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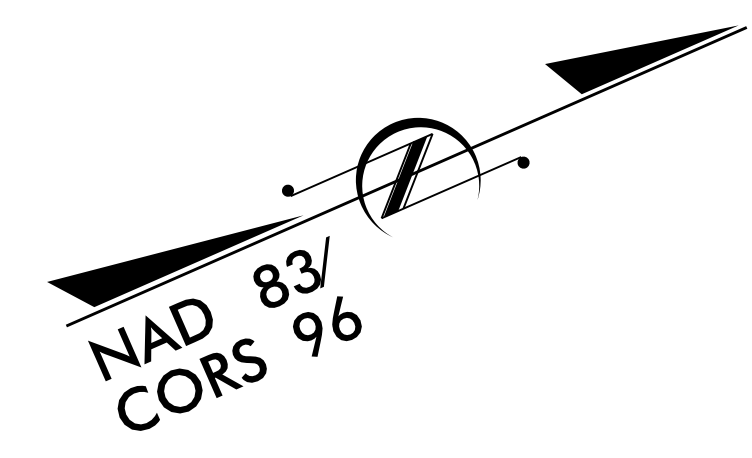
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

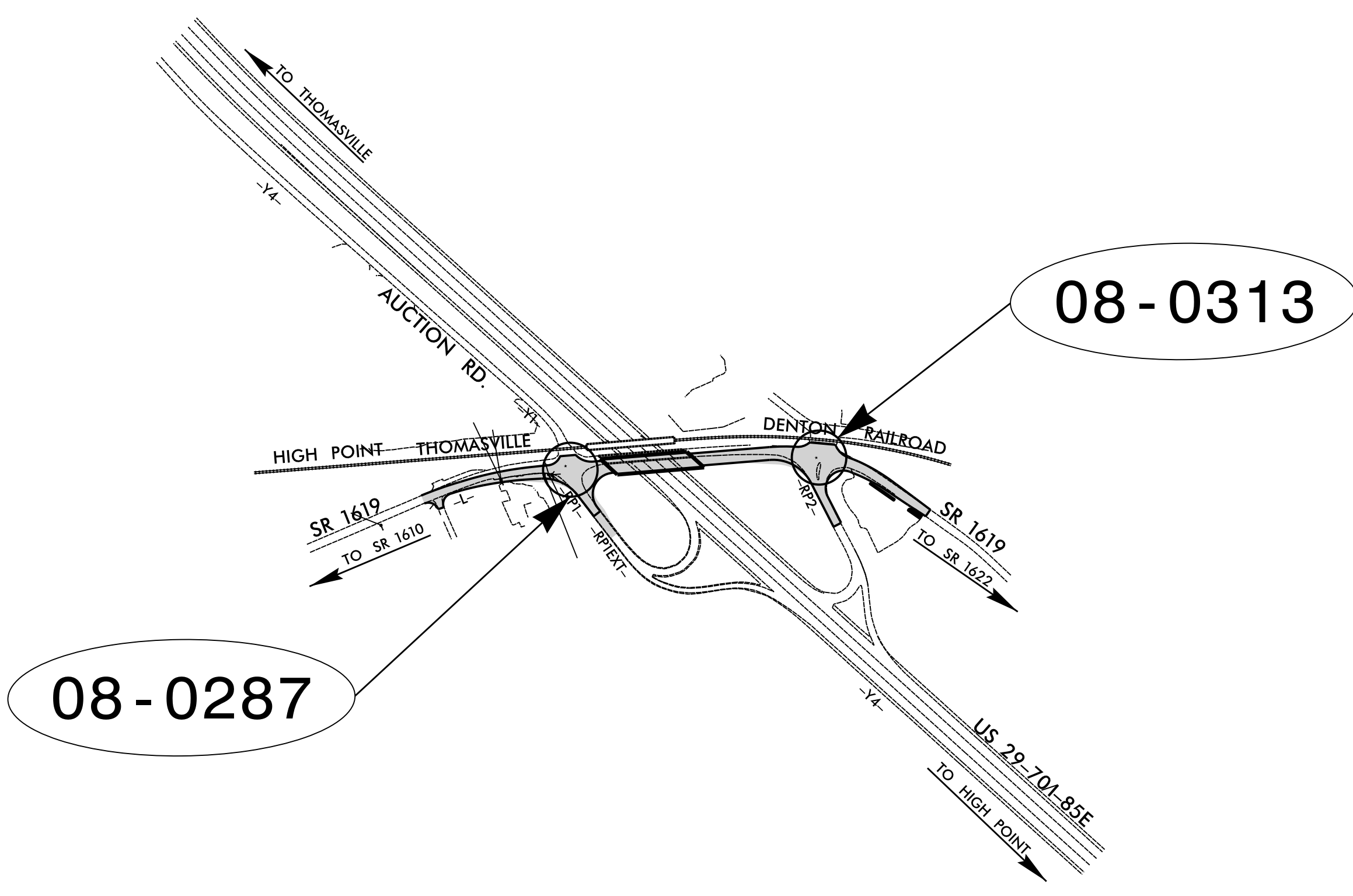
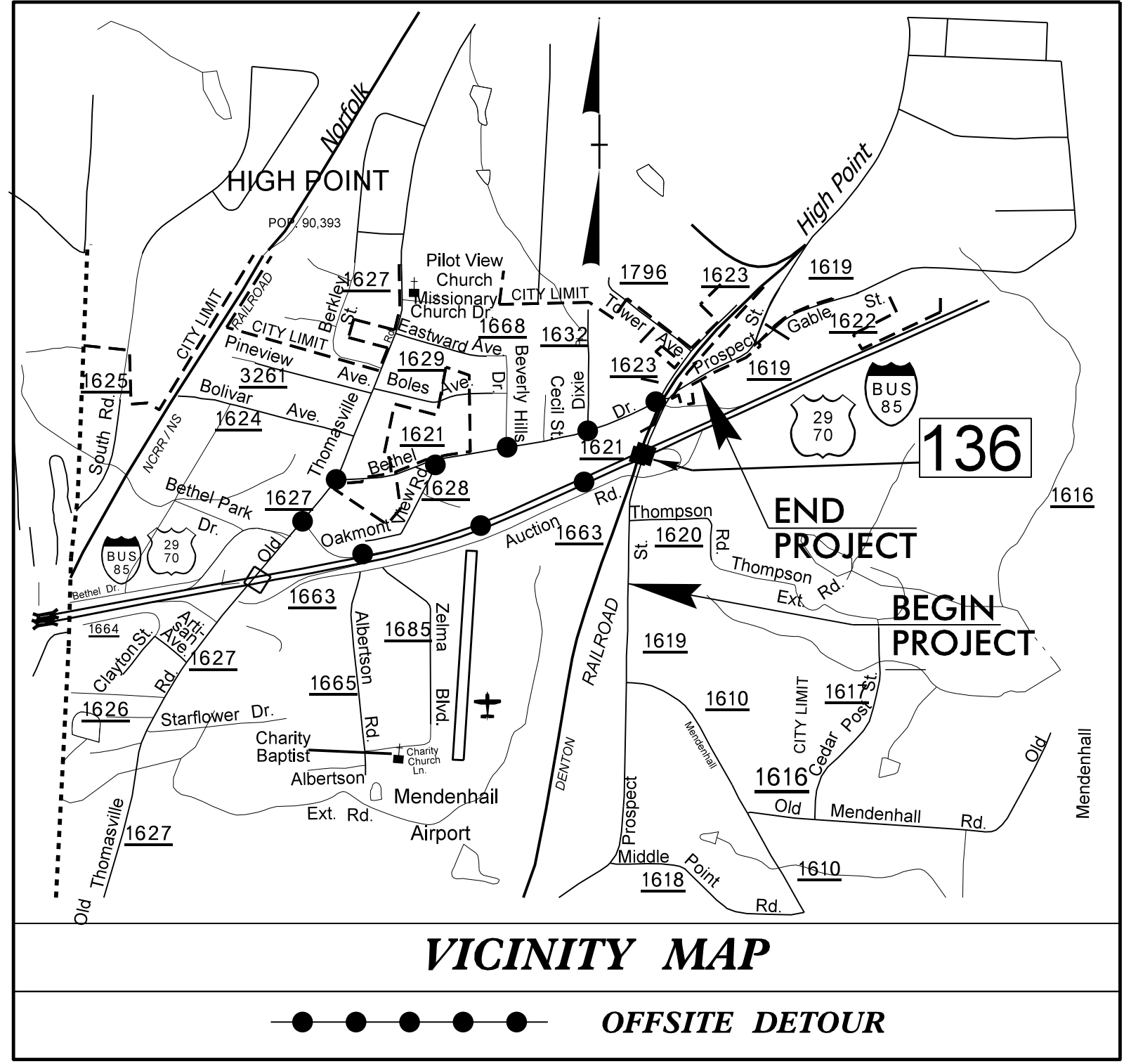
LOCATION: BRIDGE 136 OVER US 29-70I-85 BUSINESS ON SR 1619 (PROSPECT STREET) IN HIGH POINT

TYPE OF WORK: SIGNALS



TIP PROJECT: B-5114

CONTRACT: C203589



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. 2.0-2.3 | 08-0287 | SR 1619 (Prospect Street) at I-85 Bus./US 29 NB-70 EB Ramp and SR 1663 (Auction Road) |
| Sig. 3.0-3.3 | 08-0313 | SR 1619 (Prospect Street) at I-85 Bus./US 29 SB-70 WB Ramp and SR 1621 (Bethel Drive) |
| SCP 1 | N/A | Wireless Communications Plans |

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

750 N. Greenfield Parkway, Garner, NC 27529

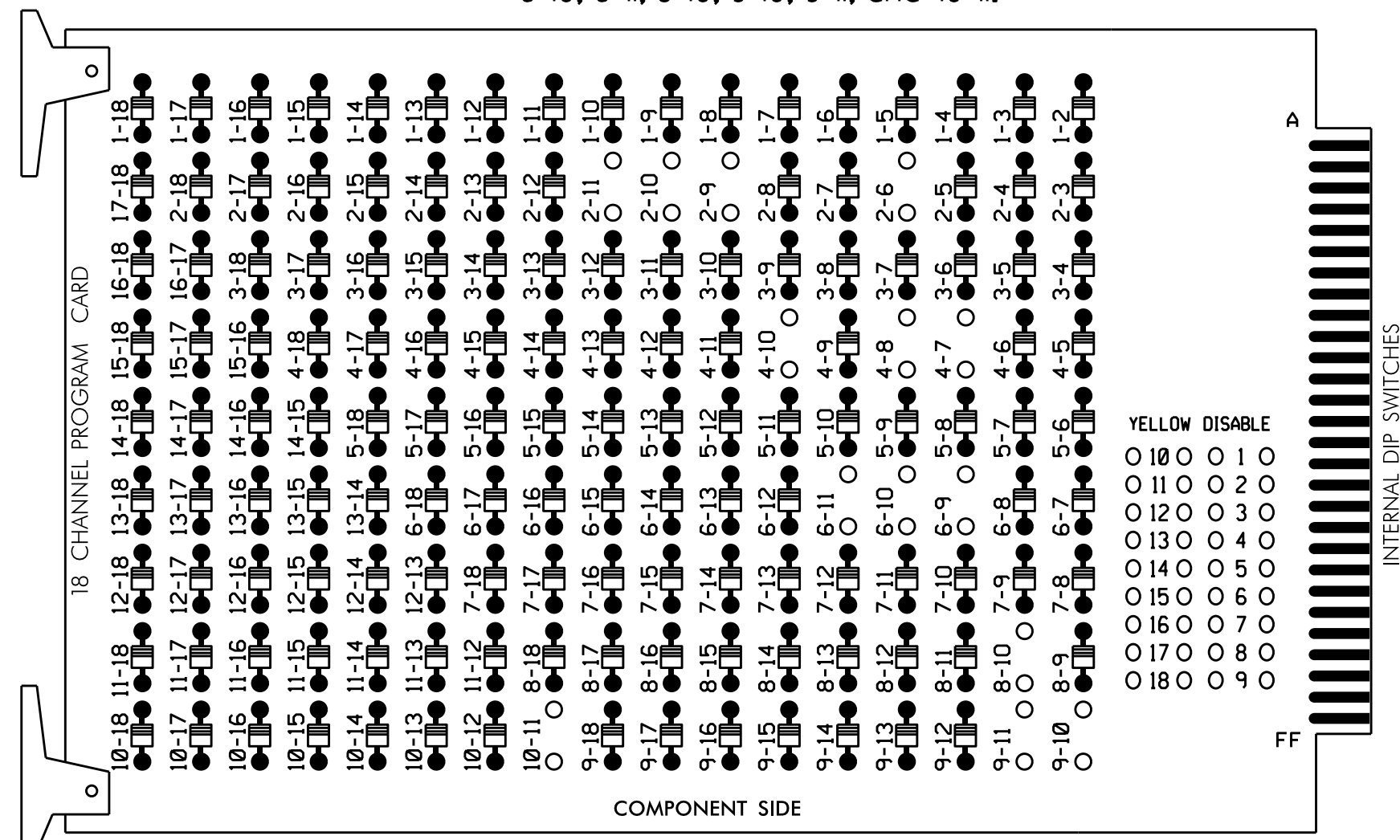
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EDI MODEL 2018ECLIP-NC CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

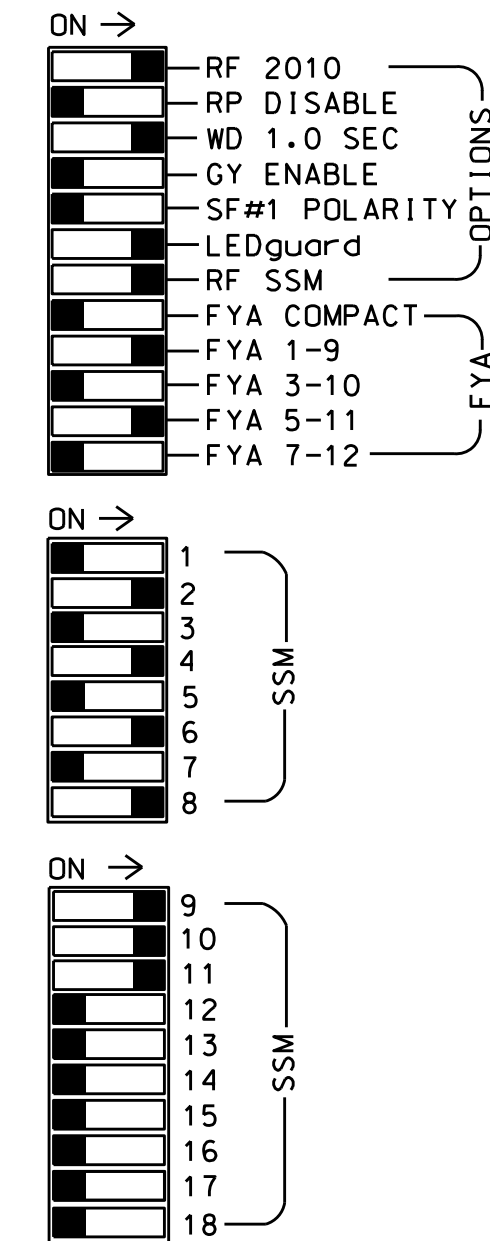
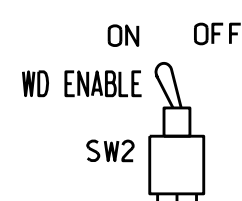
REMOVE DIODE JUMPERS 2-6, 2-9, 2-10, 2-11, 4-7, 4-8, 4-10, 6-9, 6-10, 6-11, 8-10, 9-10, 9-11, and 10-11.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Integrate monitor with Ethernet network in cabinet.



■ = DENOTES POSITION OF SWITCH

NOTES

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

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5,S8,S10,S11,
 AUX S1,AUX S2,AUX S4
 PHASES USED.....2,4,6,7*,8
 OVERLAP "A".....6
 OVERLAP "B".....2+4+6+8
 OVERLAP "C".....2
 OVERLAP "D".....NOT USED

* PHASE USED DURING PREEMPT ONLY

SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------------|----|-------|-------|----|----------|-------|----|-------|-------|-----|----------|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1 | 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 |
| PHASE | 1 | 2 | 2 PED | 3 | 4 | 4 PED | 5 | 6 | 6 PED | 7 | 8 | 8 PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | NU | 22,23 | NU | NU | 41,42,43 | NU | NU | 62,63 | NU | 41 | 81,82,83 | NU | 61 | 44,45 | NU | 21 | NU | NU |
| RED | | 128 | | | 101 | | | 134 | | | 107 | | | A124 | | | | |
| YELLOW | | 129 | | | 102 | | | 135 | | * | 108 | | | A125 | | | | |
| GREEN | | 130 | | | 103 | | | 136 | | | 109 | | | | | | | |
| RED ARROW | | | | | | | | | | | | | | A121 | | | A114 | |
| YELLOW ARROW | | | | | | | | | | | | | | A122 | | | A115 | |
| FLASHING YELLOW ARROW | | | | | | | | | | | | | | A123 | | | A116 | |
| GREEN ARROW | | | | | | | | | | 124 | | | | | | | | |

NU = Not Used

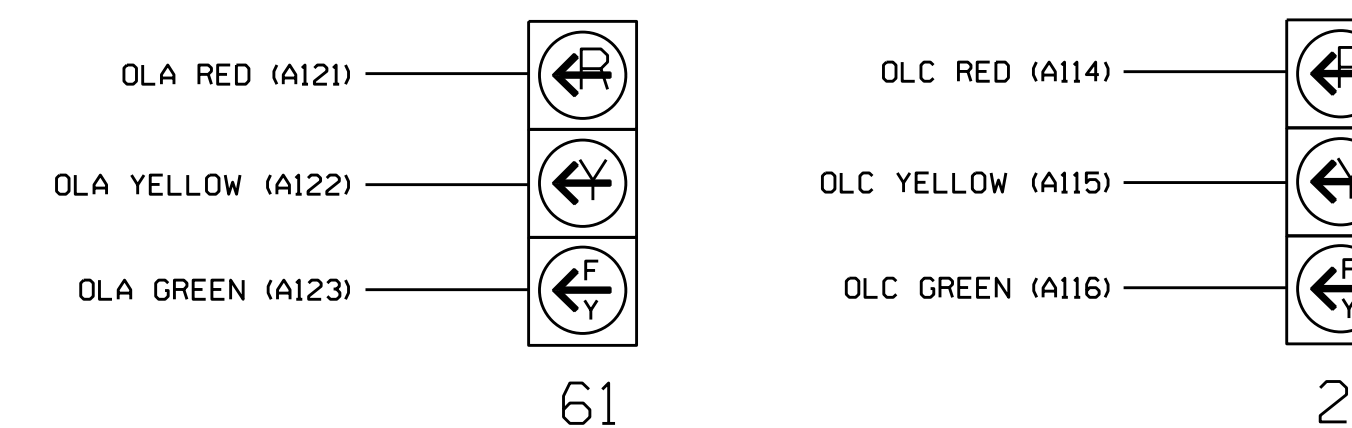
* See pictorial of head wiring in detail below.

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

8" Flashing Yellow → A126

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

| FILE | U | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | |
|------|---|-------------|--------|----|----|----|----|----|----|----|----|----|----|----|----|------|
| "I" | L | FS | ∅2/SYS | ∅2 | ∅4 | ∅4 | ∅4 | ∅4 | ∅4 | ∅4 | ∅4 | ∅4 | ∅4 | ∅4 | ∅4 | FS |
| | | DC ISOLATOR | 2A/S1 | 2B | 4A | 4B | 4C | 4D | 4E | 4F | 4G | 4H | 4I | 4J | 4K | 4L |
| "J" | L | PRE1 | ∅6 | ∅6 | ∅8 | ∅8 | ∅8 | ∅8 | ∅8 | ∅8 | ∅8 | ∅8 | ∅8 | ∅8 | ∅8 | PRE1 |
| | | AC ISOLATOR | 6A | 6B | 8A | 8B | 8C | 8D | 8E | 8F | 8G | 8H | 8I | 8J | 8K | 8L |

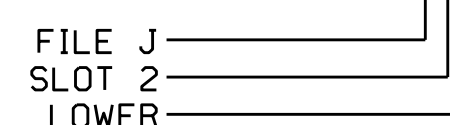
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME
 PRE1 = RR PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | INPUT ASSIGNMENT NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND | FULL TIME DELAY | STRETCH TIME | DELAY TIME |
|----------|---------------|-----------------|---------|----------------------|--------------|------------|------|--------|-----------------|--------------|------------|
| 2A/S1 | TB2-5,6 | I2U | 39 | 1 | 2 | 2/SYS | Y | Y | | | |
| 2B | TB2-7,8 | I2L | 43 | 5 | 12 | 2 | Y | Y | | | |
| 4A | TB4-9,10 | I6U | 41 | 3 | 4 | 4 | Y | Y | | | |
| 4B | TB4-11,12 | I6L | 45 | 7 | 14 | 4 | Y | Y | Y | | 5 |
| 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 |

INPUT FILE POSITION LEGEND: J2L



PREEMPT ONLY PHASE OMIT NOTE

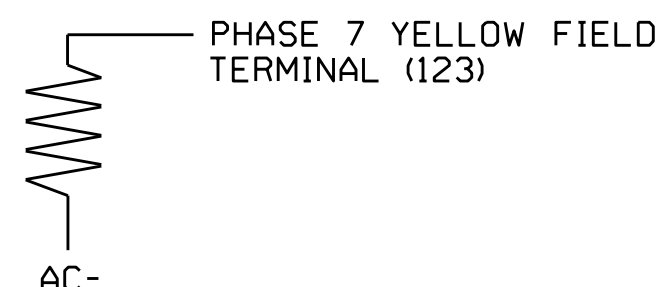
(program controller as shown below)

From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phase 7 for 'Omit Phase' and Phases 2, 4, 6 and 8 for 'Startup Calls'. This is to prevent Phase 7 from being served when not in Preempt.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 08-0287
 DESIGNED: February 2015
 SEALED: 2/19/2015
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

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



Electrical Detail - Sheet 1 of 3

Electrical and Programming Details for: SR 1619 (Prospect Street) at I-85 Bus./US 29 NB-70 EB Ramp and SR 1663 (Auction Road)

Prepared in the Offices of: TRANSPORTATION MOBILITY AND SAFETY CONSULTANTS, INC. 750 N. Greenfield Pkwy, Garner, NC 27529

Division 8 Randolph County High Point

PLAN DATE: February 2015 REVIEWED BY: JTR

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by: John T. Rowe, Jr. 2/23/2015

SIG. INVENTORY NO. 08-0287

20-155-2015-08-20
 S:\IT\SSA\15-08-20\Signal\work\hous\sig\Mon\Arms\stronp\080287_sml.ele.xxx.dgn
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 S:\IT\SSA\15-08-20\Signal\work\hous\sig\Mon\Arms\stronp\080287_sml.ele.xxx.dgn

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:      |12345678910111213141516
VEH OVL PARENTS: |      X
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR:  | _ RED _ YELLOW _ GREEN
FLASH COLORS:   | _ RED _ YELLOW X GREEN
-----
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

PRESS '+'

```

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:      |12345678910111213141516
VEH OVL PARENTS: | X X X 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?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

PRESS '+'

```

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:      |12345678910111213141516
VEH OVL PARENTS: | 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
    
```

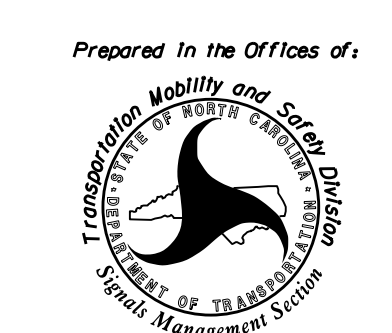
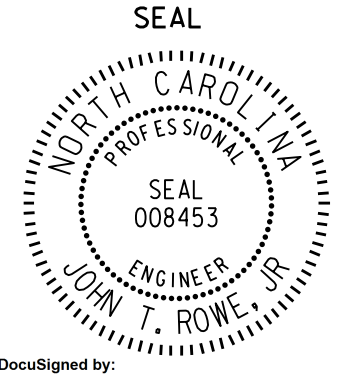
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 08-0287
 DESIGNED: February 2015
 SEALED: 2/19/2015
 REVISED: N/A

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Electrical Detail - Sheet 2 of 3

| | | | |
|--|--|---|--|
| ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529 | SR 1619 (Prospect Street) at I-85 Bus./US 29 NB-70 EB Ramp and SR 1663 (Auction Road) | | SEAL  SEAL 008453 ENGINEER JOHN T. ROWE, JR. |
| | Division 8 Randolph County High Point | PLAN DATE: February 2015 REVIEWED BY: JTR | |
| REVISIONS | | INIT. DATE | DocuSigned by: John T. Rowe, Jr. 2/23/2015 841080C145EE4F5 DATE |
| | | | SIG. INVENTORY NO. 08-0287 |

RAILROAD PREEMPTION PROGRAMMING DETAIL

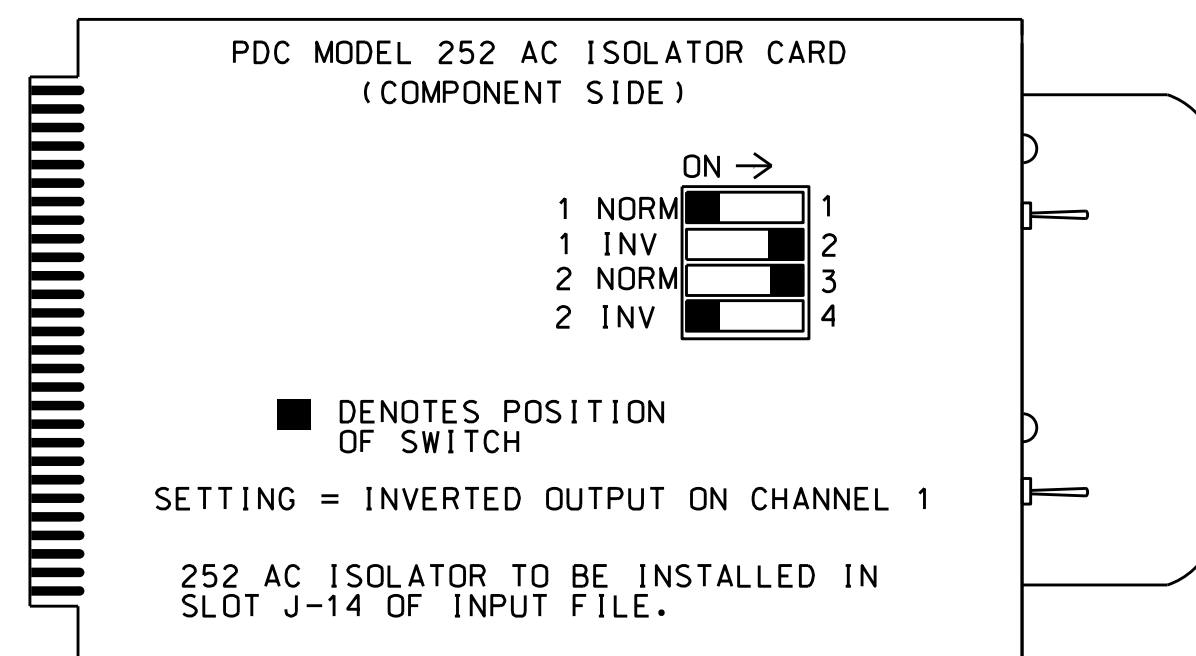
(program controller as shown below)

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

| PREEMPTION #1 | SETTINGS (NEXT:1-10) |
|--------------------------------------|-------------------------|
| INTERVAL/TIMING | CLEAR/DWELL PHASES |
| GRN YEL RED | 12345678910111213141516 |
| 1 15 4.3 2.1 | X X |
| 2 255 0.0 0.0 | X X |
| 3 0 0.0 0.0 | |
| 4 0 0.0 0.0 | |
| 5 1 0.0 0.0 | X X |
| EXIT CALLS | |
| OPTIONS | |
| PRIORITY (Y/N TO SELECT) |HIGH |
| DELAY TIMER (0-255 SEC) |0 |
| MIN GREEN BEFORE PRE (0= DEFAULT) | ...1 |
| PED CLEAR BEFORE PRE (0= DEFAULT) | ...0 |
| YELLOW CLEAR BEFORE PRE (0= DEFAULT) | ...0 |
| RED CLEAR BEFORE PRE (0= DEFAULT) | ...0 |
| DWELL MIN TIMER (0-255 SEC) |10 |
| DWELL MAX TIMER (0-OFF,1-255MIN) | ...0 |
| DWELL HOLD-OVER TIMER (0-255) |0 |
| LATCH CALL? |N |
| LINK TO NEXT PREEMPT? |N |
| ENABLE BACKUP PROTECTION? |N |
| HOLD CLEAR 1 PHASES DURING DELAY? | ...N |
| FAST GREEN FLASH DWELL PHASES? |N |
| PED CLEARANCE THROUGH YELLOW? |N |
| INHIBIT OVERLAP GREEN EXTENSION? | ...N |
| SERVICE DURING SOFTWARE FLASH? |N |
| REST IN RED DURING DWELL INTERVAL? | ...N |
| FLASH DWELL INTERVAL? |N |
| ALLOW PEDS IN DWELL INTERVAL? |N |
| RE-TIME DWELL INTERVAL? |N |
| OVERLAPS: | ABCDEFGHIJKLMNOP |
| DWELL INT FLASH YELLOW | |
| OMIT OVERLAPS: | XX |

PREEMPT 1 AC ISOLATOR (MODEL 252)
OUTPUT PROGRAMMING DETAIL

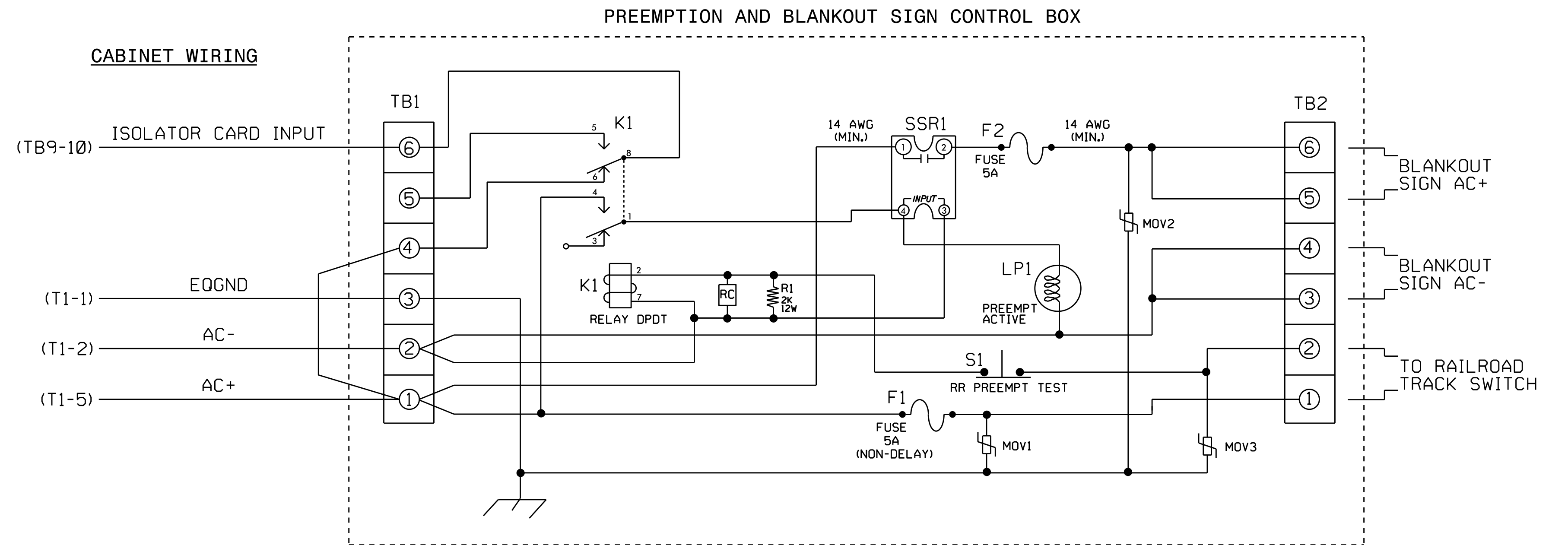
(set DIP switches as shown below)



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

RAILROAD PREEMPTION WIRING DETAIL

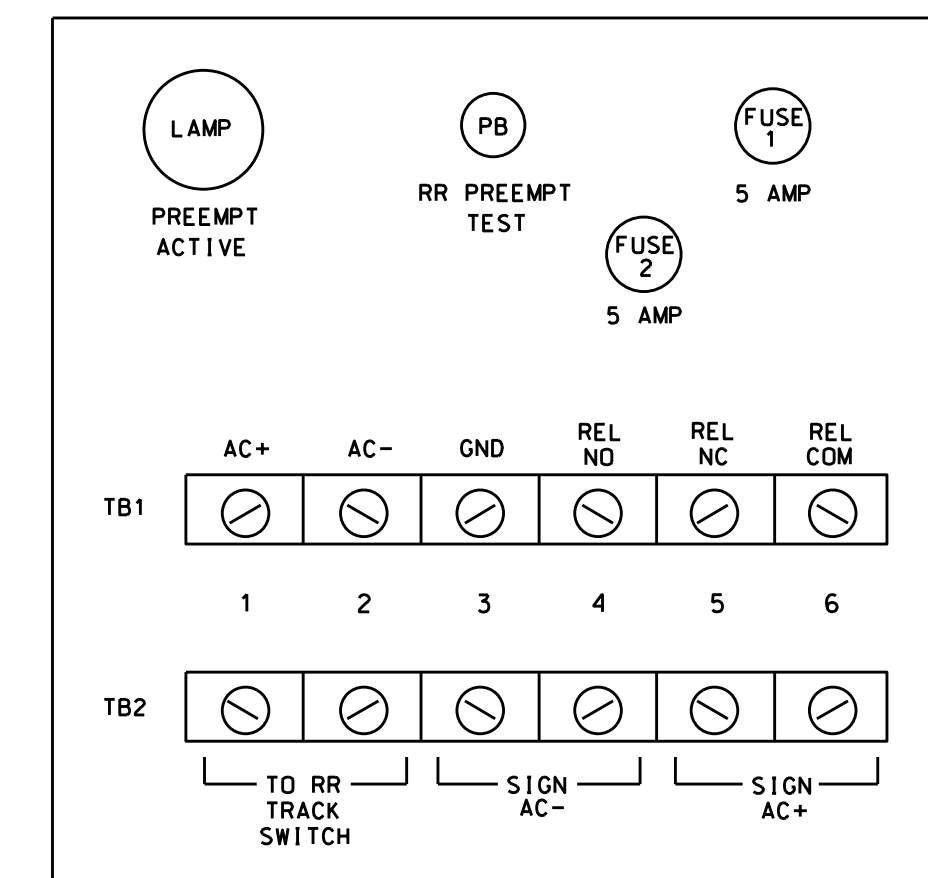
(wire as shown below)



NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT with 120VAC coil with octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
- 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.
- IMPORTANT!!** A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW



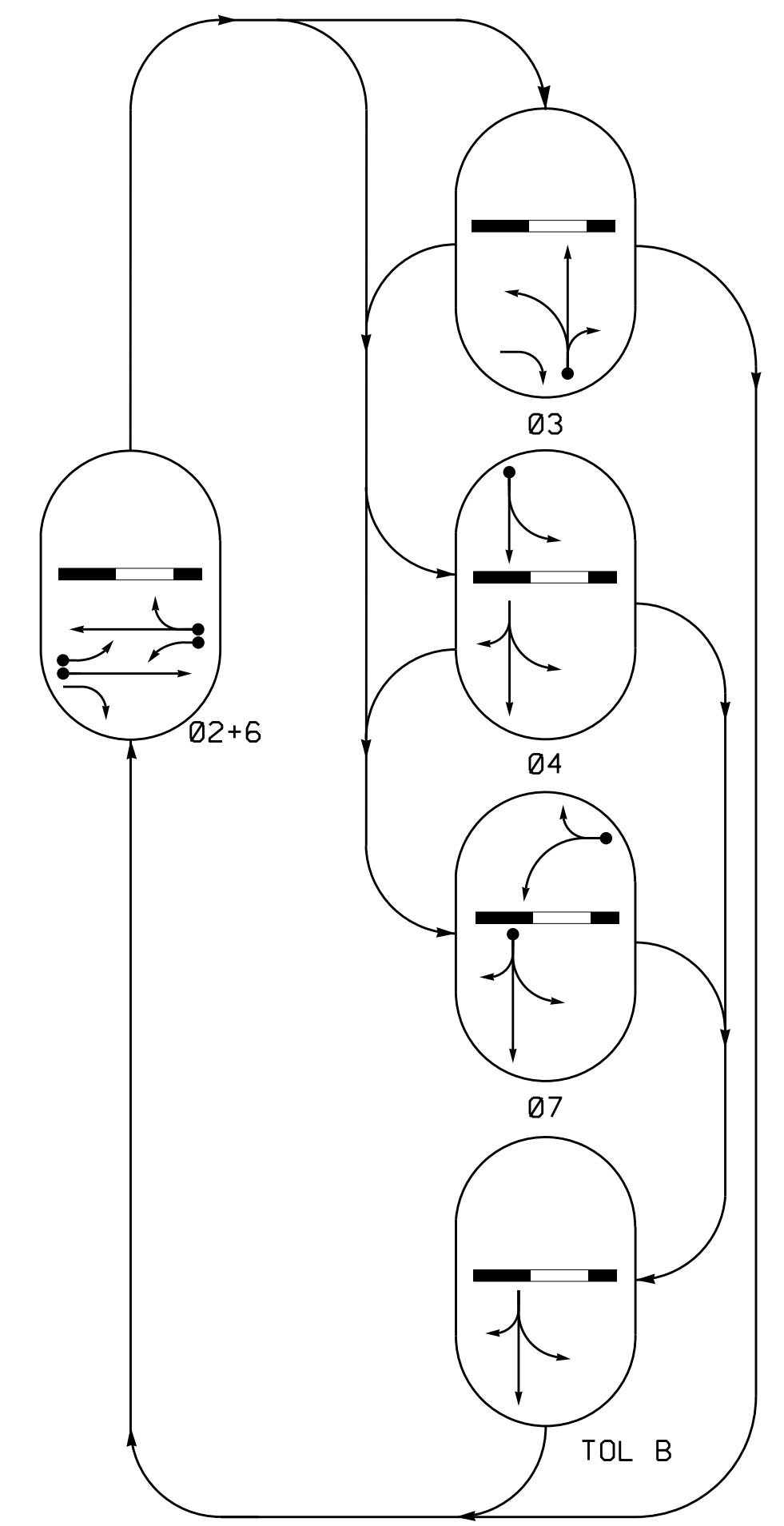
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 08-0287
DESIGNED: February 2015
SEALED: 2/19/2015
REVISED: N/A

Electrical Detail - Sheet 3 of 3

| | | |
|-----------------------------------|--|---|
| | DETAILS FOR: SR 1619 (Prospect Street) at I-85 Bus./US 29 NB-70 EB Ramp and SR 1663 (Auction Road) | SEAL |
| | Prepared in the Offices of: S. Armstrong 2/23/2015 | |
| REVISIONS: _____ INIT. DATE _____ | | DocuSigned by: John T. Rowe, Jr. 2/23/2015 SIG. INVENTORY NO. 08-0287 |

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

RAIL PREEMPT PHASES
(High Priority)

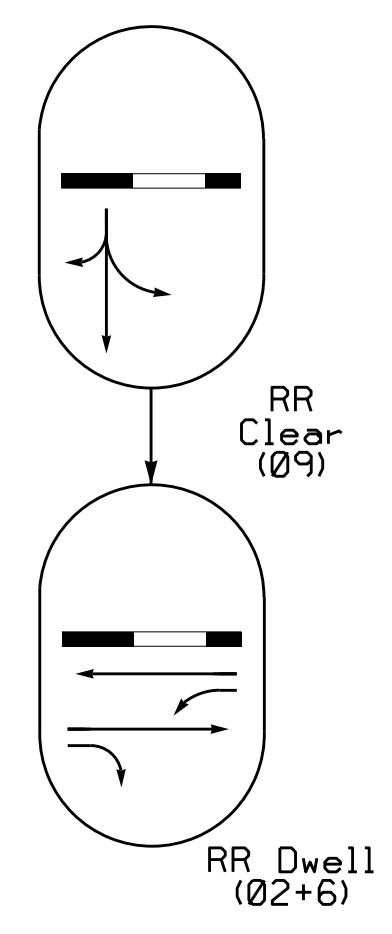
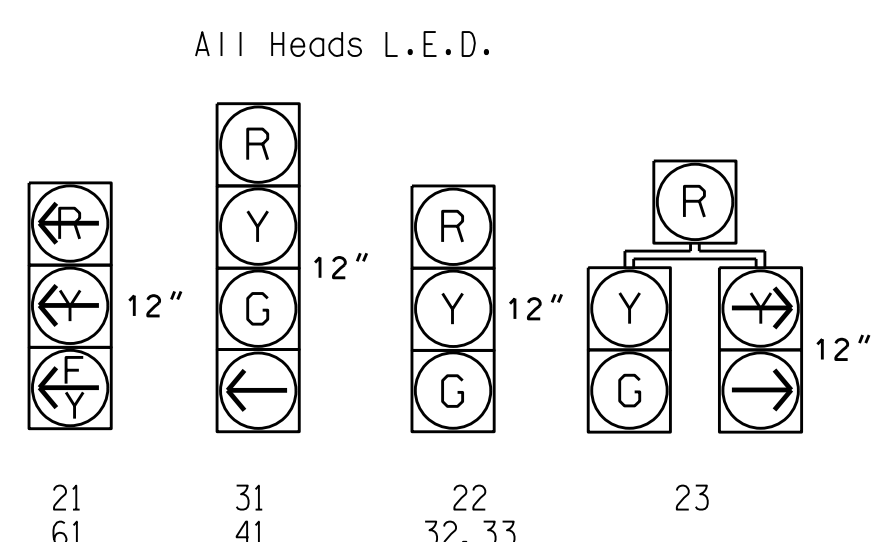


TABLE OF OPERATION

| SIGNAL FACE | PHASE | | | | | | | | | | |
|-------------|-------|-----|-----|-----|-------|----------|----------|-------|----------|----------|-------|
| | 02+6 | 03 | 04 | 07 | TOL B | RR CLEAR | RR DWELL | FLASH | RR CLEAR | RR DWELL | FLASH |
| 21 | Y | R | R | R | R | R | R | Y | R | R | Y |
| 22 | G | R | R | R | R | R | R | G | R | R | Y |
| 23 | G | R | R | R | R | R | R | G | R | R | Y |
| 31 | R | G | R | R | R | R | R | R | R | R | R |
| 32, 33 | R | G | R | R | R | R | R | R | R | R | R |
| 41 | R | R | G | R | R | R | R | R | R | R | R |
| 42 | R | R | G | R | R | R | R | R | R | R | R |
| 61 | Y | R | R | R | R | R | R | Y | R | R | Y |
| 62, 63 | G | R | R | R | R | R | R | G | R | R | Y |
| 71 | R | R | R | G | R | R | R | R | R | R | R |
| 72 | R | R | R | G | R | R | R | R | R | R | R |
| 91 | R | R | G | G | G | R | R | R | R | R | R |
| 92 | R | R | G | G | G | R | R | R | R | R | R |
| SIGN D | OFF | OFF | OFF | OFF | OFF | ON | ON | * | | | |

* SEE NOTE 6

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



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

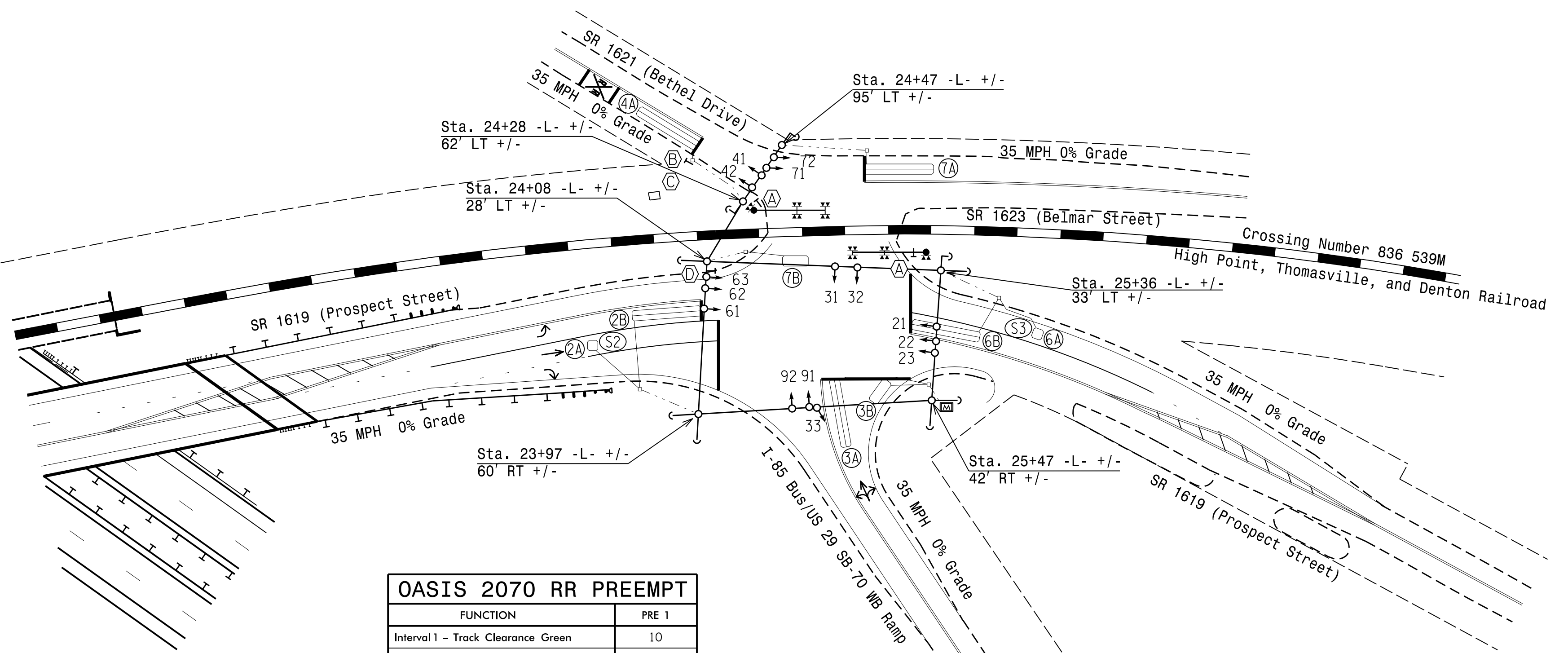
| LOOP | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | DETECTOR PROGRAMMING | | | | SYSTEM LOOP | NEW CARD | |
|-------|-----------|----------------------------|-------|----------|----------------------|---------|-----------|-----------------|-------------|----------|---|
| | | | | | PHASE | CALLING | EXTENSION | FULL TIME DELAY | | | |
| 2A/S2 | 6X6 | 70 | 4 | Y | 2 | Y | Y | - | - | Y | Y |
| 2B | 6X40 | 0 | 2-4-2 | Y | 2 | Y | Y | - | - | - | Y |
| 3A | 6X40 | 0 | 2-4-2 | Y | 3 | Y | Y | - | - | 3 | - |
| 3B | 6X15 | 0 | 4 | Y | 3 | Y | Y | - | - | 15 | - |
| 4A | 6X40 | 0 | 2-4-2 | Y | 4 | Y | Y | - | - | - | Y |
| 6A/S3 | 6X6 | 70 | 4 | Y | 6 | Y | Y | - | - | - | Y |
| 6B | 6X40 | 0 | 2-4-2 | Y | 6 | Y | Y | - | - | - | Y |
| 7A | 6X40 | 0 | 2-4-2 | Y | 7 | Y | Y | - | - | 3 | - |
| 7B | 6X15 | +20* | 4 | Y | 7 | Y | Y | - | - | 5 | - |

* From the nearest rail of railroad track

4 Phase Fully Actuated With Railroad Preemption (Prospect St. CLS)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- This location contains railroad preemption phasing. Do not program signal for late night flashing operation.
- The order of phase 3 and/or (phase 4 and 7) may be reversed.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Ensure flashing operation does not alter operation of blankout signs.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data:
Master Asset #: 10805.
Controller Asset #: 0313.



OASIS 2070 RR PREEMPT

| FUNCTION | PRE 1 |
|-------------------------------------|-------|
| Interval 1 - Track Clearance Green | 10 |
| Interval 1 - Track Clearance Yellow | 3.8 |
| Interval 1 - Track Clearance Red | 1.8 |
| Interval 2 - Dwell Green | 255 |
| Interval 2 - Dwell Yellow | 0.0* |
| Interval 2 - Dwell Red | 0.0* |
| Interval 5 - Exit Green | 1 |
| Interval 5 - Yellow | 0.0 |
| Interval 5 - Red | 0.0 |
| Exit Phase(s) | 3 |
| Priority | High |
| Delay Time | 0 |
| Min Green Before Pre | 1 |
| Ped Clear Before Pre | 0 |
| Yellow Clear Before Pre | 0.0* |
| Red Clear Before Pre | 0.0* |
| Dwell Min Time | 10 |
| Enable Backup Protection | N |
| Ped Clear Through Yellow | N |
| Omit Overlaps | C |

* Time defaults to time used for phase during normal operation

This signal was designed for simultaneous preemption.

OASIS 2070 TIMING CHART

| FEATURE | PHASE | | | | | |
|-------------------------|------------|-----|-----|------------|-----|-------|
| | 2 | 3 | 4 | 6 | 7 | TOL B |
| Min Green 1 * | 10 | 7 | 7 | 10 | 7 | 4 |
| Extension 1 * | 3.0 | 1.0 | 1.0 | 3.0 | 2.0 | |
| Max Green 1 * | 40 | 25 | 25 | 40 | 25 | |
| Yellow Clearance | 4.0 | 3.6 | 3.6 | 4.0 | 3.0 | 3.8 |
| Red Clearance | 1.9 | 2.6 | 2.7 | 1.9 | 1.4 | 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 | - | - | - | - | - | |
| Simultaneous Gap | ON | ON | ON | ON | ON | |

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

LEGEND

| PROPOSED | EXISTING |
|---|---|
| ○→ Traffic Signal Head | ●→ N/A |
| ○→ Modified Signal Head | ○→ N/A |
| ○→ Pedestrian Signal Head With Push Button & Sign | ○→ N/A |
| ○→ Signal Pole with Guy | ○→ N/A |
| ○→ Signal Pole with Sidewalk Guy | ○→ N/A |
| □ Inductive Loop Detector | □ Inductive Loop Detector |
| □ Master Controller & Cabinet | □ Master Controller & Cabinet |
| □ Junction Box | □ Junction Box |
| --- 2-in Underground Conduit | --- 2-in Underground Conduit |
| N/A Right of Way | N/A Right of Way |
| → Directional Arrow | → Directional Arrow |
| N/A Guardrail | N/A Guardrail |
| N/A Railroad Cantilever | N/A Railroad Cantilever |
| N/A Railroad Tracks | N/A Railroad Tracks |
| (A) "DO NOT STOP ON TRACKS" Sign (R8-8) | (A) "DO NOT STOP ON TRACKS" Sign (R8-8) |
| (B) "STOP HERE ON RED" Sign (R10-6) | (B) "STOP HERE ON RED" Sign (R10-6) |
| (C) "NO TURN ON RED" Sign (R10-11) | (C) "NO TURN ON RED" Sign (R10-11) |
| (D) "NO RIGHT TURN - TRAIN" L.E.D Blankout Sign | (D) "NO RIGHT TURN - TRAIN" L.E.D Blankout Sign |

New Installation

SR 1619 (Prospect Street) at I-85 Bus/US 29 SB-70 WB Ramp and SR 1621 (Bethel Dr.)

Division 8 Randolph County High Point

PLAN DATE: February 2015 REVIEWED BY: I. O. Umozurike

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

SCALE: 1"=50'

SEAL

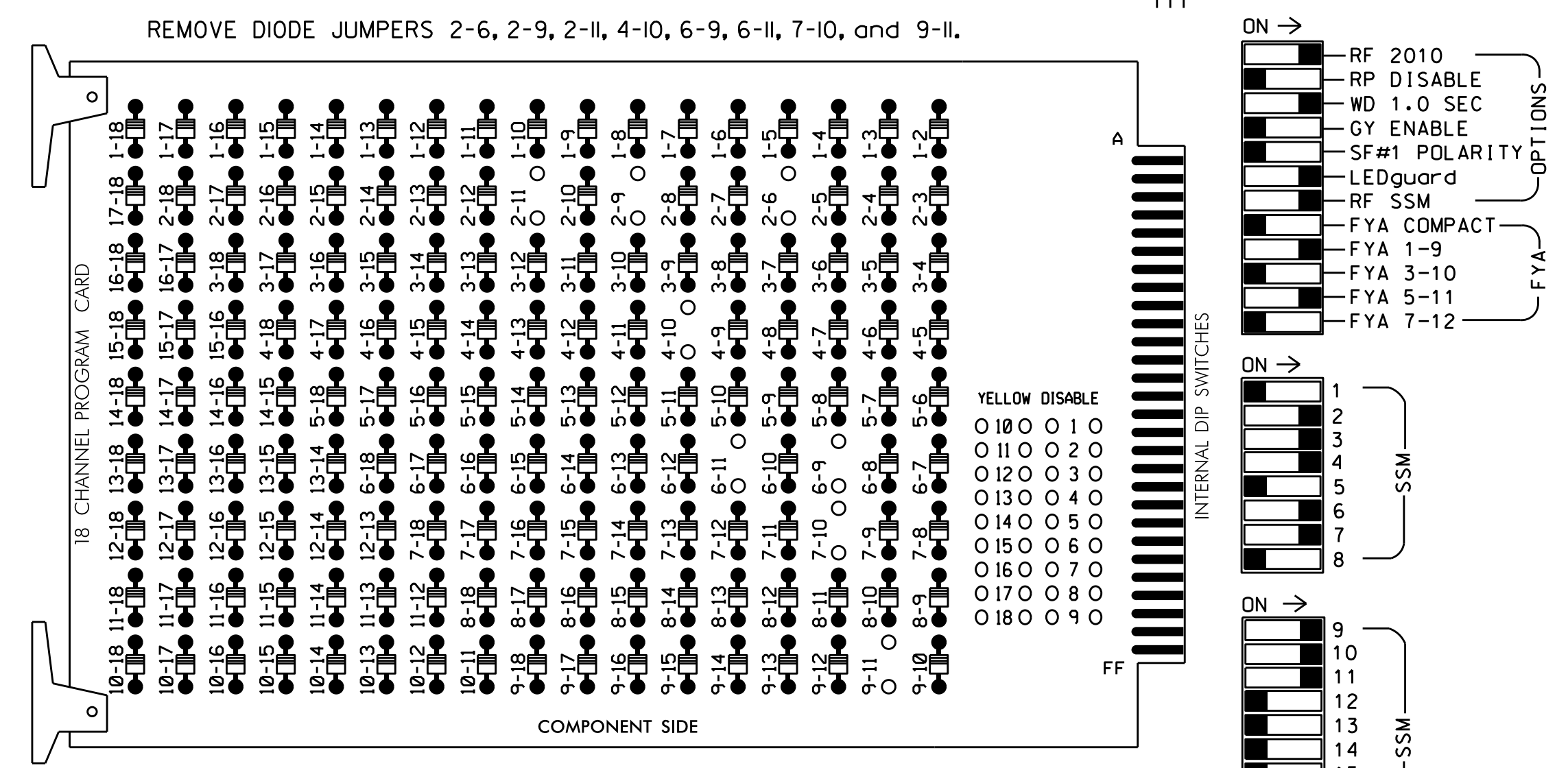
DATE: 2/19/2015

SIG. INVENTORY NO. 08-0313

19-FEB-2015 12:53
 P:\IT\Projects\016\0160313\0160313.dgn
 RZ:1600

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

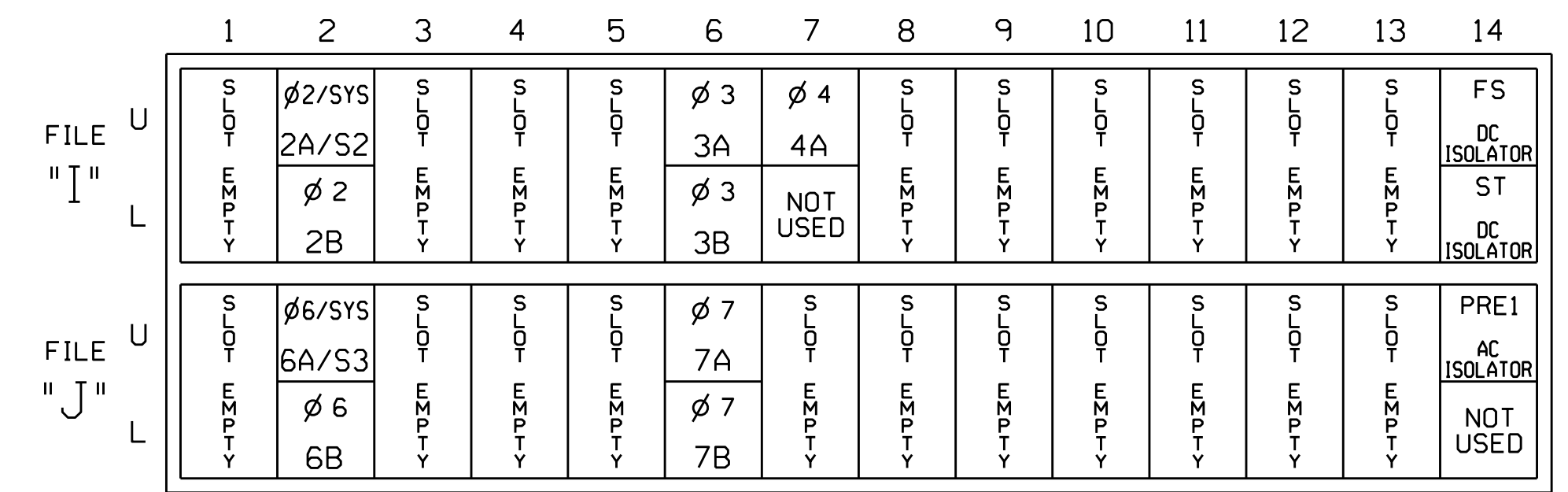


NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

INPUT FILE POSITION LAYOUT

(front view)

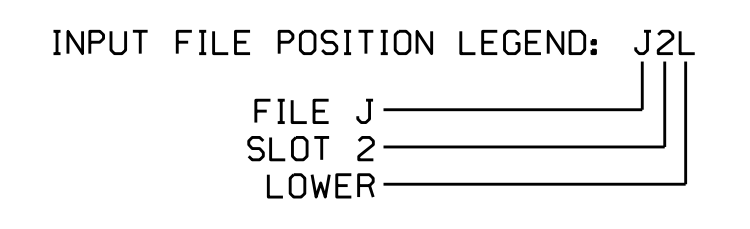


EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME
PRE1 = RR PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | INPUT ASSIGNMENT NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND | FULL TIME DELAY | STRETCH TIME | DELAY TIME |
|----------|---------------|-----------------|---------|----------------------|--------------|------------|------|--------|-----------------|--------------|------------|
| 2A/S2 | TB2-5,6 | I2U | 39 | 1 | 2 | 2/SYS | Y | Y | | | |
| 2B | TB2-7,8 | I2L | 43 | 5 | 12 | 2 | Y | Y | | | |
| 3A | TB4-9,10 | I6U | 41 | 3 | 4 | 3 | Y | Y | | | 3 |
| 3B | TB4-11,12 | I6L | 45 | 7 | 14 | 3 | Y | Y | | | 15 |
| 4A | TB6-1,2 | I7U | 65 | 27 | 34 | 4 | Y | Y | | | |
| 6A/S3 | TB3-5,6 | J2U | 40 | 2 | 6 | 6/SYS | Y | Y | | | |
| 6B | TB3-7,8 | J2L | 44 | 6 | 16 | 6 | Y | Y | | | |
| 7A | TB5-9,10 | J6U | 42 | 4 | 8 | 7 | Y | Y | | | 3 |
| 7B | TB5-11,12 | J6L | 46 | 8 | 18 | 7 | Y | Y | Y | | 5 |



SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 | | | | | | |
|-----------------------|----|-------|-------|-----|-----|-------|-----|----|-------|-----|-------|-------|--------|--------|--------|--------|--------|--------|------|----|-----|------|----|--|
| CMU CHANNEL NO. | 1 | 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 | | | | | | |
| PHASE | 1 | 2 | 2 PED | 3 | 4 | 4 PED | 5 | 6 | 6 PED | 7 | 8 | 8 PED | OLA | OLB | SPARE | OLC | OLD | SPARE | | | | | | |
| SIGNAL HEAD NO. | NU | 22,23 | NU | 23 | 31 | 32,33 | 41 | 42 | NU | NU | 62,63 | NU | 71 | 72 | NU | NU | 61* | 91 | 92 | NU | 21* | NU | NU | |
| RED | | 128 | | 116 | 116 | 101 | 101 | | | 134 | 122 | 122 | | | | | | A124 | A124 | | | | | |
| YELLOW | | 129 | | 117 | 117 | 102 | 102 | | | 135 | 123 | 123 | | | | | | A125 | A125 | | | | | |
| GREEN | | 130 | | 118 | 118 | 103 | 103 | | | 136 | 124 | 124 | | | | | | A126 | A126 | | | | | |
| RED ARROW | | | | | | | | | | | | | | | | | | A121 | | | | A114 | | |
| YELLOW ARROW | | | | | | | | | | | | | | | | | | A122 | | | | A115 | | |
| FLASHING YELLOW ARROW | | | | | | | | | | | | | | | | | | A123 | | | | A116 | | |
| GREEN ARROW | | | | | | | | | | | | | | | | | | A126 | | | | | | |

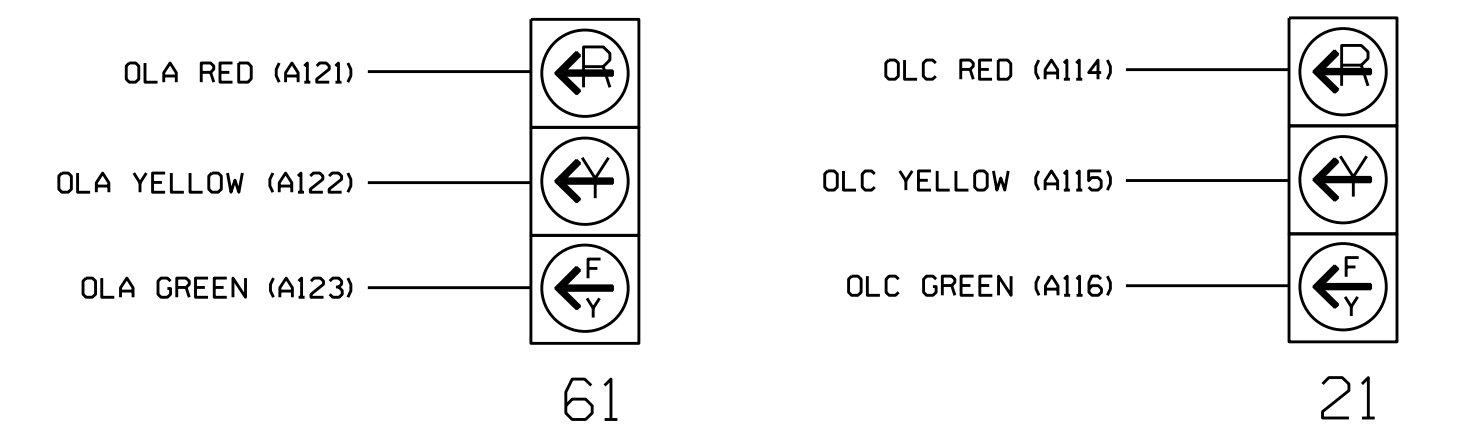
NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail below.

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 Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
5. The cabinet and controller are part of the Prospect St. Closed Loop System.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



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,S8,S10,AUX S1,AUX S2,AUX S4
PHASES USED.....2,3,4,6,7,9*
OVERLAP "A".....6
OVERLAP "B".....4+7+9
OVERLAP "C".....2
OVERLAP "D".....NOT USED
* PHASE USED DURING PREEMPT ONLY

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 08-0313
DESIGNED: February 2015
SEALED: 2/19/2015
REVISED: N/A

Electrical Detail - Sheet 1 of 3

| | | | |
|--|---|--|---|
| | Electrical and Programming Details For: | SR 1619 (Prospect Street) at I-85 Bus/US 29 SB-70 WB Ramp and SR 1621 (Bethel Dr.) | SEAL JOHN T. ROWE, JR. ENGINEER 008453 |
| | Prepared In the Offices of: | Division 8 Randolph County High Point | SEAL JOHN T. ROWE, JR. ENGINEER 008453 |
| PLAN DATE: February 2015 | REVIEWED BY: [Signature] | PREPARED BY: S. Armstrong | REVIEWED BY: [Signature] |
| REVISIONS | INIT. | DATE | Date Signed by: John T. Rowe, Jr. 2/23/2015 |
| 750 N. Greenfield Pkwy, Garner, NC 27529 | 841000145EE4F5 | DATE | SIG. INVENTORY NO. 08-0313 |

23-EDP-2015-08-56
 S:\ITS\ASIS\15_Signal\work\hgr\oups\g_Mon\mstr\prog\0313_sml.elec.xxx.dgn
 S:\ITS\ASIS\15_Signal\work\hgr\oups\g_Mon\mstr\prog\0313_sml.elec.xxx.dgn
 S:\ITS\ASIS\15_Signal\work\hgr\oups\g_Mon\mstr\prog\0313_sml.elec.xxx.dgn

OVERLAP PROGRAMMING DETAIL
(program controller as shown below)

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

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:      12345678910111213141516
VEH OVL PARENTS:  X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR:  _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

PRESS '+'

```

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:      12345678910111213141516
VEH OVL PARENTS:  X X X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:  X X
STARTUP COLOR:  _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.4
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...3.8
RED CLEAR (0=PARENT,0.1-25.5 SEC)...1.8
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

PRESS '+'

```

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:      12345678910111213141516
VEH OVL PARENTS:  X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR:  _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
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: 08-0313
DESIGNED: February 2015
SEALED: 2/19/2015
REVISED: N/A

PREEMPT ONLY PHASE OMIT NOTE
(program controller as shown below)


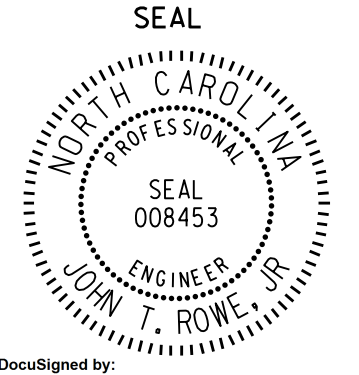
From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phase 9 for 'Omit Phase' and Phases 2, 3, 4, 6, and 7 for 'Startup Calls'. This is to prevent Phase 9 from being served when not in Preempt.

PHASE SEQUENCE PROGRAMMING DETAIL
(program controller as shown below)

FROM DASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

| PHASE SEQUENCE: PAGE 1 | | NEXT: PAGES) | | | | |
|------------------------|-----------|--------------|-----------|------------|-----------|-------|
| RNG\LEAD | BARRIER 1 | X-LAG\LEAD | BARRIER 2 | X-LAG\LEAD | BARRIER 3 | X-LAG |
| 1 :0 | 2 | 0 | 0 | 3 | 4 | 7 |
| 2 :0 | 6 | 0 | 0 | 0 | 0 | 0 |
| 3 :0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 :0 | 0 | 0 | 0 | 0 | 0 | 0 |

Electrical Detail - Sheet 2 of 3

| | | | |
|--|---|---|--|
| ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of:  | SR 1619 (Prospect Street) at I-85 Bus/US 29 SB-70 WB Ramp and SR 1621 (Bethel Dr.) | | SEAL  SEAL 008453 JOHN T. ROWE, JR. ENGINEER |
| | Division 8 PLAN DATE: February 2015 PREPARED BY: S. Armstrong | Randolph County High Point REVIEWED BY: JTR REVIEWED BY: | |

20-1-15-2015 08:47
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 somstrong

RAILROAD PREEMPTION PROGRAMMING DETAIL

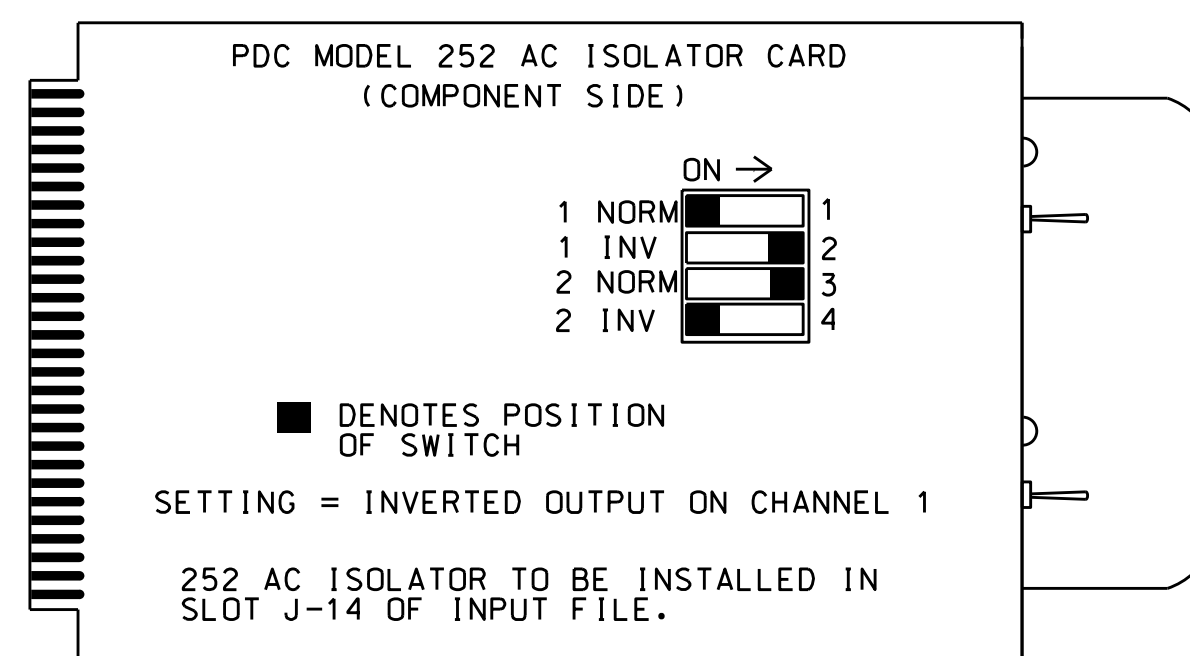
(program controller as shown below)

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

| PREEMPTION #1 | SETTINGS (NEXT:1-10) |
|--------------------------------------|-------------------------|
| INTERVAL/TIMING | CLEAR/DWELL PHASES |
| GRN YEL RED | 12345678910111213141516 |
| 1 10 3.8 1.8 | X |
| 2 255 0.0 0.0 | X X |
| 3 0 0.0 0.0 | |
| 4 0 0.0 0.0 | |
| 5 1 0.0 0.0 | X |
| EXIT CALLS | |
| OPTIONS | |
| PRIORITY (Y/N TO SELECT) |HIGH |
| DELAY TIMER (0-255 SEC) |0 |
| MIN GREEN BEFORE PRE (0= DEFAULT) | ...1 |
| PED CLEAR BEFORE PRE (0= DEFAULT) | ...0 |
| YELLOW CLEAR BEFORE PRE (0= DEFAULT) | ...0 |
| RED CLEAR BEFORE PRE (0= DEFAULT) | ...0 |
| DWELL MIN TIMER (0-255 SEC) |10 |
| DWELL MAX TIMER (0=OFF,1-255MIN) | ...0 |
| DWELL HOLD-OVER TIMER (0-255) |0 |
| LATCH CALL? |N |
| LINK TO NEXT PREEMPT? |N |
| ENABLE BACKUP PROTECTION? |N |
| HOLD CLEAR 1 PHASES DURING DELAY? | ...N |
| FAST GREEN FLASH DWELL PHASES? |N |
| PED CLEARANCE THROUGH YELLOW? |N |
| INHIBIT OVERLAP GREEN EXTENSION? |N |
| SERVICE DURING SOFTWARE FLASH? |N |
| REST IN RED DURING DWELL INTERVAL? | ...N |
| FLASH DWELL INTERVAL? |N |
| ALLOW PEDS IN DWELL INTERVAL? |N |
| RE-TIME DWELL INTERVAL? |N |
| OVERLAPS: | ABCDEFGHIJKLMN |
| DWELL INT FLASH YELLOW | |
| OMIT OVERLAPS: | X |

**PREEMPT 1 AC ISOLATOR (MODEL 252)
OUTPUT PROGRAMMING DETAIL**

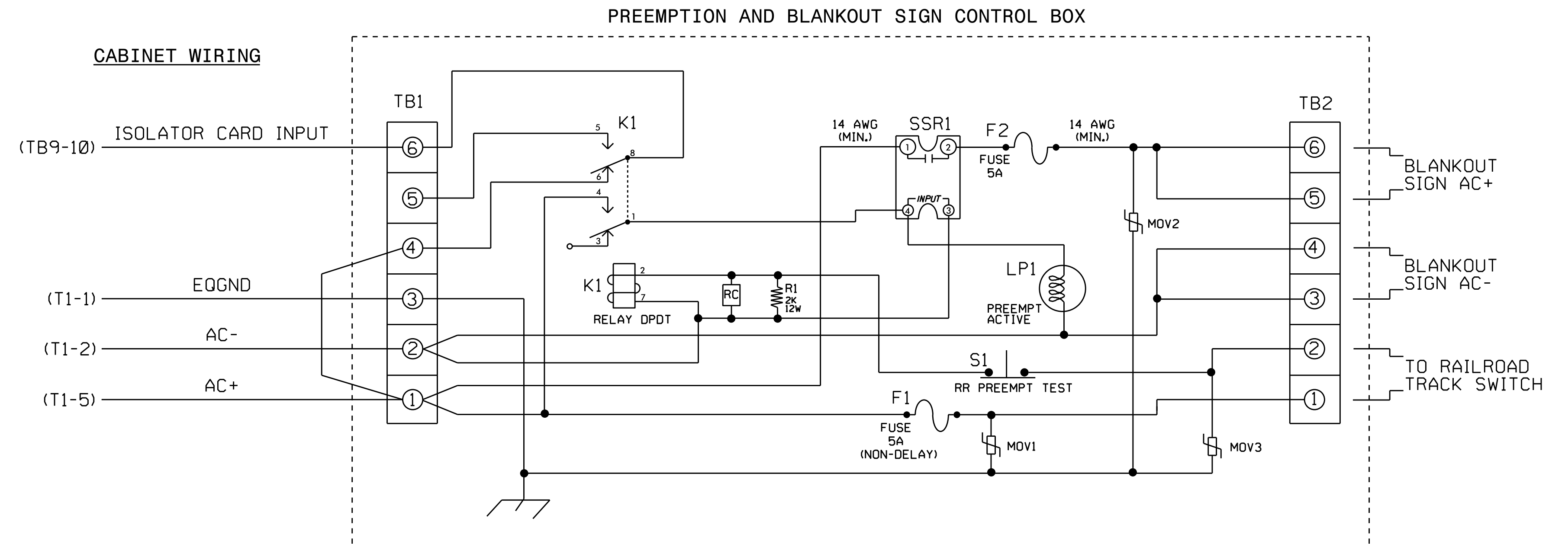
(set DIP switches as shown below)



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

RAILROAD PREEMPTION WIRING DETAIL

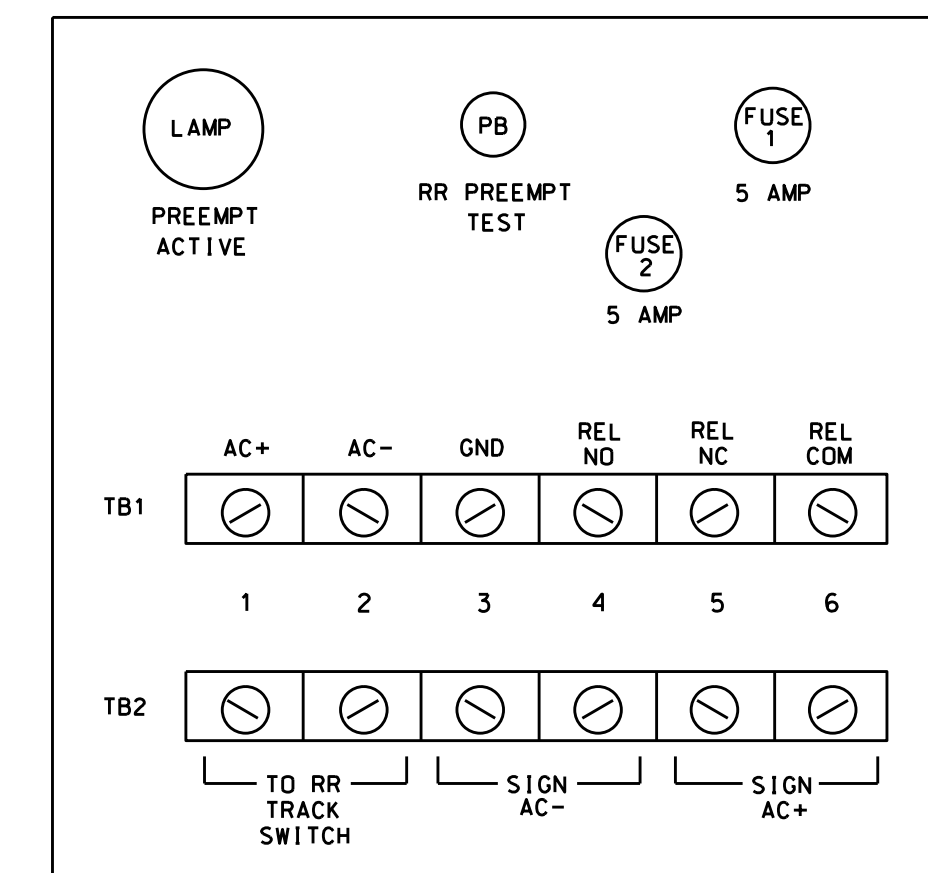
(wire as shown below)



NOTES

- Relay K1 is shown in the energized (Preempt not active) normal operation state.
- Relay K1 is a DPDT with 120VAC coil with octal base.
- Relay SSR1 is a SPST (normally open) Solid State Relay with AC input and AC (25 amp) output.
- 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.
- IMPORTANT!!** A jumper must be added between input file terminals J14-E and J14-K if not already present. Also, terminal TB9-12 (on input panel) shall be connected to AC neutral (jumper may have to be added).

FRONT VIEW

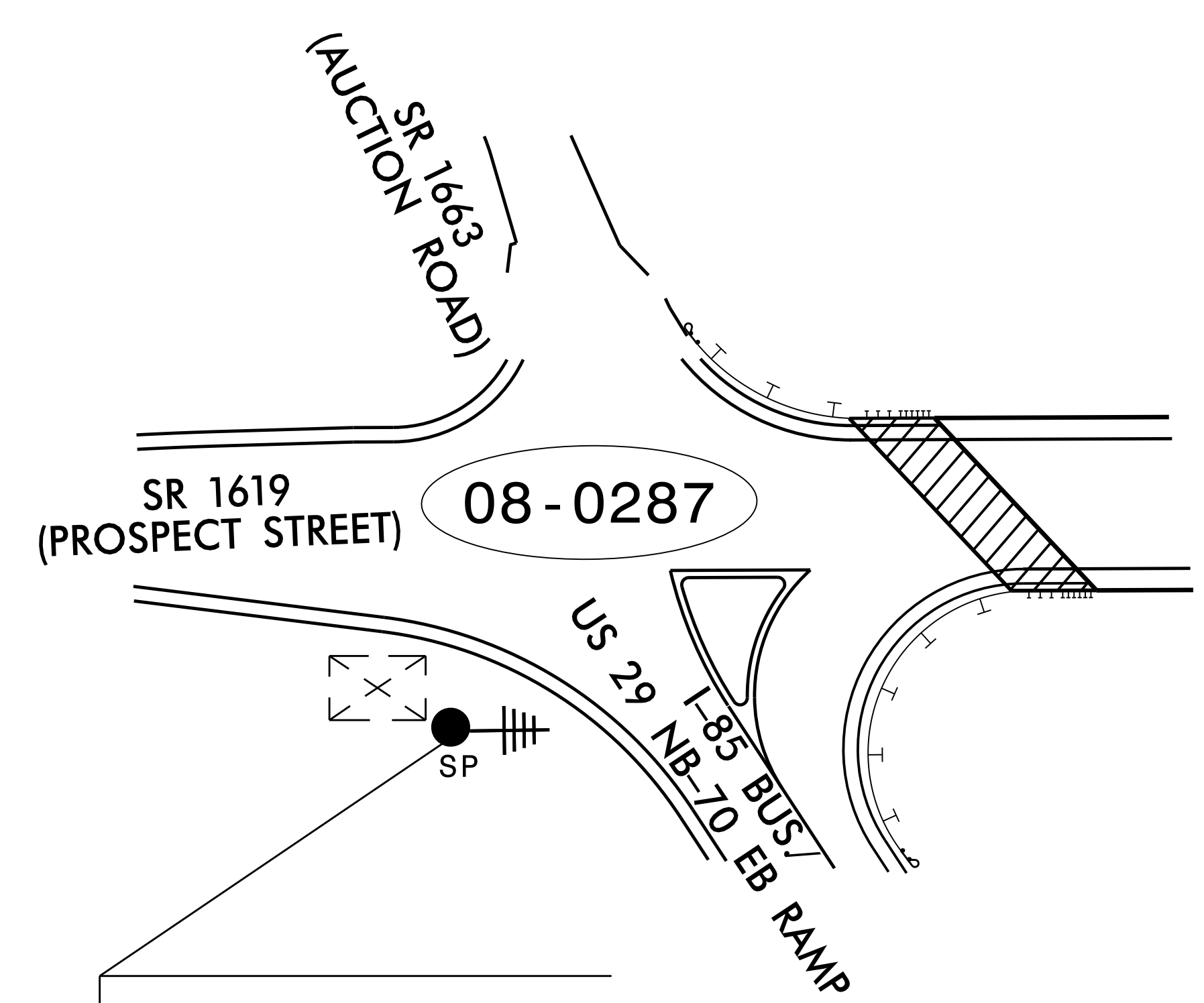


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 08-0313
DESIGNED: February 2015
SEALED: 2/19/2015
REVISED: N/A

Electrical Detail - Sheet 3 of 3

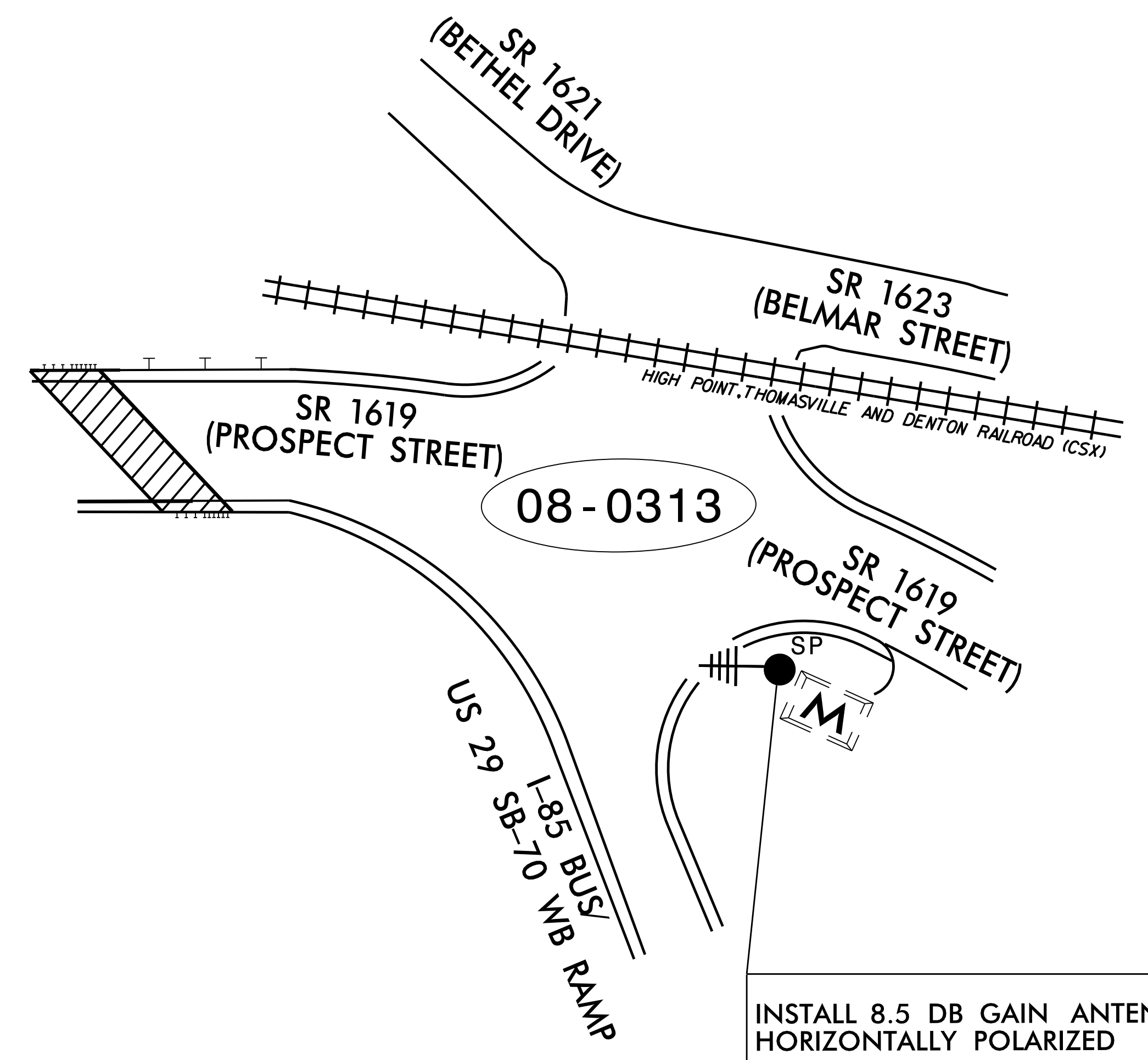
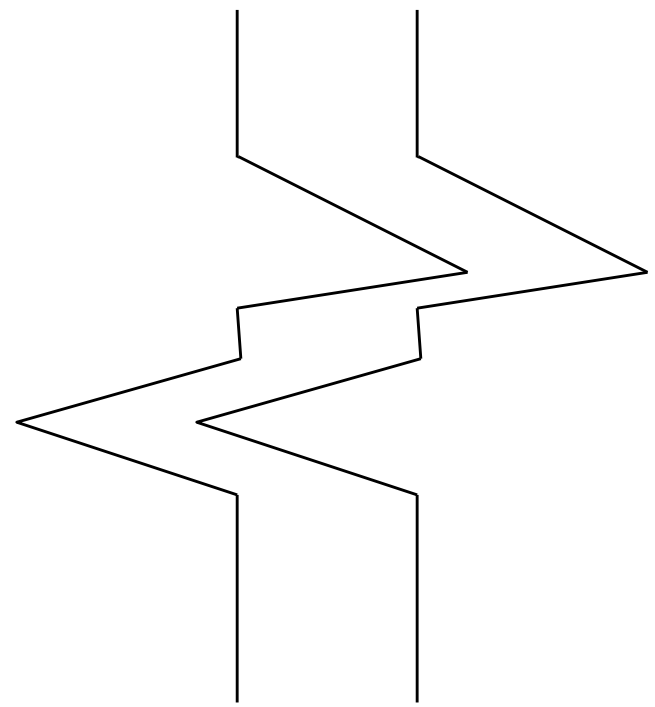
| | | |
|--|--|----------|
| | DETAILS FOR: SR 1619 (Prospect Street) at I-85 Bus/US 29 SB-70 WB Ramp and SR 1621 (Bethel Dr.) | SEAL |
| | Division 8 Randolph County High Point PLAN DATE: February 2015 REVIEWED BY: JTR PREPARED BY: S. Armstrong REVIEWED BY: | |

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 sarmstrong



INSTALL 8.5 DB GAIN ANTENNA
HORIZONTALLY POLARIZED

ATTACH ANTENNA 12"
ABOVE SIGNAL CABLE



INSTALL 8.5 DB GAIN ANTENNA
HORIZONTALLY POLARIZED

ATTACH ANTENNA 12"
ABOVE SIGNAL CABLE

INSTALL TELEPHONE SERVICE

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

LEGEND

| | |
|--|--|
| | YAGI ANTENNA (SINGLE) |
| | EXISTING CONTROLLER AND CABINET |
| | EXISTING MASTER CONTROLLER AND CABINET |
| | SIGNAL INVENTORY NUMBER |
| | EXISTING WOOD POLE |
| | SIGNAL POLE |

| | | | |
|--|--|---------------------------------------|--|
| Prepared in the Offices of: 750 N. Greenfield Pkwy., Garner, NC 27529 | WIRELESS COMMUNICATION PLAN | | |
| | DIVISION 8 RANDOLPH CO. HIGH POINT PLAN DATE: FEBRUARY 2015 REVIEWED BY: N. Avery PREPARED BY: H. T. BERGGREN REVIEWED BY: 99F5094CBED9443 | | |
| SCALE | REVISIONS _____ _____ _____ | INIT. DATE _____ _____ _____ | DocuSigned by: Gregory A. Fuller 2/17/2015 DATE _____ |