



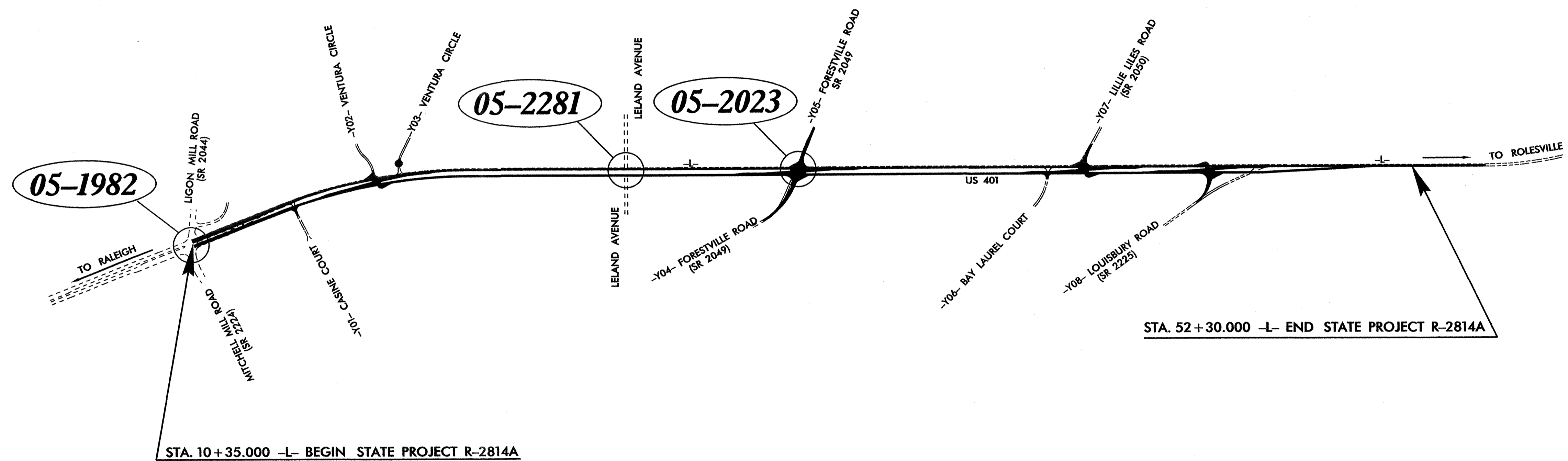
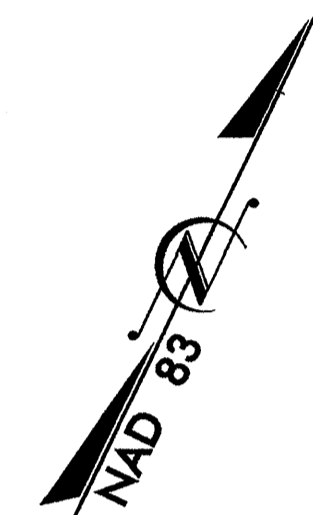
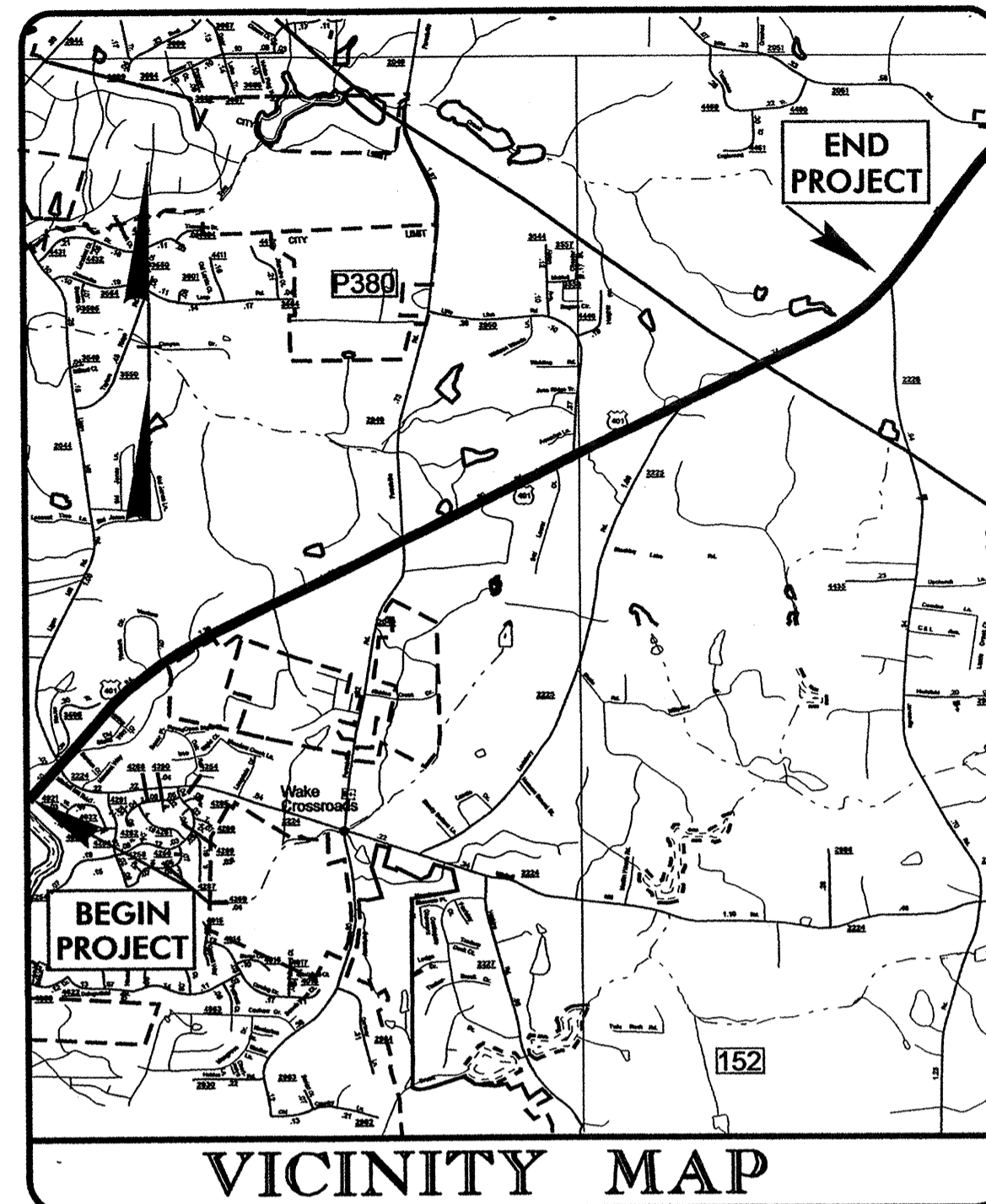
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

**LOCATION: RALEIGH - US 401 (LOUISBURG ROAD)
FROM SR 2044 (LIGON MILL ROAD) TO
NORTH OF SR 2225 (LOUISBURY ROAD)**

**TYPE OF WORK: TRAFFIC SIGNALS &
COMMUNICATIONS CABLE ROUTING PLANS**

Project: R-2814A



Refer to "Roadway Standard Drawings
NCDOT" dated July 2006 and
"Standard Specifications for Roads
and Structures" dated July 2006.

Index of Plans

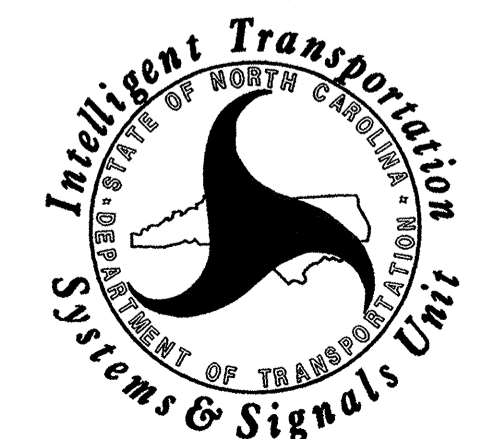
Sheet #	Reference #	Location/Description
Sig. 1	-----	Title Sheet
Sig. 2-7	05-1982	US 401 (Louisburg Road) at SR 2044 (Ligon Mill Road)/SR 2224 (Mitchell Mill Road)
Sig. 8-13	05-2281	US 401 (Louisburg Road) at Leland Avenue
Sig. 14-19	05-2023	US 401 (Louisburg Road) at SR 2049 (Forestville Road)
Sig. 20-22	-----	Inductive Detection Loops Details
Sig. 23-29	-----	Communications Cable Routing Details

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

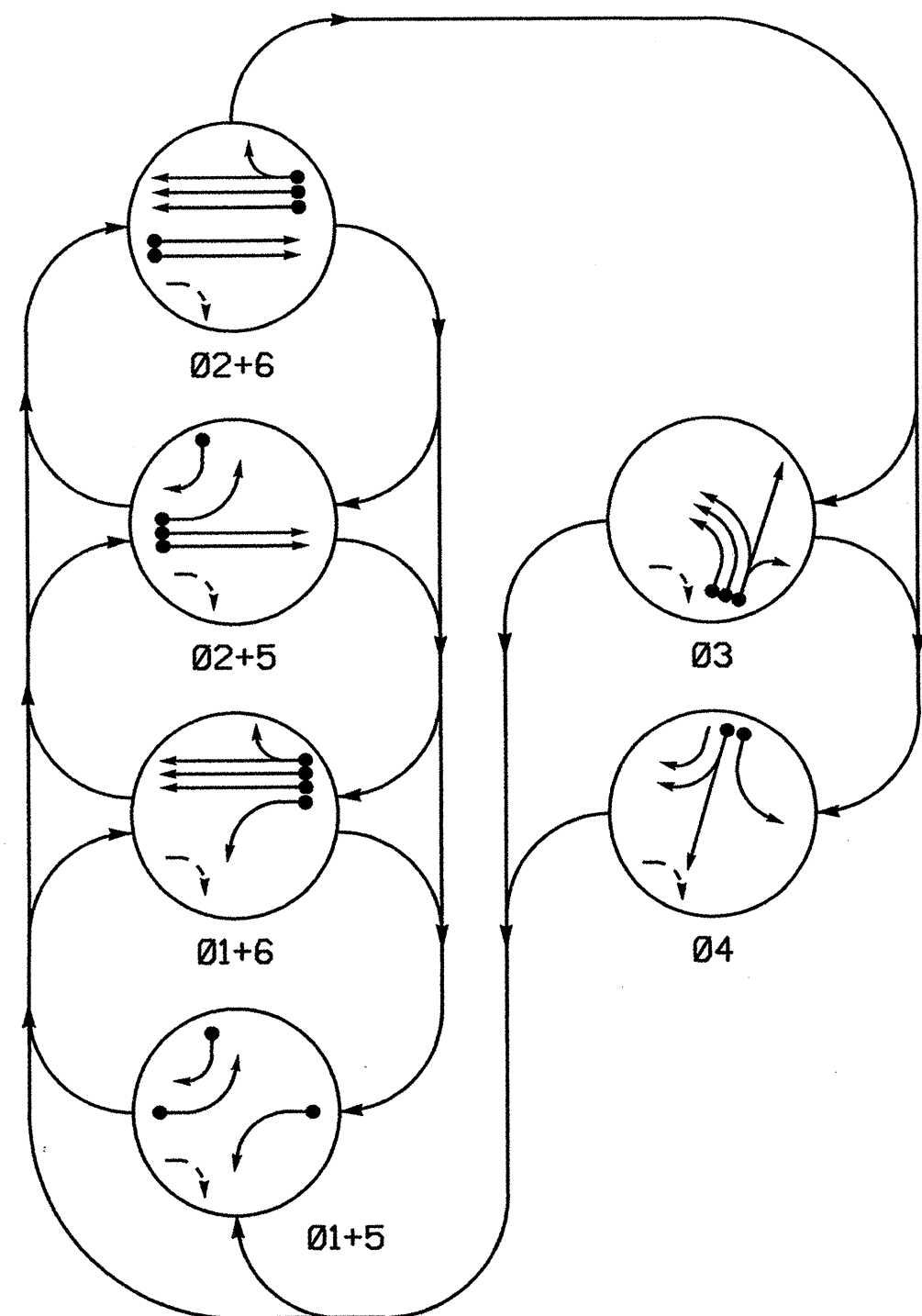
Robert J. Ziembra, PE - Central Region Signals Project Engineer
George C. Brown, PE - Signal Equipment Design Engineer
I. Neil Avery - Signal Communications Project Engineer

Prepared in the Office of:
DIVISION OF HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS
BRANCH



WBS: 34506.1.1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- ◄● DETECTED MOVEMENT
- ◄◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄-- UNSIGNALIZED MOVEMENT
- ◄~ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE						
	Ø 1 1+5	Ø 2 2+5	Ø 3 3	Ø 4 4	Ø 5 5	Ø 6 6	F
Ø 2+6							
Ø 2+5							
Ø 1+6							
Ø 1+5							

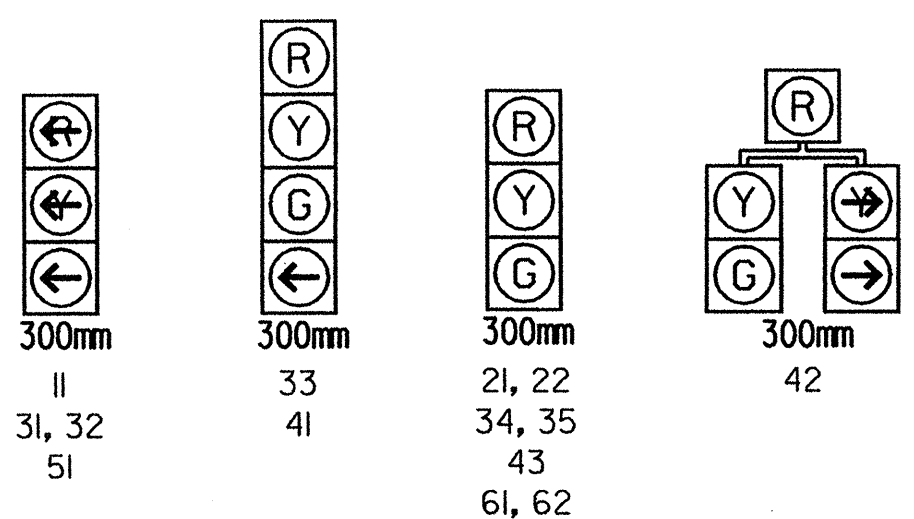
Ø 21, 22	R	R	G	G	R	R	Y
Ø 31, 32	R	R	R	R			
Ø 33	R	R	R	R	G	R	R
Ø 34, 35	R	R	R	R	G	R	R
Ø 41	R	R	R	R	R	G	R
Ø 42	R	R	R	R	R	G	R
Ø 43	R	R	R	R	R	G	R
Ø 51	R	R	R	R	R	R	R
Ø 61, 62	R	G	R	G	R	R	Y

LOOP & DETECTOR UNIT INSTALLATION CHART

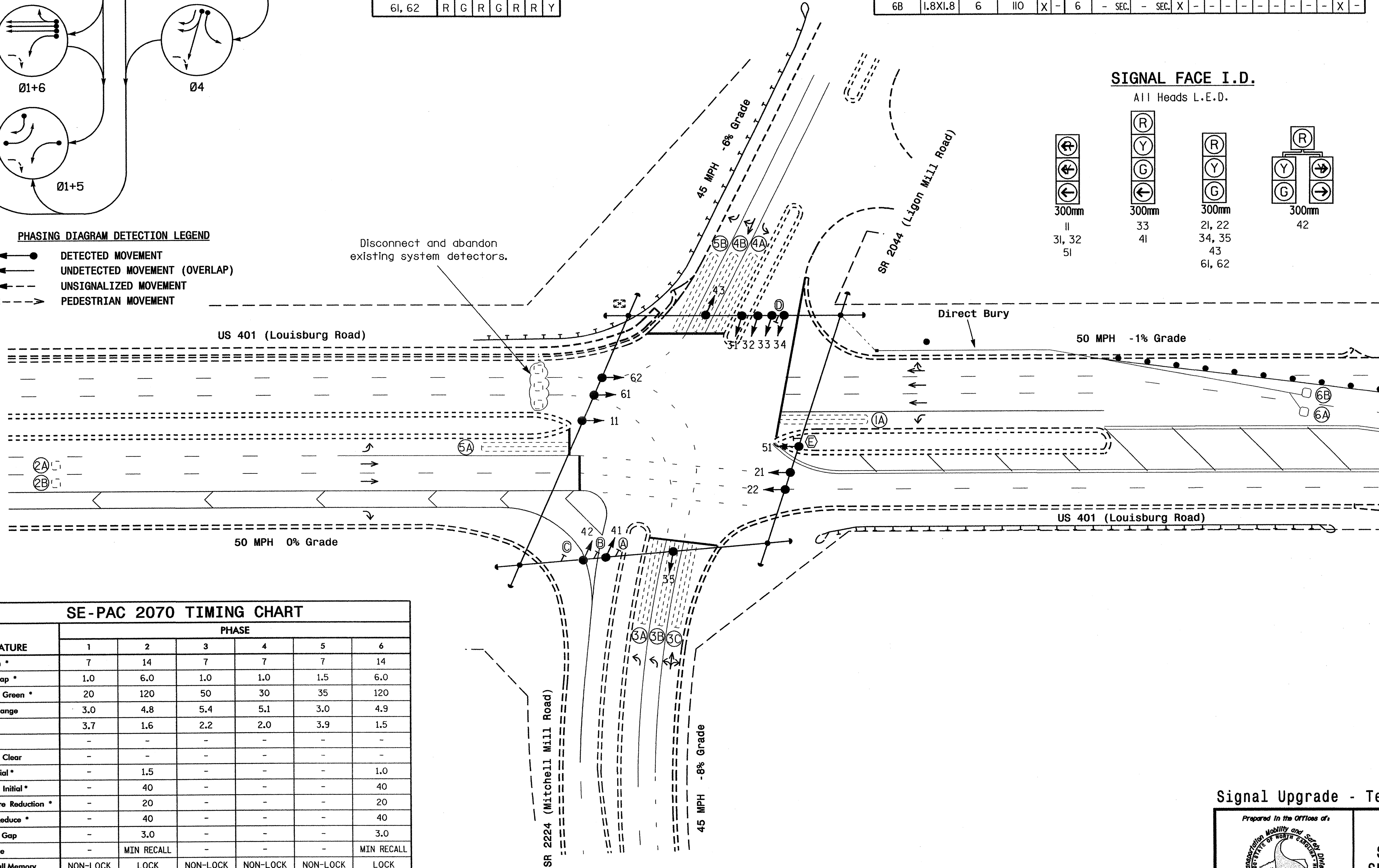
LOOP NO.	SIZE (m)	TURNS	DIST. FROM STOPBAR (m)	NEW	EXISTING	DETECTOR PROGRAMMING																
						ASSIGNED PHASE	TIMING		OPERATION MODE							SYSTEM		STATUS				
							DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	1 CALL	STOP A	STOP B	PROTECT LEFT TURN	PROTECT THROUGH	SWITCH AND	SYSTEM	NEW	EXISTING			
1A	1.8X1.8	2-4-2	0	-	X	1	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2A	1.8X1.8	EXIST	110	-	X	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2B	1.8X1.8	EXIST	110	-	X	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3A	1.8X1.8	2-4-2	0	-	X	3	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3B	1.8X1.8	2-4-2	0	-	X	3	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3C	1.8X1.8	2-4-2	0	-	X	3	10	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4A	1.8X1.8	2-4-2	0	-	X	4	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4B	1.8X1.8	2-4-2	0	-	X	4	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5A	1.8X1.8	2-4-2	0	-	X	5	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5B	1.8X1.8	2-4-2	0	-	X	5	15	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6A	1.8X1.8	6	110	X	-	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6B	1.8X1.8	6	110	X	-	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	X

SIGNAL FACE I.D.

All Heads L.E.D.



Disconnect and abandon existing system detectors.



SE-PAC 2070 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	14	7	7	7	14
Passage Gap *	1.0	6.0	1.0	1.0	1.5	6.0
Maximum Green *	20	120	50	30	35	120
Yellow Change	3.0	4.8	5.4	5.1	3.0	4.9
Red Clear	3.7	1.6	2.2	2.0	3.9	1.5
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	-	1.5	-	-	-	1.0
Maximum Initial *	-	40	-	-	-	40
Time Before Reduction *	-	20	-	-	-	20
Time To Reduce *	-	40	-	-	-	40
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK
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.

LEGEND

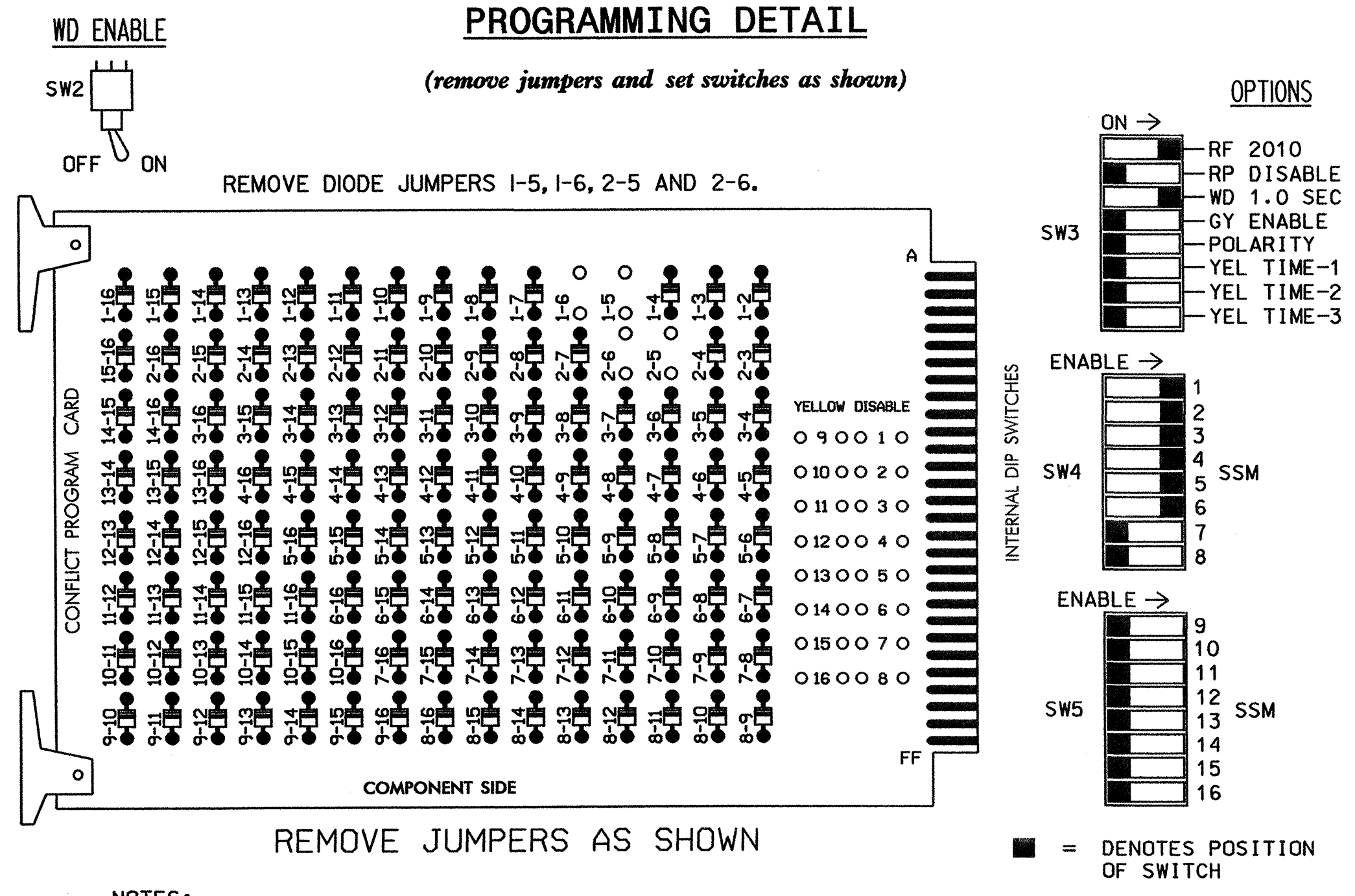
- | PROPOSED | EXISTING | |
|----------|----------|---|
| ○ | ● | Traffic Signal Head |
| ○ | N/A | Modified Signal Head |
| □ | □ | Sign |
| ○ | ○ | Pedestrian Signal Head |
| ○ | ○ | With Push Button & Sign |
| ○ | ○ | Signal Pole with Guy |
| ○ | ○ | Signal Pole with Sidewalk Guy |
| □ | □ | Inductive Loop Detector |
| □ | □ | Controller & Cabinet |
| □ | □ | Junction Box |
| - - - | - - - | 50mm Underground Conduit |
| N/A | - - - | Right of Way with Marker |
| N/A | - - - | Directional Arrow |
| N/A | - - - | Guardrail |
| ● | ● | Construction Zone Drums |
| (A) | (A) | Left Arrow "ONLY" Sign (R3-5L) |
| (B) | (B) | Combined Through and Right Arrow Sign (R3-6R) |
| (C) | (C) | Right Arrow "ONLY" Sign (R3-5R) |
| (D) | (D) | Dual Turn and Through Arrows Sign |
| (E) | (E) | "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) |

Signal Upgrade - Temporary Design 1 Construction Phase II

<p>750 N. Grandfield Pleno, Garner, NC 27529</p> <p>SCALE 1:500</p>	<p>US 401 (Louisburg Road)</p> <p>at</p> <p>SR 2044 (Ligon Mill Road) / SR 2224 (Mitchell Mill Road)</p> <p>Division 5 Wake County Raleigh</p> <p>PLAN DATE: July 2009 REVIEWED BY:</p> <p>PREPARED BY: C.E. Carter REVIEWED BY:</p> <p>REVISIONS</p> <p>INIT. DATE</p> <p>SIGNATURE DATE</p> <p>SIG. INVENTORY NO. 05-1982T1</p>	<p>SEAL</p>
---	---	-------------

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 7,8, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature, on controller unit, for all phases.
- Program phases 2 and 6, on controller unit, for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P				
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED				
SIGNAL HEAD NO.	11	21,22	NU	31,32	33	34,35	41	42,43	NU	42	51	61,62	NU	NU	NU	NU
RED		128		116	116	101	101					134				
YELLOW		129		117	117	102	102					135				
GREEN		130		118	118	103	103					136				
RED ARROW	125			116								131				
YELLOW ARROW	126			117								132	132			
GREEN ARROW	127			118	118		103					133	133			

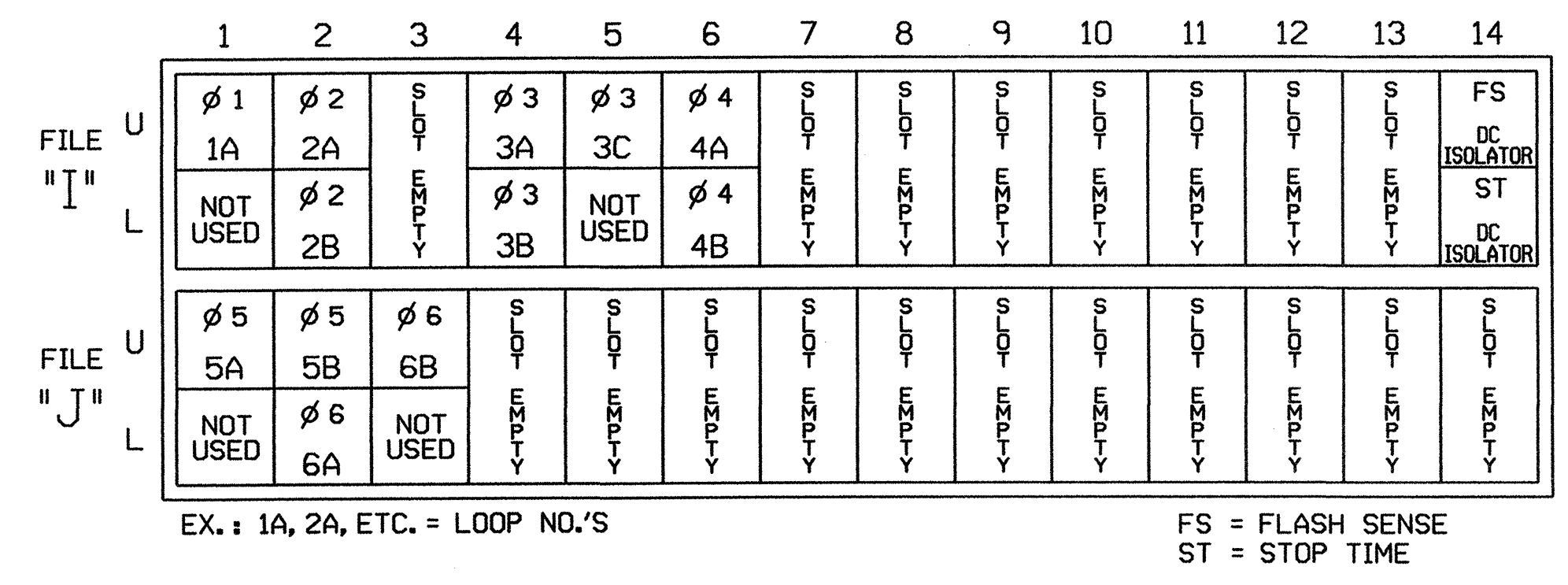
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....EXISTING 2070L
 CABINET.....EXISTING 332
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6
 PHASES USED.....1,2,3,4,5,6
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

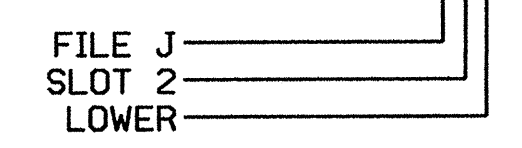
(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1		
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
3A	TB4-1,2	I4U	47	7	3		
3B	TB4-3,4	I4L	47	7	3		
3C	TB4-5,6	I5U	58	9	3	10	
4A	TB4-9,10	I6U	41	11	4		
4B	TB4-11,12	I6L	45	12	4		
5A	TB3-1,2	J1U	55	19	5		
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-7,8	J2L	44	22	6		
6B	TB3-9,10	J3U	64	23	6		

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1982T1
 DESIGNED: July 2009
 SEALED: 08-13-09
 REVISED: N/A

Signal Upgrade - Temporary Design 1 - Construction Phase II

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 401 (Louisburg Road) at SR 2044 (Ligon Mill Road) / SR 2224 (Mitchell Mill Road)

Division 05 Wake County Raleigh

PLAN DATE: August 2009 REVIEWED BY: T. J. J. J.

PREPARED BY: S. Armstrong REVIEWED BY: T. J. J. J.

REVISIONS: INIT. DATE

750 H. Grantfield Pkwy, Garner, NC 27529

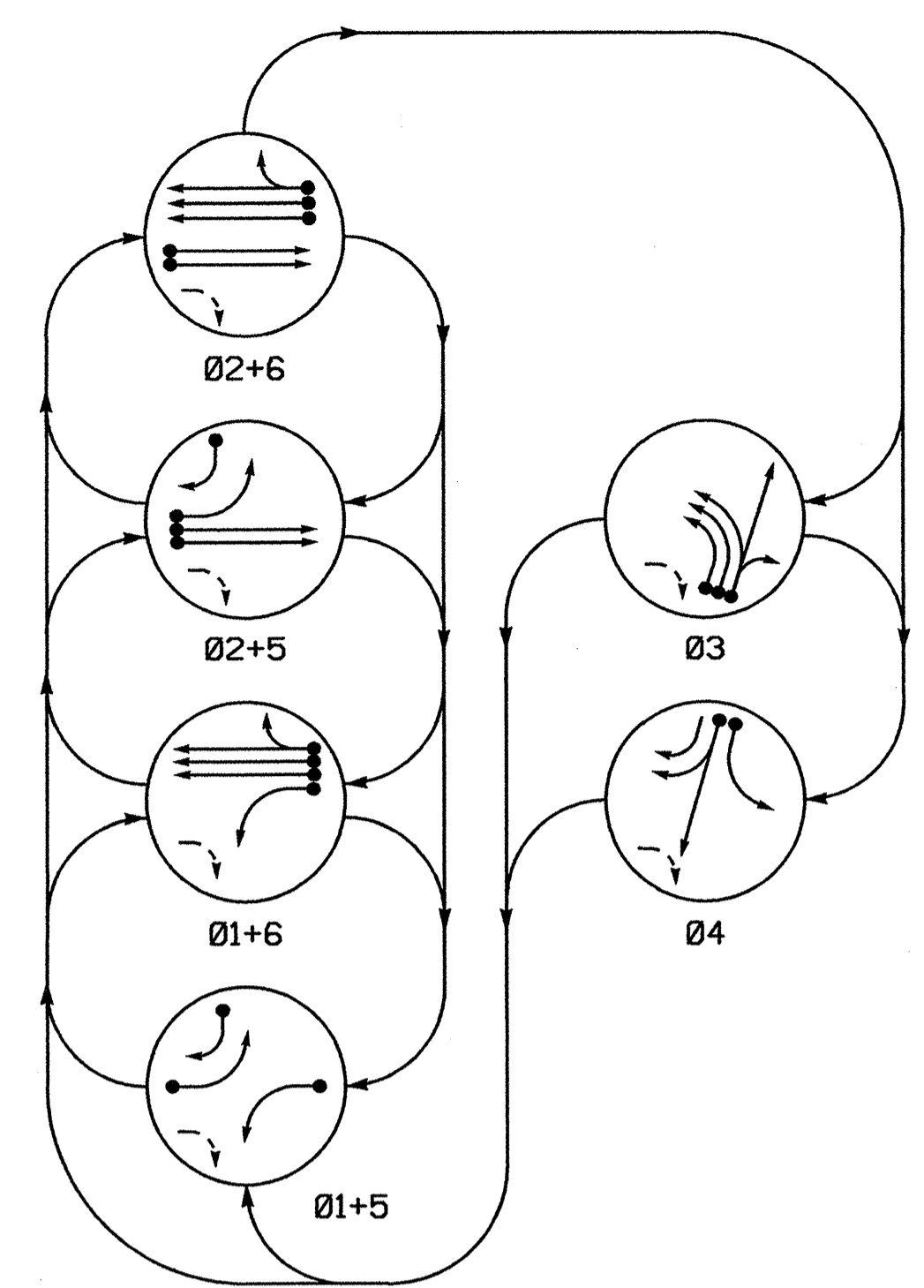
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

Signature: George C. Brown DATE: 8/18/09

SIG. INVENTORY NO. 05-1982T1

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	←	←	←	←	←	←
21, 22	R	R	G	G	R	R
31, 32	←	←	←	←	←	←
33	R	R	R	R	G	R
34, 35	R	R	R	R	G	R
41	R	R	R	R	R	G
42	R	R	R	R	R	G
43	R	R	R	R	R	G
51	←	←	←	←	←	←
61, 62	R	G	R	G	R	Y

LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

LOOP NO.	SIZE (m)	TURNS	DIST. FROM STOPBAR (m)	NEW	EXISTING	ASSIGNED PHASE	DETECTOR PROGRAMMING																		
							DELAY	EXTEND (STRETCH)	OPERATION MODE							SWITCH	SYSTEM	NEW	EXISTING						
									VEHICLE	PEDESTRIAN	1 CALL	2 STOP	3 STOP	4 STOP	5 STOP					6 STOP	7 STOP				
1A	1.8X1.8	2-4-2	0	-	X	1	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
2A	1.8X1.8	EXIST	110	-	X	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
2B	1.8X1.8	EXIST	110	-	X	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
3A	1.8X1.8	2-4-2	0	-	X	3	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
3B	1.8X1.8	2-4-2	0	-	X	3	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
3C	1.8X1.8	2-4-2	0	-	X	3	10	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
4A	1.8X1.8	2-4-2	0	-	X	4	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
4B	1.8X1.8	2-4-2	0	-	X	4	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
5A	1.8X1.8	2-4-2	0	-	X	5	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
5B	1.8X1.8	2-4-2	0	-	X	5	15	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
6B	1.8X1.8	6	110	X	-	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
6C	1.8X1.8	6	110	X	-	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X

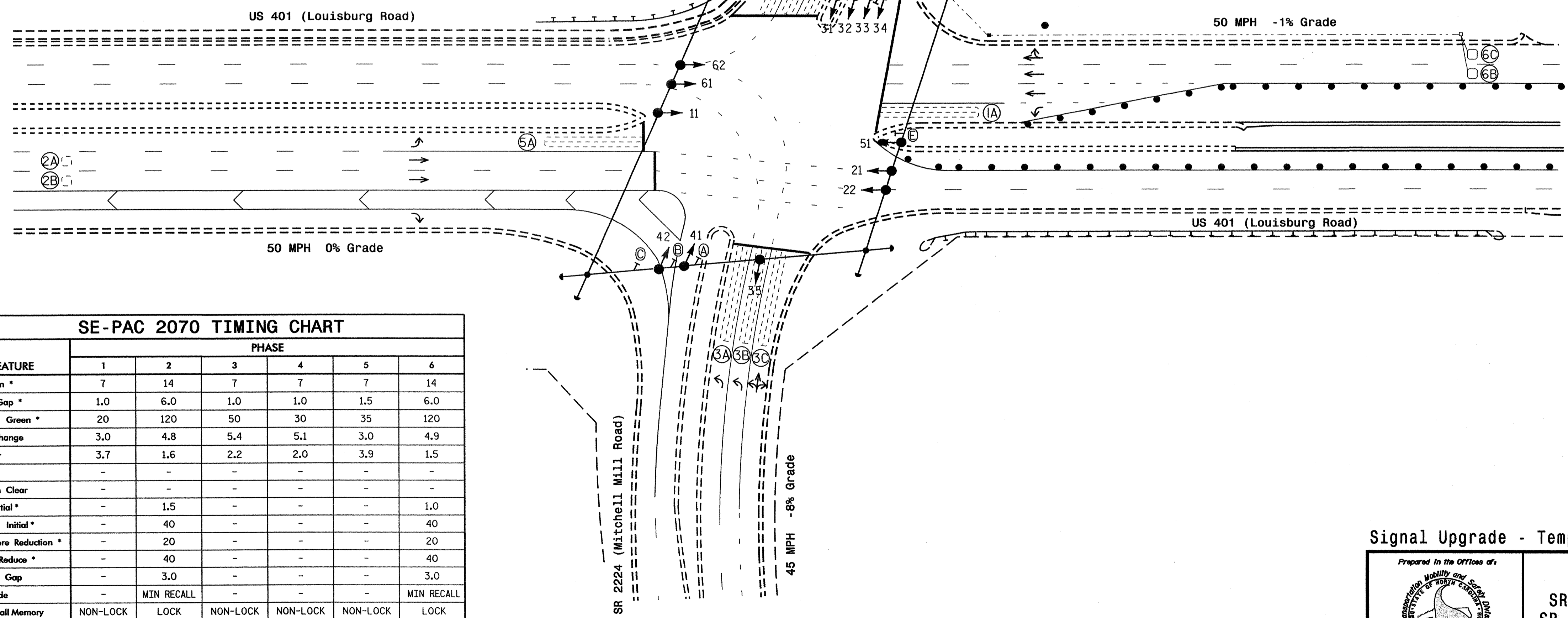
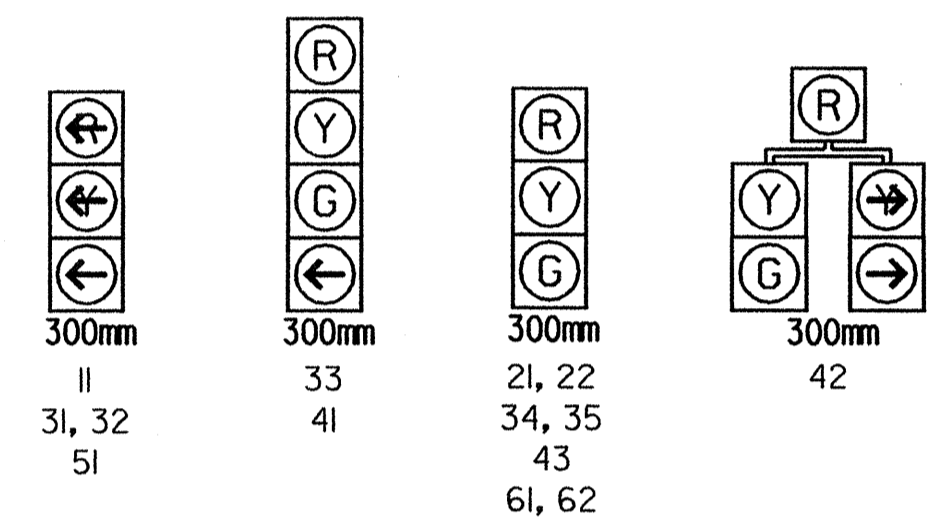
6 Phase Fully Actuated (Raleigh Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 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.

SIGNAL FACE I.D.

All Heads L.E.D.



SE-PAC 2070 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green *	7	14	7	7	7	14
Passage Gap *	1.0	6.0	1.0	1.0	1.5	6.0
Maximum Green *	20	120	50	30	35	120
Yellow Change	3.0	4.8	5.4	5.1	3.0	4.9
Red Clear	3.7	1.6	2.2	2.0	3.9	1.5
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	-	1.5	-	-	-	1.0
Maximum Initial *	-	40	-	-	-	40
Time Before Reduction *	-	20	-	-	-	20
Time To Reduce *	-	40	-	-	-	40
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK
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.

LEGEND

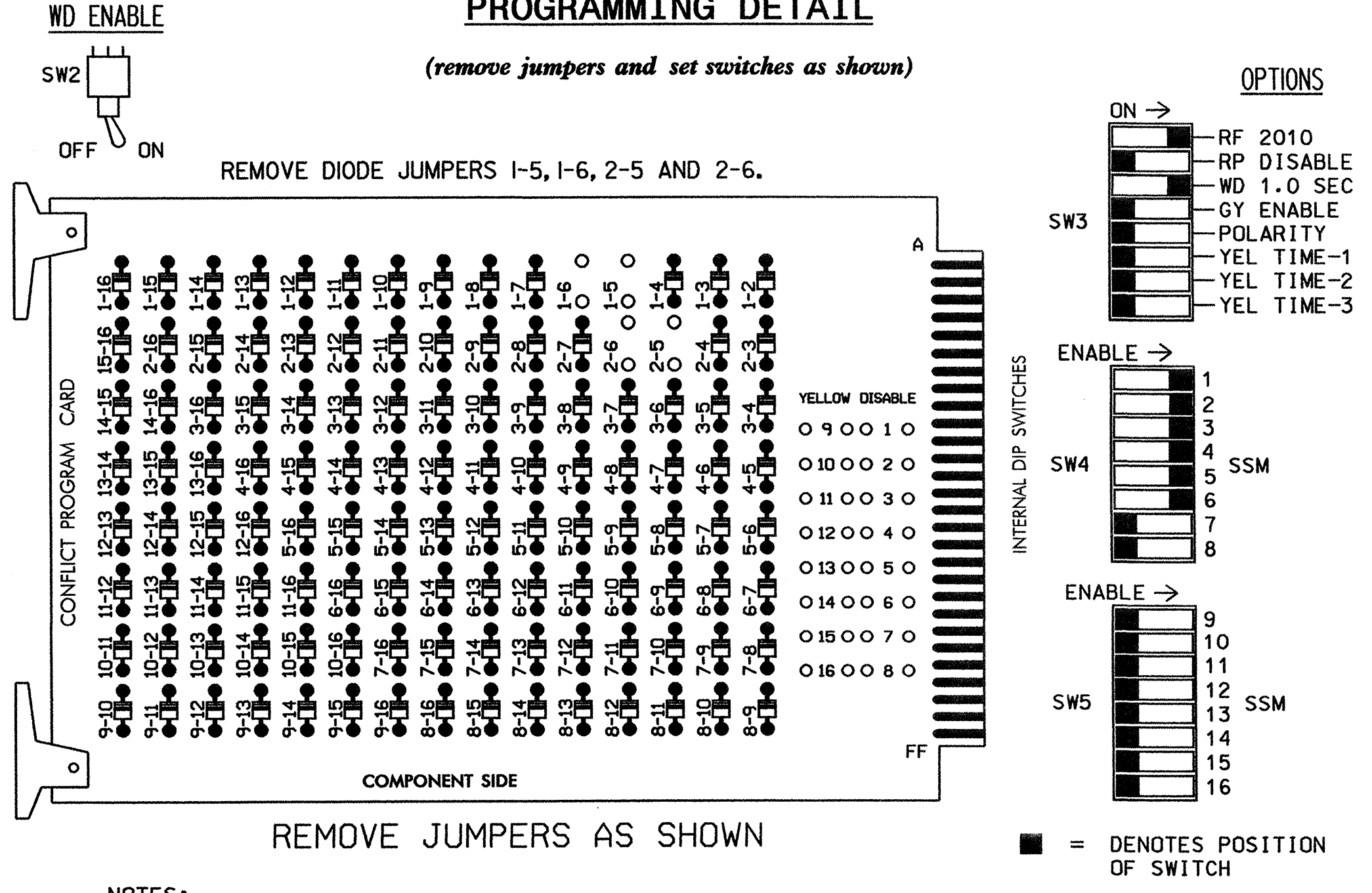
- | PROPOSED | EXISTING |
|---|----------|
| ○→ Traffic Signal Head | ●→ N/A |
| ○→ Modified Signal Head | ○→ N/A |
| ○→ Sign | ○→ N/A |
| ○→ Pedestrian Signal Head With Push Button & Sign | ○→ N/A |
| ○→ Signal Pole with Guy | ○→ N/A |
| ○→ Signal Pole with Sidewalk Guy | ○→ N/A |
| ○→ Inductive Loop Detector | ○→ N/A |
| ○→ Controller & Cabinet | ○→ N/A |
| ○→ Junction Box | ○→ N/A |
| ○→ 50mm Underground Conduit | ○→ N/A |
| ○→ Right of Way with Marker | ○→ N/A |
| ○→ Directional Arrow | ○→ N/A |
| ○→ Guardrail | ○→ N/A |
| ○→ Construction Zone Drums | ○→ N/A |
| ○→ Left Arrow "ONLY" Sign (R3-5L) | ○→ A |
| ○→ Combined Through and Right Arrow Sign (R3-6R) | ○→ B |
| ○→ Right Arrow "ONLY" Sign (R3-5R) | ○→ C |
| ○→ Dual Turn and Through Arrows Sign | ○→ D |
| ○→ "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) | ○→ E |

Signal Upgrade - Temporary Design 2 Construction Phase III

<p>Prepared in the offices of TRANSPORTATION MOBILITY AND SAFETY DIVISION STATE OF NORTH CAROLINA SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>US 401 (Louisburg Road) at SR 2044 (Ligon Mill Road) / SR 2224 (Mitchell Mill Road)</p> <p>Division 5 Wake County Raleigh</p>		<p>SEAL</p> <p>ROBERT J. ZILMER ENGINEER 8/13/09</p>
	<p>PLAN DATE: August 2009</p> <p>PREPARED BY: C.E. Carter</p>	<p>REVIEWED BY:</p>	

13-AUG-2009 16:33 63*118 signal&wkr\grcupst\p_projects\sr-2814\csm\gnol\sm05-1982\051982m.sig_den_20090813.dgn

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature, on controller unit, for all phases.
- Program phases 2 and 6, on controller unit, for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P				
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED				
SIGNAL HEAD NO.	11	21,22	NU	31,32	33	34,35	41	42,43	NU	42	51	61,62	NU	NU	NU	NU
RED		128			116	116	101	101				134				
YELLOW		129			117	117	102	102				135				
GREEN		130			118	118	103	103				136				
RED ARROW	125				116							131				
YELLOW ARROW	126				117							132	132			
GREEN ARROW	127				118	118		103				133	133			

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....EXISTING 2070L
 CABINET.....EXISTING 332
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6
 PHASES USED.....1,2,3,4,5,6
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

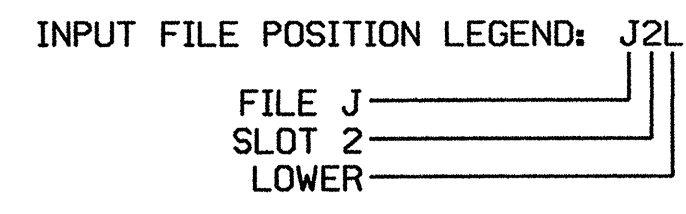
FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 3	∅ 3	∅ 4	S	S	S	S	S	S	S	S	FS
L	1A	2A	3A	3C	4A	-OF	-OF	-OF	-OF	-OF	-OF	-OF	-OF	DC ISOLATOR
	NOT USED	2B	3B	NOT USED	4B	-OF	-OF	-OF	-OF	-OF	-OF	-OF	-OF	ST
														DC ISOLATOR
U	∅ 5	∅ 5	∅ 6	S	S	S	S	S	S	S	S	S	S	S
L	5A	5B	6B	-OF	-OF	-OF	-OF	-OF	-OF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

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

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1		
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
3A	TB4-1,2	I4U	47	7	3		
3B	TB4-3,4	I4L	47	7	3		
3C	TB4-5,6	I5U	58	9	3	10	
4A	TB4-9,10	I6U	41	11	4		
4B	TB4-11,12	I6L	45	12	4		
5A	TB3-1,2	J1U	55	19	5		
5B	TB3-5,6	J2U	40	21	5	15	
6B	TB3-9,10	J3U	64	23	6		
6C	TB3-11,12	J3L	77	24	6		



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1982T2
 DESIGNED: August 2009
 SEALED: 08-13-09
 REVISED: N/A

Signal Upgrade - Temporary Design 2 - Construction Phase III

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 401 (Louisburg Road) at SR 2044 (Ligon Mill Road) / SR 2224 (Mitchell Mill Road)

Division 05 Wake County Raleigh

PLAN DATE: August 2009 REVIEWED BY: T. J. J. PREPARED BY: S. Armstrong

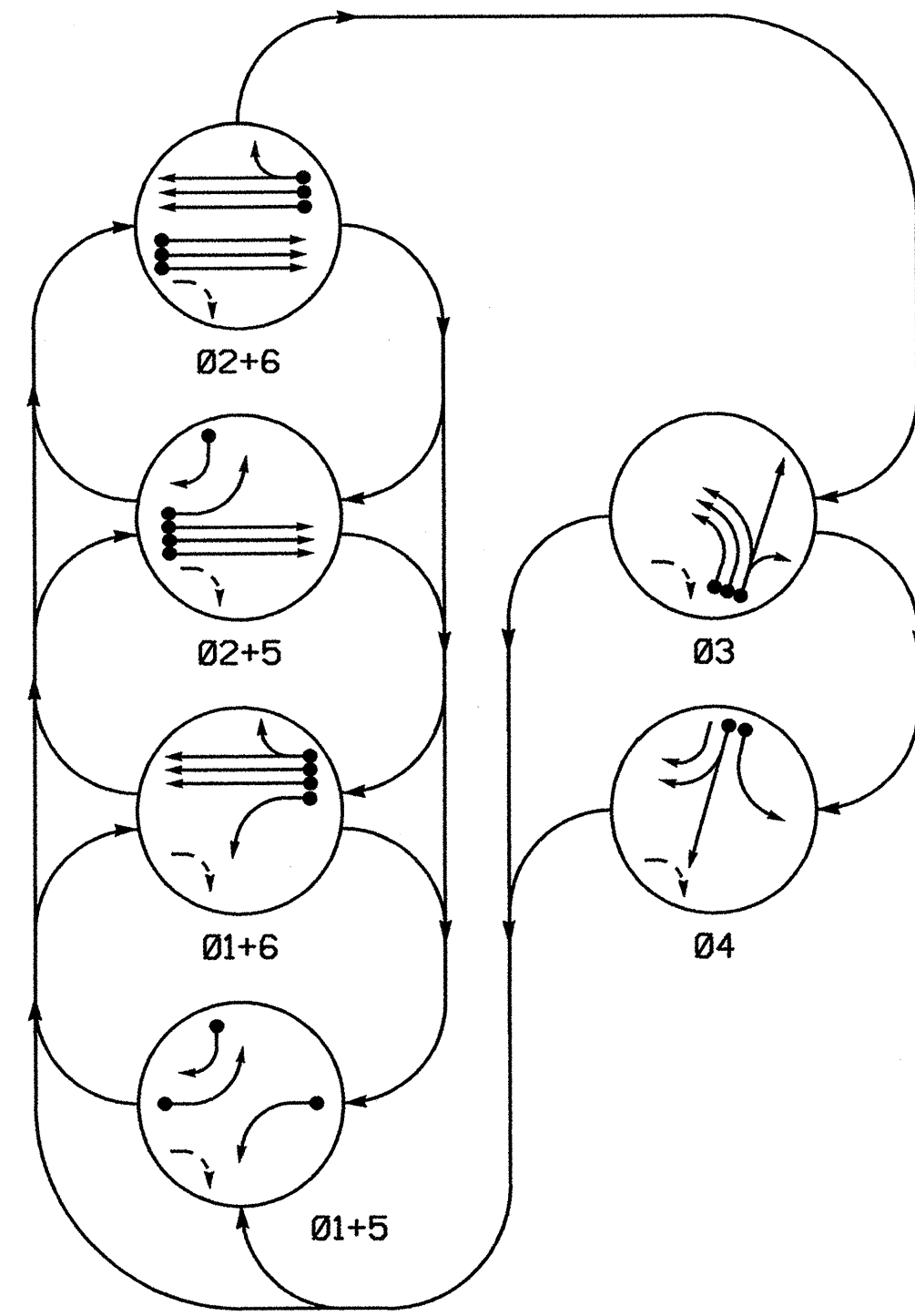
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

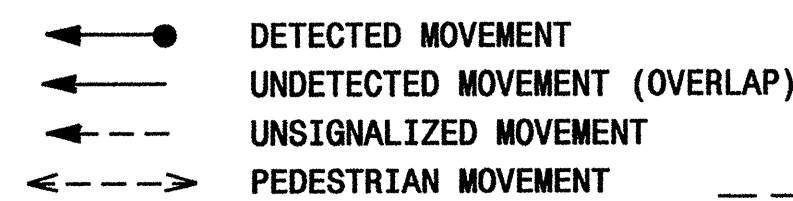
SIG. INVENTORY NO. 05-1982T2

14-AUG-2009 10:24 s:\115\sig\work\kgr\cupas\sig_mon\armstrong\051982T2_sm.le...xxx.dgn sarmsstrong

PHASING DIAGRAM



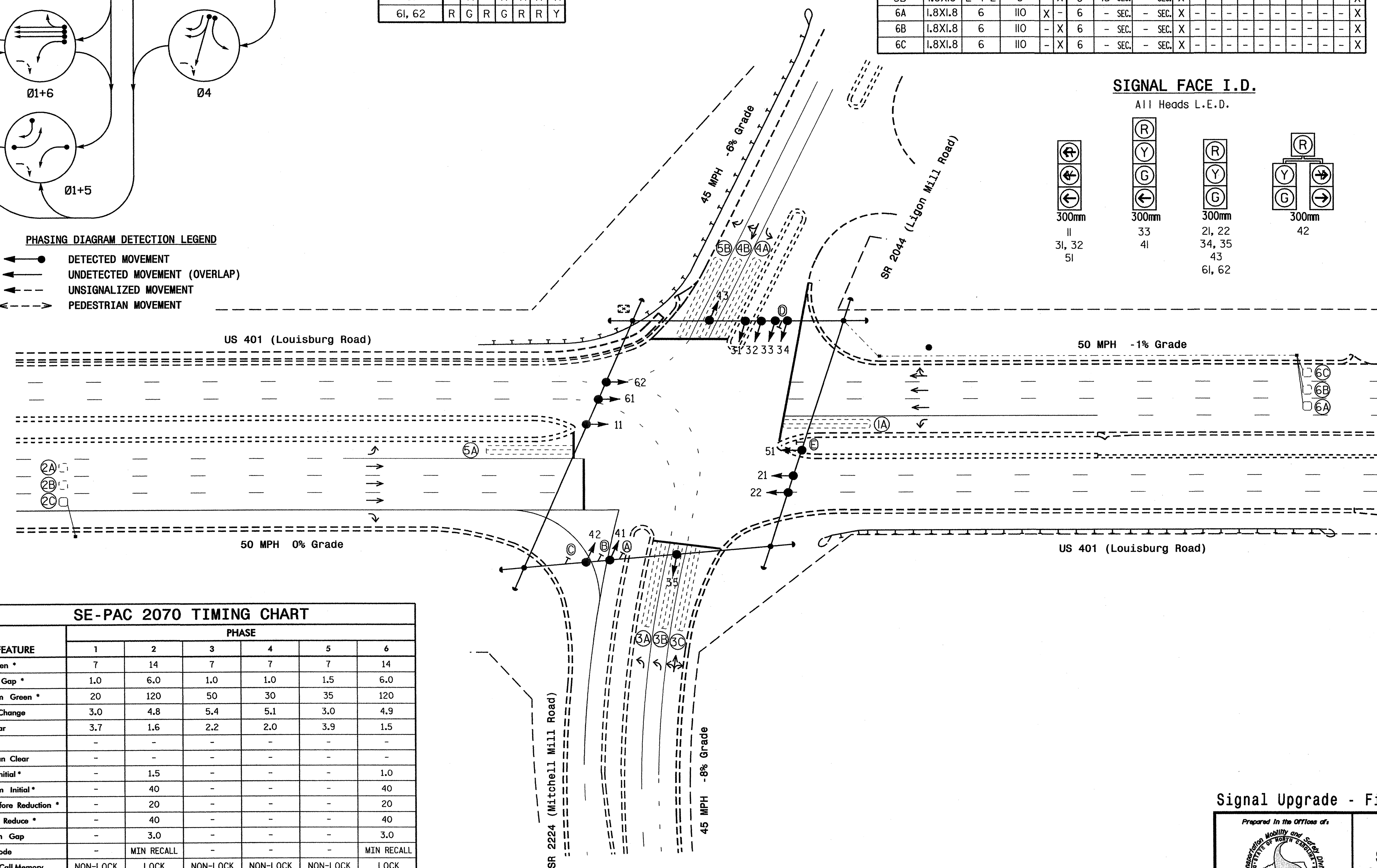
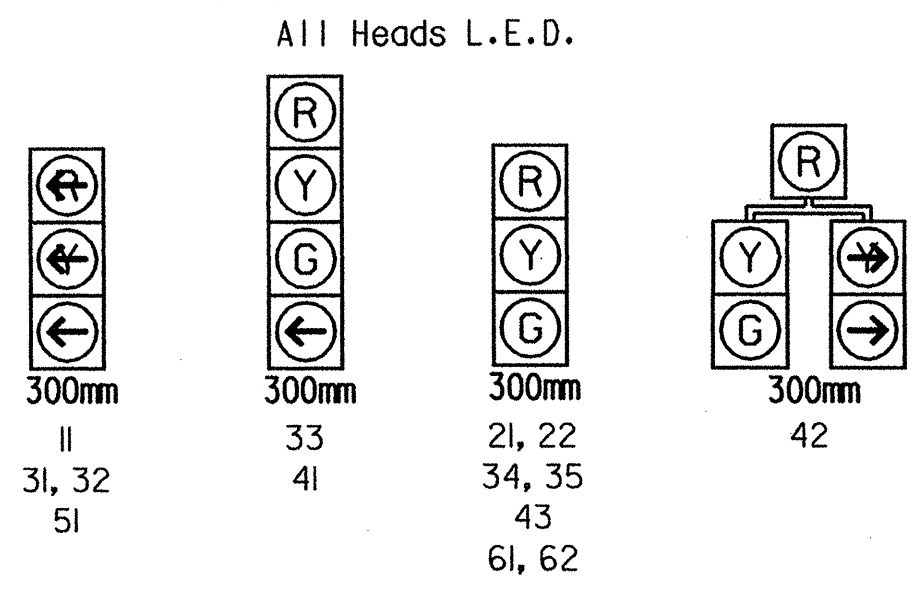
PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE	PHASE					
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 3	Ø 4
11						
21, 22	R	R	G	R	R	Y
31, 32	R	R	R	R	R	R
33	R	R	R	R	G	R
34, 35	R	R	R	R	G	R
41	R	R	R	R	G	R
42	R	R	R	R	R	G
43	R	R	R	R	G	R
51						
61, 62	R	G	R	G	R	Y

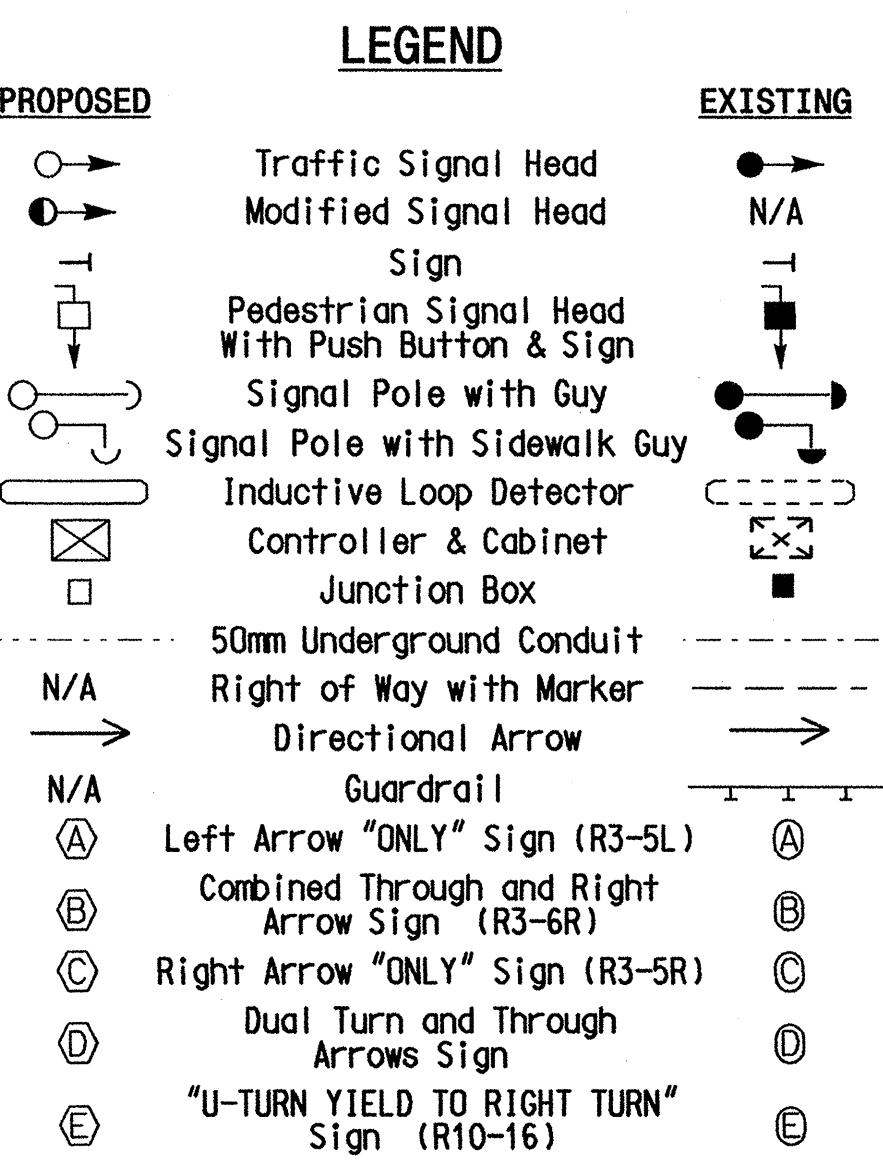
LOOP & DETECTOR UNIT INSTALLATION CHART SE-PAC 2070 CONTROLLER WITH 170 CABINET																			
INDUCTIVE LOOPS								DETECTOR PROGRAMMING											
LOOP NO.	SIZE (m)	TURNS	DIST. FROM STOPBAR (m)	NEW	EXISTING	ASSIGNED PHASE	TIMING		OPERATION MODE							SYSTEM LOOPS	STATUS		
							DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	1 CALL	STOP & GO	PROTECTOR	PROTECTOR THROUGH	AND			SWITCH	NEW
1A	1.8X1.8	2-4-2	0	-	X	1	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
2A	1.8X1.8	EXIST	110	-	X	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
2B	1.8X1.8	EXIST	110	-	X	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
2C	1.8X1.8	5	110	X	-	2	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
3A	1.8X1.8	2-4-2	0	-	X	3	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
3B	1.8X1.8	2-4-2	0	-	X	3	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
3C	1.8X1.8	2-4-2	0	-	X	3	10	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
4A	1.8X1.8	2-4-2	0	-	X	4	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
4B	1.8X1.8	2-4-2	0	-	X	4	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
5A	1.8X1.8	2-4-2	0	-	X	5	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
5B	1.8X1.8	2-4-2	0	-	X	5	15	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
6A	1.8X1.8	6	110	X	-	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
6B	1.8X1.8	6	110	X	-	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X
6C	1.8X1.8	6	110	X	-	6	-	SEC.	-	SEC.	X	-	-	-	-	-	-	-	X

SIGNAL FACE I.D.



FEATURE	SE-PAC 2070 TIMING CHART					
	1	2	3	4	5	6
Min Green *	7	14	7	7	7	14
Passage Gap *	1.0	6.0	1.0	1.0	1.5	6.0
Maximum Green *	20	120	50	30	35	120
Yellow Change	3.0	4.8	5.4	5.1	3.0	4.9
Red Clear	3.7	1.6	2.2	2.0	3.9	1.5
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	-	1.5	-	-	-	1.0
Maximum Initial *	-	40	-	-	-	40
Time Before Reduction *	-	20	-	-	-	20
Time To Reduce *	-	40	-	-	-	40
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK
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.

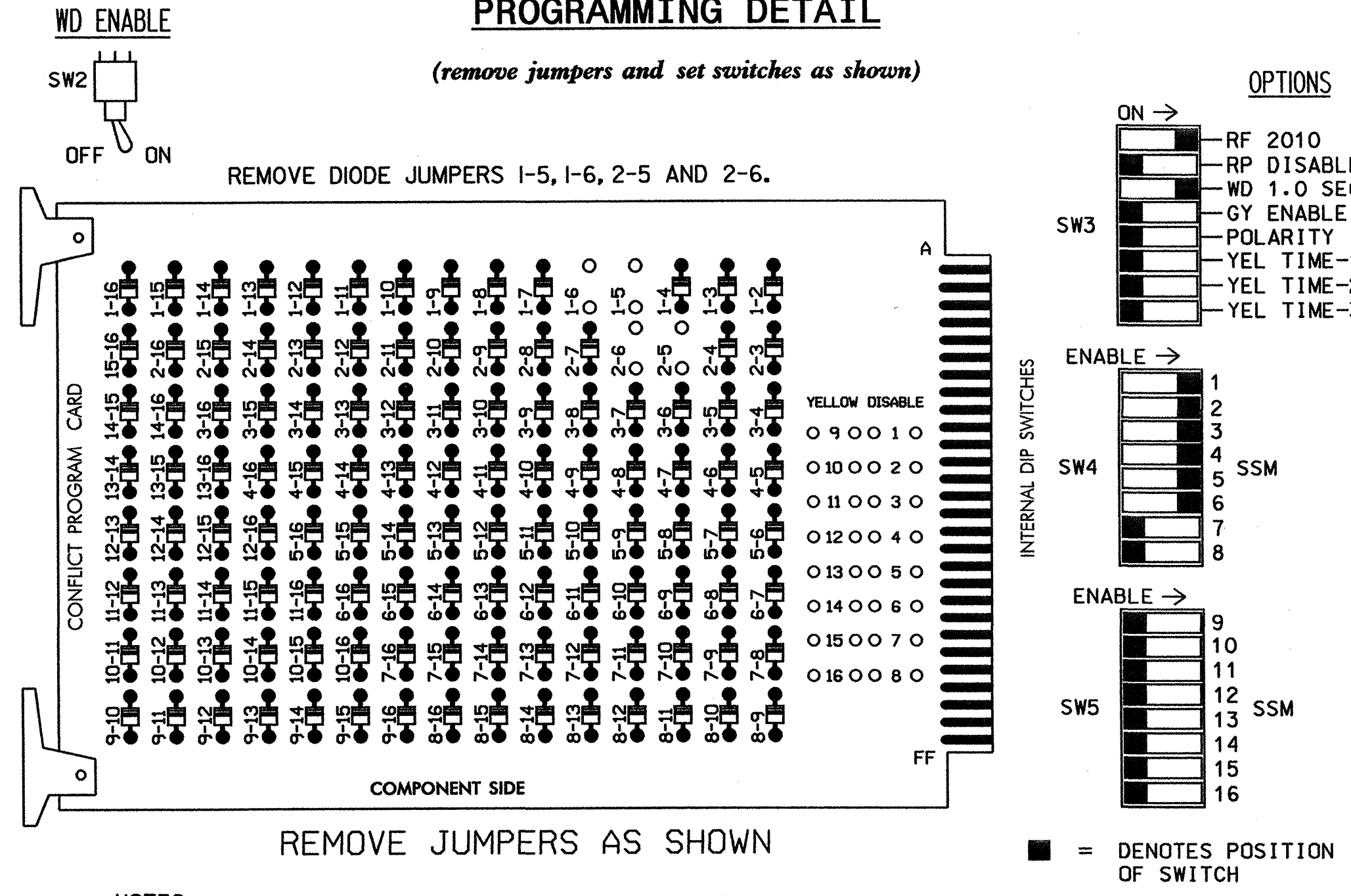


Signal Upgrade - Final Design

	<p>US 401 (Louisburg Road) at SR 2044 (Ligon Mill Road) / SR 2224 (Mitchell Mill Road)</p> <p>Division 5 Wake County Raleigh</p>	<p>SEAL 026486 05/13/09</p>
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>PLANNED BY: C.E. Carter</p>	<p>REVIEWED BY:</p>
<p>SCALE 1:500</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
<p>SIGNATURE DATE</p>		
<p>SIG. INVENTORY NO. 05-1982</p>		

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature, on controller unit, for all phases.
- Program phases 2 and 6, on controller unit, for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P				
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED				
SIGNAL HEAD NO.	11	21,22	NU	31,32	33	34,35	41	42,43	NU	42	51	61,62	NU	NU	NU	NU
RED		128			116	116	101	101				134				
YELLOW		129			117	117	102	102				135				
GREEN		130			118	118	103	103				136				
RED ARROW	125				116							131				
YELLOW ARROW	126				117							132	132			
GREEN ARROW	127				118	118		103				133	133			

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....EXISTING 2070L
 CABINET.....EXISTING 332
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6
 PHASES USED.....1,2,3,4,5,6
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

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

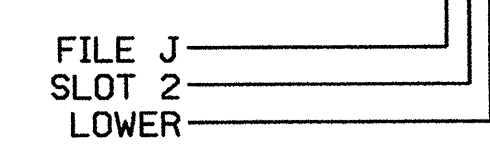
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1		
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
2C	TB2-9,10	I3U	63	5	2		
3A	TB4-1,2	I4U	47	7	3		
3B	TB4-3,4	I4L	47	7	3		
3C	TB4-5,6	I5U	58	9	3	10	
4A	TB4-9,10	I6U	41	11	4		
4B	TB4-11,12	I6L	45	12	4		
5A	TB3-1,2	J1U	55	19	5		
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-7,8	J2L	44	22	6		
6B	TB3-9,10	J3U	64	23	6		
6C	TB3-11,12	J3L	77	24	6		

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1982
 DESIGNED: March 2009
 SEALED: 08-13-09
 REVISED: N/A

Signal Upgrade - Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 401 (Louisburg Road) at SR 2044 (Ligon Mill Road)/ SR 2224 (Mitchell Mill Road)

Division 05 Wake County Raleigh

PLAN DATE: August 2009 REVIEWED BY: T. J. J. J.

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

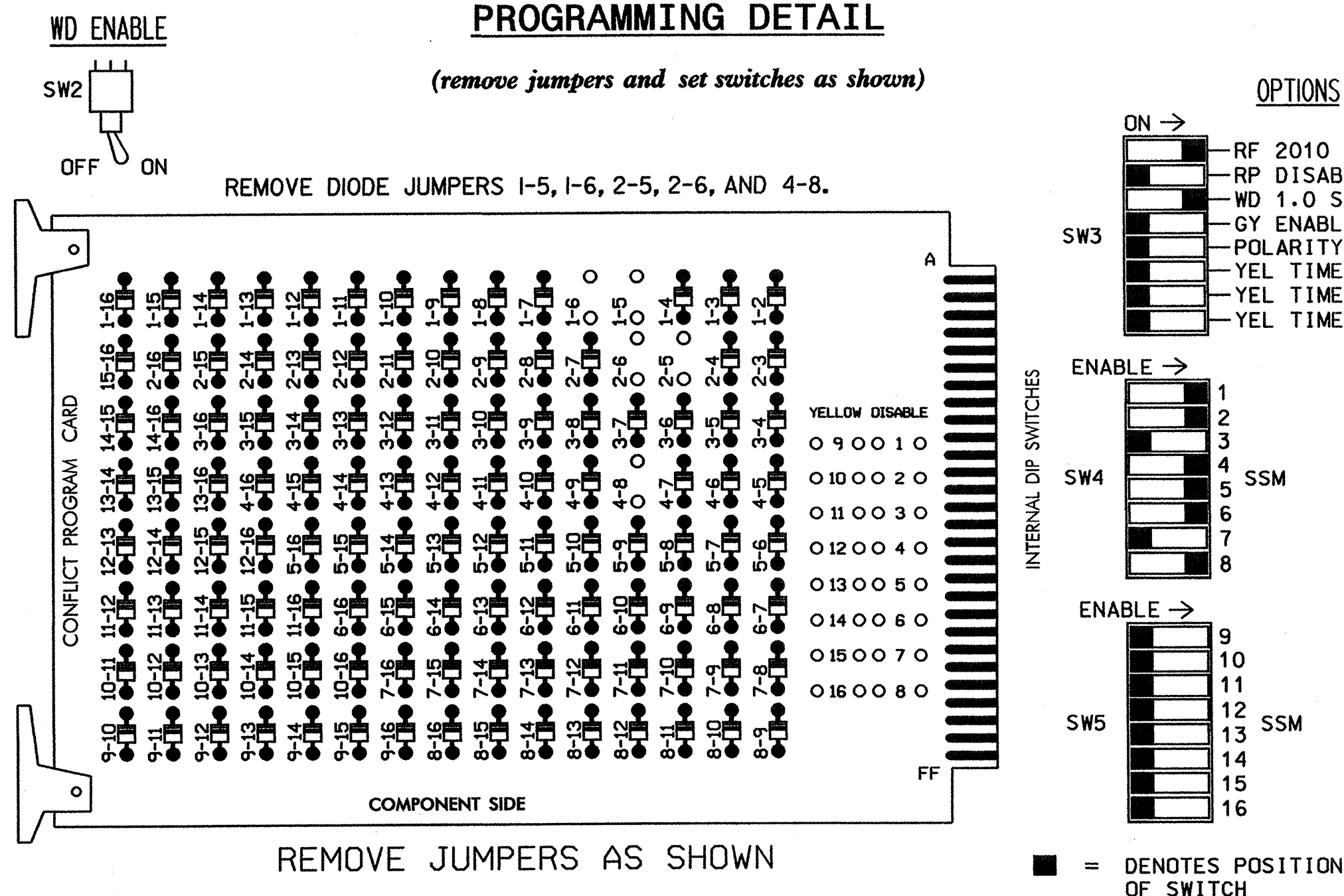
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

SIG. INVENTORY NO. 05-1982

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature, on controller unit, for all phases.
- Program phases 4 and 8, on controller unit, for dual entry.
- Program phases 2 and 6, on controller unit, for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61,82	21,22	NU	NU	41,42	NU	21,42	61,62	NU	NU	81,82	NU
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					
Hand icon												
Person icon												

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....EAGLE 2070L
 CABINET.....EAGLE 332
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8
 PHASES USED.....1,2,4,5,6,8
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14	FILE "J"
U	∅ 1	∅ 2	∅ 1	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	FS
L	1A	2A	1B	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	DC ISOLATOR
U	NOT USED	NOT USED	NOT USED	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	ST
L	5A	6A	5B	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	DC ISOLATOR
	NOT USED	NOT USED	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	

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

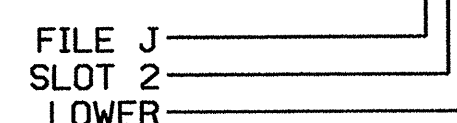
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A ¹	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
1B	TB2-9,10	I3U	63	5	1	15	
	2A	TB2-5,6	I2U	39	3	2	
4A	TB4-9,10	I6U	41	11	4		
5A ²	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-9,10	J3U	64	23	5	15	
5C	TB3-11,12	J3L	77	24	5	15	
6A	TB3-5,6	J2U	40	21	6		
8A	TB5-9,10	J6U	42	31	8	3	

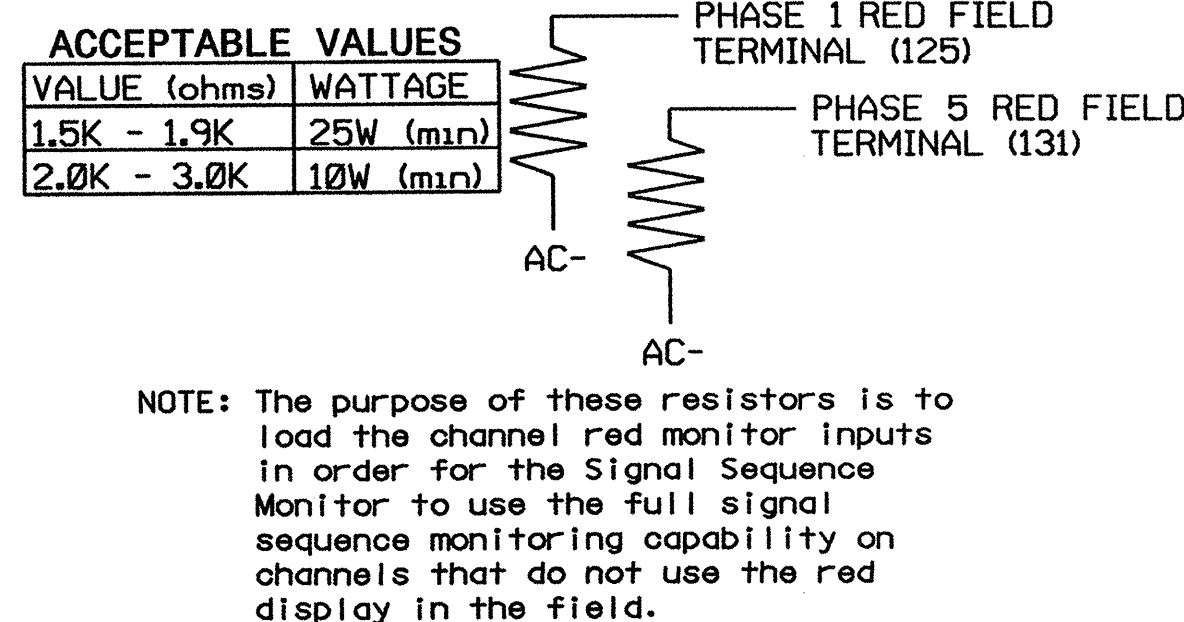
- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.

IMPORTANT - remove jumpers from TB2-5 to TB2-7, TB2-6 to TB2-8, TB3-5 to TB3-7, and TB3-6 to TB3-8 if present.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL



BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

SE-PAC PHASE DATA	PRESS # DESIRED
1-VEHICLE TIMES	6-N. LOCK & MISC
2-DENSITY TIMES	7-SPEC. SEQUENCE
3-PEDEST. TIMES	8-SPEC. DETECTOR
4-INIT & N.A. RESP	9-PHASE COPY
5-V & P RECALLS	0-MISC PED OPTIONS
	F-PRIOR MENU

PHASE.....	1	2	3	4	5	6	7	8
OMIT	2	0	0	0	6	0	0	0
-YEL	0	0	0	0	0	0	0	0
OCAL	4	0	0	0	4	0	0	0

OMIT:### PHS ON OMTS THIS PHASE
 -YEL:### PHS YEL OMTS THIS PHS YEL
 OCAL: WHEN OMIT, DETS CALL### PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

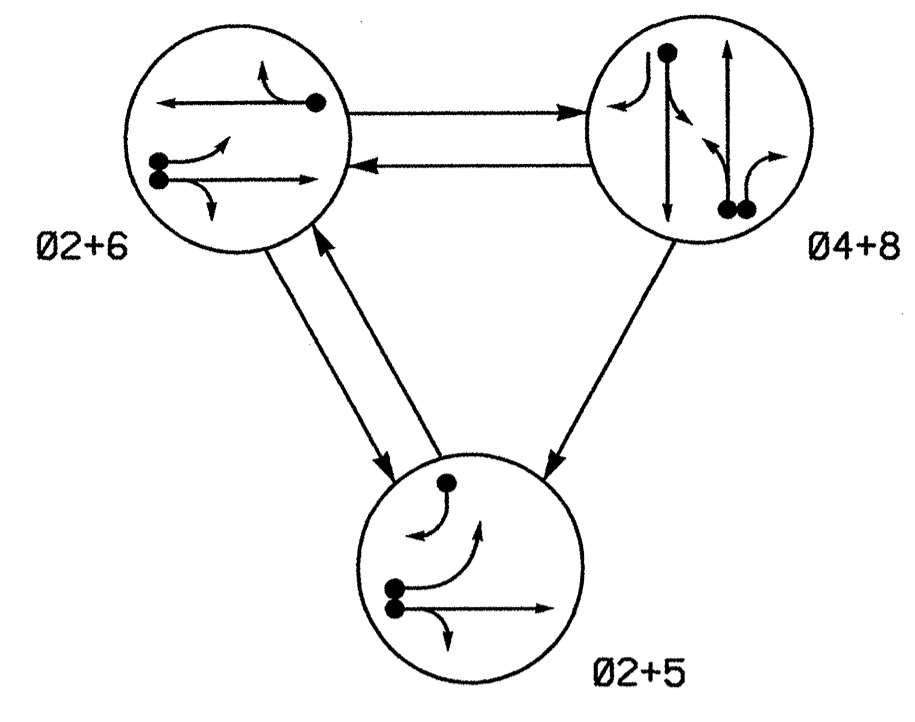
Special Sequence programming complete.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2281T1
 DESIGNED: August 2009
 SEALED: 08-31-09
 REVISED: N/A

Signal Upgrade - Temporary Design 1 - Construction Phase I

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	US 401 (Louisburg Road) at Leland Avenue		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Division 05 Wake County Raleigh PLAN DATE: August 2009 REVIEWED BY: T. J. J. J. PREPARED BY: S. Armstrong REVIEWED BY:	REVISIONS: INIT. DATE SIGNATURE: DATE	
SIG. INVENTORY NO. 05-2281T1			

PHASING DIAGRAM

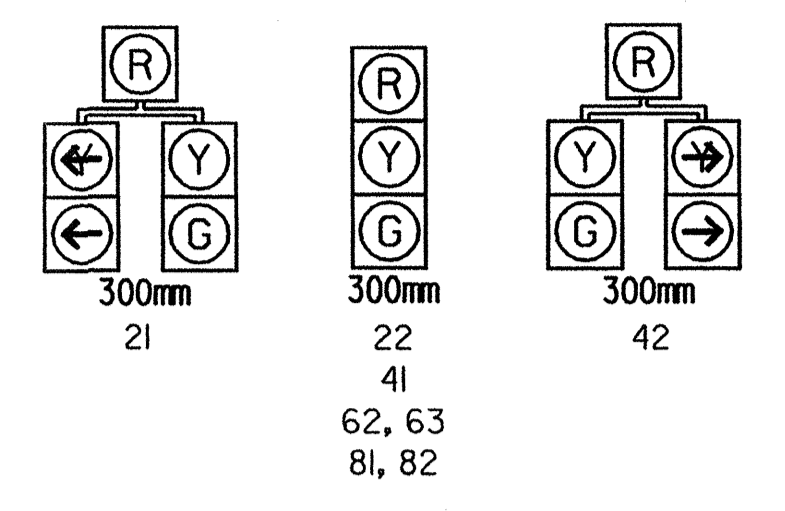


PHASING DIAGRAM DETECTION LEGEND
 ● → DETECTED MOVEMENT
 ○ → UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 - - - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø 2+5	Ø 2+6	Ø 4+8	F L H S	Ø 2+5
21	G	R	Y		
22	G	R	Y		
41	R	G	R		
42	R	G	R		
62, 63	R	G	Y		
81, 82	R	G	R		

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



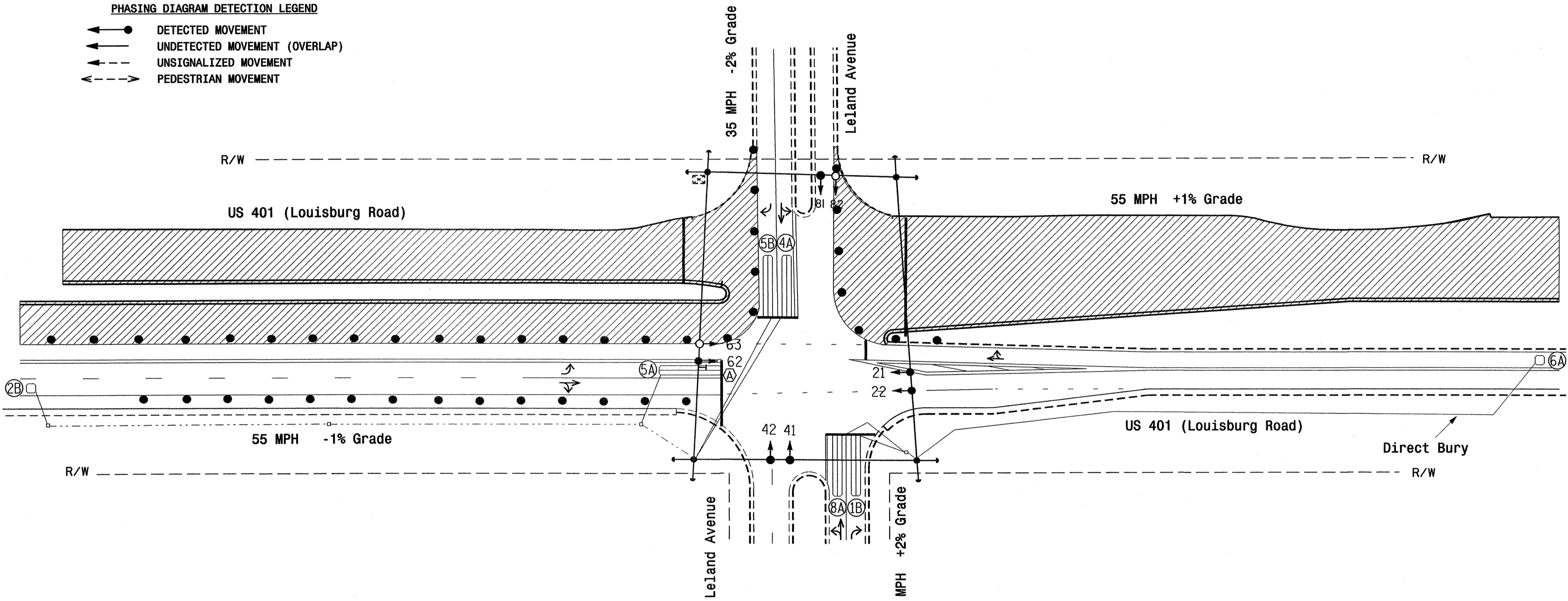
LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

LOOP NO.	SIZE (m)	TURNS	DIST. FROM STOPBAR (m)	NEW	EXISTING	ASSIGNED PHASE	DETECTOR PROGRAMMING											STATUS								
							TIMING		OPERATION MODE											NEW	EXISTING					
							DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	T CALL	STOP A	STOP B	PROPER	PROPER	PROPER	PROPER	AND	SWITCH			SYSTEM				
1B	1.8X12	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-		
2B	1.8X1.8	6	130	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	
4A	1.8X12	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	
5A	1.8X12	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
5B	1.8X12	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
6A	1.8X1.8	6	130	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
8A	1.8X12	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-

3 Phase Fully Actuated (Raleigh Signal System)

NOTES

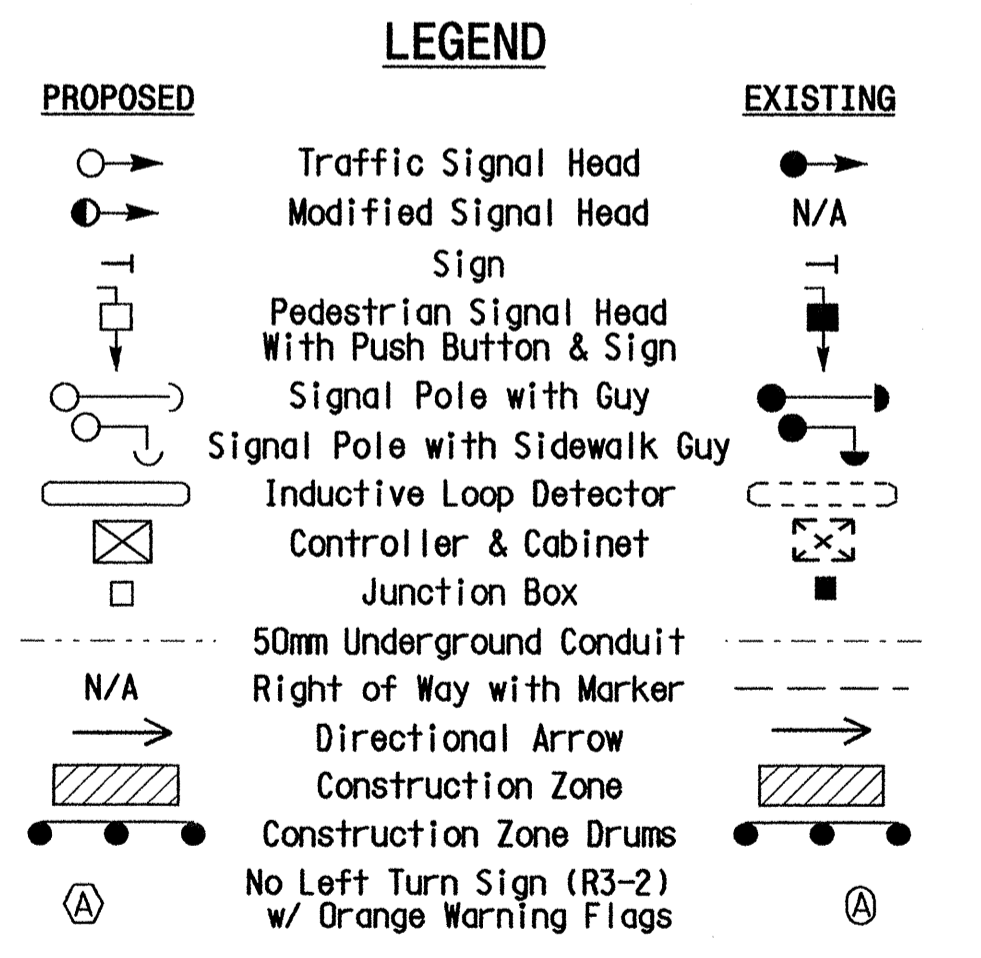
- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Reposition existing signal heads numbered 21, 22, and 62.
- 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.



SE-PAC 2070 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 *	120	30	20	120	30
Yellow Clearance	5.3	3.3	3.0	5.1	3.7
Red Clearance	1.2	2.1	1.8	1.0	1.9
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5	-
Max Variable Initial *	46	-	-	46	-
Time Before Reduction *	20	-	-	20	-
Time To Reduce *	40	-	-	40	-
Minimum Gap	3.4	-	-	3.4	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK
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 2 Construction Phase II

US 401 (Louisburg Road) at Leland Avenue

Division 5 Wake County Raleigh

PLAN DATE: August 2009 REVIEWED BY: [Signature]

PREPARED BY: C.E. Carter REVIEWED BY: [Signature]

SCALE: 1:500

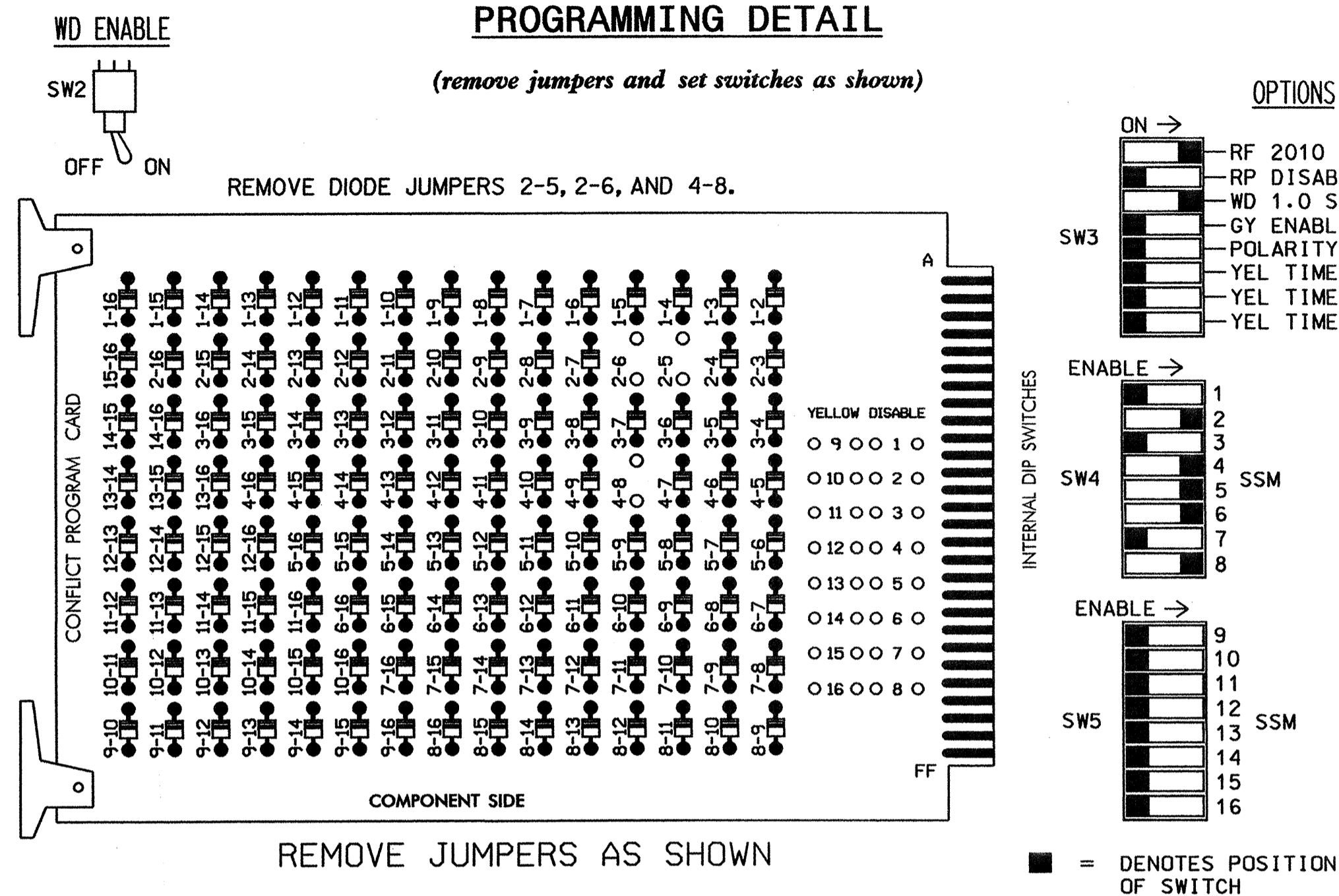
SIGNATURE: [Signature] DATE: 8/31/09

SIG. INVENTORY NO. 05-2281T2

12-OCT-2009 16:08 s:\its\signal\work\groups\11\proj\sectsw-281\louis\louis\05-2281\052281.tbl_sig_dsn_2009xxx.dgn

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on controller unit, for dual entry.
6. Program phases 2 and 6, on controller unit, for volume density operation.
7. The cabinet and controller are part of the Raleigh Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	21,42	62,63	NU	NU	81,82	NU
RED		128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW								132				
GREEN ARROW								133				

NU = Not Used

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

EQUIPMENT INFORMATION

CONTROLLER.....EAGLE 2070L
 CABINET.....EAGLE 332
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S4,S5,S6,S8
 PHASES USED.....2,4,5,6,8
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

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

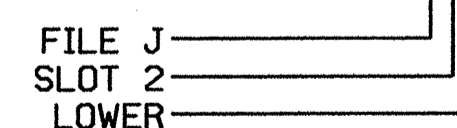
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 * Wired Input - Do not populate slot with detector card
 * Leave detector card in slot 11, but turn CH1 and CH2 OFF.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1B	TB2-9,10	I3U	63	5	1	15	
2B	TB2-7,8	I2L	43	4	2		
4A	TB4-9,10	I6U	41	11	4		
5A	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-9,10	J3U	64	23	5	15	
6A	TB3-5,6	J2U	40	21	6		
8A	TB5-9,10	J6U	42	31	8		

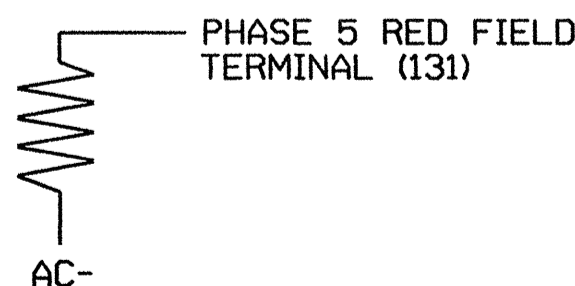
NOTE: a jumper should be in place from I1-W to J4-W, and from J1-W to I4-W on the rear of the input file.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2281T2
 DESIGNED: August 2009
 SEALED: 08-31-09
 REVISED: N/A

Signal Upgrade - Temporary Design 2 - Construction Phase II

ELECTRICAL AND PROGRAMMING DETAILS FOR: 	US 401 (Louisburg Road) at Leland Avenue		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Division 05 Wake County Raleigh PLAN DATE: August 2009 REVIEWED BY: T. J. J... PREPARED BY: S. Armstrong REVIEWED BY:	REVISIONS: _____ INIT. DATE _____ _____	
Prepared In the Offices of: S. Armstrong 750 N. Greenfield Pkwy, Garner, NC 27529			SIGNATURE: _____ DATE: _____ Sig. Inventory No. 05-2281T2



PHASING DIAGRAM

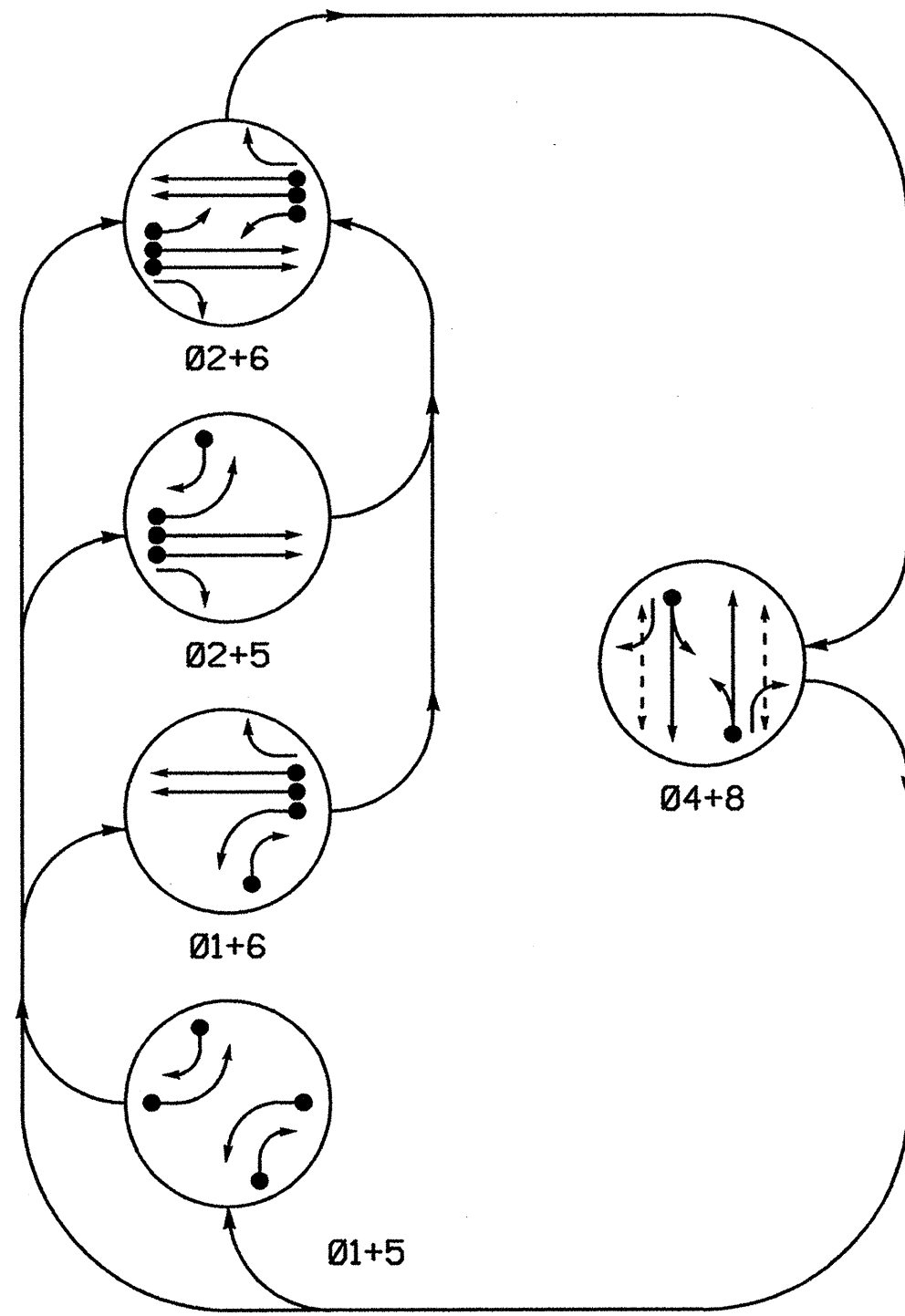
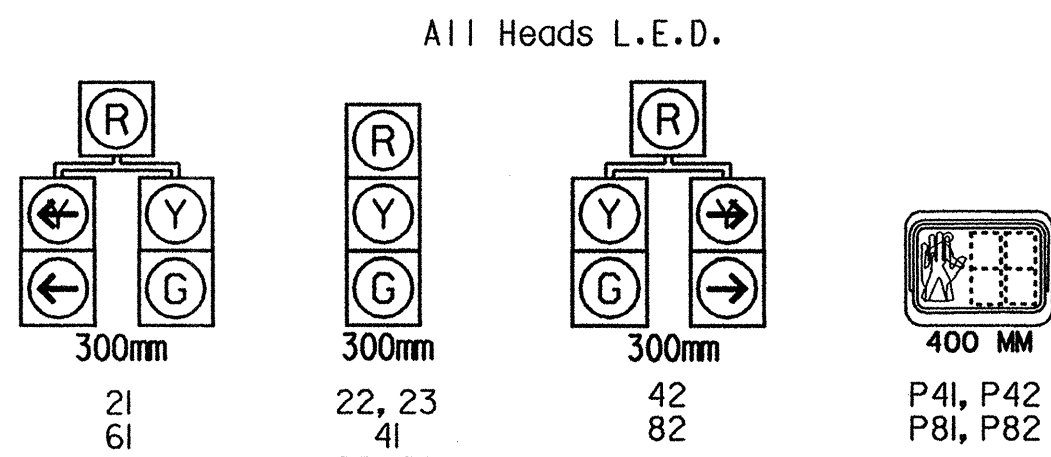


TABLE OF OPERATION

Table of Operation matrix showing phases (Ø 1+5, Ø 2+5, Ø 4+8, F LIGHTS) and signal face (21, 22, 23, 41, 42, 61, 62, 63, 81, 82, P41, P42, P81, P82) settings.

SIGNAL FACE I.D.



LOOP & DETECTOR UNIT INSTALLATION CHART

Loop & Detector Unit Installation Chart with columns for Inductive Loops (Loop No., Size, Turns, etc.) and Detector Programming (Timing, Operation Mode, Status).

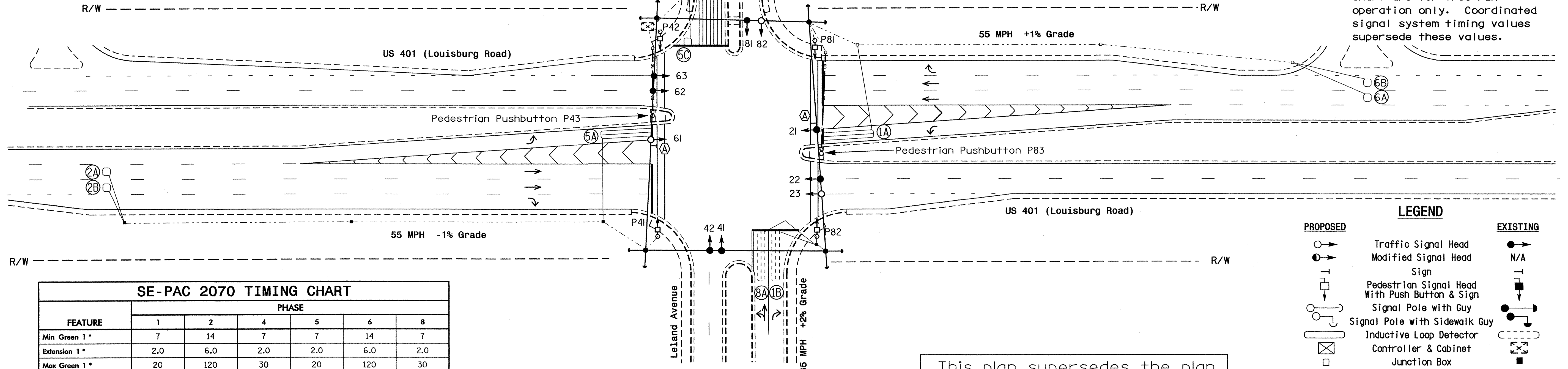
5 Phase Fully Actuated (Raleigh Signal System)

NOTES

- Notes 1-10: Refer to 'Roadway Standard Drawings NCDOT' dated July 2006 and 'Standard Specifications for Roads and Structures' dated July 2006. Do not program signal for late night flashing operation unless otherwise directed by the Engineer. Omit phase 1 during phase 2 on. Omit phase 5 during phase 6 on. Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (see Electrical Details).

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT (solid line with dot)
UNDETECTED MOVEMENT (OVERLAP) (dashed line)
UNSIGNALIZED MOVEMENT (dotted line)
PEDESTRIAN MOVEMENT (dashed line with arrow)



SE-PAC 2070 TIMING CHART

SE-PAC 2070 Timing Chart table with columns for Feature and Phases 1, 2, 4, 5, 6, 8.

* 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.

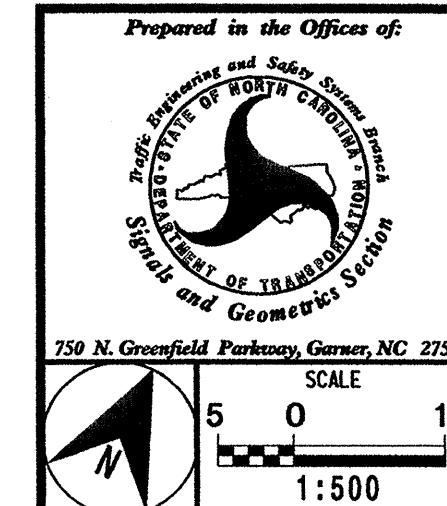
LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Sign, Pedestrian Signal Head, Signal Pole with Guy, Inductive Loop Detector, Junction Box, 50mm Underground Conduit, Right of Way with Marker, Directional Arrow, Signal Pedestal, 'U-TURN YIELD TO RIGHT TURN' Sign.
EXISTING: N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A.

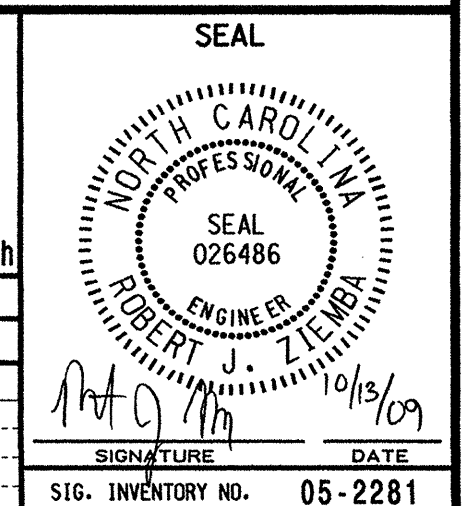
This plan supersedes the plan signed and sealed on 8/31/09.

Signal Upgrade

Final Design

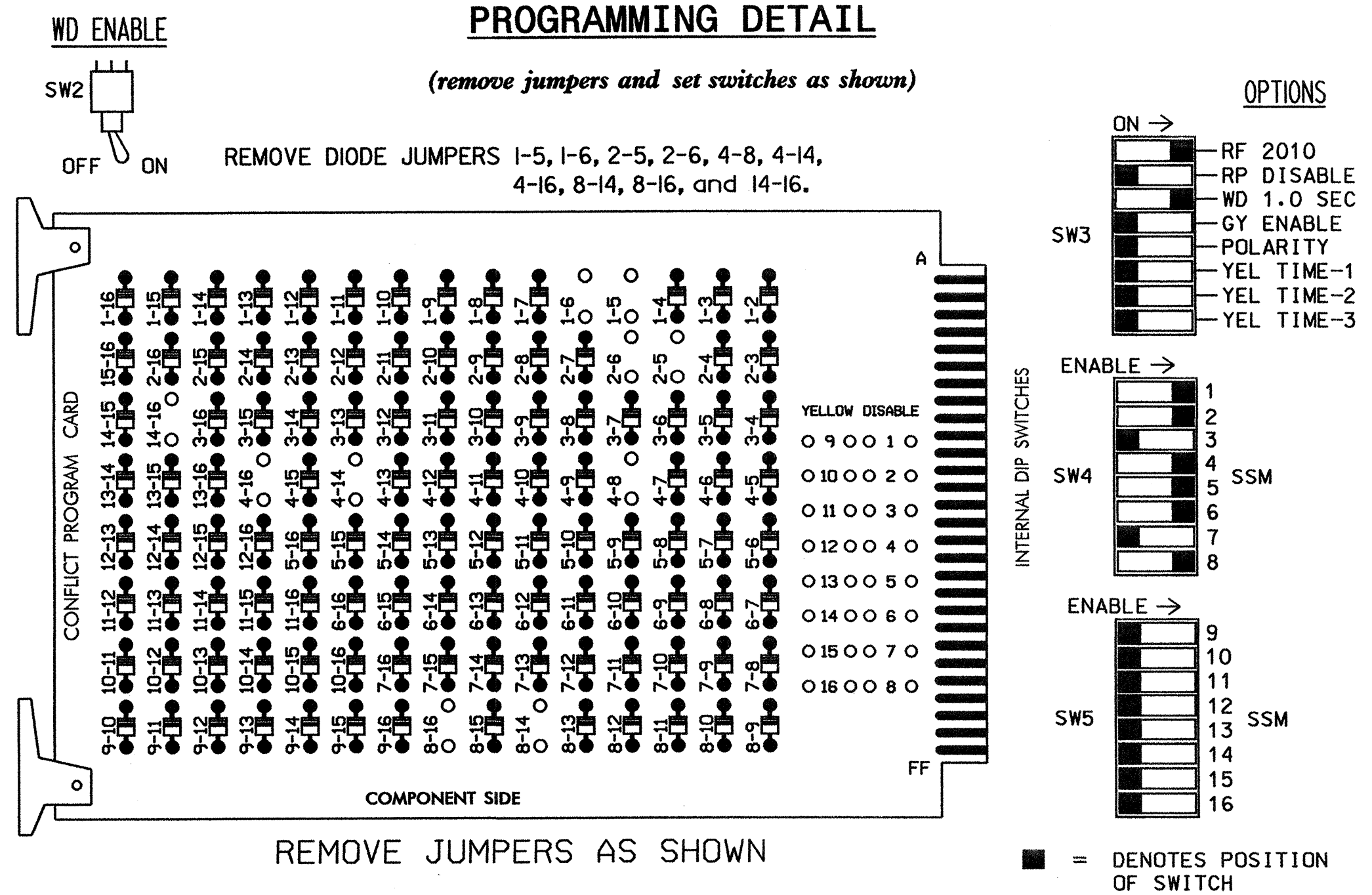


Project information form: US 401 (Louisburg Road) at Leland Avenue, Division 5, Wake County, Raleigh, dated October 2009, prepared by C.E. Carter.



EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature, on controller unit, for all phases.
- Program phases 4 and 8, on controller unit, for dual entry.
- Program phases 2 and 6, on controller unit, for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....EAGLE 2070L
 CABINET.....EAGLE 332
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S4,S4P,S5,S6,S8,S8P
 PHASES USED.....1,2,4,4 PED,5,6,8,8 PED
 OVERLAPS.....NONE

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61,82	21,22 23	NU	NU	41,42	P41, P42	21,42	61,62 63	NU	NU	81,82	P81, P82
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126							132				
GREEN ARROW	127							133				
Hand icon								104				110
Person icon								106				112

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.

BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

SE-PAC PHASE DATA	PRESS # DESIRED
1-VEHICLE TIMES	6-N.LOCK & MISC
2-DENSITY TIMES	7-SPEC. SEQUENCE
3-PEDEST. TIMES	8-SPEC. DETECTOR
4-INIT & N.A. RESP	9-PHASE COPY
5-V & P RECALLS	0-MISC PED OPTIONS
	F-PRIOR MENU

PHASE.....1...2...3...4...5...6...7...8	OMIT	2	0	0	0	6	0	0	0
-YEL	0	0	0	0	0	0	0	0	0
OCAL	4	0	0	0	0	4	0	0	0

OMIT:## PHS ON OMIT THIS PHASE
 -YEL:## PHS YEL OMIT THIS PHS YEL
 OCAL: WHEN OMIT, DETS CALL## PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

Special Sequence programming complete.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2281
 DESIGNED: October 2009
 SEALED: 10-13-09
 REVISED: N/A

THIS ELECTRICAL DETAIL SUPERSEDES THE DETAIL ORIGINALLY SIGNED AND SEALED ON 09/03/09.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 1	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13
L	*1A	2A	1B	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
	NOT USED	∅ 2	NOT USED	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14
	∅ 5	∅ 6	∅ 5	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	∅ 18
U	5A	6A	5B	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A	18A
L	NOT USED	∅ 6	∅ 5	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	∅ 18
	∅ 5	∅ 6	∅ 5	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	∅ 18

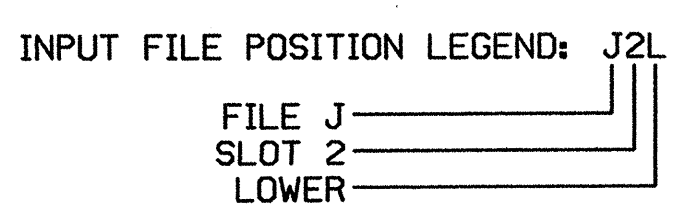
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 * Wired Input - Do not populate slot with detector card
 * Make sure detector CH 1 is turned ON.

INPUT FILE CONNECTION & PROGRAMMING CHART

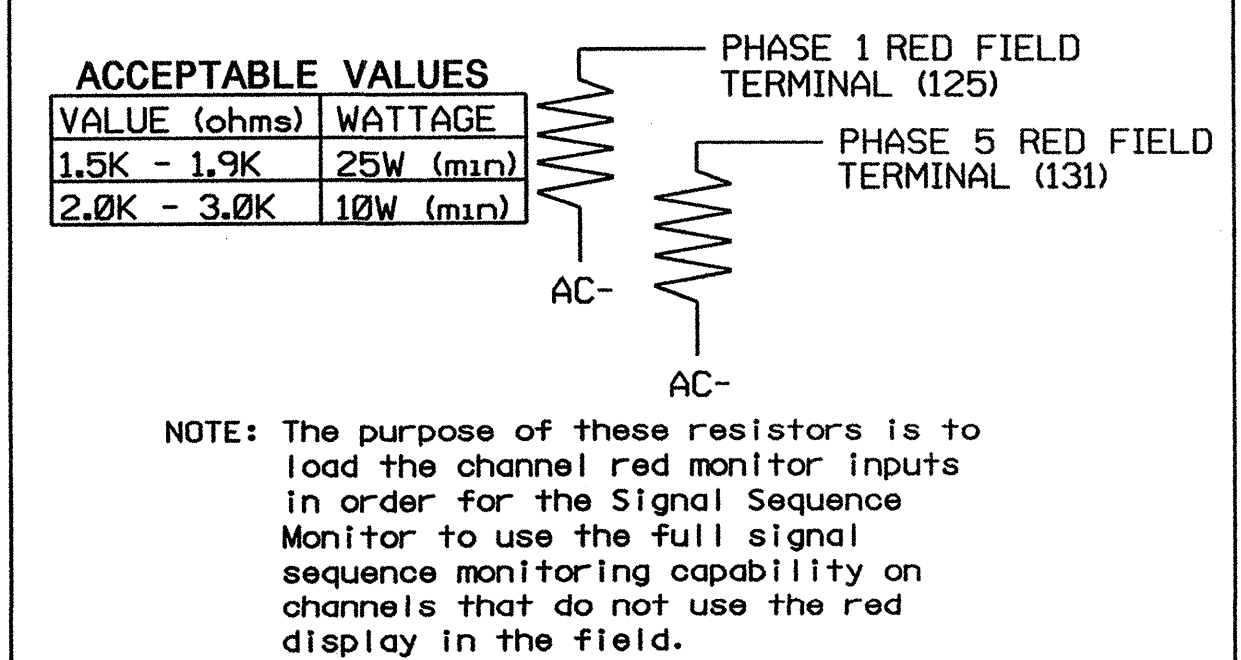
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
1B	TB2-9,10	I3U	63	5	1	15	
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
4A	TB4-9,10	I6U	41	11	4		
5A	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-9,10	J3U	64	23	5	15	
5C	TB3-11,12	J3L	77	24	5	15	
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
8A	TB5-9,10	J6U	42	31	8		
PED PUSH BUTTONS							
P41,P42,P43	TB8-5,6	I12L	69	PED 4	4 PED		
P81,P82,P83	TB8-8,9	I13L	70	PED 8	8 PED		

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

NOTE: a jumper should be in place from I1-W to J4-W, and from J1-W to I4-W on the rear of the input file.



LOAD RESISTOR INSTALLATION DETAIL



Signal Upgrade - Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 401 (Louisburg Road) at Leland Avenue

Division 05 Wake County Raleigh

PLAN DATE: October 2009 REVIEWED BY: T. Seyle

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

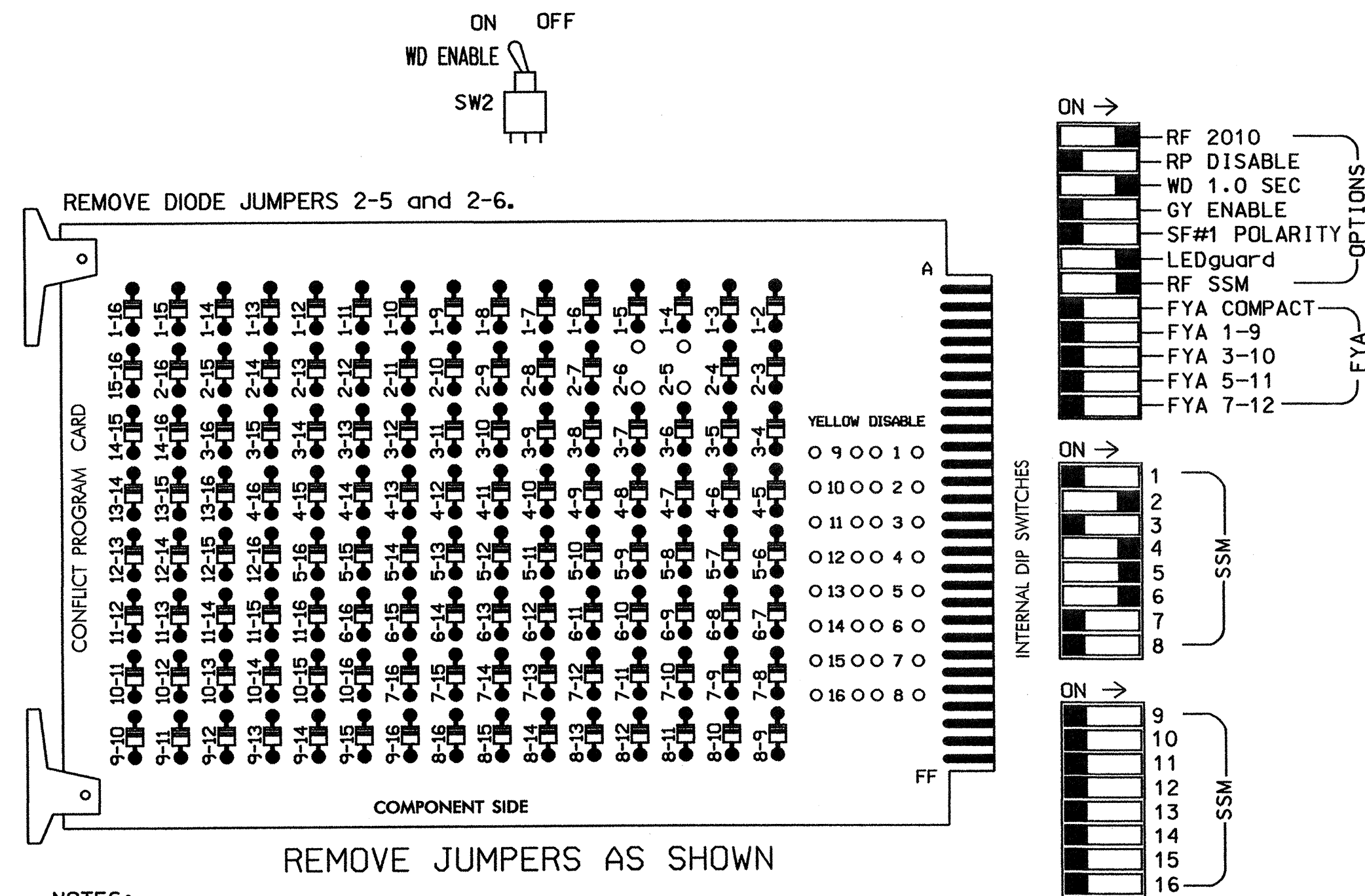
SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN

SIGNATURE DATE
 George C. Brown 10/14/09

SIG. INVENTORY NO. 05-2281

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature, on controller unit, for all phases.
- Program phases 2 and 6, on controller unit, for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332
 SOFTWARE.....SE-PAC2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S4,S5,S6
 PHASES USED.....2,4,5,6
 OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

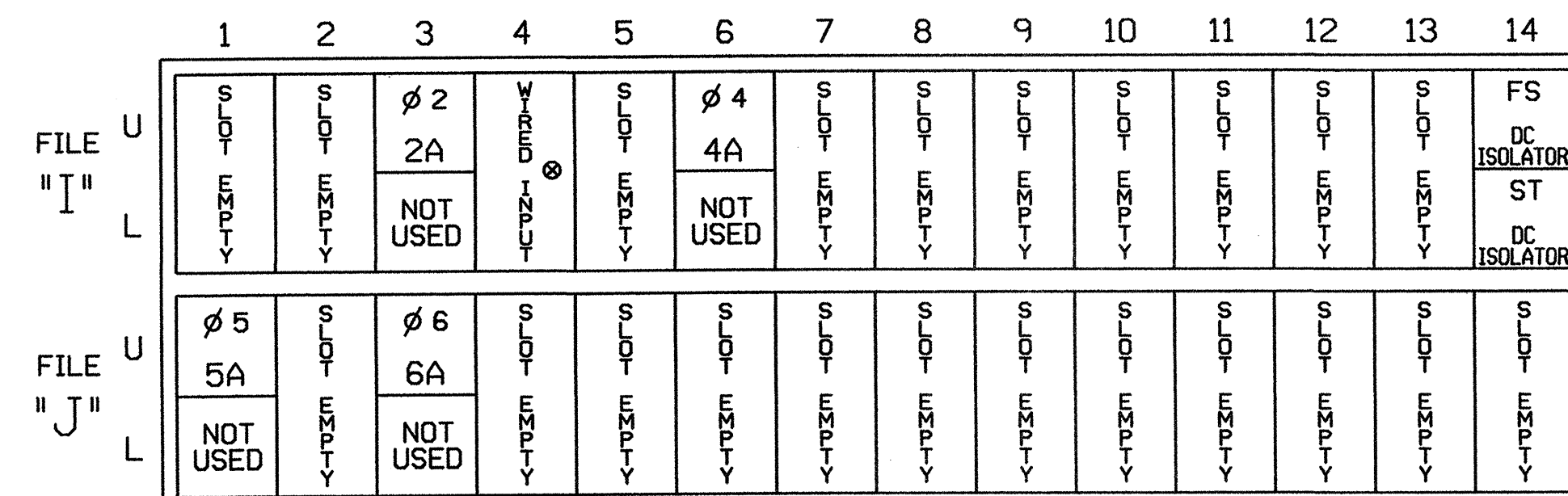
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	21	61,62	NU	NU	NU	NU
RED		128			101		*	134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW								132				
GREEN ARROW								133				
Hand icon												
Person icon												

NU = Not Used

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

INPUT FILE POSITION LAYOUT

(front view)



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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE

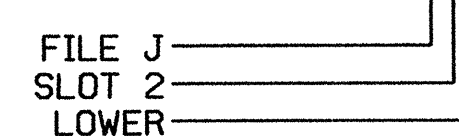
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
2A	TB2-9,10	I3U	63	5	2		
4A	TB4-9,10	I6U	41	11	4	10	
5A ¹	-	TB3-1,2	J1U	55	19	5	15
			I4U	47	7	2	
6A	TB3-9,10	J3U	64	23	6		

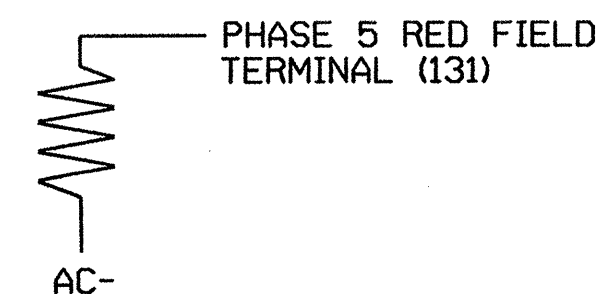
¹Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

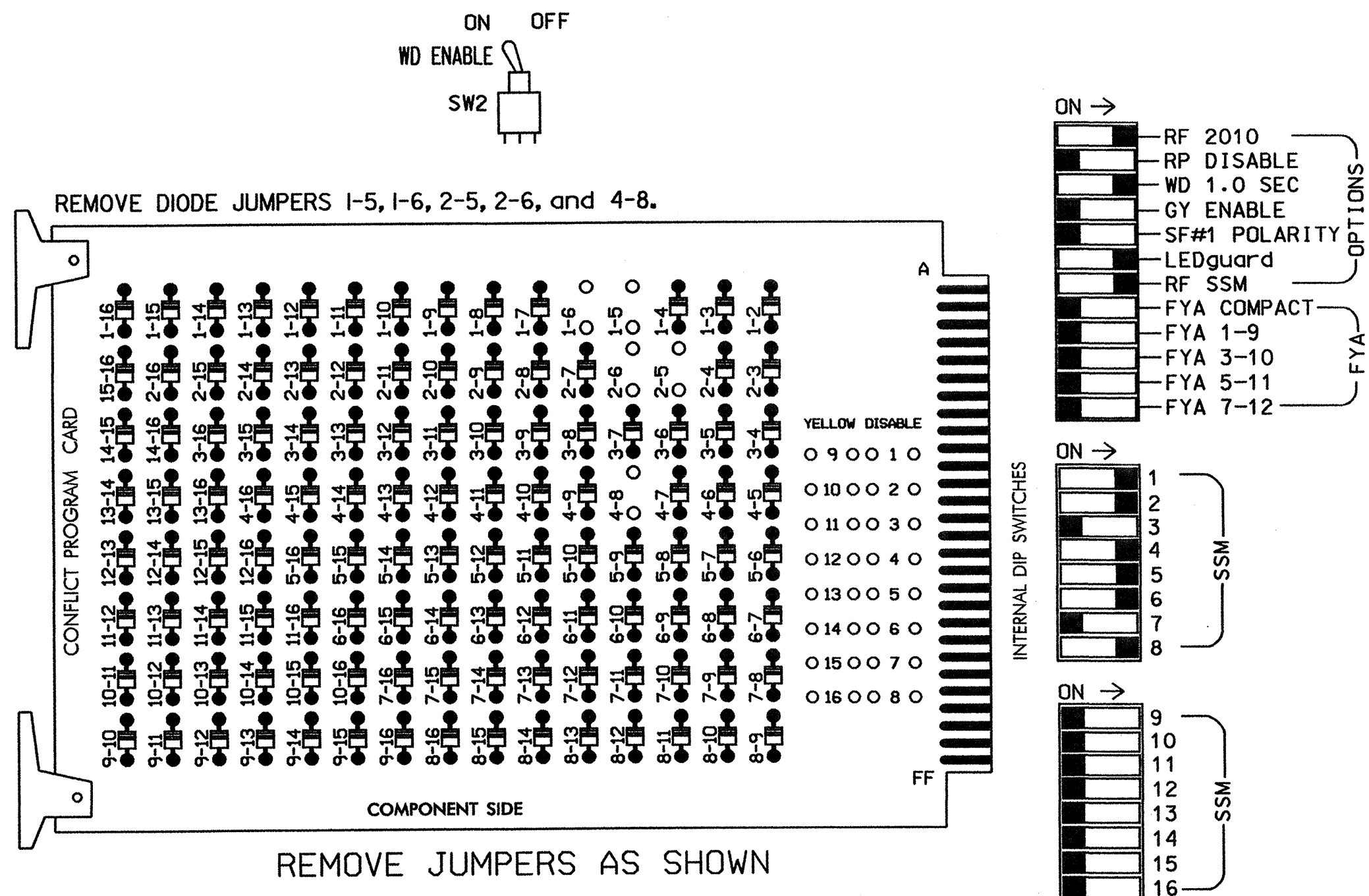
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2023T1
 DESIGNED: April 2009
 SEALED: 08-27-09
 REVISED: N/A

Signal Upgrade - Temporary Design 1 - Construction Phase I

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Office of: 750 N. Greenfield Pkwy, Garner, NC 27529	US 401 (Louisburg Road) at SR 2049 (Forestville Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Division 05 Wake County Raleigh PLAN DATE: August 2009 REVIEWED BY: T. J. J. J. PREPARED BY: S. Armstrong REVIEWED BY:	REVISIONS INIT. DATE _____ _____	
SIGNATURE: <i>S. Armstrong</i> DATE: 9/2/09		SIG. INVENTORY NO. 05-2023T1	

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature, on controller unit, for all phases.
- Program phases 4 and 8, on controller unit, for dual entry.
- Program phases 2 and 6, on controller unit, for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

SIGNAL HEAD HOOK-UP CHART

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

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....EXISTING 2070L
CABINET.....EXISTING 332
SOFTWARE.....SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8
PHASES USED.....1,2,4,5,6,8
OVERLAPS.....NONE

BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

SE-PAC PHASE DATA	PRESS # DESIRED
1-VEHICLE TIMES	6-N.LOCK & MISC
2-DENSITY TIMES	7-SPEC. SEQUENCE
3-PEDEST. TIMES	8-SPEC. DETECTOR
4-INIT & N.A. RESP	9-PHASE COPY
5-V & P RECALLS	0-MISC PED OPTIONS
	F-PRIOR MENU

PHASE.....1...2...3...4...5...6...7...8	OMIT	2	0	0	0	6	0	0	0
-YEL	0	0	0	0	0	0	0	0	0
OCAL	4	0	0	0	4	0	0	0	0

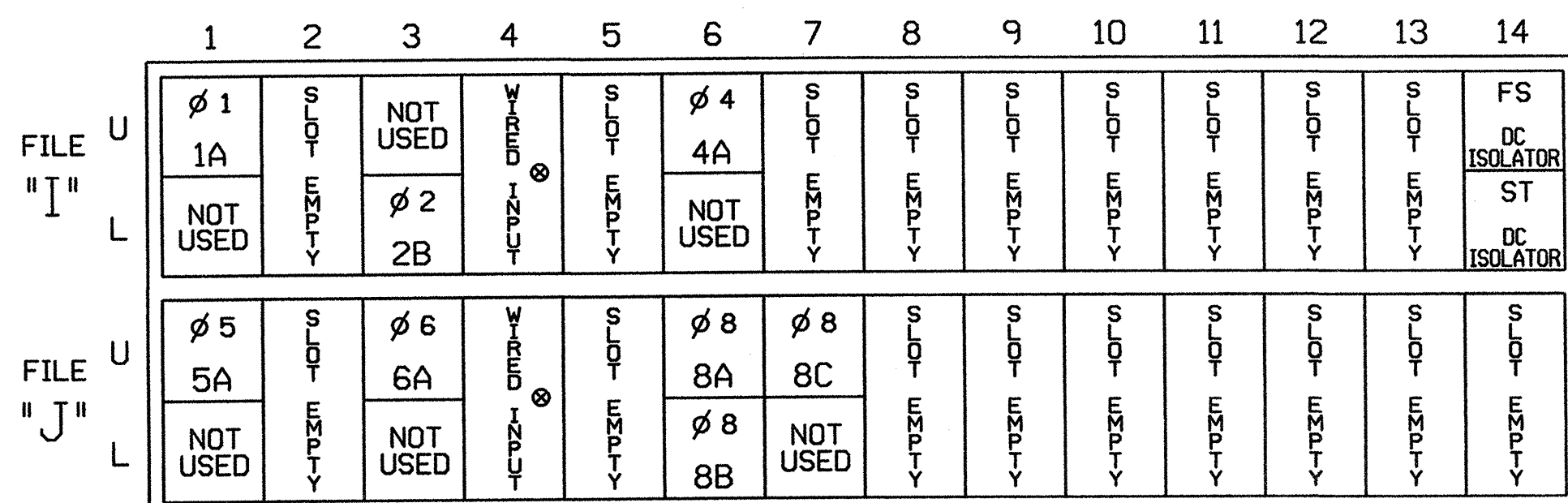
OMIT:## PHS ON OMITTS THIS PHASE
-YEL:## PHS YEL OMITTS THIS PHS YEL
OCAL: WHEN OMIT, DETS CALL## PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

Special Sequence programming complete.

INPUT FILE POSITION LAYOUT

(front view)



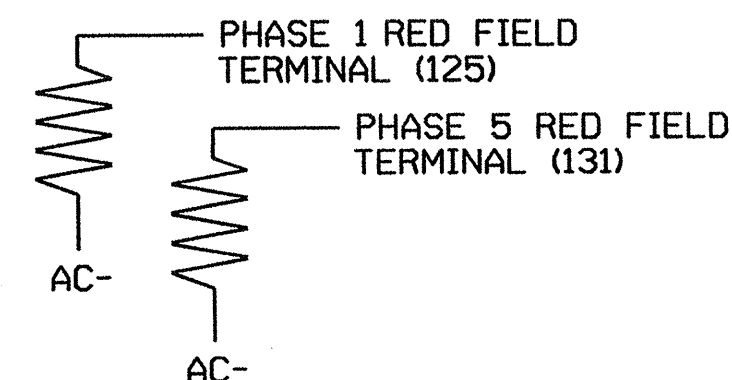
EX.: 1A, 2A, ETC. = LOOP NO.'S

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

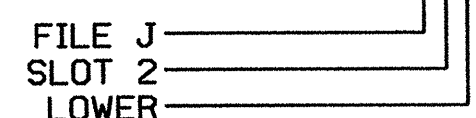
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A ¹	TB2-1,2	IIU	56	1	1	15	
2B	TB2-11,12	J4U	48	25	6		
4A	TB4-9,10	I3L	76	6	2		
5A ²	TB3-1,2	J6U	41	11	4	10	
6A	TB3-9,10	J1U	55	19	5	15	
8A	TB5-9,10	I4U	47	7	2		
8B	TB3-9,10	J3U	64	23	6		
8B	TB5-9,10	J6U	42	31	8	3	
8C	TB7-1,2	J7U	66	33	8	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



Signal Upgrade - Temporary Design 2 - Construction Phase II

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 401 (Louisburg Road)
at
SR 2049 (Forestville Road)



Division 5 Wake County Raleigh

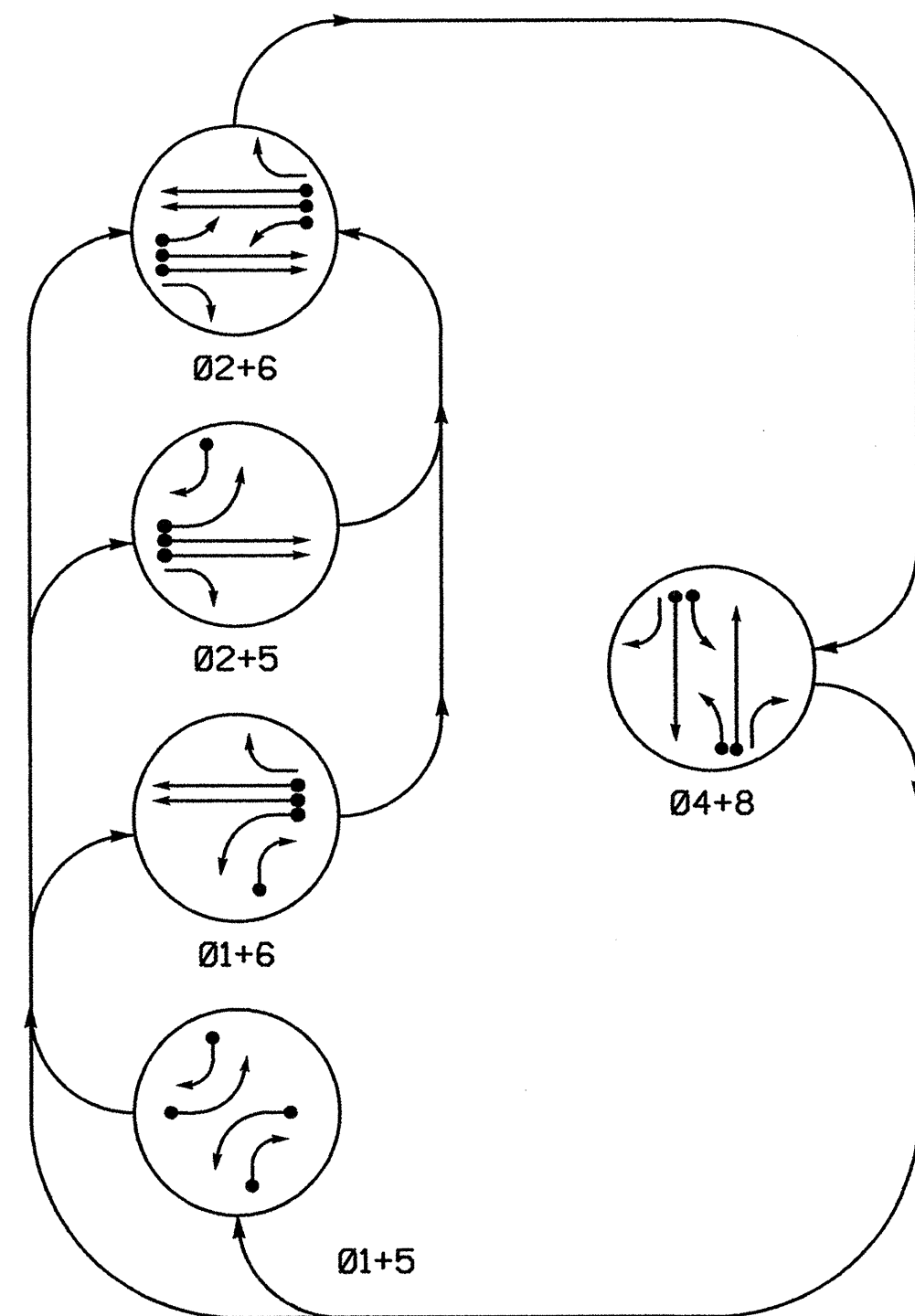
PLAN DATE: August 2009 REVIEWED BY: T. J. J. J.
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 022013
GEORGE C. BROWN
9/2/09
SIG. INVENTORY NO. 05-2023T2

PHASING DIAGRAM



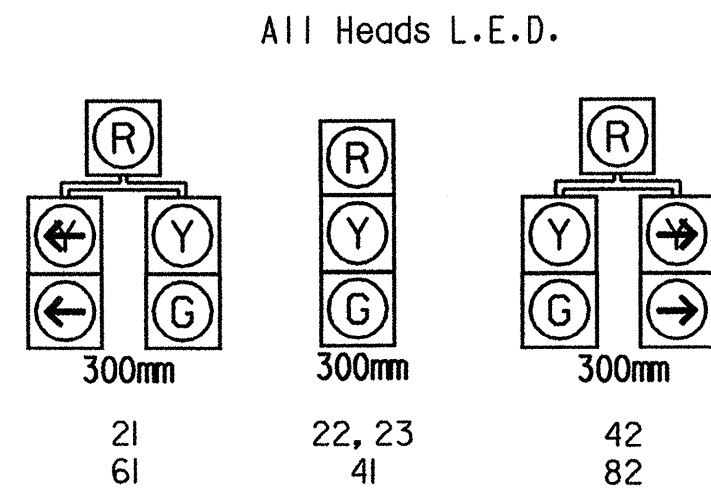
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 4+8
21	R	R	G	R	Y
22, 23	R	R	G	R	Y
41	R	R	R	R	G
42	R	R	R	R	G
61	R	R	R	R	Y
62, 63	R	R	R	R	Y
81	R	R	R	R	G
82	R	R	R	R	G

SIGNAL FACE I.D.



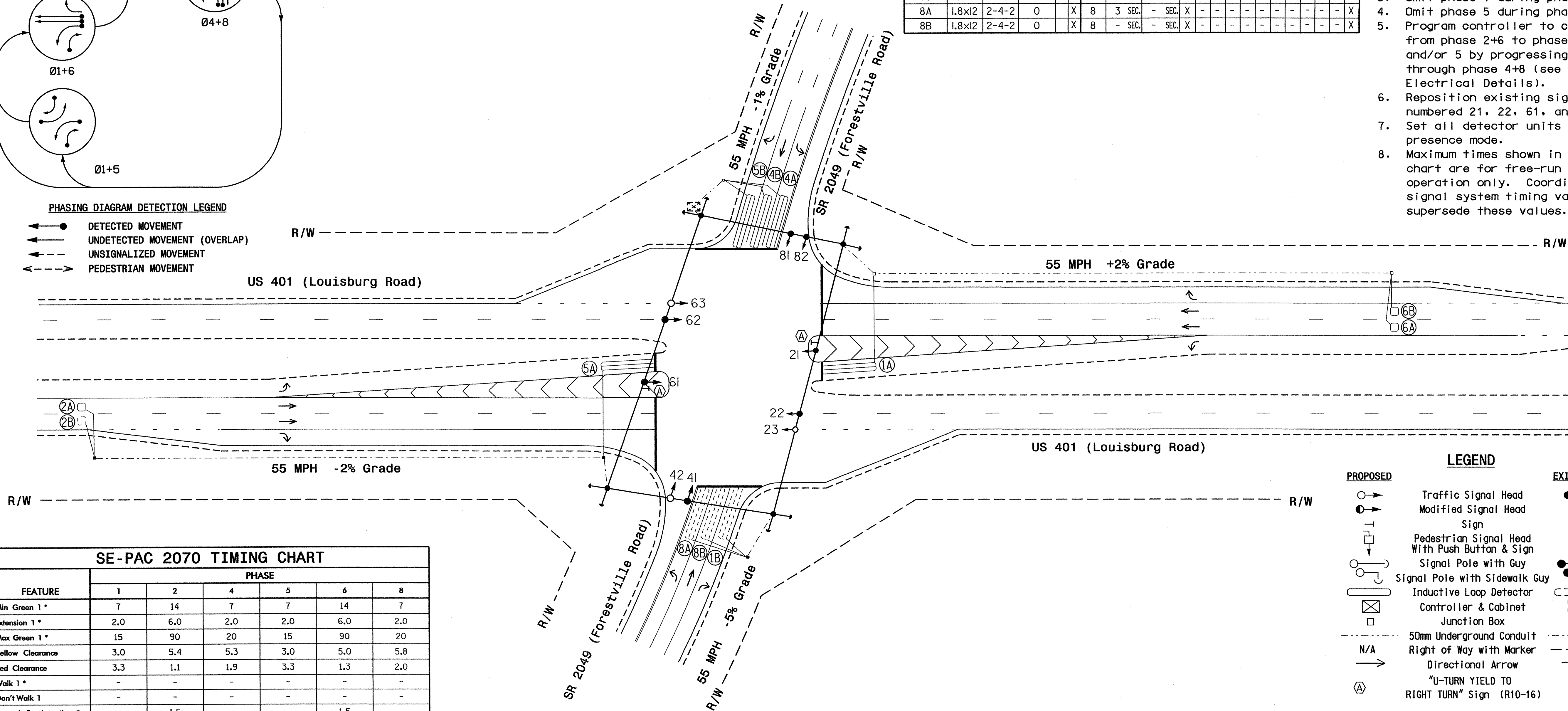
LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

LOOP NO.	SIZE (m)	TURNS	DIST. FROM STOPBAR (m)	NEW EXISTING	ASSIGNED PHASE	DETECTOR PROGRAMMING														
						TIMING		OPERATION MODE							SWITCH	SYSTEM LOOPS	STATUS			
						DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	STOP A	STOP B	PROTECTOR LEFT	PROTECTOR THROUGH	AND						
1A	1.8x12	2-4-2	0	X	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
1B	1.8x12	2-4-2	0	X	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
2A	1.8x1.8	6	130	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
2B	1.8x1.8	6	130	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
4A	1.8x12	2-4-2	0	X	4	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
4B	1.8x12	2-4-2	0	X	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
5A	1.8x12	2-4-2	0	X	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
5B	1.8x12	2-4-2	0	X	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
6A	1.8x1.8	6	130	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
6B	1.8x1.8	6	130	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
8A	1.8x12	2-4-2	0	X	8	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-
8B	1.8x12	2-4-2	0	X	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X	-

5 Phase Fully Actuated (Raleigh Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Omit phase 1 during phase 2 on.
- Omit phase 5 during phase 6 on.
- Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (see Electrical Details).
- Reposition existing signal heads numbered 21, 22, 61, and 62.
- 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.



SE-PAC 2070 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	20	15	90	20	
Yellow Clearance	3.0	5.4	5.3	3.0	5.0	5.8	
Red Clearance	3.3	1.1	1.9	3.3	1.3	2.0	
Walk 1*	-	-	-	-	-	-	
Don't Walk 1	-	-	-	-	-	-	
Seconds Per Actuation*	-	1.5	-	-	1.5	-	
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	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

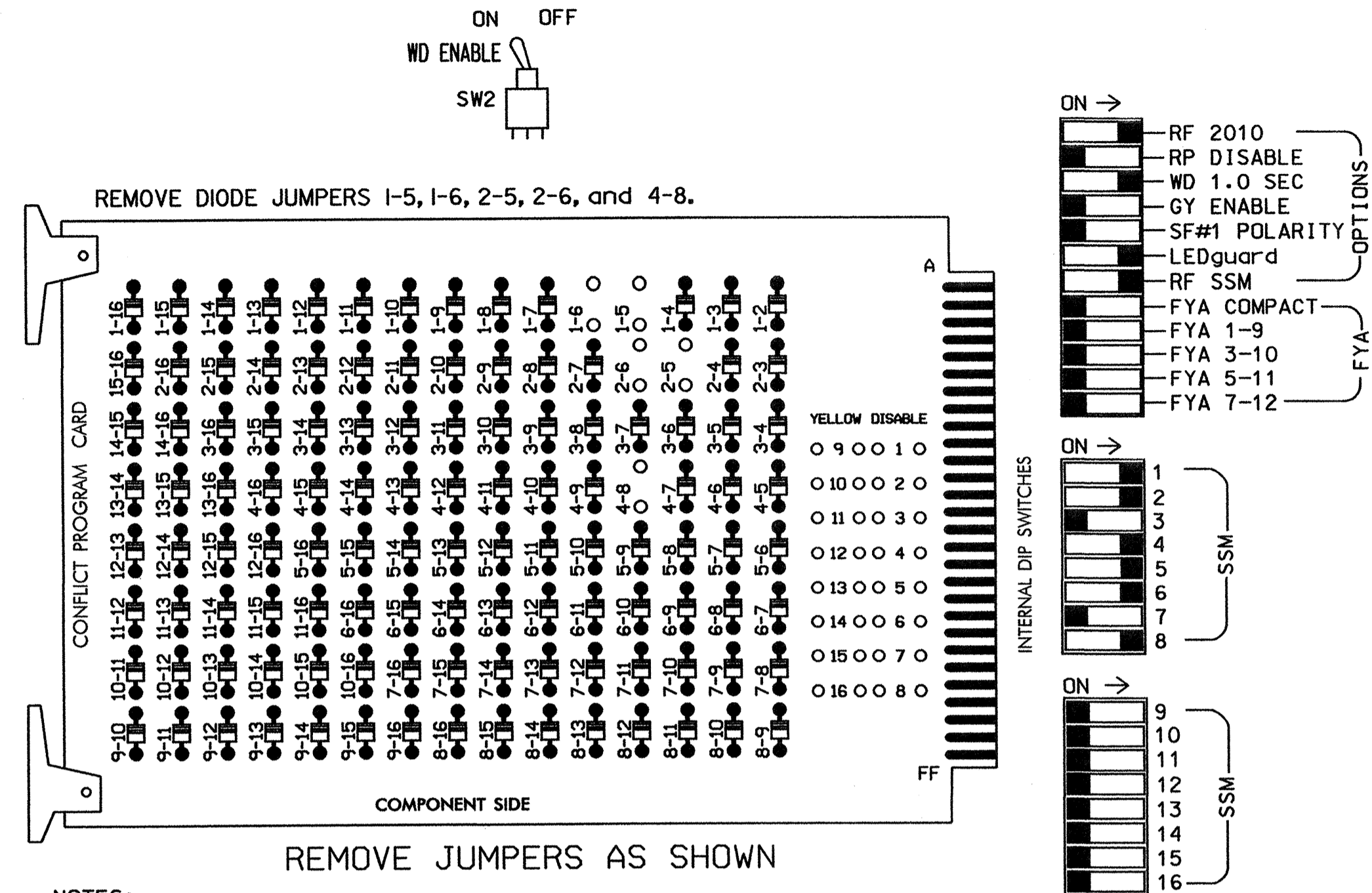
- | | | | |
|--|---|--|---|
| | PROPOSED Traffic Signal Head | | EXISTING Traffic Signal Head |
| | PROPOSED Modified Signal Head | | EXISTING Modified Signal Head |
| | PROPOSED Pedestrian Signal Head | | EXISTING Pedestrian Signal Head |
| | PROPOSED Signal Pole with Guy | | EXISTING Signal Pole with Guy |
| | PROPOSED 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 50mm Underground Conduit | | EXISTING 50mm Underground Conduit |
| | PROPOSED Right of Way with Marker | | EXISTING Right of Way with Marker |
| | PROPOSED Directional Arrow | | EXISTING Directional Arrow |
| | PROPOSED "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) | | EXISTING "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) |

Signal Upgrade Final Design

	<p>US 401 (Louisburg Road) at SR 2049 (Forestville Road)</p>		<p>SEAL</p>
	<p>Division 5 Wake County Raleigh</p>		<p>PLANNED BY: C.E. Carter</p>
	<p>PLAN DATE: April 2009</p>	<p>REVIEWED BY:</p>	
<p>750 N. Greenfield Place, Garner, NC 27529</p>		<p>REVISIONS</p>	
<p>SCALE: 1:500</p>		<p>INIT. DATE</p>	
<p>SIGNATURE: <i>[Signature]</i></p>		<p>DATE: 05-2023</p>	

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program controller to start up in phases 2 and 6 green.
- Enable simultaneous gap-out feature, on controller unit, for all phases.
- Program phases 4 and 8, on controller unit, for dual entry.
- Program phases 2 and 6, on controller unit, for volume density operation.
- The cabinet and controller are part of the Raleigh Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61,82	21,22 23	NU	NU	41,42	NU	21,42	61,62 63	NU	NU	81,82	NU
RED	*	128			101		*	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....EXISTING 2070L
CABINET.....EXISTING 332
SOFTWARE.....SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8
PHASES USED.....1,2,4,5,6,8
OVERLAPS.....NONE

BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

EPAC PHASE DATA	PRESS # DESIRED
1-VEHICLE TIMES	5-V & P RECALLS
2-DENSITY TIMES	6-N.LOCK & MISC
3-PEDEST. TIMES	7-SPEC. SEQUENCE
4-INITIALIZE & N.A. RESPONSE	8-SPEC. DETECTOR
	9-PHASE COPY

F-PRIOR MENU

PHASE.....	1...	2...	3...	4...	5...	6...	7...	8
OMIT	2	0	0	0	6	0	0	0
-YEL	0	0	0	0	0	0	0	0
OCAL	4	0	0	0	4	0	0	0

OMIT:## PHS ON OMTS THIS PHASE
-YEL:## PHS YEL OMTS THIS PHS YEL
OCAL: WHEN OMIT, DETS CALL## PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

Special Sequence programming complete.

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I" U	∅ 1	∅ 1	∅ 2	∅ 2	∅ 2	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4
L	1A	1B	2A	2B	2B	4A	4A	4A	4A	4A	4A	4A	4A	4A
FILE "J" U	∅ 5	∅ 5	∅ 6	∅ 6	∅ 6	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8
L	5A	5B	6A	6B	6B	8A	8A	8A	8A	8A	8A	8A	8A	8A

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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE

ST = STOP TIME

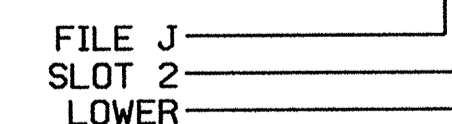
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A ¹	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
1B	TB2-5,6	I2U	39	3	1	15	
2A	TB2-9,10	I3U	63	5	2		
2B	TB2-11,12	I3L	76	6	2		
4A	TB4-9,10	I6U	41	11	4	3	
4B	TB4-11,12	I6L	45	12	4		
5A ²	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
8A	TB5-9,10	J6U	42	31	8	3	
8B	TB5-11,12	J6L	46	32	8		

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

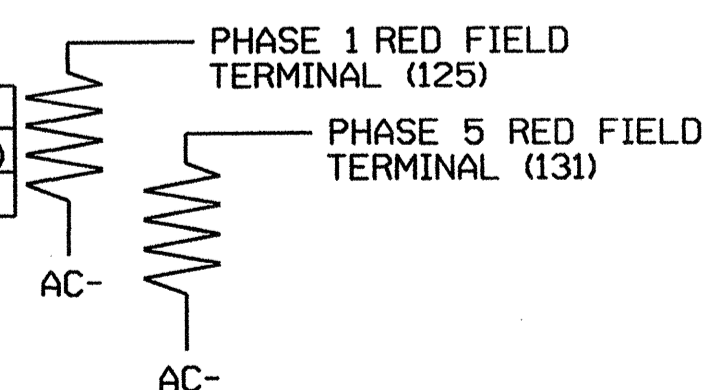
²Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2023
DESIGNED: April 2009
SEALED: 08-27-09
REVISED: N/A

Signal Upgrade - Final Design

	ELECTRICAL AND PROGRAMMING DETAILS FOR:		US 401 (Louisburg Road) at SR 2049 (Forestville Road)	
	Prepared In the Office of: Transportation Mobility and Safety Division of Transportation Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529		Division 05	Wake County Raleigh
	PLAN DATE: August 2009	REVIEWED BY: T. J. J.	PREPARED BY: S. Armstrong	REVIEWED BY:
	REVISIONS	INIT.	DATE	

Sig. INVENTORY NO. 05-2023

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

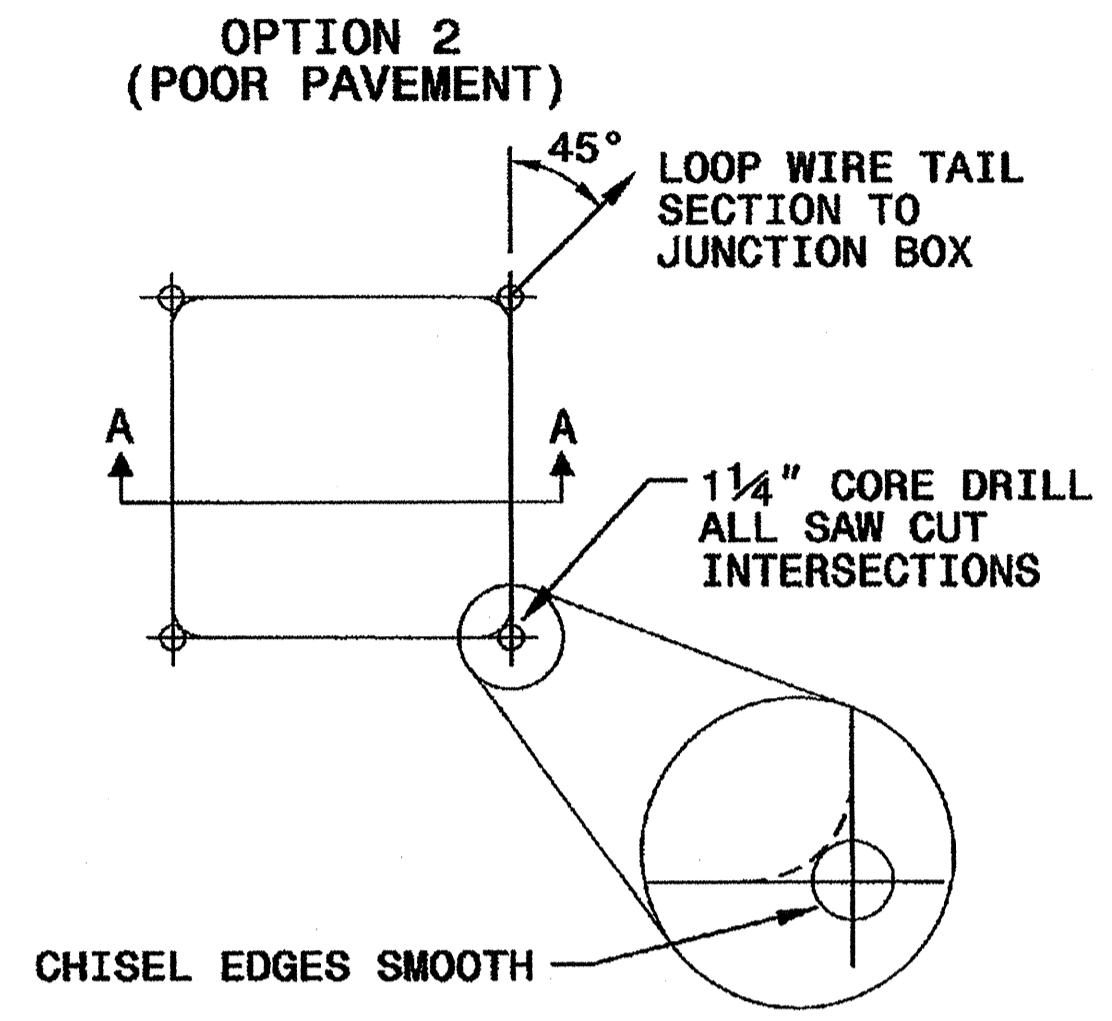
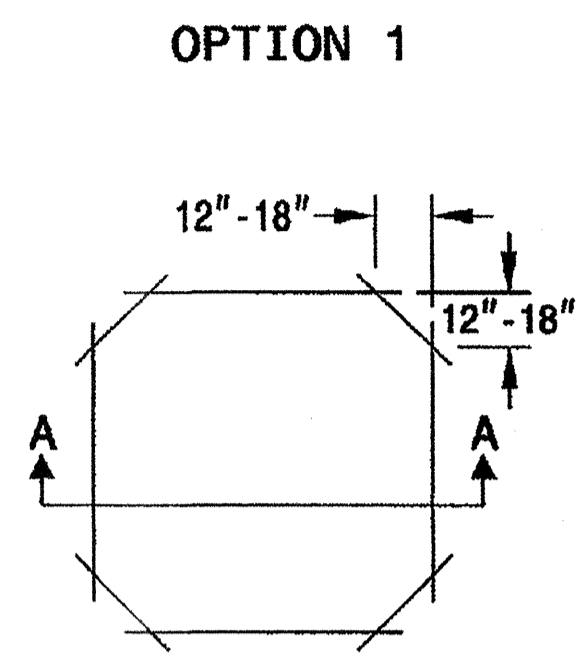
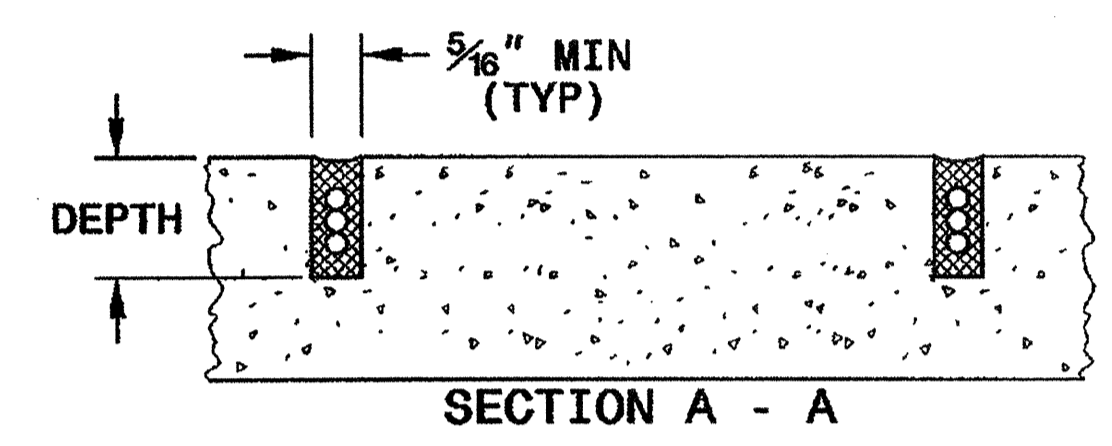
SHEET 1 OF 3
1725D01

CONVENTIONAL 4-SIDED LOOP

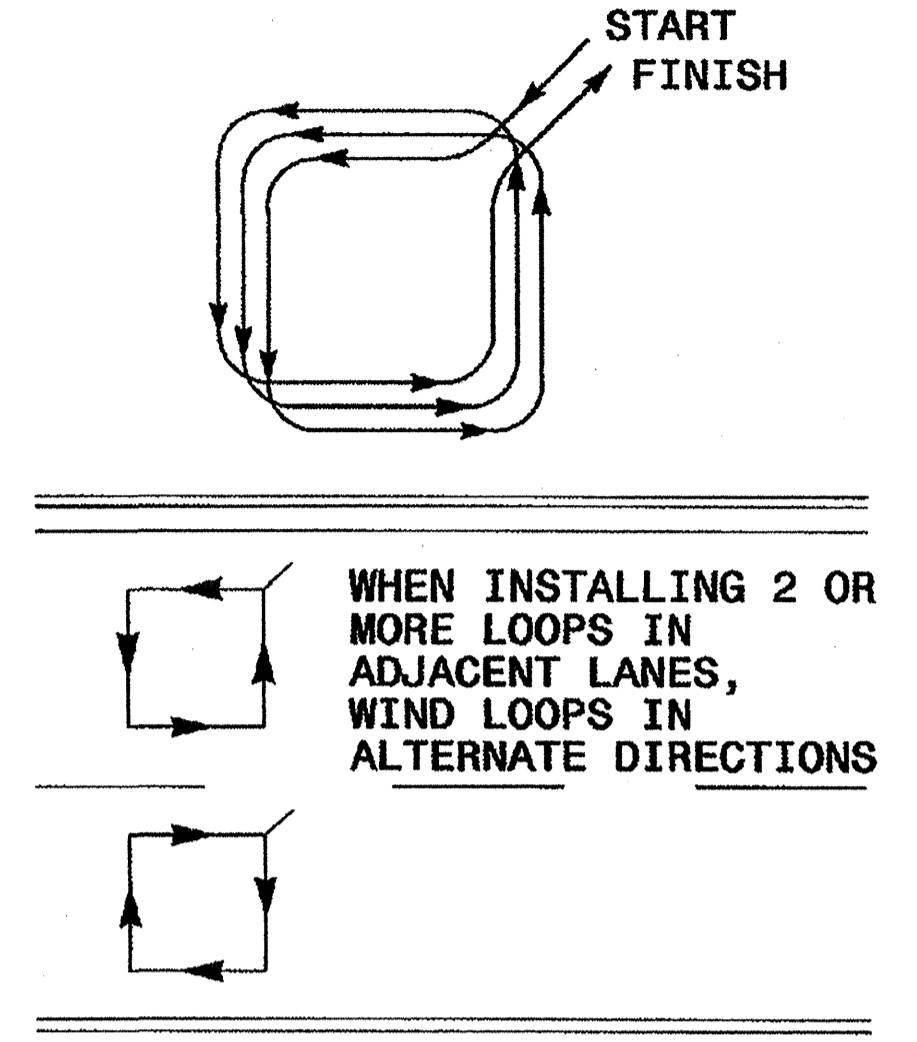
SAW CUT OPTIONS

SAW SLOT DEPTH CHART

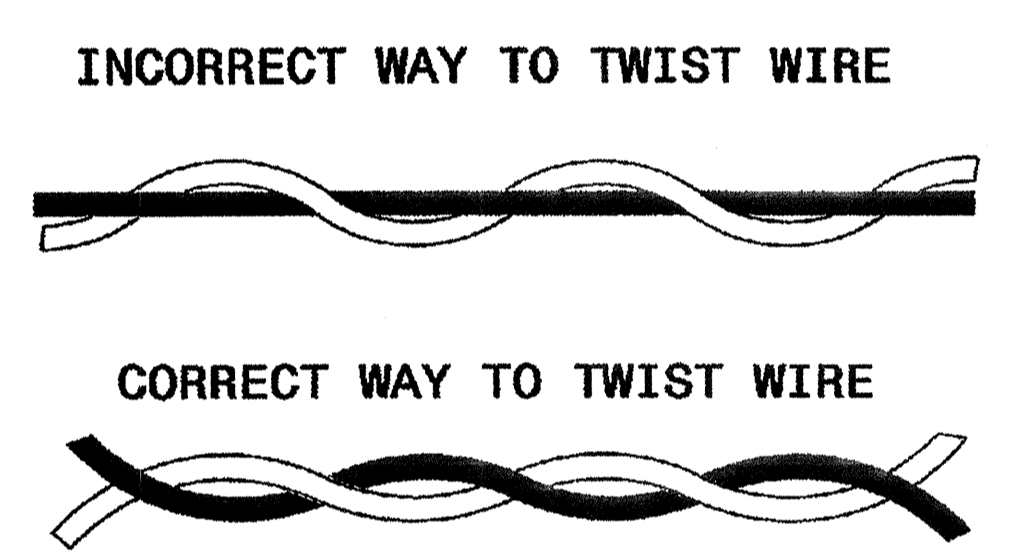
DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

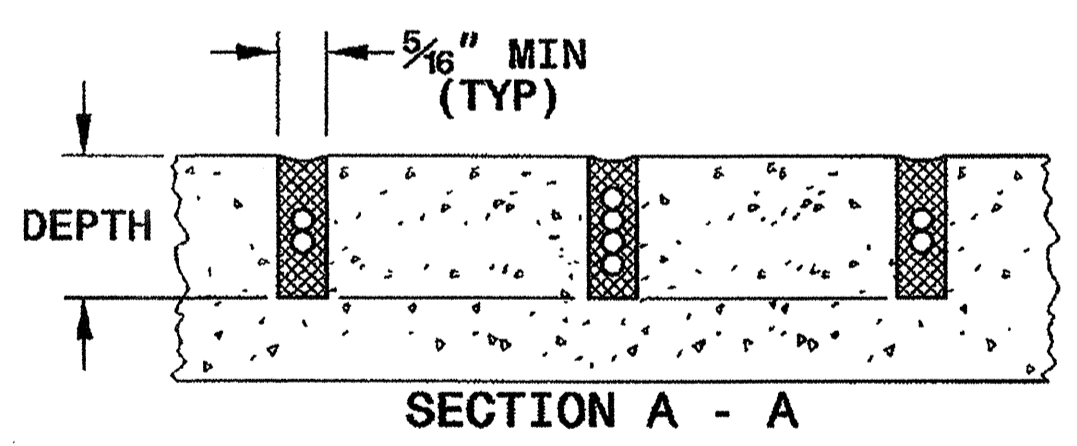
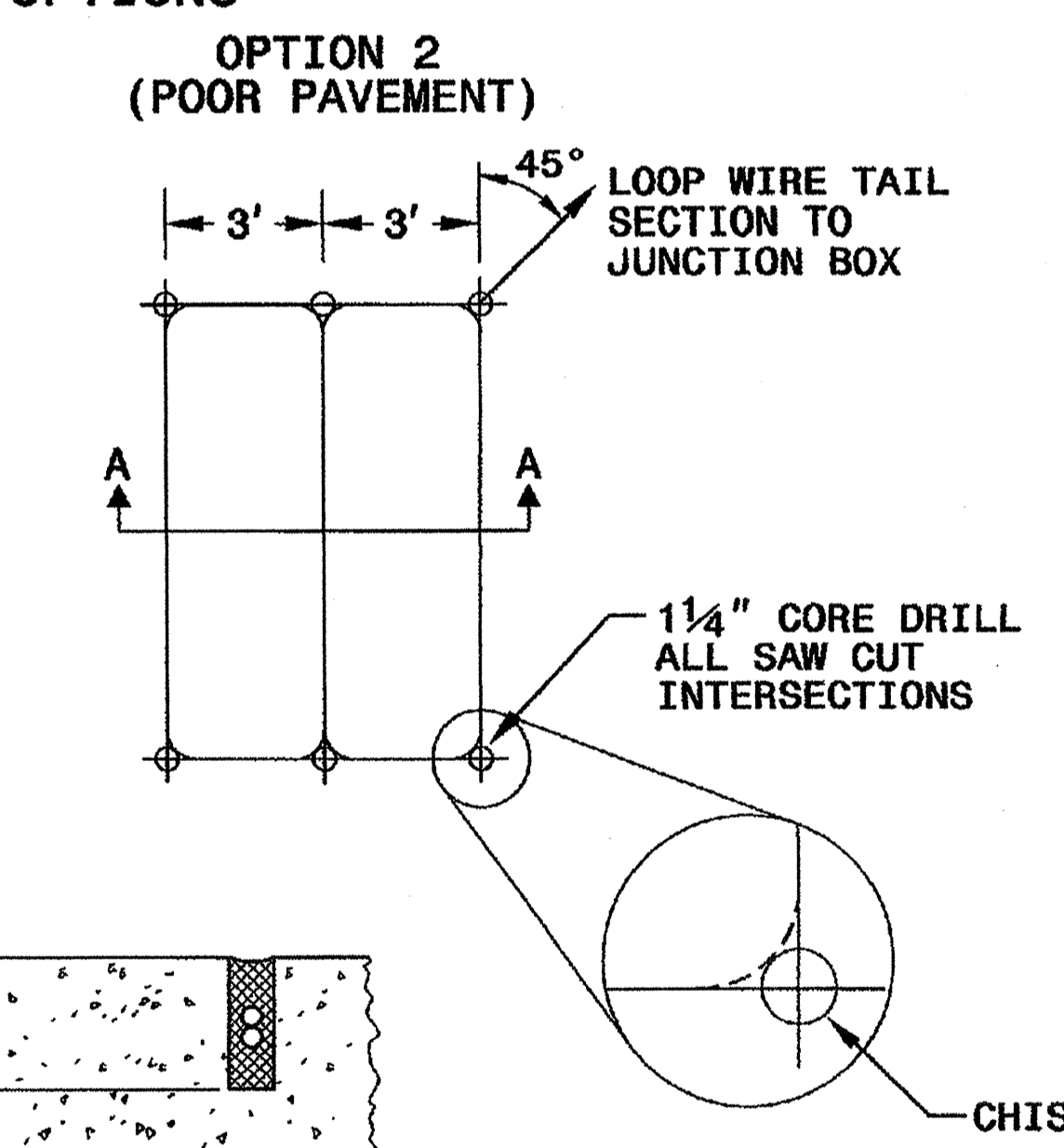
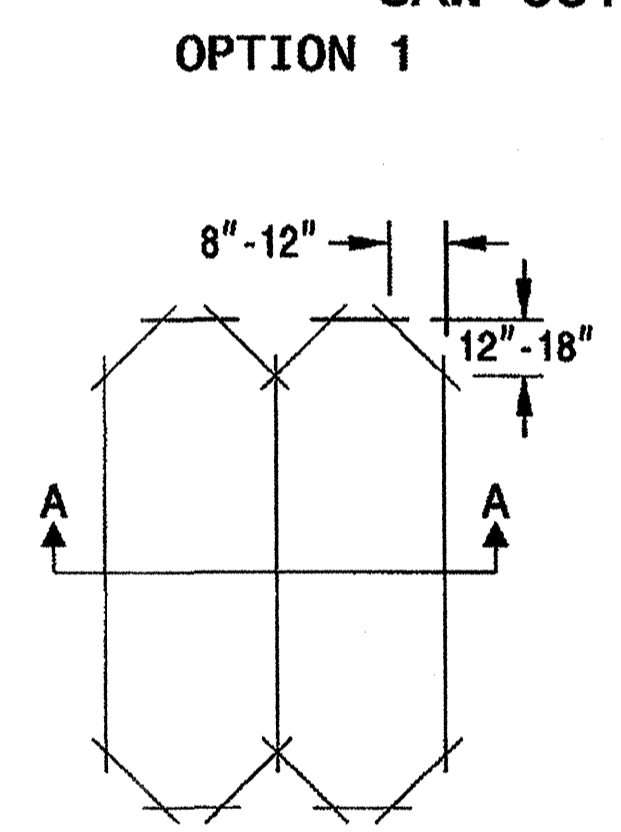


NOTES

1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

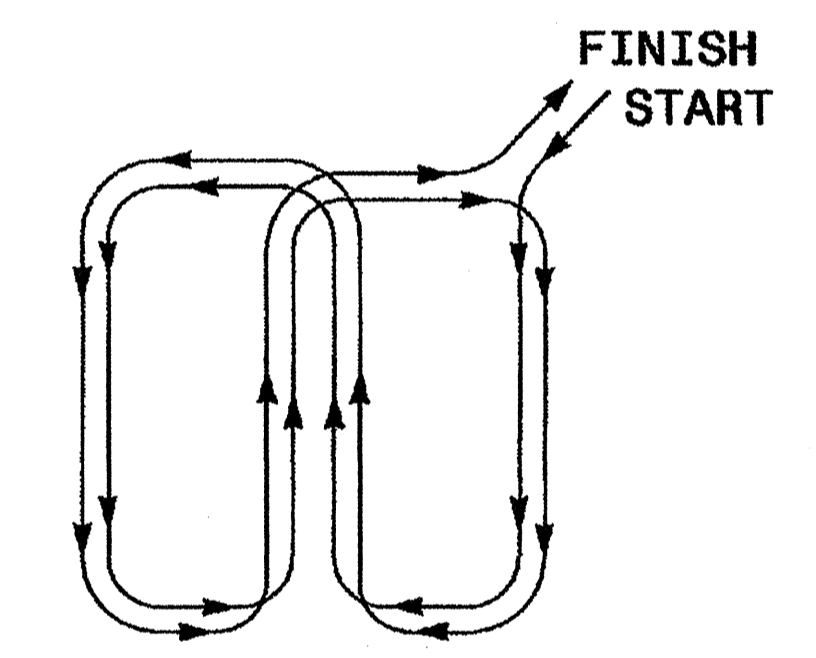
QUADRUPOLE LOOP

SAW CUT OPTIONS



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

LOOP WINDING METHOD



STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

Wilton DeWitt 11/24/08
SIGNATURE DATE

24-INDV-2008 09:28
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STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

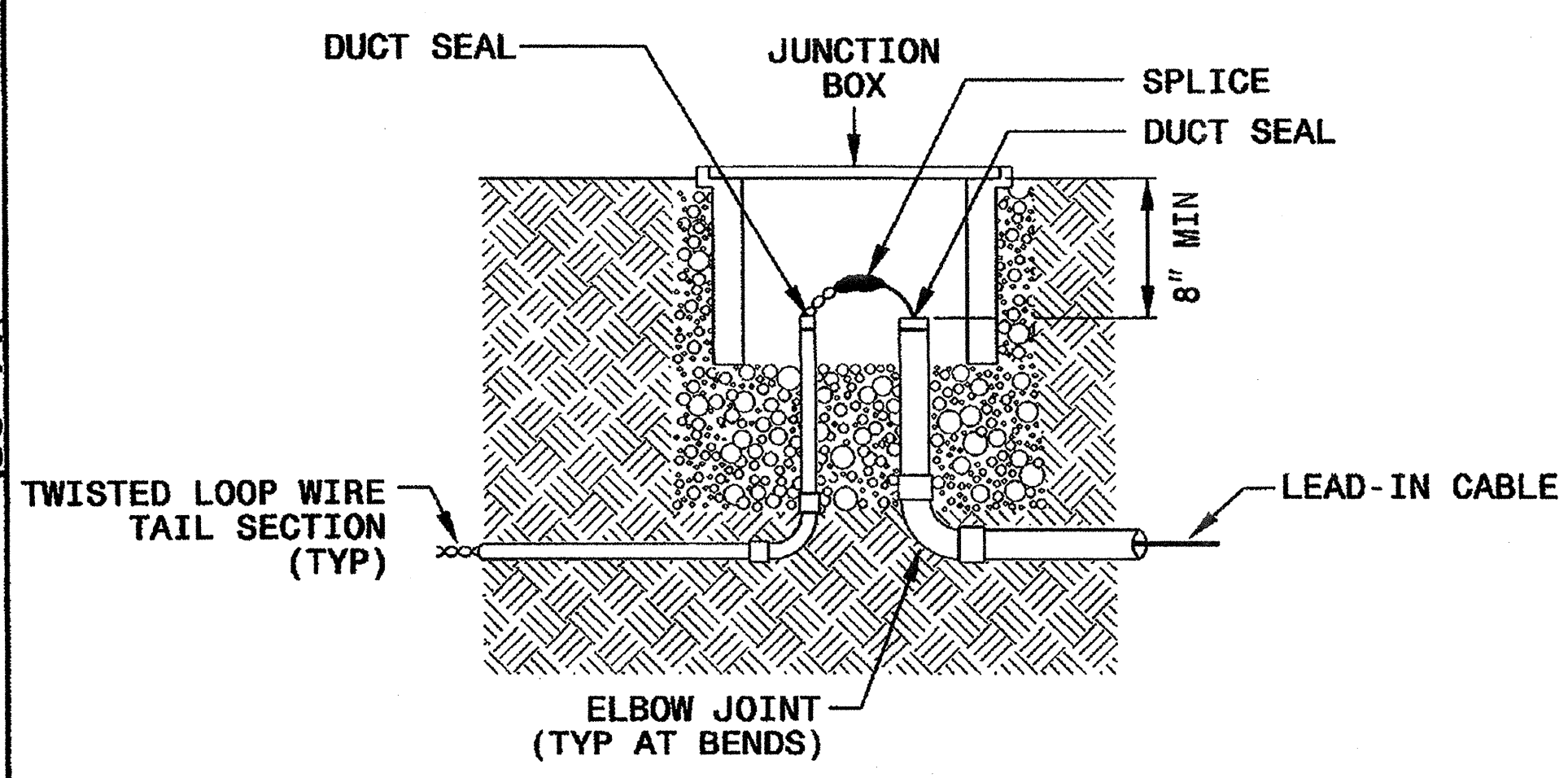
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ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

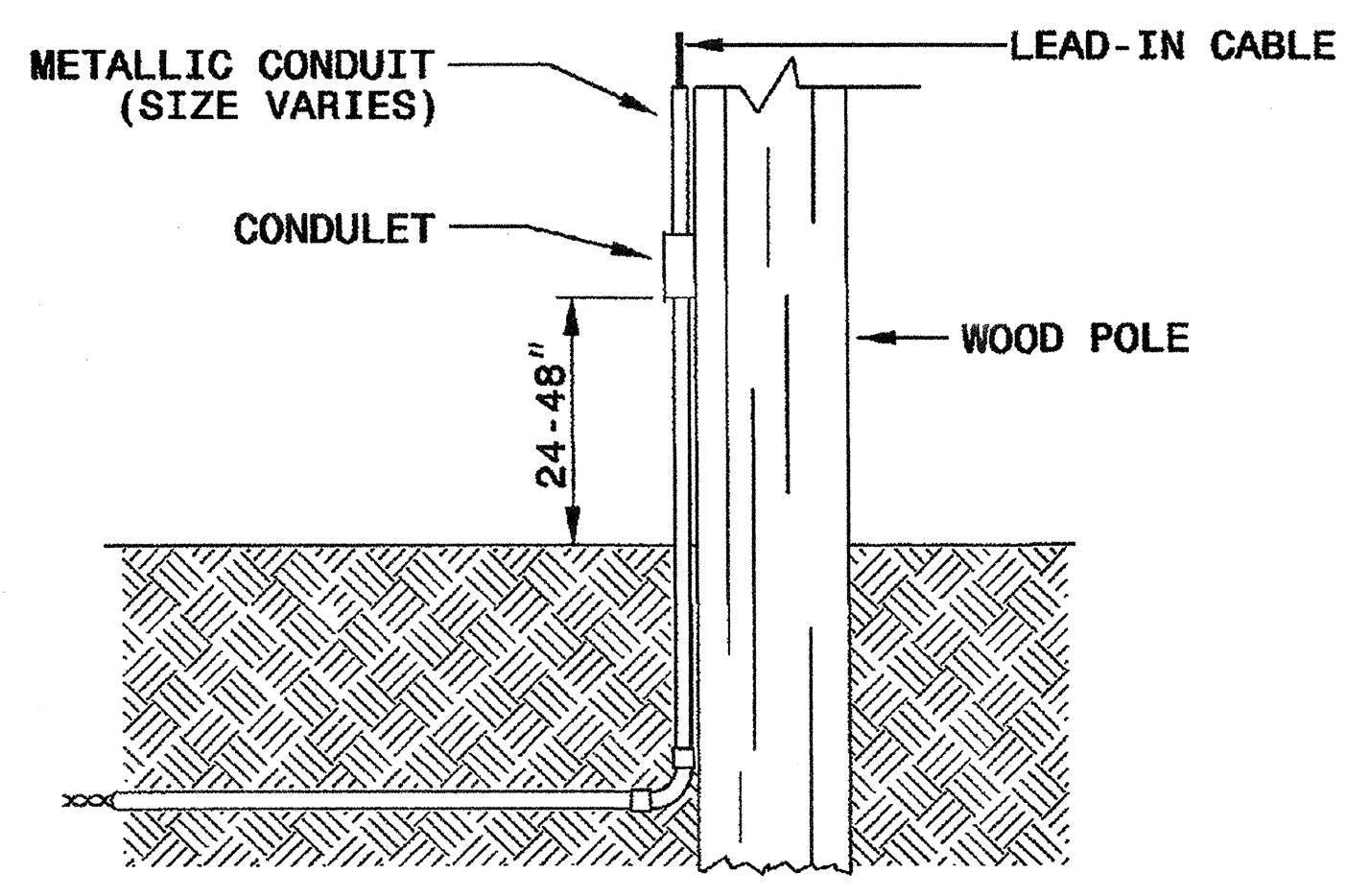
SHEET 2 OF 3
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

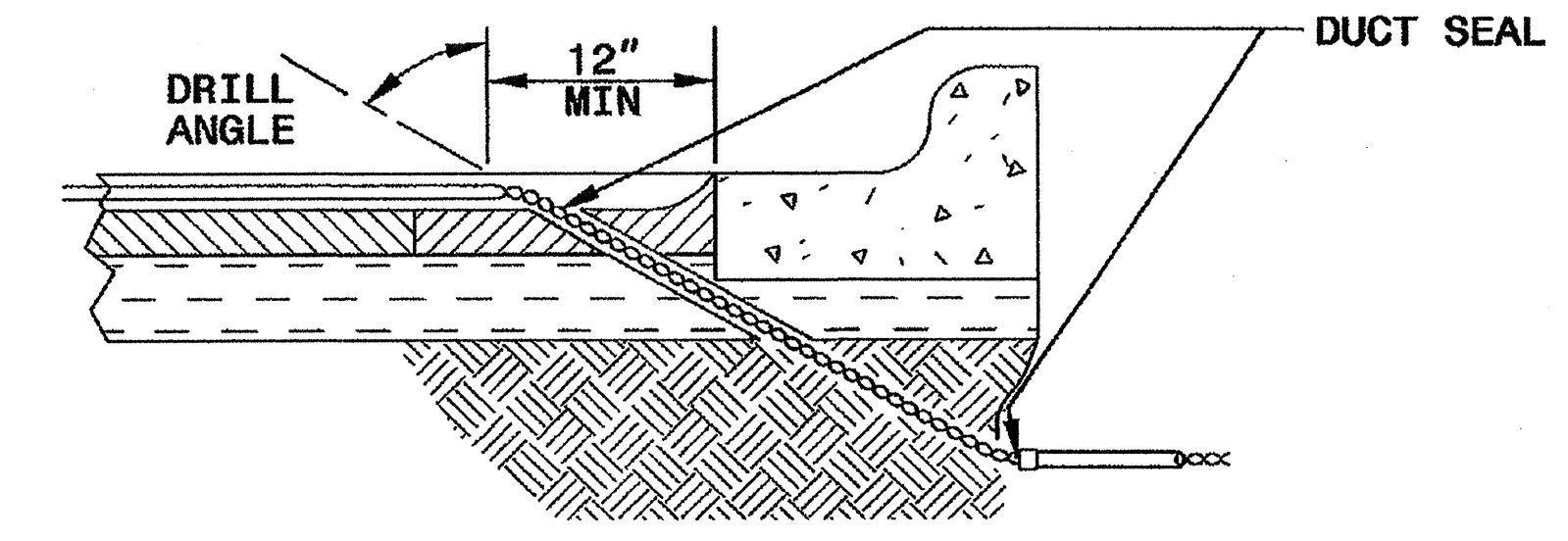


NOTE

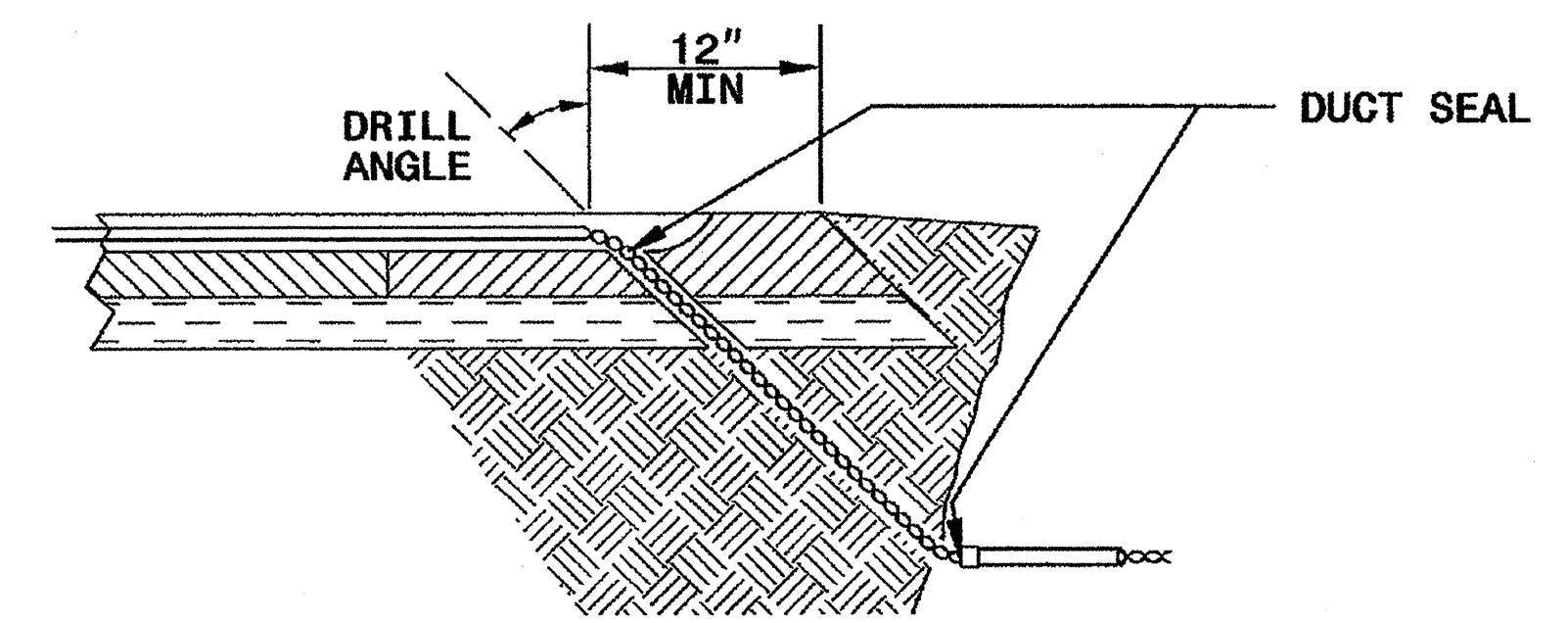
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

1. DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
2. TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
3. BEFORE SEALING LOOPS, INSTALL DUCT SEAL WHERE LOOP WIRE TAIL SECTION LEAVES SAW CUT IN PAVEMENT AND AT ENTRANCE OF CONDUIT TO JUNCTION BOX.

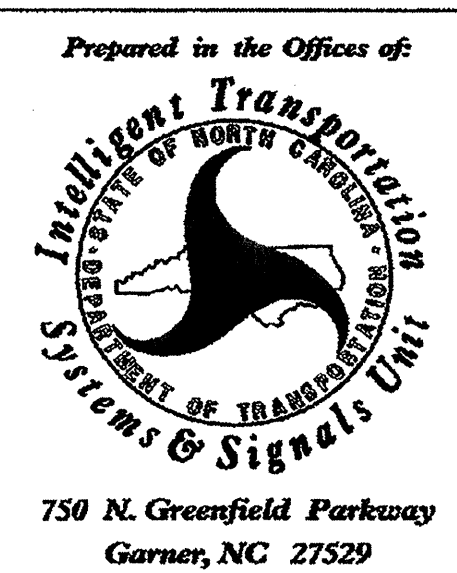
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

SHEET 2 OF 3
1725D01

See Plate for Title



SEAL

Milton J. Dean 11/24/08
SIGNATURE DATE

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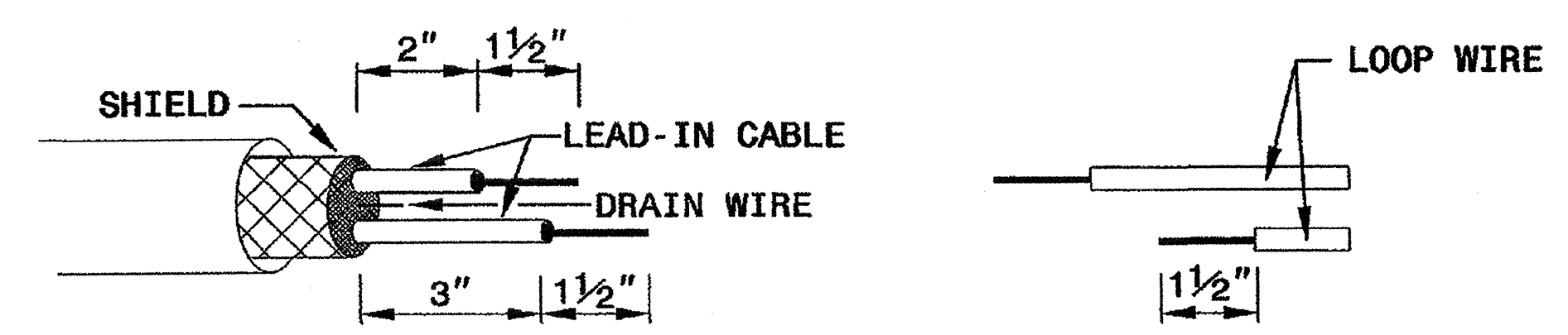
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DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

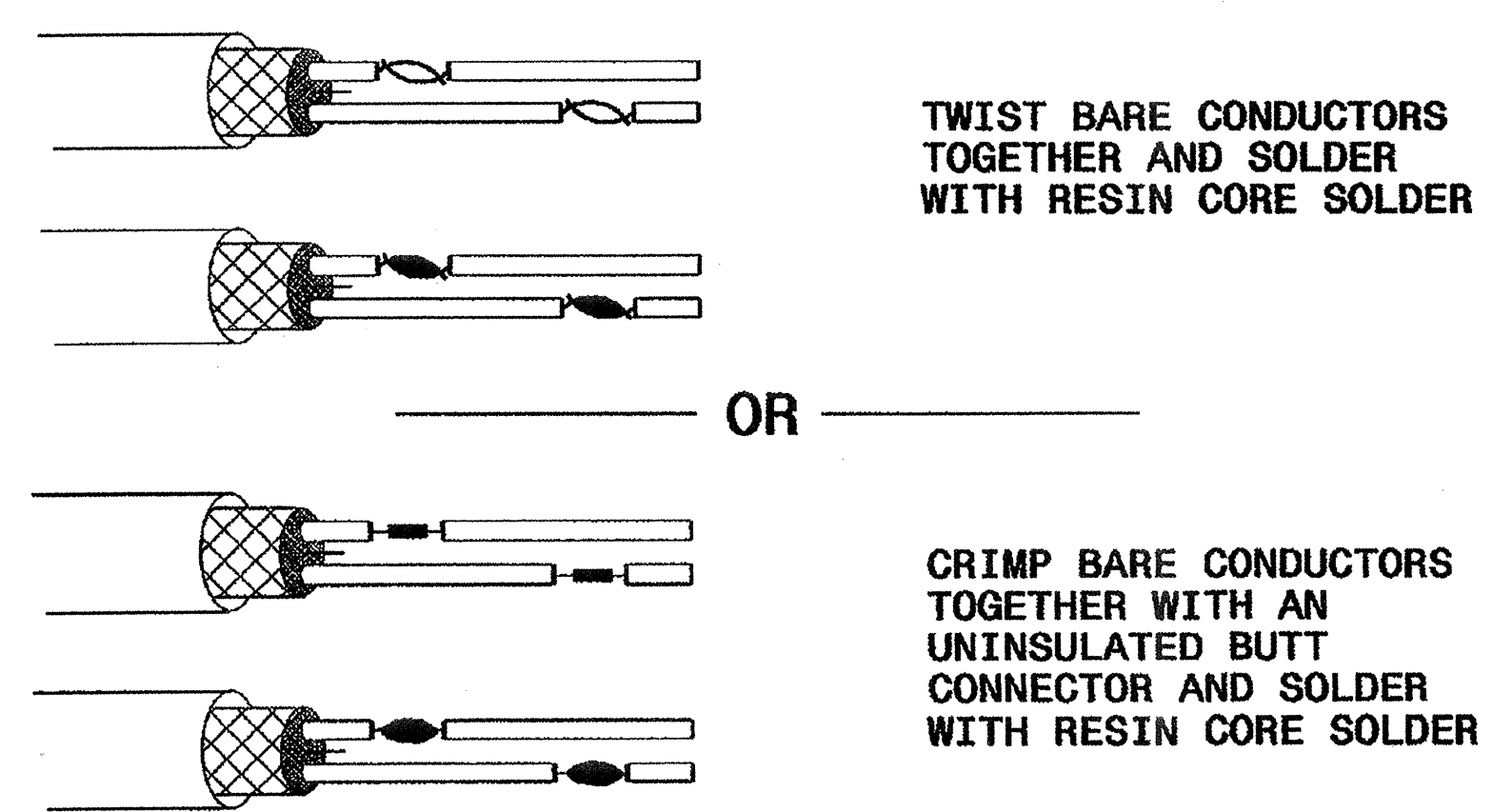
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE

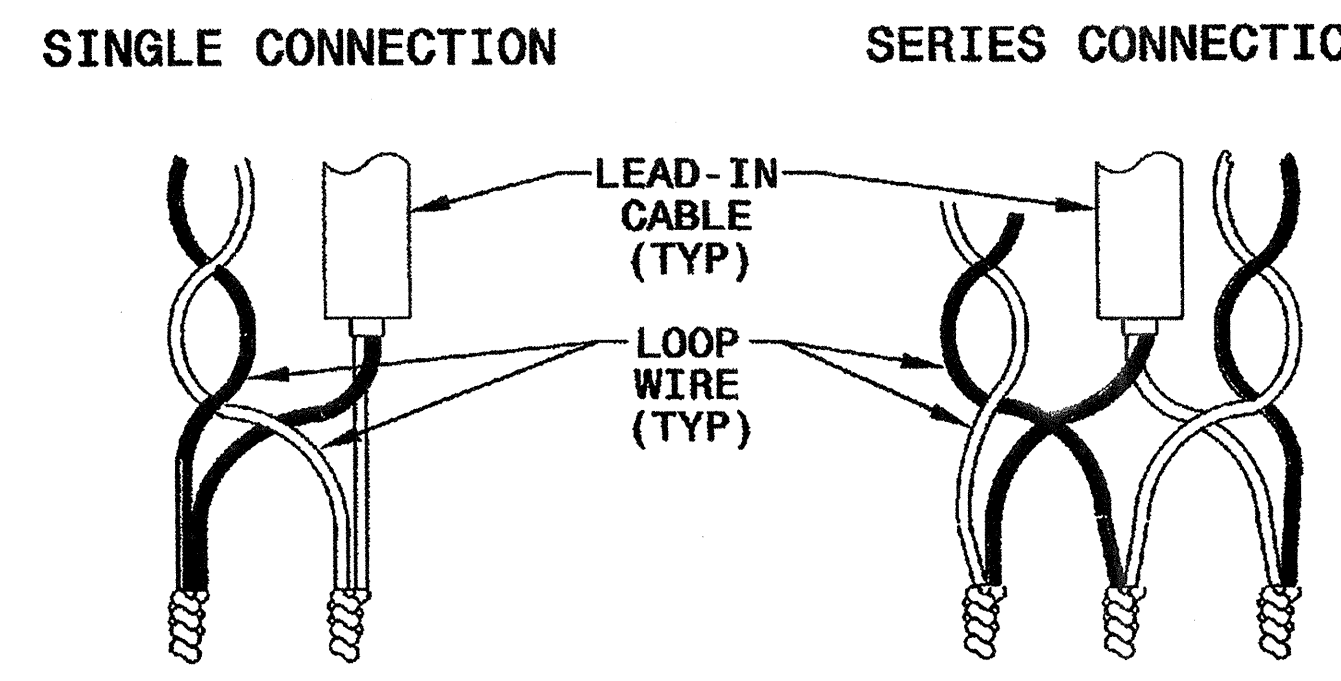


STEP 2. CONNECT AND SOLDER

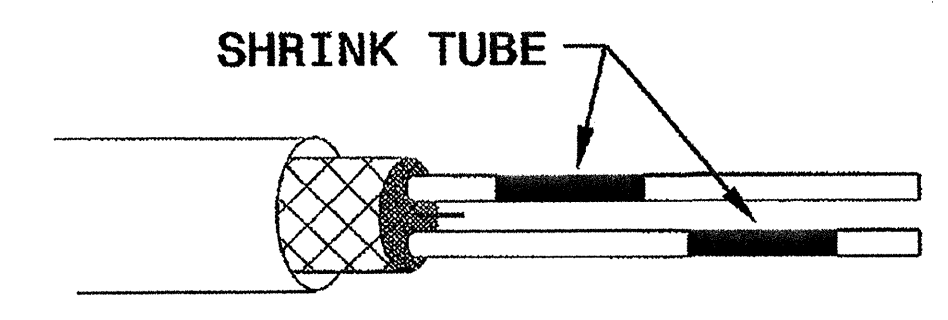


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

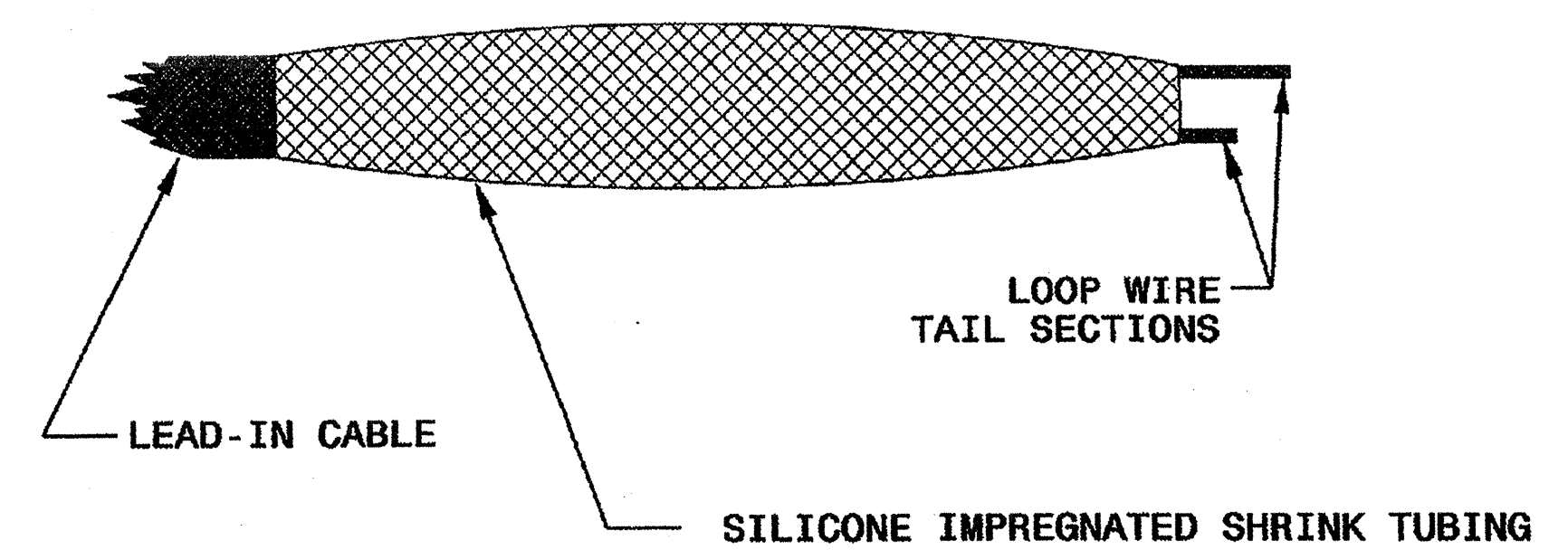
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

Milton J. Dean 11/24/08
SIGNATURE DATE

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

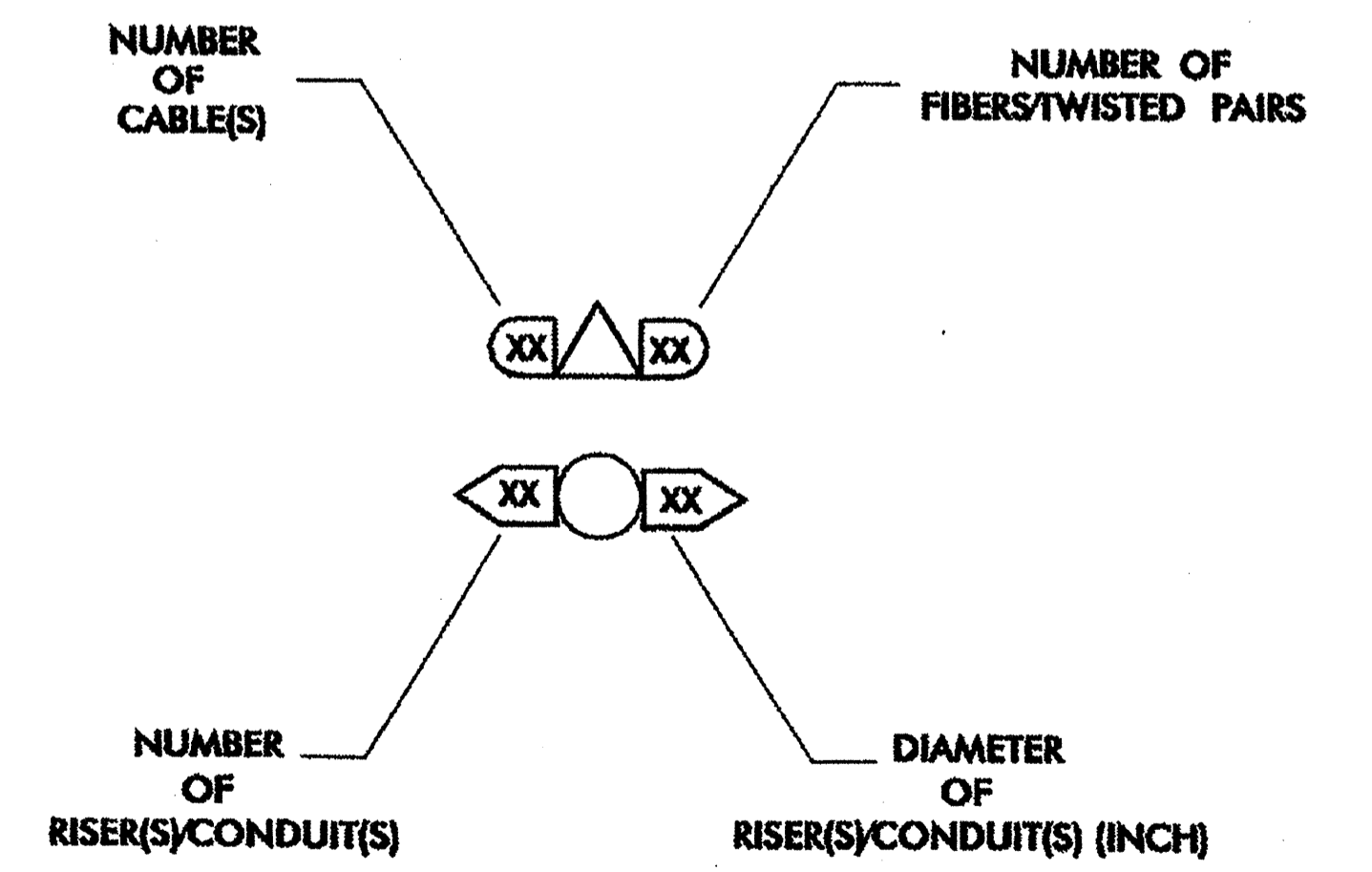
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL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

LEGEND

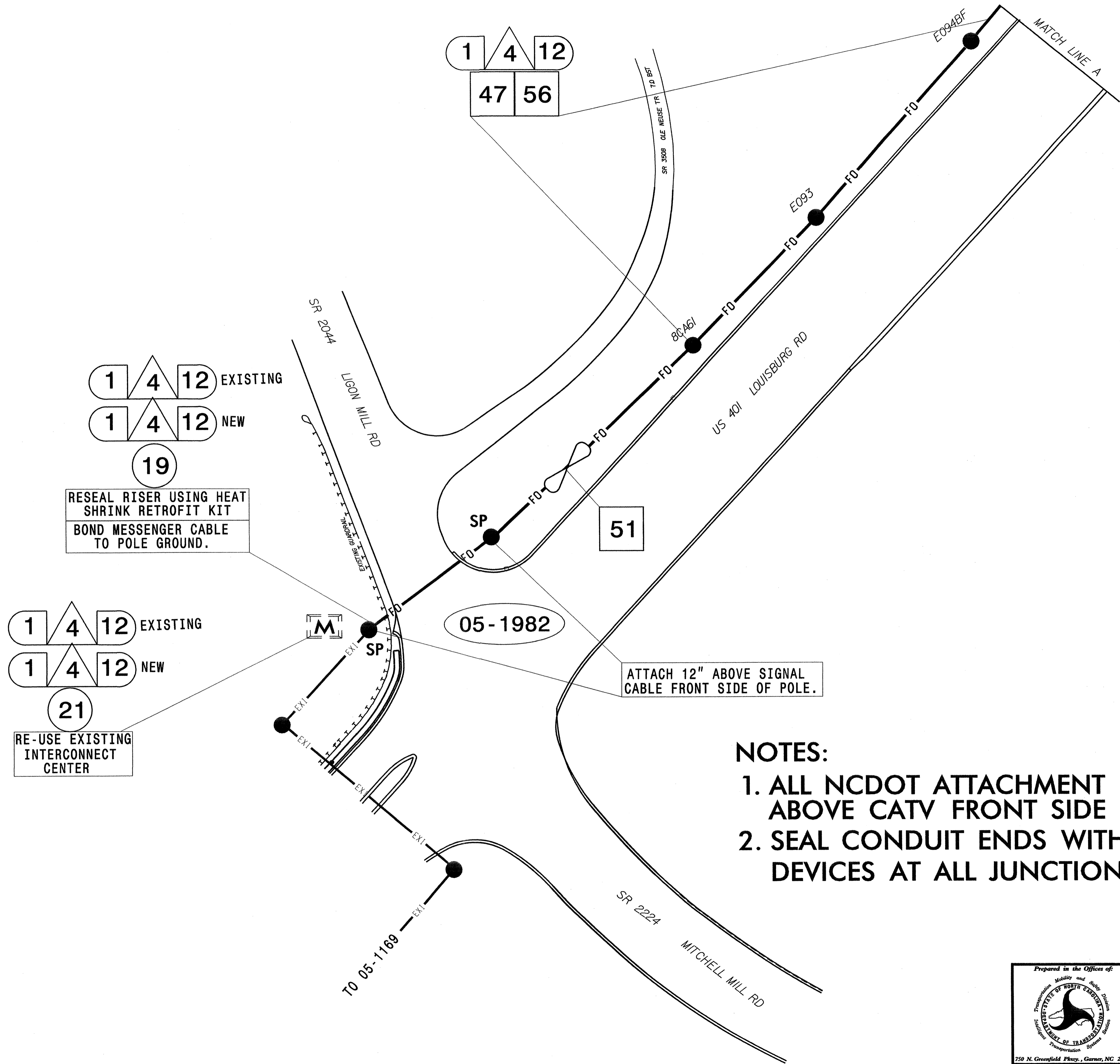
- FO NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI EXISTING COMMUNICATIONS CABLE
- REM EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD NEW DIRECTIONAL DRILLED CONDUIT
- B&J NEW BORED AND JACKED CONDUIT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

CONSTRUCTION NOTE SYMBOLOGY KEY

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



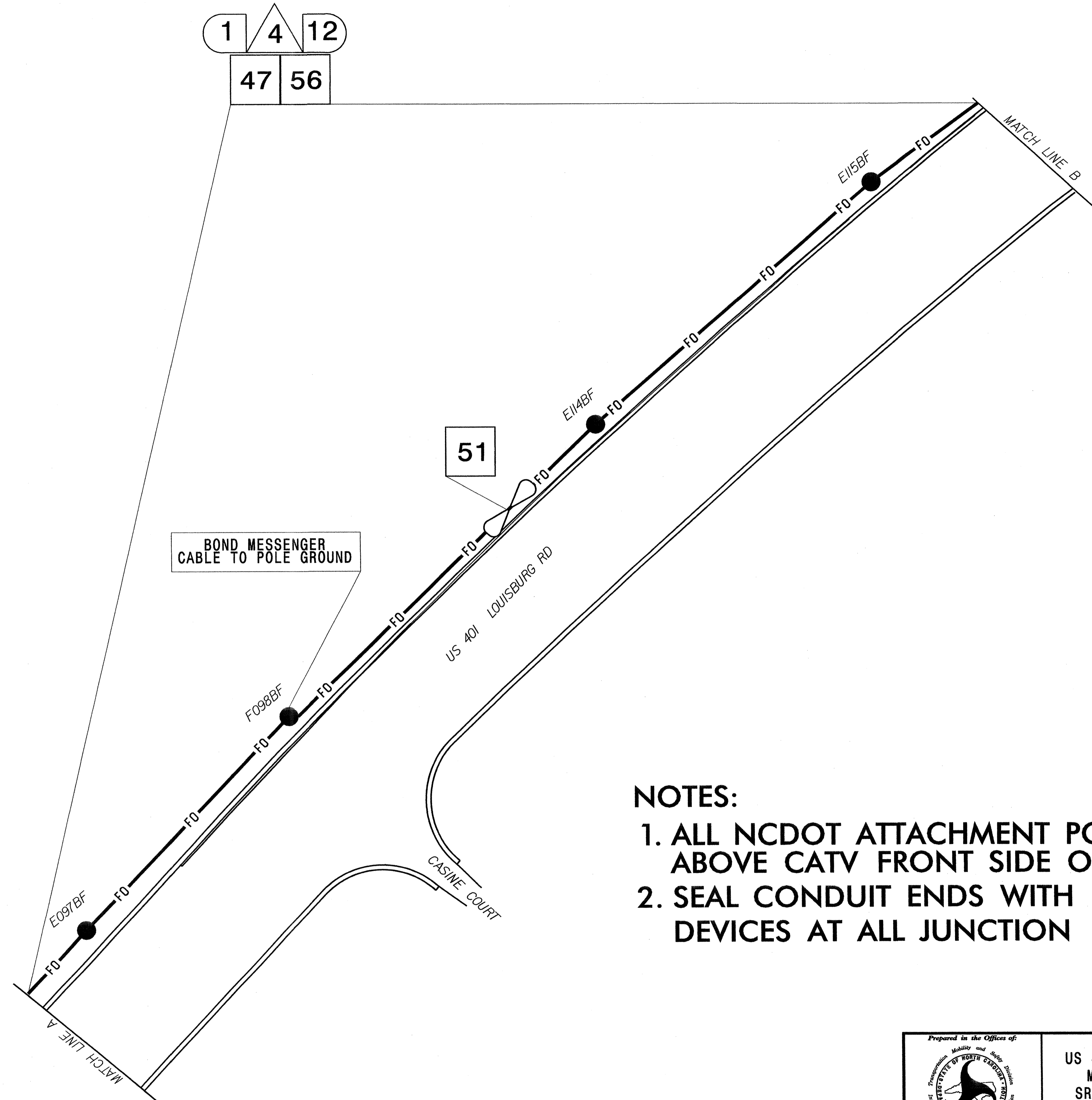
<p>Prepared in the Office of: <small>North Carolina Department of Transportation Division of Traffic Management Systems</small></p> <p>222 N. McDowell St., Raleigh, NC 27603</p>	CONSTRUCTION NOTES		SEAL							
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NOTES:

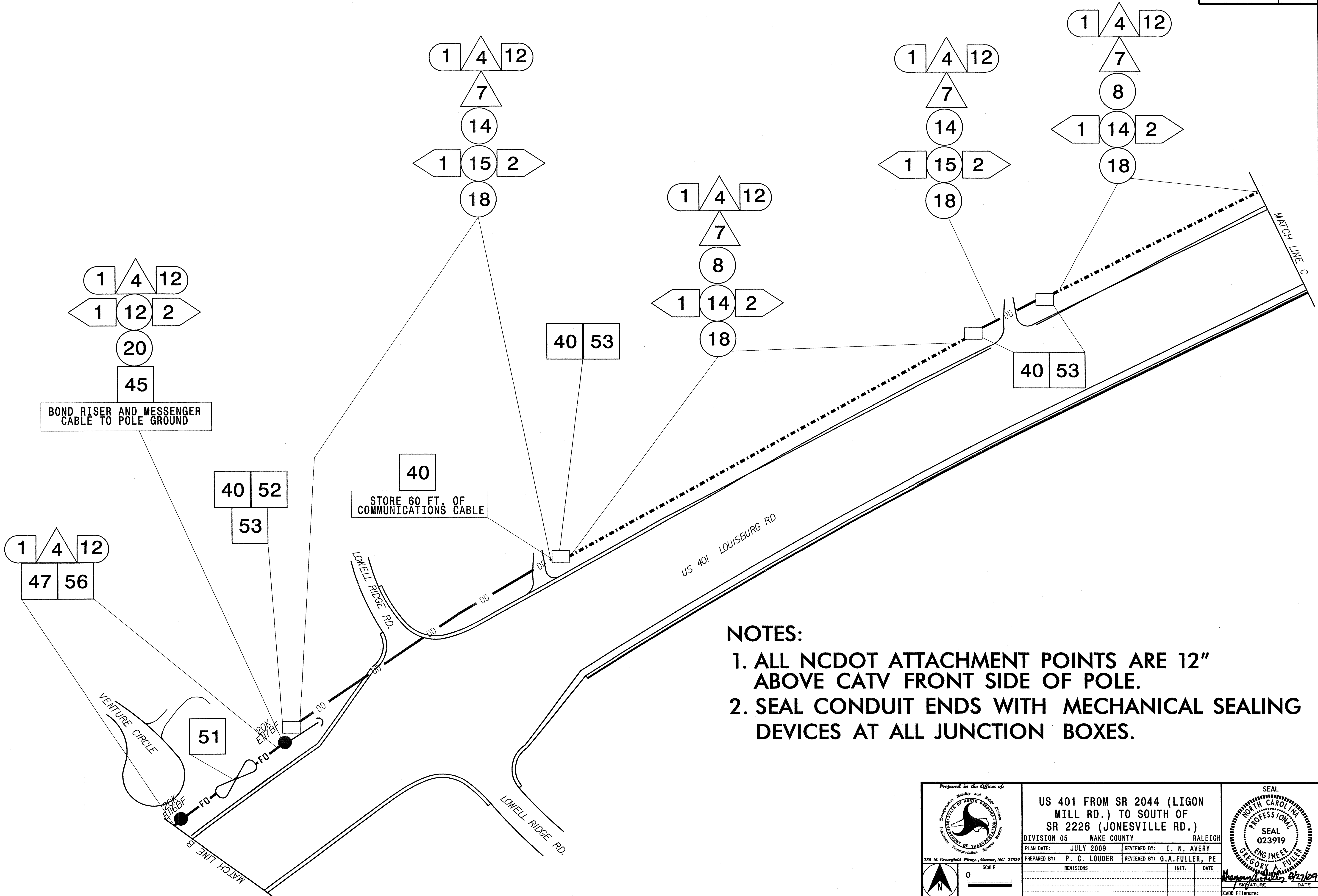
1. ALL NCDOT ATTACHMENT POINTS ARE 12" ABOVE CATV FRONT SIDE OF POLE.
2. SEAL CONDUIT ENDS WITH MECHANICAL SEALING DEVICES AT ALL JUNCTION BOXES.

	US 401 FROM SR 2044 (LIGON MILL RD.) TO SOUTH OF SR 2226 (JONESVILLE RD.)		
	DIVISION 05 WAKE COUNTY RALEIGH	PLAN DATE: JULY 2009 REVIEWED BY: I. N. AVERY	
PREPARED BY: P. C. LOUDER	REVIEWED BY: G.A. FULLER, PE	REVISIONS	INIT. DATE
SCALE: 0		SIGNATURE: <i>Gregory H. Fuller</i>	DATE: 9/21/09

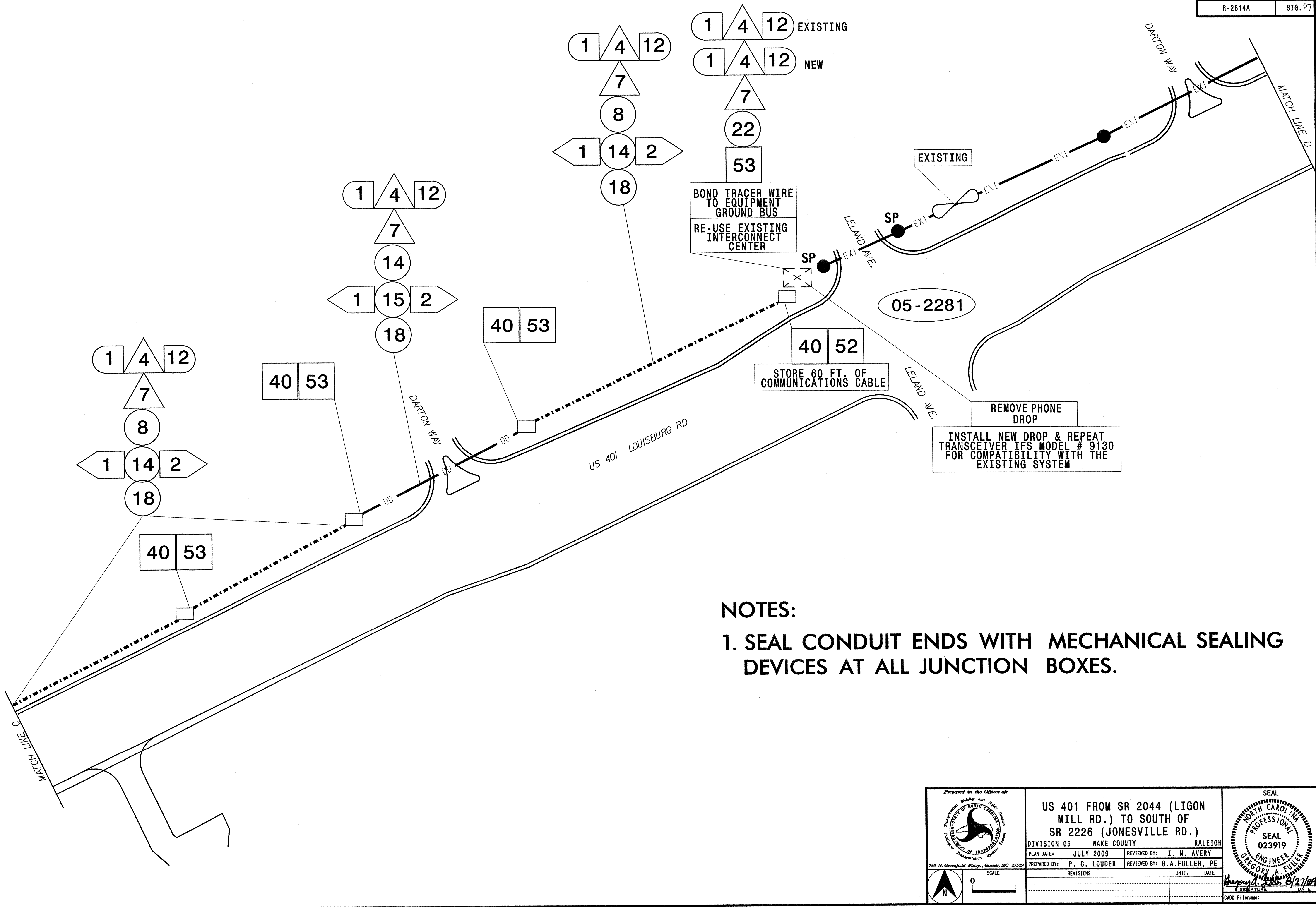


- NOTES:**
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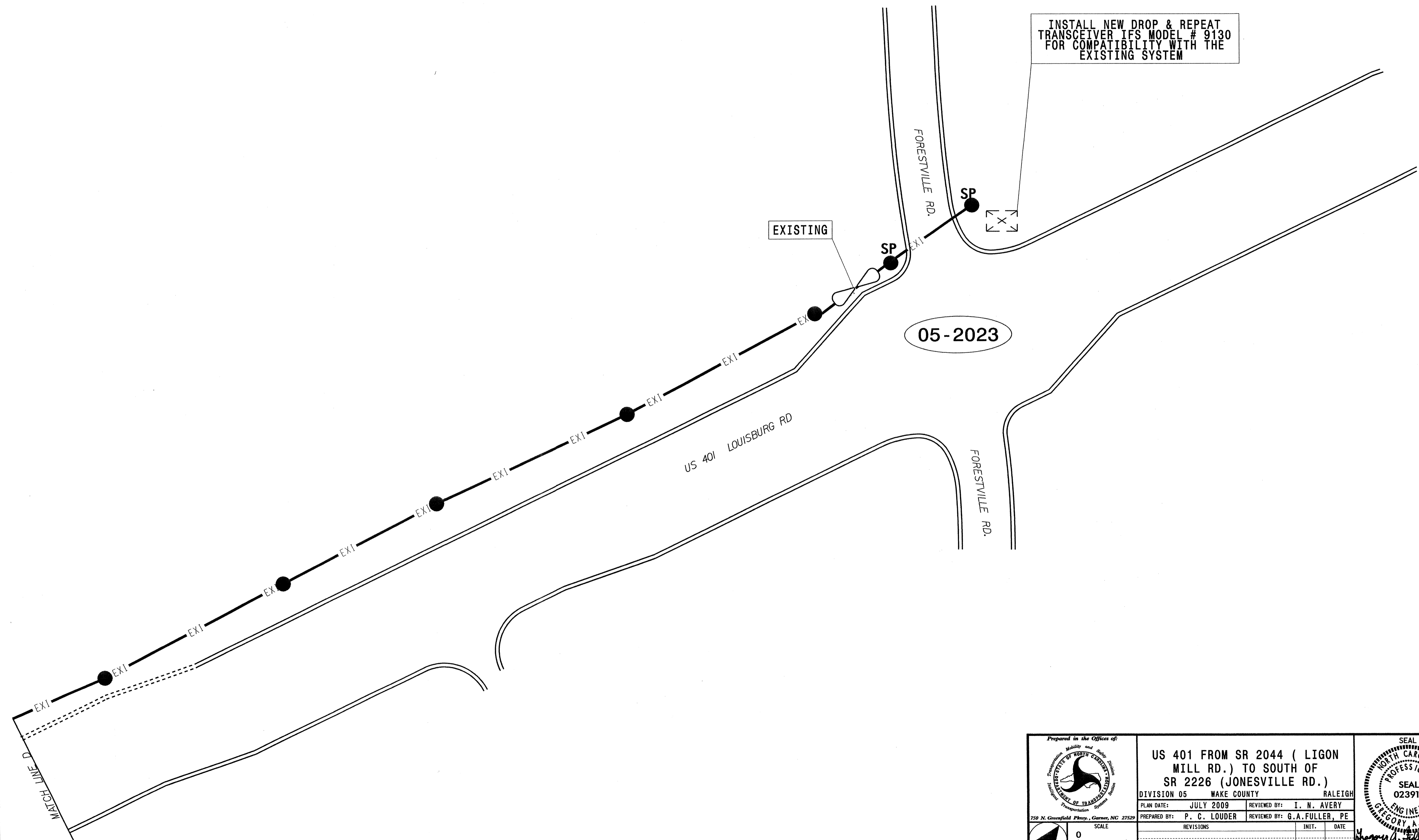
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750 N. Greenfield Pkwy., Garner, NC 27529	PREPARED BY: P. C. LOUDER	REVIEWED BY: G.A. FULLER, PE	SIGNATURE: <i>Gregory A. Fuller</i> DATE: 9/27/09
SCALE: 0	REVISIONS	INIT.	DATE



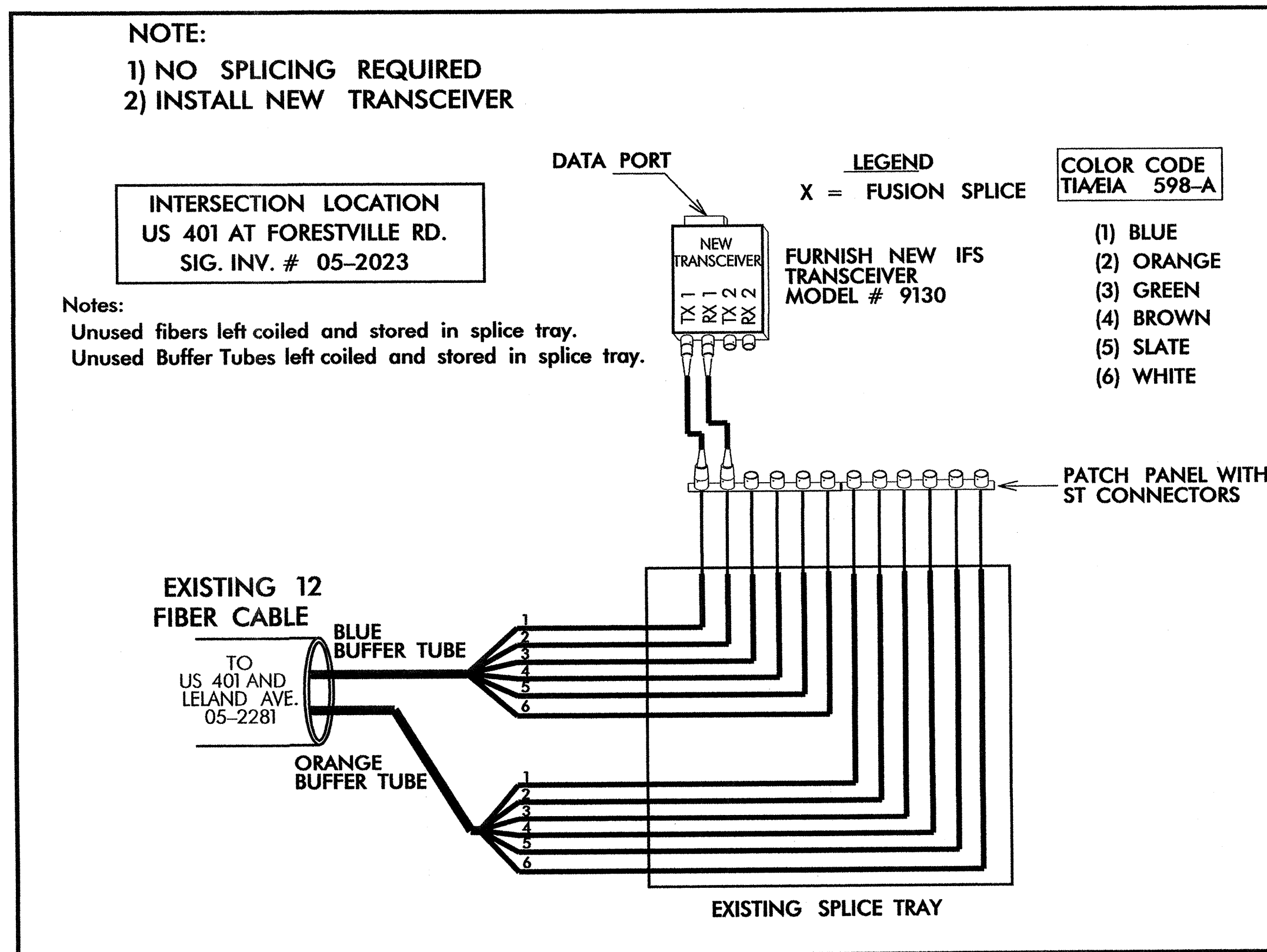
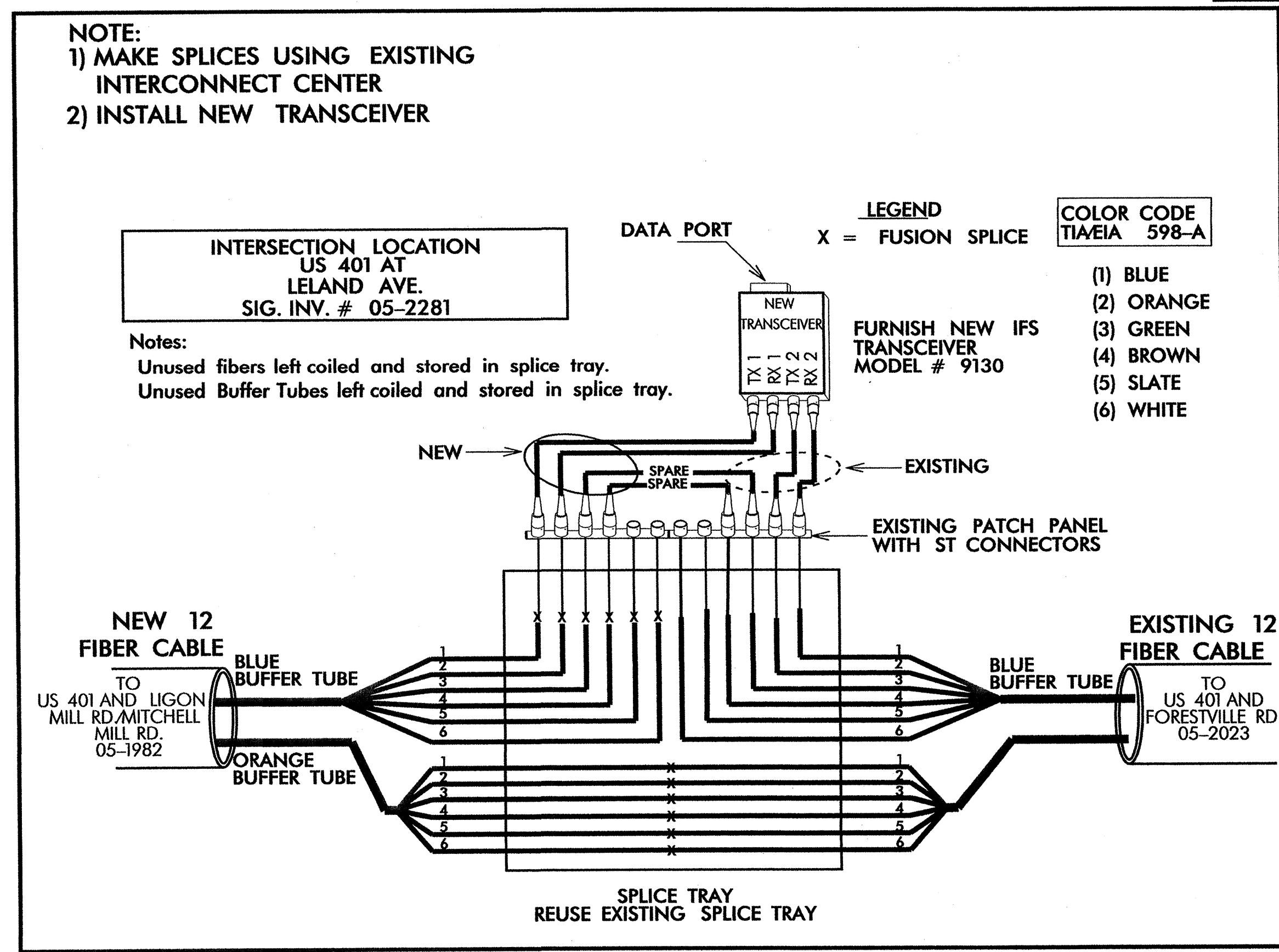
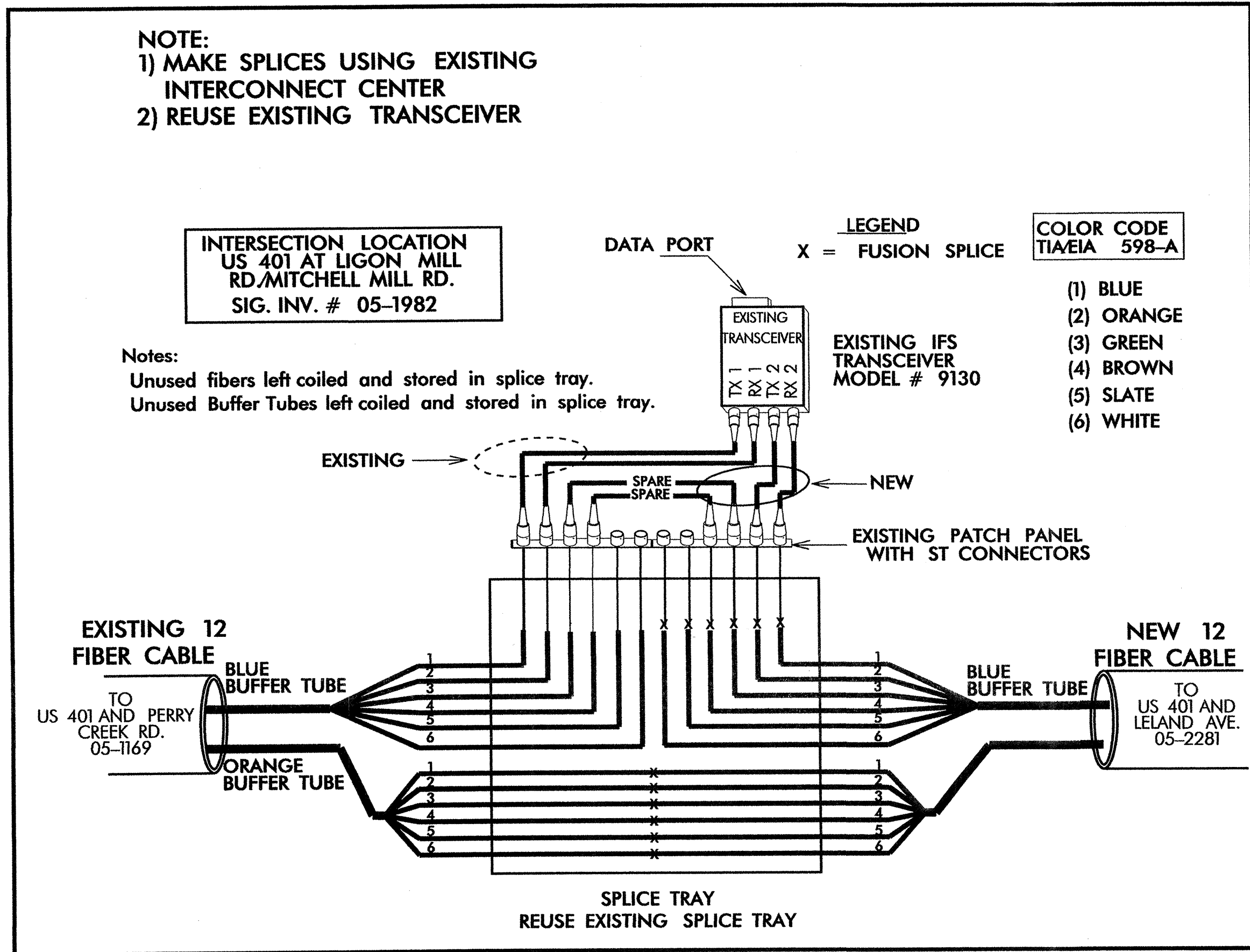
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750 N. Greenfield Pkwy., Garner, NC 27529 	SCALE: 0		SIGNATURE: <i>Gregory A. Fuller</i> DATE: 8/27/09



<p>750 N. Greenfield Place, Garner, NC 27529</p>	US 401 FROM SR 2044 (LIGON MILL RD.) TO SOUTH OF SR 2226 (JONESVILLE RD.)		
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<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>US 401 FROM SR 2044 (LIGON MILL RD.) TO SOUTH OF SR 2226 (JONESVILLE RD.)</p>							
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<p>CADD FILE NAME:</p>		<p>SIGNATURE: <i>Gregory A. Fuller</i> DATE: 8/27/09</p>						



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

<p>Prepared in the Offices of: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION</p>	US 401 FROM SR 2044 (LIGON MILL RD.) TO SOUTH OF SR 2226 (JONESVILLE RD.)		
	DIVISION 05 WAKE COUNTY RALEIGH	PLAN DATE: AUGUST 2009 REVIEWED BY: I. N. AVERY PREPARED BY: P. C. LOUDER REVIEWED BY: G. A. FULLER, PE	
SCALE 	REVISIONS	INIT. DATE	SIGNATURE DATE G. A. FULLER 8/27/09