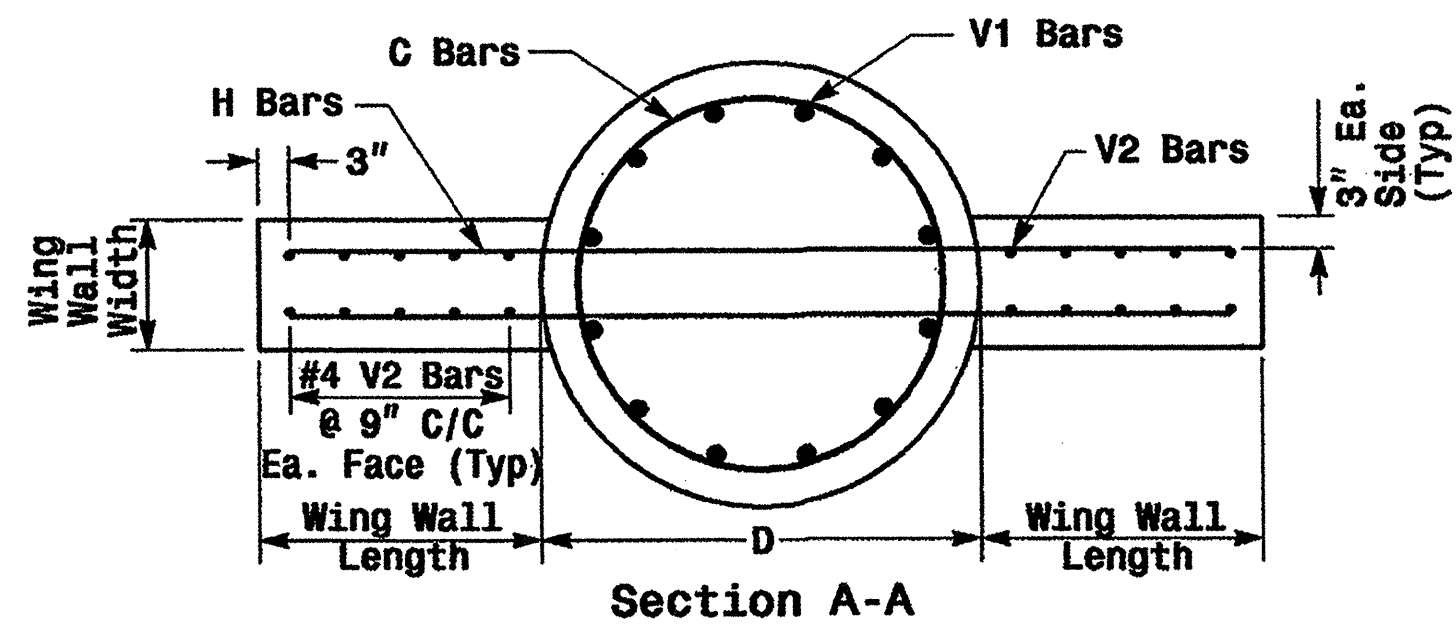
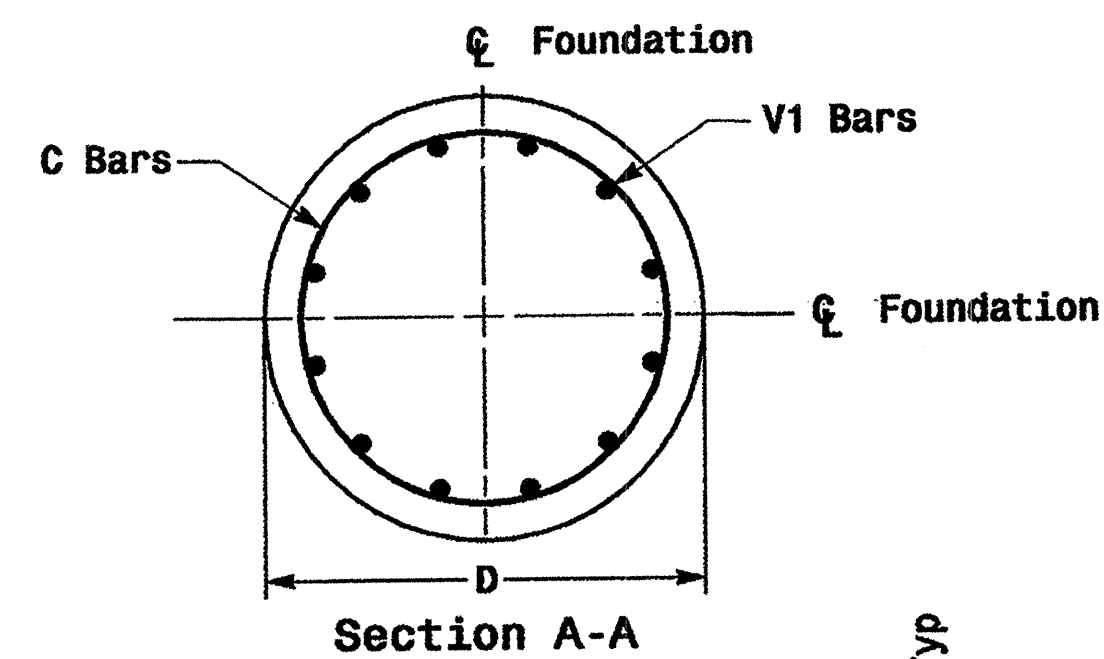
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Designer is responsible for providing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

Fabrication Details - Mast Arm Poles

01-SEP-2005 14:11 W:\pcep\188-un1\1\work\groups\2004 metal pole standard\sk204.m5.dgn p1 alexander

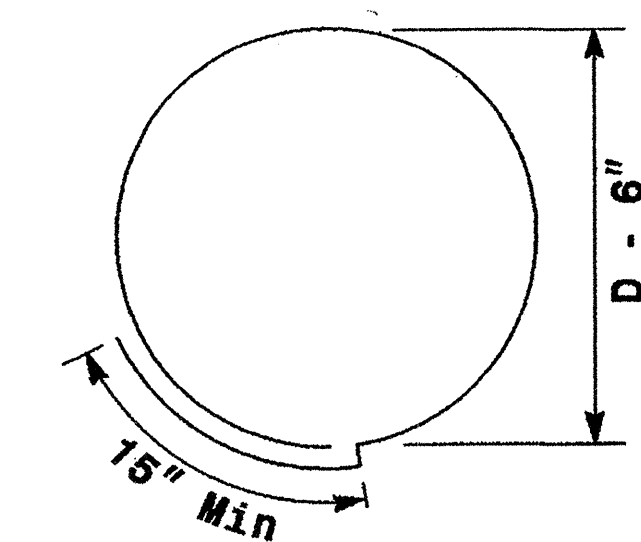
	Fabrication Details For Mast Arm Connection To Pole		
	PLAN DATE: May 2005 PREPARED BY: P. L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito	
122 N. McDowell St., Raleigh, NC 27603		SIGNATURE: <i>D. Sarker</i> 9.2.2005 DATE:	SIG. INVENTORY NO.

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

REINFORCING STEEL TABLE FOR STANDARD 42" and 48" DRILL PIER SHAFT WITH TYPE 1 AND TYPE 2 WING WALLS

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

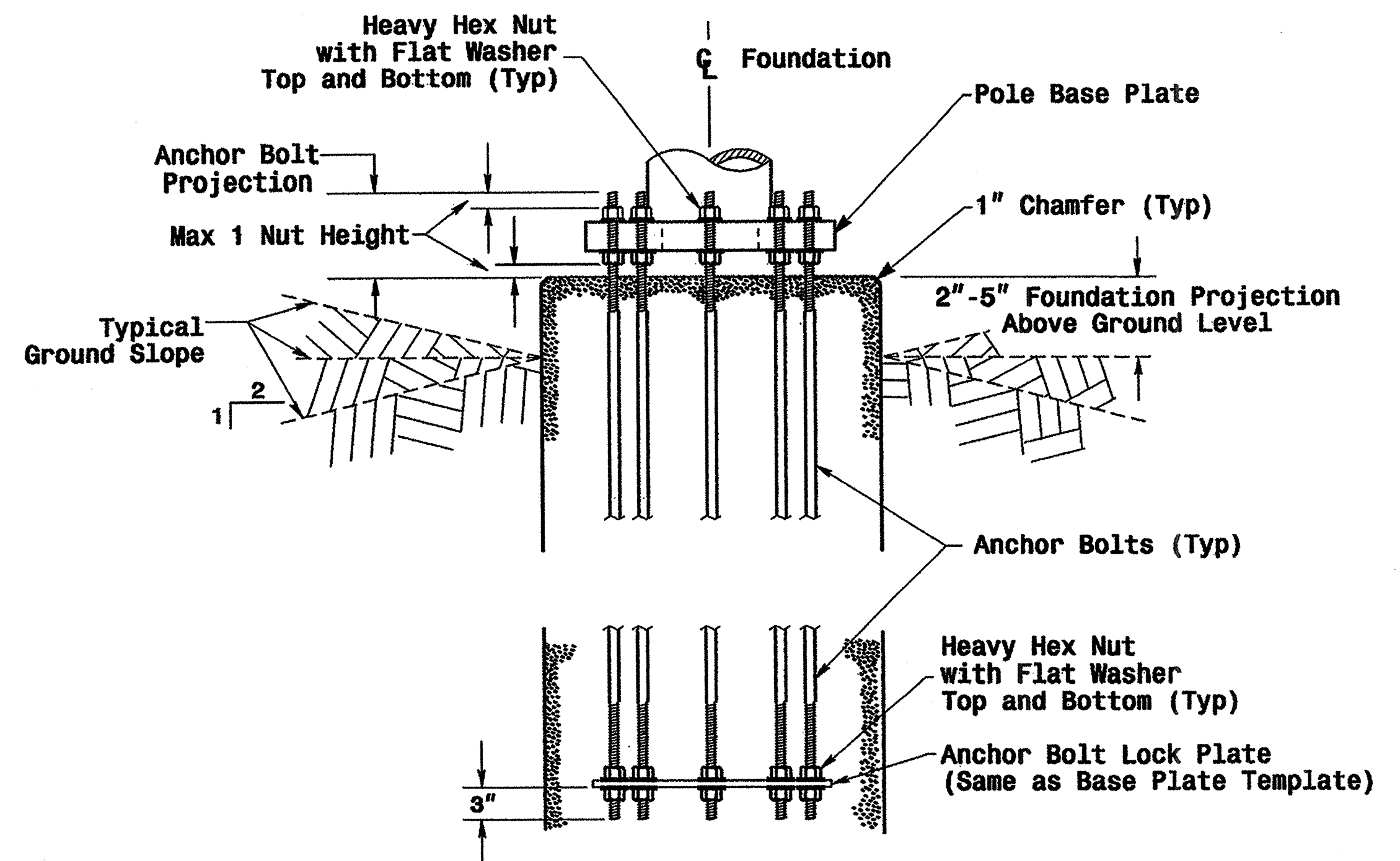
WING WALL DETAILS

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

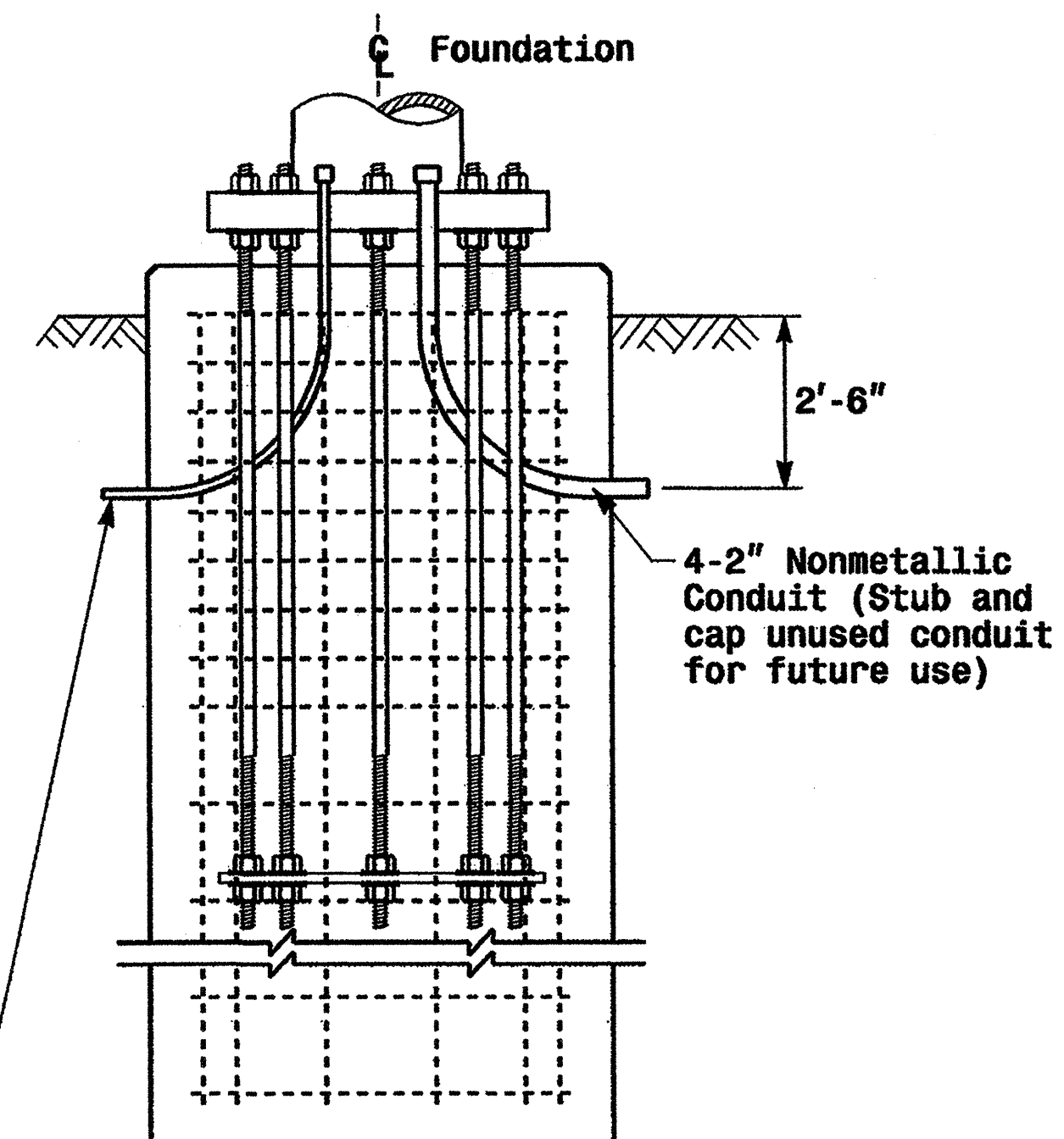
See Note No. 4

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.)

	Construction Details Foundations		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER 028094 D. SARKAR
	Prepared in the Office of: 	PLAN DATE: May 2005 PREPARED BY: C.F. ANDREWS SCALE: NA NONE	REVIEWED BY: P.L. ALEXANDER REVIEWED BY: A.M. ESPOSITO REVISIONS: _____ INIT. DATE _____

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS", ROADWAY DESIGN UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2002 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1715.01	UNDERGROUND CONDUIT
1716.01	JUNCTION BOXES
1730.01	FIBER OPTIC CABLE - SPARE CABLE STORAGE
1730.02	FIBER OPTIC CABLE - CONDUIT INSTALLATION
1733.01	DELINEATOR MARKERS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

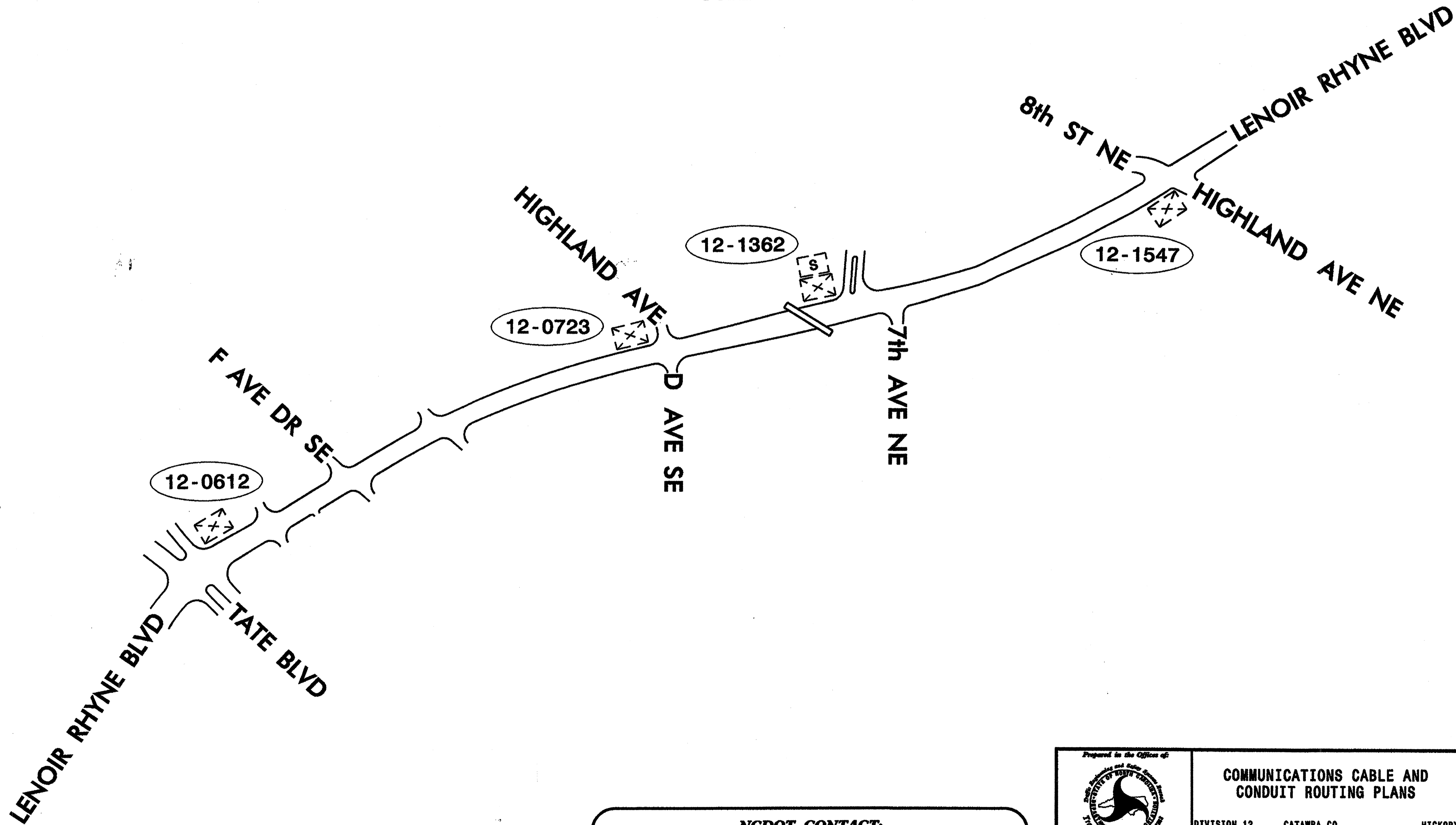
CATAWBA COUNTY

LOCATION: **LENOIR RHYNE BLVD FROM TATE BLVD TO HIGHLAND AVE NE/8th ST NE**

TYPE OF WORK: **COMMUNICATIONS CABLE AND CONDUIT ROUTING**

PROJECT: U-2306A

PROJECT: U-2306A



NCDOT CONTACT:
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
G.G. MURR, JR., PE - TRAFFIC MANAGEMENT SYSTEMS ENGINEER

 Prepared by the Office of: STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS 122 N. McDowell St., Raleigh, NC 27603	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS		SEAL G.G. MURR, JR. ENGINEER
	DIVISION 12 CATAWBA CO. HICKORY	PLAN DATE: JUNE 2004 REVIEWED BY: I.N. AVERY	
SCALE: 0	REVISIONS:		SIGNATURE: <i>[Signature]</i> DATE: 6-14-04

- 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

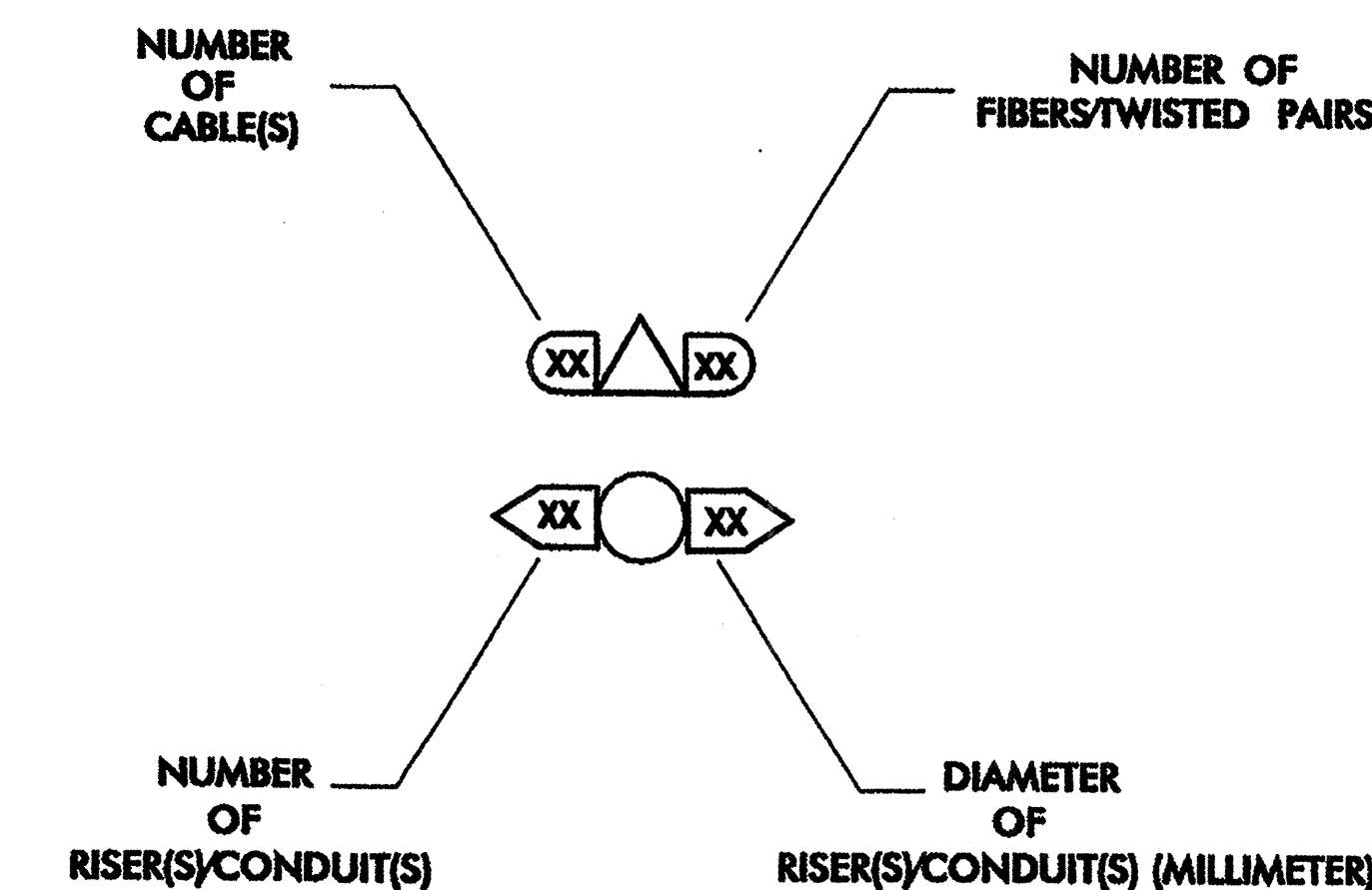
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL 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 30 METERS OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 6 METERS 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

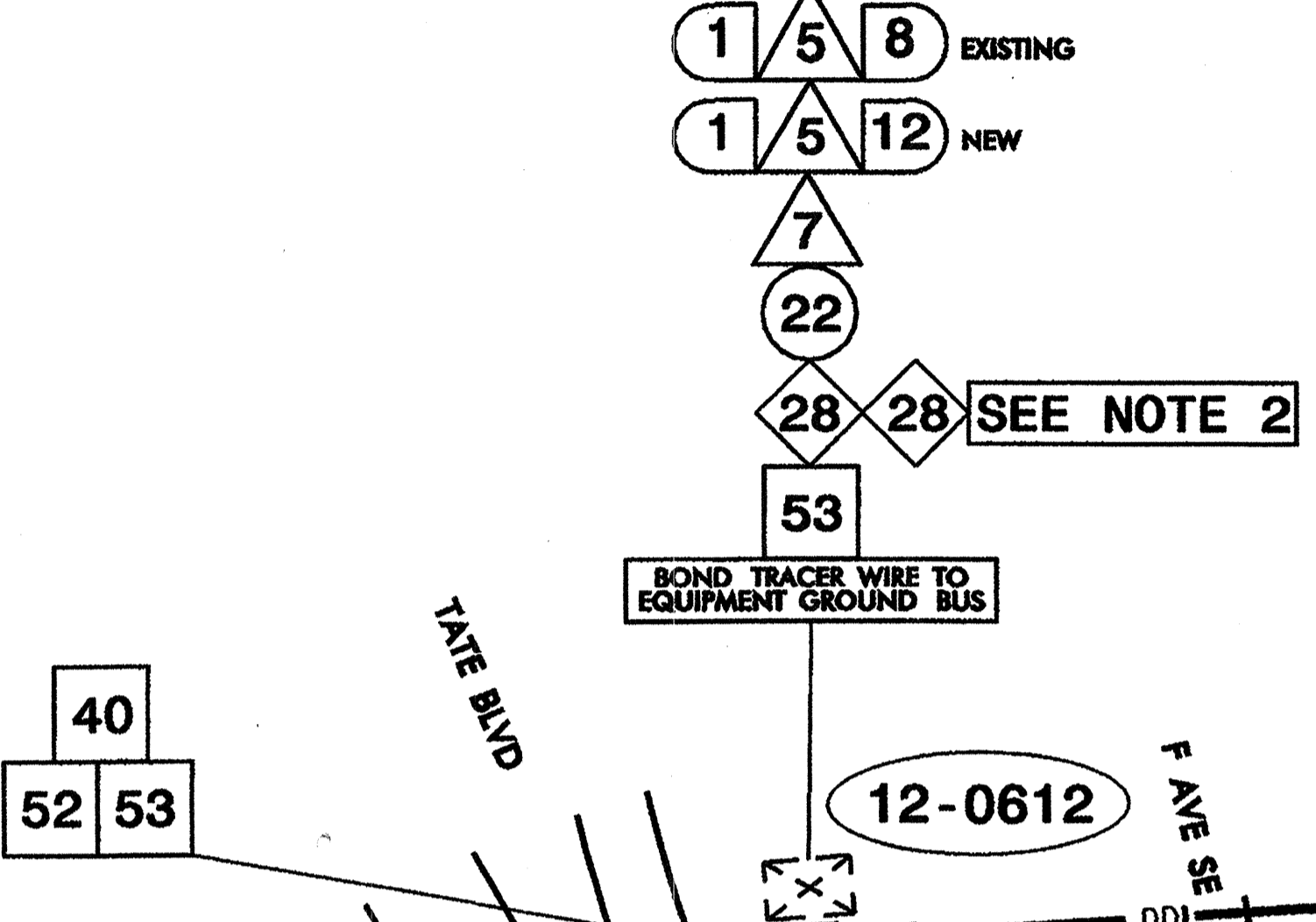
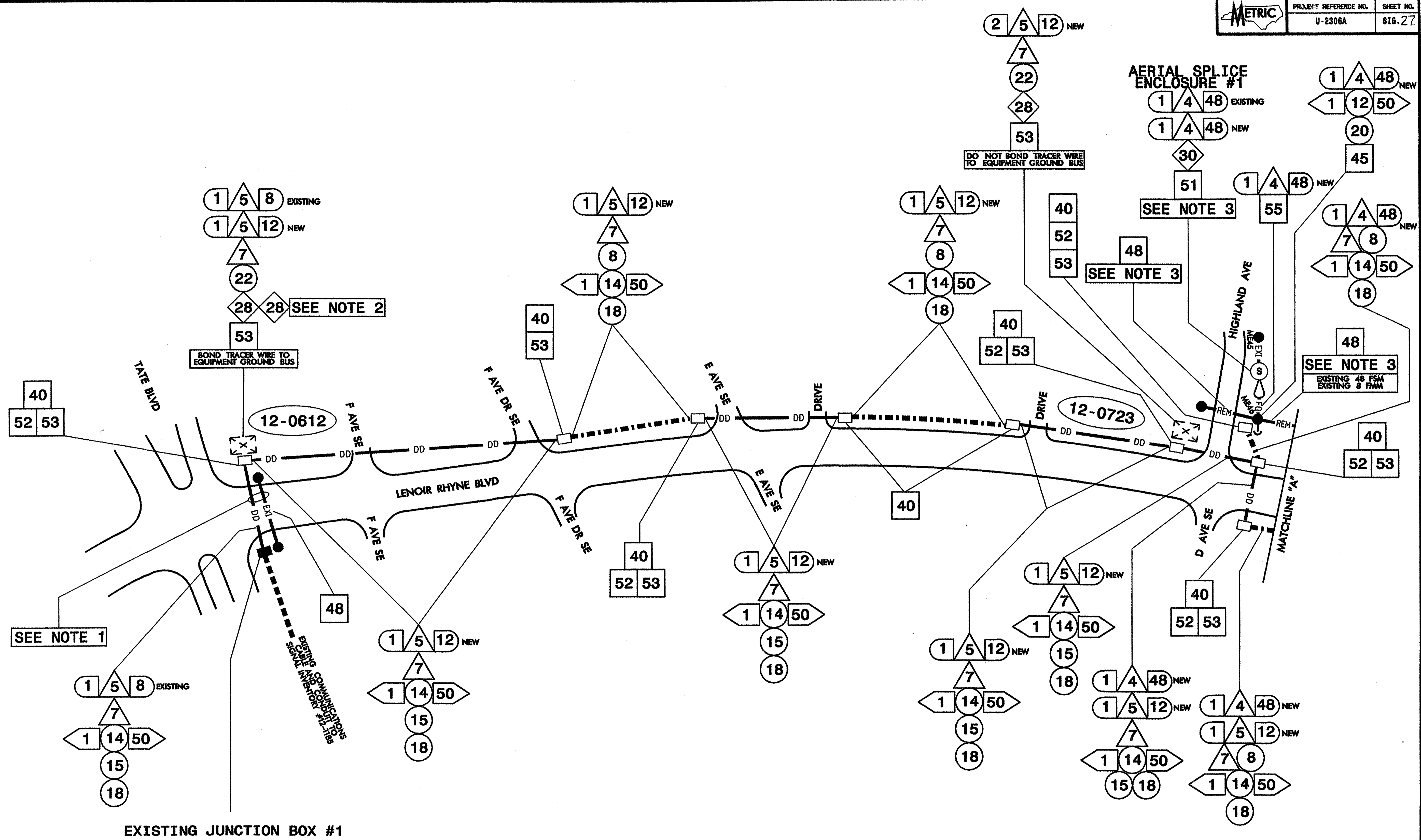
- FO NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI EXISTING COMMUNICATIONS CABLE
- REM EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- NEW DIRECTIONAL DRILLED CONDUIT
- B&J NEW BORED AND JACKED CONDUIT
- 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
- 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)



<p>222 N. McDowell St., Raleigh, NC 27603</p>	CONSTRUCTION NOTES		
	PLAN DATE: _____ REVISIONS: _____ SCALE: _____ NORTH:	REVIEWED BY: _____ REVIEWED BY: G. A. FULLER INIT. DATE: _____ DATE: 10/31/02	



DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS

SEE NOTE 3

SEE NOTE 3

SEE NOTE 3
EXISTING 48 FSM
EXISTING 8 FMM

SEE NOTE 1

EXISTING JUNCTION BOX #1

NOTES:

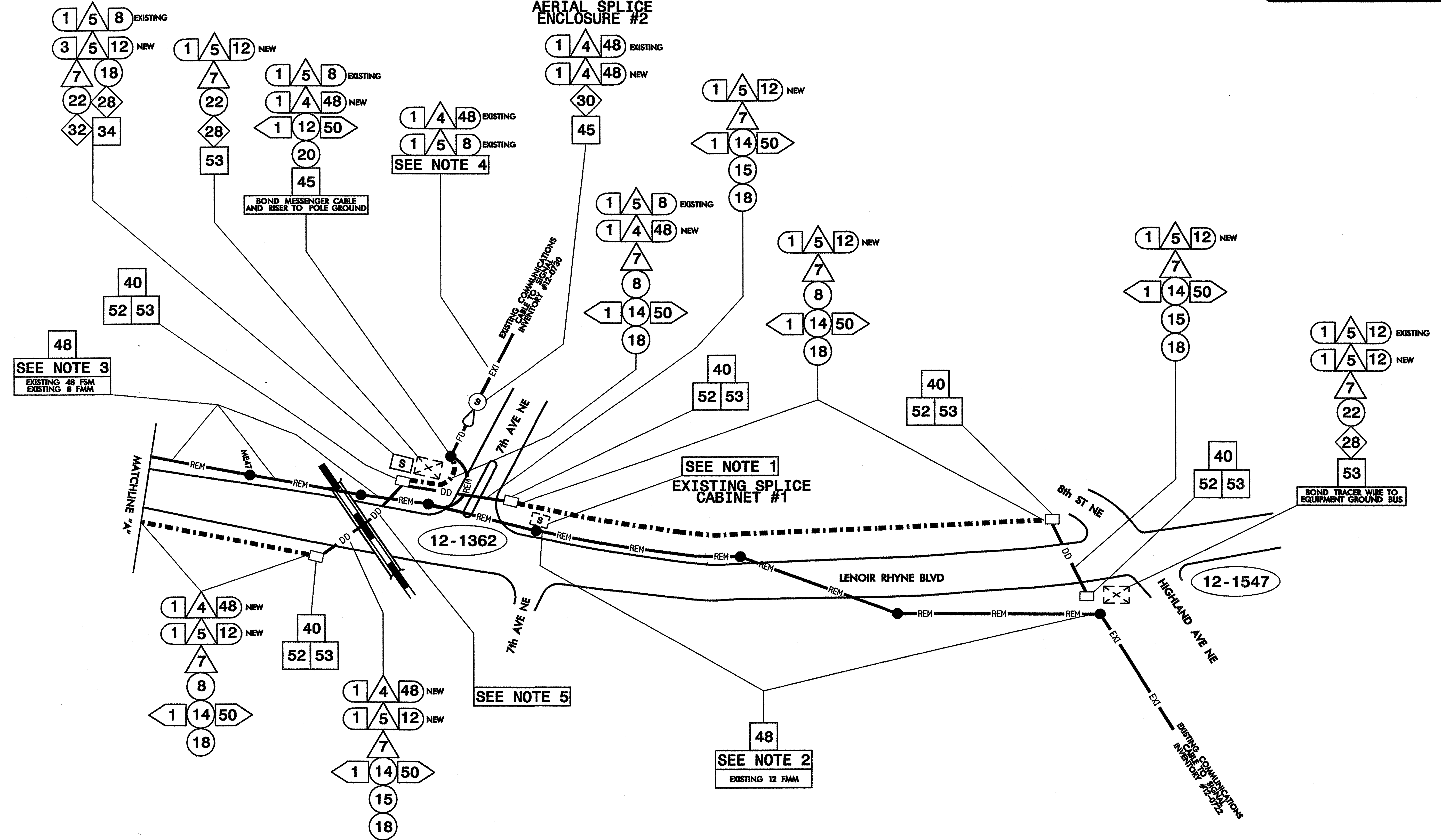
- CONTRACTOR TO REMOVE THE EXISTING MULTI-MODE COMMUNICATIONS CABLE (AERIAL RUN) AND ROUTE THROUGH THE CONTRACTOR INSTALLED CONDUIT SYSTEM TO THE NEW CONTROLLER CABINET LOCATION (SIG. INV. #12-0612). STORE EXCESS SPARE COMMUNICATIONS CABLE IN EXISTING JUNCTION BOX #1.
- TERMINATE THE EXISTING MULTI-MODE COMMUNICATIONS CABLE IN A SEPARATE INTERCONNECT CENTER AS SHOWN IN THE MULTI-MODE SPLICE PLANS.
- REMOVE THE EXISTING 8 FIBER MULTI-MODE CABLE THAT RUNS BETWEEN SIG. INV. #12-0723 AND EXISTING SPLICE CABINET #1. THIS SECTION OF CABLE IS TO BE DISCARDED. CUT THE EXISTING 48 FIBER SINGLE-MODE CABLE, BACK PULL AND STORE FOR FUTURE TERMINATION AT "AERIAL SPLICE ENCLOSURE #1."

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

	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS		
	DIVISION 12 CATAWBA CO. HICKORY PLAN DATE: JUNE 2004 REVIEWED BY: I.H. AVERY PREPARED BY: S.C. WARDLE REVIEWED BY: G.G. MURR		
SCALE 0 	REVISIONS INIT. DATE _____ _____		SIGNATURE DATE 6-14-04

SPLICE CABINET #2

AERIAL SPLICE ENCLOSURE #2



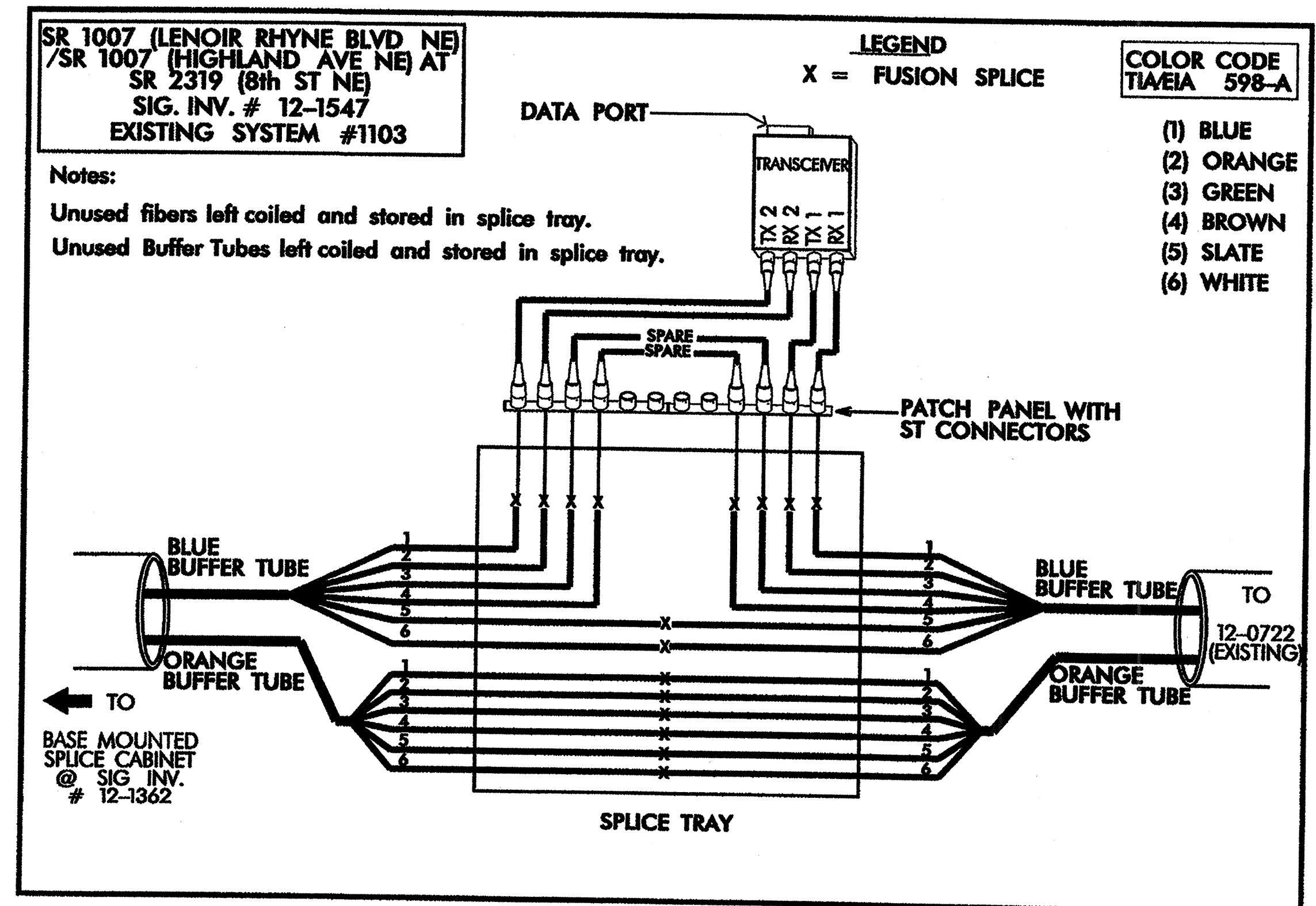
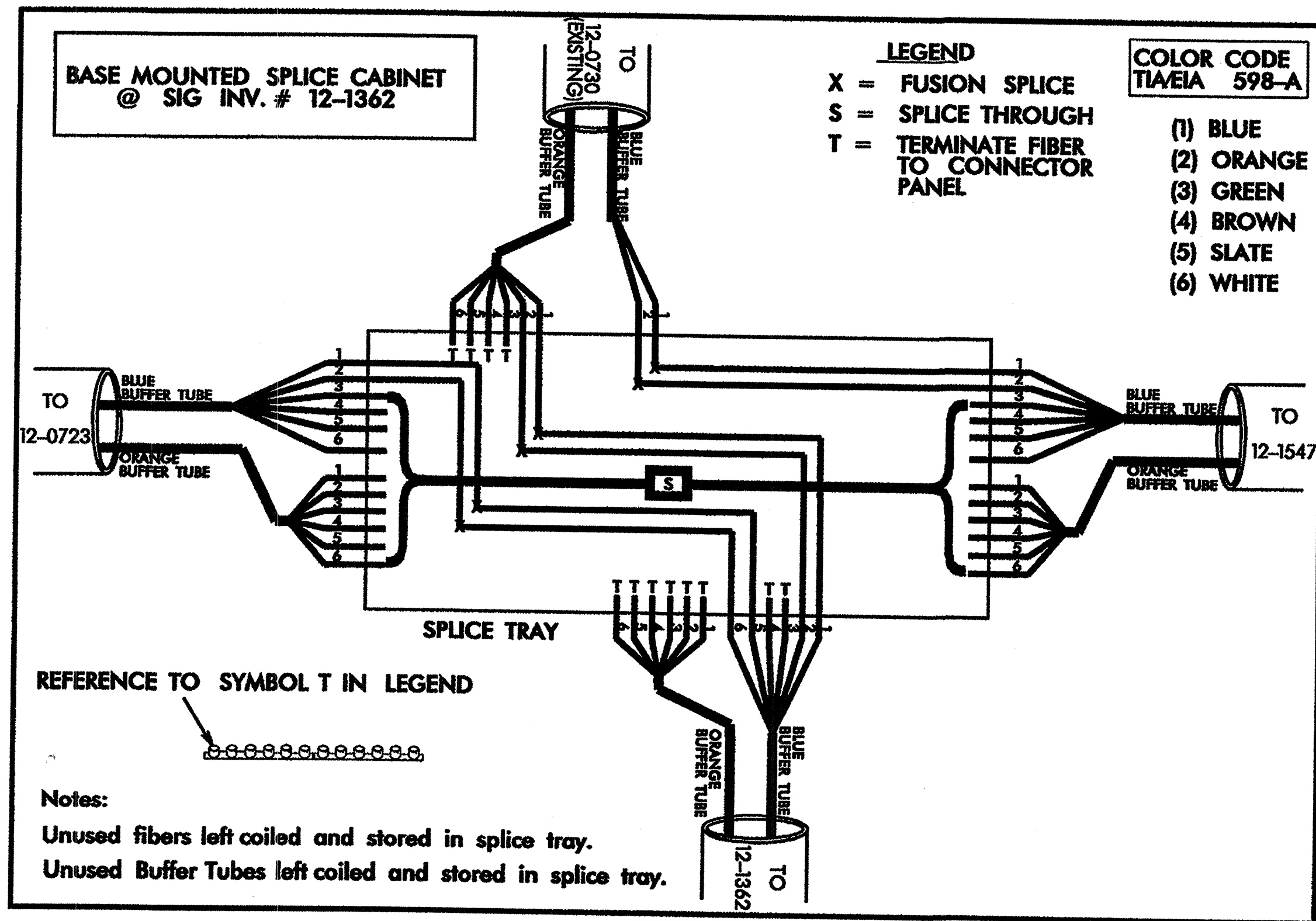
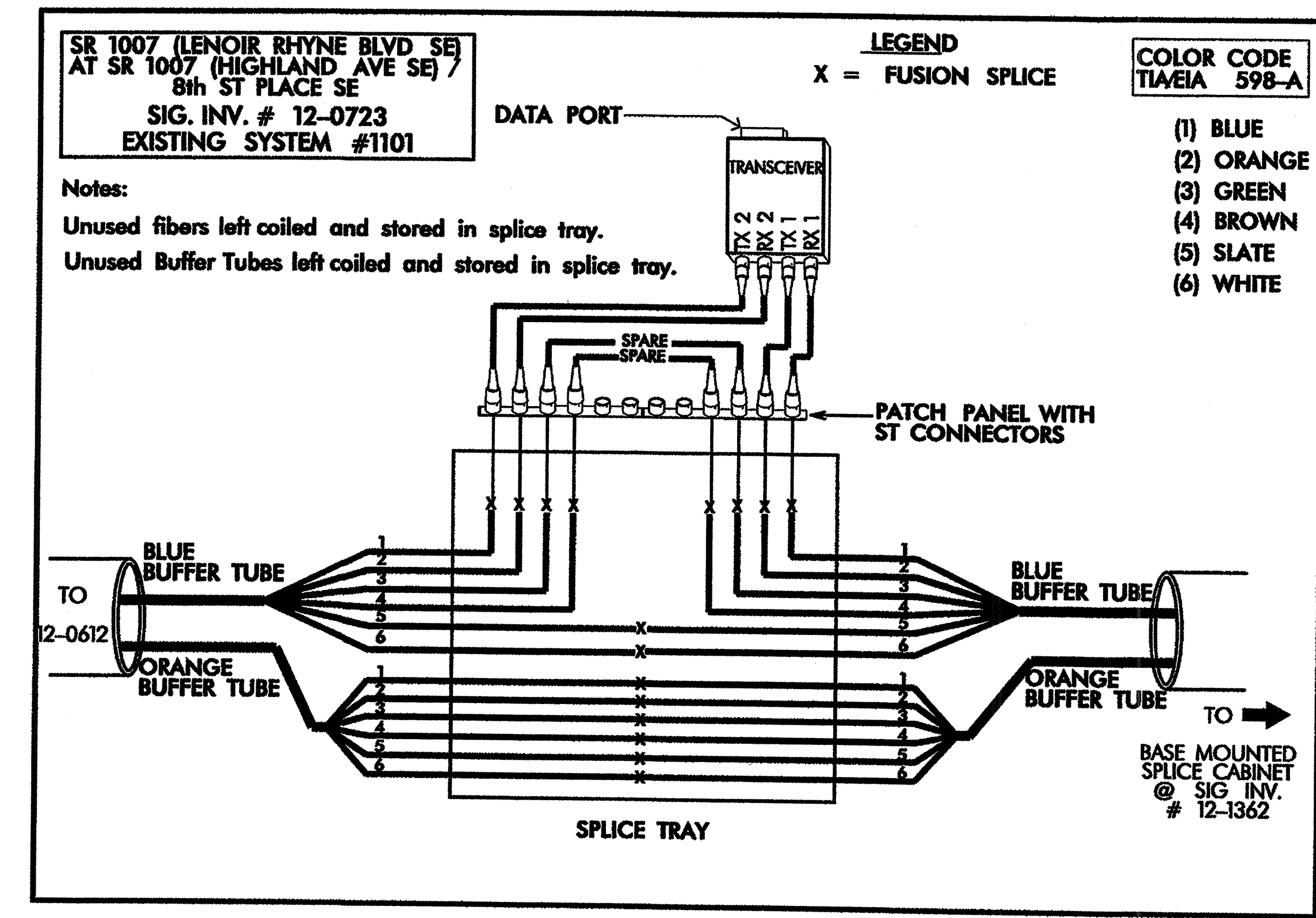
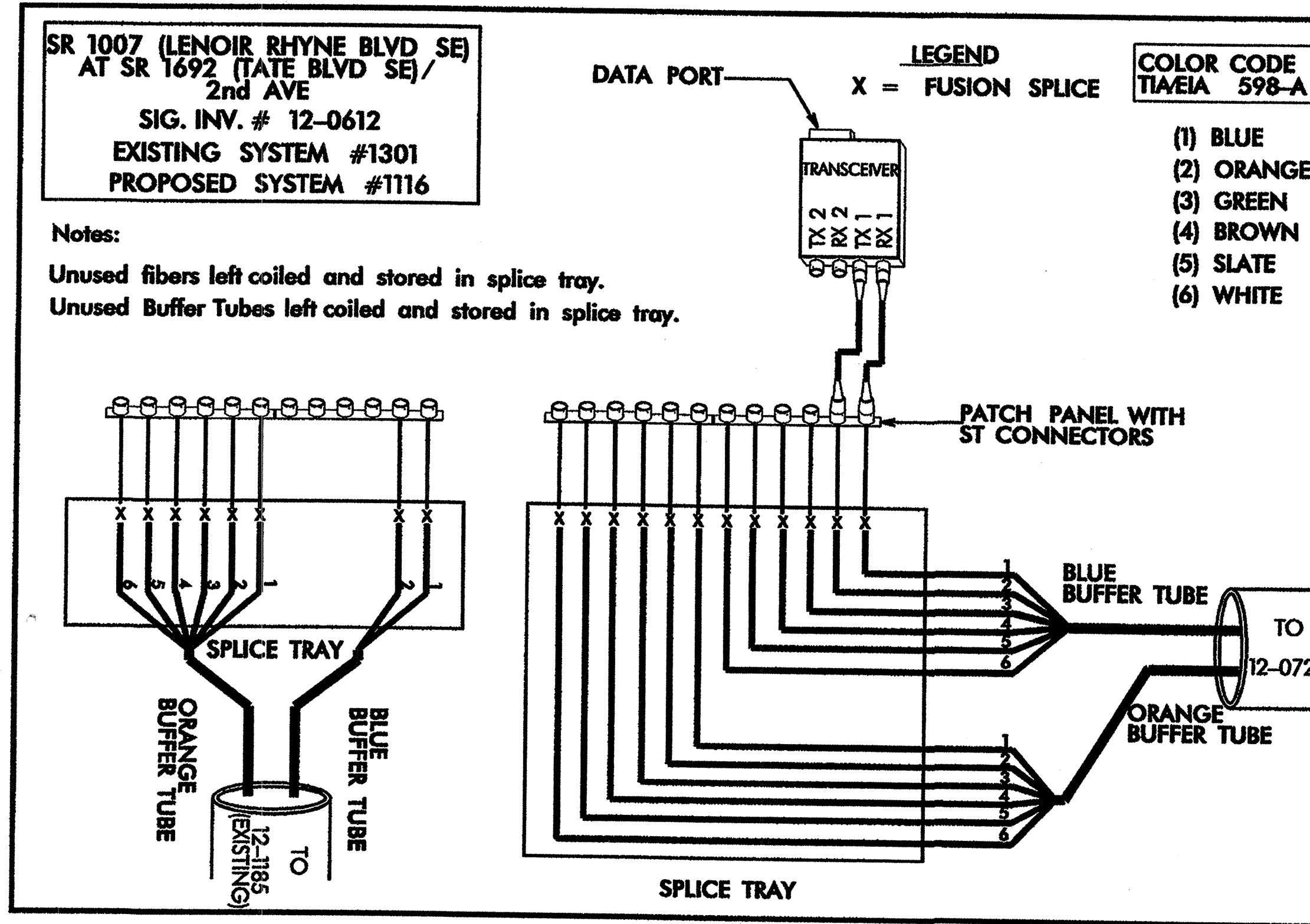
NOTES:

1. REMOVE EXISTING SPLICE CABINET #1 AND INTERCONNECT CENTER AND RETURN TO ENGINEER
2. REMOVE THE EXISTING 12 FIBER MULTI-MODE CABLE WHICH RUNS BETWEEN "EXISTING SPLICE CABINET #1" AND SIG. INV. #12-1547. THIS SECTION OF CABLE IS TO BE DISCARDED AND REPLACED WITH NEW 12 FIBER MULTI-MODE CABLE.
3. CUT THE EXISTING 48 FIBER SINGLE-MODE CABLE, BACK PULL AND STORE FOR FUTURE TERMINATION AT "AERIAL SPLICE ENCLOSURE #2." REMOVE AND DISCARD ANY MULTI-MODE COMMUNICATIONS CABLE THAT RUNS BETWEEN "EXISTING SPLICE CABINET #1" AND SIG. INV. #12-0723.
4. RELOCATE THE SECTION OF 8 FIBER MULTI-MODE COMMUNICATIONS CABLE THAT RUNS BETWEEN "EXISTING SPLICE CABINET #1" AND SIG. INV. #12-0730. REROUTE THE EXISTING CABLE TO THE "NEW SPLICE CABINET #2" LOCATED AT SIG. INV. #12-1362.
5. CONTRACTOR MAY CONSIDER INSTALLING CONDUIT UNDER ROADWAY WHILE THE ROADBED IS OPENED FOR OTHER UTILITY WORK, DRAINAGE, ETC. THERE ARE SEVERAL UNDERGROUND UTILITIES IN THIS AREA.


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

	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS		
	DIVISION 12 CATAWBA CO. HICKORY PLAN DATE: JUNE 2004 REVIEWED BY: I.N. AVERY PREPARED BY: S.C. WARDLE REVIEWED BY: G.G. MURR		
222 N. McDowell St., Raleigh, NC 27603 SCALE: 0		REVISIONS: _____ INIT. DATE: _____	SIGNATURE: _____ DATE: 6-14-04

MULTI-MODE FIBER OPTIC CABLE

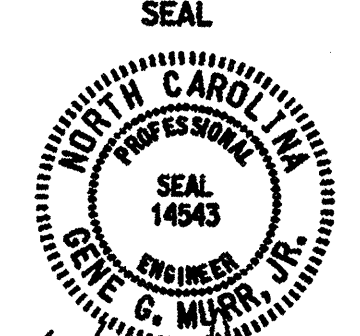


NOTE 1: CONTRACTOR TO RETURN EXISTING TRANSCEIVERS AND INTERCONNECT CENTERS TO THE ENGINEER FOR RETURN TO THE CITY OF HICKORY
 NOTE 2: FURNISH OPTTECOM MODEL 4170-S-ST TRANSCEIVERS FOR COMPATILITY WITH THE EXISTING HICKORY COMPUTERIZED SIGNAL SYSTEM
 NOTE 3: TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING THE PROPER TERMINATIONS

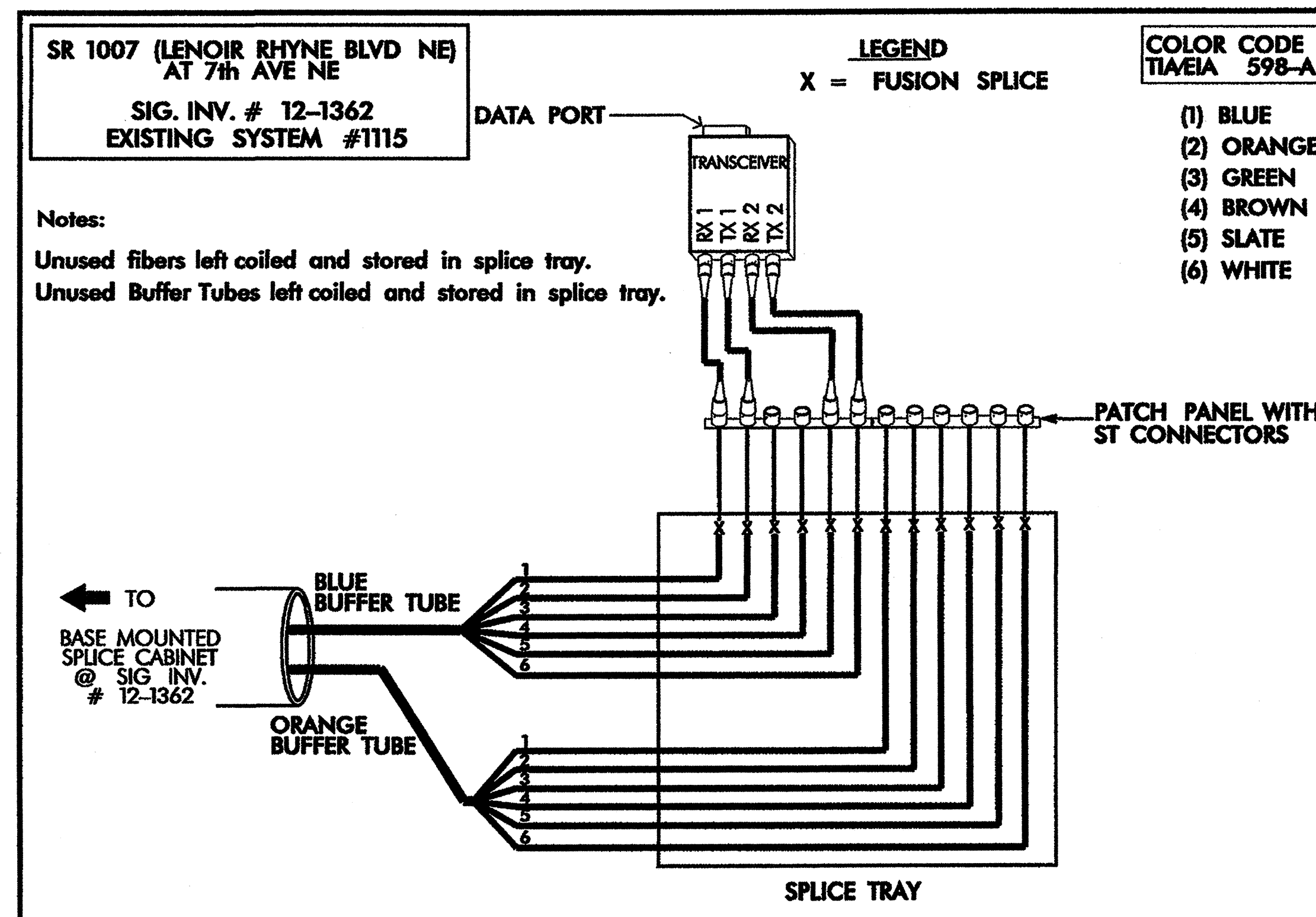
Prepared in the Office of

MULTI-MODE SPICE PLAN

DIVISION 12 CATAWBA CO. HICKORY
 PLAN DATE: JUNE 2004 REVIEWED BY: I.N. AVERY
 PREPARED BY: ADRIAN CREECH REVIEWED BY: G.G. MURR, JR.
 REVISIONS: _____ INIT. DATE

SCALE: 0

SEAL

 SIGNATURE: _____ DATE: 6-14-04



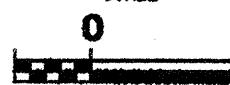

MULTI-MODE FIBER OPTIC CABLE



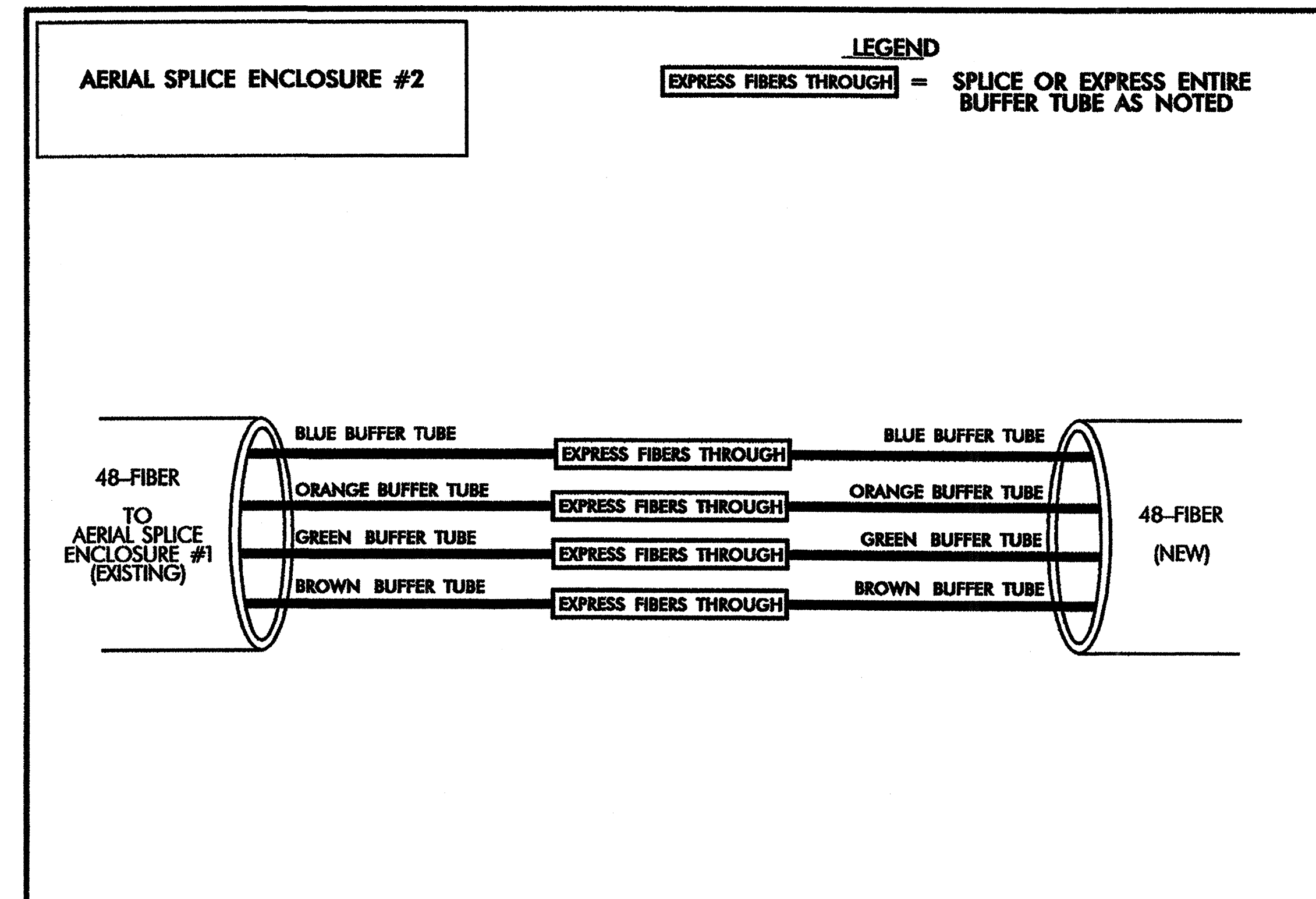
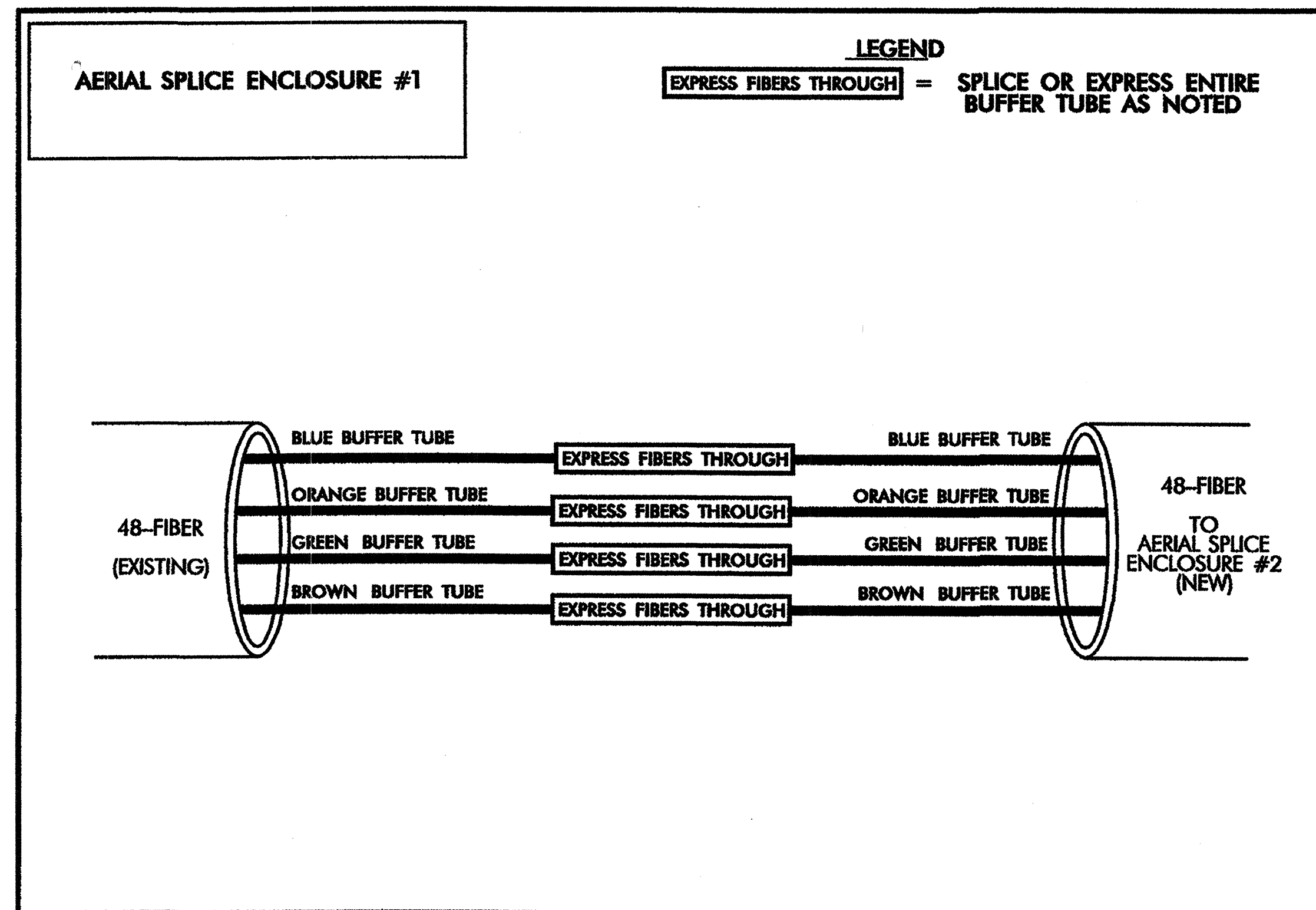
NOTE 1: CONTRACTOR TO RETURN EXISTING TRANSCEIVERS AND INTERCONNECT CENTERS TO THE ENGINEER FOR RETURN TO THE CITY OF HICKORY

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NOTE 3: TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING THE PROPER TERMINATIONS

 <small>Prepared in the Office of: The State of North Carolina Department of Transportation Traffic Management Systems</small>	MULTI-MODE SPLICE PLAN		 <small>SEAL 14543 ENGINEER G.G. MURR, JR.</small>
	<small>DIVISION 12 CATAWBA CO. HICKORY</small>		
<small>122 N. McDowell St., Raleigh, NC 27603</small>	<small>PLAN DATE: JUNE 2004</small>	<small>REVIEWED BY: I.N. AVERY</small>	<small>REVISIONS</small>
<small>SCALE</small> 0	<small>PREPARED BY: ADRIAN CREECH</small>	<small>REVIEWED BY: G.G. MURR, JR.</small>	<small>INIT. DATE</small>
	<small>SIGNATURE</small> 	<small>DATE</small> 6-14-04	<small>CADD File name:</small>

SINGLE-MODE FIBER OPTIC CABLE



NOTE 1: TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING THE PROPER TERMINATIONS

	SINGLE-MODE SPLICE PLAN	
	DIVISION 12 CATAWBA CO. HICKORY PLAN DATE: JUNE 2004 REVIEWED BY: I. W. AVERY PREPARED BY: ADRIAN CREECH REVIEWED BY: G. G. MURR, JR.	SCALE: 0
REVISIONS _____ _____ _____	INIT. DATE _____ _____ _____	SIGNATURE DATE 6-14-04 _____