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TIP PROJECT: R–2413CA

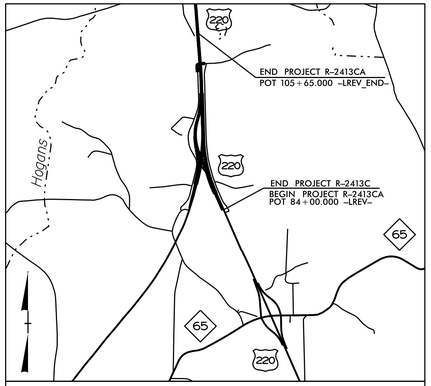
CONTRACT: C203645

Project No.	Sheet No.
R–2413CA	Sig. 1

METRIC — ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND .OR MILLIMETERS UNLESS OTHERWISE NOTED

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

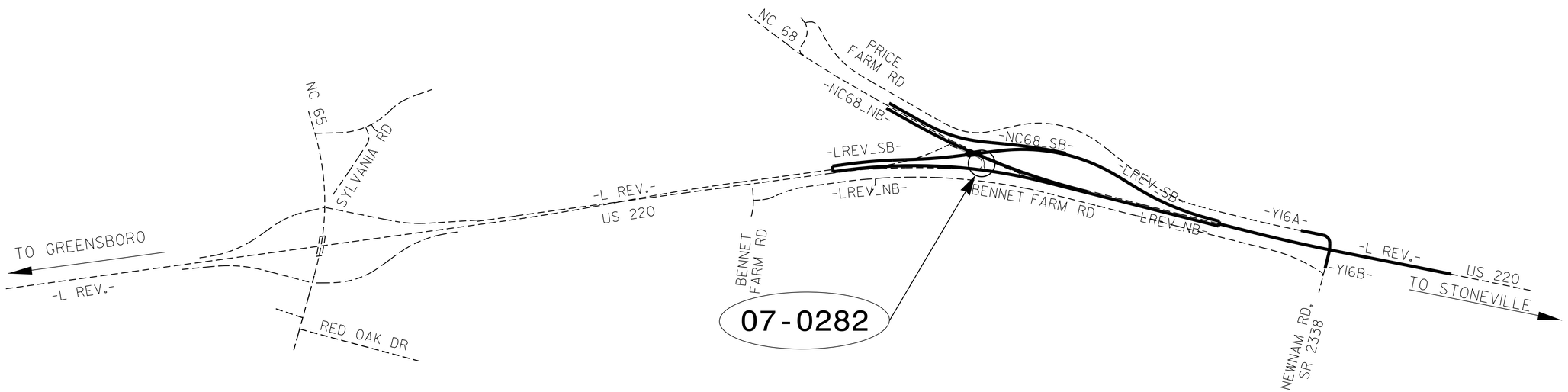
ROCKINGHAM COUNTY



VICINITY MAP

LOCATION: US 220 /FUTURE I–73 AT NC 68 – CONVERT AT–GRADE INTERSECTION TO INTERCHANGE

TYPE OF WORK: SIGNALS



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

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1	--------	Title Sheet
Sig. 2.0–2.4	07–0282	US 220 at NC 68

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Robert J. Ziemba, PE – Central Region Signals Engineer
John T. Rowe Jr., PE – Signal Equipment Design Engineer

Prepared In the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY BRANCH
Transportation Mobility and Safety Division · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · Signal Design Section
750 N. Greenfield Parkway, Garner, NC 27529

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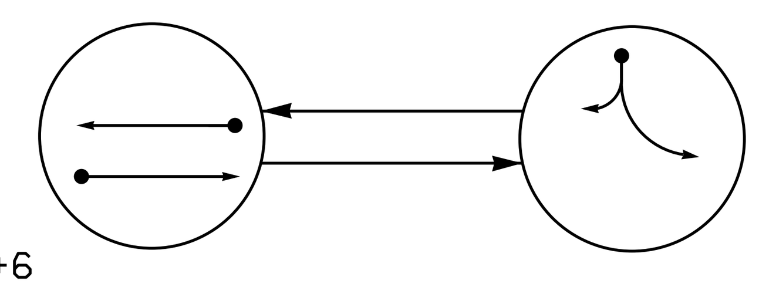
rjziemba

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21, 22	G	R	Y
41, 42, 43	R	G	R
61, 62	G	R	Y

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
23	ON	OFF
44	OFF	ON
63	ON	OFF

SIGNAL FACE I.D.

All Heads L.E.D.

R Y G 300mm — 21, 22; 41, 42, 43; 61, 62

Y 300mm — 23; 44; 63

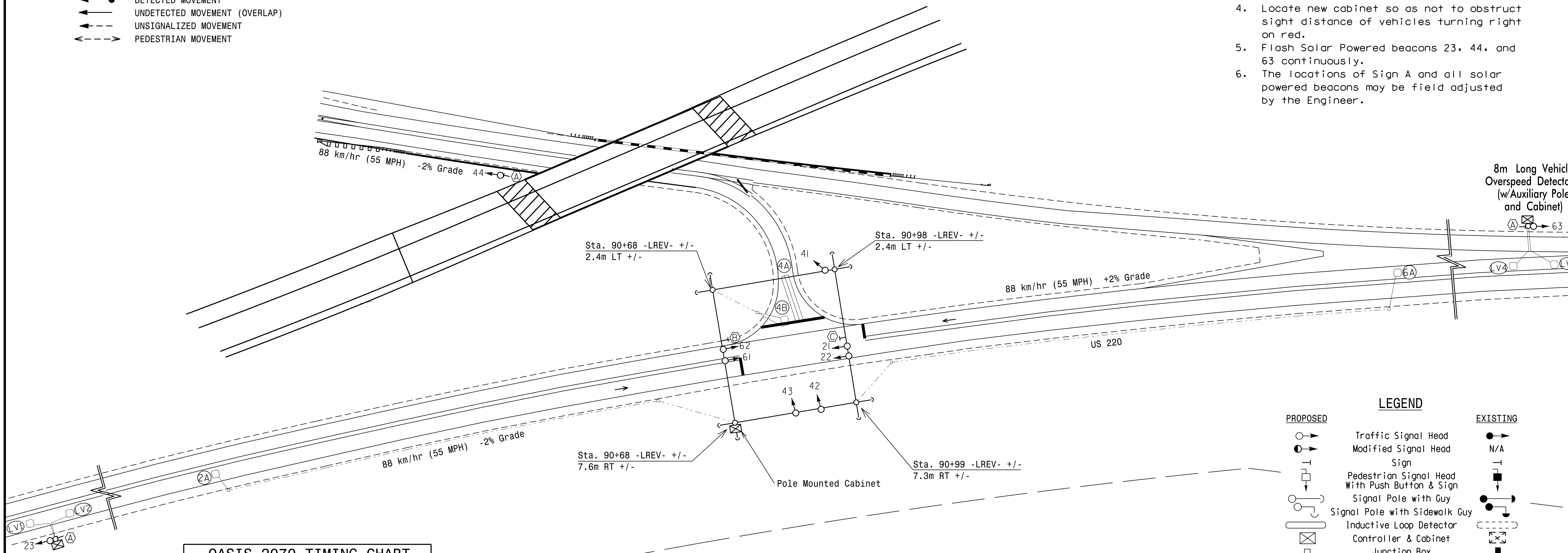
2070 LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (m)	TURNS	DISTANCE FROM STOPBAR (m)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
2A	1.8X1.8	5	130	Y	2	Y	Y	-	-	-	-	Y
4A	1.8X12	2-4-2	0	Y	4	Y	Y	-	-	-	-	Y
4B	1.8X1.8	4	0	Y	4	Y	Y	-	-	-	15	Y
6A	1.8X1.8	6	130	Y	6	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Flash Solar Powered beacons 23, 44, and 63 continuously.
6. The locations of Sign A and all solar powered beacons may be field adjusted 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	
	50mm Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
A	Signal Ahead Sign (W3-3) w/ Orange Flags and Flashing Solar Powered Beacons	A
B	No Right Turn Sign (R3-1)	B
C	No Left Turn Sign (R3-2)	C

OASIS 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	14	7	14
Extension 1 *	6.0	1.0	6.0
Max Green 1 *	120	30	120
Yellow Clearance	5.4	3.0	5.0
Red Clearance	1.0	1.6	1.1
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	2.5	-	2.5
Max Variable Initial *	46	-	46
Time Before Reduction *	15	-	15
Time To Reduce *	30	-	30
Minimum Gap	3.4	-	3.4
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

LONG VEHICLE OVERSPEED DETECTION SYSTEM
LOOP & DETECTION INSTALLATION CHART

LOOP NO.	SIZE (m)	TURNS	DIST. FROM STOPBAR (m)	NEW	EXISTING	SYSTEM NUMBER	LANE NO.	DETECTOR NUMBER	CHANNEL	NEMA PHASE	TIMING FEATURE	TIMING TIME	PLACE CALL DURING PHASE	INHIBIT DELAY DURING GREEN?
LV1	1.8X1.8	5	313	X	-	NORTHBOUND APPROACH ①	1	1	1	2*	NONE	- SEC.	ALL	NO
LV2	1.8X1.8	5	305	X	-		1		2		NONE	- SEC.	ALL	NO
LV3	1.8X1.8	5	313	X	-	SOUTHBOUND APPROACH ②	1	2	1	6*	NONE	- SEC.	ALL	NO
LV4	1.8X1.8	5	305	X	-		1		2		NONE	- SEC.	ALL	NO
LVODS THRESHOLD SPEED (MPH)		55								2/6				
LVODS EXTEND TIME		12 SEC.								2/6				

*Phase hold output to controller

This plan supersedes the plan signed and sealed on 8/16/11.

Temporary Signal (TMP 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

US 220
at
NC 68

Division 7 Rockingham County NE of Stokesdale

PLAN DATE: January 2015	REVIEWED BY:
PREPARED BY: I. O. Umozurike	REVIEWED BY:

SCALE 5 0 10 — 1:500

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by: 1B9B4B6C2A7A494...
SIGNATURE 1/27/2015 DATE

SIG. INVENTORY NO. 07-0282

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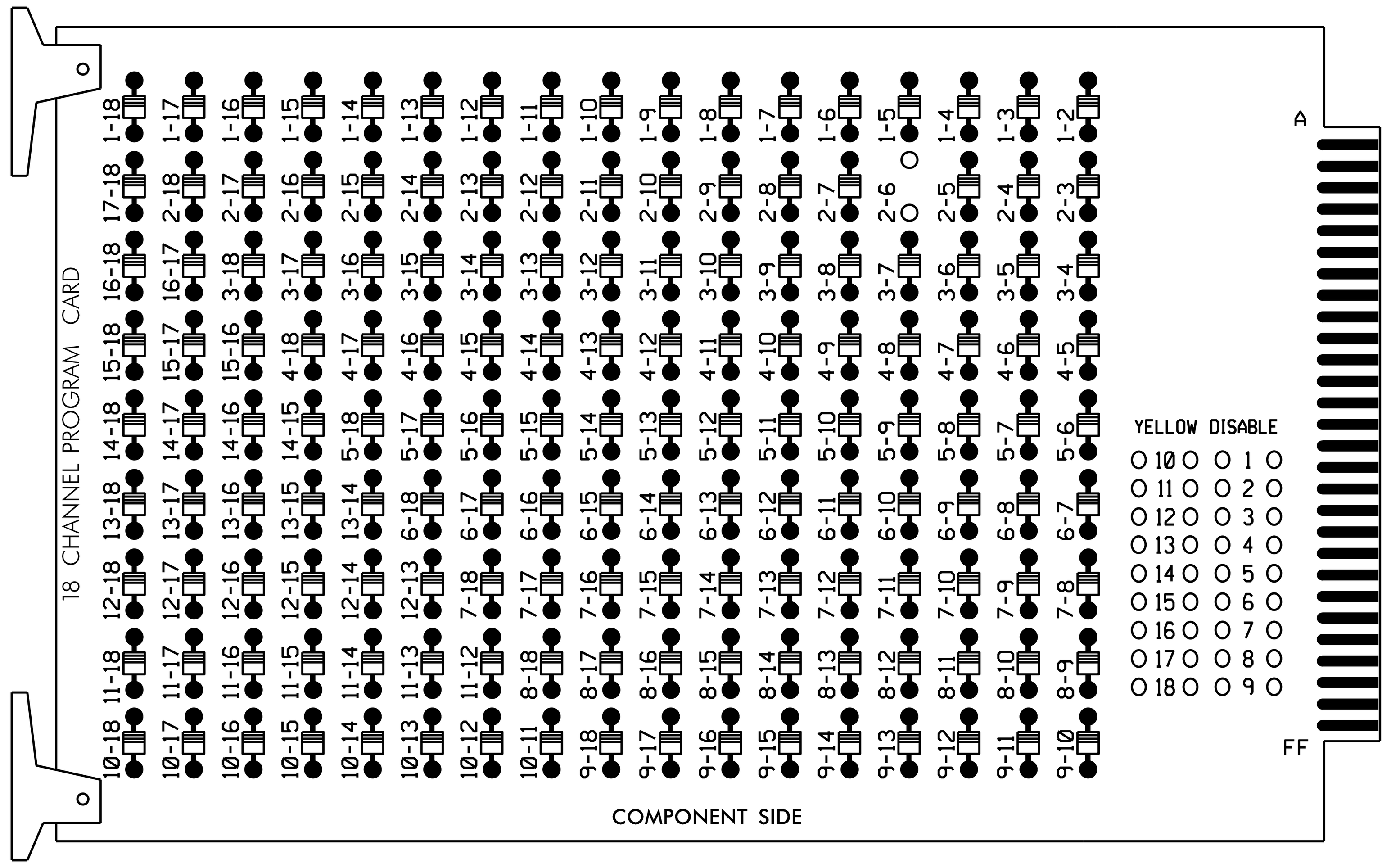
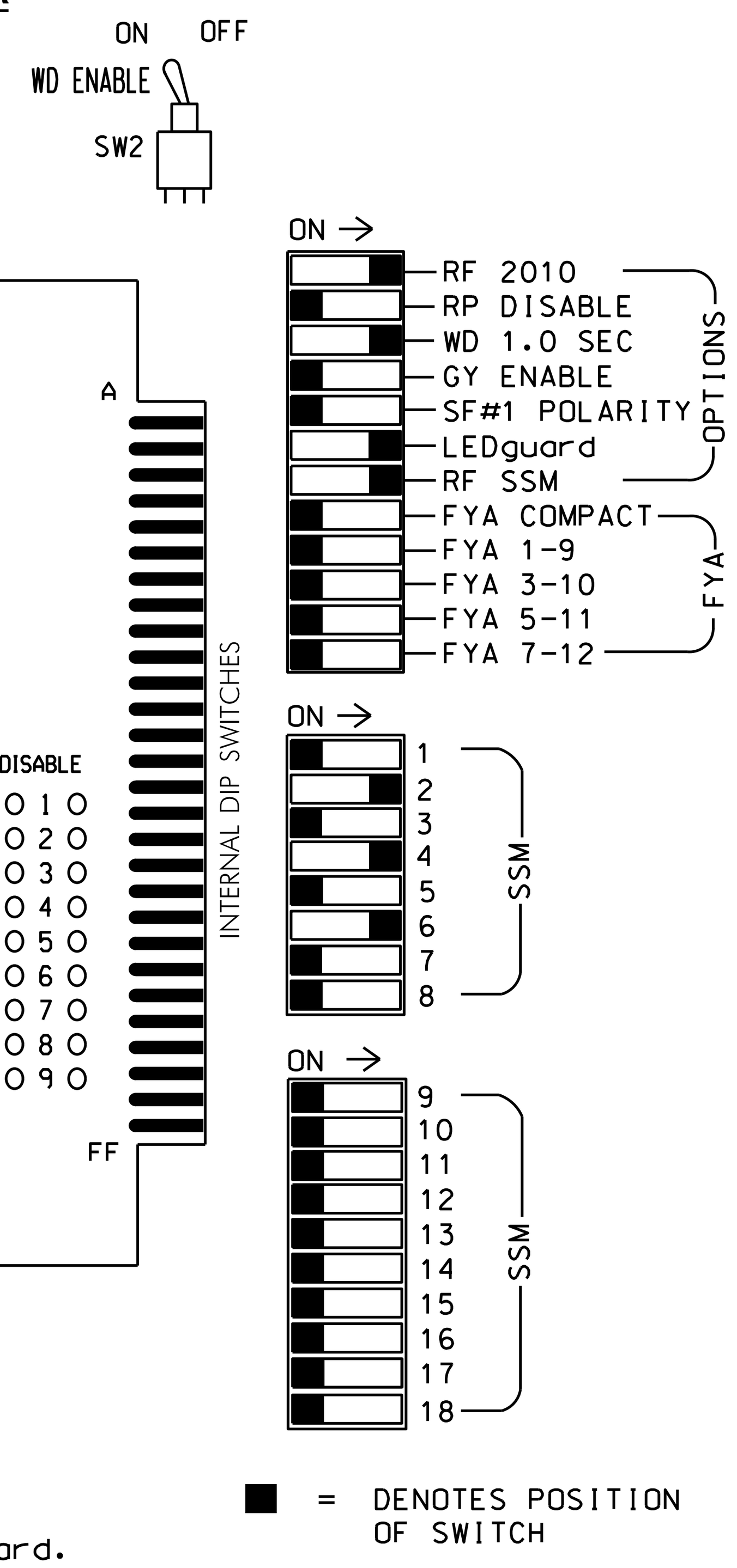
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPER 2-6.





REMOVE JUMPER AS SHOWN

NOTES:

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

NOTES

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

EQUIPMENT INFORMATION

CONTROLLER..............2070L
CABINET.................336
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S5,S8
PHASES USED.............2,4,6
OVERLAPS................NONE

PROJECT REFERENCE NO.	SHEET NO.
R-2413CA	Sig. 2.1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42 43	NU	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

SOLAR POWERED BEACON NOTE

Install solar powered beacons per manufacturer's directions and flash continuously. The locations are shown on the Signal Design Plan and may be field adjusted accordingly by the NCDOT engineer.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	Ø 2 2A	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	Ø 2 HOLD AC ISOLATOR	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L		NOT USED		Ø 4 4B		NOT USED			Ø 6 HOLD AC ISOLATOR					ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			15
6A	TB21-11,12	I6U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

THIS ELECTRICAL PLAN SUPERSEDES THE PLAN ORIGINALLY SEALED ON 8/19/11.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0282
DESIGNED: January 2015
SEALED: 1/27/2015
REVISED: N/A

Electrical Detail - Temporary Signal (TMP Phase I) - Sheet 1 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 220
at
NC 68

Division 7 | Rockingham County | NE of Stokesdale

PLAN DATE: January 2015 | REVIEWED BY: JTR
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

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

DocuSigned by: John T. Rowe, Jr. 1/28/2015
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DATE

SIG. INVENTORY NO. 07-0282

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PROJECT REFERENCE NO.	SHEET NO.
R-2413CA	Sig. 2.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

(program controller as shown below)

1. From Main Menu press '6' (Outputs). Then '3' (Logical I/O Processor).

2. The programming shown below will place the controller in flash if the output of either Long Vehicle Detection Unit is active for longer than 4 minutes

```
  LOGICAL I/O COMMAND #1   (+/-COMMAND#)
IF  INPUT    ASSIGNMENT #13 IS ON
OR  INPUT    ASSIGNMENT #14 IS ON

                  ↓
              SCROLL DOWN
THEN:
    DELAY FOR  240.0 SECONDS
SET INPUT    ASSIGNMENT #64 ON
```

Input #13 = Ø2 Hold (19U)
Input #14 = Ø6 Hold (19L)

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

3. From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Logic Flag 1.

INPUT ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '5' (INPUTS). THEN '+' UNTIL PIN 51 (INPUT 13) IS REACHED.

```
PAGE: 1 C1 PIN:51  HOLD PHASES
INPUT ASSIGNMENT #.................13
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................._
VEHICLE DETECTOR (1-64)............._
PEDESTRIAN DETECTOR (1-16).........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................_
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)....................._
FLASH SENSE (Y/N)..................._
DOOR OPEN (Y/N)....................._
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)........_
SPECIAL FUNCTION ALARM (1-8)........_
TOD HOUR SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................2
PLAN (65=FLSH,66=FREE)..._  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...._
CHANGE PHASE TIMING PAGE (1-4)......._
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...._
CHANGE INPUT PAGE (1-4).............._
CHANGE OUTPUT PAGE (1-4)............._
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

PRESS '+'

```
PAGE: 1 C1 PIN:52  HOLD PHASES
INPUT ASSIGNMENT #.................14
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................._
VEHICLE DETECTOR (1-64)............._
PEDESTRIAN DETECTOR (1-16).........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................_
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)....................._
FLASH SENSE (Y/N)..................._
DOOR OPEN (Y/N)....................._
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)........_
SPECIAL FUNCTION ALARM (1-8)........_
TOD HOUR SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................6
PLAN (65=FLSH,66=FREE)..._  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...._
CHANGE PHASE TIMING PAGE (1-4)......._
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...._
CHANGE INPUT PAGE (1-4).............._
CHANGE OUTPUT PAGE (1-4)............._
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

PRESS '+' until input assignment #64 is reached

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

← Note: Program for Plan 65 and Offset 0

PROGRAMMING COMPLETE

THIS ELECTRICAL PLAN SUPERSEDES THE PLAN ORIGINALLY SEALED ON 8/19/11.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0282
DESIGNED: January 2015
SEALED: 1/27/2015
REVISED: N/A

Electrical Detail - Temporary Signal (TMP Phase I) - Sheet 2 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 220
at
NC 68

Division 7 Rockingham County NE of Stokesdale

PLAN DATE: January 2015 REVIEWED BY: JTR

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

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

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

DocuSigned by: John T. Rowe, Jr. 1/28/2015
641D60C145EE4F5... DATE

SIG. INVENTORY NO. 07-0282

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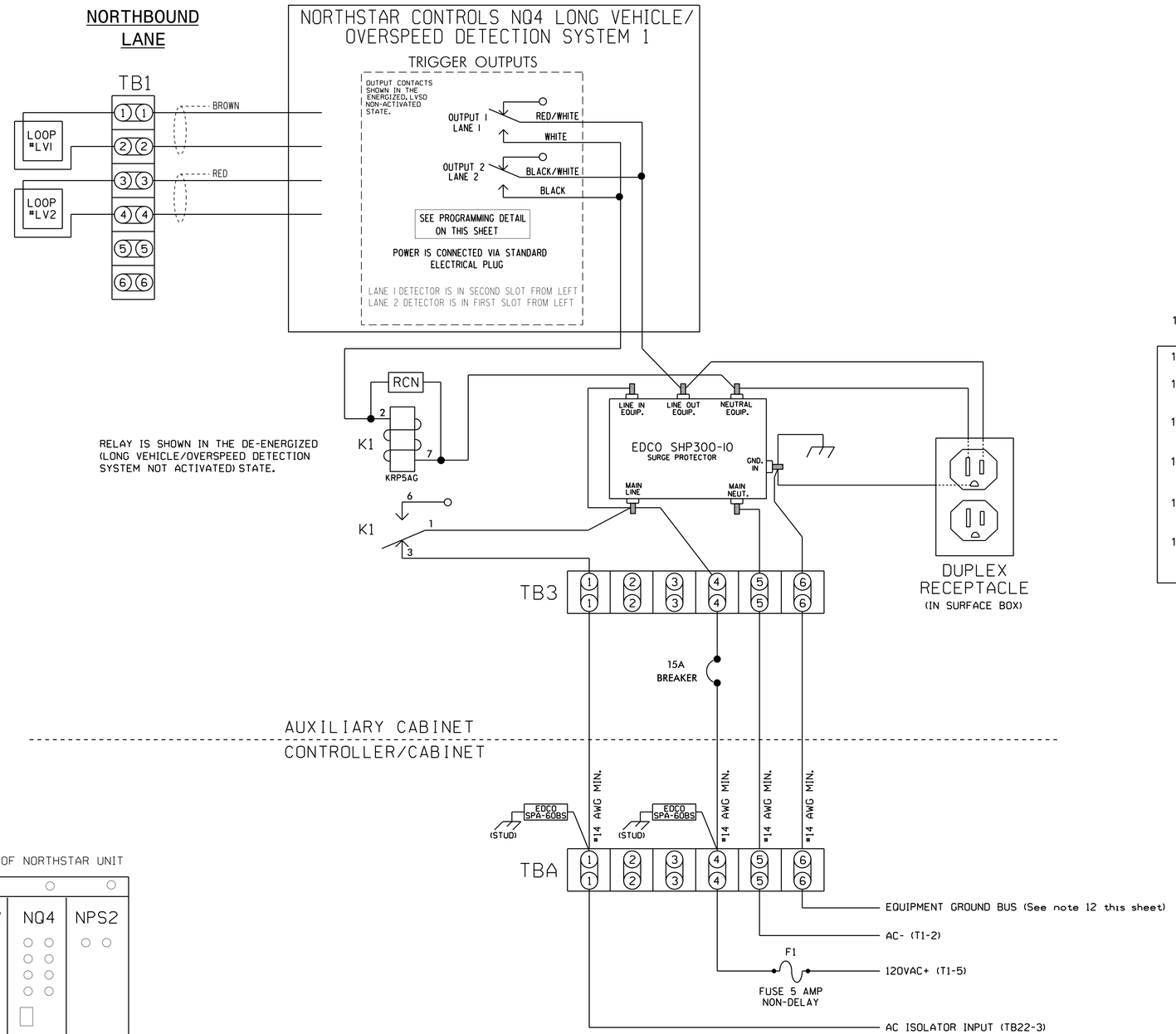
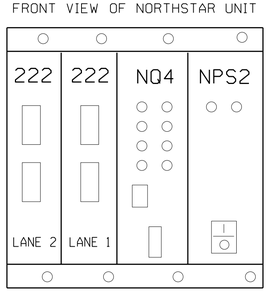
PROJECT REFERENCE NO.	SHEET NO.
R-2413CA	Sig. 2.3

WIRING DETAIL FOR NORTHSTAR CONTROLS NQ4 LONG VEHICLE / OVERSPEED DETECTION SYSTEM NO. 1

(wire unit as shown below)



FRONT VIEW OF NORTHSTAR UNIT



NOTES

1. All loop lead-ins shall be twisted.
2. Loop spacing is critical to the proper operation of this Overspeed Detection System. Make sure loop spacing is correctly programmed in NQ4 Unit.
3. Insure that connectors on rear of NQ4 are seated securely.
4. NQ4 Unit shall be located in an auxiliary cabinet adjacent to Speed Warning System loops.
5. Unit power is connected by standard electrical plug.
6. Terminal strips TB1, TB2, TB3, & TBA to be added by installer.
7. Relay 'K1' is a SPDT with an 120VAC coil. Potter & Brumfield no. KRP5AGAG, Dot Material no. 625028600.
8. The RC Network across the coil of 'K1' is a .1 micro farad, 100 ohm. Dot Material no. 106018075. P&B no. 104M060C100
9. EDCO SPA-60BS is a surge protector for 120VAC interconnect circuits. Dot Material no. 625022076.
10. EDCO SHP300-10 is an AC service surge protector. Dot Material no. 625022075.
11. Do not install ground rods at auxiliary cabinet.
12. Install equipment ground from controller cabinet to auxiliary cabinet if not already present.
13. Install disconnect if there is no disconnect present at auxiliary cabinet.
14. IMPORTANT! A jumper must be installed between input file terminals I9-E and I9-K if not already present.
15. IMPORTANT! For proper operation of the Long Vehicle Detection Unit, tie TB24-4 to AC neutral.
16. IMPORTANT! Make sure both channels of AC Isolator card inserted at input file position I9 are set for inverted operation.

NORTHSTAR CONTROLS MODEL NQ4 PROGRAMMING DETAIL

(program unit as shown)

NOTE: UNIT MUST BE PROGRAMMED USING PC AND HYPERTERMINAL PROGRAM. FOR CONNECTION TO HYPERTERMINAL REFER TO NQ4 OPERATION MANUAL.

PROGRAM NQ4 BY TYPING THE FOLLOWING COMMANDS

1. SET SPEED=55
2. SET LENGTH=22'
3. SET ALARMTIME=12
4. SET SEPARATION=27' (LEADING EDGE TO LEADING EDGE) (THIS VALUE MAY VARY. PROGRAM ACTUAL MEASURED SEPARATION)
5. SET LOOP LENGTH=6' (THIS VALUE MAY VARY. PROGRAM ACTUAL MEASURED LOOP LENGTH)
6. SAVE

NOTE

PROGRAMMING APPLIES TO LANE 1

THIS ELECTRICAL PLAN SUPERSEDES THE PLAN ORIGINALLY SEALED ON 8/19/11.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0282
DESIGNED: January 2015
SEALED: 1/27/2015
REVISED: N/A

Electrical Detail - Temporary Signal (TMP Phase I) - Sheet 3 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 220
at
NC 68

Division 7 Rockingham County NE of Stokesdale

PLAN DATE: January 2015 REVIEWED BY: JTR

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
DocuSigned by: John T. Rowe, Jr. 1/28/2015
641D60C145EE4F5... DATE
SIG. INVENTORY NO. 07-0282

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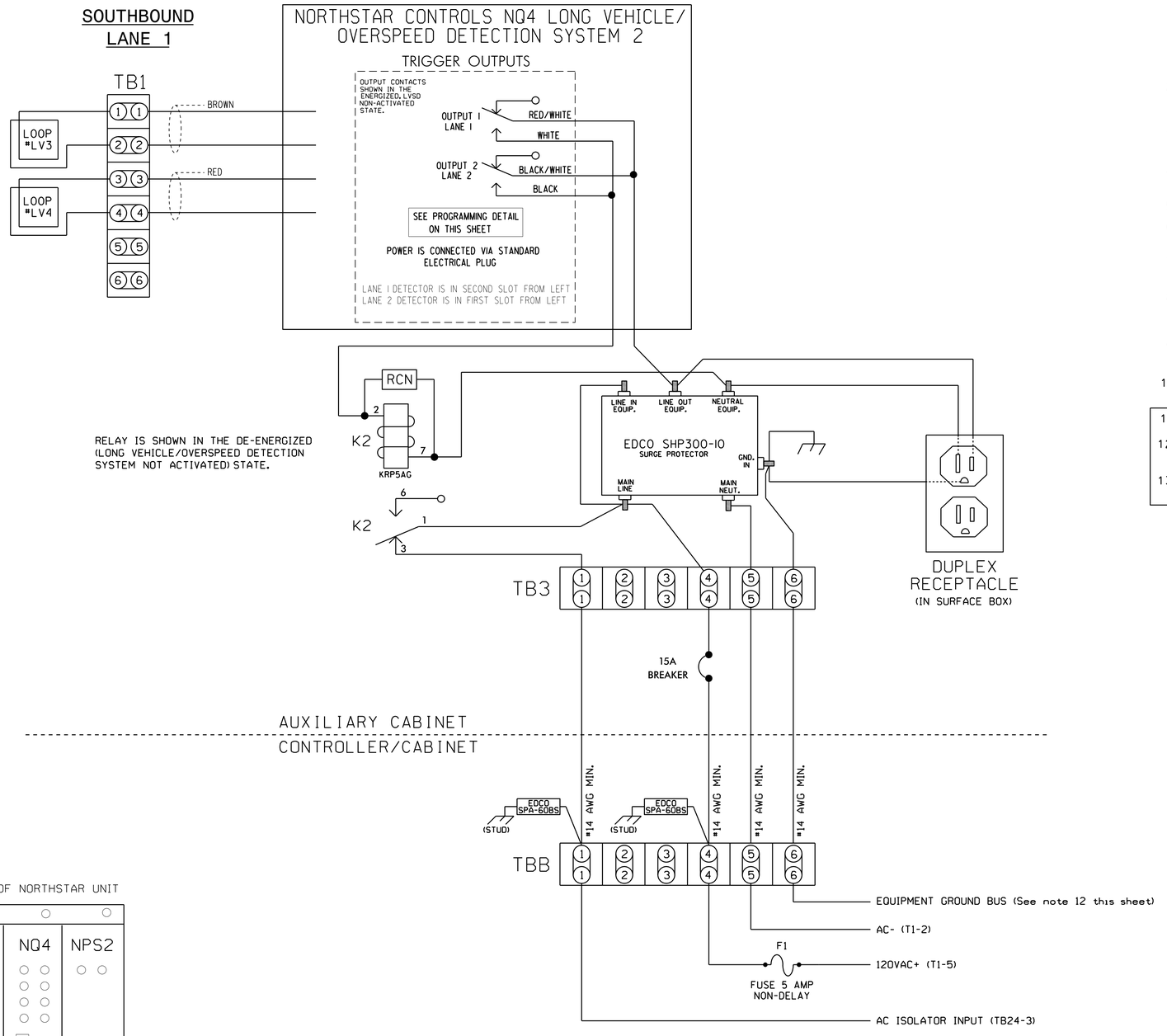
armstrong

PROJECT REFERENCE NO.	SHEET NO.
R-2413CA	Sig. 2.4

WIRING DETAIL FOR NORTHSTAR CONTROLS NQ4 LONG VEHICLE / OVERSPEED DETECTION SYSTEM NO. 2

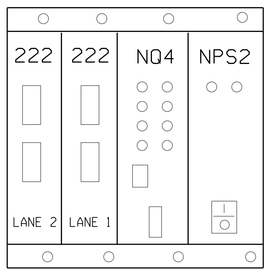
(wire unit as shown below)



NOTES

1. All loop lead-ins shall be twisted.
2. Loop spacing is critical to the proper operation of this Overspeed Detection System. Make sure loop spacing is correctly programmed in NQ4 Unit.
3. Insure that connectors on rear of NQ4 are seated securely.
4. NQ4 Unit shall be located in an auxiliary cabinet adjacent to Speed Warning System Loops.
5. Unit power is connected by standard electrical plug.
6. Terminal strips TB1, TB2, TB3, & TBB to be added by installer.
7. Relay 'K2' is a SPDT with an 120VAC coil. Potter & Brumfield no. KRP5AGAG, Dot Material no. 625028600.
8. The RC Network across the coil of 'K2' is a .1 micro farad, 100 ohm. Dot Material no. 106018075. P&B no. 104M060C100
9. EDCO SPA-60BS is a surge protector for 120VAC interconnect circuits. Dot Material no. 625022076.
10. EDCO SHP300-10 is an AC service surge protector. Dot Material no. 625022075.
11. Do not install ground rods at auxiliary cabinet.
12. Install equipment ground from controller cabinet to auxiliary cabinet if not already present.
13. Install disconnect if there is no disconnect present at auxiliary cabinet.

FRONT VIEW OF NORTHSTAR UNIT



NORTHSTAR CONTROLS MODEL NQ4 PROGRAMMING DETAIL

(program unit as shown)

NOTE: UNIT MUST BE PROGRAMMED USING PC AND HYPERTERMINAL PROGRAM. FOR CONNECTION TO HYPERTERMINAL REFER TO NQ4 OPERATION MANUAL.

PROGRAM NQ4 BY TYPING THE FOLLOWING COMMANDS

1. SET SPEED=55
2. SET LENGTH=22'
3. SET ALARMTIME=12
4. SET SEPARATION=27' (LEADING EDGE TO LEADING EDGE) (THIS VALUE MAY VARY, PROGRAM ACTUAL MEASURED SEPARATION)
5. SET LOOP LENGTH=6' (THIS VALUE MAY VARY, PROGRAM ACTUAL MEASURED LOOP LENGTH)
6. SAVE

NOTE

PROGRAMMING APPLIES TO LANE 1

THIS ELECTRICAL PLAN SUPERSEDES THE PLAN ORIGINALLY SEALED ON 8/19/11.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0282
DESIGNED: January 2015
SEALED: 1/27/2015
REVISED: N/A

Electrical Detail - Temporary Signal (TMP Phase I) - Sheet 4 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 220
at
NC 68

Division 7 Rockingham County NE of Stokesdale

PLAN DATE:	January 2015	REVIEWED BY:	JTR
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

DocuSigned by: John T. Rowe, Jr. 1/28/2015
641D60C145EE4F5... DATE

SIG. INVENTORY NO. 07-0282

27-JAN-2015 15:09
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