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TIP PROJECT: U-2581BA

CONTRACT:

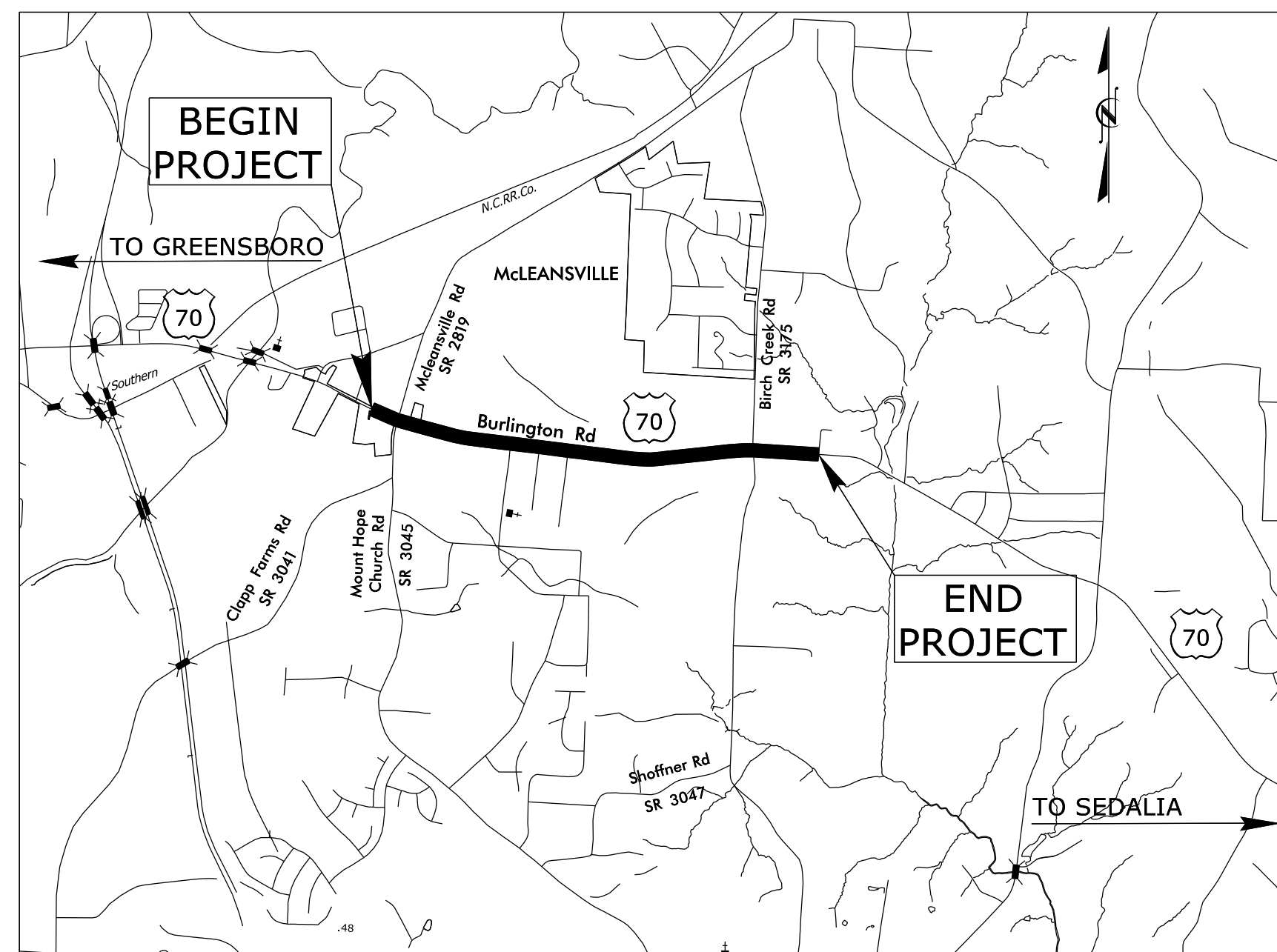
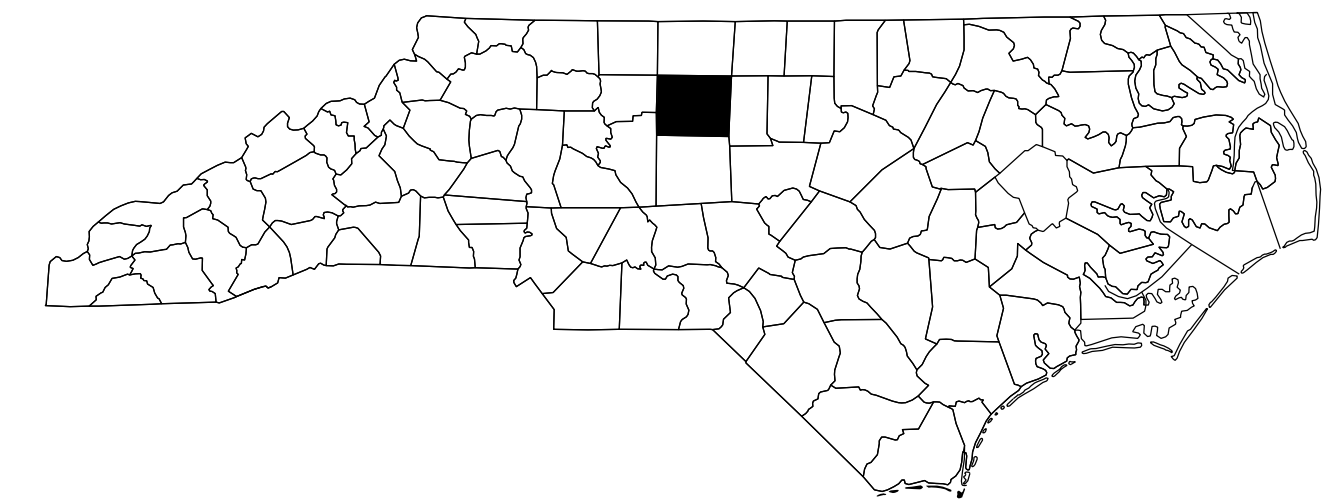
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

| | |
|-------------|-----------|
| Project No. | Sheet No. |
| U-2581BA | Sig. 1.0 |

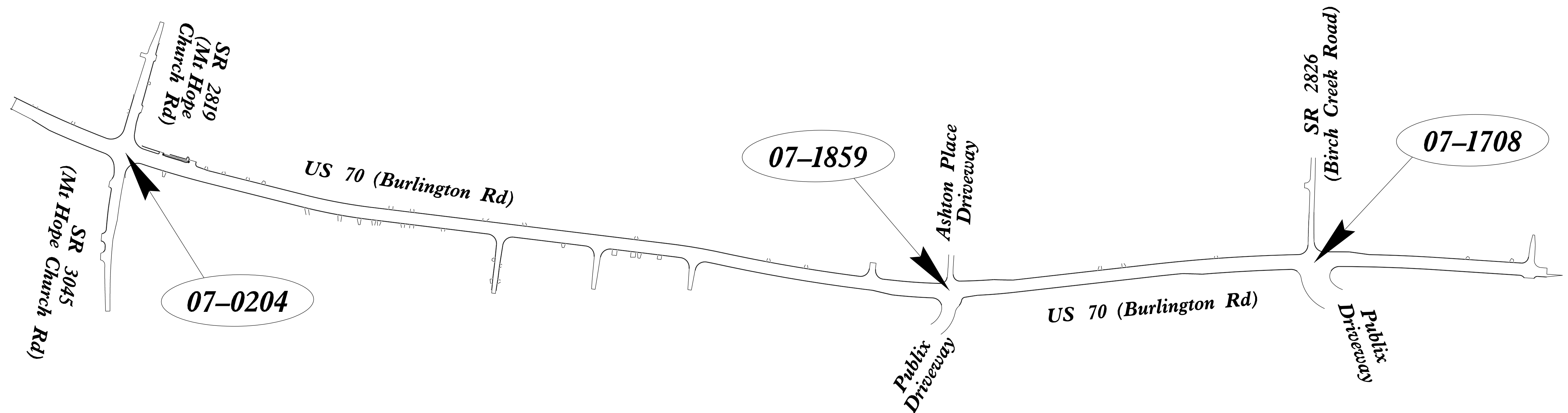
GUILFORD COUNTY

LOCATION: US 70 (BURLINGTON ROAD) FROM WEST OF SR 3045 (MT. HOPE CHURCH ROAD) / SR 2819 (MCLEANSVILLE ROAD) TO JUST EAST OF SR 2826 (BIRCH CREEK ROAD)

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS



VICINITY MAP



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

| INDEX OF PLANS | | |
|----------------|-------------|---|
| Sheet # | Reference # | Location /Description |
| Sig. 1.0 | ----- | Title Sheet |
| Sig. 2.0-4.4 | 07-0204 | US 70 (Burlington Rd) at SR 3045/2819 (Mt Hope Church Rd) |
| Sig. 5.0-5.3 | 07-1859 | US 70 (Burlington Rd) at Publix and Ashton Place |
| Sig. 6.0-8.3 | 07-1708 | US 70 (Burlington Rd) at SR 2826 (Birch Creek Rd) |
| Sig. 9.0 | ----- | Plate Sheet |
| Sig. MI-M8 | ----- | MI-M8 Standard Metal Pole Details |
| SCP. 1-3 | ----- | Signal Communication Plans |

LEGEND

##-#### SIGNAL INVENTORY NUMBER

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT


Contacts:

Robert J. Ziemba, PE – Central Region Signals Engineer

Todd Joyce, PE – Signal Equipment Design Engineer

Neil Avery – Intelligent Transportation Systems Engineer

Prepared for the North Carolina Department of Transportation
In the Office of:



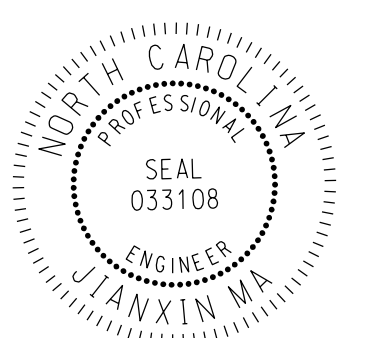
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0329

Refer to Roadway Standard Drawings NCDOT dated January 2018 and Standard Specifications for Roads and Structures dated January 2018.

JAMES GOODNIGHT, PE
PROJECT ENGINEER

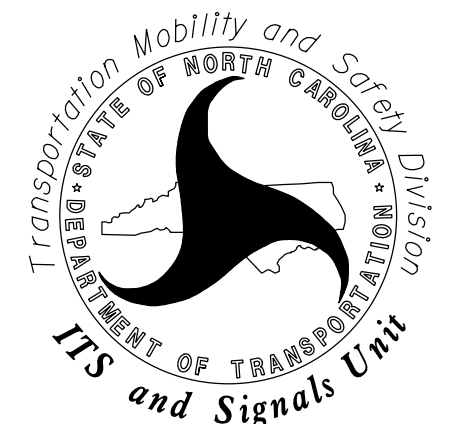
JIANXIN MA, PE PTOE
PROJECT DESIGN ENGINEER

SEAL



DocuSigned by:
Jianxin Ma 9/9/2019
827E1953081444F...
SIGNATURE DATE

DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY
AND SAFETY DIVISION



ITS and Signals Unit

750 N. Greenfield Parkway, Garner, NC 27529

6 Phase Fully Actuated (Isolated)

PHASING DIAGRAM

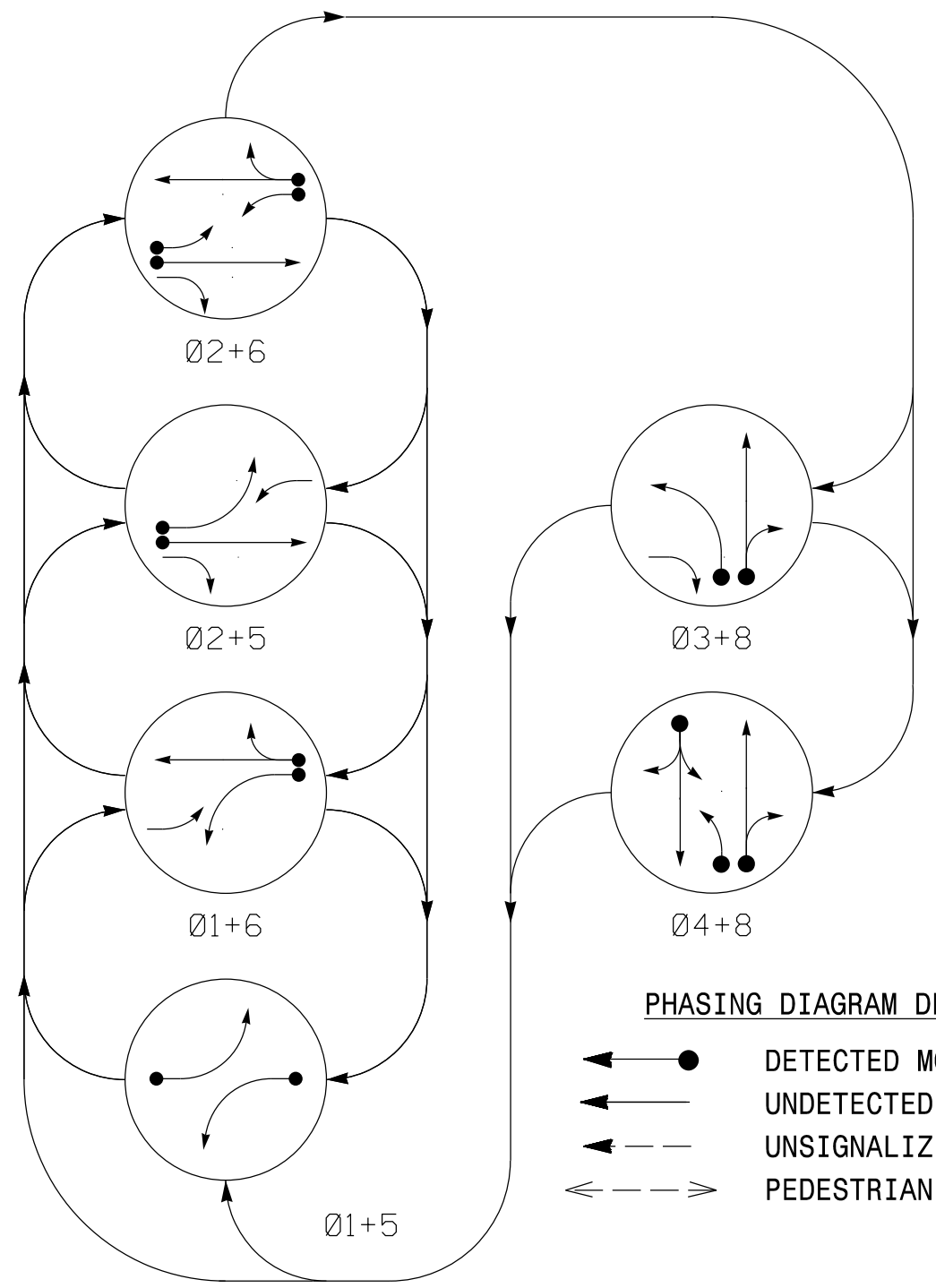
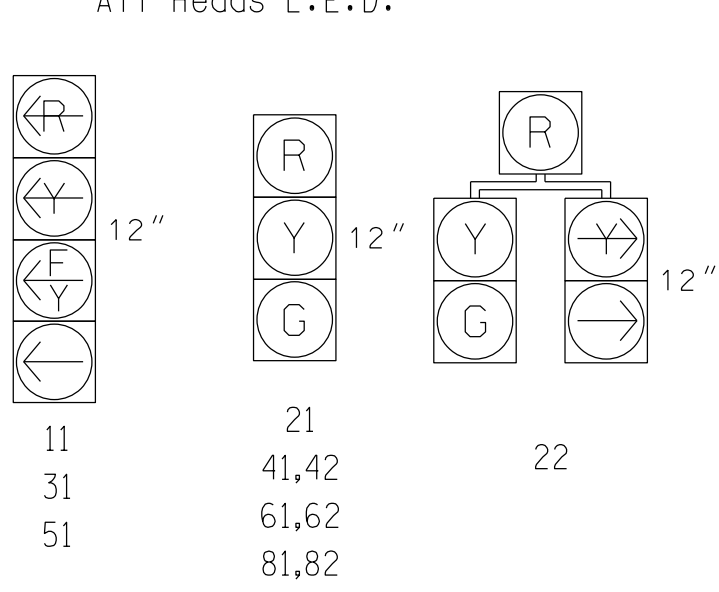


TABLE OF OPERATION

| SIGNAL FACE | PHASE | | | | | | | |
|-------------|---------|---------|---------|---------|---------|---------|---|---|
| | Ø 1 + 5 | Ø 1 + 6 | Ø 2 + 5 | Ø 2 + 6 | Ø 3 + 8 | Ø 4 + 8 | F | H |
| 11 | ← | ← | ← | ← | ← | ← | ← | ← |
| 21 | R | R | G | G | R | R | Y | Y |
| 22 | R | R | R | G | R | R | Y | Y |
| 31 | ← | ← | ← | ← | ← | ← | ← | ← |
| 41,42 | R | R | R | R | R | G | R | R |
| 51 | ← | ← | ← | ← | ← | ← | ← | ← |
| 61, 62 | R | G | R | G | R | R | Y | Y |
| 81,82 | R | R | R | R | G | G | R | R |

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

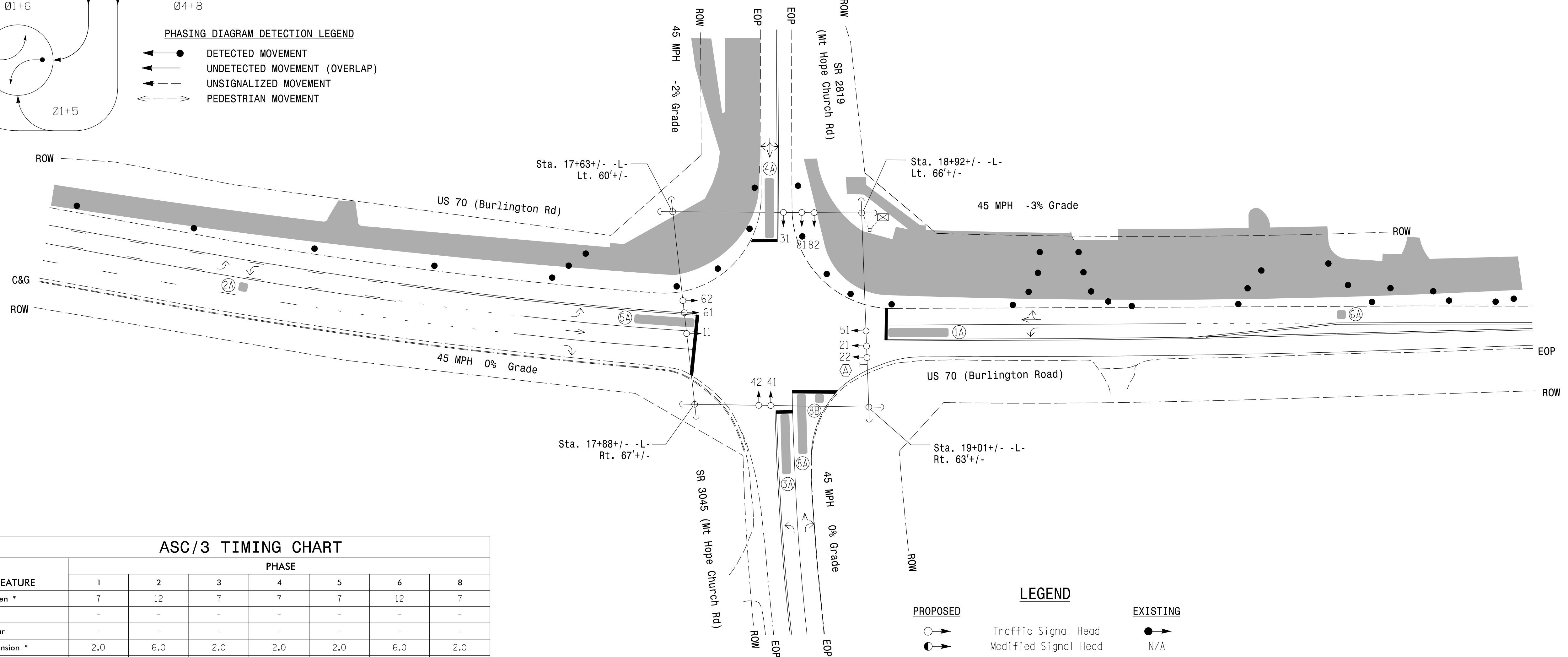
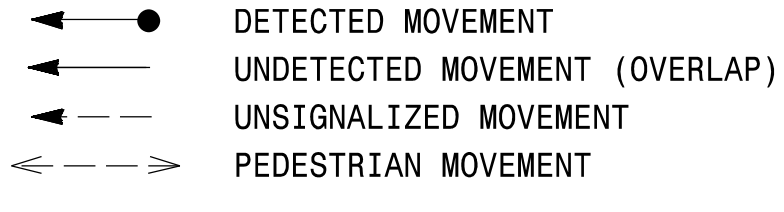
| ZONE | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | PROGRAMMING | | | | | | | |
|------|-----------|----------------------------|-------|----------|-------------|---------|-------------|------------|-------------------|------|-------------|----------|
| | | | | | PHASE | CALLING | EXTEND TIME | DELAY TIME | USE ADDED INITIAL | TYPE | SYSTEM LOOP | NEW CARD |
| 1A* | 6X40 | 0 | * | * | 1 | Yes | - | 15 | - | S | - | - |
| 2A* | 6X6 | 300 | * | * | 2 | Yes | - | - | - | X | N | - |
| 3A* | 6X40 | 0 | * | * | 3 | Yes | - | 15 | - | S | - | - |
| 4A* | 6X40 | 0 | * | * | 4 | Yes | - | 5 | - | S | - | - |
| 5A* | 6X40 | 0 | * | * | 5 | Yes | - | 15 | - | S | - | - |
| 6A* | 6X6 | 300 | * | * | 2 | Yes | - | 3 | - | G | - | - |
| 8A* | 6X40 | 0 | * | * | 8 | Yes | - | 10 | - | S | - | - |
| 8B* | 6X6 | 0 | * | * | 8 | Yes | - | 15 | - | S | - | - |

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
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. Omit phase 3 during phase 4 on.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Incorporate Video Detection system for vehicle detection.
8. Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.

PHASING DIAGRAM DETECTION LEGEND

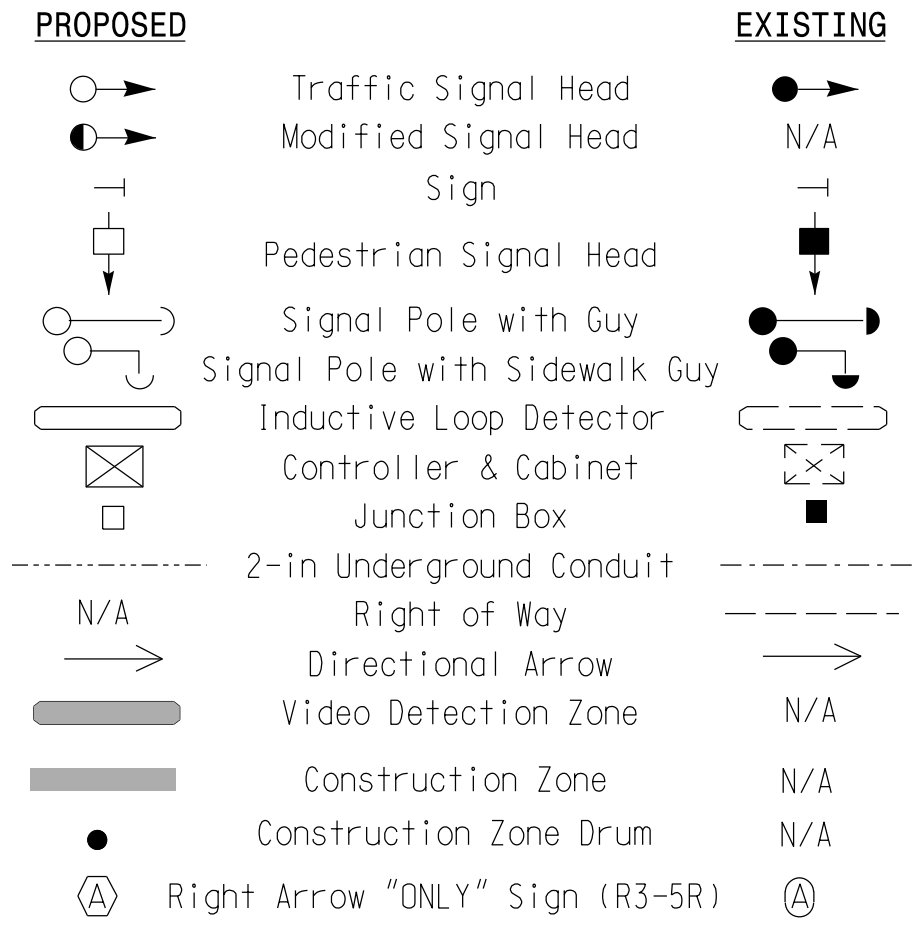


ASC/3 TIMING CHART

| FEATURE | PHASE | | | | | | | |
|-------------------------|-------|------------|-----|-----|-----|------------|-----|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 8 | |
| Min Green * | 7 | 12 | 7 | 4 | 7 | 12 | 7 | |
| Walk * | - | - | - | - | - | - | - | |
| Ped Clear | - | - | - | - | - | - | - | |
| Veh. Extension * | 2.0 | 6.0 | 2.0 | 2.0 | 2.0 | 6.0 | 2.0 | |
| Max 1 * | 20 | 120 | 15 | 30 | 20 | 120 | 30 | |
| Yellow | 3.0 | 4.8 | 3.0 | 4.7 | 3.0 | 4.8 | 4.5 | |
| Red Clear | 2.9 | 1.3 | 2.3 | 1.5 | 2.1 | 1.3 | 1.0 | |
| Actuations B4 Add * | - | - | - | - | - | - | - | |
| Seconds / Actuation * | - | 1.5 | - | - | - | 1.5 | - | |
| Max Initial * | - | 34 | - | - | - | 34 | - | |
| Time Before Reduction * | - | 15 | - | - | - | 15 | - | |
| Time To Reduce * | - | 60 | - | - | - | 60 | - | |
| Minimum Gap | - | 3.0 | - | - | - | 3.0 | - | |
| Locking Detector | - | X | - | - | - | X | - | |
| Recall Position | - | VEH RECALL | - | - | - | VEH RECALL | - | |
| Dual Entry | - | - | - | X | - | - | X | |
| Simultaneous Gap | X | X | X | X | X | X | X | |

* 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



Signal Upgrade-Temporary Design 1 (TMP Phase I)

US 70 (Burlington Rd)
at
SR 3045/2819
(Mt Hope Church Rd)

Division 7 Guilford County Greensboro

PLAN DATE: September 2019 REVIEWED BY: M. L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

SCALE: 1"=40'

DATE: 9/9/2019

SIG. INVENTORY NO. 07-0204T1

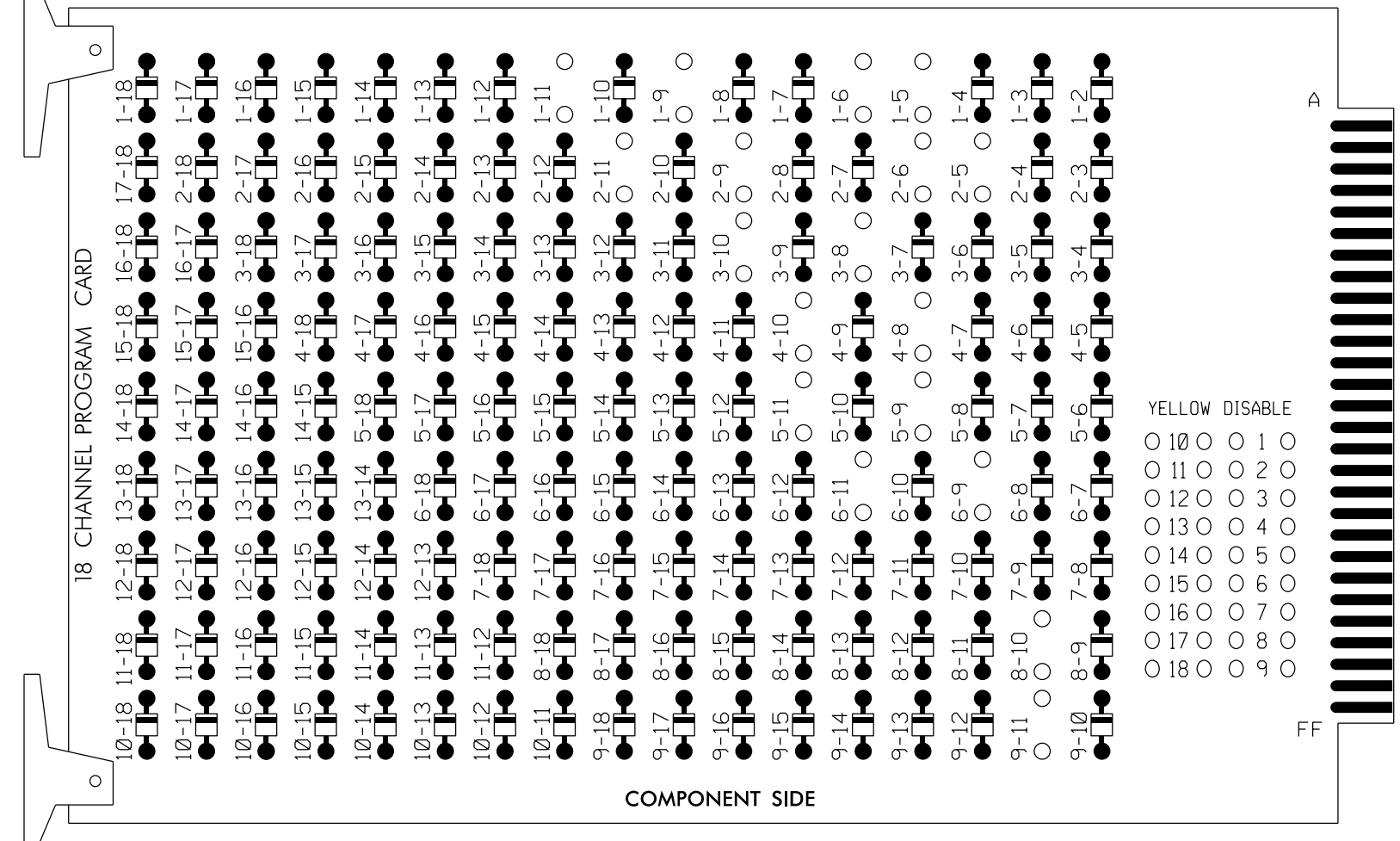


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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, 3-8, 3-10, 4-8, 4-10, 5-9, 5-11, 6-9, 6-11, 8-10, AND 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.

EQUIPMENT INFORMATION

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

* See overlap programming detail on sheet 2

| 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 | 31* | 22 | 41,42 | NU | 51* | 61,62 | NU | NU | 81,82 | NU | 11* | 31* | NU | 51* | NU |
| RED | | 128 | | * | 101 | | | 134 | | 107 | | | | | | | | |
| YELLOW | * | 129 | | | 102 | | * | 135 | | 108 | | | | | | | | |
| GREEN | | 130 | | | 103 | | | 136 | | 109 | | | | | | | | |
| RED ARROW | | | | | | | | | | | | | A121 | A124 | | A114 | | |
| YELLOW ARROW | | | | | 117 | | | | | | | | A122 | A125 | | A115 | | |
| FLASHING YELLOW ARROW | | | | | | | | | | | | | A123 | A126 | | A116 | | |
| GREEN ARROW | 127 | | | 118 | 118 | | | 133 | | | | | | | | | | |

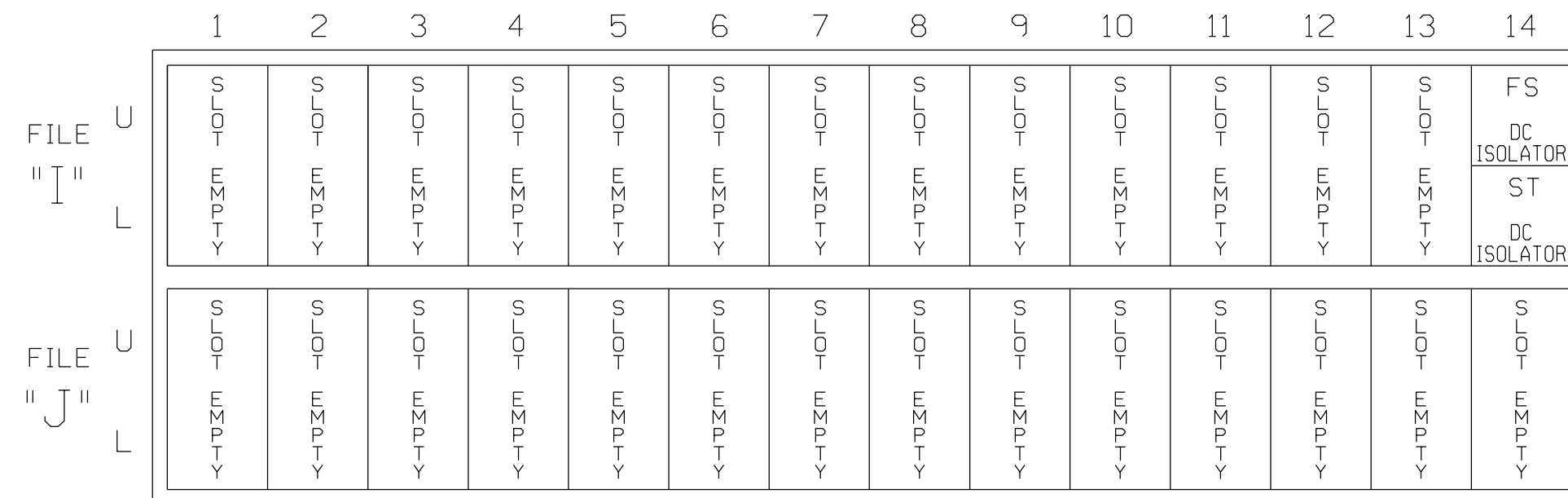
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

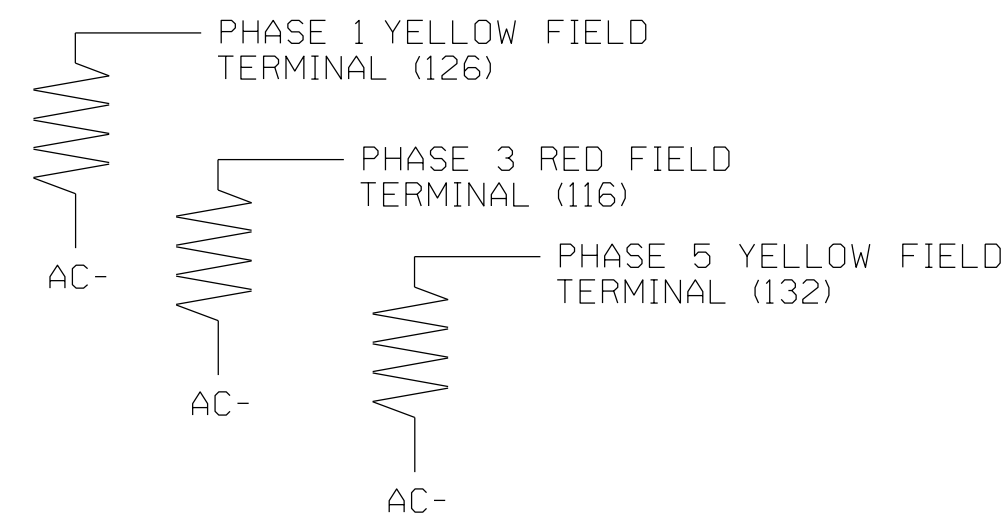
FS = FLASH SENSE
 ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

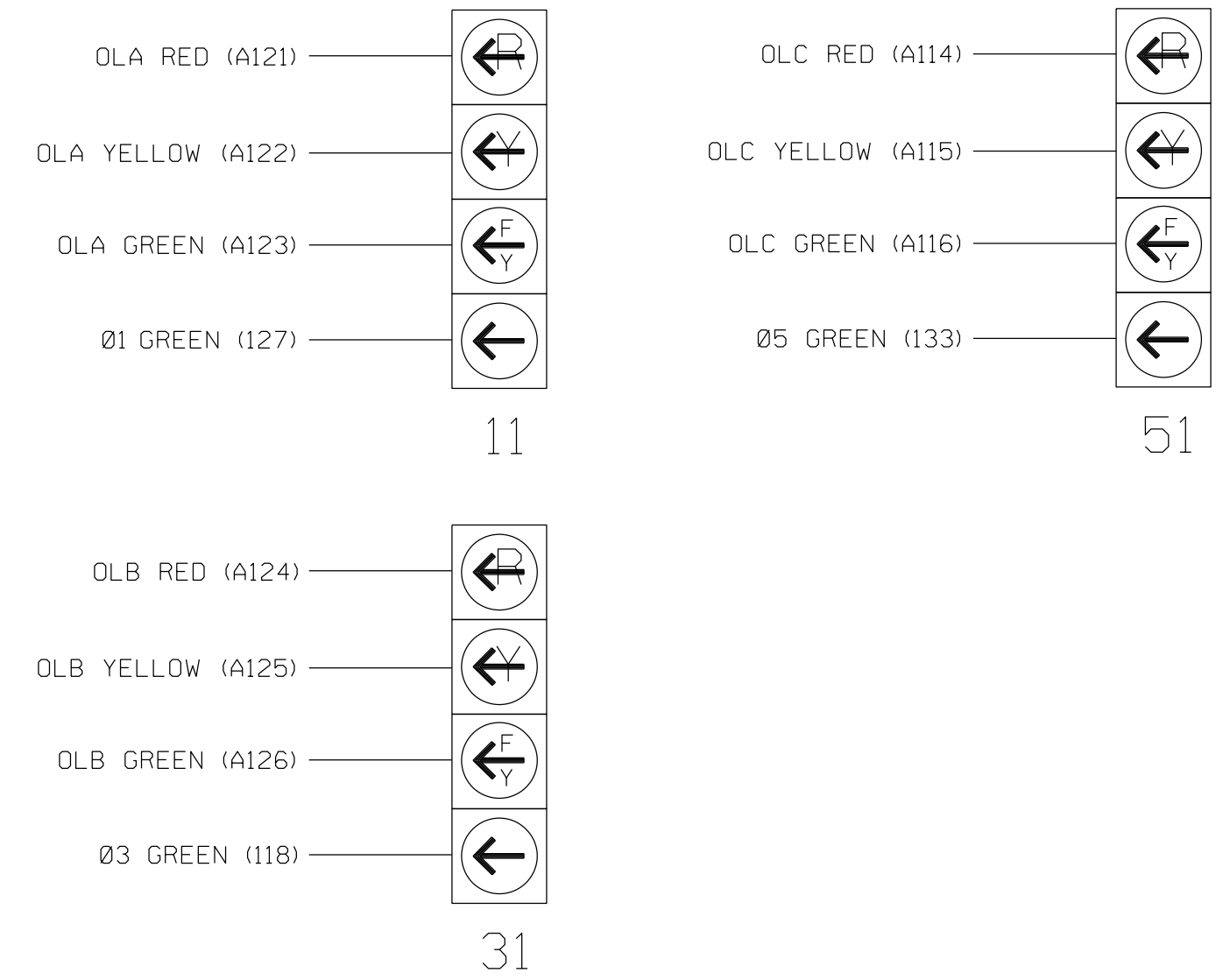
ACCEPTABLE VALUES

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



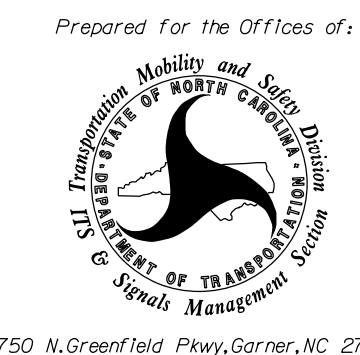
SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0204T1
 DESIGNED: September 2019
 SEALED: 09/09/2019
 REVISED: N/A

Electrical Detail-Temporary Design 1 (TMP Phase I)-Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:



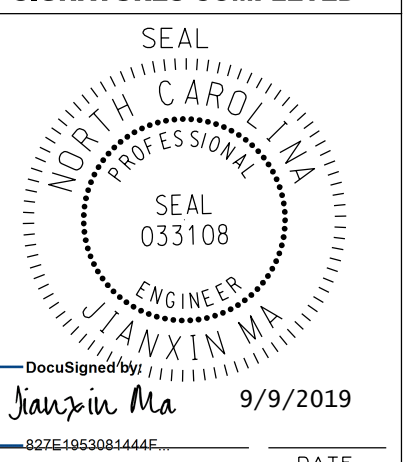
US 70 (Burlington Road)
 at
 SR 3045/2819
 (Mt. Hope Church Road)

Division 7 Guilford County Greensboro
 PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles
 PREPARED BY: J. Ma REVIEWED BY:

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



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SIG. INVENTORY NO. 07-0204T1

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

| | |
|---|--|
| TMG VEH OVLP... [A] TYPE: | PPLT FYA |
| PROTECTED LEFT TURN.... | PHASE 1 |
| OPPOSING THROUGH..... | PHASE 2 |
| FLASHING ARROW OUTPUT.....CH9 ISOLATE | |
| DELAY START OF: FYA..0.0 CLEARANCE..0.0 | |
| ACTION PLAN SF BIT DISABLE..... 0 | |

Toggle Once

OVERLAP B

Select TMG VEH OVLP [B] and 'PPLT FYA'

| | |
|---|--|
| TMG VEH OVLP... [B] TYPE: | PPLT FYA |
| PROTECTED LEFT TURN.... | PHASE 3 |
| OPPOSING THROUGH..... | PHASE 4 |
| FLASHING ARROW OUTPUT.....CH10 ISOLATE | |
| DELAY START OF: FYA..0.0 CLEARANCE..0.0 | |
| ACTION PLAN SF BIT DISABLE..... 0 | |

Toggle Once

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

| | |
|---|--|
| TMG VEH OVLP... [C] TYPE: | PPLT FYA |
| PROTECTED LEFT TURN.... | PHASE 5 |
| OPPOSING THROUGH..... | PHASE 6 |
| FLASHING ARROW OUTPUT.....CH11 ISOLATE | |
| DELAY START OF: FYA..0.0 CLEARANCE..0.0 | |
| ACTION PLAN SF BIT DISABLE..... 0 | |

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

ECONOLITE ASC/3-2070 BACKUP PROTECTION ENABLE PROGRAMMING

(program controller as shown)

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 1. CONTROLLER SEQ
3. From CONTROLLER SEQUENCE Submenu select 3. BACKUP PREVENT PHASES

Follow programming as shown below. On the 'ENABLE BACKUP PREVENT' screen move cursor to the appropriate field and press 'YES/NO' on the controller keypad to toggle field value between 'X', 'B', 'C' and 'OFF'.

| ENABLE BACKUP PREVENT | | | | | | | | | | | | | | | | |
|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TMG/BKUP | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 2 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 3 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 4 | . | X | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 5 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 6 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 7 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 8 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 9 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 10 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 11 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 12 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 13 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 14 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 15 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 16 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |

END PROGRAMMING

NOTES

1. 'X' inhibits the controller from servicing the 'BACKUP' (column) phase when the 'TIMING' (row) phase is active or next.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0204T1
DESIGNED: September 2019
SEALED: 09/09/2019
REVISED: N/A

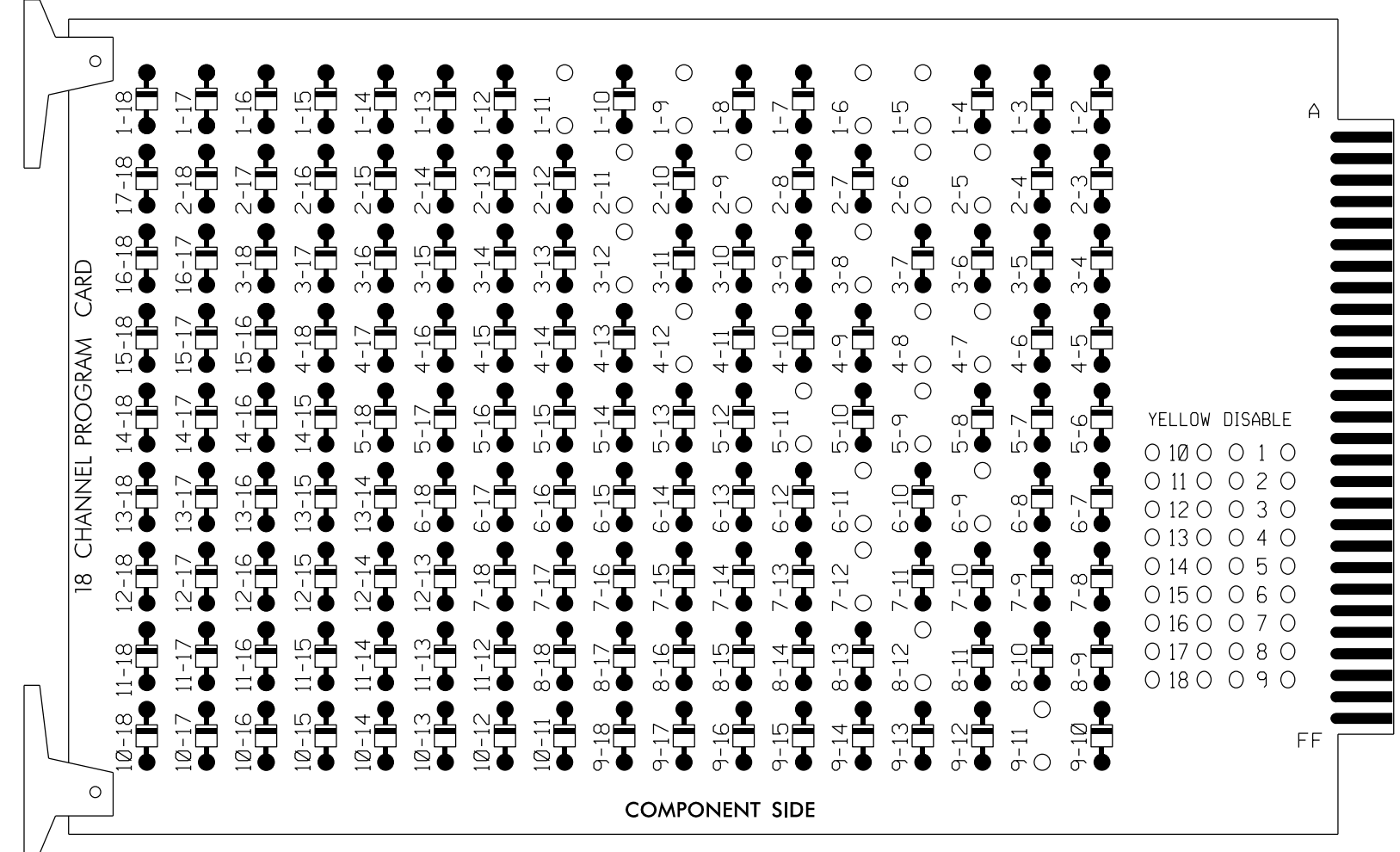


Electrical Detail-Temporary Design 1 (TMP Phase I)-Sheet 2 of 2

| <p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p>Prepared for the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p> | <p>US 70 (Burlington Road) at SR 3045/2819 (Mt. Hope Church Road)</p> <p>Division 7 Guilford County Greensboro</p> <p>PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles</p> <p>PREPARED BY: J. Ma 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> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> | REVISIONS | INIT. | DATE | | | | | | | | | | <p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>SEAL</p> <p>DocuSign by J. Ma 9/9/2019 027E1655001044P</p> <p>SIG. INVENTORY NO. 07-0204T1</p> |
|---|---|-----------|-------|------|--|--|--|--|--|--|--|--|--|--|
| REVISIONS | INIT. | DATE | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

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, 3-8, 3-12, 4-7, 4-8, 4-12, 5-9, 5-11, 6-9, 6-11, 7-12, 8-12, 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.

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,S10,S11,
 AUXS1,AUXS4,AUXS5
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....*
 * See overlap programming detail on sheet 2

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 | 81,22 | 41,42 | NU | 51★ | 42 | 61,62 | NU | 71★ | 62 | 81,82 | NU | 11★ | NU | 51★ | 71★ | NU |
| RED | | 128 | | * | 101 | | | * | 134 | | * | 107 | | | | | | | |
| YELLOW | * | 129 | | | 102 | | | | 135 | | | 108 | | | | | | | |
| GREEN | | 130 | | | 103 | | | | 136 | | | 109 | | | | | | | |
| RED ARROW | | | | | | | | | | | | | A121 | | | A114 | A101 | | |
| YELLOW ARROW | | | | | 117 | | | | 132 | | | 123 | | A122 | | A115 | A102 | | |
| FLASHING YELLOW ARROW | | | | | | | | | | | | | | A123 | | A116 | A103 | | |
| GREEN ARROW | 127 | | | | 118 | | | 133 | 133 | | 124 | 124 | | | | | | | |

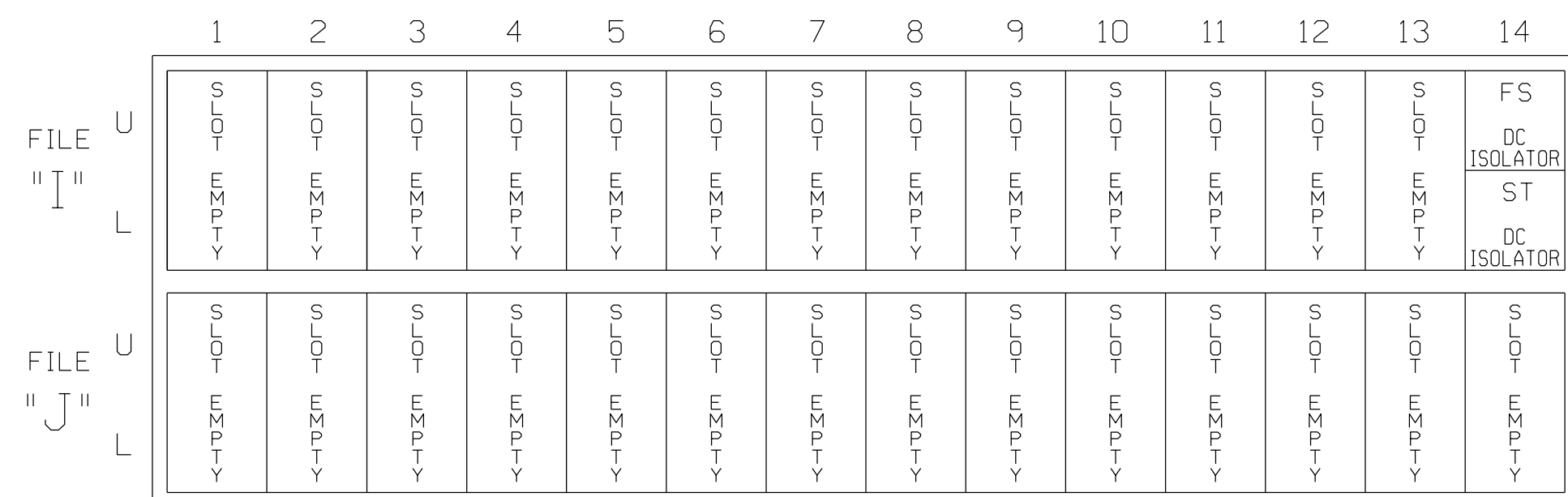
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

SPECIAL DETECTOR NOTE

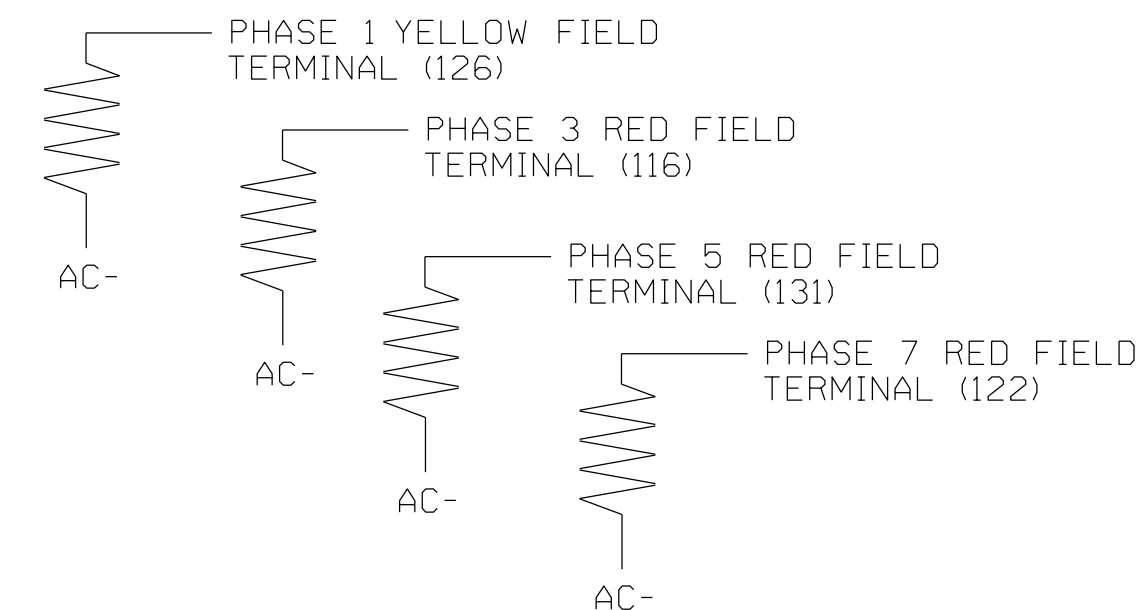
Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

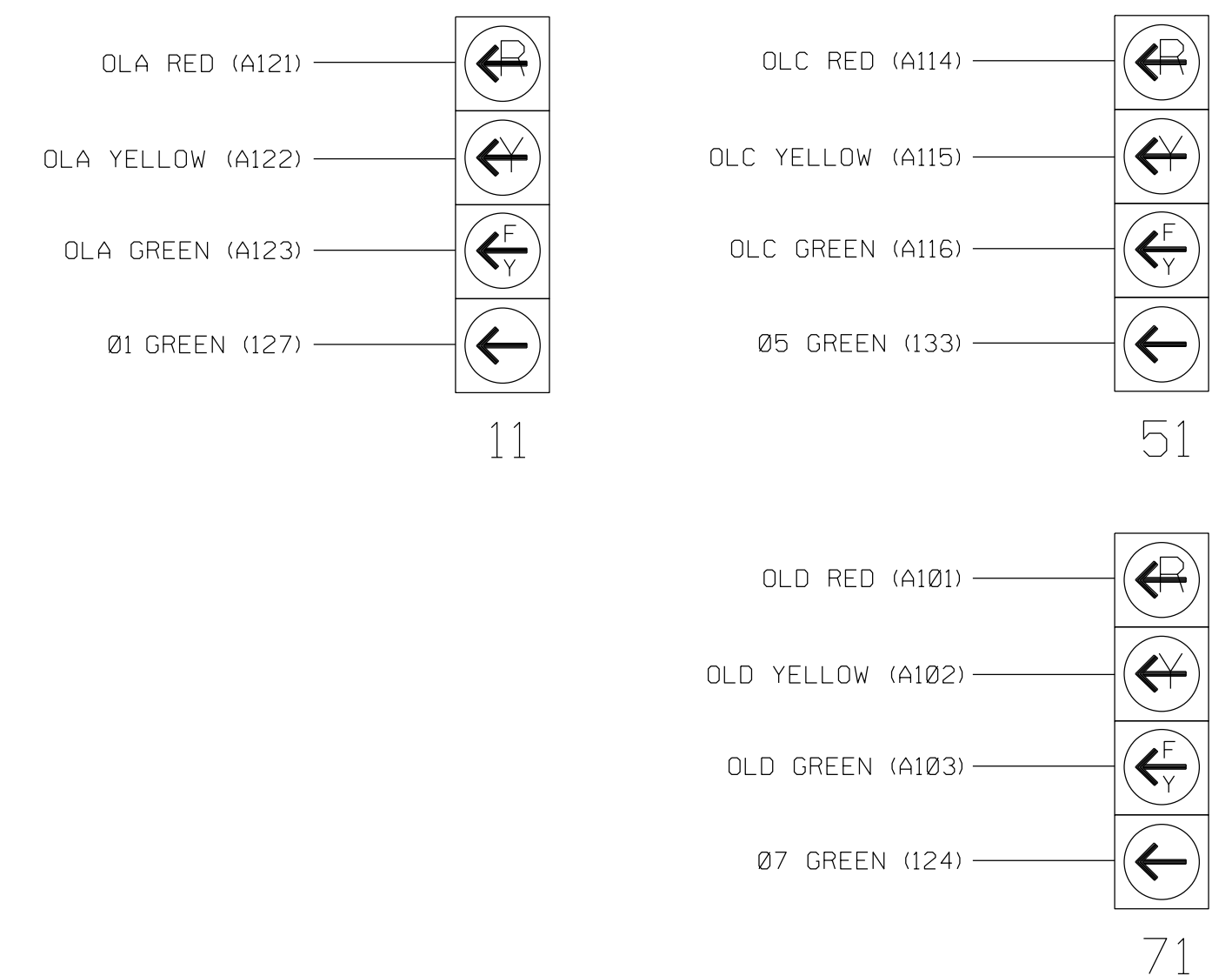
ACCEPTABLE VALUES

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

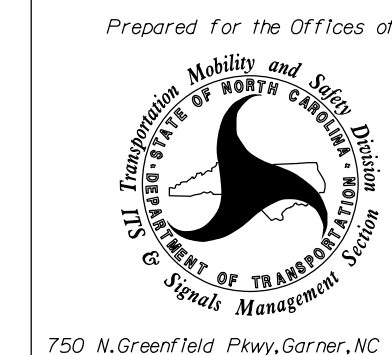


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0204T2
 DESIGNED: September 2019
 SEALED: 09/09/2019
 REVISED: N/A

Electrical Detail-Temporary Design 2 (TMP Phase II)-Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 70 (Burlington Road)
 at
 SR 3045/2819
 (Mt. Hope Church Road)



750 N. Greenfield Pkwy, Garner, NC 27529

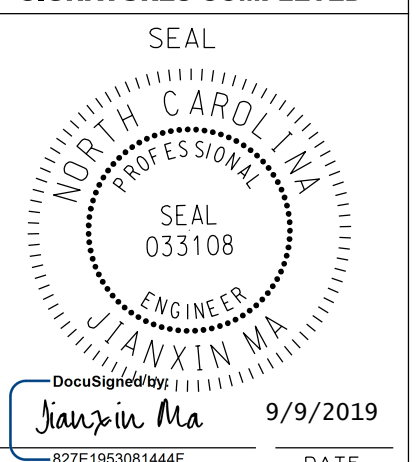
Division 7 Guilford County Greensboro

PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



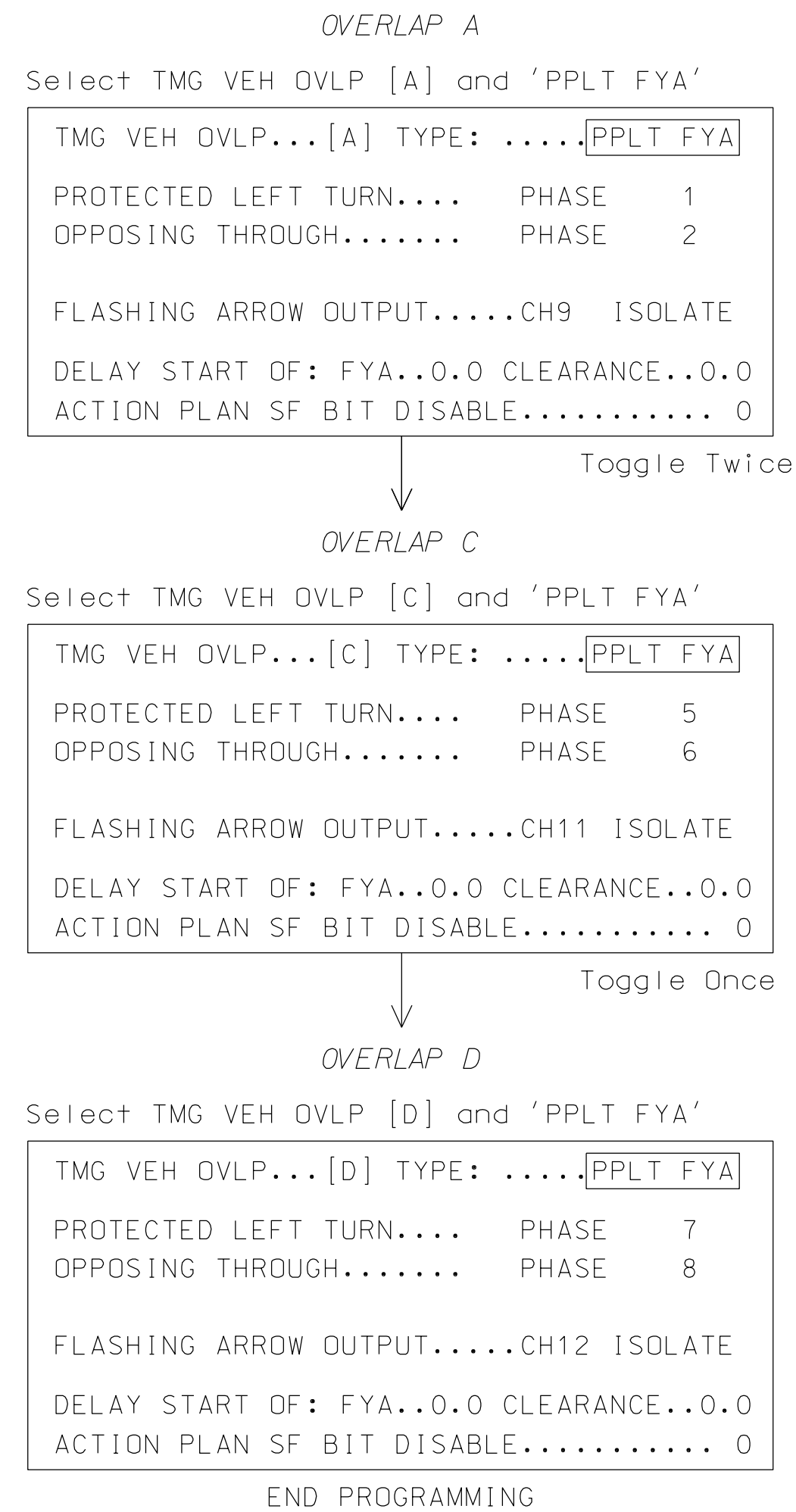
DATE 9/9/2019

SIG. INVENTORY NO. 07-0204T2

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS



ECONOLITE ASC/3-2070 BACKUP PROTECTION ENABLE PROGRAMMING

(program controller as shown)

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 1. CONTROLLER SEQ
3. From CONTROLLER SEQUENCE Submenu select 3. BACKUP PREVENT PHASES

Follow programming as shown below. On the 'ENABLE BACKUP PREVENT' screen move cursor to the appropriate field and press 'YES/NO' on the controller keypad to toggle field value between 'X', 'B', 'C' and 'OFF'.

| ENABLE BACKUP PREVENT | | | | | | | | | | | | | | | | |
|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TMG/BKUP | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 2 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 3 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 4 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 5 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 6 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 7 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 8 | . | . | . | . | . | . | X | . | . | . | . | . | . | . | . | . |
| 9 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 10 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 11 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 12 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 13 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 14 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 15 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |
| 16 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . |

END PROGRAMMING

NOTES

1. 'X' inhibits the controller from servicing the 'BACKUP' (column) phase when the 'TIMING' (row) phase is active or next.

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0204T2
DESIGNED: September 2019
SEALED: 09/09/2019
REVISED: N/A



Electrical Detail-Temporary Design 2 (TMP Phase II)-Sheet 2 of 3

| <p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared for the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p> | <p>US 70 (Burlington Road)</p> <p>at</p> <p>SR 3045/2819</p> <p>(Mt. Hope Church Road)</p> <p style="font-size: x-small;">Division 7 Guilford County Greensboro</p> <p>PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles</p> <p>PREPARED BY: J. Ma REVIEWED BY:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">REVISIONS</th> <th style="width: 20%;">INIT.</th> <th style="width: 30%;">DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table> | REVISIONS | INIT. | DATE | | | | <p style="text-align: center; font-size: small;">SEAL</p> <p style="font-size: x-small;">DocuSigned by: Jianxin Ma 9/9/2019 827E1953081444F DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-0204T2</p> |
|--|--|-----------|-------|------|--|--|--|--|
| REVISIONS | INIT. | DATE | | | | | | |
| | | | | | | | | |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ECONOLITE ASC/3-2070 CONTROLLER SEQUENCE PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 1. CONTROLLER SEQ
3. From CONTROLLER SEQUENCE Submenu select 1. PHASE RING SEQUENCE AND ASSIGNMENT

Move the cursor to the SEQUENCE COMMANDS field, toggle to select "C" mode, enter phases in desired sequence.

```

CONTROLLER SEQUENCE [ 1 ]
SEQUENCE COMMANDS . HW ALT SEQ ENA.          NO
      01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16
BC-   C  C  C  C  C  C  C  C  C  C  C  C  C  C  C  C
R1-   1  2  4  3  .  .  .  .  .  .  .  .  .  .  .  .
R2-   5  6  7  8  .  .  .  .  .  .  .  .  .  .  .  .
R3-   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
R4-   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .

R1-R4=RING 1-4, DATA ENTRY, PHASES 1-16
BC=BARRIER CONTROL, VALUES: B,C
B=CURRENT GROUP RING BARRIER
C=COMPATIBILITY PROGRAMMED BY MAIN MENU 1-1-2

```

END SEQUENCE AND ASSIGNMENT PROGRAMMING

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 1. CONTROLLER SEQ
3. From CONTROLLER SEQUENCE Submenu select 2. PHASE COMPATIBILITY

Program phase compatibility as shown below to ensure phases 3 and 7 cannot run concurrently.

```

PHASE COMPATIBILITY
      6 5 4 3 2 1 0 9 8 7 6 5 4 3 2
1 . . . . . X X . . .
2 . . . . . . X X . . .
3 . . . . . X . . . . .
4 . . . . . X X . . .
5 . . . . . . . . . . .
6 . . . . . . . . . . .
7 . . . . . . . . . . .
8 . . . . . . . . . . .
9 . . . . . . . . . . .
10 . . . . . . . . . . .
11 . . . . . . . . . . .
12 . . . . . . . . . . .
13 . . . . . . . . . . .
14 . . . . . . . . . . .
15 . . . . . . . . . . .

```

END COMPATIBILITY PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0204T2
DESIGNED: September 2019
SEALED: 09/09/2019
REVISED: N/A

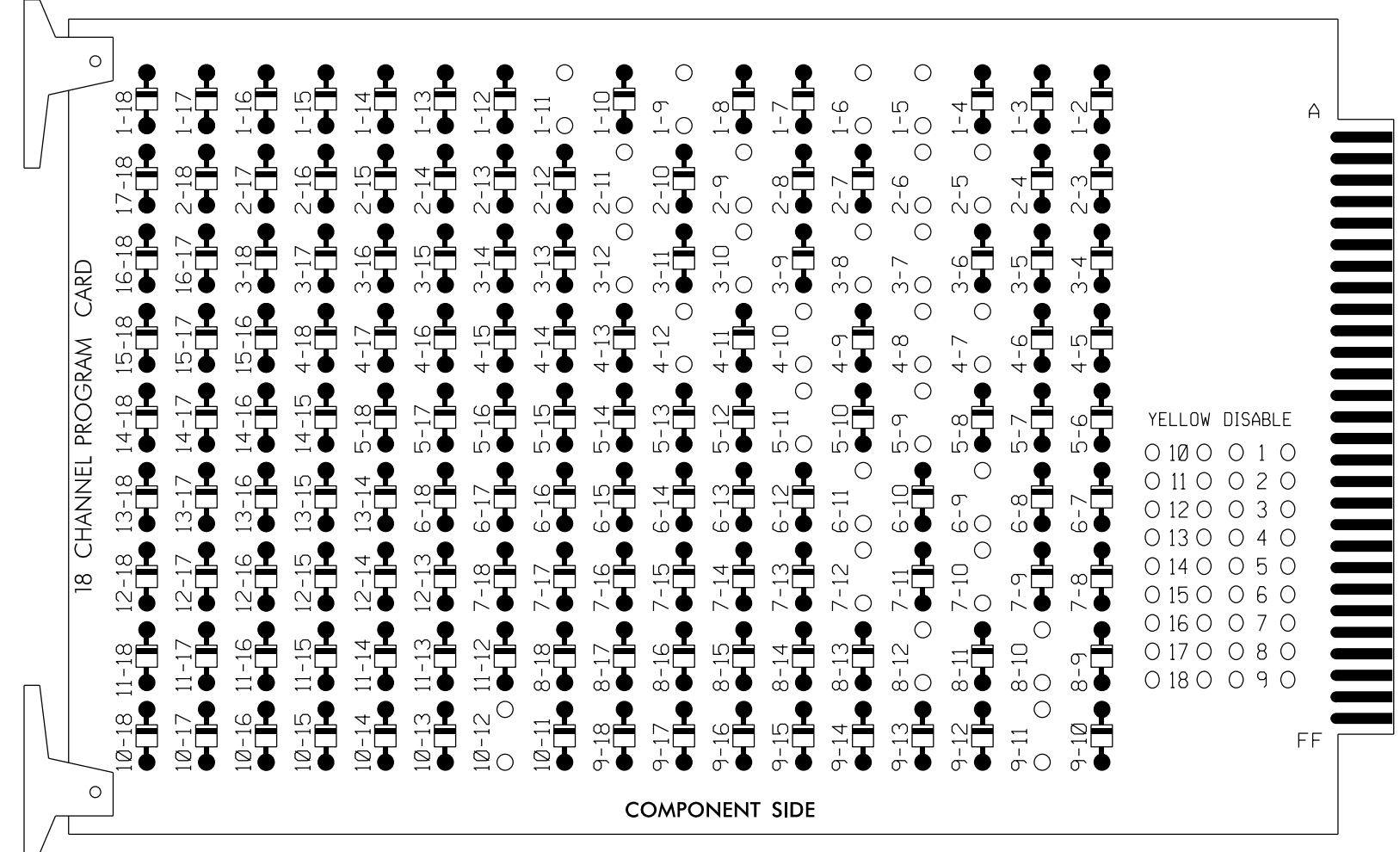


Electrical Detail-Temporary Design 2 (TMP Phase II)-Sheet 3 of 3

| | | | | | | |
|---|--|----------------------------------|----------------------------------|---------------------------|--------------|---|
| <p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: small;">Prepared for the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p> | <p>US 70 (Burlington Road) at SR 3045/2819 (Mt. Hope Church Road)</p> <p>Division 7 Guilford County Greensboro</p> <table style="width: 100%; font-size: x-small;"> <tr> <td>PLAN DATE: September 2019</td> <td>REVIEWED BY: M.L. Stygles</td> </tr> <tr> <td>PREPARED BY: J. Ma</td> <td>REVIEWED BY:</td> </tr> </table> | PLAN DATE: September 2019 | REVIEWED BY: M.L. Stygles | PREPARED BY: J. Ma | REVIEWED BY: | <p style="text-align: center; font-size: x-small;">DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <div style="text-align: center;"> <p style="font-size: x-small;">SEAL 033108 JIANXIN MA ENGINEER</p> </div> <p style="font-size: x-small;">Documented by: Jianxin Ma 9/9/2019 DATE: _____ SIG. INVENTORY NO. 07-0204T2</p> |
| PLAN DATE: September 2019 | REVIEWED BY: M.L. Stygles | | | | | |
| PREPARED BY: J. Ma | REVIEWED BY: | | | | | |

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, 3-10, 3-12, 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.

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 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 S2,AUX S4,AUX S5
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAP "A".....*
 OVERLAP "B".....*
 OVERLAP "C".....*
 OVERLAP "D".....*
 * See overlap programming detail on sheet 2

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 | 21,22 | 31★ | 22 | 41,42 | 51★ | 42 | 61,62 | 71★ | 62 | 81,82 | 11★ | 31★ | 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 | | 126 | | | 117 | | | 132 | | | 123 | | | | A122 | A125 | A115 | A102 |
| FLASHING YELLOW ARROW | | | | | | | | | | | | | | | A123 | A126 | A116 | A103 |
| GREEN ARROW | 127 | 127 | | | 118 | 118 | | 133 | 133 | | 124 | 124 | | | | | | |

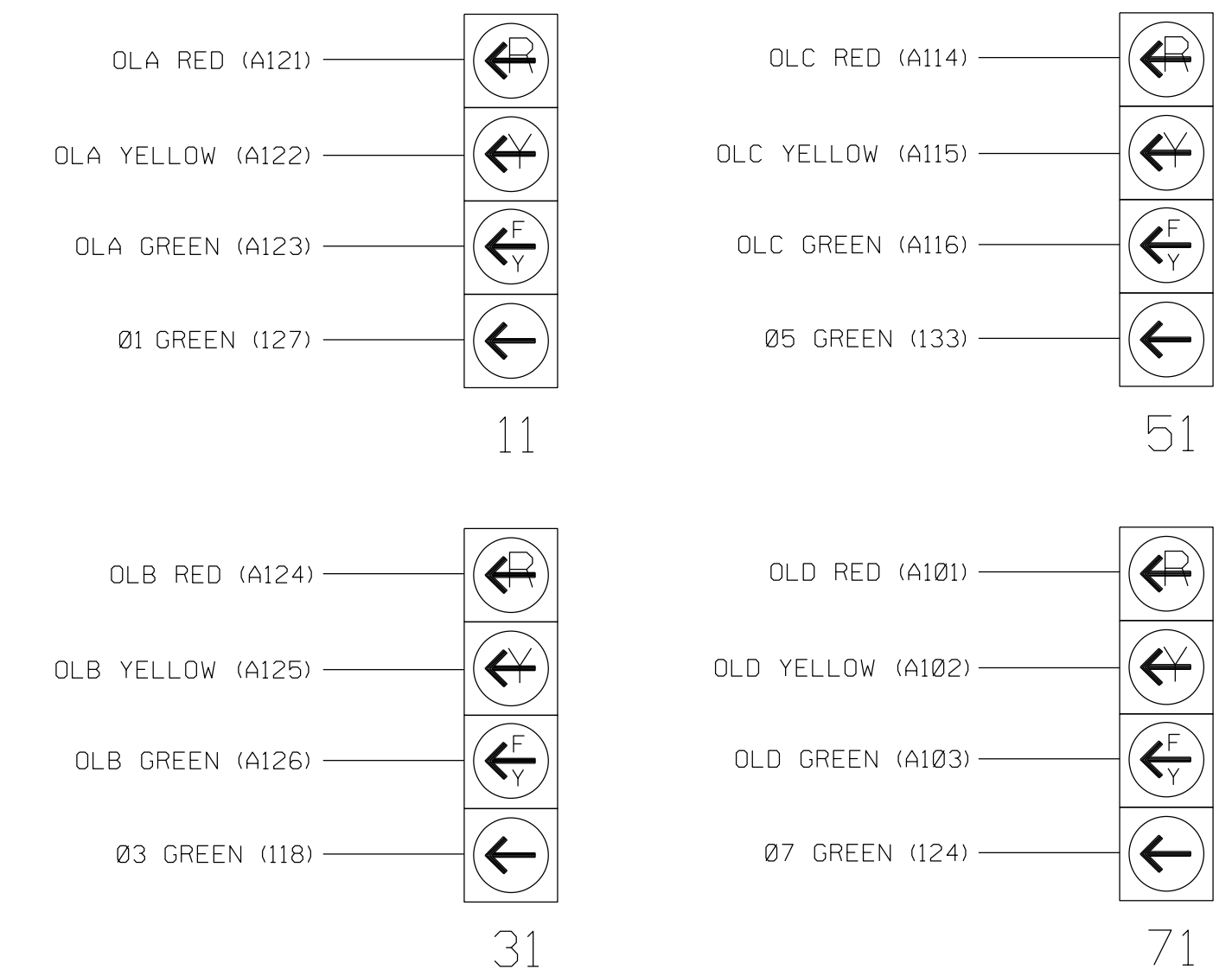
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

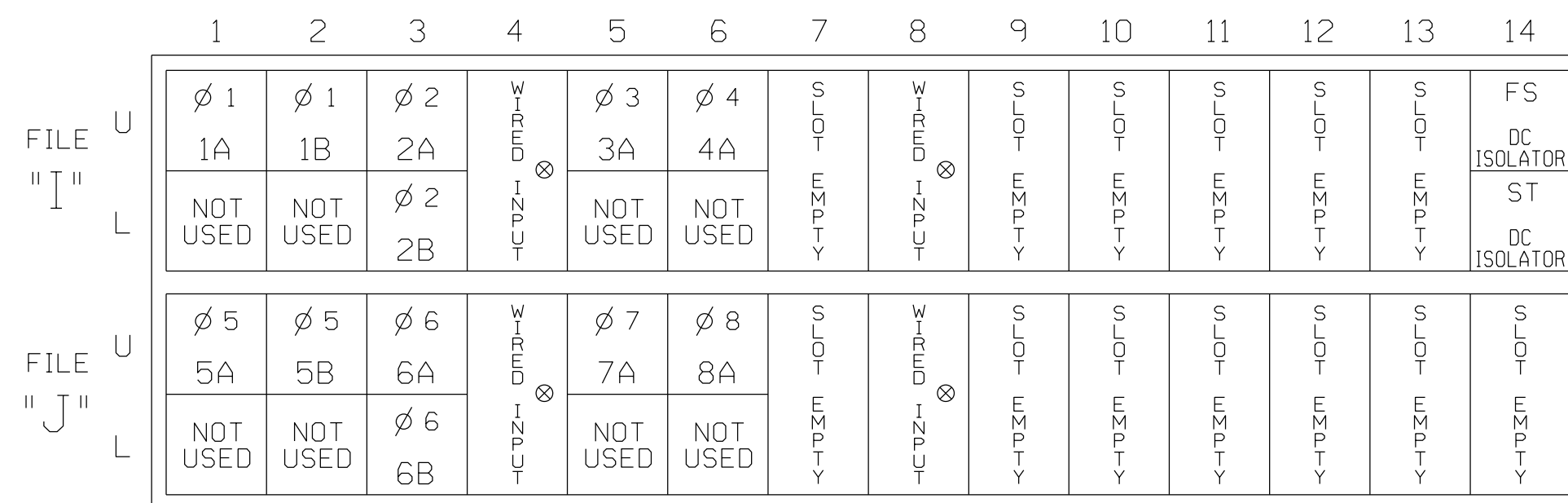
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

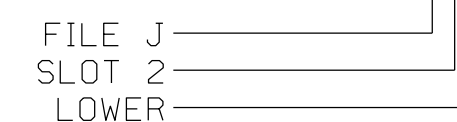
INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND TIME | DELAY TIME | ADDED INITIAL | DETECTOR TYPE |
|-----------------|---------------|-----------------|---------|--------------|------------|------|-------------|------------|---------------|---------------|
| 1A ¹ | TB2-1,2 | I1U | 56 | 1★ | 1 | YES | | 15 | | S |
| | - | J4U | 48 | 26★ | 6 | YES | | 3 | | G |
| 1B | TB2-5,6 | I2U | 39 | 2 | 1 | YES | | 15 | | S |
| 2A | TB2-9,10 | I3U | 63 | 32 | 2 | YES | | | X | N |
| 2B | TB2-11,12 | I3L | 76 | 42 | 2 | YES | | | X | N |
| 3A ² | TB4-5,6 | I5U | 58 | 3★ | 3 | YES | | 15 | | S |
| | - | J8U | 50 | 28★ | 8 | YES | | 3 | | S |
| 4A | TB4-9,10 | I6U | 41 | 4 | 4 | YES | | | | S |
| 5A ³ | TB3-1,2 | J1U | 55 | 5★ | 5 | YES | | 15 | | S |
| | - | I4U | 47 | 22★ | 2 | YES | | 3 | | G |
| 5B | TB3-5,6 | J2U | 40 | 6 | 5 | YES | | 15 | | S |
| 6A | TB3-9,10 | J3U | 64 | 36 | 6 | YES | | | X | N |
| 6B | TB3-11,12 | J3L | 77 | 46 | 6 | YES | | | X | N |
| 7A ⁴ | TB5-5,6 | J5U | 57 | 7★ | 7 | YES | | 15 | | S |
| | - | I8U | 49 | 24★ | 4 | YES | | 3 | | S |
| 8A | TB5-9,10 | J6U | 42 | 8 | 8 | YES | | | | S |

- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from I5-W to J8-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.

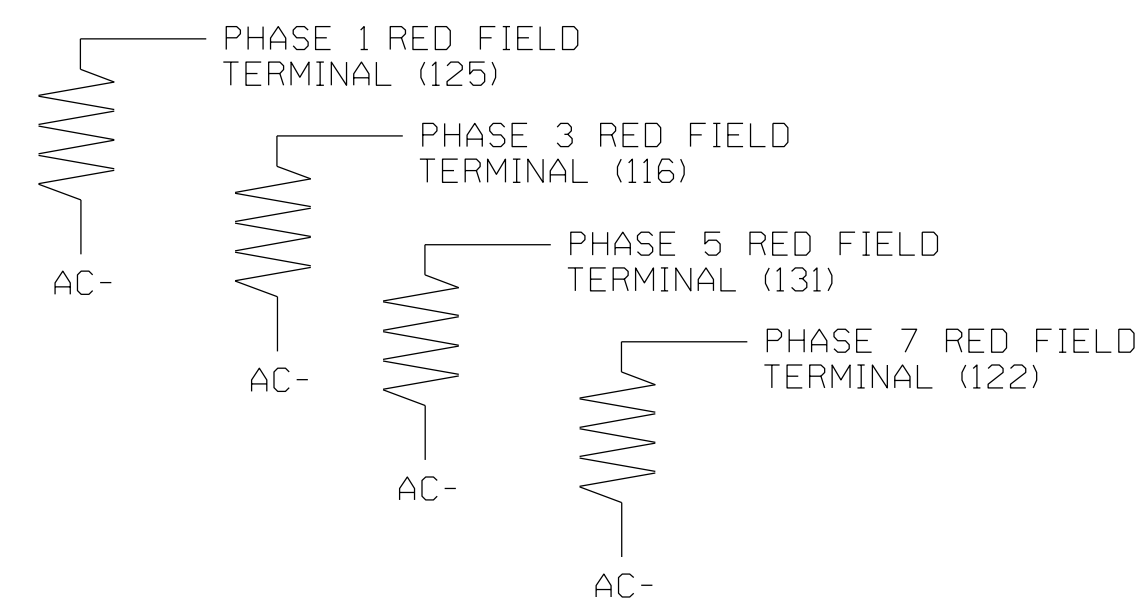
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet(s) x.

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

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



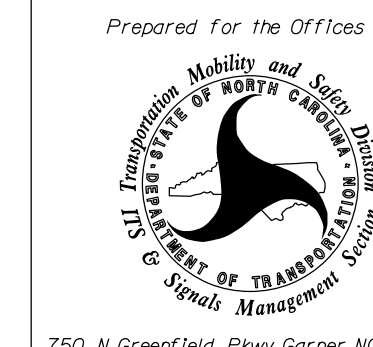
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0204
 DESIGNED: September 2019
 SEALED: 09/09/2019
 REVISED: N/A

Electrical Detail-Final Design-Sheet 1 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 70 (Burlington Road)

at
 SR 3045/2819
 (Mt. Hope Church Road)



750 N. Greenfield Pkwy, Garner, NC 27529

Division 7 Guilford County Greensboro

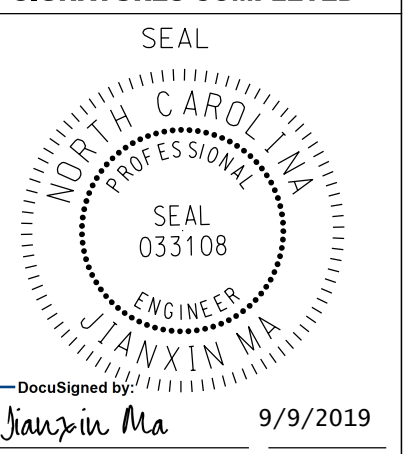
PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

REVISIONS INIT. DATE



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



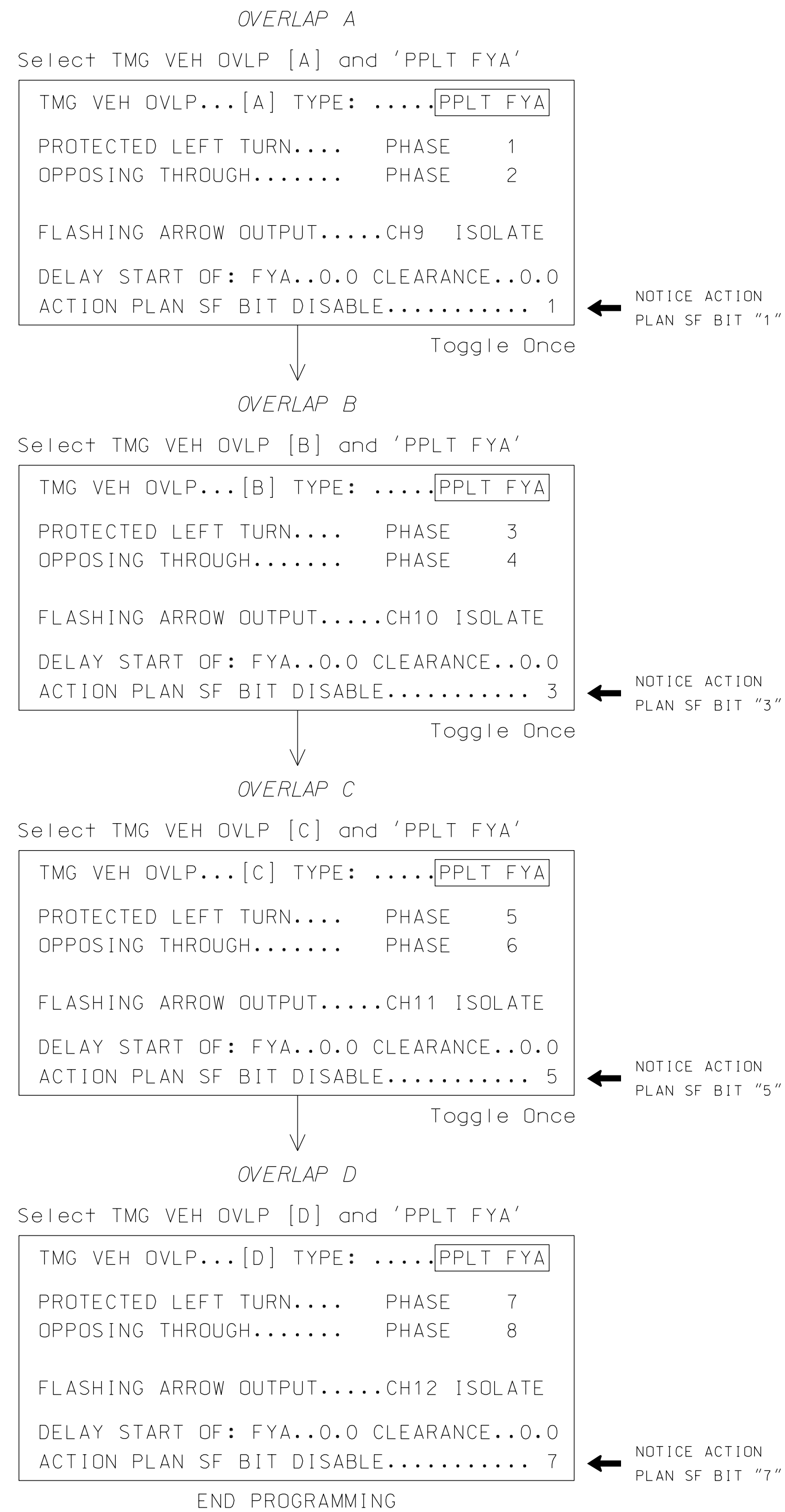
DocuSign 9/9/2019

SIG. INVENTORY NO. 07-0204

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS



FLASHER CIRCUIT MODIFICATION DETAIL

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

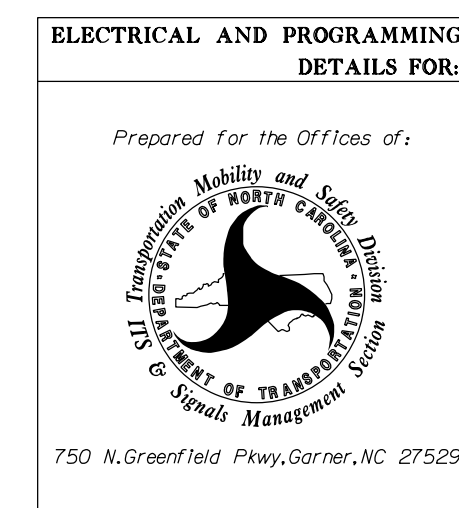
1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0204
 DESIGNED: September 2019
 SEALED: 09/09/2019
 REVISED: N/A



Electrical Detail-Final Design-Sheet 2 of 4



| | | |
|--------------------------------|---------------------------|------------|
| US 70 (Burlington Road) | | |
| at | | |
| SR 3045/2819 | | |
| (Mt. Hope Church Road) | | |
| Division 7 | Guilford County | Greensboro |
| PLAN DATE: September 2019 | REVIEWED BY: M.L. Stygles | |
| PREPARED BY: J. Ma | REVIEWED BY: | |
| REVISIONS | INIT. | DATE |
| | | |
| | | |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

NORTH CAROLINA
PROFESSIONAL ENGINEERS
SEAL
033108
J. MA

DocuSigned by: **J. Ma** 9/9/2019
DATE
SIG. INVENTORY NO. 07-0204

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A, 3A, 7A

(program controller as shown)

IMPORTANT!

Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

- From Main Menu select **8. UTILITIES**
- From UTILITIES Submenu select **1. COPY/CLEAR**
- Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

```

COPY / CLEAR UTILITY
FROM          TO
PHASE TIMING... > PHASE TIMING...
TIMING PLAN... > TIMING PLAN...
PH DET OPT PLAN. > PH DET OPT PLAN.
DETECTOR PLAN... 1 > DETECTOR PLAN... 2
TOGGLE TO SELECT A "FROM" AND A "TO"
THEN PRESS ENTER
    
```

- From Main Menu select **6. DETECTORS**
- From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
- Place cursor in VEH DET PLAN [] position and enter "2".

- Place cursor in VEH DETECTOR [] position and enter "1".
- Set delay time to "0".

```

VEH DETECTOR [ 1]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
1 1
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

- Place cursor in VEH DETECTOR [] position and enter "26".
- Set assigned phase to "0".

```

VEH DETECTOR [26]  VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
26 0
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

- Place cursor in VEH DETECTOR [] position and enter "5".
- Set delay time to "0".

```

VEH DETECTOR [ 5]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
5 5
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

- Place cursor in VEH DETECTOR [] position and enter "22".
- Set assigned phase to "0".

```

VEH DETECTOR [22]  VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
22 0
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

- Place cursor in VEH DETECTOR [] position and enter "3".
- Set delay time to "0".

```

VEH DETECTOR [ 3]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
3 3
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

- Place cursor in VEH DETECTOR [] position and enter "28".
- Set assigned phase to "0".

```

VEH DETECTOR [28]  VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
28 0
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

- Place cursor in VEH DETECTOR [] position and enter "7".
- Set delay time to "0".

```

VEH DETECTOR [ 7]  VEH DET PLAN [ 2]
TYPE: S-STANDARD
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
7 7
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

- Place cursor in VEH DETECTOR [] position and enter "24".
- Set assigned phase to "0".

```

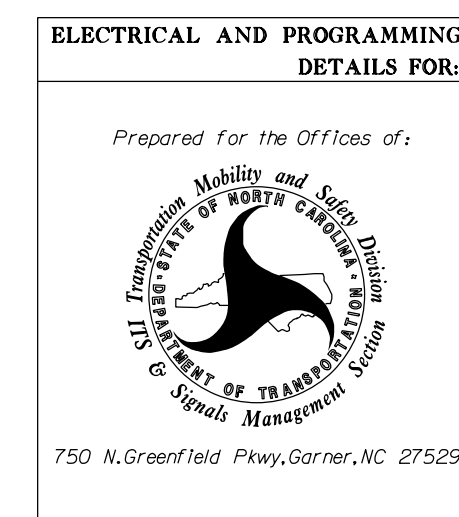
VEH DETECTOR [24]  VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
24 0
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
    
```

END PROGRAMMING



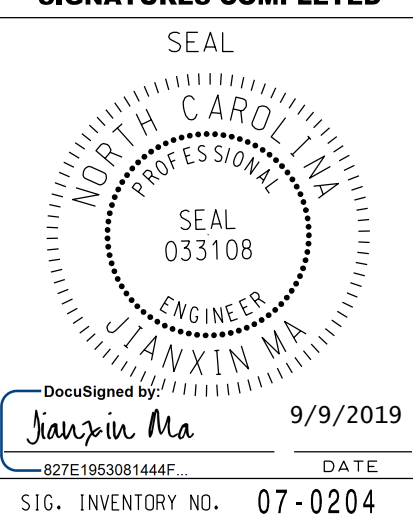
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
P: 919-829-0328

Electrical Detail-Final Design-Sheet 3 of 4



| | | |
|---|---------------------------|------------|
| ELECTRICAL AND PROGRAMMING DETAILS FOR: | | |
| US 70 (Burlington Road) at SR 3045/2819 (Mt. Hope Church Road) | | |
| Division 7 | Guilford County | Greensboro |
| PLAN DATE: September 2019 | REVIEWED BY: M.L. Stygles | |
| PREPARED BY: J. Ma | REVIEWED BY: | |
| REVISIONS | INIT. | DATE |
| | | |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0204
DESIGNED: September 2019
SEALED: 09/09/2019
REVISED: N/A

DocuSigned by: J. Ma
9/9/2019
DATE
SIG. INVENTORY NO. 07-0204

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1, 3, 5, and 7.

| PHASING | VEH DET PLAN | SF BITS ENABLED |
|--|--------------|-----------------|
| ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u> | 1 | NONE |
| ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u> | 2 | 1, 3, 5, 7 |

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1, 3, 5, AND 7 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

- SF BITS 1,3,5,7: Modifies overlap parent phases for heads 11, 31, 51, and 71 to run protected turns only.
- VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 8 call on loop 3A and reduces delay time for phase 3 call on loop 3A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

Disables phase 4 call on loop 7A and reduces delay time for phase 7 call on loop 7A to 3 seconds.

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

```

ACTION PLAN...[ 1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --   RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY NO

  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  X  .  X  .  X  .  X  .  X  .  (1-8)
AUX FCT  .  .  .  (1-3)

  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
LP 1-15  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 16-30 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 31-45 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 46-60 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 61-75 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 76-90 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
LP 91-100 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .

```

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0204
DESIGNED: September 2019
SEALED: 09/09/2019
REVISED: N/A

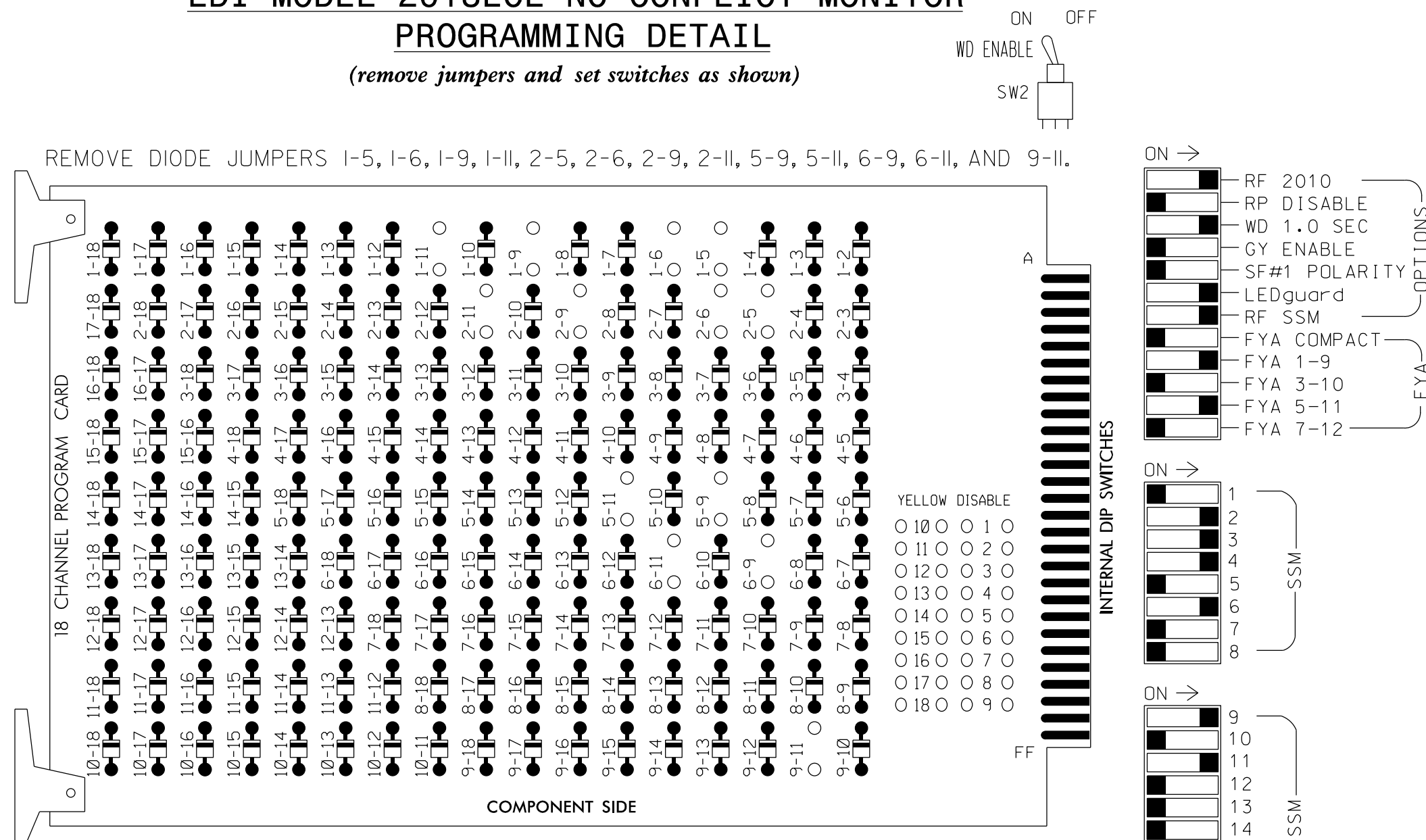


Electrical Detail-Final Design-Sheet 4 of 4

| <p style="font-size: 8px;">750 N. Greenfield Pkwy, Garner, NC 27529</p> | <p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p>US 70 (Burlington Road) at SR 3045/2819 (Mt. Hope Church Road)</p> <p>Division 7 Guilford County Greensboro</p> <p>PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles</p> <p>PREPARED BY: J. Ma REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> | REVISIONS | INIT. | DATE | | | | | | | | | | <p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p style="font-size: 8px;">SEAL NORTH CAROLINA PROFESSIONAL ENGINEERS SEAL 033108 JIAN XIN MA</p> <p style="font-size: 8px;">DocuSigned by: <i>Jianxin Ma</i> 827E1953081644F 9/9/2019 DATE</p> <p style="font-size: 8px;">SIG. INVENTORY NO. 07-0204</p> |
|---|--|-----------|-------|------|--|--|--|--|--|--|--|--|--|--|
| REVISIONS | INIT. | DATE | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

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 controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the US 70 (Burlington Road) Closed Loop system.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,
 AUX S1,AUX S4
 PHASES USED.....1,2,3,4,5,6
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail on sheet 2

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 | |
|-----------------------|-------|-------|-------|-----------|-----|-------|----|-----|-------|-----|-------|-------|--------|--------|--------|--------|--------|--------|----|
| CNU 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 | 31, 32,33 | 22 | 41 | 42 | 62 | NU | 51* | 61,62 | NU | NU | NU | NU | 11* | NU | 51* | NU |
| RED | 128 | | 116 | 116 | 101 | 101 | | | | | 134 | | | | | | | | |
| YELLOW | * 129 | | 117 | 117 | 102 | 102 | | | | * | 135 | | | | | | | | |
| GREEN | | 130 | 118 | 118 | 103 | 103 | | | | | 136 | | | | | | | | |
| RED ARROW | | | | | | | | | | | | | | | | A121 | | A114 | |
| YELLOW ARROW | | | | | 117 | | | 102 | | | | | | | | A122 | | A115 | |
| FLASHING YELLOW ARROW | | | | | | | | | | | | | | | | A123 | | A116 | |
| GREEN ARROW | 127 | | 118 | 118 | 103 | 103 | | 133 | | | | | | | | | | | |

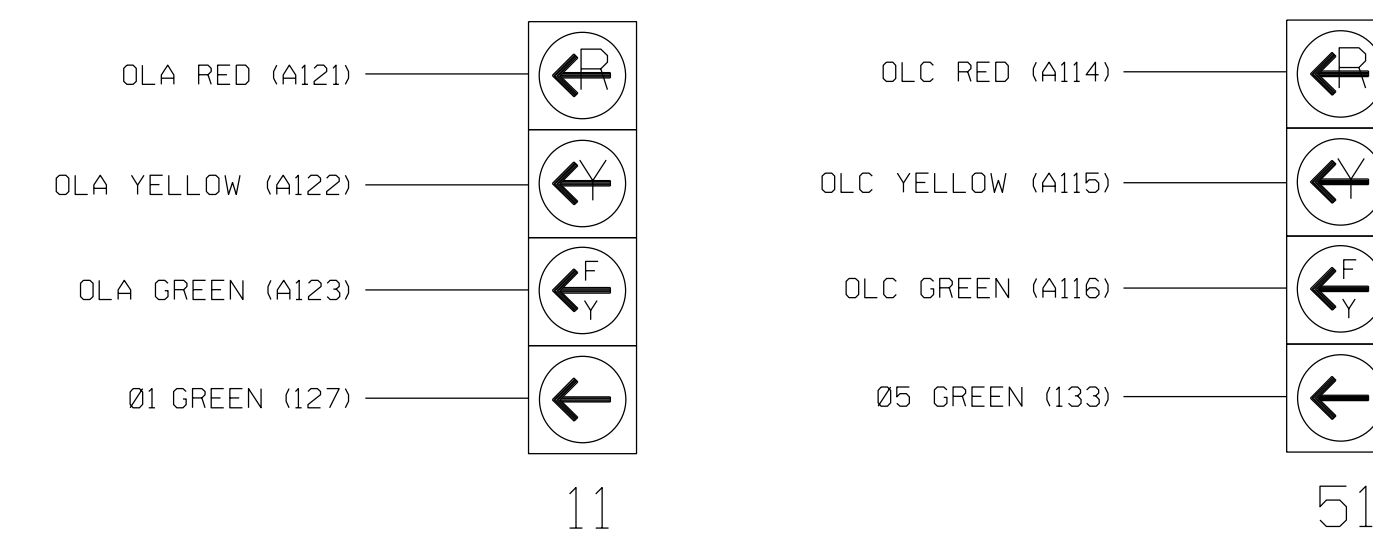
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

| FILE "I" | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|----------|-----------|------------------|------------------|-----------|-----------|------------------|-----------|-----------|-----------|-------------|-------------|-------------|-------------|-------------|
| FILE "I" | Ø 1 1A | Ø 2/SYS 2A/S7 | Ø 3/SYS 3A/S8 | Ø 4 4A | Ø 5 5A | Ø 6/SYS 6A/S5 | Ø 7 7A | Ø 8 8A | Ø 9 9A | Ø 10 10A | Ø 11 11A | Ø 12 12A | Ø 13 13A | Ø 14 14A |
| FILE "J" | NOT USED | Ø 2/SYS 2B/S8 | Ø 3/SYS 3B/S6 | NOT USED | Ø 5 5A | Ø 6/SYS 6B/S6 | Ø 3 3A | Ø 3 3C | Ø 4 4A | Ø 5 5A | Ø 6 6A | Ø 7 7A | Ø 8 8A | Ø 9 9A |

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

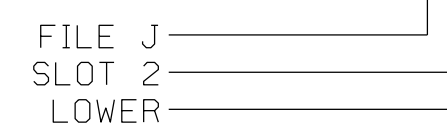
| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND TIME | DELAY TIME | ADDED INITIAL | DETECTOR TYPE |
|-----------------|---------------|-----------------|---------|--------------|------------|------|-------------|------------|---------------|---------------|
| 1A ¹ | TB2-1,2 | I1U | 56 | 1 ★ | 1 | YES | | 15 | | S |
| | - | J4U | 48 | 26 ★ | 6 | YES | | 3 | | G |
| 2A/S7 | TB2-5,6 | I2U | 39 | 2 | 2/SYS | YES | | | X | N |
| 2B/S8 | TB2-7,8 | I2L | 43 | 12 | 2/SYS | YES | | | X | N |
| 3A | TB5-9,10 | J6U | 42 | 8 | 3 | YES | | | | S |
| 3B | TB5-11,12 | J6L | 46 | 18 | 3 | YES | | 5 | | S |
| 3C | TB7-1,2 | J7U | 66 | 38 | 3 | YES | | 15 | | S |
| 4A | TB4-9,10 | I6U | 41 | 4 | 4 | YES | | 5 | | S |
| 5A ² | TB3-1,2 | J1U | 55 | 5 ★ | 5 | YES | | 15 | | S |
| | - | I4U | 47 | 22 ★ | 2 | YES | | 3 | | G |
| 6A/S5 | TB3-5,6 | J2U | 40 | 6 | 6/SYS | YES | | | X | N |
| 6B/S6 | TB3-7,8 | J2L | 44 | 16 | 6/SYS | YES | | | X | N |

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

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

★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

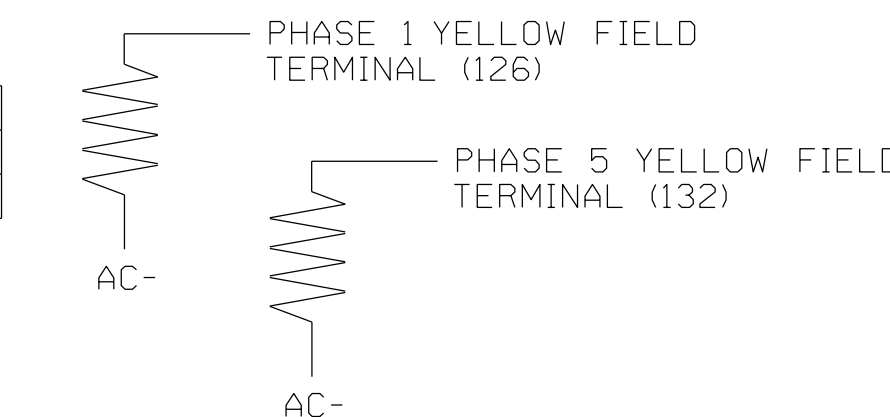
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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

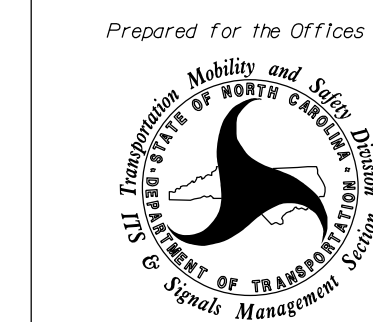


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1859
 DESIGNED: September 2019
 SEALED: 09/09/2019
 REVISED: N/A

Electrical Detail-Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 70 (Burlington Road)
 at
 Publix and Ashton Place



750 N. Greenfield Pkwy, Garner, NC 27529

Division 7 Guilford County McLeansville
 PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles
 PREPARED BY: J. Ma REVIEWED BY:

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



VHB Engineering NC, P.C. (C-3705)
 940 Main Campus Drive, Suite 500
 Raleigh, NC 27606
 P: 919-829-0328

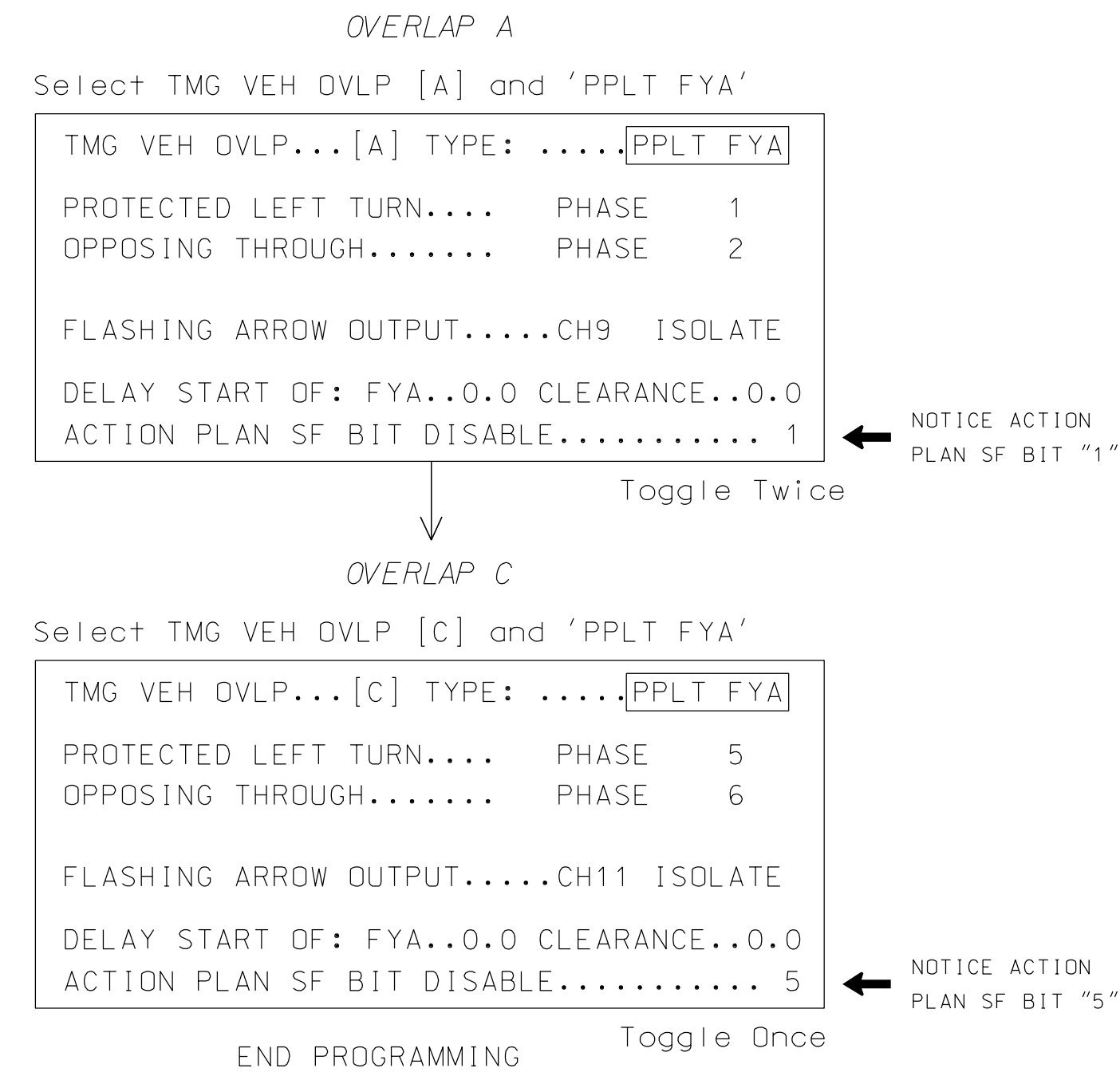
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 033108
 J. Ma
 9/9/2019
 8274653081444E
 DATE
 SIG. INVENTORY NO. 07-1859

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS



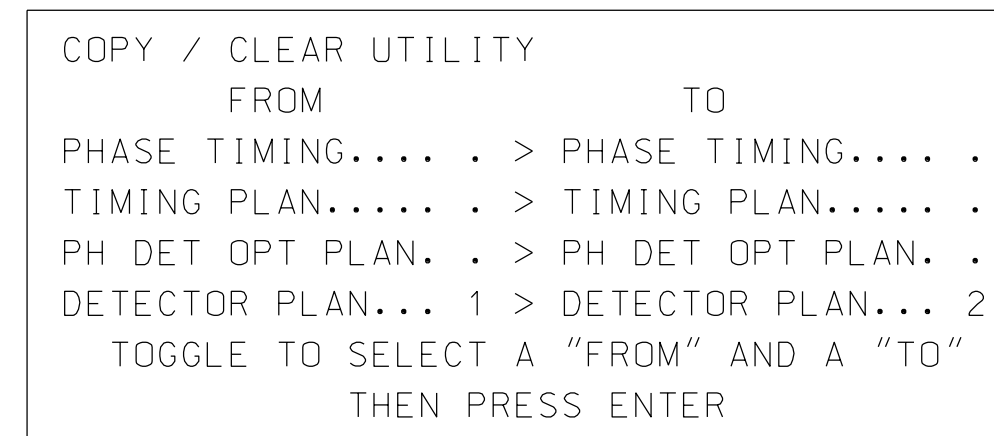
ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A

(program controller as shown)

IMPORTANT!

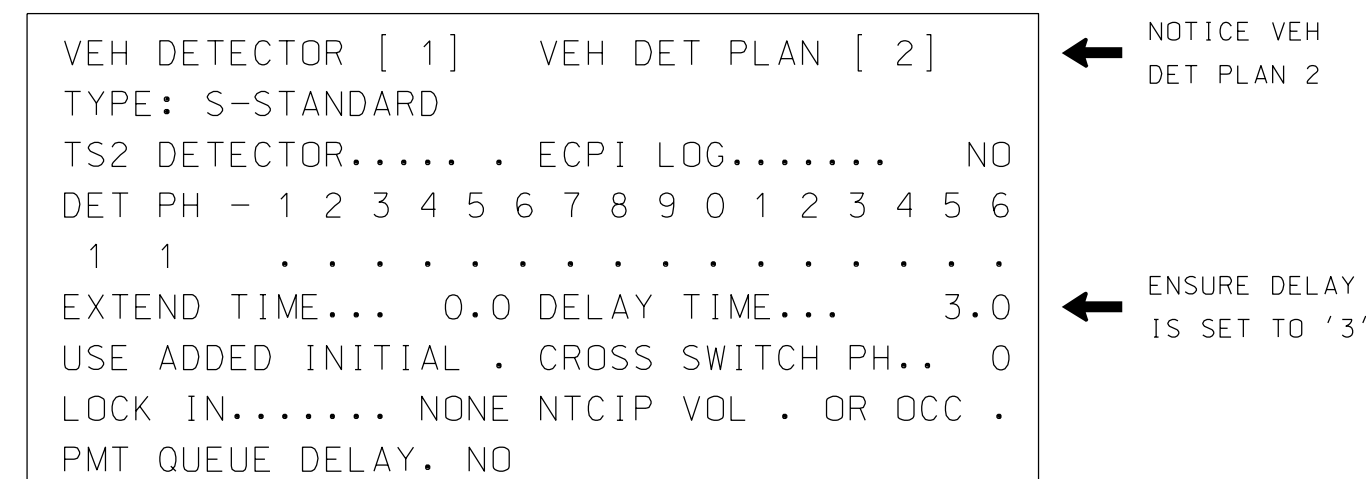
Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select 8. UTILITIES
2. From UTILITIES Submenu select 1. COPY/CLEAR
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

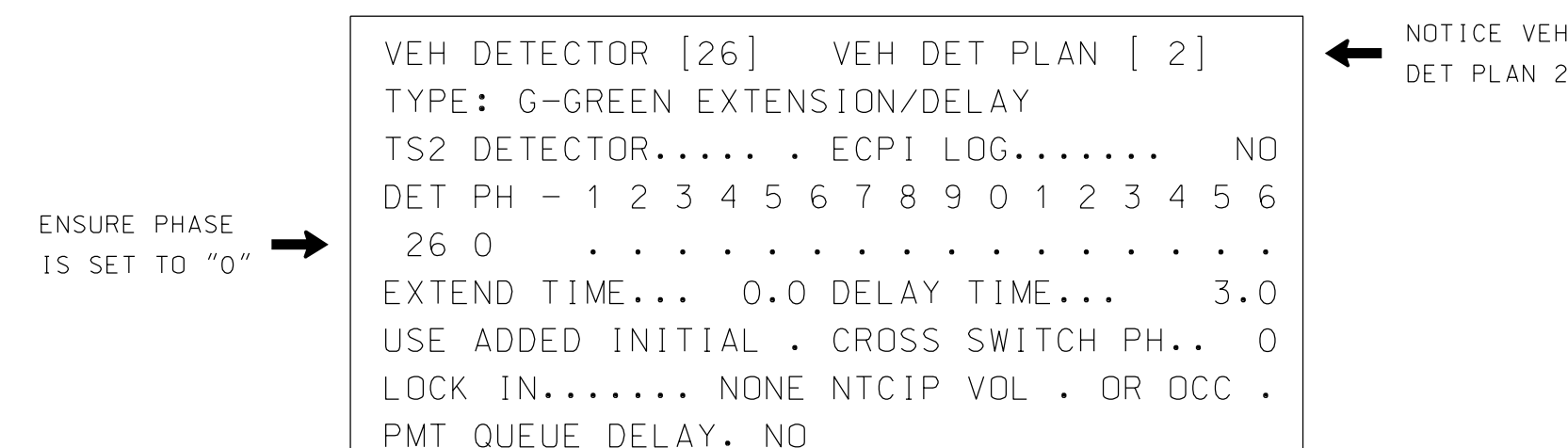


4. From Main Menu select 6. DETECTORS
5. From DETECTOR Submenu select 2. VEHICLE DETECTOR SETUP
6. Place cursor in VEH DET PLAN [] position and enter "2".

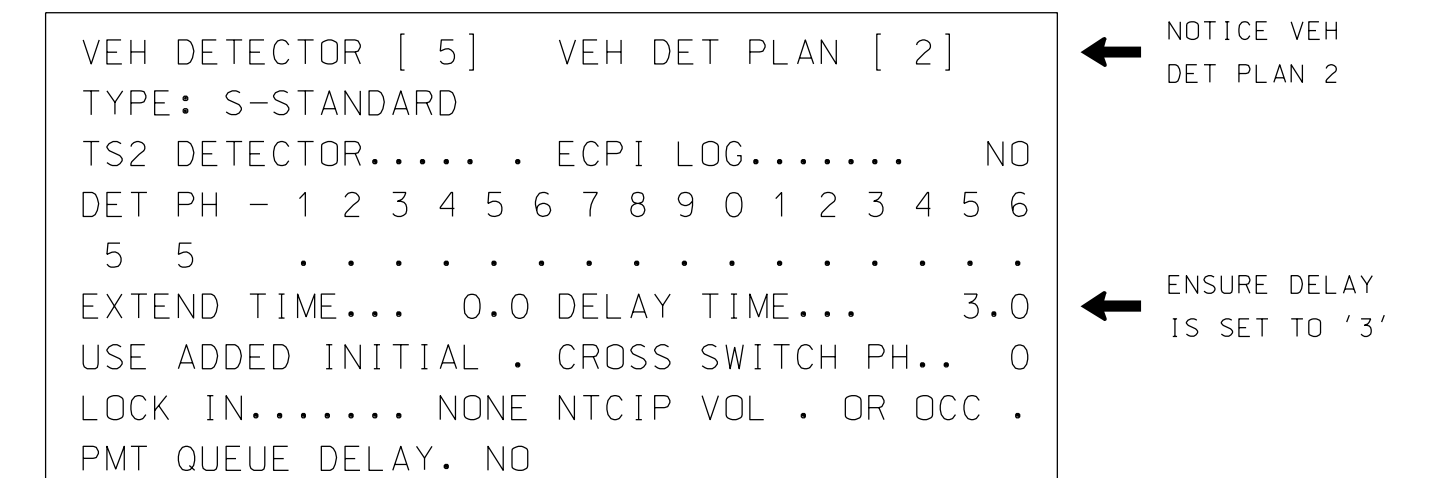
- Place cursor in VEH DETECTOR [] position and enter "1".
- Set delay time to "3".



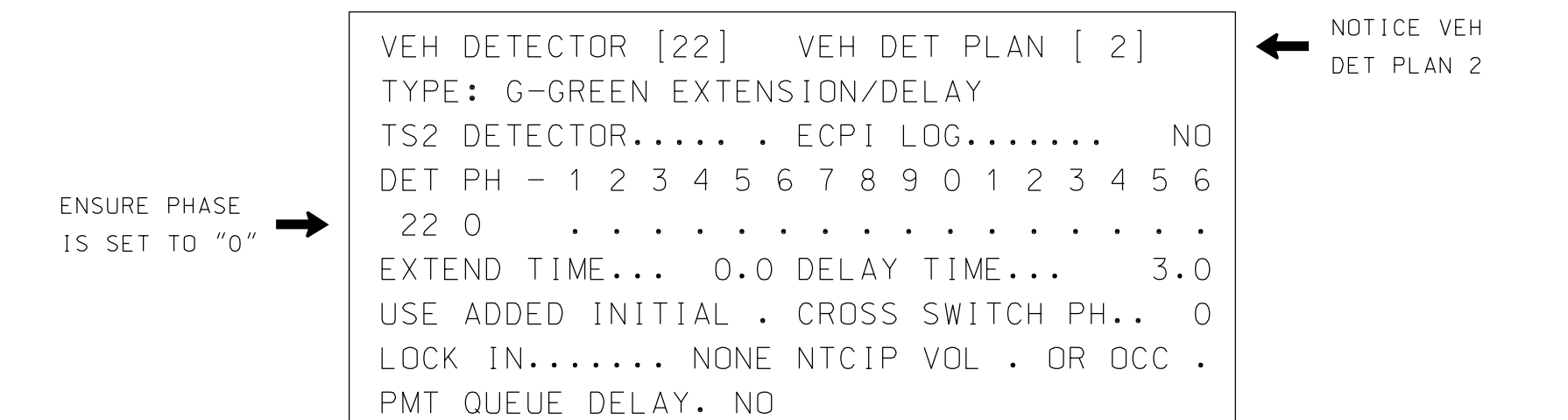
- Place cursor in VEH DETECTOR [] position and enter "26".
- Set assigned phase to "0".



- Place cursor in VEH DETECTOR [] position and enter "5".
- Set delay time to "3".



- Place cursor in VEH DETECTOR [] position and enter "22".
- Set assigned phase to "0".



END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-1859
 DESIGNED: September 2019
 SEALED: 09/09/2019
 REVISED: N/A



Electrical Detail-Sheet 2 of 3

| ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529 | US 70 (Burlington Road) at Publix and Ashton Place Division 7 Guilford County McLeansville PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles PREPARED BY: J. Ma REVIEWED BY: | SEAL SEAL 033108 J. Ma 9/9/2019 DATE SIG. INVENTORY NO. 07-1859 | | | | | | |
|--|--|---|------|--|--|--|--|--|
| <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 | | | | | |
| REVISIONS | INIT. | DATE | | | | | | |
| | | | | | | | | |

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

| | |
|-----------------------|---------------------------------|
| ACTION PLAN...[1] | |
| PATTERN.....AUTO | SYS OVERRIDE.... NO |
| TIMING PLAN..... 0 | SEQUENCE..... 0 |
| VEH DETECTOR PLAN.. 2 | DET LOG.....NONE |
| FLASH..... -- | RED REST..... NO |
| VEH DET DIAG PLN... 0 | PED DET DIAG PLN..0 |
| DIMMING ENABLE.. NO | PRIORITY RETURN. NO |
| PED PR RETURN.. NO | QUEUE DELAY..... NO |
| PMT COND DELAY NO | |
| PHASE | 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 |
| PED RCL | |
| WALK 2 | |
| VEX 2 | |
| VEH RCL | |
| MAX RCL | |
| MAX 2 | |
| PHASE | 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 |
| MAX 3 | |
| CS INH | |
| OMIT | |
| SPC FCT | X . . . X . . . (1-8) |
| AUX FCT | . . . (1-3) |
| | 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 |
| LP 1-15 | |
| LP 16-30 | |
| LP 31-45 | |
| LP 46-60 | |
| LP 61-75 | |
| LP 76-90 | |
| LP 91-100 | |

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 AND 5.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 AND 5.

| PHASING | VEH DET PLAN | SF BITS ENABLED |
|--|--------------|-----------------|
| ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u> | 1 | NONE |
| ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u> | 2 | 1, 5 |

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1 AND 5 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

- SF BITS 1,5: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.
- VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

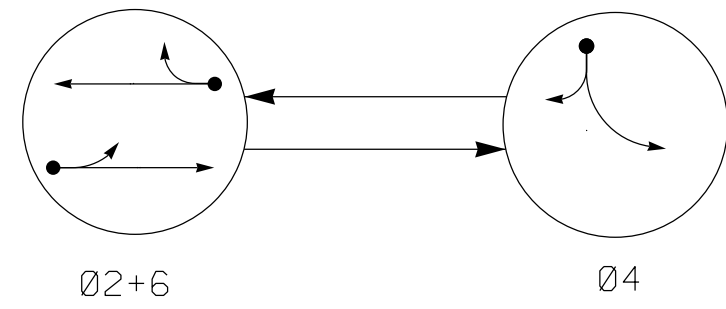
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1859
DESIGNED: September 2019
SEALED: 09/09/2019
REVISED: N/A



Electrical Detail-Sheet 3 of 3

| | | |
|--|--|--|
| ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529 | US 70 (Burlington Road) at Publix and Ashton Place Division 7 Guilford County McLeansville PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles PREPARED BY: J. Ma REVIEWED BY: | DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL SEAL 033108 J. Ma 9/9/2019 827E1953081444F DATE SIG. INVENTORY NO. 07-1859 |
|--|--|--|

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

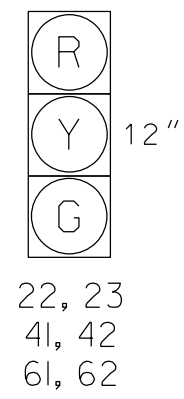
- ← DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- ← - - - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

| SIGNAL FACE | PHASE | | |
|-------------|-------|----|-------|
| | Ø2+6 | Ø4 | FLASH |
| 22, 23 | G | R | Y |
| 41, 42 | R | G | R |
| 61, 62 | G | R | Y |

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

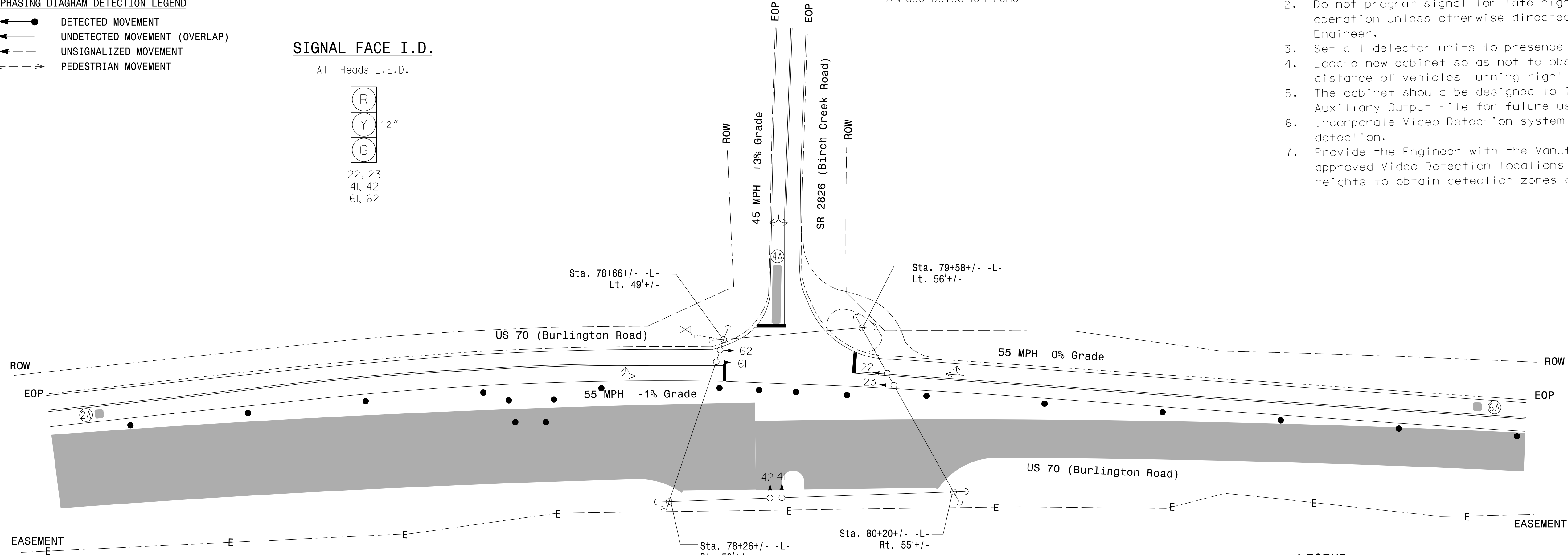
| ZONE | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | PROGRAMMING | | | | | | | |
|------|-----------|----------------------------|-------|----------|-------------|---------|-------------|------------|-------------------|------|-------------|----------|
| | | | | | PHASE | CALLING | EXTEND TIME | DELAY TIME | USE ADDED INITIAL | TYPE | SYSTEM LOOP | NEW CARD |
| 2A* | 6X6 | 420 | * | * | 2 | Yes | - | - | X | N | - | - |
| 4A* | 6X40 | 0 | * | * | 4 | Yes | - | 5 | - | S | - | - |
| 6A* | 6X6 | 420 | * | * | 6 | Yes | - | - | X | N | - | - |

* Video Detection Zone

2 Phase Fully Actuated (Isolated)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red. The cabinet should be designed to include an Auxiliary Output File for future use.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.



ASC/3 TIMING CHART

| FEATURE | PHASE | | |
|-------------------------|------------|-----|------------|
| | 2 | 4 | 6 |
| Min Green * | 14 | 7 | 14 |
| Walk * | - | - | - |
| Ped Clear | - | - | - |
| Veh. Extension * | 6.0 | 2.0 | 6.0 |
| Max 1 * | 90 | 30 | 90 |
| Yellow | 5.3 | 3.0 | 5.2 |
| Red Clear | 1.0 | 1.6 | 1.0 |
| Actuations B4 Add * | - | - | - |
| Seconds / Actuation * | 2.5 | - | 2.5 |
| Max Initial * | 46 | - | 46 |
| Time Before Reduction * | 15 | - | 15 |
| Time To Reduce * | 30 | - | 30 |
| Minimum Gap | 3.4 | - | 3.4 |
| Locking Detector | X | - | X |
| Recall Position | VEH RECALL | - | VEH RECALL |
| Dual Entry | - | - | - |
| Simultaneous Gap | X | X | X |

* 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 |
|----------|----------|
| ○ → | ● → |
| ● → | N/A |
| — | — |
| □ | □ |
| ○ → | ● → |
| ○ → | ● → |
| □ | □ |
| □ | □ |
| — | — |
| N/A | — |
| → | → |
| — | N/A |
| — | N/A |
| ● | N/A |



Signal Upgrade-Temporary Design 1 (TMP Phase I)

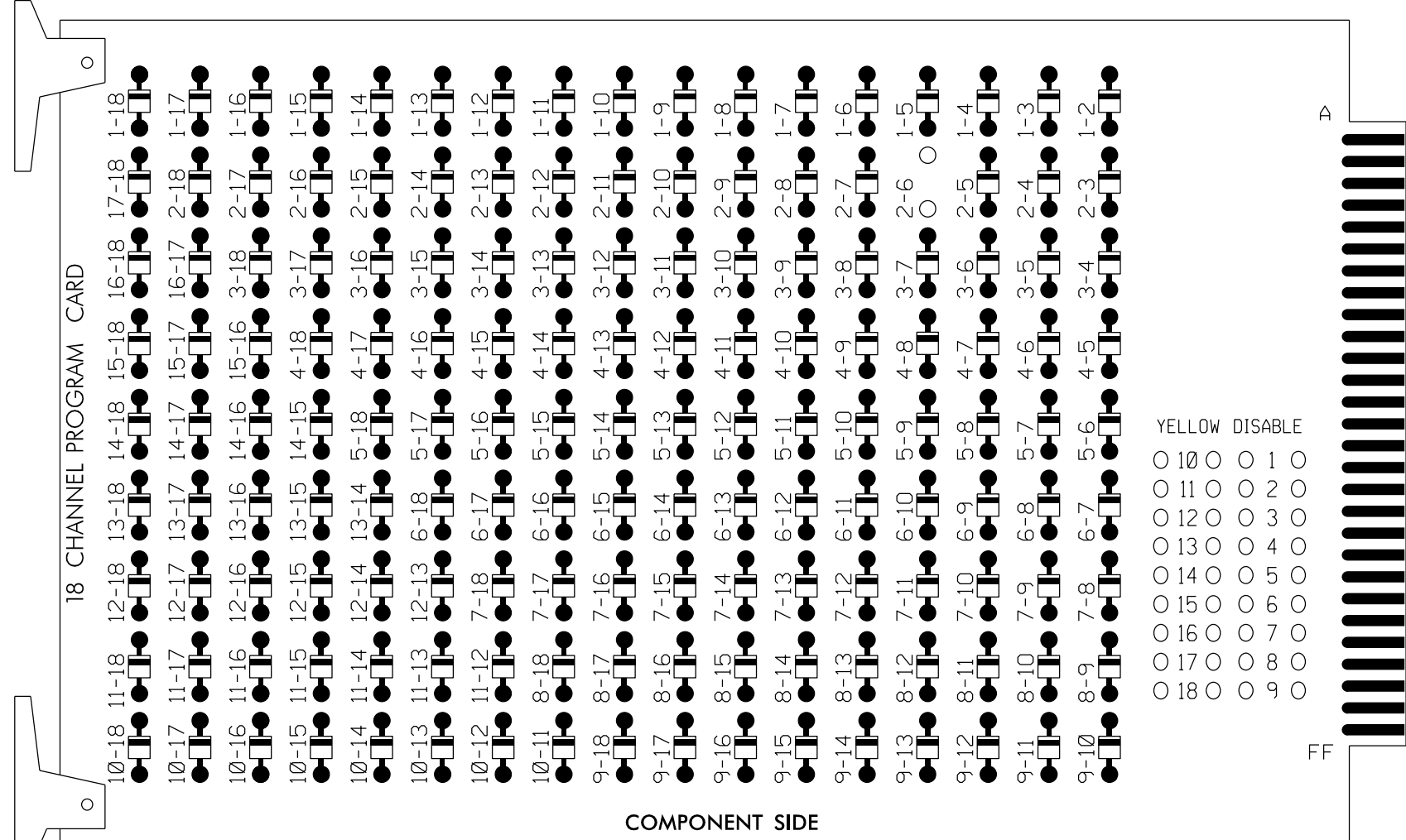
| | | | |
|--|---|------------------------------------|--|
| | <p>US 70 (Burlington Road) at SR 2826 (Birch Creek Road)</p> | | <p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER J. Ma 033108 9/9/2019</p> |
| | <p>Division 7 Guilford County McLeansville</p> <p>PLAN DATE: September 2019 REVIEWED BY: M. L. Stygles</p> <p>PREPARED BY: J. Ma REVIEWED BY:</p> | <p>REVISIONS</p> <p>INIT. DATE</p> | |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 Green and 6 Green.

SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------------|----|-------|-------|----|-------|-------|----|-------|-------|-----|-----|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO. | 1 | 2 | 13 | 3 | 4 | 14 | 5 | 6 | 15 | 7 | 8 | 16 | 9 | 10 | 17 | 11 | 12 | 18 |
| PHASE | 1 | 2 | 2 PED | 3 | 4 | 4 PED | 5 | 6 | 6 PED | 7 | 8 | 8 PED | OLA | OLB | SPARE | OLC | OLD | SPARE |
| SIGNAL HEAD NO. | NU | 22,23 | NU | NU | 41,42 | NU | NU | 61,62 | NU | NU | NU | NU | NU | NU | NU | NU | NU | NU |
| RED | | 128 | | | 101 | | | 134 | | | | | | | | | | |
| YELLOW | | 129 | | | 102 | | | 135 | | | | | | | | | | |
| GREEN | | 130 | | | 103 | | | 136 | | | | | | | | | | |
| RED ARROW | | | | | | | | | | | | | | | | | | |
| YELLOW ARROW | | | | | | | | | | | | | | | | | | |
| FLASHING YELLOW ARROW | | | | | | | | | | | | | | | | | | |
| GREEN ARROW | | | | | | | | | | | | | | | | | | |

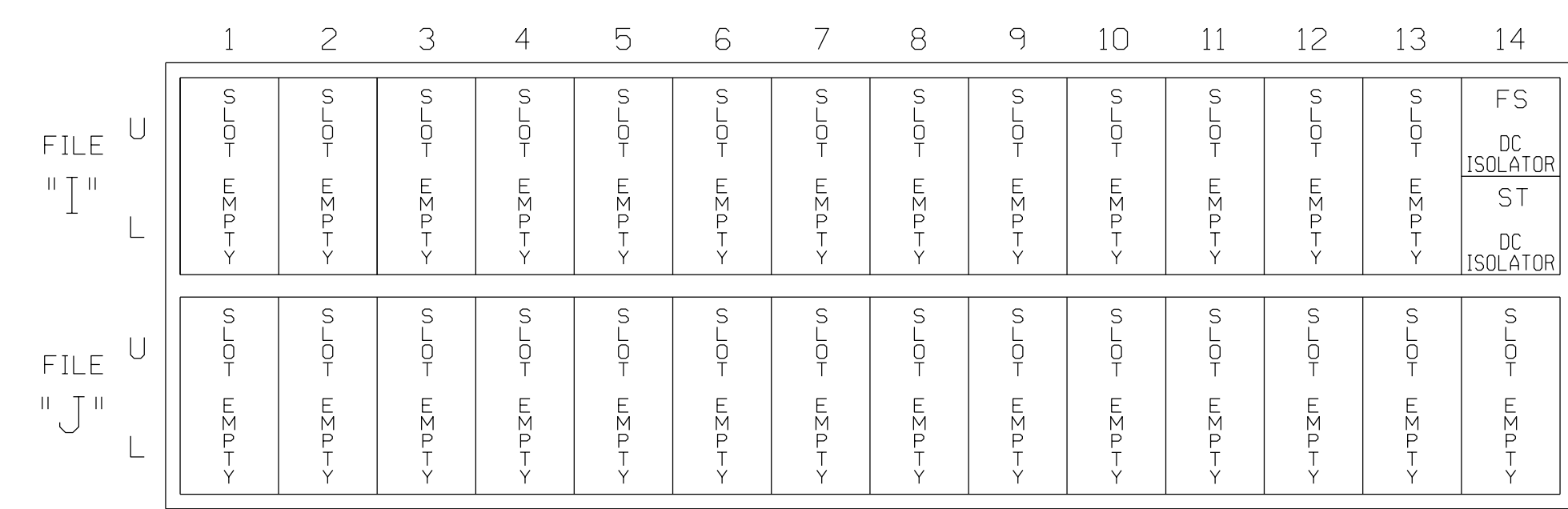
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5,S8
 PHASES USED.....2,4,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

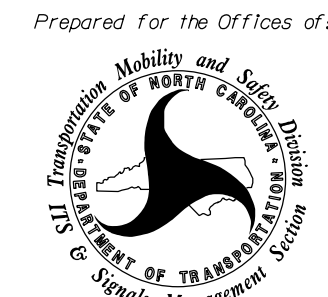
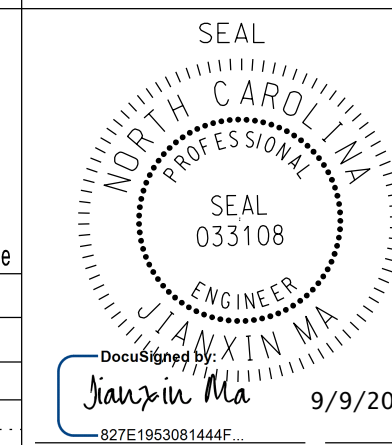
SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-1708T1
 DESIGNED: September 2019
 SEALED: 09/09/2019
 REVISED:

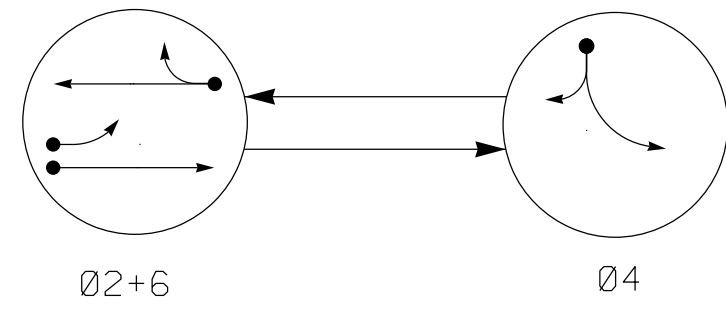


Electrical Detail-Temporary Design 1 (TMP Phase I)

| | | | |
|--|--|--|---|
| ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529 | US 70 (Burlington Rd) at SR 2826 (Birch Creek Rd) | | SEAL  SEAL 033108 J. Ma 9/9/2019 |
| | Division 7 PLAN DATE: September 2019 PREPARED BY: J. Ma | Guilford County REVIEWED BY: M.L. Stygles REVIEWED BY: | |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PHASING DIAGRAM

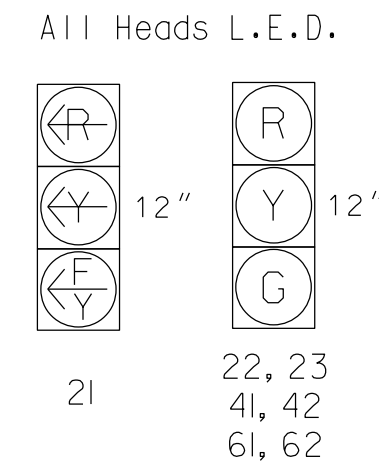


PHASING DIAGRAM DETECTION LEGEND
 ● DETECTED MOVEMENT
 ◀ UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 <- - - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

| SIGNAL FACE | PHASE | | |
|-------------|-------|-----|-------|
| | Ø 2+6 | Ø 4 | FLASH |
| 21 | F | R | Y |
| 22, 23 | G | R | Y |
| 41, 42 | R | G | R |
| 61, 62 | G | R | Y |

SIGNAL FACE I.D.



ASC/3 DETECTOR INSTALLATION CHART

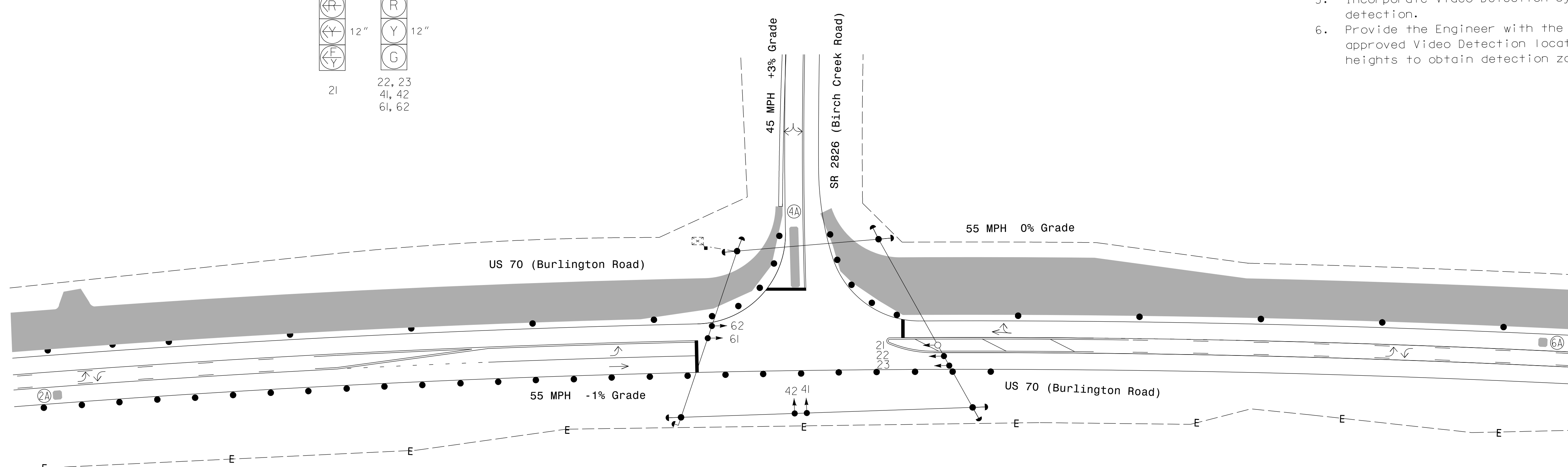
| ZONE | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | PROGRAMMING | | | | | | |
|------|-----------|----------------------------|-------|----------|-------------|---------|-------------|------------|-------------------|------|-------------|
| | | | | | PHASE | CALLING | EXTEND TIME | DELAY TIME | USE ADDED INITIAL | TYPE | SYSTEM LOOP |
| 2A* | 6X6 | 420 | * | * | 2 | Yes | - | - | X | N | - |
| 4A* | 6X40 | 0 | * | * | 4 | Yes | - | 5 | - | S | - |
| 6A* | 6X6 | 420 | * | * | 6 | Yes | - | - | X | N | - |

* Video Detection Zone

2 Phase Fully Actuated (Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Reposition all existing signal heads.
5. Incorporate Video Detection system for vehicle detection.
6. Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.



ASC/3 TIMING CHART

| FEATURE | PHASE | | |
|-------------------------|------------|-----|------------|
| | 2 | 4 | 6 |
| Min Green * | 14 | 7 | 14 |
| Walk * | - | - | - |
| Ped Clear | - | - | - |
| Veh. Extension * | 6.0 | 2.0 | 6.0 |
| Max I * | 90 | 30 | 90 |
| Yellow | 5.3 | 3.0 | 5.2 |
| Red Clear | 1.2 | 2.1 | 1.0 |
| Actuations B4 Add * | - | - | - |
| Seconds /Actuation * | 2.5 | - | 2.5 |
| Max Initial * | 46 | - | 46 |
| Time Before Reduction * | 15 | - | 15 |
| Time To Reduce * | 30 | - | 30 |
| Minimum Gap | 3.4 | - | 3.4 |
| Locking Detector | X | - | X |
| Recall Position | VEH RECALL | - | VEH RECALL |
| Dual Entry | - | - | - |
| Simultaneous Gap | X | X | X |

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

LEGEND

| PROPOSED | EXISTING |
|-----------------------------------|------------------------------|
| ○ → Traffic Signal Head | ● → N/A |
| ● → Modified Signal Head | ○ → N/A |
| □ → Sign | □ → N/A |
| □ → Pedestrian Signal Head | □ → N/A |
| ○ → Signal Pole with Guy | ○ → N/A |
| ○ → Signal Pole with Sidewalk Guy | ○ → N/A |
| ⊠ → Inductive Loop Detector | ⊠ → N/A |
| ⊠ → Controller & Cabinet | ⊠ → N/A |
| □ → Junction Box | □ → N/A |
| --- 2-in Underground Conduit | --- 2-in Underground Conduit |
| N/A → Right of Way | N/A → Right of Way |
| → Directional Arrow | → Directional Arrow |
| ▬ Video Detection Zone | ▬ Video Detection Zone |
| ▬ Construction Zone | ▬ Construction Zone |
| ● Construction Zone Drum | ● Construction Zone Drum |

Signal Upgrade-Temporary Design 2 (TMP Phase II)

750 N. Greenfield Pkwy, Garner, NC 27529

US 70 (Burlington Road) at SR 2826 (Birch Creek Road)

Division 7 Guilford County McLeansville

PLAN DATE: September 2019 REVIEWED BY: M. L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

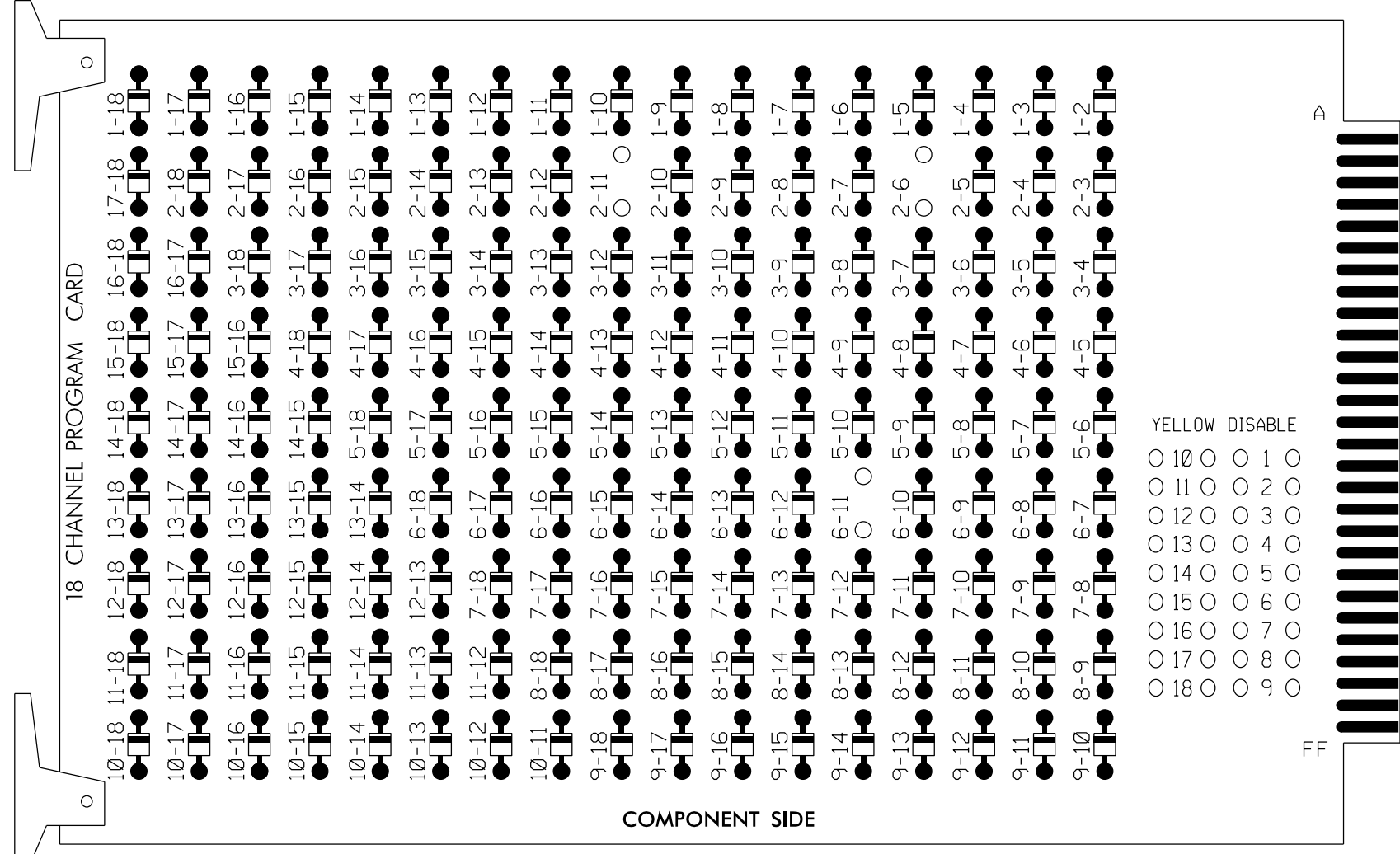
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

9/9/2019

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

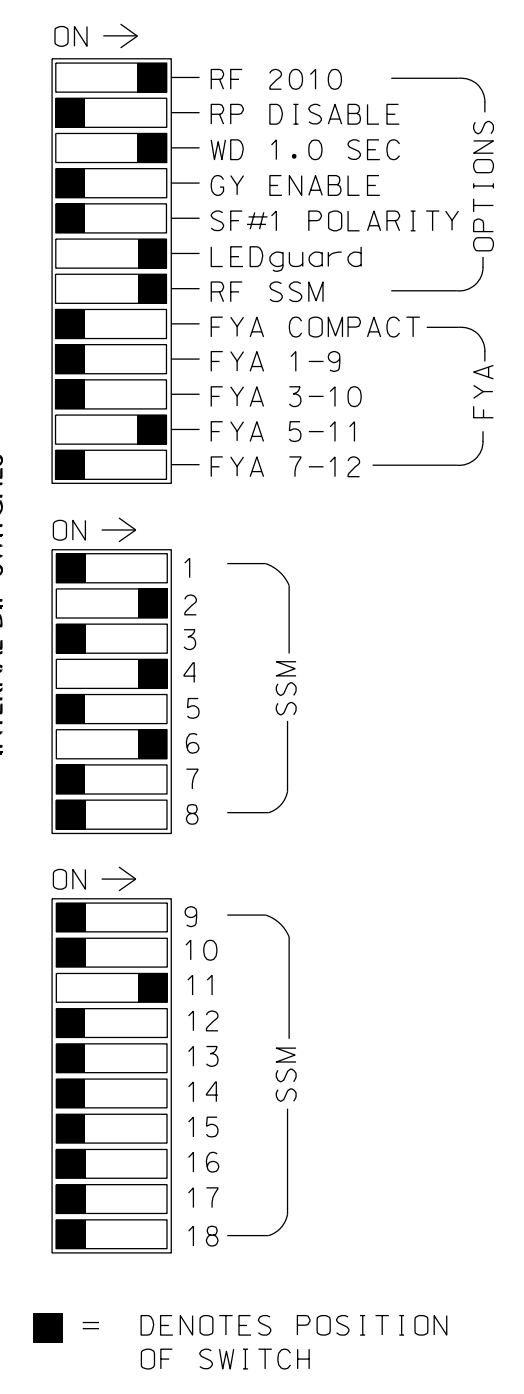
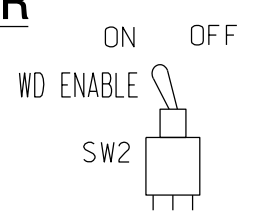
REMOVE DIODE JUMPERS 2-6, 2-II, AND 6-II.



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.



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phase 2 Green and 6 Green.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5,S8,AUX S4
 PHASES USED.....2,4,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED

* See overlap programming detail on this sheet

SIGNAL HEAD HOOK-UP CHART

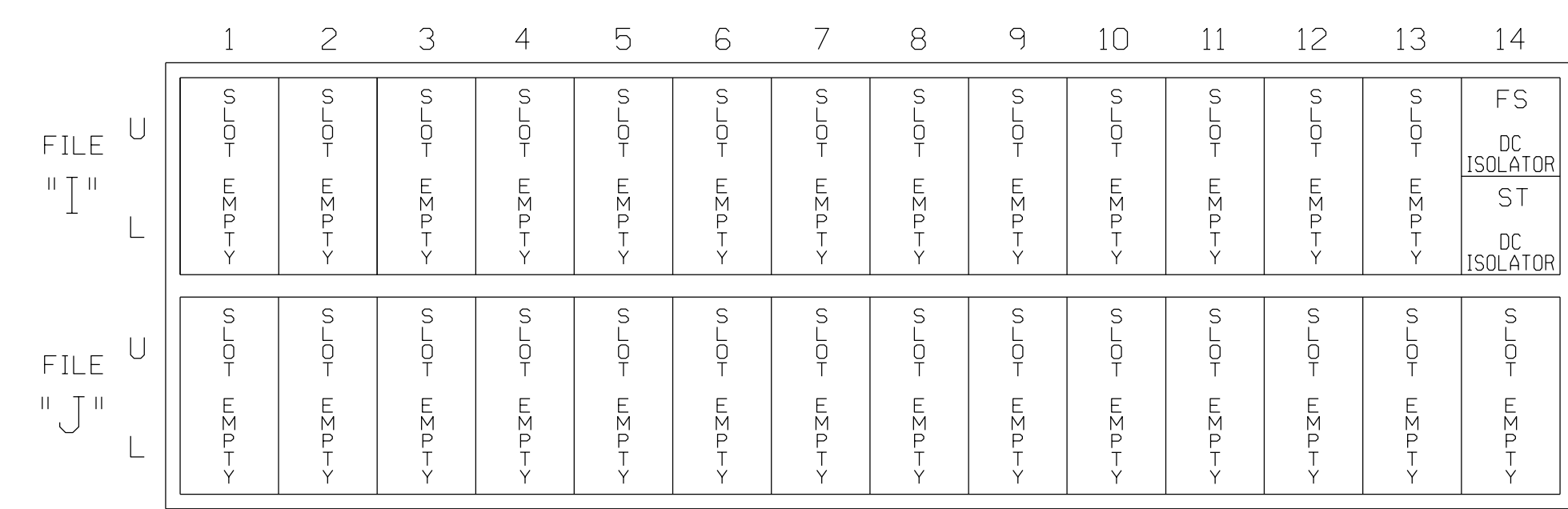
| LOAD SWITCH NO. | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 | S12 | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 | |
|-----------------------|----|-------|-------|----|-------|-------|----|-------|-------|-----|-----|-------|--------|--------|--------|--------|--------|--------|------|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

NU = Not Used

* See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

SPECIAL DETECTOR NOTE

Install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **2. CONTROLLER**
- From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**

OVERLAP C

Select TMG VEH OVLP [C] and 'OTHER/ECONOLITE'

```

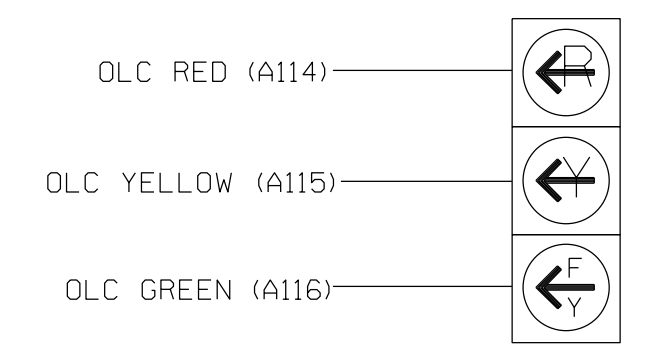
TMG VEH OVLP...[C] TYPE:OTHER/ECONOLITE
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
INCLUDED . . . . . X . . . . .
PROTECT . . . . .
PED PRTC . . . . .
NOT OVLP . . . . .
FLSH GRN . . . . . 1 . . . . .
LAG X PH . . . . .
LAG 2 PH . . . . .

LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0
    
```

END PROGRAMMING

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1708T2
 DESIGNED: September 2019
 SEALED: 09/09/2019
 REVISED:

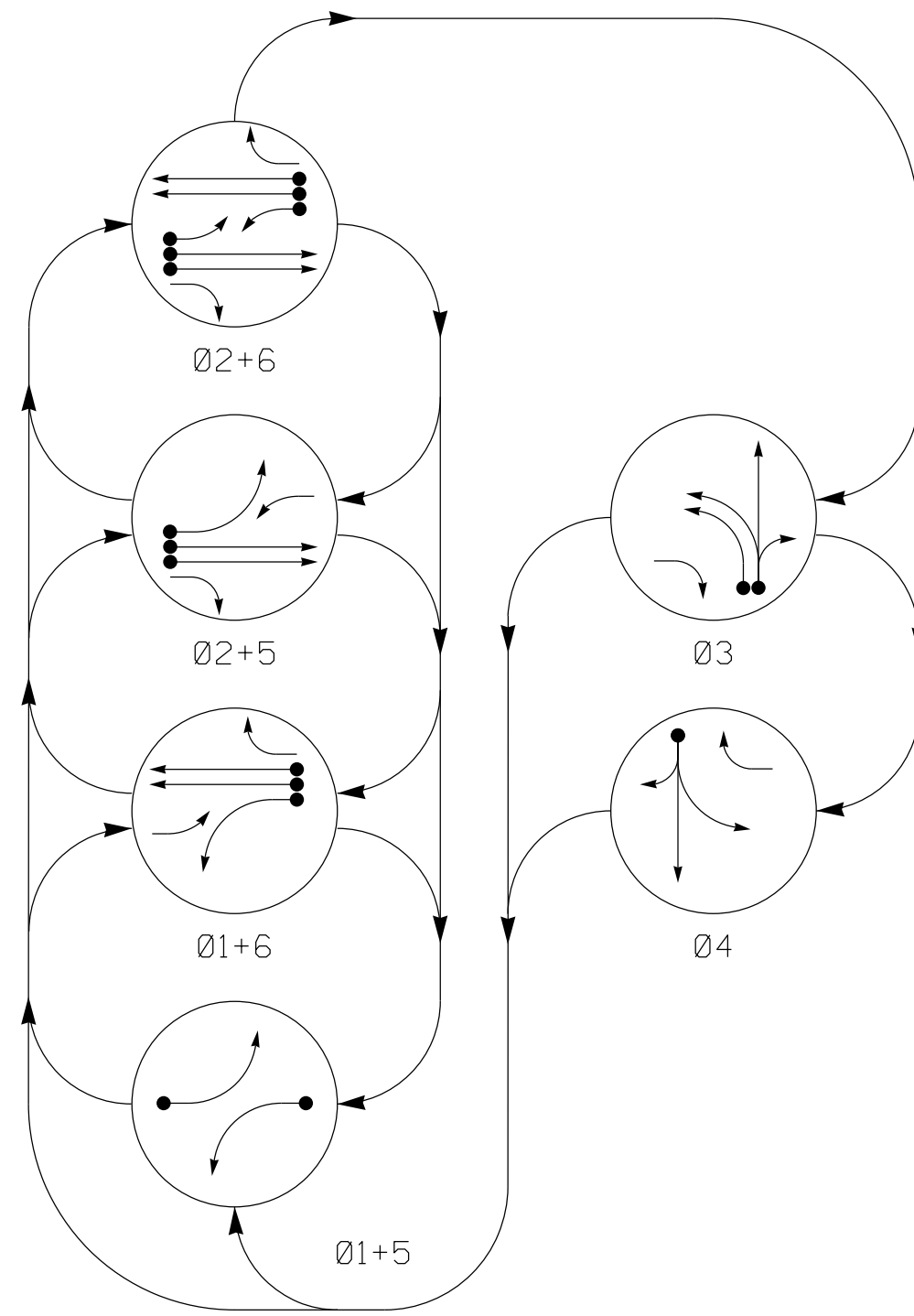


Electrical Detail-Temporary Design 2 (TMP Phase II)

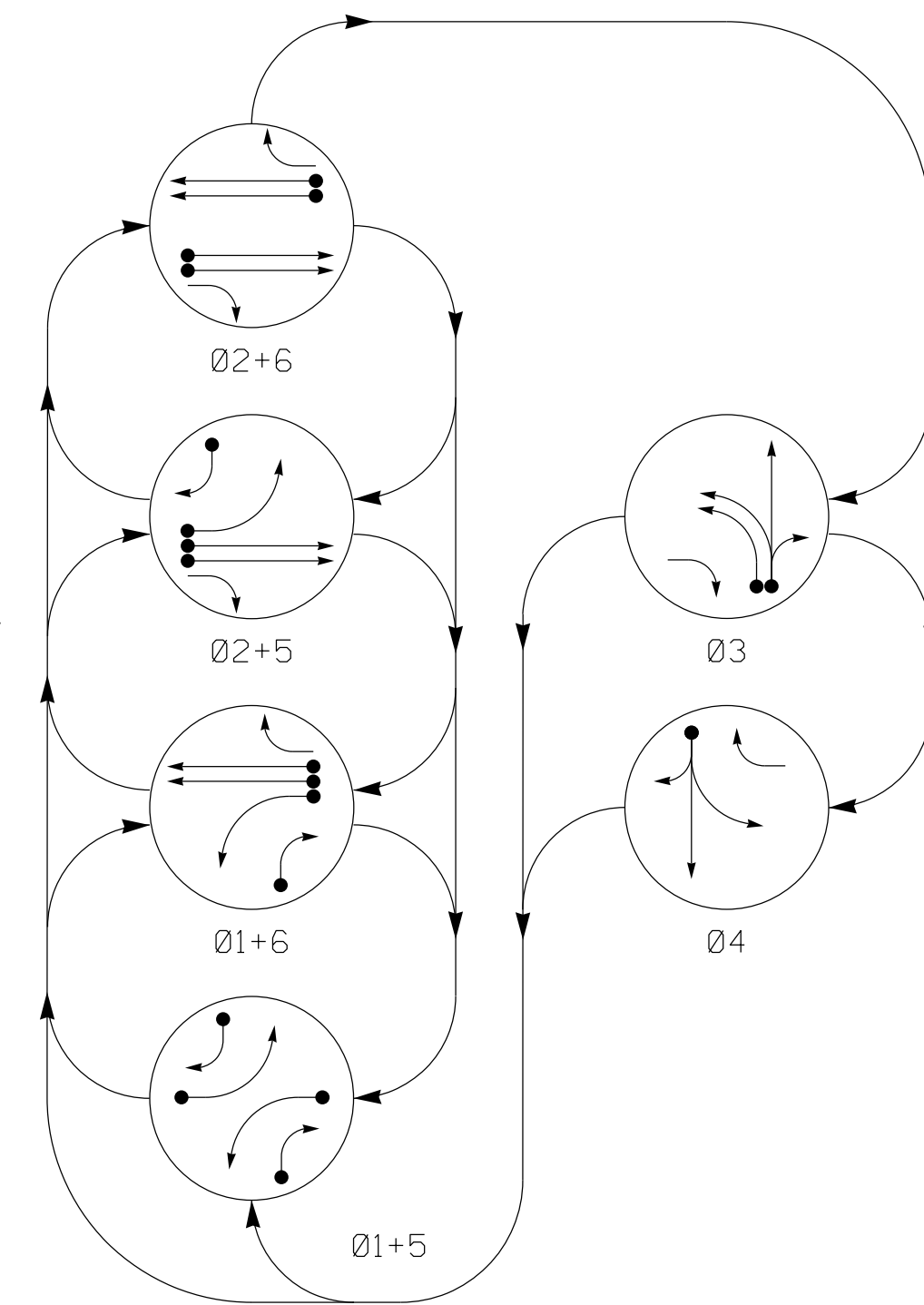
| | | | |
|---|---|---|-------------------------------|
| ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529 | US 70 (Burlington Rd) at SR 2826 (Birch Creek Rd) | | SEAL J. Ma 9/9/2019 |
| | Division 7 PLAN DATE: September 2019 PREPARED BY: J. Ma | Guilford County Mcaleansville REVIEWED BY: M.L. Stygles REVIEWED BY: | |

6 Phase Fully Actuated (US 70 (Burlington Rd.) Closed Loop System) Signal System #: 10712

DEFAULT PHASING DIAGRAM



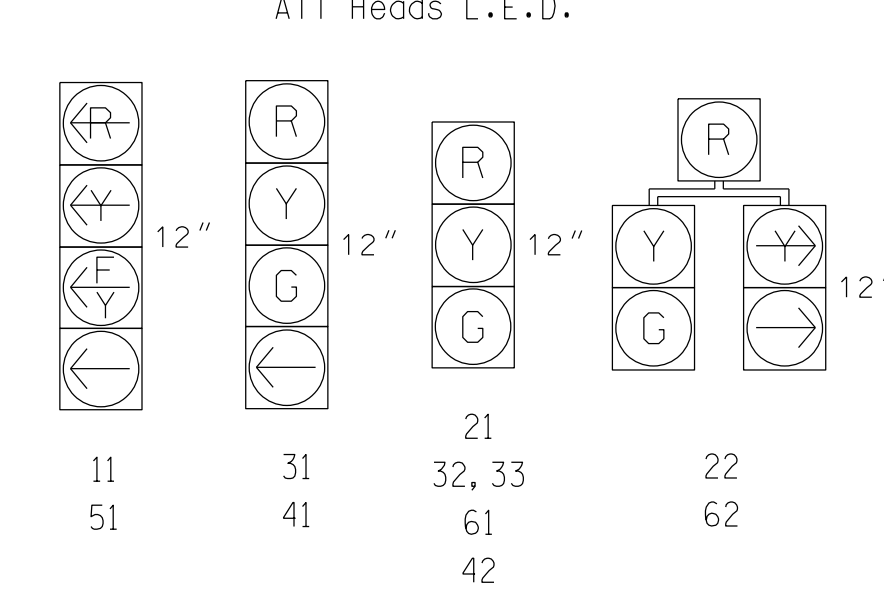
ALTERNATE PHASING DIAGRAM



| SIGNAL FACE | PHASE | | | | | |
|-------------|-------|-------|-------|-------|-----|-----|
| | Ø 1+5 | Ø 1+6 | Ø 2+5 | Ø 2+6 | Ø 3 | Ø 4 |
| 11 | ← | ← | ← | ← | ← | ← |
| 21 | R | R | G | G | R | R |
| 22 | R | R | G | G | R | R |
| 31 | R | R | R | R | G | R |
| 32, 33 | R | R | R | R | G | R |
| 41 | R | R | R | R | R | G |
| 42 | R | R | R | R | R | G |
| 51 | ← | ← | ← | ← | ← | ← |
| 61 | R | G | R | G | R | R |
| 62 | R | G | R | G | R | R |

| SIGNAL FACE | PHASE | | | | | |
|-------------|-------|-------|-------|-------|-----|-----|
| | Ø 1+5 | Ø 1+6 | Ø 2+5 | Ø 2+6 | Ø 3 | Ø 4 |
| 11 | ← | ← | ← | ← | ← | ← |
| 21 | R | R | G | G | R | R |
| 22 | R | R | G | G | R | R |
| 31 | R | R | R | R | G | R |
| 32, 33 | R | R | R | R | G | R |
| 41 | R | R | R | R | R | G |
| 42 | R | R | R | R | R | G |
| 51 | ← | ← | ← | ← | ← | ← |
| 61 | R | G | R | G | R | R |
| 62 | R | G | R | G | R | R |

SIGNAL FACE I.D.

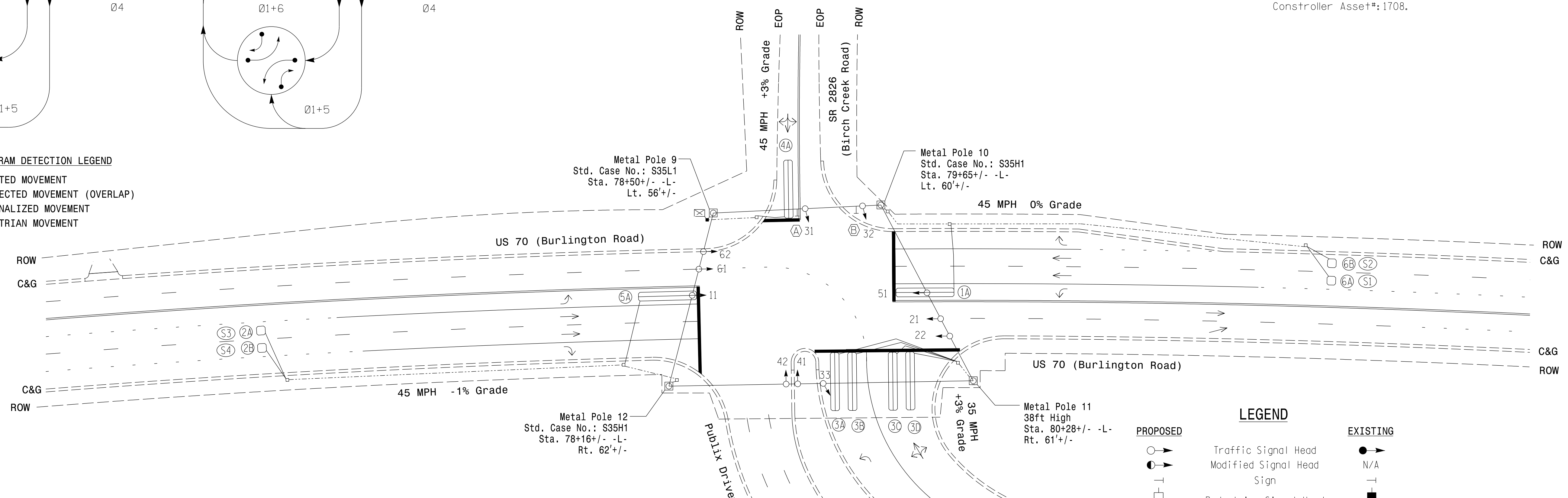


NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- The order of phase 3 and 4 may be reversed.
- Set all detector units to presence mode.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times show in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Constroller Asset#: 1708.

PHASING DIAGRAM DETECTION LEGEND

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



ASC/3 TIMING CHART

| FEATURE | PHASE | | | | | |
|-------------------------|-------|------------|-----|-----|-----|------------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Min Green * | 7 | 12 | 7 | 7 | 7 | 12 |
| Walk * | - | - | - | - | - | - |
| Ped Clear | - | - | - | - | - | - |
| Veh. Extension * | 2.0 | 6.0 | 2.0 | 2.0 | 2.0 | 6.0 |
| Max I * | 20 | 120 | 30 | 30 | 20 | 120 |
| Yellow | 3.0 | 4.6 | 4.3 | 4.3 | 3.0 | 4.6 |
| Red Clear | 2.9 | 2.1 | 2.4 | 2.0 | 3.1 | 2.1 |
| Actuations B4 Add * | - | - | - | - | - | - |
| Seconds / Actuation * | - | 2.5 | - | - | - | 2.5 |
| Max Initial * | - | 34 | - | - | - | 34 |
| Time Before Reduction * | - | 15 | - | - | - | 15 |
| Time To Reduce * | - | 60 | - | - | - | 60 |
| Minimum Gap | - | 3.0 | - | - | - | 3.0 |
| Locking Detector | - | X | - | - | - | X |
| Recall Position | - | VEH RECALL | - | - | - | VEH RECALL |
| Dual Entry | - | - | - | - | - | - |
| Simultaneous Gap | X | X | X | X | X | X |

ASC/3 DETECTOR INSTALLATION CHART

| LOOP | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | PROGRAMMING | | | | | | | |
|-------|-----------|----------------------------|-------|----------|-------------|---------|-------------|------------|-------------------|------|-------------|----------|
| | | | | | PHASE | CALLING | EXTEND TIME | DELAY TIME | USE ADDED INITIAL | TYPE | SYSTEM LOOP | NEW CARD |
| 1A | 6X40 | 0 | 2-4-2 | X | 1 | Yes | - | 15* | - | S | - | X |
| 2A/S3 | 6X6 | 300 | 5 | X | 2 | Yes | - | 3 | - | G | - | X |
| 2B/S4 | 6X6 | 300 | 5 | X | 2 | Yes | - | - | X | N | X | X |
| 3A | 6X40 | 0 | 2-4-2 | X | 3 | Yes | - | - | - | S | - | X |
| 3B | 6X40 | 0 | 2-4-2 | X | 3 | Yes | - | - | - | S | - | X |
| 3C | 6X40 | 0 | 2-4-2 | X | 3 | Yes | - | - | - | S | - | X |
| 3D | 6X40 | 0 | 2-4-2 | X | 3 | Yes | - | - | - | S | - | X |
| 4A | 6X40 | 0 | 2-4-2 | X | 4 | Yes | - | 5 | - | S | - | X |
| 5A | 6X40 | 0 | 2-4-2 | X | 5 | Yes | - | 15* | - | S | - | X |
| 6A/S1 | 6X6 | 300 | 5 | X | 6 | Yes | - | 3 | - | G | - | X |
| 6B/S2 | 6X6 | 300 | 5 | X | 6 | Yes | - | - | X | N | X | X |

* Reduce delay to 3 seconds during Alternate Phasing Operation.
Disable phase call for loop(s) during Alternate Phasing Operation.



Signal Upgrade-Final Design

Prepared for the Offices of: **US 70 (Burlington Rd) at SR 2826 (Birch Creek Rd) and Public Driveway**

Division 7 Guilford County McLeansville
 PLAN DATE: September 2019 REVIEWED BY: M. Stygles
 PREPARED BY: J. Ma REVIEWED BY:

SCALE: 1" = 40'

REVISIONS: _____ INIT. DATE

SEAL: **STYGLS** (Professional Engineer Seal)

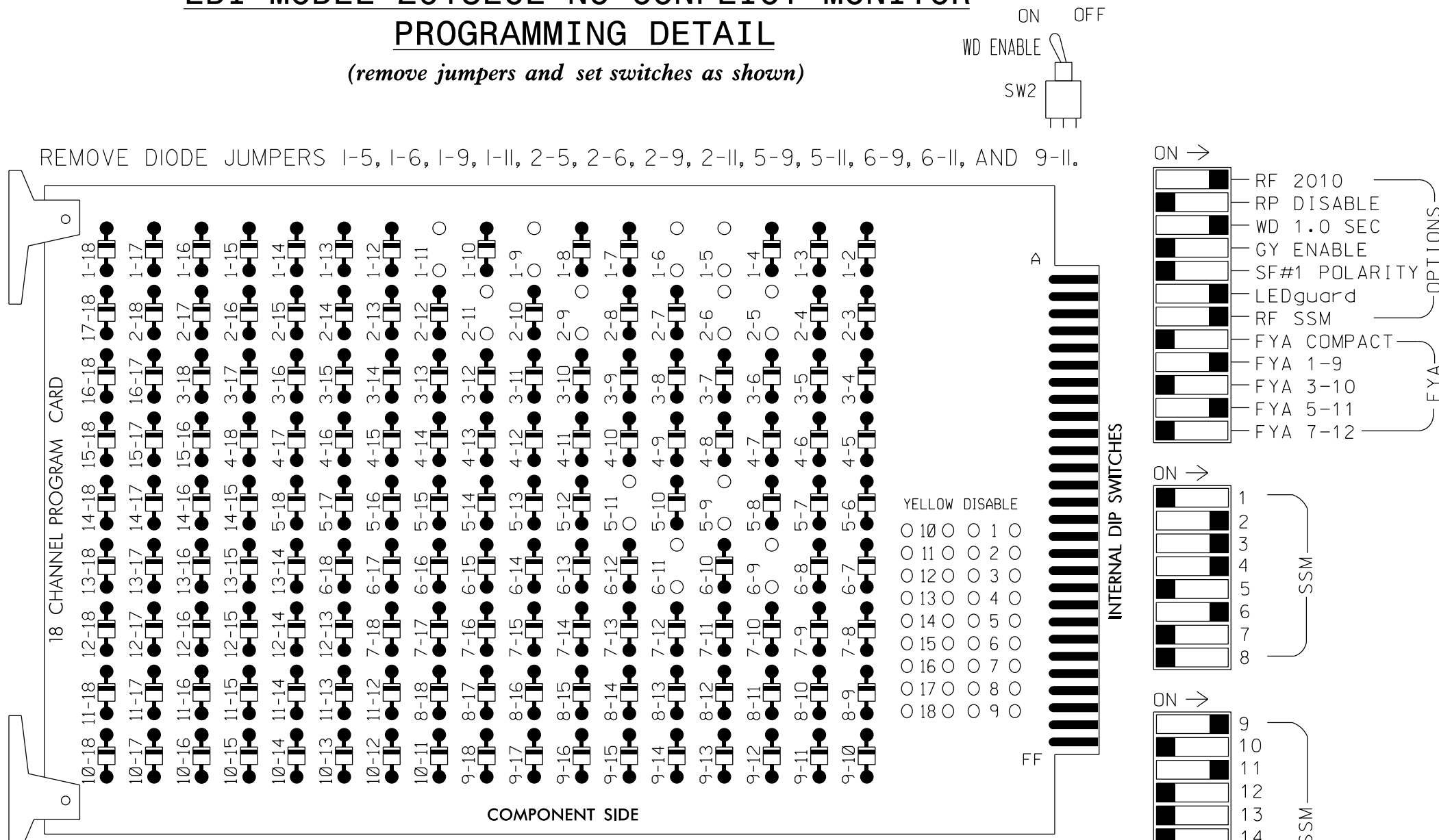
DATE: 9/12/2019

SIG. INVENTORY NO. 07-1708



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 controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the US 70 (Burlington Road) Closed Loop system.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,
 AUX S1,AUX S4
 PHASES USED.....1,2,3,4,5,6
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail on sheet 2

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 | 31, 32,33 | 22 | 41 | 42 | 62 | NU | 51* | 61,62 | NU | 11* | NU | NU | 51* | NU | NU |
| RED | | 128 | | 116 | 116 | 101 | 101 | | | | 134 | | | | | | | |
| YELLOW | * | 129 | | 117 | 117 | 102 | 102 | | * | 135 | | | | | | | | |
| GREEN | | 130 | | 118 | 118 | 103 | 103 | | | | 136 | | | | | | | |
| RED ARROW | | | | | | | | | | | | | A121 | | | | A114 | |
| YELLOW ARROW | | | | | | 117 | | 102 | | | | | A122 | | | | A115 | |
| FLASHING YELLOW ARROW | | | | | | | | | | | | | A123 | | | | A116 | |
| GREEN ARROW | 127 | | | 118 | 103 | 103 | 133 | | | | | | | | | | | |

NU = Not Used
 * Denotes install load resistor. See Load Resistor Installation Detail this sheet.
 * See 4-Sect. FYA-PPLT Signal Wiring Detail below.

INPUT FILE POSITION LAYOUT

(front view)

| FILE "I" | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|----------|---------|---------|---------|---------|---------|----------|-----|-----|-----|-----|-----|-----|-----|-------------|
| ∅ 1 | ∅ 2/SYS | ∅ 2A/S3 | ∅ 2/SYS | ∅ 2/SYS | ∅ 2/SYS | ∅ 4 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | FS |
| NOT USED | ∅ 2/SYS | 2B/S4 | ∅ 2/SYS | ∅ 2/SYS | ∅ 2/SYS | NOT USED | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | DC ISOLATOR |
| FILE "J" | ∅ 5 | ∅ 6/SYS | ∅ 6A/S1 | ∅ 6/SYS | ∅ 6/SYS | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | DC ISOLATOR |
| NOT USED | ∅ 6/SYS | 6B/S2 | ∅ 6/SYS | ∅ 6/SYS | ∅ 6/SYS | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | ∅ 3 | |

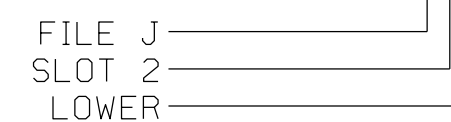
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 ⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

| LOOP NO. | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | CALL | EXTEND TIME | DELAY TIME | ADDED INITIAL | DETECTOR TYPE |
|-----------------|---------------|-----------------|---------|--------------|------------|------|-------------|------------|---------------|---------------|
| 1A ¹ | TB2-1,2 | I1U | 56 | 1* | 1 | YES | | 15 | | S |
| | | J4U | 48 | 26* | 6 | YES | | 3 | | G |
| 2A/S3 | TB2-5,6 | I2U | 39 | 2 | 2/SYS | YES | | | X | N |
| 2B/S4 | TB2-7,8 | I2L | 43 | 12 | 2/SYS | YES | | | X | N |
| 3A | TB5-9,10 | J6U | 42 | 8 | 3 | YES | | | | S |
| 3B | TB5-11,12 | J6L | 46 | 18 | 3 | YES | | | | S |
| 3C | TB7-1,2 | J7U | 66 | 38 | 3 | YES | | | | S |
| 3D | TB7-3,4 | J7L | 79 | 48 | 3 | YES | | | | S |
| 4A | TB4-9,10 | I6U | 41 | 4 | 4 | YES | | 5 | | S |
| 5A ² | TB3-1,2 | J1U | 55 | 5* | 5 | YES | | 15 | | S |
| | | I4U | 47 | 22* | 2 | YES | | 3 | | G |
| 6A/S1 | TB3-5,6 | J2U | 40 | 6 | 6/SYS | YES | | | X | N |
| 6B/S2 | TB3-7,8 | J2L | 44 | 16 | 6/SYS | YES | | | X | N |

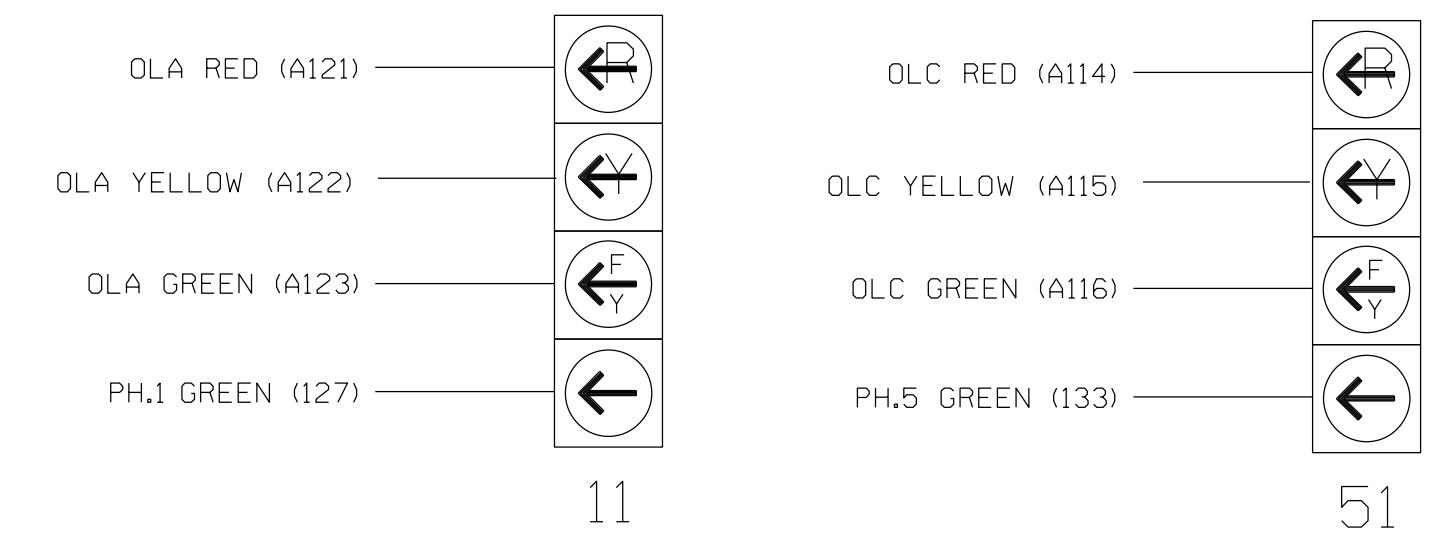
- Add jumper from I1-W to J4-W, on rear of input file.
 - Add jumper from J1-W to I4-W, on rear of input file.
- * For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L



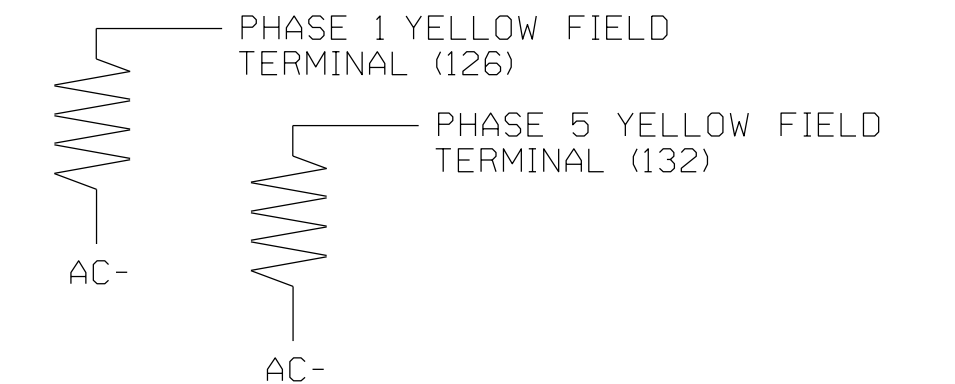
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1708
 DESIGNED: September 2019
 SEALED: 09/12/2019
 REVISED: N/A

Electrical Detail-Final Upgrade (Sheet 1 of 3)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 70 (Burlington Rd) at SR 2826 (Birch Creek Rd) and Public Driveway

Division 7 Gullford County McLeansville

PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles

PREPARED BY: J. Ma REVIEWED BY:

REVISIONS INIT. DATE

9/12/2019

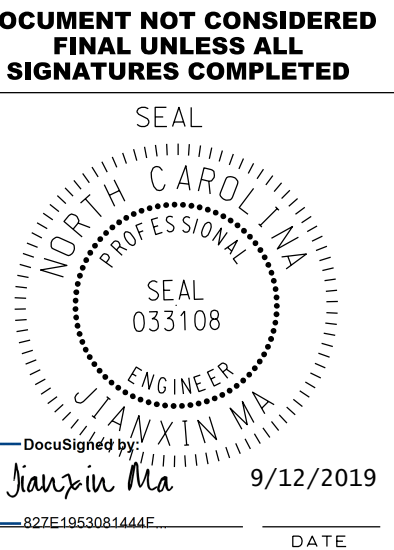
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL 033108

SEAL 033108

DATE 9/12/2019

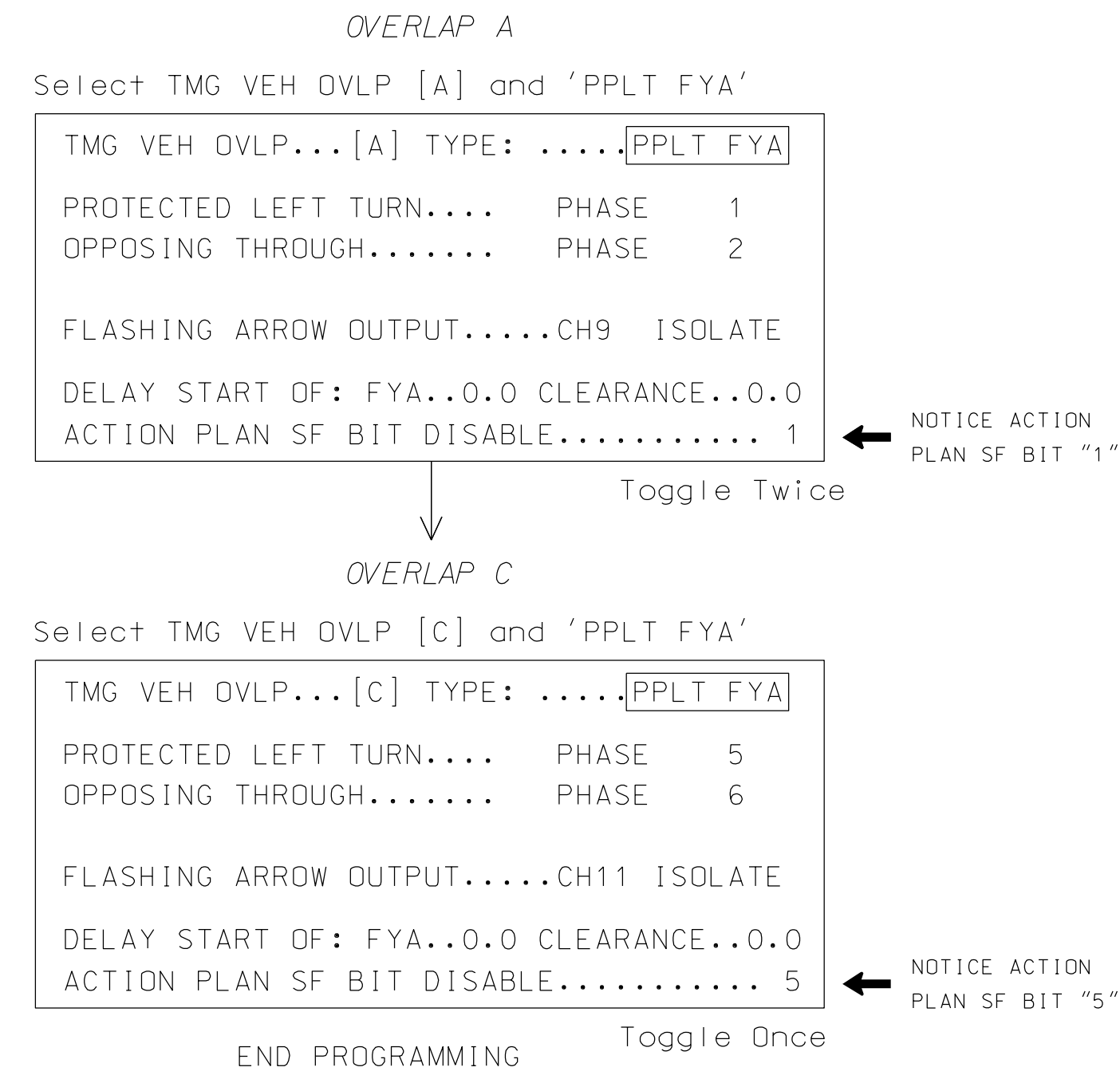
SIG. INVENTORY NO. 07-1708



ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS



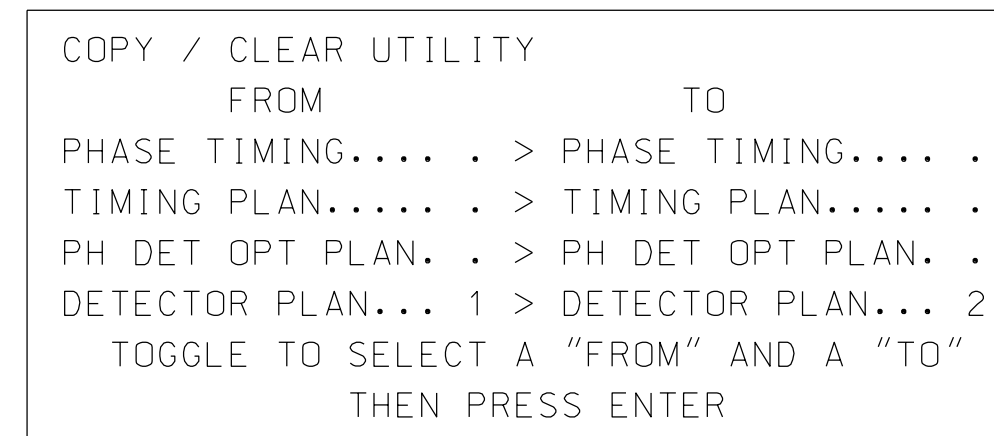
ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A, 5A

(program controller as shown)

IMPORTANT!

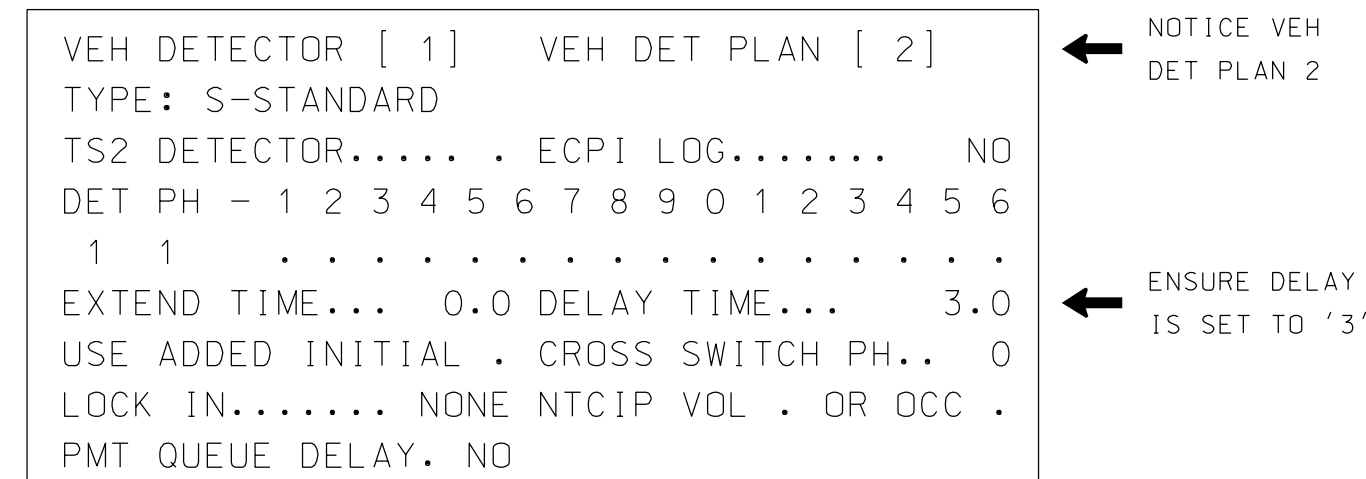
Program detectors per the input file connection and programming chart shown on sheet 1 before proceeding.

1. From Main Menu select 8. UTILITIES
2. From UTILITIES Submenu select 1. COPY/CLEAR
3. Copy from DETECTOR PLAN "1" to DETECTOR PLAN "2".

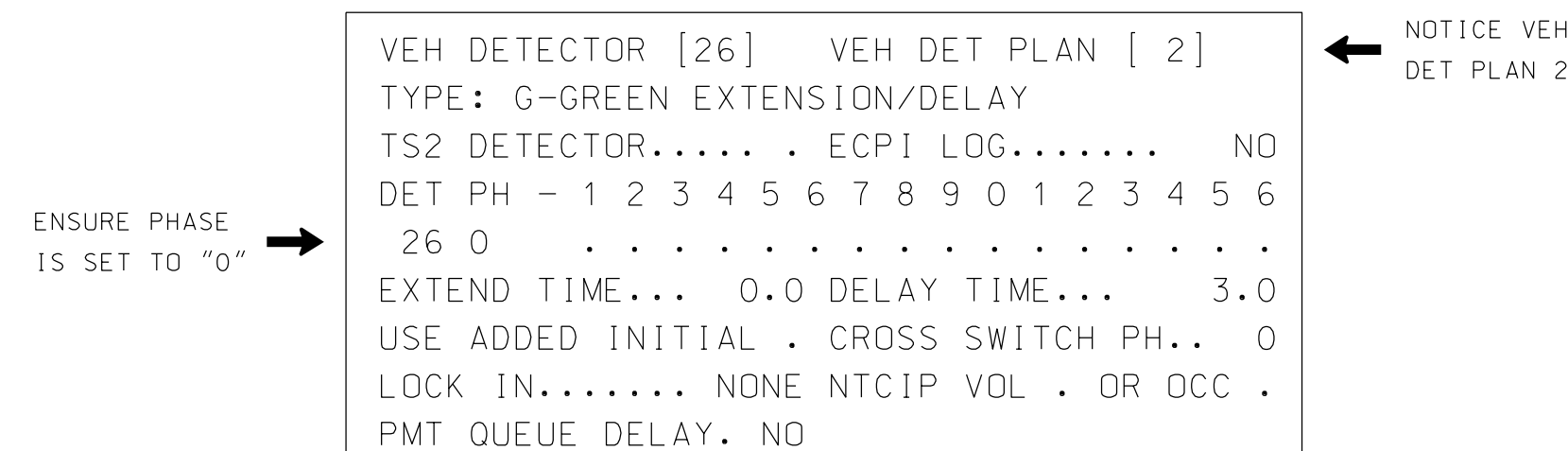


4. From Main Menu select 6. DETECTORS
5. From DETECTOR Submenu select 2. VEHICLE DETECTOR SETUP
6. Place cursor in VEH DET PLAN [] position and enter "2".

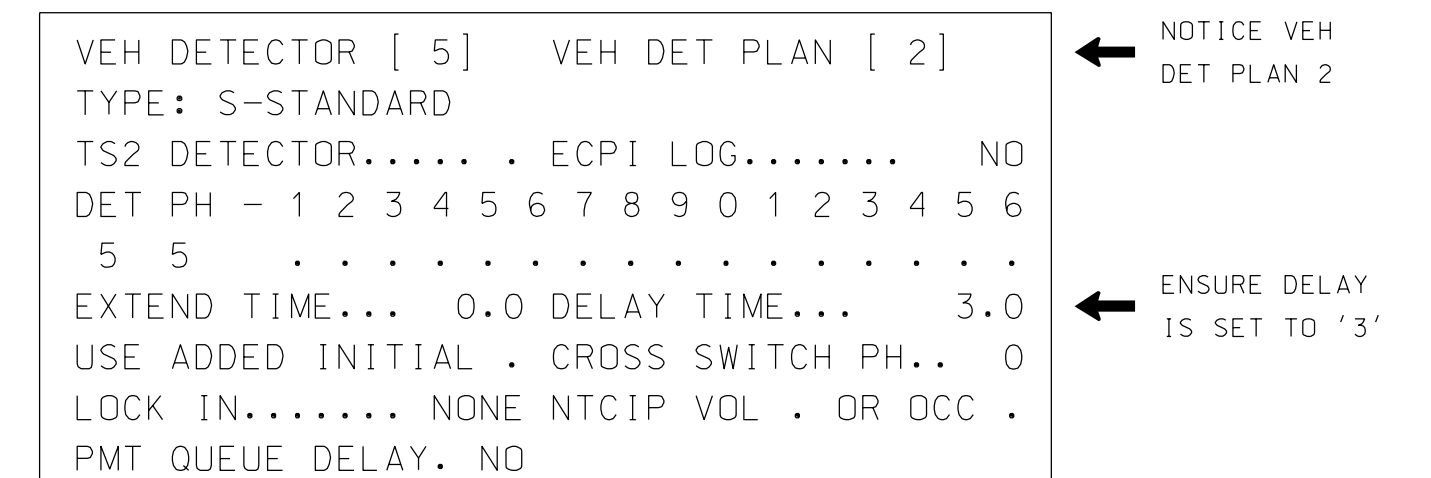
- Place cursor in VEH DETECTOR [] position and enter "1".
- Set delay time to "3".



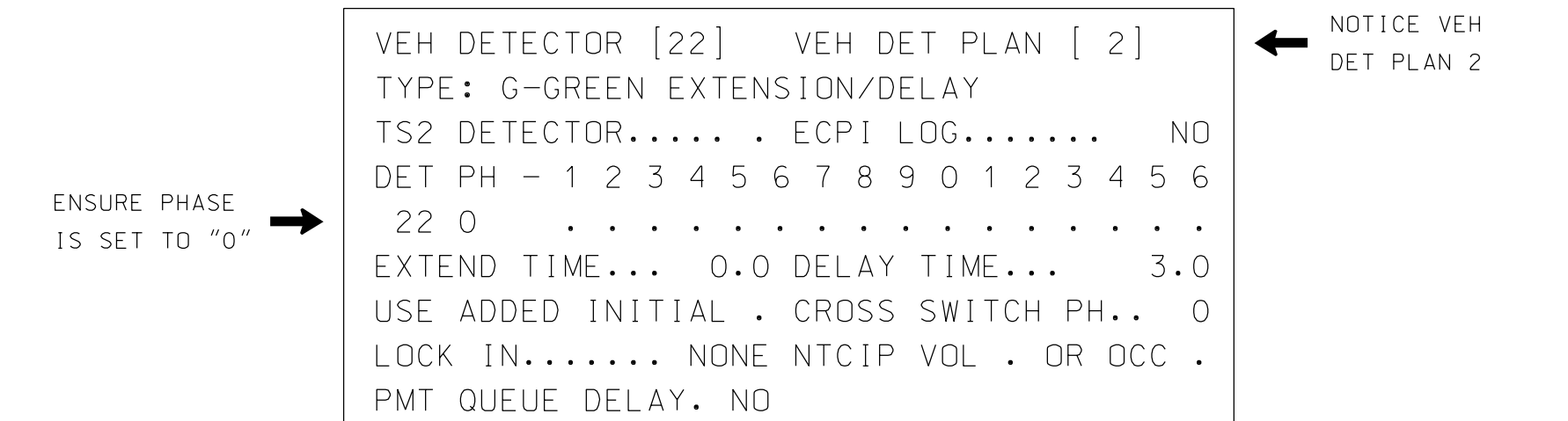
- Place cursor in VEH DETECTOR [] position and enter "26".
- Set assigned phase to "0".



- Place cursor in VEH DETECTOR [] position and enter "5".
- Set delay time to "3".



- Place cursor in VEH DETECTOR [] position and enter "22".
- Set assigned phase to "0".



END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-1708
 DESIGNED: September 2019
 SEALED: 09/12/2019
 REVISED: N/A



Electrical Detail-Final Upgrade (Sheet 2 of 3)

| | | |
|--|---|---|
| ELECTRICAL AND PROGRAMMING DETAILS FOR: | US 70 (Burlington Rd) at SR 2826 (Birch Creek Rd) and Publix Driveway | SEAL NORTH CAROLINA PROFESSIONAL ENGINEER J. ANJIN MA |
| Prepared for the Offices of: CITY OF RALEIGH Department of Transportation & Signal Management | Division 7 Guilford County McLeansville PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles PREPARED BY: J. Ma REVIEWED BY: | SEAL 033108 J. ANJIN MA 9/12/2019 DATE |
| 750 N. Greenfield Pkwy, Garner, NC 27529 | REVISIONS INIT. DATE | DocuSign by J. ANJIN MA 827E1953081444F DATE SIG. INVENTORY NO. 07-1708 |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

1. From Main Menu select 5. TIME BASE
2. From TIME BASE Submenu select 2. ACTION PLAN

| | |
|-----------------------|---------------------------------|
| ACTION PLAN...[1] | |
| PATTERN.....AUTO | SYS OVERRIDE.... NO |
| TIMING PLAN..... 0 | SEQUENCE..... 0 |
| VEH DETECTOR PLAN.. 2 | DET LOG.....NONE |
| FLASH..... -- | RED REST..... NO |
| VEH DET DIAG PLN... 0 | PED DET DIAG PLN..0 |
| DIMMING ENABLE.. NO | PRIORITY RETURN. NO |
| PED PR RETURN.. NO | QUEUE DELAY..... NO |
| PMT COND DELAY NO | |
| PHASE | 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 |
| PED RCL | |
| WALK 2 | |
| VEX 2 | |
| VEH RCL | |
| MAX RCL | |
| MAX 2 | |
| PHASE | 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 |
| MAX 3 | |
| CS INH | |
| OMIT | |
| SPC FCT | X . . . X . . . (1-8) |
| AUX FCT | . . . (1-3) |
| | 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 |
| LP 1-15 | |
| LP 16-30 | |
| LP 31-45 | |
| LP 46-60 | |
| LP 61-75 | |
| LP 76-90 | |
| LP 91-100 | |

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM CHANGES (SHOWN BELOW) IN A TIME BASED ACTION PLAN. SCHEDULE A DAY PLAN THAT INCLUDES THE ACTION PLAN PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 AND 5.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT VEH DET PLAN 2 AND ENABLE SF BITS 1 AND 5.

| PHASING | VEH DET PLAN | SF BITS ENABLED |
|--|--------------|-----------------|
| ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u> | 1 | NONE |
| ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u> | 2 | 1, 5 |

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN SF BITS 1 AND 5 AND VEH DET PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

- SF BITS 1,5: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.
- VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.
Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1708
DESIGNED: September 2019
SEALED: 09/12/2019
REVISED: N/A



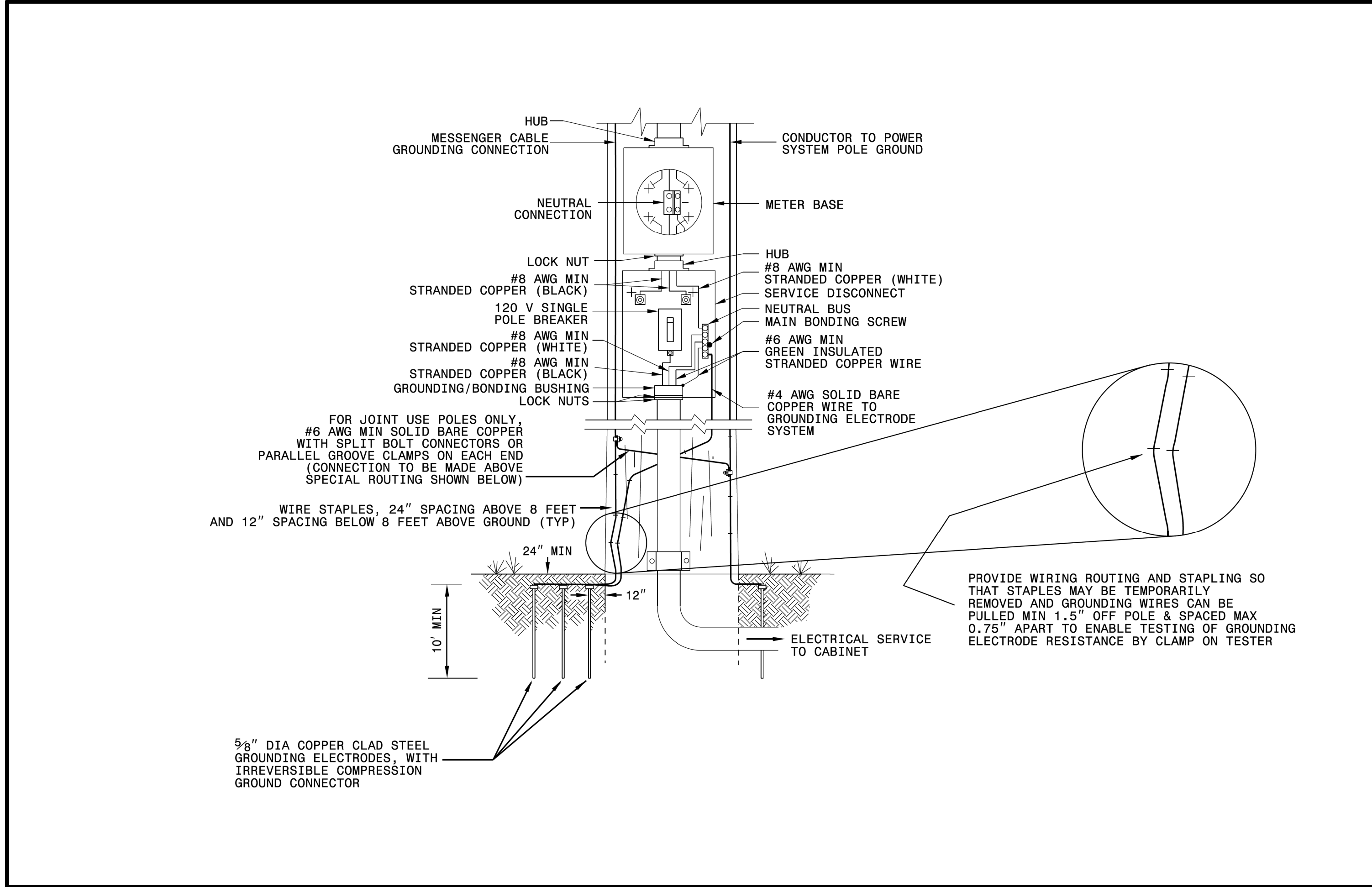
Electrical Detail-Final Upgrade (Sheet 3 of 3)

| <p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: small;">Prepared for the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Garner, NC 27529</p> | <p>US 70 (Burlington Rd) at SR 2826 (Birch Creek Rd) and Publix Driveway</p> <p style="font-size: x-small;">Division 7 Guilford County McLeansville</p> <p style="font-size: x-small;">PLAN DATE: September 2019 REVIEWED BY: M.L. Stygles</p> <p style="font-size: x-small;">PREPARED BY: J. Ma REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | REVISIONS | INIT. | DATE | | | | <p style="text-align: center; font-weight: bold; font-size: small;">DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <div style="text-align: center;"> <p style="font-size: x-small;">SEAL 033108 J. Ma 9/12/2019 827E1953081444F DATE</p> </div> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-1708</p> |
|---|---|-----------|-------|------|--|--|--|--|
| REVISIONS | INIT. | DATE | | | | | | |
| | | | | | | | | |

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

ENGLISH STANDARD DRAWING FOR
ELECTRICAL SERVICE GROUNDING
GROUNDING AND BONDING

SHEET 1 OF 1
1700D01

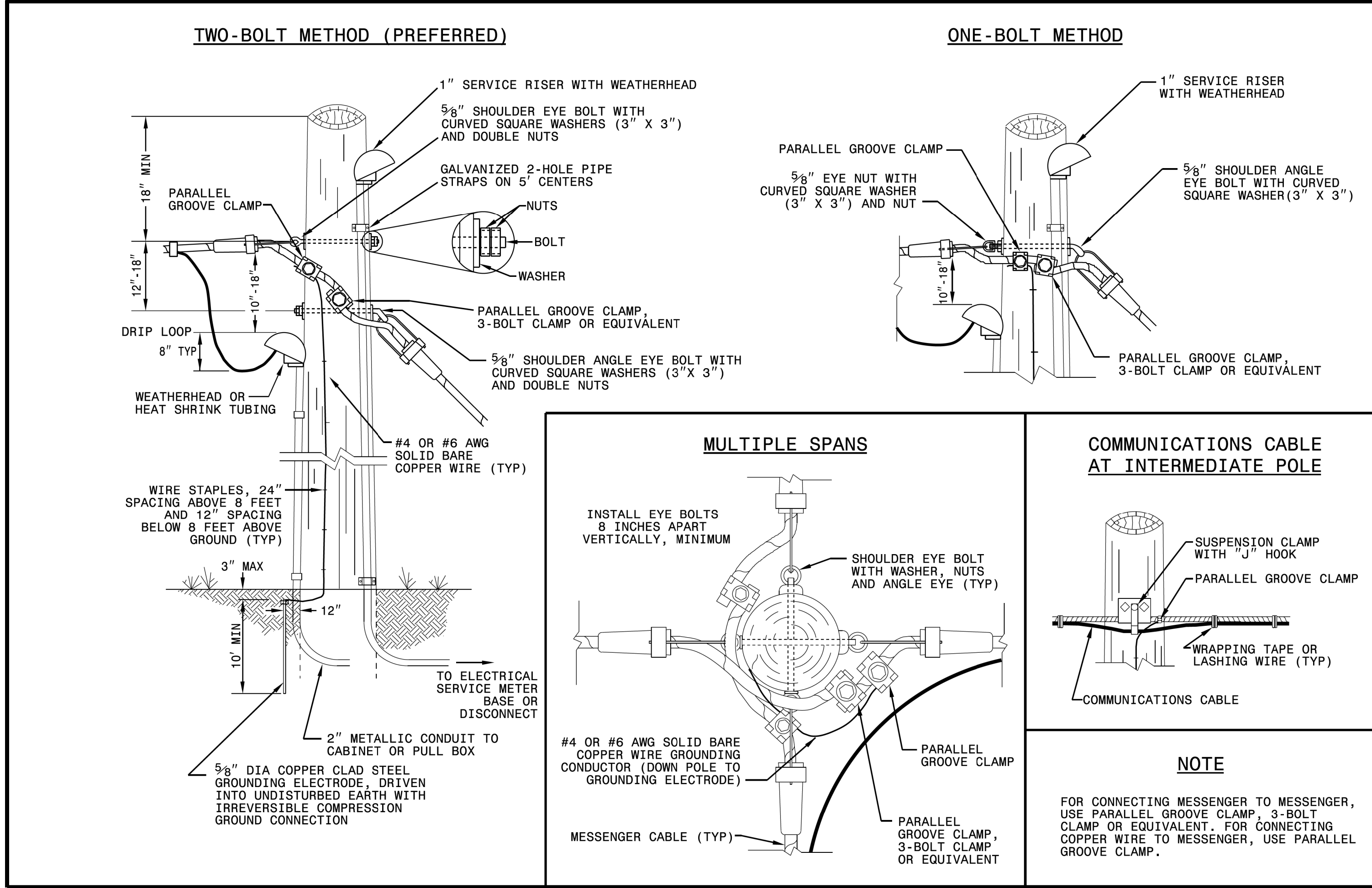


11-DOT-2017-08-15
U-2581BA-Std Draw/Eng/Plate Sheets/2018-Plate Sheet -dgn
r.m.hough

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

ENGLISH STANDARD DRAWING FOR
WOOD POLES
METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1
1720D01



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

See Plate for Title

Prepared in the Offices of:

SEAL

DocuSigned by:
Mohd Aslami
10/11/2017

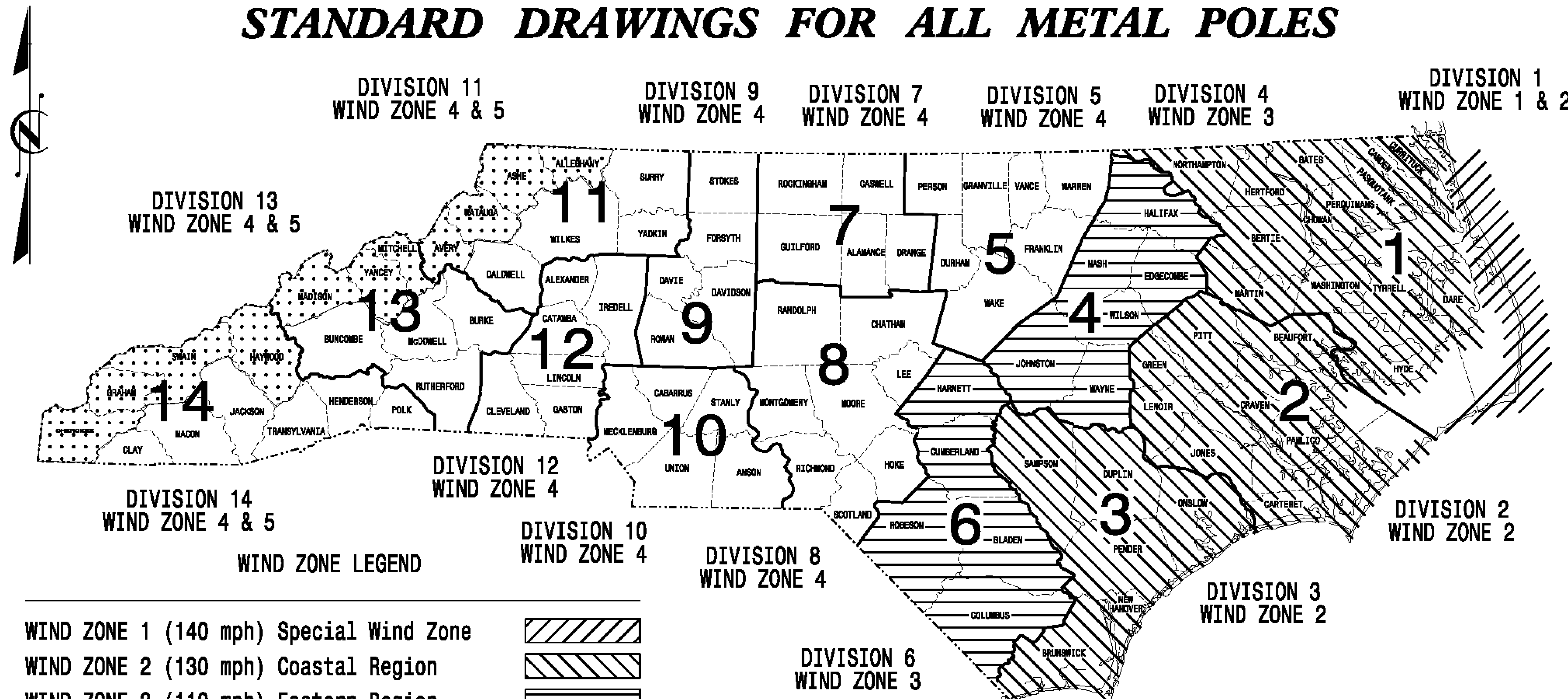
750 N. Greenfield Parkway
Garner, NC 27529

DATE

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

| | |
|-----------------|-----------|
| PROJECT ID. NO. | SHEET NO. |
| U-2581BA | Sig.M1 |

STANDARD DRAWINGS FOR ALL METAL POLES



<https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

Prepared in the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

Designed in conformance with the latest 2015 Interim to the 6th Edition 2013

AASHTO

Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS

| DRAWING NUMBER | DESCRIPTION |
|----------------|---|
| Sig. M 1 | Statewide Wind Zone Map |
| Sig. M 2 | Typical Fabrication Details—All Metal Poles |
| Sig. M 3 | Typical Fabrication Details—Strain Poles |
| Sig. M 4 | Typical Fabrication Details—Mast Arm Poles |
| Sig. M 5 | Typical Fabrication Details—Mast Arm Connection |
| Sig. M 6 | Typical Fabrication Details—Strain Pole Attachments |
| Sig. M 7 | Construction Details—Foundations |
| Sig. M 8 | Standard Strain Pole Foundation—All Soil Conditions |

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

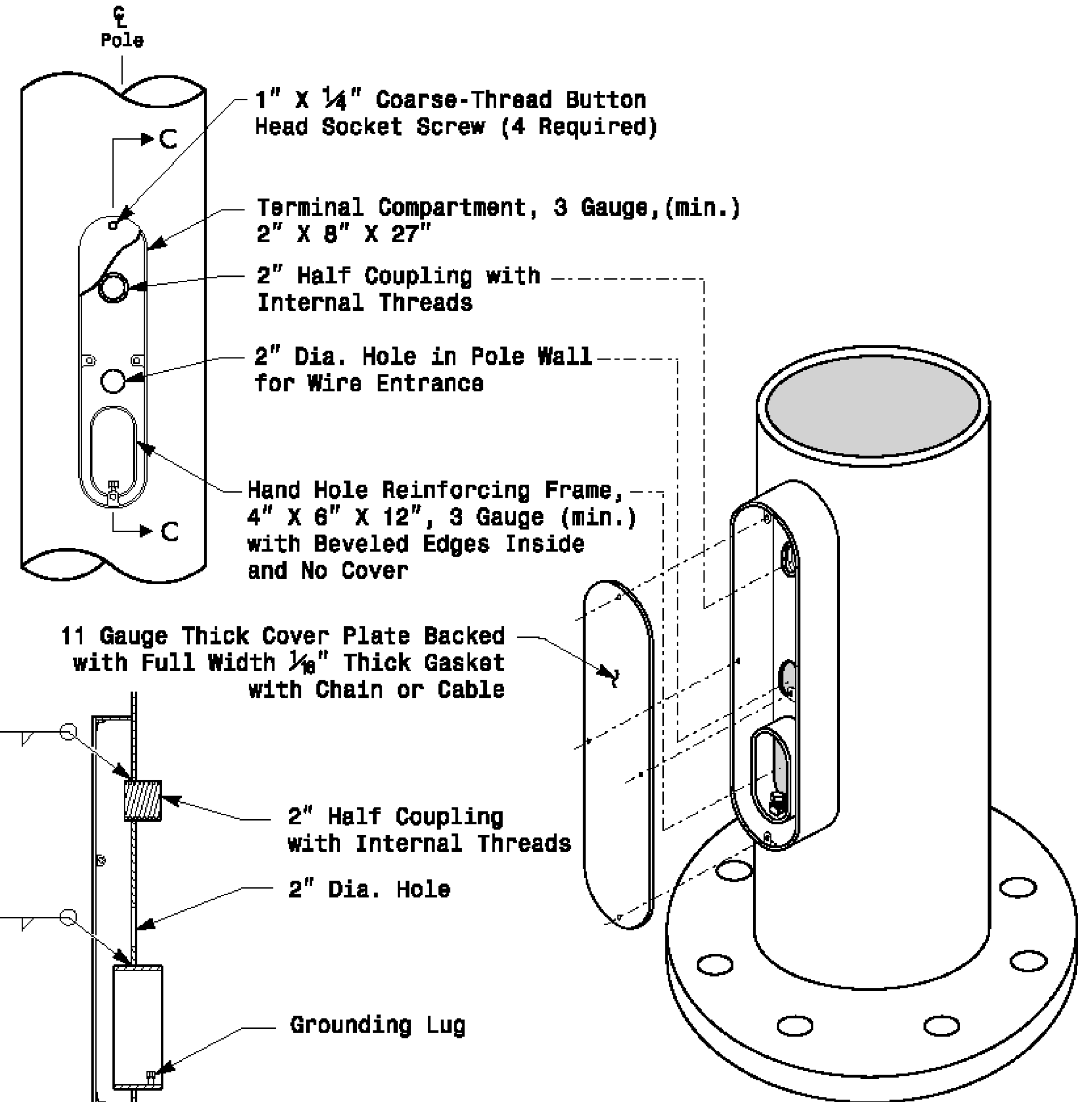
M.M. MCDIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER

J. P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

SEAL

10/11/2017
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

| | |
|---------------------------|------------------------|
| 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 SIG. INV. NO. _____ | |
| NCDOT POLE NO. _____ | |

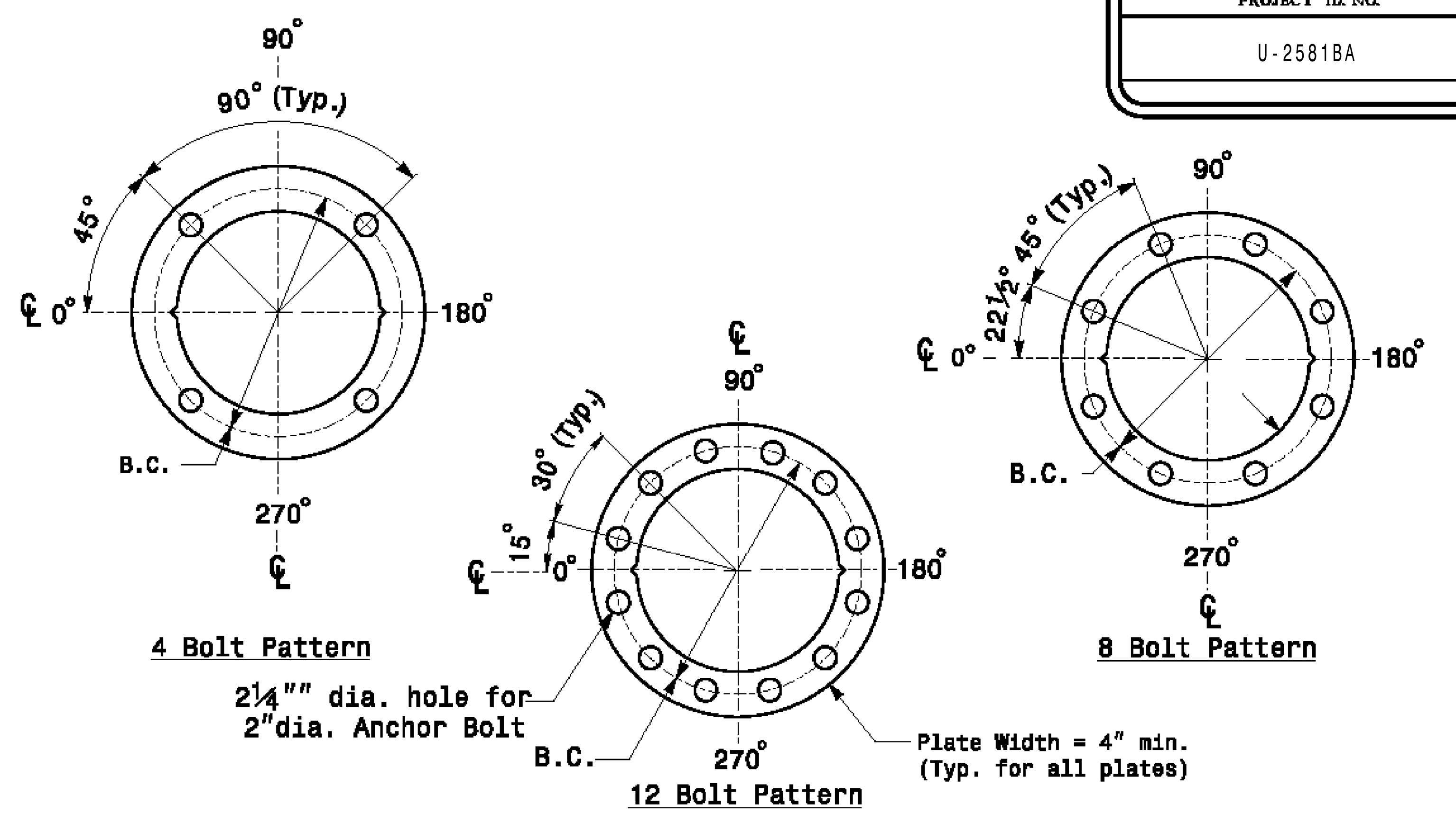
Shaft I.D. Tag
(Provide on Shaft of Strain Poles and Mast Arm Poles Shaft)

- 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 Signal Inv. Number and pole I.D. number
 - 5) See drawing M3 and M4 for mounting positions of I.D. tags.

Identification Tag Details

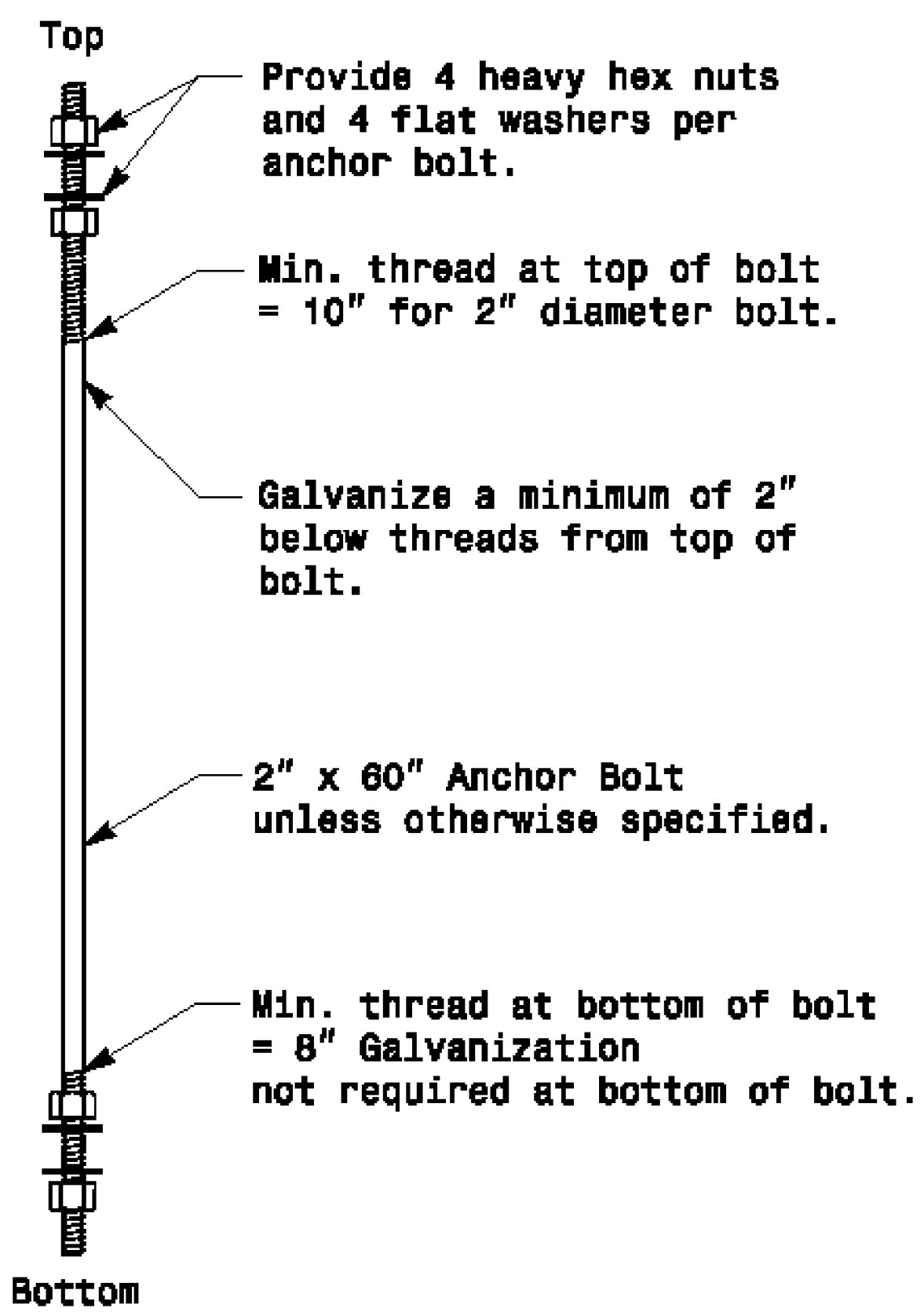
| | |
|---------------------------|------------------------|
| MFG _____ | MFG. DATE: MM/YY _____ |
| SECTION D/T/L/Y _____ | |
| NCDOT SIG. INV. NO. _____ | |
| NCDOT POLE NO. _____ | |

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

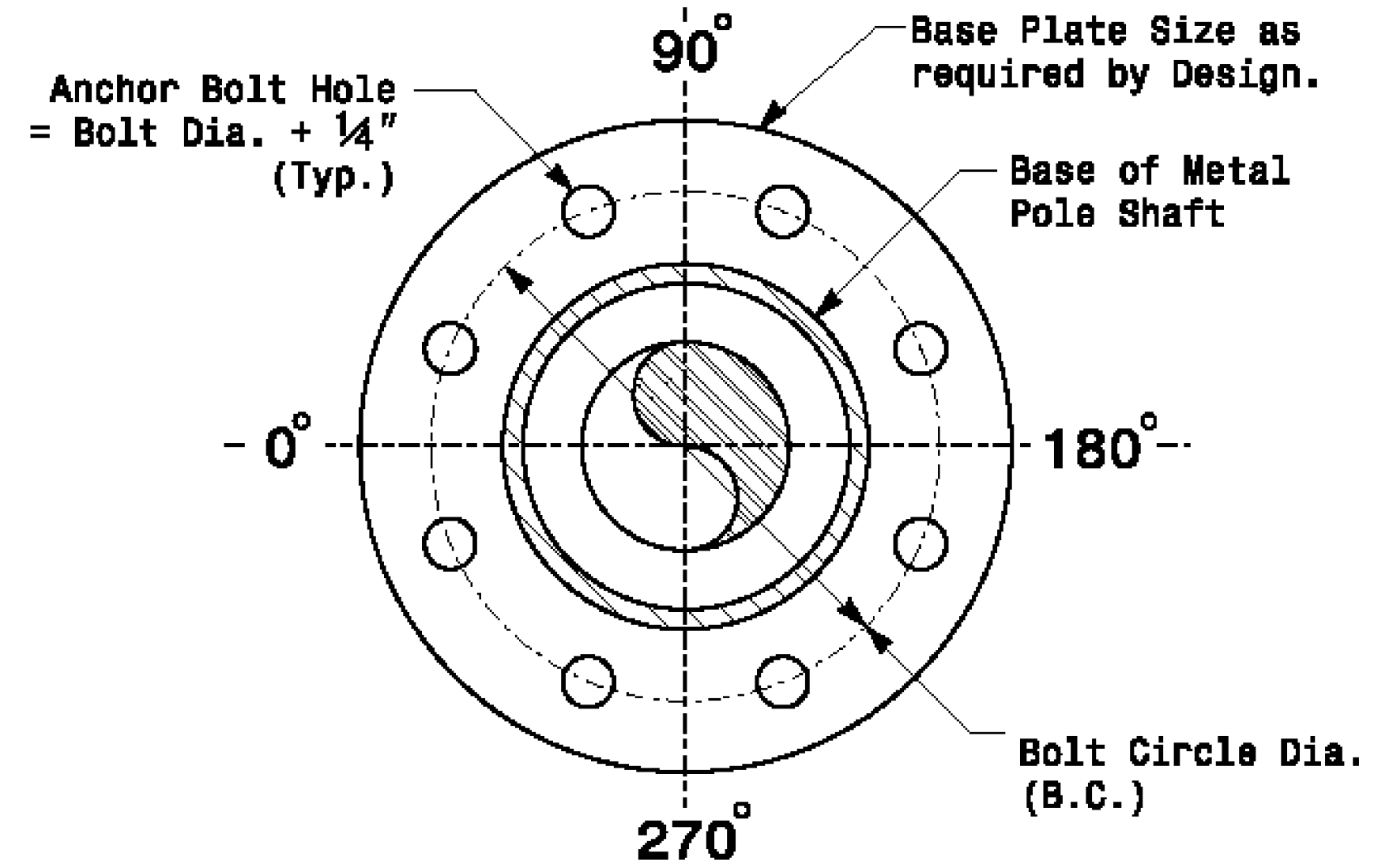


Construct Templates and Plates from 1/4 inch min. thick Steel. Galvanizing is not required.

Base Plate Template and Anchor Bolt Lock Plate Details

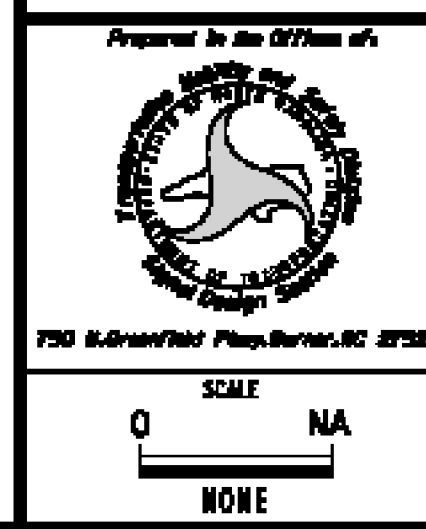


Anchor Bolt Detail

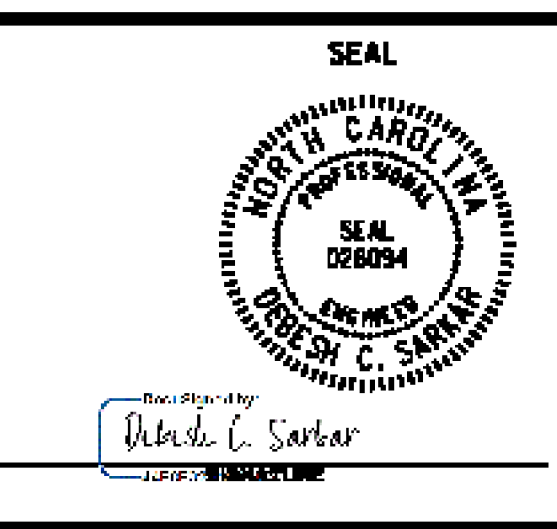


Note: Base plate may be circular, octagonal, square or rectangular in shape.

Typical Base Plate Detail



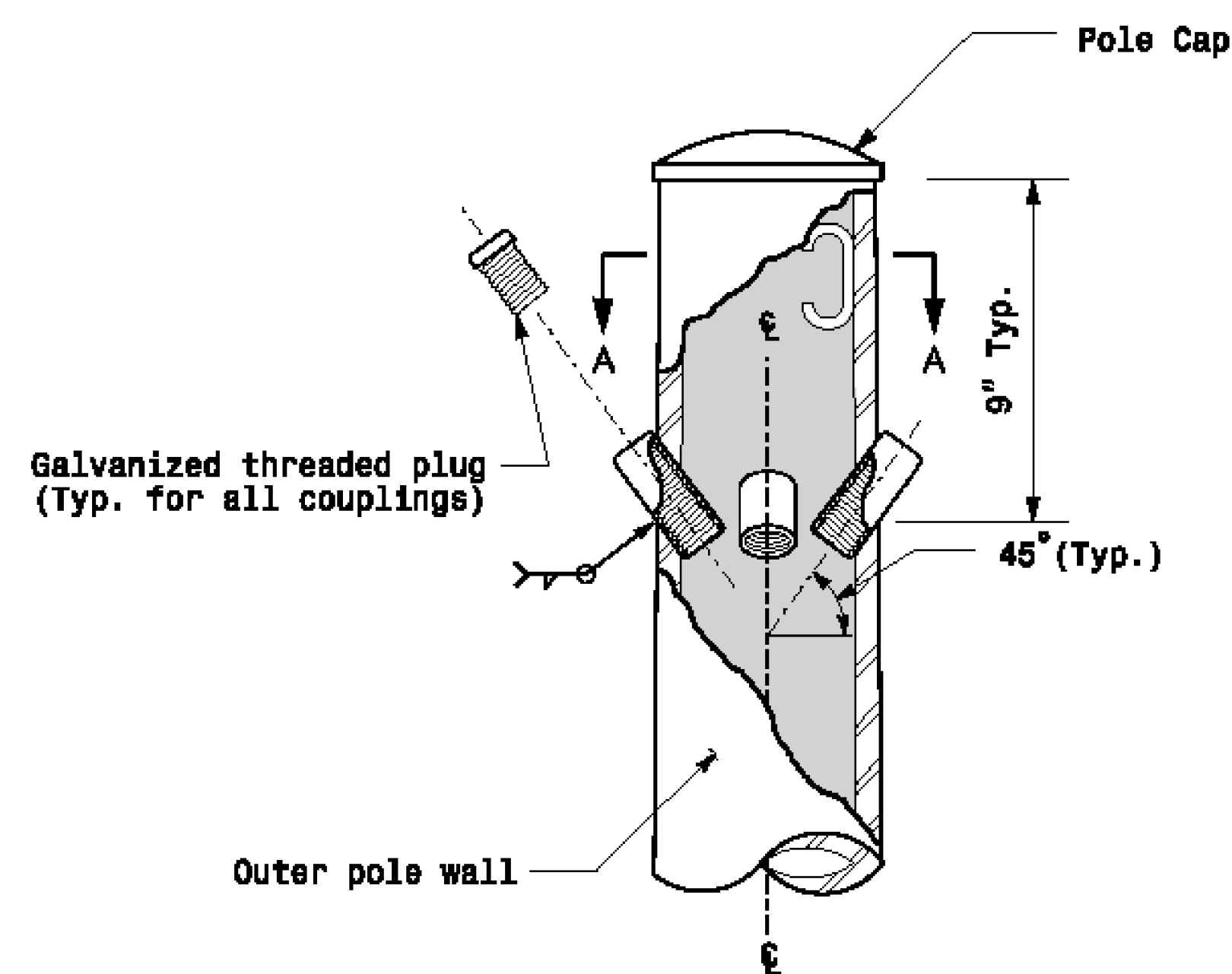
| | |
|---|---------------------------|
| Typical Fabrication Details For All Metal Poles | |
| PLAN DATE: OCTOBER 2017 | DESIGNED BY: C.F. ANDREWS |
| PREPARED BY: N. BITTLING | REVIEWED BY: D.C. BARKAR |
| REVISIONS | INIT. DATE |
| | |



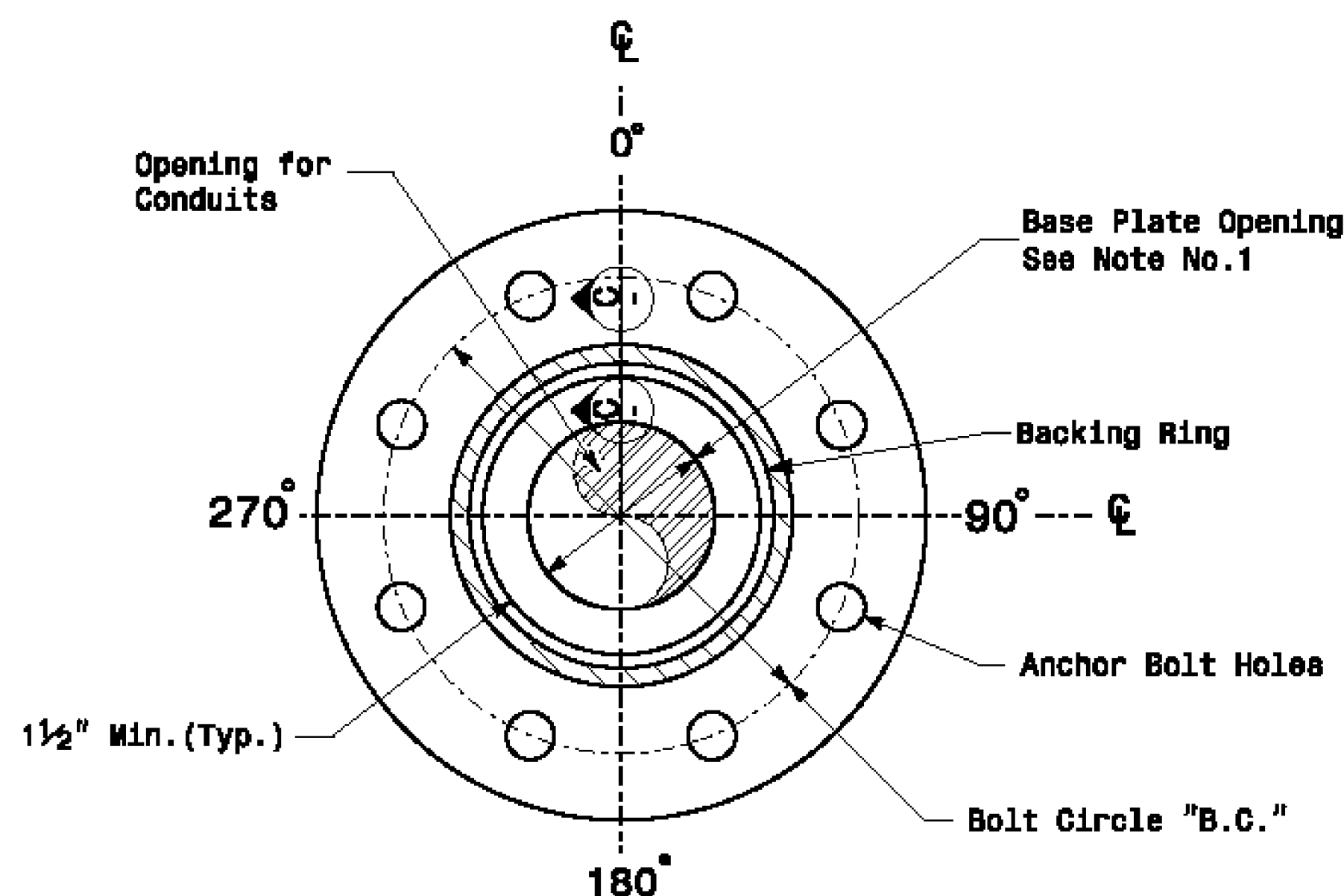
10/11/2017 DATE

11-067-2017 08:30 514 15264115 5100 1545 1001 1001 Section Section Eastern Region\mkt Sheets\2017\2014 Sig. M2 Std. Fabrication Detail 15-111 Poles.dgn

Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".

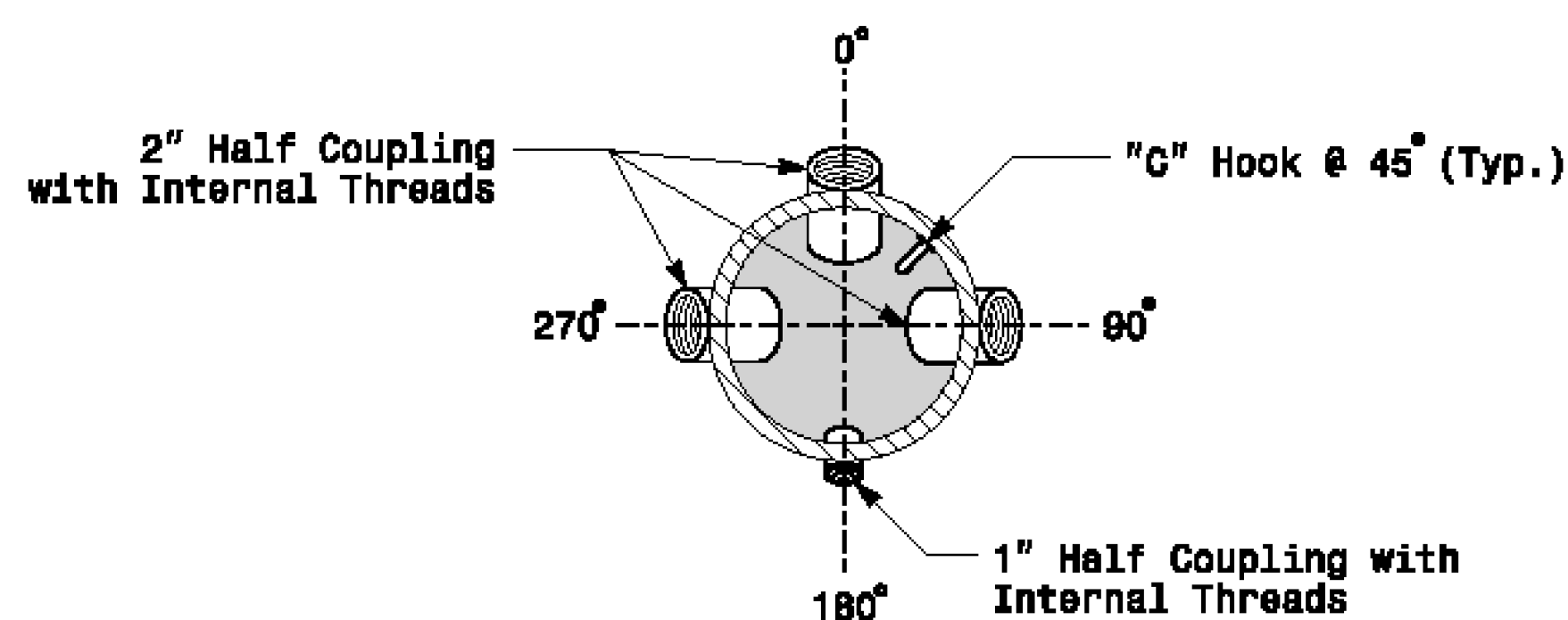


Cable Entrances at Top of Pole

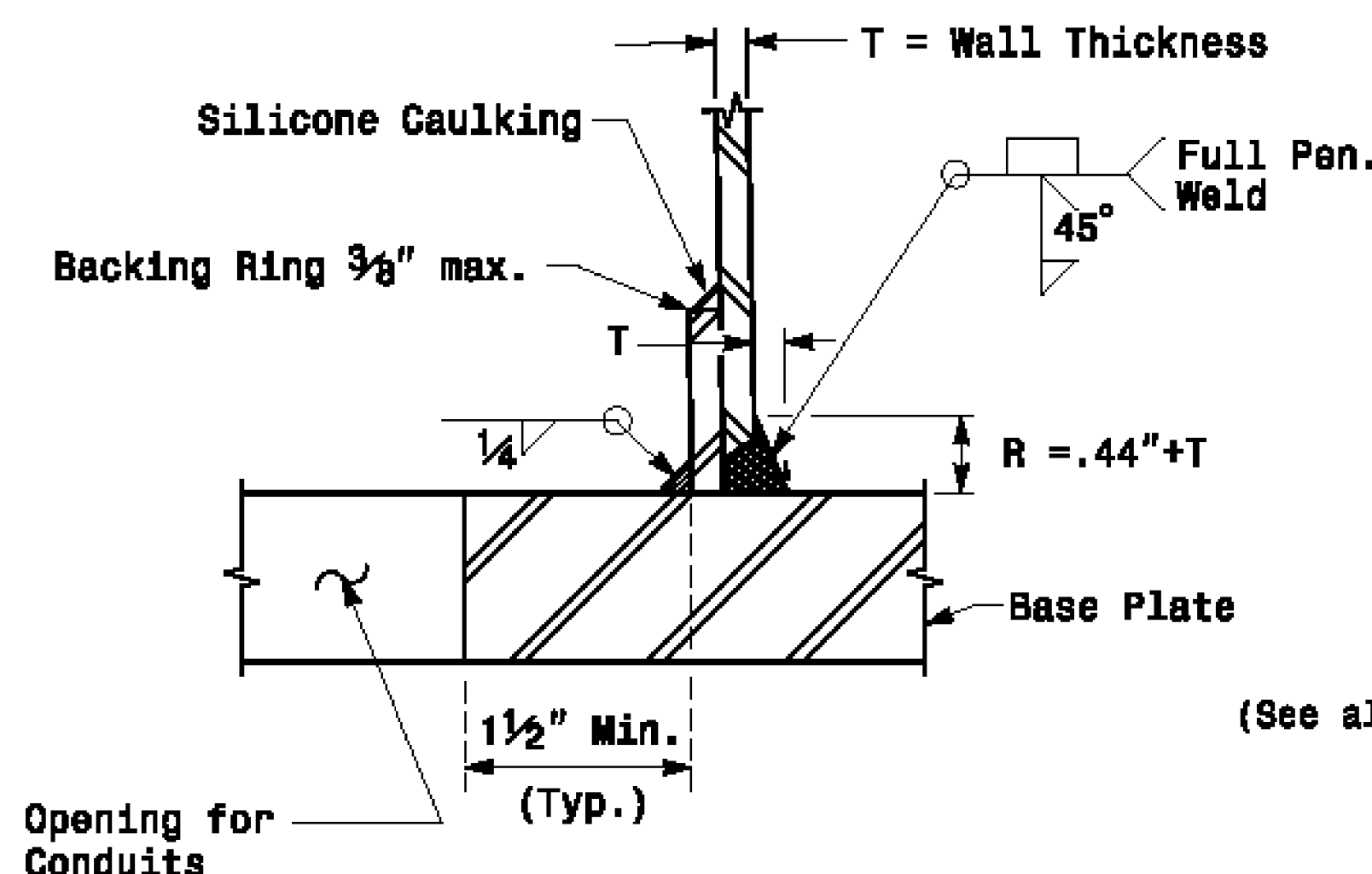


**Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)**

2 Cable Clamps designed for variable attachment heights from 1'-6" to 5'-0" below the top of the pole.



**Section A-A
Radial Orientation for Factory Installed
Accessories at Top of Pole**



**Section C-C
(Pole Attachment to Base Plate)
Full-Penetration
Groove Weld Detail**

Shaft I.D. Tag (See drawing M2 for details)

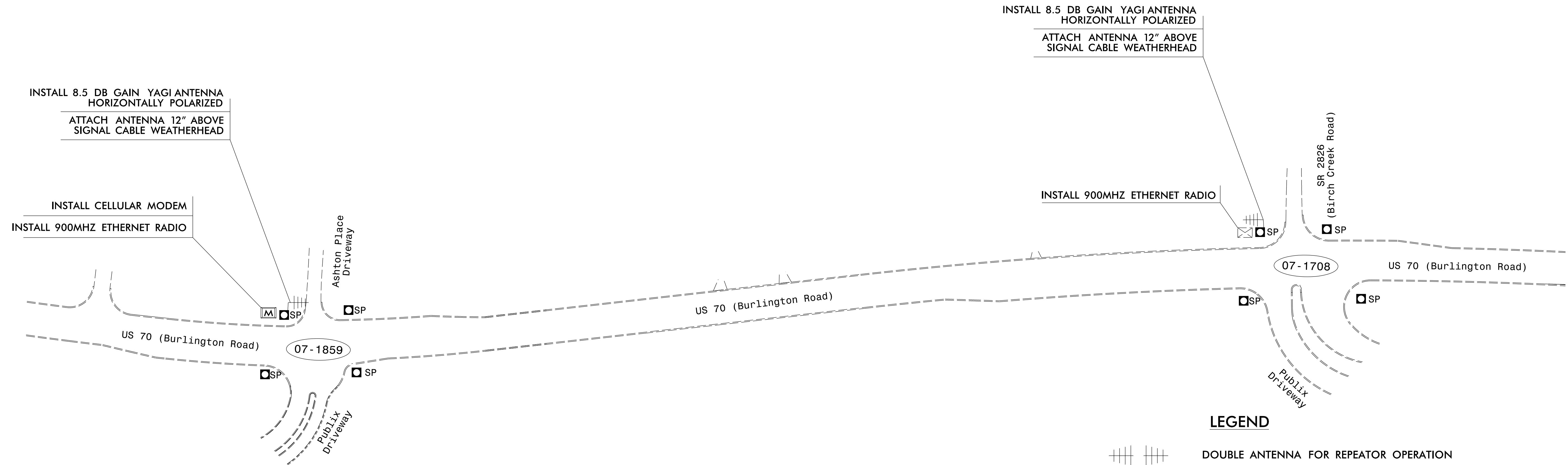
Terminal Compartment (See drawing M2 for details)

Anchor Bolt (See also drawing M2 for details)

Monotube Strain Pole

| | | | |
|-------------|---|---|------------------|
| | Typical Fabrication Details For Strain Poles | | |
| | PLAN DATE: OCTOBER 2017 PREPARED BY: N. BITTING | DESIGNED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR | |
| SCALE: NONE | REVISIONS: | INIT. DATE | DATE: 10/11/2017 |

Fabrication Details - Strain Poles



LEGEND

- DOUBLE ANTENNA FOR REPEATOR OPERATION
- SINGLE ANTENNA
- EXISTING CONTROLLER AND CABINET
- NEW CONTROLLER AND CABINET
- EXISTING MASTER CONTROLLER AND CABINET
- XX-XXXX SIGNAL INVENTORY NUMBER
- NEW METAL POLE W/MAST ARM
- EXISTING METAL POLE W/MAST ARM
- NEW METAL POLE
- EXISTING METAL POLE
- SP SIGNAL POLE
- EXISTING CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX

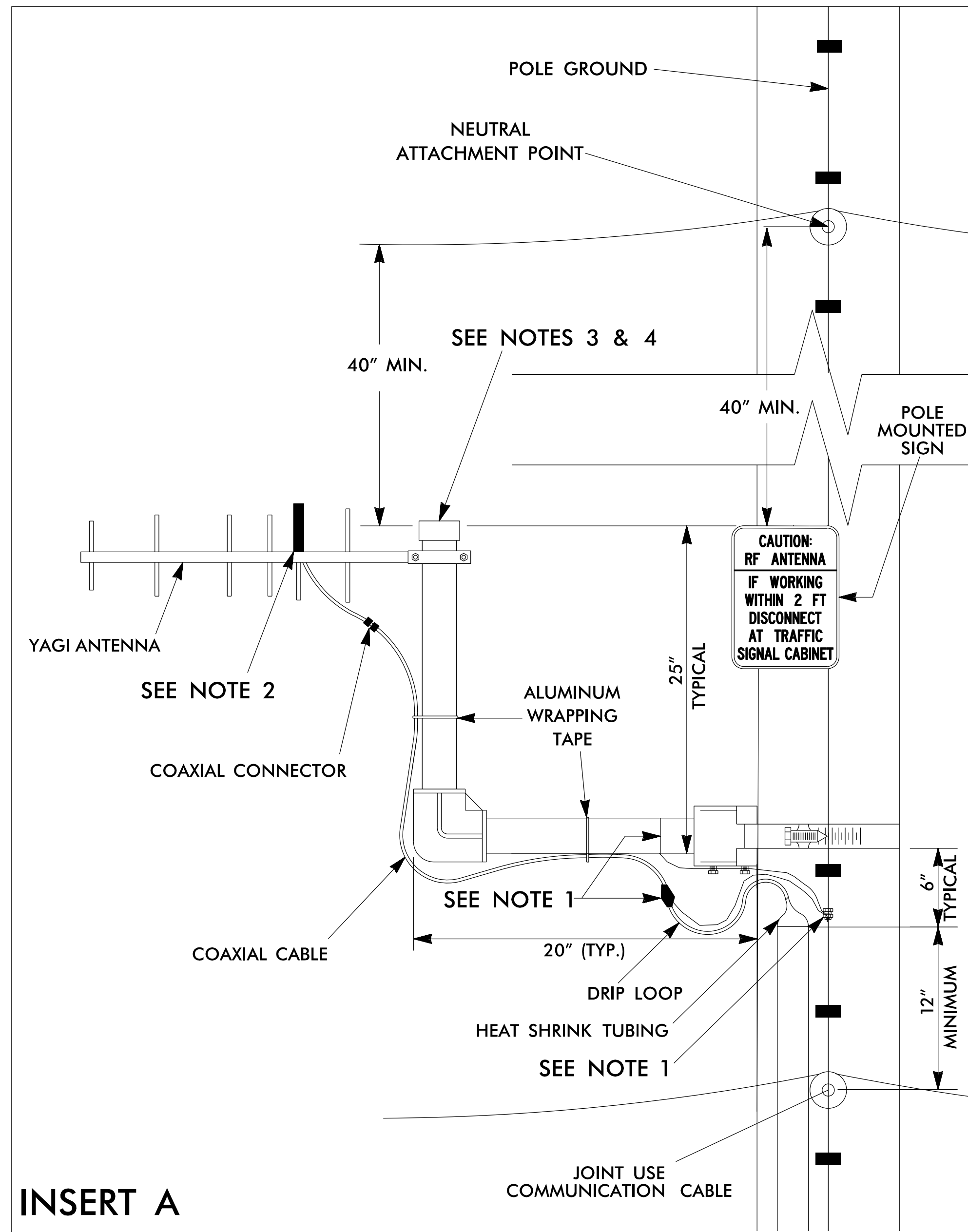
NOTES FOR WIRELESS COMMUNICATIONS:

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



Wireless Communication Plan

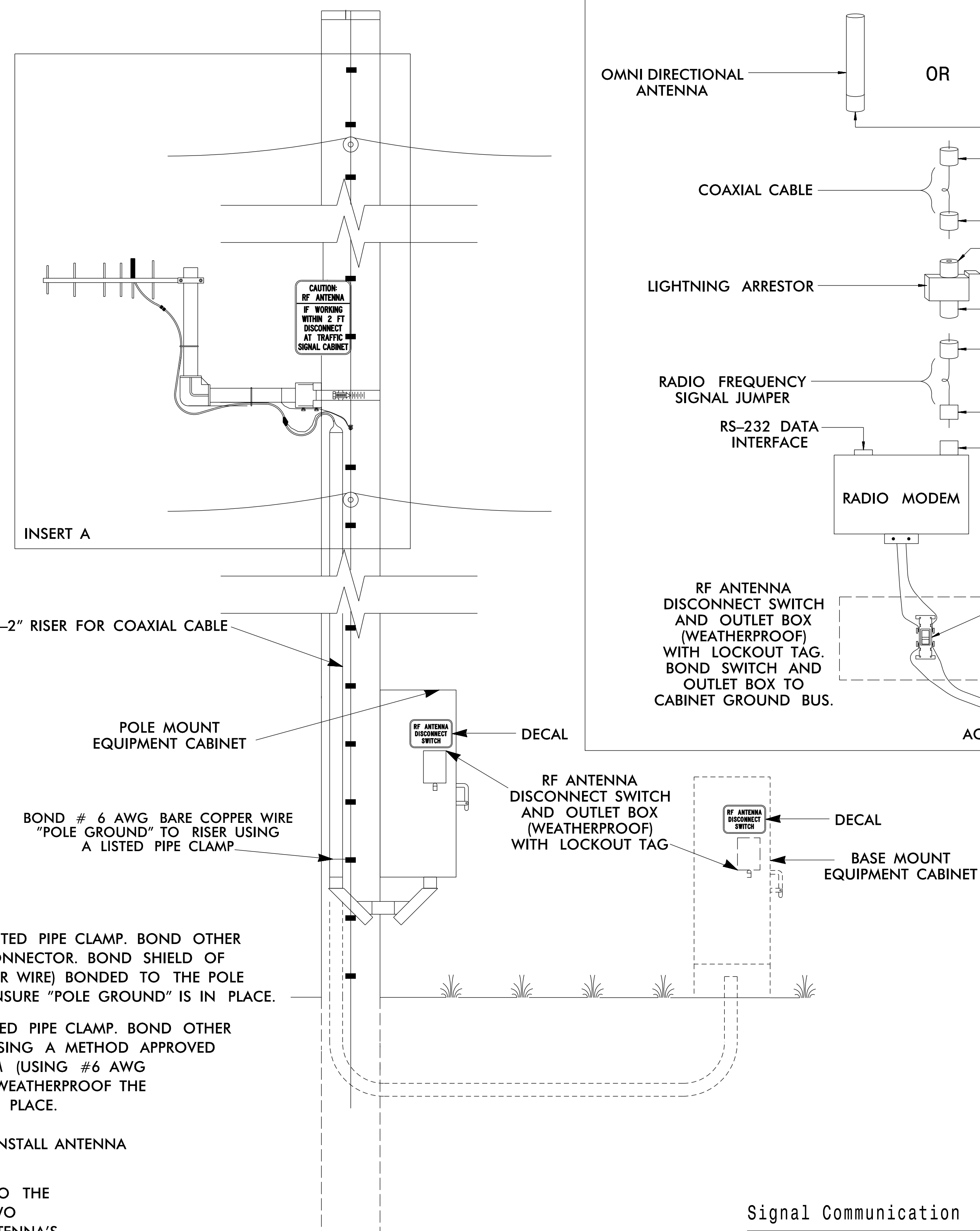
| | | | |
|---|---|-------------------------|--|
| Prepared for the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529 | US 70 (Burlington Rd) | | |
| | Division 7 Guilford County Greensboro PLAN DATE: September 2019 REVIEWED BY: M. Stygles PREPARED BY: J. Ma REVIEWED BY: | REVISIONS INIT. DATE | |



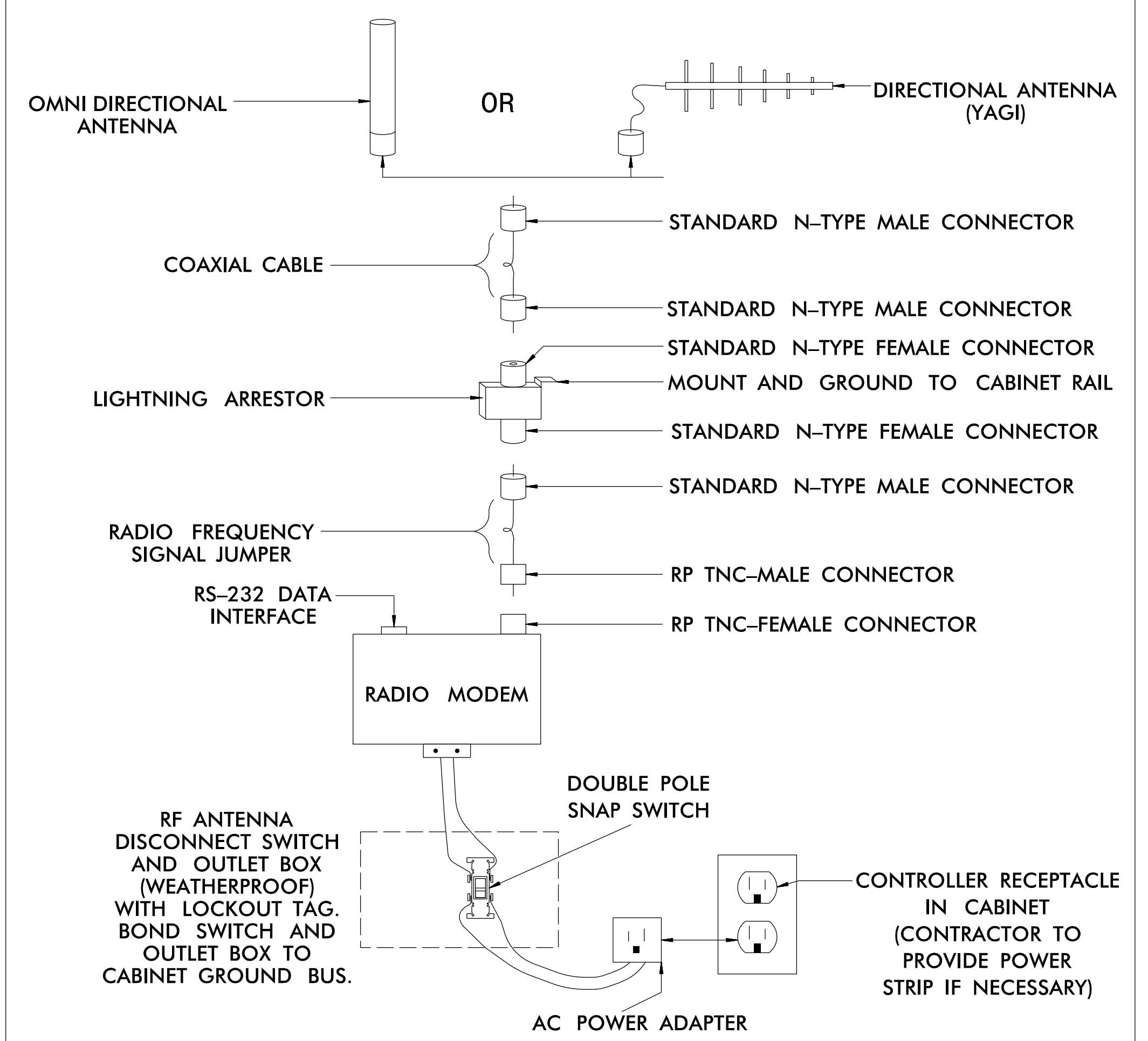
INSERT A

NOTES

- WOOD POLE — BOND # 6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF # 6 AWG SOLID BARE COPPER WIRE TO THE POLE OR EXISTING SYSTEM GROUND USING A METHOD APPROVED BY THE ENGINEER. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "POLE GROUND" IS IN PLACE.
 METAL POLE — BOND # 6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF # 6 AWG SOLID BARE COPPER WIRE TO THE POLE OR EXISTING SYSTEM GROUND USING A METHOD APPROVED BY THE ENGINEER. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "SYSTEM GROUND" IS IN PLACE.
- YAGI ANTENNA SHOWN IN VERTICAL POLARIZATION POSITION FOR CLARIFICATION. TYPICALLY INSTALL ANTENNA IN HORIZONTAL POLARIZATION POSITION.
- TO CONSERVE VERTICAL SPACING ON THE POLE (JOINT-USE OR SIGNAL POLE) WITH REGARDS TO THE SURROUNDING UTILITIES, INSTALL THE ANTENNA MOUNTING HARDWARE USING ONE OF THE TWO METHODS LISTED BELOW: (ENSURE THAT THE MOUNTING METHOD DOES NOT DEGRADE THE ANTENNA'S SIGNAL INTEGRITY)
 - ROTATE THE VERTICAL SUPPORT ARM 90 DEGREES SUCH THAT THE ANTENNA IS AT THE SAME HEIGHT AS THE HORIZONTAL SUPPORT ARM.
 - ELIMINATE THE VERTICAL SUPPORT ARM AND MOUNT THE ANTENNA TO THE HORIZONTAL SUPPORT ARM.
 - ANTENNA, ANTENNA SUPPORT ARM, AND SIGN TO MAINTAIN A 40" SEPARATION FROM NEUTRAL /POWER AND 12" FROM OTHER UTILITIES.
- INSTALL AN END CAP TO SEAL THE EXPOSED END OF THE MOUNTING PIPE.



ANTENNA AND COAXIAL CABLE CONNECTION SCHEMATIC



Signal Communication

| | | | |
|--|---|--|--|
| Prepared for the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529 | US 70 (Burlington Rd) Wireless Radio Antenna Typical Details | | DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL SEAL 033108 JIANXIN MA ENGINEER 9/9/2019 |
| | Division 7 Guilford County Greensboro PLAN DATE: September 2019 PREPARED BY: J. Ma REVISIONS: _____ INIT. DATE _____ | REVIEWED BY: M. Stygles REVIEWED BY: _____ DATE: _____ | |

