This electronic collection of documents is provided for the convenience of the user and is Not a Certified Document –

The documents contained herein were originally issued and sealed by the individuals whose names and license numbers appear on each page, on the dates appearing with their signature on that page.
This file or an individual page shall not be considered a certified document.

1. INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2. INSTALL COAX CABLE
3. INSTALL ETHERNET CABLE
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13. INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
14. INSTALL POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER
20. INSTALL CABLE(S) IN NEW RISER
21. INSTALL CABLE(S) IN EXISTING CONDUIT STUB–OUTS
22. INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
23. INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26. MODIFY EXISTING INTERCONNECT CENTER /SPLICE ENCLOSURE
27. INSTALL NEW FIBER OPTIC TRANSCEIVER
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPLICE CABLE IN CABINET
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. INSTALL POLE MOUNTED SPLICE CABINET
32. INSTALL BASE MOUNTED SPLICE CABINET
33. REMOVE EXISTING SPLICE CABINET
34. INSTALL CABINET FOUNDATION
35. REMOVE EXISTING CABINET FOUNDATION
36. INSTALL CCTV CAMERA ASSEMBLY
37. INSTALL CCTV CAMERA WOOD POLE
38. INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39. INSTALL JUNCTION BOX
40. INSTALL OVERSIZED JUNCTION BOX
41. REMOVE EXISTING JUNCTION BOX
42. INSTALL WOOD POLE
43. REMOVE EXISTING WOOD POLE
44. INSTALL AERIAL GUY ASSEMBLY
45. INSTALL STANDARD GUY ASSEMBLY
46. INSTALL SIDEWALK GUY ASSEMBLY
47. INSTALL MESSENGER CABLE
48. REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
49. REMOVE EXISTING MESSENGER CABLE
50. INSTALL TELEPHONE SERVICE
51. INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52. INSTALL DELINEATOR MARKER
53. STORE 20 FEET OF COMMUNICATIONS CABLE
54. LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55. LASH CABLE(S) TO EXISTING MESSENGER CABLE
56. LASH CABLE(S) TO NEW MESSENGER CABLE
57. MODIFY EXISTING ELECTRICAL SERVICE
58. INSTALL NEW ELECTRICAL SERVICE
59. INSTALL NEW FIELD ETHERNET SWITCH
60. BOND TRACER WIRE TO EQUIPMENT GROUND BUS
61. DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS
62. BOND RISER AND MESSENGER CABLE TO POLE GROUND

ATTACHMENT POINT:

Symbol	Meaning
XX"/SS over YYY	DISTANCE ABOVE (IN)/ATTACHMENT POINT REFERENCE POINT
YYY over XX"/SS	REFERENCE POINT DISTANCE BELOW (IN)/ATTACHMENT POINT

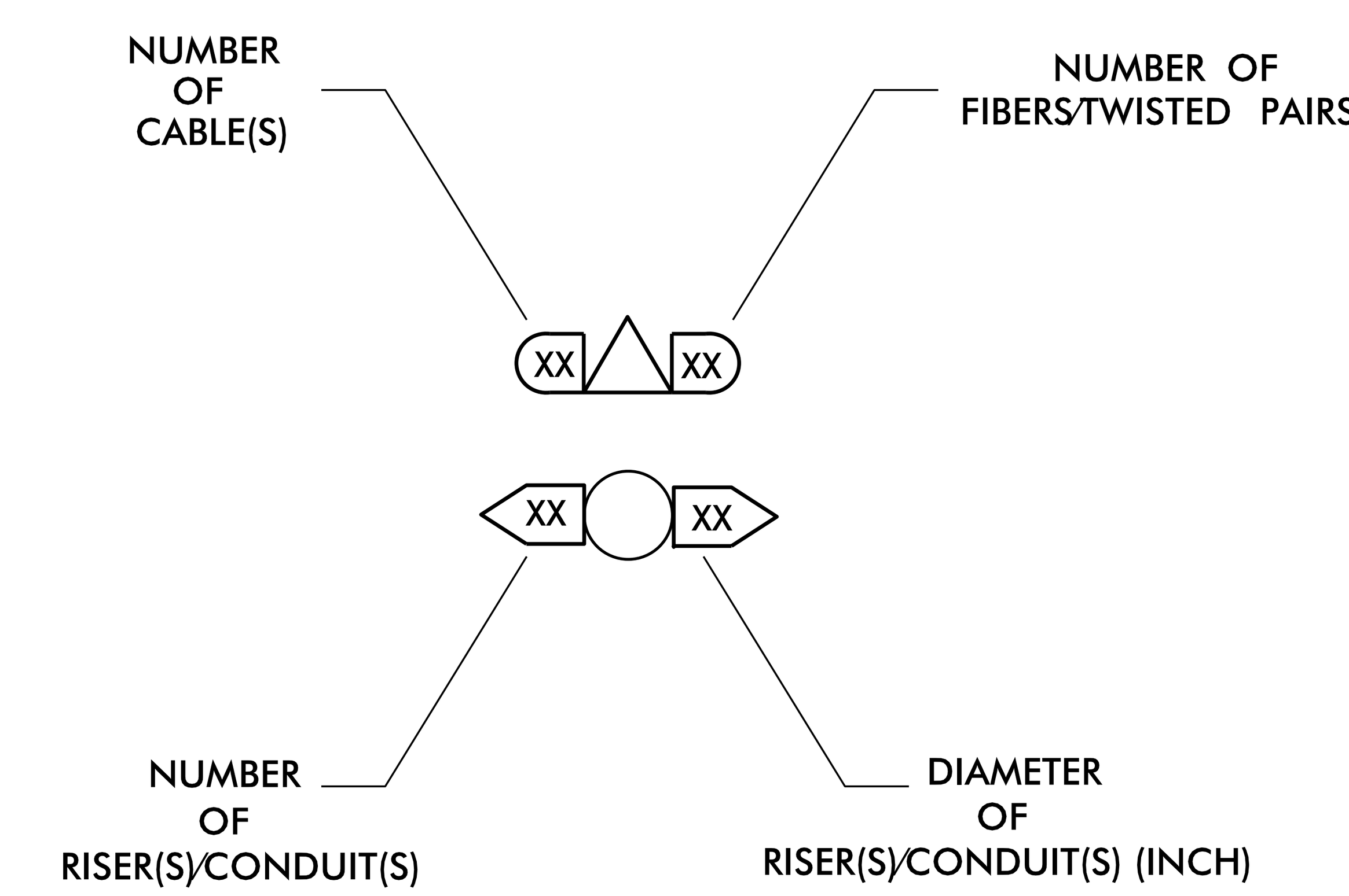
"SS" REFERENCE LOCATION	
FS =	FRONT SIDE OF POLE
BS =	BACK SIDE OF POLE

LEGEND

Symbol	Description
—FO—	NEW FIBER OPTIC COMMUNICATIONS CABLE
—TWIST PR—	NEW TWISTED PAIR COMMUNICATIONS CABLE
—EXI—	EXISTING COMMUNICATIONS CABLE
—REM—	EXISTING COMMUNICATIONS CABLE TO BE REMOVED
thin line	NEW AERIAL GUY ASSEMBLY
dash-dot line	NEW CONDUIT
dashed line	EXISTING CONDUIT
—DD—	NEW DIRECTIONAL DRILLED CONDUIT
—B&J—	NEW BORED AND JACKED CONDUIT
open rectangle	NEW JUNCTION BOX
filled rectangle	EXISTING JUNCTION BOX
open circle	NEW WOOD POLE
filled circle	EXISTING WOOD POLE
S in circle	AERIAL SPLICE ENCLOSURE
circle in square	NEW METAL POLE
circle in filled square	EXISTING METAL POLE
camera symbol	NEW CCTV ASSEMBLY
guy symbol	NEW STANDARD GUY ASSEMBLY
sidewalk guy symbol	NEW SIDEWALK GUY ASSEMBLY
snow shoe symbol	NEW CABLE STORAGE RACKS (SNOW SHOES)
X in dashed box	EXISTING CONTROLLER AND CABINET
S in dashed box	EXISTING SPLICE CABINET
S in box	NEW SPLICE CABINET
SP	SIGNAL POLE
XX–XXXX	SIGNAL INVENTORY NUMBER

CONSTRUCTION NOTE SYMBOLOGY KEY

Symbol	Meaning
XX	INDICATES NUMBER OF CABLES, LOOPS, ETC.
XX	INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
XX	INDICATES NUMBER OF RISER(S)/CONDUIT(S)
XX	INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
750 N. Greenfield Pkwy., Garner, NC 27529

CONSTRUCTION NOTES

DIVISION 05 WAKE COUNTY RALEIGH

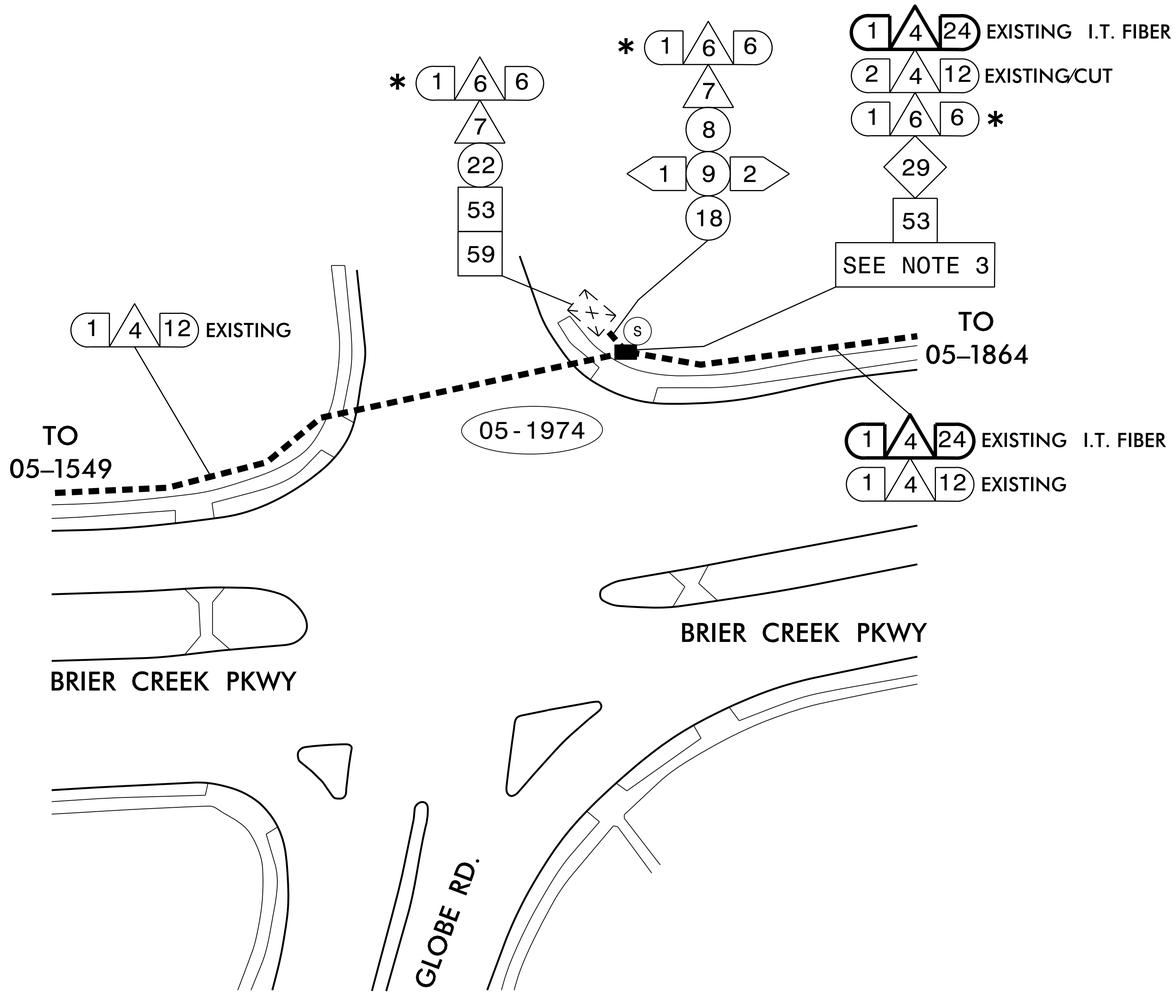
PLAN DATE:	JULY 2017	REVIEWED BY:	Mil Avery 09F5DB4CBED3443...
PREPARED BY:	A. J. SKUCE		

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI
DocuSigned by: Mohd Aslami 5D9B0BA6DBB6495...
7/28/2017
DATE

PROJECT REFERENCE NO.	SHEET NO.
W-5705I	SCP.2

* = PRETERMINATED 6–FIBER DROP CABLE



1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF RALEIGH TRANSPORTATION ENGINEER, JED NEFFENEGGER, AT (919) 996–4039 TO ARRANGE FOR THE CITY TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE CITY TRANSPORTATION ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) INSTALL NEW SPLICE INCLOSURE IN EXISTING SPECIAL SIZED JUNCTION BOX. DO NOT DISTURB THE EXISTING 24–FIBER I.T. CABLE SPLICE ENCLOSURE.

BOLD CONSTRUCTION NOTES SHOW EXISTING I.T. FIBER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:

750 N. Greenfield Pkwy., Garner, NC 27529

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS

DIVISION 05 WAKE COUNTY RALEIGH

PLAN DATE: JULY 2017

PREPARED BY: A. J. SKUCE

REVIEWED BY: Neil Avery
DocuSigned by:
09F5DB4CBED3443...

SCALE
0 30'
1" = 30'

REVISIONS	INIT.	DATE

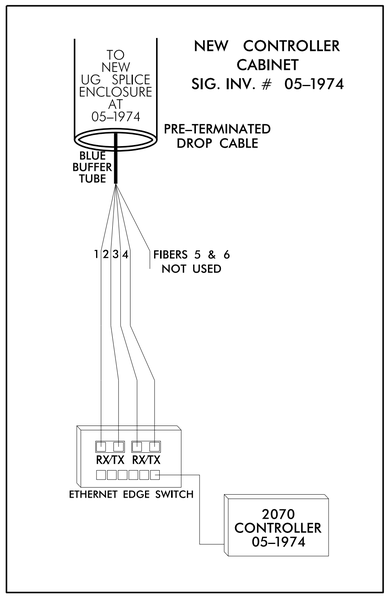
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ISLAMI

DocuSigned by:
Mohd Islami
5D9B0BA8DBB6495...

7/28/2017
DATE

PROJECT REFERENCE NO.	SHEET NO.
W-5705I	SCP.3

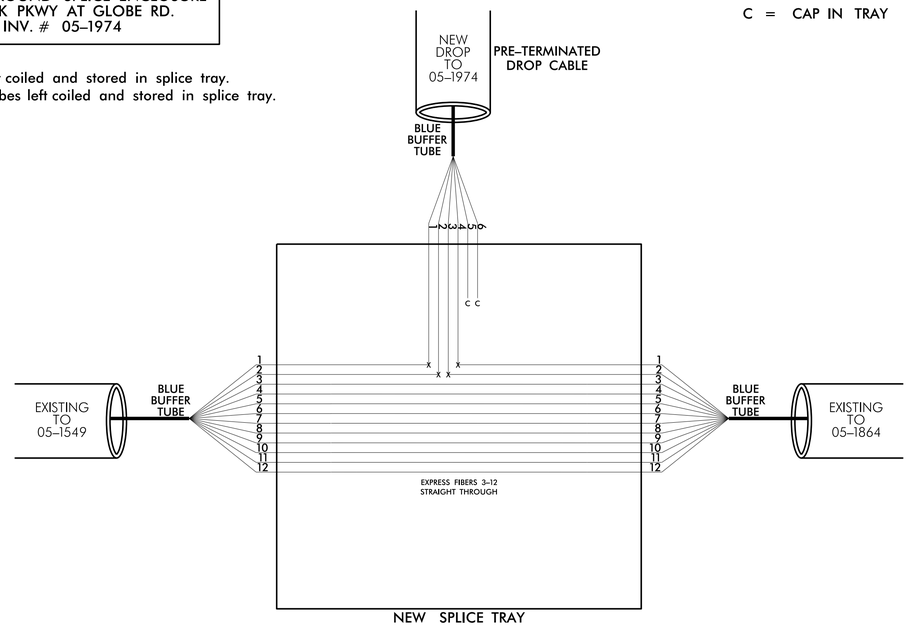


NEW UNDERGROUND SPLICE ENCLOSURE
BRIER CREEK PKWY AT GLOBE RD.
SIG. INV. # 05–1974

Notes:
Unused fibers left coiled and stored in splice tray.
Unused Buffer Tubes left coiled and stored in splice tray.

LEGEND
X = FUSION SPLICE
C = CAP IN TRAY

COLOR CODE TIA/EIA 598–A
(1) BLUE
(2) ORANGE
(3) GREEN
(4) BROWN
(5) SLATE
(6) WHITE



1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF RALEIGH TRANSPORTATION ENGINEER, JED NEFFENEGGER, AT (919) 996–4039 TO ARRANGE FOR THE CITY TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE CITY TRANSPORTATION ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL

2) PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.

4) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

1) SPLICE LOCATION
2) DATE
3) COMPANY NAME
4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1–4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Integrated Mobility and Congestion Management Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SPLICE DETAIL

DIVISION 05 WAKE COUNTY RALEIGH

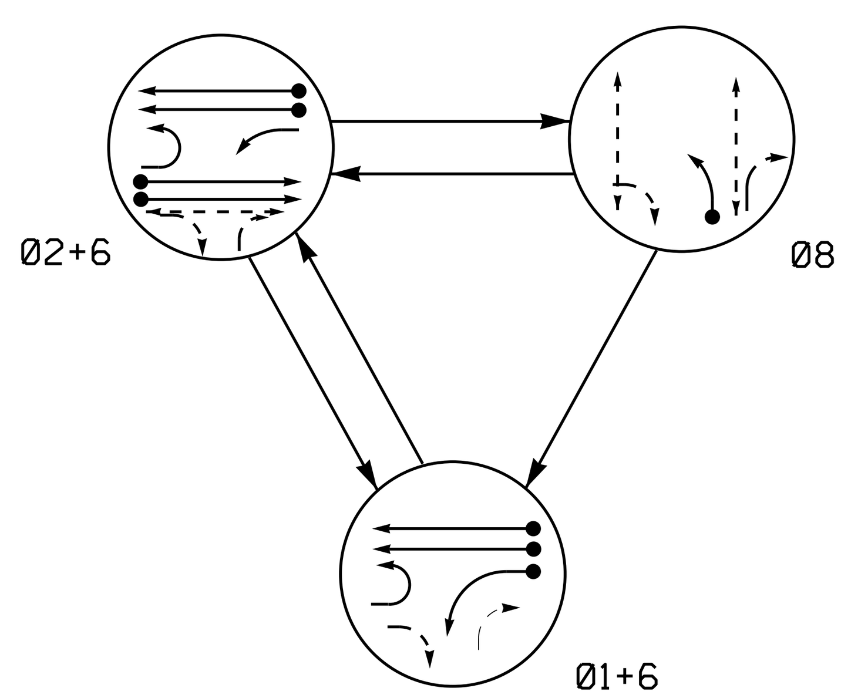
PLAN DATE: JULY 2017
PREPARED BY: A. J .SKUCE
REVIEWED BY: DocuSigned by: Mil Avery 09F5DB4CBED3443...

REVISIONS	INIT.	DATE

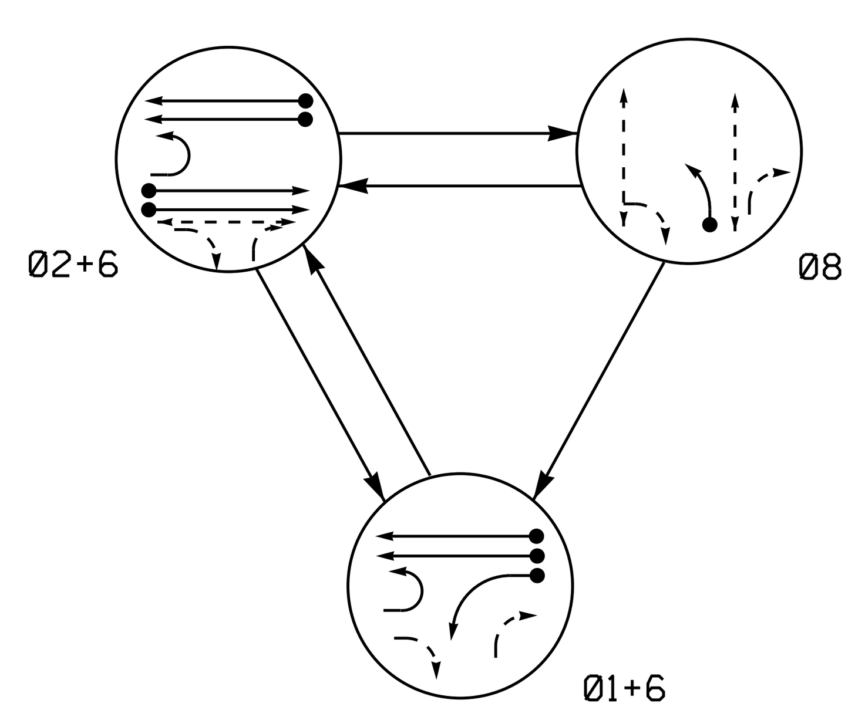
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI
DocuSigned by: Mohd Aslami 5D9B0BA6DBB6495...
7/28/2017
DATE

PROJECT REFERENCE NO.	SHEET NO.
W-5705I	Sig. 1

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- ←● DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- ← – – UNSIGNALIZED MOVEMENT
- <– – –> PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø8	FLASH
11	←	←F/Y	←R	←Y
21	F/Y (U-turn)	F/Y (U-turn)	R (U-turn)	Y (U-turn)
22, 23, 24	R	G	R	Y
61, 62, 63	G	G	R	Y
81, 82	R	R	G	R
P21, P22	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK
P83, P84	DW	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø8	FLASH
11	←	←R	←R	←Y
21	F/Y (U-turn)	F/Y (U-turn)	R (U-turn)	Y (U-turn)
22, 23, 24	R	G	R	Y
61, 62, 63	G	G	R	Y
81, 82	R	R	G	R
P21, P22	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK
P83, P84	DW	DW	W	DRK

SE-PAC 2070 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	TIMING DELAY	TIMING EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROT/PER LEFT	6 PROT/PER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	STATUS NEW	STATUS EXISTING
1A	6X40	2-4-2	0	X	-	1	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2A	6X6	5	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2B	6X6	5	300	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	5	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	5	300	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

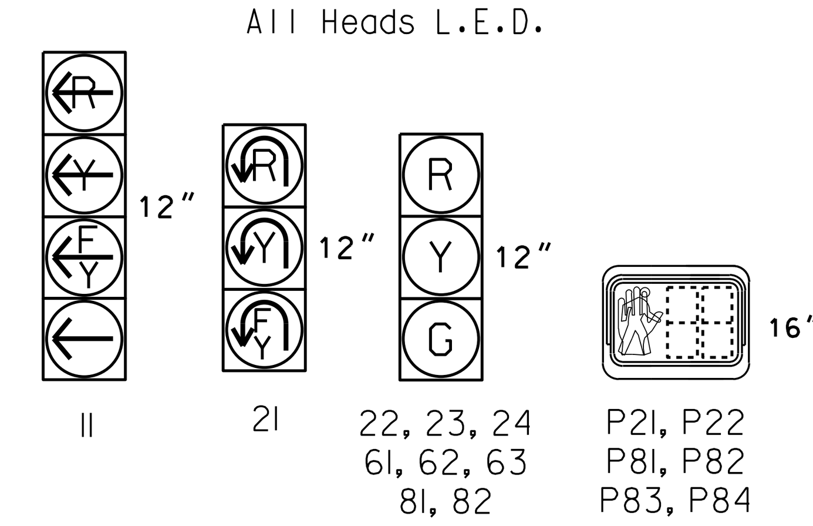
3 Phase
Fully Actuated
(Raleigh Signal System)

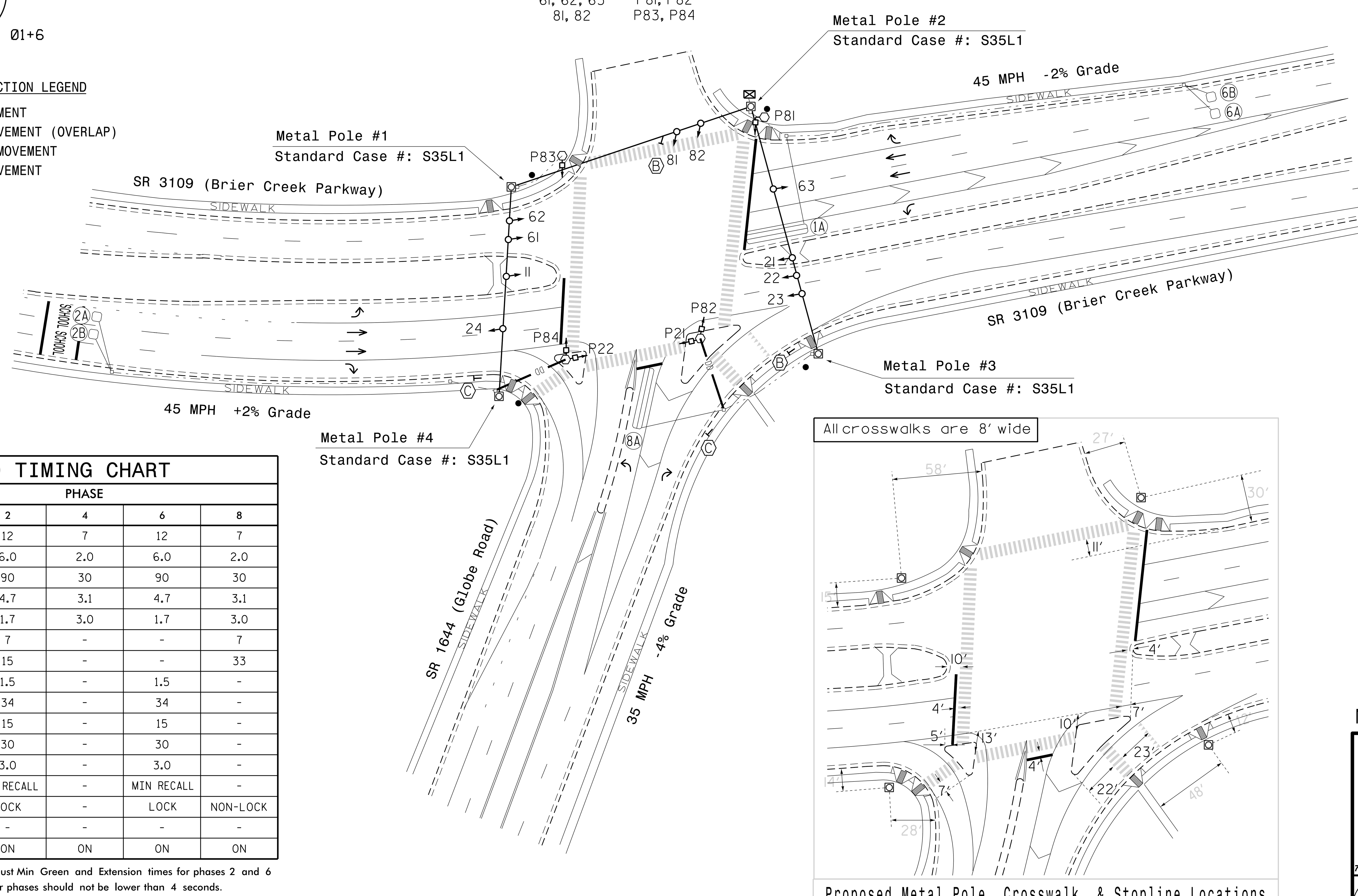
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing unless otherwise shown.
9. The City Traffic Engineer will determine the hours of use for each phasing plan.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Program phase 4 as a dummy phase for Ring 1.
12. All metal poles and ped pedestals shall be black powder coated.

SIGNAL FACE I.D.

All Heads L.E.D.





SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	4	6	8
Min Green *	7	12	7	12	7
Passage Gap *	2.0	6.0	2.0	6.0	2.0
Maximum Green *	15	90	30	90	30
Yellow Change	3.4	4.7	3.1	4.7	3.1
Red Clear	3.0	1.7	3.0	1.7	3.0
Walk *	-	7	-	-	7
Pedestrian Clear	-	15	-	-	33
Added Initial *	-	1.5	-	1.5	-
Maximum Initial *	-	34	-	34	-
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	-	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.

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	●—⌣
⊂⊃	Inductive Loop Detector	⊂ – – ⊃
⊠	Controller & Cabinet	⊠ (dashed)
□	Junction Box	■
– · – · –	2-in Underground Conduit	– · – · –
N/A	Right of Way	— — — —
→	Directional Arrow	→
◙	Metal Strain Pole	◙
— DD —	Directional Drill	N/A
⬡	Type II Signal Pedestal	⬢
N/A	Curb Ramp	⩚
(A)	"YIELD" Sign (R1-2)	(A)
(B)	"TURNING VEHICLES YIELD TO PEDESTRIANS" Sign (R10-15)	(B)
(C)	PEDESTRAIN WARNING SIGN (W11-2)	(C)

New Installation

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy.Garner.NC 27529

SR 3109 (Brier Creek Parkway) at SR 1644 (Globe Road)

Division 5 Wake County Raleigh

PLAN DATE:	September 2017	REVIEWED BY:
PREPARED BY:	C.E. Carter	REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 10/27/2017
43032054A2654C3...
DATE

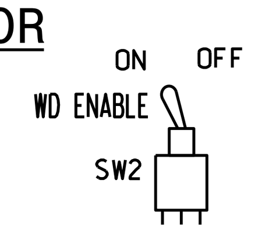
SIG. INVENTORY NO. 05-1974

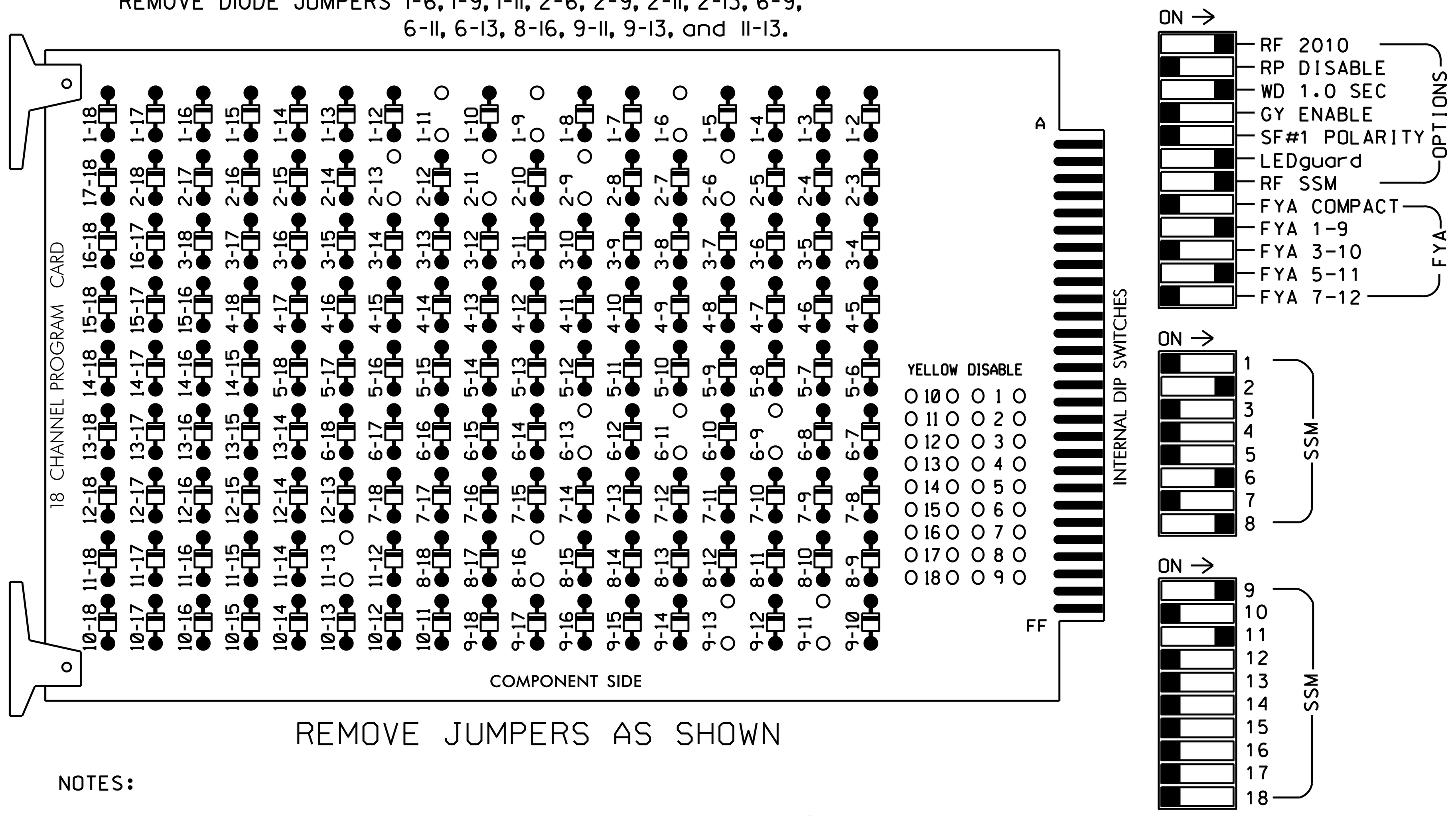
22-DEC-2017 09:28
S:*Static*Sig_Library*Div05*051974_sig_dsn_20171027.dgn
rwhough

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 2-6, 2-9, 2-11, 2-13, 6-9, 6-11, 6-13, 8-16, 9-11, 9-13, and 11-13.





REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phases 2 and 6 green.
3. Enable simultaneous gap-out feature, on controller unit, for all phases.
4. Program phases 2 and 6, on controller unit, for volume density operation.
5. The cabinet and controller are part of the Raleigh Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............2070
CABINET.................332 W/ AUX
SOFTWARE................SE-PAC2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S3,S8,S11,S12,AUX S1,AUX S4
PHASES USED.............1,2,2PED,4*,6,8,8PED
OVERLAP A...............**
OVERLAP B...............NOT USED
OVERLAP C...............**
OVERLAP D...............NOT USED

* DUMMY 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.	11★	22,23 24	P21, P22	NU	NC	NU	NU	61,62 63	NU	NU	81,82	P81,P82 P83,P84	11★	NU	NU	21★	NU	NU
RED		128						134			107							
YELLOW	*	129						135			108							
GREEN		130						136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127																	
(Don't Walk)			113									110						
(Walk)			115									112						

NU = Not Used

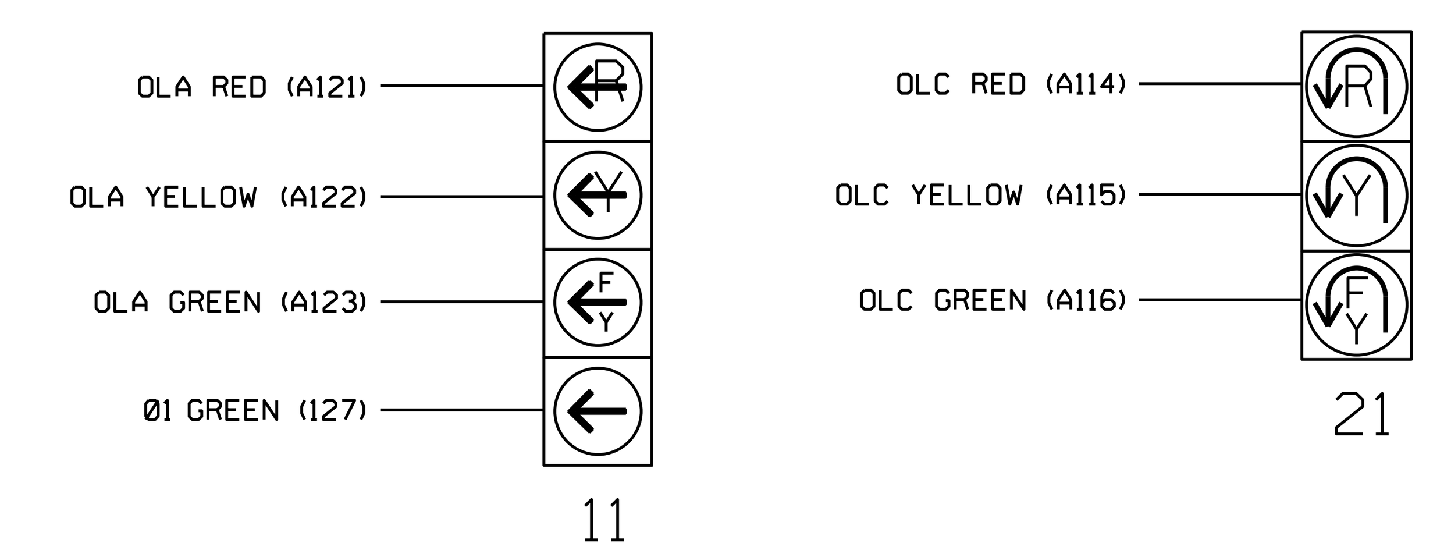
NC = No Connection

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE: See sheet 2 for Protected & Permitted Phases programming.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
"I"	L	NOT USED	Ø2 2B										NOT USED	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
"J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L		Ø6 6B				NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1	5	
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
8A	TB5-9,10	J6U	42	31	8		
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P81,P82 P83,P84	TB8-8,9	I13L	70	PED 8	8 PED		

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

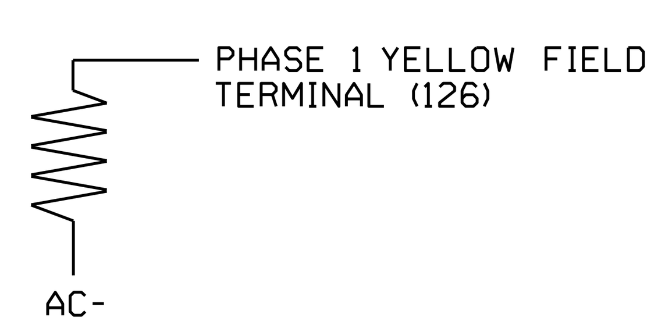
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1974
DESIGNED: September 2017
SEALED: 10/27/2017
REVISED: N/A

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3109 (Brier Creek Parkway)
at
SR 1644 (Globe Road)

Prepared in the Offices of:
ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

Division 5 | Wake County | Raleigh

PLAN DATE: October 2017	REVIEWED BY:
PREPARED BY: S. Armstrong	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036880 ENGINEER KEITH M. MIMS

DocuSigned by: Keith M. Mims 2F80786E8CD34A5... 11/7/2017 DATE

SIG. INVENTORY NO. 05-1974

FLASHING YELLOW ARROW PROTECTED/PERMISSIVE SEQUENCE FOR OVERLAPS A & C

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC      6-ALT SEQUENCES
 2-REMOTE FLASH        7-PORT 1 DATA
[3-OVERLAP STANDARD]   8-I/O MISC
 4-OVERLAP SPECIAL     9-SIG DRV OUT
 5-RING STRUCTURE

                              F-PRIOR MENU
```

DO NOT enter any OVL PHASES! →

```
SE-PAC OVERLAP - A              (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 000100000 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

PRESS "B" TWICE

DO NOT enter any OVL PHASES! →

```
SE-PAC OVERLAP - C              (0-NO/1-YES)

 OVL PHASES:  000000000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 000001000 00000

A-UP B-DN D-DspChn   E-EDIT  F-PRIOR MENU
```

OVERLAP PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO UNIT DATA

PROTECTED AND PERMISSIVE PHASES FOR FLASHING YELLOW ARROW

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC      6-ALT SEQUENCES
 2-REMOTE FLASH        7-PORT 1 DATA
 3-OVERLAP STANDARD    8-I/O MISC
[4-OVERLAP SPECIAL]    9-SIG DRV OUT
 5-RING STRUCTURE

                              F-PRIOR MENU
```

```
SE-PAC OVLP.A...B...C...D...E...F...G...H.
   TR GRN   0   0   0   0   0   0   0   0
   YEL/10  40  40  40  40  40  40  40  40
   RED/10  20  20  20  20  20  20  20  20
   -G/Y     1   0   5   0   0   0   0   0    ← PROTECTED PHASES
   +GRN     2   0   6   0   0   0   0   0    ← PERMISSIVE PHASES
 (-) #-PH G/Y KILLS OVLP= (+) #-PH G STRT
 A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

PPLT DEFINITION PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO UNIT DATA

NOTE: THIS PROGRAMMING IS REQUIRED FOR SIGNAL HEADS 11 AND 21 SO THAT THE SOLID GREEN ARROW TURNS ON EXCLUSIVELY DURING PROTECTED GREEN PHASE 1, AND THE FLASHING YELLOW ARROWS TURN ON EXCLUSIVELY DURING PERMITTED GREEN PHASES 2 & 6. NOTE THAT THE FLASHING YELLOW ARROW FOR SIGNAL HEAD 11 WILL NOT FLASH AT ALL DURING THE ALTERNATE PHASING PERIOD.

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
```

Phases 3,5,7 NOT used! →

```
PHASE......1...2...3...4...5...6...7...8...9
 INITIAL   1   4   0   1   0   4   0   1   0
 NA RESP   0   1   0   2   0   1   0   2   0

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

INIT & N.A. RESP programming complete.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 05-1974
DESIGNED: September 2017
SEALED: 10/27/2017
REVISED: N/A

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 3109 (Brier Creek Parkway) at SR 1644 (Globe Road)

Division 5 Wake County Raleigh

PLAN DATE: October 2017 REVIEWED BY:
PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Transportation Mobility and Safety Division, ITS & Signals Management Section — State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036880 ENGINEER KEITH M. MIMS

DocuSigned by: Keith M. Mims 2F80786E8CD34A5... 11/7/2017 DATE

SIG. INVENTORY NO. 05-1974

TOD EVENT SCHEDULING PROGRAMMING DETAIL
TO CALL ALTERNATE PHASING OPERATION DURING COORDINATION

(program controller as shown below)

∗ DENOTES TO BE DETERMINED BY THE DIVISION TRAFFIC ENGINEER.

NOTES

1. Phase Functions can be called by Time of Day (TOD) in Traffic Events, but not during coordination.
2. Special Functions can be called by Time of Day using Aux Events, and can run in conjunction with Coordination.
3. Special Functions can be used to call a Phase Function. In doing this a Phase function can run while a Coordination pattern is running.
4. If Alternate Phasing is used during FREE-RUN, Phase Function 1 must be turned on with a Traffic Event.

PHASE FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 1 - Assign "OVERLAP A OMIT" to Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA      PRESS # DESIRED

 1-VIEW CURRENT         6-EQUATE/TRANSFER
 2-SET TIME/DATE        7-CLEAR MEMORY
 3-TRAFFIC EVENTS       8-DIMMING
 4-AUX EVENTS          [9-PHS FUNC MAPPING]
 5-TOY EVENTS           0-SPC FUNC MAPPING
                             F-PRIOR MENU
```

```
EPAC  TIME BASE PHS FUNC MAPPING
                 PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
   1  PHS-01 MAX # 2   000000000 0000000
   2  PHS-02 MAX # 2   010000000 0000000
   3  PHS-03 MAX # 2   001000000 0000000
   4  PHS-04 MAX # 2   000100000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

← REMOVE PHASE FUNCTION NUM 1 DEFAULT VALUE

HIT "A" KEY UNTIL POSITIONED ON NUM 145

```
EPAC  TIME BASE PHS FUNC MAPPING
                 PHS FUNC SEL(0-OFF/1-ON)
 NUM..P-FUNCT NAME.....123456789 0123456
 145  OVERLAP A OMIT   100000000 0000000
 146  OVERLAP B OMIT   000000000 0000000
 147  OVERLAP C OMIT   000000000 0000000
 148  OVERLAP D OMIT   000000000 0000000
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

← SET SWITCH 1 "ON' AS SHOWN FOR OVERLAP A OMIT

PHASE FUNCTION PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO TIME BASE DATA

SPECIAL FUNCTION MAPPING PROGRAMMING DETAIL

(program controller as shown below)

Step 2 - Assign Special Function 1 to call Phase Function 1.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA      PRESS # DESIRED

 1-VIEW CURRENT         6-EQUATE/TRANSFER
 2-SET TIME/DATE        7-CLEAR MEMORY
 3-TRAFFIC EVENTS       8-DIMMING
 4-AUX EVENTS           9-PHS FUNC MAPPING
 5-TOY EVENTS          [0-SPC FUNC MAPPING]
                             F-PRIOR MENU
```

```
EPAC TIME BASE SPC FUNC MAPPING
                              SPC FUNC
 S-FUNCTION NAME .........    12345678
   SPC 1-8 AS PHS FUNC 1- 8   10000000
   SPC 1-8 AS PHS FUNC 9-16   00000000
   SPEC FUNCTION 1            10000000
 CODES.......0-OFF....1-ON...........
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

← PHASE FUNCTION 1 WILL BE CALLED WHEN SPECIAL FUNCTION 1 IS SELECTED

SPECIAL FUNCTION PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO TIME BASE DATA

AUX EVENT PROGRAMMING TO CALL SPECIAL FUNCTION DURING COORDINATION

(program controller as shown below)

Step 3 - An Auxiliary event will be used to call the Special Function. This is done in Time Base Data under Aux Event. Add Auxiliary events as needed remembering to use one event to turn the Special Function on and one event to turn the Special Function off. If these are to be used in conjunction with the Traffic Events during Coordination then the On/Off times should be identical.

FROM MAIN MENU PRESS 6 (TIME BASE DATA)

```
EPAC TIME BASE DATA      PRESS # DESIRED

 1-VIEW CURRENT         6-EQUATE/TRANSFER
 2-SET TIME/DATE        7-CLEAR MEMORY
 3-TRAFFIC EVENTS       8-DIMMING
[4-AUX EVENTS]          9-PHS FUNC MAPPING
 5-TOY EVENTS           0-SPC FUNC MAPPING
                             F-PRIOR MENU
```

```
EPAC TIME BASE - AUXILIARY EVENTS
  DD  HH MM  A123  D123  DIM  S12345678
  *   *  *    000   000   0    10000000
  *   *  *    000   000   0    00000000
  *   *  *    000   000   0    00000000
CODES........0-OFF....1-ON.............
OVERWRITE ">" W/ 1-ADD  2-DELETE  3-EDIT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Special Function (SF)
← SF 1 "ON"
← SF 1 "OFF"

AUX EVENT PROGRAMMING COMPLETE
PRESS 'F' TO RETURN TO TIME BASE DATA

! AUX EVENT MUST BE SCHEDULED TO RUN CONCURRENT WITH A TRAFFIC EVENT SCHEDULED COORDINATION PATTERN.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1974
DESIGNED: September 2017
SEALED: 10/27/2017
REVISED: N/A

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 3109 (Brier Creek Parkway) at SR 1644 (Globe Road)
Prepared in the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation, 750 N.Greenfield Pkwy,Garner,NC 27529	Division 5 / Wake County / Raleigh
	PLAN DATE: October 2017 / REVIEWED BY:
	PREPARED BY: S. Armstrong / REVIEWED BY:
	REVISIONS / INIT. / DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036880 ENGINEER KEITH M. MIMS

DocuSigned by: Keith M. Mims 2F80786E8CD34A5... 11/7/2017 DATE

SIG. INVENTORY NO. 05-1974

07-NOV-2017 13:12
S:∗ITS&SU∗ITS Signals∗Workgroups∗Sig Man∗Armstrong∗051974_sm_ele_xxx.dgn
sarmstrong