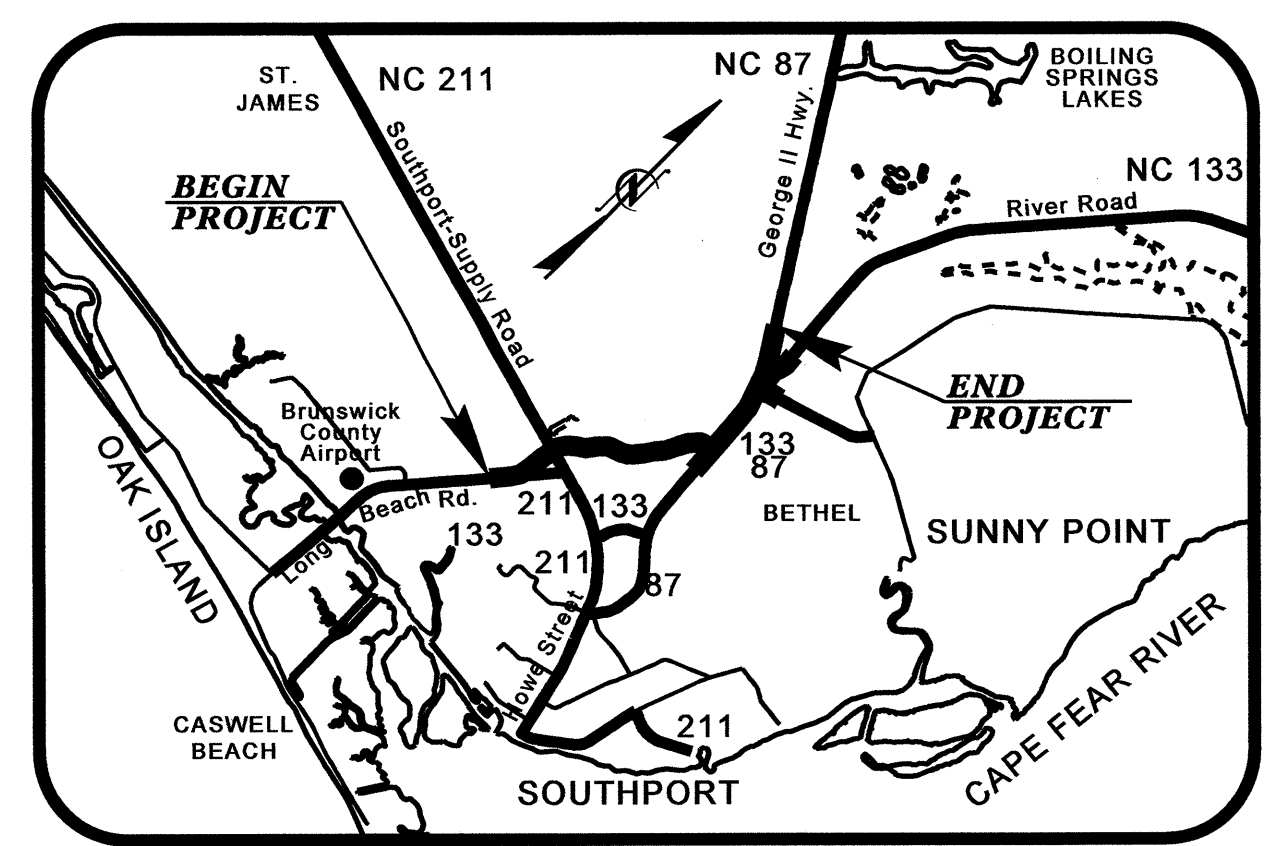
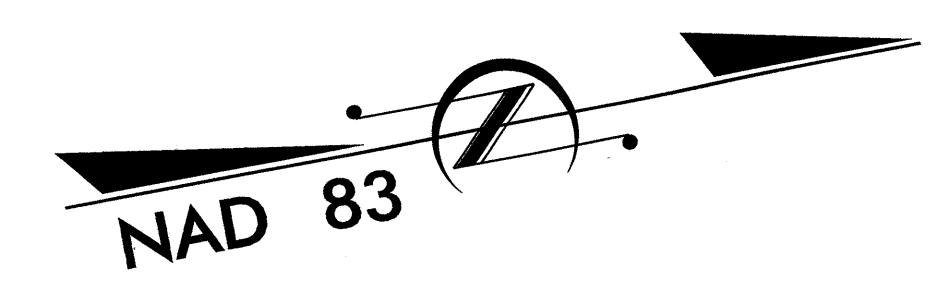


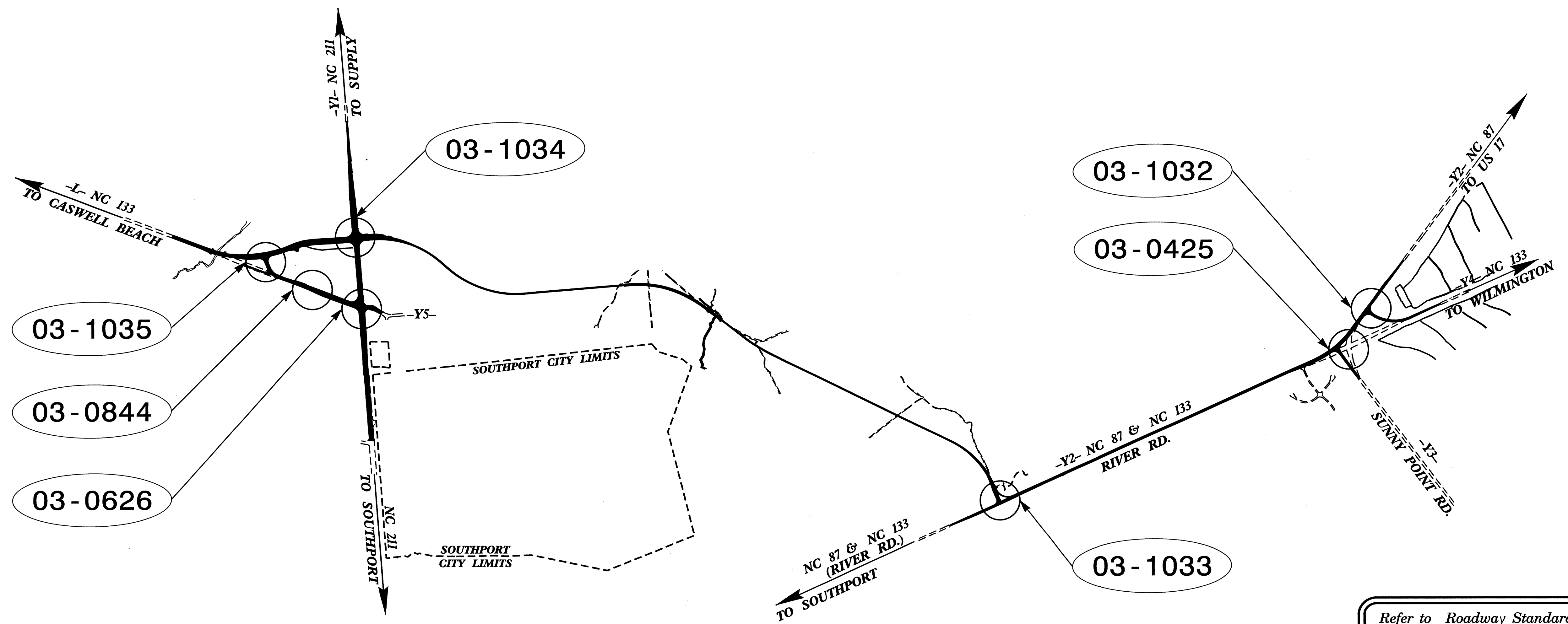
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
BRUNSWICK COUNTY

LOCATION: NEW ROUTE FROM NC 133 (LONG BEACH RD.)
TO NC 133 & NC 87 (RIVER RD.), NORTH OF SOUTHPORT

TYPE OF WORK: TRAFFIC SIGNALS.



TIP: R-3324



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. 2-5	03-1035	New NC 133 at Old NC 133 (Long Beach Road)
Sig. 6-9	03-1034	NC 211 (Southport-Supply Road) at New NC 133
Sig. 10-21	03-0626	NC 211 (Southport-Supply Road) at NC 133 (Long Beach Road) and Lowe's Entrance
Sig. 22-29	03-0844	Old NC 133 (Long Beach Road) at Live Oak Village Shopping Center
Sig. 30-34	03-1033	NC 87 (River Road)/NC 87-133 (River Road) at New NC 133
Sig. 35-40	03-0425	NC 87/133 & NC 133 at NC 87 & Sunny Point Road
Sig. 41-48	03-1032	NC 87-133 (River Road)/NC 87 (George II Highway) at NC 133 (River Road)
Sig. 49-53	N/A	Standard Drawings for Metal Poles
Sig. 54-58	N/A	Communications Cable and Conduit Routing Plans

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT
Contacts:
Jason P. Galloway, PE - Eastern Region Signals Project Engineer
George C. Brown., PE - Signal Equipment Design Engineer
Greg Fuller, PE - State ITS and Signals Engineer

Prepared In the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY
BRANCH

750 N. Greenfield Parkway, Garner, NC 27529

02-001-2012 1304
P:\TIP\Projects\R3324\Traffic\Signals\Design\Titlesheet\3324_rduj_tsh.dgn
10/10/2012 1:16:16 PM

PHASING DIAGRAM

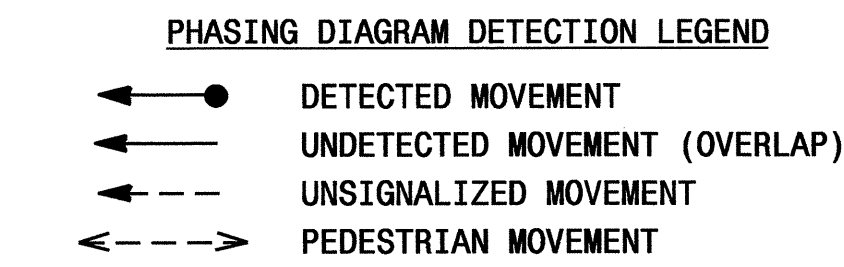
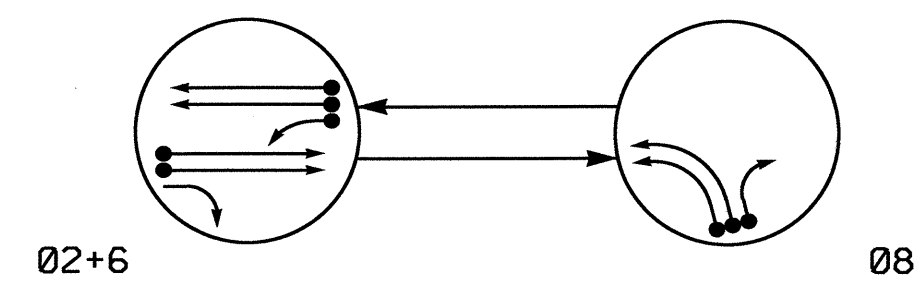
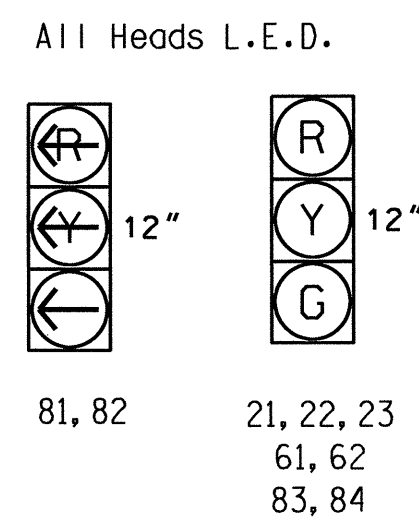


TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	08	FLASH
21, 22, 23	G	R	Y
61, 62	G	R	Y
81, 82	R	R	R
83, 84	R	G	R

SIGNAL FACE I.D.



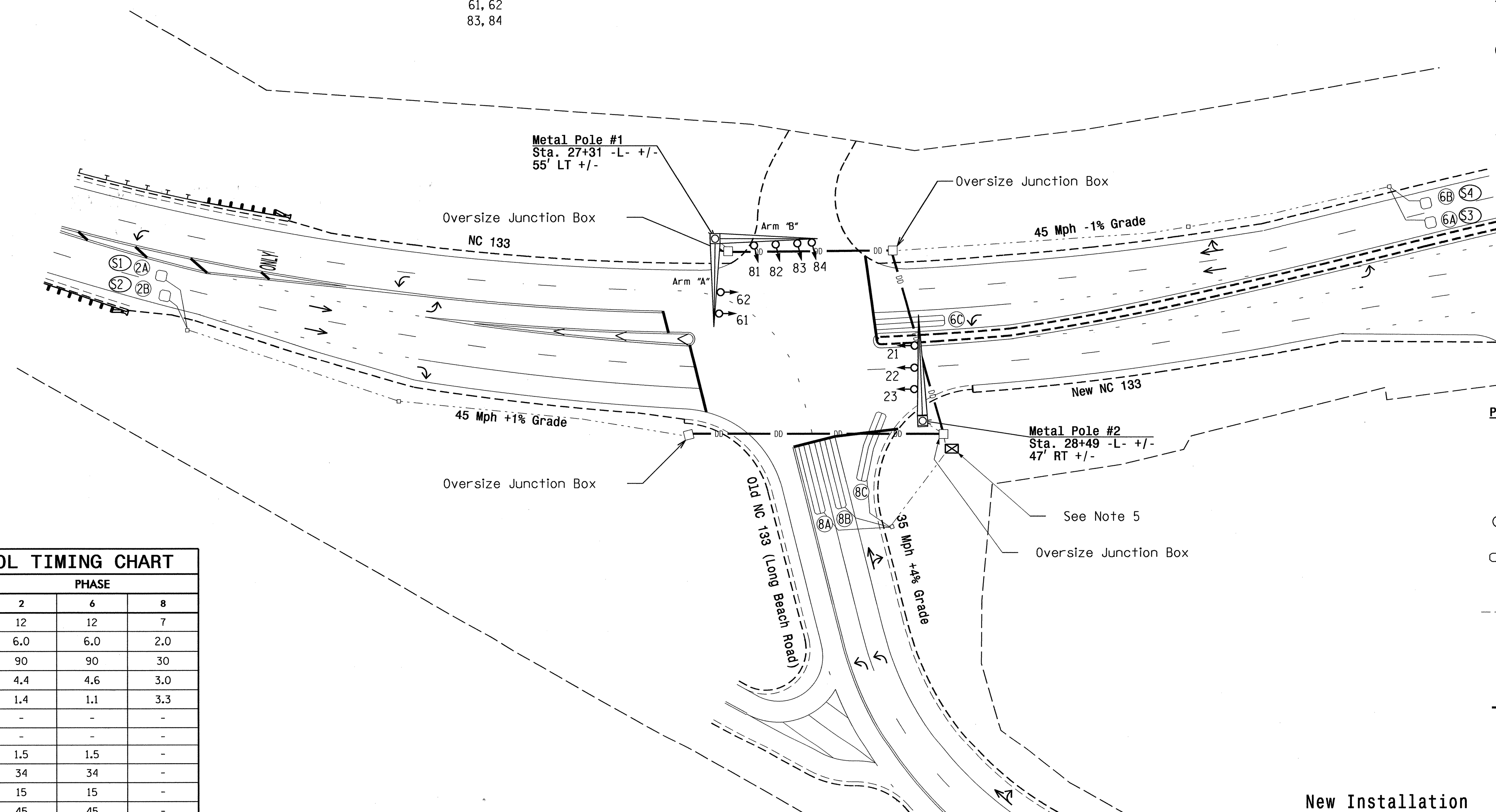
OASIS 2070L LOOP & DETECTOR INSTALLATION

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/S1	6X6	300	4	Y	2	Y	Y	---	---	---	Y	Y
2B/S2	6X6	300	4	Y	2	Y	Y	---	---	---	Y	Y
6A/S3	6X6	300	4	Y	6	Y	Y	---	---	---	Y	Y
6B/S4	6X6	300	4	Y	6	Y	Y	---	---	---	Y	Y
6C	6X40	0	2-4-2	Y	6	Y	Y	---	---	3	---	---
8A	6X40	0	2-4-2	Y	8	Y	Y	---	---	3	---	---
8B	6X40	0	2-4-2	Y	8	Y	Y	---	---	---	---	---
8C	6X40	+10	2-4-2	Y	8	Y	Y	---	---	10	---	---

2 Phase Fully Actuated NC 87/133/211 Closed Loop System

NOTES

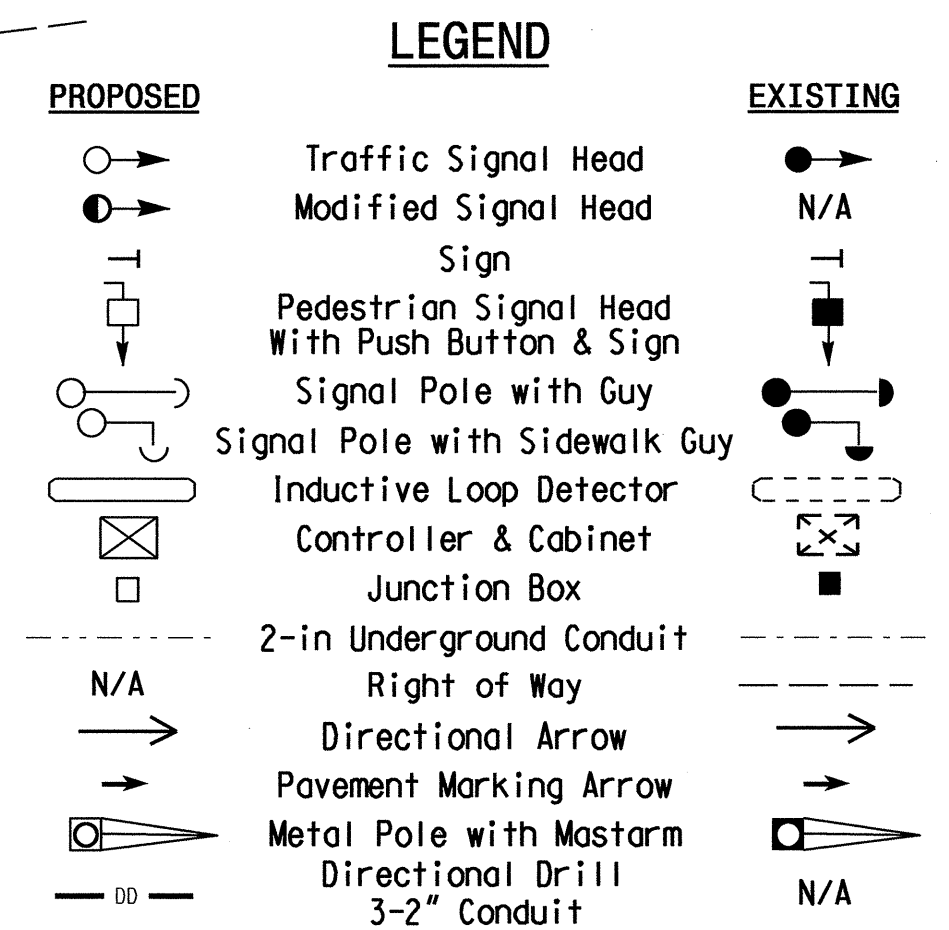
- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Design the cabinet to include an Auxiliary Output file for future use.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1035.



OASIS 2070L TIMING CHART

FEATURE	PHASE		
	2	6	8
Min Green 1 *	12	12	7
Extension 1 *	6.0	6.0	2.0
Max Green 1 *	90	90	30
Yellow Clearance	4.4	4.6	3.0
Red Clearance	1.4	1.1	3.3
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 *	45	45	-
Minimum Gap	3.0	3.0	-
Recall Mode	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	YELLOW	YELLOW	-
Dual Entry	-	-	-
Simultaneous Gap	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.



New Installation

Prepared in the Offices of:
Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION
SIGNAL DESIGN SECTION
 750 N. Greenfield Hwy, Garner, NC 27529

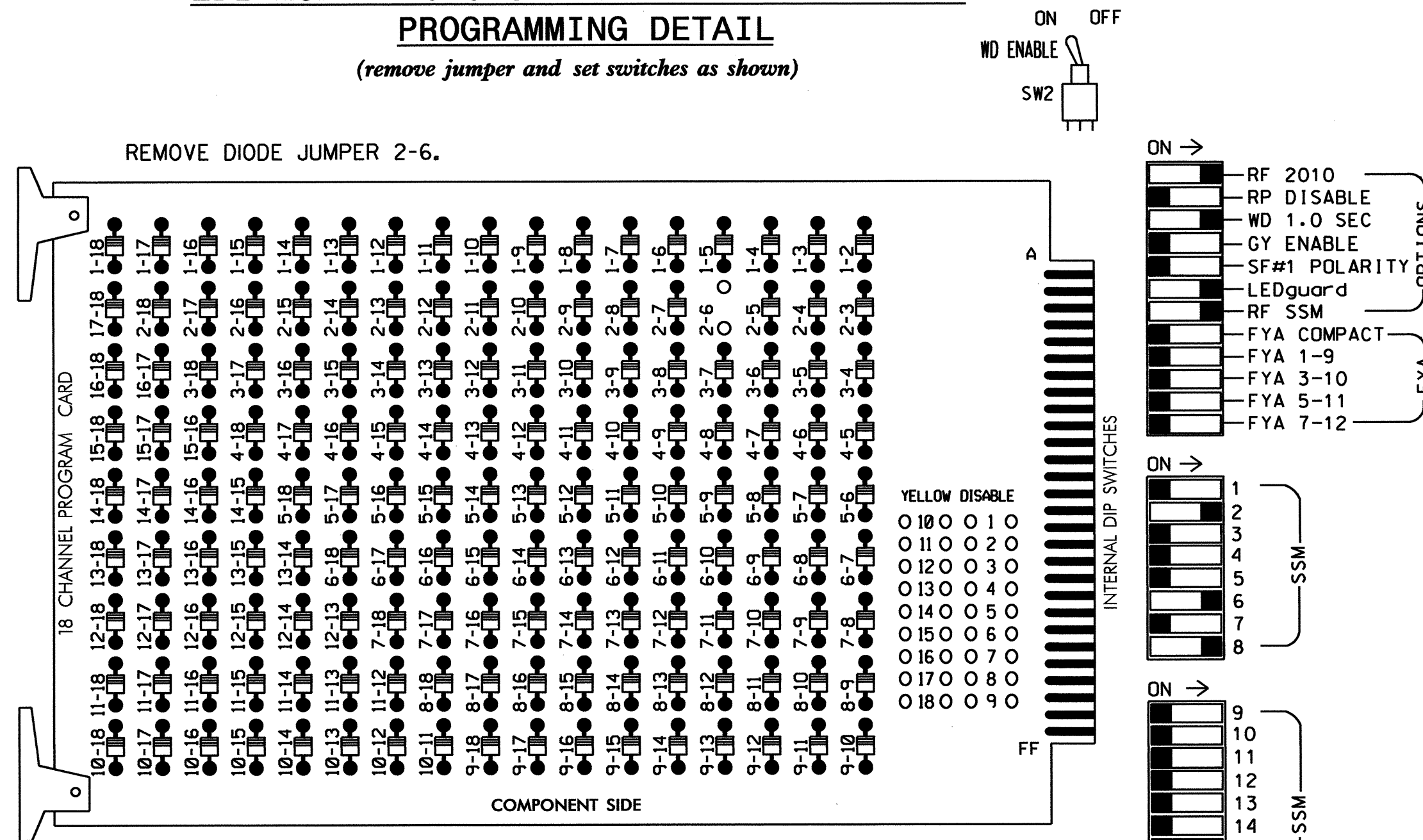
New NC 133 at Old NC 133 (Long Beach Road)

Division 3 Brunswick County Southport
 PLAN DATE: July 2012 REVIEWED BY: J. P. Galloway
 PREPARED BY: IOU/JPG REVIEWED BY:

SCALE: 1" = 40'

SIGNATURE: *J.P. Galloway* DATE: 9/11/12
 SIG. INVENTORY NO. 03-1035

EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL
 (remove jumper 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.
- 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 NC 87/133/211 Closed Loop System.

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.	NU	21, 22, 23	NU	NU	NU	NU	NU	61, 62	NU	NU	81, 82	83, 84	NU	NU	NU	NU	NU	NU
RED		128						134			107							
YELLOW		129						135			108							
GREEN		130						136			109							
RED ARROW											107							
YELLOW ARROW											108							
GREEN ARROW											109							

NU = Not Used

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.....S2,S8,S11
 PHASES USED.....2,6,8
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT
 (front view)

FILE	U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	S	∅2/SYS	S	S	S	S	S	S	S	S	S	S	S	S	FS
	T	2A/S1	T	T	T	T	T	T	T	T	T	T	T	T	DC ISOLATOR
"J"	S	∅6/SYS	∅6	S	S	∅8	∅8	S	S	S	S	S	S	S	S
	T	6A/S3	6C	T	T	∅8	NOT USED	T	T	T	T	T	T	T	ST
"U"	S	∅6/SYS	NOT USED	S	S	∅8	NOT USED	S	S	S	S	S	S	S	S
	T	6B/S4	T	T	T	∅8	NOT USED	T	T	T	T	T	T	T	DC ISOLATOR

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S1	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
6A/S3	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S4	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y	Y		3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			10

INPUT FILE POSITION LEGEND: J2L
 FILE J
 SLOT 2
 LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1035
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

Electrical Detail

Electrical and Programming Details For:

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

New NC 133 at Old NC 133 (Long Beach Road)

Division 3 Brunswick County Southport

PLAN DATE: August 2012 REVIEWED BY: T. J. [Signature]

PREPARED BY: C. Strickland REVIEWED BY: [Signature]

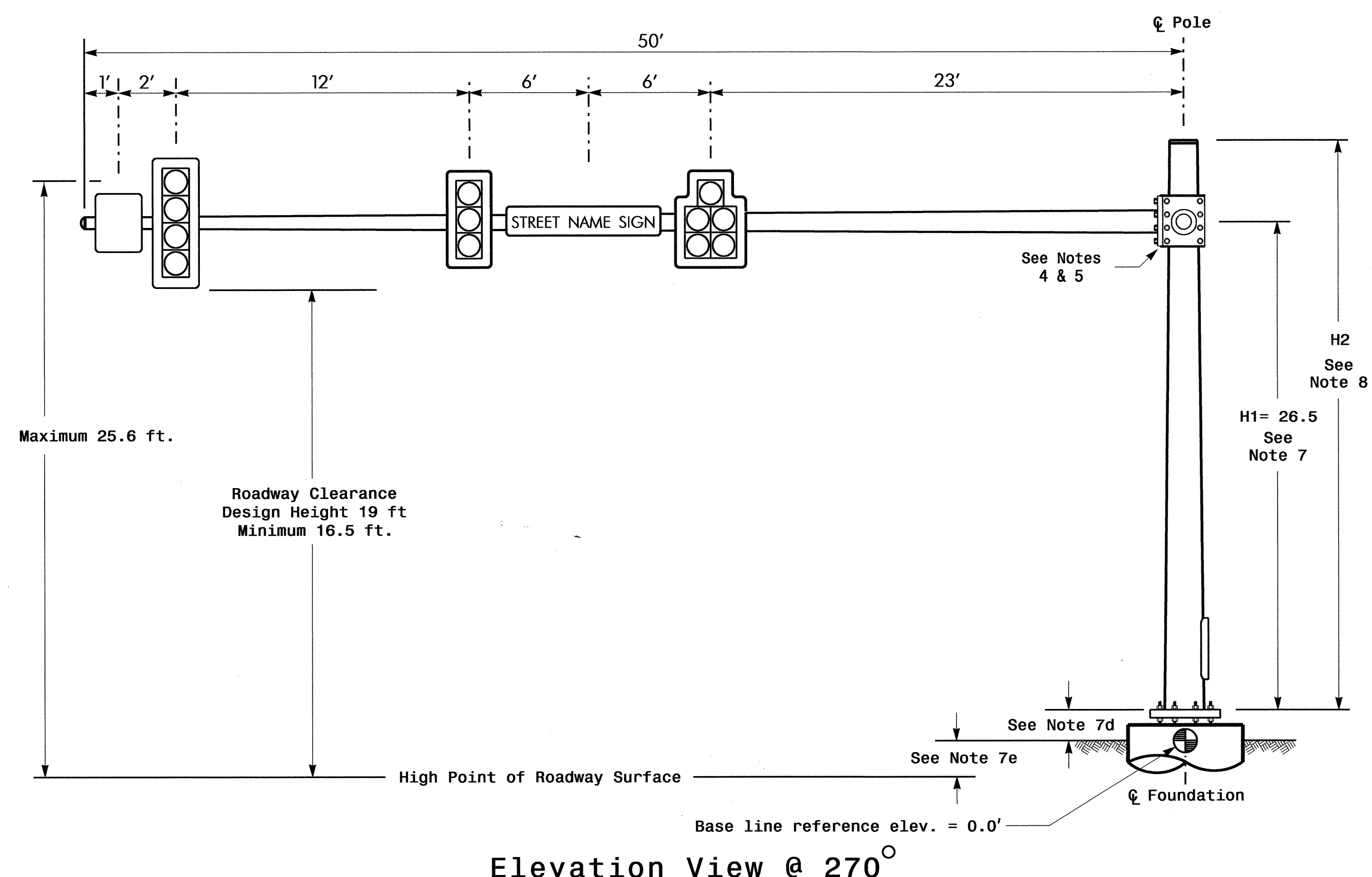
REVISIONS	INIT.	DATE

Signature: *George C. Brown* 9/13/12

SIG. INVENTORY NO. 03-1035

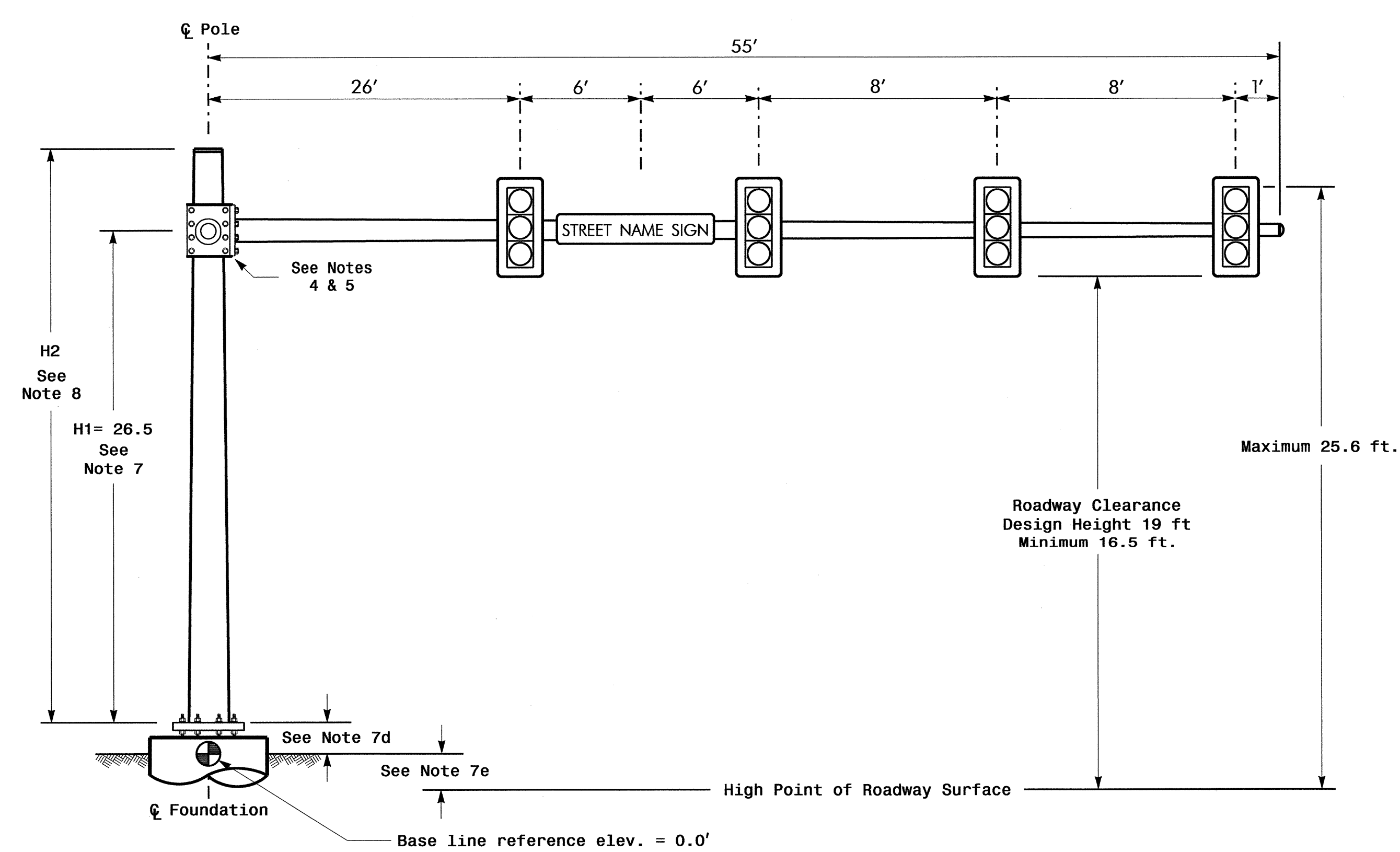
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Design Loading for METAL POLE NO. 1, MAST ARM A



Elevation View @ 270°

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

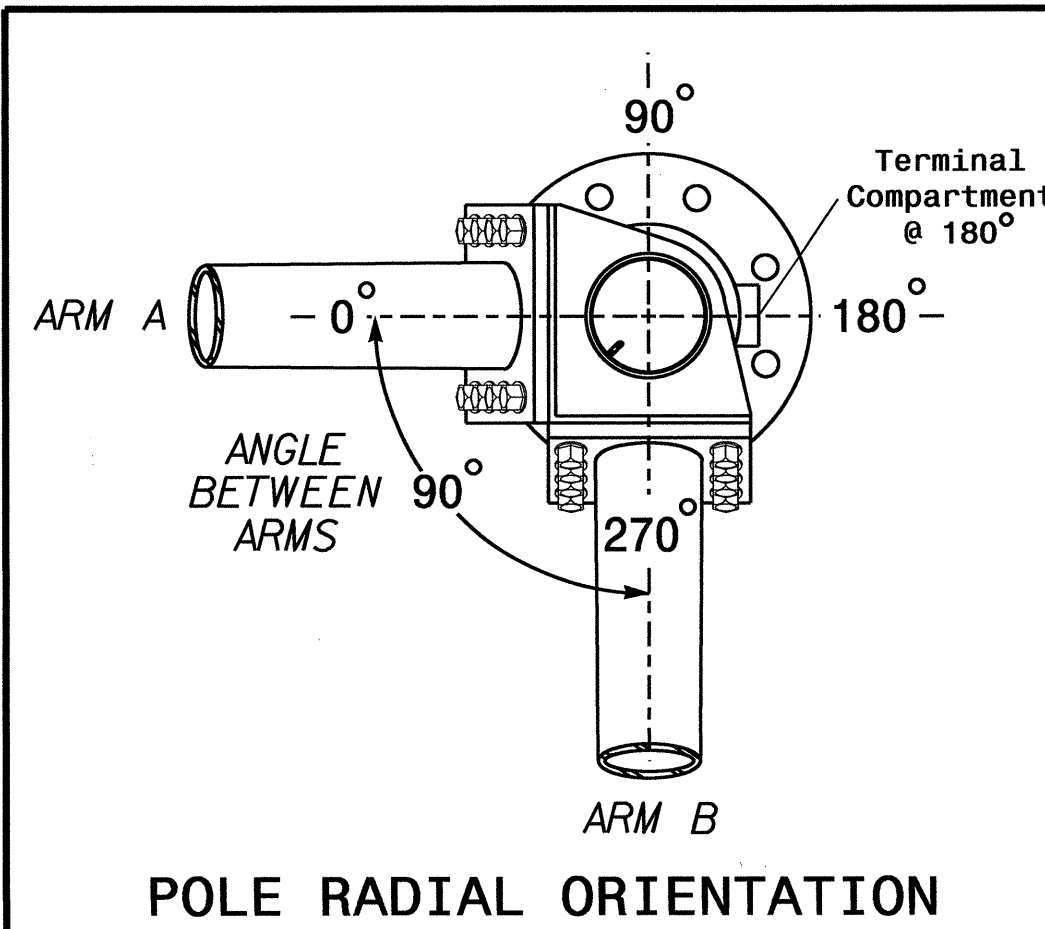


Elevation View @ 0°

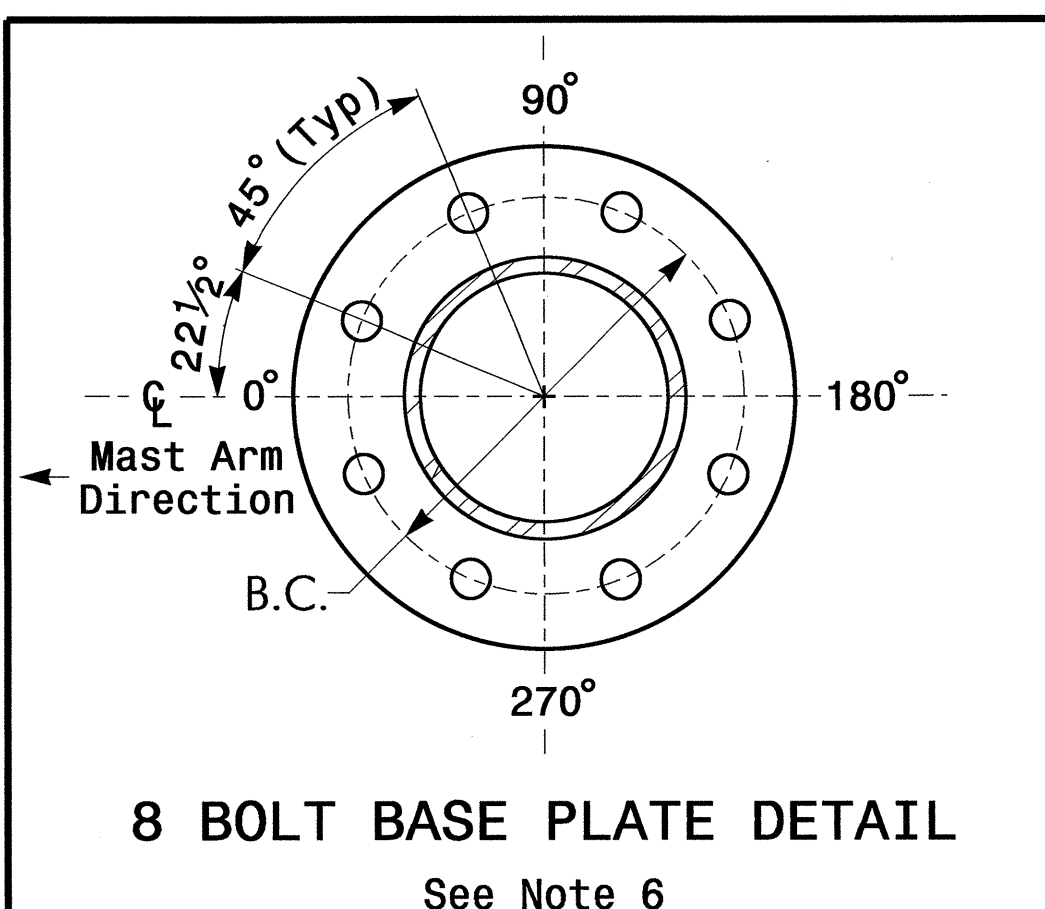
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

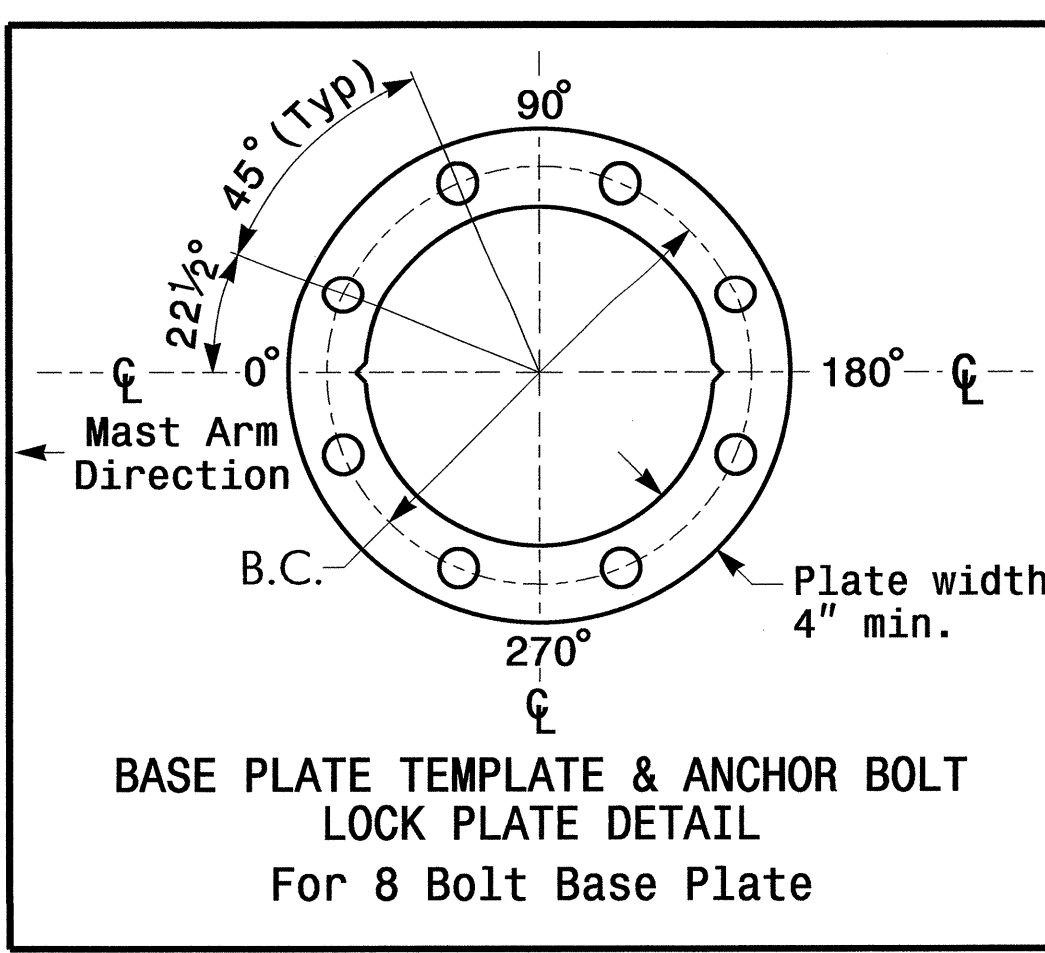
Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+5.4 ft.	N/A
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



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

MAST ARM LOADING SCHEDULE

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

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 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.

Design Requirements

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

NCDOT Wind Zone 2 (130 mph)

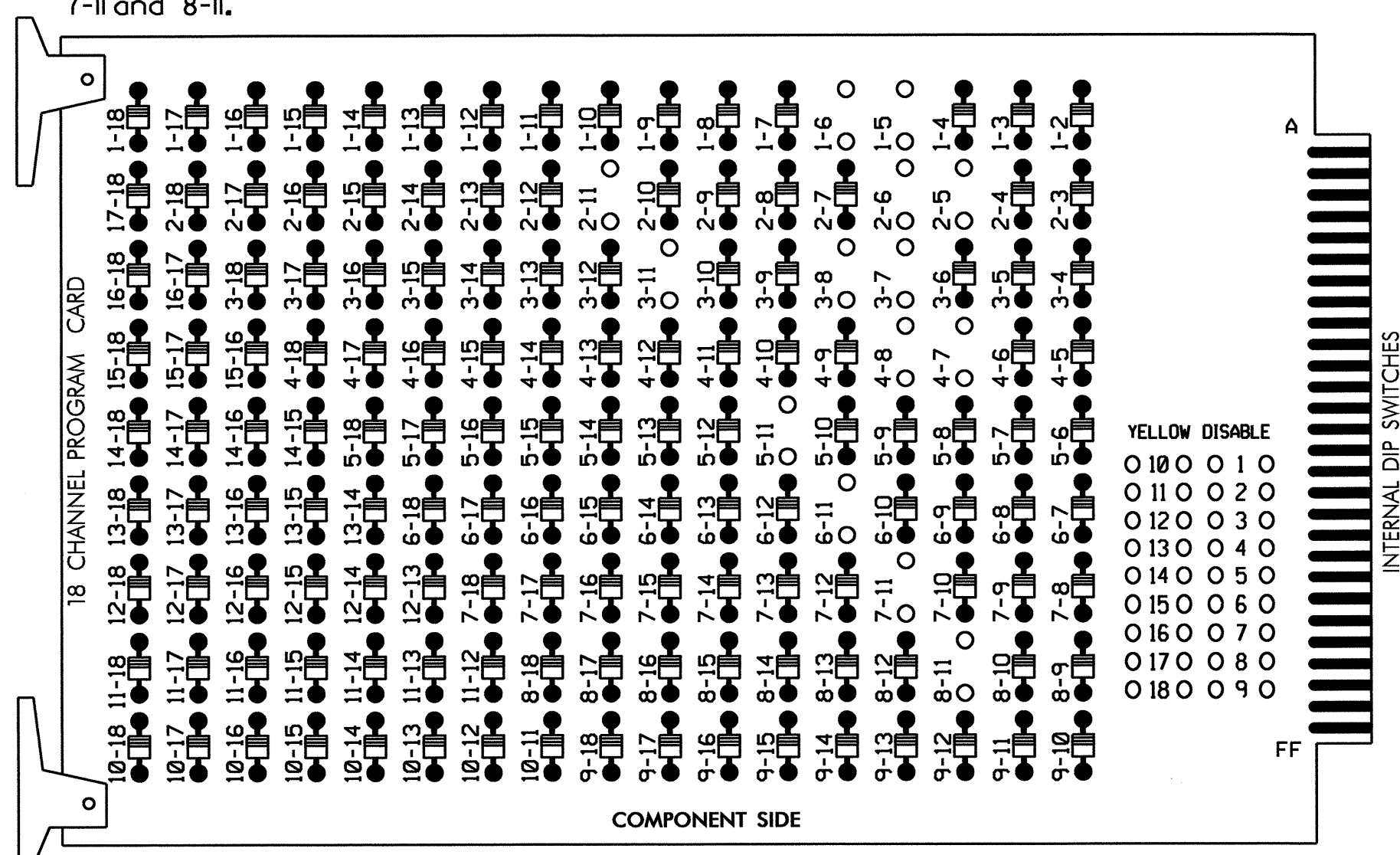
	Prepared in the Offices of New NC 133 at Old NC 133 (Long Beach Road)		SEAL
	Division 3 Brunswick County Southport PLAN DATE: August 2012 PREPARED BY: IOU/JPG SCALE: 0 N/A N/A	REVIEWED BY: J. P. Galloway REVIEWED BY: DATE: 9/4/12	
750 N. Greenfield Pkwy, Garner, NC 27529			SIG. INVENTORY NO. 03-1035

30-AUG-2012 14:08
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**EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)

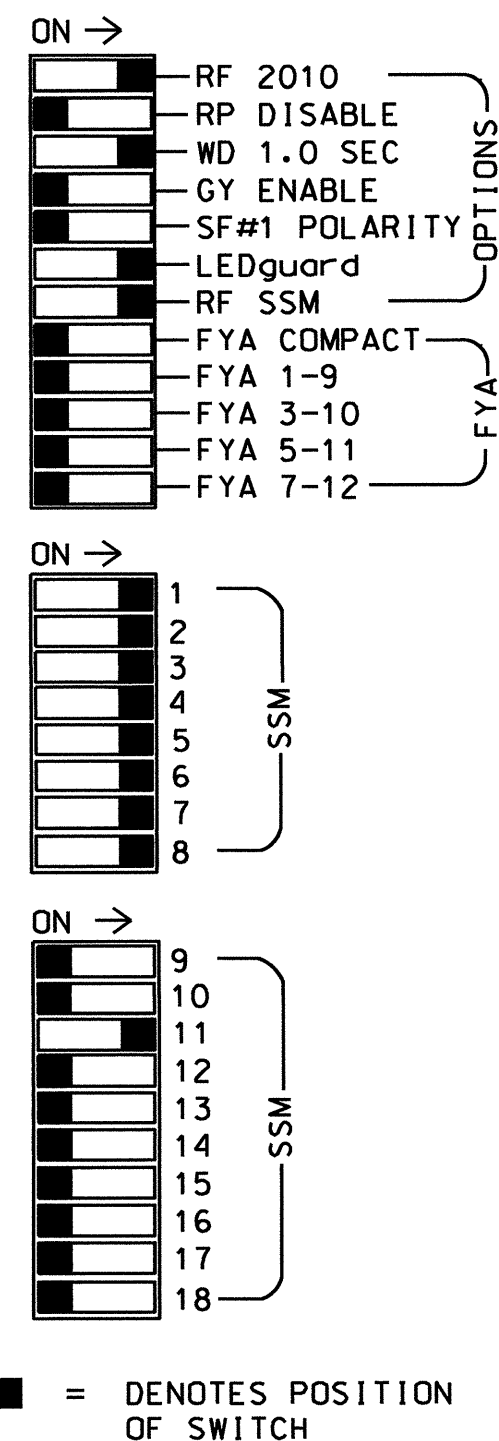
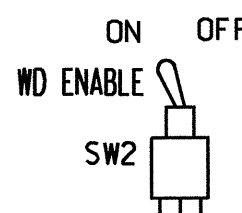
REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 2-11, 3-7, 3-8, 3-11, 4-7, 4-8, 5-11, 6-11, 7-11 and 8-11.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- 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.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and phases 2, 4, 6 and 8 for 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 NC 87/133/211 Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,
 S11,AUX S4
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAP C.....2+3

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	21,22	NU	31,32	41,42	NU	42	51	61,62	NU	62	71	81,82	NU	NU	NU	23,24	NU	NU
RED		128			101				134				107				A114		
YELLOW		129			102				135				108						
GREEN		130			103				136				109						
RED ARROW	125				116				131				122						
YELLOW ARROW	126				117				132	132			123	123					A115
GREEN ARROW	127				118				133	133			124	124					A116

NU = Not Used

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 - 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

OVERLAP PROGRAMMING COMPLETE

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/SYS	S	S	∅ 3	∅ 4/SYS	∅ 4	S	S	S	S	S	S	FS
L	1A	2A/S13	-OF	-OF	3A	4A/S17	4C	-OF	-OF	-OF	-OF	-OF	-OF	DC ISOLATOR
	NOT USED	∅ 2/SYS	∅ 3	∅ 4/SYS	∅ 4	∅ 3	∅ 4/SYS	∅ 4	∅ 3	∅ 4/SYS	∅ 4	∅ 3	∅ 4/SYS	DC ISOLATOR
	2B/S14	∅ 2/SYS	3B	4B/S18	4D	3B	4B/S18	4D	3B	4B/S18	4D	3B	4B/S18	DC ISOLATOR
U	∅ 5	∅ 5	∅ 6/SYS	S	∅ 7	∅ 8/SYS	∅ 8	∅ 8	S	S	S	S	S	S
L	5A	5B	6A/S15	-OF	7A	8A/S19	8C	8E	-OF	-OF	-OF	-OF	-OF	-OF
	NOT USED	NOT USED	∅ 6/SYS	∅ 6/SYS	NOT USED	∅ 8/SYS	∅ 8	NOT USED	∅ 6/SYS	∅ 6/SYS	∅ 6/SYS	∅ 6/SYS	∅ 6/SYS	∅ 6/SYS
	6B/S16	6B/S16	∅ 6/SYS	∅ 6/SYS	8B/S20	8D	NOT USED	NOT USED	∅ 6/SYS	∅ 6/SYS	∅ 6/SYS	∅ 6/SYS	∅ 6/SYS	∅ 6/SYS

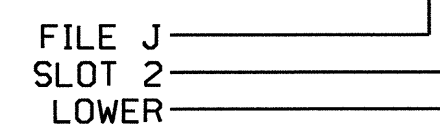
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

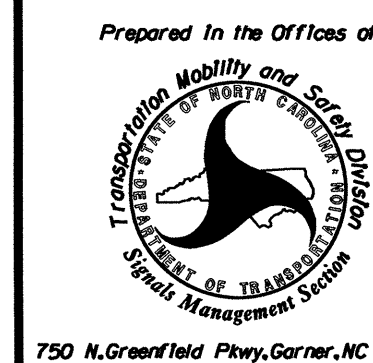
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A/S13	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S14	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-7,8	I5L	58	20	3	3	Y	Y			
4A/S17	TB4-9,10	I6U	41	3	4	4/SYS	Y	Y			
4B/S18	TB4-11,12	I6L	45	7	14	4/SYS	Y	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			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A/S15	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y			
6B/S16	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A/S19	TB5-9,10	J6U	42	4	8	8/SYS	Y	Y			
8B/S20	TB5-11,12	J6L	46	8	18	8/SYS	Y	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
8E	TB7-5,6	J8U	50	12	28	8	Y	Y			15

INPUT FILE POSITION LEGEND: J2L



Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:



750 N. Greenfield Pkwy, Garner, NC 27529

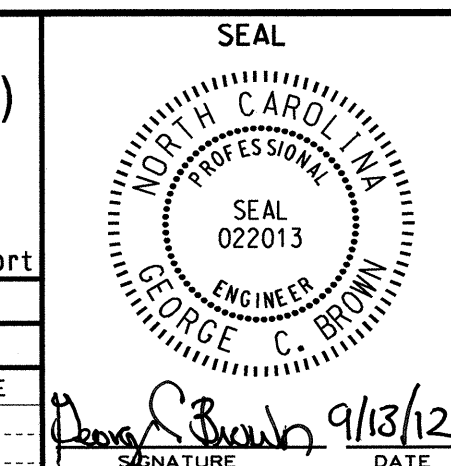
NC 211 (Southport-Supply Road)
 at
 New NC 133

Division 3 Brunswick County Southport

PLAN DATE: August 2012 REVIEWED BY: T. J. J. J.

PREPARED BY: C. Strickland REVIEWED BY:

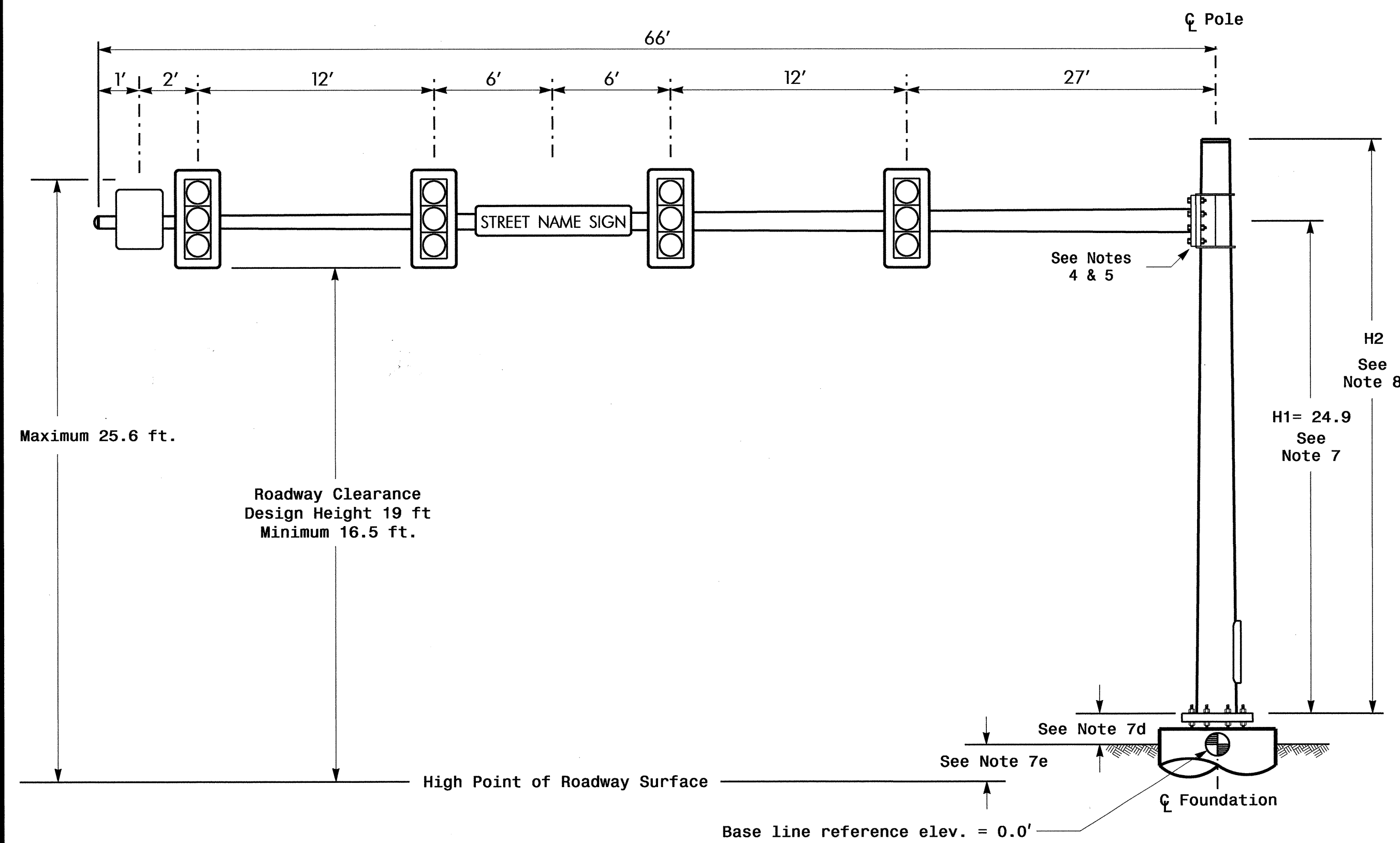
REVISIONS INIT. DATE



SIGNATURE DATE 9/13/12

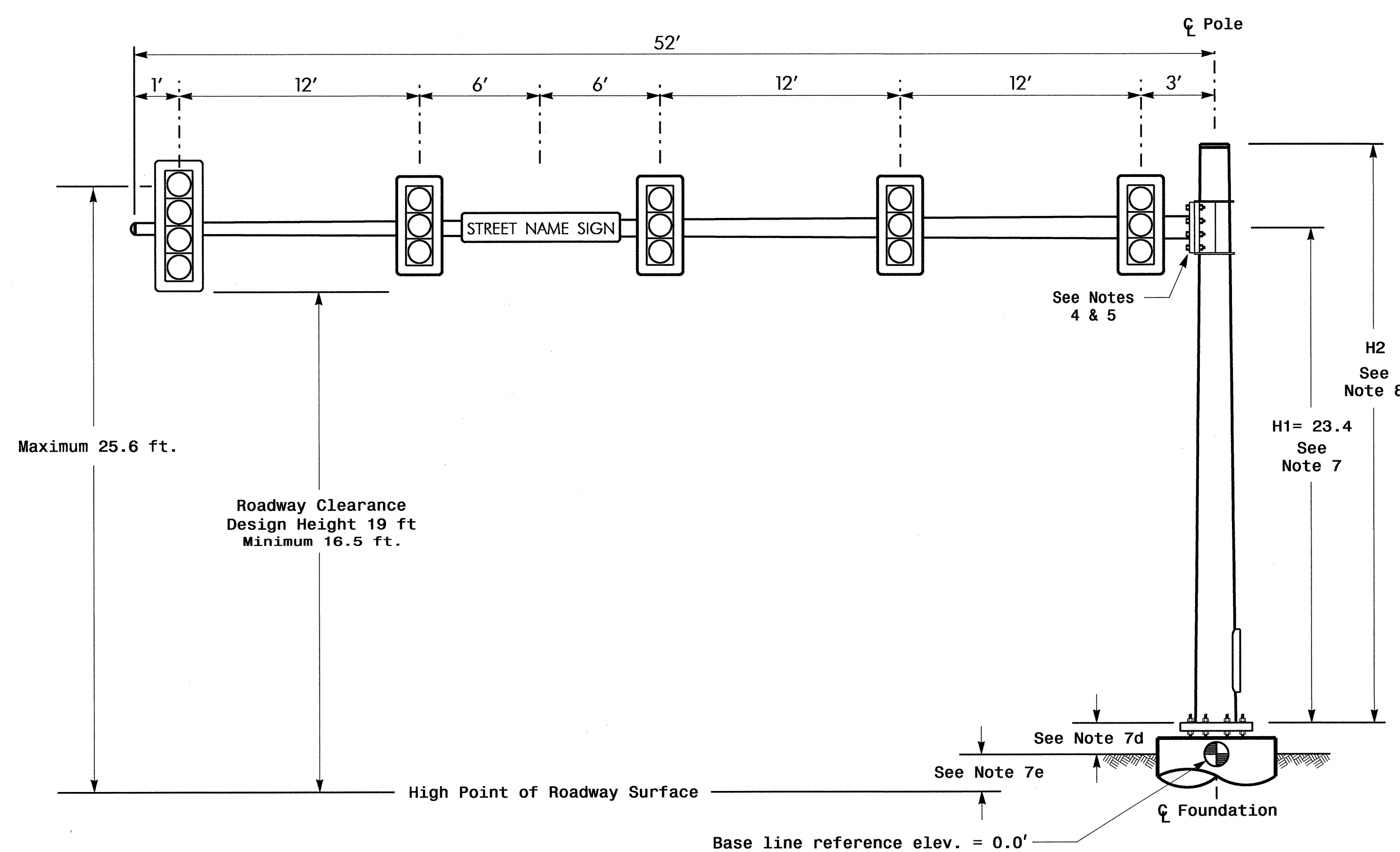
SIG. INVENTORY NO. 03-1034

Design Loading for METAL POLE NO. 5



Elevation View

Design Loading for METAL POLE NO. 6



Elevation View

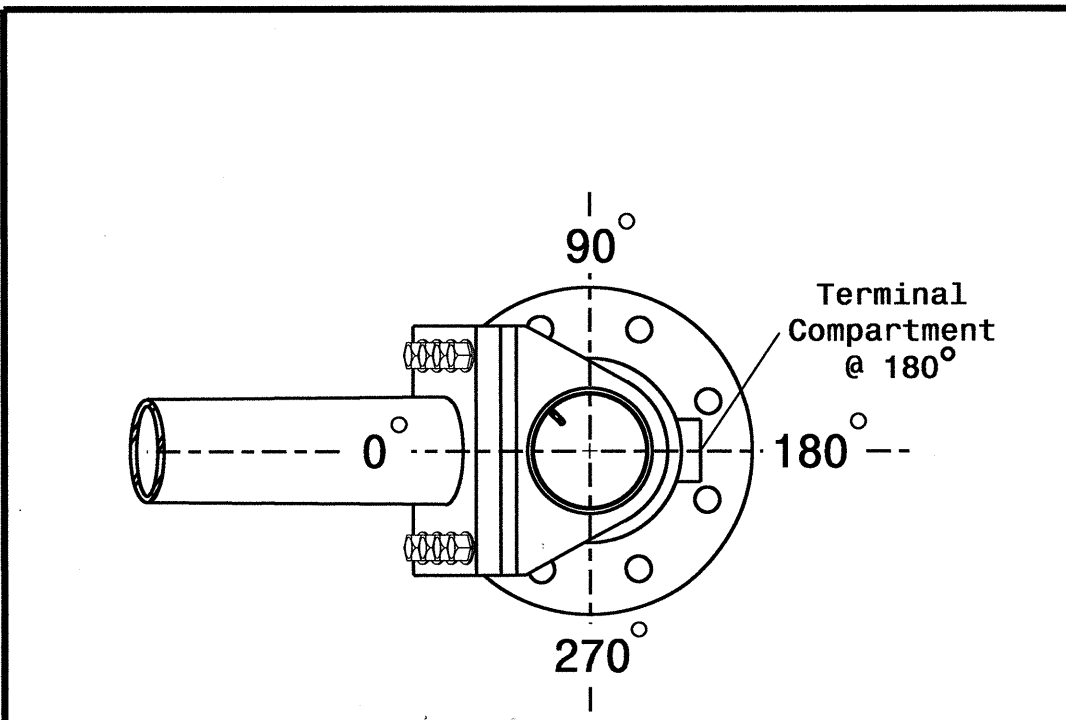
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

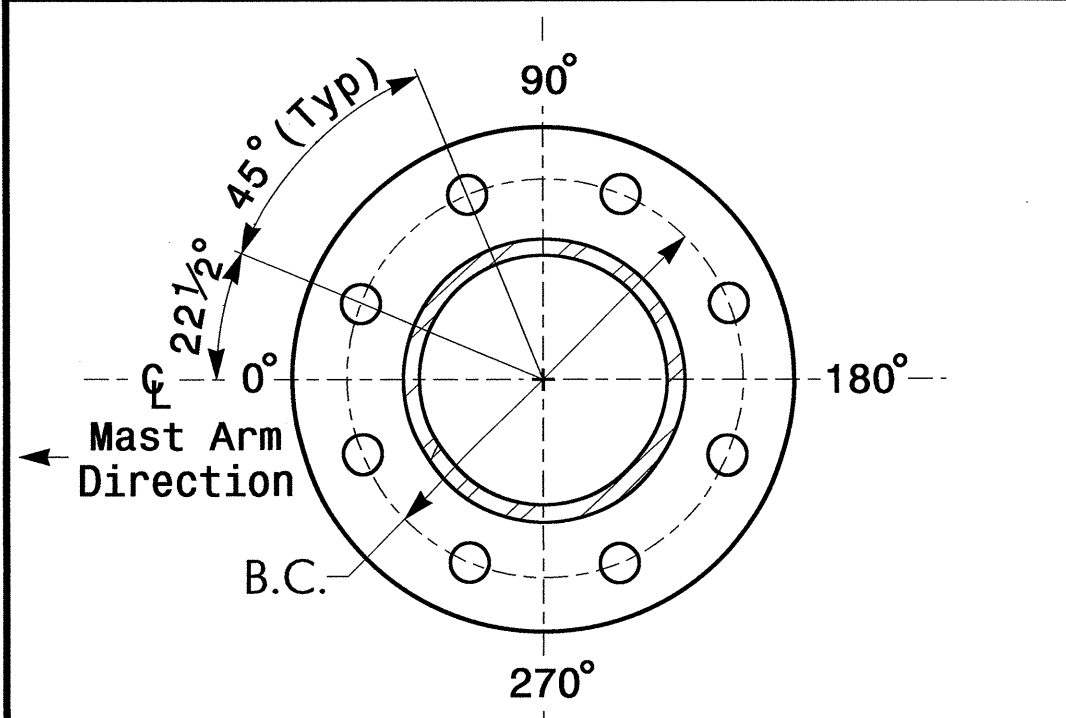
Elevation Differences for:	Pole 5	Pole 6
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+3.9 ft.	+2.4 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

MAST ARM LOADING SCHEDULE

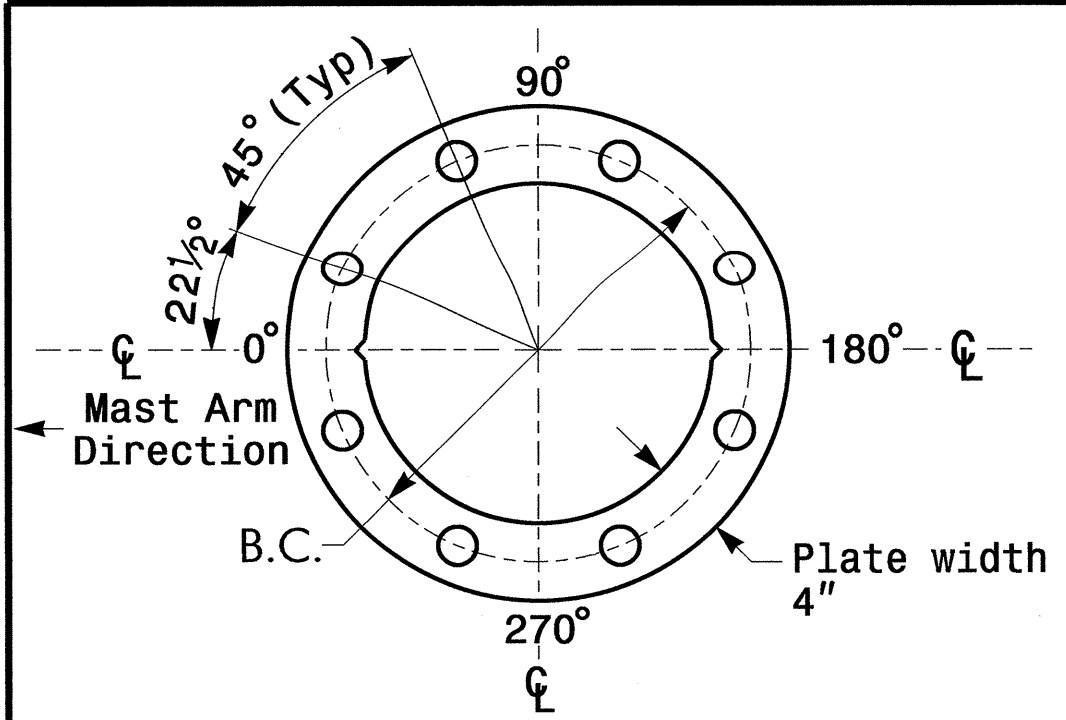
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



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

NOTES

- Design Reference Material**
- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 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.
- Design Requirements**
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
 - Design all signal supports using stress ratios that do not exceed 0.9.
 - The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
 - A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
 - Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
 - The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
 - The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
 - If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
 - The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
 - The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

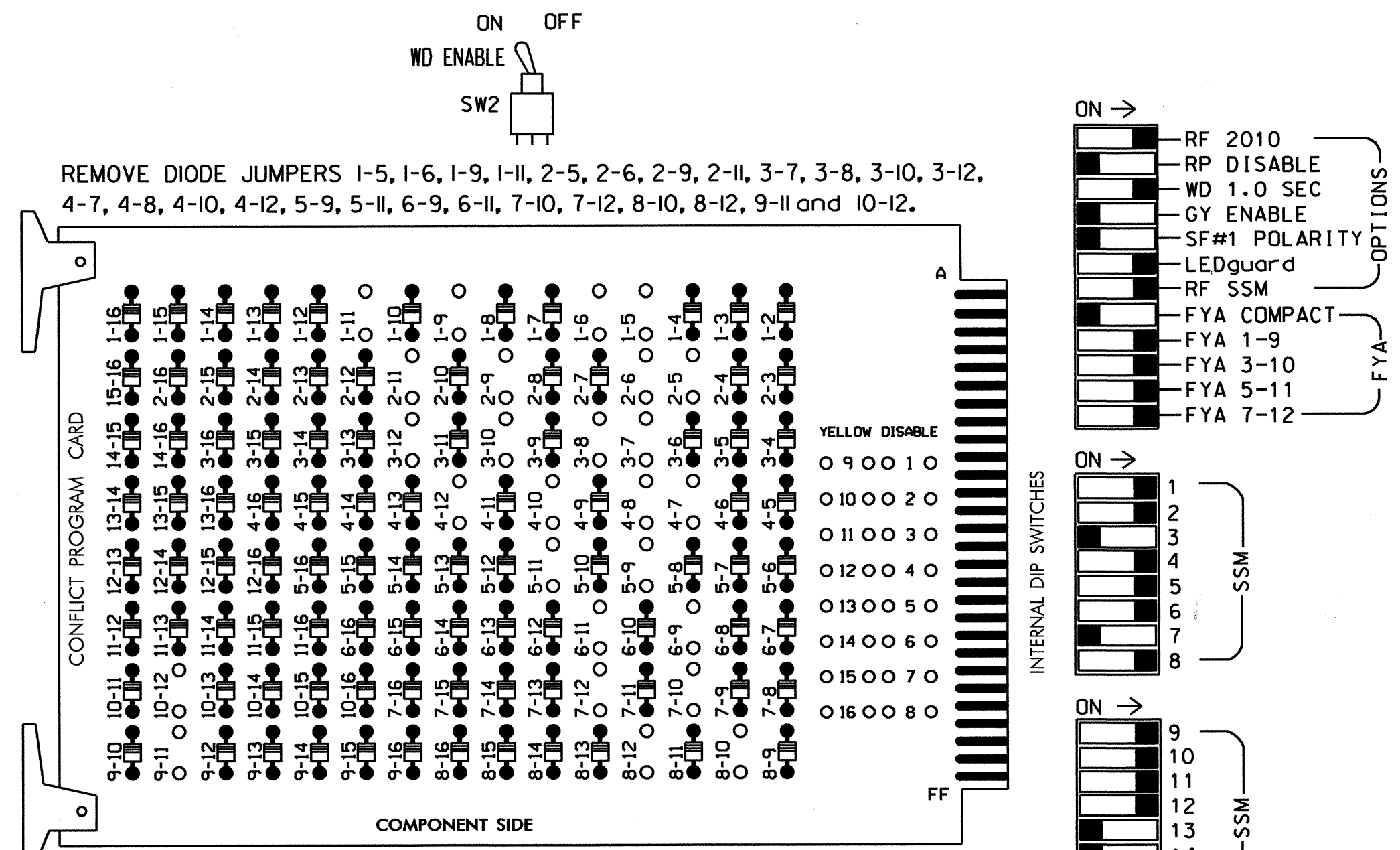
NCDOT Wind Zone 2 (130 mph)

	Prepared In the Offices of: NC 211 (Southport-Supply Road) at New NC 133	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER J. P. GALLOWAY 29904
	Division 3 Brunswick County Southport PLAN DATE: August 2012 REVIEWED BY: J. P. Galloway PREPARED BY: IOU/JPG REVIEWED BY:	SCALE 0 N/A N/A

30-AUG-2012 14:19 C:\GIS\Projects\034\034.dwg 1034-1034.dgn

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11 and 10-12.

REMOVE JUMPERS AS SHOWN

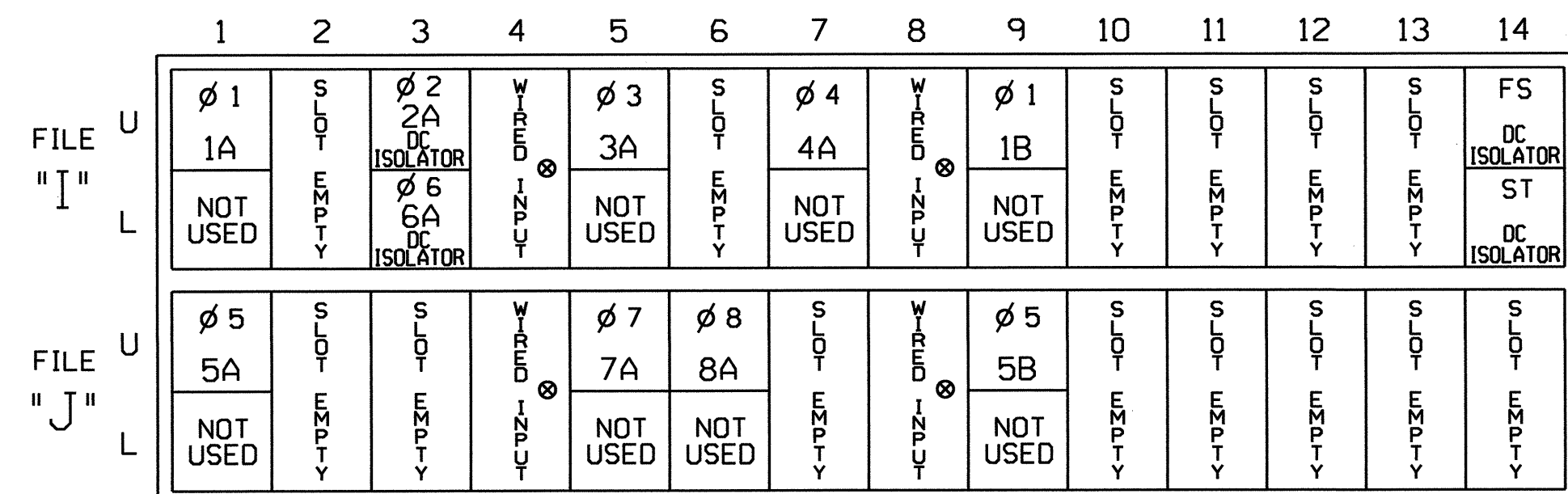
NOTES:

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

■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

Note: Install a model 242 DC isolator in slot 13 for use with microwave detectors. See the Microwave Detector Wiring Details on sheets 3 and 4.

IMPORTANT: For proper operation of the microwave detector, remove surge protection from TB2-9 and TB2-10, and from TB2-11 and TB2-12.

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 3,7, 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 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 overlaps 1 and 2 as Wag Overlaps.
- The cabinet and controller are part of the NC 87/133/211 Closed Loop System.

EQUIPMENT INFORMATION

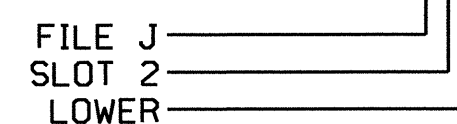
CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,
 S12,S13.
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAP "A".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....5+6
 OVERLAP "D".....7+8

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 ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
1B	TB6-9,10	I9U	60	22	11	1	Y	Y			15
**2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A ²	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	J8U	50	12	28	8	Y	Y			3
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
5A ³	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y	Y		3
5B	TB7-9,10	J9U	59	21	15	5	Y	Y			
**6A	TB2-11,12	I3L	76	38	42	6	Y	Y			
7A ⁴	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11	24	4	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

- Add jumper from I1-W to J4-W, on rear of input file.
 - Add jumper from I5-W to J8-W, on rear of input file.
 - Add jumper from J1-W to I4-W, on rear of input file.
 - Add jumper from J5-W to I8-W, on rear of input file.
- **Microwave Pulse Detector (see wiring detail sheets 3 and 4).

INPUT FILE POSITION LEGEND: J2L



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	82	21,22	NU	31	41,42	NU	42	51	61,62	NU	71	81,82	NU	11	31	NU	51	71
RED	*	128			101		*	134			107								
YELLOW		129		*	102			135		*	108								
GREEN		130			103			136			109								
RED ARROW																A121	A124	A114	A101
YELLOW ARROW		126					132									A122	A125	A115	A102
FLASHING YELLOW ARROW																A123	A126	A116	A103
GREEN ARROW	127	127			118		133	133		124									

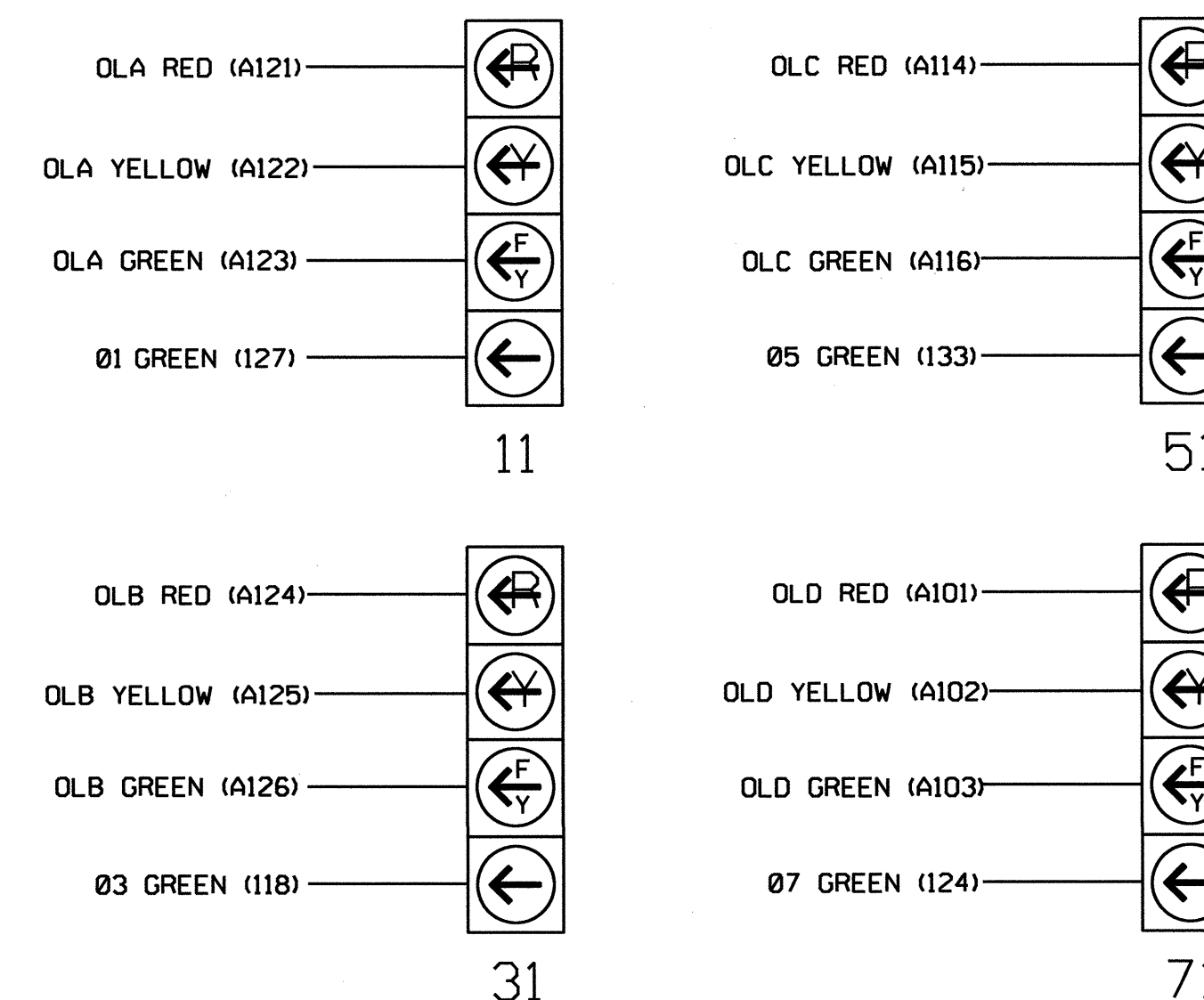
NU = Not Used

* Denotes install load resistor. See load resistor installation detail sheet 5.

* 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 these signals require special logic programming. See sheet 2 of 5 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0626T1
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

Electrical Detail - Temp 1 - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR: **NC 211 (Southport-Supply Road) at NC 133 (Long Beach Road) and Lowe's Entrance**

Division 3 Brunswick County Southport

PLAN DATE: August 2012 REVIEWED BY: T. J. J...

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Phry, Garner, NC 27529

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

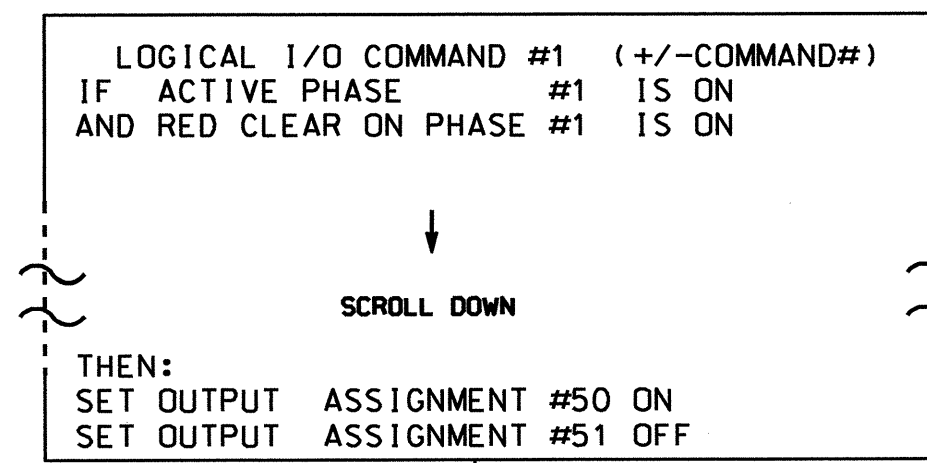
SIGNATURE: [Signature] DATE: 9/17/12

SIG. INVENTORY NO. 03-0626T1

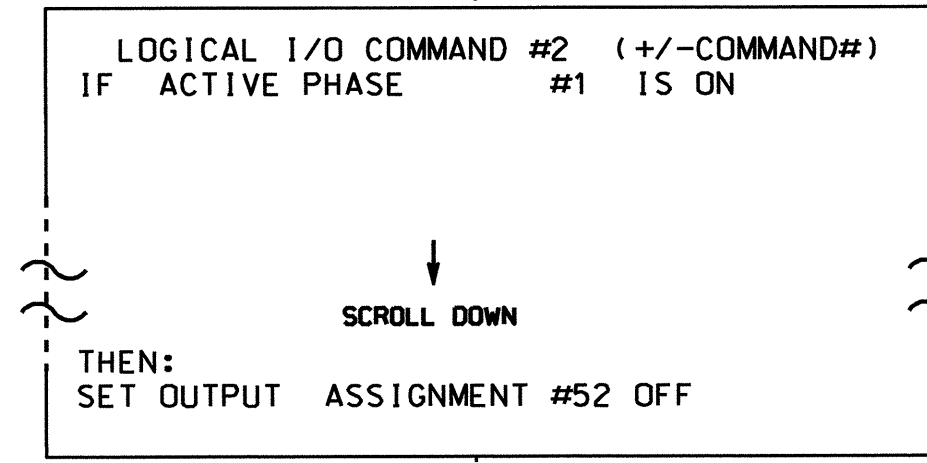
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE AND TO INVERT INPUT FROM MICROWAVE DETECTOR

(program controller as shown below)

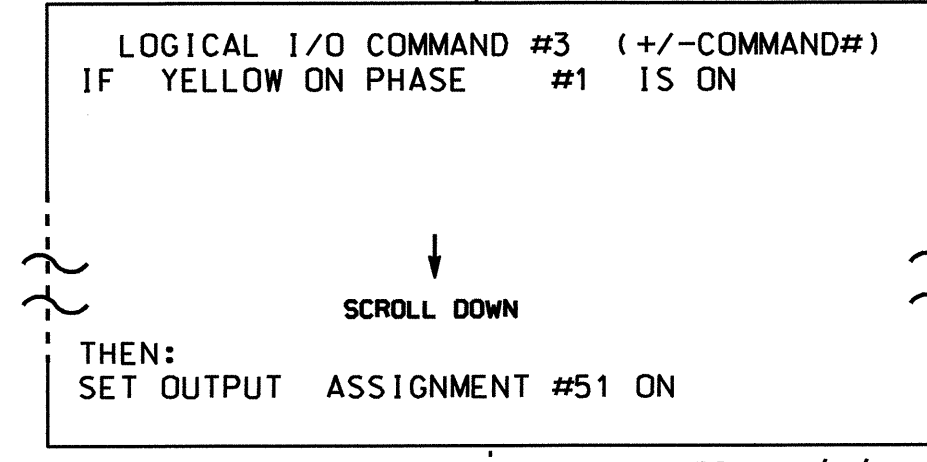
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15 AND 16.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



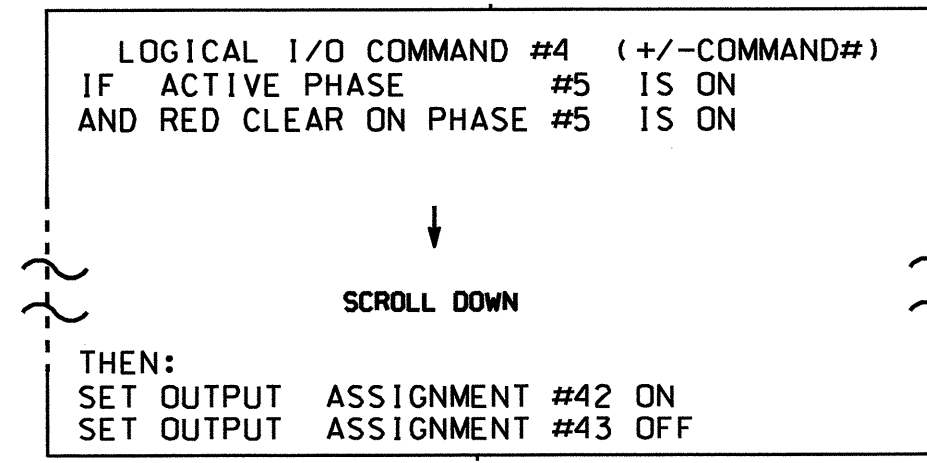
NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).



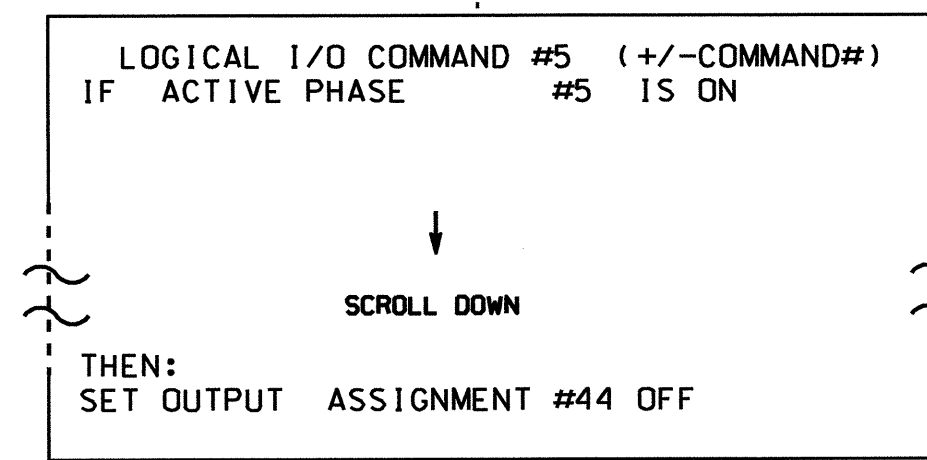
NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).



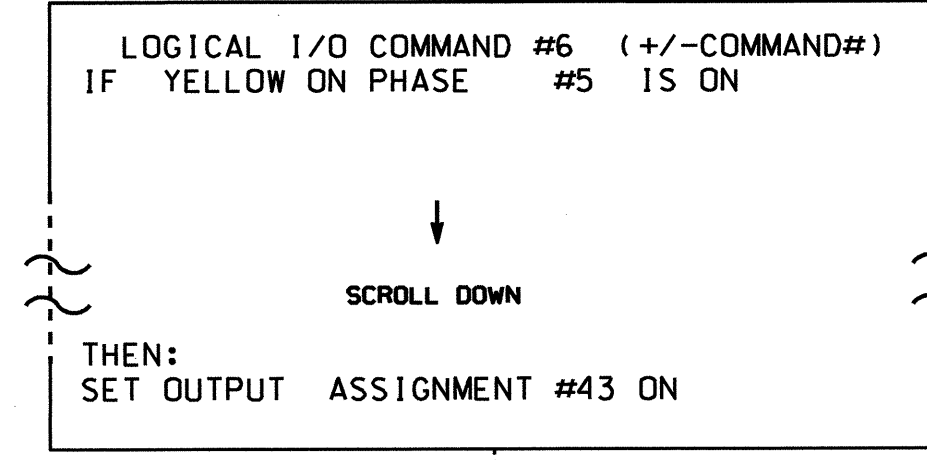
NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).



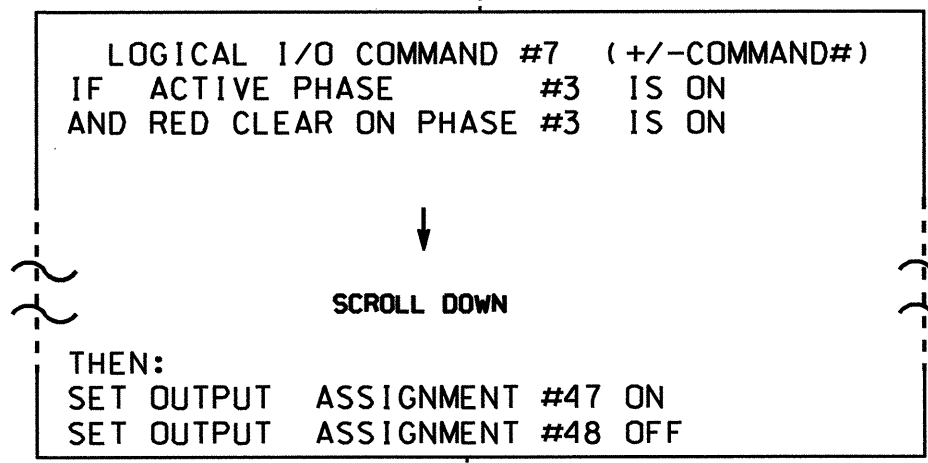
NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).



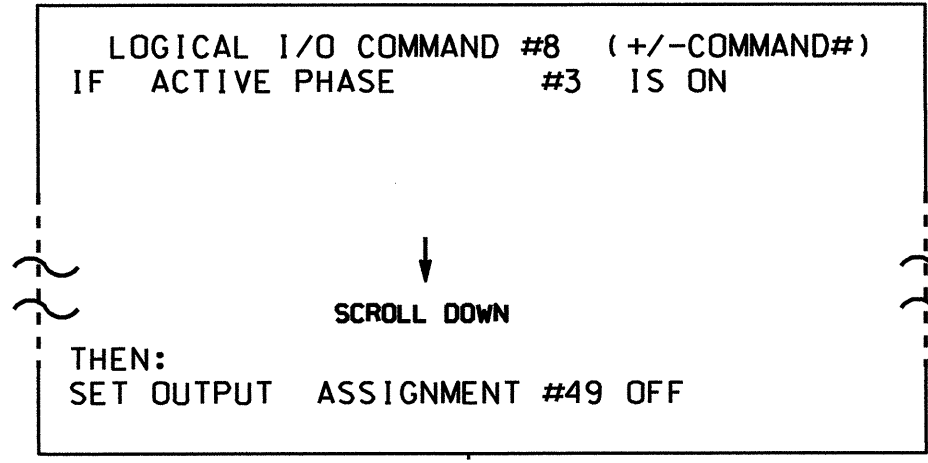
NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).



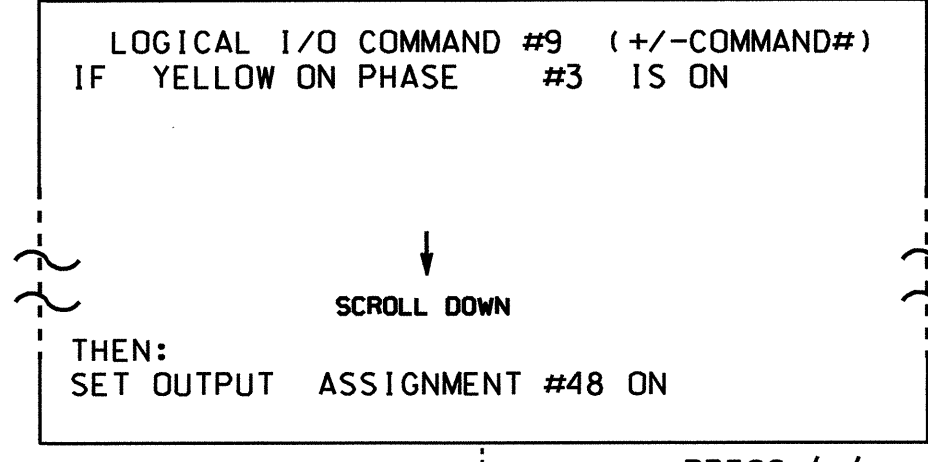
NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).



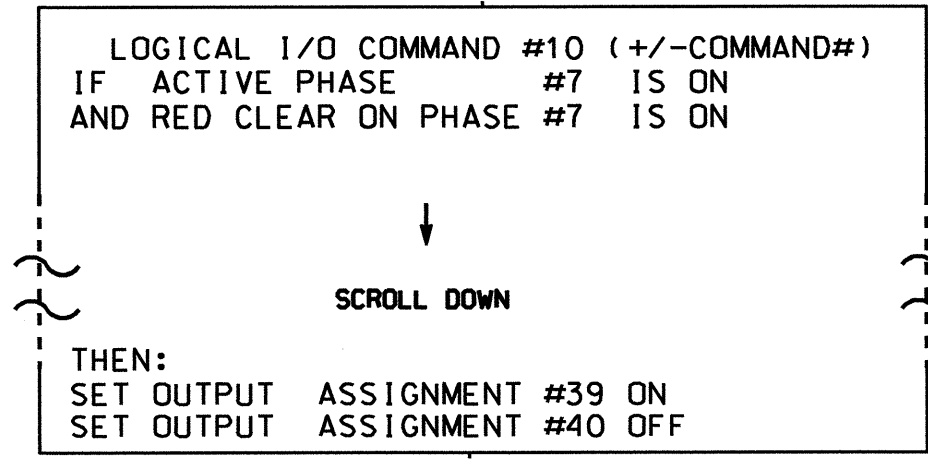
NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).



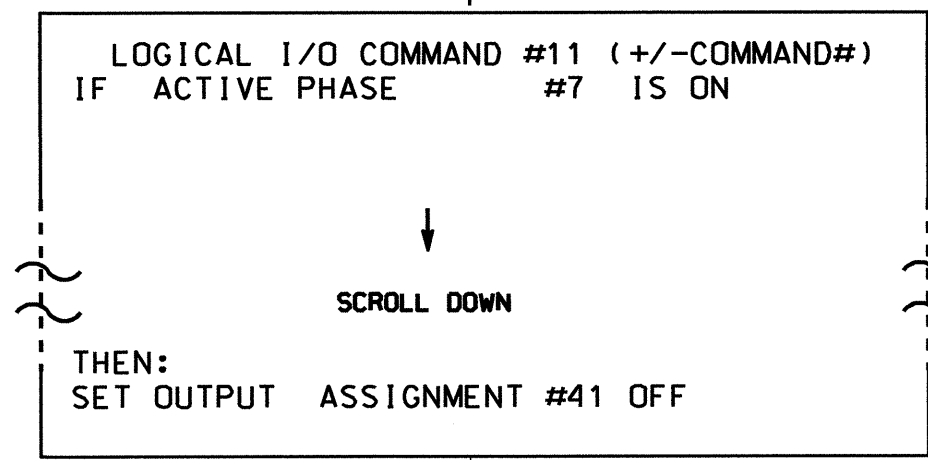
NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).



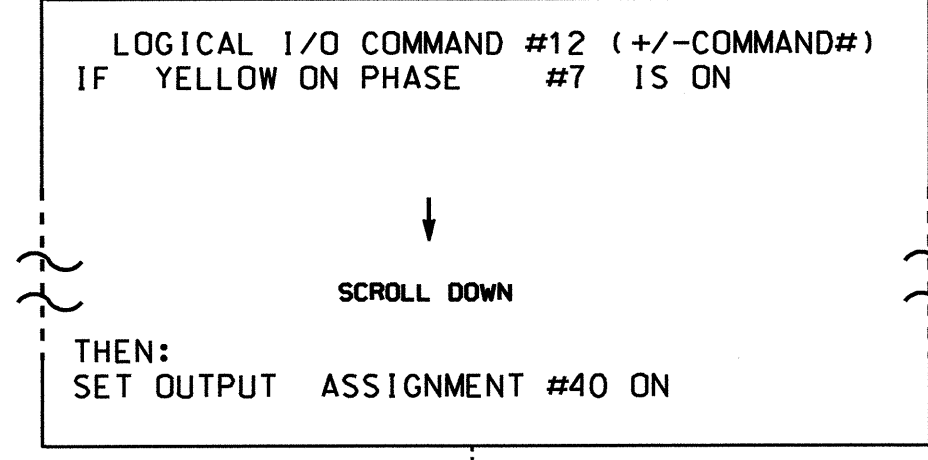
NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).



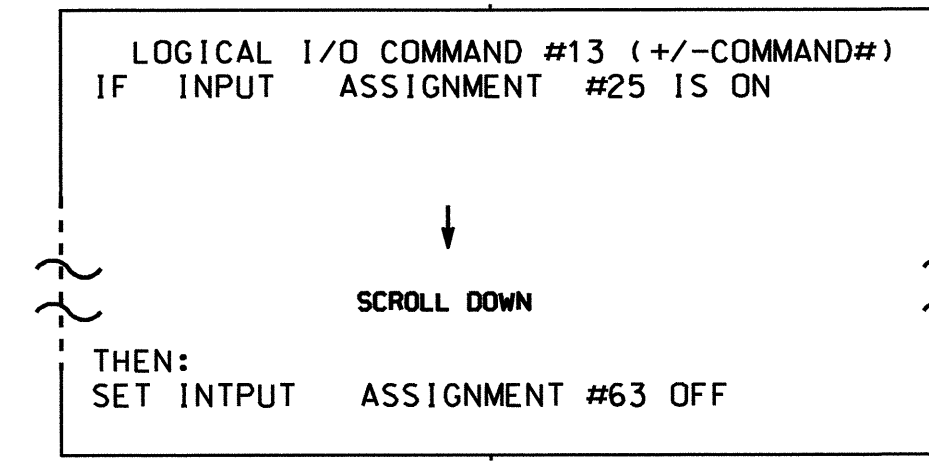
NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).



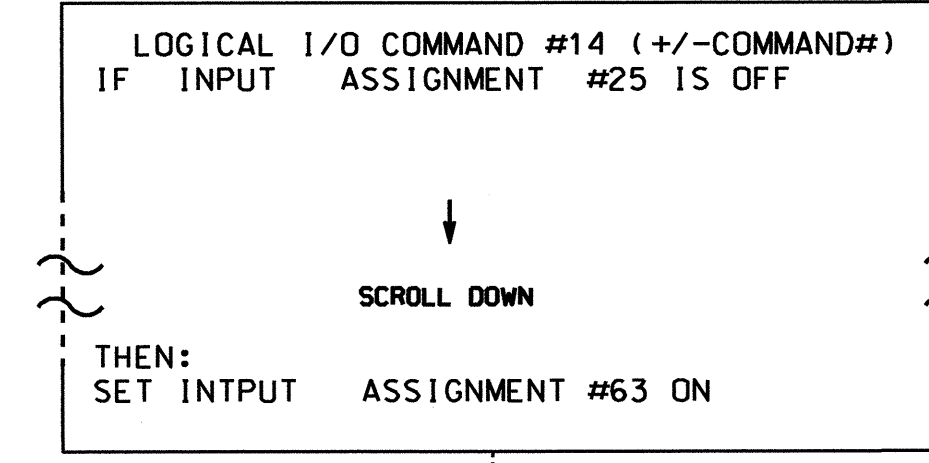
NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).



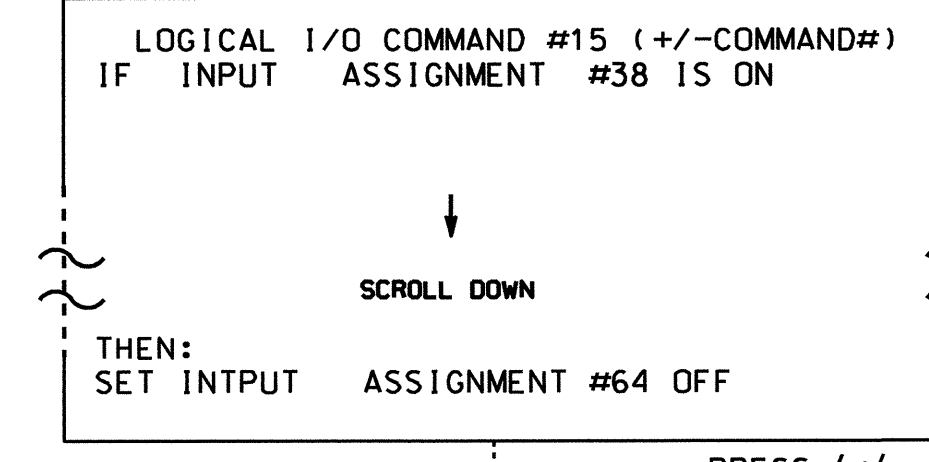
NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).



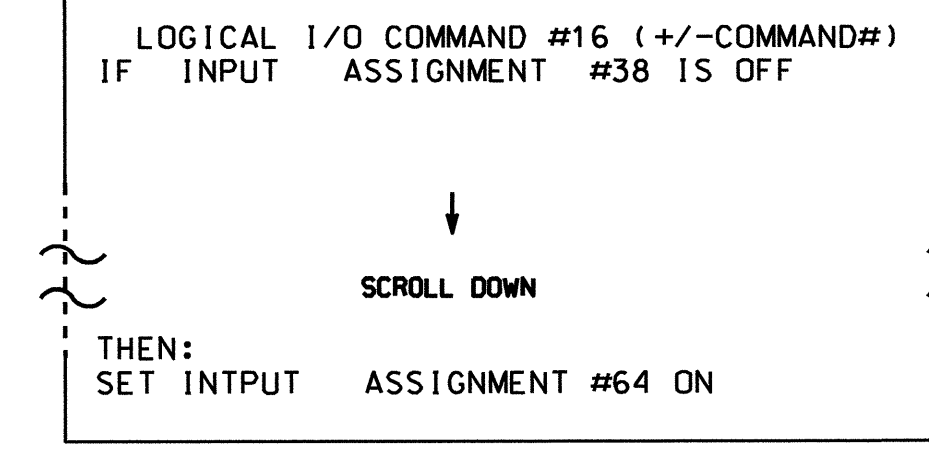
NOTE: TC-26B CONTACTS ARE CLOSED, SO NO CALL IS 'DETECTED' LOOP 2A.



NOTE: TC-26B CONTACTS ARE OPEN, SO A CALL IS 'DETECTED' LOOP 2A.



NOTE: TC-26B CONTACTS ARE CLOSED, SO NO CALL IS 'DETECTED' LOOP 6A.



NOTE: TC-26B CONTACTS ARE OPEN, SO A CALL IS 'DETECTED' LOOP 6A.

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

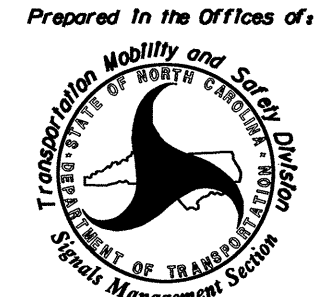
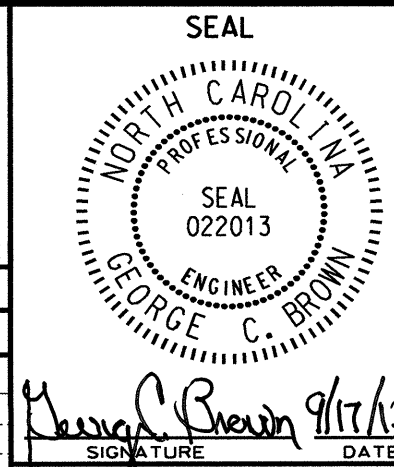
IO REFERENCE SCHEDULE
USE TO INTERPRET LOGIC PROCESSOR

- OUTPUT 39 = Overlap D Red
- OUTPUT 40 = Overlap D Yellow
- OUTPUT 41 = Overlap D Green
- OUTPUT 42 = Overlap C Red
- OUTPUT 43 = Overlap C Yellow
- OUTPUT 44 = Overlap C Green
- OUTPUT 47 = Overlap B Red
- OUTPUT 48 = Overlap B Yellow
- OUTPUT 49 = Overlap B Green
- OUTPUT 50 = Overlap A Red
- OUTPUT 51 = Overlap A Yellow
- OUTPUT 52 = Overlap A Green

- * INPUT 25 = TC26B Physical Input (Not Enabled)
- * INPUT 63 = Dummy TC26B Input (Detector 32)
- * INPUT 38 = TC26B Physical Input (Not Enabled)
- * INPUT 64 = Dummy TC26B Input (Detector 42)

* Input Remapped (See Sheet 3 of 5).

Electrical Detail - Temp 1 - Sheet 2 of 5

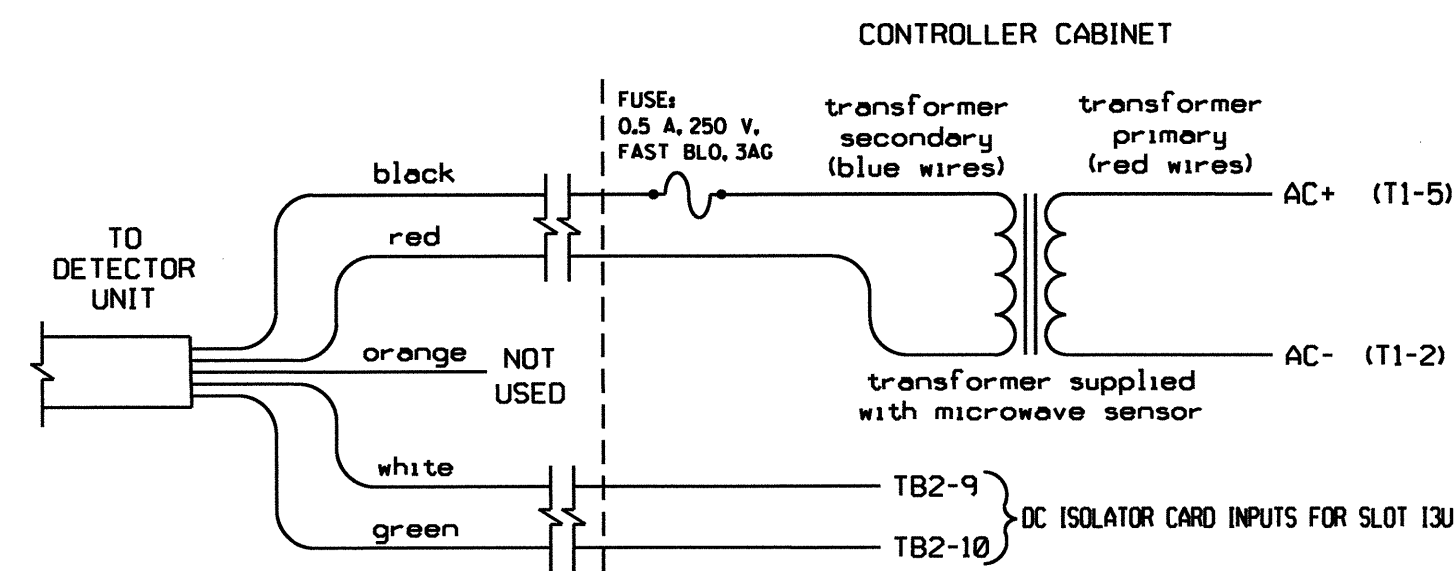
<p>Prepared In the Offices of:</p>  <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 211 (Southport-Supply Road) at NC 133 (Long Beach Road) and Lowe's Entrance</p>		<p>SEAL</p>  <p>SEAL 022013 ENGINEER GEORGE C. BROWN</p>			
	<p>Division 3 Brunswick County Southport</p> <p>PLAN DATE: August 2012 REVIEWED BY: T. J. J...</p> <p>PREPARED BY: G. Strickland REVIEWED BY:</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> </tr> </table>		INIT.	DATE	
INIT.	DATE					

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0626T1
DESIGNED: July 2012
SEALED: 09/11/12
REVISED: N/A

12-SEP-2012 09:38 S:\ITS\ASJ\115_Signal\work\logics\610_MonM5TrLckI\arch\03626-sm_e1e-xxx-dgn

MICROWAVE DETECTOR WIRING DETAIL LOOP 2A

(wire as shown)



TC26B WIRE LIST

COLOR	FUNCTION
black	12V to 24V AC/DC (no polarity)
red	12V to 24V AC/DC (no polarity)
orange	Output Relay Normally Open
white	Output Relay Normally Closed
green	Output Relay Common

NOTES:

- Sensor is a Microwave Sensors, Inc. Model TC-26B microwave motion detector mounted on poles as indicated on the Signal Design Plans.
- Microwave wiring shown above will cause a permanent call unless the Input Assignment Programming and Logical I/O Processor Programming details are entered as shown on this sheet. These programming details will cause a call to be placed upon opening the Normally Closed contact on TC26B.
- DC Isolator's LED will be ON when no call is present and will be OFF when a call is present.
- Important: For proper operation of the microwave detector, remove surge protection from TB2-9, TB2-10, TB2-11, and TB2-12 and insert 242 DC Isolator in slot 13.

INPUT ASSIGNMENT PROGRAMMING DETAIL FOR MICROWAVE DETECTOR INPUT (LOOP 2A)

(program controller as shown below)

FROM MAIN MENU PRESS '5' (INPUTS), THEN '+' UNTIL INPUT 25 (PIN 63) IS REACHED. MODIFY DEFAULT CONDITIONS AS INDICATED BY ARROWS.

```

PAGE: 1 C1 PIN:63 NOT ENABLED
INPUT ASSIGNMENT #.....25
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....Y
VEHICLE DETECTOR (1-64).....
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)... OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)..
    
```

ENTER 'YES' for Not Enabled

```

PAGE: 1 C1 PIN:0 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....63
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....32
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)...65 OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)..
    
```

ENTER '32' for Vehicle Detector

PROGRAMMING COMPLETE

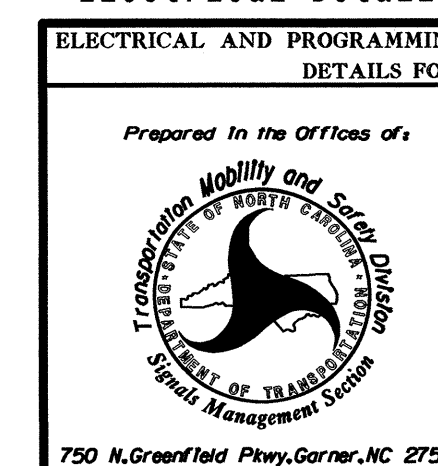
PRESS '-' until Input Assignment #63 is reached

NOTE:

This remapping removes the default detector from the microwave's physical input and reassigns it to unused INPUT 63. The Logical I/O Processor Programming Detail on sheet 2 will invert the disabled input and control INPUT 63 and the reassigned detector.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0626T1
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

Electrical Detail - Temp 1 - Sheet 3 of 5



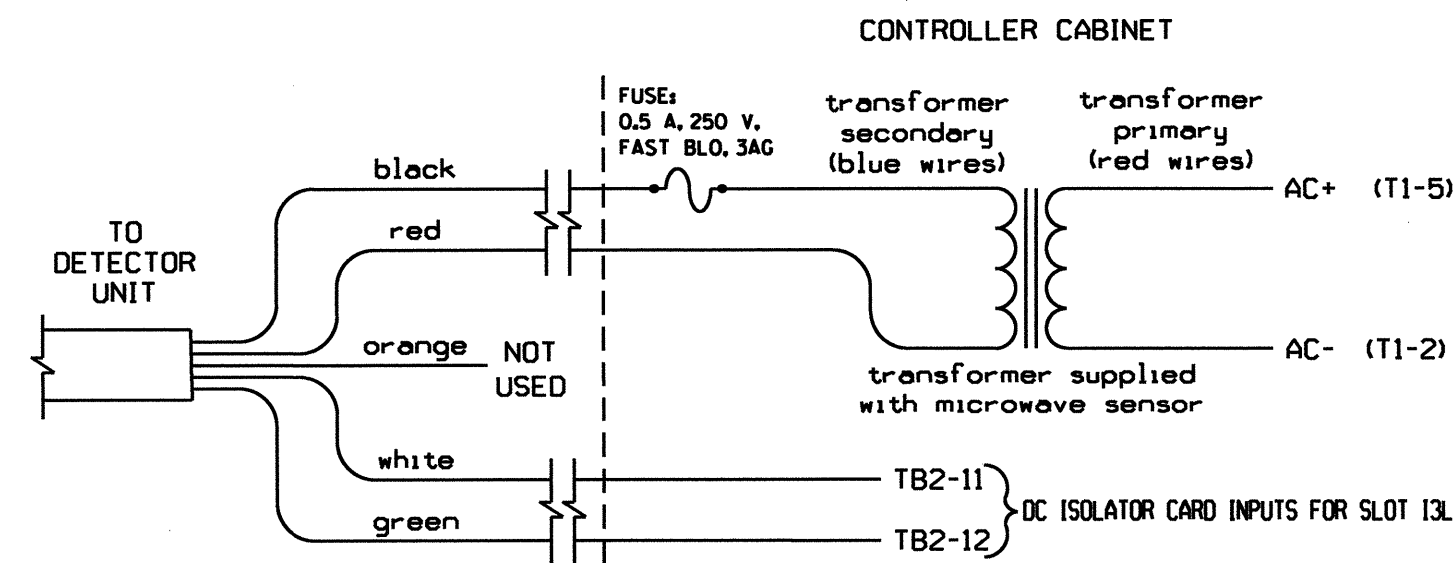
ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 211 (Southport-Supply Road) at NC 133 (Long Beach Road) and Lowe's Entrance	
Prepared In the Offices of:	Division 3	Brunswick County	Southport
PLAN DATE: August 2012	REVIEWED BY: TJA	PREPARED BY: C. Strickland	REVIEWED BY:
REVISIONS	INIT.	DATE	

Signature: George C. Brown
 Date: 9/11/12
 Seal No: 022013

SIG. INVENTORY NO. 03-0626T1

MICROWAVE DETECTOR WIRING DETAIL LOOP 6A

(wire as shown)



TC26B WIRE LIST

COLOR	FUNCTION
black	12V to 24V AC/DC (no polarity)
red	12V to 24V AC/DC (no polarity)
orange	Output Relay Normally Open
white	Output Relay Normally Closed
green	Output Relay Common

NOTES:

- Sensor is a Microwave Sensors, Inc. Model TC-26B microwave motion detector mounted on poles as indicated on the Signal Design Plans.
- Microwave wiring shown above will cause a permanent call unless the Input Assignment Programming and Logical I/O Processor Programming details are entered as shown on this sheet. These programming details will cause a call to be placed upon opening the Normally Closed contact on TC26B.
- DC Isolator's LED will be ON when no call is present and will be OFF when a call is present.
- Important: For proper operation of the microwave detector, remove surge protection from TB2-9, TB2-10, TB2-11, and TB2-12 and insert 242 DC Isolator in slot 13.

INPUT ASSIGNMENT PROGRAMMING DETAIL FOR MICROWAVE DETECTOR INPUT (LOOP 6A)

(program controller as shown below)

FROM MAIN MENU PRESS '5' (INPUTS), THEN '+' UNTIL INPUT 38 (PIN 76) IS REACHED. MODIFY DEFAULT CONDITIONS AS INDICATED BY ARROWS.

```

PAGE: 1 C1 PIN:76 NOT ENABLED
INPUT ASSIGNMENT #.....38
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....Y
VEHICLE DETECTOR (1-64).....
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)... OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)...
CHANGE PHASE CONTROL PAGE (1-4)...
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)...
CHANGE OUTPUT PAGE (1-4)...
OVERRIDE PHASE CONTROL FUNCTION (Y)...
    
```

ENTER 'YES' for Not Enabled

```

PAGE: 1 C1 PIN:0 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....64
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....42
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)...65 OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)...
CHANGE PHASE CONTROL PAGE (1-4)...
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)...
CHANGE OUTPUT PAGE (1-4)...
OVERRIDE PHASE CONTROL FUNCTION (Y)...
    
```

ENTER '42' for Vehicle Detector

PROGRAMMING COMPLETE

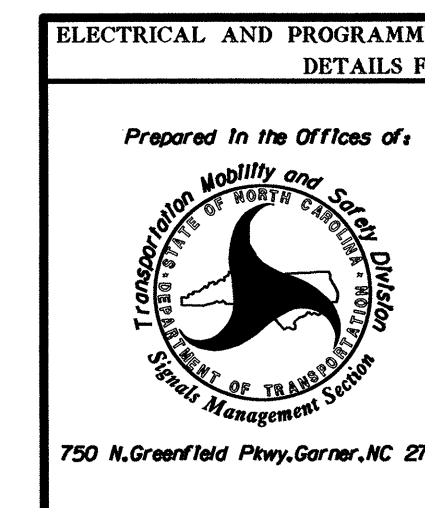
PRESS '-' until Input Assignment #64 is reached

NOTE:

This remapping removes the default detector from the microwave's physical input and reassigns it to unused INPUT 64. The Logical I/O Processor Programming Detail on sheet 2 will invert the disabled input and control INPUT 64 and the reassigned detector.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0626T1
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

Electrical Detail - Temp 1 - Sheet 4 of 5



ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 211 (Southport-Supply Road) at NC 133 (Long Beach Road) and Lowe's Entrance	
Prepared In the Offices of:	Division 3	Brunswick County	Southport
PLAN DATE: August 2012	REVIEWED BY: T. J. J.	PREPARED BY: C. Strickland	REVIEWED BY:
REVISIONS	INIT.	DATE	
750 N. Greenfield Pkwy, Garner, NC 27529		SIGNATURE: <i>C. Strickland</i> DATE: 9/17/12	

SEAL	INVENTORY NO. 03-0626T1
------	-------------------------

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 '+'

```

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 '+'

```

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

PRESS '+'

```

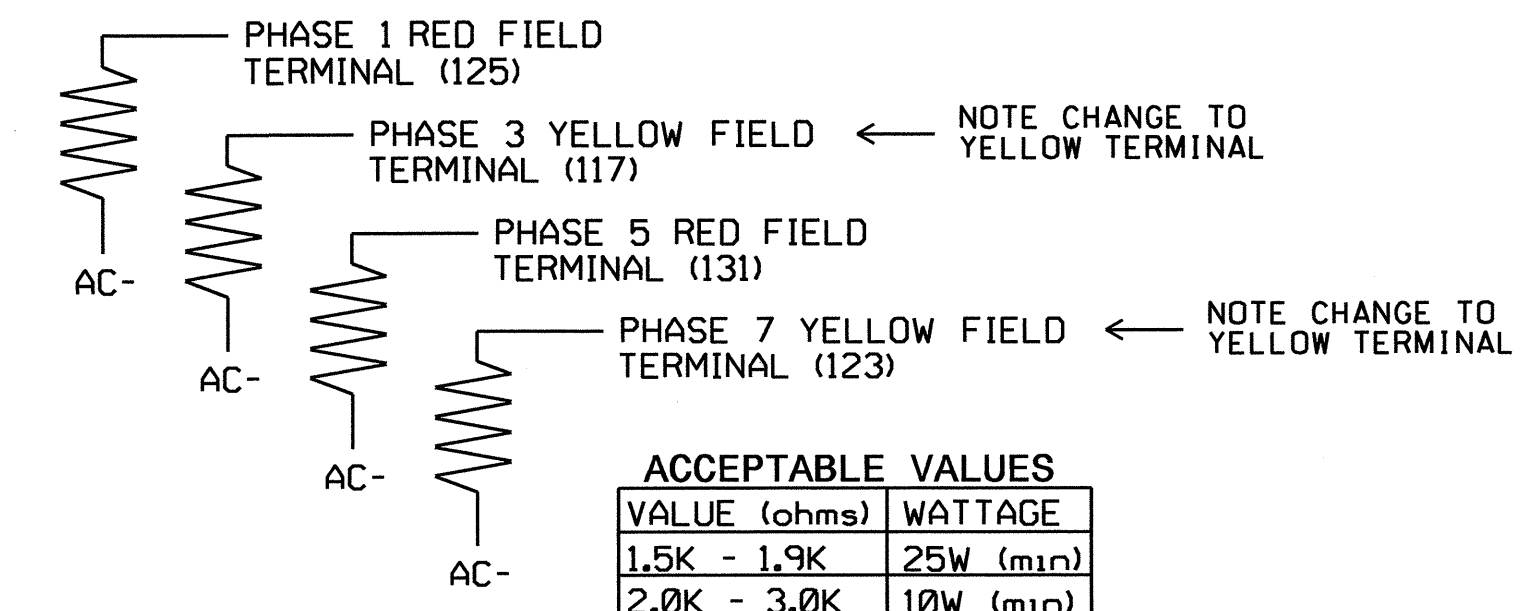
PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN 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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



! IMPORTANT: Move Load Resistors from Red Field Terminal to Yellow Field Terminal for Phases 3 and 7.

FLASHER CIRCUIT MODIFICATION DETAIL

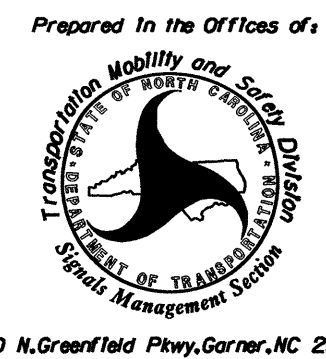
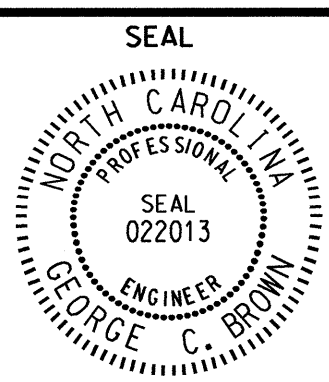
IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

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

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

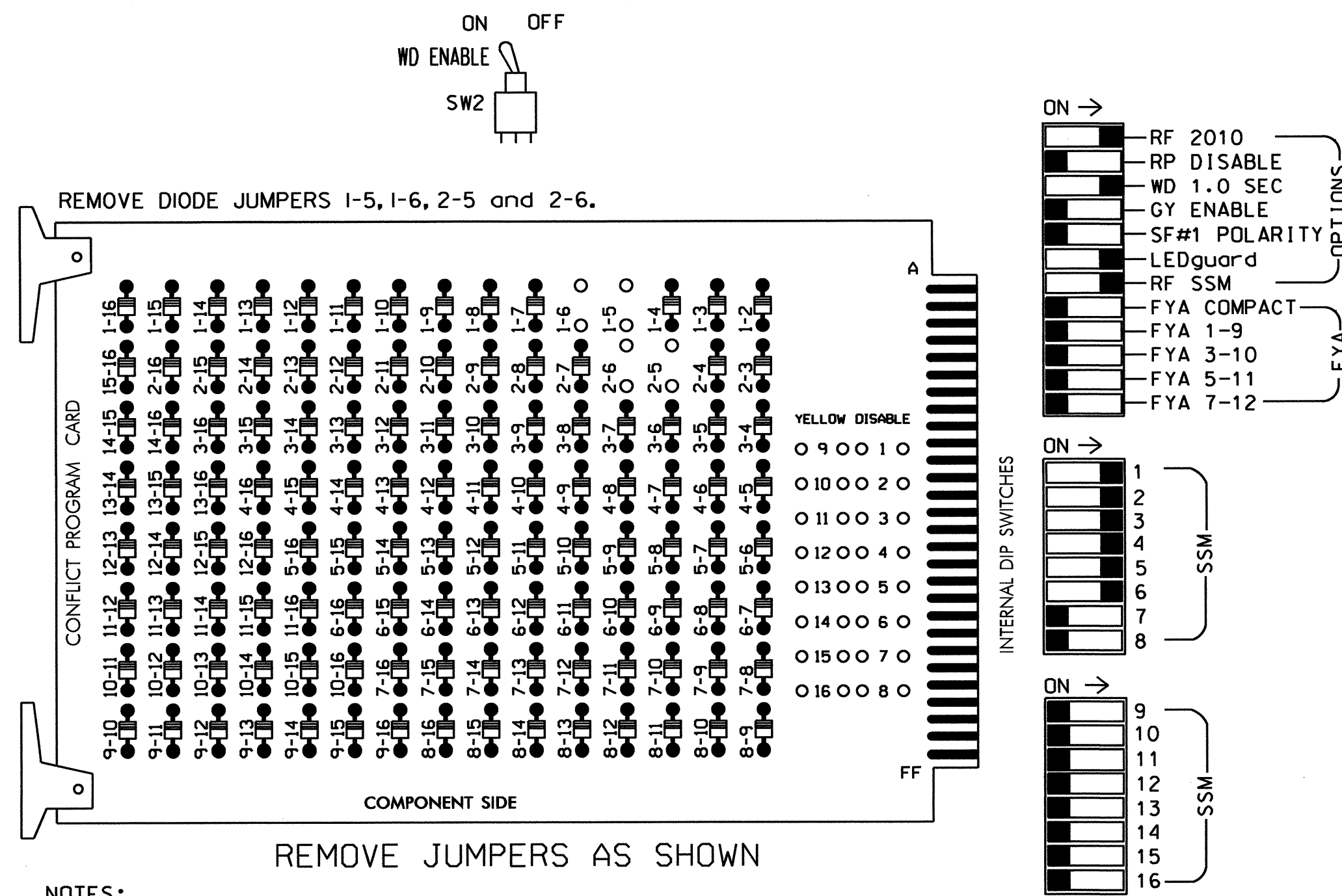
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0626T1
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

Electrical Detail - Temp 1 - Sheet 5 of 5

 <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 211 (Southport-Supply Road)	SEAL 
	Prepared In the Offices of: NC 133 (Long Beach Road) and Lowe's Entrance	
REVISIONS:		SIGNATURE: <i>George C. Brown</i> DATE: 9/17/12 SIG. INVENTORY NO. 03-0626T1

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 7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- 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 NC 87/133/211 Closed Loop 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.	11,12	32	21,22	NU	31	32	41	42	62	NU	42	51	61,62	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												131					
YELLOW ARROW	126	126						102		132	132							
GREEN ARROW	127	127			118	103	103			133	133							

NU = Not Used

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
 PHASES USED.....1,2,3,4,5,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

(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 DISABLE ACT LOGIC COMMANDS 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15 AND 16.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR). REMOVE ALL LOGICAL STATEMENTS FROM LOGICAL I/O COMMANDS 1-16.

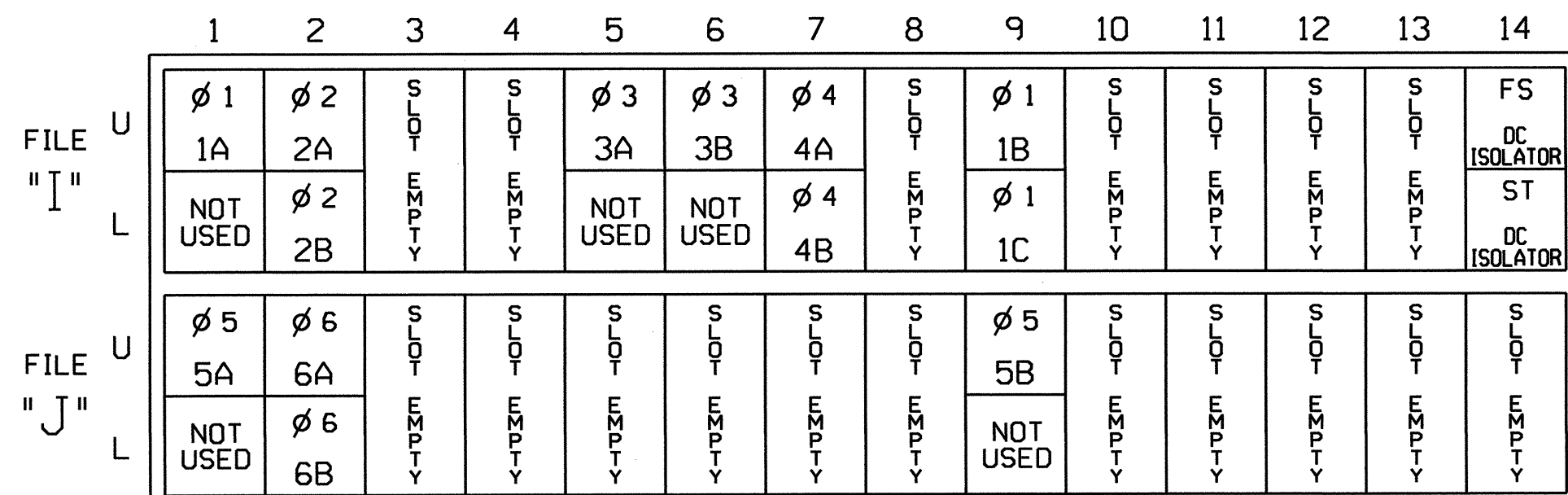
OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

- FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).
- REMOVE PROGRAMMED OVERLAP SETTINGS FROM OVERLAPS A. B. C AND D.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

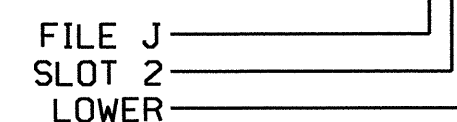
- IMPORTANT: Remove model 242 DC isolator from slot 13.
- IMPORTANT: Install surge protection from TB2-9 to TB2-10, and from TB2-11 to TB2-12.

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	11U	56	18	1	1	Y	Y			
1B	TB6-9,10	19U	60	22	11	1	Y	Y			
1C	TB6-11,12	19L	62	24	13	1	Y	Y			15
2A	TB2-5,6	12U	39	1	2	2	Y	Y			
2B	TB2-7,8	12L	43	5	12	2	Y	Y			
3A	TB4-5,6	15U	58	20	3	3	Y	Y			
3B	TB4-9,10	16U	41	3	4	3	Y	Y			
4A	TB6-1,2	17U	65	27	34	4	Y	Y			
4B	TB6-3,4	17L	78	40	44	4	Y	Y			
5A	TB3-1,2	11U	55	17	5	5	Y	Y			
5B	TB7-9,10	19U	59	21	15	5	Y	Y			15
6A	TB3-5,6	12U	40	2	6	6	Y	Y			
6B	TB3-7,8	12L	44	6	16	6	Y	Y			

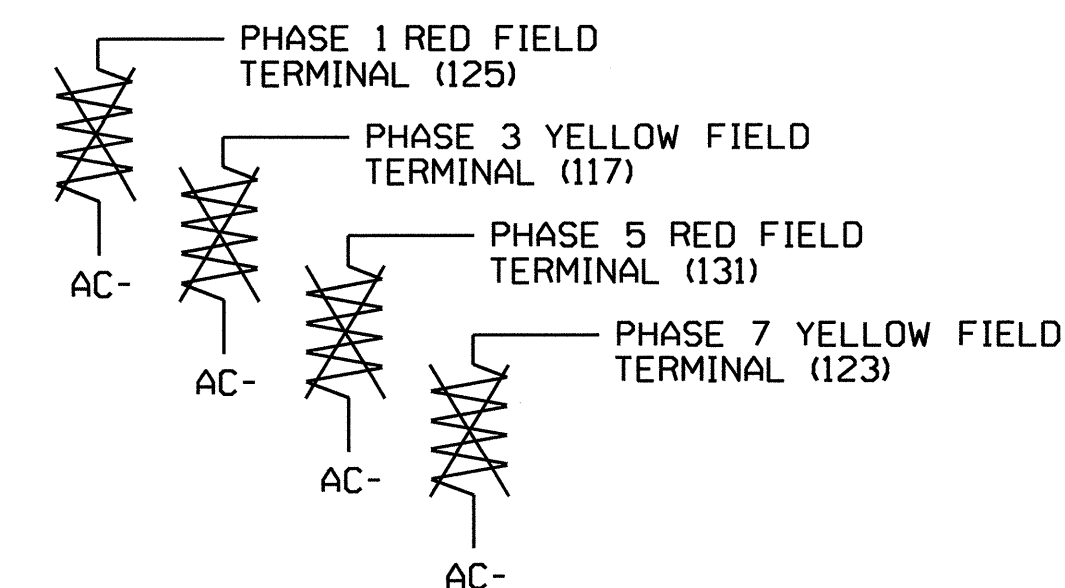
- Note: Remove jumper from I1-W to J4-W, on rear of input file.
- Note: Remove jumper from I5-W to J8-W, on rear of input file.
- Note: Remove jumper from J1-W to I4-W, on rear of input file.
- Note: Remove jumper from J5-W to I8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR REMOVAL DETAIL

(remove resistors as shown below)



Electrical Detail - Temp 2

Electrical and Programming Details for: **NC 211 (Southport-Supply Road) at NC 133 (Long Beach Road) and Lowe's Entrance**

Division 3 Brunswick County Southport

Prepared In the Offices of: **Y. Greenfield Pkwy, Garner, NC 27529**

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0626T2
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

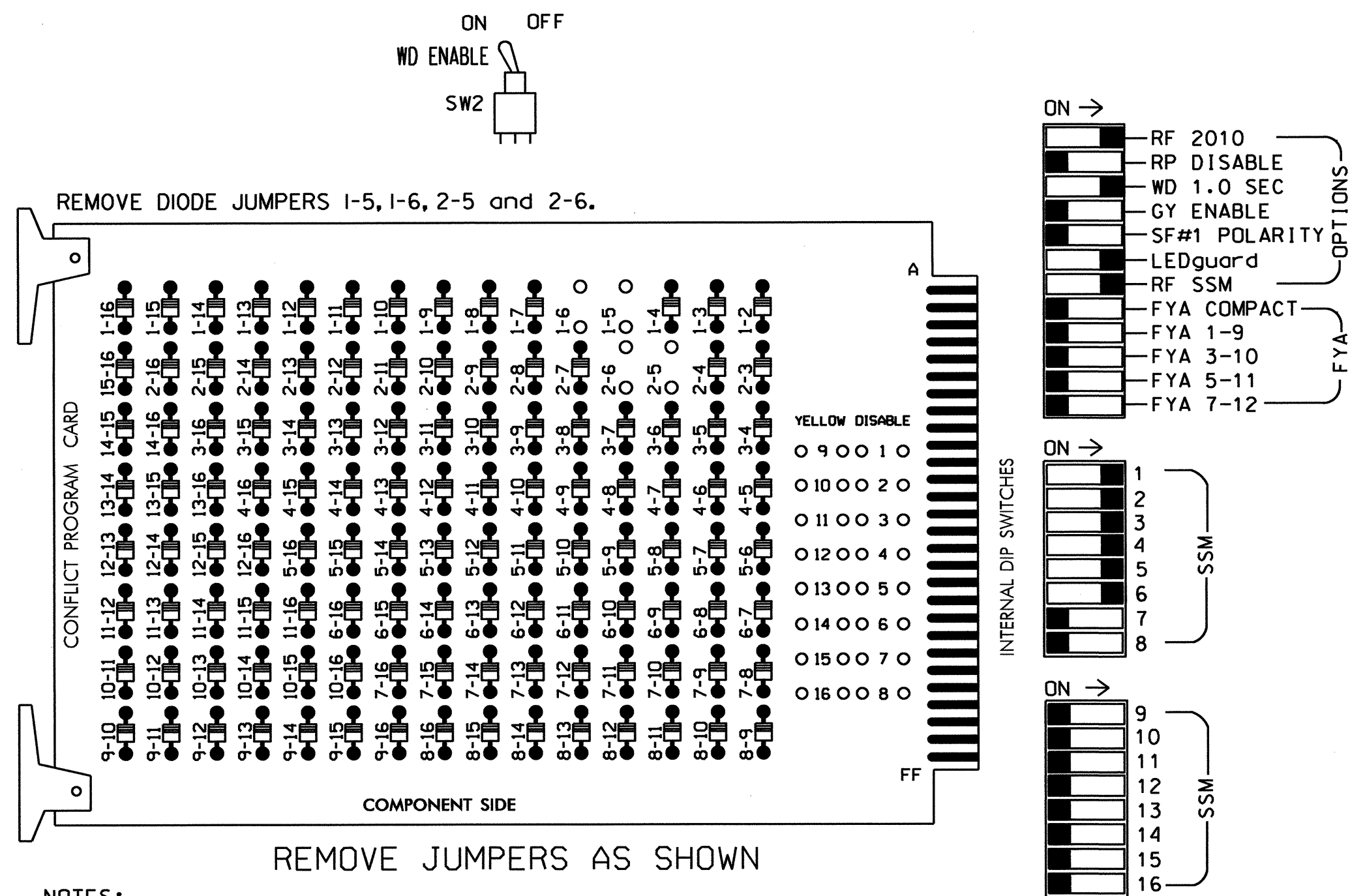
PLAN DATE: August 2012 REVIEWED BY: *T. V. J.*
 PREPARED BY: C. Strickland REVIEWED BY: *T. V. J.*

REVISIONS: _____ INIT. DATE

Signature: *George C. Brown* 9/11/12
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013
 SIGNATURE: _____ DATE: _____
 SIG. INVENTORY NO. 03-0626T2

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.

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. 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 7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- 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 NC 87/133/211 Closed Loop 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.	11,12	32	21,22	NU	31	32	41	42	62	NU	42	51	61,62	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												131					
YELLOW ARROW	126	126						102		132	132							
GREEN ARROW	127	127			118	103	103			133	133							

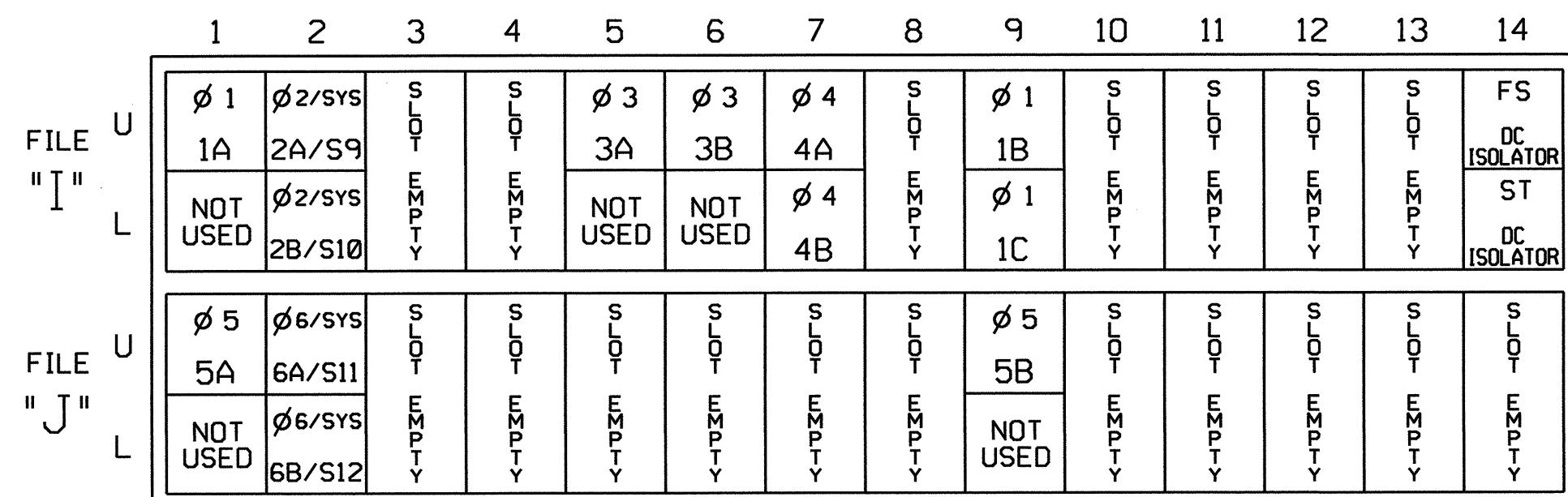
NU = Not Used

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
 PHASES USED.....1,2,3,4,5,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

INPUT FILE POSITION LAYOUT

(front view)



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

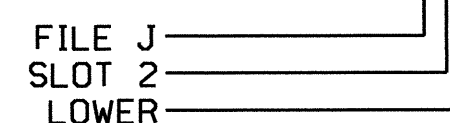
FS = FLASH SENSE
 ST = STOP TIME

⊗ 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			
1B	TB6-9,10	I9U	60	22	11	1	Y	Y			
1C	TB6-11,12	I9L	62	24	13	1	Y	Y			15
2A/S9	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S10	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB7-9,10	J9U	59	21	15	5	Y	Y			15
6A/S11	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S12	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			

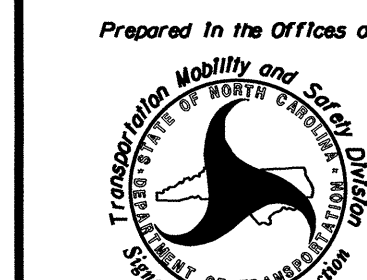
INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0626
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:



750 N. Greenfield Pkwy, Garner, NC 27529

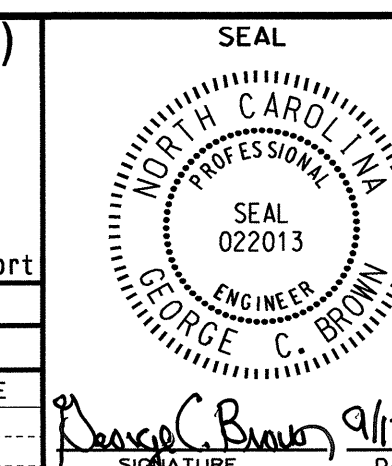
NC 211 (Southport-Supply Road) at NC 133 (Long Beach Road) and Lowe's Entrance

Division 3 Brunswick County Southport

PLAN DATE: August 2012 REVIEWED BY: T. J. J...

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS INIT. DATE



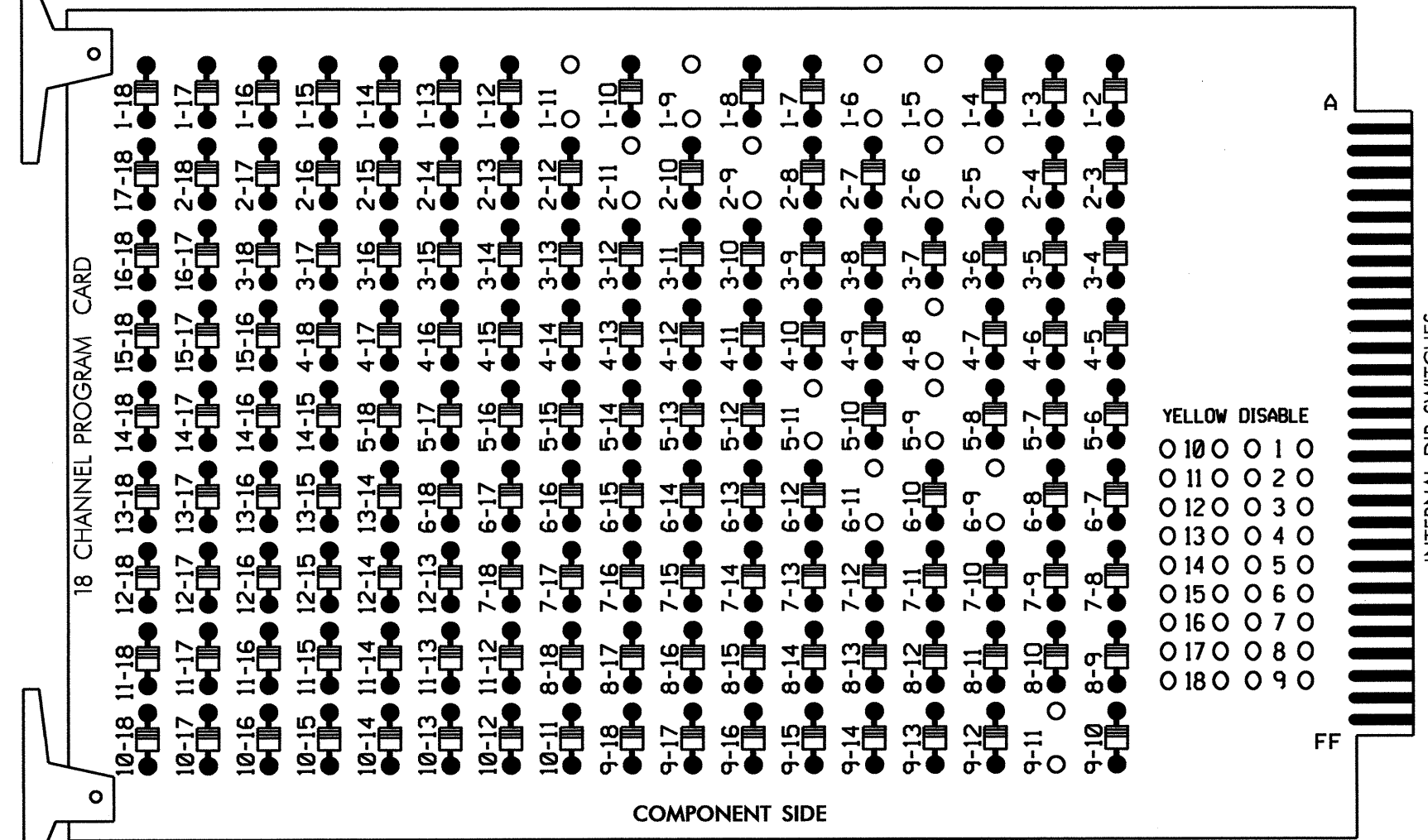
SIGNATURE DATE

SIG. INVENTORY NO. 03-0626

EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

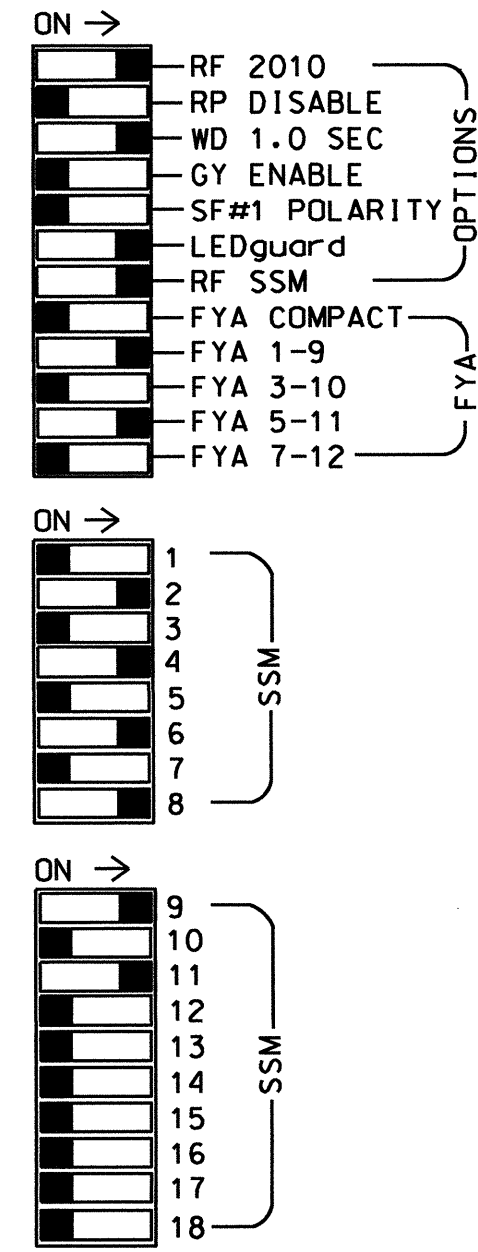
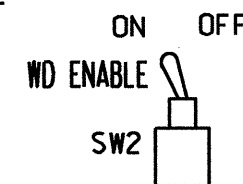
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-II, 2-5, 2-6, 2-9, 2-II, 4-8, 5-9, 5-II, 6-9, 6-II and 9-II.



REMOVE JUMPERS 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.



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. 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 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.

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

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*	21,22	NU	NU	41,42	NU	51*	61,62	NU	NU	81,82	NU	11*	NU	NU	51*	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										

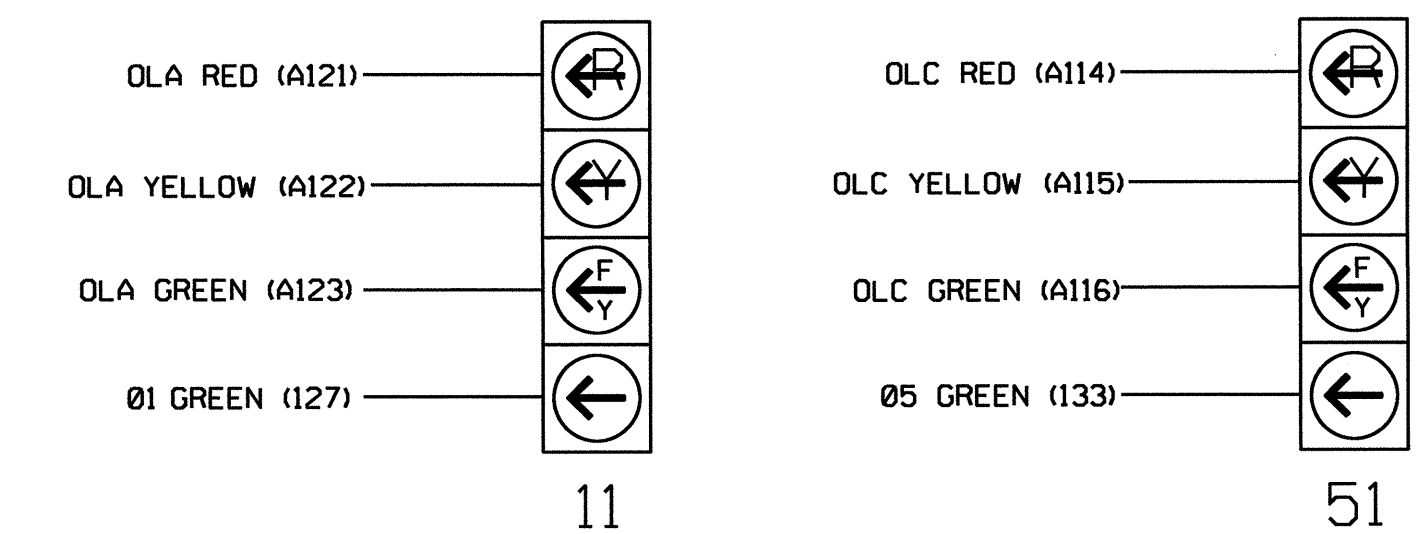
NU = Not Used

* 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)

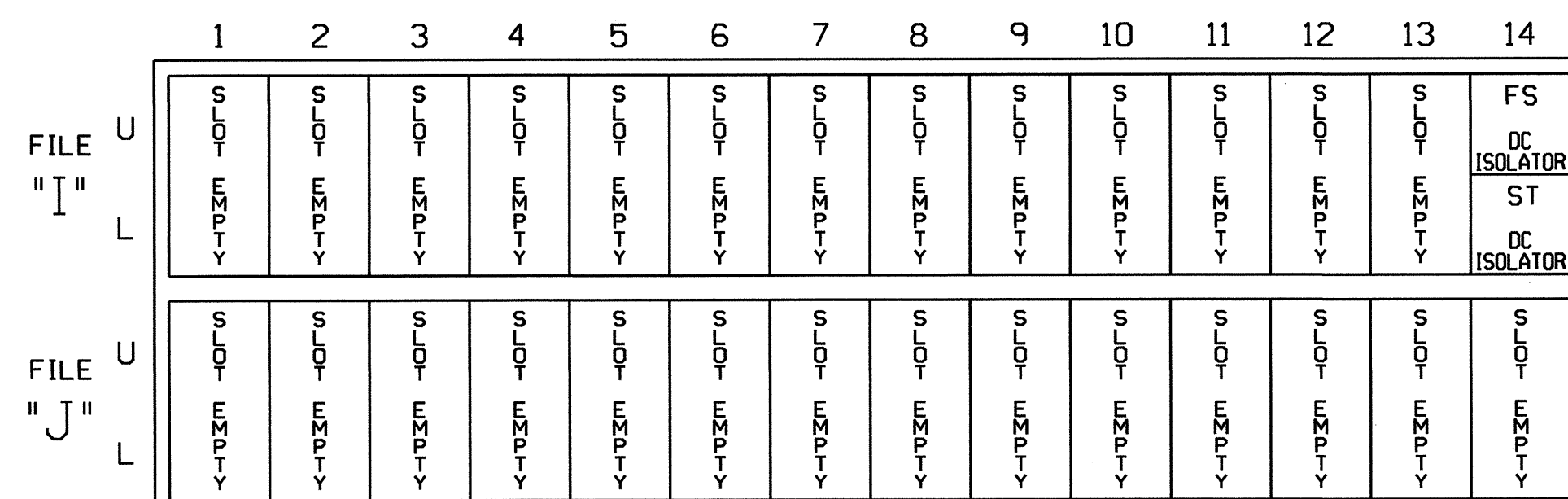


NOTE

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

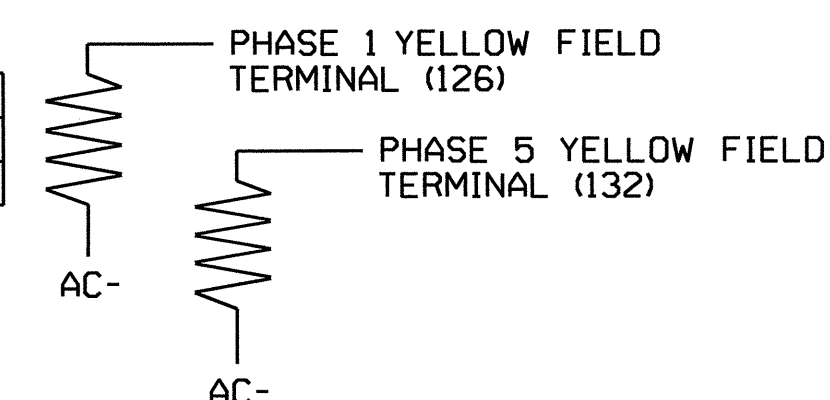
SPECIAL DETECTOR NOTE

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



Electrical Detail - Temp 1 - Sheet 1 of 2

Electrical and Programming Details For:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Old NC 133 (Long Beach Road) at Live Oak Village Shopping Center

Division 3 Brunswick County Southport

PLAN DATE: September 2012 REVIEWED BY: T. J. Strickland

PREPARED BY: C. Strickland REVIEWED BY: T. J. Strickland

REVISIONS: INIT. DATE

Signature: George C. Brown, 9/14/12

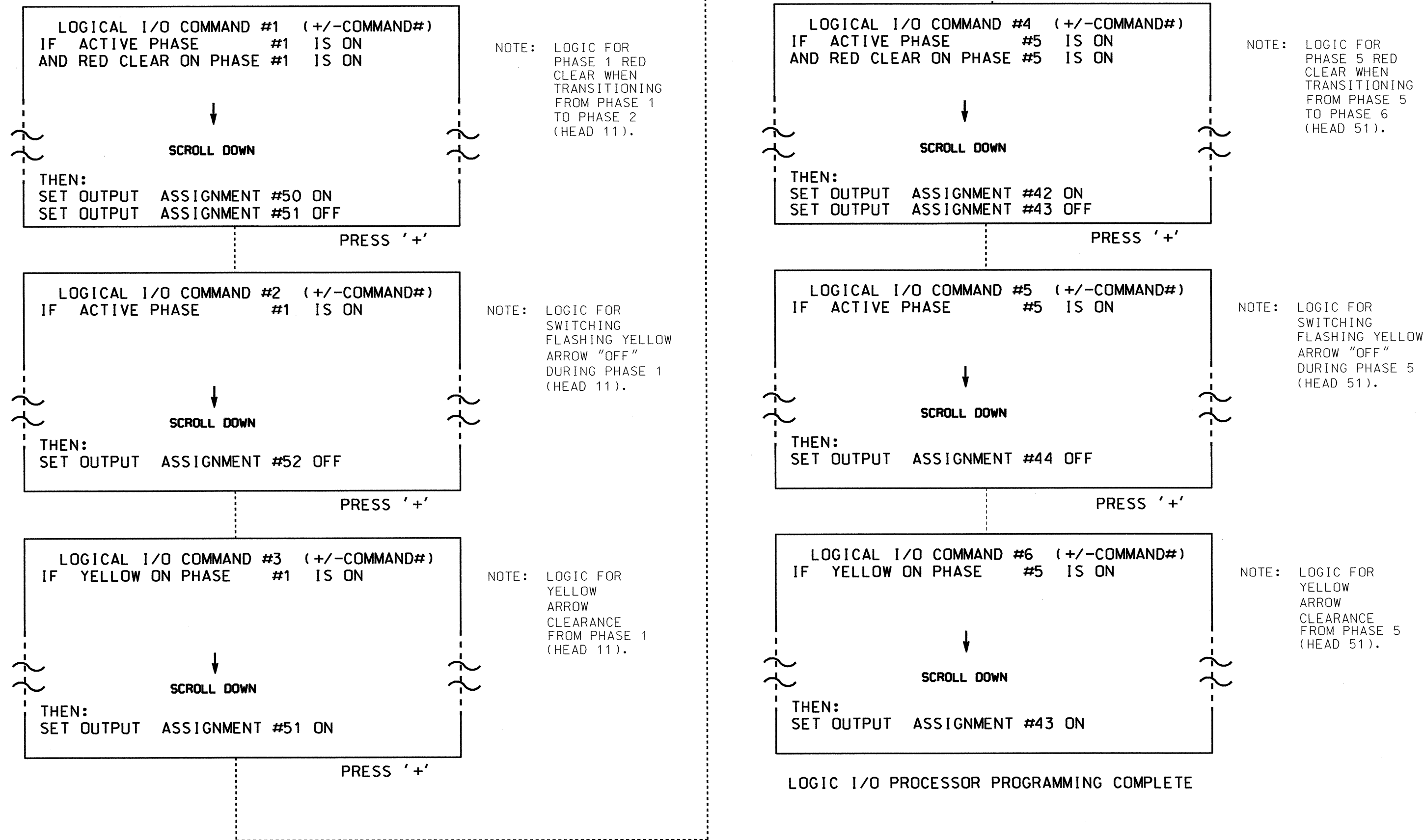
SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

SIG. INVENTORY NO. 03-0844T

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).



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

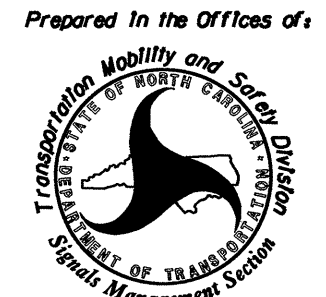
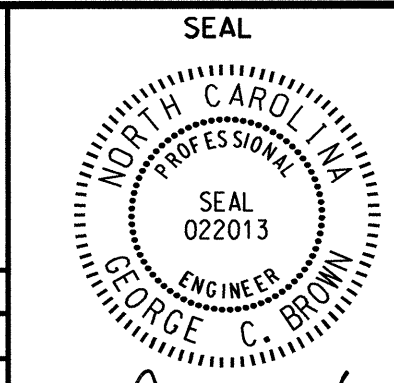
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE: 12345678910111213141516
 VEH OVL PARENTS: XX
 VEH OVL NOT VEH:
 VEH OVL NOT PED:
 VEH OVL GRN EXT:
 STARTUP COLOR: _ RED _ YELLOW _ GREEN
 FLASH COLORS: _ RED _ YELLOW X GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 GREEN 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

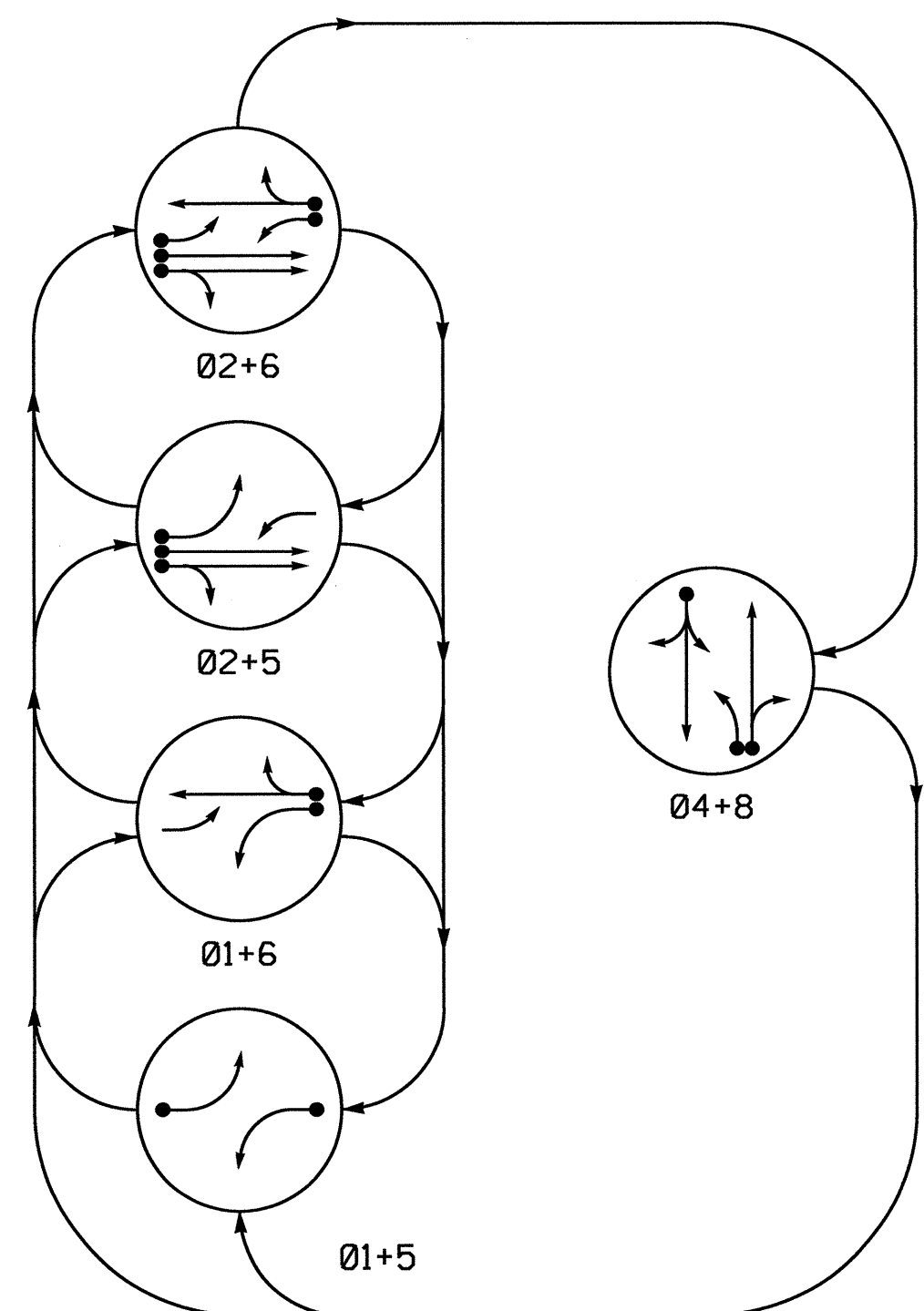
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-0844T.
 DESIGNED: August 2012
 SEALED: 09/11/12
 REVISED: N/A

Electrical Detail - Temp 1 - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	Old NC 133 (Long Beach Road) at Live Oak Village Shopping Center Division 3 Brunswick County Southport	SEAL  ENGINEER GEORGE C. BROWN
PLAN DATE: September 2012 REVIEWED BY: <i>T. J. J.</i> PREPARED BY: C. Strickland REVIEWED BY:		SIGNATURE: <i>George C. Brown</i> 9/14/12 DATE:
REVISIONS: INIT. DATE		
SIG. INVENTORY NO. 03-0844T		

PHASING DIAGRAM

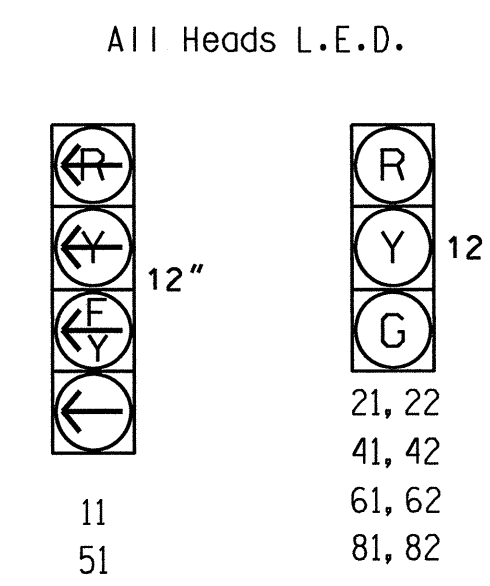


PHASING DIAGRAM DETECTION LEGEND
 ● DETECTED MOVEMENT
 ○ UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 - - - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	F L S H
11	←	←	←	←	←	←
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	R	R
51	←	←	←	←	←	←
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.



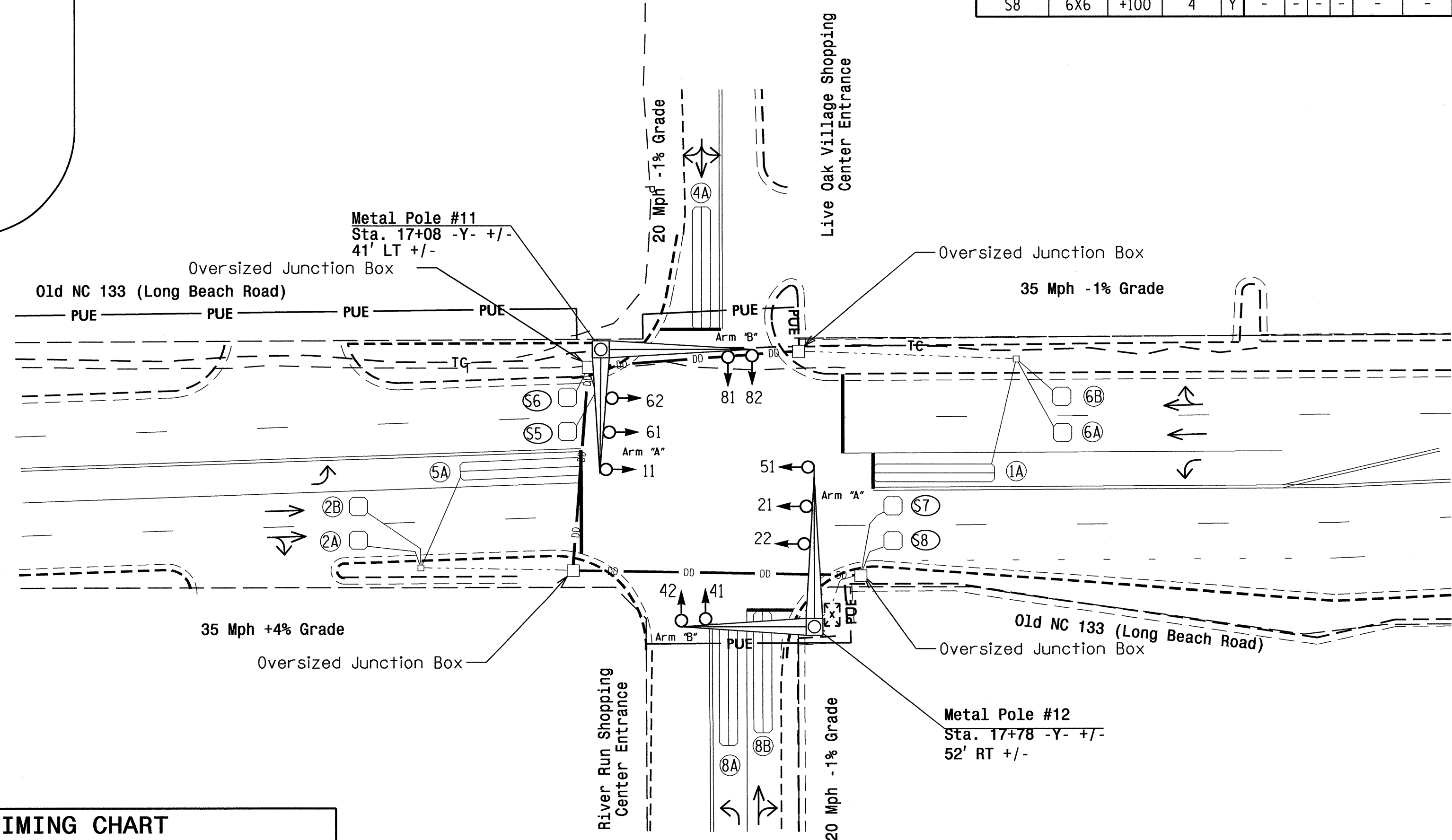
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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	2-4-2	Y	1	Y	Y	-	-	15	-	Y
2A, 2B	6X6	300	4	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A, 6B	6X6	300	4	Y	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	10	-	Y
S5	6X6	+90	4	Y	-	-	-	-	-	-	-	Y
S6	6X6	+90	4	Y	-	-	-	-	-	-	-	Y
S7	6X6	+100	4	Y	-	-	-	-	-	-	-	Y
S8	6X6	+100	4	Y	-	-	-	-	-	-	-	Y

5 Phase Fully Actuated NC 87/133/211 Closed Loop 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.
- Set all detector units to presence mode.
- Phase 1 and/or phase 5 may be lagged.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #0844.



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	3.0	2.0	2.0	3.0	2.0
Max Green 1 *	20	90	30	20	90	30
Yellow Clearance	3.0	3.9	3.0	3.0	3.9	3.0
Red Clearance	2.3	1.5	2.6	2.1	1.5	2.8
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	-	NONE	-	-	NONE	-
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.

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
○ → Modified Signal Head	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
⊗ Inductive Loop Detector	⊗ Inductive Loop Detector
□ Controller & Cabinet	□ Controller & Cabinet
□ Junction Box	□ Junction Box
- - - 2-in Underground Conduit	- - - 2-in Underground Conduit
N/A Right of Way	- - - Right of Way
→ Directional Arrow	→ Directional Arrow
→ Pavement Marking Arrow	→ Pavement Marking Arrow
○ Metal Pole with Mastarm	○ Metal Pole with Mastarm
- - - Directional Drill 3-2" Conduit	N/A
⊗ Left Arrow "ONLY" Sign (R3-5L)	⊗ Left Arrow "ONLY" Sign (R3-5L)
- - - PUE - Permanent Utility Easement	- - - PUE - Permanent Utility Easement

Signal Upgrade Final

750 N. Greenfield Pkwy, Garner, NC 27529

Old NC 133 (Long Beach Road) at Live Oak Village Shopping Center

Division 3 Brunswick County Southport

PLAN DATE: August 2012 REVIEWED BY: J. P. Galloway

PREPARED BY: IOU/JPG REVIEWED BY:

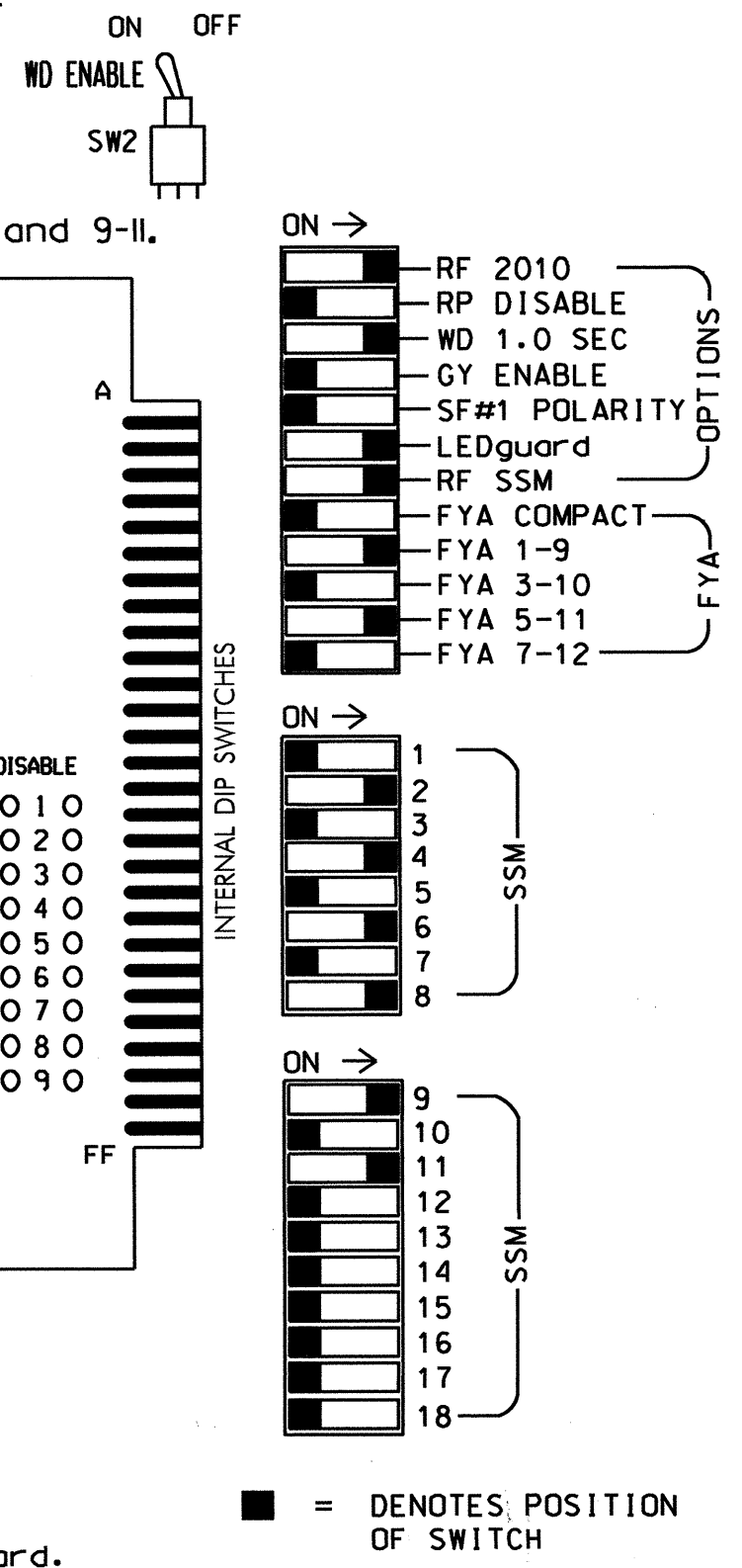
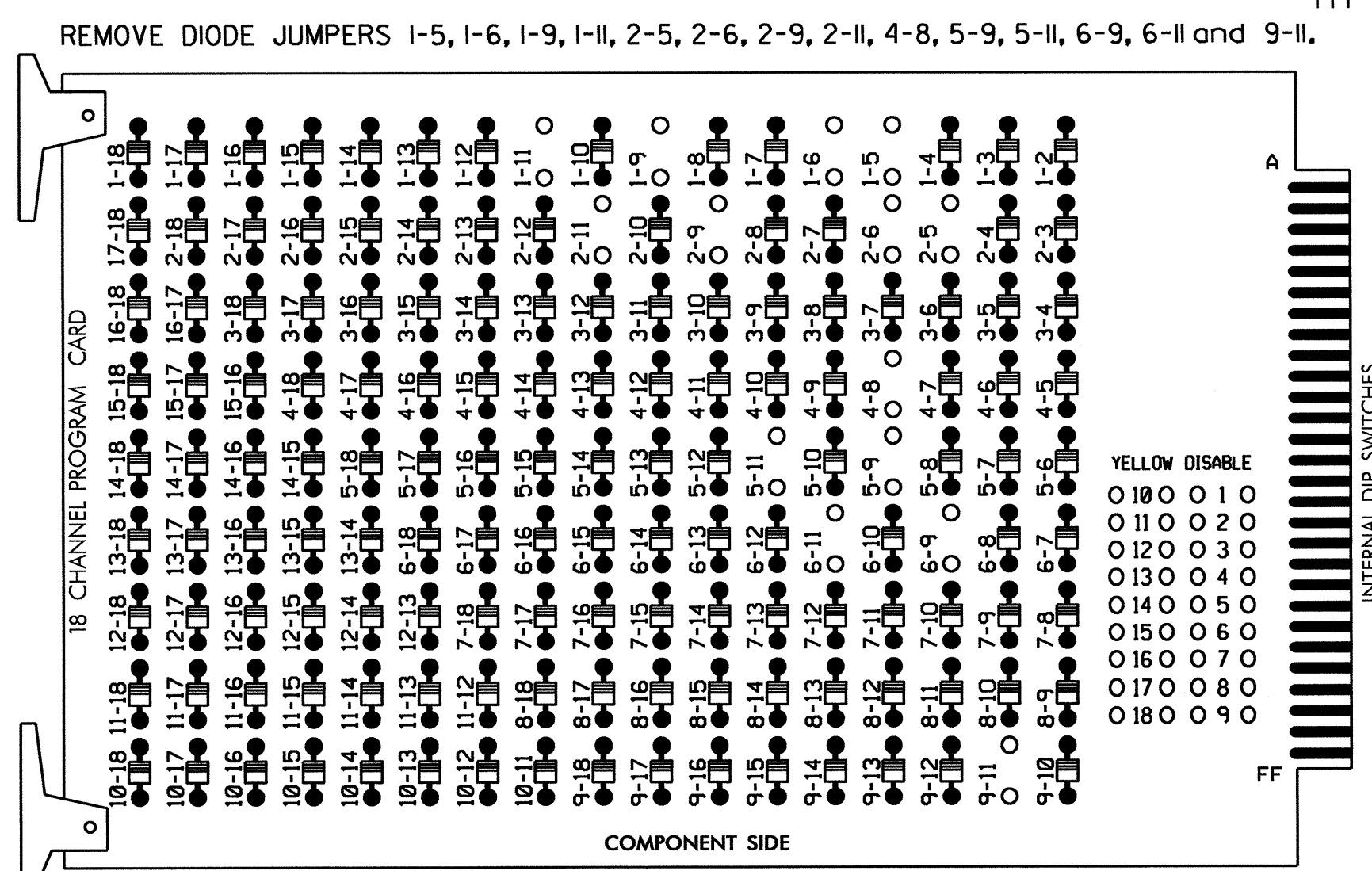
SEAL

DATE: 9/11/12

SIG. INVENTORY NO. 03-0844

10-SEP-2012 11:47
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 10-SEP-2012 11:47
 P:\Projects\0844\0844.dgn
 10-SEP-2012 11:47
 P:\Projects\0844\0844.dgn

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 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 NC 87/133/211 Closed Loop 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,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

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	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	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)

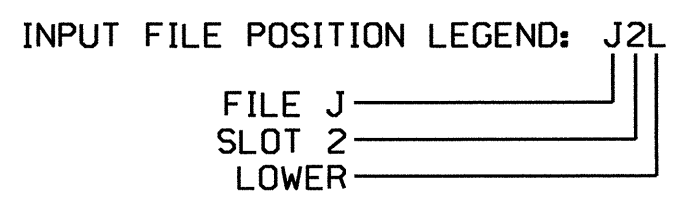
FILE	U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	SYS. DET. S5	S	S	S	S	FS
	L	1A	2A,2B	∅ 3	4A	∅ 5	∅ 6	∅ 7	∅ 8	SYS. DET. S6	S	S	S	S	DC ISOLATOR
"J"	U	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	SYS. DET. S7	S	S	S	S	S
	L	5A	6A,6B	∅ 7	8A	∅ 9	∅ 10	∅ 11	∅ 12	SYS. DET. S8	S	S	S	S	DC ISOLATOR

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

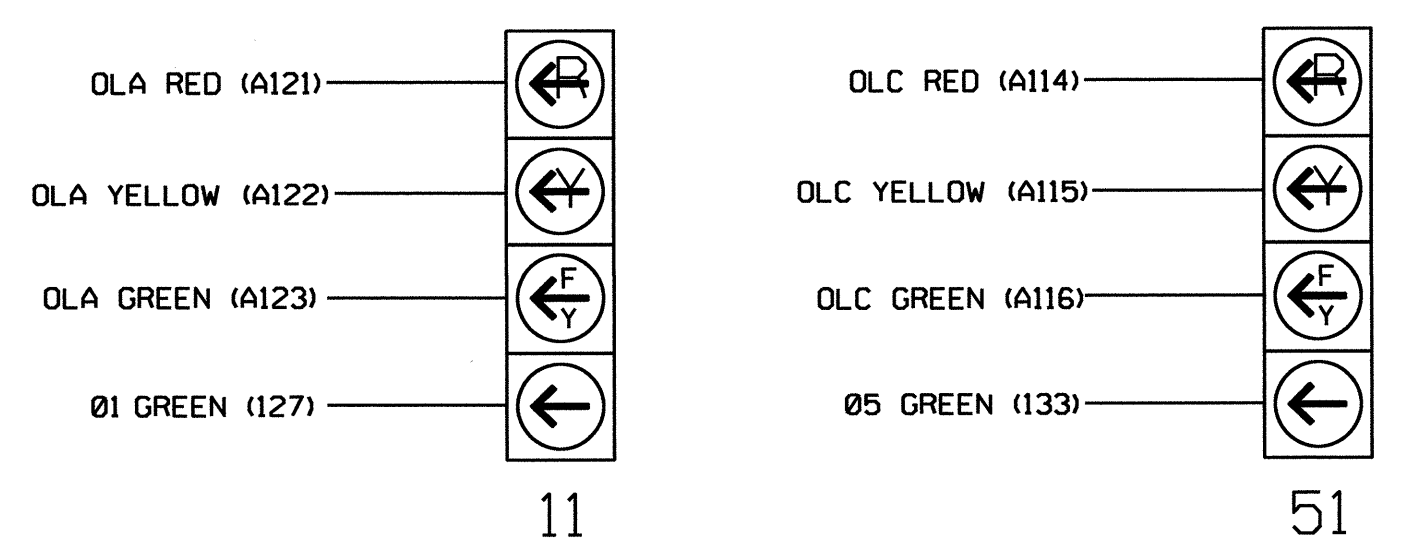
INPUT FILE CONNECTION & PROGRAMMING CHART

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 ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
* S5	TB6-9,10	I9U	60	22	11	SYS					
* S6	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					

- ¹Add jumper from I1-W to J4-W, on rear of input file.
²Add jumper from J1-W to I4-W, on rear of input file.
 * System detector only. Remove the vehicle phase assigned to this detector in the default programming.

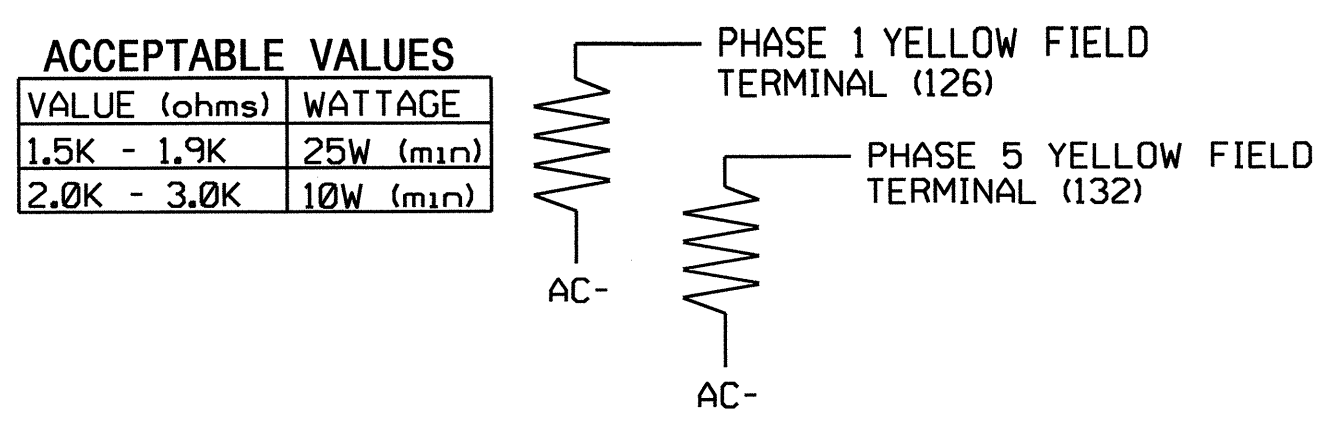


4 SECTION FYA PPLT SIGNAL WIRING DETAIL
(wire signal heads as shown)



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

LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown below)



Electrical Detail Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

Old NC 133 (Long Beach Road) at Live Oak Village Shopping Center
 Division 3 Brunswick County Southport
 PLAN DATE: September 2012 REVIEWED BY: T.J.P.
 PREPARED BY: C. Strickland REVIEWED BY:

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0844
 DESIGNED: August 2012
 SEALED: 09/11/12
 REVISED: N/A

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN
 SIGNATURE DATE 9/14/12

REVISIONS: INIT. DATE

SIG. INVENTORY NO. 03-0844

12-SEP-2012 12:00 S:\IT\S&I\TIS\Sig\nc\edi\2018ECL-NC\030844-sm_e1e-xxx.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, 3, 4, 5 AND 6.
- 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 51).

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 51).

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 51).

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

← NOTICE GREEN FLASH

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

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

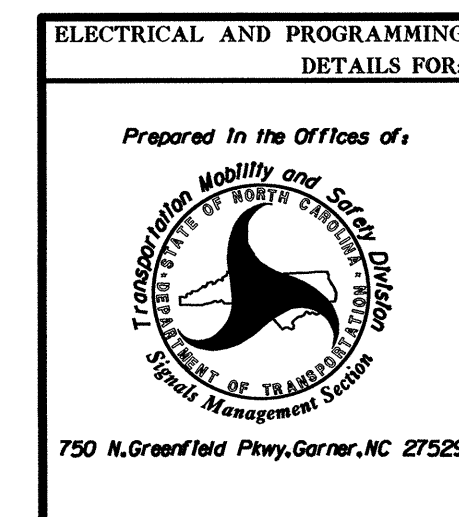
← NOTICE GREEN FLASH

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

OVERLAP PROGRAMMING COMPLETE

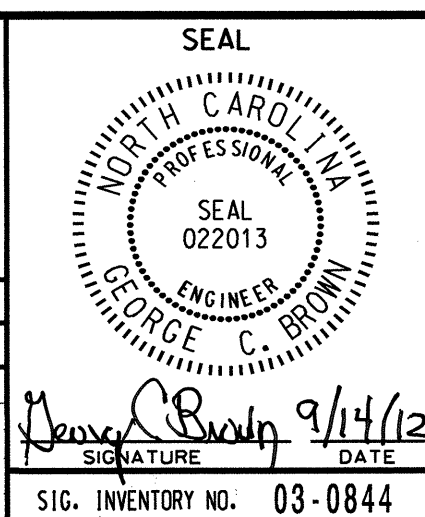
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0844
DESIGNED: August 2012
SEALED: 09/11/12
REVISED: N/A

Electrical Detail Sheet 2 of 2



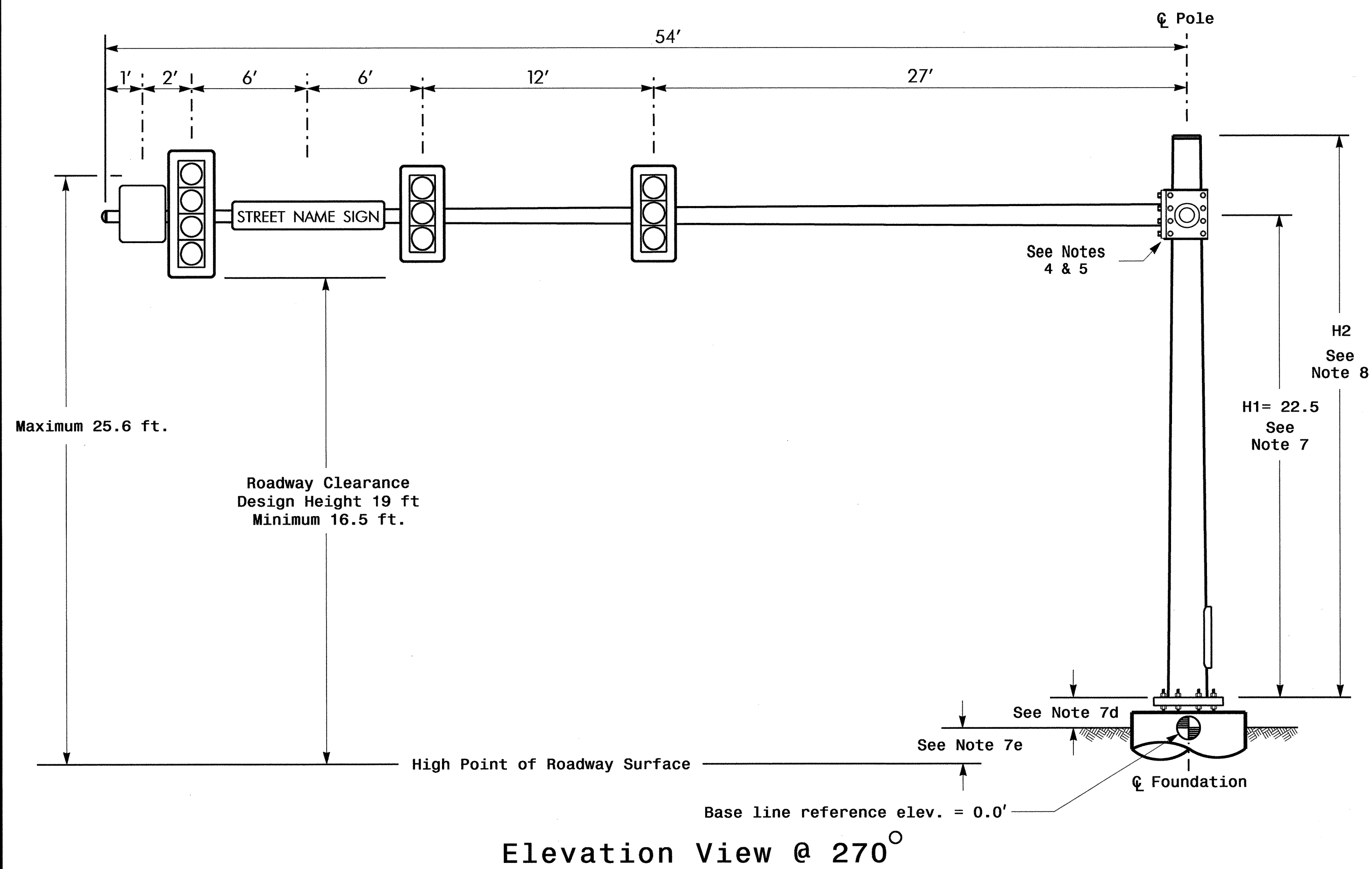
Old NC 133 (Long Beach Road)
at
Live Oak Village Shopping Center
Division 3 Brunswick County Southport

PLAN DATE: September 2012	REVIEWED BY: [Signature]
PREPARED BY: C. Strickland	REVIEWED BY:
REVISIONS	INIT. DATE



12-SEP-2012 12:01 S:\IT\SS\WITS_Signal\workgroups\sig Mem\strickland\030844_sme_e_03xxx.dgn

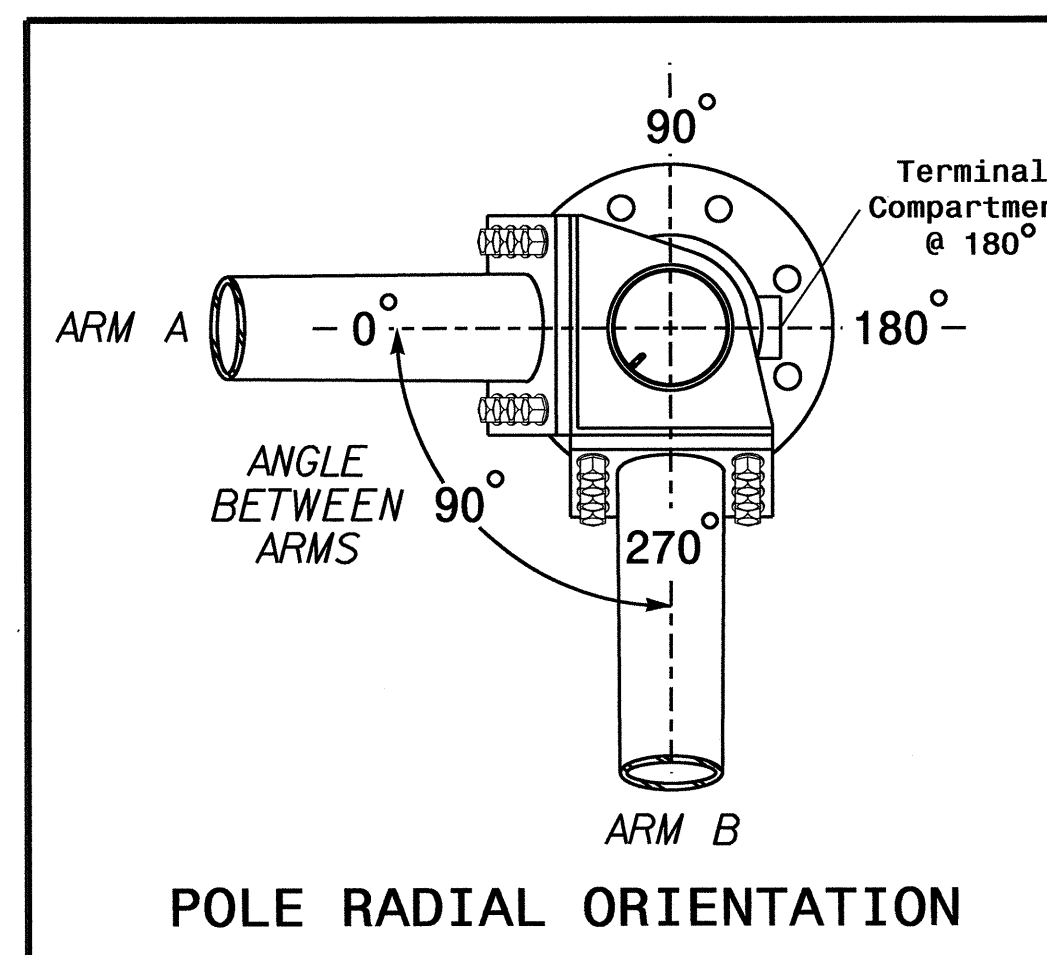
Design Loading for METAL POLE NO. 12, MAST ARM A



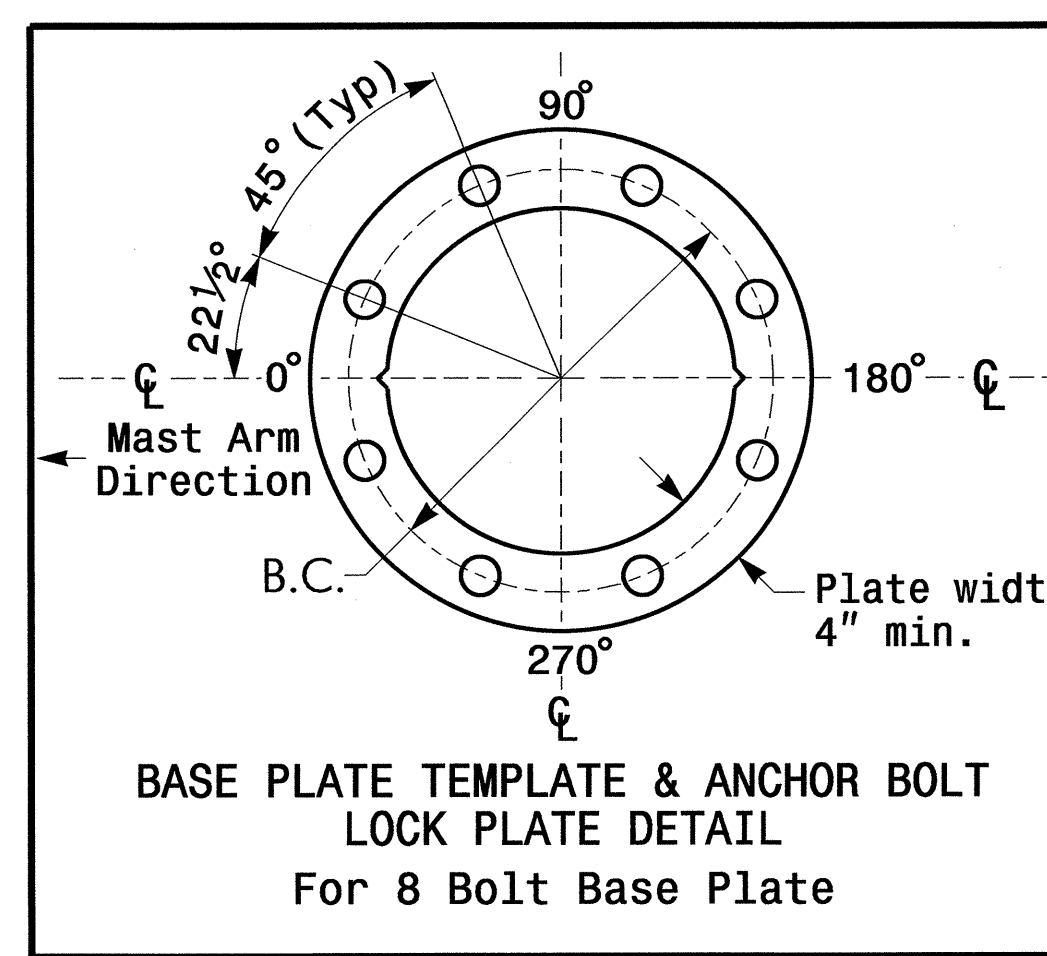
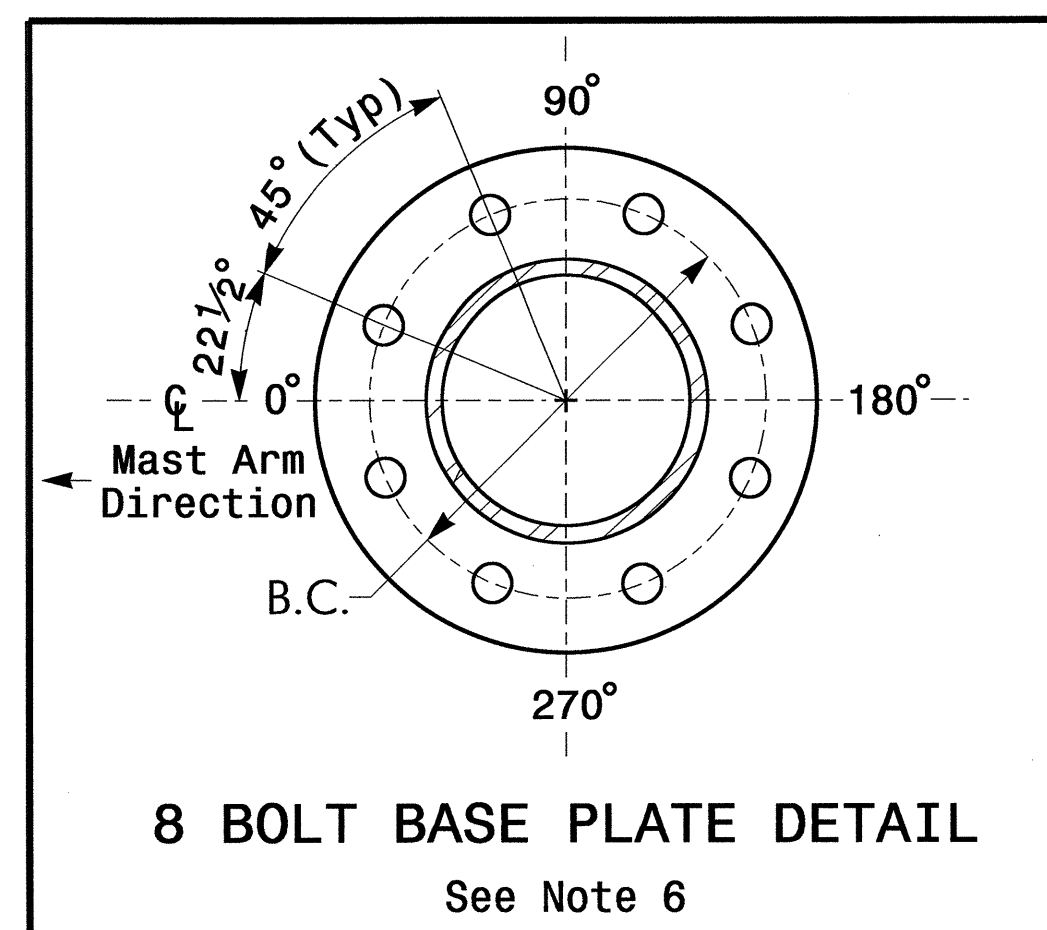
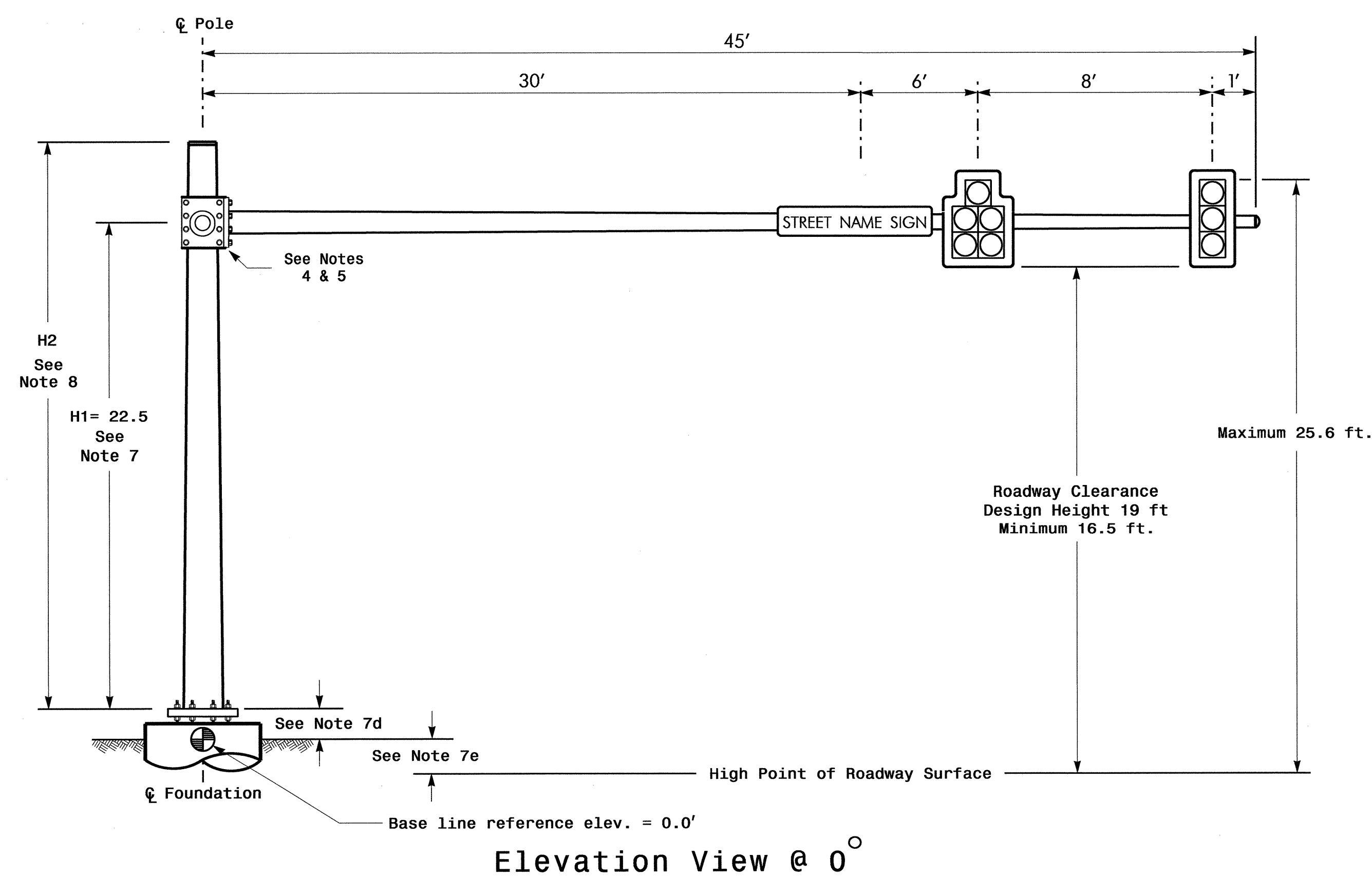
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.4 ft.	+1.4 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



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



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]	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
[Symbol]	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 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.

Design Requirements

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

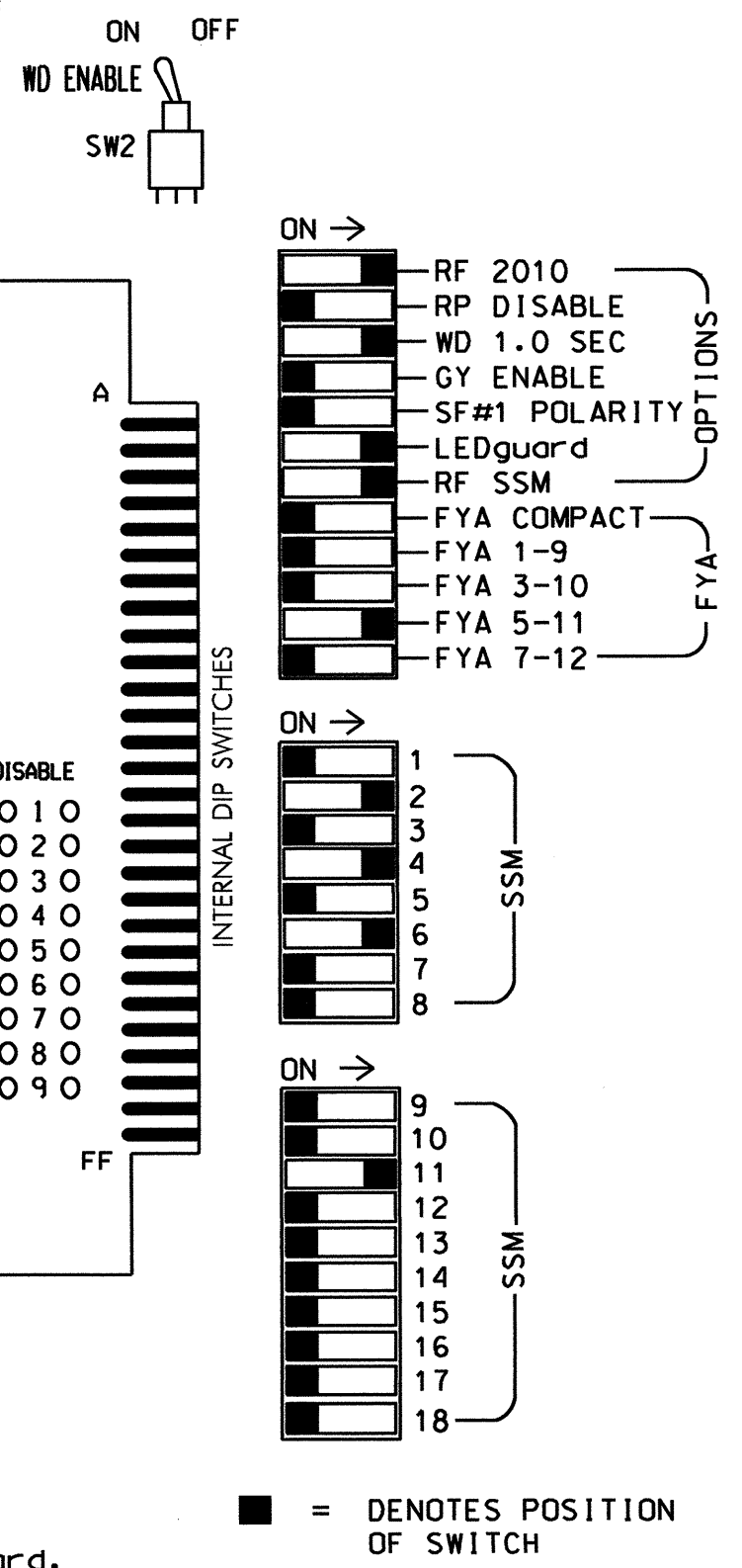
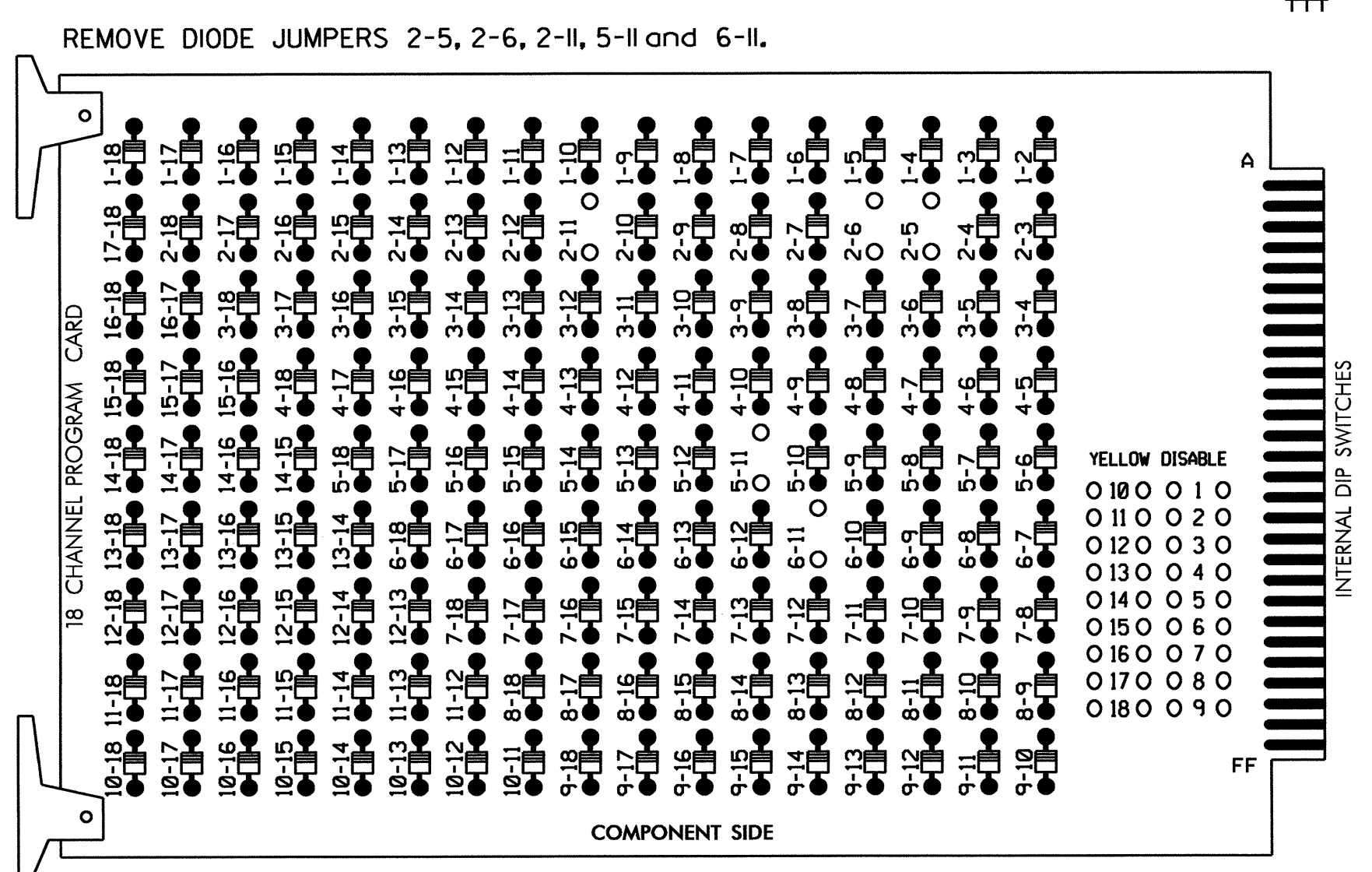
NCDOT Wind Zone 2 (130 mph)

	Old NC 133 (Long Beach Road) at Live Oak Village Shopping Center		SEAL JASON P. GALLOWAY PROFESSIONAL ENGINEER STATE OF NORTH CAROLINA LICENSE NO. 29904 9/4/12
	Division 3 Brunswick County Southport PLAN DATE: August 2012 REVIEWED BY: J. P. Galloway	PREPARED BY: I. O. UMOZURIKE REVIEWED BY:	
SCALE: N/A 0 N/A	REVISIONS:	INIT. DATE:	SIGNATURE: DATE:
SIG. INVENTORY NO. 03-0844			9/4/12

EDI MODEL 2018ECL-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. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
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 NC 87/133/211 Closed Loop 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.....S2,S5,S7,S8,AUX S4
 PHASES USED.....2,4,5,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

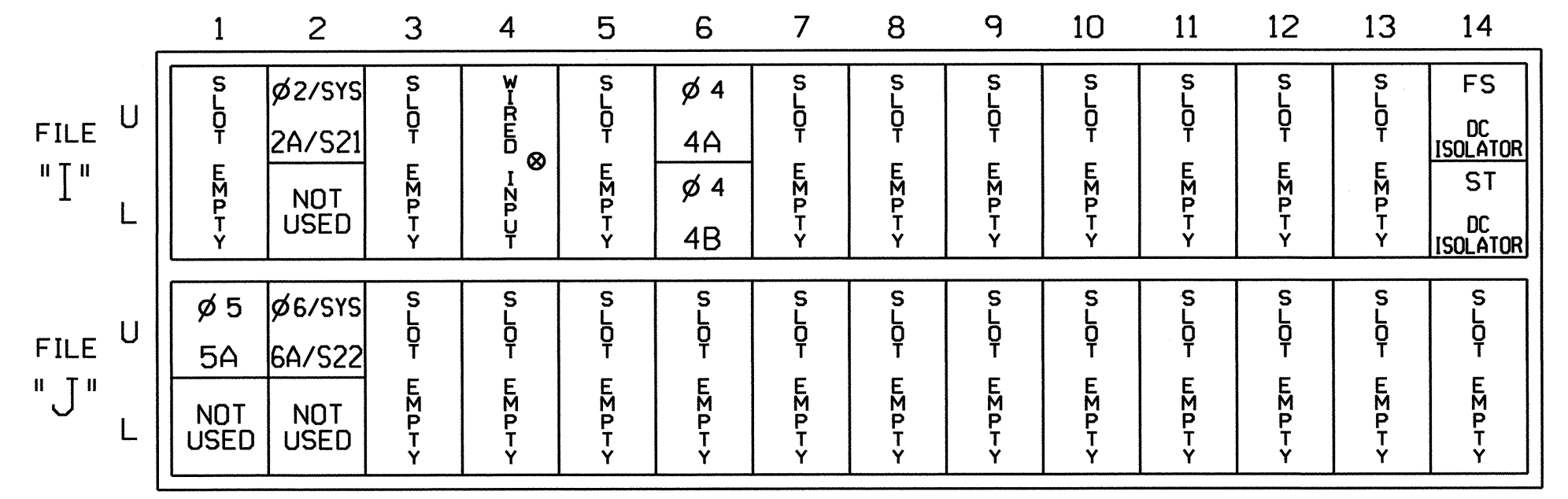
SIGNAL HEAD HOOK-UP CHART

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.	NU	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	51	NU	NU	
RED		128			101			134											
YELLOW		129			102		*	135											
GREEN		130			103			136											
RED ARROW																		A114	
YELLOW ARROW																			A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW								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

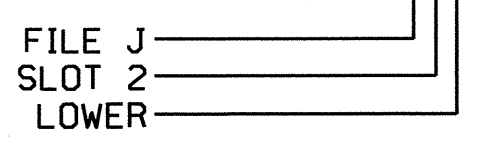
⊗ Wired Input - Do not populate slot with detector card

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
2A/S21	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			5
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y	Y		15
6A/S22	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			3

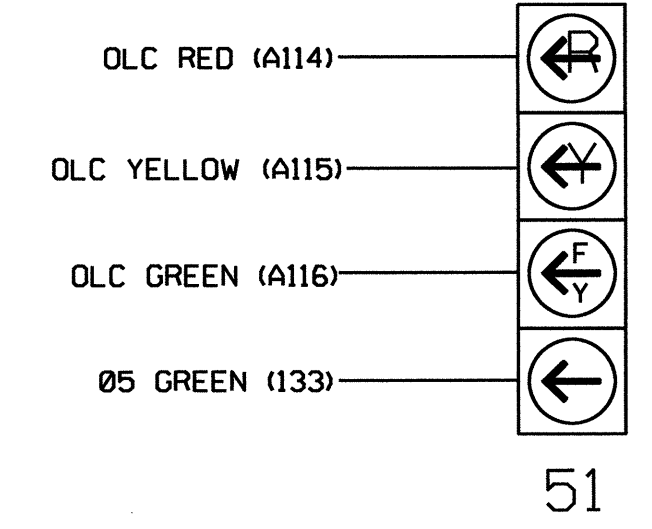
¹Add jumper from J1-W to 14-W, on rear of input file.

INPUT FILE POSITION LEGEND:



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



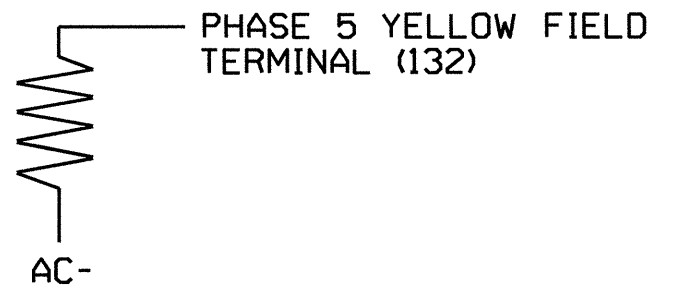
NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



ELECTRICAL DETAIL SHEET 1 OF 2

Prepared In the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

NC 87 (River Road)/
 NC 87-133 (River Road)
 at
 New NC 133
 Division 3 Brunswick County Southport
 PLAN DATE: August 2012 REVIEWED BY: T. J. J.
 PREPARED BY: C. Strickland REVIEWED BY:
 REVISIONS INIT. DATE

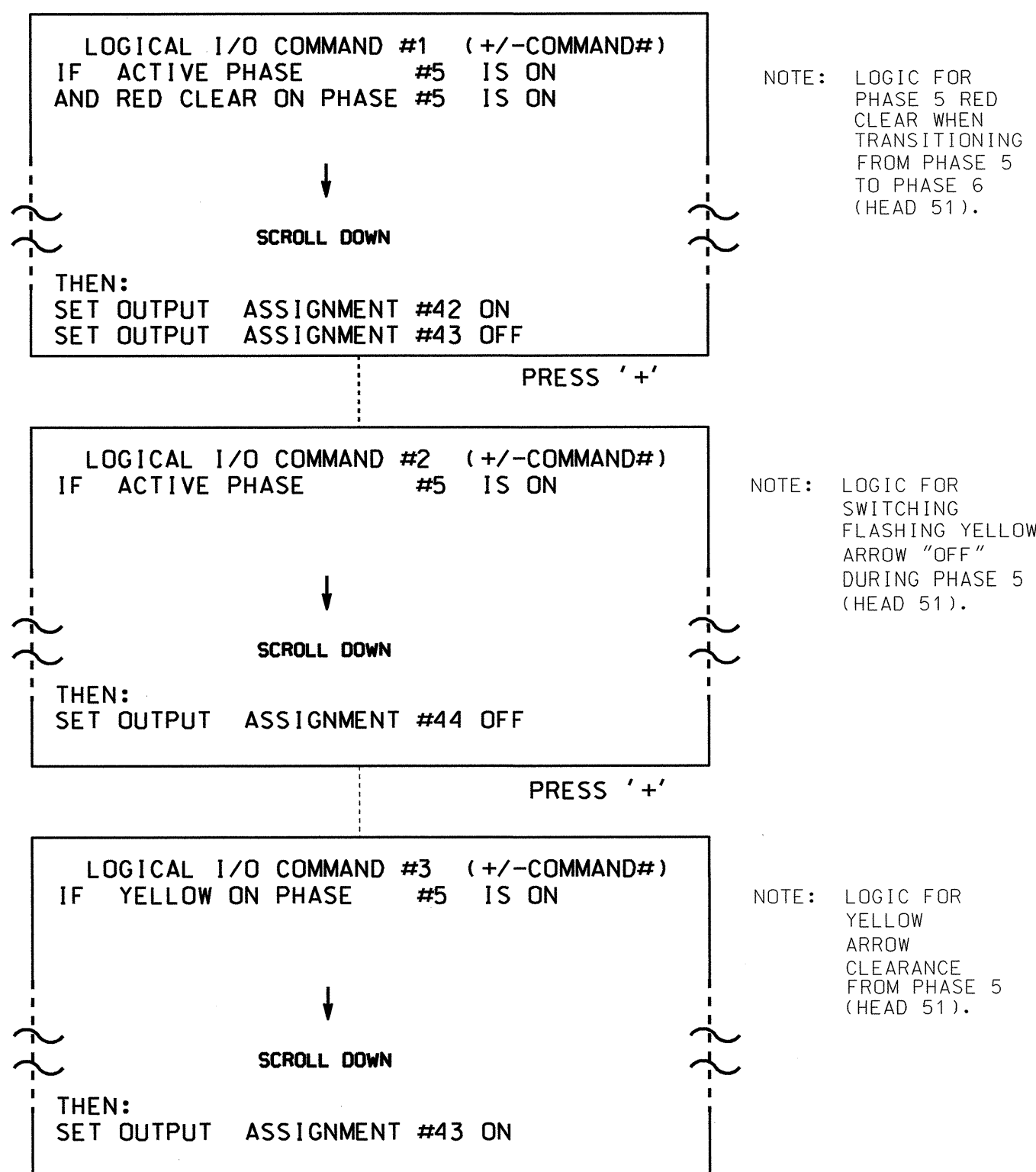
SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN
 SIGNATURE DATE
 SIG. INVENTORY NO. 03-1033

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1033
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

**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).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

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)...0.0
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

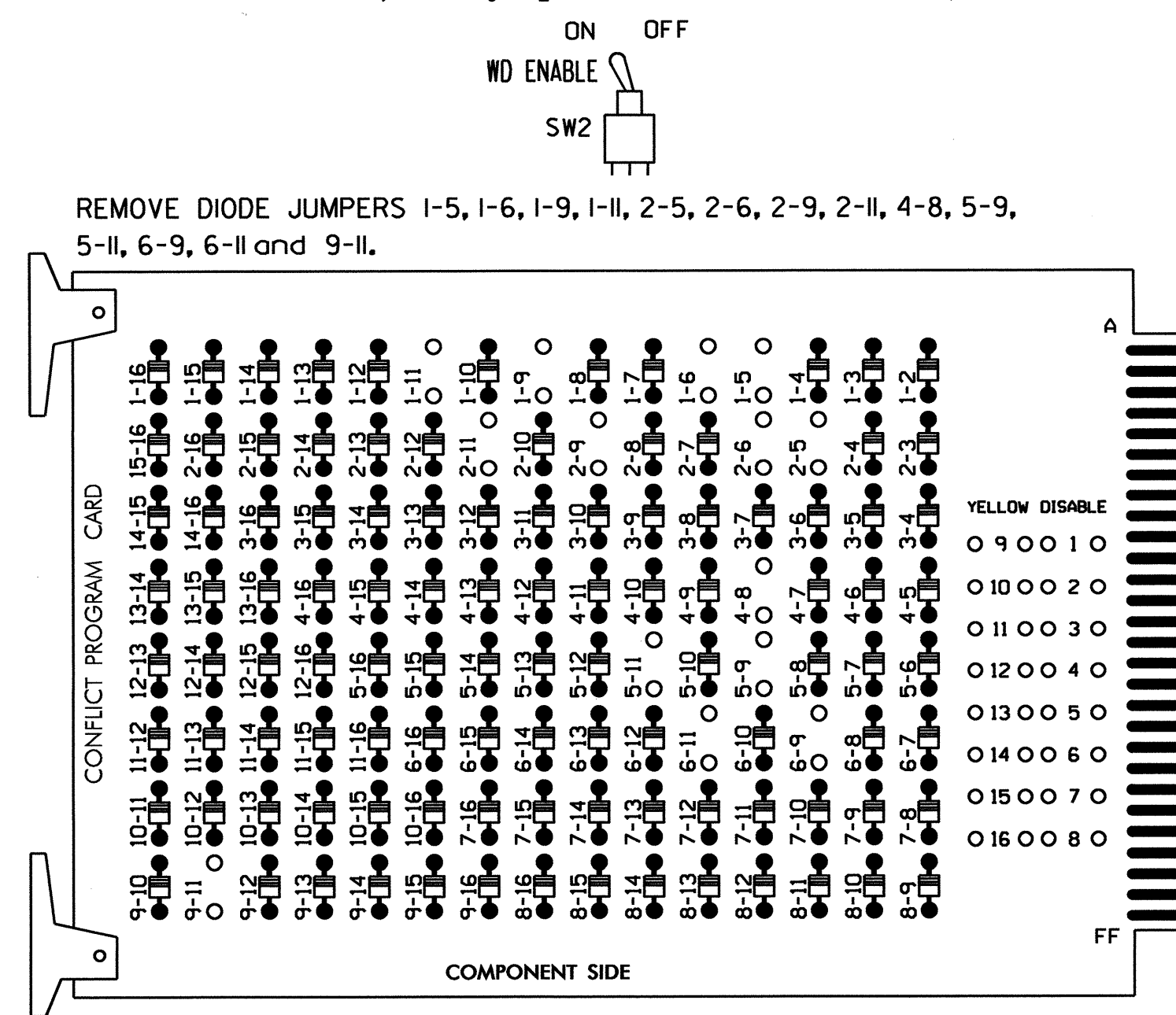
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1033
DESIGNED: July 2012
SEALED: 09/11/12
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	NC 87 (River Road)/ NC 87-133 (River Road) at NEW NC 133		SEAL ENGINEER GEORGE C. BROWN
	Division 3	Brunswick County	Southport
	PLAN DATE: August 2012	REVIEWED BY: T. J. J.	
	PREPARED BY: G. Strickland	REVIEWED BY:	
REVISIONS _____ INIT. DATE _____		SIGNATURE: DATE: 9/13/12	
			SIG. INVENTORY NO. 03-1033

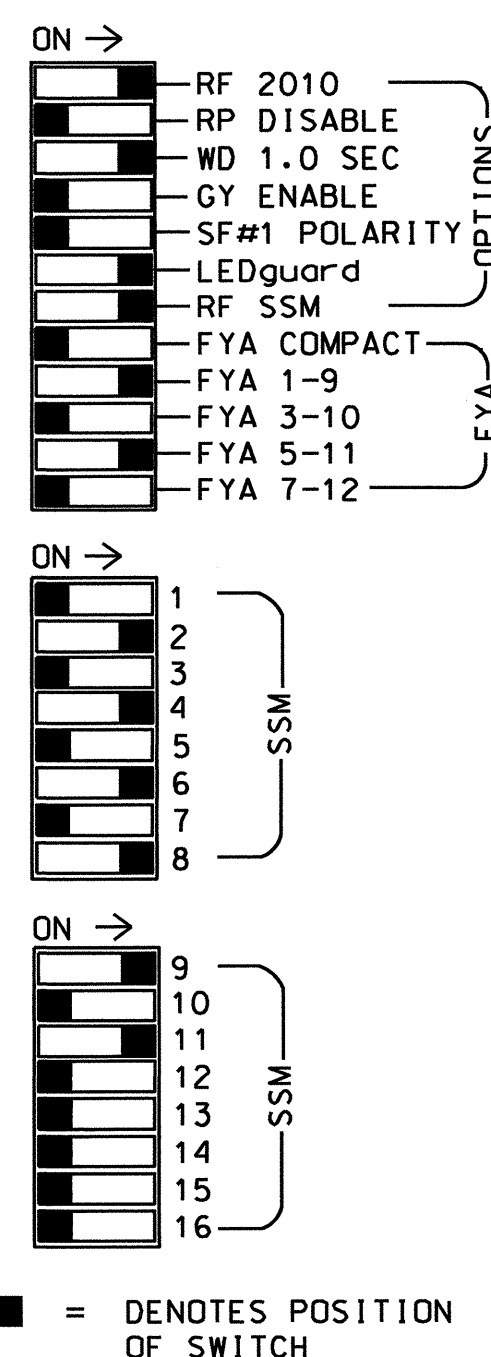
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(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 1,3,5,7,10,12,13,14,15 & 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 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.

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,S6,S8,S9,S12
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

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	9	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11*	21,22	NU	NU	41,42	NU	51*	61,62	NU	NU	81,82	NU	11*	NU	NU	51*	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											

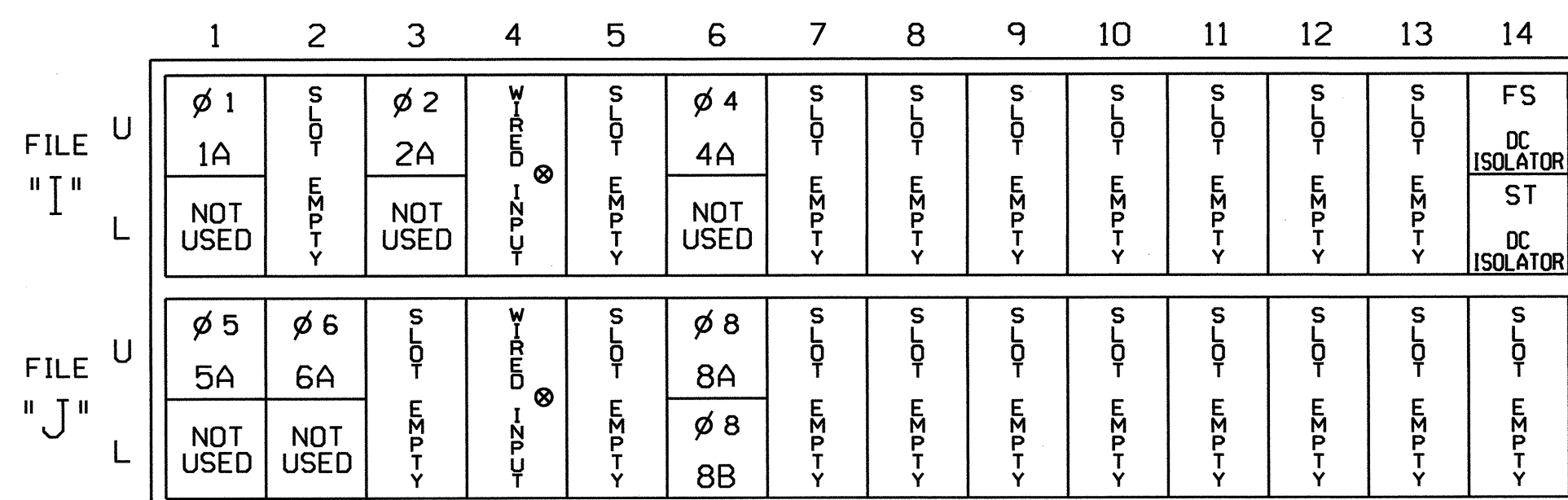
NU = Not Used

* 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

⊗ Wired Input - Do not populate slot with detector card

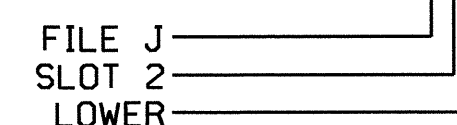
INPUT FILE CONNECTION & PROGRAMMING CHART

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 ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
		J4U	48	10	26	6	Y	Y	Y		3
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			15
		I4U	47	9	22	2	Y	Y	Y		3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

¹Add jumper from I1-W to J4-W. on rear of input file.

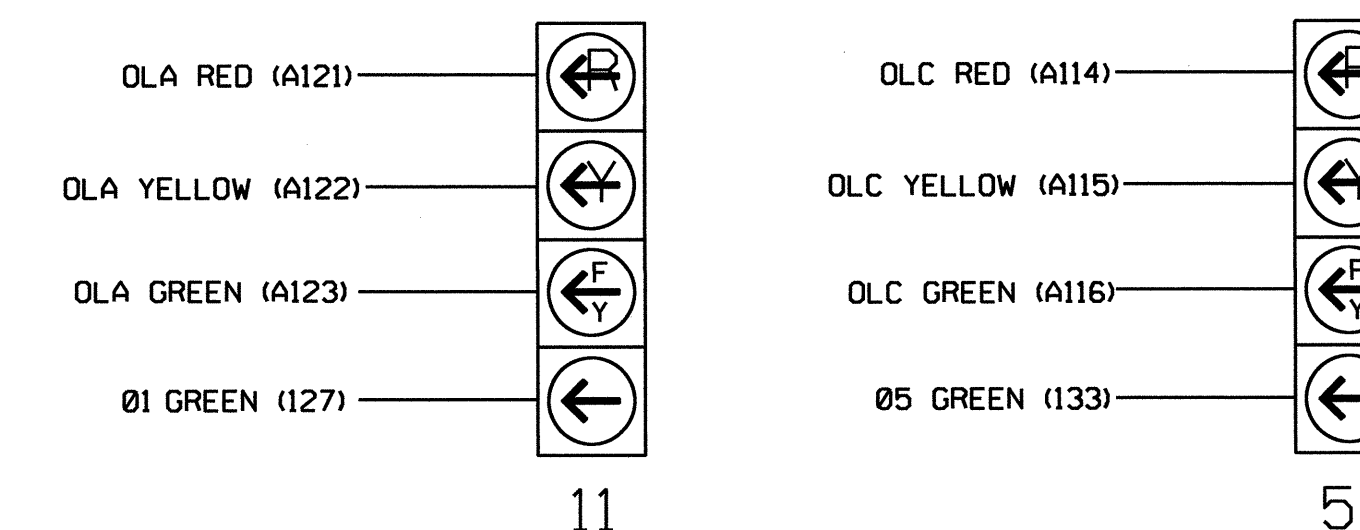
²Add jumper from J1-W to I4-W. on rear of input file.

INPUT FILE POSITION LEGEND: J2L



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 of 2 for programming instructions.

BACKUP PROTECTION NOTE

(program controller as shown below)

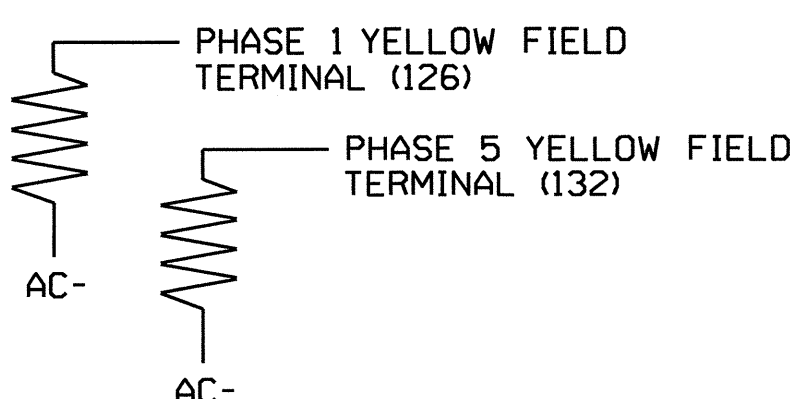
From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

! IMPORTANT: If present, remove all phases from 'Backup Protect'.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0425T1
 DESIGNED: August 2012
 SEALED: 09/11/12
 REVISED: N/A

Electrical Detail - Temp 1 - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	NC 87/133 & NC 133 at NC 87 & Sunny Point Road		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN ENGINEER Signature: George C. Brown 9/13/12 DATE
	Division 3 Brunswick County Sunny Point		
	PLAN DATE: August 2012 PREPARED BY: C. Strickland	REVIEWED BY: T. J. [Signature] REVIEWED BY:	
	REVISIONS INIT. DATE	DATE	

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 51).

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 51).

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 51).

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

← NOTICE GREEN FLASH

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

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

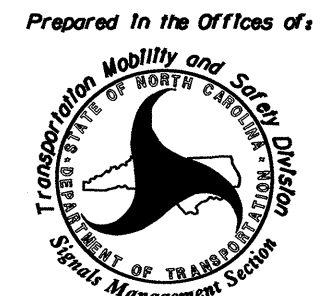
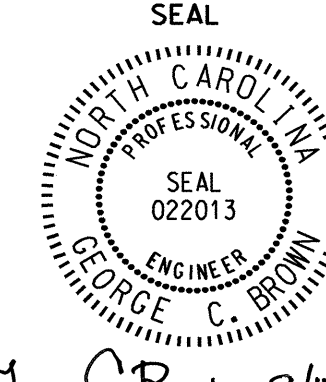
← NOTICE GREEN FLASH

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

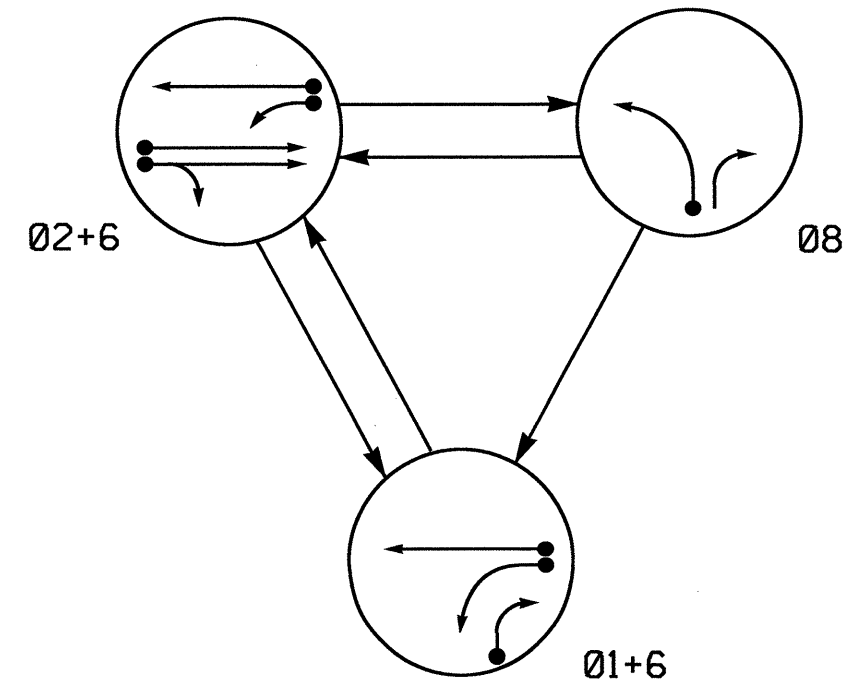
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0425T1
DESIGNED: August 2012
SEALED: 09/11/12
REVISED: N/A

Electrical Detail - Temp 1 - Sheet 2 of 2

<p>Prepared In the Offices of:</p>  <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 87/133 & NC 133 at NC 87 & Sunny Point Road</p> <p>Division 3 Brunswick County Sunny Point</p> <p>PLAN DATE: August 2012 REVIEWED BY: <i>T. J. Strickland</i></p> <p>PREPARED BY: C. Strickland 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				<p>SEAL</p>  <p><i>George C. Brown</i> 9/13/12 SIGNATURE DATE</p> <p>SIG. INVENTORY NO. 03-0425T1</p>
REVISIONS	INIT.	DATE						

PHASING DIAGRAM



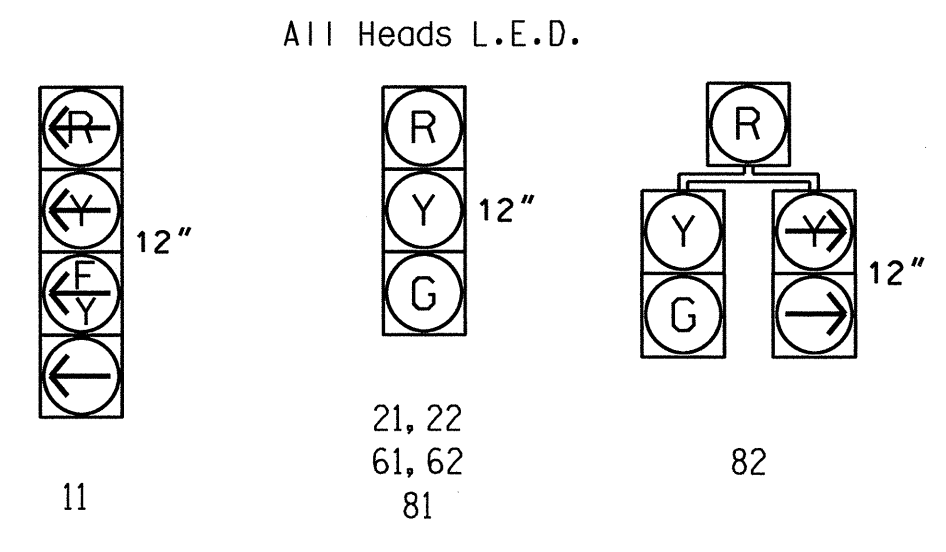
PHASING DIAGRAM DETECTION LEGEND
 ● DETECTED MOVEMENT
 ◀ UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 - - - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	01+6	02+6	08	F L S H
11	-	F	R	Y
21, 22	R	G	R	Y
61, 62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

F = Flashing Yellow Arrow

SIGNAL FACE I.D.



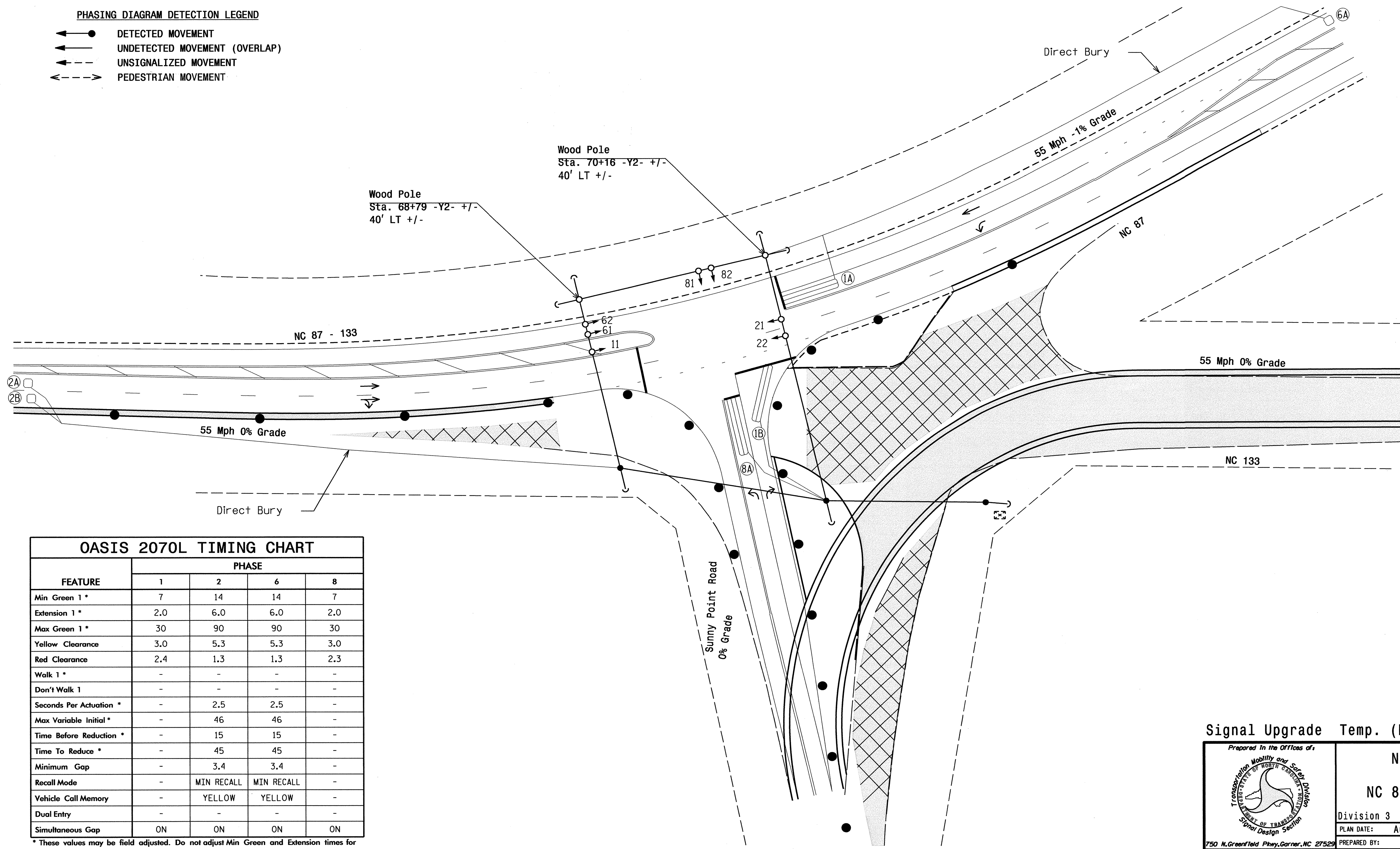
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	STRETCH TIME		
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	15	-
2A	6X6	420	6	Y	2	Y	Y	-	-	-
2B	6X6	420	6	Y	2	Y	Y	-	-	-
6A	6X6	420	6	Y	6	Y	Y	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	3	-

5 Phase Fully Actuated (Isolated)

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. Set all detector units to presence mode.



OASIS 2070L TIMING CHART

FEATURE	PHASE			
	1	2	6	8
Min Green 1 *	7	14	14	7
Extension 1 *	2.0	6.0	6.0	2.0
Max Green 1 *	30	90	90	30
Yellow Clearance	3.0	5.3	5.3	3.0
Red Clearance	2.4	1.3	1.3	2.3
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	2.5	2.5	-
Max Variable Initial *	-	46	46	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.4	3.4	-
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	● → N/A
○ → 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
- - - Right of Way	- - - Right of Way
→ Directional Arrow	→ Directional Arrow
→ Pavement Marking Arrow	→ Pavement Marking Arrow
● Construction Zone Drums	● Construction Zone Drums
⊕ "YIELD" Sign (R1-2)	⊕ "YIELD" Sign (R1-2)

Signal Upgrade Temp. (Phase III)

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

750 N. Grandfield Pkwy, Garner, NC 27529

NC 87/133 & NC 133 at NC 87 & Sunny Point Road

Division 3 Brunswick County Sunny Point

PLAN DATE: August 2012 REVIEWED BY: J. P. Galloway

PREPARED BY: IOU/JPG REVISIONS: INIT. DATE

SCALE: 1" = 40'

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29904

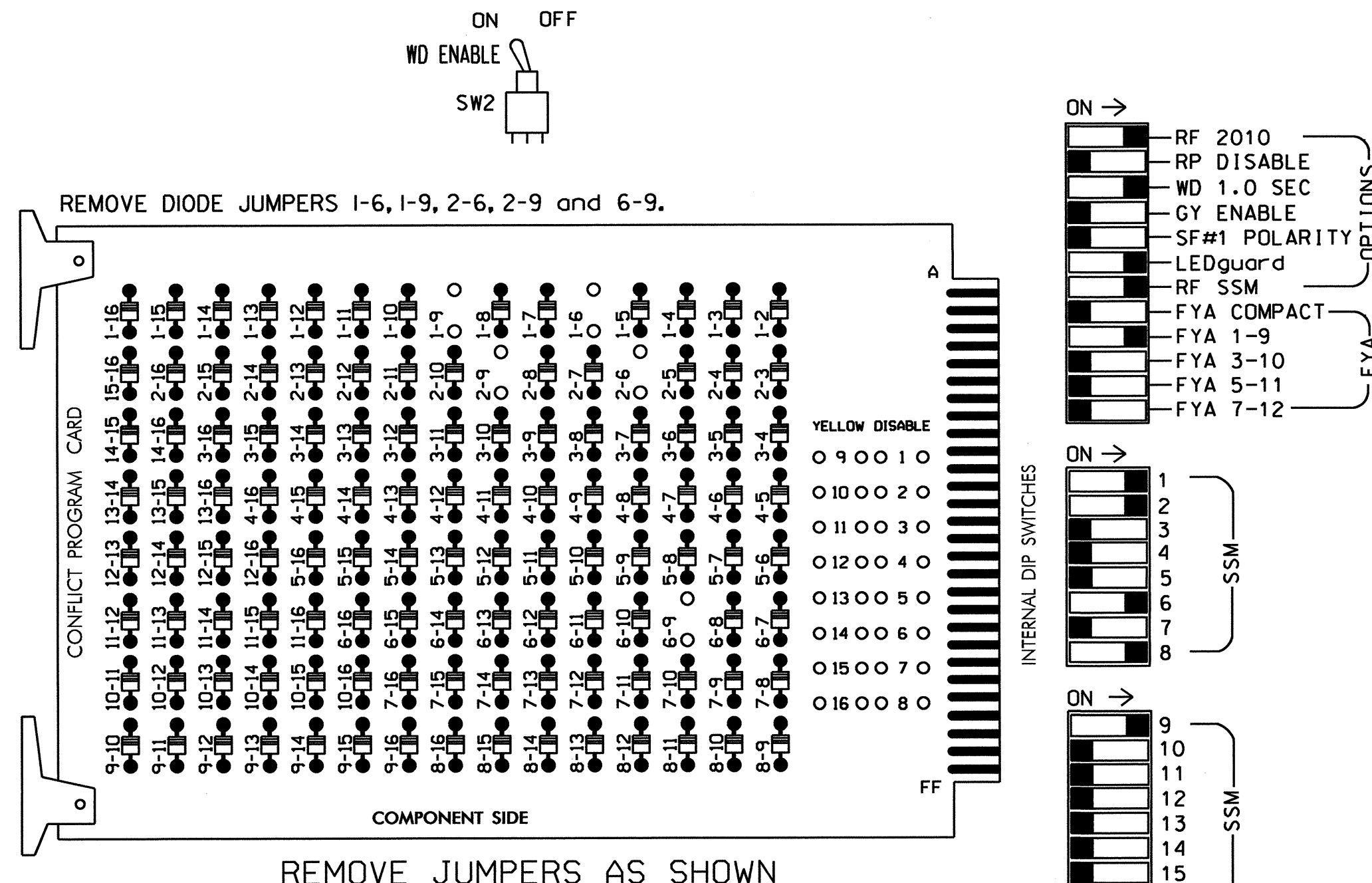
SIGNATURE: J. P. Galloway DATE: 9/11/12

SIG. INVENTORY NO. 03-0425T2

11-SEP-2012 08:24 R:\tr-off\cws\gn01\sig\03-0425\030425T2.dgn 2012mdd .dgn

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 3,4,5, 7,10,11,12,13,14,15 & 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 Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

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*	82	21,22	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11*	NU	NU	NU	NU	NU
RED	*	128						134			107							
YELLOW		129						135			108							
GREEN		130						136			109							
RED ARROW																		A121
YELLOW ARROW		126																A122
FLASHING YELLOW ARROW																		A123
GREEN ARROW	127	127																

NU = Not Used

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

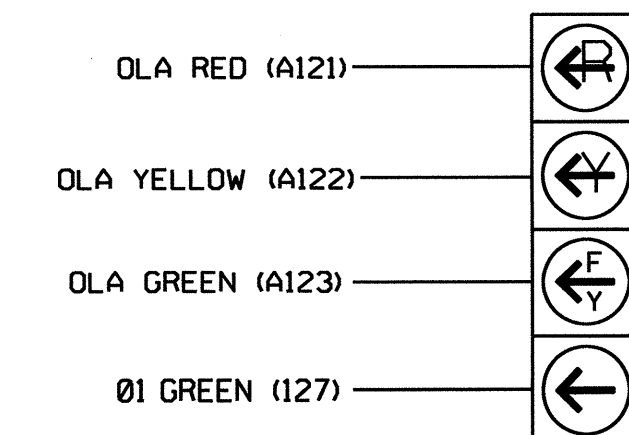
★ See pictorial of head wiring in detail below.

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,S6,S8,S9
 PHASES USED.....1,2,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



11

NOTE

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

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
 ST = STOP TIME

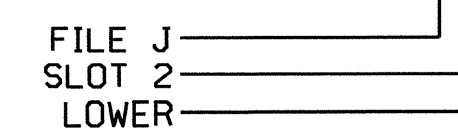
⊗ Wired Input - Do not populate slot with detector card

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 ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
		J4U	48	10	26	6	Y	Y	Y		3
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3

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

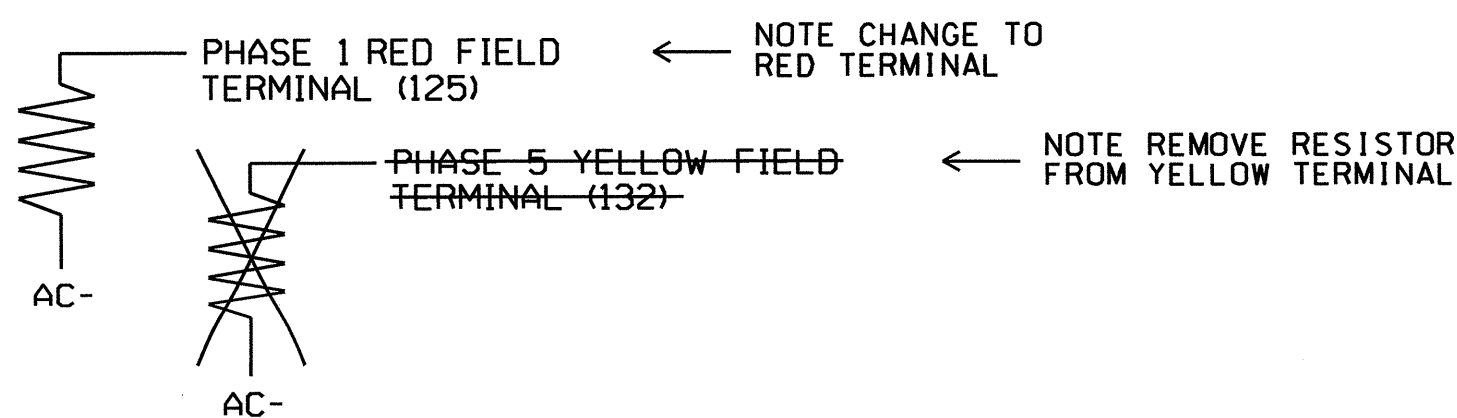
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



! IMPORTANT: Move Load Resistors from Yellow Field Terminal to Red Field Terminal for Phase 1.

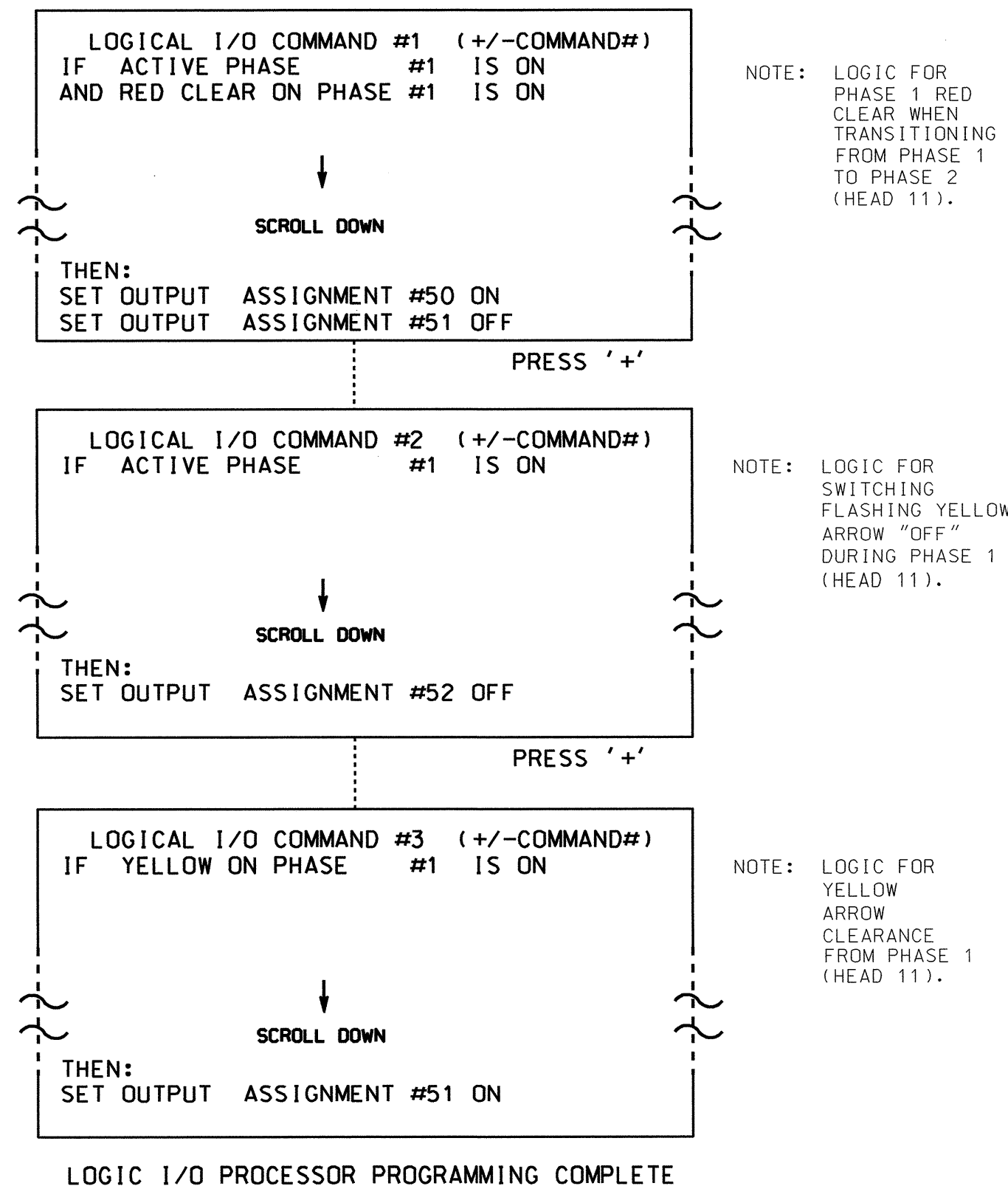
Electrical Detail - Temp 2 - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: TRANSPORTATION MOBILITY AND SAFETY SOLUTIONS, INC. 750 N. Greenfield Pkwy, Garner, NC 27529	NC 87/133 & NC 133 at NC 87 & Sunny Point Road Brunswick County Sunny Point		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GORGE C. BROWN 9/13/12 DATE
	PLAN DATE: August 2012 PREPARED BY: C. Strickland	REVIEWED BY: T. Jgn REVIEWED BY:	

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).



! IMPORTANT: If present, remove ACT LOGIC COMMANDS 4, 5 and 6.

OUTPUT REFERENCE SCHEDULE

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)...0.0
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:
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH...N
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
    
```

OVERLAP PROGRAMMING COMPLETE

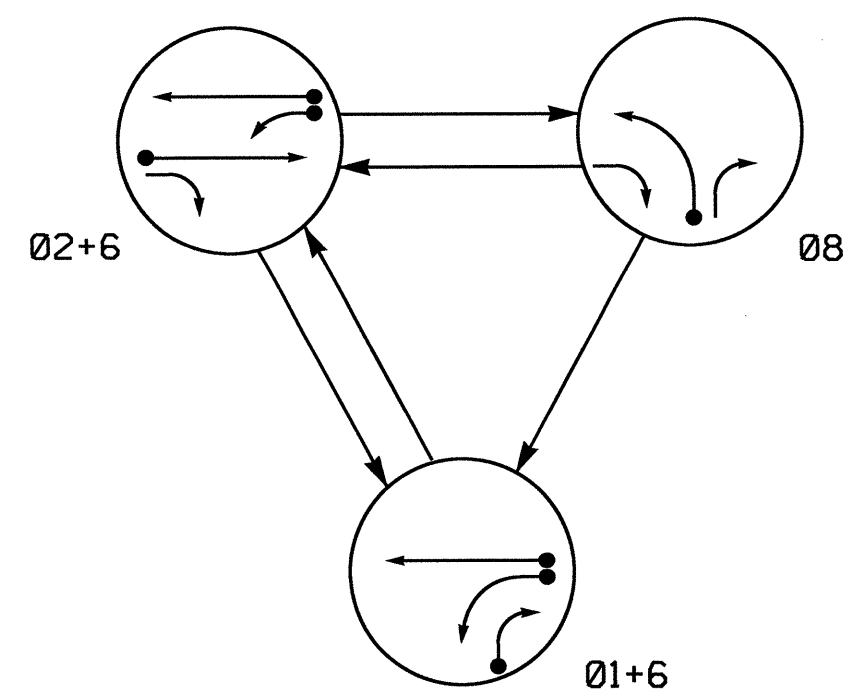
! IMPORTANT: Remove Overlap 'C' settings.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0425T2
DESIGNED: August 2012
SEALED: 09/11/12
REVISED: N/A

Electrical Detail - Temp 2 - Sheet 2 of 2

	Prepared In the Offices of: NC 87/133 & NC 133 at NC 87 & Sunny Point Road		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN	
	Division 3 Brunswick County Sunny Point	PLAN DATE: August 2012 REVIEWED BY: T. J. [Signature]		
	PREPARED BY: C. Strickland	REVIEWED BY:		REVISIONS INIT. DATE
	SIGNATURE: [Signature] DATE: 9/13/12			SIG. INVENTORY NO. 03-0425T2

PHASING DIAGRAM

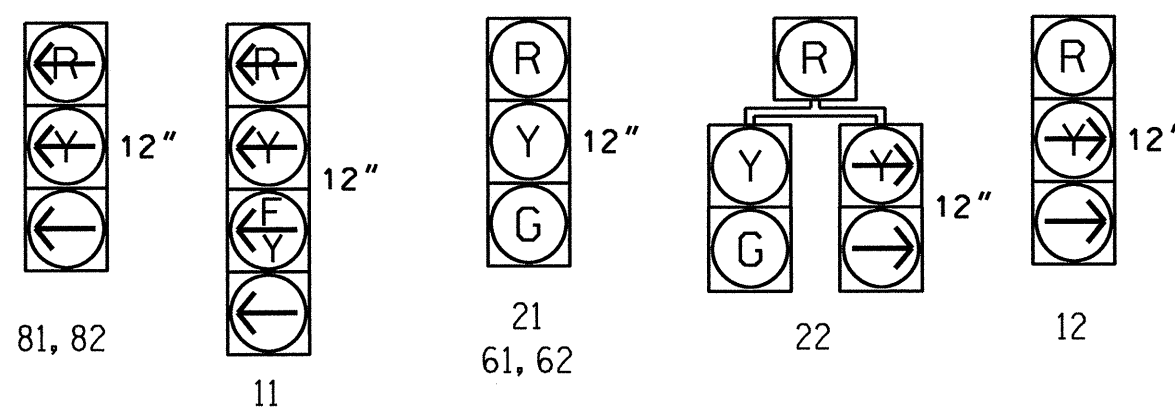


SIGNAL FACE	PHASE		
	Ø1+6	Ø2+6	Ø8
11	←	←	←
12	→	→	→
21	R	G	R
22	G	G	Y
61, 62	G	G	R
81, 82	←	←	←

← = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY		
1A	6X40	0	2-4-2	Y	1	Y	Y	—	15	—
1B	6X40	+10	2-4-2	Y	1	Y	Y	—	15	—
2A/S23	6X6	420	5	Y	2	Y	Y	—	—	Y
6A/S24	6X6	420	5	Y	6	Y	Y	—	—	Y
8A	6X40	+10	2-4-2	Y	8	Y	Y	—	3	—

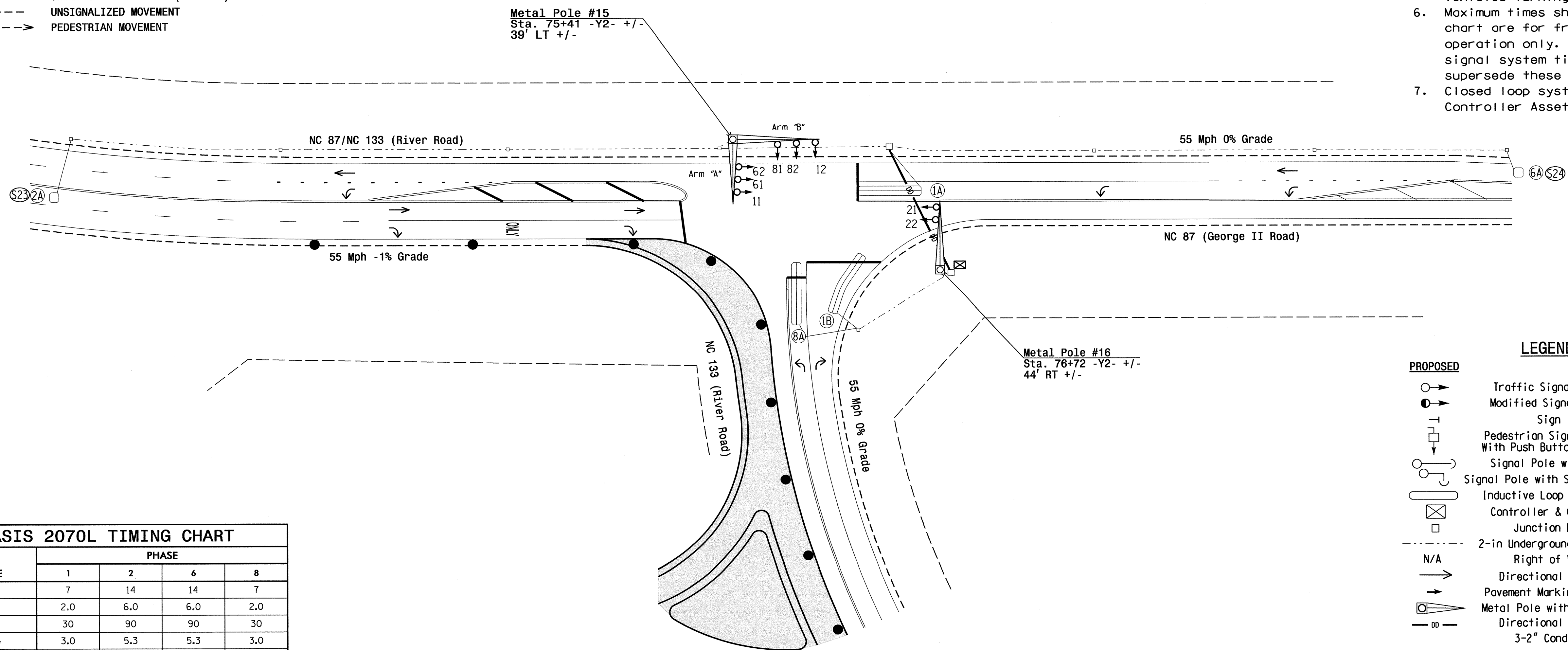
3 Phase Fully Actuated NC 87/133/211 Closed Loop System

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 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. Closed loop system data: Controller Asset #1032.

PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070L TIMING CHART

FEATURE	PHASE			
	1	2	6	8
Min Green 1 *	7	14	14	7
Extension 1 *	2.0	6.0	6.0	2.0
Max Green 1 *	30	90	90	30
Yellow Clearance	3.0	5.3	5.3	3.0
Red Clearance	2.6	1.6	1.6	2.4
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	2.5	2.5	-
Max Variable Initial *	-	46	46	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.4	3.4	-
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 |
| ○ T Sign | T Sign |
| ○ T Pedestrian Signal Head With Push Button & Sign | ○ T Pedestrian Signal Head With Push Button & Sign |
| ○ T Signal Pole with Guy | ○ T Signal Pole with Guy |
| ○ T Signal Pole with Sidewalk Guy | ○ T Signal Pole with Sidewalk Guy |
| □ Inductive Loop Detector | □ Inductive Loop Detector |
| □ Controller & Cabinet | □ Controller & Cabinet |
| □ Junction Box | □ Junction Box |
| --- 2-in Underground Conduit | --- 2-in Underground Conduit |
| N/A Right of Way | --- Right of Way |
| → Directional Arrow | → Directional Arrow |
| → Pavement Marking Arrow | → Pavement Marking Arrow |
| ○ Metal Pole with Mastarm | ○ Metal Pole with Mastarm |
| --- Directional Drill | N/A |
| --- 3-2" Conduit | N/A |

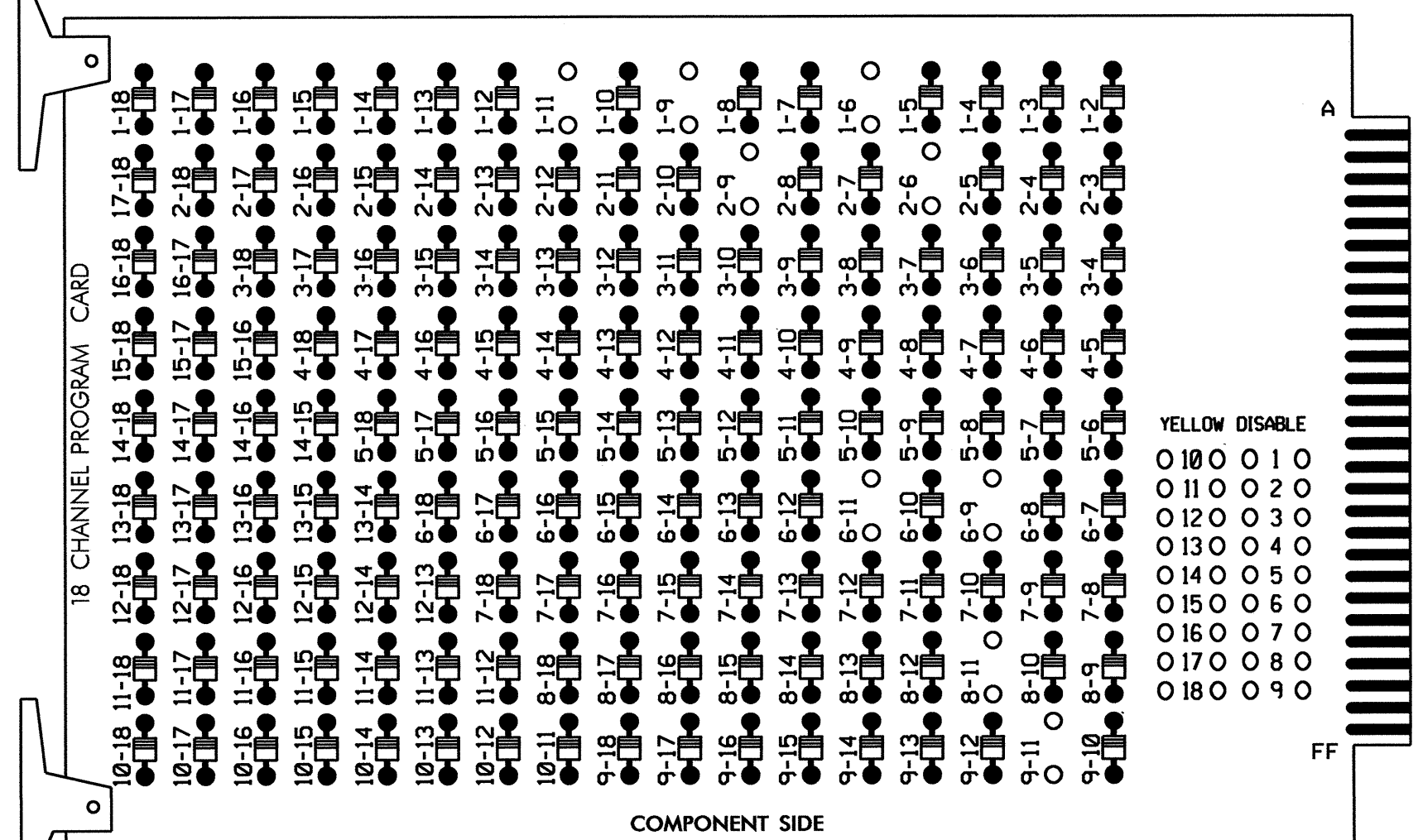
New Installation - Temp (Phase III)

	Prepared In the Offices of: NC 87-133 (River Road) / NC 87 (George II Highway) at NC 133 (River Road)		SEAL STATE OF NORTH CAROLINA PROFESSIONAL ENGINEER J. P. GALLOWAY 29904
	Division 3 Brunswick County Southport	PLAN DATE: July 2012	
PREPARED BY: IOU/JPG	REVISIONS:	REVIEWED BY:	DATE: 9/11/12
SCALE: 0 40 1" = 40'	REVISIONS:	INIT. DATE:	DATE:

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

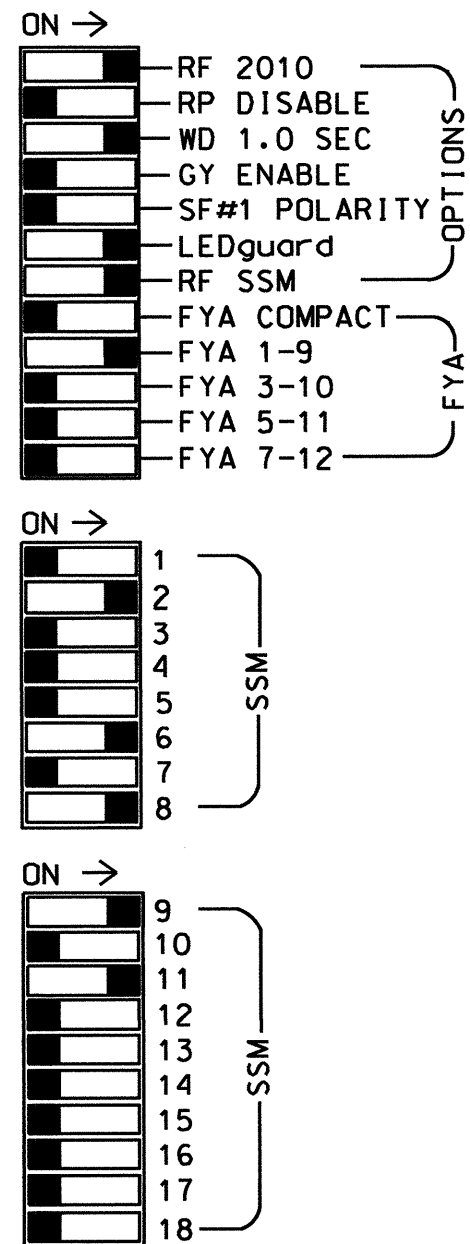
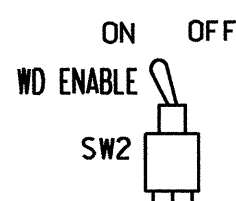
REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 2-6, 2-9, 6-9, 6-11, 8-11 and 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- 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.



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. 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, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the NC 87/133/211 Closed Loop 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,S8,S11,AUX S1,AUX S4
 PHASES USED.....1,2,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....1+8
 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*	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU	11*	NU	NU	12	NU
RED		128						134										A124
YELLOW	*	129						135										
GREEN		130						136										
RED ARROW											107		A121					
YELLOW ARROW											108	108	A122				A125	
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127										109	109						A126

NU = Not Used

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

★ See pictorial of head wiring in detail below.

** Flash Note: Wire Overlap "C" to flash on Flasher unit #2, Circuit #1.

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	S	S	S	S	S	S	S	S	S	FS
I	1A	1B	-	-	-	-	-	-	-	-	-	-	-	DC ISOLATOR
L	NOT USED	∅ 2/SYS	-	-	-	-	-	-	-	-	-	-	-	ST
		2A/S23	-	-	-	-	-	-	-	-	-	-	-	DC ISOLATOR
U	S	∅ 6/SYS	S	S	S	∅ 8	S	S	S	S	S	S	S	S
I	-	6A/S24	-	-	-	∅ 8	-	-	-	-	-	-	-	-
L	-	NOT USED	-	-	-	∅ 8	-	-	-	-	-	-	-	-
	-	-	-	-	-	∅ 8B	-	-	-	-	-	-	-	-

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

FS = FLASH SENSE
 ST = STOP TIME

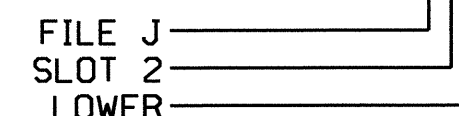
⊗ Wired Input - Do not populate slot with detector card

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 ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
		J4U	48	10	26	6	Y	Y	Y		3
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A/S23	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
6A/S24	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

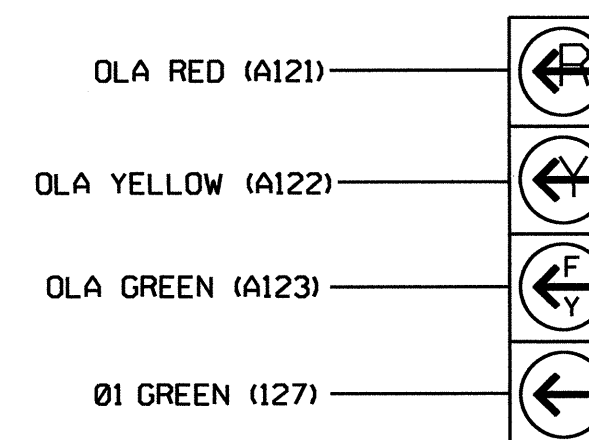
¹Add jumper from I1-W to J4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



11

NOTE

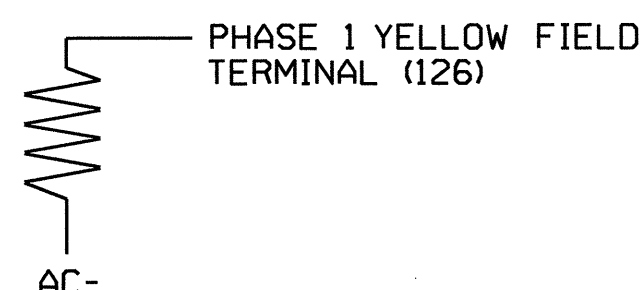
- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1032
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



Electrical Detail - Sheet 1 of 2

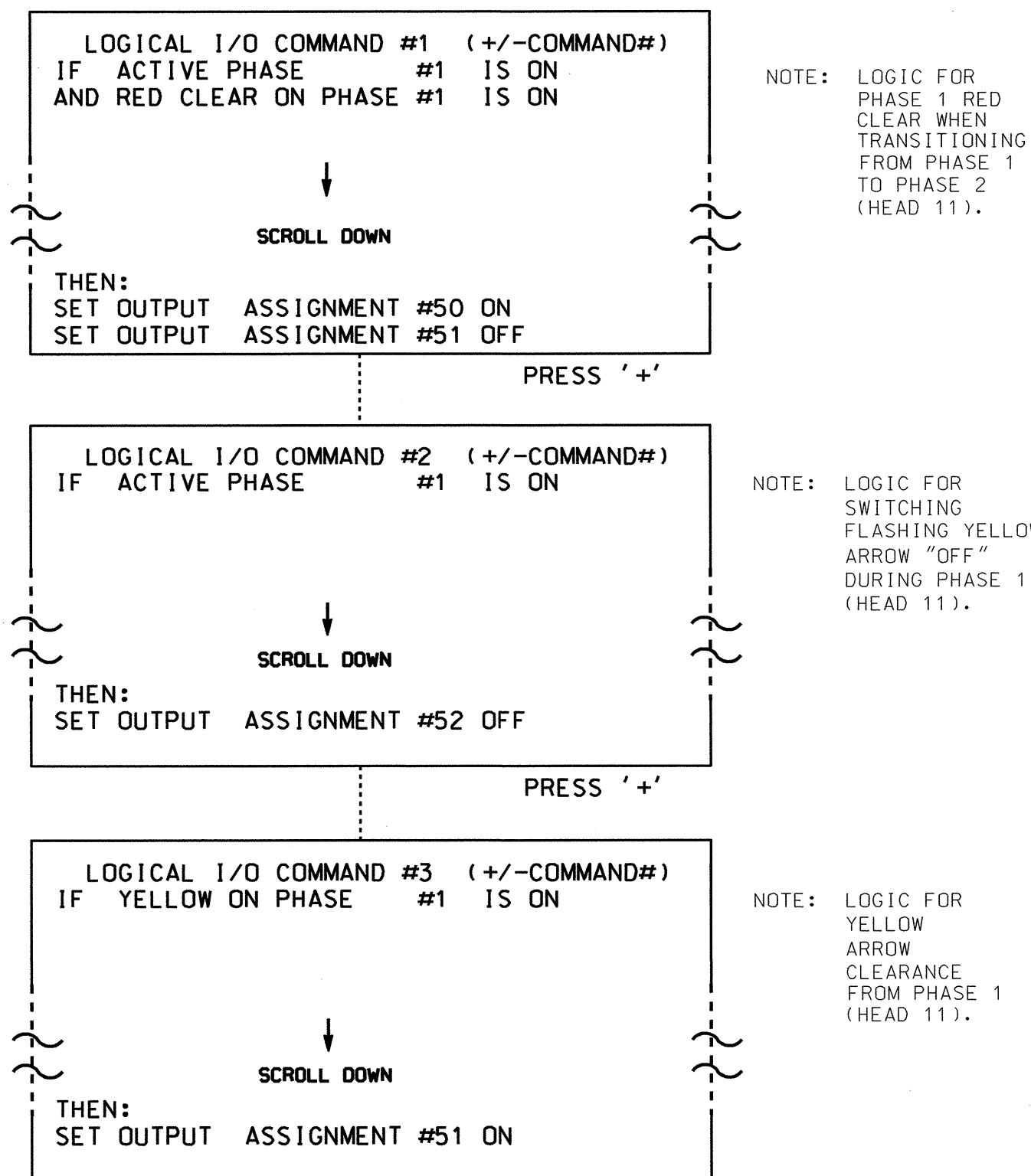
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	NC 87-133 (River Road)/ NC 87 (George II Highway) at NC 133 (River Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Division 3 Brunswick County Southport	PLAN DATE: August 2012 REVIEWED BY: <i>T. Strickland</i> PREPARED BY: C. Strickland REVIEWED BY:	
REVISIONS		INIT. DATE	SIGNATURE: <i>George C. Brown</i> 9/14/12 DATE

13-SEP-2012 11:17 S:\ITS\SUM\ITS_Sig\03-1032\Work\03-1032-sm-el-xxx.dgn

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



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
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 ← NOTICE GREEN FLASH
 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

PRESS '+' TWICE

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

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-1032
 DESIGNED: July 2012
 SEALED: 09/11/12
 REVISED: N/A

Electrical Detail - Sheet 2 of 2

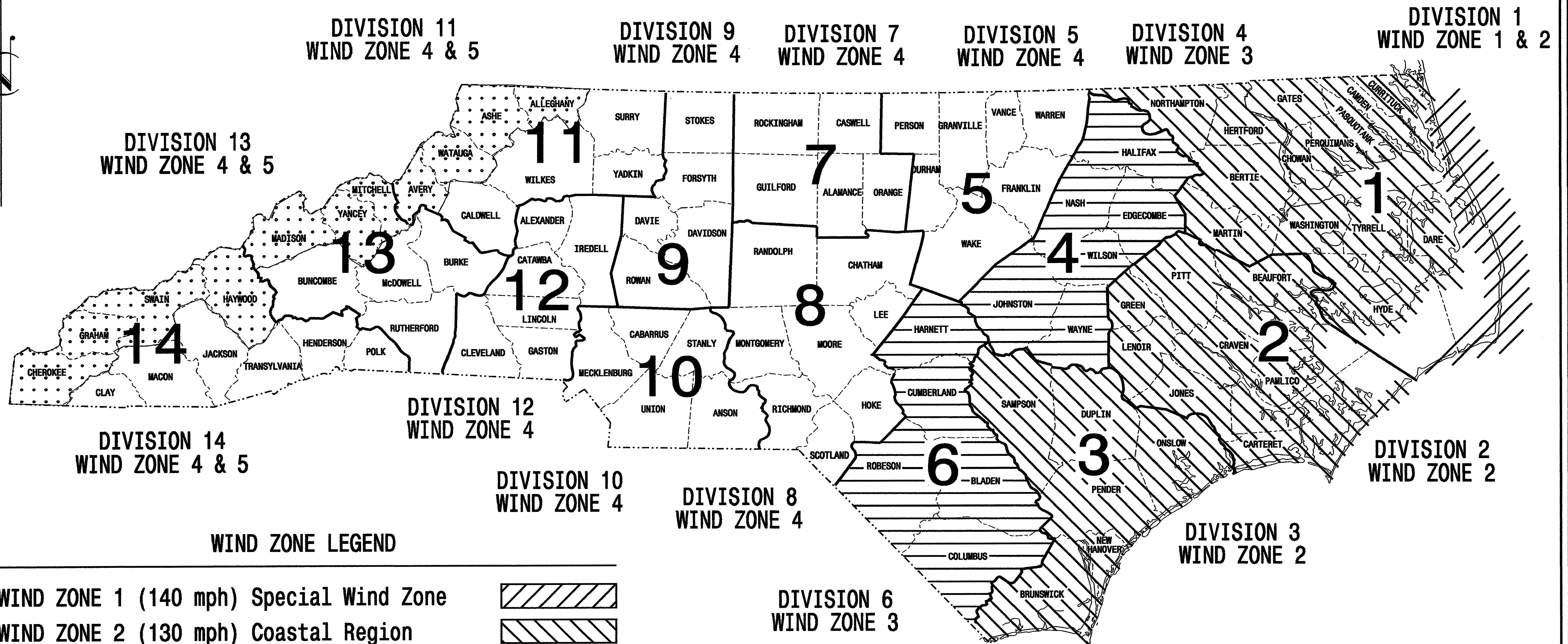
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	NC 87-133 (River Road)/ NC 87 (George II Highway) at NC 133 (River Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN SIGNATURE DATE
	Division 3 Brunswick County Southport	PLAN DATE: August 2012 REVIEWED BY: T. J. [Signature]	
REVISIONS INIT. DATE			SIG. INVENTORY NO. 03-1032

12-SEP-2012 08:25 S:\ITS\ASU\ITS_Signal\Workgroups\sig_Man\61rfr\ck\land\031032_sm.ele.xxx.dgn

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	R-3324	Sig. 49
F.A. PROJ. NO.	M 1	
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES



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

Prepared in the Offices of:

122 N. McDowell St., Raleigh, NC 27603

Designed in conformance with the 2002 Interim to the 4th Edition 2001

AASHTO

Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

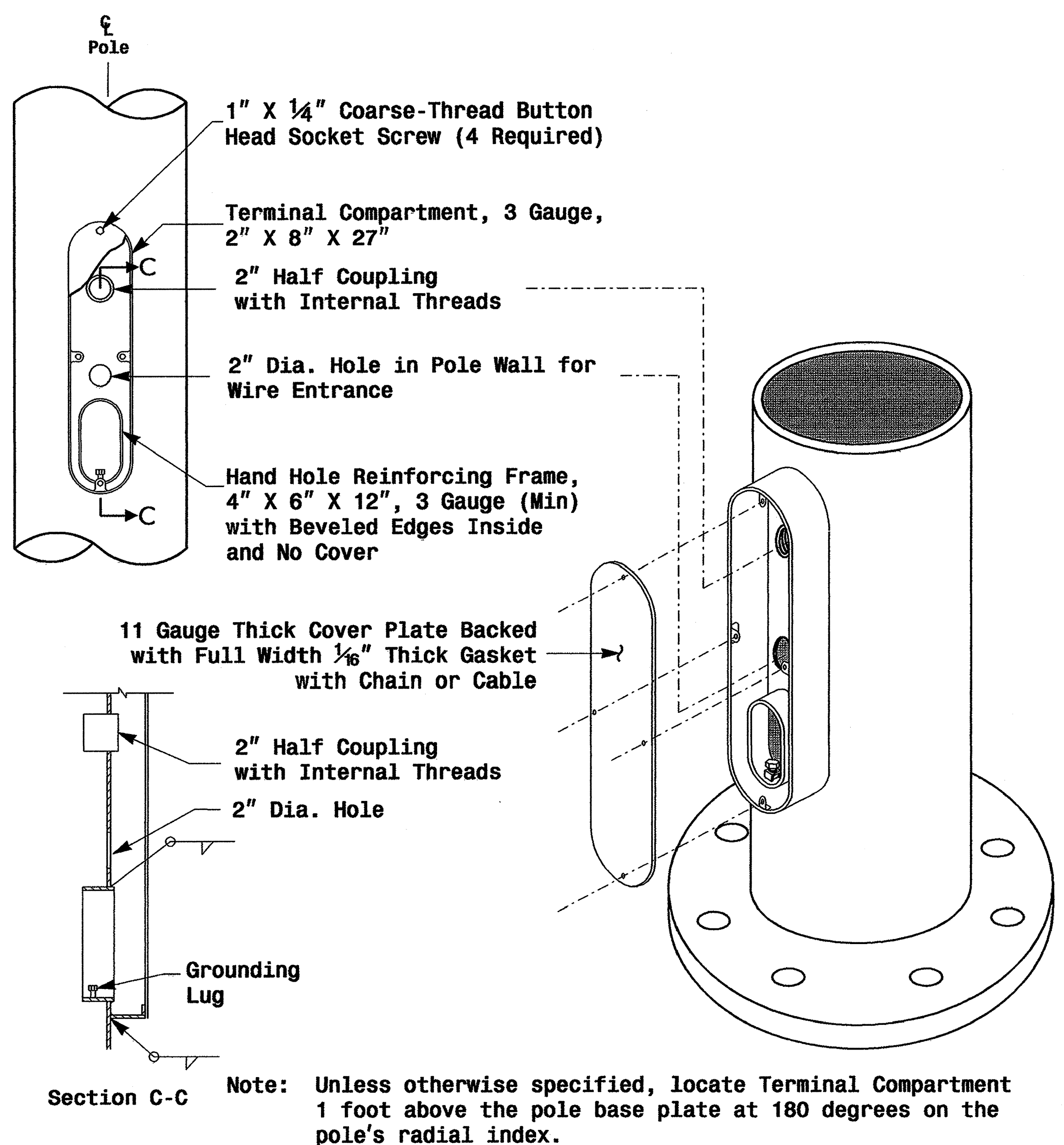
INDEX OF PLANS	
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

NCDOT CONTACTS:
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

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

SEAL

9.2.2005
DATE



Terminal Compartment Detail

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 _____	

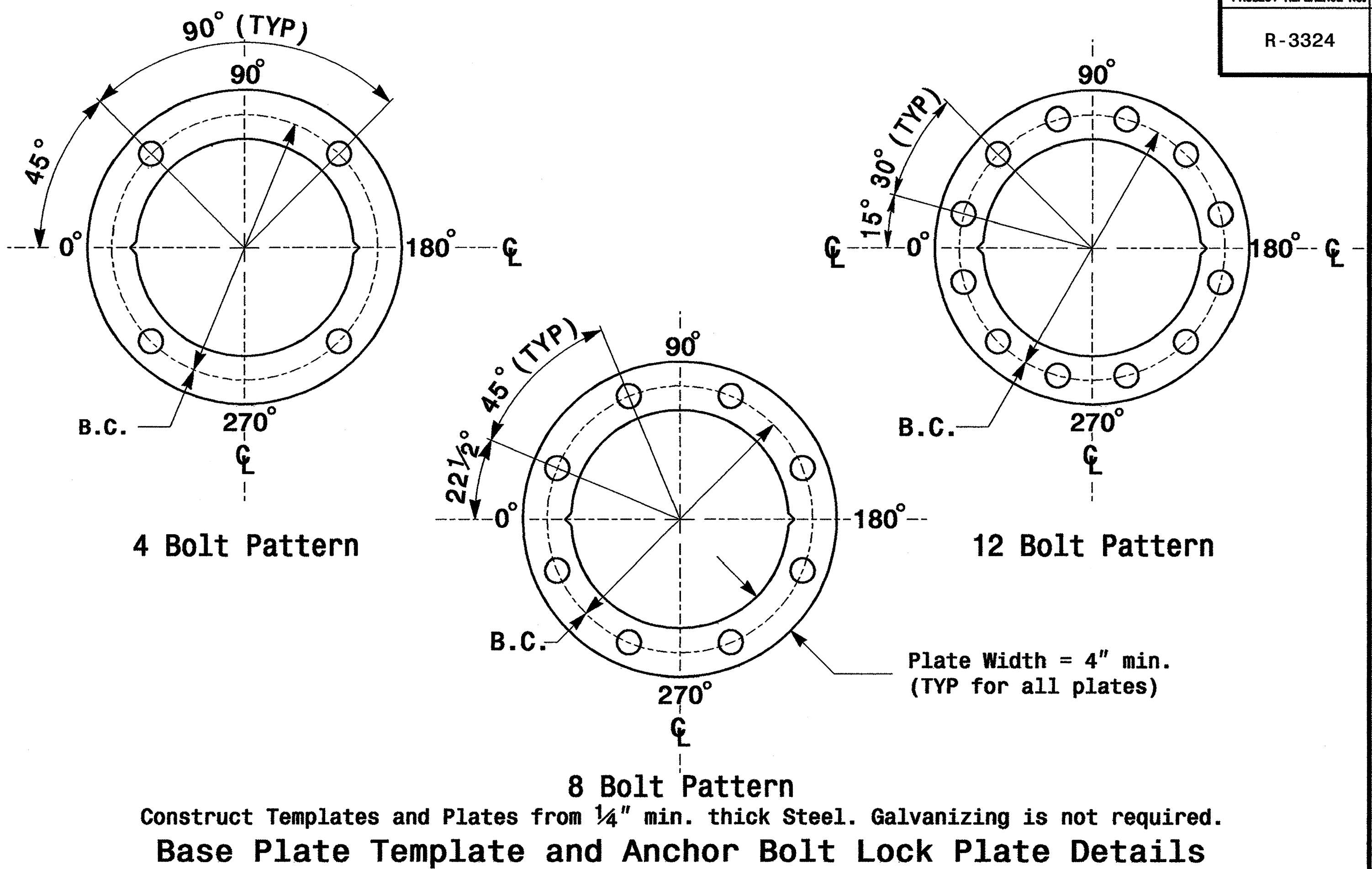
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	
NCDOT STANDARD _____	

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

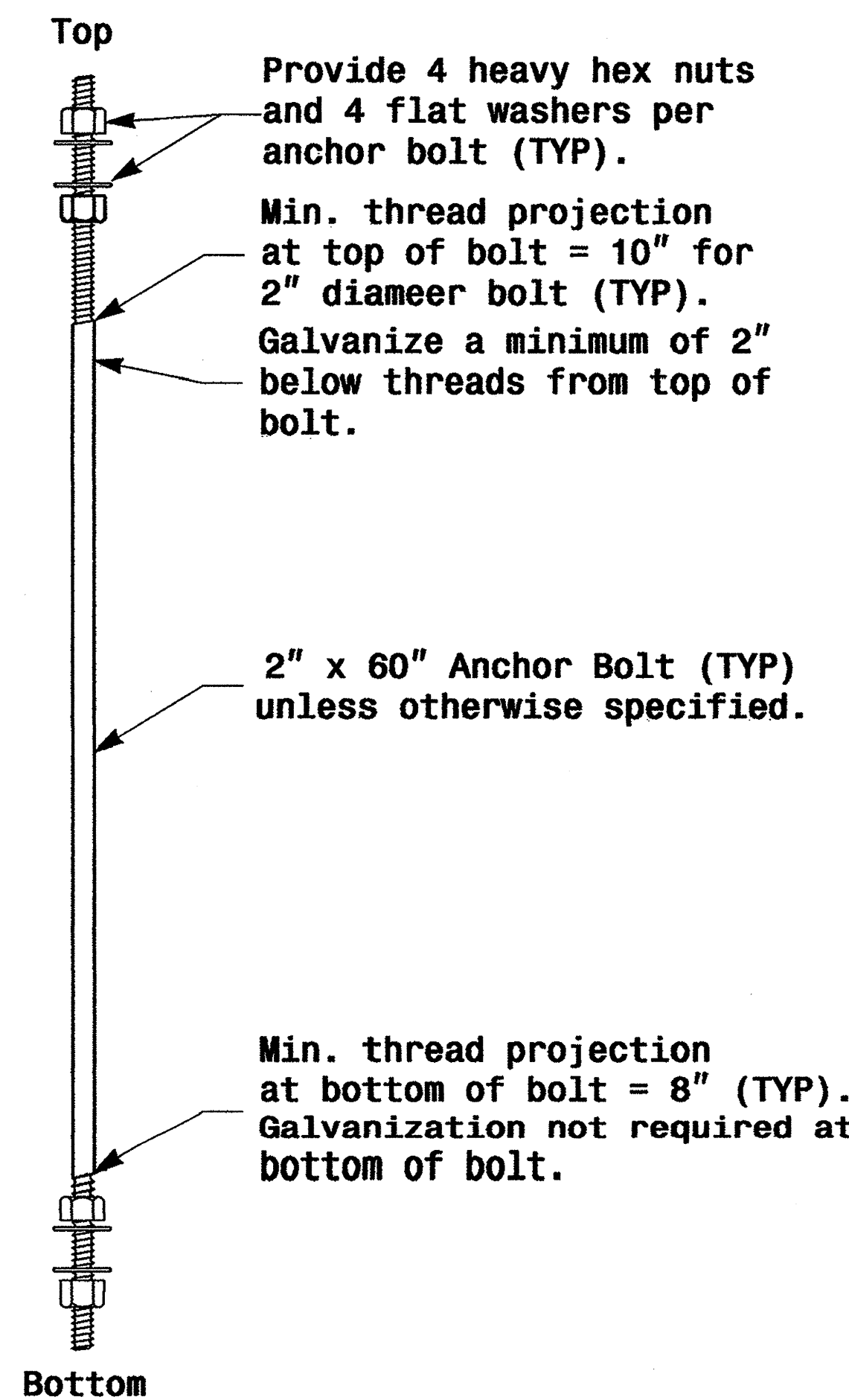
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

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

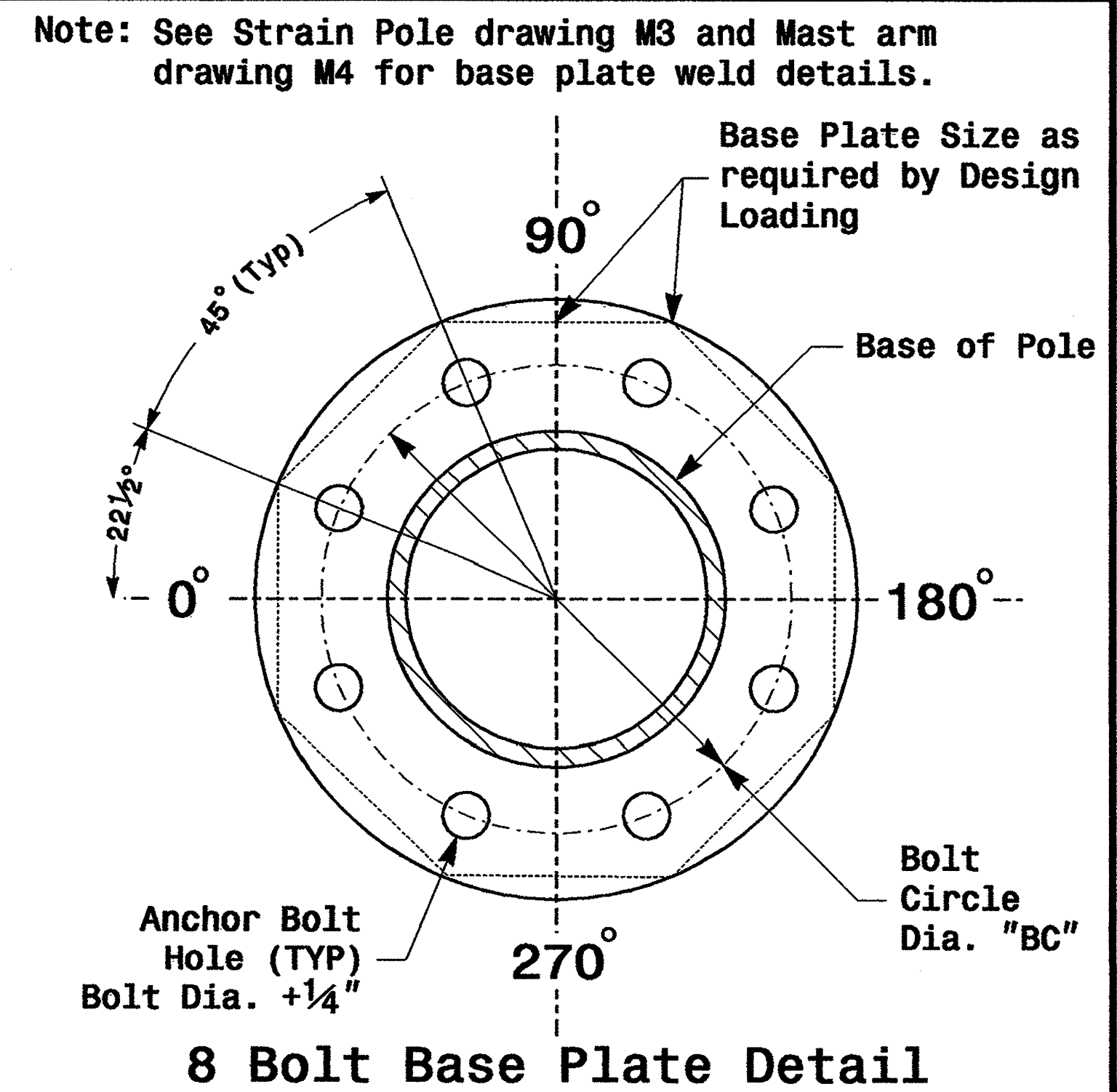
Identification Tag Details



Base Plate Template and Anchor Bolt Lock Plate Details



Anchor Bolt Detail

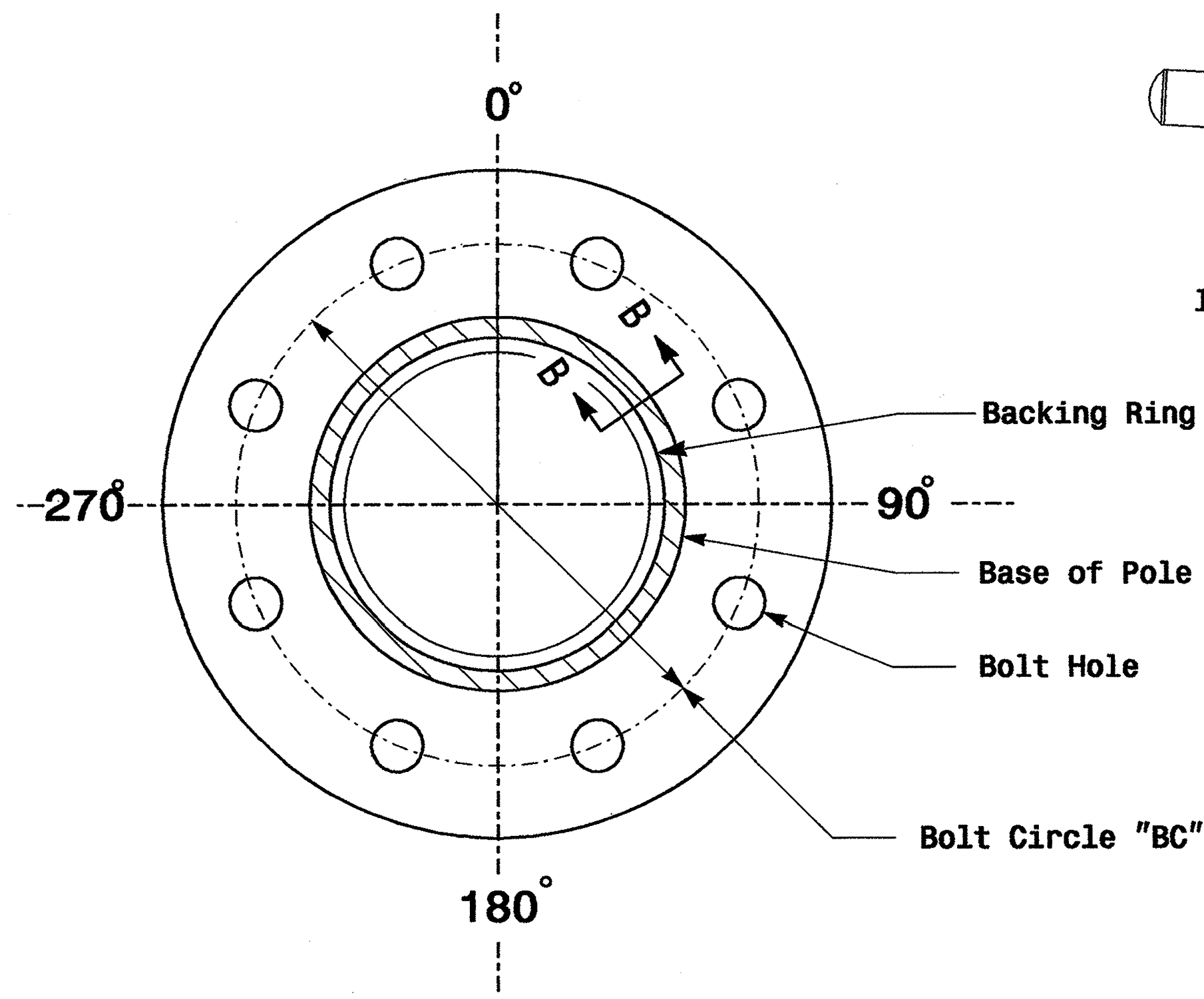


8 Bolt Base Plate Detail

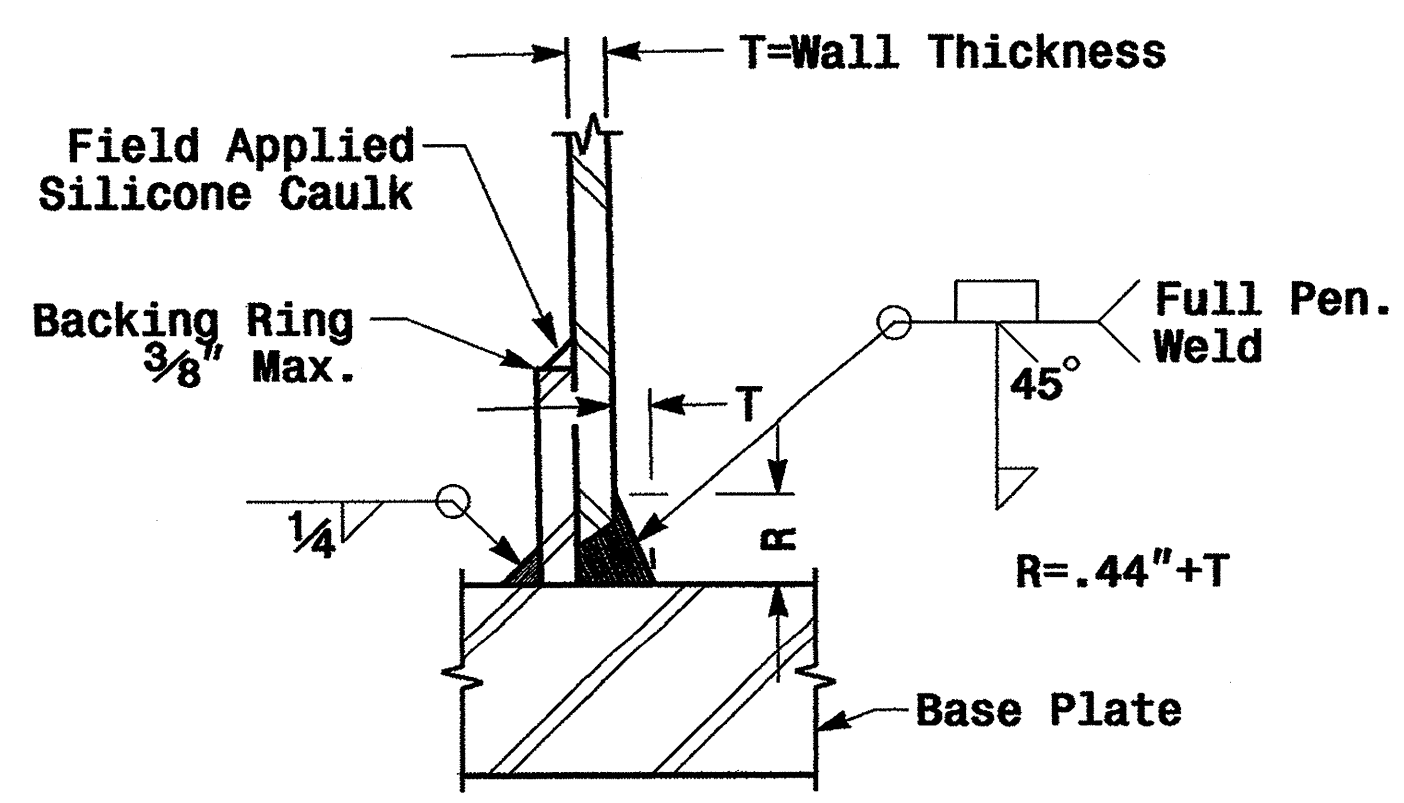
	Typical Fabrication Details Common To All Metal Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander REVISIONS: _____ SCALE: 0 NA NONE	REVIEWED BY: C.F. Andrews REVIEWED BY: A.W. Esposito INIT. DATE DATE	

Fabrication Details - All Poles

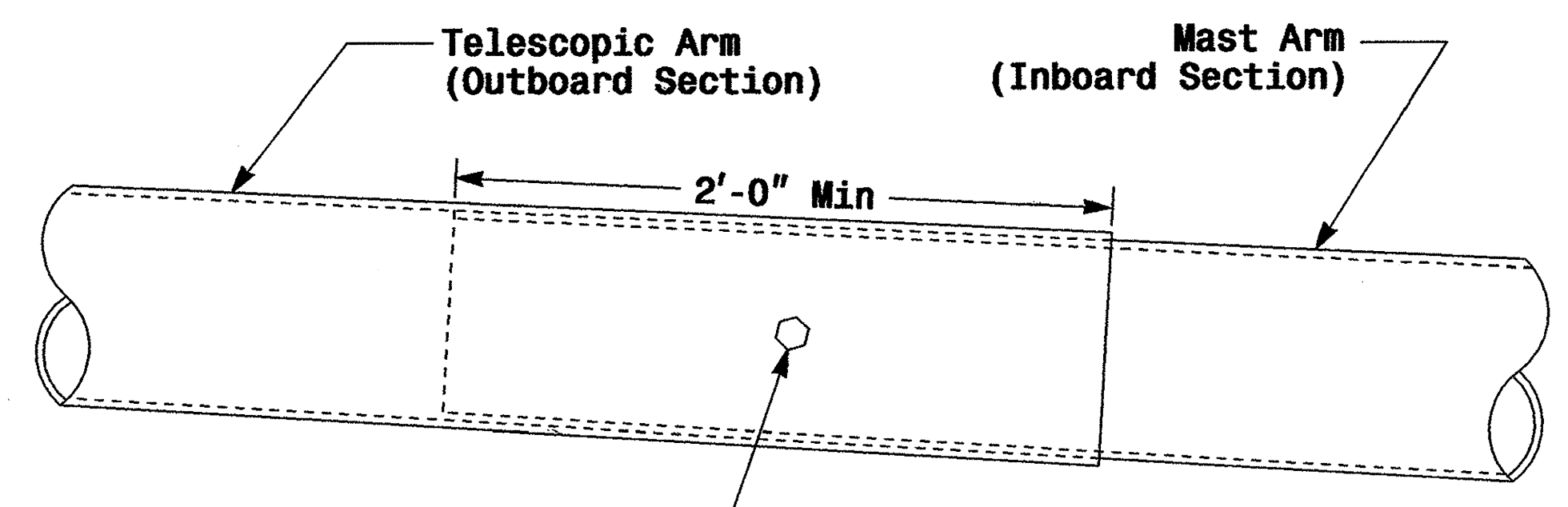
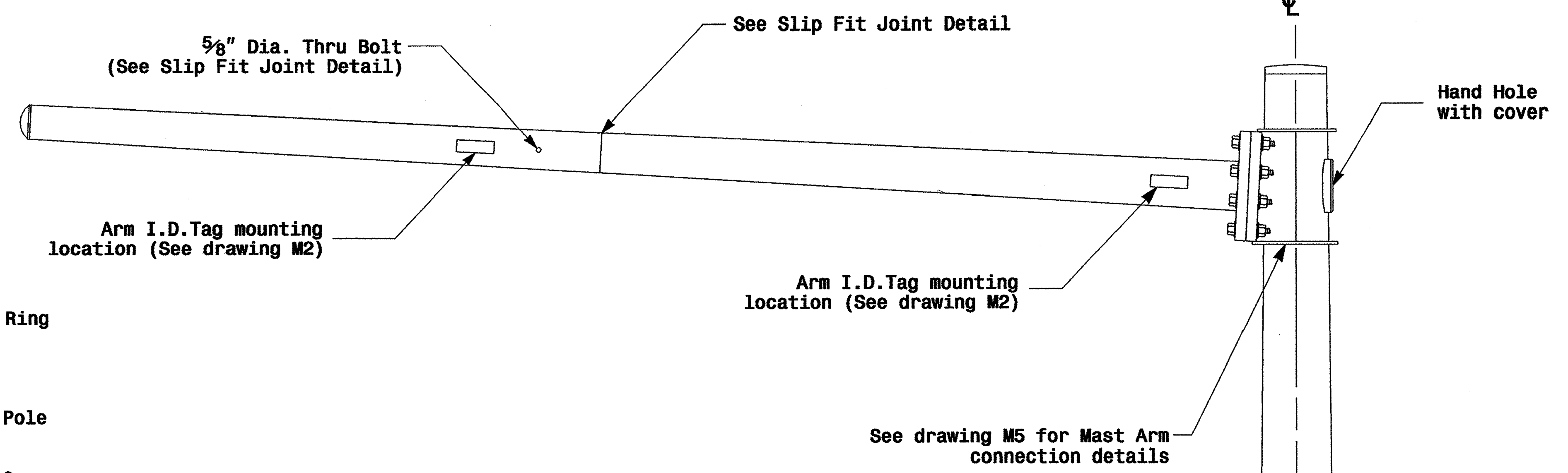
01-SEP-2005 18:22 D:\2004\Metal Pole Standard\004.meg thru m6.dgn canrews



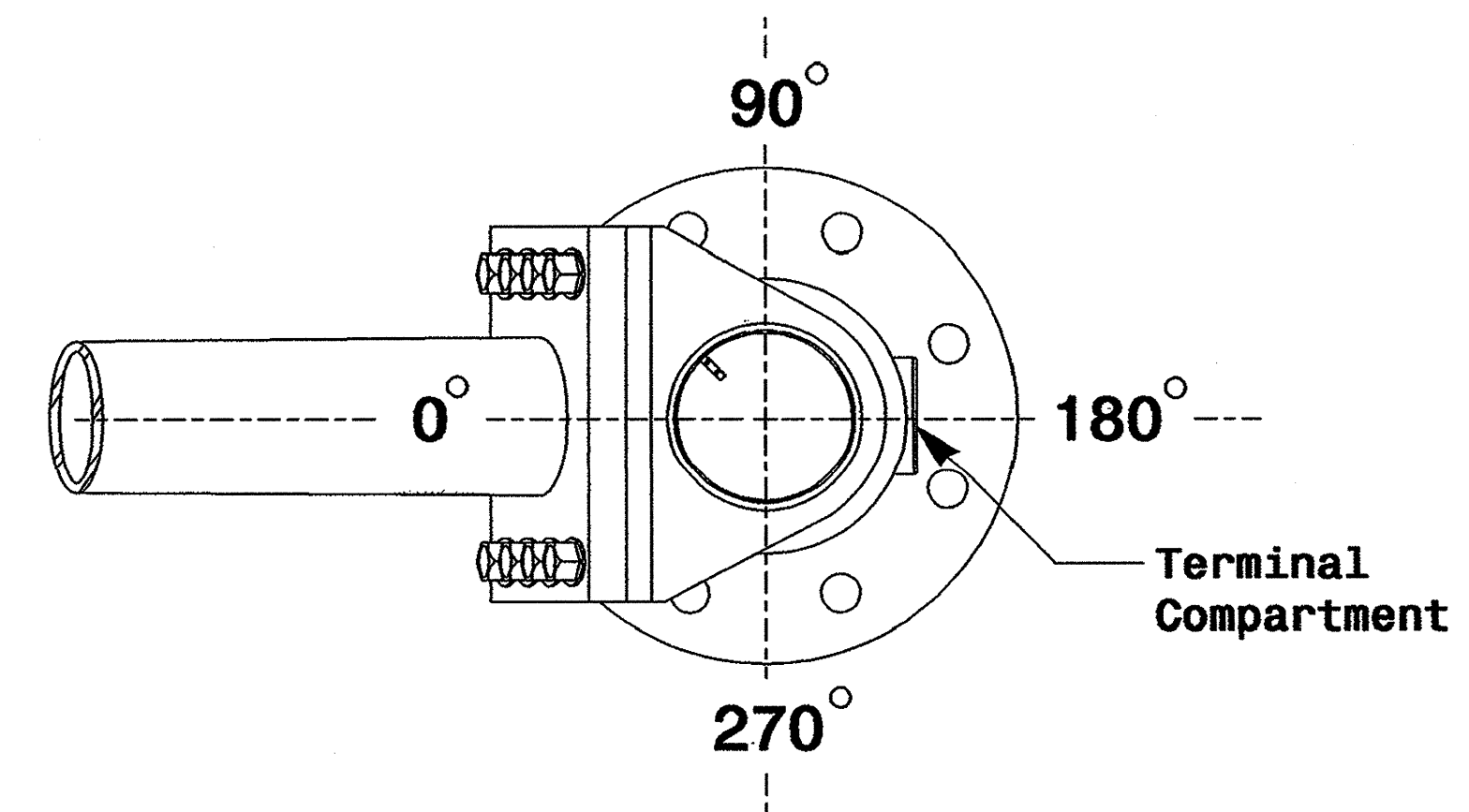
Section A-A
(See drawing M 2)
Pole Base Plate



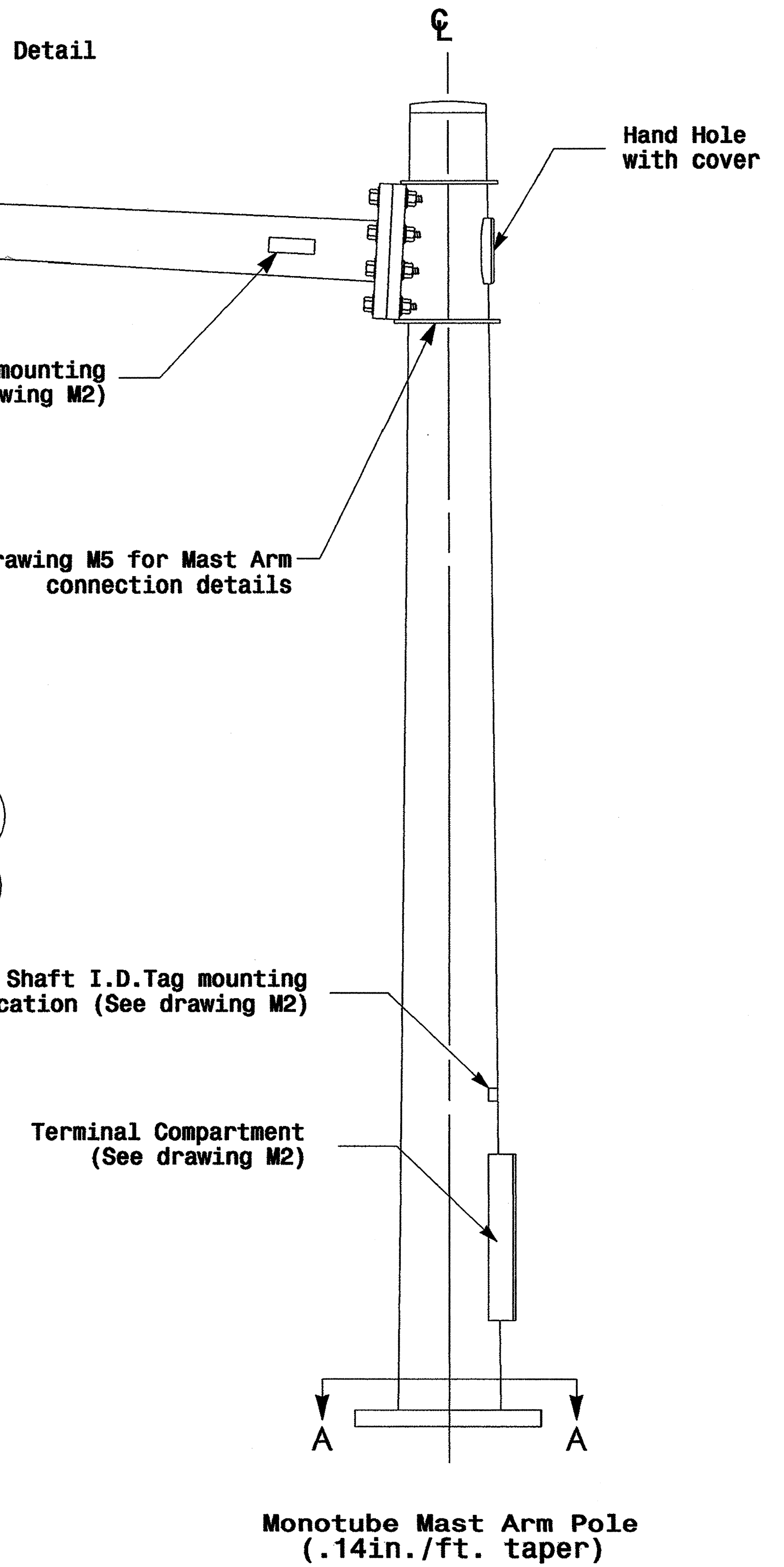
Section B-B
(Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



3/4" Factory Drilled Hole in Outboard Tube. Field Drill Inboard Tube. 5/8" Galvanized Thru Stud with (2) Hex. Locknuts Ea.
Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation

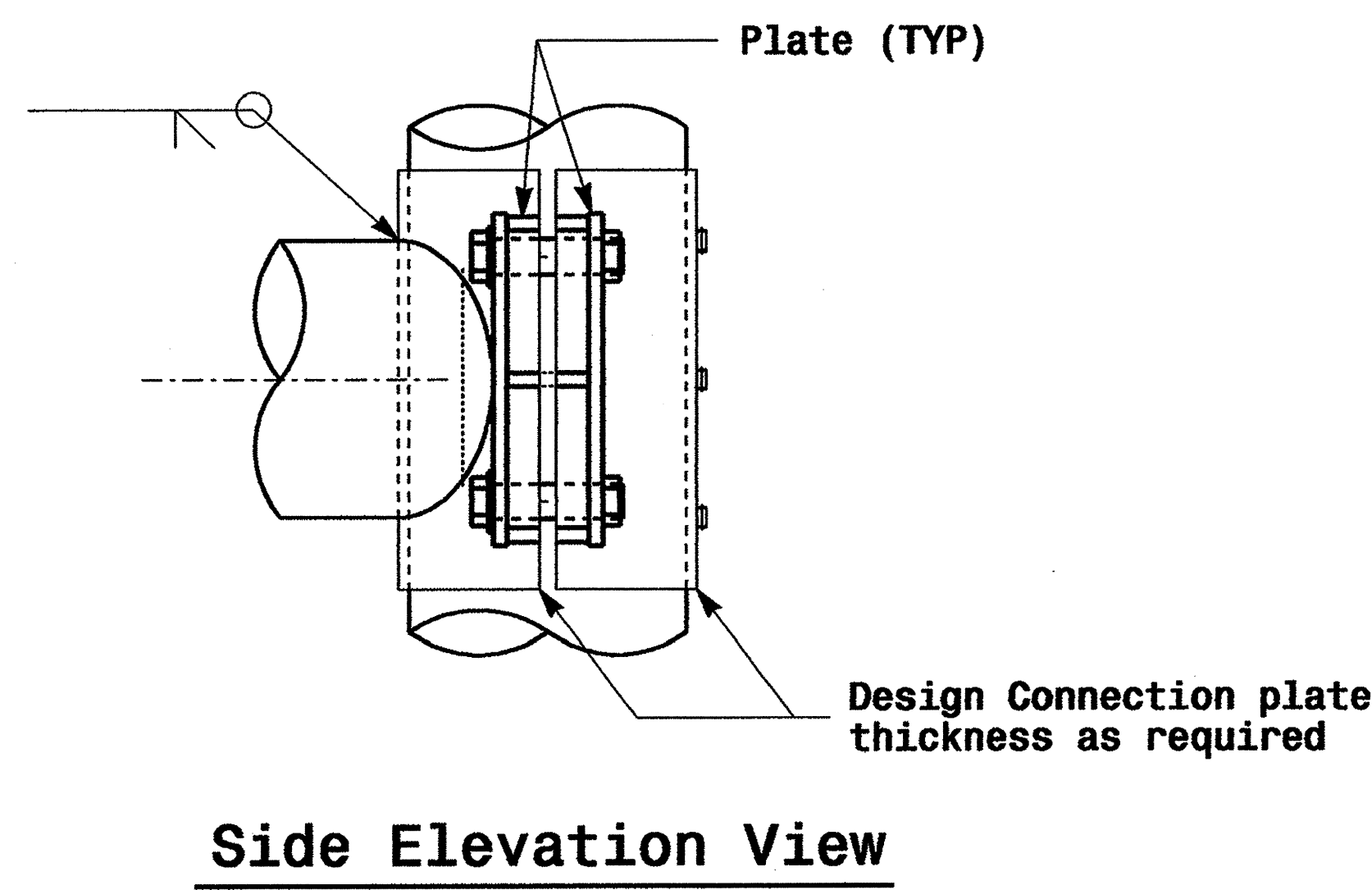


Monotube Mast Arm Pole
(.14in./ft. taper)

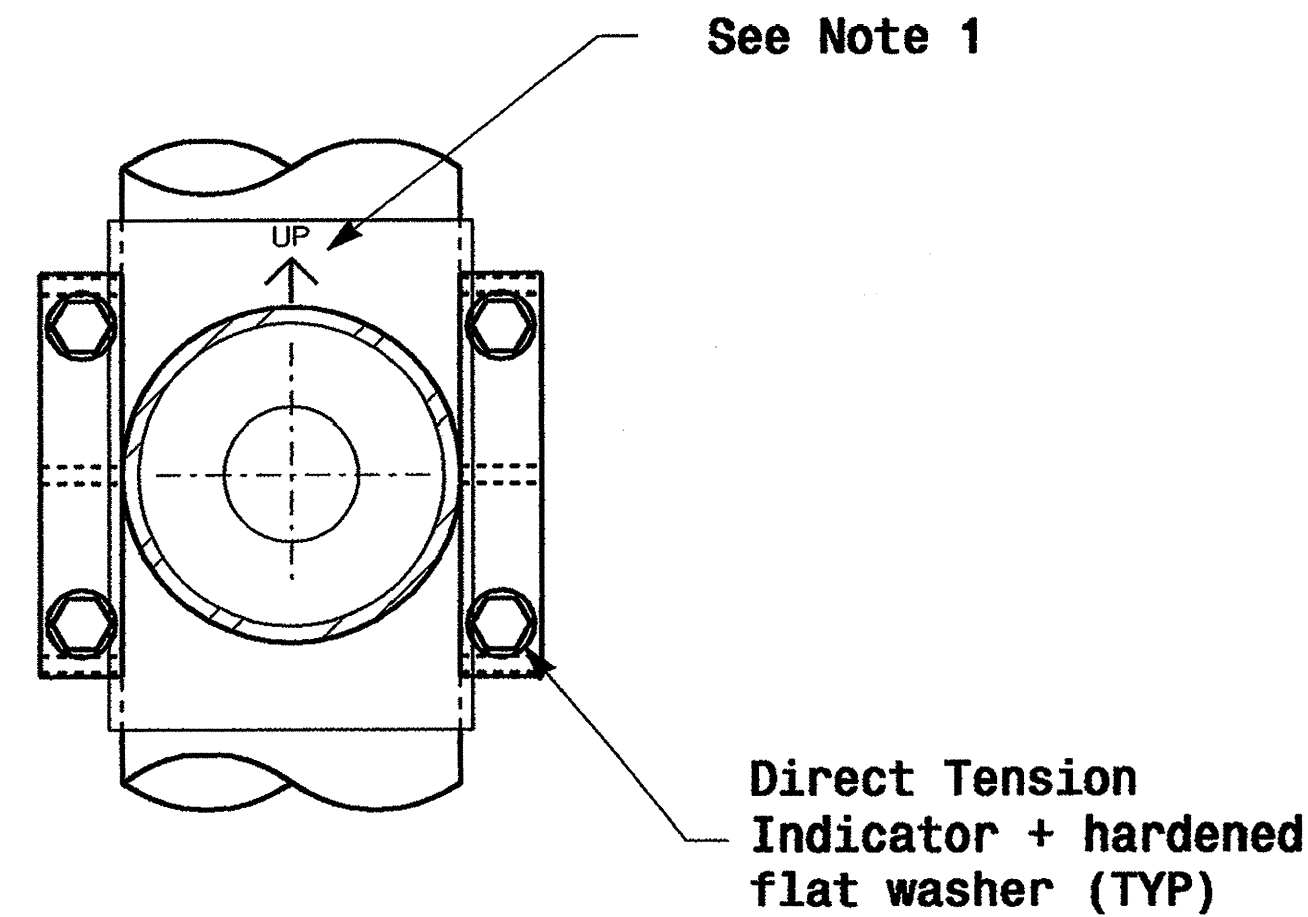
	Typical Fabrication Details for Mast Arm Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander SCALE: 0 NA NONE	REVIEWED BY: C.F. Andrews REVIEWED BY: A.W. Esposito	

01-SEP-2005 14:08 -unit:hwk:gr:base:2004 metal pole standard:2004 in. dgm

Adjustable Clamp Type Bolted Mast Arm Connection

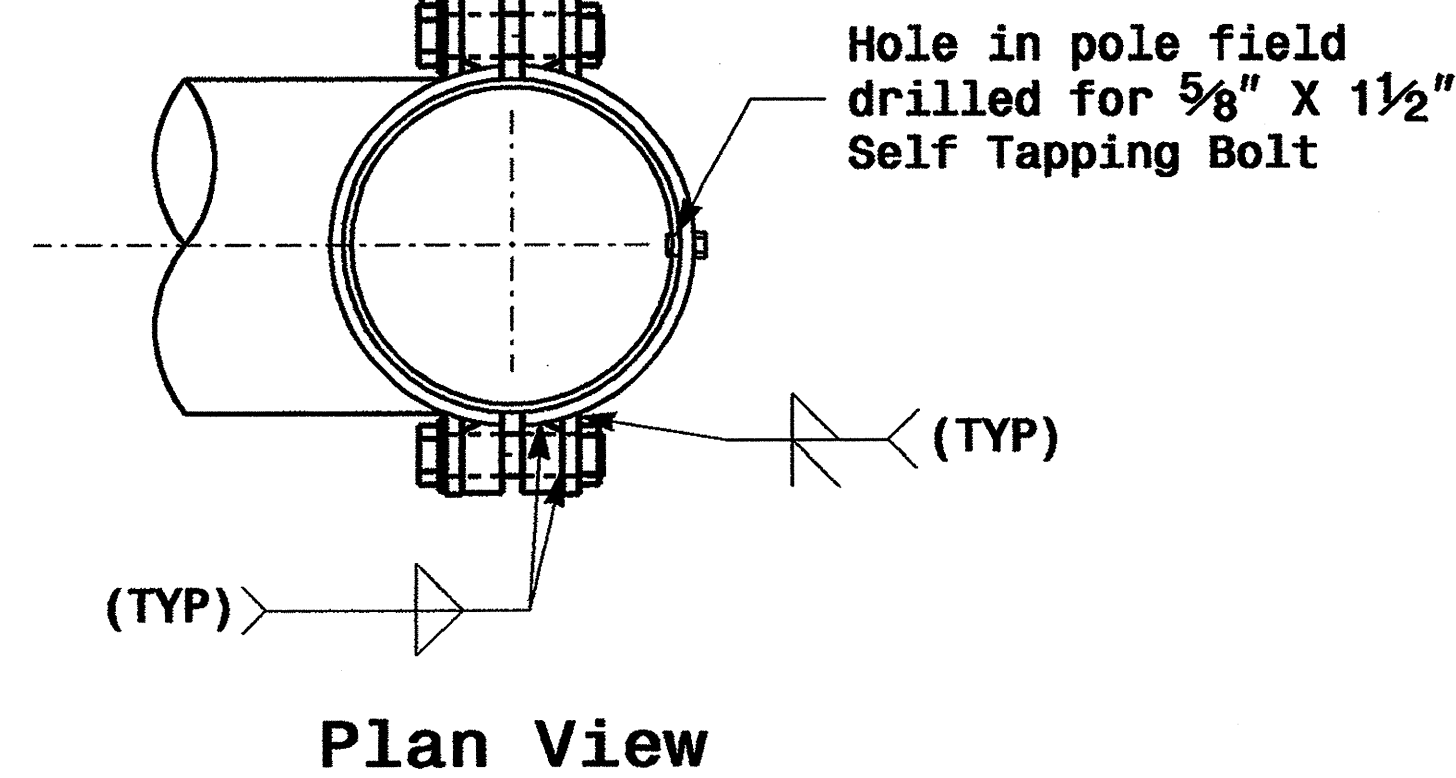


Side Elevation View



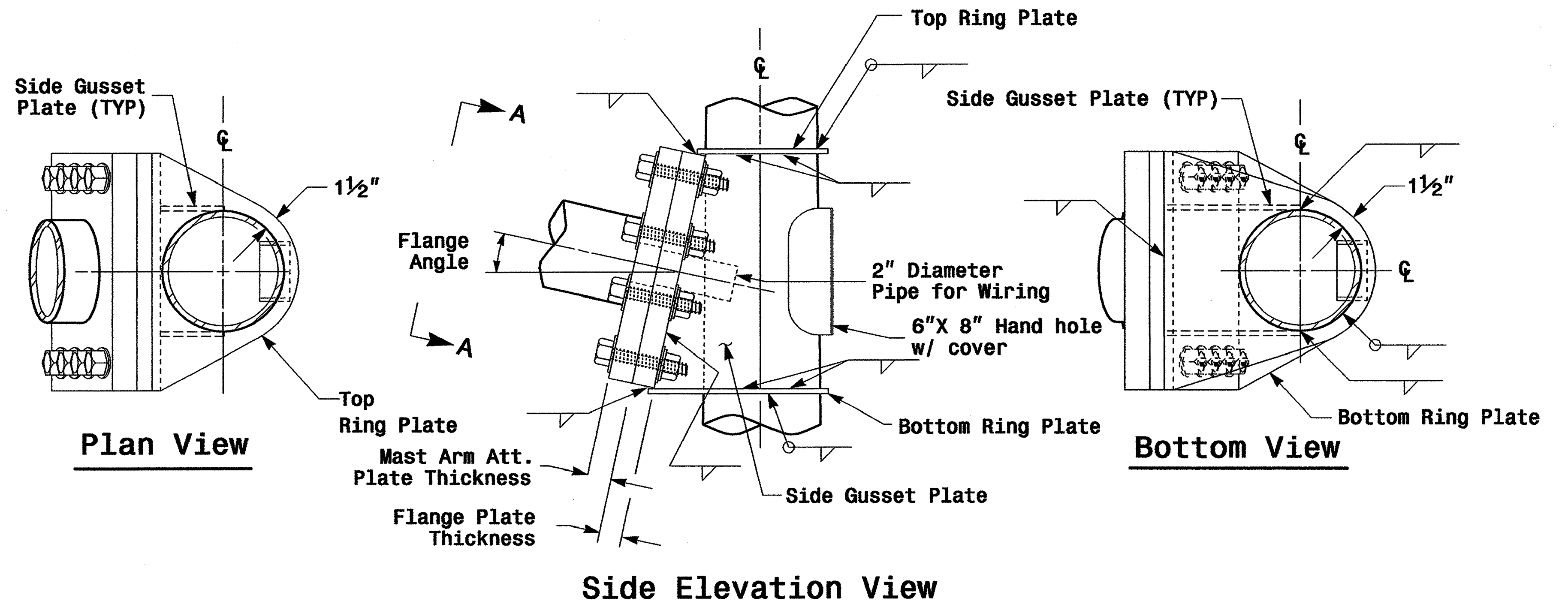
Front Elevation View

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

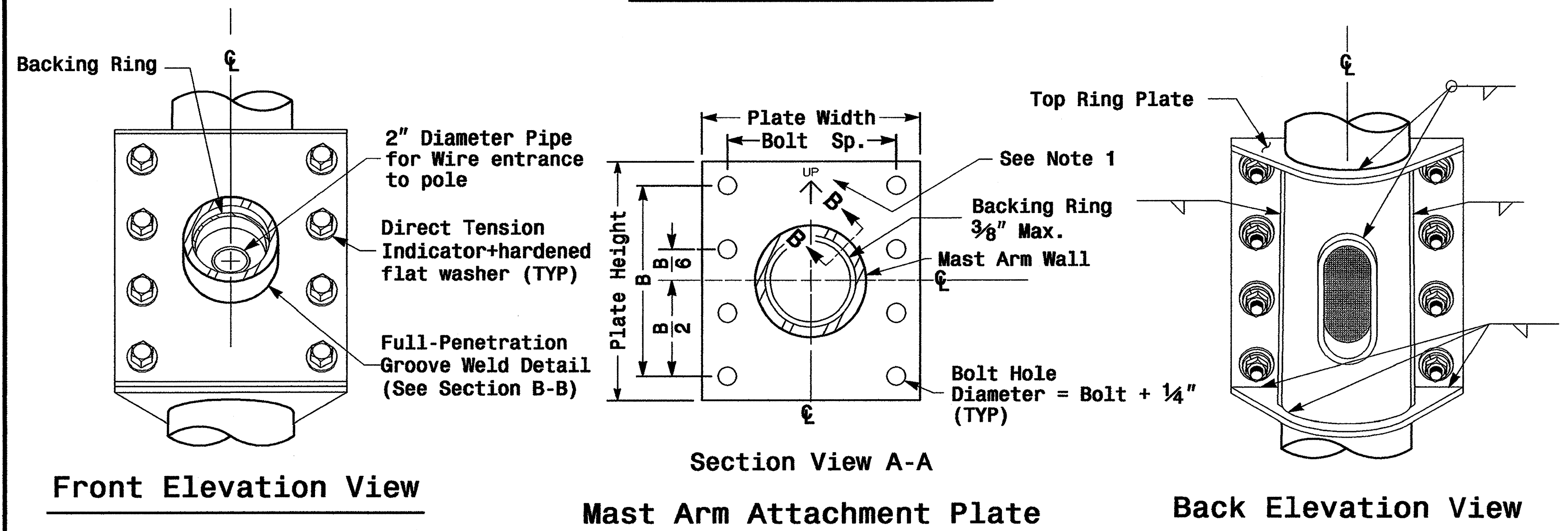


Plan View

Welded Ring Stiffened Mast Arm Connection



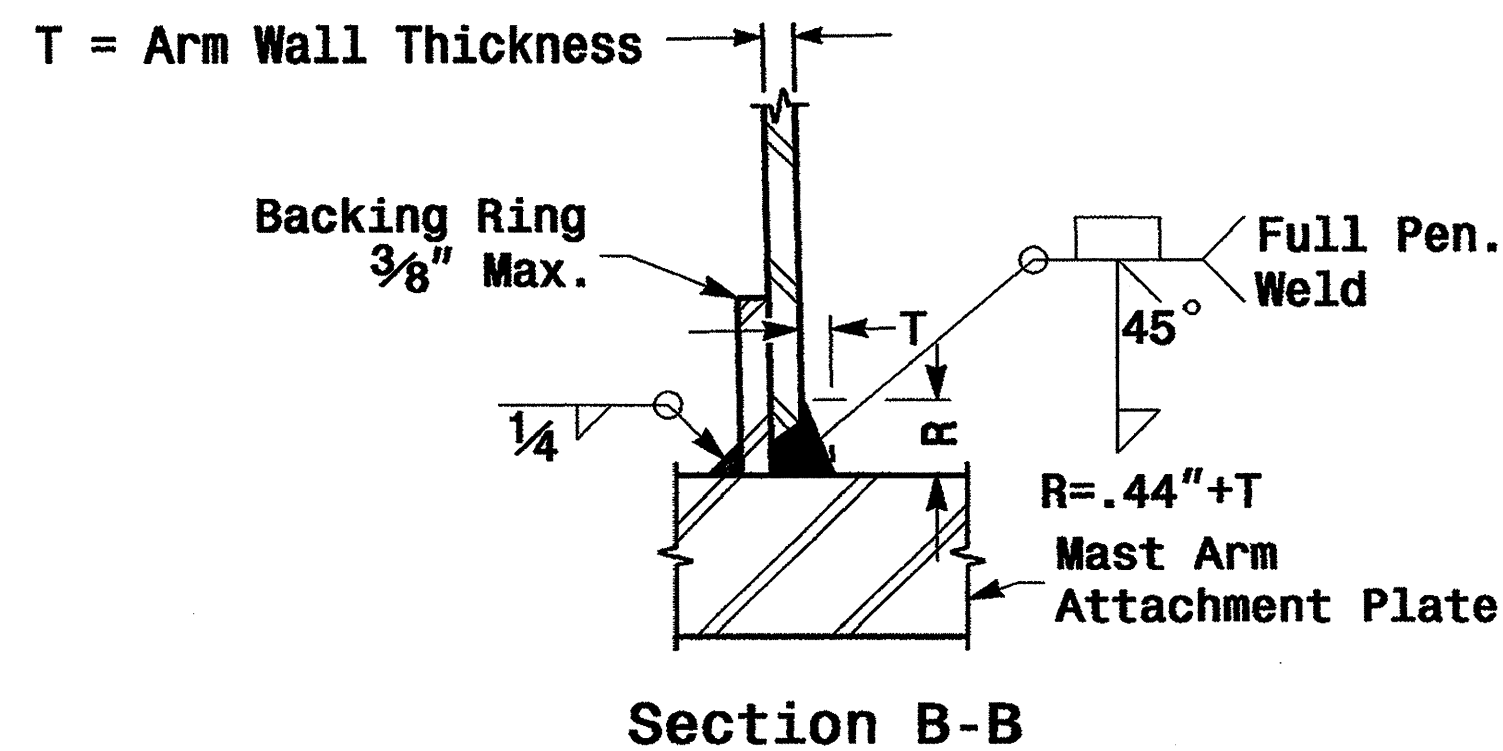
Side Elevation View



Front Elevation View

Mast Arm Attachment Plate

Back Elevation View



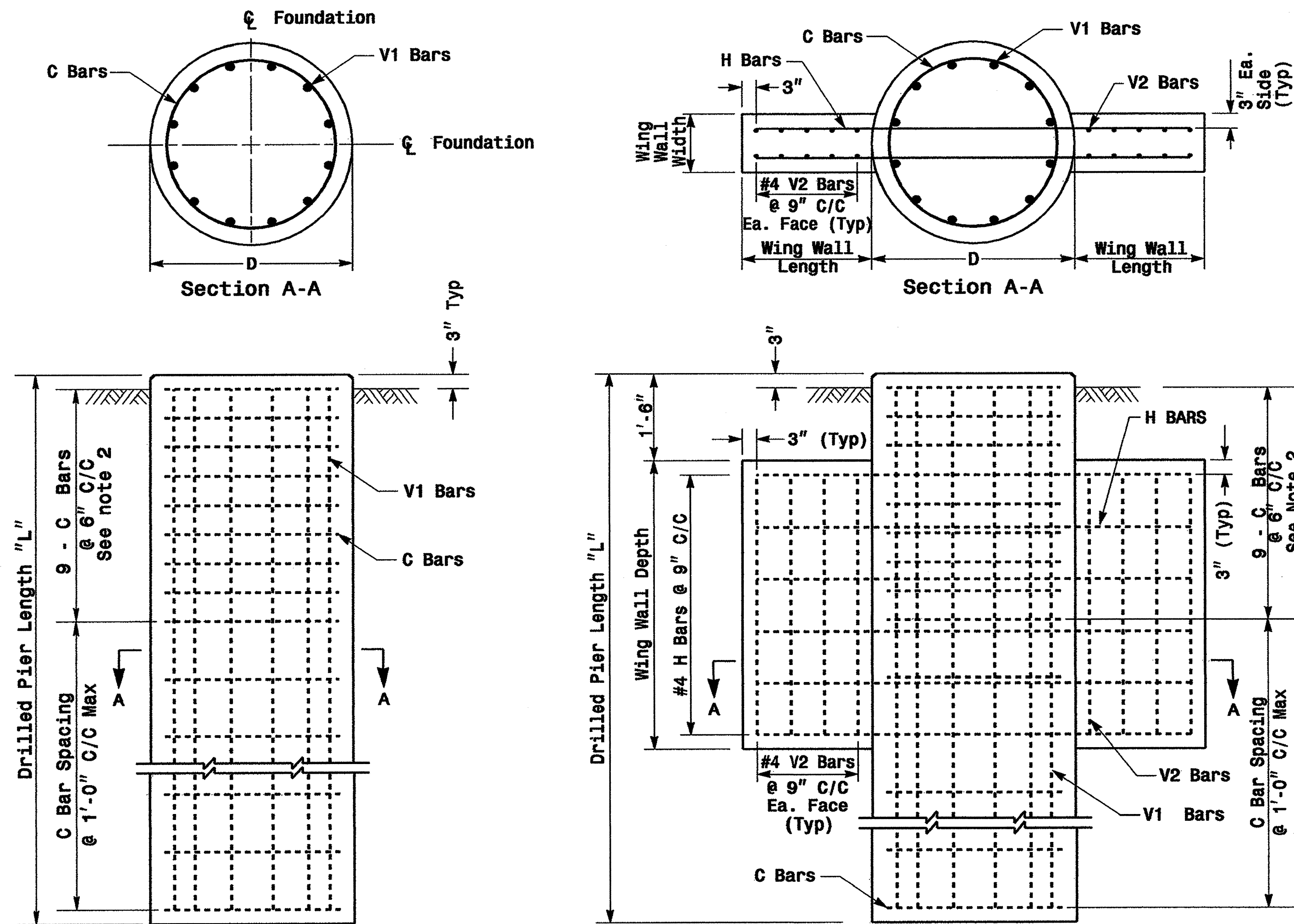
Full-Penetration Groove Weld Detail

Notes:

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

	Fabrication Details For Mast Arm Connection To Pole		
	PLAN DATE: May 2005	REVIEWED BY: C.F. Andrews	
SCALE: 0 NA NONE	REVISIONS:	INIT.:	DATE:
SIG. INVENTORY NO.			DATE: 9.2.2005

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

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

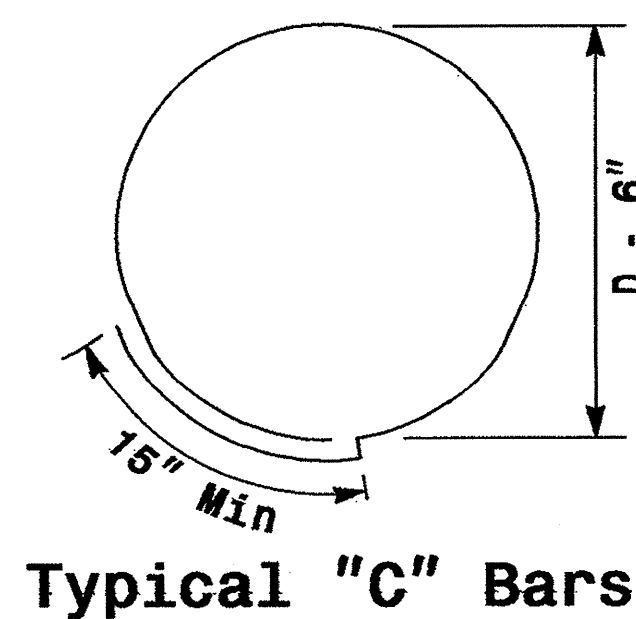
Wing Wall Type	Drill Pier Shaft Dia. (in.)	Reinforcing Steel					
		Bar Name	No.	Size	Type	Length	
TYPE 1	42"	V1	9	#8	STR.	**	
		V2	12	#4	STR.	2'-6"	
		H	8	#4	STR.	6'-0"	
		C	*	#4	CIR.	10'-9"	
TYPE 2	42"	V1	9	#8	STR.	**	
		V2	16	#4	STR.	4'-6"	
		H	12	#4	STR.	9'-0"	
		C	*	#4	CIR.	10'-9"	
TYPE 2	48"	V1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

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

WING WALL DETAILS

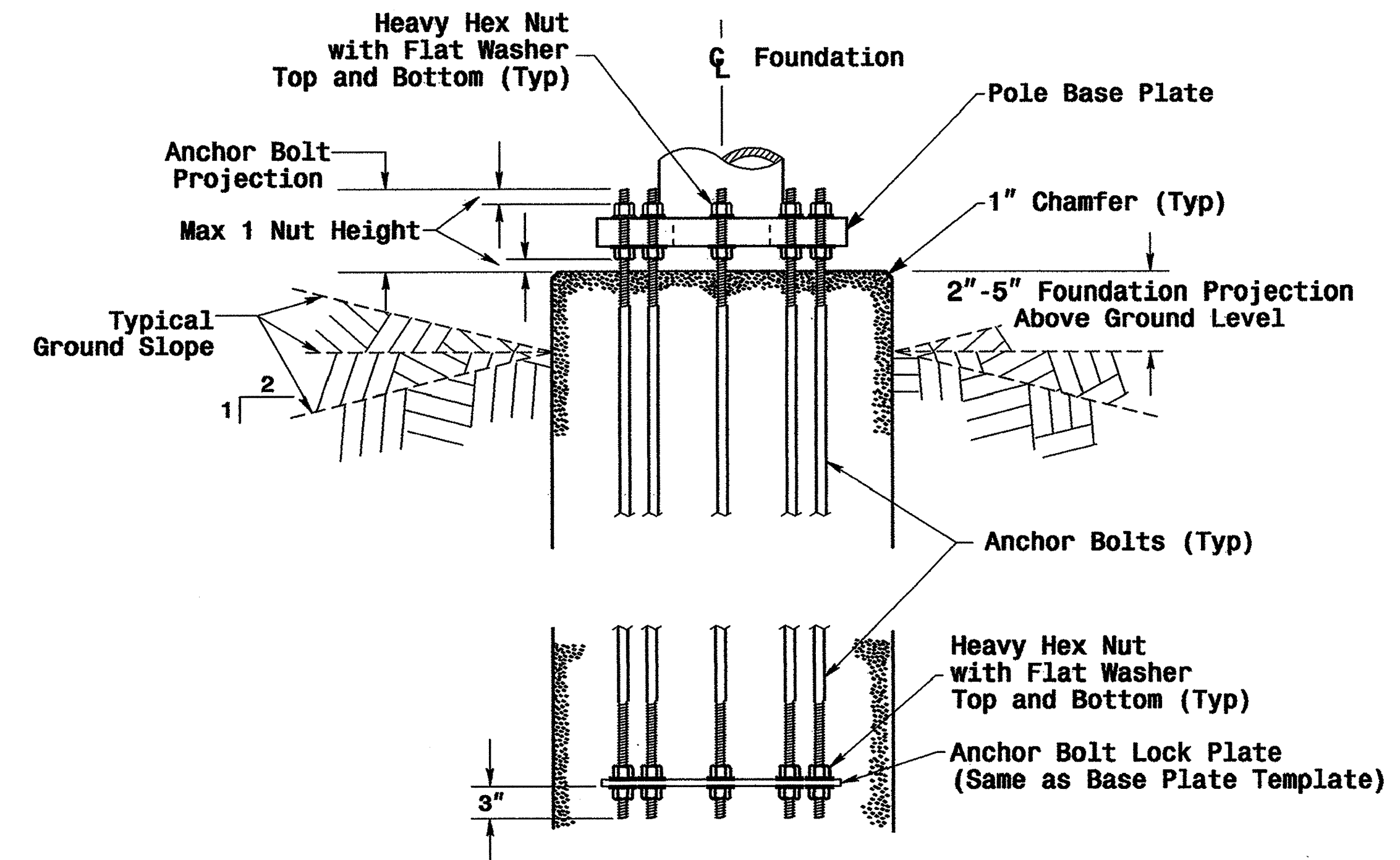
Wing Wall Type	Wing Wall Length (Ft.)	Wing Wall Width (Ft.)	Wing Wall Depth (Ft.)	Concrete Volume (Cu. Yds.)
TYPE 1	1'-6"	1'-0"	3'-0"	.4
TYPE 2	3'-0"	1'-0"	5'-0"	1.2

See Note No. 4

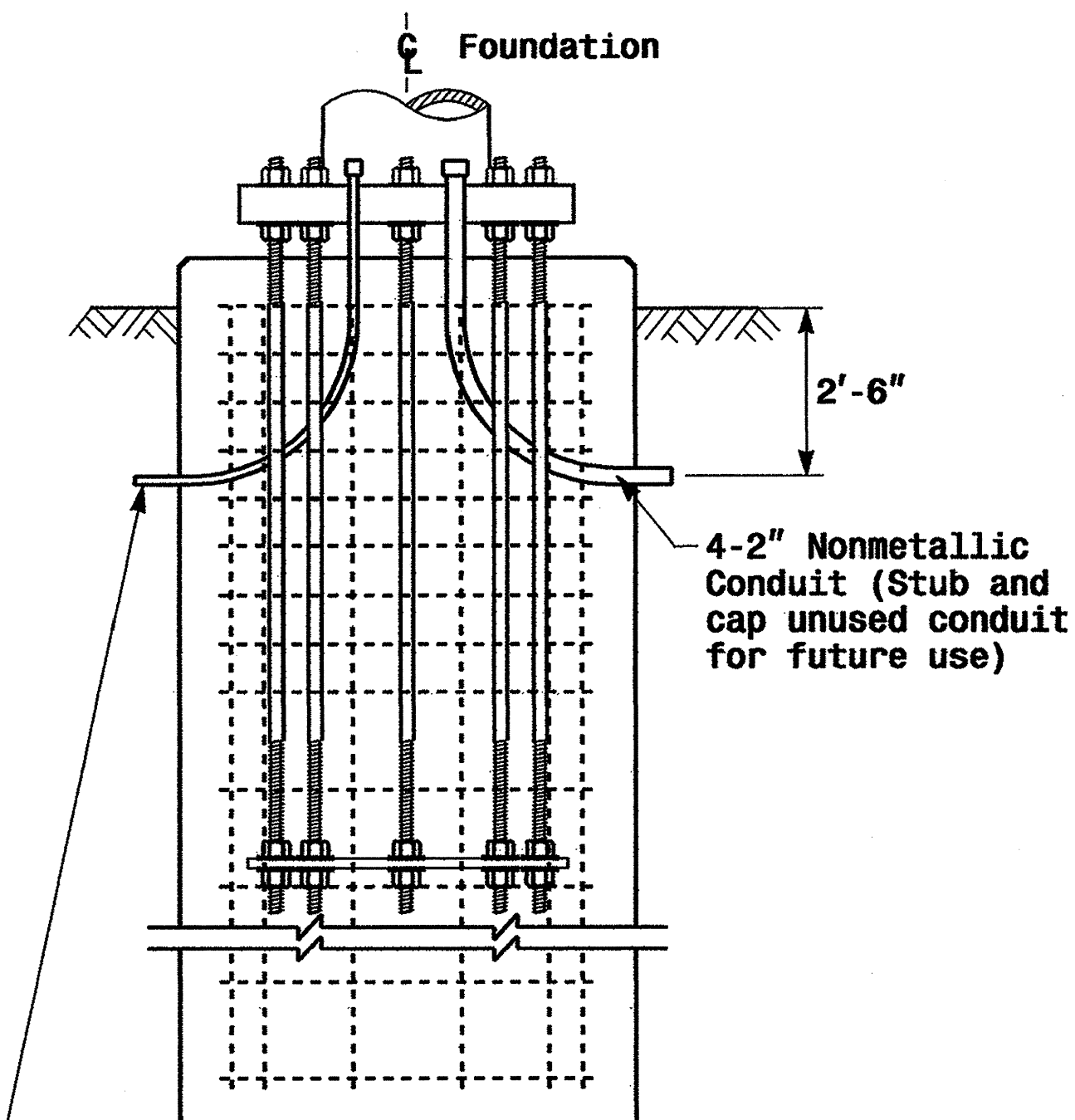


Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



Notes

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

Construction Details - Foundations

	Construction Details Foundations		
	PLAN DATE: May 2005 SCALE: 0 NA NONE	REVIEWED BY: P.L. ALEXANDER PREPARED BY: C.F. ANDREWS	
222 N. McDowell St., Raleigh, NC 27609		REVISIONS:	SIGNATURE: <i>D. Sarkar</i> 9.2.2005 DATE:

- 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

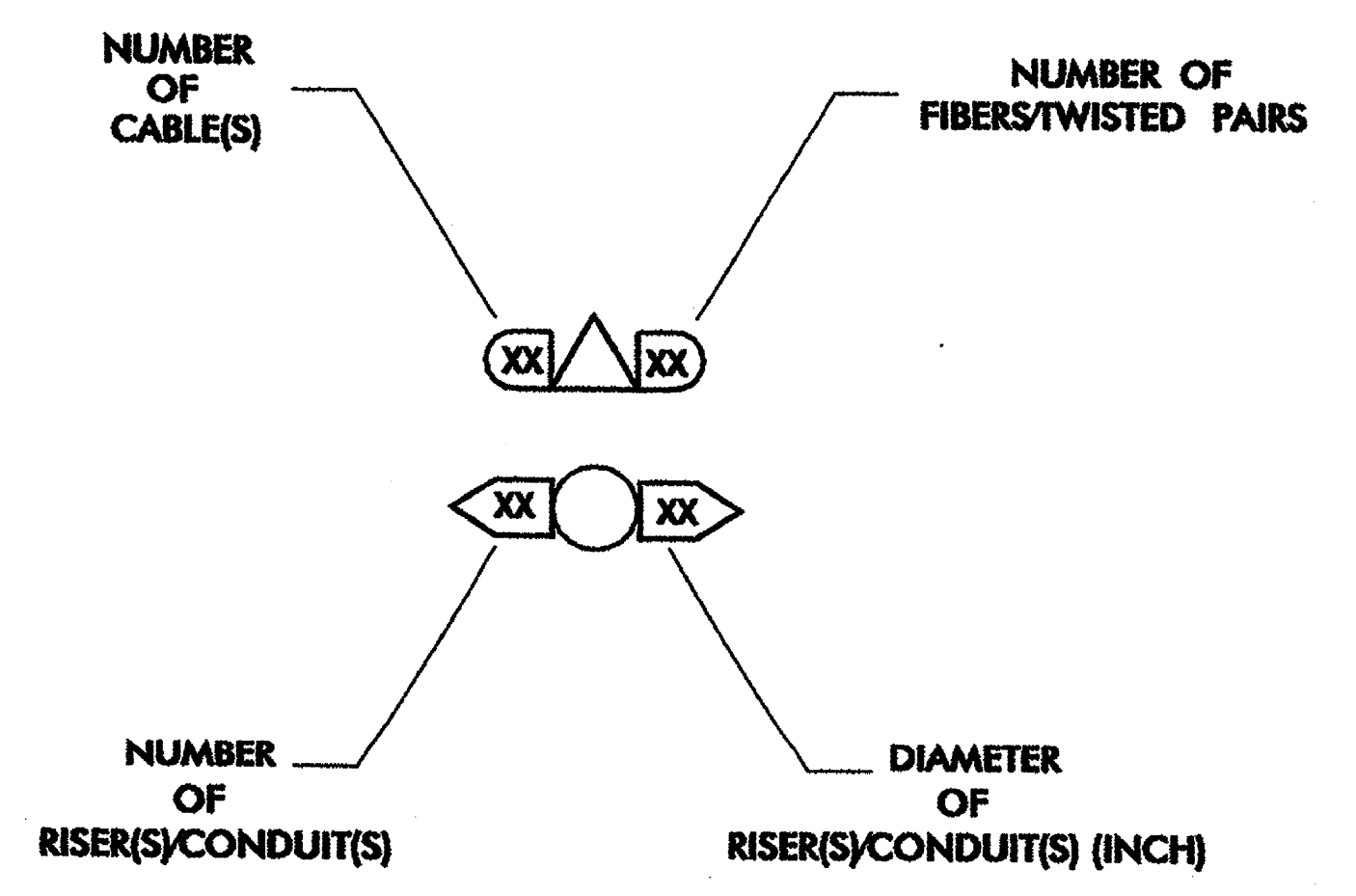
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL 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)

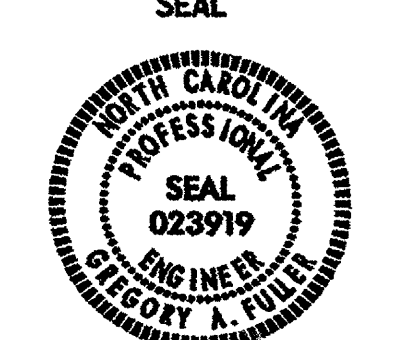


Prepared in the Office of

 222 N. McDowell St., Raleigh, NC 27603

CONSTRUCTION NOTES

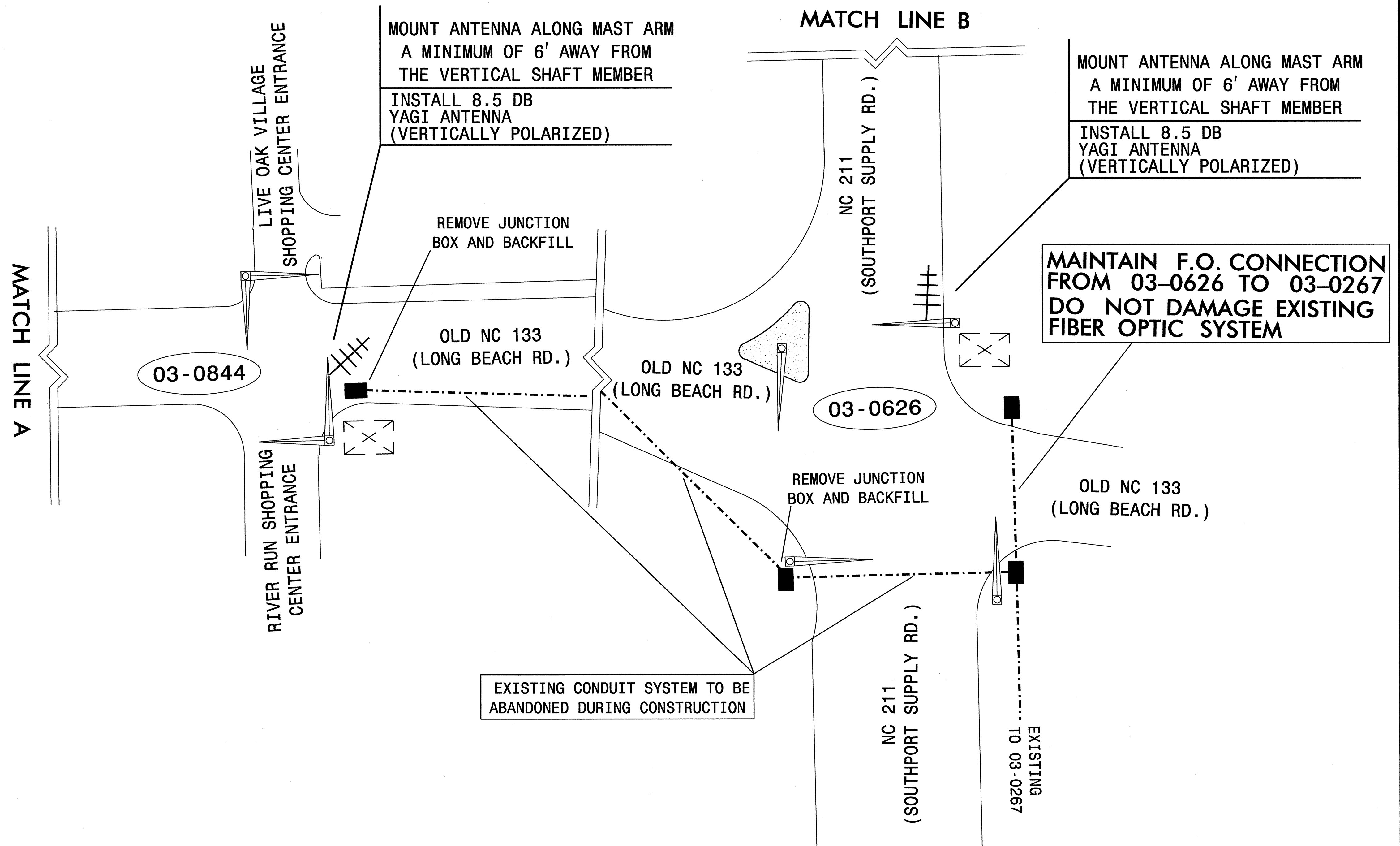
PLAN DATE: _____ REVISIONS: _____
 PREPARED BY: _____ REVISIONS: _____
 SCALE: 0 _____

REVIEWED BY: **G. A. FULLER**
 INIT. DATE

SEAL

 SIGNATURE: *Gregory A. Fuller* DATE: 10/31/02
 CADD File name: _____

LEGEND

	YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
	YAGI ANTENNA (SINGLE)
	OMNI ANTENNA
	EXISTING CONTROLLER AND CABINET
	EXISTING MASTER CONTROLLER AND CABINET
	SIGNAL INVENTORY NUMBER
	METAL POLE W/MAST ARM
	EXISTING WOOD POLE
	NEW METAL POLE
	SP SIGNAL POLE
	EXISTING METAL POLE
	EXISTING JUNCTION BOX
	EXISTING CONDUIT



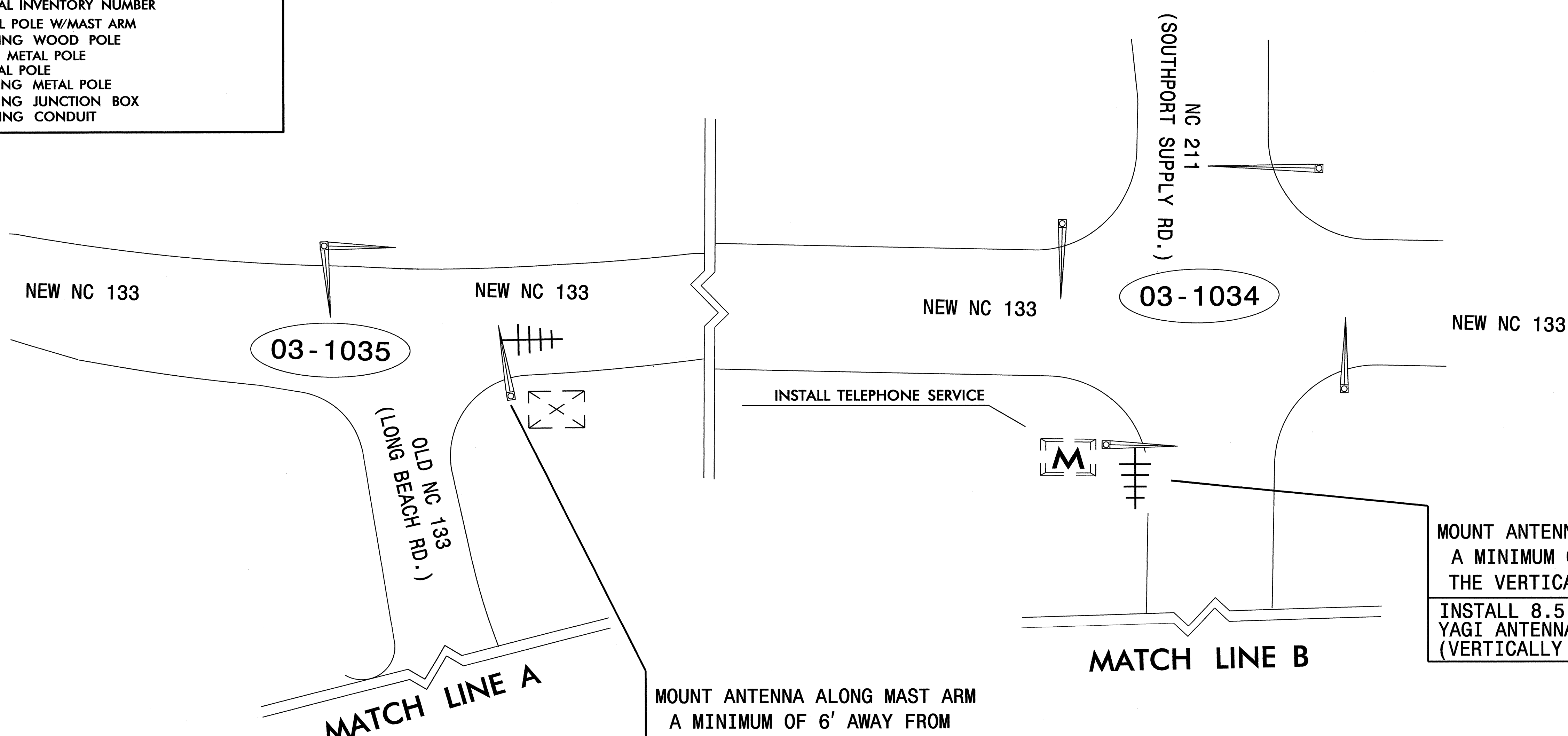
- NOTES FOR WIRELESS COMMUNICATIONS:**
- INSTALL COAXIAL CABLE:
 - ON WOOD POLES, REQUIRING A NEW RISER, INSTALL A 2" RISER WITH WEATHERHEAD TO ROUTE THE COAXIAL CABLE TO THE ANTENNA. ON POLES WITH EXISTING RISERS WITH WEATHERHEADS REUSE THE RISER ASSEMBLY.
 - ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL 1/2" HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
 - ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND REPLACE THE WEATHERHEAD WITH HEAT SHRINK TUBING AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - BETWEEN THE POINT OF EXITING THE METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
 - IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
 - INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER.
(NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
 - MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
 - INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET.
(NOTE: RF ANTENNA DISCONNECT SWITCH AND DECAL ARE NOT REQUIRED WHEN THE ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
 - REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

SYSTEM # 1

<p>750 N. Greenfield Place, Garner, NC 27529</p>	<p>SOUTHPORT NC 211/NC 133/NEW NC 133 FROM OLD NC 133 TO NC 211</p>								
	<p>DIVISION 03 BRUNSWICK COUNTY SOUTHPORT</p> <p>PLAN DATE: OCTOBER 2012 REVIEWED BY: I. N. AVERY</p> <p>PREPARED BY: P. C. LOUDER REVIEWED BY: G. A. FULLER, PE</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		NO.	DATE	INIT.	DATE		
NO.	DATE	INIT.	DATE						
<p>SCALE</p> <p>0</p>	<p>Signature: <i>Gregory A. Fuller</i> 9/28/12 DATE</p>		<p>CADD File Name:</p>						

LEGEND

	YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
	YAGI ANTENNA (SINGLE)
	OMNI ANTENNA
	EXISTING CONTROLLER AND CABINET
	EXISTING MASTER CONTROLLER AND CABINET
	SIGNAL INVENTORY NUMBER
	METAL POLE W/MAST ARM
	EXISTING WOOD POLE
	NEW METAL POLE
	SIGNAL POLE
	EXISTING METAL POLE
	EXISTING JUNCTION BOX
	EXISTING CONDUIT



MOUNT ANTENNA ALONG MAST ARM
A MINIMUM OF 6' AWAY FROM
THE VERTICAL SHAFT MEMBER
INSTALL 8.5 DB
YAGI ANTENNA
(VERTICALLY POLARIZED)

MOUNT ANTENNA ALONG MAST ARM
A MINIMUM OF 6' AWAY FROM
THE VERTICAL SHAFT MEMBER
INSTALL 8.5 DB
YAGI ANTENNA
(VERTICALLY POLARIZED)

- NOTES FOR WIRELESS COMMUNICATIONS:**
- INSTALL COAXIAL CABLE:
 - ON WOOD POLES, REQUIRING A NEW RISER, INSTALL A 2" RISER WITH WEATHERHEAD TO ROUTE THE COAXIAL CABLE TO THE ANTENNA. ON POLES WITH EXISTING RISERS WITH WEATHERHEADS REUSE THE RISER ASSEMBLY.
 - ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL 1/2" HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
 - ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND REPLACE THE WEATHERHEAD WITH HEAT SHRINK TUBING AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - BETWEEN THE POINT OF EXITING THE METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
 - IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
 - INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER. (NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
 - MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
 - INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET. (NOTE: RF ANTENNA DISCONNECT SWITCH AND DECAL ARE NOT REQUIRED WHEN THE ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
 - REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

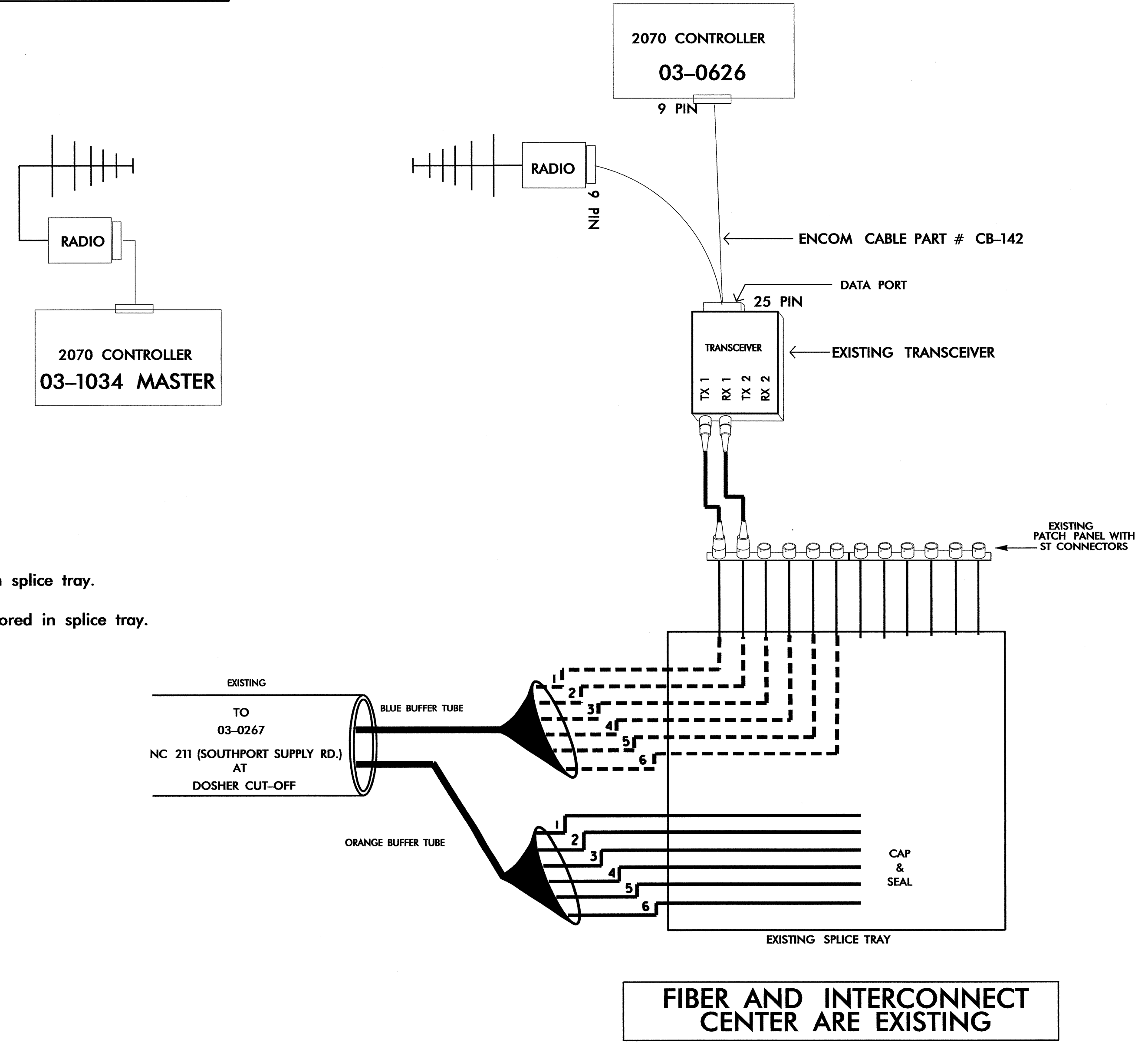
SYSTEM # 1

<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	SOUTHPORT NC 211/NC 133/New NC 133 FROM OLD NC 133 TO NC 211		
	DIVISION 03 BRUNSWICK COUNTY SOUTHPORT PLAN DATE: OCTOBER 2012 REVIEWED BY: I. N. AVERY PREPARED BY: P. C. LOUDER REVIEWED BY: G. A. FULLER, PE	REVISIONS: _____ INIT. DATE _____ _____	

CADD #11000000

FIBER OPTIC CABLE

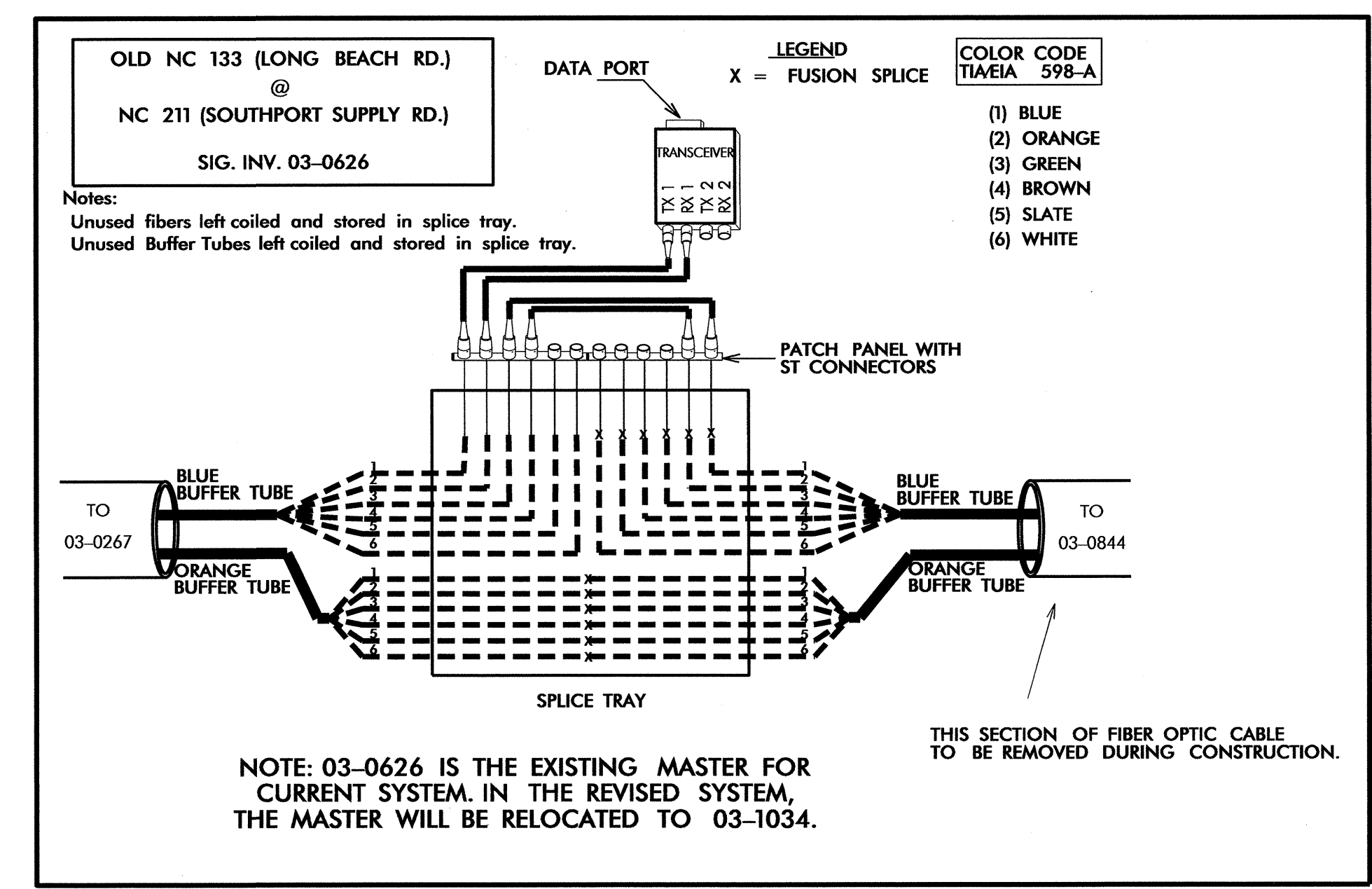
**INTERSECTION LOCATION
 OLD NC 133 (LONG BEACH RD.)
 @
 NC 211 (SOUTHPORT SUPPLY RD.)
 SIG. INV. # 03-0626**



FIBER AND INTERCONNECT CENTER ARE EXISTING

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

EXISTING F.O. ARRANGEMENT/REFERENCE ONLY



NOTE: 03-0626 IS THE EXISTING MASTER FOR CURRENT SYSTEM. IN THE REVISED SYSTEM, THE MASTER WILL BE RELOCATED TO 03-1034.

SYSTEM # 1

<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	SOUTHPORT NC 211/NC 133/NEW NC 133 FROM OLD NC 133 TO NC 211		SEAL
	DIVISION 03 BRUNSWICK COUNTY SOUTHPORT		
SCALE 	PLAN DATE: OCTOBER 2012 PREPARED BY: P. C. LOUDER	REVIEWED BY: I. N. AVERY REVIEWED BY: G. A. FULLER, PE	SIGNATURE: <i>Gregory A. Fuller</i> DATE: 9/28/12

LEGEND

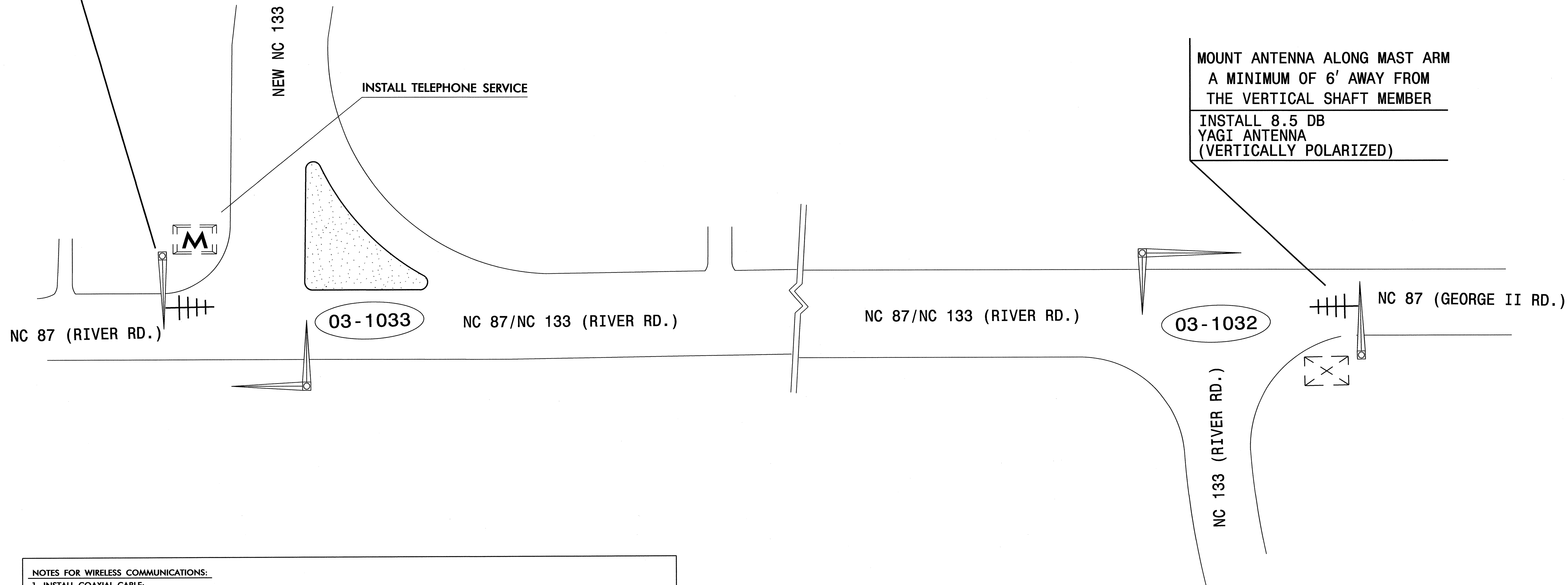
- +++ YAGI ANTENNA (DOUBLE) FOR REPEATOR OPERATION
- ++ YAGI ANTENNA (SINGLE)
- ⊞ OMNI ANTENNA
- ⊞ EXISTING CONTROLLER AND CABINET
- ⊞ EXISTING MASTER CONTROLLER AND CABINET
- ⊞-XXXX SIGNAL INVENTORY NUMBER
- ⊞ METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- NEW METAL POLE
- SP SIGNAL POLE
- ⊞ EXISTING METAL POLE
- EXISTING JUNCTION BOX
- EXISTING CONDUIT

MOUNT ANTENNA ALONG MAST ARM
A MINIMUM OF 6' AWAY FROM
THE VERTICAL SHAFT MEMBER

INSTALL 8.5 DB
YAGI ANTENNA
(VERTICALLY POLARIZED)

MOUNT ANTENNA ALONG MAST ARM
A MINIMUM OF 6' AWAY FROM
THE VERTICAL SHAFT MEMBER

INSTALL 8.5 DB
YAGI ANTENNA
(VERTICALLY POLARIZED)



NOTES FOR WIRELESS COMMUNICATIONS:

1. INSTALL COAXIAL CABLE:
 - A. ON WOOD POLES, REQUIRING A NEW RISER, INSTALL A 2" RISER WITH WEATHERHEAD TO ROUTE THE COAXIAL CABLE TO THE ANTENNA. ON POLES WITH EXISTING RISERS WITH WEATHERHEADS REUSE THE RISER ASSEMBLY.
 - B. ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL 1/2" HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
 - C. ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND REPLACE THE WEATHERHEAD WITH HEAT SHRINK TUBING AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - D. BETWEEN THE POINT OF EXITING THE METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
2. IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
3. INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER.
(NOTE: RF WARNING SIGN NOT REQUIRED WHEN ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
4. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
5. INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET.
(NOTE: RF ANTENNA DISCONNECT SWITCH AND DECAL ARE NOT REQUIRED WHEN THE ANTENNA IS INSTALLED ON AN NCDOT-OWNED POLE.)
6. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

SYSTEM # 2

	Prepared in the Offices of: Mobility and Safety Division STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER 023919 GREGORY A. FULLER
	NC 87/NC 133 (RIVER RD) FROM NEW NC 133 TO NC 133 (RIVER RD.) DIVISION 03 BRUNSWICK COUNTY SOUTHPORT		
750 N. Greenfield Pkwy., Garner, NC 27529	PLAN DATE: OCTOBER 2012 PREPARED BY: P. C. LOUDER	REVIEWED BY: I. N. AVERY REVIEWED BY: G. A. FULLER, PE	SCALE: 0 REVISIONS: _____ INIT.: _____ DATE: _____
			Signature: <i>Gregory A. Fuller</i> 9/28/12 DATE: _____ CADD File: _____