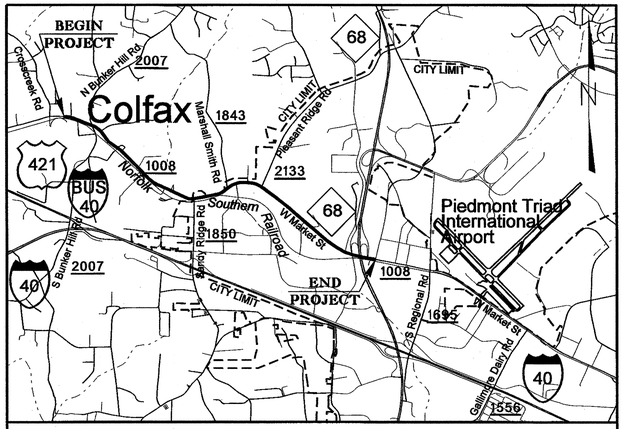
Project No.	Sheet No.
R-2611	Sig. 1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

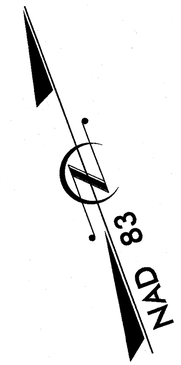
GUILFORD COUNTY

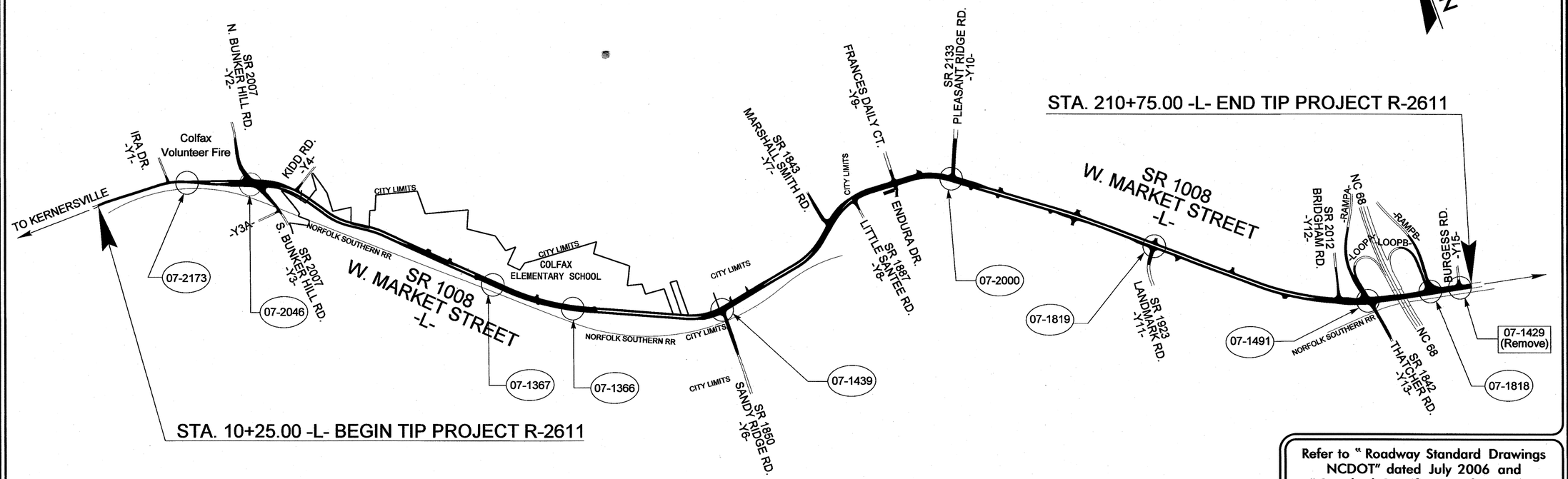
LOCATION: SR 1008 (WEST MARKET STREET) FROM WEST OF SR 2007 (BUNKER HILL RD.) AT COLFAX TO NC 68 IN GREENSBORO

TYPE OF WORK: Traffic Signals and Signal Communication Cable



VICINITY MAP





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	N/A	Title Sheet
Sig. 2–3	07–2173	SR 1008 (W. Market Street) at Colfax Volunteer Fire Dept.
Sig. 4–15	07–2046	SR 1008 (W. Market Street) at SR 2007 (Bunker Hill Road)
Sig. 16	07–1367	SR 1008 (W. Market Street) at Colfax Elementary School (West Flasher)
Sig. 17	07–1366	SR 1008 (W. Market Street) at Colfax Elementary School (East Flasher)
Sig. 18	N/A	School Flasher Sign Details
Sig. 19–40	07–1439	SR 1008 (W. Market Street) at SR 1850 (Sandy Ridge Road)
Sig. 41–56	07–2000	SR 1008 (W. Market Street) at SR 2133 (Pleasant Ridge Road)
Sig. 57–60	07–1819	SR 1008 (W. Market Street) at SR 1923 (Landmark Road)/SE Freight Entrance
Sig. 61–90	07–1491	SR 1008 (W. Market Street) at SR 1842 (Thatcher Road)/NC 68 SB Ramps
Sig. 91–106	07–1818	SR 1008 (W. Market Street) at NC 68 NB Ramps
Remove	07–1429	SR 1008 (W. Market Street) at Burgess Road
Sig. 107–112	N/A	Standard Drawings for Metal Poles
Sig. 113–115	N/A	Inductive Detetion Loop Detection
Sig. 116–129	N/A	Communications Cable Routing and Splice Plans

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

Robert J. Ziemba, 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
TRANSPORTATION MOBILITY AND SAFETY DIVISION

750 N. Greenfield Parkway, Garner, NC 27529

Project: R-2611

WBS: 34482.1.1

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PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 2

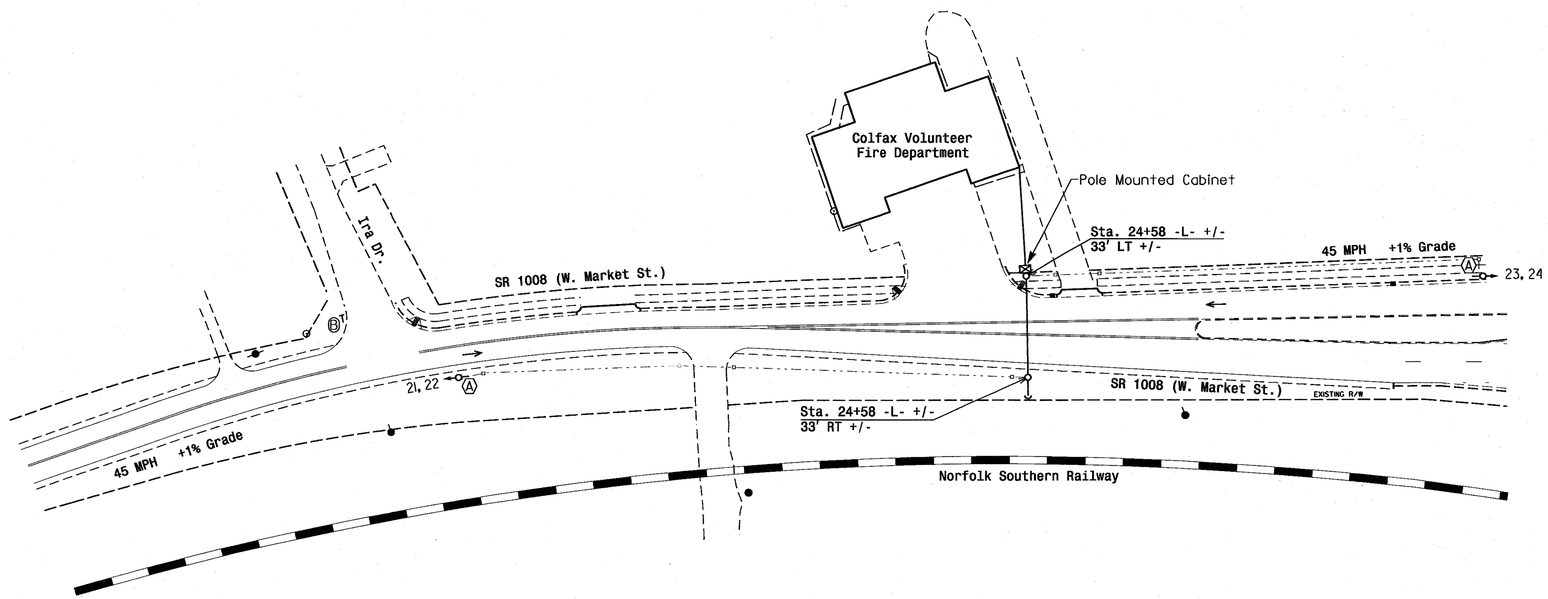
TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
21, 23	ON	OFF
22, 24	OFF	ON

SIGNAL FACE I.D.

All Heads L.E.D.

21, 22
23, 24 (Y) 12"



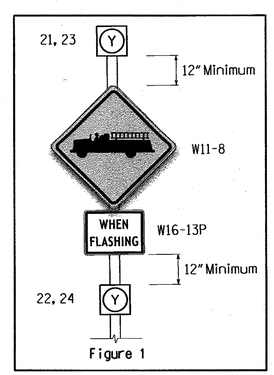


Figure 1

2-Circuit
Actuated Emergency Flasher

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Locate emergency vehicle preemption switch in the Colfax Volunteer Fire Department.
3. Locate sign A and beacons 300 Ft. from VFD driveway unless otherwise directed by the Engineer.
4. The Division Traffic Engineer will determine the Delay before Flash and the duration the beacons shall flash once activated.
5. Signal pole and cabinet locations may be adjusted in the field as directed by the Engineer.

LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
(A)	Emergency Vehicle Sign (W11-8) with "WHEN FLASHING" Plaque (W16-13p) and Warning Beacons - See Figure 1	(A)
(B)	"STOP" Sign (R1-1)	(B)

New Installation

Prepared In the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at Colfax Volunteer Fire Dept.

Division 7 Guilford County Colfax

PLAN DATE:	April 2011	REVIEWED BY:	R. Hough
PREPARED BY:	Sterling	REVIEWED BY:	

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIMBA
SIGNATURE 5/11/11 DATE
SIG. INVENTORY NO. 07-2173

11-MAY-2011 14:24
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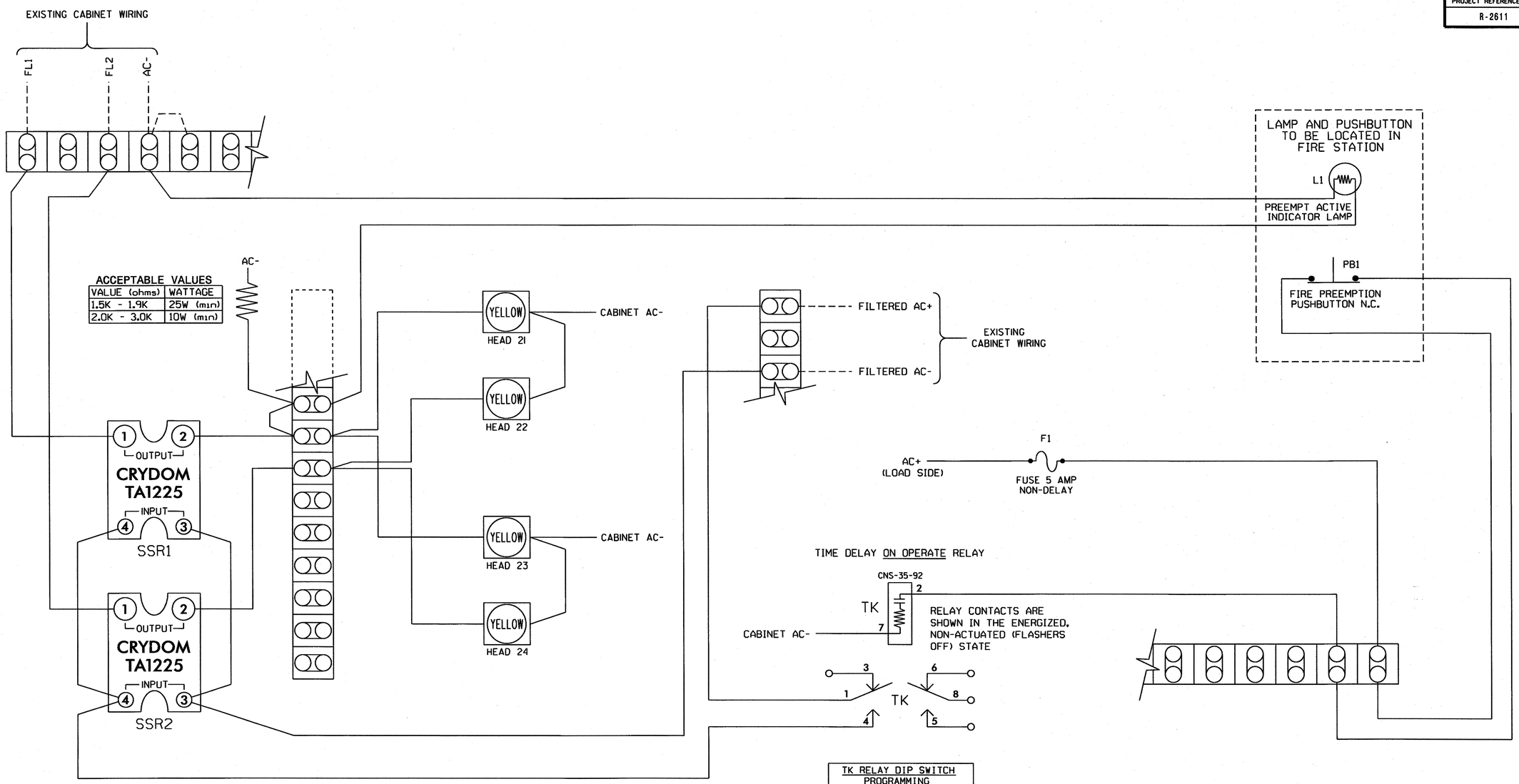
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 3

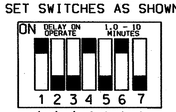


NOTES

1. RELAYS 'SSR1' & 'SSR2' ARE SPST SOLID STATE RELAYS WITH AC INPUT, AC OUTPUT. (CRYDOM #TA1225 OR APPROVED EQUAL)
2. CABINET IS A DUAL CIRCUIT NEMA FLASHER CABINET.
3. MOV'S AND TERMINAL BLOCKS ARE FURNISHED WITH THE FLASHER CABINET.
4. 'L1' IS A FULL VOLTAGE TYPE PILOT LAMP WITH RED LENS. (SQUARE-D NO. 9001AL2 OR APPROVED EQUAL)
5. 'PB1' IS A MOMENTARY ACTION PUSH BUTTON, SQUARE-D NO. 9001KRIU WITH NORMALLY CLOSED CONTACT BLOCK, SQUARE-D NO. 9001KA3. (APPROVED EQUAL MAY BE USED)
6. PUSH BUTTON AND PILOT LAMP TO BE MOUNTED IN A SURFACE TYPE WALL BOX. (HOFFMAN PART NO. E1PB OR APPROVED EQUAL)
7. RELAY 'TK' IS A MULTIFUNCTION TIME-DELAY RELAY DPDT WITH 120V AC COIL. (TYCO P&B NO. CNS-35-92 OR APPROVED EQUAL)

TK RELAY DIP SWITCH PROGRAMMING

SET SWITCHES AS SHOWN



SET TIME ON KNOB OF RELAY PER NOTE BELOW*

■ DENOTES POSITION OF SWITCH

*TIME TO BE DETERMINED BY FIELD TRIALS

IMPORTANT!!

REMOVE BONDING JUMPER BETWEEN AC NEUTRAL AND EQUIPMENT GROUND IN FLASHER CABINET IF A SIMILAR JUMPER IS INSTALLED IN EITHER METER BASE OR DISCONNECT ENCLOSURE.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2173
DESIGNED: April 2011
SEALED: 5/11/11
REVISED: N/A

New Installation

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering & Safety Systems Branch
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at Colfax Volunteer Fire Dept.

Division 7 | Guilford County | Colfax

PLAN DATE: May 2011	REVIEWED BY: T. Jay		
PREPARED BY: S. Armstrong	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 5/12/11
SIGNATURE DATE
SIG. INVENTORY NO. 07-2173

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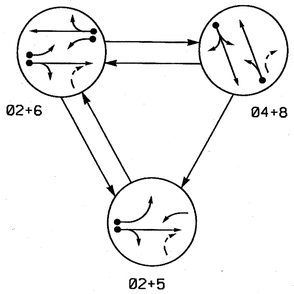
SARMSTRONG

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

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

F Y = Flashing Yellow Arrow

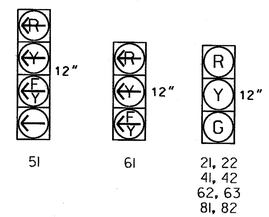
STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ←	TO F Y	TO ~~R~~
	1 2	1 2	1 2
←	← ←	~~Y~~ ~~R~~	~~Y~~ ~~R~~
F Y	F Y F Y	F Y F Y	~~Y~~ ~~R~~
~~R~~	~~R~~ ~~R~~	~~R~~ ~~R~~	~~R~~ ~~R~~

F Y = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



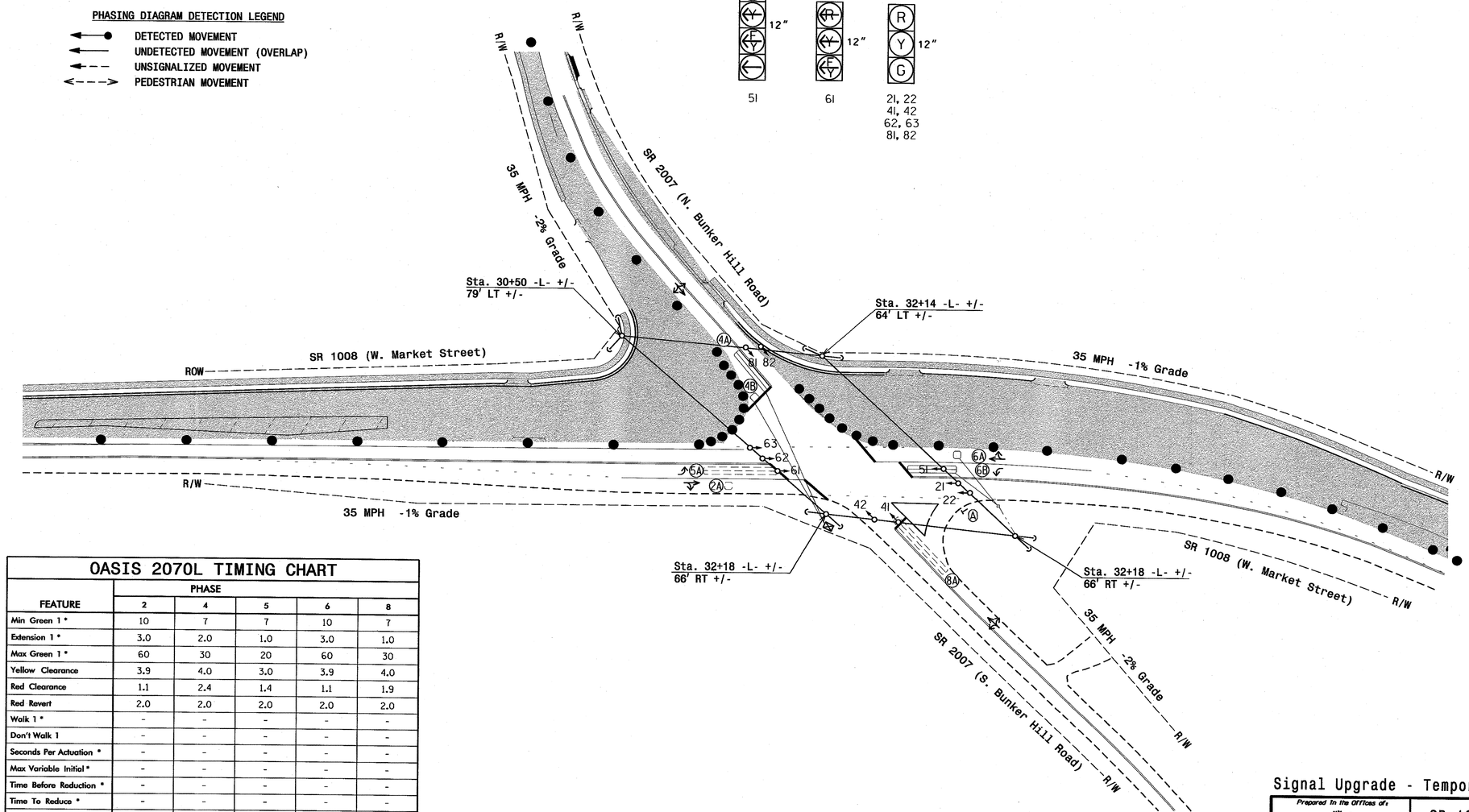
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	70	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6X60	0	2-4-2	Y	4	Y	Y	-	-	3	-	Y
4B	6X6	0	3	Y	4	Y	Y	-	-	15	-	Y
5A	6X60	+5	2-4-2	-	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
6A	6X6	70	EXISTING	Y	6	Y	Y	-	-	-	-	Y
6B	6X60	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
8A	6X60	+5	2-4-2	-	8	Y	Y	-	-	3	-	Y

3 Phase Fully Actuated (Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing unless otherwise noted.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Construction Area	
	Construction Zone Drums	
	"YIELD" Sign (R1-2)	

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	7	10	7
Extension 1 *	3.0	2.0	1.0	3.0	1.0
Max Green 1 *	60	30	20	60	30
Yellow Clearance	3.9	4.0	3.0	3.9	4.0
Red Clearance	1.1	2.4	1.4	1.1	1.9
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	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 1 (Construction Phase I)

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, NC Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 50 1"=50'

SR 1008 (W. Market Street) at SR 2007 (Bunker Hill Road)

Division 7 Guilford County Colfax

PLAN DATE: January 2011 REVIEWED BY: R. Hough
PREPARED BY: C.E. Carter REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE 4/29/11 DATE

SIG. INVENTORY NO. 07-2046 T1

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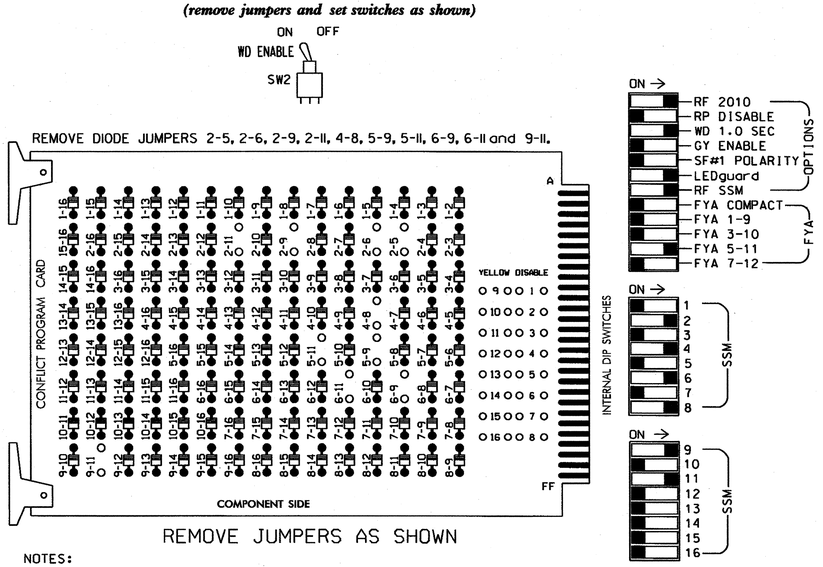
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 5

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 5,7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	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.

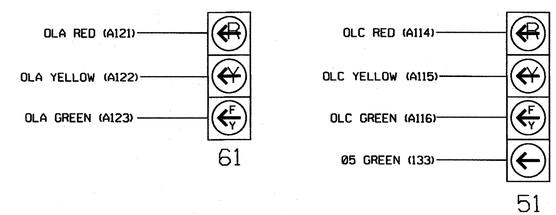
★ See pictorial of head wiring in detail below.

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,S4,S5,S6,S8,S9,S12
PHASES USED.....2,4,5,6,8
OVERLAP "A".....2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for signal head 51 requires special logic programming. See sheet 2 of 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"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B				NOT USED								

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			
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

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

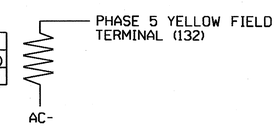
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2046 T1
DESIGNED: January 2011
SEALED: 04/29/11
REVISED:

ELECTRICAL DETAIL - TEMP 1 - SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 Guilford County Colfax

PLAN DATE: April 2011	REVIEWED BY: T. Jga
PREPARED BY: C. Strickland	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C Brown 5/3/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2046 T1

02-MAY-2011 09:27
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$$$$TSK$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 6

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

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.

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

```
LOGICAL I/O COMMAND #1  (+/-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
```

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

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

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

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

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

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:            |123456789101112131415 16
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:            |123456789101112131415 16
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: 07-2046 T1
DESIGNED: January 2011
SEALED: 04/29/11
REVISED:

ELECTRICAL DETAIL - TEMP 1 - SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 Guilford County Colfax

PLAN DATE: April 2011	REVIEWED BY: T. Jogg		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

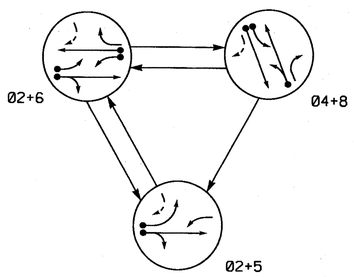
George C Brown 5/3/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2046 T1

02-MAY-2011 09:28
S:*TSGSU*ITS Signals*Workgroups*Sig Mgmt*Strickland*072046.sm.ele_xxx.dgn
ds8:f:04\gmb

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 7

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

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

F Y = Flashing Yellow Arrow

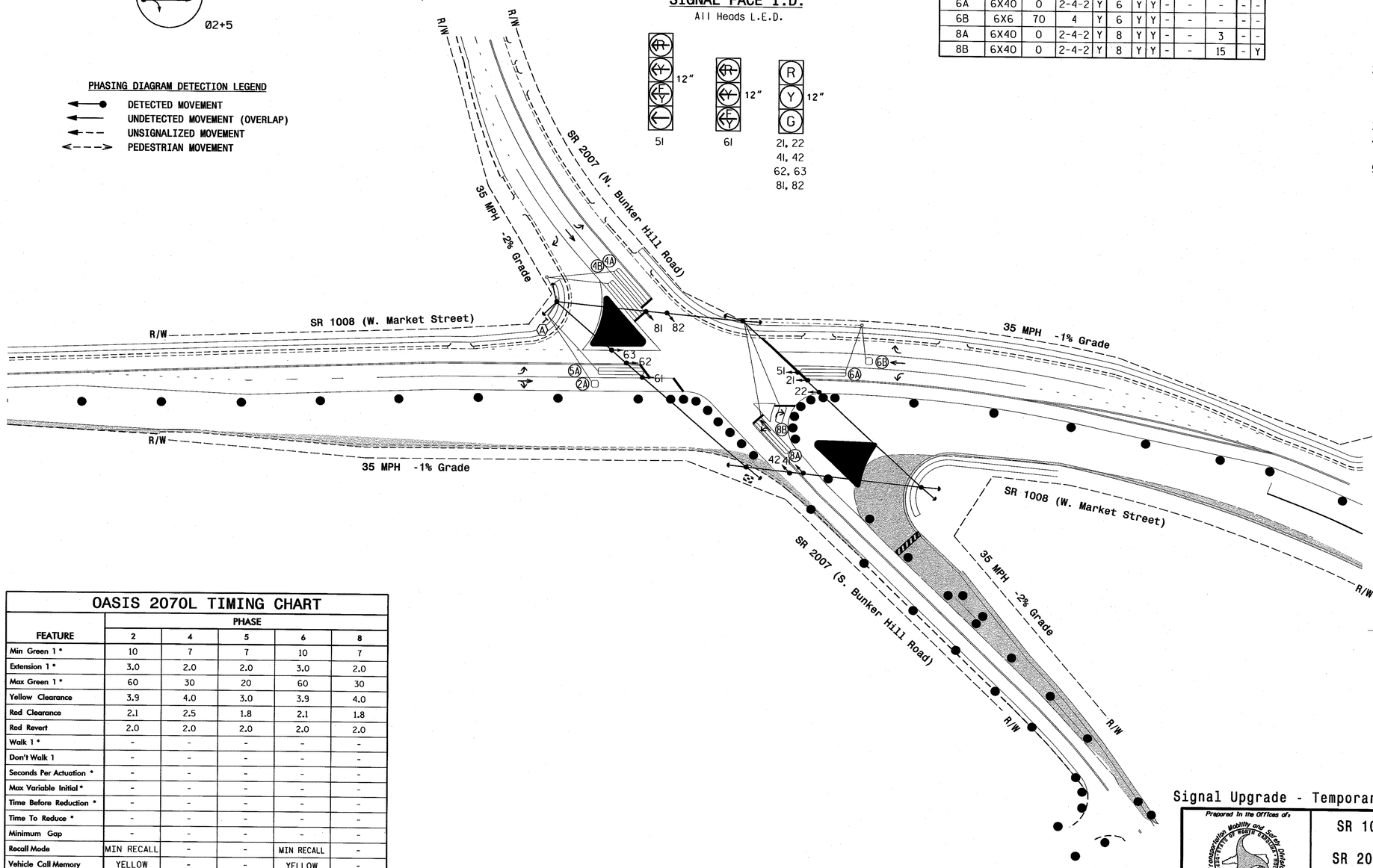
STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F Y 1	TO F Y 2	TO R 1	TO R 2
←	←	←	Y	R	Y	R
F Y	F Y	F Y	F Y	F Y	Y	R
R	R	R	R	R	R	R

F Y = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS: 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	70	4	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	-	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
6A	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	-
6B	6X6	70	4	Y	6	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	3	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	15	-	Y

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	7	10	7
Extension 1 *	3.0	2.0	2.0	3.0	2.0
Max Green 1 *	60	30	20	60	30
Yellow Clearance	3.9	4.0	3.0	3.9	4.0
Red Clearance	2.1	2.5	1.8	2.1	1.8
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	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.

3 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition all signal heads to accomodate lane shifts.
5. Set all detector units to presence mode.

LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	New Construction	
	Construction Zone Drums	
	"YIELD" Sign (R1-2)	

Signal Upgrade - Temporary Design 2 (Construction Phase II)

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy, Garner, NC 27529

SR 1008 (W. Market Street) at SR 2007 (Bunker Hill Road)

Division 7 Guilford County Colfax

PLAN DATE: January 2011	REVIEWED BY: R. Hough
PREPARED BY: C.E. Carter	REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

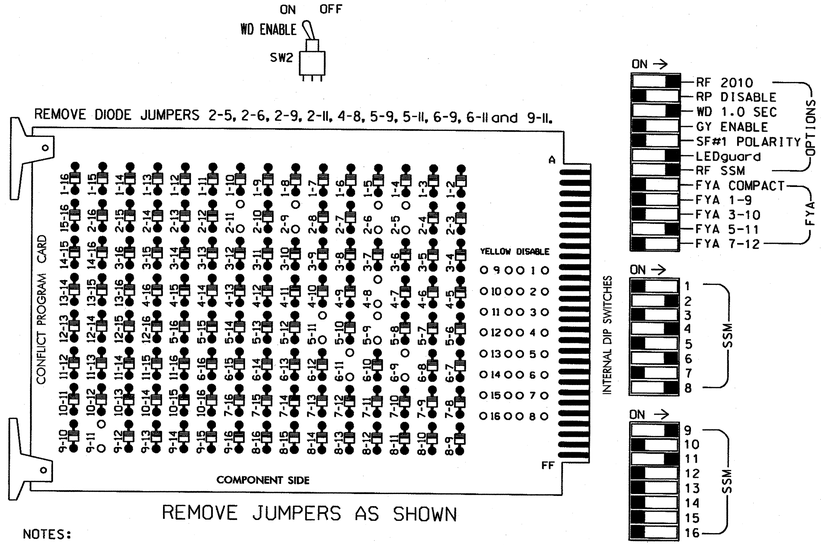
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE
DATE 2/29/11
SIG. INVENTORY NO. 07-2046 T2

02-MAY-2011 10:19
P:\TIPProjects\R-2611\Traffic\Signals\Design\Signals\07-2046\07204612_sig_dsn_20110429.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 8

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

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, 5,7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	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.

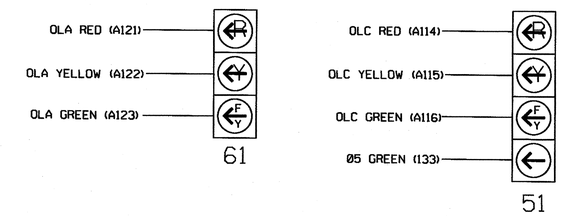
★ See pictorial of head wiring in detail below.

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,S4,S5,S6,S8,S9,S12
PHASES USED.....2,4,5,6,8
OVERLAP "A".....2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for signal head 51 requires special logic programming. See sheet 2 of 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"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B				Ø8 8B								

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
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			
5A[1]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
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			15

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

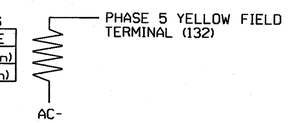
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2046 T2
DESIGNED: January 2011
SEALED: 04/29/11
REVISED:

ELECTRICAL DETAIL - TEMP 2 - SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 Guilford County Colfax

PLAN DATE: April 2011	REVIEWED BY: T. Jay		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/3/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2046 T2

02-MAY-2011 10:59
S:\MTS&SUM\TS Signals\workgroups\Sig Mgmt\Strickland\07046_sm_ele_xxx.dgn
$$$$FILENAME

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

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.

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

```
LOGICAL I/O COMMAND #1  (+/-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
```

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

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

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

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

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

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:            |123456789101112131415 16
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:            |123456789101112131415 16
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: 07-2046 T2
DESIGNED: January 2011
SEALED: 04/29/11
REVISED:

ELECTRICAL DETAIL - TEMP 2 - SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 | Guilford County | Colfax

PLAN DATE: April 2011 | REVIEWED BY: T. Vann
PREPARED BY: C. Strickland | REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

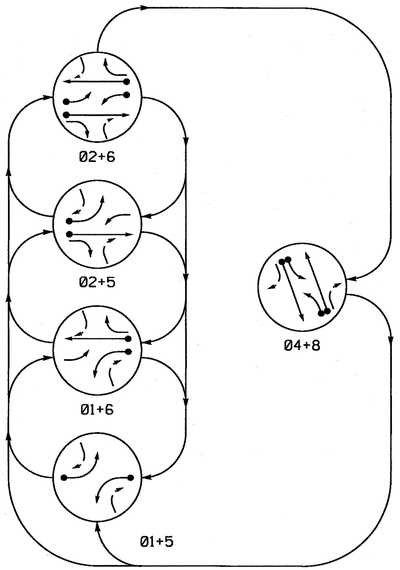
George C Brown 5/3/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2046 T2

02-MAY-2011 11:01
S:##TSSSUMITS Signals##Workgroups##Sig Mgmt##Strickland##07046_sm_ele_xxx.dgn
cdstrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 10

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←	~~←~~	F Y	F Y	~~R~~	~~Y~~
21, 22	R	R	G	G	R	Y
41, 42, 43	R	R	R	R	G	R
51	←	F Y	←	F Y	~~R~~	~~Y~~
61, 62	R	G	R	G	R	Y
81, 82, 83	R	R	R	R	G	R

F Y = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	← 2	F Y 1	F Y 2	~~R~~ 1	~~R~~ 2
←		~~←~~	~~Y~~	~~R~~	~~Y~~	~~R~~
F Y	F Y	F Y	F Y	F Y	~~Y~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

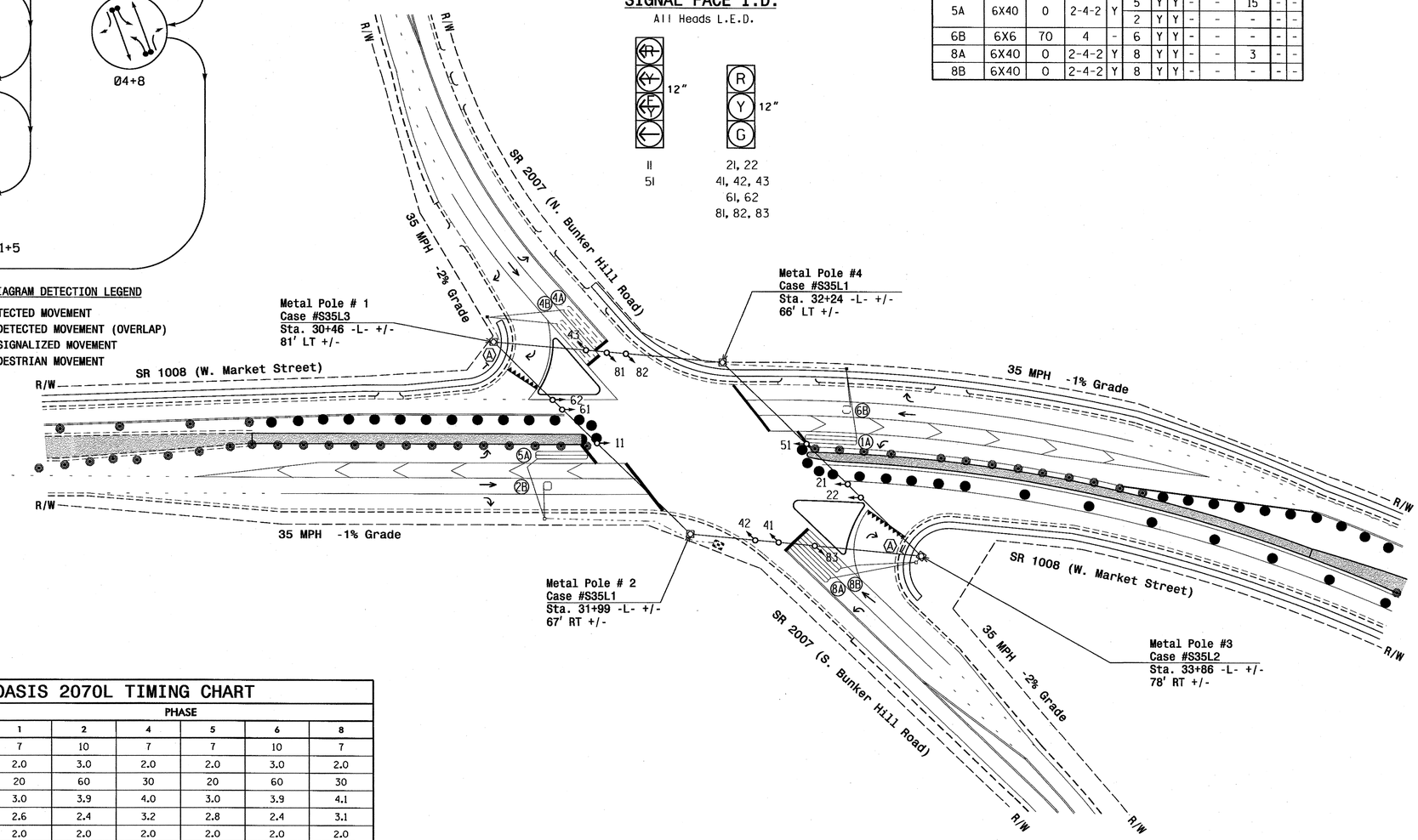
F Y = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.

11
51

21, 22
41, 42, 43
61, 62
81, 82, 83



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
					6	Y	Y	-	-	-	-	Y
2B	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
6B	6X6	70	4	-	6	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	3	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	-

5 Phase
Fully Actuated
(Isolated)

NOTES

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

LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
	New Construction	
	Construction Zone Drums	
	"YIELD" Sign (R1-2)	

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	2.0	3.0	2.0	2.0	3.0	2.0
Max Green 1 *	20	60	30	20	60	30
Yellow Clearance	3.0	3.9	4.0	3.0	3.9	4.1
Red Clearance	2.6	2.4	3.2	2.8	2.4	3.1
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	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 3 (Construction Phase III)

Prepared In the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 Guilford County Colfax

PLAN DATE:	April 2011	REVIEWED BY:	
PREPARED BY:	R. Hough	REVIEWED BY:	

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

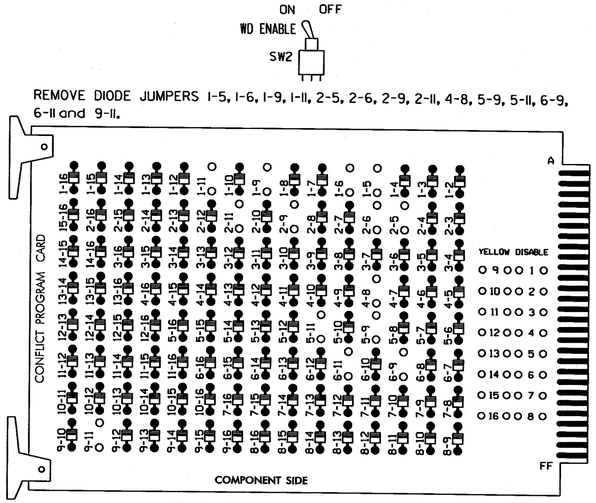
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 4/29/11 DATE
SIG. INVENTORY NO. 07-2046 T3

29-APR-2011 14:49
P:*TrProjects\R-2611\Traffic\Signals\Design\Signals\07-2046\07204613_sig_dsn_20110429.dgn
PZ-EDSD

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 11

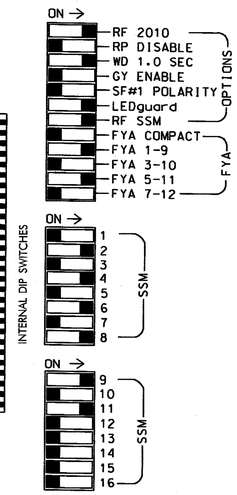
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

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.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	NOT USED	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	NOT USED	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B				Ø8 8B								

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

FS = FLASH SENSE
ST = STOP TIME

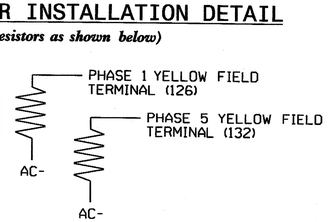
⊗ Wired Input - Do not populate slot with detector card

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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



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, 5,7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	41, 42,43	NU	51★	61,62	NU	NU	81, 82,83	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.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8,S9,S12
PHASES USED.....1,2,4,5,6,8
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

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			
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			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	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			

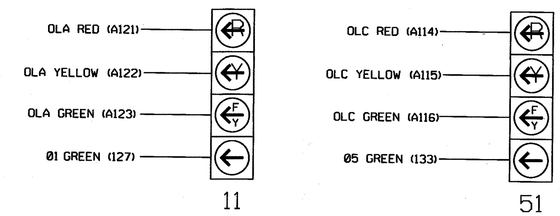
[1] Add jumper from I1-W to J4-W, on rear of input file.

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2046 T3
DESIGNED: April 2011
SEALED: 04/29/11
REVISED:

ELECTRICAL DETAIL - TEMP 3 - SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 Guilford County Colfax

PLAN DATE: April 2011	REVIEWED BY: T.Vaz		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 5/13/11
SIG. INVENTORY NO. 07-2046 T3

09-MAY-2011 10:44
S:\TSB\SHEETS\Signals\Workgroups\Sig Mgmt\Strickland\ardw07204G_sm.dgn
castrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.12

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
```

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

PRESS '+'

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

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

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

PRESS '+'

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

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

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

PRESS '+'

```
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
```

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

PRESS '+'

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

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

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

PRESS '+'

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

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

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:          ¦123456789101112131415 16
VEH OVL PARENTS:¦XX
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          ¦123456789101112131415 16
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: 07-2046 T3
DESIGNED: April 2011
SEALED: 04/29/11
REVISED:

ELECTRICAL DETAIL - TEMP 3 - SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 | Guilford County | Colfax

PLAN DATE: April 2011 | REVIEWED BY: T. Jgs
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

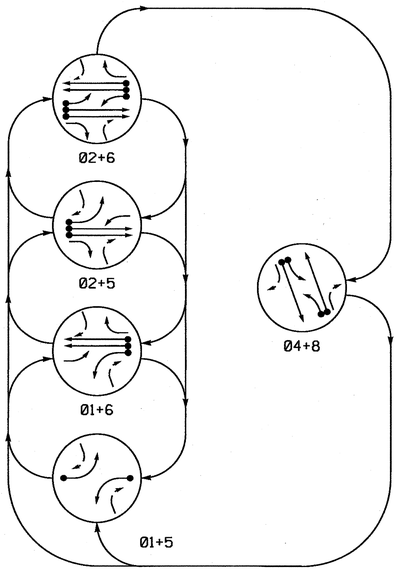
SIGNATURE | DATE 5/3/11

SIG. INVENTORY NO. 07-2046 T3

02-MAY-2011 09:10
S:\TMS\Traffic Signals\Workgroups\Sig Mon\Strickland\07046_sm_ele_xxx.dgn
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 13

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←	←	F.Y.	F.Y.	~~R~~	~~Y~~
21, 22	R	R	G	G	R	Y
41, 42, 43	R	R	R	R	G	R
51	←	F.Y.	←	F.Y.	~~R~~	~~Y~~
61, 62	R	G	R	G	R	Y
81, 82, 83	R	R	R	R	G	R

F.Y. = Flashing Yellow Arrow

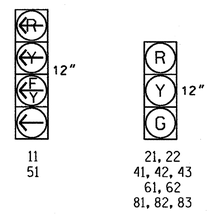
STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F.Y. 1	TO F.Y. 2	TO ~~R~~ 1	TO ~~R~~ 2
←			~~Y~~	~~R~~	~~Y~~	~~R~~
F.Y.	F.Y.	F.Y.	F.Y.	F.Y.	~~Y~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

F.Y. = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



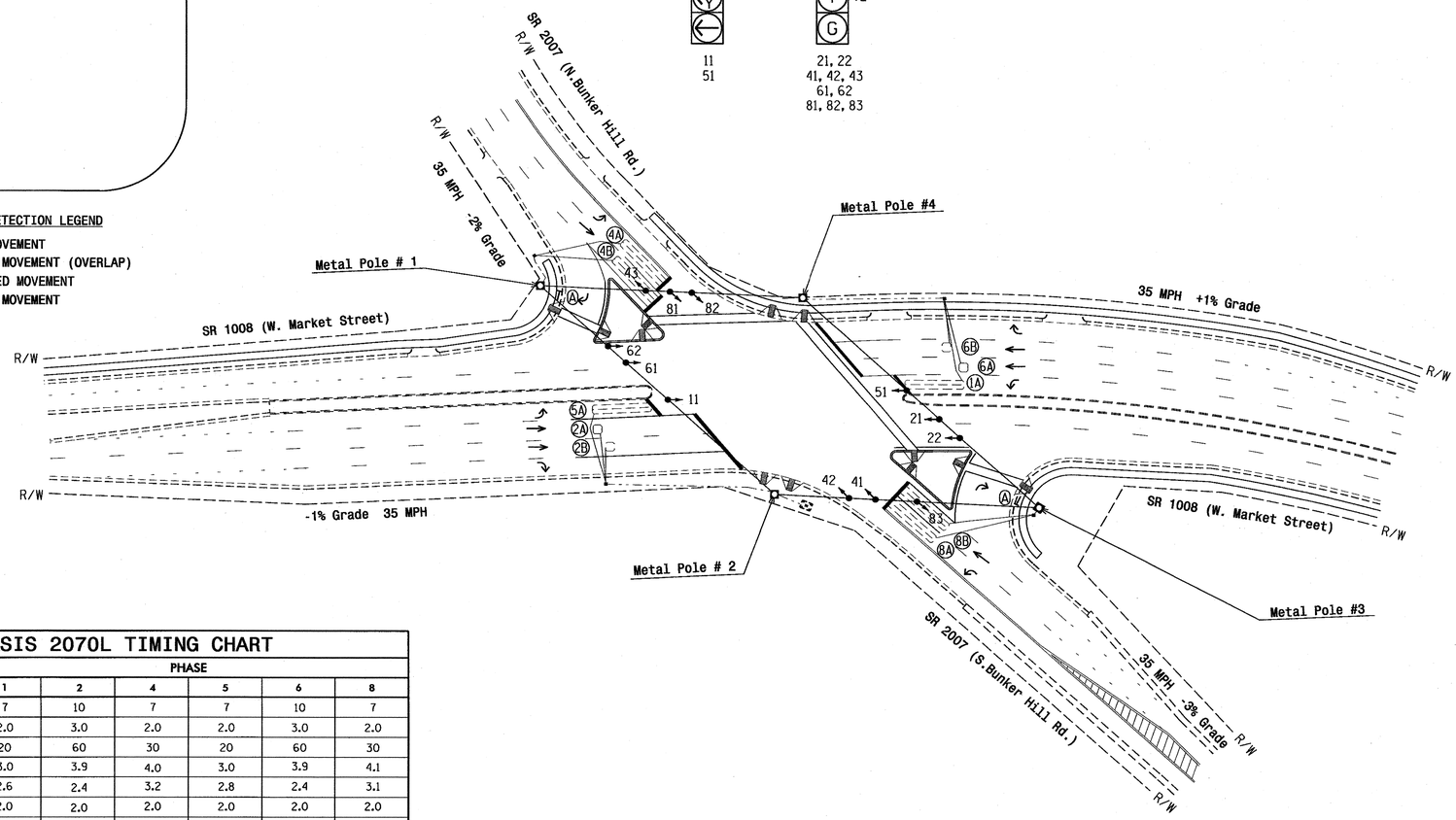
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
					6	Y	Y	-	-	-	-	-
2A	6X6	70	4	Y	2	Y	Y	-	-	-	-	-
2B	6X6	70	4	-								
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
6A	6X6	70	4	Y	6	Y	Y	-	-	-	-	-
6B	6X6	70	4	-								
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	3	-	-
8B	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	-

5 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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 21, 22, 61, and 62.
5. Set all detector units to presence mode.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
	"YIELD" Sign (R1-2)	

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	2.0	3.0	2.0	2.0	3.0	2.0
Max Green 1 *	20	60	30	20	60	30
Yellow Clearance	3.0	3.9	4.0	3.0	3.9	4.1
Red Clearance	2.6	2.4	3.2	2.8	2.4	3.1
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	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:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 Guilford County Colfax

PLAN DATE: April 2011	REVIEWED BY: Hough
PREPARED BY: M.Bazzarie	REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

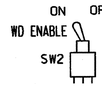
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT U. ZIEMBA
SIGNATURE 4/22/11 DATE
SIG. INVENTORY NO. 07-2046

11-MAY-2011 08:55
P:\WIPProjects-RW\2611\Traffic\Signals\Designs\Signals\07-2046\07-2046_sig_dsn_20110429.dgn
22:10:00

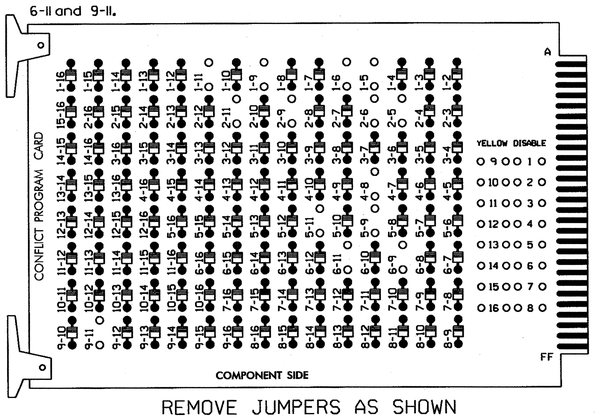
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 14

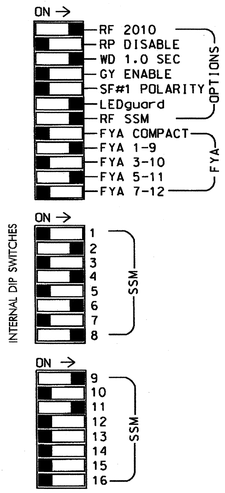
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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





REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

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.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1	Ø2	SLOT	WIRED ⊗	SLOT	Ø4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
		1A	2A	EMPTY	INPUT	EMPTY	4A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L	NOT USED	Ø2				Ø4								ST
			2B				4B								DC ISOLATOR
FILE "J"	U	Ø5	Ø6	SLOT	WIRED ⊗	SLOT	Ø8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		5A	6A	EMPTY	INPUT	EMPTY	8A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L	NOT USED	Ø6				Ø8								
			6B				8B								

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

FS = FLASH SENSE
ST = STOP TIME

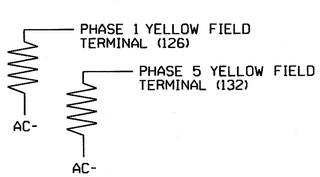
⊗ Wired Input - Do not populate slot with detector card

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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



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, 5,7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8,S9,S12
PHASES USED.....1,2,4,5,6,8
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A	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			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
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			

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	41, 42,43	NU	51★	61,62	NU	NU	81, 82,83	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											

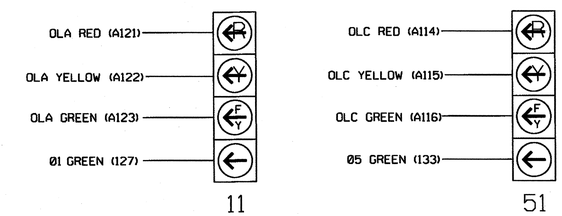
NU = Not Used

✳ 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 of 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2046
DESIGNED: April 2011
SEALED: 04/29/11
REVISED:

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 Guilford County Colfax

PLAN DATE:	April 2011	REVIEWED BY:	T. Jga
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/3
SIGNATURE DA.

SIG. INVENTORY NO. 07-200

02-MAY-2011 11:30
S:*ITSASU*ITS Signals*Workgroups*Sig Mom*Strickland*d072046_sm_ele_xxx.dgn
castrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 15

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
```

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

PRESS '+'

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

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

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

PRESS '+'

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

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

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

PRESS '+'

```
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
```

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

PRESS '+'

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

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

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

PRESS '+'

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

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

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:          ¦123456789101112131415 16
VEH OVL PARENTS:¦XX
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          ¦123456789101112131415 16
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: 07-2046
DESIGNED: April 2011
SEALED: 04/29/11
REVISED:

ELECTRICAL DETAIL SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2007 (Bunker Hill Road)

Division 7 | Guilford County | Colfax

PLAN DATE: April 2011	REVIEWED BY: T. Jge		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/3/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2046

02-MAY-2011 11:31
S:*TS&SU*TS Signals*workgroups*Sig Mon*Strickland*072046_smle_e_xxx.dgn
dbstrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 16

2-Circuit
Pre-Timed
School Flasher

SIGNAL FACE I.D.

All Heads L.E.D.

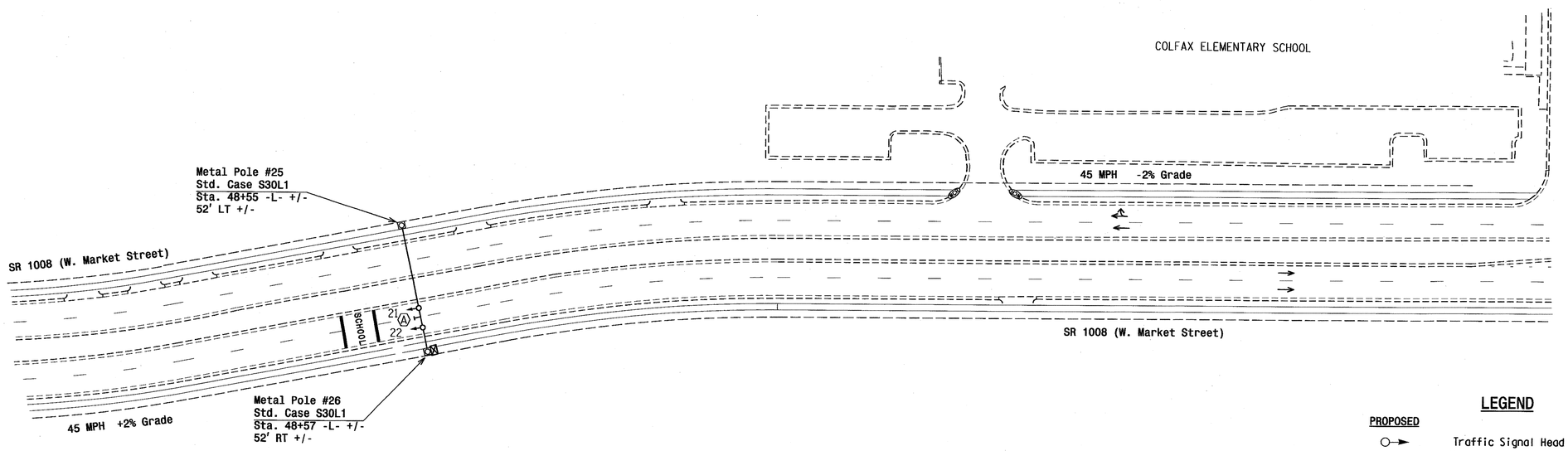
Y 12"

21, 22

TABLE OF OPERATION		
SIGNAL FACE	Interval 1	Interval 2
21, 22	ON	OFF

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. The Division Traffic Engineer will determine the hours of flash for the warning beacons.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
	School Speed Limit Warning Sign w/ Beacons [See Figure 1]	

Signal Upgrade

Prepared In the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 50 1'=50'

SR 1008 (W. Market Street) at Colfax Elementary School (West Flasher)

Division 7 Guilford County Colfax

PLAN DATE:	April 2011	REVIEWED BY:	R. Hough
PREPARED BY:	W.Bazzarie	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE 5/10/11 DATE

SIG. INVENTORY NO. 07-1367

10-MAY-2011 18:10
P:\TIPPROJECTS\R-2611\Traffic\Signals\Design\Signals\07-1367\071367_sig_dsn_20110510.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 17

2-Circuit
Pre-Timed
School Flasher

SIGNAL FACE I.D.

All Heads L.E.D.

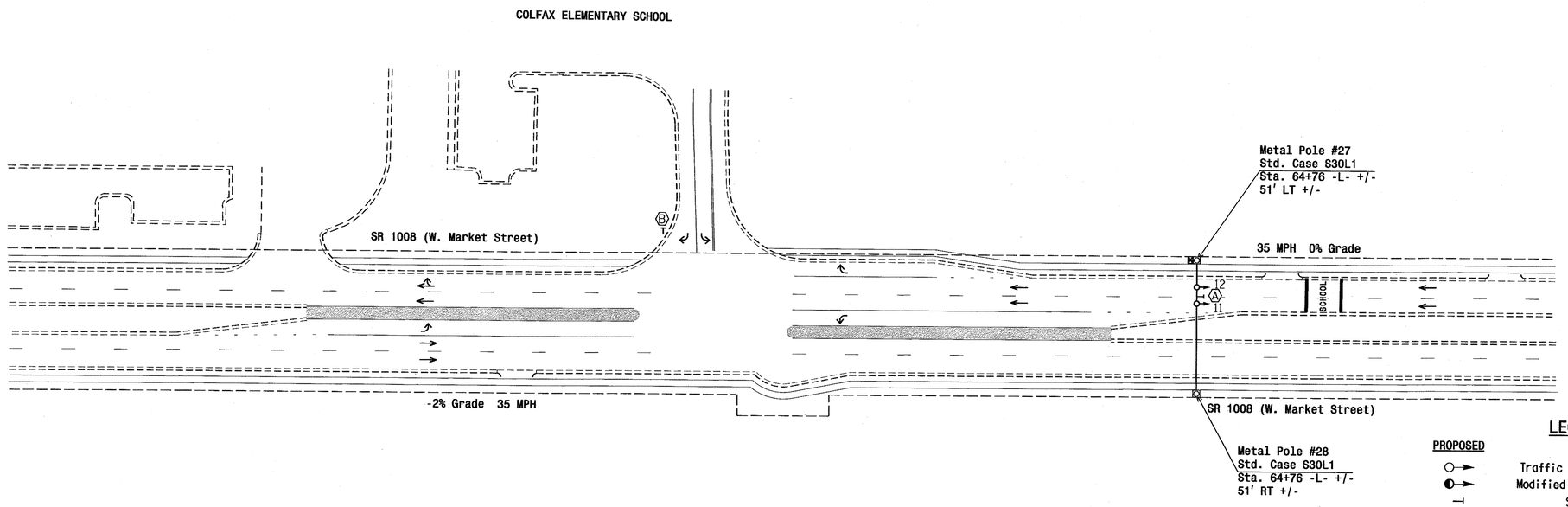
Y 12"

11, 12

TABLE OF OPERATION		
SIGNAL FACE	Interval 1	Interval 2
11, 12	ON	OFF

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. The Division Traffic Engineer will determine the hours of flash for the warning beacons.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
A	School Speed Limit Warning Sign w/ Beacons [See Figure 1]	A
B	"STOP" Sign (R1-1)	B

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at Colfax Elementary School (East Flasher)

Division 7 Guilford County Colfax

PLAN DATE: April 2011 REVIEWED BY:

PREPARED BY: M.Bazzarie REVIEWED BY:

SCALE 0 50 1'=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. TIEMEYER
SIGNATURE 5/11/11 DATE

SIG. INVENTORY NO. 07-1366

11-MAY-2011 15:16
R:\Traffic\Signals\Designs\Signals\07-1366\07136 6_sig_dsn_20110511.dgn
rwhough

TIP NO.	SHEET NO.
R-2611	Sig. 18

APPROVED: [illegible]

DATE: 3/10/11

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022959 ENGINEER RONALD W. KING

SIGN NUMBER: SP11128

TYPE: D

QUANTITY: 2

SIGN WIDTH: 5'-6"
HEIGHT: 4'-0"
TOTAL AREA: 22.0 Sq.Ft.

BORDER TYPE: RECESSED
RECESS: 0.63"
WIDTH: 1"
RADII: 1.75"

NO. Z BARS:
LENGTH:

BACKG COLOR: White/Fluorescent Yellow-Green

COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.125" (3.2 mm) ALUMINUM

DESIGN BY: J. Hambright

PROJECT ID: R-2611

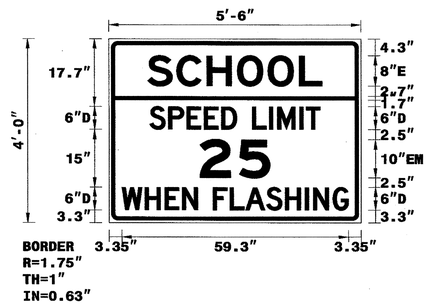
CHECKED BY: S. Kunz

DIV: 7

DATE: Feb 24, 2011

USE NOTES:

1. Legend and border shall be black, direct applied, nonreflective sheeting.
2. Background shall be Grade B reflective sheeting for the top portion of the sign (Yellow-Green).
3. Background shall be Grade C reflective sheeting for the bottom portion of the sign (White).



BORDER
R=1.75"
TH=1"
IN=0.63"

NOTE: FABRICATE SIGN WITH SQUARE CORNERS AND BRACKETS FOR SPAN WIRE ATTACHMENT.

LETTER POSITIONS

Spacing Factor is 1 unless specified otherwise

Letter locations are panel edge to lower left corner

																												Series/Size Text Length
S	C	H	O	O	L																							E 2000
10.2	17.7	25.7	33.6	41.6	49.8																							45.7
S	P	E	E	D	L	I	M	I	T																			D 2000
10.7	15.6	20.4	24.9	29.5	37.5	42	44.1	49.9	51.6																			44.6
2	5																											EM 2000
23.8	34.1																											18.4
W	H	E	N	F	L	A	S	H	I	N	G																	D 2000
3.4	9.4	14.6	19.2	27.3	31.7	35.7	41.2	46.1	51.3	53.4	58.6																	59.3

FILENAME: Proposed signs

NORTH CAROLINA D.O.T. SIGN DETAIL

NOTE: INSTALLATION OF THIS SIGN (WITH FLASHERS) ON SPAN WIRE WAS DETERMINED BY THE SIGNALS DESIGN SECTION. REFER TO THE SIGNALS DESIGN SECTION PLANS.

SIN: 07-1366 and 07-1367

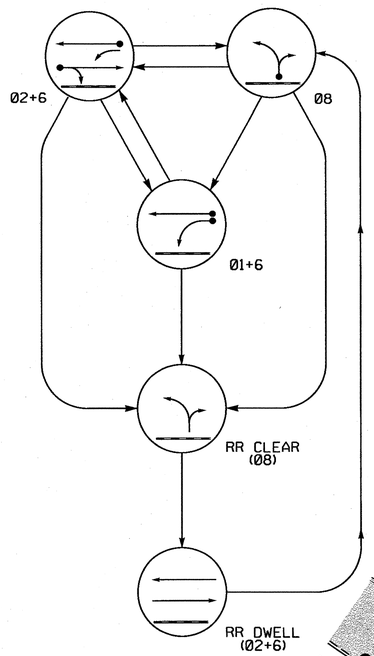
SIGN DESIGN
FOR INSTALLATION ON SPANWIRE
WITH SIGNAL FLASHERS

Q:\WAP\2011\11\7
jhambright
R:\R2611\Traffic\Signing\CADD\Sign Designs\Proposed signs.dgn
ST_TES24777

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 19

3 Phase /w RR Preemption Fully Actuated (Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	08	RR DWELL	RR CLEAR	FLASH
11	←	F Y	~~R~~	~~R~~	~~R~~	~~Y~~
21, 22	R	G	R	R	G	Y
61, 62	G	G	R	R	G	Y
81, 82	R	R	G	G	R	R
SIGN A	OFF	OFF	OFF	ON	ON	*

F Y = Flashing Yellow Arrow
* See Note 7

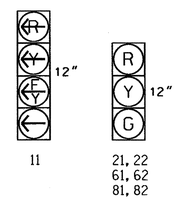
STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

		TO ←	TO F Y	TO ~~R~~
		1 2	1 2	1 2
FROM ←		← ←	~~Y~~ ~~R~~	~~Y~~ ~~R~~
FROM F Y		F Y F Y	F Y F Y	~~Y~~ ~~R~~
FROM ~~R~~		~~R~~ ~~R~~	~~R~~ ~~R~~	~~R~~ ~~R~~

F Y = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



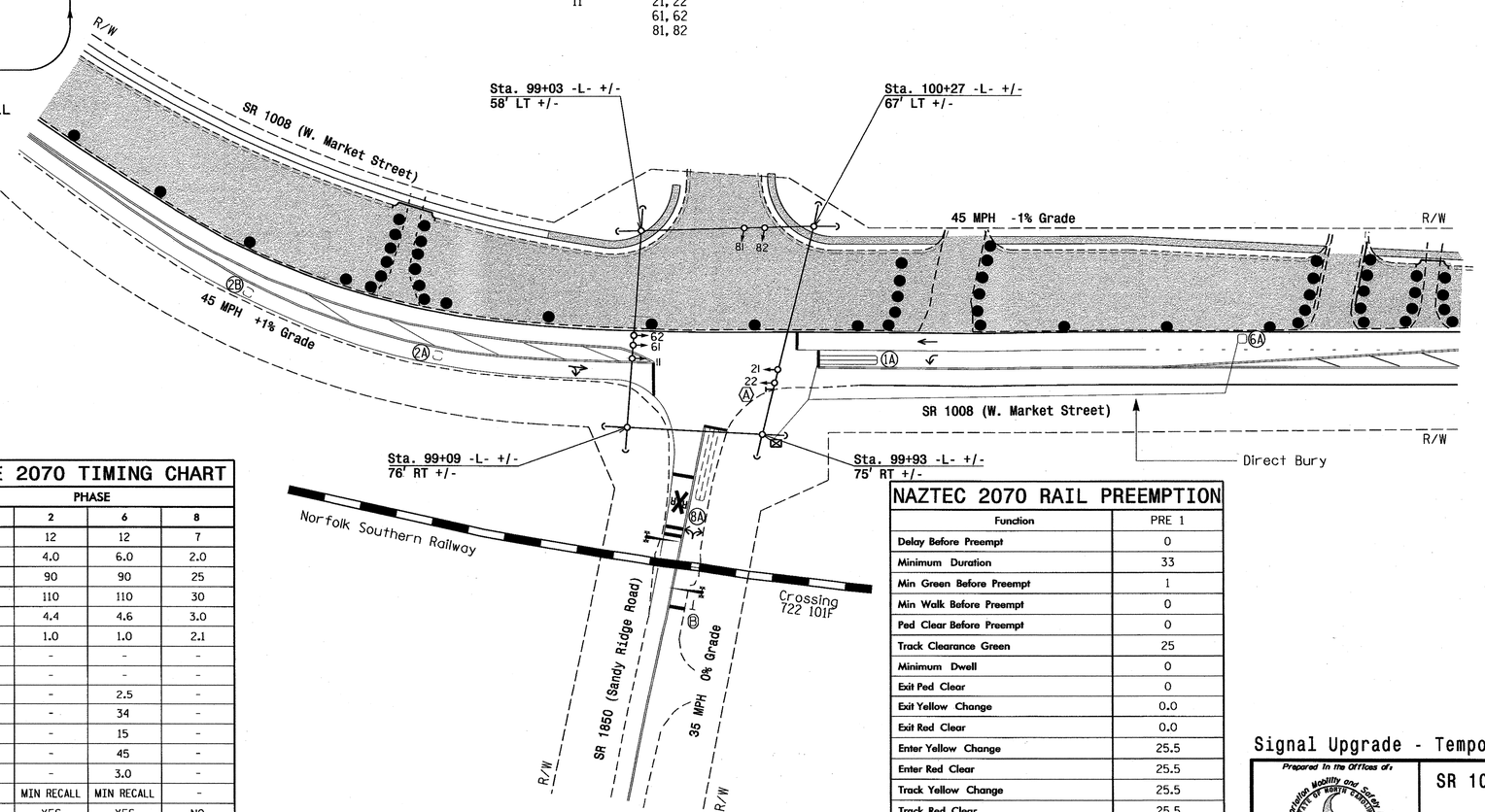
LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	-	15	-	X	X	-	-	X
2A	6X6	143	EXIST	-	2	-	-	-	X	X	-	-	X
2B	6X6	285	EXIST	-	2	-	-	-	X	X	-	-	X
6A	6X6	300	5	X	6	-	-	-	X	X	X	-	X
8A	6X50	0	2-4-2	-	8	-	5	-	X	X	-	-	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Ensure flashing operation does not alter operation of blankout signs.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	6	8
Min Green *	7	12	12	7
Gap, Extension *	2.0	4.0	6.0	2.0
Maximum Green 1 *	20	90	90	25
Maximum Green 2 *	25	110	110	30
Yellow Clear	3.0	4.4	4.6	3.0
Red Clear	1.2	1.0	1.0	2.1
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	-	2.5	-
Maximum Initial *	-	-	34	-
Time Before Reduction *	-	-	15	-
Time To Reduce *	-	-	45	-
Minimum Gap	-	-	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Lock Calls	NO	YES	YES	NO
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

This signal was designed for advanced preemption.

NAZTEC 2070 RAIL PREEMPTION

Function	PRE 1
Delay Before Preempt	0
Minimum Duration	33
Min Green Before Preempt	1
Min Walk Before Preempt	0
Ped Clear Before Preempt	0
Track Clearance Green	25
Minimum Dwell	0
Exit Ped Clear	0
Exit Yellow Change	0.0
Exit Red Clear	0.0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Yellow Change	25.5
Track Red Clear	25.5
All-Red B4 Dwell	OFF
Lock Input	OFF
Overide Higher # Preempt	ON
Link to Preempt #	0
Exit Preempt To	8

LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Construction Zone Drums	
	New Construction Zone	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
A	"NO RIGHT TURN - TRAIN" LED Blankout Sign	A
B	"DO NOT STOP ON TRACKS" Sign (R8-8)	B

Signal Upgrade - Temporary Design 1 (Construction Phase I)

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, 750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY: R. Hough
PREPARED BY: C.E. Carter	REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

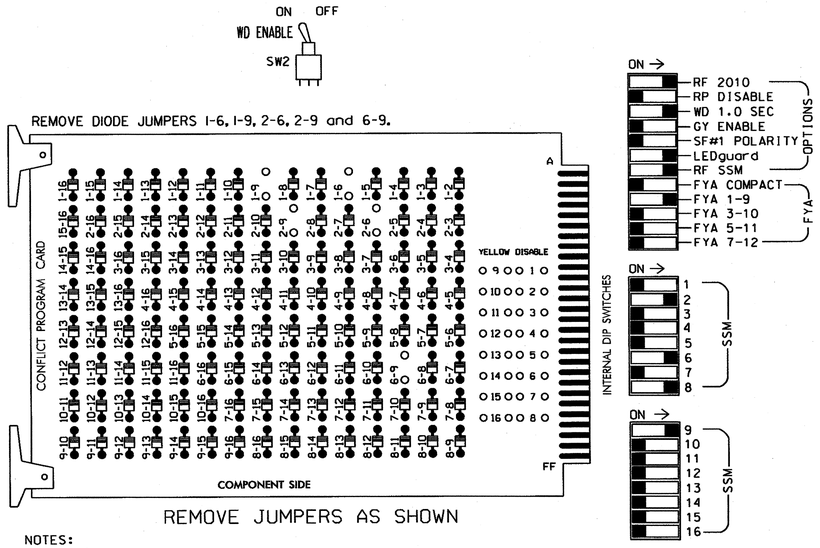
SIGNATURE DATE 5/6/11

SIG. INVENTORY NO. 07-1439 T1

06-MAY-2011 12:11
P:\TIPProjects-R\R2611\Traffic\Signals\Design\Signals\07-1439\07143911_sig_dsn_20110506.dgn
ziemba

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4, 5,7,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11★	NU	NU	NU	NU	NU
RED		128						134			107							
YELLOW	✱	129						135			108							
GREEN		130						136			109							
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127																	

NU = Not Used

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

★ See pictorial of head wiring in detail below.

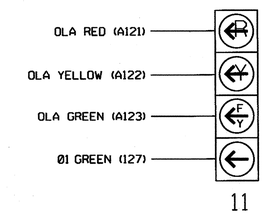
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
VERSION 70.0A BUILD 4196
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S6,S8,S9
PHASES USED.....1,2,6,8
OVERLAP A.....*

*See Sheet 3 of 4 Overlap programming Detail

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. See Overlap Programming Detail Sheet 3 of 4.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	NOT USED	Ø2 2B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2A	NOT USED											ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L		NOT USED				NOT USED								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.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
	1A	TB2-1,2	I1U	56	1	1		15		X	X	
*	1A (Logic)	-	-	60	13	1				X	X	
	2A	TB2-7,8	I2L	43	3	2				X	X	
	2B	TB2-9,10	I3U	63	4	2				X	X	
	6A	TB3-5,6	J2U	40	16	6				X	X	X
	8A	TB5-9,10	J6U	42	22	8		5		X	X	

* Note for 1A (Logic): Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to "I/O Logic Programming Detail to Apply RR Preempt Exit Call on Phase 1" (Sheet 3 of 4).

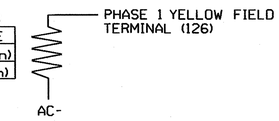
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T1
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 1 - Sheet 1 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering & Safety Systems Branch
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 | Guilford County | Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Jones
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
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SIGNATURE | DATE 5/12/11
SIG. INVENTORY NO. 07-1439T1

09-MAY-2011 13:27
S:\TSS\Signals\Workgroups\Sig Man\Strickland\07143S_sm_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 21

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS
ENTER PREEMPT #1

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1  Times    :  Begin     :   Other
  Delay     0   MinGrn    1   Track Grn  25
MinDura    33   MinWlk    0   Min Dwell   0
MaxPres     0   PedClr    0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              ---- Preempt Phases ----
Track Veh        8  0  0  0
DwellCyc Veh     2  6  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             8  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1        Preempt Options
                    Lock input OFF
            Override Auto Flash ON
   Override higher # preempt ON
                 Flash in dwell OFF
            Link to preempt # 0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 Preempt Times+      --- Exit --
                       Ped Clr    0
  Extend Dwell    0       Yel    0.0
   Return Max     0       Red    0.0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1                -- Preempt Overlaps+ --
        Track        0  0  0  0  0  0  0  0
      (more)         0  0  0  0
     DwellCyc        0  0  0  0  0  0  0  0
      (more)         0  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1        Preempt Options +
Enable ON                      Pattern    0
  Type RAIL     Skip Track if Overide OFF
Output TS-2            Coord+Preempt  OFF
                     Volt Mon Flash   OFF
Lnk Aft Dwel OFF     Return Max/Min   MAX
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 AdvTimes
enterYellowChange25.5
enterRedClear    25.5
trackYellowChange25.5
trackRedClear    25.5
All Red B4 Dwell  OFF
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

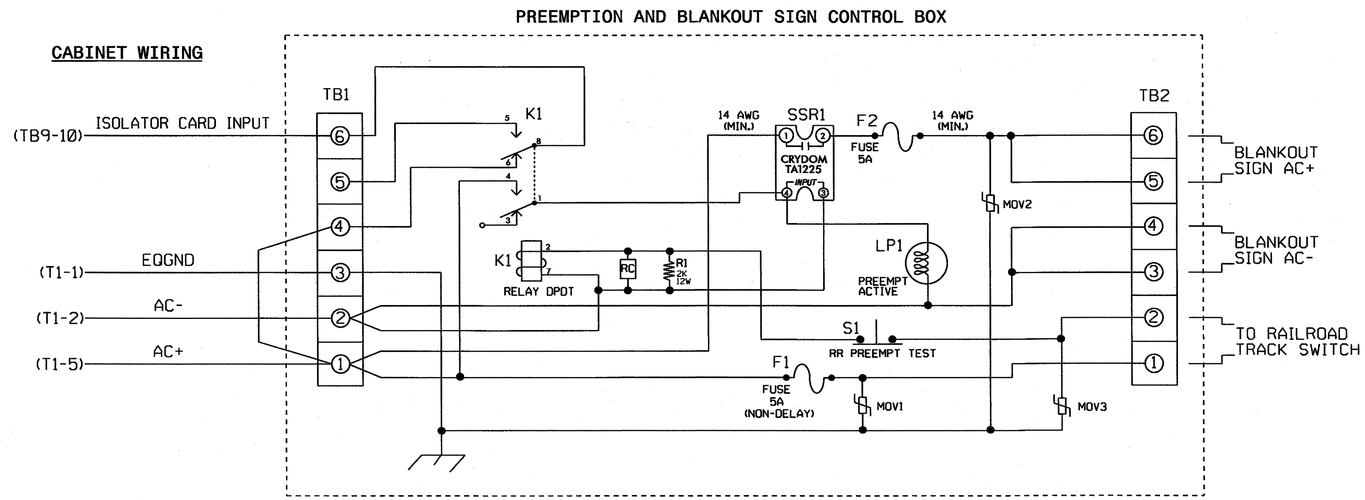
```
# 1          --   Initial Dwell   --
Phases       0  0  0  0
Peds         0  0  0  0
Overlaps     0  0  0  0  0  0  0  0
  (more)     0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

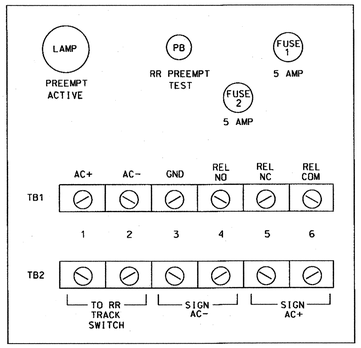
CABINET WIRING



NOTES

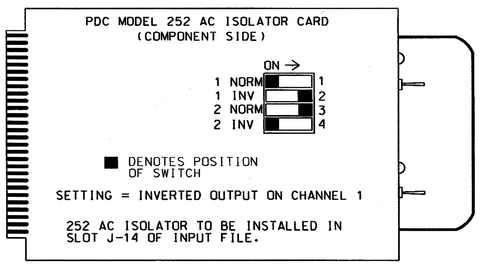
1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 Is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. 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.
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K; DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. 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: 07-1439T1
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 1 - Sheet 2 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Transportation Mobility and Safety Division, Department of Transportation, State of North Carolina, Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011		REVIEWED BY: T. Jyle	
PREPARED BY: C. Strickland		REVIEWED BY:	
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 5/12/11 DATE
SIG. INVENTORY NO. 07-1439T1

09-MAY-2011 13:28
S:*ITSSUM*TS Signals*Workgroups*Sig Man*Strickland*07143_sample_xxx.dgn
cbestrickland

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  1
then press Enter
```

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp A-1   Ps....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp A-1   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp A-1
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Clrncs ON
Extra Included Phases OFF
```

OVERLAP PROGRAMMING COMPLETE

I/O LOGIC PROGRAMMING DETAIL TO APPLY RR PREEMPT EXIT CALL ON PHASE 1

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

```
Result Fcn Oper   Fcn Oper   Fcn   Timer
* I208= I208       I  0       I  0 DLY   1
  I13 = I198       I  0       I  0 DLY   0 -------DETECTOR 13 CALLS PHASE 1
  I  0= I  0       I  0       I  0 DLY   0
  I  0= I  0       I  0       I  0 DLY   0
  I  0= I  0       I  0       I  0 DLY   0
  I  0= I  0       I  0       I  0 DLY   0
```

* Denotes input function 208 (flash sense) logic delay is assigned per Mode 5 default.

NOTE

1. The above I/O Programming ensures a Phase 1 call when exiting RR Preempt. A Phase 1 call is nessesary for proper FYA operation (Signal Head 11) when exiting RR Preempt.
2. Ensure Detector 13 is setup to call phase 1 (default value).
3. Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to INPUT FILE CONNECTION & PROGRAMMING CHART.

I/O REFERENCE SCHEDULE

INPUT FUNCTION 208 = Flash Sense
INPUT FUNCTION 13 = Veh Call Det 13
INPUT FUNCTION 198 = Preempt 1 In

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T1
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 1 - Sheet 3 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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Traffic Engineering Branch
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Jump
PREPARED BY: C. Strickland | REVIEWED BY:

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SIGNATURE | DATE 5/12/11
SIG. INVENTORY NO. 07-1439T1

09-MAY-2011 13:28
S:\TMS\CAD\Signals\Work\Groups\Sig Mon\Cstrick\and07i439_sample_xxx.dgn
cstrickland

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
         T&F Biu Map: DEFAULT
 Invert Rail Inputs: OFF
    EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
Init ABC with: NONE
   Init D with: NONE
  Init 2A with: MODE 5
Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	39	Ch15 Yellow
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	59	Ch11 Green
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-8	57	Ch9 Green	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-1 (C1 pin 35) = Load Switch S2P-Y
Pin 7-8 (C1 pin 99) = Load Switch S9-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   .   .   ←
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   0   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T1
DESIGNED: April 2011
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Electrical Detail - Temp Design 1 - Sheet 4 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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Transportation Mobility and Safety Division
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750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
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Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Jones
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

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SIGNATURE 5/12/11 DATE

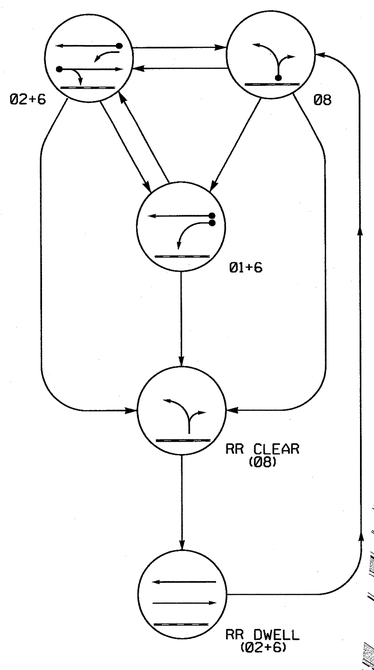
SIG. INVENTORY NO. 07-1439T1

09-MAY-2011 13:32
S:\RTI\SIGNALS\Workgroups\Sig Mgmt\Strickland\07-1439_smu_ele_xxx.dgn
$$$$USERNAME

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 24

3 Phase /w RR Preemption Fully Actuated (Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 08	RR CLEARANCE	RR FLASH	FLASH
11	←	F Y	R	R	R	Y
21, 22	R	G	R	R	G	Y
61, 62	G	G	R	R	G	Y
81, 82	R	R	G	G	R	R
SIGN A	OFF	OFF	OFF	ON	ON	*

F Y = Flashing Yellow Arrow
* See Note 6

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM \ TO	← 1	← 2	F Y 1	F Y 2	R 1	R 2
←	←	←	Y	R	Y	R
F Y	F Y	F Y	F Y	F Y	Y	R
R	R	R	R	R	R	R

F Y = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

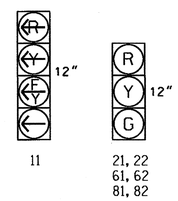
INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	-	15	-	X	X	-	-	-
2A	6X6	300	5	X	2	-	-	-	X	X	X	-	-
6B	6X6	300	5	X	6	-	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	X	8	-	5	-	X	X	-	-	-

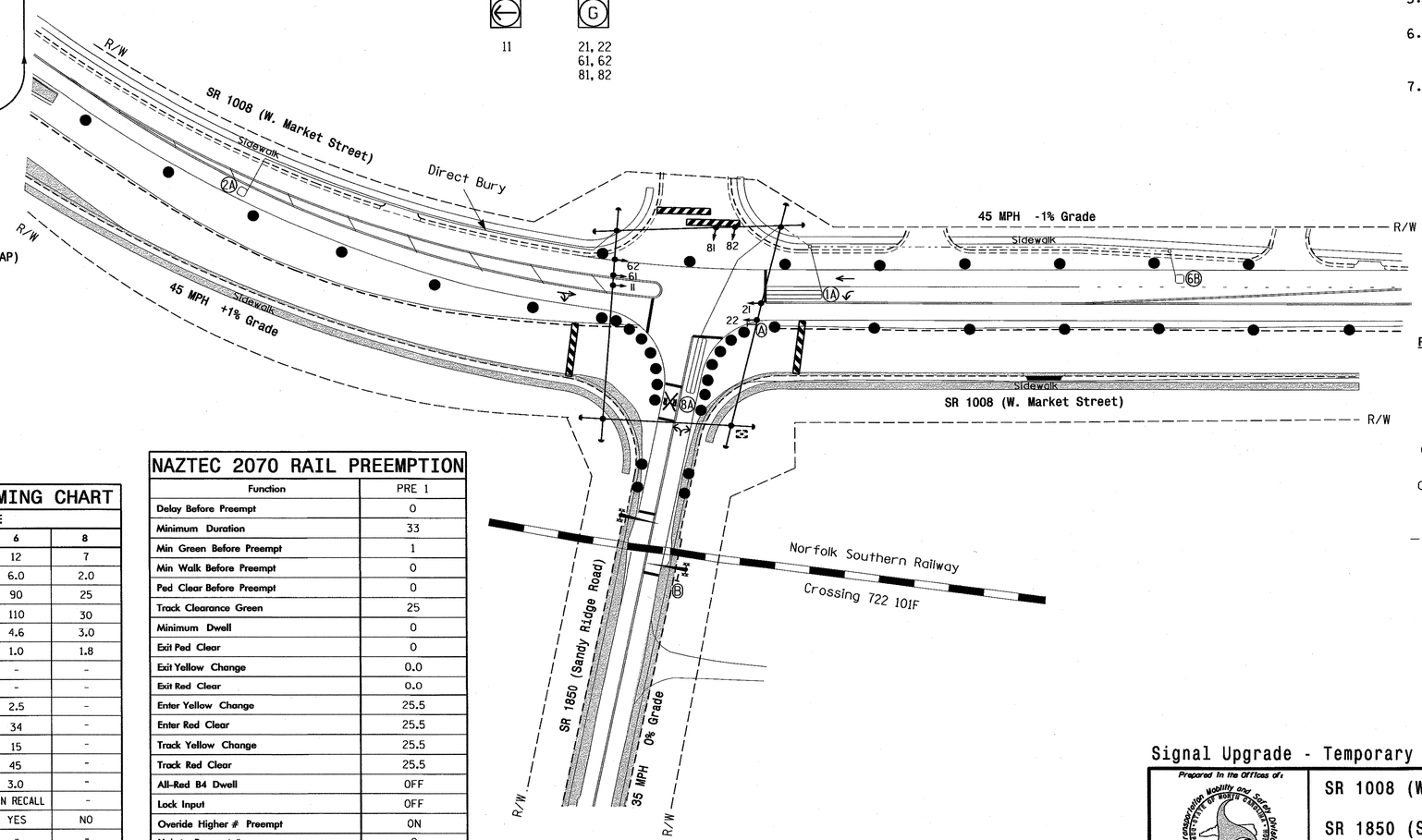
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Reposition existing signal heads numbered 11, 21, 22, 61, and 62.
4. Phase 1 may be lagged.
5. Set all detector units to presence mode.
6. Ensure flashing operation does not alter operation of blankout signs.
7. 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.





LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
	Construction Zone	
	Construction Zone Drums	
Ⓐ	"NO RIGHT TURN - TRAIN" LED Blankout Sign	Ⓐ
Ⓑ	"DO NOT STOP ON TRACKS" Sign (R8-8)	Ⓑ

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green *	7	12	12	7
Gap, Extension *	2.0	6.0	6.0	2.0
Maximum Green 1 *	20	90	90	25
Maximum Green 2 *	25	110	110	30
Yellow Clear	3.0	4.4	4.6	3.0
Red Clear	1.1	1.0	1.0	1.8
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	2.5	2.5	-
Maximum Initial *	-	34	34	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Lock Calls	NO	YES	YES	NO
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

NAZTEC 2070 RAIL PREEMPTION

Function	PRE 1
Delay Before Preempt	0
Minimum Duration	33
Min Green Before Preempt	1
Min Walk Before Preempt	0
Ped Clear Before Preempt	0
Track Clearance Green	25
Minimum Dwell	0
Exit Ped Clear	0
Exit Yellow Change	0.0
Exit Red Clear	0.0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Yellow Change	25.5
Track Red Clear	25.5
All-Red B4 Dwell	OFF
Lock Input	OFF
Overide Higher # Preempt	ON
Link to Preempt #	0
Exit Preempt To	8

This signal was designed for advanced preemption.

Signal Upgrade - Temporary Design 2 (Construction Phase II)

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, 750 N.Greenfield Pkwy, Garner, NC 27529

SR 1008 (W. Market Street) at SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY: R. Hough
PREPARED BY: C.E. Carter	REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE DATE 5/6/11

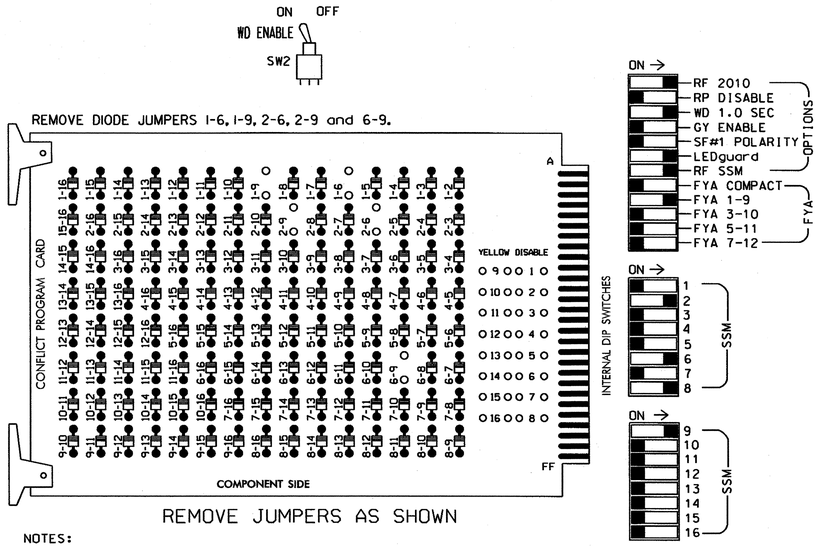
SIG. INVENTORY NO. 07-1439 T2

06-MAY-2011 12:14
P:\ETIProjects-R\R2611\Traffic\Signals\Design\Signals\07-1439\07143972_sig_dsn_20110506.dgn
rzieme

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.25

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2A												ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L		Ø6 6B				NOT USED								NOT USED

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

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

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 1,3,4, 5,7,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11★	NU	NU	NU	NU	NU
RED		128						134			107							
YELLOW	✱	129						135			108							
GREEN		130						136			109							
RED ARROW													A121					
YELLOW ARROW													A122					
FLASHING YELLOW ARROW													A123					
GREEN ARROW	127																	

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

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
VERSION 70.0A BUILD 4196
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S6,S8,S9
PHASES USED.....1,2,6,8
OVERLAP A.....*

*See Sheet 3 of 4 Overlap programming Detail

INPUT FILE CONNECTION & PROGRAMMING CHART

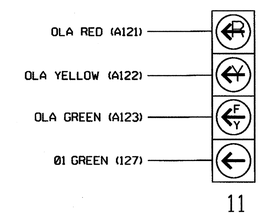
	LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
	1A	TB2-1,2	I1U	56	1	1		15		X	X	
*	1A (Logic)	-	-	60	13	1				X	X	
	2A	TB2-7,8	I2L	43	3	2				X	X	X
	6B	TB3-7,8	J2L	44	17	6				X	X	X
	8A	TB5-9,10	J6U	42	22	8		5		X	X	

* Note for 1A (Logic): Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to "I/O Logic Programming Detail to Apply RR Preempt Exit Call on Phase 1" (Sheet 3 of 4).

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

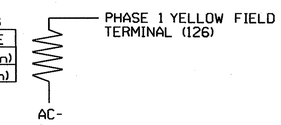
1. See Overlap Programming Detail Sheet 3 of 4.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T2
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 2 - Sheet 1 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY:		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 5/12/11
SIG. INVENTORY NO. 07-1439T2

09-MAY-2011 14:20
S:\TTSSDWH\TS Signals\Workgroups\Sig Mgmt\Strickland\ds\07143 9_smlelb_xxx.dgn
$WORKING$

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 26

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS
ENTER PREEMPT #1

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1  Times    :  Begin     :   Other
  Delay     0   MinGrn    1   Track Grn  25
MinDura    33   MinWlk    0   Min Dwell   0
MaxPres     0   PedClr    0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              ---- Preempt Phases ----
Track Veh        8  0  0  0
DwellCyc Veh     2  6  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             8  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1          Preempt Options
                   Lock input OFF
          Override Auto Flash ON
     Override higher # preempt ON
              Flash in dwell OFF
         Link to preempt # 0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 Preempt Times+     --- Exit --
                     Ped Clr     0
  Extend Dwell    0      Yel   0.0
   Return Max     0      Red   0.0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              -- Preempt Overlaps+ --
        Track    0  0  0  0  0  0  0  0
      (more)     0  0  0  0
     DwellCyc    0  0  0  0  0  0  0  0
      (more)     0  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1        Preempt Options +
Enable ON                     Pattern    0
  Type RAIL     Skip Track if Overide OFF
Output TS-2           Coord+Preempt  OFF
                     Volt Mon Flash  OFF
Lnk Aft Dwel OFF     Return Max/Min  MAX
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 AdvTimes
enterYellowChange25.5
enterRedClear    25.5
trackYellowChange25.5
trackRedClear    25.5
All Red B4 Dwell  OFF
```

PRESS "ESC"

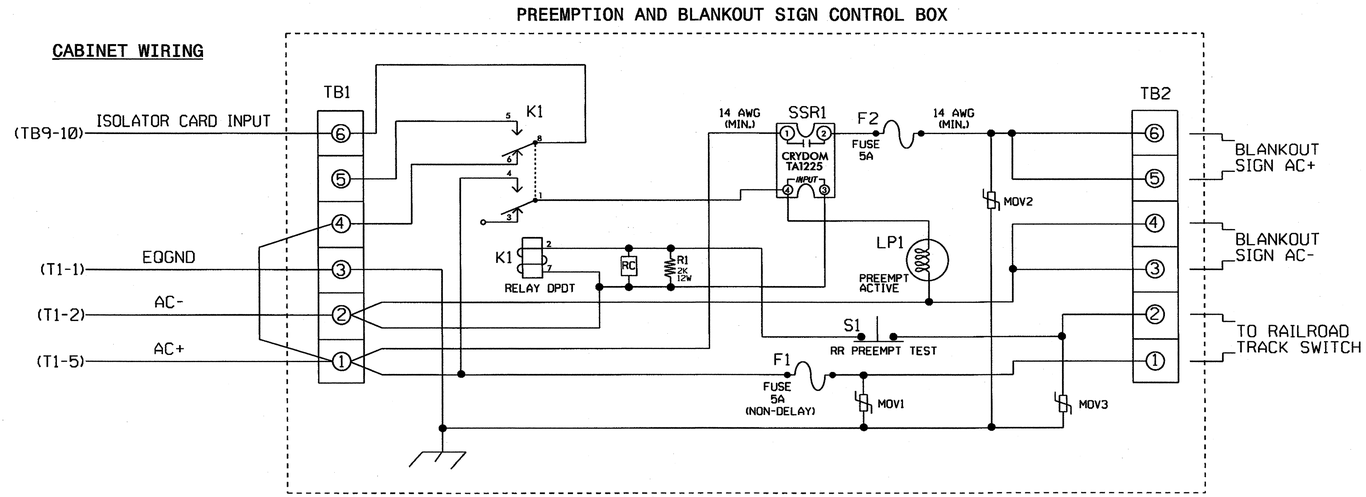
```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1          --   Initial Dwell   --
Phases      0  0  0  0
Peds        0  0  0  0
Overlaps    0  0  0  0  0  0  0  0
  (more)    0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

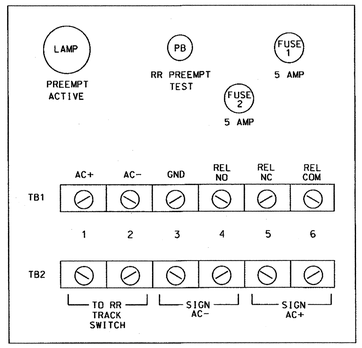
(wire as shown below)



NOTES

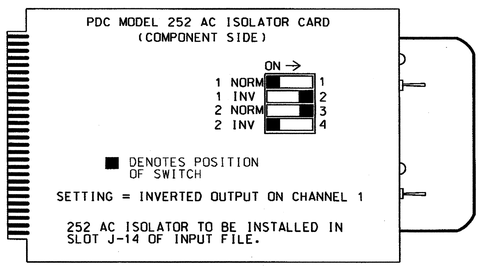
1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 Is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. 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.
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K; DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. 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: 07-1439T2
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 2 - Sheet 2 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Technology Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Jones
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE 5/12/11 DATE

SIG. INVENTORY NO. 07-1439T2

09-MAY-2011 14:21
S:*TSGS*ITS Signals*Workgroups*Sig Man*Strickland*07143_sm_ele_xxx.dgn
cadstrickland

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  1

  then press Enter
```

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp A-1   Ps....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp A-1   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp A-1
LeadGreen  OFF   Transit 0
GreenExtInh      0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
    Confl Lock Enable OFF
      Parent P Clrncs ON
  Extra Included Phases OFF
```

OVERLAP PROGRAMMING COMPLETE

I/O LOGIC PROGRAMMING DETAIL TO APPLY RR PREEMPT EXIT CALL ON PHASE 1

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16  7.IO Logic
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

```
Result Fcn Oper   Fcn Oper   Fcn    Timer
*  I208= I208      I  0      I  0 DLY    1
   I13 = I198      I  0      I  0 DLY    0 ---------DETECTOR 13 CALLS PHASE 1
   I  0= I  0      I  0      I  0 DLY    0
   I  0= I  0      I  0      I  0 DLY    0
   I  0= I  0      I  0      I  0 DLY    0
   I  0= I  0      I  0      I  0 DLY    0
```

* Denotes input function 208 (flash sense) logic delay is assigned per Mode 5 default.

NOTE

1. The above I/O Programming ensures a Phase 1 call when exiting RR Preempt. A Phase 1 call is nessesary for proper FYA operation (Signal Head 11) when exiting RR Preempt.
2. Ensure Detector 13 is setup to call phase 1 (default value).
3. Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to INPUT FILE CONNECTION & PROGRAMMING CHART.

I/O REFERENCE SCHEDULE

INPUT FUNCTION 208 = Flash Sense
INPUT FUNCTION 13 = Veh Call Det 13
INPUT FUNCTION 198 = Preempt 1 In

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T2
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 2 - Sheet 3 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Jan
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BRUNN

SIGNATURE 5/12/11 DATE

SIG. INVENTORY NO. 07-1439T2

09-MAY-2011 14:22
S:\TSDnet\IS\Signals\workgroups\sig Name\Strickland\07-1439_smu-ele_xxx.dgn
Sastrickland

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  [6.IO Parms]  9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
 Invert Rail Inputs: OFF
    EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    [9.IO UserMap]
```

```
User I/O Maps
1. Inputs
2. Outputs
[3. Init Map]
```

SELECT MODE 5 →

```
Initialize User I/O Maps
   Init ABC with: NONE
       Init D with: NONE
      Init 2A with: MODE 5
 Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
[2. Outputs]
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    [5.FIO 2A]
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	39	Ch15 Yellow
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	59	Ch11 Green
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-8	57	Ch9 Green	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-1 (C1 pin 35) = Load Switch S2P-Y
Pin 7-8 (C1 pin 99) = Load Switch S9-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  [4.Chan+  1-16] 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   .   .   ←
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   0   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T2
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 2 - Sheet 4 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Jones
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

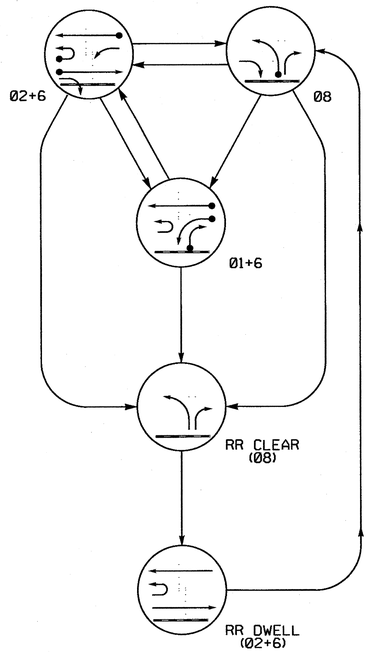
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 5/12/11
SIGNATURE DATE
SIG. INVENTORY NO. 07-1439T2

09-MAY-2011 14:23
S:\ITS&SU\ITS Signals\Workgroups\Sig Mane\Strickland\071439_smu_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 29

3 Phase with RR Preemption Fully Actuated (Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	08	CLEARR	DWELL	FLASH
11	←	F	~~R~~	~~R~~	~~R~~	~~Y~~
21	R	G	R	R	G	Y
22	R	G	R/→	R	G	Y
23	~~F~~	~~F~~	~~R~~	~~R~~	~~F~~	~~Y~~
61, 62	G	G	R	R	G	Y
81	R	R	G	G	R	R
82	R/→	R	G	G	R	R
SIGN A	OFF	OFF	OFF	ON	ON	*

F = Flashing Yellow Arrow
* See Note 5

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ←		TO F		TO ~~R~~	
	1	2	1	2	1	2
←	←	←	~~Y~~	~~R~~	~~Y~~	~~R~~
F	F	F	F	F	~~Y~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

F = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

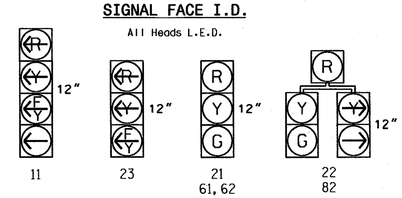
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	-	15	-	X	X	-	-	-
1B	6X40	0	2-4-2	X	1	-	15	-	X	X	-	-	X
2B	6X6	300	5	X	2	-	-	-	X	X	X	-	-
2C	6X40	0	2-4-2	X	2	-	-	-	X	X	-	-	-
6B	6X6	300	5	-	6	-	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	X	8	-	3	-	X	X	-	-	-

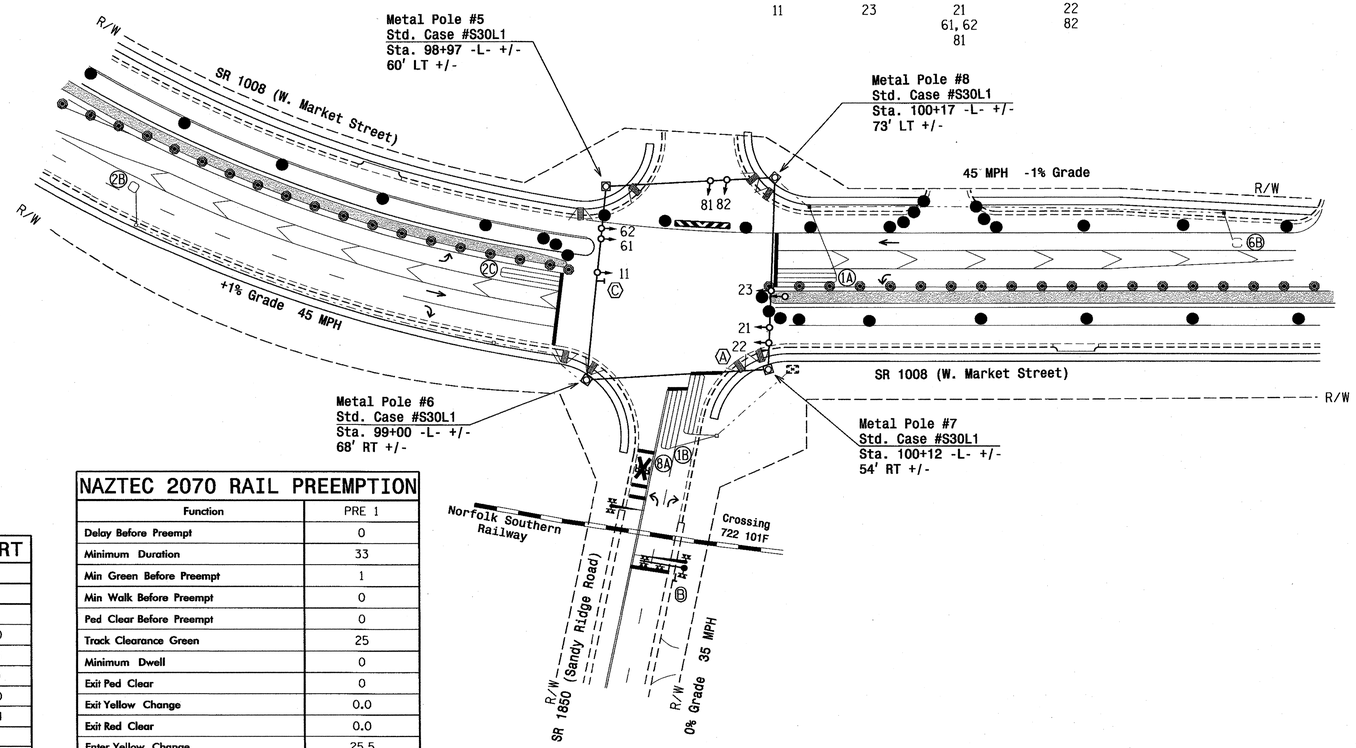
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Ensure flashing operation does not alter operation of blankout signs.
6. 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.





LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
N/A	Railroad Cantilever	
	Construction Zone	
	Construction Zone Drums	
A	"NO RIGHT TURN - TRAIN" LED Blankout Sign	A
B	"DO NOT STOP ON TRACKS" Sign (R8-8)	B
C	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	C

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	6	8
Min Green *	7	12	12	7
Gap, Extension *	2.0	6.0	6.0	2.0
Maximum Green 1 *	20	90	90	25
Maximum Green 2 *	25	110	110	30
Yellow Clear	3.0	4.6	4.6	3.0
Red Clear	3.1	2.0	2.0	3.4
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	2.5	2.5	-
Maximum Initial *	-	34	34	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Lock Calls	NO	YES	YES	NO
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

NAZTEC 2070 RAIL PREEMPTION

Function	PRE 1
Delay Before Preempt	0
Minimum Duration	33
Min Green Before Preempt	1
Min Walk Before Preempt	0
Ped Clear Before Preempt	0
Track Clearance Green	25
Minimum Dwell	0
Exit Ped Clear	0
Exit Yellow Change	0.0
Exit Red Clear	0.0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Yellow Change	25.5
Track Red Clear	25.5
All-Red B4 Dwell	OFF
Lock Input	OFF
Overide Higher # Preempt	ON
Link to Preempt #	0
Exit Preempt To	8

This signal was designed for advanced preemption.

Signal Upgrade - Temporary Design 3 (Construction Phase III)

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section, 750 N.Greenfield Pkwy, Garner, NC 27529

SR 1008 (W. Market Street) at SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: R. Hough
PREPARED BY: W. Bazzarie REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

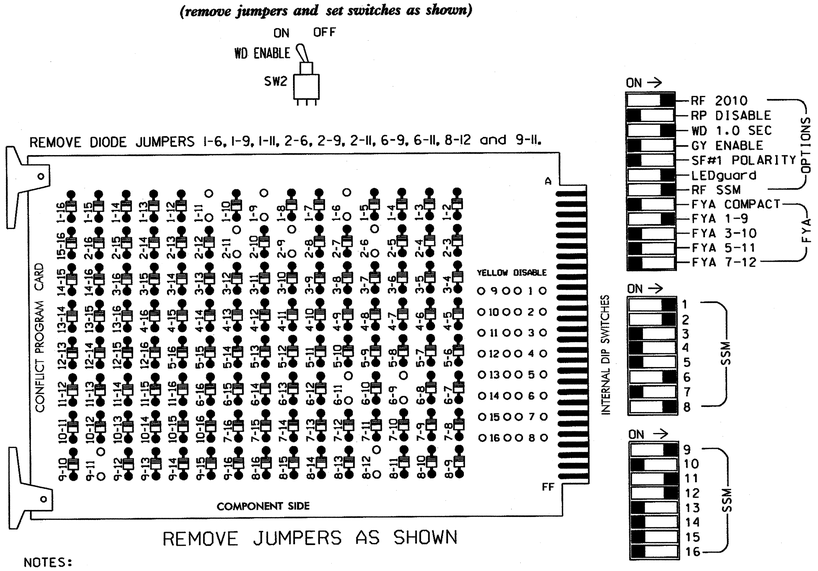
SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 5/6/11
SIG. INVENTORY NO. 07-1439 T3

11-MAY-2011 09:51
R:\Traffic\Signals\Designs\Signals\07-1439\07143913_sig_dsn_20110506.dgn
rwrough

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 3D

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,4,5, 7,10,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	82	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11★	NU	NU	23★	22	NU
RED		✱	128						134			107						✱	
YELLOW			129						135			108							
GREEN			130						136			109							
RED ARROW														A121			A114		
YELLOW ARROW		126												A122			A115	A102	
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127	127																A103	

NU = Not Used

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

★ See pictorial of head wiring in detail below.

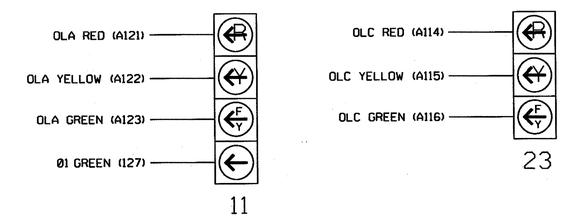
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
VERSION 70.0A BUILD 4196
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S6,S8,S9,S12,S13
PHASES USED.....1,2,6,8
OVERLAP A.....*
OVERLAP B.....NOT USED
OVERLAP C.....*
OVERLAP D.....*

*See Sheet 3 of 5 Overlap programming Detail

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. See Overlap Programming Detail Sheet 3 of 5.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2C											ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L		Ø6 6B				NOT USED								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.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
1A	TB2-1,2	I1U	56	1	1		15		X	X	
✱ 1A (Logic)	-	-	60	13	1				X	X	
1B	TB2-5,6	I2U	39	2	1		15		X	X	
2B	TB2-9,10	I3U	63	4	2				X	X	X
2C	TB2-11,12	I3L	76	5	2				X	X	
6B	TB3-7,8	J2L	44	17	6				X	X	X
8A	TB5-9,10	J6U	42	22	8		3		X	X	

✱ Note for 1A (Logic): Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to "I/O Logic Programming Detail to Apply RR Preempt Exit Call on Phase 1" (Sheet 5 of 5).

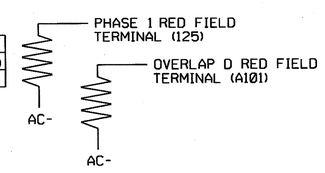
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

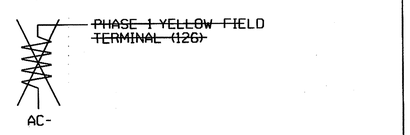
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



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.

LOAD RESISTOR REMOVAL DETAIL

(remove resistor as shown below)



! IMPORTANT: If present, remove load resistor PHASE 1 YELLOW FIELD TERMINAL (126)

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T3
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 3 - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY: T. Vaz		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 5/12/11 DATE
SIG. INVENTORY NO. 07-1439T3

1:MKW-2011 07:26
S:\TRASUMITS\Signals\Workgroups\Sig Mon\Strickland\07143g_smele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 3

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS
ENTER PREEMPT #1

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1  Times    :   Begin     :    Other
  Delay     0   MinGrn    1    Track Grn  25
MinDura    33   MinWlk    0    Min Dwell   0
MaxPres     0   PedClr    0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1              ---- Preempt Phases ----
Track Veh        8  0  0  0
DwellCyc Veh     2  6  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             8  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1  Preempt Options
                          Lock input OFF
                  Override Auto Flash ON
        Override higher # preempt ON
                       Flash in dwell OFF
                   Link to preempt # 0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1 Preempt Times+     --- Exit --
                       Ped Clr    0
  Extend Dwell    0       Yel    0.0
   Return Max     0       Red    0.0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1                -- Preempt Overlaps+ --
      Track        0  0  0  0  0  0  0  0
     (more)        0  0  0  0
   DwellCyc        3  0  0  0  0  0  0  0
     (more)        0  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1      Preempt Options +
Enable ON                    Pattern    0
  Type RAIL     Skip Track if Overide OFF
Output TS-2            Coord+Preempt   OFF
                      Volt Mon Flash   OFF
Lnk Aft Dwel OFF      Return Max/Min   MAX
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1 AdvTimes
enterYellowChange25.5
enterRedClear     25.5
trackYellowChange25.5
trackRedClear     25.5
All Red B4 Dwell   OFF
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

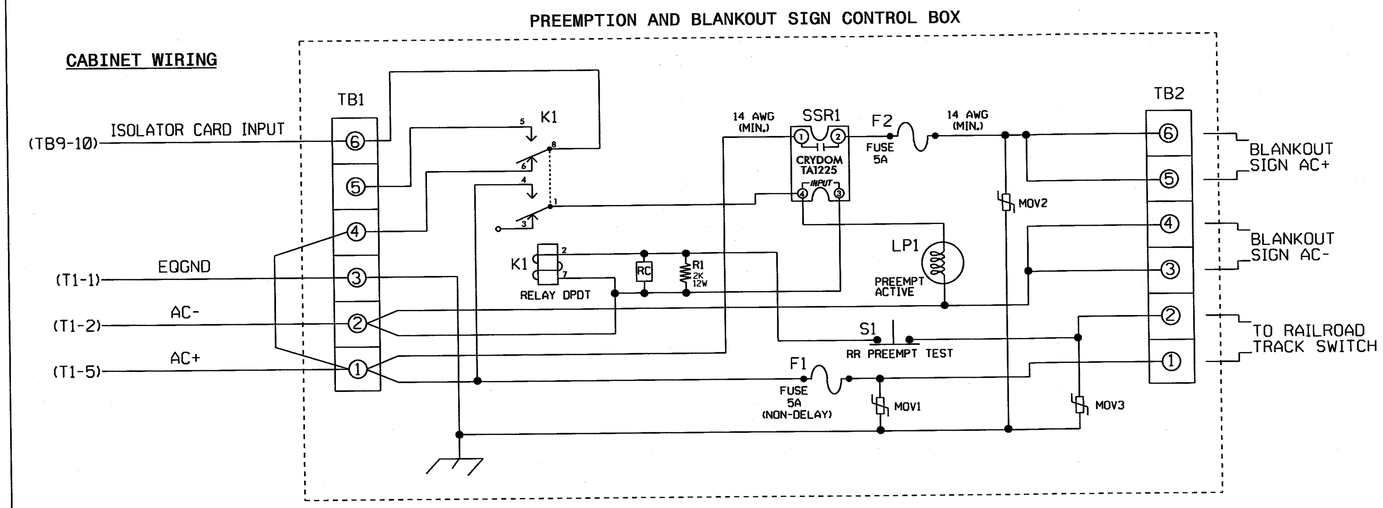
```
# 1          --   Initial Dwell   --
Phases       0  0  0  0
Peds         0  0  0  0
Overlaps     0  0  0  0  0  0  0  0
  (more)     0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

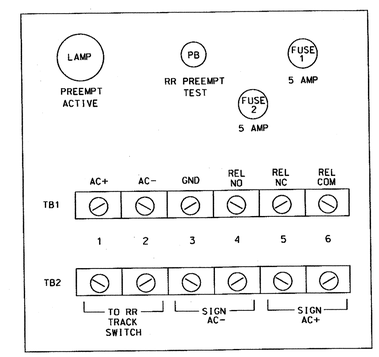
CABINET WIRING



NOTES

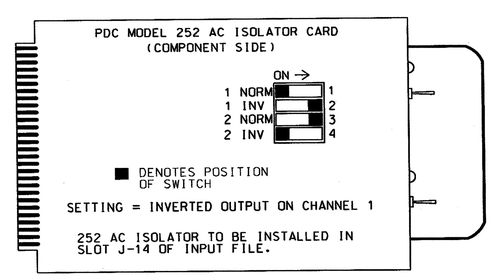
1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 Is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. 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.
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K; DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. 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: 07-1439T3
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 3 - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering & Safety Systems Branch
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Jopt
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/12/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1439T3

10-MAY-2011 07:50
R:\Traffic Eng\Signals\Workgroups\Sig Mgmt\Strickland\07-1439.smle\e.xxx.dgn
Cameron Lewis
C. Strickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 32

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
 Ovrlp A-1   Ps....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1
LeadGreen  OFF   Transit 0
GreenExtInh      0  0  0  0  0  0  0  0
```

PRESS "ESC" TWICE

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Included Ps    6  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3
LeadGreen  OFF   Transit 0
GreenExtInh      0  0  0  0  0  0  0  0
```

PRESS "ESC" TWICE

```
Enter Overlap #  4
  then press Enter
```

```
Overlap D-4
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp D-4   Ps....................
Included Ps    8  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap D-4
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp D-4   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap D-4
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp D-4
LeadGreen  OFF   Transit 0
GreenExtInh      0  0  0  0  0  0  0  0
```

PRESS "ESC" THREE TIMES

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T3
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 3 - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Jyp
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE | DATE 5/12/11
SIG. INVENTORY NO. 07-1439T3

10-MAY-2011 15:59
S:*MTSSSUMITS Signals*Workgroups*Sig MarkStrickland*071439_sml_ele_xxx.dgn
$$$$TEMPORD

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 33

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
         T&F Biu Map: DEFAULT
 Invert Rail Inputs: OFF
    EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
     Init ABC with: NONE
       Init D with: NONE
      Init 2A with: MODE 5
 Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                 9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	39	Ch15 Yellow
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	59	Ch11 Green
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-8	57	Ch9 Green	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-1 (C1 pin 35) = Load Switch S2P-Y
Pin 7-8 (C1 pin 99) = Load Switch S9-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   .   .   ←
Flash Grn .   .   X   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   0   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T3
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 3 - Sheet 4 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Joyce
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE 5/12/11 DATE

SIG. INVENTORY NO. 07-1439T3

10-MAY-2011 07:52
S:\TITSSG\HTS Signals\Workgroups\Sig Mgmt\Strickland\071439_smu_ele_xxx.dgn
SSMTTSSG_UOS

I/O LOGIC PROGRAMMING DETAIL
TO APPLY RR PREEMPT EXIT CALL ON PHASE 1

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-8

```
                    Channel & I/O
1.Chan  1-16  4.Chan+  1-16 [7.IO Logic]
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

	Result	Fcn	Oper	Fcn	Oper	Fcn		Timer	
*	I208=	I208		I	0	I	0	DLY	1
	I13 =	I198		I	0	I	0	DLY	0 ------- DETECTOR 13 CALLS PHASE 1
	I 0=	I 0		I	0	I	0	DLY	0
	I 0=	I 0		I	0	I	0	DLY	0
	I 0=	I 0		I	0	I	0	DLY	0
	I 0=	I 0		I	0	I	0	DLY	0

* Denotes input function 208 (flash sense) logic delay is assigned per Mode 5 default.

NOTE

1. The above I/O Programming ensures a Phase 1 call when exiting RR Preempt. A Phase 1 call is nessesary for proper FYA operation (Signal Head 11) when exiting RR Preempt.
2. Ensure Detector 13 is setup to call phase 1 (default value).
3. Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to INPUT FILE CONNECTION & PROGRAMMING CHART.

I/O REFERENCE SCHEDULE

INPUT FUNCTION 208 = Flash Sense
INPUT FUNCTION 13 = Veh Call Det 13
INPUT FUNCTION 198 = Preempt 1 In

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439T3
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Temp Design 3 - Sheet 5 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY:		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

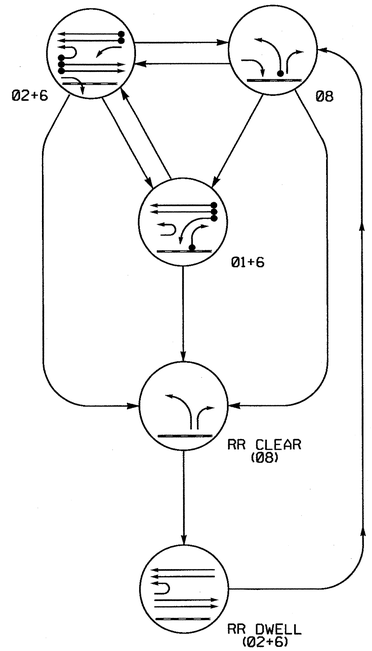
SIGNATURE DATE 5/12/11

SIG. INVENTORY NO. 07-1439T3

10-MAY-2011 07:53
S:\TMS\Sheets\Signals\Workgroups\Sig Work\Strickland\07-1439_sheet8_xxx.dgn
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 35

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	08	CLEARR	DWELL	FLASH
11	←	F Y	~~R~~	~~R~~	~~R~~	~~Y~~
21	R	G	R	R	G	Y
22	R	G	R/→	R	G	Y
23	~~F Y~~	~~F Y~~	~~R~~	~~R~~	~~F Y~~	~~Y~~
61, 62	G	G	R	R	G	Y
81	R	R	G	G	R	R
82	R/→	R	G	G	R	R
SIGN A	OFF	OFF	OFF	ON	ON	*

F Y = Flashing Yellow Arrow
* See Note 6

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ←	TO F Y	TO ~~R~~
	1 2	1 2	1 2
←	~~←~~ ~~←~~	~~R~~ ~~Y~~	~~R~~ ~~Y~~
F Y	~~F Y~~ ~~F Y~~	~~F Y~~ ~~F Y~~	~~R~~ ~~Y~~
~~R~~	~~R~~ ~~R~~	~~R~~ ~~R~~	~~R~~ ~~R~~

F Y = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	-	15	-	X	X	-	-	-
1B	6X40	0	2-4-2	-	1	-	15	-	X	X	-	-	-
2A	6X6	300	5	X	2	-	-	-	X	X	X	-	X
2B	6X6	300	5	-	2	-	-	-	X	X	X	-	-
2C	6X40	0	2-4-2	-	2	-	-	-	X	X	-	-	-
6A	6X6	300	5	X	6	-	-	-	X	X	X	-	X
6B	6X6	300	5	-	6	-	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	-	8	-	3	-	X	X	-	-	-

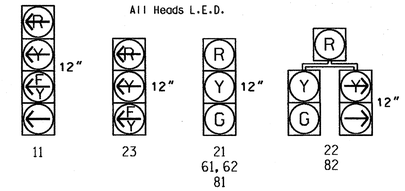
3 Phase with RR Preemption Fully Actuated (Greensboro Signal System)

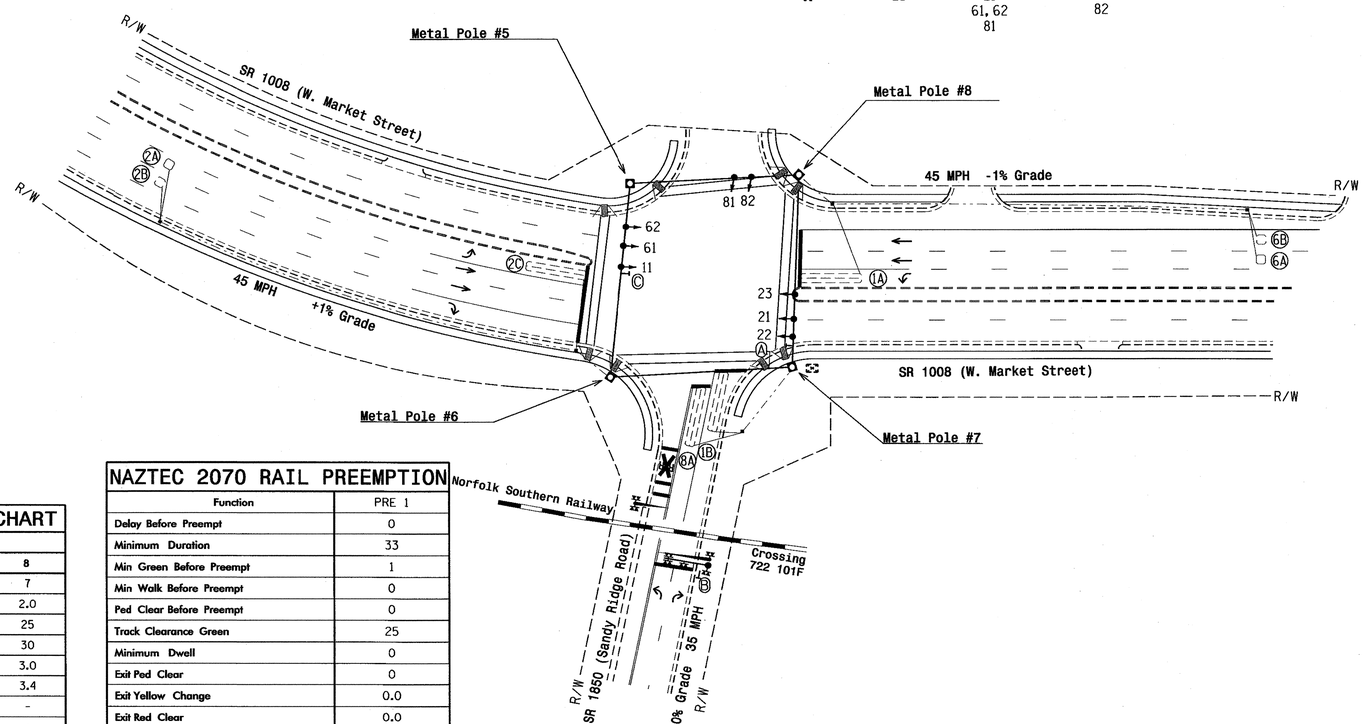
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and may be lagged.
4. Reposition existing signal heads numbered 21, 22, 61, and 62.
5. Set all detector units to presence mode.
6. Ensure flashing operation does not alter operation of blankout signs.
7. 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.





LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
N/A	Railroad Cantilever	
Ⓐ	"NO RIGHT TURN - TRAIN" LED Blankout Sign	Ⓐ
Ⓑ	"DO NOT STOP ON TRACKS" Sign (R8-8)	Ⓑ
Ⓒ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓒ

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	6	8
Min Green *	7	12	12	7
Gap, Extension *	2.0	6.0	6.0	2.0
Maximum Green 1 *	20	90	90	25
Maximum Green 2 *	25	110	110	30
Yellow Clear	3.0	4.6	4.6	3.0
Red Clear	3.1	2.0	2.0	3.4
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	2.5	2.5	-
Maximum Initial *	-	34	34	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Lock Calls	NO	YES	YES	NO
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

NAZTEC 2070 RAIL PREEMPTION

Function	PRE 1
Delay Before Preempt	0
Minimum Duration	33
Min Green Before Preempt	1
Min Walk Before Preempt	0
Ped Clear Before Preempt	0
Track Clearance Green	25
Minimum Dwell	0
Exit Ped Clear	0
Exit Yellow Change	0.0
Exit Red Clear	0.0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Yellow Change	25.5
Track Red Clear	25.5
All-Red B4 Dwell	OFF
Lock Input	OFF
Overide Higher # Preempt	ON
Link to Preempt #	0
Exit Preempt To	8

This signal was designed for advanced preemption.

Signal Upgrade - Final Design

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, 750 N.Greenfield Pkwy, Garner, NC 27529

SR 1008 (W. Market Street) at SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: R. Hough
PREPARED BY: W. Bazzarie REVIEWED BY:

SCALE 1"=50' (0 – 50)

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE DATE 5/6/11

SIG. INVENTORY NO. 07-1439

11-MAY-2011 09:47
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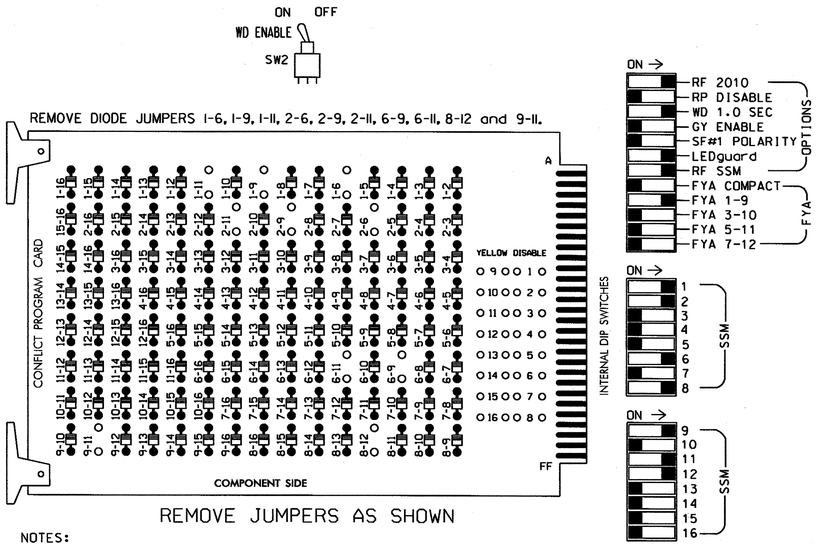
rwhough

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 36

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2A	Ø2 2C											ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L		Ø6 6B				NOT USED								NOT USED

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

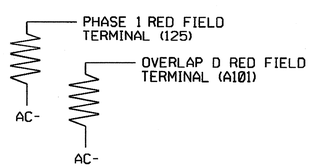
FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,4,5, 7,10,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
VERSION 70.0A BUILD 4196
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S6,S8,S9,S12,S13
PHASES USED.....1,2,6,8
OVERLAP A.....*
OVERLAP B.....NOT USED
OVERLAP C.....*
OVERLAP D.....*

*See Sheet 3 of 5 Overlap programming Detail

INPUT FILE CONNECTION & PROGRAMMING CHART

	LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
	1A	TB2-1,2	I1U	56	1	1		15		X	X	
*	1A (Logic)	-	-	60	13	1				X	X	
	1B	TB2-5,6	I2U	39	2	1		15		X	X	
	2A	TB2-7,8	I2L	43	3	2				X	X	X
	2B	TB2-9,10	I3U	63	4	2				X	X	X
	2C	TB2-11,12	I3L	76	5	2				X	X	
	6A	TB3-5,6	J2U	40	16	6				X	X	X
	6B	TB3-7,8	J2L	44	17	6				X	X	X
	8A	TB5-9,10	J6U	42	22	8		3		X	X	

* Note for 1A (Logic): Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to "I/O Logic Programming Detail to Apply RR Preempt Exit Call on Phase 1" (Sheet 5 of 5).

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

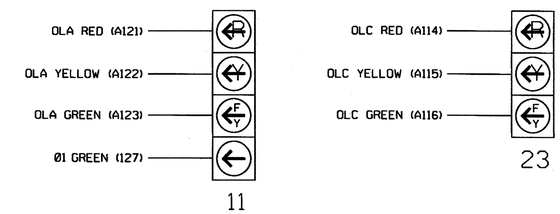
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	82	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11★	NU	NU	23★	22	NU
RED		*	128						134			107						*	
YELLOW			129						135			108							
GREEN			130						136			109							
RED ARROW														A121			A114		
YELLOW ARROW		126												A122			A115	A102	
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127	127																A103	

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

1. See Overlap Programming Detail Sheet 3 of 5.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY: T. Jack		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 5/12/11
SIG. INVENTORY NO. 07-1439

10-MAY-2011 08:39
S:\TTSA\SHTS\Signals\workgroups\sig Mgmt\strickland\07139_emlele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 37

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS
ENTER PREEMPT #1

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1  Times    :  Begin     :   Other
  Delay     0   MinGrn   1   Track Grn  25
MinDura    33   MinWlk   0   Min Dwell   0
MaxPres     0   PedClr   0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              ---- Preempt Phases ----
Track Veh        8  0  0  0
DwellCyc Veh     2  6  0  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             8  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1        Preempt Options
                      Lock input OFF
           Override Auto Flash ON
     Override higher # preempt ON
                 Flash in dwell OFF
            Link to preempt # 0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 Preempt Times+      --- Exit --
                      Ped Clr     0
  Extend Dwell    0       Yel   0.0
   Return Max     0       Red   0.0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              -- Preempt Overlaps+ --
        Track    0  0  0  0  0  0  0  0
      (more)     0  0  0  0
     DwellCyc    3  0  0  0  0  0  0  0
      (more)     0  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1      Preempt Options +
Enable ON                    Pattern    0
  Type RAIL     Skip Track if Overide OFF
Output TS-2            Coord+Preempt  OFF
                     Volt Mon Flash   OFF
Lnk Aft Dwel OFF     Return Max/Min   MAX
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 AdvTimes
enterYellowChange25.5
enterRedClear    25.5
trackYellowChange25.5
trackRedClear    25.5
All Red B4 Dwell  OFF
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1        --   Initial Dwell    --
Phases    0  0  0  0
Peds      0  0  0  0
Overlaps  0  0  0  0  0  0  0  0
  (more)  0  0  0  0  0  0  0  0
```

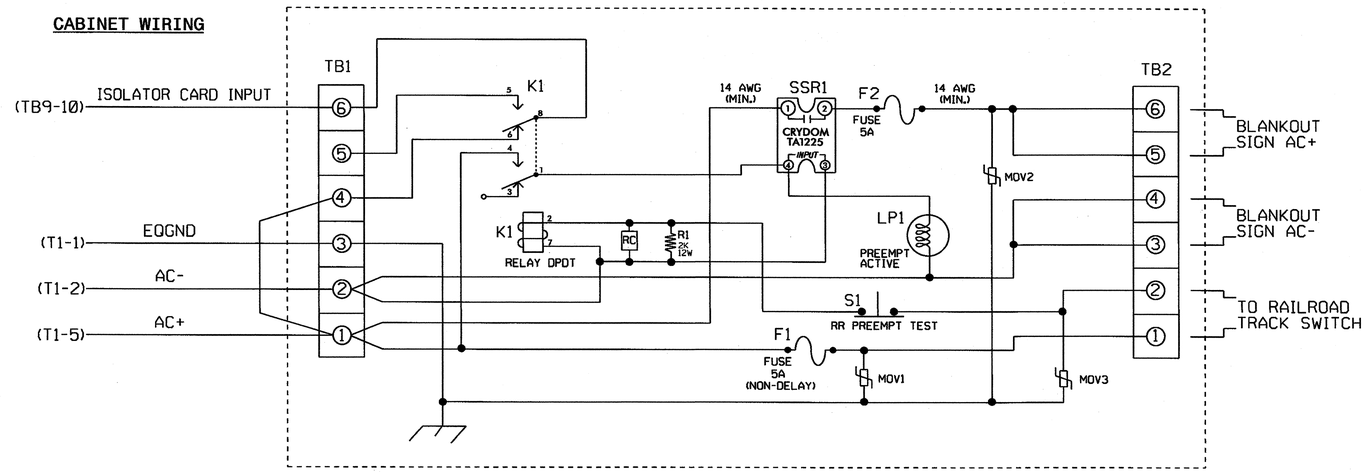
PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

PREEMPTION AND BLANKOUT SIGN CONTROL BOX

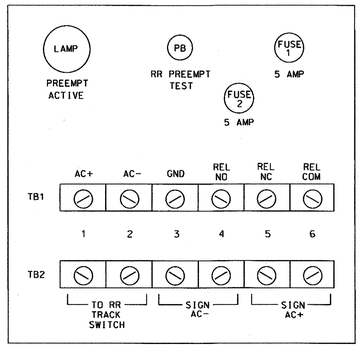
CABINET WIRING



NOTES

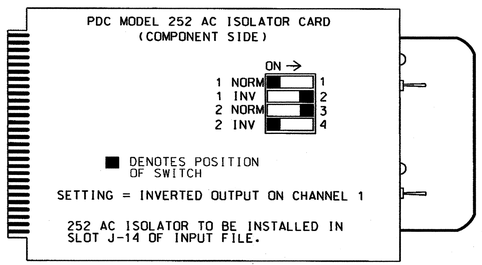
1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 Is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. 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.
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K; DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. 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)



SETTING = INVERTED OUTPUT ON CHANNEL 1

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

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: 07-1439
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Management Section, Division of Highways, Department of Transportation, State of North Carolina
750 N.Greenfield Pkwy.Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Jones
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/12/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1439

10-MAY-2011 08:41
S:\Traffic\Signals\Workgroups\Sig Mgmt\Strickland\07-1439_sht_01_e_xxx.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 38

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp A-1   Ps....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp A-1   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp A-1
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

PRESS "ESC" TWICE

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp C-3   Ps....................
Included Ps    6  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp C-3   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

PRESS "ESC" TWICE

```
Enter Overlap #  4
  then press Enter
```

```
Overlap D-4
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp D-4   Ps....................
Included Ps    8  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap D-4
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp D-4   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap D-4
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp D-4
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

PRESS "ESC" THREE TIMES

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
  Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011	REVIEWED BY:		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

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NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE | DATE 5/12/11

SIG. INVENTORY NO. 07-1439

10-MAY-2011 15:55
S:*TS&S\MTS Signals*Workgroups*Sig Mana&Strickland*071439_smu_ele_xxx.dgn
oastrtlsk1002

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  [6.IO Parms]  9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
 Invert Rail Inputs: OFF
    EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms  [9.IO UserMap]
```

```
User I/O Maps
1. Inputs
2. Outputs
[3. Init Map]
```

```
Initialize User I/O Maps
   Init ABC with: NONE
     Init D with: NONE
    Init 2A with: MODE 5
Init TF BIUs with: NONE
```

SELECT MODE 5 →

PRESS "ESC"

```
User I/O Maps
1. Inputs
[2. Outputs]
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    [5.FIO 2A]
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	39	Ch15 Yellow
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	59	Ch11 Green
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-8	57	Ch9 Green	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-1 (C1 pin 35) = Load Switch S2P-Y
Pin 7-8 (C1 pin 99) = Load Switch S9-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  [4.Chan+  1-16] 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

→

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   .   .   ←
Flash Grn .   .   X   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   0   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439
DESIGNED: April 2011
SEALED: 05/06/11
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Electrical Detail - Sheet 4 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY: T. JM		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 5/6/11
SIG. INVENTORY NO. 07-1439

19-May-2011 08:45
S:\TEDSIGN\TS Signals\Workgroups\Sig Man\Strickland\071439_sm_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 40

I/O LOGIC PROGRAMMING DETAIL
TO APPLY RR PREEMPT EXIT CALL ON PHASE 1

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-8

Channel & I/O

1.Chan 1-16	4.Chan+ 1-16	7.IO Logic
2.chan 17-24	5.chan+ 17-24	8.IO Viewer
3.Chan Parms	6.IO Parms	9.IO UserMap

	Result	Fcn	Oper	Fcn	Oper	Fcn		Timer	
*	I208=	I	208	I	0	I	0	DLY	1
	I13 =	I	198	I	0	I	0	DLY	0
	I 0=	I	0	I	0	I	0	DLY	0
	I 0=	I	0	I	0	I	0	DLY	0
	I 0=	I	0	I	0	I	0	DLY	0
	I 0=	I	0	I	0	I	0	DLY	0

DETECTOR 13 CALLS PHASE 1

* Denotes input function 208 (flash sense) logic delay is assigned per Mode 5 default.

NOTE

1. The above I/O Programming ensures a Phase 1 call when exiting RR Preempt. A Phase 1 call is nessesary for proper FYA operation (Signal Head 11) when exiting RR Preempt.
2. Ensure Detector 13 is setup to call phase 1 (default value).
3. Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to INPUT FILE CONNECTION & PROGRAMMING CHART.

I/O REFERENCE SCHEDULE

INPUT FUNCTION 208 = Flash Sense
INPUT FUNCTION 13 = Veh Call Det 13
INPUT FUNCTION 198 = Preempt 1 In

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1439
DESIGNED: April 2011
SEALED: 05/06/11
REVISED:

Electrical Detail - Sheet 5 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1850 (Sandy Ridge Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Vgt
PREPARED BY: C. Strickland REVIEWED BY:

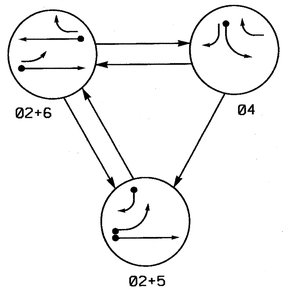
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 5/12/11
SIG. INVENTORY NO. 07-1439

10-MAY-2011 09:01
S:\TTSASU\ITS Signals\workgroups\Sig Name\Strickland\07-1439_sml_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 41

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R/	R	G	R
51	←	F.Y.	~~R~~	~~Y~~
61	R	G	R	Y
62	R	G	R/	Y

F.Y. = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F.Y. 1	TO F.Y. 2	TO ~~R~~ 1	TO ~~R~~ 2
←	←	←	~~Y~~	~~R~~	~~Y~~	~~R~~
F.Y.	F.Y.	F.Y.	F.Y.	F.Y.	~~Y~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

F.Y. = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	285	EXIST	-	2	-	-	-	X	X	-	-	X
2B	6X6	143	EXIST	-	2	-	-	-	X	X	-	-	X
4A	6X40	0	2-4-2	X	4	-	3	-	X	X	-	-	X
5A	6X50	+5	2-4-2	-	5	-	15	-	X	X	-	-	X
5B	6X40	+5	2-4-2	X	5	-	15	-	X	X	-	-	X
6A	6X6	300	5	X	6	-	-	-	X	X	X	-	X

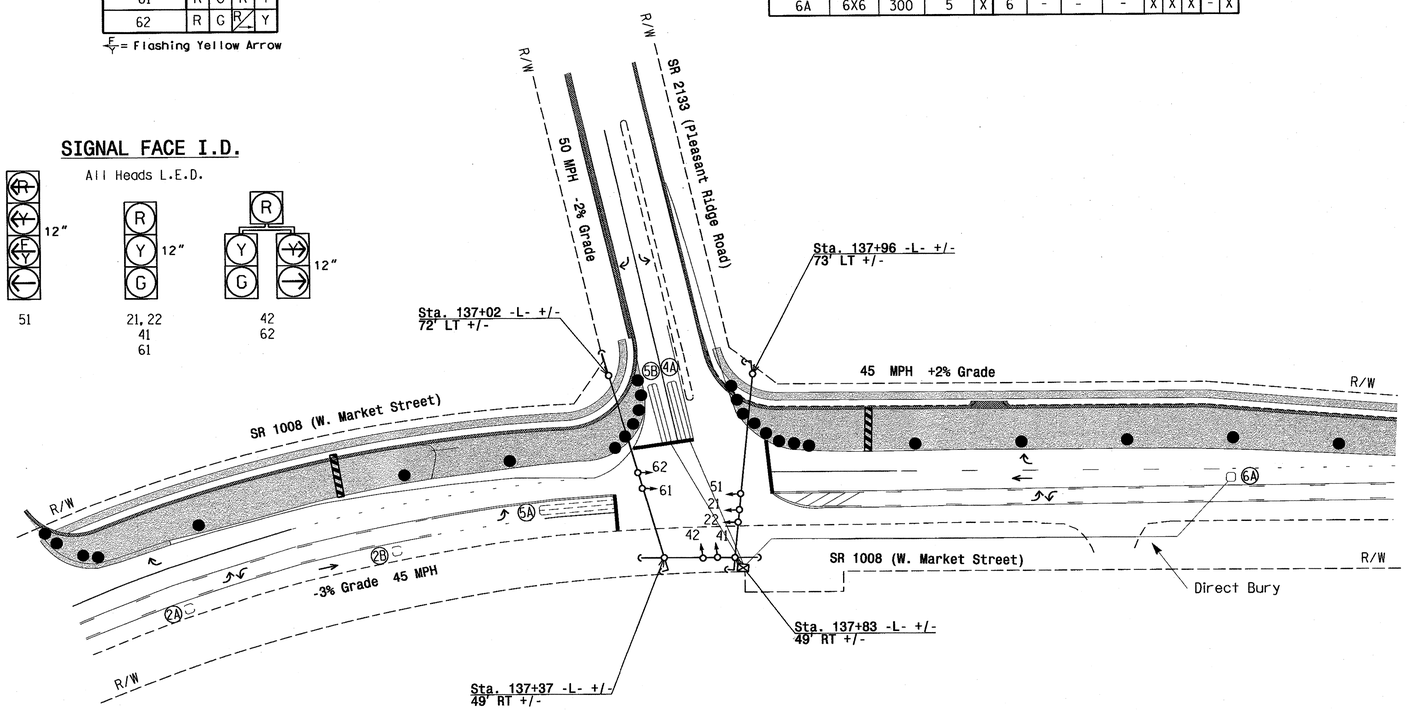
3 Phase
Fully Actuated
(Greensboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. 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.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Construction Zone	
	Construction Zone Drums	

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Gap, Extension *	4.0	2.0	2.0	6.0
Maximum Green 1 *	90	20	15	90
Maximum Green 2 *	110	25	20	110
Yellow Clear	4.8	3.0	3.0	4.3
Red Clear	1.4	2.4	2.6	1.3
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	-	-	2.5
Maximum Initial *	-	-	-	34
Time Before Reduction *	-	-	-	15
Time To Reduce *	-	-	-	45
Minimum Gap	-	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Upgrade - Temporary Design 1 (Construction Phase I)

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 50 1"=50'

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE: March 2011	REVIEWED BY: R. Hough
PREPARED BY: W.Bazzarie	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/2/11 DATE
SIG. INVENTORY NO. 07-2000T1

04-MAY-2011 15:54
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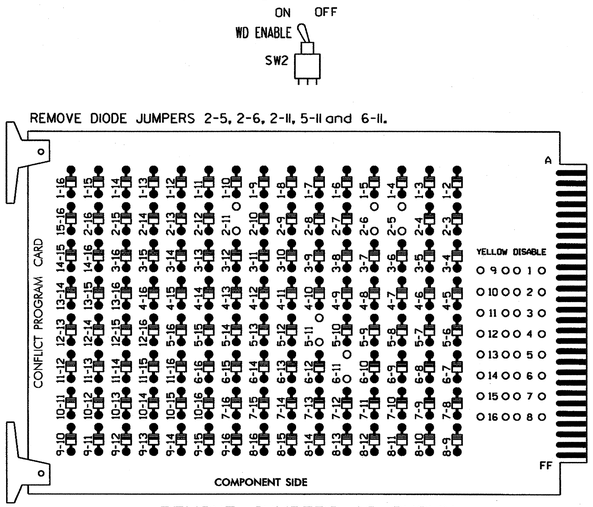
rzziemba

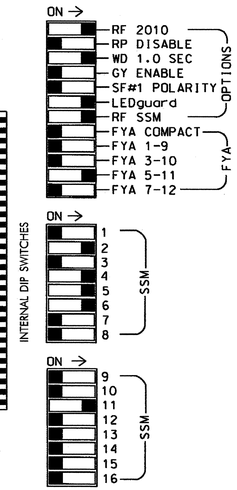
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 42

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	NU	42	51★	61,62	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101			✱		134									
YELLOW		129			102					135									
GREEN		130			103					136									
RED ARROW																	A114		
YELLOW ARROW						102		132									A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW						103		133	133										

NU = Not Used

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

★ See pictorial of head wiring in detail below.

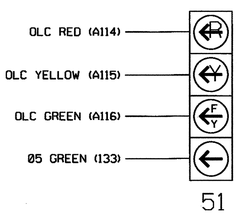
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12
PHASES USED.....2,4,5,6
OVERLAP C.....✱

✱See Sheet 2 of 3 Overlap Programming Detail

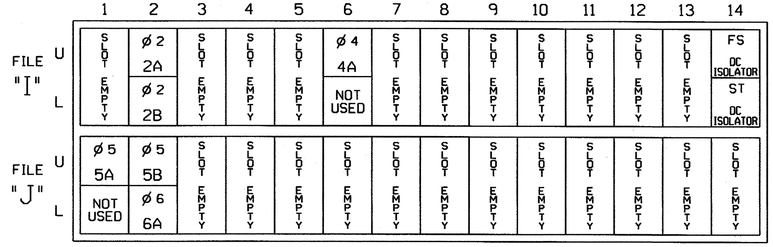
4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



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.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A	TB2-5,6	I2U	39	2	2				X	X	
2B	TB2-7,8	I2L	43	3	2				X	X	
4A	TB4-9,10	I6U	41	8	4		3		X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB3-5,6	J2U	40	16	5		15		X	X	
6A	TB3-7,8	J2L	44	17	6				X	X	X

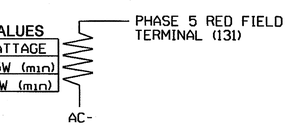
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



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: 07-2000T1
DESIGNED: March 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Temp 1 - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Department of Transportation
State of North Carolina
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Jyn
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE DATE 5/6/11

SIG. INVENTORY NO. 07-2000T1

04-MAY-2011 09:43
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cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 43

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Included Ps    5  0  0  0  0  0  0  0
Modifier Ps    6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

Notice type FYA-4 →

PRESS "ESC"

```
Overlap C-3
1.Program Parms
[2.Confl Prog+]
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
[3.Program Parms+]
```

```
 Ovrlp C-3
LeadGreen  OFF   Transit 0
GreenExtInh      0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2000T1
DESIGNED: March 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Temp 1 - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Management Section
DEPT. OF TRANSPORTATION
STATE OF NORTH CAROLINA

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. [illegible]
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE 5/6/11 DATE

SIG. INVENTORY NO. 07-2000T1

04-May-2011 09:45
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$$$$TSKLOPS

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
         T&F Biu Map: DEFAULT
 Invert Rail Inputs: OFF
    EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
Init ABC with: NONE
  Init D with: NONE
   Init 2A with: MODE 5
Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-2	39	Ch15 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	57	Ch9 Green

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
6-8	59	Ch11 Green	39	Ch15 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-2 (C1 pin 36) = Load Switch S6P-Y
Pin 6-8 (C1 pin 87) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
     Chan.1...2...3...4...5...6...7...8 >
Flash Red .  .  .  .  .  .  .  .
Flash Yel .  .  .  .  .  .  .  .
Flash Grn .  .  .  .  .  .  .  .
Inhibit Red Flash In
  Preempt .  .  .  .  .  .  .  .
Olap Ovrd 0  0  0  0  0  0  0  0
```

```
     Chan.9..10..11..12..13..14..15..16
Flash Red .  .  .  .  .  .  .  .
Flash Yel .  .  .  .  .  .  X  .
Flash Grn .  .  .  .  .  .  .  .
Inhibit Red Flash In
  Preempt .  .  .  .  .  .  .  .
Olap Ovrd 0  0  0  0  0  0  3  0
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2000T1
DESIGNED: March 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Temp 1 - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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Transportation Mobility and Safety Division
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Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY:
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

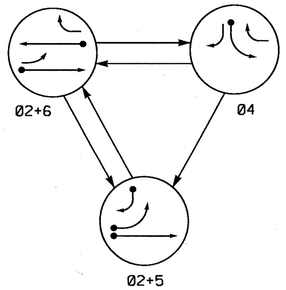
SIGNATURE | DATE 5/6/11

SIG. INVENTORY NO. 07-2000T1

04-MAY-2011 09:46
S:\ATS&SU\ITS Signal\workgroups\Sig Mgmt\Strickland\R072000_sm_ele_xxx.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 45

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R/⤳	R	G	R
51	←	F Y	R	Y
61	R	G	R	Y
62	R	G	R/⤳	Y

F Y = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F Y 1	TO F Y 2	TO R 1	TO R 2
←	←	←	Y	R	Y	R
F Y	F Y	F Y	F Y	F Y	Y	R
R	R	R	R	R	R	R

F Y = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	X	2	-	-	-	X	X	X	-	-
4A	6X40	+10	2-4-2	X	4	-	3	-	X	X	-	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	-
5B	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	-
6A	6X6	300	5	X	6	-	-	-	X	X	X	-	-

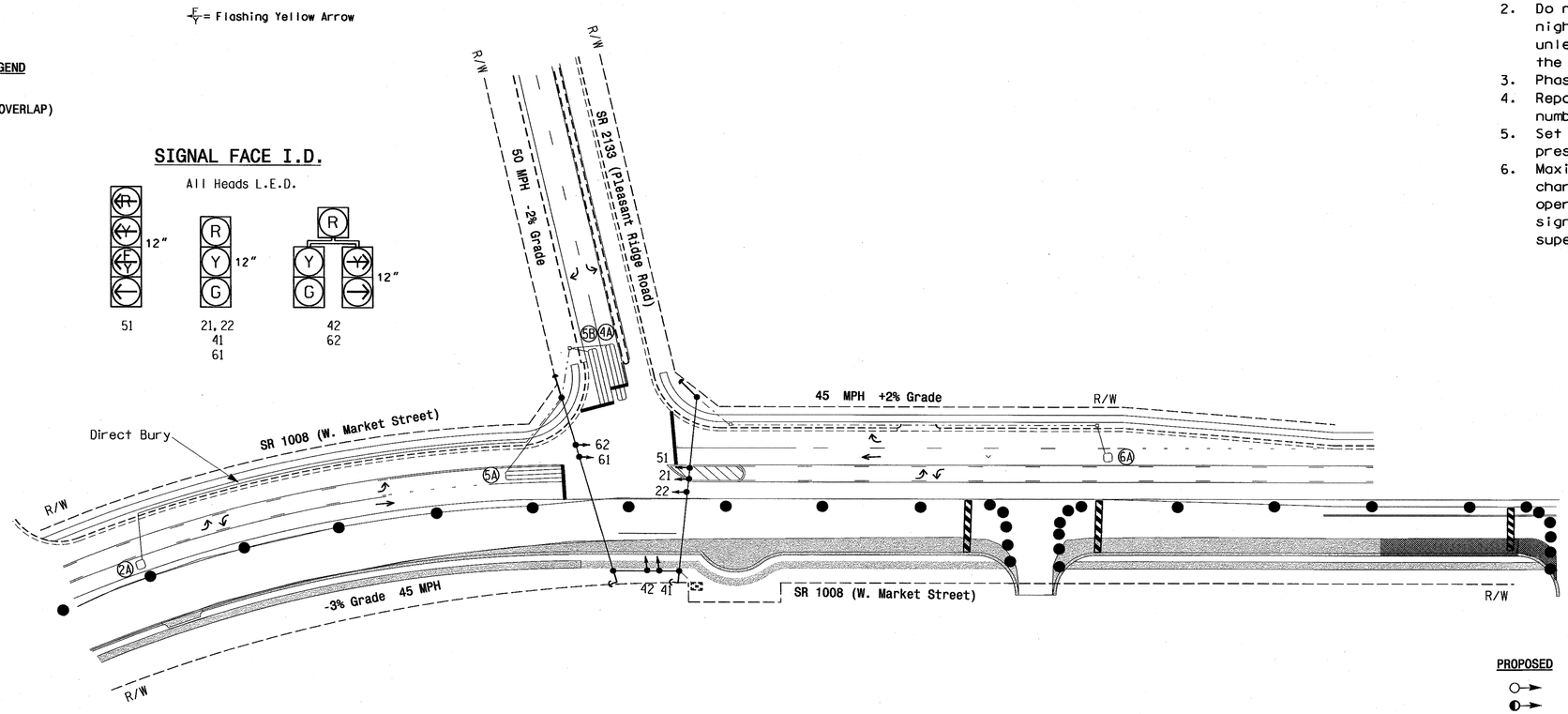
3 Phase
Fully Actuated
(Greensboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads numbered 21, 22, 51, 61 and 62.
5. Set all detector units to presence mode.
6. 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.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Construction Zone	
	Construction Zone Drums	

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Gap, Extension *	6.0	2.0	2.0	6.0
Maximum Green 1 *	90	20	15	90
Maximum Green 2 *	110	25	20	110
Yellow Clear	4.8	3.0	3.0	4.3
Red Clear	1.0	2.6	2.3	1.0
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	2.5	-	-	2.5
Maximum Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Upgrade - Temporary Design 2 (Construction Phase II)

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 50 1"=50'

SR 1008 (W. Market Street) at SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE:	March 2011	REVIEWED BY:	R. Hough
PREPARED BY:	M.Bazzarie	REVIEWED BY:	

REVISIONS	INIT.	DATE

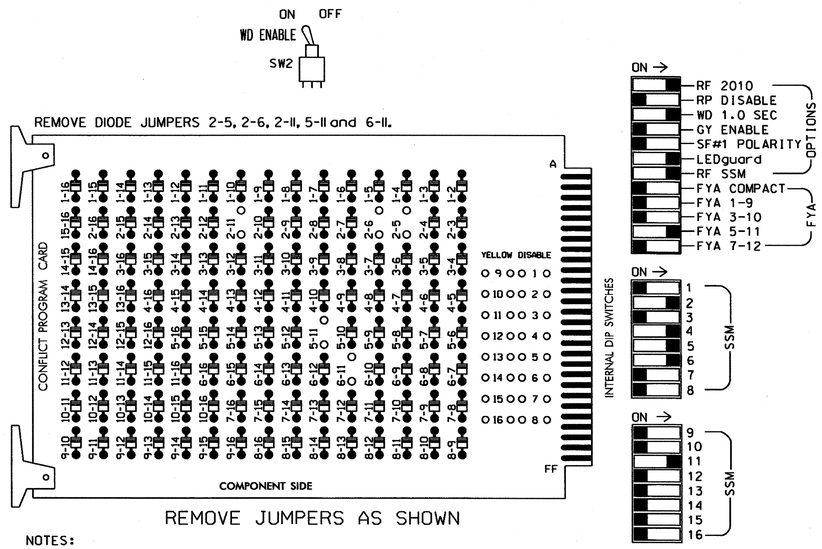
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 5/2/11
SIG. INVENTORY NO. 07-2000T2

04-MAY-2011 15:57
P:\#TIP\Projects\R2611\Traffic\Signals\Design\Signals\07-2000\07200072_sig_dsn_20110502..dgn
PT 2.0.0.0

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 46

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	NU	42	51★	61,62	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101			✱		134									
YELLOW		129			102					135									
GREEN		130			103					136									
RED ARROW																	A114		
YELLOW ARROW						102		132									A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW						103		133	133										

NU = Not Used

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

★ See pictorial of head wiring in detail below.

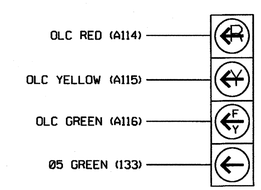
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12
PHASES USED.....2,4,5,6
OVERLAP C.....*

*See Sheet 2 of 3 Overlap Programming Detail

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6A												

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.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A	TB2-5,6	I2U	39	2	2				X	X	X
4A	TB4-9,10	I6U	41	8	4		3		X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB3-5,6	J2U	40	16	5		15		X	X	
6A	TB3-7,8	J2L	44	17	6				X	X	X

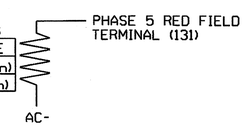
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



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: 07-2000T2
DESIGNED: March 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Temp 2 - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Joyce
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/6/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2000T2

05-MAY-2011 08:09
S:\TMS\DIVISION7\Signals\Workgroups\Sig Mgmt\Strickland\M072000_simulate_xxx.dgn
cassrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 47

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  3
then press Enter
```

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp C-3   Ps....................
Included Ps    5  0  0  0  0  0  0  0
Modifier Ps    6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp C-3   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp C-3
LeadGreen  OFF   Transit 0
GreenExtInh      0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2000T2
DESIGNED: March 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Temp 2 - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011	REVIEWED BY: T. Jyl		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/6/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2000T2

05-MAY-2011 08:14
S:*ITS&SM*ITS Signals*WkGroups*Sig Mana*Strickland*072000_smu01b_xxx.dgn
$$$$rptdsk$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 48

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
         T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
   EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
     Init ABC with: NONE
       Init D with: NONE
      Init 2A with: MODE 5
Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-2	39	Ch15 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	57	Ch9 Green

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
6-8	59	Ch11 Green	39	Ch15 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-2 (C1 pin 36) = Load Switch S6P-Y
Pin 6-8 (C1 pin 87) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   X   .   ←
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   3   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2000T2
DESIGNED: March 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Temp 2 - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Joyce
PREPARED BY:	C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/6/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2000T2

05-MAY-2011 08:19
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PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 49

3 Phase
Fully Actuated
(Greensboro Signal System)

PHASING DIAGRAM

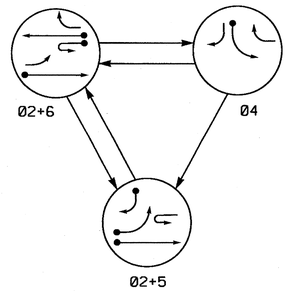


TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R/⟋	R	G	R
51	←	F.Y.	R	Y
61	F.Y.	F.Y.	R	Y
62	R	G	R	Y
63	R	G	R/⟋	Y

F.Y. = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ←	TO F.Y. 1	TO F.Y. 2	TO R 1	TO R 2
←	←	←	Y R	Y R	Y R
F.Y.	F.Y.	F.Y. F.Y.	F.Y. F.Y.	Y R	Y R
R	R R	R R	R R	R R	R R

F.Y. = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2B	6X6	300	5	X	2	-	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	-	3	-	X	X	-	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	-
5B	6X40	0	2-4-2	-	5	-	15	-	X	X	-	-	-
6B	6X6	300	5	X	6	-	-	-	X	X	X	-	-
6C	6X40	0	2-4-2	X	6	-	-	-	X	X		-	X

NOTES

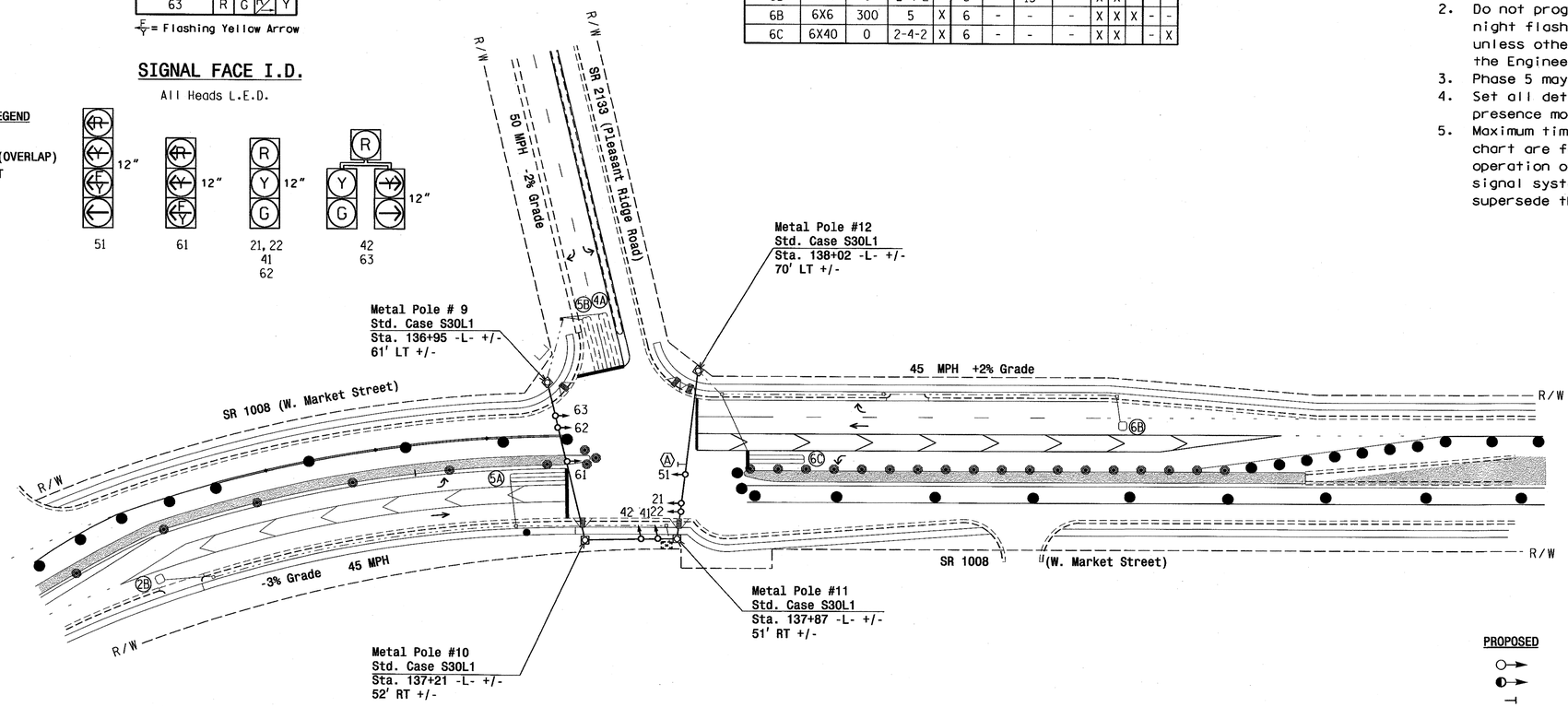
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. 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.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
	Construction Zone	
	Construction Zone Drums	
	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Gap, Extension *	6.0	2.0	2.0	6.0
Maximum Green 1 *	90	20	15	90
Maximum Green 2 *	110	25	20	110
Yellow Clear	4.8	3.0	3.0	4.8
Red Clear	1.3	3.3	2.9	1.3
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	2.5	-	-	2.5
Maximum Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Upgrade - Temporary Design 3 (Construction Phase III)

Prepared In the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	R. Hough
PREPARED BY:	W.Bazzarie	REVIEWED BY:	

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

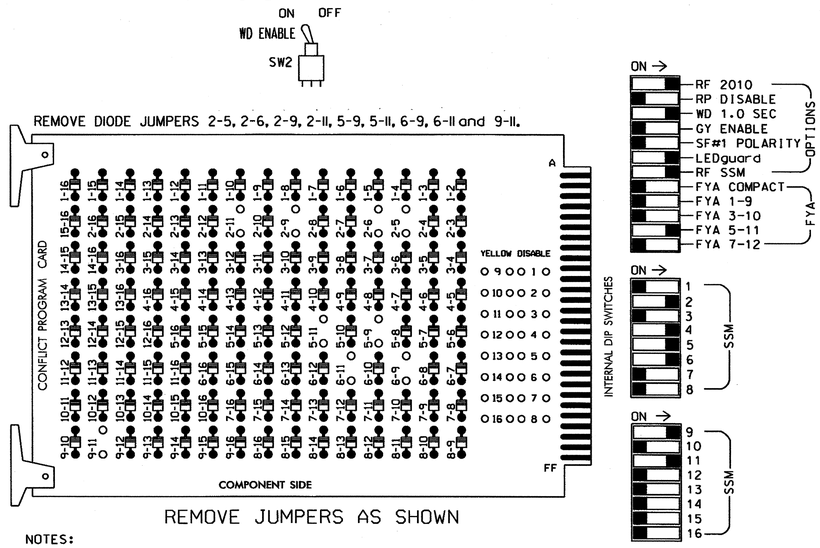
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/2/11 DATE
SIG. INVENTORY NO. 07-2000 T3

04-MAY-2011 15:56
S:\TPB\Projects\R2611\Traffic\Signals\Designs\Signals\07-2000\07200073_sig_dsn_20110502.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.50

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	63	NU	42	51★	62,63	NU	NU	NU	61★	NU	NU	51★	NU	NU
RED		128			101			*		134									
YELLOW		129			102					135									
GREEN		130			103					136									
RED ARROW														A121			A114		
YELLOW ARROW						102		132						A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW						103		133	133										

NU = Not Used

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

★ See pictorial of head wiring in detail below.

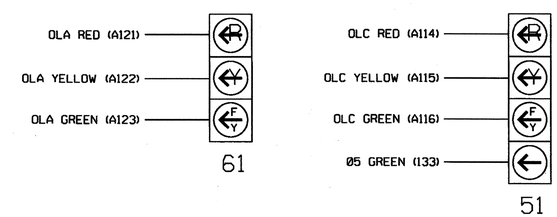
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S9,S12
PHASES USED.....2,4,5,6
OVERLAP A.....*
OVERLAP C.....*

*See Sheet 2 of 3 Overlap Programming Detail

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	NOT USED	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø2 2B	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6B	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	NOT USED	Ø6 6C	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2B	TB2-7,8	I2L	43	3	2				X	X	X
4A	TB4-9,10	I6U	41	8	4		3		X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB3-5,6	J2U	40	16	5		15		X	X	
6B	TB3-9,10	J3U	64	18	6				X	X	X
6C	TB3-11,12	J3L	77	19	6				X	X	

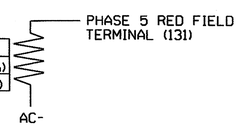
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



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: 07-2000 T3
DESIGNED: April 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Temp 3 - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Joyce
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE | DATE 5/6/11

SIG. INVENTORY NO. 07-2000 T3

04-May-2011 08:55
S:\Traffic Control Systems\Signals\Workgroups\Sig Mon\Strickland\ed072000_smule_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 51

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1   Ps....................
Included Ps    2  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

PRESS "ESC" THREE TIMES

Notice type FYA-4 →

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Included Ps    5  0  0  0  0  0  0  0
Modifier Ps    6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2000 T3
DESIGNED: April 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Temp 3 - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011	REVIEWED BY: T.Van		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/6/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2000 T3

10-MAY-2011 14:27
S:\MTSAS\MTS Signals\Workgroups\Sig Mgmt\Strickland\completed_electrical\R2611_sm_ele_20110506.dgn
cestrickland

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
   EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
Init ABC with: NONE
   Init D with: NONE
  Init 2A with: MODE 5
Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-2	39	Ch15 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	57	Ch9 Green

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
6-8	59	Ch11 Green	39	Ch15 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-2 (C1 pin 36) = Load Switch S6P-Y
Pin 6-8 (C1 pin 87) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16   4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   X   .   ←
Flash Grn X   .   .   .   .   .   .   .   ←
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   3   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2000 T3
DESIGNED: April 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Temp 3 - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Intelligent Transportation Systems
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7	Guilford County	Greensboro
PLAN DATE: April 2011	REVIEWED BY: T. Joyce	
PREPARED BY: C. Strickland	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/6/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-2000 T3

04-MAY-2011 08:59
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ceesrrsel.cnd

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 53

3 Phase
Fully Actuated
(Greensboro Signal System)

PHASING DIAGRAM

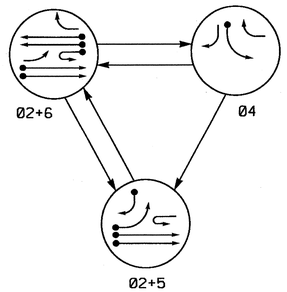


TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R/⟋	R	G	R
51	←	F.Y.	R	Y
61	F.Y.	F.Y.	R	Y
62	R	G	R	Y
63	R	G	R/⟋	Y

F.Y. = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F.Y. 1	TO F.Y. 2	TO R 1	TO R 2
←	←	←	Y	R	Y	R
F.Y.	F.Y.	F.Y.	F.Y.	F.Y.	Y	R
R	R	R	R	R	R	R

F.Y. = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	X	2	-	-	-	X	X	X	-	-
2B	6X6	300	5	-	2	-	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	-	3	-	X	X	-	-	-
5A	6X40	0	2-4-2	-	5	-	15	-	X	X	-	-	-
5B	6X40	0	2-4-2	-	5	-	15	-	X	X	-	-	-
6A	6X6	300	5	X	6	-	-	-	X	X	X	-	X
6B	6X6	300	5	-	6	-	-	-	X	X	X	-	-
6C	6X40	0	2-4-2	-	6	-	-	-	X	X	-	-	-

NOTES

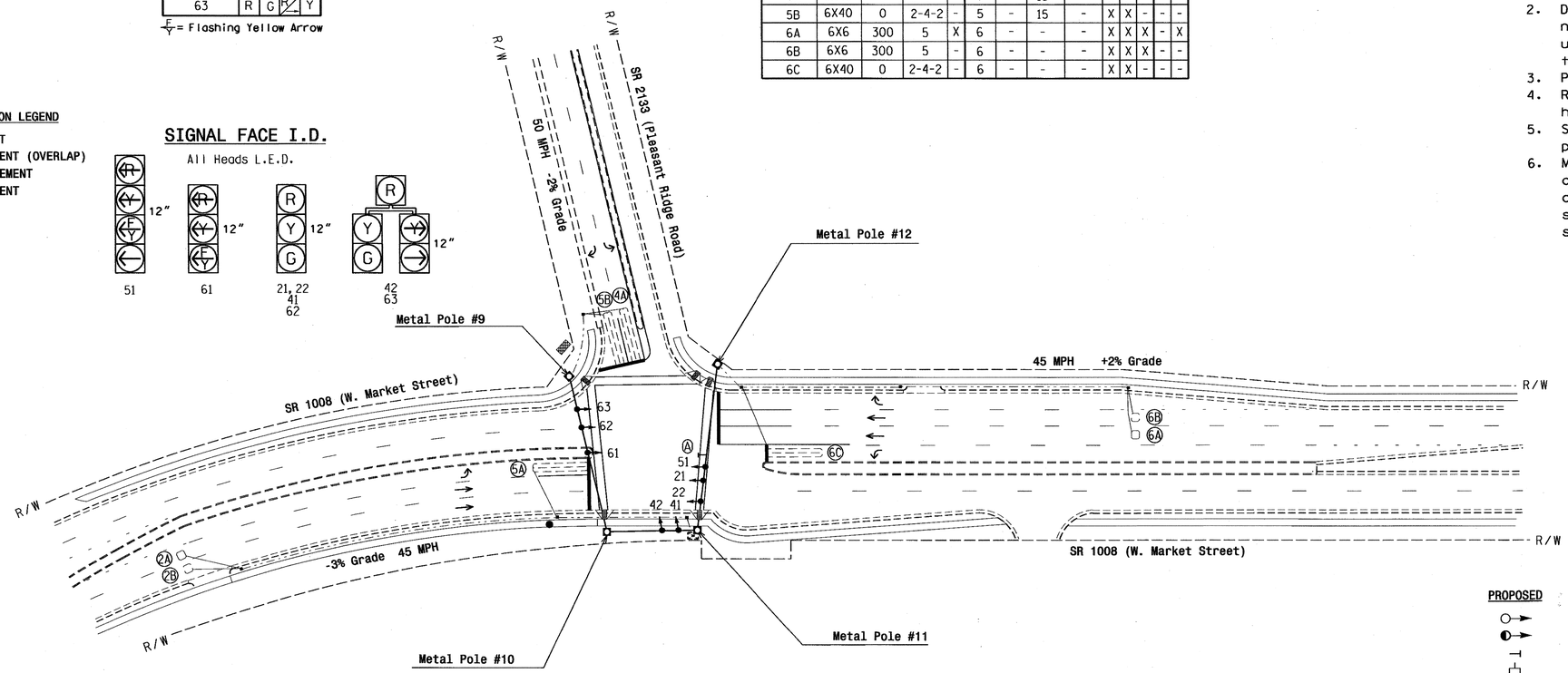
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads numbered 21 and 62.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Gap, Extension *	6.0	2.0	2.0	6.0
Maximum Green 1 *	90	20	15	90
Maximum Green 2 *	110	25	20	110
Yellow Clear	4.8	3.0	3.0	4.8
Red Clear	1.3	3.1	2.8	1.3
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	1.5	-	-	1.5
Maximum Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Upgrade - Final Design

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 50 1"=50'

SR 1008 (W. Market Street) at SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY: R. Hough
PREPARED BY: M.Bazzarie	REVIEWED BY:

REVISIONS	INIT.	DATE

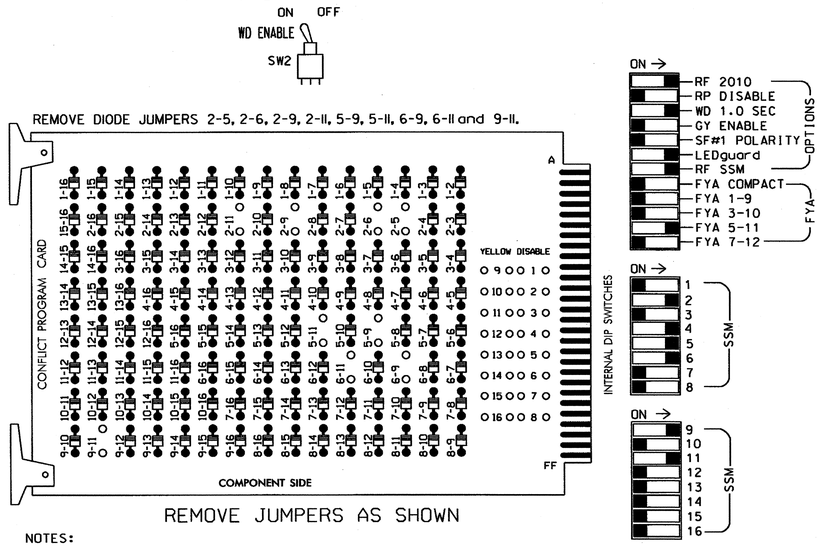
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/2/11 DATE
SIG. INVENTORY NO. 07-2000

04-MAY-2011 15:34
P:*WIP\Projects-RW\2611\TrafficSignals\Designs\Signals\07-2000\07200D_sig.dgn,20110502.dgn
ziemba

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.54

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	63	NU	42	51★	62,63	NU	NU	NU	NU	61★	NU	NU	51★	NU	NU
RED		128			101			✱		134									
YELLOW		129			102					135									
GREEN		130			103					136									
RED ARROW														A121			A114		
YELLOW ARROW						102		132						A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW						103		133	133										

NU = Not Used

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

★ See pictorial of head wiring in detail below.

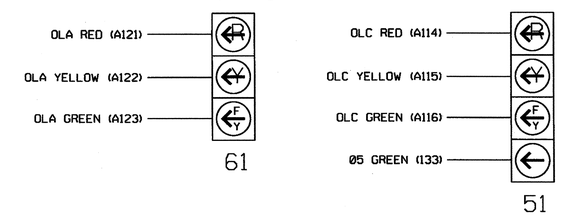
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S9,S12
PHASES USED.....2,4,5,6
OVERLAP A.....*
OVERLAP C.....*

*See Sheet 2 of 3 Overlap Programming Detail

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2 2A	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø2 2B	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6B	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø6 6A	Ø6 6C	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A	TB2-5,6	I2U	39	2	2				X	X	X
2B	TB2-7,8	I2L	43	3	2				X	X	X
4A	TB4-9,10	I6U	41	8	4		3		X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB3-5,6	J2U	40	16	5		15		X	X	
6A	TB3-7,8	J2L	44	17	6				X	X	X
6B	TB3-9,10	J3U	64	18	6				X	X	X
6C	TB3-11,12	J3L	77	19	6				X	X	

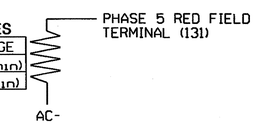
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



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: 07-2000
DESIGNED: April 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering & Safety Systems Branch
Signal Management Center
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Vaughn
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 5/6/11
SIG. INVENTORY NO. 07-2000

05-MAY-2011 13:26
S:*TSS*TS Signals\workgroups*Sig Manager\rickland\m072000_smlate_xxx.dgn
ssstrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.55

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  1
then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp A-1   Ps....................
Included Ps    2 0 0 0 0 0 0 0
Modifier Ps    0 0 0 0 0 0 0 0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
[2.Confl Prog+]
3.Program Parms+
```

```
Ovrlp A-1   Ps....................
Confl Ps       0 0 0 0 0 0 0 0
Confl Ovrlps   0 0 0 0 0 0 0 0
Confl Peds     0 0 0 0 0 0 0 0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
[3.Program Parms+]
```

```
Ovrlp A-1
LeadGreen  OFF  Transit 0
GreenExtInh     0 0 0 0 0 0 0 0
```

PRESS "ESC" THREE TIMES

Notice type FYA-4 →

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  3
then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp C-3   Ps....................
Included Ps    5 0 0 0 0 0 0 0
Modifier Ps    6 0 0 0 0 0 0 0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
[2.Confl Prog+]
3.Program Parms+
```

```
Ovrlp C-3   Ps....................
Confl Ps       0 0 0 0 0 0 0 0
Confl Ovrlps   0 0 0 0 0 0 0 0
Confl Peds     0 0 0 0 0 0 0 0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
[3.Program Parms+]
```

```
Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0 0 0 0 0 0 0 0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2000
DESIGNED: April 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Vick
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE | DATE 5/6/11
SIG. INVENTORY NO. 07-2000

10-MAY-2011 14:57
S:*TSASM*TS Signals*WorkGroups*Sig Mgmt*Frdklandwcompleted.electrical*072000_smcle_20110506.dgn
CASTRICKLAND

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.56

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
 Invert Rail Inputs: OFF
    EVP Ped Confirm: OFF
```

SELECT USER MODE

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
Initialize User I/O Maps
   Init ABC with: NONE
     Init D with: NONE
    Init 2A with: MODE 5
 Init TF BIUs with: NONE
```

SELECT MODE 5

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-2	39	Ch15 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	57	Ch9 Green

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
6-8	59	Ch11 Green	39	Ch15 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-2 (C1 pin 36) = Load Switch S6P-Y
Pin 6-8 (C1 pin 87) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
     Chan.1...2...3...4...5...6...7...8 >
Flash Red .  .   .   .   .   .   .   .
Flash Yel .  .   .   .   .   .   .   .
Flash Grn .  .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .  .   .   .   .   .   .   .
Olap Ovrd 0  0   0   0   0   0   0   0
```

```
     Chan.9..10..11..12..13..14..15..16
Flash Red .  .   .   .   .   .   .   .
Flash Yel .  .   .   .   .   .   X   .
Flash Grn X  .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .  .   .   .   .   .   .   .
Olap Ovrd 0  0   0   0   0   0   3   0
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-2000
DESIGNED: April 2011
SEALED: 05/02/11
REVISED:

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section, Department of Transportation, State of North Carolina

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 2133 (Pleasant Ridge Rd.)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Lyon
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

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

George C. Brown 5/6/11
SIGNATURE DATE

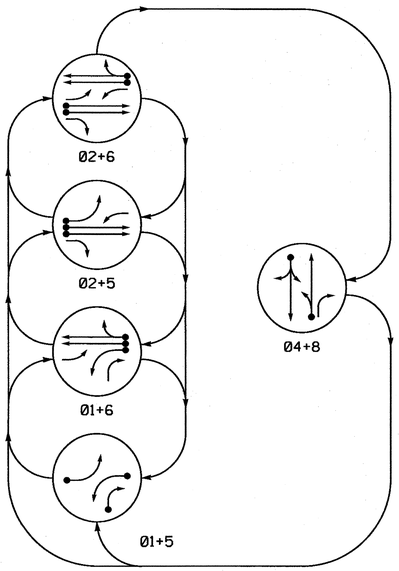
SIG. INVENTORY NO. 07-2000

05-MAY-2011 10:53
S:*ITS&SU*ITS Signals*workgroups*Sig Mark*Strickland*072000_smelle.xxx.dgn
cstrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.57

5 Phase
Fully Actuated
(Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

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

F Y = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ←	TO F Y 1	TO F Y 2	TO R 1	TO R 2
←	←	Y	Y	R	R
F Y 1	F Y	F Y	F Y	Y	R
F Y 2	F Y	F Y	F Y	Y	R
R	R	R	R	R	R

F Y = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

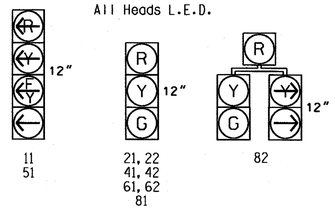
INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	-	15	-	X	X	-		X
1B	6X40	0	2-4-2	X	1	-	15	-	X	X	-	-	X
2A	6X6	300	5	X	2	-	-	-	X	X	X	-	X
2B	6X6	300	5	X	2	-	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	X	4	-	3	-	X	X	-	-	X
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	X
6A	6X6	300	6	X	6	-	-	-	X	X	X	-	X
6B	6X6	300	6	X	6	-	-	-	X	X	X	-	X
8A	6X40	0	2-4-2	X	8	-	3	-	X	X	-	-	X

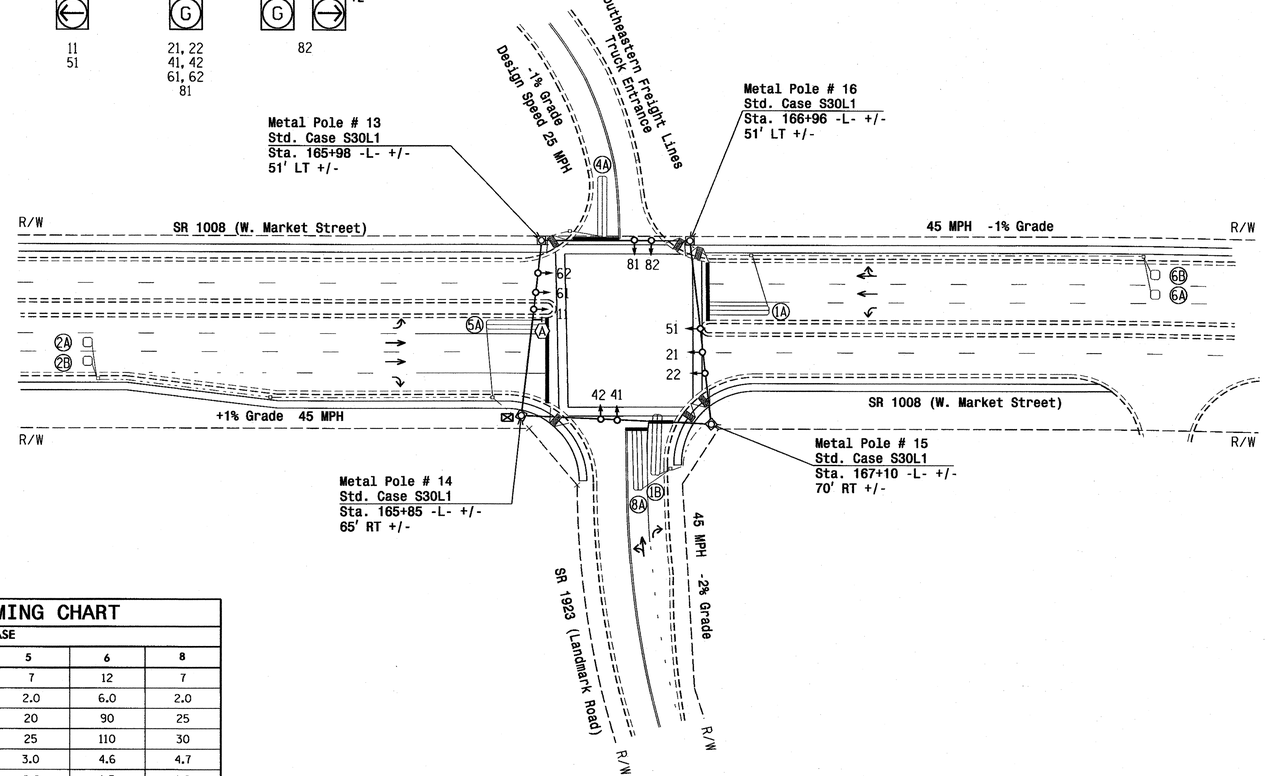
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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.
6. 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.





LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Gap, Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Maximum Green 1 *	20	90	25	20	90	25
Maximum Green 2 *	25	110	30	25	110	30
Yellow Clear	3.0	4.6	4.2	3.0	4.6	4.7
Red Clear	3.1	1.5	2.1	2.6	1.5	1.9
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	-	1.5	-	-	1.5	-
Maximum Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	45	-	-	45	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Lock Calls	NO	YES	NO	NO	YES	NO
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.

New Installation

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1923 (Landmark Road) and
Southeastern Freight Lines

Division 7 Guilford County Greensboro

PLAN DATE:	March 2011	REVIEWED BY:	R. Hough
PREPARED BY:	W.Bazzarie	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 50 1"=50'

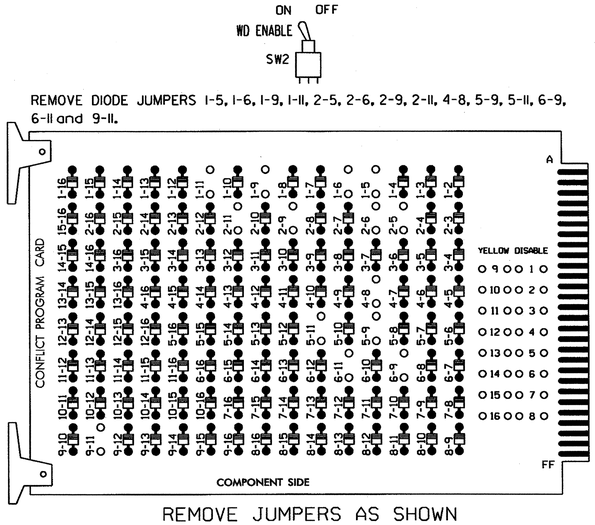
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 4/25/11
SIG. INVENTORY NO. 07-1819

16-MAY-2011 12:28
R:\Traffic\Signals\Designs\Signals\07-1819\071819_SIG_dsn_20110425.dgn
rwhough

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.58

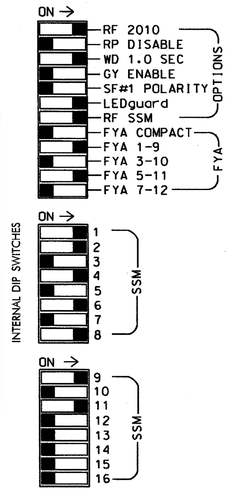
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS I-5, I-6, I-9, I-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



■ = DENOTES POSITION OF SWITCH

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5, 7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. Program phases 4 and 8 for Dual Entry.
8. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1		2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	82	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		126												A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127	127						133											

NU = Not Used

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

★ See pictorial of head wiring in detail below.

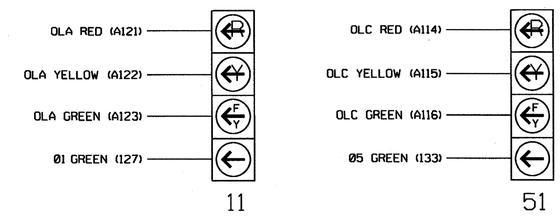
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8,S9,S12
PHASES USED.....1,2,4,5,6,8
OVERLAP A.....*
OVERLAP C.....*

*See Sheet 2 of 3 Overlap Programming Detail

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2B			NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B				NOT USED								

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.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
1A	TB2-1,2	I1U	56	1	1		15		X	X	
1B	TB2-5,6	I2U	39	2	1		15		X	X	
2A	TB2-9,10	I3U	63	4	2				X	X	X
2B	TB2-11,12	I3L	76	5	2				X	X	X
4A	TB4-9,10	I6U	41	8	4		3		X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
6A	TB3-5,6	J2U	40	16	6				X	X	X
6B	TB3-7,8	J2L	44	17	6				X	X	X
8A	TB5-9,10	J6U	42	22	8		3		X	X	

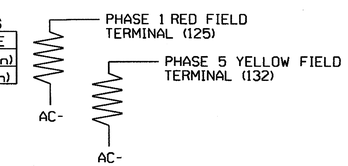
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1819
DESIGNED: March 2011
SEALED: 04/25/11
REVISED:

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1008 (W. Market Street) at SR 1923 (Landmark Road) and Southeastern Freight Lines

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE DATE 5/2/11

SIG. INVENTORY NO. 07-1819

05-MAY-2011 08:45
S:\MTS&SUM\TS\Signals\Workgroups\Sig Mon\Sirlexington\07181 9_smu.dgn
cassr1264.cnf

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.57

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
     Lock Inhibit OFF
  Confl Lock Enable OFF
    Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
 Ovrlp A-1   Ps....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

PRESS "ESC" THREE TIMES

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
 Ovrlp C-3   Ps....................
Included Ps    5  0  0  0  0  0  0  0
Modifier Ps    6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1819
DESIGNED: March 2011
SEALED: 04/25/11
REVISED:

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
SR 1923 (Landmark Road) and
Southeastern Freight Lines

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY:		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE DATE 5/2/11

SIG. INVENTORY NO. 07-1819

10-MAY-2011 14:45
S:\TIS&SM\TS Signals\workgroups\sig Mark\Strickland\completed_electrical\07181g_smele_20110502.dgn
ossrf\ossrf001

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
 Invert Rail Inputs: OFF
    EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
     Init ABC with: NONE
       Init D with: NONE
      Init 2A with: MODE 5
 Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Not Used	5-2	0	Not Used
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	42	Ch18 Yellow	5-6	41	Ch17 Yellow
5-7	115	Not Used	5-8	114	Watchdog
6-1	18	Ch18 Red	6-2	66	Ch18 Green

Note:
Pin 5-1 is defaulted as Channel 13 Yellow (Fcn 37), and pin 5-2 is defaulted as Channel 15 Yellow (Fcn 39). Change the function of pins 5-1 and 5-2 to '0' (Not Used).

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	17	Ch17 Red	7-2	65	Ch17 Green
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

Note:
Pin 7-8 is defaulted as Ch9 Green (Fcn 57), and pin 6-8 is defaulted as Ch 11 Green (Fcn 59). Change the function of pin 7-8 to '37' (Ch13 Yellow), and pin 6-8 to '39' (Ch 15 Yellow).

OUTPUT PROGRAMMING COMPLETE

Pin 7-8 (C1 pin 99) = Load Switch S9-G
Pin 6-8 (C1 pin 90) = Load Switch S11-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   X   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   3   0
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1819
DESIGNED: March 2011
SEALED: 04/25/11
REVISED:

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1008 (W. Market Street) at SR 1923 (Landmark Road) and Southeastern Freight Lines

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Vye

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N.Greenfield Pkwy,Garner,NC 27529

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

SIGNATURE DATE 5/2/11

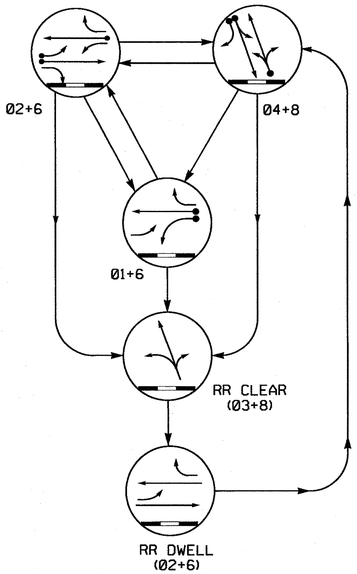
SIG. INVENTORY NO. 07-1819

26-APR-2011 09:46
S:\RTS&SU\ITS Signals\Workgroups\Sig Mark\Strickland\071819_smlelte_xxx.dgn
$$$$TSKTCMD

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 61

3 Phase Fully Actuated With Railroad Preemption (Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	04+8	CLEARANCE	DWELL	FLASH
11	←	F.Y.	R	R	R	Y
21	F.Y.	F.Y.	R	R	F.Y.	Y
22, 23	R	G	R	R	G	Y
41, 42	R	R	G	R	R	R
61, 62	G	G	R	R	G	Y
81	R	R	G	G	R	R
82	R	R	G	G	R	R
SIGN A	OFF	OFF	OFF	ON	ON	*

F.Y. = Flashing Yellow Arrow
* See Note 7

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ←	TO F.Y. 1	TO F.Y. 2	TO R 1	TO R 2
←	←	←	Y	R	Y	R
F.Y.	F.Y.	F.Y.	F.Y.	F.Y.	Y	R
R	R	R	R	R	R	R

F.Y. = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

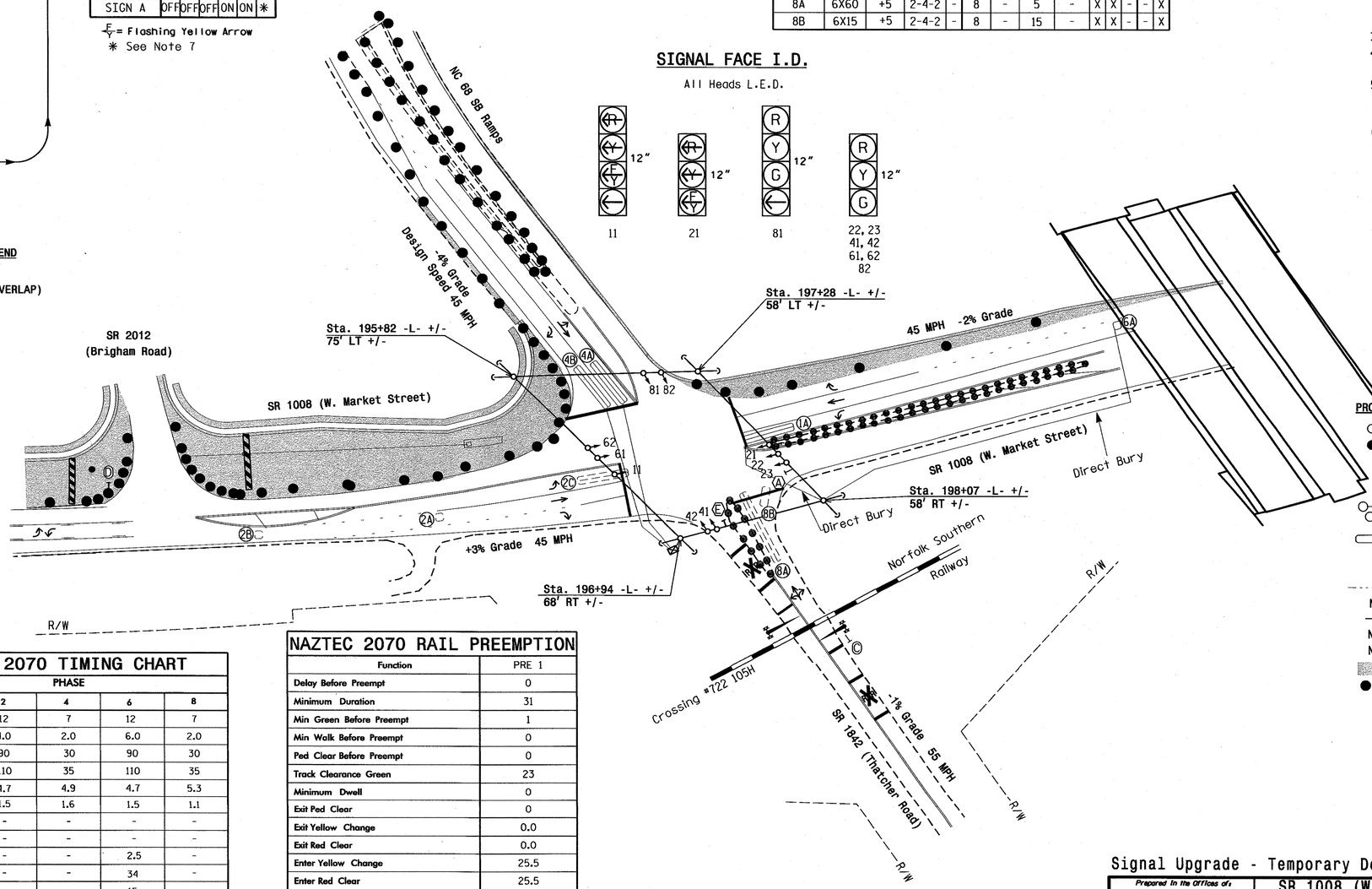
INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	-	15	-	X	X	-	-	X
2A	6X6	143	EXIST	-	2	-	-	-	X	X	-	-	X
2B	6X6	285	EXIST	-	2	-	-	-	X	X	-	-	X
2C	6X50	+5	2-4-2	-	2	-	-	-	X	X	-	-	X
4A	6X40	0	2-4-2	X	4	-	3	-	X	X	-	-	X
4B	6X40	0	2-4-2	X	4	-	15	-	X	X	-	-	X
6A	6X6	300	4	X	6	-	-	-	X	X	X	-	X
8A	6X60	+5	2-4-2	-	8	-	5	-	X	X	-	-	X
8B	6X15	+5	2-4-2	-	8	-	15	-	X	X	-	-	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Ensure flashing operation does not alter operation of blankout signs.
8. 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.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
	Construction Zone	
	Construction Zone Drums	
Ⓐ	"NO RIGHT TURN - TRAIN" L.E.D. Blankout Sign	Ⓐ
Ⓒ	"DO NOT STOP ON TRACKS" Sign (R8-8)	Ⓒ
Ⓓ	"STOP" Sign (R1-1)	Ⓓ
Ⓔ	"ONCOMING TRAFFIC MAY HAVE EXTENDED GREEN" Sign (W25-2)	Ⓔ

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	4	6	8
Min Green *	7	12	7	12	7
Gap, Extension *	2.0	4.0	2.0	6.0	2.0
Maximum Green 1 *	20	90	30	90	30
Maximum Green 2 *	25	110	35	110	35
Yellow Clear	3.0	4.7	4.9	4.7	5.3
Red Clear	1.9	1.5	1.6	1.5	1.1
Walk *	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-
Added Initial *	-	-	-	2.5	-
Maximum Initial *	-	-	-	34	-
Time Before Reduction *	-	-	-	15	-
Time To Reduce *	-	-	-	45	-
Minimum Gap	-	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Lock Calls	NO	YES	NO	YES	NO
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.

NAZTEC 2070 RAIL PREEMPTION

Function	PRE 1
Delay Before Preempt	0
Minimum Duration	31
Min Green Before Preempt	1
Min Walk Before Preempt	0
Ped Clear Before Preempt	0
Track Clearance Green	23
Minimum Dwell	0
Exit Ped Clear	0
Exit Yellow Change	0.0
Exit Red Clear	0.0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Yellow Change	25.5
Track Red Clear	25.5
All-Red B4 Dwell	OFF
Lock Input	OFF
Overide Higher # Preempt	ON
Link to Preempt #	0
Exit Preempt To	4+8

This signal was designed for advanced preemption.

Signal Upgrade - Temporary Design 1 (Construction Phase I)

Prepared In the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, 750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: R. Hough
PREPARED BY: W. Bazzarie REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/10/11 DATE
SIG. INVENTORY NO. 07-1491T1

16-MAY-2011 10:33
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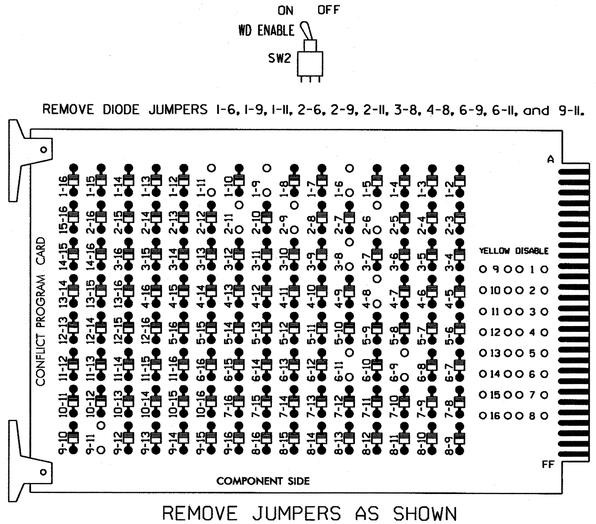
rziemba

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 62

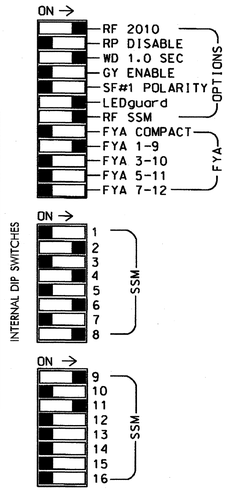
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 2-6, 2-9, 2-11, 3-8, 4-8, 6-9, 6-11, and 9-11.

REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

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 1,3,5, 7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. Program phases 4 and 8 for Dual Entry.
8. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	22,23	NU	81	41,42	NU	NU	61,62	NU	NU	81,82	NU	11★	NU	NU	21★	NU	NU
RED		128			101			134			107							
YELLOW	✳	129		✳	102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127			118														

NU = Not Used

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

★ See pictorial of head wiring in detail below.

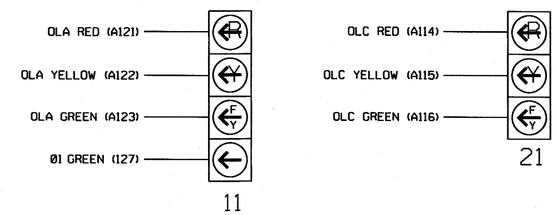
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX OUTPUT FILE
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S6,S8,S9,S12
PHASES USED.....1,2,*3,4,6,8
OVERLAP A.....**
OVERLAP B.....NOT USED
OVERLAP C.....6
OVERLAP D.....NOT USED

* USED DURING PREEMPT ONLY - DO NOT ENABLE THIS PHASE
** SEE OVERLAP PROGRAMMING DETAIL ON SHEET 2

3 & 4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	SLOT EMPTY	Ø2 2A	Ø2 2C	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED		Ø2 2B	NOT USED			Ø4 4B							ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L		NOT USED				Ø8 8B								NOT USED

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

FS = FLASH SENSE
ST = STOP TIME
PRE1 = RR PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

	LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
	1A	TB2-1,2	I1U	56	1	1		15		X	X	
*	1A (Logic)	-	-	60	13	1				X	X	
	2A	TB2-9,10	I3U	63	4	2				X	X	
	2B	TB2-11,12	I3L	76	5	2				X	X	
	2C	TB4-1,2	I4U	47	6	2				X	X	
	4A	TB6-1,2	I7U	65	10	4		3		X	X	
	4B	TB6-3,4	I7L	78	11	4		15		X	X	
	6A	TB3-5,6	J2U	40	16	6				X	X	X
	8A	TB5-9,10	J6U	42	22	8		5		X	X	
	8B	TB5-11,12	J6L	46	23	8		15		X	X	

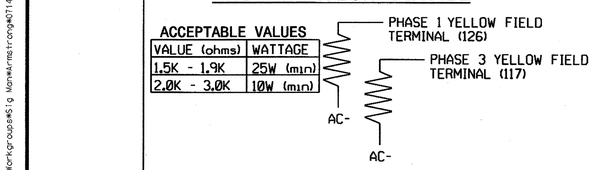
* Note for 1A (Logic): Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to "I/O Logic Programming Detail to Apply RR Preempt Exit Call on Phase 1" (Sheet 5 of 5).

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T1
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1 - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Jay
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T1

16-MAY-2011 13:30
S:\TSMSS\TTS Signals\Workgroups\Sig Management\07149T_smu01a_xxxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 63

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1    Ps....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

Notice type FYA-4 ➡

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1    Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

PRESS "ESC" TWICE

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3    Ps....................
Included Ps    6  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3    Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T1
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1 - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Joyce

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T1

11-MAY-2011 15:39
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sarmstrong

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
   EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
Init ABC with: NONE
  Init D with: NONE
   Init 2A with: MODE 5
Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A   4.NEMA D
2.NEMA B   5.FIO 2A
3.NEMA C                 9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	39	Ch15 Yellow
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	59	Ch11 Green
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-8	57	Ch9 Green	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-1 (C1 pin 35) = Load Switch S2P-Y
Pin 7-8 (C1 pin 99) = Load Switch S9-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   .   .
Flash Grn .   .   X   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   0   0
```

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T1
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1 - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Lyon
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE DATE 5/13/11

SIG. INVENTORY NO. 07-1491T1

11-MAY-2011 15:40
S:#ITS&S\ITS Signals\workgroups\sig Man\Armstrong\07149i_sm_e1a_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 65

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS
ENTER PREEMPT #1

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1  Times    :   Begin     :    Other
  Delay     0   MinGrn    1    Track Grn  23
MinDura    31   MinWlk    0    Min Dwell   0
MaxPres     0   PedClr    0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              ---- Preempt Phases ----
Track Veh        3  8  0  0
DwellCyc Veh     2  6  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             4  8  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1        Preempt Options
                    Lock input OFF
          Override Auto Flash ON
   Override higher # preempt ON
                 Flash in dwell OFF
            Link to preempt # 0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 Preempt Times+      --- Exit --
                      Ped Clr     0
  Extend Dwell    0       Yel   0.0
   Return Max     0       Red   0.0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              -- Preempt Overlaps+ --
        Track    0  0  0  0  0  0  0  0
       (more)    0  0  0  0
     DwellCyc    3  0  0  0  0  0  0  0
       (more)    0  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1      Preempt Options +
Enable ON                    Pattern    0
  Type RAIL     Skip Track if Overide OFF
Output TS-2            Coord+Preempt   OFF
                      Volt Mon Flash   OFF
Lnk Aft Dwel OFF    Return Max/Min     MAX
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 AdvTimes
enterYellowChange25.5
enterRedClear    25.5
trackYellowChange25.5
trackRedClear    25.5
All Red B4 Dwell  OFF
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

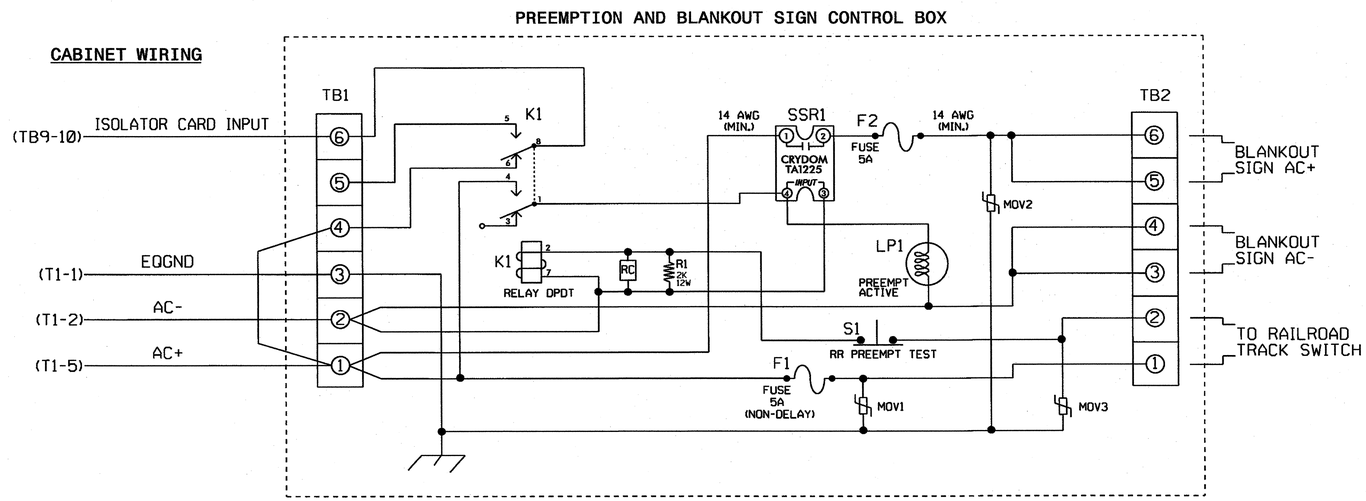
```
# 1          --   Initial Dwell   --
Phases     0  0  0  0
Peds       0  0  0  0
Overlaps   0  0  0  0  0  0  0  0
  (more)   0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

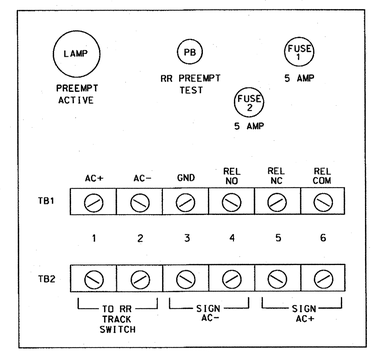
CABINET WIRING



NOTES

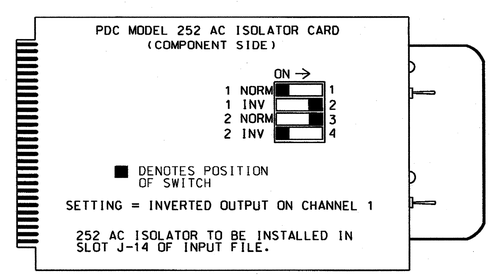
1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 Is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. 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.
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K; DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. 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)



SETTING = INVERTED OUTPUT ON CHANNEL 1

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

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: 07-1491T1
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1 - Sheet 4 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T.Jones
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T1

11-MAY-2011 15:40
S:*ITSASU*ITS Signals*Workgroups*Sig Mark*Armstrong*07149l_smi_ele.xxx.dgn
samstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 66

I/O LOGIC PROGRAMMING DETAIL
TO APPLY RR PREEMPT EXIT CALL ON PHASE 1

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-8

```
                    Channel & I/O
1.Chan  1-16   4.Chan+  1-16 [7.IO Logic]
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

	Result	Fcn	Oper	Fcn	Oper	Fcn		Timer		
*	I208=	I208		I	0	I	0	DLY	1	
	I13 =	I198		I	0	I	0	DLY	0	------DETECTOR 13 CALLS PHASE 1
	I 0=	I 0		I	0	I	0	DLY	0	
	I 0=	I 0		I	0	I	0	DLY	0	
	I 0=	I 0		I	0	I	0	DLY	0	
	I 0=	I 0		I	0	I	0	DLY	0	

* Denotes input function 208 (flash sense) logic delay is assigned per Mode 5 default.

NOTE

1. The above I/O Programming ensures a Phase 1 call when exiting RR Preempt. A Phase 1 call is nessesary for proper FYA operation (Signal Head 11) when exiting RR Preempt.
2. Ensure Detector 13 is setup to call phase 1 (default value).
3. Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to INPUT FILE CONNECTION & PROGRAMMING CHART.

I/O REFERENCE SCHEDULE

INPUT FUNCTION 208 = Flash Sense
INPUT FUNCTION 13 = Veh Call Det 13
INPUT FUNCTION 198 = Preempt 1 In

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T1
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1 - Sheet 5 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 | Guilford County | Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Lapp
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

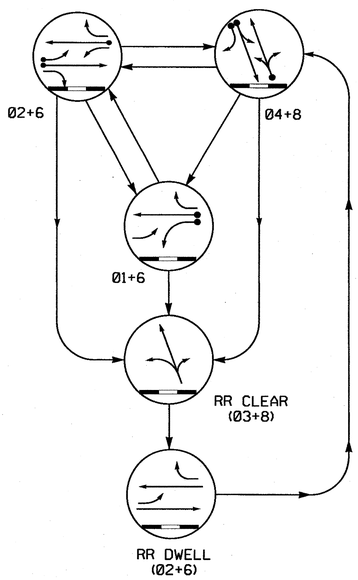
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 5/13/11 DATE
SIG. INVENTORY NO. 07-1491T1

11-MAY-2011 15:41
S:*ITS&S*ITS Signals*Workgroups*Sig Mgmt*Armstrong*07149i_smu_ele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 67

3 Phase
Fully Actuated
With Railroad Preemption
(Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04+8	PHASE CRFR	PHASE DWELL	PHASE FLASH
11	←	F Y	R	R	R	Y
21	F Y	F Y	R	R	F Y	Y
22, 23	R	G	R	R	G	Y
41, 42	R	R	G	R	R	R
61, 62	G	G	R	R	G	Y
81	R	R	G	G ←	R	R
82	R	R	G	G	R	R
SIGN A	OFF	OFF	OFF	ON	ON	✱

F Y = Flashing Yellow Arrow
✱ See Note 6

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM \ TO	← 1	F Y 2	R 1	R 2
←	←	✱	R	✱ R
F Y	F Y	F Y	F Y	✱ R
R	R	R	R	R

F Y = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

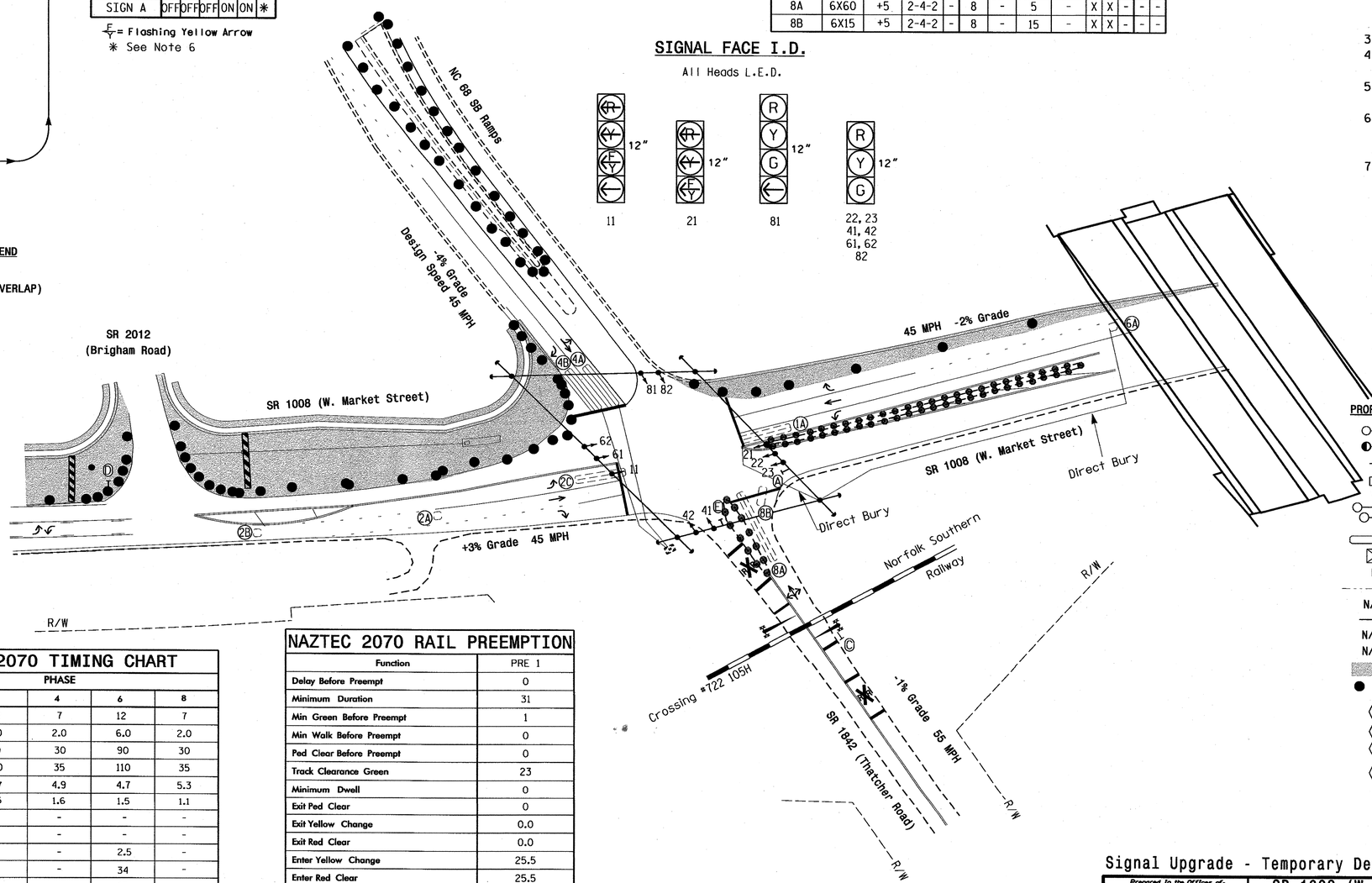
INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	-	15	-	X	X	-	-	-
2A	6X6	143	EXIST	-	2	-	-	-	X	X	-	-	-
2B	6X6	285	EXIST	-	2	-	-	-	X	X	-	-	-
2C	6X50	+5	2-4-2	-	2	-	-	-	X	X	-	-	-
4A	6X40	0	2-4-2	X	4	-	-	-	X	X	-	-	-
4B	6X40	0	2-4-2	X	4	-	15	-	X	X	-	-	-
6A	6X6	300	4	-	6	-	-	-	X	X	X	-	-
8A	6X60	+5	2-4-2	-	8	-	5	-	X	X	-	-	-
8B	6X15	+5	2-4-2	-	8	-	15	-	X	X	-	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 may be lagged.
4. Reposition existing signal heads numbered 41 and 42.
5. Set all detector units to presence mode.
6. Ensure flashing operation does not alter operation of blankout signs.
7. 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.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
	Construction Zone	
	Construction Zone Drums	
Ⓐ	"NO RIGHT TURN - TRAIN" L.E.D. Blankout Sign	Ⓐ
Ⓒ	"DO NOT STOP ON TRACKS" Sign (R8-8)	Ⓒ
Ⓓ	"STOP" Sign (R1-1)	Ⓓ
Ⓔ	"ONCOMING TRAFFIC MAY HAVE EXTENDED GREEN" Sign (W25-2)	Ⓔ

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	7	12	7	12	7
Gap, Extension *	2.0	4.0	2.0	6.0	2.0
Maximum Green 1 *	20	90	30	90	30
Maximum Green 2 *	25	110	35	110	35
Yellow Clear	3.0	4.7	4.9	4.7	5.3
Red Clear	1.9	1.5	1.6	1.5	1.1
Walk *	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-
Added Initial *	-	-	-	2.5	-
Maximum Initial *	-	-	-	34	-
Time Before Reduction *	-	-	-	15	-
Time To Reduce *	-	-	-	45	-
Minimum Gap	-	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Lock Calls	NO	YES	NO	YES	NO
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.

NAZTEC 2070 RAIL PREEMPTION

Function	PRE 1
Delay Before Preempt	0
Minimum Duration	31
Min Green Before Preempt	1
Min Walk Before Preempt	0
Ped Clear Before Preempt	0
Track Clearance Green	23
Minimum Dwell	0
Exit Ped Clear	0
Exit Yellow Change	0.0
Exit Red Clear	0.0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Yellow Change	25.5
Track Red Clear	25.5
All-Red B4 Dwell	OFF
Lock Input	OFF
Overide Higher # Preempt	ON
Link to Preempt #	0
Exit Preempt To	4+8

This signal was designed for advanced preemption.

Signal Upgrade - Temporary Design 1A (Construction Phase I)

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	May 2011	REVIEWED BY:	R. Hough
PREPARED BY:	W. Bazzarie	REVIEWED BY:	

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/10/11 DATE
SIG. INVENTORY NO. 07-1491T1A

15-MAY-2011 10:12
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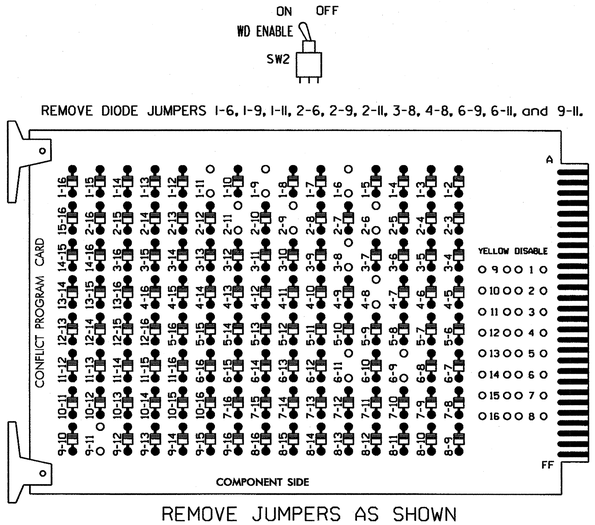
rziemba

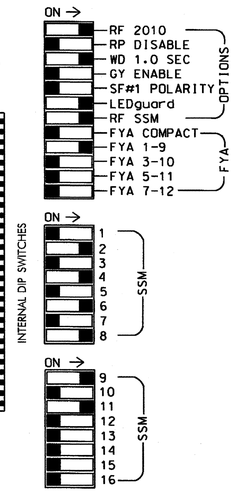
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 68

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



NOTES:

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

■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 / 1A	SLOT EMPTY	Ø 2 / 2A	Ø 2 / 2C	SLOT EMPTY	SLOT EMPTY	Ø 4 / 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS / DC ISOLATOR
	L	NOT USED		Ø 2 / 2B	NOT USED			Ø 4 / 4B							ST / DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 / 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 8 / 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 / AC ISOLATOR
	L		NOT USED				Ø 8 / 8B								NOT USED

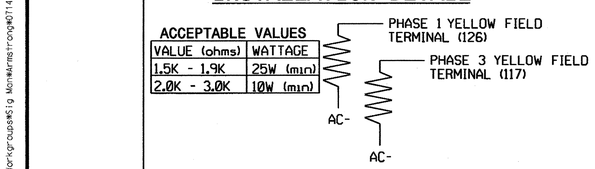
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME
PRE1 = RR PREEMPT

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



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 1,3,5, 7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. Program phases 4 and 8 for Dual Entry.
8. The cabinet and controller are part of the City of Greensboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX OUTPUT FILE
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S6,S8,S9,S12
PHASES USED.....1,2,*3,4,6,8
OVERLAP A.....**
OVERLAP B.....NOT USED
OVERLAP C.....6
OVERLAP D.....NOT USED

* USED DURING PREEMPT ONLY - DO NOT ENABLE THIS PHASE
** SEE OVERLAP PROGRAMMING DETAIL ON SHEET 2

INPUT FILE CONNECTION & PROGRAMMING CHART

	LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
	1A	TB2-1,2	I1U	56	1	1		15		X	X	
*	1A (Logic)	-	-	60	13	1				X	X	
	2A	TB2-9,10	I3U	63	4	2				X	X	
	2B	TB2-11,12	I3L	76	5	2				X	X	
	2C	TB4-1,2	I4U	47	6	2				X	X	
	4A	TB6-1,2	I7U	65	10	4				X	X	
	4B	TB6-3,4	I7L	78	11	4		15		X	X	
	6A	TB3-5,6	J2U	40	16	6				X	X	X
	8A	TB5-9,10	J6U	42	22	8		5		X	X	
	8B	TB5-11,12	J6L	46	23	8		15		X	X	

* Note for 1A (Logic): Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to "I/O Logic Programming Detail to Apply RR Preempt Exit Call on Phase 1" (Sheet 5 of 5).

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

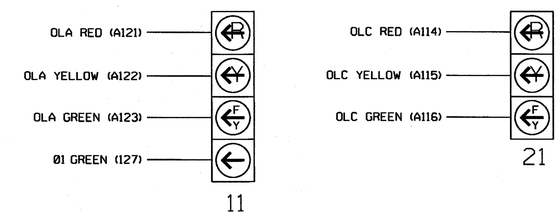
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	22,23	NU	81	41,42	NU	NU	61,62	NU	NU	81,82	NU	11★	NU	NU	21★	NU	NU
RED		128			101			134			107							
YELLOW	*	129		*	102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127			118														

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

3 & 4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T1A
DESIGNED: May 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1A - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 | Guilford County | Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Uy
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE | DATE 5/13/11
SIG. INVENTORY NO. 07-1491T1A

16-MAY-2011 13:31
S:*ITSSG*ITS Signals*Workgroups*Sig Mon*Armstrong*071491_smlele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 69

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
  Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1   Ps....................
Included Ps   1  0  0  0  0  0  0  0
Modifier Ps   2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

Notice type FYA-4 ➡

PRESS "ESC"

```
Overlap A-1
1.Program Parms
[2.Confl Prog+]
3.Program Parms+
```

```
 Ovrlp A-1   Ps....................
Confl Ps      0  0  0  0  0  0  0  0
Confl Ovrlps  0  0  0  0  0  0  0  0
Confl Peds    0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
[3.Program Parms+]
```

```
 Ovrlp A-1
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

PRESS "ESC" TWICE

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Included Ps   6  0  0  0  0  0  0  0
Modifier Ps   0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
[2.Confl Prog+]
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Confl Ps      0  0  0  0  0  0  0  0
Confl Ovrlps  0  0  0  0  0  0  0  0
Confl Peds    0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
[3.Program Parms+]
```

```
 Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T1A
DESIGNED: May 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1A - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N. Greenfield Pwky, Garner, NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Vik
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T1A

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smarmstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 7D

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
   EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
Initialize User I/O Maps
     Init ABC with: NONE
       Init D with: NONE
      Init 2A with: MODE 5
Init TF BIUs with: NONE
```

SELECT MODE 5 →

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A   4.NEMA D
2.NEMA B   5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	39	Ch15 Yellow
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	59	Ch11 Green
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-8	57	Ch9 Green	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-1 (C1 pin 35) = Load Switch S2P-Y
Pin 7-8 (C1 pin 99) = Load Switch S9-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   .   .
Flash Grn .   .   X   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   0   0
```

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T1A
DESIGNED: May 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1A - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T.Jpr
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T1A

13-MAY-2011 10:29
S:\#ITS&SU\ITS Signals\Workgroups\Sig Man\Armstrong\07-1491_sm_ele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 71

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS
ENTER PREEMPT #1

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1  Times    :  Begin     :   Other
   Delay    0   MinGrn    1   Track Grn  23
MinDurg    31   MinWlk    0   Min Dwell   0
MaxPres     0   PedClr    0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              ---- Preempt Phases ----
Track Veh        3  8  0  0
DwellCyc Veh     2  6  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             4  8  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1        Preempt Options
                    Lock input OFF
          Override Auto Flash ON
   Override higher # preempt ON
              Flash in dwell OFF
         Link to preempt # 0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 Preempt Times+      --- Exit --
                        Ped Clr    0
  Extend Dwell    0        Yel  0.0
   Return Max     0        Red  0.0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              -- Preempt Overlaps+ --
        Track    0  0  0  0  0  0  0  0
       (more)    0  0  0  0
     DwellCyc    3  0  0  0  0  0  0  0
       (more)    0  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1      Preempt Options +
Enable ON                    Pattern    0
  Type RAIL     Skip Track if Overide OFF
Output TS-2            Coord+Preempt   OFF
                     Volt Mon Flash    OFF
Lnk Aft Dwel OFF    Return Max/Min     MAX
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 AdvTimes
enterYellowChange25.5
enterRedClear    25.5
trackYellowChange25.5
trackRedClear    25.5
All Red B4 Dwell  OFF
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

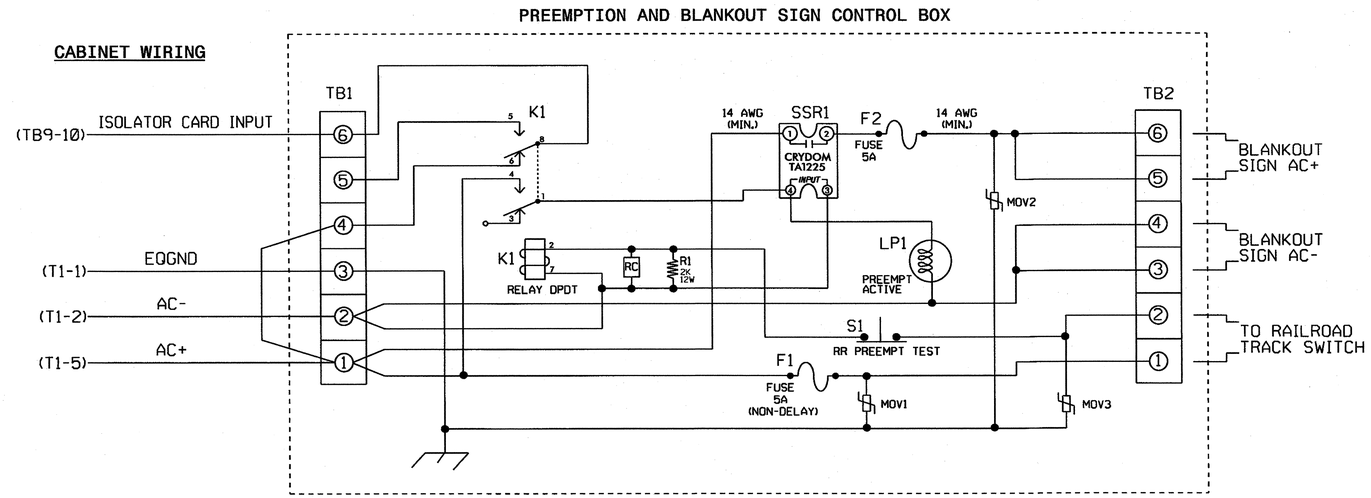
```
# 1        --   Initial Dwell    --
Phases    0  0  0  0
Peds      0  0  0  0
Overlaps  0  0  0  0  0  0  0  0
  (more)  0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

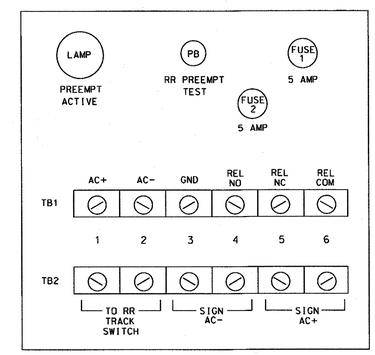
CABINET WIRING



NOTES

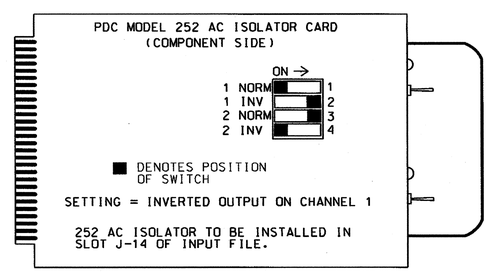
1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 Is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. 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.
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K: DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. 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: 07-1491T1A
DESIGNED: May 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1A - Sheet 4 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Jgl
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T1A

13-MAY-2011 10:30
S:\TSASU\TS Signals\Workgroups\Sig Mgmt\armstrong\071491_sm_ele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 72

I/O LOGIC PROGRAMMING DETAIL
TO APPLY RR PREEMPT EXIT CALL ON PHASE 1

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-8

```
                Channel & I/O
1.Chan  1-16  4.Chan+  1-16 [7.IO Logic]
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

	Result	Fcn	Oper	Fcn	Oper	Fcn		Timer		
*	I208=	I208		I	0	I	0	DLY	1	
	I13 =	I198		I	0	I	0	DLY	0	--------DETECTOR 13 CALLS PHASE 1
	I 0=	I	0	I	0	I	0	DLY	0	
	I 0=	I	0	I	0	I	0	DLY	0	
	I 0=	I	0	I	0	I	0	DLY	0	
	I 0=	I	0	I	0	I	0	DLY	0	

* Denotes input function 208 (flash sense) logic delay is assigned per Mode 5 default.

NOTE

1. The above I/O Programming ensures a Phase 1 call when exiting RR Preempt. A Phase 1 call is nessesary for proper FYA operation (Signal Head 11) when exiting RR Preempt.
2. Ensure Detector 13 is setup to call phase 1 (default value).
3. Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to INPUT FILE CONNECTION & PROGRAMMING CHART.

I/O REFERENCE SCHEDULE

INPUT FUNCTION 208 = Flash Sense
INPUT FUNCTION 13 = Veh Call Det 13
INPUT FUNCTION 198 = Preempt 1 In

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T1A
DESIGNED: May 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 1A - Sheet 5 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 | Guilford County | Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T.Jones
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE | DATE 5/13/11

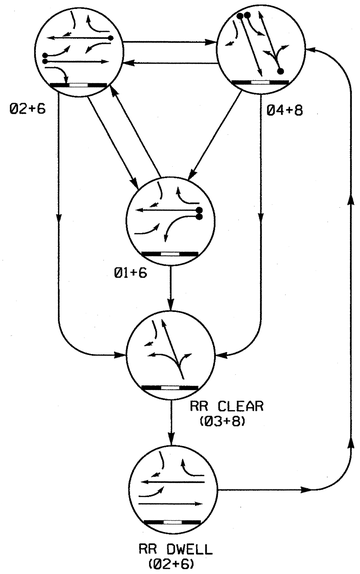
SIG. INVENTORY NO. 07-1491T1A

13-MAY-2011 10:31
S:\TSA5\ITS Signals\Workgroups\Sig Mon\Armstrong\07149i_sm_ele_xxx.dgn
SARMSTRONG

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 73

3 Phase with Railroad Preemption Fully Actuated (Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	02+6	04+8	CLEARANCE	DWELL	FLASH
11	←	F	~~R~~	~~R~~	~~R~~	~~Y~~
21	~~F~~	~~F~~	~~R~~	~~R~~	F	~~Y~~
22, 23	R	G	R	R	G	Y
41, 42	R	R	G	R	R	R
61, 62	G	G	R	R	G	Y
81	R	R	G	G	R	R
82	R	R	G	G	R	R
SIGN A	OFF	OFF	OFF	ON	ON	*

F = Flashing Yellow Arrow
* See Note 6

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM \ TO	← 1	← 2	F 1	F 2	~~R~~ 1	~~R~~ 2
←	←	←	~~Y~~	~~R~~	~~Y~~	~~R~~
F	F	F	F	F	~~Y~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

F = Flashing Yellow Arrow

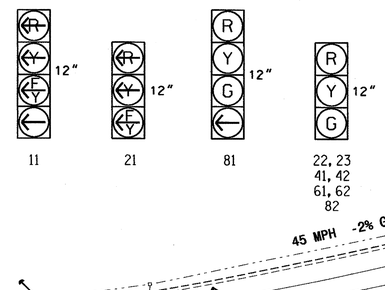
LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X50	0	2-4-2	X	1	-	15	-	X	X	-	-	-
2A	6X6	300	4	X	2	-	-	-	X	X	X	-	-
2B	6X40	0	2-4-2	X	2	-	-	-	X	X	-	-	-
3A	6X40	0	2-4-2	X	4	-	3	-	X	X	-	-	-
3B	6X40	0	2-4-2	X	4	-	-	-	X	X	-	-	-
6B	6X6	300	5	X	6	-	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	X	8	-	5	-	X	X	-	-	-
8B	6X15	+5	4	X	8	-	15	-	X	X	-	-	-

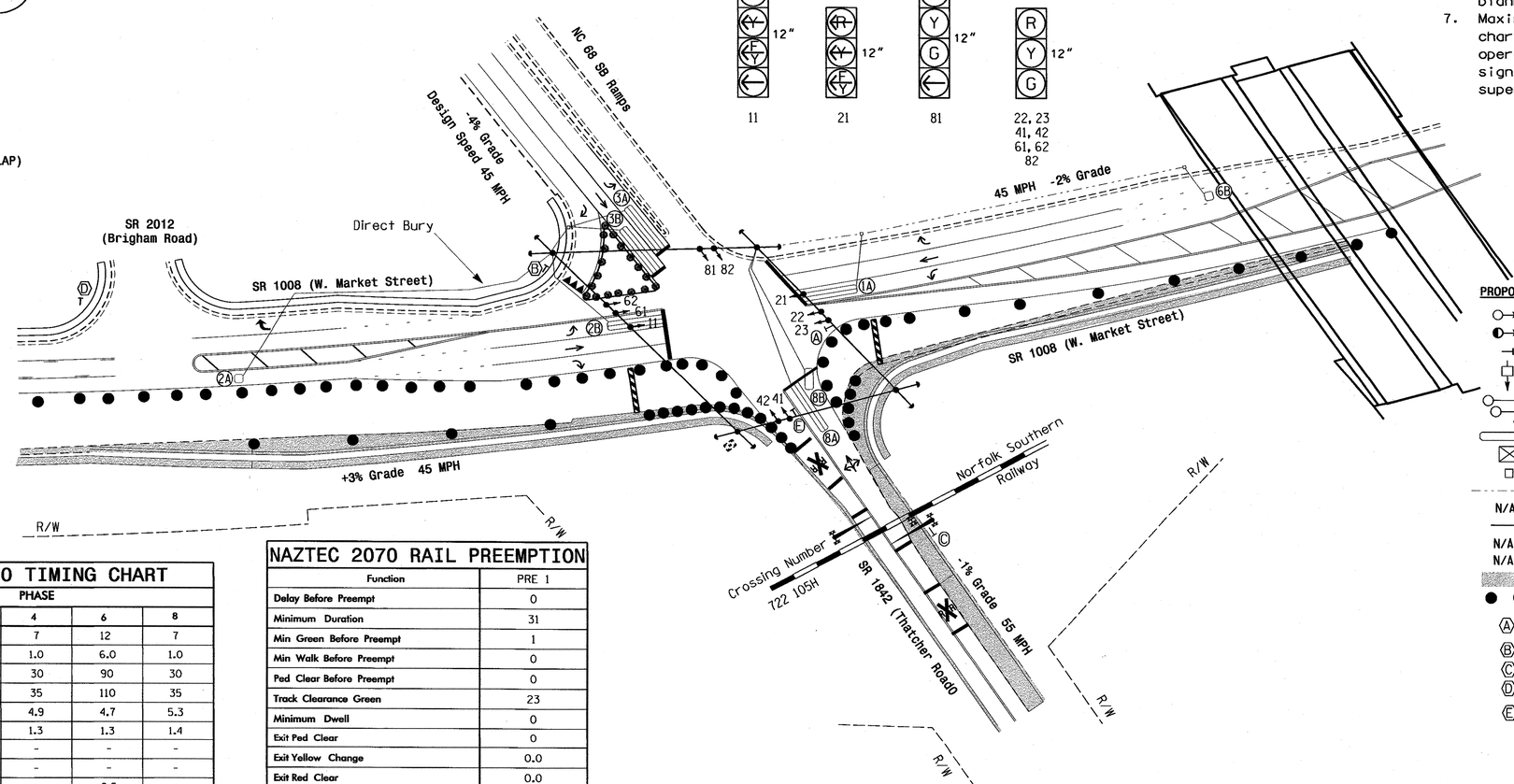
SIGNAL FACE I.D.

All Heads L.E.D.



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 may be lagged.
4. Reposition all existing signal heads as shown.
5. Set all detector units to presence mode.
6. Ensure flashing operation does not alter operation of blankout signs.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
	New Construction Zone	
	Construction Zone Drums	
Ⓐ	"NO RIGHT TURN - TRAIN" LED Blankout Sign	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	"DO NOT STOP ON TRACKS" Sign (R8-8)	Ⓒ
Ⓓ	"STOP" Sign (R1-1)	Ⓓ
Ⓔ	"ONCOMING TRAFFIC MAY HAVE EXTENDED GREEN" Sign (W25-2)	Ⓔ

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	4	6	8
Min Green *	7	12	7	12	7
Gap, Extension *	1.0	6.0	1.0	6.0	1.0
Maximum Green 1 *	20	90	30	90	30
Maximum Green 2 *	25	110	35	110	35
Yellow Clear	3.0	4.7	4.9	4.7	5.3
Red Clear	1.8	1.3	1.3	1.3	1.4
Walk *	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-
Added Initial *	-	2.5	-	2.5	-
Maximum Initial *	-	34	-	34	-
Time Before Reduction *	-	15	-	15	-
Time To Reduce *	-	45	-	45	-
Minimum Gap	-	3.0	-	3.0	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Lock Calls	NO	YES	NO	YES	NO
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.

NAZTEC 2070 RAIL PREEMPTION

Function	PRE 1
Delay Before Preempt	0
Minimum Duration	31
Min Green Before Preempt	1
Min Walk Before Preempt	0
Ped Clear Before Preempt	0
Track Clearance Green	23
Minimum Dwell	0
Exit Ped Clear	0
Exit Yellow Change	0.0
Exit Red Clear	0.0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Yellow Change	25.5
Track Red Clear	25.5
All-Red B4 Dwell	OFF
Lock Input	OFF
Overide Higher # Preempt	ON
Link to Preempt #	0
Exit Preempt To	4+8

This signal was designed for advanced preemption.

Signal Upgrade - Temporary Design 2 (Construction Phase II)

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, 750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: R. Hough

PREPARED BY: M. Bazzarie REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE DATE 5/10/11

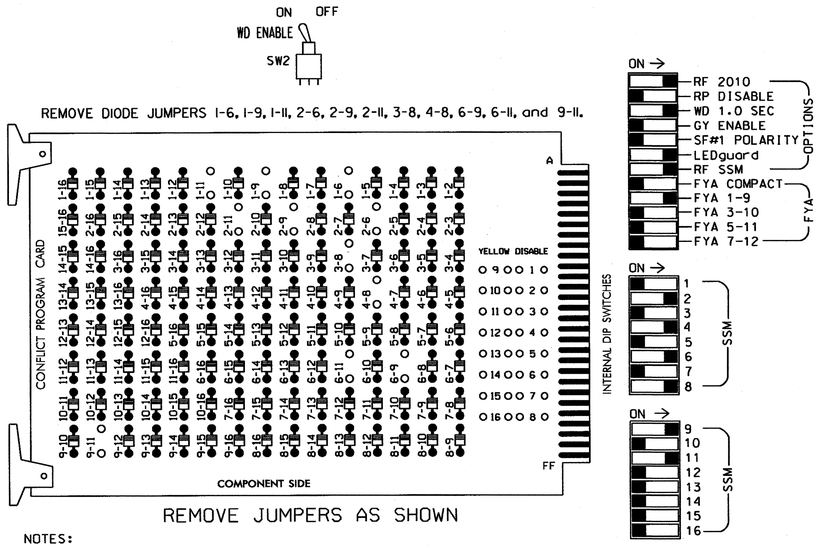
SIG. INVENTORY NO. 07-1491T2

10-MAY-2011 17:39
P:\mtjProjects-R\R2611\Traffic\Signals\Designs\Signals\07-1491\07149112_sig_dsn_20110510.dgn
FZ18000

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 74

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 7,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. Program phases 4 and 8 for Dual Entry.
8. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	22,23	NU	81	41,42	NU	NU	61,62	NU	NU	81,82	NU	11★	NU	NU	21★	NU	NU
RED		128			101			134			107							
YELLOW	*	129		*	102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127			118														

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)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	SLOT	Ø2 2A	SLOT	SLOT	Ø3 3A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	NOT USED	EMPTY	Ø2 2B	EMPTY	EMPTY	Ø3 3B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	NOT USED	SLOT	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	PRE1 AC ISOLATOR
	L	EMPTY	Ø6 6B	EMPTY	EMPTY	EMPTY	Ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	NOT USED

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

FS = FLASH SENSE
ST = STOP TIME
PRE1 = RR PREEMPT

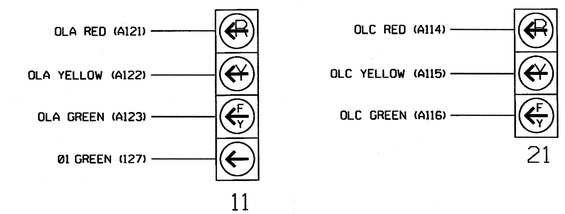
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX OUTPUT FILE
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S6,S8,S9,S12
PHASES USED.....1,2,*3,4,6,8
OVERLAP A.....**
OVERLAP B.....NOT USED
OVERLAP C.....6
OVERLAP D.....NOT USED

* USED DURING PREEMPT ONLY - DO NOT ENABLE THIS PHASE
** SEE OVERLAP PROGRAMMING DETAIL ON SHEET 2

3 & 4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE CONNECTION & PROGRAMMING CHART

	LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
	1A	TB2-1,2	I1U	56	1	1		15		X	X	
*	1A (Logic)	-	-	60	13	1				X	X	
	2A	TB2-9,10	I3U	63	4	2				X	X	X
	2B	TB2-11,12	I3L	76	5	2				X	X	
	3A	TB4-9,10	I6U	41	8	4		3		X	X	
	3B	TB4-11,12	I6L	45	9	4				X	X	
	6B	TB3-7,8	J2L	44	17	6				X	X	X
	8A	TB5-9,10	J6U	42	22	8		5		X	X	
	8B	TB5-11,12	J6L	46	23	8		15		X	X	

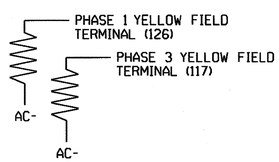
* Note for 1A (Logic): Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to "I/O Logic Programming Detail to Apply RR Preempt Exit Call on Phase 1" (Sheet 5 of 5).

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T2
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 2 - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY:
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Management Section
750 N.Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 5/13/11
SIG. INVENTORY NO. 07-1491T2

16-MAY-2011 09:23
S:#ITSSG\#ITS Signals#Workgroups#Sig Mana#armstrong#071491_sm_ele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 75

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp A-1   Ps....................
Included Ps    1  0  0  0  0  0  0  0
Modifier Ps    2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

Notice type FYA-4 →

PRESS "ESC"

```
Overlap A-1
1.Program Parms
[2.Confl Prog+]
3.Program Parms+
```

```
 Ovrlp A-1   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap A-1
1.Program Parms
2.Confl Prog+
[3.Program Parms+]
```

```
 Ovrlp A-1
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

PRESS "ESC" TWICE

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Included Ps    6  0  0  0  0  0  0  0
Modifier Ps    0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
[2.Confl Prog+]
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
[3.Program Parms+]
```

```
 Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T2
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 2 - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Public Transportation and Traffic Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
759 N. Greenfield Pwky, Garner, NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Jones
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T2

11-MAY-2011 15:54
S:\TTSSCHMITS\Signals\Workgroups\Sig Mgmt\mstrong\07149l_smlele_xxx.dgn
S.Armstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 76

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
                Channel & I/O
1.Chan   1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   [6.IO Parms]  9.IO UserMap
```

SELECT USER MODE →

```
                I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
   EVP Ped Confirm: OFF
```

PRESS "ESC"

```
                Channel & I/O
1.Chan   1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    [9.IO UserMap]
```

```
                User I/O Maps
1. Inputs
2. Outputs
[3. Init Map]
```

SELECT MODE 5 →

```
          Initialize User I/O Maps
     Init ABC with: NONE
       Init D with: NONE
      Init 2A with: MODE 5
  Init TF BIUs with: NONE
```

PRESS "ESC"

```
                User I/O Maps
1. Inputs
[2. Outputs]
3. Init Map
```

```
                User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    [5.FIO 2A]
3.NEMA C                          9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	39	Ch15 Yellow
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	59	Ch11 Green
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-8	57	Ch9 Green	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-1 (C1 pin 35) = Load Switch S2P-Y
Pin 7-8 (C1 pin 99) = Load Switch S9-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
                Channel & I/O
1.Chan   1-16  [4.Chan+  1-16] 7.IO Logic
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   .   .
Flash Grn .   .   X   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   0   0
```

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T2
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 2 - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T.J.
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T2

11-MAY-2011 15:54
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sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 77

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS
ENTER PREEMPT #1

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1  Times    :   Begin      :    Other
  Delay     0   MinGrn    1    Track Grn  23
MinDura    31   MinWlk    0    Min Dwell   0
MaxPres     0   PedClr    0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1              ---- Preempt Phases ----
Track Veh        3  8  0  0
DwellCyc Veh     2  6  0  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0  0
Exit             4  8  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1        Preempt Options
                    Lock input OFF
          Override Auto Flash ON
   Override higher # preempt ON
                 Flash in dwell OFF
            Link to preempt # 0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1 Preempt Times+      --- Exit --
                        Ped Clr    0
  Extend Dwell    0        Yel  0.0
   Return Max     0        Red  0.0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1              -- Preempt Overlaps+ --
        Track    0  0  0  0  0  0  0  0
       (more)    0  0  0  0
     DwellCyc    3  0  0  0  0  0  0  0
       (more)    0  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1      Preempt Options +
Enable ON                      Pattern    0
  Type RAIL     Skip Track if Overide  OFF
Output TS-2               Coord+Preempt  OFF
                         Volt Mon Flash  OFF
Lnk Aft Dwel OFF        Return Max/Min   MAX
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1 AdvTimes
enterYellowChange25.5
enterRedClear    25.5
trackYellowChange25.5
trackRedClear    25.5
All Red B4 Dwell  OFF
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

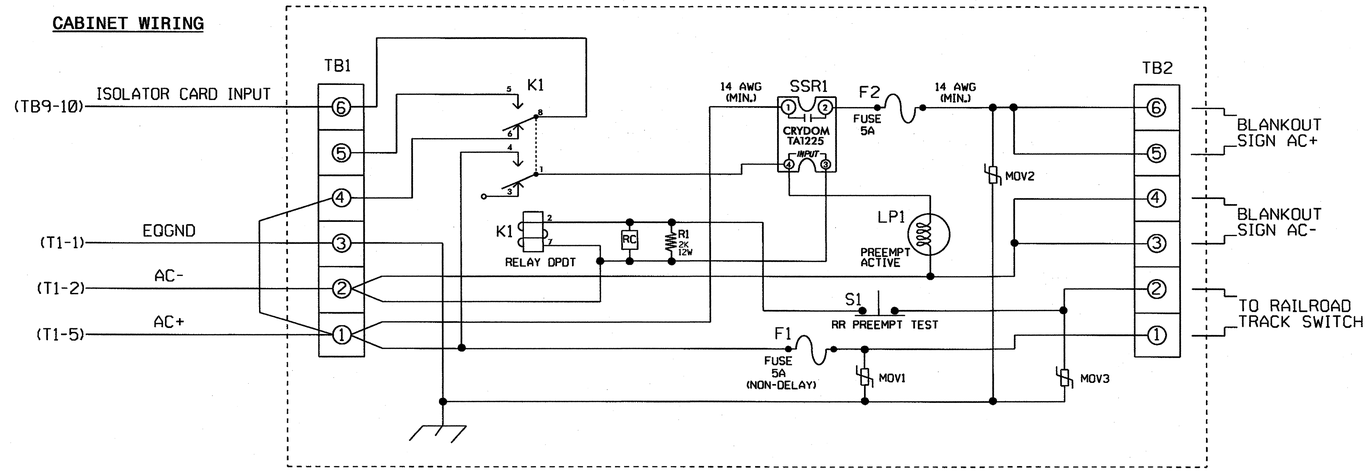
```
# 1          --   Initial Dwell    --
Phases    0  0  0  0
Peds      0  0  0  0
Overlaps  0  0  0  0  0  0  0  0
  (more)  0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

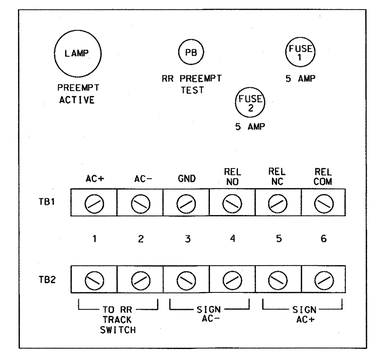
PREEMPTION AND BLANKOUT SIGN CONTROL BOX



NOTES

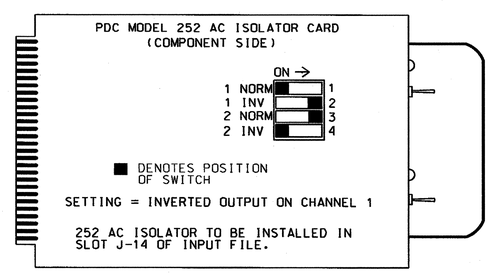
1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 Is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. 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.
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K; DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. 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)



SETTING = INVERTED OUTPUT ON CHANNEL 1

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

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: 07-1491T2
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 2 - Sheet 4 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Uzzle
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE 5/13/11 DATE

SIG. INVENTORY NO. 07-1491T2

11-MAY-2011 15:54
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armstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 78

I/O LOGIC PROGRAMMING DETAIL
TO APPLY RR PREEMPT EXIT CALL ON PHASE 1

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-8

```
                    Channel & I/O
1.Chan  1-16   4.Chan+  1-16 [7.IO Logic]
2.chan 17-24   5.chan+ 17-24 8.IO Viewer
3.Chan Parms   6.IO Parms    9.IO UserMap
```

	Result	Fcn	Oper	Fcn	Oper	Fcn		Timer	
*	I208=	I208		I	0	I	0	DLY	1
	I13 =	I198		I	0	I	0	DLY	0 ····· DETECTOR 13 CALLS PHASE 1
	I 0=	I	0	I	0	I	0	DLY	0
	I 0=	I	0	I	0	I	0	DLY	0
	I 0=	I	0	I	0	I	0	DLY	0
	I 0=	I	0	I	0	I	0	DLY	0

* Denotes input function 208 (flash sense) logic delay is assigned per Mode 5 default.

NOTE

1. The above I/O Programming ensures a Phase 1 call when exiting RR Preempt. A Phase 1 call is nessesary for proper FYA operation (Signal Head 11) when exiting RR Preempt.
2. Ensure Detector 13 is setup to call phase 1 (default value).
3. Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to INPUT FILE CONNECTION & PROGRAMMING CHART.

I/O REFERENCE SCHEDULE

INPUT FUNCTION 208 = Flash Sense
INPUT FUNCTION 13 = Veh Call Det 13
INPUT FUNCTION 198 = Preempt 1 In

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T2
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 2 - Sheet 5 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
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Division 7 | Guilford County | Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Jg
PREPARED BY:	S. Armstrong	REVIEWED BY:	

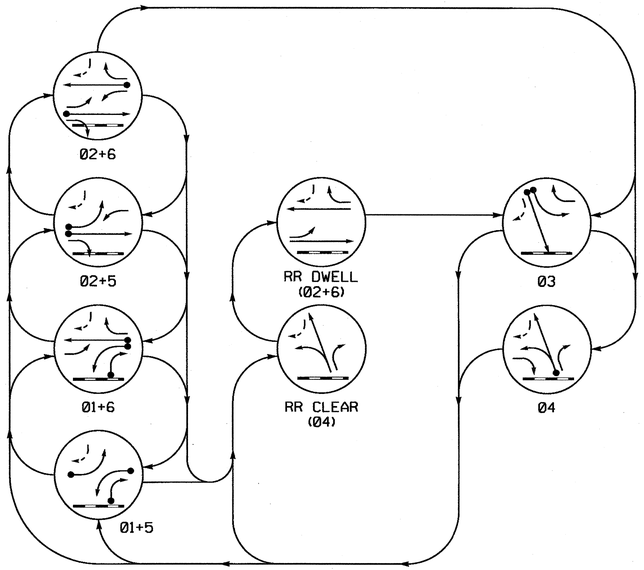
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 5/13/11
SIGNATURE DATE
SIG. INVENTORY NO. 07-1491T2

11-MAY-2011 15:55
S:*ITSASU*ITS Signals*Workgroups*Sig Mgmt*Armstrong*071491_sm_ele_xxx.dgn
SARMSTRONG

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 79

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	CLEARANCE	DWELL	FLASH
11	←	←	F	F	R	R	R	R	Y
21	R	R	G	G	R	R	R	G	Y
22	R	R	G	G	R	R	R	R	R
31	R	R	R	R	G	R	R	R	R
32	R	R	R	R	G	R	R	R	R
41	R	R	R	R	G	G	R	R	R
42	R	R	R	R	R	G	G	R	R
51	←	F	←	F	R	R	R	F	Y
61	R	G	R	G	R	R	R	G	Y
62	R	G	R	G	R	R	R	G	Y
SIGN A	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	*

F = Flashing Yellow Arrow
* See Note 6

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM \ TO	← 1	← 2	F 1	F 2	R 1	R 2
←	←	←	Y	R	Y	R
F	F	F	F	F	Y	R
R	R	R	R	R	R	R

F = Flashing Yellow Arrow

LOOP & DETECTOR UNIT INSTALLATION CHART
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	-	15	-	X	X	-	-
1B	6X40	0	2-4-2	X	1	-	15	-	X	X	-	-
1C	6X15	0	4	X	1	-	15	-	X	X	-	X
2B	6X6	300	4	X	2	-	-	-	X	X	X	-
3A	6X40	0	2-4-2	-	3	-	-	-	X	X	-	-
3B	6X40	0	2-4-2	-	3	-	-	-	X	X	-	-
4A	6X40	0	2-4-2	X	4	-	3	-	X	X	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-
6B	6X6	300	5	-	6	-	-	-	X	X	X	-

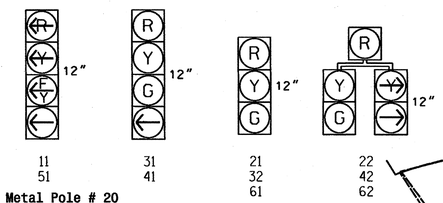
6 Phase Fully Actuated With Railroad Preemption (Greensboro Signal System)

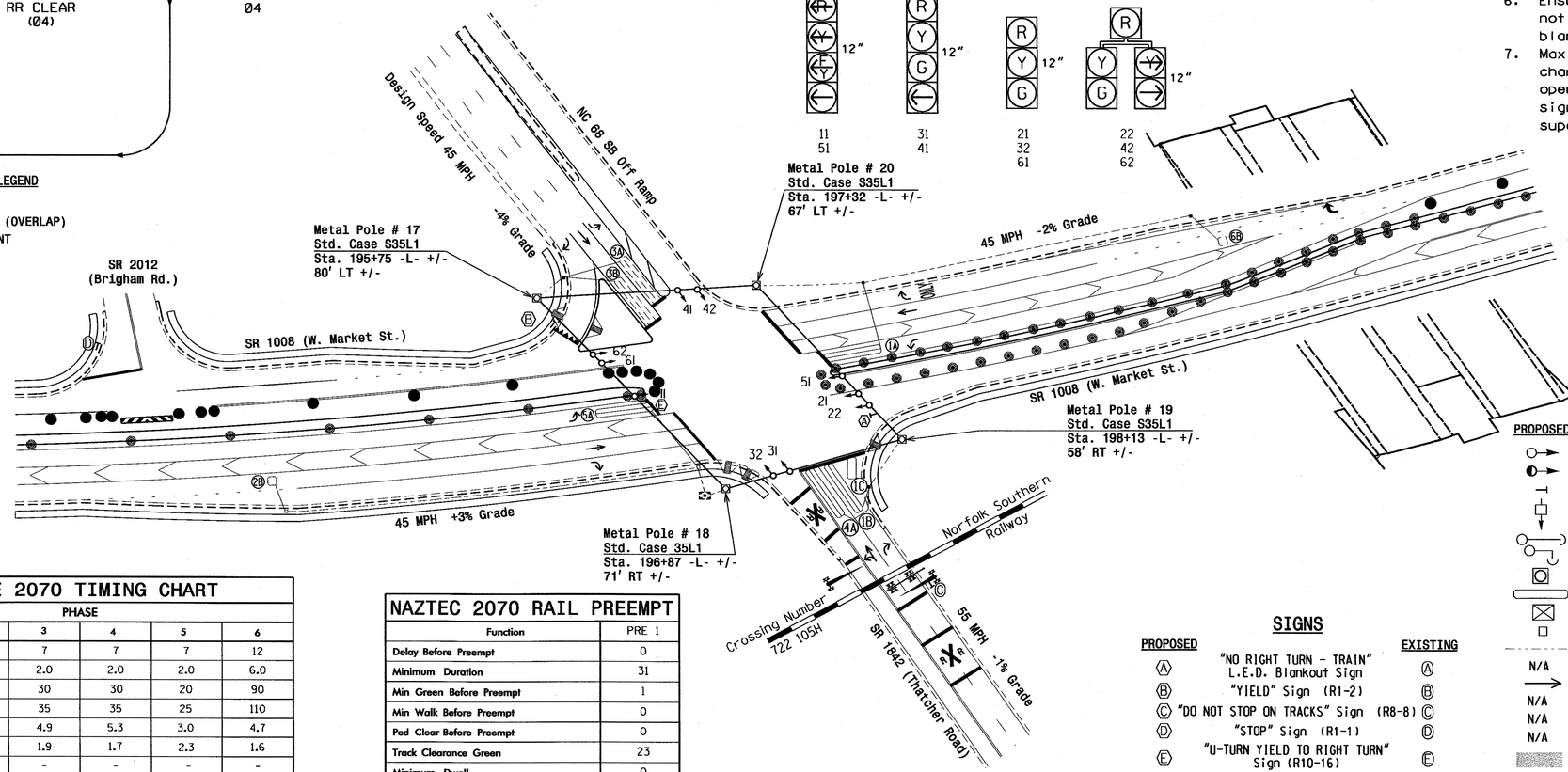
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Ensure flashing operation does not alter operation of blankout signs.
7. 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.





LEGEND

PROPOSED		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	
	Metal Strain Pole	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
N/A	Railroad Cantilever	
	Construction Zone	
	Construction Zone Drums	

SIGNS

PROPOSED		EXISTING
A	"NO RIGHT TURN - TRAIN" L.E.D. Blankout Sign	A
B	"YIELD" Sign (R1-2)	B
C	"DO NOT STOP ON TRACKS" Sign (R8-8)	C
D	"STOP" Sign (R1-1)	D
E	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	E

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Gap, Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Maximum Green 1 *	20	90	30	30	20	90
Maximum Green 2 *	25	110	35	35	25	110
Yellow Clear	3.0	4.7	4.9	5.3	3.0	4.7
Red Clear	2.8	1.6	1.9	1.7	2.3	1.6
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	-	2.5	-	-	-	2.5
Maximum Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Lock Calls	NO	YES	NO	NO	NO	YES
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.

NAZTEC 2070 RAIL PREEMPT

Function	PRE 1
Delay Before Preempt	0
Minimum Duration	31
Min Green Before Preempt	1
Min Walk Before Preempt	0
Ped Clear Before Preempt	0
Track Clearance Green	23
Minimum Dwell	0
Exit Ped Clear	0
Exit Yellow Change	0.0
Exit Red Clear	0.0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Yellow Change	25.5
Track Red Clear	25.5
All-Red B4 Dwell	OFF
Lock Input	OFF
Overide Higher # Preempt	OFF
Link to Preempt #	0
Exit Preempt To	3

This signal was designed for advanced preemption.

Signal Upgrade - Temporary Design 3 (Construction Phase III)

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, 750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	R. Hough
PREPARED BY:	Sterling	REVIEWED BY:	

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE DATE 5/10/11

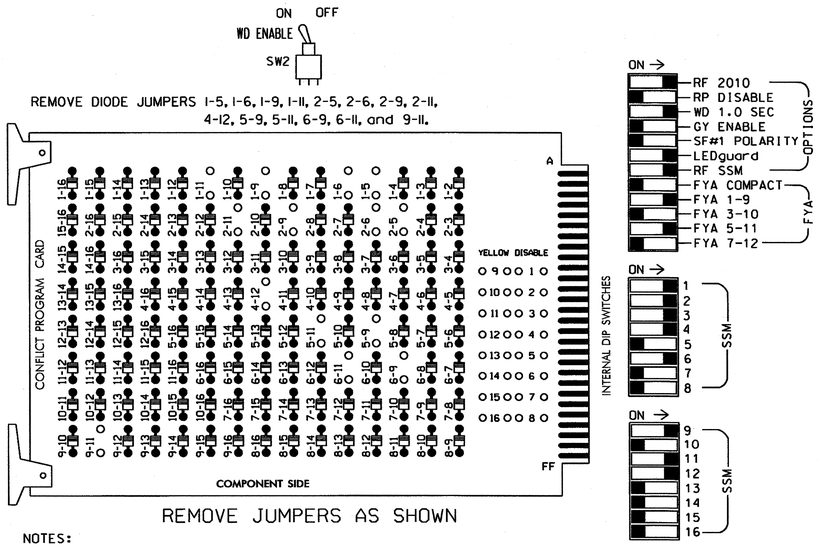
SIG. INVENTORY NO. 07-1491 T3

10-MAY-2011 17:31
P:\#IPProjects-R#2611\Traffic\Signals\Designs\Signals\07-1491\07149173_sig_dsn_20110510.dgn
22.0000

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 8D

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	NOT USED	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø1 1C	Ø2 2B			Ø3 3B	NOT USED							ST DC ISOLATOR
FILE "J"	U	Ø5 5A	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L	NOT USED	Ø6 6B												NOT USED

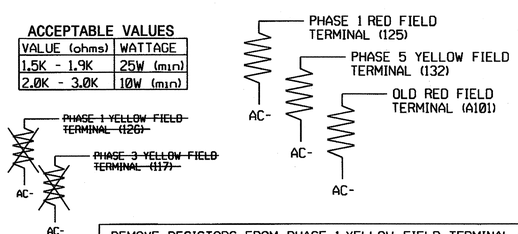
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME
PRE1 = RR PREEMPT

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



REMOVE RESISTORS FROM PHASE 1 YELLOW FIELD TERMINAL (126) AND PHASE 3 YELLOW FIELD TERMINAL (117), IF PRESENT.

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 5,7, 8,10,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX OUTPUT FILE
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S9,S12,S13
PHASES USED.....1,2,3,4,5,6
OVERLAP A.....*
OVERLAP B.....NOT USED
OVERLAP C.....*
OVERLAP D.....4

* SEE OVERLAP PROGRAMMING DETAIL ON SHEET 2

INPUT FILE CONNECTION & PROGRAMMING CHART

	LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
	1A	TB2-1,2	I1U	56	1	1		15		X	X	
*	1A (Logic)	-	-	60	13	1				X	X	
	1B	TB2-5,6	I2U	39	2	1		15		X	X	
	1C	TB2-7,8	I2L	43	3	1		15		X	X	
	2B	TB2-11,12	I3L	76	5	2				X	X	X
	3A	TB4-9,10	I6U	41	8	3				X	X	
	3B	TB4-11,12	I6L	45	9	3				X	X	
	4A	TB6-1,2	I7U	65	10	4		3		X	X	
	5A	TB3-1,2	J1U	55	15	5		15		X	X	
	6B	TB3-7,8	J2L	44	17	6				X	X	X

* Note for 1A (Logic): Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to "I/O Logic Programming Detail to Apply RR Preempt Exit Call on Phase 1" (Sheet 5 of 5).

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

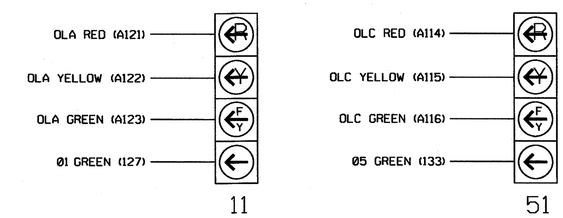
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3			S4		S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1		2	2 PED	3			4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	42	21,22	NU	31	32	62	41	42	NU	51★	61,62	NU	NU	NU	NU	11★	NU	NU	51★	22	NU
RED		*	128		116	116		101	101			134									*	
YELLOW			129		117	117		102	102		*	135										
GREEN			130		118	118		103	103			136										
RED ARROW																	A121			A114		
YELLOW ARROW		126					117										A122			A115	A102	
FLASHING YELLOW ARROW																	A123			A116		
GREEN ARROW	127	127			118		118	103			133										A103	

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)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1491T3
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 3 - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY: T.Jan
PREPARED BY: S. Armstrong	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE DATE 5/13/11

SIG. INVENTORY NO. 07-1491T3

13-MAY-2011 08:30
S:#TTSASU#ITS Signals#Workgroups#Sig Man#Armstrong#071491_sml_ele_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 81

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A, C, and D*

(program controller as shown below)

* NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  1
then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp A-1   Ps....................
Included Ps   1 0 0 0 0 0 0 0
Modifier Ps   2 0 0 0 0 0 0 0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  3
then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp C-3   Ps....................
Included Ps   5 0 0 0 0 0 0 0
Modifier Ps   6 0 0 0 0 0 0 0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  4
then press Enter
```

```
Overlap D-4
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp D-4   Ps....................
Included Ps   4 0 0 0 0 0 0 0
Modifier Ps   0 0 0 0 0 0 0 0
Type:NORMAL   Grn:  0  Yel: 3.5  Red: 1.5
```

END OF OVERLAP PROGRAMMING DETAIL

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T3
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 3 - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N. Greenfield Pwky, Garner, NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 | Guilford County | Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. J. [illegible]
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T3

11-MAY-2011 16:00
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sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 82

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  [6.IO Parms]  9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
 Invert Rail Inputs: OFF
    EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms  [9.IO UserMap]
```

```
User I/O Maps
1. Inputs
[2. Outputs]
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
     Init ABC with: NONE
       Init D with: NONE
      Init 2A with: MODE 5
 Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
[2. Outputs]
3. Init Map
```

```
User Output Maps
1.NEMA A   4.NEMA D
2.NEMA B   [5.FIO 2A]
3.NEMA C                 9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

OUTPUT PROGRAMMING COMPLETE

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-1	37	Ch13 Yellow....	0	Unused
5-2	39	Ch15 Yellow	0	Unused

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
7-8	57	Ch9 Green	37	Ch13 Yellow
6-8	59	Ch11 Green	39	Ch15 Yellow

Pin 5-1 (C1 pin 35) = Load Switch S2P-Y
Pin 5-2 (C1 pin 37) = Load Switch S6P-Y
Pin 7-8 (C1 pin 99) = Load Switch S9-G
Pin 6-8 (C1 pin 90) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  [4.Chan+  1-16] 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   X   .   ←
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   3   0   ←
```

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T3
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 3 - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. J. B.
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 5/13/11 DATE
SIG. INVENTORY NO. 07-1491T3

11-MAY-2011 16:01
S:\MTS&SU\MTS Signals\Workgroups\Sig Mgmt\Armstrong\071491_smt_ele_xxx.dgn
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 83

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS
ENTER PREEMPT #1

```
# 1              Preemption
[1.Times]          4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1  Times    :   Begin      :     Other
  Delay     0   MinGrn    1    Track Grn   23
MinDura    31   MinWlk    0    Min Dwell    0
MaxPres     0   PedClr    0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
[2.Phases]         5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1              ---- Preempt Phases ----
Track Veh        4  0  0  0
DwellCyc Veh     2  6  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             3  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
[3.Options]        6.Options+     9.Init'Dwell
```

```
# 1        Preempt Options
                    Lock input OFF
            Override Auto Flash ON
   Override higher # preempt ON
                 Flash in dwell OFF
            Link to preempt # 0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          [4.Times+]
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1 Preempt Times+     --- Exit --
                     Ped Clr     0
  Extend Dwell    0      Yel   0.0
   Return Max     0      Red   0.0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
[2.Overlaps+]      5.Overlaps+    8.AdvTimes
3.Options          6.Options+     9.Init'Dwell
```

```
# 1              -- Preempt Overlaps+ --
        Track    3  0  0  0  0  0  0  0
       (more)    0  0  0  0
     DwellCyc    3  0  0  0  0  0  0  0
       (more)    0  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
[3.Options]        6.Options+     9.Init'Dwell
```

```
# 1      Preempt Options +
Enable ON                    Pattern    0
  Type RAIL     Skip Track if Overide  OFF
Output TS-2               Coord+Preempt  OFF
                           Volt Mon Flash  OFF
Lnk Aft Dwel OFF        Return Max/Min  MAX
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    [8.AdvTimes]
3.Options          6.Options+     9.Init'Dwell
```

```
# 1 AdvTimes
enterYellowChange25.5
enterRedClear     25.5
trackYellowChange25.5
trackRedClear     25.5
All Red B4 Dwell   OFF
```

PRESS "ESC"

```
# 1              Preemption
1.Times            4.Times+
2.Phases           5.Overlaps+    8.AdvTimes
3.Options          6.Options+     [9.Init'Dwell]
```

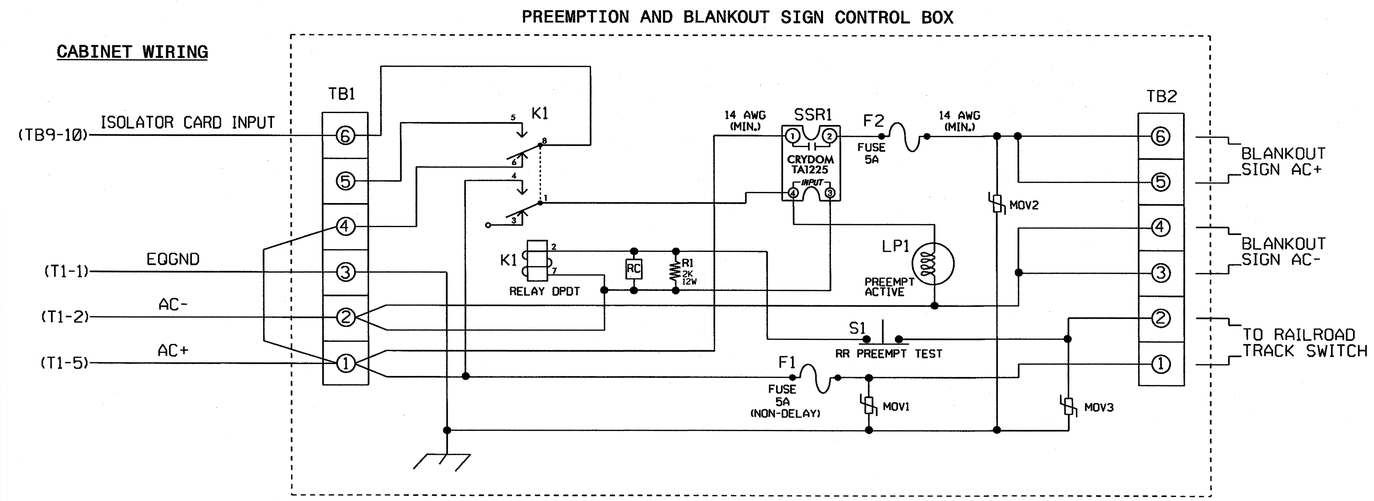
```
# 1          --   Initial Dwell    --
Phases     0  0  0  0
Peds       0  0  0  0
Overlaps   0  0  0  0  0  0  0  0
  (more)   0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

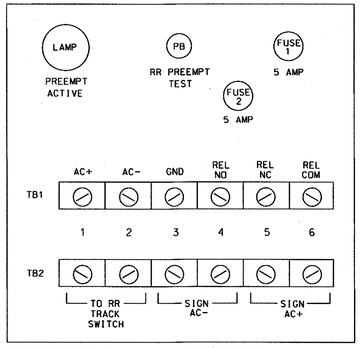
CABINET WIRING



NOTES

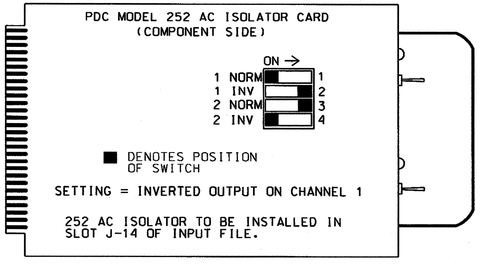
1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 Is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. 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.
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K; DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. 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)



SETTING = INVERTED OUTPUT ON CHANNEL 1

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

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: 07-1491T3
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 3 - Sheet 4 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Department of Transportation State of North Carolina
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Joyce
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T3

11-MAY-2011 16:02
S:#TTSASU#ITS Signals#WorkGroups#Sig Mgmt#armstrong#071491_smelle.xxx.dgn
armstrong

I/O LOGIC PROGRAMMING DETAIL
TO APPLY RR PREEMPT EXIT CALL ON PHASE 1

(program controller as shown below)

FROM MAIN MENU. KEYSTROKES 1-8

Channel & I/O

1.Chan 1-16	4.Chan+ 1-16	7.IO Logic
2.chan 17-24	5.chan+ 17-24	8.IO Viewer
3.Chan Parms	6.IO Parms	9.IO UserMap

	Result	Fcn	Oper	Fcn	Oper	Fcn		Timer	
*	I208=	I208		I	0	I	0	DLY	1
	I13 =	I198		I	0	I	0	DLY	0
	I 0=	I 0		I	0	I	0	DLY	0
	I 0=	I 0		I	0	I	0	DLY	0
	I 0=	I 0		I	0	I	0	DLY	0
	I 0=	I 0		I	0	I	0	DLY	0

--------DETECTOR 13 CALLS PHASE 1

* Denotes input function 208 (flash sense) logic delay is assigned per Mode 5 default.

NOTE

1. The above I/O Programming ensures a Phase 1 call when exiting RR Preempt. A Phase 1 call is nessesary for proper FYA operation (Signal Head 11) when exiting RR Preempt.
2. Ensure Detector 13 is setup to call phase 1 (default value).
3. Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to INPUT FILE CONNECTION & PROGRAMMING CHART.

I/O REFERENCE SCHEDULE

INPUT FUNCTION 208 = Flash Sense
INPUT FUNCTION 13 = Veh Call Det 13
INPUT FUNCTION 198 = Preempt 1 In

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491T3
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Temporary Design 3 - Sheet 5 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Ugh
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491T3

11-MAY-2011 16:02
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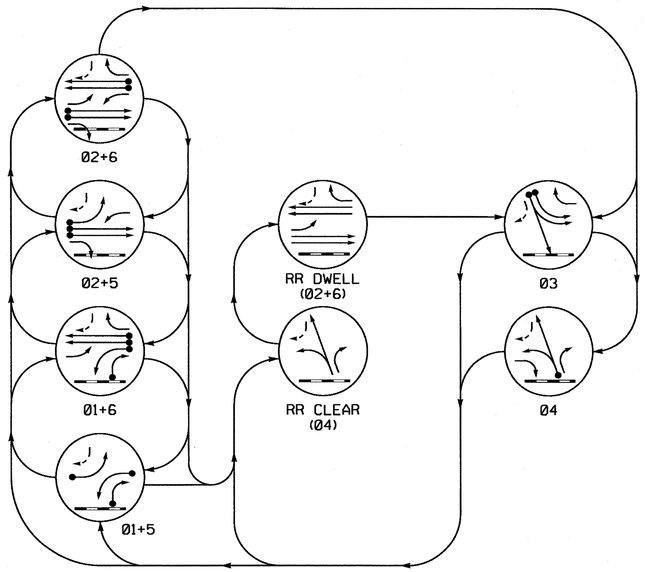
$$WORKING$$

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 8S

6 Phase Fully Actuated With Railroad Preemption (Greensboro Signal System)

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	CLEARANCE	DWELL	FLASH
11	←	~~←~~	~~F~~	~~F~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
21	R	R	G	G	R	R	R	G	Y
22	R	R	G	G	R	R/←	R	G	Y
31	R	R	R	R	G ←	R	R	R	R
32	R	R	R	R	G	R	R	R	R
41	R	R	R	R	G ←	G ←	R	R
42	R/←	R/←	R	R	R	G	G	R	R
51	←	F	←	F	~~R~~	~~R~~	~~R~~	F	~~Y~~
61	R	G	R	G	R	R	R	G	Y
62	R	G	R	G	R/←	R	R	G	Y
SIGN A	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	*

F = Flashing Yellow Arrow
* See Note 7

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F 1	TO F 2	TO ~~R~~ 1	TO ~~R~~ 2
←	←	←	~~Y~~	~~R~~	~~Y~~	~~R~~
F	F	F	F	F	~~Y~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

F = Flashing Yellow Arrow

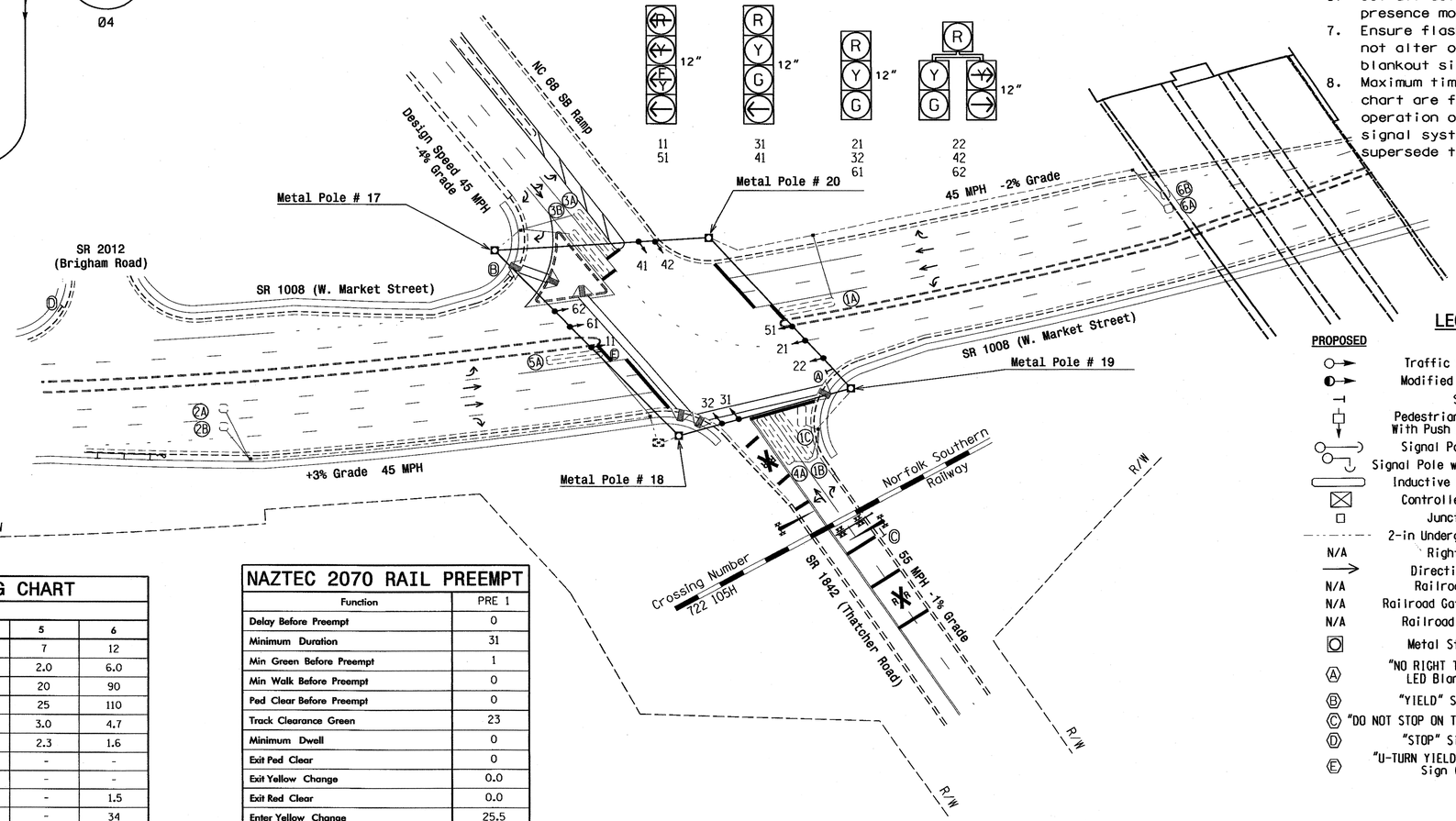
LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	-	15	-	X	X	-	-	-
1B	6X40	0	2-4-2	-	1	-	15	-	X	X	-	-	-
1C	6X15	0	4	-	1	-	15	-	X	X	-	-	-
2A	6X6	300	4	X	2	-	-	-	X	X	X	-	-
2B	6X6	300	4	-	2	-	-	-	X	X	X	-	-
3A	6X40	0	2-4-2	-	3	-	-	-	X	X	-	-	-
3B	6X40	0	2-4-2	-	3	-	-	-	X	X	-	-	-
4A	6X40	0	2-4-2	-	4	-	3	-	X	X	-	-	-
5A	6X40	0	2-4-2	-	5	-	15	-	X	X	-	-	-
6A	6X6	300	5	X	6	-	-	-	X	X	X	-	X
6B	6X6	300	5	-	6	-	-	-	X	X	X	-	-

SIGNAL FACE I.D.

All Heads L.E.D.



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal heads numbered 21 and 61.
6. Set all detector units to presence mode.
7. Ensure flashing operation does not alter operation of blankout signs.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
N/A	Railroad Gate and Flasher	
N/A	Railroad Cantilever	
	Metal Strain Pole	
Ⓐ	"NO RIGHT TURN - TRAIN" LED Blankout Sign	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	"DO NOT STOP ON TRACKS" Sign (R8-8)	Ⓒ
Ⓓ	"STOP" Sign (R1-1)	Ⓓ
Ⓔ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓔ

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Gap, Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Maximum Green 1 *	20	90	30	30	20	90
Maximum Green 2 *	25	110	35	35	25	110
Yellow Clear	3.0	4.7	4.9	5.3	3.0	4.7
Red Clear	2.8	1.6	1.9	1.7	2.3	1.6
Walk *	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-
Added Initial *	-	1.5	-	-	-	1.5
Maximum Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	45	-	-	-	45
Minimum Gap	-	3.0	-	-	-	3.0
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Lock Calls	NO	YES	NO	NO	NO	YES
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.

NAZTEC 2070 RAIL PREEMPT

Function	PRE 1
Delay Before Preempt	0
Minimum Duration	31
Min Green Before Preempt	1
Min Walk Before Preempt	0
Ped Clear Before Preempt	0
Track Clearance Green	23
Minimum Dwell	0
Exit Ped Clear	0
Exit Yellow Change	0.0
Exit Red Clear	0.0
Enter Yellow Change	25.5
Enter Red Clear	25.5
Track Yellow Change	25.5
Track Red Clear	25.5
All-Red B4 Dwell	OFF
Lock Input	OFF
Overide Higher # Preempt	ON
Link to Preempt #	0
Exit Preempt To	3

This signal was designed for advanced preemption.

Signal Upgrade - Final Design

Prepared in the Offices of: Transportation Mobility and Safety Division, State of North Carolina, Department of Transportation, Signal Design Section, 750 N.Greenfield Pkwy, Garner, NC 27529

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: R. Hough

PREPARED BY: W. Bazzarie REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIMBA

SIGNATURE DATE 5/10/11

SIG. INVENTORY NO. 07-1491

10-MAY-2011 17:28
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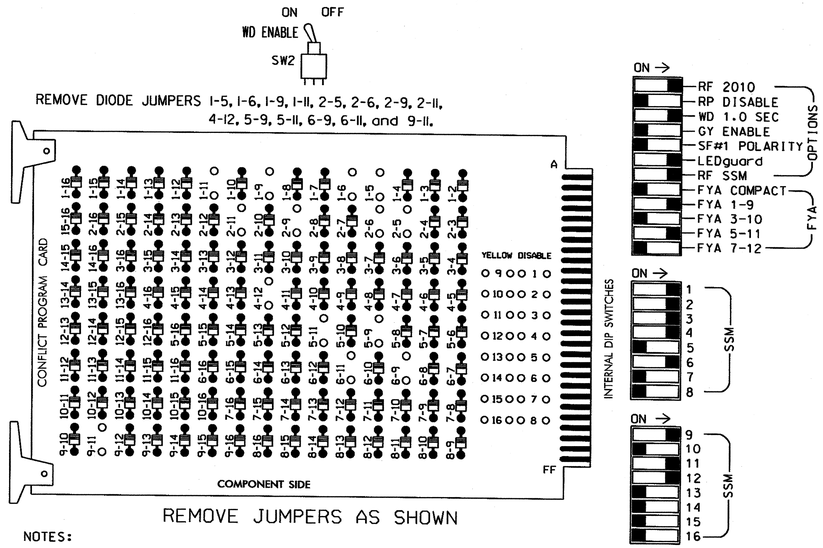
PZ:BM03

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 86

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-12, 5-9, 5-11, 6-9, 6-11, and 9-11.

REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

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 5,7, 8,10,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

LOAD SWITCH NO.	S1		S2	S2P	S3			S4		S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1		2	2 PED	3			4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	42	21,22	NU	31	32	62	41	42	NU	51★	61,62	NU	NU	NU	NU	11★	NU	NU	51★	22	NU
RED		*	128		116	116		101	101			134									*	
YELLOW			129		117	117		102	102		*	135										
GREEN			130		118	118		103	103			136										
RED ARROW																	A121			A114		
YELLOW ARROW		126					117										A122			A115	A102	
FLASHING YELLOW ARROW																	A123			A116		
GREEN ARROW	127	127			118		118	103			133										A103	

NU = Not Used

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

★ See pictorial of head wiring in detail below.

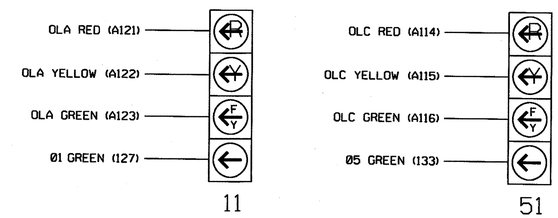
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX OUTPUT FILE
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S9,S12,S13
PHASES USED.....1,2,3,4,5,6
OVERLAP A.....*
OVERLAP B.....NOT USED
OVERLAP C.....*
OVERLAP D.....4

* SEE OVERLAP PROGRAMMING DETAIL ON SHEET 2

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø1 1C	Ø2 2B			Ø3 3B	NOT USED							ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	PRE1 AC ISOLATOR
	L	NOT USED	Ø6 6B												NOT USED

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

FS = FLASH SENSE
ST = STOP TIME
PRE1 = RR PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

	LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
	1A	TB2-1,2	I1U	56	1	1		15		X	X	
*	1A (Logic)	-	-	60	13	1				X	X	
	1B	TB2-5,6	I2U	39	2	1		15		X	X	
	1C	TB2-7,8	I2L	43	3	1		15		X	X	
	2A	TB2-9,10	I3U	63	4	2				X	X	X
	2B	TB2-11,12	I3L	76	5	2				X	X	X
	3A	TB4-9,10	I6U	41	8	3				X	X	
	3B	TB4-11,12	I6L	45	9	3				X	X	
	4A	TB6-1,2	I7U	65	10	4		3		X	X	
	5A	TB3-1,2	J1U	55	15	5		15		X	X	
	6A	TB3-5,6	J2U	40	16	6				X	X	X
	6B	TB3-7,8	J2L	44	17	6				X	X	X

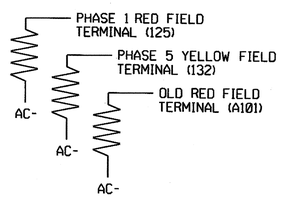
* Note for 1A (Logic): Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to "I/O Logic Programming Detail to Apply RR Preempt Exit Call on Phase 1" (Sheet 5 of 5).

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Final Design - Sheet 1 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY:
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS | INIT. | DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

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

SIGNATURE DATE 5/13/11

SIG. INVENTORY NO. 07-1491

13-MAY-2011 08:35
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armstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 67

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A, C, and D*

(program controller as shown below)

* NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  1
  then press Enter
```

```
Overlap A-1
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
 Ovrlp A-1   Ps....................
Included Ps   1  0  0  0  0  0  0  0
Modifier Ps   2  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
 Ovrlp C-3   Ps....................
Included Ps   5  0  0  0  0  0  0  0
Modifier Ps   6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC" TWICE

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  4
  then press Enter
```

```
Overlap D-4
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp D-4   Ps....................
Included Ps   4  0  0  0  0  0  0  0
Modifier Ps   0  0  0  0  0  0  0  0
Type:NORMAL  Grn:  0  Yel: 3.5  Red: 1.5
```

END OF OVERLAP PROGRAMMING DETAIL

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Final Design - Sheet 2 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N. Greenfield Pwky, Garner, NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 | Guilford County | Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Jyn
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1491

11-MAY-2011 16:09
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scarmstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 88

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
 Invert Rail Inputs: OFF
    EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
Initialize User I/O Maps
     Init ABC with: NONE
       Init D with: NONE
      Init 2A with: MODE 5
 Init TF BIUs with: NONE
```

SELECT MODE 5 →

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	0	Unused	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Default Description	Change To: Fcn	Change To: Description
5-1	37	Ch13 Yellow	0	Unused
5-2	39	Ch15 Yellow	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	37	Ch13 Yellow

Programming notes:

Pin	Default Fcn	Default Description	Change To: Fcn	Change To: Description
7-8	57	Ch9 Green	37	Ch13 Yellow
6-8	59	Ch11 Green	39	Ch15 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-1 (C1 pin 35) = Load Switch S2P-Y
Pin 5-2 (C1 pin 37) = Load Switch S6P-Y
Pin 7-8 (C1 pin 99) = Load Switch S9-G
Pin 6-8 (C1 pin 90) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
     Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
     Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   X   .   X   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   1   0   3   0
```

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Final Design - Sheet 3 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Jafa

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Management Section, Department of Transportation, State of North Carolina

750 N.Greenfield Pkwy,Garner,NC 27529

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

SIGNATURE DATE 5/13/11

SIG. INVENTORY NO. 07-1491

11-MAY-2011 16:09
S:#ITSAS@#ITS Signals#Workgroups#Sig Mon#Armstrong#07149i_smle0_xxx.dgn
smstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 89

RAILROAD PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "3" PREEMPTS
ENTER PREEMPT #1

```
# 1              Preemption
[1.Times]        4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1  Times    :   Begin      :    Other
  Delay     0   MinGrn    1    Track Grn  23
MinDura    31   MinWlk    0    Min Dwell   0
MaxPres     0   PedClr    0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
[2.Phases]       5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              ---- Preempt Phases ----
Track Veh        4  0  0  0
DwellCyc Veh     2  6  0  0  0  0  0  0
DwellCyc(more)   0  0  0  0
DwellCyc (Ped)   0  0  0  0  0  0  0  0
Exit             3  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
[3.Options]      6.Options+     9.Init'Dwell
```

```
# 1        Preempt Options
                    Lock input OFF
            Override Auto Flash ON
   Override higher # preempt ON
                 Flash in dwell OFF
            Link to preempt # 0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          [4.Times+]
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 Preempt Times+     --- Exit --
                     Ped Clr    0
  Extend Dwell    0      Yel  0.0
   Return Max     0      Red  0.0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         [5.Overlaps+]  8.AdvTimes
3.Options        6.Options+     9.Init'Dwell
```

```
# 1              -- Preempt Overlaps+ --
        Track    3  0  0  0  0  0  0  0
       (more)    0  0  0  0
     DwellCyc    3  0  0  0  0  0  0  0
       (more)    0  0  0  0
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
[3.Options]      6.Options+     9.Init'Dwell
```

```
# 1      Preempt Options +
Enable ON                    Pattern    0
  Type RAIL     Skip Track if Overide OFF
Output TS-2              Coord+Preempt  OFF
                        Volt Mon Flash  OFF
Lnk Aft Dwel OFF      Return Max/Min    MAX
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    [8.AdvTimes]
3.Options        6.Options+     9.Init'Dwell
```

```
# 1 AdvTimes
enterYellowChange25.5
enterRedClear     25.5
trackYellowChange25.5
trackRedClear     25.5
All Red B4 Dwell   OFF
```

PRESS "ESC"

```
# 1              Preemption
1.Times          4.Times+
2.Phases         5.Overlaps+    8.AdvTimes
3.Options        6.Options+     [9.Init'Dwell]
```

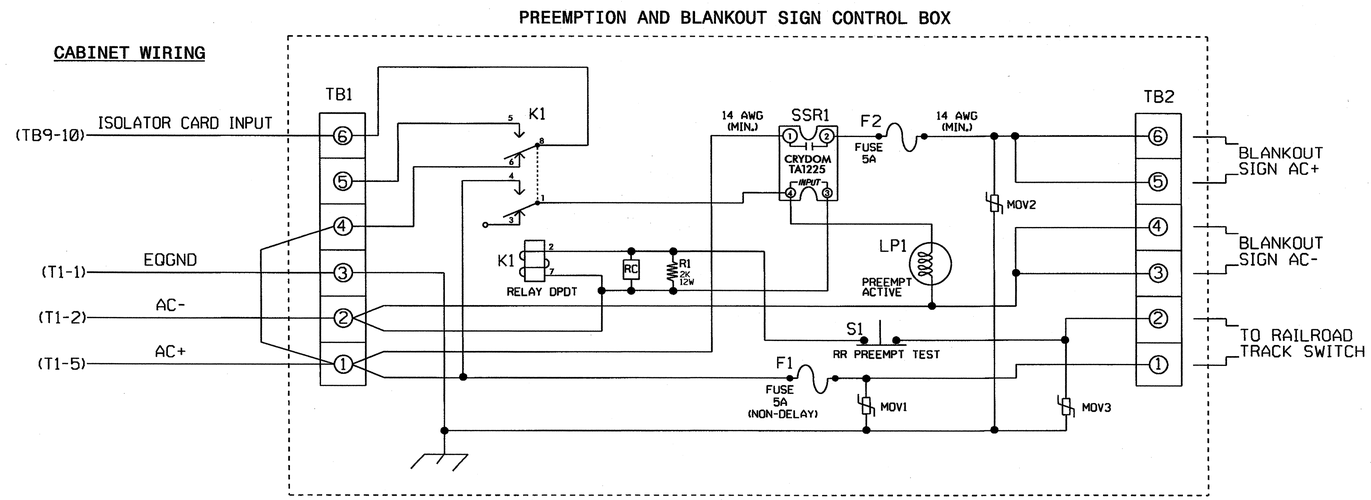
```
# 1          --   Initial Dwell   --
Phases     0  0  0  0
Peds       0  0  0  0
Overlaps   0  0  0  0  0  0  0  0
  (more)   0  0  0  0  0  0  0  0
```

PROGRAMMING COMPLETE

RAILROAD PREEMPTION WIRING DETAIL

(wire as shown below)

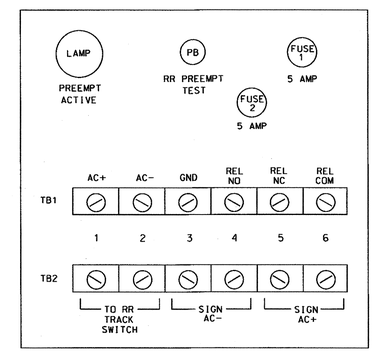
CABINET WIRING



NOTES

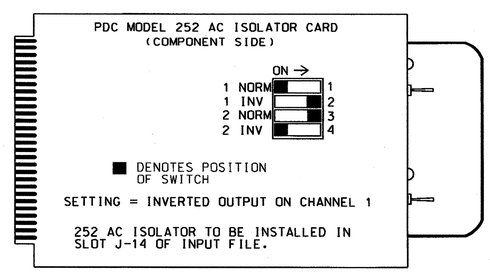
1. Relay K1 is shown in the energized (Preempt not active) normal operation state.
2. Relay K1 is a Potter & Brumfield KRP11AG DPDT Relay with 120VAC coil and octal base.
3. Relay SSR1 Is A Crydom TA1225 SPST (normally open) Solid State Relay with AC input and AC (25 Amp) output. Dot Material# 625028740.
4. 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.
5. Resistor is valued at 2K ohm, 12 watt. Clarostat part no. VPR10F-2K; DOT Material# 625011550.
6. RC network is valued at .1 microfarad, 100 ohm.
7. If replacement movs are needed, GE part no. V150LA20A (Dot Material# 106023975) may be used.
8. Preemption and Blankout Sign Control Box is a Control Technologies Part No. 2299-101. DOT Material # 619033450.
9. 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)



SETTING = INVERTED OUTPUT ON CHANNEL 1

252 AC ISOLATOR TO BE INSTALLED IN SLOT J-14 OF INPUT FILE.

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: 07-1491
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Final Design - Sheet 4 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at NC 68 SB Ramps and SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Jones
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE 5/13/11 DATE

SIG. INVENTORY NO. 07-1491

11-MAY-2011 16:09
S:*ITSASU*ITS Signals*Workgroups*Sig Mgmt*Armstrong*071491_smlele_xxx.dgn
armstrong

I/O LOGIC PROGRAMMING DETAIL
TO APPLY RR PREEMPT EXIT CALL ON PHASE 1

(program controller as shown below)

FROM MAIN MENU, KEYSTROKES 1-8

```
                    Channel & I/O
1.Chan  1-16   4.Chan+  1-16 [7.IO Logic]
2.chan 17-24   5.chan+ 17-24  8.IO Viewer
3.Chan Parms   6.IO Parms     9.IO UserMap
```

	Result	Fcn	Oper	Fcn	Oper	Fcn		Timer		
*	I208=	I208		I	0	I	0	DLY	1	
	I13 =	I198		I	0	I	0	DLY	0	---------DETECTOR 13 CALLS PHASE 1
	I 0=	I	0	I	0	I	0	DLY	0	
	I 0=	I	0	I	0	I	0	DLY	0	
	I 0=	I	0	I	0	I	0	DLY	0	
	I 0=	I	0	I	0	I	0	DLY	0	

* Denotes input function 208 (flash sense) logic delay is assigned per Mode 5 default.

NOTE

1. The above I/O Programming ensures a Phase 1 call when exiting RR Preempt. A Phase 1 call is nessesary for proper FYA operation (Signal Head 11) when exiting RR Preempt.
2. Ensure Detector 13 is setup to call phase 1 (default value).
3. Enable Red.Lock (Y) for Detector 13 (MM-5-2). Refer to INPUT FILE CONNECTION & PROGRAMMING CHART.

I/O REFERENCE SCHEDULE

INPUT FUNCTION 208 = Flash Sense
INPUT FUNCTION 13 = Veh Call Det 13
INPUT FUNCTION 198 = Preempt 1 In

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1491
DESIGNED: April 2011
SEALED: 5/10/11
REVISED: N/A

Signal Upgrade - Final Design - Sheet 5 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 SB Ramps and
SR 1842 (Thatcher Road)

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	REVIEWED BY:	T. Sgr
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 5/13/11
SIGNATURE DATE
SIG. INVENTORY NO. 07-1491

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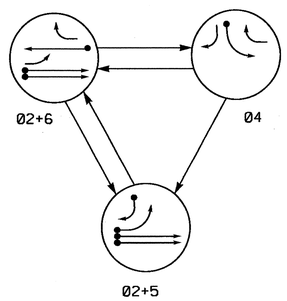
armstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 9\

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R/←	R	G	R
51	←	F Y	R	Y
61	R	G	R	Y
62	R	G	R/←	Y

F Y = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM \ TO	←	F Y 1	F Y 2	R 1	R 2
←	←	←	R	R	R
F Y	F Y	F Y	F Y	R	R
R	R	R	R	R	R

F Y = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.

LOOP & DETECTOR UNIT INSTALLATION CHART

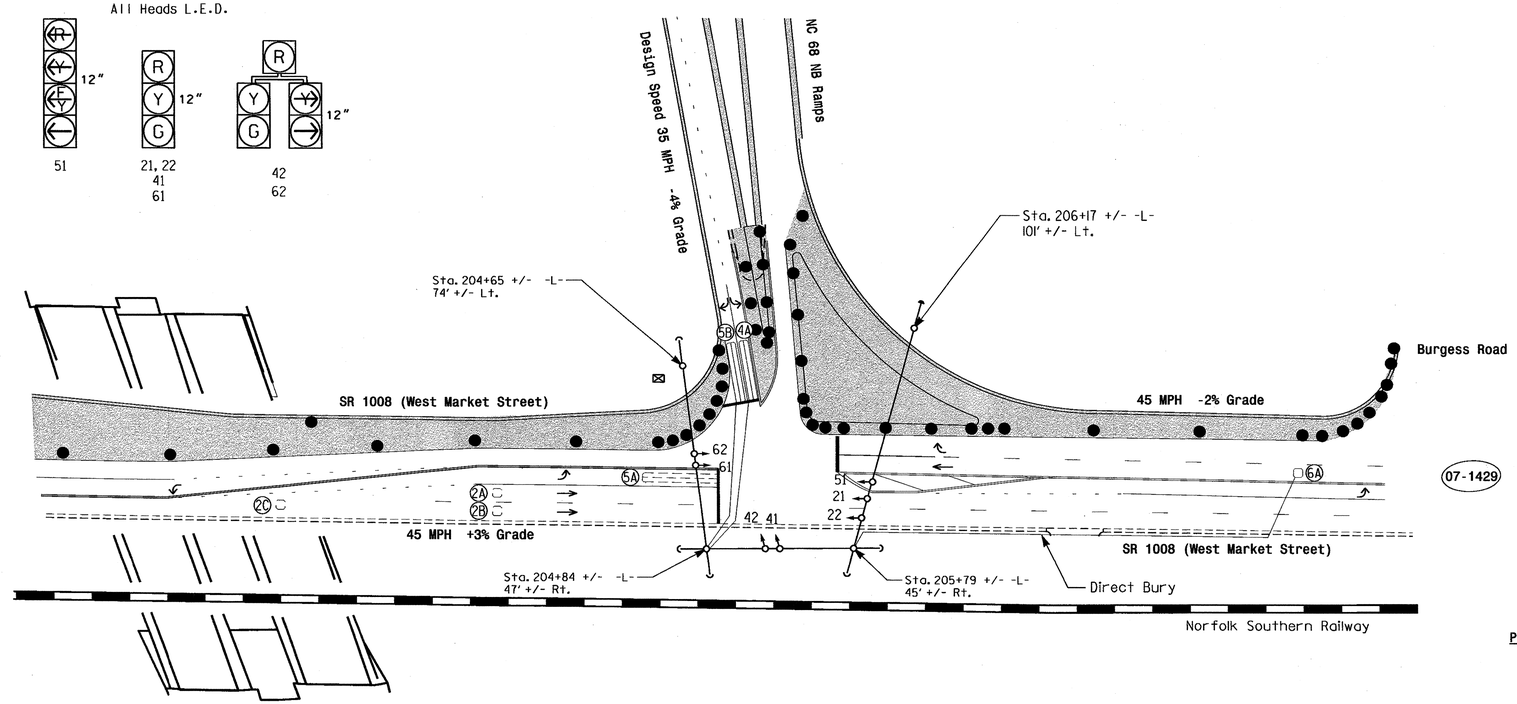
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A, 2B	6X6	143	EXIST	-	2	-	-	-	X	X	-	-	X
2C	6X6	285	EXIST	-	2	-	-	-	X	X	-	-	X
4A	6X40	0	2-4-2	X	4	-	-	-	X	X	-	-	X
5A	6X50	0	2-4-2	-	5	-	15	-	X	X	-	-	X
5B	6X40	6X40	2-4-2	X	5	-	15	-	X	X	-	-	X
6A	6X6	300	5	X	6	-	-	-	X	X	X	-	X

3 Phase Fully Actuated (Greensboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Gap, Extension *	4.0	2.0	2.0	6.0
Maximum Green 1 *	90	20	15	90
Maximum Green 2 *	110	30	25	110
Yellow Clear	4.3	3.0	3.0	4.7
Red Clear	1.0	2.4	1.9	1.2
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	-	-	2.5
Maximum Initial *	-	-	-	34
Time Before Reduction *	-	-	-	15
Time To Reduce *	-	-	-	45
Minimum Gap	-	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	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	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
	New Construction	
	Construction Zone Drums	

Signal Upgrade - Temporary Design 1 (Construction Phase I)

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (West Market Street) at NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE:	April 2011	PREPARED BY:	M. Bazzarie
PREPARED BY:	TS Thigpen	REVIEWED BY:	R. Hough

REVISIONS	INIT.	DATE

SCALE 0 50 1"=50'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/5/11 DATE

SIG. INVENTORY NO. 07-1818 T1

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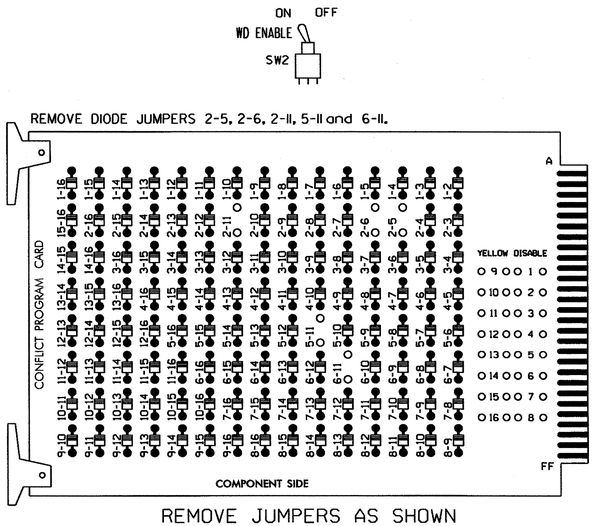
rziemba

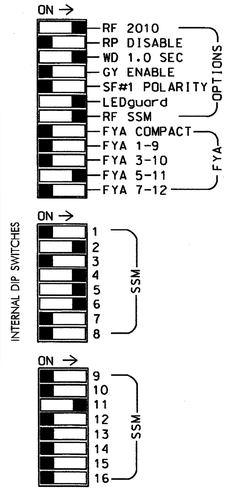
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 92

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12
PHASES USED.....2,4,5,6
OVERLAP C.....*

*See Sheet 2 of 3 Overlap Programming Detail

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4		S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4		4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	NU	42	51★	61,62	NU	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101			*		134										
YELLOW		129			102					135										
GREEN		130			103					136										
RED ARROW																		A114		
YELLOW ARROW						102		132										A115		
FLASHING YELLOW ARROW																		A116		
GREEN ARROW						103		133	133											

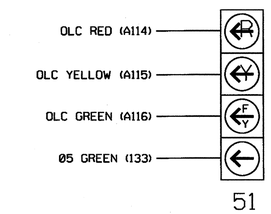
NU = Not Used

* 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. See Overlap Programming Detail Sheet 2 of 3.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A,2B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2C				NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	NOT USED											

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.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A,2B	TB2-5,6	I2U	39	2	2				X	X	
2C	TB2-7,8	I2L	43	3	2				X	X	
4A	TB4-9,10	I6U	41	8	4				X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB3-5,6	J2U	40	16	5		15		X	X	
6A	TB3-9,10	J3U	64	18	6				X	X	X

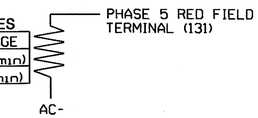
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



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: 07-1818T1
DESIGNED: April 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Temp 1 - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Jyt
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/12/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1818T1

11-MAY-2011 12:05
S:*MTS&SL*MTS Signals*Workgroups*Sig Man*Strickland*07181B_smele_xxx.dgn
cassrtickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 93

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  3
then press Enter
```

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
Ovrlp C-3   Ps....................
Included Ps    5  0  0  0  0  0  0  0
Modifier Ps    6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp C-3   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1818T1
DESIGNED: April 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Temp 1 - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011	REVIEWED BY: T. Jyn		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/12/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1818T1

11-MAY-2011 09:51
S:\MTS&SD\MTS Signals\Workgroups\Sig Man\Strickland\071818_smlate_xxx.dgn
cestrickland

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
         T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
   EVP Ped Confirm: OFF
```

SELECT USER MODE →

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
Initialize User I/O Maps
Init ABC with: NONE
Init D with: NONE
Init 2A with: MODE 5
Init TF BIUs with: NONE
```

SELECT MODE 5 →

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Default Description	Change To: Fcn	Change To: Description
5-2	39	Ch15 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	57	Ch9 Green

Programming notes:

Pin	Default Fcn	Default Description	Change To: Fcn	Change To: Description
6-8	59	Ch11 Green	39	Ch15 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-2 (C1 pin 36) = Load Switch S6P-Y
Pin 6-8 (C1 pin 87) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
     Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
     Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   X   .   ←
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   3   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1818T1
DESIGNED: April 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Temp 1 - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
Department of Transportation State of North Carolina
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011	REVIEWED BY: T. Joyce		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

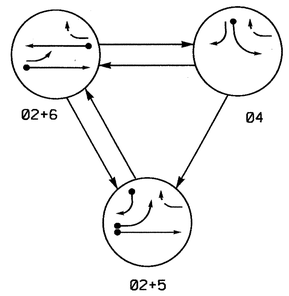
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 5/12/11
SIGNATURE DATE
SIG. INVENTORY NO. 07-1818T1

1:WAY:2011 09:53
S:***\Signals\Signals\Signals\Mon45\Groups45\g Mon45\Strickland\07181 8_smu_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 95

3 Phase
Fully Actuated
(Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

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

F Y = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F Y 1	TO F Y 2	TO R 1	TO R 2
←	←	←	Y	R	Y	R
F Y	F Y	F Y	F Y	F Y	Y	R
R	R	R	R	R	R	R

F Y = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.

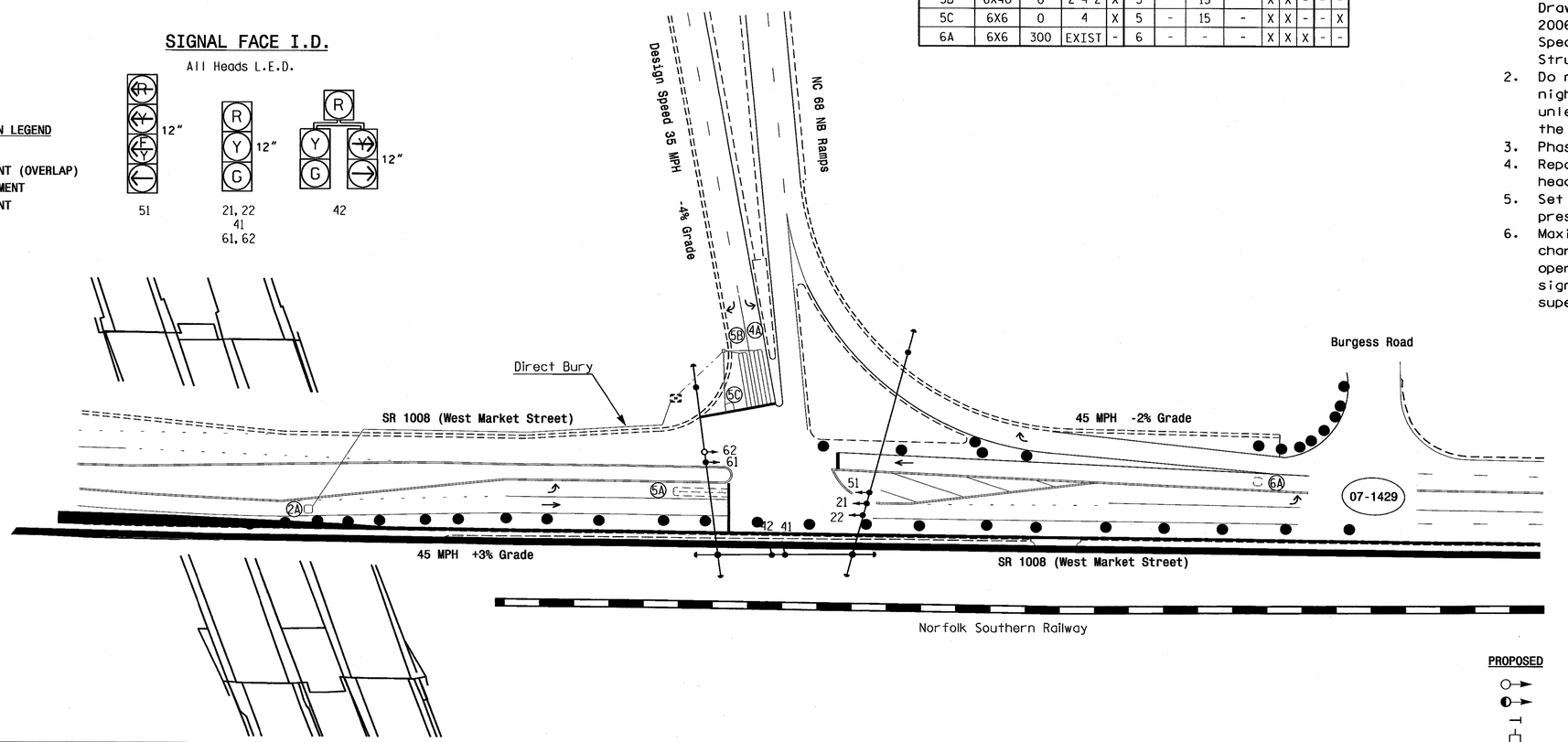
LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	X	2	-	-	-	X	X	X	-	-
4A	6X50	0	2-4-2	X	4	-	-	-	X	X	-	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	-
5B	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	-
5C	6X6	0	4	X	5	-	15	-	X	X	-	-	X
6A	6X6	300	EXIST	-	6	-	-	-	X	X	X	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads numbered 21, 22, and 61.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Gap, Extension *	6.0	2.0	2.0	6.0
Maximum Green 1 *	90	20	15	90
Maximum Green 2 *	110	30	25	110
Yellow Clear	4.3	3.0	3.0	4.7
Red Clear	1.2	3.1	1.9	1.3
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	2.5	-	-	2.5
Maximum Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	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	
N/A	Right of Way	
	Directional Arrow	
N/A	Railroad Tracks	
	New Construction	
	Construction Zone Drums	

Signal Upgrade - Temporary Design 2 (Construction Phase II)

Prepared In the Offices of: Transportation Mobility and Safety Division, Signal Design Section, 750 N.Greenfield Pkwy, Garner, NC 27529

SR 1008 (West Market Street) at NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: R. Hough

PREPARED BY: M.Bazzarie REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

SIGNATURE DATE 5/5/11

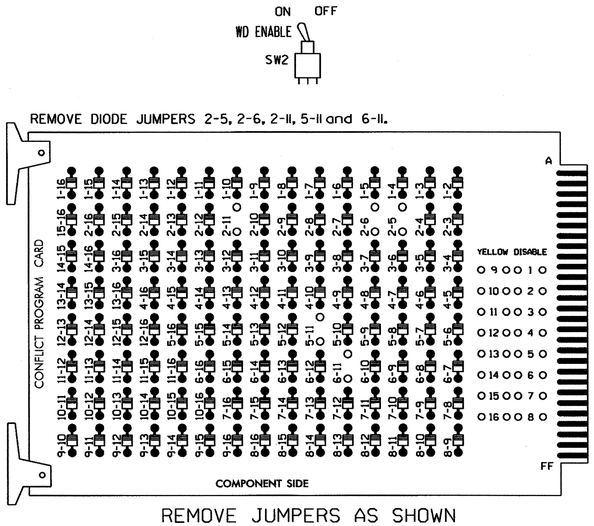
SIG. INVENTORY NO. 07-1818 T2

05-MAY-2011 13:24
P:\R\Projects\R2611\Traffic\Signals\Design\Signals\07-1818\07181872_sig_dsn_20110505.dgn
rziemba

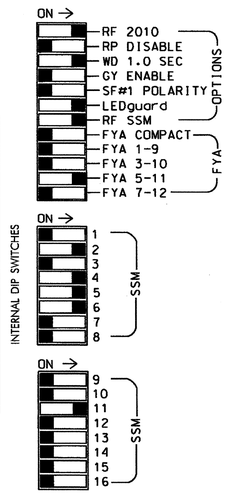
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 96

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	NU	42	51★	61,62	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101			✱		134									
YELLOW		129			102					135									
GREEN		130			103					136									
RED ARROW																	A114		
YELLOW ARROW						102		132									A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW						103		133	133										

NU = Not Used

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

★ See pictorial of head wiring in detail below.

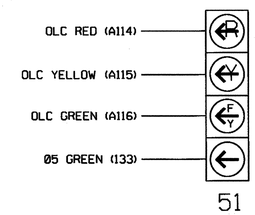
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12
PHASES USED.....2,4,5,6
OVERLAP C.....*

*See Sheet 2 of 3 Overlap Programming Detail

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. See Overlap Programming Detail Sheet 2 of 3.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				NOT USED								ST DC ISOLATOR
FILE "J"	U	ø5 5A	ø5 5B	ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	ø5 5C	NOT USED											

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.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A	TB2-5,6	I2U	39	2	2				X	X	X
4A	TB4-9,10	I6U	41	8	4				X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB3-5,6	J2U	40	16	5		15		X	X	
5C	TB3-7,8	J2L	44	17	5		15		X	X	
6A	TB3-9,10	J3U	64	18	6				X	X	X

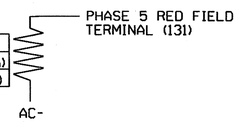
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



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: 07-1818T2
DESIGNED: April 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Temp 2 - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T.Jap
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/12/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1818T2

11-MAY-2011 12:28
S:\#TISSCOM\TS Signals\Workgroups\Sig Mgmt\Strickland\07-1818_sml_ele_xxx.dgn
$$$$TSCONS

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.97

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
2.Program
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Included Ps   5  0  0  0  0  0  0  0
Modifier Ps   6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

Notice type FYA-4 →

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Confl Ps      0  0  0  0  0  0  0  0
Confl Ovrlps  0  0  0  0  0  0  0  0
Confl Peds    0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1818T2
DESIGNED: April 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Temp 2 - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011	REVIEWED BY: T. Yak		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/12/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1818T2

11-MAY-2011 13:05
S:*MTS&SUM*TS Signals*Workgroups*Sig Mgmt*Strickland*071818_sm_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 98

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  [6.IO Parms]  9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
   EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms  [9.IO UserMap]
```

```
User I/O Maps
1. Inputs
2. Outputs
[3. Init Map]
```

SELECT MODE 5 →

```
Initialize User I/O Maps
Init ABC with: NONE
  Init D with: NONE
   Init 2A with: MODE 5
Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
[2. Outputs]
3. Init Map
```

```
User Output Maps
1.NEMA A   4.NEMA D
2.NEMA B   [5.FIO 2A]
3.NEMA C                 9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-2	39	Ch15 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	57	Ch9 Green

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
6-8	59	Ch11 Green	39	Ch15 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-2 (C1 pin 36) = Load Switch S6P-Y
Pin 6-8 (C1 pin 87) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  [4.Chan+  1-16] 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   X   .   ←
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   3   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1818T2
DESIGNED: April 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Temp 2 - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Inglis
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

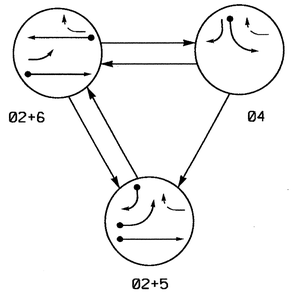
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 5/12/11
SIGNATURE DATE
SIG. INVENTORY NO. 07-1818T2

11-MAY-2011 13:07
S:*ITSSUMITS Signals*Workgroups*Sig Mgmt*Strickland*07181B_sm_ele_xxx.dgn
$$$$USERNAME

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 99

3 Phase
Fully Actuated
(Greensboro Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	←	F Y	~~R~~	~~Y~~
61, 62	R	G	R	Y

F Y = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F Y 1	TO F Y 2	TO ~~R~~ 1	TO ~~R~~ 2
←	←	←	~~Y~~	~~R~~	~~Y~~	~~R~~
F Y	F Y	F Y	F Y	F Y	~~Y~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

F Y = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.

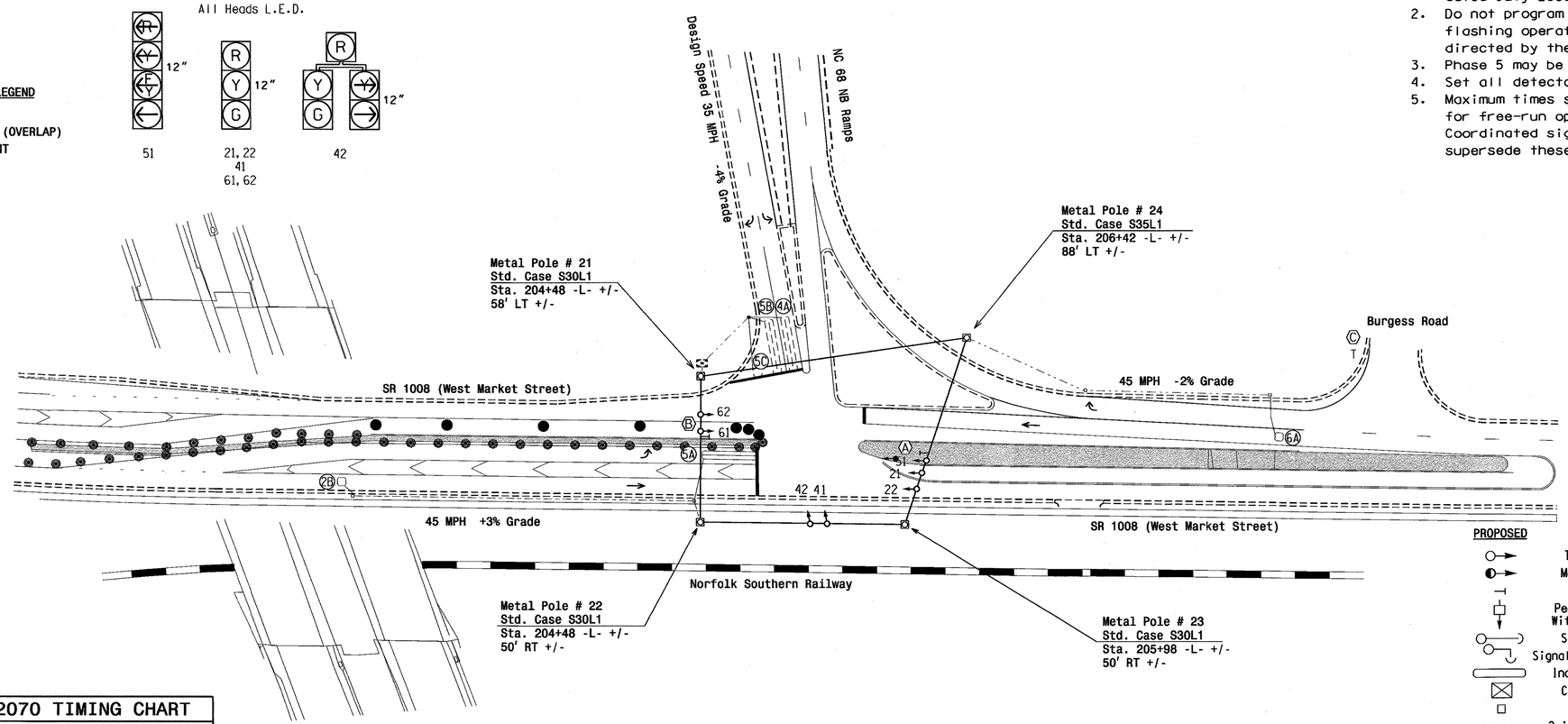
LOOP & DETECTOR UNIT INSTALLATION CHART

NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2B	6X6	300	5	X	2	-	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	-	3	-	X	X	-	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	-
5B	6X40	0	2-4-2	-	5	-	15	-	X	X	-	-	-
5C	6X6	0	4	-	5	-	15	-	X	X	-	-	-
6A	6X6	300	5	X	6	-	-	-	X	X	X	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	New Construction	
	Construction Zone Drums	
	Metal Strain Pole	
N/A	Railroad Tracks	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	No U-Turn Sign (R3-4)	Ⓑ
Ⓒ	"STOP" Sign (R1-1)	Ⓒ

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Gap, Extension *	6.0	2.0	2.0	6.0
Maximum Green 1 *	90	20	15	90
Maximum Green 2 *	110	30	25	110
Yellow Clear	4.3	3.0	3.0	4.7
Red Clear	1.2	2.9	2.1	1.3
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	2.5	-	-	2.5
Maximum Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Upgrade - Temporary Design 3 (Construction Phase III)

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signal Design Section, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
1750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (West Market Street) at NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: R. Hough
PREPARED BY: M.Bazzarie REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS | INIT. | DATE

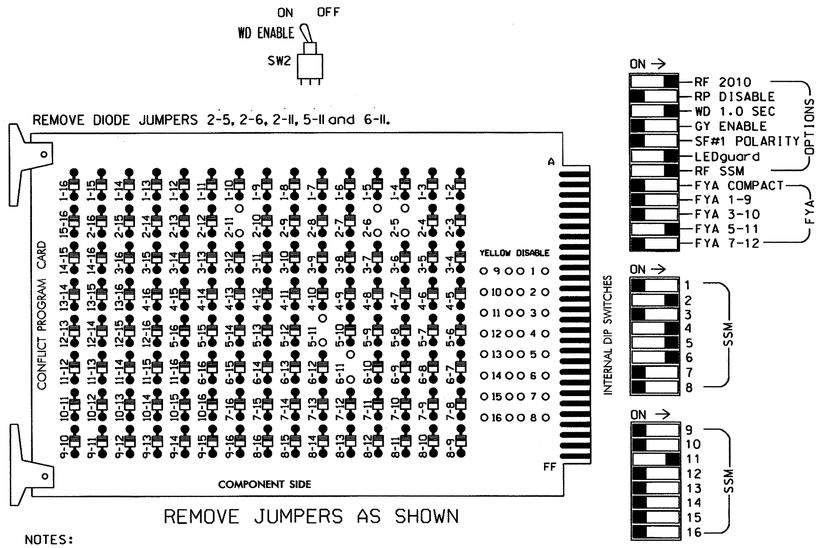
SEAL: NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 5/5/11 DATE
SIG. INVENTORY NO. 07-1818 T3

05-MAY-2011 13:18
P:\PROJECTS\R-2611\Signals\Designs\07-1818\07181873_sig_dsn_20110505.dgn
ziemba

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 100

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	42	51★	61,62	NU	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101		*		134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW																	A114		
YELLOW ARROW							132										A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW							133	133											

NU = Not Used

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

★ See pictorial of head wiring in detail below.

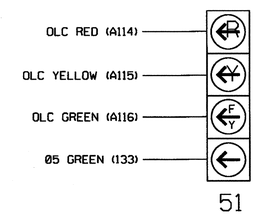
EQUIPMENT INFORMATION

CONTROLLER.....NAZTEC 2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12
PHASES USED.....2,4,5,6
OVERLAP C.....*

*See Sheet 2 of 3 Overlap Programming Detail

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. See Overlap Programming Detail Sheet 2 of 3.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2B				NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø5 5C	NOT USED											

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.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2B	TB2-7,8	I2L	43	3	2				X	X	X
4A	TB4-9,10	I6U	41	8	4		3		X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB3-5,6	J2U	40	16	5		15		X	X	
5C	TB3-7,8	J2L	44	17	5		15		X	X	
6A	TB3-9,10	J3U	64	18	6				X	X	X

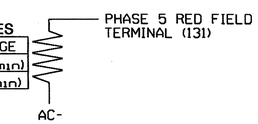
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



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: 07-1818T3
DESIGNED: April 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Temp 3 - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Jap
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE DATE 5/13/11
SIG. INVENTORY NO. 07-1818T3

11-MAY-2011 09:22
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Sig_Mgmt_Sig_Mgmt

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.101

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  [6.IO Parms]  9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
   EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms  [9.IO UserMap]
```

```
User I/O Maps
1. Inputs
[2. Outputs]
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
Init ABC with: NONE
   Init D with: NONE
    Init 2A with: MODE 5
Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
[2. Outputs]
3. Init Map
```

```
User Output Maps
1.NEMA A   4.NEMA D
2.NEMA B   [5.FIO 2A]
3.NEMA C                 9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-2	39	Ch15 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	57	Ch9 Green

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
6-8	59	Ch11 Green	39	Ch15 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-2 (C1 pin 36) = Load Switch S6P-Y
Pin 6-8 (C1 pin 87) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  [4.Chan+  1-16] 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
     Chan.1...2...3...4...5...6...7...8 >
Flash Red .  .   .   .   .   .   .   .
Flash Yel .  .   .   .   .   .   .   .
Flash Grn .  .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .  .   .   .   .   .   .   .
Olap Ovrd 0  0   0   0   0   0   0   0
```

```
     Chan.9..10..11..12..13..14..15..16
Flash Red .  .   .   .   .   .   .   .
Flash Yel .  .   .   .   .   .   X   .   ←
Flash Grn .  .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .  .   .   .   .   .   .   .
Olap Ovrd 0  0   0   0   0   0   3   0   ←
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1818T3
DESIGNED: April 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Temp 3 - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street) at NC 68 Northbound Ramps

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011 | REVIEWED BY: T. Jan
PREPARED BY: C. Strickland | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1818T3

10-MAY-2011 11:31
S:\TTSA&SW\TS Signals\workgroups\Sig Mgmt\Strickland\07181B_sm_ele_xxx.dgn
cestrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.102

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

Notice type FYA-4 →

```
 Ovrlp C-3   Ps....................
Included Ps    5  0  0  0  0  0  0  0
Modifier Ps    6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
[2.Confl Prog+]
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Confl Ps       0  0  0  0  0  0  0  0
Confl Ovrlps   0  0  0  0  0  0  0  0
Confl Peds     0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
[3.Program Parms+]
```

```
 Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1818T3
DESIGNED: April 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Temp 3 - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Transportation Mobility and Safety Division
Traffic Engineering Branch
Signals Management Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Uyen
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

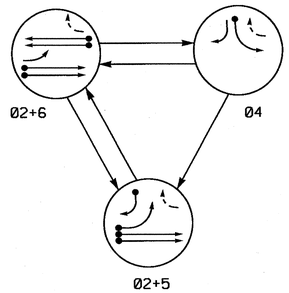
George C Brown 5/13/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1818T3

10-MAY-2011 11:29
S:#TISAS(#)TS Signals#Workgroups#Sig Mgm#Strickland#071818_sm_ele_xxx.dgn
cesrickland

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 103

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+5	PHASE 02+6	PHASE 04	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	←	F.Y.	R	Y
61, 62	R	G	R	Y

F.Y. = Flashing Yellow Arrow

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F.Y. 1	TO F.Y. 2	TO R 1	TO R 2
←			~~←~~	~~←~~	~~R~~	~~R~~
F.Y.			F.Y.	F.Y.	~~R~~	~~R~~
R	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

F.Y. = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.

LOOP & DETECTOR UNIT INSTALLATION CHART

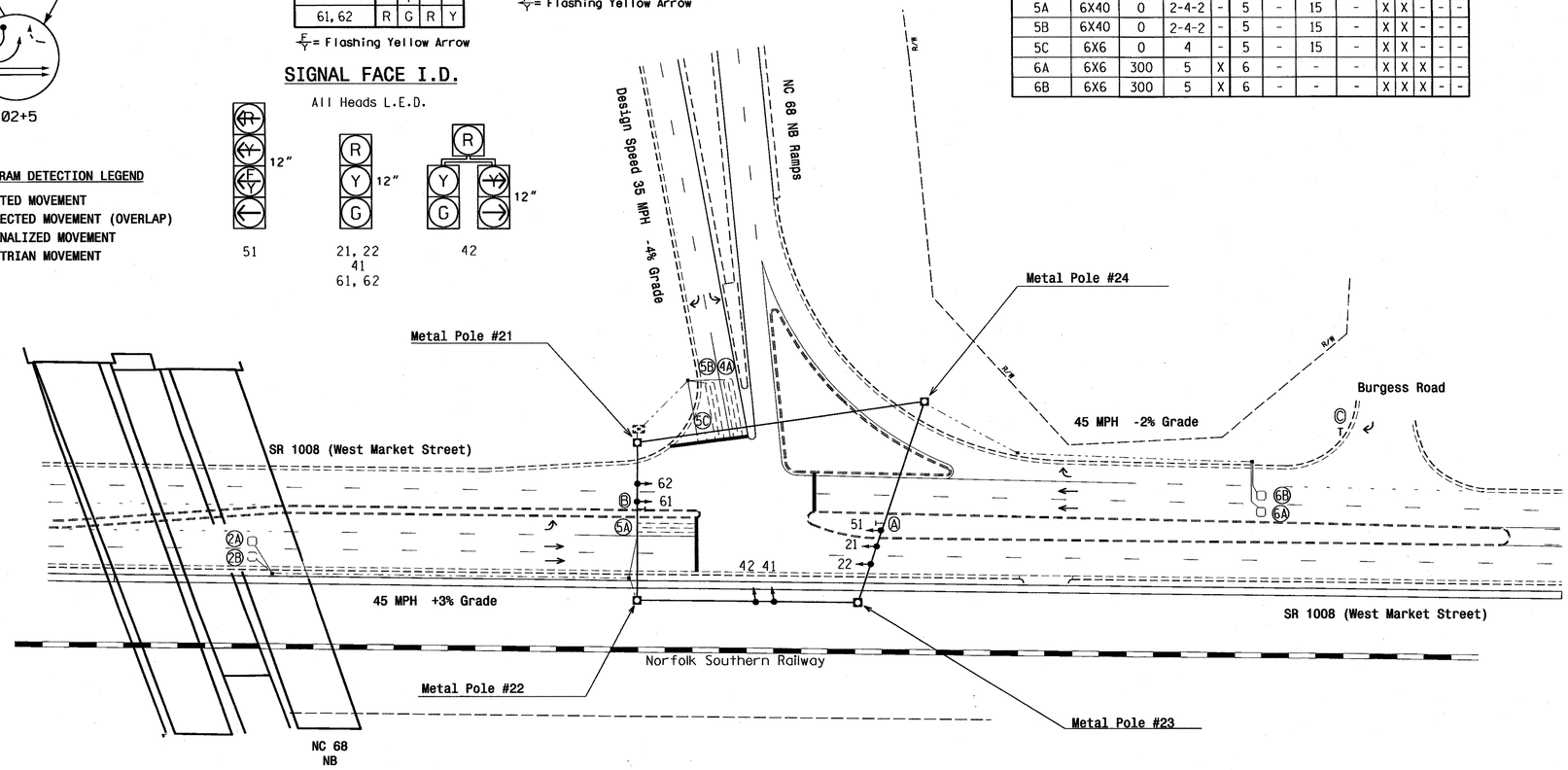
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	300	5	X	2	-	-	-	X	X	X	-	-
2B	6X6	300	5	-	2	-	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	-	-	-	X	X	-	-	-
5A	6X40	0	2-4-2	-	5	-	15	-	X	X	-	-	-
5B	6X40	0	2-4-2	-	5	-	15	-	X	X	-	-	-
5C	6X6	0	4	-	5	-	15	-	X	X	-	-	-
6A	6X6	300	5	X	6	-	-	-	X	X	X	-	-
6B	6X6	300	5	X	6	-	-	-	X	X	X	-	-

3 Phase
Fully Actuated
(Greensboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

PROPOSED		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	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
N/A	Railroad Tracks	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	No U-Turn Sign (R3-4)	Ⓑ
Ⓒ	"STOP" Sign (R1-1)	Ⓒ

NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Gap, Extension *	6.0	2.0	2.0	6.0
Maximum Green 1 *	90	20	15	90
Maximum Green 2 *	110	25	20	110
Yellow Clear	4.3	3.0	3.0	4.7
Red Clear	1.2	2.9	2.1	1.3
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	1.5	-	-	1.5
Maximum Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Upgrade- Final Design

Prepared In the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 50 1"=50'

SR 1008 (West Market Street) at NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: March 2011 REVIEWED BY: R. Hough
PREPARED BY: M.Bazzarie REVIEWED BY:

REVISIONS	INIT.	DATE

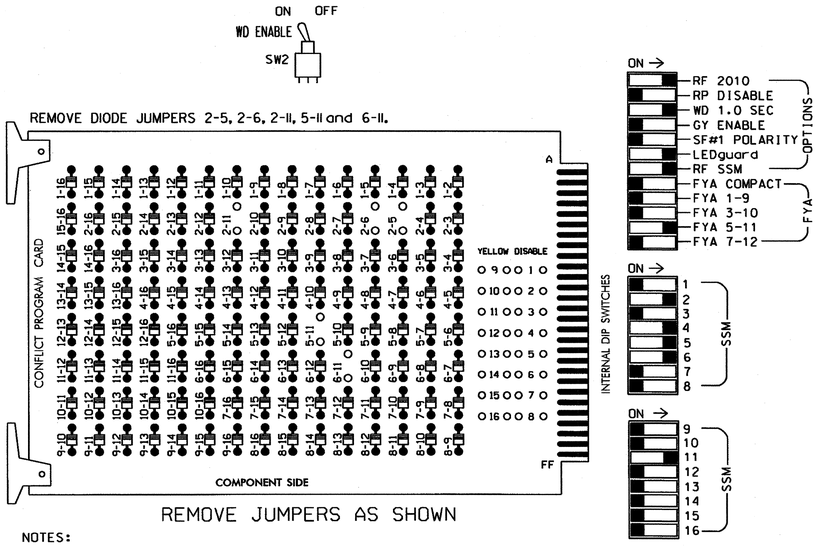
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE DATE 8/5/11
SIG. INVENTORY NO. 07-1818

05-MAY-2011 13:01
P:\TIPProjects\R-2611\Traffic\Signals\Design\Signals\07-1818\071818_sig_dsn_20110505.dgn
rziemba

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig.104

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3, 7,8,9,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Initialize database in Naztec 2070 local software (Apogee) as FULL-MODE 5. This initialization should be done prior to programming controller.
4. Program phases 2 and 6 for Start Up In Green.
5. Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
6. Ensure "Local Flash Start" feature is set to "ON".
7. The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	42	51★	61,62	NU	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101		✳		134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW																	A114		
YELLOW ARROW							132										A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW							133	133											

NU = Not Used

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

★ See pictorial of head wiring in detail below.

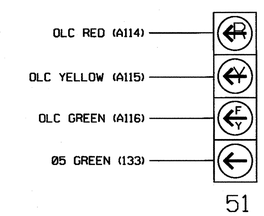
EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S12
PHASES USED.....2,4,5,6
OVERLAP C.....*

*See Sheet 2 of 3 Overlap Programming Detail

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. See Overlap Programming Detail Sheet 2 of 3.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2 2A	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø2 2B	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø5 5C	Ø6 6B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A	TB2-5,6	I2U	39	2	2				X	X	X
2B	TB2-7,8	I2L	43	3	2				X	X	X
4A	TB4-9,10	I6U	41	8	4				X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB3-5,6	J2U	40	16	5		15		X	X	
5C	TB3-7,8	J2L	44	17	5		15		X	X	
6A	TB3-9,10	J3U	64	18	6				X	X	X
6B	TB3-11,12	J3L	77	19	6				X	X	X

INPUT FILE POSITION LEGEND: J2L

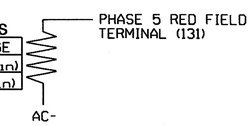
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

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



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: 07-1818
DESIGNED: March 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Lynn

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section, Department of Transportation, State of North Carolina

750 N.Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

SIGNATURE DATE 5/13/11

SIG. INVENTORY NO. 07-1818

12-MAY-2011 08:06
S:\ITS\SIGNALS\Workgroups\Sig Name\Strickland\07181B.sml.ele.xxx.dgn
cestrickland

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```
Overlaps
[1.General Parms]
2.Program
3.Status
```

```
General Overlap Parameters
      Lock Inhibit OFF
   Confl Lock Enable OFF
     Parent P Clrncs ON
Extra Included Phases OFF
```

PRESS "ESC"

```
Overlaps
1.General Parms
[2.Program]
3.Status
```

```
Enter Overlap #  3
  then press Enter
```

```
Overlap C-3
[1.Program Parms]
2.Confl Prog+
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Included Ps   5  0  0  0  0  0  0  0
Modifier Ps   6  0  0  0  0  0  0  0
Type:FYA-4   Grn:  0  Yel: 3.5  Red: 1.5
```

Notice type FYA-4 →

PRESS "ESC"

```
Overlap C-3
1.Program Parms
[2.Confl Prog+]
3.Program Parms+
```

```
 Ovrlp C-3   Ps....................
Confl Ps      0  0  0  0  0  0  0  0
Confl Ovrlps  0  0  0  0  0  0  0  0
Confl Peds    0  0  0  0  0  0  0  0
```

PRESS "ESC"

```
Overlap C-3
1.Program Parms
2.Confl Prog+
[3.Program Parms+]
```

```
 Ovrlp C-3
LeadGreen  OFF  Transit 0
GreenExtInh     0  0  0  0  0  0  0  0
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1818
DESIGNED: March 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 | Guilford County | Greensboro

PLAN DATE: April 2011	REVIEWED BY: T. Joy		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
SIGNATURE 5/13/11 DATE
SIG. INVENTORY NO. 07-1818

11-MAY-2011 14:14
S:*RTTSSDLMTS Signals*workgroups*Sig Mgmt*Strickland*07181B_smleta_xxx.dgn
$WORK$.dgn

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.

2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

SELECT USER MODE →

```
I/O Parameters
C1-C11-ABC IO Mode: USER
     D Conn Mapping: NONE
        T&F Biu Map: DEFAULT
Invert Rail Inputs: OFF
   EVP Ped Confirm: OFF
```

PRESS "ESC"

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

SELECT MODE 5 →

```
Initialize User I/O Maps
Init ABC with: NONE
    Init D with: NONE
   Init 2A with: MODE 5
Init TF BIUs with: NONE
```

PRESS "ESC"

```
User I/O Maps
1. Inputs
2. Outputs
3. Init Map
```

```
User Output Maps
1.NEMA A    4.NEMA D
2.NEMA B    5.FIO 2A
3.NEMA C                9.TS2 IO
```

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwtchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	6-2	115	Not Used

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
5-2	39	Ch15 Yellow....	0	Unused

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	7-8	57	Ch9 Green

Programming notes:

Pin	Default Fcn	Description	Change To: Fcn	Description
6-8	59	Ch11 Green	39	Ch15 Yellow

OUTPUT PROGRAMMING COMPLETE

Pin 5-2 (C1 pin 36) = Load Switch S6P-Y
Pin 6-8 (C1 pin 87) = Load Switch S12-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.

FROM MAIN MENU, KEYSTROKES 1-8

```
Channel & I/O
1.Chan  1-16  4.Chan+  1-16 7.IO Logic
2.chan 17-24  5.chan+ 17-24 8.IO Viewer
3.Chan Parms  6.IO Parms    9.IO UserMap
```

PRESS THE RIGHT ARROW KEY UNTIL THE SCREEN AT RIGHT APPEARS

```
      Chan.1...2...3...4...5...6...7...8 >
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   .   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   0   0
```

```
      Chan.9..10..11..12..13..14..15..16
Flash Red .   .   .   .   .   .   .   .
Flash Yel .   .   .   .   .   .   X   .
Flash Grn .   .   .   .   .   .   .   .
Inhibit Red Flash In
  Preempt .   .   .   .   .   .   .   .
Olap Ovrd 0   0   0   0   0   0   3   0
```

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1818
DESIGNED: March 2011
SEALED: 05/05/11
REVISED:

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1008 (W. Market Street)
at
NC 68 Northbound Ramps

Division 7 Guilford County Greensboro

PLAN DATE: April 2011 REVIEWED BY: T. Jym
PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/3/11
SIGNATURE DATE

SIG. INVENTORY NO. 07-1818

11-MAY-2011 14:15
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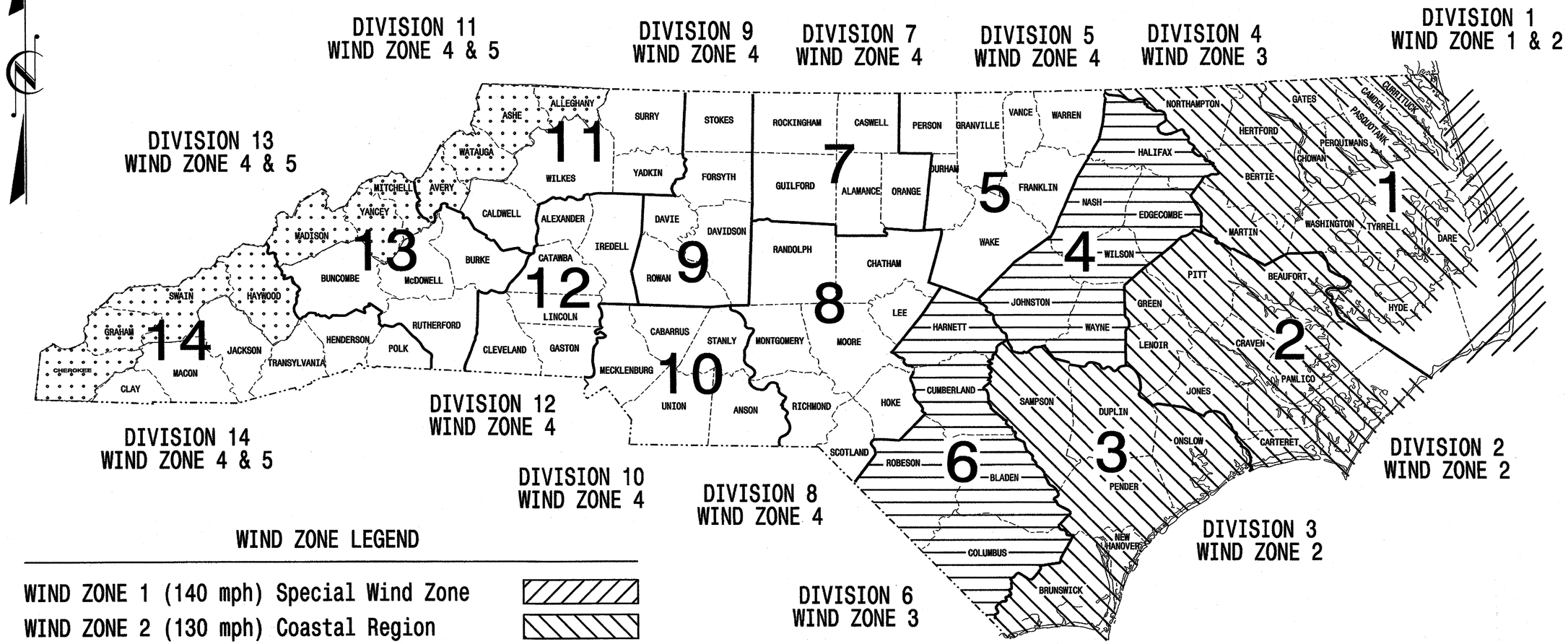
cestrickland

STATE	PROJECT NO.	SHEET NO.
N.C.	R-2611	Sig. 107
F. A. PROJ. NO.		M 1
PROJECT ID. NO.		

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR METAL POLES

NCDOT METAL POLE STANDARDS



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:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section

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, Luminares, 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

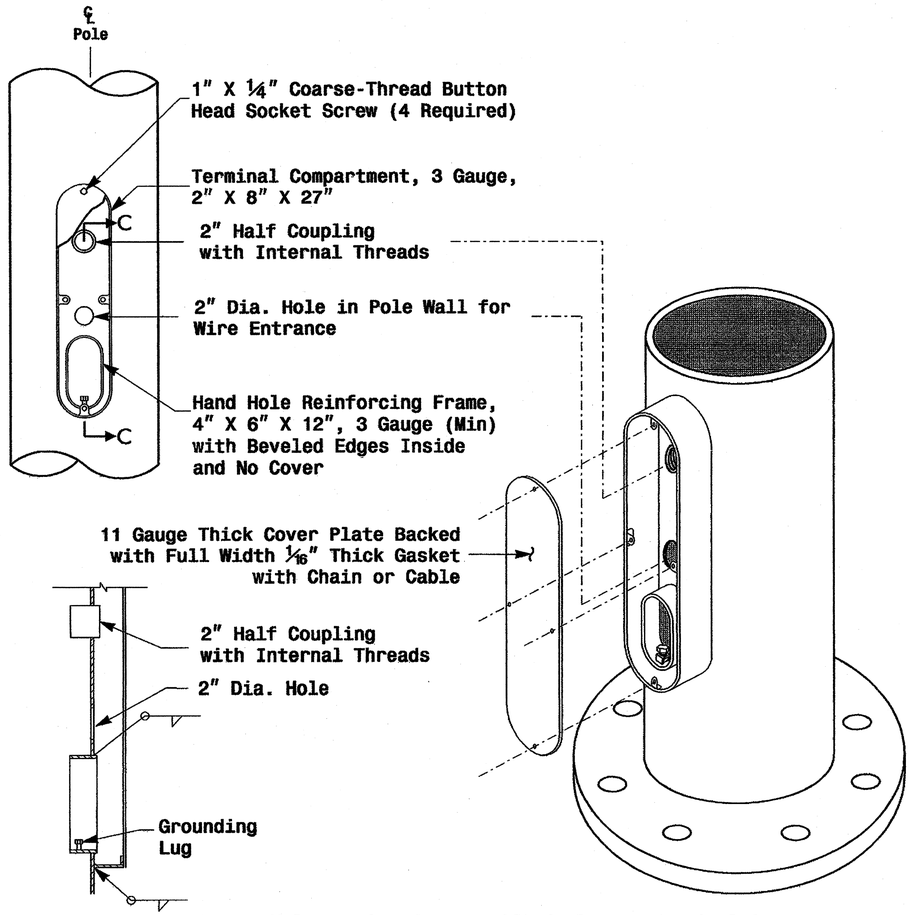
G. A. Fuller, P.E. – State ITS and Signals Engineer
G. G. Murr, Jr., P.E. – State Signals Engineer
D. C. Sarkar, P.E. – ITS and Signals Senior Structural Engineer
C. F. Andrews, Jr. – ITS and Signals Structural Project Engineer
M. Aslam – ITS and Signals Structural Project Engineer
N. Bitting, P.E. –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

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 7.21.2009
SIGNATURE DATE

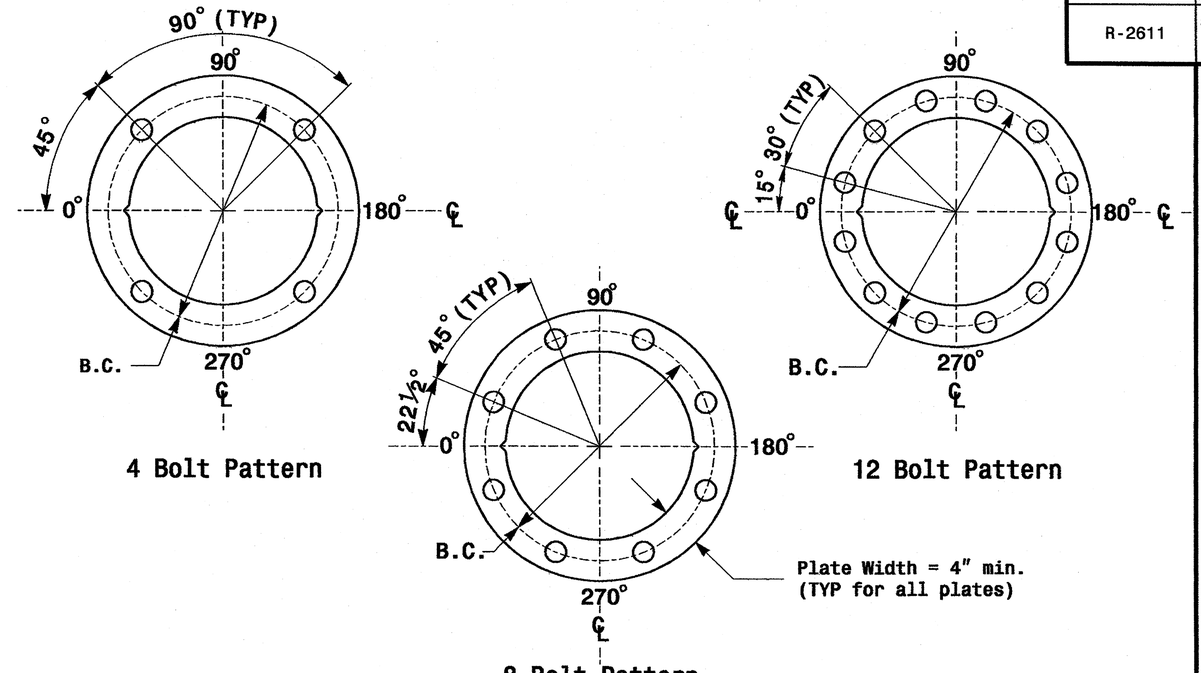
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 108 M 2



Section C-C

Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail



Construct Templates and Plates from ¼" min. thick Steel. Galvanizing is not required.

Base Plate Template and Anchor Bolt Lock Plate Details

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

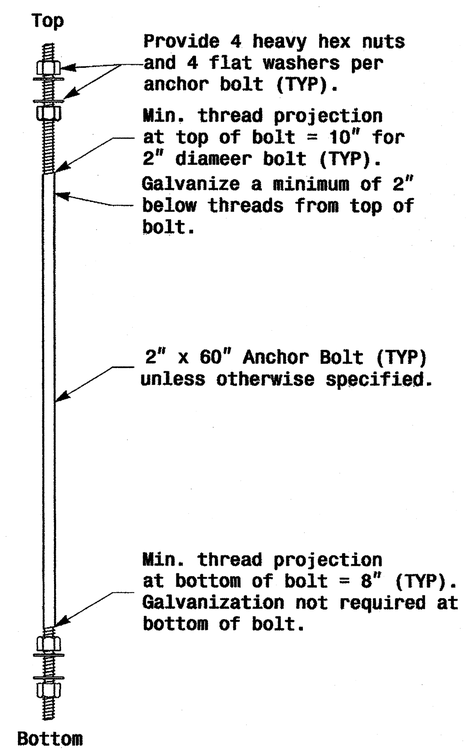
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

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

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

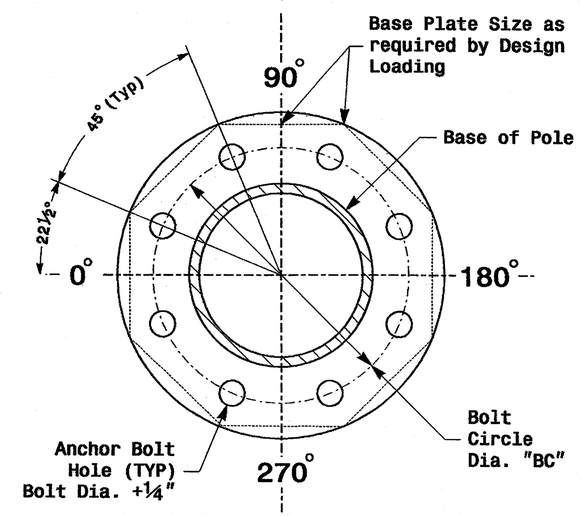
Notes:
1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
2) A.B. = Anchor Bolt
3) B.C. = Bolt Circle of Anchor Bolts
4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
5) See drawing M4 for mounting positions of I.D. tags.

Identification Tag Details



Anchor Bolt Detail

Note: See Strain Pole drawing M3 and Mast arm drawing M4 for base plate weld details.



8 Bolt Base Plate Detail

Fabrication Details – All Poles

Prepared in the Office of: Traffic Engineering and Safety Systems Branch, Department of Transportation, State of North Carolina, Raleigh, NC 27603

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.W. Esposito

REVISIONS	INIT.	DATE

SCALE 0 NA NONE

SEAL: North Carolina Professional Engineer Seal 028094 Dinesh C. Sarkar

D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

01-SEP-2005 16:22
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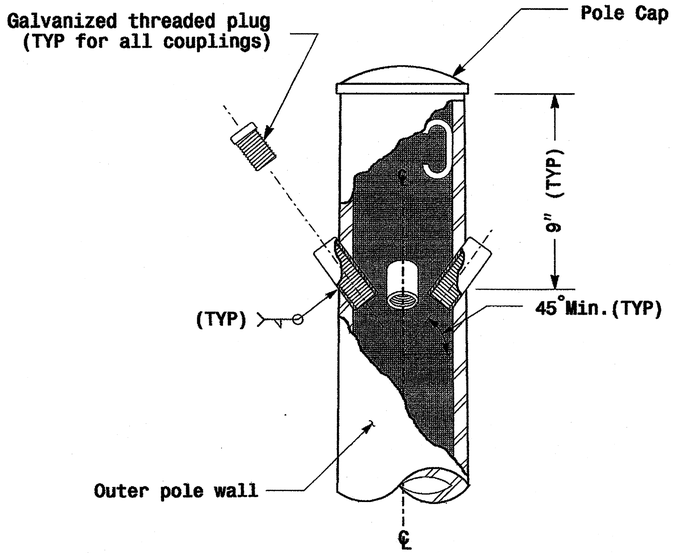
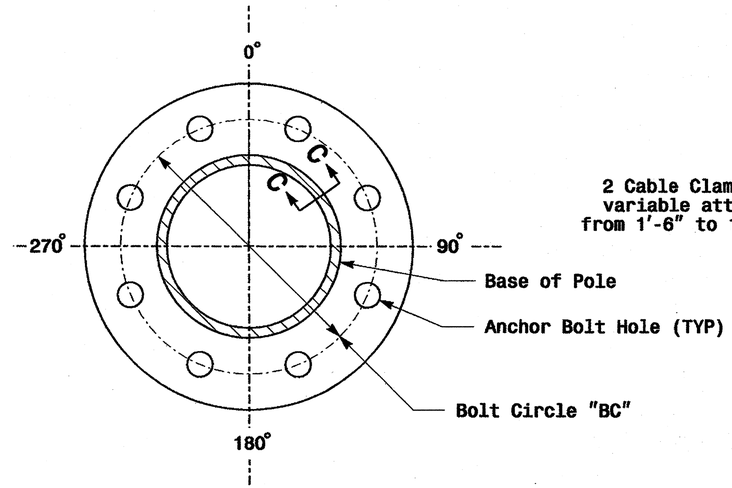
cadsrvwb

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 109 M 3

Fabrication Details – Strain Poles



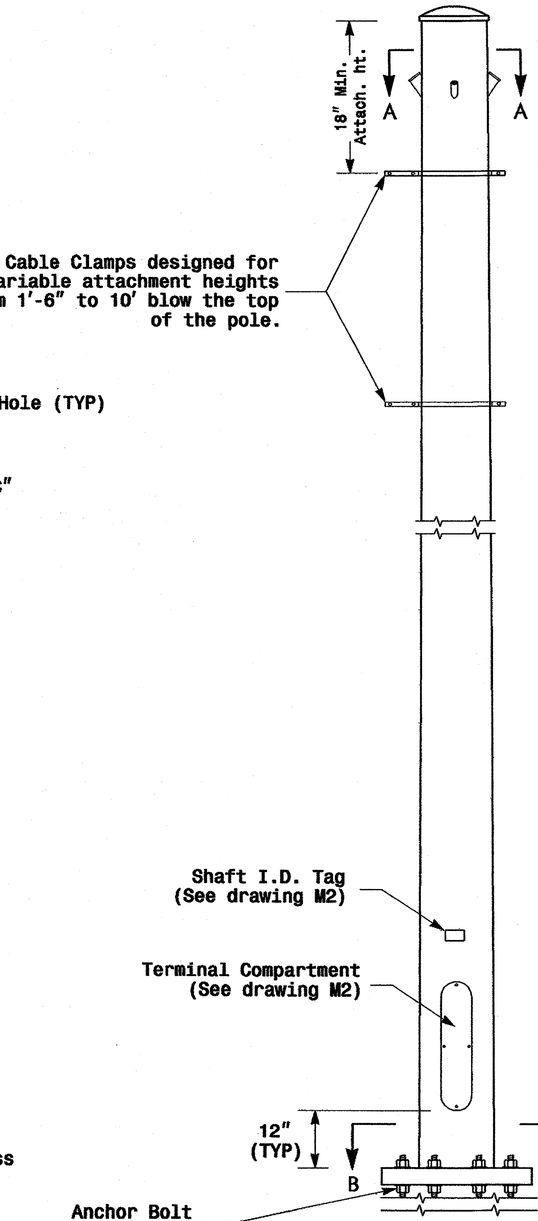
Cable Entrances at Top of Pole



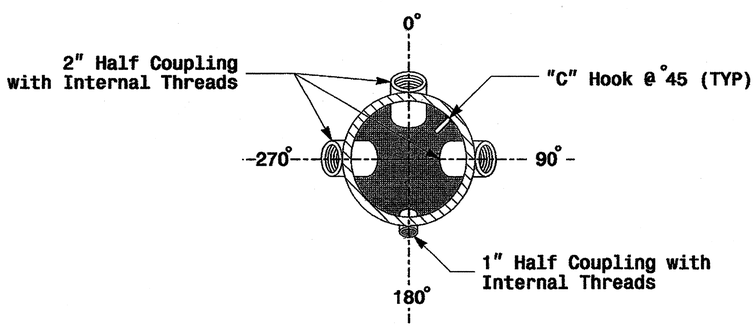
Section B-B

(See drawing M2)

Pole Base Plate

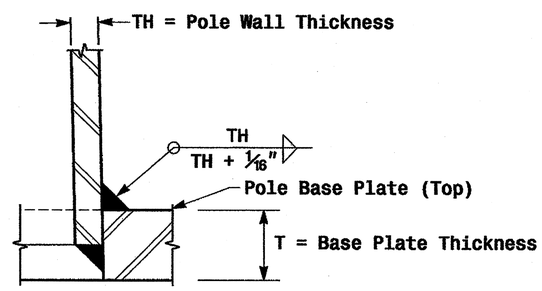


Monotube Strain Pole
(.14"/Foot Taper)



Section A-A

Radial Orientation for Factory Installed Accessories at Top of Pole



Section C-C

Socket Connection Weld Detail

Prepared in the Offices of:
State Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE: 0 NA — NONE

Typical Fabrication Details
For Strain Poles

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

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

01-SEP-2005 14:07
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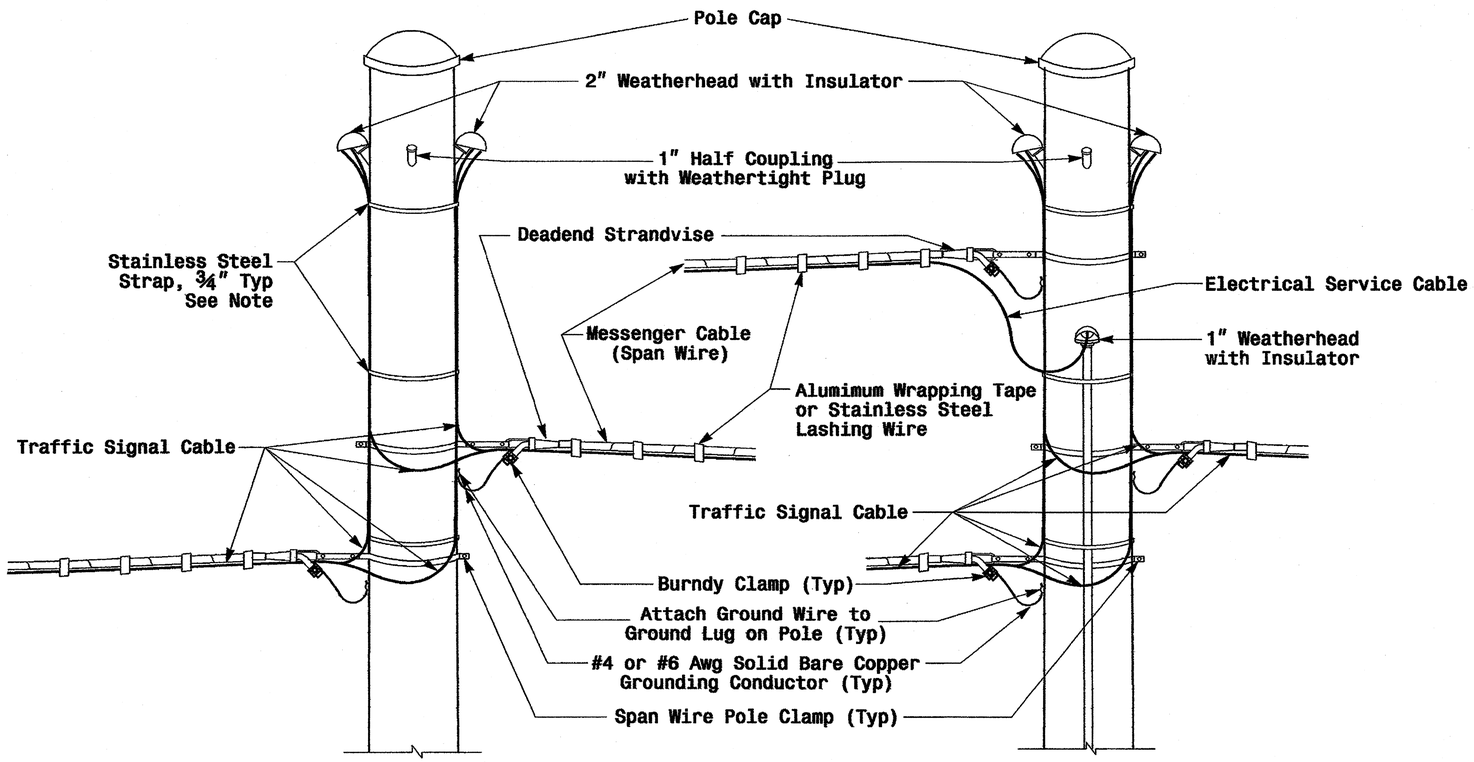
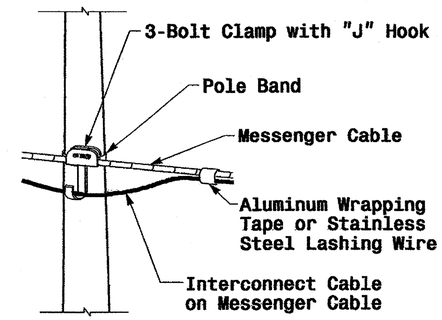
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 110 M 6

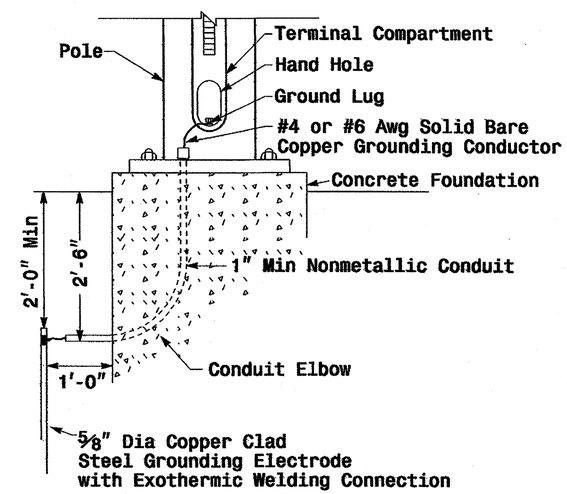


Note: Strap all signal cables to the side of the pole with ¾" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail

Construction Details – Strain Poles

Prepared in the Offices of: Traffic Engineering Branch, Signals and Geometrics Section, Division of Highways, Department of Transportation, 122 N. McDowell St., Raleigh, NC 27603

SCALE: 0 NA — NONE

Construction Details
Strain Poles

PLAN DATE: May 2005		REVIEWED BY: P.L. ALEXANDER	
PREPARED BY: C.F. ANDREWS		REVIEWED BY: D.C. SARKAR	
REVISIONS		INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 016286 ENGINEER MILTON I. DEAN

SIGNATURE — DATE 9-1-05

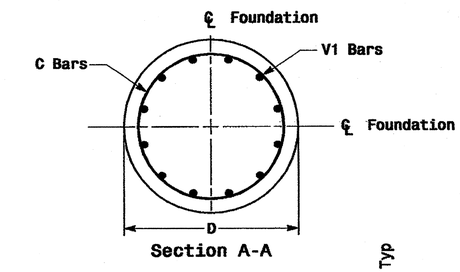
SIG. INVENTORY NO.

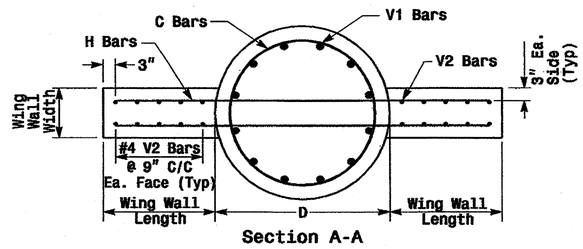
01-SEP-2005 16:13
w:\people-unit\workgroups\2004 metal pole standards\2004 m6.dgn
pdlexander

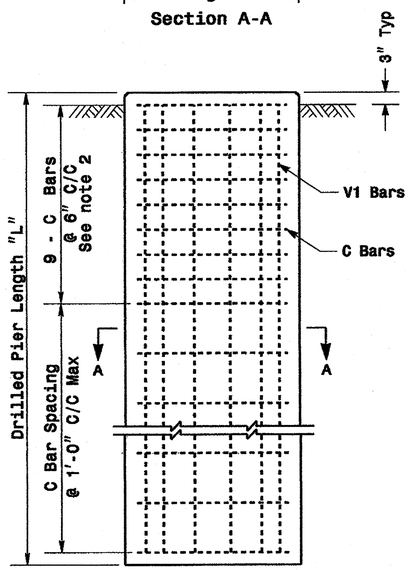
PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. III M 7

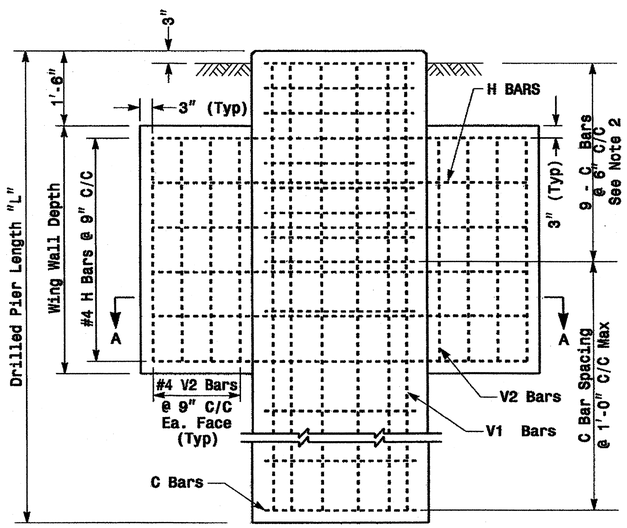
Construction Details – Foundations

Reinforcing Steel Bars







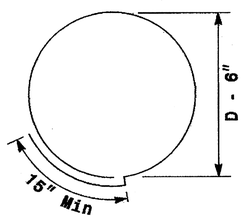


REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (42" & 48" DIAMETER)						
Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

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

REINFORCING STEEL TABLE FOR STANDARD 42" and 48" DRILL PIER SHAFT WITH TYPE 1 AND TYPE 2 WING WALLS						
Wing Wall Type	Drill Pier Shaft Dia. (in.)	Reinforcing Steel				
		Bar Name	No.	Size	Type	Length
TYPE 1	42"	V1	9	#8	STR.	**
		V2	12	#4	STR.	2'-6"
		H	8	#4	STR.	6'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	42"	V1	9	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	48"	V1	12	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-6"
		C	*	#4	CIR.	12'-6"

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



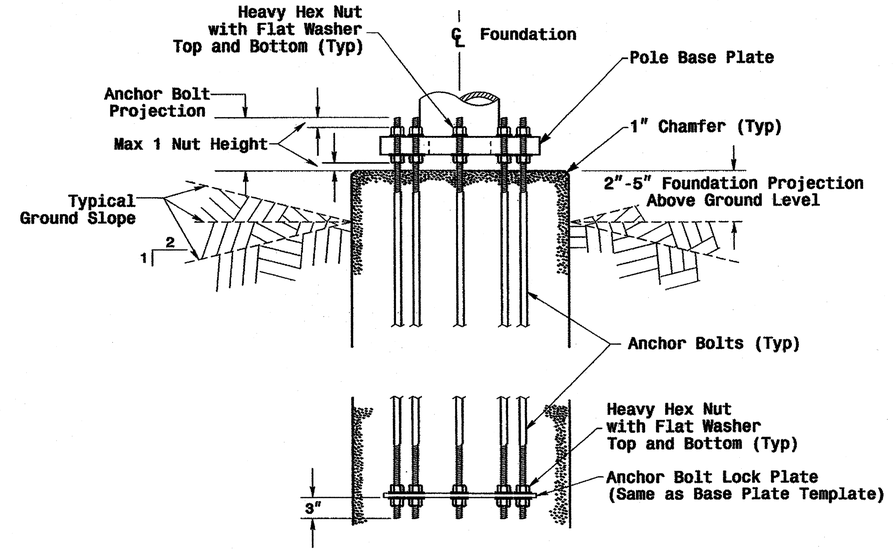
Typical "C" Bars

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

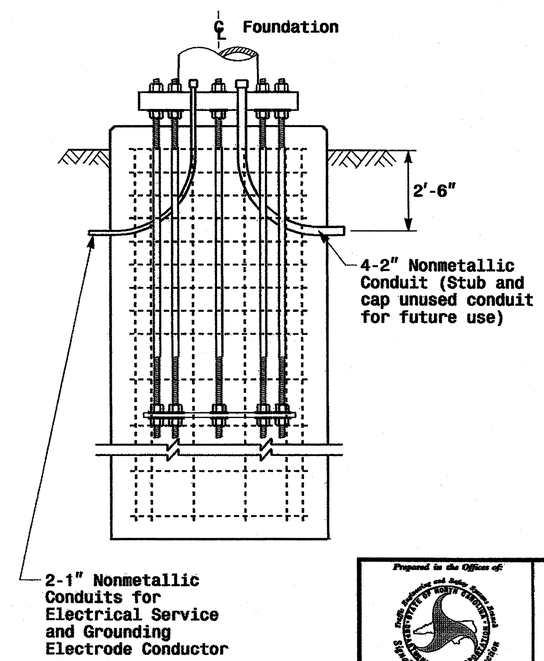
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



Notes

1. The number of C-bars is based on foundation depth. For standard foundations, see sheet M 8.
2. 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.
3. The length of V1-bars is based on foundation depth. For standard foundations, see sheet M 8.
4. The quantities for steel and concrete shown in the Wing Wall Details Chart reflect the amount of material for 1 pair of wing walls (2 wing walls per drilled pier shaft.)

Prepared in the Offices of: Roadway Standards Unit, Highway Design Branch, Division of Highways, Department of Transportation, Raleigh, NC 27601

Construction Details Foundations

PLAN DATE: May 2005	REVIEWED BY: P.L. ALEXANDER
PREPARED BY: C.F. ANDREWS	REVIEWED BY: A.M. ESPOSITO

REVISIONS	INIT.	DATE

SCALE: 0 NA — NONE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBDESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

STG. INVENTORY NO.

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pollardsr

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 112 M 8

		STANDARD STRAIN POLES				STANDARD FOUNDATIONS 42" Diameter Drilled Pier Length (L) – Feet						
						Clay				Sand		
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Moment at the Pole Base (ft-kp)	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

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Division of Highways, State of North Carolina, Department of Transportation, Traffic Engineering and Safety Systems Branch, Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE: 0 NA — None

Standard Strain Poles and Standard Foundations

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

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

02-SEP-2005 12:42
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polexander

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 113

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

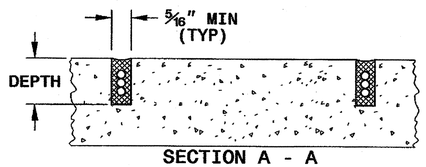
11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

CONVENTIONAL 4-SIDED LOOP

SAW SLOT DEPTH CHART

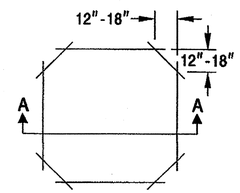
DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0



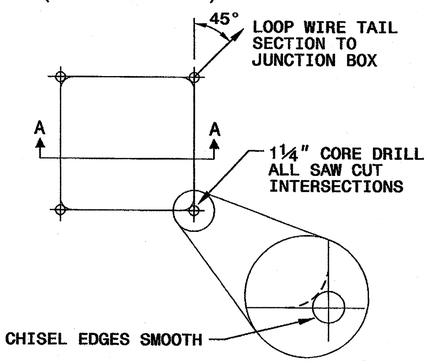
SECTION A - A

SAW CUT OPTIONS

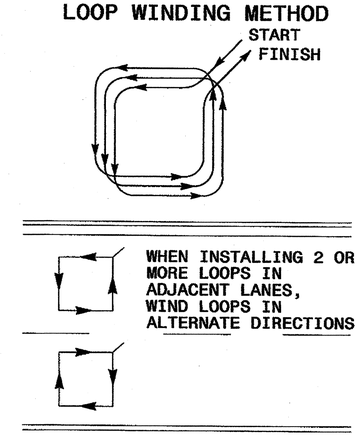
OPTION 1



OPTION 2
(POOR PAVEMENT)



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE

CORRECT WAY TO TWIST WIRE

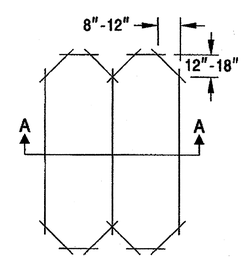
NOTES

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.

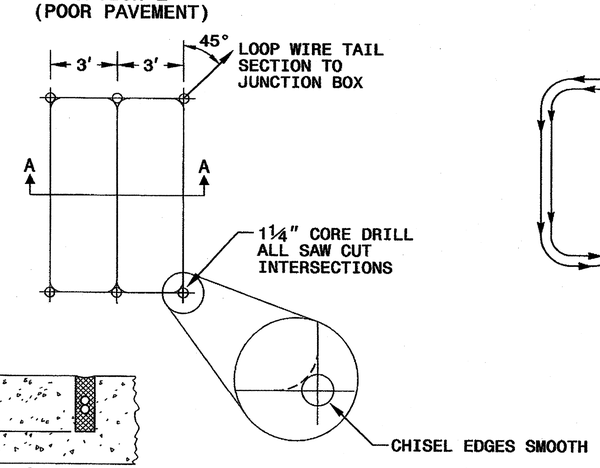
QUADRUPOLE LOOP

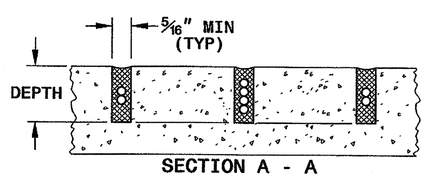
SAW CUT OPTIONS

OPTION 1



OPTION 2
(POOR PAVEMENT)

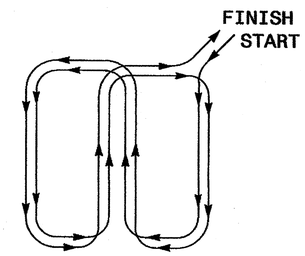




SECTION A - A

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.

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

SHEET 1 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 16286 ENGINEER WALTON I. DEAN

SIGNATURE — DATE 11/24/08

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PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 114

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

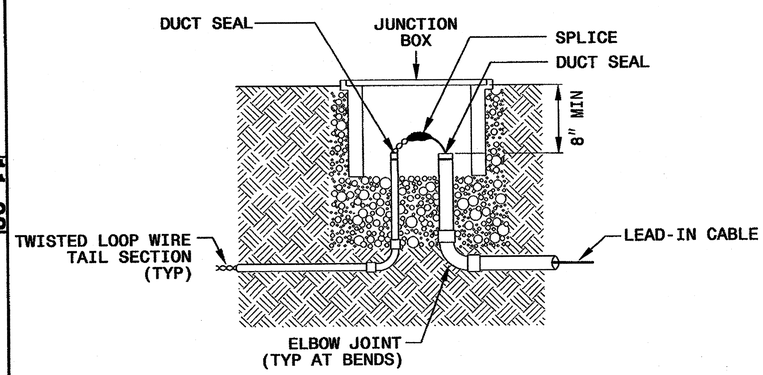
11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

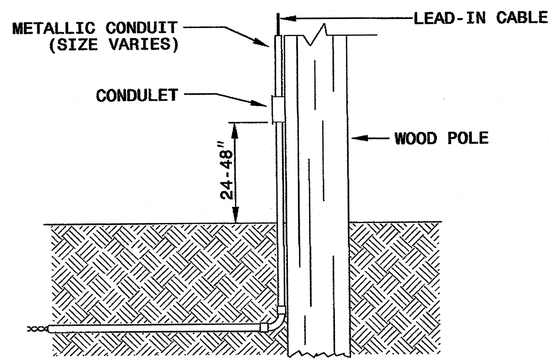
SHEET 2 OF 3
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

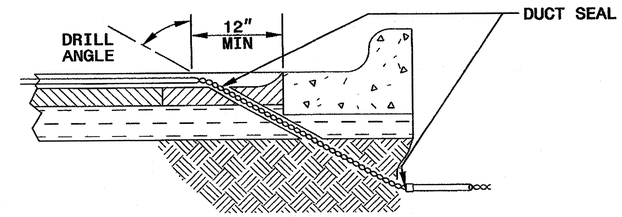


NOTE

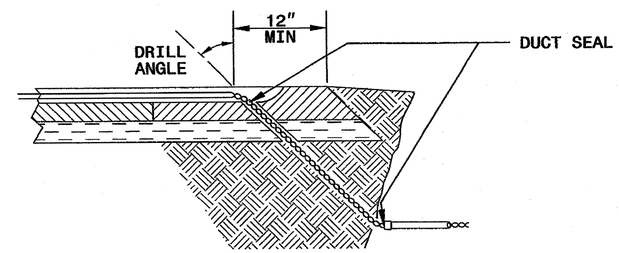
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

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.

11-08
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

SHEET 2 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 16286 ENGINEER MILTON I. DEAN

Milton I. Dean 11/24/08
SIGNATURE DATE

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dmilton

PROJECT REFERENCE NO.	SHEET NO.
R-2611	Sig. 115

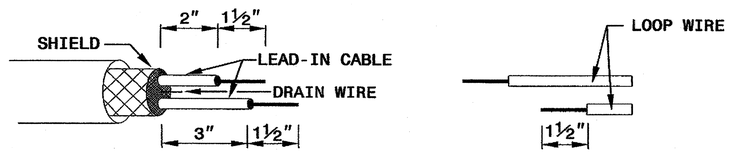
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

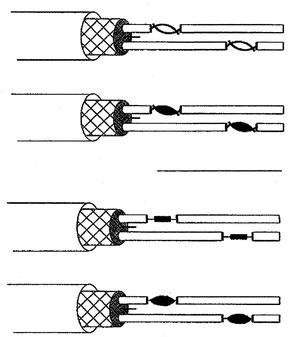
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE



STEP 2. CONNECT AND SOLDER



TWIST BARE CONDUCTORS TOGETHER AND SOLDER WITH RESIN CORE SOLDER

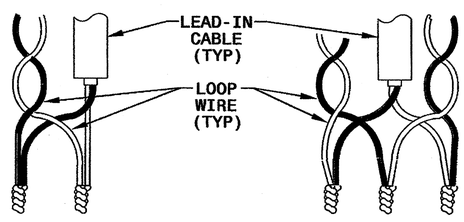
OR

CRIMP BARE CONDUCTORS TOGETHER WITH AN UNINSULATED BUTT CONNECTOR AND SOLDER WITH RESIN CORE SOLDER

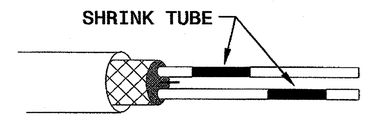
BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS

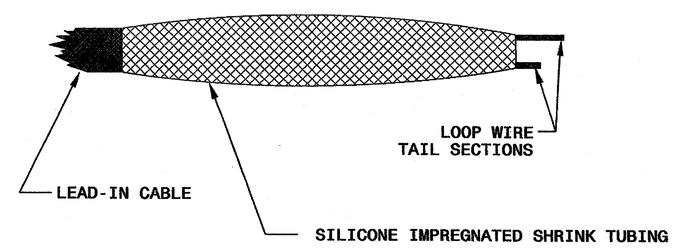
SINGLE CONNECTION SERIES CONNECTION



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:

Intelligent Transportation Systems & Signals Unit
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 16286 ENGINEER MILTON I. DEAN

Milton I. Dean 11/24/08
SIGNATURE DATE

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PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 116

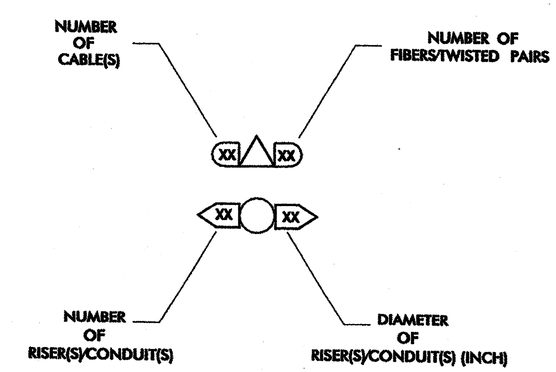
1. INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2. INSTALL REA, PE – 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
3. INSTALL REA, PE – 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP 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
S	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)
X	EXISTING CONTROLLER AND CABINET
S	EXISTING SPLICE CABINET
S	NEW SPLICE CABINET
SP	SIGNAL POLE
XX-XXXX	SIGNAL INVENTORY NUMBER

CONSTRUCTION NOTE SYMBOLOGY KEY

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



Prepared in the Office of: Traffic Management Unit, Traffic Engineering and Safety Systems Branch, Division of Highways, State of North Carolina, Department of Transportation
122 N. McDowell St., Raleigh, NC 27603

SCALE: 0

CONSTRUCTION NOTES

PLAN DATE:	REVIEWED BY:
PREPARED BY:	REVIEWED BY: G. A. FULLER

REVISIONS	INIT.	DATE

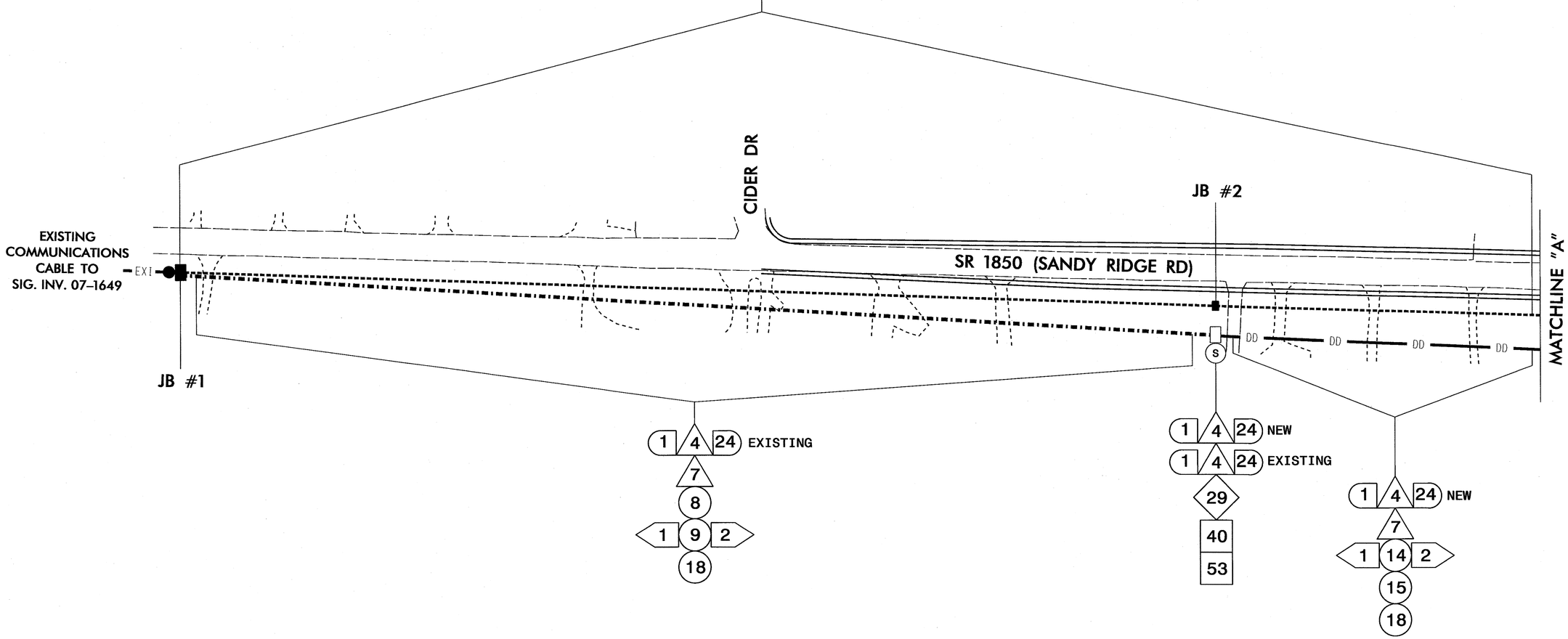
SEAL: NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

SIGNATURE: Gregory A. Fuller DATE: 10/31/02

CADD FILENAME:

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 117

1) CUT FIBER OPTIC CABLE IN EXISTING JUNCTION BOX #2 AND BACK PULL TO EXISTING JUNCTION BOX #1.
2) REMOVE AND DISCARD REMAINING FIBER OPTIC CABLE FROM EXISTING JUNCTION BOX #2 TO EXISTING AERIAL SPLICE ENCLOSURE AT 07-1439.
3) REMOVE EXISTING JUNCTION BOXES 2, 3, & 4. BACK FILL AND TAMP WITH A SUITABLE MATERIAL.



CONSTRUCTION PHASE I

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG SR 1850 (SANDY RIDGE RD)

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

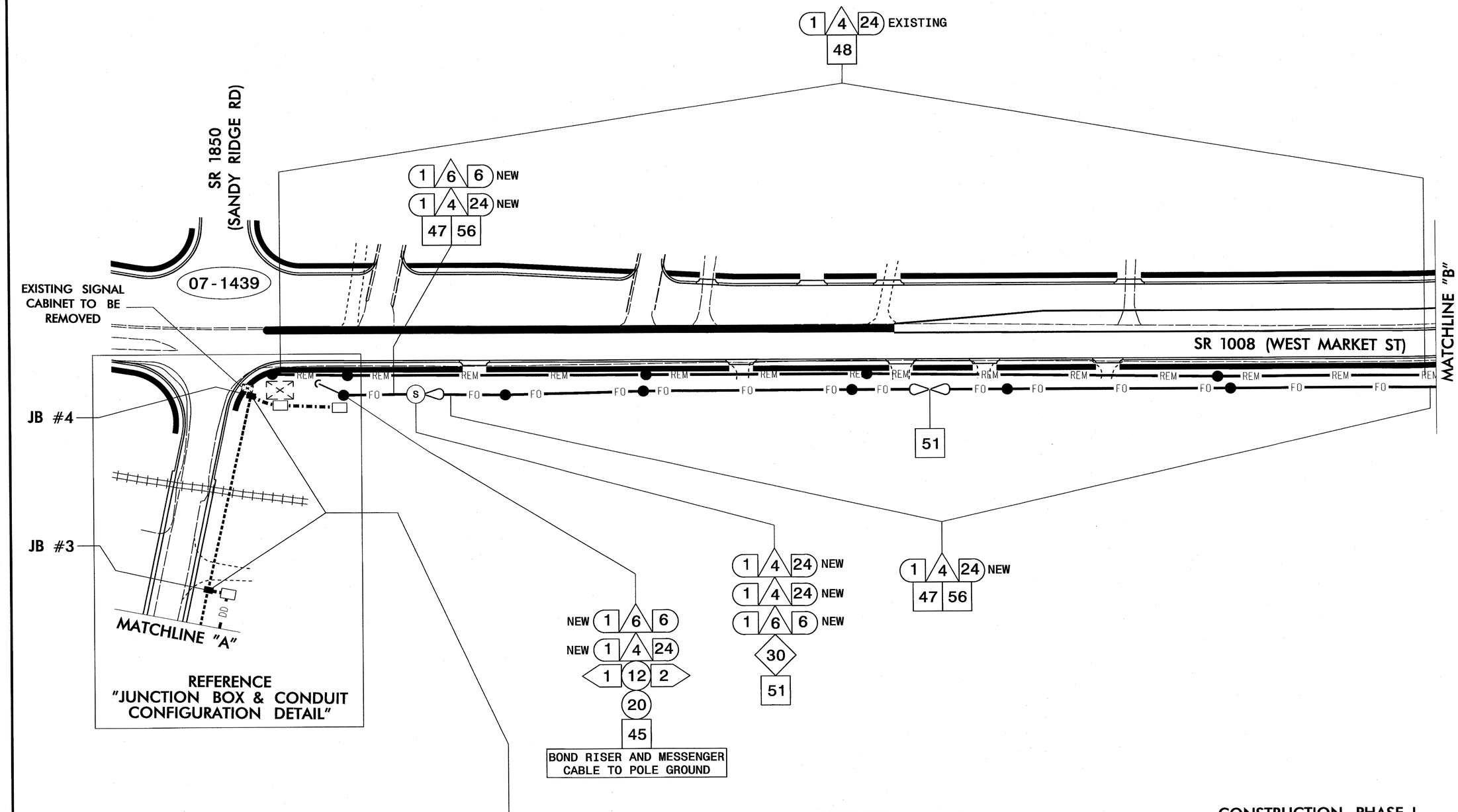
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 118



1) CUT FIBER OPTIC CABLE IN EXISTING JUNCTION BOX #2 AND BACK PULL TO EXISTING JUNCTION BOX #1.
2) REMOVE AND DISCARD REMAINING FIBER OPTIC CABLE FROM EXISTING JUNCTION BOX #2 TO EXISTING AERIAL SPLICE ENCLOSURE AT 07–1439.
3) REMOVE EXISTING JUNCTION BOXES 2, 3, & 4. BACK FILL AND TAMP WITH A SUITABLE MATERIAL.

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

CONSTRUCTION PHASE I

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Systems Operations
750 N. Greenfield Pkwy., Garner, NC 27529

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG SR 1008 (WEST MARKET STREET)

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

SCALE 0

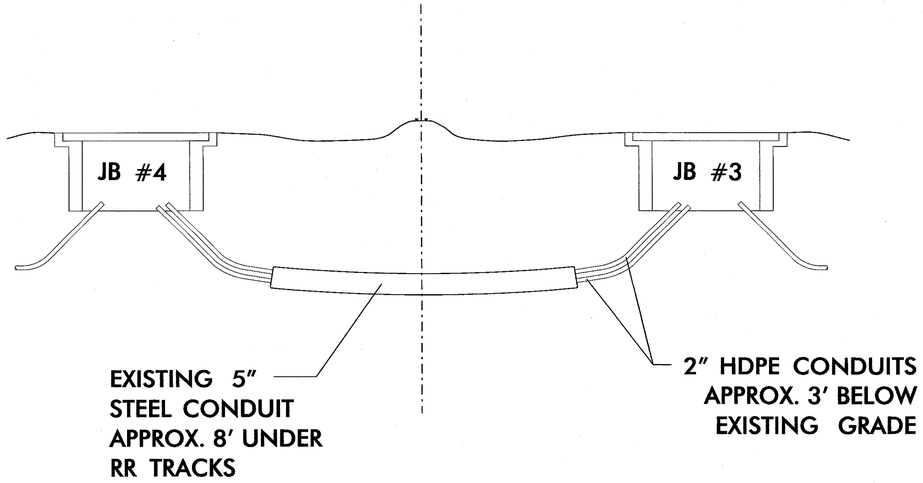
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

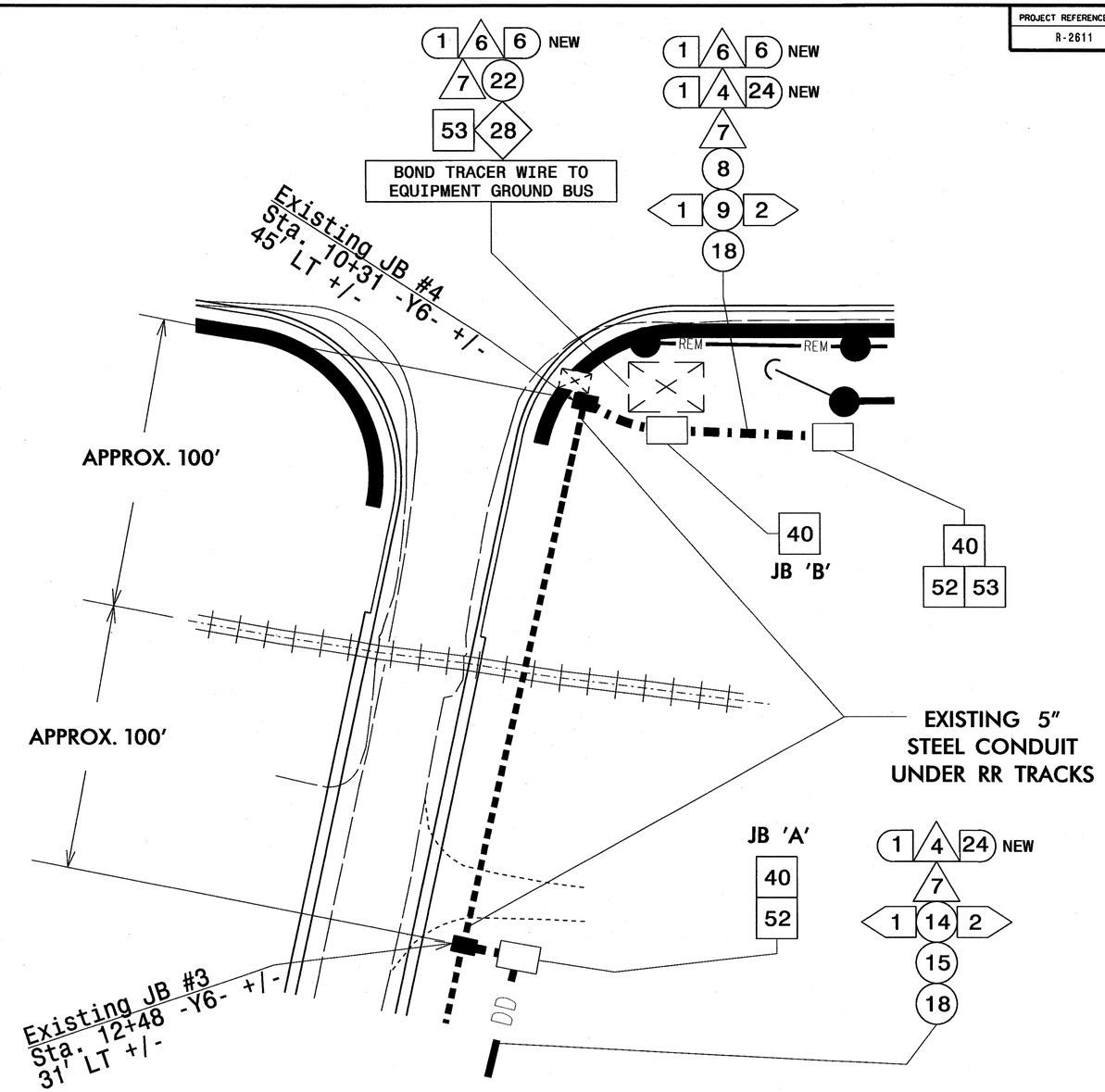
Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 119



"EXISTING PROFILE VIEW"



"PLAN VIEW"

CONSTRUCTION PHASE I

1. INSTALL NEW OVERSIZED JUNCTION BOX "A" AT INSIDE EDGE OF RIGHT OF WAY IN THE VICINITY AS SHOWN. INSTALL NEW OVERSIZED JUNCTION BOX "B" NEAR NEW SIGNAL CABINET LOCATION AS SHOWN.
2. AT EXISTING JUNCTION BOXES #3 & #4, LOCATE ENDS OF EXISTING 2" HDPE CONDUITS. LOCATION & DEPTH SHOWN ON PLANS ARE APPROXIMATE.
3. INSTALL AN ENGINEER APPROVED HDPE CONDUIT COUPLING AND EXTEND NEW SECTIONS OF 2" HDPE CONDUIT TO NEW OVERSIZED JUNCTION BOXES "A" & "B".

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0

JUNCTION BOX & CONDUIT CONFIGURATION DETAIL

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

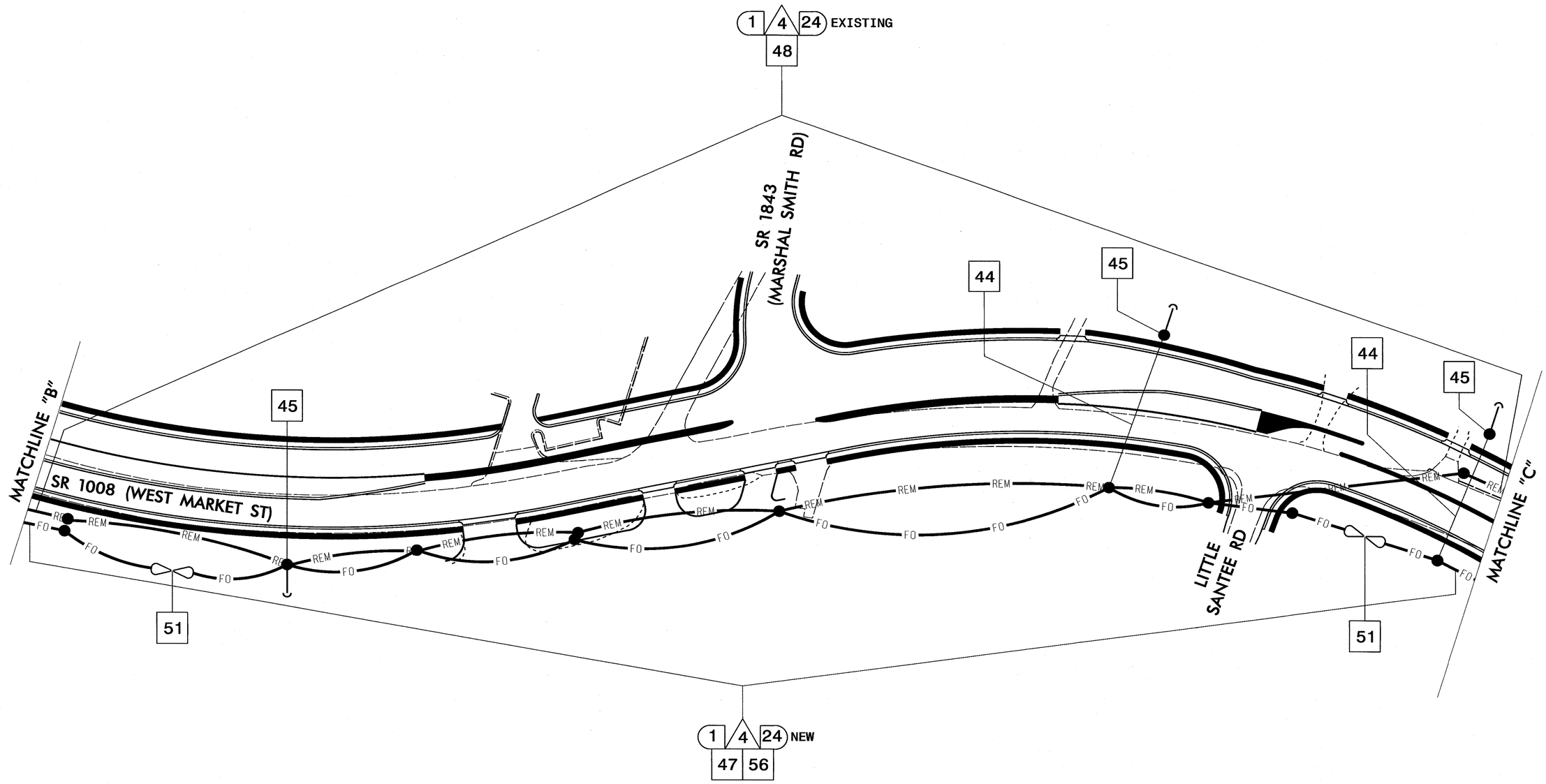
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 12D



CONSTRUCTION PHASE I

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Systems
759 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG SR 1008 (WEST MARKET STREET)

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

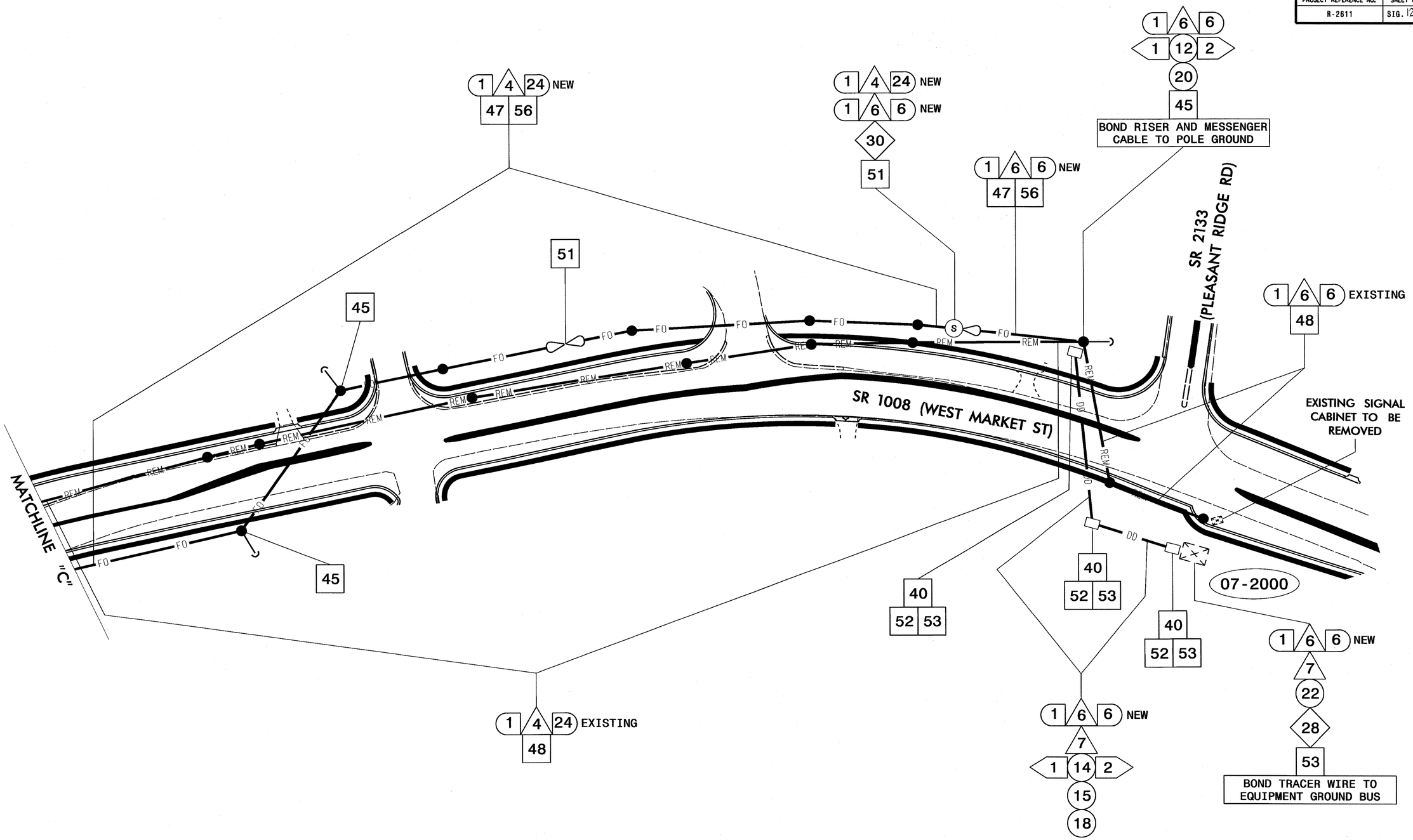
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 121



CONSTRUCTION PHASE I

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

Prepared in the Offices of:
Transportation Mobility and Safety Division
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG SR 1008 (WEST MARKET STREET)

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

SCALE 0

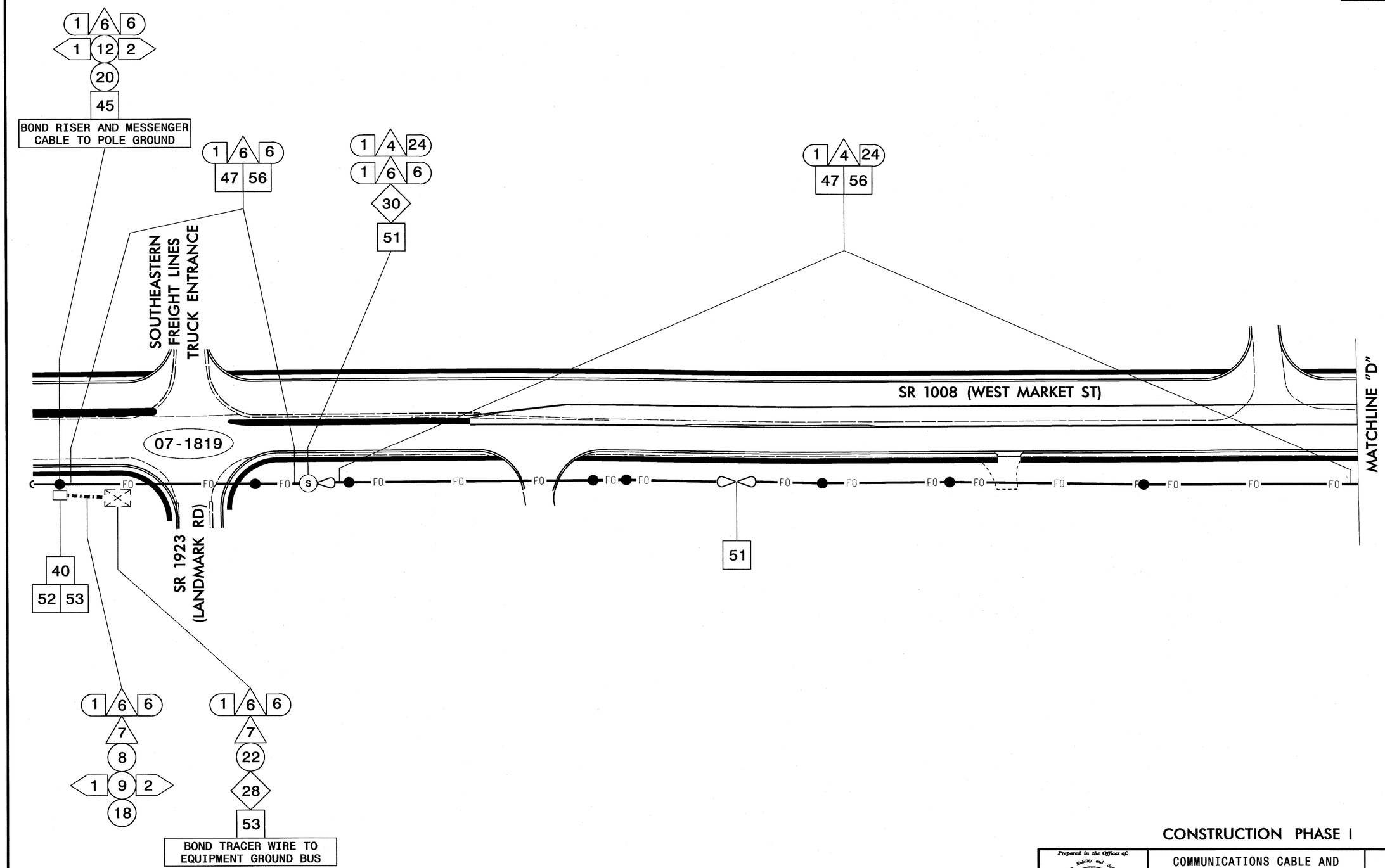
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 122



CONSTRUCTION PHASE I

NOTES:

1. REMOVE GIGABIT ETHERNET SWITCH FROM SIGNAL CABINET TO BE REMOVED AT 07–1429 AND RELOCATE TO NEW SIGNAL AT 07–1819.

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

Prepared in the Offices of:
Transportation Mobility and Safety Division
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG SR 1008 (WEST MARKET STREET)

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

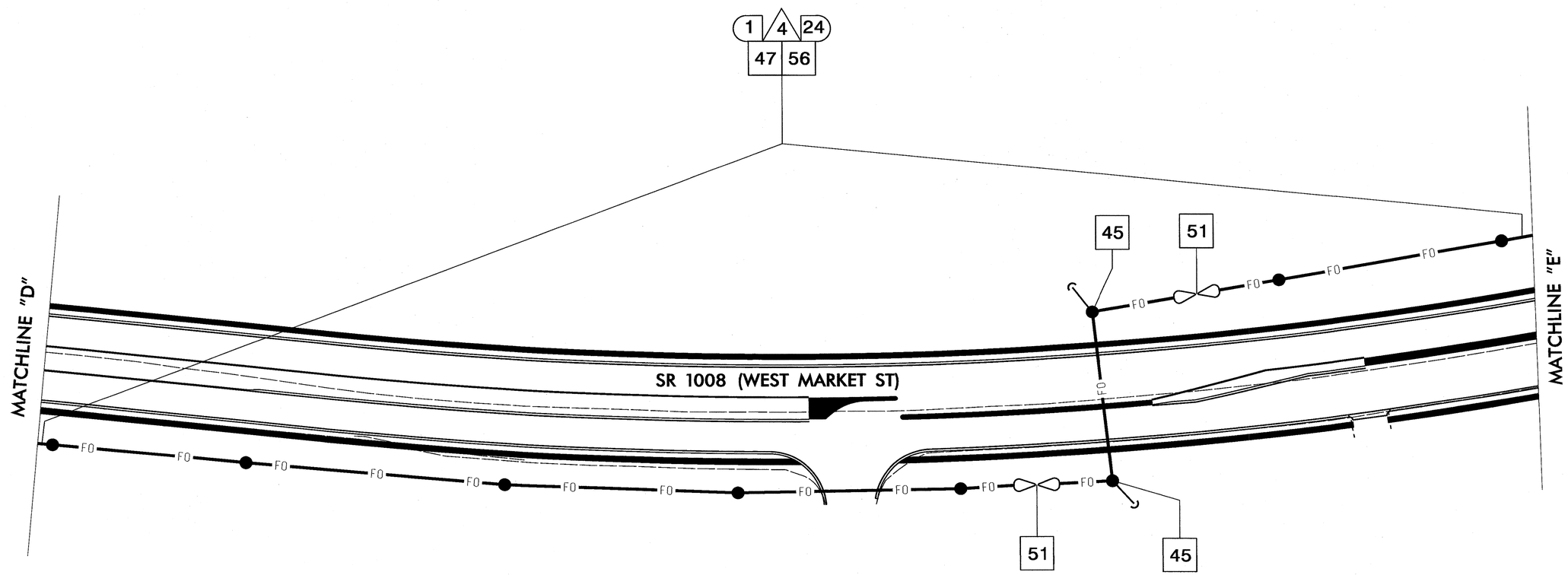
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 123



CONSTRUCTION PHASE I

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG SR 1008 (WEST MARKET STREET)

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

SCALE 0

REVISIONS	INIT.	DATE

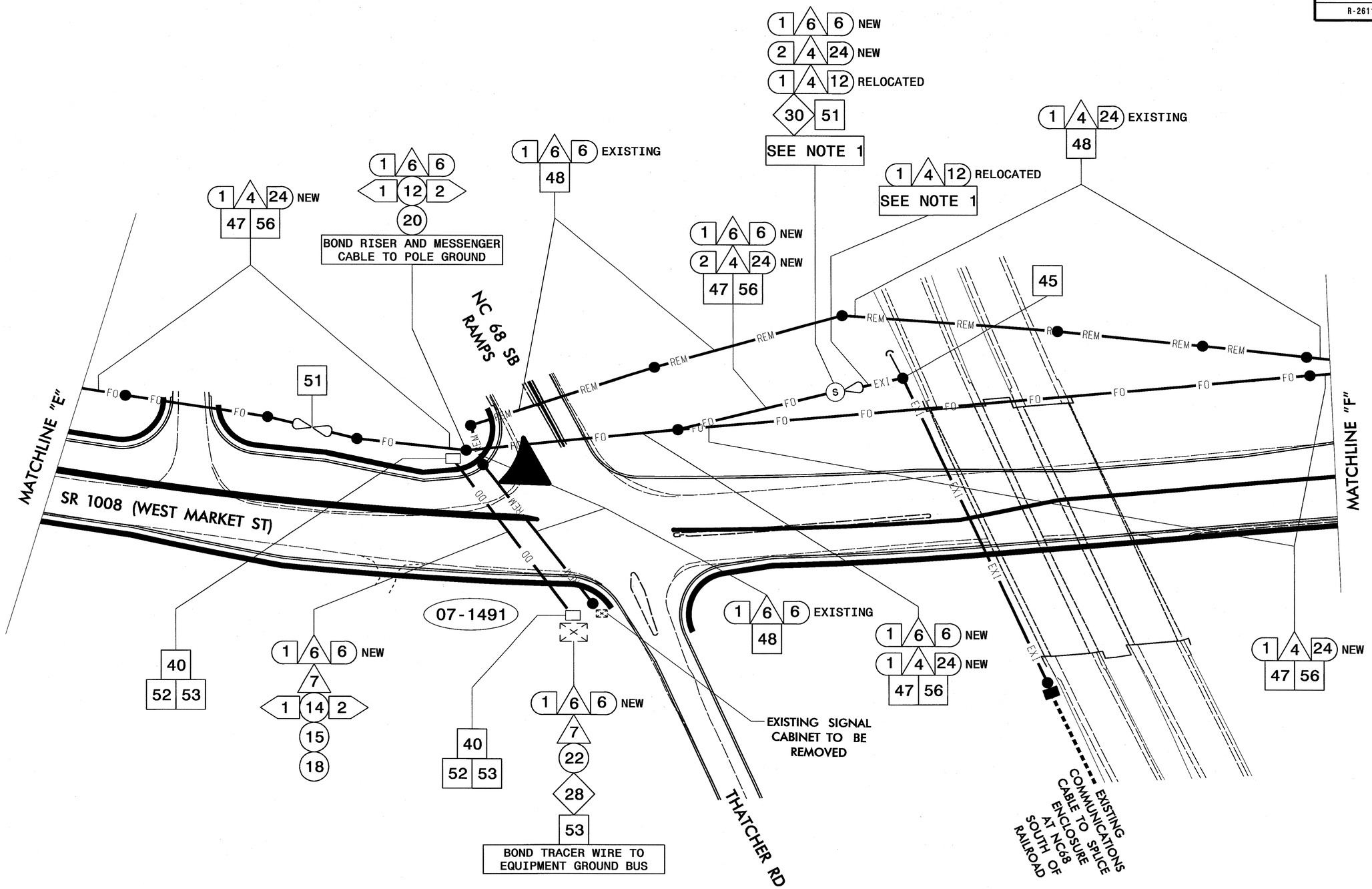
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/4/11
SIGNATURE DATE

CADD Filename:

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 124



CONSTRUCTION PHASE I

NOTES:

1. RELOCATE EXISTING 12 FIBER CONNECTOR CABLE TO NEW SPLICE ENCLOSURE AS SHOWN.

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Systems
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG SR 1008 (WEST MARKET STREET)

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

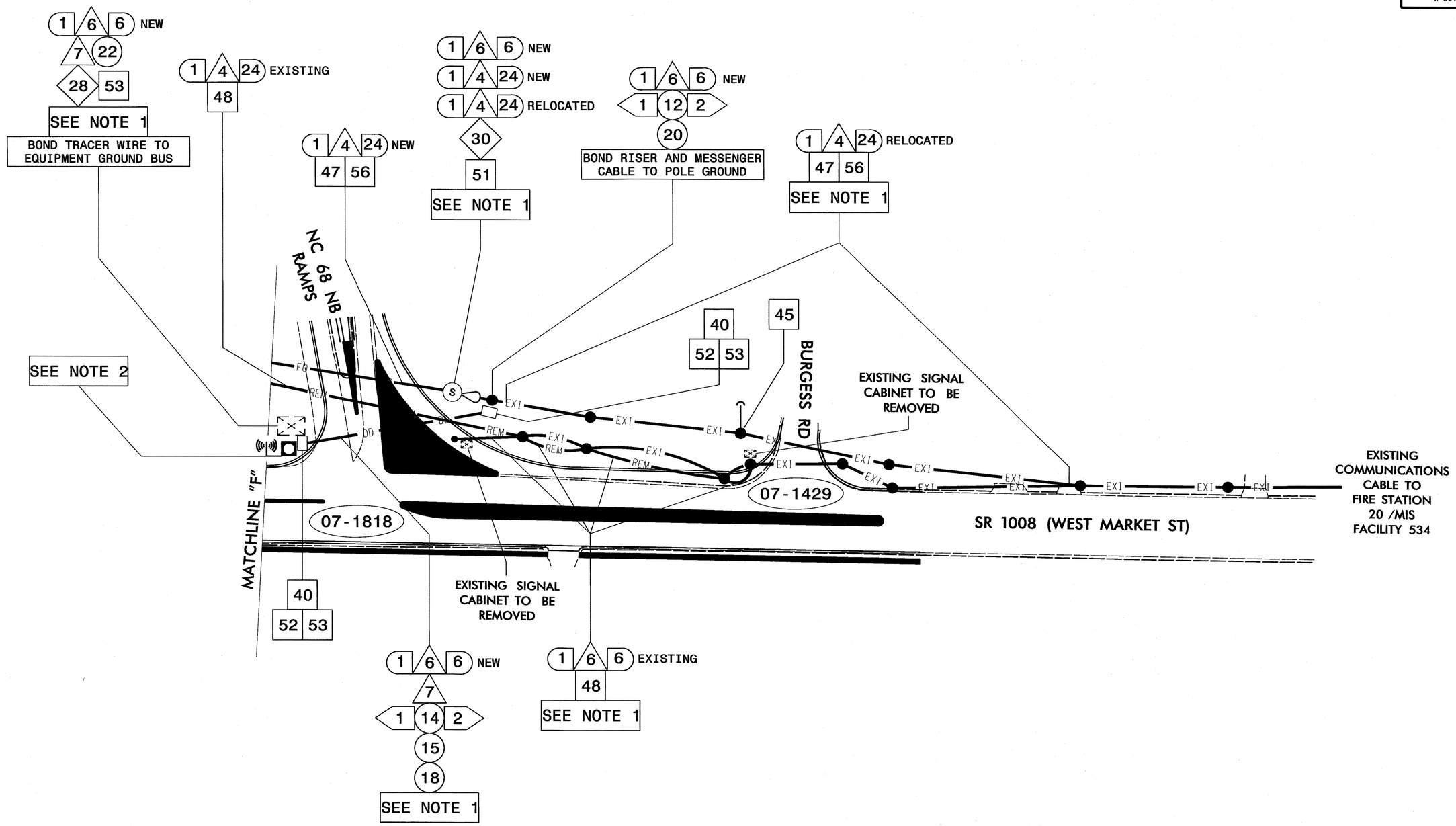
REVISIONS INIT. DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 125



NOTES:

1. REMOVE 6 FIBER DROP CABLE FROM EXISTING CABINETS AT 07–1818 AND 07–1429. DO NOT REMOVE 24 FIBER TRUNK CABLE. RELOCATE AS SHOWN TO NEW POLE LINE AND INSTALL IN NEW SPLICE ENCLOSURE WITH NEW 24 FIBER CABLE TO 07–1491 AND NEW 6 FIBER DROP TO 07–1818. SIGNAL 07–1429 TO BE REMOVED FROM SYSTEM. REMOVE GIGABIT ETHERNET SWITCH FROM CABINET AT 07–1429 AND RELOCATE TO NEW SIGNAL AT 07–1819.
2. REMOVE WIRELESS EQUIPMENT FROM EXISTING SIGNAL CABINET AND RELOCATE TO NEW CABINET AND POLE. ENSURE THAT WIRELESS COMMUNICATION IS MAINTAINED WITH SIGNALS 07–1459, 07–0968, 07–1029, & 07–2001 AFTER EQUIPMENT RELOCATION.

ALL NCDOT ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

CONSTRUCTION PHASE I

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS ALONG SR 1008 (WEST MARKET STREET)

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

SCALE 0

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 126

FIBER OPTIC CABLE

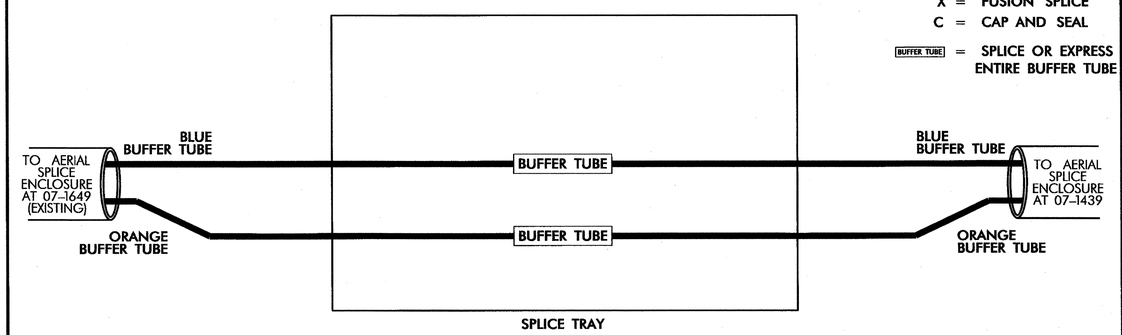
UNDERGROUND SPLICE ENCLOSURE
SR 1850 (SANDY RIDGE RD)
BETWEEN SR 1008 (W. MARKET ST)
AND CIDER DR
NEAR EXISTING JUNCTION BOX #2

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

COLOR CODE
TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND
X = FUSION SPLICE
C = CAP AND SEAL
BUFFER TUBE = SPLICE OR EXPRESS ENTIRE BUFFER TUBE



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

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0

SPLICE PLAN

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/6/11
SIGNATURE DATE

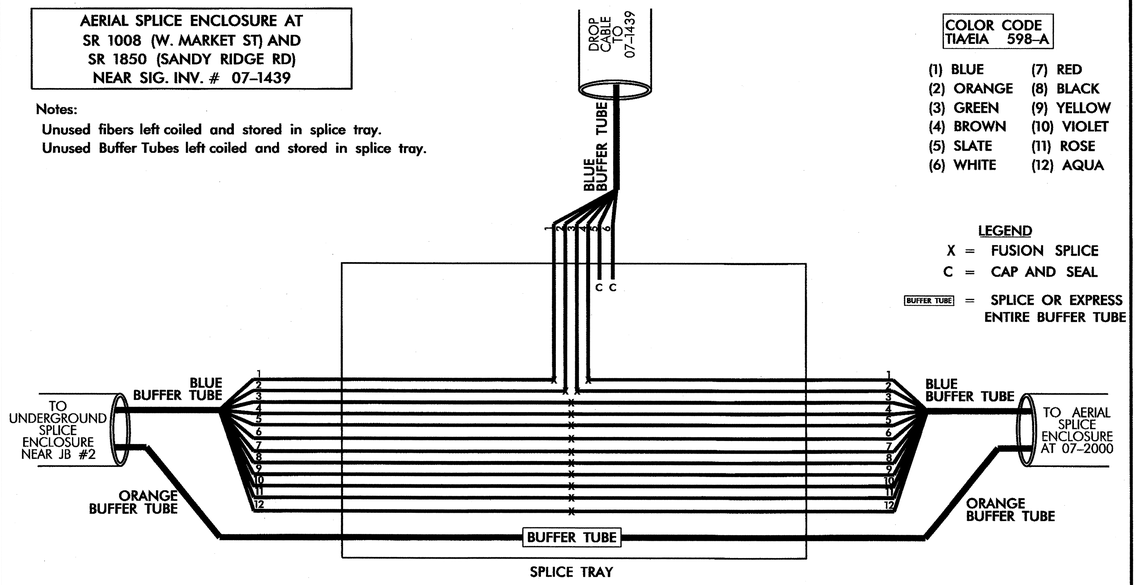
CADD Filename:

FIBER OPTIC CABLE

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 127

AERIAL SPLICE ENCLOSURE AT
SR 1008 (W. MARKET ST) AND
SR 1850 (SANDY RIDGE RD)
NEAR SIG. INV. # 07-1439

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



COLOR CODE TIA/EIA 598-A

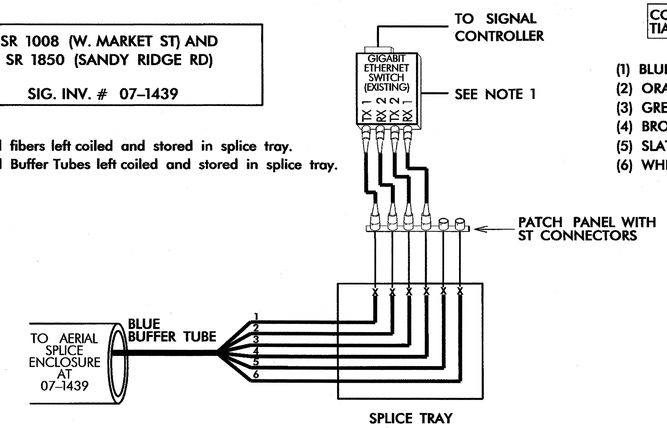
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND
X = FUSION SPLICE
C = CAP AND SEAL
BUFFER TUBE = SPLICE OR EXPRESS ENTIRE BUFFER TUBE

SR 1008 (W. MARKET ST) AND
SR 1850 (SANDY RIDGE RD)

SIG. INV. # 07-1439

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



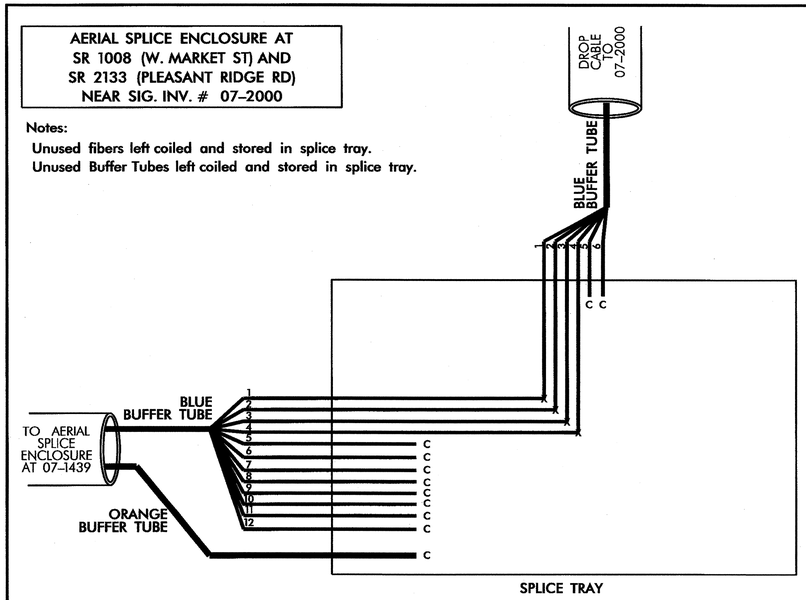
COLOR CODE TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND
X = FUSION SPLICE
C = CAP AND SEAL

AERIAL SPLICE ENCLOSURE AT
SR 1008 (W. MARKET ST) AND
SR 2133 (PLEASANT RIDGE RD)
NEAR SIG. INV. # 07-2000

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



COLOR CODE TIA/EIA 598-A

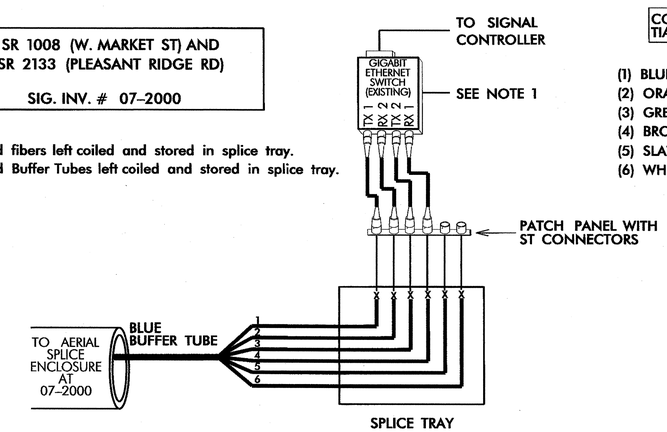
(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND
X = FUSION SPLICE
C = CAP AND SEAL
BUFFER TUBE = SPLICE OR EXPRESS ENTIRE BUFFER TUBE

SR 1008 (W. MARKET ST) AND
SR 2133 (PLEASANT RIDGE RD)

SIG. INV. # 07-2000

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



COLOR CODE TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND
X = FUSION SPLICE
C = CAP AND SEAL

NOTES:

1. RELOCATE EXISTING GIGABIT ETHERNET SWITCH FROM EXISTING SIGNAL CABINET TO NEW CABINET AND INSTALL WITH NEW INTERCONNECT CENTER.

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

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0

SPLICE PLAN

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

FIBER OPTIC CABLE

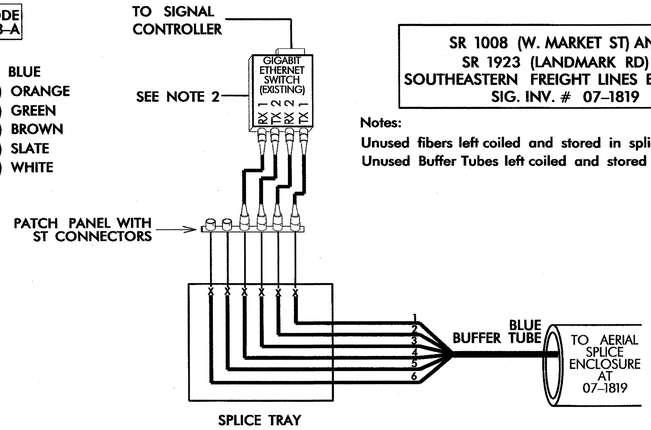
PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 128

COLOR CODE
TIA/EIA 598-A

(7) RED	(1) BLUE
(8) BLACK	(2) ORANGE
(9) YELLOW	(3) GREEN
(10) VIOLET	(4) BROWN
(11) ROSE	(5) SLATE
(12) AQUA	(6) WHITE

SR 1008 (W. MARKET ST) AND
SR 1923 (LANDMARK RD)/
SOUTHEASTERN FREIGHT LINES ENTRANCE
SIG. INV. # 07-1819

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



LEGEND
X = FUSION SPLICE
C = CAP AND SEAL

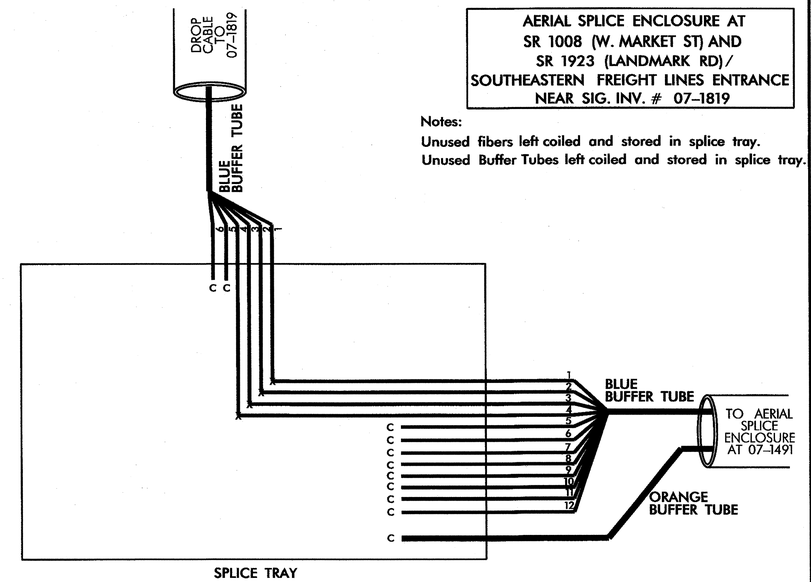
COLOR CODE
TIA/EIA 598-A

(7) RED	(1) BLUE
(8) BLACK	(2) ORANGE
(9) YELLOW	(3) GREEN
(10) VIOLET	(4) BROWN
(11) ROSE	(5) SLATE
(12) AQUA	(6) WHITE

LEGEND
X = FUSION SPLICE
C = CAP AND SEAL
BUFFER TUBE = SPLICE OR EXPRESS ENTIRE BUFFER TUBE

AERIAL SPLICE ENCLOSURE AT
SR 1008 (W. MARKET ST) AND
SR 1923 (LANDMARK RD)/
SOUTHEASTERN FREIGHT LINES ENTRANCE
NEAR SIG. INV. # 07-1819

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

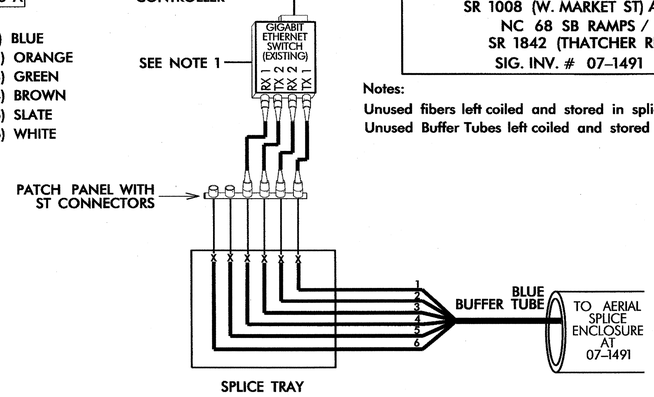


COLOR CODE
TIA/EIA 598-A

(7) RED	(1) BLUE
(8) BLACK	(2) ORANGE
(9) YELLOW	(3) GREEN
(10) VIOLET	(4) BROWN
(11) ROSE	(5) SLATE
(12) AQUA	(6) WHITE

SR 1008 (W. MARKET ST) AND
NC 68 SB RAMPS /
SR 1842 (THATCHER RD)
SIG. INV. # 07-1491

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



LEGEND
X = FUSION SPLICE
C = CAP AND SEAL

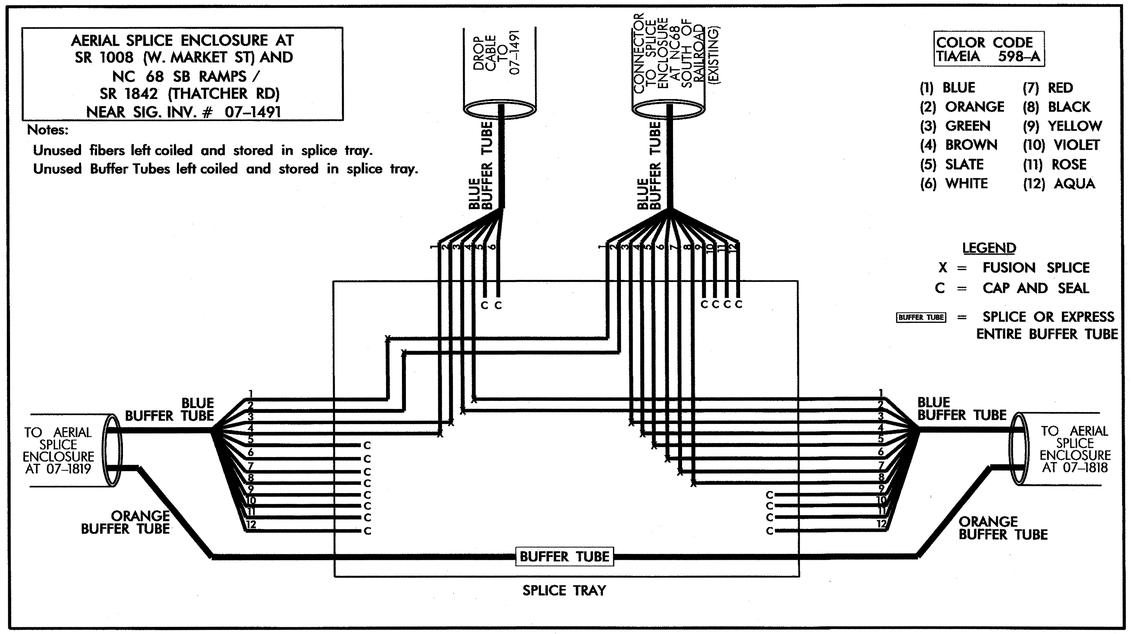
AERIAL SPLICE ENCLOSURE AT
SR 1008 (W. MARKET ST) AND
NC 68 SB RAMPS /
SR 1842 (THATCHER RD)
NEAR SIG. INV. # 07-1491

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

COLOR CODE
TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

LEGEND
X = FUSION SPLICE
C = CAP AND SEAL
BUFFER TUBE = SPLICE OR EXPRESS ENTIRE BUFFER TUBE



NOTES:

1. RELOCATE EXISTING GIGABIT ETHERNET SWITCH FROM EXISTING SIGNAL CABINET TO NEW CABINET AND INSTALL WITH NEW INTERCONNECT CENTER.
2. REMOVE GIGABIT ETHERNET SWITCH FROM EXISTING SIGNAL CABINET TO BE REMOVED AT 07-1429 AND RELOCATE TO NEW SIGNAL CABINET AT 07-1819.

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

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intermodal Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0

SPLICE PLAN

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

REVISIONS	INIT.	DATE

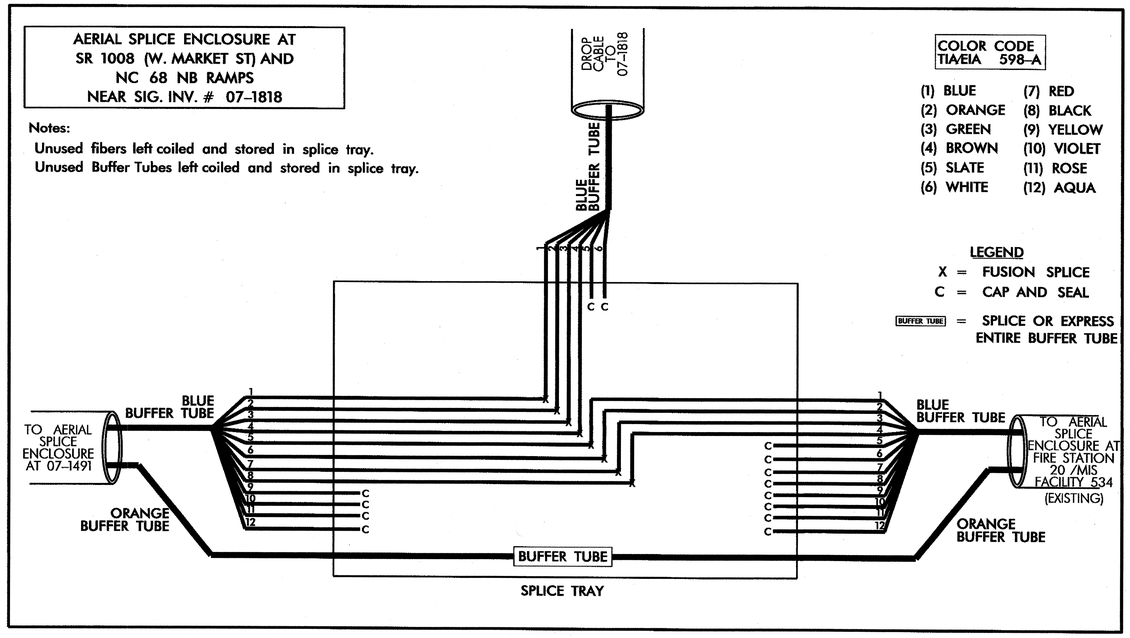
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

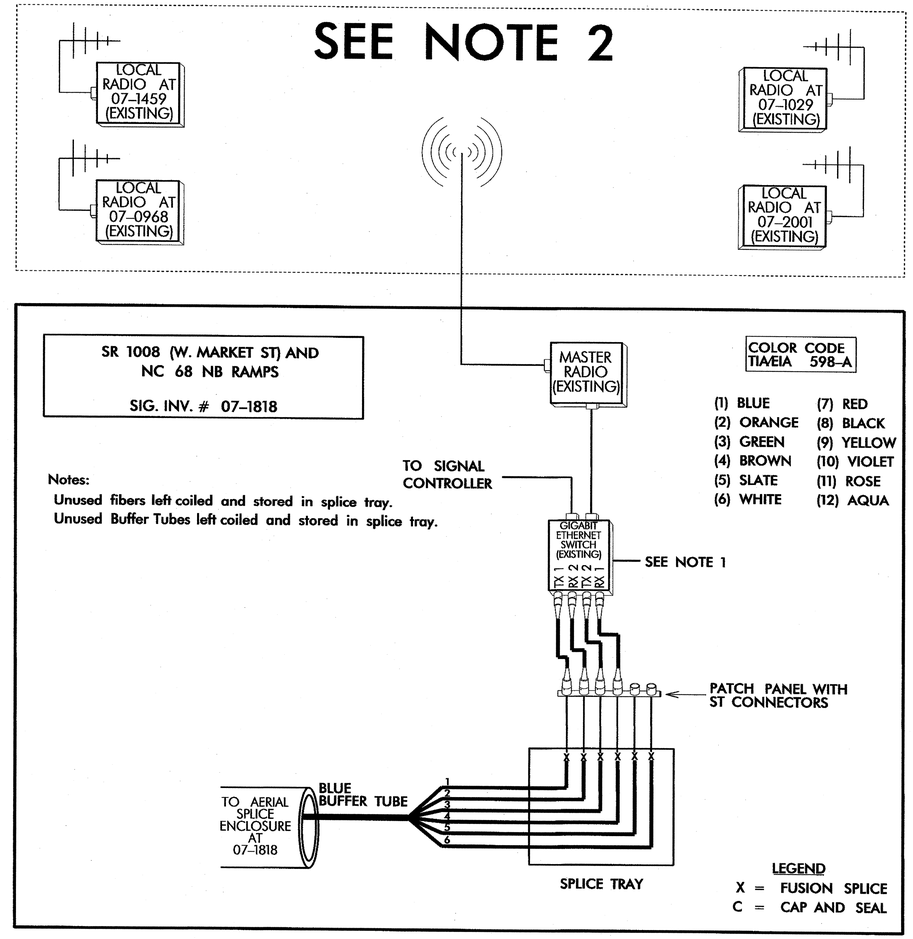
Gregory A. Fuller 5/6/11
SIGNATURE DATE

CADD Filename:

FIBER OPTIC CABLE

PROJECT REFERENCE NO.	SHEET NO.
R-2611	SIG. 129





NOTES:

1. RELOCATE EXISTING GIGABIT ETHERNET SWITCH FROM EXISTING SIGNAL CABINET TO NEW CABINET AND INSTALL WITH NEW INTERCONNECT CENTER.
2. REMOVE WIRELESS EQUIPMENT FROM EXISTING SIGNAL CABINET AND RELOCATE TO NEW CABINET AND POLE. ENSURE THAT WIRELESS COMMUNICATION IS MAINTAINED WITH SIGNALS 07-1459, 07-0968, 07-1029, & 07-2001 AFTER EQUIPMENT RELOCATION.

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Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0

SPLICE PLAN

DIVISION 07 GUILFORD COUNTY GREENSBORO

PLAN DATE:	MAY 2011	REVIEWED BY:	I.N. AVERY
PREPARED BY:	S.C. WARDLE	REVIEWED BY:	G.A. FULLER

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

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SIGNATURE DATE

CADD Filename: