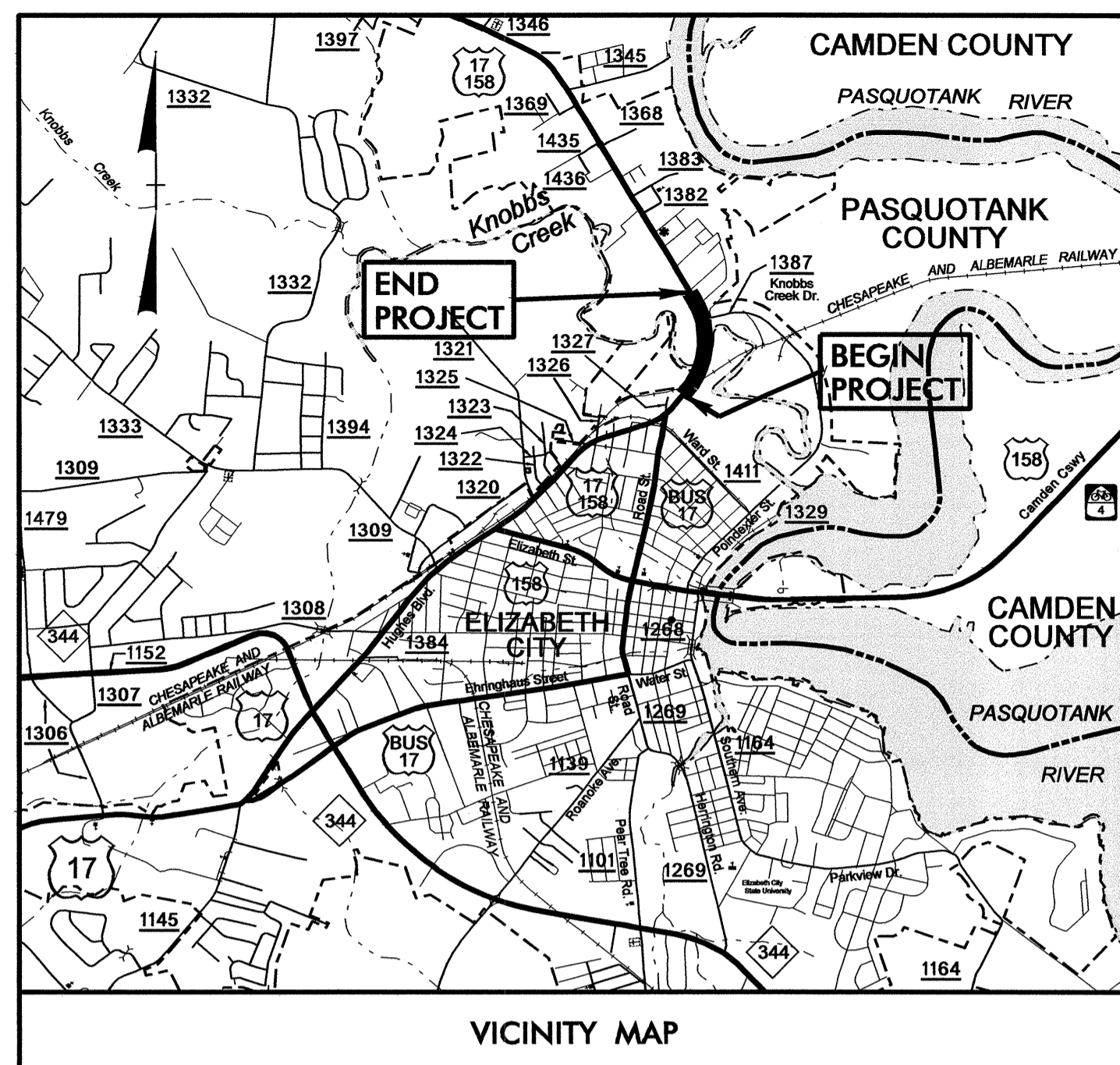


**TIP: B-4599**

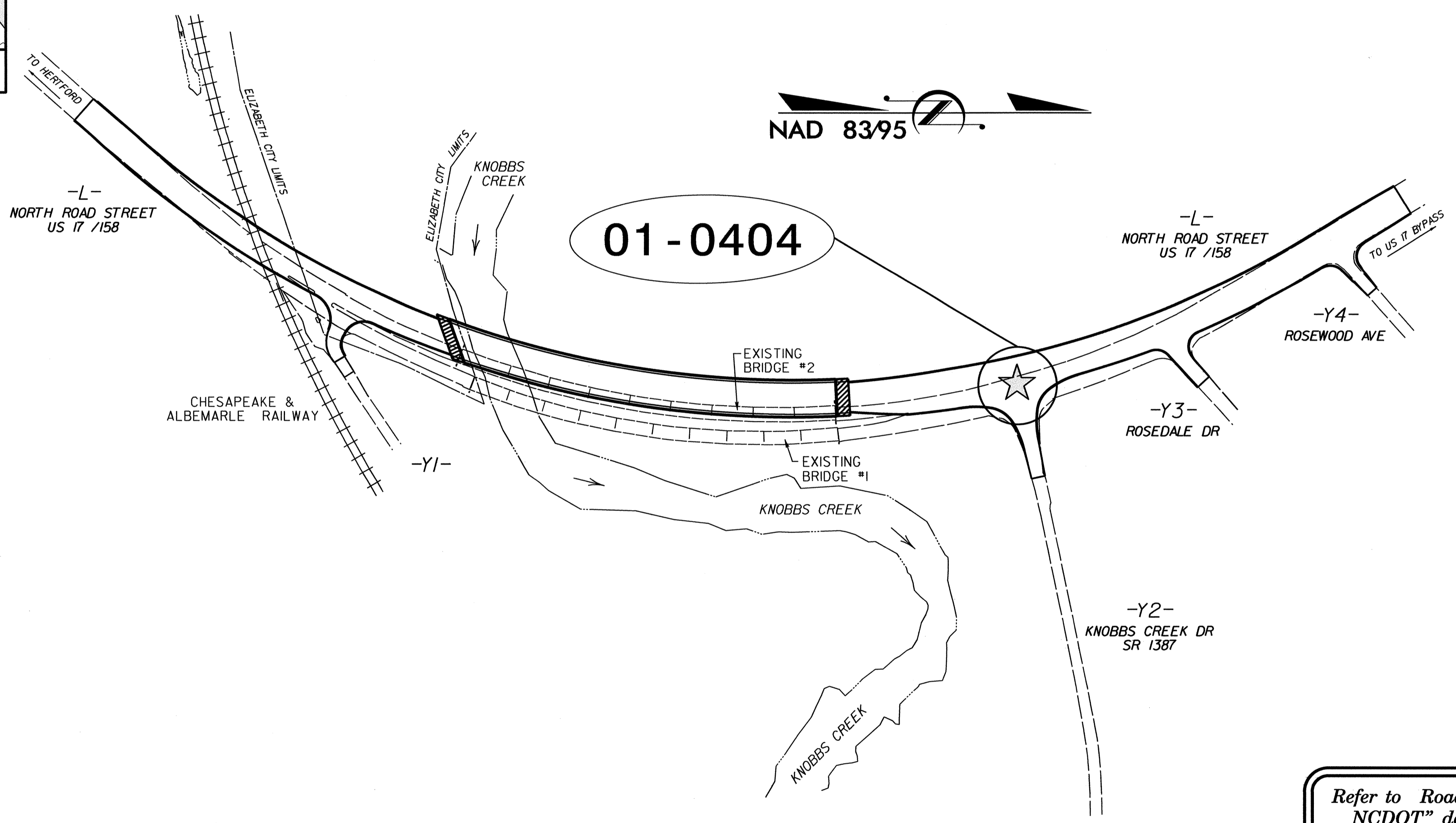


VICINITY MAP

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# PASQUOTANK COUNTY

**LOCATION: BRIDGES NOS. 1 & 2 OVER KNOBBS CREEK ON US 17 / US 158.**  
**TYPE OF WORK: TRAFFIC SIGNALS.**



Refer to Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.

Index of Plans		
Sheet #	Reference #	Location/Description
Sig. 1	-----	Title Sheet
Sig. 2-18	01-0404 T1, T2, T3 & Final	US 17-158 (N. Road Street) at SR 1387 (Knobbs Creek Road)/Commercial Drive
Sig. 19-20	N/A	Cable Routing Plans
Sig. 21-25	N/A	Metal Pole Typicals

**Transportation Mobility And System Division**

Contacts:

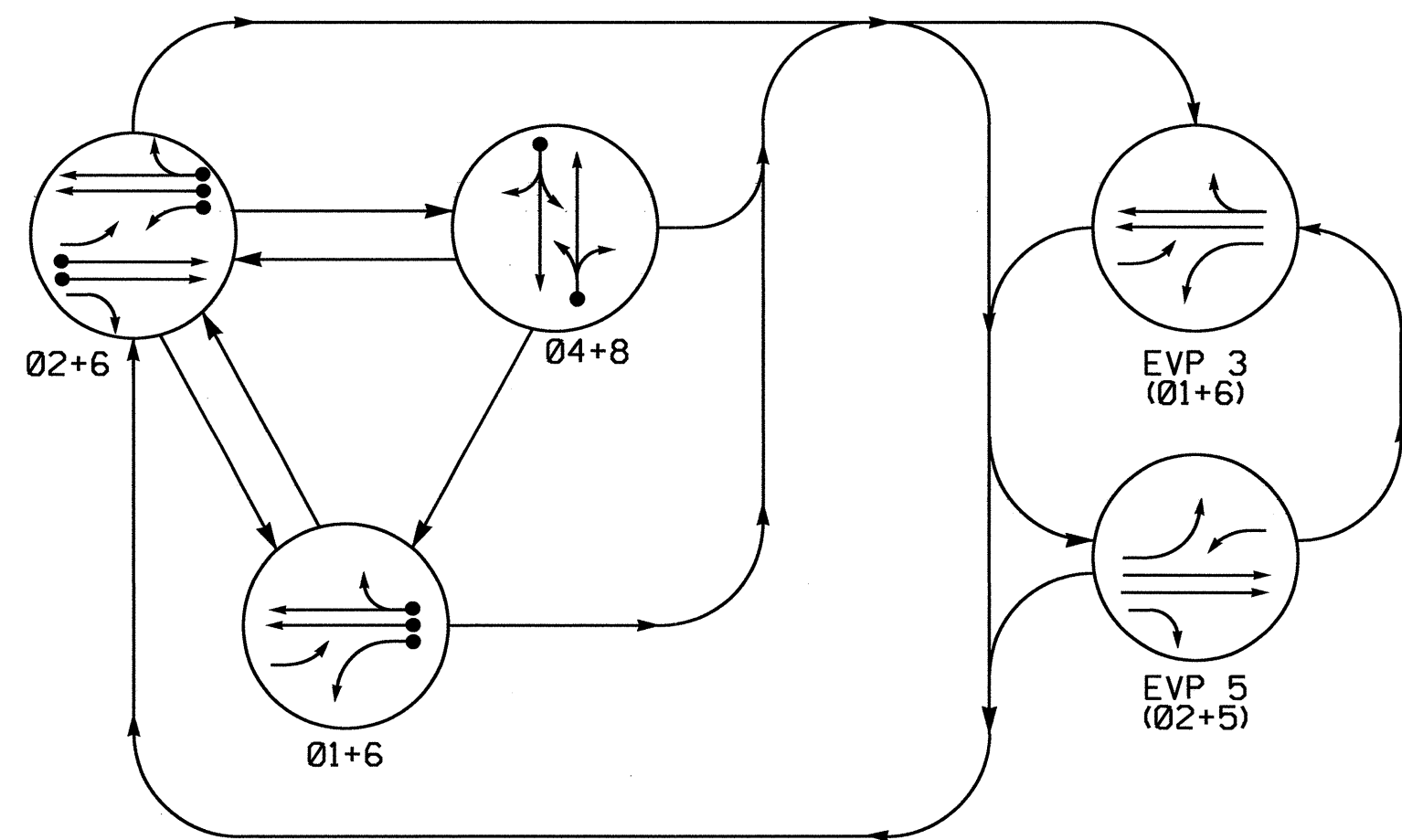
**Pamela L. Alexander, PE** - East Region Signal Project Engineer  
**John T. Rowe Jr., PE** - Signal Equipment Design Engineer

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
**TRANSPORTATION MOBILITY AND SAFETY DIVISION**

750 N. Greenfield Parkway, Garner, NC 27529

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PHASING DIAGRAM

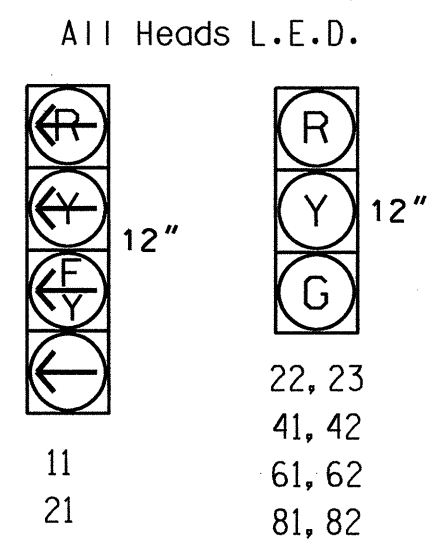


**PHASING DIAGRAM DETECTION LEGEND**  
 ● DETECTED MOVEMENT  
 ○ UNDETECTED MOVEMENT (OVERLAP)  
 - UNSIGNALIZED MOVEMENT  
 - PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

SIGNAL FACE	PHASE					
	01+6	02+6	04+8	EVP 3	EVP 5	FLASH
11	←	←	←	←	←	←
21	←	←	←	←	←	←
22, 23	R	G	R	R	G	R
41, 42	R	R	G	R	R	R
61, 62	G	G	R	G	R	Y
81, 82	R	R	G	R	R	R

**SIGNAL FACE I.D.**



**OASIS 2070L LOOP & DETECTOR INSTALLATION CHART**

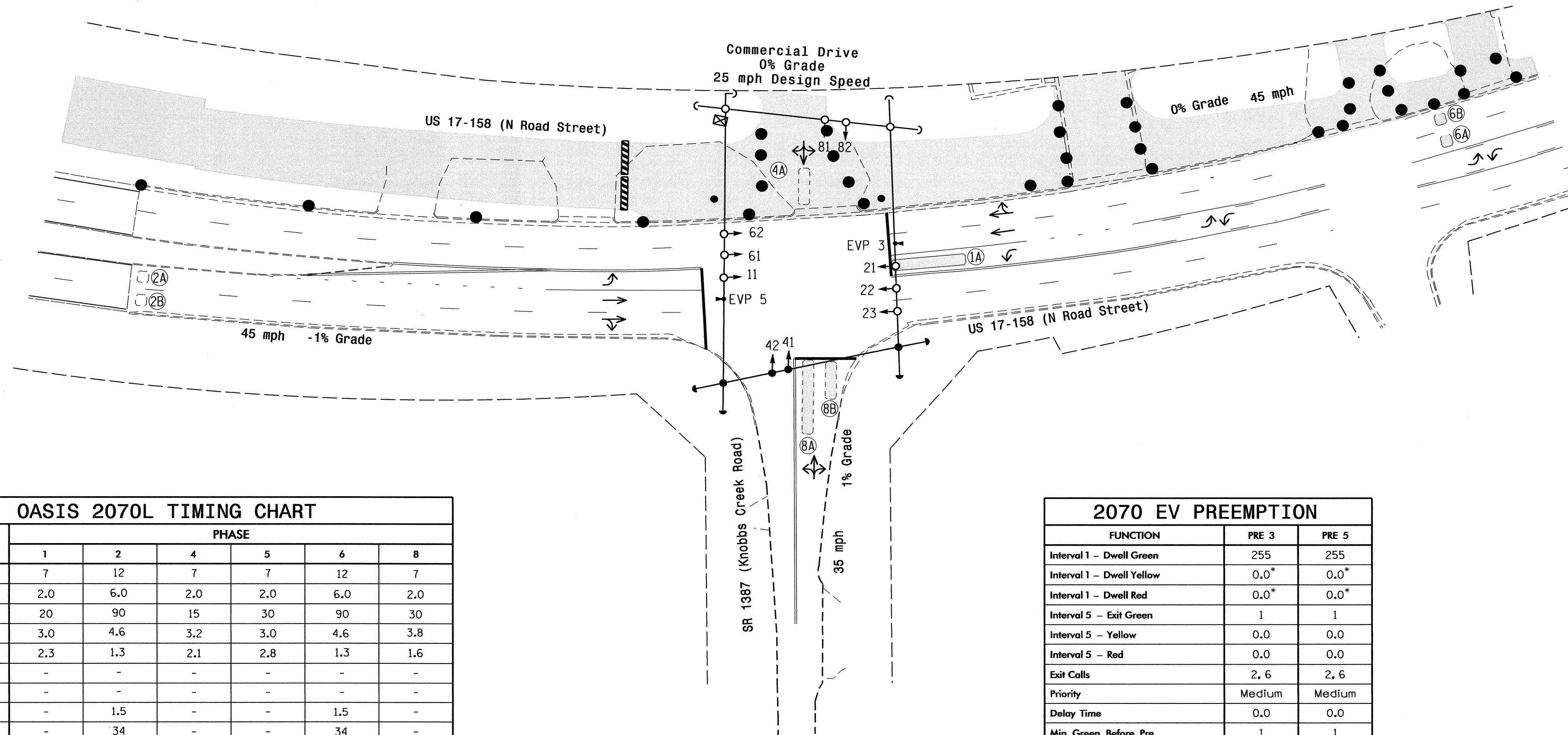
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A*	6X40	0	-	Y	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
2A	6X6	300	5	-	2	Y	Y	-	-	-	-	Y
2B	6X6	300	5	-	2	Y	Y	-	-	-	-	Y
4A*	6X20	-	-	-	4	Y	Y	-	-	5	-	Y
6A*	6X6	300	-	Y	6	Y	Y	-	-	-	-	Y
6B*	6X6	300	-	Y	6	Y	Y	-	-	-	-	Y
8A*	6X40	0	-	-	8	Y	Y	-	-	3	-	Y
8B*	6X20	0	-	-	8	Y	Y	-	-	15	-	Y

\* Wireless Detection

**3 Phase Fully Actuated w/ EV Preempt US 17/US 17 Bus (Elizabeth City) CLS**

**NOTES**

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. This intersection features an optical preemption system. Relocate existing detectors from existing span to new span. Shown locations of optical detectors are conceptual only.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data: Controller Asset 0404.



**OASIS 2070L TIMING CHART**

FEATURE	PHASE						
	1	2	4	5	6	8	
Min Green 1*	7	12	7	7	12	7	
Extension 1*	2.0	6.0	2.0	2.0	6.0	2.0	
Max Green 1*	20	90	15	30	90	30	
Yellow Clearance	3.0	4.6	3.2	3.0	4.6	3.8	
Red Clearance	2.3	1.3	2.1	2.8	1.3	1.6	
Walk 1*	-	-	-	-	-	-	
Don't Walk 1	-	-	-	-	-	-	
Seconds Per Actuation*	-	1.5	-	-	1.5	-	
Max Variable Initial*	-	34	-	-	34	-	
Time Before Reduction*	-	15	-	-	15	-	
Time To Reduce*	-	30	-	-	30	-	
Minimum Gap	-	3.0	-	-	3.0	-	
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-	
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-	
Dual Entry	-	-	ON	-	-	ON	
Simultaneous Gap	ON	ON	ON	ON	ON	ON	

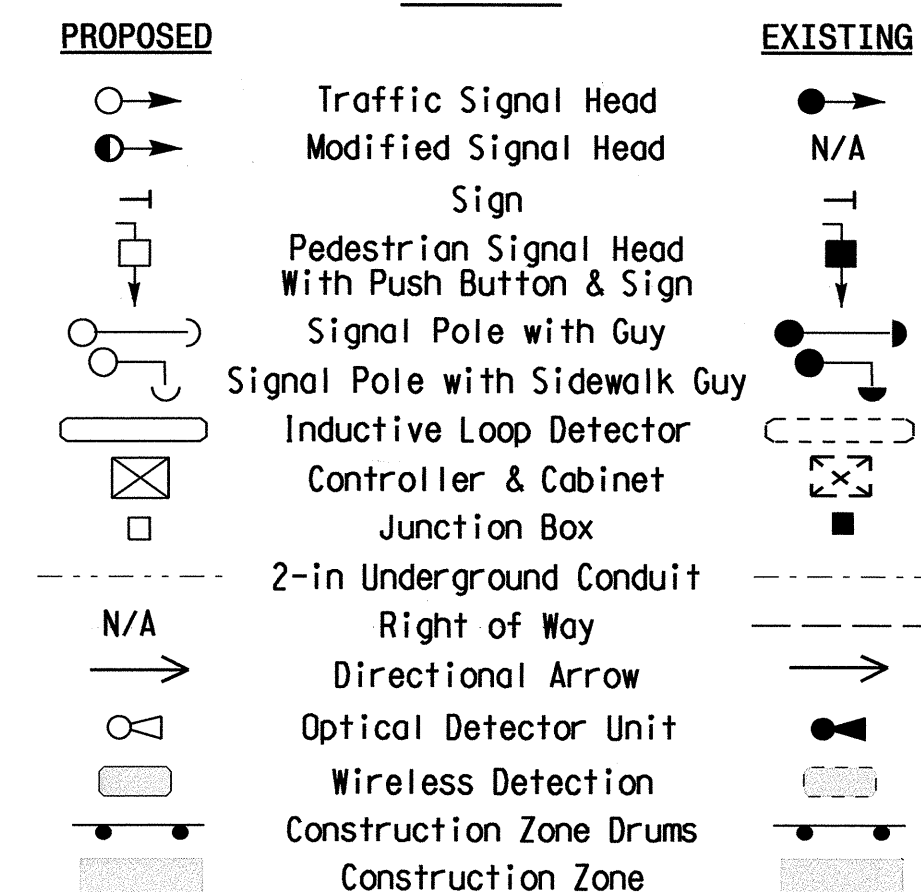
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

**2070 EV PREEMPTION**

FUNCTION	PRE 3	PRE 5
Interval 1 - Dwell Green	255	255
Interval 1 - Dwell Yellow	0.0*	0.0*
Interval 1 - Dwell Red	0.0*	0.0*
Interval 5 - Exit Green	1	1
Interval 5 - Yellow	0.0	0.0
Interval 5 - Red	0.0	0.0
Exit Calls	2, 6	2, 6
Priority	Medium	Medium
Delay Time	0.0	0.0
Min Green Before Pre	1	1
Ped Clear Before Pre	0	0
Yellow Clear Before Pre	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*
Dwell Min Time	12	12
Enable Backup Protection	N	N
Ped Clear Through Yellow	N	N
Preempt Extend**	2	2
Omit Overlaps	-	-

\* Time defaults to time used for phase during normal operation  
 \*\* Program Timing on Optical Detection Unit

**LEGEND**



**Signal Upgrade - Temporary 1**

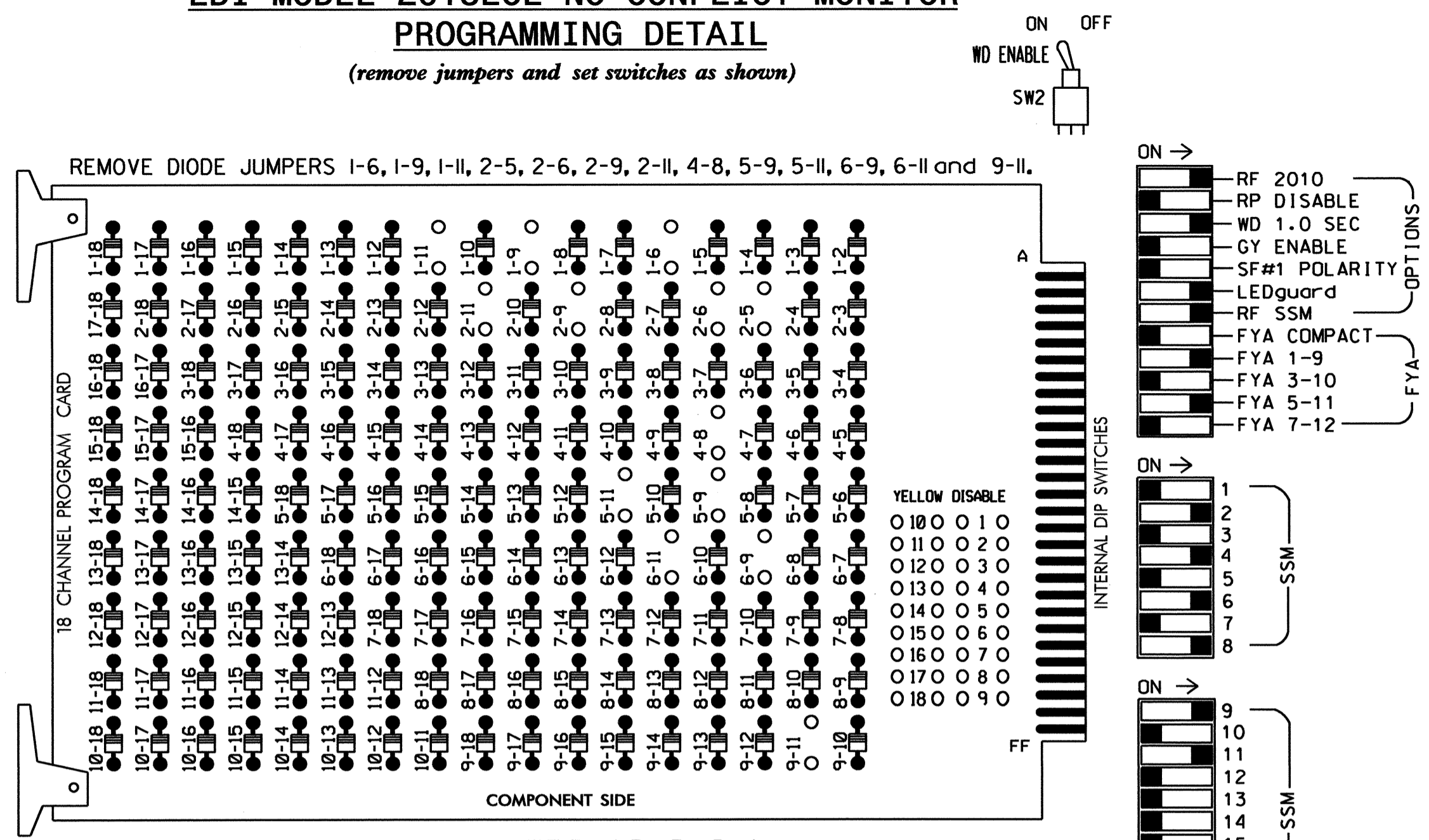
Prepared in the Offices of:  
 Transportation Utility and South Division  
 Division 1 Pasquotank County Elizabeth City  
 PLAN DATE: January 2012 REVIEWED BY: J.P. Galloway  
 PREPARED BY: PL Alexander REVIEWED BY:  
 SCALE: 1" = 40'  
 REVISIONS: INIT. DATE  
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23489  
 SIGNATURE: DATE: 2/13/12  
 SIG. INVENTORY NO. 01-040411

10-FEB-2012 14:34  
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 tomazur.lke



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

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the US 17/ US 17 Bus (Elizabeth City) CLS.

### EQUIPMENT INFORMATION

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

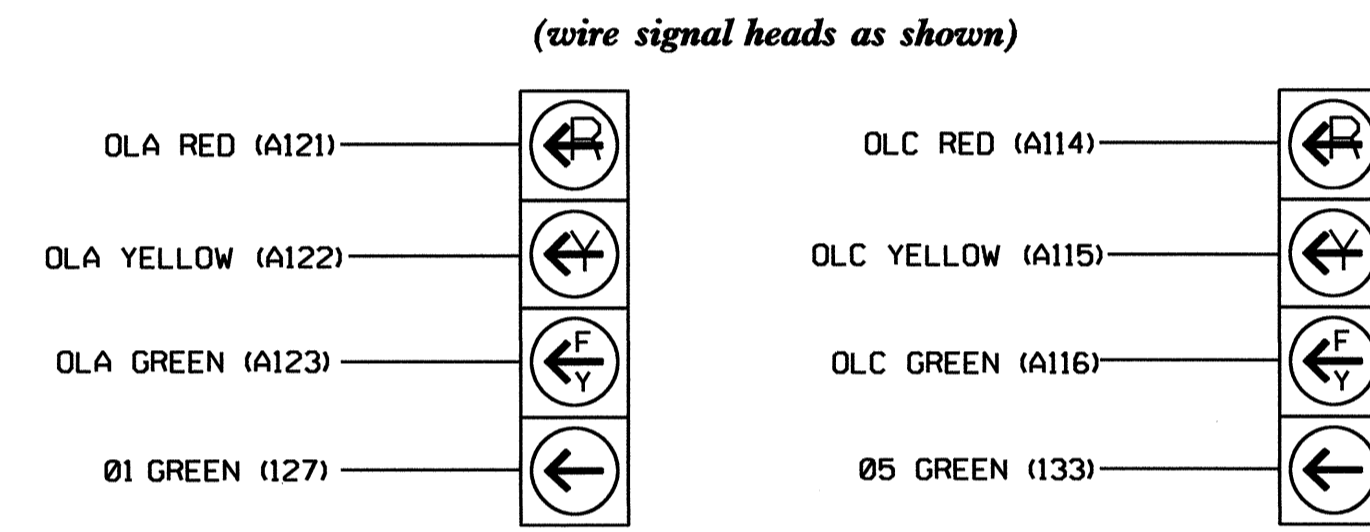
\* USED DURING EV PREEMPT 5 ONLY

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMJ CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	22,23	NU	NU	41,42	NU	21	61,62	NU	NU	81,82	NU	11	NU	NU	21	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127							133										

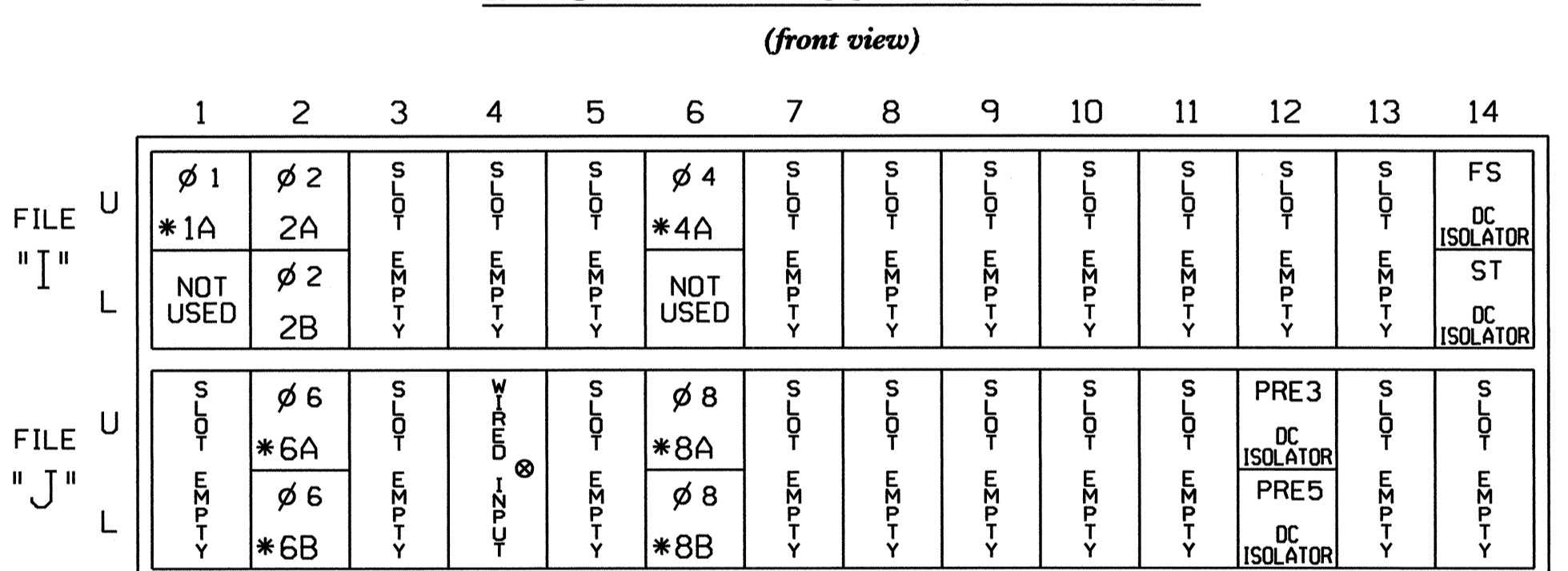
NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \* See pictorial of head wiring in detail below.

### 4 SECTION FYA PPLT SIGNAL WIRING DETAIL



NOTE: 1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

### INPUT FILE POSITION LAYOUT

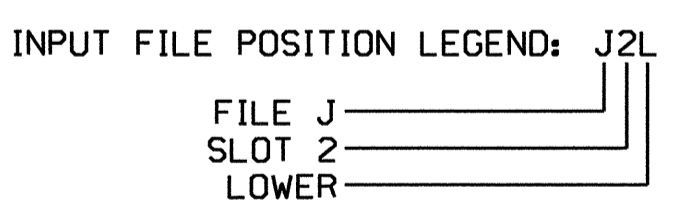


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 \* Wireless Detection.  
 FS = FLASH SENSE  
 ST = STOP TIME  
 PRE = PREEMPT  
 ⊗ Wired Input - Do not populate slot with detector card

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
* 1A <sup>1</sup>	-	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
* 4A	-	I6U	41	3	4	4	Y	Y			5
* 6A	-	J2U	40	2	6	6	Y	Y			
* 6B	-	J2L	44	6	16	6	Y	Y			
* 8A	-	J6U	42	4	8	8	Y	Y			3
* 8B	-	J6L	46	8	18	8	Y	Y			15

<sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.  
 \* Wireless Detection.



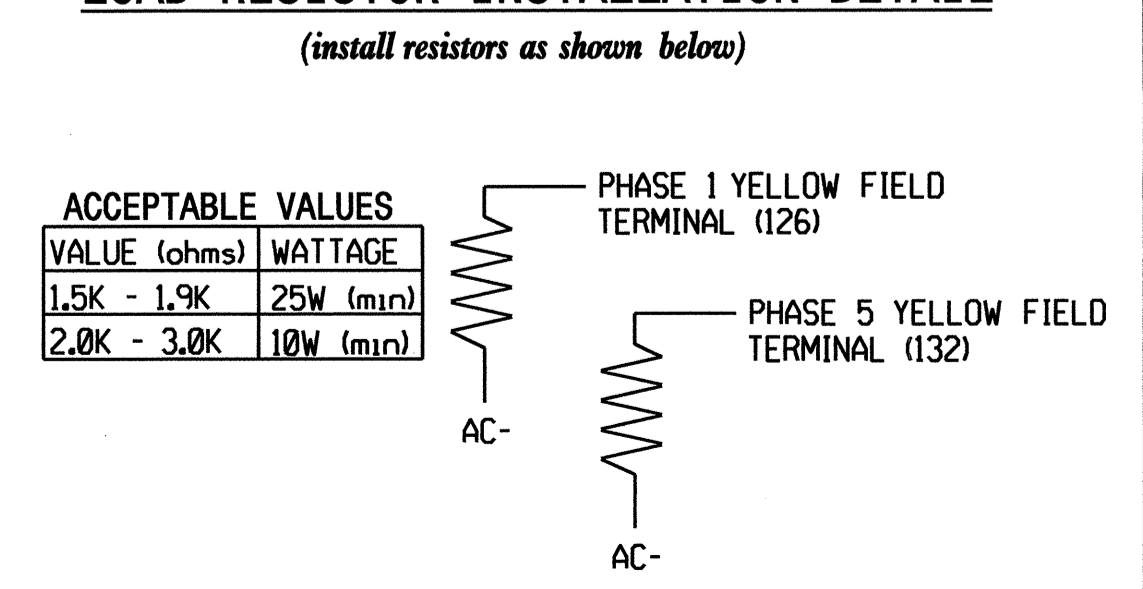
### PREEMPT ONLY PHASE OMIT NOTE

(program controller as shown below)  
 From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phase 5 for 'Omit Phase' and Phases 1, 2, 4, 6 and 8 for 'Startup Calls'. This is to prevent Phase 5 from being served when not in Preempt.

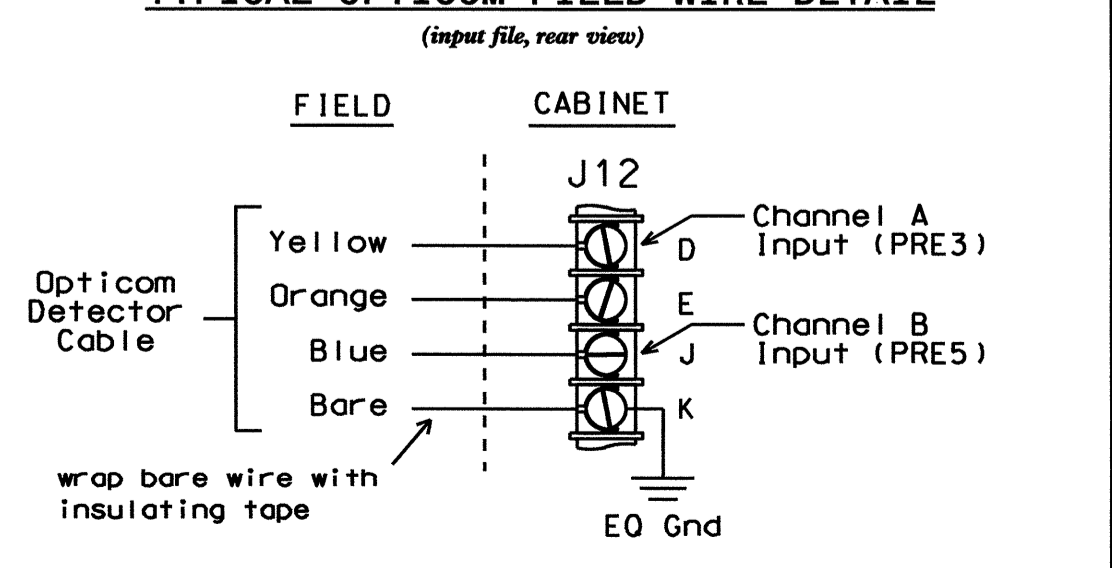
### \* WIRELESS DETECTION SYSTEM

- Install a Wireless Vehicle Detection System for vehicle detection. Perform installation according to manufacturer's directions and NCDOT Engineer-approved mounting locations to accomplish the detection schemes shown on the signal design plans.
- Ensure that the Wireless Vehicle Detection System is fully compatible with equipment manufactured in accordance with the specifications for the type 2070 controller.

### LOAD RESISTOR INSTALLATION DETAIL



### TYPICAL OPTICOM FIELD WIRE DETAIL



### PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)  
 FROM OASIS LOCAL CONTROLLER MAIN MENU  
 SELECT: 4 PHASE SEQUENCE

PHASE	SEQUENCE	PAGE	1	NEXT	PAGES
RNG;LEAD	BARRIER 1	X-LAG;LEAD	BARRIER 2	X-LAG	
1	1	2	0	0	0
2	0	6	0	5	0
3	0	0	0	0	0
4	0	0	0	0	0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0404T1  
 DESIGNED: January 2012  
 SEALED: 2-13-12  
 REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 3 - TEMPORARY 1

US 17-158 (N Road Street) at SR 1387 (Knobbs Creek Road)/ Commercial Drive

Division 1 Pasquotank County Elizabeth City  
 PLAN DATE: January 2012 REVIEWED BY: JTK  
 PREPARED BY: JAMES Peterson REVIEWED BY:

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

SIGNATURE: [Signature] DATE: 2-15-12  
 SIG. INVENTORY NO. 01-0404T1

15-FEB-2012 08:08 S:\TSS\SM\TSS\Signal\work\groups\sig\_Man\Refer\sm010404\_sm.e\_000.dgn J.Peterson

## LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)  
IF ACTIVE PHASE #1 IS ON  
AND RED CLEAR ON PHASE #1 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #50 ON  
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)  
IF ACTIVE PHASE #1 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)  
IF YELLOW ON PHASE #1 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)  
IF ACTIVE PHASE #5 IS ON  
AND RED CLEAR ON PHASE #5 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #42 ON  
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 21).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)  
IF ACTIVE PHASE #5 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 21).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)  
IF YELLOW ON PHASE #5 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 21).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

### OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red  
OUTPUT 43 = Overlap C Yellow  
OUTPUT 44 = Overlap C Green  
OUTPUT 50 = Overlap A Red  
OUTPUT 51 = Overlap A Yellow  
OUTPUT 52 = Overlap A Green

## OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS  
PHASE: ;12345678910111213141516  
VEH OVL PARENTS: ;XX  
VEH OVL NOT VEH: ;  
VEH OVL NOT PED: ;  
VEH OVL GRN EXT: ;  
STARTUP COLOR: \_ RED \_ YELLOW \_ GREEN  
FLASH COLORS: \_ RED \_ YELLOW X GREEN  
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0  
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0  
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0  
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+' TWICE

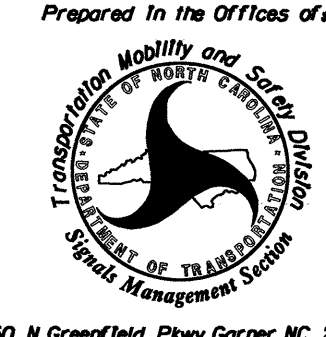
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS  
PHASE: ;12345678910111213141516  
VEH OVL PARENTS: ; XX  
VEH OVL NOT VEH: ;  
VEH OVL NOT PED: ;  
VEH OVL GRN EXT: ;  
STARTUP COLOR: \_ RED \_ YELLOW \_ GREEN  
FLASH COLORS: \_ RED \_ YELLOW X GREEN  
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0  
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0  
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0  
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 01-0404T1  
DESIGNED: January 2012  
SEALED: 2-13-12  
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 3 - TEMPORARY 1

	US 17-158 (N Road Street) at SR 1387 (Knobbs Creek Road)/ Commercial Drive		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JOHN T. ROWE, JR. 008453
	Prepared in the Offices of: James Peterson 750 N. Greenfield Pkwy, Garner, NC 27529	Division 1 Pasquotank County Elizabeth City PLAN DATE: January 2012 REVIEWED BY: JTR PREPARED BY: James Peterson REVIEWED BY:	
REVISIONS:		INIT. DATE	SIG. INVENTORY NO. 01-0404T1



### EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' to advance to Preemption #3.

```

PREEMPTION #3 SETTINGS (NEXT:1-10)
INTERVAL/TIMING CLEAR/DWELL PHASES
GRN YEL RED 12345678910111213141516
1 255 0.0 0.0 X X
2 0 0.0 0.0
3 0 0.0 0.0
4 0 0.0 0.0
5 1 0.0 0.0 X X
EXIT CALLS

PRIORITY (Y/N TO SELECT) .....MED
DELAY TIMER (0-255 SEC) .....0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0
DWELL MIN TIMER (0-255 SEC) .....12
DWELL MAX TIMER (0-OFF.1-255MIN) ....0
DWELL HOLD-OVER TIMER (0-255) .....0
LATCH CALL? .....N
LINK TO NEXT PREEMPT? .....N
ENABLE BACKUP PROTECTION? .....N
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES? .....N
PED CLEARANCE THROUGH YELLOW? .....N
INHIBIT OVERLAP GREEN EXTENSION? ....N
SERVICE DURING SOFTWARE FLASH? .....N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL? .....N
ALLOW PEDS IN DWELL INTERVAL? .....N
RE-TIME DWELL INTERVAL? .....N
OVERLAPS: ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW
  
```

PRESS 'NEXT TWICE

```

PREEMPTION #5 SETTINGS (NEXT:1-10)
INTERVAL/TIMING CLEAR/DWELL PHASES
GRN YEL RED 12345678910111213141516
1 255 0.0 0.0 X X
2 0 0.0 0.0
3 0 0.0 0.0
4 0 0.0 0.0
5 1 0.0 0.0 X X
EXIT CALLS

PRIORITY (Y/N TO SELECT) .....MED
DELAY TIMER (0-255 SEC) .....0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0
DWELL MIN TIMER (0-255 SEC) .....12
DWELL MAX TIMER (0-OFF.1-255MIN) ....0
DWELL HOLD-OVER TIMER (0-255) .....0
LATCH CALL? .....N
LINK TO NEXT PREEMPT? .....N
ENABLE BACKUP PROTECTION? .....N
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES? .....N
PED CLEARANCE THROUGH YELLOW? .....N
INHIBIT OVERLAP GREEN EXTENSION? ....N
SERVICE DURING SOFTWARE FLASH? .....N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL? .....N
ALLOW PEDS IN DWELL INTERVAL? .....N
RE-TIME DWELL INTERVAL? .....N
OVERLAPS: ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW
OMIT OVERLAPS:
  
```

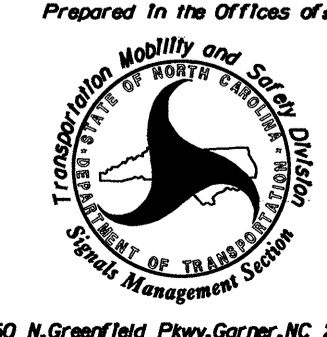
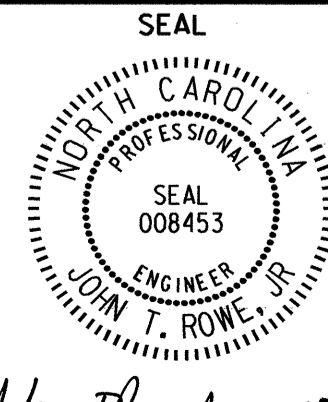

PREEMPT PROGRAMMING COMPLETE

Program extend time on optical detector units for 2.0 sec for EVP3 and EVP5.

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 01-0404T1  
DESIGNED: January 2012  
SEALED: 2-13-12  
REVISED: N/A

14-FEB-2012 14:09 S:\13545\13545\13545\SIG\01-0404T1.dgn J.Peterson

ELECTRICAL DETAIL SHEET 3 OF 3 - TEMPORARY 1

	<p><b>US 17-158 (N Road Street)</b> at <b>SR 1387 (Knobbs Creek Road)/</b> <b>Commercial Drive</b></p>							
<p>Division 1 Pasquotank County Elizabeth City</p>								
<p>PLAN DATE: January 2012 REVIEWED BY: JTR</p>								
<p>PREPARED BY: James Peterson REVIEWED BY:</p>								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE				<p style="text-align: right;">  2-15-12            SIGNATURE DATE            SIG. INVENTORY NO. 01-0404T1         </p>	
REVISIONS	INIT.	DATE						

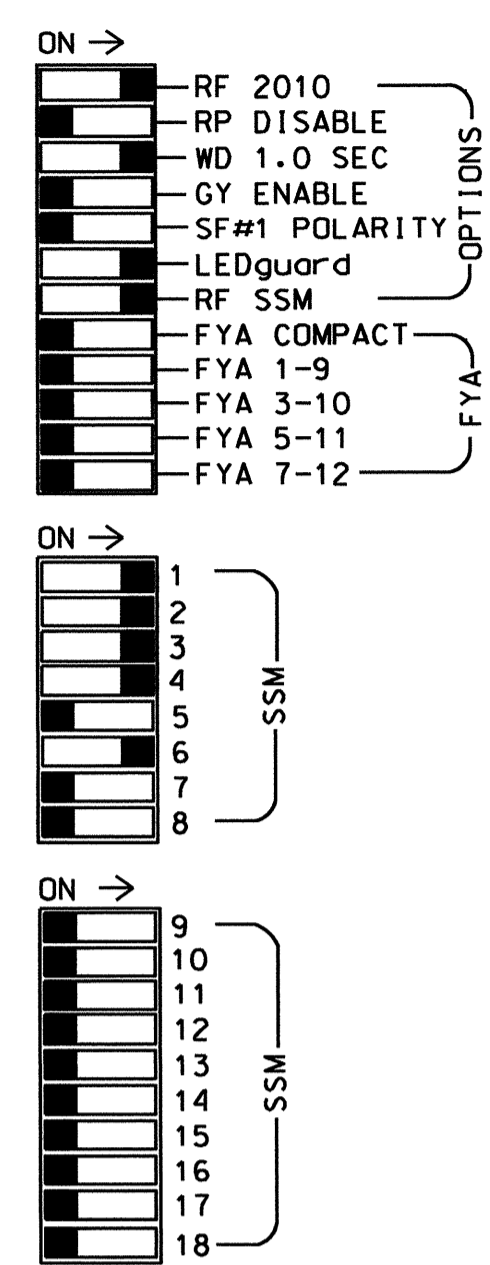
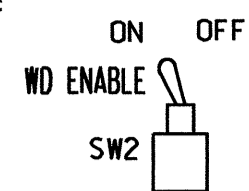
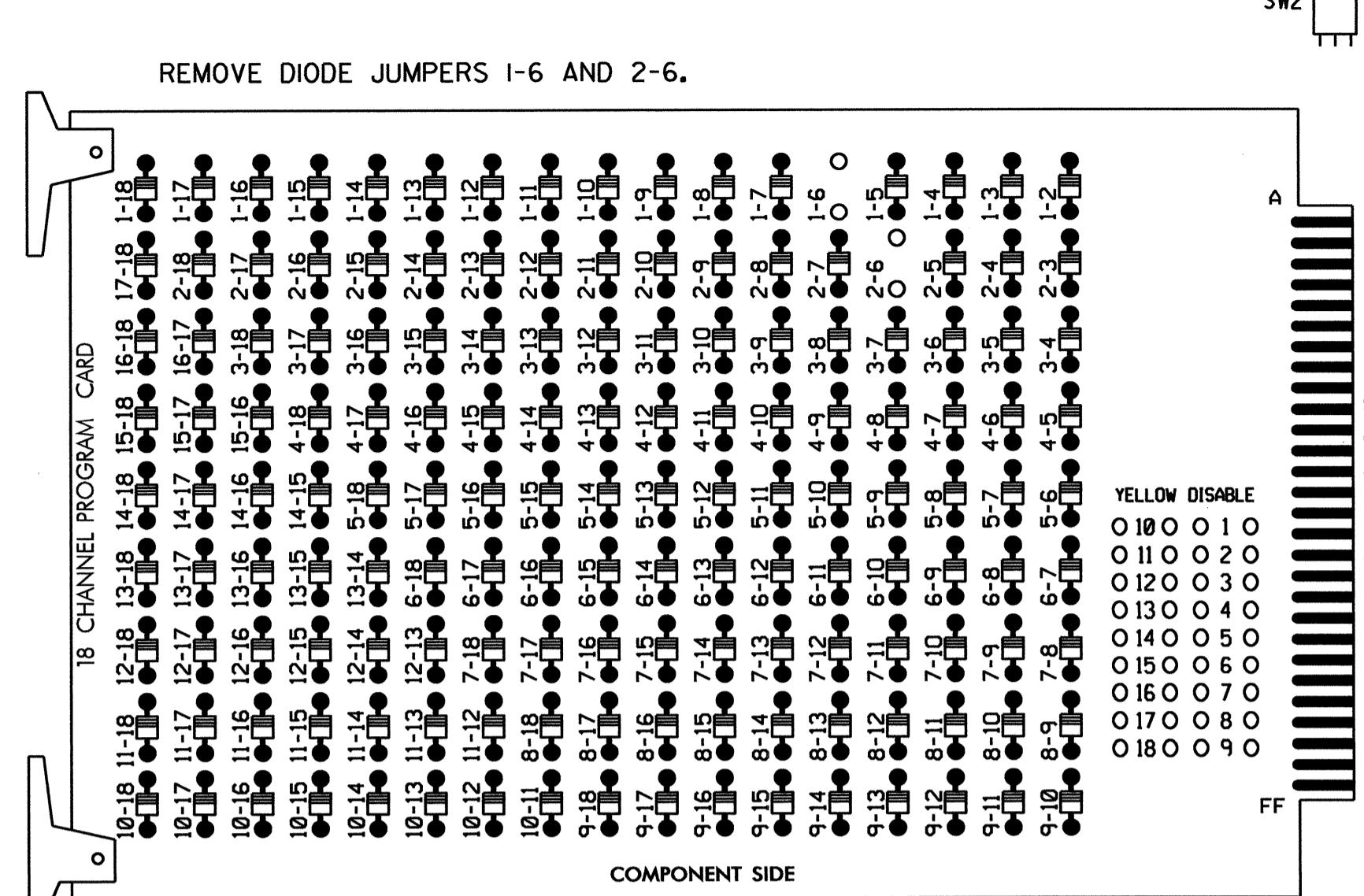




**EDI MODEL 2018ECL-NC CONFLICT MONITOR**

**PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. part 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the US 17/ US 17 Bus (Elizabeth City) CLS.

**EQUIPMENT INFORMATION**

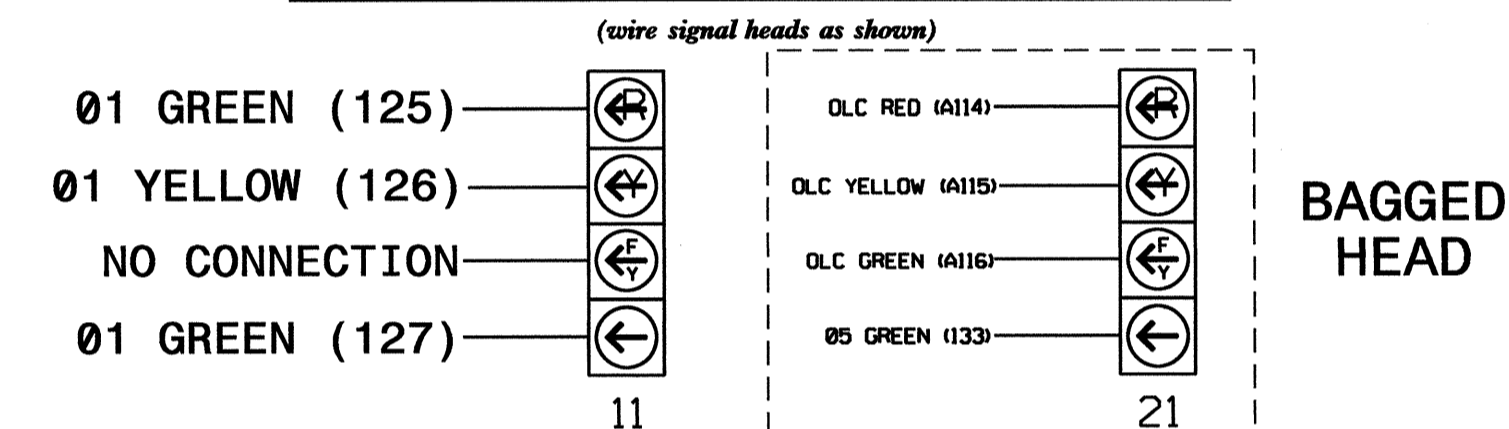
CONTROLLER.....2070L  
 CABINET.....332 /W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S8  
 PHASES USED.....1,2,3,4,6.  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT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

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	22,23	NU	31	32	41	42	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	NU
RED	128		116	116	101	101				134								
YELLOW	129		117	117	102	102				135								
GREEN	130		118	118	103	103				136								
RED ARROW	125																	
YELLOW ARROW	126																	
FLASHING YELLOW ARROW																		
GREEN ARROW	127		118		103													

NU = Not Used  
 Disconnected & bag head 21 from 01-0404T1.  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \* See pictorial of head wiring in detail below.

**4 SECTION FYA PPLT SIGNAL WIRING DETAIL**



**INPUT FILE POSITION LAYOUT**

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 3	∅ 3	∅ 4									FS
I	*1A	2A	*3A	*3B	*4A									DC ISOLATOR
L	NOT USED	∅ 2	NOT USED	NOT USED	NOT USED									ST
U		∅ 6												DC ISOLATOR
J		*6A												PRE3
L		∅ 6												DC ISOLATOR
		*6B												PRE5
														DC ISOLATOR

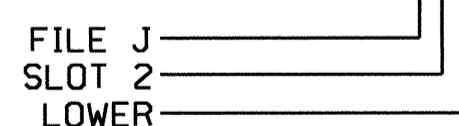
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 PRE = PREEMPT  
 \* Wireless Detection.  
 ⊗ Wired Input - Do not populate slot with detector card

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
* 1A <sup>1</sup>	-	I1U	56	18	1	1	Y	Y			15
2A	TB2-5,6	J4U	48	10	26	6	Y	Y	Y		3
2B	TB2-7,8	J2L	39	1	2	2	Y	Y			
* 3A	-	I4U	47	9	12	2	Y	Y			3
* 3B	-	I5U	58	20	3	3	Y	Y			15
* 4A	-	I6U	41	3	4	4	Y	Y			5
* 6A	-	J2U	40	2	6	6	Y	Y			
* 6B	-	J2L	44	6	16	6	Y	Y			

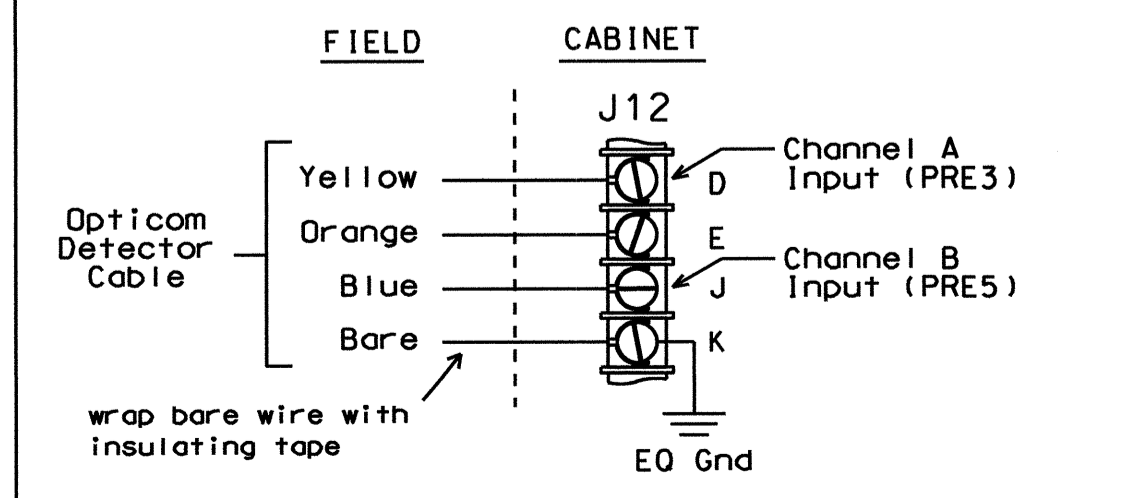
<sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.  
 \*Wireless Detection.

INPUT FILE POSITION LEGEND: J2L



**TYPICAL OPTICOM FIELD WIRE DETAIL**

(input file, rear view)



**PHASE SEQUENCE PROGRAMMING DETAIL**

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU  
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1 NEXT: PAGES)											
RNG	LEAD	BARRIER 1	X-LAG	LEAD	BARRIER 2	X-LAG					
1	:1	2	0	0	3	4	0	0	0	0	0
2	:0	6	0	0	:0	0	0	0	0	0	0
3	:0	0	0	0	:0	0	0	0	0	0	0
4	:0	0	0	0	:0	0	0	0	0	0	0

**BACKUP PROTECTION NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**\* WIRELESS DETECTION SYSTEM**

- Install a Wireless Vehicle Detection System for vehicle detection. Perform installation according to manufacturer's directions and NCDOT Engineer-approved mounting locations to accomplish the detection schemes shown on the signal design plans.
- Ensure that the Wireless Vehicle Detection System is fully compatible with equipment manufactured in accordance with the specifications for the type 2070 controller.

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 01-0404T2  
 DESIGNED: January 2012  
 SEALED: 2-13-12  
 REVISED: N/A

ELECTRICAL DETAIL SHEET 1 OF 2 - TEMPORARY 2

Electrical and Programming Details for: **US 17-158 (N Road Street) at SR 1387 (Knobbs Creek Road)/ Commercial Drive**

Prepared in the Offices of: **TRANSPORTATION MOBILITY AND SAFETY CONSULTANTS, INC.**

750 N. Greenfield Pkwy, Garner, NC 27529

Division 1 Pasquotank County Elizabeth City

PLAN DATE: January 2012 REVIEWED BY: JTR

PREPARED BY: James Peterson REVIEWED BY:

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

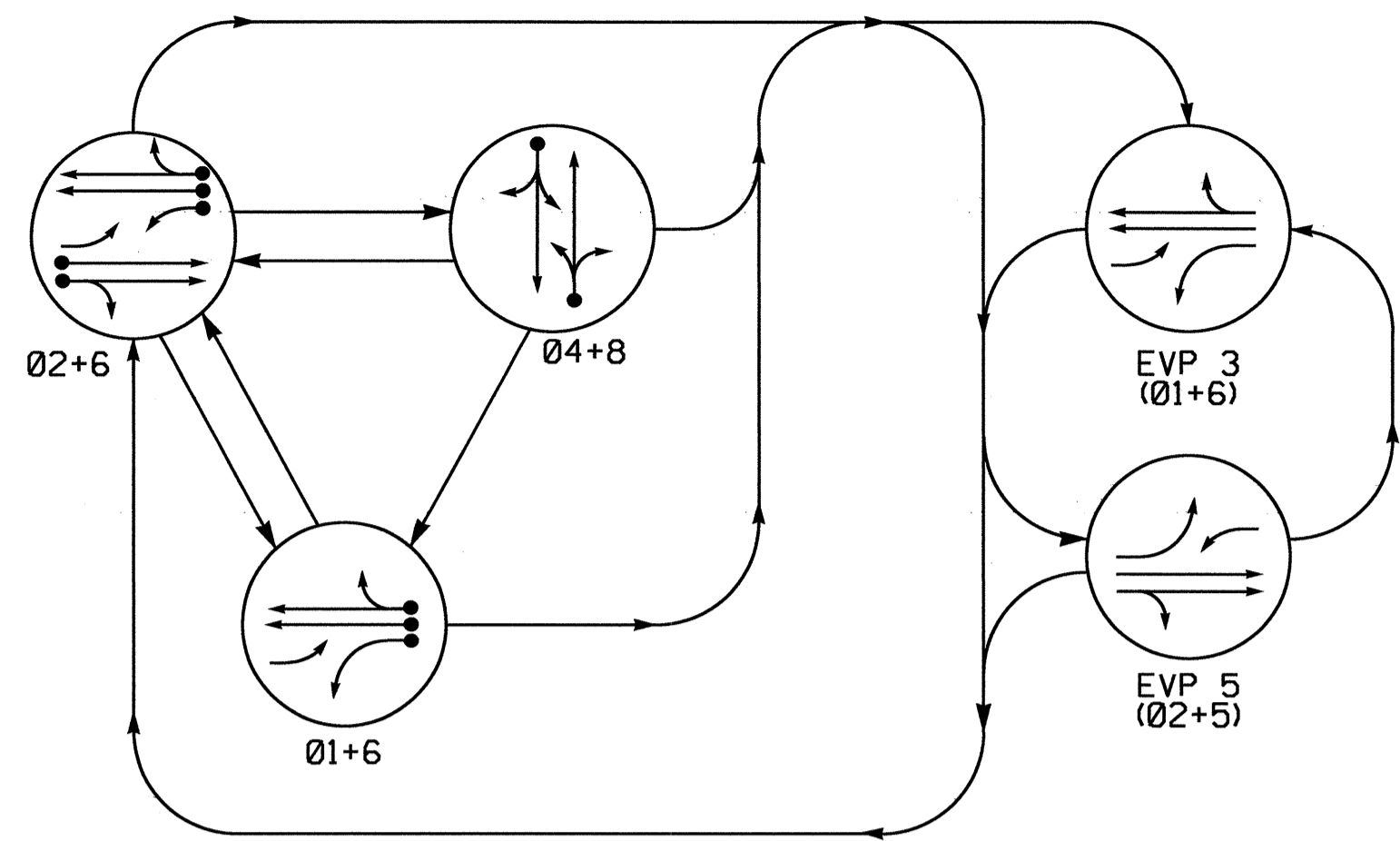
SIGNATURE: [Signature] DATE: 2-15-12

SIG. INVENTORY NO. 01-0404T2





PHASING DIAGRAM



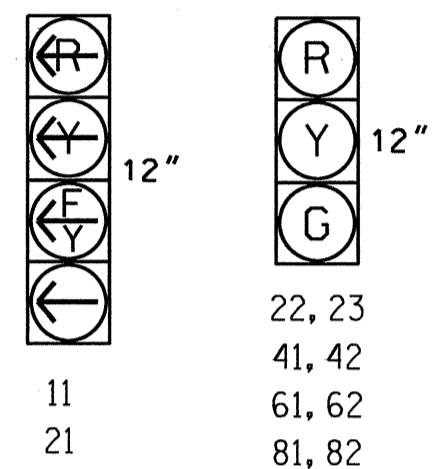
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE					
	01+6	02+6	04+8	EVP 3	EVP 5	F L
11	Y	Y	Y	Y	Y	Y
21	Y	Y	Y	Y	Y	Y
22, 23	R	G	R	R	G	Y
41, 42	R	R	G	R	R	R
61, 62	G	G	R	G	R	Y
81, 82	R	R	G	R	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

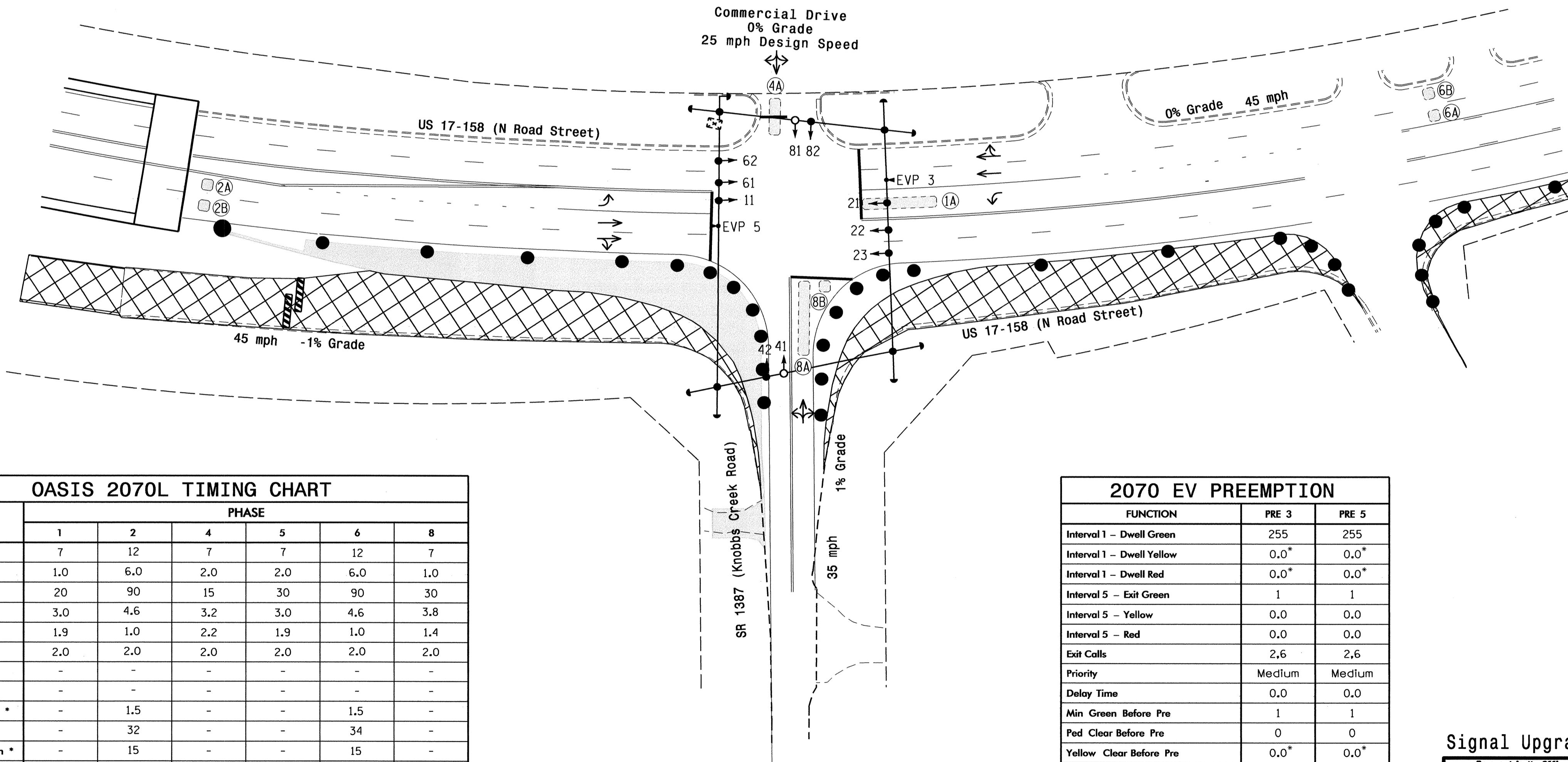
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
1A*	6X40	0	-	-	1	Y	Y	-	-	15	-	-
2A*	6X6	275	-	Y	2	Y	Y	-	-	3	-	-
2B*	6X6	275	-	Y	2	Y	Y	-	-	-	-	-
4A*	6X20	+10	-	-	4	Y	Y	-	-	5	-	-
6A*	6X6	300	-	-	6	Y	Y	-	-	-	-	-
6B*	6X6	300	-	-	6	Y	Y	-	-	-	-	-
8A*	6X30	0	-	-	8	Y	Y	-	-	3	-	-
8B*	6X20	0	-	-	8	Y	Y	-	-	15	-	-

\* Wireless Detection  
Move detectors 8A and 8B

3 Phase Fully Actuated w/ EV Preempt US 17/US 17 Bus (Elizabeth City) CLS

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Disable Backup Protect for phase 6.
5. Reposition existing signal heads numbered 21, 22 and 23.
6. Set all detector units to presence mode.
7. This intersection features an optical preemption system. Reposition existing detector 5. Shown locations of optical detectors are conceptual only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Closed loop system data: Controller Asset 0404.



OASIS 2070L TIMING CHART

FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1*	7	12	7	7	12	7
Extension 1*	1.0	6.0	2.0	2.0	6.0	1.0
Max Green 1*	20	90	15	30	90	30
Yellow Clearance	3.0	4.6	3.2	3.0	4.6	3.8
Red Clearance	1.9	1.0	2.2	1.9	1.0	1.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1*	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation*	-	1.5	-	-	1.5	-
Max Variable Initial*	-	32	-	-	34	-
Time Before Reduction*	-	15	-	-	15	-
Time To Reduce*	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

2070 EV PREEMPTION

FUNCTION	PRE 3	PRE 5
Interval 1 - Dwell Green	255	255
Interval 1 - Dwell Yellow	0.0*	0.0*
Interval 1 - Dwell Red	0.0*	0.0*
Interval 5 - Exit Green	1	1
Interval 5 - Yellow	0.0	0.0
Interval 5 - Red	0.0	0.0
Exit Calls	2.6	2.6
Priority	Medium	Medium
Delay Time	0.0	0.0
Min Green Before Pre	1	1
Ped Clear Before Pre	0	0
Yellow Clear Before Pre	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*
Dwell Min Time	12	12
Enable Backup Protection	N	N
Ped Clear Through Yellow	N	N
Preempt Extend**	2	2
Omit Overlaps	-	-

\* Time defaults to time used for phase during normal operation

\*\* Program Timing on Optical Detection Unit

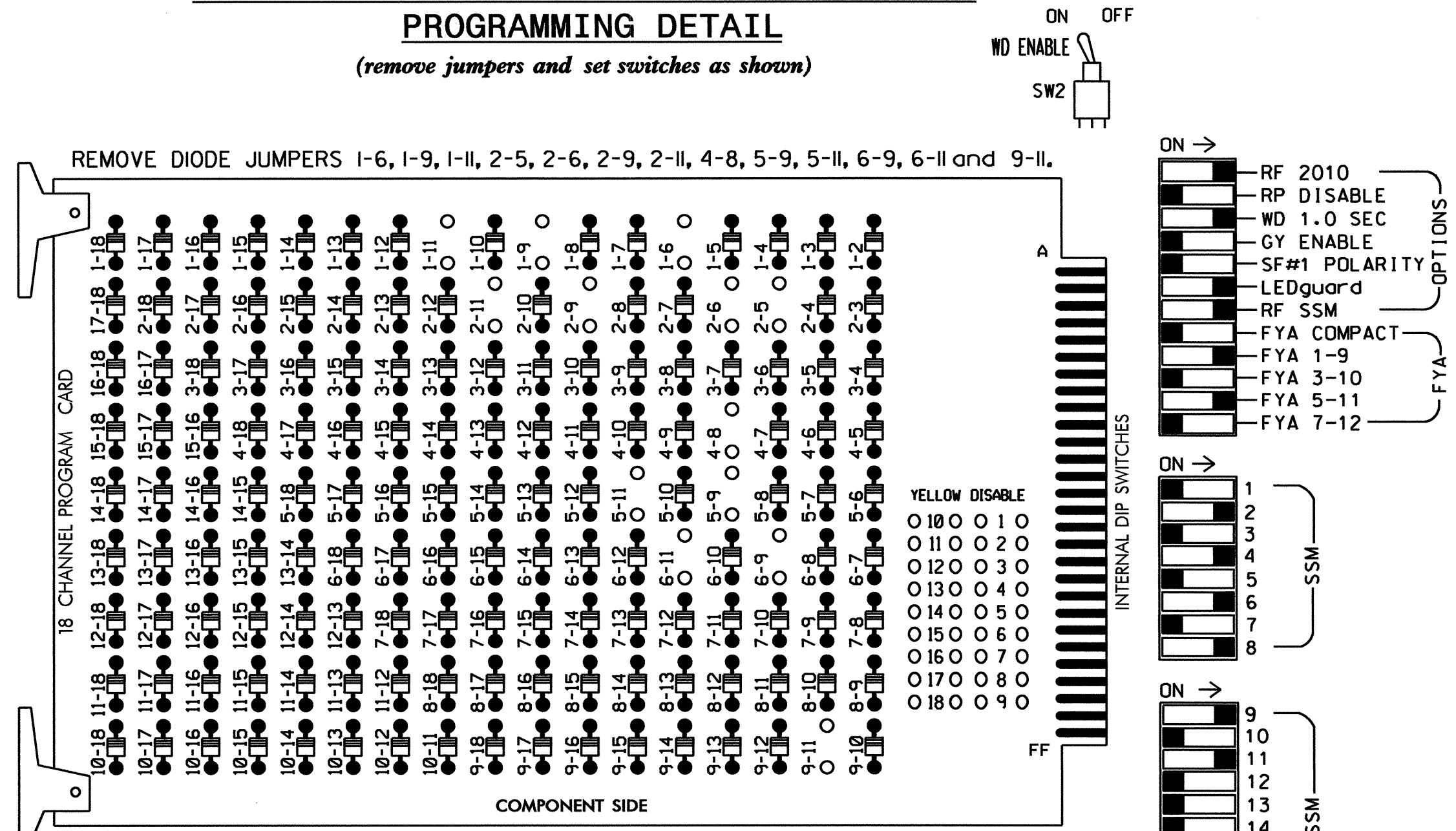
LEGEND

- | 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                              |
| ○ Optical Detector Unit                          | ○ Optical Detector Unit                          |
| ○ Wireless Detection                             | ○ Wireless Detection                             |
| ○ Construction Zone Drums                        | ○ Construction Zone Drums                        |
| ■ Construction Zone                              | ■ Construction Zone                              |

Signal Upgrade - Temporary 3

	US 17-158 (N Road Street) at SR 1387 (Knobbs Creek Road)/ Commercial Drive		
	Division 1 Pasquotank County Elizabeth City PLAN DATE: January 2012 REVIEWED BY: JP Galloway	PREPARED BY: PL Alexander REVIEWED BY:	
750 N. Greenfield Pkwy, Garner, NC 27526 SCALE: 0 40 1" = 40'		SIG. INVENTORY NO. 01-0404T3	

**EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL**  
(remove jumpers and set switches as shown)



- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
  - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
  - Ensure that Red Enable is active at all times during normal operation.
  - Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the US 17/ US 17 Bus (Elizabeth City) CLS.

8. Disable Backup Protect for phase 6.

**EQUIPMENT INFORMATION**

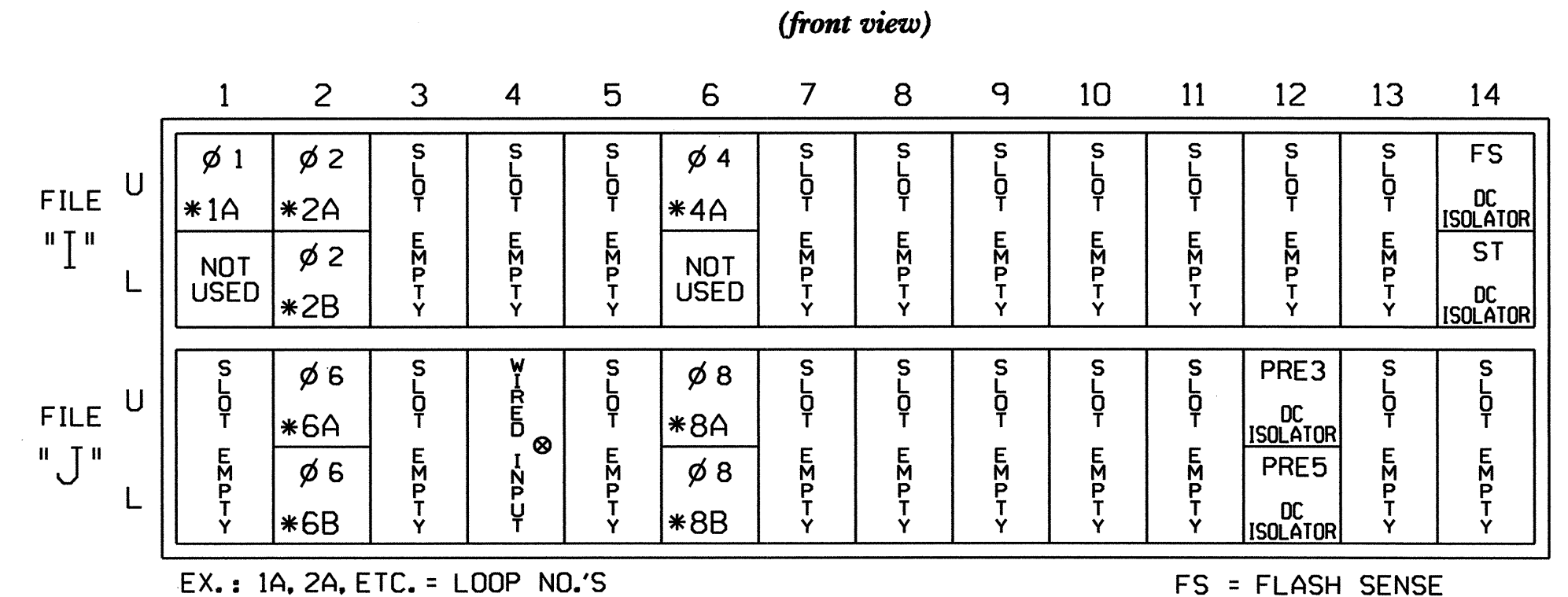
CONTROLLER.....2070L  
 CABINET.....332 /W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,AUX S1,AUX S4.  
 PHASES USED.....1,2,4,\*5,6,8.  
 OVERLAP "A".....1+2  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....NOT USED  
 \* USED DURING EV PREEMPT 5 ONLY

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	22,23	NU	NU	41,42	NU	21	61,62	NU	NU	81,82	NU	11	NU	NU	21	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121				A114	
YELLOW ARROW													A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW	127							133										

NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \* See pictorial of head wiring in detail below.

**INPUT FILE POSITION LAYOUT**  
(front view)

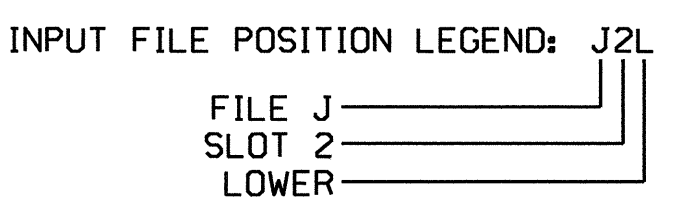


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 PRE = PREEMPT  
 \* Wireless Detection.  
 ⊗ Wired Input - Do not populate slot with detector card

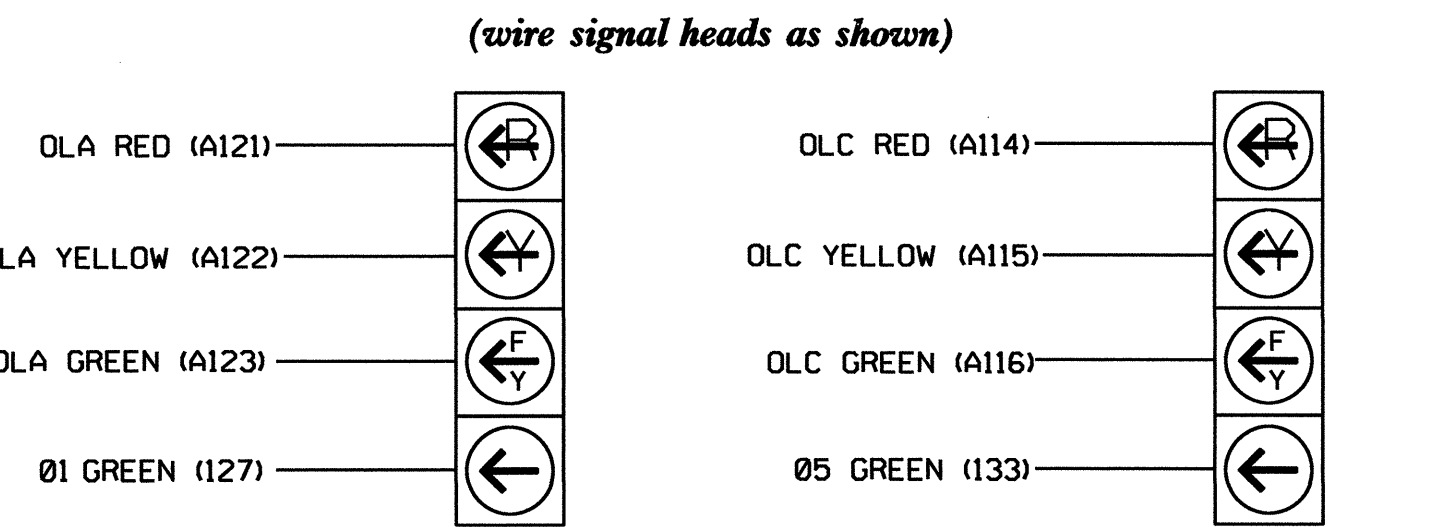
**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
* 1A <sup>1</sup>	-	I1U	56	18	1	1	Y	Y			15
* 2A	-	J4U	48	10	26	6	Y	Y	Y		3
* 2B	-	I2L	43	5	12	2	Y	Y			
* 4A	-	I6U	41	3	4	4	Y	Y			5
* 6A	-	J2U	40	2	6	6	Y	Y			
* 6B	-	J2L	44	6	16	6	Y	Y			
* 8A	-	J6U	42	4	8	8	Y	Y			3
* 8B	-	J6L	46	8	18	8	Y	Y			15

<sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.  
 \* Wireless Detection.



**4 SECTION FYA PPLT SIGNAL WIRING DETAIL**  
(wire signal heads as shown)



NOTE 11 21  
 1. The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

**PREEMPT ONLY PHASE OMIT NOTE**  
(program controller as shown below)

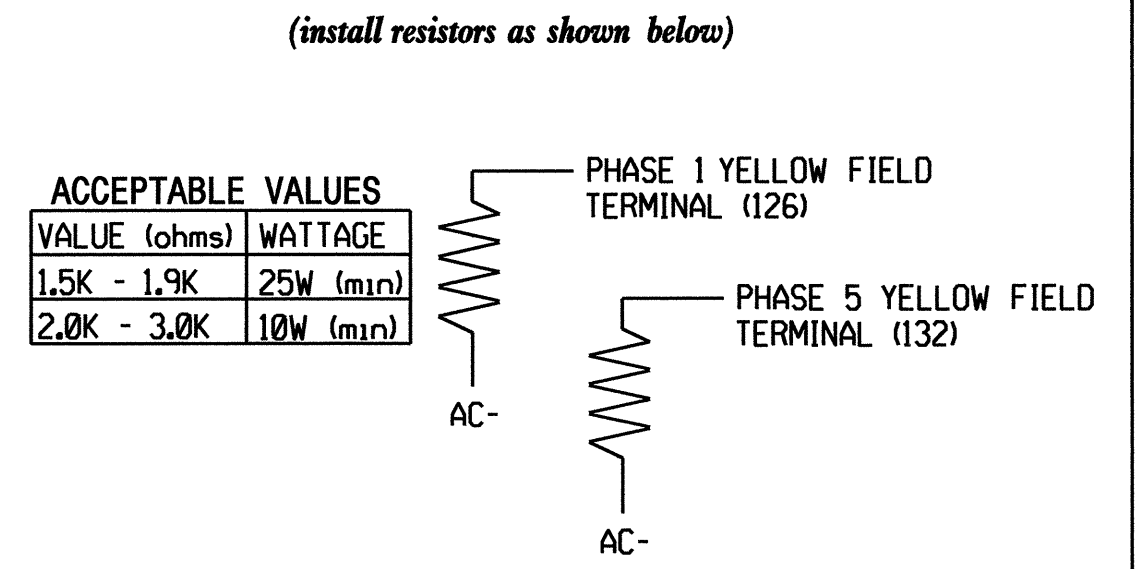
From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phase 5 for 'Omit Phase' and Phases 1, 2, 4, 6 and 8 for 'Startup Calls'. This is to prevent Phase 5 from being served when not in Preempt.

**\* WIRELESS DETECTION SYSTEM**

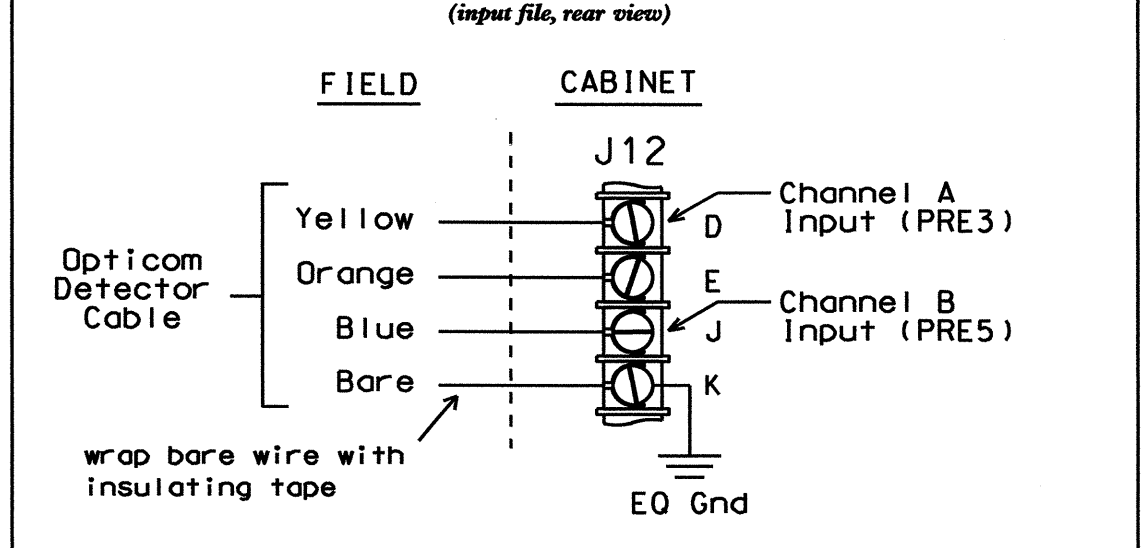
- Install a Wireless Vehicle Detection System for vehicle detection. Perform installation according to manufacturer's directions and NCDOT Engineer-approved mounting locations to accomplish the detection schemes shown on the signal design plans.
- Ensure that the Wireless Vehicle Detection System is fully compatible with equipment manufactured in accordance with the specifications for the type 2070 controller.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0404T3  
 DESIGNED: January 2012  
 SEALED: 2-13-12  
 REVISED: N/A

**LOAD RESISTOR INSTALLATION DETAIL**  
(install resistors as shown below)



**TYPICAL OPTICOM FIELD WIRE DETAIL**  
(input file, rear view)



**PHASE SEQUENCE PROGRAMMING DETAIL**  
(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU  
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1	NEXT: PAGES
RNG: LEAD	BARRIER 1 X-LAG: LEAD BARRIER 2 X-LAG
1 : 1	2 0 0 : 0 4 0 0 0
2 : 0	6 0 5 : 0 8 0 0 0
3 : 0	0 0 0 : 0 0 0 0 0
4 : 0	0 0 0 : 0 0 0 0 0

ELECTRICAL DETAIL SHEET 1 OF 3 - TEMPORARY 3

US 17-158 (N Road Street) at SR 1387 (Knobbs Creek Road)/ Commercial Drive

Division 1 Pasquotank County Elizabeth City  
 PLAN DATE: January 2012 REVIEWED BY: JTR  
 PREPARED BY: James Peterson REVIEWED BY:

SEAL: JOHN T. ROWE, ENGINEER

750 N. Greenfield Pkwy, Garner, NC 27529

SIGNATURE: John Peterson 2-15-12 DATE: DATE

SIG. INVENTORY NO. 01-0404T3

15-FEB-2012 08:21  
 S:\ITS\ASUM\ITS\_S1\gnl\sw\Kgr\cupa\sig\_Mam\Personson\010404T3.sm.le.xxx.dgn  
 J Peterson



## LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)  
IF ACTIVE PHASE #1 IS ON  
AND RED CLEAR ON PHASE #1 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #50 ON  
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)  
IF ACTIVE PHASE #1 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)  
IF YELLOW ON PHASE #1 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)  
IF ACTIVE PHASE #5 IS ON  
AND RED CLEAR ON PHASE #5 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #42 ON  
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 21).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)  
IF ACTIVE PHASE #5 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 21).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)  
IF YELLOW ON PHASE #5 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 21).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

### OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red  
OUTPUT 43 = Overlap C Yellow  
OUTPUT 44 = Overlap C Green  
OUTPUT 50 = Overlap A Red  
OUTPUT 51 = Overlap A Yellow  
OUTPUT 52 = Overlap A Green

## OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS  
PHASE: 112345678910111213141516  
VEH OVL PARENTS: XX  
VEH OVL NOT VEH: :  
VEH OVL NOT PED: :  
VEH OVL GRN EXT: :  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0.0  
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0  
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0  
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS  
PHASE: 112345678910111213141516  
VEH OVL PARENTS: XX  
VEH OVL NOT VEH: :  
VEH OVL NOT PED: :  
VEH OVL GRN EXT: :  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN

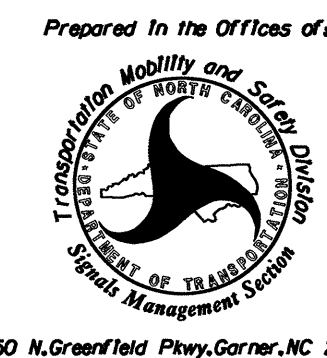
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0.0  
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0  
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0  
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 01-0404T3  
DESIGNED: January 2012  
SEALED: 2-13-12  
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 3 - TEMPORARY 3

	<p><b>US 17-158 (N Road Street)</b> at <b>SR 1387 (Knobbs Creek Road)/ Commercial Drive</b></p>	<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR.</p>						
<p>Division 1 Pasquotank County Elizabeth City</p>								
<p>PLAN DATE: January 2012 REVIEWED BY: JTR</p>								
<p>PREPARED BY: James Peterson REVIEWED BY:</p>								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE				
REVISIONS	INIT.	DATE						
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>		<p><i>John T. Rowe, Jr.</i> 2-15-12 SIGNATURE DATE</p>						
<p>SIG. INVENTORY NO. 01-0404T3</p>								

### EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' to advance to Preemption #3.

PREEMPTION #3 SETTINGS (NEXT:1-10)			CLEAR/DWELL PHASES																
INTERVAL/TIMING	GRN	YEL	RED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 255	0.0	0.0	0.0	X															
2	0	0.0	0.0																
3	0	0.0	0.0																
4	0	0.0	0.0																
5	1	0.0	0.0					X	X										

EXIT CALLS

PRIORITY (Y/N TO SELECT) .....MED  
 DELAY TIMER (0-255 SEC) .....0  
 MIN GREEN BEFORE PRE (0= DEFAULT)....1  
 PED CLEAR BEFORE PRE (0= DEFAULT)....0  
 YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0  
 RED CLEAR BEFORE PRE (0= DEFAULT)....0.0  
 DWELL MIN TIMER (0-255 SEC) .....12  
 DWELL MAX TIMER (0=OFF,1-255MIN) ....0  
 DWELL HOLD-OVER TIMER (0-255) .....0  
 LATCH CALL? .....N  
 LINK TO NEXT PREEMPT? .....N  
 ENABLE BACKUP PROTECTION? .....N  
 HOLD CLEAR 1 PHASES DURING DELAY? ...N  
 FAST GREEN FLASH DWELL PHASES? .....N  
 PED CLEARANCE THROUGH YELLOW? .....N  
 INHIBIT OVERLAP GREEN EXTENSION? ....N  
 SERVICE DURING SOFTWARE FLASH? .....N  
 REST IN RED DURING DWELL INTERVAL? ..N  
 FLASH DWELL INTERVAL? .....N  
 ALLOW PEDS IN DWELL INTERVAL? .....N  
 RE-TIME DWELL INTERVAL? .....N  
 OVERLAPS: ABCDEFGHIJKLMNPO  
 DWELL INT FLASH YELLOW

PRESS 'NEXT TWICE

PREEMPTION #5 SETTINGS (NEXT:1-10)			CLEAR/DWELL PHASES																
INTERVAL/TIMING	GRN	YEL	RED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 255	0.0	0.0	0.0	X	X														
2	0	0.0	0.0																
3	0	0.0	0.0																
4	0	0.0	0.0																
5	1	0.0	0.0					X	X										

EXIT CALLS

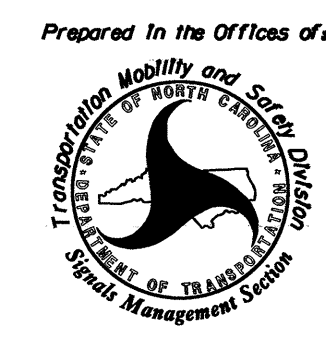
PRIORITY (Y/N TO SELECT) .....MED  
 DELAY TIMER (0-255 SEC) .....0  
 MIN GREEN BEFORE PRE (0= DEFAULT)....1  
 PED CLEAR BEFORE PRE (0= DEFAULT)....0  
 YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0  
 RED CLEAR BEFORE PRE (0= DEFAULT)....0.0  
 DWELL MIN TIMER (0-255 SEC) .....12  
 DWELL MAX TIMER (0=OFF,1-255MIN) ....0  
 DWELL HOLD-OVER TIMER (0-255) .....0  
 LATCH CALL? .....N  
 LINK TO NEXT PREEMPT? .....N  
 ENABLE BACKUP PROTECTION? .....N  
 HOLD CLEAR 1 PHASES DURING DELAY? ...N  
 FAST GREEN FLASH DWELL PHASES? .....N  
 PED CLEARANCE THROUGH YELLOW? .....N  
 INHIBIT OVERLAP GREEN EXTENSION? ....N  
 SERVICE DURING SOFTWARE FLASH? .....N  
 REST IN RED DURING DWELL INTERVAL? ..N  
 FLASH DWELL INTERVAL? .....N  
 ALLOW PEDS IN DWELL INTERVAL? .....N  
 RE-TIME DWELL INTERVAL? .....N  
 OVERLAPS: ABCDEFGHIJKLMNPO  
 DWELL INT FLASH YELLOW  
 OMIT OVERLAPS:

PREEMPT PROGRAMMING COMPLETE

Program extend time on optical detector units for 2.0 sec for EVP3 and EVP5.

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: 01-0404T3  
 DESIGNED: January 2012  
 SEALED: 2-13-12  
 REVISED: N/A

14-FEB-2012 14:15 S:\JTS\SUMITS\Sig\01-0404T3.dgn JTPeterson

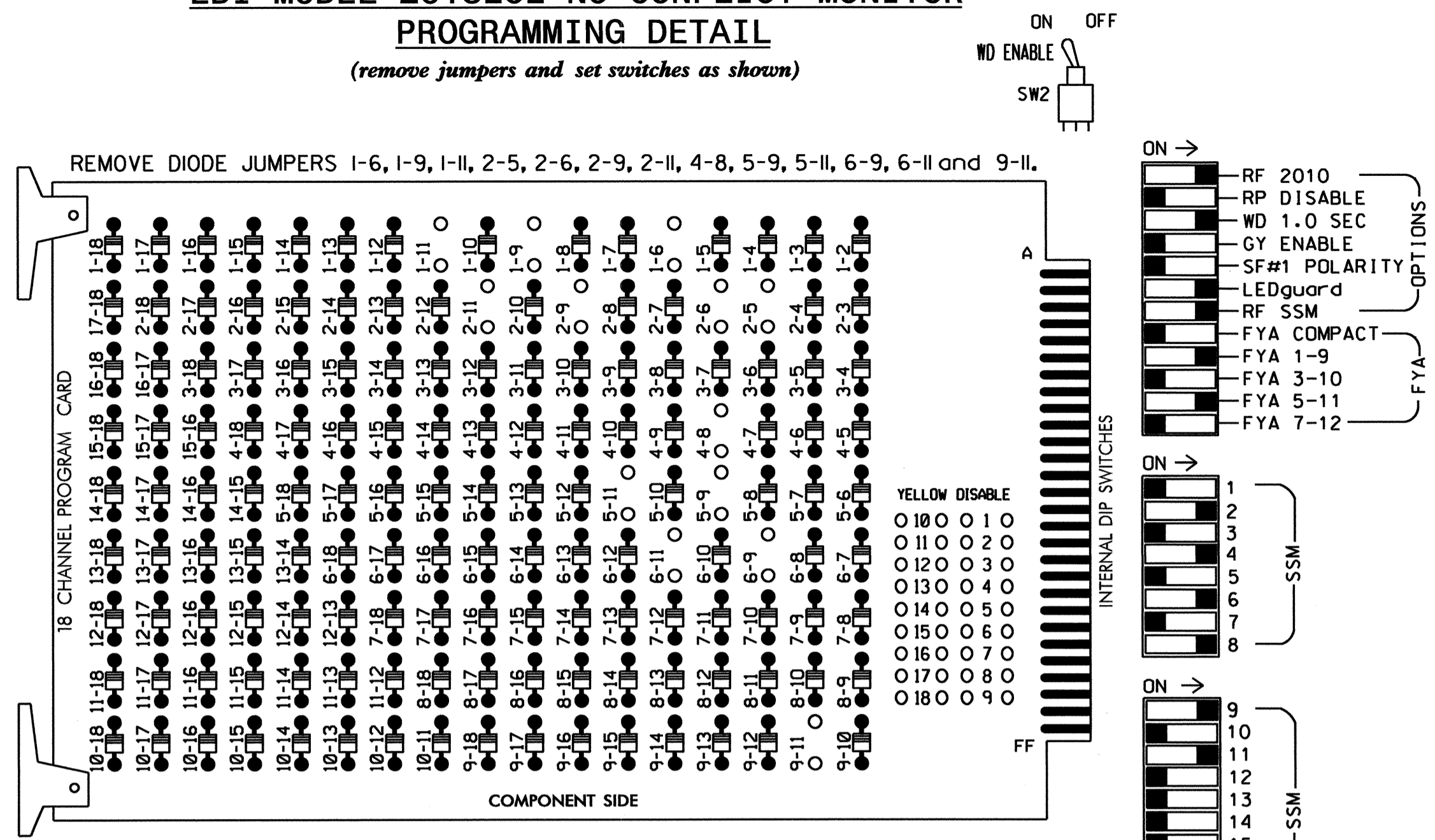
ELECTRICAL AND PROGRAMMING DETAILS FOR:		US 17-158 (N Road Street) at SR 1387 (Knobbs Creek Road)/ Commercial Drive		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR.
Prepared in the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529		Division 1 Pasquotank County Elizabeth City		SIGNATURE: <i>John T. Rowe, Jr.</i> 2-15-12 DATE
PLAN DATE: January 2012		REVIEWED BY: JTR		
PREPARED BY: James Peterson		REVIEWED BY:		SIG. INVENTORY NO. 01-0404T3
REVISIONS		INIT. DATE		





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

(remove jumpers and set switches as shown)



**NOTES:**

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

### NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the US 17/ US 17 Bus (Elizabeth City) CLS.

### EQUIPMENT INFORMATION

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

\* USED DURING EV PREEMPT 5 ONLY

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	22,23	NU	NU	41,42	NU	21	61,62	NU	NU	81,82	NU	11	NU	NU	21	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121				A114	
YELLOW ARROW													A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW	127							133										

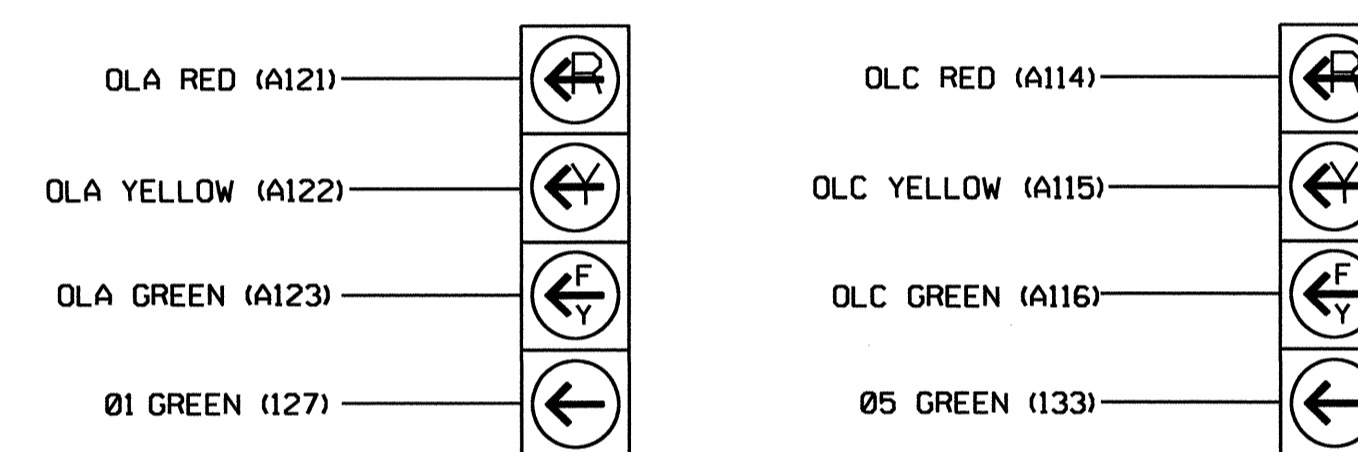
NU = Not Used

\* Denotes install load resistor. See load resistor installation detail this sheet.

\* See pictorial of head wiring in detail below.

### 4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

### INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 2	∅ 3	∅ 3	* 4A	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	FS
L	NOT USED	∅ 2	NOT USED	∅ 3	∅ 3	NOT USED	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	DC ISOLATOR
U	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	* 8A	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	PRE3	∅ 8	DC ISOLATOR
L	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	* 8B	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	PRE5	∅ 8	DC ISOLATOR

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

\* Wireless Detection.

∅ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE  
 ST = STOP TIME  
 PRE = PREEMPT

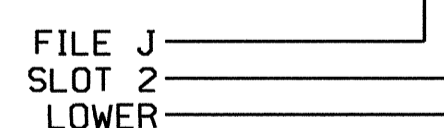
### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A <sup>1</sup>	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y	Y		3
* 4A	-	I6U	41	3	4	4	Y	Y			5
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
* 8A	-	J6U	42	4	8	8	Y	Y			3
* 8B	-	J6L	46	8	18	8	Y	Y			15

<sup>1</sup>Add jumper from I1-W to J4-W, on rear of input file.

\* Wireless Detection.

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0404  
 DESIGNED: July 2011  
 SEALED: 2-13-12  
 REVISED: N/A

### PREEMPT ONLY PHASE OMIT NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phase 5 for 'Omit Phase' and Phases 1, 2, 4, 6 and 8 for 'Startup Calls'. This is to prevent Phase 5 from being served when not in Preempt.

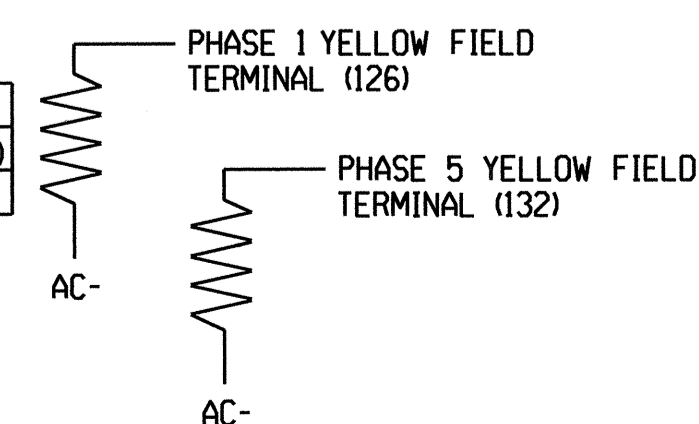
### \* WIRELESS DETECTION SYSTEM

- Install a Wireless Vehicle Detection System for vehicle detection. Perform installation according to manufacturer's directions and NCDOT Engineer-approved mounting locations to accomplish the detection schemes shown on the signal design plans.
- Ensure that the Wireless Vehicle Detection System is fully compatible with equipment manufactured in accordance with the specifications for the type 2070 controller.

### LOAD RESISTOR INSTALLATION DETAIL

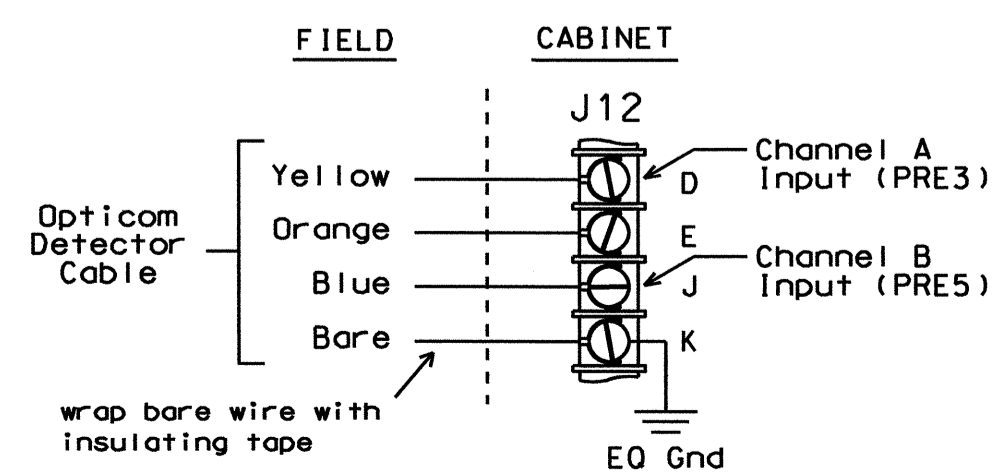
(install resistors as shown below)

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



### TYPICAL OPTICOM FIELD WIRE DETAIL

(input file, rear view)



### PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU  
 SELECT: 4 PHASE SEQUENCE

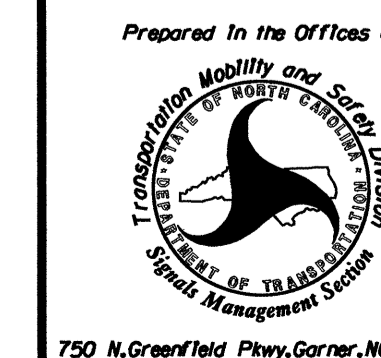
PHASE SEQUENCE: PAGE 1	NEXT: PAGES				
RNG	LEAD	BARRIER 1	X-LAG	LEAD	BARRIER 2
1	1	2	0	0	4
2	0	6	0	5	8
3	0	0	0	0	0
4	0	0	0	0	0

ELECTRICAL DETAIL SHEET 1 OF 3 - FINAL

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 17-158 (N Road Street)

at  
 SR 1387 (Knobbs Creek Road)/  
 Commercial Drive



Divisio 1 Pasquotank County Elizabeth City  
 PLAN DATE: January 2012 REVIEWED BY: JTR  
 PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL  
 JOHN T. ROWE  
 ENGINEER  
 STATE OF NORTH CAROLINA  
 License No. 008453  
 Signature: John T. Rowe  
 Date: 2-15-12

SIG. INVENTORY NO. 01-0404



## LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)  
IF ACTIVE PHASE #1 IS ON  
AND RED CLEAR ON PHASE #1 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #50 ON  
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)  
IF ACTIVE PHASE #1 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)  
IF YELLOW ON PHASE #1 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)  
IF ACTIVE PHASE #5 IS ON  
AND RED CLEAR ON PHASE #5 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #42 ON  
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 21).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)  
IF ACTIVE PHASE #5 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 21).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)  
IF YELLOW ON PHASE #5 IS ON

↓  
SCROLL DOWN

THEN:  
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 21).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

### OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red  
OUTPUT 43 = Overlap C Yellow  
OUTPUT 44 = Overlap C Green  
OUTPUT 50 = Overlap A Red  
OUTPUT 51 = Overlap A Yellow  
OUTPUT 52 = Overlap A Green

## OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

- FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS  
PHASE: 12345678910111213141516  
VEH OVL PARENTS: XX  
VEH OVL NOT VEH: ;  
VEH OVL NOT PED: ;  
VEH OVL GRN EXT: ;  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0  
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0  
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0  
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS  
PHASE: 12345678910111213141516  
VEH OVL PARENTS: XX  
VEH OVL NOT VEH: ;  
VEH OVL NOT PED: ;  
VEH OVL GRN EXT: ;  
STARTUP COLOR: - RED - YELLOW - GREEN  
FLASH COLORS: - RED - YELLOW X GREEN

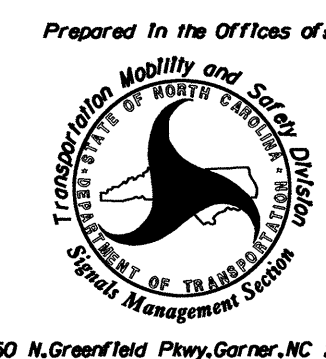
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0  
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0  
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0  
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 01-0404  
DESIGNED: July 2011  
SEALED: 2-13-12  
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 3 - FINAL

 <p style="font-size: 8px;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p><b>US 17-158 (N Road Street)</b> at <b>SR 1387 (Knobbs Creek Road)/ Commercial Drive</b></p>	<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, P.E.</p>					
<p>Division 1 Pasquotank County Elizabeth City</p>							
<p>PLANNED BY: January 2012 REVIEWED BY: STR</p>							
<p>PREPARED BY: James Peterson REVIEWED BY:</p>							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">REVISIONS</th> <th style="width: 25%;">INIT.</th> <th style="width: 25%;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p>DATE: 2-15-12</p> <p>SIGNATURE: <i>John T. Rowe</i></p>
REVISIONS	INIT.	DATE					
		<p>SIG. INVENTORY NO. 01-0404</p>					

### EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' to advance to Preemption #3.

PREEMPTION #3			SETTINGS (NEXT:1-10)															
INTERVAL/TIMING			CLEAR/DWELL PHASES															
GRN	YEL	RED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	255	0.0	0.0	X	X													
2	0	0.0	0.0															
3	0	0.0	0.0															
4	0	0.0	0.0															
5	1	0.0	0.0	X	X													

EXIT CALLS

PRIORITY (Y/N TO SELECT) .....MED  
 DELAY TIMER (0-255 SEC) .....0  
 MIN GREEN BEFORE PRE (0= DEFAULT)....1  
 PED CLEAR BEFORE PRE (0= DEFAULT)....0  
 YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0  
 RED CLEAR BEFORE PRE (0= DEFAULT)....0.0  
 DWELL MIN TIMER (0-255 SEC) .....12  
 DWELL MAX TIMER (0=OFF,1-255MIN) ....0  
 DWELL HOLD-OVER TIMER (0-255) .....0  
 LATCH CALL? .....N  
 LINK TO NEXT PREEMPT? .....N  
 ENABLE BACKUP PROTECTION? .....N  
 HOLD CLEAR 1 PHASES DURING DELAY? ...N  
 FAST GREEN FLASH DWELL PHASES? .....N  
 PED CLEARANCE THROUGH YELLOW? .....N  
 INHIBIT OVERLAP GREEN EXTENSION? ....N  
 SERVICE DURING SOFTWARE FLASH? .....N  
 REST IN RED DURING DWELL INTERVAL? ..N  
 FLASH DWELL INTERVAL? .....N  
 ALLOW PEDS IN DWELL INTERVAL? .....N  
 RE-TIME DWELL INTERVAL? .....N  
 OVERLAPS: ..... ABCDEFGHIJKLMN  
 DWELL INT FLASH YELLOW

PRESS 'NEXT TWICE

PREEMPTION #5			SETTINGS (NEXT:1-10)															
INTERVAL/TIMING			CLEAR/DWELL PHASES															
GRN	YEL	RED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	255	0.0	0.0	X	X													
2	0	0.0	0.0															
3	0	0.0	0.0															
4	0	0.0	0.0															
5	1	0.0	0.0	X	X													

EXIT CALLS

PRIORITY (Y/N TO SELECT) .....MED  
 DELAY TIMER (0-255 SEC) .....0  
 MIN GREEN BEFORE PRE (0= DEFAULT)....1  
 PED CLEAR BEFORE PRE (0= DEFAULT)....0  
 YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0  
 RED CLEAR BEFORE PRE (0= DEFAULT)....0.0  
 DWELL MIN TIMER (0-255 SEC) .....12  
 DWELL MAX TIMER (0=OFF,1-255MIN) ....0  
 DWELL HOLD-OVER TIMER (0-255) .....0  
 LATCH CALL? .....N  
 LINK TO NEXT PREEMPT? .....N  
 ENABLE BACKUP PROTECTION? .....N  
 HOLD CLEAR 1 PHASES DURING DELAY? ...N  
 FAST GREEN FLASH DWELL PHASES? .....N  
 PED CLEARANCE THROUGH YELLOW? .....N  
 INHIBIT OVERLAP GREEN EXTENSION? ....N  
 SERVICE DURING SOFTWARE FLASH? .....N  
 REST IN RED DURING DWELL INTERVAL? ..N  
 FLASH DWELL INTERVAL? .....N  
 ALLOW PEDS IN DWELL INTERVAL? .....N  
 RE-TIME DWELL INTERVAL? .....N  
 OVERLAPS: ..... ABCDEFGHIJKLMN  
 DWELL INT FLASH YELLOW  
 OMIT OVERLAPS:

PREEMPT PROGRAMMING COMPLETE

Program extend time on optical detector units for 2.0 sec for EVP3 and EVP5.

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 01-0404  
DESIGNED: July 2011  
SEALED: 2-13-12  
REVISED: N/A

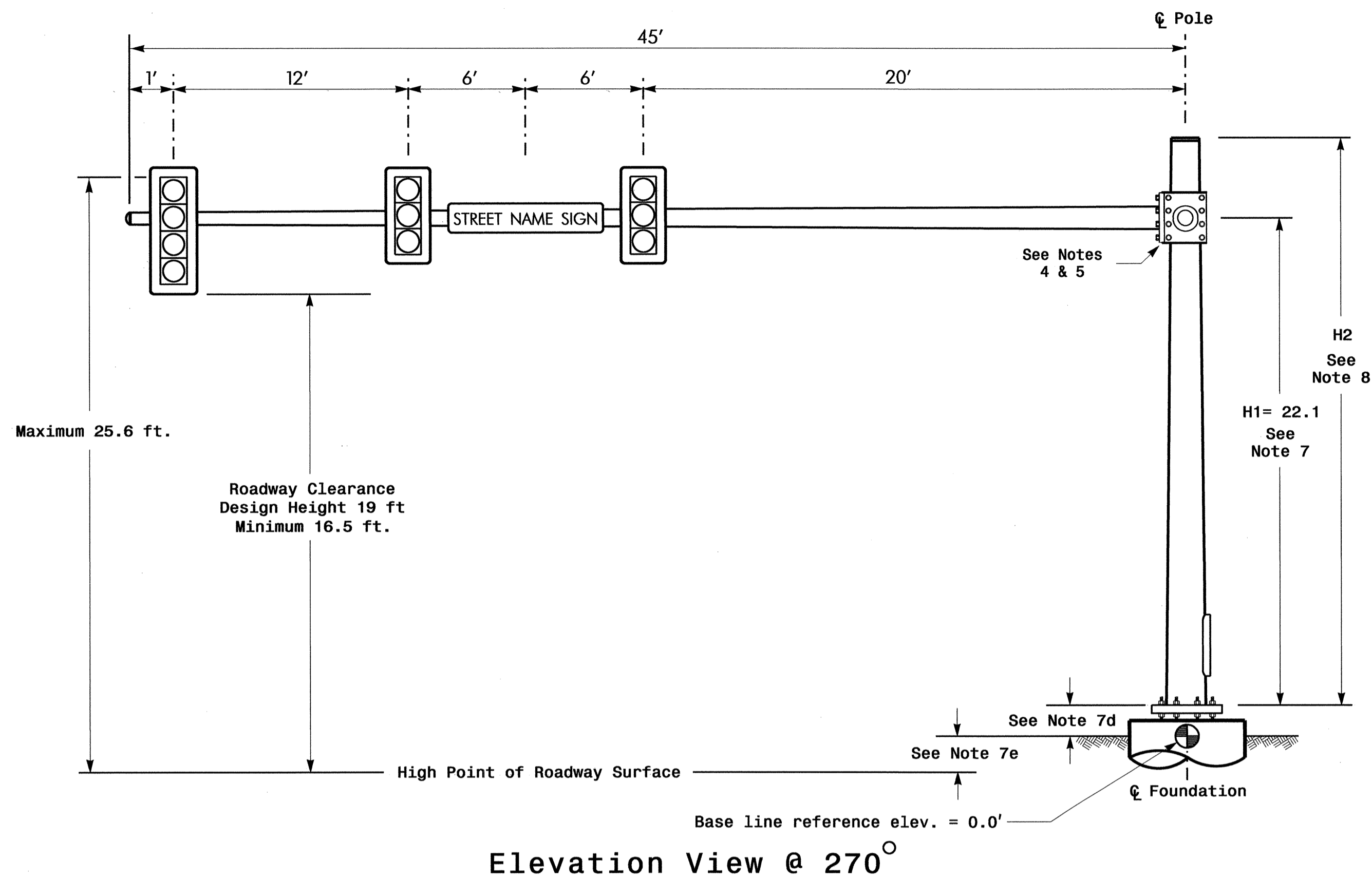
14-FEB-2012 14:53 S:\155\SUMITS\151\proj\work\groups\sig\_mon\peterson\010404\_sm\_eie.xxx.dgn j.peterson

ELECTRICAL DETAIL SHEET 3 OF 3

<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared in the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p><b>US 17-158 (N Road Street)</b> at <b>SR 1387 (Knobbs Creek Road)/ Commercial Drive</b></p> <p style="font-size: x-small;">Division 1 Pasquotank County Elizabeth City</p> <p style="font-size: x-small;">PLAN DATE: January 2012 REVIEWED BY: <i>JR</i></p> <p style="font-size: x-small;">PREPARED BY: James Peterson REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p style="font-size: x-small;">SEAL</p> <p style="font-size: x-small;">SEAL 008453 ENGINEER JOHN T. ROWE, P.E.</p> <p style="font-size: x-small;">Signature: <i>John T. Rowe</i> 2-15-12 DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 01-0404</p>
REVISIONS	INIT.	DATE						

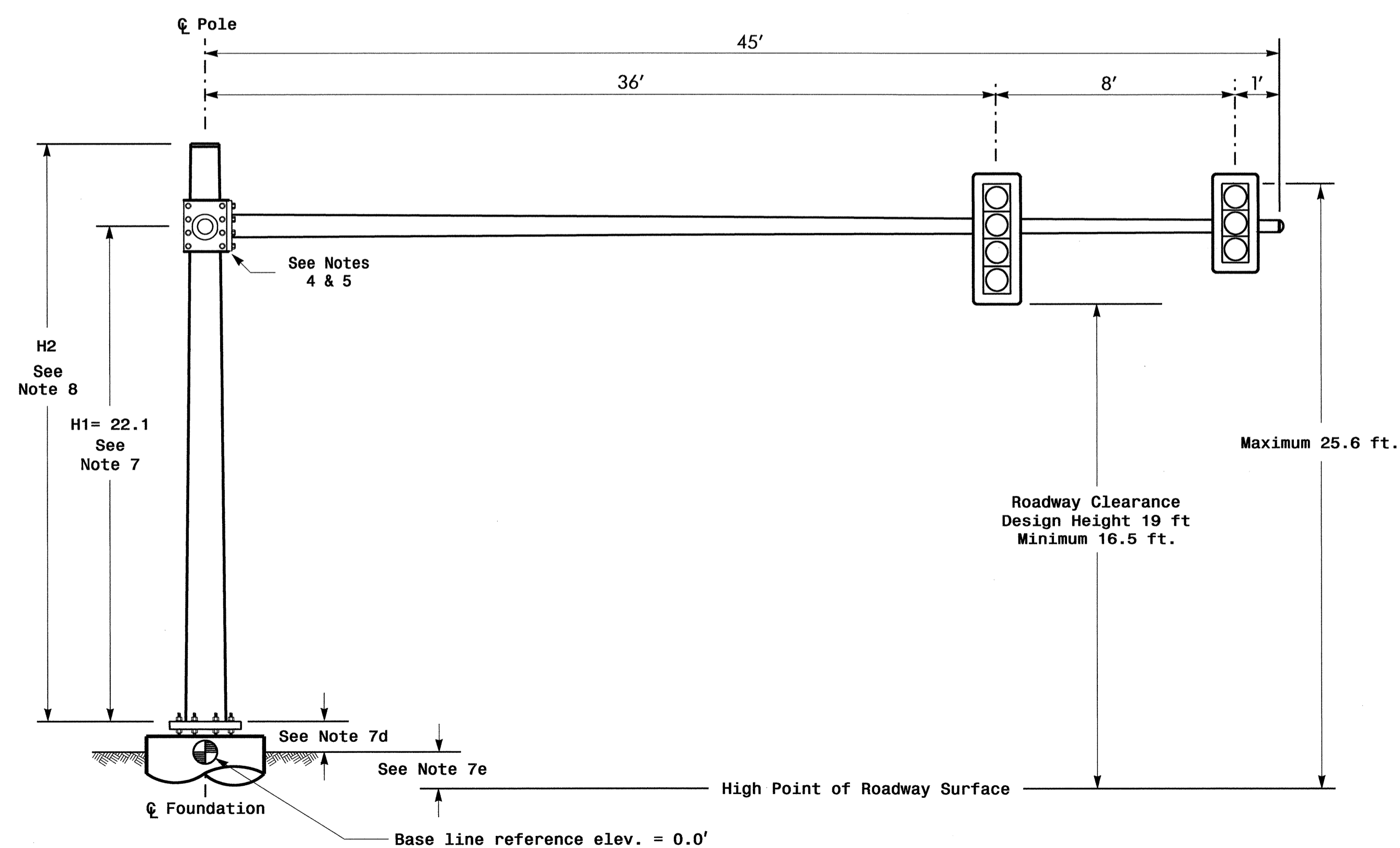


Design Loading for METAL POLE NO. 1, MAST ARM A



Elevation View @ 270°

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

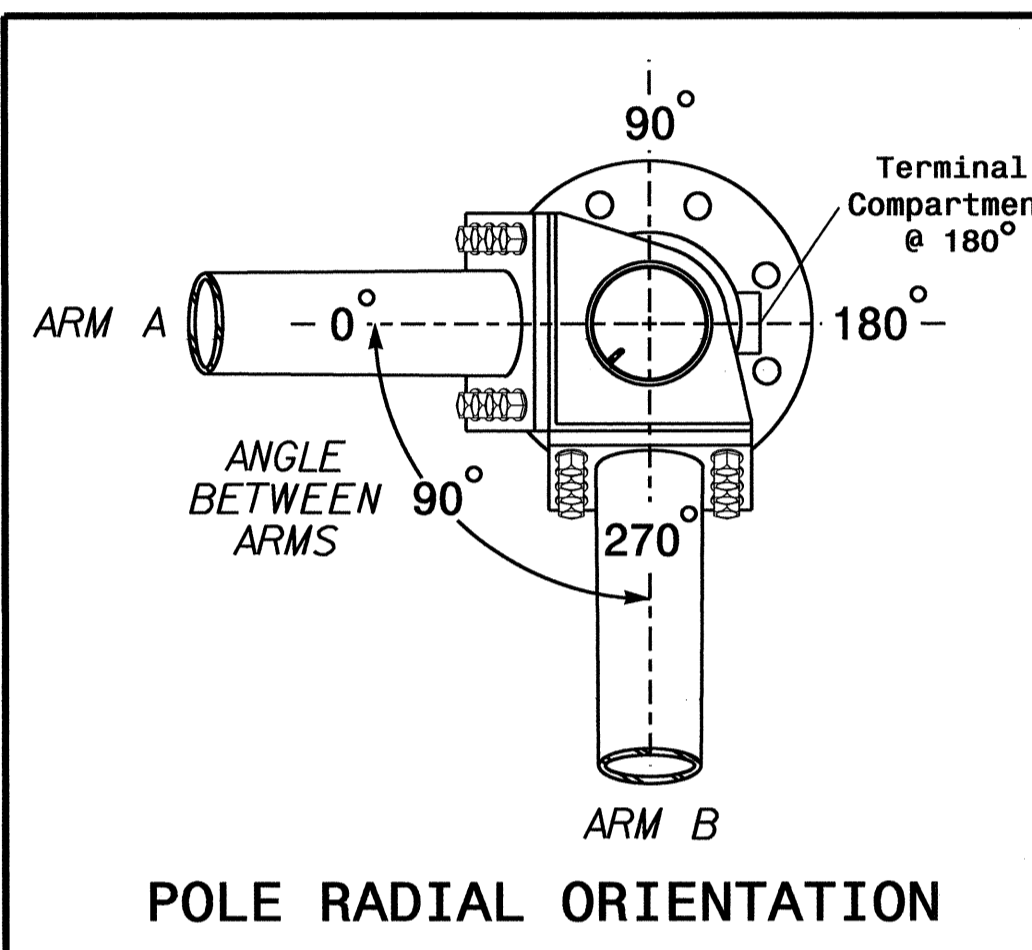


Elevation View @ 0°

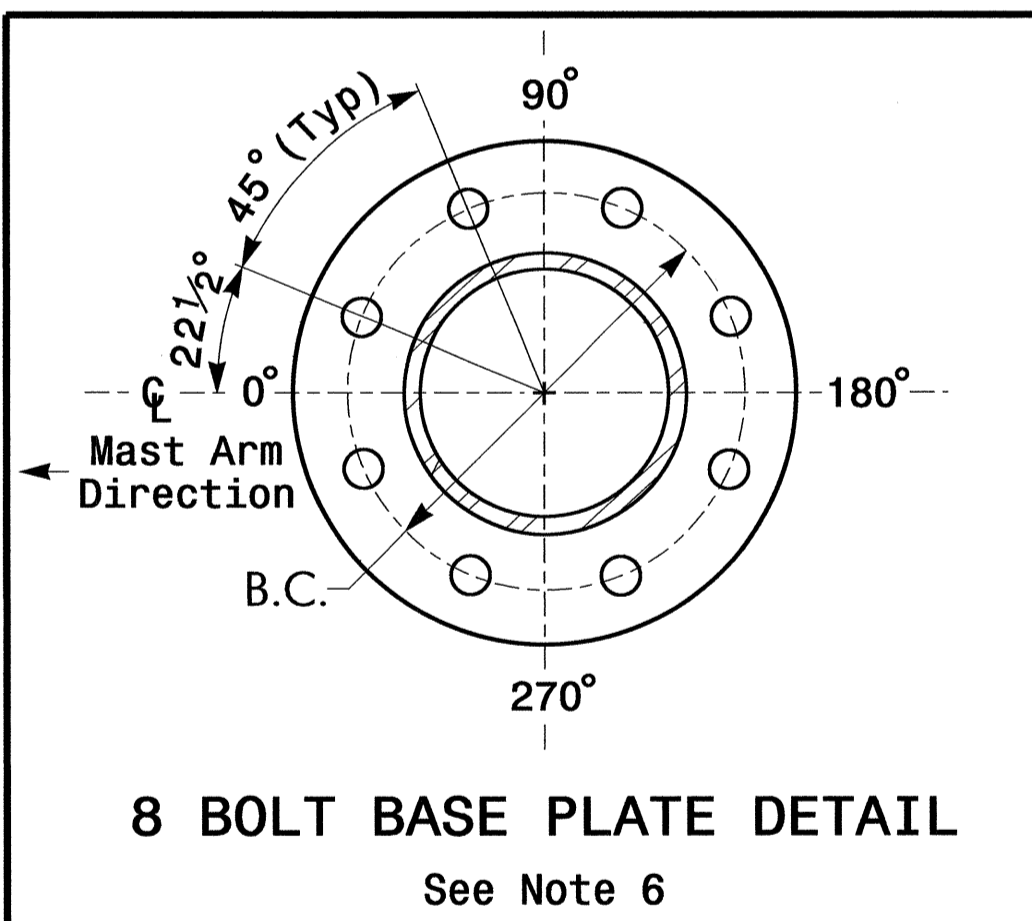
**SPECIAL NOTE**  
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available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

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

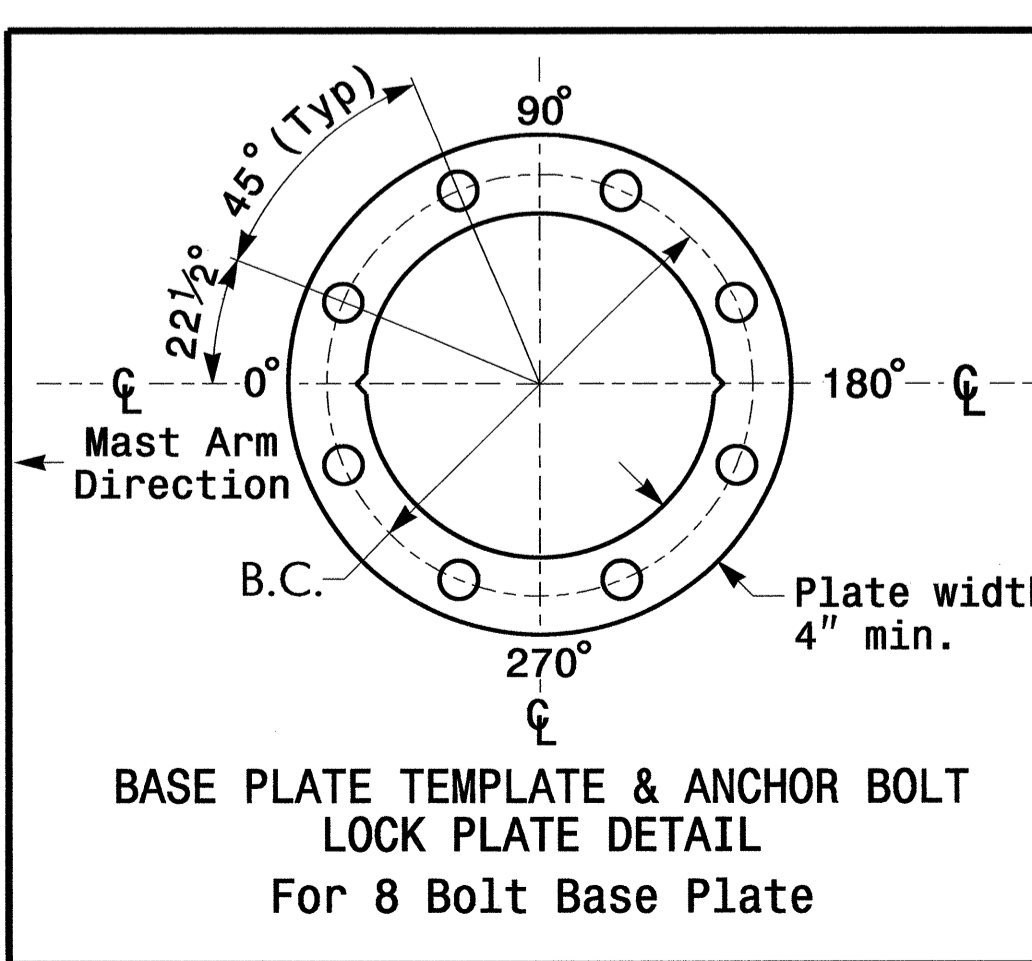
Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at $\phi$ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.9 ft.	N/A
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL  
See Note 6



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

**MAST ARM LOADING SCHEDULE**

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Symbol]	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
[Symbol]	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
[Symbol]	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

Design Reference Material

- NOTES**
- 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 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
    - The 2012 NCDOT Roadway Standard Drawings.
    - The traffic signal project plans and special provisions.
    - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

Design Requirements

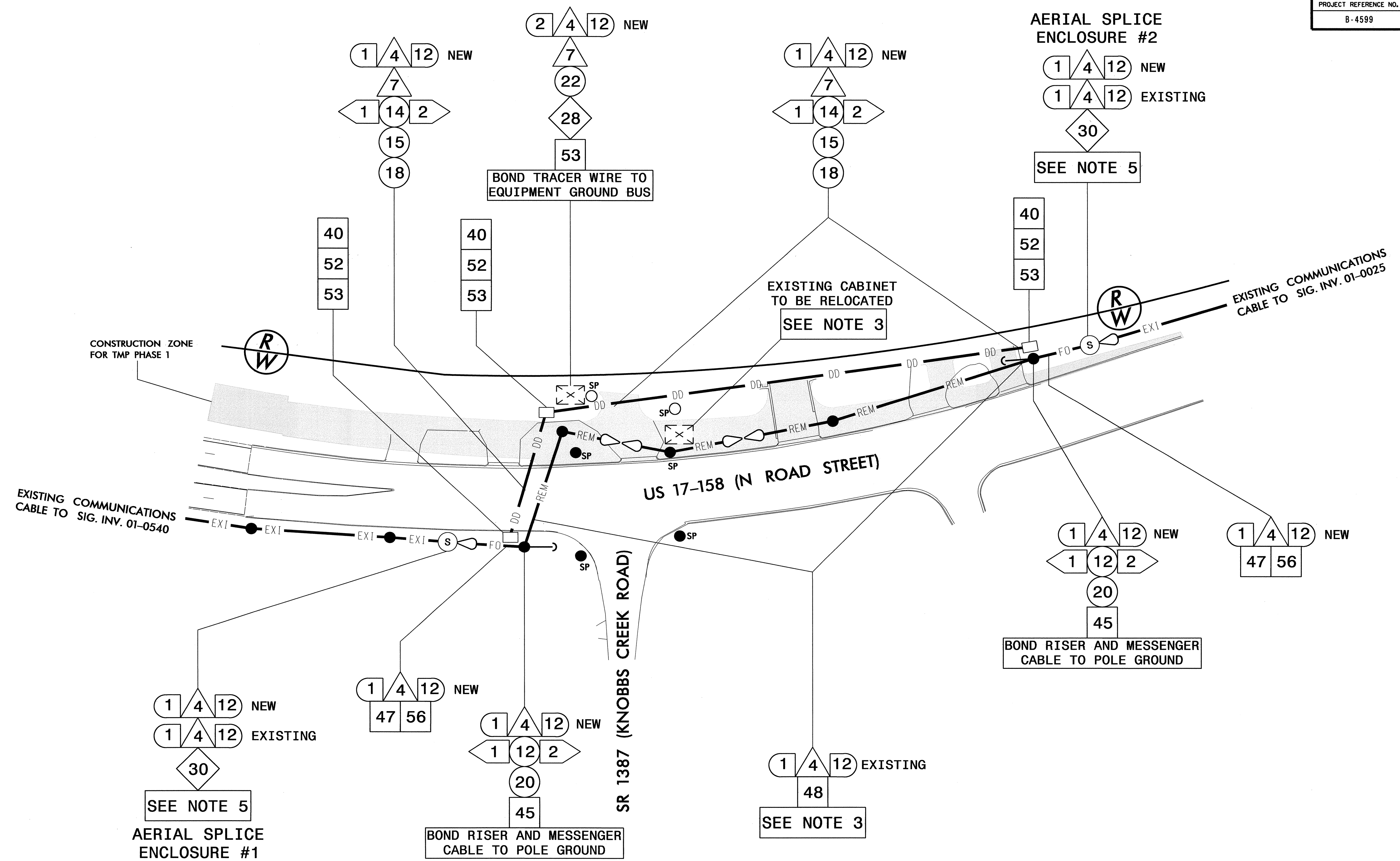
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
  - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
  - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
  - The roadway clearance height for design is as shown in the elevation views.
  - The top of the pole base plate is .75 feet above the ground elevation.
  - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of the pole using the greater of the following:
  - Mast arm attachment height (H1) plus 2 feet, or
  - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 3 (110 mph)

	Prepared In the Offices of: US 17-158 (N Road Street) at SR 1387 (Knobbs Creek Road)/ Commercial Drive Division 1 Pasquotank County Elizabeth City PLAN DATE: July 2011 REVIEWED BY: JP Galloway PREPARED BY: PL Alexander REVIEWED BY:		SEAL 
	SCALE 0 N/A N/A	REVISIONS INIT. DATE	







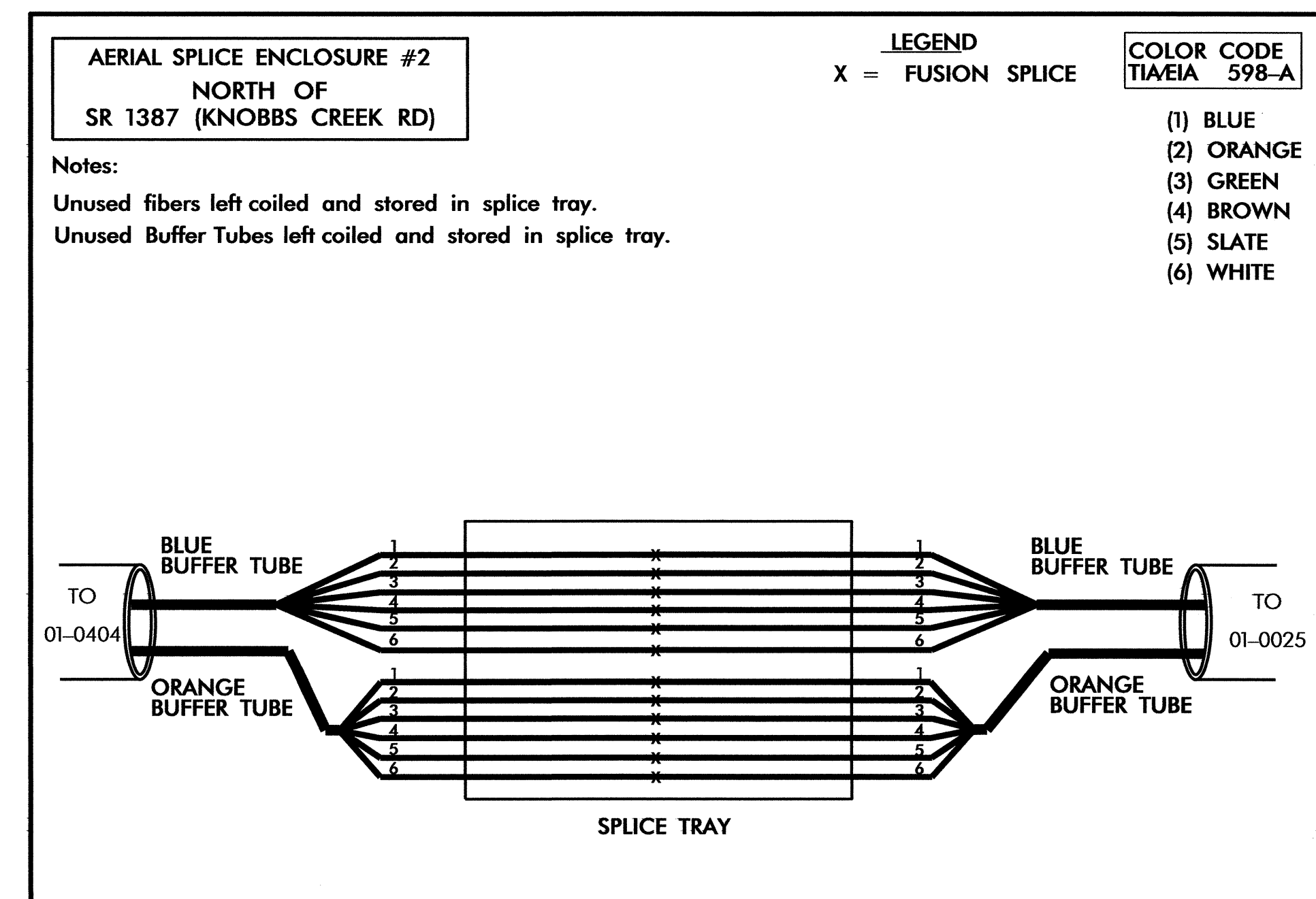
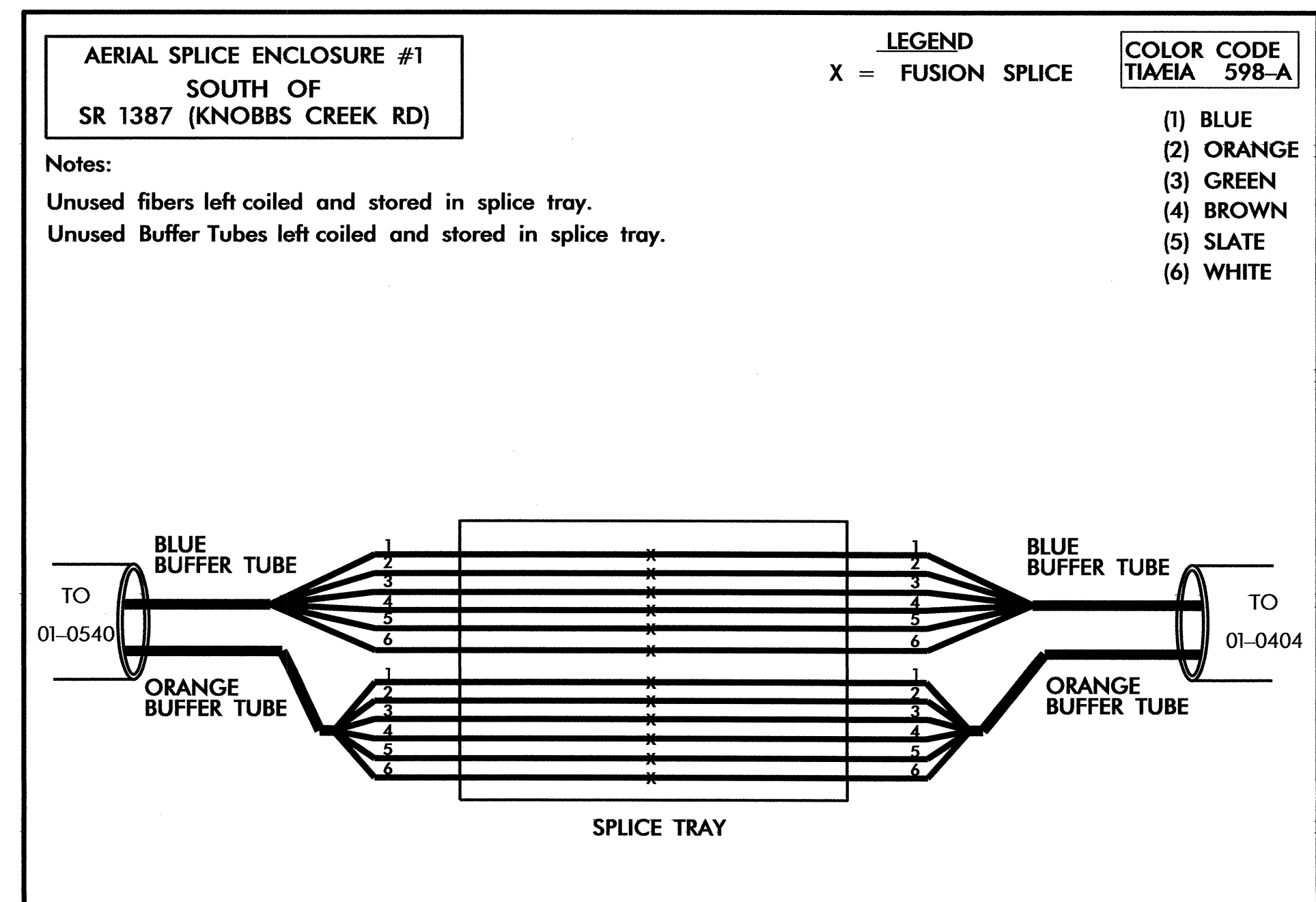
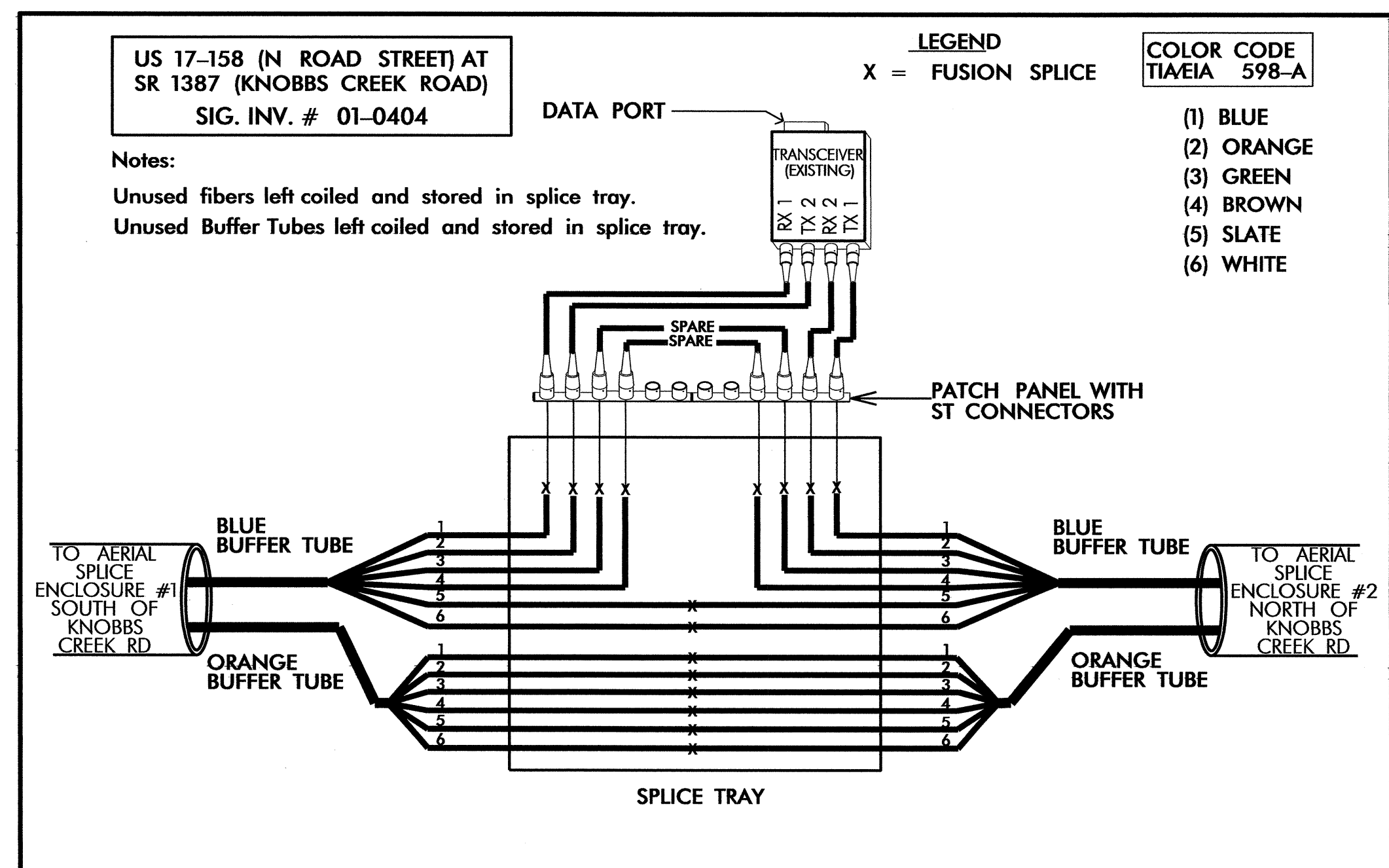
**NOTES:**

1. RECORD AND PROVIDE TO THE ENGINEER DOCUMENTATION OF EXISTING SPLICES IN THE EXISTING INTERCONNECT CENTER PRIOR TO REMOVAL OF ANY FIBER OPTIC CABLES.
2. REMOVE FIBER OPTIC TRANSCEIVER FROM EXISTING SIGNAL CABINET AND RELOCATE TO NEW CABINET.
3. AT THE EXISTING CABINET LOCATION, REMOVE AND BACK PULL THE FIBER OPTIC CABLE AND STORE ON NEW SNOW SHOE ARRANGEMENTS AS SHOWN.
4. INSTALL NEW AERIAL SPLICE ENCLOSURES AND INSTALL NEW 12 FIBER CABLE INTO NEW SIGNAL CABINET AS SHOWN.
5. STORE 300 FEET OF SPARE CABLE ON NEW SNOW SHOES AT EACH SPLICE ENCLOSURE LOCATION.

**TEMPORARY SIGNAL DESIGN 1 (TMP PHASE 1)**

	<p>COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG US 17-158 (NORTH ROAD STREET)</p>								
	<p>DIVISION 01 PASQUOTANK COUNTY ELIZABETH CITY PLAN DATE: FEBRUARY 2012 REVIEWED BY: I.N. AVERY PREPARED BY: S.C. WARDLE REVIEWED BY: G.A. FULLER</p>								
<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>SCALE 0</p>	<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> </tbody> </table>	REVISIONS	INIT.	DATE				<p>Signature: <i>Gregory A. Fuller</i> 2/29/12 DATE: 2/29/12 CADD File Name: _____</p>
REVISIONS	INIT.	DATE							

# FIBER OPTIC CABLE



**NOTES:**

1. RELOCATE EXISTING IFS MODEL D9130 TRANSCEIVER FROM EXISTING SIGNAL CABINET TO NEW CABINET AND INSTALL WITH NEW INTERCONNECT CENTER.
2. CONTRACTOR TO RECORD EXISTING SPlicing PRIOR TO REMOVAL OF ANY SPICES. RESPLICE ACCORDING TO EXISTING SPlicing CONFIGURATION.

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

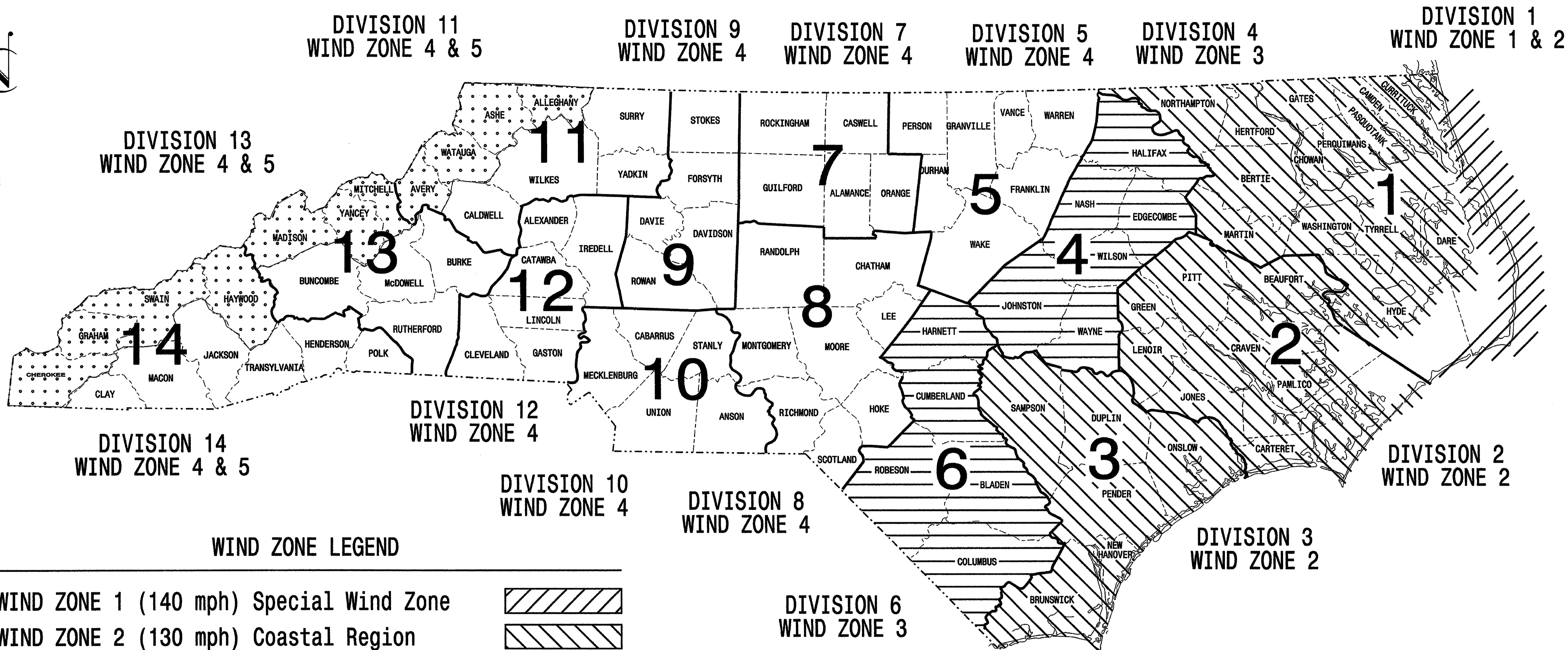
	<b>SPlice PLAN</b> <b>ALONG US 17-158</b> <b>(NORTH ROAD STREET)</b>		
	DIVISION 01 PASQUOTANK COUNTY ELIZABETH CITY PLAN DATE: FEBRUARY 2012 REVIEWED BY: I.N. AVERY PREPARED BY: S.C. WARDLE REVIEWED BY: G.A. FULLER	REVISIONS INIT. DATE	
SCALE 0		SIGNATURE: <i>Gregory A. Fuller</i> 2-29-12 DATE	



# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	B-4599	Sig.21
F. A. PROJ. NO.		M 1
PROJECT ID. NO.		

## STANDARD DRAWINGS FOR METAL POLES



<http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

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

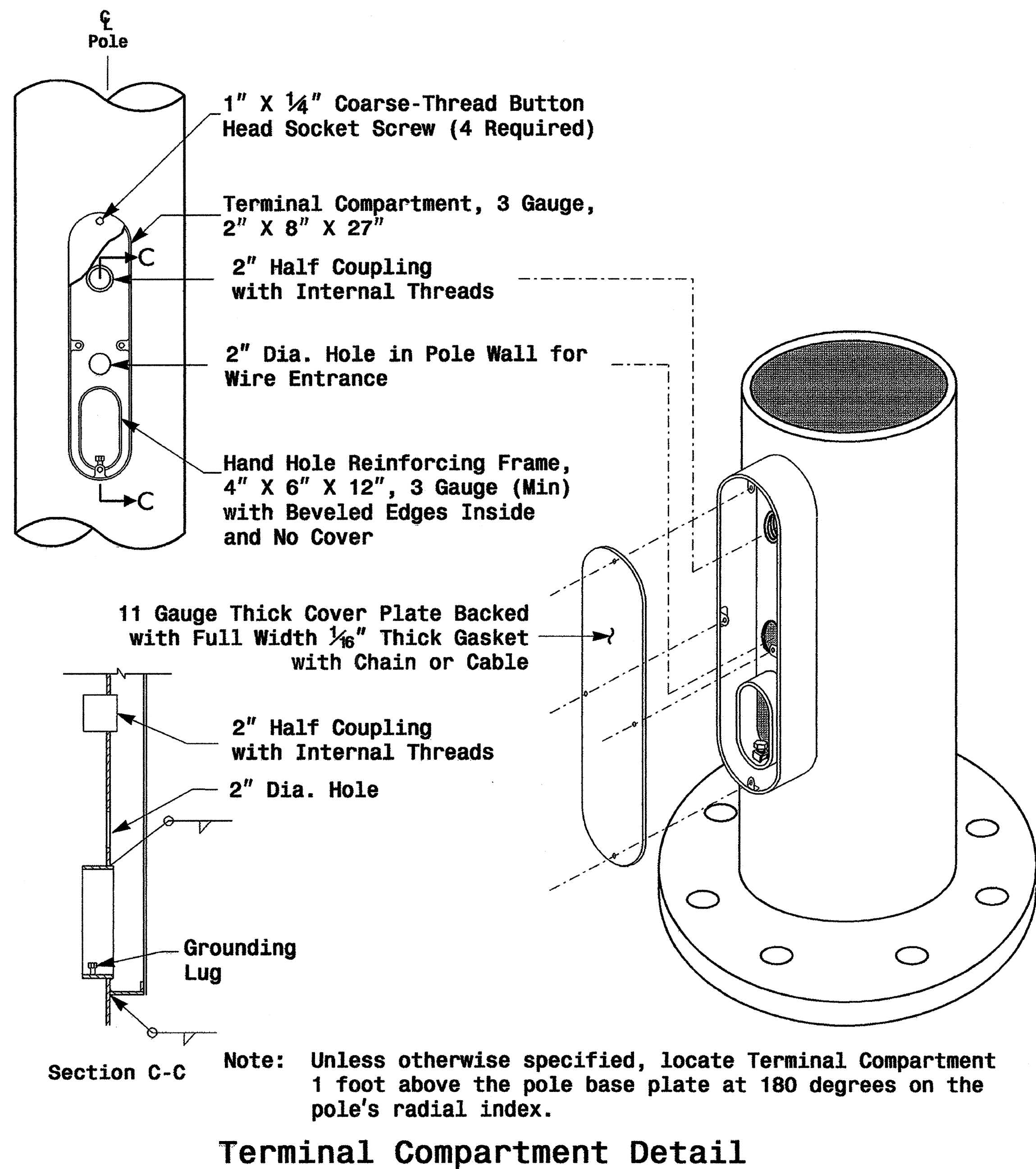
**NCDOT CONTACTS:**  
**MOBILITY AND SAFETY DIVISION - ITS and SIGNALS UNIT**

G. A. Fuller, P.E. - State ITS and Signals Engineer  
 G. G. Murr, Jr., P.E. - State Signals Engineer  
 D. C. Sarkar, P.E. - ITS and Signals Senior Structural Engineer  
 C. F. Andrews, Jr. - ITS and Signals Structural Project Engineer  
 M. Aslam - ITS and Signals Structural Project Engineer  
 N. Bitting, P.E. - ITS and Signals Structural Project Engineer

SEAL

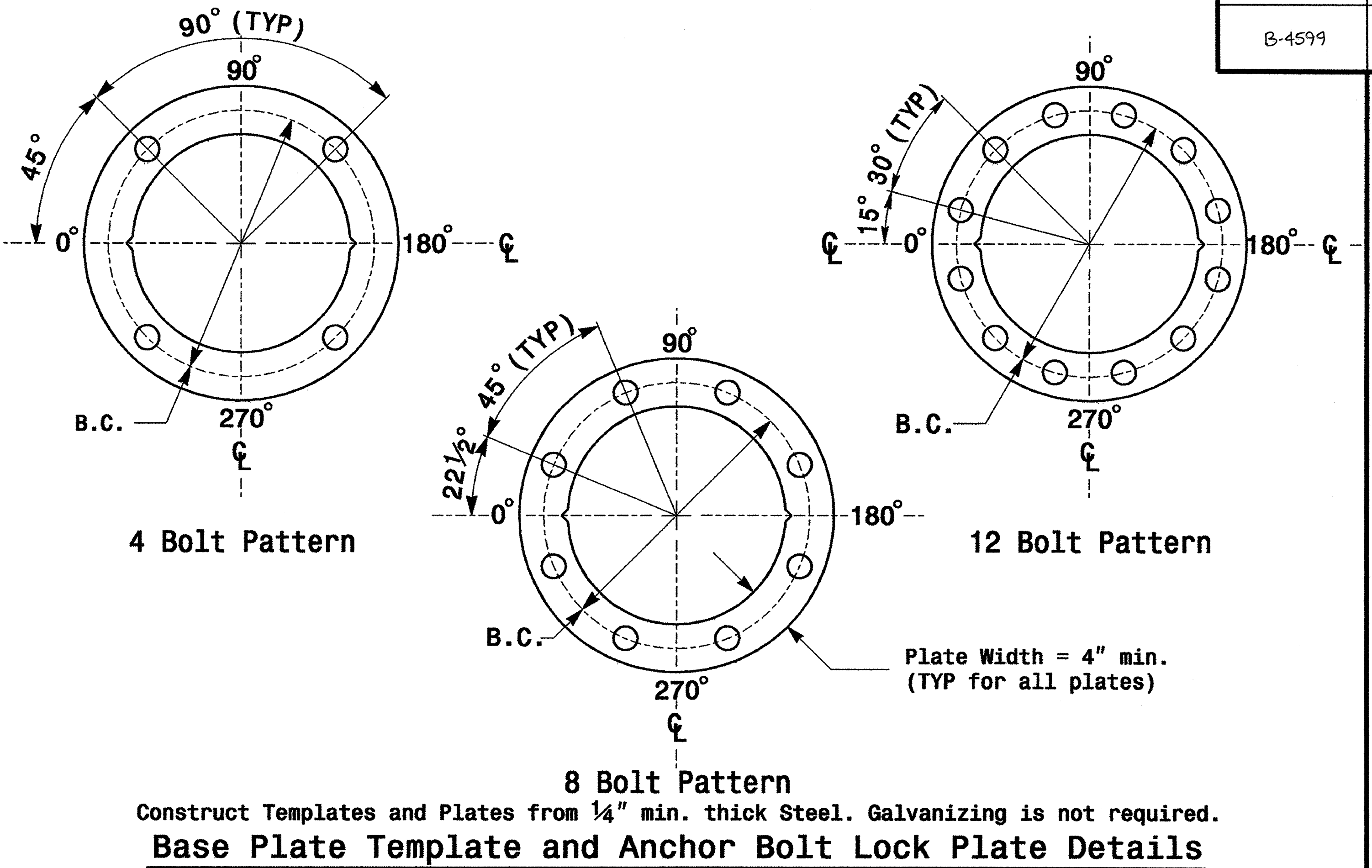
D. Sarkar 7.21.2009  
SIGNATURE DATE





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**

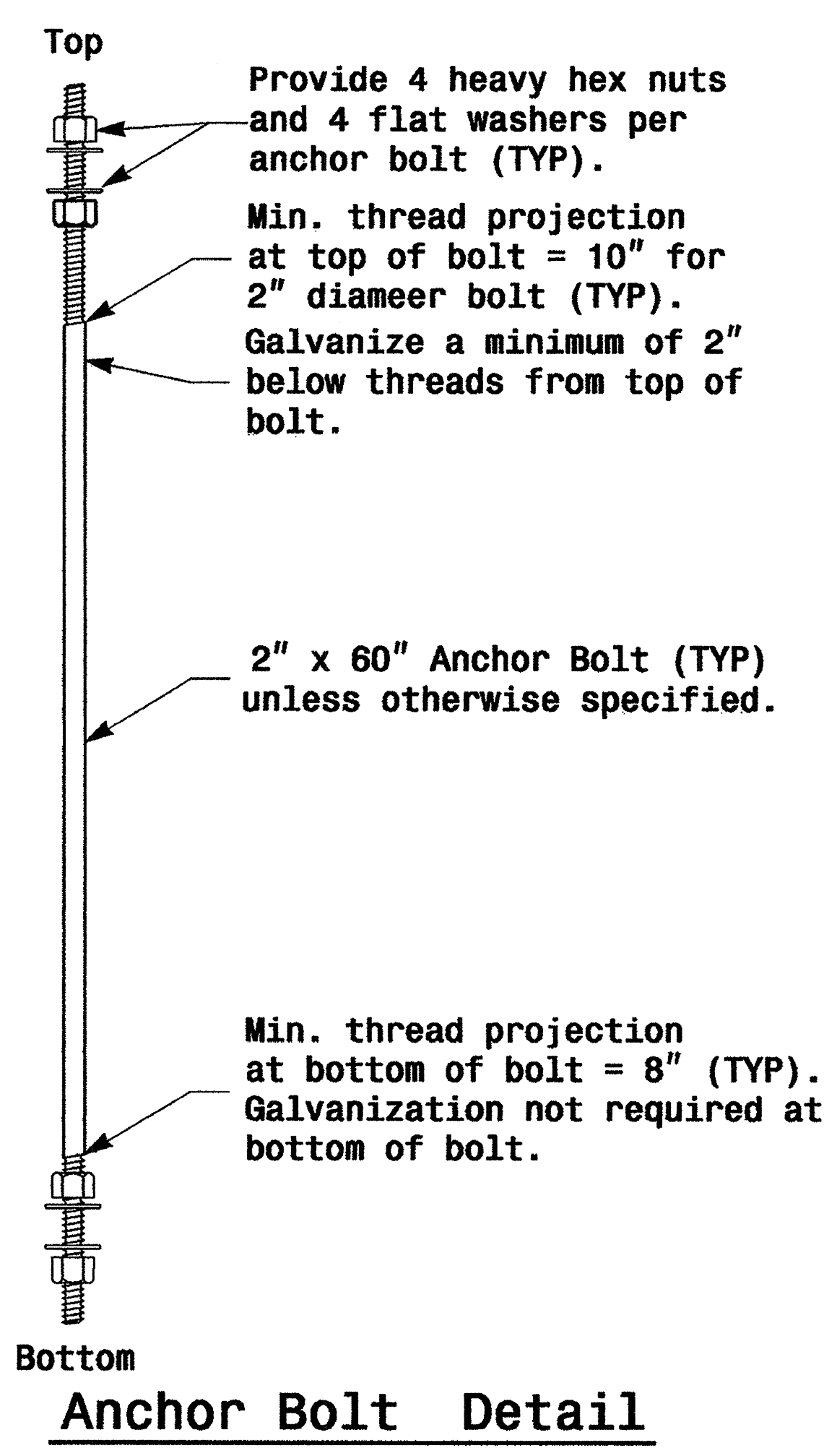
MFG _____ MFG. DATE: MM/YY	MFG _____ MFG. DATE: MM/YY
SHAFT D/T/L/Y _____	SECTION D/T/L/Y _____
ARM-A D/T/L/Y _____	NCDOT STANDARD _____
ARM-B D/T/L/Y _____	
A.B. DIA./B.C./L/Y _____	
NCDOT STANDARD _____	

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

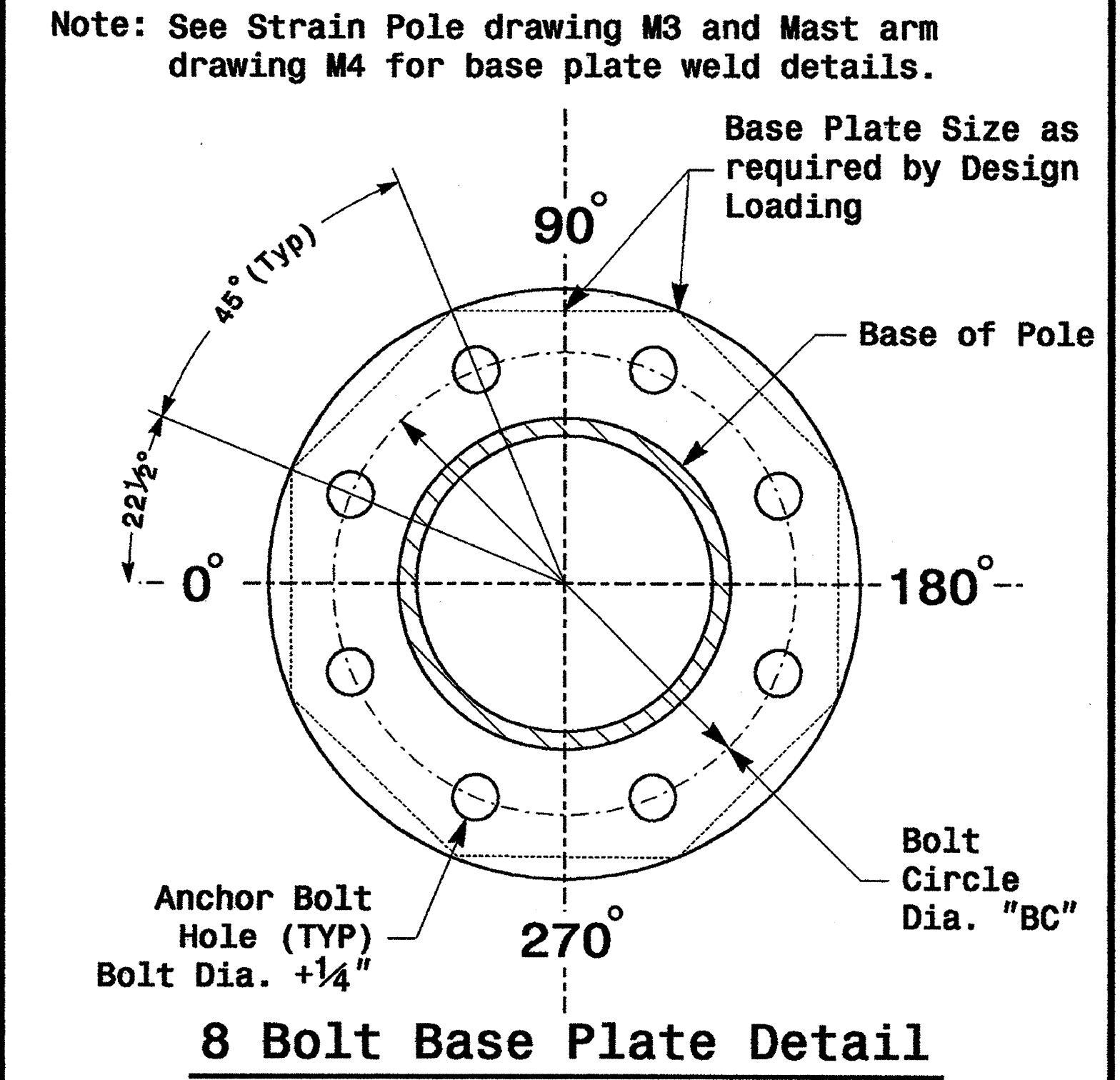
Arm I.D. Tag (Provide on each section of a multi-section mast arm)

- 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**



Prepared in the Office of: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Typical Fabrication Details Common To All Metal Poles

PLAN DATE: May 2005 REVIEWED BY: C.F. Andrews

PREPARED BY: P.L. Alexander REVIEWED BY: A.M. Esposito

SCALE: NONE

Signature: D. Sarkar 9.2.2005

SIG. INVENTORY NO.:

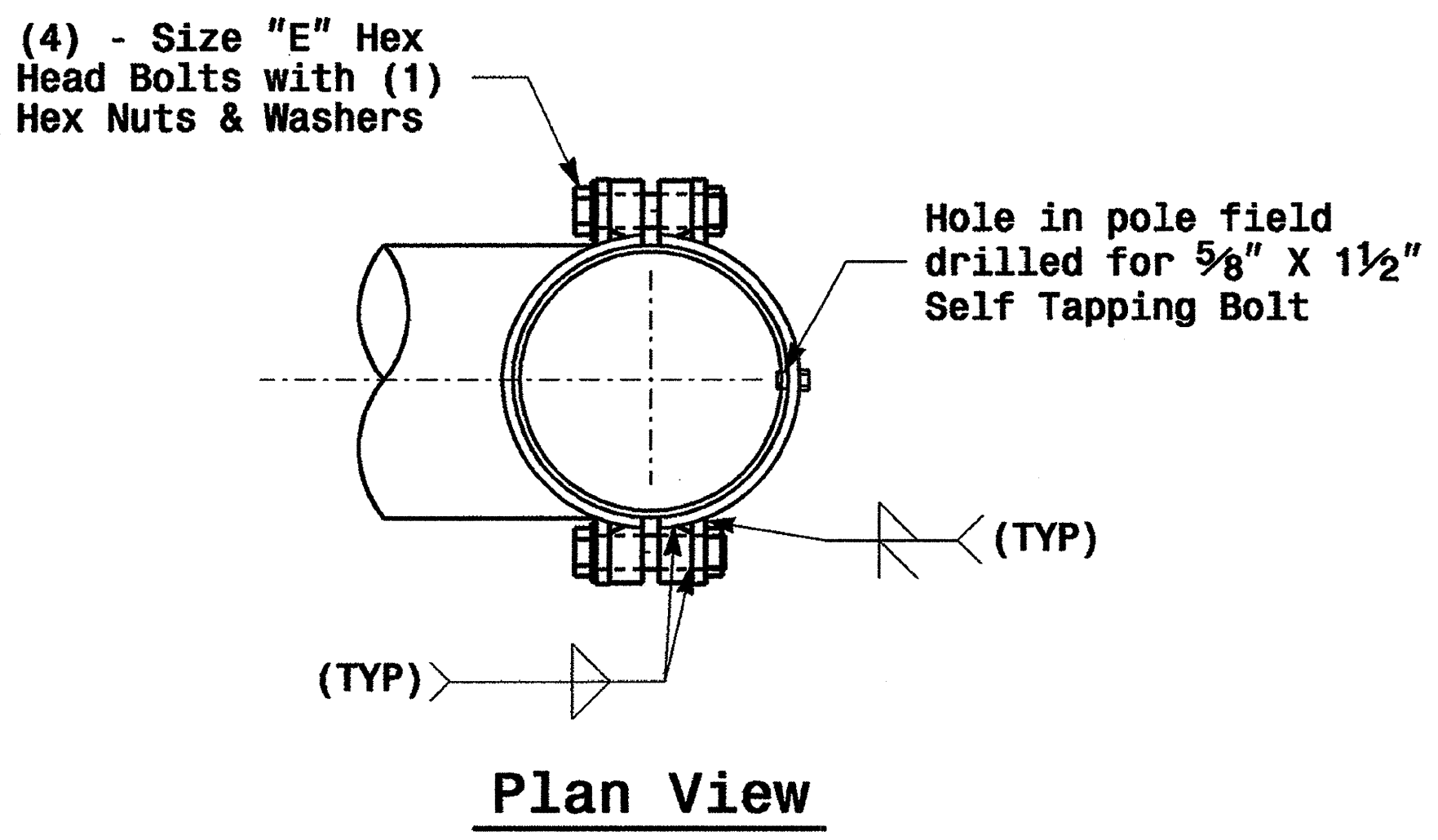
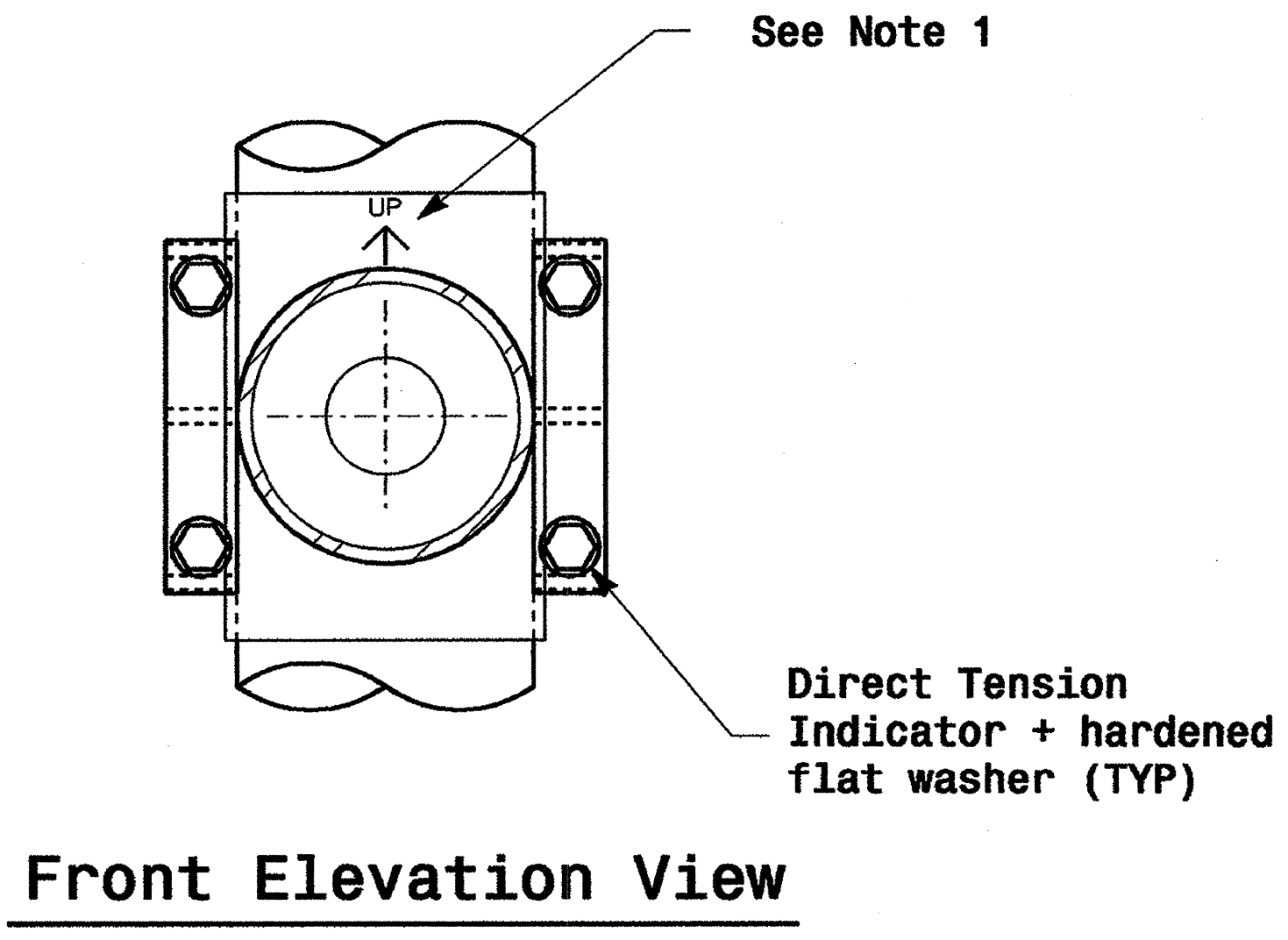
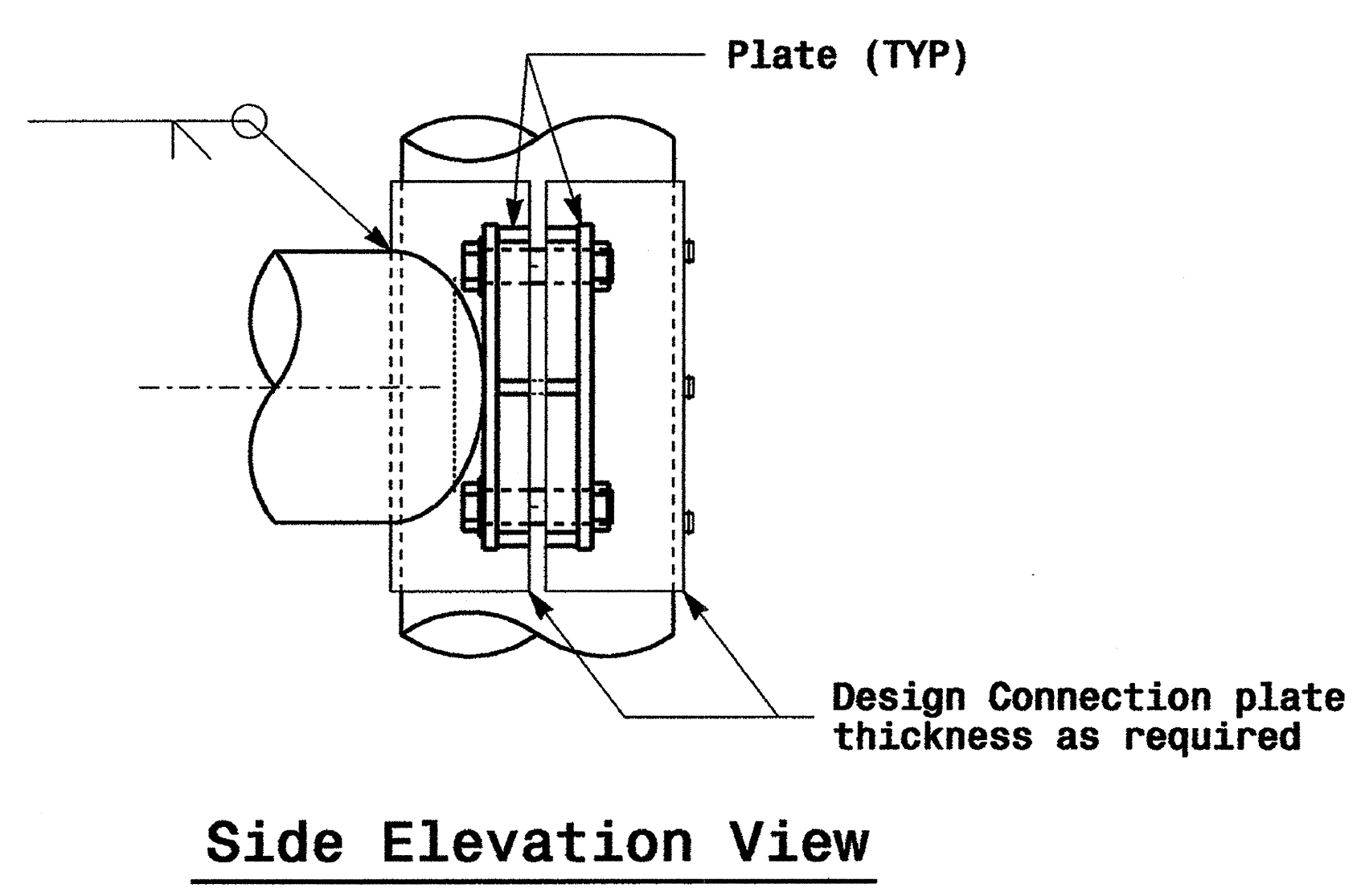
**Fabrication Details - All Poles**

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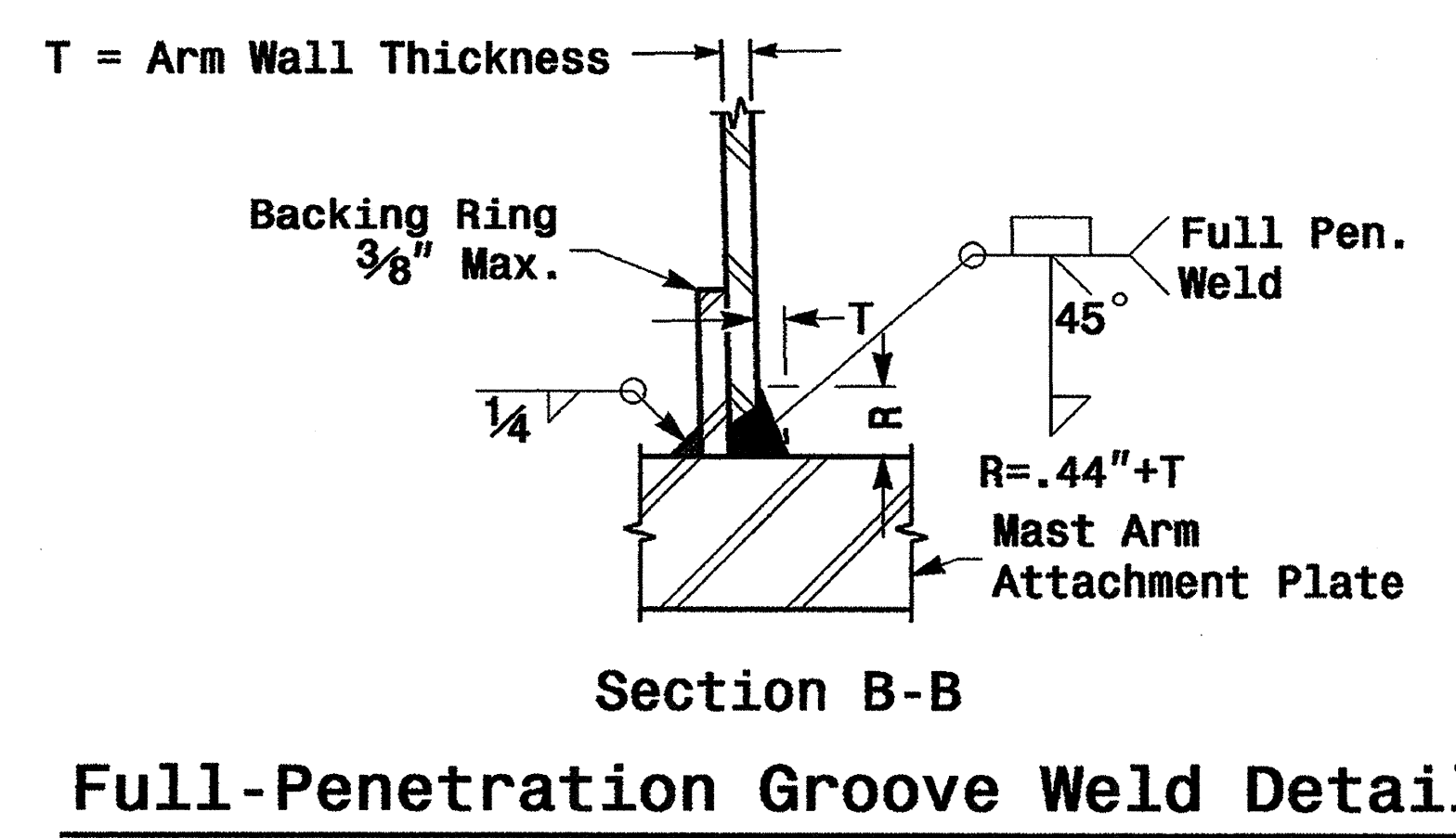
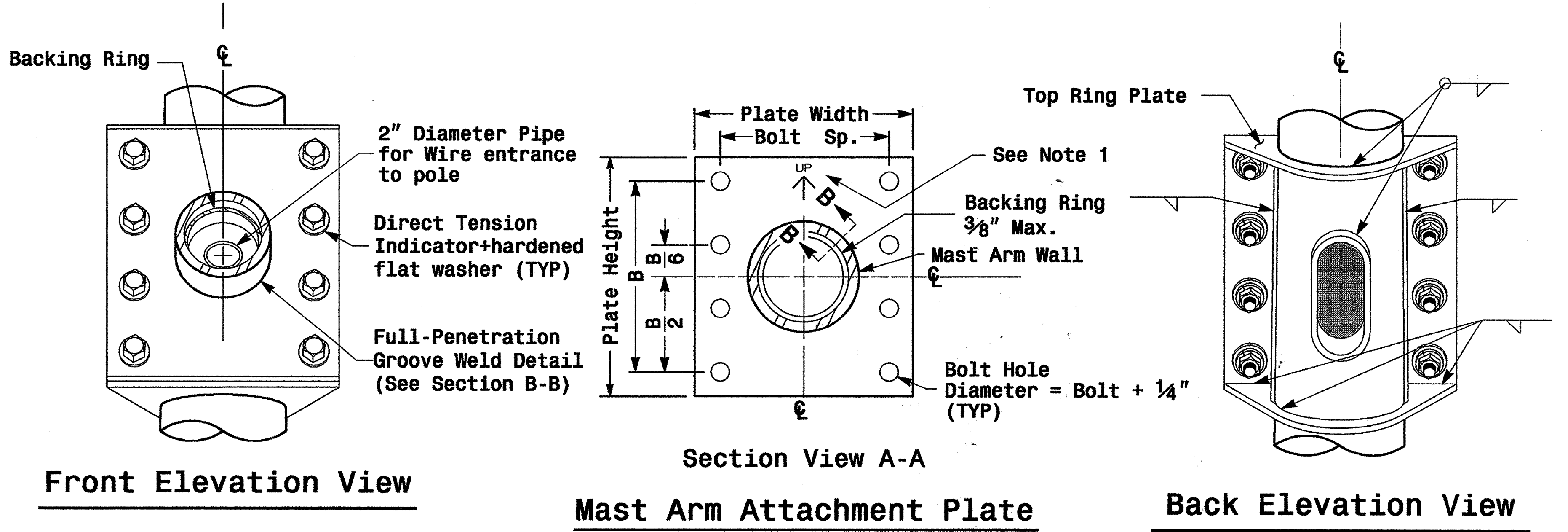
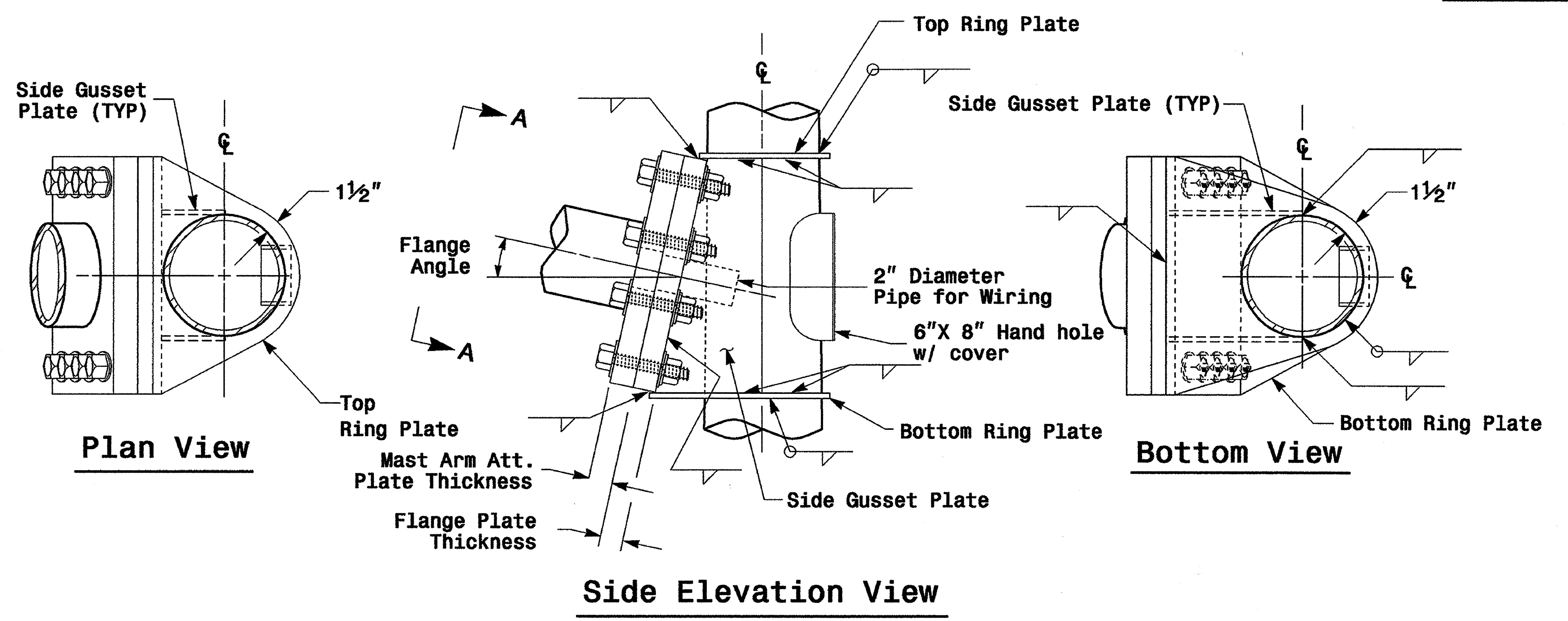




### Adjustable Clamp Type Bolted Mast Arm Connection



### 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.

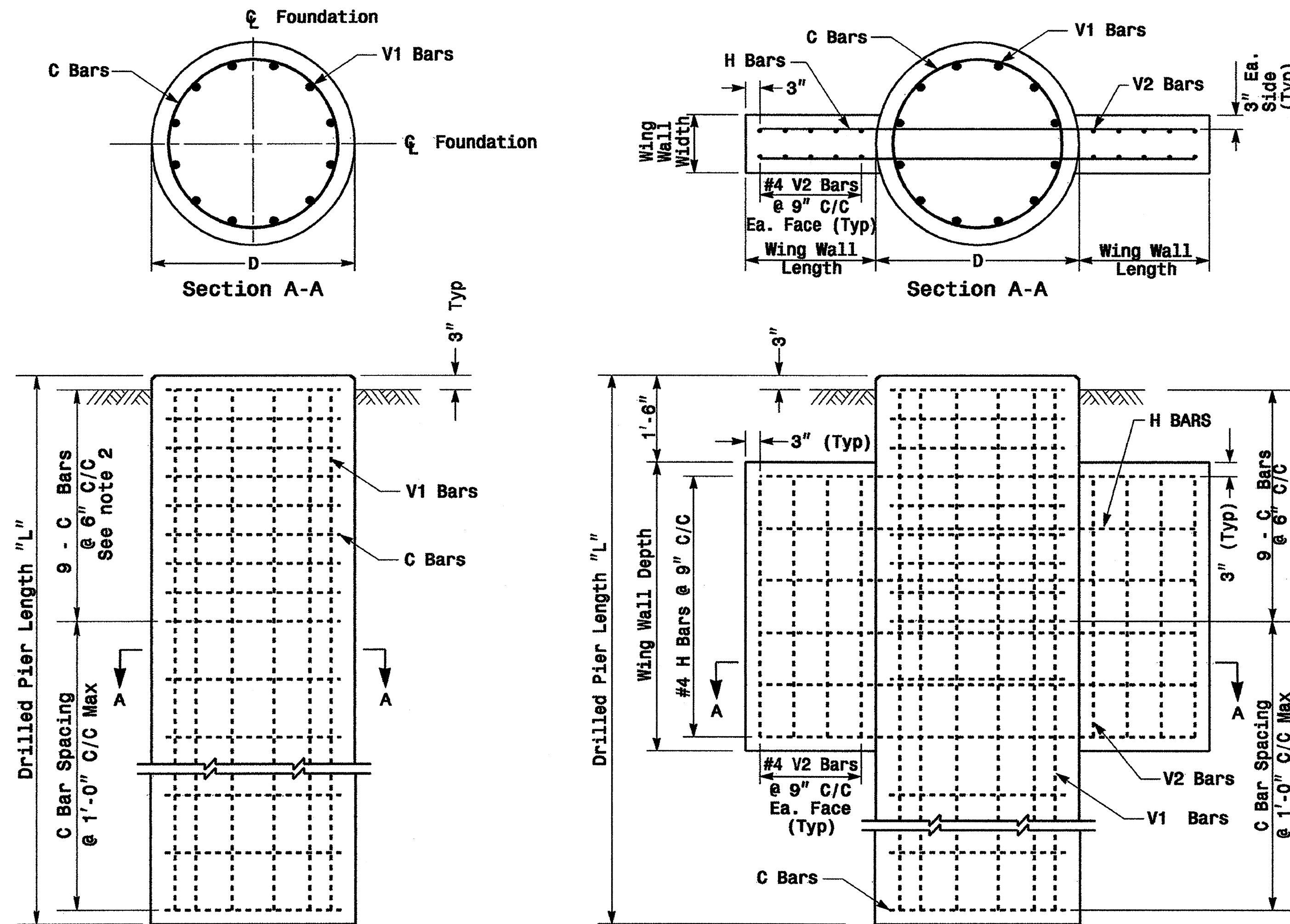
	<b>Fabrication Details For Mast Arm Connection To Pole</b>		
	PLAN DATE: <b>May 2005</b> PREPARED BY: <b>P.L. Alexander</b>	REVIEWED BY: <b>C.F. Andrews</b> REVIEWED BY: <b>A.M. Esposito</b>	

01-SEP-2005 14:11:00 v:\poc\poc\unit1\work\poc\sup\6204 mast pole.stn\mcds2004.m5.dgn

**Fabrication Details - Mast Arm Poles**

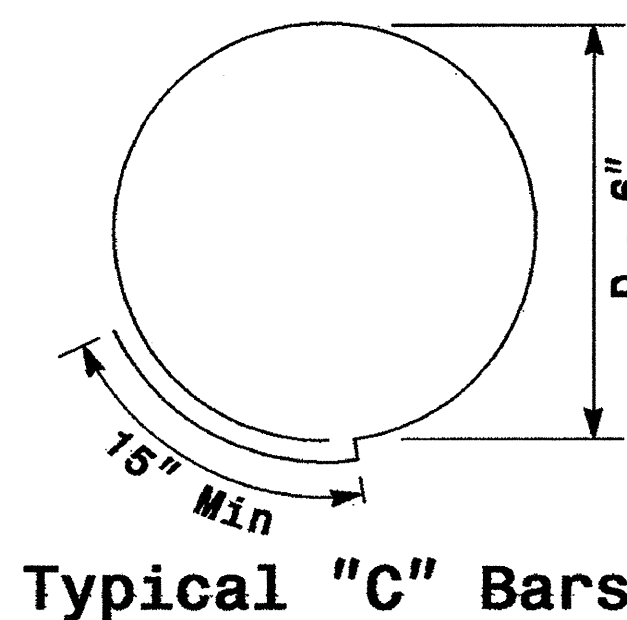


## Reinforcing Steel Bars



REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (42" & 48" DIAMETER)						
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"

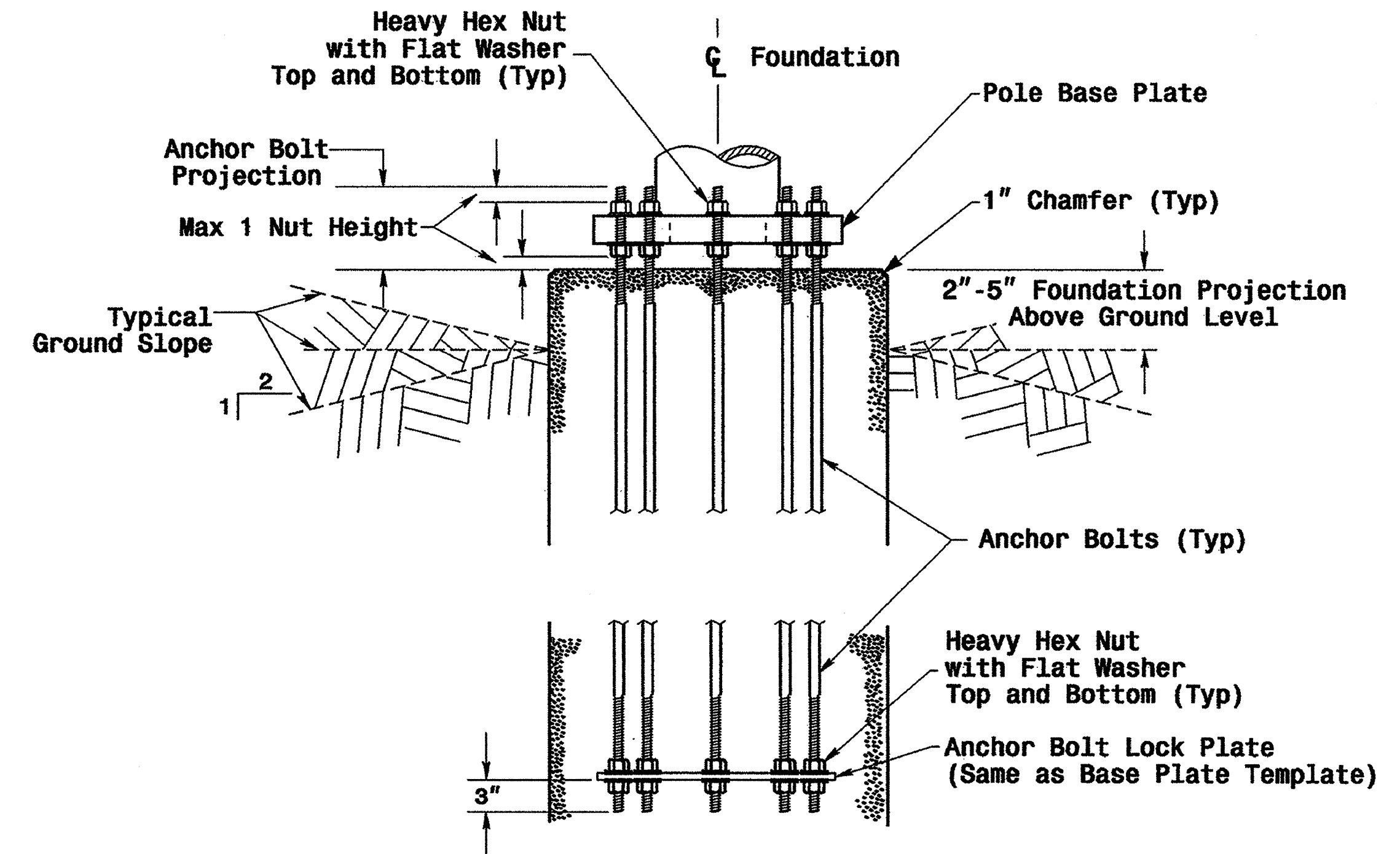
\* See Note No. 1  
\*\* See Note No. 3

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

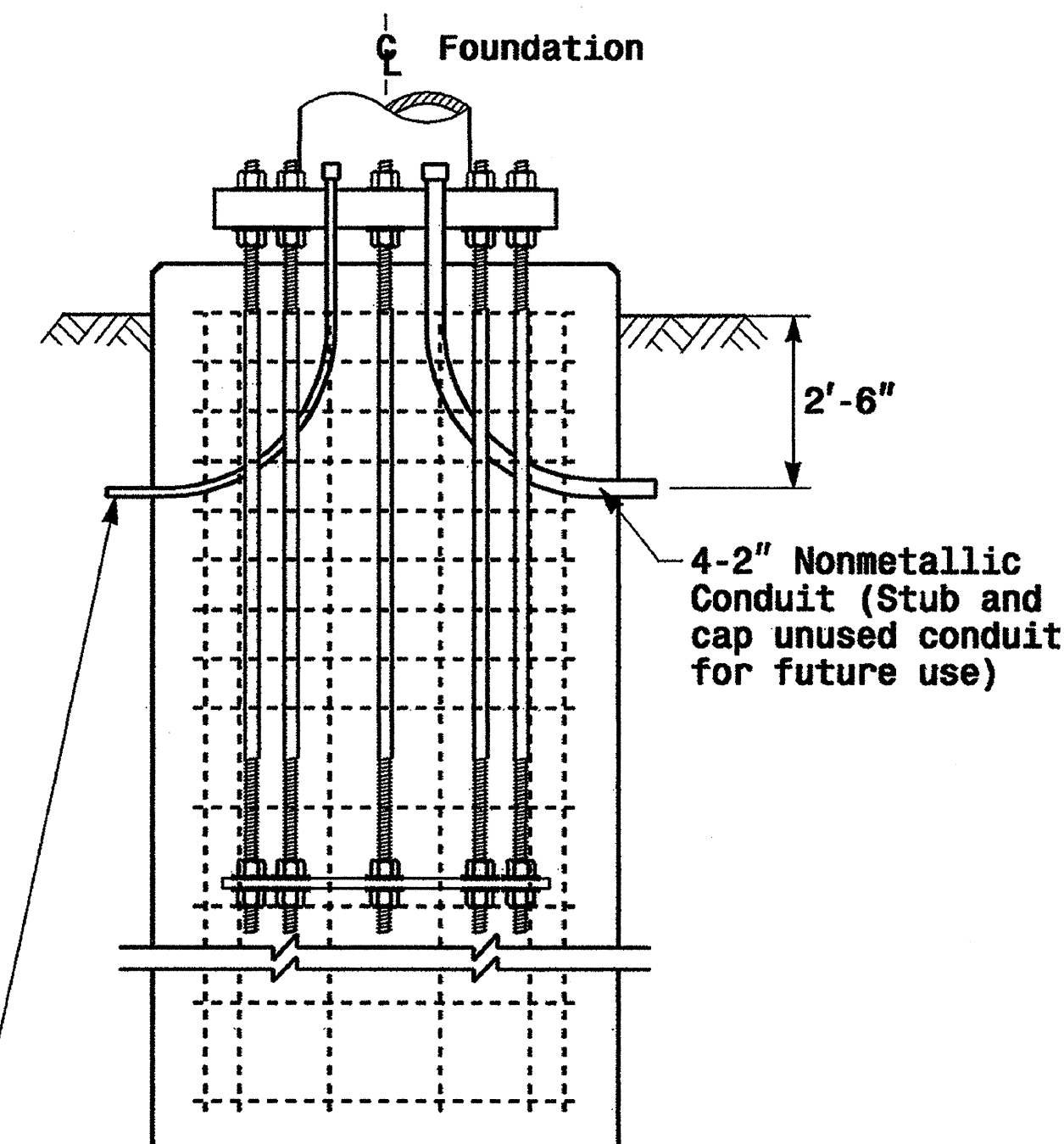
See Note No. 4

## Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



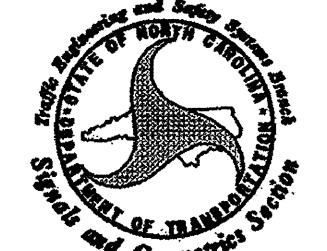
## Typical Foundation Conduit Details



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

## Notes

- The number of C-bars is based on foundation depth. For standard foundations, see sheet M 8.
- Circular tie reinforcing rings may be vertically adjusted by +/- 3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
- The length of V1-bars is based on foundation depth. For standard foundations, see sheet M 8.
- The quantities for steel and concrete shown in the Wing Wall Details Chart reflect the amount of material for 1 pair of wing walls (2 wing walls per drilled pier shaft.)

Prepared in the Office of:  
  
**Construction Details Foundations**  
 PLAN DATE: May 2005 REVIEWED BY: P.L. ALEXANDER  
 PREPARED BY: C.F. ANDREWS REVIEWED BY: A.M. ESPOSITO  
 SCALE: 0 NA  
 NONE  
 DATE: 9.2.2005  
 SIGNATURE: D. Sarker  
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094  
 SIGNATURE: DINESH C. SARKAR  
 DATE: 9.2.2005  
 SIG. INVENTORY NO.