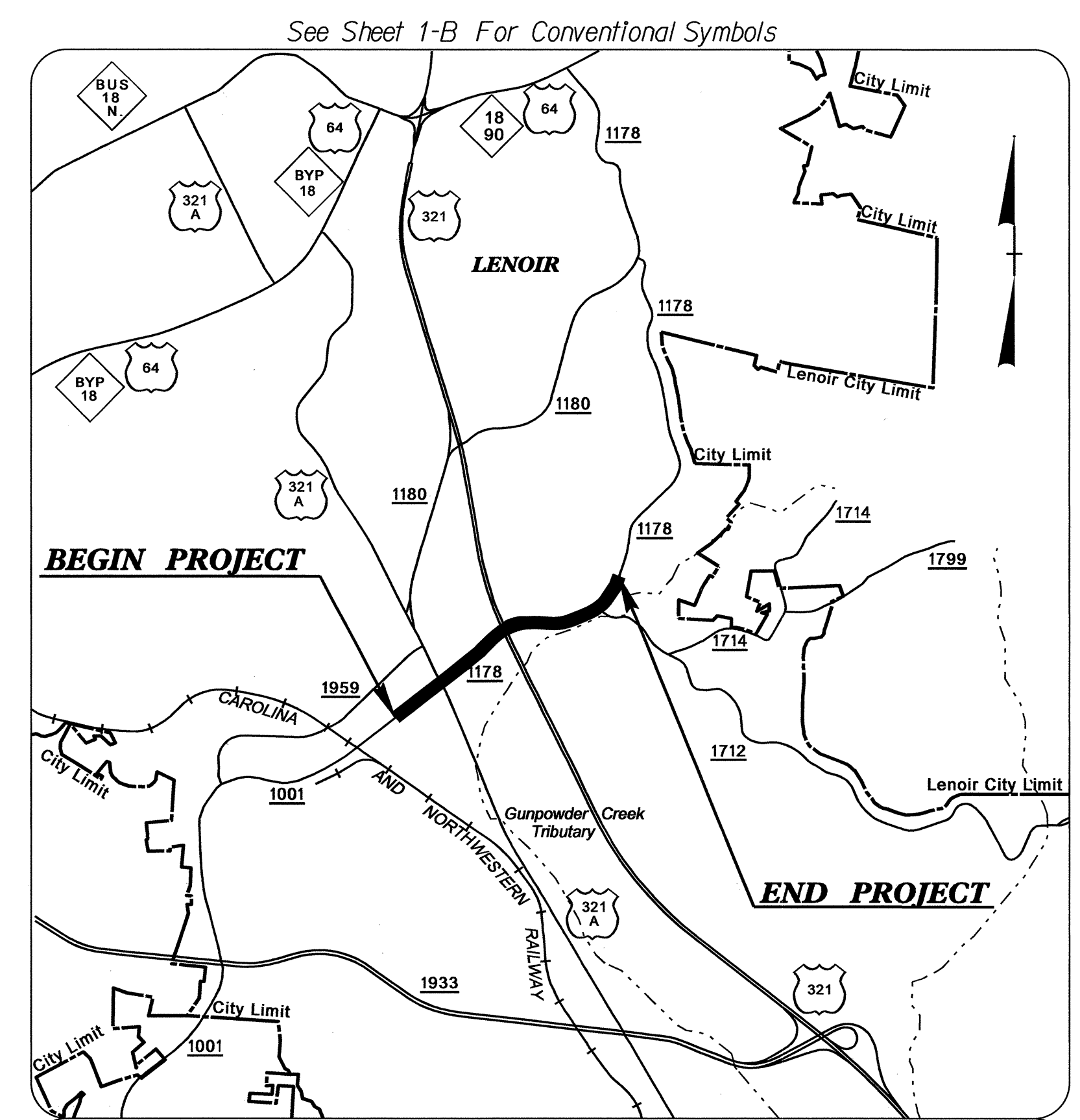
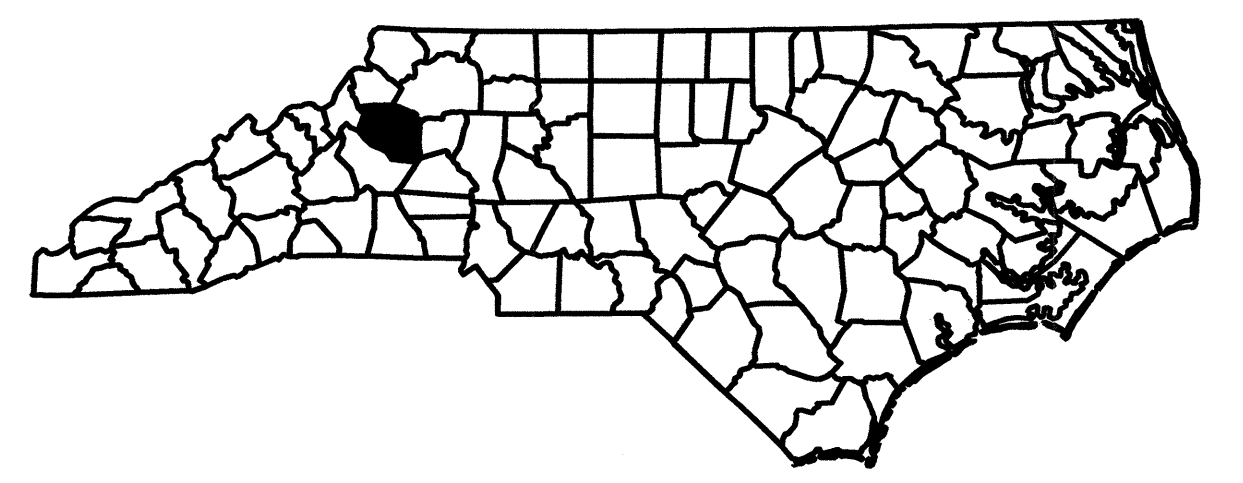


**TIP PROJECT: U-2211B**

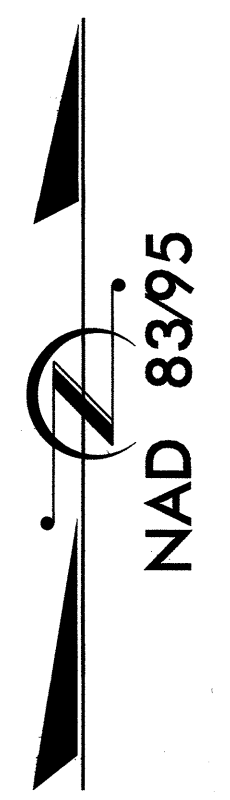
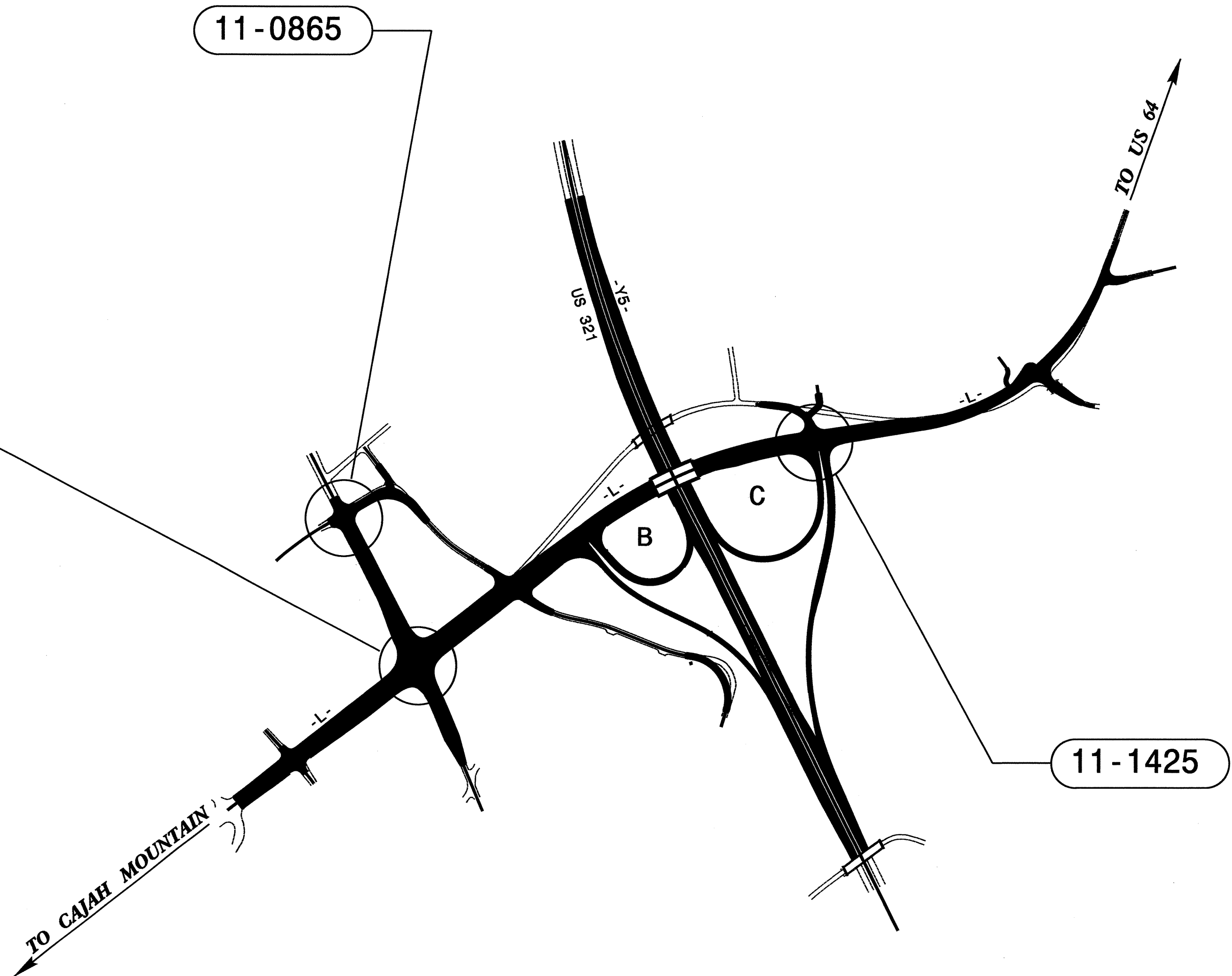
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**CALDWELL COUNTY**

**LOCATION: LENOIR - SR 1001 (HIBRITEN DRIVE) FROM US 321A (NORWOOD STREET) TO SR 1712 (STARCROSS ROAD) EAST OF US 321**

**TYPE OF WORK: SIGNALS**



VICINITY MAP SHOWING LOCATION OF PROJECT U-2211B



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

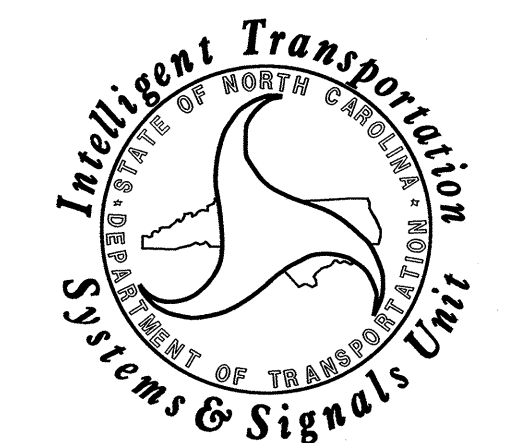
| Sheet #    | Reference # | Location/Description   |
|------------|-------------|--|
| Sig. 1     |             | Title Sheet  |
| Sig. 2-11  | 11-1297     | US 321A (Norwood Street) at SR 1178 (Hibriten Drive)                         |
| Sig. 12-14 | 11-1425     | US 321 NB Ramp / Old Hibriten Drive at SR 1178 (Hibriten Drive)              |
| Sig. 15-22 | 11-0865     | US 321A (Norwood Street) at SR 1959 (Connelly Springs Road) / Berkley Street |
| Sig. 23-28 |             | Standard Drawings for Metal Poles  |

**INTELLIGENT TRANSPORTATION AND SIGNALS UNIT**

Contacts:

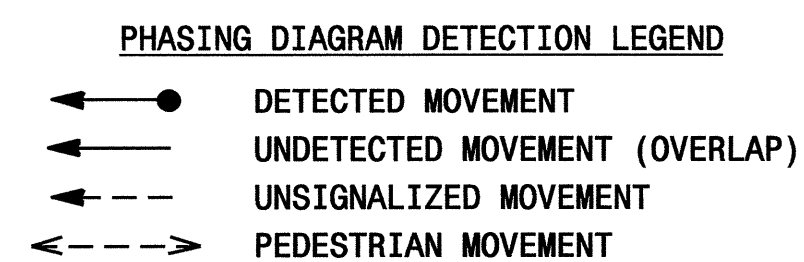
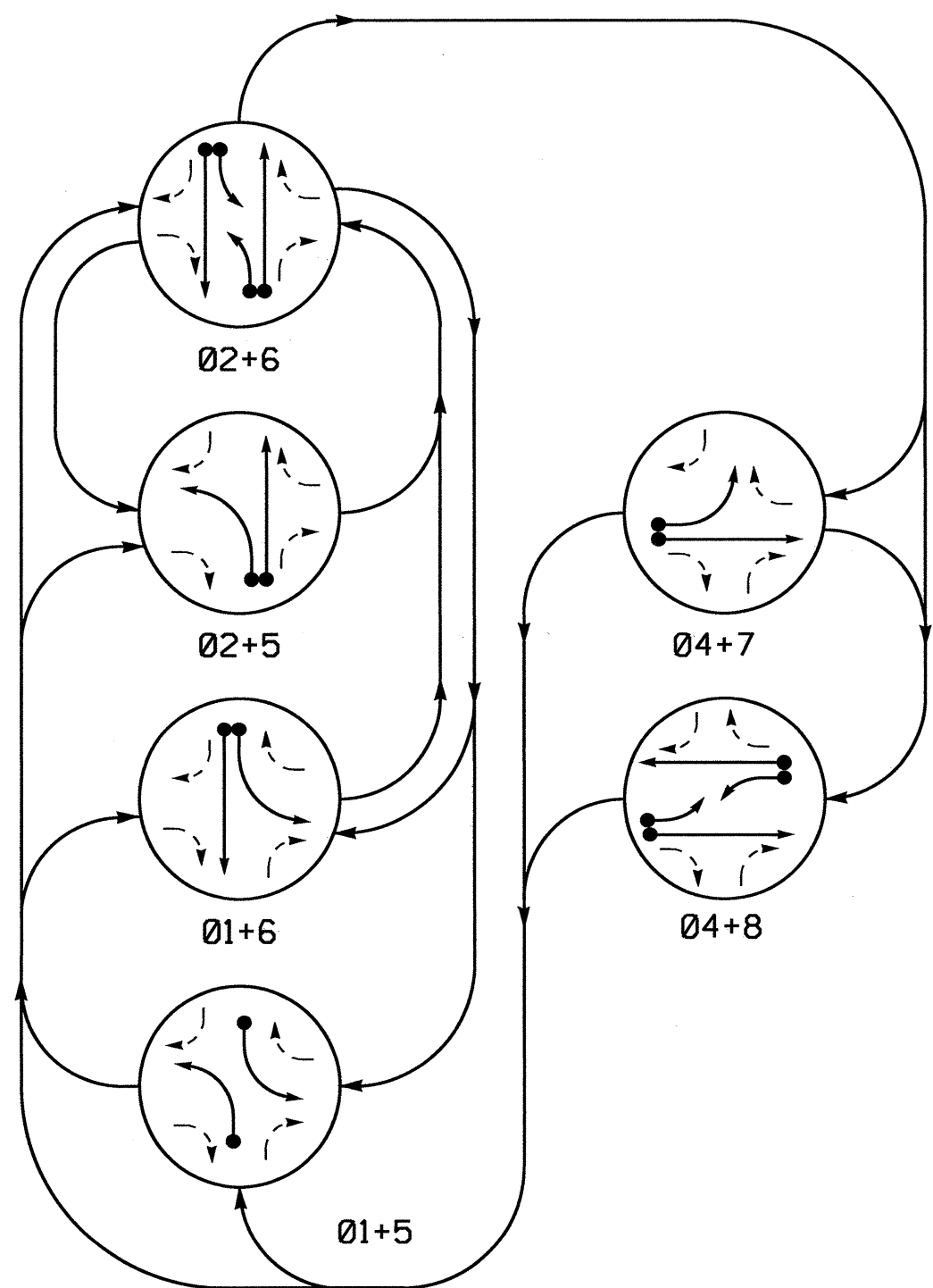
**Zachary Little, PE - West Region Signal Project Engineer**  
**John Rowe, PE - Signal Equipment Design Engineer**

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



31-JAN-2012 08:47 R:\Traffic\Signals\Design\Titlesheet\U2211B\_rdy\_rsh.dgn zmlt+le

PHASING DIAGRAM

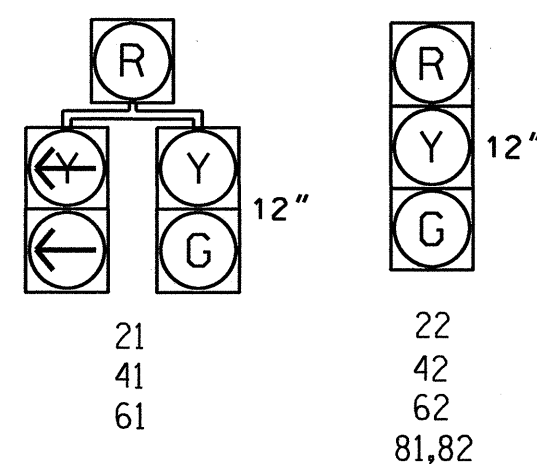


**TABLE OF OPERATION**

| SIGNAL FACE | PHASE |      |      |      |      |      |    |    |
|-------------|-------|------|------|------|------|------|----|----|
|             | 01+5  | 01+6 | 02+5 | 02+6 | 04+7 | 04+8 | FL | HS |
| 21          | R     | R    | G    | G    | R    | R    | Y  |    |
| 22          | R     | R    | G    | G    | R    | R    | Y  |    |
| 41          | R     | R    | R    | R    | G    | G    | R  |    |
| 42          | R     | R    | R    | R    | G    | G    | R  |    |
| 61          | R     | R    | G    | G    | R    | R    | Y  |    |
| 62          | R     | G    | R    | G    | R    | R    | Y  |    |
| 81,82       | R     | R    | R    | R    | R    | G    | R  |    |

**SIGNAL FACE I.D.**

All Heads L.E.D.



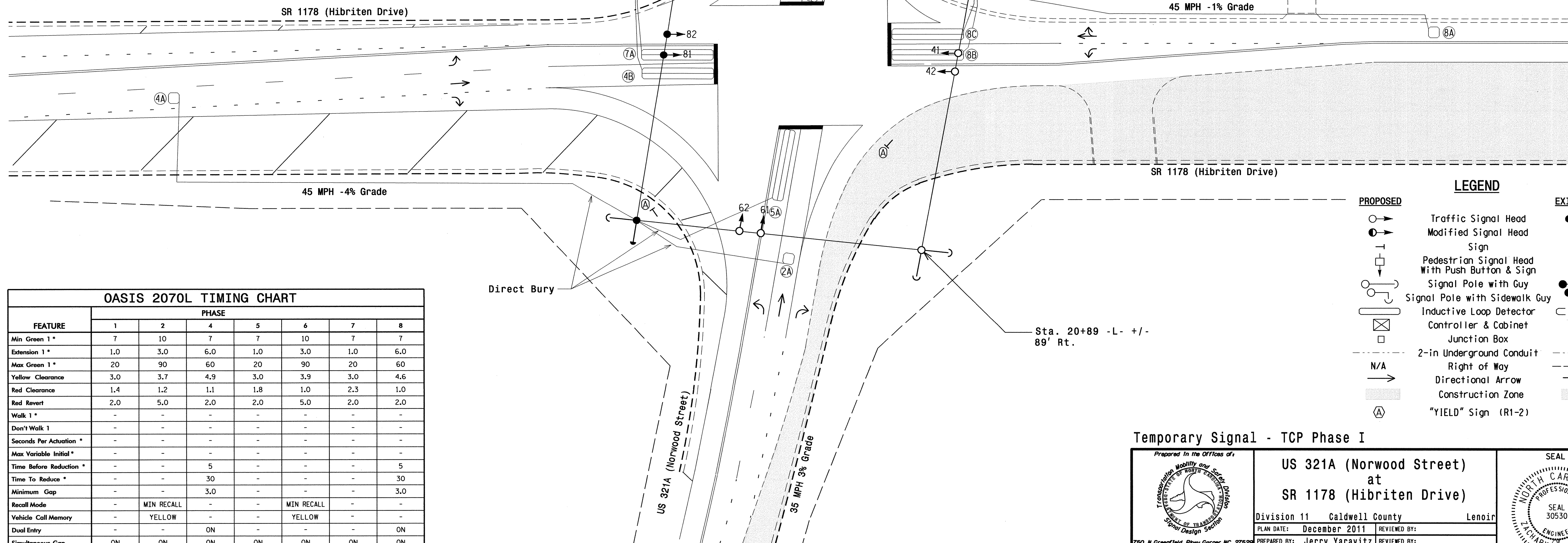
**OASIS 2070L LOOP & DETECTOR INSTALLATION CHART**

| LOOP | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | DETECTOR PROGRAMMING |         |           |                 | STRETCH TIME | DELAY TIME | SYSTEM LOOP | NEW CARD |
|------|-----------|----------------------------|-------|----------|----------------------|---------|-----------|-----------------|--------------|------------|-------------|----------|
|      |           |                            |       |          | PHASE                | CALLING | EXTENSION | FULL TIME DELAY |              |            |             |          |
| 1A   | 6X40      | 0                          | 2-4-2 | Y        | 1                    | Y       | Y         | -               | -            | 15         | -           | Y        |
| 2A   | 6X6       | 70                         | 5     | Y        | 2                    | Y       | Y         | -               | -            | -          | -           | Y        |
| 4A   | 6X6       | 300                        | 5     | Y        | 4                    | -       | Y         | -               | -            | -          | -           | Y        |
| 4B   | 6X40      | 0                          | 2-4-2 | Y        | 4                    | Y       | Y         | Y               | 2.0          | 5          | -           | Y        |
| 5A   | 6X40      | 0                          | 2-4-2 | Y        | 5                    | Y       | Y         | -               | -            | 15         | -           | Y        |
| 6A   | 6X6       | 70                         | 5     | Y        | 6                    | Y       | Y         | -               | -            | -          | -           | Y        |
| 7A   | 6X40      | 0                          | 2-4-2 | Y        | 7                    | Y       | Y         | -               | -            | 15         | -           | Y        |
| 8A   | 6X6       | 300                        | 2-4-2 | Y        | 8                    | -       | Y         | -               | -            | -          | -           | Y        |
| 8B   | 6X40      | 0                          | 2-4-2 | Y        | 8                    | Y       | Y         | Y               | -            | 3          | -           | Y        |
| 8C   | 6X40      | 0                          | 2-4-2 | Y        | 8                    | Y       | Y         | Y               | 2.0          | 5          | -           | Y        |

6 Phase Fully Actuated Isolated

NOTES

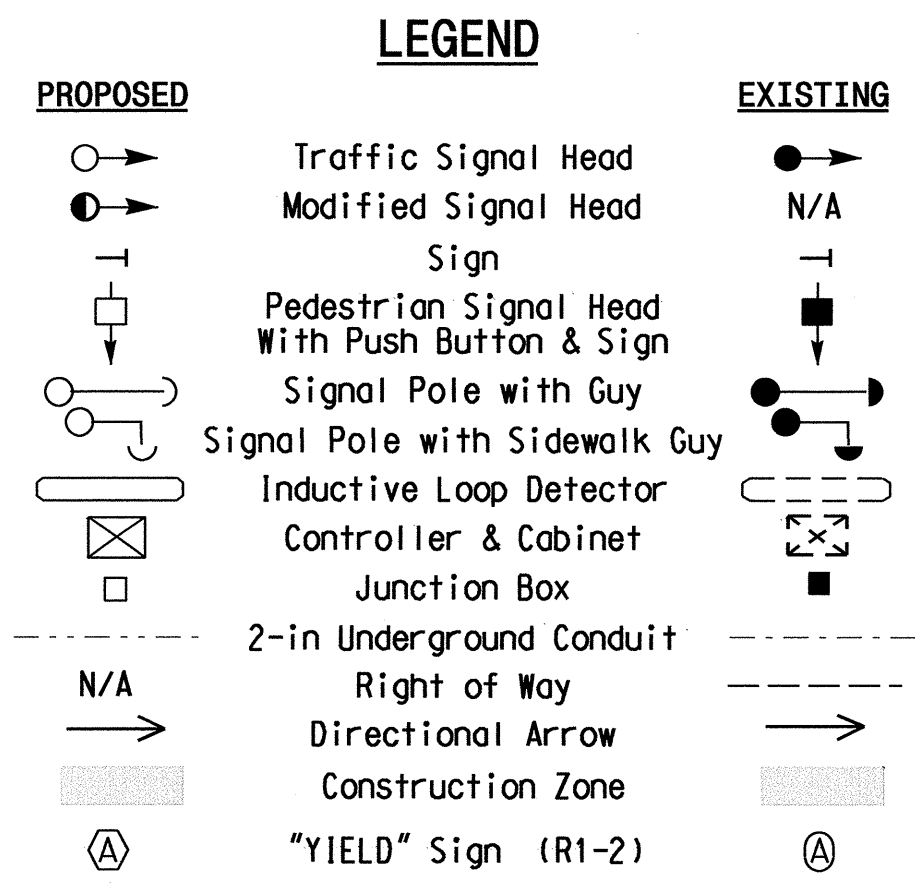
- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Enable Backup Protect for phase 2 and 6 to allow the controller to clear from phase 2+6 to phase 1 and/or phase 5 by progressing through an all red display.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.



**OASIS 2070L TIMING CHART**

| FEATURE                | PHASE |            |     |     |            |     |     |  |
|------------------------|-------|------------|-----|-----|------------|-----|-----|--|
|                        | 1     | 2          | 4   | 5   | 6          | 7   | 8   |  |
| Min Green 1*           | 7     | 10         | 7   | 7   | 10         | 7   | 7   |  |
| Extension 1*           | 1.0   | 3.0        | 6.0 | 1.0 | 3.0        | 1.0 | 6.0 |  |
| Max Green 1*           | 20    | 90         | 60  | 20  | 90         | 20  | 60  |  |
| Yellow Clearance       | 3.0   | 3.7        | 4.9 | 3.0 | 3.9        | 3.0 | 4.6 |  |
| Red Clearance          | 1.4   | 1.2        | 1.1 | 1.8 | 1.0        | 2.3 | 1.0 |  |
| Red Revert             | 2.0   | 5.0        | 2.0 | 2.0 | 5.0        | 2.0 | 2.0 |  |
| Walk 1*                | -     | -          | -   | -   | -          | -   | -   |  |
| Don't Walk 1           | -     | -          | -   | -   | -          | -   | -   |  |
| Seconds Per Actuation* | -     | -          | -   | -   | -          | -   | -   |  |
| Max Variable Initial*  | -     | -          | -   | -   | -          | -   | -   |  |
| Time Before Reduction* | -     | -          | 5   | -   | -          | -   | 5   |  |
| Time To Reduce*        | -     | -          | 30  | -   | -          | -   | 30  |  |
| Minimum Gap            | -     | -          | 3.0 | -   | -          | -   | 3.0 |  |
| Recall Mode            | -     | MIN RECALL | -   | -   | MIN RECALL | -   | -   |  |
| Vehicle Call Memory    | -     | YELLOW     | -   | -   | YELLOW     | -   | -   |  |
| Dual Entry             | -     | -          | ON  | -   | -          | -   | ON  |  |
| Simultaneous Gap       | ON    | 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.

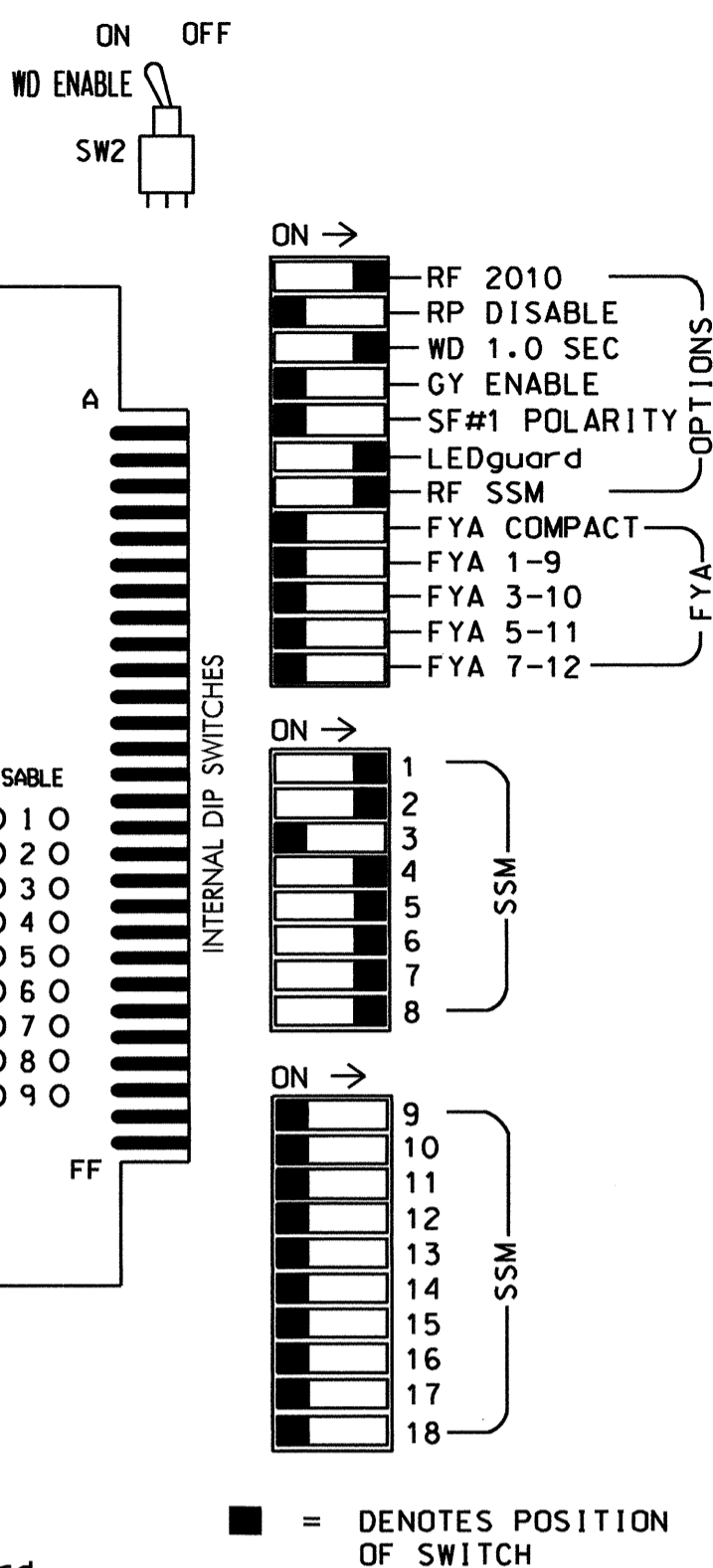
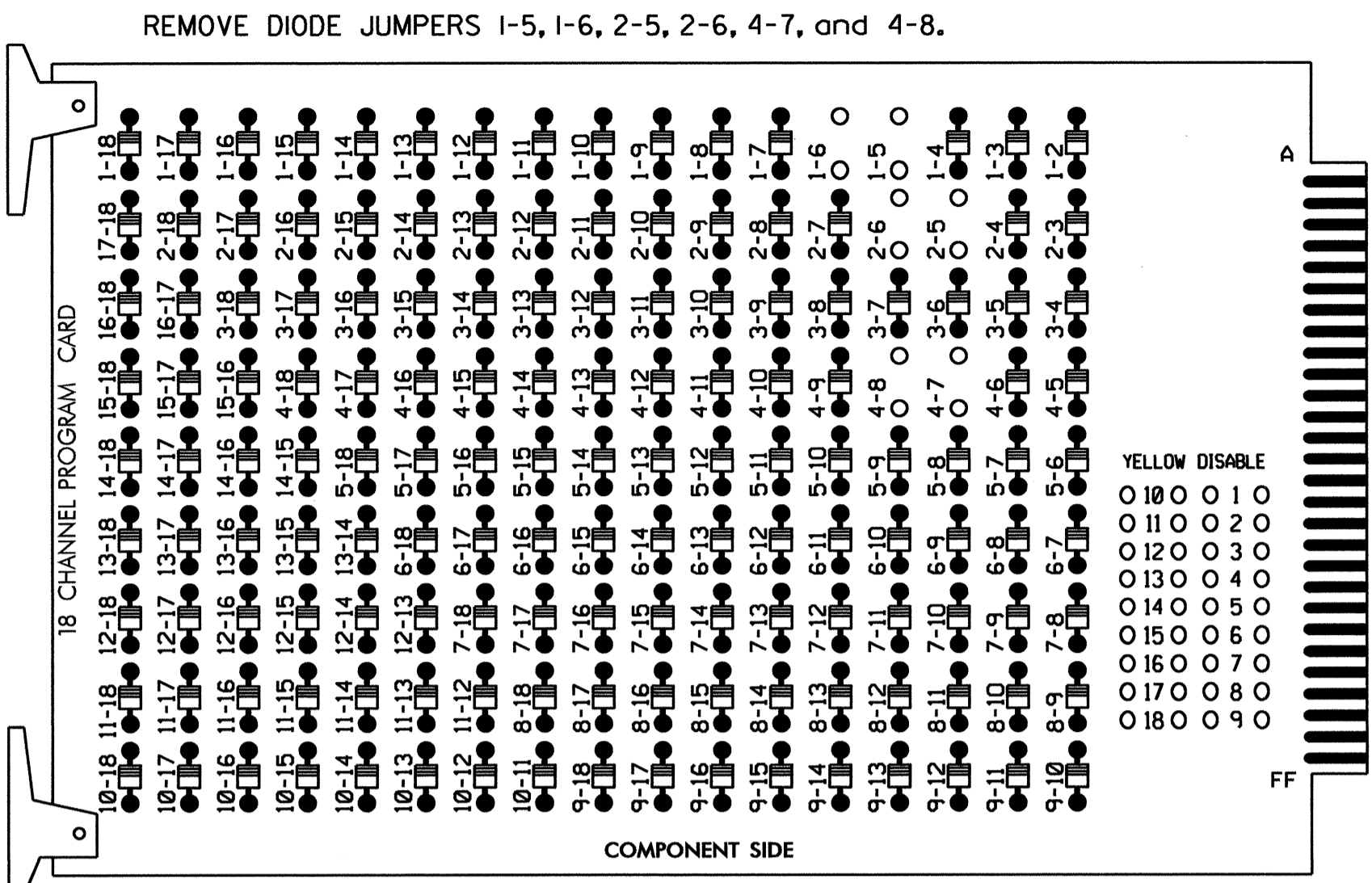


Temporary Signal - TCP Phase I

|                                    |   |   |
|------------------------------------|---|---|
|                                    | <p>US 321A (Norwood Street) at SR 1178 (Hibriten Drive)</p> |   |
|                                    | <p>Division 11 Caldwell County Lenoir</p>                   | <p>Division 11 Caldwell County Lenoir</p> |
|                                    | <p>PLAN DATE: December 2011</p>                             | <p>REVIEWED BY:</p>                       |
| <p>PREPARED BY: Jerry Varavitz</p> | <p>REVIEWED BY:</p>   | <p>SCALE: 1"=30'</p>                      |
| <p>REVISIONS</p>                   | <p>INIT.</p>  | <p>DATE</p>                               |
| <p>SIGNATURE</p>                   | <p>DATE</p>   | <p>DATE</p>                               |

30-JAN-2012 08:33

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



REMOVE JUMPERS AS SHOWN

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

**NOTES**

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

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S10,S11  
 PHASES USED.....1,2,4,5,6,7,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....NOT USED

**SIGNAL HEAD HOOK-UP CHART**

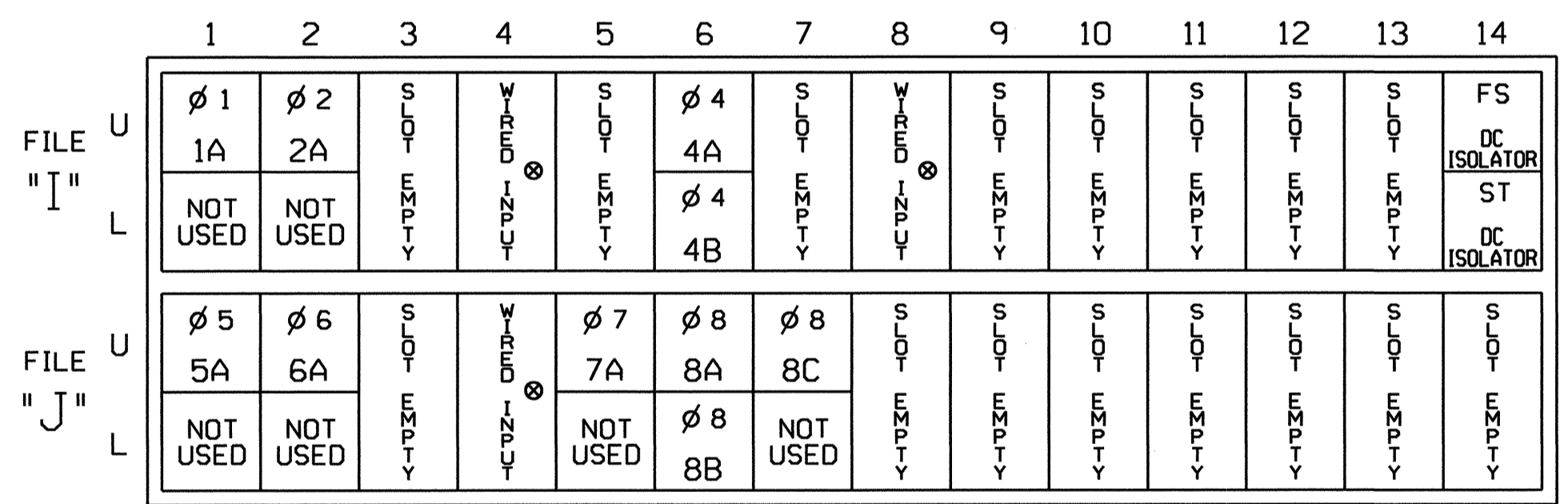
| LOAD SWITCH NO. | S1  | S2    | S3    | S4 | S5    | S6    | S7 | S8    | S9    | S10 | S11   | S12   | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------|-----|-------|-------|----|-------|-------|----|-------|-------|-----|-------|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1   | 2     | 13    | 3  | 4     | 14    | 5  | 6     | 15    | 7   | 8     | 16    | 9      | 10     | 17     | 11     | 12     | 18     |
| PHASE           | 1   | 2     | 2 PED | 3  | 4     | 4 PED | 5  | 6     | 6 PED | 7   | 8     | 8 PED | OLA    | OLB    | SPARE  | OLC    | OLD    | SPARE  |
| SIGNAL HEAD NO. | 61  | 21,22 | NU    | NU | 41,42 | NU    | 21 | 61,62 | NU    | 41  | 81,82 | NU    | NU     | NU     | NU     | NU     | NU     | NU     |
| RED             | *   | 128   |       |    | 101   |       | *  | 134   |       | *   | 107   |       |        |        |        |        |        |        |
| YELLOW          |     | 129   |       |    | 102   |       |    | 135   |       |     | 108   |       |        |        |        |        |        |        |
| GREEN           |     | 130   |       |    | 103   |       |    | 136   |       |     | 109   |       |        |        |        |        |        |        |
| RED ARROW       |     |       |       |    |       |       |    |       |       |     |       |       |        |        |        |        |        |        |
| YELLOW ARROW    | 126 |       |       |    |       |       |    | 132   |       | 123 |       |       |        |        |        |        |        |        |
| GREEN ARROW     | 127 |       |       |    |       |       |    | 133   |       | 124 |       |       |        |        |        |        |        |        |

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

**BACKUP PROTECTION NOTE**

(program controller as shown below)  
 From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**INPUT FILE POSITION LAYOUT**  
(from view)

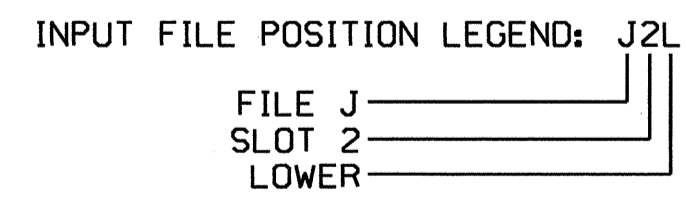


EX.: 1A, 2A, ETC. = LOOP NO.'S  
 FS = FLASH SENSE  
 ST = STOP TIME  
 ⊗ Wired Input - Do not populate slot with detector card

**INPUT FILE CONNECTION & PROGRAMMING CHART**

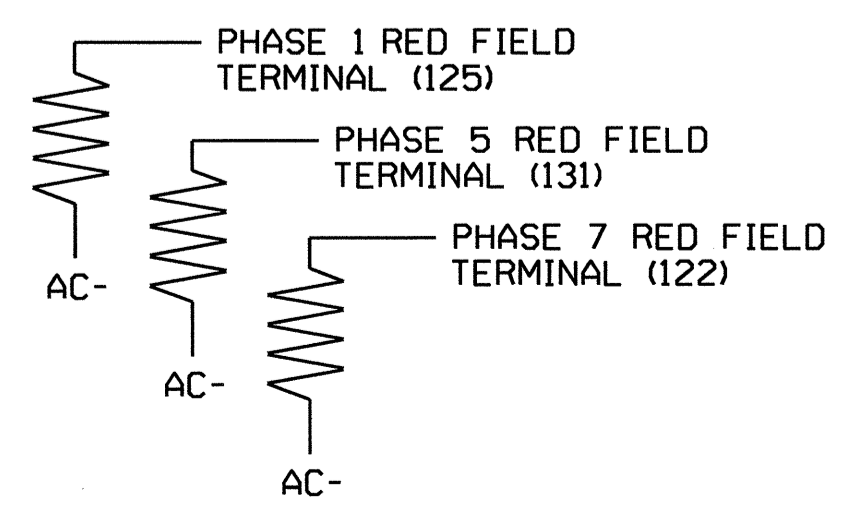
| LOOP NO.        | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | INPUT ASSIGNMENT NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND | FULL TIME DELAY | STRETCH TIME | DELAY TIME |
|-----------------|---------------|-----------------|---------|----------------------|--------------|------------|------|--------|-----------------|--------------|------------|
| 1A <sup>1</sup> | TB2-1,2       | I1U             | 56      | 18                   | 1            | 1          | Y    | Y      |                 |              | 15         |
| 2A              | TB2-5,6       | J4U             | 48      | 10                   | 26           | 6          | 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               | 2.0          | 5          |
| 5A <sup>2</sup> | TB3-1,2       | J1U             | 55      | 17                   | 5            | 5          | Y    | Y      |                 |              | 15         |
| 6A              | TB3-5,6       | J2U             | 40      | 2                    | 6            | 6          | Y    | Y      |                 |              |            |
| 7A <sup>3</sup> | TB5-5,6       | J5U             | 57      | 19                   | 7            | 7          | Y    | Y      |                 |              | 15         |
| 8A              | TB5-9,10      | J6U             | 42      | 4                    | 8            | 8          | Y    | Y      | Y               |              | 3          |
| 8B              | TB5-11,12     | J6L             | 46      | 8                    | 18           | 8          | Y    | Y      | Y               |              | 3          |
| 8C              | TB7-1,2       | J7U             | 66      | 28                   | 38           | 8          | Y    | Y      | Y               | 2.0          | 5          |

- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.
- Add jumper from J5-W to I8-W, on rear of input file.



**LOAD RESISTOR INSTALLATION DETAIL**  
(install resistors as shown below)

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

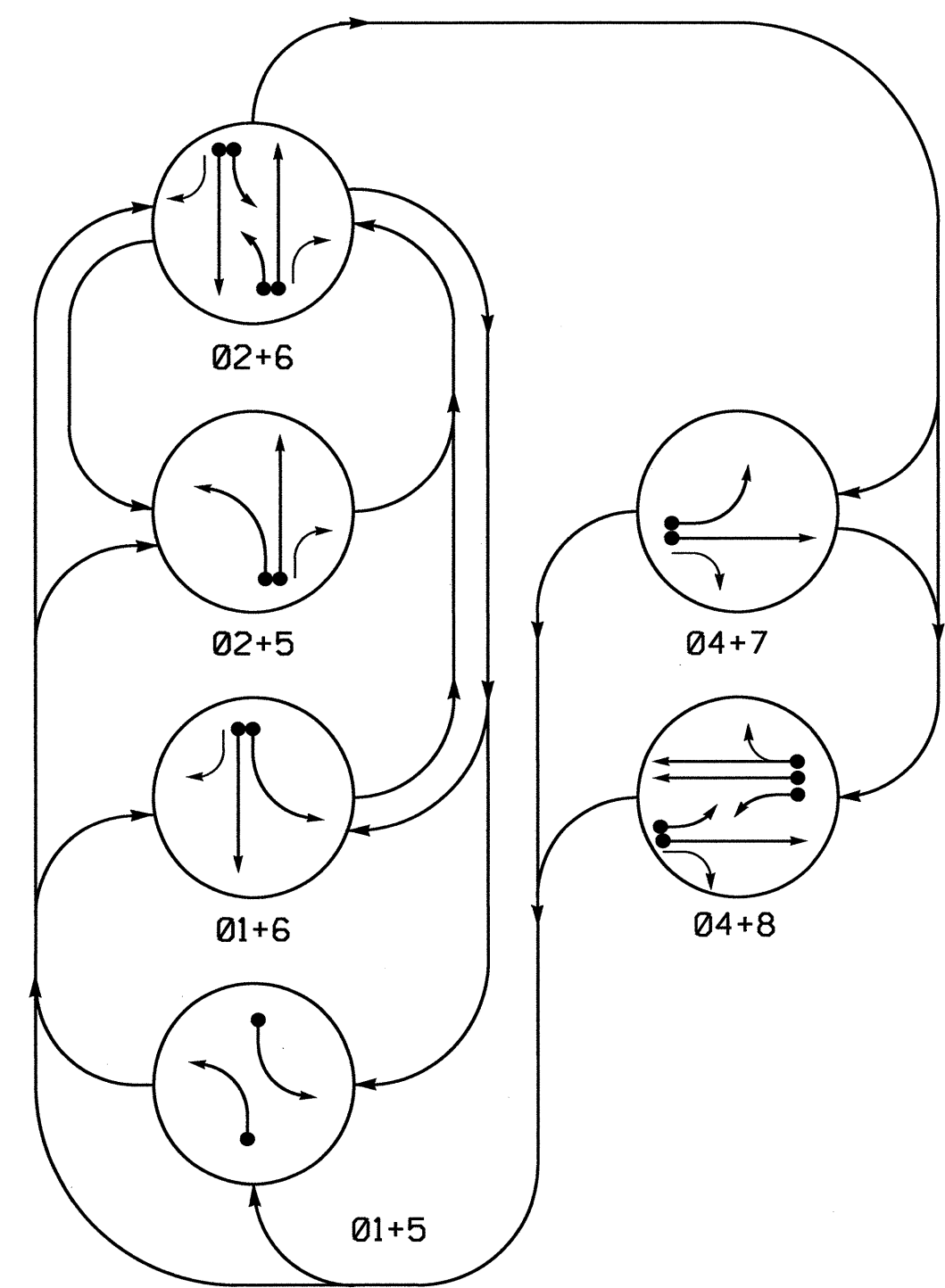


Temporary Signal - TCP Phase 1

|  |   |  |  |  |   |
|--|---|--|--|--|---|
|  | ELECTRICAL AND PROGRAMMING DETAILS FOR: |  | US 321A (Norwood Street) at SR 1178 (Hibriten Drive) |  | SEAL<br>NORTH CAROLINA PROFESSIONAL ENGINEER<br>SEAL 008453<br>JOHN T. ROWE, JR.<br>1-26-12 |
|  | Division 11 Caldwell County Lenoir      |  | PREPARED BY: S. Armstrong REVIEWED BY: JTR           |  |   |
|  | PLAN DATE: January 2012                 |  | REVISIONS:   |  |   |
|  | REVISIONS:                              |  | INIT. DATE   |  |   |

750 N. Greenfield Pkwy, Garner, NC 27529

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

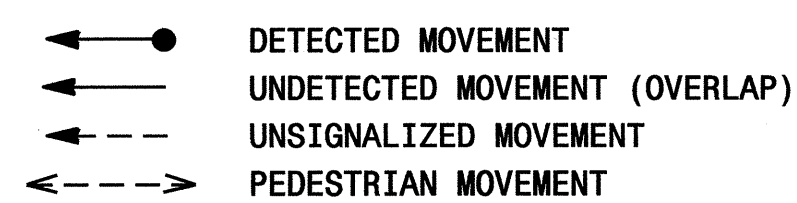
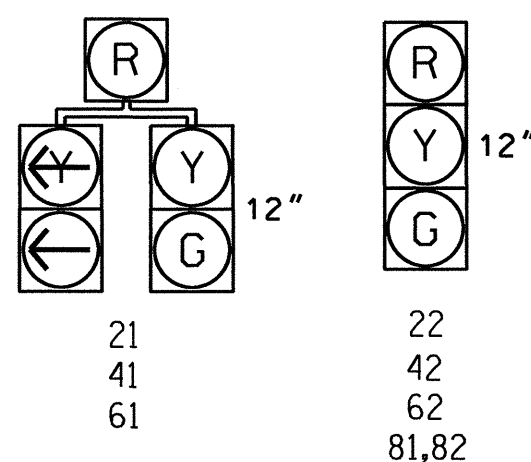


TABLE OF OPERATION

| SIGNAL FACE | PHASE |      |      |      |      |      |    |       |
|-------------|-------|------|------|------|------|------|----|-------|
|             | 01+5  | 01+6 | 02+5 | 02+6 | 04+7 | 04+8 | 61 | 81,82 |
| 21          | R     | R    | G    | G    | R    | R    | Y  |       |
| 22          | R     | R    | G    | G    | R    | R    | Y  |       |
| 41          | R     | R    | R    | R    | G    | G    | R  |       |
| 42          | R     | R    | R    | R    | G    | G    | R  |       |
| 61          | R     | G    | R    | G    | R    | R    | Y  |       |
| 62          | R     | G    | R    | G    | R    | R    | Y  |       |
| 81,82       | R     | R    | R    | R    | R    | G    |    |       |

SIGNAL FACE I.D.

All Heads L.E.D.



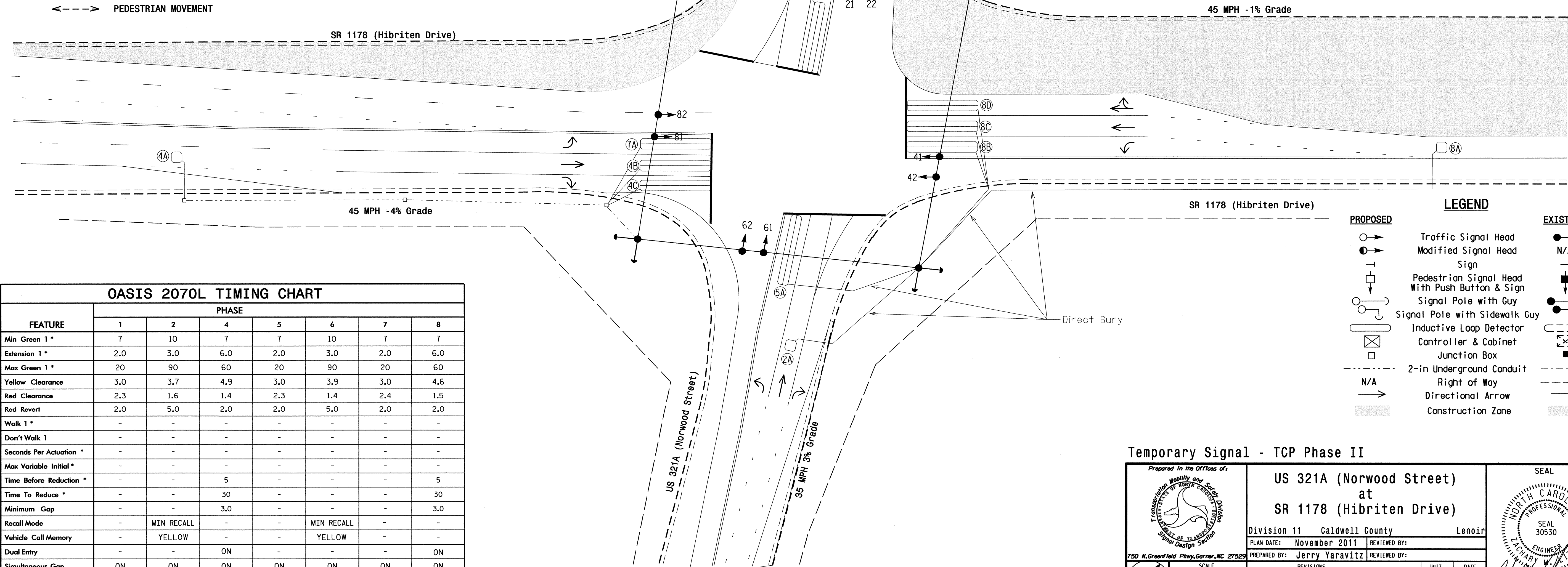
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

| LOOP | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | DETECTOR PROGRAMMING |         |           |                 |              |            |             |          |
|------|-----------|----------------------------|-------|----------|----------------------|---------|-----------|-----------------|--------------|------------|-------------|----------|
|      |           |                            |       |          | PHASE                | CALLING | EXTENSION | FULL TIME DELAY | STRETCH TIME | DELAY TIME | SYSTEM LOOP | NEW CARD |
| 1A   | 6X40      | 0                          | 2-4-2 | Y        | 1                    | Y       | Y         | -               | -            | 15         | -           | -        |
| 2A   | 6X6       | 70                         | 5     | Y        | 2                    | Y       | Y         | -               | -            | -          | -           | -        |
| 4A   | 6X6       | 300                        | 5     | Y        | 4                    | -       | Y         | -               | -            | -          | -           | -        |
| 4B   | 6X40      | 0                          | 2-4-2 | Y        | 4                    | Y       | Y         | Y               | 2.0          | 5          | -           | -        |
| 4C   | 6X40      | 0                          | 2-4-2 | Y        | 4                    | Y       | Y         | Y               | 2.0          | 15         | -           | Y        |
| 5A   | 6X40      | 0                          | 2-4-2 | Y        | 5                    | Y       | Y         | -               | -            | 15         | -           | -        |
| 6A   | 6X6       | 70                         | 5     | Y        | 6                    | Y       | Y         | -               | -            | -          | -           | -        |
| 7A   | 6X40      | 0                          | 2-4-2 | Y        | 4                    | Y       | Y         | Y               | -            | 3          | -           | -        |
| 8A   | 6X6       | 300                        | 5     | Y        | 8                    | -       | Y         | -               | -            | 3          | -           | -        |
| 8B   | 6X40      | 0                          | 2-4-2 | Y        | 8                    | Y       | Y         | Y               | -            | 3          | -           | -        |
| 8C   | 6X40      | 0                          | 2-4-2 | Y        | 8                    | Y       | Y         | Y               | 2.0          | 5          | -           | -        |
| 8D   | 6X40      | 0                          | 2-4-2 | Y        | 8                    | Y       | Y         | Y               | 2.0          | 5          | -           | Y        |

6 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. Enable Backup Protect for phase 2 and 6 to allow the controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through an all red display.
4. Set all detector units to presence mode.



OASIS 2070L TIMING CHART

| FEATURE                 | PHASE |            |     |     |            |     |     |  |
|-------------------------|-------|------------|-----|-----|------------|-----|-----|--|
|                         | 1     | 2          | 4   | 5   | 6          | 7   | 8   |  |
| Min Green 1 *           | 7     | 10         | 7   | 7   | 10         | 7   | 7   |  |
| Extension 1 *           | 2.0   | 3.0        | 6.0 | 2.0 | 3.0        | 2.0 | 6.0 |  |
| Max Green 1 *           | 20    | 90         | 60  | 20  | 90         | 20  | 60  |  |
| Yellow Clearance        | 3.0   | 3.7        | 4.9 | 3.0 | 3.9        | 3.0 | 4.6 |  |
| Red Clearance           | 2.3   | 1.6        | 1.4 | 2.3 | 1.4        | 2.4 | 1.5 |  |
| Red Revert              | 2.0   | 5.0        | 2.0 | 2.0 | 5.0        | 2.0 | 2.0 |  |
| Walk 1 *                | -     | -          | -   | -   | -          | -   | -   |  |
| Don't Walk 1            | -     | -          | -   | -   | -          | -   | -   |  |
| Seconds Per Actuation * | -     | -          | -   | -   | -          | -   | -   |  |
| Max Variable Initial *  | -     | -          | -   | -   | -          | -   | -   |  |
| Time Before Reduction * | -     | -          | 5   | -   | -          | -   | 5   |  |
| Time To Reduce *        | -     | -          | 30  | -   | -          | -   | 30  |  |
| Minimum Gap             | -     | -          | 3.0 | -   | -          | -   | 3.0 |  |
| Recall Mode             | -     | MIN RECALL | -   | -   | MIN RECALL | -   | -   |  |
| Vehicle Call Memory     | -     | YELLOW     | -   | -   | YELLOW     | -   | -   |  |
| Dual Entry              | -     | -          | ON  | -   | -          | -   | ON  |  |
| Simultaneous Gap        | ON    | ON         | ON  | ON  | ON         | ON  | ON  |  |

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

LEGEND

| PROPOSED | EXISTING |
|----------|----------|
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |

Temporary Signal - TCP Phase II

US 321A (Norwood Street)  
at  
SR 1178 (Hibriten Drive)

Division 11 Caldwell County Lenoir

PLAN DATE: November 2011 REVIEWED BY:

PREPARED BY: Jerry Yaravitz REVIEWED BY:

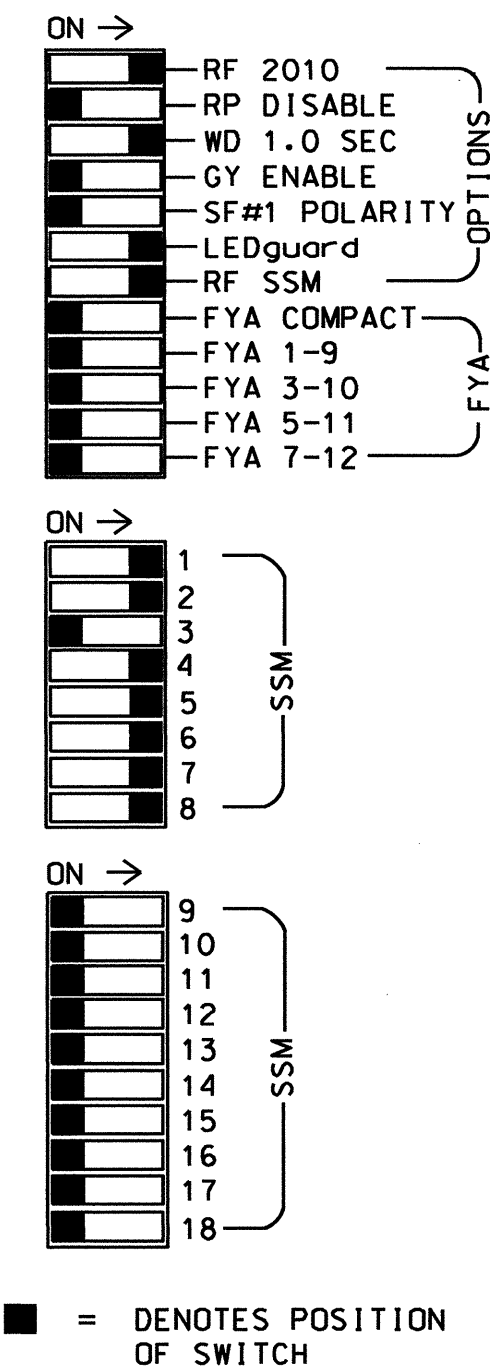
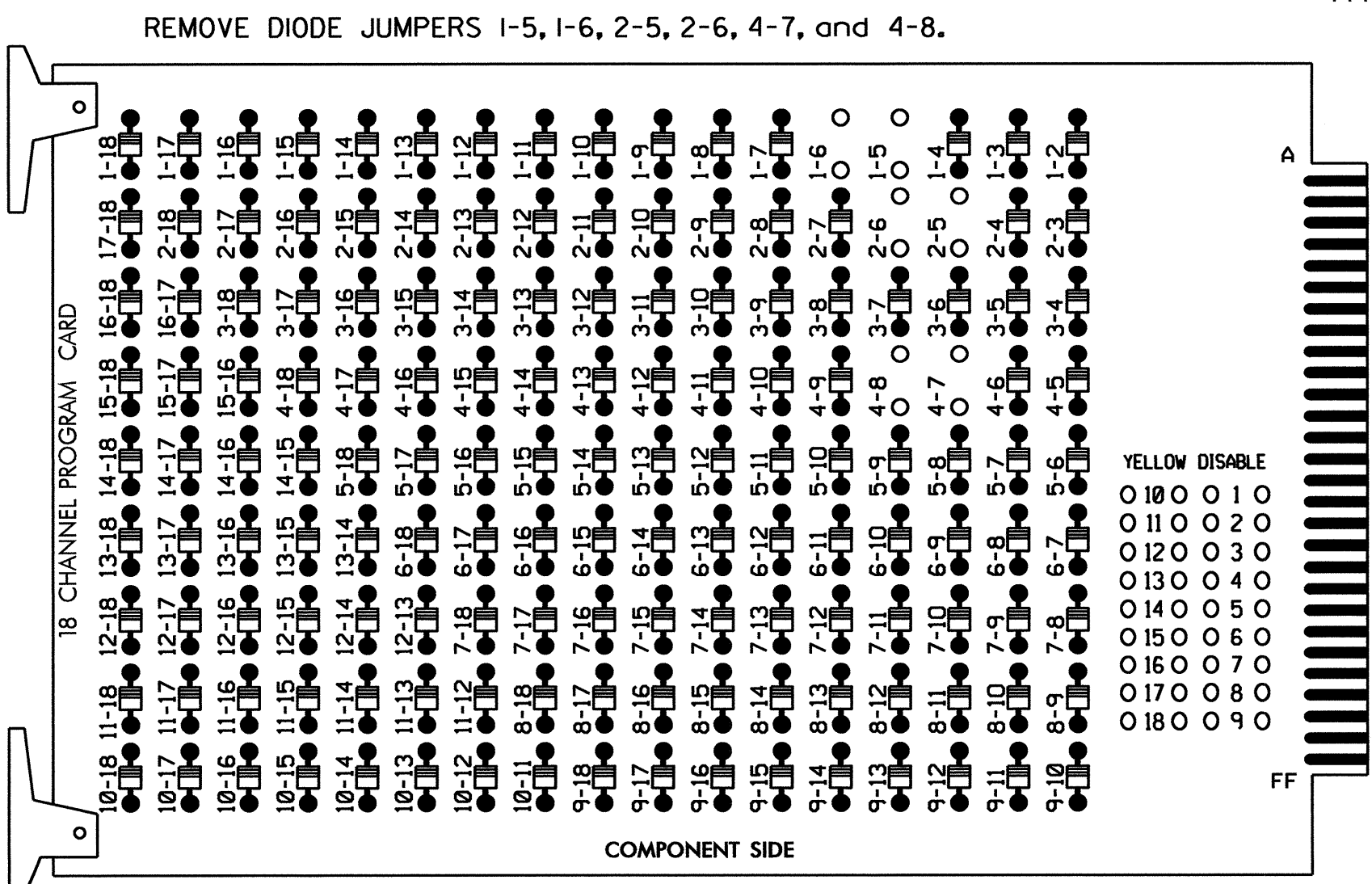
750 N. Greenfield Pkwy, Garner, NC 27529

| REVISIONS | INIT. | DATE |
|-----------|-------|------|
|           |       |      |
|           |       |      |

SCALE 0 30  
1"=30'

INVENTORY NO. 11-129772

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



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

**NOTES**

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

**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. | 61  | 21,22 | NU    | NU | 41,42 | NU    | 21 | 61,62 | NU    | 41  | 81,82 | NU    | NU     | NU     | NU     | NU     | NU     | NU     |
| RED             | *   | 128   |       |    | 101   |       | *  | 134   |       | *   | 107   |       |        |        |        |        |        |        |
| YELLOW          |     | 129   |       |    | 102   |       |    | 135   |       |     | 108   |       |        |        |        |        |        |        |
| GREEN           |     | 130   |       |    | 103   |       |    | 136   |       |     | 109   |       |        |        |        |        |        |        |
| RED ARROW       |     |       |       |    |       |       |    |       |       |     |       |       |        |        |        |        |        |        |
| YELLOW ARROW    | 126 |       |       |    |       |       |    | 132   |       | 123 |       |       |        |        |        |        |        |        |
| GREEN ARROW     | 127 |       |       |    |       |       |    | 133   |       | 124 |       |       |        |        |        |        |        |        |

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

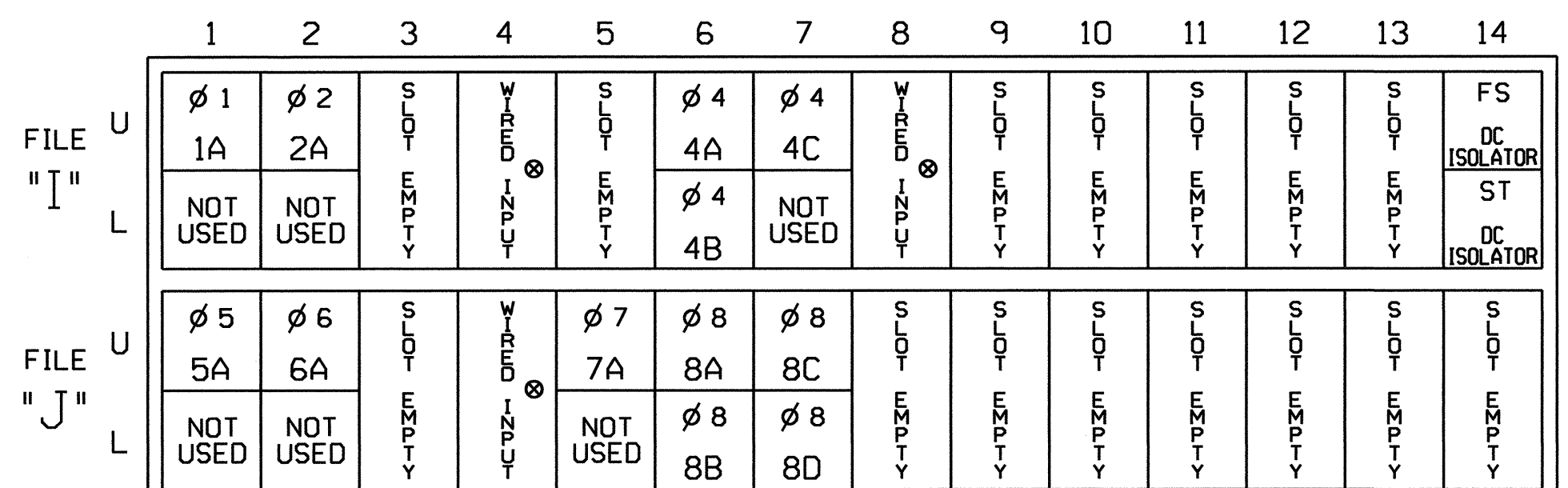
**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
CABINET.....332 W/ AUX  
SOFTWARE.....ECONOLITE OASIS  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S10,S11  
PHASES USED.....1,2,4,5,6,7,8  
OVERLAP "A".....NOT USED  
OVERLAP "B".....NOT USED  
OVERLAP "C".....NOT USED  
OVERLAP "D".....NOT USED

**BACKUP PROTECTION NOTE**

(program controller as shown below)  
From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**INPUT FILE POSITION LAYOUT**  
(from view)

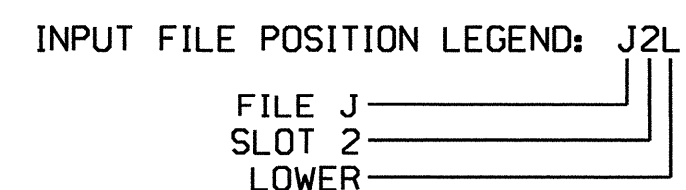


EX.: 1A, 2A, ETC. = LOOP NO.'S  
FS = FLASH SENSE  
ST = STOP TIME  
⊗ Wired Input - Do not populate slot with detector card

**INPUT FILE CONNECTION & PROGRAMMING CHART**

| LOOP NO.        | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | INPUT ASSIGNMENT NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND | FULL TIME DELAY | STRETCH TIME | DELAY TIME |
|-----------------|---------------|-----------------|---------|----------------------|--------------|------------|------|--------|-----------------|--------------|------------|
| 1A <sup>1</sup> | 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      |                 |              |            |
| 4A              | TB4-9,10      | I6U             | 41      | 3                    | 4            | 4          | Y    | Y      |                 |              |            |
| 4B              | TB4-11,12     | I6L             | 45      | 7                    | 14           | 4          | Y    | Y      | Y               | 2.0          | 5          |
| 4C              | TB6-1,2       | I7U             | 65      | 27                   | 34           | 4          | Y    | Y      | Y               | 2.0          | 15         |
| 5A <sup>2</sup> | 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      |                 |              |            |
| 7A <sup>3</sup> | TB5-5,6       | J5U             | 57      | 19                   | 7            | 7          | Y    | Y      |                 |              | 15         |
|                 | -             | I8U             | 49      | 11                   | 24           | 4          | Y    | Y      | Y               |              | 3          |
| 8A              | TB5-9,10      | J6U             | 42      | 4                    | 8            | 8          | Y    | Y      |                 |              | 3          |
| 8B              | TB5-11,12     | J6L             | 46      | 8                    | 18           | 8          | Y    | Y      | Y               |              | 3          |
| 8C              | TB7-1,2       | J7U             | 66      | 28                   | 38           | 8          | Y    | Y      | Y               | 2.0          | 5          |
| 8D              | TB7-3,4       | J7L             | 79      | 41                   | 48           | 8          | Y    | Y      | Y               | 2.0          | 5          |

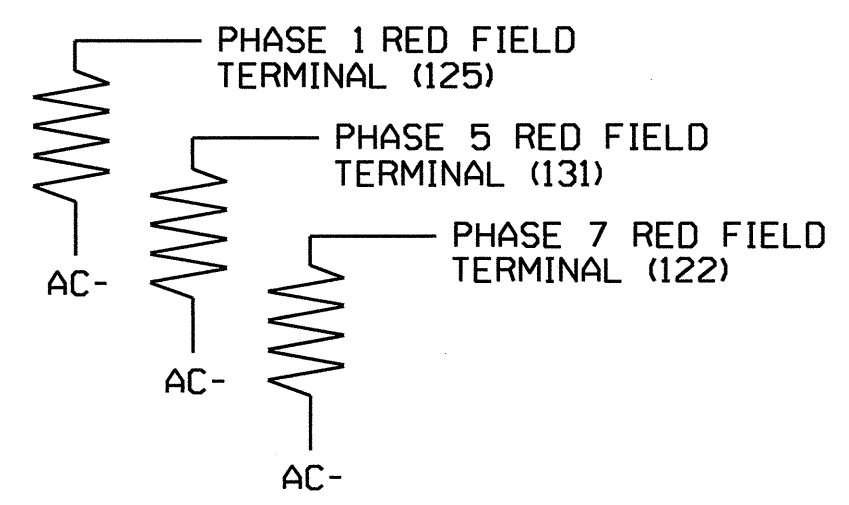
- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.
- Add jumper from J5-W to I8-W, on rear of input file.



**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) |



Temporary Signal - TCP Phase 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: US 321A (Norwood Street) at SR 1178 (Hibriten Drive)

Division 11 Caldwell County Lenoir

PLAN DATE: January 2012 REVIEWED BY: JTR

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: INIT. DATE

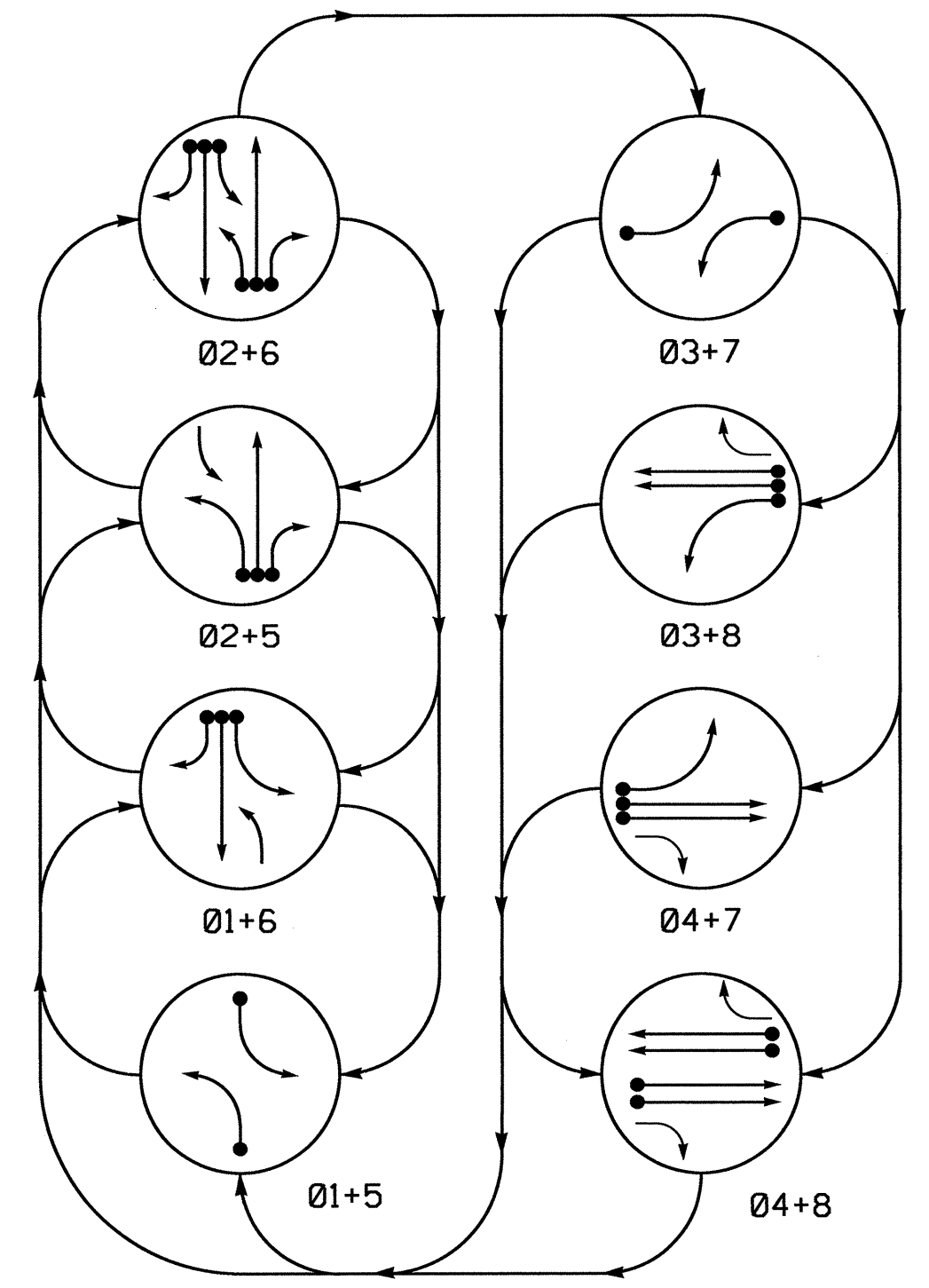
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JOHN T. ROWE, III

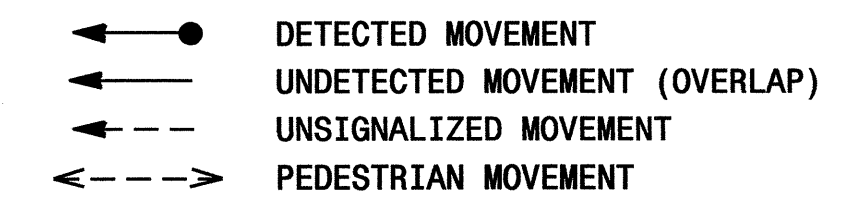
SIGNATURE: John Rowe DATE: 1-26-12

SIG. INVENTORY NO. 11-129772

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**



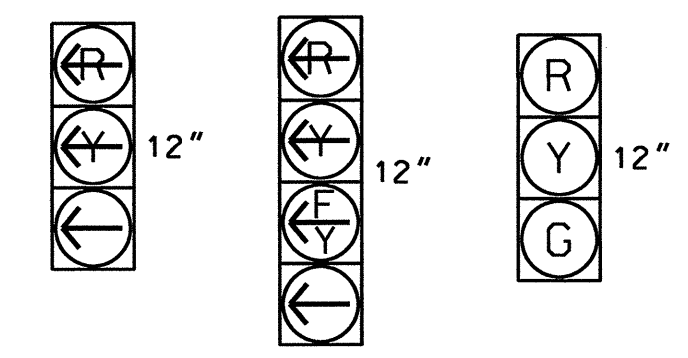
**TABLE OF OPERATION**

| SIGNAL FACE | PHASE |      |      |      |      |      |      |      |
|-------------|-------|------|------|------|------|------|------|------|
|             | 01+5  | 01+6 | 02+5 | 02+6 | 03+7 | 03+8 | 04+7 | 04+8 |
| 11          | ←     | ←    | ←    | ←    | ←    | ←    | ←    | ←    |
| 21,22       | R     | R    | G    | G    | R    | R    | R    | Y    |
| 31          | ←     | ←    | ←    | ←    | ←    | ←    | ←    | ←    |
| 41,42       | R     | R    | R    | R    | R    | R    | G    | G    |
| 51          | ←     | ←    | ←    | ←    | ←    | ←    | ←    | ←    |
| 61,62       | R     | G    | R    | G    | R    | R    | R    | Y    |
| 71          | ←     | ←    | ←    | ←    | ←    | ←    | ←    | ←    |
| 81,82       | R     | R    | R    | R    | R    | G    | R    | G    |

Y = Flashing Yellow Arrow

**SIGNAL FACE I.D.**

All Heads L.E.D.



31 71 11 51 21,22 41,42 61,62 81,82

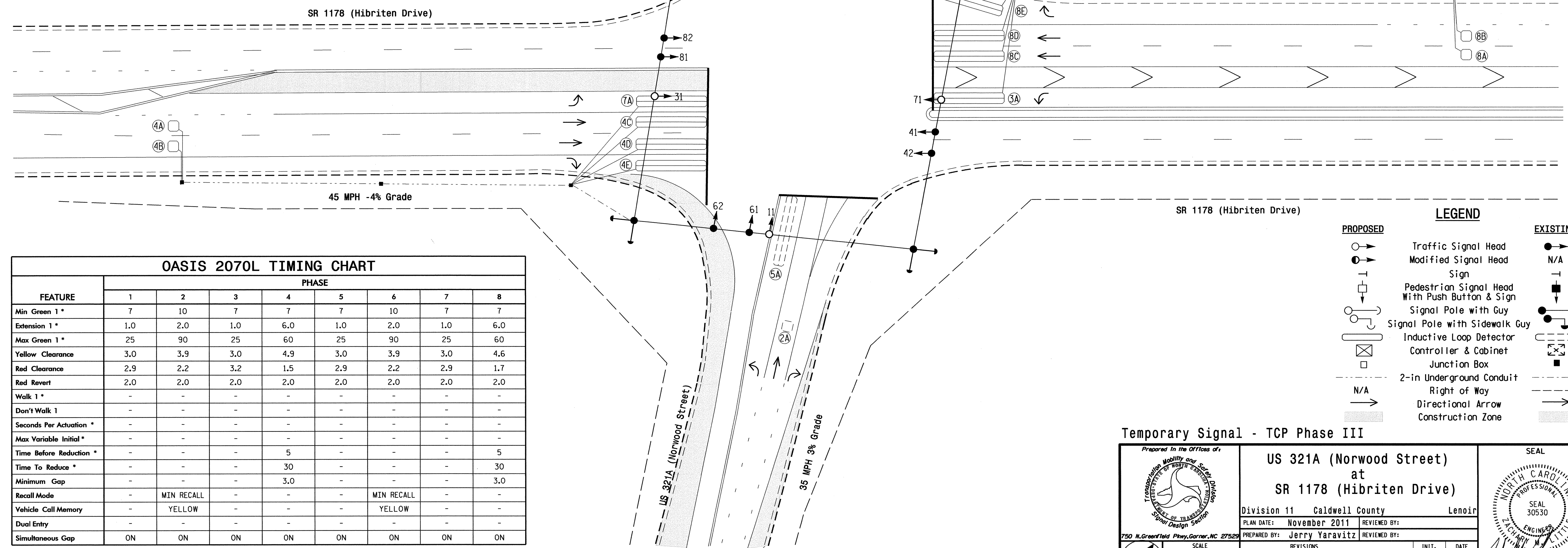
**OASIS 2070L LOOP & DETECTOR INSTALLATION CHART**

| LOOP | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | DETECTOR PROGRAMMING |       |         |           |                 |              | SYSTEM LOOP | NEW CARD |            |
|------|-----------|----------------------------|-------|----------------------|-------|---------|-----------|-----------------|--------------|-------------|----------|------------|
|      |           |                            |       | NEW LOOP             | PHASE | CALLING | EXTENSION | FULL TIME DELAY | STRETCH TIME |             |          | DELAY TIME |
| 1A   | 6X40      | 0                          | 2-4-2 | -                    | 1     | Y       | Y         | -               | -            | 15          | -        | -          |
| 2A   | 6X40      | 70                         | 2-4-2 | -                    | 2     | Y       | Y         | -               | -            | -           | -        | -          |
| 3A   | 6X40      | 0                          | 2-4-2 | Y                    | 3     | Y       | Y         | -               | -            | -           | -        | -          |
| 4A   | 6X6       | 300                        | 2-4-2 | Y                    | 4     | -       | Y         | -               | -            | -           | -        | -          |
| 4B   | 6X6       | 300                        | 2-4-2 | Y                    | 4     | -       | Y         | -               | -            | -           | -        | Y          |
| 4C   | 6X40      | 0                          | 2-4-2 | Y                    | 4     | Y       | Y         | Y               | 2.0          | 5           | -        | -          |
| 4D   | 6X40      | 0                          | 2-4-2 | Y                    | 4     | Y       | Y         | Y               | 2.0          | 5           | -        | -          |
| 4E   | 6X40      | 0                          | 2-4-2 | Y                    | 4     | Y       | Y         | Y               | 2.0          | 5           | -        | -          |
| 5A   | 6X40      | 0                          | 2-4-2 | -                    | 5     | Y       | Y         | -               | -            | 15          | -        | -          |
| 6A   | 6X40      | 70                         | 2-4-2 | -                    | 6     | Y       | Y         | -               | -            | -           | -        | -          |
| 7A   | 6X40      | 0                          | 2-4-2 | Y                    | 7     | Y       | Y         | -               | -            | -           | -        | -          |
| 8A   | 6X6       | 300                        | 2-4-2 | Y                    | 8     | -       | Y         | -               | -            | -           | -        | -          |
| 8B   | 6X6       | 300                        | 2-4-2 | Y                    | 8     | -       | Y         | -               | -            | -           | -        | Y          |
| 8C   | 6X40      | 0                          | 2-4-2 | Y                    | 8     | Y       | Y         | Y               | 2.0          | 5           | -        | -          |
| 8D   | 6X40      | 0                          | 2-4-2 | Y                    | 8     | Y       | Y         | Y               | 2.0          | 5           | -        | -          |
| 8E   | 6X40      | 0                          | 2-4-2 | Y                    | 8     | Y       | Y         | Y               | 2.0          | 5           | -        | -          |

**8 Phase Fully Actuated Isolated**

**NOTES**

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated July 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.

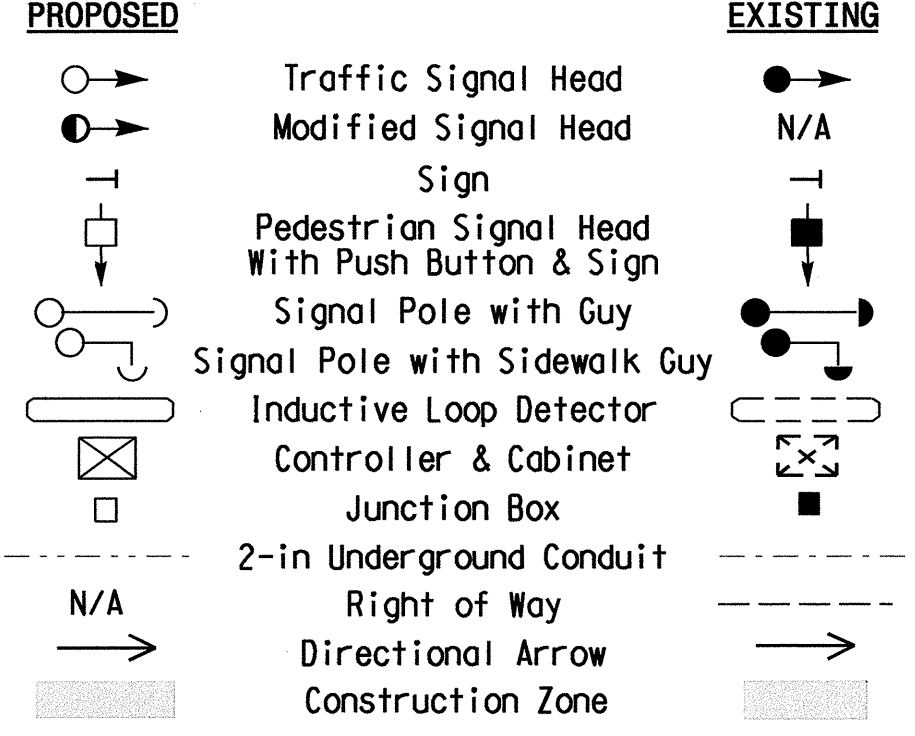


**OASIS 2070L TIMING CHART**

| FEATURE                | PHASE |            |     |     |     |            |     |     |
|------------------------|-------|------------|-----|-----|-----|------------|-----|-----|
|                        | 1     | 2          | 3   | 4   | 5   | 6          | 7   | 8   |
| Min Green 1*           | 7     | 10         | 7   | 7   | 7   | 10         | 7   | 7   |
| Extension 1*           | 1.0   | 2.0        | 1.0 | 6.0 | 1.0 | 2.0        | 1.0 | 6.0 |
| Max Green 1*           | 25    | 90         | 25  | 60  | 25  | 90         | 25  | 60  |
| Yellow Clearance       | 3.0   | 3.9        | 3.0 | 4.9 | 3.0 | 3.9        | 3.0 | 4.6 |
| Red Clearance          | 2.9   | 2.2        | 3.2 | 1.5 | 2.9 | 2.2        | 2.9 | 1.7 |
| Red Revert             | 2.0   | 2.0        | 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* | -     | -          | -   | 5   | -   | -          | -   | 5   |
| Time To Reduce*        | -     | -          | -   | 30  | -   | -          | -   | 30  |
| Minimum Gap            | -     | -          | -   | 3.0 | -   | -          | -   | 3.0 |
| Recall Mode            | -     | MIN RECALL | -   | -   | -   | MIN RECALL | -   | -   |
| Vehicle Call Memory    | -     | YELLOW     | -   | -   | -   | YELLOW     | -   | -   |
| Dual Entry             | -     | -          | -   | -   | -   | -          | -   | -   |
| Simultaneous Gap       | ON    | ON         | ON  | ON  | ON  | ON         | 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**



**Temporary Signal - TCP Phase III**

**US 321A (Norwood Street) at SR 1178 (Hibriten Drive)**

Division 11 Caldwell County Lenoir

PLAN DATE: November 2011 REVIEWED BY: Jerry Varavitz

PREPARED BY: Jerry Varavitz REVIEWED BY:

SCALE: 1"=30'

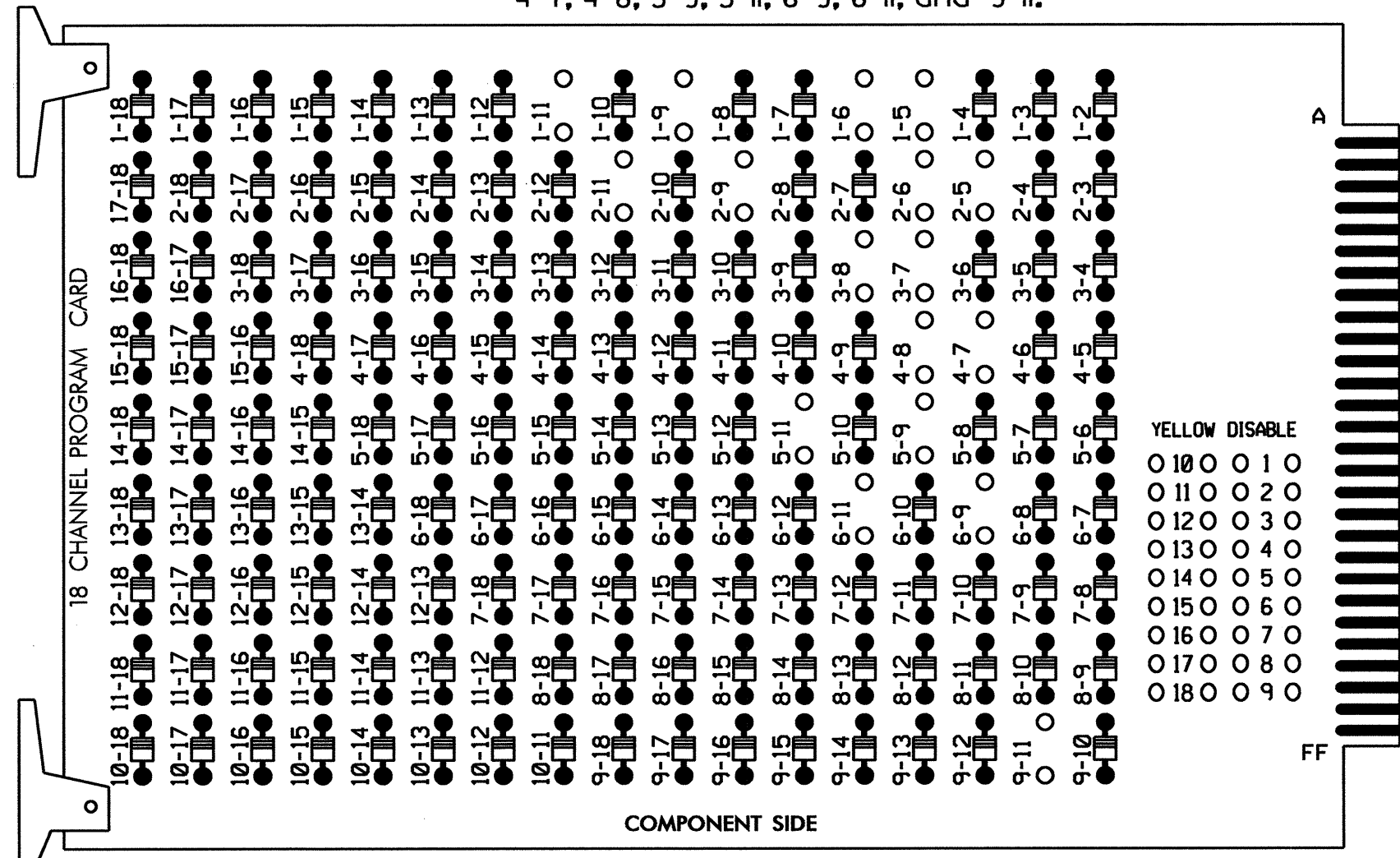
| REVISIONS | INIT. | DATE |
|-----------|-------|------|
|           |       |      |

25-JAN-2012 15:33:00 C:\P1\Signal\Signal\gms1\gms1\1297\1129773.s1g.dgn 2011xxxx.dgn

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

(remove jumpers and set switches as shown)

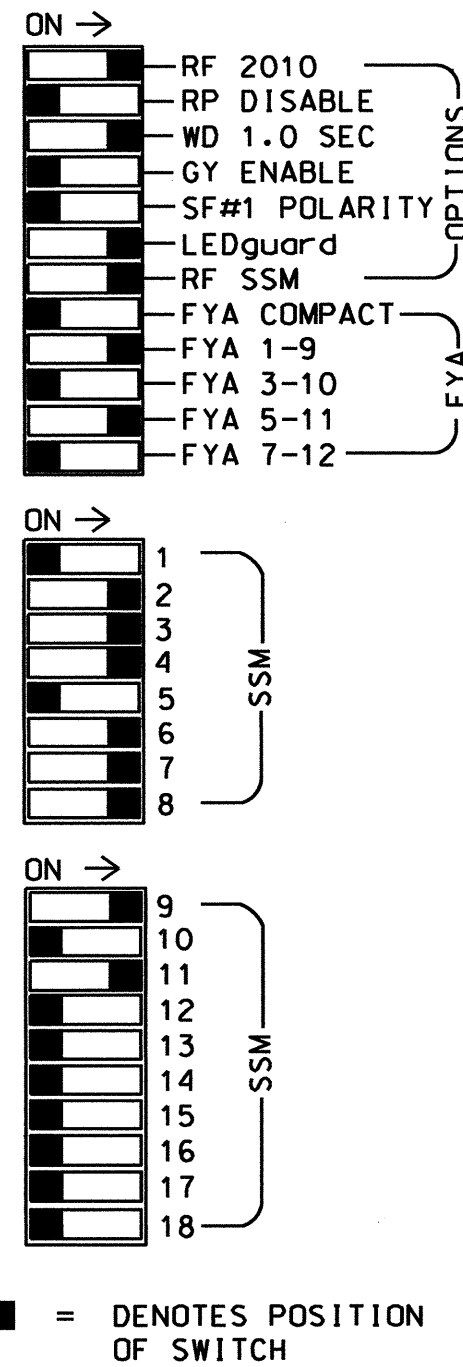
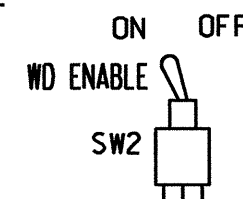
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 4-7, 4-8, 5-9, 5-11, 6-9, 6-11, and 9-11.



REMOVE JUMPERS AS SHOWN

**NOTES:**

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



**NOTES**

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

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11,  
 AUX S1, AUX S4  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....NOT USED

**SIGNAL HEAD HOOK-UP CHART**

| LOAD SWITCH NO.       | S1  | S2    | S3 | S4  | S5    | S6 | S7 | S8    | S9 | S10 | S11   | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------------|-----|-------|----|-----|-------|----|----|-------|----|-----|-------|-----|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO.       | 1   | 2     | 13 | 3   | 4     | 14 | 5  | 6     | 15 | 7   | 8     | 16  | 9      | 10     | 17     | 11     | 12     | 18     |
| PHASE                 | 1   | 2     | 3  | 4   | 5     | 6  | 7  | 8     | 9  | 10  | 11    | 12  | 13     | 14     | 15     | 16     | 17     | 18     |
| SIGNAL HEAD NO.       | 11  | 21,22 | NU | 31  | 41,42 | NU | 51 | 61,62 | NU | 71  | 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             |     |       |    | 116 |       |    |    |       |    | 122 |       |     | A121   |        |        | A114   |        |        |
| YELLOW ARROW          |     |       |    | 117 |       |    |    |       |    | 123 |       |     | A122   |        |        | A115   |        |        |
| FLASHING YELLOW ARROW |     |       |    |     |       |    |    |       |    |     |       |     | A123   |        |        | A116   |        |        |
| GREEN ARROW           | 127 |       |    | 118 |       |    |    | 133   |    | 124 |       |     |        |        |        |        |        |        |

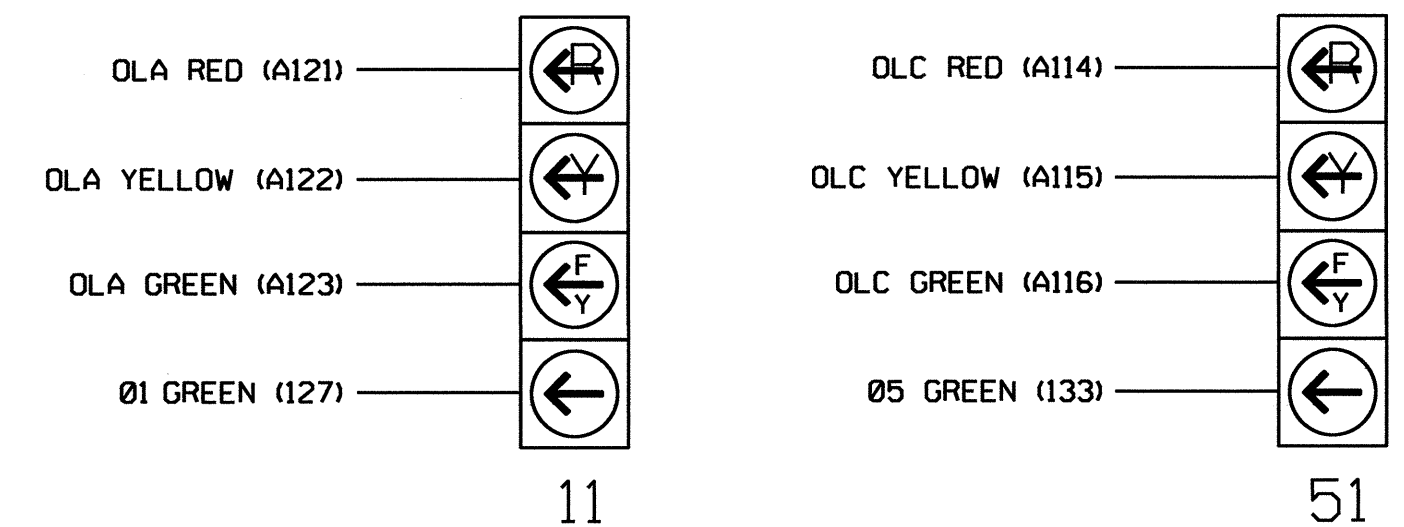
NU = Not Used

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

\* See pictorial of head wiring in detail below.

**4 SECTION FYA PPLT SIGNAL WIRING DETAIL**

(wire signal heads as shown)

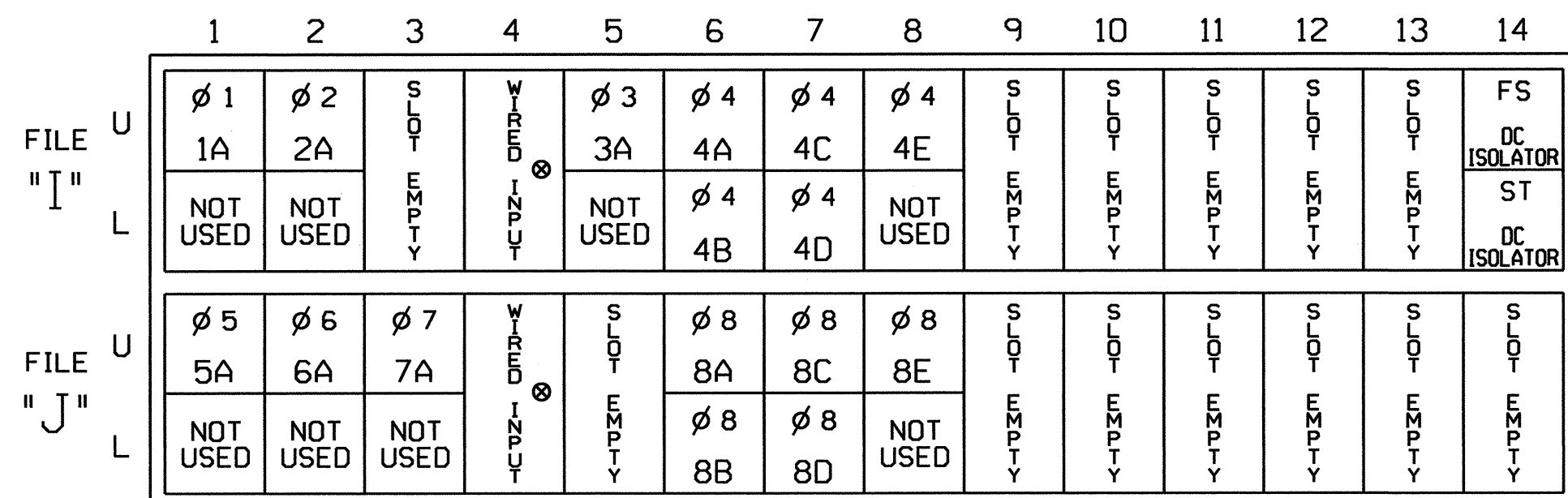


**NOTE**

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 2 for programming instructions.

**INPUT FILE POSITION LAYOUT**

(front view)



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

FS = FLASH SENSE  
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

**INPUT FILE CONNECTION & PROGRAMMING CHART**

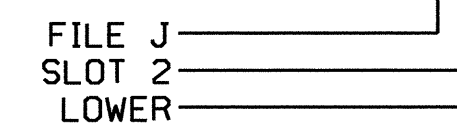
| LOOP NO.        | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | INPUT ASSIGNMENT NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND | FULL TIME DELAY | STRETCH TIME | DELAY TIME |
|-----------------|---------------|-----------------|---------|----------------------|--------------|------------|------|--------|-----------------|--------------|------------|
| 1A <sup>1</sup> | 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      |                 |              |            |
| 3A              | TB4-5,6       | I5U             | 58      | 20                   | 3            | 3          | Y    | Y      |                 |              |            |
| 4A              | TB4-9,10      | I6U             | 41      | 3                    | 4            | 4          |      | Y      |                 |              |            |
| 4B              | TB4-11,12     | I6L             | 45      | 7                    | 14           | 4          |      | Y      |                 |              |            |
| 4C              | TB6-1,2       | I7U             | 65      | 27                   | 34           | 4          | Y    | Y      | Y               | 2.0          | 5          |
| 4D              | TB6-3,4       | I7L             | 78      | 40                   | 44           | 4          | Y    | Y      | Y               | 2.0          | 5          |
| 4E              | TB6-5,6       | I8U             | 49      | 11                   | 24           | 4          | Y    | Y      | Y               | 2.0          | 5          |
| 5A <sup>2</sup> | 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      |                 |              |            |
| 7A              | TB3-9,10      | J3U             | 64      | 26                   | 36           | 7          | Y    | Y      |                 |              |            |
| 8A              | TB5-9,10      | J6U             | 42      | 4                    | 8            | 8          |      | Y      |                 |              |            |
| 8B              | TB5-11,12     | J6L             | 46      | 8                    | 18           | 8          |      | Y      |                 |              |            |
| 8C              | TB7-1,2       | J7U             | 66      | 28                   | 38           | 8          | Y    | Y      | Y               | 2.0          | 5          |
| 8D              | TB7-3,4       | J7L             | 79      | 41                   | 48           | 8          | Y    | Y      | Y               | 2.0          | 5          |
| 8E              | TB7-5,6       | J8U             | 50      | 12                   | 28           | 8          | Y    | Y      | Y               | 2.0          | 5          |

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

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

**IMPORTANT!** Remove jumper from J5-W to I8-W if one is currently installed on rear of input file.

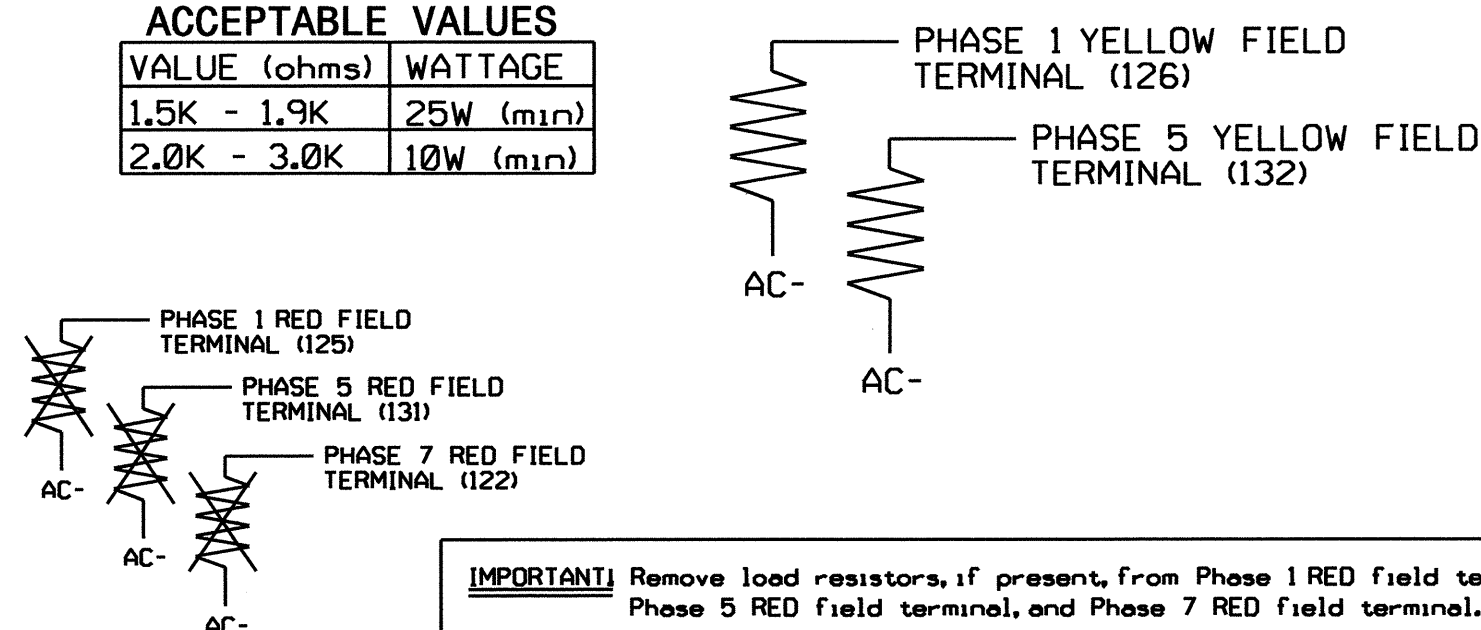
INPUT FILE POSITION LEGEND: J2L



**LOAD RESISTOR INSTALLATION DETAIL**

(install resistors as shown below)

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



**IMPORTANT!** Remove load resistors, if present, from Phase 1 RED field terminal, Phase 5 RED field terminal, and Phase 7 RED field terminal.

**BACKUP PROTECTION NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert Times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**DELETE**

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1297T3  
 DESIGNED: November 2011  
 SEALED: 1/25/12  
 REVISED: N/A

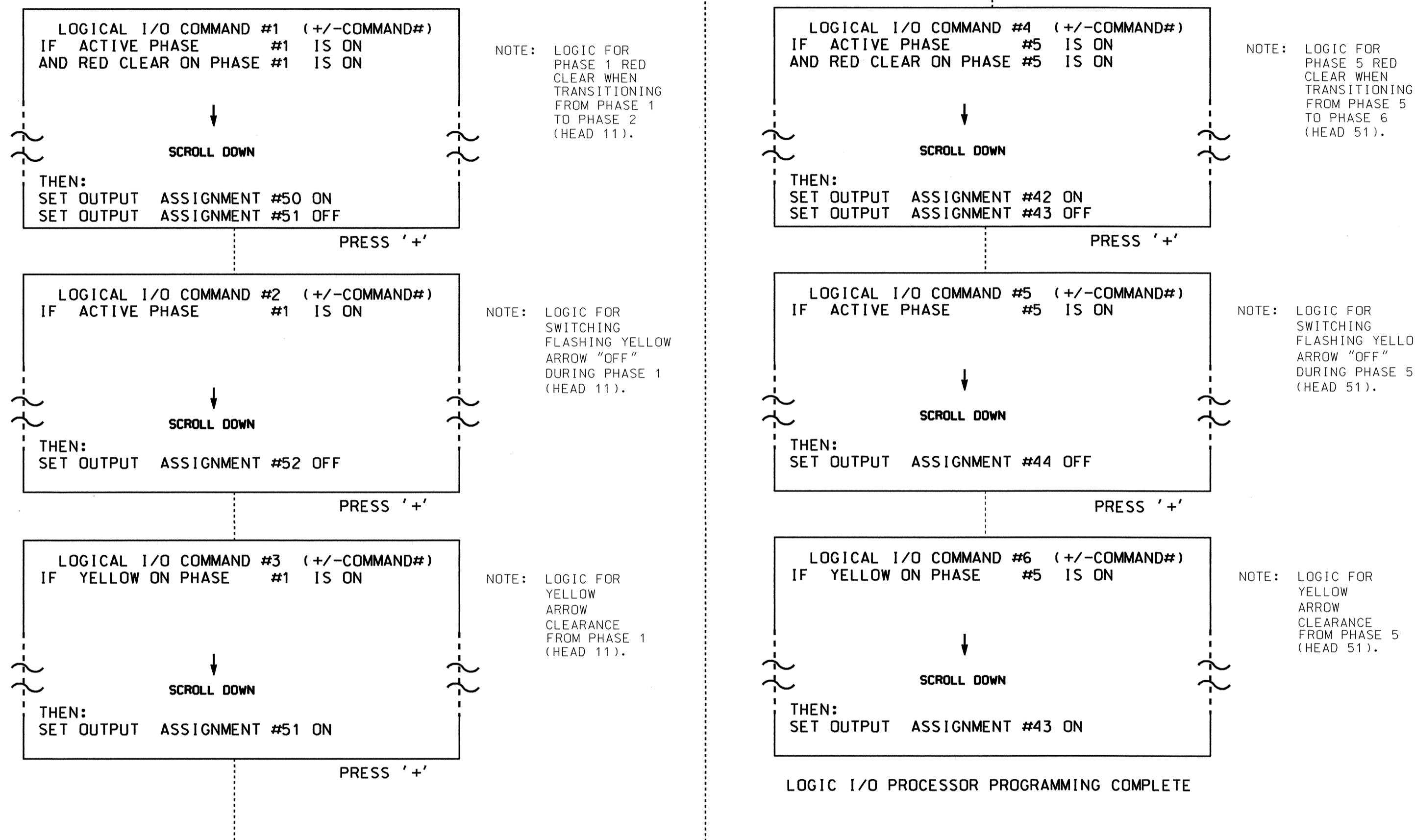
Temporary Signal - TCP Phase 3 - Sheet 1 of 2

|  |  |                      |  |
|--|--|----------------------|--|
| ELECTRICAL AND PROGRAMMING DETAILS FOR:<br>Prepared In the Office of:<br>750 N. Greenfield Parkway, Corner, NC 27529 | US 321A (Norwood Street)<br>at<br>SR 1178 (Hibriten Drive)   |                      | SEAL<br>NORTH CAROLINA PROFESSIONAL ENGINEER<br>SEAL 008453<br>ENGINEER<br>JOHN T. ROWE, III<br>SIGNATURE DATE 1-27-12<br>SIG. INVENTORY NO. 11-1297T3 |
|  | Division 11 Caldwell County Lenoir<br>PLAN DATE: January 2012 REVIEWED BY: JTR<br>PREPARED BY: S. Armstrong REVIEWED BY: | REVISIONS INIT. DATE |  |

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

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS), SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



**OUTPUT REFERENCE SCHEDULE**

|           |   |                  |
|-----------|---|------------------|
| OUTPUT 42 | = | Overlap C Red    |
| OUTPUT 43 | = | Overlap C Yellow |
| OUTPUT 44 | = | Overlap C Green  |
| OUTPUT 50 | = | Overlap A Red    |
| OUTPUT 51 | = | Overlap A Yellow |
| OUTPUT 52 | = | Overlap A Green  |

### OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1297T3  
DESIGNED: November 2011  
SEALED: 1/25/12  
REVISED: N/A

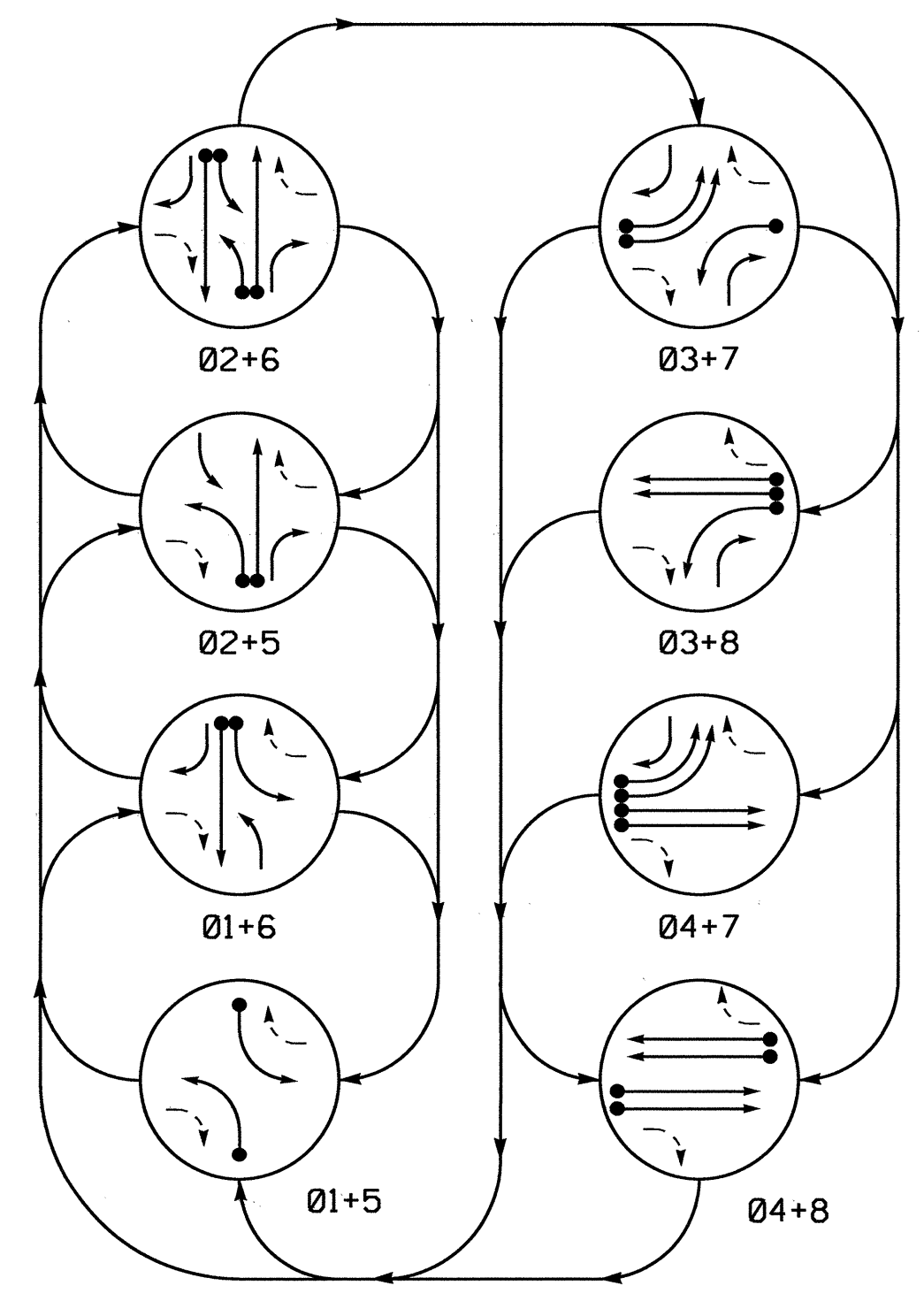
26-JAN-2012 11:27 AM C:\p1\work\krc\cupss\sig\_mon\krmstron\11297T3\_ele.ele...xxx.dgn

Temporary Signal - TCP Phase 3 - Sheet 2 of 2

|           |   |              |  |   |  |        |
|-----------|---|--------------|--|---|--|--------|
|           | ELECTRICAL AND PROGRAMMING DETAILS FOR: |              | US 321A (Norwood Street)<br>at<br>SR 1178 (Hibriten Drive) |   |  |        |
|           | Prepared In the Offices of:             |              | Division 11  | Caldwell County   |  | Lenoir |
|           | PLAN DATE:                              | January 2012 | REVIEWED BY:   | JTR   |  |        |
|           | PREPARED BY:                            | S. Armstrong | REVIEWED BY:   |   |  |        |
| REVISIONS |   | INIT.        | DATE   |   |  |        |
|           |   |              |  | 1-27-12<br>SIGNATURE DATE<br>SIG. INVENTORY NO. 11-1297T3 |  |        |



PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

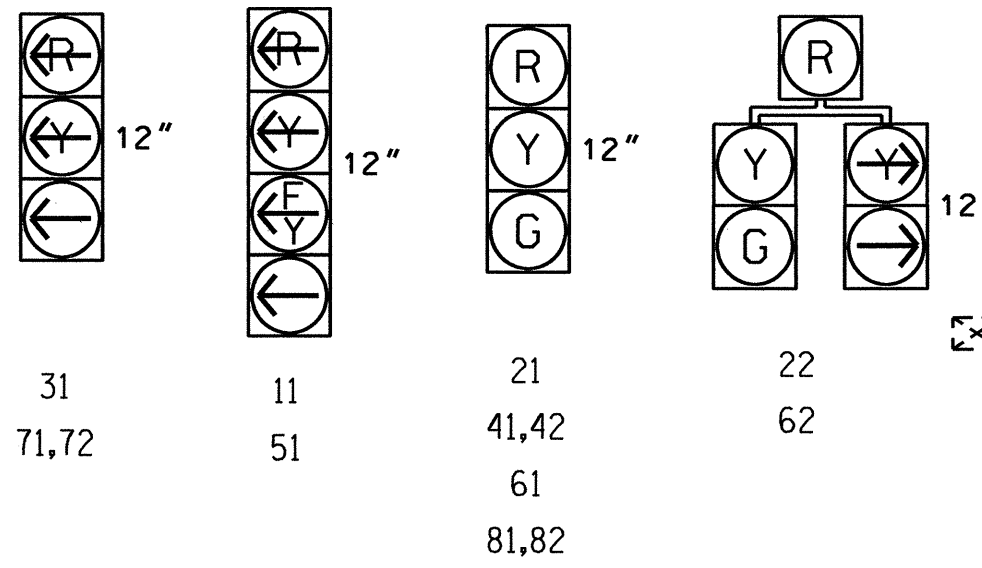
TABLE OF OPERATION

| SIGNAL FACE | PHASE |      |      |      |      |      |      |   |
|-------------|-------|------|------|------|------|------|------|---|
|             | 01+5  | 02+5 | 03+5 | 03+7 | 03+8 | 04+7 | 04+8 | F |
| 11          | ←     | ←    | ←    | ←    | ←    | ←    | ←    | ← |
| 21          | R     | R    | G    | R    | R    | R    | R    | Y |
| 22          | R     | R    | G    | R    | R    | R    | R    | Y |
| 31          | ←     | ←    | ←    | ←    | ←    | ←    | ←    | ← |
| 41,42       | R     | R    | R    | R    | R    | G    | G    | R |
| 51          | ←     | ←    | ←    | ←    | ←    | ←    | ←    | ← |
| 61          | R     | G    | R    | G    | R    | R    | R    | Y |
| 62          | R     | G    | R    | G    | R    | R    | R    | Y |
| 71,72       | ←     | ←    | ←    | ←    | ←    | ←    | ←    | ← |
| 81,82       | R     | R    | R    | R    | R    | G    | G    | R |

F = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



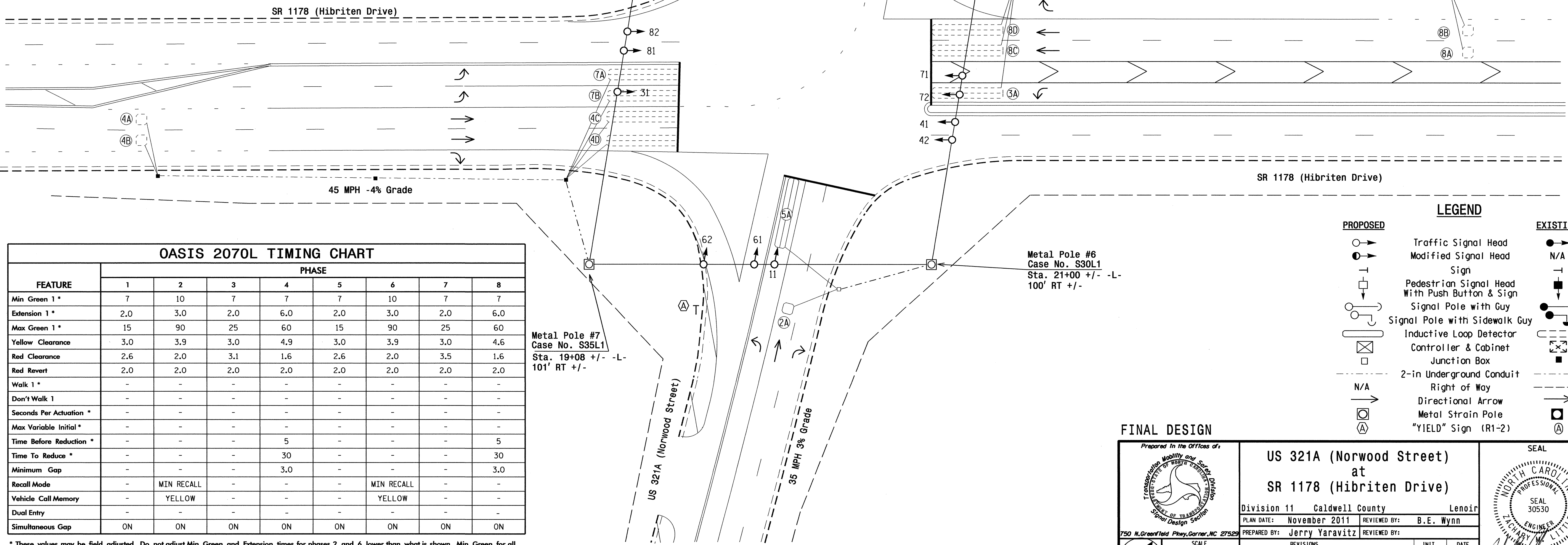
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

| LOOP | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | DETECTOR PROGRAMMING |         |           |                 |              |            |             |          |
|------|-----------|----------------------------|-------|----------|----------------------|---------|-----------|-----------------|--------------|------------|-------------|----------|
|      |           |                            |       |          | PHASE                | CALLING | EXTENSION | FULL TIME DELAY | STRETCH TIME | DELAY TIME | SYSTEM LOOP | NEW CARD |
| 1A   | 6X40      | 0                          | 2-4-2 | -        | 1                    | Y       | Y         | -               | -            | 15         | -           | -        |
| 2A   | 6X6       | 70                         | 5     | Y        | 2                    | Y       | Y         | -               | -            | -          | -           | -        |
| 3A   | 6X40      | 0                          | 2-4-2 | -        | 3                    | Y       | Y         | -               | -            | 15         | -           | -        |
| 4A   | 6X6       | 300                        | 6     | -        | 4                    | -       | Y         | -               | -            | -          | -           | -        |
| 4B   | 6X6       | 300                        | 6     | -        | 4                    | -       | Y         | -               | -            | -          | -           | -        |
| 4C   | 6X40      | 0                          | 2-4-2 | -        | 4                    | Y       | Y         | Y               | 2.0          | 5          | -           | -        |
| 4D   | 6X40      | 0                          | 2-4-2 | -        | 4                    | Y       | Y         | Y               | 2.0          | 5          | -           | -        |
| 5A   | 6X40      | 0                          | 2-4-2 | Y        | 5                    | Y       | Y         | -               | -            | 15         | -           | -        |
| 6A   | 6X6       | 70                         | 3     | -        | 6                    | Y       | Y         | -               | -            | -          | -           | -        |
| 7A   | 6X40      | 0                          | 2-4-2 | -        | 7                    | Y       | Y         | -               | -            | 15         | -           | -        |
| 7B   | 6X40      | 0                          | 2-4-2 | -        | 7                    | Y       | Y         | -               | -            | 15         | -           | -        |
| 8A   | 6X6       | 300                        | 6     | -        | 8                    | -       | Y         | -               | -            | -          | -           | -        |
| 8B   | 6X6       | 300                        | 6     | -        | 8                    | -       | Y         | -               | -            | -          | -           | -        |
| 8C   | 6X40      | 0                          | 2-4-2 | -        | 8                    | Y       | Y         | Y               | 2.0          | 5          | -           | -        |
| 8D   | 6X40      | 0                          | 2-4-2 | -        | 8                    | Y       | Y         | Y               | 2.0          | 5          | -           | -        |

8 Phase Fully Actuated Isolated

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.



OASIS 2070L TIMING CHART

| FEATURE                | PHASE |            |     |     |     |            |     |     |
|------------------------|-------|------------|-----|-----|-----|------------|-----|-----|
|                        | 1     | 2          | 3   | 4   | 5   | 6          | 7   | 8   |
| Min Green 1*           | 7     | 10         | 7   | 7   | 7   | 10         | 7   | 7   |
| Extension 1*           | 2.0   | 3.0        | 2.0 | 6.0 | 2.0 | 3.0        | 2.0 | 6.0 |
| Max Green 1*           | 15    | 90         | 25  | 60  | 15  | 90         | 25  | 60  |
| Yellow Clearance       | 3.0   | 3.9        | 3.0 | 4.9 | 3.0 | 3.9        | 3.0 | 4.6 |
| Red Clearance          | 2.6   | 2.0        | 3.1 | 1.6 | 2.6 | 2.0        | 3.5 | 1.6 |
| Red Revert             | 2.0   | 2.0        | 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* | -     | -          | -   | 5   | -   | -          | -   | 5   |
| Time To Reduce*        | -     | -          | -   | 30  | -   | -          | -   | 30  |
| Minimum Gap            | -     | -          | -   | 3.0 | -   | -          | -   | 3.0 |
| Recall Mode            | -     | MIN RECALL | -   | -   | -   | MIN RECALL | -   | -   |
| Vehicle Call Memory    | -     | YELLOW     | -   | -   | -   | YELLOW     | -   | -   |
| Dual Entry             | -     | -          | -   | -   | -   | -          | -   | -   |
| Simultaneous Gap       | ON    | ON         | ON  | ON  | ON  | ON         | 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 |
|  | Proposed Modified Signal Head                           |  | N/A      |
|  | Proposed Sign   |  | N/A      |
|  | Proposed Pedestrian Signal Head With Push Button & Sign |  | N/A      |
|  | Proposed Signal Pole with Guy                           |  | N/A      |
|  | Proposed Signal Pole with Sidewalk Guy                  |  | N/A      |
|  | Proposed Inductive Loop Detector                        |  | N/A      |
|  | Proposed Controller & Cabinet                           |  | N/A      |
|  | Proposed Junction Box                                   |  | N/A      |
|  | Proposed 2-in Underground Conduit                       |  | N/A      |
|  | N/A   |  | N/A      |
|  | Proposed Directional Arrow                              |  | N/A      |
|  | Proposed Metal Strain Pole                              |  | N/A      |
|  | Proposed "YIELD" Sign (R1-2)                            |  | N/A      |

FINAL DESIGN

Prepared In the Offices of:  
  
 750 N. Greenfield Pkwy, Corner, NC 27520

**US 321A (Norwood Street) at SR 1178 (Hibriten Drive)**

Division 11 Caldwell County Lenoir  
 PLAN DATE: November 2011 REVIEWED BY: B.E. Wynn  
 PREPARED BY: Jerry Yaravitz REVIEWED BY:

SCALE: 1"=30'

REVISIONS: \_\_\_\_\_

INIT. DATE

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

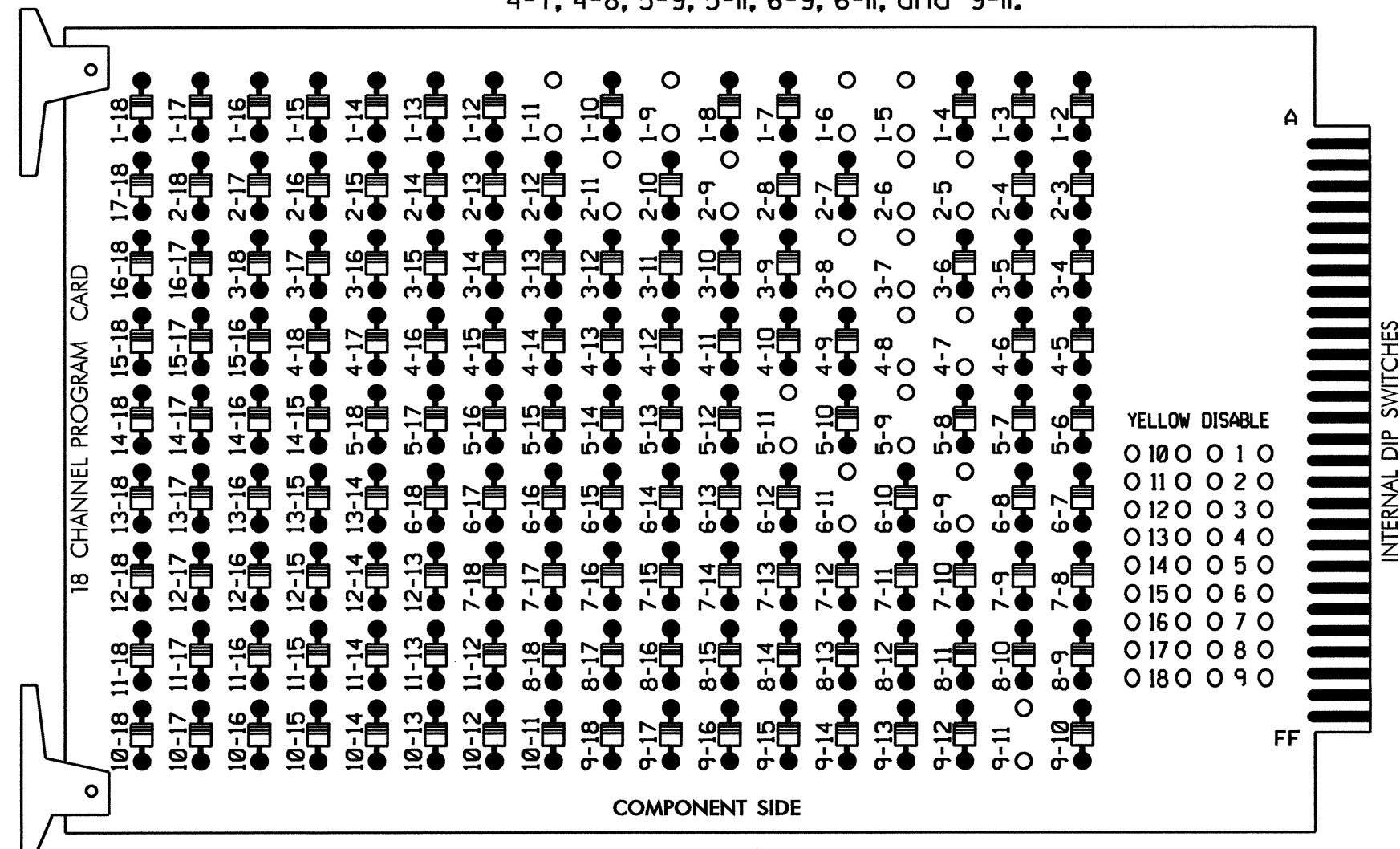
SIG. INVENTORY NO. 11-1297

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 30530 ZACHARY LITTLE

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

(remove jumpers and set switches as shown)

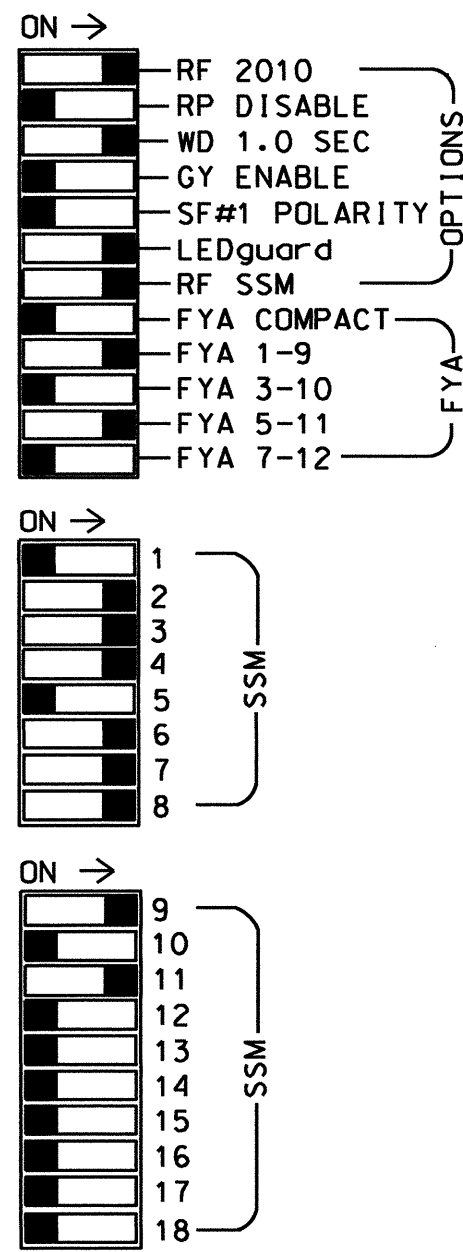
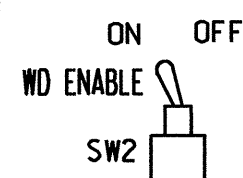
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 4-7, 4-8, 5-9, 5-11, 6-9, 6-11, and 9-11.



REMOVE JUMPERS AS SHOWN

**NOTES:**

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



**NOTES**

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

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11,  
 AUX S1, AUX S4  
 PHASES USED.....1,2,3,4,5,6,7,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....5+6  
 OVERLAP "D".....NOT USED

**SIGNAL HEAD HOOK-UP CHART**

| LOAD SWITCH NO.       | S1  | S2    | S3    | S4  | S5  | S6    | S7 | S8  | S9    | S10 | S11 | S12   | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------------|-----|-------|-------|-----|-----|-------|----|-----|-------|-----|-----|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO.       | 1   | 2     | 13    | 3   | 4   | 14    | 5  | 6   | 15    | 7   | 8   | 16    | 9      | 10     | 17     | 11     | 12     | 18     |
| PHASE                 | 1   | 2     | 2 PED | 3   | 4   | 4 PED | 5  | 6   | 6 PED | 7   | 8   | 8 PED | OLA    | OLB    | SPARE  | OLC    | OLD    | SPARE  |
| SIGNAL HEAD NO.       | 11  | 21,22 | NU    | 22  | 31  | 41,42 | NU | 51  | 61,62 | NU  | 62  | 71,72 | 81,82  | NU     | 11     | NU     | 51     | NU     |
| RED                   |     | 128   |       |     | 101 |       |    | 134 |       |     | 107 |       |        |        |        |        |        |        |
| YELLOW                | *   | 129   |       |     | 102 |       | *  | 135 |       |     | 108 |       |        |        |        |        |        |        |
| GREEN                 |     | 130   |       |     | 103 |       |    | 136 |       |     | 109 |       |        |        |        |        |        |        |
| RED ARROW             |     |       |       |     | 116 |       |    |     |       |     | 122 |       |        |        | A121   |        |        | A114   |
| YELLOW ARROW          |     |       |       |     | 117 | 117   |    |     |       |     | 123 | 123   |        |        | A122   |        |        | A115   |
| FLASHING YELLOW ARROW |     |       |       |     |     |       |    |     |       |     |     |       |        |        | A123   |        |        | A116   |
| GREEN ARROW           | 127 |       |       | 118 | 118 |       |    | 133 |       |     | 124 | 124   |        |        |        |        |        |        |

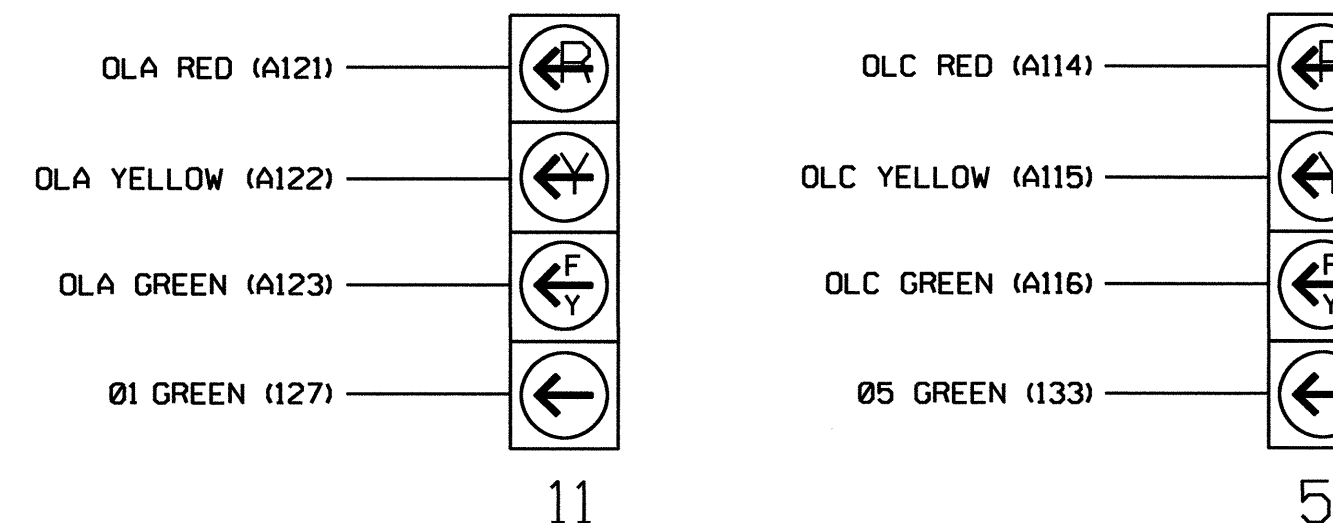
NU = Not Used

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

\* See pictorial of head wiring in detail below.

**4 SECTION FYA PPLT SIGNAL WIRING DETAIL**

(wire signal heads as shown)



**NOTE**

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 2 for programming instructions.

**INPUT FILE POSITION LAYOUT**

(front view)

| FILE "I" | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8 | 9 | 10 | 11 | 12 | 13 | 14          |
|----------|-----|-----|-----|-----|-----|-----|----|---|---|----|----|----|----|-------------|
| U        | ∅ 1 | ∅ 2 | S   | ∅ 3 | ∅ 4 | ∅ 4 | S  | S | S | S  | S  | S  | S  | FS          |
| L        | 1A  | 2A  | 3A  | 4A  | 4C  | 4B  | 4D |   |   |    |    |    |    | DC ISOLATOR |
| U        | ∅ 5 | ∅ 6 | ∅ 7 | ∅ 8 | ∅ 8 | S   | S  | S | S | S  | S  | S  | S  | FS          |
| L        | 5A  | 6A  | 7A  | 8A  | 8C  | 8B  | 8D |   |   |    |    |    |    | DC ISOLATOR |

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

FS = FLASH SENSE  
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

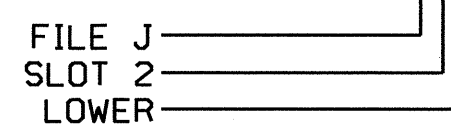
**INPUT FILE CONNECTION & PROGRAMMING CHART**

| LOOP NO.        | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | INPUT ASSIGNMENT NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND | FULL TIME DELAY | STRETCH TIME | DELAY TIME |
|-----------------|---------------|-----------------|---------|----------------------|--------------|------------|------|--------|-----------------|--------------|------------|
| 1A <sup>1</sup> | 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      |                 |              |            |
| 3A              | TB4-5,6       | I5U             | 58      | 20                   | 3            | 3          | Y    | Y      |                 |              | 15         |
| 4A              | TB4-9,10      | I6U             | 41      | 3                    | 4            | 4          |      | Y      |                 |              |            |
| 4B              | TB4-11,12     | I6L             | 45      | 7                    | 14           | 4          |      | Y      |                 |              |            |
| 4C              | TB6-1,2       | I7U             | 65      | 27                   | 34           | 4          | Y    | Y      | Y               | 2.0          | 5          |
| 4D              | TB6-3,4       | I7L             | 78      | 40                   | 44           | 4          | Y    | Y      | Y               | 2.0          | 5          |
| 5A <sup>2</sup> | 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      |                 |              |            |
| 7A              | TB3-9,10      | J3U             | 64      | 26                   | 36           | 7          | Y    | Y      |                 |              | 15         |
| 7B              | TB3-11,12     | J3L             | 77      | 39                   | 46           | 7          | Y    | Y      |                 |              | 15         |
| 8A              | TB5-9,10      | J6U             | 42      | 4                    | 8            | 8          |      | Y      |                 |              |            |
| 8B              | TB5-11,12     | J6L             | 46      | 8                    | 18           | 8          |      | Y      |                 |              |            |
| 8C              | TB7-1,2       | J7U             | 66      | 28                   | 38           | 8          | Y    | Y      | Y               | 2.0          | 5          |
| 8D              | TB7-3,4       | J7L             | 79      | 41                   | 48           | 8          | Y    | Y      | Y               | 2.0          | 5          |

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

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

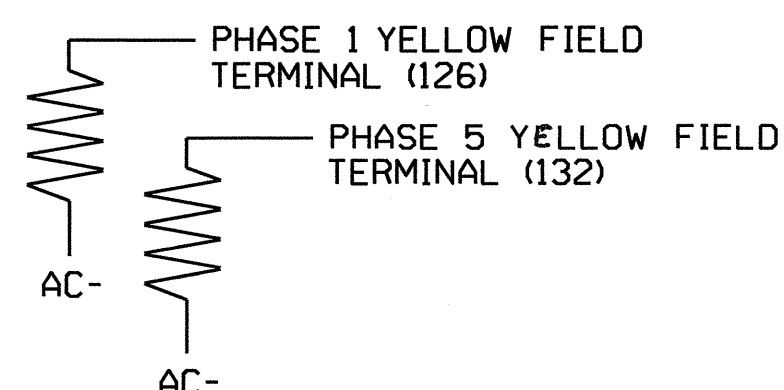
**INPUT FILE POSITION LEGEND: J2L**



**LOAD RESISTOR INSTALLATION DETAIL**

(install resistors as shown below)

| ACCEPTABLE VALUES | VALUE (ohms) | WATTAGE   |
|-------------------|--------------|-----------|
| 1                 | 1.5K - 1.9K  | 25W (min) |
| 2                 | 2.0K - 3.0K  | 10W (min) |



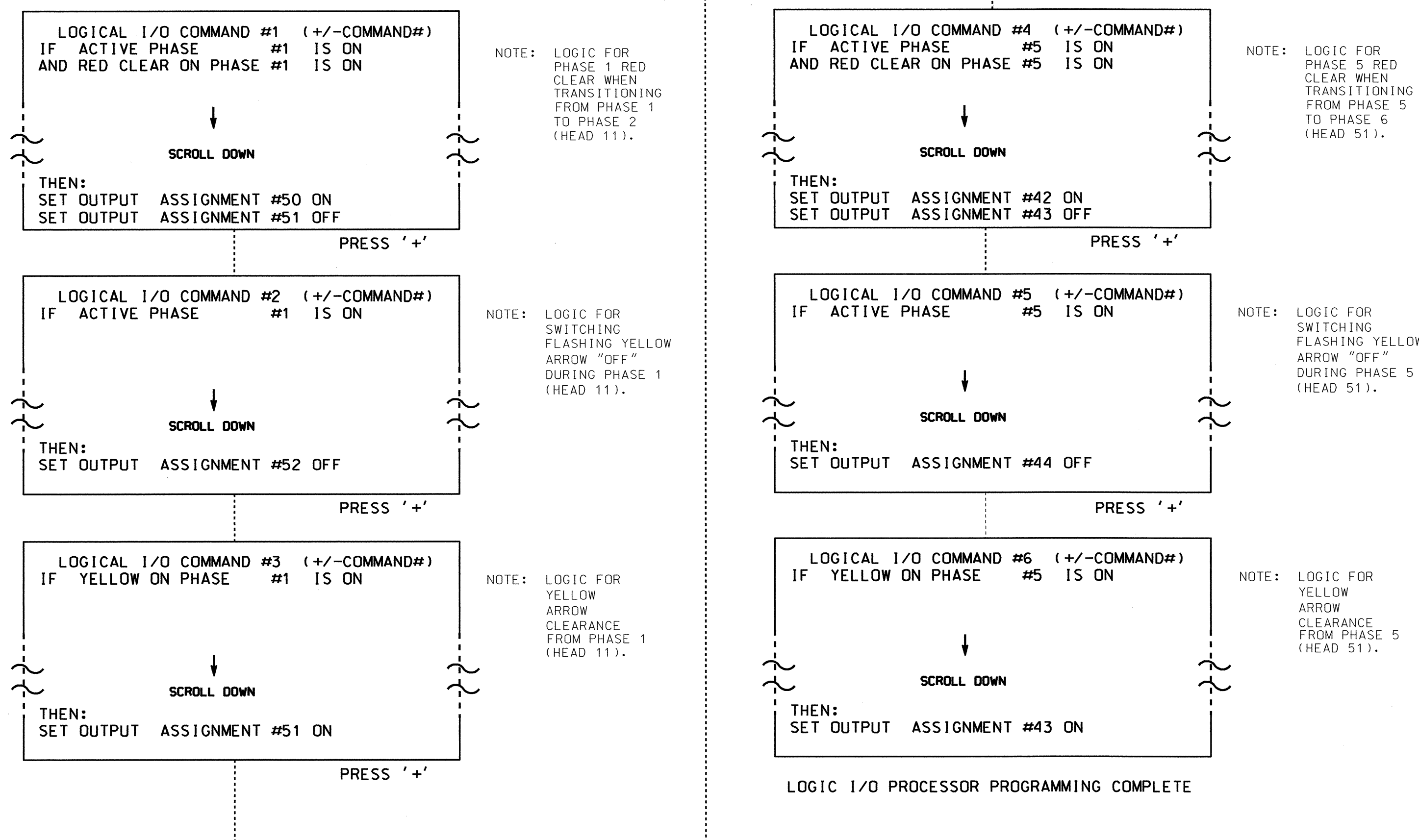
Final Design - Sheet 1 of 2

|           |   |   |  |   |   |
|-----------|---|---|--|---|---|
|           | ELECTRICAL AND PROGRAMMING DETAILS FOR: |   | US 321A (Norwood Street) at SR 1178 (Hibriten Drive) |   | SEAL<br>NORTH CAROLINA PROFESSIONAL ENGINEER<br>SEAL 008453<br>JOHN F. ROWE, P.E. |
|           | Prepared In the Offices of:             | Division 11<br>PLAN DATE: January 2012<br>PREPARED BY: S. Armstrong | Caldwell County<br>REVIEWED BY: JTR<br>REVIEWED BY:  | Lenoir  |   |
| REVISIONS |   | INIT.   | DATE   | Signature: John Rowe 1-26-12<br>DATE: 1-26-12<br>SIG. INVENTORY NO. 11-1297 |   |

## 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).



| OUTPUT REFERENCE SCHEDULE |                  |
|---------------------------|------------------|
| OUTPUT 42 =               | Overlap C Red    |
| OUTPUT 43 =               | Overlap C Yellow |
| OUTPUT 44 =               | Overlap C Green  |
| OUTPUT 50 =               | Overlap A Red    |
| OUTPUT 51 =               | Overlap A Yellow |
| OUTPUT 52 =               | Overlap A Green  |

## OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

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

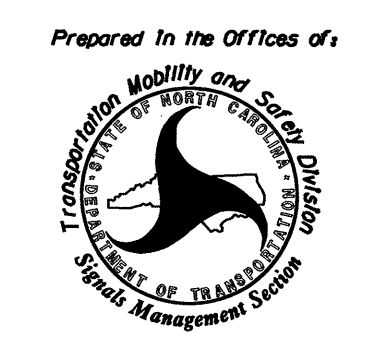
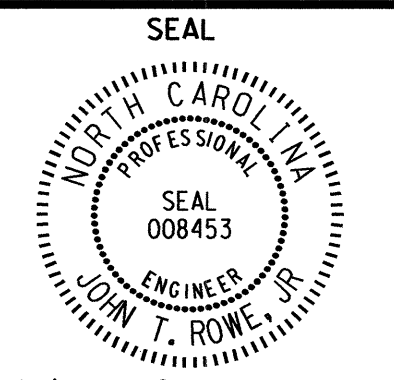
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 11-1297  
DESIGNED: November 2011  
SEALED: 1/25/12  
REVISED: N/A

26-JAN-2012 11:45:31 \\s:\proj\11297\Sig\11297\_Sig\_Ele\_11-2211B.dgn

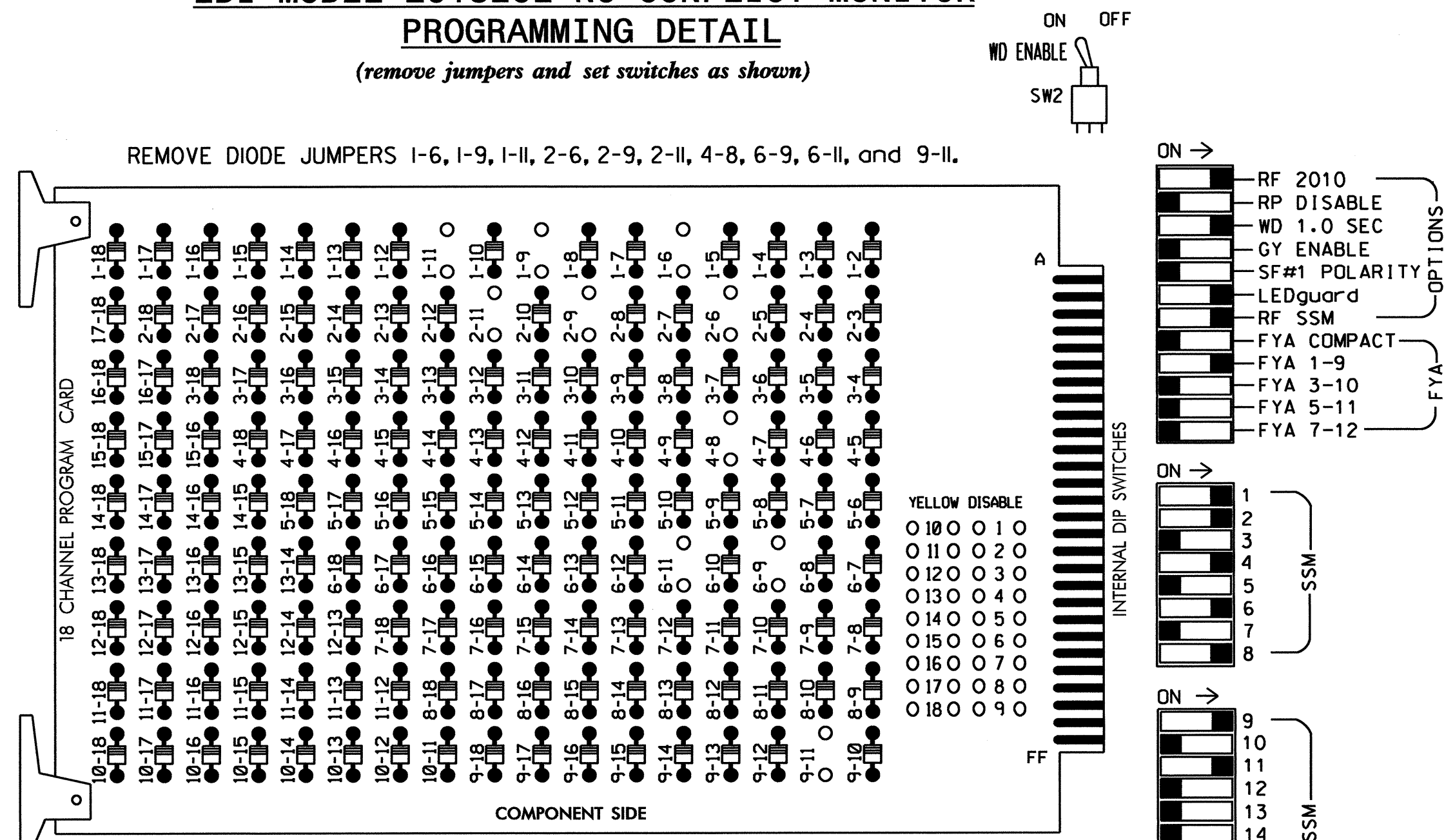
Final Design - Sheet 2 of 2

|   | <p><b>US 321A (Norwood Street)<br/>at<br/>SR 1178 (Hibriten Drive)</b></p> |  |       |      |  |  |  |                                   |
|--|--|---|-------|------|--|--|--|-----------------------------------|
| <p>Division 11 Caldwell County Lenoir</p>  |  | <p>Signature: <i>John T. Rowe</i> 1-26-12<br/>DATE</p>                                |       |      |  |  |  |                                   |
| <p>PLAN DATE: January 2012 REVIEWED BY: <i>STK</i></p> <p>PREPARED BY: S. Armstrong REVIEWED BY:</p>   |  |   |       |      |  |  |  |                                   |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> |  | REVISIONS   | INIT. | DATE |  |  |  | <p>SIG. INVENTORY NO. 11-1297</p> |
| REVISIONS  | INIT.  | DATE  |       |      |  |  |  |                                   |
|  |  |   |       |      |  |  |  |                                   |



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

(remove jumpers and set switches as shown)



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

**EQUIPMENT INFORMATION**

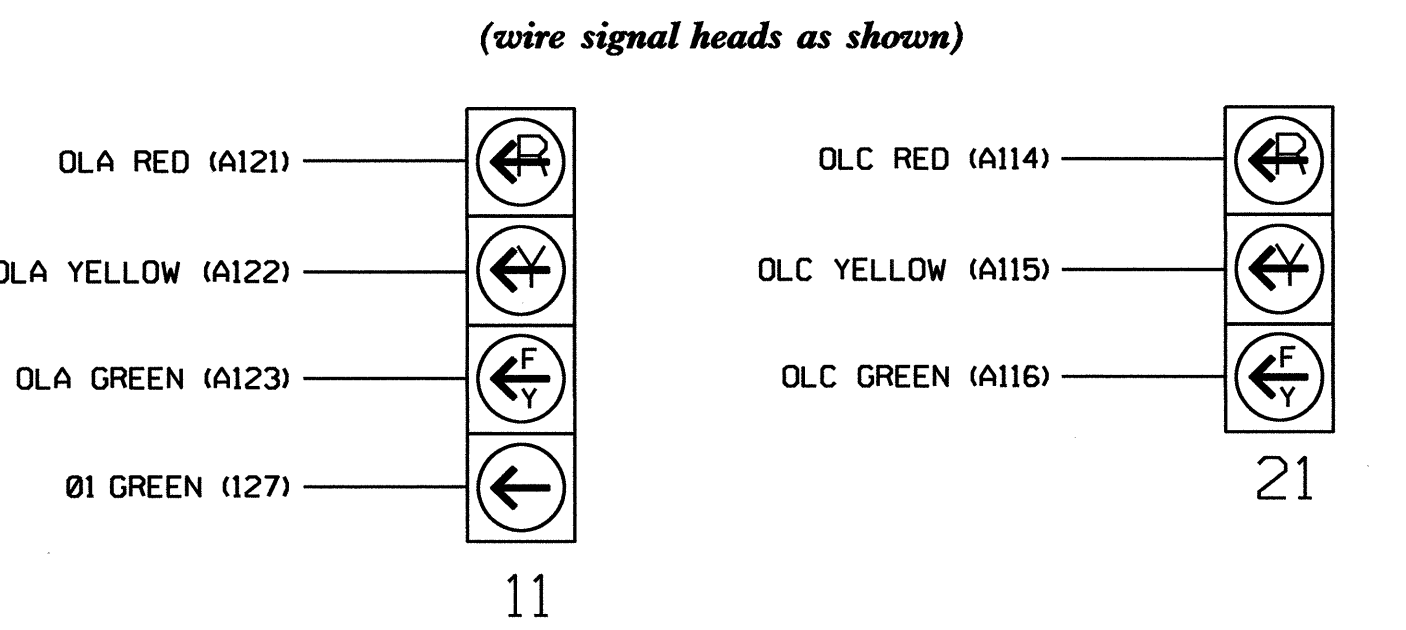
CONTROLLER.....2070L  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE LOAD SWITCHES USED.....S1,S2,S5,S8,S11,AUX S1,AUX S4  
 PHASES USED.....1,2,4,6,8  
 OVERLAP "A".....1+2  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....6  
 OVERLAP "D".....NOT USED

**SIGNAL HEAD HOOK-UP CHART**

| LOAD SWITCH NO.       | S1  | S2  | S3    | S4 | S5 | S6    | S7 | S8 | S9    | S10 | S11 | S12   | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------------|-----|-----|-------|----|----|-------|----|----|-------|-----|-----|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO.       | 1   | 2   | 13    | 3  | 4  | 14    | 5  | 6  | 15    | 7   | 8   | 16    | 9      | 10     | 17     | 11     | 12     | 18     |
| PHASE                 | 1   | 2   | 2 PED | 3  | 4  | 4 PED | 5  | 6  | 6 PED | 7   | 8   | 8 PED | OLA    | OLB    | SPARE  | OLC    | OLD    | SPARE  |
| SIGNAL HEAD NO.       | 11* | 82  | 22,23 | NU | NU | 41,42 | NU | NU | 61,62 | NU  | NU  | 81,82 | NU     | 11*    | NU     | NU     | 21*    | 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 |       |    |    |       |    |    |       |     |     |       |        |        |        |        |        |        |

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**



**NOTE**  
 The sequence display for signal head 11 requires special logic programming. See sheet 2 for programming instructions.

**INPUT FILE POSITION LAYOUT**

(front view)

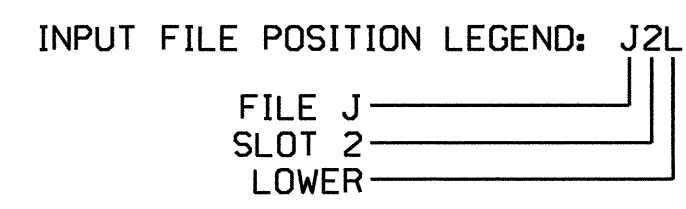
| FILE | 1        | 2   | 3   | 4   | 5        | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   |             |
|------|----------|-----|-----|-----|----------|------|------|------|------|------|------|------|------|------|-------------|
| U    | ∅ 1      | ∅ 1 | ∅ 2 | ∅ 3 | ∅ 4      | ∅ 5  | ∅ 6  | ∅ 7  | ∅ 8  | ∅ 9  | ∅ 10 | ∅ 11 | ∅ 12 | ∅ 13 | FS          |
| I    | 1A       | 1B  | 2B  | 2C  | 4A       | 4B   | 4C   | 4D   | 4E   | 4F   | 4G   | 4H   | 4I   | 4J   | DC ISOLATOR |
| L    | NOT USED | ∅ 2 | ∅ 2 | ∅ 3 | NOT USED | ∅ 4  | ∅ 5  | ∅ 6  | ∅ 7  | ∅ 8  | ∅ 9  | ∅ 10 | ∅ 11 | ∅ 12 | ST          |
| U    | ∅ 5      | ∅ 6 | ∅ 7 | ∅ 8 | ∅ 9      | ∅ 10 | ∅ 11 | ∅ 12 | ∅ 13 | ∅ 14 | ∅ 15 | ∅ 16 | ∅ 17 | ∅ 18 | DC ISOLATOR |
| J    | ∅ 6      | 6A  | 6B  | 6C  | 8A       | 8B   | 8C   | 8D   | 8E   | 8F   | 8G   | 8H   | 8I   | 8J   | FS          |
| L    | ∅ 6      | 6A  | 6B  | 6C  | NOT USED | ∅ 8  | ∅ 9  | ∅ 10 | ∅ 11 | ∅ 12 | ∅ 13 | ∅ 14 | ∅ 15 | ∅ 16 | FS          |

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

**INPUT FILE CONNECTION & PROGRAMMING CHART**

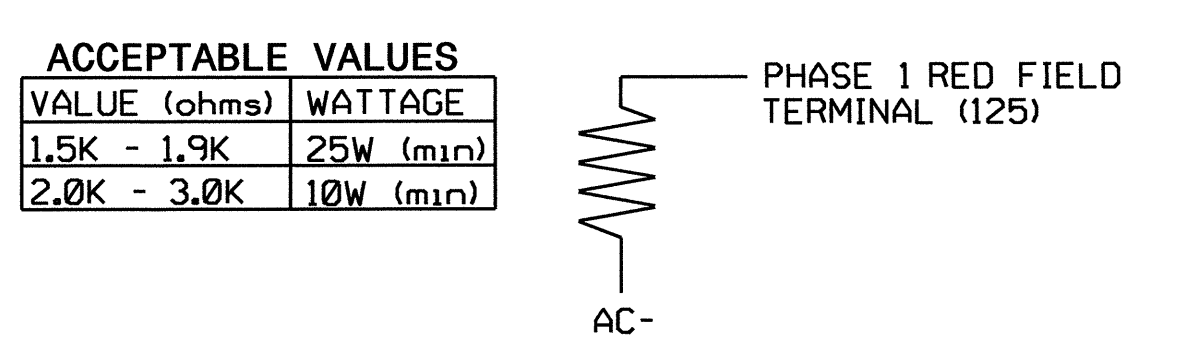
| LOOP NO.        | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | INPUT ASSIGNMENT NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND | FULL TIME DELAY | STRETCH TIME | DELAY TIME |
|-----------------|---------------|-----------------|---------|----------------------|--------------|------------|------|--------|-----------------|--------------|------------|
| 1A <sup>1</sup> | TB2-1,2       | I1U             | 56      | 18                   | 1            | 1          | Y    | Y      |                 |              | 15         |
|                 |               | J4U             | 48      | 10                   | 26           | 6          | Y    | Y      | Y               |              | 3          |
| 1B              | TB2-5,6       | I2U             | 39      | 1                    | 2            | 1          | Y    | Y      |                 |              | 15         |
| 2A              | TB2-7,8       | I2L             | 43      | 5                    | 12           | 2          | Y    | Y      |                 |              |            |
| 2B              | TB2-9,10      | I3U             | 63      | 25                   | 32           | 2          | Y    | Y      |                 |              |            |
| 2C              | TB2-11,12     | I3L             | 76      | 38                   | 42           | 2          | Y    | Y      |                 |              |            |
| 4A              | TB4-9,10      | I6U             | 41      | 3                    | 4            | 4          | 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      |                 |              |            |

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



**LOAD RESISTOR INSTALLATION DETAIL**

(install resistor as shown below)



New Installation - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1178 (Hibriten Drive) at US 321 NB Ramp/Old Hibriten Drive

Division 11 Caldwell County Lenoir

Prepared In the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N. Greenfield Pkwy, Garner, NC 27529

PLANNED BY: S. Armstrong  
 REVIEWED BY: JTR

PREPARED BY: S. Armstrong  
 REVIEWED BY:

REVISIONS: \_\_\_\_\_ INIT. DATE

SIGNATURE: *John T. Rowe* DATE: 1-25-12  
 SGC INVENTORY NO. 11-1425

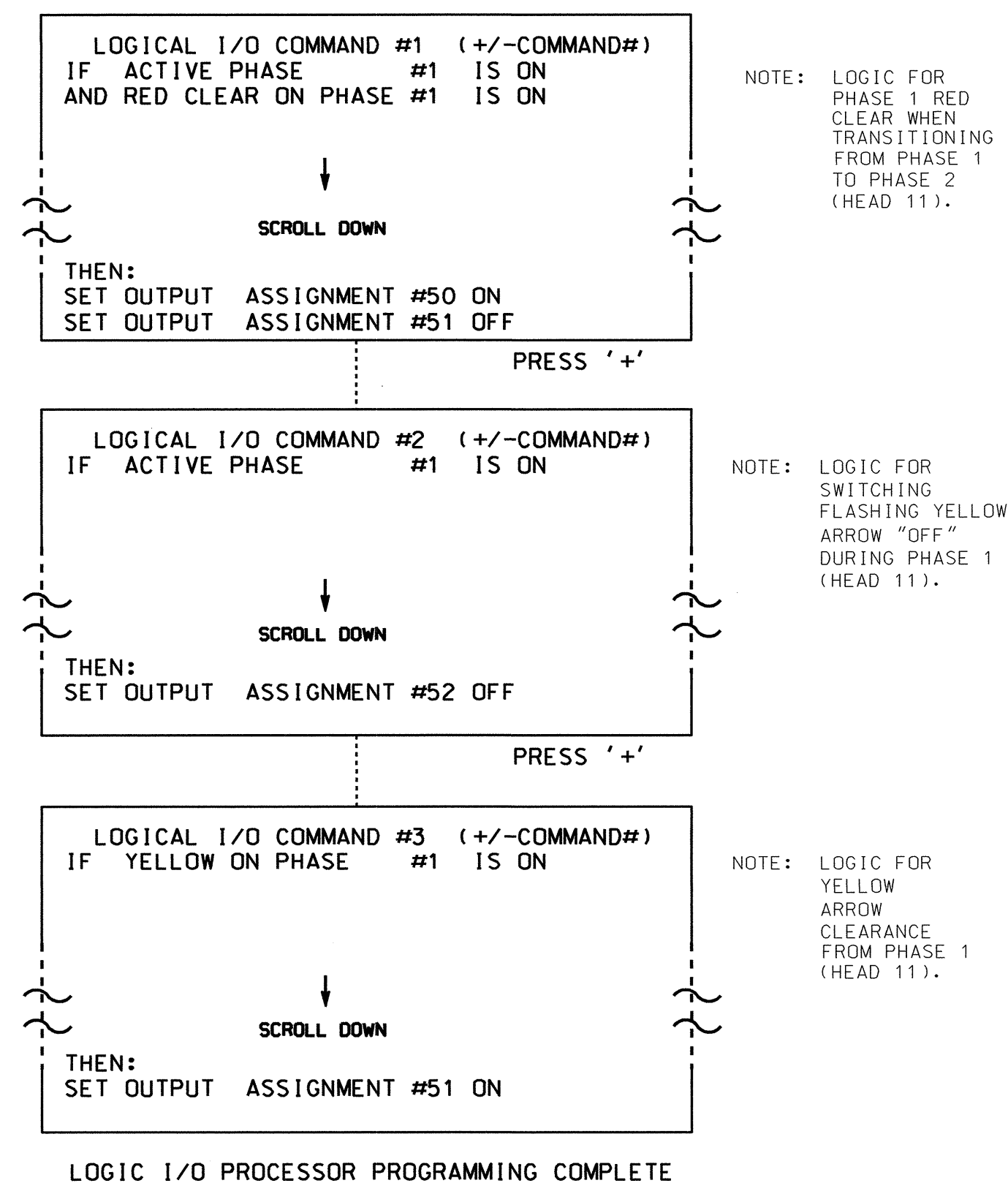
SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER JOHN T. ROWE, JR. SEAL 008453

25-JAN-2012 13:55  
 C:\Users\jtr\Documents\Projects\11-1425\_Sig.13\_elec.dwg

**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).



**OUTPUT REFERENCE SCHEDULE**

OUTPUT 50 = Overlap A Red  
OUTPUT 51 = Overlap A Yellow  
OUTPUT 52 = Overlap A Green

**OVERLAP PROGRAMMING DETAIL**

(program controller as shown below)

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

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

← NOTICE GREEN FLASH

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0.0  
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0  
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0  
OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)  
FLASH YELLOW IN CONTROLLER FLASH?...Y  
GREEN EXTENSION (0-255 SEC)...0.0  
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0  
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0  
OUTPUT AS PHASE # (0=NONE, 1-16)...0

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 11-1425  
DESIGNED: November 2011  
SEALED: 1/25/12  
REVISED: N/A

25-JAN-2012 13:59  
C:\Users\jtr\Documents\11-1425-Sig\11-1425-Sig.dgn

New Installation - Sheet 2 of 2

|  |   |                            |   |   |  |
|--|---|----------------------------|---|---|--|
|  | ELECTRICAL AND PROGRAMMING DETAILS FOR: |                            | SR 1178 (Hibriten Drive)                    |   | SEAL<br>NORTH CAROLINA PROFESSIONAL ENGINEER<br>JOHN T. ROWE, JR.<br>SEAL 008453 |
|  | Prepared In the Offices of:             |                            | at<br>US 321 NB Ramp/<br>Old Hibriten Drive |   |  |
| Division 11 Caldwell County Lenoir       |   | PLAN DATE: January 2012    | REVIEWED BY: JTR                            | PREPARED BY: S. Armstrong                         |  |
| REVISIONS                                |   | INIT.                      | DATE  | SIGNATURE: <i>John T. Rowe, Jr.</i> DATE: 1-25-12 |  |
| 750 N. Greenfield Pkwy, Garner, NC 27529 |   | SIG. INVENTORY NO. 11-1425 |   | 11-1425   |  |



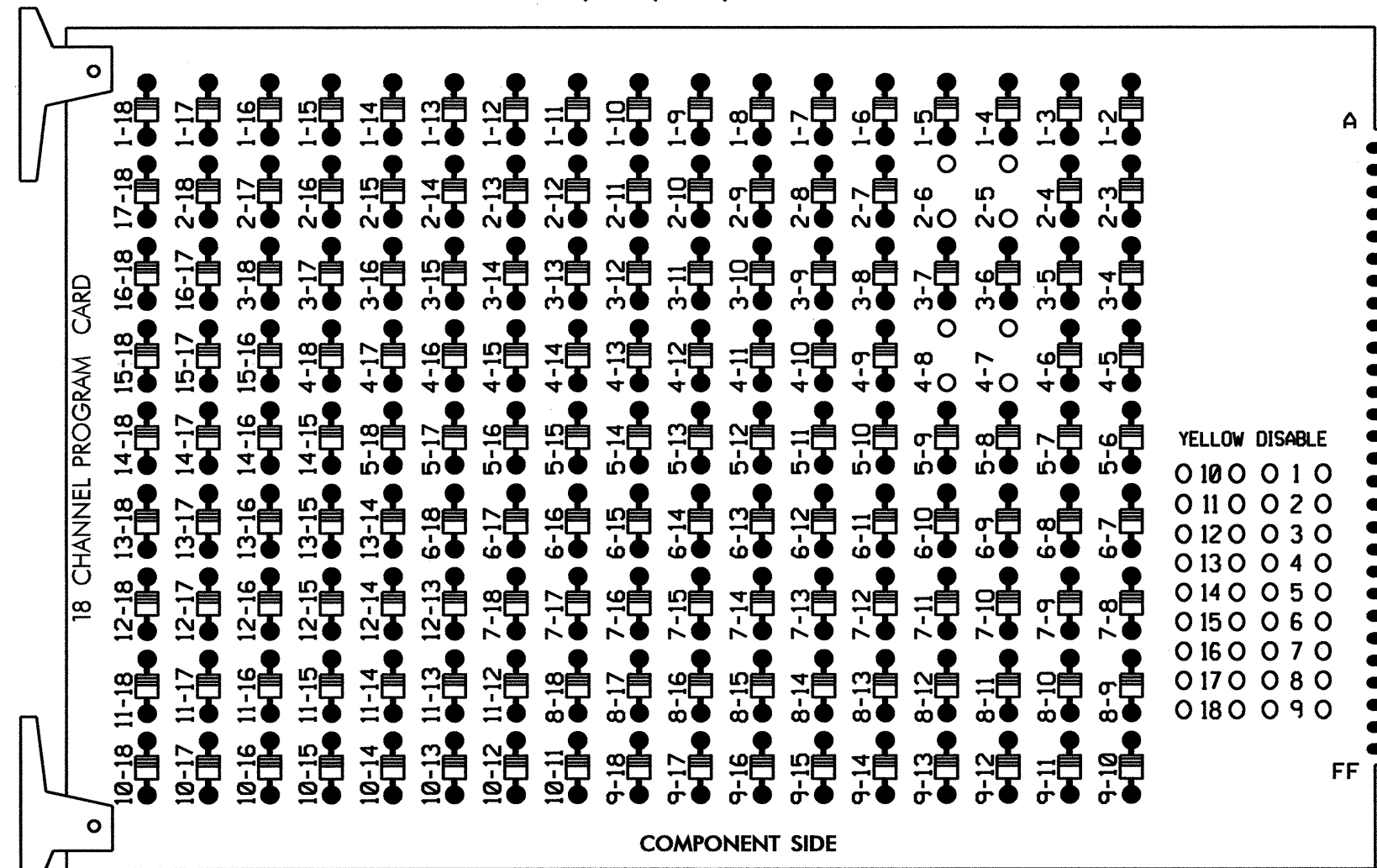




**EDI MODEL 2018ECL-NC CONFLICT MONITOR**  
**PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)

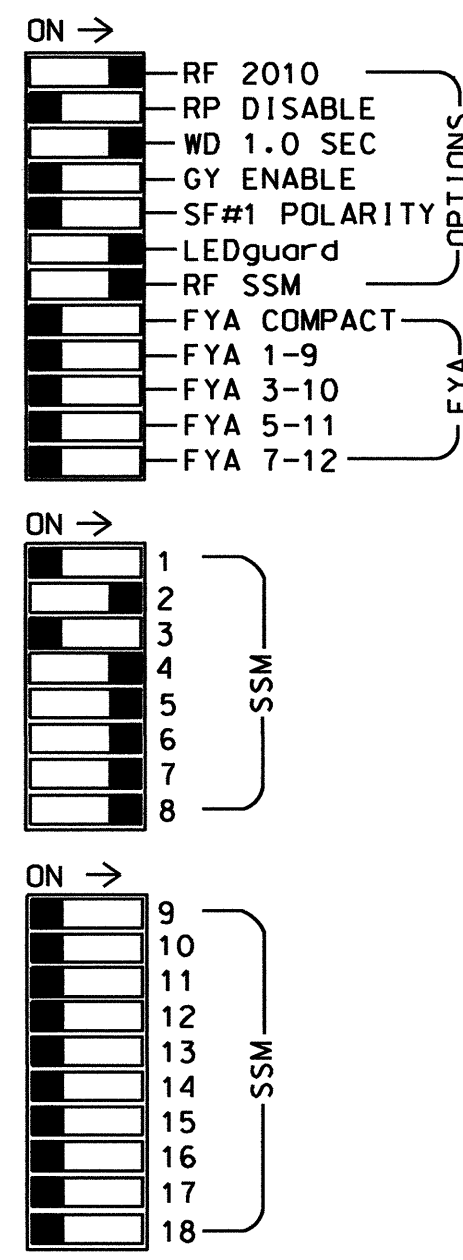
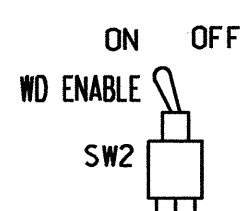
REMOVE DIODE JUMPERS 2-5, 2-6, 4-7, and 4-8.



REMOVE JUMPERS AS SHOWN

**NOTES:**

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



**NOTES**

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

**SIGNAL HEAD HOOK-UP CHART**

| LOAD SWITCH NO. | S1 | S2    | S3    | S4 | S5    | S6    | S7 | S8    | S9    | S10   | S11   | S12   | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------|----|-------|-------|----|-------|-------|----|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1  | 2     | 13    | 3  | 4     | 14    | 5  | 6     | 15    | 7     | 8     | 16    | 9      | 10     | 17     | 11     | 12     | 18     |
| PHASE           | 1  | 2     | 2 PED | 3  | 4     | 4 PED | 5  | 6     | 6 PED | 7     | 8     | 8 PED | OLA    | OLB    | SPARE  | OLC    | OLD    | SPARE  |
| SIGNAL HEAD NO. | NU | 21,22 | NU    | NU | 41,42 | NU    | 21 | 61,62 | NU    | 41,62 | 81,82 | NU    | NU     | NU     | NU     | NU     | NU     | NU     |
| RED             |    | 128   |       |    | 101   |       | *  | 134   |       | *     | 107   |       |        |        |        |        |        |        |
| YELLOW          |    | 129   |       |    | 102   |       |    | 135   |       |       | 108   |       |        |        |        |        |        |        |
| GREEN           |    | 130   |       |    | 103   |       |    | 136   |       |       | 109   |       |        |        |        |        |        |        |
| RED ARROW       |    |       |       |    |       |       |    |       |       |       |       |       |        |        |        |        |        |        |
| YELLOW ARROW    |    |       |       |    |       |       |    | 132   |       |       | 123   |       |        |        |        |        |        |        |
| GREEN ARROW     |    |       |       |    |       |       |    | 133   |       |       | 124   |       |        |        |        |        |        |        |

NU = Not Used

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

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
 CABINET.....332 W/ AUX  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S5,S7,S8,S10,S11  
 PHASES USED.....2,4,5,6,7,8  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....NOT USED

**DYNAMIC BACK-UP CONTROL PROGRAMMING**

(program controller as shown below)

- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Function 1.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

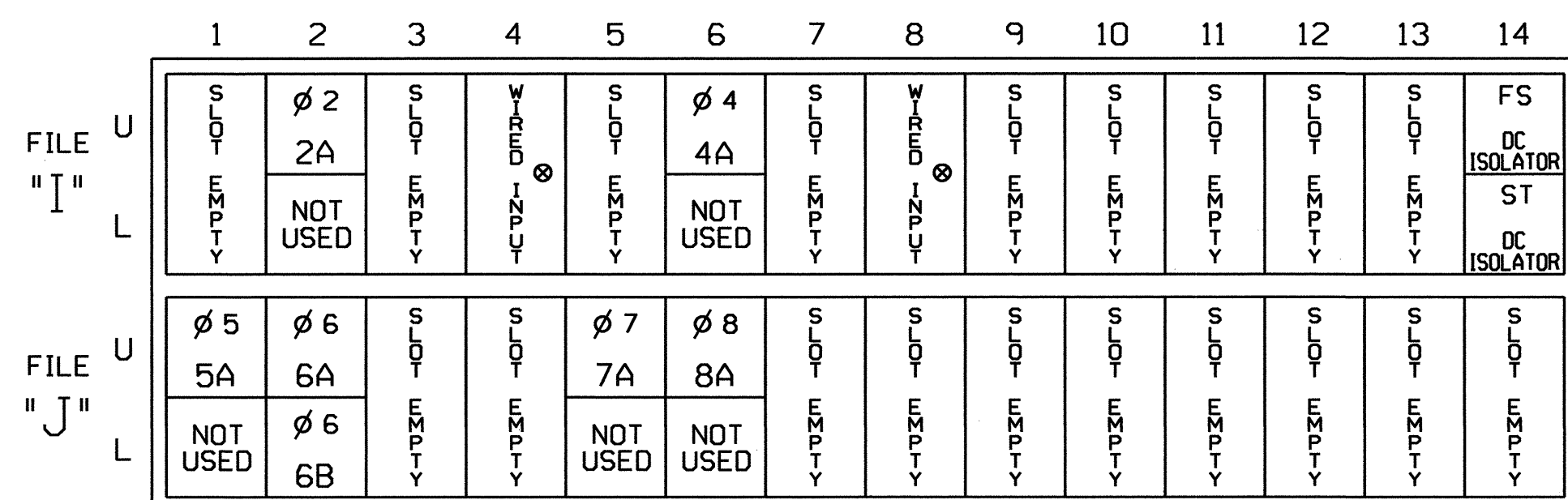
```

DYNAMIC/BACKUP CONTROL FUNCTION #01
OVERLAPS:::ABCDEFGHIJKLMNP
IF OVERLAPS ARE ACTIVE:
OR PHASES:::12345678910111213141516
IF PHASES ARE ON: X
OMIT PHASES: X
    
```

BACKUP PROTECTION PROGRAMMING COMPLETE

**INPUT FILE POSITION LAYOUT**

(front view)



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

FS = FLASH SENSE  
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

**BACKUP PROTECTION NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

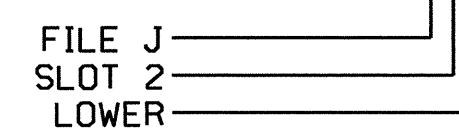
**INPUT FILE CONNECTION & PROGRAMMING CHART**

| 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      |                 |              | 10         |
| 5A <sup>1</sup> | 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      |                 |              |            |
| 7A <sup>2</sup> | TB5-5,6       | J5U             | 57      | 19                   | 7            | 7          | Y    | Y      |                 |              | 15         |
|                 |               | I8U             | 49      | 11                   | 24           | 4          | Y    | Y      |                 |              | 3          |
| 8A              | TB5-9,10      | J6U             | 42      | 4                    | 8            | 8          | Y    | Y      |                 |              | 5          |

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

<sup>2</sup>Add jumper from J5-W to I8-W, on rear of input file.

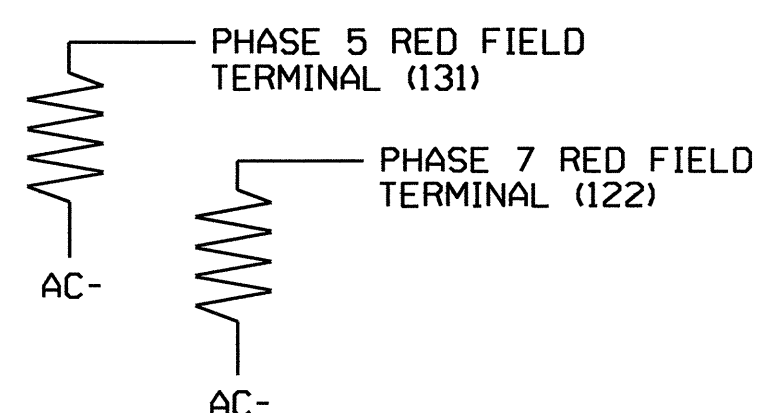
INPUT FILE POSITION LEGEND: J2L



**LOAD RESISTOR INSTALLATION DETAIL**

(install resistors as shown below)

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



Temporary Signal - TCP Phase 1 - Details 8 & 9

Electrical and Programming Details For: **US 321A (Norwood Street) at SR 1959 (Connelly Springs Road)/Berkley Street**

Division 11 Caldwell County Lenoir

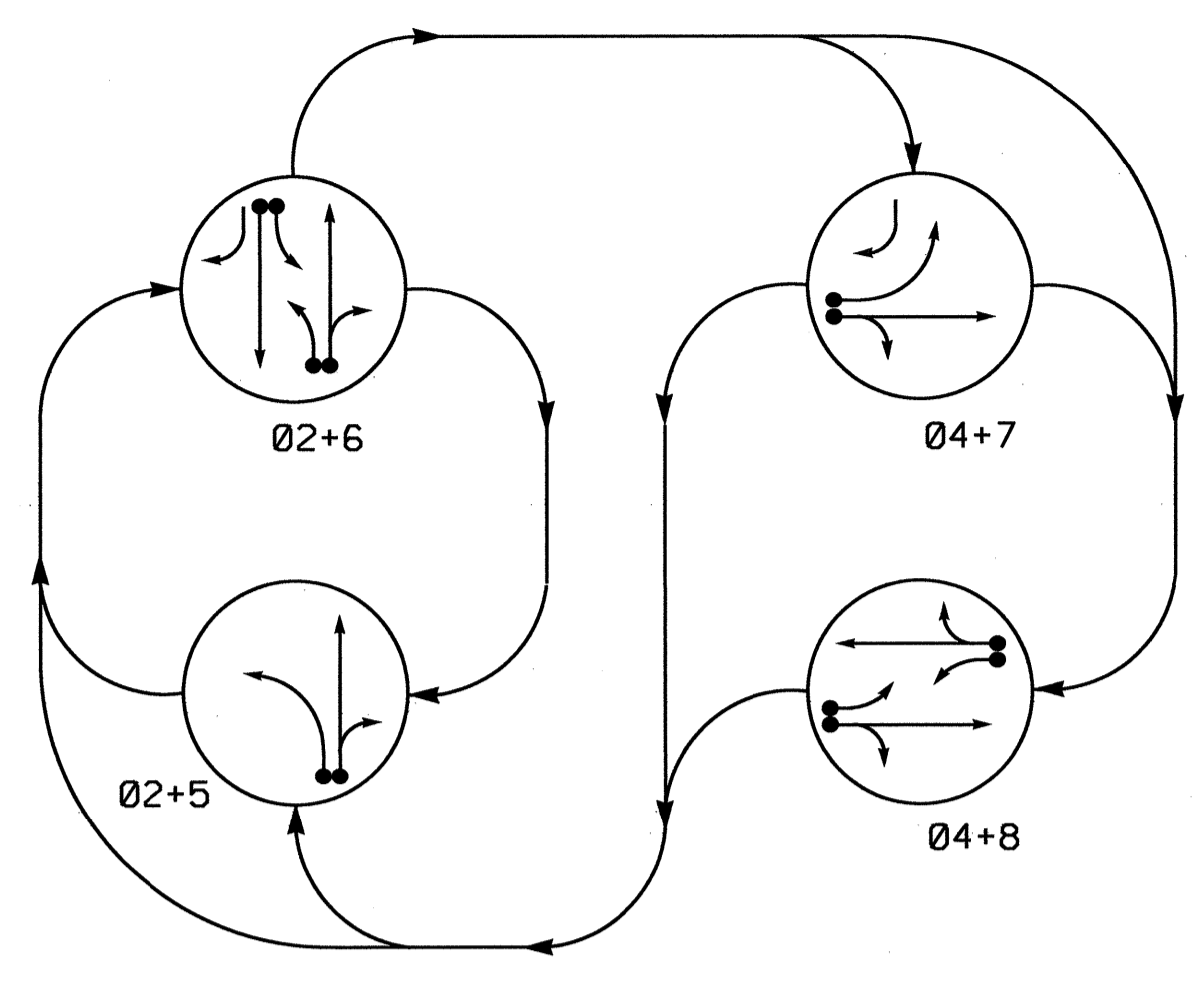
Prepared by: S. Armstrong  
 Reviewed by: JTR

Plan Date: January 2012  
 Revised: 1/26/12

Signature: [Signature]  
 Date: 1-27-12

Inventory No. 11-0865T1, T2

**PHASING DIAGRAM**



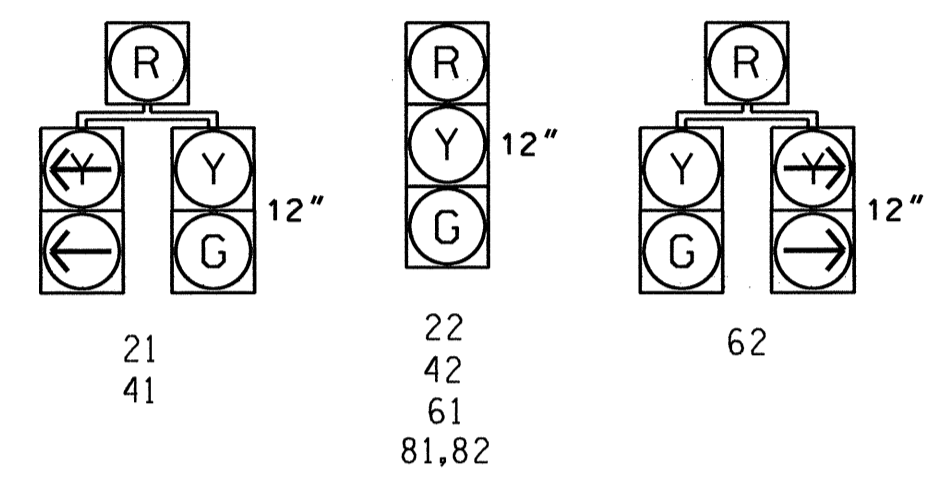
**PHASING DIAGRAM DETECTION LEGEND**

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

| SIGNAL FACE | PHASE |      |      |      | FLASH |
|-------------|-------|------|------|------|-------|
|             | 02+5  | 02+6 | 04+7 | 04+8 |       |
| 21          | G     | R    | R    | Y    |       |
| 22          | G     | G    | R    | Y    |       |
| 41          | R     | R    | G    | R    |       |
| 42          | R     | R    | G    | R    |       |
| 61          | R     | G    | R    | Y    |       |
| 62          | R     | G    | R    | Y    |       |
| 81,82       | R     | R    | R    | G    |       |

**SIGNAL FACE I.D.**

All Heads L.E.D.

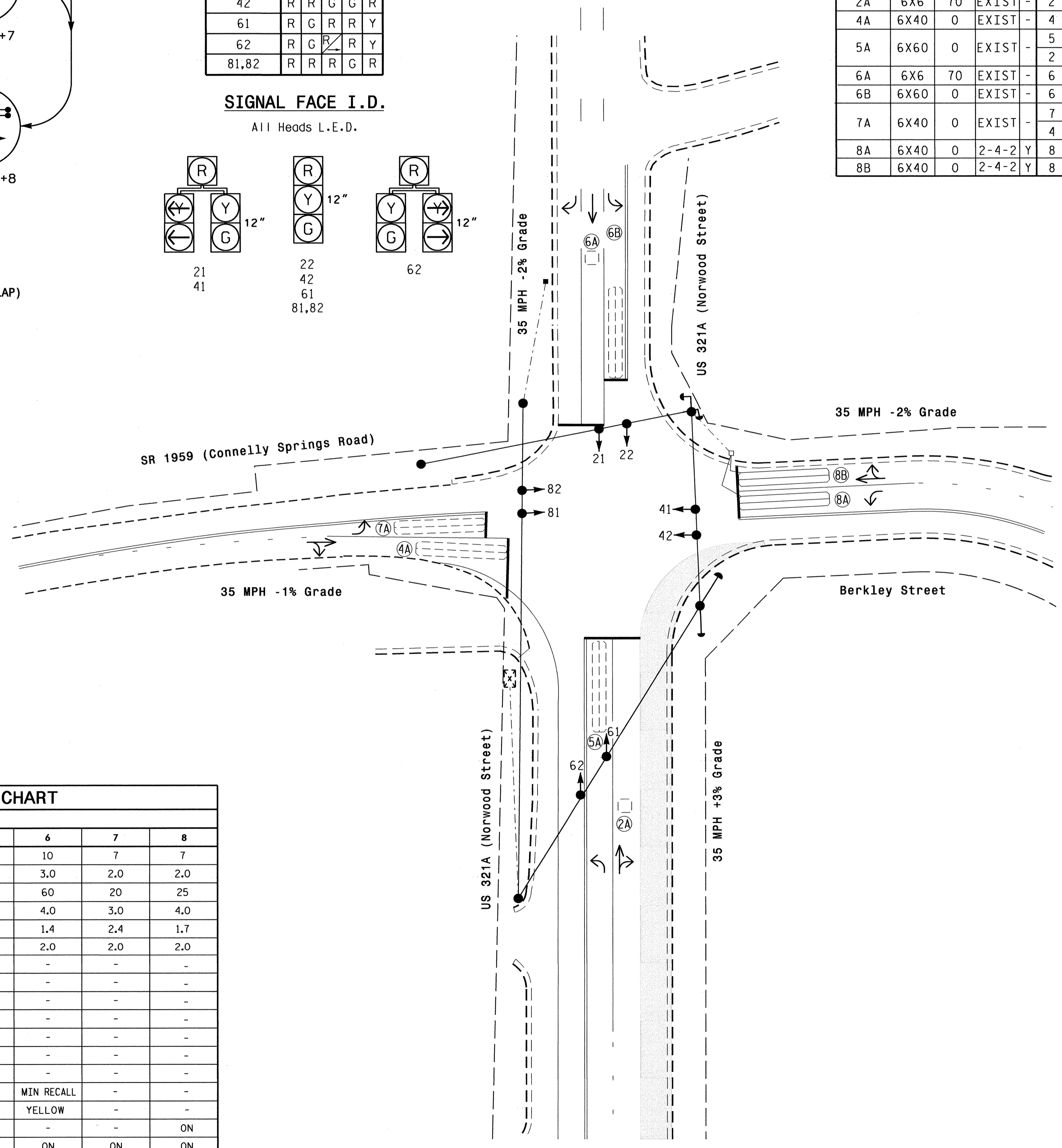


| OASIS 2070L LOOP & DETECTOR INSTALLATION CHART |           |                            |       |                      |       |         |           |                 |              |            |             |          |
|--|-----------|----------------------------|-------|----------------------|-------|---------|-----------|-----------------|--------------|------------|-------------|----------|
| INDUCTIVE LOOPS                                |           |                            |       | DETECTOR PROGRAMMING |       |         |           |                 |              |            |             |          |
| LOOP   | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP             | PHASE | CALLING | EXTENSION | FULL TIME DELAY | STRETCH TIME | DELAY TIME | LOOP SYSTEM | NEW CARD |
| 2A   | 6X6       | 70                         | EXIST | -                    | 2     | Y       | Y         | -               | -            | -          | -           | -        |
| 4A   | 6X40      | 0                          | EXIST | -                    | 4     | Y       | Y         | -               | -            | 10         | -           | -        |
| 5A   | 6X60      | 0                          | EXIST | -                    | 5     | Y       | Y         | -               | -            | 15         | -           | -        |
| 6A   | 6X6       | 70                         | EXIST | -                    | 6     | Y       | Y         | -               | -            | -          | -           | -        |
| 6B   | 6X60      | 0                          | EXIST | -                    | 6     | Y       | Y         | -               | -            | -          | -           | -        |
| 7A   | 6X40      | 0                          | EXIST | -                    | 7     | Y       | Y         | -               | -            | 15         | -           | -        |
| 8A   | 6X40      | 0                          | 2-4-2 | Y                    | 8     | Y       | Y         | -               | -            | 3          | -           | -        |
| 8B   | 6X40      | 0                          | 2-4-2 | Y                    | 8     | Y       | Y         | -               | -            | 10         | -           | Y        |

4 Phase Fully Actuated Isolated

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Omit phase 7 during phase 8 on.
- Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 2+5 by progressing through an all red display.
- Set all detector units to presence mode.



| FEATURE                 | PHASE      |     |     |            |     |     |
|-------------------------|------------|-----|-----|------------|-----|-----|
|                         | 2          | 4   | 5   | 6          | 7   | 8   |
| Min Green 1 *           | 10         | 7   | 7   | 10         | 7   | 7   |
| Extension 1 *           | 3.0        | 2.0 | 2.0 | 3.0        | 2.0 | 2.0 |
| Max Green 1 *           | 60         | 25  | 20  | 60         | 20  | 25  |
| Yellow Clearance        | 3.7        | 3.9 | 3.0 | 4.0        | 3.0 | 4.0 |
| Red Clearance           | 1.6        | 1.5 | 2.3 | 1.4        | 2.4 | 1.7 |
| Red Revert              | 5.0        | 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.

| PROPOSED | EXISTING |
|----------|----------|
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |

Temporay Signal - TCP Phase II

750 N. Greenfield Pkwy, Garner, NC 27529

**US 321A (Norwood Street) at SR 1959 (Connelly Springs Road)/Berkley Street**

Division 11 Caldwell County Lenoir

PLANNED BY: December 2011 REVIEWED BY: B. Wynn

PREPARED BY: Jerry Yaravitz REVIEWED BY:

SEAL

ZACHARY LITTLE  
ENGINEER  
30530

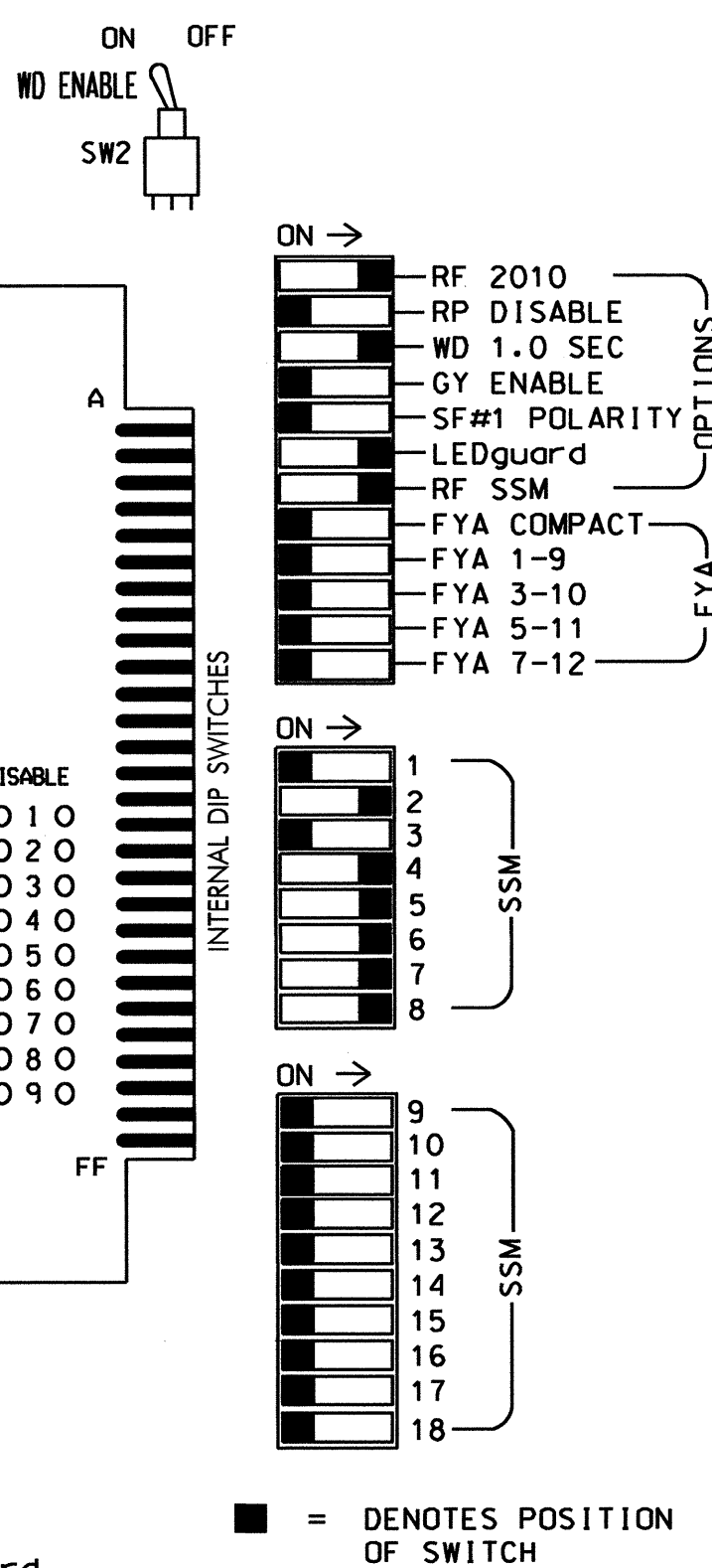
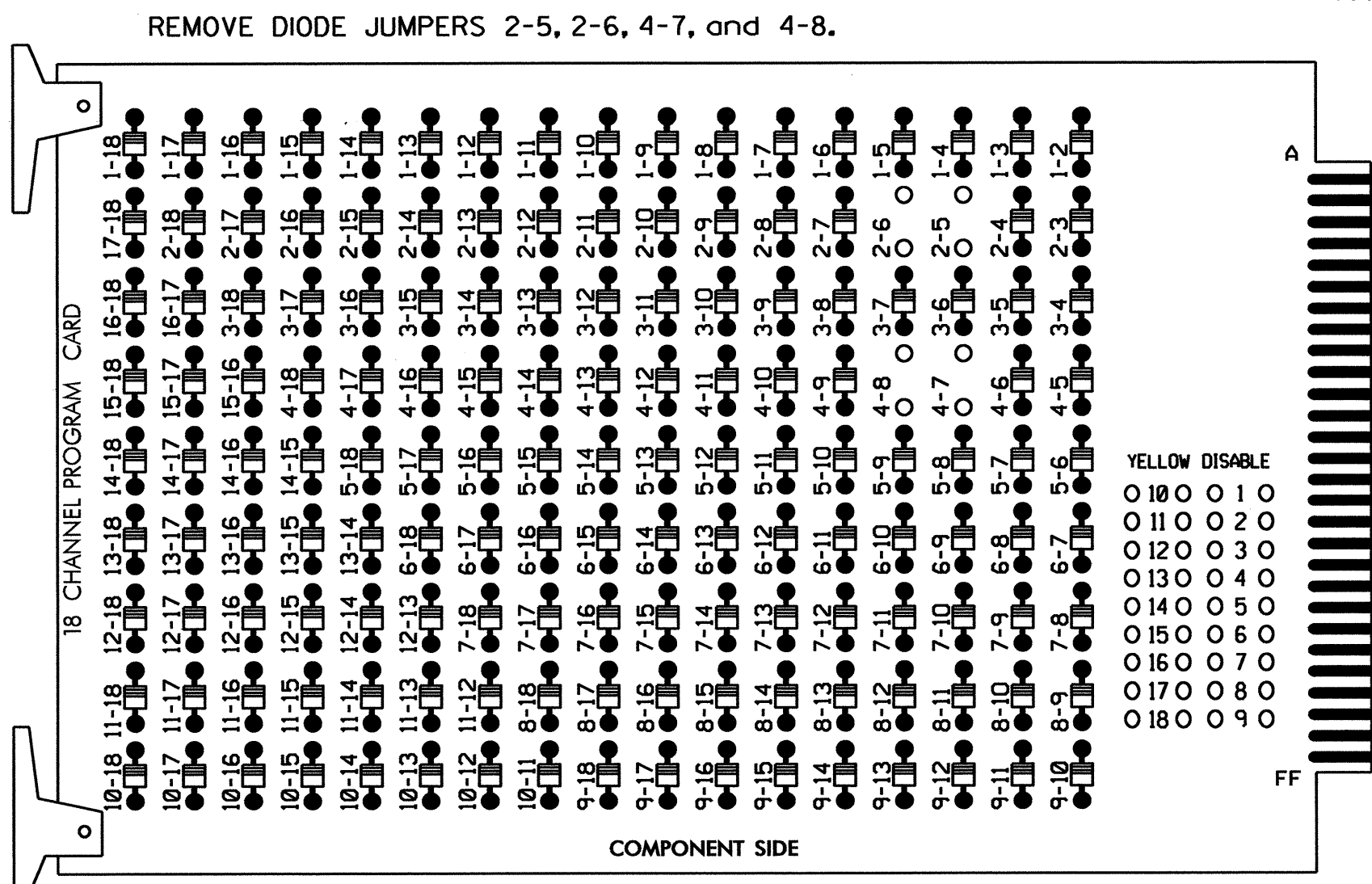
SCALE: 0 30 1"=30'

REVISIONS: INIT. DATE

06-MAR-2012 13:26 C:\p05\signal\sigdes\gms\gms1\gms1-0865\110865\TR-sig.dwg\_2012\xxxx.dgn 2/11/12

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

(remove jumpers and set switches as shown)



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

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

**SIGNAL HEAD HOOK-UP CHART**

| LOAD SWITCH NO. | S1 | S2    | S3    | S4 | S5    | S6    | S7 | S8    | S9    | S10   | S11   | S12   | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------|----|-------|-------|----|-------|-------|----|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1  | 2     | 13    | 3  | 4     | 14    | 5  | 6     | 15    | 7     | 8     | 16    | 9      | 10     | 17     | 11     | 12     | 18     |
| PHASE           | 1  | 2     | 2 PED | 3  | 4     | 4 PED | 5  | 6     | 6 PED | 7     | 8     | 8 PED | OLA    | OLB    | SPARE  | OLC    | OLD    | SPARE  |
| SIGNAL HEAD NO. | NU | 21,22 | NU    | NU | 41,42 | NU    | 21 | 61,62 | NU    | 41,62 | 81,82 | NU    | NU     | NU     | NU     | NU     | NU     | NU     |
| RED             |    | 128   |       |    | 101   |       | *  | 134   |       | *     | 107   |       |        |        |        |        |        |        |
| YELLOW          |    | 129   |       |    | 102   |       |    | 135   |       |       | 108   |       |        |        |        |        |        |        |
| GREEN           |    | 130   |       |    | 103   |       |    | 136   |       |       | 109   |       |        |        |        |        |        |        |
| RED ARROW       |    |       |       |    |       |       |    |       |       |       |       |       |        |        |        |        |        |        |
| YELLOW ARROW    |    |       |       |    |       |       |    | 132   |       |       | 123   |       |        |        |        |        |        |        |
| GREEN ARROW     |    |       |       |    |       |       |    | 133   |       |       | 124   |       |        |        |        |        |        |        |

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

**EQUIPMENT INFORMATION**

CONTROLLER.....2070L  
CABINET.....332 W/ AUX  
SOFTWARE.....ECONOLITE OASIS  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
LOAD SWITCHES USED.....S2,S5,S7,S8,S10,S11  
PHASES USED.....2,4,5,6,7,8  
OVERLAP "A".....NOT USED  
OVERLAP "B".....NOT USED  
OVERLAP "C".....NOT USED  
OVERLAP "D".....NOT USED

**DYNAMIC BACK-UP CONTROL PROGRAMMING**  
(program controller as shown below)

- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Function 1.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

DYNAMIC/BACKUP CONTROL FUNCTION #01  
OVERLAPS:ABCDEFGHIJKLMNPO  
IF OVERLAPS ARE ACTIVE :  
OR PHASES:12345678910111213141516  
IF PHASES ARE ON : X  
OMIT PHASES : X

BACKUP PROTECTION PROGRAMMING COMPLETE

**INPUT FILE POSITION LAYOUT**

(front view)

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

| FILE "J" | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       | 11       | 12       | 13       | 14       |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| U        | ∅ 5      | ∅ 6      | ∅ 7      | ∅ 8      | ∅ 9      | ∅ 10     | ∅ 11     | ∅ 12     | ∅ 13     | ∅ 14     | ∅ 15     | ∅ 16     | ∅ 17     | ∅ 18     |
| L        | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED | NOT USED |

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

⊗ Wired Input - Do not populate slot with detector card

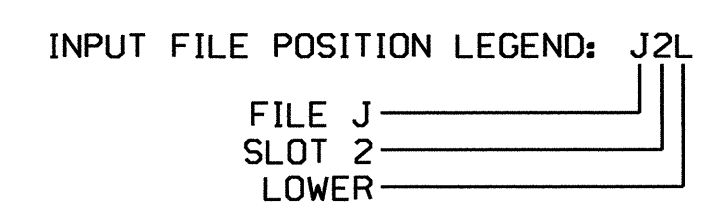
**BACKUP PROTECTION NOTE**  
(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2 for 'Backup Protect'. Make sure the Red Revert times shown in the Signal Design Plans are programmed in the 'Phase Timing' menu.

**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      |                 |              | 10         |
| 5A <sup>1</sup> | 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      |                 |              |            |
| 7A <sup>2</sup> | TB5-5,6       | J5U             | 57      | 19                   | 7            | 7          | Y    | Y      |                 |              | 15         |
|                 | -             | I8U             | 49      | 11                   | 24           | 4          | Y    | Y      |                 |              | 3          |
| 8A              | TB5-9,10      | J6U             | 42      | 4                    | 8            | 8          | Y    | Y      |                 |              | 3          |
| 8B              | TB5-11,12     | J6L             | 46      | 8                    | 18           | 8          | Y    | Y      |                 |              | 10         |

- <sup>1</sup>Add jumper from J1-W to I4-W. on rear of input file.  
<sup>2</sup>Add jumper from J5-W to I8-W. on rear of input file.

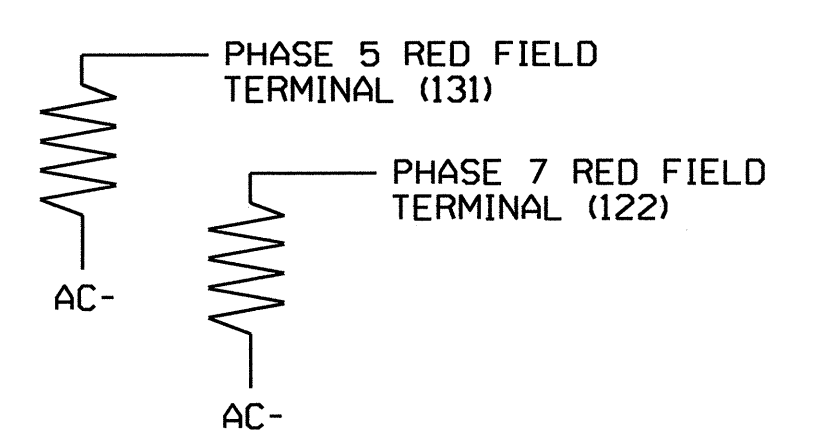


**LOAD RESISTOR INSTALLATION DETAIL**

(install resistors as shown below)

ACCEPTABLE VALUES

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



Temporary Signal - TCP Phase 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: US 321A (Norwood Street) at SR 1959 (Connelly Springs Road)/Berkley Street

Division 11 Caldwell County Lenoir

PLAN DATE: January 2012 REVIEWED BY: JTR

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

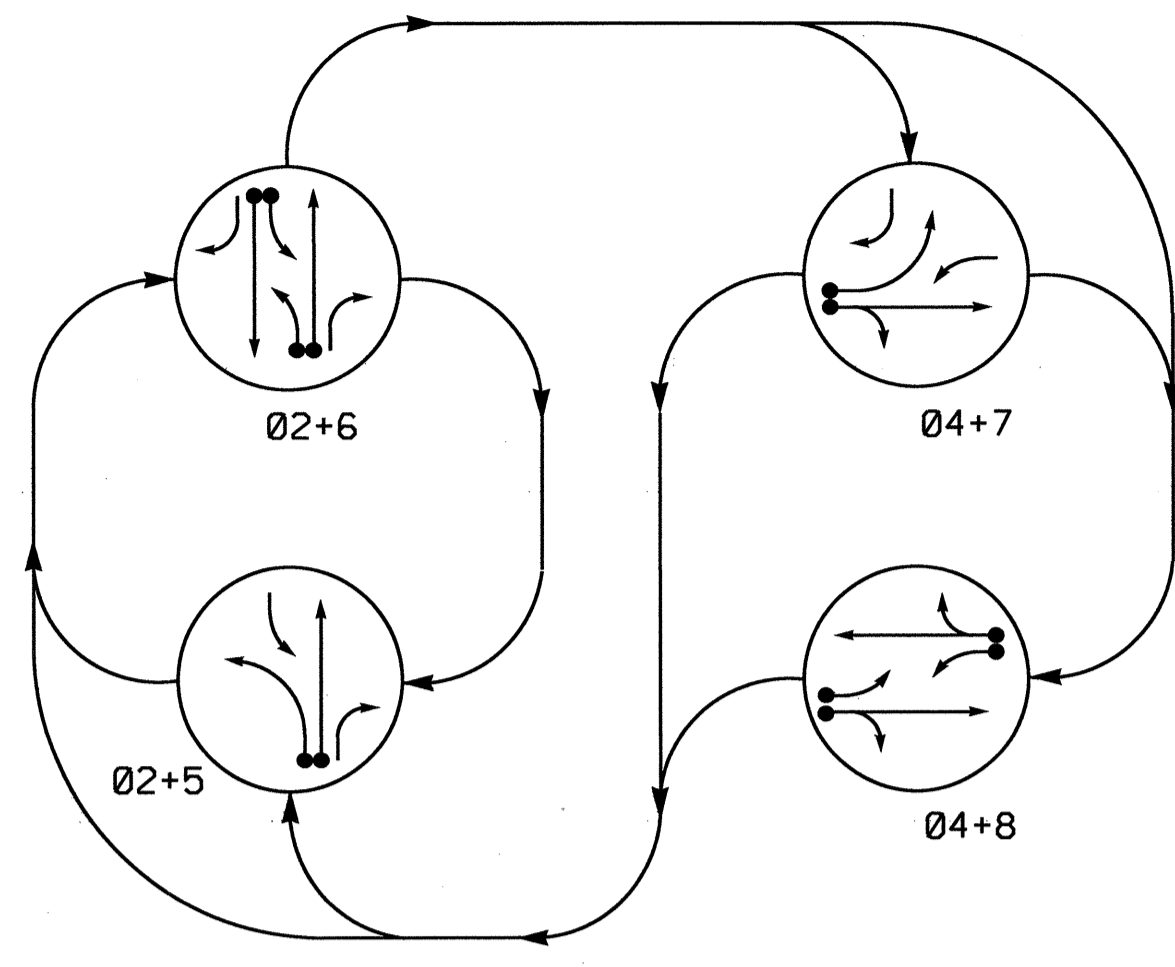
750 N. Greenfield Pkwy, Garner, NC 27529

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

SIGNATURE DATE 1-27-12

SIG. INVENTORY NO. 11-0865T3

PHASING DIAGRAM

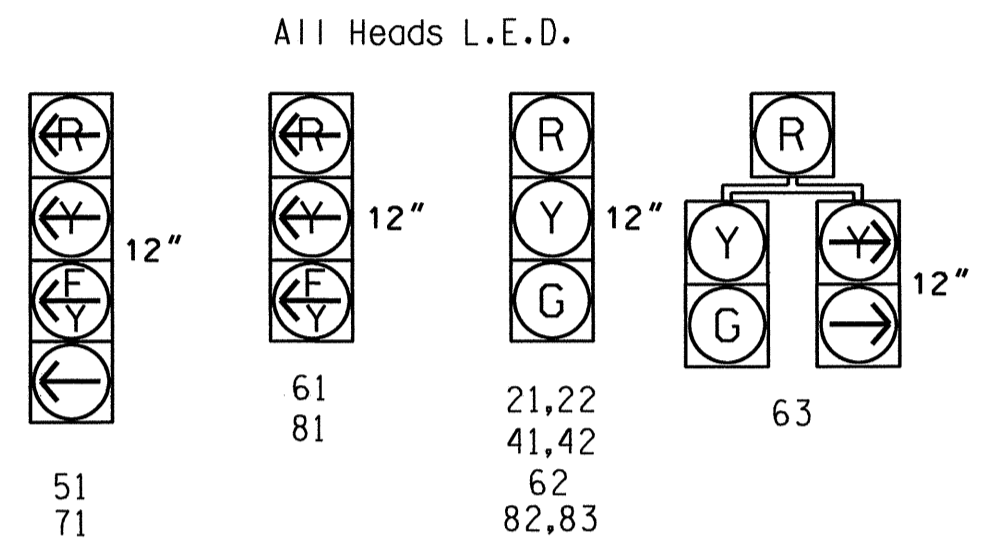


**PHASING DIAGRAM DETECTION LEGEND**  
 ● DETECTED MOVEMENT  
 ◀ UNDETECTED MOVEMENT (OVERLAP)  
 - - - UNSIGNALIZED MOVEMENT  
 - - - PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

| SIGNAL FACE | PHASE |      |      |      |   |
|-------------|-------|------|------|------|---|
|             | 02+5  | 02+6 | 04+7 | 04+8 | F |
| 21,22       | G     | G    | R    | R    | Y |
| 41,42       | R     | R    | G    | G    | R |
| 51          | -     | F    | R    | R    | Y |
| 61          | F     | F    | R    | R    | Y |
| 62          | R     | G    | R    | R    | Y |
| 63          | R     | G    | R    | R    | Y |
| 71          | R     | R    | F    | F    | R |
| 81          | R     | R    | F    | F    | R |
| 82,83       | R     | R    | R    | G    | R |

**SIGNAL FACE I.D.**



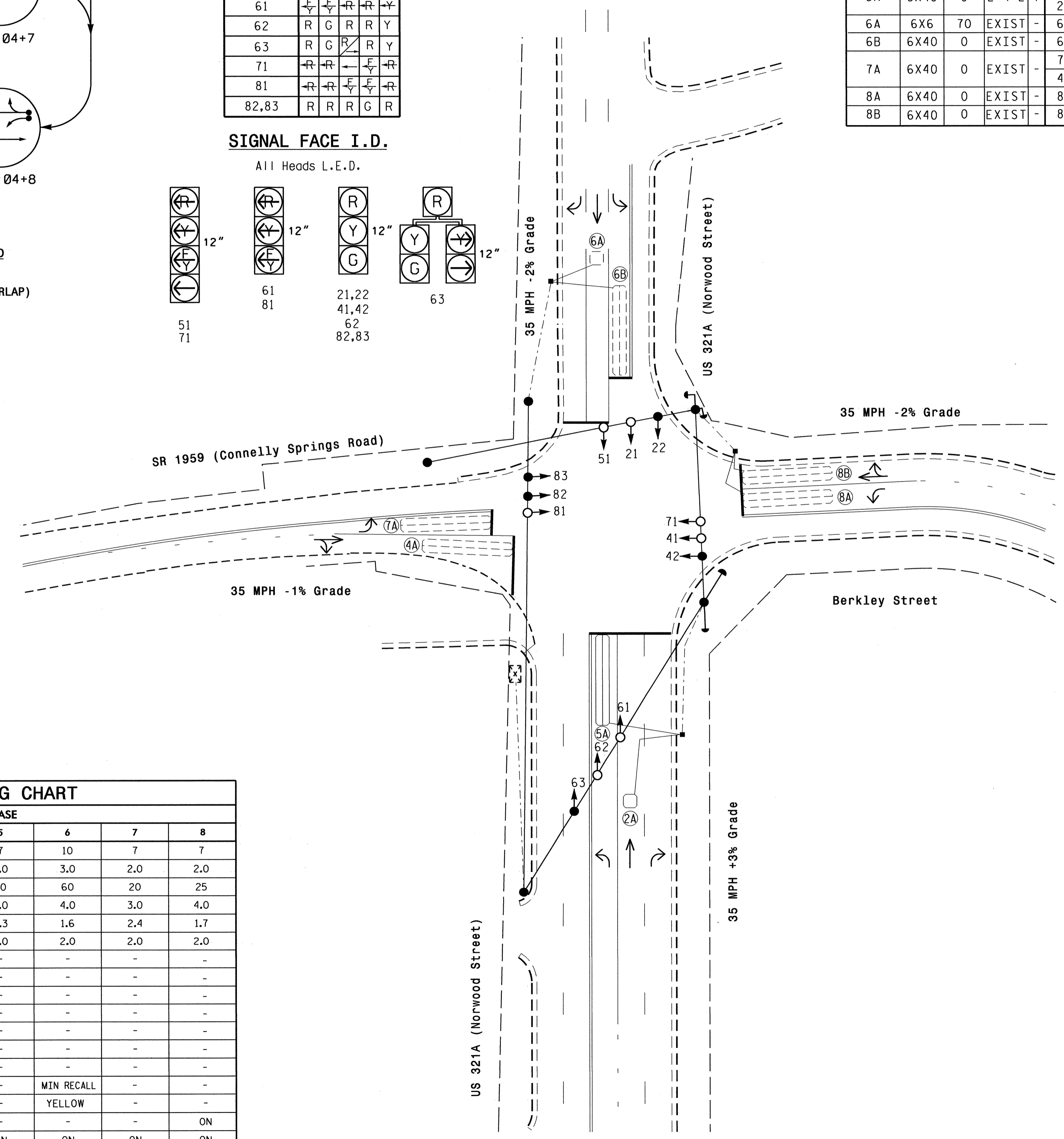
**OASIS 2070L LOOP & DETECTOR INSTALLATION CHART**

| LOOP | INDUCTIVE LOOPS |                            |       | DETECTOR PROGRAMMING |         |           |                 |              |            |             |          |
|------|-----------------|----------------------------|-------|----------------------|---------|-----------|-----------------|--------------|------------|-------------|----------|
|      | SIZE (FT)       | DISTANCE FROM STOPBAR (FT) | TURNS | PHASE                | CALLING | EXTENSION | FULL TIME DELAY | STRETCH TIME | DELAY TIME | SYSTEM LOOP | NEW CARD |
| 2A   | 6X6             | 70                         | 5     | Y                    | 2       | Y         | Y               | -            | -          | -           | -        |
| 4A   | 6X40            | 0                          | EXIST | -                    | 4       | Y         | Y               | -            | 10         | -           | -        |
| 5A   | 6X40            | 0                          | 2-4-2 | Y                    | 5       | Y         | Y               | -            | 15         | -           | -        |
| 6A   | 6X6             | 70                         | EXIST | -                    | 6       | Y         | Y               | -            | -          | -           | -        |
| 6B   | 6X40            | 0                          | EXIST | -                    | 6       | Y         | Y               | -            | -          | -           | -        |
| 7A   | 6X40            | 0                          | EXIST | -                    | 7       | Y         | Y               | -            | 15         | -           | -        |
| 8A   | 6X40            | 0                          | EXIST | -                    | 8       | Y         | Y               | -            | 3          | -           | -        |
| 8B   | 6X40            | 0                          | EXIST | -                    | 8       | Y         | Y               | -            | 10         | -           | -        |

4 Phase Fully Actuated Isolated

**NOTES**

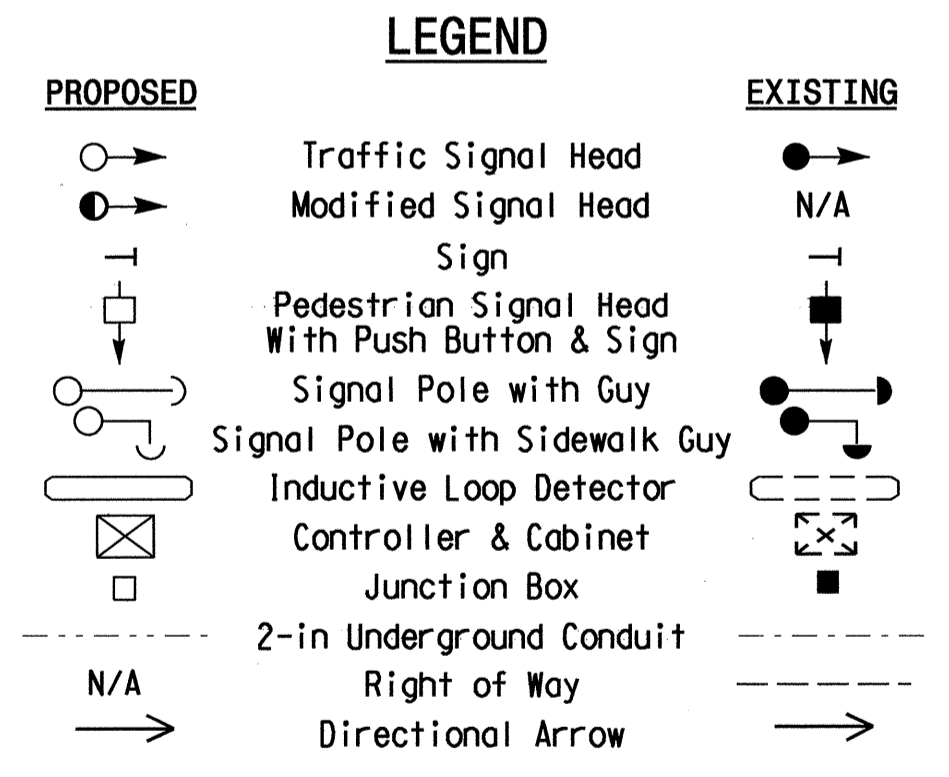
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Phase 7 may be lagged.
5. Set all detector units to presence mode.



**OASIS 2070L TIMING CHART**

| FEATURE                 | PHASE      |     |     |            |     |     |  |
|-------------------------|------------|-----|-----|------------|-----|-----|--|
|                         | 2          | 4   | 5   | 6          | 7   | 8   |  |
| Min Green 1 *           | 10         | 7   | 7   | 10         | 7   | 7   |  |
| Extension 1 *           | 3.0        | 2.0 | 2.0 | 3.0        | 2.0 | 2.0 |  |
| Max Green 1 *           | 60         | 25  | 20  | 60         | 20  | 25  |  |
| Yellow Clearance        | 4.0        | 4.0 | 3.0 | 4.0        | 3.0 | 4.0 |  |
| Red Clearance           | 1.6        | 1.7 | 2.3 | 1.6        | 2.4 | 1.7 |  |
| 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.



**FINAL DESIGN**

Prepared in the Offices of:  
 Transportation Mobility and Safety Division  
 NORTH CAROLINA PROFESSIONAL ENGINEERS AND SURVEYORS  
 SEAL 30530  
 ENGINEER  
 ZACHARY W. LITTLE

**US 321A (Norwood Street) at SR 1959 (Connelly Springs Road)/Berkley Street**

Division 11 Caldwell County Lenoir  
 PLAN DATE: December 2011 REVIEWED BY: B.E. Wynn  
 PREPARED BY: Jerry Yaravitz REVIEWED BY:  
 REVISIONS INIT. DATE

SCALE 0 30  
 1"=30'

SIG. INVENTORY NO. 11-0865

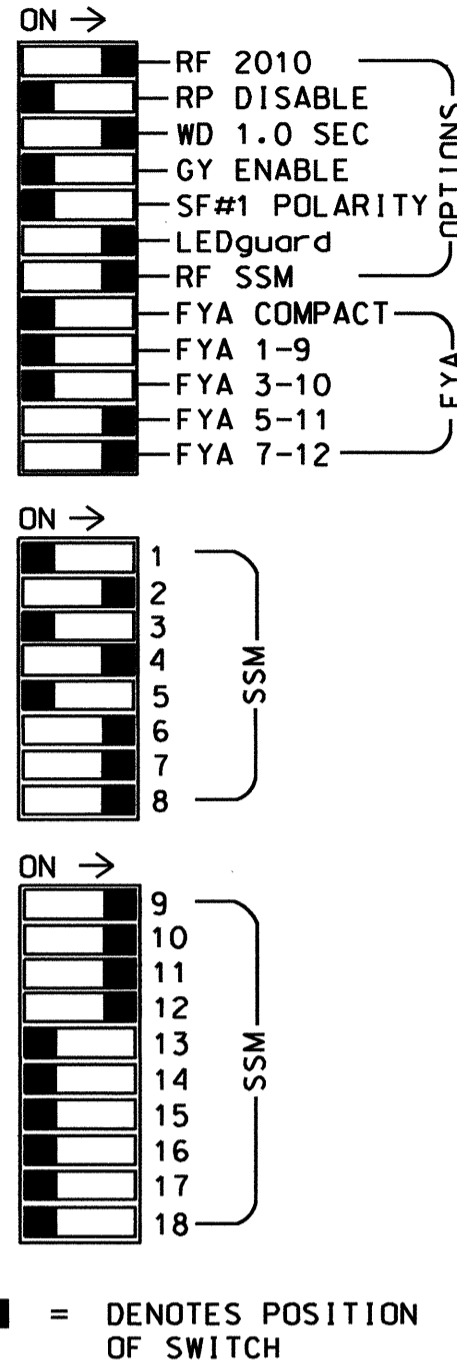
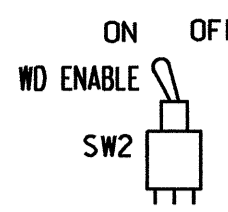
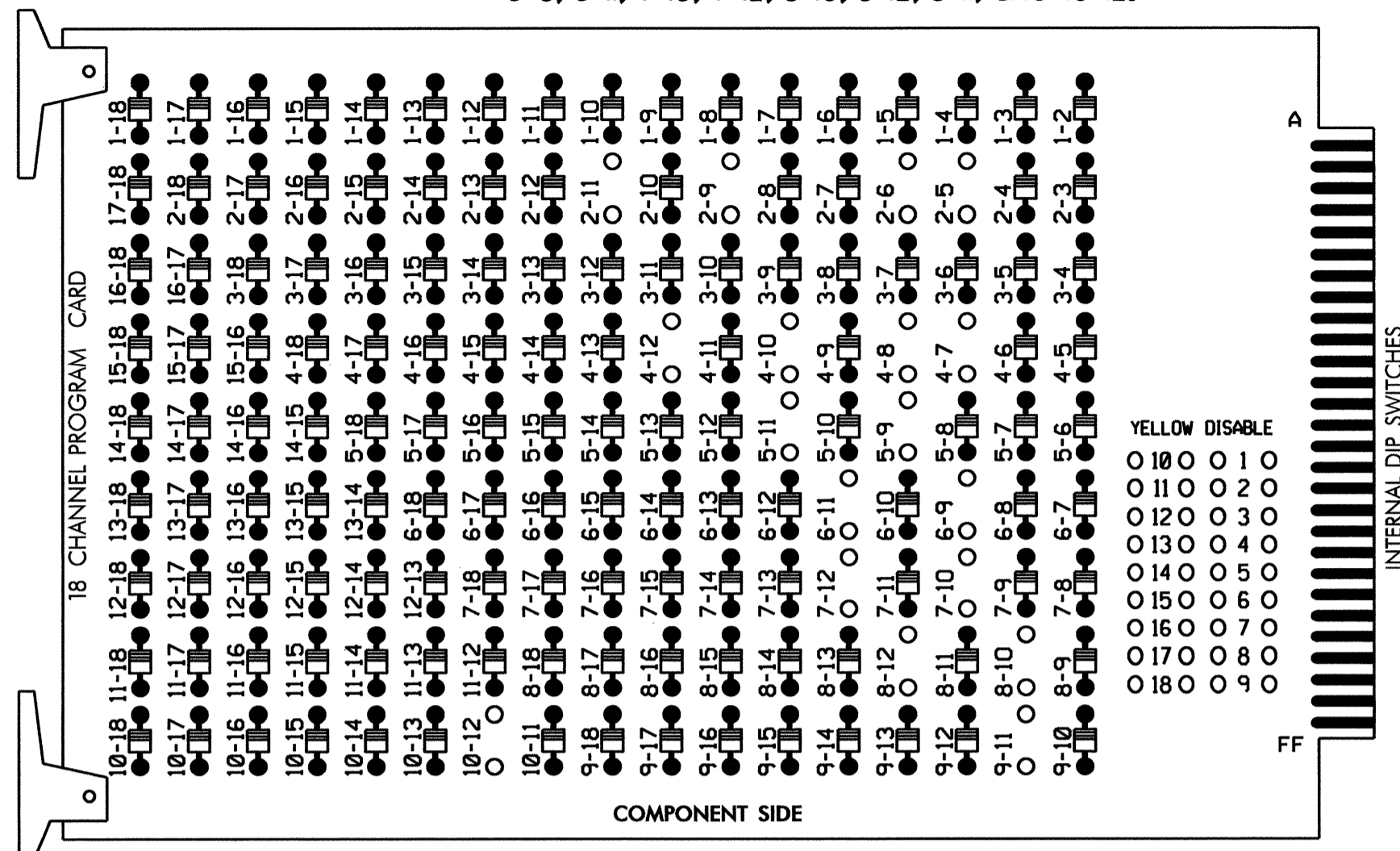
06-MAR-2012 13:33  
 C:\p05\signal\oas\oas\signal\11-0865\110865\_wpc\le\_s\o-dn\_2012\xxx.dgn  
 2/11/12

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

**PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



REMOVE JUMPERS AS SHOWN

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

**NOTES**

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

**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 |      |
|-----------------------|----|-------|-------|----|-------|-------|-----|-------|-------|-----|-----|-------|--------|--------|--------|--------|--------|--------|------|
| CHU CHANNEL NO.       | 1  | 2     | 13    | 3  | 4     | 14    | 5   | 6     | 15    | 7   | 8   | 16    | 9      | 10     | 17     | 11     | 12     | 18     |      |
| PHASE                 | 1  | 2     | 2 PED | 3  | 4     | 4 PED | 5   | 6     | 6 PED | 7   | 8   | 8 PED | OLA    | OLB    | SPARE  | OLC    | OLD    | SPARE  |      |
| SIGNAL HEAD NO.       | NU | 21,22 | NU    | NU | 41,42 | NU    | 51* | 62,63 | NU    | 63  | 71* | 82,83 | NU     | 61*    | 81*    | NU     | 51*    | 71*    | NU   |
| RED                   |    | 128   |       |    | 101   |       |     | 134   |       | *   |     | 107   |        |        |        |        |        |        |      |
| YELLOW                |    | 129   |       |    | 102   |       | *   | 135   |       |     |     | 108   |        |        |        |        |        |        |      |
| GREEN                 |    | 130   |       |    | 103   |       |     | 136   |       |     |     | 109   |        |        |        |        |        |        |      |
| RED ARROW             |    |       |       |    |       |       |     |       |       |     |     |       |        |        | A121   | A124   |        | A114   | A101 |
| YELLOW ARROW          |    |       |       |    |       |       |     |       |       | 123 |     |       |        |        | A122   | A125   |        | A115   | A102 |
| FLASHING YELLOW ARROW |    |       |       |    |       |       |     |       |       |     |     |       |        |        | A123   | A126   |        | A116   | A103 |
| GREEN ARROW           |    |       |       |    |       |       | 133 |       | 124   | 124 |     |       |        |        |        |        |        |        |      |

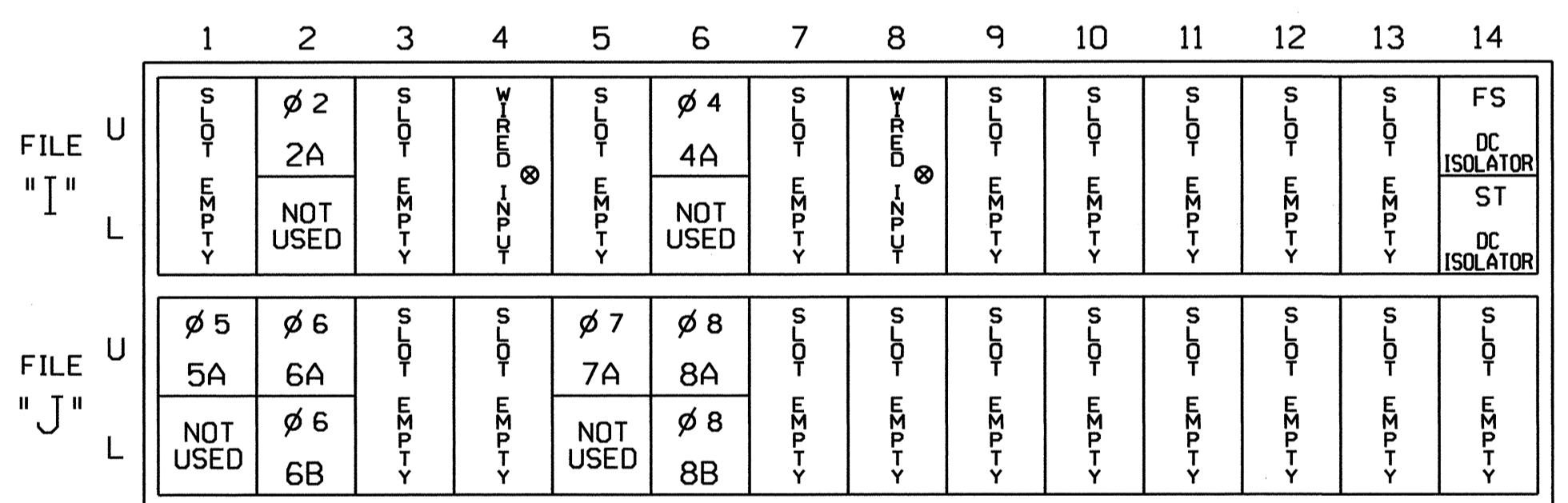
NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \* See pictorial of head wiring in detail below.

**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,S5,S7,S8,S10,S11, AUX S1  
 AUX S2, AUX S4, AUX S5  
 PHASES USED.....2,4,5,6,7,8  
 OVERLAP "A".....2  
 OVERLAP "B".....4  
 OVERLAP "C".....5+6  
 OVERLAP "D".....7+8

**INPUT FILE POSITION LAYOUT**

(front view)



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

**BACKUP PROTECTION NOTE**

(program controller as shown below)

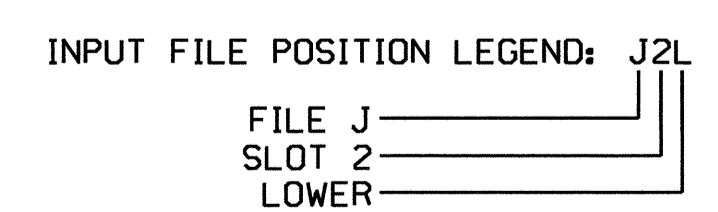
From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2 for 'Backup Protect'. Make sure the Red Revert Times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**DELETE**

**INPUT FILE CONNECTION & PROGRAMMING CHART**

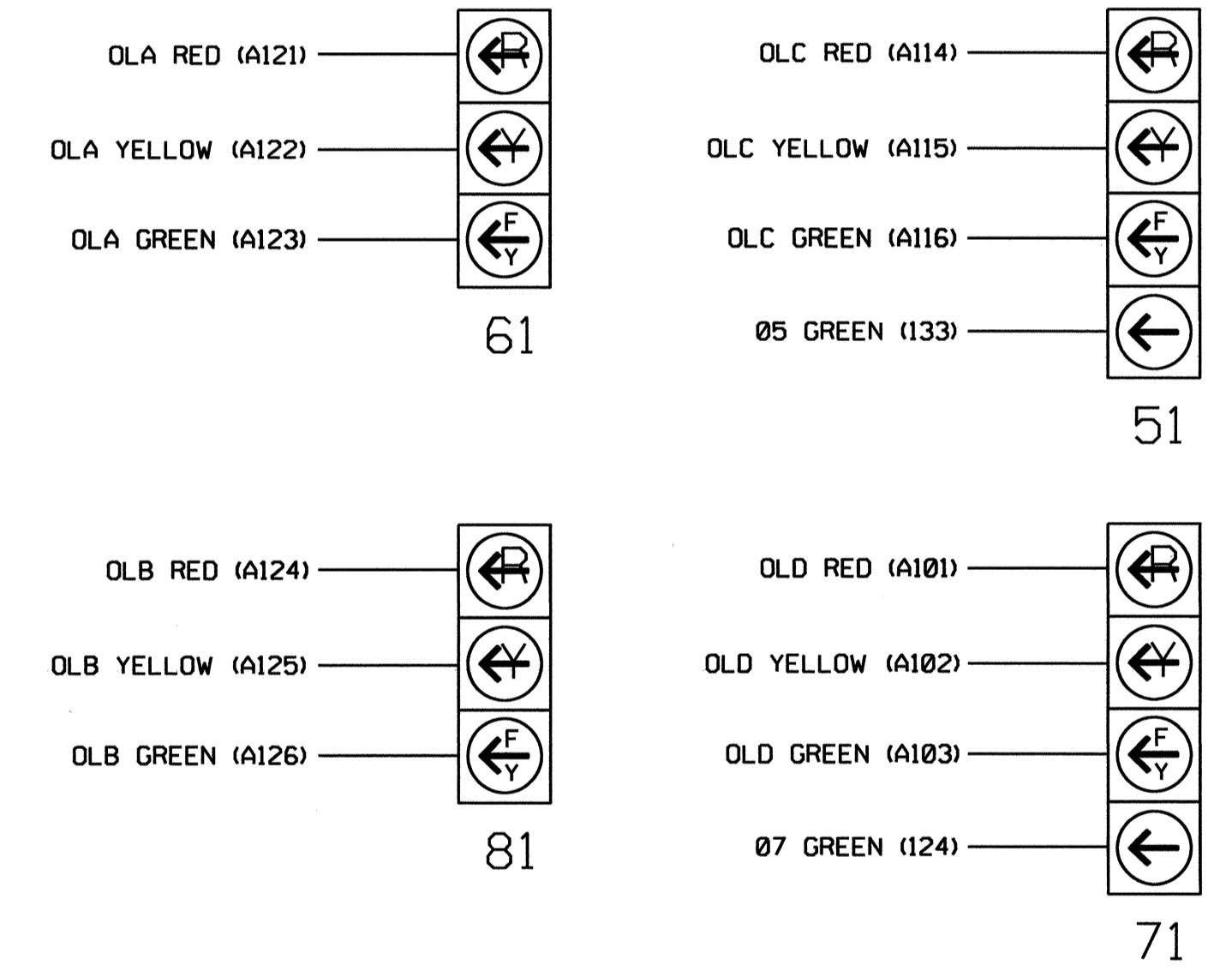
| LOOP NO.        | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | INPUT ASSIGNMENT NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND | FULL TIME DELAY | STRETCH TIME | DELAY TIME |
|-----------------|---------------|-----------------|---------|----------------------|--------------|------------|------|--------|-----------------|--------------|------------|
| 2A              | TB2-5,6       | I2U             | 39      | 1                    | 2            | 2          | Y    | Y      |                 |              |            |
| 4A              | TB4-9,10      | I6U             | 41      | 3                    | 4            | 4          | Y    | Y      |                 |              | 10         |
| 5A <sup>1</sup> | 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      |                 |              |            |
| 7A <sup>2</sup> | TB5-5,6       | J5U             | 57      | 19                   | 7            | 7          | Y    | Y      |                 |              | 15         |
|                 |               | I8U             | 49      | 11                   | 24           | 4          | Y    | Y      |                 |              | 3          |
| 8A              | TB5-9,10      | J6U             | 42      | 4                    | 8            | 8          | Y    | Y      |                 |              | 3          |
| 8B              | TB5-11,12     | J6L             | 46      | 8                    | 18           | 8          | Y    | Y      |                 |              | 10         |

<sup>1</sup>Add jumper from J1-W to I4-W, on rear of input file.  
<sup>2</sup>Add jumper from J5-W to I8-W, on rear of input file.



**3 & 4 SECTION FYA SIGNAL WIRING DETAIL**

(wire signal heads as shown)

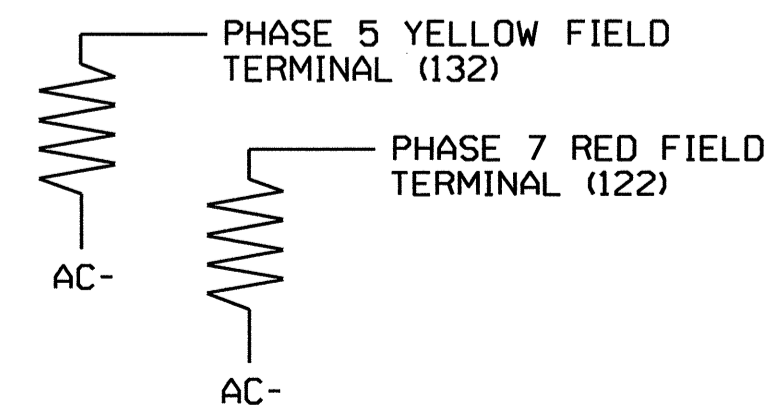


**NOTE**  
 The sequence display for signal heads 51 and 71 requires special logic programming. See sheet 2 for programming instructions.

**LOAD RESISTOR INSTALLATION DETAIL**

(install resistors as shown below)

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



**IMPORTANT!** Remove load resistor from Phase 5 RED field terminal (I31) if present.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-0865  
 DESIGNED: December 2011  
 SEALED: 1/26/12  
 REVISED: N/A

Final Design - Sheet 1 of 2

Electrical and Programming Details For: **US 321A (Norwood Street) at SR 1959 (Connelly Springs Road)/Berkley Street**

Prepared In the Offices of: **Transportation Mobility and Safety Solutions**

Division 11 Caldwell County Lenoir  
 PLAN DATE: January 2012 REVIEWED BY: JTR  
 PREPARED BY: S. Armstrong REVIEWED BY:  
 REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

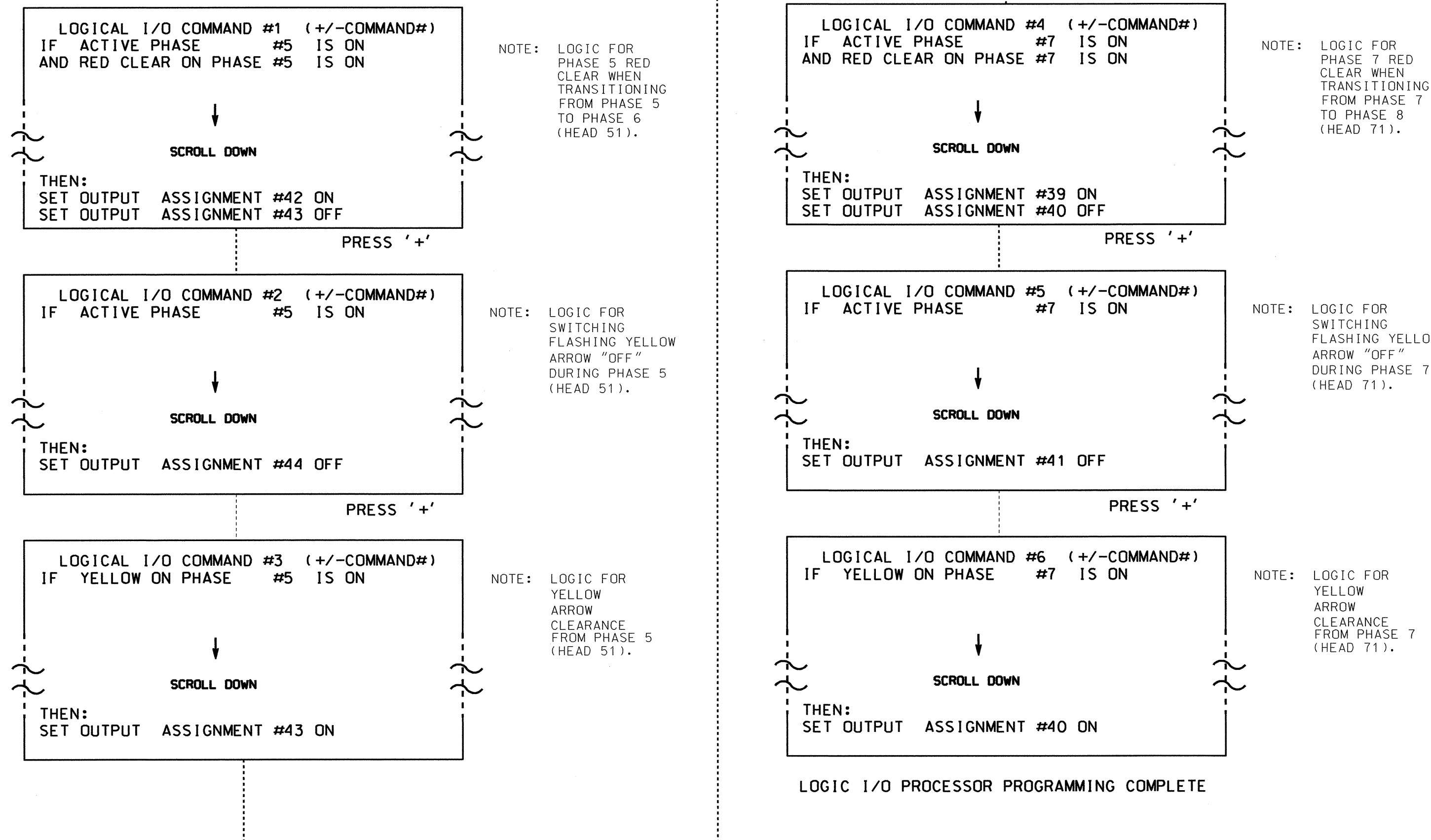
SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 008453  
 JOHN T. ROWE, P.E.

SIGNATURE DATE: 1-27-12  
 SIG. INVENTORY NO. 11-0865

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

(program controller as shown below)

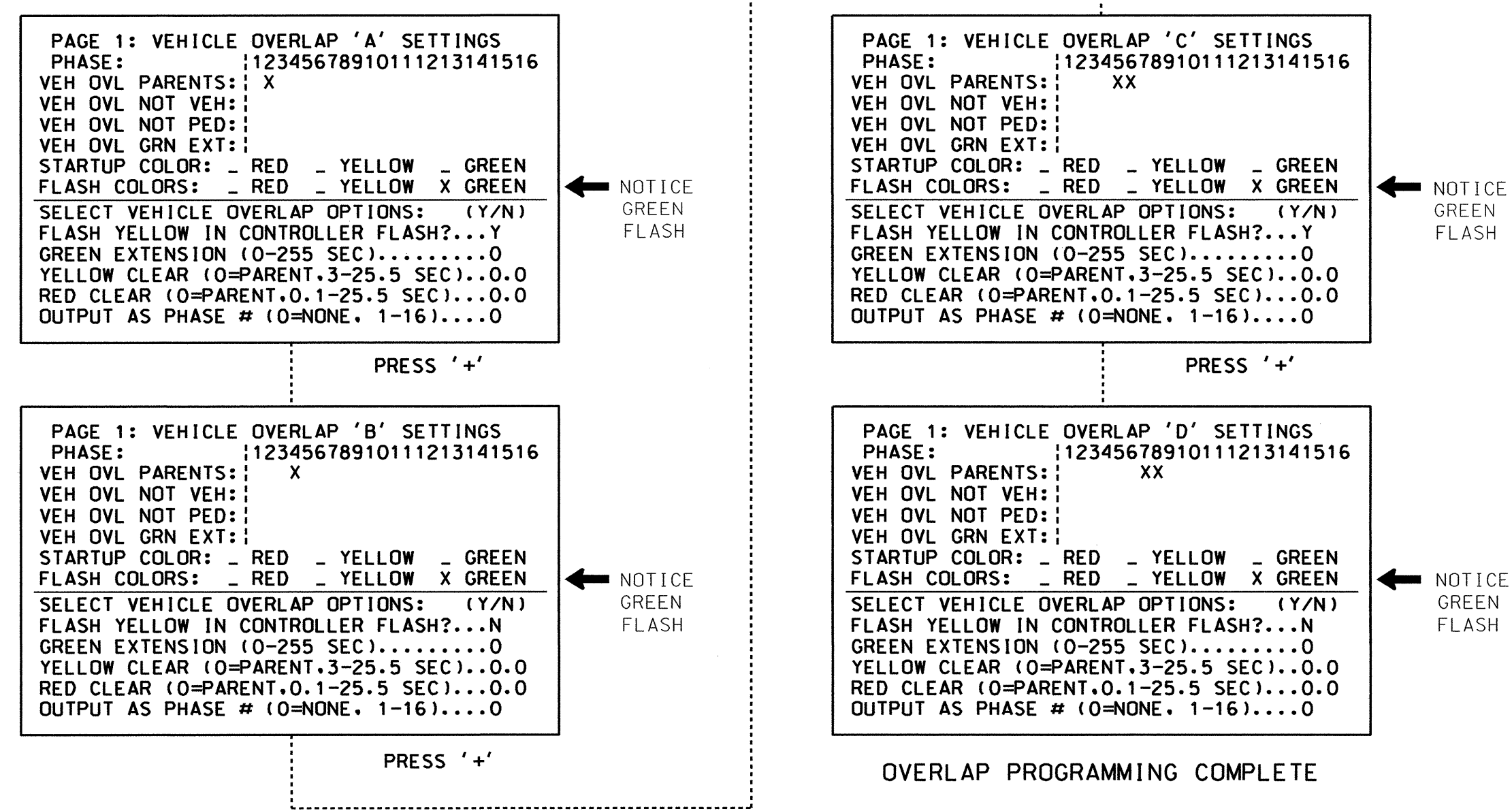
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



| OUTPUT REFERENCE SCHEDULE |                  |
|---------------------------|------------------|
| OUTPUT 42 =               | Overlap C Red    |
| OUTPUT 43 =               | Overlap C Yellow |
| OUTPUT 44 =               | Overlap C Green  |
| OUTPUT 39 =               | Overlap D Red    |
| OUTPUT 40 =               | Overlap D Yellow |
| OUTPUT 41 =               | Overlap D Green  |

### OVERLAP PROGRAMMING DETAIL (program controller as shown below)

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



### DYNAMIC BACK-UP CONTROL PROGRAMMING (program controller as shown below)

- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Function 1.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

DYNAMIC/BACKUP CONTROL FUNCTION #01  
OVERLAPS: ABCDEFGHIJKLMNPO  
IF OVERLAPS ARE ACTIVE:  
OR PHASES: 12345678910111213141516  
IF PHASES ARE ON: X  
OMIT PHASES: X

BACKUP PROTECTION PROGRAMMING COMPLETE

**DELETE**

### FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
- REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

Final Design - Sheet 2 of 2

|   |   |   |   |
|---|---|---|---|
| ELECTRICAL AND PROGRAMMING DETAILS FOR:<br> | US 321A (Norwood Street)<br>at<br>SR 1959 (Connelly Springs Road)/Berkley Street    |   | SEAL<br>NORTH CAROLINA PROFESSIONAL ENGINEER<br>SEAL 008453<br><br>JOHN T. ROWLEY, P.E.<br>DATE 1-27-12<br>SIG. INVENTORY NO. 11-0865 |
|   | Division 11 Caldwell County Lenoir<br>PREPARED BY: S. Armstrong<br>REVIEWED BY: JTR | PREPARED BY: S. Armstrong<br>REVIEWED BY: JTR |   |

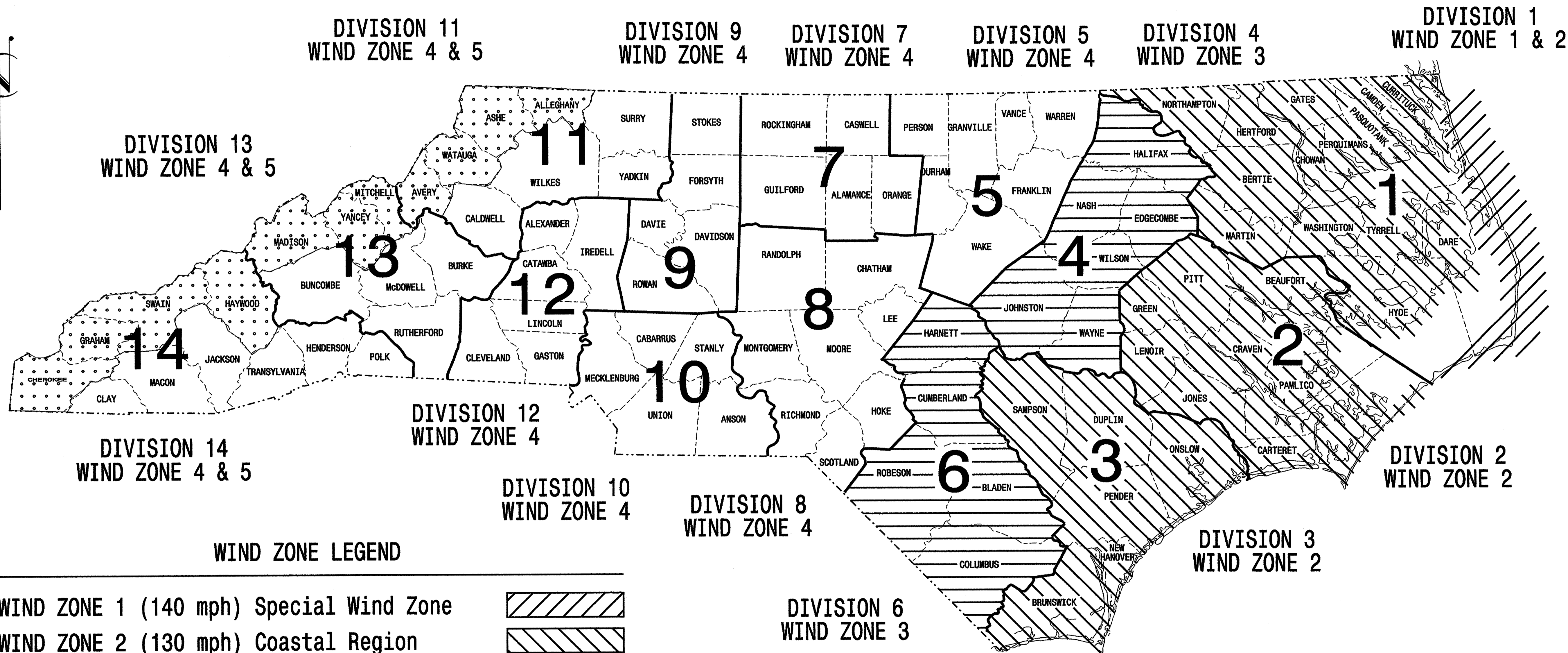
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-0865  
DESIGNED: December 2011  
SEALED: 1/26/12  
REVISED: N/A

27-JAN-2012 07:02 S:\ITS\501\TIS\_Signal\sig\kgr\pdp\sig\_mon\mtr\mtr\10865\_sht.2\_e\_2211b.dgn

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

|                 |             |           |
|-----------------|-------------|-----------|
| STATE           | PROJECT NO. | SHEET NO. |
| N.C.            | U-2211B     | Sig. 23   |
| F. A. PROJ. NO. | M 1         |           |
| PROJECT ID. NO. |             |           |

## STANDARD DRAWINGS FOR METAL POLES

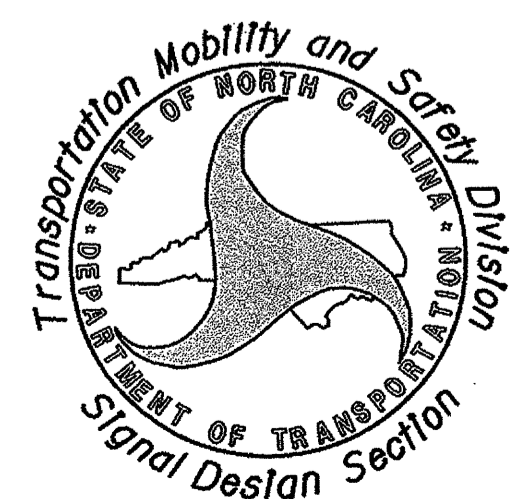


### WIND ZONE LEGEND

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

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

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

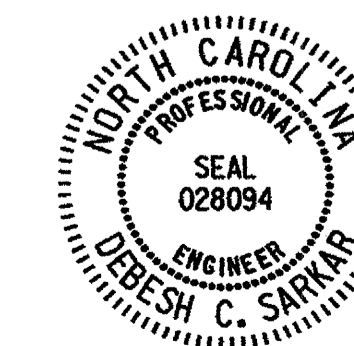
Designed in conformance  
with the  
2002 Interim to the  
4th Edition 2001  
**AASHTO**  
Standard Specifications for  
Structural Supports for  
Highway Signs, Luminaires,  
and Traffic Signals

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

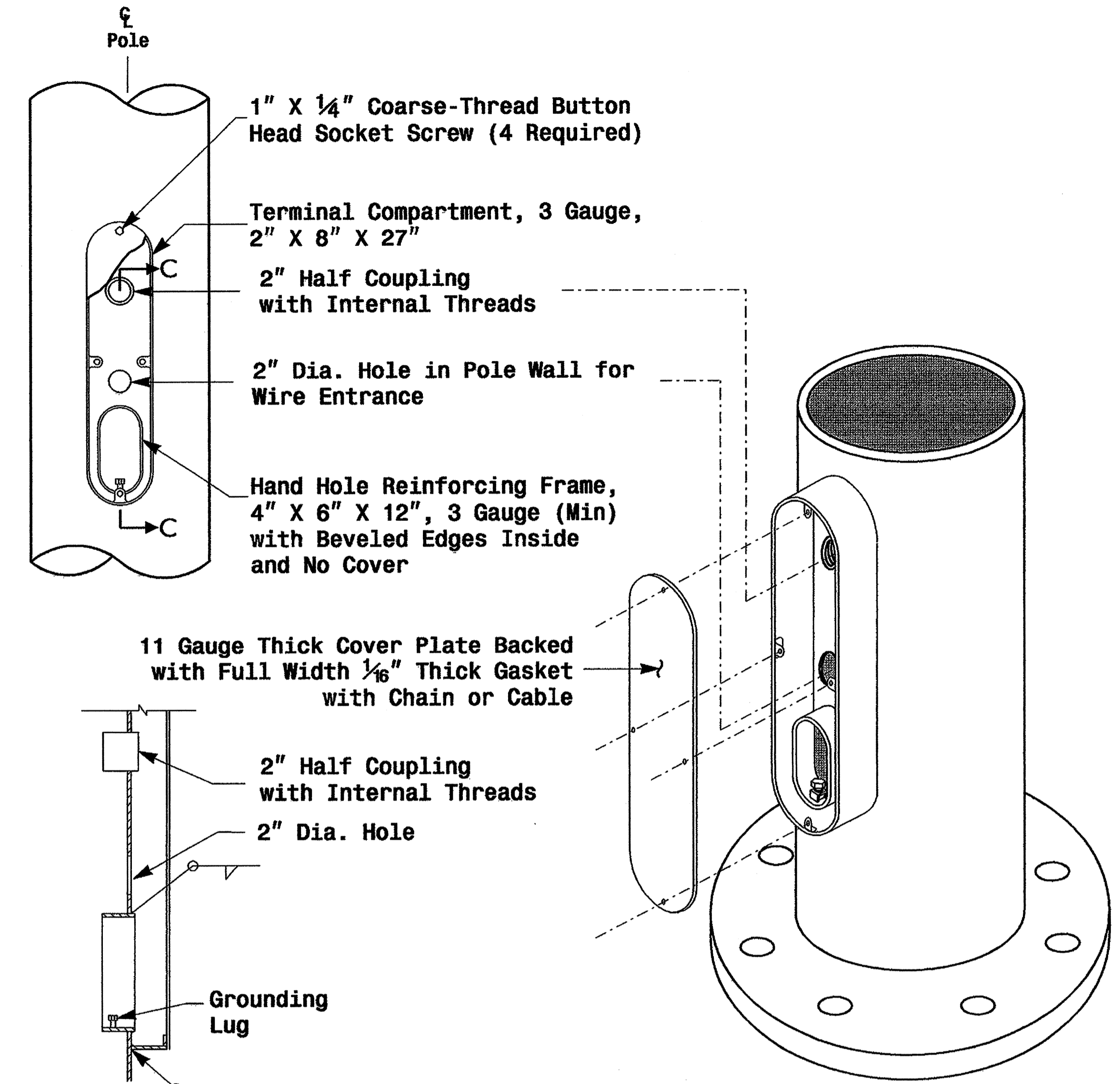
### NCDOT CONTACTS: MOBILITY AND SAFETY DIVISION - ITS and SIGNALS UNIT

- G. A. Fuller, P.E. - State ITS and Signals Engineer
- G. G. Murr, Jr., P.E. - State Signals Engineer
- D. C. Sarkar, P.E. - ITS and Signals Senior Structural Engineer
- C. F. Andrews, Jr. - ITS and Signals Structural Project Engineer
- M. Aslam - ITS and Signals Structural Project Engineer
- N. Bitting, P.E. - ITS and Signals Structural Project Engineer

SEAL

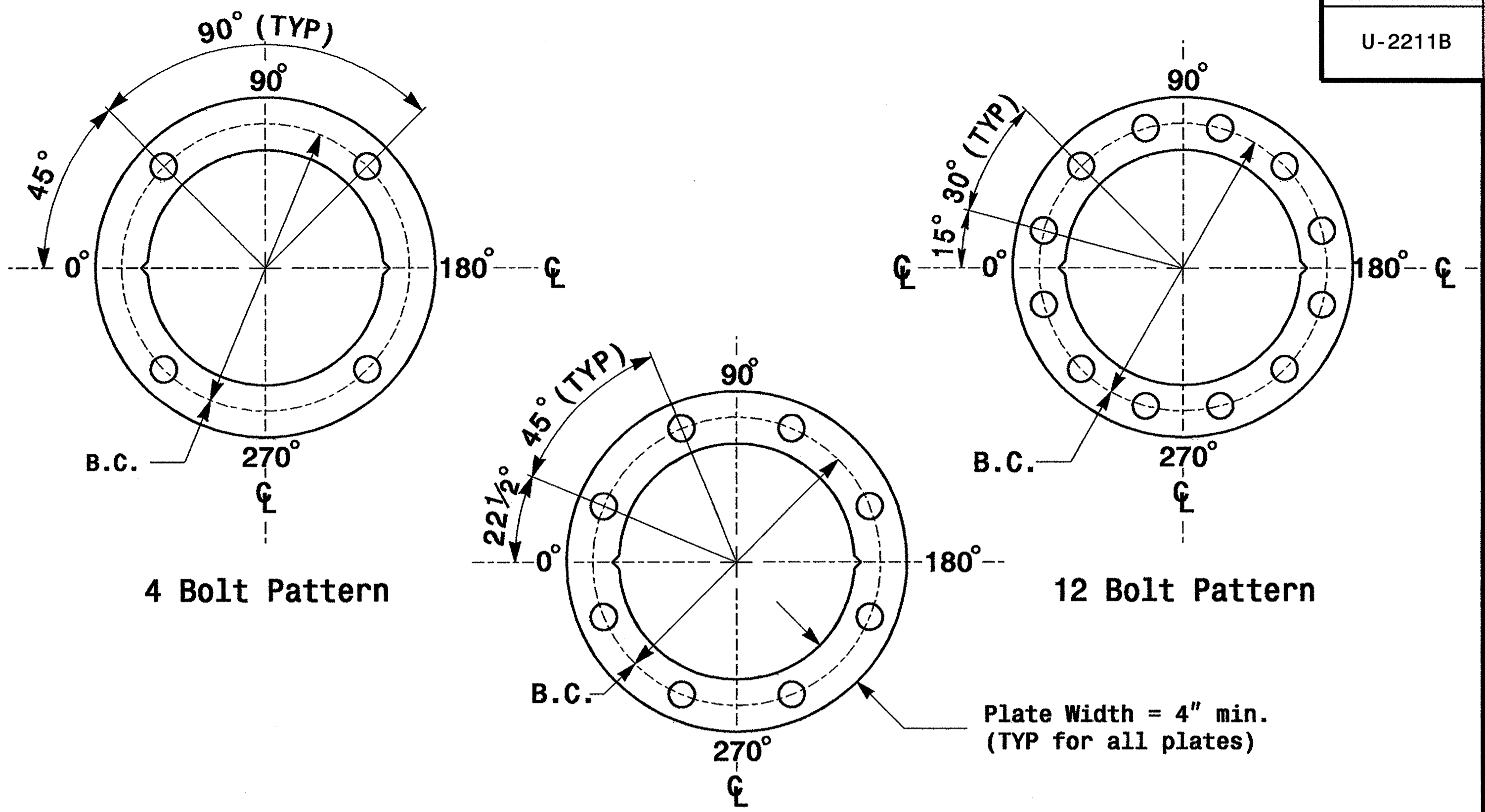


*D. Sarkar* 7-26-2009  
SIGNATURE DATE



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 1/4" 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 _____     |                        |

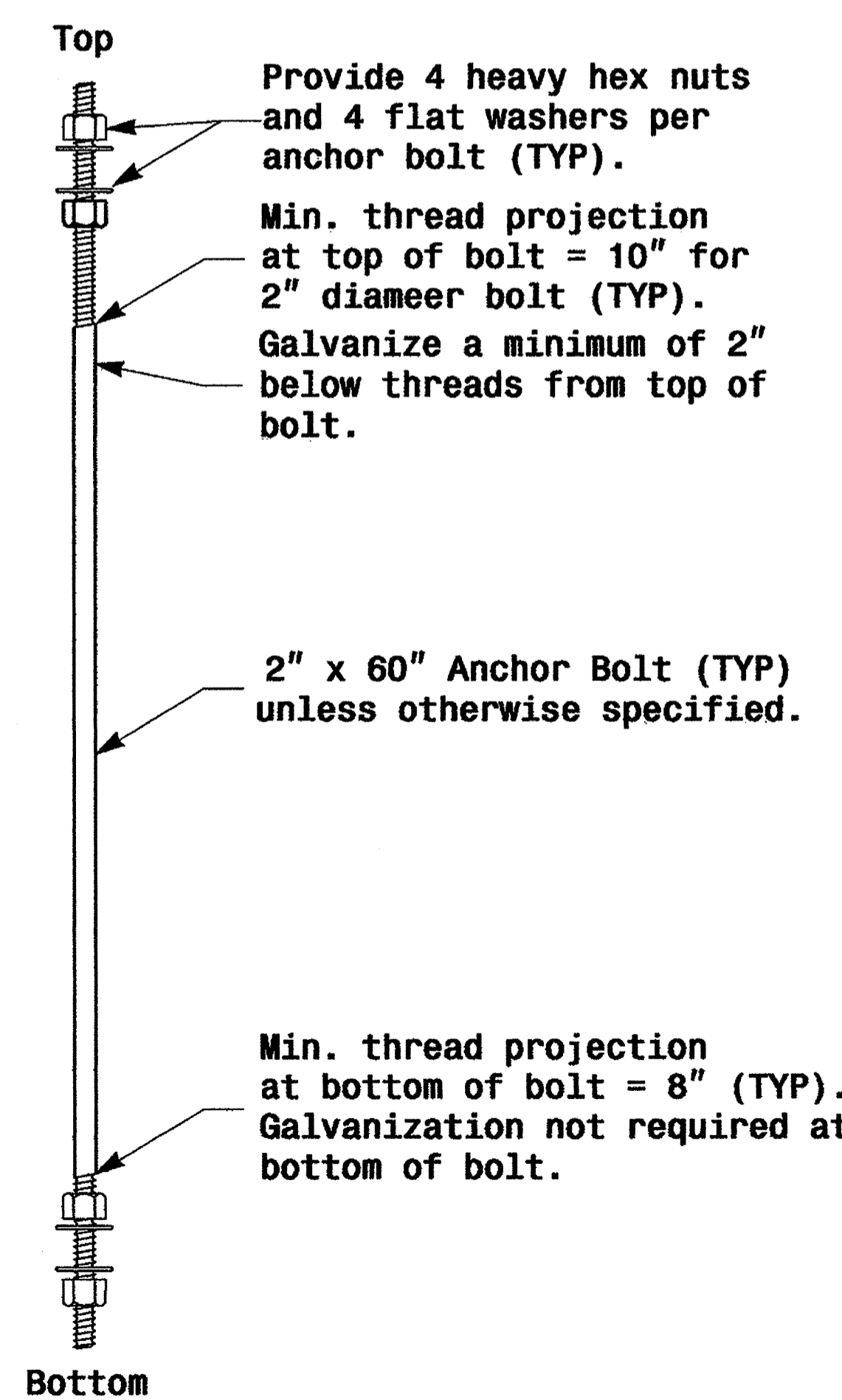
|                       |                        |
|-----------------------|------------------------|
| MFG _____             | MFG. DATE: MM/YY _____ |
| SECTION D/T/L/Y _____ |                        |
| NCDOT STANDARD _____  |                        |

Arm I.D. Tag  
 (Provide on each section of a multi-section mast arm)

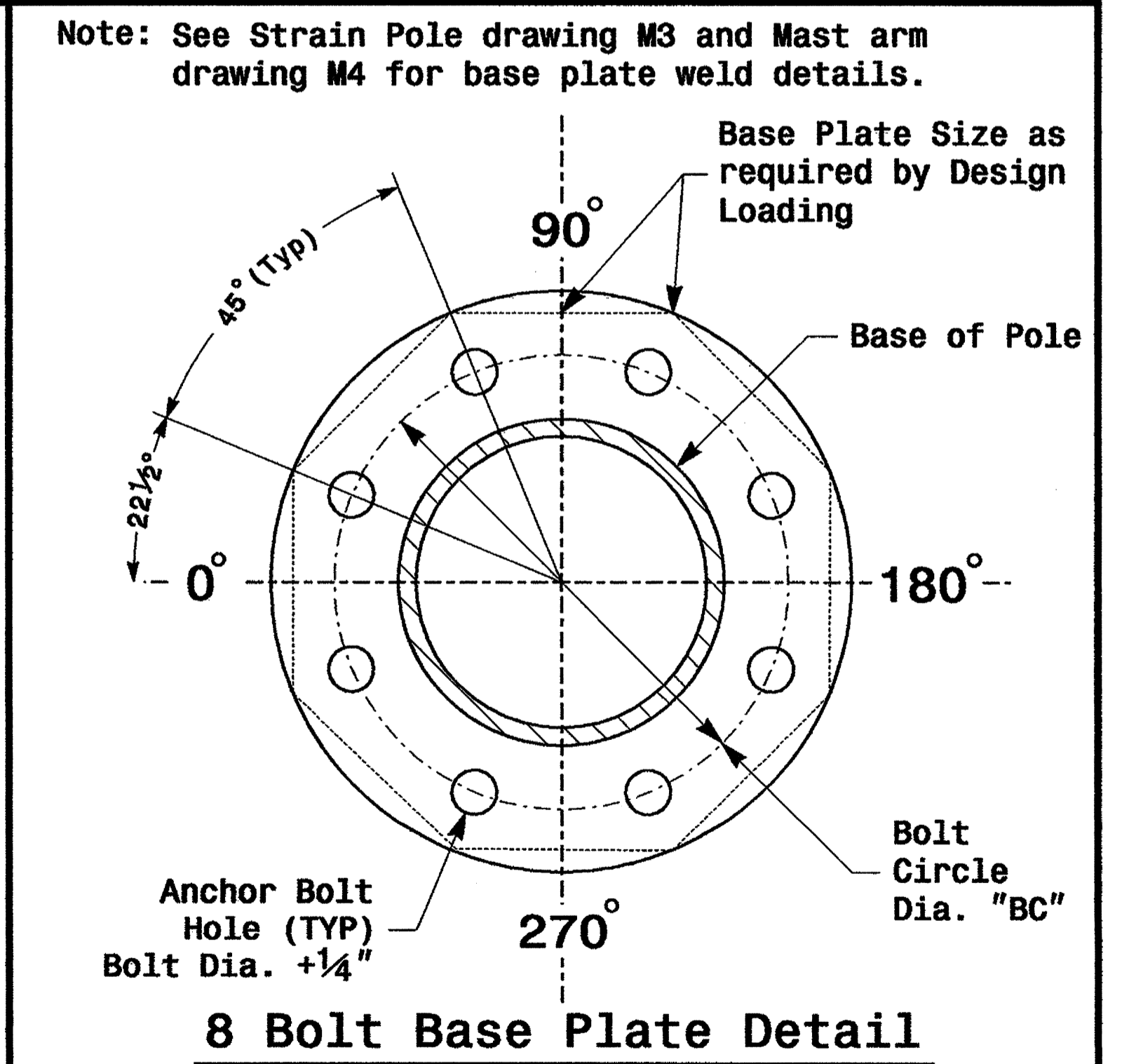
Shaft I.D. Tag  
 (Provide on Strain Poles and Mast Arm Poles)

- 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**



**8 Bolt Base Plate Detail**

Prepared by the Office of:

222 N. McDowell St., Raleigh, NC 27603

Scale: 0 NA NONE

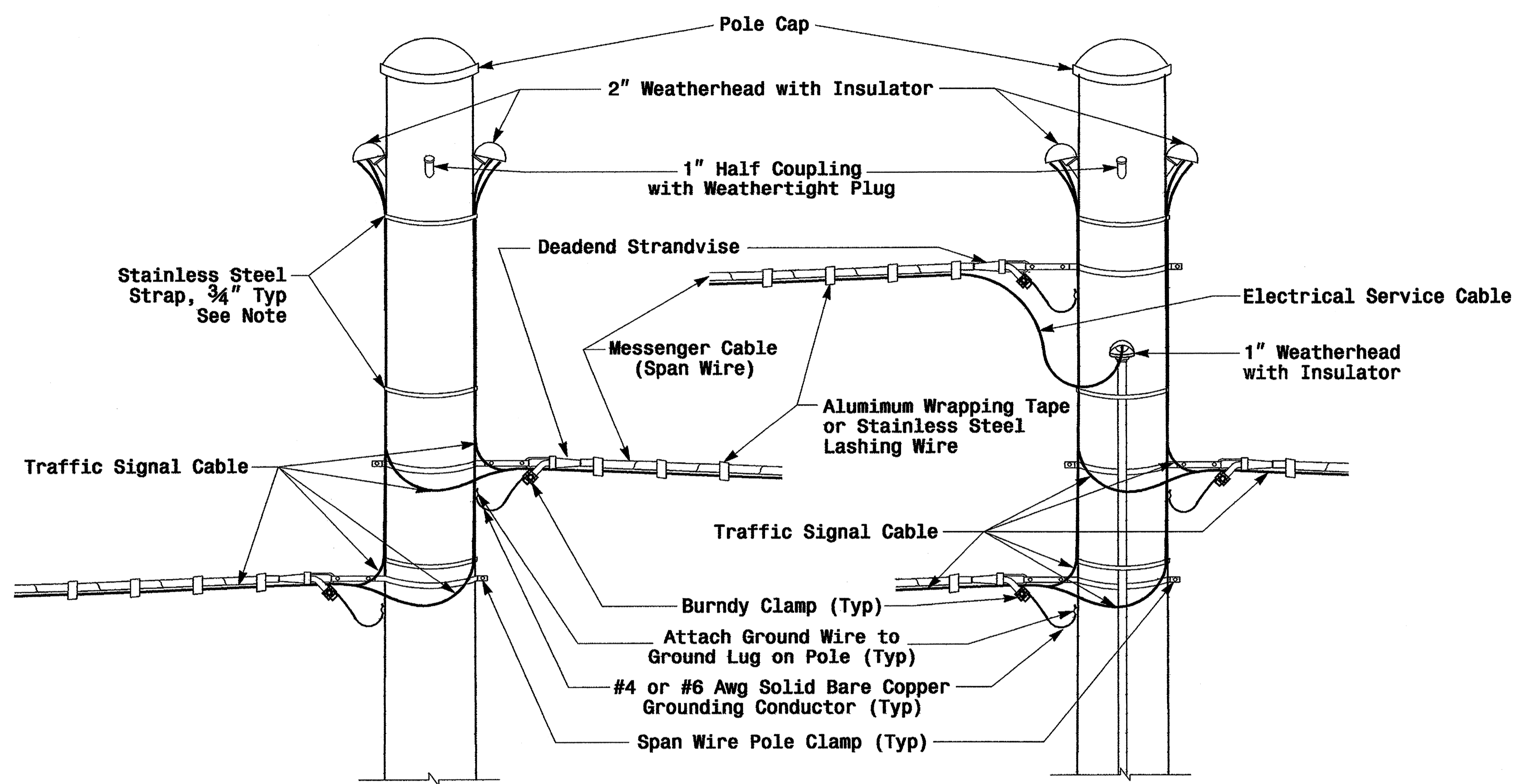
|   |                            |  |
|---|----------------------------|--|
| Typical Fabrication Details Common To All Metal Poles |                            |  |
| PLAN DATE: May 2005                                   | REVIEWED BY: C.F. Andrews  |  |
| PREPARED BY: P.L. Alexander                           | REVIEWED BY: A.M. Esposito | Signature: <i>D. Sankar</i> 9.2.2005<br>DATE: _____<br>SIG. INVENTORY NO.: _____ |
| REVISIONS   | INIT. DATE                 |  |

**Fabrication Details - All Poles**

11-SEP-2005 10:27  
 D:\a304\work\1016\stender\stender04.nc thru m6.dgn  
 condrens

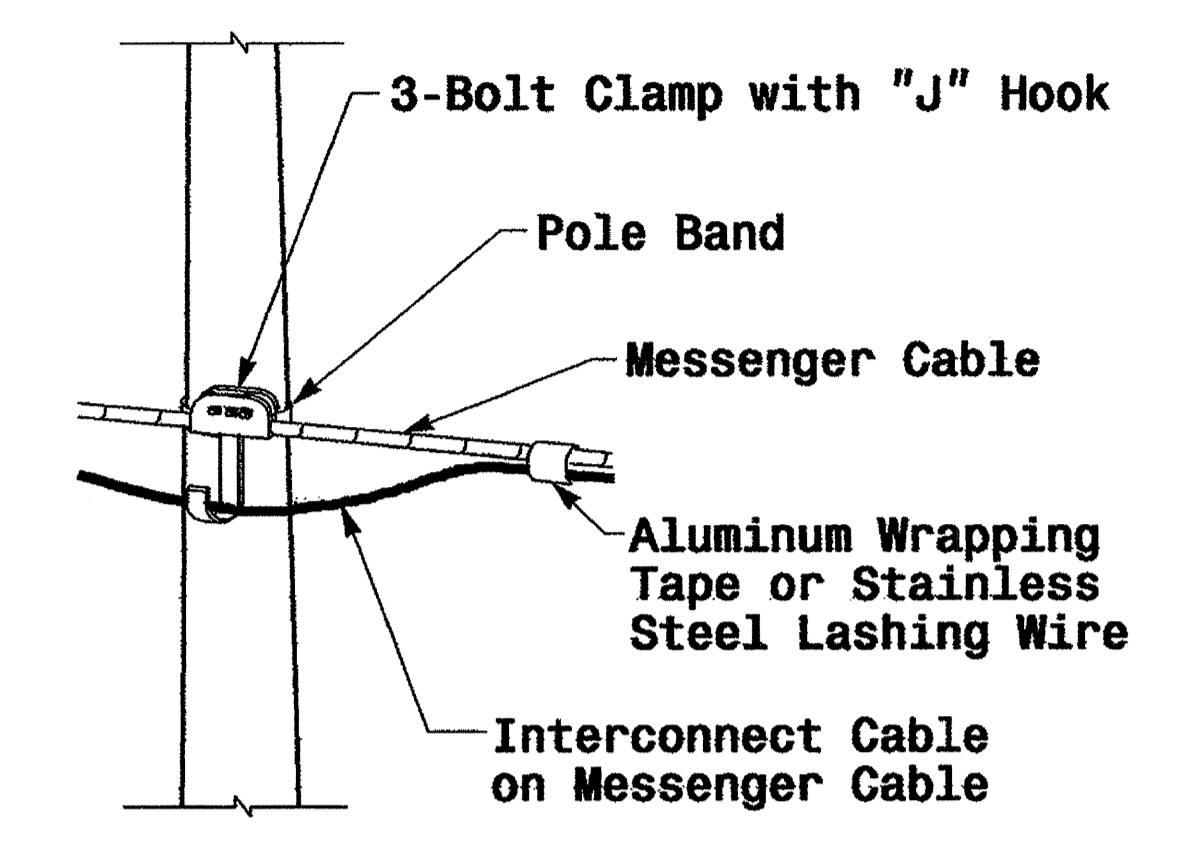




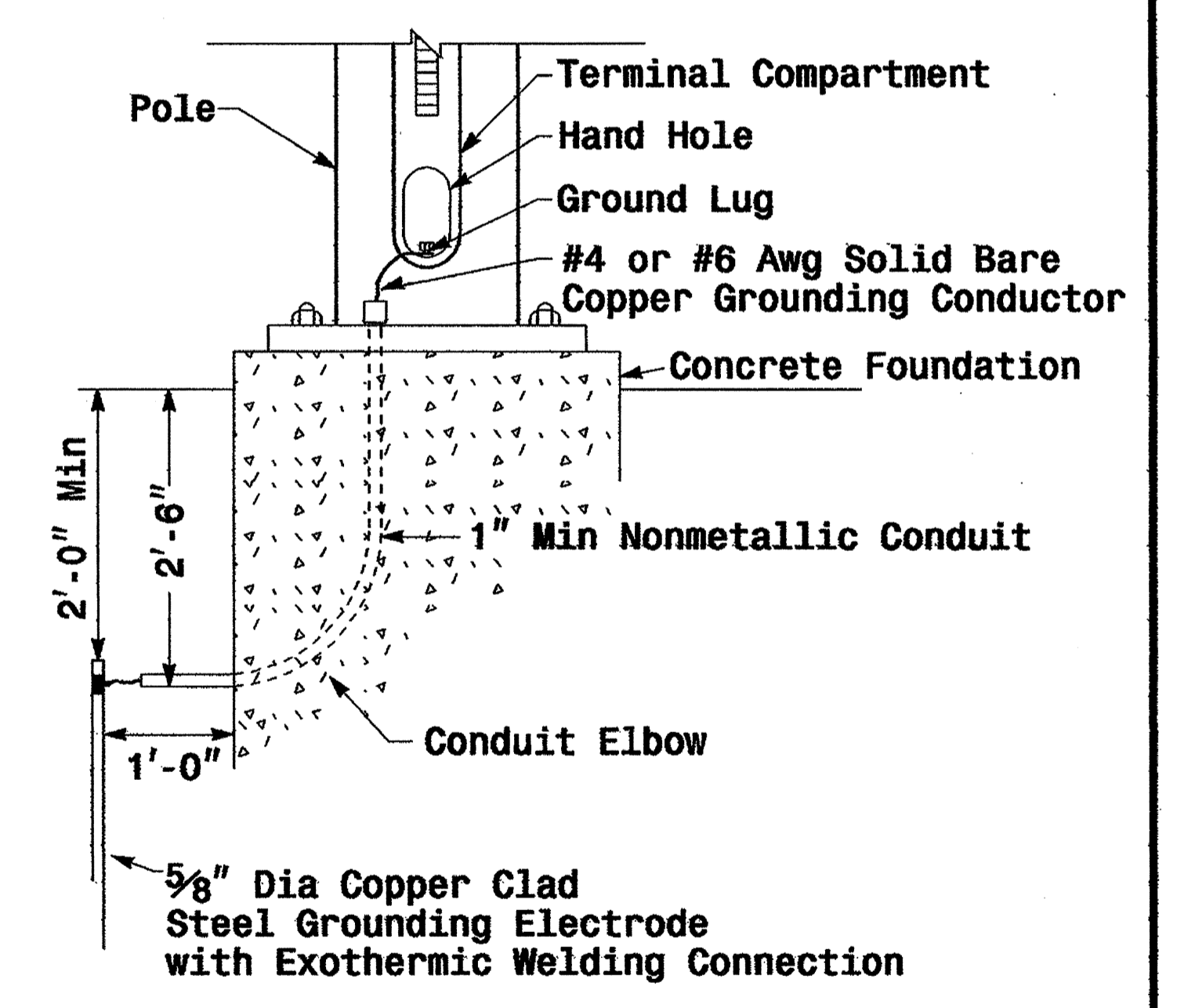


Note: Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

**Strain Pole Attachments**



**Attachment of Cable to Intermediate Metal Pole**



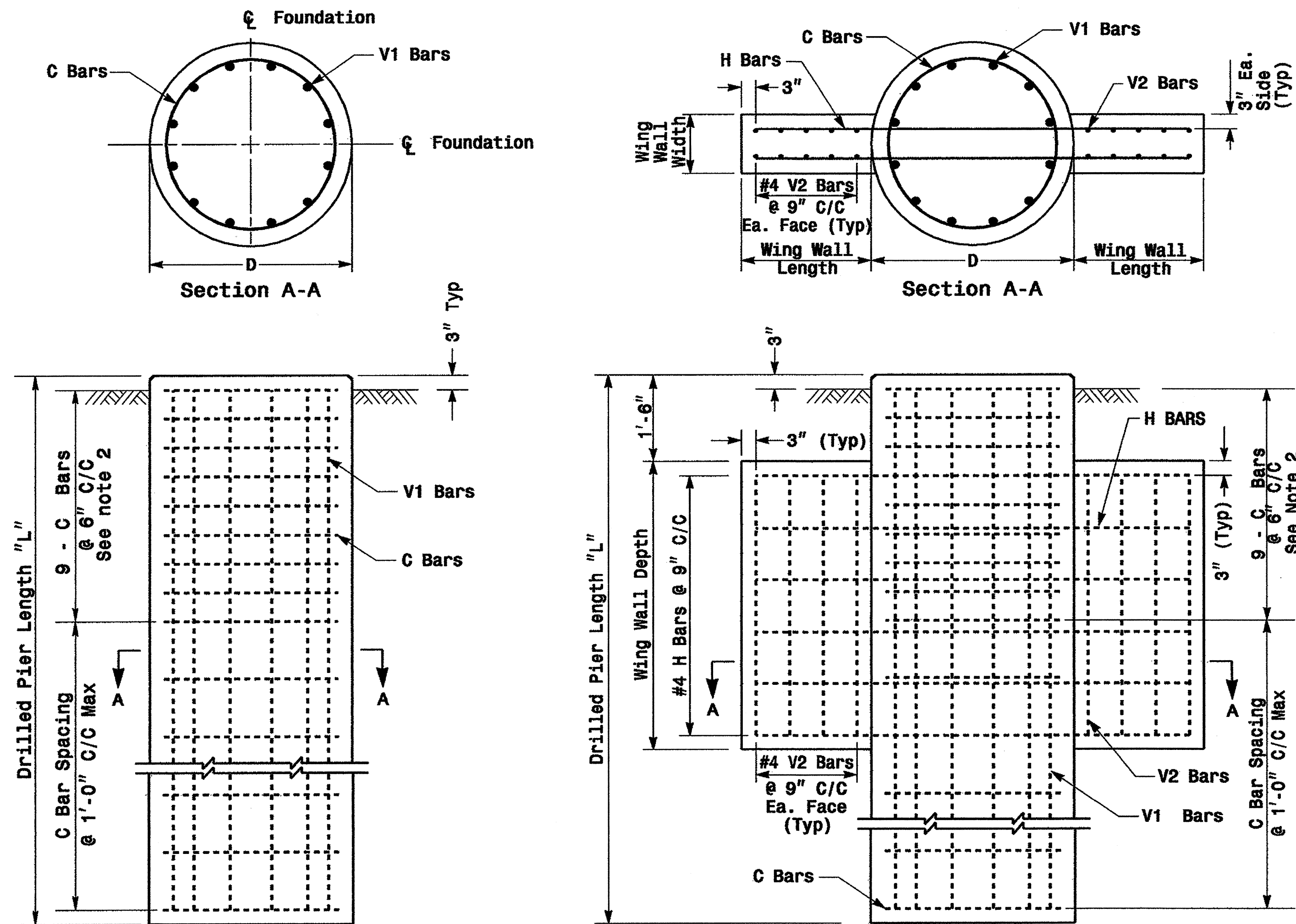
**Metal Pole Grounding Detail**

**Construction Details - Strain Poles**

01-SEP-2005 16:33  
C:\p000168-un1\work\groups\2004 metal pole strainer\ds2004.mf.dgn  
P:\work\groups\2004 metal pole strainer\ds2004.mf.dgn

|                  |  |   |  |
|------------------|--|---|--|
|                  | <b>Construction Details<br/>Strain Poles</b>                   |   |  |
|                  | PLAN DATE: <b>May 2005</b><br>PREPARED BY: <b>C.F. ANDREWS</b> | REVIEWED BY: <b>P.L. ALEXANDER</b><br>REVIEWED BY: <b>D.C. SARKAR</b> |  |
| SCALE: 0 NA NONE |  | SIGNATURE: <i>Mitko</i> DATE: <b>9-1-05</b>                           |  |
|                  |  | SIG. INVENTORY NO.  |  |

### 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**

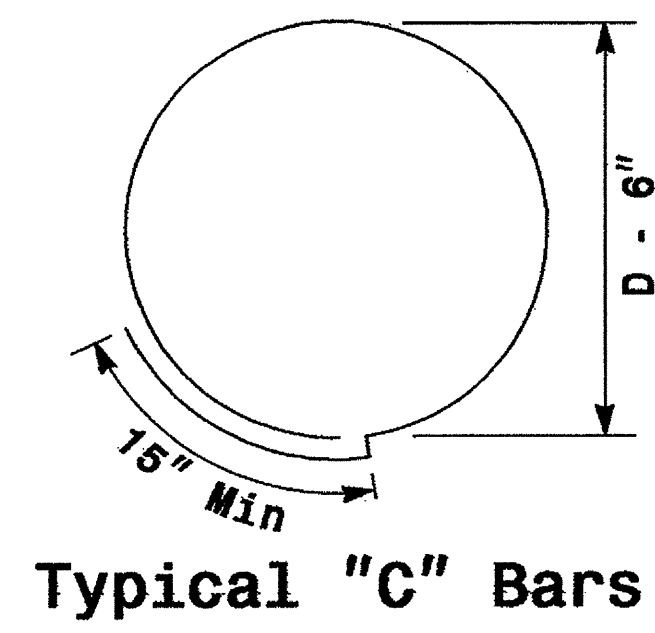
| Wing Wall Type | Drill Pier Shaft Dia. (in.) | Reinforcing Steel |     |      |      |        |
|----------------|-----------------------------|-------------------|-----|------|------|--------|
|                |                             | Bar Name          | No. | Size | Type | Length |
| TYPE 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

**WING WALL DETAILS**

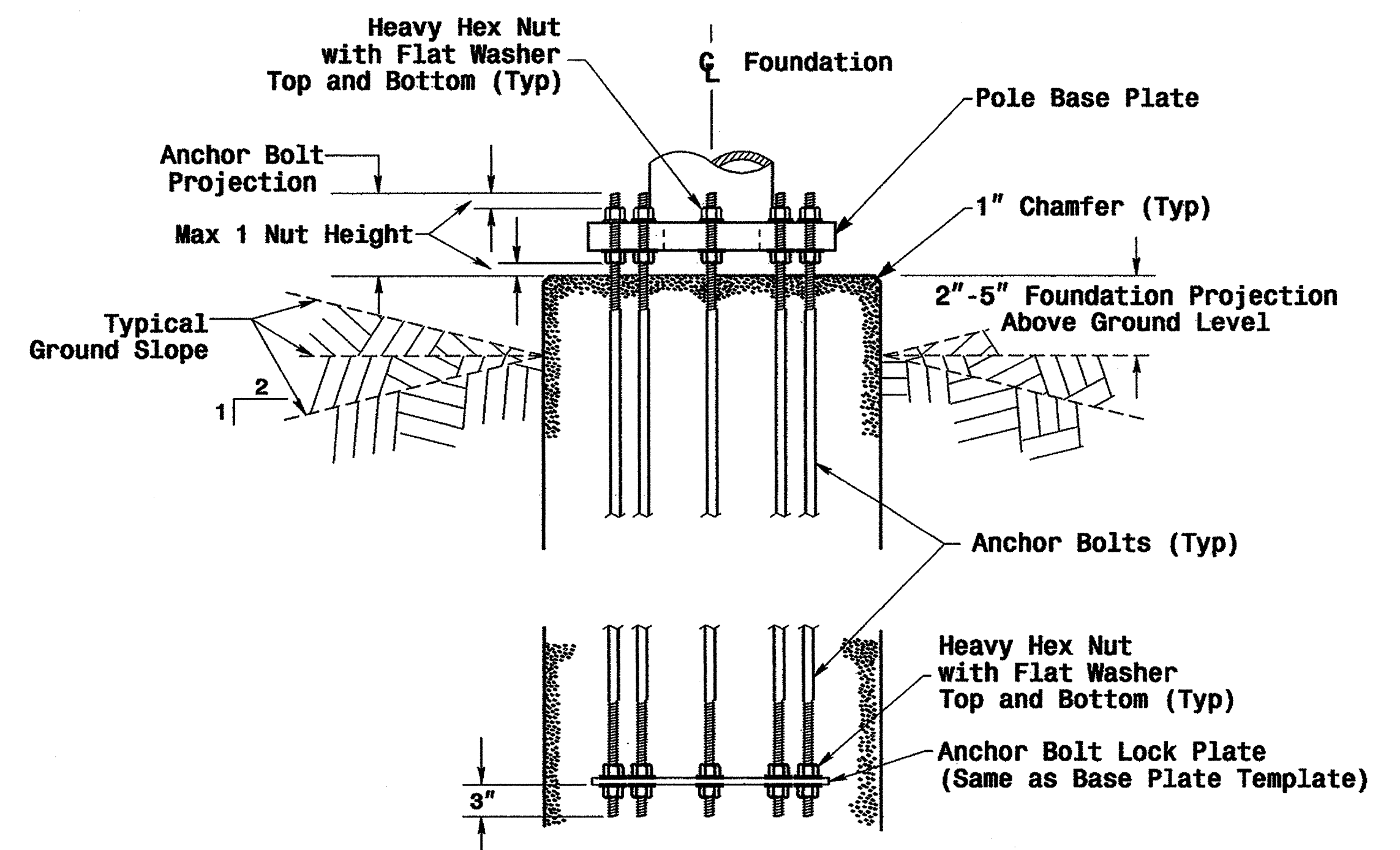
| Wing Wall Type | Wing Wall Length (Ft.) | Wing Wall Width (Ft.) | Wing Wall Depth (Ft.) | Concrete Volume (Cu. Yds.) |
|----------------|------------------------|-----------------------|-----------------------|----------------------------|
| TYPE 1         | 1'-6"                  | 1'-0"         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

See Note No. 4

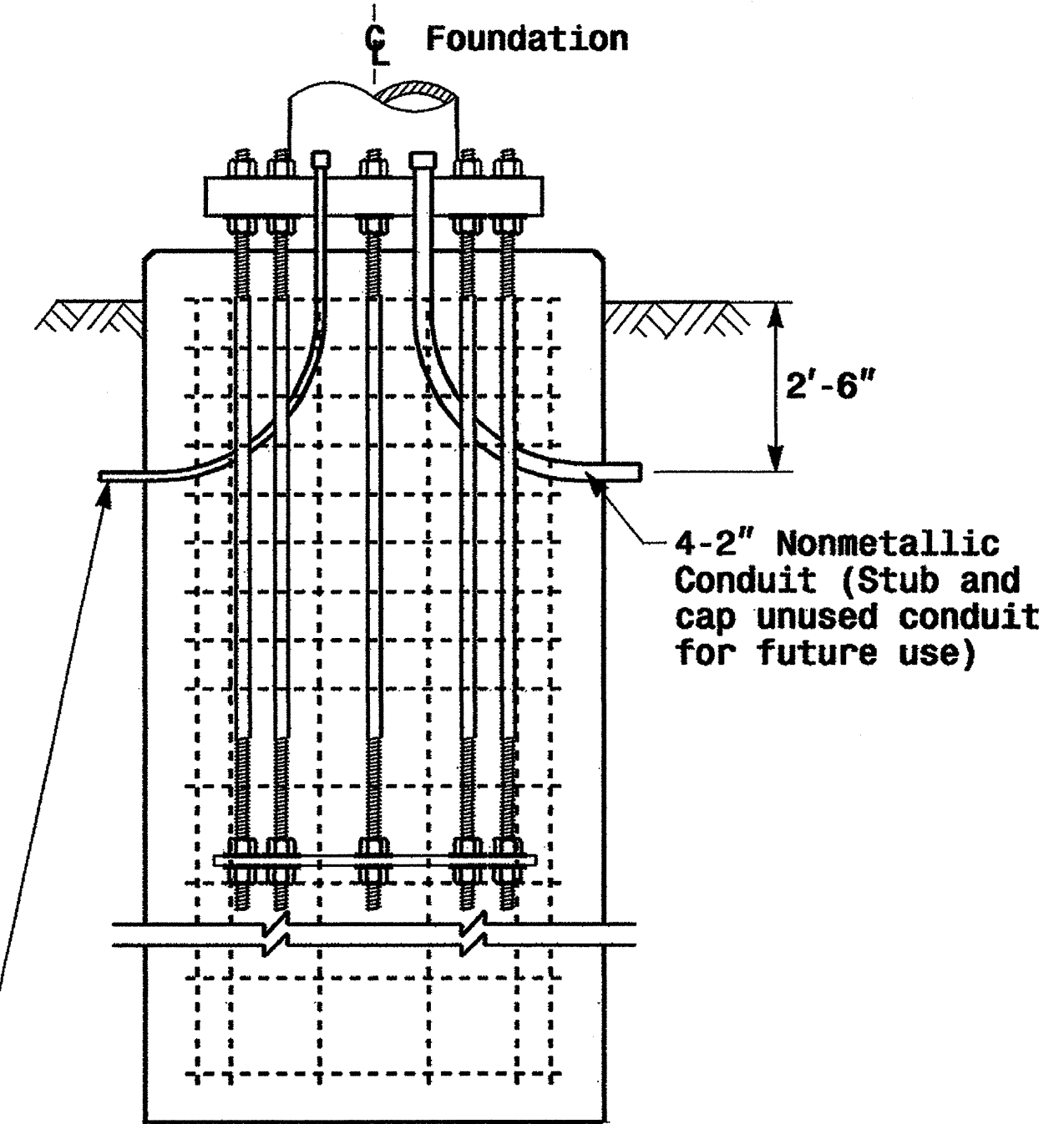


### Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



### Typical Foundation Conduit Details



2-1" Nonmetallic Conduits for Electrical Service and Grounding Electrode Conductor

### Notes

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

Prepared in the Office of:

**Construction Details Foundations**

PLAN DATE: May 2005 REVIEWED BY: P.L. ALEXANDER  
 PREPARED BY: C.F. ANDREWS REVIEWED BY: A.M. ESPOSITO

SCALE: 0 NA NONE

SIGNATURE: D. Sankar 9.2.2005  
 DATE: 9.2.2005  
 SIG. INVENTORY NO.

Construction Details - Foundations

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 pol exchdgr

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

Concrete Volume (cubic yards) = .356 X L

**Fabrication Design Notes:**

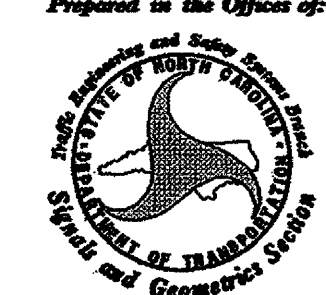
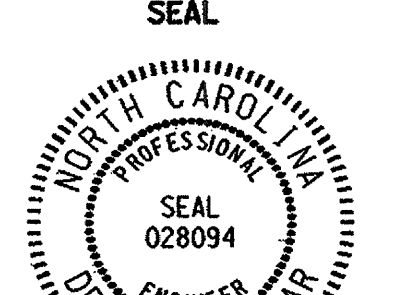
1. Values shown in "Moment at the Pole Base" column represents the minimum acceptable capacity allowable for design using a design CSR of 1.
2. Base plate thickness (T) is 2.0 inches.

**Foundation Selection:**

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

Standard Strain Poles

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|   |   |                                  |   |
|---|---|----------------------------------|---|
|  | <b>Standard Strain Poles and Standard Foundations</b> |                                  |  |
|   | PLAN DATE: <b>May 2005</b>                            | REVIEWED BY: <b>C.F. Andrews</b> |   |
| PREPARED BY: <b>P.L. Alexander</b>  | REVIEWED BY: <b>A.M. Esposito</b>                     | REVISIONS                        | INIT. DATE  |
| SCALE: <b>None</b>  |   | SIGNATURE: <i>D. SarKar</i>      | DATE: <b>9.2.2005</b>   |