

05-11-2027 16:05  
 S:\116\30715\_Signals\Signal Design Section\Central Region\Div 5\I-5941\I-5941\_sig\_tsh.dgn  
 Robert J. Ziembra

**Project: I-5941**

**Contract: C204885**

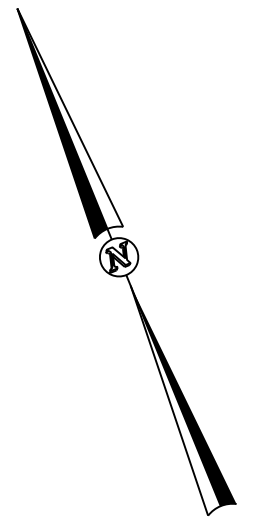
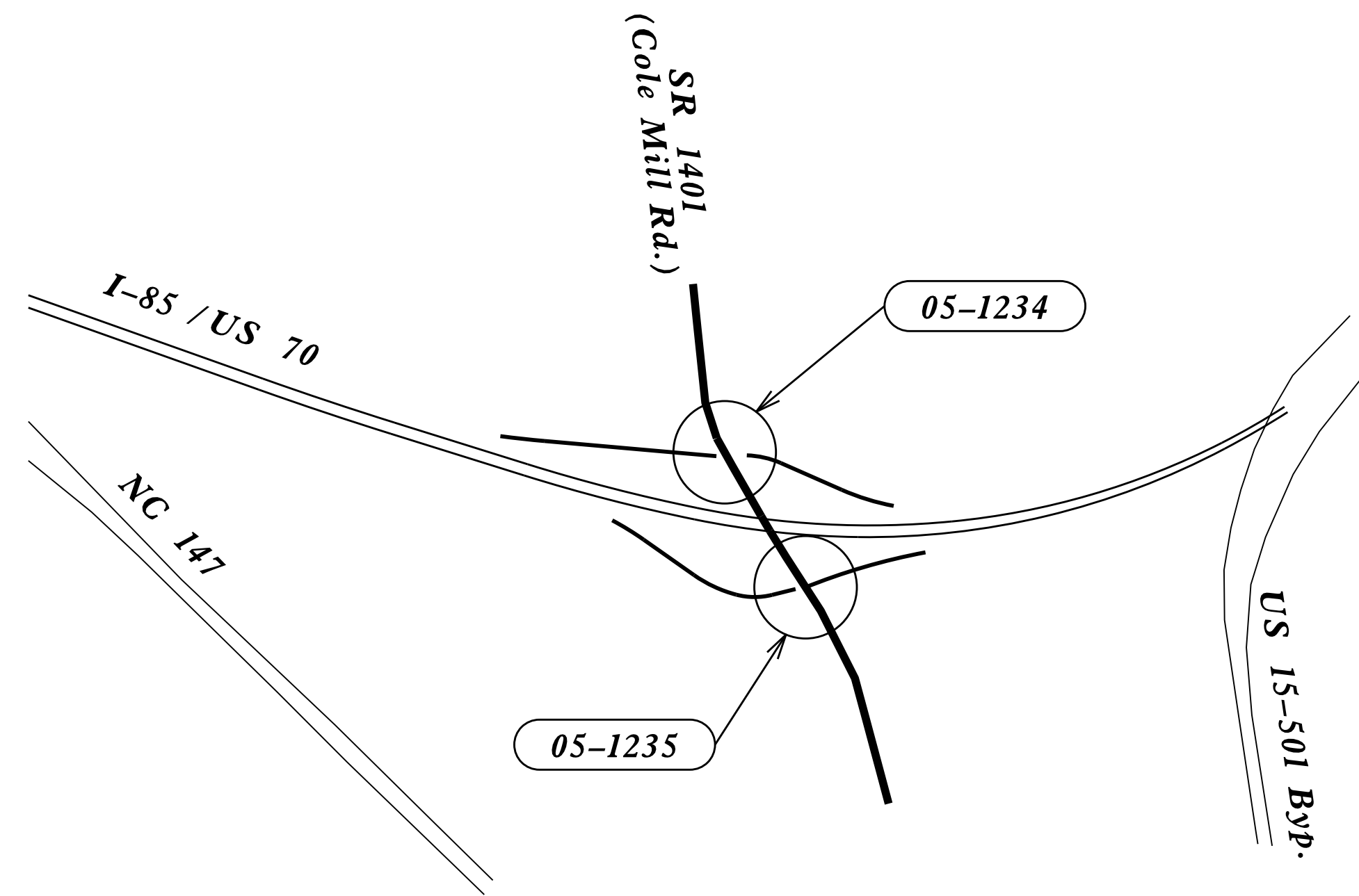
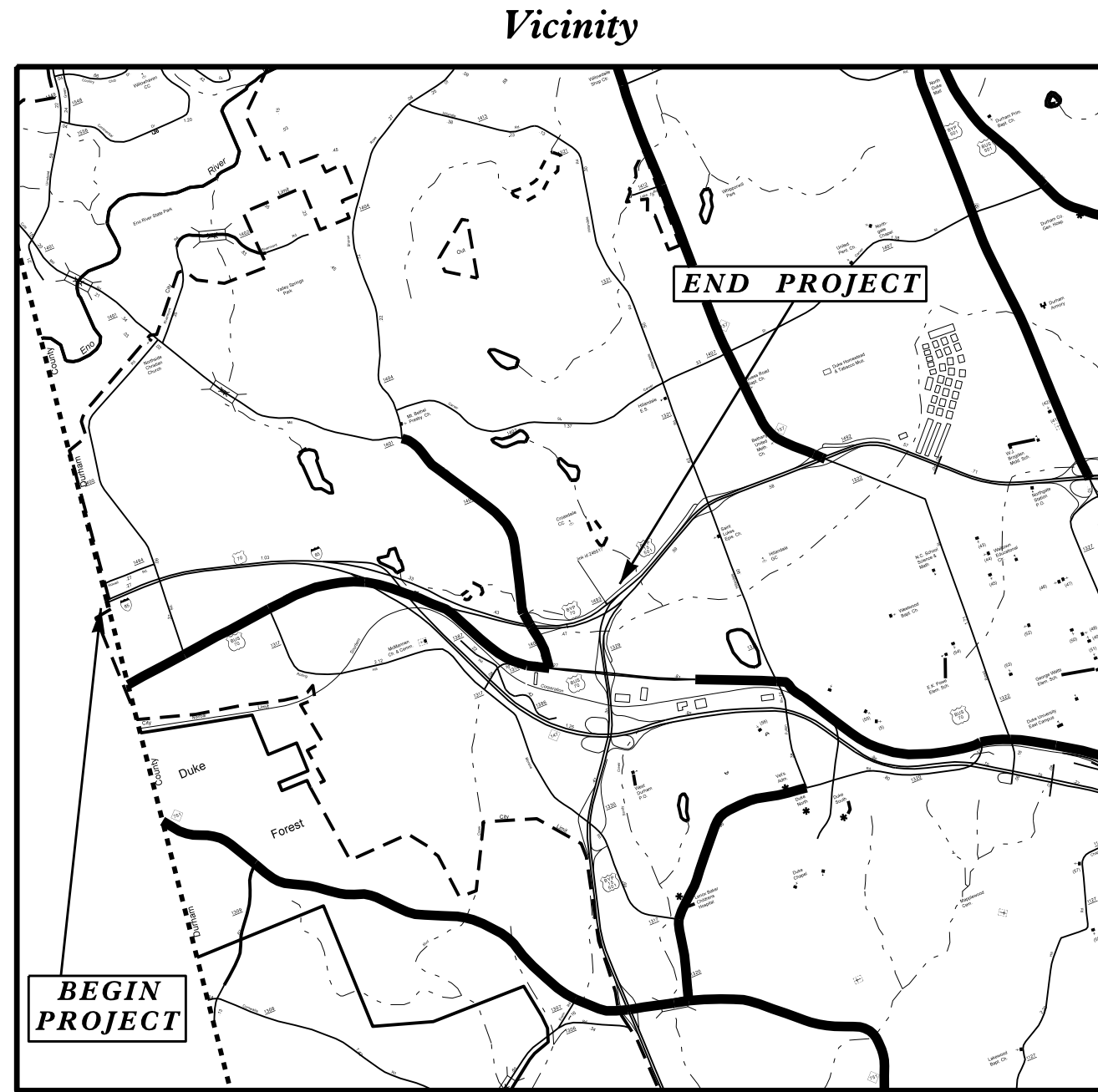
Project No.	Sheet No.
I-5941	Sig. 1.0

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**DURHAM COUNTY**

**LOCATION: SR 1401 (COLE MILL ROAD) AT I-85 /US 70**

**TYPE OF WORK: TRAFFIC SIGNALS**



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

Sheet #	Reference #
Sig. 1.0	-----
Sig. 2.0-2.3	05-1234
Sig. 3.0-3.3	05-1235

**Index of Plans**

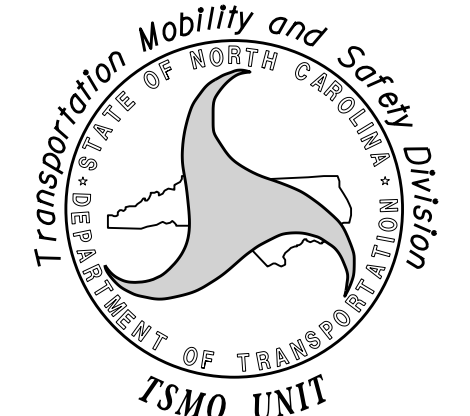
Title Sheet	Location/Description
Title Sheet	
SR 1401 (Cole Mill Road) at I-85 SB /US 70 WB Ramps	
SR 1401 (Cole Mill Road) at I-85 NB /US 70 EB Ramps	

**TRANSPORTATION SYSTEMS  
MANAGEMENT & OPERATIONS UNIT**

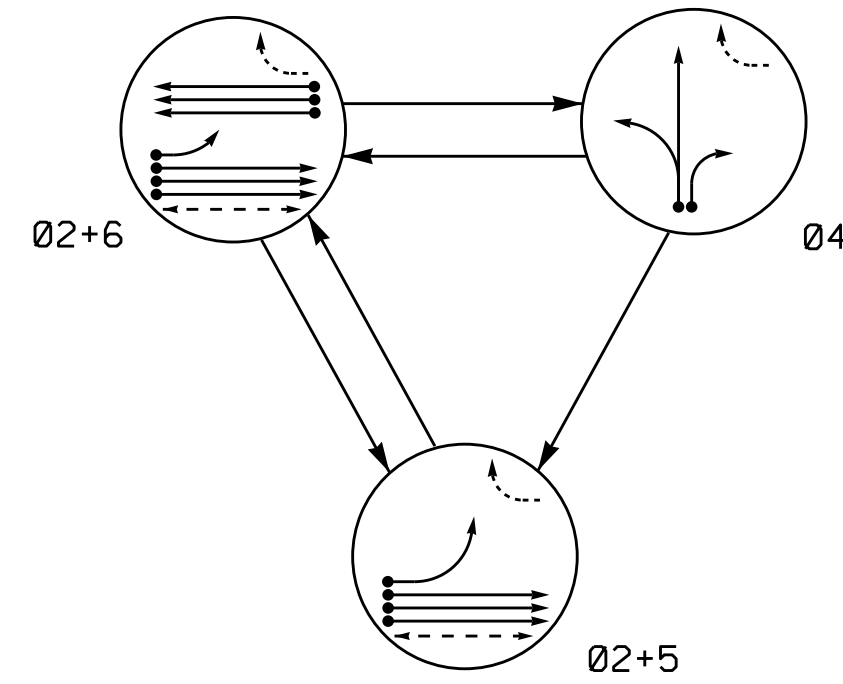
Contacts:

**Robert J. Ziembra, PE** - Central Region Signals Engineer  
**Ryan W. Hough, PE** - Signal Equipment Design Engineer

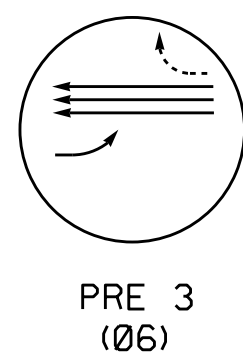
Prepared in the Office of:  
DIVISION OF HIGHWAYS  
TRANSPORTATION MOBILITY & SAFETY DIVISION



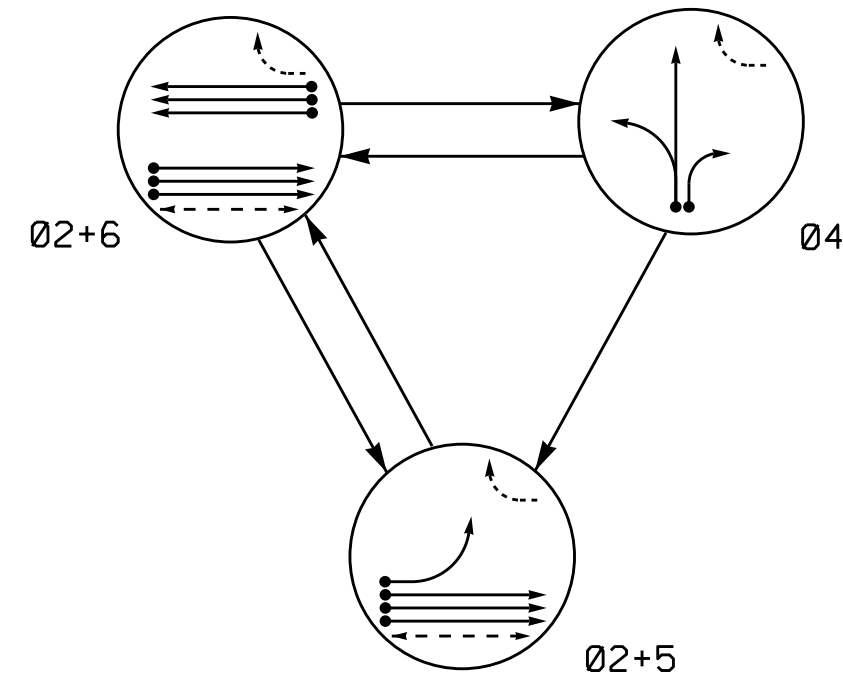
DEFAULT PHASING DIAGRAM



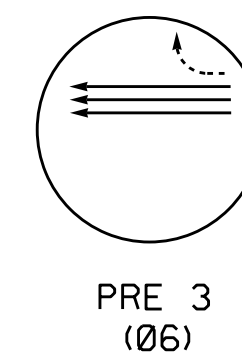
DEFAULT EV PREEMPT PHASES



ALTERNATE PHASING DIAGRAM



ALTERNATE EV PREEMPT PHASES



PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE				
	02+5	04	P3	F	FLASH
21, 22	↑	↑	R	R	Y
41, 42	R	R	G	R	R
51	←	←	←	←	←
61, 62	R	↑	R	↑	Y
P21, P22	W	W	DW	DW	DRK

SIGNAL FACE	PHASE				
	02+5	04	P3	F	FLASH
21, 22	↑	↑	R	R	Y
41, 42	R	R	G	R	R
51	←	←	←	←	←
61, 62	R	↑	R	↑	Y
P21, P22	W	W	DW	DW	DRK

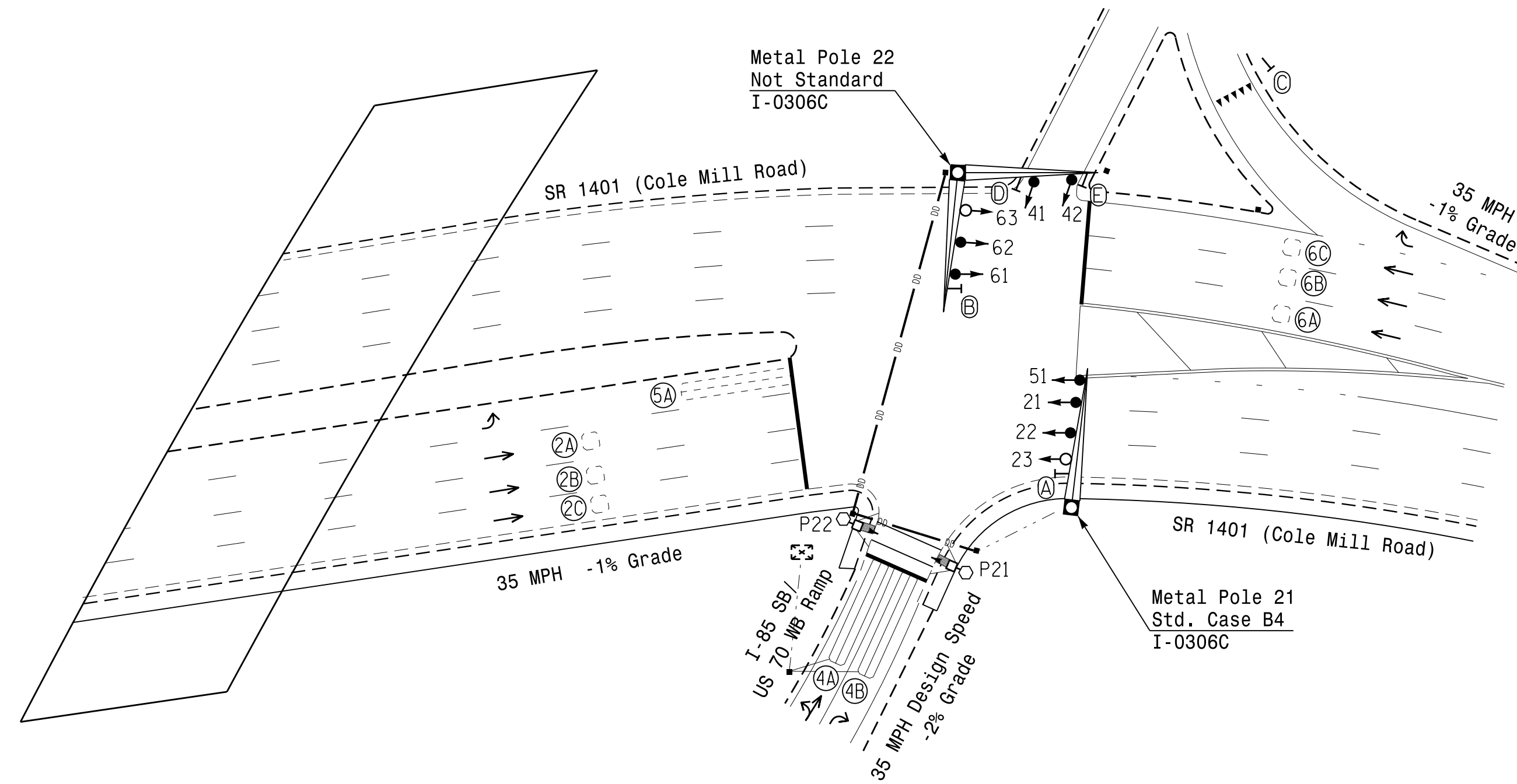
ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP NEW CARD
2A	6X6	70	3	-	2	Yes	-	-	-	N	-
2B	6X6	70	3	-	2	Yes	-	-	-	N	-
2C	6X6	70	3	-	2	Yes	-	-	-	N	-
4A	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-
4B	6X40	0	2-4-2	X	4	Yes	-	15	-	N	-
5A	6X40	0	2-4-2	-	5	Yes	-	15*	-	N	-
6A	6X6	70	4	-	6	Yes	-	-	-	N	-
6B	6X6	70	4	-	6	Yes	-	-	-	N	-
6C	6X6	70	4	-	6	Yes	-	-	-	N	-

\* Disable delay during Alternate Phasing operation.  
# Disable phase call for loop during Alternate Phasing operation.

3 Phase Fully Actuated w/ Emergency Vehicle Preemption (Durham 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 signals heads 21, 22, 51, 61, and 62.
- All existing vehicle signal heads have backplates.
- Install backplates on signal heads 23 and 63.
- 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.
- Pavement markings are existing unless otherwise shown.
- This intersection features a GPS preempt system.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green *	10	7	7	10
Walk *	7	-	-	-
Ped Clear	4	-	-	-
Veh. Extension *	3.0	2.0	2.0	3.0
Max I *	50	25	20	50
Yellow	3.9	4.0	3.0	3.9
Red Clear	2.5	2.9	3.4	2.5
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	-	X
Recall Position	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

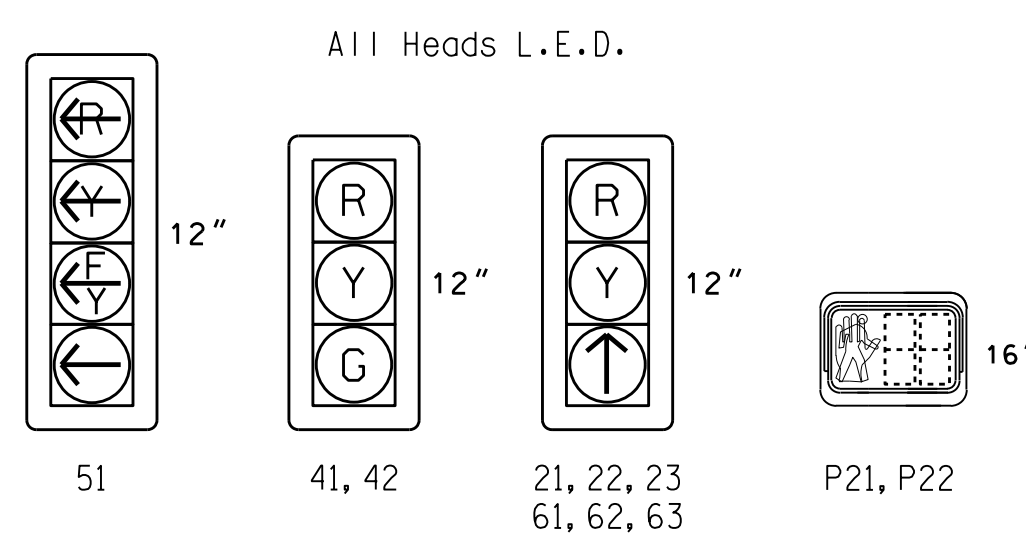
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ASC/3 EV PREEMPT

FUNCTION	PRE 3
Exit Phase(s)	2+6
Preempt Override	OFF
Delay Time	0
Ped Clear Through Yellow	Y
Terminate Phases	N
Entrance Walk	1
Entrance Ped Clear	255*
Entrance Min Green	1
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Minimum Dwell Time	7
Preempt Input Extension Time**	2
Preempt Max Time	120
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

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

SIGNAL FACE I.D.



LEGEND

- | PROPOSED   | EXISTING   |
|--|--|
| ○ → Traffic Signal Head                            | ● → Traffic Signal Head                          |
| ○ → Modified Signal Head                           | N/A  |
| ○ → Pedestrian Signal Head With Push Button & Sign | N/A  |
| ○ → Signal Pole with Guy                           | ○ → Signal Pole with Guy                         |
| ○ → Signal Pole with Sidewalk Guy                  | ○ → Signal Pole with Sidewalk Guy                |
| □ → Inductive Loop Detector                        | □ → Inductive Loop Detector                      |
| □ → Controller & Cabinet                           | □ → Controller & Cabinet                         |
| □ → Junction Box                                   | □ → Junction Box                                 |
| --- 2-in Underground Conduit                       | --- 2-in Underground Conduit                     |
| N/A → Right of Way                                 | --- Right of Way                                 |
| N/A → Directional Arrow                            | → Directional Arrow                              |
| N/A → Directional Drill                            | --- Directional Drill                            |
| ○ → Metal Pole with Mastarm                        | ○ → Metal Pole with Mastarm                      |
| ○ → Type II Signal Pedestal                        | ○ → Type II Signal Pedestal                      |
| N/A → Curb Ramp                                    | ▲ → Curb Ramp                                    |
| Ⓐ → No Right Turn Sign (R3-1)                      | Ⓐ → No Right Turn Sign (R3-1)                    |
| Ⓑ → No Left Turn Sign (R3-2)                       | Ⓑ → No Left Turn Sign (R3-2)                     |
| Ⓒ → "YIELD" Sign (R1-2)                            | Ⓒ → "YIELD" Sign (R1-2)                          |
| Ⓓ → Combined Through and Left Arrow Sign (R3-6L)   | Ⓓ → Combined Through and Left Arrow Sign (R3-6L) |
| Ⓔ → Right Arrow "ONLY" Sign (R3-5R)                | Ⓔ → Right Arrow "ONLY" Sign (R3-5R)              |

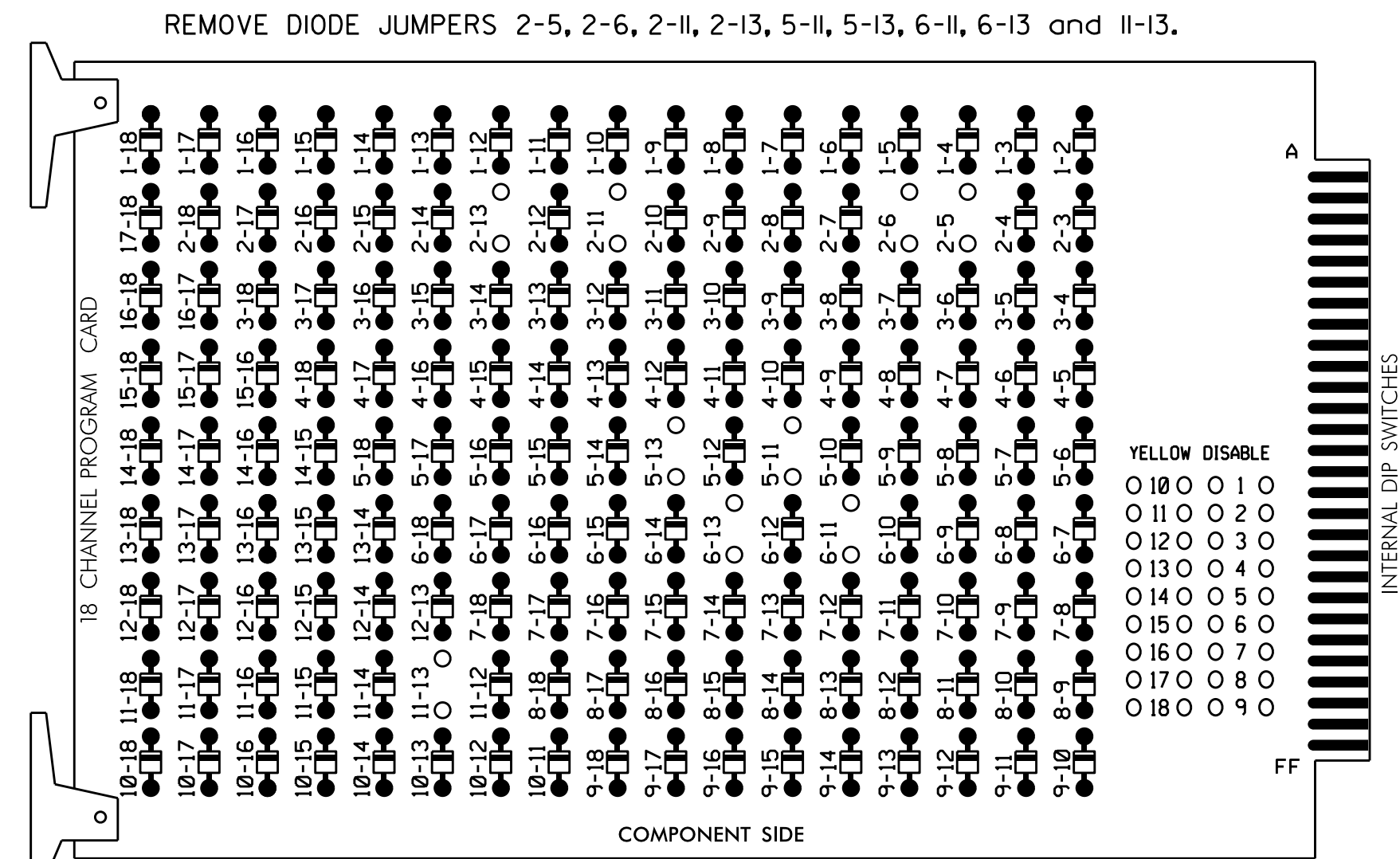
Signal Upgrade

	SR 1401 (Cole Mill Road) at I-85 SB/ US 70 WB Ramps		
	Division 5 Durham County Durham	PLAN DATE: July 2023 REVIEWED BY:	
PREPARED BY: J.A. Lohr	REVISIONS		DATE: 09/05/2023
SCALE: 1" = 40'	REVISIONS		DATE:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

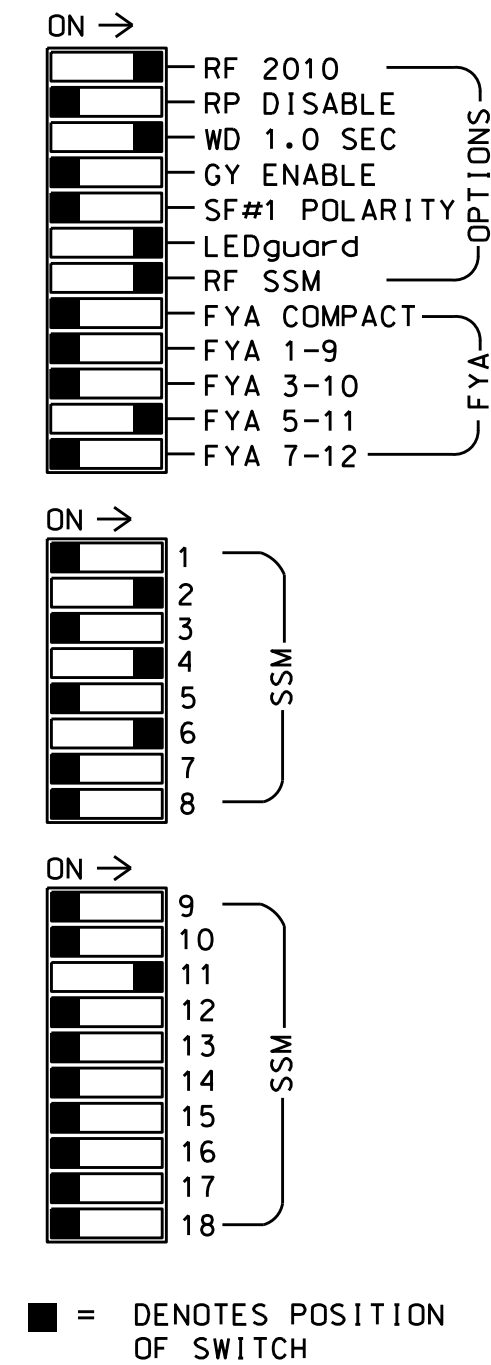
### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

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



### 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.
- The cabinet and controller are part of the Durham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S2,S3,S5,S7,S8,AUX S4  
 PHASES USED.....2,2 PED,4,5,6  
 OVERLAP "A".....NOT USED  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....\*  
 OVERLAP "D".....NOT USED

\* See overlap programming detail on sheet 2

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	NU	51	61,62	NU	NU	NU	NU	NU	NU	NU	51	NU	NU	
RED		128			101			134											
YELLOW		129			102		*	135											
GREEN					103														
RED ARROW																		A114	
YELLOW ARROW																			A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW		130						133	136										
Hand icon							113												
Person icon							115												

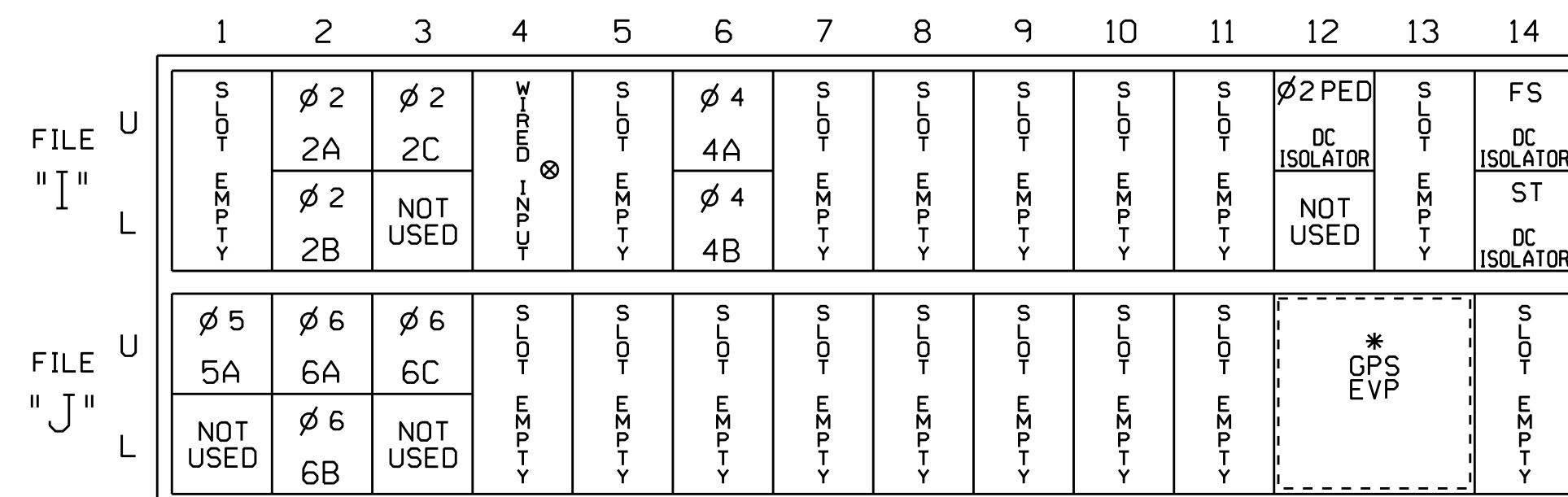
NU = Not Used

\* 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  
 See GPS Preemption Installation Note Below

FS = FLASH SENSE  
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

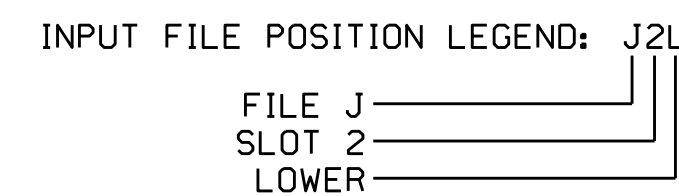
### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB2-5,6	I2U	39	2	2	YES				N
2B	TB2-7,8	I2L	43	12	2	YES				N
2C	TB2-9,10	I3U	63	32	2	YES				N
4A	TB4-9,10	I6U	41	4	4	YES				N
4B	TB4-11,12	I6L	45	14	4	YES		15		N
5A <sup>1</sup>	TB3-1,2	J1U	55	5	5	YES		15		N
		I4U	47	22	2	YES				N
6A	TB3-5,6	J2U	40	6	6	YES				N
6B	TB3-7,8	J2L	44	16	6	YES				N
6C	TB3-9,10	J3U	64	36	6	YES				N

NOTE:  
 INSTALL DC ISOLATORS  
 IN INPUT FILE SLOT 112.

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

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



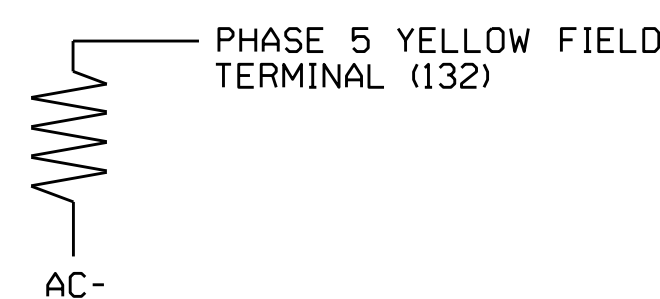
### SPECIAL DETECTOR NOTE

Install a GPS preemption system. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting location to accomplish the preemption schemes shown on the Signal Design Plans.

### LOAD RESISTOR INSTALLATION DETAIL

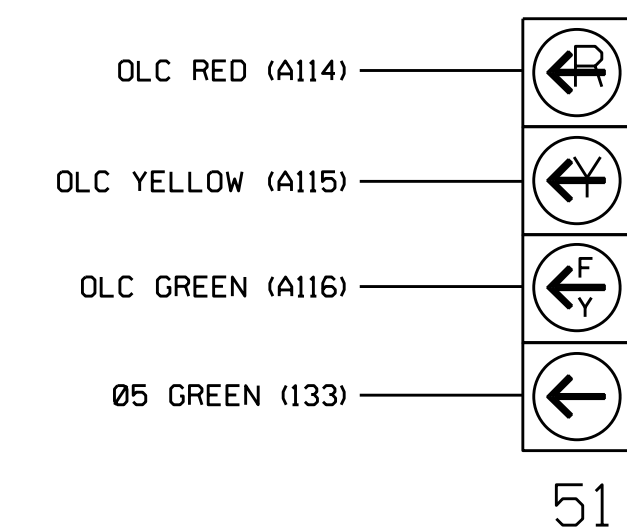
(install resistors as shown)

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



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



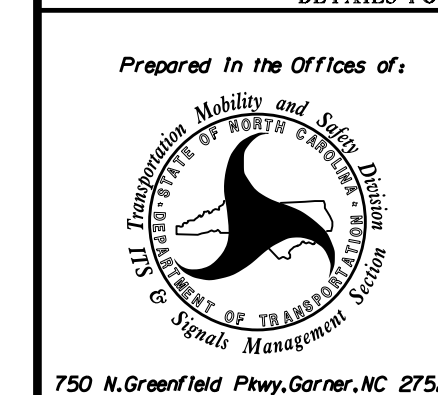
### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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: 05-1234  
 DESIGNED: July 2023  
 SEALED: 09/05/2023  
 REVISED: N/A

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

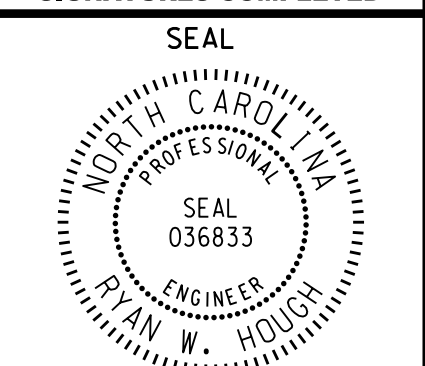


SR 1401 (Cole Mill Road)  
 at  
 I-85 SB/US 70 WB Ramps

Division 5 Durham County Durham  
 PLAN DATE: August 2023 REVIEWED BY:  
 PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DocuSigned by:  
 Ryan W. Houff  
 09/05/2023  
 DATE

SIG. INVENTORY NO. 05-1234

### ECONOLITE ASC/3-2070 EMERGENCY VEHICLE

#### PREEMPT PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select **4. PREEMPTOR/TSP**
- From PREEMPTOR/TSP/SCP Submenu select **1. PREEMPT PLAN 1-10**

Place cursor in [ ] next to Preempt Plan and press 3. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Emergency Vehicle Preempt #3.

```

PREEMPT PLAN [ 3]  ENABLE....YES
VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
OVERLAP A B C D E F G H I J K L M N O P
TRKCLR V . . . . .
TRKCLR O . . . . .
ENA TRL . . . . .
DWEL VEH . . . . . X . . . . .
DWEL PED . . . . .
DWEL OLP . . F1 . . . . .
CYC VEH . . . . .
CYC PED . . . . .
CYC OLP . . . . .
EXIT PH . X . . . X . . . . .
EXIT CAL . . . . .
SP FUNC . . . . .
    
```

```

ENABLE... YESIPMT OVRIDE.. IINTERLOCK. NO
DET LOCK... XIDELAY.. OIINHIBIT... 0
OVERIDE FL. . IDURATION OICLR-GRN... NO
TERM OLP. NOIPC>YEL YESITERM PH NO
PED DARK.. NOITC RESRV NOIDWELL FL OFF
LINK PMT... OIX FLCOLR REDIEXIT OPT. OFF
X TMG PLN... OIRE-SERV.. OIFLT TYPE.HARD
FREE DUR PMTIR1 NOIR2 NOIR3 NOIR4 NO
--TIMING-----WALKIPED CLIMN GRI YELI RED
ENTRANCE TM. 11 2551 1125.5125.5
-----MIN GRIEXT GRIMX GRI YELI RED
TRACK CLEAR 01 01 0125.5125.5
-----MIN DLIPMTEXTIMX TMI YELI RED
DWL/CYC-EXIT 71 0.01 120125.5125.5
PMT ACTIVE OUT..ON PMT ACT DWELL...NO
OTHER - PRI PMT.OFF NON-PRI PMT....OFF
INH EXT TIME... 0.0 PED PR RETURN...OFF
PRIORITY RETURN.OFF QUEUE DELAY.... OFF
COND DELAY.....OFF
PHASES 1 2 3 4 5 6 7 8
PR RTN% 0 0 0 0 0 0 0 0
PHASES 9 10 11 12 13 14 15 16
PR RTN% 0 0 0 0 0 0 0 0
    
```

PROGRAM EXTEND TIME ON GPS DETECTOR UNIT FOR 2.0 SEC.

### ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP

#### PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 5A

## IMPORTANT!

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

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

```

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

- From Main Menu select **6. DETECTORS**
- From DETECTOR Submenu select **2. VEHICLE DETECTOR SETUP**
- Place cursor in VEH DET PLAN [ ] position and enter "2".
- Place cursor in VEH DETECTOR [ ] position and enter "5".
- Set delay time to "0".

```

VEH DETECTOR [ 5]  VEH DET PLAN [ 2]
TYPE: N-NTCIP
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
5 5 . . . . .
CALL OPTION.... YES DELAY TIME... 0.0
EXT OPTION. PASSAGE EXTENSION TIME. 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY- NO
    
```

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

```

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

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1234  
 DESIGNED: July 2023  
 SEALED: 09/05/2023  
 REVISED: N/A

### ECONOLITE ASC/3-2070 OVERLAP

#### PROGRAMMING DETAIL

(program controller as shown)

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

Toggle 3x

#### OVERLAP C

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

```

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

END PROGRAMMING

### ECONOLITE ASC/3-2070 PREEMPT FILTERING PROGRAMMING DETAIL

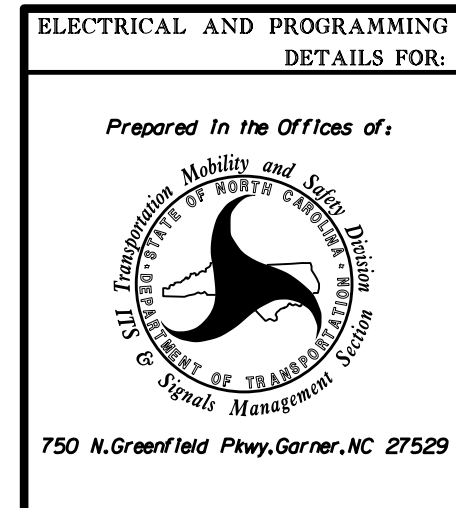
(program controller as shown)

- From Main Menu select **4. PREEMPTOR/TSP**
- From PREEMPT/TSP/SCP Submenu select **2. ENABLE PREEMPT FILTERING & TSP/SCP**

```

ENABLE PREEMPT FILTERING & TSP/SCP
FILTERED SOLID PULSING
INPUT 1 ...BYPASSED... BYPASSED..
2 ...BYPASSED... BYPASSED..
3 ..PREEMPT 3. ...BYPASSED..
4 ...BYPASSED... BYPASSED..
5 ...BYPASSED... BYPASSED..
6 ...BYPASSED... BYPASSED..
7 ...BYPASSED... BYPASSED..
8 ...BYPASSED... BYPASSED..
9 ...BYPASSED... BYPASSED..
10 ...BYPASSED... BYPASSED..
    
```

Electrical Detail - Sheet 2 of 3



SR 1401 (Cole Mill Road)  
 at  
 I-85 SB/US 70 WB Ramps

Division 5 Durham County Durham

PLAN DATE: August 2023 REVIEWED BY:

PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Seal of Ryan W. Hough, Professional Engineer, License No. 036833, State of North Carolina.

DocuSigned by: Ryan W. Hough 09/05/2023

SIG. INVENTORY NO. 05-1234

05-SEP-2023 13:26  
 S:\TSS\KTS\SIGNAL\Workgroups\Signal\Projects\Main\Projects From Signal Design\Mch1ive\Project\KTS\SIG\05-1234\_sme.ele-20230905.dgn  
 sgm:lr:report:ck

## ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

### ALTERNATE PHASING ACTIVATION DETAIL

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

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

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

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

#### ALTERNATE PHASING CHANGE SUMMARY

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

**SF BIT 5:** Modifies overlap parent phase for head 51 to run protected turns only.

**VEH DET PLAN 2:** Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

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

```

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

**NOTE:** Action Plan [\*] is shown as a reference only. The actual Action Plan number(s) will be determined by the Division Traffic Engineer and/or the City Traffic Engineer.

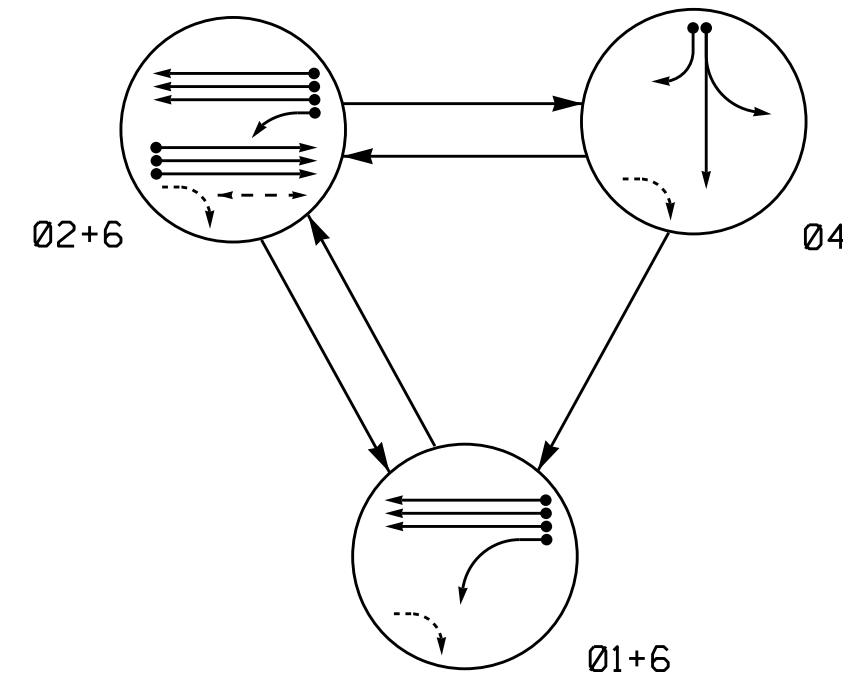
Electrical Detail - Sheet 3 of 3

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

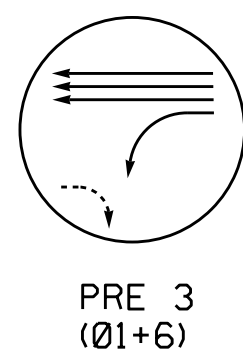
<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared in the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Corner, NC 27529</p>	<p><b>SR 1401 (Cole Mill Road) at I-85 SB/US 70 WB Ramps</b></p> <p style="font-size: x-small;">Division 5      Durham County      Durham</p> <p style="font-size: x-small;">PLAN DATE: August 2023      REVIEWED BY:</p> <p style="font-size: x-small;">PREPARED BY: S. Kirkpatrick      REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISIONS	INIT.	DATE										<p style="text-align: center;">SEAL</p> <p style="font-size: x-small;">DocuSigned by: <b>Ryan W. Hough</b>      09/05/2023</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 05-1234</p>
REVISIONS	INIT.	DATE												

THIS ELECTRICAL DETAIL IS FOR  
THE SIGNAL DESIGN: 05-1234  
DESIGNED: July 2023  
SEALED: 09/05/2023  
REVISED: N/A

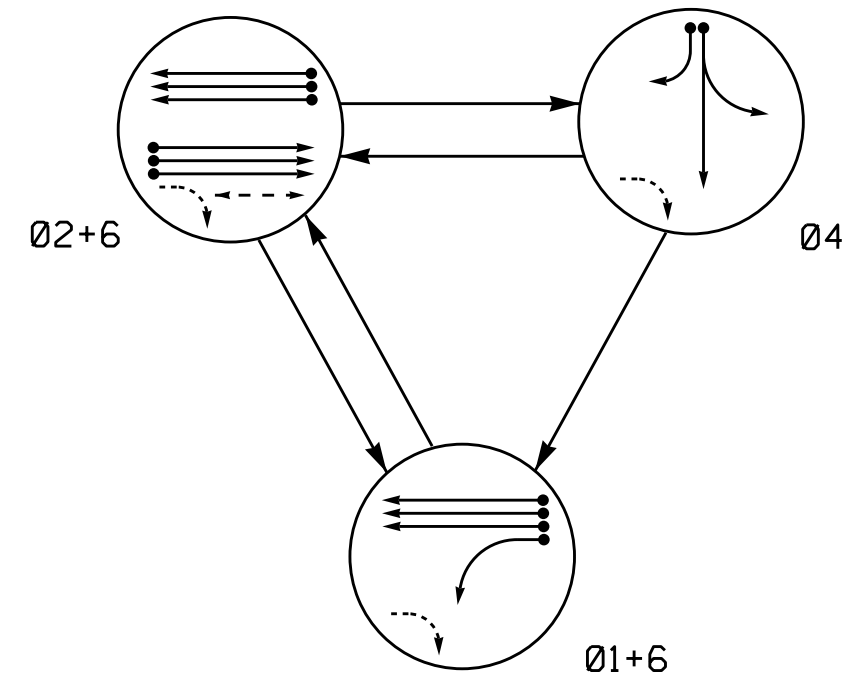
DEFAULT PHASING DIAGRAM



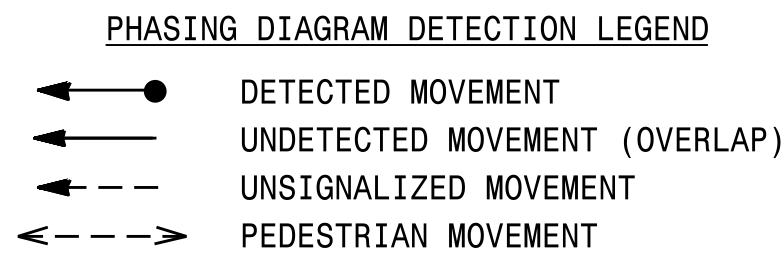
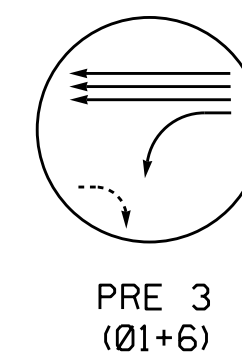
DEFAULT EV PREEMPT PHASES



ALTERNATE PHASING DIAGRAM



ALTERNATE EV PREEMPT PHASES



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE				
	01+6	02+6	04	PRE 3	FLASH
11	←	←	←	←	←
21, 22	R	↑	R	R	Y
41, 42	R	R	G	R	R
61, 62	↑	↑	R	↑	Y
P21, P22	DW	W	DW	DW	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE				
	01+6	02+6	04	PRE 3	FLASH
11	←	←	←	←	←
21, 22	R	↑	R	R	Y
41, 42	R	R	G	R	R
61, 62	↑	↑	R	↑	Y
P21, P22	DW	W	DW	DW	DRK

ASC/3 DETECTOR INSTALLATION CHART

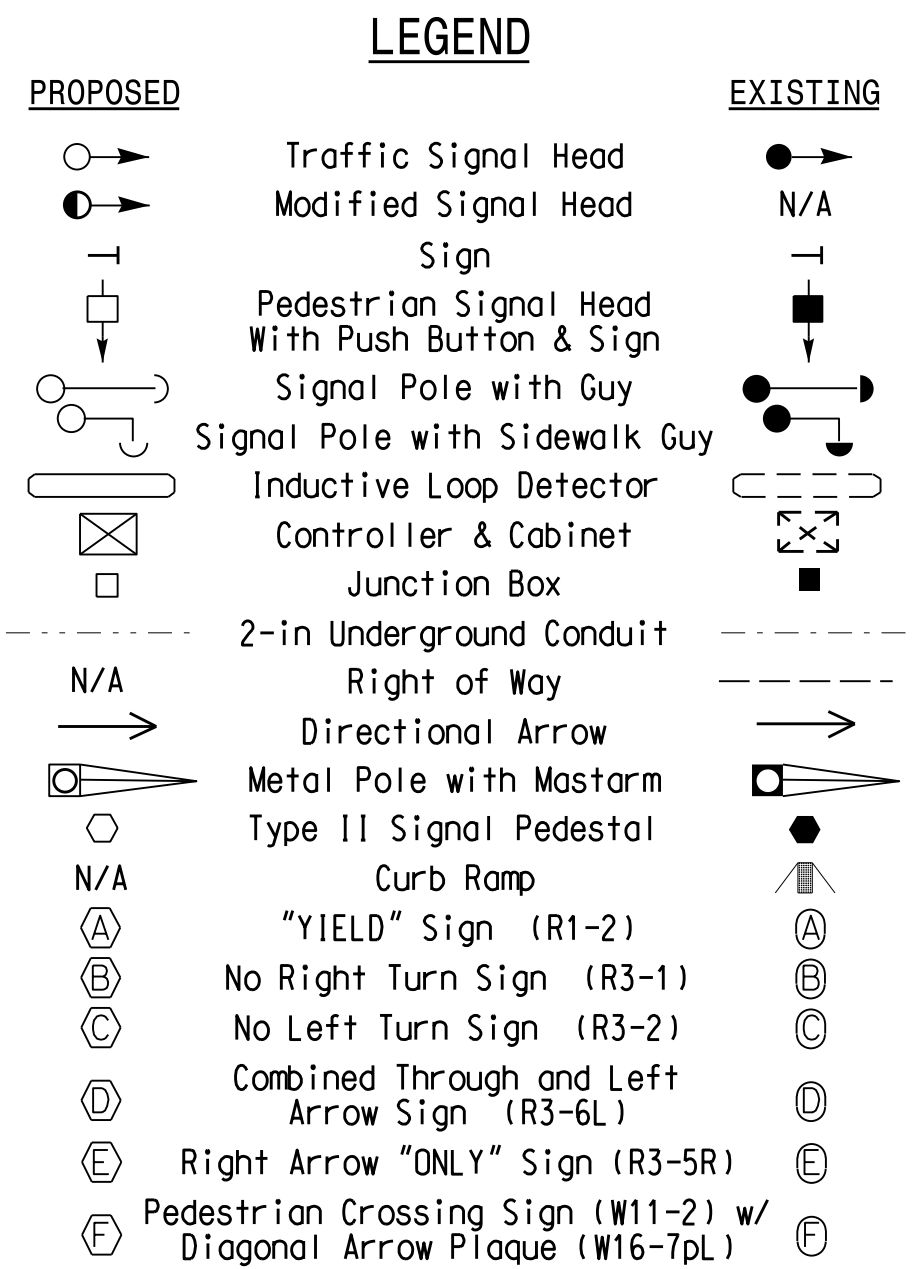
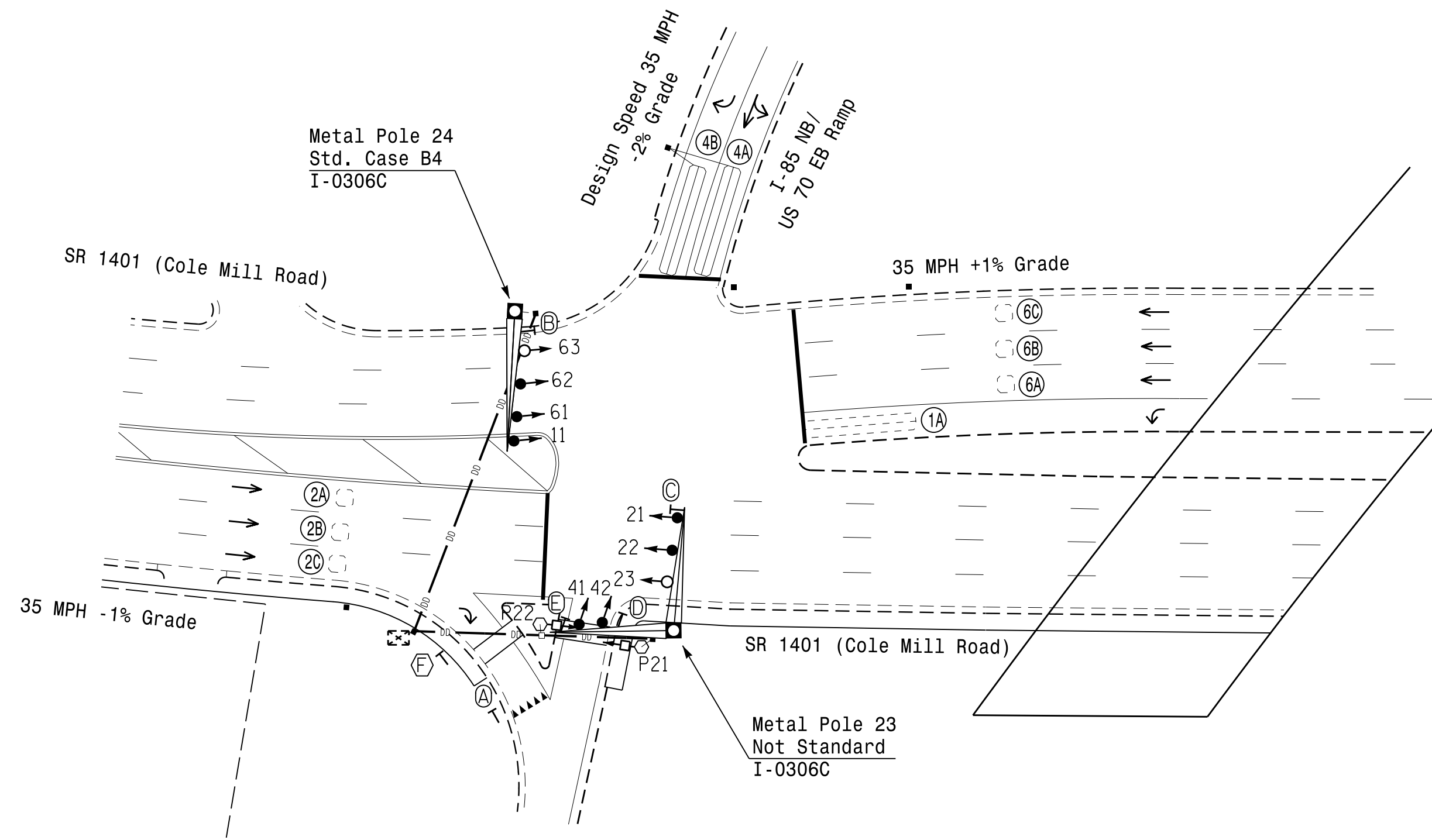
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP SYSTEM	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	15*	-	N	-	-
2A	6X6	70	3	-	2	Yes	-	-	-	N	-	-
2B	6X6	70	3	-	2	Yes	-	-	-	N	-	-
2C	6X6	70	3	-	2	Yes	-	-	-	N	-	-
4A	6X40	0	2-4-2	X	4	Yes	-	-	-	N	-	-
4B	6X40	0	2-4-2	X	4	Yes	-	15	-	N	-	-
6A	6X6	70	4	-	6	Yes	-	-	-	N	-	-
6B	6X6	70	4	-	6	Yes	-	-	-	N	-	-
6C	6X6	70	4	-	6	Yes	-	-	-	N	-	-

\* Disable delay during Alternate Phasing operation.  
# Disable phase call for loop during Alternate Phasing operation.

3 Phase Fully Actuated w/ Emergency Vehicle Preemption (Durham 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 11, 21, 22, 61, and 62.
- All existing vehicle signal heads have backplates.
- Install backplates on new signal heads 23 and 63.
- 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.
- Pavement markings are existing unless otherwise shown.
- This intersection features a GPS preemption system.
- The Division (City) Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



ASC/3 TIMING CHART

FEATURE	PHASE			
	1	2	4	6
Min Green *	7	10	7	10
Walk *	-	7	-	-
Ped Clear	-	4	-	-
Veh. Extension *	2.0	3.0	2.0	3.0
Max I *	25	50	20	50
Yellow	3.0	3.9	4.0	3.9
Red Clear	3.2	2.4	2.6	2.4
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	X	-	X
Recall Position	-	VEH. RECALL	-	VEH. RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

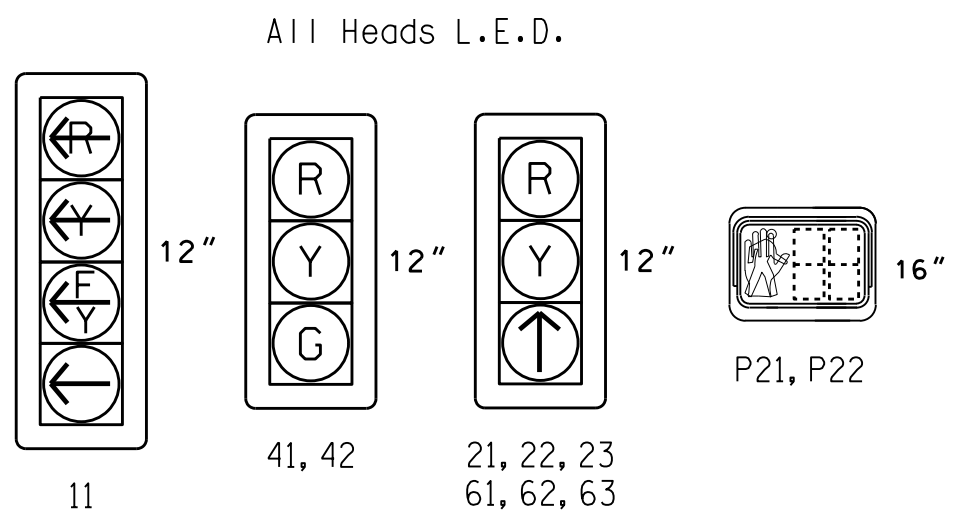
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ASC/3 EV PREEMPT

FUNCTION	PRE 3
Exit Phase(s)	2+6
Preempt Override	OFF
Delay Time	0
Ped Clear Through Yellow	Y
Terminate Phases	N
Entrance Walk	1
Entrance Ped Clear	255*
Entrance Min Green	1
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Minimum Dwell Time	7
Preempt Input Extension Time**	2
Preempt Max Time	120
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

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

SIGNAL FACE I.D.



Signal Upgrade

Prepared in the Offices of:  
TRANSPORTATION MOBILITY AND SAFETY DIVISION  
STATE OF NORTH CAROLINA  
SIGNAL DESIGN SECTION

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1401 (Cole Mill Road) at I-85 NB/ US 70 EB Ramps

Division 5 Durham County Durham

PLAN DATE: June 2023 REVIEWED BY:

PREPARED BY: J.A. Lohr REVIEWED BY:

REVISIONS: INIT. DATE

SCALE: 1" = 40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486

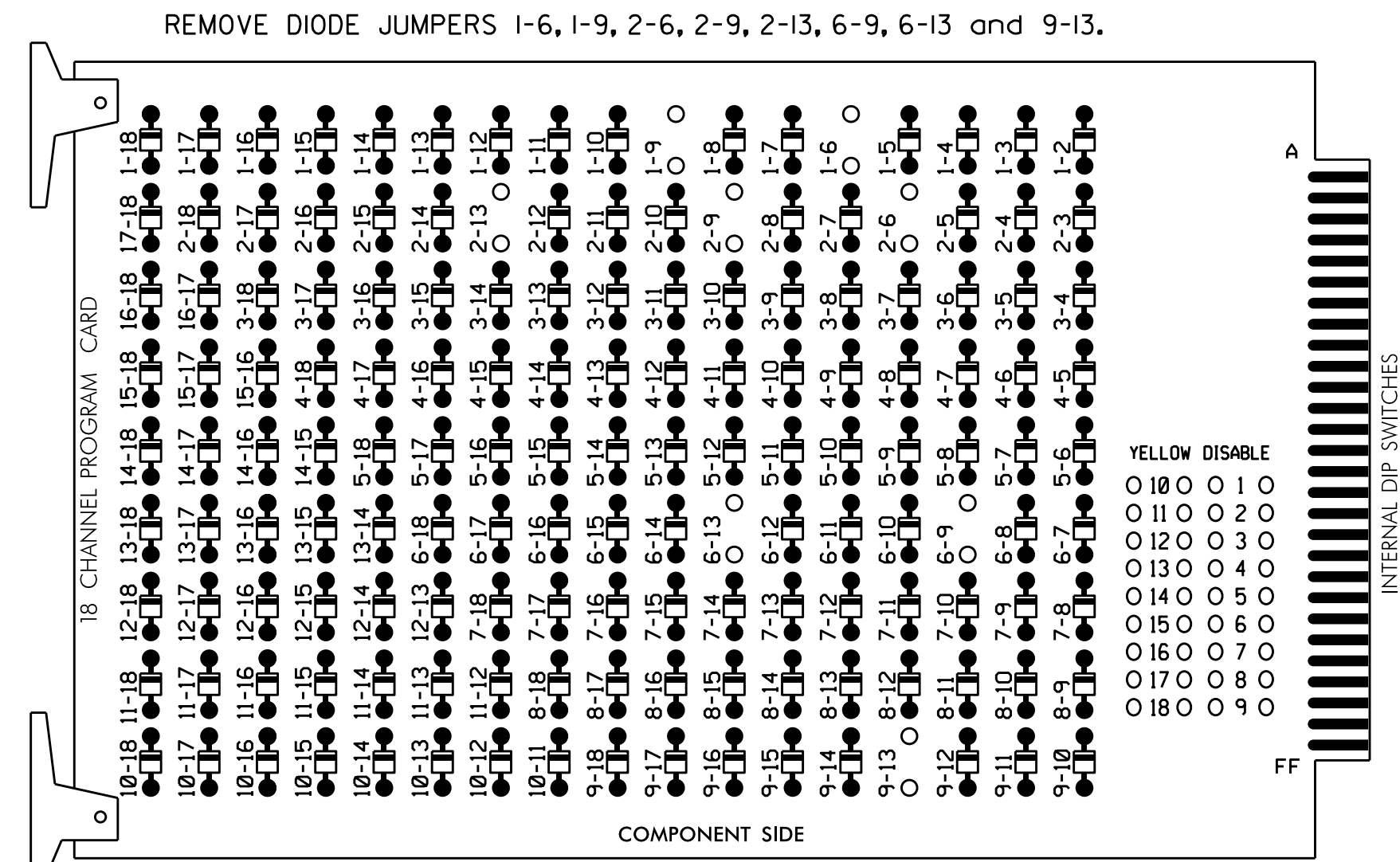
09/05/2023 DATE

SIG. INVENTORY NO. 05-1235

27-OCT-2023 11:29 S:\IT\GIS\KITS\SIGNAL\Signal Design Section\Central Region\01iv 5\I-5941\051235\_s1g\_dsm\_20230905.dgn J.Lohr

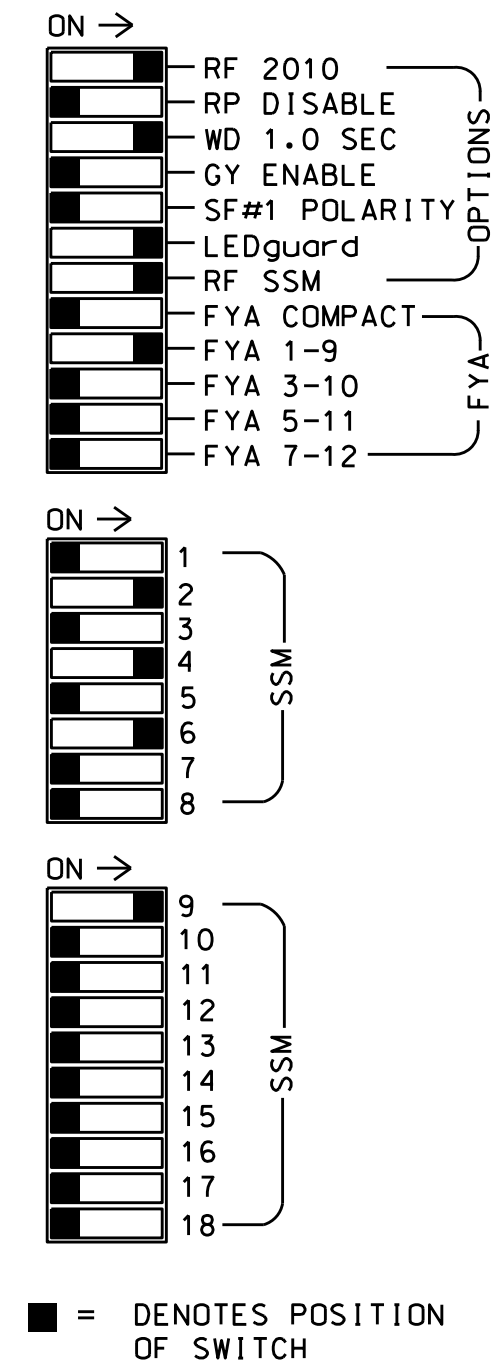
### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



**NOTES:**

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



### 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.
- The cabinet and controller are part of the Durham Signal System.

### EQUIPMENT INFORMATION

CONTROLLER.....2070LX  
 CABINET.....332 W/AUX  
 SOFTWARE.....ECONOLITE ASC/3-2070  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE  
 LOAD SWITCHES USED.....S1,S2,S3,S5,S8,AUX S1  
 PHASES USED.....1,2,2 PED,4,6  
 OVERLAP "A".....\*  
 OVERLAP "B".....NOT USED  
 OVERLAP "C".....NOT USED  
 OVERLAP "D".....NOT USED  
 \* See overlap programming detail on sheet 2

### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11*	21,22	P21, P22	NU	41,42	NU	NU	61,62	NU	NU	NU	NU	11*	NU	NU	NU	NU	NU	
RED		128			101			134											
YELLOW	*	129			102			135											
GREEN					103														
RED ARROW																		A121	
YELLOW ARROW																			A122
FLASHING YELLOW ARROW																			A123
GREEN ARROW	127	130						136											
Hand																			113
Person																			115

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)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
U	∅ 1 1A	∅ 2 2A	∅ 2 2C	S -OR-	S -OR-	∅ 4 4A	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	∅ 2 PED DC ISOLATOR	S -OR-	FS DC ISOLATOR
L	NOT USED	∅ 2 2B	NOT USED	S -OR-	S -OR-	∅ 4 4B	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	NOT USED	S -OR-	DC ISOLATOR
U	S -OR-	∅ 6 6A	∅ 6 6C	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-
L	S -OR-	∅ 6 6B	NOT USED	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-	S -OR-

EX.: 1A, 2A, ETC. = LOOP NO.'S  
 See GPS Preemption Installation Note Below

FS = FLASH SENSE  
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

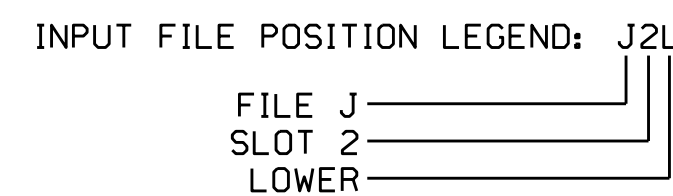
### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A <sup>1</sup>	TB2-1,2	I1U	56	1 ★	1	YES		15		N
2A	TB2-5,6	J4U	48	26 ★	6	YES				N
2B	TB2-7,8	I2L	43	12	2	YES				N
2C	TB2-9,10	I3U	63	32	2	YES				N
4A	TB4-9,10	I6U	41	4	4	YES				N
4B	TB4-11,12	I6L	45	14	4	YES		15		N
6A	TB3-5,6	J2U	40	6	6	YES				N
6B	TB3-7,8	J2L	44	16	6	YES				N
6C	TB3-9,10	J3U	64	36	6	YES				N
PED PUSH BUTTONS										
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED					

NOTE:  
 INSTALL DC ISOLATORS  
 IN INPUT FILE SLOT 112.

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

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



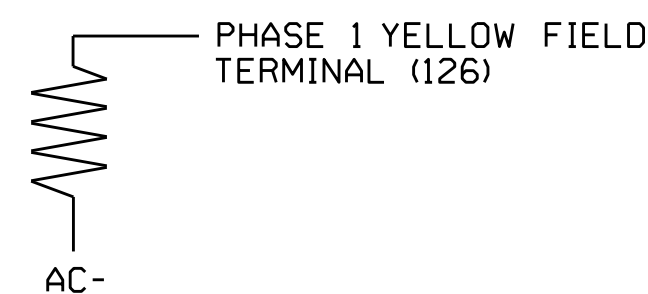
### SPECIAL DETECTOR NOTE

Install a GPS preemption system. Perform installation according to manufacturer's directions and NCDOT engineer approved mounting location to accomplish the preemption schemes shown on the Signal Design Plans.

### LOAD RESISTOR INSTALLATION DETAIL

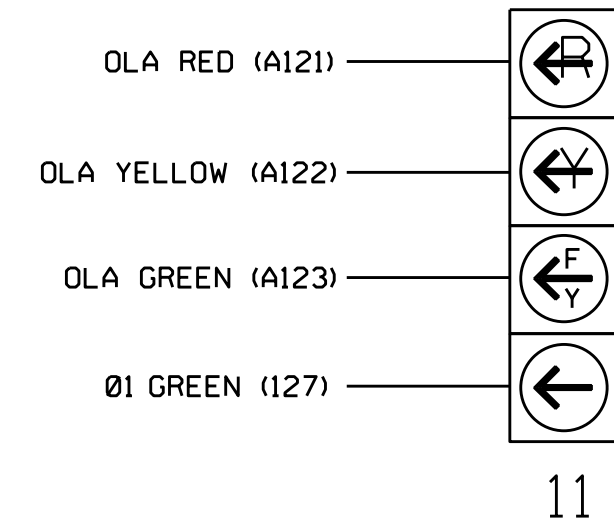
(install resistors as shown)

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



### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



### 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: 05-1235  
 DESIGNED: June 2023  
 SEALED: 09/05/2023  
 REVISED: N/A

Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of: 750 N. Greenfield Pkwy, Cary, NC 27529	SR 1401 (Cole Mill Road) at I-85 NB/US 70 EB Ramps		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL NORTH CAROLINA PROFESSIONAL ENGINEER RYAN W. HOUGH SEAL 036833
	Division 5 Durham County Durham PLAN DATE: August 2023 PREPARED BY: S. Kirkpatrick	REVIEWED BY: REVIEWED BY:	

### ECONOLITE ASC/3-2070 EMERGENCY VEHICLE

#### PREEMPT PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select 4. PREEMPTOR/TSP
- From PREEMPTOR/TSP/SCP Submenu select 1. PREEMPT PLAN 1-10

Place cursor in [ ] next to Preempt Plan and press 3. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Emergency Vehicle Preempt #3.

```

PREEMPT PLAN [ 3]  ENABLE....YES
VEH/PED 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
OVERLAP A B C D E F G H I J K L M N O P
TRKCLR V . . . . .
TRKCLR O . . . . .
ENA TRL . . . . .
DWEL VEH X . . . . X . . . . .
DWEL PED . . . . .
DWEL OLPF1 . . . . .
CYC VEH . . . . .
CYC PED . . . . .
CYC OLP . . . . .
EXIT PH . X . . . X . . . . .
EXIT CAL . . . . .
SP FUNC . . . . .
    
```

```

ENABLE... YESIPMT OVRIDE.. IINTERLOCK. NO
DET LOCK... XIDELAY.. 0IINHIBIT... 0
OVERIDE FL. . IDURATION 0ICLR-GRN... NO
TERM OLP. NOIPC>YEL YESITERM PH NO
PED DARK.. NOITC RESRV NOIDWELL FL OFF
LINK PMT...OIX FLCOLR REDIEXIT OPT. OFF
X TMG PLN...OIRE-SERV.. 0IFLT TYPE.HARD
FREE DUR PMTIR1 NOIR2 NOIR3 NOIR4 NO
--TIMING-----WALKIPED CLIMN GRI YELI RED
ENTRANCE TM. 11 2551 1125.5125.5
-----MIN GRIEXT GRIMX GRI YELI RED
TRACK CLEAR 01 01 0125.5125.5
-----MIN DLIPMTEXTIMX TMI YELI RED
DWL/CYC-EXIT 71 0.01 120125.5125.5
PMT ACTIVE OUT..ON PMT ACT DWELL...NO
OTHER - PRI PMT.OFF NON-PRI PMT....OFF
INH EXT TIME... 0.0 PED PR RETURN...OFF
PRIORITY RETURN.OFF QUEUE DELAY.... OFF
COND DELAY.....OFF
PHASES 1 2 3 4 5 6 7 8
PR RTN% 0 0 0 0 0 0 0 0
PHASES 9 10 11 12 13 14 15 16
PR RTN% 0 0 0 0 0 0 0 0
    
```

PROGRAM EXTEND TIME ON GPS DETECTOR UNIT FOR 2.0 SEC.

### ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 1A

## IMPORTANT!

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

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

```

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

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

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

```

VEH DETECTOR [ 1]  VEH DET PLAN [ 2]
TYPE: N-NTCIP
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
1 1 . . . . .
CALL OPTION.... YES DELAY TIME... 0.0
EXT OPTION. PASSAGE EXTENSION TIME. 0.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY- NO
    
```

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

```

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

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1235  
DESIGNED: June 2023  
SEALED: 09/05/2023  
REVISED: N/A

### ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

#### OVERLAP A

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

```

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

END PROGRAMMING

### ECONOLITE ASC/3-2070 PREEMPT FILTERING PROGRAMMING DETAIL

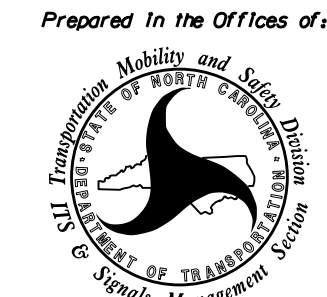
(program controller as shown)

- From Main Menu select 4. PREEMPTOR/TSP
- From PREEMPT/TSP/SCP Submenu select 2. ENABLE PREEMPT FILTERING & TSP/SCP

```

ENABLE PREEMPT FILTERING & TSP/SCP
FILTERED SOLID PULSING
INPUT 1 ...BYPASSED... ..BYPASSED..
2 ...BYPASSED... ..BYPASSED..
3 ..PREEMPT 3. ...BYPASSED..
4 ...BYPASSED... ..BYPASSED..
5 ...BYPASSED... ..BYPASSED..
6 ...BYPASSED... ..BYPASSED..
7 ...BYPASSED... ..BYPASSED..
8 ...BYPASSED... ..BYPASSED..
9 ...BYPASSED... ..BYPASSED..
10 ...BYPASSED... ..BYPASSED..
    
```

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:  
Prepared in the Offices of:  
  
750 N. Greenfield Pkwy, Garner, NC 27529

SR 1401 (Cole Mill Road)  
at  
I-85 NB/US 70 EB Ramps

Division 5 Durham County Durham

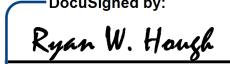
PLAN DATE: August 2023 REVIEWED BY:

PREPARED BY: S. Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 036833  
RYAN W. HOUGH

DocuSigned by:  
 09/05/2023  
DATE

SIG. INVENTORY NO. 05-1235

05-SEP-2023 13:40 S:\TSS\KTS\Sigonal\Workgroups\4519\_Mon#Projects From Signal Design\Active Projects\ck405-1234 & 05-1235 (I-5941)\M051235.sm.ele.20230905.dgn sgn.r.rp.rpt.ck



**ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL**

**ALTERNATE PHASING ACTIVATION DETAIL**

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

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

PHASING	VEH DET PLAN	SF BIT ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	1

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

**ALTERNATE PHASING CHANGE SUMMARY**

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

**SF BIT 1:** Modifies overlap parent phase for head 11 to run protected turns only.

**VEH DET PLAN 2:** Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

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

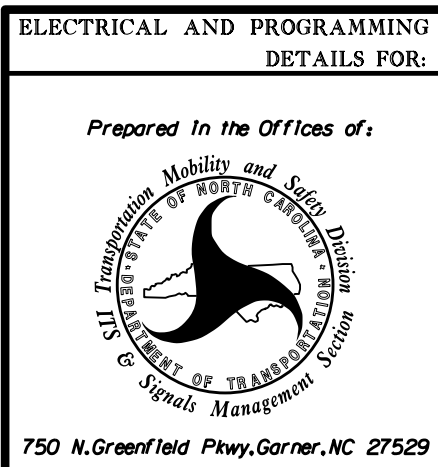
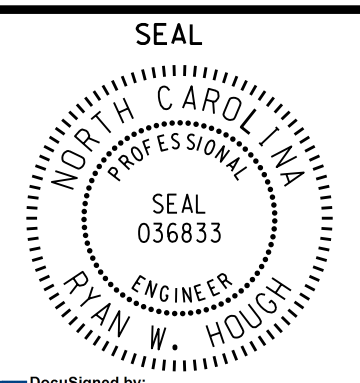
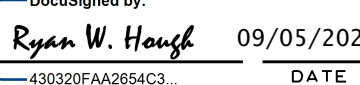
```

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

**NOTE:** Action Plan [\*] is shown as a reference only. The actual Action Plan number(s) will be determined by the Division Traffic Engineer and/or the City Traffic Engineer.

Electrical Detail - Sheet 3 of 3

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

	SR 1401 (Cole Mill Road) at I-85 NB/US 70 EB Ramps		
	Division 5 Durham County Durham		
	PLAN DATE: August 2023	REVIEWED BY:	
	PREPARED BY: S. Kirkpatrick	REVIEWED BY:	
REVISIONS	INIT.	DATE	DocuSigned by:  09/05/2023

SIG. INVENTORY NO. 05-1235

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1235  
 DESIGNED: June 2023  
 SEALED: 09/05/2023  
 REVISED: N/A

05-SEP-2023 13:41  
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