

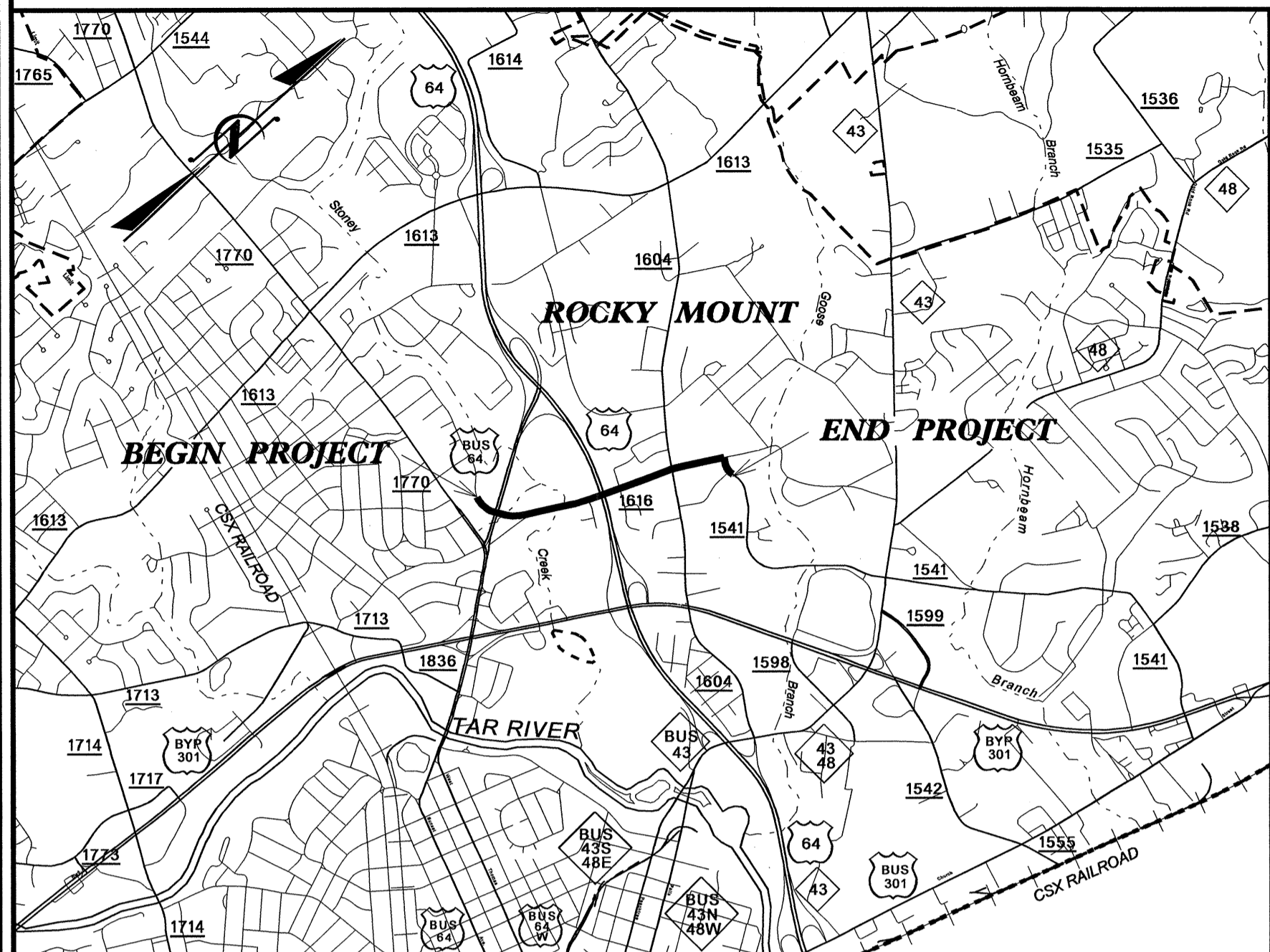
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# NASH COUNTY

**LOCATION: SR-1616 (COUNTRY CLUB ROAD) FROM  
US 64 BUSINESS (BUCK LEONARD BLVD.)  
TO SR-1541 (JEFFREYS ROAD)**

**TYPE OF WORK: SIGNALS**

**TIP PROJECT: U-3331**



**VICINITY MAP**



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

Sheet #	Reference #	Location/Description
Sig. 1		Title Sheet
Sig. 2-7	04-0740	US 64 Bus. (Buck Leonard Blvd.) at SR 1616 (Country Club Road)/Zebulon Drive
Sig. 8-13	04-0599	SR 1604 (Hunter Hill Road) at SR 1616 (Country Club Road)
Sig. 14-16	04-0849	SR 1616 (Country Club Road) at SR 1541 (Jeffrey's Road)
Sig. 17-23	N/A	Communications Cable Routing Plans
Sig. 24-30	N/A	Metal Pole Standards

**INTELLIGENT TRANSPORTATION AND SIGNALS UNIT**

Contacts:  
**Jason Galloway, PE - East Region Signal Project Engineer**  
**George Brown, PE - Signal Equipment Design Engineer**  
**Greg Fuller, PE - Intelligent Transportation Systems Engineer**

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

750 N. Greenfield Parkway, Garner, NC 27529

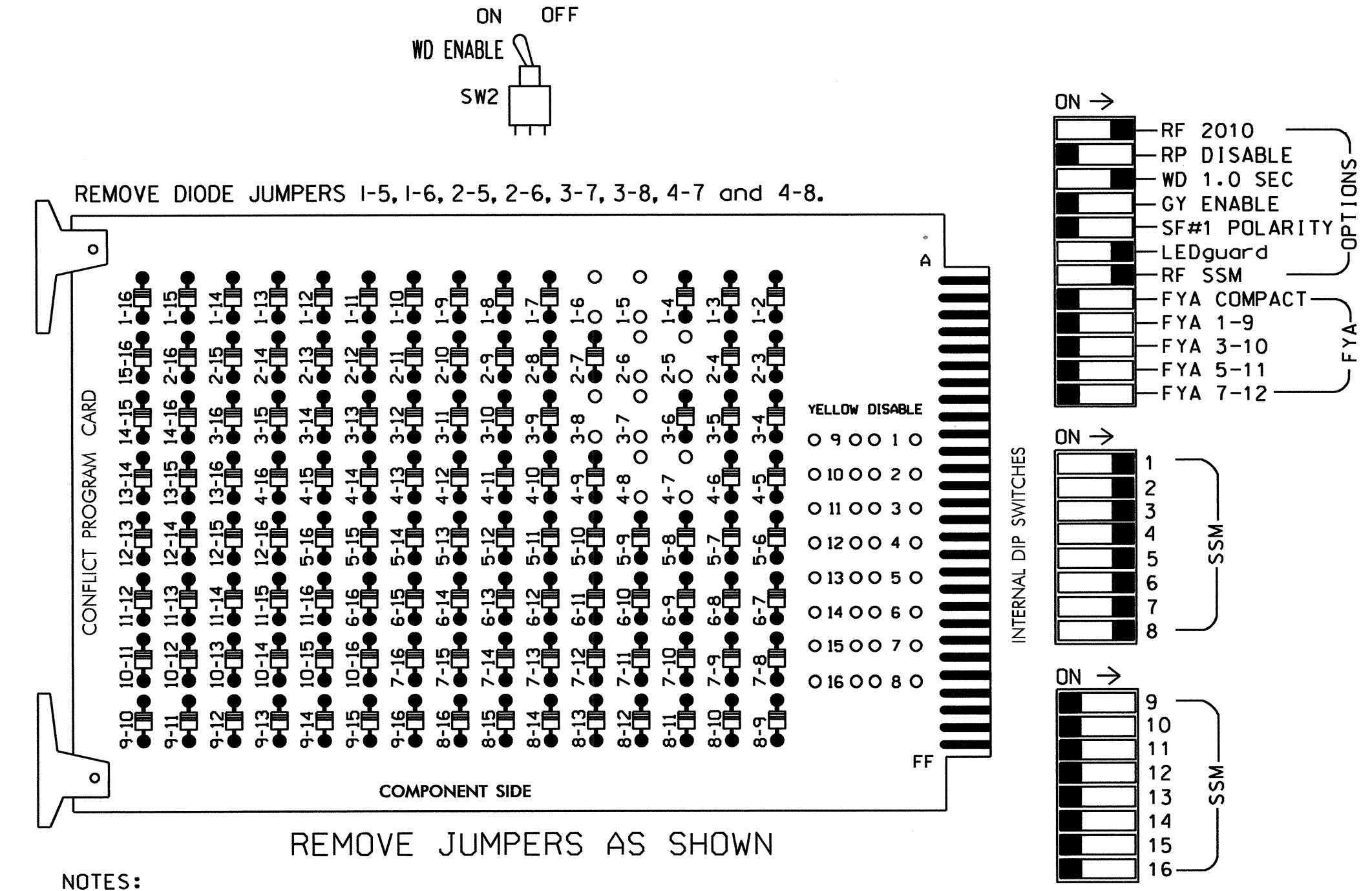
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### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- NOTES:
1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
  2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

### NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. 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.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Rocky Mount City System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070L  
 CABINET.....332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAPS.....NONE

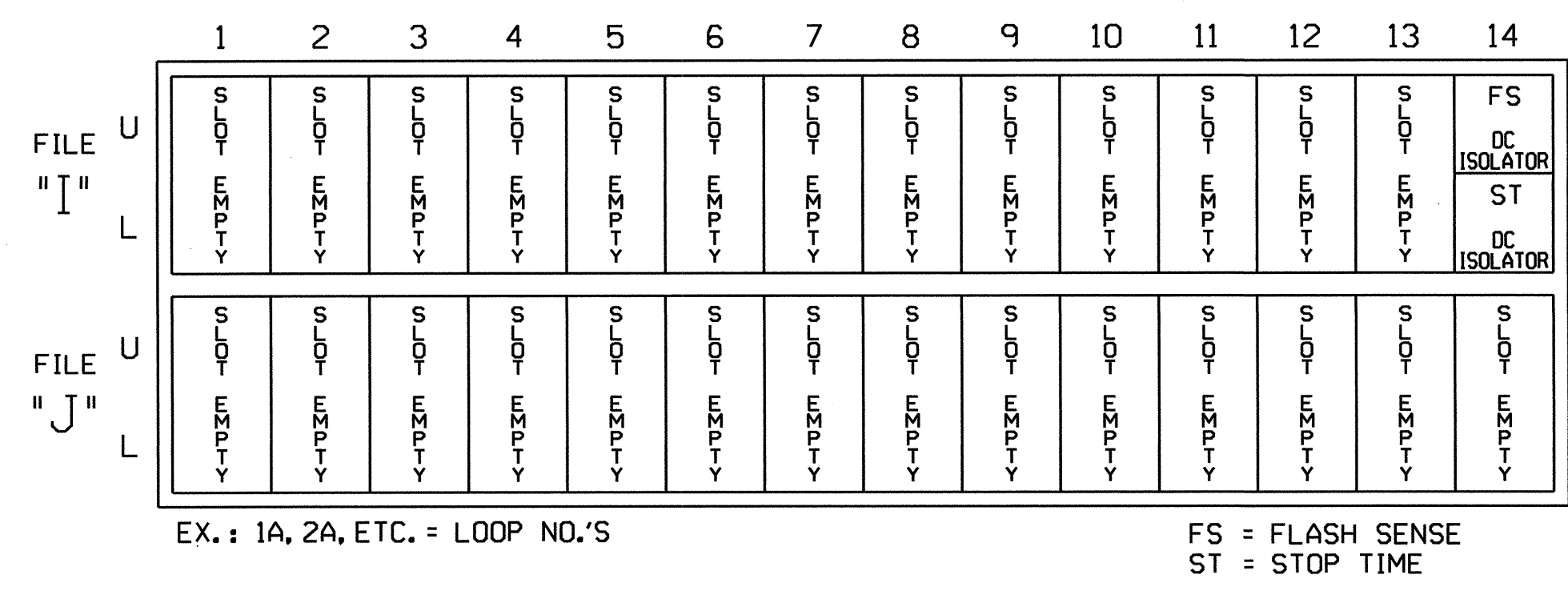
### SIGNAL HEAD HOOK-UP CHART

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.	11	21,22	NU	31	41,42	NU	51	61,62	NU	71	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW	125			116			131			122		
YELLOW ARROW	126			117			132			123		
GREEN ARROW	127			118			133			124		

NU = Not Used

### INPUT FILE POSITION LAYOUT

(front view)



### SPECIAL DETECTOR NOTE

Install a video 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0740T1  
 DESIGNED: January 2014  
 SEALED: 2/6/14  
 REVISED: N/A

Electrical Detail - Temp 1

ELECTRICAL AND PROGRAMMING DETAILS FOR: US 64 Bus (Buck Leonard Blvd) at SR 1616 (Country Club Rd) / Zebulon Rd

Division 4 Nash County Rocky Mount

PLAN DATE: January 2014 REVIEWED BY:

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Hwy, Garner, NC 27529

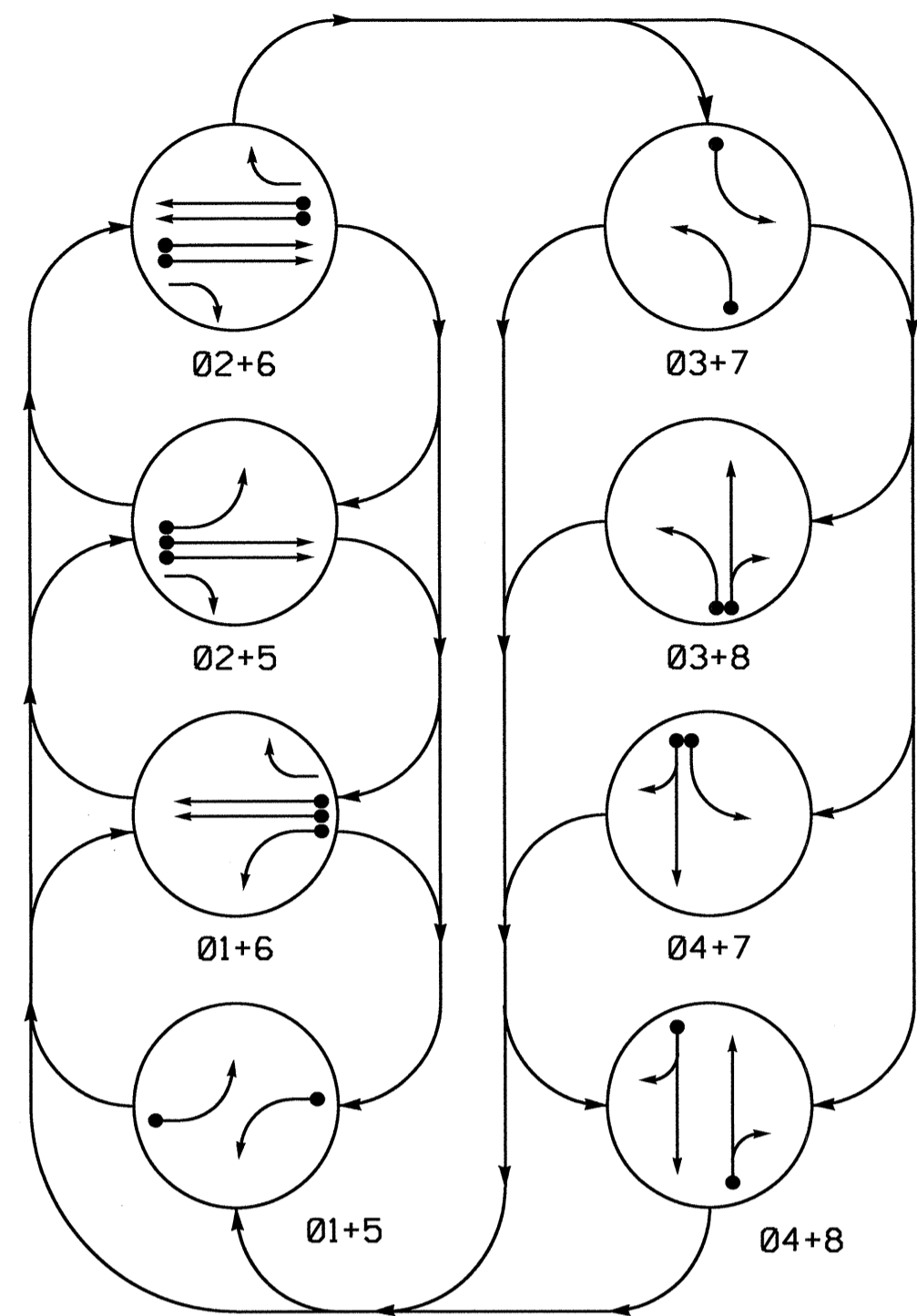
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

Signature: [Signature] DATE: 2/12/14

SIG. INVENTORY NO. 04-0740T1

04-0740-2014-12-01  
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 GCSH\T\ckland

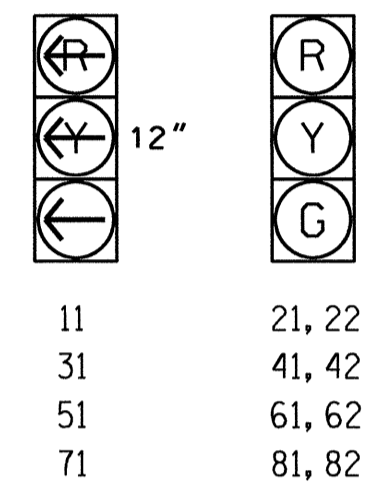
PHASING DIAGRAM



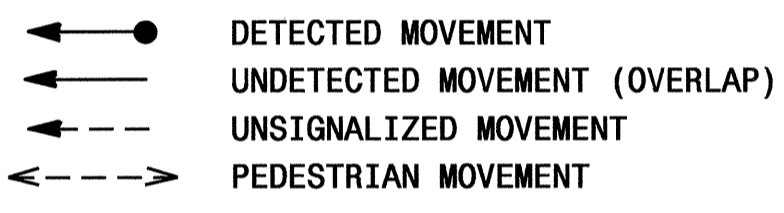
SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	R	Y
31	←	←	←	←	←	←	←	←
41, 42	R	R	R	R	R	R	G	G
51	←	←	←	←	←	←	←	←
61, 62	R	G	R	G	R	R	R	Y
71	←	←	←	←	←	←	←	←
81, 82	R	R	R	R	R	G	R	G

SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND



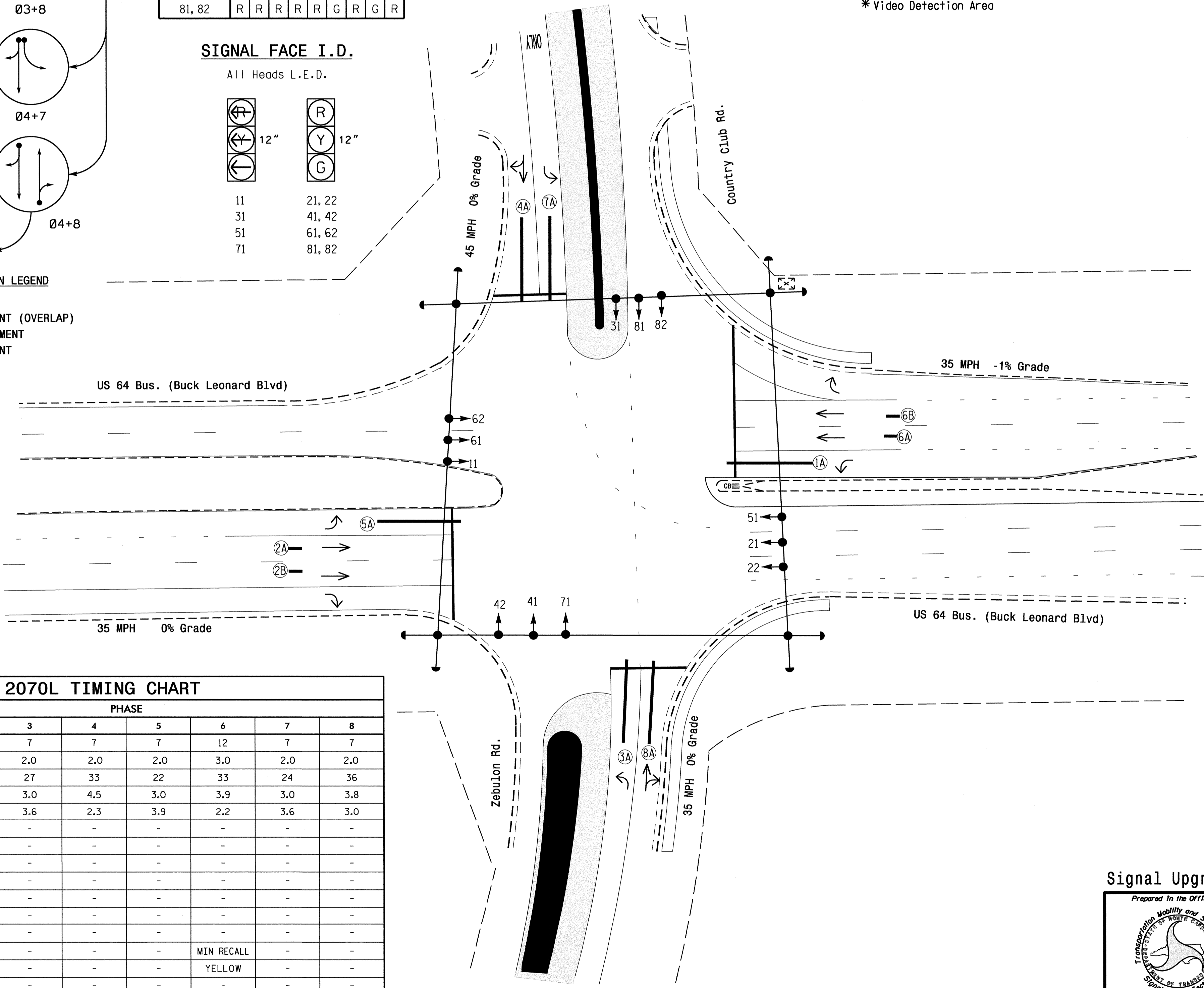
Video Detection Area	INDUCTIVE LOOPS				DETECTOR PROGRAMMING							
	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM AREA	NEW CARD
1A	6X40	+5	*	*	1	Y	Y	-	-	-	-	-
2A, 2B	6X6	70	*	*	2	Y	Y	-	-	-	-	-
3A	6X40	+5	*	*	3	Y	Y	-	-	-	-	-
4A	6X40	+5	*	*	4	Y	Y	-	-	10	-	-
5A	6X40	+5	*	*	5	Y	Y	-	-	-	-	-
6A, 6B	6X6	70	*	*	6	Y	Y	-	-	-	-	-
7A	6X40	+5	*	*	7	Y	Y	-	-	3	-	-
8A	6X40	+5	*	*	8	Y	Y	-	-	10	-	-

\* Video Detection Area

8 Phase Fully Actuated Rocky Mount City System

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 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. System data: Zone 11 Controller Asset #0740.



FEATURE	OASIS 2070L TIMING CHART							
	1	2	3	4	5	6	7	8
Min Green 1*	7	12	7	7	7	12	7	7
Extension 1*	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1*	27	28	27	33	22	33	24	36
Yellow Clearance	3.0	3.8	3.0	4.5	3.0	3.9	3.0	3.8
Red Clearance	3.5	2.2	3.6	2.3	3.9	2.2	3.6	3.0
Walk 1*	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation*	-	-	-	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-	-	-	-
Time To Reduce*	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	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.

PROPOSED		EXISTING	
○→	Traffic Signal Head	●→	N/A
●→	Modified Signal Head	+	+
+	Sign	+	+
⊕	Pedestrian Signal Head With Push Button & Sign	⊕	⊕
⊕	Signal Pole with Guy	⊕	⊕
⊕	Signal Pole with Sidewalk Guy	⊕	⊕
⊗	Inductive Loop Detector	⊗	⊗
⊗	Controller & Cabinet	⊗	⊗
⊗	Junction Box	⊗	⊗
⊗	2-in Underground Conduit	⊗	⊗
N/A	Right of Way	---	---
→	Directional Arrow	→	→
█	Construction Zone	N/A	N/A
█	Video Detection Area	N/A	N/A

Signal Upgrade / Temporary 2 (Phase III)

Prepared in the Offices of  
 Transportation Mobility and Safety Division  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 Signal Design Section

US 64 Bus (Buck Leonard Blvd) at SR 1616 (Country Club Rd) / Zebulon Rd  
 Division 4 Nash County Rocky Mount  
 PLAN DATE: January 2014 REVIEWED BY: JPG  
 PREPARED BY: EM Minshew REVIEWED BY: [Signature]

750 N. Greenfield Pkwy, Garner, NC 27529  
 SCALE: 0 30  
 1" = 30'

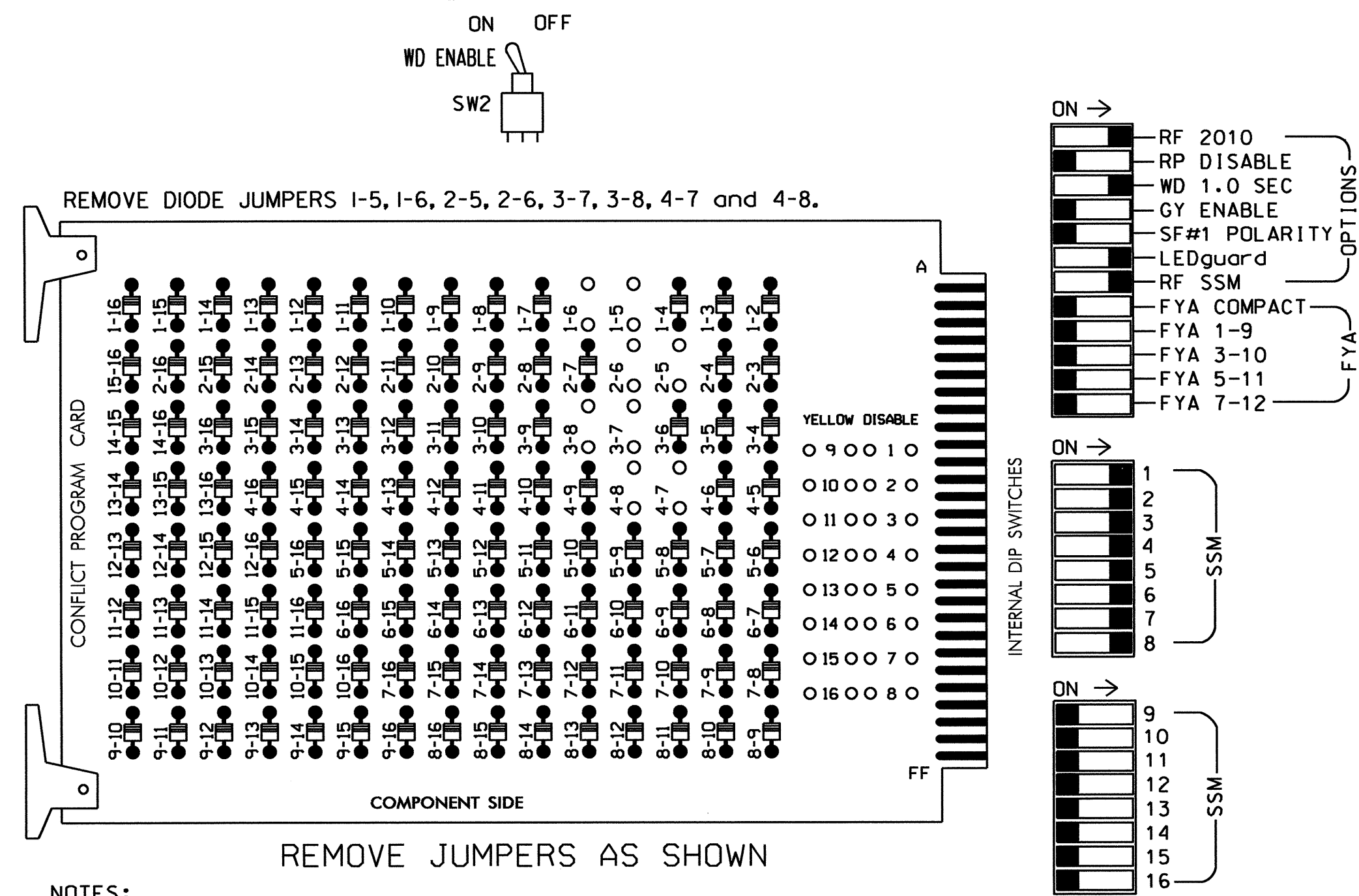
SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 29904  
 J. SON P. GALLUM  
 DATE: 2/6/14  
 SIGNATURE: [Signature] DATE: 2/6/14  
 SIG. INVENTORY NO. 04-0740T2

04-EEB-2014\_07.dwg  
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 emminshew



### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

### NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. 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.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Rocky Mount City System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070L  
 CABINET.....332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAPS.....NONE

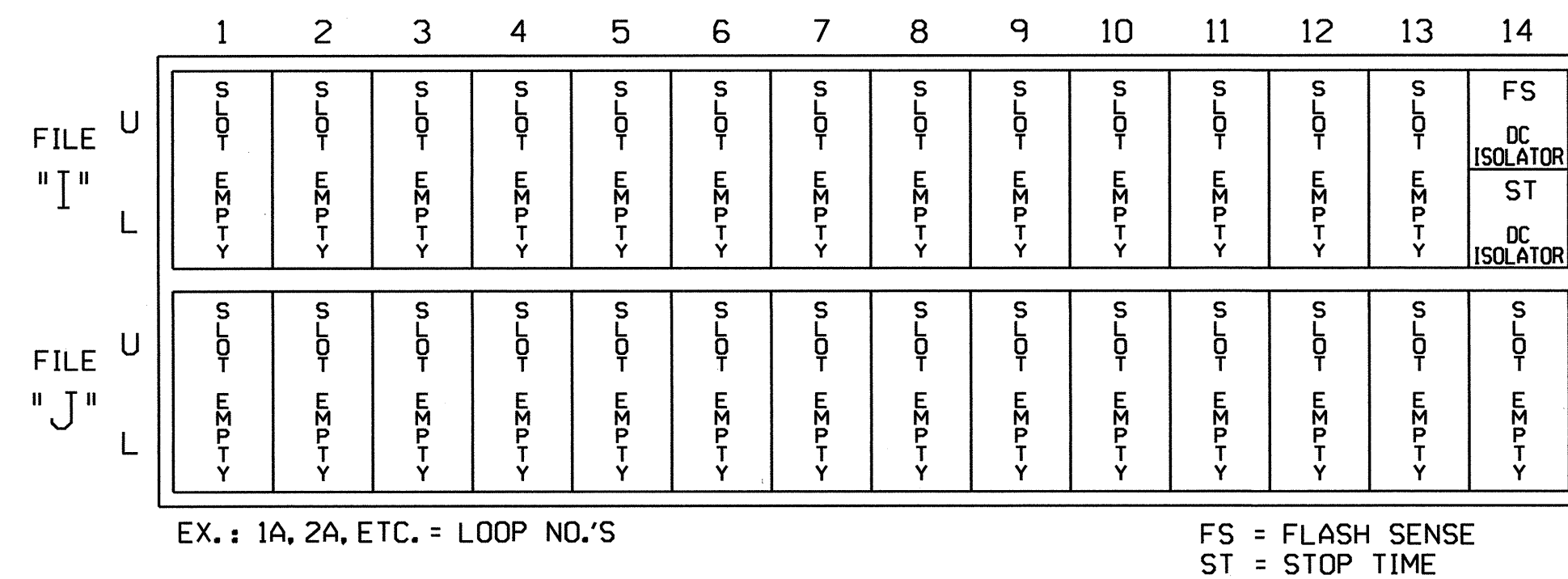
### SIGNAL HEAD HOOK-UP CHART

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.	11	21,22	NU	31	41,42	NU	51	61,62	NU	71	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW	125			116			131			122		
YELLOW ARROW	126			117			132			123		
GREEN ARROW	127			118			133			124		

NU = Not Used

### INPUT FILE POSITION LAYOUT

(front view)



### SPECIAL DETECTOR NOTE

Install a video 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0740T2  
 DESIGNED: January 2014  
 SEALED: 2/6/14  
 REVISED: N/A

Electrical Detail - Temp 2

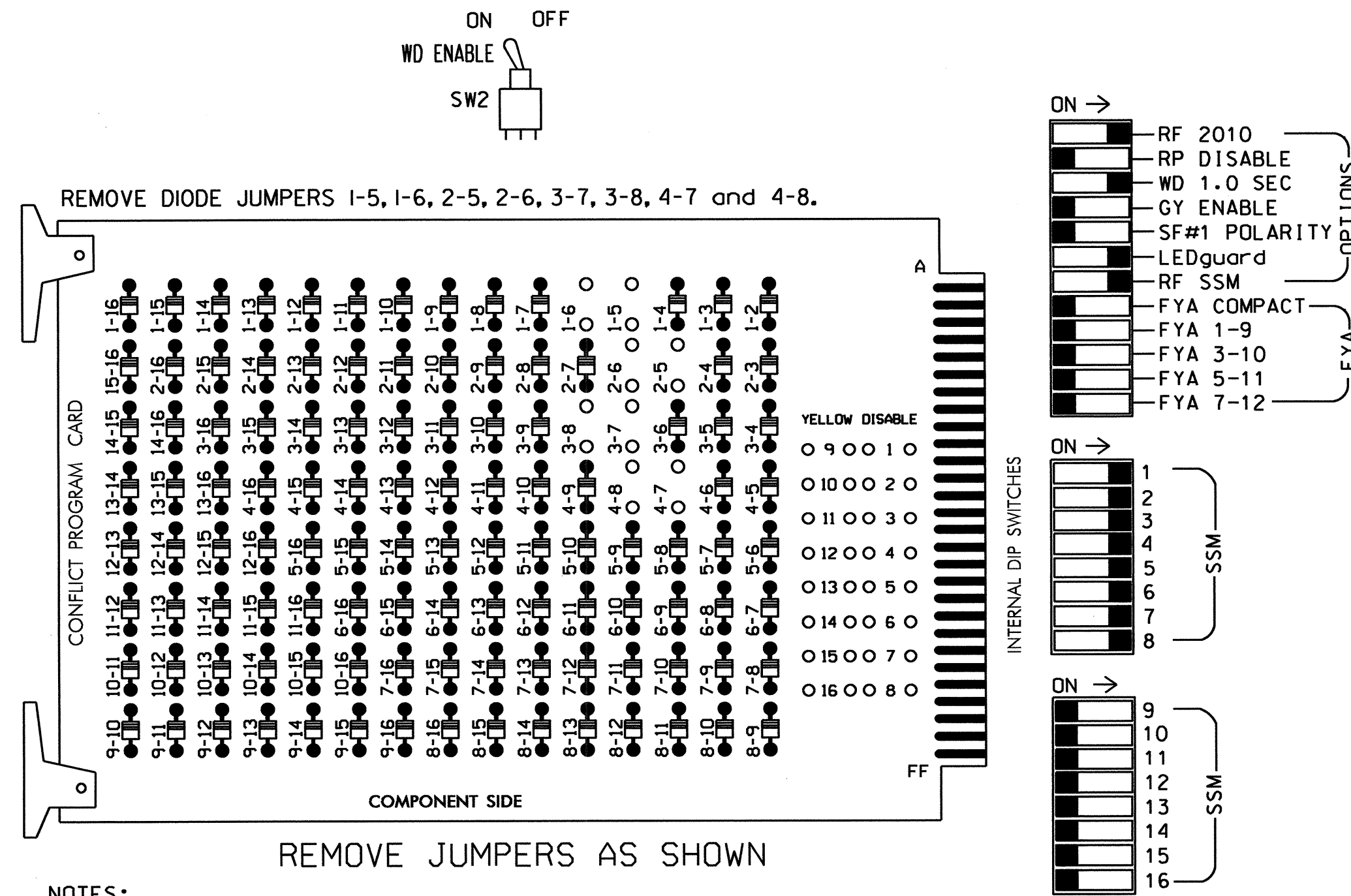
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 64 Bus (Buck Leonard Blvd) at SR 1616 (Country Club Rd) / Zebulon Rd	SEAL 
	Prepared In the Offices of:	Division 4 Nash County Rocky Mount	
PLAN DATE: January 2014		REVIEWED BY: T.J.Z.	SIGNATURE: <i>George C. Brown</i> DATE: 2/12/14
PREPARED BY: C. Strickland		REVIEWED BY:	
REVISIONS		INIT. DATE	SIG. INVENTORY NO. 04-0740T2





### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

### NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. 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.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Rocky Mount City System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070L  
 CABINET.....332  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAPS.....NONE

### SIGNAL HEAD 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.	11	82	21,22	22	31	41,42	51	61,62	62	71,72	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW	125				116			131			122	
YELLOW ARROW	126	126			117	117		132			123	123
GREEN ARROW	127	127			118	118		133			124	124

NU = Not Used

### INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	S	S	∅ 3	∅ 4	S	S	SYS. DET. S8	S	S	S	S	FS
L	1A	1B	T	T	3A	4A	T	T	S	S	S	S	S	DC ISOLATOR
U	NOT USED	∅ 2	S	S	NOT USED	NOT USED	S	S	SYS. DET. S9	S	S	S	S	ST
L	2A,2B	2A,2B	T	T			T	T	S	S	S	S	S	DC ISOLATOR
U	∅ 5	∅ 6	S	S	∅ 7	∅ 7	S	S	S	S	S	S	S	S
L	5A	6A,6B	T	T	7A	7B	T	T	S	S	S	S	S	S
U	NOT USED	NOT USED	S	S	NOT USED	∅ 8	S	S	S	S	S	S	S	S
L			T	T	8A	8A	T	T	S	S	S	S	S	S

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

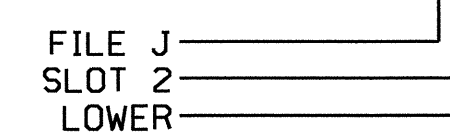
FS = FLASH SENSE  
 ST = STOP TIME

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A,2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB5-9,10	J6U	42	4	8	7	Y	Y			
8A	TB5-11,12	J6L	46	8	18	8	Y	Y			10
* S8	TB6-9,10	I9U	60	22	11	SYS					
* S9	TB6-11,12	I9L	62	24	13	SYS					

\* System Detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0740  
 DESIGNED: January 2014  
 SEALED: 2/6/14  
 REVISED: N/A

Electrical Detail - Final

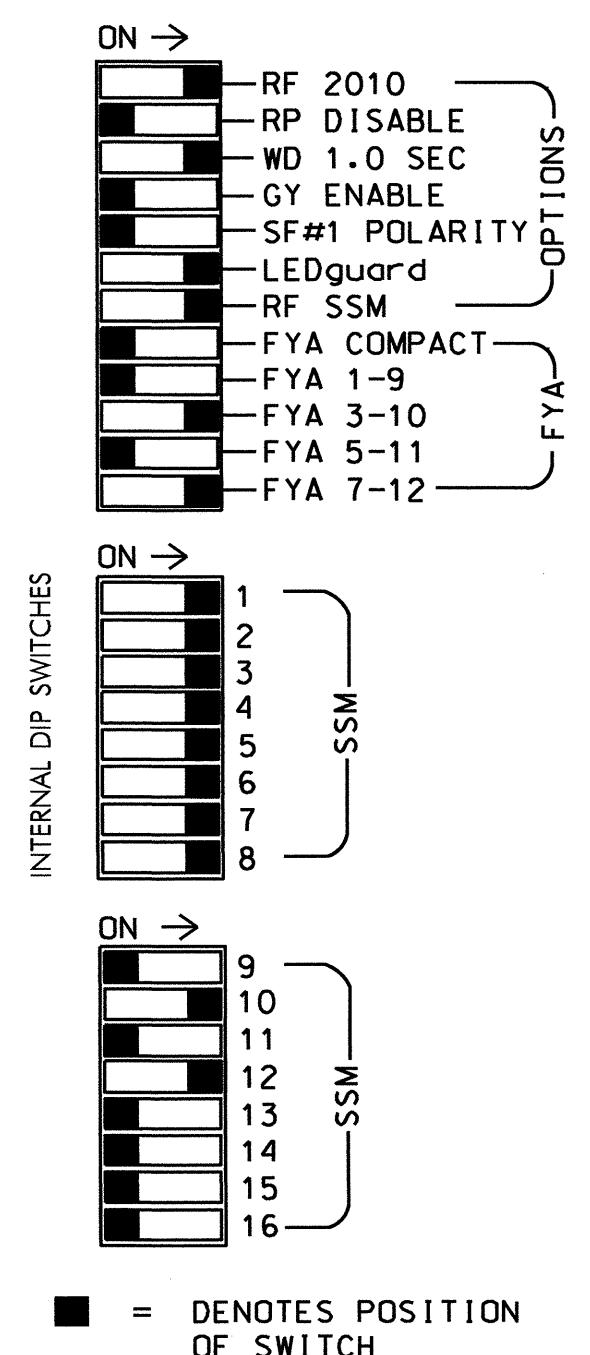
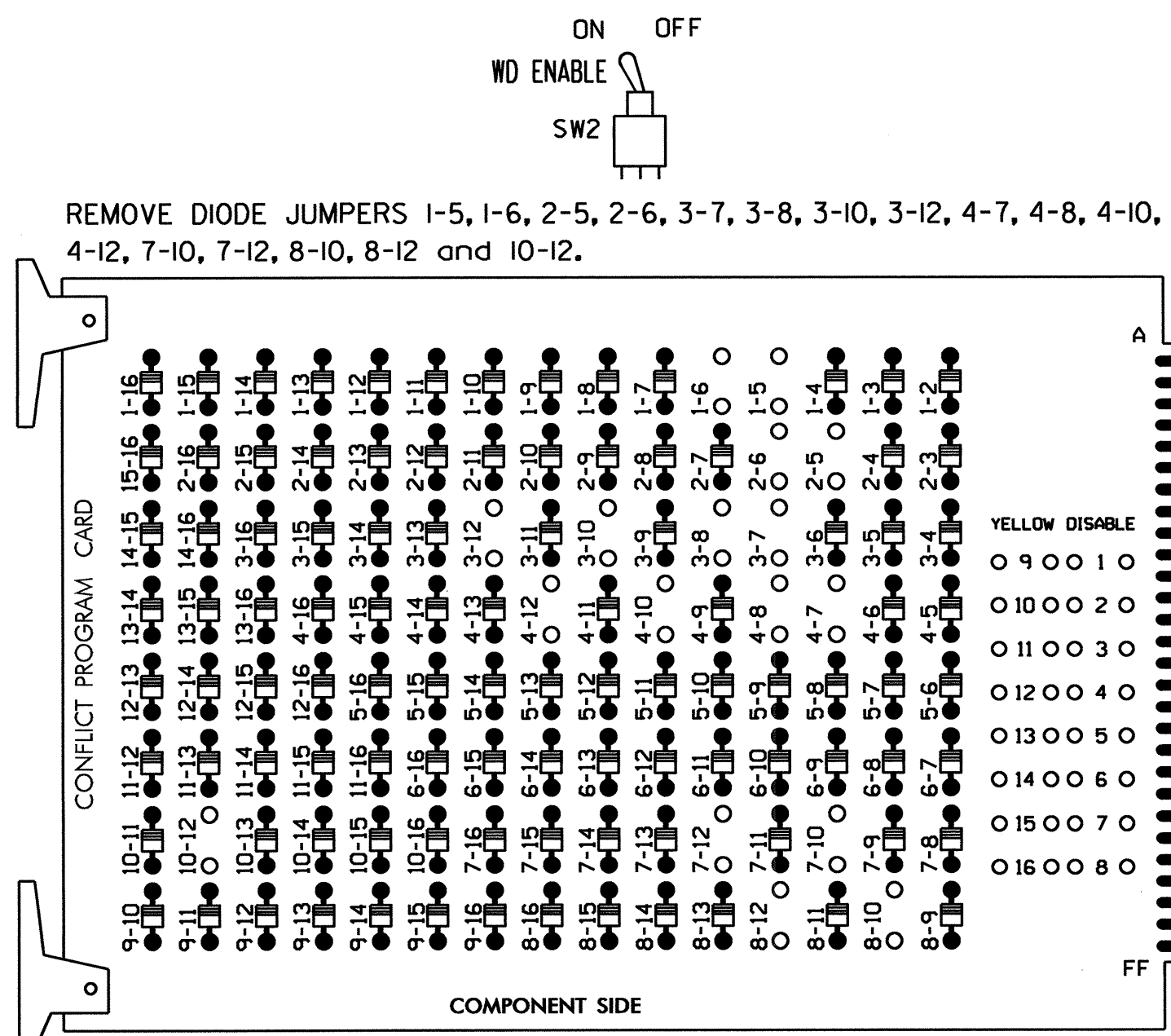
	ELECTRICAL AND PROGRAMMING DETAILS FOR: <b>US 64 Bus (Buck Leonard Blvd) at SR 1616 (Country Club Rd) / Zebulon Rd</b>		
	Division 4 PLAN DATE: January 2014 PREPARED BY: C. Strickland	Nash County REVIEWED BY: T. J. [Signature] REVIEWED BY:	
750 N. Greenfield Hwy, Garner, NC 27529			SEAL SIG. INVENTORY NO. 04-0740





### EDI MODEL 2010ECL-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.
  - Make sure jumpers SEL2-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. The installer shall 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, 11, 13, 14, 15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 4 and 8 for Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 2 as Wag Overlaps.
- The cabinet and controller are part of the Rocky Mount Signal System.

### SIGNAL HEAD 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	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11	21,22	NU	22	31*	41,42	NU	51	61,62	NU	62	71*	81,82	NU	NU	31*	NU	71*	NU
RED		128			*	101			134			*	107						
YELLOW			129			102			135				108						
GREEN			130			103			136				109						
RED ARROW	125							131								A124		A101	
YELLOW ARROW	126			117				132		123						A125		A102	
FLASHING YELLOW ARROW																A126		A103	
GREEN ARROW	127			118	118			133		124	124								

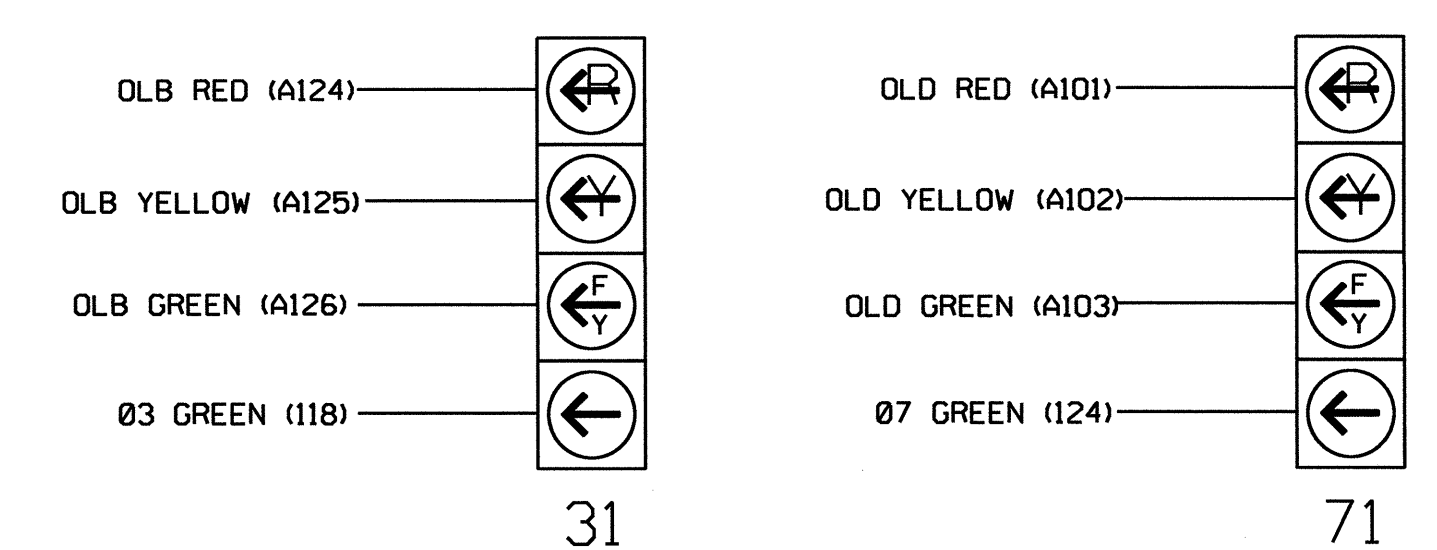
NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \* See pictorial of head wiring in detail below.

### 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,S3,S4,S5,S6,S7,S8,S10,S13  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....3+4  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....7+8

### 4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



- NOTE
- The sequence display for these signals require special logic programming. See sheet 2 of 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	S	S	∅ 3	∅ 4/SYS	∅ 4	∅ 4	SYS. DET. S3	S	S	S	S	FS
L	NOT USED	NOT USED	←	←	NOT USED	∅ 4/SYS	∅ 4	∅ 4	SYS. DET. S4	←	←	←	←	DC ISOLATOR
U	∅ 5	∅ 6	S	S	∅ 7	∅ 8/SYS	∅ 8	∅ 8	SYS. DET. S7	S	S	S	S	FS
L	NOT USED	NOT USED	←	←	NOT USED	∅ 8/SYS	∅ 8	∅ 8	SYS. DET. S8	←	←	←	←	DC ISOLATOR

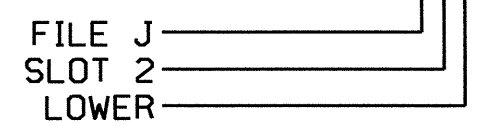
EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 \* Wired Input - Do not populate slot with detector card

### 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	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A <sup>1</sup>	TB4-5,6	I5U	58	20	3	3	Y	Y			15
4A/S1	TB4-9,10	I6U	41	3	4	4/SYS		Y			3
4B/S2	TB4-11,12	I6L	45	7	14	4/SYS		Y			
4C	TB6-1,2	I7U	65	27	34	4	Y	Y	Y	2.0	5
4D	TB6-3,4	I7L	78	40	44	4	Y	Y	Y	2.0	5
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A <sup>2</sup>	TB5-5,6	J5U	57	19	7	7	Y	Y			15
8A/S5	TB5-9,10	J6U	42	4	8	8/SYS		Y			3
8B/S6	TB5-11,12	J6L	46	8	18	8/SYS		Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y	Y	2.0	5
8D	TB7-3,4	J7L	79	41	48	8	Y	Y	Y	2.0	5
* S3	TB6-9,10	I9U	60	22	11	SYS					
* S4	TB6-11,12	I9L	62	24	13	SYS					
* S7	TB7-9,10	J9U	59	21	15	SYS					
* S8	TB7-11,12	J9L	61	23	17	SYS					

- <sup>1</sup>Add jumper from I5-W to J8-W, on rear of input file.  
<sup>2</sup>Add jumper from J5-W to I8-W, on rear of input file.  
 \* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

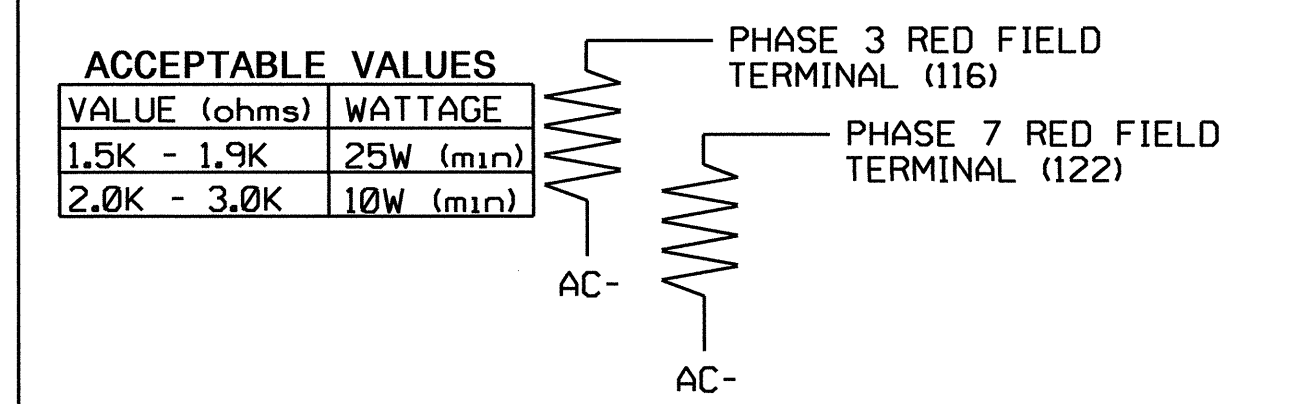
### INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0599T1  
 DESIGNED: January 2014  
 SEALED: 2/5/14  
 REVISED: N/A

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



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.

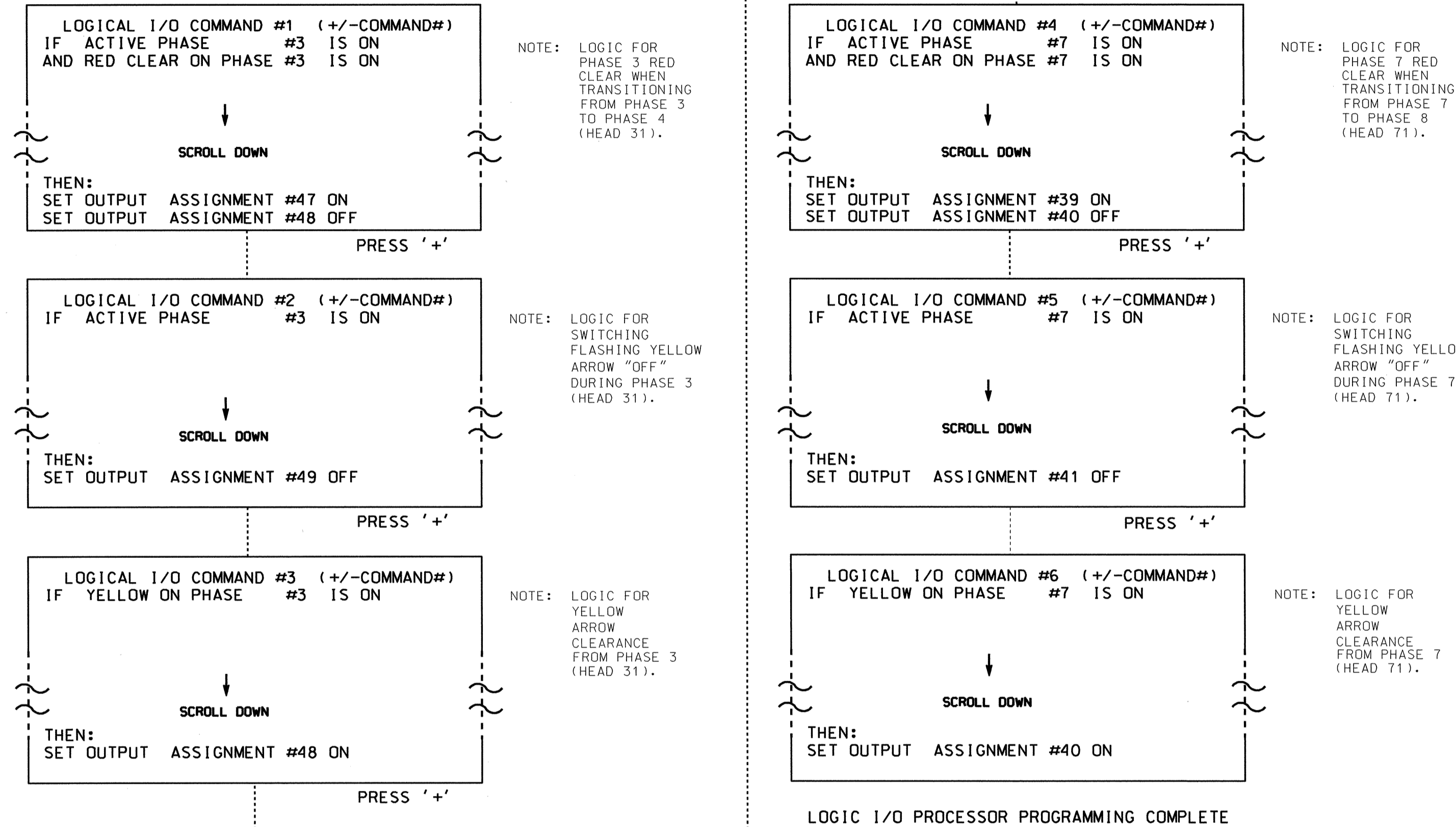
Electrical Detail - Temp - Sheet 1 of 2

	ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1604 (Hunter Hill Road) at SR 1616 (County Club Road)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER GEORGE C. BROWN 022013
	Division 04 Nash County Rocky Mount PLAN DATE: January 2014 REVIEWED BY: T. J. J.	PREPARED BY: C. Strickland REVIEWED BY:
	REVISIONS: _____ INIT. DATE	SIGNATURE: _____ DATE: 2/12/14
	750 N. Greenfield Pkwy, Garner, NC 27529	SIG. INVENTORY NO. 04-0599T1

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

(program controller as shown below)

- 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.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 39	= Overlap D Red
OUTPUT 40	= Overlap D Yellow
OUTPUT 41	= Overlap D Green
OUTPUT 47	= Overlap B Red
OUTPUT 48	= Overlap B Yellow
OUTPUT 49	= Overlap B Green

### OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+'

```

PAGE 1: VEHICLE OVERLAP 'B' 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?...N
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 'D' 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?...N
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

### FLASHER CIRCUIT MODIFICATION DETAIL

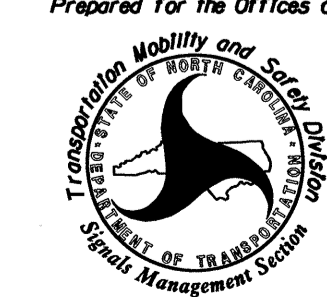
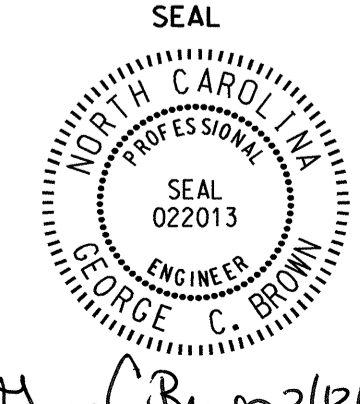
IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

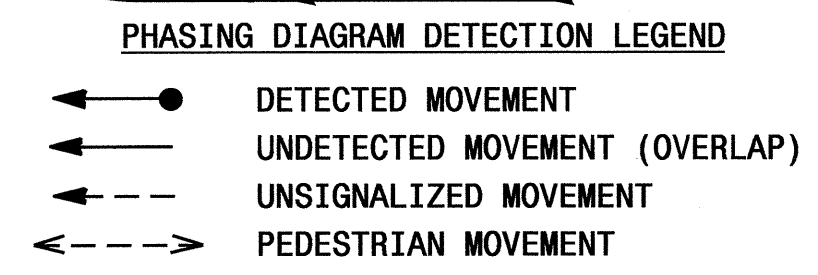
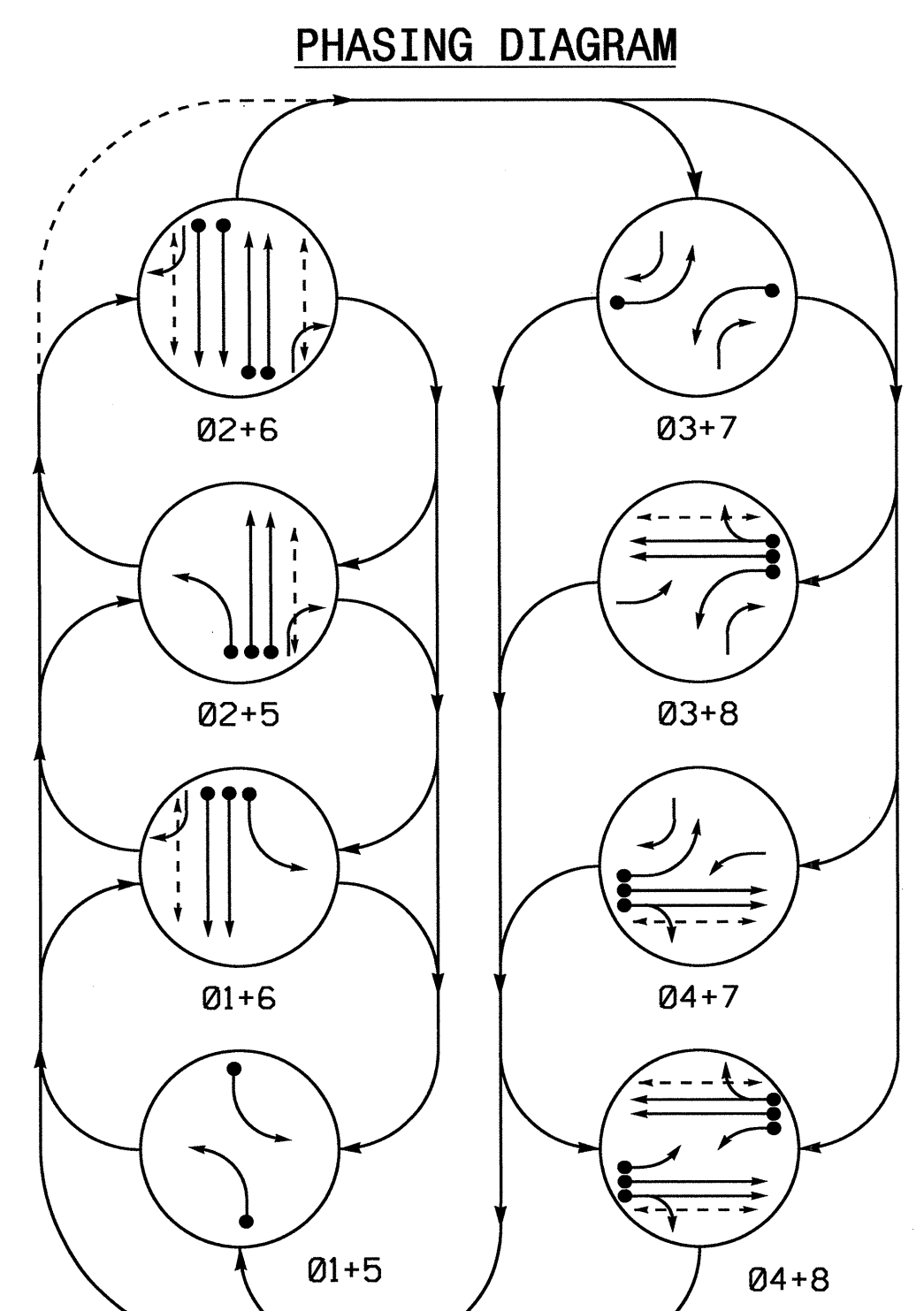
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0599T1  
DESIGNED: January 2014  
SEALED: 2/5/14  
REVISED: N/A

Electrical Detail - Temp - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	SR 1604 (Hunter Hill Road) at SR 1616 (County Club Road)	SEAL  SEAL 022013 ENGINEER GEORGE C. BROWN
	Division 04 Nash County Rocky Mount PLAN DATE: January 2014 REVIEWED BY: T. J. J... PREPARED BY: C. Strickland REVIEWED BY:	

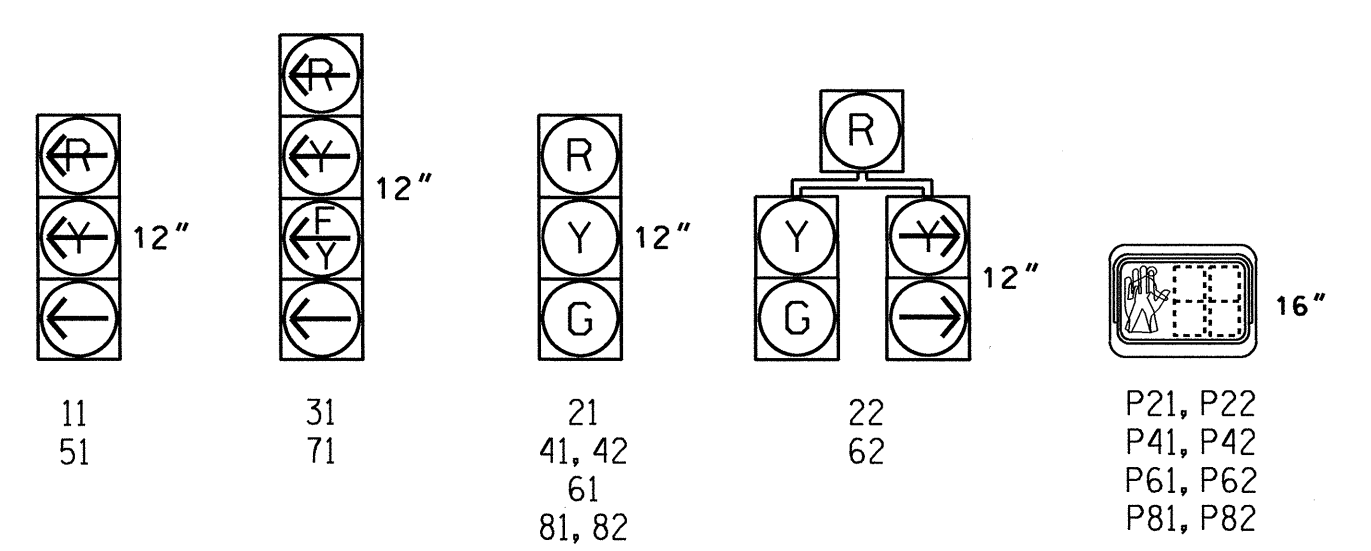
07-FEB-2014 07:23  
 C:\Users\sig\Documents\Sig\04-0599T1.dgn  
 04-0599T1.dgn





SIGNAL FACE	PHASE							
	01+5	02+5	02+6	03+7	03+8	04+7	04+8	FL/FR
11	←	←	←	←	←	←	←	←
21	R	R	G	G	R	R	R	Y
22	R	R	G	G	R	R	R	Y
31	←	←	←	←	←	←	←	←
41,42	R	R	R	R	R	R	G	G
51	←	←	←	←	←	←	←	←
61	R	G	R	G	R	R	R	Y
62	R	G	R	G	R	R	R	Y
71	←	←	←	←	←	←	←	←
81,82	R	R	R	R	R	G	R	G
P21,P22	DW	W	W	DW	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	W	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DRK
P81,P82	DW	DW	DW	DW	W	DW	W	DRK

SIGNAL FACE I.D.  
All Heads L.E.D.

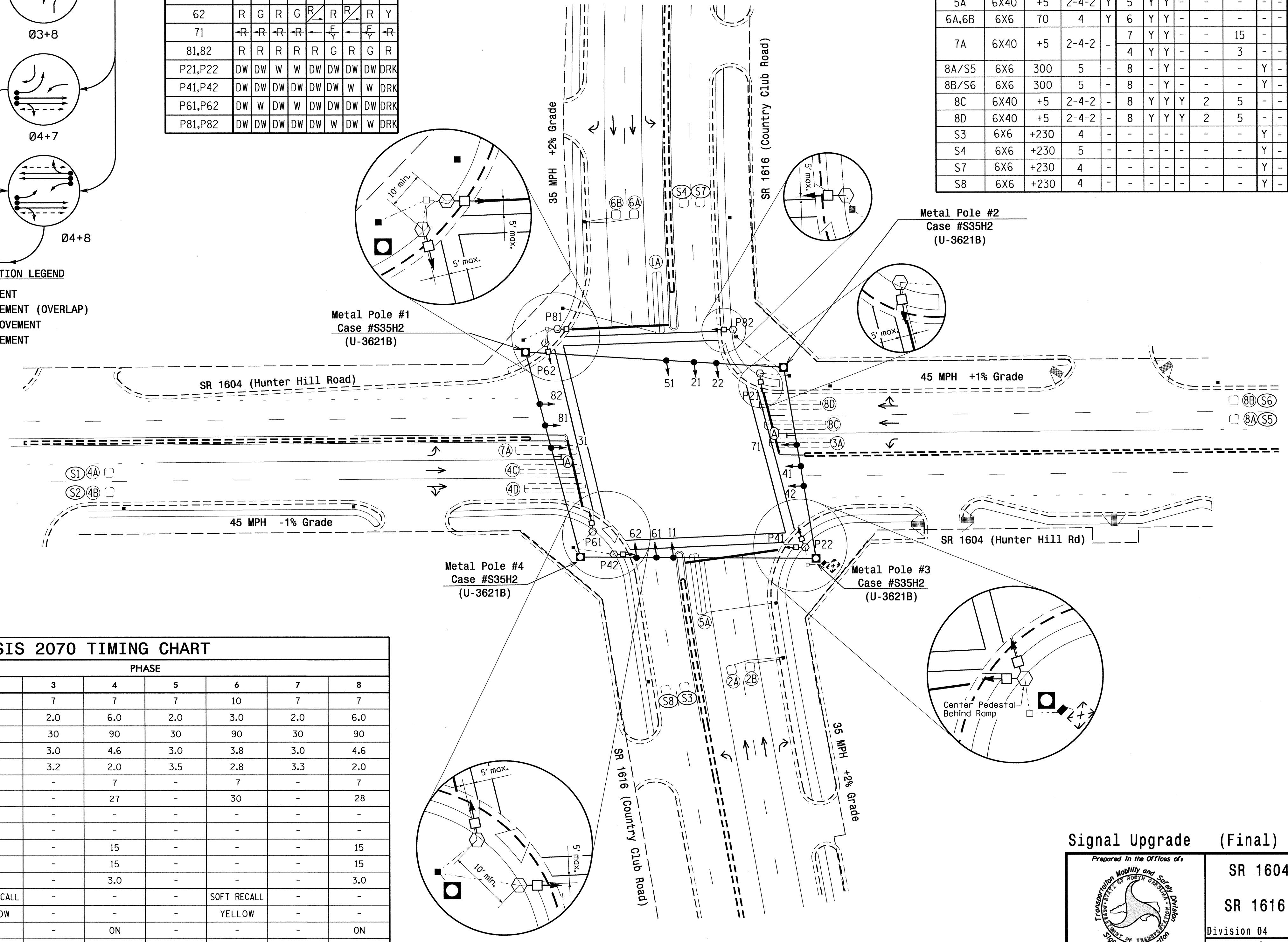


LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY				
1A	6X40	+5	2-4-2	Y	1	Y	Y	-	-	-	-	-
2A,2B	6X6	70	4	Y	2	Y	Y	-	-	-	-	-
3A	6X40	+5	2-4-2	-	3	Y	Y	-	-	15	-	-
4A/S1	6X6	300	5	-	4	-	-	-	-	-	-	Y
4B/S2	6X6	300	5	-	4	-	-	-	-	-	-	Y
4C	6X40	+5	2-4-2	-	4	Y	Y	Y	2	5	-	-
4D	6X40	+5	2-4-2	-	4	Y	Y	Y	2	5	-	-
5A	6X40	+5	2-4-2	Y	5	Y	Y	-	-	-	-	-
6A,6B	6X6	70	4	Y	6	Y	Y	-	-	-	-	-
7A	6X40	+5	2-4-2	-	4	Y	Y	-	-	3	-	-
8A/S5	6X6	300	5	-	8	-	-	-	-	-	-	Y
8B/S6	6X6	300	5	-	8	-	-	-	-	-	-	Y
8C	6X40	+5	2-4-2	-	8	Y	Y	Y	2	5	-	-
8D	6X40	+5	2-4-2	-	8	Y	Y	Y	2	5	-	-
S3	6X6	+230	4	-	-	-	-	-	-	-	-	Y
S4	6X6	+230	5	-	-	-	-	-	-	-	-	Y
S7	6X6	+230	4	-	-	-	-	-	-	-	-	Y
S8	6X6	+230	4	-	-	-	-	-	-	-	-	Y

8 Phase Fully Actuated Rocky Mount Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Reposition existing signal heads numbered 11, 21, 22, 51, 61 and 62.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- System data: Zone 12. Controller Asset 0599.
- Pushbutton locations must be approved in the field by the Division Traffic Engineer prior to installation.



FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	2.0	3.0	2.0	6.0	2.0	3.0	2.0	6.0
Max Green 1 *	30	90	30	90	30	90	30	90
Yellow Clearance	3.0	3.7	3.0	4.6	3.0	3.8	3.0	4.6
Red Clearance	3.5	2.8	3.2	2.0	3.5	2.8	3.3	2.0
Walk 1 *	-	7	-	7	-	7	-	7
Don't Walk 1	-	27	-	27	-	30	-	28
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	15	-	-	-	15
Time To Reduce *	-	-	-	15	-	-	-	15
Minimum Gap	-	-	-	3.0	-	-	-	3.0
Recall Mode	-	SOFT RECALL	-	-	-	SOFT RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	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.

PROPOSED	EXISTING
	N/A
N/A	
N/A	

Signal Upgrade (Final)

Prepared in the Offices of:  
TRANSPORTATION MOBILITY AND SAFETY DIVISION  
STATE OF NORTH CAROLINA  
Signal Design Section

SR 1604 (Hunter Hill Road)  
at  
SR 1616 (Country Club Road)

Division 04 Nash County Rocky Mount  
PLAN DATE: January 2014 REVIEWED BY: JG  
PREPARED BY: EM Minshew REVIEWED BY:  
REVISIONS: INIT. DATE

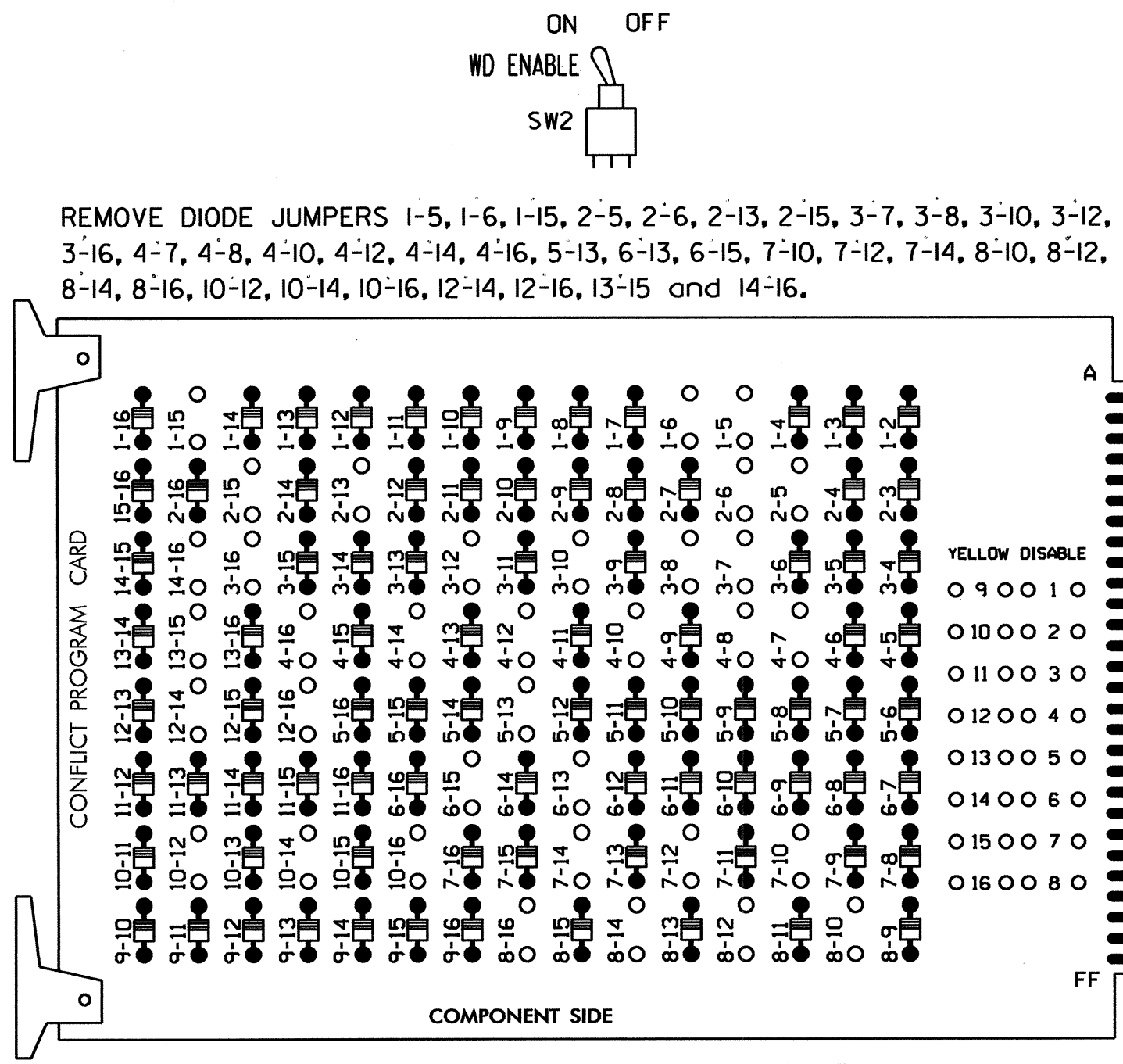
SEAL  
NORTH CAROLINA  
PROFESSIONAL ENGINEER  
SEAL 29904  
J. GALLAWAY  
2/5/14

750 N. Greenfield Pkwy, Garner, NC 27529  
SCALE: 0 40  
1" = 40'



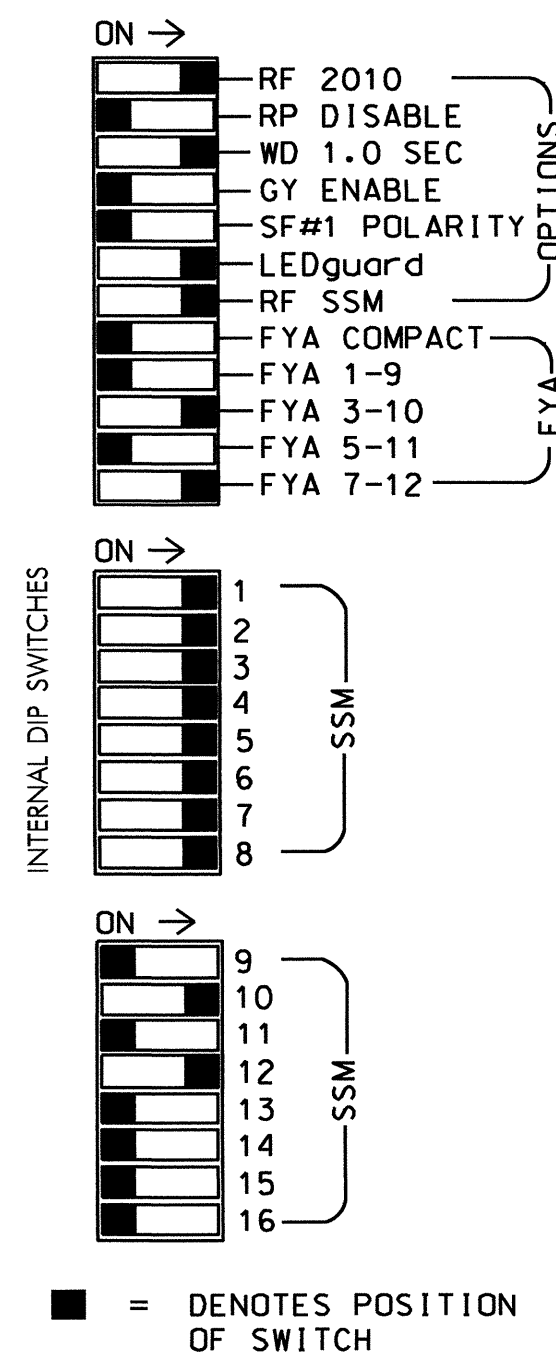
### EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(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.
- Make sure jumpers SEL2-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. The installer shall 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, 11, 13, 14, 15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 4 and 8 for Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash, and overlap 2 as Wag Overlaps.
- The cabinet and controller are part of the Rocky Mount Signal System.

### 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,S2P,S3,S4,S4P,S5,S6,S6P,S7,  
 S8,S8P,S10,S13  
 PHASES USED.....1,2,2 PED,3,4,4 PED,5,6,6 PED,7,8,8 PED  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....3+4  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....7+8

### SIGNAL HEAD 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	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11	21,22	P21, P22	22	31*	41,42	P41, P42	51	61,62	P61, P62	62	71*	81,82	P81, P82	NU	31*	NU	71*	NU
RED		128		*	101			134		*	107								
YELLOW		129			102			135			108								
GREEN		130			103			136			109								
RED ARROW	125							131						A124				A101	
YELLOW ARROW	126			117				132		123				A125				A102	
FLASHING YELLOW ARROW														A126				A103	
GREEN ARROW	127			118	118			133		124	124								
Hand				113				104		119				110					
Person				115				106		121				112					

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)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 3	∅ 4/SYS	∅ 4	∅ 4/SYS	∅ 4	∅ 4	SYS. DET. S3	S	S	∅ 2 PED	∅ 6 PED	FS
L	1A	2A,2B	3A	4A/S1	4C	4A/S2	4D	4C	SYS. DET. S4	S	S	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
U	∅ 5	∅ 6	∅ 7	∅ 8/SYS	∅ 8	∅ 8/SYS	∅ 8	∅ 8	SYS. DET. S7	S	S	∅ 4 PED	∅ 8 PED	ST
L	5A	6A,6B	7A	8A/S5	8C	8B/S6	8D	8C	SYS. DET. S8	S	S	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR

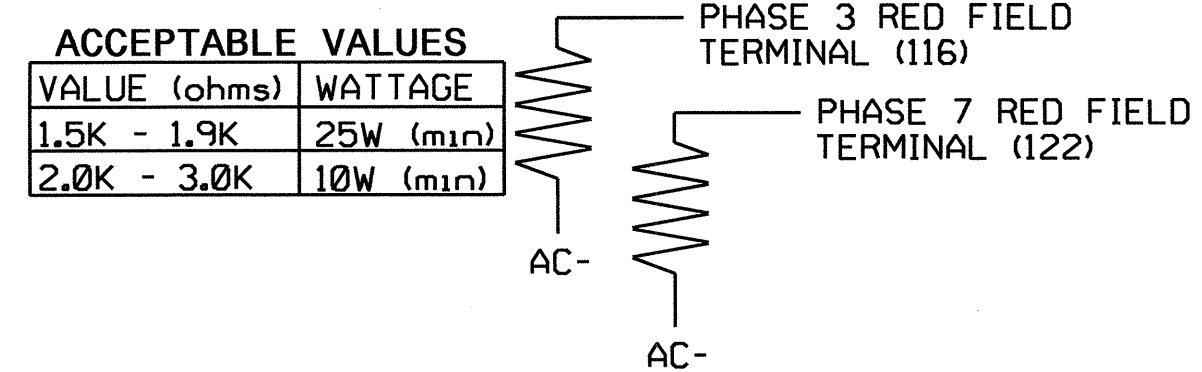
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

### LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



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.

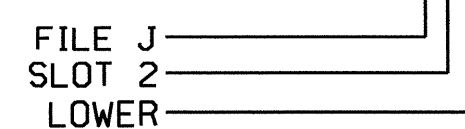
### INPUT FILE CONNECTION & PROGRAMMING CHART

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	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A <sup>1</sup>	TB4-5,6	J5U	58	20	3	3	Y	Y			15
		J8U	50	12	28	8	Y	Y			3
4A/S1	TB4-9,10	I6U	41	3	4	4/SYS		Y			
4B/S2	TB4-11,12	I6L	45	7	14	4/SYS		Y			
4C	TB6-1,2	I7U	65	27	34	4	Y	Y	Y	2.0	5
4D	TB6-3,4	I7L	78	40	44	4	Y	Y	Y	2.0	5
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
7A <sup>2</sup>	TB5-5,6	J5U	57	19	7	7	Y	Y			15
		I8U	49	11	24	4	Y	Y			3
8A/S5	TB5-9,10	J6U	42	4	8	8/SYS		Y			
8B/S6	TB5-11,12	J6L	46	8	18	8/SYS		Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y	Y	2.0	5
8D	TB7-3,4	J7L	79	41	48	8	Y	Y	Y	2.0	5
* S3	TB6-9,10	I9U	60	22	11	SYS					
* S4	TB6-11,12	I9L	62	24	13	SYS					
* S7	TB7-9,10	J9U	59	21	15	SYS					
* S8	TB7-11,12	J9L	61	23	17	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29		PED 2		2 PED			
P41,P42	TB8-5,6	I12L	69	31		PED 4		4 PED			
P61,P62	TB8-7,9	I13U	68	30		PED 6		6 PED			
P81,P82	TB8-8,9	I13L	70	32		PED 8		8 PED			

NOTE:  
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

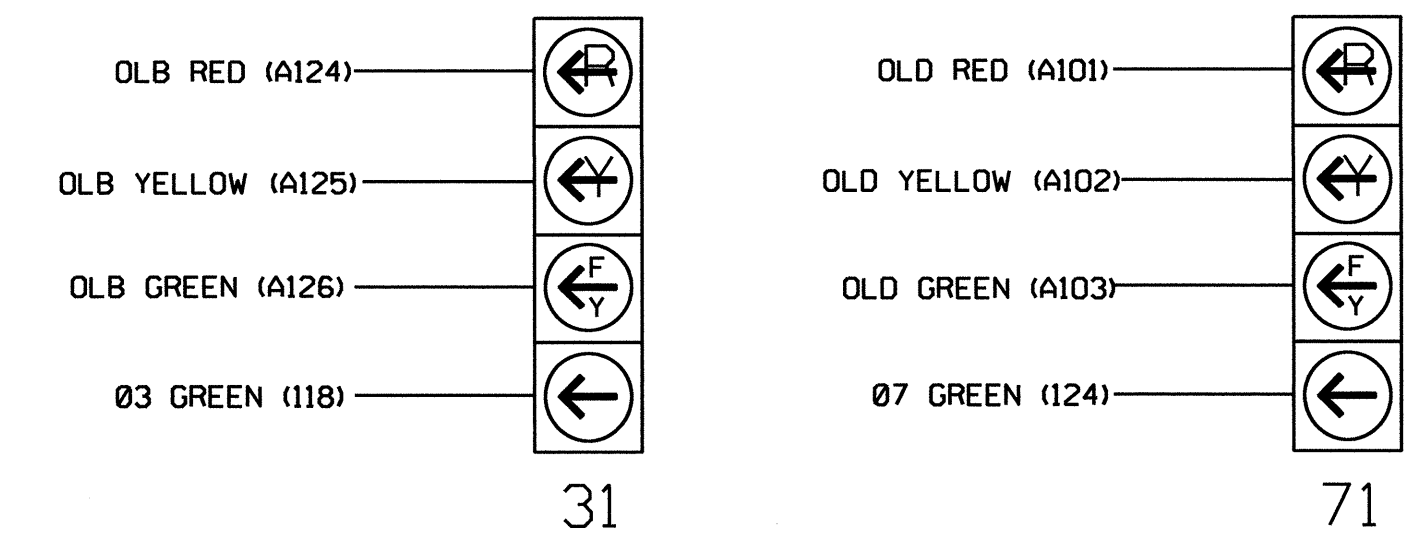
- Add jumper from I5-W to J8-W, on rear of input file.
  - Add jumper from J5-W to I8-W, on rear of input file.
- \* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L



### 4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



**NOTE**

- The sequence display for these signals require special logic programming. See sheet 2 of 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-0599  
 DESIGNED: January 2014  
 SEALED: 2/5/14  
 REVISED: N/A

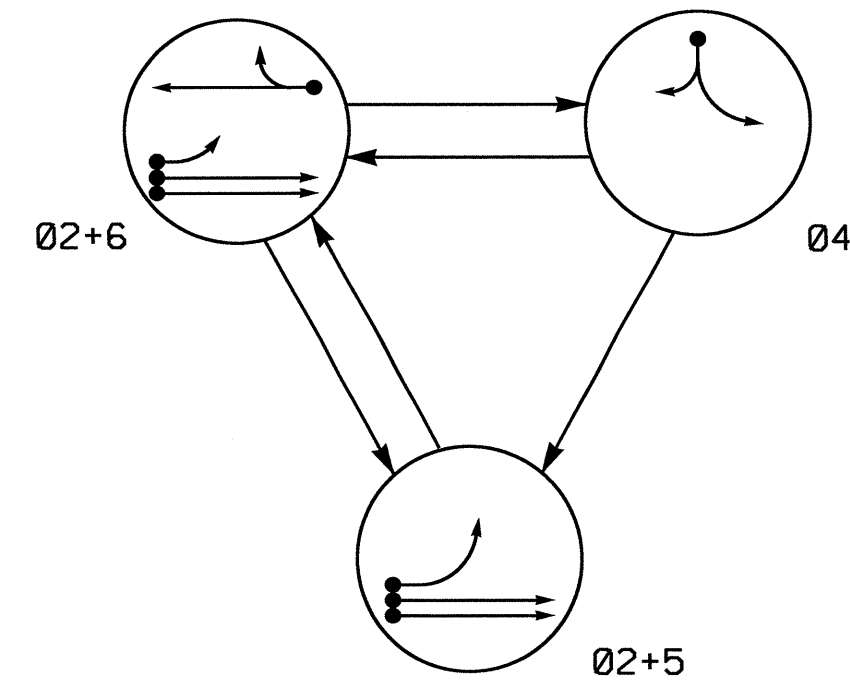
Electrical Detail - Final - Sheet 1 of 2

	ELECTRICAL AND PROGRAMMING DETAILS FOR:		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Prepared for the Offices of:		
	SR 1604 (Hunter Hill Road) at SR 1616 (County Club Road)		
	Division 04 Nash County Rocky Mount		
PLAN DATE: January 2014	REVIEWED BY: T. J. J...	REVISIONS	INIT. DATE
PREPARED BY: C. Strickland	REVIEWED BY:		
750 N. Greenfield Pkwy, Garner, NC 27529		SIGNATURE: <i>C. Strickland</i> DATE: 2/2/14 SIG. INVENTORY NO. 04-0599	





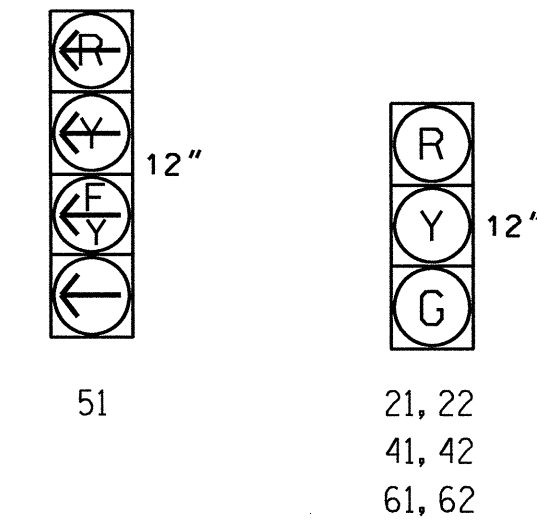
**PHASING DIAGRAM**



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

SIGNAL FACE	PHASE			
	Ø2+5	Ø2+6	Ø4	FLASH
21,22	G	G	R	Y
41,42	R	R	G	R
51	-	Y	R	Y
61,62	R	G	R	Y

**SIGNAL FACE I.D.**  
All Heads L.E.D.

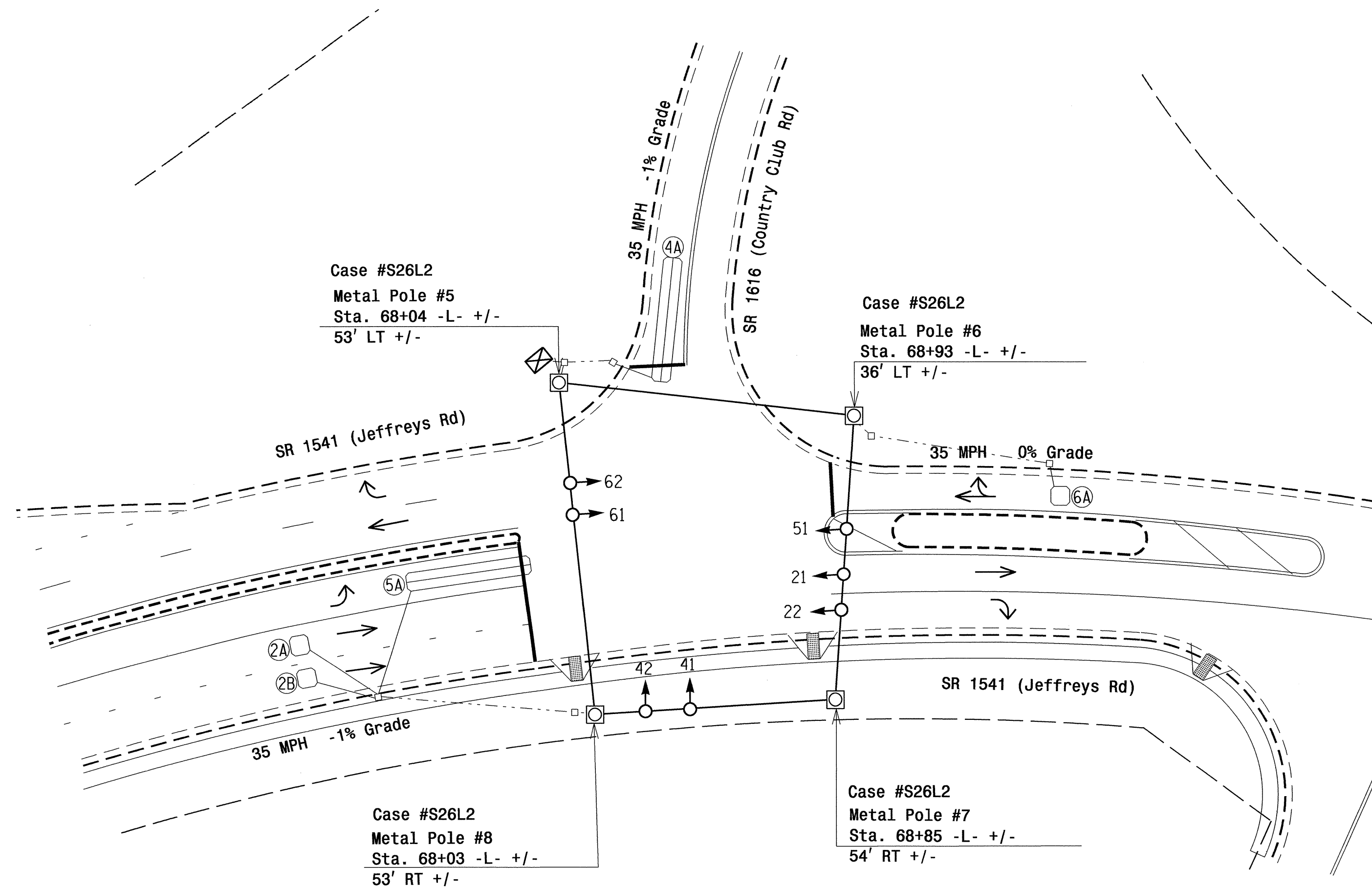


OASIS 2070 LOOP & DETECTOR INSTALLATION CHART												
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A,2B	6X6	70	3	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	+5	2-4-2	Y	4	Y	Y	-	-	10	-	Y
5A	6X40	+5	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A	6X6	70	3	Y	6	Y	Y	-	-	-	-	Y

**3 Phase Fully Actuated Rocky Mount Signal System**

**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 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. System data: Zone 12 Controller Asset #0849.



**OASIS 2070 TIMING CHART**

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	10	7	7	10
Extension 1 *	3.0	2.0	2.0	3.0
Max Green 1 *	40	20	15	40
Yellow Clearance	3.9	3.0	3.0	3.9
Red Clearance	1.5	2.6	2.3	1.5
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

**LEGEND**

PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
○ → Modified Signal Head	N/A
○ → Sign	N/A
○ → Pedestrian Signal Head With Push Button & Sign	○ → Pedestrian Signal Head
○ → Signal Pole with Guy	○ → Signal Pole with Guy
○ → Signal Pole with Sidewalk Guy	○ → Signal Pole with Sidewalk Guy
○ → Metal Strain Pole	○ → Metal Strain Pole
○ → Inductive Loop Detector	○ → Inductive Loop Detector
○ → Controller & Cabinet	○ → Controller & Cabinet
○ → Junction Box	○ → Junction Box
○ → 2-in Underground Conduit	○ → 2-in Underground Conduit
○ → Right of Way	○ → Right of Way
○ → Directional Arrow	○ → Directional Arrow
○ → Wheel Chair Ramp	○ → Wheel Chair Ramp

**New Installation (Phase III and Final)**

**SR 1541 (Jeffreys Rd) at SR 1616 (Country Club Rd)**

Division 4 Nash County Rocky Mount

PLAN DATE: January 2014 REVIEWED BY: JPG

PREPARED BY: EM Minshew REVIEWED BY:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 30 1"=30'

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

SIGNATURE: \_\_\_\_\_ DATE: 2/5/14

SIG. INVENTORY NO. 04-0849

18 FEB 2014 14:27 R:\P\1411\1411001\1411001.dgn

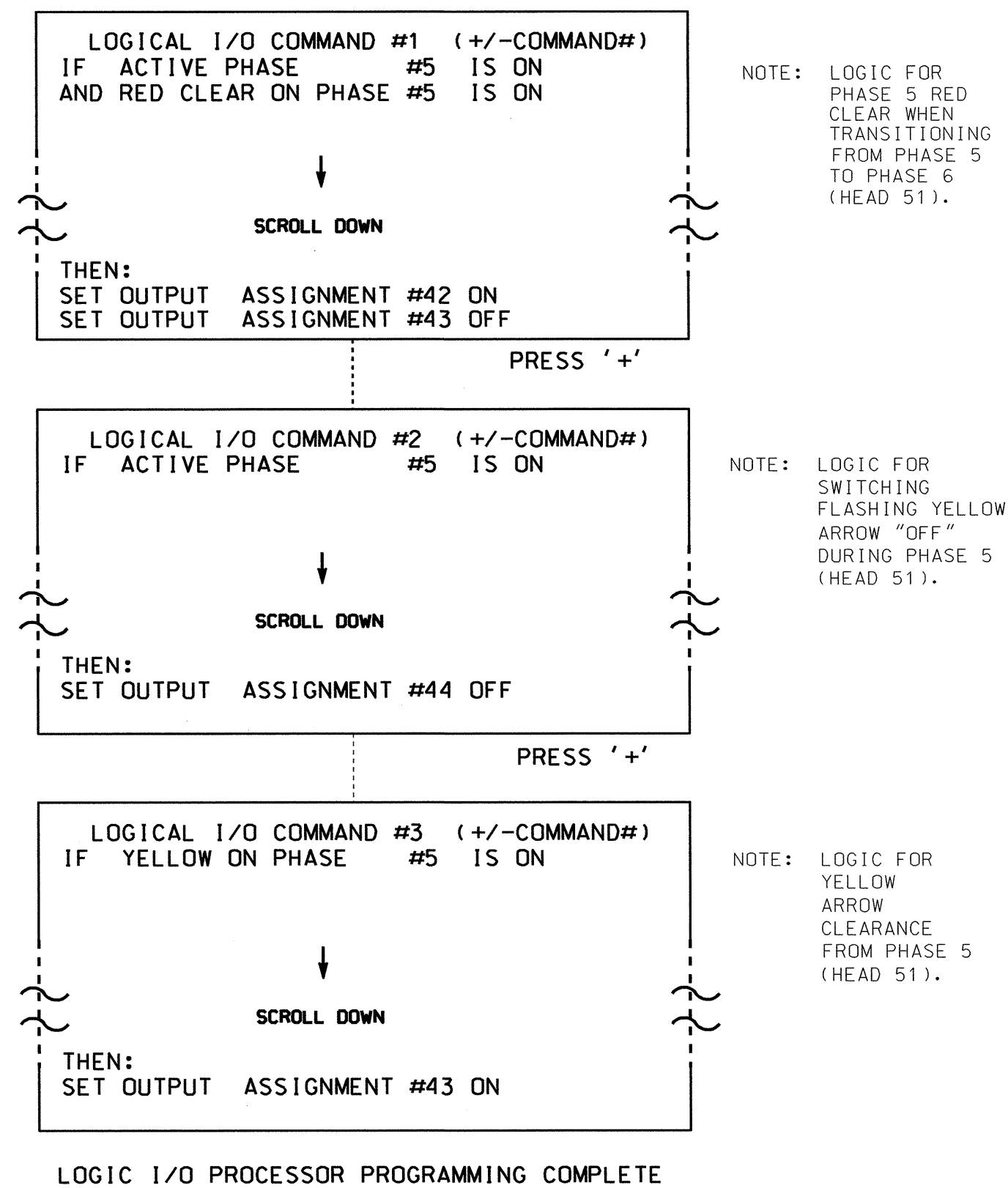




**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL  
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

*(program controller as shown below)*

- 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 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



<b>OUTPUT REFERENCE SCHEDULE</b>
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

**OVERLAP PROGRAMMING DETAIL**

*(program controller as shown below)*

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

PRESS '+' TWICE

```

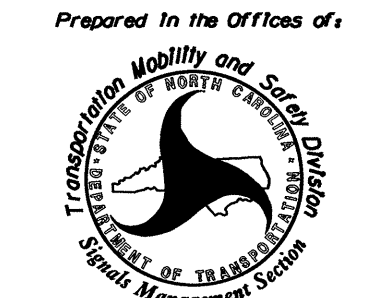
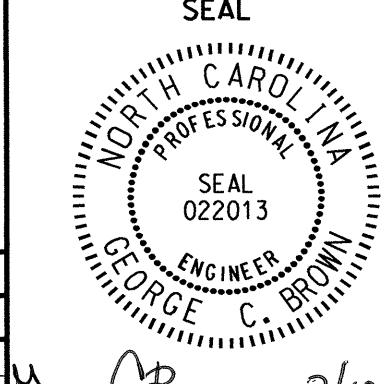
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:      12345678910111213141516
VEH OVL PARENTS:  XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR:  - RED  - YELLOW  - GREEN
FLASH COLORS:  - RED  - YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
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: 04-0849  
 DESIGNED: January 2014  
 SEALED: 2/5/14  
 REVISED: N/A

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:  Prepared in the Offices of:  TRANSPORTATION MOBILITY AND SAFETY SOLUTIONS, INC. 750 N. Greenfield Pkwy, Garner, NC 27529	<b>SR 1541 (Jeffreys Rd) at SR 1616 (Country Club Rd)</b> Division 4      Nash County      Rocky Mount PLAN DATE: January 2014      REVIEWED BY: <i>T. J. J...</i> PREPARED BY: C. Strickland      REVIEWED BY: <table border="1" style="width: 100%; text-align: center;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE				SEAL  ENGINEER GEORGE C. BROWN SIGNATURE: <i>George C. Brown</i> DATE: 2/12/14
REVISIONS	INIT.	DATE						
		SIG. INVENTORY NO. 04-0849						



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

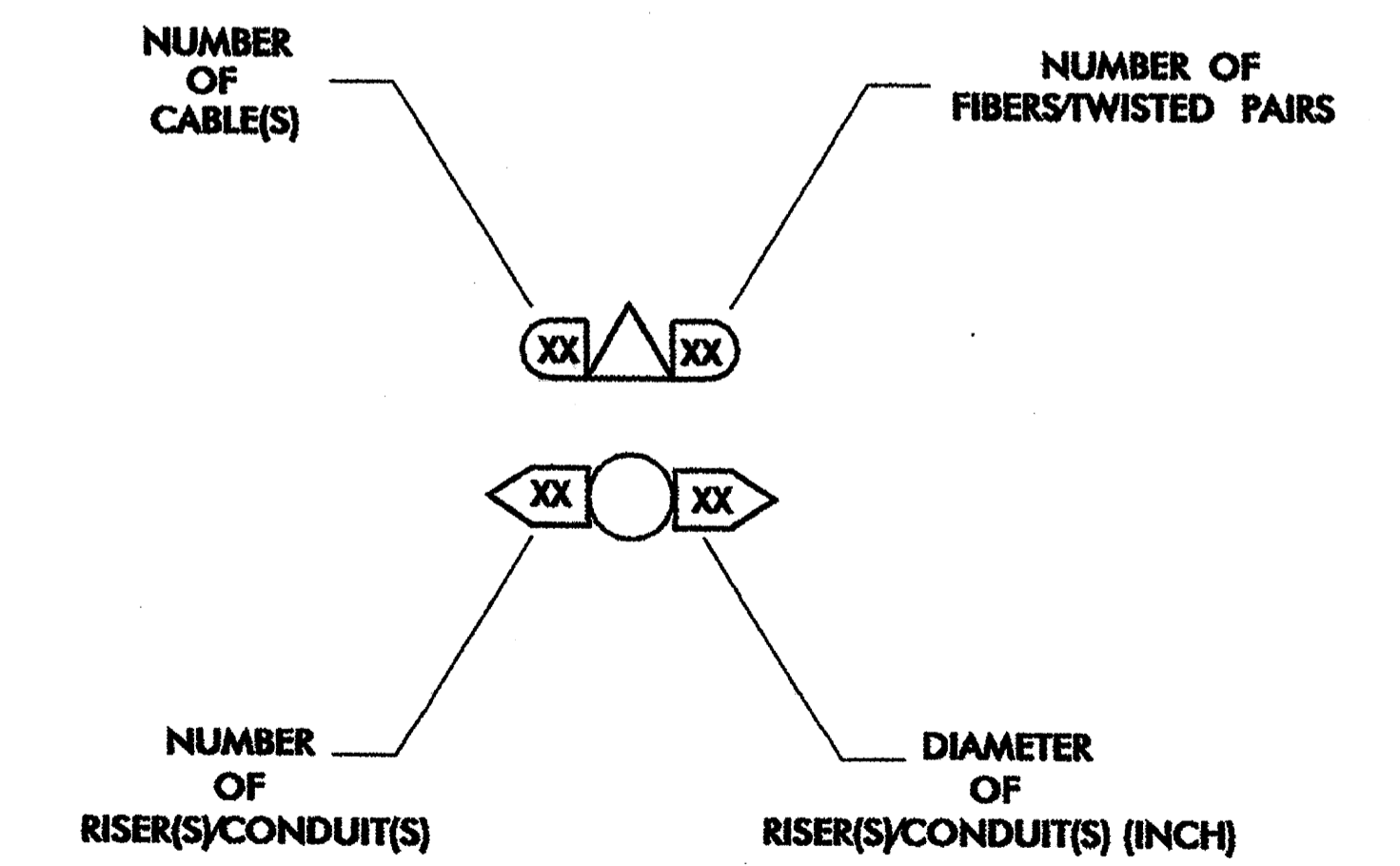
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL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

**LEGEND**

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

**CONSTRUCTION NOTE SYMBOLOGY KEY**

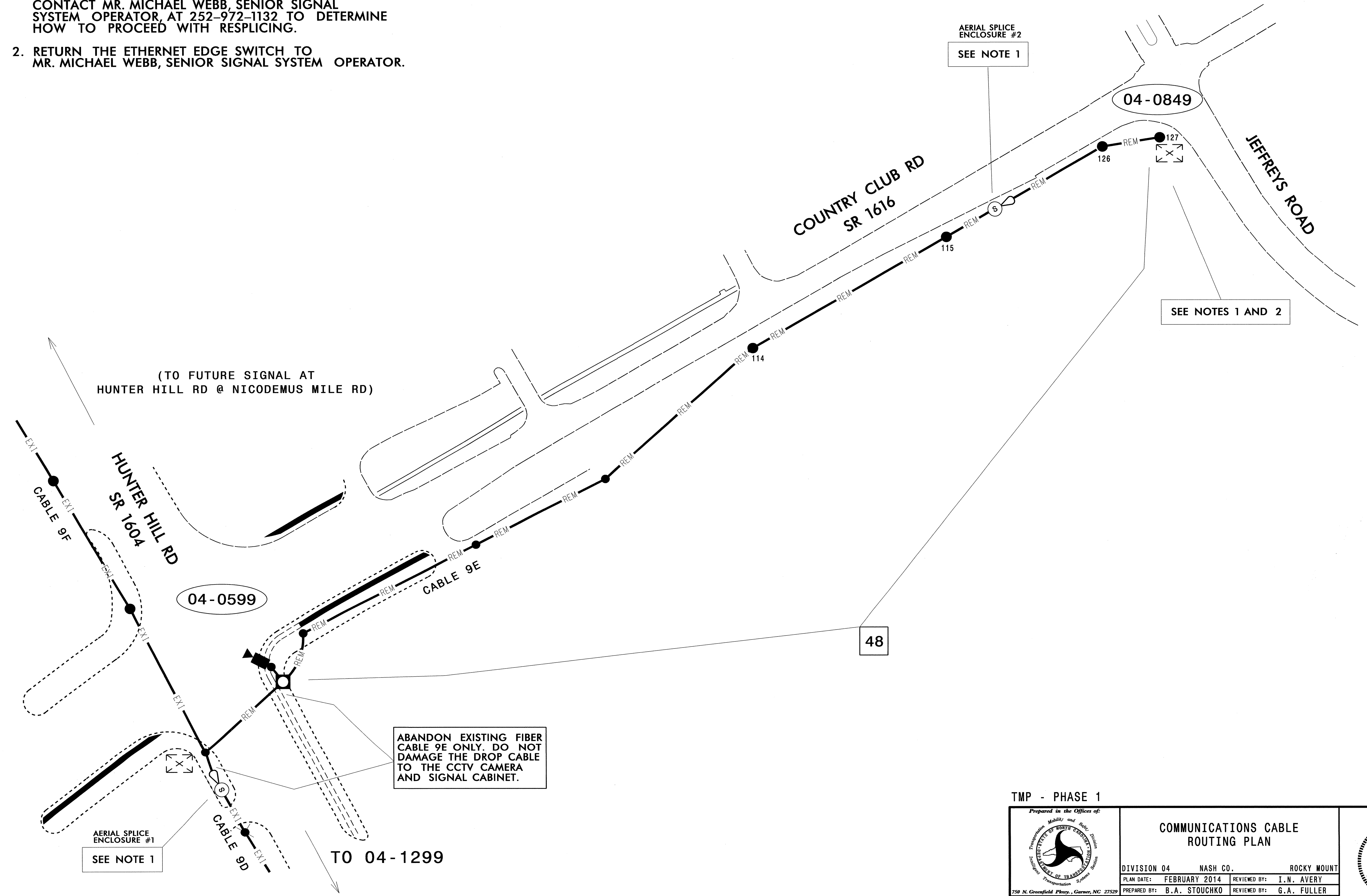
- XX INDICATES NUMBER OF CABLES, LOOPS, ETC.
- XX INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- XX INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- XX INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



	<b>CONSTRUCTION NOTES</b>		
	PLAN DATE: _____ PREPARED BY: _____ SCALE: _____	REVIEWED BY: _____ REVIEWED BY: <b>G. A. FULLER</b> REVISIONS: _____ INTI.: _____ DATE: _____	

**NOTES:**

1. CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE PLANS. IF DISCREPANCIES EXIST CONTACT MR. MICHAEL WEBB, SENIOR SIGNAL SYSTEM OPERATOR, AT 252-972-1132 TO DETERMINE HOW TO PROCEED WITH RESPLICING.
2. RETURN THE ETHERNET EDGE SWITCH TO MR. MICHAEL WEBB, SENIOR SIGNAL SYSTEM OPERATOR.



TMP - PHASE 1

	<b>COMMUNICATIONS CABLE ROUTING PLAN</b>		
	DIVISION 04    NASH CO.    ROCKY MOUNT		
PLAN DATE: FEBRUARY 2014	REVIEWED BY: I.N. AVERY		SIGNATURE: <i>Gregory A. Fuller</i> DATE: 2/19/14
PREPARED BY: B.A. STOCHKO	REVIEWED BY: G.A. FULLER		
SCALE: 0 to 50	REVISIONS	INIT.	DATE



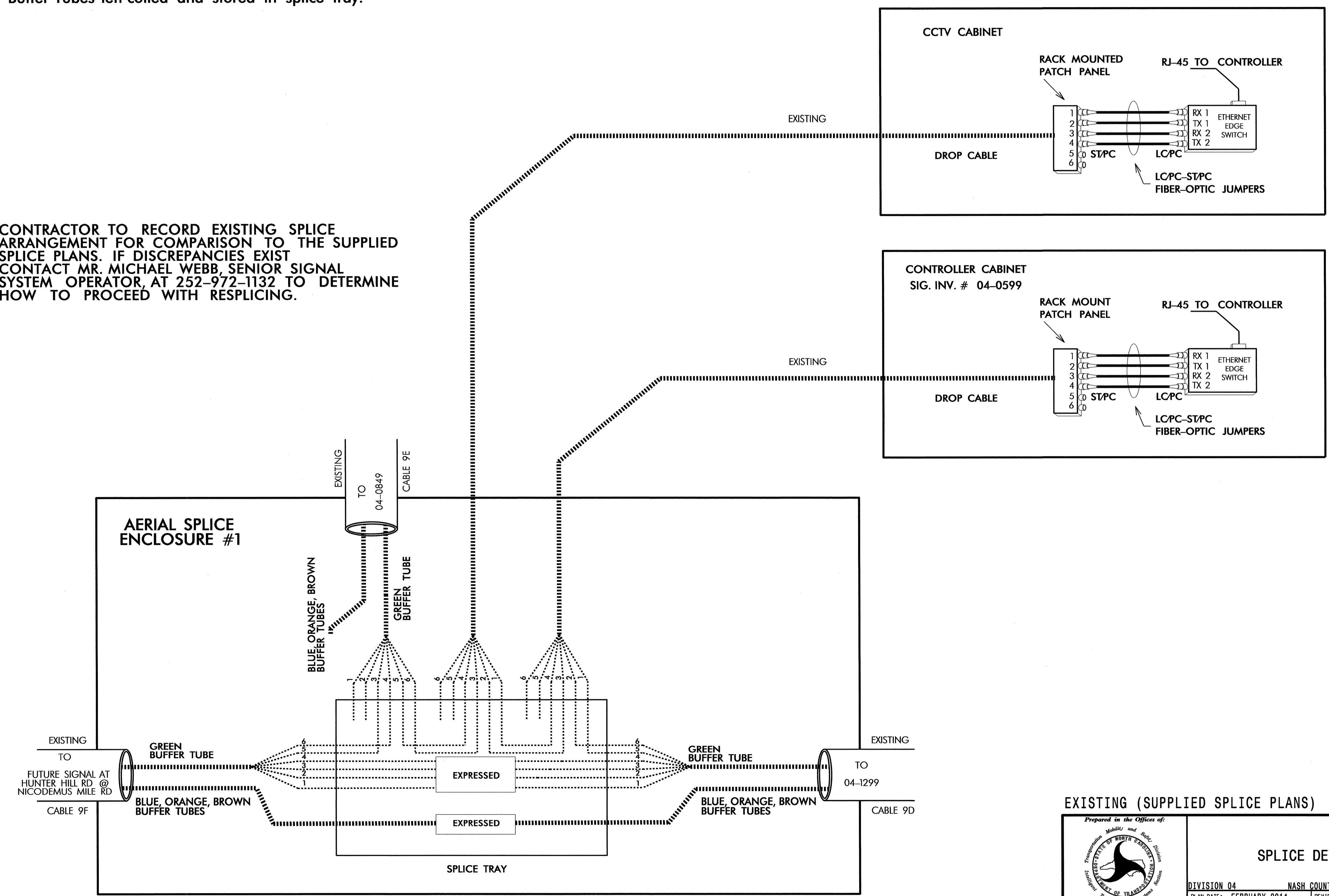
INTERSECTION LOCATION  
 HUNTER HILL RD @ COUNTRY CLUB RD  
 NEAR 04-0599

# EXISTING SPLICE DETAIL. FOR INFORMATION PURPOSES ONLY.

- LEGEND**  
 X = FUSION SPLICE
- COLOR CODE**  
 TIA/EIA 598-A
- (1) BLUE
  - (2) ORANGE
  - (3) GREEN
  - (4) BROWN
  - (5) SLATE
  - (6) WHITE

**Notes:**  
 Unused fibers left coiled and stored in splice tray.  
 Unused Buffer Tubes left coiled and stored in splice tray.

CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE PLANS. IF DISCREPANCIES EXIST CONTACT MR. MICHAEL WEBB, SENIOR SIGNAL SYSTEM OPERATOR, AT 252-972-1132 TO DETERMINE HOW TO PROCEED WITH RESPLICING.



EXISTING (SUPPLIED SPLICE PLANS)

	<b>SPLICE DETAIL</b>		
	DIVISION 04      NASH COUNTY      ROCKY MOUNT		
	PLAN DATE: FEBRUARY 2014 PREPARED BY: B.A. STOUCHKO	REVIEWED BY: I.N. AVERY REVIEWED BY: G.A. FULLER	
REVISIONS		INIT.      DATE	SIGNATURE      DATE
250 N. Greenfield Pkwy., Garner, NC 27529		[Signature] 2/19/14	CADD Filename:

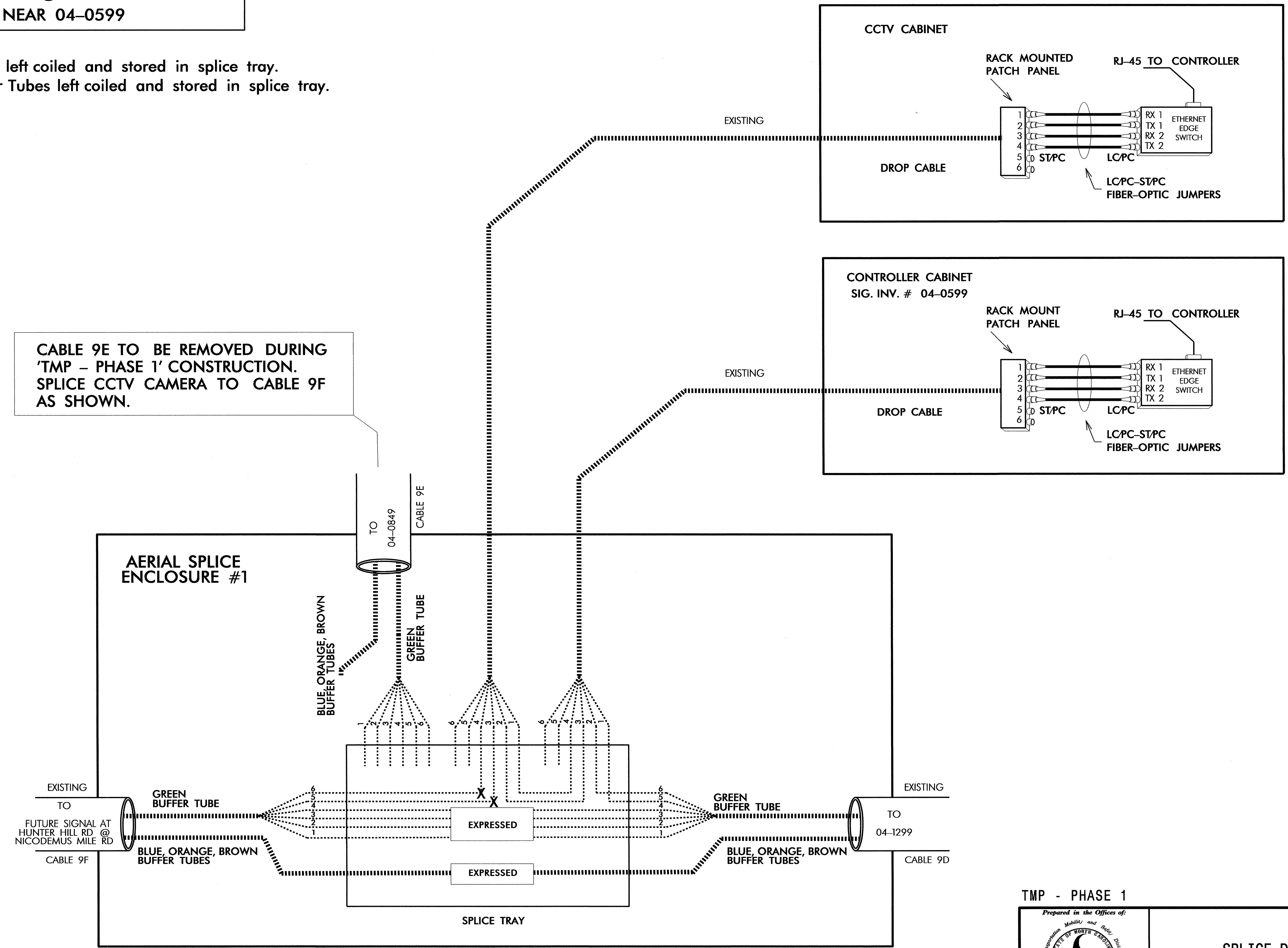
**INTERSECTION LOCATION  
HUNTER HILL RD @ COUNTRY CLUB RD  
NEAR 04-0599**

**Notes:**  
Unused fibers left coiled and stored in splice tray.  
Unused Buffer Tubes left coiled and stored in splice tray.

**LEGEND**  
X = FUSION SPLICE

**COLOR CODE**  
TIA/EIA 598-A

(1) BLUE  
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(4) BROWN  
(5) SLATE  
(6) WHITE



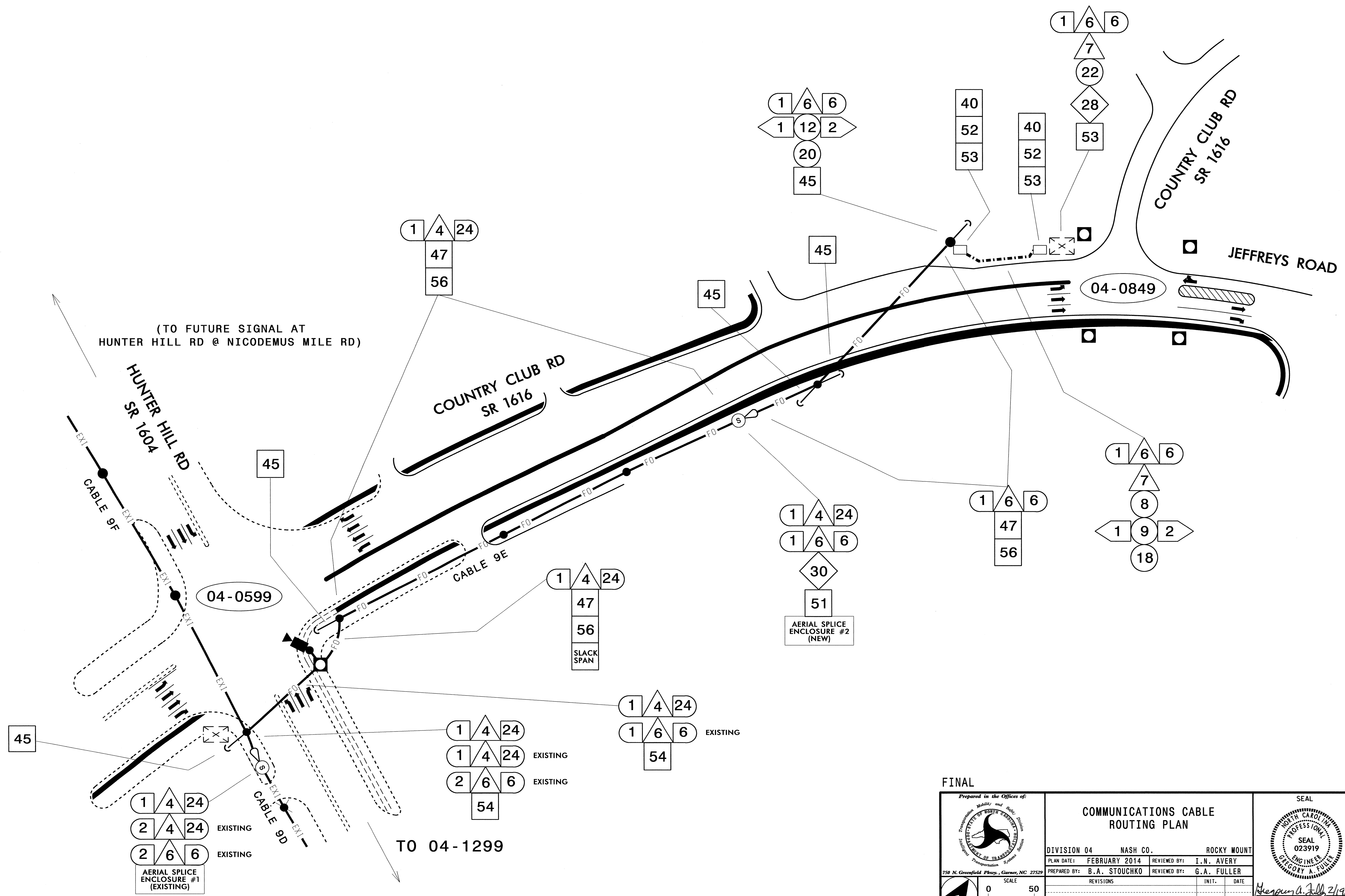
TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS

**TMP - PHASE 1**

	<b>SPLICE DETAIL</b>		SEAL
	DIVISION 04	NASH COUNTY	ROCKY MOUNT
	PLAN DATE: FEBRUARY 2014	REVIEWED BY: I.N. AVERY	
	PREPARED BY: B.A. STOUCHKO	REVIEWED BY: G.A. FULLER	
REVISIONS	INIT.	DATE	

CADD File name:





<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p><b>COMMUNICATIONS CABLE ROUTING PLAN</b></p>		
	<p>DIVISION 04 NASH CO. ROCKY MOUNT</p> <p>PLAN DATE: FEBRUARY 2014</p>	<p>REVIEWED BY: I.N. AVERY</p>	
<p>PREPARED BY: B.A. STOCHKO</p>	<p>REVIEWED BY: G.A. FULLER</p>	<p>DATE</p>	<p>DATE</p>
<p>SCALE 0 50</p>	<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>

Signature: *Gregory A. Fuller* 2/19/14  
 CADD File Name:

# FIBER OPTIC CABLE

**INTERSECTION LOCATION**  
**HUNTER HILL RD @ COUNTRY CLUB RD**  
**NEAR 04-0599**

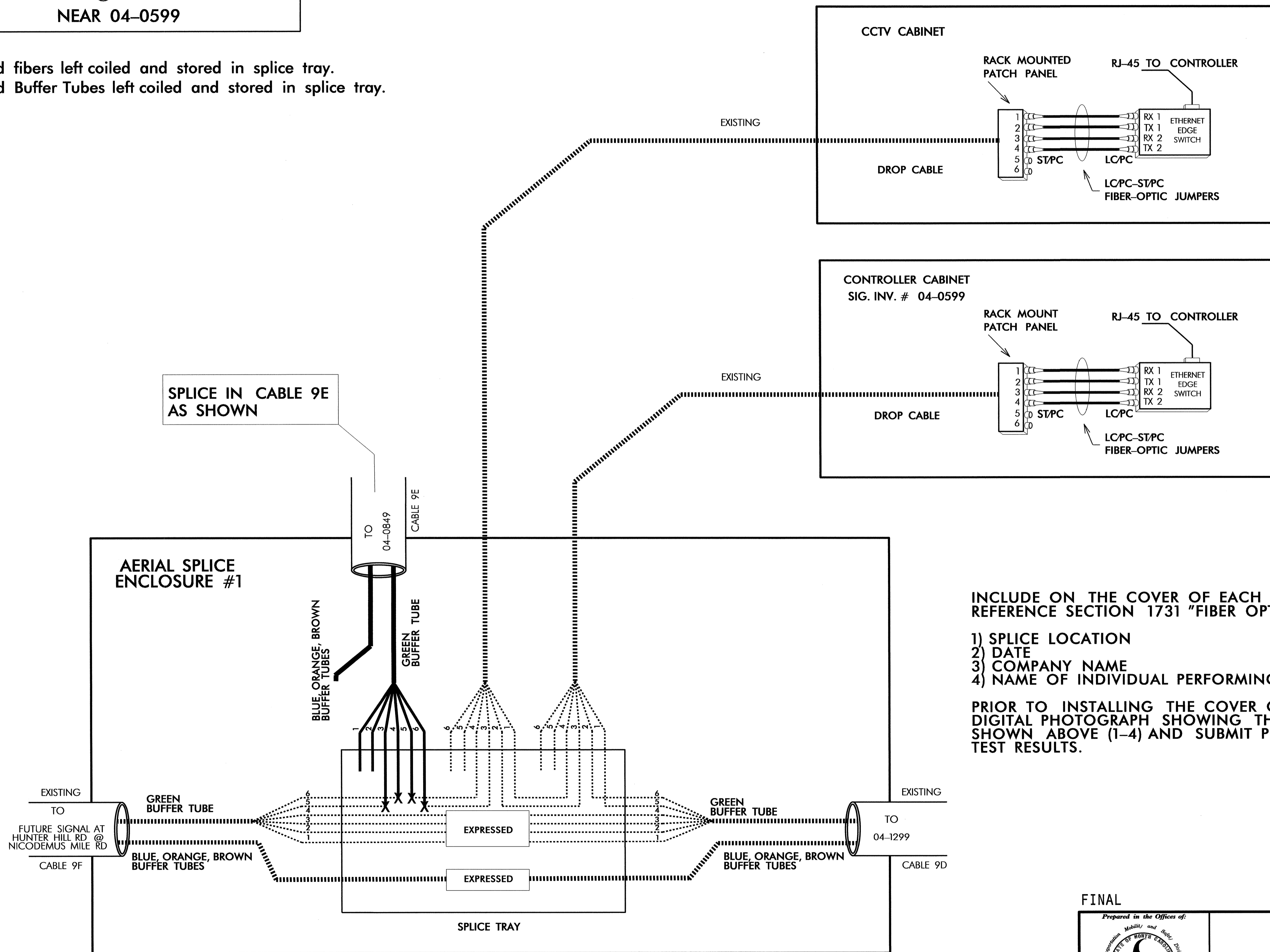
**Notes:**

Unused fibers left coiled and stored in splice tray.  
 Unused Buffer Tubes left coiled and stored in splice tray.

**LEGEND**  
 X = FUSION SPLICE

**COLOR CODE**  
 TIA/EIA 598-A

(1) BLUE  
 (2) ORANGE  
 (3) GREEN  
 (4) BROWN  
 (5) SLATE  
 (6) WHITE



INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING:  
 REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

- 1) SPLICE LOCATION
- 2) DATE
- 3) COMPANY NAME
- 4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

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

FINAL

	<b>SPLICE DETAIL</b>		
	DIVISION 04      NASH COUNTY      ROCKY MOUNT		
	PLAN DATE: FEBRUARY 2014	REVIEWED BY: I.N. AVERY	
	PREPARED BY: B.A. STOUCHKO	REVIEWED BY: G.A. FULLER	
REVISIONS	INIT.	DATE	SIGNATURE: <i>Gregory A. Fuller</i> 2/19/14 DATE

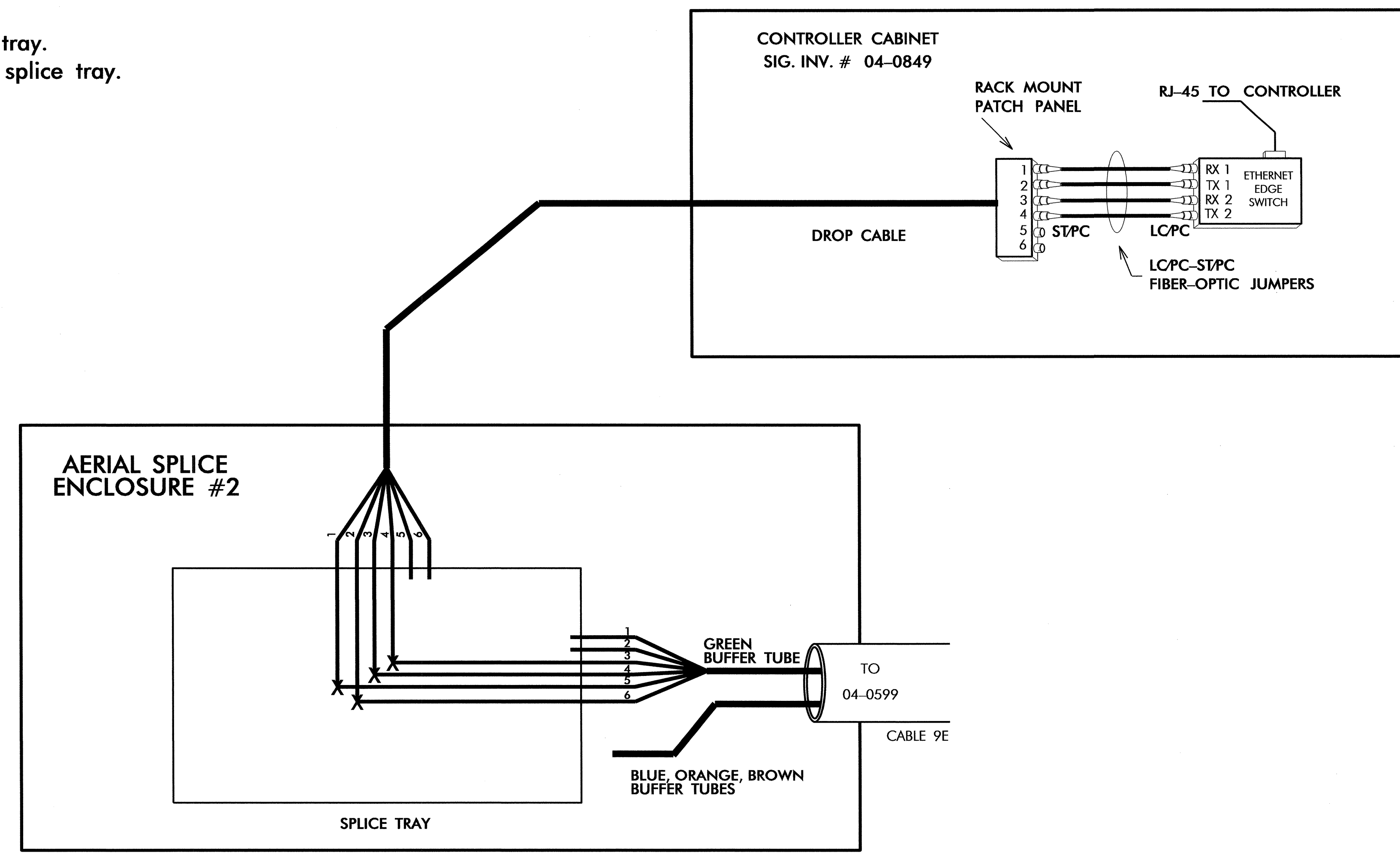


# FIBER OPTIC CABLE

INTERSECTION LOCATION  
COUNTRY CLUB RD @ JEFFREYS RD  
NEAR 04-0849

Unused fibers left coiled and stored in splice tray.  
Unused Buffer Tubes left coiled and stored in splice tray.

- LEGEND  
X = FUSION SPLICE
- COLOR CODE  
TIA/EIA 598-A
- (1) BLUE
  - (2) ORANGE
  - (3) GREEN
  - (4) BROWN
  - (5) SLATE
  - (6) WHITE



**NOTES:**

- 1) ETHERNET EDGE SWITCH TO BE PROVIDED BY THE CONTRACTOR. CONTACT MR. MICHAEL WEBB, SENIOR SIGNAL SYSTEM OPERATOR, AT 252-972-1132 BEFORE BEGINNING WORK. PROVIDE 5 WORKING DAYS NOTICE.
- 2) THE CITY WILL PROGRAM THE ETHERNET EDGE SWITCH WITH REQUIRED NETWORK CONFIGURATION DATA (INCLUDING BUT NOT LIMITED TO PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK, AND VLAN ID INFORMATION).

INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING:  
REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

- 1) SPLICE LOCATION
- 2) DATE
- 3) COMPANY NAME
- 4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

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

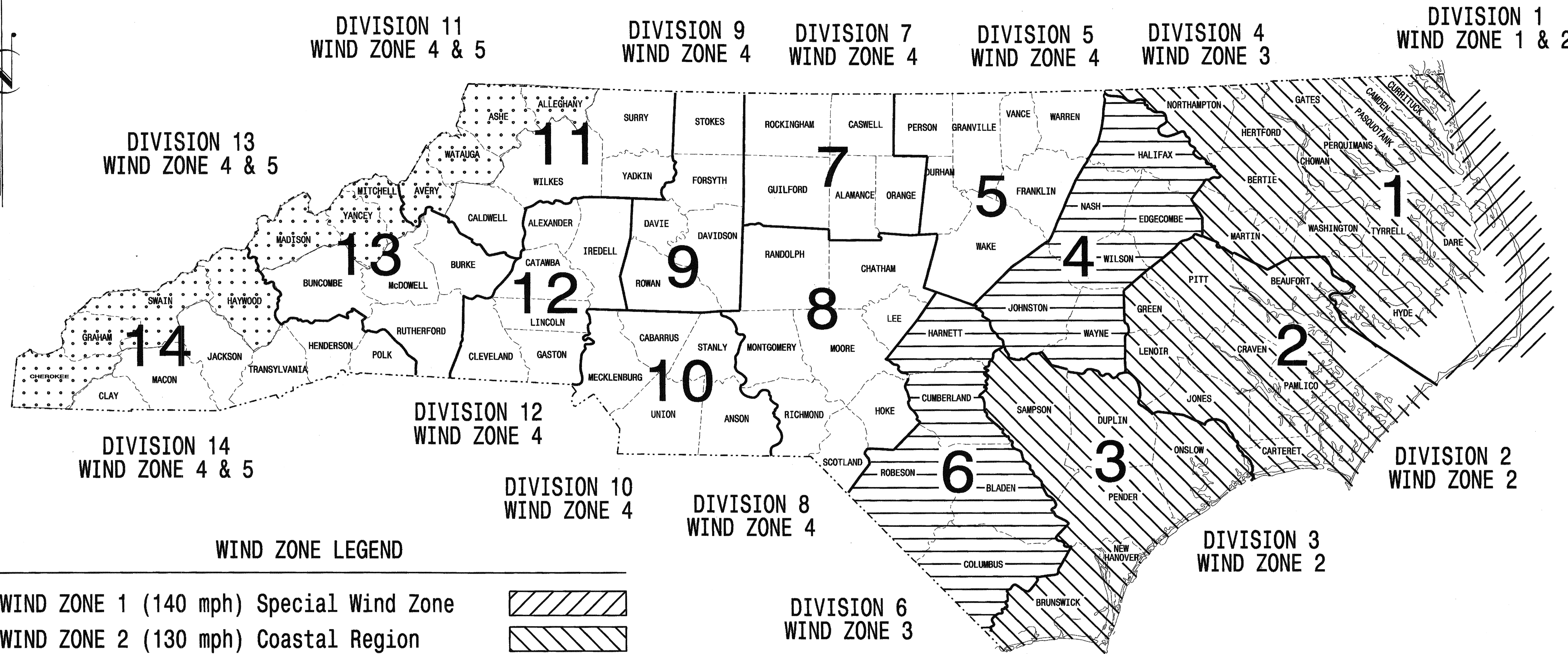
FINAL

	<b>SPLICE DETAIL</b>		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER GREGORY A. FULLER 023919
	DIVISION 04      NASH COUNTY      ROCKY MOUNT		
	PLAN DATE: FEBRUARY 2014	REVIEWED BY: I.N. AVERY	
	PREPARED BY: B.A. STOCHKO	REVIEWED BY: G.A. FULLER	
REVISIONS	INIT.	DATE	SIGNATURE: <i>Gregory A. Fuller</i> DATE: 2/19/14

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	U-3331	Sig. 24
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	

<https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Designed in conformance  
with the latest  
2012 Interim to the  
5th Edition 2009  
**AASHTO**  
Standard Specifications for  
Structural Supports for  
Highway Signs, Luminaires,  
and Traffic Signals

**INDEX OF PLANS**

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

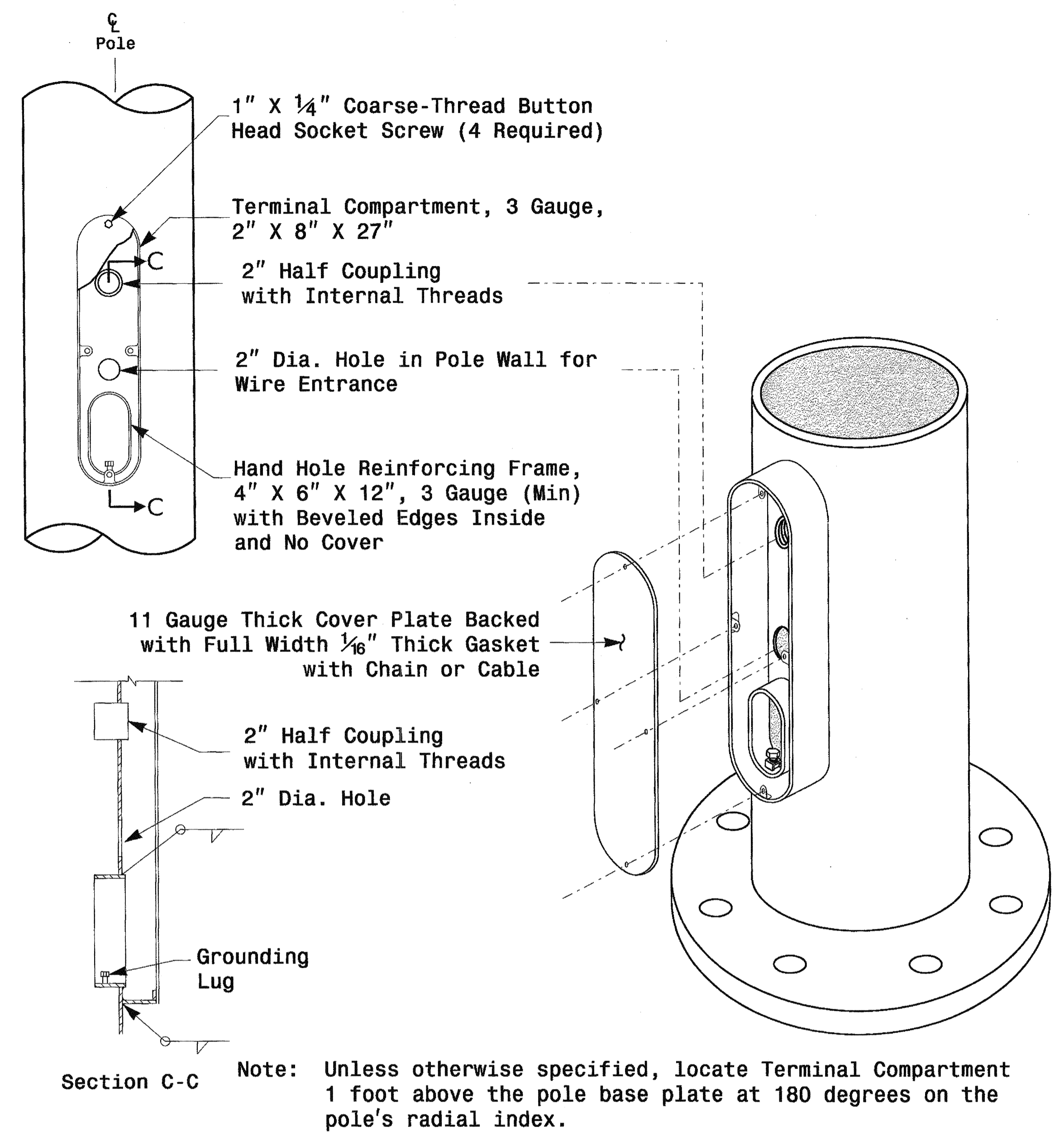
**D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER**

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

SEAL

*D. Sarkar* 8.7.2013  
SIGNATURE DATE





**Terminal Compartment Detail**

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

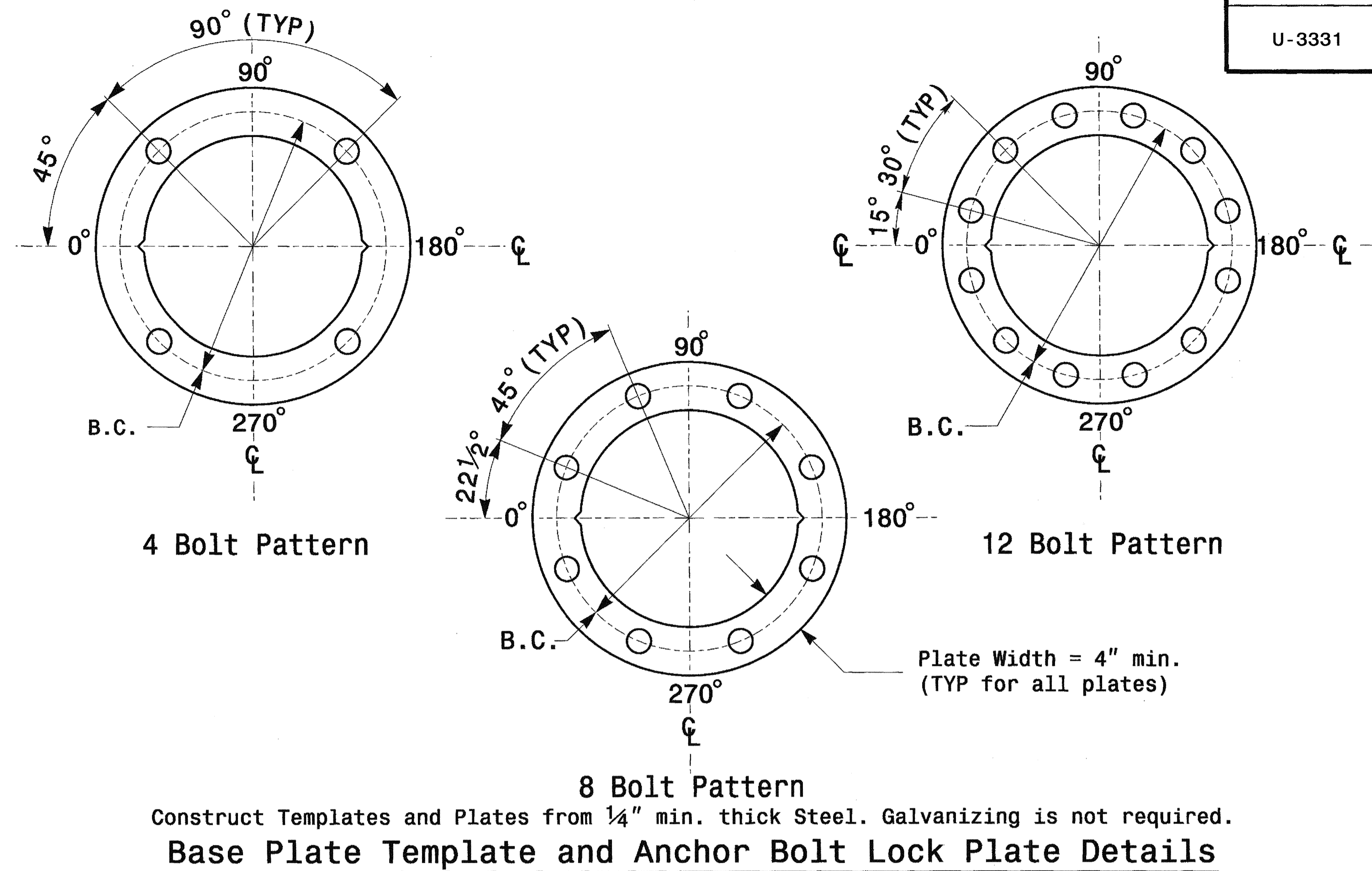
**Shaft I.D. Tag**  
(Provide on Strain Poles and Mast Arm Poles)

- Notes:
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
  - 2) A.B. = Anchor Bolt
  - 3) B.C. = Bolt Circle of Anchor Bolts
  - 4) If Custom Design, use "NCDOT STANDARD" line for pole I.D. number and Signal Inv. Number.
  - 5) See drawing M4 for mounting positions of I.D. tags.

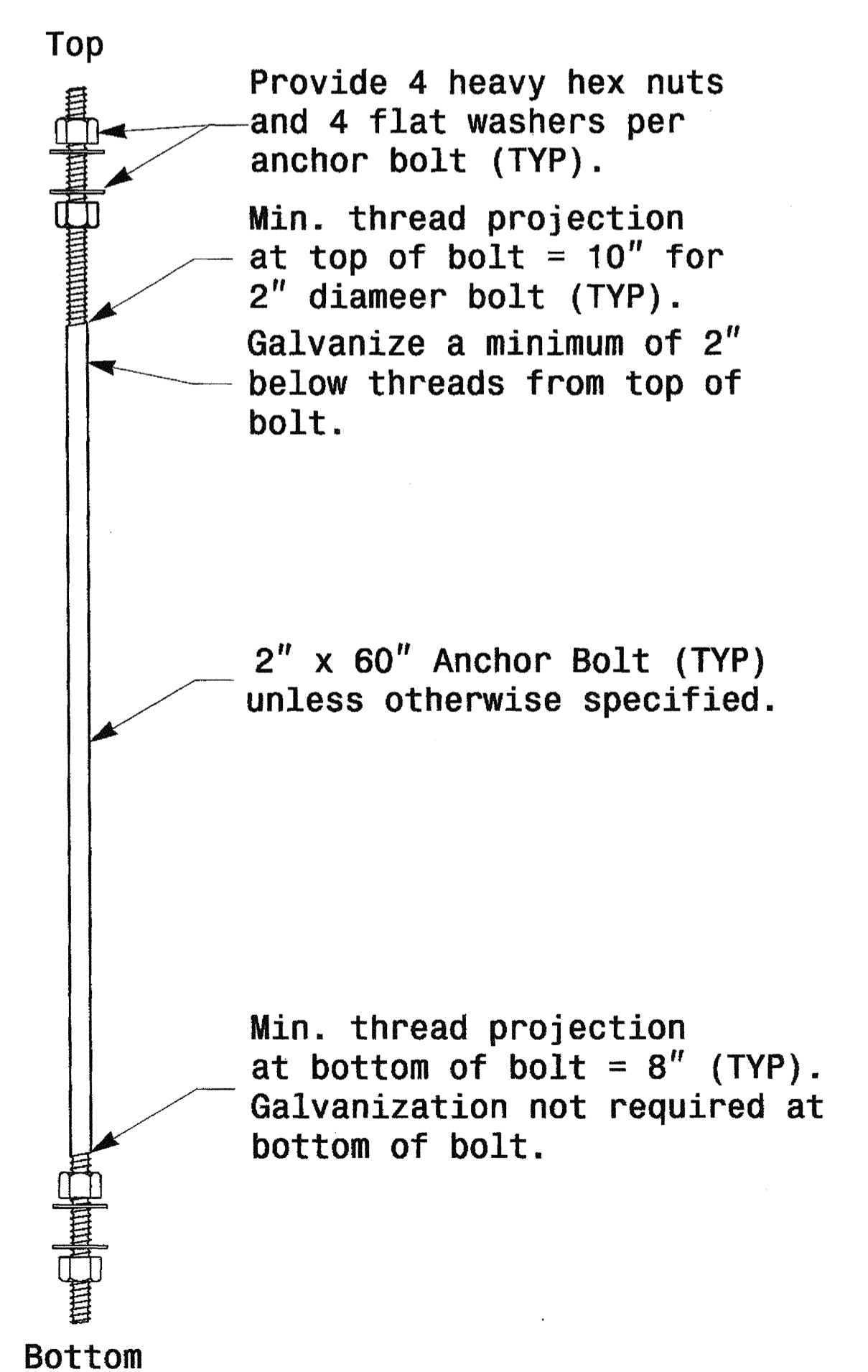
**Identification Tag Details**

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

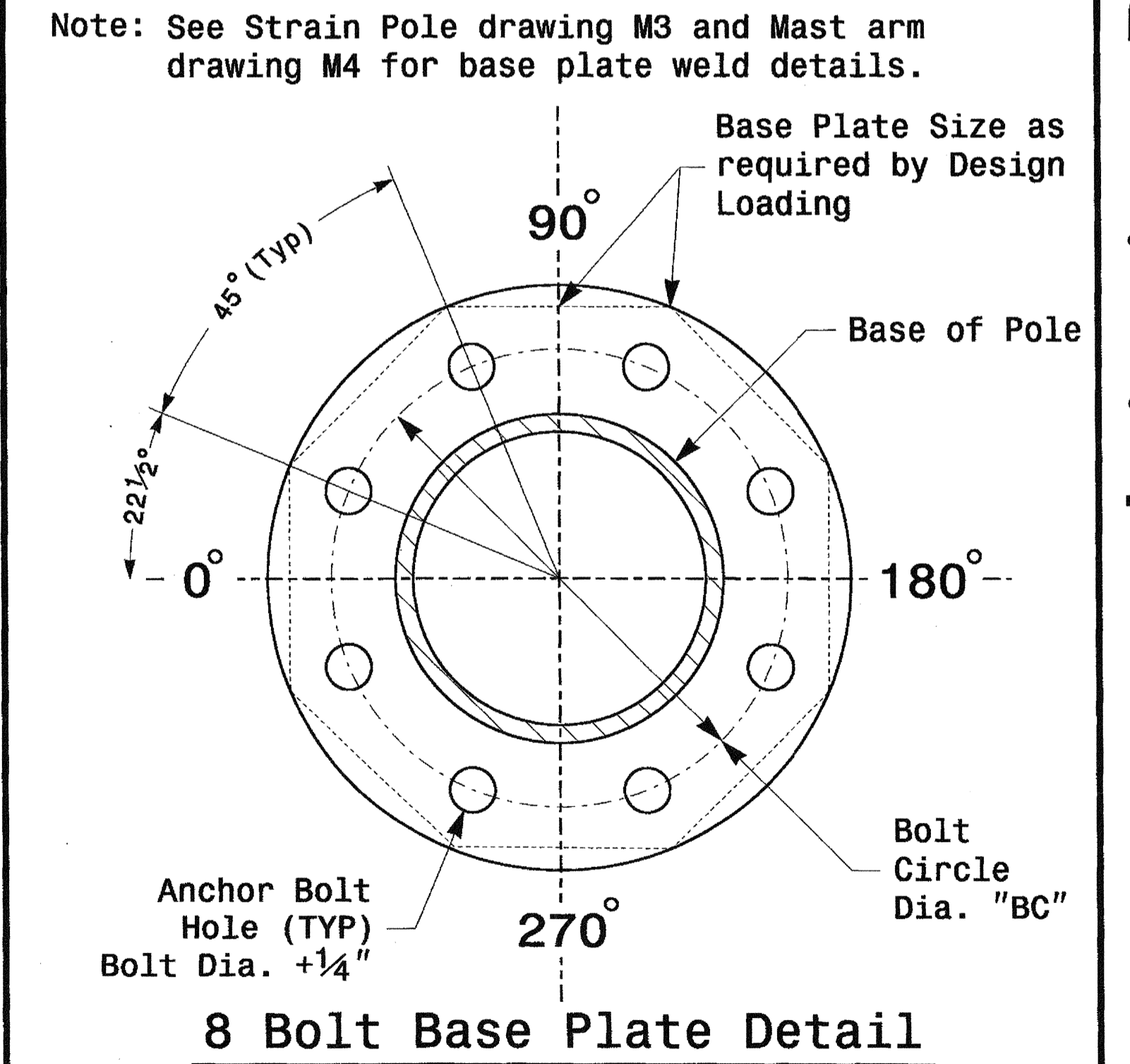
**Arm I.D. Tag**  
(Provide on each section of a multi-section mast arm)



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



**Anchor Bolt Detail**



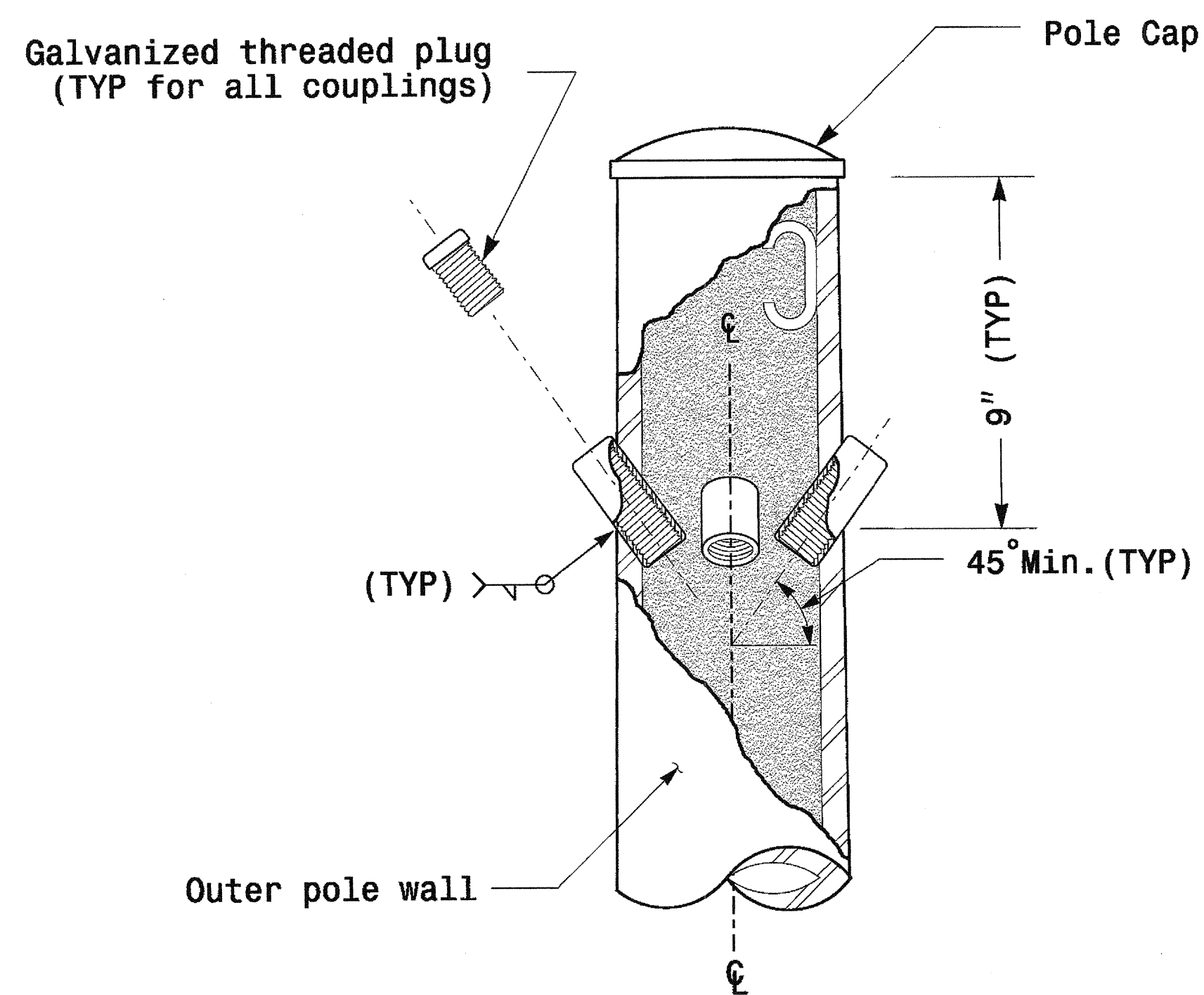
**8 Bolt Base Plate Detail**

	<b>Typical Fabrication Details Common To All Metal Poles</b>		
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
SCALE: 0 NONE NA		SIGNATURE: <i>D. Sarkar</i> 8-7-2013	DATE: 8-7-2013

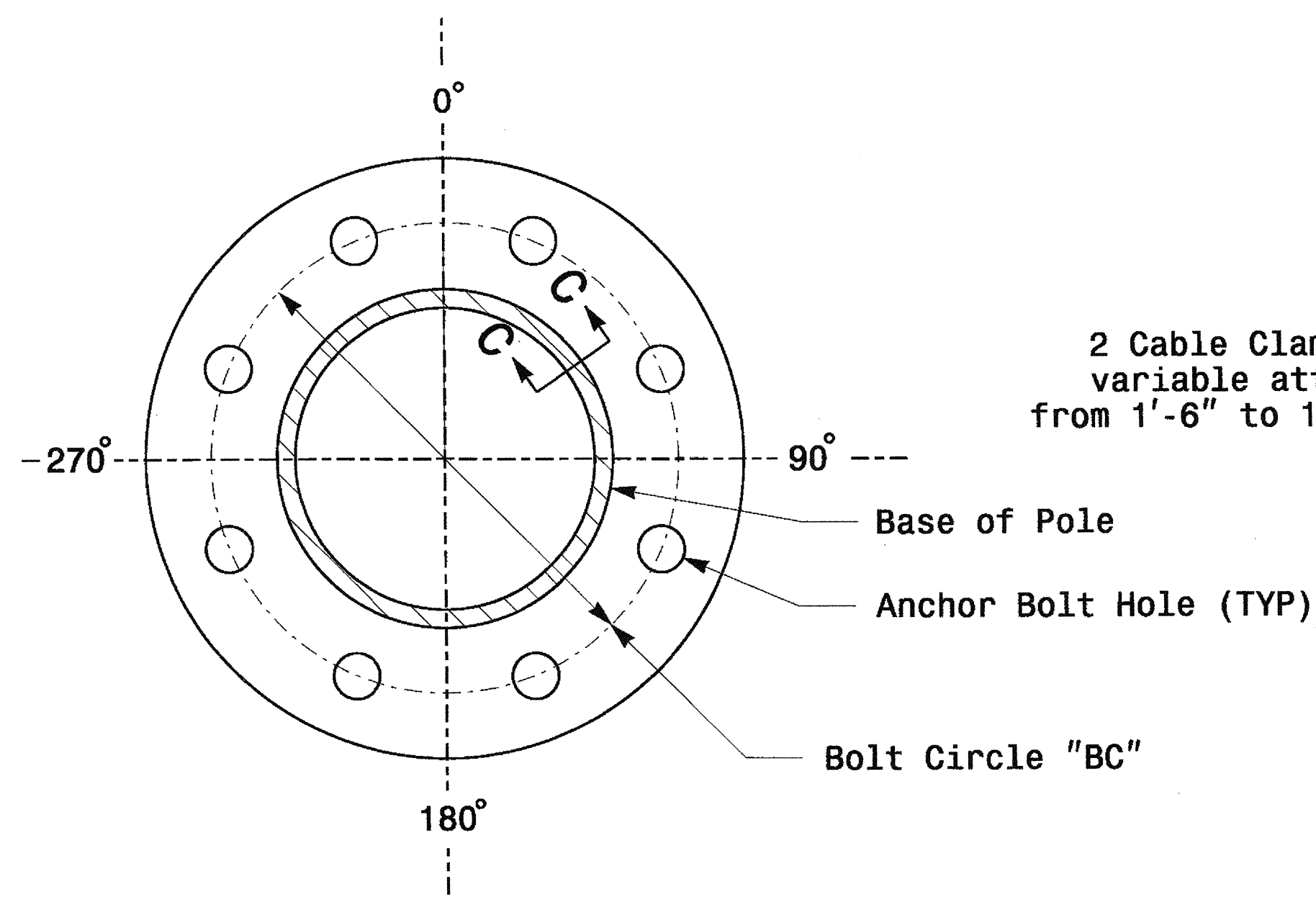
**Fabrication Details - All Poles**

C:\Users\j11111\OneDrive\Documents\Structural\Drawings\2012 Standard Strain Pole tags\*2012.m2.dgn  
 07-AUG-2013 15:15  
 07-AUG-2013 15:15  
 07-AUG-2013 15:15

# Fabrication Details - Strain Poles

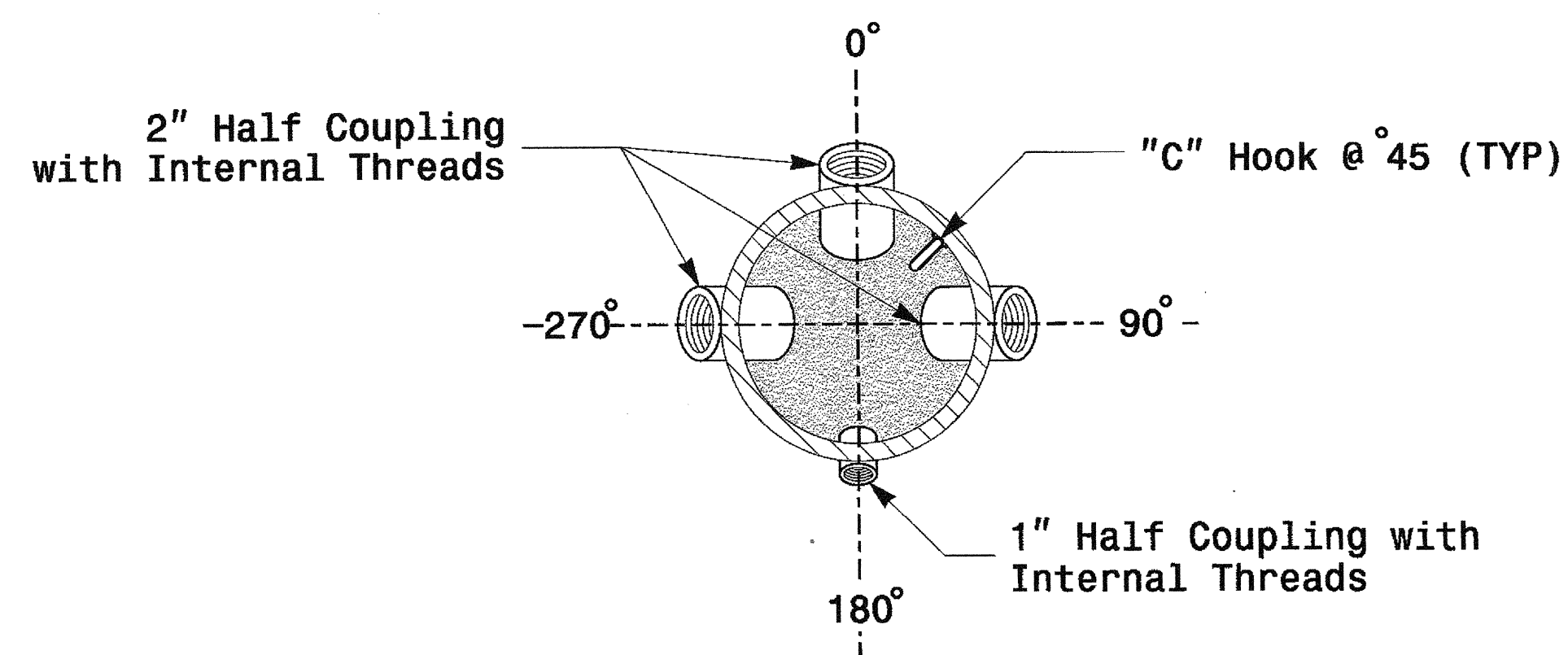
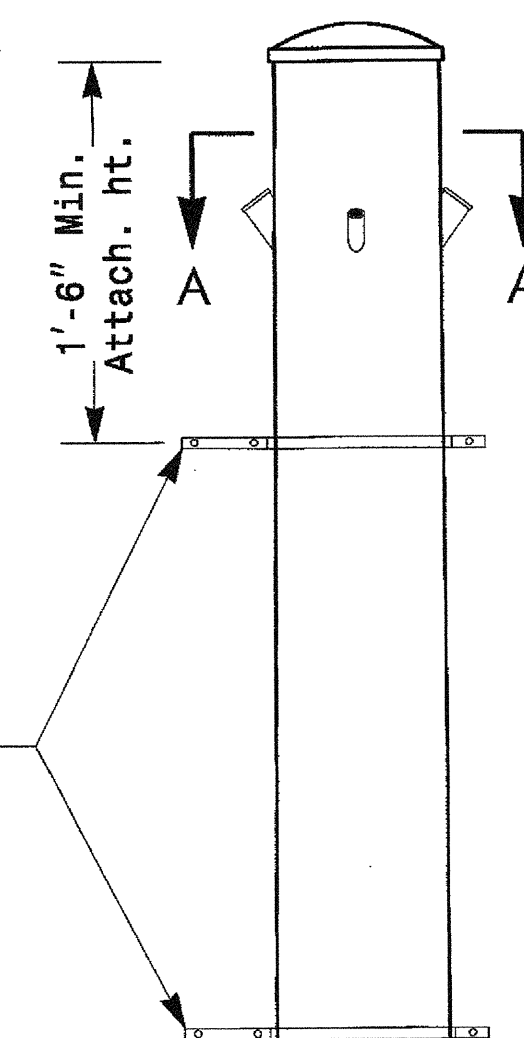


**Cable Entrances at Top of Pole**

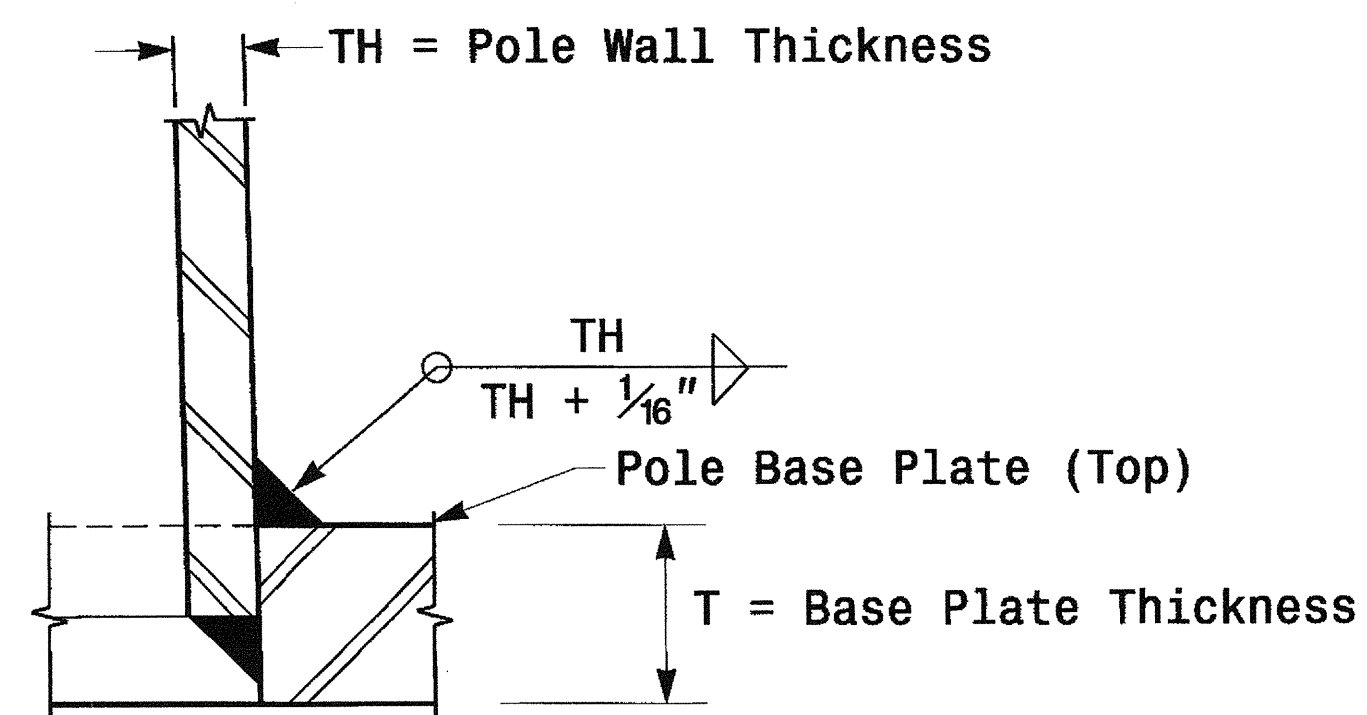


**Section B-B  
Pole Base Plate**  
(See drawing M2)

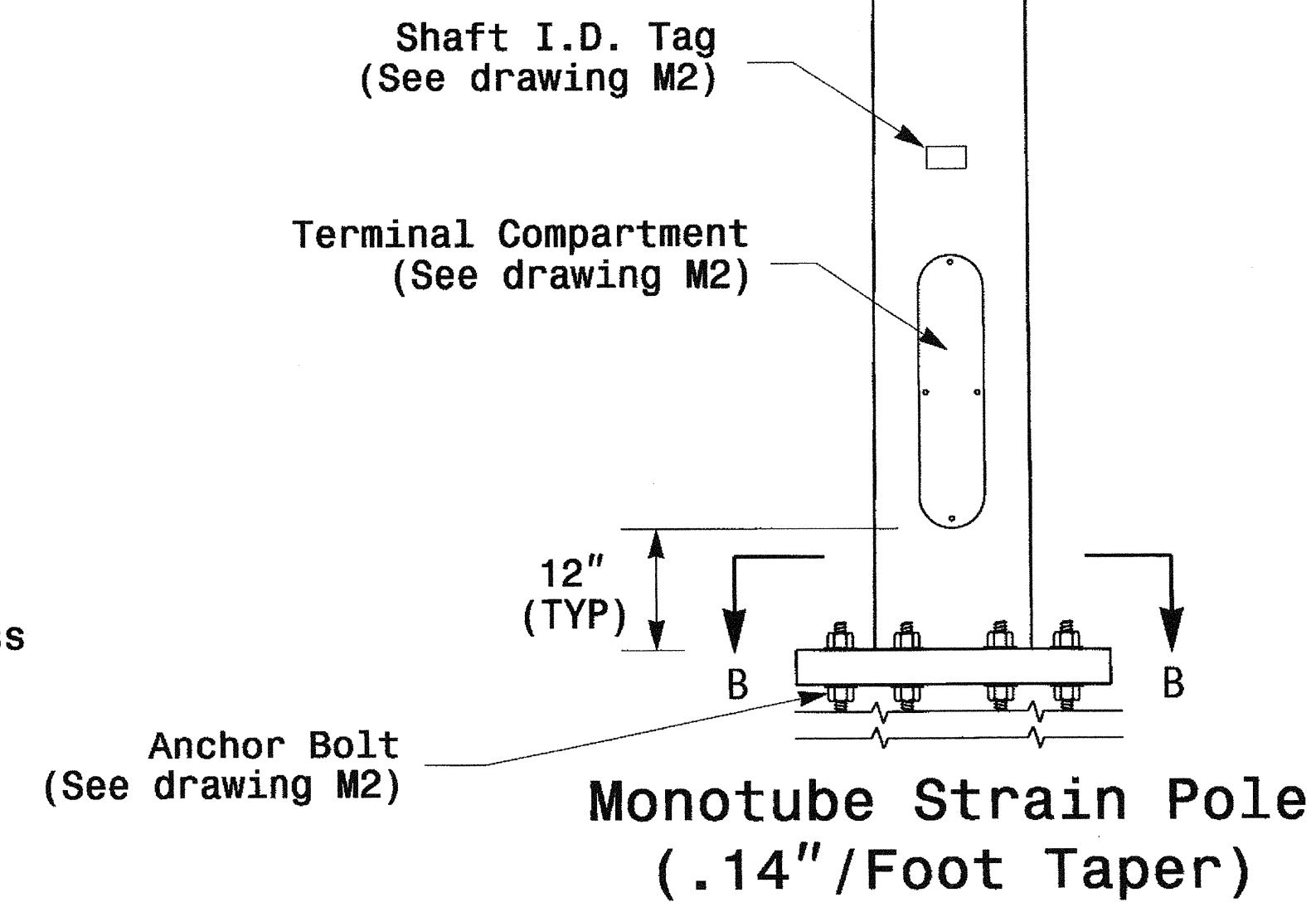
2 Cable Clamps designed for variable attachment heights from 1'-6" to 10' below the top of the pole.



**Radial Orientation for Factory Installed Accessories at Top of Pole**



**Socket Connection Weld Detail**



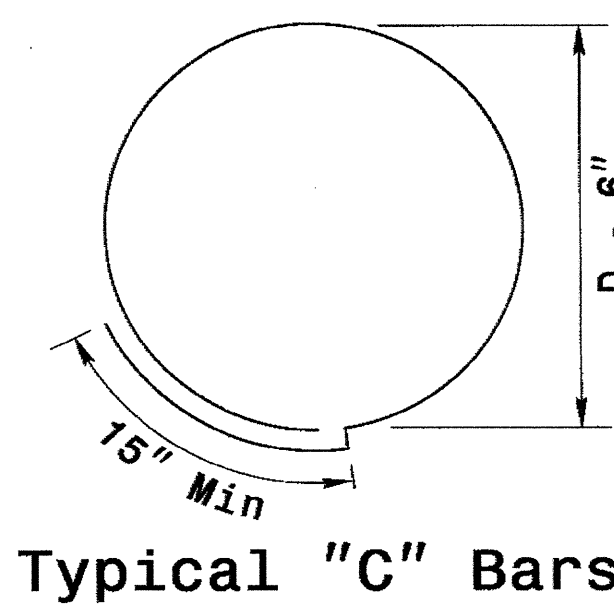
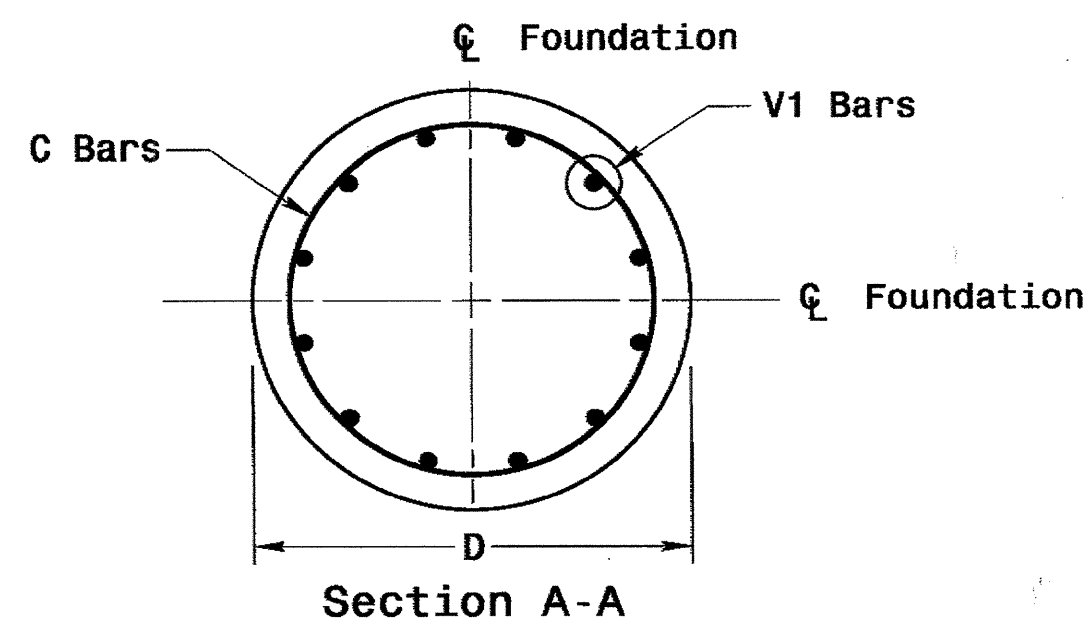
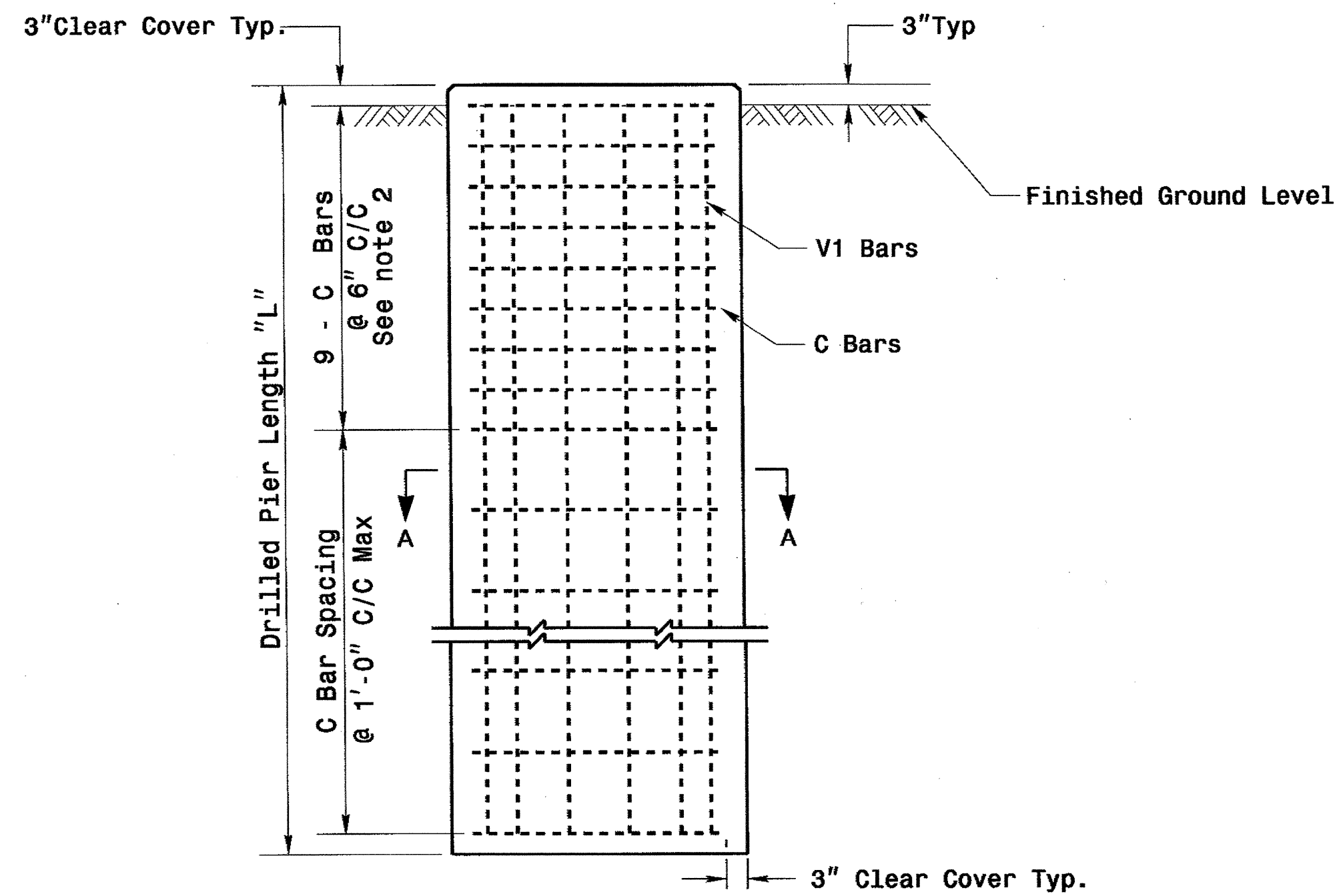
07-AUG-2013 13:11 5:41TS&LIMITS Signal&workgroups&structures&drawings&012 Standard Strain Pole Dwg&2012 m3.dgn mb11111g

	<b>Typical Fabrication Details For Strain Poles</b>		
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	SIGNATURE: <i>D.C. Sarkar</i> DATE: 8-7-2013		SIG. INVENTORY NO.





## Reinforcing Steel Bars

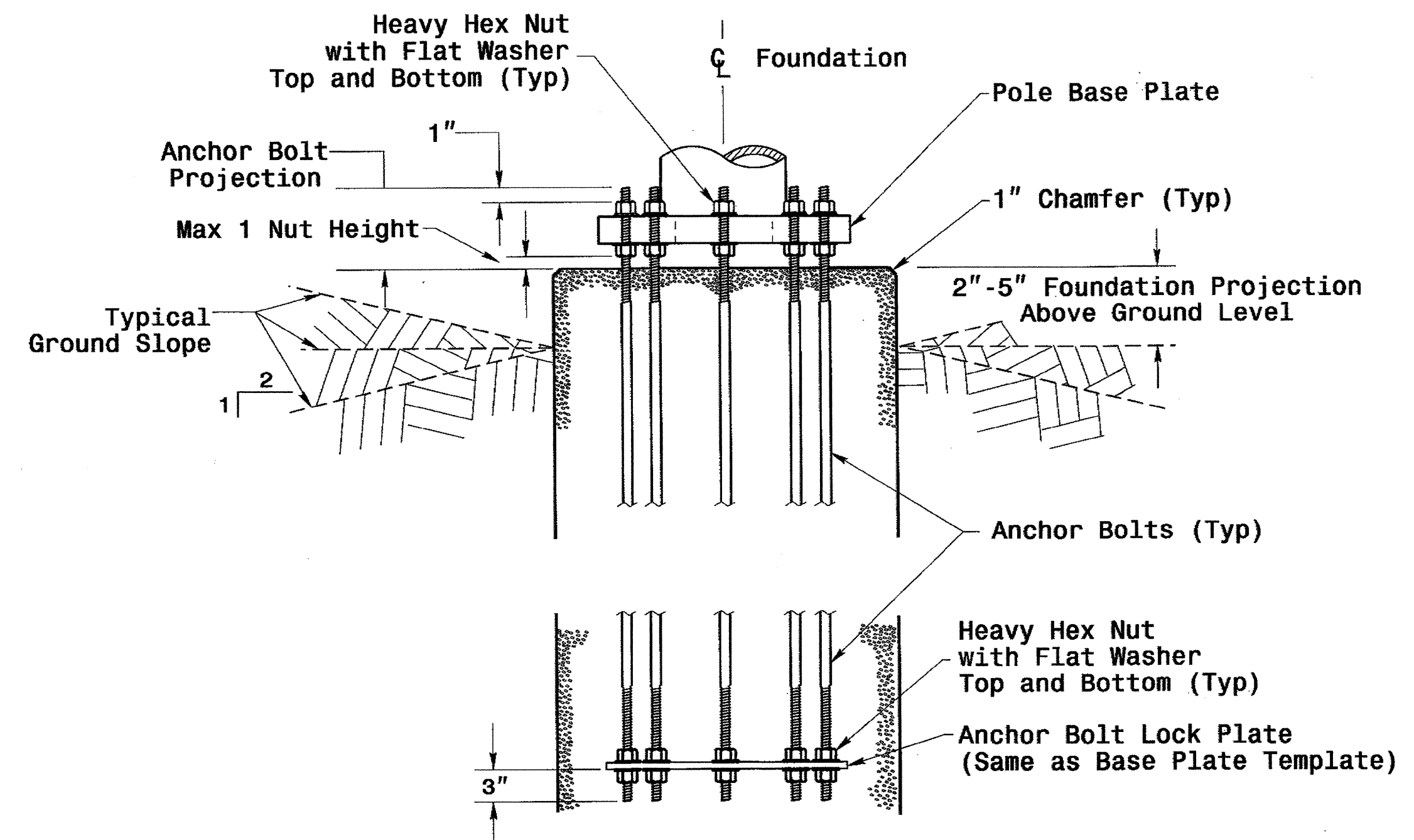


Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
48"	.465 x L	V1	***	#8	STR.	**
		C	*	#4	CIR.	12'-6"

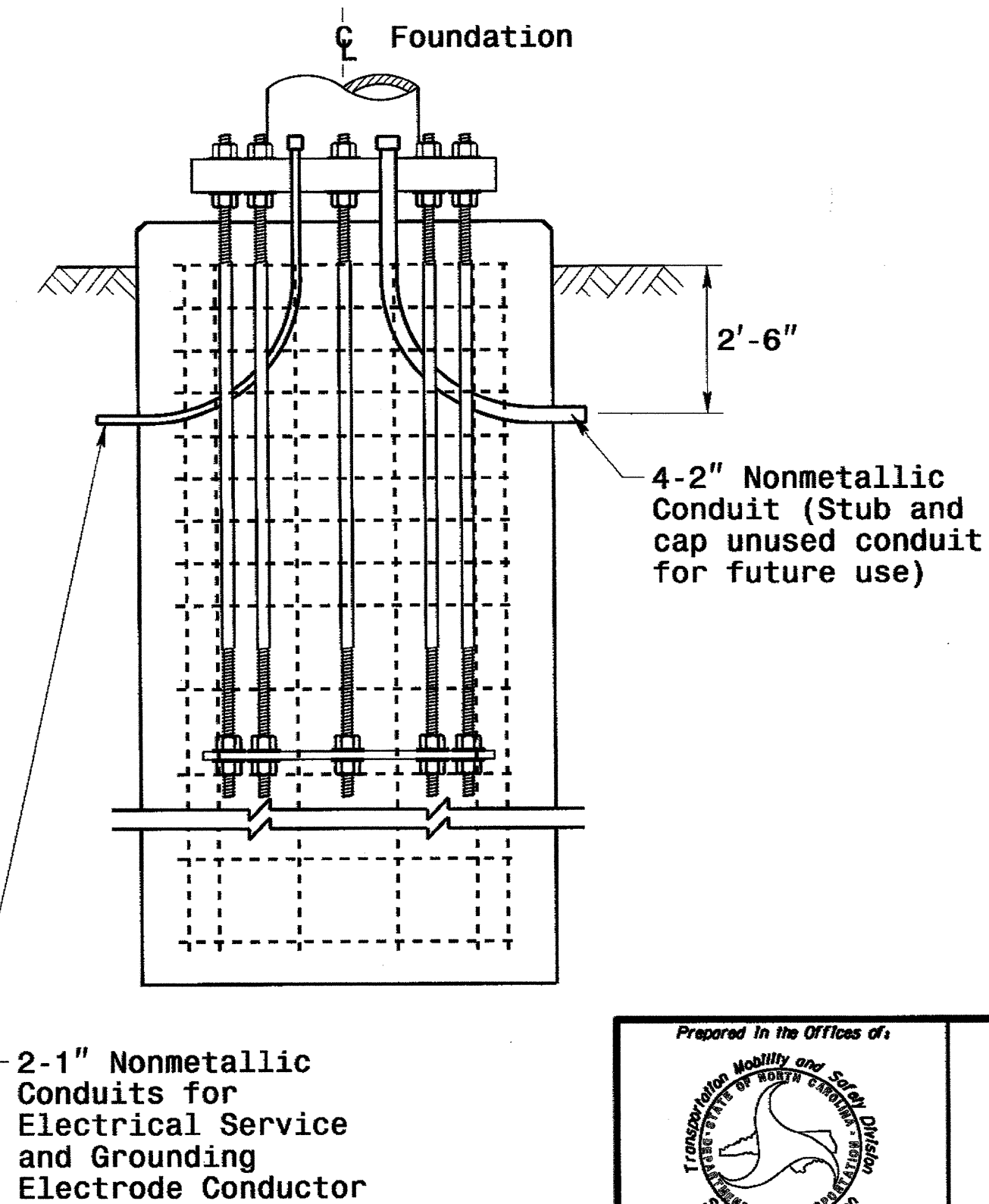
\* See Note No. 1  
 \*\* See Note No. 3  
 \*\*\* See Note No. 4

## Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



## Typical Foundation Conduit Details



## Notes

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

PROJECT REFERENCE NO. U-3331  
 SHEET NO. Sig. 28  
 M 7

Construction Details - Foundations

30-AN-2014 16149 S:\TS&S\175 S1\Drawings\Structure\Drawings\2012 Standard Strain Pole Design\2012 All Foundation Fabrication Details (2).dgn

	Construction Details Foundations		SEAL
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING REVISIONS:	DESIGNED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR DATE:	SIGNATURE: <i>D. Sarkar</i> DATE: 2.7.2014 SIG. INVENTORY NO.



# SATURATED SOIL CONDITION

PROJECT REFERENCE NO. U-3331	SHEET NO. Sig 29 M 8
---------------------------------	----------------------------

		STANDARD STRAIN POLES						STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) - Feet						Reinforcement				
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base			Clay				Sand		Longitudinal		Stirrups		
					Axial (kip)	Shear (kip)	Moment (ft-kip)	Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30	Bar Size (#)	Quantity	Bar Size (#)	Spacing (in.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	19	13	9	8	17	14.5	12.5	8	13	4	12
		S30L3	30	25	2	11	300	20	13.5	9	8	17.5	15	13	8	14	4	12
		S35L3	35	25	3	11	320	20	13.5	9.5	8	17.5	15	13	8	15	4	12
	HEAVY	S30H3	30	29	3	16	450	24.5	17	13	11	21	17.5	15	8	18	4	12
		S35H3	35	29	4	16	515	26	17.5	12	8.5	22	18.5	16	8	20	4	12
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	18	12.5	8.5	8	16.5	14	12	8	13	4	12
		S30L2	30	23	2	10	270	19	12.5	9	8	16.5	14	12.5	8	13	4	12
		S35L2	35	23	3	10	300	19.5	13	9	8	17	14.5	13	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	25.5	15.5	11	8	20	17	14.5	8	17	4	12
		S35H2	35	29	4	15	475	25	16.5	11.5	8	21	17.5	15.5	8	19	4	12
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	18	12.5	8.5	8	16.5	14	12	8	13	4	12
		S30L2	30	23	2	10	270	19	12.5	9	8	16.5	14	12.5	8	13	4	12
		S35L2	35	23	3	10	300	19.5	13	9	8	17	14.5	13	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	25.5	15.5	11	8	20	17	14.5	8	17	4	12
		S35H2	35	29	4	15	475	25	16.5	11.5	8	21	17.5	15.5	8	19	4	12
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	16	11	8	8	15	12.5	11	8	12	4	12
		S30L1	30	22	2	8	205	16.5	11.5	8	8	15	13	11.5	8	12	4	12
		S35L1	35	22	3	8	230	17	12	8	8	15.5	13.5	11.5	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	20.5	14	9.5	8	18	15	13.5	8	15	4	12
		S35H1	35	25	4	12	350	21	14.5	10	8	18.5	15.5	13.5	8	16	4	12
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	18	12.5	8.5	8	16.5	14	12	8	13	4	12
		S30L2	30	23	2	10	270	19	12.5	9	8	16.5	14	12.5	8	13	4	12
		S35L2	35	23	3	10	300	19.5	13	9	8	17	14.5	13	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	25.5	15.5	11	8	20	17	14.5	8	17	4	12
		S35H2	35	29	4	15	475	25	16.5	11.5	8	21	17.5	15.5	8	19	4	12

### Fabrication Design Notes:

- Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
- Min. base plate thickness (T) is 2.0 inches.

### Foundation Selection:

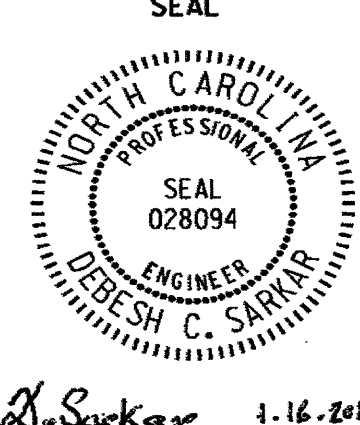
- Perform a standard penetration test at each proposed foundation site to determine "N" value.
- Select the appropriate wind zone from M 1 drawing.
- Select the soil type (Clay or Sand) that best describes the soil characteristics.
- Get the appropriate standard pole case number from the plans or from the Engineer.
- Select the appropriate column in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case.  
The foundation depth is the value where the column and the row intersect.
- Reference Drilled Shafts: Construction Procedures and Design Methods, FHWA -IF-99-025

- S30H1 - Hard Clay-Stirrup Spacing: 6 in. c/c
- S30H2 - Hard Clay-Stirrup Spacing: 6 in. c/c
- S30H3 - Hard Clay-Stirrup Spacing: 6 in. c/c
- Dense Sand-Stirrup Spacing: 6 in. c/c
- S35H1 - Hard Clay - Stirrup Spacing: 6 in. c/c
- S35H2 - Very Stiff Clay-Stirrup Spacing: 6 in. c/c
- Hard Clay- Stirrup Spacing: 6 in. c/c
- Dense Sand- Stirrup Spacing: 6 in. c/c
- S35H3 - Very Stiff Clay-Stirrup Spacing: 6 in. c/c
- Dense Sand-Stirrup Spacing: 6 in. c/c

48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Foundation Depth

**Standard Strain Pole Foundation-Saturated Soil Condition**

19-JAN-2014 08:31 C:\Users\NLS\Sig\p\sig\groups\structures\drawings\2012 Standard Strain Pole Design\2012 MS\_Saturated1.dwg

	<p><b>Standard Strain Pole Foundation for Saturated Soil Condition</b></p> <p>PLAN DATE: SEPTEMBER 2013    DESIGNED BY: C.B COGDWELL</p> <p>PREPARED BY: N. BITTING    REVIEWED BY: D. SARKAR</p>	<p>SCALE</p> <p>0 NA</p> <p>None</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				
REVISIONS	INIT.	DATE						
	<p><i>N. Sarkar</i>    1-16-2014</p> <p>SIGNATURE    DATE</p>							



# DRY SOIL CONDITION

PROJECT REFERENCE NO.	SHEET NO.
U-3331	Sig.30 M 9

		STANDARD STRAIN POLES						STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) - Feet						Reinforcement				
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base			Clay				Sand		Longitudinal		Stirrups		
					Axial (kip)	Shear (kip)	Moment (ft-kip)	Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30	Bar Size (#)	Quantity	Bar Size (#)	Spacing (in.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	18	12.5	9	8	14.5	11	10	8	13	4	12
		S30L3	30	25	2	11	300	18.5	13	9	8	15	11.5	10	8	14	4	12
		S35L3	35	25	3	11	320	19	13.5	9.5	8	15	11.5	10.5	8	15	4	12
	HEAVY	S30H3	30	29	3	16	450	23	16	11	8	17.5	13.5	11.5	8	18	4	12
		S35H3	35	29	4	16	515	24.5	16.5	12	8.5	18.5	14	12	8	20	4	12
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	17	12	8.5	8	14	11	9.5	8	13	4	12
		S30L2	30	23	2	10	270	18	12.5	8.5	8	14.5	11	10	8	13	4	12
		S35L2	35	23	3	10	300	18.5	13	9	8	14.5	11.5	10	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	22	15	10.5	8	17	13	11.5	8	17	4	12
		S35H2	35	29	4	15	475	23.5	16	11.5	8	18	13.5	12	8	19	4	12
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	17	12	8.5	8	14	11	9.5	8	13	4	12
		S30L2	30	23	2	10	270	18	12.5	8.5	8	14.5	11	10	8	13	4	12
		S35L2	35	23	3	10	300	18.5	13	9	8	14.5	11.5	10	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	22	15	10.5	8	17	13	11.5	8	17	4	12
		S35H2	35	29	4	15	475	23.5	16	11.5	8	18	13.5	12	8	19	4	12
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	15.5	10.5	8	8	13	10	9	8	12	4	12
		S30L1	30	22	2	8	205	15.5	11	8	8	13	10	9	8	12	4	12
		S35L1	35	22	3	8	230	16.5	11.5	8	8	13.5	10.5	9	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	19.5	13.5	9.5	8	15	12	10.5	8	15	4	12
		S35H1	35	25	4	12	350	20	14	10	8	15.5	12	10.5	8	15	4	12
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	17	12	8.5	8	14	11	9.5	8	13	4	12
		S30L2	30	23	2	10	270	18	12.5	8.5	8	14.5	11	10	8	13	4	12
		S35L2	35	23	3	10	300	18.5	13	9	8	14.5	11.5	10	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	22	15	10.5	8	17	13	11.5	8	17	4	12
		S35H2	35	29	4	15	475	23.5	16	11.5	8	18	13.5	12	8	19	4	12

### Fabrication Design Notes:

- Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
- Min. base plate thickness (T) is 2.0 inches.

### Foundation Selection:


- Perform a standard penetration test at each proposed foundation site to determine "N" value.
- Select the appropriate wind zone from M 1 drawing.
- Select the soil type (Clay or Sand) that best describes the soil characteristics.
- Get the appropriate standard pole case number from the plans or from the Engineer.
- Select the appropriate column in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case. The foundation depth is the value where the column and the row intersect.
- Reference Drilled Shafts: Construction Procedures and Design Methods, FHWA -IF-99-025

- S30H1 - Hard Clay-Stirrup Spacing: 6 in. c/c  
 - Dense Sand-Stirrup Spacing: 6 in. c/c
- S30H2 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c  
 - Hard Clay: Stirrup Spacing: 6 in. c/c  
 - Medium Clay: Stirrup Spacing: 6 in. c/c  
 - Dense Sand: Stirrup Spacing: 6 in. c/c
- S30H3 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c  
 - Hard Clay: Stirrup Spacing: 6 in. c/c  
 - Medium Clay: Stirrup Spacing: 6 in. c/c  
 - Dense Sand: Stirrup Spacing: 6 in. c/c
- S35H1 - Hard Clay: tirror Spacing: 6 in. c/c  
 - Dense Sand: Stirrup Spacing: 6 in. c/c
- S35H2 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c  
 - Hard Clay: Stirrup Spacing: 6 in. c/c  
 - Medium Clay: Stirrup Spacing: 6 in. c/c  
 - Dense Sand: Stirrup Spacing: 6 in. c/c
- S35H3 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c  
 - Hard Clay: Stirrup Spacing: 6 in. c/c  
 - Medium Clay: Stirrup Spacing: 6 in. c/c  
 - Dense Sand: Stirrup Spacing: 6 in. c/c

**Standard Strain Pole Foundation-Dry Soil Condition**

48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Foundation Depth

15-1114-2014\_09\_12  
 S:\Projects\2014\15-1114\15-1114.dwg  
 Standard Strain Pole Design 2012 MB Saturated - MB Dry.dgn  
 02/02/2014

 Prepared in the Office of: TRANSPORTATION MOBILITY AND SAFETY DIVISION NORTH CAROLINA DEPARTMENT OF TRANSPORTATION 750 N. Greenfield Pkwy, Garner, NC 27529	<b>Standard Strain Pole Foundation for Dry Soil Condition</b>		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEEPAK C. SARKAR
	PLAN DATE: SEPTEMBER 2013    DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING    REVIEWED BY: D. SARKAR	REVISIONS:    INIT.    DATE	
SCALE: 0 NA NONE			SIGNATURE: <i>D. SARKAR</i> DATE: 1.16.2014