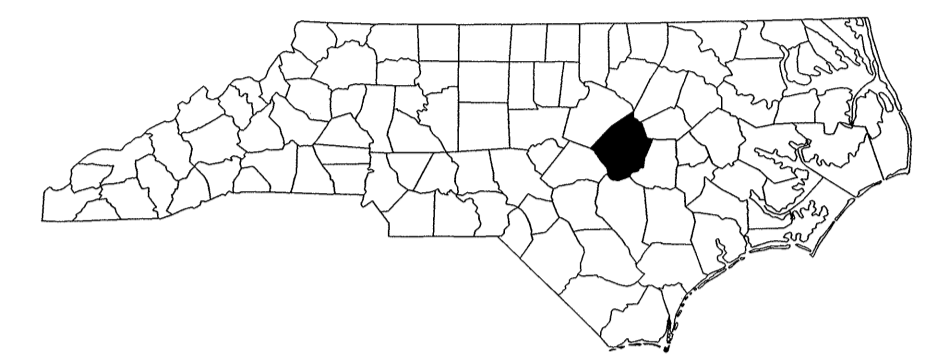


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

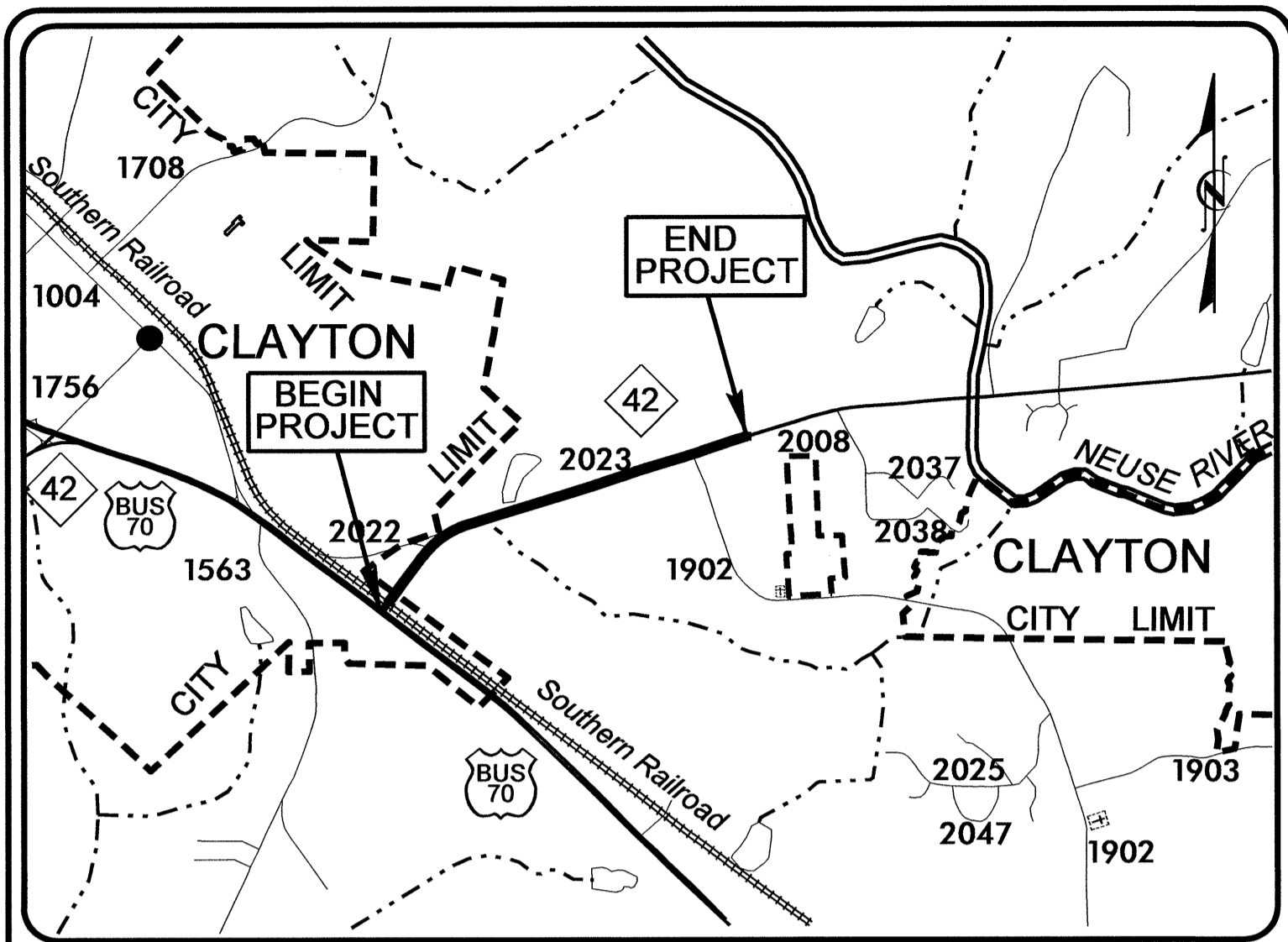
JOHNSTON COUNTY

LOCATION: NC 42 FROM US 70 IN CLAYTON TO
0.31 MI EAST OF SR 1902 (GLEN LAUREL RD)

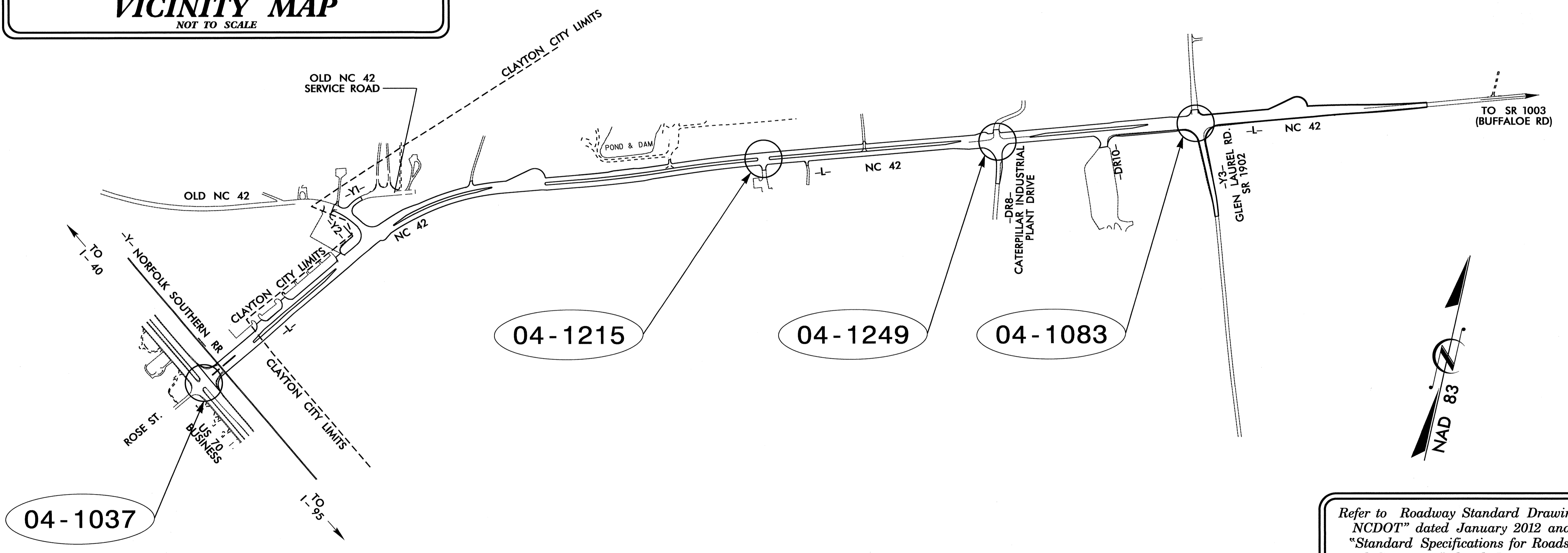
TYPE OF WORK: SIGNALS



TIP PROJECT: R-3825A



VICINITY MAP
NOT TO SCALE



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

Sheet #	Reference #	Location/Description
Sig. 1		Title Sheet
Sig. 2-7	04-1037 Temp. & Final	US 70 Bus. at NC 42 and SR 1589 (Rose Street)
Sig. 8-12	04-1215 T1, T2 & Final	US 42 at Clayton Fire Dept.
Sig. 13-21	04-1249 T1, T2 & Final	NC 42 at Caterpillar Entrance/Bayer Research Entrance
Sig. 22-28	04-1083 T1, T2 & Final	NC 42 at SR 1902 (Glen Laurel Road)/Caterpillar Access Road
Sig. 29-34	N/A	Metal Strain Poles Typicals

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT
Contacts:

Jason P. Galloway, PE - Eastern Region Signal Project Engineer
John T Rowe Jr., PE - Signal Equipment Design Engineer

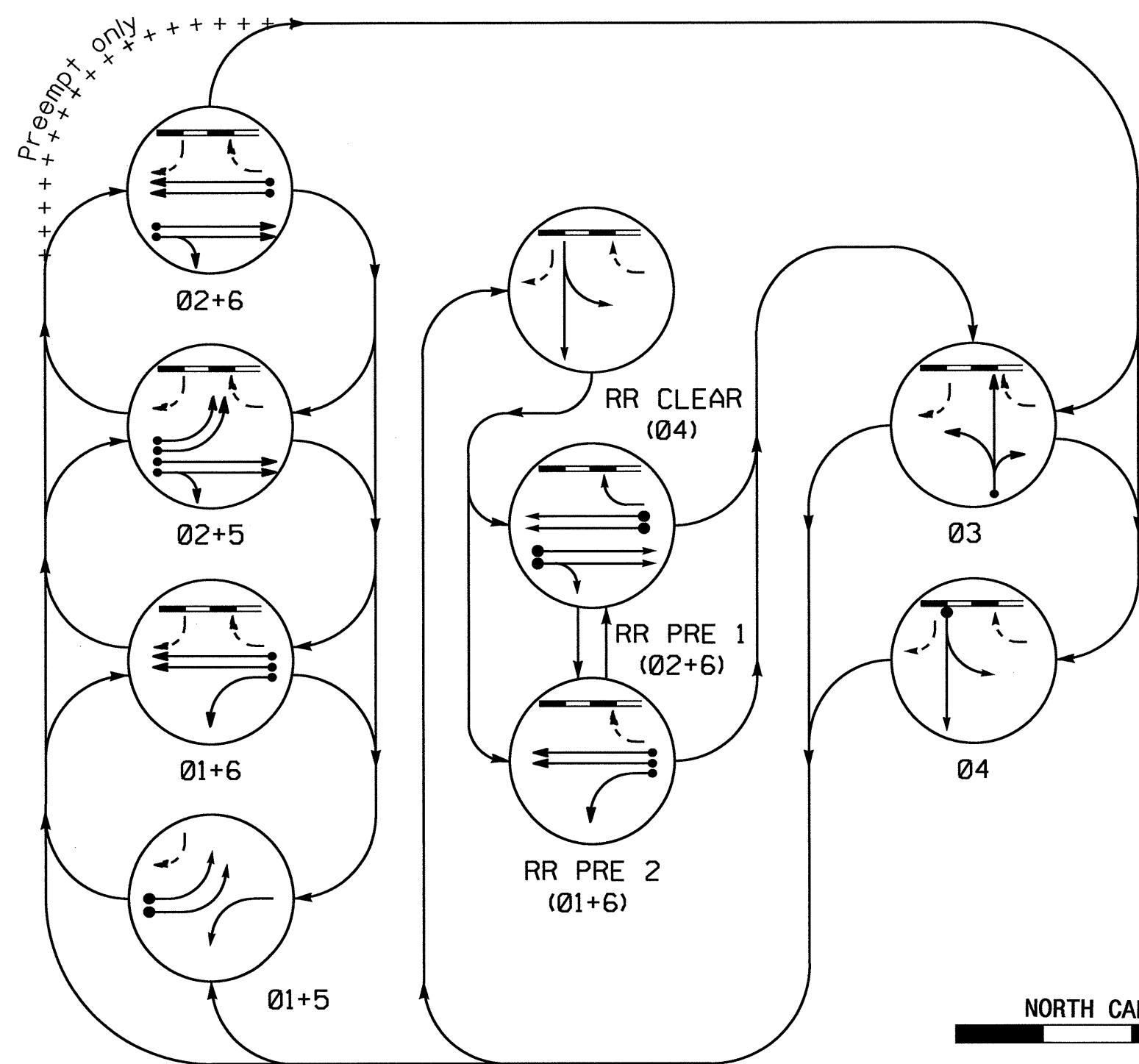
Prepared in the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY
DIVISION



750 N. Greenfield Parkway, Garner, NC 27529

18-NOV-2011 09:08 R:\Traffic\Signals\Design\Titlesheet\3825a_sig_tsh.dgn

PHASING DIAGRAM



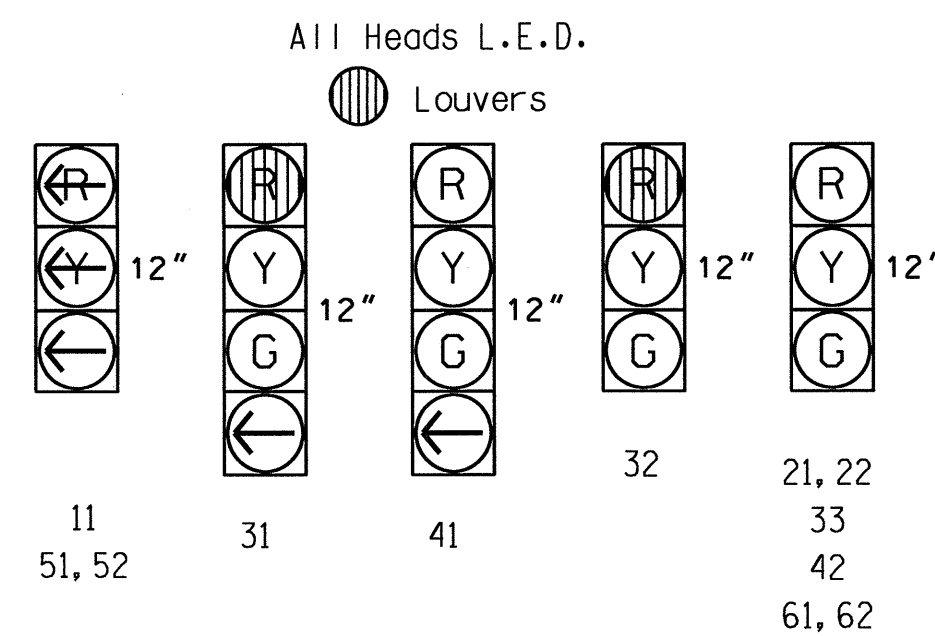
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE										
	02+5	02+6	01+5	01+6	03	04	01+5	01+6	03	04	01+5
11	R	R	-	-	-	-	R	R	R	R	R
21, 22	G	G	R	R	R	R	G	G	R	R	R
31	R	R	R	R	R	R	G	G	R	R	R
32, 33	R	R	R	R	G	R	R	R	R	R	R
41	R	R	R	R	R	G	R	R	R	R	R
42	R	R	R	R	R	G	R	R	R	R	R
51, 52	-	-	-	-	-	-	R	R	R	R	R
61, 62	R	G	R	G	R	R	G	G	R	R	R

SIGNAL FACE I.D.



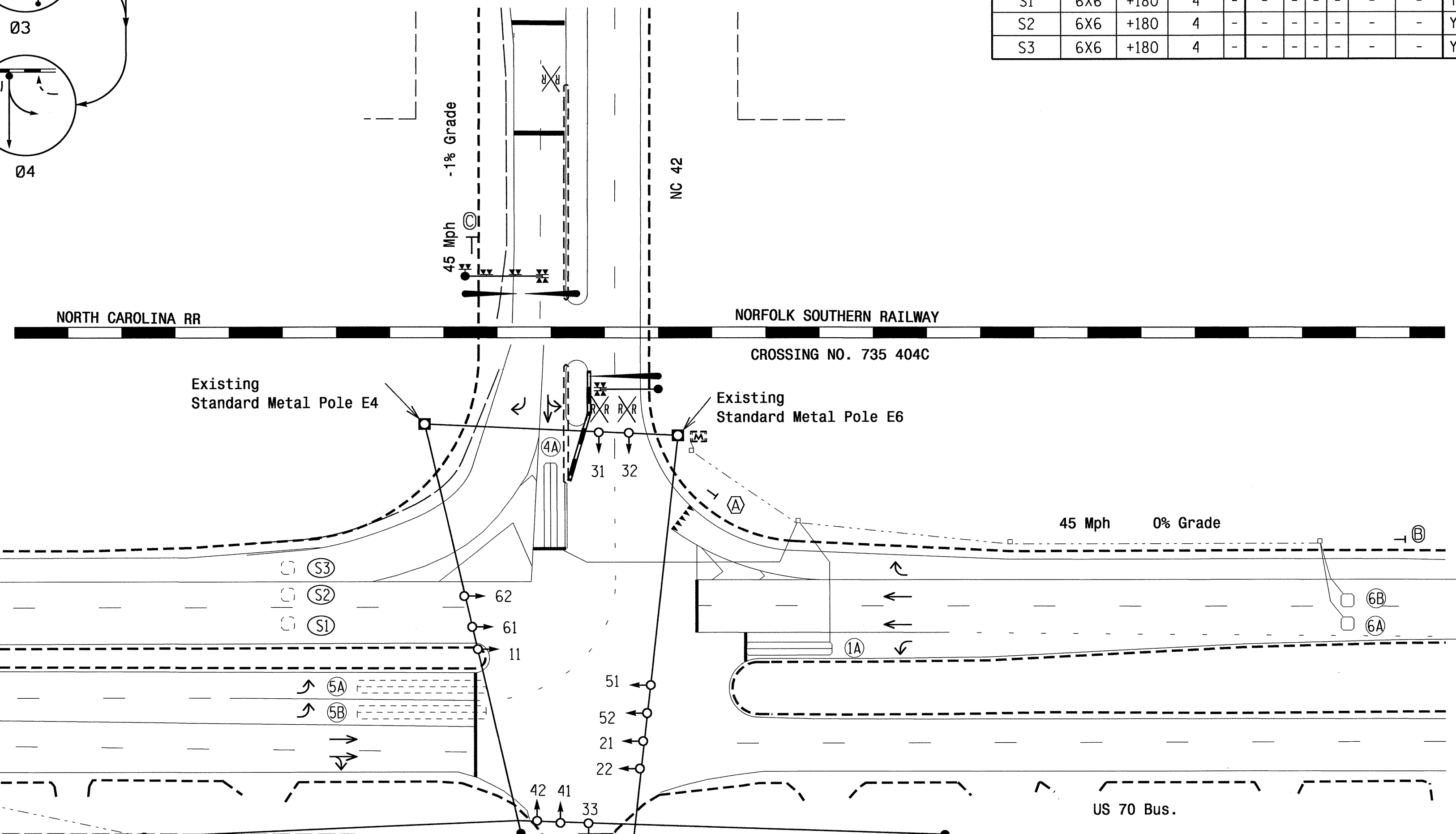
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			STRETCH TIME	DELAY TIME
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	-
2A	6X6	300	4	Y	2	Y	Y	-	-	-
2B	6X6	300	4	Y	2	Y	Y	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	5
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-
5A	6X60	+5	2-4-2	-	5	Y	Y	-	-	-
5B	6X60	+5	2-4-2	-	5	Y	Y	-	-	-
6A	6X6	300	4	Y	6	Y	Y	-	-	-
6B	6X6	300	4	Y	6	Y	Y	-	-	-
S1	6X6	+180	4	-	-	-	-	-	-	Y
S2	6X6	+180	4	-	-	-	-	-	-	Y
S3	6X6	+180	4	-	-	-	-	-	-	Y

6 Phase Fully Actuated w/ RR Pre-Emption Clayton US 70 Bus. CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
- Phase 1 and/or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #10401, Controller Asset #1037.



LEGEND

- | | | | |
|--|----------------------------------------------|--|----------------------------------------------|
| | PROPOSED Traffic Signal Head | | EXISTING Traffic Signal Head |
| | PROPOSED Modified Signal Head | | EXISTING Modified Signal Head |
| | PROPOSED Pedestrian Signal Head | | EXISTING Pedestrian Signal Head |
| | PROPOSED Signal Pole with Guy | | EXISTING Signal Pole with Guy |
| | PROPOSED Inductive Loop Detector | | EXISTING Inductive Loop Detector |
| | PROPOSED Controller & Cabinet | | EXISTING Controller & Cabinet |
| | PROPOSED Junction Box | | EXISTING Junction Box |
| | PROPOSED 2-in Underground Conduit | | EXISTING 2-in Underground Conduit |
| | PROPOSED Right of Way | | EXISTING Right of Way |
| | PROPOSED Directional Arrow | | EXISTING Directional Arrow |
| | PROPOSED Metal Strain Pole | | EXISTING Metal Strain Pole |
| | PROPOSED "YIELD" Sign (R1-2) | | EXISTING "YIELD" Sign (R1-2) |
| | PROPOSED RR Advance Warning Sign (W10-2R) | | EXISTING RR Advance Warning Sign (W10-2R) |
| | PROPOSED "DO NOT STOP ON TRACKS" Sign (R8-8) | | EXISTING "DO NOT STOP ON TRACKS" Sign (R8-8) |

2070 RAIL PREEMPTION

FUNCTION	PRE 1
Interval 1 - Track Clearance Green	21
Interval 1 - Track Clearance Yellow	4.6
Interval 1 - Track Clearance Red	1.6
Interval 2 - Dwell Green	255
Interval 2 - Dwell Yellow	0.0*
Interval 2 - Dwell Red	0.0*
Interval 5 - Exit Green	1
Interval 5 - Yellow	0.0
Interval 5 - Red	0.0
Priority	High
Delay Time	0
Min Green Before Pre	1
Ped Clear Before Pre	0
Yellow Clear Before Pre	4.6
Red Clear Before Pre	1.7
Dwell Min Time	7
Ped Clear Through Yellow	N
Omit Overlaps	P

OASIS 2070L TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	14	7	7	7	14
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	15	100	20	30	45	100
Max Green 2 *	15	60	20	30	40	60
Yellow Clearance	3.0	4.5	3.8	4.6	3.0	4.5
Red Clearance	3.3	1.2	2.4	1.6	3.1	1.3
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	30	-	-	-	30
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	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.

This signal was designed for advanced preemption.

Signal Upgrade - Temporary Design - Phase II

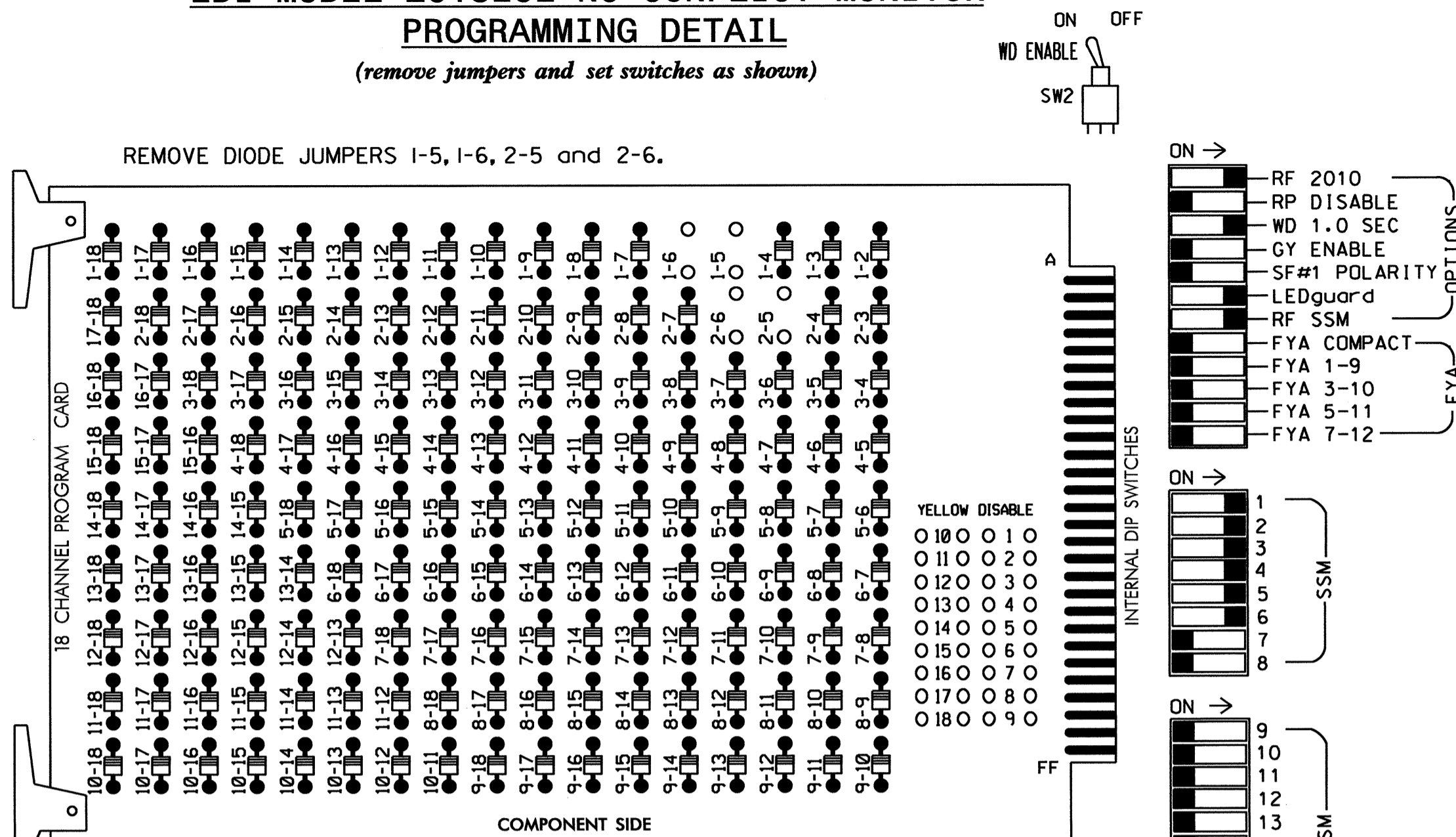
Prepared in the Office of:

US 70 Bus. at NC 42/SR 1589 (Rose St.)
 Division 4 Johnston County Clayton
 PLAN DATE: September 2011 REVIEWED BY:
 PREPARED BY: I. O. Umzurike REVIEWED BY:
 SCALE: 0 40 1"=40'
 REVISIONS: INIT. DATE: 11/10/11
 SIG. INVENTORY NO. 04-10371

18-Nov-2011 11:12 R:\ITC\offices\gnas\gnas\gnas\1037\041037\temp_sig_dgn_2011rmdc.dgn

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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 Clayton US 70 Bus. CLS.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332
 SOFTWARE.....ECONOLITE OASIS (Version 3.02.77 or other approved version.)
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
 PHASES USED.....1,2,3,4,5,6
 OVERLAP A:.....NOT USED
 OVERLAP B:.....NOT USED
 OVERLAP C:.....NOT USED
 OVERLAP D:.....NOT USED
 OVERLAP P:.....1+2+3+4+5+6

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	32,33	41	42	NU	51,52	61,62	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									132		
GREEN ARROW	127			118		103				133		

NU = Not Used

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'P' SETTINGS
 PHASE: 12345678910111213141516
 VEH OVL PARENTS: :XXXXXX
 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 (0-25.5 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: 04-1037T
 DESIGNED: September 2011
 SEALED: 11-10-11
 REVISED: N/A

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	FS
1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	DC ISOLATOR
NOT USED	∅ 2	NOT USED	NOT USED	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	ST
	2B													DC ISOLATOR
FILE "J"	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	PRE1			
	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	AC ISOLATOR			
	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	NOT USED			
	5B	6B	7B	8B	9B	10B	11B	12B	13B	14B	NOT USED			

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

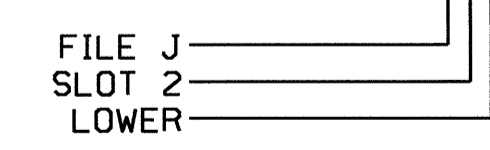
FS = FLASH SENSE
 ST = STOP TIME
 PRE = PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			5
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-3,4	J1L	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
* S3	TB7-9,10	J9U	59	21	15	SYS					

* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

INPUT FILE POSITION LEGEND: J2L



Electrical Detail - Sheet 1 of 2- Temporary Design - Phase II

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

US 70 Bus. at NC 42 and SR 1589 (Rose St.)

Division 4 Johnston County Clayton

PLAN DATE: October 2011 REVIEWED BY: JWP

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

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

SIGNATURE: [Signature] DATE: 11-15-11

SIG. INVENTORY NO. 04-1037T

10-NOV-2011 11:36 S:\TSS\WITS Signal\workgroups\Sig Mon\ Peterson\041037-sm_elec_dgn

RAILROAD PREEMPTION PROGRAMMING DETAIL

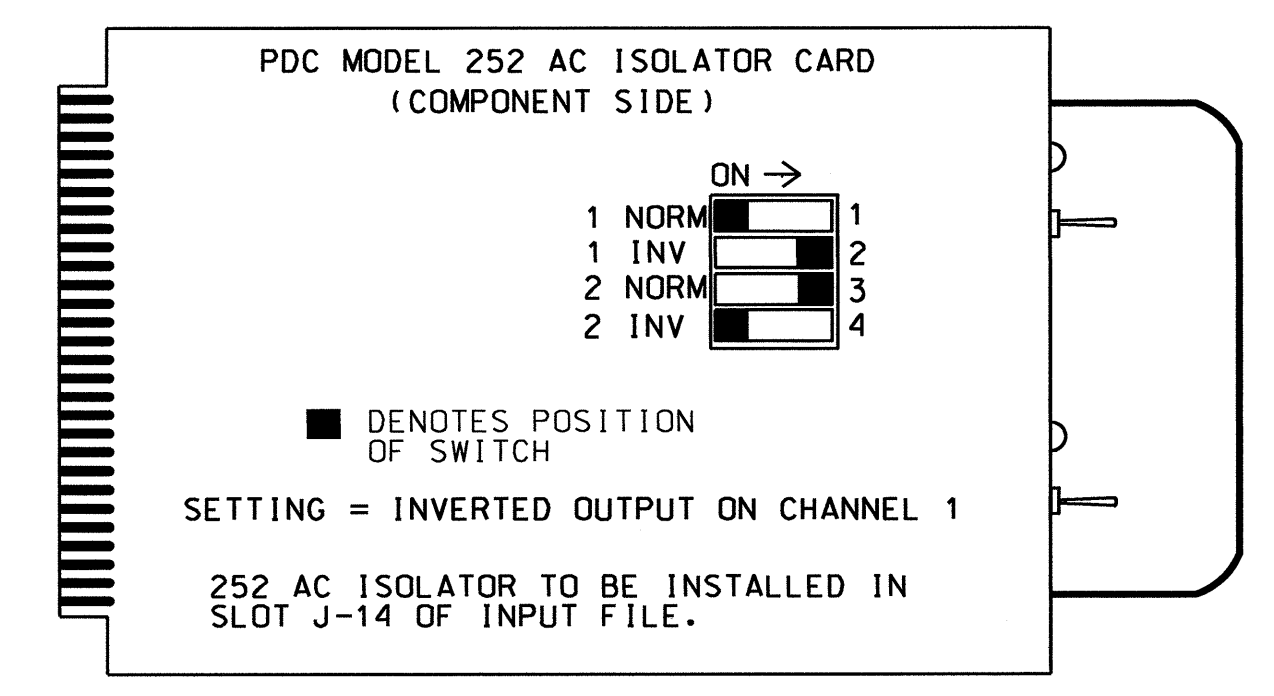
(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions).

PREEMPTION #1	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 21 4.6 1.6	X
2 255 0.0 0.0	XX X
3 0 0.0 0.0	
4 0 0.0 0.0	
5 1 0.0 0.0	X
EXIT CALLS	
OPTIONS	
PRIORITY (Y/N TO SELECT)	.....HIGH
DELAY TIMER (0-255 SEC)	.....0
MIN GREEN BEFORE PRE (0= DEFAULT)	...1
PED CLEAR BEFORE PRE (0= DEFAULT)	...0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)	...4.6
RED CLEAR BEFORE PRE (0= DEFAULT)	...1.7
DWELL MIN TIMER (0-255 SEC)	.....7
DWELL MAX TIMER (0=OFF,1-255MIN)	....0
DWELL HOLD-OVER TIMER (0-255)	.....0
LATCH CALL?	.....N
LINK TO NEXT PREEMPT?	.....N
ENABLE BACKUP PROTECTION?	.....N
HOLD CLEAR 1 PHASES DURING DELAY?	...N
FAST GREEN FLASH DWELL PHASES?	.....N
PED CLEARANCE THROUGH YELLOW?	.....N
INHIBIT OVERLAP GREEN EXTENSION?	...N
SERVICE DURING SOFTWARE FLASH?	.....N
REST IN RED DURING DWELL INTERVAL?	...N
FLASH DWELL INTERVAL?	.....N
ALLOW PEDS IN DWELL INTERVAL?	.....N
RE-TIME DWELL INTERVAL?	.....N
OVERLAPS:	ABCDEFGHIJKLMN
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	X

PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

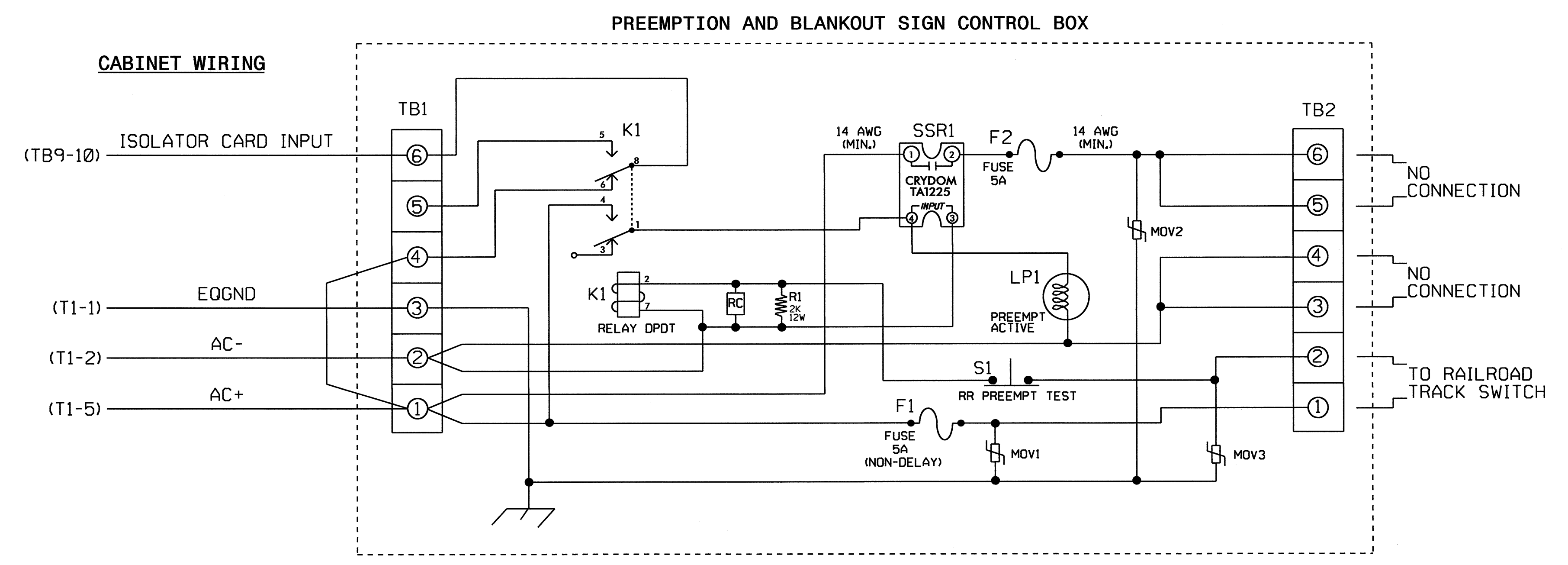
(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

RAILROAD PREEMPTION WIRING DETAIL

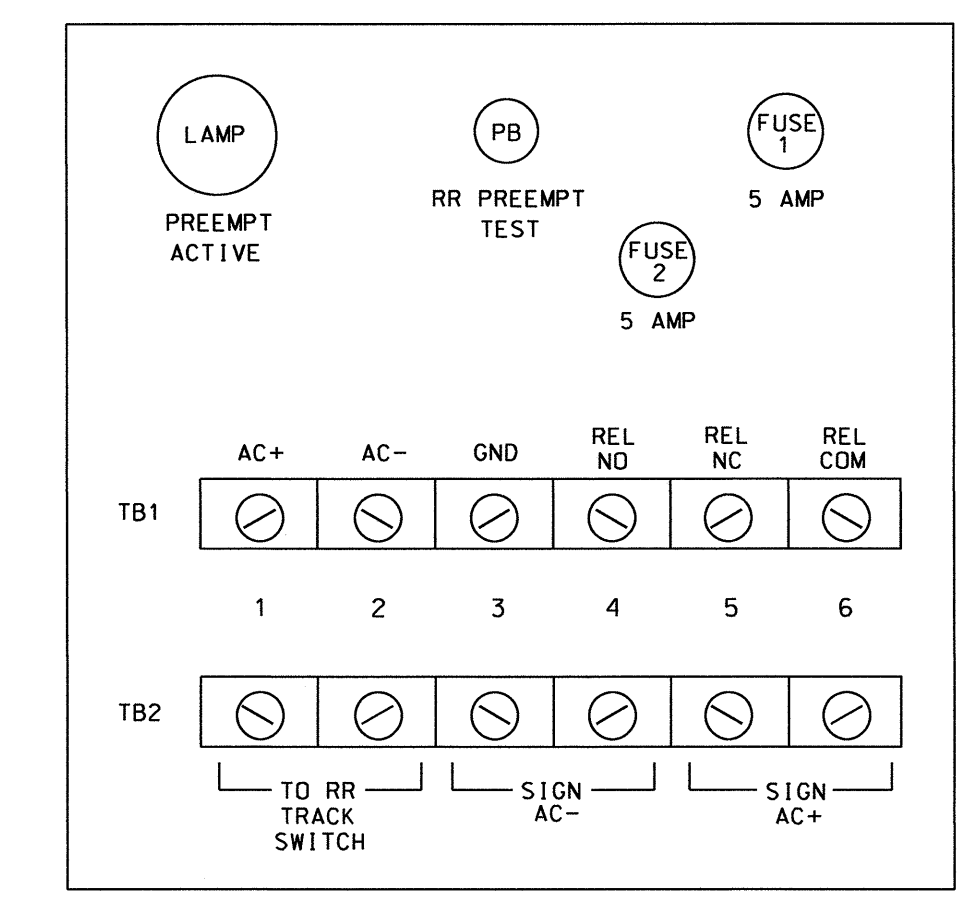
(wire as shown below)



NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT with 120VAC coil. Potter & Brumfield KRP11AG with octal base or approved equivalent.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output. Crydom TA1225 or approved equivalent.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
- Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K or approved equivalent.
- RC network is valued at .1 microfarad, 100 ohm.
- If replacement movs are needed, GE part no. V150LA20A may be used.
- Preemption and Blankout Sign Control Box is a Control Technologies part no. 2299-101 or approved equivalent.
- IMPORTANT!!** A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1037T
 DESIGNED: September 2011
 SEALED: 11-10-11
 REVISED: N/A

Electrical Detail - Sheet 2 of 2- Temporary Design - Phase II

	ELECTRICAL AND PROGRAMMING DETAILS FOR:		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE, JR. SIGNATURE DATE 11-15-11 SIG. INVENTORY NO. 04-1037T
	Prepared In the Offices of:		
	US 70 Bus. at NC 42 and SR 1589 (Rose St.)		
	Division 4 PLAN DATE: October 2011 PREPARED BY: James Peterson	Johnston County Clayton REVIEWED BY: [Signature] REVIEWED BY: [Signature]	
REVISIONS		INIT. DATE	

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PHASING DIAGRAM

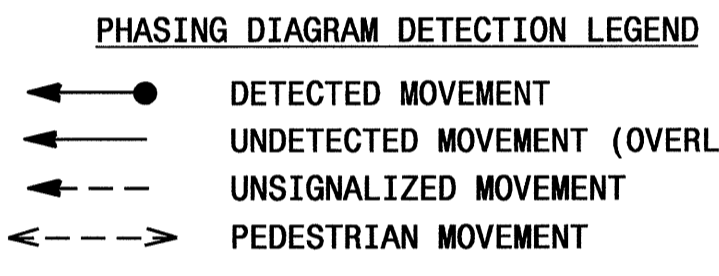
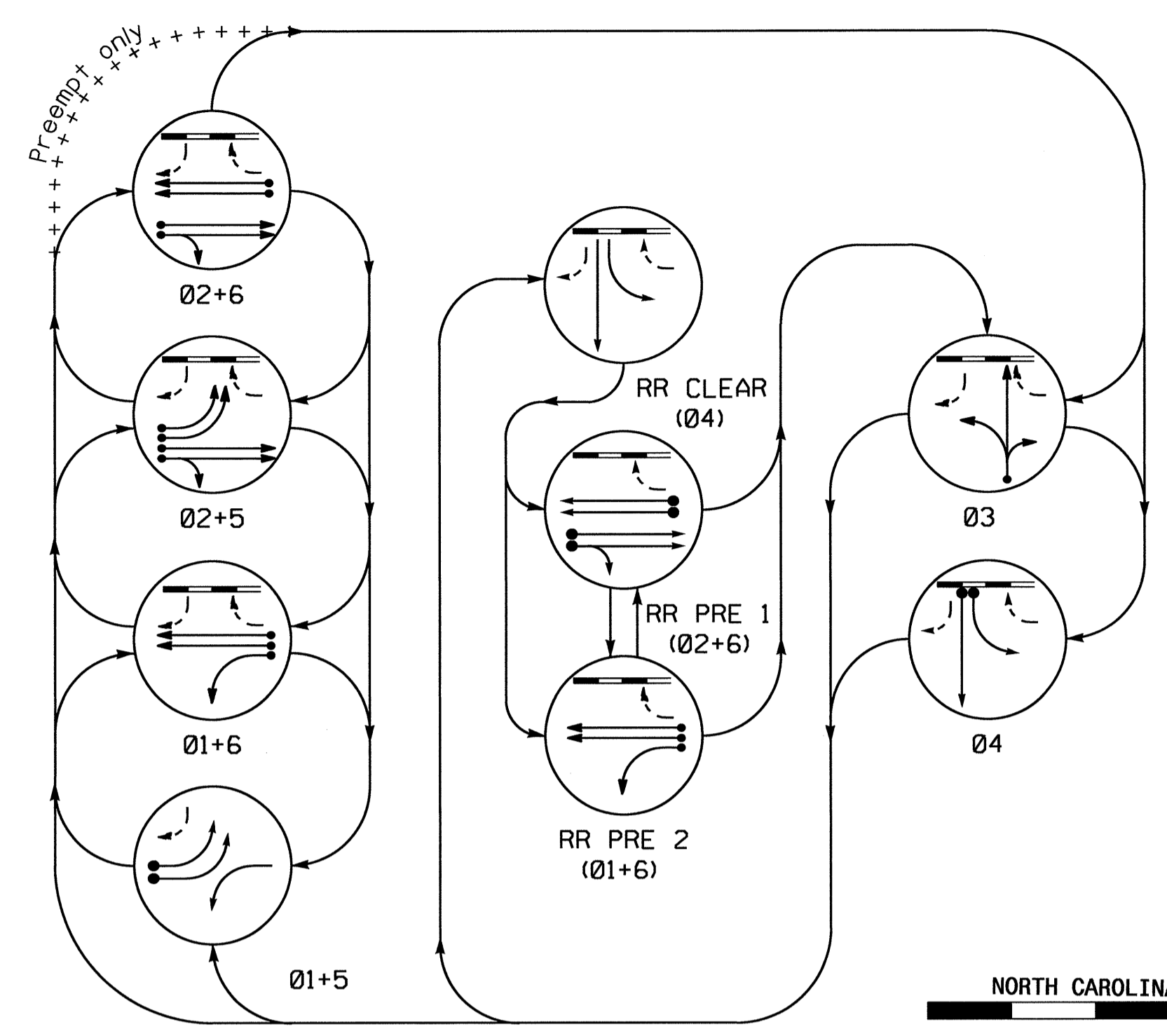
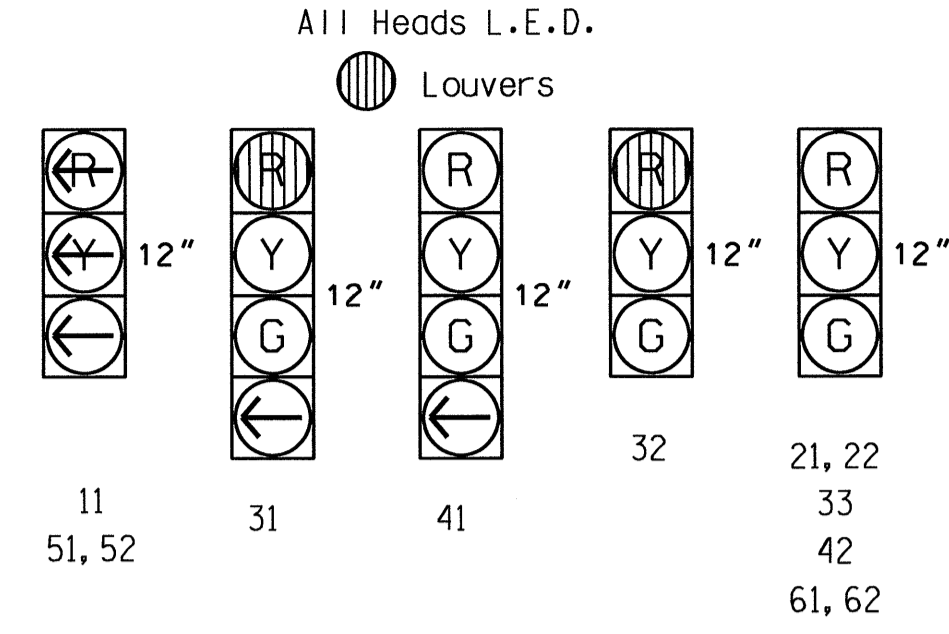


TABLE OF OPERATION

SIGNAL FACE	PHASE											
	02+5	02+6	01+5	01+6	03	04	RR CLEAR (04)	RR PRE 1 (02+6)	RR PRE 2 (01+6)	01+5	01+6	02+5
11	R	R	R	R	R	R	R	R	R	R	R	R
21, 22	G	G	R	R	R	R	R	R	R	G	R	Y
31	R	R	R	R	R	R	R	R	R	R	R	R
32, 33	R	R	R	R	G	R	R	R	R	R	R	R
41	R	R	R	R	R	G	G	R	R	R	R	R
42	R	R	R	R	R	G	G	R	R	R	R	R
51, 52	←	←	←	←	←	←	←	←	←	←	←	←
61, 62	R	G	R	G	R	R	R	G	G	Y		

SIGNAL FACE I.D.



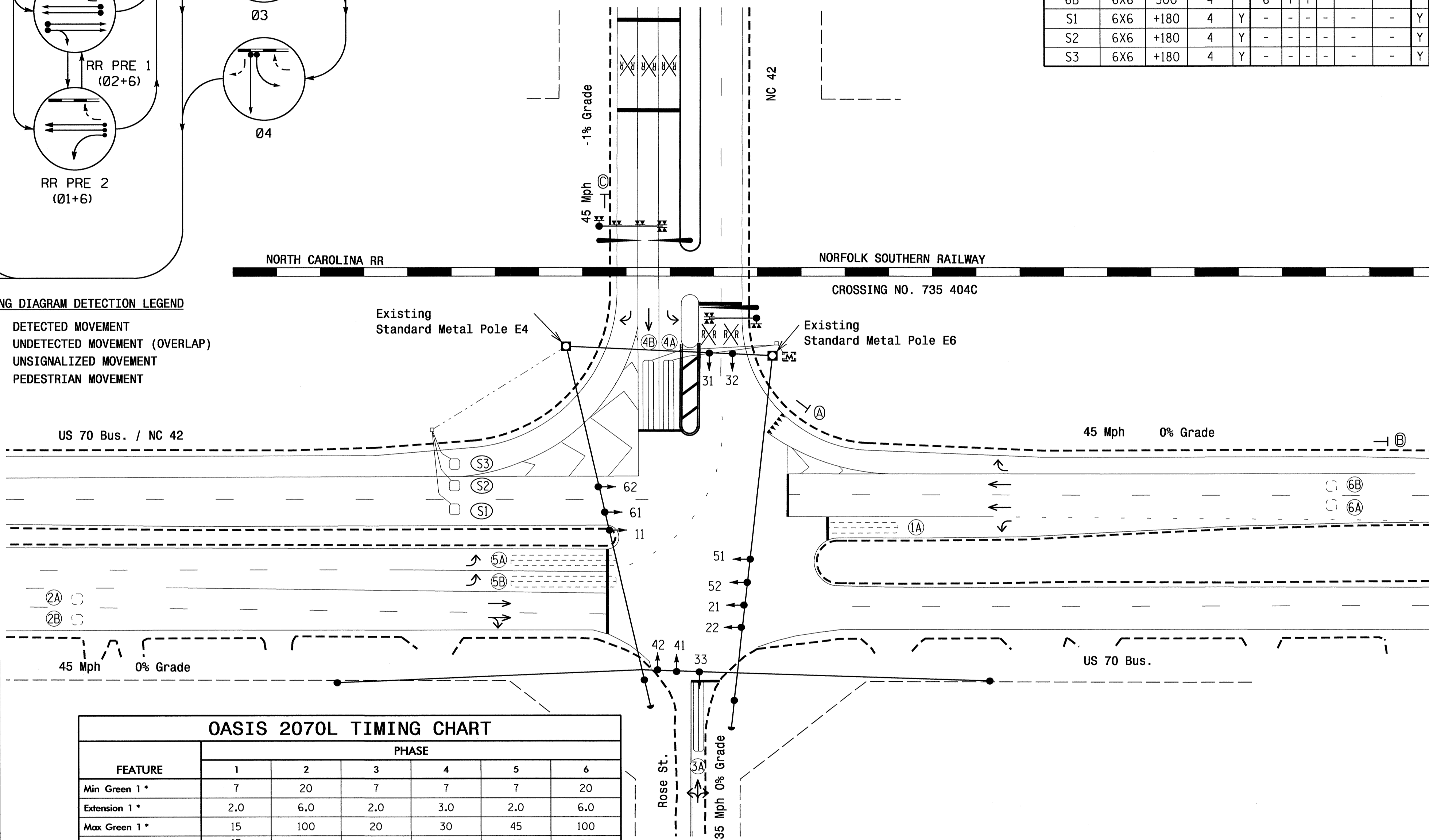
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY		
1A	6X60	+5	2-4-2	-	1	Y	Y	-	-	-
2A	6X6	300	4	-	2	Y	Y	-	-	-
2B	6X6	300	4	-	2	Y	Y	-	-	-
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	5
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-
5A	6X60	+5	2-4-2	-	5	Y	Y	-	-	-
5B	6X60	+5	2-4-2	-	5	Y	Y	-	-	-
6A	6X6	300	4	-	6	Y	Y	-	-	-
6B	6X6	300	4	-	6	Y	Y	-	-	-
S1	6X6	+180	4	Y	-	-	-	-	-	Y
S2	6X6	+180	4	Y	-	-	-	-	-	Y
S3	6X6	+180	4	Y	-	-	-	-	-	Y

6 Phase Fully Actuated w/ RR Pre-Emption Clayton US 70 Bus. CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
- Phase 1 and/or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #10401, Controller Asset #1037.



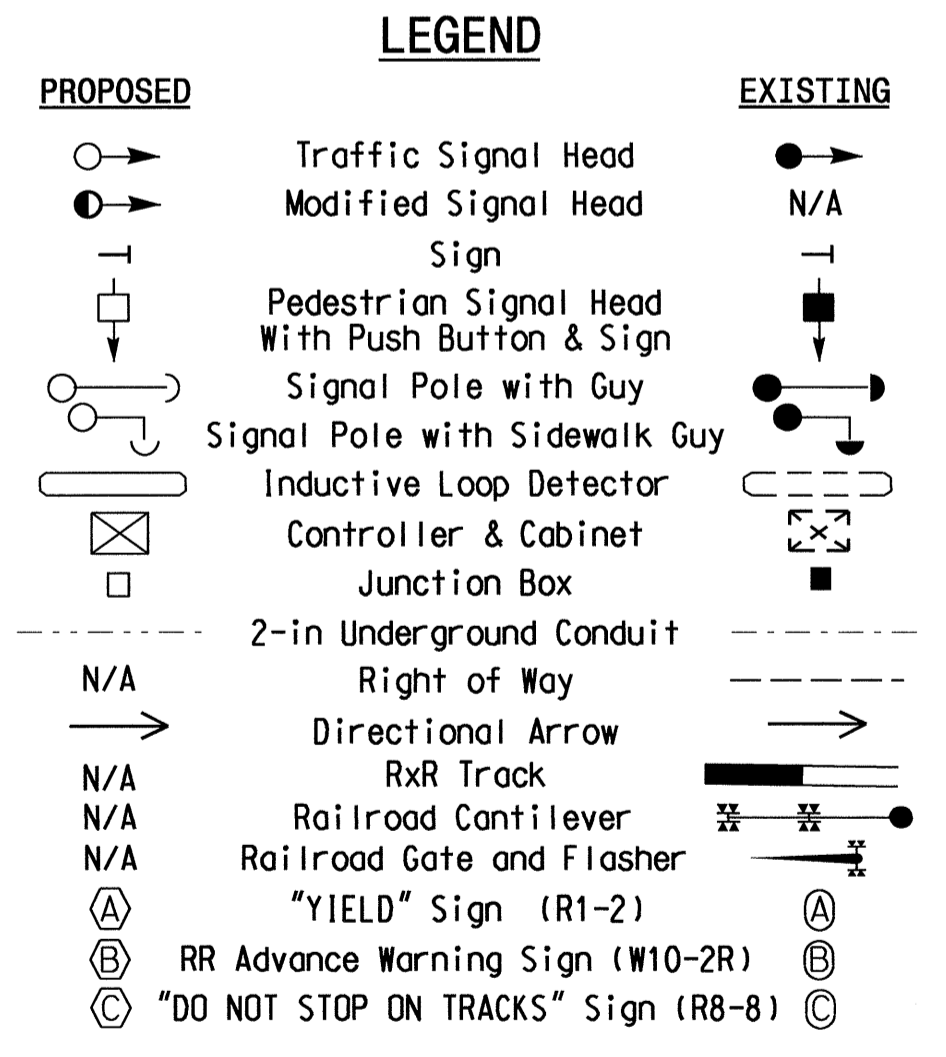
2070 RAIL PREEMPTION

FUNCTION	PRE 1
Interval 1 - Track Clearance Green	23
Interval 1 - Track Clearance Yellow	4.5
Interval 1 - Track Clearance Red	1.8
Interval 2 - Dwell Green	255
Interval 2 - Dwell Yellow	0.0*
Interval 2 - Dwell Red	0.0*
Interval 5 - Exit Green	1
Interval 5 - Yellow	0.0
Interval 5 - Red	0.0
Priority	High
Delay Time	0
Min Green Before Pre	1
Ped Clear Before Pre	0
Yellow Clear Before Pre	4.5
Red Clear Before Pre	1.8
Dwell Min Time	7
Ped Clear Through Yellow	N
Omit Overlaps	P

OASIS 2070L TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	20	7	7	7	20
Extension 1 *	2.0	6.0	2.0	3.0	2.0	6.0
Max Green 1 *	15	100	20	30	45	100
Max Green 2 *	15	60	20	30	40	60
Yellow Clearance	3.0	4.5	3.8	4.5	3.0	4.5
Red Clearance	3.3	1.2	2.4	1.8	3.3	1.3
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5
Max Variable Initial *	-	34	-	-	-	34
Time Before Reduction *	-	30	-	-	-	30
Time To Reduction *	-	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	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.



Signal Upgrade - Final

US 70 Bus. at NC 42 and SR 1589 (Rose St.)

Division 4 Johnston County Clayton

PLAN DATE: September 2011 REVIEWED BY: I. O. Umozurike

PREPARED BY: I. O. Umozurike

REVISIONS: _____ INIT. DATE

SCALE: 1"=40'

SEAL 29904

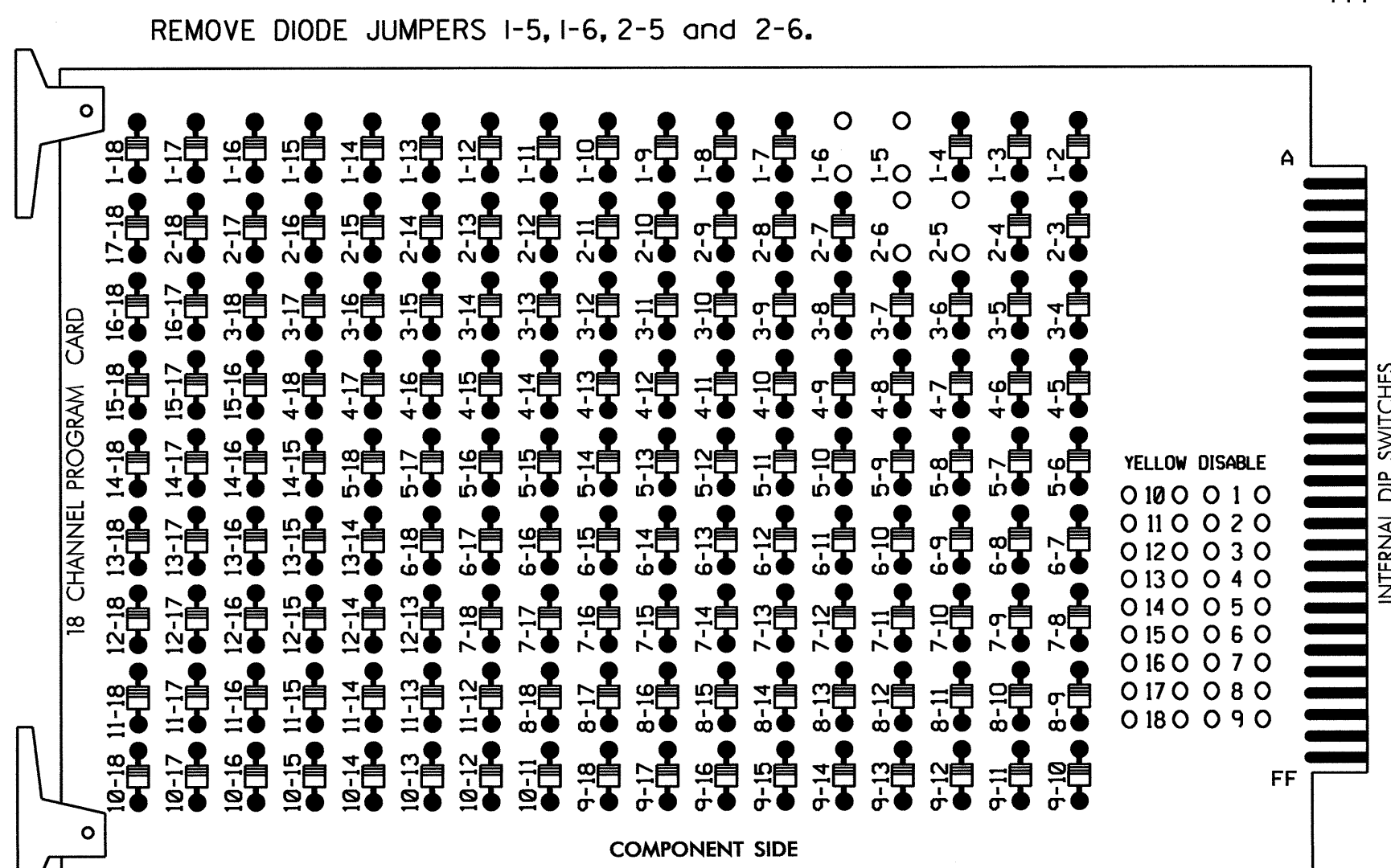
SIG. INVENTORY NO. 04-1037

18-NOV-2011 11:11 R:\proj\1037\1037.dgn I:\proj\1037\1037.dgn

EDI MODEL 2018ECL-NC CONFLICT MONITOR

PROGRAMMING DETAIL

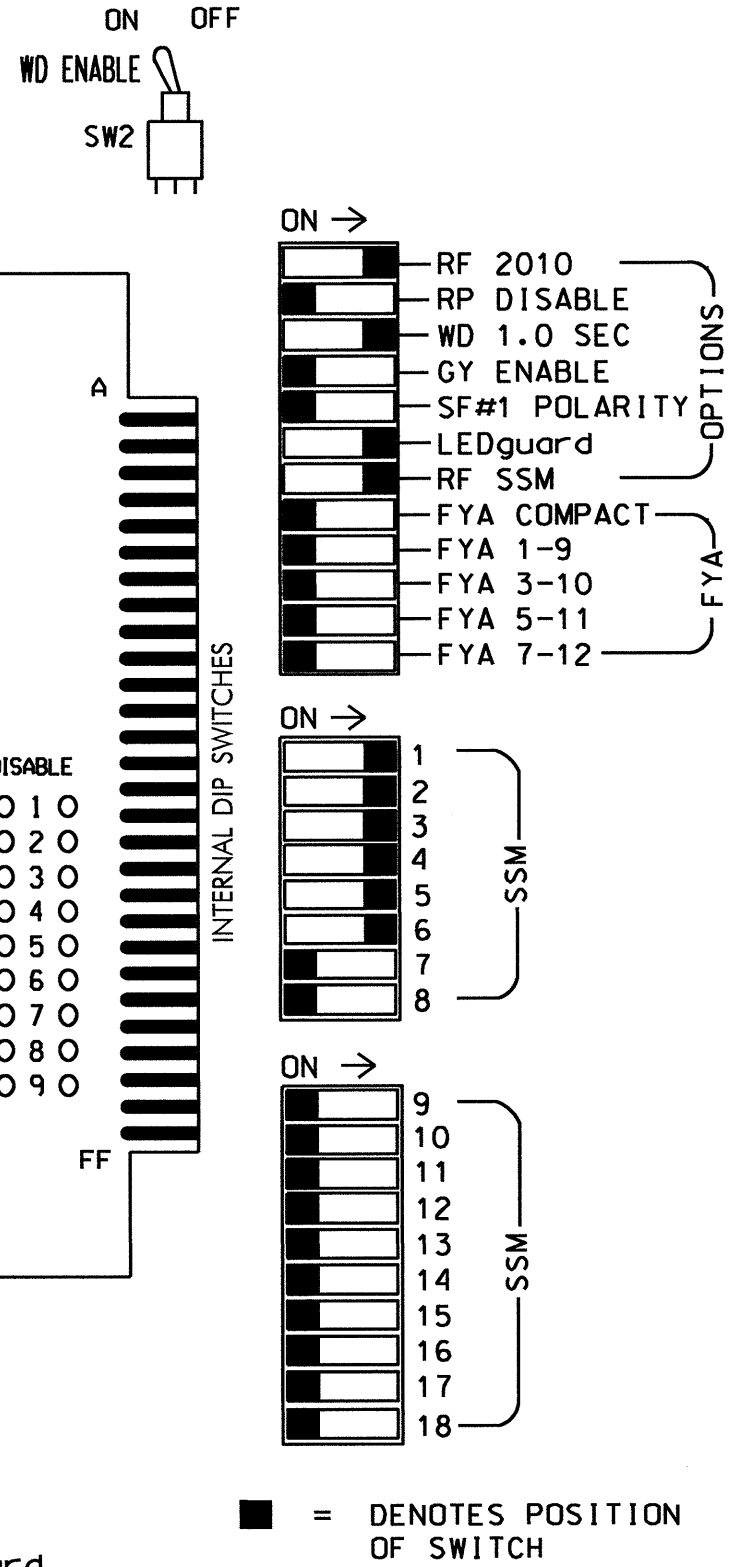
(remove jumpers and set switches as shown)



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.
- The cabinet and controller are part of the Clayton US 70 Bus. CLS.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332
 SOFTWARE.....ECONOLITE OASIS (Version 3.02.77 or other approved version.)
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
 PHASES USED.....1,2,3,4,5,6
 OVERLAP A:.....NOT USED
 OVERLAP B:.....NOT USED
 OVERLAP C:.....NOT USED
 OVERLAP D:.....NOT USED
 OVERLAP P:.....1+2+3+4+5+6

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	32,33	41	42	NU	51,52	61,62	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								132			
GREEN ARROW	127			118	103			133				

NU = Not Used

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '--'

```

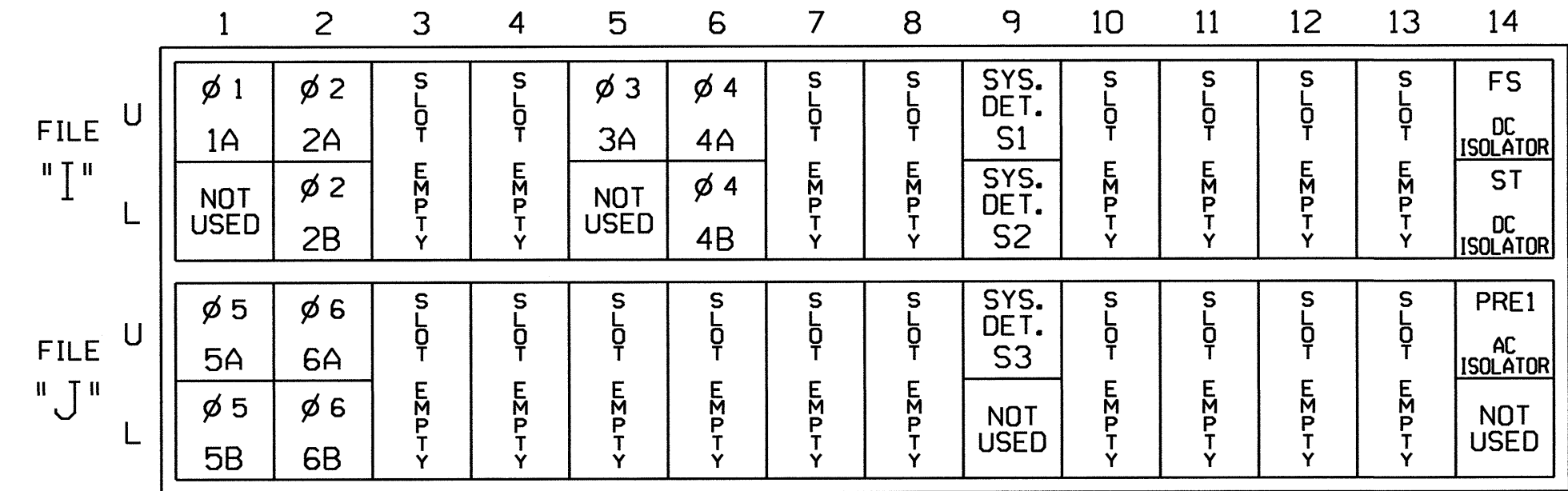
PAGE 1: VEHICLE OVERLAP 'P' SETTINGS
PHASE:          :12345678910111213141516
VEH OVL PARENTS: :XXXXXX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR:  _ RED _ YELLOW _ GREEN
FLASH COLORS:   _ RED _ YELLOW _ GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1037
 DESIGNED: September 2011
 SEALED: 11-10-11
 REVISED: N/A

INPUT FILE POSITION LAYOUT

(front view)



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

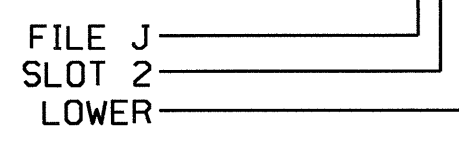
FS = FLASH SENSE
 ST = STOP TIME
 PRE = PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			5
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
* S1	TB6-9,10	I9U	60	22	11	SYS					
* S2	TB6-11,12	I9L	62	24	13	SYS					
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-3,4	J1L	55	17	5	5	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
* S3	TB7-9,10	J9U	59	21	15	SYS					

* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

INPUT FILE POSITION LEGEND: J2L



Electrical Detail - Sheet 1 of 2 - Final

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

US 70 Bus. at NC 42 and SR 1589 (Rose St.)

Division 4 Johnston County Clayton

PLAN DATE: October 2011 REVIEWED BY: JWP

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

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

Signature: John T. Rowe, Jr. 11-15-11 DATE

SIG. INVENTORY NO. 04-1037

14-NOV-2011 07:41 S:\ITS\SIG\ITS Signal\sig\groups\sig Mon\Peter\bornd\1037_sml_e_000.dgn

RAILROAD PREEMPTION PROGRAMMING DETAIL

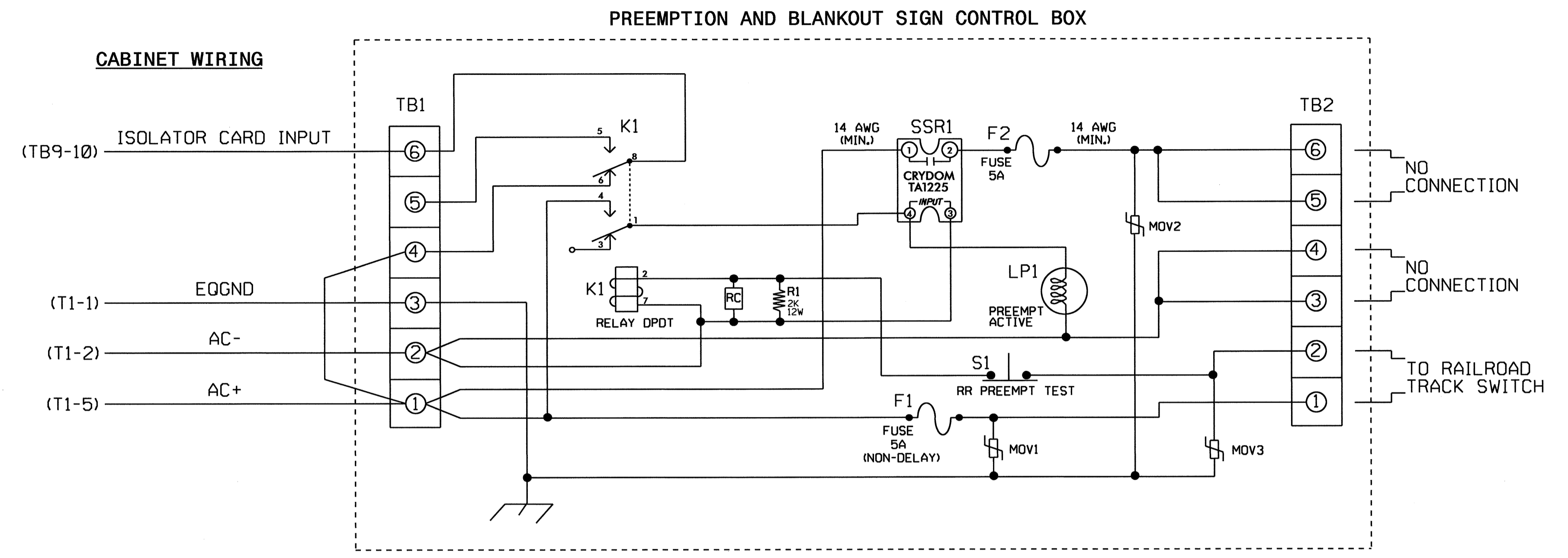
(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions).

PREEMPTION #1	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 23 4.5 1.8	X
2 255 0.0 0.0	XX X
3 0 0.0 0.0	
4 0 0.0 0.0	
5 1 0.0 0.0	X
EXIT CALLS	
OPTIONS	
PRIORITY (Y/N TO SELECT)	.....HIGH
DELAY TIMER (0-255 SEC)	.....0
MIN GREEN BEFORE PRE (0= DEFAULT)	...1
PED CLEAR BEFORE PRE (0= DEFAULT)	...0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)	...4.5
RED CLEAR BEFORE PRE (0= DEFAULT)	...1.8
DWELL MIN TIMER (0-255 SEC)	.....7
DWELL MAX TIMER (0=OFF,1-255MIN)	....0
DWELL HOLD-OVER TIMER (0-255)	.....0
LATCH CALL?	.....N
LINK TO NEXT PREEMPT?	.....N
ENABLE BACKUP PROTECTION?	.....N
HOLD CLEAR 1 PHASES DURING DELAY?	...N
FAST GREEN FLASH DWELL PHASES?	.....N
PED CLEARANCE THROUGH YELLOW?	.....N
INHIBIT OVERLAP GREEN EXTENSION?	...N
SERVICE DURING SOFTWARE FLASH?	.....N
REST IN RED DURING DWELL INTERVAL?	..N
FLASH DWELL INTERVAL?	.....N
ALLOW PEDS IN DWELL INTERVAL?	.....N
RE-TIME DWELL INTERVAL?	.....N
OVERLAPS:	ABCDEFGHIJKLMN
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	X

RAILROAD PREEMPTION WIRING DETAIL

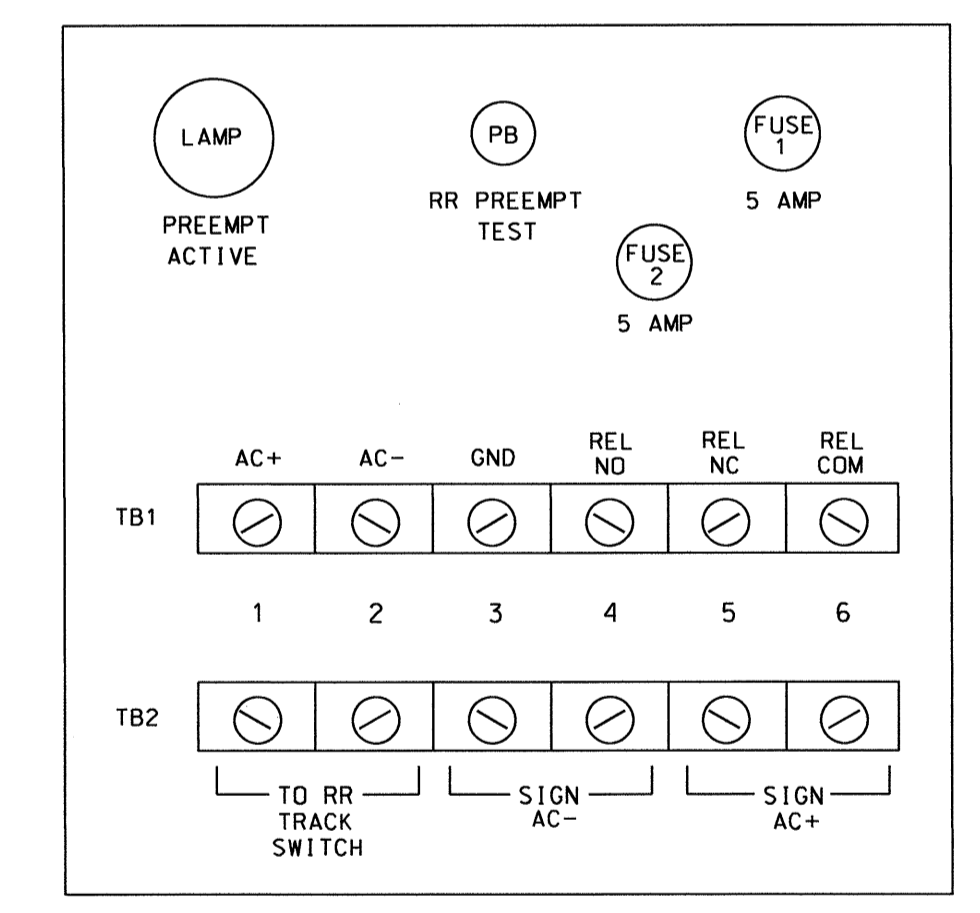
(wire as shown below)



NOTES

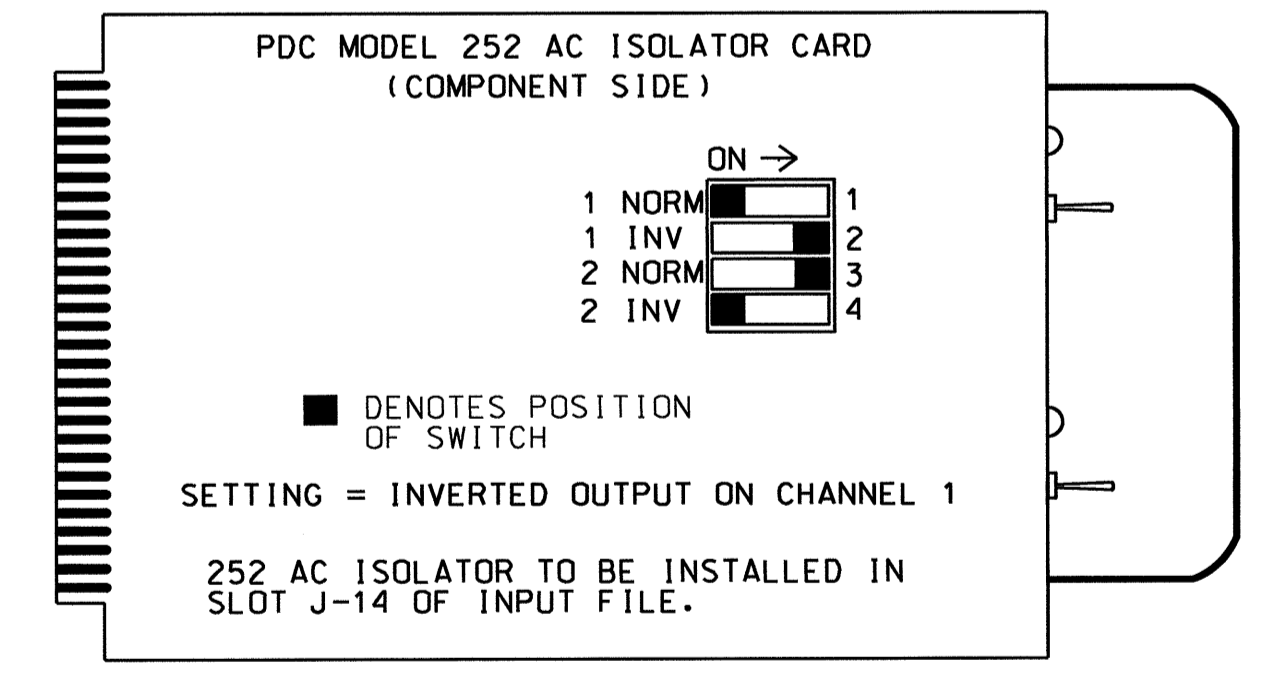
- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT with 120VAC coil. Potter & Brumfield KRP11AG with octal base or approved equivalent.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output. Crydom TA1225 or approved equivalent.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card.
- Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K or approved equivalent.
- RC network is valued at .1 microfarad, 100 ohm.
- If replacement movs are needed, GE part no. V150LA20A may be used.
- Preemption and Blankout Sign Control Box is a Control Technologies part no. 2299-101 or approved equivalent.
- IMPORTANT!!** A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW



PREEMPT 1 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

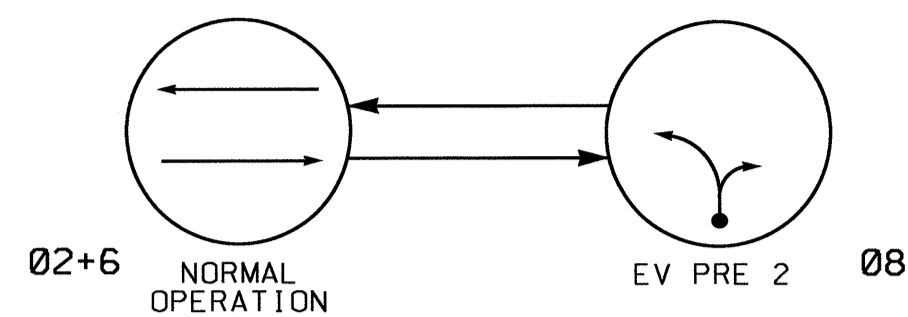
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1037
DESIGNED: September 2011
SEALED: 11-10-11
REVISED: N/A

Electrical Detail - Sheet 2 of 2 - Final

	<p>US 70 Bus. at NC 42 and SR 1589 (Rose St.)</p>		
	<p>Division 4 Johnston County Clayton</p>	<p>PLAN DATE: October 2011 REVIEWED BY: <i>AWA</i></p>	
<p>PREPARED BY: James Peterson REVIEWED BY:</p>		<p>REVISIONS</p>	<p>INIT. DATE</p>
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>		<p><i>John T. Rowe</i> 11-15-11</p>	<p>SIGNATURE DATE</p>
<p>SIG. INVENTORY NO. 04-1037</p>			

14-NOV-2011 14:55 J:\projects\sig\workgroups\sig\Main\ Peterson\041037_sml.ele.xxx.dgn

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- UN SIGNALIZED MOVEMENT
- ←- - - -> PEDESTRIAN MOVEMENT

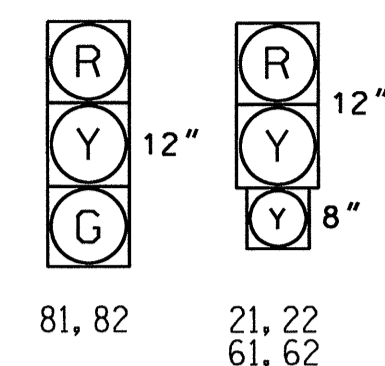
TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	EV PRE 2	FLASHER
21, 22	F	R	Y
61, 62	F	R	Y
81, 82	DRK	G	R

F = 8" Flashing Yellow
DRK - Dark

SIGNAL FACE I.D.

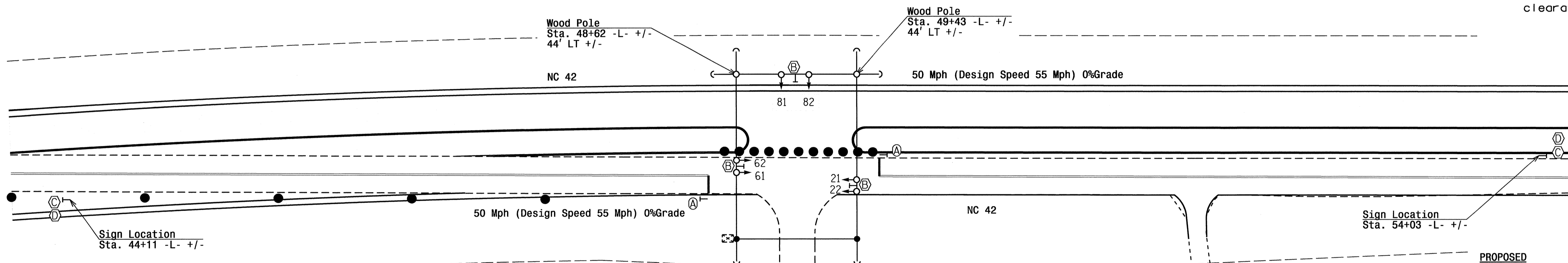
All Heads L.E.D.



**2 Phase
Emergency Vehicle Preemption
Isolated**

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.
- Emergency vehicle preemption switch is located in the fire department.
- The Division Traffic Engineer will determine the Delay Time and Dwell Min time for the emergency vehicle preemption timing.
- Clear signal heads 21, 22, 61 and 62 from flashing 8" yellow to steady 12" yellow during interval 1 and steady red during interval 2.
- Signal head 81 and 82 will display Red indication during clearance to preemption.



OASIS 2070L TIMING CHART

FEATURE	PHASE		
	2	6	8
Min Green 1 *	14	14	7
Extension 1 *	-	-	-
Max Green 1 *	30	30	30
Yellow Clearance	5.2	5.2	3.0
Red Clearance	1.0	1.0	1.6
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	-	-	-
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.

2070 EV PREEMPTION

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

* Time defaults to time used for phase during normal operation
** See note #4

LEGEND

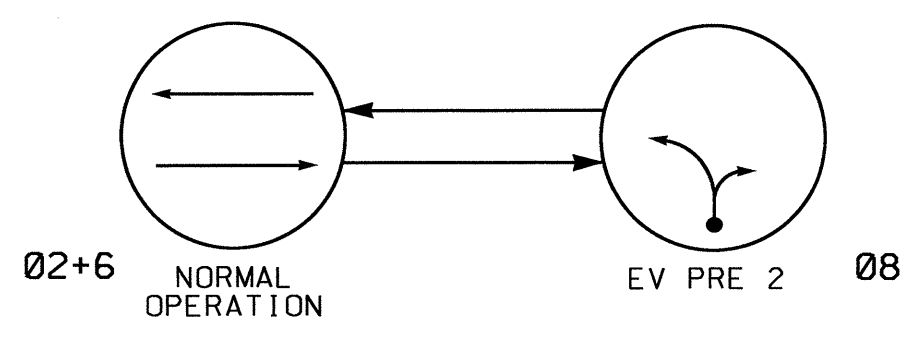
- | | | | |
|--|---------------------------------------------------------|--|---------------------------------------------------------|
| | PROPOSED Traffic Signal Head | | EXISTING Traffic Signal Head |
| | PROPOSED Modified Signal Head | | EXISTING Modified Signal Head |
| | PROPOSED Pedestrian Signal Head With Push Button & Sign | | EXISTING Pedestrian Signal Head With Push Button & Sign |
| | PROPOSED Signal Pole with Guy | | EXISTING Signal Pole with Guy |
| | PROPOSED Signal Pole with Sidewalk Guy | | EXISTING Signal Pole with Sidewalk Guy |
| | PROPOSED Inductive Loop Detector | | EXISTING Inductive Loop Detector |
| | PROPOSED Controller & Cabinet | | EXISTING Controller & Cabinet |
| | PROPOSED Junction Box | | EXISTING Junction Box |
| | PROPOSED 2-in Underground Conduit | | EXISTING 2-in Underground Conduit |
| | PROPOSED Right of Way | | EXISTING Right of Way |
| | PROPOSED Directional Arrow | | EXISTING Directional Arrow |
| | PROPOSED "STOP HERE ON RED" Sign (R10-6) | | EXISTING "STOP HERE ON RED" Sign (R10-6) |
| | PROPOSED "Emergency Signal" Sign (R10-13) | | EXISTING "Emergency Signal" Sign (R10-13) |
| | PROPOSED Emergency Vehicle Sign (W11-8) | | EXISTING Emergency Vehicle Sign (W11-8) |
| | PROPOSED "Emergency Signal Ahead" Sign (W11-12p) | | EXISTING "Emergency Signal Ahead" Sign (W11-12p) |

Signal Upgrade - Temporary Design - Phase I & II

	NC 42 at Clayton Fire Dept.		
	Division 4 Johnston County Clayton PLAN DATE: September 2011 REVIEWED BY:	PREPARED BY: I. O. Umzurike REVIEWED BY:	
SCALE 0 40 1"=40'	REVISIONS	INIT. DATE	SIGNATURE DATE I. O. Umzurike 10/31/11

18-NDV-2011 06:27
 R:\Traffic\sig\104-1215-04\121511_1_1.dgn, 2011mddc.dgn
 10/31/11 10:41:11 AM

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- ◄●► DETECTED MOVEMENT
- ◄—► UNDETECTED MOVEMENT (OVERLAP)
- ◄- - -► UNSIGNALIZED MOVEMENT
- ◄- - - - -► PEDESTRIAN MOVEMENT

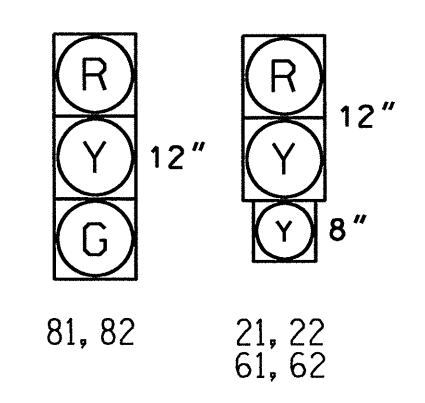
TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	EV PRE 2	FLASH
21, 22	F _Y	R	Y
61, 62	F _Y	R	Y
81, 82	DRK	G	R

F_Y = 8" Flashing Yellow
DRK - Dark

SIGNAL FACE I.D.

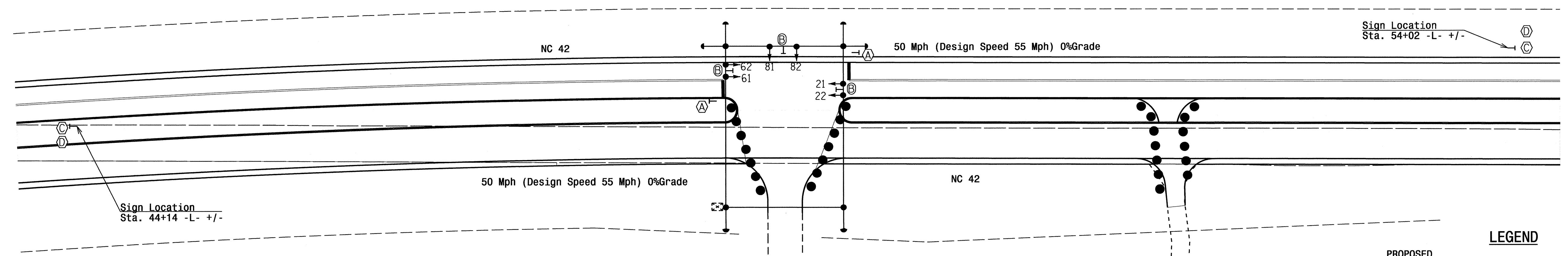
All Heads L.E.D.



**2 Phase
Emergency Vehicle Preemption
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. Reposition existing signal heads numbered 21, 22, 61 and 62.
4. Emergency vehicle preemption switch is located in the fire department.
5. The Division Traffic Engineer will determine the Delay Time and Dwell Min time for the emergency vehicle preemption timing.
6. Clear signal heads 21, 22, 61 and 62 from flashing 8" yellow to steady 12" yellow during interval 1 and steady red during interval 2.
7. Signal head 81 and 82 will display Red indication during clearance to preemption.



OASIS 2070L TIMING CHART

FEATURE	PHASE		
	2	6	8
Min Green 1 *	14	14	7
Extension 1 *	-	-	-
Max Green 1 *	30	30	30
Yellow Clearance	5.2	5.2	3.0
Red Clearance	1.0	1.0	2.6
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	-	-	-
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.

2070 EV PREEMPTION

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

* Time defaults to time used for phase during normal operation
** See note #5

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
◐ → Modified Signal Head	N/A
□ → Sign	□ → Sign
◻ → Pedestrian Signal Head With Push Button & Sign	◻ → Pedestrian Signal Head With Push Button & Sign
○ → Signal Pole with Guy	○ → Signal Pole with Guy
○ → Signal Pole with Sidewalk Guy	○ → Signal Pole with Sidewalk Guy
⊗ → Inductive Loop Detector	⊗ → Inductive Loop Detector
□ → Controller & Cabinet	□ → Controller & Cabinet
□ → Junction Box	□ → Junction Box
- - - → 2-in Underground Conduit	- - - → 2-in Underground Conduit
- - - → Right of Way	- - - → Right of Way
→ → Directional Arrow	→ → Directional Arrow
Ⓐ → "STOP HERE ON RED" Sign (R10-6)	Ⓐ → "STOP HERE ON RED" Sign (R10-6)
Ⓑ → "Emergency Signal" Sign (R10-13)	Ⓑ → "Emergency Signal" Sign (R10-13)
Ⓒ → Emergency Vehicle Sign (W11-8)	Ⓒ → Emergency Vehicle Sign (W11-8)
Ⓓ → "Emergency Signal Ahead" Sign (W11-12p)	Ⓓ → "Emergency Signal Ahead" Sign (W11-12p)

Signal Upgrade - Temporary Design - Phase III

**NC 42
at
Clayton Fire Dept.**

Division 4 Johnston County Clayton
 PLAN DATE: September 2011 REVIEWED BY:
 PREPARED BY: I. O. Umzurike REVIEWED BY:

REVISIONS

NO.	DESCRIPTION	INIT.	DATE

SIGNATURE: *I. O. Umzurike* DATE: 10/31/11

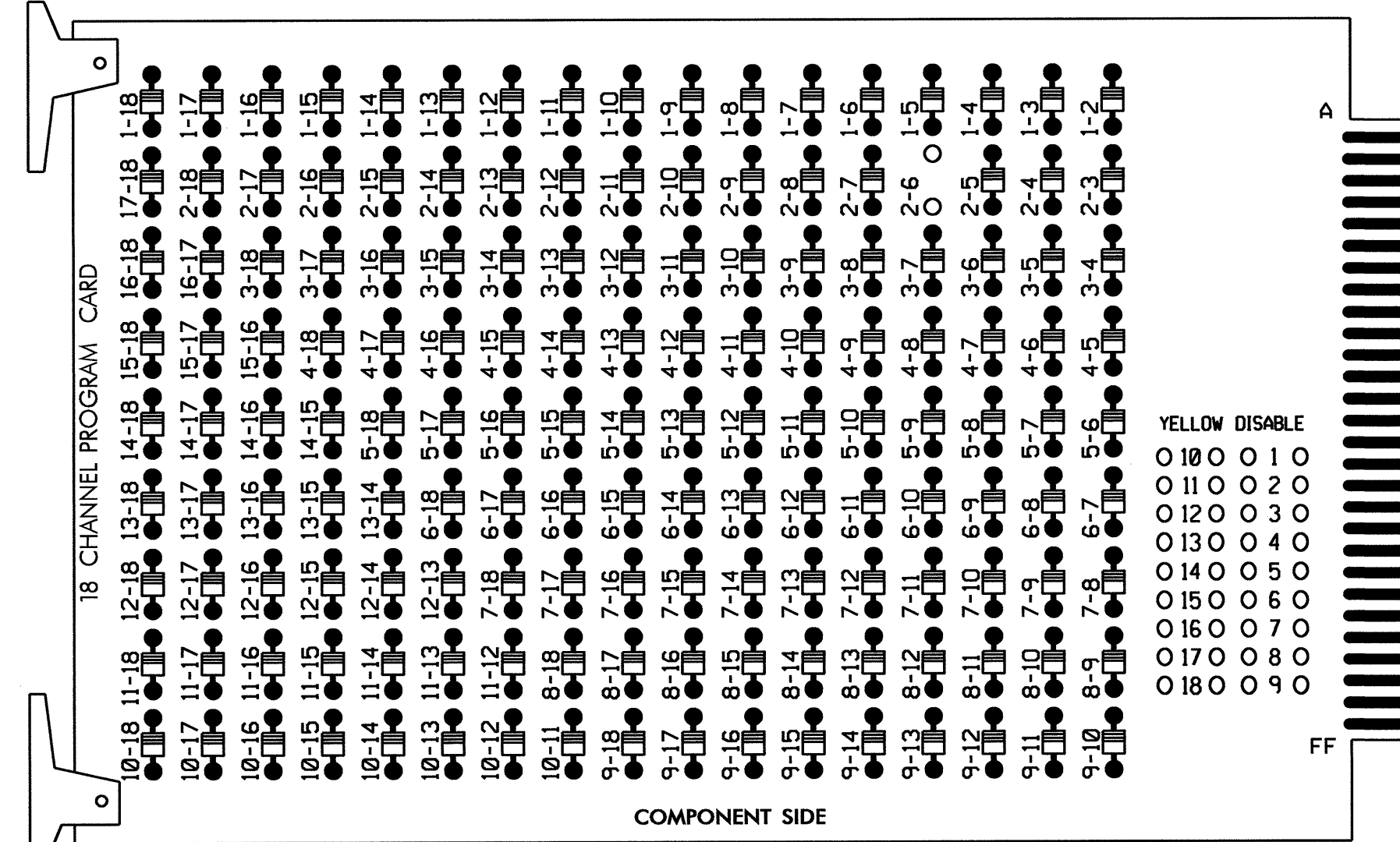
SIG. INVENTORY NO. 04-121512

18-NOV-2011 06:28 P:\Traffic\04-121512\121512_s1.g.dgn_2011.mda-dgn

EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumper and set switches as shown)

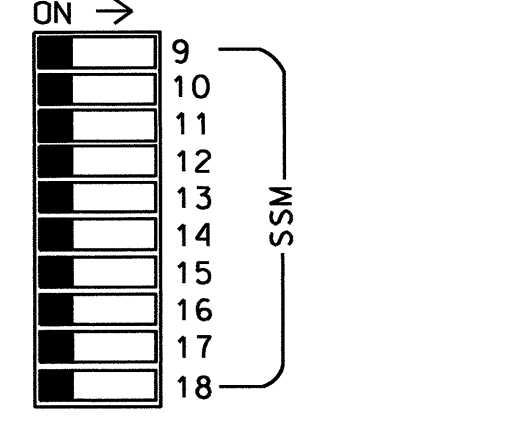
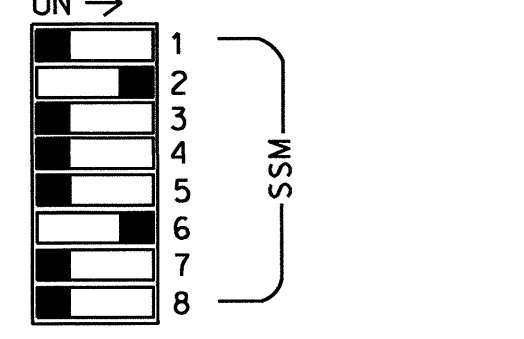
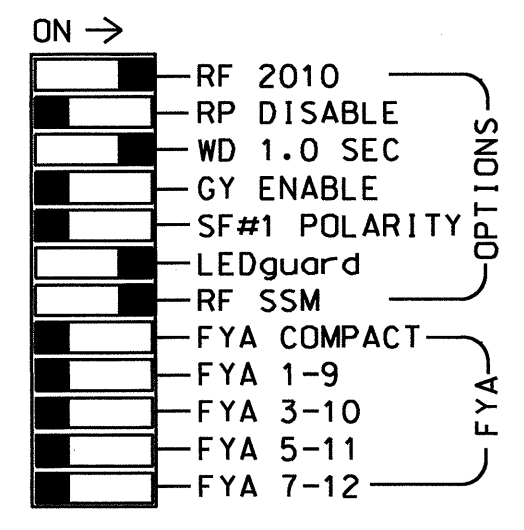
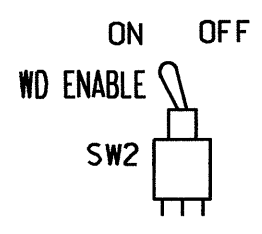
REMOVE DIODE JUMPER 2-6.



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 Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,*S3,S8,S11
PHASES USED.....2,6,8
OVERLAPS.....NONE

* S3 (2 PED) USED FOR FIREHOUSE PILOT LAMP ONLY.

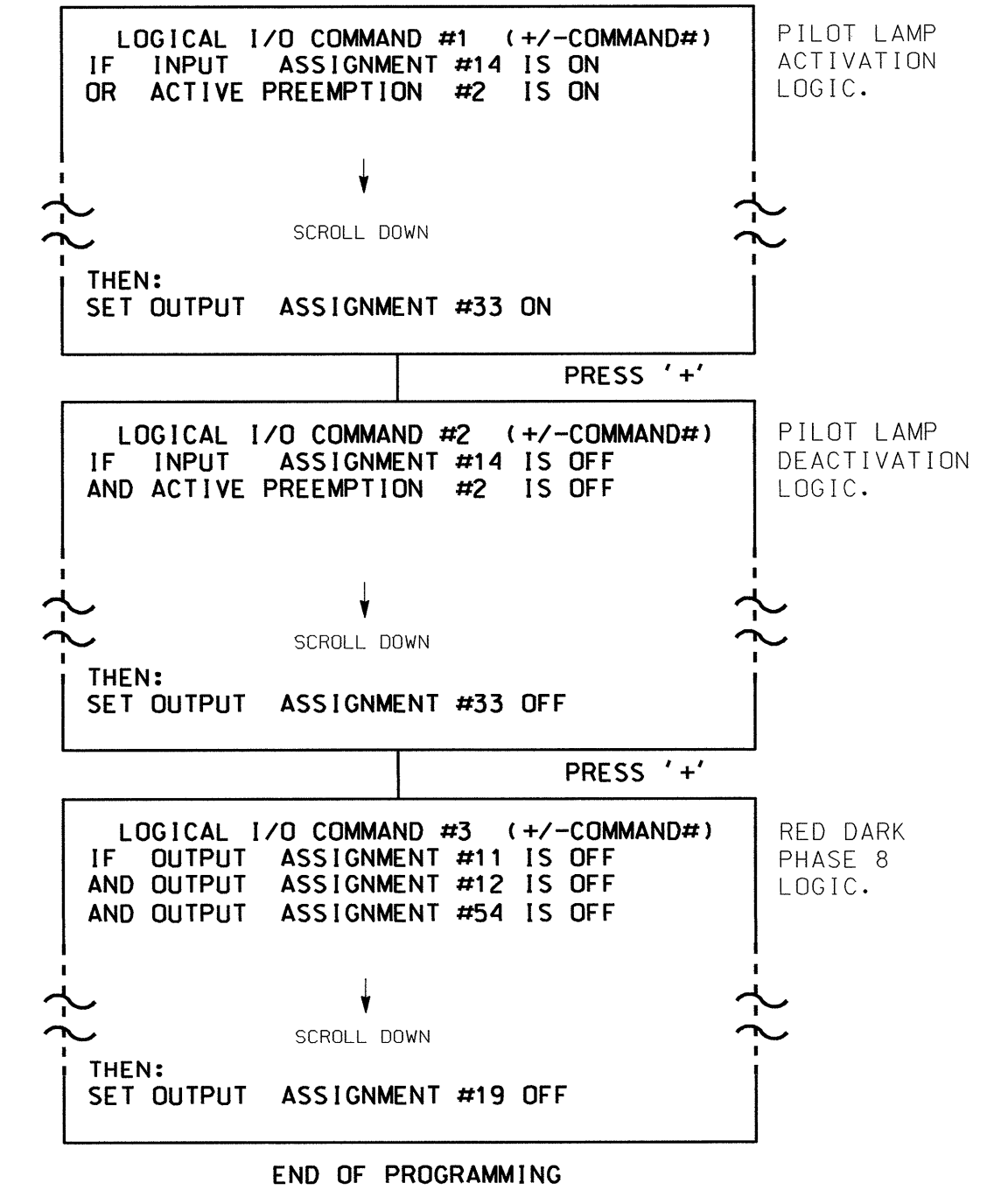
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	**	NU	NU	NU	NU	61,62	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN											109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used
** Firehouse pushbutton pilot lamp will be wired to S2P-Y. See wiring and programming detail on sheet 2.

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
FOR INDICATOR LAMP CONTROL

- 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).

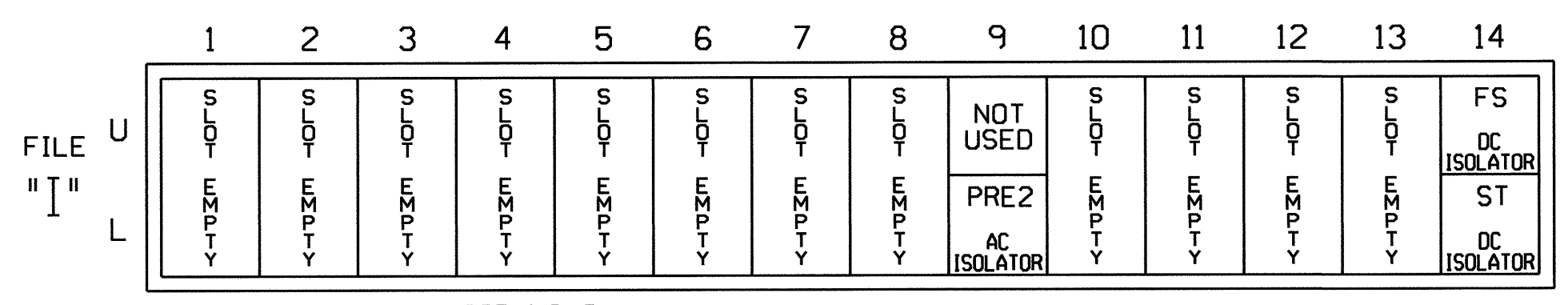


REFERENCE SCHEDULE

INPUT 14	= Preempt 2 input
OUTPUT 11	= Phase 2 Red
OUTPUT 12	= Phase 2 Yellow
OUTPUT 19	= Phase 8 Red
OUTPUT 33	= Phase 2 PED Yellow
OUTPUT 54	= Controller Flash

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME
PRE2 = EV PREEMPT

PREEMPT ONLY PHASE OMIT NOTE

(program controller as shown below)

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

PHASES 2+6
GREEN INTERVAL FLASH PROGRAMMING DETAIL

(Program controller as shown below)

THE FOLLOWING PROGRAMMING WILL ALLOW PHASES 2 AND 6 TO FLASH THEIR RESPECTIVE GREEN OUTPUTS DURING NORMAL OPERATION.

- STEP 1
FROM MAIN MENU PRESS 2 (PHASE CONTROL) THEN 1 (PHASE CONTROL FUNCTIONS).
- STEP 2
SCROLL DOWN 15 TIMES AND FIND 'GREEN INT FLASH'
- STEP 3
ENABLE PHASE 2 AND 6 FOR 'GREEN INT FLASH'

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1215, 04-1215T1 and 04-1215T2
DESIGNED: September 2011
SEALED: 10-31-11
REVISED: N/A

Signal Upgrade - Sheet 1 of 2 - Temp And Final

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
Signal Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 42
at
Clayton Fire Dept.

Division 4 Johnston County Clayton
PLAN DATE: September 2011 REVIEWED BY:
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
STATE OF NORTH CAROLINA
PROFESSIONAL ENGINEER
JOHN T. ROWE, ESQ.
SEAL 008453
DATE: 11-9-11
SIGNATURE: [Signature]

SIG. INVENTORY NO. 04-1215

04-1215-2011-106:105
1:12:41:15 SignalManagement\041215-sm.ele.sxx.dgn
1:12:41:15

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

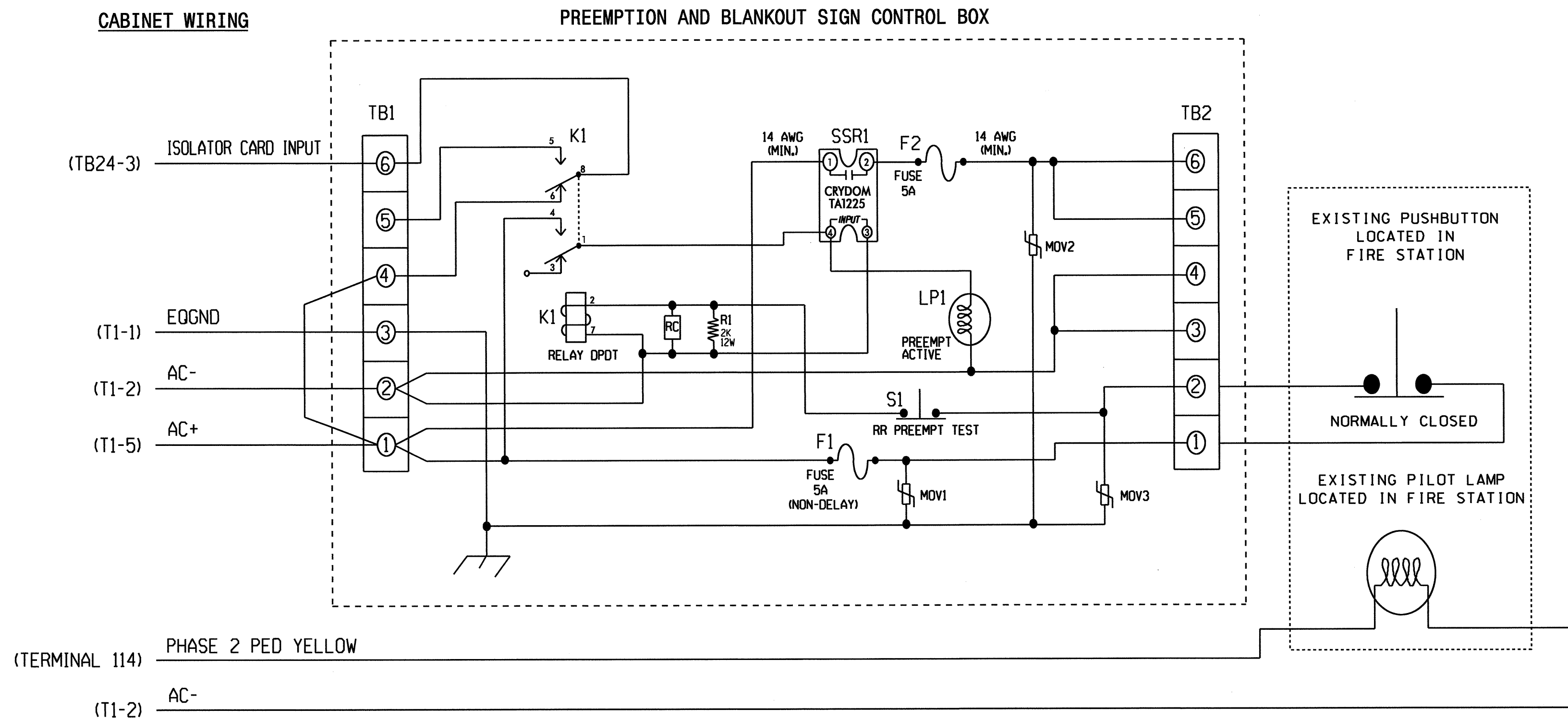
From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' to advance to Preemption #2.

PREEMPTION #2	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0 0.0	X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 1 0.0 0.0	X X
EXIT CALLS	
	OPTIONS
PRIORITY (Y/N TO SELECT)	.....MED
DELAY TIMER (0-255 SEC)*
MIN GREEN BEFORE PRE (0= DEFAULT)	...1
PED CLEAR BEFORE PRE (0= DEFAULT)	...0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)	...0.0
RED CLEAR BEFORE PRE (0= DEFAULT)	...0.0
DWELL MIN TIMER (0-255 SEC)*
DWELL MAX TIMER (0=OFF,1-255MIN)	...0
DWELL HOLD-OVER TIMER (0-255)	.....0
LATCH CALL?	.....Y
LINK TO NEXT PREEMPT?	.....N
ENABLE BACKUP PROTECTION?	.....N
HOLD CLEAR 1 PHASES DURING DELAY?	...N
FAST GREEN FLASH DWELL PHASES?	.....N
PED CLEARANCE THROUGH YELLOW?	.....N
INHIBIT OVERLAP GREEN EXTENSION?	...N
SERVICE DURING SOFTWARE FLASH?	.....N
REST IN RED DURING DWELL INTERVAL?	...N
FLASH DWELL INTERVAL?	.....N
ALLOW PEDS IN DWELL INTERVAL?	...N
RE-TIME DWELL INTERVAL?	.....Y
OVERLAPS:	.....ABCDEF GHIJKLMN OP
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

* Denotes timing to be determined in field.

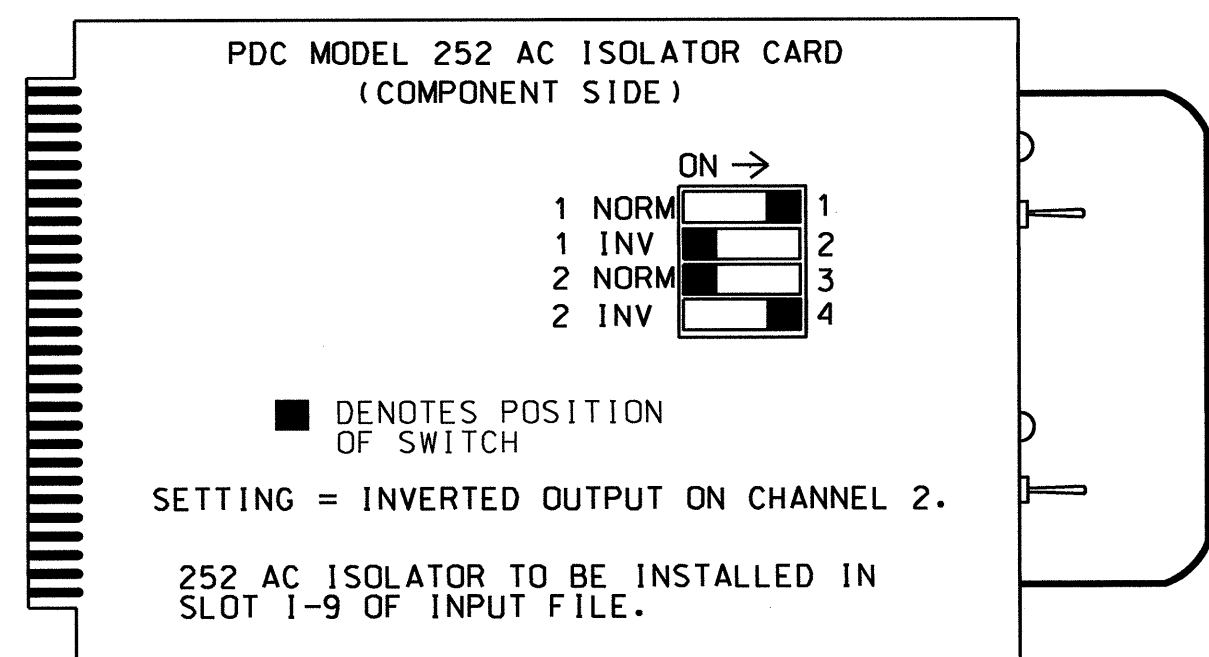
EV Preemption Control Box Wiring Detail

(wire as shown below)



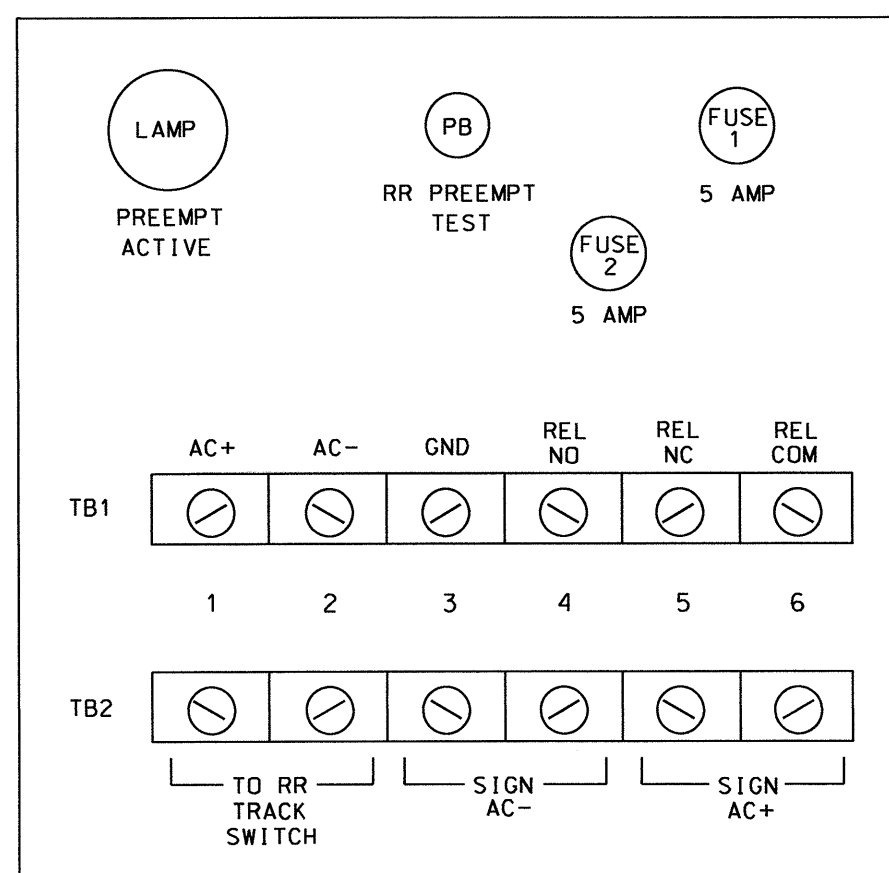
PREEMPT 2 AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

FRONT VIEW



NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
- Relay SSR1 is a Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
- AC Isolator Card shall activate preemption upon removal of AC+ from the input (as shown above). To accomplish this set invert dip switch on AC Isolator Card (See detail this sheet).
- Resistor is valued at 2K ohm, 12 watt, Clarostat part no. VPR10F-2K; DOT Material# 625011550.
- RC network is valued at .1 microfarad, 100 ohm.
- If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
- Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
- IMPORTANT!! Terminal TB24-4 (on input panel) shall be connected to AC neutral (jumper may have to be added).

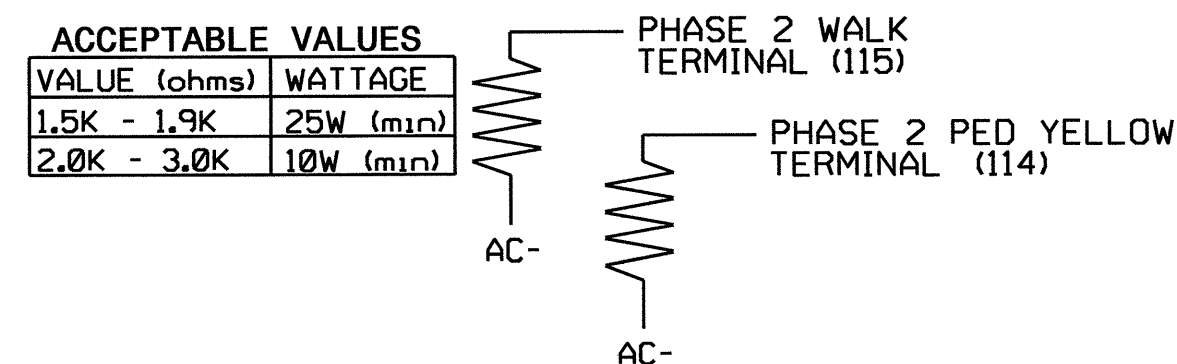
LAMP NOTES

- Ensure Molex plug labeled 2PY-4PY-6PY-8PY (located behind rear panel of output file) is disconnected.
- Make sure load resistors are in place as shown in the Load Resistor Installation Detail on this sheet.
- Install a loadswitch in Output File Slot S3.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1215, 04-1215T1 and 04-1215T2
DESIGNED: September 2011
SEALED: 10-31-11
REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



Signal Upgrade - Sheet 2 of 2 - Temp And Final

	Prepared In the Offices of: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529		ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 42 at Clayton Fire Dept.		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE JR. 11-9-11 DATE
	Division 4 Johnston County Clayton		PLAN DATE: September 2011 REVIEWED BY: JLP		
	PREPARED BY: James Peterson		REVIEWED BY:		
	REVISIONS		INIT. DATE		

PHASING DIAGRAM

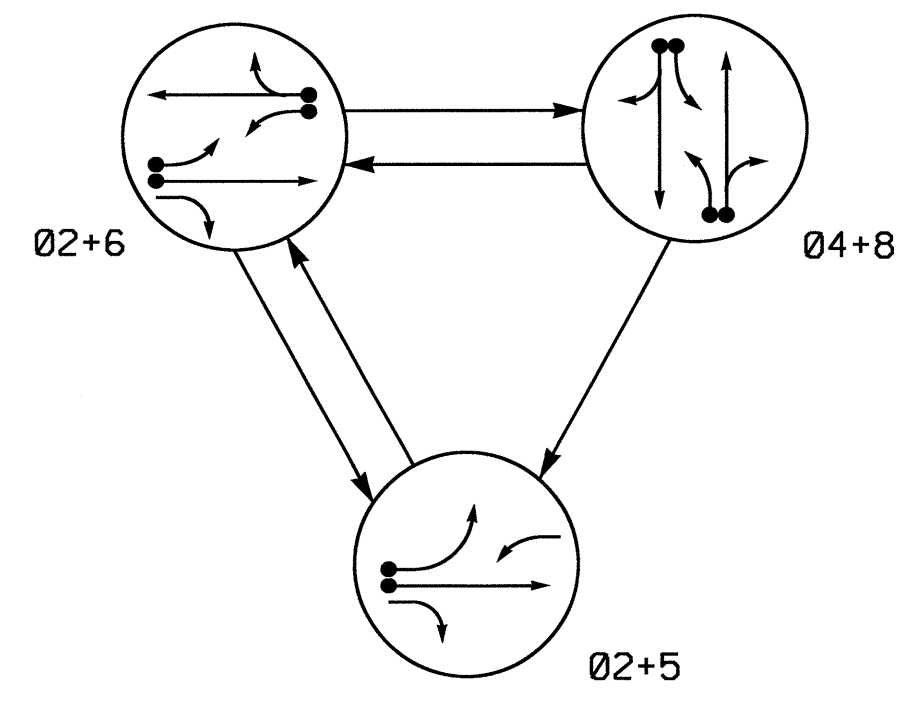
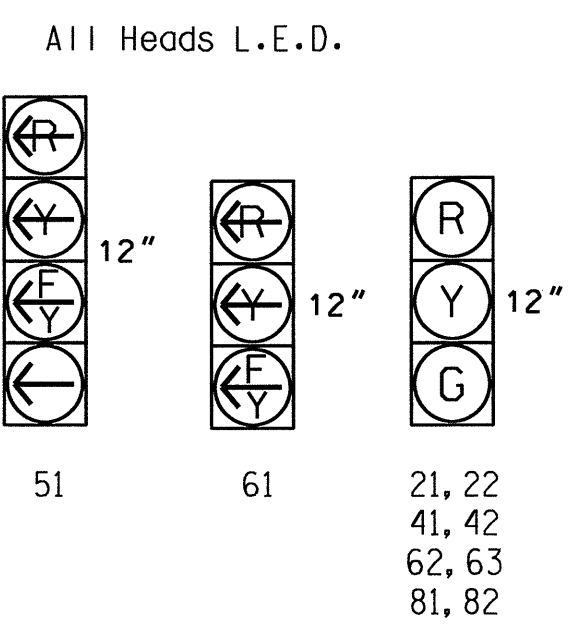


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41, 42	R	R	G	R
51	—	F	R	Y
61	F	F	R	Y
62, 63	R	G	R	Y
81, 82	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
2A	6X6	420	5	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	+5	2-4-2	Y	4	Y	Y	-	-	3	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	15	-	Y
5A	6X40	+5	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A	6X6	420	5	Y	2	Y	Y	Y	-	3	-	Y
6B	6X40	0	2-4-2	Y	6	Y	Y	Y	-	3	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	3	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	10	-	Y

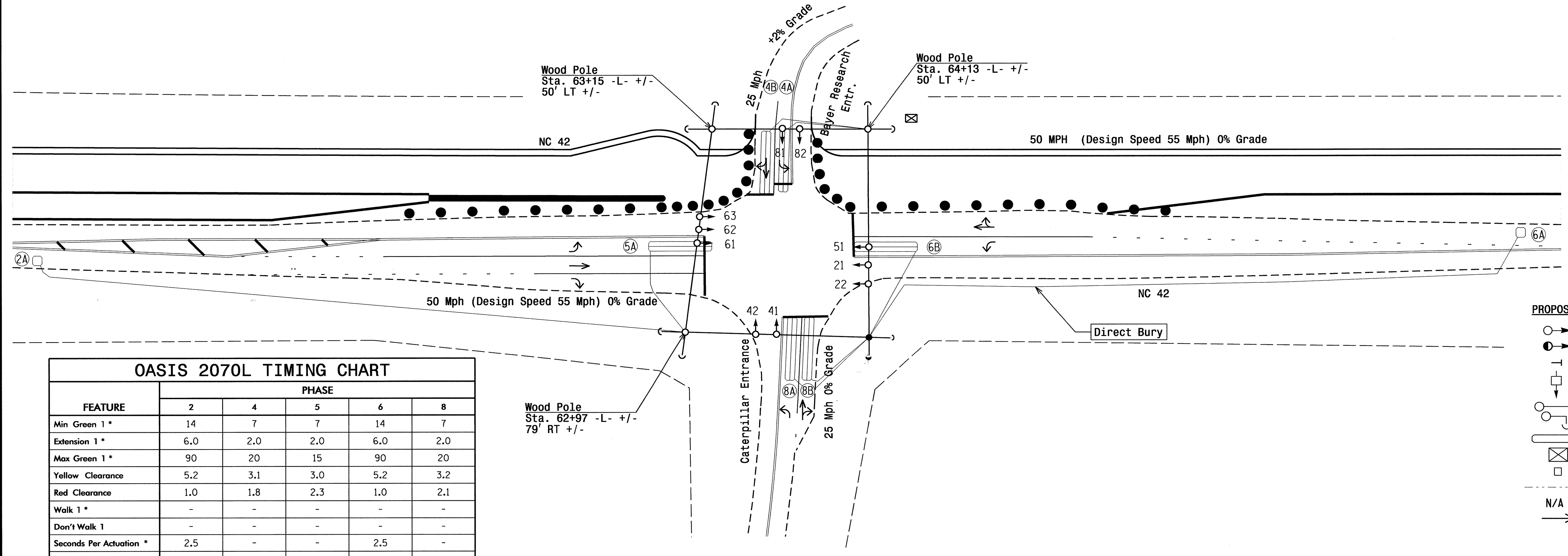
3 Phase Fully Actuated Isolated

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 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.

PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070L TIMING CHART

FEATURE	PHASE				
	2	4	5	6	8
Min Green 1*	14	7	7	14	7
Extension 1*	6.0	2.0	2.0	6.0	2.0
Max Green 1*	90	20	15	90	20
Yellow Clearance	5.2	3.1	3.0	5.2	3.2
Red Clearance	1.0	1.8	2.3	1.0	2.1
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 *	30	-	-	30	-
Minimum Gap	3.4	-	-	3.4	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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

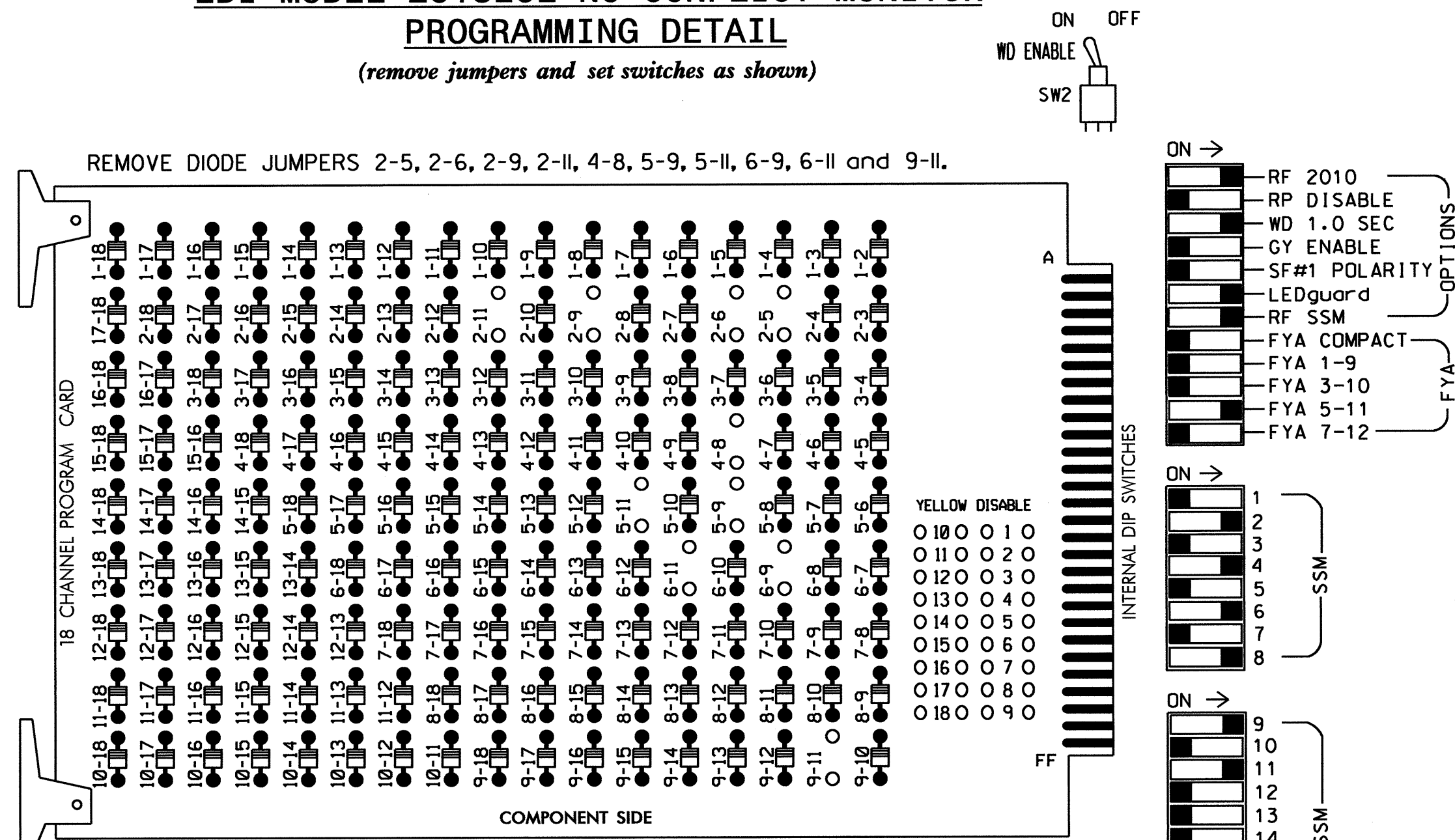
PROPOSED	LEGEND	EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
	Right of Way	
	Directional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

Signal Upgrade - Temporary Design - Phase I & II

	<p>NC 42 at Caterpillar Entrance/ Bayer Research Entrance</p>	
	<p>Division 4 Johnston County Clayton</p> <p>PLAN DATE: September 2011</p> <p>PREPARED BY: I. O. UMOZURIKE</p>	<p>REVIEWED BY:</p> <p>REVISIONS</p> <p>INIT. DATE</p>
	<p>10/31/11</p> <p>SIG. INVENTORY NO. 04-12491I</p>	

1B-HDV-2011_06132 R:\trf\1041\gn\1840\12491I_s1g.dgn, 2011/10/31/11

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



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.
- 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.....S2,S5,S7,S8,S11,AUX S1,AUX S4.
 PHASES USED.....2,4,5,6,8.
 OVERLAP "A".....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.	NU	21,22	NU	NU	41,42	NU	51	62,63	NU	NU	81,82	NU	61	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								133										

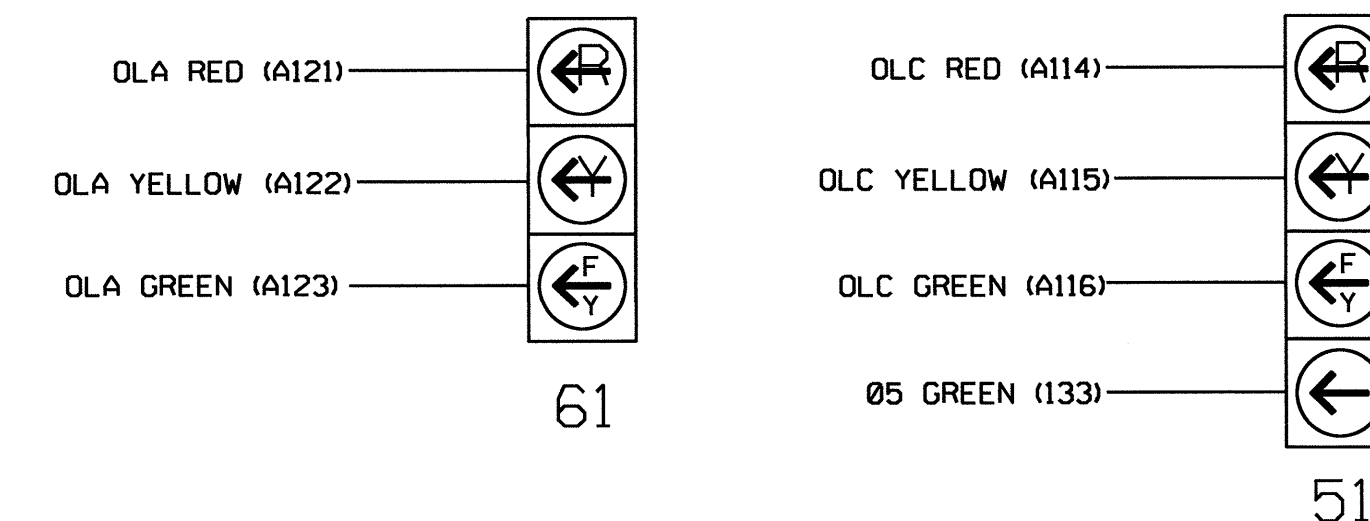
NU = Not Used

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

* See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

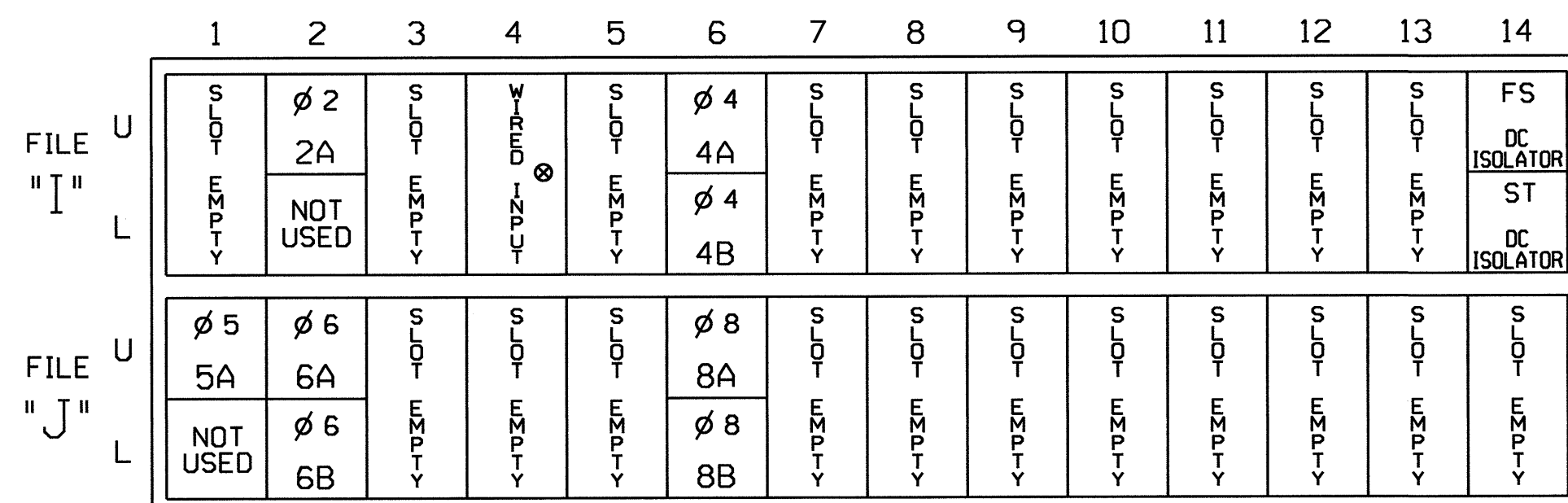


NOTE

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

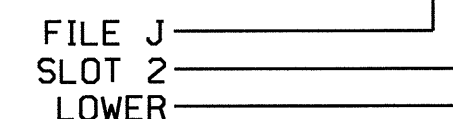
⊗ Wired Input - Do not populate slot with detector card

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	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
5A ¹	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			
6B	TB3-7,8	J2L	44	6	16	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			10

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

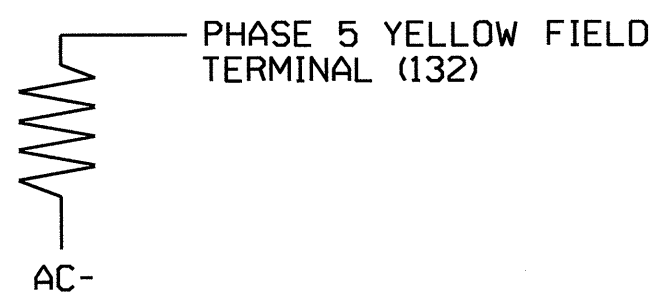
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



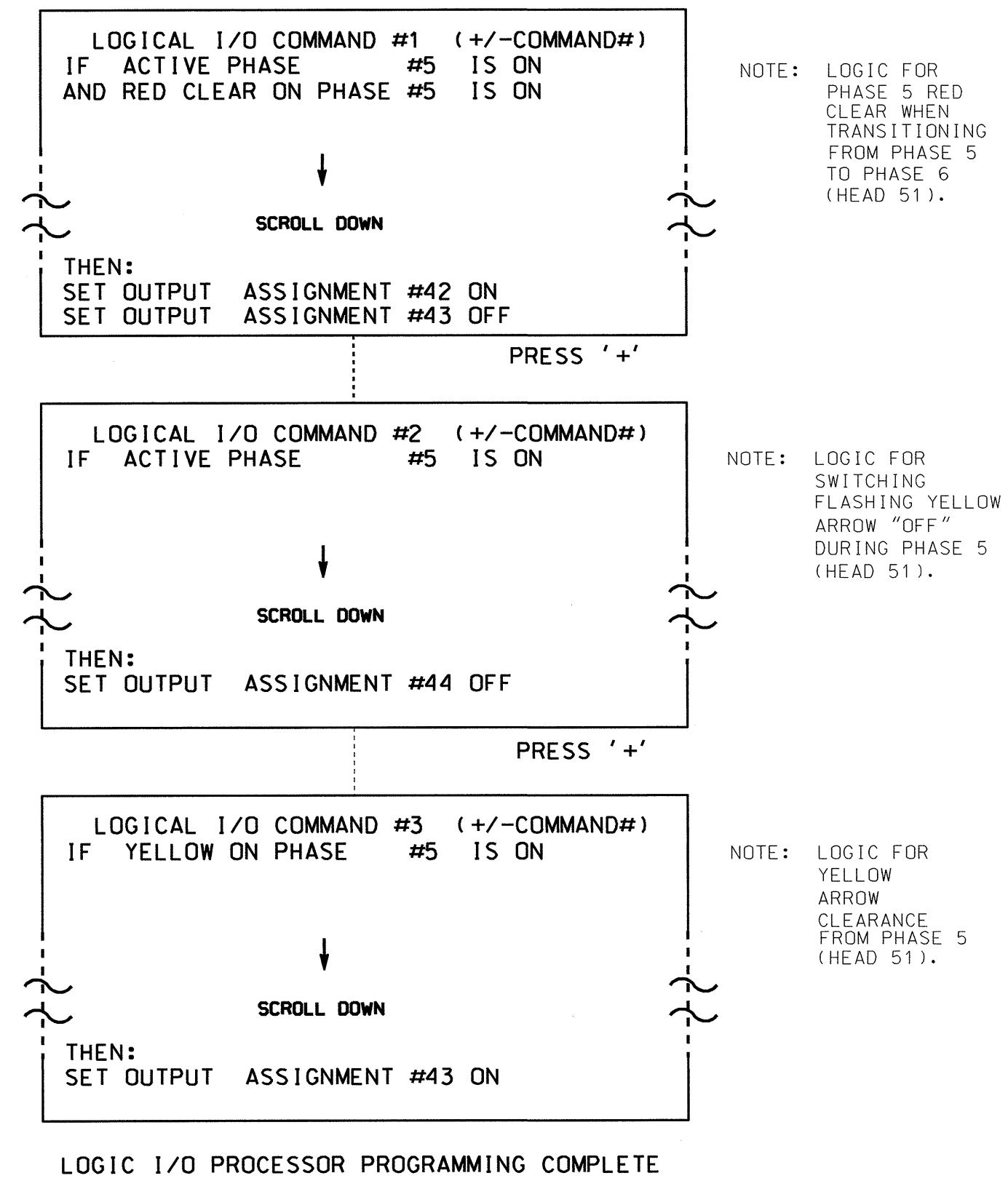
Electrical Detail - Sheet 1 of 2 - Temporary Design - Phases I & II

	NC 42 at Caterpillar Entrance / Bayer Research Entrance		SEAL
	Division 4 Johnston County Clayton		
	PLAN DATE: September 2011	REVIEWED BY: <i>J.P.P.</i>	
	PREPARED BY: James Peterson	REVIEWED BY:	
REVISIONS		INIT. DATE	SIGNATURE: <i>John T. Rowe</i> DATE: 11-2-11
			SIG. INVENTORY NO. 04-1249T1

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 COMMAND 1, 2 and 3.
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

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: X

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

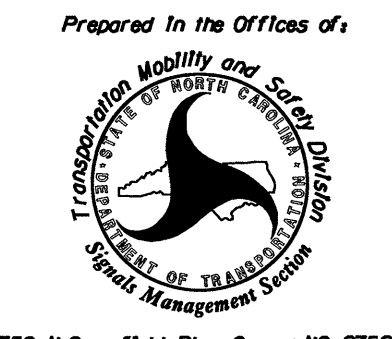
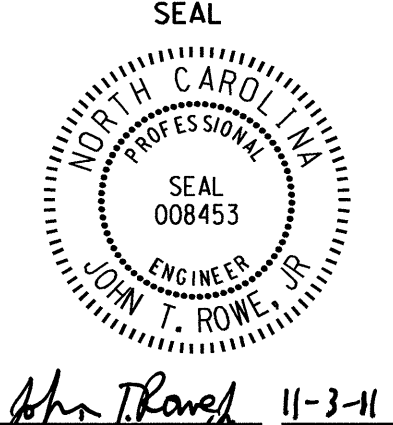
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0

OUTPUT AS PHASE # (0=NONE, 1-16)...0

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 04-1249T1
DESIGNED: September 2011
SEALED: 10-31-11
REVISED: N/A

02-NOV-2011 13:37 S:\TSS\JMTS\S1\gnl\isw\Kgr\pape\sig.Mam\ Peterson\041249_sml.eie.xxx.dgn j.peterson

Electrical Detail - Sheet 2 of 2 - Temporary Design - Phases I & II								
	<p>NC 42 at Caterpillar Entrance / Bayer Research Entrance</p> <p>Division 4 Johnston County Clayton</p> <p>PLAN DATE: September 2011 REVIEWED BY: <i>J.P.</i></p> <p>PREPARED BY: James Peterson REVIEWED BY:</p>							
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p><i>John T. Rowe</i> 11-3-11 SIGNATURE DATE</p> <p>SIG. INVENTORY NO. 04-1249T1</p>
REVISIONS	INIT.	DATE						

PHASING DIAGRAM

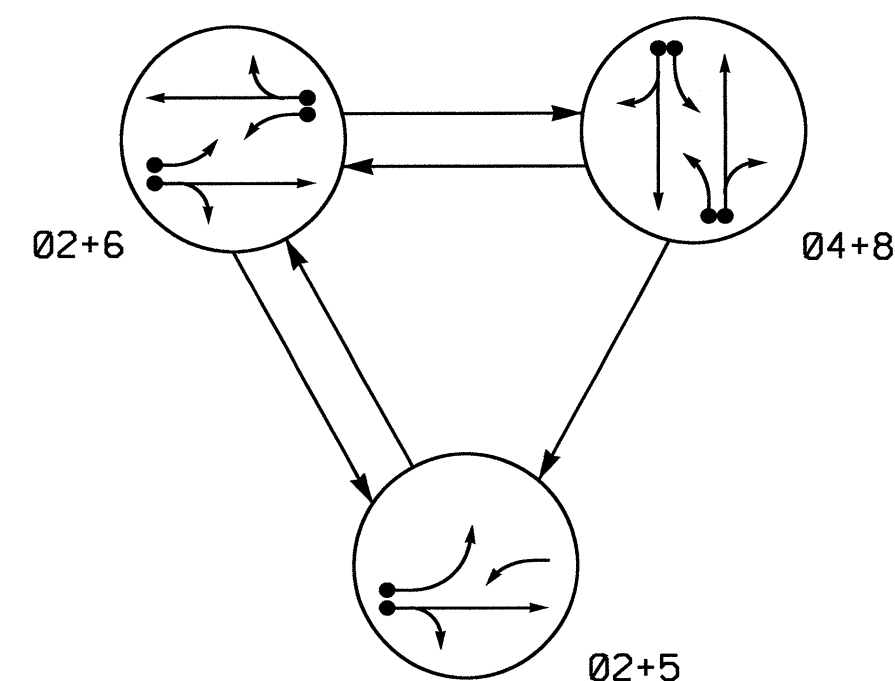
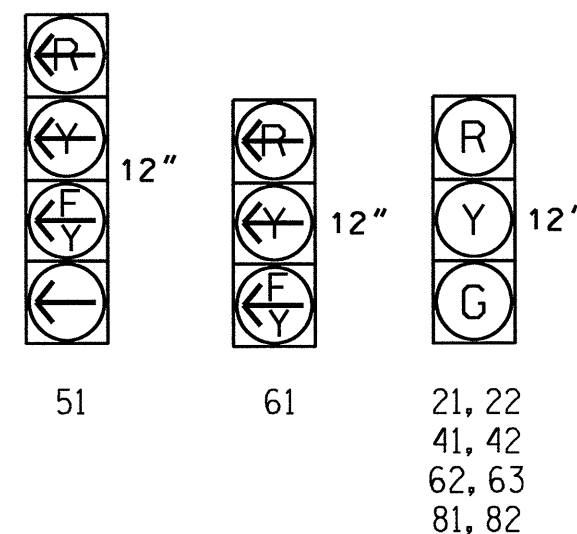


TABLE OF OPERATION

SIGNAL FACE	PHASE				
	02+5	02+6	04+8	F L S H	
21, 22	G	G	R	Y	
41, 42	R	R	G	R	
51		F	R	Y	
61		F	R	Y	
62, 63	R	G	R	Y	
81, 82	R	R	G	R	

SIGNAL FACE I.D.

All Heads L.E.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
2A	6X6	420	5	Y	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	15	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	5	-	-
6A	6X6	420	5	Y	6	Y	Y	-	-	-	-	-
6B	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	-	-	10	-	-

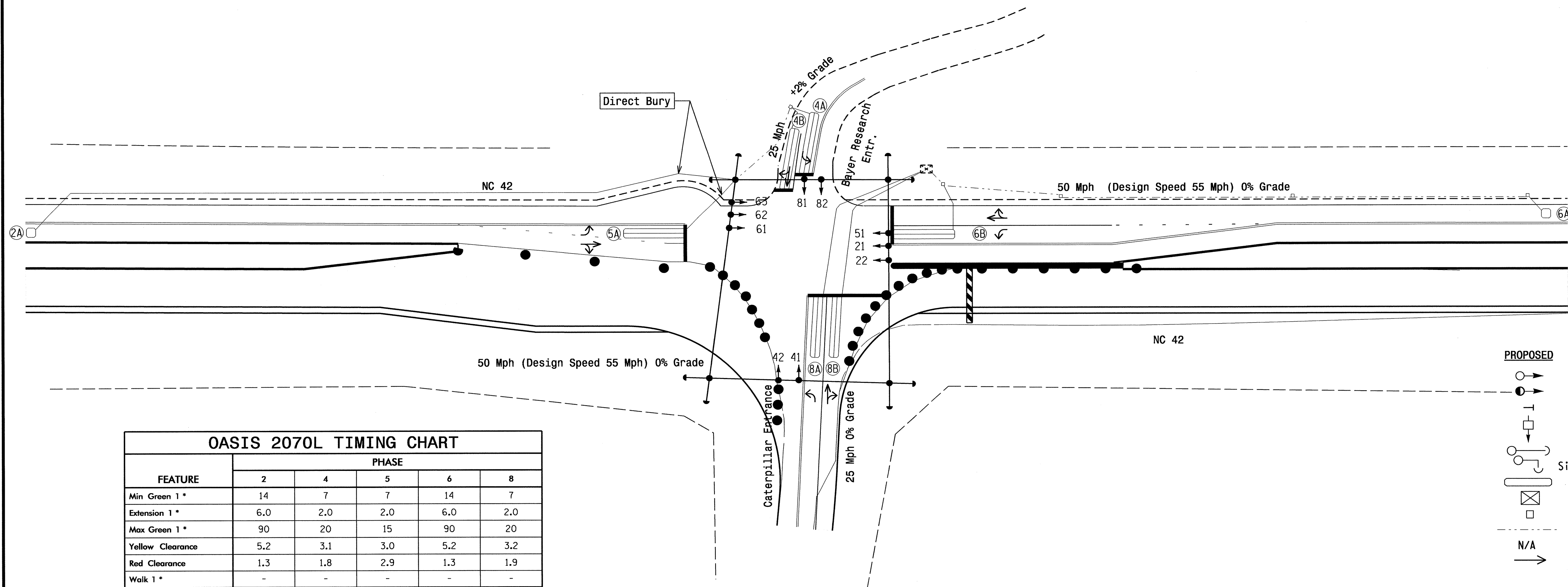
3 Phase Fully Actuated Isolated

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 5 may be logged.
4. Reposition existing signal head numbered 21, 22, 51, 61, 62 and 63.
5. Set all detector units to presence mode.

PHASING DIAGRAM DETECTION LEGEND

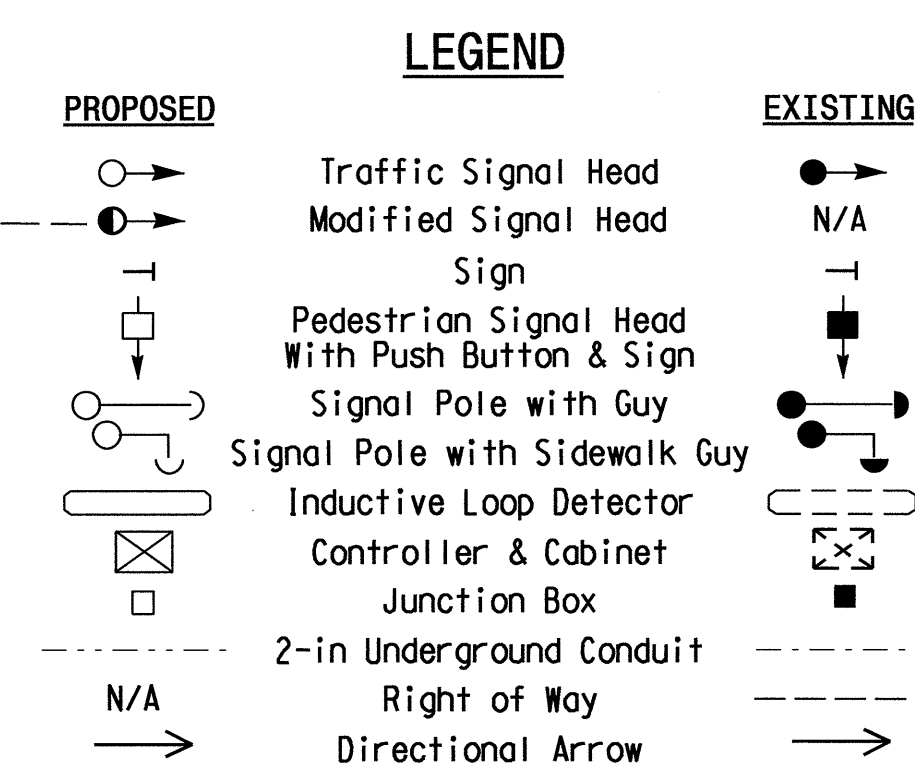
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



OASIS 2070L TIMING CHART

FEATURE	PHASE				
	2	4	5	6	8
Min Green 1 *	14	7	7	14	7
Extension 1 *	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	90	20	15	90	20
Yellow Clearance	5.2	3.1	3.0	5.2	3.2
Red Clearance	1.3	1.8	2.9	1.3	1.9
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 *	30	-	-	30	-
Minimum Gap	3.4	-	-	3.4	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	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.



Signal Upgrade - Temporary Design - Phase III

Prepared In the Office of:

 750 N. Greenfield Pkwy, Garner, NC 27529

NC 42 at Caterpillar Entrance/ Bayer Research Entrance

Division 4 Johnston County Clayton

PLAN DATE: September 2011 REVIEWED BY: _____

PREPARED BY: I. O. Umozurike REVIEWED BY: _____

REVISIONS	INIT.	DATE

SEAL

 JASON P. GALLOWAY
 ENGINEER

10/31/11
 DATE

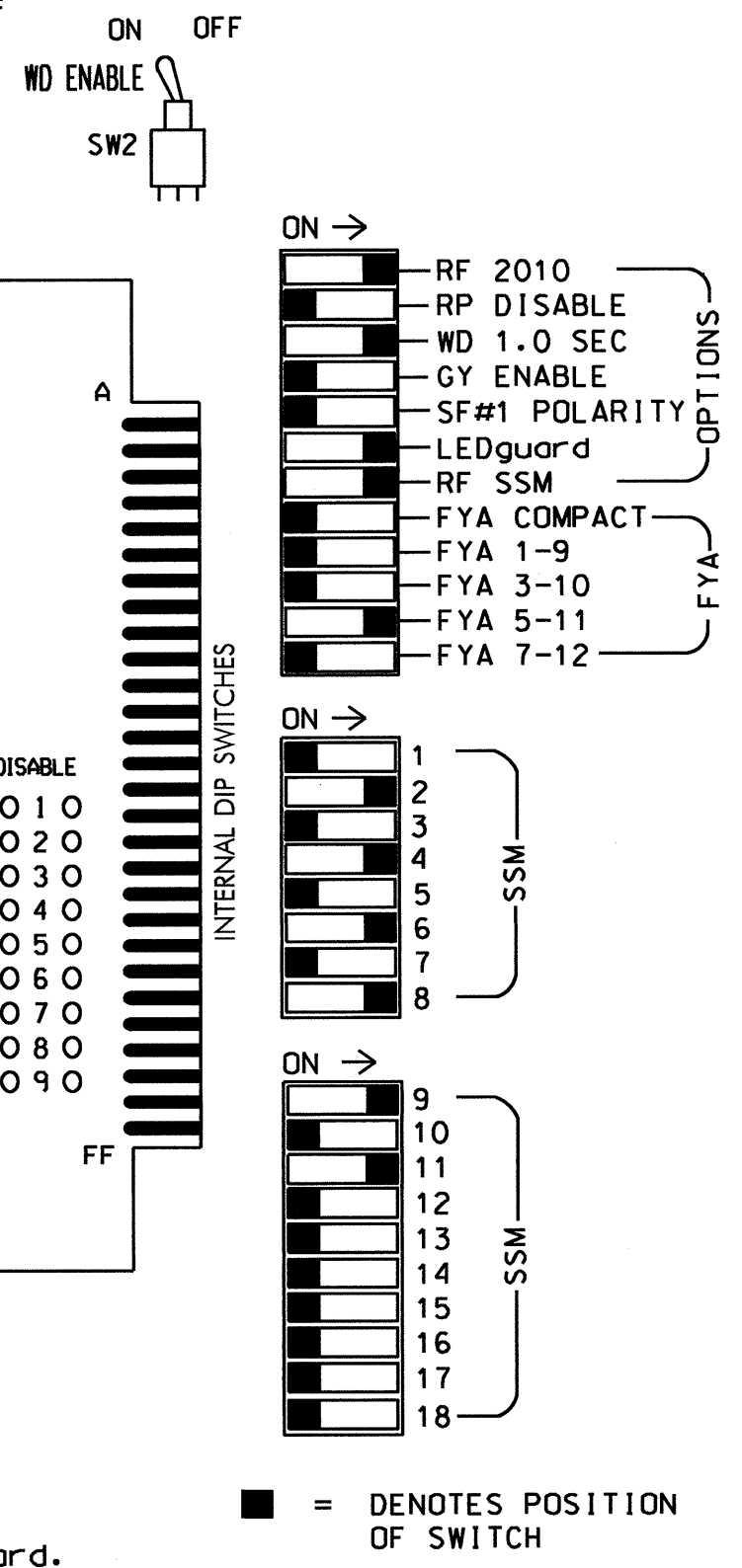
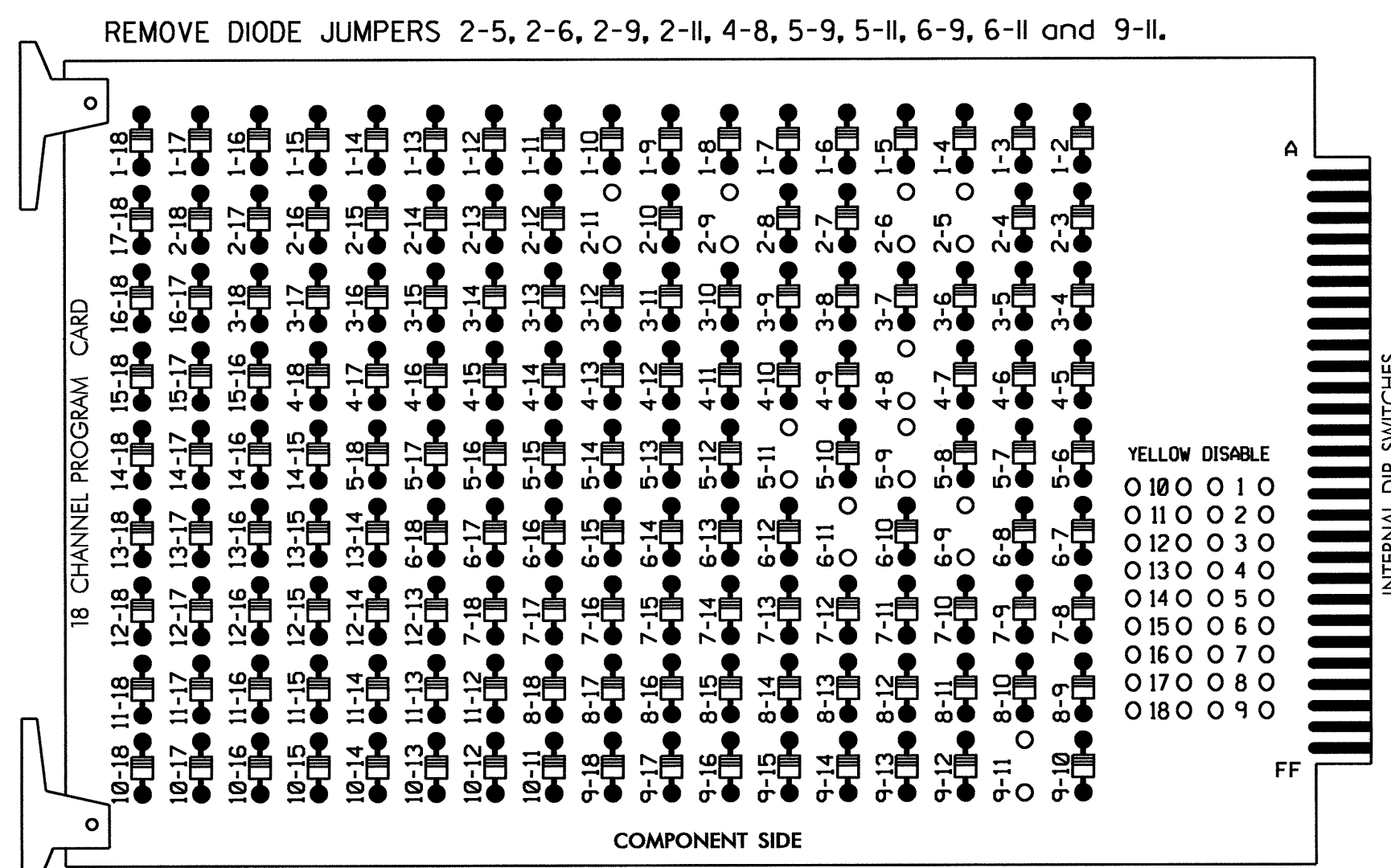
SIGNATURE

SCALE 1"=40'

SIG. INVENTORY NO. 04-1249T2

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

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

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

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,S11,AUX S1,AUX S4.
 PHASES USED.....2,4,5,6,8.
 OVERLAP "A".....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.	NU	21,22	NU	NU	41,42	NU	51	62,63	NU	NU	81,82	NU	61	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								133										

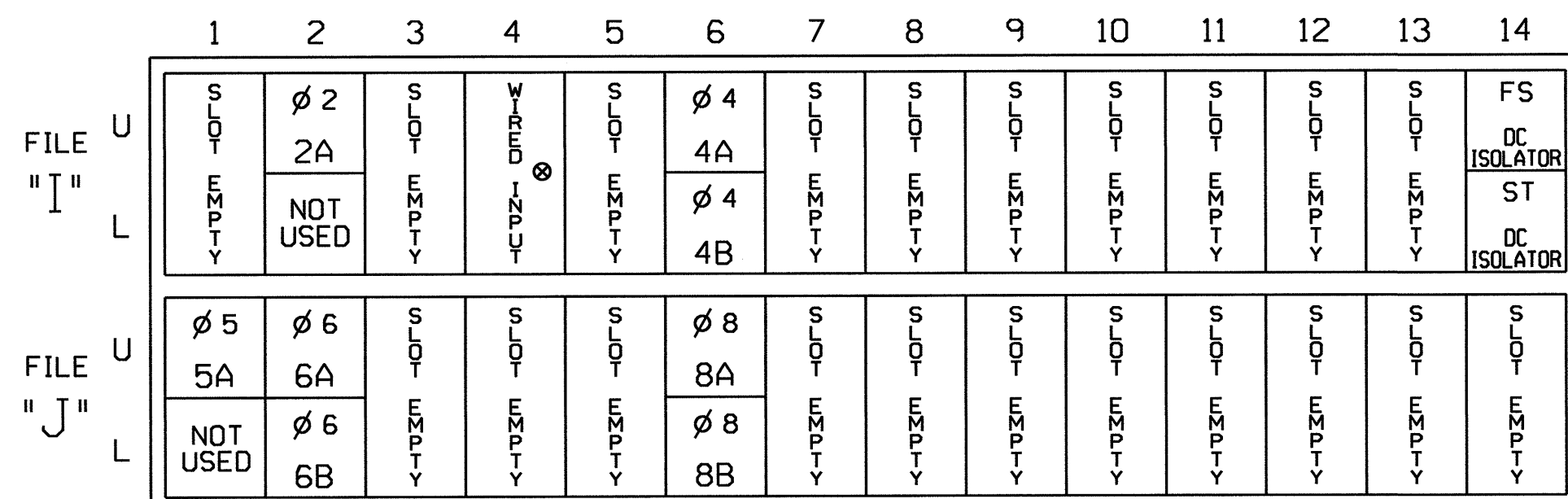
NU = Not Used

* 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

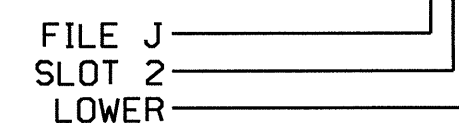
⊗ Wired Input - Do not populate slot with detector card

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	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			5
		I4U	47	9	22	2	Y	Y	Y		3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	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			10

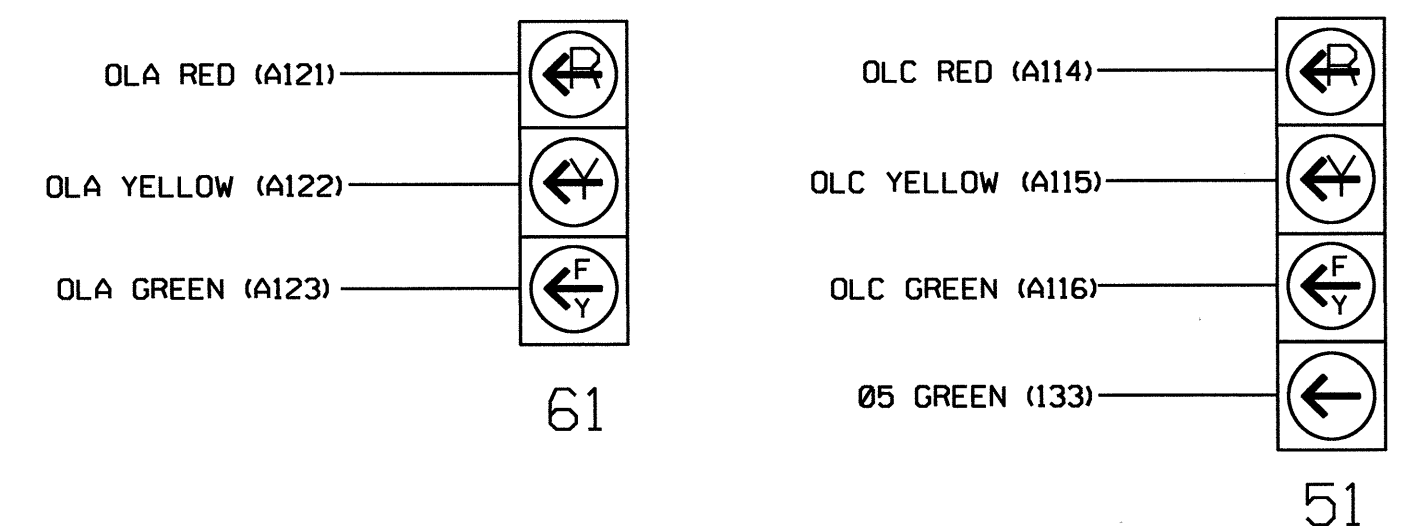
¹Add jumper from J1-W to 14-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



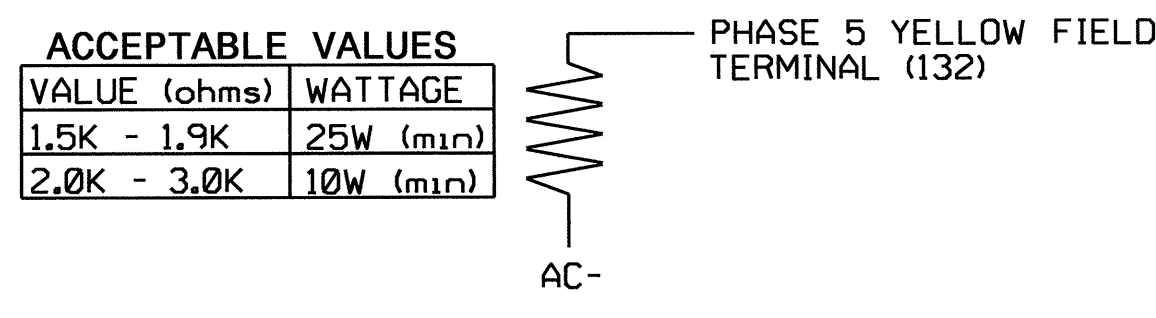
NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1249T2
 DESIGNED: September 2011
 SEALED: 10-31-11
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



ELECTRICAL AND PROGRAMMING DETAILS FOR:
 Prepared in the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

NC 42
 at
Caterpillar Entrance / Bayer Research Entrance
 Division 4 Johnston County Clayton
 PLAN DATE: September 2011 REVIEWED BY: *[Signature]*
 PREPARED BY: James Peterson REVIEWED BY:
 REVISIONS INIT. DATE

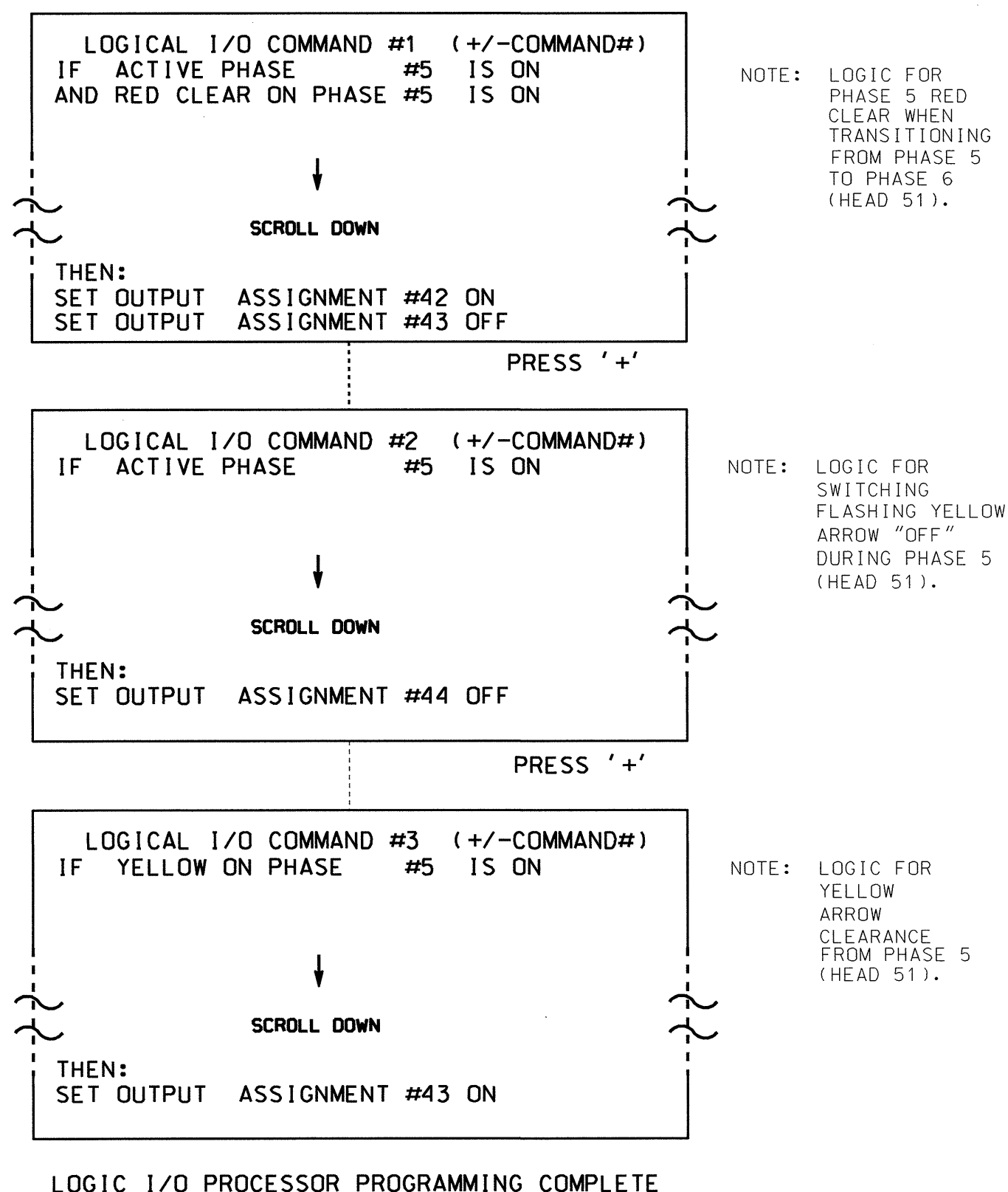
SEAL

 SEAL 008453
 ENGINEER
 JOHN T. ROWLEY, JR.
[Signature] 11-3-11
 SIGNATURE DATE
 SIG. INVENTORY NO. 04-1249T2

**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 COMMAND 1, 2 and 3.
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

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: X
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

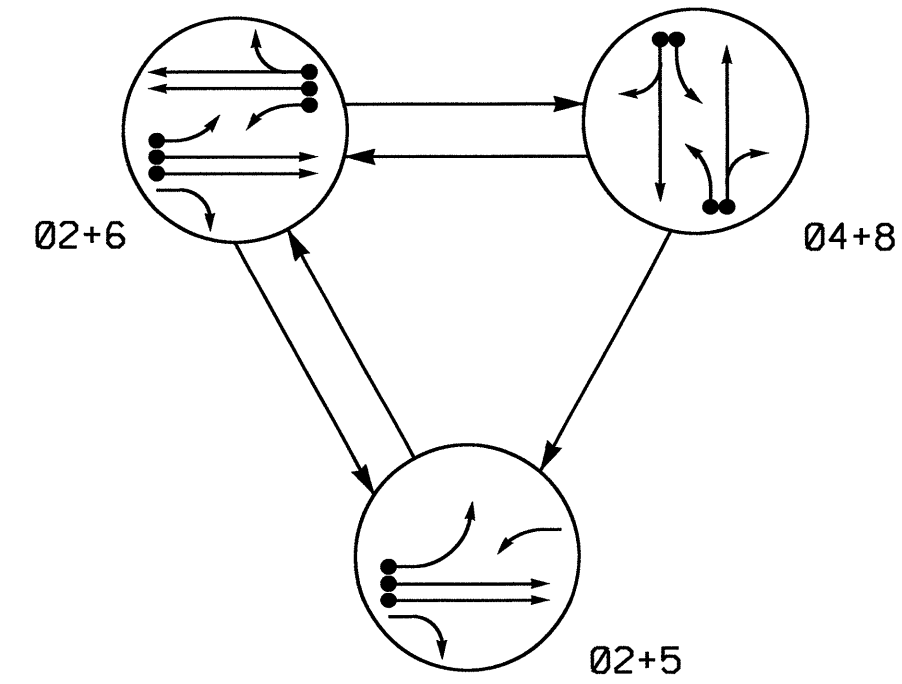
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 04-1249T2
DESIGNED: September 2011
SEALED: 10-31-11
REVISED: N/A

02-1004-2011_11-29
S:\TSS\SUMITS\SIGNALS\work\gr\0408\sig_MonPeterson\041249_sml_e-xxx.dgn
J.Peterson

Electrical Detail - Sheet 2 of 2 - Temporary Design - Phase III

	NC 42 at Caterpillar Entrance / Bayer Research Entrance		
	Division 4 Johnston County Clayton		
Prepared In the Offices of: James Peterson Signal Management Section	PLAN DATE: September 2011 PREPARED BY: James Peterson	REVIEWED BY: [Signature] REVIEWED BY:	REVISIONS INIT. DATE
		SIGNATURE: [Signature] DATE: 11-3-11	SEAL INVENTORY NO. 04-1249T2

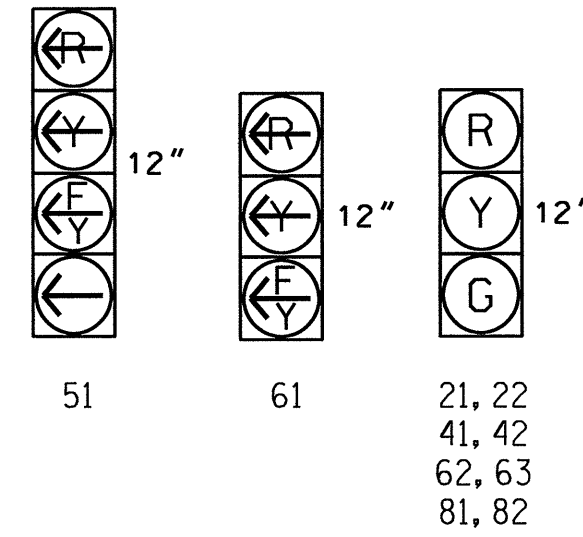
PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41, 42	R	R	G	R
51	←	←	←	←
61	←	←	←	←
62, 63	R	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

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

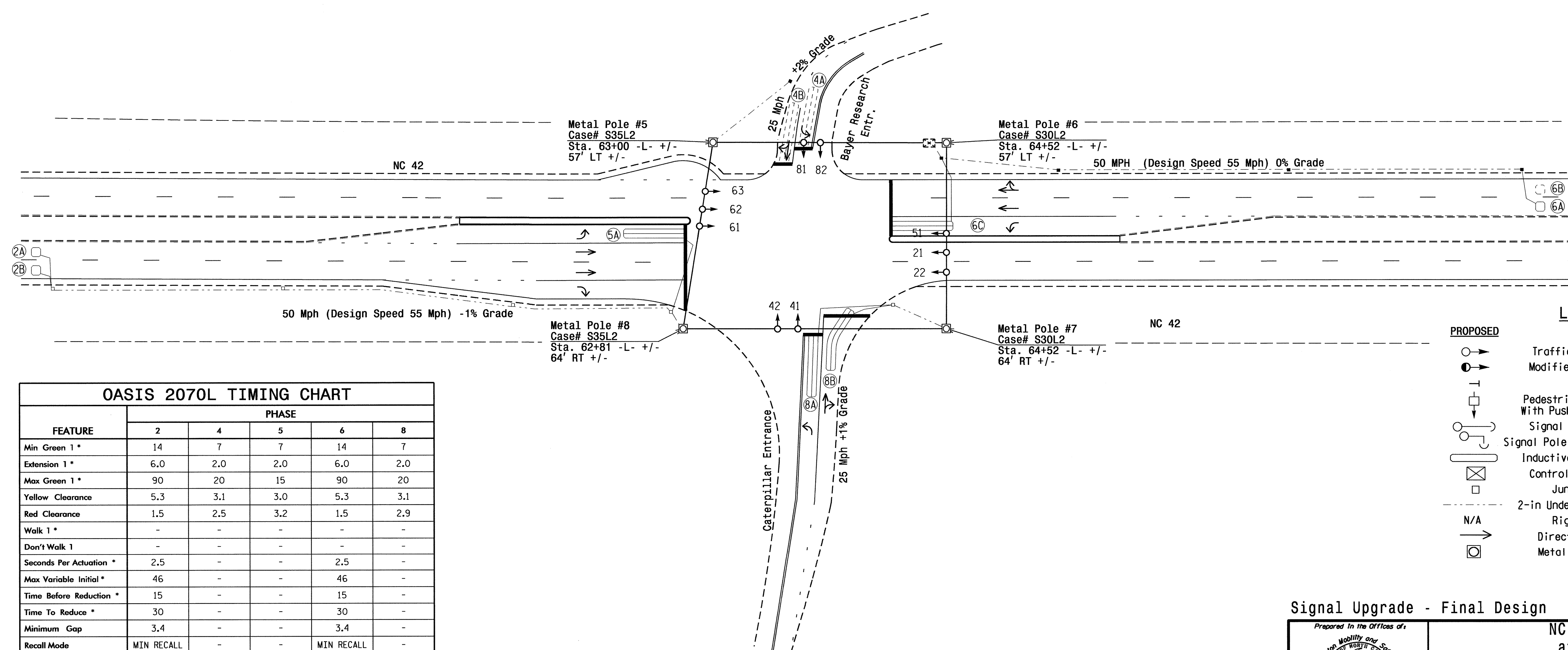
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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
2A	6X6	420	5	Y	2	Y	Y	-	-	-	-	-
2B	6X6	420	5	Y	2	Y	Y	-	-	-	-	-
4A	6X60	0	2-4-2	-	4	Y	Y	-	-	3	-	-
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	10	-	-
5A	6X60	0	2-4-2	Y	5	Y	Y	-	-	15	-	-
6A	6X6	420	5	Y	6	Y	Y	-	-	-	-	-
6B	6X6	420	5	-	6	Y	Y	-	-	-	-	-
6C	6X60	0	2-4-2	Y	6	Y	Y	Y	-	3	-	-
8A	6X60	0	2-4-2	Y	8	Y	Y	-	-	3	-	-
8B	6X60	+5	2-4-2	Y	8	Y	Y	-	-	15	-	-

3 Phase Fully Actuated Isolated

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.



FEATURE	PHASE				
	2	4	5	6	8
Min Green 1 *	14	7	7	14	7
Extension 1 *	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	90	20	15	90	20
Yellow Clearance	5.3	3.1	3.0	5.3	3.1
Red Clearance	1.5	2.5	3.2	1.5	2.9
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 *	30	-	-	30	-
Minimum Gap	3.4	-	-	3.4	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	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
○ → Sign	N/A
○ → Pedestrian Signal Head With Push Button & Sign	N/A
○ → 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
→	→ Directional Arrow
○	○ Metal Strain Pole

Signal Upgrade - Final Design

Prepared In the Office of:

 TRANSPORTATION MOBILITY AND SAFETY DIVISION
 SIGNAL DESIGN SECTION
 750 N. Greenfield Pkwy, Garner, NC 27529

NC 42
 at
 Caterpillar Entrance/
 Bayer Research Entrance

Division 4 Johnston County Clayton
 PLAN DATE: September 2011 REVIEWED BY:
 PREPARED BY: I. O. Umozurike REVIEWED BY:

SEAL

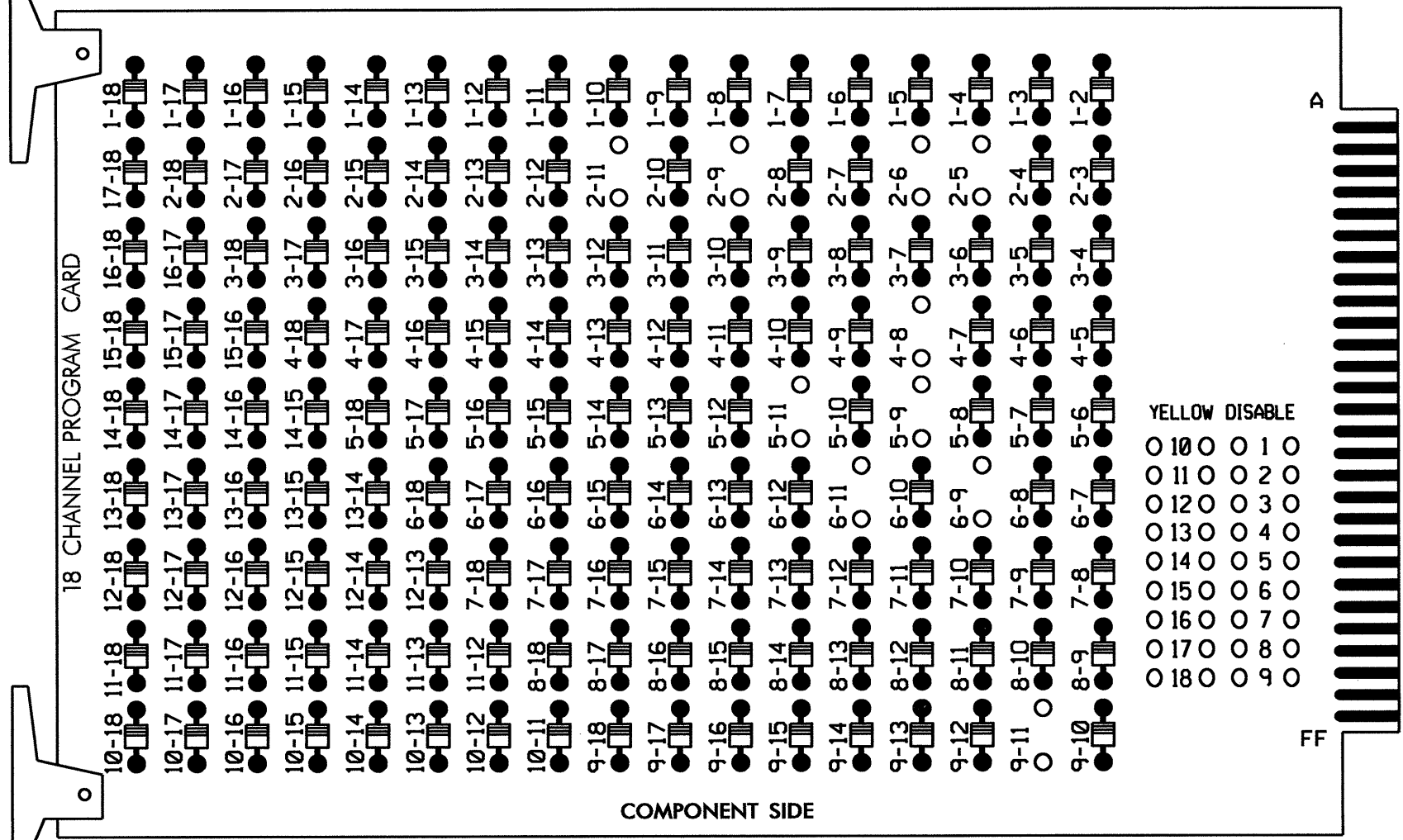
 ENGINEER
 I. O. Umozurike
 DATE: 10/31/11

REVISIONS	INIT.	DATE

SCALE: 1"=40'

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

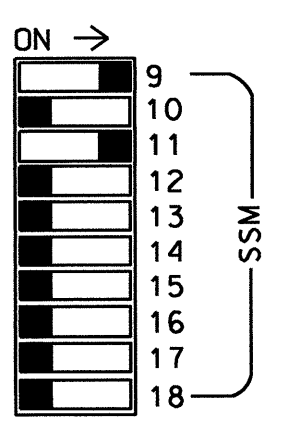
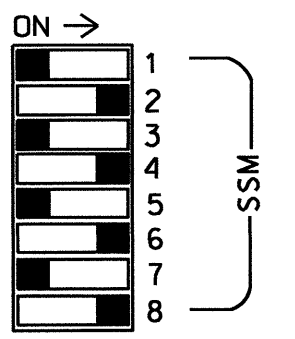
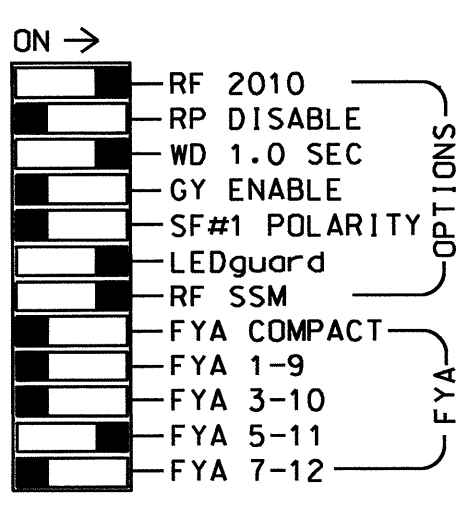
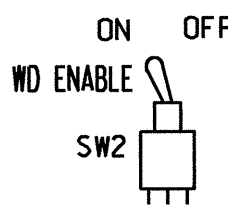
REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11 and 9-11.



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.
- 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.....S2,S5,S7,S8,S11,AUX S1,AUX S4.
 PHASES USED.....2,4,5,6,8.
 OVERLAP "A".....2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

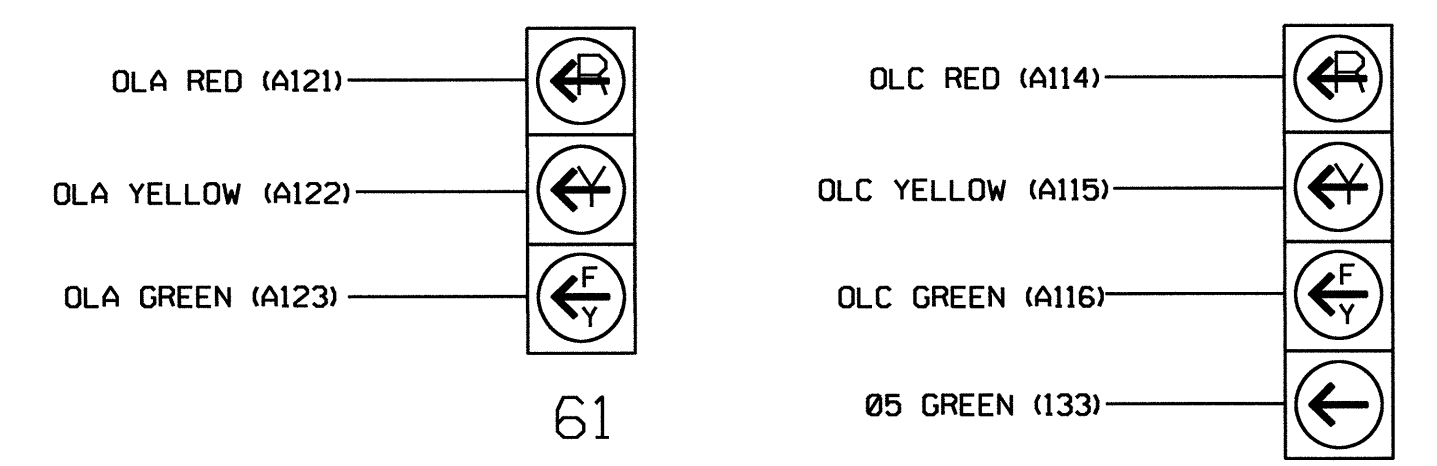
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5*	6	6 PED	7	8	8 PED	OLA*	OLB	SPARE	OLC*	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51	62,63	NU	NU	81,82	NU	61	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								133										

NU = Not Used

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

* See pictorial of head wiring in detail below.

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)



NOTE

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

INPUT FILE POSITION LAYOUT
(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2	∅ 2
L	2A	2B	2C	2D	2E	2F	2G	2H	2I	2J	2K	2L	2M	2N
U	∅ 5	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6
L	5A	6A	6C	6D	6E	6F	6G	6H	6I	6J	6K	6L	6M	6N
	NOT USED	∅ 6	NOT USED	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6
	6B	6E	6F	6G	6H	6I	6J	6K	6L	6M	6N	6O	6P	6Q

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

FS = FLASH SENSE
 ST = STOP TIME

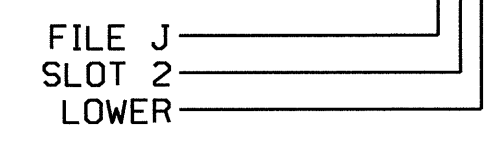
⊗ Wired Input - Do not populate slot with detector card

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	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A ¹	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			
6B	TB3-7,8	J2L	44	6	16	6	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			15

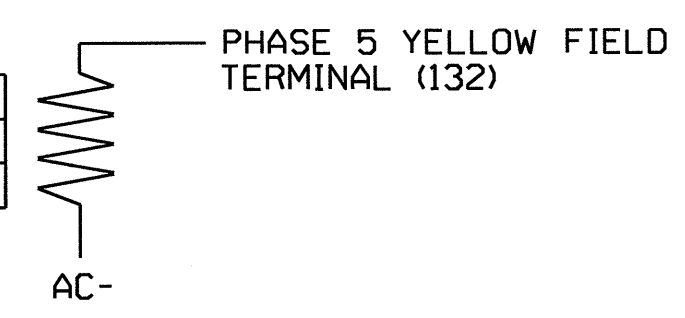
¹Add jumper from J1-W to I4-W, on rear of input file.

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)



Electrical Detail - Sheet 1 of 2 - Final

Prepared In the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

NC 42
 at
Caterpillar Entrance / Bayer Research Entrance
 Division 4 Johnston County Clayton
 PLAN DATE: September 2011 REVIEWED BY: J.Peterson
 PREPARED BY: James Peterson REVIEWED BY: J.Peterson
 REVISIONS: _____ INIT. DATE: _____

SEAL

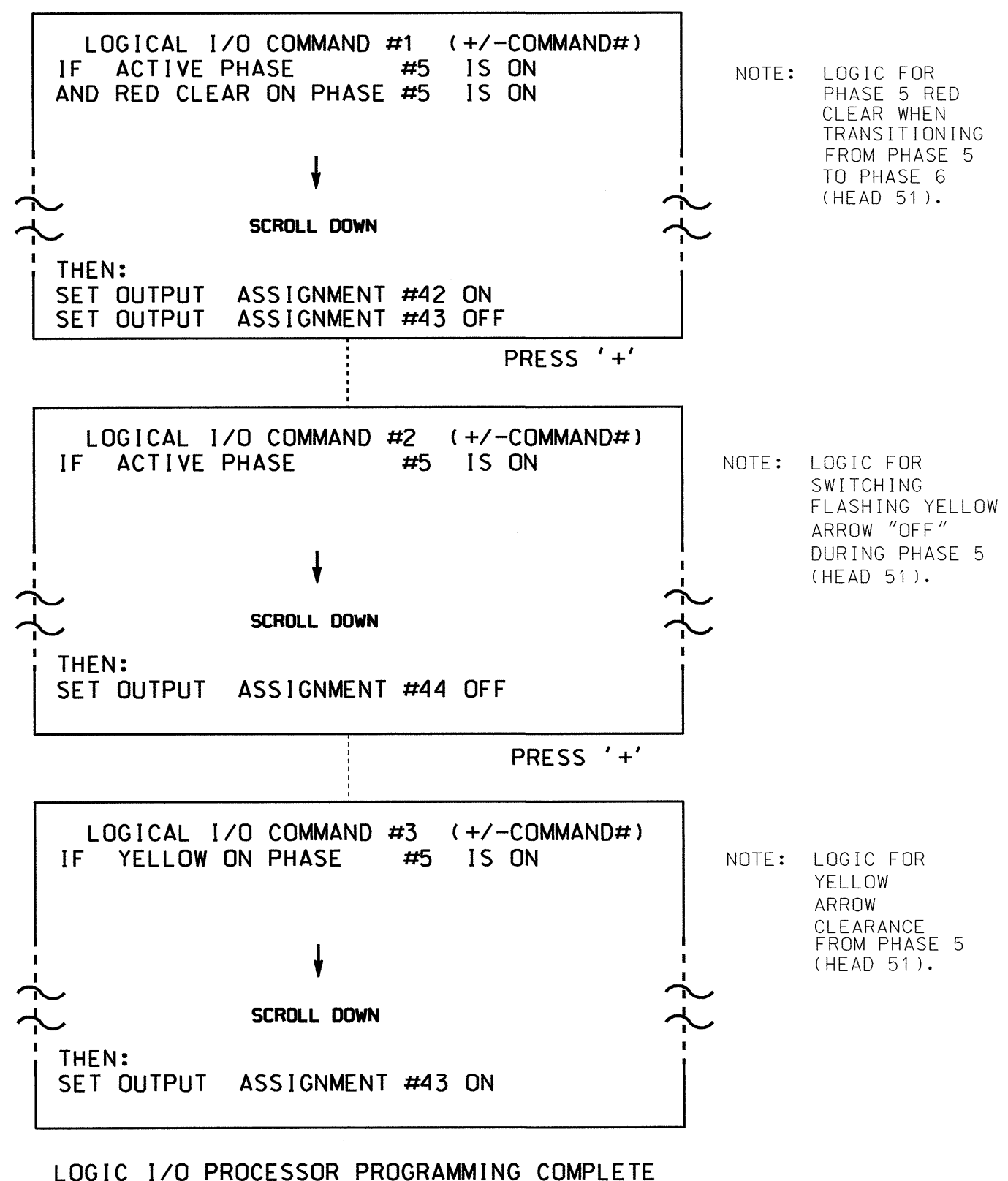
 JOHN T. ROWE, JR.
 ENGINEER
 11-3-11
 SIGNATURE DATE
 SIG. INVENTORY NO. 04-1249

01-NOV-2011 11:22 S:\ITS&SUM\ITS_Sig\work\groups\Sig_Mon\ Peterson\041249_sml_e_000.dgn Peterson

**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 COMMAND 1, 2 and 3.
- 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

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: X
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

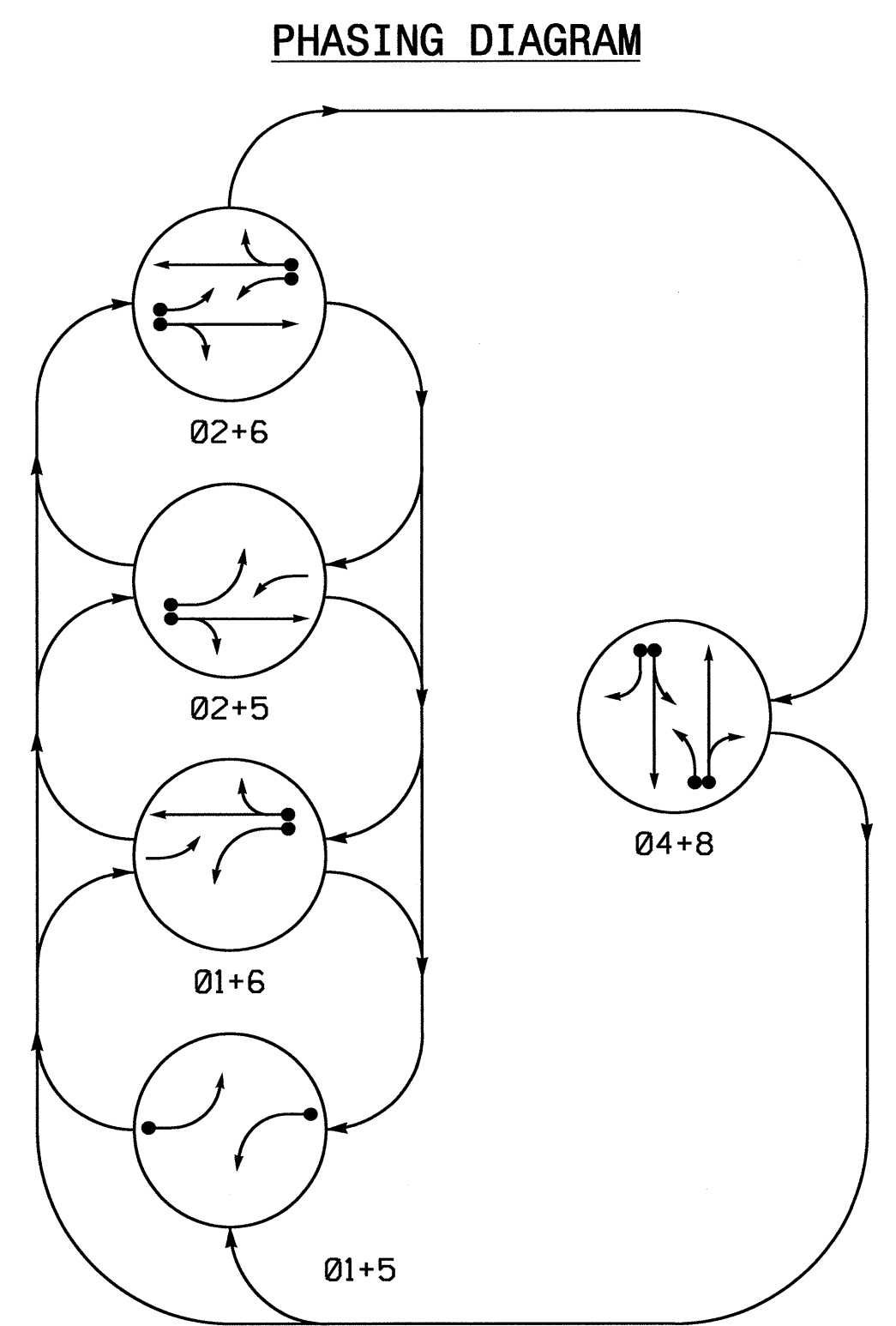
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 04-1249
DESIGNED: September 2011
SEALED: 10-31-11
REVISED: N/A

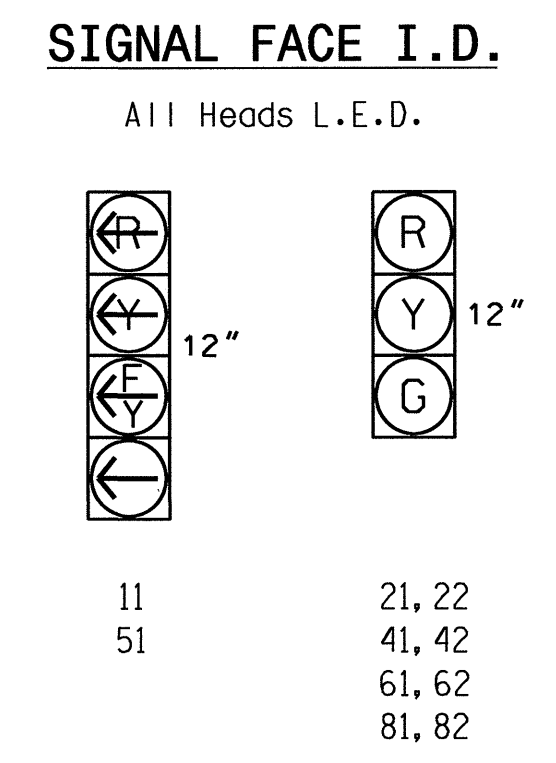
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J.Peterson

Electrical Detail - Sheet 2 of 2 - Final

	NC 42 at Caterpillar Entrance / Bayer Research Entrance		
	Division 4 Johnston County Clayton	PLAN DATE: September 2011 REVIEWED BY: <i>J.P.</i>		PREPARED BY: James Peterson REVIEWED BY:
REVISIONS			INIT. DATE
SIGNATURE: <i>John T. Rowley</i> DATE: 11-3-11			SIG. INVENTORY NO. 04-1249



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

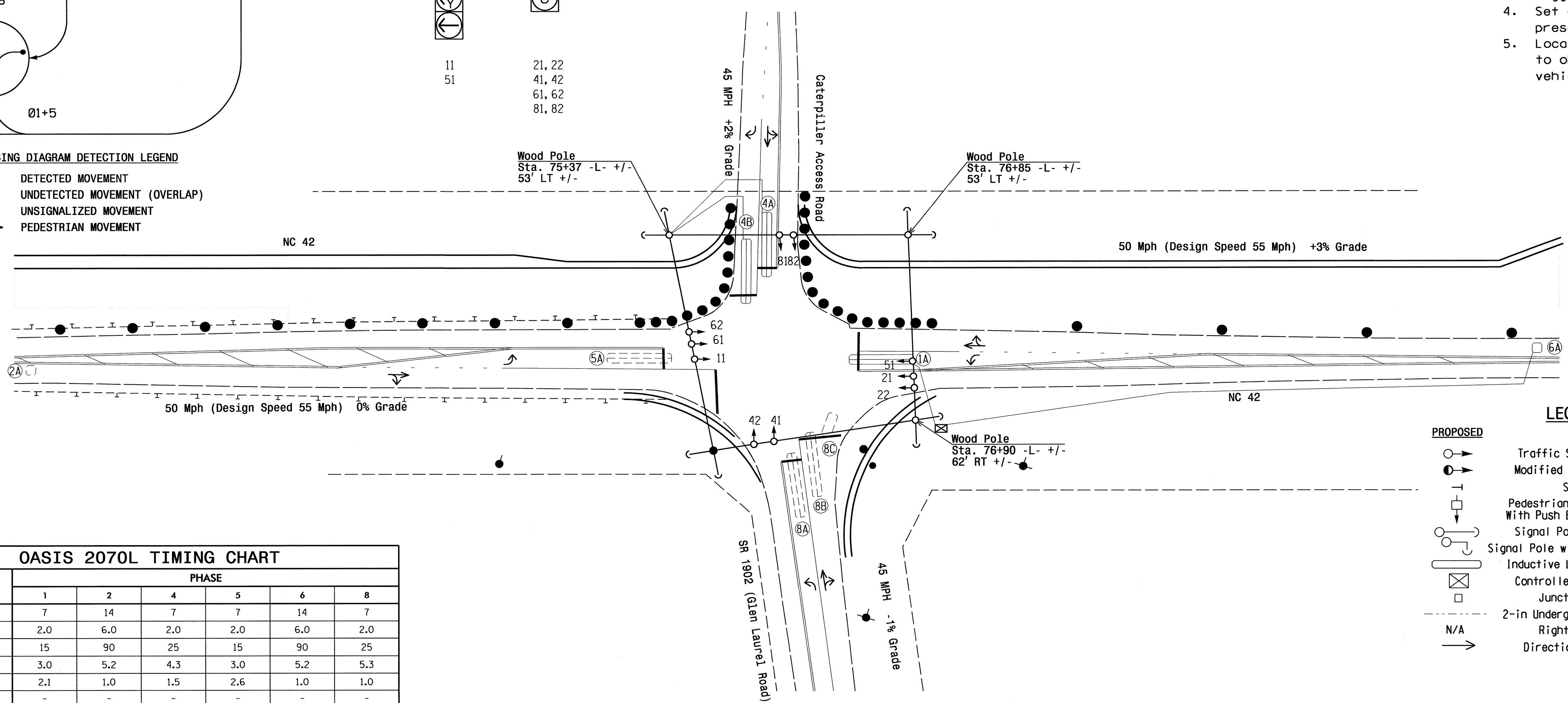
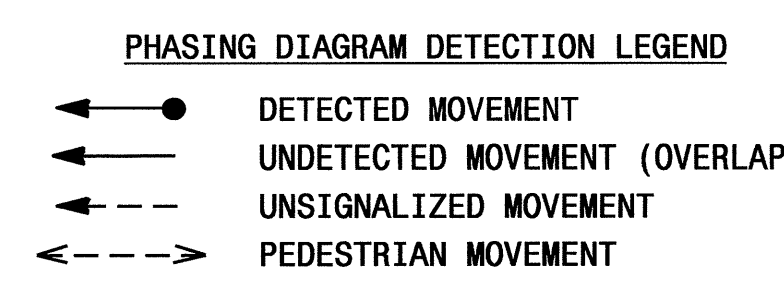


LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING							
				PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	+5	2-4-2	Y	Y	Y	-	-	15	-	-
2A	6X6	420	6	-	2	Y	Y	-	-	-	-
4A	6X40	+5	2-4-2	Y	4	Y	Y	-	-	3	-
4B	6X40	+5	2-4-2	Y	4	Y	Y	-	-	15	-
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	15	-
6A	6X6	420	5	Y	6	Y	Y	-	-	-	-
8A	6X40	+5	2-4-2	-	8	Y	Y	-	-	3	-
8B	6X40	+5	2-4-2	-	8	Y	Y	-	-	5	-
8C	6X15	+15	3	-	8	Y	Y	-	-	15	-

5 Phase Fully Actuated Isolated

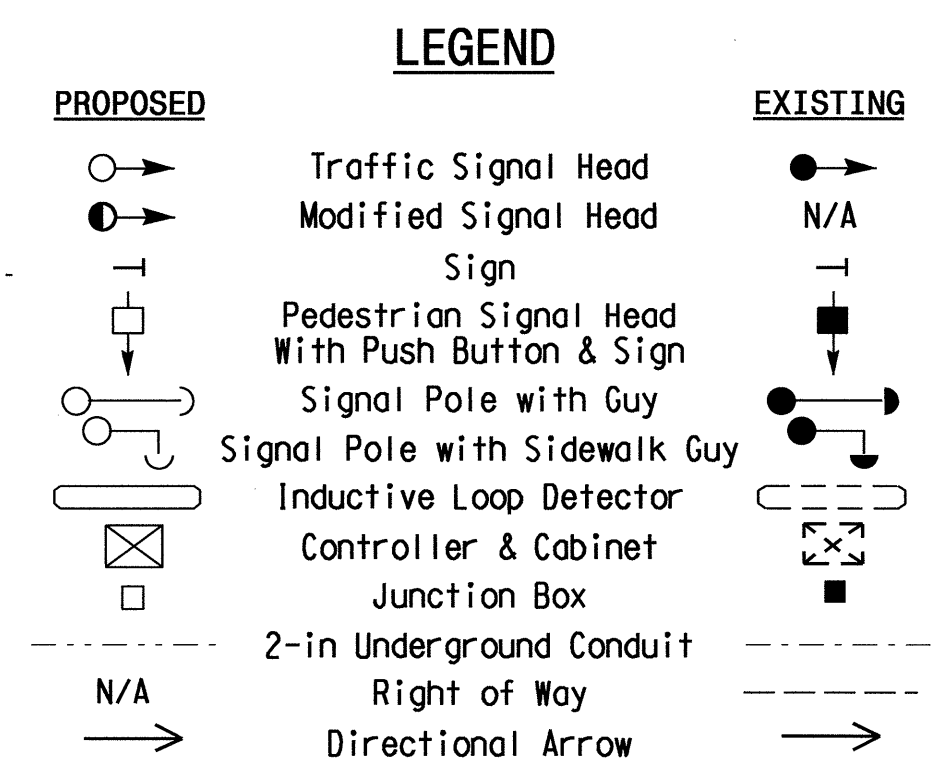
NOTES

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.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.



FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1 *	7	14	7	7	14	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	15	90	25	15	90	25
Yellow Clearance	3.0	5.2	4.3	3.0	5.2	5.3
Red Clearance	2.1	1.0	1.5	2.6	1.0	1.0
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	-	-	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.



Signal Upgrade - Temporary Design - Phase I

NC 42
at
SR 1902 (Glen Laurel Road) /
Caterpillar Access Road

Division 4 Johnston County Clayton

PLAN DATE: September 2011 REVIEWED BY: _____

PREPARED BY: JPG REVIEWED BY: _____

SCALE: 1"=40'

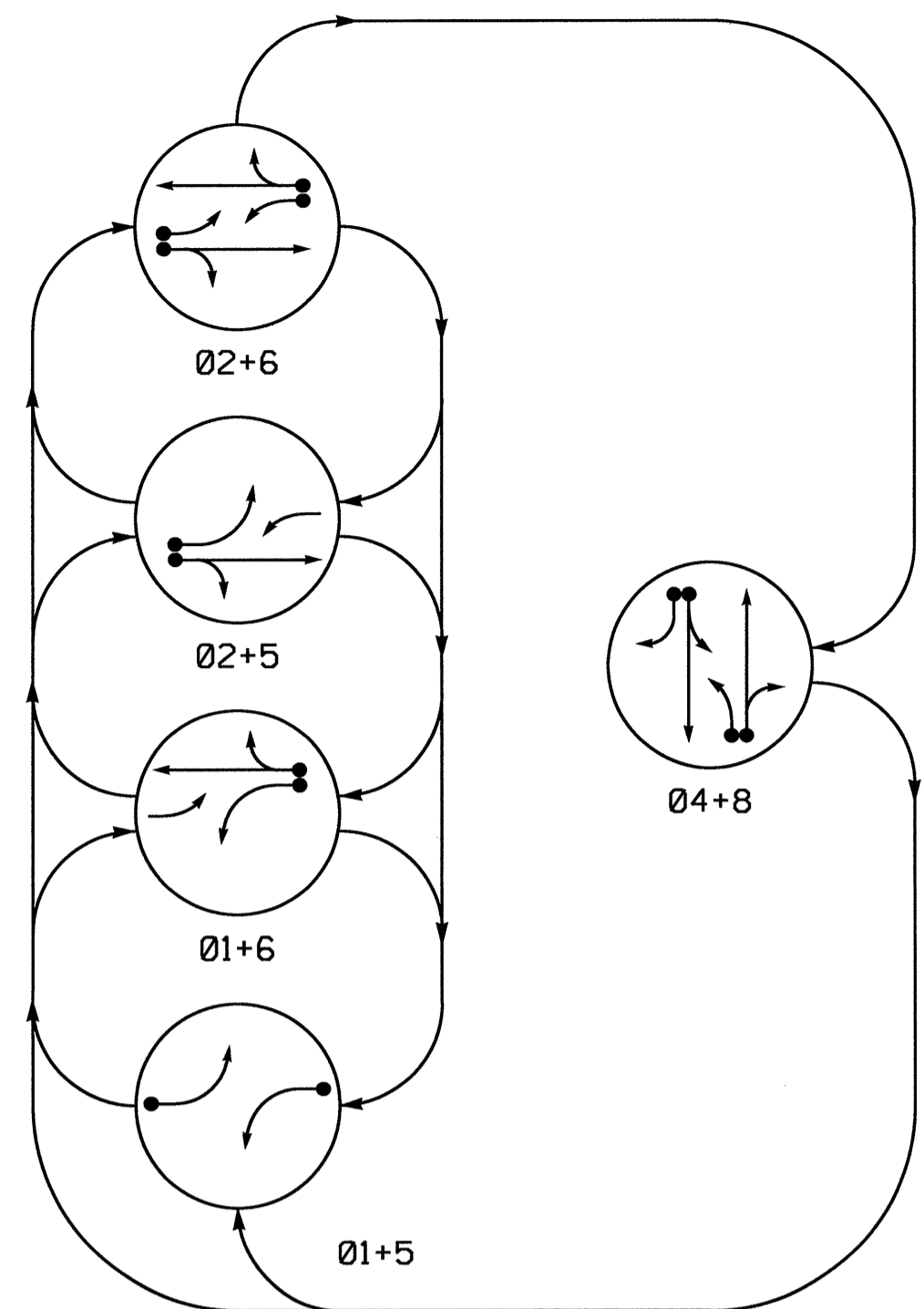
REVISIONS	INIT.	DATE

10/31/11
DATE

SIG. INVENTORY NO. 04-1083TI

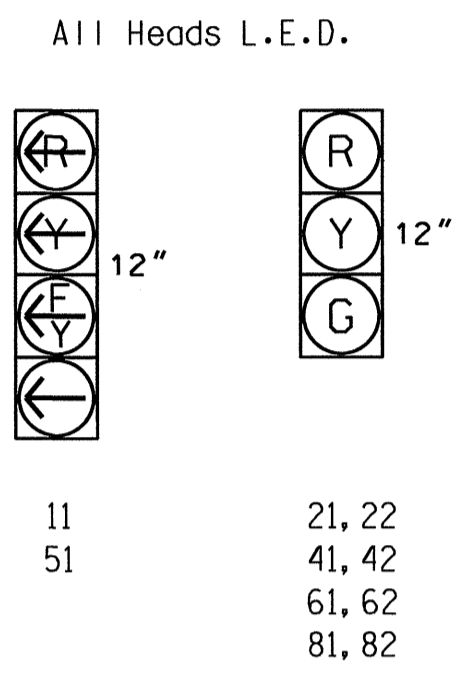
18-NOV-2011 06:21 R:\tr\offices\gn\gn\1902\1902_1083TI_1083TI.dwg

PHASING DIAGRAM



SIGNAL FACE	PHASE					FLASHER
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 4+8	
11	←	←	←	←	←	Y
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	←	←	←	←	Y
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.



LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME			DELAY TIME
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	-
2A	6X6	420	6	Y	2	Y	Y	-	-	3	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	15	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	-
6A	6X6	420	5	Y	6	Y	Y	-	-	-	-	-
8A	6X40	+5	2-4-2	Y	8	Y	Y	-	-	3	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	5	-	-
8C	6X15	+15	3	Y	8	Y	Y	-	-	15	-	-

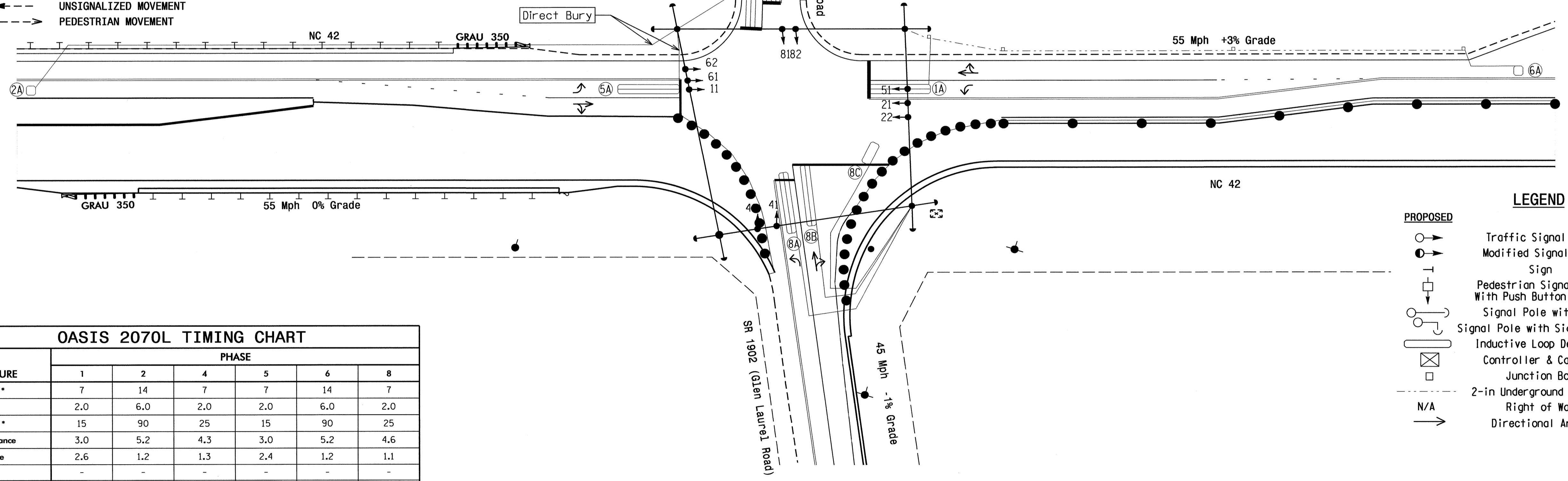
5 Phase Fully Actuated Isolated

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. Reposition existing signal heads numbered 11, 21, 22, 51, 61 and 62.
5. Set all detector units to presence mode.

PHASING DIAGRAM DETECTION LEGEND

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



FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1 *	7	14	7	7	14	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	15	90	25	15	90	25
Yellow Clearance	3.0	5.2	4.3	3.0	5.2	4.6
Red Clearance	2.6	1.2	1.3	2.4	1.2	1.1
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	-	-	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.

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

Signal Upgrade - Temporary Design - Phase III

NC 42
at
SR 1902 (Glen Laurel Road) / Caterpillar Access Road

Division 4 Johnston County Clayton

PLAN DATE: September 2011 REVIEWED BY:

PREPARED BY: I. O. Umzurike REVIEWED BY:

REVISIONS

SCALE: 1" = 40'

DATE: 10/31/11

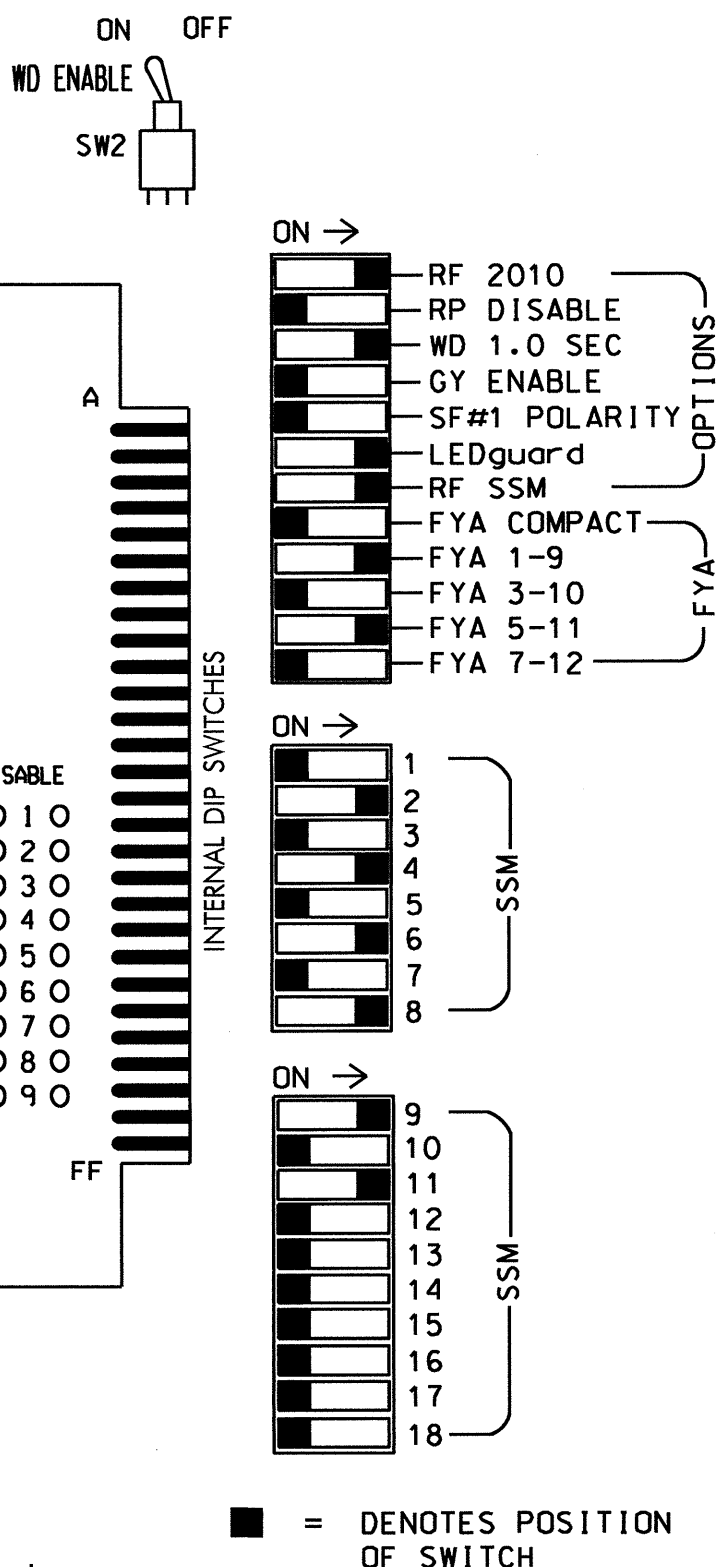
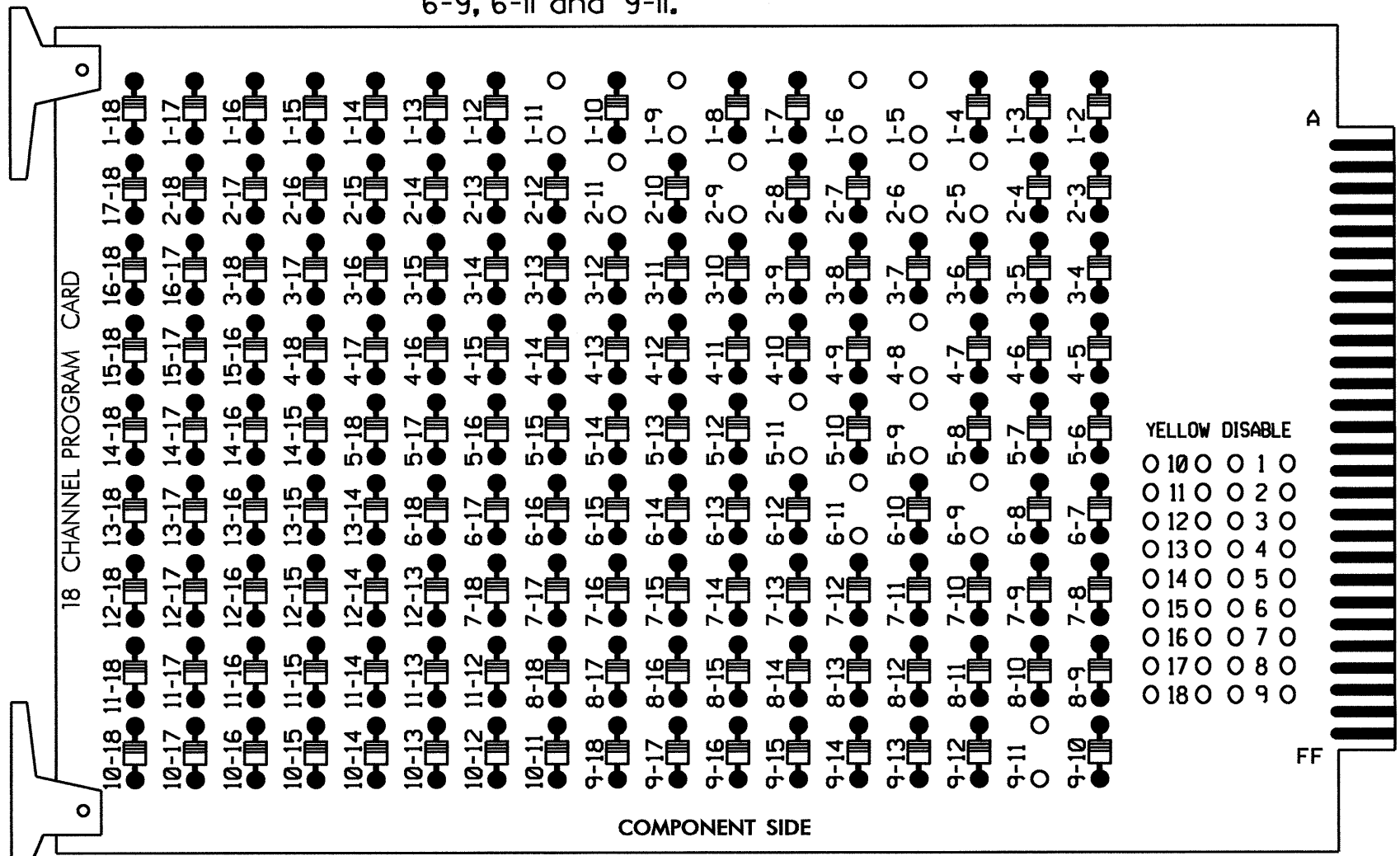
SEAL

SIG. INVENTORY NO. 04-1083T2

18-Nov-2011 08:24 I:\Projects\1083T2\Sig\1083T2-Sig.dgn - 2011madd.dgn

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

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11 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.

NOTES

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

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

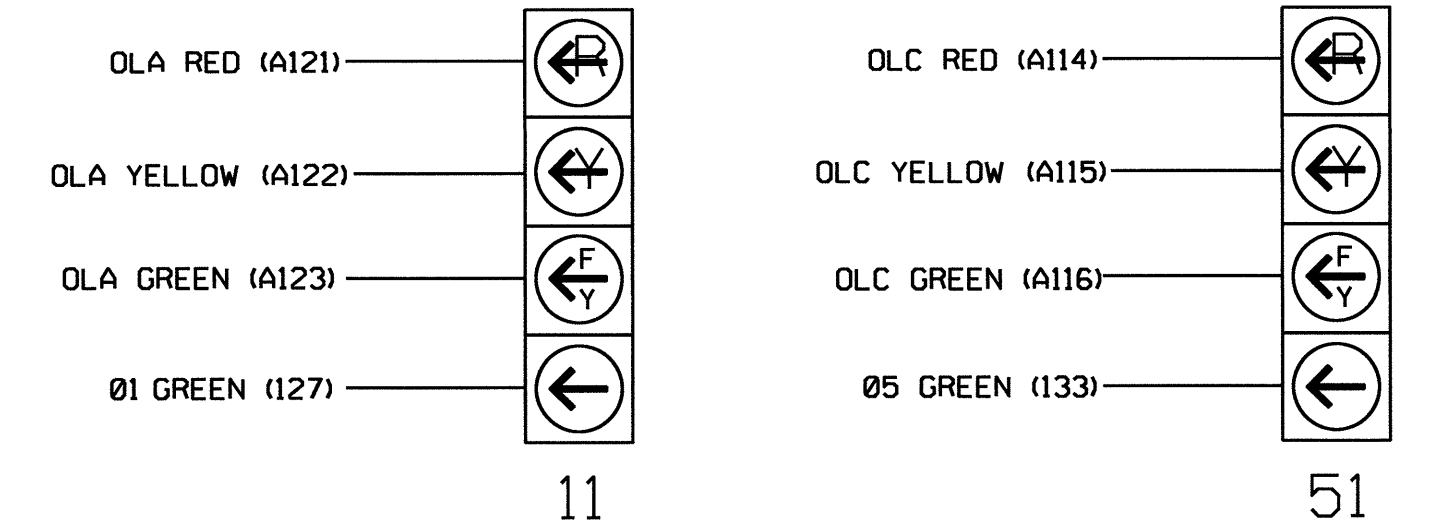
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11*	21,22	NU	NU	41,42	NU	51*	61,62	NU	NU	81,82	NU	11*	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.

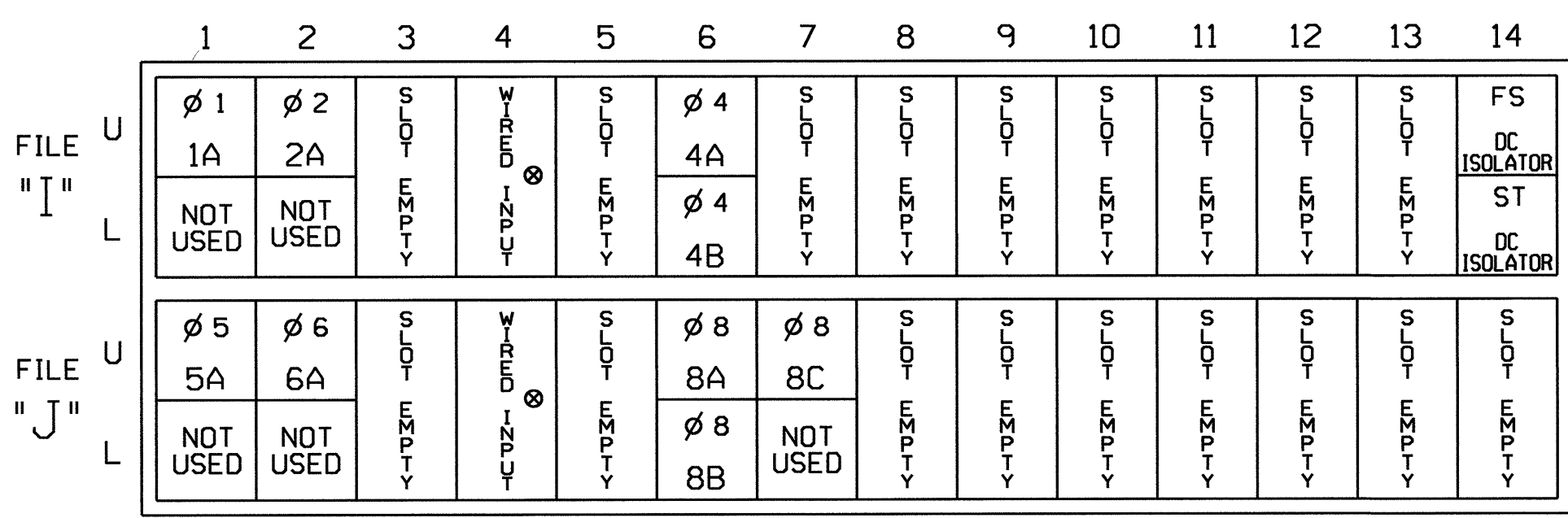
4 SECTION FYA PPLT SIGNAL WIRING DETAIL
(wire signal heads as shown)



NOTE

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

INPUT FILE POSITION LAYOUT
(front view)



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

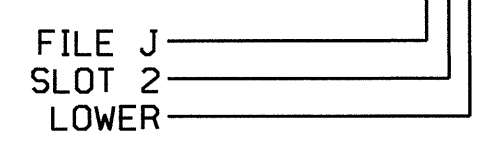
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

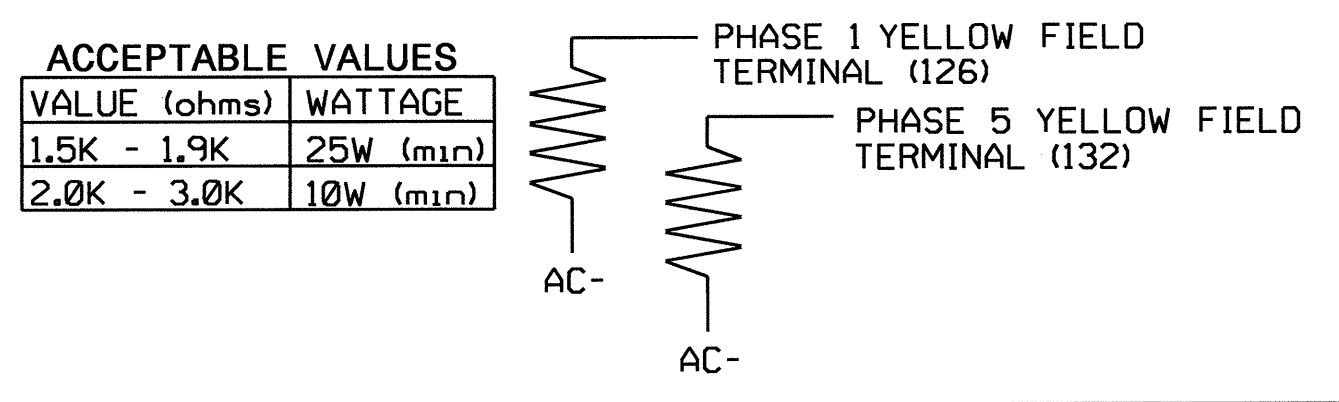
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y	Y		15
2A	TB2-5,6	J4U	48	10	26	6	Y	Y	Y		3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
5A ²	TB3-1,2	J1U	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			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			5
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15

- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from J1-W to I4-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)

Electrical Detail - Sheet 1 of 2 - Temp. Design Phases I and III

Electrical and Programming Details for:

NC 42
 at
 SR 1902 (Glen Laurel Road)/
 Catepillar Access Road

Division 4 Johnston County Clayton

Prepared In the Office of:

PLAN DATE: October 2011 REVIEWED BY: *MJP*

PREPARED BY: James Peterson REVIEWED BY:

REVISIONS: _____ INIT. DATE

SIGNATURE: *John T. Rowe* DATE: 11-2-11

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

SIG. INVENTORY NO. 04-1083T1172

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
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

```

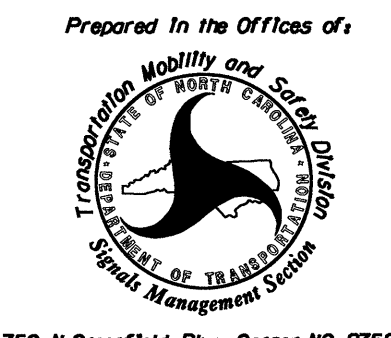
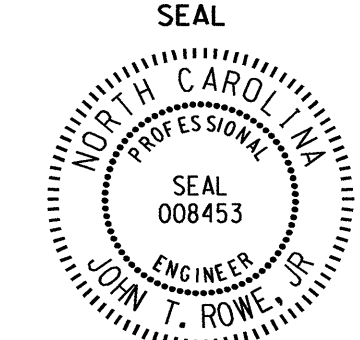
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (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: 04-1083T1
 and 04-1083T2
 DESIGNED: September 2011
 SEALED: 10-31-11
 REVISED: N/A

Electrical Detail - Sheet 2 of 2 - Temp. Design Phases I and III

 <p style="font-size: 8px;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 42 at SR 1902 (Glen Laurel Road) / Caterpillar Access Road</p> <p>Division 4 Johnston County Clayton</p> <p>PLAN DATE: October 2011 REVIEWED BY: <i>John T. Rowe</i></p> <p>PREPARED BY: James Peterson REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p>SEAL</p>  <p>SEAL 008453</p> <p><i>John T. Rowe</i> 11-3-11 SIGNATURE DATE</p> <p>SIG. INVENTORY NO. 04-1083T1&T2</p>
REVISIONS	INIT.	DATE						

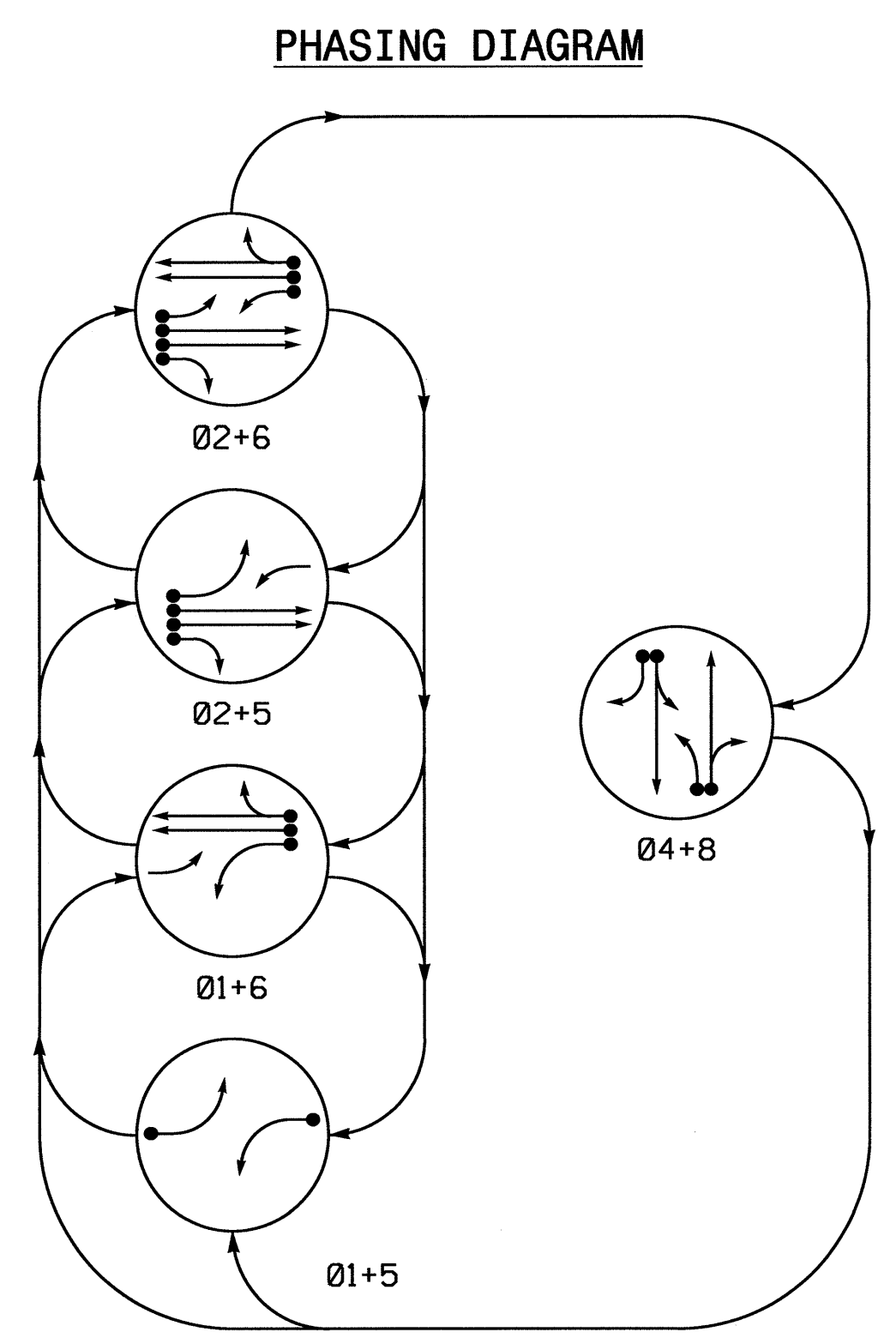
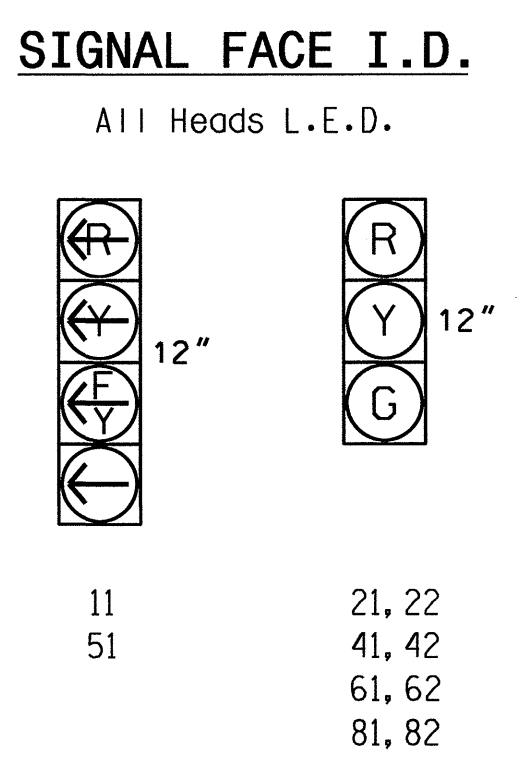


TABLE OF OPERATION

SIGNAL FACE	PHASE				FLASH
	01+5	01+6	02+5	02+6	
11	←	←	←	←	Y
21, 22	R	R	G	G	R
41, 42	R	R	R	R	G
51	←	←	←	←	Y
61, 62	R	G	R	G	R
81, 82	R	R	R	R	G



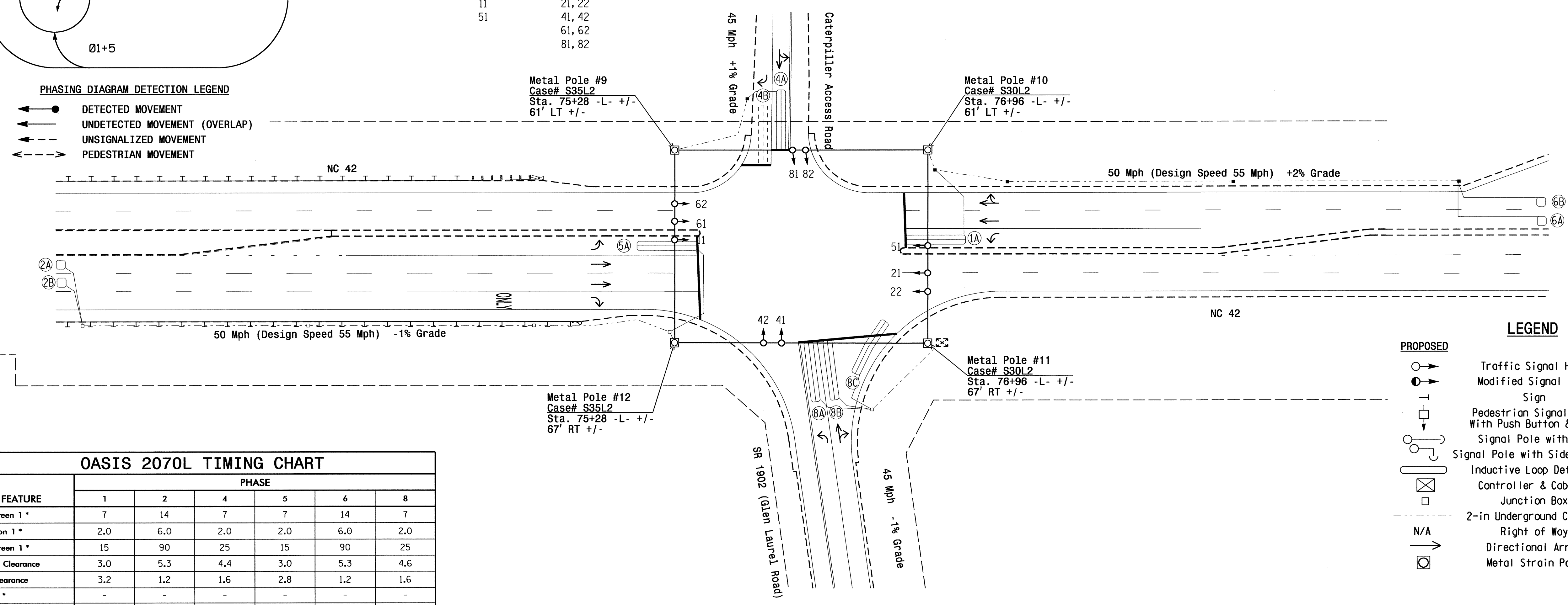
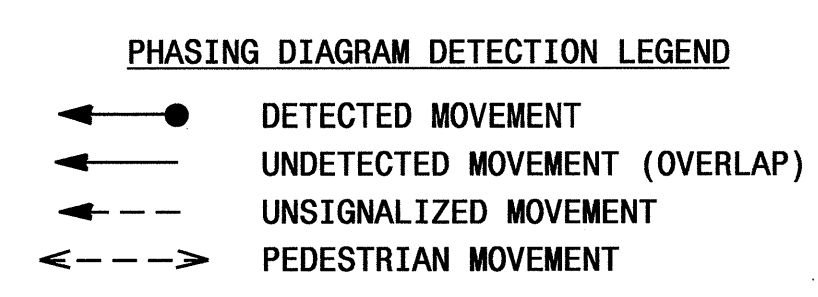
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY		
1A	6X40	+5	2-4-2	Y	1	Y	Y	-	15	-
2A	6X6	420	6	Y	2	Y	Y	-	3	-
2B	6X6	420	6	Y	2	Y	Y	-	-	Y
4A	6X40	+5	2-4-2	Y	4	Y	Y	-	3	-
4B	6X40	+5	2-4-2	-	4	Y	Y	-	15	-
5A	6X40	+5	2-4-2	Y	5	Y	Y	-	15	-
6A	6X6	420	6	Y	6	Y	Y	-	-	-
6B	6X6	420	6	Y	6	Y	Y	-	-	Y
8A	6X40	+5	2-4-2	Y	8	Y	Y	-	3	-
8B	6X40	+5	2-4-2	Y	8	Y	Y	-	5	-
8C	6X15	+15	3	Y	8	Y	Y	-	15	-

5 Phase Fully Actuated Time Based System

NOTES

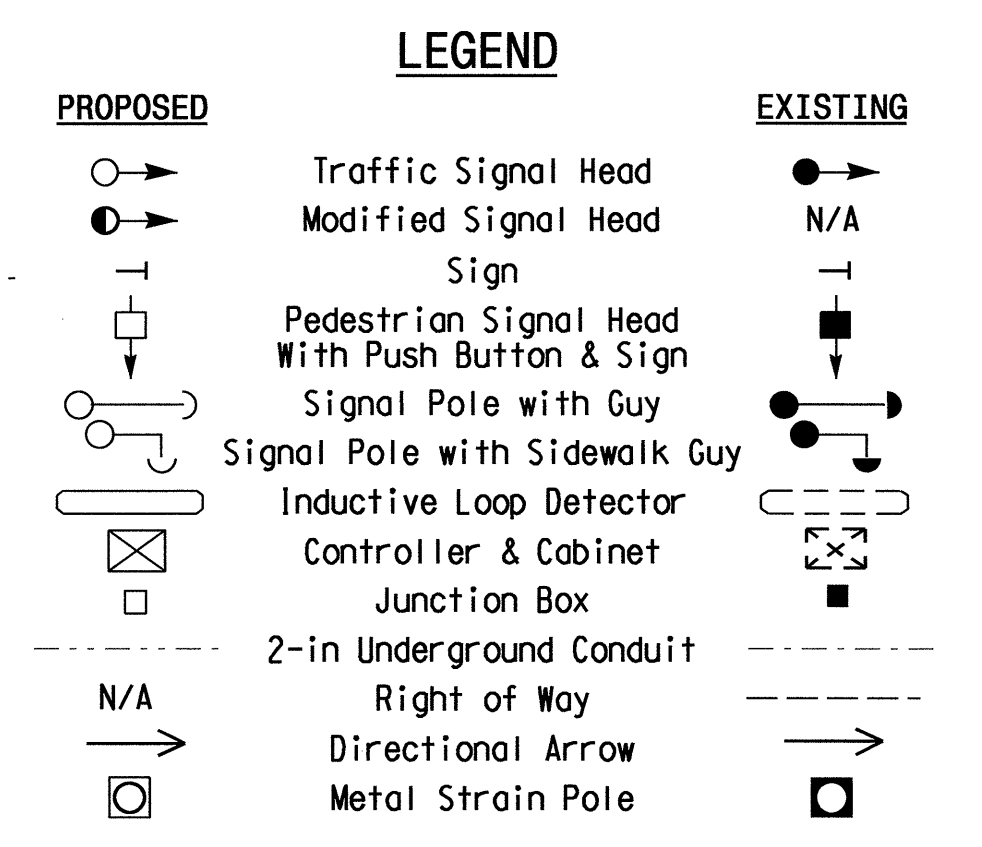
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.



OASIS 2070L TIMING CHART

FEATURE	PHASE						
	1	2	4	5	6	8	
Min Green 1*	7	14	7	7	14	7	
Extension 1*	2.0	6.0	2.0	2.0	6.0	2.0	
Max Green 1*	15	90	25	15	90	25	
Yellow Clearance	3.0	5.3	4.4	3.0	5.3	4.6	
Red Clearance	3.2	1.2	1.6	2.8	1.2	1.6	
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	-	-	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.



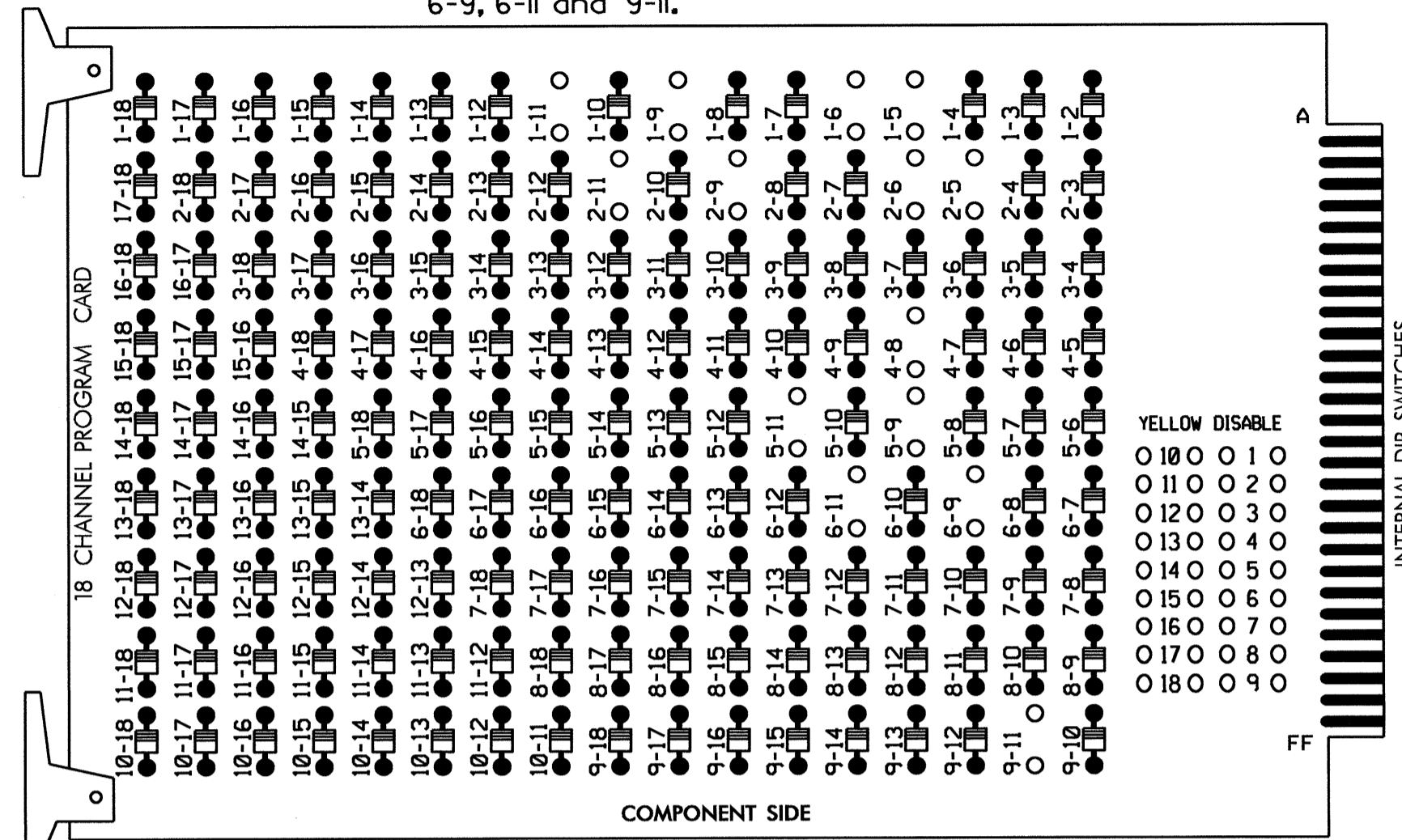
Signal Upgrade - Final Design

Prepared in the Offices of

NC 42 at SR 1902 (Glen Laurel Road)/Caterpillar Access Road
 Division 4 Johnston County Clayton
 PLAN DATE: September 2011 REVIEWED BY:
 PREPARED BY: I. O. Umzurike REVIEWED BY:
 SCALE: 1"=40'
 REVISIONS: INIT. DATE
 SIGNATURE: I. O. Umzurike DATE: 10/31/11
 SIG. INVENTORY NO. 04-1083

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

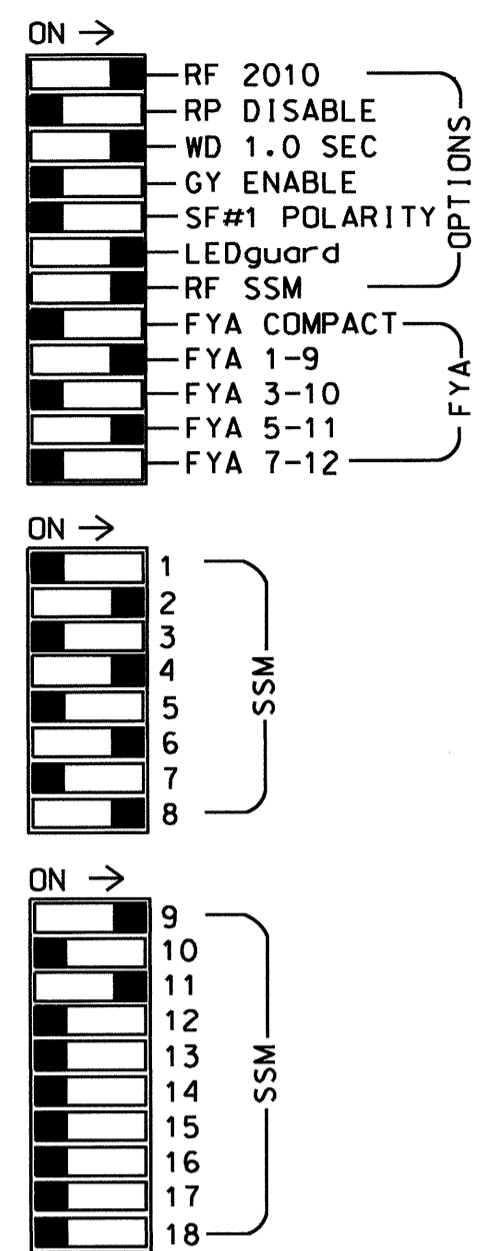
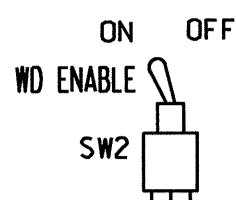
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11 and 9-11.



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.
- 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,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

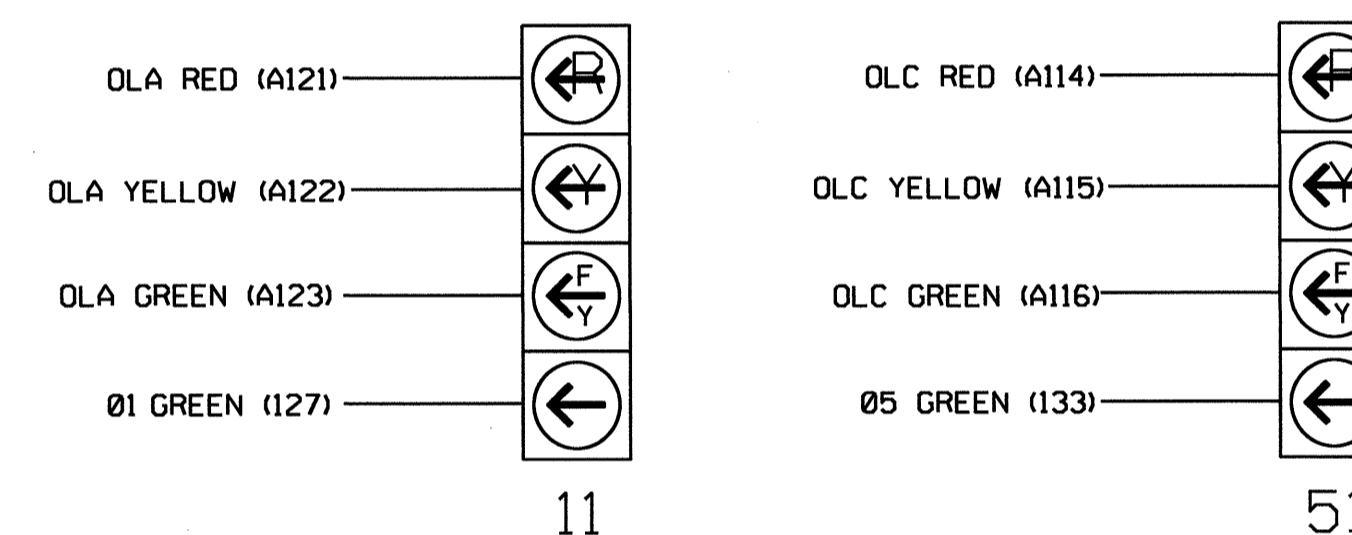
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11*	21,22	NU	NU	41,42	NU	51*	61,62	NU	NU	81,82	NU	11*	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

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

INPUT FILE POSITION LAYOUT
(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	∅ 1 1A	∅ 2 2A	∅ 3 3A	∅ 4 4A	∅ 5 5A	∅ 6 6A	∅ 7 7A	∅ 8 8A	∅ 9 9A	∅ 10 10A	∅ 11 11A	∅ 12 12A	∅ 13 13A	∅ 14 14A
FILE "J"	NOT USED	∅ 2 2B	∅ 3 3B	∅ 4 4B	∅ 5 5B	∅ 6 6B	∅ 7 7B	∅ 8 8B	∅ 9 9B	∅ 10 10B	∅ 11 11B	∅ 12 12B	∅ 13 13B	∅ 14 14B

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

FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

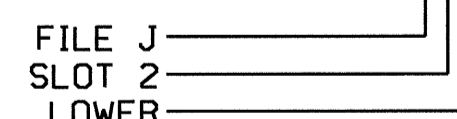
INPUT FILE CONNECTION & PROGRAMMING CHART

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	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
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			
6B	TB3-7,8	J2L	44	6	16	6	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			5
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15

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

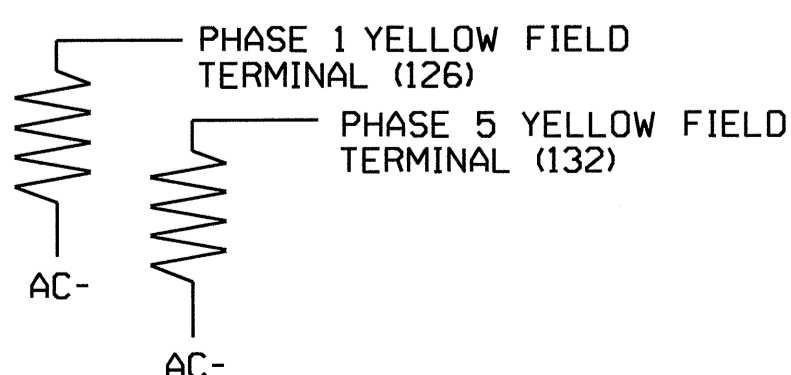
²Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L

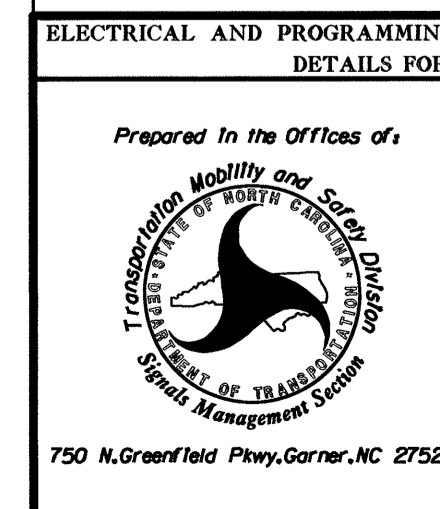


LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown below)

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



Electrical Detail - Sheet 1 of 2 - Final



NC 42
 at
 SR 1902 (Glen Laurel Road)/
 Caterpillar Access Road
 Division 4 Johnston County Clayton
 PLAN DATE: October 2011 REVIEWED BY: JPR
 PREPARED BY: James Peterson REVIEWED BY:
 REVISIONS INIT. DATE

SEAL
 JOHN T. ROWE
 ENGINEER
 SEAL 008453
 SIGNATURE DATE 11-3-11
 SIG. INVENTORY NO. 04-1083

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
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

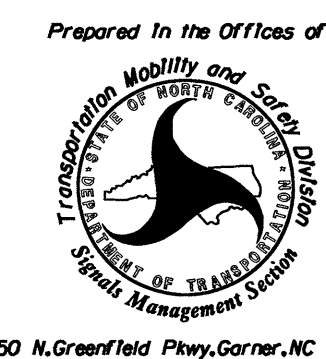
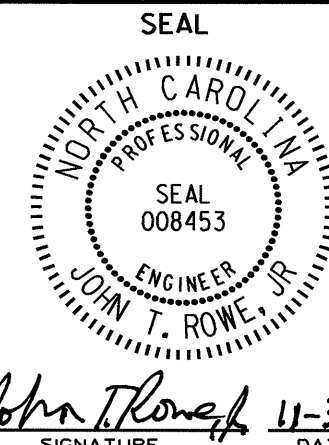
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: ;12345678910111213141516
VEH OVL PARENTS: ;XX
VEH OVL NOT VEH: ;
VEH OVL NOT PED: ;
VEH OVL GRN EXT: ;
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 04-1083
DESIGNED: September 2011
SEALED: 10-31-11
REVISED: N/A

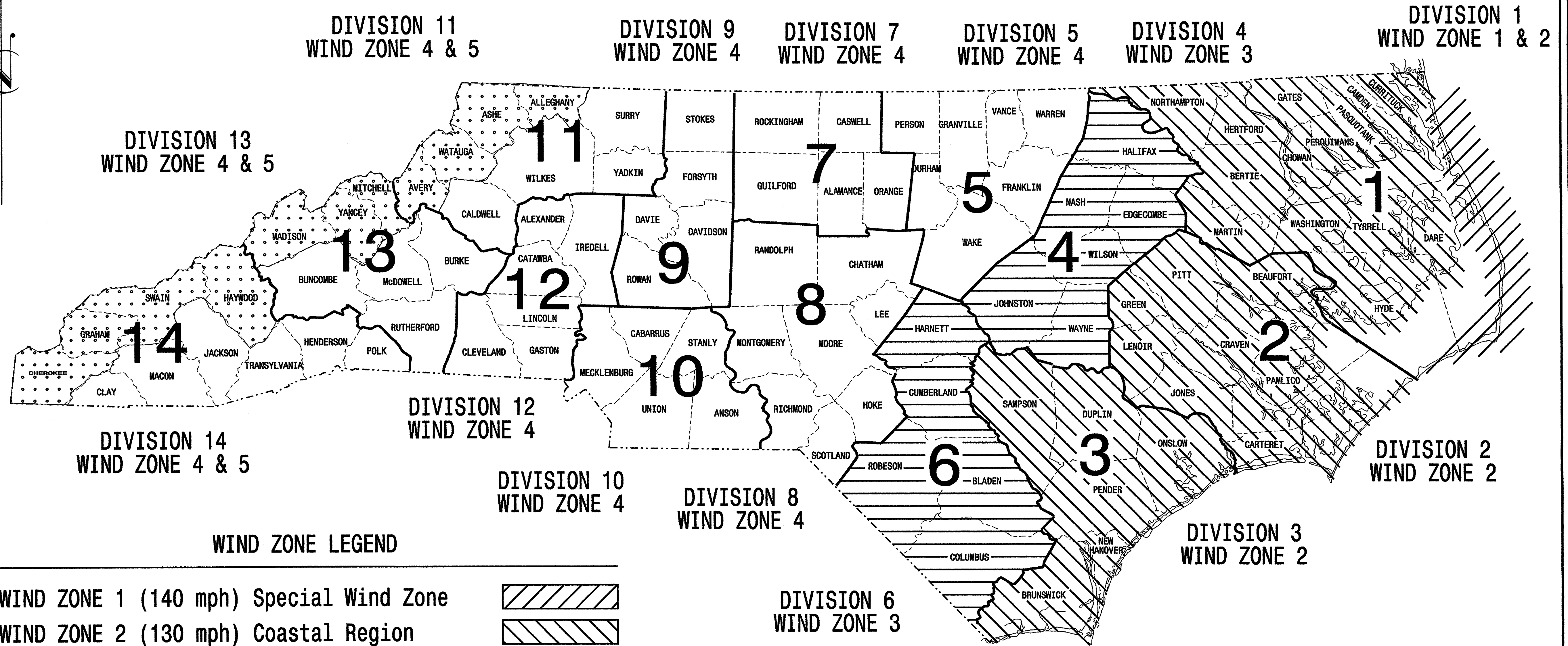
Electrical Detail - Sheet 2 of 2 - Final

	NC 42 at SR 1902 (Glen Laurel Road)/ Caterpillar Access Road		SEAL 	
	Division 4 Johnston County Clayton			
	PLAN DATE: October 2011	REVIEWED BY: <i>JWR</i>		
	PREPARED BY: James Peterson	REVIEWED BY:		
REVISIONS		INIT.	DATE	
		<i>John T. Rowe</i>	11-3-11	
		SIGNATURE DATE		
		SIG. INVENTORY NO. 04-1083		

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	R-3825A	Sig.29
F. A. PROJ. NO.	M 1	
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES



WIND ZONE LEGEND

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

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

Prepared in the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

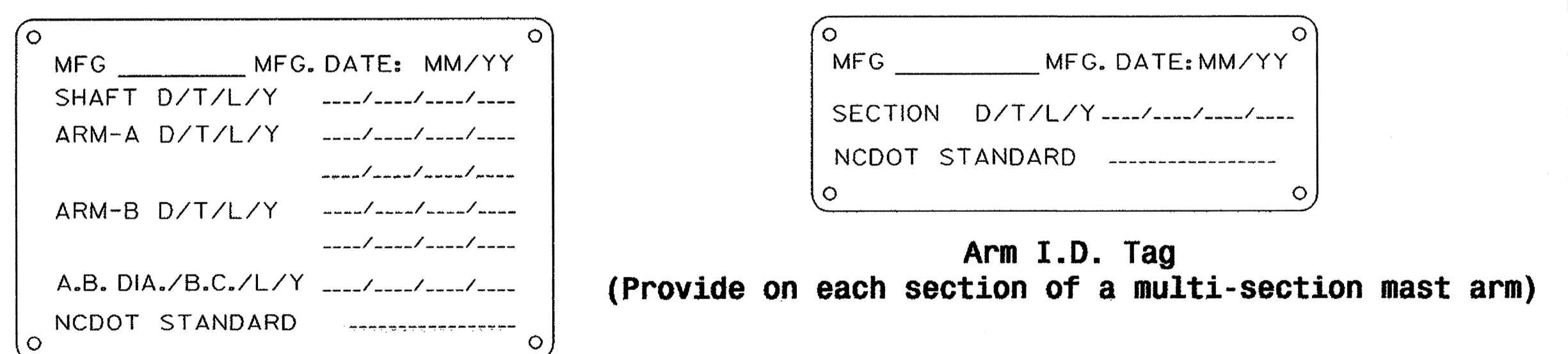
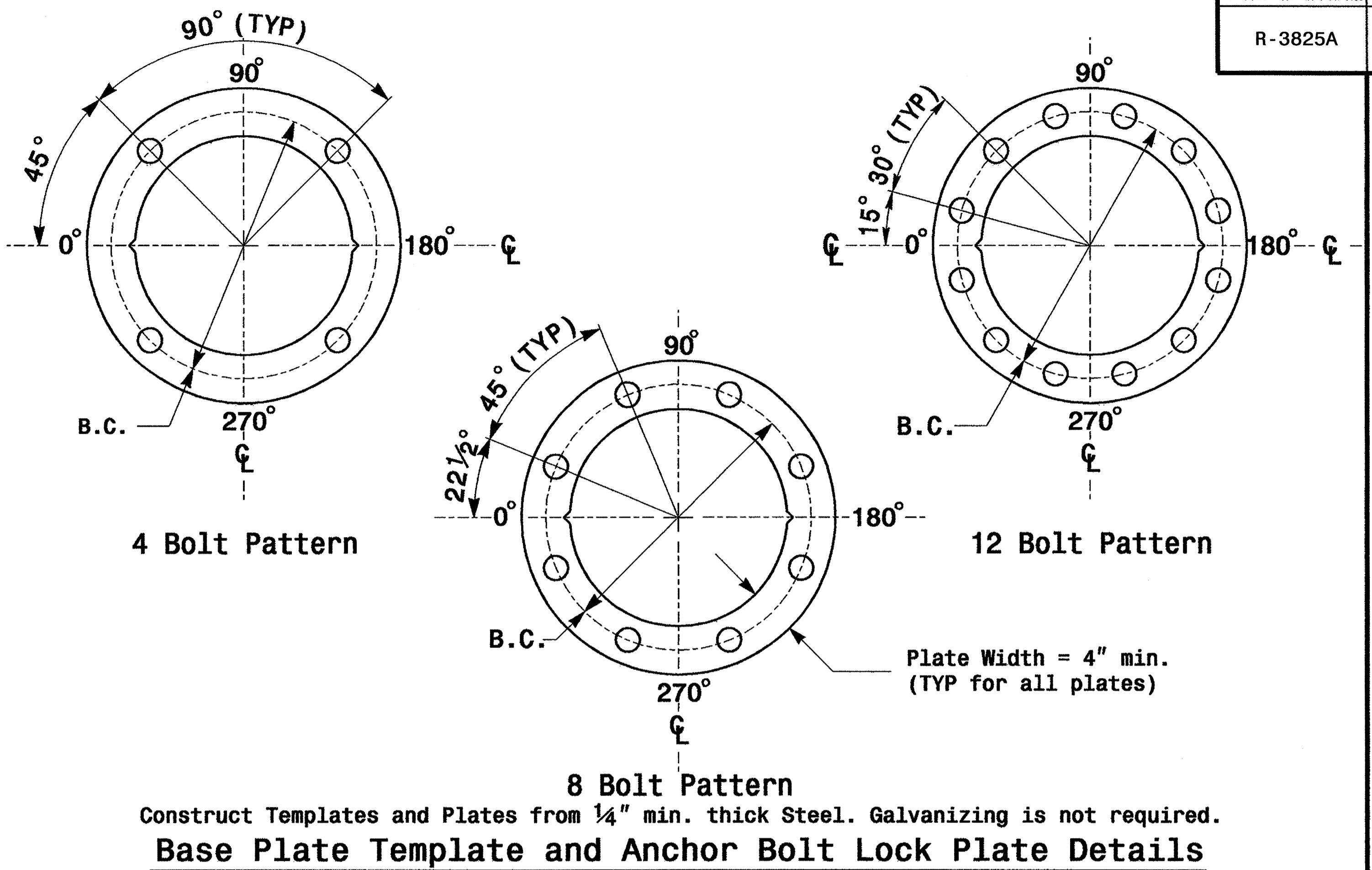
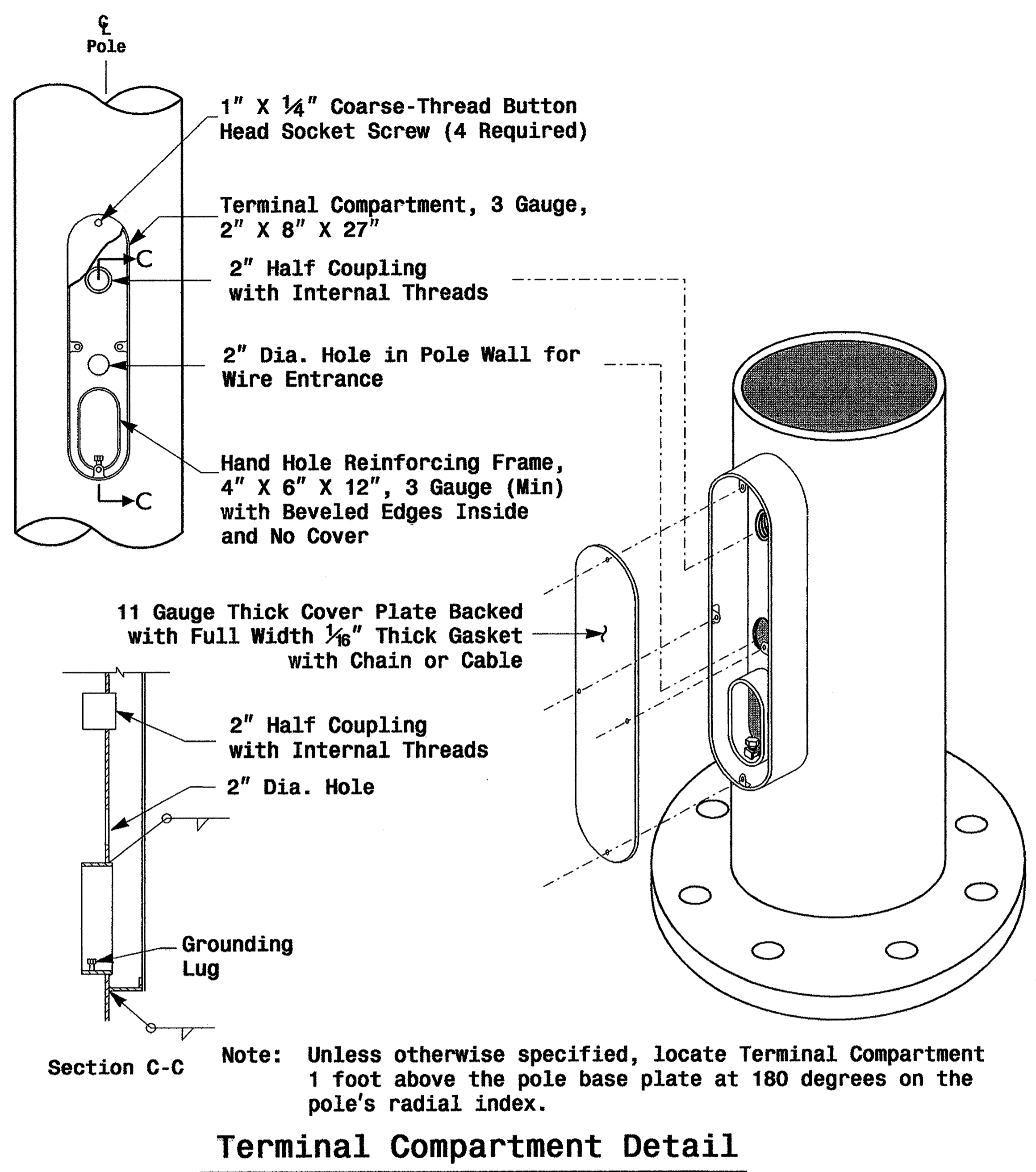
Designed in conformance
with the
2002 Interim to the
4th Edition 2001
AASHTO
Standard Specifications for
Structural Supports for
Highway Signs, Luminaires,
and Traffic Signals

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

NCDOT CONTACTS:	
MOBILITY AND SAFETY DIVISION - ITS and SIGNALS UNIT	
G. A. Fuller, P.E. - State ITS and Signals Engineer	
G. G. Murr, Jr., P.E. - State Signals Engineer	
D. C. Sarkar, P.E. - ITS and Signals Senior Structural Engineer	
C. F. Andrews, Jr. - ITS and Signals Structural Project Engineer	
M. Aslam - ITS and Signals Structural Project Engineer	
N. Bitting, P.E. - ITS and Signals Structural Project Engineer	

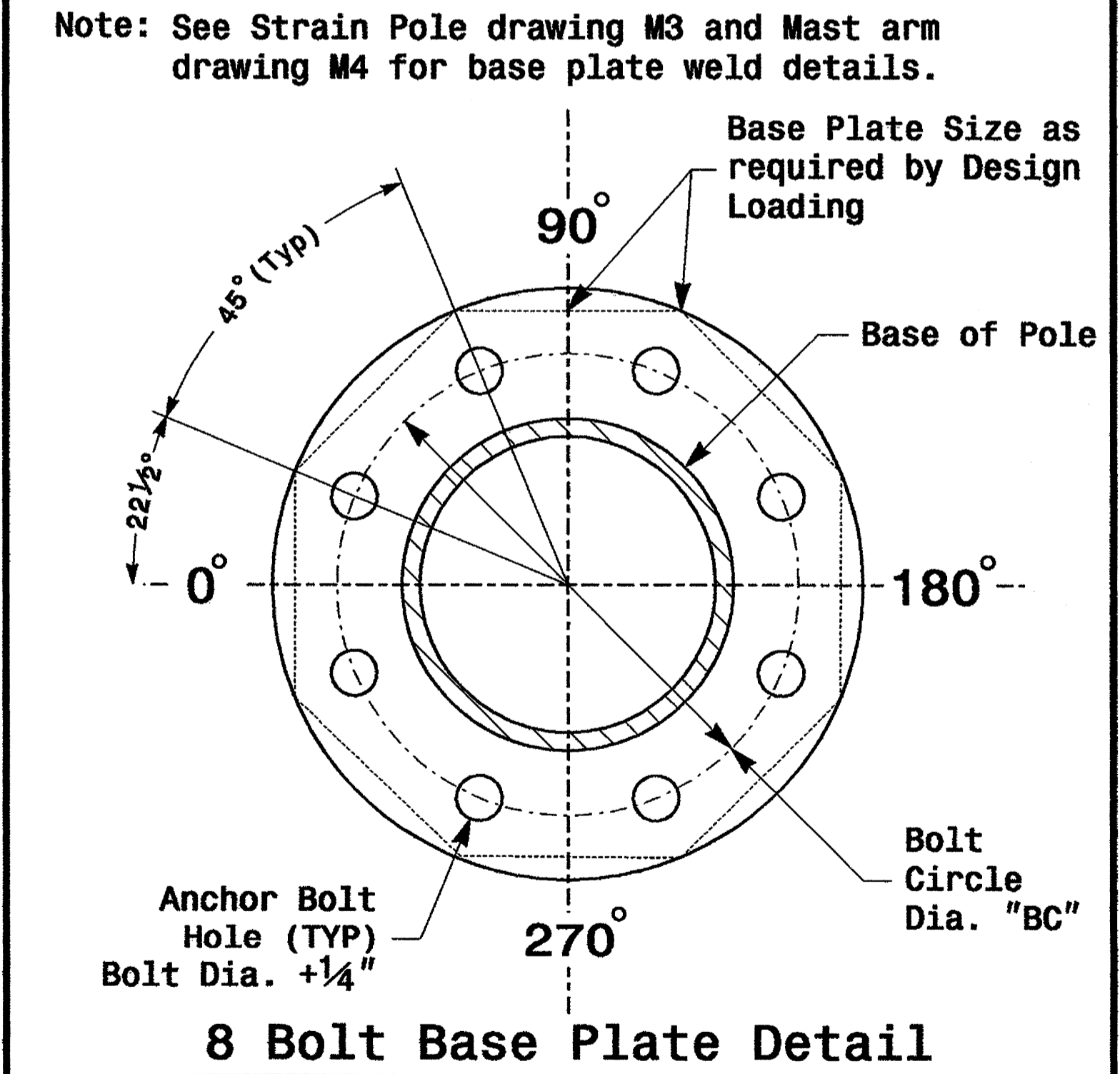
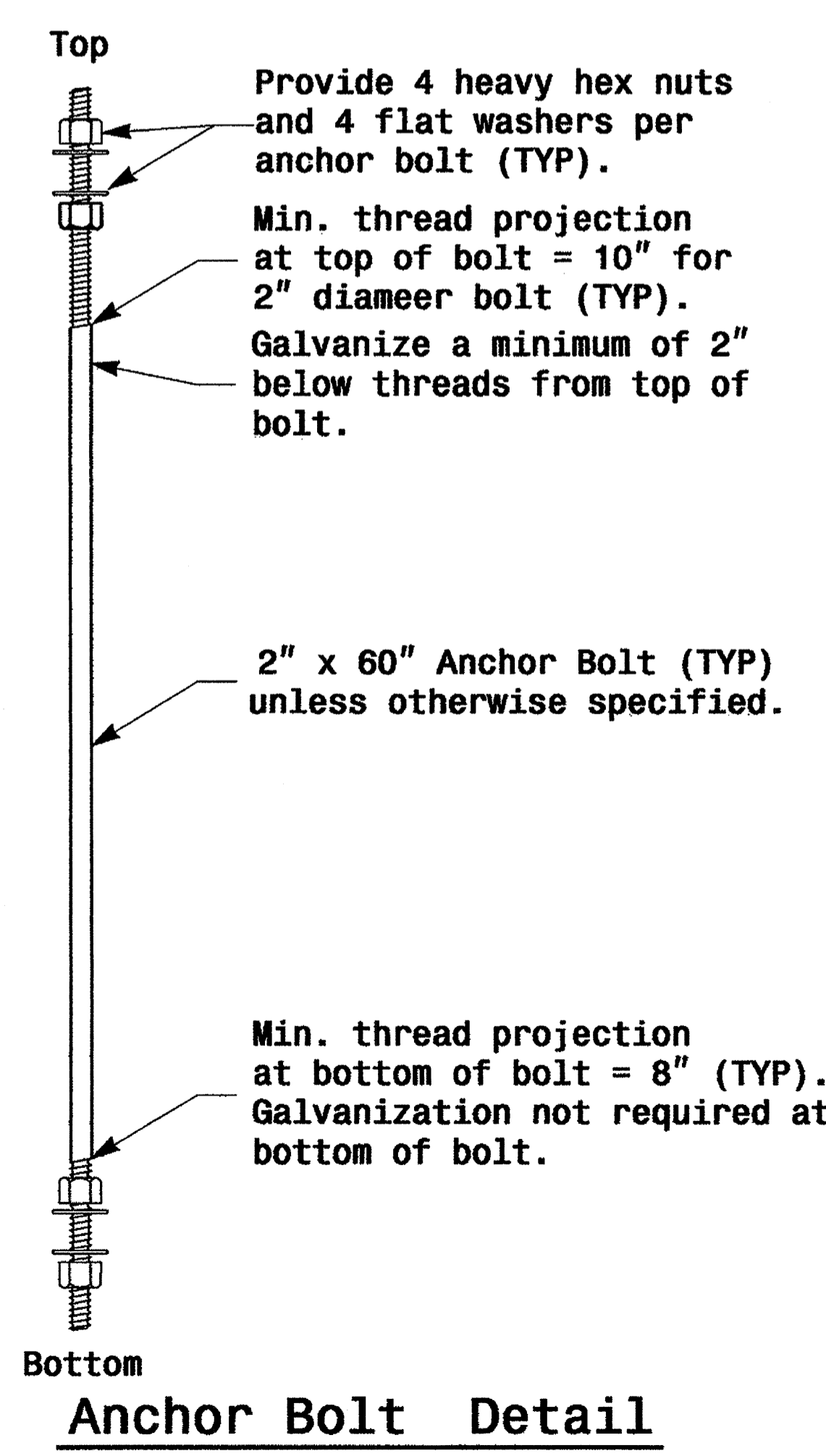
SEAL

SIGNATURE DATE 7.21.2009



- 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



Prepared in the Office of:

Typical Fabrication Details Common To All Metal Poles

PLAN DATE: May 2005 REVIEWED BY: C.F. Andrews
PREPARED BY: P.L. Alexander REVIEWED BY: A.M. Esposito

REVISIONS INIT. DATE

SCALE: 0 NA NONE

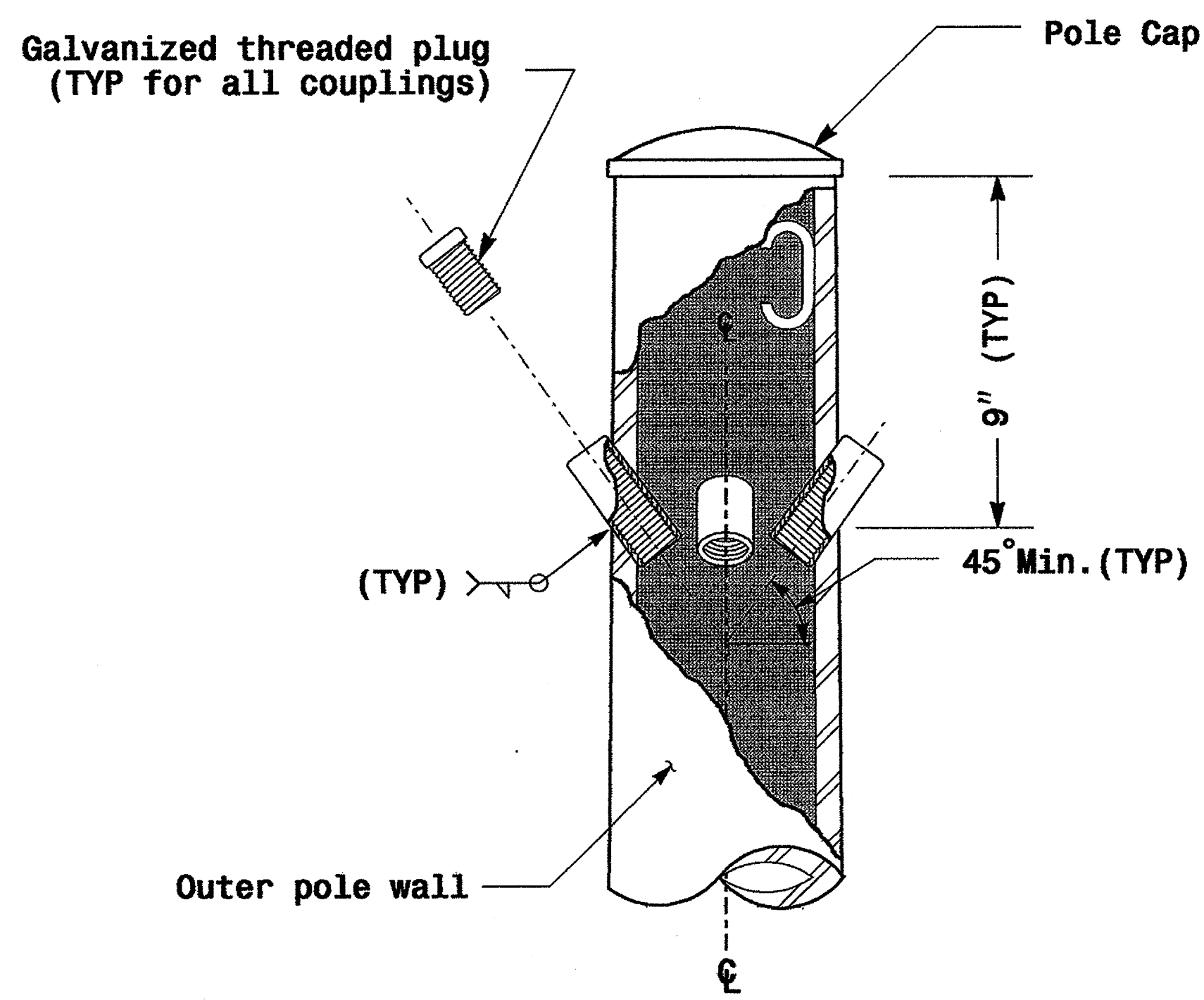
SEAL: PROFESSIONAL ENGINEER DEBESH C. SARKAR

SIGNATURE: D. Sarkar 9.2.2005 DATE

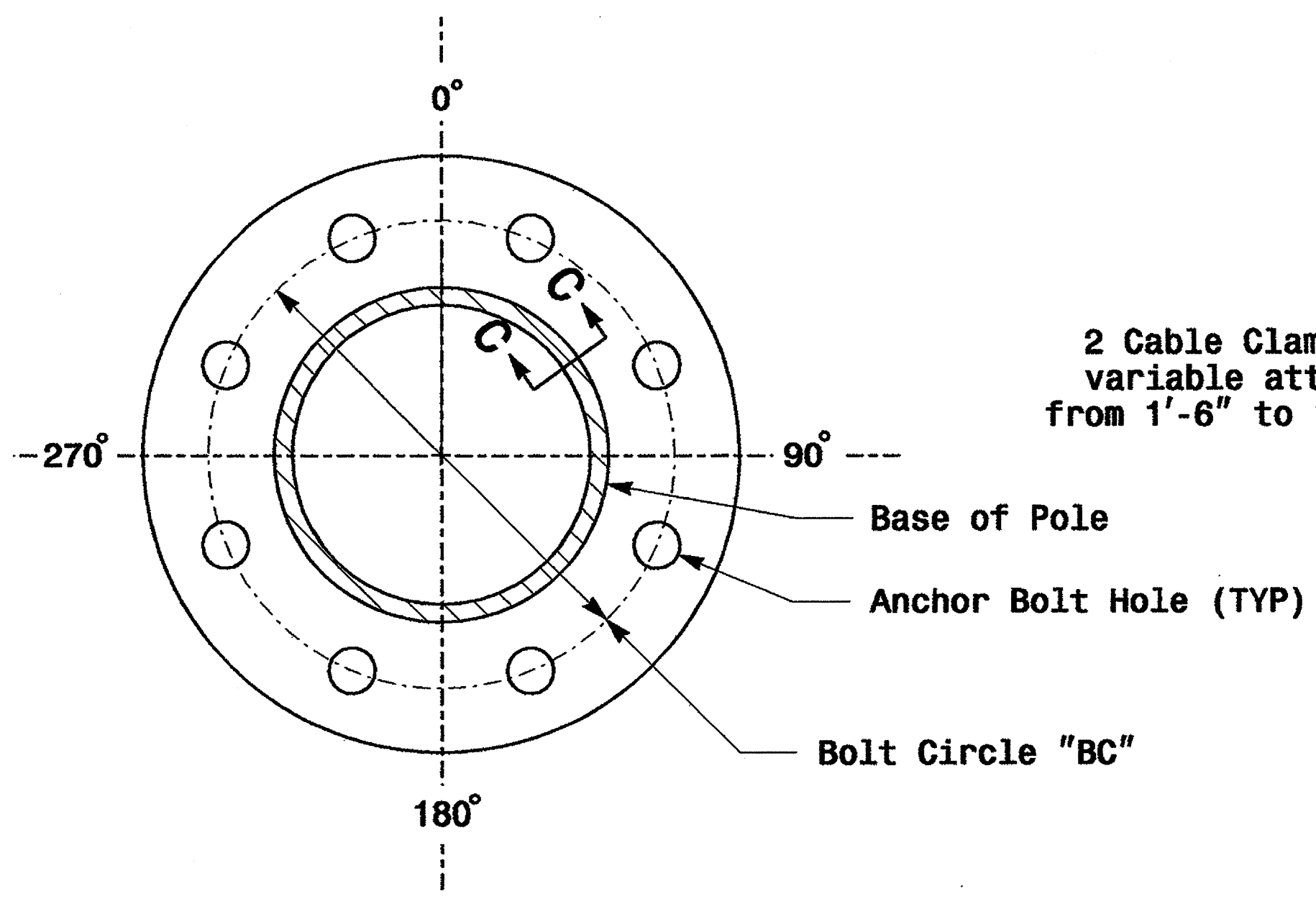
SIG. INVENTORY NO.

Fabrication Details - All Poles

11-SEP-2005 18:22 01-3825A-01 Pole Standard.dwg 2004 re thru mfg.dgn

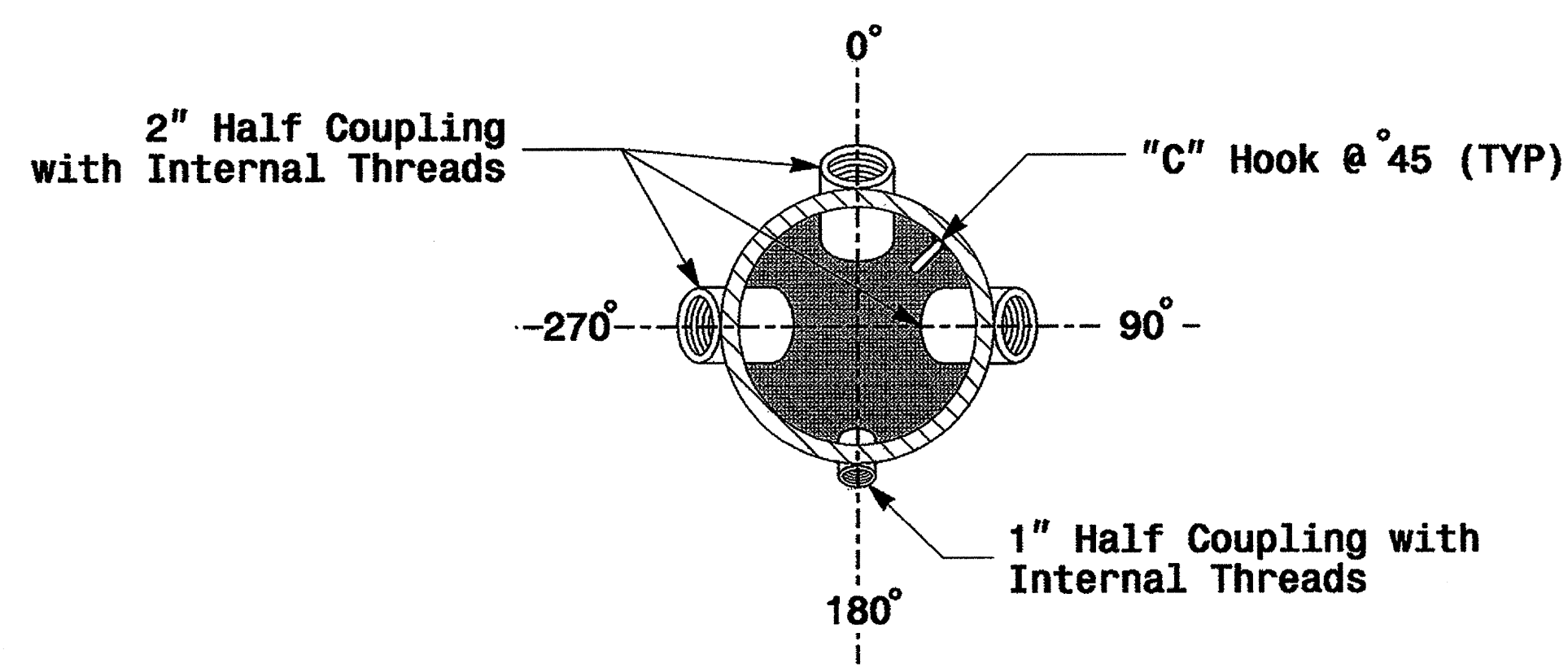
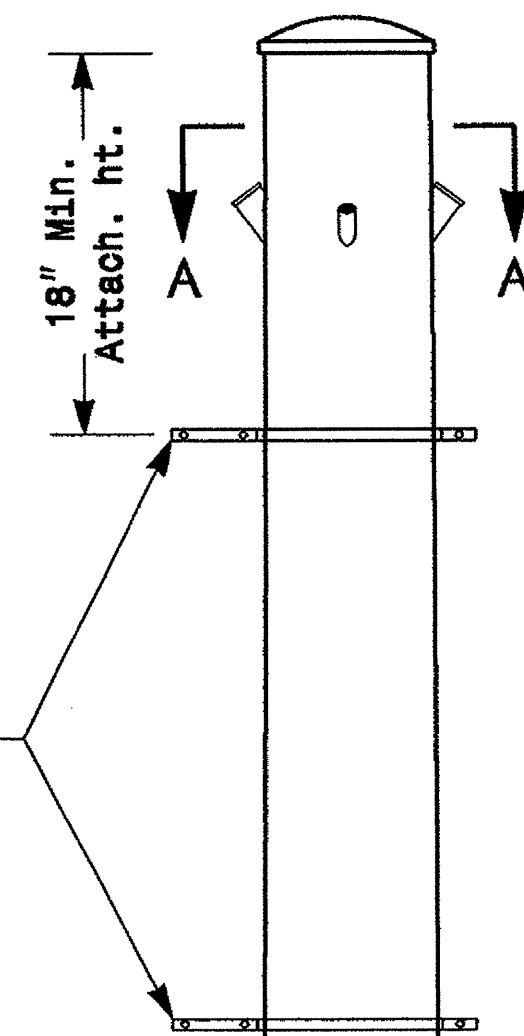


Cable Entrances at Top of Pole

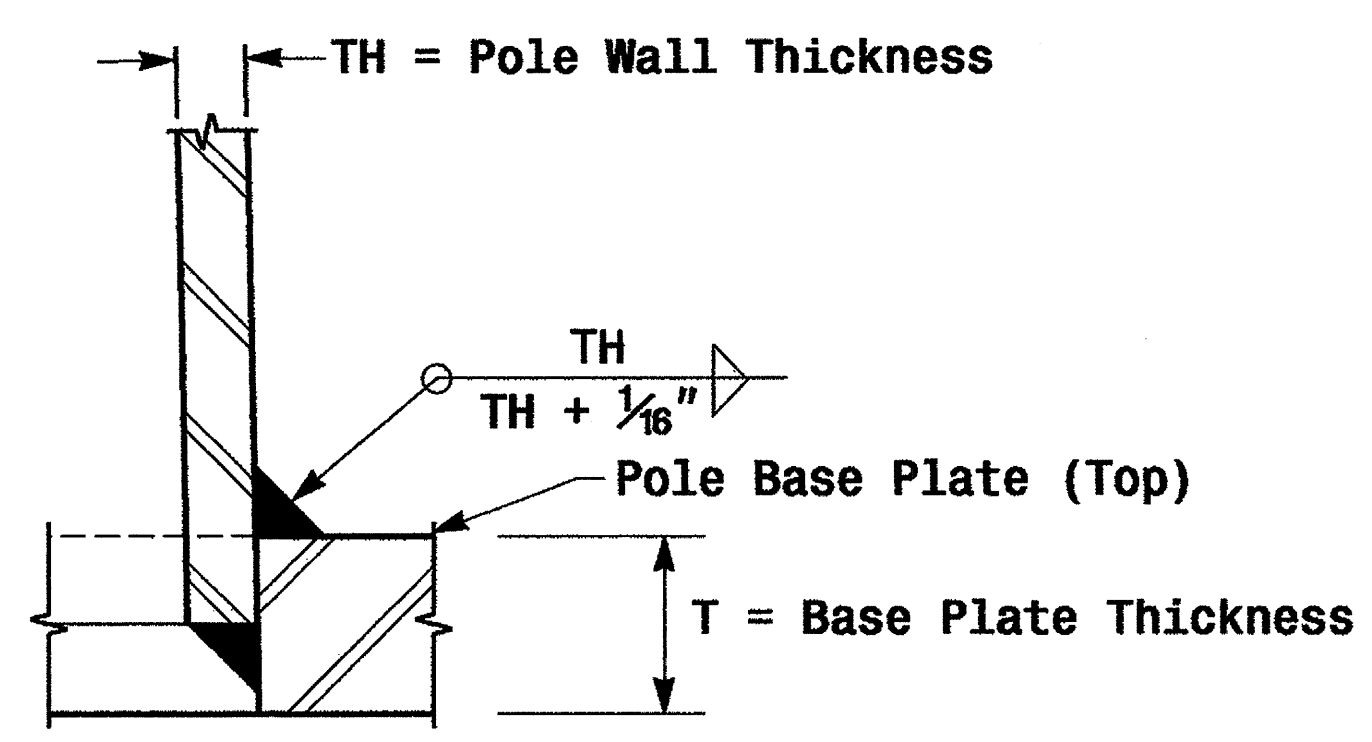


Section B-B
(See drawing M2)
Pole Base Plate

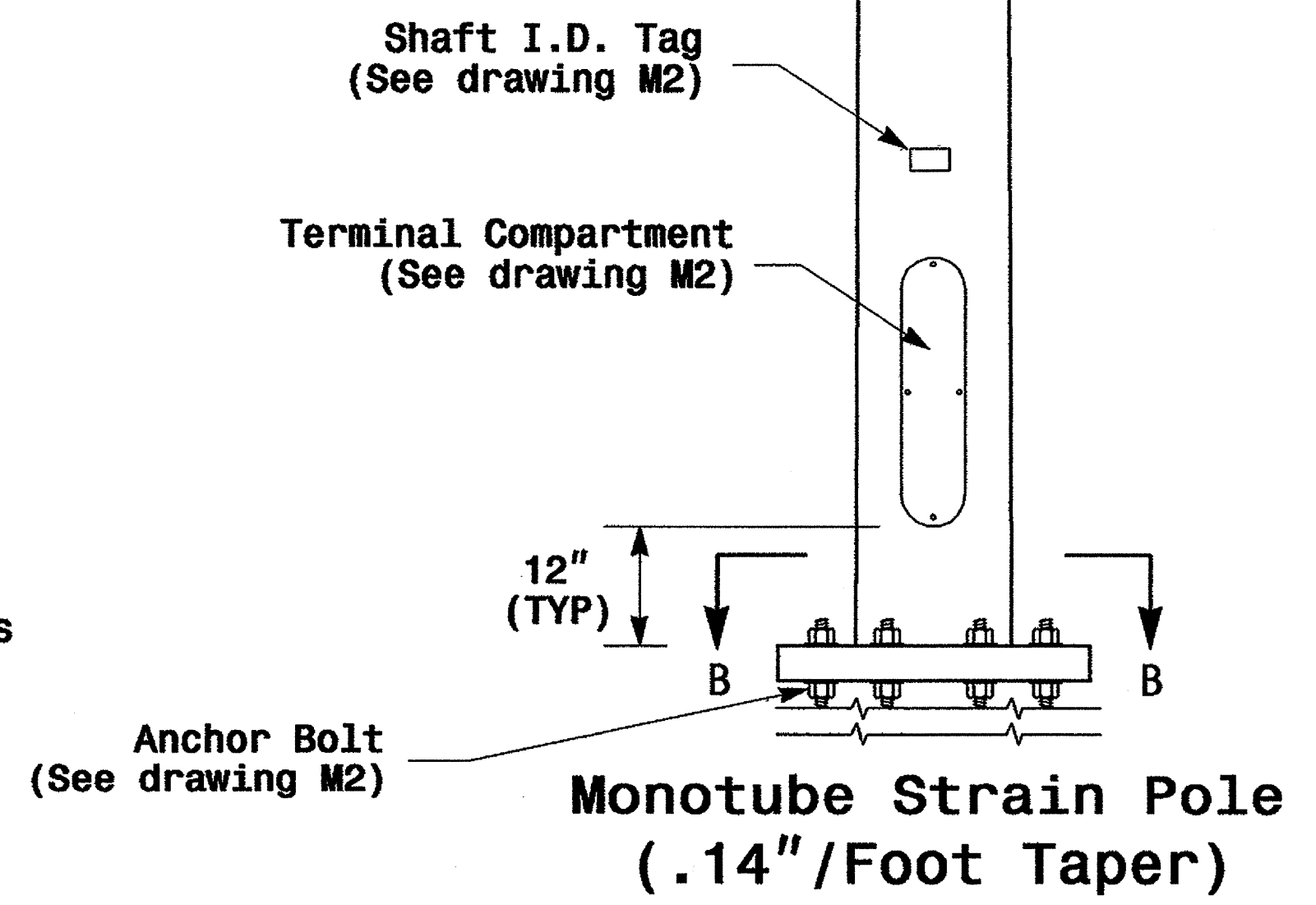
2 Cable Clamps designed for variable attachment heights from 1'-6" to 10' below the top of the pole.



Section A-A
Radial Orientation for Factory Installed Accessories at Top of Pole

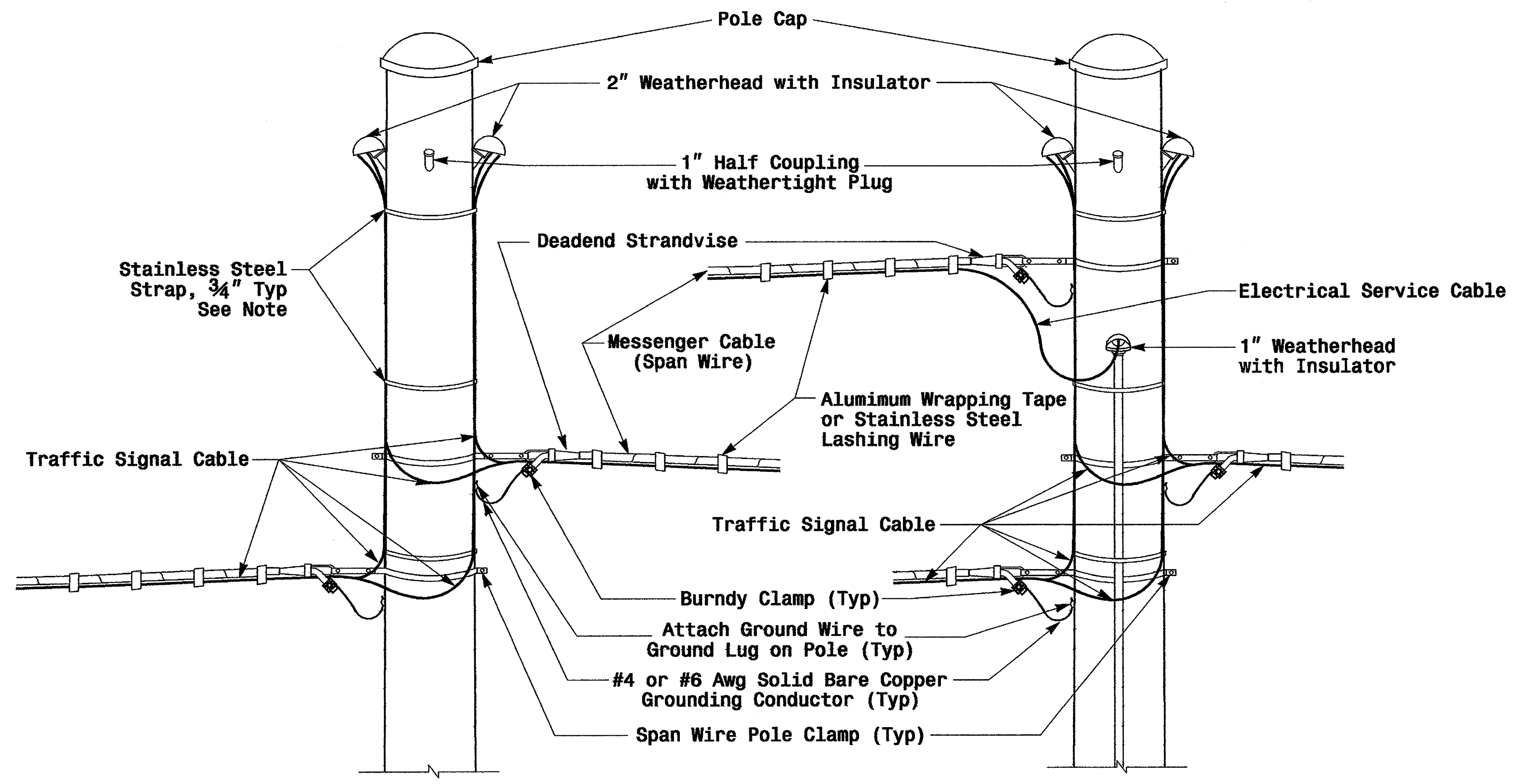


Section C-C
Socket Connection Weld Detail



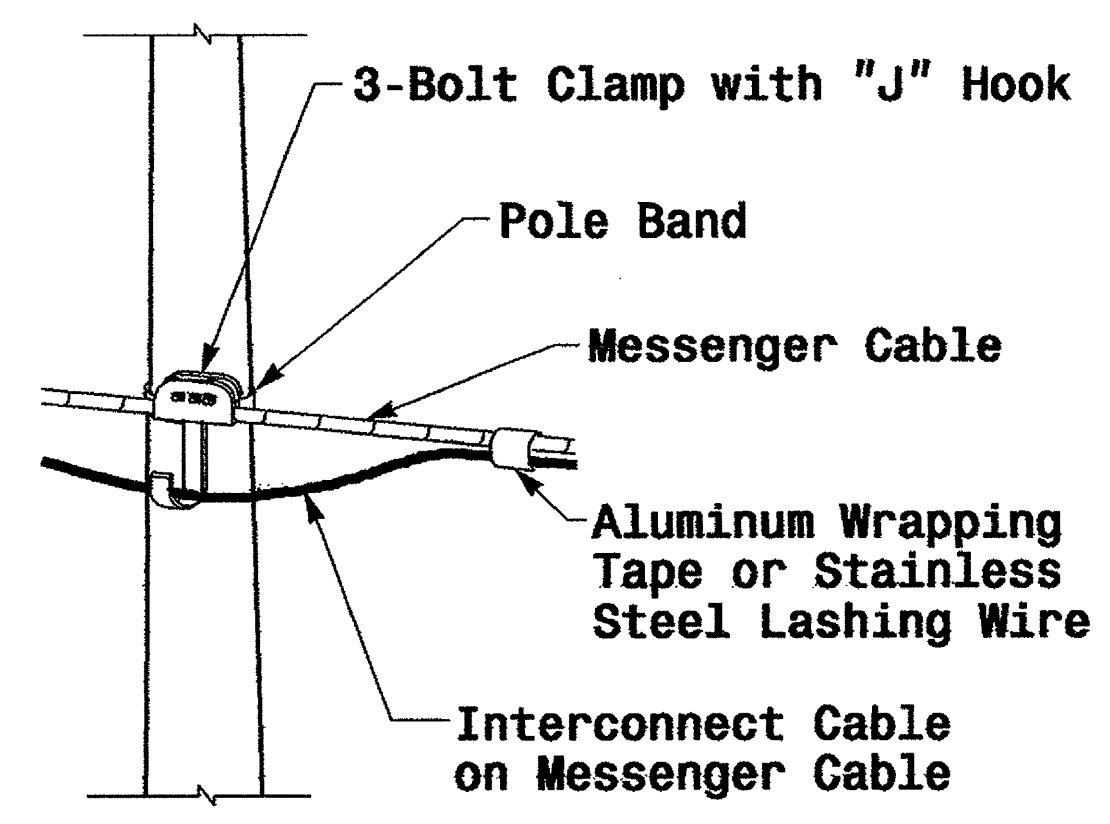
	Typical Fabrication Details For Strain Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.W. Esposito		SCALE: 0 NA NONE
222 N. McDowell St., Raleigh, NC 27603		REVISIONS:	SIGNATURE: <i>D. Sarker</i> 9.2.2005 DATE:
SIG. INVENTORY NO.			SEAL

01-SEP-2005 14:07
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polecon.dwg

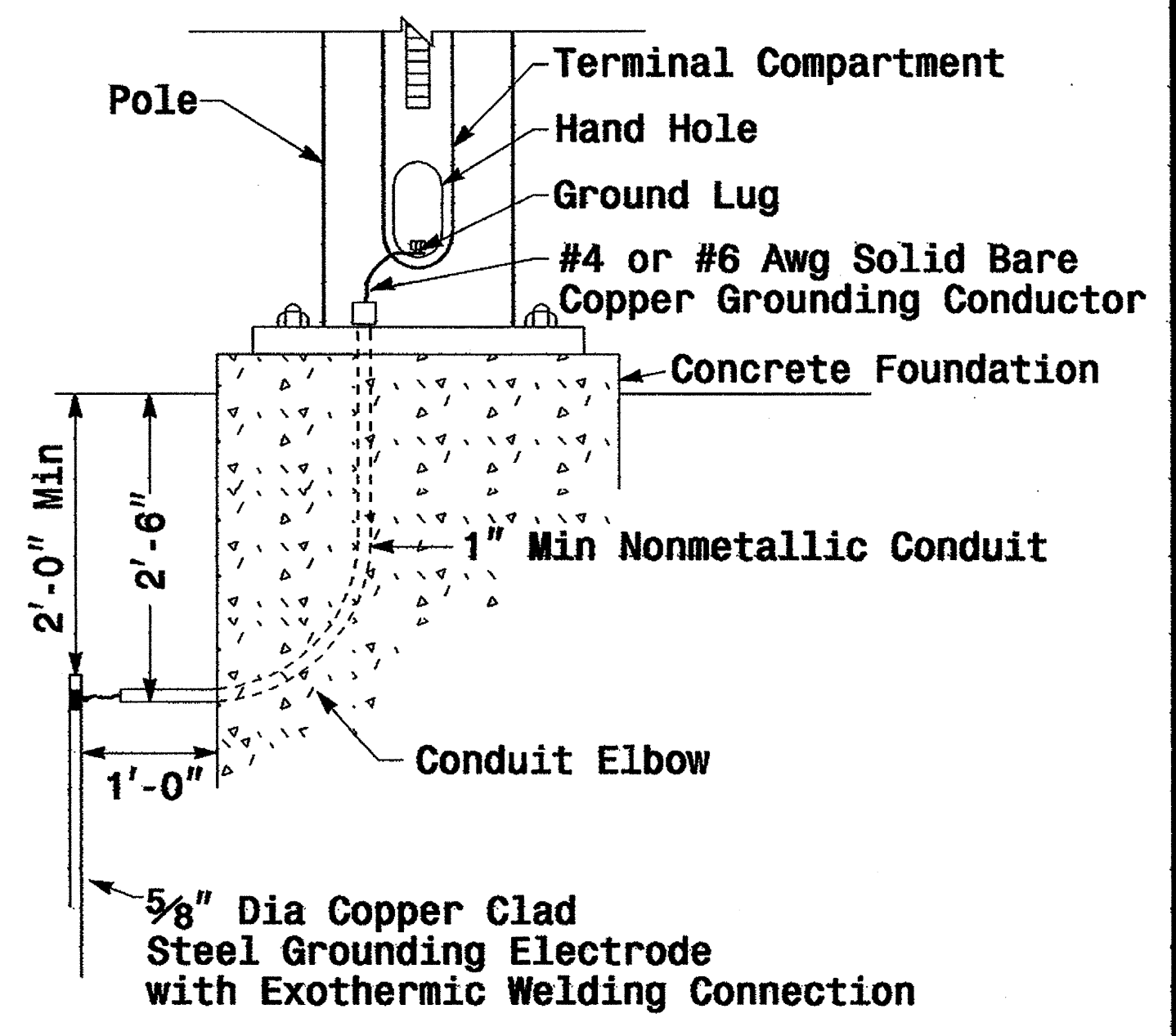


Note: Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



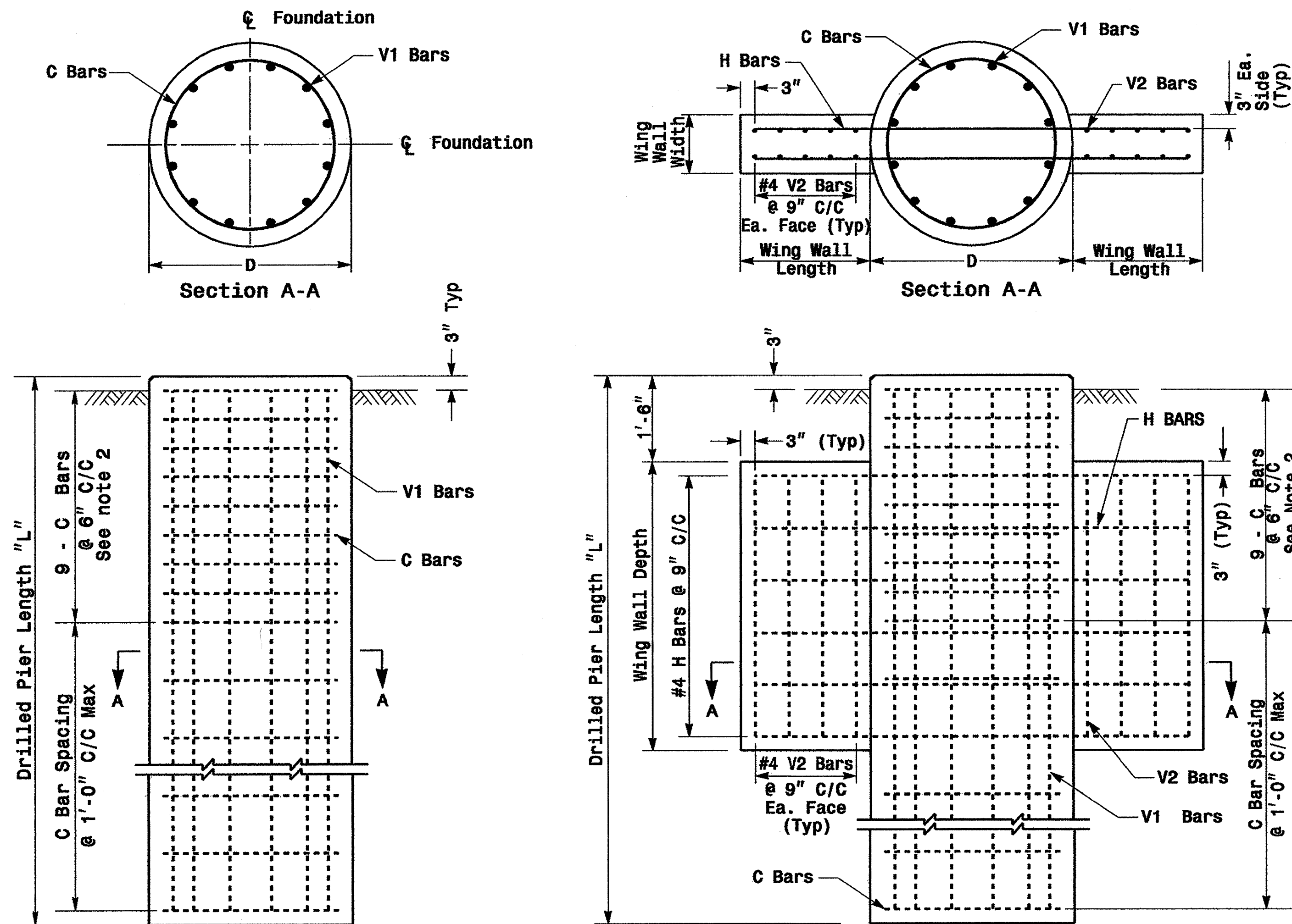
Metal Pole Grounding Detail

Construction Details - Strain Poles

01-SEP-2005 16:33
vr:peop:es-un11:workgroups:004:metal_pole_strainpoles.dgn

	Construction Details Strain Poles		
	PLAN DATE: May 2005 PREPARED BY: C.F. ANDREWS	REVIEWED BY: P.L. ALEXANDER REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	SIGNATURE: <i>Milton I. Dean</i> 9-1-05 DATE		SEAL MILTON I. DEAN ENGINEER STATE OF NORTH CAROLINA SEAL 016286

Reinforcing Steel Bars



Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

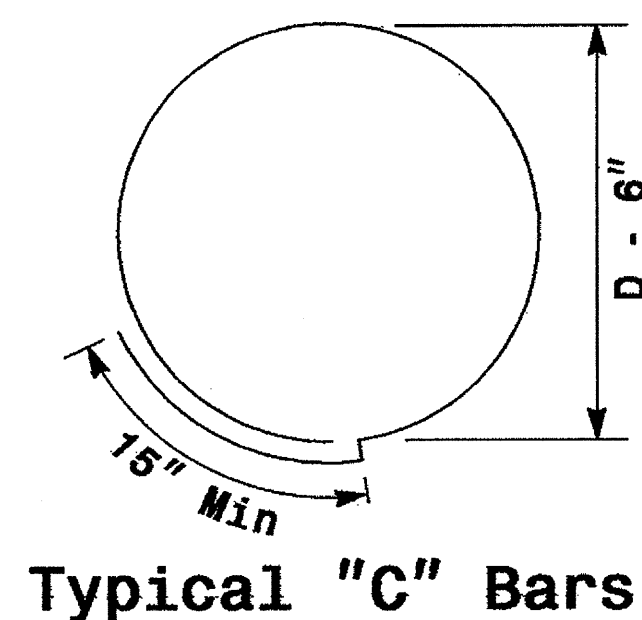
* See Note No. 1
** See Note No. 3

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

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

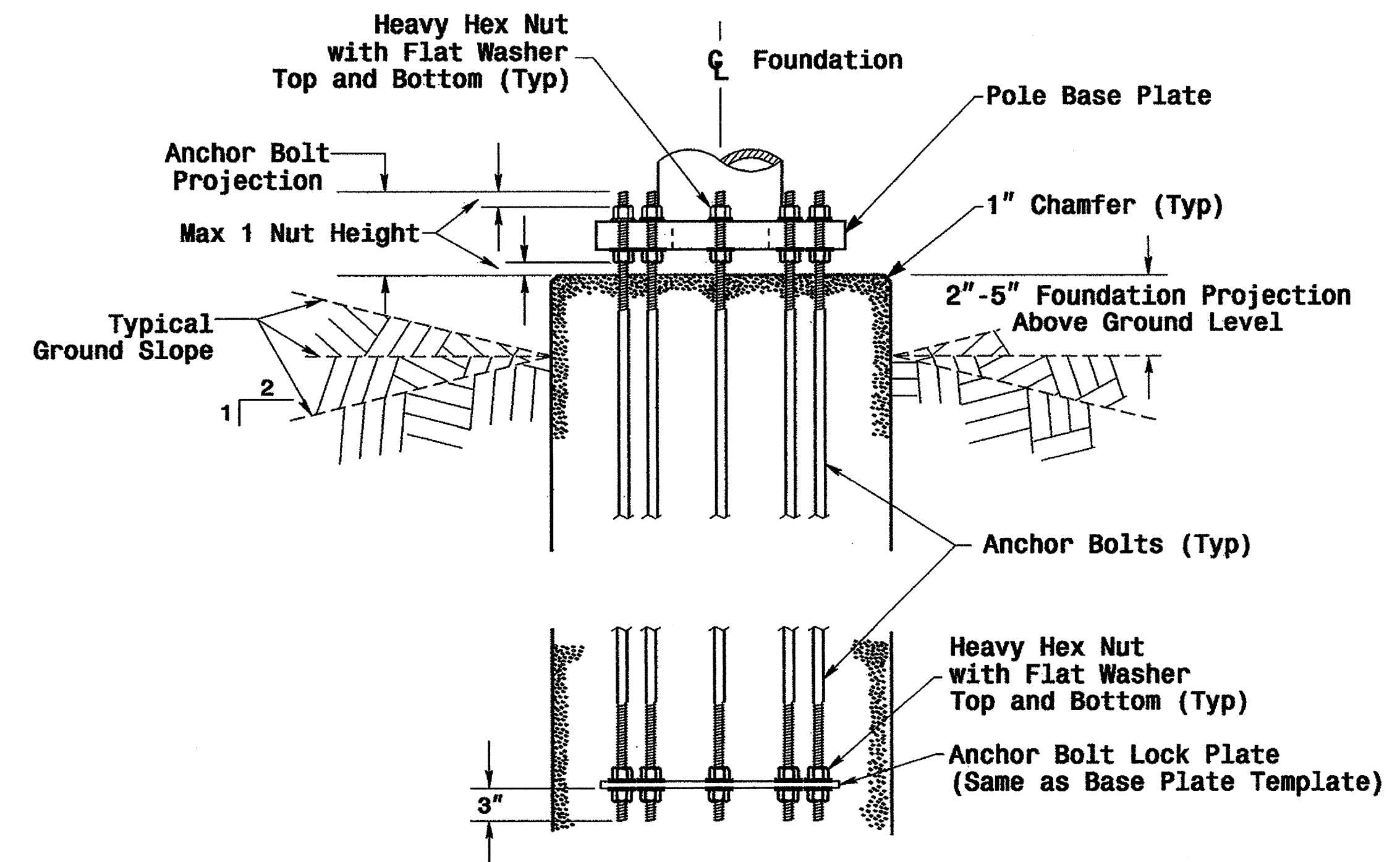
Wing Wall Type	Wing Wall Length (Ft.)	Wing Wall Width (Ft.)	Wing Wall Depth (Ft.)	Concrete Volume (Cu. Yds.)
TYPE 1	1'-6"	1'-0"	3'-0"	.4
TYPE 2	3'-0"	1'-0"	5'-0"	1.2

See Note No. 4

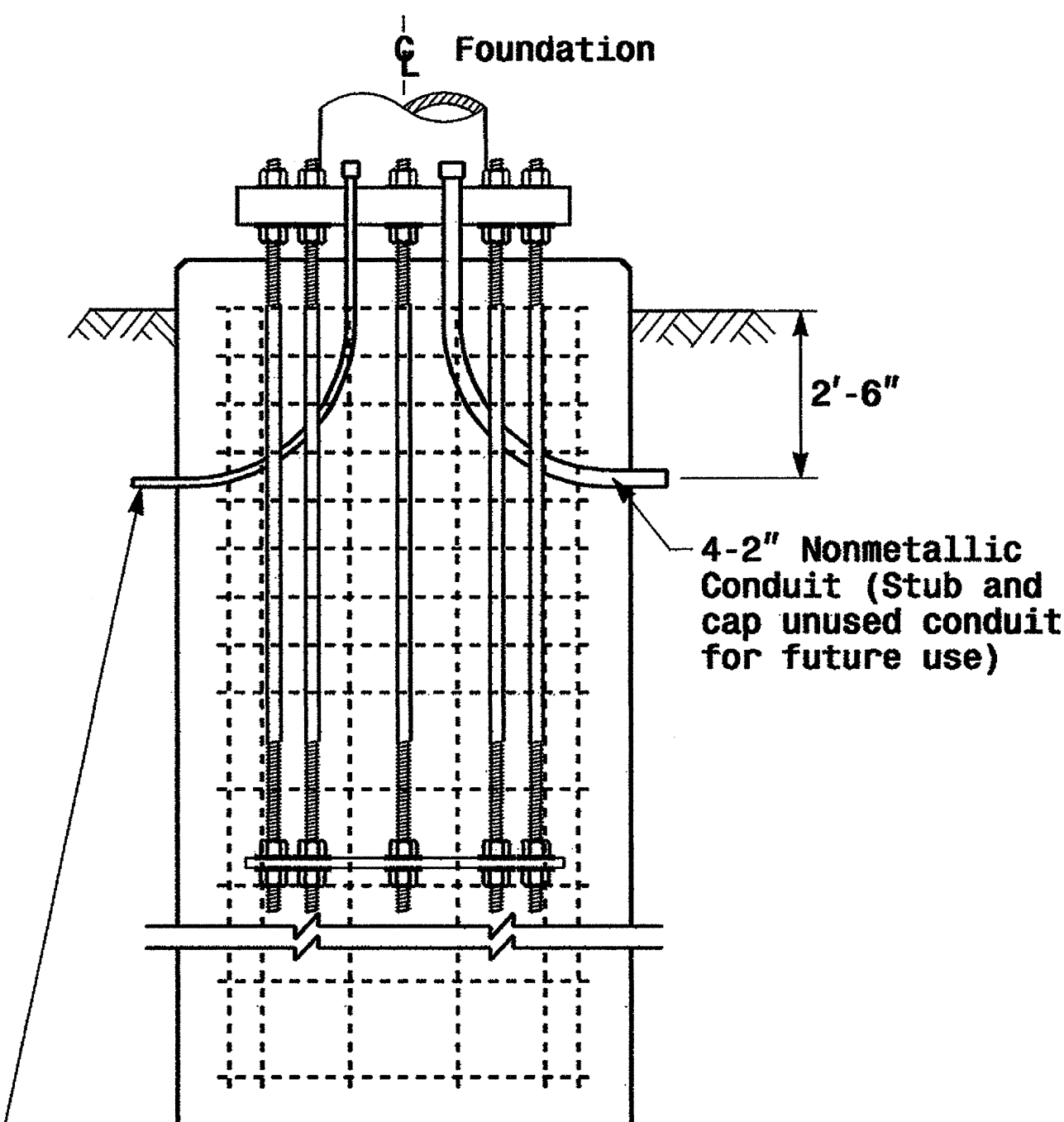


Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



Notes

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

	Construction Details Foundations		SEAL
	PLAN DATE: May 2005 PREPARED BY: C.F. ANDREWS	REVIEWED BY: P.L. ALEXANDER REVIEWED BY: A.M. ESPOSITO	SCALE: 0 NA NONE	SIGNATURE: D. Sarker DATE: 9.2.2005 SIG. INVENTORY NO.

		STANDARD STRAIN POLES				STANDARD FOUNDATIONS 42" Diameter Drilled Pier Length (L) - Feet						
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Moment at the Pole Base (ft-kp)	Clay				Sand		
						Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30
WIND ZONE 1	LIGHT	S26L3	26	25	280	20.5	14.0	11.5	9.5	18.0	16.0	14.0
		S30L3	30	25	310	21.0	14.5	11.5	9.5	18.5	16.5	14.5
		S35L3	35	25	350	22.5	15.0	12.0	10.0	19.5	17.5	15.5
	HEAVY	S30H3	30	29	450	25.5	16.5	13.0	11.0	21.0	18.5	16.5
		S35H3	35	29	540	26.0	17.0	13.5	11.5	22.0	19.5	17.0
WIND ZONE 2	LIGHT	S26L2	26	23	250	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S30L2	30	23	290	20.0	14.0	11.5	9.5	18.5	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	9.5	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	24.5	16.0	13.0	10.5	21.0	18.5	16.0
		S35H2	35	29	485	25.5	16.5	13.5	11.0	21.5	19.0	16.5
WIND ZONE 3	LIGHT	S26L2	26	23	250	18.5	13.0	10.5	9.0	17.5	15.0	13.5
		S30L2	30	23	290	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S35L2	35	23	315	20.0	14.0	11.5	9.5	18.5	16.0	14.5
	HEAVY	S30H2	30	29	415	23.0	15.5	12.5	10.0	20.5	17.5	16.0
		S35H2	35	29	485	24.0	16.0	13.0	10.5	21.0	18.0	16.5
WIND ZONE 4	LIGHT	S26L1	26	22	195	18.0	13.0	10.5	9.0	16.5	14.5	13.0
		S30L1	30	22	225	18.5	13.0	10.5	9.0	17.0	15.0	13.5
		S35L1	35	22	255	19.0	13.5	11.0	9.0	17.5	15.5	14.0
	HEAVY	S30H1	30	25	330	22.0	15.0	12.0	9.5	19.5	17.0	15.0
		S35H1	35	25	385	23.0	15.5	12.5	10.0	20.0	17.5	15.5
WIND ZONE 5	LIGHT	S26L2	26	23	250	19.0	13.5	10.5	9.0	17.5	15.5	13.5
		S30L2	30	23	290	20.0	14.0	11.0	9.5	18.0	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	10.0	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	23.5	15.5	12.5	10.5	21.0	18.0	16.0
		S35H2	35	29	485	25.0	16.5	13.0	11.0	21.5	18.5	16.5

Concrete Volume (cubic yards) = .356 X L

Fabrication Design Notes:

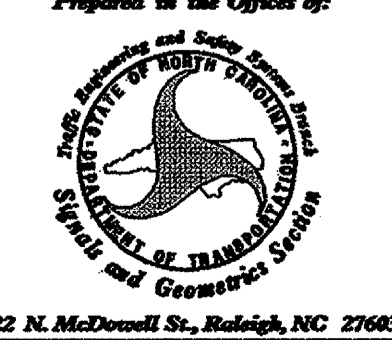
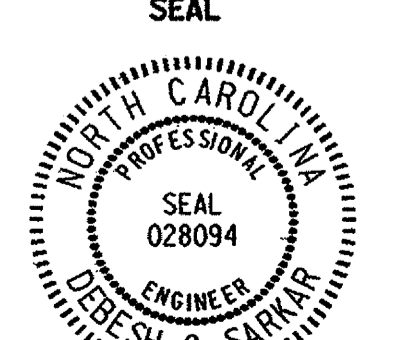
1. Values shown in "Moment at the Pole Base" column represents the minimum acceptable capacity allowable for design using a design CSR of 1.
2. Base plate thickness (T) is 2.0 inches.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from sheet M 1.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate pole case load number from the plans or from the Engineer.
5. Select the appropriate column in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case. The foundation depth is the value where the column and the row intersect.

Standard Strain Poles

02-SEP-2005 12:42 vr:peaco es-un1*workgroups004 metal pole standard0204 mb etd strain pole.dgn

	Standard Strain Poles and Standard Foundations		
	PLAN DATE: May 2005	REVIEWED BY: C.F. Andrews		REVISIONS:
PREPARED BY: P.L. Alexander		REVIEWED BY: A.M. Esposito	SCALE: None
222 N. McDowell St., Raleigh, NC 27603		INIT.	DATE
None		<i>D. Sarkar</i>	9.2.2005