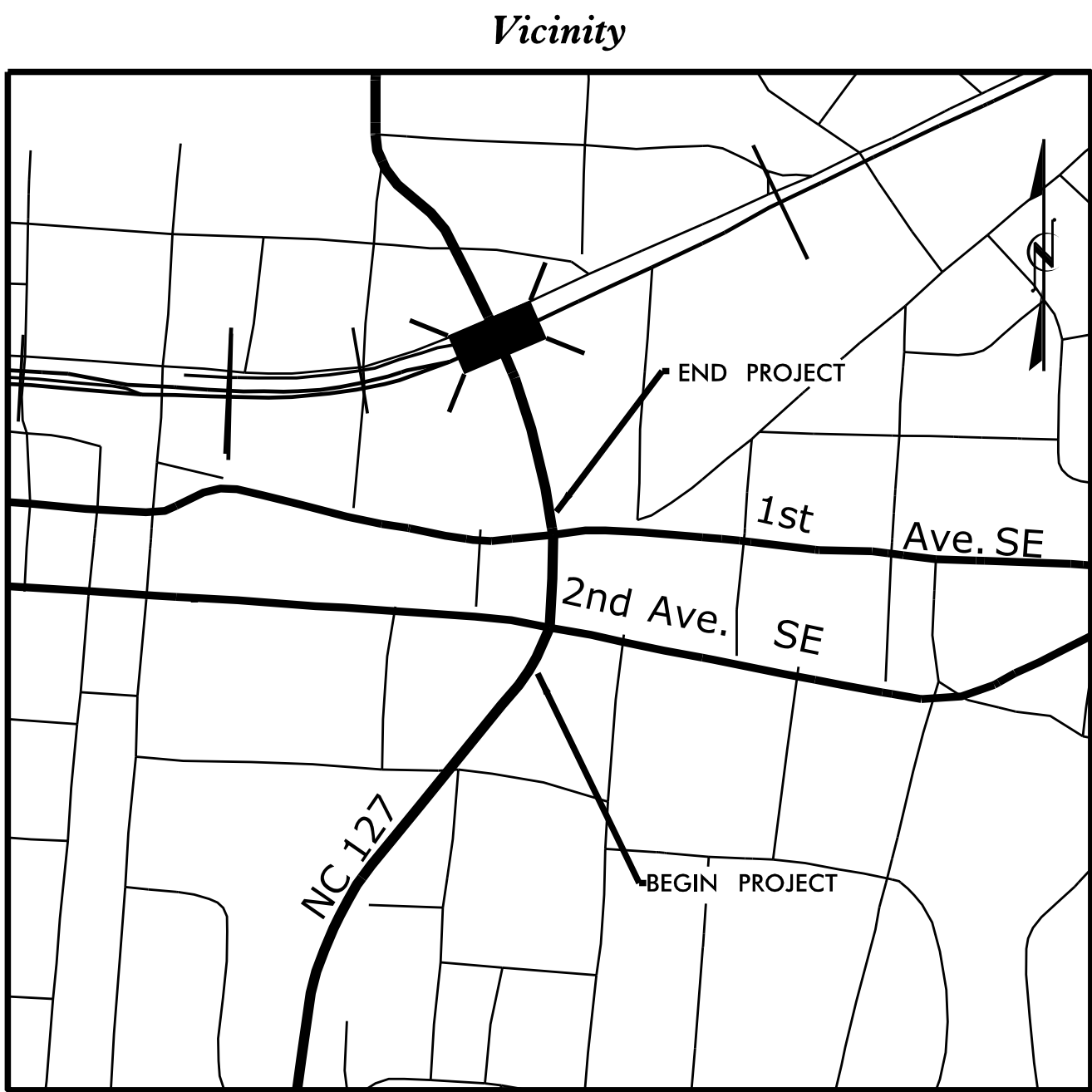


Project: U-5777

Contract:

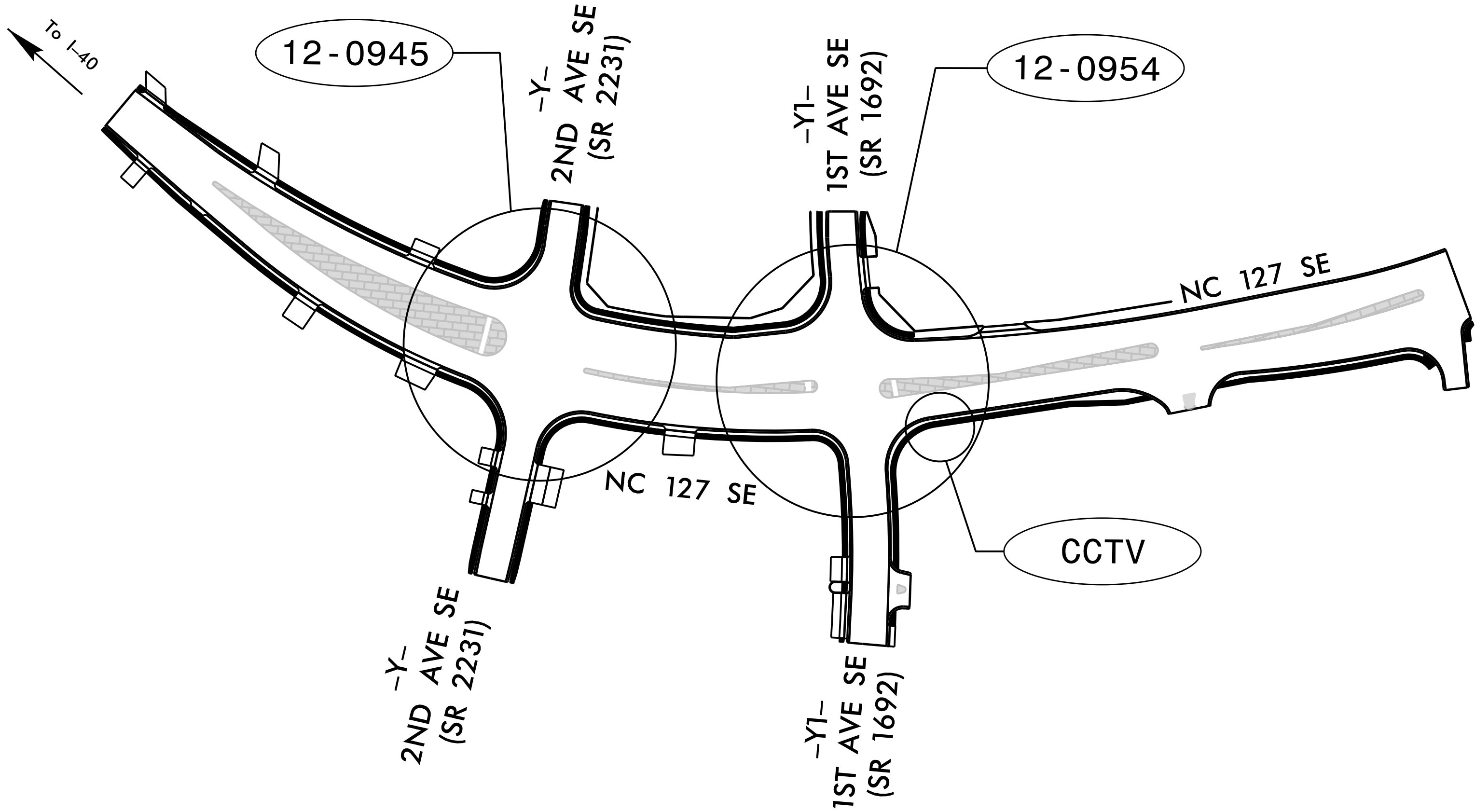


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

CATAWBA COUNTY

LOCATION: NC 127 FROM 1ST AVENUE SE TO 2ND AVENUE SE

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS



**PLANS PREPARED BY:**  
**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

**Natasha R. Simmons, P.E., PTOE – Project Engineer**  
**J. Andrew Wagner, P.E. – Design Engineer**  
**Nicole K. Vlanich, P.E. – Design Engineer**  
**Emily E. Tiller – Design Engineer**  
**Garrett D. Berry – Design Technician**

| Index of Plans |             |                                   |
|----------------|-------------|-----------------------------------|
| Sheet #        | Reference # | Location/Description              |
| Sig. 1.0       | -----       | Title Sheet                       |
| Sig. 2.0-7.5   | 12-0945     | NC 127 at SR 2231 (2nd Ave SE)    |
| Sig. 8.0-13.5  | 12-0954     | NC 127 at SR 1692 (1st Ave SE)    |
| Sig. M1A-M9    | -----       | Standard Drawings for Metal Poles |
| SCP. 1-3       | -----       | Signal Communication Plans        |

**LEGEND**  
SIGNAL INVENTORY NUMBER  
12-####

**TRANSPORTATION SYSTEMS  
MANAGEMENT & OPERATIONS**

**Contacts:**  
**R. Nicholas Zinser, PE – Western Region Signals Engineer**  
**Todd Joyce, PE – Signal Equipment Design Engineer**  
**Gregg Green – Signal Communications Project Engineer**

**NCDOT – DIVISION 12**

**Contacts:**  
**Scott M. Poston – Division Traffic Engineer**  
**Randy D. Steskal, PE, PLS – Regional Traffic Engineer**

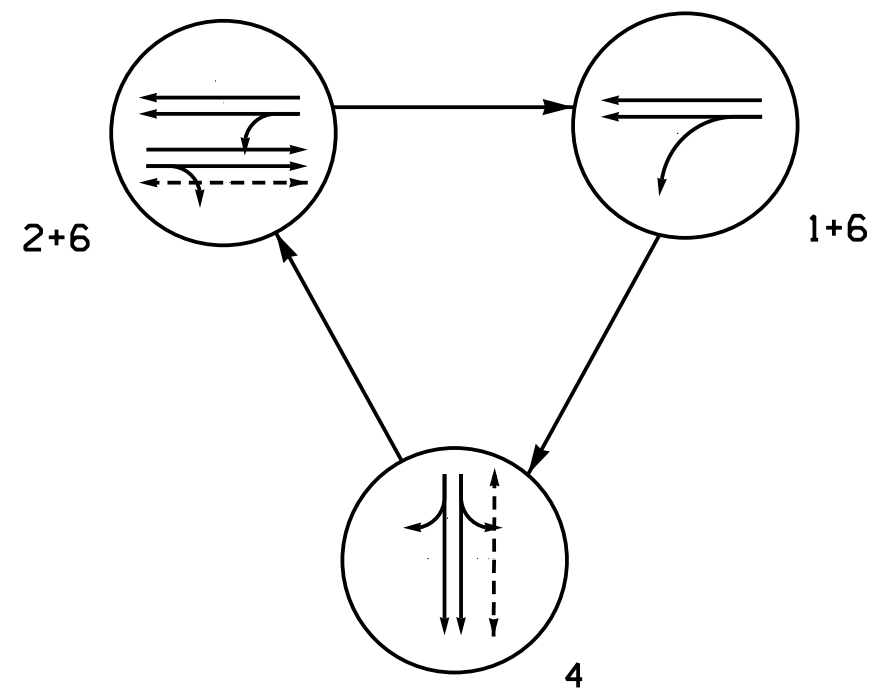
Refer to “Roadway Standard Drawings  
NCDOT” dated January 2024 and  
“Standard Specifications for Roads  
and Structures” dated January 2024.

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

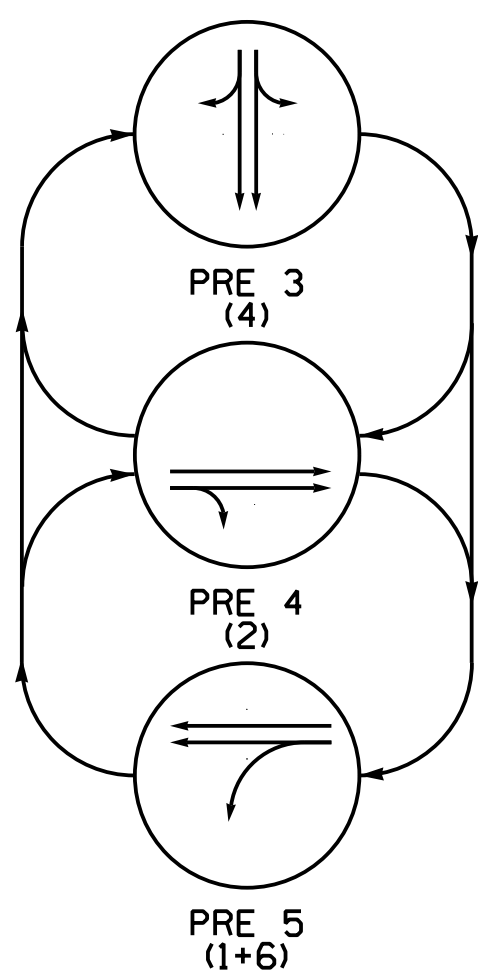
750 N. Greenfield Parkway, Garner, NC 27529

|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5777                | Sig. 2.0  |

### PHASING DIAGRAM



## EV PREEMPT PHASES



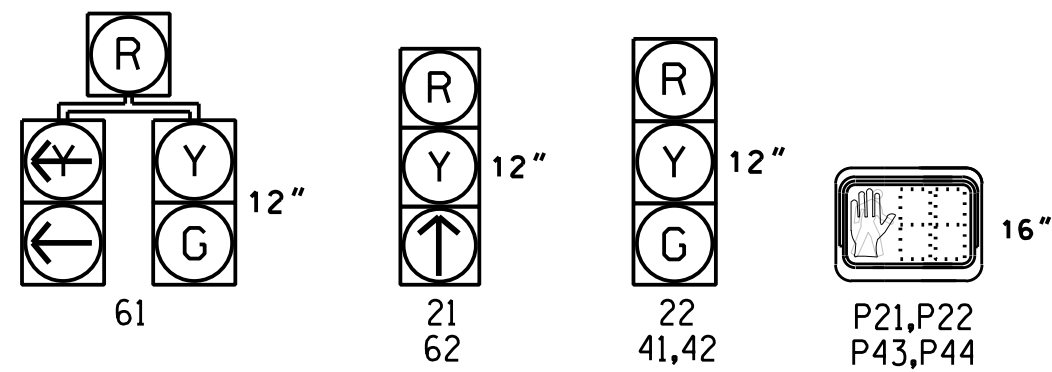
### PHASING DIAGRAM DETECTION LEGEND

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

| TABLE OF OPERATION |              |             |    |                  |                  |                  |                       |
|--------------------|--------------|-------------|----|------------------|------------------|------------------|-----------------------|
| SIGNAL<br>FACE     | PHASE        |             |    |                  |                  |                  |                       |
|                    | 1<br>+<br>6  | 2<br>+<br>6 | 4  | P<br>R<br>E<br>3 | P<br>R<br>E<br>4 | P<br>R<br>E<br>5 | F<br>L<br>A<br>S<br>H |
| 21                 | R            | ↑           | R  | R                | ↑                | R                | R                     |
| 22                 | R            | G           | R  | R                | G                | R                | R                     |
| 41,42              | R            | R           | G  | G                | R                | R                | R                     |
| 61                 | <del>G</del> | G           | R  | R                | R                | <del>G</del>     | R                     |
| 62                 | ↑            | ↑           | R  | R                | ↑                | ↑                | R                     |
| P21,P22            | DW           | W           | DW | DW               | DW               | DW               | DR                    |
| P43,P44            | DW           | DW          | W  | DW               | DW               | DW               | DR                    |

SIGNAL FACE I.D.

All Heads L.E.D.



3 Phase with EVP  
Pre-Timed  
Hickory City Signal System

## NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
6. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Hickory Signal System Data:  
Controller Asset #0316.

### LEGEND

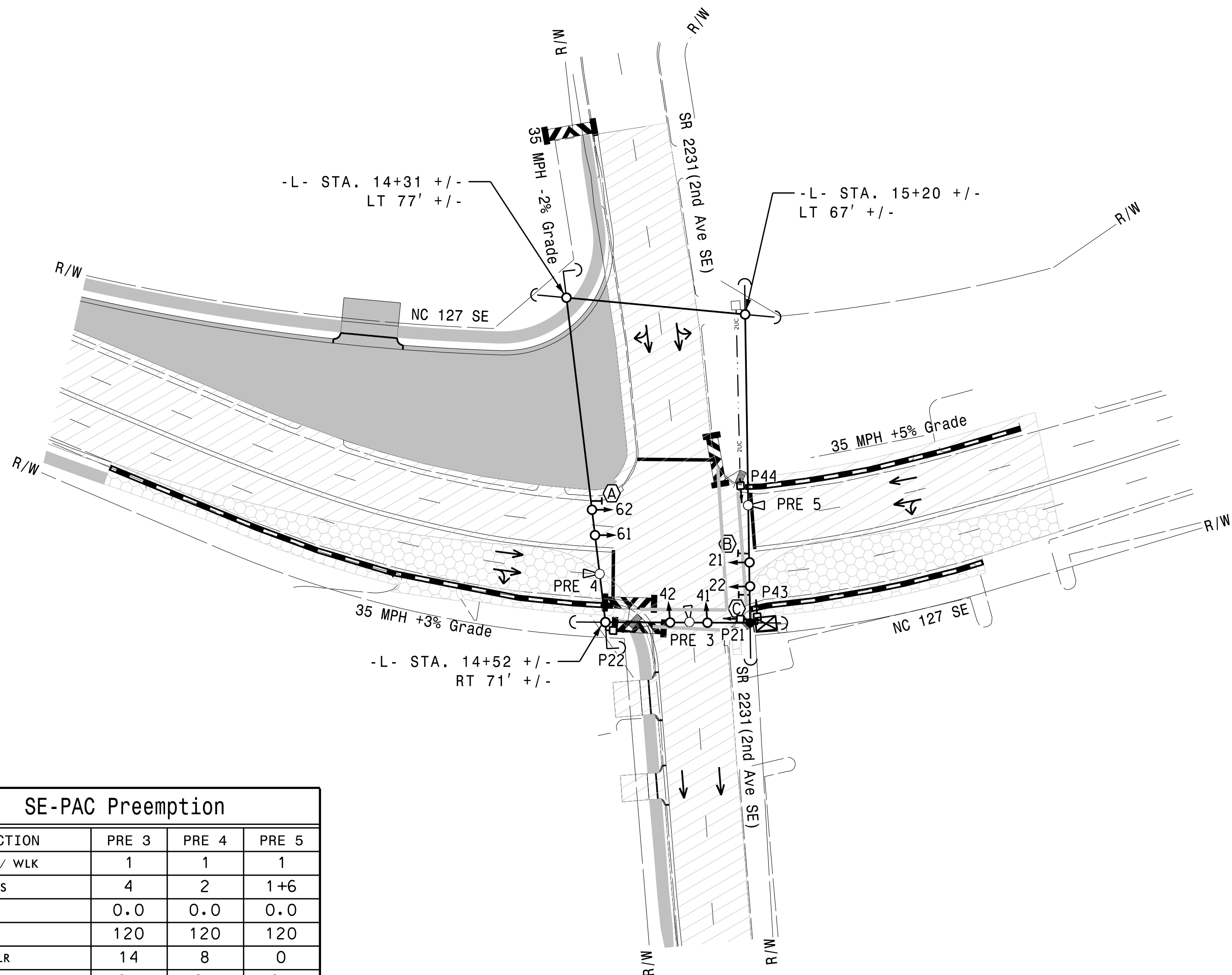
| PROPOSED |                                | EXISTING |
|----------|--------------------------------|----------|
|          | Traffic Signal Head            |          |
|          | Modified Signal Head           | N/A      |
|          | Sign                           |          |
|          | Pedestrian Signal Head         |          |
|          | With Push Button & Sign        |          |
|          | Signal Pole with Guy           |          |
|          | Signal Pole with Sidewalk Guy  |          |
|          | Out of Pavement Detector       |          |
|          | Controller & Cabinet           |          |
|          | Junction Box                   |          |
|          | 2-in Underground Conduit       |          |
| N/A      | Right of Way                   |          |
|          | Barrier                        | N/A      |
|          | Directional Arrow              |          |
|          | Type II Signal Pedestal        |          |
|          | Construction Zone              | N/A      |
|          | Wedge/Widen                    |          |
|          | Temporary Pavement             |          |
| N/A      | Curb Ramp                      |          |
|          | Pedestrian Barricade           | N/A      |
|          | No Right Turn Sign (R3-1)      |          |
|          | No Left Turn Sign (R3-2)       |          |
|          | "NO TURN ON RED" Sign (R10-11) |          |

| SE-PAC 2070 TIMING CHART |            |                |                |                |
|--------------------------|------------|----------------|----------------|----------------|
| FEATURE                  | PHASE      |                |                |                |
|                          | 1          | 2              | 4              | 6              |
| Min Green *              | 7          | 10             | 7              | 10             |
| Passage Gap *            | -          | -              | -              | -              |
| Maximum Green *          | 40         | 40             | 40             | 40             |
| Yellow Change            | 3.0        | 3.7            | 4.0            | 3.7            |
| Red Clear                | 1.6        | 1.1            | 1.4            | 1.1            |
| Walk *                   | -          | 14             | 14             | 14             |
| Pedestrian Clear         | -          | 9              | 15             | 9              |
| Advance Walk *           | -          | 7              | 7              | 7              |
| Added Initial *          | -          | -              | -              | -              |
| Maximum Initial *        | -          | -              | -              | -              |
| Time Before Reduction *  | -          | -              | -              | -              |
| Time To Reduce *         | -          | -              | -              | -              |
| Minimum Gap              | -          | -              | -              | -              |
| Recall Mode              | MAX RECALL | MAX/PED RECALL | MAX/PED RECALL | MAX/PED RECALL |
| Vehicle Call Memory      | NON-LOCK   | NON-LOCK       | NON-LOCK       | NON-LOCK       |
| Dual Entry               | -          | -              | -              | -              |
| Simultaneous Gap         | ON         | ON             | ON             | ON             |

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

| SE-PAC Preemption |       |       |       |
|-------------------|-------|-------|-------|
| FUNCTION          | PRE 3 | PRE 4 | PRE 5 |
| MIN GRN / WLK     | 1     | 1     | 1     |
| EXIT PHASES       | 4     | 2     | 1+6   |
| DELAY             | 0.0   | 0.0   | 0.0   |
| MXCALL            | 120   | 120   | 120   |
| SEL PED CLR       | 14    | 8     | 0     |
| SEL YEL / 10      | 0*    | 0*    | 0*    |
| SEL RED / 10      | 0*    | 0*    | 0*    |
| TRACK GREEN       | 0     | 0     | 0     |
| TRK PED CLR       | 0     | 0     | 0     |
| TRK YEL / 10      | 0     | 0     | 0     |
| TRK RED / 10      | 0     | 0     | 0     |
| DWELL GRN         | 7     | 10    | 10    |
| RET PED CLR       | 0     | 0     | 0     |
| RET YEL / 10      | 0*    | 0*    | 0*    |
| RET RED / 10      | 0*    | 0*    | 0*    |
| PREEMPT EXTEND**  | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.



Signal Upgrade -  
Temporary Design 1  
(Construction Phase 1)

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

|                                                                                                        |                                              |                              |                                                                                               |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------|-----------------------------------------------------------------------------------------------|
| <br>Prepared For: | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)      |                              | SEAL<br> |
|                                                                                                        | Division 12      Catawba County      Hickory |                              |                                                                                               |
|                                                                                                        | PLAN DATE:    October 2023                   | REVIEWED BY:    N.K. Vianich |                                                                                               |
|                                                                                                        | PREPARED BY:    E.E. Tiller                  | REVIEWED BY:    N.R. Simmons |                                                                                               |
| REVISIONS      INIT.      DATE                                                                         |                                              |                              |                                                                                               |
|                                                                                                        |                                              |                              |                                                                                               |
|                                                                                                        |                                              |                              |                                                                                               |
|                                                                                                        |                                              |                              |                                                                                               |

  
 750 N. Greenfield Pkwy, Corner, NC 27252

DocuSigned by:  

 N. K. Vianich    9/6/2024  
 CEROA    SIGNATURE      DATE

SIGNED  

 N. R. Simmons    12-0945T  
 SIGNED      INVENTORY NO.    DATE



0      40  
 1" = 40'

SCALE



ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

Assign advanced walk to peds 2, 4, and 6 as shown below.

PHASE MENU

1-VEHICLE DATA

2-DENSITY TIMES+

3-PEDESTRIAN DATA

4-INIT & NA RESP+

5-N.LOCK & MISC+

6-SPEC. SEQUENCE+

7-DETECTOR DATA

8-PHASE & BANK COPY

9-SELECT PHASE BANK

'+' DENOTES BANKABLE DATA [1]

PEDESTRIAN MENU

1-PED TIMES+

2-PED RECALL+

3-PED OFFSET+

4-MISC PED OPTIONS+

[1]

PHASE.....1...2...3...4...5...6...7...8

WOFF/10 0 70 0 70 0 70 0 0

MODE\* 0 0 0 0 0 0 0 0

CODES: \* 0=ADVANCE 1=DELAY

[1]

ADVANCE WALK PED PROGRAMMING COMPLETE

VEHICLE RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

PHASE MENU

1-VEHICLE DATA

2-DENSITY TIMES+

3-PEDESTRIAN DATA

4-INIT & NA RESP+

5-N.LOCK & MISC+

6-SPEC. SEQUENCE+

7-DETECTOR DATA

8-PHASE & BANK COPY

9-SELECT PHASE BANK

'+' DENOTES BANKABLE DATA [1]

VEHICLE DATA

1-VEHICLE TIMES+

2-DYNAMIC MAX+

3-RECALLS+

4-BIKE & AWS TIMES+

[1]

PHASE.....1...2...3...4...5...6...7...8

VEH RCL 3 3 0 3 0 3 0 0

VEH DLY 0 0 0 0 0 0 0 0

CODES.....0...1...2...3...4...5....

NONE 1CALL MIN MAX SOFT BIKE

[1]

VEH RECALL PROGRAMMING COMPLETE

PEDESTRIAN RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

PHASE MENU

1-VEHICLE DATA

2-DENSITY TIMES+

3-PEDESTRIAN DATA

4-INIT & NA RESP+

5-N.LOCK & MISC+

6-SPEC. SEQUENCE+

7-DETECTOR DATA

8-PHASE & BANK COPY

9-SELECT PHASE BANK

'+' DENOTES BANKABLE DATA [1]

PEDESTRIAN MENU

1-PED TIMES+

2-PED RECALL+

3-PED OFFSET+

4-MISC PED OPTIONS+

[1]

PHASE.....1...2...3...4...5...6...7...8

PED RCL 0 2 0 2 0 2 0 0

PED DLY 0 0 0 0 0 0 0 0

CODES.....0...1...2...3...4....

NONE 1CALL PED NA NA+

[1]

PED RECALL PROGRAMMING COMPLETE

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

SELECT 7-PREEMPT DATA FROM MAIN MENU

- PREEMPT 3 -

PREEMPTS

1-PREEMPT 1

2-PREEMPT 2

3-PREEMPT 3

4-PREEMPT 4

5-PREEMPT 5

6-PREEMPT 6

7-PREEMPT 7

8-PREEMPT 8

9-PREEMPT 9

A-PREEMPT 10

B-PREEMPT 11

C-PREEMPT 12

0-OVERRIDES

D-DEFAULT DATA

PREEMPT 3

1-MISCELLANEOUS

2-INTERVAL TIMES

3-VEHICLE STATUS

6-PEDEST. STATUS

7-OVERLAP STATUS

PREEMPT 3 MISC DATA

TEST: 0

DET: 250 DELAY: 0 MXCAL:120 DB/10: 0

NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0

LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

EXIT 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0

CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 3 menu  
select 2 - Interval Times

PREEMPT 3 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 7

EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN--

GREEN : 0

PED CLR: 14 PED CLR: 0 PED CLR: 0

YEL/10 : 0 YEL/10 : 0 YEL/10 : 0

RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 3 menu  
select 3 - Vehicle Status

PREEMPT 3 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0

DWELL 0 0 0 1 0 0 0 0 0 0 0 0 0 0

(0-RED,1-GRN,2-FLR,3-FLY,4-DARK,5-FLG)

CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(0-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 4 -

PREEMPTS

1-PREEMPT 1

2-PREEMPT 2

3-PREEMPT 3

4-PREEMPT 4

5-PREEMPT 5

6-PREEMPT 6

7-PREEMPT 7

8-PREEMPT 8

9-PREEMPT 9

A-PREEMPT 10

B-PREEMPT 11

C-PREEMPT 12

0-OVERRIDES

D-DEFAULT DATA

PREEMPT 4

1-MISCELLANEOUS

2-INTERVAL TIMES

3-VEHICLE STATUS

6-PEDEST. STATUS

7-OVERLAP STATUS

PREEMPT 4 MISC DATA

TEST: 0

DET: 251 DELAY: 0 MXCAL:120 DB/10: 0

NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0

LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

EXIT 0 1 0 0 0 0 0 0 0 0 0 0 0 0

CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 4 menu  
select 2 - Interval Times

PREEMPT 4 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 10

EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN--

GREEN : 0

PED CLR: 8 PED CLR: 0 PED CLR: 0

YEL/10 : 0 YEL/10 : 0 YEL/10 : 0

RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 4 menu  
select 3 - Vehicle Status

PREEMPT 4 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0

DWELL 0 1 0 0 0 0 0 0 0 0 0 0 0 0

(0-RED,1-GRN,2-FLR,3-FLY,4-DARK,5-FLG)

CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(0-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 5 -

PREEMPTS

1-PREEMPT 1

2-PREEMPT 2

3-PREEMPT 3

4-PREEMPT 4

5-PREEMPT 5

6-PREEMPT 6

7-PREEMPT 7

8-PREEMPT 8

9-PREEMPT 9

A-PREEMPT 10

B-PREEMPT 11

C-PREEMPT 12

0-OVERRIDES

D-DEFAULT DATA

PREEMPT 5

1-MISCELLANEOUS

2-INTERVAL TIMES

3-VEHICLE STATUS

6-PEDEST. STATUS

7-OVERLAP STATUS

PREEMPT 5 MISC DATA

TEST: 0

DET: 252 DELAY: 0 MXCAL:120 DB/10: 0

NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0

LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

EXIT 1 0 0 0 0 1 0 0 0 0 0 0 0 0

CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 5 menu  
select 2 - Interval Times

PREEMPT 5 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 10

EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN--

GREEN : 0

PED CLR: 0 PED CLR: 0 PED CLR: 0

YEL/10 : 0 YEL/10 : 0 YEL/10 : 0

RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 5 menu  
select 3 - Vehicle Status

PREEMPT 5 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0

DWELL 1 0 0 0 0 1 0 0 0 0 0 0 0 0

(0-RED,1-GRN,2-FLR,3-FLY,4-DARK,5-FLG)

CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(0-NO..1-ACT..2-MIN REC..3-MX REC)

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

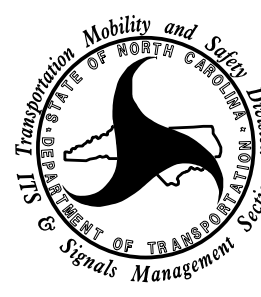
end of programming

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

Signal Upgrade-  
Electrical Detail - Sheet 2 of 3  
(Construction Phase 1)

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945T1  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                 |                                                                                                                                               |                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                                                                                                      | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)                                                                                                       | SEAL<br>NORTH CAROLINA<br>PROFESSIONAL<br>SEAL<br>031464<br>NATASHA R. SIMMONS<br>ENGINEER      |
| Prepared for:<br><br>750 N.Greenfield Pkwy,Garner,NC 27529 | Division 12 Catawba County Hickory<br>PLAN DATE: January 2024 REVIEWED BY: N.K. Vianich<br>PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons | DocuSigned by:<br>Natasha R. Simmons 9/6/2024<br>SIGNATURE DATE<br>SIG. INVENTORY NO. 12-0945T1 |
|                                                                                                                                                 | REVISIONS                                                                                                                                     | INIT. DATE                                                                                      |
|                                                                                                                                                 |                                                                                                                                               |                                                                                                 |
|                                                                                                                                                 |                                                                                                                                               |                                                                                                 |
|                                                                                                                                                 |                                                                                                                                               |                                                                                                 |

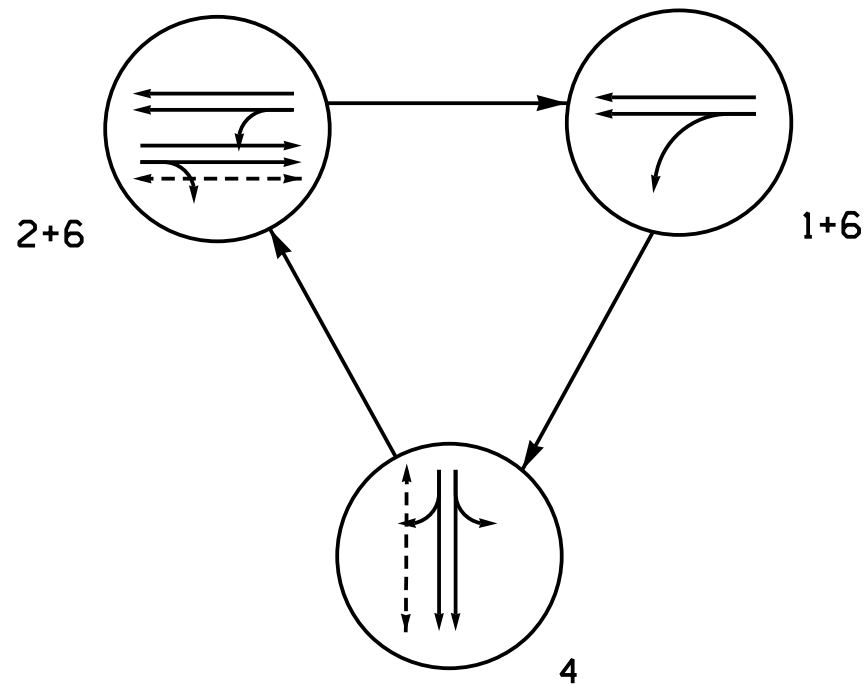
HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997



| PROJECT REFERENCE NO. | SHEET NO. |
|-----------------------|-----------|
| U-5777                | Sig. 3.0  |

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

EV PREEMPT PHASES  
(Medium Priority)

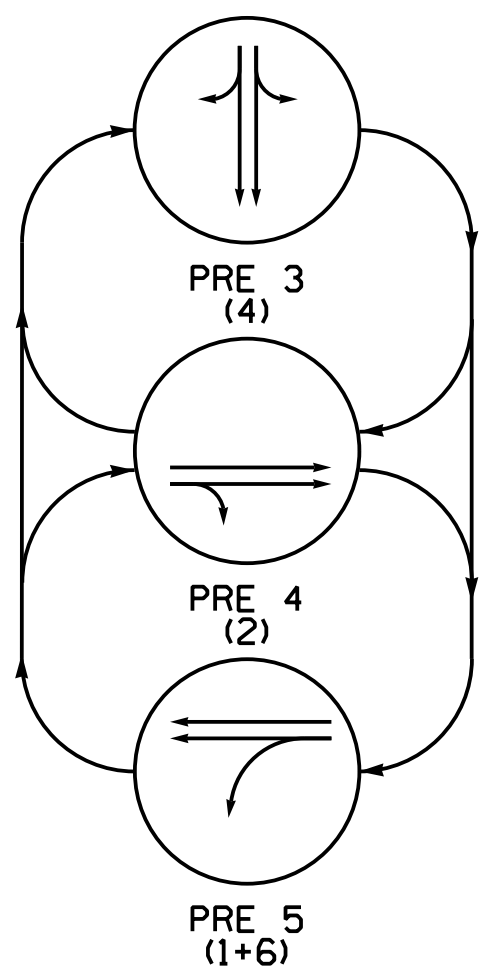
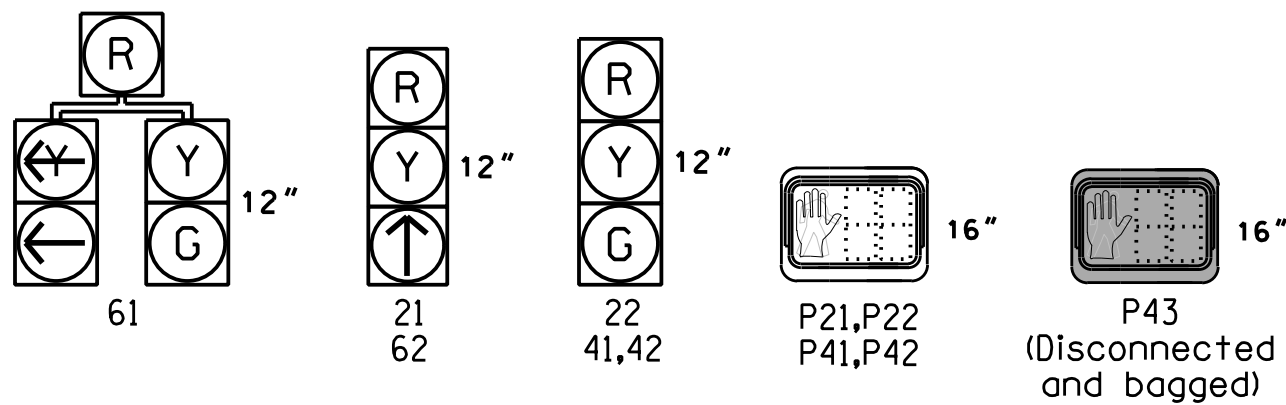


TABLE OF OPERATION

| SIGNAL FACE | PHASE |       |    |       |       |       |       |  |  |  |
|-------------|-------|-------|----|-------|-------|-------|-------|--|--|--|
|             | 1 + 6 | 2 + 6 | 4  | PRE 3 | PRE 4 | PRE 5 | FLASH |  |  |  |
| 21          | R     | ↑     | R  | R     | ↑     | R     | R     |  |  |  |
| 22          | R     | G     | R  | R     | G     | R     | R     |  |  |  |
| 41,42       | R     | R     | G  | G     | R     | R     | R     |  |  |  |
| 61          | ⧵     | G     | R  | R     | ⧵     | R     |       |  |  |  |
| 62          | ↑     | ↑     | R  | R     | R     | ↑     | R     |  |  |  |
| P21,P22     | DW    | W     | DW | DW    | DW    | DW    | DRK   |  |  |  |
| P41,P42     | DW    | DW    | W  | DW    | DW    | DW    | DRK   |  |  |  |

SIGNAL FACE I.D.

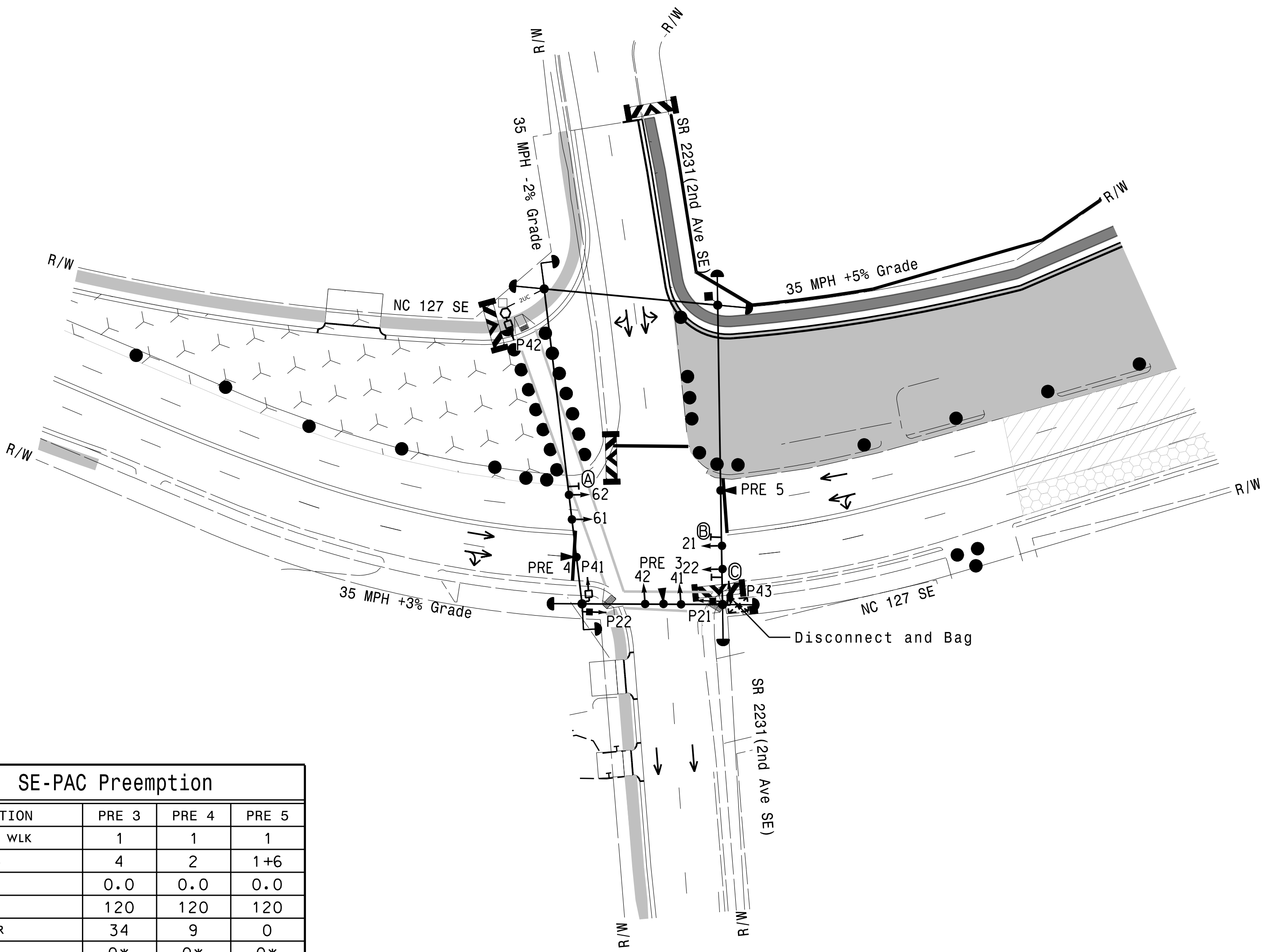
All Heads L.E.D.



3 Phase with EVP  
Pre-Timed  
Hickory City Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Disconnect and bag existing pedestrian head numbered P43.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Hickory Signal System Data: Controller Asset #0316.



SE-PAC 2070 TIMING CHART

| FEATURE                 | PHASE      |                |                |                |
|-------------------------|------------|----------------|----------------|----------------|
|                         | 1          | 2              | 4              | 6              |
| Min Green *             | 7          | 10             | 7              | 10             |
| Passage Gap *           | -          | -              | -              | -              |
| Maximum Green *         | 40         | 40             | 40             | 40             |
| Yellow Change           | 3.0        | 3.7            | 4.0            | 3.7            |
| Red Clear               | 1.6        | 1.3            | 1.4            | 1.3            |
| Walk *                  | -          | 14             | 14             | 14             |
| Pedestrian Clear        | -          | 9              | 34             | 9              |
| Advance Walk *          | -          | 7              | 7              | 7              |
| Added Initial *         | -          | -              | -              | -              |
| Maximum Initial *       | -          | -              | -              | -              |
| Time Before Reduction * | -          | -              | -              | -              |
| Time To Reduce *        | -          | -              | -              | -              |
| Minimum Gap             | -          | -              | -              | -              |
| Recall Mode             | MAX RECALL | MAX/PED RECALL | MAX/PED RECALL | MAX/PED RECALL |
| Vehicle Call Memory     | NON-LOCK   | NON-LOCK       | NON-LOCK       | NON-LOCK       |
| Dual Entry              | -          | -              | -              | -              |
| Simultaneous Gap        | ON         | ON             | ON             | ON             |

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

SE-PAC Preemption

| FUNCTION         | PRE 3 | PRE 4 | PRE 5 |
|------------------|-------|-------|-------|
| MIN GRN / WLK    | 1     | 1     | 1     |
| EXIT PHASES      | 4     | 2     | 1+6   |
| DELAY            | 0.0   | 0.0   | 0.0   |
| MXCALL           | 120   | 120   | 120   |
| SEL PED CLR      | 34    | 9     | 0     |
| SEL YEL / 10     | 0*    | 0*    | 0*    |
| SEL RED / 10     | 0*    | 0*    | 0*    |
| TRACK GREEN      | 0     | 0     | 0     |
| TRK PED CLR      | 0     | 0     | 0     |
| TRK YEL / 10     | 0     | 0     | 0     |
| TRK RED / 10     | 0     | 0     | 0     |
| DWELL GRN        | 7     | 10    | 10    |
| RET PED CLR      | 0     | 0     | 0     |
| RET YEL / 10     | 0*    | 0*    | 0*    |
| RET RED / 10     | 0*    | 0*    | 0*    |
| PREEMPT EXTEND** | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.

LEGEND

| PROPOSED | EXISTING |
|----------|----------|
|          |          |
|          | N/A      |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
| N/A      |          |
|          | N/A      |
|          |          |
|          |          |
|          | N/A      |
|          |          |
|          |          |
|          |          |
|          |          |
|          | N/A      |
|          |          |
|          |          |
|          |          |

Signal Upgrade -  
Temporary Design 2  
(Construction Phase 1, Step 4)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

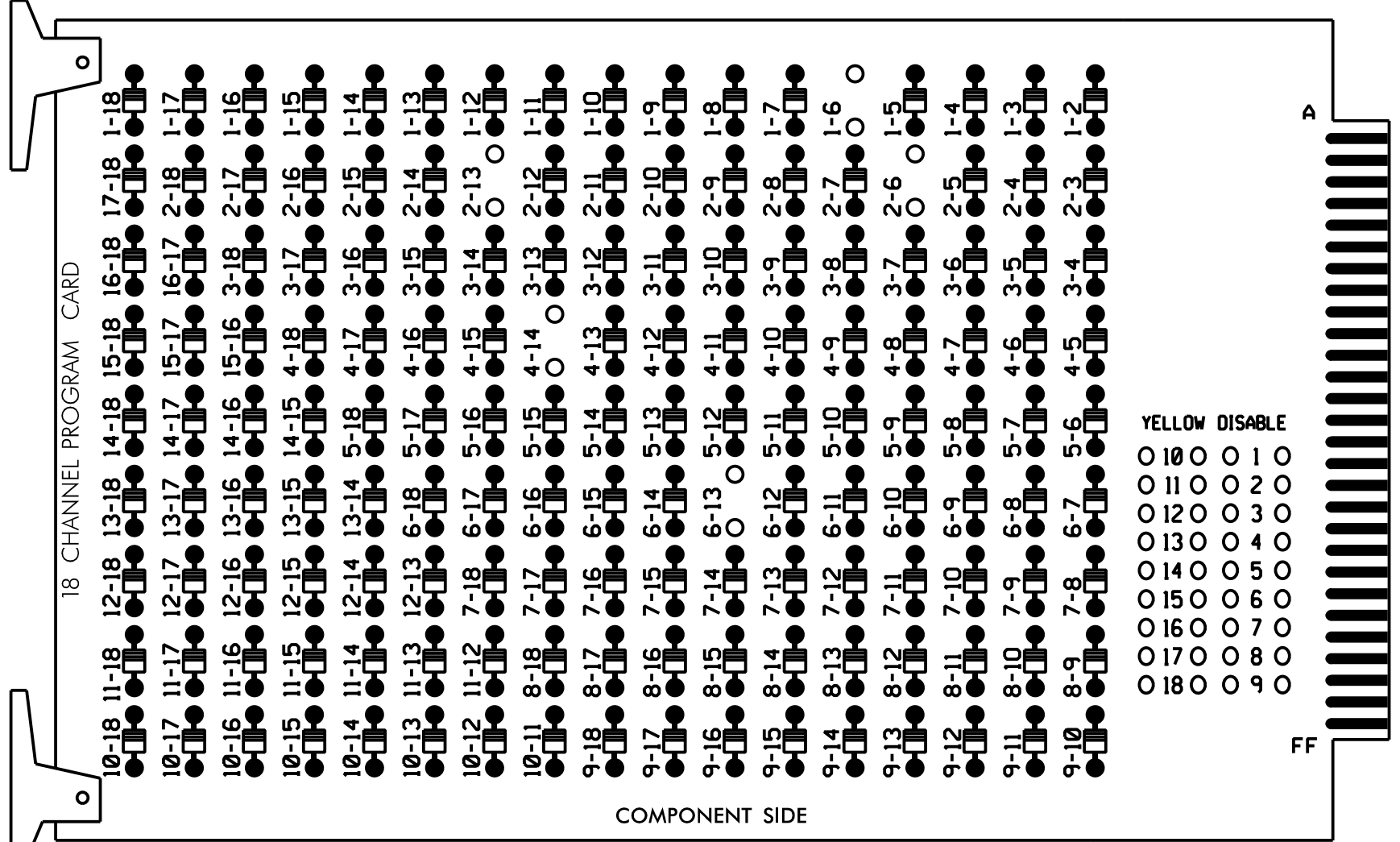
|                                               |                                         |                           |      |
|-----------------------------------------------|-----------------------------------------|---------------------------|------|
|                                               | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE) |                           |      |
|                                               | Division 12 Catawba County Hickory      |                           |      |
|                                               | PLAN DATE: October 2023                 | REVIEWED BY: N.K. Vianich |      |
|                                               | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons |      |
| REVISIONS                                     |                                         | INIT.                     | DATE |
| 0 40<br>1"=40'                                |                                         |                           |      |
| DocuSigned by:<br>Natasha R. Simmons 9/6/2024 |                                         | DATE                      |      |
| SIC. INVENTORY NO. 12-094572                  |                                         |                           |      |

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

18 CHANNEL CONFLICT MONITOR  
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 2-6, 2-13, 4-14 and 6-13.



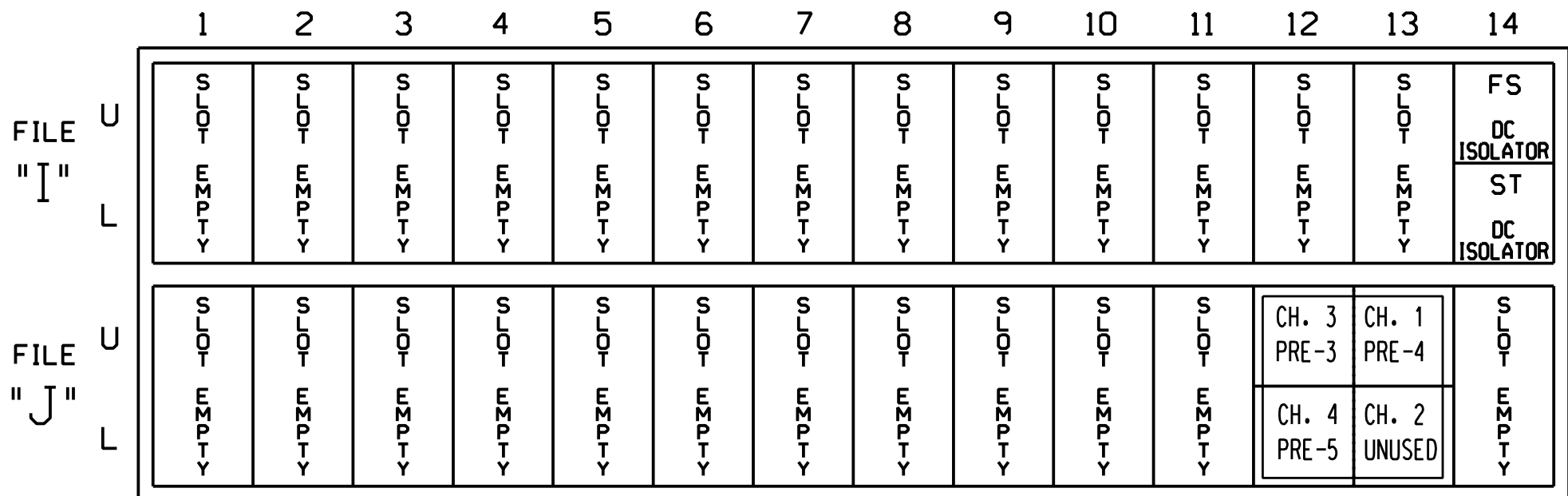
■ = DENOTES POSITION OF SWITCH

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.

INPUT FILE POSITION LAYOUT

(front view)



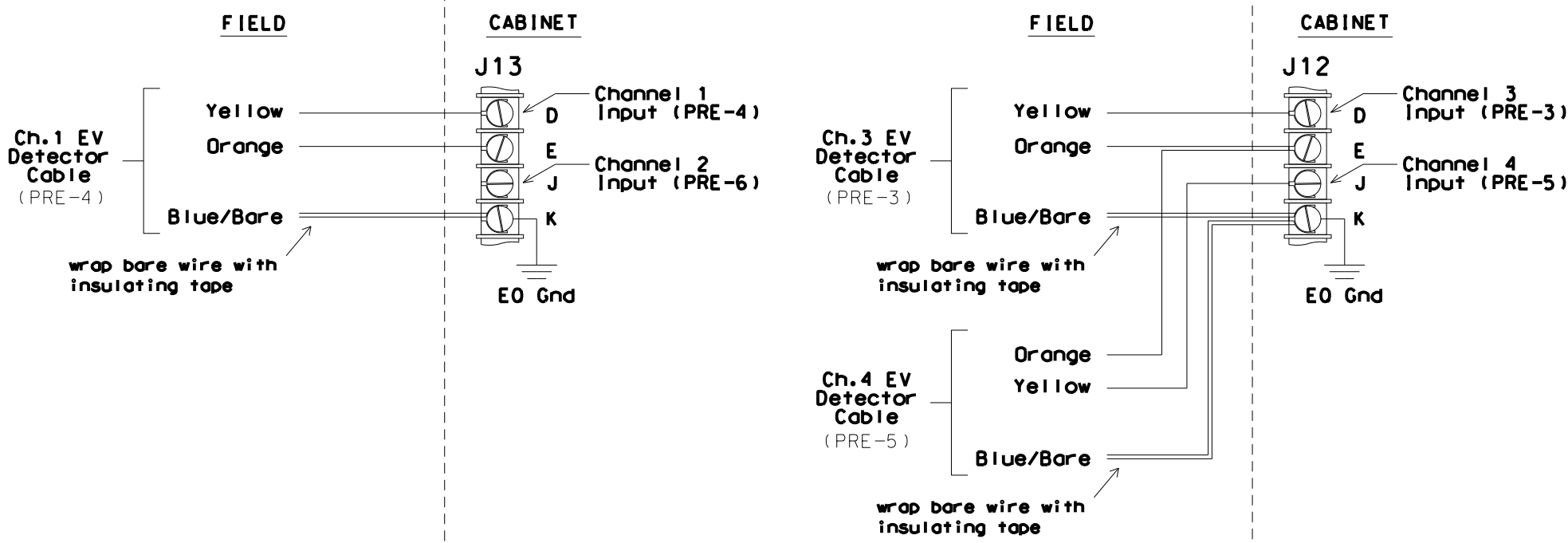
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE  
ST = STOP TIME  
PRE = PREEMPT

4 CHANNEL EV OSP CARD  
INSERT CARD INTO  
SLOT J13

TYPICAL EV FIELD WIRE DETAIL

(input file, rear view)



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 phases 2 and 6 Green/Don't Walk.
- Enable Simultaneous Gap-Out feature for all phases.
- The cabinet and controller are part of the Hickory City Signal System.

EQUIPMENT INFORMATION

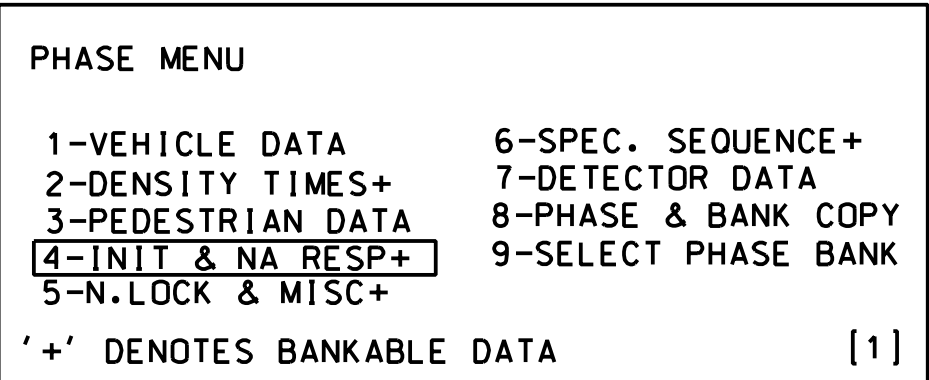
CONTROLLER.....2070LX  
CABINET.....332 W/ AUX  
SOFTWARE.....SE-PAC2070 VER. 5.4  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S8  
PHASES USED.....1,2,2 PED,4,4 PED,6,\*6 PED  
OVERLAP "A".....NOT USED  
OVERLAP "B".....NOT USED  
OVERLAP "C".....NOT USED  
OVERLAP "D".....NOT USED

\* Phase used for timing purposes only.

INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)



PHASES 3,5,7,8 NOT USED! → PHASE....1...2...3...4...5...6...7...8  
INITIAL 1 6 0 1 0 6 0 0 ← CODE 6 (G/DW) ALLOWS PHASES 2 AND 6 TO START IN GREEN AND SKIP THE PED PHASE  
NA RESP 2 1 0 2 0 1 0 0

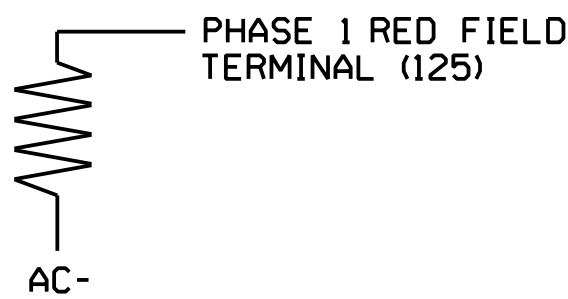
CODES....0...1...2...3...4...5...6  
INITL NONE INACT RED YEL GRN DRK G/DW  
NA RSP NONE NA1 NA2 1&2 --- ---  
\*\*\*

INIT & N.A. RESP PROGRAMMING COMPLETE

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No. C-1554  
(919) 546-8997

SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO.       | S1  | S2  | S3    | S4       | S5 | S6    | S7       | S8 | S9    | S10 | S11 | S12   | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------------|-----|-----|-------|----------|----|-------|----------|----|-------|-----|-----|-------|--------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO.       | 1   | 2   | 13    | 3        | 4  | 14    | 5        | 6  | 15    | 7   | 8   | 16    | 9      | 10     | 17     | 11     | 12     | 18     |
| PHASE                 | 1   | 2   | 2 PED | 3        | 4  | 4 PED | 5        | 6  | 6 PED | 7   | 8   | 8 PED | OLA    | OLB    | SPARE  | OLC    | OLD    | SPARE  |
| SIGNAL HEAD NO.       | 61  | 21  | 22    | P21, P22 | NU | 41,42 | P41, P42 | NU | 61    | 62  | NC  | NU    | NU     | NU     | NU     | NU     | NU     | NU     |
| RED                   | *   | 128 | 128   |          |    | 101   |          |    | 134   | 134 |     |       |        |        |        |        |        |        |
| YELLOW                |     | 129 | 129   |          |    | 102   |          |    | 135   | 135 |     |       |        |        |        |        |        |        |
| GREEN                 |     |     | 130   |          |    | 103   |          |    | 136   |     |     |       |        |        |        |        |        |        |
| RED ARROW             |     |     |       |          |    |       |          |    |       |     |     |       |        |        |        |        |        |        |
| YELLOW ARROW          | 126 |     |       |          |    |       |          |    |       |     |     |       |        |        |        |        |        |        |
| FLASHING YELLOW ARROW |     |     |       |          |    |       |          |    |       |     |     |       |        |        |        |        |        |        |
| GREEN ARROW           | 127 | 130 |       |          |    |       |          |    | 136   |     |     |       |        |        |        |        |        |        |
| Hand                  |     |     |       |          |    | 113   |          |    | 104   |     |     |       |        |        |        |        |        |        |
| Walking               |     |     |       |          |    | 115   |          |    | 106   |     |     |       |        |        |        |        |        |        |

NU = Not Used  
NC = Not Connected

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

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

Signal Upgrade-  
Electrical Detail - Sheet 1 of 3  
(Construction Phase 1, Step 4)

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945T2  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                           |  |                                          |  |                                                                                                               |  |
|-----------------------------------------------------------|--|------------------------------------------|--|---------------------------------------------------------------------------------------------------------------|--|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                |  | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)  |  | SEAL<br>NORTH CAROLINA<br>PROFESSIONAL<br>ENGINEER<br>SEAL 031464<br>NATASHA R. SIMMONS                       |  |
| Prepared for:<br>Hickory City<br>Signal Management System |  | Division 12<br>Catawba County<br>Hickory |  | PLAN DATE: January 2024<br>REVIEWED BY: N.K. Vianich<br>PREPARED BY: E.E. Tiller<br>REVIEWED BY: N.R. Simmons |  |
| 750 N.Greenfield Pkwy, Garner, NC 27529                   |  | REVISIONS                                |  | INIT. DATE                                                                                                    |  |
|                                                           |  |                                          |  | DocuSigned by:<br>Natasha R. Simmons 9/6/2024<br>SIGNATURE DATE                                               |  |
|                                                           |  |                                          |  | SIG. INVENTORY NO. 12-0945T2                                                                                  |  |



SE-PAC2070 CONTROLLER RING CONFIGURATION DETAIL

(program controller as shown below)

NOTE:

BEFORE PROGRAMMING CONTROLLER, BE SURE TO LOAD DEFAULT PARAMETERS.

From Main Menu, press '4' (Unit Data)

UNIT DATA

1-STARTUP & MISC.

2-FLASH

3-OVERLAP DATA

4-PEER-TO-PEER+

5-RING STRUCTURE

6-ALT SEQUENCES

7-PORT 1/ITS DATA

8-I/O MISC

9-OUTPUT MAPPING

B-BANK SELECTION

C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

RING STRUCTURES PHASE - 1

RING: 1

NEXT PHASE: 3

PHASES: 12345678 90123456

COMPATIBLE: x0001100 00000000

UP/DOWN TO SCROLL

E-EDIT

RING STRUCTURES PHASE - 2

RING: 1

NEXT PHASE: 1

PHASES: 12345678 90123456

COMPATIBLE: 0x001100 00000000

UP/DOWN TO SCROLL

E-EDIT

RING STRUCTURES PHASE - 3

RING: 1

NEXT PHASE: 4

PHASES: 12345678 90123456

COMPATIBLE: 00x00011 00000000

UP/DOWN TO SCROLL

E-EDIT

RING STRUCTURES PHASE - 4

RING: 1

NEXT PHASE: 2

PHASES: 12345678 90123456

COMPATIBLE: 000x0011 00000000

UP/DOWN TO SCROLL

E-EDIT

RING STRUCTURES PHASE - 5

RING: 2

NEXT PHASE: 6

PHASES: 12345678 90123456

COMPATIBLE: 1100x000 00000000

UP/DOWN TO SCROLL

E-EDIT

RING STRUCTURES PHASE - 6

RING: 2

NEXT PHASE: 7

PHASES: 12345678 90123456

COMPATIBLE: 11000x00 00000000

UP/DOWN TO SCROLL

E-EDIT

RING STRUCTURES PHASE - 7

RING: 2

NEXT PHASE: 8

PHASES: 12345678 90123456

COMPATIBLE: 001100x0 00000000

UP/DOWN TO SCROLL

E-EDIT

RING STRUCTURES PHASE - 8

RING: 2

NEXT PHASE: 5

PHASES: 12345678 90123456

COMPATIBLE: 0011000x 00000000

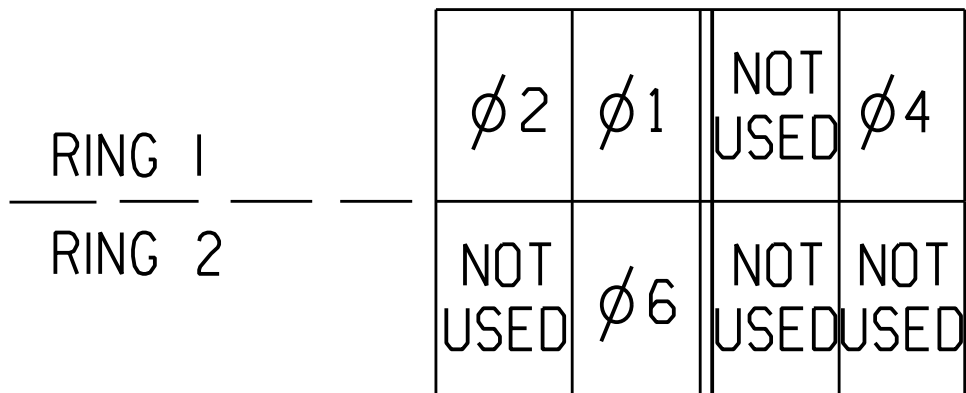
UP/DOWN TO SCROLL

E-EDIT

End of Ring Strucutre Programming

DUAL-QUAD WITH  
PHASES 1 & 2 ROATATED

(PHASES 1 & 2 INCOMPATIBLE)



BARRIER

REMOTE FLASH  
PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC

2- FLASH

3- OVERLAP DATA

4- PEER-TO-PEER

5- RING STRUCTURE

6- SEQUENCES

7- PORT 1/ITS DATA

8- I/O MISC

9- PUTPUT MAPPING

B-BANK SELECTION

C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

FLASH

1- REMOTE FLASH SETTINGS

2- REMOTE FLASH ENTRY/EXIT PHASES

3- CABINET FLASH SETTINGS

REMOTE FLASH SETTINGS

TEST-A FLASH: 0

LDSW:123456789 0123456789 0123456789 012

FLSH:110010010 0000000000 0000000000 000

ALT:010010000 0000000000 0000000000 000

0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW

SELECT 'F' RETURN TO FLASH MENU

FLASH

1- REMOTE FLASH SETTINGS

2- REMOTE FLASH ENTRY/EXIT PHASES

3- CABINET FLASH SETTINGS

REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456

ENTRY: 01000100 00000000

EXIT: 01000100 00000000

REMOTE FLASH PROGRAMMING COMPLETE

ALL RED FLASH STARTUP  
PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC

2- FLASH

3- OVERLAP DATA

4- PEER-TO-PEER

5- RING STRUCTURE

6- SEQUENCES

7- PORT 1/ITS DATA

8- I/O MISC

9- PUTPUT MAPPING

B-BANK SELECTION

C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

STARTUP & MISC

STARTUP TIME.: 6 (SEC)

STATE: 2 (0-FL

RED REV/10....: 40 (TSEC)

AUTO PED CLR.: 0 (0-NO 1-YES)

STOP T RESET.: 0 (0-NO 1-YES)

SEQUENCE.....: 0 (0-18)

SPECIAL SEO : 0 (SEE HELP)

STARTUP PROGRAMMING COMPLETE

Signal Upgrade-  
Electrical Detail - Sheet 3 of 3  
(Construction Phase 1, Step 4)

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945T2  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

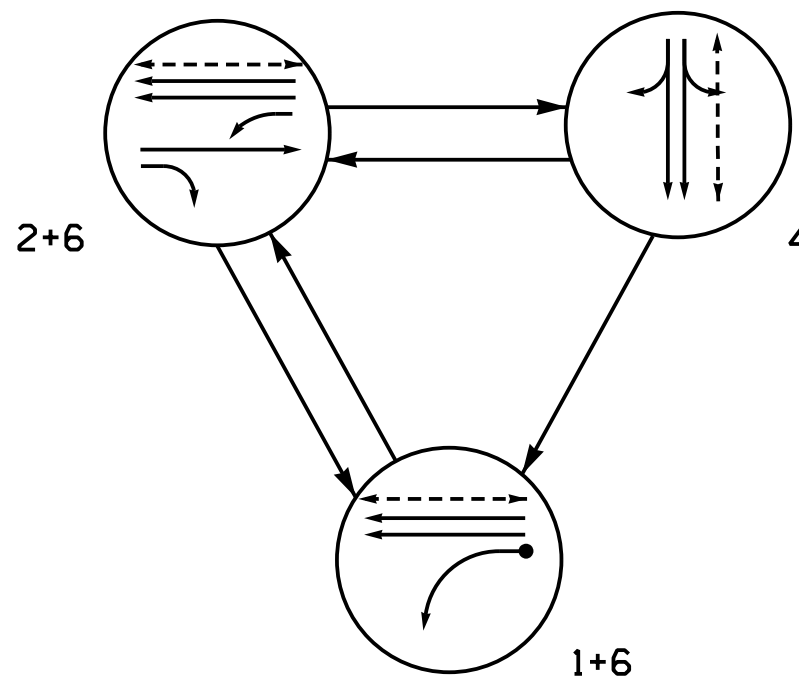
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                            |                                                                                 |                                                                                      |
|----------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                                 | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)                                         | SEAL                                                                                 |
| <div>Prepared for:<br/><br/>750 N. Greenfield Pkwy, Garner, NC 27529</div> | Division 12<br>PLAN DATE: January 2024<br>PREPARED BY: E.E. Tiller<br>REVISIONS | Catawba County<br>Hickory<br>REVIEWED BY: N.K. Vlanich<br>N.R. Simmons<br>INIT. DATE |
| DocuSigned by:<br><br>SIGNATURE                                            |                                                                                 | DATE<br>9/6/2024                                                                     |
| SIG. INVENTORY NO.                                                         |                                                                                 | 12-0945T2                                                                            |

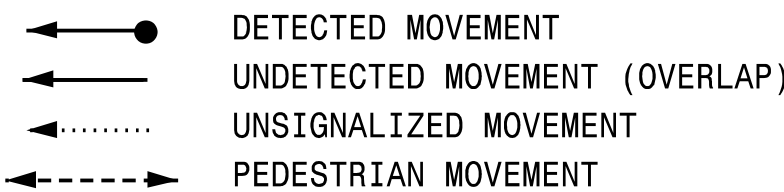
HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

PHASING DIAGRAM

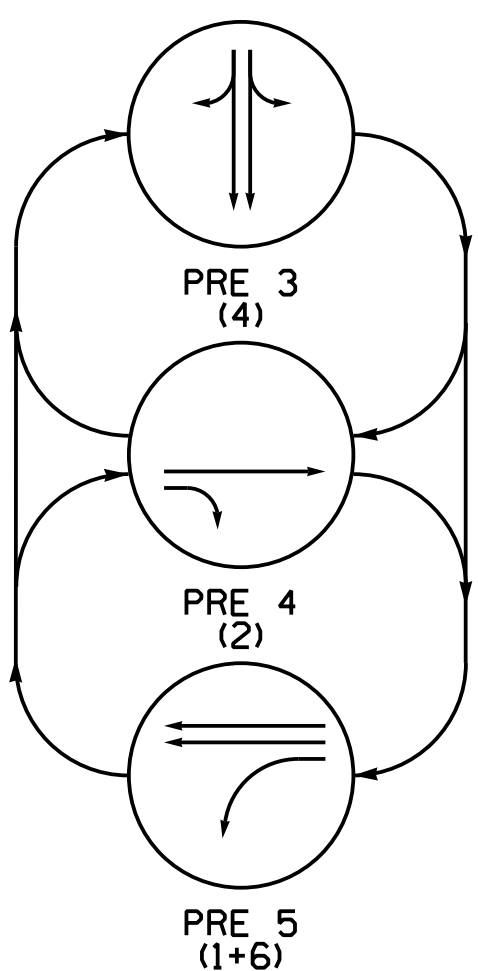


PHASING DIAGRAM DETECTION LEGEND



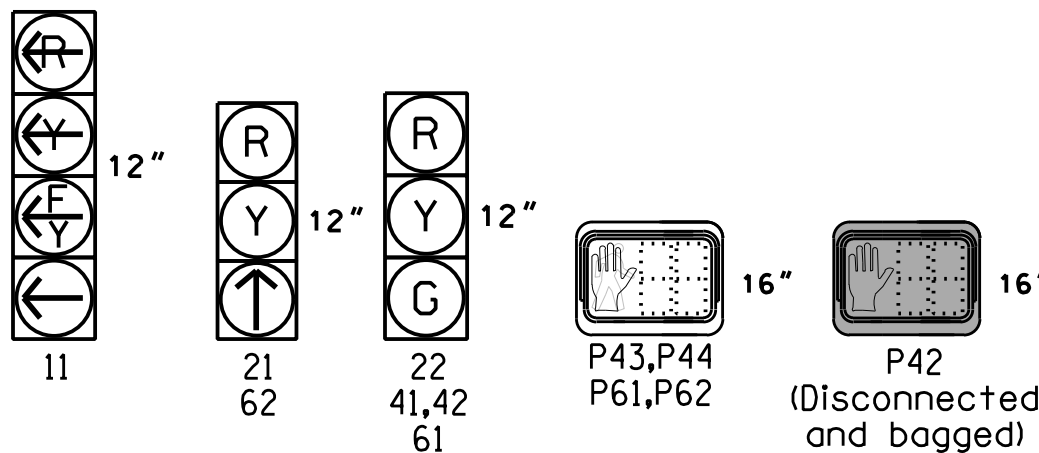
EV PREEMPT PHASES

(Medium Priority)



SIGNAL FACE I.D.

All Heads L.E.D.



SE-PAC 2070 TIMING CHART

| FEATURE                 | PHASE    |            |                |                |
|-------------------------|----------|------------|----------------|----------------|
|                         | 1        | 2          | 4              | 6              |
| Min Green *             | 7        | 10         | 7              | 10             |
| Passage Gap *           | 3.0      | -          | -              | -              |
| Maximum Green *         | 40       | 40         | 40             | 40             |
| Yellow Change           | 3.0      | 3.8        | 4.0            | 3.8            |
| Red Clear               | 1.8      | 1.4        | 1.7            | 1.4            |
| Walk *                  | -        | -          | 11             | 14             |
| Pedestrian Clear        | -        | -          | 32             | 14             |
| Advance Walk *          | -        | -          | 4              | 7              |
| Added Initial *         | -        | -          | -              | -              |
| Maximum Initial *       | -        | -          | -              | -              |
| Time Before Reduction * | -        | -          | -              | -              |
| Time To Reduce *        | -        | -          | -              | -              |
| Minimum Gap             | -        | -          | -              | -              |
| Recall Mode             | -        | MAX RECALL | MAX/PED RECALL | MAX/PED RECALL |
| Vehicle Call Memory     | NON-LOCK | NON-LOCK   | NON-LOCK       | NON-LOCK       |
| Dual Entry              | -        | -          | -              | -              |
| Simultaneous Gap        | ON       | ON         | ON             | ON             |

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

SE-PAC Preemption

| FUNCTION         | PRE 3 | PRE 4 | PRE 5 |
|------------------|-------|-------|-------|
| MIN GRN / WLK    | 1     | 1     | 1     |
| EXIT PHASES      | 4     | 2     | 1+6   |
| DELAY            | 0.0   | 0.0   | 0.0   |
| MXCALL           | 120   | 120   | 120   |
| SEL PED CLR      | 30    | 0     | 12    |
| SEL YEL / 10     | 0*    | 0*    | 0*    |
| SEL RED / 10     | 0*    | 0*    | 0*    |
| TRACK GREEN      | 0     | 0     | 0     |
| TRK PED CLR      | 0     | 0     | 0     |
| TRK YEL / 10     | 0     | 0     | 0     |
| TRK RED / 10     | 0     | 0     | 0     |
| DWELL GRN        | 7     | 10    | 10    |
| RET PED CLR      | 0     | 0     | 0     |
| RET YEL / 10     | 0*    | 0*    | 0*    |
| RET RED / 10     | 0*    | 0*    | 0*    |
| PREEMPT EXTEND** | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.

TABLE OF OPERATION

| SIGNAL FACE | PHASE |       |    |       |       |       |       |  |
|-------------|-------|-------|----|-------|-------|-------|-------|--|
|             | 1 + 6 | 2 + 6 | 4  | PRE 3 | PRE 4 | PRE 5 | FLASH |  |
| 11          | -     | -     | -  | -     | -     | -     | -     |  |
| 21          | R     | ↑     | R  | R     | ↑     | R     | R     |  |
| 22          | R     | G     | R  | R     | G     | R     | R     |  |
| 41,42       | R     | R     | G  | G     | R     | R     | R     |  |
| 61          | G     | G     | R  | R     | R     | G     | R     |  |
| 62          | ↑     | ↑     | R  | R     | R     | ↑     | R     |  |
| P43,P44     | DW    | DW    | W  | DW    | DW    | DW    | DRK   |  |
| P61,P62     | W     | W     | DW | DW    | DW    | DW    | DRK   |  |

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

| INDUCTIVE LOOPS |              |       |                                 |     |          | DETECTOR PROGRAMMING |                     |         |                |        |   |   |   |   |   |   |        |                 |          |          |
|-----------------|--------------|-------|---------------------------------|-----|----------|----------------------|---------------------|---------|----------------|--------|---|---|---|---|---|---|--------|-----------------|----------|----------|
|                 |              |       |                                 |     |          | ASSIGNED<br>PHASE    | TIMING              |         | OPERATION MODE |        |   |   |   |   |   |   | SWITCH | STATUS          |          |          |
|                 |              |       |                                 |     |          |                      |                     |         | 0              | 1      | 2 | 3 | 4 | 5 | 6 | 7 |        | NEW             | EXISTING |          |
| ZONE            | SIZE<br>(ft) | TURNS | DIST. FROM<br>STOP LINE<br>(ft) | NEW | EXISTING | DELAY                | EXTEND<br>(STRETCH) | VEHICLE | PEDESTRIAN     | 1 CALL | 2 | 3 | 4 | 5 | 6 | 7 | SWITCH | SYSTEM<br>LOOPS | NEW      | EXISTING |
| 1A*             | 6X40         | *     | 0                               | *   | -        | 1                    | 15 SEC.             | -       | SEC.           | X      | - | - | - | - | - | - | -      | -               | *        | -        |

\* Multizone Microwave Detection

3 Phase with EVP  
Semi-Actuated  
Hickory City Signal System  
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Reposition existing signal heads numbered 22, and 62, signs A, B, and C and PRE 4 and 5.
- Disconnect and bag existing pedestrian head numbered P42.
- Set all detector units to presence mode.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Hickory Signal System Data: Controller Asset #0316.

LEGEND

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

Signal Upgrade -  
Temporary Design 3  
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                       |                                                                                                                                               |                                                                               |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <br>Prepared for:<br>Hickory City<br>Signal Design Section<br>750 N. Greenfield Hwy, Garner, NC 27529 | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)                                                                                                       | SEAL<br>NORTH CAROLINA<br>PROFESSIONAL<br>ENGINEER<br>031464<br>W. A. SIMMONS |
|                                                                                                       | Division 12 Catawba County Hickory<br>PLAN DATE: October 2023 REVIEWED BY: N.K. Vianich<br>PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons | REVISIONS<br>INIT. DATE<br>SIGNATURE DATE                                     |

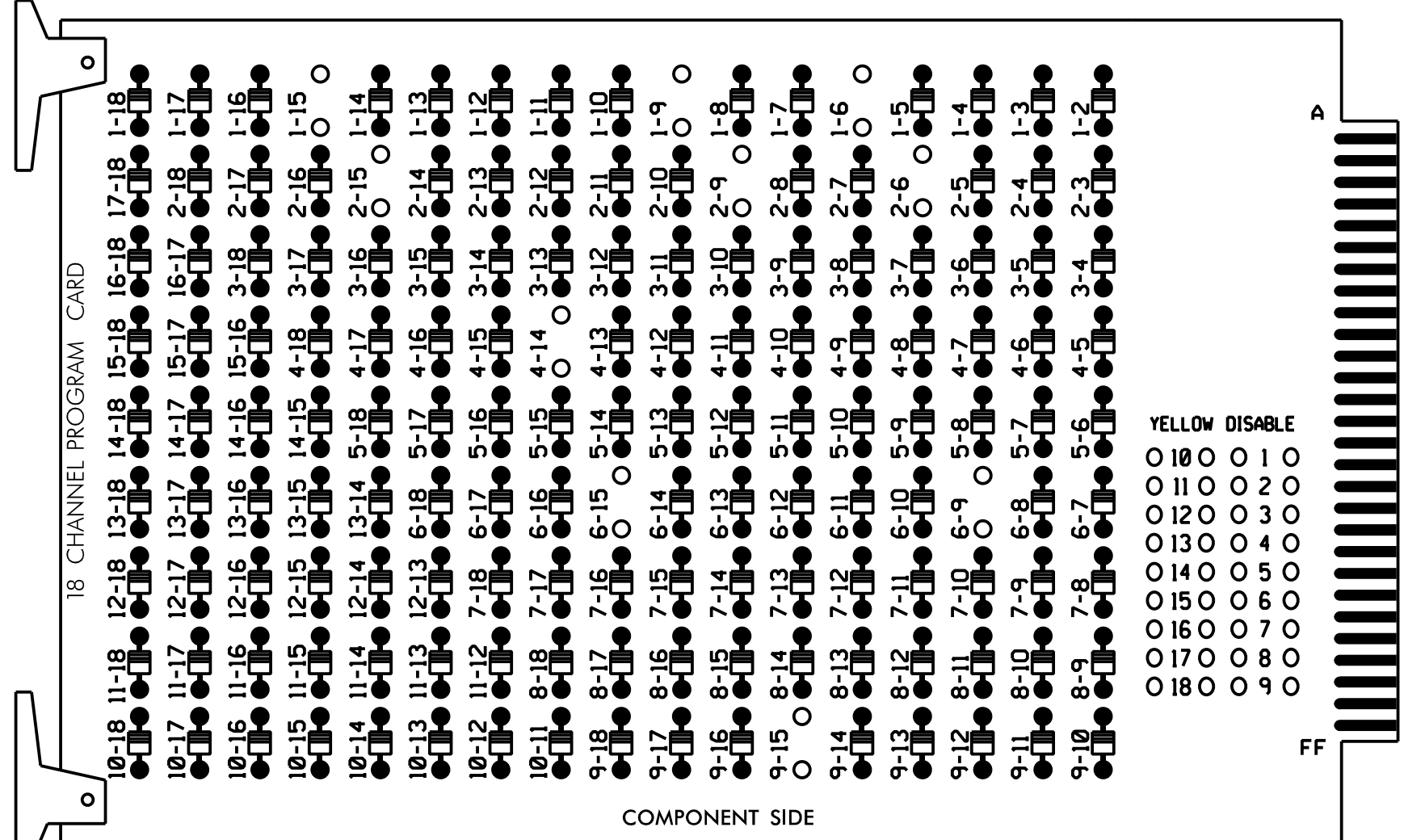
HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

18 CHANNEL CONFLICT MONITOR  
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 1-15, 2-6, 2-9, 2-15, 4-14, 6-9, 6-15 and 9-15.

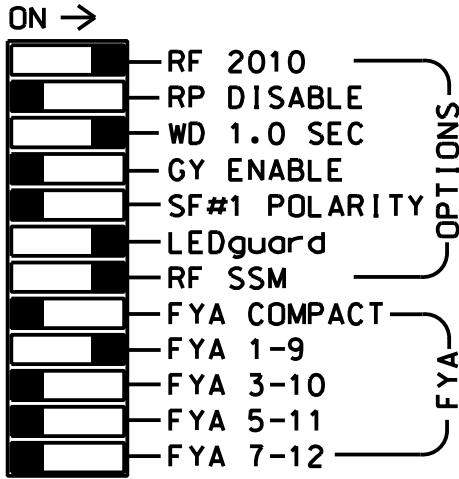
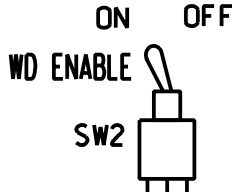


REMOVE JUMPERS AS SHOWN

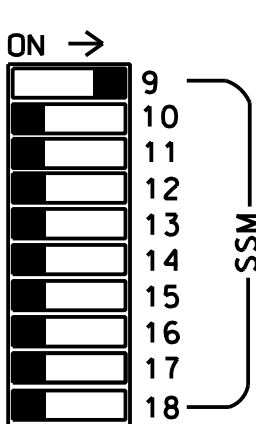
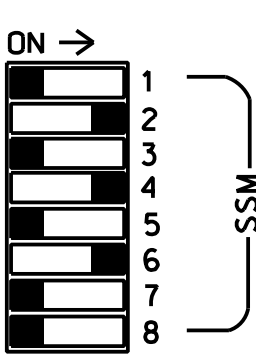
NOTES:

- 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



INTERNAL DIP SWITCHES



NOTES

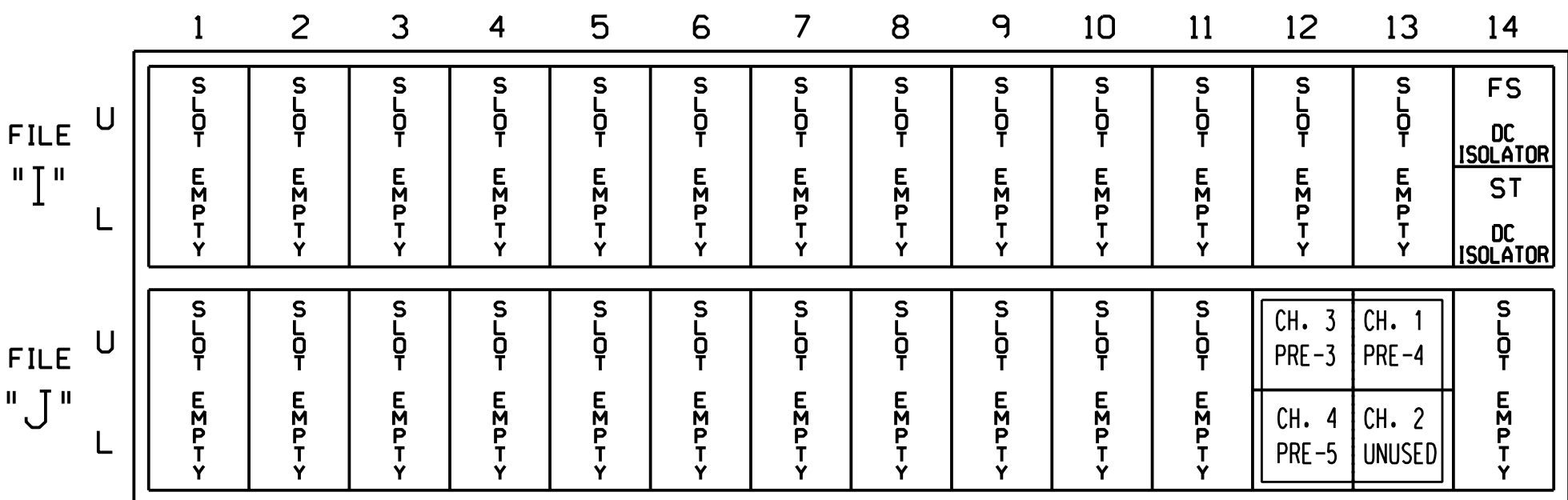
- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program controller to start up in phases 2 and 6 Green/Don't Walk.
- Enable Simultaneous Gap-Out feature for all phases.
- The cabinet and controller are part of the Hickory City Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
CABINET.....332 W/ AUX  
SOFTWARE.....SE-PAC2070 VER. 5.4  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
LOAD SWITCHES USED.....S1,S2,S5,S6,S8,S9,AUX S1  
PHASES USED.....1,2,4,4 PED,6,6 PED  
OVERLAP "A".....\*  
OVERLAP "B".....NOT USED  
OVERLAP "C".....NOT USED  
OVERLAP "D".....NOT USED  
\* See Sheet 2 for Overlap Programming.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE  
ST = STOP TIME  
PRE = PREEMPT

4 CHANNEL EV OSP CARD  
INSERT CARD INTO  
SLOT J13

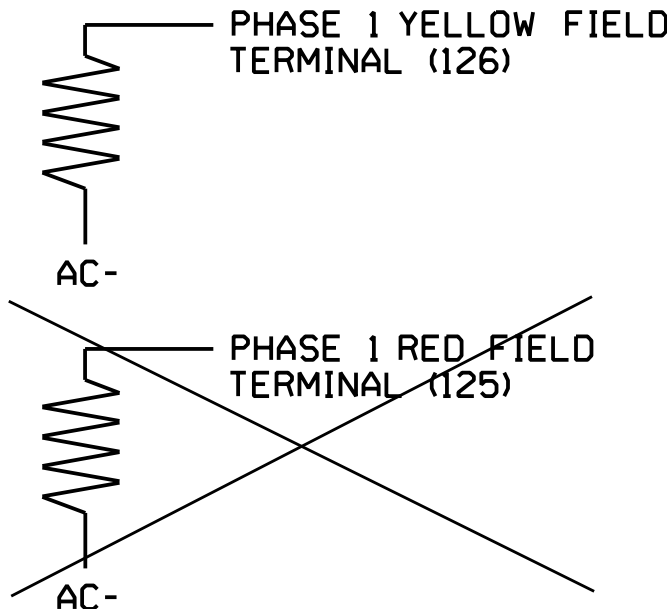
SPECIAL DETECTOR NOTE

Install a multizone microwave 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

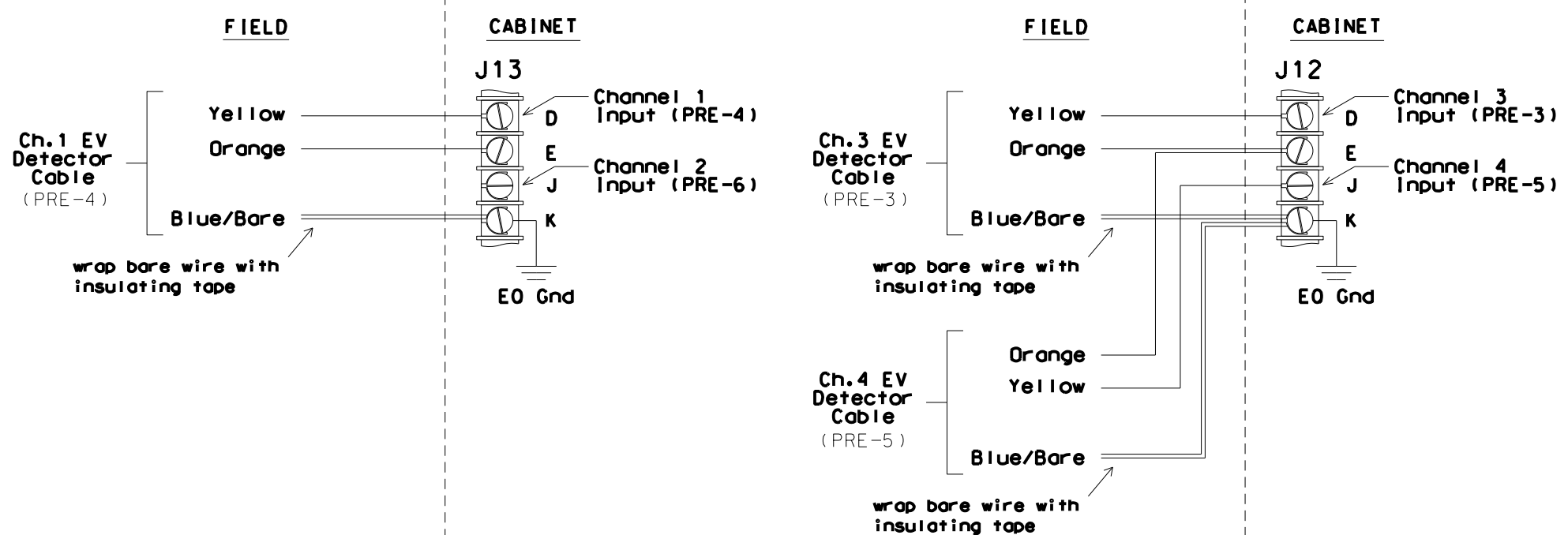
(install resistor as shown below)

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



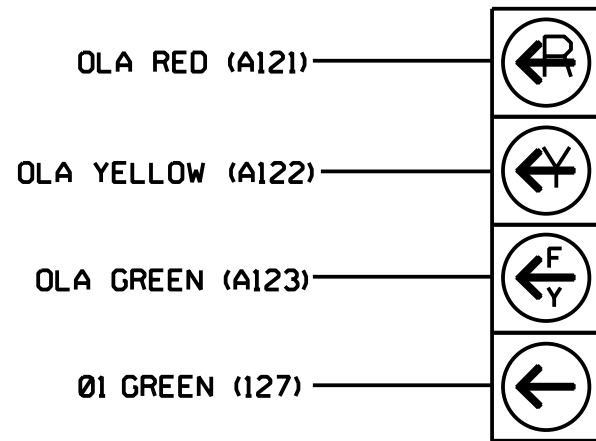
TYPICAL EV FIELD WIRE DETAIL

(input file, rear view)



FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



11

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945T3  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 1 of 3  
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                           |  |                                                                                                                                                     |  |                                                                                            |  |
|-----------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------|--|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                |  | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)                                                                                                             |  | SEAL<br>NORTH CAROLINA<br>PROFESSIONAL<br>ENGINEER<br>SEAL<br>031464<br>NATASHA R. SIMMONS |  |
| Prepared for:<br>Hickory City<br>Signal Management System |  | Division 12 Catawba County Hickory                                                                                                                  |  | DocuSigned by:<br>Natasha R. Simmons 9/6/2024                                              |  |
| PLAN DATE: January 2024                                   |  | REVIEWED BY: N.K. Vianich                                                                                                                           |  | DATE                                                                                       |  |
| PREPARED BY: E.E. Tiller                                  |  | REVIEWED BY: N.R. Simmons                                                                                                                           |  | SIGNATURE                                                                                  |  |
| REVISIONS                                                 |  | INIT.                                                                                                                                               |  | DATE                                                                                       |  |
| 750 N. Greenfield Pkwy, Garner, NC 27529                  |  | HNTB NORTH CAROLINA, P.C.<br>4000 Center at North Hills St<br>Suite 500<br>Raleigh, North Carolina 27609<br>NC License No: C-1554<br>(919) 546-8997 |  | SIC. INVENTORY NO. 12-0945T3                                                               |  |

(program controller as shown below)

Assign advanced walk to peds 4 and 6 as shown below.

ADVANCE WALK PED PROGRAMMING COMPLETE

(program controller as shown below)

VEH RECALL PROGRAMMING COMPLETE

END OF OVERLAP PROGRAMMING

(program controller as shown below)

PED RECALL PROGRAMMING COMPLETE

(program controller as shown below)

INIT & N.A. RESP PROGRAMMING COMPLETE

← CODE 6 (G/DW) ALLOWS PHASES  
2 AND 6 TO START IN GREEN  
AND SKIP THE PED PHASE

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

DocuSigned by:  
Natasha R. Simmons 9/6/2021  
SIGNATURE DATE  
SIG. INVENTORY NO. 12-0945T3

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

SELECT 7-PREEMPT DATA FROM MAIN MENU

- PREEMPT 3 -

PREEMPTS

1-PREEMPT 1  
2-PREEMPT 2  
3-PREEMPT 3  
4-PREEMPT 4

5-PREEMPT 5  
6-PREEMPT 6  
7-PREEMPT 7  
8-PREEMPT 8

9-PREEMPT 9  
A-PREEMPT 10  
B-PREEMPT 11  
C-PREEMPT 12

O-OVERRIDES

D-DEFAULT DATA

PREEMPT 3

1-MISCELLANEOUS  
2-INTERVAL TIMES  
3-VEHICLE STATUS

4-PEDEST. STATUS  
5-OVERLAP STATUS

PREEMPT 3 MISC DATA

TEST: 0

DET: 250 DELAY: 0 MXCAL:120 DB/10: 0  
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0  
LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
EXIT 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0  
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 3 menu  
select 2 - Interval Times

PREEMPT 3 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 7  
EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN---

GREEN : 0

PED CLR: 30 PED CLR: 0 PED CLR: 0  
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0  
RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 3 menu  
select 3 - Vehicle Status

PREEMPT 3 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0  
(O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 4 -

PREEMPTS

1-PREEMPT 1  
2-PREEMPT 2  
3-PREEMPT 3  
4-PREEMPT 4

5-PREEMPT 5  
6-PREEMPT 6  
7-PREEMPT 7  
8-PREEMPT 8

9-PREEMPT 9  
A-PREEMPT 10  
B-PREEMPT 11  
C-PREEMPT 12

O-OVERRIDES

D-DEFAULT DATA

PREEMPT 4

1-MISCELLANEOUS  
2-INTERVAL TIMES  
3-VEHICLE STATUS

4-PEDEST. STATUS  
5-OVERLAP STATUS

PREEMPT 4 MISC DATA

TEST: 0

DET: 251 DELAY: 0 MXCAL:120 DB/10: 0  
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0  
LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
EXIT 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 4 menu  
select 2 - Interval Times

PREEMPT 4 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 10  
EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN---

GREEN : 0

PED CLR: 0 PED CLR: 0 PED CLR: 0  
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0  
RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 4 menu  
select 3 - Vehicle Status

PREEMPT 4 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 5 -

PREEMPTS

1-PREEMPT 1  
2-PREEMPT 2  
3-PREEMPT 3  
4-PREEMPT 4

5-PREEMPT 5  
6-PREEMPT 6  
7-PREEMPT 7  
8-PREEMPT 8

9-PREEMPT 9  
A-PREEMPT 10  
B-PREEMPT 11  
C-PREEMPT 12

O-OVERRIDES

D-DEFAULT DATA

PREEMPT 5

1-MISCELLANEOUS  
2-INTERVAL TIMES  
3-VEHICLE STATUS

4-PEDEST. STATUS  
5-OVERLAP STATUS

PREEMPT 5 MISC DATA

TEST: 0

DET: 252 DELAY: 0 MXCAL:120 DB/10: 0  
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0  
LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
EXIT 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 5 menu  
select 2 - Interval Times

PREEMPT 5 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 10  
EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN---

GREEN : 0

PED CLR: 12 PED CLR: 0 PED CLR: 0  
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0  
RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 5 menu  
select 3 - Vehicle Status

PREEMPT 5 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  
(O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt 5 menu  
select 5 - Overlap Status

PREEMPT 5 OVERLAP STATUS

PHASE....A.B.C.D.E.F.G.H.I.J.K.L.M.N.O.P  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-R.1-G.2-FR.3-FY.4-DK.5-FG 10-NO.1-ACT)  
TRAIL 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

NOTE: Option 4 is not used. Be sure  
values are set at default=0.

end of programming

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC  
2- FLASH  
3- OVERLAP DATA  
4- PEER-TO-PEER  
5- RING STRUCTURE

6- SEQUENCES  
7- PORT 1/ITS DATA  
8- I/O MISC  
9- PUTPUT MAPPING  
B-BANK SELECTION  
C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

FLASH

1- REMOTE FLASH SETTINGS  
2- REMOTE FLASH ENTRY/EXIT PHASES  
3- CABINET FLASH SETTINGS

REMOTE FLASH SETTINGS

TEST-A FLASH: 0

LDSW:123456789 0123456789 0123456789 012  
FLSH:110010010 0001000000 0000000000 000  
ALT:010010000 0000000000 0000000000 000

O-DARK 1-RED 2-YELLOW 3-STEADY YELLOW

SELECT 'F' RETURN TO FLASH MENU

FLASH

1- REMOTE FLASH SETTINGS  
2- REMOTE FLASH ENTRY/EXIT PHASES  
3- CABINET FLASH SETTINGS

REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456  
ENTRY: 01000100 00000000  
EXIT: 01000100 00000000

REMOTE FLASH PROGRAMMING COMPLETE

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC  
2- FLASH  
3- OVERLAP DATA  
4- PEER-TO-PEER  
5- RING STRUCTURE

6- SEQUENCES  
7- PORT 1/ITS DATA  
8- I/O MISC  
9- PUTPUT MAPPING  
B-BANK SELECTION  
C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

STARTUP & MISC

STARTUP TIME.: 6 (SEC) STATE: 2 (O-FL  
RED REV/10....: 40 (TSEC) 1-RED  
AUTO PED CLR.: 0 (O-NO 1-YES) 2-RAF)  
STOP T RESET.: 0 (O-NO 1-YES)  
SEQUENCE.....: 0 (O-18)  
SPECIAL SEO : 0 (SEE HELP)

STARTUP PROGRAMMING COMPLETE

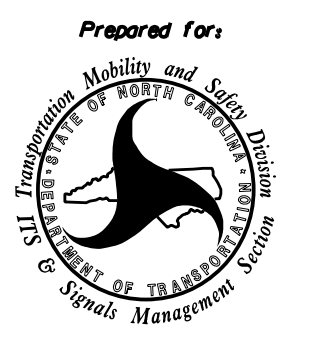
THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945T3  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 3 of 3  
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING  
DETAILS FOR:

Prepared for:



750 N.Greenfield Pkwy, Garner, NC 27529

NC 127 SE  
at  
SR 2231 (2nd Ave SE)

Division 12 Catawba County Hickory

PLAN DATE: January 2024 REVIEWED BY: N.K. Vianich  
PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

REVISIONS

INIT. DATE

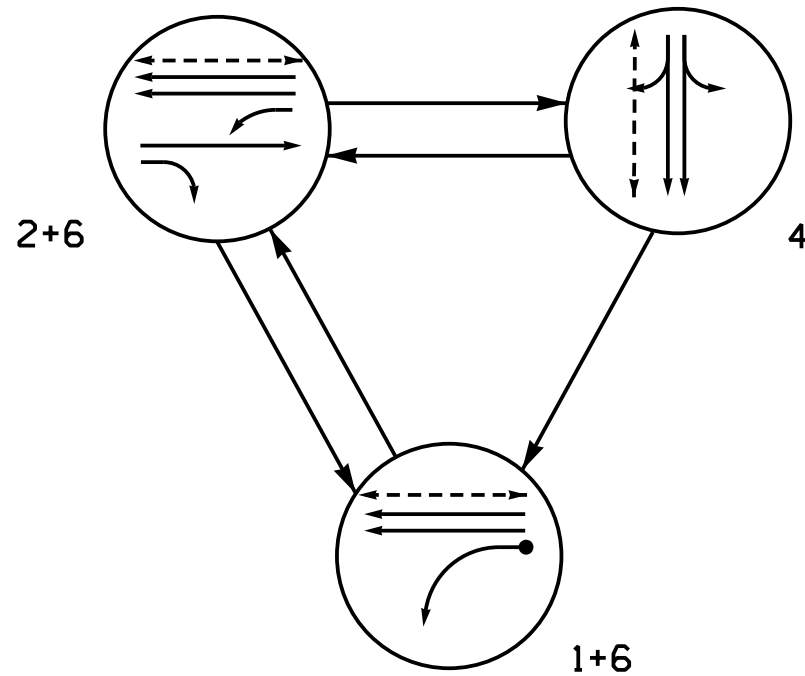
SEAL  
NORTH CAROLINA  
PROFESSIONAL  
SEAL  
031464  
ENGINEER  
NATASHA R. SIMMONS

DocuSigned by:  
Natasha R. Simmons 9/6/2024  
SIGNATURE DATE  
SIG. INVENTORY NO. 12-0945T3

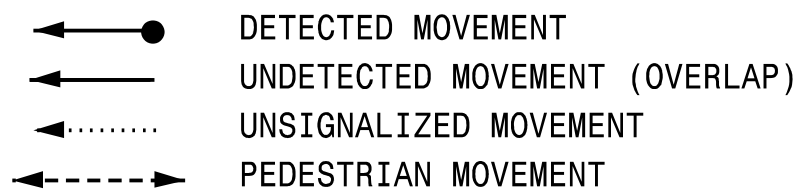
HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

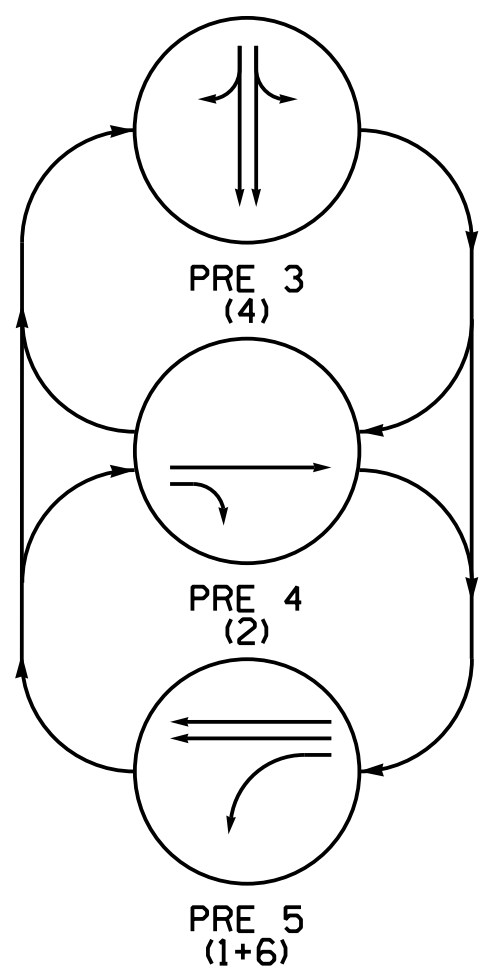
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

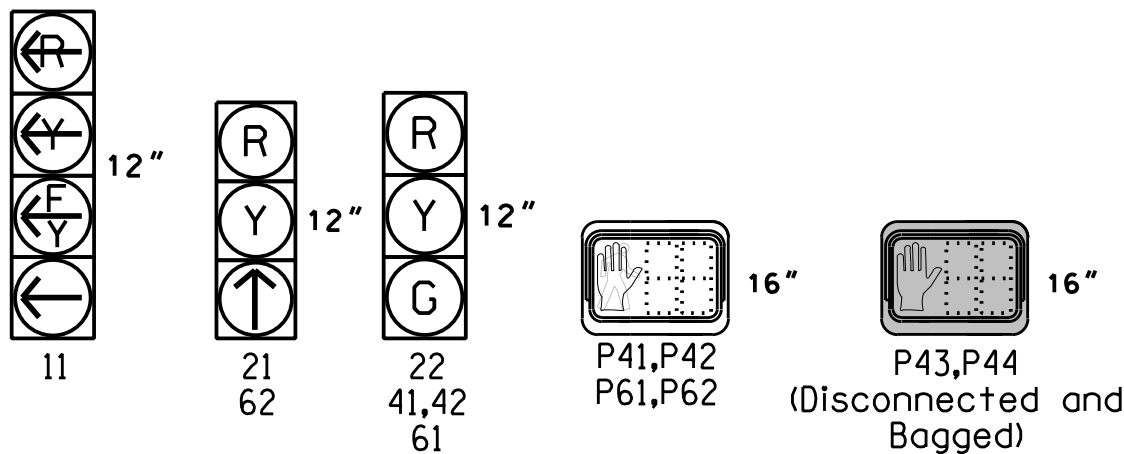


EV PREEMPT PHASES  
(Medium Priority)



SIGNAL FACE I.D.

All Heads L.E.D.



SE-PAC 2070 TIMING CHART

| FEATURE                 | PHASE    |            |                |                |
|-------------------------|----------|------------|----------------|----------------|
|                         | 1        | 2          | 4              | 6              |
| Min Green *             | 7        | 10         | 7              | 10             |
| Passage Gap *           | 2.0      | -          | -              | -              |
| Maximum Green *         | 40       | 40         | 40             | 40             |
| Yellow Change           | 3.0      | 3.8        | 4.0            | 3.8            |
| Red Clear               | 1.8      | 2.1        | 1.7            | 2.1            |
| Walk *                  | -        | -          | 12             | 14             |
| Pedestrian Clear        | -        | -          | 24             | 14             |
| Advance Walk *          | -        | -          | 5              | 7              |
| Added Initial *         | -        | -          | -              | -              |
| Maximum Initial *       | -        | -          | -              | -              |
| Time Before Reduction * | -        | -          | -              | -              |
| Time To Reduce *        | -        | -          | -              | -              |
| Minimum Gap             | -        | -          | -              | -              |
| Recall Mode             | -        | MAX RECALL | MAX/PED RECALL | MAX/PED RECALL |
| Vehicle Call Memory     | NON-LOCK | NON-LOCK   | NON-LOCK       | NON-LOCK       |
| Dual Entry              | -        | -          | -              | -              |
| Simultaneous Gap        | ON       | ON         | ON             | ON             |

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

| SIGNAL FACE | PHASE |       |    |       |       |       |       |  |
|-------------|-------|-------|----|-------|-------|-------|-------|--|
|             | 1 + 6 | 2 + 6 | 4  | PRE 3 | PRE 4 | PRE 5 | FLASH |  |
| 11          | -     | -     | -  | -     | -     | -     | -     |  |
| 21          | R     | ↑     | R  | R     | ↑     | R     | R     |  |
| 22          | R     | G     | R  | R     | G     | R     | R     |  |
| 41,42       | R     | R     | G  | G     | R     | R     | R     |  |
| 61          | G     | G     | R  | R     | R     | G     | R     |  |
| 62          | ↑     | ↑     | R  | R     | R     | ↑     | R     |  |
| P41,P42     | DW    | DW    | W  | DW    | DW    | DW    | DRK   |  |
| P61,P62     | W     | W     | DW | DW    | DW    | DW    | DRK   |  |

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

| INDUCTIVE LOOPS |           |       |                           |     |          | DETECTOR PROGRAMMING |         |                  |                |            |        |   |   |   |   |   |   |        |
|-----------------|-----------|-------|---------------------------|-----|----------|----------------------|---------|------------------|----------------|------------|--------|---|---|---|---|---|---|--------|
| ZONE            | SIZE (ft) | TURNS | DIST. FROM STOP LINE (ft) | NEW | EXISTING | ASSIGNED PHASE       | TIMING  |                  | OPERATION MODE |            |        |   |   |   |   |   |   |        |
|                 |           |       |                           |     |          |                      | DELAY   | EXTEND (STRETCH) | VEHICLE        | PEDESTRIAN | 1 CALL | 2 | 3 | 4 | 5 | 6 | 7 | STATUS |
| 1A*             | 6X40      | *     | 0                         | -   | *        | 1                    | 15 SEC. | - SEC.           | X              | -          | -      | - | - | - | - | - | - | *      |

\* Multizone Microwave Detection

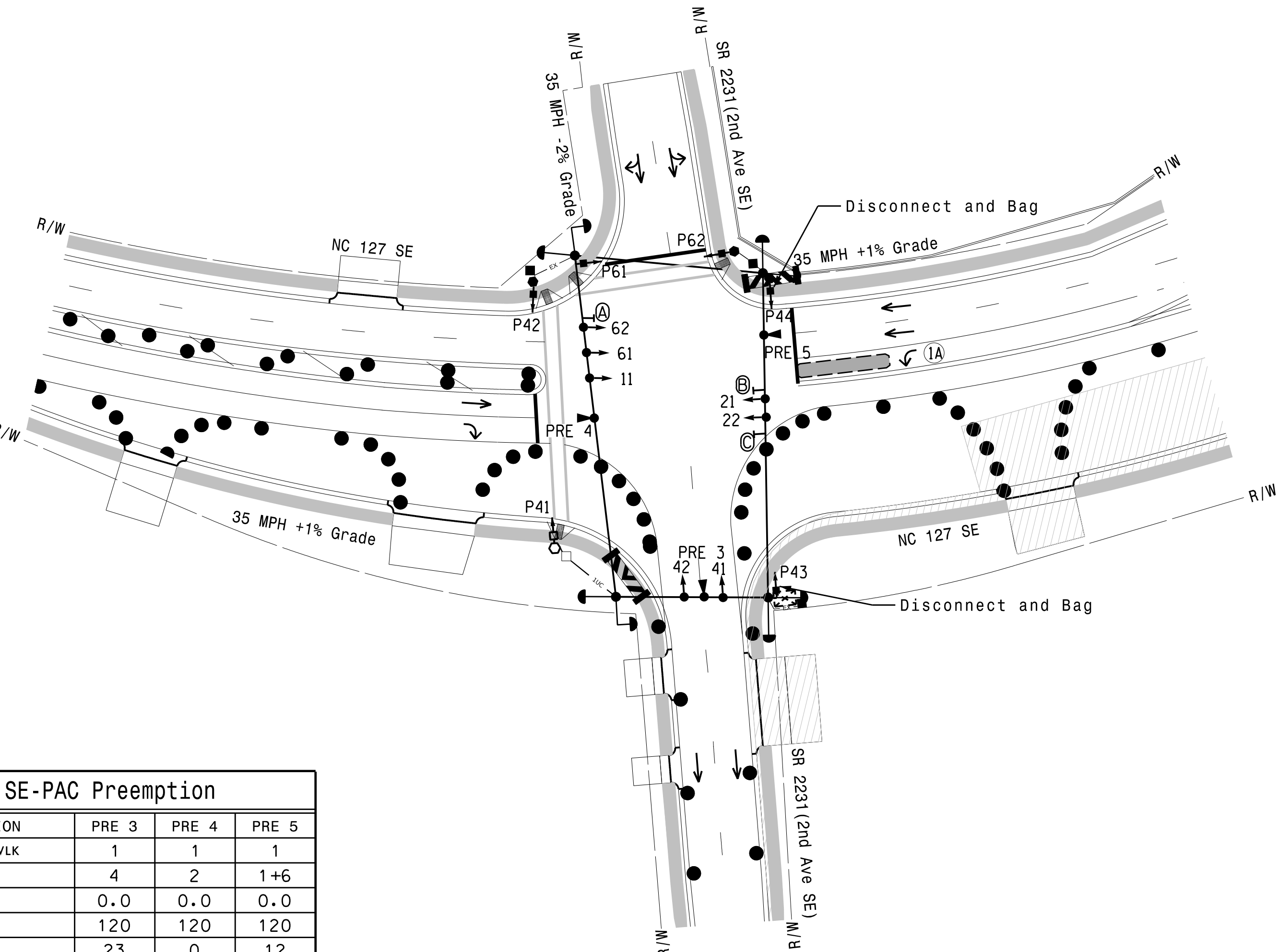
3 Phase with EVP  
Semi-Actuated  
Hickory City Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Disconnect and bag existing pedestrian heads numbered P43 and P44.
- Set all detector units to presence mode.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Hickory Signal System Data: Controller Asset #0316.

LEGEND

| PROPOSED | EXISTING |
|----------|----------|
|          |          |
|          | N/A      |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
| N/A      |          |
|          | N/A      |
|          |          |
|          | N/A      |
|          |          |
|          | N/A      |
| N/A      |          |
|          | N/A      |
|          |          |
|          |          |
|          |          |



SE-PAC Preemption

| FUNCTION         | PRE 3 | PRE 4 | PRE 5 |
|------------------|-------|-------|-------|
| MIN GRN / WLK    | 1     | 1     | 1     |
| EXIT PHASES      | 4     | 2     | 1+6   |
| DELAY            | 0.0   | 0.0   | 0.0   |
| MXCALL           | 120   | 120   | 120   |
| SEL PED CLR      | 23    | 0     | 12    |
| SEL YEL / 10     | 0*    | 0*    | 0*    |
| SEL RED / 10     | 0*    | 0*    | 0*    |
| TRACK GREEN      | 0     | 0     | 0     |
| TRK PED CLR      | 0     | 0     | 0     |
| TRK YEL / 10     | 0     | 0     | 0     |
| TRK RED / 10     | 0     | 0     | 0     |
| DWELL GRN        | 7     | 10    | 10    |
| RET PED CLR      | 0     | 0     | 0     |
| RET YEL / 10     | 0*    | 0*    | 0*    |
| RET RED / 10     | 0*    | 0*    | 0*    |
| PREEMPT EXTEND** | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.

Signal Upgrade -  
Temporary Design 4  
(Construction Phase 2, Step 2)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

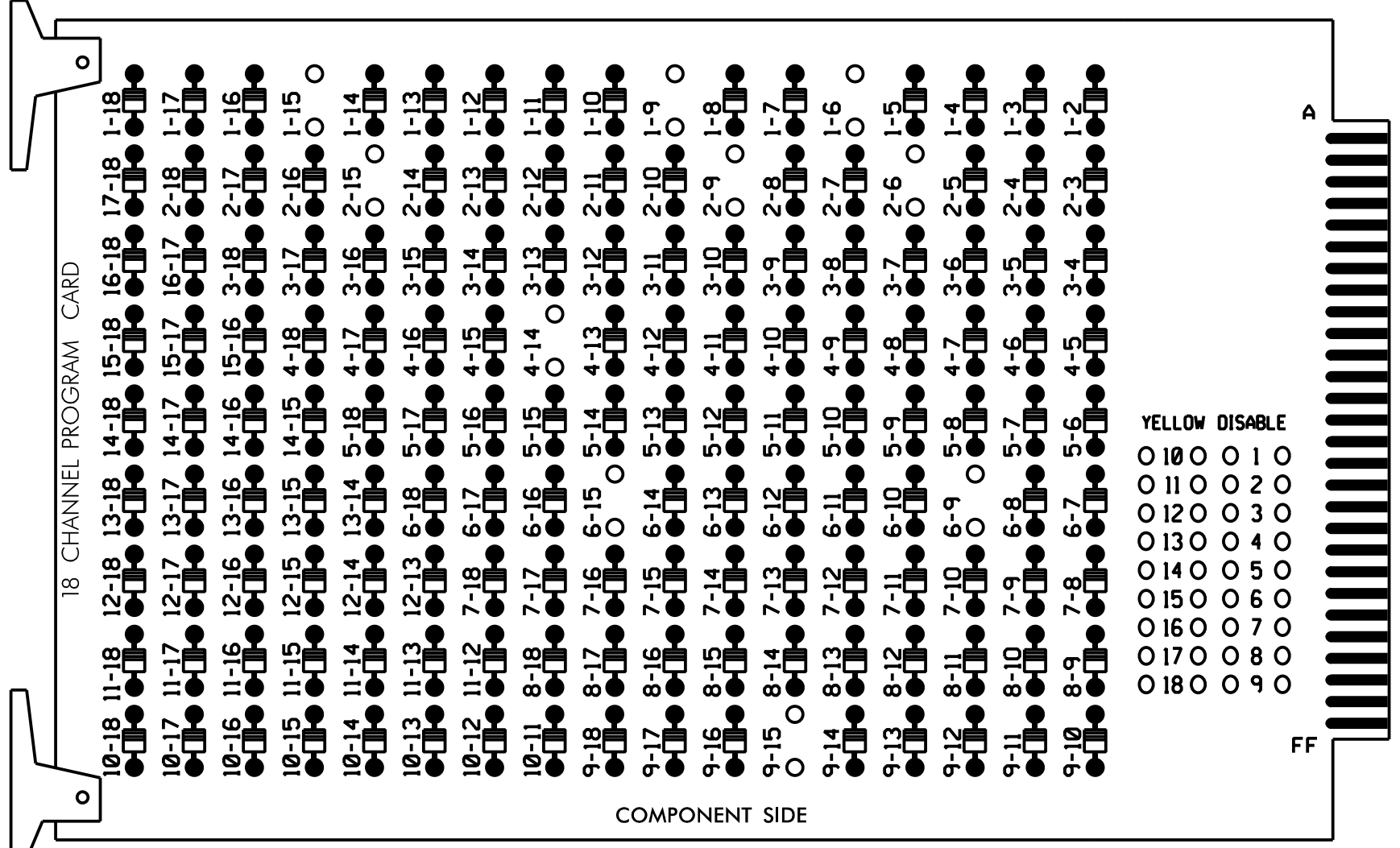
|  |                                            |                                                                                                                                                                                                      |                                                                                                 |
|--|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|  | Prepared for:<br><br>Signal Design Section | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)<br>Division 12<br>Catwaba County<br>Hickory<br>PLAN DATE: October 2023<br>REVIEWED BY: N.K. Vianich<br>PREPARED BY: E.E. Tiller<br>REVIEWED BY: N.R. Simmons | SEAL<br>NORTH CAROLINA<br>PROFESSIONAL<br>SEAL<br>031464<br>ENGINEER<br>W. A. S. R. SIMMONS     |
|  | 750 N. Greenfield Pkwy, Garner, NC 27529   | REVISIONS<br>INIT. DATE                                                                                                                                                                              | DocuSigned by:<br>Natasha R. Simmons 9/6/2024<br>SIGNATURE DATE<br>SIG. INVENTORY NO. 12-094574 |

HNTB  
HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

18 CHANNEL CONFLICT MONITOR  
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 1-15, 2-6, 2-9, 2-15, 4-14, 6-9, 6-15 and 9-15.



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 phases 2 and 6 Green/Don't Walk.
- Enable Simultaneous Gap-Out feature for all phases.
- The cabinet and controller are part of the Hickory City Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
CABINET.....332 W/ AUX  
SOFTWARE.....SE-PAC2070 VER. 5.4  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
LOAD SWITCHES USED.....S1,S2,S5,S6,S8,S9,AUX S1  
PHASES USED.....1,2,4,4 PED,6,6 PED  
OVERLAP "A".....\*  
OVERLAP "B".....NOT USED  
OVERLAP "C".....NOT USED  
OVERLAP "D".....NOT USED  
\* See Sheet 2 for Overlap Programming.

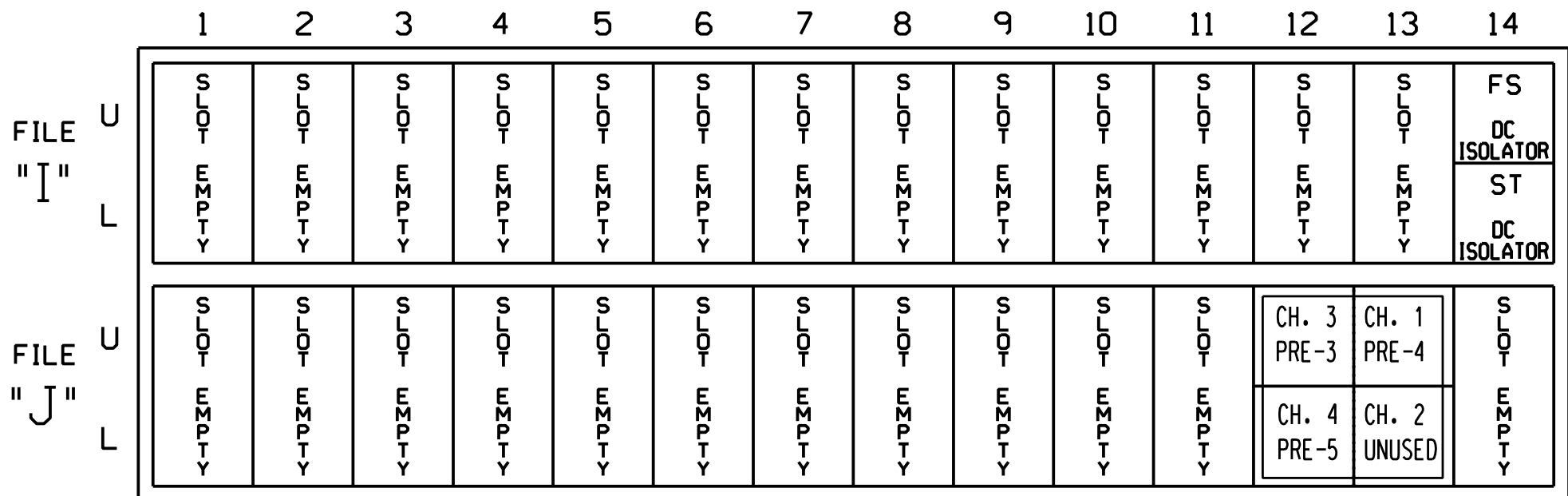
SIGNAL HEAD HOOK-UP CHART

| 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 | NU  | 41,42 | P41, P42 | NU  | 61    | 62  | P61, P62 | NU    | NU     | NU     | 11★    | NU     | NU     | NU     |
| RED                   |     | 128 | 128   |    | 101 |       |          | 134 | 134   |     |          |       |        |        |        |        |        |        |
| YELLOW                | *   | 129 | 129   |    | 102 |       |          | 135 | 135   |     |          |       |        |        |        |        |        |        |
| GREEN                 |     |     | 130   |    | 103 |       |          | 136 |       |     |          |       |        |        |        |        |        |        |
| RED ARROW             |     |     |       |    |     |       |          |     |       |     |          |       | A121   |        |        |        |        |        |
| YELLOW ARROW          |     |     |       |    |     |       |          |     |       |     |          |       | A122   |        |        |        |        |        |
| FLASHING YELLOW ARROW |     |     |       |    |     |       |          |     |       |     |          |       | A123   |        |        |        |        |        |
| GREEN ARROW           | 127 | 130 |       |    |     |       |          | 136 |       |     |          |       |        |        |        |        |        |        |
| Hand                  |     |     |       |    | 104 |       |          |     | 119   |     |          |       |        |        |        |        |        |        |
| Walking               |     |     |       |    | 106 |       |          |     | 121   |     |          |       |        |        |        |        |        |        |

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  
PRE = PREEMPT

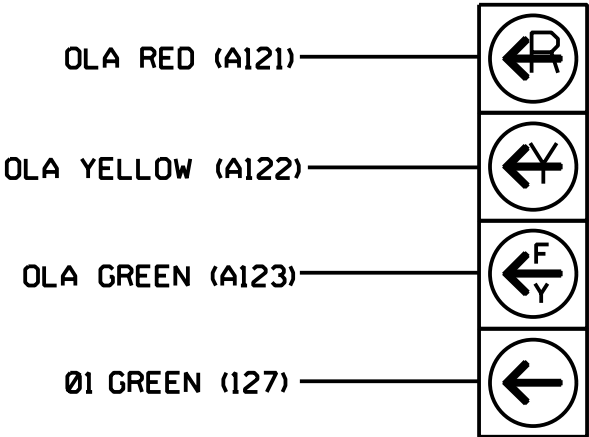
4 CHANNEL EV OSP CARD  
INSERT CARD INTO  
SLOT J13

SPECIAL DETECTOR NOTE

Install a multizone microwave 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.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



11

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945T4  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 1 of 3  
(Construction Phase 2, Step 2)

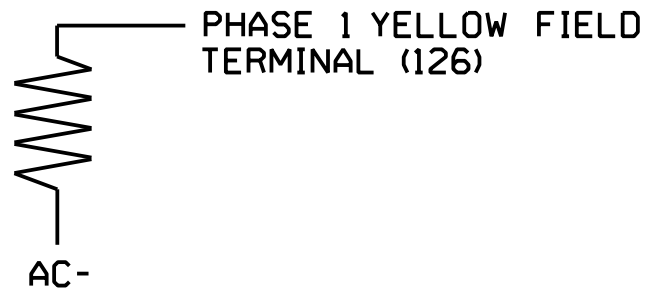
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                      |                                                                   |                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                                                                                                                           | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)<br>Catawba County Hickory | SEAL<br>NORTH CAROLINA<br>PROFESSIONAL<br>ENGINEER<br>SEAL<br>031464<br>NATASHA R. SIMMONS |
| Prepared for:<br>HNTB NORTH CAROLINA, P.C.<br>4000 Center at North Hills St<br>Suite 500<br>Raleigh, North Carolina 27609<br>NC License No. C-1554<br>(919) 546-8997 | PLAN DATE: January 2024<br>PREPARED BY: E.E. Tiller<br>REVISIONS  | REVIEWED BY: N.K. Vianich<br>REVIEWED BY: N.R. Simmons<br>INIT. DATE                       |
| DocuSigned by:<br>Natasha R. Simmons 9/6/2024<br>SIGNATURE DATE                                                                                                      |                                                                   | SIG. INVENTORY NO. 12-0945T4                                                               |

LOAD RESISTOR INSTALLATION DETAIL

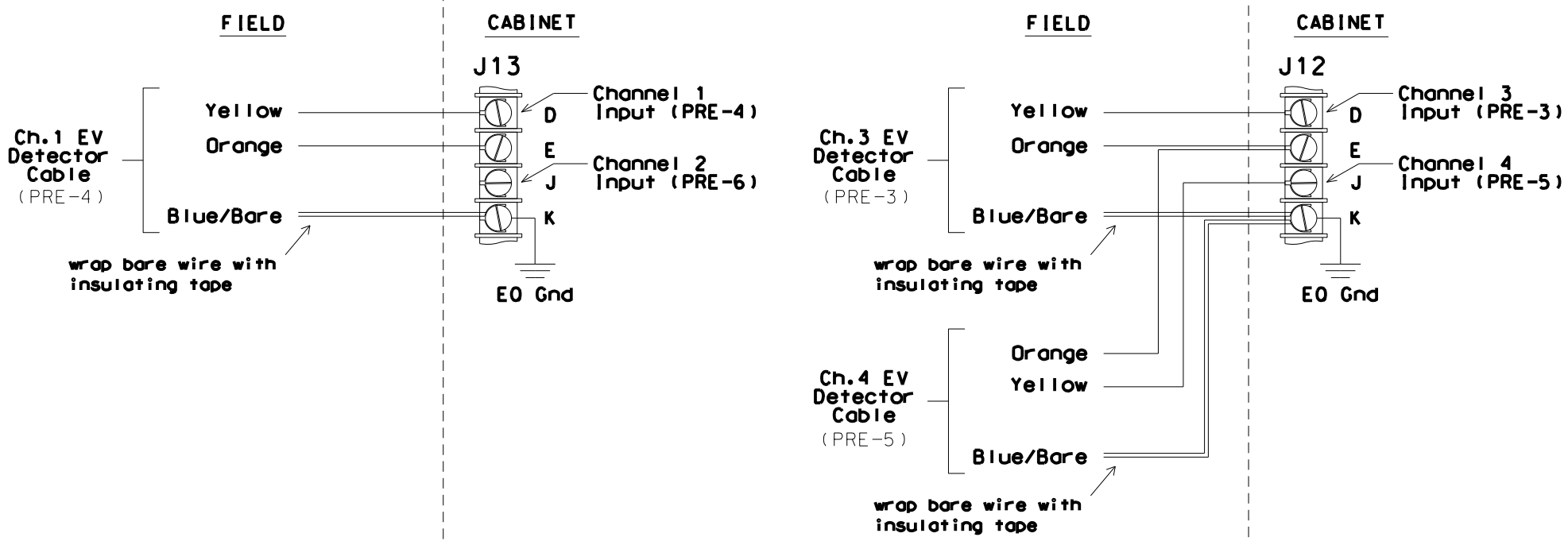
(install resistor as shown below)

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



TYPICAL EV FIELD WIRE DETAIL

(input file, rear view)





EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

SELECT 7-PREEMPT DATA FROM MAIN MENU

- PREEMPT 3 -

PREEMPTS

|             |             |              |
|-------------|-------------|--------------|
| 1-PREEMPT 1 | 5-PREEMPT 5 | 9-PREEMPT 9  |
| 2-PREEMPT 2 | 6-PREEMPT 6 | A-PREEMPT 10 |
| 3-PREEMPT 3 | 7-PREEMPT 7 | B-PREEMPT 11 |
| 4-PREEMPT 4 | 8-PREEMPT 8 | C-PREEMPT 12 |

O-OVERRIDES      D-DEFAULT DATA

PREEMPT 3

|                  |                  |
|------------------|------------------|
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

PREEMPT 3 MISC DATA      TEST: 0

DET: 250   DELAY: 0   MXCAL:120   DB/10: 0

NLOCK: 0   EXTND: 0   L OUT: 0   SRMOD: 0

LINK#: 0   DURAT: 0   GATE : 0   R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

EXIT    0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0

CALLS   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 3 menu

select 2 - Interval Times

PREEMPT 3 INTERVAL TIMES

MIN GRN: 1   MIN WLK: 1   DWL GRN: 7

EXT PED: 0

--SELECT---    ---TRACK---    ---RETURN---

GREEN : 0

PED CLR: 23   PED CLR: 0   PED CLR: 0

YEL/10 : 0   YEL/10 : 0   YEL/10 : 0

RED/10 : 0   RED/10 : 0   RED/10 : 0

select F - return to Preempt 3 menu

select 3 - Vehicle Status

PREEMPT 3 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

DWELL   0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0

(0-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)

CYCLE   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(0-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 4 -

PREEMPTS

|             |             |              |
|-------------|-------------|--------------|
| 1-PREEMPT 1 | 5-PREEMPT 5 | 9-PREEMPT 9  |
| 2-PREEMPT 2 | 6-PREEMPT 6 | A-PREEMPT 10 |
| 3-PREEMPT 3 | 7-PREEMPT 7 | B-PREEMPT 11 |
| 4-PREEMPT 4 | 8-PREEMPT 8 | C-PREEMPT 12 |

O-OVERRIDES      D-DEFAULT DATA

PREEMPT 4

|                  |                  |
|------------------|------------------|
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

PREEMPT 4 MISC DATA      TEST: 0

DET: 251   DELAY: 0   MXCAL:120   DB/10: 0

NLOCK: 0   EXTND: 0   L OUT: 0   SRMOD: 0

LINK#: 0   DURAT: 0   GATE : 0   R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

EXIT    0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

CALLS   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 4 menu

select 2 - Interval Times

PREEMPT 4 INTERVAL TIMES

MIN GRN: 1   MIN WLK: 1   DWL GRN: 10

EXT PED: 0

--SELECT---    ---TRACK---    ---RETURN---

GREEN : 0

PED CLR: 0   PED CLR: 0   PED CLR: 0

YEL/10 : 0   YEL/10 : 0   YEL/10 : 0

RED/10 : 0   RED/10 : 0   RED/10 : 0

select F - return to Preempt 4 menu

select 3 - Vehicle Status

PREEMPT 4 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

DWELL   0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(0-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)

CYCLE   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(0-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 5 -

PREEMPTS

|             |             |              |
|-------------|-------------|--------------|
| 1-PREEMPT 1 | 5-PREEMPT 5 | 9-PREEMPT 9  |
| 2-PREEMPT 2 | 6-PREEMPT 6 | A-PREEMPT 10 |
| 3-PREEMPT 3 | 7-PREEMPT 7 | B-PREEMPT 11 |
| 4-PREEMPT 4 | 8-PREEMPT 8 | C-PREEMPT 12 |

O-OVERRIDES      D-DEFAULT DATA

PREEMPT 5

|                  |                  |
|------------------|------------------|
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

PREEMPT 5 MISC DATA      TEST: 0

DET: 252   DELAY: 0   MXCAL:120   DB/10: 0

NLOCK: 0   EXTND: 0   L OUT: 0   SRMOD: 0

LINK#: 0   DURAT: 0   GATE : 0   R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

EXIT    1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0

CALLS   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 5 menu

select 2 - Interval Times

PREEMPT 5 INTERVAL TIMES

MIN GRN: 1   MIN WLK: 1   DWL GRN: 10

EXT PED: 0

--SELECT---    ---TRACK---    ---RETURN---

GREEN : 0

PED CLR: 12   PED CLR: 0   PED CLR: 0

YEL/10 : 0   YEL/10 : 0   YEL/10 : 0

RED/10 : 0   RED/10 : 0   RED/10 : 0

select F - return to Preempt 5 menu

select 3 - Vehicle Status

PREEMPT 5 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6

TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

DWELL   1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0

(0-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)

CYCLE   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(0-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt 5 menu

select 5 - Overlap Status

PREEMPT 5 OVERLAP STATUS

PHASE....A.B.C.D.E.F.G.H.I.J.K.L.M.N.O.P

TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

DWELL   5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

CYCLE   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(0-R.1-G.2-FR.3-FY.4-DK.5-FG 10-NO.1-ACT)

TRAIL   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

NOTE: Option 4 is not used. Be sure  
values are set at default=0.

end of programming

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

REMOTE FLASH  
PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

|                   |                    |
|-------------------|--------------------|
| 1- STARTUP & MISC | 6- SEQUENCES       |
| 2- FLASH          | 7- PORT 1/ITS DATA |
| 3- OVERLAP DATA   | 8- I/O MISC        |
| 4- PEER-TO-PEER   | 9- PUTPUT MAPPING  |
| 5- RING STRUCTURE | B-BANK SELECTION   |
|                   | C-COPY BANK        |

'+' DENOTES BANKABLE UNIT DATA      [1]

FLASH

|                                   |
|-----------------------------------|
| 1- REMOTE FLASH SETTINGS          |
| 2- REMOTE FLASH ENTRY/EXIT PHASES |
| 3- CABINET FLASH SETTINGS         |

REMOTE FLASH SETTINGS      TEST-A FLASH: 0

LDSW:123456789   0123456789   0123456789   012

FLSH:110010010   0001000000   0000000000   000

ALT:010010000   0000000000   0000000000   000

O-DARK   1-RED   2-YELLOW   3-STEADY YELLOW

SELECT 'F' RETURN TO FLASH MENU

FLASH

|                                   |
|-----------------------------------|
| 1- REMOTE FLASH SETTINGS          |
| 2- REMOTE FLASH ENTRY/EXIT PHASES |
| 3- CABINET FLASH SETTINGS         |

REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678   90123456

ENTRY: 01000100   00000000

EXIT: 01000100   00000000

REMOTE FLASH PROGRAMMING COMPLETE

ALL RED FLASH STARTUP  
PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

|                   |                    |
|-------------------|--------------------|
| 1- STARTUP & MISC | 6- SEQUENCES       |
| 2- FLASH          | 7- PORT 1/ITS DATA |
| 3- OVERLAP DATA   | 8- I/O MISC        |
| 4- PEER-TO-PEER   | 9- PUTPUT MAPPING  |
| 5- RING STRUCTURE | B-BANK SELECTION   |
|                   | C-COPY BANK        |

'+' DENOTES BANKABLE UNIT DATA      [1]

STARTUP & MISC

STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL

RED REV/10....: 40 (TSEC)      1-RED

AUTO PED CLR.: 0 (0-NO   1-YES)   2-RAF )

STOP T RESET.: 0 (0-NO   1-YES)

SEQUENCE.....: 0 (0-18)

SPECIAL SEO : 0 (SEE HELP)

STARTUP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945T4  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 3 of 3  
(Construction Phase 2, Step 2)

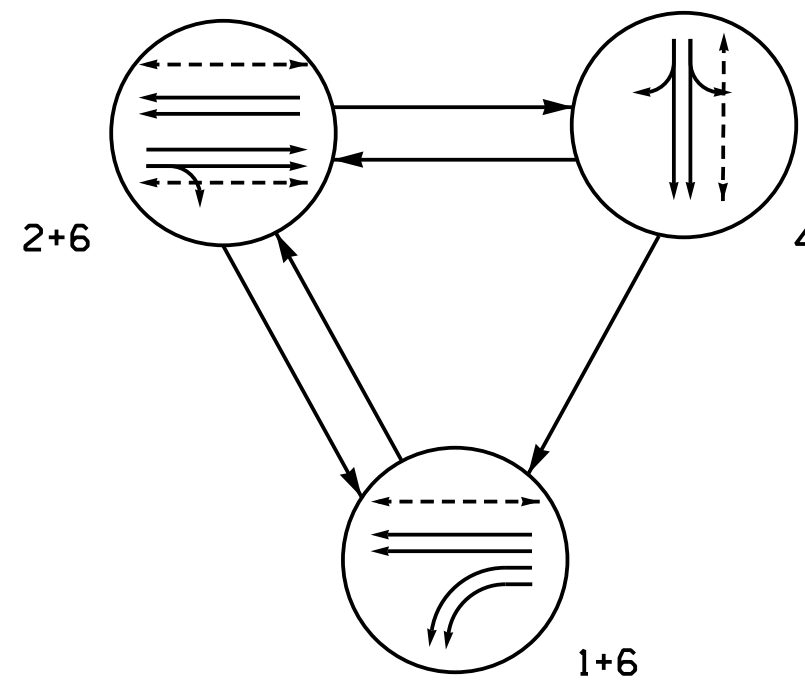
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                                                     |                                          |                                                                    |                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:<br><br>Prepared for:<br><br>750 N.Greenfield Pkwy, Garner, NC 27529 | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)  |                                                                    | SEAL<br> |
|                                                                                                                                                                                                     | Division 12    Catawba County    Hickory |                                                                    |                                                                                               |
|                                                                                                                                                                                                     | PLAN DATE: January 2024                  | REVIEWED BY: N.K. Vianich                                          |                                                                                               |
|                                                                                                                                                                                                     | PREPARED BY: E.E. Tiller                 | REVIEWED BY: N.R. Simmons                                          |                                                                                               |
|                                                                                                                                                                                                     | REVISIONS                                |                                                                    | INIT.    DATE                                                                                 |
|                                                                                                                                                                                                     |                                          | DocuSigned by:<br>Natasha R. Simmons 9/6/2024<br>SIGNATURE    DATE |                                                                                               |
|                                                                                                                                                                                                     |                                          | SIG. INVENTORY NO. 12-0945T4                                       |                                                                                               |

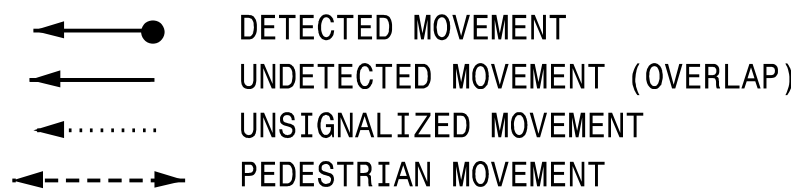
HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND



EV PREEMPT PHASES

(Medium Priority)

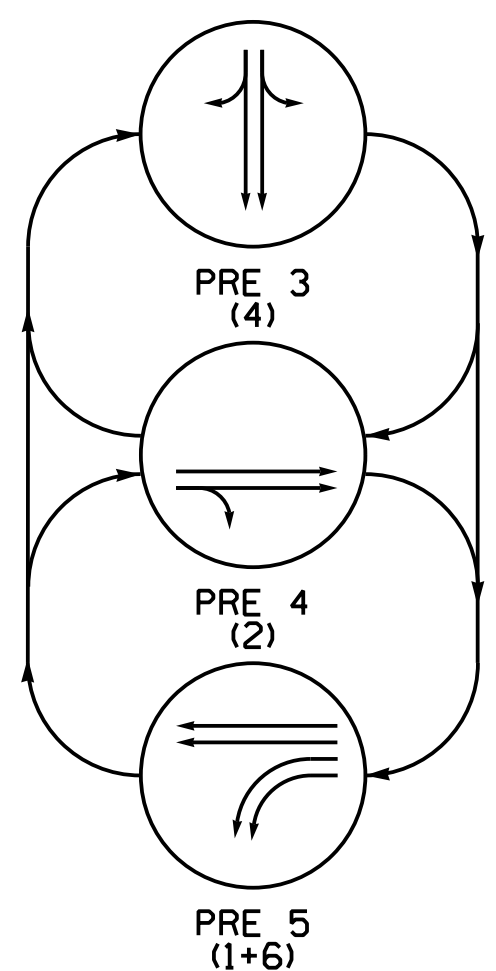


TABLE OF OPERATION

| SIGNAL FACE | PHASE |       |     |       |       |       |       |
|-------------|-------|-------|-----|-------|-------|-------|-------|
|             | 1 + 6 | 2 + 6 | 4   | PRE 3 | PRE 4 | PRE 5 | FLASH |
| 11,12       | ---   | ---   | --- | ---   | ---   | ---   | ---   |
| 21          | R     | ↑     | R   | R     | ↑     | R     | R     |
| 22          | R     | G     | R   | R     | G     | R     | R     |
| 41,42       | R     | R     | G   | G     | R     | R     | R     |
| 61          | G     | G     | R   | R     | R     | G     | R     |
| 62          | ↑     | ↑     | R   | R     | R     | ↑     | R     |
| P21,P22     | DW    | W     | DW  | DW    | DW    | DW    | DRK   |
| P43,P44     | DW    | DW    | W   | DW    | DW    | DW    | DRK   |
| P61,P62     | W     | W     | DW  | DW    | DW    | DW    | DRK   |

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

| INDUCTIVE LOOPS |           |       |                           |              | DETECTOR PROGRAMMING |        |                  |                |            |        |   |   |   |   |   |   |        |
|-----------------|-----------|-------|---------------------------|--------------|----------------------|--------|------------------|----------------|------------|--------|---|---|---|---|---|---|--------|
| ZONE            | SIZE (ft) | TURNS | DIST. FROM STOP LINE (ft) | NEW EXISTING | ASSIGNED PHASE       | TIMING |                  | OPERATION MODE |            |        |   |   |   |   |   |   |        |
|                 |           |       |                           |              |                      | DELAY  | EXTEND (STRETCH) | VEHICLE        | PEDESTRIAN | 1 CALL | 2 | 3 | 4 | 5 | 6 | 7 | STATUS |
| 1A*             | 6X40      | *     | 0                         | *            | -                    | 1      | - SEC.           | - SEC.         | X          | -      | - | - | - | - | - | - | *      |
| 1B*             | 6X40      | *     | 0                         | *            | -                    | 1      | - SEC.           | - SEC.         | X          | -      | - | - | - | - | - | - | *      |

\* Multizone Microwave Detection

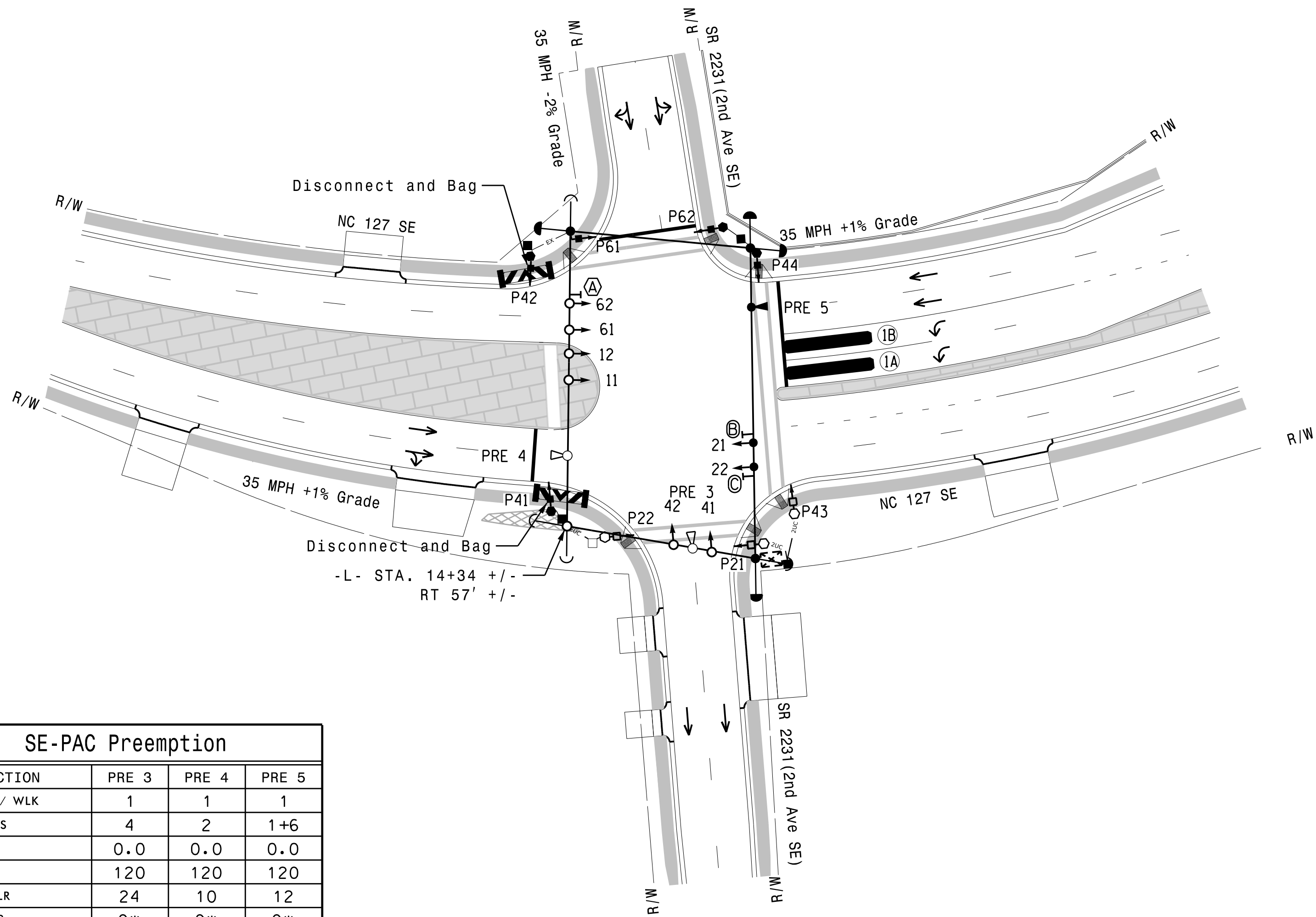
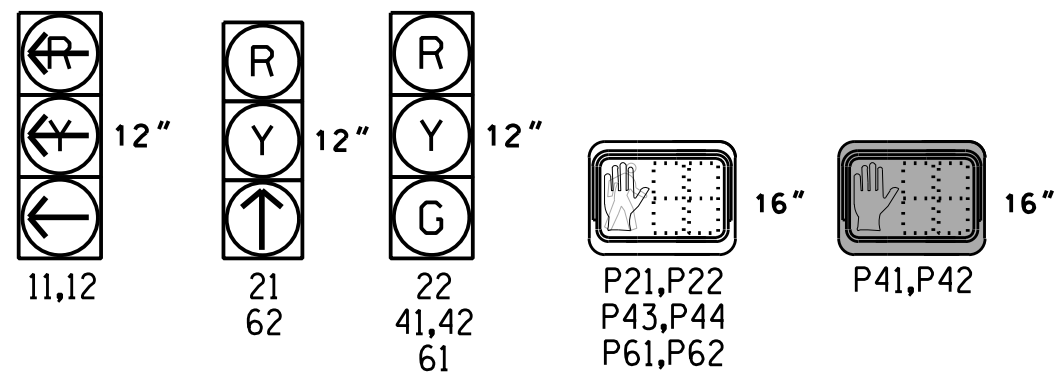
3 Phase with EVP  
Semi-Actuated  
Hickory City Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Disconnect and bag existing pedestrian heads numbered P41 and P42.
- Reposition existing signal heads numbered 21 and 22. signs ⓑ and ⓒ.
- Set all detector units to presence mode.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Hickory Signal System Data: Controller Asset #0316.

SIGNAL FACE I.D.

All Heads L.E.D.



SE-PAC 2070 TIMING CHART

| FEATURE                 | PHASE    |                |                |                |
|-------------------------|----------|----------------|----------------|----------------|
|                         | 1        | 2              | 4              | 6              |
| Min Green *             | 7        | 10             | 7              | 10             |
| Passage Gap *           | 2.0      | -              | -              | -              |
| Maximum Green *         | 40       | 40             | 40             | 40             |
| Yellow Change           | 3.0      | 3.8            | 4.0            | 3.8            |
| Red Clear               | 3.3      | 2.1            | 2.7            | 2.1            |
| Walk *                  | -        | 14             | 13             | 14             |
| Pedestrian Clear        | -        | 12             | 25             | 14             |
| Advance Walk *          | -        | 7              | 6              | 7              |
| Added Initial *         | -        | -              | -              | -              |
| Maximum Initial *       | -        | -              | -              | -              |
| Time Before Reduction * | -        | -              | -              | -              |
| Time To Reduce *        | -        | -              | -              | -              |
| Minimum Gap             | -        | -              | -              | -              |
| Recall Mode             | -        | MAX/PED RECALL | MAX/PED RECALL | MAX/PED RECALL |
| Vehicle Call Memory     | NON-LOCK | NON-LOCK       | NON-LOCK       | NON-LOCK       |
| Dual Entry              | -        | -              | -              | -              |
| Simultaneous Gap        | ON       | ON             | ON             | ON             |

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

SE-PAC Preemption

| FUNCTION         | PRE 3 | PRE 4 | PRE 5 |
|------------------|-------|-------|-------|
| MIN GRN / WLK    | 1     | 1     | 1     |
| EXIT PHASES      | 4     | 2     | 1+6   |
| DELAY            | 0.0   | 0.0   | 0.0   |
| MXCALL           | 120   | 120   | 120   |
| SEL PED CLR      | 24    | 10    | 12    |
| SEL YEL / 10     | 0*    | 0*    | 0*    |
| SEL RED / 10     | 0*    | 0*    | 0*    |
| TRACK GREEN      | 0     | 0     | 0     |
| TRK PED CLR      | 0     | 0     | 0     |
| TRK YEL / 10     | 0     | 0     | 0     |
| TRK RED / 10     | 0     | 0     | 0     |
| DWELL GRN        | 7     | 10    | 10    |
| RET PED CLR      | 0     | 0     | 0     |
| RET YEL / 10     | 0*    | 0*    | 0*    |
| RET RED / 10     | 0*    | 0*    | 0*    |
| PREEMPT EXTEND** | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.

LEGEND

| PROPOSED | EXISTING                       |
|----------|--------------------------------|
|          |                                |
|          | N/A                            |
|          |                                |
|          |                                |
|          |                                |
|          |                                |
|          |                                |
|          |                                |
|          |                                |
|          |                                |
| N/A      | Right of Way                   |
|          | N/A                            |
|          |                                |
|          | N/A                            |
|          |                                |
| N/A      | Curb Ramp                      |
|          | N/A                            |
| Ⓐ        | No Right Turn Sign (R3-1)      |
| Ⓑ        | No Left Turn Sign (R3-2)       |
| ⓒ        | "NO TURN ON RED" Sign (R10-11) |

Signal Upgrade -  
Temporary Design 5  
(Construction Phase 3)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                  |                                                                                                                                                                   |                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Prepared for:<br>TRANSPORTATION MOBILITY AND SAFETY DIVISION<br>STATE OF NORTH CAROLINA<br>Signal Design Section<br>750 N. Greenfield Pkwy, Garner, NC 27529 | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)<br>Division 12 Catawba County Hickory<br>PLAN DATE: October 2023<br>REVIEWED BY: E.E. Tiller<br>REVIEWED BY: N.R. Simmons | SEAL<br>NORTH CAROLINA PROFESSIONAL ENGINEER<br>SEAL 031464<br>NATASHA R. SIMMONS<br>DocuSigned by:<br>Natasha R. Simmons 9/6/2024<br>DATE<br>SIG. INVENTORY NO. 12-0945T5 |
|                                                                                                                                                                  | REVISIONS<br>INIT. DATE                                                                                                                                           |                                                                                                                                                                            |

HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997



ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

Assign advanced walk to peds 2, 4 and 6 as shown below.

PHASE MENU  

1-VEHICLE DATA  
2-DENSITY TIMES+  
**3-PEDESTRIAN DATA**  
4-INIT & NA RESP+  
5-N.LOCK & MISC+  
'+' DENOTES BANKABLE DATA

6-SPEC. SEQUENCE+  
7-DETECTOR DATA  
8-PHASE & BANK COPY  
9-SELECT PHASE BANK  
[1]

PEDESTRIAN MENU  

1-PED TIMES+  
2-PED RECALL+  
**3-PED OFFSET+**  
4-MISC PED OPTIONS+

[1]

PHASE.....1...2...3...4...5...6...7...8  
WOFF/10 0 70 0 60 0 70 0 0  
MODE\* 0 0 0 0 0 0 0 0  
  
CODES: \* 0=ADVANCE 1=DELAY  
  
[1]

ADVANCE WALK PED PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

PHASE MENU  

1-VEHICLE DATA  
2-DENSITY TIMES+  
3-PEDESTRIAN DATA  
**4-INIT & NA RESP+**  
5-N.LOCK & MISC+  
'+' DENOTES BANKABLE DATA

6-SPEC. SEQUENCE+  
7-DETECTOR DATA  
8-PHASE & BANK COPY  
9-SELECT PHASE BANK  
[1]

PHASE....1...2...3...4...5...6...7...8  
INITIAL 1 6 0 1 0 6 0 0  
NA RESP 2 1 0 2 0 1 0 0  
  
CODES.....0....1...2....3...4...5...6  
INITL NONE INACT RED YEL GRN DRK G/DW  
NA RSP NONE NA1 NA2 1&2 --- --- ---  
  
\* \* \*  
  
INIT & N.A. RESP PROGRAMMING COMPLETE

PHASES 3,5,7,8 NOT USED! →

← CODE 6 (G/DW) ALLOWS PHASE 2 TO START IN GREEN AND SKIP THE PED PHASE

VEHICLE RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

PHASE MENU  

**1-VEHICLE DATA**  
2-DENSITY TIMES+  
3-PEDESTRIAN DATA  
4-INIT & NA RESP+  
5-N.LOCK & MISC+  
'+' DENOTES BANKABLE DATA

6-SPEC. SEQUENCE+  
7-DETECTOR DATA  
8-PHASE & BANK COPY  
9-SELECT PHASE BANK  
[1]

VEHICLE DATA  

1-VEHICLE TIMES+  
2-DYNAMIC MAX+  
**3-RECALLS+**  
4-BIKE & AWS TIMES+

[1]

PHASE....1...2...3...4...5...6...7...8  
VEH RCL 0 3 0 3 0 3 0 0  
VEH DLY 0 0 0 0 0 0 0 0  
  
CODES.....0....1...2....3...4...5....  
NONE 1CALL MIN MAX SOFT BIKE  
  
[1]

VEH RECALL PROGRAMMING COMPLETE

PEDESTRIAN RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

PHASE MENU  

1-VEHICLE DATA  
2-DENSITY TIMES+  
**3-PEDESTRIAN DATA**  
4-INIT & NA RESP+  
5-N.LOCK & MISC+  
'+' DENOTES BANKABLE DATA

6-SPEC. SEQUENCE+  
7-DETECTOR DATA  
8-PHASE & BANK COPY  
9-SELECT PHASE BANK  
[1]

PEDESTRIAN MENU  

1-PED TIMES+  
2-PED RECALL+  
**3-PED OFFSET+**  
4-MISC PED OPTIONS+

[1]

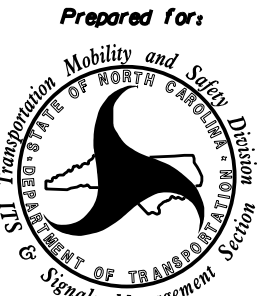
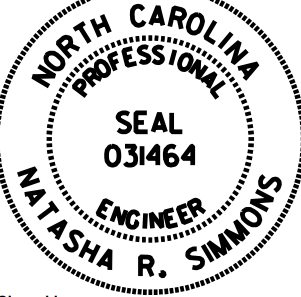
PHASE....1...2...3...4...5...6...7...8  
PED RCL 0 2 0 2 0 2 0 0  
PED DLY 0 0 0 0 0 0 0 0  
  
CODES.....0....1...2....3...4  
NONE 1CALL PED NA NA+  
  
[1]

PED RECALL PROGRAMMING COMPLETE

Signal Upgrade-  
Electrical Detail - Sheet 2 of 3  
(Construction Phase 3)

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945T5  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                                                                                                        |                                         |                           |                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div><div>ELECTRICAL AND PROGRAMMING<br/>DETAILS FOR:</div><div><div>Prepared for:</div><div><div>750 N.Greenfield Pkwy, Garner, NC 27529</div></div></div></div> | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE) |                           | <div><div>SEAL</div><div><div>SEAL<br/>031464<br/>ENGINEER<br/>NATASHA R. SIMMONS</div></div></div> |
|                                                                                                                                                                                                                                                        | Division 12 Catawba County Hickory      |                           |                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                        | PLAN DATE: January 2024                 | REVIEWED BY: N.K. Vianich |                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                        | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons |                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                        | REVISIONS                               |                           |                                                                                                                                                                                          |
| INIT. DATE                                                                                                                                                                                                                                             |                                         |                           |                                                                                                                                                                                          |
| DocuSigned by:<br><br>SIGNATURE DATE                                                                                                                              |                                         |                           |                                                                                                                                                                                          |
| SIG. INVENTORY NO. 12-0945T5                                                                                                                                                                                                                           |                                         |                           |                                                                                                                                                                                          |

**HNTB**  
HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

SELECT 7-PREEMPT DATA FROM MAIN MENU

- PREEMPT 3 -

PREEMPTS

|             |             |              |
|-------------|-------------|--------------|
| 1-PREEMPT 1 | 5-PREEMPT 5 | 9-PREEMPT 9  |
| 2-PREEMPT 2 | 6-PREEMPT 6 | A-PREEMPT 10 |
| 3-PREEMPT 3 | 7-PREEMPT 7 | B-PREEMPT 11 |
| 4-PREEMPT 4 | 8-PREEMPT 8 | C-PREEMPT 12 |

O-OVERRIDES      D-DEFAULT DATA

PREEMPT 3

|                  |                  |
|------------------|------------------|
| 1-MISCELLANEOUS  | 6-PEDEST. STATUS |
| 2-INTERVAL TIMES | 7-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

PREEMPT 3 MISC DATA      TEST: 0

DET: 250 DELAY: 0 MXCAL:120 DB/10: 0  
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0  
LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
EXIT 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0  
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 3 menu  
select 2 - Interval Times

PREEMPT 3 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 7  
EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN--

GREEN : 0

PED CLR: 24 PED CLR: 0 PED CLR: 0  
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0  
RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 3 menu  
select 3 - Vehicle Status

PREEMPT 3 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0  
(O-RED,1-GRN,2-FLR,3-FLY,4-DARK,5-FLG)  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 4 -

PREEMPTS

|             |             |              |
|-------------|-------------|--------------|
| 1-PREEMPT 1 | 5-PREEMPT 5 | 9-PREEMPT 9  |
| 2-PREEMPT 2 | 6-PREEMPT 6 | A-PREEMPT 10 |
| 3-PREEMPT 3 | 7-PREEMPT 7 | B-PREEMPT 11 |
| 4-PREEMPT 4 | 8-PREEMPT 8 | C-PREEMPT 12 |

O-OVERRIDES      D-DEFAULT DATA

PREEMPT 4

|                  |                  |
|------------------|------------------|
| 1-MISCELLANEOUS  | 6-PEDEST. STATUS |
| 2-INTERVAL TIMES | 7-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

PREEMPT 4 MISC DATA      TEST: 0

DET: 251 DELAY: 0 MXCAL:120 DB/10: 0  
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0  
LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
EXIT 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 4 menu  
select 2 - Interval Times

PREEMPT 4 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 10  
EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN--

GREEN : 0

PED CLR: 10 PED CLR: 0 PED CLR: 0  
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0  
RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 4 menu  
select 3 - Vehicle Status

PREEMPT 4 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-RED,1-GRN,2-FLR,3-FLY,4-DARK,5-FLG)  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 5 -

PREEMPTS

|             |             |              |
|-------------|-------------|--------------|
| 1-PREEMPT 1 | 5-PREEMPT 5 | 9-PREEMPT 9  |
| 2-PREEMPT 2 | 6-PREEMPT 6 | A-PREEMPT 10 |
| 3-PREEMPT 3 | 7-PREEMPT 7 | B-PREEMPT 11 |
| 4-PREEMPT 4 | 8-PREEMPT 8 | C-PREEMPT 12 |

O-OVERRIDES      D-DEFAULT DATA

PREEMPT 5

|                  |                  |
|------------------|------------------|
| 1-MISCELLANEOUS  | 6-PEDEST. STATUS |
| 2-INTERVAL TIMES | 7-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

PREEMPT 5 MISC DATA      TEST: 0

DET: 252 DELAY: 0 MXCAL:120 DB/10: 0  
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0  
LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
EXIT 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 5 menu  
select 2 - Interval Times

PREEMPT 5 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 10  
EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN--

GREEN : 0

PED CLR: 12 PED CLR: 0 PED CLR: 0  
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0  
RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 5 menu  
select 3 - Vehicle Status

PREEMPT 5 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  
(O-RED,1-GRN,2-FLR,3-FLY,4-DARK,5-FLG)  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-NO..1-ACT..2-MIN REC..3-MX REC)

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

end of programming

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

|                   |                    |
|-------------------|--------------------|
| 1- STARTUP & MISC | 6- SEQUENCES       |
| 2- FLASH          | 7- PORT 1/ITS DATA |
| 3- OVERLAP DATA   | 8- I/O MISC        |
| 4- PEER-TO-PEER   | 9- PUTPUT MAPPING  |
| 5- RING STRUCTURE | B-BANK SELECTION   |
|                   | C-COPY BANK        |

'+' DENOTES BANKABLE UNIT DATA [1]

FLASH

|                                   |
|-----------------------------------|
| 1- REMOTE FLASH SETTINGS          |
| 2- REMOTE FLASH ENTRY/EXIT PHASES |
| 3- CABINET FLASH SETTINGS         |

REMOTE FLASH SETTINGS      TEST-A FLASH: 0

LDSW:123456789 0123456789 0123456789 012  
FLSH:110010010 0000000000 0000000000 000  
ALT:010010000 0000000000 0000000000 000

O-DARK 1-RED 2-YELLOW 3-STEADY YELLOW

SELECT 'F' RETURN TO FLASH MENU

FLASH

|                                   |
|-----------------------------------|
| 1- REMOTE FLASH SETTINGS          |
| 2- REMOTE FLASH ENTRY/EXIT PHASES |
| 3- CABINET FLASH SETTINGS         |

REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456  
ENTRY: 01000100 00000000  
EXIT: 01000100 00000000

REMOTE FLASH PROGRAMMING COMPLETE

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

|                   |                    |
|-------------------|--------------------|
| 1- STARTUP & MISC | 6- SEQUENCES       |
| 2- FLASH          | 7- PORT 1/ITS DATA |
| 3- OVERLAP DATA   | 8- I/O MISC        |
| 4- PEER-TO-PEER   | 9- PUTPUT MAPPING  |
| 5- RING STRUCTURE | B-BANK SELECTION   |
|                   | C-COPY BANK        |

'+' DENOTES BANKABLE UNIT DATA [1]

STARTUP & MISC

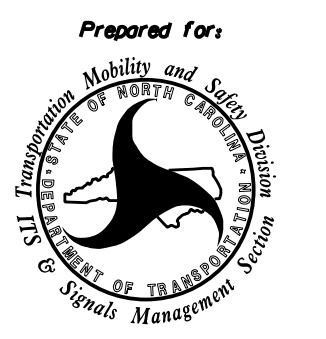
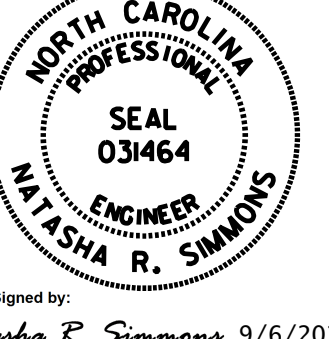
STARTUP TIME.: 6 (SEC) STATE: 2 (O-FL  
RED REV/10....: 40 (TSEC) 1-RED  
AUTO PED CLR.: 0 (O-NO 1-YES) 2-RAF)  
STOP T RESET.: 0 (O-NO 1-YES)  
SEQUENCE.....: 0 (O-18)  
SPECIAL SEO : 0 (SEE HELP)

STARTUP PROGRAMMING COMPLETE

Signal Upgrade-  
Electrical Detail - Sheet 3 of 3  
(Construction Phase 3)

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945T5  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

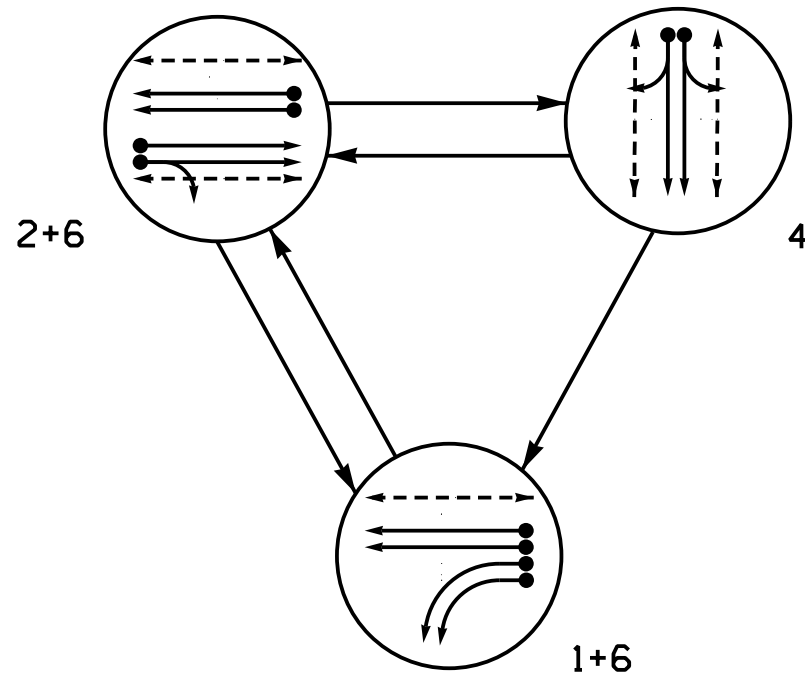
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                                                     |                                                                                         |                           |                                                                                                                     |                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:<br><br>Prepared for:<br><br>750 N.Greenfield Pkwy, Garner, NC 27529 | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)<br>Division 12      Catawba County      Hickory |                           | SEAL<br><br>NATASHA R. SIMMONS |                 |
|                                                                                                                                                                                                     | PLAN DATE: January 2024                                                                 | REVIEWED BY: N.K. Vianich |                                                                                                                     |                 |
|                                                                                                                                                                                                     | PREPARED BY: E.E. Tiller                                                                | REVIEWED BY: N.R. Simmons |                                                                                                                     |                 |
|                                                                                                                                                                                                     | REVISIONS                                                                               |                           |                                                                                                                     | INIT.      DATE |
| SIGNATURE                                                                                                                                                                                           |                                                                                         | DATE                      |                                                                                                                     |                 |
| SIG. INVENTORY NO. 12-0945T5                                                                                                                                                                        |                                                                                         |                           |                                                                                                                     |                 |

HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

EV PREEMPT PHASES

(Medium Priority)

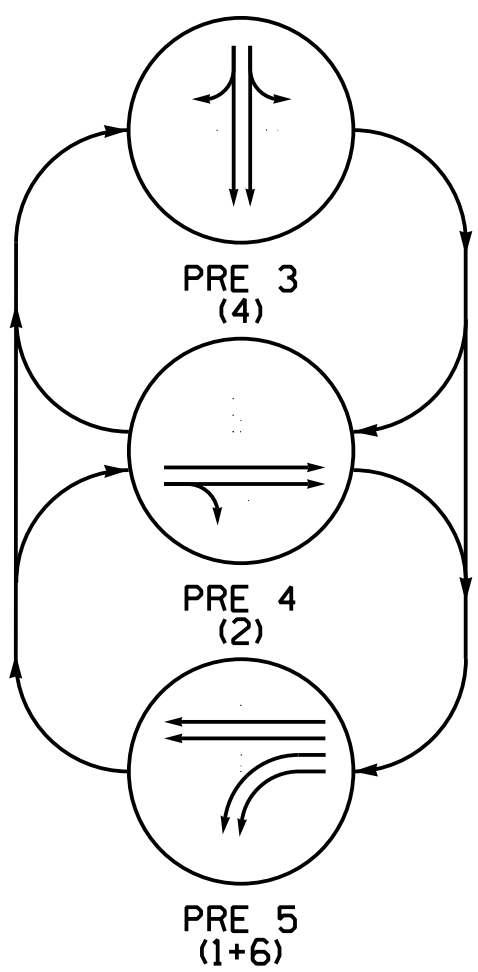


TABLE OF OPERATION

| SIGNAL FACE | PHASE |       |    |       |       |       |       |   |
|-------------|-------|-------|----|-------|-------|-------|-------|---|
|             | 1 + 6 | 2 + 6 | 4  | PRE 3 | PRE 4 | PRE 5 | FLASH |   |
| 11,12       | —     | —     | —  | —     | —     | —     | —     | — |
| 21          | R     | ↑     | R  | R     | ↑     | R     | R     |   |
| 22          | R     | G     | R  | R     | G     | R     | R     |   |
| 41,42       | R     | R     | G  | G     | R     | R     | R     |   |
| 61          | G     | G     | R  | R     | R     | G     | R     |   |
| 62          | ↑     | ↑     | R  | R     | R     | ↑     | R     |   |
| P21,P22     | DW    | W     | DW | DW    | DW    | DRK   |       |   |
| P41,P42     | DW    | DW    | W  | DW    | DW    | DRK   |       |   |
| P43,P44     | DW    | DW    | W  | DW    | DW    | DRK   |       |   |
| P61,P62     | W     | W     | DW | DW    | DW    | DRK   |       |   |

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

| INDUCTIVE LOOPS |           |       |                           |     |          | DETECTOR PROGRAMMING |         |        |                  |                |            |        |        |        |         |           |              |     |          |
|-----------------|-----------|-------|---------------------------|-----|----------|----------------------|---------|--------|------------------|----------------|------------|--------|--------|--------|---------|-----------|--------------|-----|----------|
|                 |           |       |                           |     |          | ASSIGNED PHASE       | TIMING  |        | EXTEND (STRETCH) | OPERATION MODE |            |        |        |        |         |           | SYSTEM LOOPS | NEW | EXISTING |
|                 |           |       |                           |     |          |                      |         |        |                  | VEHICLE        | PEDESTRIAN | 1 CALL | STOP A | STOP B | PROPPER | LEFT TURN |              |     |          |
| LOOP NO.        | SIZE (ft) | TURNS | DIST. FROM STOP LINE (ft) | NEW | EXISTING |                      | DELAY   |        |                  |                |            |        |        |        |         |           |              |     |          |
| 1A              | 6x40      | 2-4-2 | 0                         | X   | -        | 1                    | - SEC.  | - SEC. | X                | -              | -          | -      | -      | -      | -       | -         | -            | X   | -        |
| 1B              | 6x40      | 2-4-2 | 0                         | X   | -        | 1                    | - SEC.  | - SEC. | X                | -              | -          | -      | -      | -      | -       | -         | -            | X   | -        |
| 2A              | 6x6       | 3     | 70                        | X   | -        | 2                    | - SEC.  | - SEC. | X                | -              | -          | -      | -      | -      | -       | -         | -            | X   | -        |
| 2B              | 6x6       | 3     | 70                        | X   | -        | 2                    | - SEC.  | - SEC. | X                | -              | -          | -      | -      | -      | -       | -         | -            | X   | -        |
| 4A              | 6x40      | 2-4-2 | 0                         | X   | -        | 4                    | - SEC.  | - SEC. | X                | -              | -          | -      | -      | -      | -       | -         | -            | X   | -        |
| 4B              | 6x40      | 2-4-2 | 0                         | X   | -        | 4                    | 10 SEC. | - SEC. | X                | -              | -          | -      | -      | -      | -       | -         | -            | X   | -        |
| 4C              | 6x6       | 3     | 0                         | X   | -        | 4                    | 15 SEC. | - SEC. | X                | -              | -          | -      | -      | -      | -       | -         | -            | X   | -        |
| 6A              | 6x6       | 3     | 70                        | X   | -        | 6                    | - SEC.  | - SEC. | X                | -              | -          | -      | -      | -      | -       | -         | -            | X   | -        |
| 6B              | 6x6       | 3     | 70                        | X   | -        | 6                    | - SEC.  | - SEC. | X                | -              | -          | -      | -      | -      | -       | -         | -            | X   | -        |

3 Phase with EVP  
Fully Actuated  
Hickory City Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Hickory Signal System Data: Controller Asset #0316.

SE-PAC Preemption

| FUNCTION         | PRE 3 | PRE 4 | PRE 5 |
|------------------|-------|-------|-------|
| MIN GRN / WLK    | 1     | 1     | 1     |
| EXIT PHASES      | 4     | 2     | 1+6   |
| DELAY            | 0.0   | 0.0   | 0.0   |
| MXCALL           | 120   | 120   | 120   |
| SEL PED CLR      | 24    | 10    | 12    |
| SEL YEL / 10     | 0*    | 0*    | 0*    |
| SEL RED / 10     | 0*    | 0*    | 0*    |
| TRACK GREEN      | 0     | 0     | 0     |
| TRK PED CLR      | 0     | 0     | 0     |
| TRK YEL / 10     | 0     | 0     | 0     |
| TRK RED / 10     | 0     | 0     | 0     |
| DWELL GRN        | 7     | 10    | 10    |
| RET PED CLR      | 0     | 0     | 0     |
| RET YEL / 10     | 0*    | 0*    | 0*    |
| RET RED / 10     | 0*    | 0*    | 0*    |
| PREEMPT EXTEND** | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.

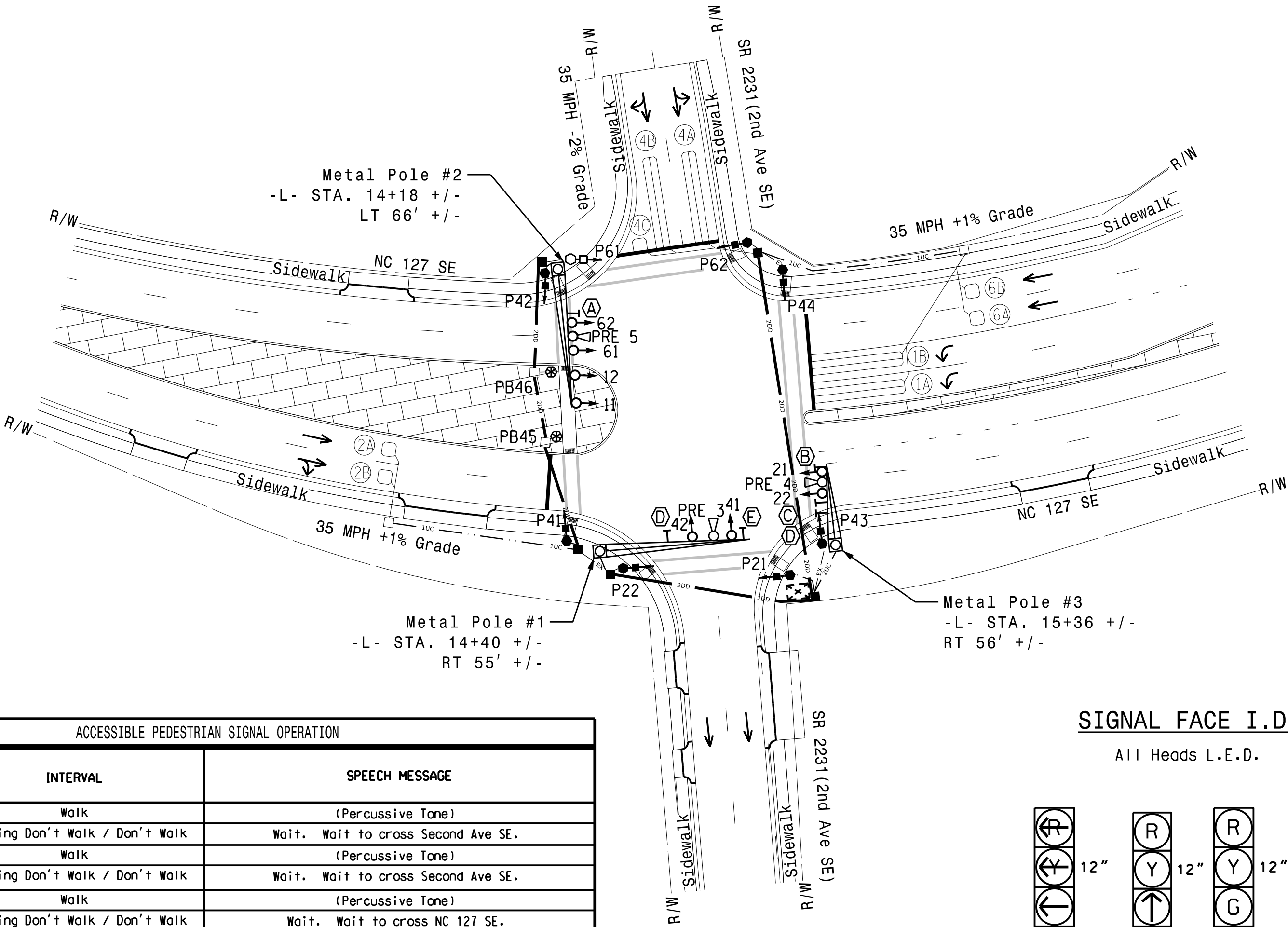
SE-PAC 2070 TIMING CHART

| FEATURE                 | PHASE    |            |          |            |
|-------------------------|----------|------------|----------|------------|
|                         | 1        | 2          | 4        | 6          |
| Min Green *             | 7        | 10         | 7        | 10         |
| Passage Gap *           | 2.0      | 3.0        | 2.0      | 3.0        |
| Maximum Green *         | 40       | 40         | 40       | 40         |
| Yellow Change           | 3.0      | 3.8        | 4.0      | 3.8        |
| Red Clear               | 3.3      | 2.2        | 2.7      | 2.2        |
| Walk *                  | -        | 7          | 7        | 7          |
| Pedestrian Clear        | -        | 12         | 25       | 14         |
| Advance Walk *          | -        | 7          | 6        | 7          |
| Added Initial *         | -        | 1.5        | -        | 1.5        |
| Maximum Initial *       | -        | 11         | -        | 11         |
| Time Before Reduction * | -        | 15         | -        | 15         |
| Time To Reduce *        | -        | 30         | -        | 30         |
| Minimum Gap             | -        | 3.0        | -        | 3.0        |
| Recall Mode             | -        | MIN RECALL | -        | MIN RECALL |
| Vehicle Call Memory     | NON-LOCK | LOCK       | NON-LOCK | LOCK       |
| Dual Entry              | -        | -          | -        | -          |
| Simultaneous Gap        | ON       | ON         | ON       | ON         |

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

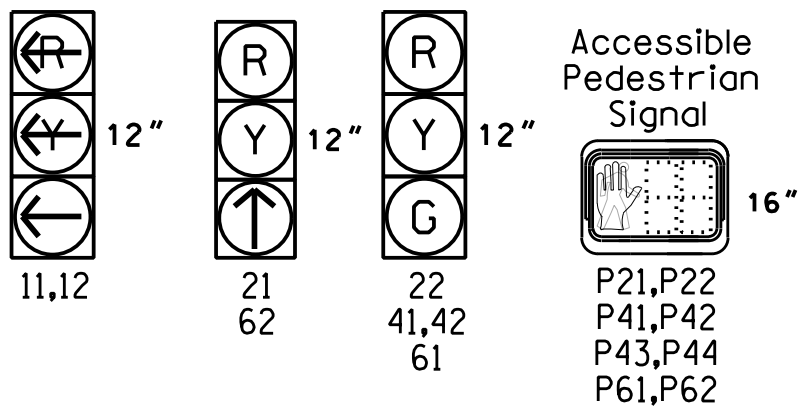
ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

| SIGNAL FACE | VOICE | TONES | INTERVAL                         | SPEECH MESSAGE                                         |
|-------------|-------|-------|----------------------------------|--------------------------------------------------------|
| P21         | X     | -     | Walk                             | (Percussive Tone)                                      |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross Second Ave SE.                     |
| P22         | -     | X     | Walk                             | (Percussive Tone)                                      |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross Second Ave SE.                     |
| P41         | -     | X     | Walk                             | (Percussive Tone)                                      |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross NC 127 SE.                         |
| P42         | X     | -     | Walk                             | NC 147. Walk sign is on to cross NC 127 SE.            |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross NC 127 SE.                         |
| P43         | X     | -     | Walk                             | (Percussive Tone)                                      |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross NC 127 SE.                         |
| P44         | -     | X     | Walk                             | (Percussive Tone)                                      |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross NC 127 SE.                         |
| PB45        | -     | X     | Walk                             | (Percussive Tone)                                      |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross NC 127 SE.                         |
| PB46        | -     | X     | Walk                             | (Percussive Tone)                                      |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross NC 127 SE.                         |
| P61         | X     | -     | Walk                             | Second Ave SE. Walk sign is on to cross Second Ave SE. |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross Second Ave SE.                     |
| P62         | -     | X     | Walk                             | (Percussive Tone)                                      |
|             | X     | -     | Flashing Don't Walk / Don't Walk | Wait. Wait to cross Second Ave SE.                     |



SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

| PROPOSED                                                           | EXISTING |
|--------------------------------------------------------------------|----------|
| ○ → Traffic Signal Head                                            | ● → N/A  |
| ○ → Modified Signal Head                                           | ○ → N/A  |
| ○ → Pedestrian Signal Head With Push Button & Sign                 | ○ → N/A  |
| ○ → Signal Pole with Guy                                           | ○ → N/A  |
| ○ → Signal Pole with Sidewalk Guy                                  | ○ → N/A  |
| ○ → Inductive Loop Detector                                        | ○ → N/A  |
| ○ → Out of Pavement Detector                                       | ○ → N/A  |
| ○ → Controller & Cabinet                                           | ○ → N/A  |
| ○ → Junction Box                                                   | ○ → N/A  |
| ○ → Right of Way                                                   | ○ → N/A  |
| ○ → Directional Arrow                                              | ○ → N/A  |
| ○ → Directional Drill                                              | ○ → N/A  |
| ○ → 2-in Underground Conduit                                       | ○ → N/A  |
| ○ → Type I Pushbutton Post                                         | ○ → N/A  |
| ○ → Metal Pole with Mastarm                                        | ○ → N/A  |
| ○ → Type II Signal Pedestal                                        | ○ → N/A  |
| ○ → N/A                                                            | ○ → N/A  |
| ○ → No Right Turn Sign (R3-1)                                      | ○ → N/A  |
| ○ → No Left Turn Sign (R3-2)                                       | ○ → N/A  |
| ○ → "NO TURN ON RED" Sign (R10-11)                                 | ○ → N/A  |
| ○ → Right "TURNING VEHICLES" Yield "10" Pedestrians Sign (R10-15R) | ○ → N/A  |
| ○ → Left "TURNING VEHICLES" Yield "10" Pedestrians Sign (R10-15L)  | ○ → N/A  |

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|           |                                         |                           |      |
|-----------|-----------------------------------------|---------------------------|------|
|           | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE) |                           |      |
|           | Division 12 Catawba County Hickory      |                           |      |
|           | PLAN DATE: October 2023                 | REVIEWED BY: N.K. Vianich |      |
|           | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons |      |
| REVISIONS |                                         | INIT.                     | DATE |
| 0         |                                         |                           |      |
| 1"=40'    |                                         |                           |      |

DocuSigned by: Natasha R. Simmons 9/6/2024  
SIC. INVENTORY NO. 12-0945

HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

*(remove jumpers and set switches as shown)*

*(remove jumpers and set switches as shown)*



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.

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.

- ## EQUIPMENT INFORMATION

```
CONTROLLER.....2070LX
CABINET.....332 W/ AUX
SOFTWARE.....SE-PAC2070 VER. 5.4
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S8,S9
PHASES USED.....1,2,2 PED,4,4 PED,6,6 PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED
```

(front view)



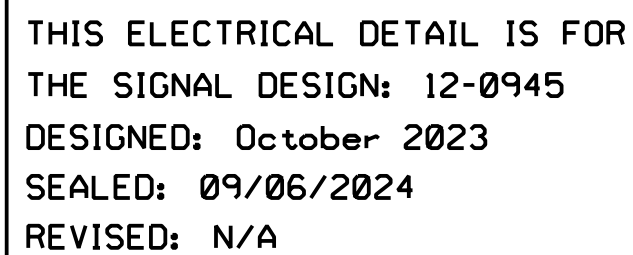
```
FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT
```

4 CHANNEL EV OSP CARD  
INSERT CARD INTO  
SLOT J13

| LOOP NO.                          | LOOP TERMINAL | INPUT FILE POS. | PIN NO. | DETECTOR NO. | NEMA PHASE | DELAY TIME                              | EXTEND (STRETCH) TIME |
|-----------------------------------|---------------|-----------------|---------|--------------|------------|-----------------------------------------|-----------------------|
| 1A                                | TB2-1,2       | I1U             | 56      | 1            | 1          | __                                      | __                    |
| 1B                                | TB2-5,6       | I2U             | 39      | 3            | 1          | __                                      | __                    |
| 2A                                | TB2-9,10      | I3U             | 63      | 5            | 2          | __                                      | __                    |
| 2B                                | TB2-11,12     | I3L             | 76      | 6            | 2          | __                                      | __                    |
| 4A                                | TB4-9,10      | I6U             | 41      | 11           | 4          | __                                      | __                    |
| 4B                                | TB4-11,12     | I6L             | 45      | 12           | 4          | 10                                      | __                    |
| 4C                                | TB6-1,2       | I7U             | 65      | 13           | 4          | 15                                      | __                    |
| 6A                                | TB3-5,6       | J2U             | 40      | 21           | 6          | __                                      | __                    |
| 6B                                | TB3-7,8       | J2L             | 44      | 22           | 6          | __                                      | __                    |
| PED PUSH<br>BUTTONS               |               |                 |         |              |            | NOTE:<br>INSTALL<br>IN INPUT<br>112 AND |                       |
| P21,P22                           | TB8-4,6       | I12U            | 67      | PED 2        | 2 PED      |                                         |                       |
| P41,P42,<br>P43,P44,<br>PB45,PB46 | TB8-5,6       | I12L            | 69      | PED 4        | 4 PED      |                                         |                       |
| P61,P62                           | TB8-7,9       | I13U            | 68      | PED 6        | 6 PED      |                                         |                       |

NOTE:  
INSTALL DC ISOLATORS  
IN INPUT FILE SLOTS  
I12 AND I13.

1. Provide a dedicated pair of wires from the cabinet to each push button.
2. Mount Fail-Safe Interconnect Terminal Board on right rear side of cabinet (above service panel).
3. Wire push buttons and Central Control Unit (CCU) per APS Installation Manual Instructions.
4. Use Controller Receptacle to power CCU. Do Not use Equipment Receptacle which is a GFI outlet.
5. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.



Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

**HNTB** HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Division 12  |              | Catawba County | Hickory      |
| PLAN DATE:   | January 2024 | REVIEWED BY:   | N.K. Vlanich |
| PREPARED BY: | E.E. Tiller  | REVIEWED BY:   | N.R. Simmons |

DocuSigned by:  
Natasha R. Simmons 9/6/2021  
SIGNATURE DATE  
SIG. INVENTORY NO. 12-0945

ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

Assign advanced walk to peds 2, 4 and 6 as shown below.

PHASE MENU

1-VEHICLE DATA

2-DENSITY TIMES+

3-PEDESTRIAN DATA

4-INIT & NA RESP+

5-N.LOCK & MISC+

6-SPEC. SEQUENCE+

7-DETECTOR DATA

8-PHASE & BANK COPY

9-SELECT PHASE BANK

'+' DENOTES BANKABLE DATA [1]

PEDESTRIAN MENU

1-PED TIMES+

2-PED RECALL+

3-PED OFFSET+

4-MISC PED OPTIONS+

[1]

PHASE.....1...2...3...4...5...6...7...8

WOFF/10

MODE\*

0

70

0

60

0

70

0

0

0

0

0

0

0

0

0

0

CODES: \* 0=ADVANCE 1=DELAY

[1]

ADVANCE WALK PED PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

PHASE MENU

1-VEHICLE DATA

2-DENSITY TIMES+

3-PEDESTRIAN DATA

4-INIT & NA RESP+

5-N.LOCK & MISC+

6-SPEC. SEQUENCE+

7-DETECTOR DATA

8-PHASE & BANK COPY

9-SELECT PHASE BANK

'+' DENOTES BANKABLE DATA [1]

PHASES 3,5,7,8  
NOT USED! →

PHASE....1...2...3...4...5...6...7...8

INITIAL

NA RESP

1

6

0

1

0

6

0

0

2

1

0

2

0

1

0

0

CODES.....0....1...2...3...4...5...6

INITL

NA RSP

NONE

NONE

INACT

NA1

RED

NA2

YEL

1&2

GRN

---

DRK

---

G/DW

---

\*\*\*

← CODE 6 (G/DW)  
ALLOWS PHASES 2 AND 6  
TO START IN GREEN  
AND SKIP THE PED  
PHASE

INIT & N.A. RESP PROGRAMMING COMPLETE

REMOTE FLASH  
PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC

2- FLASH

3- OVERLAP DATA

4- PEER-TO-PEER

5- RING STRUCTURE

6- SEQUENCES

7- PORT 1/ITS DATA

8- I/O MISC

9- PUTPUT MAPPING

B-BANK SELECTION

C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

FLASH

1- REMOTE FLASH SETTINGS

2- REMOTE FLASH ENTRY/EXIT PHASES

3- CABINET FLASH SETTINGS

REMOTE FLASH SETTINGS

TEST-A FLASH: 0

LDSW:123456789

FLSH:110010010

ALT:010010000

0123456789

0000000000

0000000000

0123456789

0000000000

0000000000

012

000

000

0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW

SELECT 'F' RETURN TO FLASH MENU

FLASH

1- REMOTE FLASH SETTINGS

2- REMOTE FLASH ENTRY/EXIT PHASES

3- CABINET FLASH SETTINGS

REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678

ENTRY: 01000100

EXIT: 01000100

90123456

00000000

00000000

REMOTE FLASH PROGRAMMING COMPLETE

ALL RED FLASH STARTUP  
PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC

2- FLASH

3- OVERLAP DATA

4- PEER-TO-PEER

5- RING STRUCTURE

6- SEQUENCES

7- PORT 1/ITS DATA

8- I/O MISC

9- PUTPUT MAPPING

B-BANK SELECTION

C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

STARTUP & MISC

STARTUP TIME.: 6 (SEC)

RED REV/10...: 40 (TSEC)

AUTO PED CLR.: 0 (0-NO

STOP T RESET.: 0 (0-NO

SEQUENCE.....: 0 (0-18)

SPECIAL SEO : 0 (SEE HELP)

STATE: 2 (0-FL

1-RED

2-RAF)

1-YES)

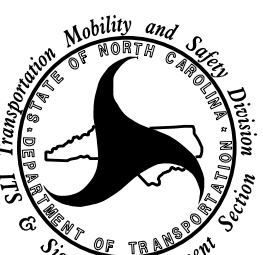
1-YES)

STARTUP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                                                                  |                                          |                           |                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:<br><br><div>Prepared for:<br/><br/>750 N.Greenfield Pkwy, Garner, NC 27529</div> | NC 127 SE<br>at<br>SR 2231 (2nd Ave SE)  |                           | SEAL<br><br>NATASHA R. SIMMONS |
|                                                                                                                                                                                                                  | Division 12    Catawba County    Hickory |                           |                                                                                                                     |
|                                                                                                                                                                                                                  | PLAN DATE: January 2024                  | REVIEWED BY: N.K. Vianich |                                                                                                                     |
|                                                                                                                                                                                                                  | PREPARED BY: E.E. Tiller                 | REVIEWED BY: N.R. Simmons |                                                                                                                     |
|                                                                                                                                                                                                                  | REVISIONS                                |                           |                                                                                                                     |
| INIT.                                                                                                                                                                                                            |                                          | DATE                      |                                                                                                                     |
| SIGNED BY:  Natasha R. Simmons                                                                                              |                                          | DATE: 9/6/2024            |                                                                                                                     |
| SIG. INVENTORY NO.                                                                                                                                                                                               |                                          | 12-0945                   |                                                                                                                     |



HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

(program controller as shown below)

- PREEMPT 3 -

O-OVERRIDES                      D-DEFAULT DATA

|                  |                  |
|------------------|------------------|
| 1-MISCELLANEOUS  | 6-PEDEST. STATUS |
| 2-INTERVAL TIMES | 7-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

```
select F - return to Preempt 3 menu
select 2 - Interval Times
```

```
select F - return to Preempt 3 menu
select 3 - Vehicle Status
```

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 4 -

O-OVERRIDES                      D-DEFAULT DATA

|                  |                  |
|------------------|------------------|
| 1-MISCELLANEOUS  | 6-PEDEST. STATUS |
| 2-INTERVAL TIMES | 7-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

```
select F - return to Preempt 4 menu
select 2 - Interval Times
```

```
select F - return to Preempt 4 menu
select 3 - Vehicle Status
```

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 5 -

| O-OVERRIDES | D-DEFAULT DATA |
|-------------|----------------|
|-------------|----------------|

|                  |                  |
|------------------|------------------|
| 1-MISCELLANEOUS  | 6-PEDEST. STATUS |
| 2-INTERVAL TIMES | 7-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

```
select F - return to Preempt 5 menu
select 2 - Interval Times
```

```
select F - return to Preempt 5 menu
select 3 - Vehicle Status
```

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

end of programming

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0945  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

Signal Upgrade-  
Electrical Detail - Sheet 3 of 3

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

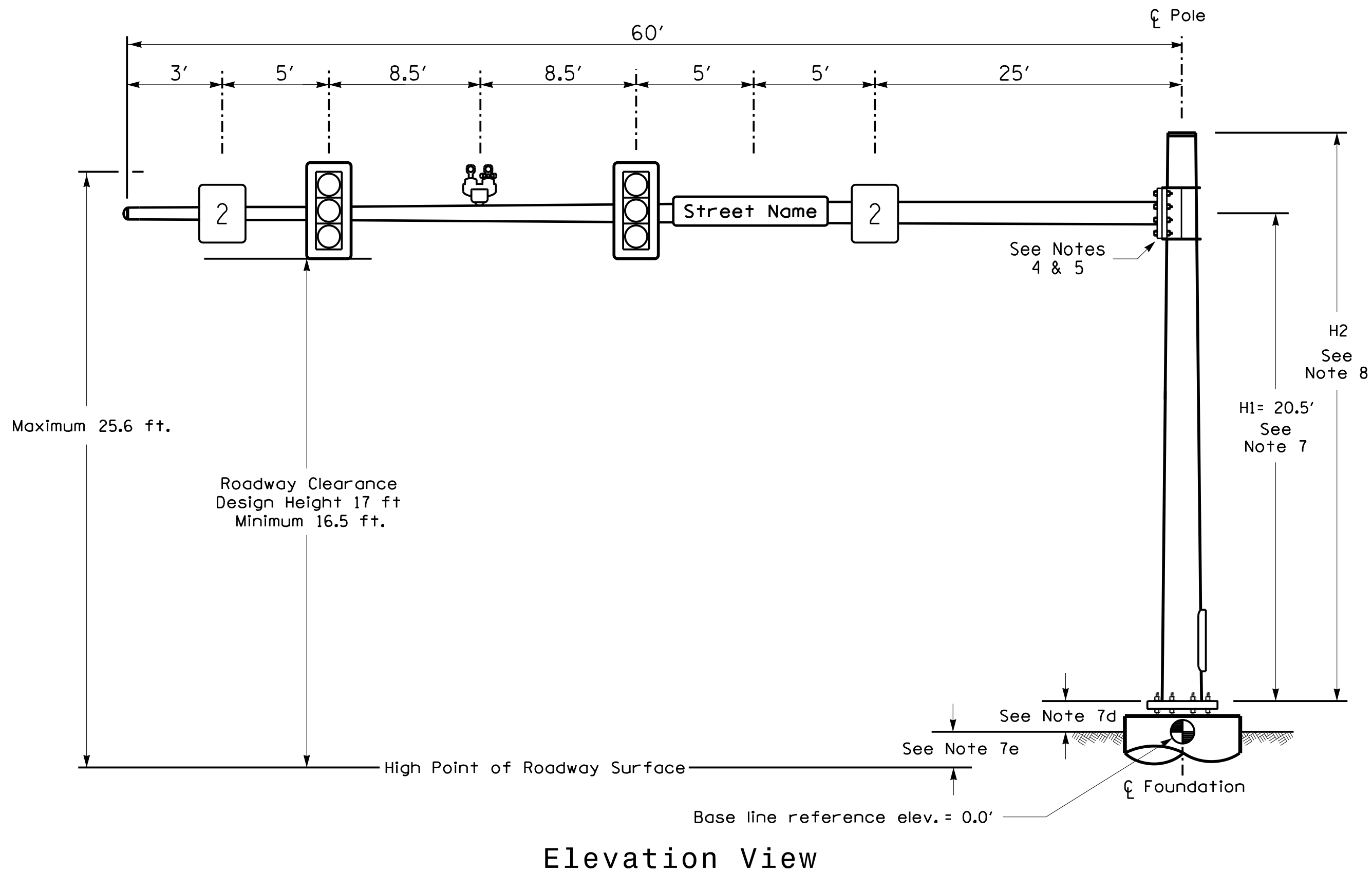
[illegible]

# HNTB

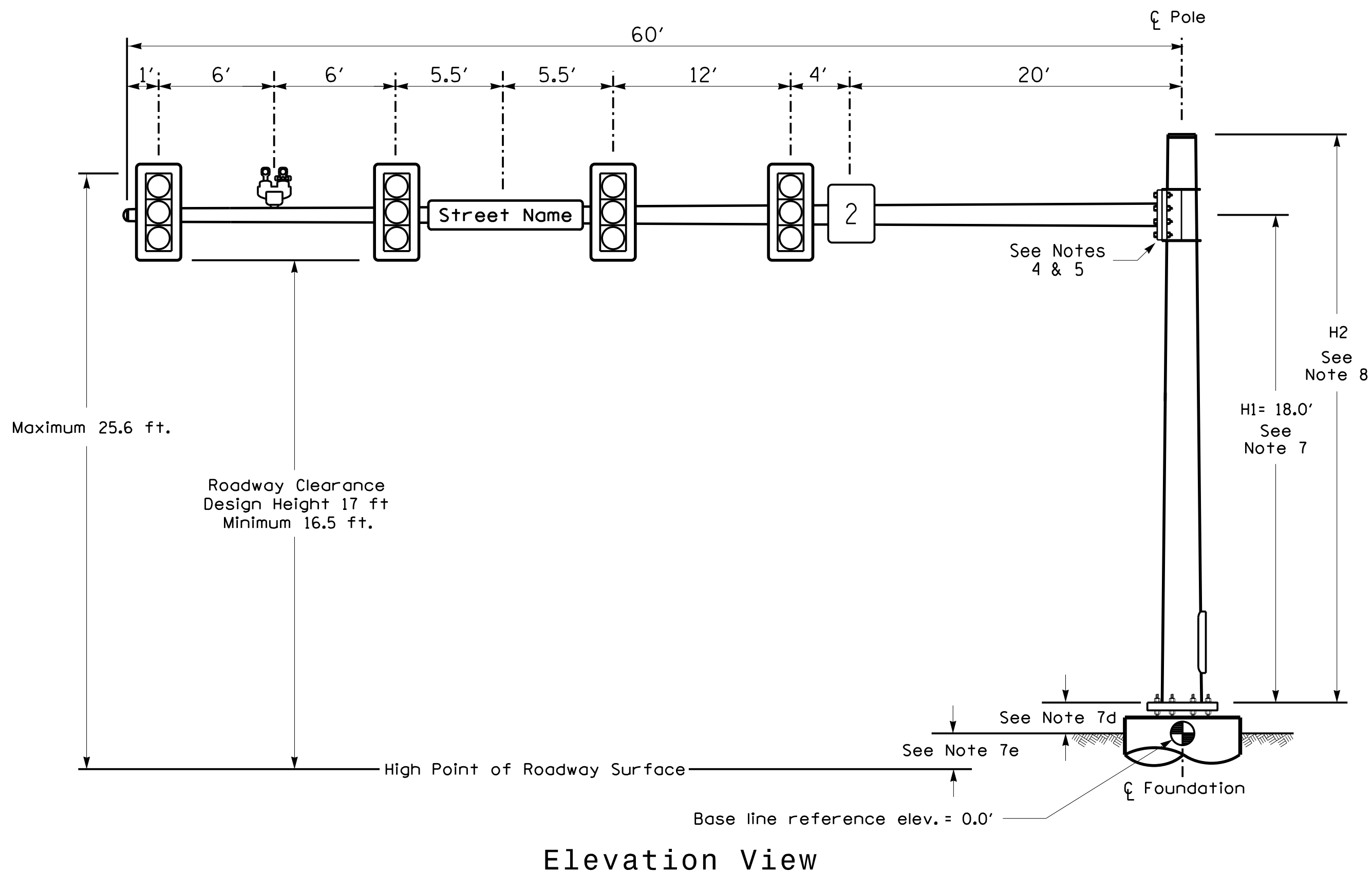
HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

750 N. Greenfield Pkwy, Garner, NC 27529

## Design Loading for METAL POLE NO. 1



### Design Loading for METAL POLE NO. 2

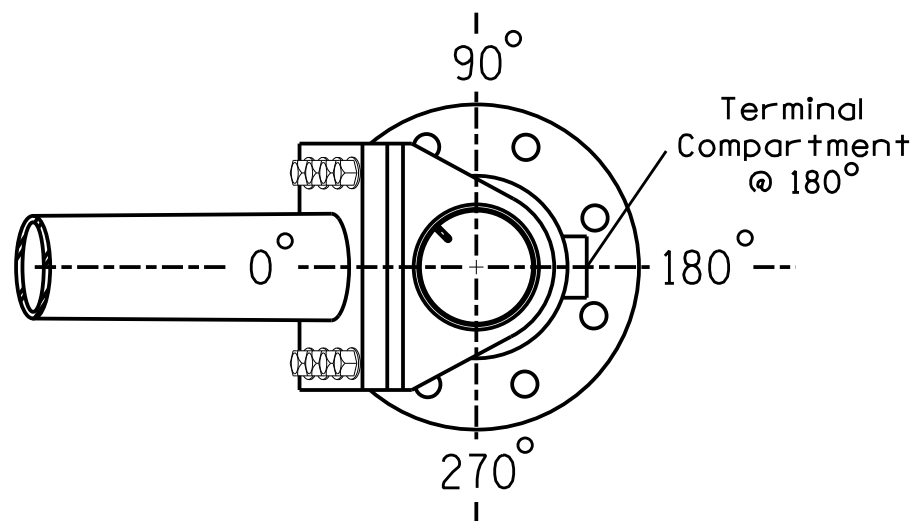


## SPECIAL NOTE

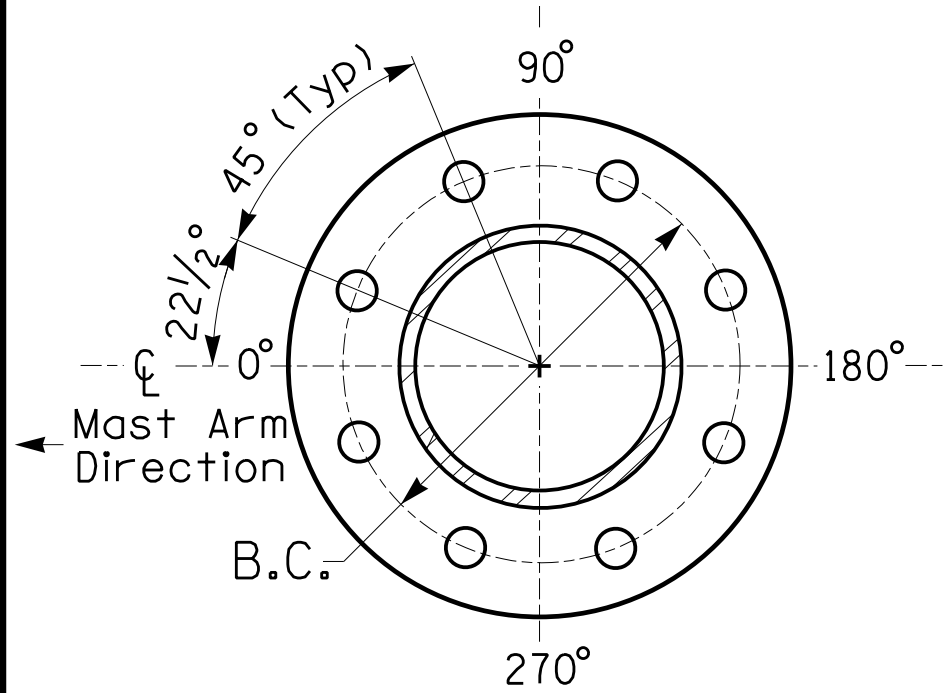
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

## Elevation Data for Mast Arm Attachment (H1)

| Elevation Differences for:                                                                                                                     | Pole 1    | Pole 2    |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|
| Baseline reference point at<br>℄ Foundation @ ground level  | 0.0 ft.   | 0.0 ft.   |
| Elevation difference at<br>High point of roadway surface                                                                                       | +1.84 ft. | -0.54 ft. |
| Elevation difference at<br>Edge of travelway or face of curb                                                                                   | +1.66 ft. | -1.39 ft. |

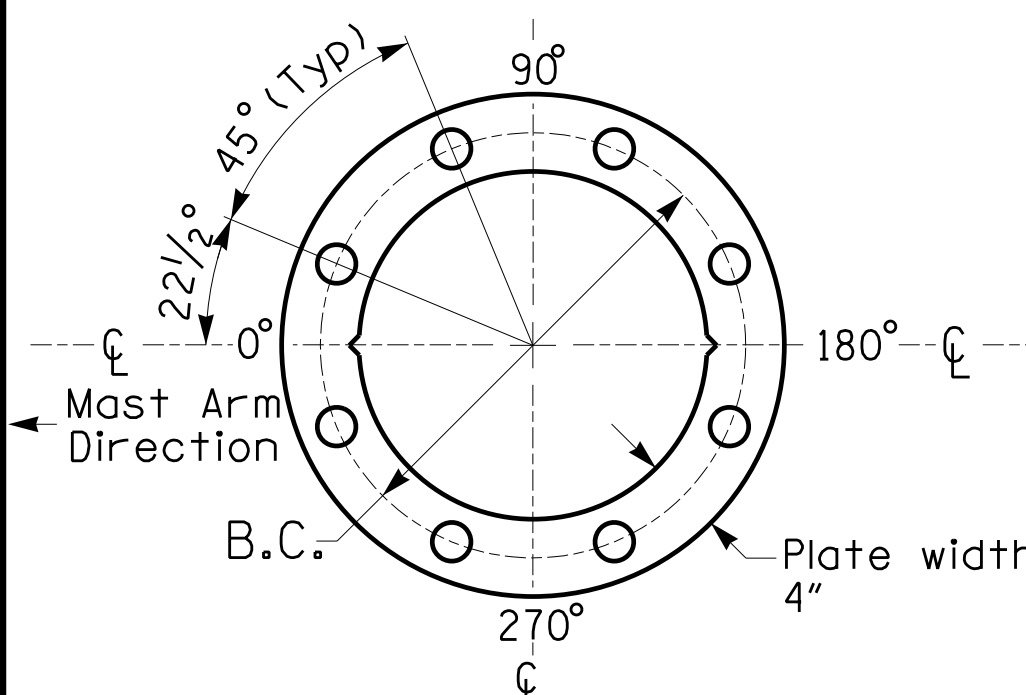


## POLE RADIAL ORIENTATION



## 8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT  
LOCK PLATE DETAIL  
For 8 Bolt Base Plate

METAL POLE No. 1 and 2

| MAST ARM LOADING SCHEDULE                                                           |                                                           |           |                         |        |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------|-------------------------|--------|
| LOADING SYMBOL                                                                      | DESCRIPTION                                               | AREA      | SIZE                    | WEIGHT |
|  | RIGID MOUNTED SIGNAL HEAD<br>12"-3 SECTION-WITH BACKPLATE | 9.3 S.F.  | 25.5" W<br>X<br>52.5" L | 60 LBS |
|  | SIGN<br>RIGID MOUNTED                                     | 7.5 S.F.  | 30.0" W<br>X<br>36.0" L | 14 LBS |
|  | STREET NAME SIGN<br>RIGID MOUNTED                         | 16.0 S.F. | 24.0" W<br>X<br>96.0" L | 36 LBS |
|  | OUT OF PAVEMENT DETECTOR<br>RIGID MOUNTED                 | 0.34 S.F. | 0.5" W<br>X<br>0.68" L  | 2 LBS  |

## NOTES

## DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
  - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
  - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
  - The 2024 NCDOT Roadway Standard Drawings.
  - The traffic signal project plans and special provisions.
  - The NCDOT "Metal Pole Standards" located at the following NCDOT website:  
<https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

## DESIGN REQUIREMENTS

3. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
4. Design all signal supports using force ratios that do not exceed 0.9.
5. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
6. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
7. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
8. The mast arm attachment height (H1) shown is based on the following design assumptions:
  - a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
  - b. Signal heads are rigidly mounted and vertically centered on the mast arm.
  - c. The roadway clearance height for design is as shown in the elevation views.
  - d. The top of the pole base plate is 0.75 feet above the ground elevation.
  - e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
9. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
  - Mast arm attachment height (H1) plus 2 feet, or
  - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
10. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
11. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
12. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

All metal poles and arms should be black in color as specified in the project special provisions.

NCDOT Wind Zone 5 (110 mph)

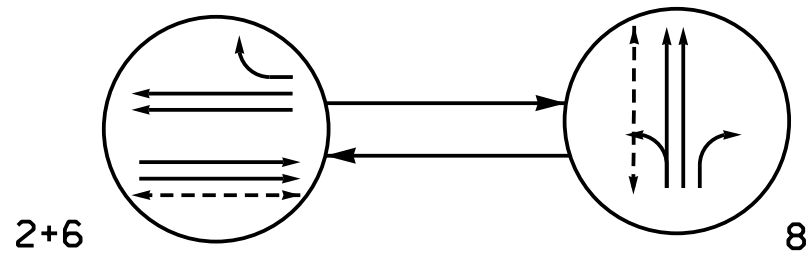
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

| <p style="text-align: center;">Prepared In the Offices of:</p> <div style="text-align: center;">  <p>TRANSPORTATION MOBILITY AND SAFETY DIVISION<br/>DEPARTMENT OF TRANSPORTATION<br/>SCHOOL DESIGN SECTION</p> </div>                                                                                                                                                     | <h1 style="margin: 0;">NC 127 SE</h1> <h2 style="margin: 0;">at</h2> <h1 style="margin: 0;">SR 2231 (2nd Ave SE)</h1> | <h1 style="margin: 0;">SEAL</h1> <div style="text-align: center;">  <p>NORTH CAROLINA<br/>PROFESSIONAL<br/>SEAL<br/>031464<br/>ENGINEER<br/>NATASHA R. SIMMONS</p> </div> |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <div style="display: flex; justify-content: space-between; padding: 5px;"> <span>Division 12</span> <span>Catawba County</span> <span>Hickory</span> </div>                                                                                                                                                                                                                                                                                                     |                                                                                                                       |                                                                                                                                                                                                                                                                |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PLAN DATE: <u>January 2024</u>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                       | REVIEWED BY: <u>N.K. Vlanich</u>                                                                                                                                                                                                                               |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PREPARED BY: <u>E.E. Tiller</u>                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                       | REVIEWED BY: <u>N.R. Simmons</u>                                                                                                                                                                                                                               |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SCALE<br><div style="display: flex; align-items: center; justify-content: center;"> <div style="border-top: 1px solid black; width: 50px; margin-right: 5px;"></div> <div style="display: flex; flex-direction: column; align-items: center;"> <span>0</span> <span>N/A</span> </div> </div>                                                                                                                                                                    |                                                                                                                       |                                                                                                                                                                                                                                                                |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| REVISIONS <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 20%;">INIT.</th> <th style="width: 20%;">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> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> |                                                                                                                       |                                                                                                                                                                                                                                                                |  | INIT. | DATE |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | INIT.                                                                                                                 | DATE                                                                                                                                                                                                                                                           |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                       |                                                                                                                                                                                                                                                                |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                       |                                                                                                                                                                                                                                                                |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                       |                                                                                                                                                                                                                                                                |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                       |                                                                                                                                                                                                                                                                |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                       |                                                                                                                                                                                                                                                                |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Designed by: <u>Natasha R. Simmons</u> 9/6/2024<br><small>ENGINEER/DATE/SCALE</small>                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                       |                                                                                                                                                                                                                                                                |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SIG. INVENTORY NO. <u>12-0945</u><br><small>DATE</small>                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                       |                                                                                                                                                                                                                                                                |  |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



| PROJECT REFERENCE NO. | SHEET NO. |
|-----------------------|-----------|
| U-5777                | Sig. 8.0  |

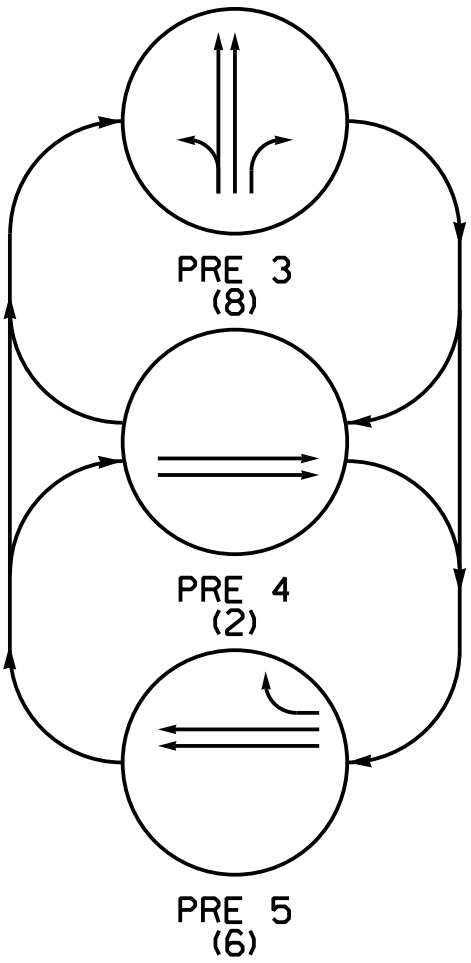
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

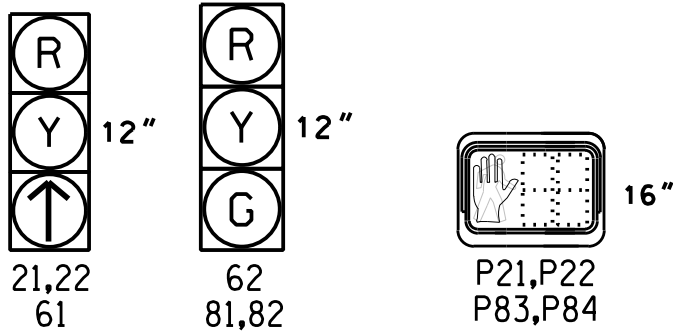
EV PREEMPT PHASES  
(Medium Priority)



| SIGNAL FACE | PHASE |    |       |       |       |       |
|-------------|-------|----|-------|-------|-------|-------|
|             | 2+6   | 8  | PRE 3 | PRE 4 | PRE 5 | FLASH |
| 21,22       | ↑     | R  | R     | ↑     | R     | R     |
| 61          | ↑     | R  | R     | R     | ↑     | R     |
| 62          | G     | R  | R     | R     | G     | R     |
| 81,82       | R     | G  | G     | R     | R     | R     |
| P21,P22     | W     | DW | DW    | DW    | DW    | DRK   |
| P83,P84     | DW    | W  | DW    | DW    | DW    | DRK   |

SIGNAL FACE I.D.

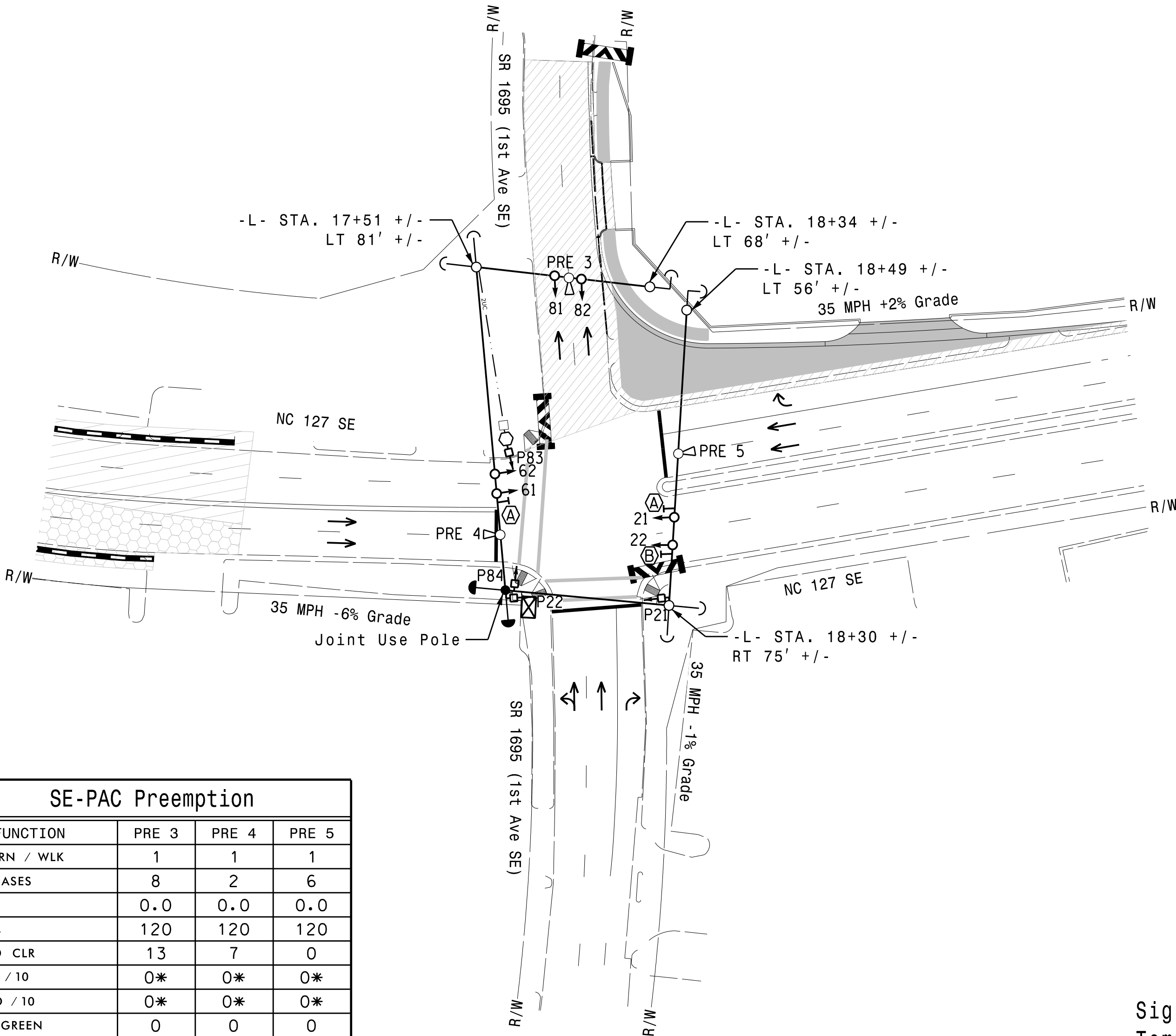
All Heads L.E.D.



2 Phase with EVP  
Pre-Timed  
Hickory City Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 4 as a dummy phase for Ring 1.
- Hickory Signal System Data: Controller Asset #0316.



SE-PAC 2070 TIMING CHART

| FEATURE                 | PHASE          |            |            |                |
|-------------------------|----------------|------------|------------|----------------|
|                         | 2              | 4          | 6          | 8              |
| Min Green *             | 10             | 7          | 10         | 7              |
| Passage Gap *           | -              | -          | -          | -              |
| Maximum Green *         | 40             | 40         | 40         | 40             |
| Yellow Change           | 4.3            | 3.9        | 4.3        | 3.9            |
| Red Clear               | 1.3            | 1.7        | 1.3        | 1.7            |
| Walk *                  | 13             | -          | -          | 13             |
| Pedestrian Clear        | 9              | -          | -          | 14             |
| Advance Walk *          | 6              | -          | -          | 6              |
| Added Initial *         | -              | -          | -          | -              |
| Maximum Initial *       | -              | -          | -          | -              |
| Time Before Reduction * | -              | -          | -          | -              |
| Time To Reduce *        | -              | -          | -          | -              |
| Minimum Gap             | -              | -          | -          | -              |
| Recall Mode             | MAX/PED RECALL | MAX RECALL | MAX RECALL | MAX/PED RECALL |
| Vehicle Call Memory     | NON-LOCK       | NON-LOCK   | NON-LOCK   | NON-LOCK       |
| Dual Entry              | -              | -          | -          | -              |
| Simultaneous Gap        | ON             | ON         | ON         | ON             |

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

SE-PAC Preemption

| FUNCTION         | PRE 3 | PRE 4 | PRE 5 |
|------------------|-------|-------|-------|
| MIN GRN / WLK    | 1     | 1     | 1     |
| EXIT PHASES      | 8     | 2     | 6     |
| DELAY            | 0.0   | 0.0   | 0.0   |
| MXCALL           | 120   | 120   | 120   |
| SEL PED CLR      | 13    | 7     | 0     |
| SEL YEL / 10     | 0*    | 0*    | 0*    |
| SEL RED / 10     | 0*    | 0*    | 0*    |
| TRACK GREEN      | 0     | 0     | 0     |
| TRK PED CLR      | 0     | 0     | 0     |
| TRK YEL / 10     | 0     | 0     | 0     |
| TRK RED / 10     | 0     | 0     | 0     |
| DWELL GRN        | 7     | 10    | 10    |
| RET PED CLR      | 0     | 0     | 0     |
| RET YEL / 10     | 0*    | 0*    | 0*    |
| RET RED / 10     | 0*    | 0*    | 0*    |
| PREEMPT EXTEND** | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.

LEGEND

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

Signal Upgrade -  
Temporary Design 1  
(Construction Phase 1)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                       |                                         |                                                  |      |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------|------|
| <br>Prepared for:<br>Hickory City<br>Signal Design Section<br>750 N. Greenfield Hwy, Garner, NC 27529 | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |                                                  |      |
|                                                                                                       | Division 12 Catawba County Hickory      |                                                  |      |
|                                                                                                       | PLAN DATE: October 2023                 | REVIEWED BY: N.K. Vianich                        |      |
|                                                                                                       | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons                        |      |
| REVISIONS                                                                                             |                                         | INIT.                                            | DATE |
| 0 40<br>1"=40'                                                                                        |                                         |                                                  |      |
| Signed by:<br>N.R. Simmons<br>DATE: 9/6/2024                                                          |                                         | DocuSigned by:<br>N.R. Simmons<br>DATE: 9/6/2024 |      |
| SIC. INVENTORY NO. 12-095411                                                                          |                                         |                                                  |      |

HNTB

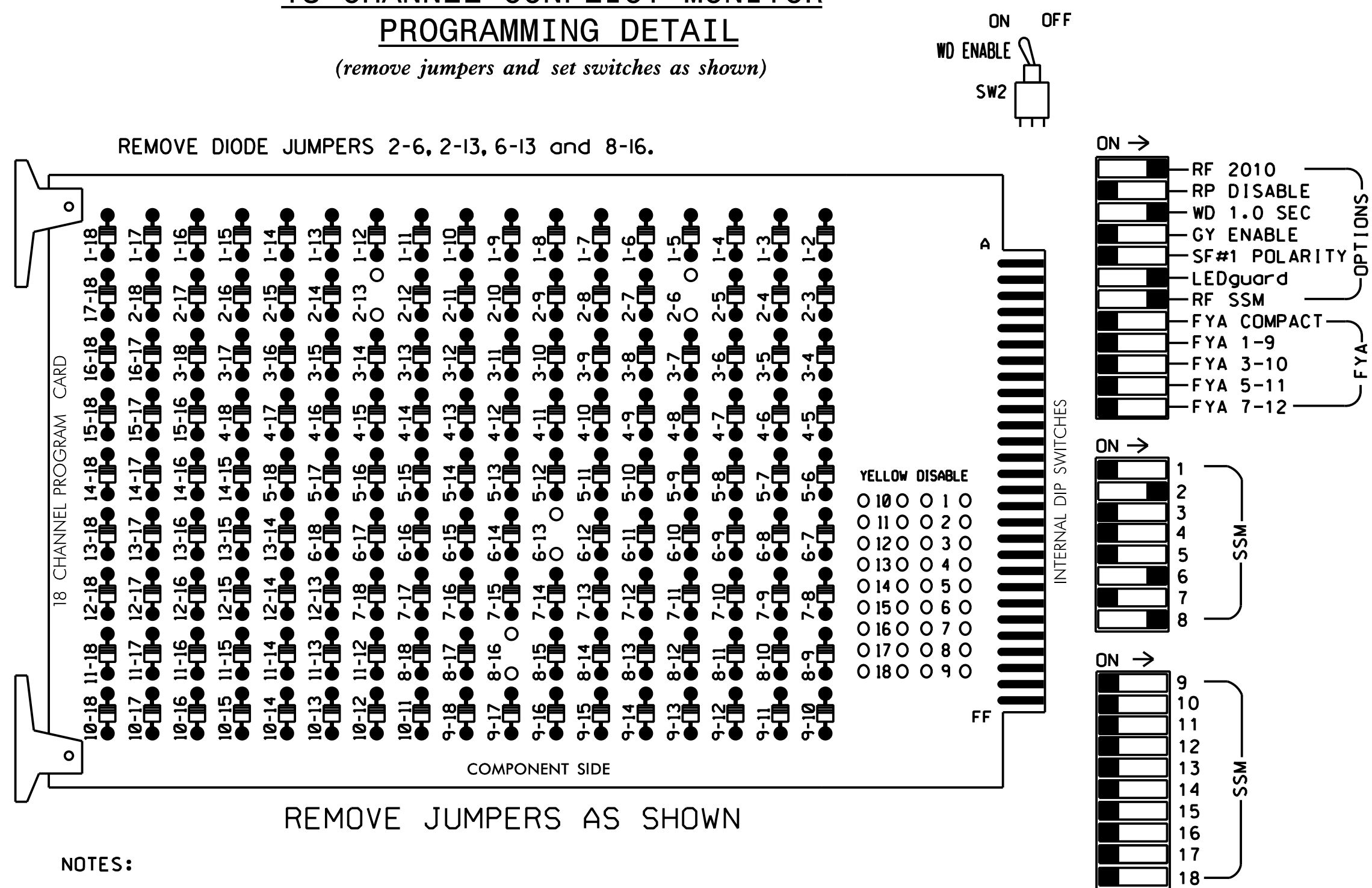
HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

## 18 CHANNEL CONFLICT MONITOR

### PROGRAMMING DETAIL

## PROGRAMMING DETAIL

*(remove jumpers and set switches as shown)*



## 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 phases 2 and 6 Green/Don't Walk.
3. Enable Simultaneous Gap-Out feature for all phases.
4. The cabinet and controller are part of the Hickory City Signal System.

## EQUIPMENT INFORMATION

```

CONTROLLER.....2070LX
CABINET.....332 W/ AUX
SOFTWARE.....SE-PAC2070 VER. 5.4
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S3,S8,S11,S12
PHASES USED.....2.2 PED.4*,6.8 PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

```

\* Phase used for timing purposes only.

# SIGNAL HEAD HOOK-UP CHART

|                                                                                     |    |       |          |    |    |       |    |     |     |       |     |       |          |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------|----|-------|----------|----|----|-------|----|-----|-----|-------|-----|-------|----------|--------|--------|--------|--------|--------|--------|
| LOAD SWITCH NO.                                                                     | S1 | S2    | S3       | S4 | S5 | S6    | S7 | S8  |     | S9    | S10 | S11   | S12      | AUX S1 | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
| CMU CHANNEL NO.                                                                     | 1  | 2     | 13       | 3  | 4  | 14    | 5  | 6   |     | 15    | 7   | 8     | 16       | 9      | 10     | 17     | 11     | 12     | 18     |
| PHASE                                                                               | 1  | 2     | 2 PED    | 3  | 4  | 4 PED | 5  | 6   |     | 6 PED | 7   | 8     | 8 PED    | OLA    | OLB    | SPARE  | OLC    | OLD    | SPARE  |
| SIGNAL HEAD NO.                                                                     | NU | 21,22 | P21, P22 | NU | NC | NU    | NU | 61  | 62  | NU    | NU  | 81,82 | P83, P84 | NU     | NU     | NU     | NU     | NU     | NU     |
| RED                                                                                 |    | 128   |          |    |    |       |    | 134 | 134 |       |     | 107   |          |        |        |        |        |        |        |
| YELLOW                                                                              |    | 129   |          |    |    |       |    | 135 | 135 |       |     | 108   |          |        |        |        |        |        |        |
| GREEN                                                                               |    |       |          |    |    |       |    |     | 136 |       |     | 109   |          |        |        |        |        |        |        |
| RED ARROW                                                                           |    |       |          |    |    |       |    |     |     |       |     |       |          |        |        |        |        |        |        |
| YELLOW ARROW                                                                        |    |       |          |    |    |       |    |     |     |       |     |       |          |        |        |        |        |        |        |
| FLASHING YELLOW ARROW                                                               |    |       |          |    |    |       |    |     |     |       |     |       |          |        |        |        |        |        |        |
| GREEN ARROW                                                                         |    | 130   |          |    |    |       |    | 136 |     |       |     |       |          |        |        |        |        |        |        |
|  |    |       | 113      |    |    |       |    |     |     |       |     |       | 110      |        |        |        |        |        |        |
|  |    |       | 115      |    |    |       |    |     |     |       |     |       | 112      |        |        |        |        |        |        |

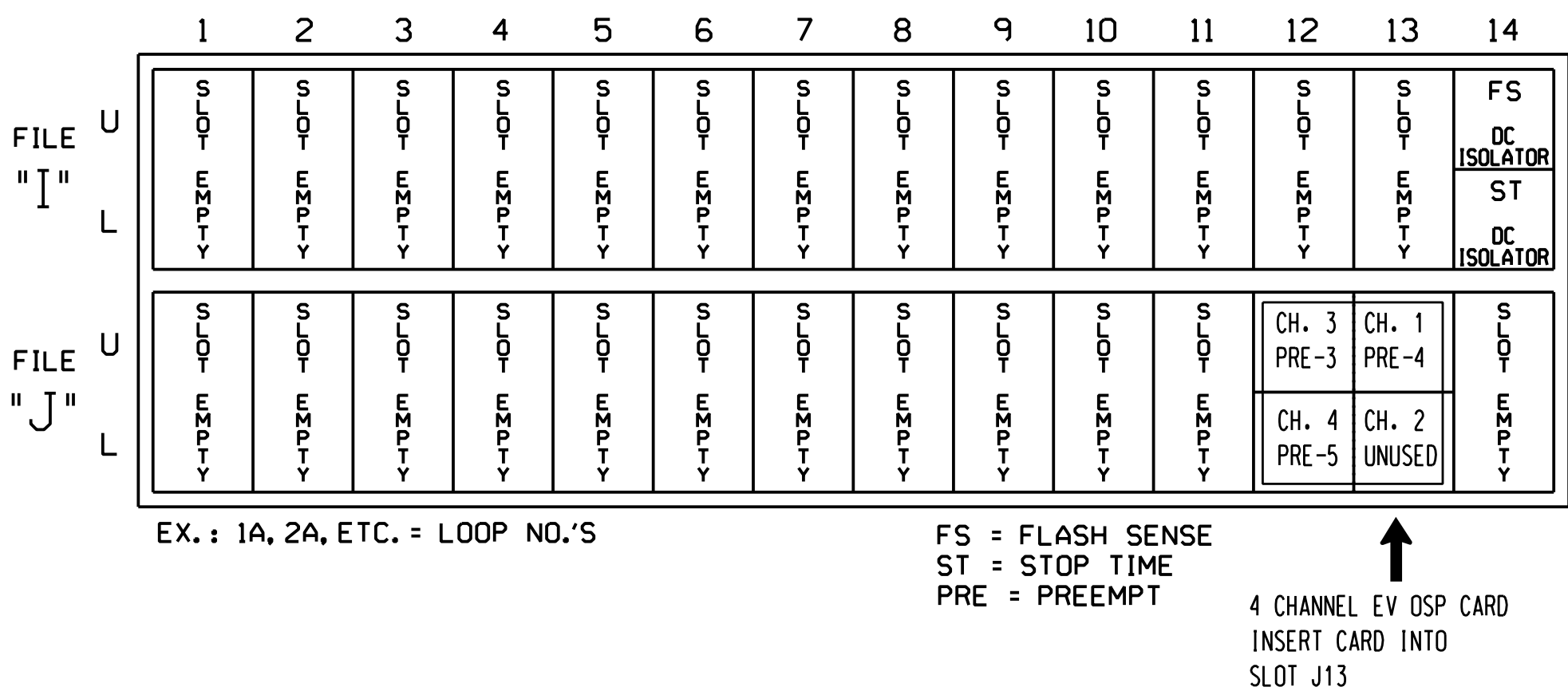
NU = Not Used  
NC = Not Connected

## COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

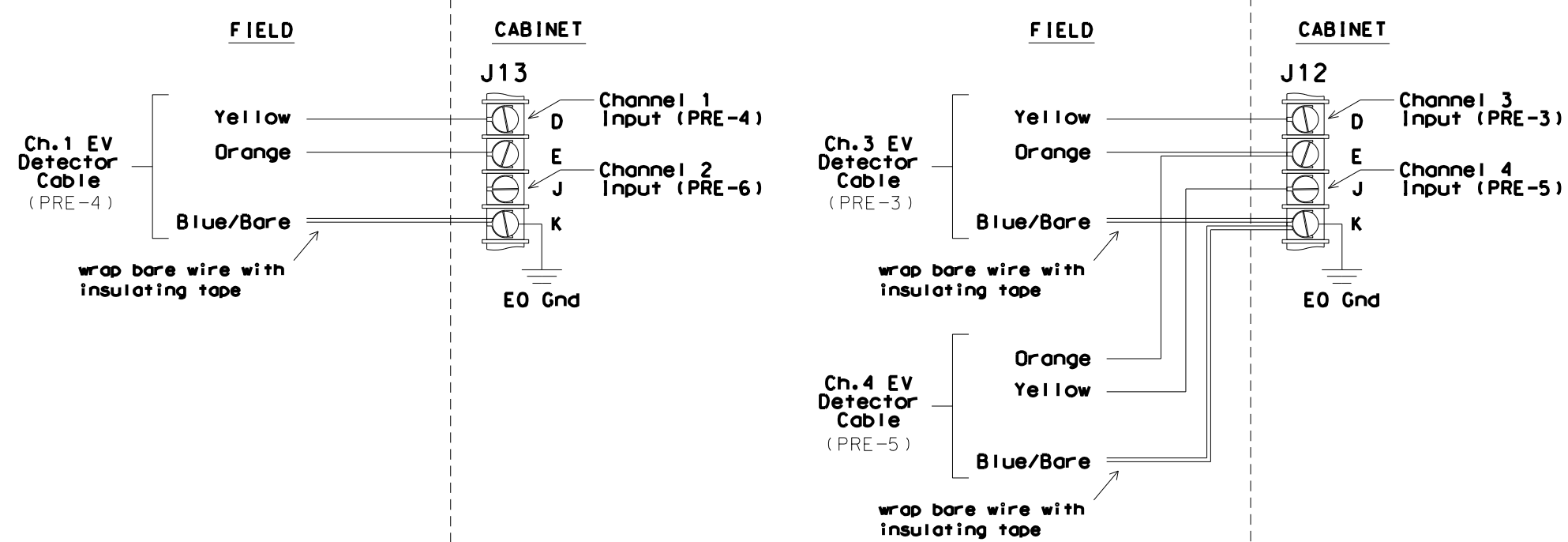
## INPUT FILE POSITION LAYOUT

(front view)



TYPICAL EV FIELD WIRE DETAIL

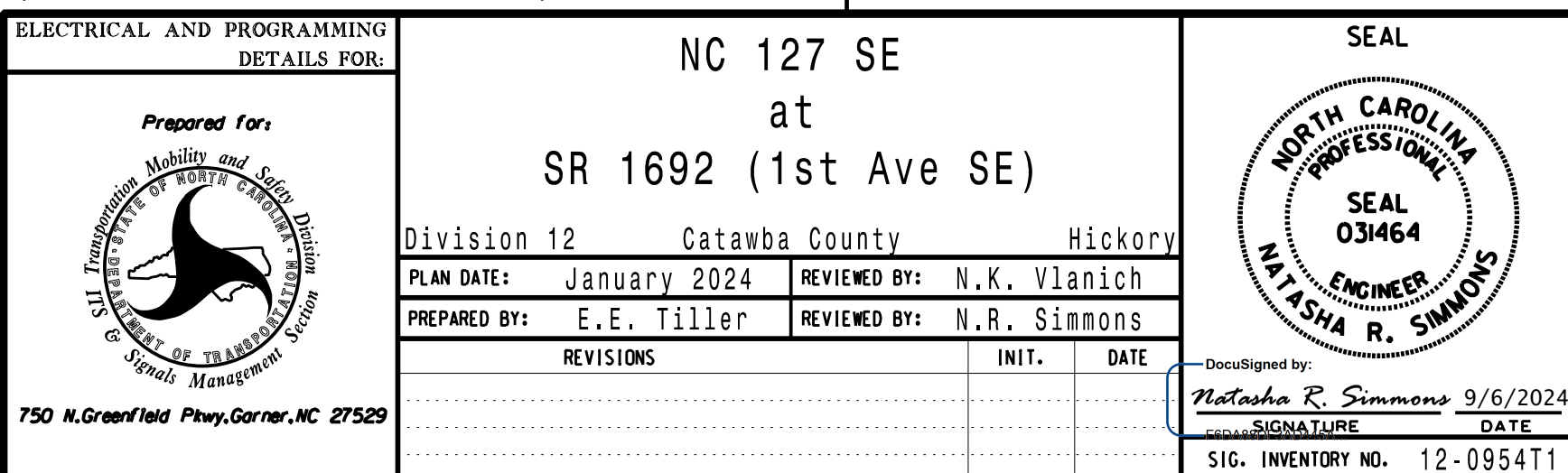
(input file, rear view)



THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T1  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 1 of 3  
(Construction Phase 1)

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



(program controller as shown below)

Assign advanced walk to peds 2 and 8 as shown below.

```

PEDESTRIAN  MENU

      1-PED TIMES+
      2-PED RECALL+
      3-PED OFFSET+
      4-MISC PED OPTIONS+

```

ADVANCE WALK PED PROGRAMMING COMPLETE

(program controller as shown below)

```
SE-PAC PHASE DATA          PRESS # DESIRED

1-VEHICLE TIMES             6-N.LOCK & MISC
2-DENSITY TIMES             7-SPEC. SEQUENCE
3-PEDST. TIMES              8-SPEC. DETECTOR
4-INIT & N.A. RESP          9-PHASE COPY
5-V & P RECALLS             0-MISC PED OPTIONS

F-PRIOR MENU
```

PHASES 1,3,5,7 →  
NOT USED!

← CODE 6 (G/DW) ALLOWS PHASES  
2 AND 6 TO START IN GREEN  
AND SKIP THE PED PHASE

**HNTB** 4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

(program controller as shown below)

|                                                                       |                    |
|-----------------------------------------------------------------------|--------------------|
| UNIT DATA                                                             |                    |
| 1- STARTUP & MISC                                                     | 6- SEQUENCES       |
| 2- FLASH                                                              | 7- PORT 1/ITS DATA |
| 3- OVERLAP DATA                                                       | 8- I/O MISC        |
| 4- PEER-TO-PEER                                                       | 9- PUTPUT MAPPING  |
| 5- RING STRUCTURE                                                     | B-BANK SELECTION   |
|                                                                       | C-COPY BANK        |
| '4' DENOTES BANKABLE UNIT DATA <span style="float: right;">[1]</span> |                    |

REMOTE FLASH SETTINGS TEST-A FLASH: 0

```
LDSW:123456789 0123456789 0123456789 012
FLSH:010000010 0100000000 0000000000 000
ALT:010000000 0000000000 0000000000 000
```

0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW

SELECT 'F' RETURN TO FLASH MENU

```
REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456
ENTRY:  01000100 00000000
EXIT:   01000100 00000000
```

REMOTE FLASH PROGRAMMING COMPLETE

(program controller as shown below)

| UNIT DATA                                                               |                    |
|-------------------------------------------------------------------------|--------------------|
| 1- STARTUP & MISC                                                       | 6- SEQUENCES       |
| 2- FLASH                                                                | 7- PORT 1/ITS DATA |
| 3- OVERLAP DATA                                                         | 8- I/O MISC        |
| 4- PEER-TO-PEER                                                         | 9- PUTPUT MAPPING  |
| 5- RING STRUCTURE                                                       | B-BANK SELECTION   |
|                                                                         | C-COPY BANK        |
| '4' DENOTES BANKABLE UNIT DATA <span style="float: right;">[ 1 ]</span> |                    |

```
STARTUP & MISC
STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
RED REV/10...: 40 (TSEC) 1-RED
AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)
STOP T RESET.: 0 (0-NO 1-YES)
SEQUENCE.....: 0 (0-18)
SPECIAL SEQ : 0 (SEE HELP)
```

STARTUP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T1  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

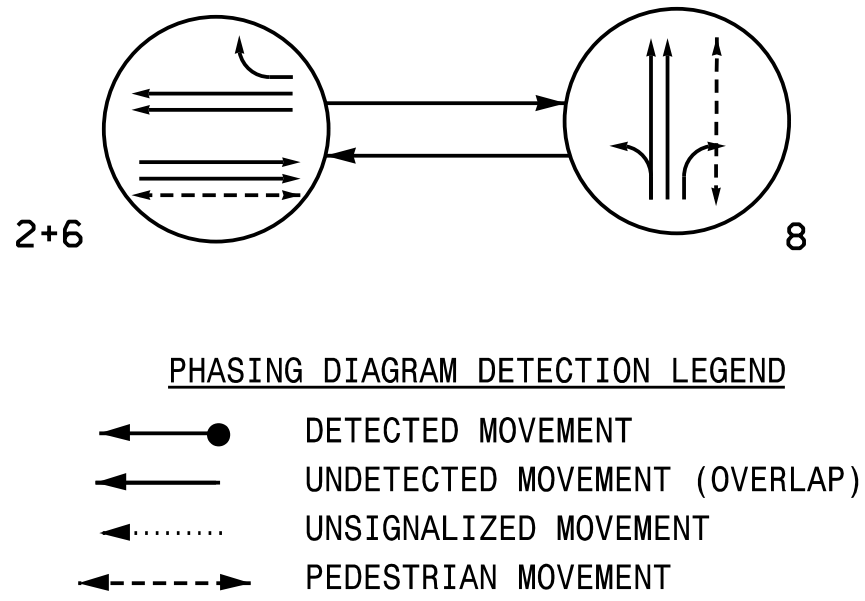
Signal Upgrade-  
Electrical Detail - Sheet 2 of 3  
(Construction Phase 1)

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

| <p>ELECTRICAL AND PROGRAMMING<br/>DETAILS FOR:</p> <div style="text-align: center;">  <p>Prepared for:</p> </div> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>            | <p>NC 127 SE<br/>at<br/>SR 1692 (1st Ave SE)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">Division 12      Catawba County      Hickory</td> </tr> <tr> <td>PLAN DATE:    January 2024</td> <td>REVIEWED BY:    N.K. Vlanich</td> </tr> <tr> <td>PREPARED BY:    E.E. Tiller</td> <td>REVIEWED BY:    N.R. Simmons</td> </tr> <tr> <td style="height: 40px; vertical-align: bottom;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">REVISIONS</th> <th style="width: 50%;">INIT.</th> <th style="width: 50%;">DATE</th> </tr> <tr> <td style="height: 30px;"></td> <td></td> <td></td> </tr> </table> </td> <td style="height: 40px; vertical-align: bottom;"> <p>Document by:<br/><i>Notasha R. Simmons</i>    9/6/2024</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">SIGNED: <i>Notasha R. Simmons</i></td> <td style="width: 50%;">DATE: 9/6/2024</td> </tr> <tr> <td colspan="2">SIC. INVENTORY NO. 12-095471</td> </tr> </table> </td> </tr> </table> | Division 12      Catawba County      Hickory |      | PLAN DATE:    January 2024 | REVIEWED BY:    N.K. Vlanich | PREPARED BY:    E.E. Tiller | REVIEWED BY:    N.R. Simmons                                                                                                                                                                                                                                                                                                 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">REVISIONS</th> <th style="width: 50%;">INIT.</th> <th style="width: 50%;">DATE</th> </tr> <tr> <td style="height: 30px;"></td> <td></td> <td></td> </tr> </table> | REVISIONS      | INIT.                        | DATE |  |  |  | <p>Document by:<br/><i>Notasha R. Simmons</i>    9/6/2024</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">SIGNED: <i>Notasha R. Simmons</i></td> <td style="width: 50%;">DATE: 9/6/2024</td> </tr> <tr> <td colspan="2">SIC. INVENTORY NO. 12-095471</td> </tr> </table> | SIGNED: <i>Notasha R. Simmons</i> | DATE: 9/6/2024 | SIC. INVENTORY NO. 12-095471 |  | <p>SEAL</p> <div style="text-align: center;">  </div> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------|----------------------------|------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------|------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------|------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------|
| Division 12      Catawba County      Hickory                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                              |      |                            |                              |                             |                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                |                              |      |  |  |  |                                                                                                                                                                                                                                                                                                                              |                                   |                |                              |  |                                                                                                                                            |
| PLAN DATE:    January 2024                                                                                                                                                                                                                                        | REVIEWED BY:    N.K. Vlanich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |      |                            |                              |                             |                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                |                              |      |  |  |  |                                                                                                                                                                                                                                                                                                                              |                                   |                |                              |  |                                                                                                                                            |
| PREPARED BY:    E.E. Tiller                                                                                                                                                                                                                                       | REVIEWED BY:    N.R. Simmons                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |      |                            |                              |                             |                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                |                              |      |  |  |  |                                                                                                                                                                                                                                                                                                                              |                                   |                |                              |  |                                                                                                                                            |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">REVISIONS</th> <th style="width: 50%;">INIT.</th> <th style="width: 50%;">DATE</th> </tr> <tr> <td style="height: 30px;"></td> <td></td> <td></td> </tr> </table> | REVISIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | INIT.                                        | DATE |                            |                              |                             | <p>Document by:<br/><i>Notasha R. Simmons</i>    9/6/2024</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">SIGNED: <i>Notasha R. Simmons</i></td> <td style="width: 50%;">DATE: 9/6/2024</td> </tr> <tr> <td colspan="2">SIC. INVENTORY NO. 12-095471</td> </tr> </table> | SIGNED: <i>Notasha R. Simmons</i>                                                                                                                                                                                                                                 | DATE: 9/6/2024 | SIC. INVENTORY NO. 12-095471 |      |  |  |  |                                                                                                                                                                                                                                                                                                                              |                                   |                |                              |  |                                                                                                                                            |
| REVISIONS                                                                                                                                                                                                                                                         | INIT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | DATE                                         |      |                            |                              |                             |                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                |                              |      |  |  |  |                                                                                                                                                                                                                                                                                                                              |                                   |                |                              |  |                                                                                                                                            |
|                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                              |      |                            |                              |                             |                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                |                              |      |  |  |  |                                                                                                                                                                                                                                                                                                                              |                                   |                |                              |  |                                                                                                                                            |
| SIGNED: <i>Notasha R. Simmons</i>                                                                                                                                                                                                                                 | DATE: 9/6/2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                              |      |                            |                              |                             |                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                |                              |      |  |  |  |                                                                                                                                                                                                                                                                                                                              |                                   |                |                              |  |                                                                                                                                            |
| SIC. INVENTORY NO. 12-095471                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                              |      |                            |                              |                             |                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |                |                              |      |  |  |  |                                                                                                                                                                                                                                                                                                                              |                                   |                |                              |  |                                                                                                                                            |



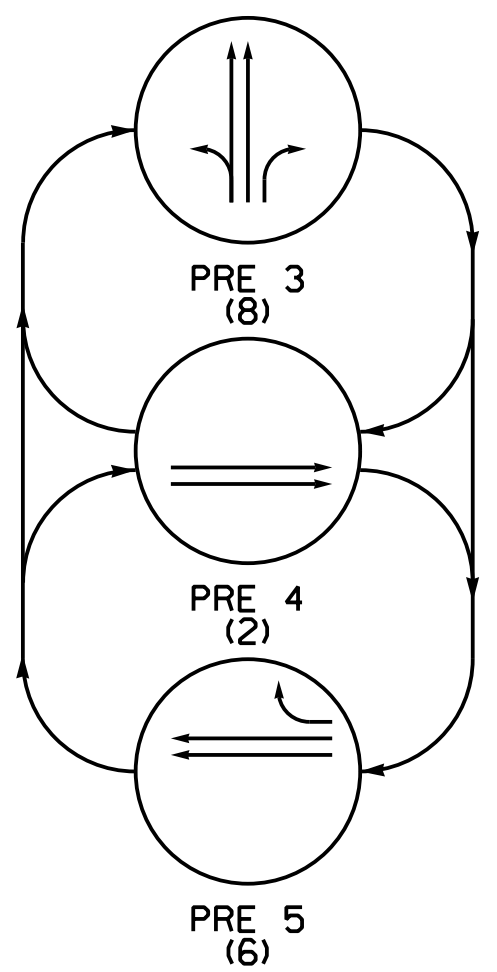
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

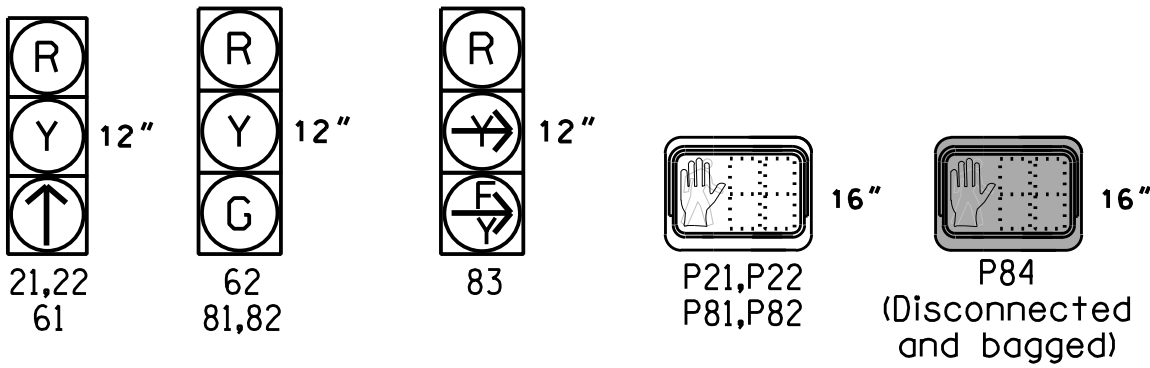
EV PREEMPT PHASES  
(Medium Priority)



| SIGNAL FACE | PHASE |    |       |       |       |       |  |
|-------------|-------|----|-------|-------|-------|-------|--|
|             | 2+6   | 8  | PRE 3 | PRE 4 | PRE 5 | FLASH |  |
| 21,22       | ↑     | R  | R     | ↑     | R     | R     |  |
| 61          | ↑     | R  | R     | R     | ↑     | R     |  |
| 62          | G     | R  | R     | R     | G     | R     |  |
| 81,82       | R     | G  | G     | R     | R     | R     |  |
| 83          | R     | Y  | Y     | R     | R     | R     |  |
| P21,P22     | W     | DW | DW    | DW    | DW    | DRK   |  |
| P81,P82     | DW    | W  | DW    | DW    | DW    | DRK   |  |

SIGNAL FACE I.D.

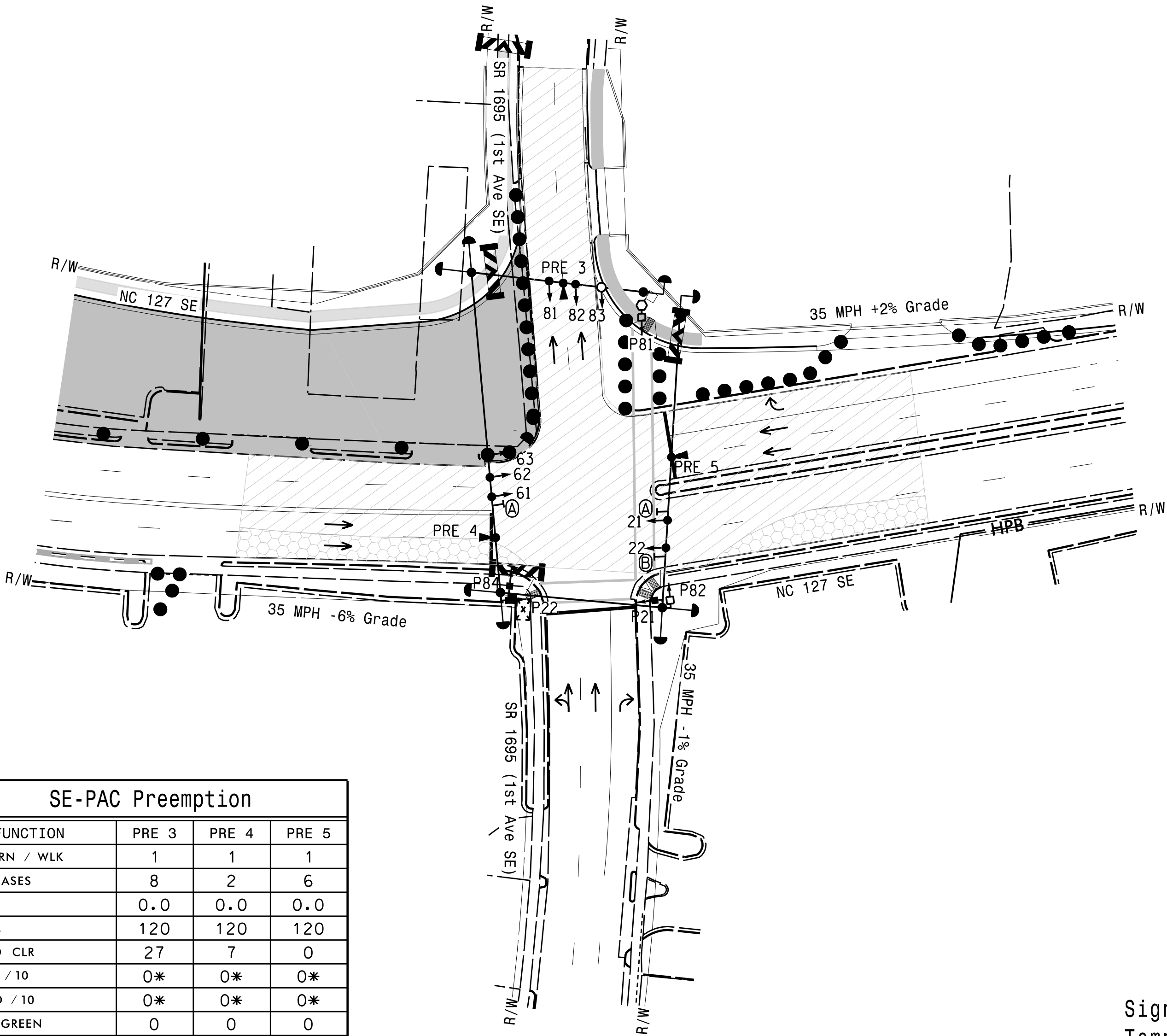
All Heads L.E.D.



2 Phase with EVP  
Pre-Timed  
Hickory City Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Disconnect and bag existing signal head numbered P84.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 4 as a dummy phase for Ring 1.
- Hickory Signal System Data: Controller Asset #0316.



SE-PAC 2070 TIMING CHART

| FEATURE                 | PHASE          |            |            |                |
|-------------------------|----------------|------------|------------|----------------|
|                         | 2              | 4          | 6          | 8              |
| Min Green *             | 10             | 7          | 10         | 7              |
| Passage Gap *           | -              | -          | -          | -              |
| Maximum Green *         | 40             | 40         | 40         | 40             |
| Yellow Change           | 4.3            | 3.9        | 4.3        | 3.9            |
| Red Clear               | 1.3            | 1.7        | 1.3        | 1.7            |
| Walk *                  | 13             | -          | -          | 14             |
| Pedestrian Clear        | 9              | -          | -          | 29             |
| Advance Walk *          | 6              | -          | -          | 7              |
| Added Initial *         | -              | -          | -          | -              |
| Maximum Initial *       | -              | -          | -          | -              |
| Time Before Reduction * | -              | -          | -          | -              |
| Time To Reduce *        | -              | -          | -          | -              |
| Minimum Gap             | -              | -          | -          | -              |
| Recall Mode             | MAX/PED RECALL | MAX RECALL | MAX RECALL | MAX/PED RECALL |
| Vehicle Call Memory     | NON-LOCK       | NON-LOCK   | NON-LOCK   | NON-LOCK       |
| Dual Entry              | -              | -          | -          | -              |
| Simultaneous Gap        | ON             | ON         | ON         | ON             |

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

SE-PAC Preemption

| FUNCTION         | PRE 3 | PRE 4 | PRE 5 |
|------------------|-------|-------|-------|
| MIN GRN / WLK    | 1     | 1     | 1     |
| EXIT PHASES      | 8     | 2     | 6     |
| DELAY            | 0.0   | 0.0   | 0.0   |
| MXCALL           | 120   | 120   | 120   |
| SEL PED CLR      | 27    | 7     | 0     |
| SEL YEL / 10     | 0*    | 0*    | 0*    |
| SEL RED / 10     | 0*    | 0*    | 0*    |
| TRACK GREEN      | 0     | 0     | 0     |
| TRK PED CLR      | 0     | 0     | 0     |
| TRK YEL / 10     | 0     | 0     | 0     |
| TRK RED / 10     | 0     | 0     | 0     |
| DWELL GRN        | 7     | 10    | 10    |
| RET PED CLR      | 0     | 0     | 0     |
| RET YEL / 10     | 0*    | 0*    | 0*    |
| RET RED / 10     | 0*    | 0*    | 0*    |
| PREEMPT EXTEND** | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.

LEGEND

| PROPOSED | EXISTING     |
|----------|--------------|
|          |              |
|          | N/A          |
|          |              |
|          |              |
|          |              |
|          |              |
|          |              |
|          |              |
|          |              |
| N/A      | Right of Way |
|          | N/A          |
|          |              |
|          |              |
|          | N/A          |
|          |              |
|          |              |
|          |              |
|          | N/A          |
|          |              |
|          |              |
|          |              |
|          |              |

Signal Upgrade -  
Temporary Design 2  
(Construction Phase 1, Step 4)

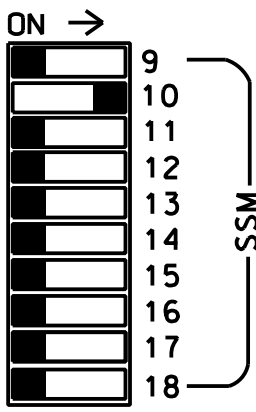
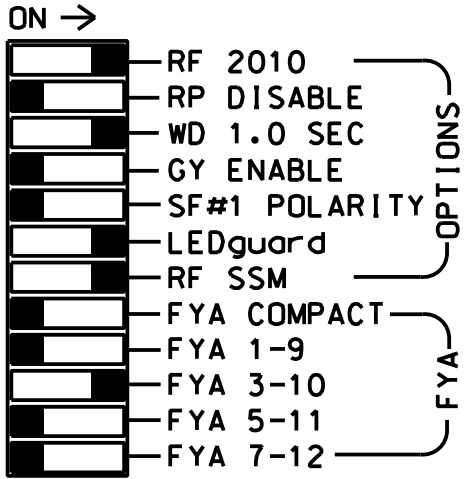
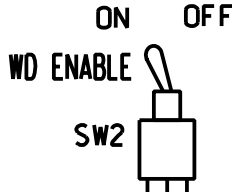
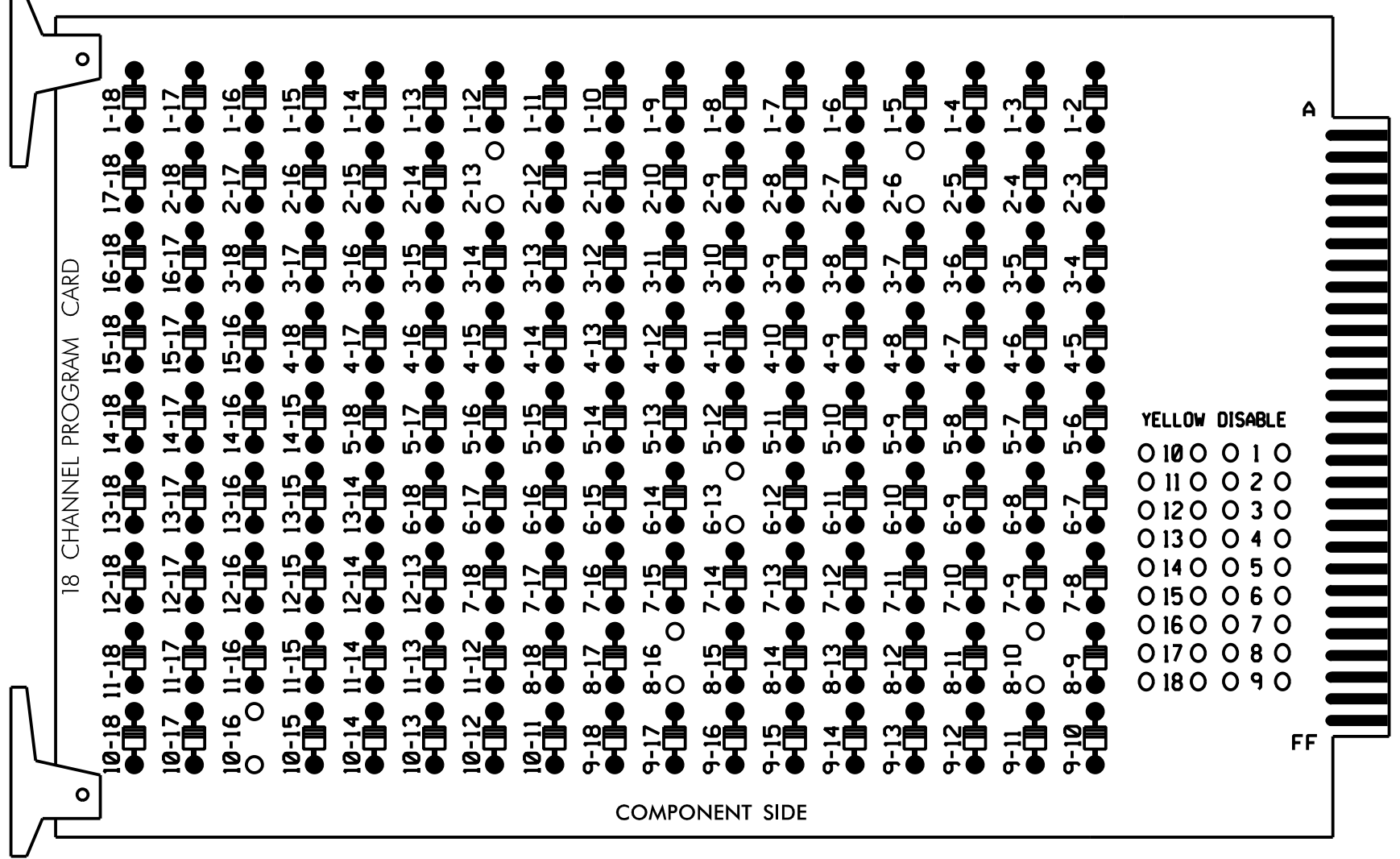
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                     |                                         |                                                                                       |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------|------|
|                                                                                                                                                     | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |                                                                                       |      |
|                                                                                                                                                     | Division 12 Catawba County Hickory      |                                                                                       |      |
|                                                                                                                                                     | PLAN DATE: October 2023                 | REVIEWED BY: N.K. Vianich                                                             |      |
|                                                                                                                                                     | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons                                                             |      |
| REVISIONS                                                                                                                                           |                                         | INIT.                                                                                 | DATE |
| 0 40<br>1"=40'                                                                                                                                      |                                         |                                                                                       |      |
| HNTB NORTH CAROLINA, P.C.<br>4000 Center at North Hills St<br>Suite 500<br>Raleigh, North Carolina 27609<br>NC License No: C-1554<br>(919) 546-8997 |                                         | DocuSigned by:<br>Natalia R. Simmons 9/6/2024<br>DATE<br>SIG. INVENTORY NO. 12-095472 |      |

18 CHANNEL CONFLICT MONITOR  
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-13, 6-13, 8-10, 8-16 and 10-16.



■ = DENOTES POSITION OF SWITCH

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 phases 2 and 6 Green/Don't Walk.
- Enable Simultaneous Gap-Out feature for all phases.
- The cabinet and controller are part of the Hickory City Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
CABINET.....332 W/ AUX  
SOFTWARE.....SE-PAC2070 VER. 5.4  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
LOAD SWITCHES USED.....S2,S3,S8,S11,S12,AUX S2  
PHASES USED.....2,2 PED,4\*,6,8,8 PED  
OVERLAP "A".....NOT USED  
OVERLAP "B".....\*\*  
OVERLAP "C".....NOT USED  
OVERLAP "D".....NOT USED

\* Phase used for timing purposes only.  
\*\* See Sheet 2 for Overlap Programming.

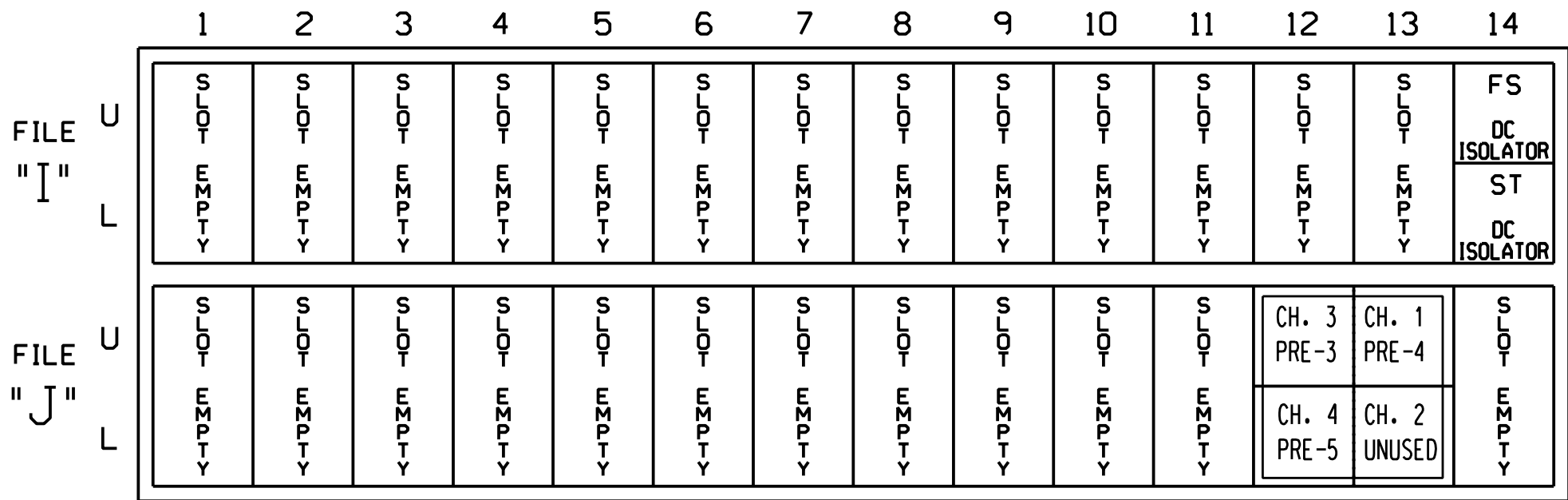
SIGNAL HEAD HOOK-UP CHART

| LOAD SWITCH NO.       | S1 | S2    | S3       | S4 | S5 | S6    | S7 | S8  | S9    | S10 | S11 | S12   | AUX S1   | AUX S2 | AUX S3 | AUX S4 | AUX S5 | AUX S6 |
|-----------------------|----|-------|----------|----|----|-------|----|-----|-------|-----|-----|-------|----------|--------|--------|--------|--------|--------|
| CMU CHANNEL NO.       | 1  | 2     | 13       | 3  | 4  | 14    | 5  | 6   | 15    | 7   | 8   | 16    | 9        | 10     | 17     | 11     | 12     | 18     |
| PHASE                 | 1  | 2     | 2 PED    | 3  | 4  | 4 PED | 5  | 6   | 6 PED | 7   | 8   | 8 PED | OLA      | OLB    | SPARE  | OLC    | OLD    | SPARE  |
| SIGNAL HEAD NO.       | NU | 21,22 | P21, P22 | NU | NC | NU    | NU | 61  | 62    | NU  | NU  | 81,82 | P81, P82 | NU     | 83     | NU     | NU     | NU     |
| RED                   |    | 128   |          |    |    |       |    | 134 | 134   |     |     | 107   |          | A124   |        |        |        |        |
| YELLOW                |    | 129   |          |    |    |       |    | 135 | 135   |     |     | 108   |          |        |        |        |        |        |
| GREEN                 |    |       |          |    |    |       |    | 136 |       |     |     | 109   |          |        |        |        |        |        |
| RED ARROW             |    |       |          |    |    |       |    |     |       |     |     |       |          |        |        |        |        |        |
| YELLOW ARROW          |    |       |          |    |    |       |    |     |       |     |     |       |          | A125   |        |        |        |        |
| FLASHING YELLOW ARROW |    |       |          |    |    |       |    |     |       |     |     |       |          | A126   |        |        |        |        |
| GREEN ARROW           |    | 130   |          |    |    |       |    | 136 |       |     |     |       |          |        |        |        |        |        |
| Hand icon             |    |       | 113      |    |    |       |    |     |       |     |     | 110   |          |        |        |        |        |        |
| Walking person icon   |    |       | 115      |    |    |       |    |     |       |     |     | 112   |          |        |        |        |        |        |

NU = Not Used  
NC = Not Connected  
★ 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  
PRE = PREEMPT

4 CHANNEL EV OSP CARD  
INSERT CARD INTO  
SLOT J13

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

FLASHER CIRCUIT MODIFICATION DETAIL

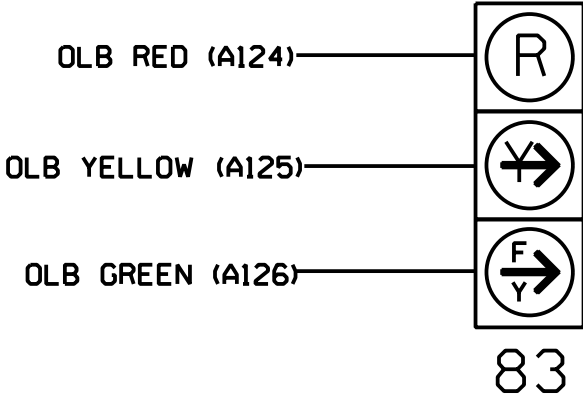
IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

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

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

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



Signal Upgrade-  
Electrical Detail - Sheet 1 of 3  
(Construction Phase 1, Step 4)

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T2  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                      |                                                                                                                                          |                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                                                                                                                           | NC 127 SE<br>at<br>SR 1692 (1st Ave SE)<br>Division 12 Catawba County Hickory                                                            | SEAL<br>NORTH CAROLINA<br>PROFESSIONAL<br>ENGINEER<br>SEAL<br>031464<br>NATASHA R. SIMMONS         |
| Prepared for:<br>HNTB NORTH CAROLINA, P.C.<br>4000 Center at North Hills St<br>Suite 500<br>Raleigh, North Carolina 27609<br>NC License No. C-1554<br>(919) 546-8997 | PLAN DATE: January 2024<br>PREPARED BY: E.E. Tiller<br>REVISIONS<br>INIT. DATE<br>REVIEWED BY: N.K. Vianich<br>REVIEWED BY: N.R. Simmons | DocuSigned by:<br>Natasha R. Simmons<br>9/6/2024<br>SIGNATURE DATE<br>SIG. INVENTORY NO. 12-0954T2 |

|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5777                | Sig. 9.2  |

## ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

Assign advanced walk to peds 2 and 8 as shown below.

|                                                                                                                                  |  |  |  |  |                     |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|---------------------|--|--|--|--|
| PHASE MENU                                                                                                                       |  |  |  |  |                     |  |  |  |  |
| 1-VEHICLE DATA                                                                                                                   |  |  |  |  | 6-SPEC. SEQUENCE+   |  |  |  |  |
| 2-DENSITY TIMES+                                                                                                                 |  |  |  |  | 7-DETECTOR DATA     |  |  |  |  |
| 3-PEDESTRIAN DATA                                                                                                                |  |  |  |  | 8-PHASE & BANK COPY |  |  |  |  |
| 4-INIT & NA RESP+                                                                                                                |  |  |  |  | 9-SELECT PHASE BANK |  |  |  |  |
| 5-N.LOCK & MISC+                                                                                                                 |  |  |  |  |                     |  |  |  |  |
| '+' DENOTES BANKABLE DATA [1]                                                                                                    |  |  |  |  |                     |  |  |  |  |
| PEDESTRIAN MENU                                                                                                                  |  |  |  |  |                     |  |  |  |  |
| 1-PED TIMES+                                                                                                                     |  |  |  |  |                     |  |  |  |  |
| 2-PED RECALL+                                                                                                                    |  |  |  |  |                     |  |  |  |  |
| 3-PED OFFSET+                                                                                                                    |  |  |  |  |                     |  |  |  |  |
| 4-MISC PED OPTIONS+                                                                                                              |  |  |  |  |                     |  |  |  |  |
| [1]                                                                                                                              |  |  |  |  |                     |  |  |  |  |
| PHASE.....1...2...3...4...5...6...7...8<br>WOFF/10    0   60   0   0   0   0   0   70<br>MODE*     0   0   0   0   0   0   0   0 |  |  |  |  |                     |  |  |  |  |
| CODES: * 0=ADVANCE 1=DELAY                                                                                                       |  |  |  |  |                     |  |  |  |  |
| [1]                                                                                                                              |  |  |  |  |                     |  |  |  |  |
| ADVANCE WALK PED PROGRAMMING COMPLETE                                                                                            |  |  |  |  |                     |  |  |  |  |

### OVERLAP DATA PROGRAMMING DETAIL FOR OVERLAP B

1. From Main Menu select **4- UNIT DATA**
2. From UNIT DATA Submenu select **3- OVERLAP DATA**

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```

OVERLAP DATA
  A: --- E: --- I: --- M: ---
  B: FYA F: --- J: --- N: ---
  C: --- G: --- K: --- O: ---
  D: --- H: --- L: --- P: ---
PREV/NEXT TO CYCLE
  
```

*OVERLAP B*

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B'. use the NEXT key to select 'FYA', then press ENT

```

FLY OVERLAP - B                DELAY/10: 0
  PHASES..12345678  90123456
  PERM PHASES: 00000001 00000000
  PROT PHASES: 00000010 00000000
  -PED PHASES: 00000000 00000000
  OVERLAPS..ABCDEFGH  IJKLMNOP
  PERM OVERLAPS: 0x000000 00000000
  PROT OVERLAPS: 0x000000 00000000
  
```

NOTICE  
DELAY/10 = 0

END OF OVERLAP PROGRAMMING

## REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC

2- FLASH

3- OVERLAP DATA

4- PEER-TO-PEER

5- RING STRUCTURE

6- SEQUENCES

7- PORT 1/ITS DATA

8- I/O MISC

9- PUTPUT MAPPING

B-BANK SELECTION

C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

FLASH

1- REMOTE FLASH SETTINGS

2- REMOTE FLASH ENTRY/EXIT PHASES

3- CABINET FLASH SETTINGS

REMOTE FLASH SETTINGS

TEST-A FLASH: (

LDSW:123456789 0123456789 0123456789 012

FLSH:010000010 0100100000 0000000000 000

ALT:010000000 0000000000 0000000000 000

0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW

SELECT 'F' RETURN TO FLASH MENU

```
FLASH
1- REMOTE FLASH SETTINGS
2- REMOTE FLASH ENTRY/EXIT PHASES
3- CABINET FLASH SETTINGS

REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456
ENTRY: 01000100 00000000
EXIT: 01000100 00000000

REMOTE FLASH PROGRAMMING COMPLETE
```

## ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

```

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA
1- STARTUP & MISC
2- FLASH
3- OVERLAP DATA
4- PEER-TO-PEER
5- RING STRUCTURE
6- SEQUENCES
7- PORT 1/ITS DATA
8- I/O MISC
9- PUTPUT MAPPING
B-BANK SELECTION
C-COPY BANK
'+ ' DENOTES BANKABLE UNIT DATA [1]

STARTUP & MISC
STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL
RED REV/10...: 40 (TSEC) 1-RED
AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF )
STOP T RESET.: 0 (0-NO 1-YES)
SEQUENCE.....: 0 (0-18)
SPECIAL SEQ : 0 (SEE HELP)

STARTUP PROGRAMMING COMPLETE

```

### INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

|                                                                                                                                                                               |                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>SE-PAC PHASE DATA</p> <p>1-VEHICLE TIMES<br/>         2-DENSITY TIMES<br/>         3-PEDST. TIMES<br/>         4-INIT &amp; N.A. RESP<br/>         5-V &amp; P RECALLS</p> | <p>PRESS # DESIRED</p> <p>6-N.LOCK &amp; MISC<br/>         7-SPEC. SEQUENCE<br/>         8-SPEC. DETECTOR<br/>         9-PHASE COPY<br/>         0-MISC PED OPTIONS</p> |
| <p>F-PRIOR MENU</p>                                                                                                                                                           |                                                                                                                                                                         |

PHASES 1,3,5,7  
NOT USED!

|            |      |      |      |      |      |      |      |   |
|------------|------|------|------|------|------|------|------|---|
| PHASE..... | 1... | 2... | 3... | 4... | 5... | 6... | 7... | 8 |
| INITIAL    | 0    | 6    | 0    | 1    | 0    | 6    | 0    | 1 |
| NA RESP    | 0    | 1    | 0    | 2    | 0    | 1    | 0    | 2 |

|            |      |       |      |      |      |      |      |
|------------|------|-------|------|------|------|------|------|
| CODES..... | 0... | 1...  | 2... | 3... | 4... | 5... | 6    |
| INITL      | NONE | INACT | RED  | YEL  | GRN  | DRK  | G/DW |
| NA RESP    | NONE | NA1   | NA2  | BOTH | ---  | ---  | ---  |

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

← CODE 6 (G/DW) ALLOWS PHASES  
2 AND 6 TO START IN GREEN  
AND SKIP THE PED PHASE

INIT & N.A. RESP PROGRAMMING COMPLETE

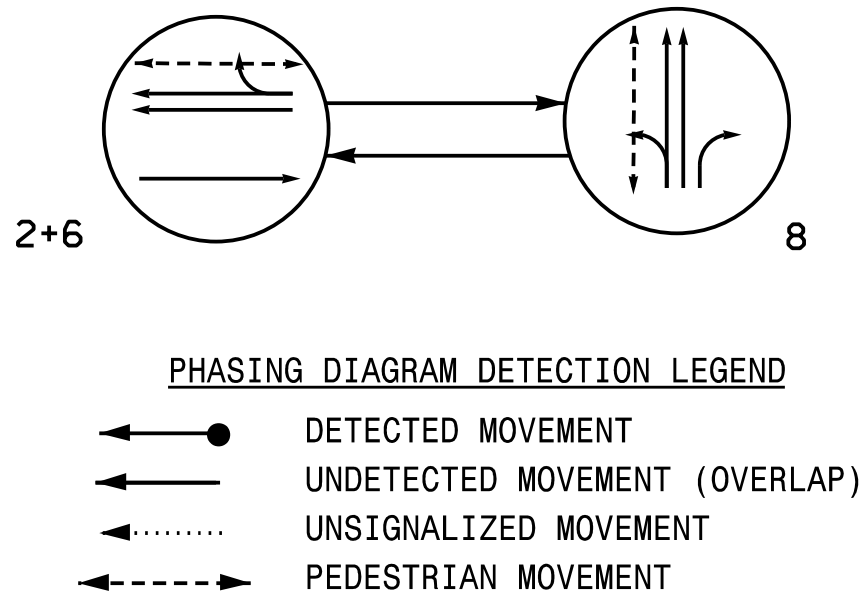
Signal Upgrade-  
Electrical Detail - Sheet 2 of 3  
(Construction Phase 1, Step 4)

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

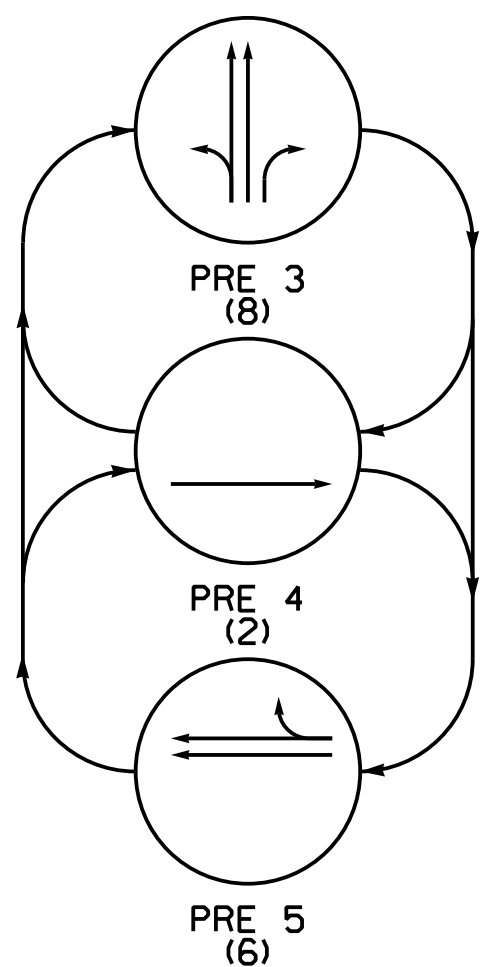
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR                                                                         | <h1 style="margin: 0;">NC 127 SE</h1> <p style="font-size: 2em; margin: 0;">at</p> <h1 style="margin: 0;">SR 1692 (1st Ave SE)</h1>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SEAL<br><br> |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------|---------|-------------------|--------------|----------------------------------|---------------------|-------------|----------------------------------|-----------|--|-----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Prepared for:</i><br><br> | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: left; padding: 5px;">Division 12</th> <th style="text-align: left; padding: 5px;">Catawba County</th> <th style="text-align: left; padding: 5px;">Hickory</th> </tr> <tr> <td style="padding: 5px;"><b>PLAN DATE:</b></td> <td style="padding: 5px;">January 2024</td> <td style="padding: 5px;"><b>REVIEWED BY:</b> N.K. Vlanich</td> </tr> <tr> <td style="padding: 5px;"><b>PREPARED BY:</b></td> <td style="padding: 5px;">E.E. Tiller</td> <td style="padding: 5px;"><b>REVIEWED BY:</b> N.R. Simmons</td> </tr> <tr> <td style="padding: 5px; text-align: center;">REVISIONS</td> <td style="padding: 5px;"></td> <td style="padding: 5px; text-align: center;">INIT.      DATE</td> </tr> <tr><td style="height: 20px;"></td><td></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td><td></td></tr> </table> | Division 12                                                                                       | Catawba County | Hickory | <b>PLAN DATE:</b> | January 2024 | <b>REVIEWED BY:</b> N.K. Vlanich | <b>PREPARED BY:</b> | E.E. Tiller | <b>REVIEWED BY:</b> N.R. Simmons | REVISIONS |  | INIT.      DATE |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | DocuSigned by:<br><br><b>Natasha R. Simmons</b> 9/6/2024<br>SIGNED _____ DATE _____<br>SIG. INVENTORY NO. 12-0954T2 |
| Division 12                                                                                                       | Catawba County                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Hickory                                                                                           |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
| <b>PLAN DATE:</b>                                                                                                 | January 2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>REVIEWED BY:</b> N.K. Vlanich                                                                  |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
| <b>PREPARED BY:</b>                                                                                               | E.E. Tiller                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>REVIEWED BY:</b> N.R. Simmons                                                                  |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
| REVISIONS                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | INIT.      DATE                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
|                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |
| 750 N.Greenfield Pkwy,Garner, NC 27529                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                   |                |         |                   |              |                                  |                     |             |                                  |           |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                          |



PHASING DIAGRAM



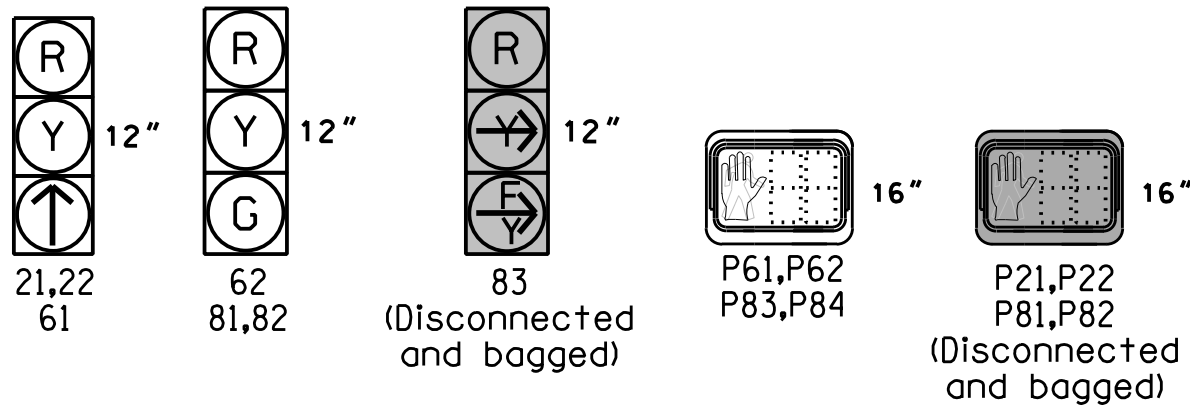
EV PREEMPT PHASES  
(Medium Priority)



| SIGNAL FACE | PHASE |    |       |       |       |       |  |
|-------------|-------|----|-------|-------|-------|-------|--|
|             | 2+6   | 8  | PRE 3 | PRE 4 | PRE 5 | FLASH |  |
| 21,22       | ↑     | R  | R     | ↑     | R     | R     |  |
| 61          | ↑     | R  | R     | R     | ↑     | R     |  |
| 62          | G     | R  | R     | R     | G     | R     |  |
| 81,82       | R     | G  | G     | R     | R     | R     |  |
| P61,P62     | W     | DW | DW    | DW    | DW    | DRK   |  |
| P83,P84     | DW    | W  | DW    | DW    | DW    | DRK   |  |

SIGNAL FACE I.D.

All Heads L.E.D.



2 Phase with EVP  
Pre-Timed  
Hickory City Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Reposition existing signal heads numbered 21, 22, 61, 62, PRE 4 and 5, and existing signs A and B.
- Remove existing signal head numbered 63.
- Disconnect and bag existing signal head numbered 83 and pedestrian heads numbered P21, P22, P81, and P82.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 4 as a dummy phase for Ring 1.
- Hickory Signal System Data: Controller Asset #0316.

LEGEND

| PROPOSED | EXISTING     |
|----------|--------------|
|          |              |
|          | N/A          |
|          |              |
|          |              |
|          |              |
|          |              |
|          |              |
|          |              |
|          |              |
| N/A      | Right of Way |
|          | N/A          |
|          | N/A          |
|          | N/A          |
|          |              |
|          | N/A          |
|          |              |
| N/A      | Curb Ramp    |
|          | N/A          |
|          |              |
| N/A      | Curb Ramp    |
|          |              |
|          |              |

SE-PAC 2070 TIMING CHART

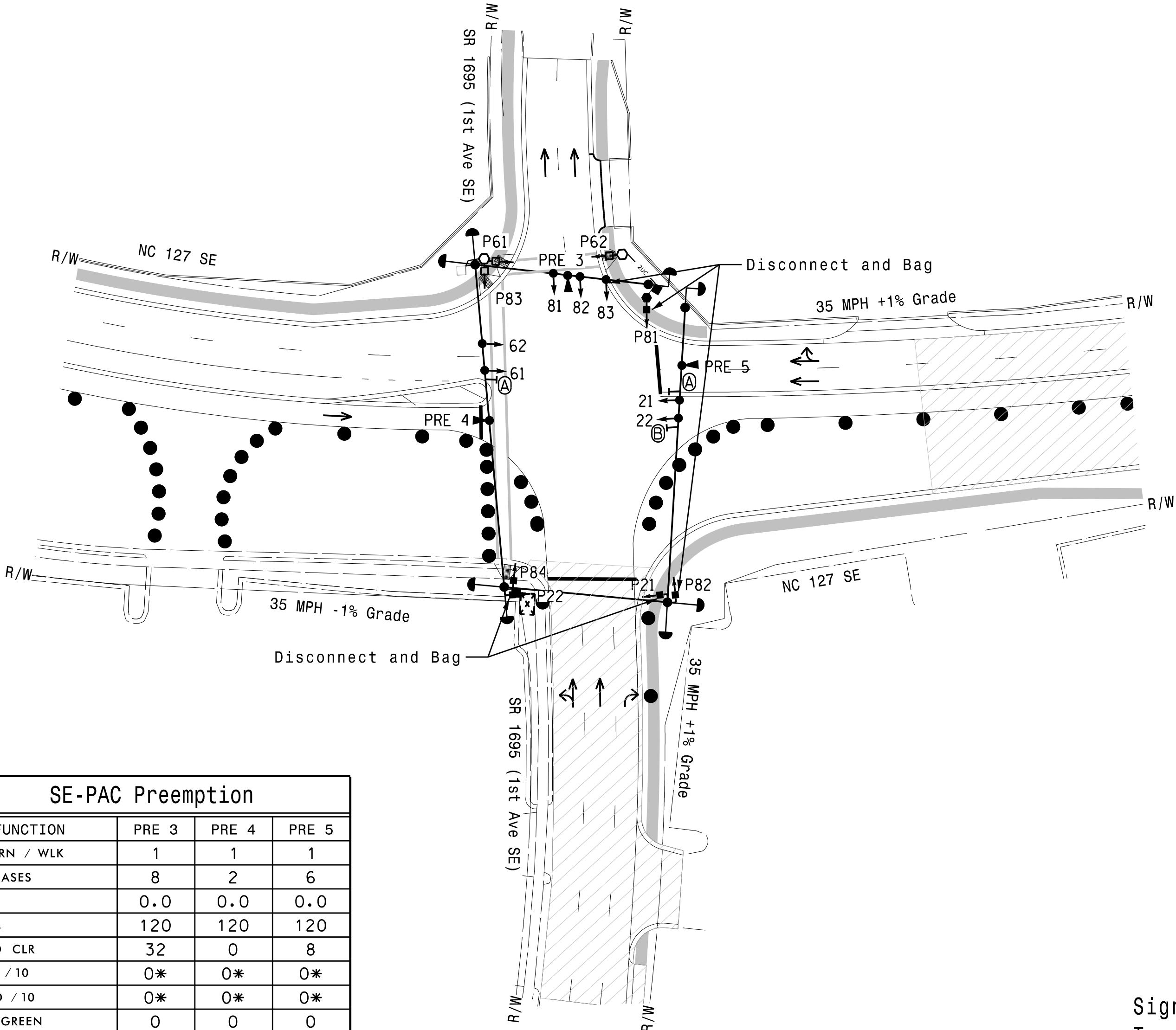
| FEATURE                 | PHASE      |            |                |                |
|-------------------------|------------|------------|----------------|----------------|
|                         | 2          | 4          | 6              | 8              |
| Min Green *             | 10         | 7          | 10             | 7              |
| Passage Gap *           | -          | -          | -              | -              |
| Maximum Green *         | 40         | 40         | 40             | 40             |
| Yellow Change           | 3.9        | 3.8        | 3.9            | 3.8            |
| Red Clear               | 1.4        | 2.8        | 1.4            | 2.8            |
| Walk *                  | -          | -          | 14             | 14             |
| Pedestrian Clear        | -          | -          | 9              | 33             |
| Advance Walk *          | -          | -          | 7              | 7              |
| Added Initial *         | -          | -          | -              | -              |
| Maximum Initial *       | -          | -          | -              | -              |
| Time Before Reduction * | -          | -          | -              | -              |
| Time To Reduce *        | -          | -          | -              | -              |
| Minimum Gap             | -          | -          | -              | -              |
| Recall Mode             | MAX RECALL | MAX RECALL | MAX/PED RECALL | MAX/PED RECALL |
| Vehicle Call Memory     | NON-LOCK   | NON-LOCK   | NON-LOCK       | NON-LOCK       |
| Dual Entry              | -          | -          | -              | -              |
| Simultaneous Gap        | ON         | ON         | ON             | ON             |

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

SE-PAC Preemption

| FUNCTION         | PRE 3 | PRE 4 | PRE 5 |
|------------------|-------|-------|-------|
| MIN GRN / WLK    | 1     | 1     | 1     |
| EXIT PHASES      | 8     | 2     | 6     |
| DELAY            | 0.0   | 0.0   | 0.0   |
| MXCALL           | 120   | 120   | 120   |
| SEL PED CLR      | 32    | 0     | 8     |
| SEL YEL / 10     | 0*    | 0*    | 0*    |
| SEL RED / 10     | 0*    | 0*    | 0*    |
| TRACK GREEN      | 0     | 0     | 0     |
| TRK PED CLR      | 0     | 0     | 0     |
| TRK YEL / 10     | 0     | 0     | 0     |
| TRK RED / 10     | 0     | 0     | 0     |
| DWELL GRN        | 7     | 10    | 10    |
| RET PED CLR      | 0     | 0     | 0     |
| RET YEL / 10     | 0*    | 0*    | 0*    |
| RET RED / 10     | 0*    | 0*    | 0*    |
| PREEMPT EXTEND** | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.



Signal Upgrade -  
Temporary Design 3  
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

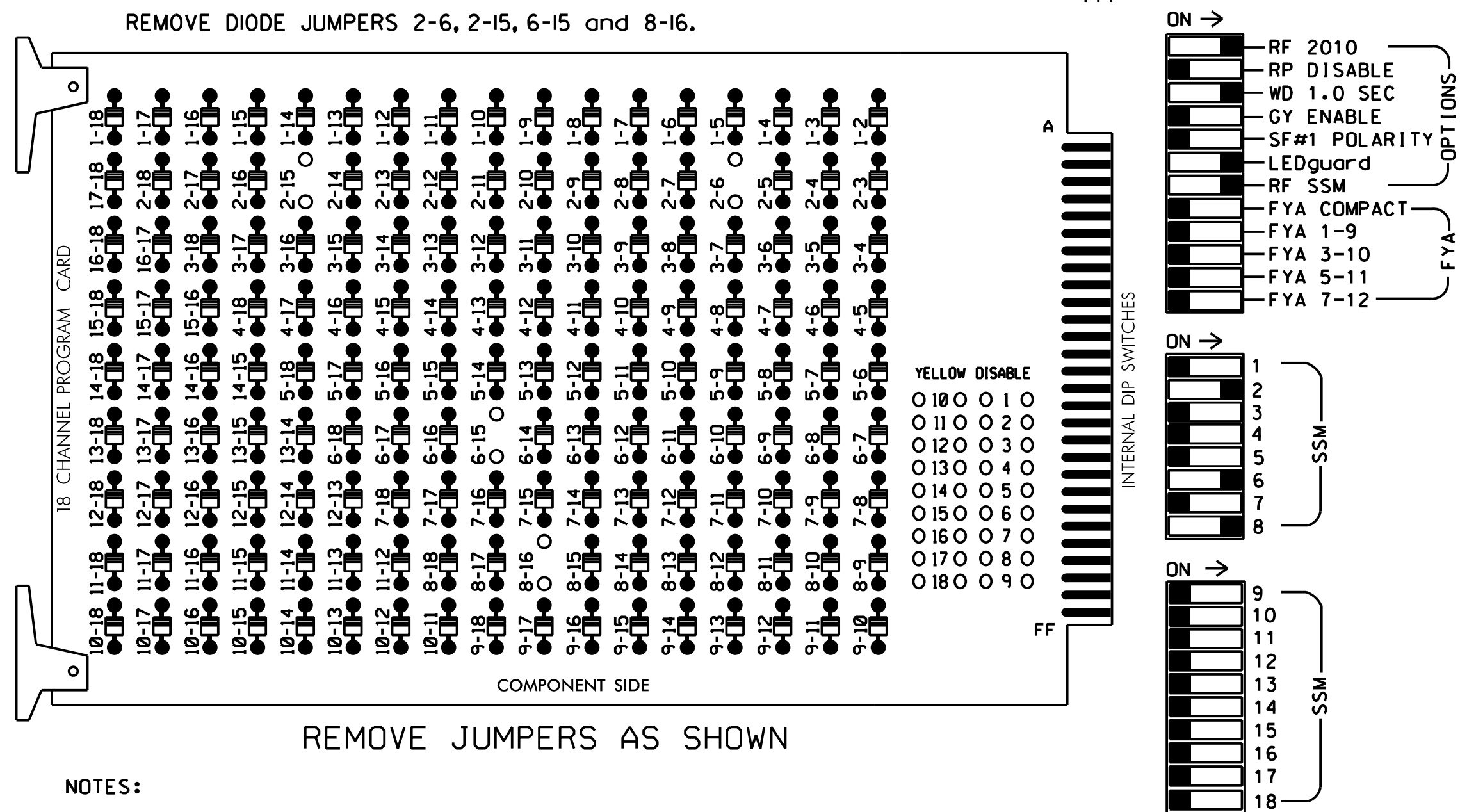
|                                                                                                                                                                          |                                         |                           |      |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------|------|---------|
| <br>Prepared for:<br>HNTB NORTH CAROLINA, P.C.<br>4000 Center at North Hills St<br>Suite 500<br>Raleigh, North Carolina 27609<br>NC License No: C-1554<br>(919) 546-8997 | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |                           |      |         |
|                                                                                                                                                                          | Division 12                             | Catawba County            |      | Hickory |
|                                                                                                                                                                          | PLAN DATE: October 2023                 | REVIEWED BY: N.K. Vianich |      |         |
|                                                                                                                                                                          | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons |      |         |
| REVISIONS                                                                                                                                                                |                                         | INIT.                     | DATE |         |
| 0                                                                                                                                                                        |                                         |                           |      |         |
| 1"=40'                                                                                                                                                                   |                                         |                           |      |         |
| DocuSigned by:<br>Natasha R. Simmons                                                                                                                                     |                                         | 9/6/2024                  |      |         |
| DATE                                                                                                                                                                     |                                         | DATE                      |      |         |
| SIG. INVENTORY NO. 12-095473                                                                                                                                             |                                         |                           |      |         |

## 18 CHANNEL CONFLICT MONITOR

### PROGRAMMING DETAIL

## PROGRAMMING DETAIL

*(remove jumpers and set switches as shown)*



REMOVE JUMPERS AS SHOWN

**NOTES:**

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 controller to start up in phases 2 and 6 Green/Don't Walk.
3. Enable Simultaneous Gap-Out feature for all phases.
4. The cabinet and controller are part of the Hickory City Signal System.

## EQUIPMENT INFORMATION

```

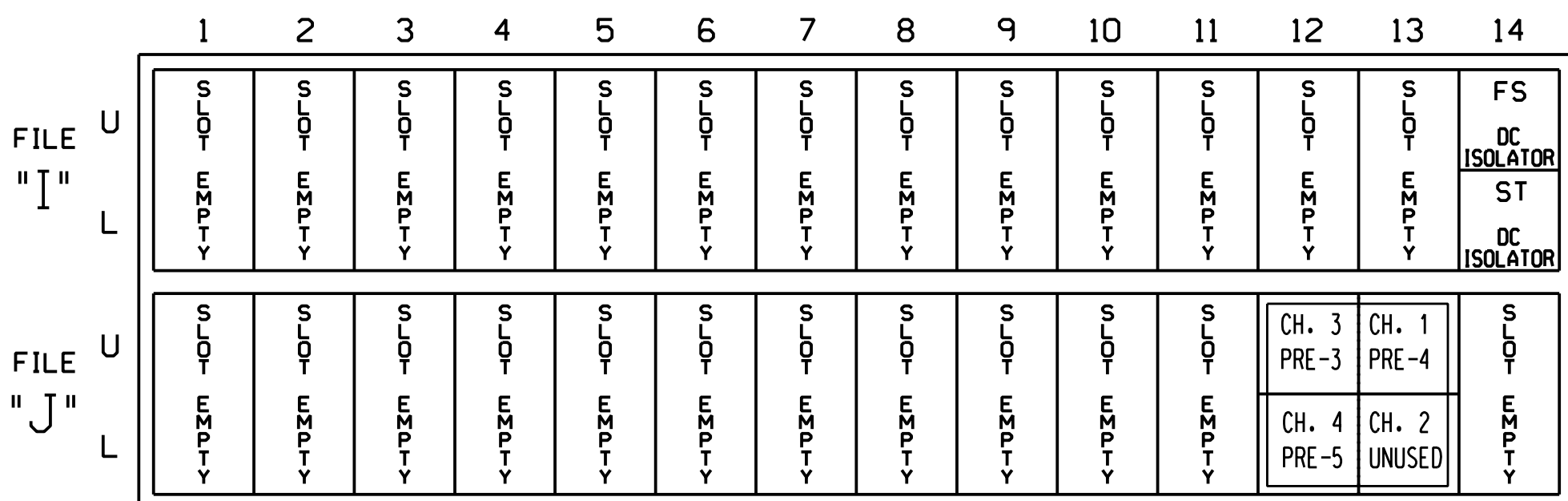
CONTROLLER.....2070LX
CABINET.....332 W/ AUX
SOFTWARE.....SE-PAC2070 VER. 5.4
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S8,S9,S11,S12
PHASES USED.....2,4*,6,6PED,8,8 PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED

```

\* Phase used for timing purposes only.

## INPUT FILE POSITION LAYOUT

(front view)



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

```
FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT
```

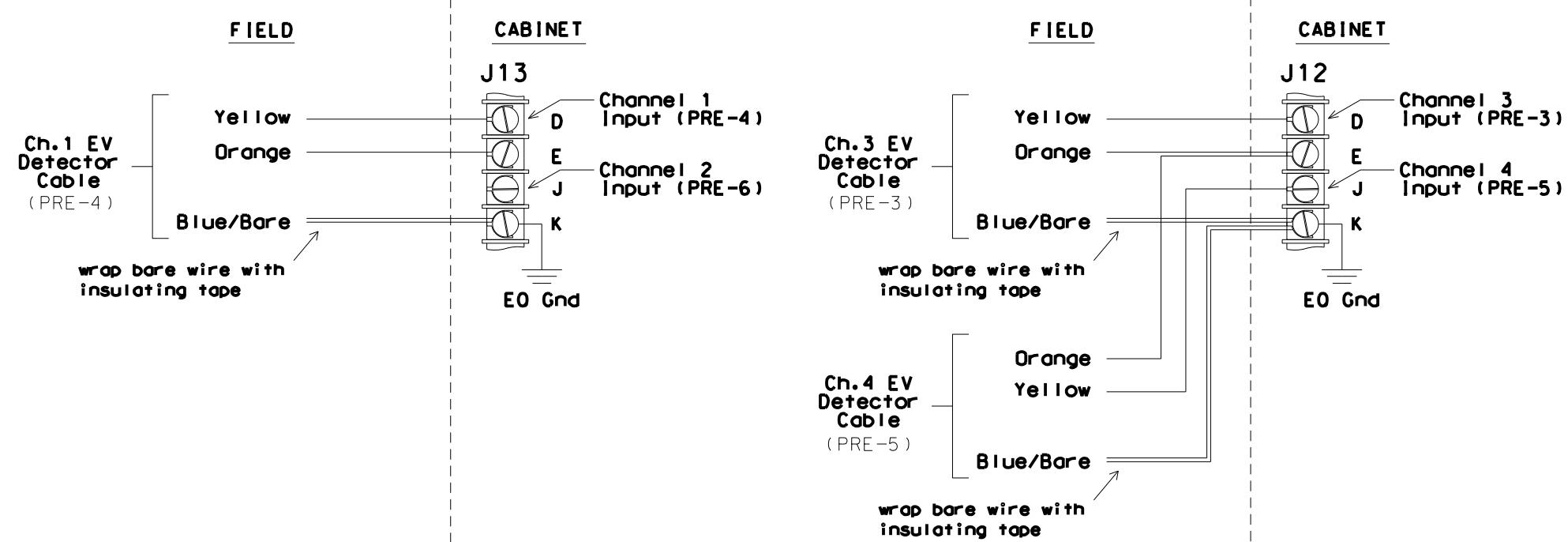
ST = STOP TIME  
000 0000:00

PRE = PREEMP

4 CHANNEL EV OSP CARD  
INSERT CARD INTO  
SLOT J13

TYPICAL EV FIELD WIRE DETAIL

(input file, rear view)

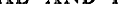


## COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T3  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 1 of 3  
(Construction Phase 2)

|                                                                                                                                                                                                  |                                              |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                                                                                                                                                       | NC 127 SE<br>at<br>SR 1692 (1st Ave SE)      |  |
|  <p>Prepared for:<br/>Department of Transportation<br/>Mobility and Safety<br/>Office of North Carolina</p> | Division 12      Catawba County      Hickory |  |

|                          |                           |
|--------------------------|---------------------------|
| PLAN DATE: January 2024  | REVIEWED BY: N.K. Vlanich |
| PREPARED BY: E.E. Tiller | REVIEWED BY: N.R. Simmons |

|                          |                           |
|--------------------------|---------------------------|
| PREPARED BY: E.E. Tiller | REVIEWED BY: N.R. Simmons |
|--------------------------|---------------------------|

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

DocuSigned b

Natasha R. Simmons 9/6/2024

|                    |             |
|--------------------|-------------|
| <b>SIGNATURE</b>   | <b>DATE</b> |
| <i>[Signature]</i> |             |

SIG. INVENTORY NO. 12-0954T3

# HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

750 N. Greenfield Pkwy, Garner, NC 27529

ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

Assign advanced walk to peds 6 and 8 as shown below.

PHASE MENU

1-VEHICLE DATA  
2-DENSITY TIMES+  
3-PEDESTRIAN DATA  
4-INIT & NA RESP+  
5-N.LOCK & MISC+  
'+' DENOTES BANKABLE DATA

6-SPEC. SEQUENCE+  
7-DETECTOR DATA  
8-PHASE & BANK COPY  
9-SELECT PHASE BANK  
[1]

PEDESTRIAN MENU

1-PED TIMES+  
2-PED RECALL+  
3-PED OFFSET+  
4-MISC PED OPTIONS+

[1]

PHASE.....1...2...3...4...5...6...7...8  
WOFF/10 0 0 0 0 0 70 0 70  
MODE\* 0 0 0 0 0 0 0 0  
  
CODES: \* 0=ADVANCE 1=DELAY

[1]

ADVANCE WALK PED PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

SE-PAC PHASE DATA

1-VEHICLE TIMES  
2-DENSITY TIMES  
3-PEDEST. TIMES  
4-INIT & N.A. RESP  
5-V & P RECALLS

6-N.LOCK & MISC  
7-SPEC. SEQUENCE  
8-SPEC. DETECTOR  
9-PHASE COPY  
0-MISC PED OPTIONS  
F-PRIOR MENU

PHASE.....1...2...3...4...5...6...7...8  
INITIAL 0 6 0 1 0 6 0 1  
NA RESP 0 1 0 2 0 1 0 2  
  
CODES.....0...1...2...3...4...5...6  
INITL NONE INACT RED YEL GRN DRK G/DW  
NA RESP NONE NA1 NA2 BOTH --- --- ---  
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

PHASES 1,3,5,7  
NOT USED!

CODE 6 (G/DW) ALLOWS PHASES  
2 AND 6 TO START IN GREEN  
AND SKIP THE PED PHASE

INIT & N.A. RESP PROGRAMMING COMPLETE

REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC  
2- FLASH  
3- OVERLAP DATA  
4- PEER-TO-PEER  
5- RING STRUCTURE  
'+' DENOTES BANKABLE UNIT DATA

6- SEQUENCES  
7- PORT 1/ITS DATA  
8- I/O MISC  
9- PUTPUT MAPPING  
B-BANK SELECTION  
C-COPY BANK  
[1]

FLASH

1- REMOTE FLASH SETTINGS  
2- REMOTE FLASH ENTRY/EXIT PHASES  
3- CABINET FLASH SETTINGS

REMOTE FLASH SETTINGS

TEST-A FLASH: 0

LDSW:123456789 0123456789 0123456789 012  
FLSH:010000010 0100000000 0000000000 000  
ALT:010000000 0000000000 0000000000 000  
  
0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW

SELECT 'F' RETURN TO FLASH MENU

FLASH

1- REMOTE FLASH SETTINGS  
2- REMOTE FLASH ENTRY/EXIT PHASES  
3- CABINET FLASH SETTINGS

REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456  
ENTRY: 01000100 00000000  
EXIT: 01000100 00000000

REMOTE FLASH PROGRAMMING COMPLETE

ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC  
2- FLASH  
3- OVERLAP DATA  
4- PEER-TO-PEER  
5- RING STRUCTURE  
'+' DENOTES BANKABLE UNIT DATA

6- SEQUENCES  
7- PORT 1/ITS DATA  
8- I/O MISC  
9- PUTPUT MAPPING  
B-BANK SELECTION  
C-COPY BANK  
[1]

STARTUP & MISC

STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL  
RED REV/10...: 40 (TSEC) 1-RED  
AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)  
STOP T RESET.: 0 (0-NO 1-YES)  
SEQUENCE.....: 0 (0-18)  
SPECIAL SEQ : 0 (SEE HELP)

STARTUP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T3  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 2 of 3  
(Construction Phase 2)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                            |                                         |                           |                                                                                                 |
|--------------------------------------------|-----------------------------------------|---------------------------|-------------------------------------------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR: | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |                           | SEAL<br><br>NORTH CAROLINA<br>PROFESSIONAL<br>ENGINEER<br>SEAL<br>031464<br>NATASHA R. SIMMONS  |
|                                            | Division 12 Catawba County Hickory      |                           |                                                                                                 |
|                                            | PLAN DATE: January 2024                 | REVIEWED BY: N.K. Vlanich |                                                                                                 |
|                                            | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons |                                                                                                 |
|                                            | REVISIONS                               |                           |                                                                                                 |
| INIT.                                      |                                         | DATE                      | DocuSigned by:<br>Natasha R. Simmons 9/6/2024<br>SIGNATURE DATE<br>SIG. INVENTORY NO. 12-0954T3 |
|                                            |                                         |                           |                                                                                                 |
|                                            |                                         |                           |                                                                                                 |



HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T3  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

SELECT 7-PREEMPT DATA FROM MAIN MENU

- PREEMPT 3 -

PREEMPTS

1-PREEMPT 1  
2-PREEMPT 2  
3-PREEMPT 3  
4-PREEMPT 4

5-PREEMPT 5  
6-PREEMPT 6  
7-PREEMPT 7  
8-PREEMPT 8

9-PREEMPT 9  
A-PREEMPT 10  
B-PREEMPT 11  
C-PREEMPT 12

O-OVERRIDES

D-DEFAULT DATA

PREEMPT 3

1-MISCELLANEOUS  
2-INTERVAL TIMES  
3-VEHICLE STATUS

6-PEDEST. STATUS  
7-OVERLAP STATUS

PREEMPT 3 MISC DATA

TEST: 0

DET: 250 DELAY: 0 MXCAL:120 DB/10: 0  
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0  
LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
EXIT 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0  
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 3 menu  
select 2 - Interval Times

PREEMPT 3 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 7  
EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN---

GREEN : 0

PED CLR: 32 PED CLR: 0 PED CLR: 0  
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0  
RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 3 menu  
select 3 - Vehicle Status

PREEMPT 3 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0  
(O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 4 -

PREEMPTS

1-PREEMPT 1  
2-PREEMPT 2  
3-PREEMPT 3  
4-PREEMPT 4

5-PREEMPT 5  
6-PREEMPT 6  
7-PREEMPT 7  
8-PREEMPT 8

9-PREEMPT 9  
A-PREEMPT 10  
B-PREEMPT 11  
C-PREEMPT 12

O-OVERRIDES

D-DEFAULT DATA

PREEMPT 4

1-MISCELLANEOUS  
2-INTERVAL TIMES  
3-VEHICLE STATUS

6-PEDEST. STATUS  
7-OVERLAP STATUS

PREEMPT 4 MISC DATA

TEST: 0

DET: 251 DELAY: 0 MXCAL:120 DB/10: 0  
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0  
LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
EXIT 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 4 menu  
select 2 - Interval Times

PREEMPT 4 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 10  
EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN---

GREEN : 0

PED CLR: 0 PED CLR: 0 PED CLR: 0  
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0  
RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 4 menu  
select 3 - Vehicle Status

PREEMPT 4 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-NO..1-ACT..2-MIN REC..3-MX REC)

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 5 -

PREEMPTS

1-PREEMPT 1  
2-PREEMPT 2  
3-PREEMPT 3  
4-PREEMPT 4

5-PREEMPT 5  
6-PREEMPT 6  
7-PREEMPT 7  
8-PREEMPT 8

9-PREEMPT 9  
A-PREEMPT 10  
B-PREEMPT 11  
C-PREEMPT 12

O-OVERRIDES

D-DEFAULT DATA

PREEMPT 5

1-MISCELLANEOUS  
2-INTERVAL TIMES  
3-VEHICLE STATUS

6-PEDEST. STATUS  
7-OVERLAP STATUS

PREEMPT 5 MISC DATA

TEST: 0

DET: 252 DELAY: 0 MXCAL:120 DB/10: 0  
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0  
LINK#: 0 DURAT: 0 GATE : 0 R2C : 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
EXIT 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

select F - return to Preempt 5 menu  
select 2 - Interval Times

PREEMPT 5 INTERVAL TIMES

MIN GRN: 1 MIN WLK: 1 DWL GRN: 10  
EXT PED: 0

--SELECT--- ---TRACK--- ---RETURN---

GREEN : 0

PED CLR: 8 PED CLR: 0 PED CLR: 0  
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0  
RED/10 : 0 RED/10 : 0 RED/10 : 0

select F - return to Preempt 5 menu  
select 3 - Vehicle Status

PREEMPT 5 VEHICLE STATUS

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6  
TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
DWELL 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0  
(O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)  
CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
(O-NO..1-ACT..2-MIN REC..3-MX REC)

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

end of programming

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

VEHICLE RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

PHASE MENU

1-VEHICLE DATA  
2-DENSITY TIMES+  
3-PEDESTRIAN DATA  
4-INIT & NA RESP+  
5-N.LOCK & MISC+

6-SPEC. SEQUENCE+  
7-DETECTOR DATA  
8-PHASE & BANK COPY  
9-SELECT PHASE BANK

'+' DENOTES BANKABLE DATA [1]

VEHICLE DATA

1-VEHICLE TIMES+  
2-DYNAMIC MAX+  
3-RECALLS+  
4-BIKE & AWS TIMES+

[1]

PHASE....1...2...3...4...5...6...7...8  
VEH RCL 0 3 0 3 0 3 0 3  
VEH DLY 0 0 0 0 0 0 0 0

CODES.....0....1....2....3....4....5....  
NONE 1CALL MIN MAX SOFT BIKE

[1]

VEH RECALL PROGRAMMING COMPLETE

PEDESTRIAN RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

PHASE MENU

1-VEHICLE DATA  
2-DENSITY TIMES+  
3-PEDESTRIAN DATA  
4-INIT & NA RESP+  
5-N.LOCK & MISC+

6-SPEC. SEQUENCE+  
7-DETECTOR DATA  
8-PHASE & BANK COPY  
9-SELECT PHASE BANK

'+' DENOTES BANKABLE DATA [1]

PEDESTRIAN MENU

1-PED TIMES+  
2-PED RECALL+  
3-PED OFFSET+  
4-MISC PED OPTIONS+

[1]

PHASE....1...2...3...4...5...6...7...8  
PED RCL 0 0 0 0 0 0 2 0 2  
PED DLY 0 0 0 0 0 0 0 0 0

CODES.....0....1....2....3....4....  
NONE 1CALL PED NA NA+

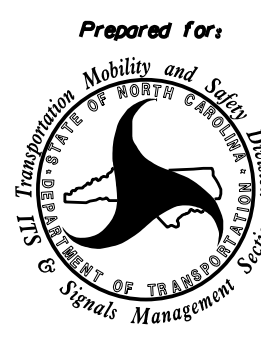
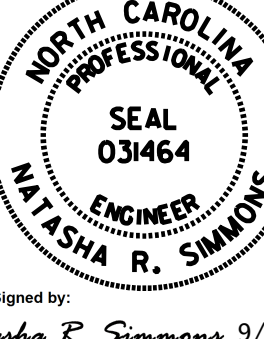
[1]

PED RECALL PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T3  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 3 of 3  
(Construction Phase 2)

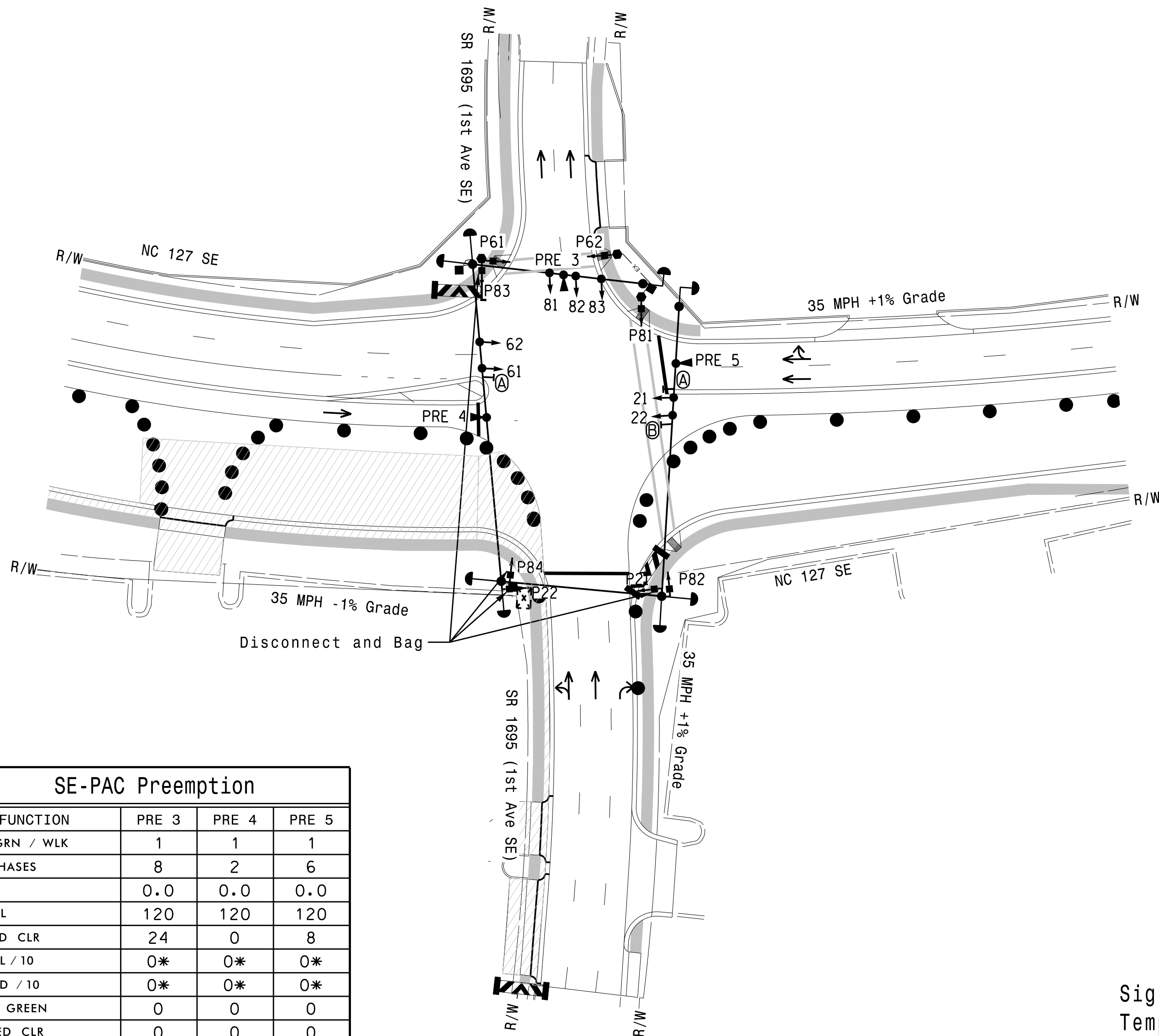
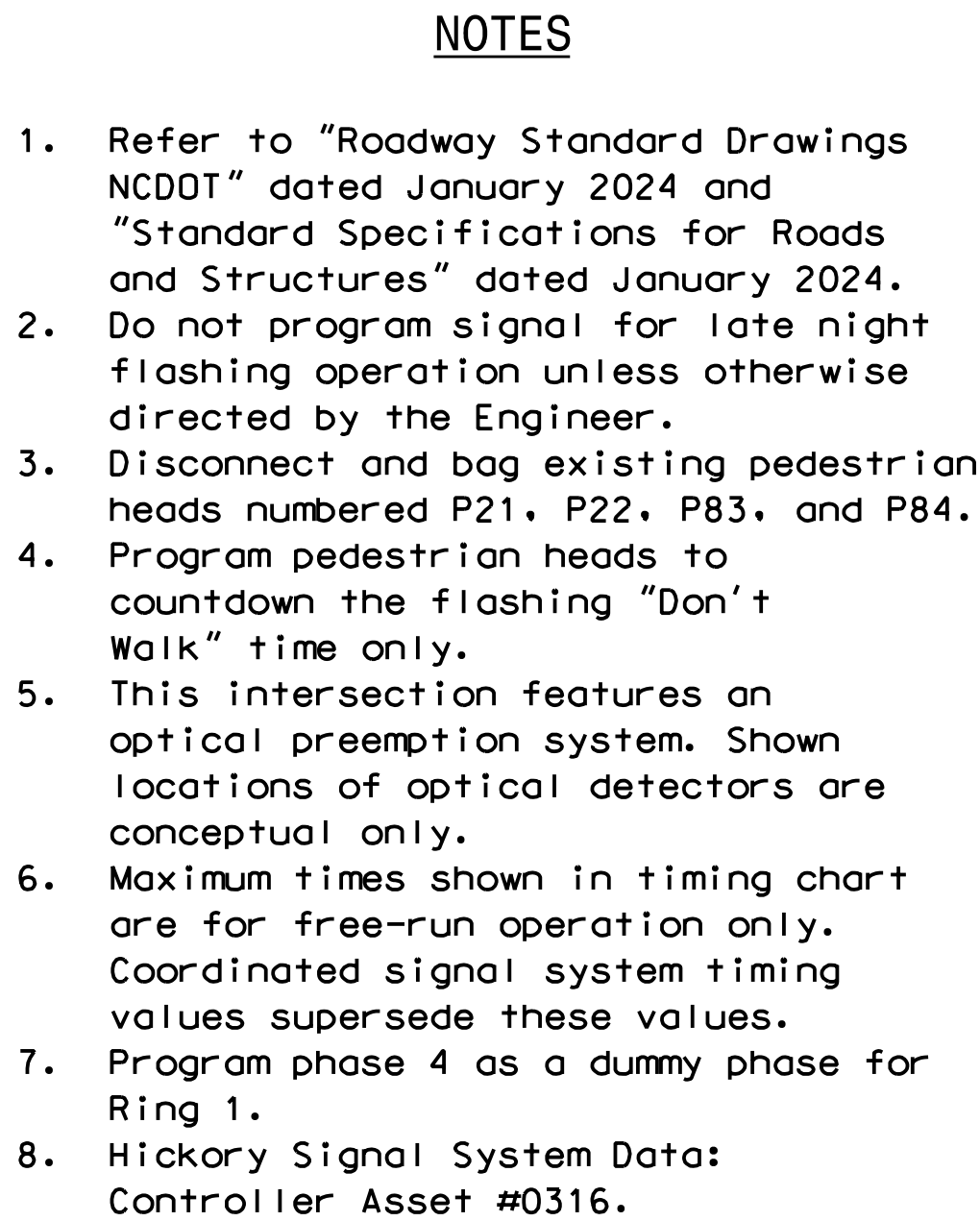
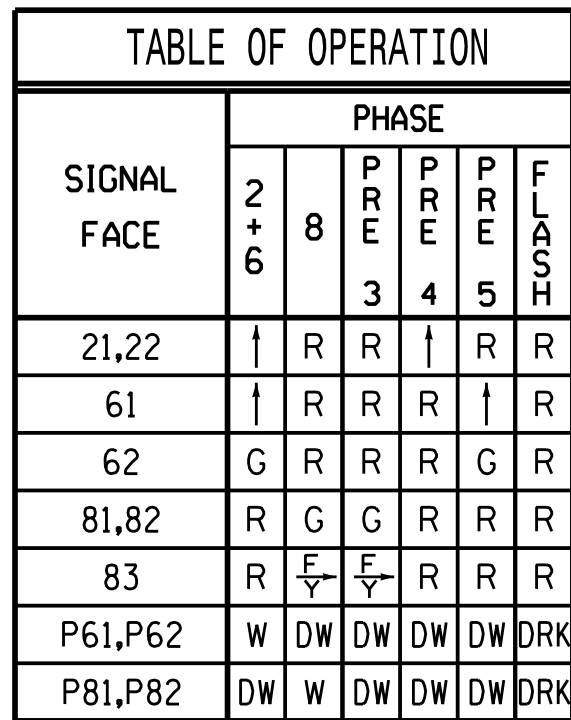
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                                                     |                                         |                           |                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:<br><br>Prepared for:<br><br>750 N.Greenfield Pkwy, Garner, NC 27529 | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |                           | SEAL<br><br>N. K. VIANICH<br>ENGINEER<br>031464 |
|                                                                                                                                                                                                     | Division 12 Catawba County Hickory      |                           |                                                                                                                                      |
|                                                                                                                                                                                                     | PLAN DATE: January 2024                 | REVIEWED BY: N.K. Vianich |                                                                                                                                      |
|                                                                                                                                                                                                     | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons |                                                                                                                                      |
|                                                                                                                                                                                                     | REVISIONS                               | INIT.                     | DATE                                                                                                                                 |
|                                                                                                                                                                                                     |                                         |                           | DocuSigned by:<br>Natasha R. Simmons 9/6/2024<br>SIGNATURE DATE                                                                      |
|                                                                                                                                                                                                     |                                         |                           | SIG. INVENTORY NO. 12-0954T3                                                                                                         |



HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

2 Phase with EVP  
Pre-Timed  
Hickory City Signal System



| SE-PAC 2070 TIMING CHART |            |            |                |                |
|--------------------------|------------|------------|----------------|----------------|
| FEATURE                  | PHASE      |            |                |                |
|                          | 2          | 4          | 6              | 8              |
| Min Green *              | 10         | 7          | 10             | 7              |
| Passage Gap *            | -          | -          | -              | -              |
| Maximum Green *          | 40         | 40         | 40             | 40             |
| Yellow Change            | 3.9        | 3.8        | 3.9            | 3.8            |
| Red Clear                | 1.6        | 2.8        | 1.6            | 2.8            |
| Walk *                   | -          | -          | 14             | 14             |
| Pedestrian Clear         | -          | -          | 9              | 26             |
| Advance Walk *           | -          | -          | 7              | 7              |
| Added Initial *          | -          | -          | -              | -              |
| Maximum Initial *        | -          | -          | -              | -              |
| Time Before Reduction *  | -          | -          | -              | -              |
| Time To Reduce *         | -          | -          | -              | -              |
| Minimum Gap              | -          | -          | -              | -              |
| Recall Mode              | MAX RECALL | MAX RECALL | MAX/PED RECALL | MAX/PED RECALL |
| Vehicle Call Memory      | NON-LOCK   | NON-LOCK   | NON-LOCK       | NON-LOCK       |
| Dual Entry               | -          | -          | -              | -              |
| Simultaneous Gap         | ON         | ON         | ON             | ON             |

| SE-PAC Preemption |       |       |       |
|-------------------|-------|-------|-------|
| FUNCTION          | PRE 3 | PRE 4 | PRE 5 |
| MIN GRN / WLK     | 1     | 1     | 1     |
| EXIT PHASES       | 8     | 2     | 6     |
| DELAY             | 0.0   | 0.0   | 0.0   |
| MXCALL            | 120   | 120   | 120   |
| SEL PED CLR       | 24    | 0     | 8     |
| SEL YEL / 10      | 0*    | 0*    | 0*    |
| SEL RED / 10      | 0*    | 0*    | 0*    |
| TRACK GREEN       | 0     | 0     | 0     |
| TRK PED CLR       | 0     | 0     | 0     |
| TRK YEL / 10      | 0     | 0     | 0     |
| TRK RED / 10      | 0     | 0     | 0     |
| DWELL GRN         | 7     | 10    | 10    |
| RET PED CLR       | 0     | 0     | 0     |
| RET YEL / 10      | 0*    | 0*    | 0*    |
| RET RED / 10      | 0*    | 0*    | 0*    |
| PREEMPT EXTEND**  | 2.0   | 2.0   | 2.0   |

| PROPOSED | LEGEND                        | EXISTING |
|----------|-------------------------------|----------|
|          | Traffic Signal Head           |          |
|          | Modified Signal Head          | N/A      |
|          | Sign                          |          |
|          | Pedestrian Signal Head        |          |
|          | With Push Button & Sign       |          |
|          | Signal Pole with Guy          |          |
|          | Signal Pole with Sidewalk Guy |          |
|          | Out of Pavement Detector      |          |
|          | Controller & Cabinet          |          |
|          | Junction Box                  |          |
|          | 2-in Underground Conduit      |          |
| N/A      | Right of Way                  |          |
|          | Barrier                       | N/A      |
|          | Directional Arrow             |          |
|          | Construction Zone Drums       |          |
|          | Construction Zone             | N/A      |
|          | Wedge/Widen                   |          |
| N/A      | Curb Ramp                     |          |
|          | Pedestrian Barricade          |          |
|          | Type II Signal Pedestal       |          |
| N/A      | Curb Ramp                     |          |
|          | No Left Turn Sign (R3-2)      |          |
|          | No Right Turn Sign (R3-1)     |          |

Signal Upgrade -  
Temporary Design 4  
(Construction Phase 2, Step 2)

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

# HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

|                                                  | Prepared For:<br><h1 style="margin: 0;">NC 127 SE</h1> <h2 style="margin: 0;">at</h2> <h1 style="margin: 0;">SR 1692 (1st Ave SE)</h1>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |  | SEAL<br> |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--|-----------------------------------------------------------------------------------------------|-------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|                                                                                                                                       | Division 12    Catawba County    Hickory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       | PLAN DATE: <u>October 2023</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | REVIEWED BY: <u>N.K. Vlanich</u> |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       | PREPARED BY: <u>E.E. Tiller</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | REVIEWED BY: <u>N.R. Simmons</u> |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 750 N. Greenfield Pkwy, Corner, NC 27529<br><br> | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">REVISIONS</th> <th style="width: 20%;">INIT.</th> <th style="width: 20%;">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> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <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 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| REVISIONS                                                                                                                             | INIT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | DATE                             |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Drawn By: _____<br>Checked By: _____<br>Date: _____<br>Scale: _____<br>Project No.: _____<br>Sheet No.: _____                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |  |                                                                                               |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



(program controller as shown below)

Assign advanced walk to peds 6 and 8 as shown below.

ADVANCE WALK PED PROGRAMMING COMPLETE

END OF OVERLAP PROGRAMMING

## REMOTE FLASH PROGRAMMING COMPLETE

STARTUP PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T4  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

SEAL



North Carolina  
PROFESSIONAL  
SEAL  
031464  
ENGINEER  
NATASHA R. SIMMONS

Designed by:

*Natasha R. Simmons* 9/6/2024

|           |      |
|-----------|------|
| SIGNATURE | DATE |
|-----------|------|

LocuSigned by: Katasha R. Simmons 9/6/2024  
SIGNATURE DATE

SIG. INVENTORY NO. 12-0954T4

## EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

SELECT 7-PREEMPT DATA FROM MAIN MENU

- PREEMPT 3 -

|                                 |             |              |
|---------------------------------|-------------|--------------|
| PREEMPTS                        |             |              |
| 1-PREEMPT 1                     | 5-PREEMPT 5 | 9-PREEMPT 9  |
| 2-PREEMPT 2                     | 6-PREEMPT 6 | A-PREEMPT 10 |
| 3-PREEMPT 3                     | 7-PREEMPT 7 | B-PREEMPT 11 |
| 4-PREEMPT 4                     | 8-PREEMPT 8 | C-PREEMPT 12 |
| O-OVERRIDES      D-DEFAULT DATA |             |              |

|                  |                  |
|------------------|------------------|
| PREEMPT 3        |                  |
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

|                                            |         |
|--------------------------------------------|---------|
| PREEMPT 3 MISC DATA                        | TEST: 0 |
| DET: 250   DELAY: 0   MXCAL:120   DB/10: 0 |         |
| NLOCK: 0   EXTND: 0   L OUT: 0   SRMOD: 0  |         |
| LINK#: 0   DURAT: 0   GATE : 0   R2C : 0   |         |
| PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6   |         |
| EXIT   0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0     |         |
| CALLS   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0    |         |

select F - return to Preempt 3 menu  
select 2 - Interval Times

|                                           |            |            |
|-------------------------------------------|------------|------------|
| PREEMPT 3 INTERVAL TIMES                  |            |            |
| MIN GRN: 1                                | MIN WLK: 1 | DWL GRN: 7 |
| EXT PED: 0                                |            |            |
| --SELECT---    ---TRACK---    ---RETURN-- |            |            |
| GREEN : 0                                 |            |            |
| PED CLR: 24                               | PED CLR: 0 | PED CLR: 0 |
| YEL/10 : 0                                | YEL/10 : 0 | YEL/10 : 0 |
| RED/10 : 0                                | RED/10 : 0 | RED/10 : 0 |

select F - return to Preempt 3 menu  
select 3 - Vehicle Status

|                                          |                                 |
|------------------------------------------|---------------------------------|
| PREEMPT 3 VEHICLE STATUS                 |                                 |
| PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6 |                                 |
| TRK GRN                                  | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| DWELL                                    | 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 |
| (O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)   |                                 |
| CYCLE                                    | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| (O-NO..1-ACT..2-MIN REC..3-MX REC)       |                                 |

select F - return to Preempt Data menu  
select 5 - Overlap Status

|                                           |                                 |
|-------------------------------------------|---------------------------------|
| PREEMPT 3 OVERLAP STATUS                  |                                 |
| PHASE....A.B.C.D.E.F.G.H.I.J.K.L.M.N.O.P  |                                 |
| TRK GRN                                   | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| DWELL                                     | 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| CYCLE                                     | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| (O-R.1-G.2-FR.3-FY.4-DK.5-FG IO-NO.1-ACT) |                                 |
| TRAIL                                     | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |

NOTE: Option 4 is not used. Be sure values are set at default=0.

end of programming

- PREEMPT 4 -

|                                 |             |              |
|---------------------------------|-------------|--------------|
| PREEMPTS                        |             |              |
| 1-PREEMPT 1                     | 5-PREEMPT 5 | 9-PREEMPT 9  |
| 2-PREEMPT 2                     | 6-PREEMPT 6 | A-PREEMPT 10 |
| 3-PREEMPT 3                     | 7-PREEMPT 7 | B-PREEMPT 11 |
| 4-PREEMPT 4                     | 8-PREEMPT 8 | C-PREEMPT 12 |
| O-OVERRIDES      D-DEFAULT DATA |             |              |

|                  |                  |
|------------------|------------------|
| PREEMPT 4        |                  |
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

|                                            |         |
|--------------------------------------------|---------|
| PREEMPT 4 MISC DATA                        | TEST: 0 |
| DET: 251   DELAY: 0   MXCAL:120   DB/10: 0 |         |
| NLOCK: 0   EXTND: 0   L OUT: 0   SRMOD: 0  |         |
| LINK#: 0   DURAT: 0   GATE : 0   R2C : 0   |         |
| PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6   |         |
| EXIT   0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0     |         |
| CALLS   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0    |         |

select F - return to Preempt 4 menu  
select 2 - Interval Times

|                                           |            |             |
|-------------------------------------------|------------|-------------|
| PREEMPT 4 INTERVAL TIMES                  |            |             |
| MIN GRN: 1                                | MIN WLK: 1 | DWL GRN: 10 |
| EXT PED: 0                                |            |             |
| --SELECT---    ---TRACK---    ---RETURN-- |            |             |
| GREEN : 0                                 |            |             |
| PED CLR: 0                                | PED CLR: 0 | PED CLR: 0  |
| YEL/10 : 0                                | YEL/10 : 0 | YEL/10 : 0  |
| RED/10 : 0                                | RED/10 : 0 | RED/10 : 0  |

select F - return to Preempt 4 menu  
select 3 - Vehicle Status

|                                          |                                 |
|------------------------------------------|---------------------------------|
| PREEMPT 4 VEHICLE STATUS                 |                                 |
| PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6 |                                 |
| TRK GRN                                  | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| DWELL                                    | 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| (O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)   |                                 |
| CYCLE                                    | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| (O-NO..1-ACT..2-MIN REC..3-MX REC)       |                                 |

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 5 -

|                                 |             |              |
|---------------------------------|-------------|--------------|
| PREEMPTS                        |             |              |
| 1-PREEMPT 1                     | 5-PREEMPT 5 | 9-PREEMPT 9  |
| 2-PREEMPT 2                     | 6-PREEMPT 6 | A-PREEMPT 10 |
| 3-PREEMPT 3                     | 7-PREEMPT 7 | B-PREEMPT 11 |
| 4-PREEMPT 4                     | 8-PREEMPT 8 | C-PREEMPT 12 |
| O-OVERRIDES      D-DEFAULT DATA |             |              |

|                  |                  |
|------------------|------------------|
| PREEMPT 5        |                  |
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

|                                            |         |
|--------------------------------------------|---------|
| PREEMPT 5 MISC DATA                        | TEST: 0 |
| DET: 252   DELAY: 0   MXCAL:120   DB/10: 0 |         |
| NLOCK: 0   EXTND: 0   L OUT: 0   SRMOD: 0  |         |
| LINK#: 0   DURAT: 0   GATE : 0   R2C : 0   |         |
| PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6   |         |
| EXIT   0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0     |         |
| CALLS   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0    |         |

select F - return to Preempt 5 menu  
select 2 - Interval Times

|                                           |            |             |
|-------------------------------------------|------------|-------------|
| PREEMPT 5 INTERVAL TIMES                  |            |             |
| MIN GRN: 1                                | MIN WLK: 1 | DWL GRN: 10 |
| EXT PED: 0                                |            |             |
| --SELECT---    ---TRACK---    ---RETURN-- |            |             |
| GREEN : 0                                 |            |             |
| PED CLR: 8                                | PED CLR: 0 | PED CLR: 0  |
| YEL/10 : 0                                | YEL/10 : 0 | YEL/10 : 0  |
| RED/10 : 0                                | RED/10 : 0 | RED/10 : 0  |

select F - return to Preempt 5 menu  
select 3 - Vehicle Status

|                                          |                                 |
|------------------------------------------|---------------------------------|
| PREEMPT 5 VEHICLE STATUS                 |                                 |
| PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6 |                                 |
| TRK GRN                                  | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| DWELL                                    | 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 |
| (O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)   |                                 |
| CYCLE                                    | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| (O-NO..1-ACT..2-MIN REC..3-MX REC)       |                                 |

select F - return to Preempt 5 menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

## PEDESTRIAN RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

|                           |                     |
|---------------------------|---------------------|
| PHASE MENU                |                     |
| 1-VEHICLE DATA            | 6-SPEC. SEQUENCE+   |
| 2-DENSITY TIMES+          | 7-DETECTOR DATA     |
| 3-PEDESTRIAN DATA         | 8-PHASE & BANK COPY |
| 4-INIT & NA RESP+         | 9-SELECT PHASE BANK |
| 5-N.LOCK & MISC+          |                     |
| '+' DENOTES BANKABLE DATA | [1]                 |

|                     |  |
|---------------------|--|
| PEDESTRIAN MENU     |  |
| 1-PED TIMES+        |  |
| 2-PED RECALL+       |  |
| 3-PED OFFSET+       |  |
| 4-MISC PED OPTIONS+ |  |
| [1]                 |  |

|                                        |                   |
|----------------------------------------|-------------------|
| PHASE....1...2...3...4...5...6...7...8 |                   |
| PED RCL                                | 0 0 0 0 0 0 2 0 2 |
| PED DLY                                | 0 0 0 0 0 0 0 0 0 |
| CODES.....0....1....2....3....4        |                   |
| NONE 1CALL PED NA NA+                  |                   |
| [1]                                    |                   |

PED RECALL PROGRAMMING COMPLETE

## VEHICLE RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

|                           |                     |
|---------------------------|---------------------|
| PHASE MENU                |                     |
| 1-VEHICLE DATA            | 6-SPEC. SEQUENCE+   |
| 2-DENSITY TIMES+          | 7-DETECTOR DATA     |
| 3-PEDESTRIAN DATA         | 8-PHASE & BANK COPY |
| 4-INIT & NA RESP+         | 9-SELECT PHASE BANK |
| 5-N.LOCK & MISC+          |                     |
| '+' DENOTES BANKABLE DATA | [1]                 |

|                     |  |
|---------------------|--|
| VEHICLE DATA        |  |
| 1-VEHICLE TIMES+    |  |
| 2-DYNAMIC MAX+      |  |
| 3-RECALLS+          |  |
| 4-BIKE & AWS TIMES+ |  |
| [1]                 |  |

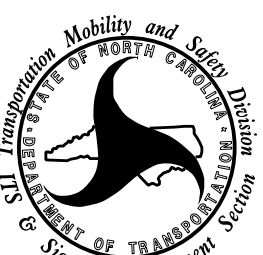
|                                          |                 |
|------------------------------------------|-----------------|
| PHASE....1...2...3...4...5...6...7...8   |                 |
| VEH RCL                                  | 0 3 0 3 0 3 0 3 |
| VEH DLY                                  | 0 0 0 0 0 0 0 0 |
| CODES.....0....1....2....3....4....5.... |                 |
| NONE 1CALL MIN MAX SOFT BIKE             |                 |
| [1]                                      |                 |

VEH RECALL PROGRAMMING COMPLETE

Signal Upgrade-  
Electrical Detail - Sheet 3 of 3  
(Construction Phase 2, Step 2)

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T4  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

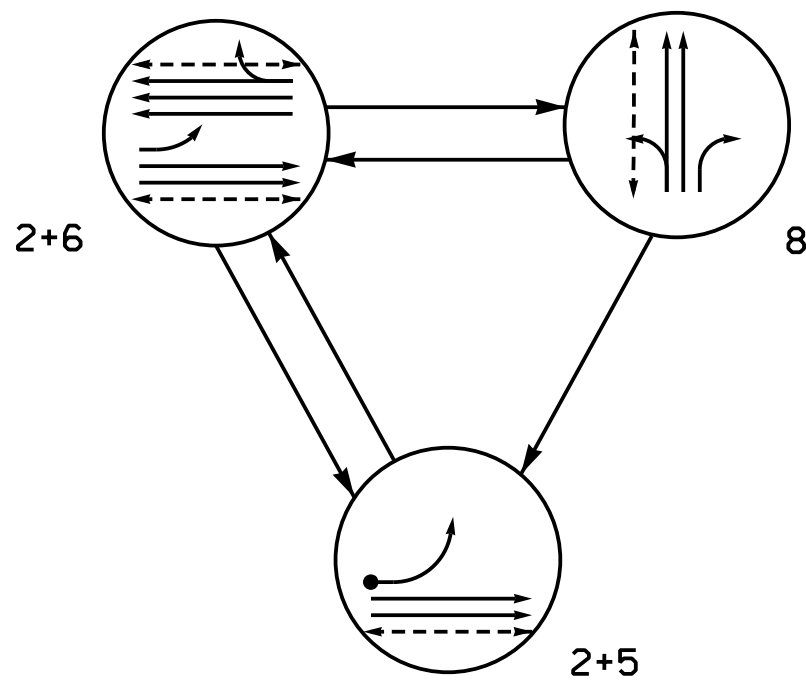
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                  |                                         |                              |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                                                                       | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |                              |
|                                                                                                                  | Division 12                             | Catawba County    Hickory    |
| Prepared for:<br>           | PLAN DATE: January 2024                 | REVIEWED BY: N.K. Vianich    |
|                                                                                                                  | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons    |
| 750 N.Greenfield Pkwy, Garner, NC 27529                                                                          | REVISIONS                               | INIT.    DATE                |
|                                                                                                                  |                                         |                              |
| DocuSigned by:<br> 9/6/2024 |                                         | SIG. INVENTORY NO. 12-0954T4 |

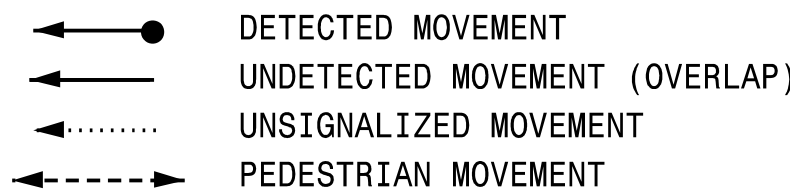
HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

PHASING DIAGRAM

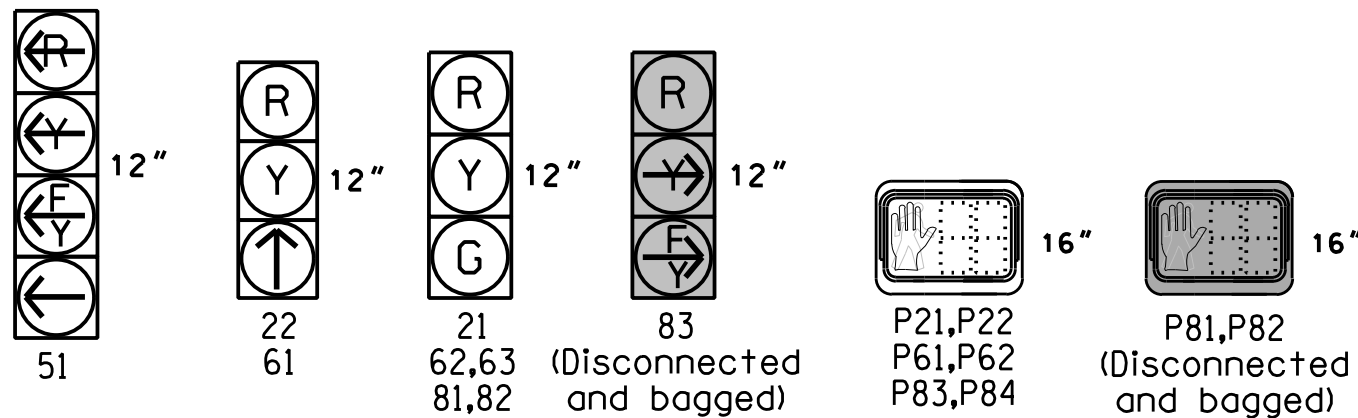


PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

All Heads L.E.D.



EV PREEMPT PHASES

(Medium Priority)

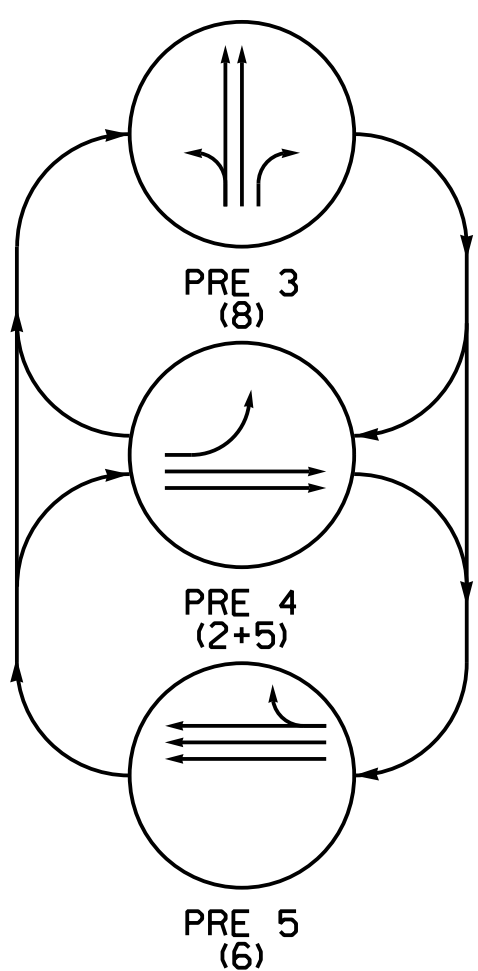


TABLE OF OPERATION

| SIGNAL FACE | PHASE |     |    |       |       |       |       |  |  |  |
|-------------|-------|-----|----|-------|-------|-------|-------|--|--|--|
|             | 2+5   | 2+6 | 8  | PRE 3 | PRE 4 | PRE 5 | FLASH |  |  |  |
| 21          | G     | G   | R  | R     | G     | R     | R     |  |  |  |
| 22          | ↑     | ↑   | R  | R     | ↑     | R     | R     |  |  |  |
| 51          | ←     | ←   | ←  | ←     | ←     | ←     | ←     |  |  |  |
| 61          | R     | ↑   | R  | R     | R     | ↑     | R     |  |  |  |
| 62,63       | R     | G   | R  | R     | R     | G     | R     |  |  |  |
| 81,82       | R     | R   | G  | G     | R     | R     | R     |  |  |  |
| P21,P22     | W     | W   | DW | DW    | DW    | DW    | DRK   |  |  |  |
| P61,P62     | DW    | W   | DW | DW    | DW    | DW    | DRK   |  |  |  |
| P83,P84     | DW    | DW  | W  | DW    | DW    | DW    | DRK   |  |  |  |

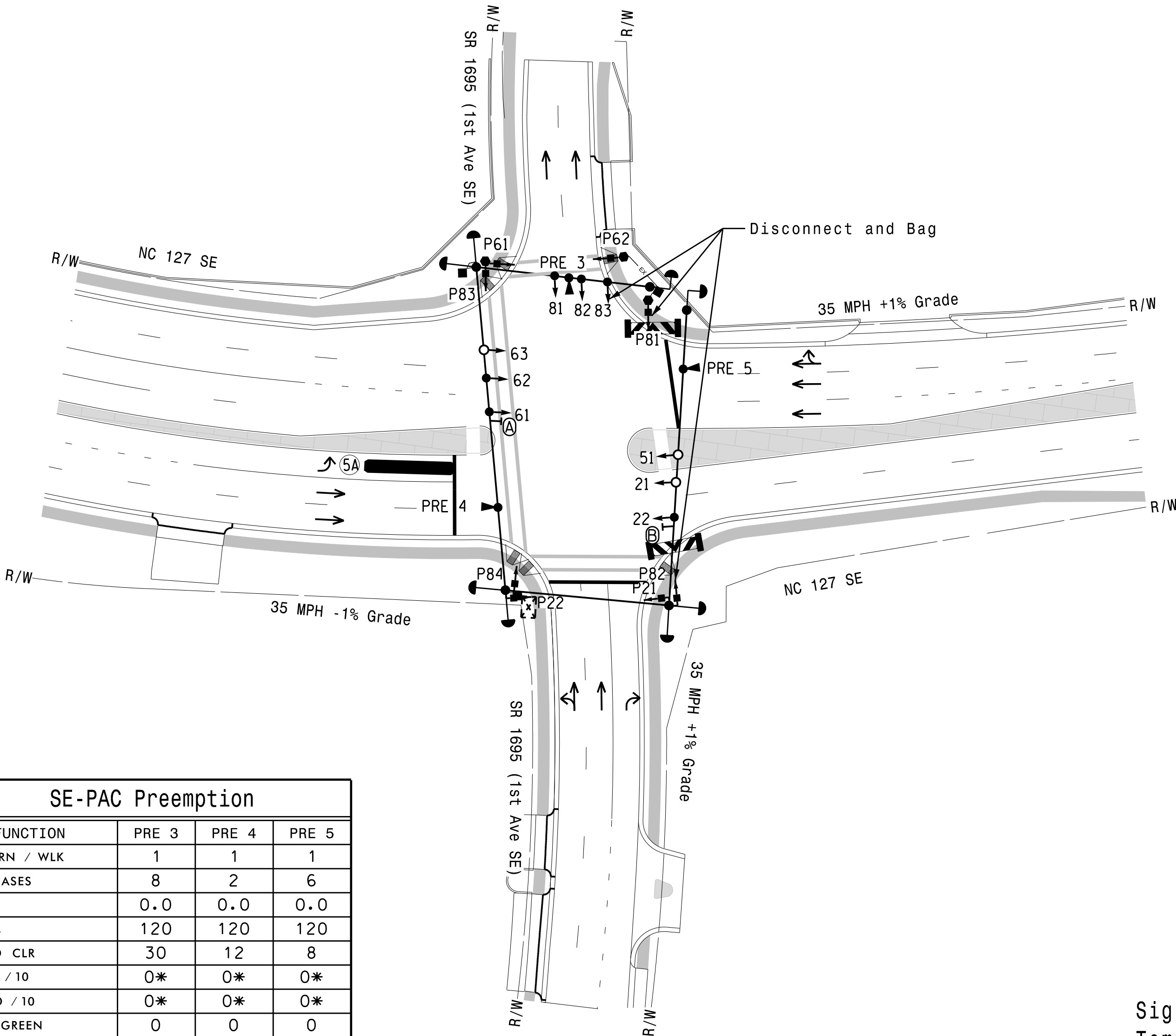
SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

| INDUCTIVE LOOPS |           |       |                           |              | DETECTOR PROGRAMMING |        |                  |                |            |        |   |   |   |   |        |              |          |        |
|-----------------|-----------|-------|---------------------------|--------------|----------------------|--------|------------------|----------------|------------|--------|---|---|---|---|--------|--------------|----------|--------|
| ZONE            | SIZE (ft) | TURNS | DIST. FROM STOP LINE (ft) | NEW EXISTING | ASSIGNED PHASE       | TIMING |                  | OPERATION MODE |            |        |   |   |   |   | SWITCH | SYSTEM LOOPS |          | STATUS |
|                 |           |       |                           |              |                      | DELAY  | EXTEND (STRETCH) | VEHICLE        | PEDESTRIAN | 1 CALL | 2 | 3 | 4 | 5 |        | NEW          | EXISTING |        |
| 5A*             | 6X40      | *     | 0                         | *            | -                    | 5      | 15 SEC.          | -              | SEC.       | X      | - | - | - | - | -      | *            | -        | -      |

\* Multizone Microwave Detection

3 Phase with EVP  
Pre-Timed  
Hickory City Signal System  
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Reposition existing signal heads numbered 22, 61, and 62 and PRE 4 and 5, and signs A and B.
- Disconnect and bag existing signal head numbered 83 and pedestrian heads numbered P81 and P82.
- Set all detector units to presence mode.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- This intersection uses multi-zone microwave detection. Install the detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 4 as a dummy phase for Ring 1.
- Hickory Signal System Data: Controller Asset #0316.



SE-PAC 2070 TIMING CHART

| FEATURE                 | PHASE          |            |          |                |                |
|-------------------------|----------------|------------|----------|----------------|----------------|
|                         | 2              | 4          | 5        | 6              | 8              |
| Min Green *             | 10             | 7          | 7        | 10             | 7              |
| Passage Gap *           | -              | -          | -        | -              | -              |
| Maximum Green *         | 40             | 40         | 20       | 40             | 40             |
| Yellow Change           | 3.9            | 3.8        | 3.0      | 3.9            | 3.8            |
| Red Clear               | 2.8            | 2.8        | 3.7      | 2.8            | 2.8            |
| Walk *                  | 14             | -          | -        | 14             | 14             |
| Pedestrian Clear        | 13             | -          | -        | 9              | 31             |
| Advance Walk *          | 7              | -          | -        | 7              | 7              |
| Added Initial *         | -              | -          | -        | -              | -              |
| Maximum Initial *       | -              | -          | -        | -              | -              |
| Time Before Reduction * | -              | -          | -        | -              | -              |
| Time To Reduce *        | -              | -          | -        | -              | -              |
| Minimum Gap             | -              | -          | -        | -              | -              |
| Recall Mode             | MAX/PED RECALL | MAX RECALL | -        | MAX/PED RECALL | MAX/PED RECALL |
| Vehicle Call Memory     | NON-LOCK       | NON-LOCK   | NON-LOCK | NON-LOCK       | NON-LOCK       |
| Dual Entry              | -              | -          | -        | -              | -              |
| Simultaneous Gap        | ON             | ON         | ON       | ON             | ON             |

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

SE-PAC Preemption

| FUNCTION         | PRE 3 | PRE 4 | PRE 5 |
|------------------|-------|-------|-------|
| MIN GRN / WLK    | 1     | 1     | 1     |
| EXIT PHASES      | 8     | 2     | 6     |
| DELAY            | 0.0   | 0.0   | 0.0   |
| MXCALL           | 120   | 120   | 120   |
| SEL PED CLR      | 30    | 12    | 8     |
| SEL YEL / 10     | 0*    | 0*    | 0*    |
| SEL RED / 10     | 0*    | 0*    | 0*    |
| TRACK GREEN      | 0     | 0     | 0     |
| TRK PED CLR      | 0     | 0     | 0     |
| TRK YEL / 10     | 0     | 0     | 0     |
| TRK RED / 10     | 0     | 0     | 0     |
| DWELL GRN        | 7     | 10    | 10    |
| RET PED CLR      | 0     | 0     | 0     |
| RET YEL / 10     | 0*    | 0*    | 0*    |
| RET RED / 10     | 0*    | 0*    | 0*    |
| PREEMPT EXTEND** | 2.0   | 2.0   | 2.0   |

\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.

LEGEND

| PROPOSED | EXISTING |
|----------|----------|
|          |          |
|          | N/A      |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          |          |
|          | N/A      |
|          | N/A      |
|          | N/A      |
|          |          |
|          |          |
|          |          |
|          |          |

Signal Upgrade -  
Temporary Design 5  
(Construction Phase 3)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                  |                                         |                           |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------|------|
| <br>Prepared for:<br>TRANSPORTATION MOBILITY AND SAFETY DIVISION<br>STATE OF NORTH CAROLINA<br>Signal Design Section<br>750 N. Greenfield Pkwy, Garner, NC 27529 | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |                           |      |
|                                                                                                                                                                  | Division 12 Catawba County Hickory      |                           |      |
|                                                                                                                                                                  | PLAN DATE: October 2023                 | REVIEWED BY: N.K. Vianich |      |
|                                                                                                                                                                  | PREPARED BY: E.E. Tiller                | REVIEWED BY: N.R. Simmons |      |
| REVISIONS                                                                                                                                                        |                                         | INIT.                     | DATE |
| 0 40<br>1"=40'                                                                                                                                                   |                                         |                           |      |
| DocuSigned by:<br>Natasha R. Simmons 9/6/2024                                                                                                                    |                                         | DATE                      |      |
| SIG. INVENTORY NO. 12-095475                                                                                                                                     |                                         |                           |      |

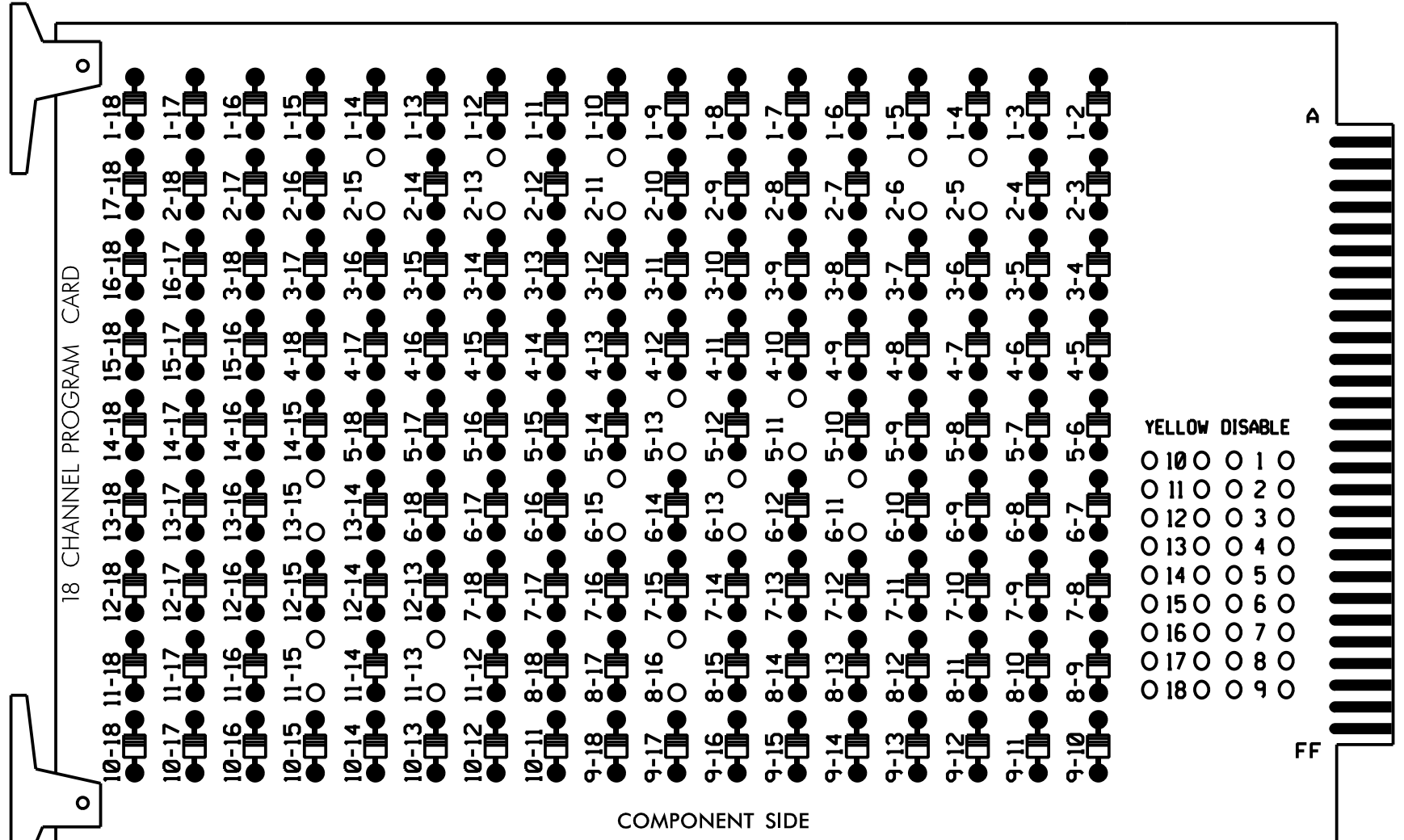
HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

18 CHANNEL CONFLICT MONITOR  
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 2-13, 2-15, 5-11, 5-13, 6-11, 6-13, 6-15, 8-16, 11-13, 11-15 and 13-15.



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 phases 2 and 6 Green/Don't Walk.
- Enable Simultaneous Gap-Out feature for all phases.
- The cabinet and controller are part of the Hickory City Signal System.

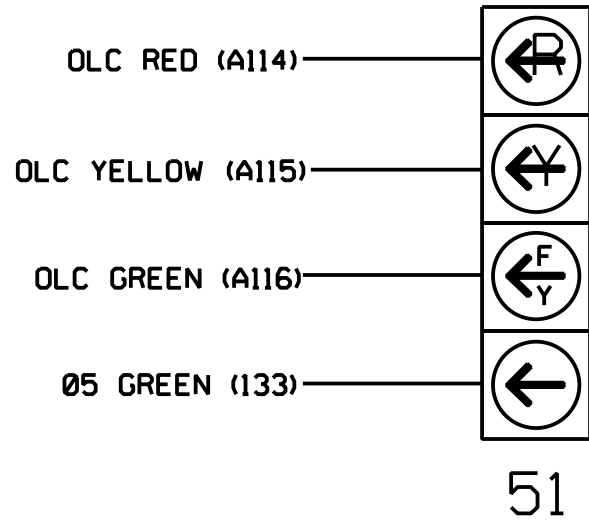
EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
CABINET.....332 W/ AUX  
SOFTWARE.....SE-PAC2070 VER. 5.4  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
LOAD SWITCHES USED.....S2,S3,S7,S8,S9,S11,S12,AUX S4  
PHASES USED.....2,2 PED,4\*,5,6,6 PED,8,8 PED  
OVERLAP "A".....NOT USED  
OVERLAP "B".....NOT USED  
OVERLAP "C".....\*\*  
OVERLAP "D".....NOT USED

\* Used for timing purposes only.  
\*\* See Sheet 2 for Overlap Programming.

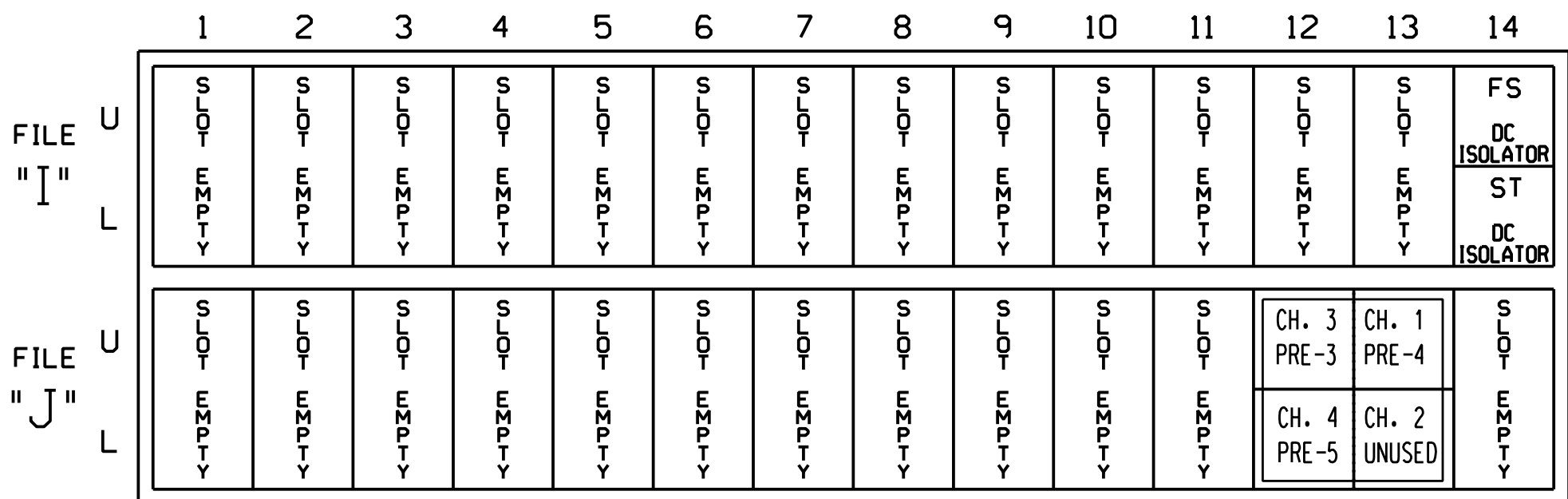
FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE  
ST = STOP TIME  
PRE = PREEMPT

4 CHANNEL EV OSP CARD  
INSERT CARD INTO  
SLOT J13

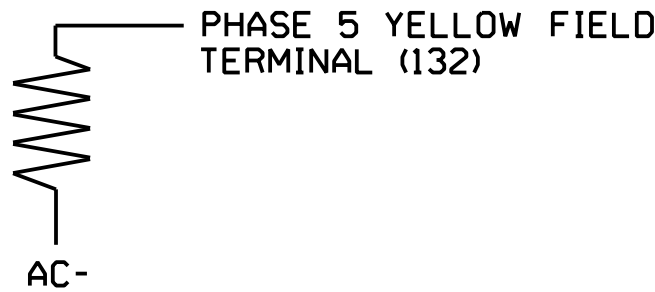
SPECIAL DETECTOR NOTE

Install a multizone microwave 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 resistor as shown below)

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T5  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 1 of 3  
(Construction Phase 3)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                            |  |                                         |  |                                                                 |
|--------------------------------------------|--|-----------------------------------------|--|-----------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR: |  | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |  | SEAL                                                            |
| Prepared for:<br>                          |  | Division 12 Catawba County Hickory      |  | SEAL<br>031464<br>ENGINEER<br>NATASHA R. SIMMONS                |
| PLAN DATE: January 2024                    |  | REVIEWED BY: N.K. Vianich               |  | DocuSigned by:<br>Natasha R. Simmons 9/6/2024<br>SIGNATURE DATE |
| PREPARED BY: E.E. Tiller                   |  | REVIEWED BY: N.R. Simmons               |  |                                                                 |
| REVISIONS                                  |  | INIT.                                   |  | SIG. INVENTORY NO. 12-0954T5                                    |
|                                            |  | DATE                                    |  |                                                                 |

HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No. C-1554  
(919) 546-8997

ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

Assign advanced walk to peds 2,6 and 8 as shown below.

PHASE MENU

1-VEHICLE DATA  
2-DENSITY TIMES+  
3-PEDESTRIAN DATA  
4-INIT & NA RESP+  
5-N.LOCK & MISC+

6-SPEC. SEQUENCE+  
7-DETECTOR DATA  
8-PHASE & BANK COPY  
9-SELECT PHASE BANK

'+' DENOTES BANKABLE DATA [1]

PEDESTRIAN MENU

1-PED TIMES+  
2-PED RECALL+  
3-PED OFFSET+  
4-MISC PED OPTIONS+

[1]

PHASE.....1...2...3...4...5...6...7...8  
WOFF/10 0 70 0 0 0 70 0 70  
MODE\* 0 0 0 0 0 0 0 0

CODES: \* 0=ADVANCE 1=DELAY

[1]

ADVANCE WALK PED PROGRAMMING COMPLETE

OVERLAP DATA PROGRAMMING DETAIL  
FOR OVERLAP C

1. From Main Menu select 4- UNIT DATA
2. From UNIT DATA Submenu select 3- OVERLAP DATA

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

OVERLAP DATA

A: --- E: --- I: --- M: ---  
B: --- F: --- J: --- N: ---  
C: FYA G: --- K: --- O: ---  
D: --- H: --- L: --- P: ---

PREV/NEXT TO CYCLE

OVERLAP C

Use Up/Dn/Left/Right keys to position cursor on Overlap 'C', use the NEXT key to select 'FYA', then press ENT

FYA OVERLAP - C DELAY/10: 0

PHASES..12345678 90123456  
PERM PHASES: 00000100 00000000  
PROT PHASES: 00001000 00000000  
-PED PHASES: 00000000 00000000  
OVERLAPS..ABCDEFGH IJKLMNOP  
PERM OVERLAPS: 00x00000 00000000  
PROT OVERLAPS: 00x00000 00000000

NOTICE  
DELAY/10 = 0

END OF OVERLAP PROGRAMMING

REMOTE FLASH  
PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC  
2- FLASH  
3- OVERLAP DATA  
4- PEER-TO-PEER  
5- RING STRUCTURE

6- SEQUENCES  
7- PORT 1/ITS DATA  
8- I/O MISC  
9- PUTPUT MAPPING  
B-BANK SELECTION  
C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

FLASH

1- REMOTE FLASH SETTINGS  
2- REMOTE FLASH ENTRY/EXIT PHASES  
3- CABINET FLASH SETTINGS

REMOTE FLASH SETTINGS TEST-A FLASH: 0

LDSW:123456789 0123456789 0123456789 012  
FLSH:010000110 0100001000 0000000000 000  
ALT:010000100 0000001000 0000000000 000

0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW

SELECT 'F' RETURN TO FLASH MENU

FLASH

1- REMOTE FLASH SETTINGS  
2- REMOTE FLASH ENTRY/EXIT PHASES  
3- CABINET FLASH SETTINGS

REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456  
ENTRY: 01000100 00000000  
EXIT: 01000100 00000000

REMOTE FLASH PROGRAMMING COMPLETE

ALL RED FLASH STARTUP  
PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

UNIT DATA

1- STARTUP & MISC  
2- FLASH  
3- OVERLAP DATA  
4- PEER-TO-PEER  
5- RING STRUCTURE

6- SEQUENCES  
7- PORT 1/ITS DATA  
8- I/O MISC  
9- PUTPUT MAPPING  
B-BANK SELECTION  
C-COPY BANK

'+' DENOTES BANKABLE UNIT DATA [1]

STARTUP & MISC

STARTUP TIME.: 6 (SEC) STATE: 2 (0-FL  
RED REV/10...: 40 (TSEC) 1-RED  
AUTO PED CLR.: 0 (0-NO 1-YES) 2-RAF)  
STOP T RESET.: 0 (0-NO 1-YES)  
SEQUENCE.....: 0 (0-18)  
SPECIAL SEQ : 0 (SEE HELP)

STARTUP PROGRAMMING COMPLETE

INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

SE-PAC PHASE DATA PRESS # DESIRED

1-VEHICLE TIMES  
2-DENSITY TIMES  
3-PEDEST. TIMES  
4-INIT & N.A. RESP  
5-V & P RECALLS

6-N.LOCK & MISC  
7-SPEC. SEQUENCE  
8-SPEC. DETECTOR  
9-PHASE COPY  
0-MISC PED OPTIONS

F-PRIOR MENU

PHASES 1,3,7  
NOT USED!

PHASE....1...2...3...4...5...6...7...8  
INITIAL 0 6 0 1 1 6 0 1  
NA RESP 0 1 0 2 2 1 0 2

CODES.....0...1...2...3...4...5...6  
INITL NONE INACT RED YEL GRN DRK G/DW  
NA RESP NONE NA1 NA2 BOTH --- --- ---  
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU

CODE 6 (G/DW) ALLOWS PHASES  
2 AND 6 TO START IN GREEN  
AND SKIP THE PED PHASE

INIT & N.A. RESP PROGRAMMING COMPLETE

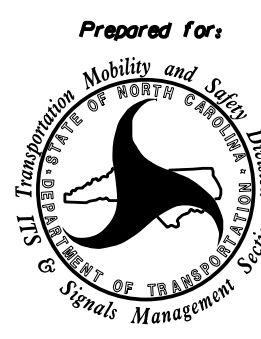
THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T5  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 2 of 3  
(Construction Phase 3)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING  
DETAILS FOR:

Prepared for:



750 N.Greenfield Pkwy, Garner, NC 27529

NC 127 SE  
at  
SR 1692 (1st Ave SE)

Division 12 Catawba County Hickory

PLAN DATE: January 2024 REVIEWED BY: N.K. Vianich  
PREPARED BY: E.E. Tiller REVIEWED BY: N.R. Simmons

REVISIONS  
INIT. DATE

SEAL  
NORTH CAROLINA  
PROFESSIONAL  
SEAL  
031464  
ENGINEER  
NATASHA R. SIMMONS

DocuSigned by:  
Natasha R. Simmons 9/6/2024  
SIGNATURE DATE  
SIG. INVENTORY NO. 12-0954T5

HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

SELECT 7-PREEMPT DATA FROM MAIN MENU

- PREEMPT 3 -

|             |             |                |
|-------------|-------------|----------------|
| PREEMPTS    |             |                |
| 1-PREEMPT 1 | 5-PREEMPT 5 | 9-PREEMPT 9    |
| 2-PREEMPT 2 | 6-PREEMPT 6 | A-PREEMPT 10   |
| 3-PREEMPT 3 | 7-PREEMPT 7 | B-PREEMPT 11   |
| 4-PREEMPT 4 | 8-PREEMPT 8 | C-PREEMPT 12   |
| O-OVERRIDES |             | D-DEFAULT DATA |

|                  |                  |
|------------------|------------------|
| PREEMPT 3        |                  |
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

|                                         |         |
|-----------------------------------------|---------|
| PREEMPT 3 MISC DATA                     | TEST: 0 |
| DET: 250 DELAY: 0 MXCAL:120 DB/10: 0    |         |
| NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0     |         |
| LINK#: 0 DURAT: 0 GATE : 0 R2C : 0      |         |
| PHASE...1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6 |         |
| EXIT 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0    |         |
| CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |         |

select F - return to Preempt 3 menu  
select 2 - Interval Times

|                                       |            |            |
|---------------------------------------|------------|------------|
| PREEMPT 3 INTERVAL TIMES              |            |            |
| MIN GRN: 1                            | MIN WLK: 1 | DWL GRN: 7 |
| EXT PED: 0                            |            |            |
| ---SELECT--- ---TRACK--- ---RETURN--- |            |            |
| GREEN : 0                             |            |            |
| PED CLR: 30                           | PED CLR: 0 | PED CLR: 0 |
| YEL/10 : 0                            | YEL/10 : 0 | YEL/10 : 0 |
| RED/10 : 0                            | RED/10 : 0 | RED/10 : 0 |

select F - return to Preempt 3 menu  
select 3 - Vehicle Status

|                                         |  |
|-----------------------------------------|--|
| PREEMPT 3 VEHICLE STATUS                |  |
| PHASE...1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6 |  |
| TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |  |
| DWELL 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0   |  |
| (O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)  |  |
| CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |  |
| (O-NO..1-ACT..2-MIN REC..3-MX REC)      |  |

select F - return to Preempt Data menu

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

- PREEMPT 4 -

|             |             |                |
|-------------|-------------|----------------|
| PREEMPTS    |             |                |
| 1-PREEMPT 1 | 5-PREEMPT 5 | 9-PREEMPT 9    |
| 2-PREEMPT 2 | 6-PREEMPT 6 | A-PREEMPT 10   |
| 3-PREEMPT 3 | 7-PREEMPT 7 | B-PREEMPT 11   |
| 4-PREEMPT 4 | 8-PREEMPT 8 | C-PREEMPT 12   |
| O-OVERRIDES |             | D-DEFAULT DATA |

|                  |                  |
|------------------|------------------|
| PREEMPT 4        |                  |
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

|                                         |         |
|-----------------------------------------|---------|
| PREEMPT 4 MISC DATA                     | TEST: 0 |
| DET: 251 DELAY: 0 MXCAL:120 DB/10: 0    |         |
| NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0     |         |
| LINK#: 0 DURAT: 0 GATE : 0 R2C : 0      |         |
| PHASE...1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6 |         |
| EXIT 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0    |         |
| CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |         |

select F - return to Preempt 4 menu  
select 2 - Interval Times

|                                       |            |             |
|---------------------------------------|------------|-------------|
| PREEMPT 4 INTERVAL TIMES              |            |             |
| MIN GRN: 1                            | MIN WLK: 1 | DWL GRN: 10 |
| EXT PED: 0                            |            |             |
| ---SELECT--- ---TRACK--- ---RETURN--- |            |             |
| GREEN : 0                             |            |             |
| PED CLR: 12                           | PED CLR: 0 | PED CLR: 0  |
| YEL/10 : 0                            | YEL/10 : 0 | YEL/10 : 0  |
| RED/10 : 0                            | RED/10 : 0 | RED/10 : 0  |

select F - return to Preempt 4 menu  
select 3 - Vehicle Status

|                                         |  |
|-----------------------------------------|--|
| PREEMPT 4 VEHICLE STATUS                |  |
| PHASE...1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6 |  |
| TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |  |
| DWELL 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0   |  |
| (O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)  |  |
| CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |  |
| (O-NO..1-ACT..2-MIN REC..3-MX REC)      |  |

select F - return to Preempt 4 menu  
select 5 - Overlap Status

|                                           |  |
|-------------------------------------------|--|
| PREEMPT 4 OVERLAP STATUS                  |  |
| PHASE...A.B.C.D.E.F.G.H.I.J.K.L.M.N.O.P   |  |
| TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |  |
| DWELL 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0     |  |
| CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0     |  |
| (O-R.1-G.2-FR.3-FY.4-DK.5-FG IO-NO.1-ACT) |  |
| TRAIL 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0     |  |

select F - return to Preempt Data menu

NOTE: Option 4 is not used. Be sure values are set at default=0.

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

- PREEMPT 5 -

|             |             |                |
|-------------|-------------|----------------|
| PREEMPTS    |             |                |
| 1-PREEMPT 1 | 5-PREEMPT 5 | 9-PREEMPT 9    |
| 2-PREEMPT 2 | 6-PREEMPT 6 | A-PREEMPT 10   |
| 3-PREEMPT 3 | 7-PREEMPT 7 | B-PREEMPT 11   |
| 4-PREEMPT 4 | 8-PREEMPT 8 | C-PREEMPT 12   |
| O-OVERRIDES |             | D-DEFAULT DATA |

|                  |                  |
|------------------|------------------|
| PREEMPT 5        |                  |
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

|                                         |         |
|-----------------------------------------|---------|
| PREEMPT 5 MISC DATA                     | TEST: 0 |
| DET: 252 DELAY: 0 MXCAL:120 DB/10: 0    |         |
| NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0     |         |
| LINK#: 0 DURAT: 0 GATE : 0 R2C : 0      |         |
| PHASE...1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6 |         |
| EXIT 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0    |         |
| CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |         |

select F - return to Preempt 5 menu  
select 2 - Interval Times

|                                       |            |             |
|---------------------------------------|------------|-------------|
| PREEMPT 5 INTERVAL TIMES              |            |             |
| MIN GRN: 1                            | MIN WLK: 1 | DWL GRN: 10 |
| EXT PED: 0                            |            |             |
| ---SELECT--- ---TRACK--- ---RETURN--- |            |             |
| GREEN : 0                             |            |             |
| PED CLR: 8                            | PED CLR: 0 | PED CLR: 0  |
| YEL/10 : 0                            | YEL/10 : 0 | YEL/10 : 0  |
| RED/10 : 0                            | RED/10 : 0 | RED/10 : 0  |

select F - return to Preempt 5 menu  
select 3 - Vehicle Status

|                                         |  |
|-----------------------------------------|--|
| PREEMPT 5 VEHICLE STATUS                |  |
| PHASE...1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6 |  |
| TRK GRN 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |  |
| DWELL 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0   |  |
| (O-RED.1-GRN.2-FLR.3-FLY.4-DARK.5-FLG)  |  |
| CYCLE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |  |
| (O-NO..1-ACT..2-MIN REC..3-MX REC)      |  |

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

end of programming

VEHICLE RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

|                               |                     |
|-------------------------------|---------------------|
| PHASE MENU                    |                     |
| 1-VEHICLE DATA                | 6-SPEC. SEQUENCE+   |
| 2-DENSITY TIMES+              | 7-DETECTOR DATA     |
| 3-PEDESTRIAN DATA             | 8-PHASE & BANK COPY |
| 4-INIT & NA RESP+             | 9-SELECT PHASE BANK |
| 5-N.LOCK & MISC+              |                     |
| '+' DENOTES BANKABLE DATA [1] |                     |

|                     |  |
|---------------------|--|
| VEHICLE DATA        |  |
| 1-VEHICLE TIMES+    |  |
| 2-DYNAMIC MAX+      |  |
| 3-RECALLS+          |  |
| 4-BIKE & AWS TIMES+ |  |
| [1]                 |  |

|                                       |  |
|---------------------------------------|--|
| PHASE...1...2...3...4...5...6...7...8 |  |
| VEH RCL 0 3 0 3 0 3 0 3               |  |
| VEH DLY 0 0 0 0 0 0 0 0               |  |
| CODES.....0...1...2...3...4...5....   |  |
| NONE 1CALL MIN MAX SOFT BIKE          |  |
| [1]                                   |  |

VEH RECALL PROGRAMMING COMPLETE

PEDESTRIAN RECALLS

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

|                               |                     |
|-------------------------------|---------------------|
| PHASE MENU                    |                     |
| 1-VEHICLE DATA                | 6-SPEC. SEQUENCE+   |
| 2-DENSITY TIMES+              | 7-DETECTOR DATA     |
| 3-PEDESTRIAN DATA             | 8-PHASE & BANK COPY |
| 4-INIT & NA RESP+             | 9-SELECT PHASE BANK |
| 5-N.LOCK & MISC+              |                     |
| '+' DENOTES BANKABLE DATA [1] |                     |

|                     |  |
|---------------------|--|
| PEDESTRIAN MENU     |  |
| 1-PED TIMES+        |  |
| 2-PED RECALL+       |  |
| 3-PED OFFSET+       |  |
| 4-MISC PED OPTIONS+ |  |
| [1]                 |  |

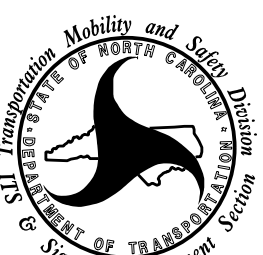
|                                       |  |
|---------------------------------------|--|
| PHASE...1...2...3...4...5...6...7...8 |  |
| PED RCL 0 2 0 0 0 2 0 2               |  |
| PED DLY 0 0 0 0 0 0 0 0               |  |
| CODES.....0...1...2...3...4           |  |
| NONE 1CALL PED NA NA+                 |  |
| [1]                                   |  |

PED RECALL PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954T5  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 3 of 3  
(Construction Phase 3)

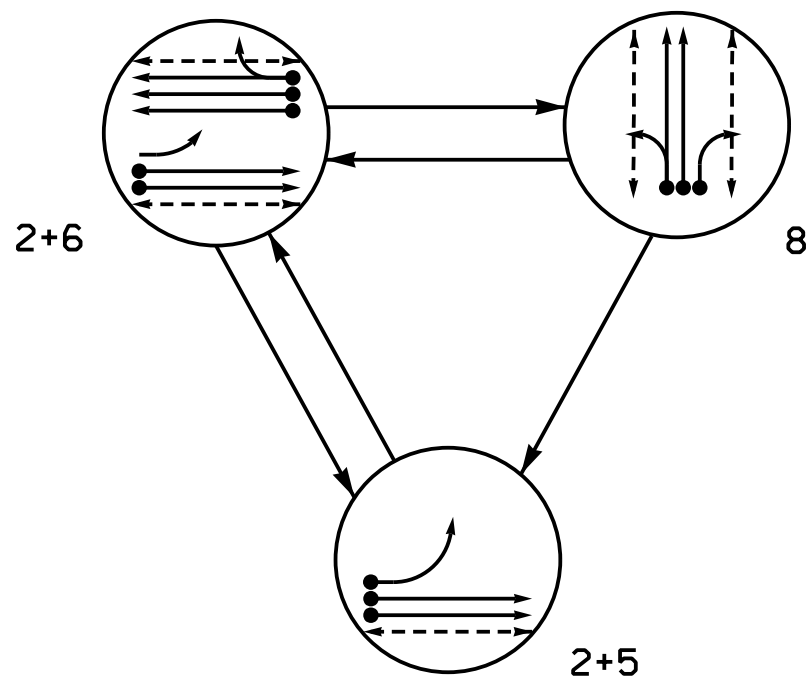
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                                                                                                                                                                                     |                                         |                |                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:<br><br>Prepared for:<br><br>750 N.Greenfield Pkwy, Garner, NC 27529 | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |                | SEAL<br><br>NATASHA R. SIMMONS |
|                                                                                                                                                                                                     | Division 12                             | Catawba County |                                                                                                                     |
| PLAN DATE: January 2024                                                                                                                                                                             | REVIEWED BY: N.K. Vlanich               |                |                                                                                                                     |
| PREPARED BY: E.E. Tiller                                                                                                                                                                            | REVIEWED BY: N.R. Simmons               |                |                                                                                                                     |
| REVISIONS                                                                                                                                                                                           | INIT.                                   | DATE           |                                                                                                                     |
|                                                                                                                                                                                                     |                                         |                |                                                                                                                     |
| DocuSigned by:<br>Natasha R. Simmons                                                                                                                                                                |                                         | 9/6/2024       |                                                                                                                     |
| SIGNATURE                                                                                                                                                                                           |                                         | DATE           |                                                                                                                     |
| SIG. INVENTORY NO.                                                                                                                                                                                  |                                         | 12-0954T5      |                                                                                                                     |



HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

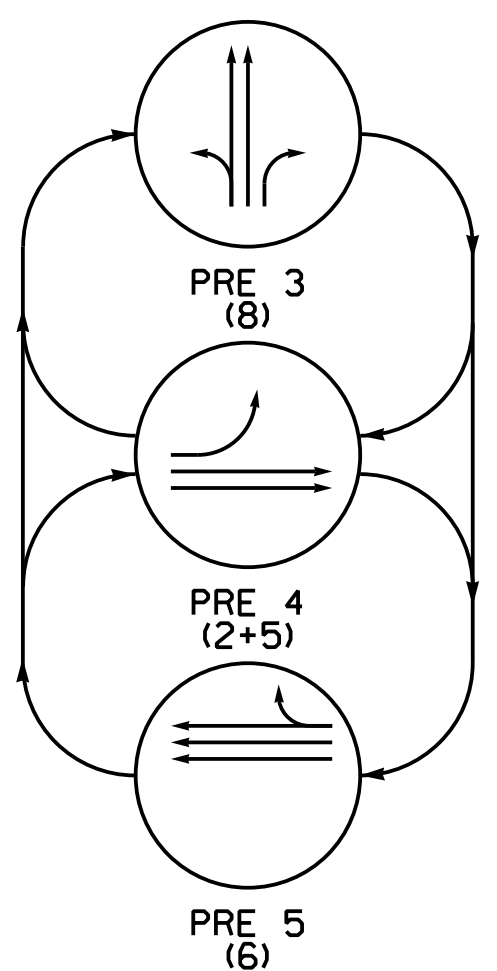
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

EV PREEMPT PHASES  
(Medium Priority)



| TABLE OF OPERATION |       |     |    |       |       |       |       |  |  |  |
|--------------------|-------|-----|----|-------|-------|-------|-------|--|--|--|
| SIGNAL FACE        | PHASE |     |    |       |       |       |       |  |  |  |
|                    | 2+5   | 2+6 | 8  | PRE 3 | PRE 4 | PRE 5 | FLASH |  |  |  |
| 21                 | G     | G   | R  | R     | G     | R     | R     |  |  |  |
| 22                 | ↑     | ↑   | R  | R     | ↑     | R     | R     |  |  |  |
| 51                 | ←     | ←   | R  | R     | ←     | R     | R     |  |  |  |
| 61                 | R     | ↑   | R  | R     | R     | ↑     | R     |  |  |  |
| 62,63              | R     | G   | R  | R     | R     | G     | R     |  |  |  |
| 81,82              | R     | R   | G  | G     | R     | R     | R     |  |  |  |
| 83                 | R     | R   | ←  | ←     | R     | R     | R     |  |  |  |
| P21,P22            | W     | W   | DW | DW    | DW    | DW    | DRK   |  |  |  |
| P61,P62            | DW    | W   | DW | DW    | DW    | DW    | DRK   |  |  |  |
| P81,P82            | DW    | DW  | W  | DW    | DW    | DW    | DRK   |  |  |  |
| P83,P84            | DW    | DW  | W  | DW    | DW    | DW    | DRK   |  |  |  |

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

| INDUCTIVE LOOPS |           |       |                           |     |          | DETECTOR PROGRAMMING |         |                  |                |            |        |   |   |   |   |        |              |        |   |
|-----------------|-----------|-------|---------------------------|-----|----------|----------------------|---------|------------------|----------------|------------|--------|---|---|---|---|--------|--------------|--------|---|
|                 |           |       |                           |     |          | ASSIGNED PHASE       | TIMING  |                  | OPERATION MODE |            |        |   |   |   |   | SWITCH | SYSTEM LOOPS | STATUS |   |
| LOOP NO.        | SIZE (ft) | TURNS | DIST. FROM STOP LINE (ft) | NEW | EXISTING |                      | DELAY   | EXTEND (STRETCH) | VEHICLE        | PEDESTRIAN | 1 CALL | 2 | 3 | 4 | 5 | 6      | 7            |        |   |
| 2A              | 6x6       | 3     | 70                        | X   | -        | 2                    | - SEC.  | - SEC.           | X              | -          | -      | - | - | - | - | -      | -            | -      | X |
| 2B              | 6x6       | 3     | 70                        | X   | -        | 2                    | - SEC.  | - SEC.           | X              | -          | -      | - | - | - | - | -      | -            | -      | X |
| 5A              | 6x40      | 2-4-2 | 0                         | X   | -        | 5                    | 15 SEC. | - SEC.           | X              | -          | -      | - | - | - | - | -      | -            | -      | X |
| 6A              | 6x6       | 4     | 70                        | X   | -        | 6                    | - SEC.  | - SEC.           | X              | -          | -      | - | - | - | - | -      | -            | -      | X |
| 6B              | 6x6       | 4     | 70                        | X   | -        | 6                    | - SEC.  | - SEC.           | X              | -          | -      | - | - | - | - | -      | -            | -      | X |
| 6C              | 6x6       | 4     | 70                        | X   | -        | 6                    | - SEC.  | - SEC.           | X              | -          | -      | - | - | - | - | -      | -            | -      | X |
| 8A              | 6x40      | 2-4-2 | 0                         | X   | -        | 8                    | - SEC.  | - SEC.           | X              | -          | -      | - | - | - | - | -      | -            | -      | X |
| 8B              | 6x40      | 2-4-2 | 0                         | X   | -        | 8                    | - SEC.  | - SEC.           | X              | -          | -      | - | - | - | - | -      | -            | -      | X |
| 8C              | 6x40      | 2-4-2 | 0                         | X   | -        | 8                    | 15 SEC. | - SEC.           | X              | -          | -      | - | - | - | - | -      | -            | -      | X |

3 Phase with EVP  
Fully Actuated  
Hickory City Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Program phase 4 as a dummy phase for Ring 1.
- Hickory Signal System Data: Controller Asset #0316.

| SE-PAC Preemption |       |       |       |  |
|-------------------|-------|-------|-------|--|
| FUNCTION          | PRE 3 | PRE 4 | PRE 5 |  |
| MIN GRN / WLK     | 1     | 1     | 1     |  |
| EXIT PHASES       | 8     | 2+5   | 6     |  |
| DELAY             | 0.0   | 0.0   | 0.0   |  |
| MXCALL            | 120   | 120   | 120   |  |
| SEL PED CLR       | 26    | 12    | 8     |  |
| SEL YEL / 10      | 0*    | 0*    | 0*    |  |
| SEL RED / 10      | 0*    | 0*    | 0*    |  |
| TRACK GREEN       | 0     | 0     | 0     |  |
| TRK PED CLR       | 0     | 0     | 0     |  |
| TRK YEL / 10      | 0     | 0     | 0     |  |
| TRK RED / 10      | 0     | 0     | 0     |  |
| DWELL GRN         | 7     | 10    | 10    |  |
| RET PED CLR       | 0     | 0     | 0     |  |
| RET YEL / 10      | 0*    | 0*    | 0*    |  |
| RET RED / 10      | 0*    | 0*    | 0*    |  |
| PREEMPT EXTEND**  | 2.0   | 2.0   | 2.0   |  |

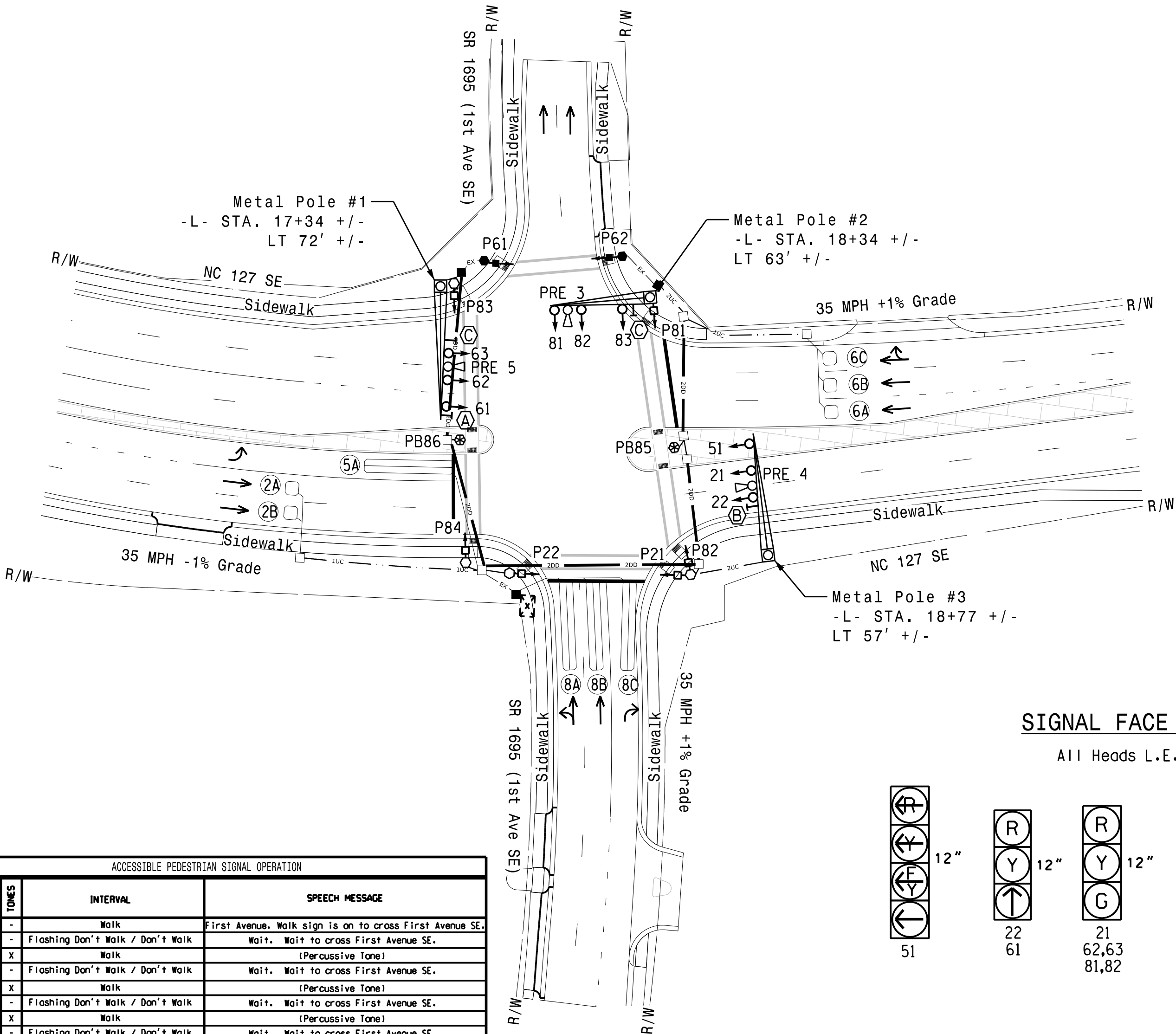
\* Time defaults to time used for phase during normal operation.  
\*\* Program Timing on Optical Detection Unit.

SE-PAC 2070 TIMING CHART

| FEATURE                 | PHASE |            |          |            |          |
|-------------------------|-------|------------|----------|------------|----------|
|                         | 2     | 4          | 5        | 6          | 8        |
| Min Green *             | 10    | 7          | 7        | 10         | 7        |
| Passage Gap *           | 3.0   | 2.0        | 2.0      | 3.0        | 2.0      |
| Maximum Green *         | 40    | 40         | 20       | 40         | 40       |
| Yellow Change           | 3.9   | 3.8        | 3.0      | 3.9        | 3.8      |
| Red Clear               | 2.5   | 2.8        | 3.4      | 2.5        | 2.8      |
| Walk *                  | 7     | -          | -        | 7          | 7        |
| Pedestrian Clear        | 13    | -          | -        | 9          | 27       |
| Advance Walk *          | 7     | -          | -        | 7          | 7        |
| Added Initial *         | 1.5   | -          | -        | 1.0        | -        |
| Maximum Initial *       | 11    | -          | -        | 11         | -        |
| Time Before Reduction * | 15    | -          | -        | 15         | -        |
| Time To Reduce *        | 30    | -          | -        | 30         | -        |
| Minimum Gap             | 3.0   | -          | -        | 3.0        | -        |
| Recall Mode             | -     | MIN RECALL | -        | MIN RECALL | -        |
| Vehicle Call Memory     | LOCK  | NON-LOCK   | NON-LOCK | LOCK       | NON-LOCK |
| Dual Entry              | -     | -          | -        | -          | -        |
| Simultaneous Gap        | ON    | ON         | ON       | ON         | ON       |

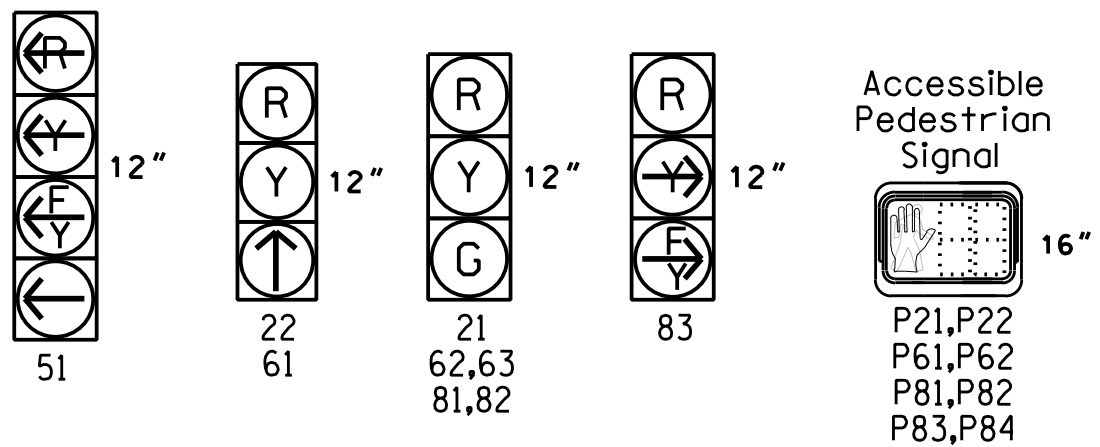
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

| ACCESSIBLE PEDESTRIAN SIGNAL OPERATION |       |       |                                      |
|----------------------------------------|-------|-------|--------------------------------------|
| SIGNAL FACE                            | VOICE | TONES | SPEECH MESSAGE                       |
| P21                                    | X     | -     | Wait. Wait to cross First Avenue SE. |
| P22                                    | X     | -     | Wait. Wait to cross First Avenue SE. |
| P61                                    | X     | -     | Wait. Wait to cross First Avenue SE. |
| P62                                    | X     | -     | Wait. Wait to cross First Avenue SE. |
| P81                                    | X     | -     | Wait. Wait to cross NC 127 SE.       |
| P82                                    | X     | -     | Wait. Wait to cross NC 127 SE.       |
| P83                                    | X     | -     | Wait. Wait to cross NC 127 SE.       |
| P84                                    | X     | -     | Wait. Wait to cross NC 127 SE.       |
| P85                                    | X     | -     | Wait. Wait to cross NC 127 SE.       |
| P86                                    | X     | -     | Wait. Wait to cross NC 127 SE.       |



SIGNAL FACE I.D.

All Heads L.E.D.



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

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

|                                               |                                         |                            |
|-----------------------------------------------|-----------------------------------------|----------------------------|
|                                               | NC 127 SE<br>at<br>SR 1692 (1st Ave SE) |                            |
|                                               | Division 12 Catawba County Hickory      |                            |
| PLAN DATE: October 2023                       | REVIEWED BY: N.K. Vianich               |                            |
| PREPARED BY: E.E. Tiller                      | REVIEWED BY: N.R. Simmons               |                            |
| REVISIONS                                     | INIT.                                   | DATE                       |
| 0                                             |                                         |                            |
| 1"=40'                                        |                                         |                            |
| DocuSigned by:<br>Natasha R. Simmons 9/6/2024 |                                         | SIG. INVENTORY NO. 12-0954 |

HNTB  
HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997



### OVERLAP DATA PROGRAMMING DETAIL FOR OVERLAP B & C

1. From Main Menu select **4- UNIT DATA**
2. From UNIT DATA Submenu select **3- OVERLAP DATA**

Use Up/Dn/Left/Right keys to position cursor on the desired Overlap. Use the NEXT key to select the overlap type. Press the ENT key and then program as per the Overlap screen(s) shown.

```
OVERLAP DATA
A: --- E: --- I: --- M: ---
B: FYA F: --- J: --- N: ---
C: FYA G: --- K: --- O: ---
D: --- H: --- L: --- P: ---
PREV/NEXT TO CYCLE
```

OVERLAP  $B$

Use Up/Dn/Left/Right keys to position cursor on Overlap 'B', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - B          DELAY/10: 0
      PHASES..12345678  90123456
PERM PHASES: 00000001  00000000
PROT PHASES: 00000010  00000000
-PED PHASES: 00000000  00000000
      OVERLAPS..ABCDEFGH  IJ KLMNOP
PERM OVERLAPS: 0x000000  00000000
PROT OVERLAPS: 0x000000  00000000

```

OVERLAP C

Use Up/Dn/Left/Right keys to position cursor on Overlap 'C', use the NEXT key to select 'FYA', then press ENT

```

FYA OVERLAP - C          DELAY/10: 0
      PHASES..12345678  90123456
      PERM PHASES: 00000100 00000000
      PROT PHASES: 00001000 00000000
      -PED PHASES: 00000000 00000000
      OVERLAPS..ABCDEF GH IJ KLMNOP
      PERM OVERLAPS: 00x00000 00000000
      PROT OVERLAPS: 00x00000 00000000

```

END OF OVERLAP PROGRAMMING

## ADVANCE WALK PED PROGRAMMING DETAIL

(program controller as shown below)

From the Main Menu, Press '3' (Phase Data)

Assign advanced walk to peds 2,6 and 8 as shown below.

| PHASE MENU                    |                     |
|-------------------------------|---------------------|
| 1-VEHICLE DATA                | 6-SPEC. SEQUENCE+   |
| 2-DENSITY TIMES+              | 7-DETECTOR DATA     |
| <b>3-PEDESTRIAN DATA</b>      | 8-PHASE & BANK COPY |
| 4-INIT & NA RESP+             | 9-SELECT PHASE BANK |
| 5-N.LOCK & MISC+              |                     |
| '+' DENOTES BANKABLE DATA [1] |                     |

```

PEDESTRIAN MENU

1-PED TIMES+
2-PED RECALL+
3-PED OFFSET+
4-MISC PED OPTIONS+

```

|            |      |      |      |      |      |      |      |    |
|------------|------|------|------|------|------|------|------|----|
| PHASE..... | 1... | 2... | 3... | 4... | 5... | 6... | 7... | 8  |
| WOFF/10    | 0    | 70   | 0    | 0    | 0    | 70   | 0    | 70 |
| MODE*      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0  |

CODES: \* 0=ADVANCE 1=DELAY

[1]

ADVANCE WALK PED PROGRAMMING COMPLETE

### INIT & N.A. RESP PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

```

SE-PAC PHASE DATA          PRESS # DESIRED

1-VEHICLE TIMES             6-N.LOCK & MISC
2-DENSITY TIMES             7-SPEC. SEQUENCE
3-PEDEST. TIMES             8-SPEC. DETECTOR
4-INIT & N.A. RESP         9-PHASE COPY
5-V & P RECALLS           0-MISC PED OPTIONS

                          F-PRIOR MENU

```

```

PHASE....1...2...3...4...5...6...7...8
INITIAL   0   6   0   1   1   6   0   1
NA RESP   0   1   0   2   2   1   0   2

CODES....0...1...2...3...4...5...6
INITL NONE INACT RED   YEL GRN DRK G/DW
NA RESP NONE NA1  NA2  BOTH  ---  ---
A-U-P B-DN C-LT D-RT E-ENTER F-PRIOR MENU

```

PHASES 1,3,7 →  
NOT USED!

← CODE 6 (G/DW) ALLOWS PHASES  
2 AND 6 TO START IN GREEN  
AND SKIP THE PED PHASE

INIT & N.A. RESP PROGRAMMING COMPLETE

## REMOTE FLASH PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

| UNIT DATA                          |                    |
|------------------------------------|--------------------|
| 1- STARTUP & MISC                  | 6- SEQUENCES       |
| 2- FLASH                           | 7- PORT 1/ITS DATA |
| 3- OVERLAP DATA                    | 8- I/O MISC        |
| 4- PEER-TO-PEER                    | 9- PUTPUT MAPPING  |
| 5- RING STRUCTURE                  | B-BANK SELECTION   |
|                                    | C-COPY BANK        |
| '4' DENOTES BANKABLE UNIT DATA [1] |                    |

FLASH

- 1- REMOTE FLASH SETTINGS
- 2- REMOTE FLASH ENTRY/EXIT PHASES
- 3- CABINET FLASH SETTINGS

| REMOTE FLASH SETTINGS                 |            | TEST-A FLASH: |            |
|---------------------------------------|------------|---------------|------------|
| LDSW:123456789                        | 0123456789 | 0123456789    | 0123456789 |
| FLSH:010000110                        | 0100101000 | 0000000000    | 0000000000 |
| ALT:010000100                         | 0000001000 | 0000000000    | 0000000000 |
| 0-DARK 1-RED 2-YELLOW 3-STEADY YELLOW |            |               |            |

SELECT 'F' RETURN TO FLASH MENU

FLASH

- 1- REMOTE FLASH SETTINGS
- 2- REMOTE FLASH ENTRY/EXIT PHASES
- 3- CABINET FLASH SETTINGS

```
REMOTE FLASH ENTRY/EXIT PHASES

PHASES: 12345678 90123456
ENTRY: 01000100 00000000
EXIT: 01000100 00000000
```

REMOTE FLASH PROGRAMMING COMPLETE

## ALL RED FLASH STARTUP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

| UNIT DATA                          |                    |
|------------------------------------|--------------------|
| 1- STARTUP & MISC                  | 6- SEQUENCES       |
| 2- FLASH                           | 7- PORT 1/ITS DATA |
| 3- OVERLAP DATA                    | 8- I/O MISC        |
| 4- PEER-TO-PEER                    | 9- PUTPUT MAPPING  |
| 5- RING STRUCTURE                  | B-BANK SELECTION   |
|                                    | C-COPY BANK        |
| '+' DENOTES BANKABLE UNIT DATA [1] |                    |

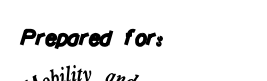
```
STARTUP & MISC
STARTUP TIME.: 6 (SEC) STATE: 2 (O-FL
RED REV/10...: 40 (TSEC)           1-RED
AUTO PED CLR.: 0 (O-NO 1-YES)      2-RAF )
STOP T RESET.: 0 (O-NO 1-YES)
SEQUENCE.....: 0 (O-18)
SPECIAL SEQ : 0 (SEE HELP)
```

STARTUP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade -  
Electrical Detail - Sheet 2 of 3

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | NC 127 SE<br>at<br>SR 1692 (1st Ave SE)      | SEAL<br><br> |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------|-----------|-------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Prepared for:<br><br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Division 12      Catawba County      Hickory |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PLAN DATE: January 2024      REVIEWED BY: N.K. Vlanich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PREPARED BY: E.E. Tiller      REVIEWED BY: N.R. Simmons                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">REVISIONS</th> <th style="width: 20%;">INIT.</th> <th style="width: 20%;">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> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <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 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| REVISIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | INIT.                                        | DATE                                                                                              |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 750 N.Greenfield Pkwy, Garner, NC 27529                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |                                                                                                   |           |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

(program controller as shown below)

- PREEMPT 3 -

| PREEMPTS           |             |                |
|--------------------|-------------|----------------|
| 1-PREEMPT 1        | 5-PREEMPT 5 | 9-PREEMPT 9    |
| 2-PREEMPT 2        | 6-PREEMPT 6 | A-PREEMPT 10   |
| <b>3-PREEMPT 3</b> | 7-PREEMPT 7 | B-PREEMPT 11   |
| 4-PREEMPT 4        | 8-PREEMPT 8 | C-PREEMPT 12   |
| O-OVERRIDES        |             | D-DEFAULT DATA |

|                  |                  |
|------------------|------------------|
| PREEMPT 3        |                  |
| 1-MISCELLANEOUS  | 4-PEDEST. STATUS |
| 2-INTERVAL TIMES | 5-OVERLAP STATUS |
| 3-VEHICLE STATUS |                  |

```
PREEMPT 3 MISC DATA          TEST: 0
DET: 250    DELAY: 0    MXCAL:120 DB/10: 0
NLOCK: 0    EXTND: 0    L OUT: 0   SRMOD: 0
LINK#: 0    DURAT: 0    GATE : 0   R2C : 0

PHASE...1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6
EXIT      0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
CALLS     0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

```
select F - return to Preempt 3 menu
select 2 - Interval Times
```

```

PREEMPT 3 INTERVAL TIMES
MIN GRN: 1 MIN WLK: 1 DWL GRN: 7
EXT PED: 0

--SELECT-- ---TRACK--- ---RETURN--
GREEN: 0
PED CLR: 26 PED CLR: 0 PED CLR: 0
YEL/10: 0 YEL/10: 0 YEL/10: 0
RED/10: 0 RED/10: 0 RED/10: 0

```

```
select F - return to Preempt 3 menu
select 3 - Vehicle Status
```

[illegible]

```
select F - return to Preempt 3 menu
select 5 - Overlap Status
```

```

PREEMPT 3 OVERLAP STATUS
PHASE . . . A . B . C . D . E . F . G . H . I . J . K . L . M . N . O . P
TRK GRN  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
DWELL    0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
CYCLE    0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(O-R,1-G,2-FR,3-FY,4-DK,5-FG IO-NO,1-ACT)
TRAIL    0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

```

select F - return to Preempt Data menu

NOTE: Option 4 is not used. Be sure values are set at default=0.

- PREEMPT 4 -

| PREEMPTS                                |                     |                      |
|-----------------------------------------|---------------------|----------------------|
| 1- <u>PREEMPT</u> 1                     | 5- <u>PREEMPT</u> 5 | 9- <u>PREEMPT</u> 9  |
| 2- <u>PREEMPT</u> 2                     | 6- <u>PREEMPT</u> 6 | A- <u>PREEMPT</u> 10 |
| 3- <u>PREEMPT</u> 3                     | 7- <u>PREEMPT</u> 7 | B- <u>PREEMPT</u> 11 |
| 4- <u>PREEMPT</u> 4                     | 8- <u>PREEMPT</u> 8 | C- <u>PREEMPT</u> 12 |
| <div> O-OVERRIDES D-DEFAULT DATA </div> |                     |                      |

```

PREEMPT 4
1-MISCELLANEOUS
2-INTERVAL TIMES
3-VEHICLE STATUS
4-PEDEST. STATUS
5-OVERLAP STATUS

```

```

PREEMPT 4 MISC DATA TEST: 0
DET: 251 DELAY: 0 MXCAL:120 DB/10: 0
NLOCK: 0 EXTND: 0 L OUT: 0 SRMOD: 0
LINK#: 0 DURAT: 0 GATE: 0 R2C: 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6
EXIT 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0
CALLS 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

```

```
select F - return to Preempt 4 menu
select 2 - Interval Times
```

```

PREEMPT 4 INTERVAL TIMES
MIN GRN: 1 MIN WLK: 1 DWL GRN: 10
EXT PED: 0
--SELECT--- ---TRACK--- ---RETURN--
GREEN : 0
PED CLR: 12 PED CLR: 0 PED CLR: 0
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0
RED/10 : 0 RED/10 : 0 RED/10 : 0

```

```
select F - return to Preempt 4 menu
select 3 - Vehicle Status
```

[illegible]

```
select F - return to Preempt 4 menu
select 5 - Overlap Status
```

```

PREEMPT 4 OVERLAP STATUS
PHASE...A.B.C.D.E.F.G.H.I.J.K.L.M.N.O.P
TRK GRN  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
DWELL    0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0
CYCLE     0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
( O-R,1-G,2-FR,3-FY,4-DK,5-FG IO-NO,1-ACT )
TRAIL    0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

```

select F - return to Preempt Data menu

NOTE: Option 4 is not used. Be sure values are set at default=0.

- PREEMPT 5 -

| PREEMPTS                                                      |                           |                      |
|---------------------------------------------------------------|---------------------------|----------------------|
| 1- <u>PREEMPT</u> 1                                           | <u>5-<u>PREEMPT</u> 5</u> | 9- <u>PREEMPT</u> 9  |
| 2- <u>PREEMPT</u> 2                                           | 6- <u>PREEMPT</u> 6       | A- <u>PREEMPT</u> 10 |
| 3- <u>PREEMPT</u> 3                                           | 7- <u>PREEMPT</u> 7       | B- <u>PREEMPT</u> 11 |
| 4- <u>PREEMPT</u> 4                                           | 8- <u>PREEMPT</u> 8       | C- <u>PREEMPT</u> 12 |
| <div> <div>O-OVERRIDES</div> <div>D-DEFAULT DATA</div> </div> |                           |                      |

```

PREEMPT 5
1-MISCELLANEOUS
2-INTERVAL TIMES
3-VEHICLE STATUS
4-PEDEST. STATUS
5-OVERLAP STATUS

```

```

PREEMPT 5 MISC DATA                                TEST: 0
DET: 252  DELAY: 0  MXCAL:120  DB/10: 0
NLOCK: 0  EXTND: 0  L OUT: 0  SRMOD: 0
LINK#: 0  DURAT: 0  GATE: 0  R2C: 0

PHASE....1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6
EXIT      0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0
CALLS     0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

```

```
select F - return to Preempt 5 menu
select 2 - Interval Times
```

```

PREEMPT 5 INTERVAL TIMES
MIN GRN: 1 MIN WLK: 1 DWL GRN: 10
EXT PED: 0
--SELECT--- ---TRACK--- ---RETURN--
          GREEN : 0
PED CLR: 8 PED CLR: 0 PED CLR: 0
YEL/10 : 0 YEL/10 : 0 YEL/10 : 0
RED/10 : 0 RED/10 : 0 RED/10 : 0

```

```
select F - return to Preempt 5 menu
select 3 - Vehicle Status
```

[illegible]

NOTE: Options 4 & 5 are not used.  
Be sure values are set at default=0.

end of programming

1. Provide a dedicated pair of wires from the cabinet to each push button.
2. Mount Fail-Safe Interconnect Terminal Board on right rear side of cabinet (above service panel).
3. Wire push buttons and Central Control Unit (CCU) per APS Installation Manual Instructions.
4. Use Controller Receptacle to power CCU. Do Not use Equipment Receptacle which is a GCFI outlet.
5. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 12-0954  
DESIGNED: October 2023  
SEALED: 09/06/2024  
REVISED: N/A

Signal Upgrade-  
Electrical Detail - Sheet 3 of 3

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

|                                                                                                                                                                                                                                                                                                                                                                |                                              |                                                                                               |              |              |              |              |              |             |              |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|
| ELECTRICAL AND PROGRAMMING<br>DETAILS FOR:                                                                                                                                                                                                                                                                                                                     | NC 127 SE<br>at<br>SR 1692 (1st Ave SE)      | SEAL<br> |              |              |              |              |              |             |              |              |
| Prepared for:<br>                                                                                                                                                                                                                                                         | Division 12      Catawba County      Hickory |                                                                                               |              |              |              |              |              |             |              |              |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">PLAN DATE:</td> <td style="width: 33%;">January 2024</td> <td style="width: 33%;">REVIEWED BY:</td> <td style="width: 33%;">N.K. Vianich</td> </tr> <tr> <td>PREPARED BY:</td> <td>E.E. Tiller</td> <td>REVIEWED BY:</td> <td>N.R. Simmons</td> </tr> </table> |                                              |                                                                                               | PLAN DATE:   | January 2024 | REVIEWED BY: | N.K. Vianich | PREPARED BY: | E.E. Tiller | REVIEWED BY: | N.R. Simmons |
| PLAN DATE:                                                                                                                                                                                                                                                                                                                                                     | January 2024                                 | REVIEWED BY:                                                                                  | N.K. Vianich |              |              |              |              |             |              |              |
| PREPARED BY:                                                                                                                                                                                                                                                                                                                                                   | E.E. Tiller                                  | REVIEWED BY:                                                                                  | N.R. Simmons |              |              |              |              |             |              |              |
| REVISIONS                                                                                                                                                                                                                                                                                                                                                      |                                              | INIT.      DATE                                                                               |              |              |              |              |              |             |              |              |
|                                                                                                                                                                                                                                                                                                                                                                |                                              |                                                                                               |              |              |              |              |              |             |              |              |
|                                                                                                                                                                                                                                                                                                                                                                |                                              |                                                                                               |              |              |              |              |              |             |              |              |
|                                                                                                                                                                                                                                                                                                                                                                |                                              |                                                                                               |              |              |              |              |              |             |              |              |

# HNTB

HNTB NORTH CAROLINA, P.C.  
4000 Center at North Hills St  
Suite 500  
Raleigh, North Carolina 27609  
NC License No: C-1554  
(919) 546-8997

[illegible]

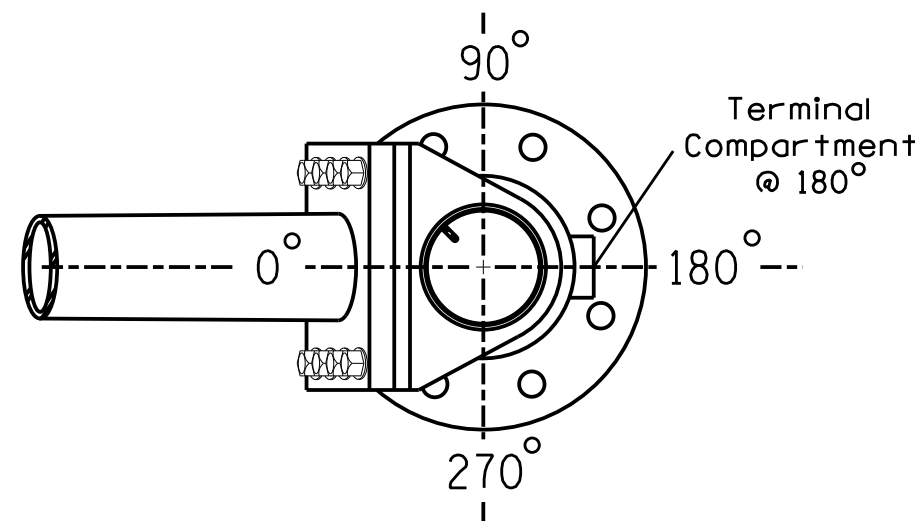
This diagram shows the elevation view of a traffic signal pole assembly. The total length of the pole is 45 feet. The components and their dimensions are as follows:

- Signal Head 1:** Located 1 foot from the left end.
- Signal Head 2:** Located 6 feet from the first signal head.
- Street Name Sign:** Located 6 feet from the second signal head.
- Signal Head 3:** Located 6 feet from the street name sign.
- Signal Head 4:** Located 12.5 feet from the third signal head.
- Signal Head 5:** Located 5 feet from the fourth signal head.
- Signal Head 6:** Located 8.5 feet from the fifth signal head.

The pole is supported by a foundation. The base line reference elevation is 0.0 feet. The height of the pole is 19 feet. The maximum height of the pole is 25.6 feet. The design height is 17 feet. The minimum height is 16.5 feet. The pole is labeled with 'See Notes 4 & 5' and 'See Notes 7e' and 'See Note 7d'.

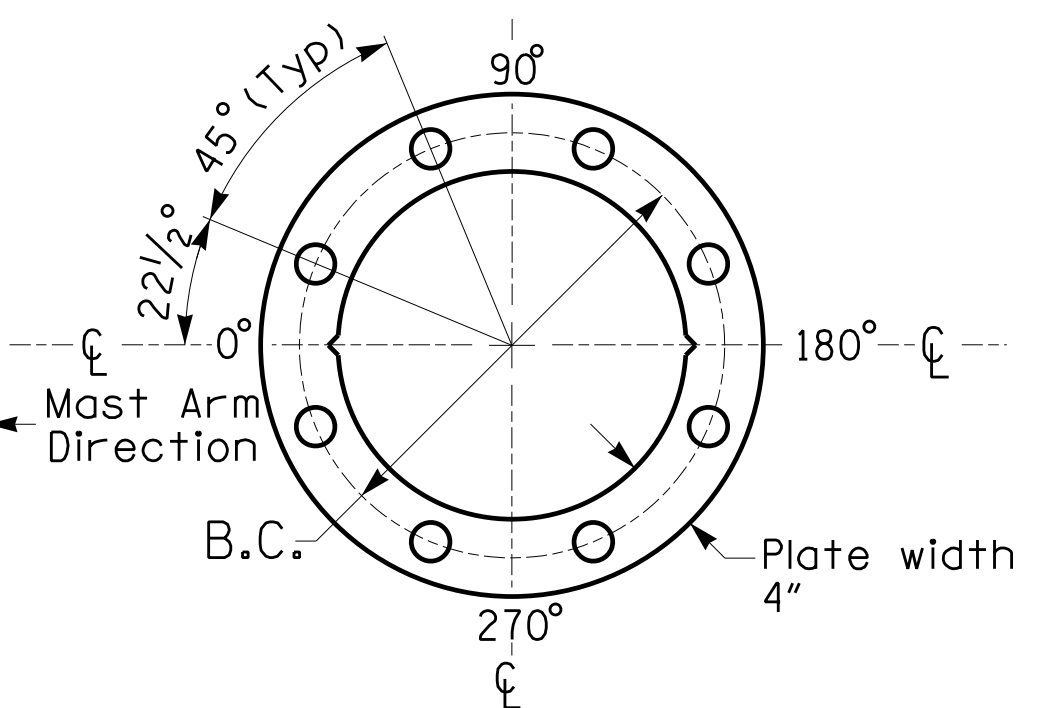
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

| Elevation Differences for:                                                                                                                     | Pole 1    | Pole 2    |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|
| Baseline reference point at<br>① Foundation @ ground level  | 0.0 ft.   | 0.0 ft.   |
| Elevation difference at<br>High point of roadway surface                                                                                       | -0.53 ft. | +0.13 ft. |
| Elevation difference at<br>Edge of travelway or face of curb                                                                                   | -0.53 ft. | -0.33 ft. |



8 BOLT BASE PLATE DETAIL

See Note 6



|                       |           |
|-----------------------|-----------|
| PROJECT REFERENCE NO. | SHEET NO. |
| U-5777                | Sig. 13.4 |

| LOADING SYMBOL                                                                      | DESCRIPTION                                               | AREA      | SIZE                    | WEIGHT |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------|-------------------------|--------|
|  | RIGID MOUNTED SIGNAL HEAD<br>12"-3 SECTION-WITH BACKPLATE | 9.3 S.F.  | 25.5" W<br>X<br>52.5" L | 60 LBS |
|  | SIGN<br>RIGID MOUNTED                                     | 7.5 S.F.  | 30.0" W<br>X<br>36.0" L | 14 LBS |
|  | STREET NAME SIGN<br>RIGID MOUNTED                         | 16.0 S.F. | 24.0" W<br>X<br>96.0" L | 36 LBS |
|  | OUT OF PAVEMENT DETECTOR<br>RIGID MOUNTED                 | 0.34 S.F. | 0.5" W<br>X<br>0.68" L  | 2 LBS  |

## DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
  - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
  - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
  - The 2024 NCDOT Roadway Standard Drawings.
  - The traffic signal project plans and special provisions.
  - The NCDOT "Metal Pole Standards" located at the following NCDOT website:  
<https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

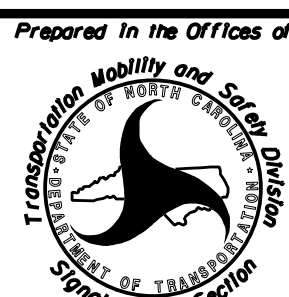
## DESIGN REQUIREMENTS

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
  - a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
  - b. Signal heads are rigidly mounted and vertically centered on the mast arm.
  - c. The roadway clearance height for design is as shown in the elevation views.
  - d. The top of the pole base plate is 0.75 feet above the ground elevation.
  - e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
  - Mast arm attachment height (H1) plus 2 feet, or
  - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

All metal poles and arms should be black in color as specified in the project special provisions.

NCDOT Wind Zone 5 (110 mph)

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



750 N. Greenfield Pkwy. Garner, NC 27529

NC 127 SE  
at  
SR 1692 (1st Ave SE)

Division 12      Catawba County      Hickory

|                          |                           |
|--------------------------|---------------------------|
| PLAN DATE: January 2024  | REVIEWED BY: N.R. Vlahich |
| PREPARED BY: E.E. Tiller | REVIEWED BY: N.R. Simmons |

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

[illegible]

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

SEA

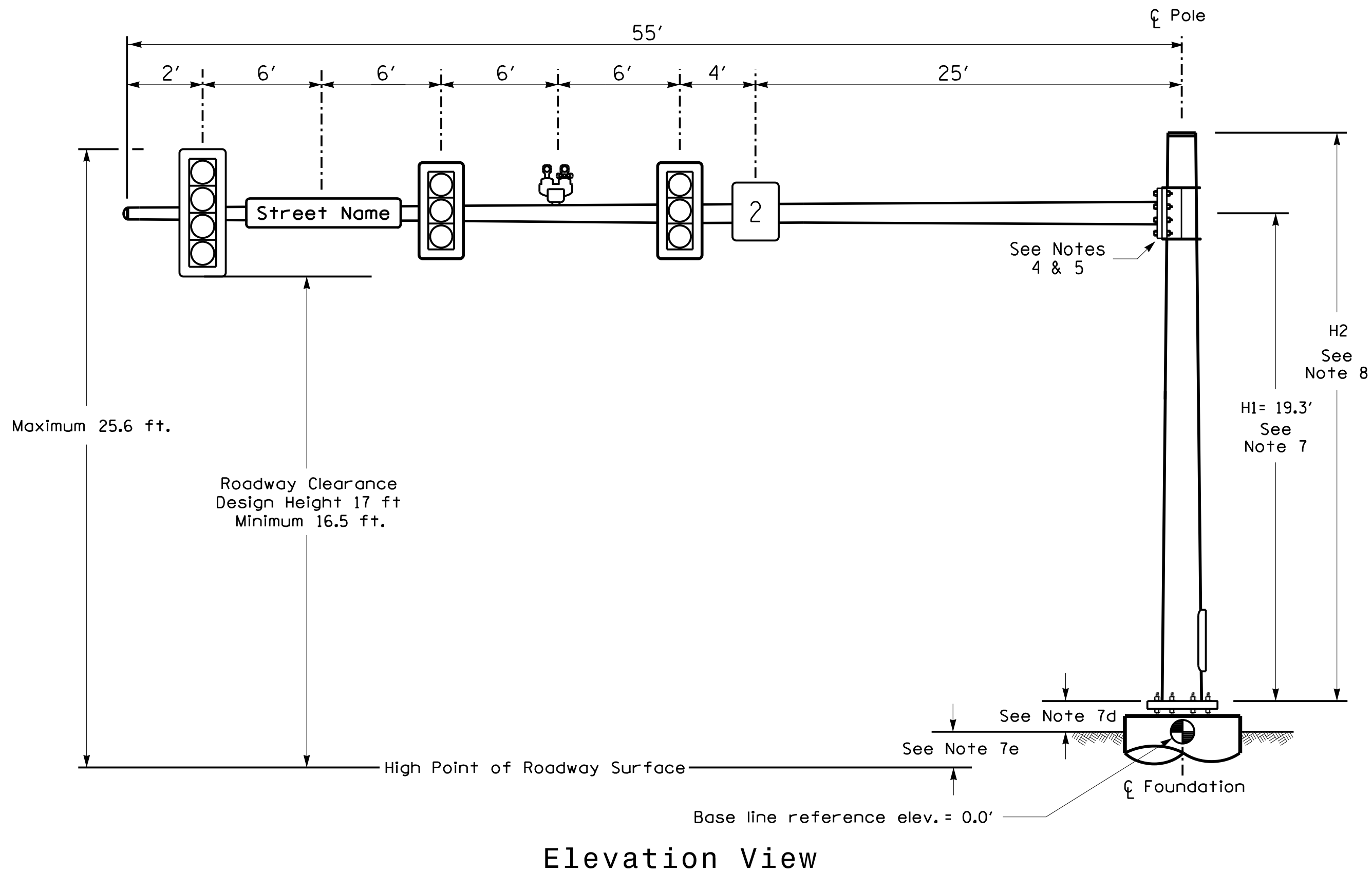


DocuSigned by:  
Natasha R. Simmons 9/6/2024

DATE

SIG. INVENTORY NO. 12-0954

### Design Loading for METAL POLE NO. 3

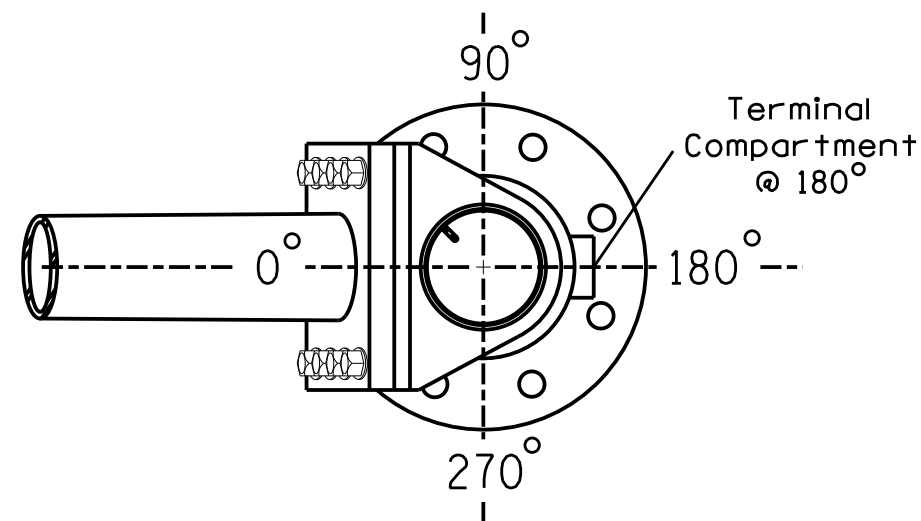


## SPECIAL NOTE

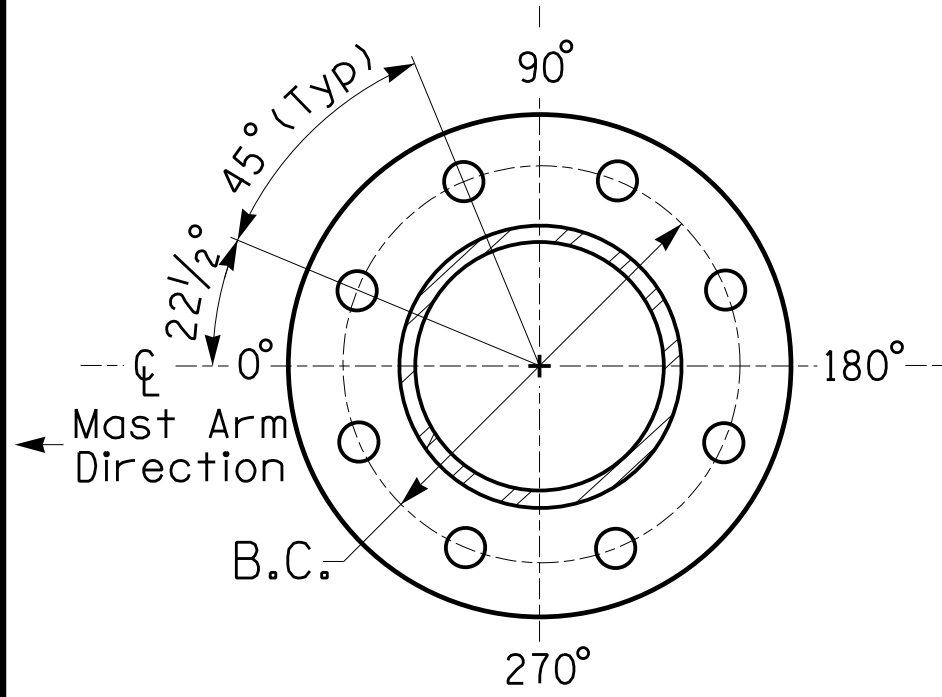
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the 'Design Height' clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

### Elevation Data for Mast Arm Attachment (H1)

| Elevation Differences for:                                   |                                                                                     | Pole 3    |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------|
| Baseline reference point at<br>℄ Foundation @ ground level   |  | 0.0 ft.   |
| Elevation difference at<br>High point of roadway surface     |                                                                                     | +0.33 ft. |
| Elevation difference at<br>Edge of travelway or face of curb |                                                                                     | -0.20 ft. |

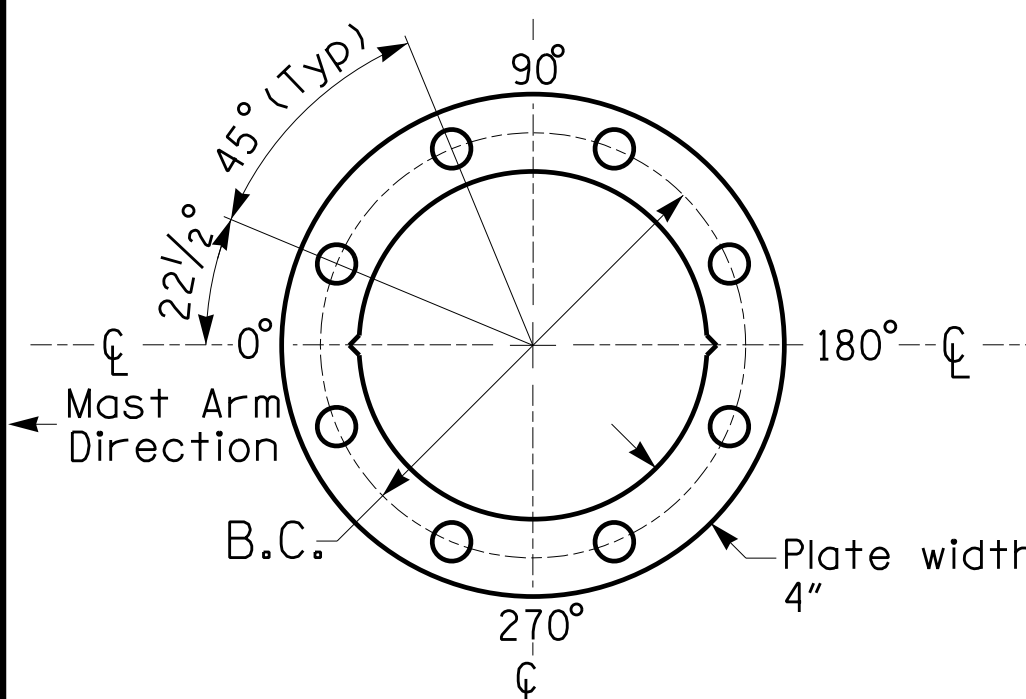


## POLE RADIAL ORIENTATION



## 8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT  
LOCK PLATE DETAIL  
For 8 Bolt Base Plate

### ETAL POLE No. 3

| MAST ARM LOADING SCHEDULE                                                           |                                                           |           |                         |        |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------|-------------------------|--------|
| LOADING SYMBOL                                                                      | DESCRIPTION                                               | AREA      | SIZE                    | WEIGHT |
|  | RIGID MOUNTED SIGNAL HEAD<br>12"-3 SECTION-WITH BACKPLATE | 9.3 S.F.  | 25.5" W<br>X<br>52.5" L | 60 LBS |
|  | SIGN<br>RIGID MOUNTED                                     | 7.5 S.F.  | 30.0" W<br>X<br>36.0" L | 14 LBS |
|  | STREET NAME SIGN<br>RIGID MOUNTED                         | 16.0 S.F. | 24.0" W<br>X<br>96.0" L | 36 LBS |
|  | OUT OF PAVEMENT DETECTOR<br>RIGID MOUNTED                 | 0.34 S.F. | 0.5" W<br>X<br>0.68" L  | 2 LBS  |

## NOTES

## DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
  - The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
  - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
  - The 2024 NCDOT Roadway Standard Drawings.
  - The traffic signal project plans and special provisions.
  - The NCDOT "Metal Pole Standards" located at the following NCDOT website:  
<https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

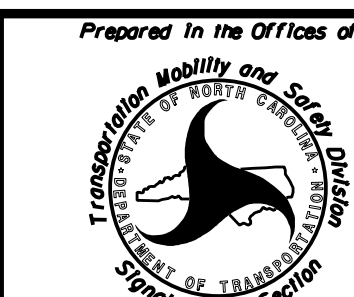
## DESIGN REQUIREMENTS

3. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
  - a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
  - b. Signal heads are rigidly mounted and vertically centered on the mast arm.
  - c. The roadway clearance height for design is as shown in the elevation views.
  - d. The top of the pole base plate is 0.75 feet above the ground elevation.
  - e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
  - Mast arm attachment height (H1) plus 2 feet, or
  - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

All metal poles and arms should be black in color as specified in the project specialprovisions.

NCDOT Wind Zone 5 (110 mph)

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



NC 127 SE  
at  
SR 1692 (1st Ave SE)

|                         |                         |         |
|-------------------------|-------------------------|---------|
| Division 12             | Catawba County          | Hickory |
| PLAN DATE: January 2004 | REMOVED BY: N. K. Vlach |         |

|                          |                           |
|--------------------------|---------------------------|
| PLAN DATE: January 2024  | REVIEWED BY: N.R. Vianich |
| PREPARED BY: E.E. Tiller | REVIEWED BY: N.R. Simmons |

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

|  |  |  |
|--|--|--|
|  |  |  |
|  |  |  |

|       |  |  |
|-------|--|--|
| ..... |  |  |
|-------|--|--|

[illegible]

---

## SEA



DocuSigned by:

Natasha R. Simmons 9/6/2024

| F8DA99DE36D445A |              | DATE    |
|-----------------|--------------|---------|
| 616             | INVENTORY NO | 12 00E4 |

SIG. INVENTORY NO. 12-0954

