

ECONOLITE ASC/3-2070 VEHICLE DETECTOR SETUP PROGRAMMING DETAIL FOR ALTERNATE PHASING

LOOP 5A

(program controller as shown)

IMPORTANT!

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

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

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

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

VEH DETECTOR [5] VEH DET PLAN [2] TYPE: S-STANDARD TS2 DETECTOR... ECPI LOG... NO DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 5 5 EXTEND TIME... 0.0 DELAY TIME... 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: S-STANDARD TS2 DETECTOR... ECPI LOG... NO DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 22 0 EXTEND TIME... 0.0 DELAY 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: 07-0037 DESIGNED: March 2018 SEALED: 6/13/2018 REVISED: NA

Electrical Detail - Sheet 3 of 4

Mattern & Craig ENGINEERS • SURVEYORS 12 BROAD STREET ASHEVILLE, NORTH CAROLINA 28801 (828) 254-2201 FAX (828) 254-4562 NC LIC. NO. C-1154

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1716 (Graham-Hopedale Road) at Vaughn Road Division 7 Alamance County Burlington PLAN DATE: March 2018 REVIEWED BY: JB Voso PREPARED BY: SE Greene REVIEWED BY: James Voso

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JAMES B. VOSO 022599 6/13/2018 SIG. INVENTORY NO. 07-0037

*****SYSTEMS***** *****USER***** **********

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.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	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 phases for head 51 to run 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...[ 1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --   RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY   NO
PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
PED RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
WALK 2   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
VEH RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX RCL  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
MAX 2    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
PHASE  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5  6
MAX 3    .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
CS INH   .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
OMIT     .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
SPC FCT  .  .  .  .  X  .  .  .  .  .  .  .  .  .  .  .
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 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .

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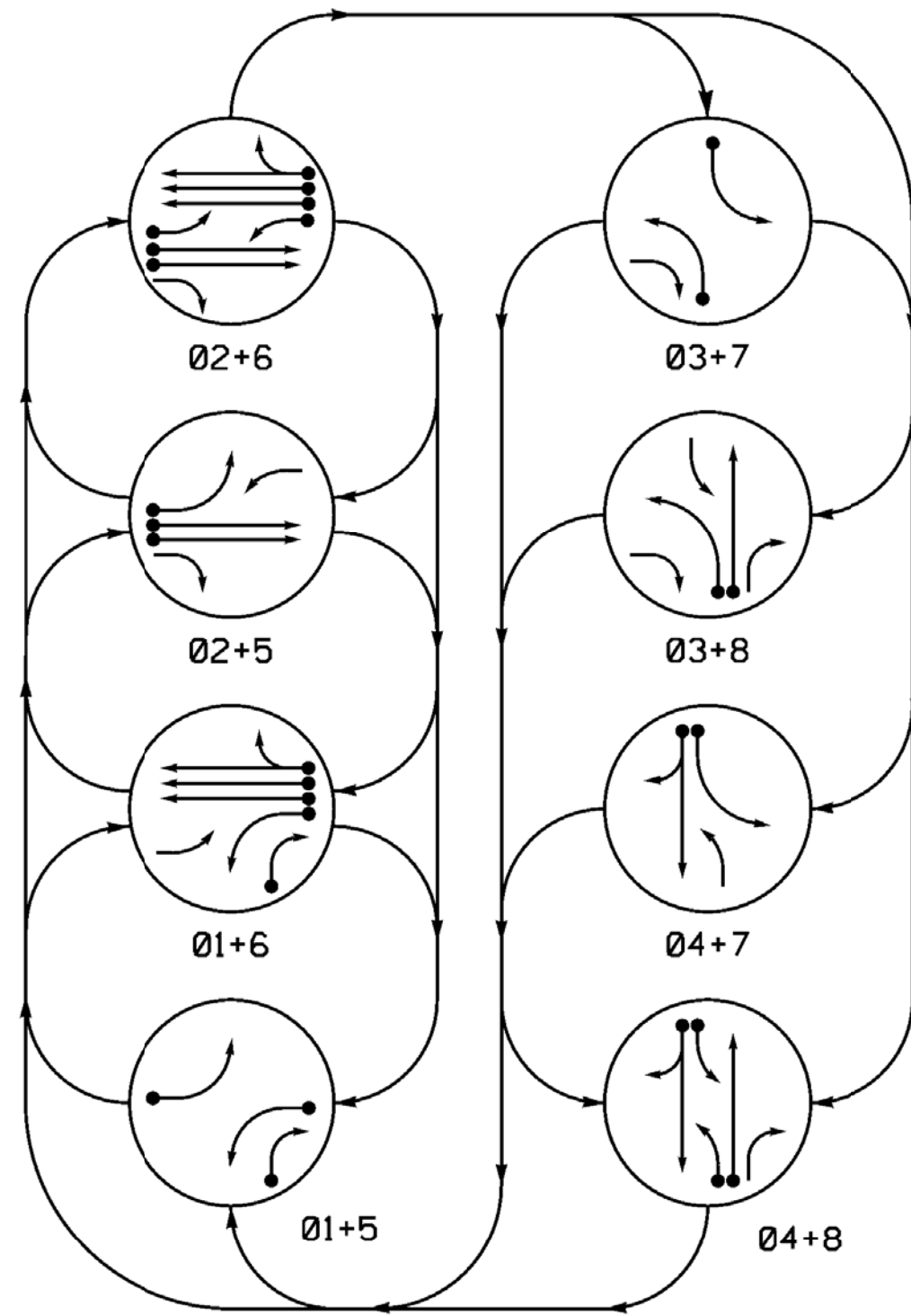
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0037
DESIGNED: March 2018
SEALED: 6/13/2018
REVISED: NA

Electrical Detail - Sheet 4 of 4

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

 <small>150 N. Greenfield Pkwy, Garner, NC 27529</small>	SR 1716 (Graham-Hopedale Road) at Vaughn Road	 <small>James Vosso 6/13/2018</small>				
	<small>Prepared for the Offices of:</small>					
	<small>Division 7 Alamance County Burlington</small> <small>PLAN DATE: March 2018 REVIEWED BY: JB Vosso</small> <small>PREPARED BY: SE Greene REVIEWED BY:</small>					
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">REVISIONS</th> <th style="width: 10%;">INIT.</th> <th style="width: 40%;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE	
REVISIONS	INIT.	DATE				

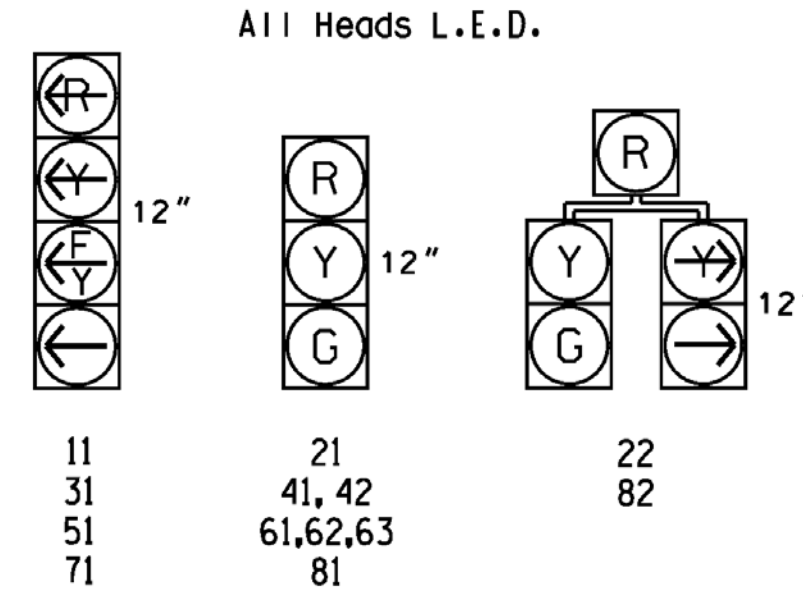
DEFAULT PHASING DIAGRAM



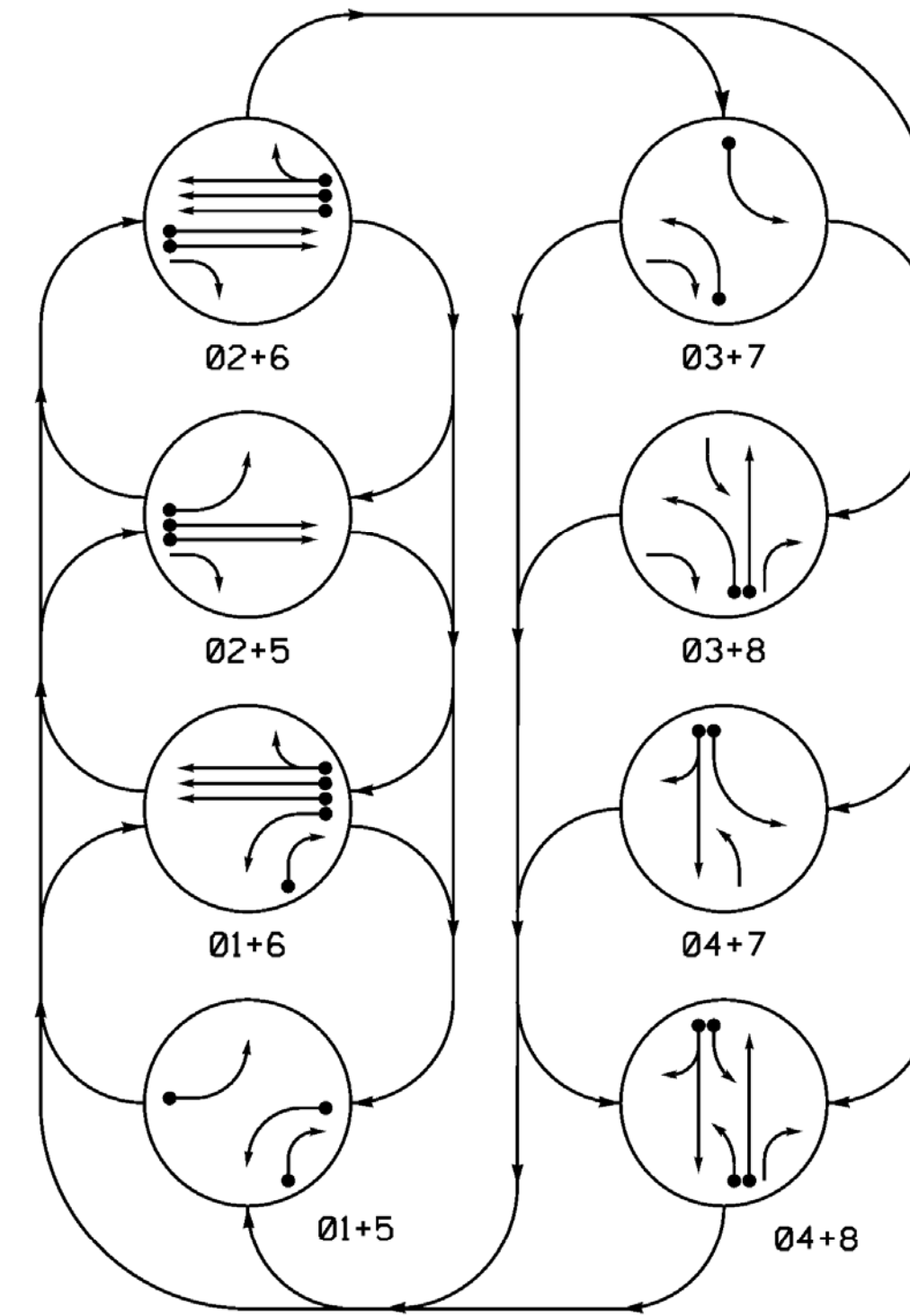
DEFAULT TABLE OF OPERATION

SIGNAL FACE	PHASE								F L E O P T
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	
11	---	---	---	---	---	---	---	---	---
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
31	R	R	R	R	---	---	---	---	---
41, 42	R	R	R	R	R	R	G	G	R
51	---	---	---	---	---	---	---	---	---
61, 62, 63	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	---	---	---	---	---
81	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.



ALTERNATE PHASING DIAGRAM



ALTERNATE TABLE OF OPERATION

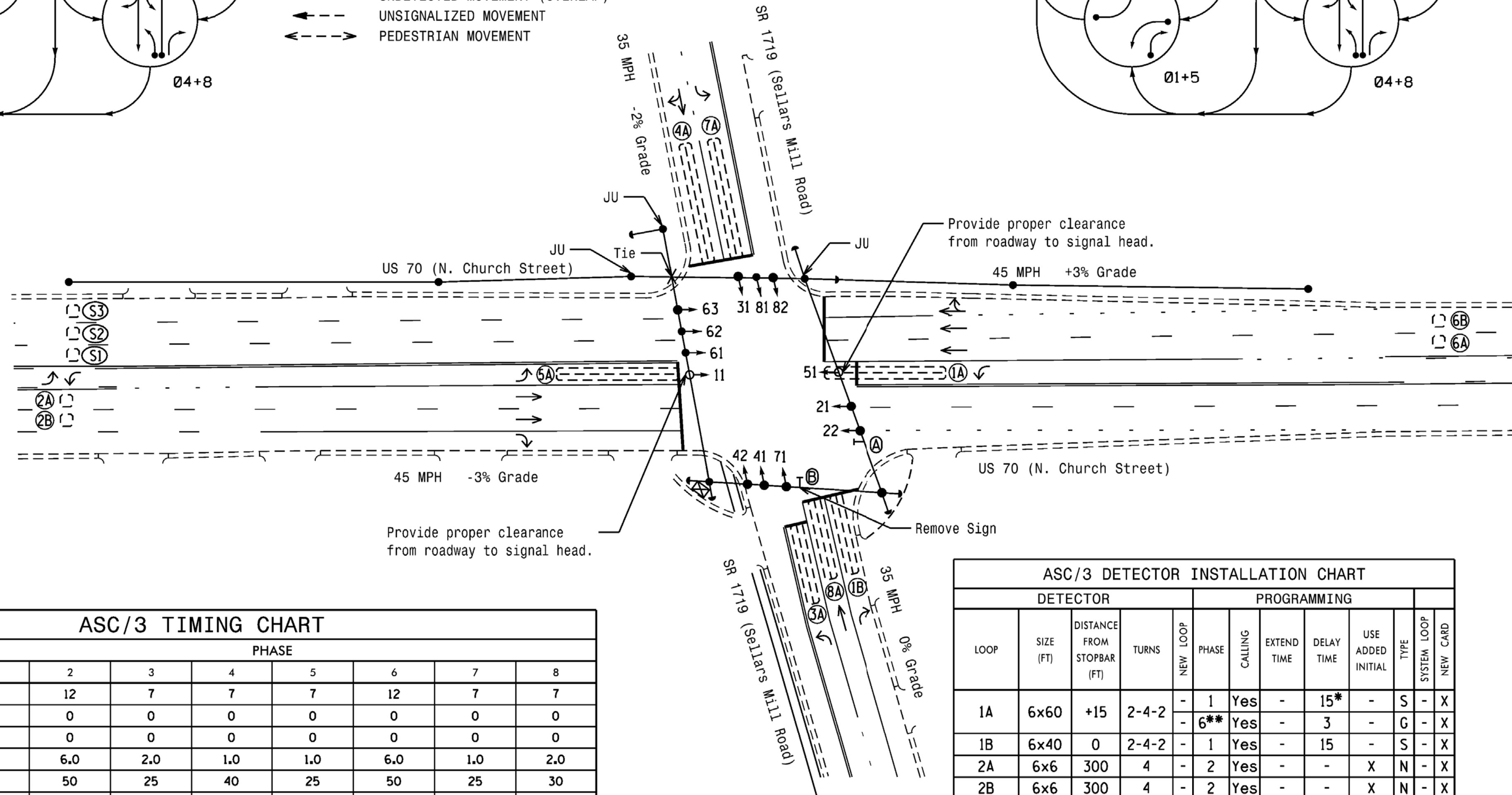
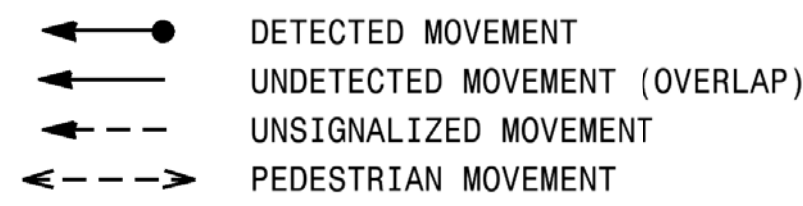
SIGNAL FACE	PHASE								F L E O P T
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	
11	---	---	---	---	---	---	---	---	---
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
31	R	R	R	R	---	---	---	---	---
41, 42	R	R	R	R	R	R	G	G	R
51	---	---	---	---	---	---	---	---	---
61, 62, 63	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	---	---	---	---	---
81	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R

8 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- The 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.

PHASING DIAGRAM DETECTION LEGEND



ASC/3 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0
Veh. Extension *	2.0	6.0	2.0	1.0	1.0	6.0	1.0	2.0
Max I *	25	50	25	40	25	50	25	30
Yellow	3.0	4.8	3.0	4.0	3.0	4.8	3.0	4.0
Red Clear	2.3	1.2	3.2	2.4	2.1	1.2	2.8	2.4
Actuations B4 Add *	-	0	-	-	-	0	-	-
Seconds / Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	15	-	-	-	15	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

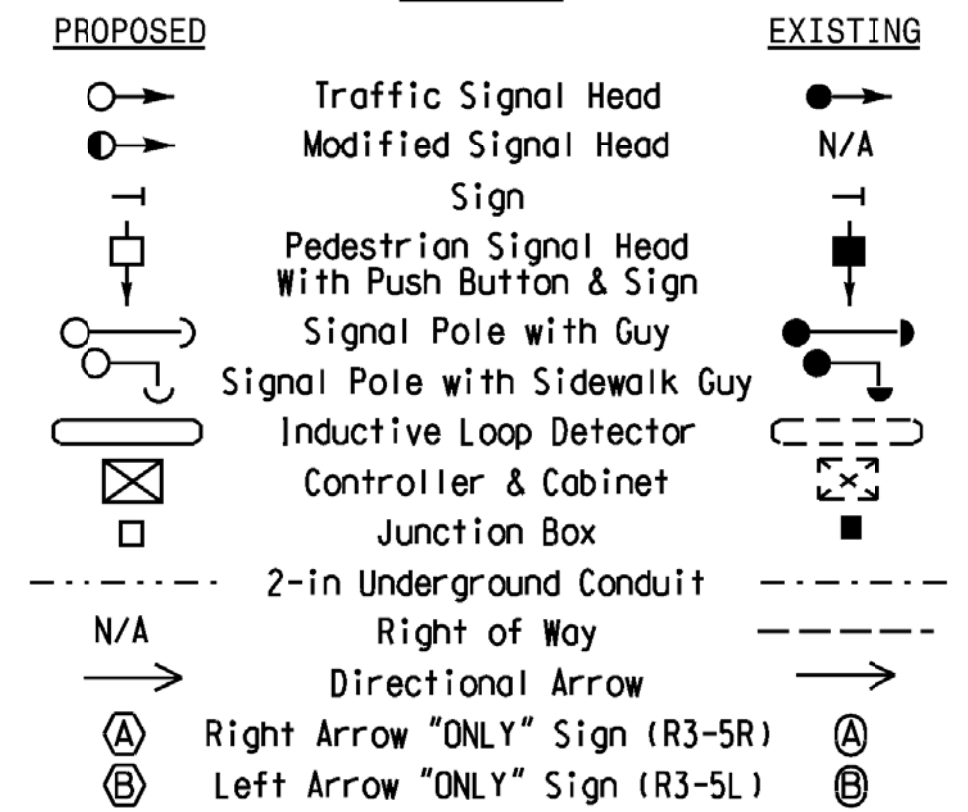
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING									
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD		
1A	6x60	+15	2-4-2	-	1	Yes	-	15*	-	S	-	X		
1B	6x40	0	2-4-2	-	1	Yes	-	15	-	S	-	X		
2A	6x6	300	4	-	2	Yes	-	-	X	N	-	X		
2B	6x6	300	4	-	2	Yes	-	-	X	N	-	X		
3A	6x40	0	2-4-2	-	3	Yes	-	10	-	S	-	X		
4A	6x60	0	2-4-2	-	4	Yes	-	10	-	S	-	X		
5A	6x60	0	2-4-2	-	5	Yes	-	15*	-	S	-	X		
6A	6x6	300	6	-	6	Yes	-	-	X	N	-	X		
6B	6x6	300	6	-	6	Yes	-	-	X	N	-	X		
7A	6x60	0	2-4-2	-	7	Yes	-	10	-	S	-	X		
8A	6x40	0	2-4-2	-	8	Yes	-	-	-	S	-	X		
S1	6x6	+368	EXIST.	-	-	No	-	-	-	N	X	X		
S2	6x6	+368	EXIST.	-	-	No	-	-	-	N	X	X		
S3	6x6	+368	EXIST.	-	-	No	-	-	-	N	X	X		

* Disable Delay During Alternate Phasing Operation.
** Disable Phase 2/6 Call for Loop 5A/1A during Alternate Phasing Operation.

LEGEND



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Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of: **US 70 (N. Church Street) at SR 1719 (Sellars Mill Road)**

Division 7 Alamance County Burlington

PLAN DATE: March 2018 REVIEWED BY: JB Voso

PREPARED BY: SE Greene REVIEWED BY:

REVISIONS

INIT. DATE

6/13/2018

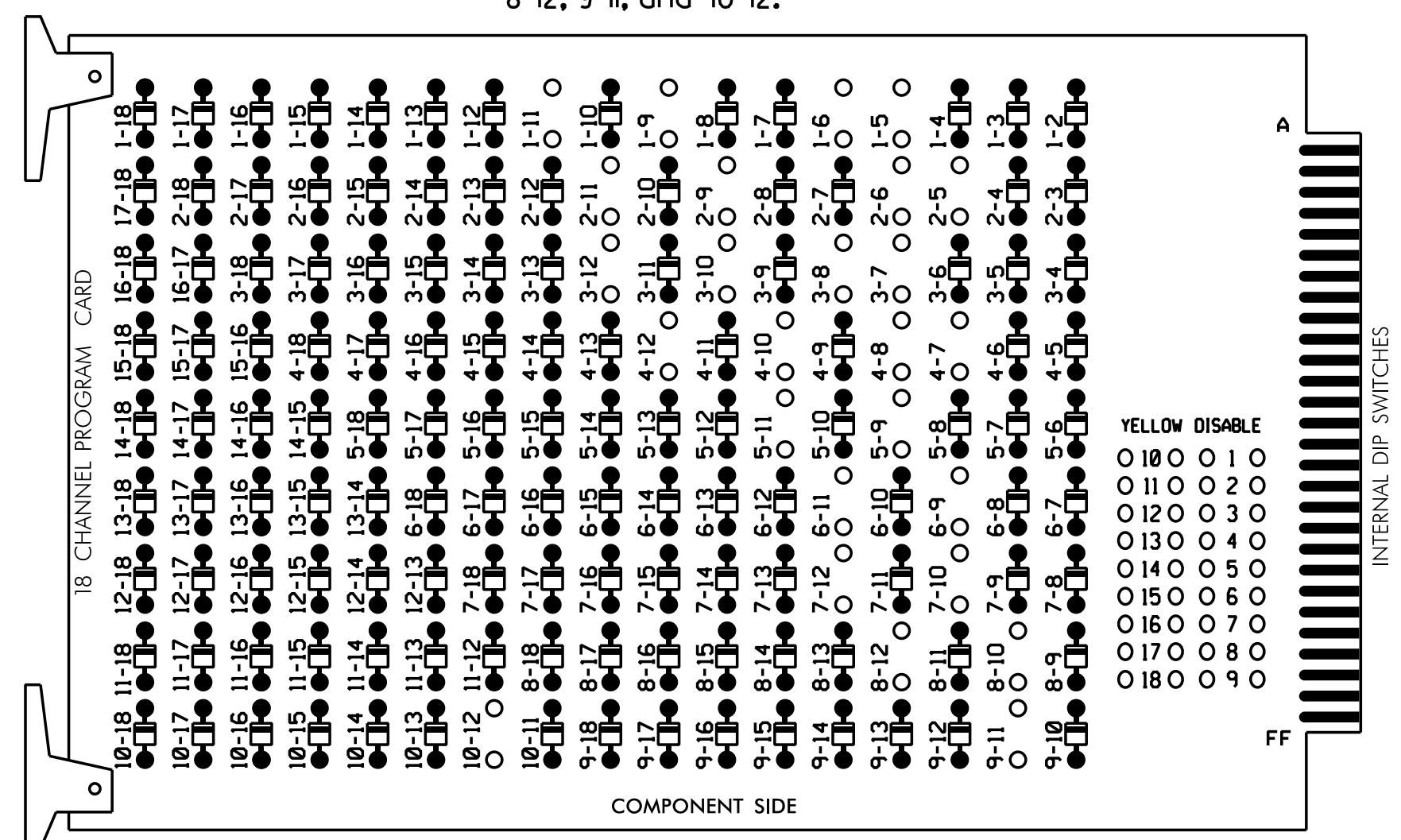
SIG. INVENTORY NO. 07-0040

*****SYTIME*****
*****BUSERNAME*****

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

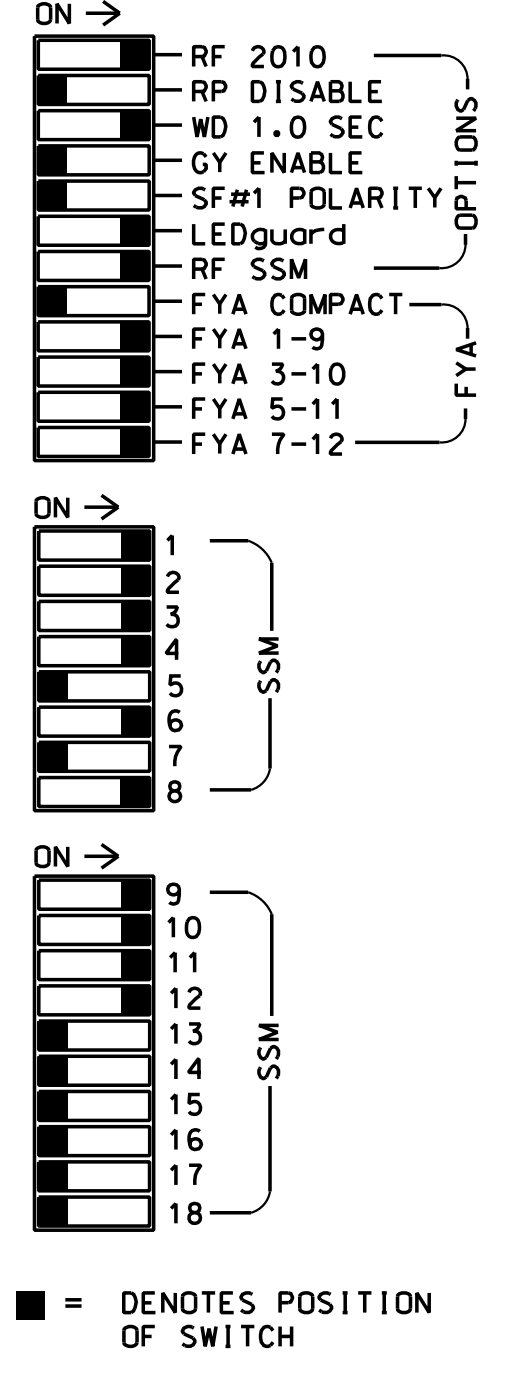
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- 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 phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham 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,S4,S5,S7,S8,S10,S11,
 AUX S1,AUX S2,AUX S4,AUX S5
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAP "A".....*
 OVERLAP "B".....*
 OVERLAP "C".....*
 OVERLAP "D".....*
 * See overlap programming detail on sheet 2

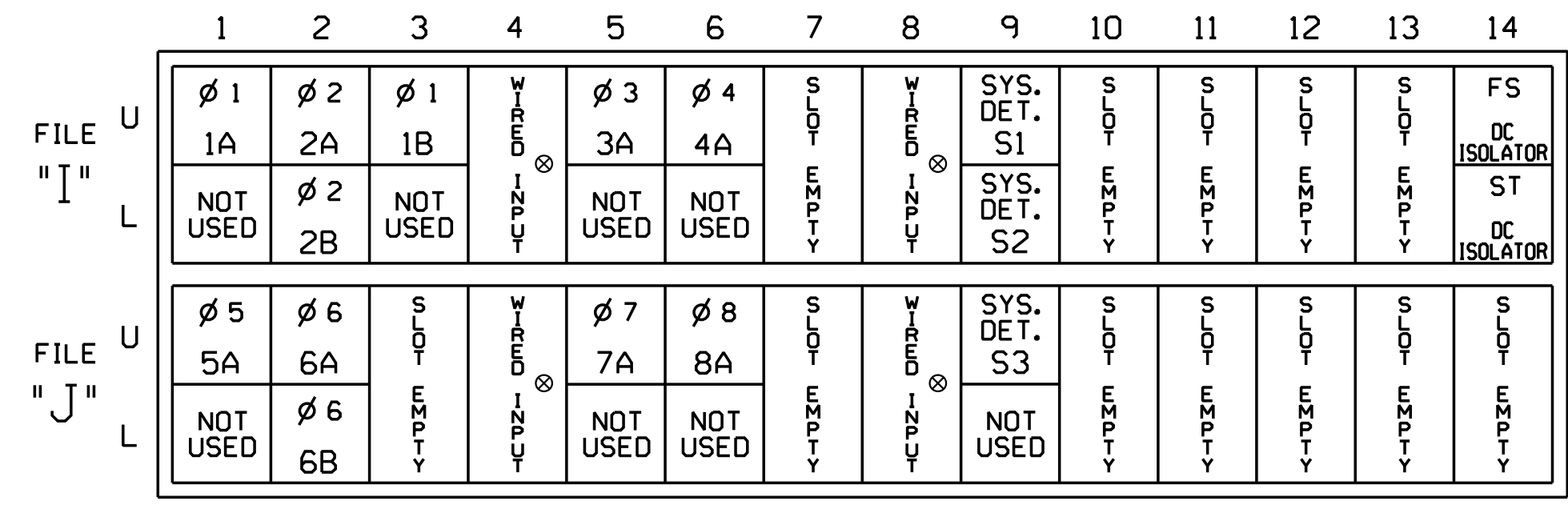
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22	31	22	41,42	51	61,62,63	71	81,82	91	101	11	31	NU	51	71	NU
RED	*	128		*	101		134		107									
YELLOW		129			102		* 135		* 108									
GREEN		130			103		136		109									
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW	126				117								A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127	127		118	118		133		124									

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	TB2-1,2	11U	56	1 ★	1	YES		15		S
	-	J4U	48	26 ★	6	YES		3		G
2A	TB2-5,6	12U	39	2	2	YES			X	N
	TB2-7,8	12L	43	12	2	YES			X	N
1B	TB2-9,10	13U	63	32	1	YES		15		S
	-	J8U	50	28	8	YES		3		S
4A	TB4-9,10	16U	41	4	4	YES		10		S
	* S1	TB6-9,10	19U	60	11	SYS	NO			N
* S2	TB6-11,12	19L	62	13	SYS	NO				N
	5A ³	TB3-1,2	11U	55	5 ★	5	YES	15		S
6A	TB3-5,6	J2U	40	6	6	YES			X	N
	TB3-7,8	J2L	44	16	6	YES			X	N
7A ⁴	TB5-5,6	J5U	57	7	7	YES		10		S
	-	J8U	49	24	4	YES		3		S
8A	TB5-9,10	J6U	42	8	8	YES				S
	* S3	TB7-9,10	J9U	59	15	SYS	NO			N

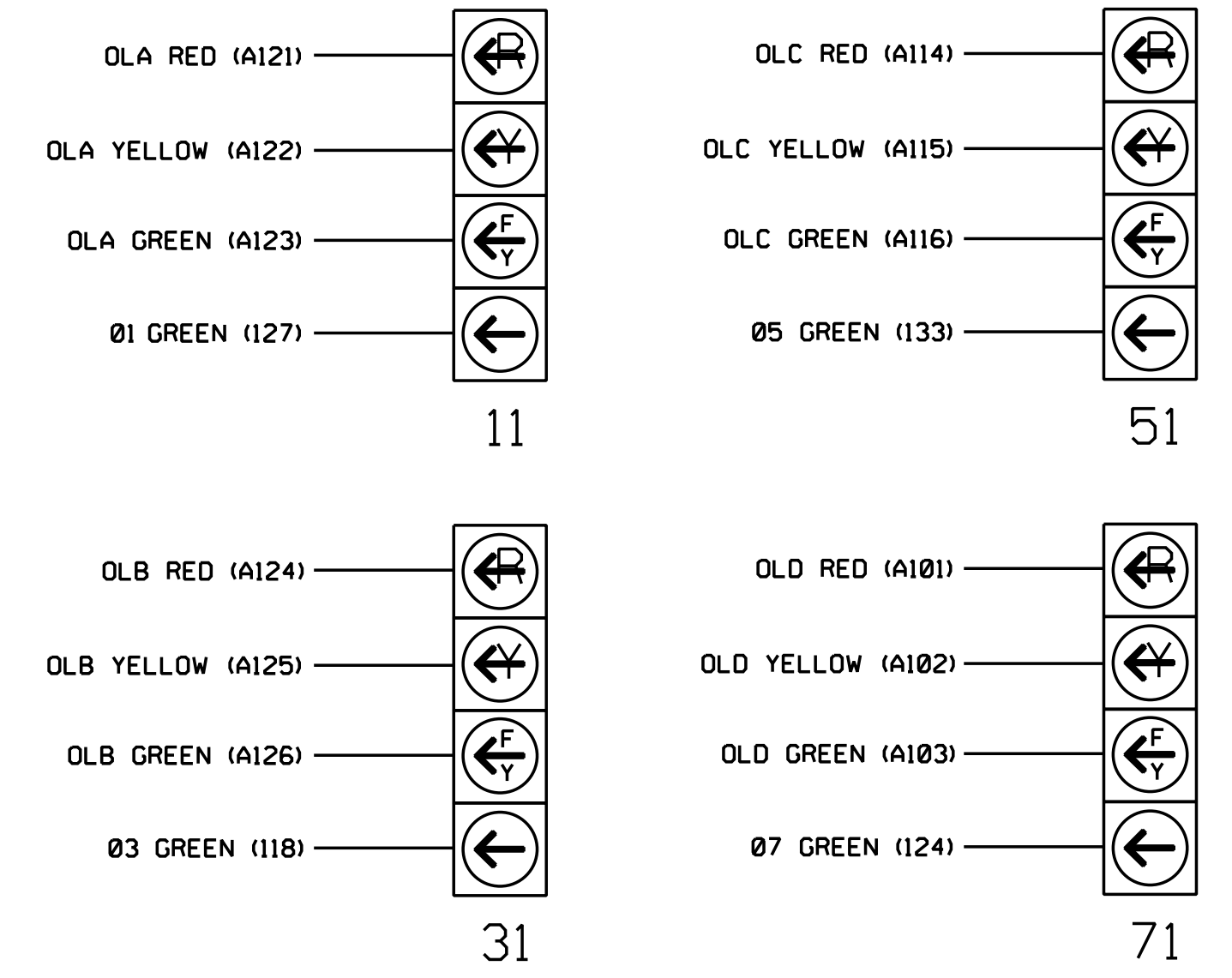
* System detector only. Remove any assigned vehicle phase.

- Add jumper from 11-W to J4-W, on rear of input file.
- Add jumper from 15-W to J8-W, on rear of input file.
- Add jumper from J1-W to 14-W, on rear of input file.
- Add jumper from J5-W to 18-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 3.

FYA SIGNAL WIRING DETAIL

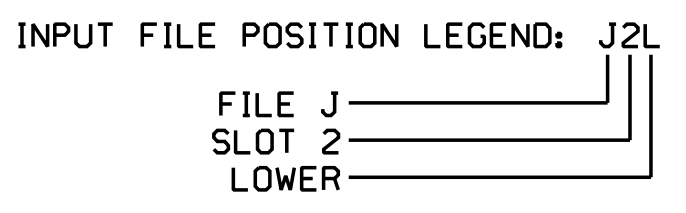
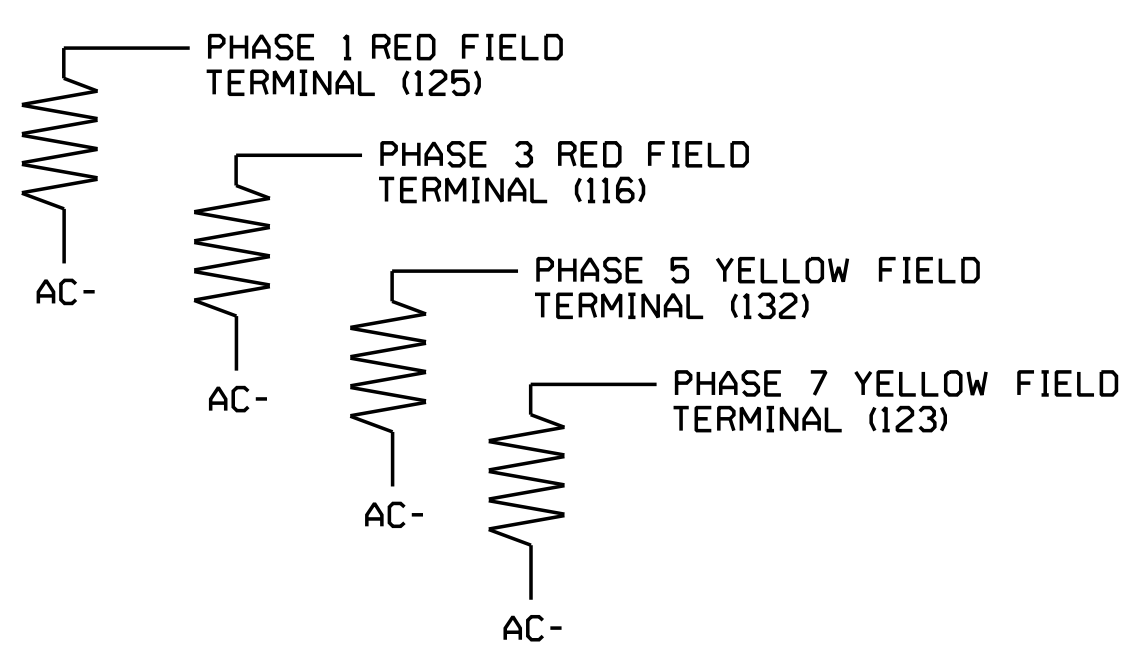
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



Electrical Detail - Sheet 1 of 4

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0040
 DESIGNED: March 2018
 SEALED: 6/13/2018
 REVISED: NA



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SEAL

Division 7 Alamance County Burlington

PLAN DATE: March 2018 REVIEWED BY: JB Voso

PREPARED BY: SE Greene REVIEWED BY:

REVISIONS

INIT. DATE

James Voso 6/13/2018

SIG. INVENTORY NO. 07-0040

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

OVERLAP A

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

TMG VEH OVLP...[A] TYPE:PPLT FYA

PROTECTED LEFT TURN.... PHASE 1

OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT.....CH9 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

ACTION PLAN SF BIT DISABLE..... 1

← NOTICE ACTION PLAN SF BIT "1"

Toggle Once

OVERLAP B

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

TMG VEH OVLP...[B] TYPE:PPLT FYA

PROTECTED LEFT TURN.... PHASE 3

OPPOSING THROUGH..... PHASE 4

FLASHING ARROW OUTPUT.....CH10 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

ACTION PLAN SF BIT DISABLE.....0

Toggle Once

OVERLAP C

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

TMG VEH OVLP...[C] TYPE:PPLT FYA

PROTECTED LEFT TURN.... PHASE 5

OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT.....CH11 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

ACTION PLAN SF BIT DISABLE..... 5

← NOTICE ACTION PLAN SF BIT "5"

Toggle Once

OVERLAP D

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

TMG VEH OVLP...[D] TYPE:PPLT FYA

PROTECTED LEFT TURN.... PHASE 7

OPPOSING THROUGH..... PHASE 8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

ACTION PLAN SF BIT DISABLE.....0

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

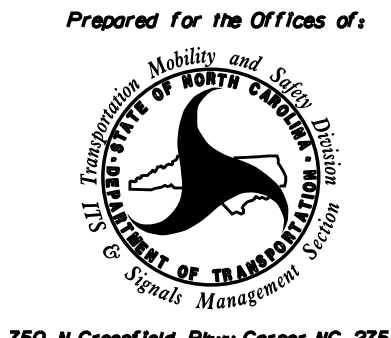
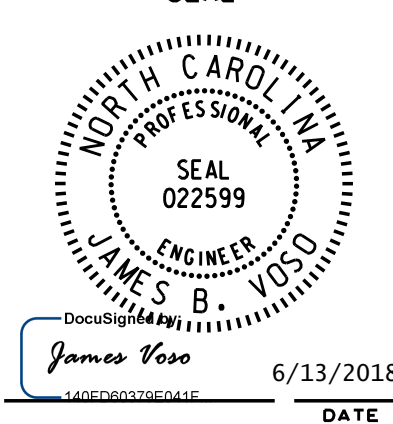


Mattern & Craig
ENGINEERS • SURVEYORS

12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0040
DESIGNED: March 2018
SEALED: 6/13/2018
REVISED: NA

Electrical Detail - Sheet 2 of 4

 <small>Prepared for the Offices of: Transportation, Mobility and Traffic Division DEPARTMENT OF TRANSPORTATION & Signal Management Services 750 N. Greenfield Pkwy, Corner, NC 27529</small>	<p>US 70 (N. Church Street) at SR 1719 (Sellars Mill Road)</p> <p>Division 7 Alamance County Burlington</p> <p>PLAN DATE: March 2018 REVIEWED BY: JB Voso</p> <p>PREPARED BY: SE Greene REVIEWED BY:</p>	<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>SEAL</p>  <small>SEAL 022599 ENGINEER JAMES B. VOSO</small>					
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE			
REVISIONS	INIT.	DATE					

9:58:38 AM C:\Users\jtkun\OneDrive\Documents\Signal Systems\06 Working Folders\Replace Sub-folders with NCDOT File Structure if Working on NCDOT Project\Wing or Dgn\07-0040\070040-sm.ele_20130903.dgn

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

(program controller as shown)

IMPORTANT!

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

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

```

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

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

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

```

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

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

```

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

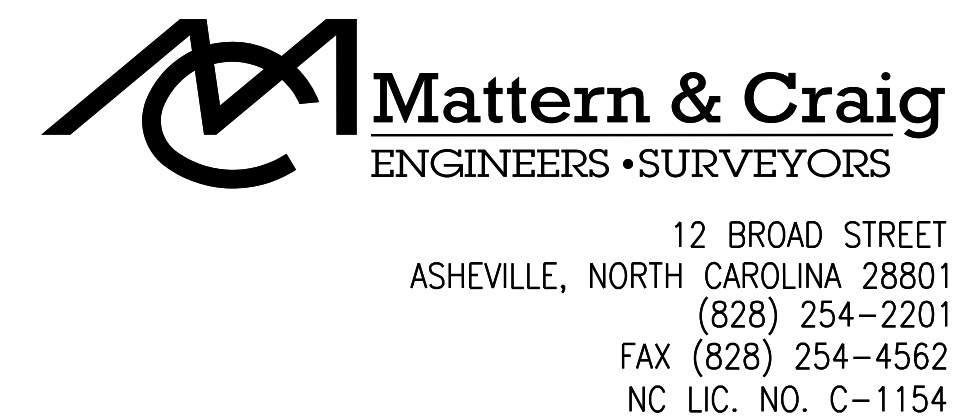
- Place cursor in VEH DETECTOR [] position and enter "22".
- Set assigned phase to "0".

```

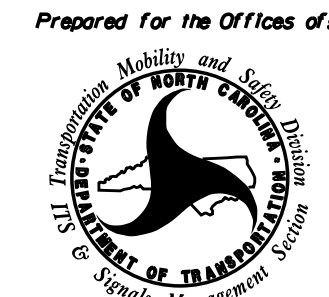
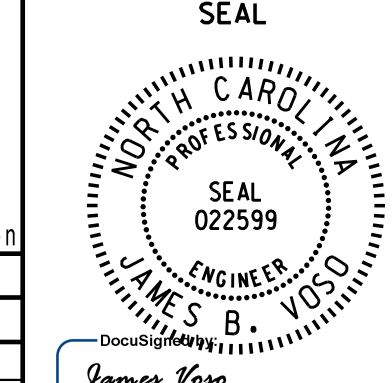
VEH DETECTOR [22]  VEH DET PLAN [ 2]
TYPE: G-GREEN EXTENSION/DELAY
TS2 DETECTOR..... ECPI LOG..... NO
DET PH - 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
22 0
EXTEND TIME... 0.0 DELAY TIME... 3.0
USE ADDED INITIAL . CROSS SWITCH PH.. 0
LOCK IN..... NONE NTCIP VOL . OR OCC .
PMT QUEUE DELAY. NO
END PROGRAMMING
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0040
DESIGNED: March 2018
SEALED: 6/13/2018
REVISED: NA

10:02:03 AM 11:43:39 - Burlington Graham Signal System06 Working Folders (Replace Sub-folders with NCDOT File Structure if Working on NCDOT Project)Ming or DgnW07-0040\070040.sm.ele.20130903.dgn



Electrical Detail - Sheet 3 of 4

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Corner, NC 27529	US 70 (N. Church Street) at SR 1719 (Sellars Mill Road)		SEAL  SEAL 022599 JAMES B. VOSO ENGINEER
	Division 7 Alamance County Burlington PLAN DATE: March 2018 REVIEWED BY: JB Voso PREPARED BY: SE Greene REVIEWED BY:	REVISIONS INIT. DATE		James Voso 6/13/2018 DATE SIG. INVENTORY NO. 07-0040

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ECONOLITE ASC/3-2070 ACTION PLAN PROGRAMMING DETAIL

ALTERNATE PHASING ACTIVATION DETAIL

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

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

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

- SF BITS 1,5:** Modifies overlap parent phases for heads 11 and 51 to run protected turns only.
- VEH DET PLAN 2:** Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.
- 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...[ 1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 0
VEH DETECTOR PLAN.. 2   DET LOG.....NONE
FLASH..... --      RED REST..... NO
VEH DET DIAG PLN... 0   PED DET DIAG PLN..0
DIMMING ENABLE.. NO   PRIORITY RETURN. NO
PED PR RETURN.. NO   QUEUE DELAY..... NO
PMT COND DELAY   NO

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

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

```



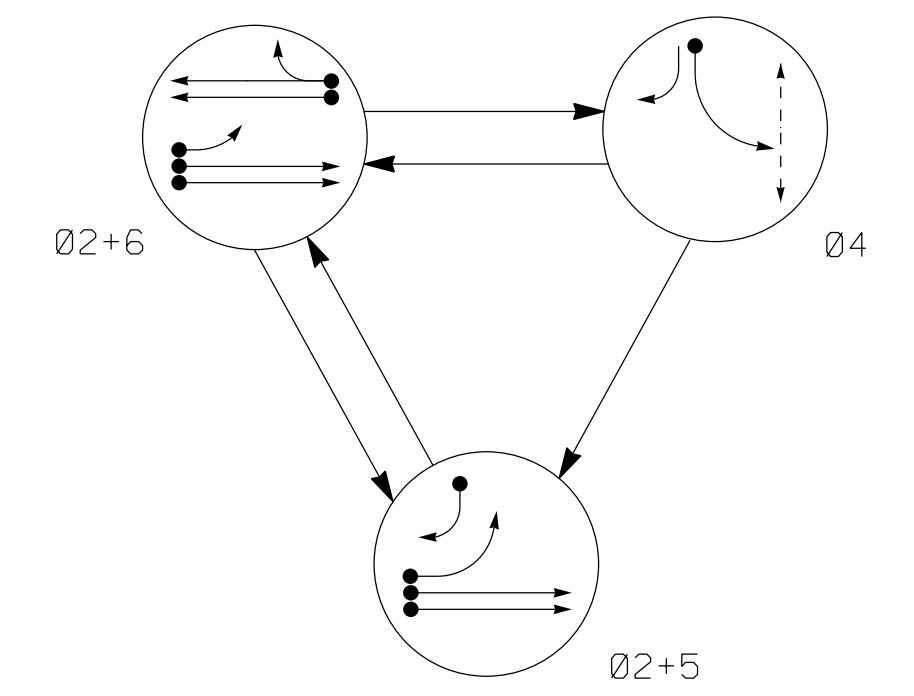
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0040
DESIGNED: March 2018
SEALED: 6/13/2018
REVISED: NA

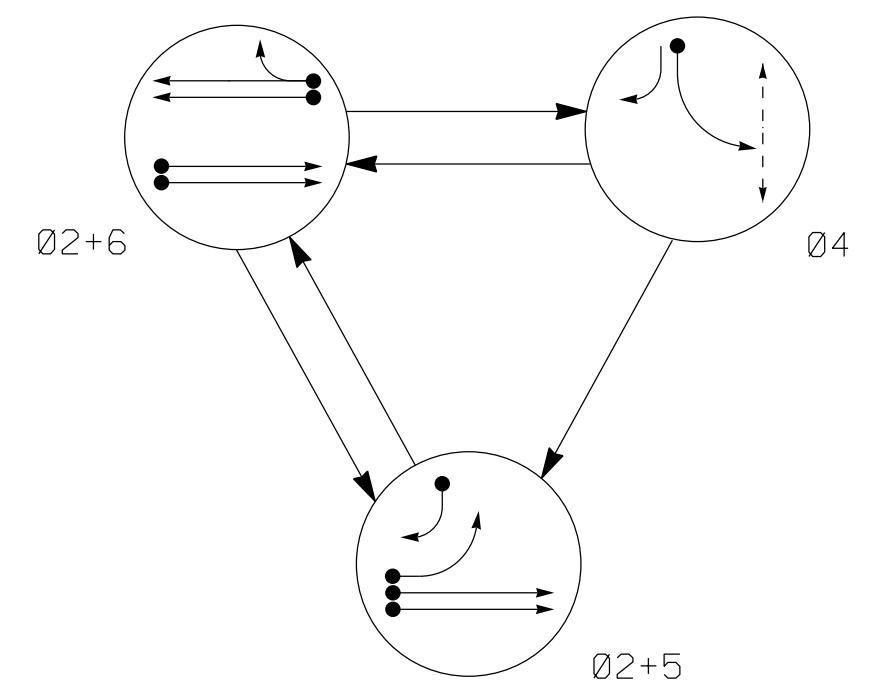
Electrical Detail - Sheet 4 of 4

 Prepared for the Offices of: Transportation, Mobility and Traffic Division DEPARTMENT OF TRANSPORTATION Signal Management Section 750 N. Greenfield Pkwy, Corner, NC 27529	US 70 (N. Church Street) at SR 1719 (Sellars Mill Road) Division 7 Alamance County Burlington PLAN DATE: March 2018 REVIEWED BY: JB Voso PREPARED BY: SE Greene REVIEWED BY:	SEAL James Voso 6/13/2018 DATE																
REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	NO.	DESCRIPTION	INIT.	DATE													DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SIG. INVENTORY NO. 07-0040	
NO.	DESCRIPTION	INIT.	DATE															

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	04	FLASH
21,22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	F	F	R	Y
61,62	R	G	R	Y
P41,P42	DW	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	04	FLASH
21,22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	R	R	R	Y
61,62	R	G	R	Y
P41,P42	DW	DW	W	DRK

ASC/3 DETECTOR INSTALLATION CHART

DETECTOR				PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X20	70	EXIST	-	2	Yes	-	-	S	-	X
4A	6X40	+5	2-4-2	-	4	Yes	-	3	S	-	X
5A	6X60	+5	2-4-2	-	5	Yes	-	*10	S	-	X
5B	6X40	+5	2-4-2	-	5	Yes	-	10	S	-	X
6B	6X20	70	EXIST	-	6	Yes	-	-	S	-	X

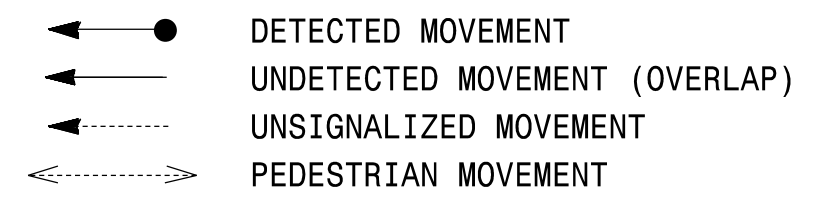
* Disable delay during alternate phasing operation.
 ** Disable phase 2 call during alternate phasing operation.

3 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

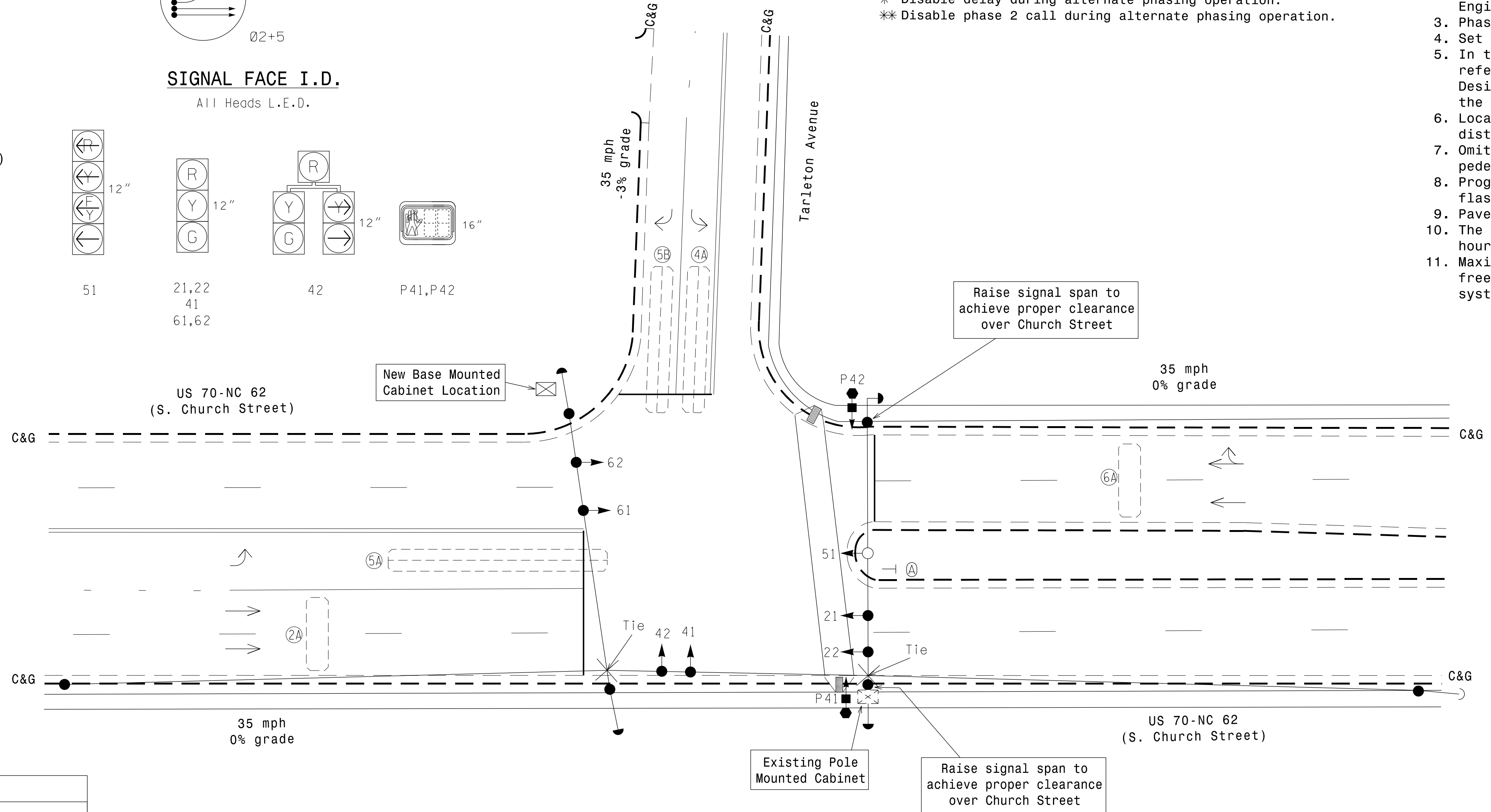
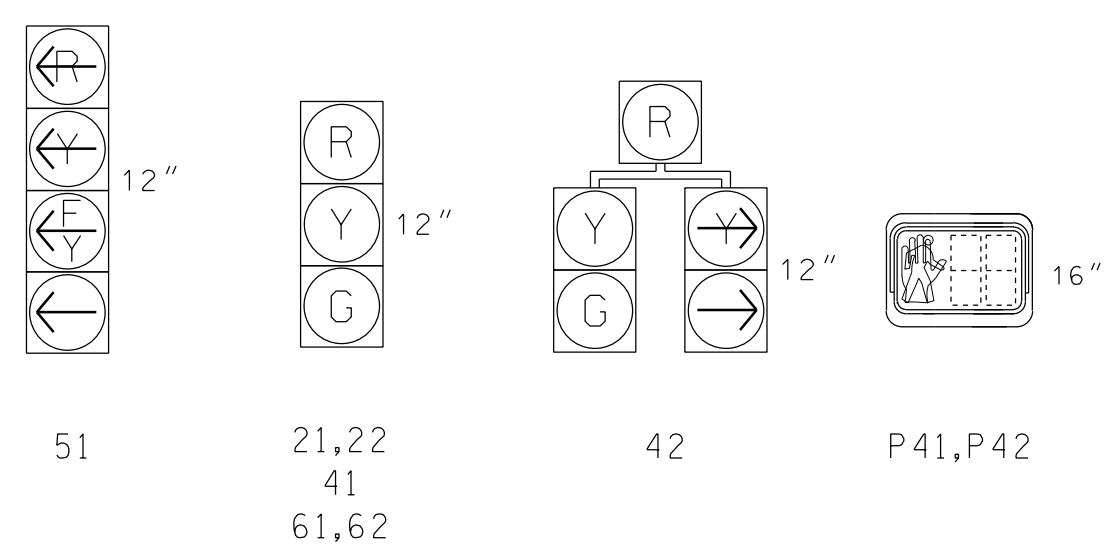
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- 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.
- The 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.

PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

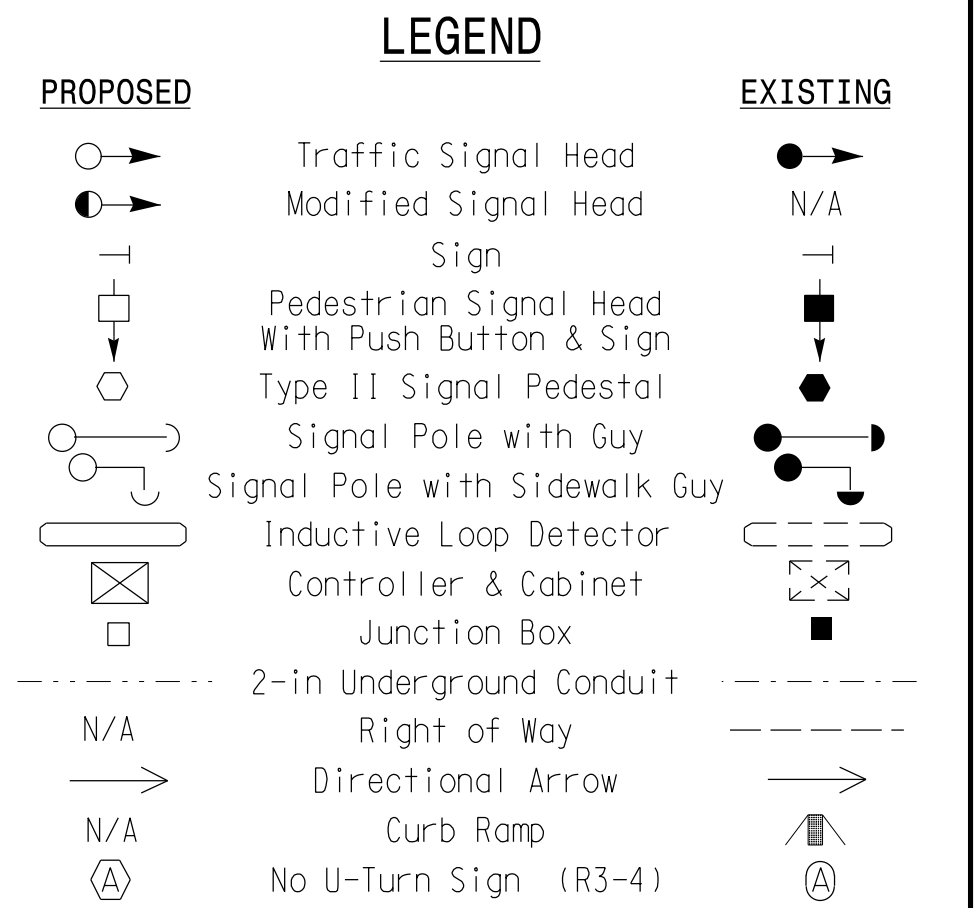
All Heads L.E.D.



ASC/3 TIMING CHART

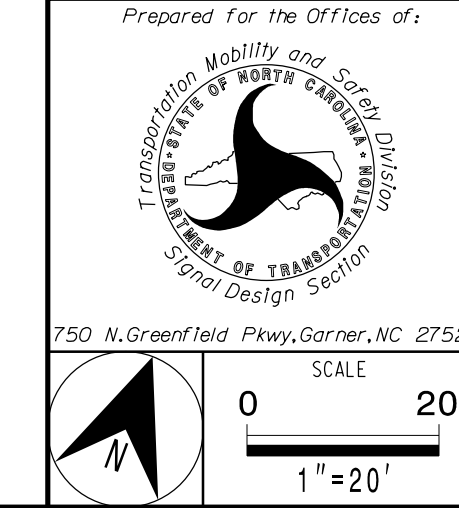
FEATURE	PHASE			
	2	4	5	6
Min Green *	10	7	7	10
Walk *	0	4	0	0
Ped Clear	0	18	0	0
Veh. Extension *	4.0	2.0	2.0	4.0
Max 1 *	60	20	10	60
Yellow	3.8	3.0	3.0	3.8
Red Clear	1.3	2.4	1.9	1.3
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To 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.



08-JUN-2018 13:59 O:\Transportation\Traffic\c:\cur\100056469 U-6015 B-G Sig Sys\Task 05_11_Signal.s\design\07-0041.dgn ALEX3361 AT LUS340649

Signal Upgrade



US 70-NC 62 (S. Church Street) at Tarleton Avenue

Division 7 Alamance County Burlington

PLAN DATE: February 2018 REVIEWED BY: AM Encarnacion

PREPARED BY: NA Ptak REVIEWED BY: PL Alexander

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 20 1"=20'

REVISIONS: INIT. DATE

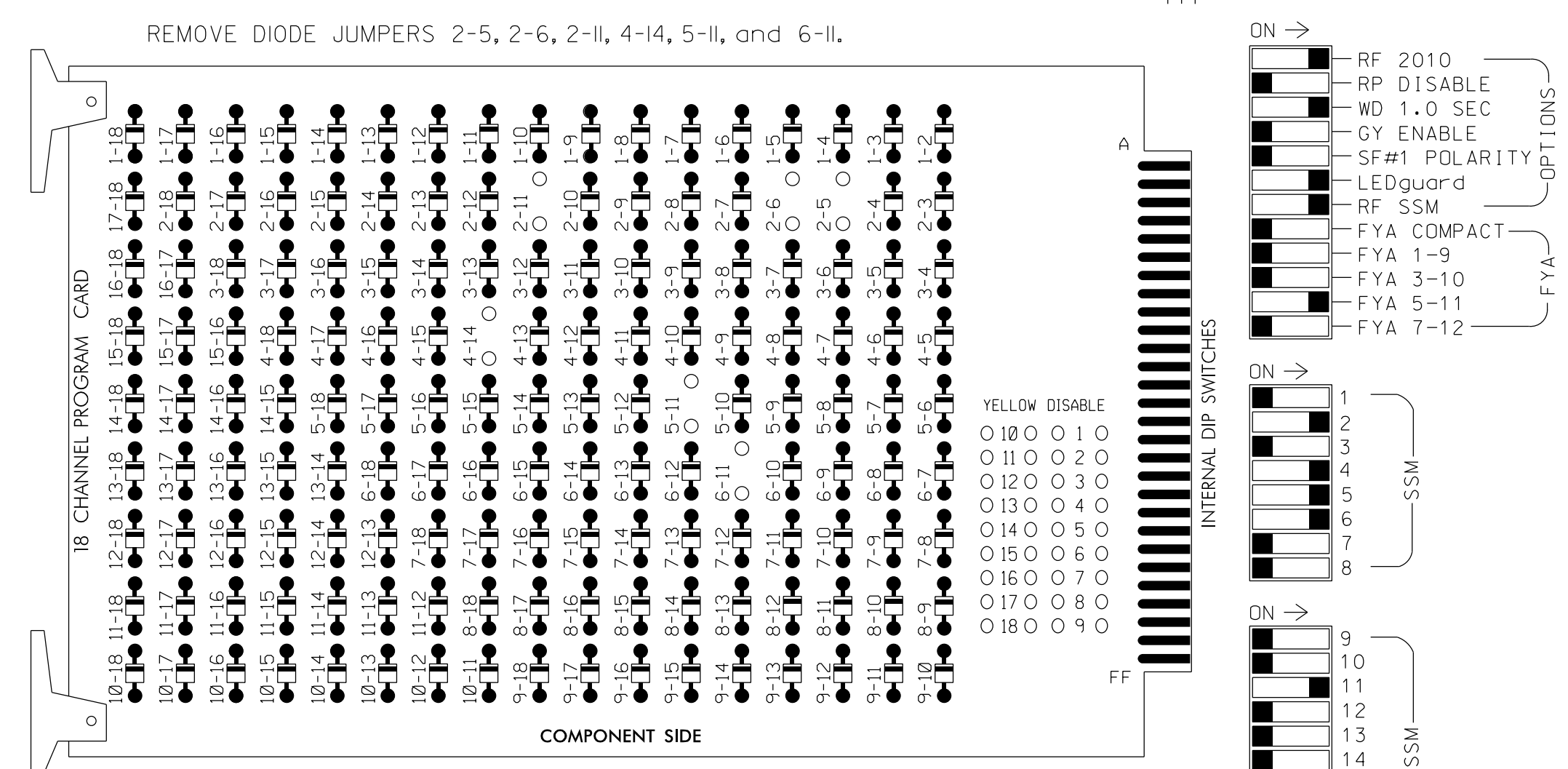
6/8/2018

SIG. INVENTORY NO. 07-0041

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
 - Ensure that Red Enable is active at all times during normal operation.
 - 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 phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham 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,S5,S6,S7,S8,AUX S4
 PHASES USED.....2,4,4 Ped,5,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED

* See overlap programming detail on sheet 2

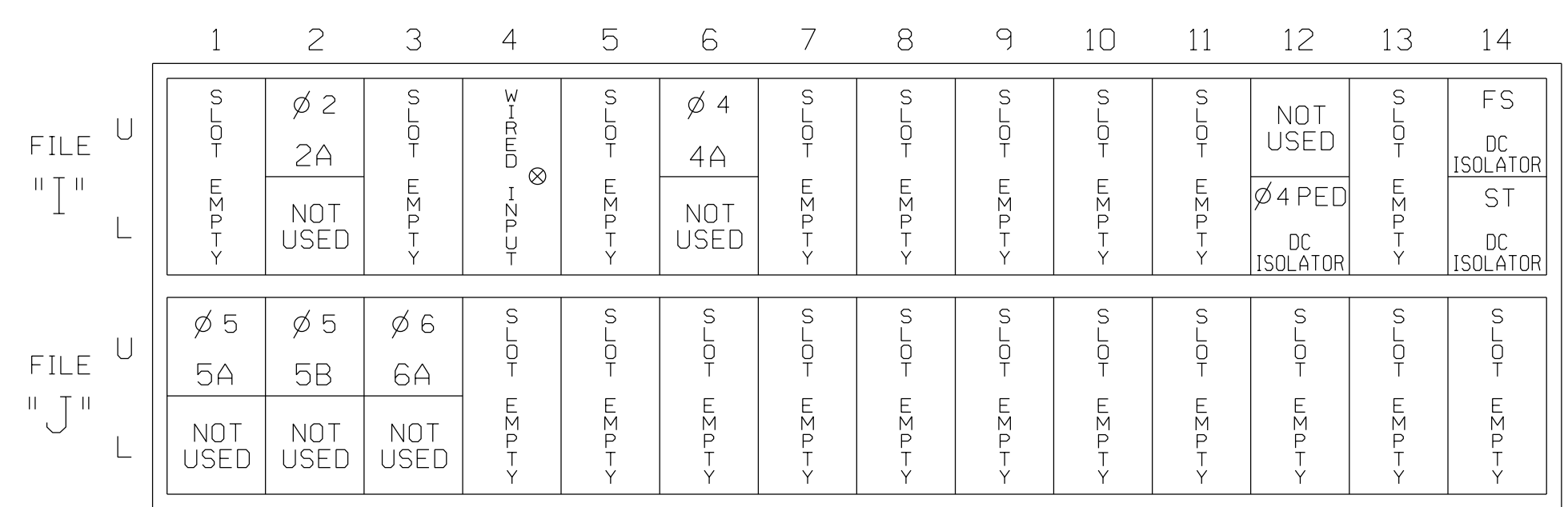
SIGNAL HEAD HOOK-UP CHART

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	NU	NU	41,42	P41 P42	42	51	61,62	NU	NU	NU	NU	NU	NU	51	NU	NU
RED		128			101		*		134									
YELLOW		129			102				135									
GREEN		130			103				136									
RED ARROW																		A114
YELLOW ARROW							132											A115
FLASHING YELLOW ARROW																		A116
GREEN ARROW							133	133										
Hand icon						104												
Person icon						106												

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
 ⊗ Wired Input - Do not populate slot with detector card

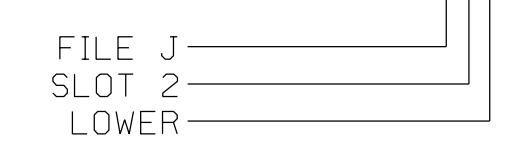
INPUT FILE CONNECTION & PROGRAMMING CHART

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				S
4A	TB4-9,10	I6U	41	4	4	YES				S
5A ¹	TB3-1,2	J1U	55	5 ★	5	YES		10		S
	-	I4U	47	22 ★	2	YES				S
5B	TB3-5,6	J2U	40	6	5	YES		10		S
6A	TB3-9,10	J3U	64	36	6	YES				S
PED PUSH BUTTONS										
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED					

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT 112.

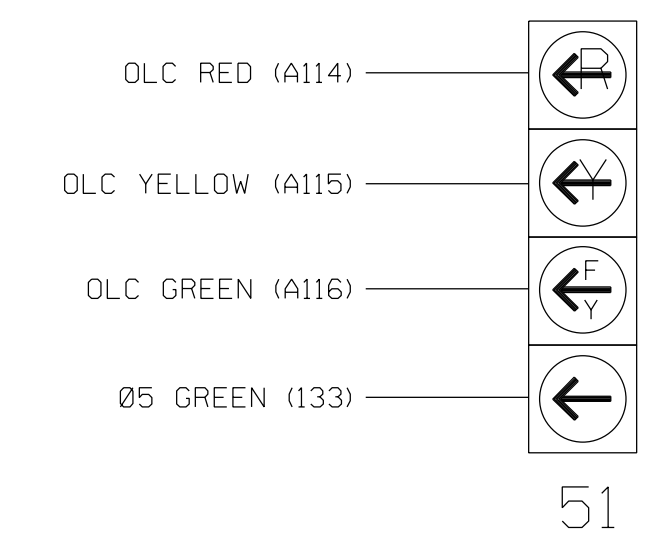
- ¹Add jumper from J1-W to I4-W, on rear of input file.
 ★ See the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L



FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

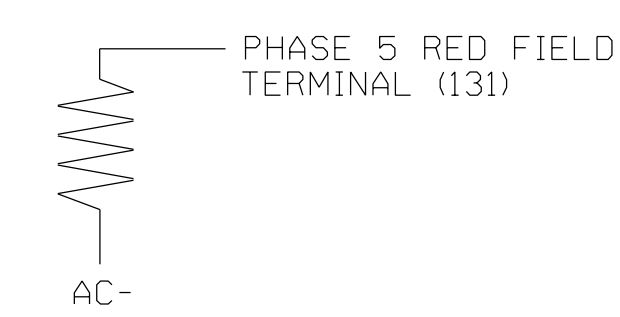
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

ACCEPTABLE VALUES

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



Electrical Detail - Sheet 1 of 3

Electrical and Programming Details For:

US 70-NC 62 (S. Church Street) at Tarleton Avenue

Division 7 Alamance County Burlington

PLAN DATE: February 2018 REVIEWED BY: AM Encarnacion

PREPARED BY: NA Ptak REVIEWED BY: PL Alexander

REVISIONS INIT. DATE

Seal: PAMELA L. ALEXANDER, PROFESSIONAL ENGINEER, NORTH CAROLINA, SEAL 023489

DATE: 6/9/2018

SIG. INVENTORY NO. 07-0041

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

(program controller as shown)

IMPORTANT!

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

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

```

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
    
```

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

```

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

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL (program controller as shown)

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

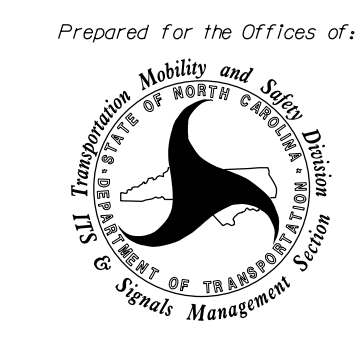
```

OVERLAP C Toggle Twice
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0041
DESIGNED: February 2018
SEALED: 6/8/2018
REVISED: N/A

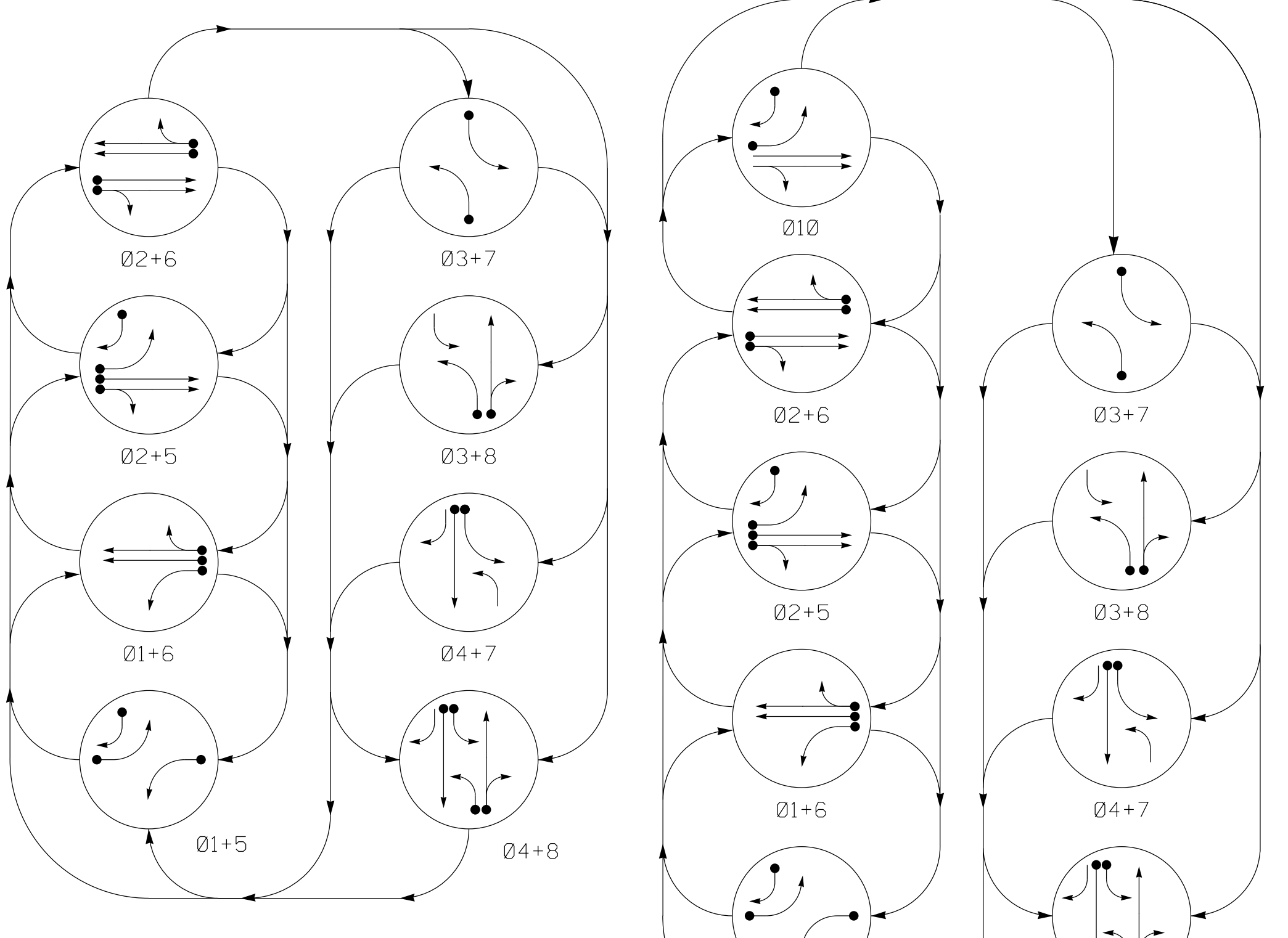
Electrical Detail - Sheet 2 of 3

	US 70-NC 62 (S. Church Street) at Tarleton Avenue	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER PAMELA L. ALEXANDER SEAL 023489
	Prepared for the Offices of: Transportation Mobility and Safety Division DEPARTMENT OF TRANSPORTATION and STATE MANAGEMENT SYSTEMS	Division 7 Alamance County Burlington PLAN DATE: February 2018 REVIEWED BY: AM Encarnacion PREPARED BY: NA Ptak REVIEWED BY: PL Alexander	6/9/2018 Pamela Alexander DATE SIG. INVENTORY NO. 07-0041

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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

ALTERNATE PHASING TABLE OF OPERATION

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

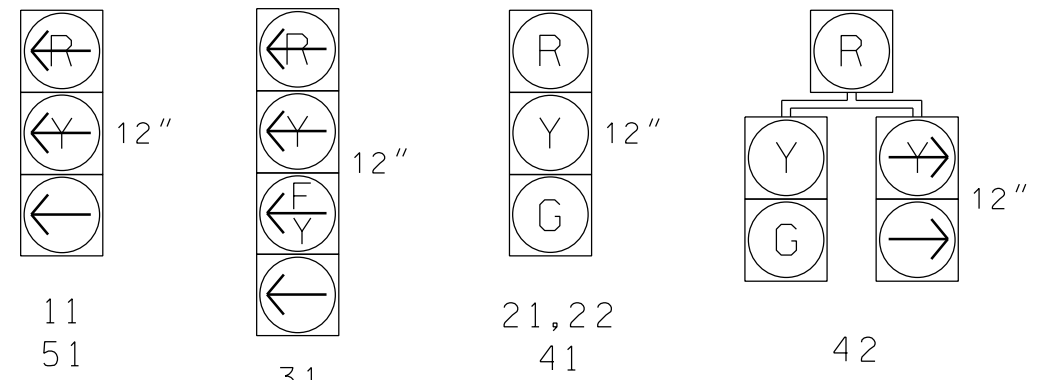
8 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Reposition existing signal head numbered 82.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- The 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.

SIGNAL FACE I.D.

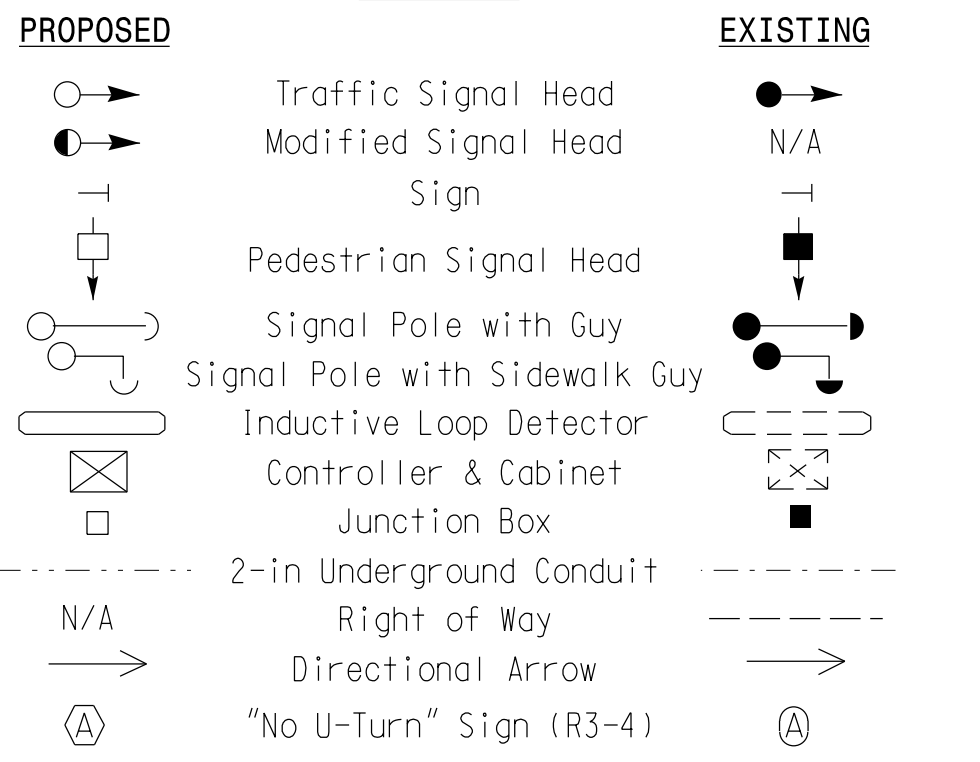
All Heads L.E.D.



ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	PROGRAMMING						
						CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP SYSTEM	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	-	-	S	-	X
2A,2B	6X6	70	EXIST	-	2	Yes	-	-	-	S	-	X
3A	6X40	0	2-4-2	-	3	Yes	-	15	-	S	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	3	-	S	-	X
5A	6X40	0	2-4-2	-	5/10	Yes	-	-	-	S	-	X
5B	6X40	0	2-4-2	-	5	Yes	-	15	-	S	-	X
6A,6B	6X6	70	EXIST	-	6	Yes	-	-	-	S	-	X
7A	6X40	0	2-4-2	-	7	Yes	-	15	-	S	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	10	-	S	-	X

LEGEND



ASC/3 TIMING CHART

FEATURE	PHASE										OLE	OLF
	1	2	3	4	5	6	7	8	10			
Min Green *	7	10	7	7	7	10	7	7	7	7	0.1	0.1
Walk *	0	0	0	0	0	0	0	0	0	0		
Ped Clear	0	0	0	0	0	0	0	0	0	0		
Veh. Extension *	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0	2.0	2.0		
Max I *	15	45	25	25	25	45	15	35	35	35		
Yellow	3.0	4.1	3.0	4.1	3.0	3.7	3.0	4.1	4.1	4.1	3.0	4.1
Red Clear	2.3	1.1	2.6	1.6	2.1	1.4	2.4	1.6	1.6	1.6	2.1	1.1
Actions 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	-	-	-	X	-	-	-	X	-	-		
Simultaneous Gap	X	X	X	X	X	X	X	X	X	X		

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

Signal Upgrade

Prepared For the Offices of:

US 70-NC 62 (S. Church Street) at SR 1445/SR 1452 (O'Neal Street)

Division 7 Alamance County Burlington

PLAN DATE: October 2017 REVIEWED BY: AM Encarnacion

PREPARED BY: VJ Paul REVIEWED BY: MB Toth

SCALE: 1"=30'

REVISIONS: INIT. DATE

6/7/2018

Melissa B. Toth

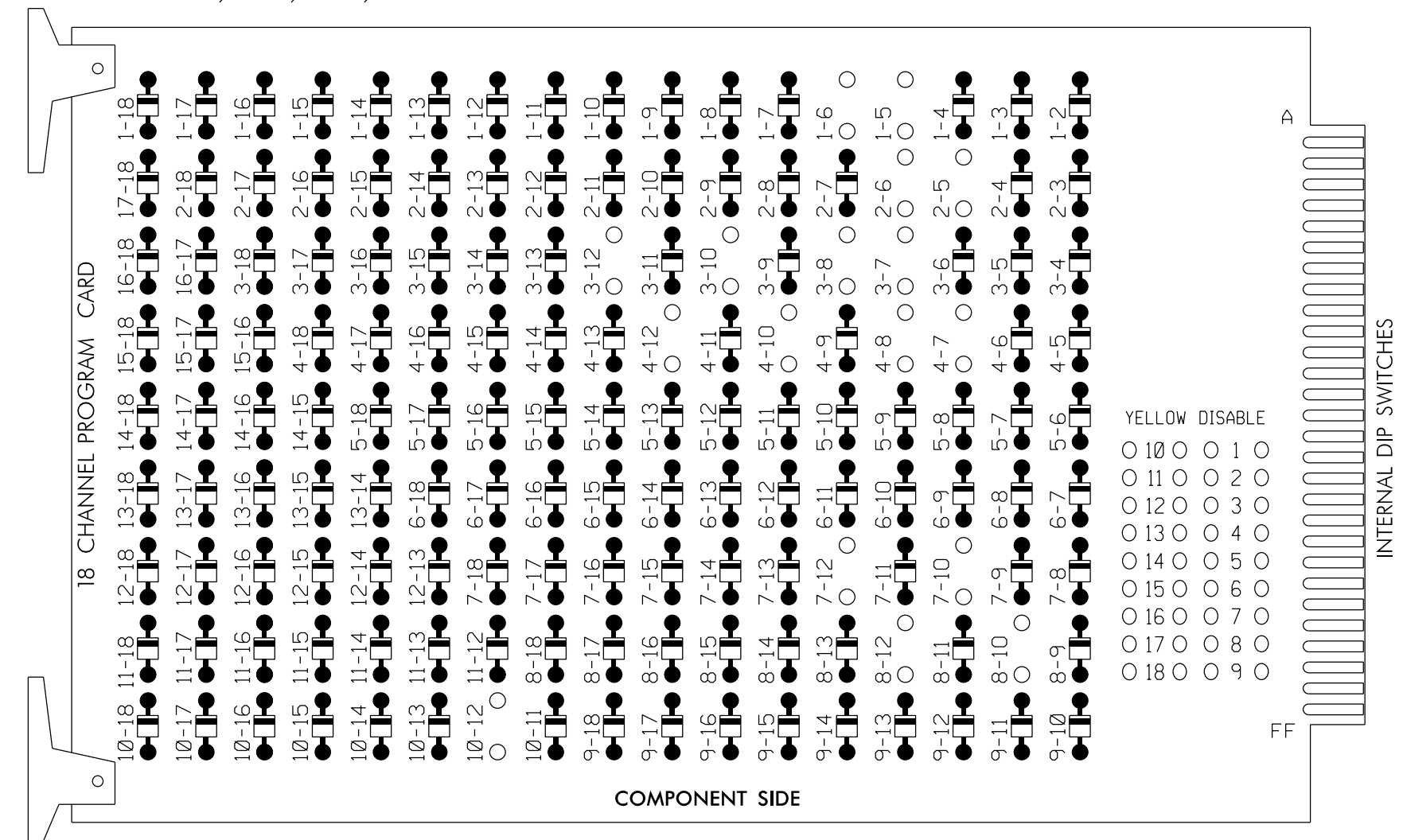
SIG. INVENTORY NO. 07-0042

07-JUN-2018 11:10 Z:\Projects\atkins\Traffic\Task\00056469 U-6015 B-G S1g Sys\Task 05_11_Signal\Des\gsm07-0042.dgn ALEX3361 AT LUS310649

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

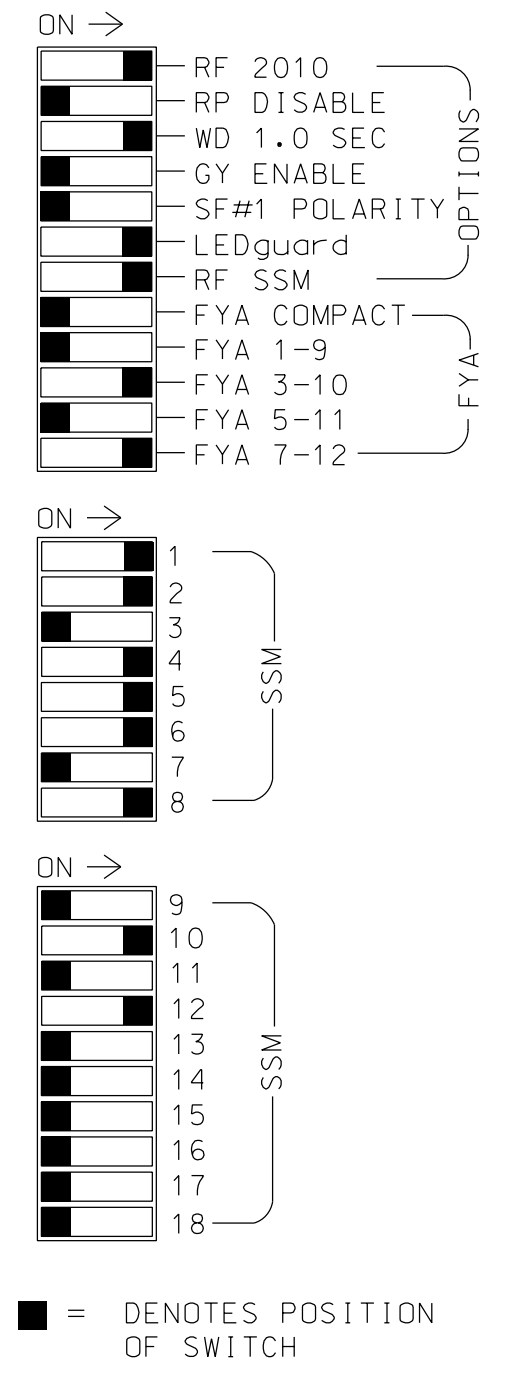
REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 7-10, 7-12, 8-10, 8-12 and 10-12.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- 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 phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham 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,S4,S5,S7,S8,S10,S11,
 AUX S2,AUX S5
 PHASES USED.....1,2,3,4,5,6,7,8,*10
 OVERLAP "A".....NOT USED
 OVERLAP "B".....**
 OVERLAP "C".....NOT USED
 OVERLAP "D".....**
 OVERLAP "G".....5+10
 OVERLAP "H".....2+10
 * Used for timing purposes only
 ** See overlap programming detail on sheet 2

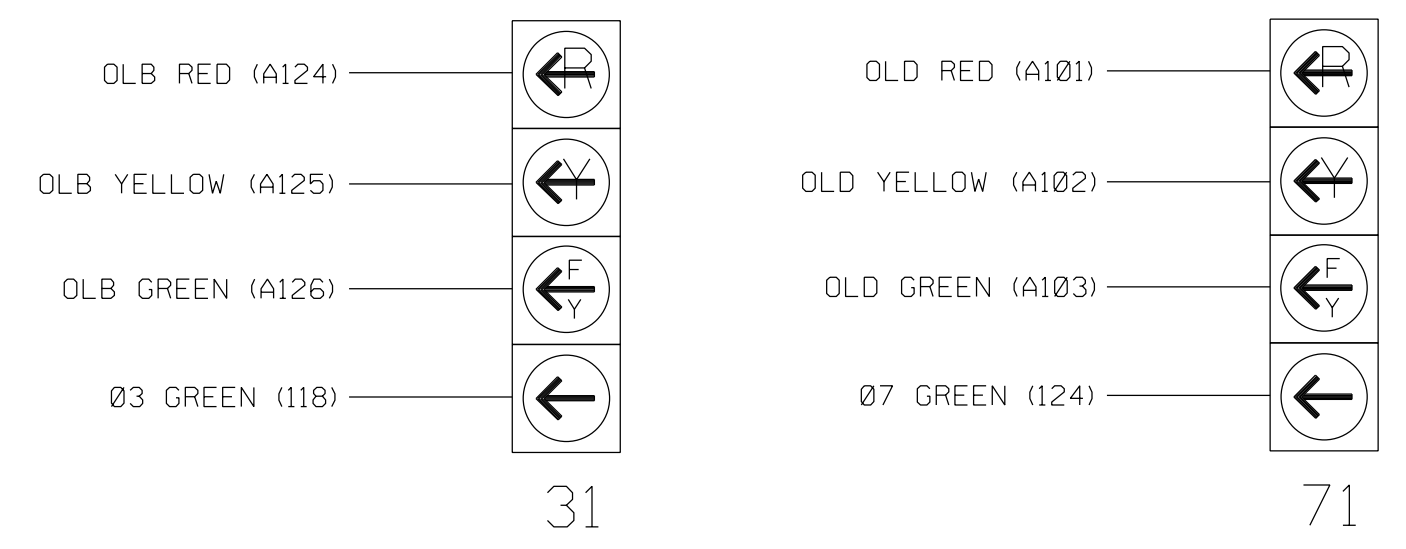
SIGNAL HEAD HOOK-UP CHART

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	OLH	2 PED	3	4	4 PED	OLG	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	31	41,42	NU	42	51	61,62	NU	71	81,82	NU	NU	31	NU	NU	71
RED		128			101				134			107						
YELLOW		129		*	102				135		*	108						
GREEN		130			103				136			109						
RED ARROW	125								131					A124				A101
YELLOW ARROW	126							132	132					A125				A102
FLASHING YELLOW ARROW														A126				A103
GREEN ARROW	127			118				133	133			124						

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail this sheet.
 Note: Outputs for load switches S2 and S7 have been remapped. See sheet 2.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1 1A	∅ 2 2A,2B	∅ 3 3A	∅ 4 4A	∅ 5 5A	∅ 6 6A,6B	∅ 7 7A	∅ 8 8A	FS DC ISOLATOR	ST DC ISOLATOR				
L	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED

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

FS = FLASH SENSE
 ST = STOP TIME

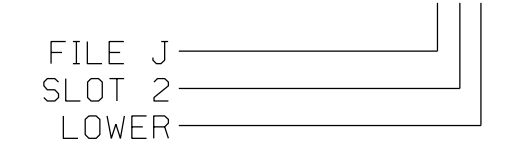
⊗ Wired Input - Do not populate slot with detector cord

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	TB2-1,2	I1U	56	1	1	YES				S
2A,2B	TB2-5,6	I2U	39	2	2	YES				S
3A	TB4-5,6	I5U	58	3	3	YES		15		S
		J8U	50	28	8	YES		3		S
4A	TB4-9,10	I6U	41	4	4	YES				S
5A	TB3-1,2	J1U	55	5	5/10	YES				S
5B	TB3-5,6	J2U	40	6	5/10	YES		15		S
6A,6B	TB3-9,10	J3U	64	36	6	YES				S
7A	TB5-5,6	J5U	57	7	7	YES		15		S
		I8U	49	24	4	YES		3		S
8A	TB5-9,10	J6U	42	8	8	YES		10		S

- Add jumper from I5-W to J8-W, on rear of input file.
- Add jumper from J5-W to I8-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L

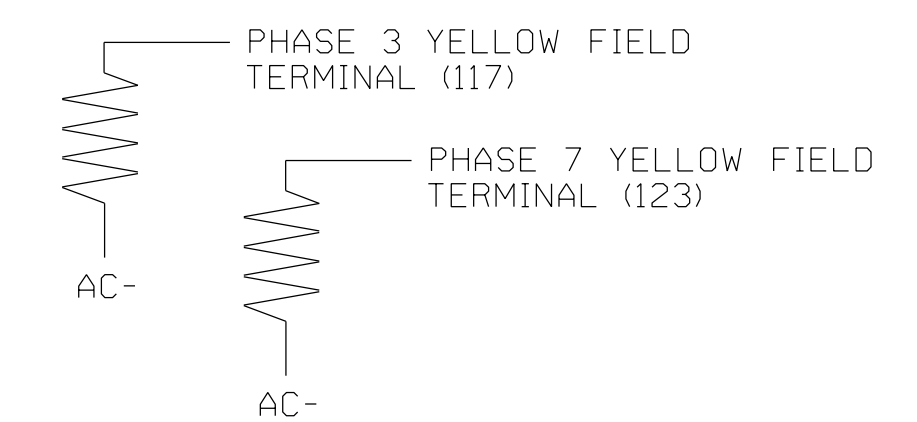


LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES

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



Electrical Detail - Sheet 1 of 5

Electrical and Programming Details For: US 70-NC 62 (S. Church Street) at SR 1445/SR 1452 (O'Neal Street)

Division 7 Alamance County Burlington

Plan Date: October 2017 Reviewed By: AM Encarnacion

Prepared By: VJ Paul Reviewed By: MB Toth

Revisions: INIT. DATE

Developed by: Melissa B. Toth 6/11/2018

Checked/Redlined by: DATE

SIG. INVENTORY NO. 07-0042

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025892 MELISSA B. TOTH

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

Toggle Once

OVERLAP B

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

TMG VEH OVLP...[B] TYPE:PPLT FYA

PROTECTED LEFT TURN.... PHASE 3

OPPOSING THROUGH..... PHASE 4

FLASHING ARROW OUTPUT.....CH10 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

ACTION PLAN SF BIT DISABLE..... 0

Toggle Twice

OVERLAP D

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

TMG VEH OVLP...[D] TYPE:PPLT FYA

PROTECTED LEFT TURN.... PHASE 7

OPPOSING THROUGH..... PHASE 8

FLASHING ARROW OUTPUT.....CH12 ISOLATE

DELAY START OF: FYA..0.0 CLEARANCE..0.0

ACTION PLAN SF BIT DISABLE..... 0

Toggle 3 Times

OVERLAP G

Select TMG VEH OVLP [G] and "NORMAL"

TMG VEH OVLP...[G] TYPE:NORMAL

PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6

INCLUDED. . . . X X

LAG GRN 0.1 YEL 3.0 RED 2.1

Toggle Once

OVERLAP H

Select TMG VEH OVLP [H] and "NORMAL"

TMG VEH OVLP...[H] TYPE:NORMAL

PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6

INCLUDED. X X

LAG GRN 0.1 YEL 4.1 RED 1.1

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

ECONOLITE ASC/3-2070 LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switches S7 and S2 as OLG and OLH, program LD SWITCH 5 as OVLP '7' TYPE 'O' and LD SWITCH 2 as OVLP '8' TYPE 'O' as shown below.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 3. LOAD SW ASSIGN

NOTICE OVLP 8 ASSIGNED TO LD SWITCH 2 →

NOTICE OVLP 7 ASSIGNED TO LD SWITCH 5 →

LD SWITCH ASSIGN							
PHASE /OVLP	TYPE	DIMMING R Y G D	---FLASH---	AUT	TGR		
1 1	V	. . . +	A	R	X		
2 8	O	. . . +	A	Y	.		
3 3	V	. . . +	A	R	X		
4 4	V	. . . +	A	R	.		
5 7	O	. . . -	A	R	.		
6 6	V	. . . -	A	Y	X		
7 7	V	. . . -	A	R	.		
8 8	V	. . . -	A	R	X		
9 1	O	. . . +	A	R	X		
10 2	O	. . . +	A	R	X		
11 3	O	. . . -	A	R	.		
12 4	O	. . . -	A	R	.		
13 2	P	. . . +	A	.	.		
14 4	P	. . . -	A	.	.		
15 6	P	. . . +	A	.	.		
16 8	P	. . . -	A	.	.		

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0042
 DESIGNED: October 2017
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Detail - Sheet 2 of 5		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 	US 70-NC 62 (S. Church Street) at SR 1445/SR 1452 (O'Neal Street) Alamance County Burlington	SEAL SEAL 025892 ENGINEER MELISSA B. TOTH
Division 7 PLAN DATE: October 2017 REVIEWED BY: AM Encarnacion PREPARED BY: VJ Paul REVIEWED BY: MB Toth		DEVELOPED BY: <i>Melissa B. Toth</i> 6/11/2018 CHECKED BY: _____ DATE: _____ SIG. INVENTORY NO. 07-0042

09-JUN-2018 13:38
 D:\Consolidation\Projects\00056469 U-6015 B-G S1g SysTask 05_11_Signal\Des\gn\mtr\ing\07-0042E.dgn
 ALEX3361 AT LUS20669

ECONOLITE ASC/3-2070 CONTROLLER SEQUENCE [1] - DEFAULT PHASING PROGRAMMING DETAIL

(program controller as shown)

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

NOTICE PHASE 10 IN SEPARATE BARRIER →

```

CONTROLLER SEQUENCE [ 1 ]
SEQUENCE COMMANDS . HW ALT SEQ ENA.          NO.
  01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16
BC-B - B - B - - - - - - - - - - - - - - -
R1-|01 02|. . |03 04|. . . . . . . . . . . . . . . .
R2-|05 06|10|. . |07 08|. . . . . . . . . . . . . . . .
R3-|. . . . . . . . . . . . . . . . . . . . . . . . . . . .
R4-|. . . . . . . . . . . . . . . . . . . . . . . . . . . .

R1-R4=RING 1-4, DATA ENTRY, PHASES 1-16
BC=BARRIER CONTROL, VALUES: B,C
B=BARRIER MODE
C=COMPATIBILITY MODE

```

END PROGRAMMING

ECONOLITE ASC/3-2070 CONTROLLER SEQUENCE [2] - ALTERNATE PHASING PROGRAMMING DETAIL

(program controller as shown)

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

NOTICE CONTROLLER SEQUENCE "2" →

NOTICE PHASE 10 IN SEPARATE BARRIER →

```

CONTROLLER SEQUENCE [ 2 ]
SEQUENCE COMMANDS . HW ALT SEQ ENA.          NO.
  01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16
BC-B - B - B - - - - - - - - - - - - - - -
R1-|01 02|. . |03 04|. . . . . . . . . . . . . . . .
R2-|05 06|10|. . |07 08|. . . . . . . . . . . . . . . .
R3-|. . . . . . . . . . . . . . . . . . . . . . . . . . . .
R4-|. . . . . . . . . . . . . . . . . . . . . . . . . . . .

R1-R4=RING 1-4, DATA ENTRY, PHASES 1-16
BC=BARRIER CONTROL, VALUES: B,C
B=BARRIER MODE
C=COMPATIBILITY MODE

```

END PROGRAMMING

ECONOLITE ASC/3-2070 "PHASES IN USE" PROGRAMMING DETAIL

(program controller as shown)

- From Main Menu select 1. CONFIGURATION
- From CONFIGURATION Submenu select 2. PHASES IN USE/PED

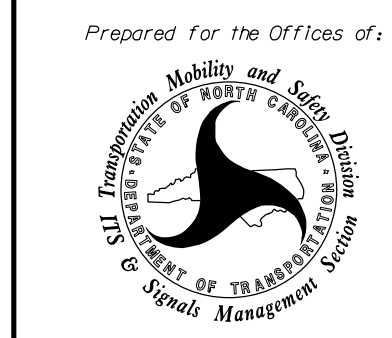
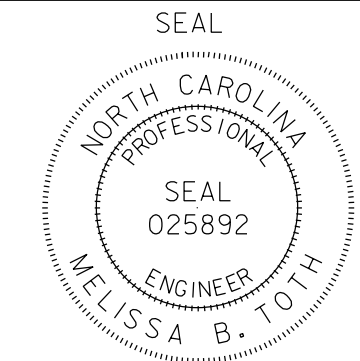
PHASES IN USE / EXCLUSIVE PED	1	2	3	4	5	6	7	8
IN USE.....	X	X	X	X	X	X	X	X
EXCLUSIVE PED	.	.	.	.	.	.	.	.

PHASE	9	10	11	12	13	14	15	16
IN USE.....	.	X	.	.	.	.	.	.
EXCLUSIVE PED

09-JUN-2018 13:38
D:\Forsyth\Tat\om\Facility\Curr\100056469 U-6015 B-G S1g SysTask 05_11_Signal\Des\gn\m1r-Ing\07-0042.dgn
ALEX3361 AT LUS10649

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0042
DESIGNED: October 2017
SEALED: 6/7/2018
REVISED: N/A

Electrical Detail - Sheet 3 of 5

	ELECTRICAL AND PROGRAMMING DETAILS FOR:	US 70-NC 62 (S. Church Street) at SR 1445/SR 1452 (O'Neal Street)	
	Prepared for the Offices of:	Division 7 Alamance County Burlington	
PLAN DATE: October 2017 PREPARED BY: VJ Paul REVIEWED BY: AM Encarnacion		REVIEWED BY: MB Toth	DEVELOPED BY: Melissa B. Toth DATE: 6/11/2018
REVISIONS		INIT. DATE	SIG. INVENTORY NO. 07-0042

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING DETAIL FOR PHASE 10 OMIT-DEFAULT PHASING

(program controller as shown)

The following logic processor programming ensures phase 10 is only serviced during Alternate Phasing. This logic will ensure phase 10 is not served during startup.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 8. LOGIC PROCESSOR
3. From LOGIC PROCESSOR Submenu select 2. LOGIC STATEMENTS

ENTER A "1" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

```

LP#:  1 COPY FROM:  1 ACTIVE: M  TRUE
IF   CTR SEQUENCE #      IS   1  T
THEN CTR OMIT PHASE      10   ON

```

LOGIC FOR OMITTING
PHASE 10 WHILE IN
NORMAL PHASING

END PROGRAMMING

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 8. LOGIC PROCESSOR
3. From LOGIC PROCESSOR Submenu select 1. LOGIC STATEMENT CONTROL

ENABLE LOGIC PROCESSOR STATEMENTS 1 & 2 BY POSITIONING THE CURSOR OVER THE FIELDS SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE IT.

```

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

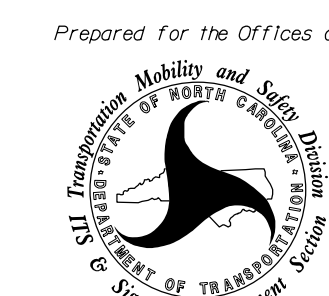
```

END PROGRAMMING

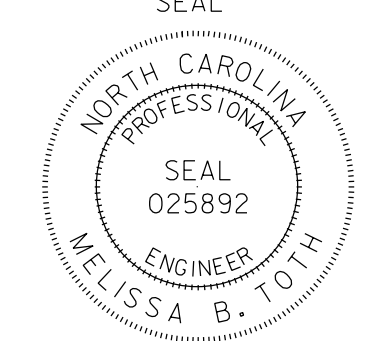
09-JUN-2018 13:38 D:\Consolidation\Projects\00056469 U-6015 B-G S19 SystemTask 05_11_Signal\Design\gn\tr-Ing\07-0042E.dgn ALEX3361 AT LUS210649

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0042
DESIGNED: October 2017
SEALED: 6/7/2018
REVISED: N/A

Electrical Detail - Sheet 4 of 5

	<p style="text-align: center;">US 70-NC 62 (S. Church Street) at SR 1445/SR 1452 (O'Neal Street)</p> <p style="text-align: center;">Division 7 Alamance County Burlington</p> <p>PLAN DATE: October 2017 REVIEWED BY: AM Encarnacion</p> <p>PREPARED BY: VJ Paul REVIEWED BY: MB Toth</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE			
REVISIONS	INIT.	DATE					

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED


Developed by: Melissa B. Toth 6/11/2018 Checked by: _____ DATE _____ SIG. INVENTORY NO. 07-0042

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 CONTROLLER SEQUENCE PLAN 2.

TO RUN ALT. PHASING DURING COORDINATION - SELECT THE TIME BASED ACTION PLAN THAT IS PROGRAMMED TO SELECT CONTROLLER SEQUENCE PLAN 2.

PHASING	CONTROLLER SEQUENCE
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2

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 CONTROLLER SEQUENCE PLAN 2 ACTIVATES TO CALL THE "ALTERNATE PHASING":

CONTROLLER SEQUENCE PLAN 2 : LOGIC PROCESSOR STATEMENT #1 OMITTS PHASE 10 DURING PHASE SEQUENCE #1. PHASE 10 WILL NOT BE OMITTED WHEN USING PHASE SEQUENCE # 2.

ECONOLITE ASC/3-2070 ACTION PLAN FOR ALTERNATE PHASING PROGRAMMING DETAIL

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

```

ACTION PLAN...[ 1]
PATTERN.....AUTO   SYS OVERRIDE.... NO
TIMING PLAN..... 0   SEQUENCE..... 2
VEH DETECTOR PLAN.. 1   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  . . . . . (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 . . . . .

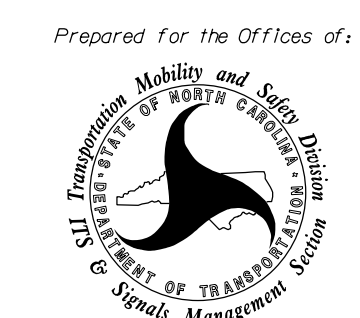
```

← NOTICE CONTROLLER SEQUENCE "2"

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0042
 DESIGNED: October 2017
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Detail - Sheet 5 of 5

ELECTRICAL AND PROGRAMMING DETAILS FOR: **US 70-NC 62 (S. Church Street) at SR 1445/SR 1452 (O'Neal Street)**

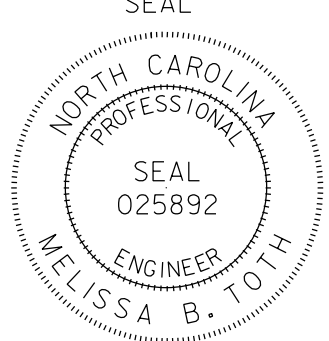
Prepared for the Offices of:


Division 7 Alamance County Burlington

PLAN DATE: October 2017 REVIEWED BY: AM Encarnacion
 PREPARED BY: VJ Paul REVIEWED BY: MB Toth

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

 SEAL 025892
 ENGINEER
 MELISSA B. TOTH

6/11/2018
 DATE
 SIG. INVENTORY NO. 07-0042

09-JUN-2018 13:38 D:\Consolidation\Projects\00056469 U-6015 B-G Sig System\Task 05_11_Signal\Des\gn\mtr-Ing\07-0042E.dgn ALEX3361 AT LUS210649

8 Phase Fully Actuated (Burlington-Graham Signal System)

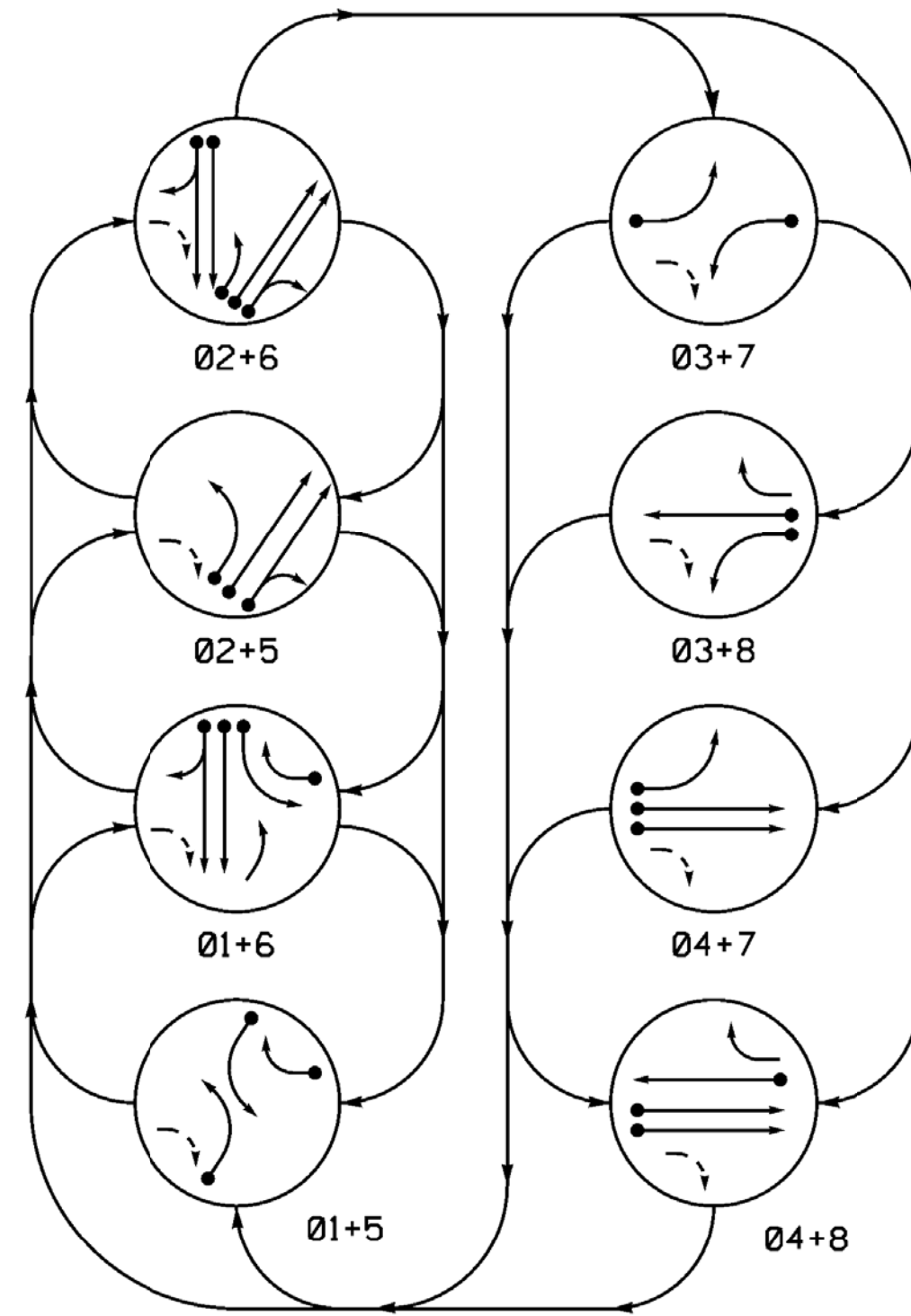
NOTES

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 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
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.

LEGEND

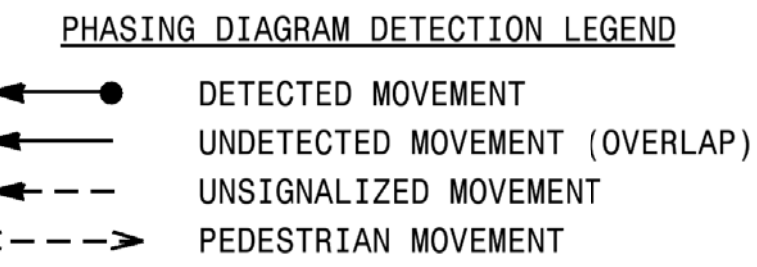
PROPOSED	EXISTING
	Traffic Signal Head
	Modified Signal Head
	Sign
	Pedestrian Signal Head With Push Button & Sign
	Signal Pole with Guy
	Signal Pole with Sidewalk Guy
	Inductive Loop Detector
	Controller & Cabinet
	Junction Box
	Directional Drill
	2-in Underground Conduit
	Right of Way
	Directional Arrow
	Left Arrow "ONLY" Sign (R3-5L)
	"YIELD" Sign (R1-2)
	Metal Strain Pole

DEFAULT PHASING DIAGRAM

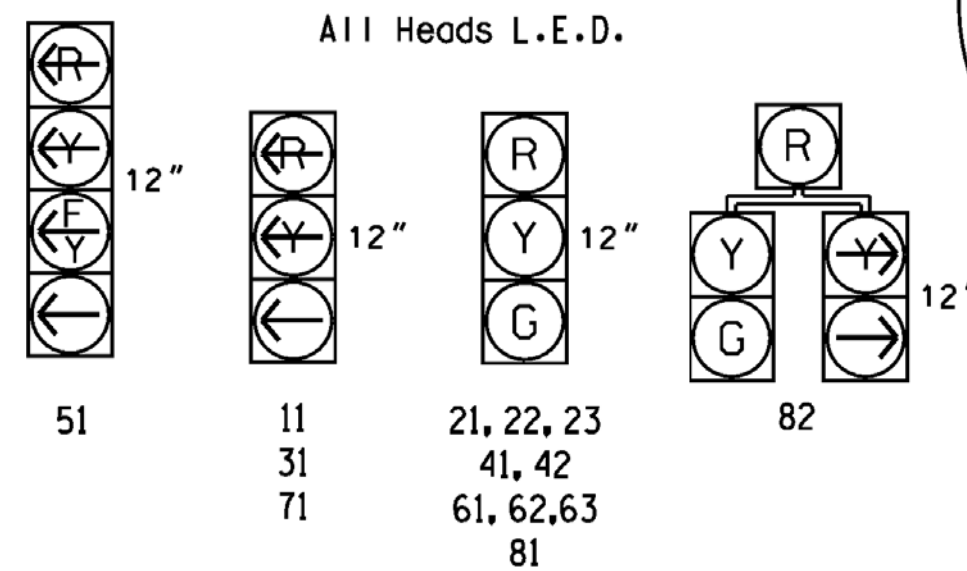


DEFAULT TABLE OF OPERATION

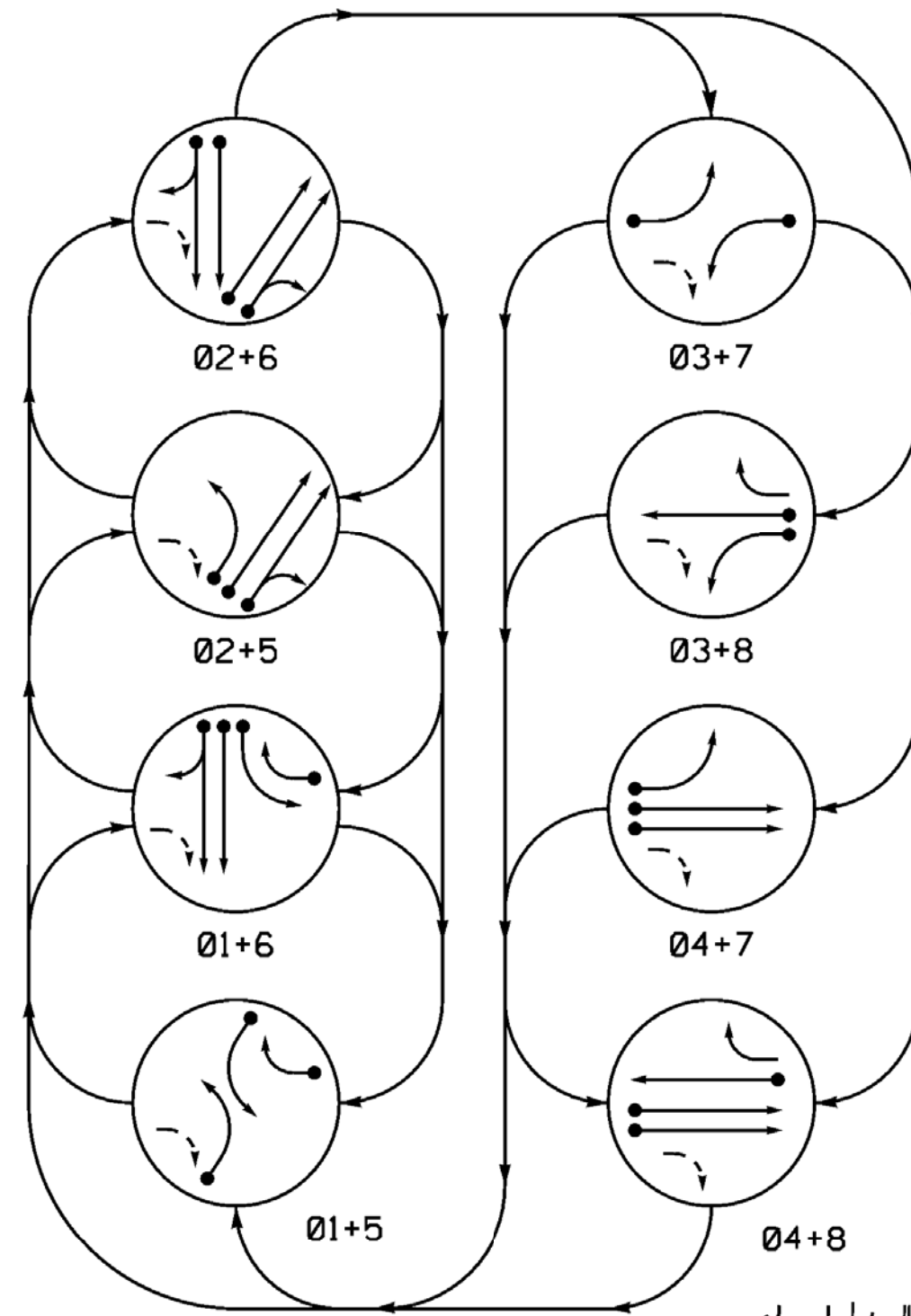
SIGNAL FACE	PHASE							
	01+5	02+6	03+7	04+8	01+6	02+5	03+8	04+7
11	---	---	---	---	---	---	---	---
21, 22, 23	R	R	G	G	R	R	R	Y
31	---	---	---	---	---	---	---	---
41, 42	R	R	R	R	R	R	G	G
51	---	---	---	---	---	---	---	---
61, 62, 63	R	G	R	G	R	R	R	Y
71	---	---	---	---	---	---	---	---
81	R	R	R	R	R	R	G	G
82	---	---	---	---	---	---	---	---



SIGNAL FACE I.D.

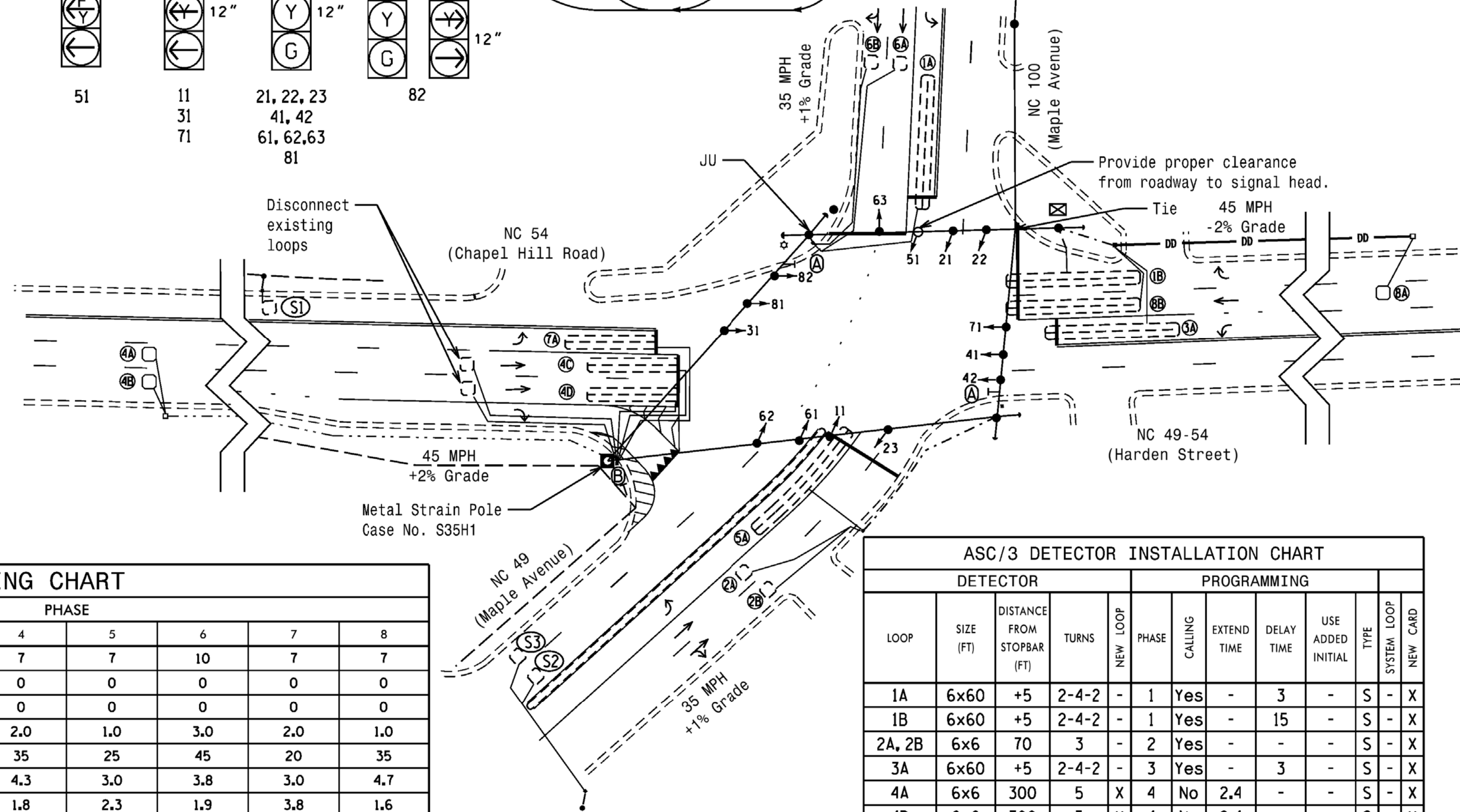


ALTERNATE PHASING DIAGRAM



ALTERNATE TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	02+6	03+7	04+8	01+6	02+5	03+8	04+7
11	---	---	---	---	---	---	---	---
21, 22, 23	R	R	G	G	R	R	R	Y
31	---	---	---	---	---	---	---	---
41, 42	R	R	R	R	R	R	G	G
51	---	---	---	---	---	---	---	---
61, 62, 63	R	G	R	G	R	R	R	Y
71	---	---	---	---	---	---	---	---
81	R	R	R	R	R	R	G	G
82	---	---	---	---	---	---	---	---



ASC/3 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green *	7	10	7	7	7	10	7	7
Walk *	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0
Veh. Extension *	1.0	3.0	1.0	2.0	1.0	3.0	2.0	1.0
Max I *	25	45	35	35	25	45	20	35
Yellow	3.0	3.8	3.0	4.3	3.0	3.8	3.0	4.7
Red Clear	2.4	1.9	3.3	1.8	2.3	1.9	3.8	1.6
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	-	-	-	X	-	-	-	X
Simultaneous Gap	X	X	X	X	X	X	X	X

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

ASC/3 DETECTOR INSTALLATION CHART

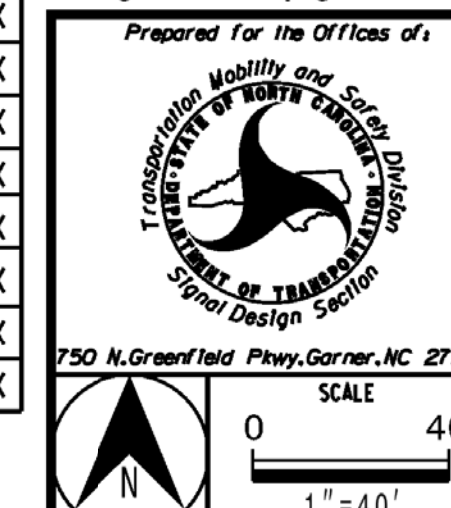
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6x60	+5	2-4-2	-	1	Yes	-	3	-	S	-	X
1B	6x60	+5	2-4-2	-	1	Yes	-	15	-	S	-	X
2A, 2B	6x60	70	3	-	2	Yes	-	-	-	S	-	X
3A	6x60	+5	2-4-2	-	3	Yes	-	3	-	S	-	X
4A	6x6	300	5	X	4	No	2.4	-	-	S	-	X
4B	6x6	300	5	X	4	No	2.4	-	-	S	-	X
4C	6x40	0	2-4-2	-	4	Yes	-	-	-	S	-	X
4D	6x40	0	2-4-2	-	4	Yes	-	-	-	S	-	X
5A	6x60	+5	2-4-2	-	5	Yes	-	15*	-	S	-	X
					2**	Yes	-	-	-	S	-	X
6A, 6B	6x6	70	3	-	6	Yes	-	-	-	S	-	X
7A	6x40	0	2-4-2	-	7	Yes	-	3	-	S	-	X
8A	6x6	300	4	X	8	No	3.1	-	-	S	-	X
8B	6x60	+5	2-4-2	-	8	Yes	-	-	-	S	-	X
S1	6x6	+330	5	-	-	No	-	-	-	N	X	X
S2	6x6	+245	5	-	-	No	-	-	-	N	X	X
S3	6x6	+245	5	-	-	No	-	-	-	N	X	X

* Disable Delay During Alternate Phasing Operation.
** Disable Phase 2 Call for Loop 5A during Alternate Phasing Operation.



12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
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NC LIC. NO. C-1154

Signal Upgrade



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Prepared for the Offices of:

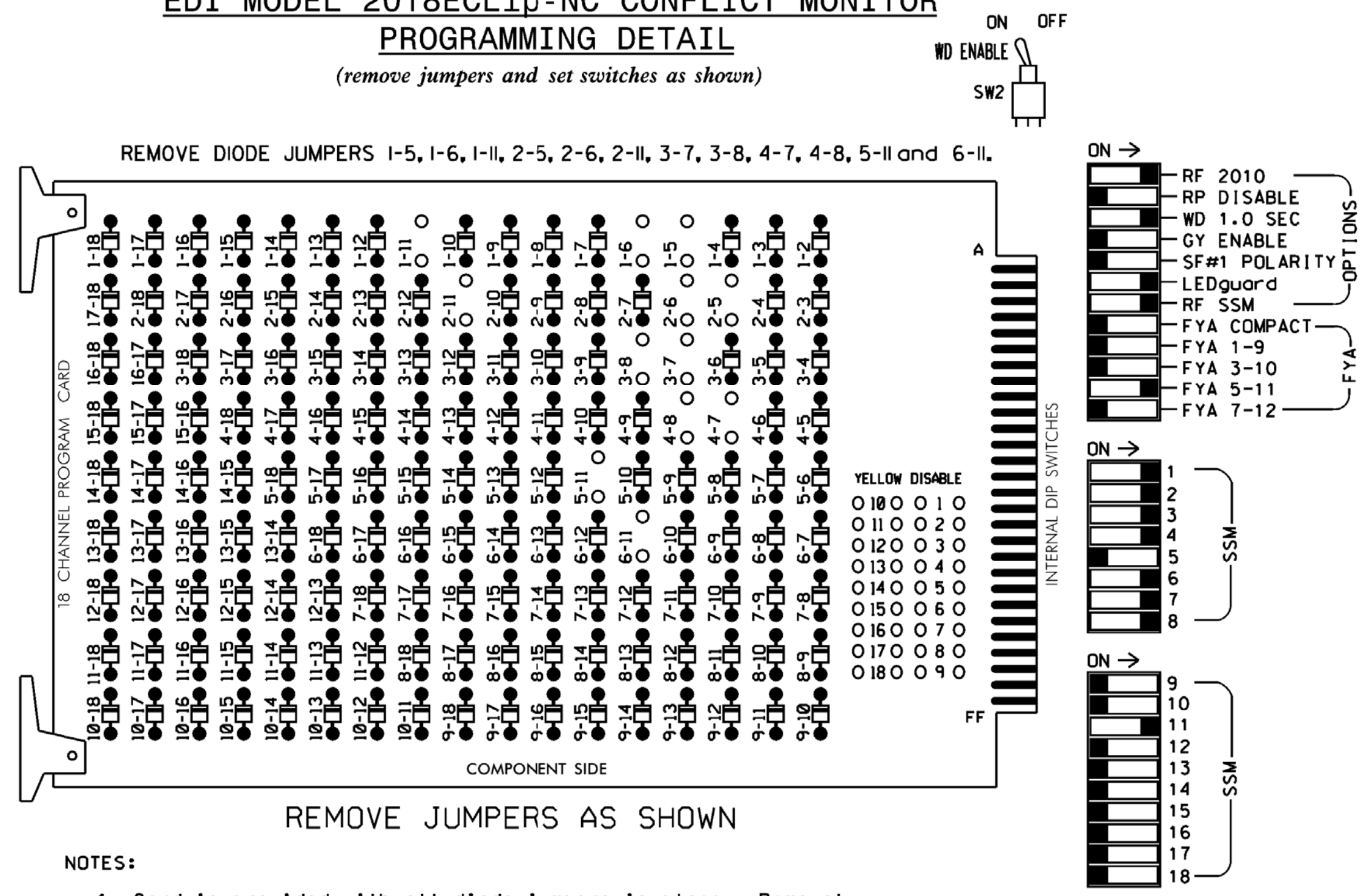
 NC 49/NC 100 (Maple Avenue)
 at
 NC 49-54 (Harden Street) /
 NC 54 (Chapel Hill Road)
 Division 7 Alamance County Burlington
 PLAN DATE: March 2018 REVIEWED BY: JB Voso
 PREPARED BY: SE Greene REVIEWED BY:
 REVISIONS: INIT. DATE
 SEAL

 James B. Voso
 6/13/2018
 DATE
 SIG. INVENTORY NO. 07-0043

*****SYTIME*****
 *****BUSINESS*****

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green and 6 Green.
4. The cabinet and controller are part of the Burlington-Graham 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,S4,S5,S7,S8,S10,S11, AUX S4
 PHASES USED.....1,2,3,4,5,6,7,8
 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

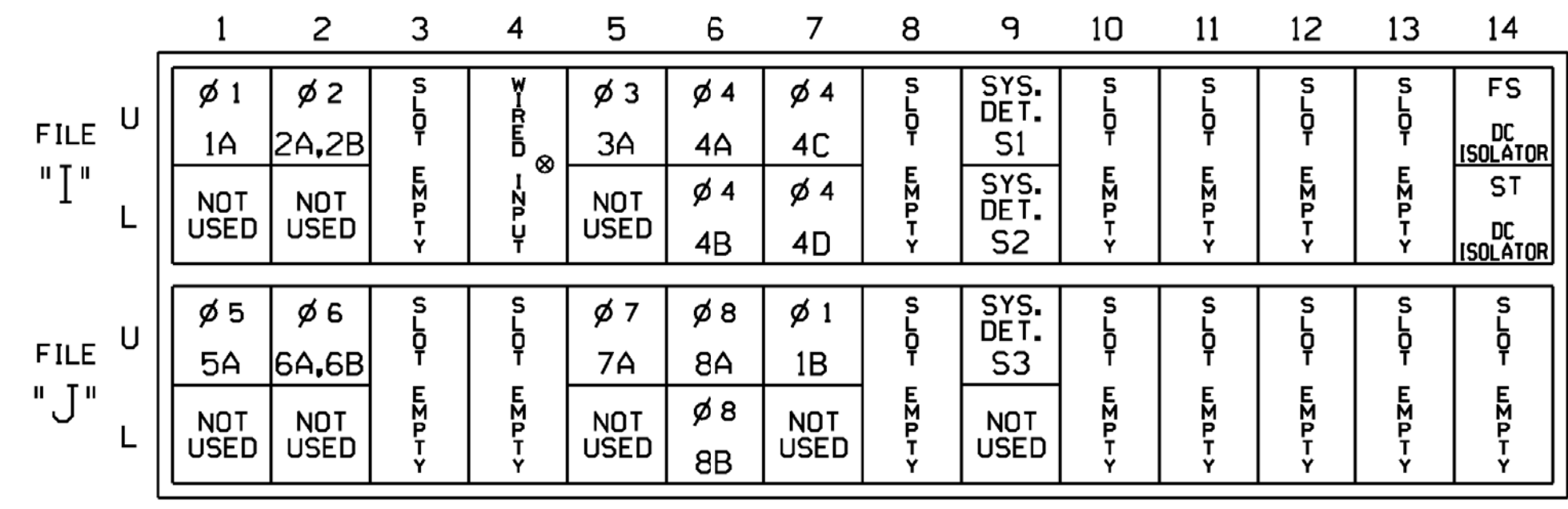
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22, 23	NU	31	41,42	NU	51	61,62, 63	NU	71	81,82	NU	NU	NU	51	NU	NU
RED			128			101			134			107						
YELLOW			129			102		*	135			108						
GREEN			130			103			136			109						
RED ARROW	125					116						122						A114
YELLOW ARROW	126	126				117						123						A115
FLASHING YELLOW ARROW																		A116
GREEN ARROW	127	127				118			133			124						

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

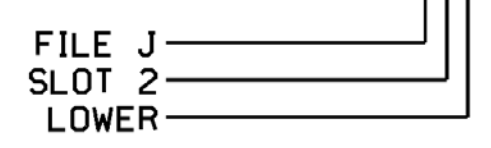
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES		3		S
1B	TB7-1,2	J7U	66	38	1	YES		15		S
2A,2B	TB2-5,6	I2U	39	2	2	YES				S
3A	TB4-5,6	I5U	58	3	3	YES		3		S
4A	TB4-9,10	I6U	41	4	4	NO	2.4			S
4B	TB4-11,12	I6L	45	14	4	NO	2.4			S
4C	TB6-1,2	I7U	65	34	4	YES				S
4D	TB6-3,4	I7L	78	44	4	YES				S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
* S2	TB6-11,12	I9L	62	13	SYS	NO				N
5A'	TB3-1,2	J1U	55	5	5	YES		15		S
		I4U	47	22	2	YES				S
6A,6B	TB3-5,6	J2U	40	6	6	YES				S
7A	TB5-5,6	J5U	57	7	7	YES		3		S
8A	TB5-9,10	J6U	42	8	8	NO	3.1			S
8B	TB5-11,12	J6L	46	18	8	YES				S
* S3	TB7-9,10	J9U	59	15	SYS	NO				N

* System detector only. Remove any assigned vehicle phase.

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

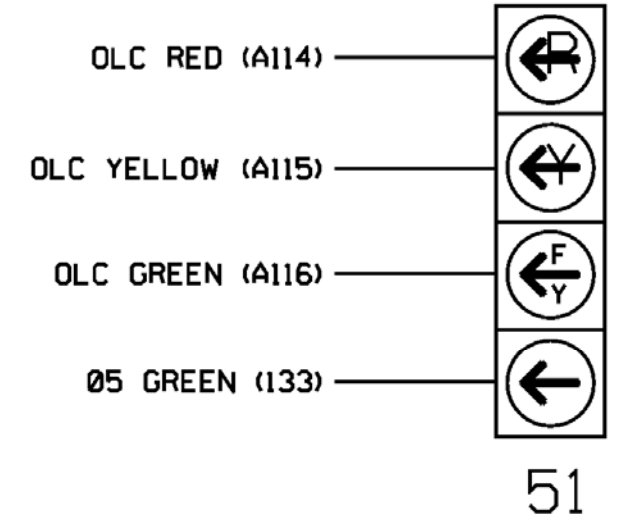
* For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 3.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

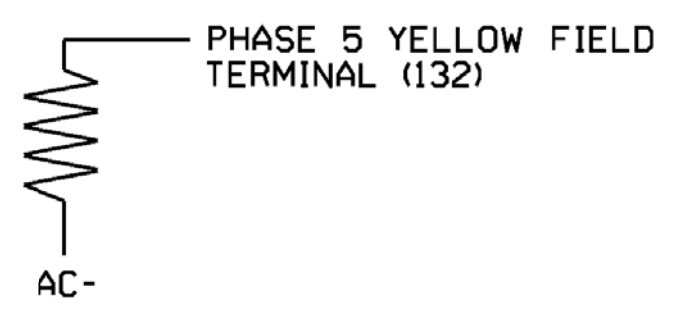
(wire signal head as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



Electrical Detail - Sheet 1 of 4

Electrical and Programming Details For: NC 49/NC 100 (Maple Avenue) at NC 49-54 (Harden Street)/ NC 54 (Chapel Hill Road)

Division 7 Alamance County Burlington

PLAN DATE: March 2018 REVIEWED BY: JB Voso

PREPARED BY: SE Greene REVIEWED BY:

REVISIONS: _____ INIT. DATE

750 N. Greenfield Pkwy, Corner, NC 27529

James Voso 6/13/2018

SIG. INVENTORY NO. 07-0043

Mattern & Craig
 ENGINEERS • SURVEYORS

12 BROAD STREET
 ASHEVILLE, NORTH CAROLINA 28801
 (828) 254-2201
 FAX (828) 254-4562
 NC LIC. NO. C-1154

*****SYTIME*****
 *****D*****
 *****USER*****

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.

PHASING	VEH DET PLAN	SF BITS ENABLED
ACTIONS REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	NONE
ACTIONS REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	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 phases 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...[1]

PATTERN.....AUTO SYS OVERRIDE.... NO

TIMING PLAN..... 0 SEQUENCE..... 0

VEH DETECTOR PLAN.. 2 DET LOG.....NONE

FLASH..... -- RED REST..... NO

VEH DET DIAG PLN... 0 PED DET DIAG PLN..0

DIMMING ENABLE.. NO PRIORITY RETURN. NO

PED PR RETURN.. NO QUEUE DELAY..... NO

PMT COND DELAY NO

PHASE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
PED RCL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
WALK 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
VEX 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
VEH RCL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MAX RCL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MAX 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PHASE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
MAX 3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CS INH	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
OMIT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SPC FCT	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
AUX FCT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Mattern & Craig
ENGINEERS • SURVEYORS

12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0043
DESIGNED: March 2018
SEALED: 6/13/2018
REVISED: NA

Electrical Detail - Sheet 4 of 4

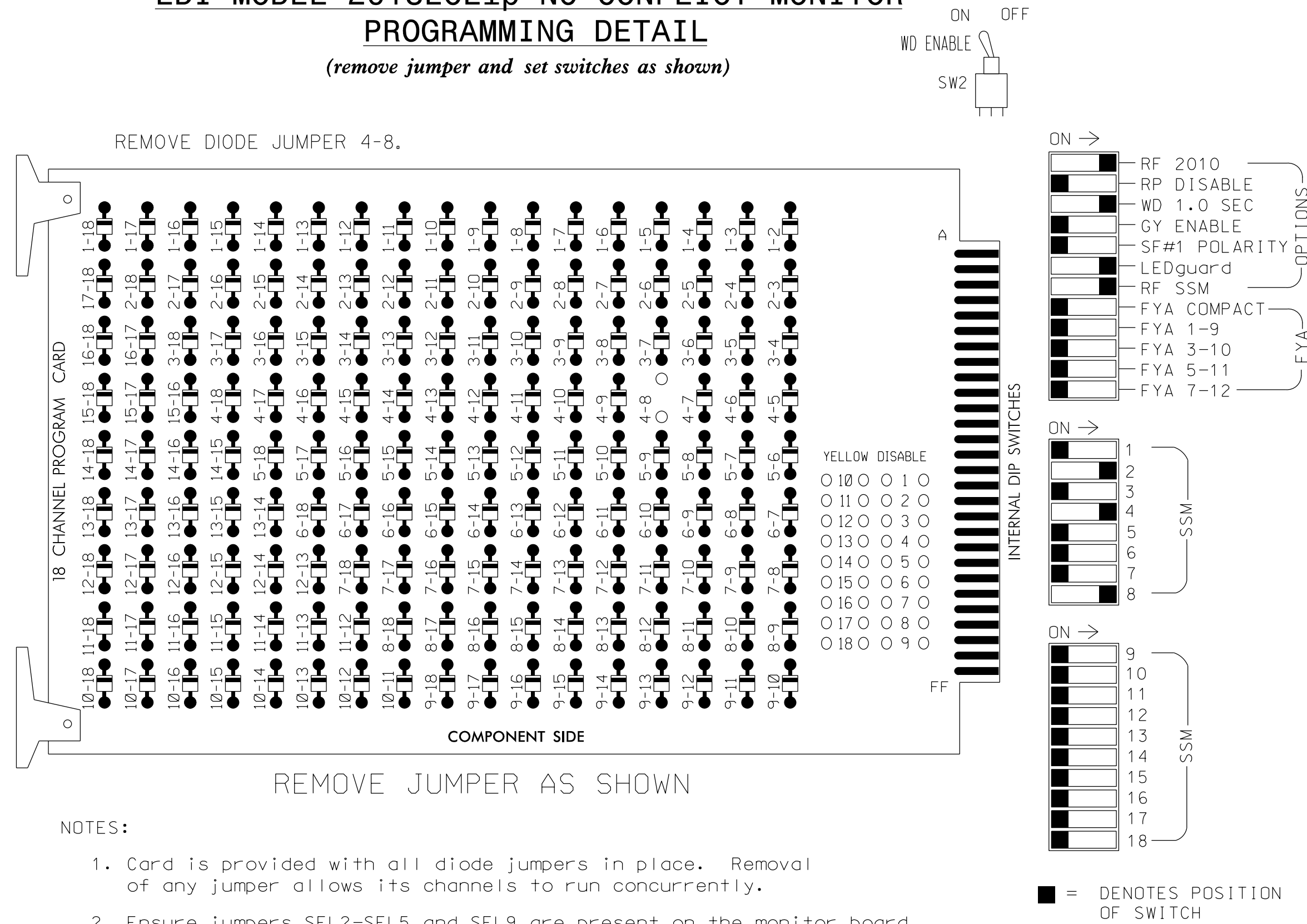
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared for the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Corner, NC 27529</p>	<p>NC 49/NC 100 (Maple Avenue) at NC 49-54 (Harden Street)/ NC 54 (Chapel Hill Road)</p> <p style="font-size: x-small;">Division 7 Alamance County Burlington</p> <p>PLAN DATE: March 2018 REVIEWED BY: JB Voso</p> <p>PREPARED BY: SE Greene REVIEWED BY:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p style="text-align: center;">SEAL</p> <p style="font-size: x-small;">James Voso 6/13/2018 DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-0043</p>
REVISIONS	INIT.	DATE						

*****SYSTEM*****
*****USER*****

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches 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. Integrate monitor with Ethernet network in cabinet.

NOTES

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22,23	NU	NU	41,42	NU	NU	NU	NU	NU	81,82	NU
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

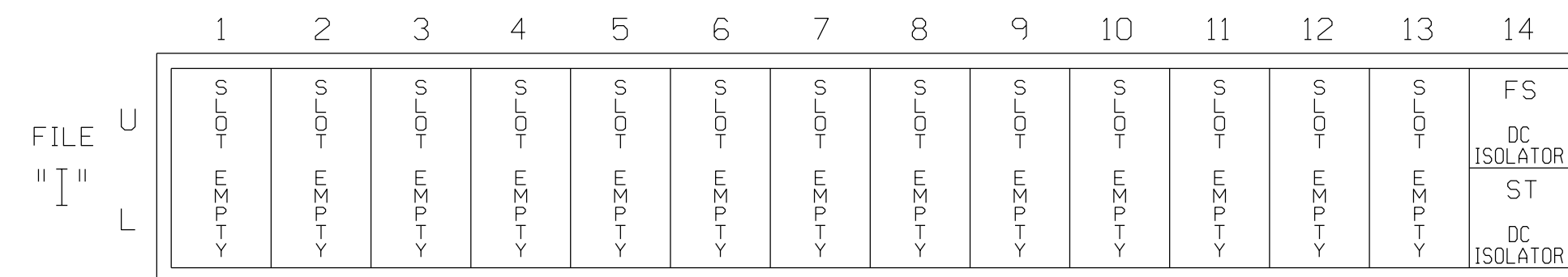
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONDLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S11
 PHASES USED.....2,4,8
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)



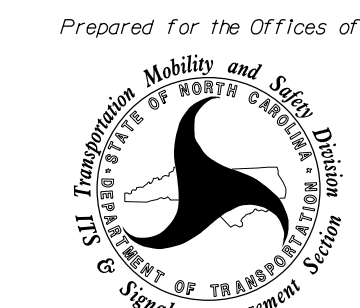
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0046
 DESIGNED: SEPT-2017
 SEALED: 06-13-2018
 REVISED: N/A

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:



US 70-NC 62 (S. Church Street) at Ruffin Street

Division 7 Alamance County Burlington

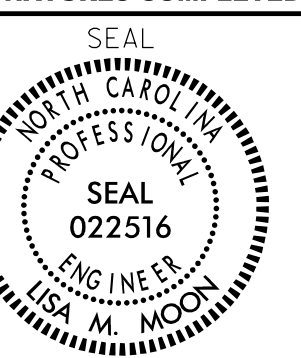
PLAN DATE: September 2017 REVIEWED BY: LM Moon

PREPARED BY: AJ Davis REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

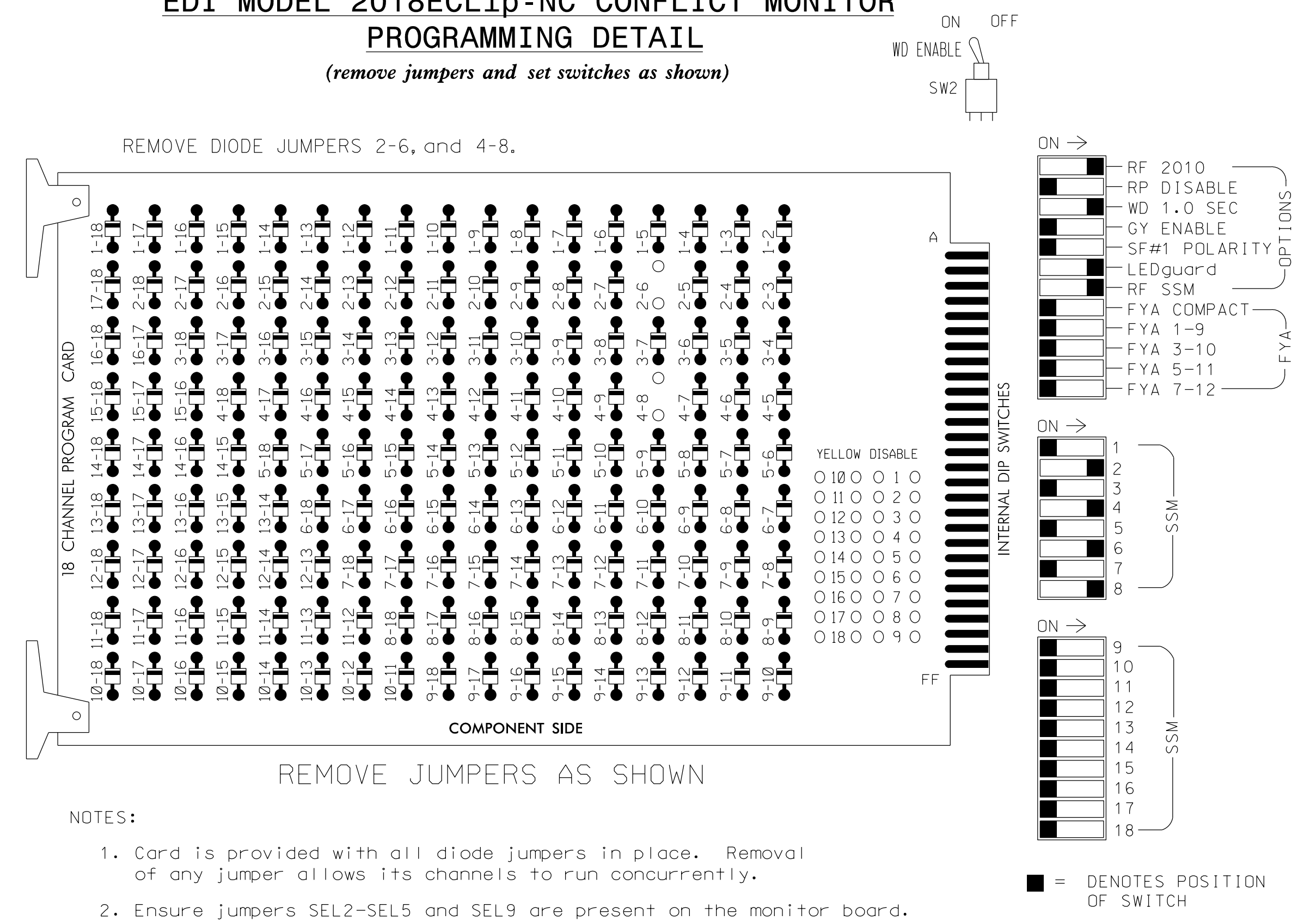


DocuSigned by: Lisa M. Moon 6/13/2018

SIG. INVENTORY NO. 07-0046

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

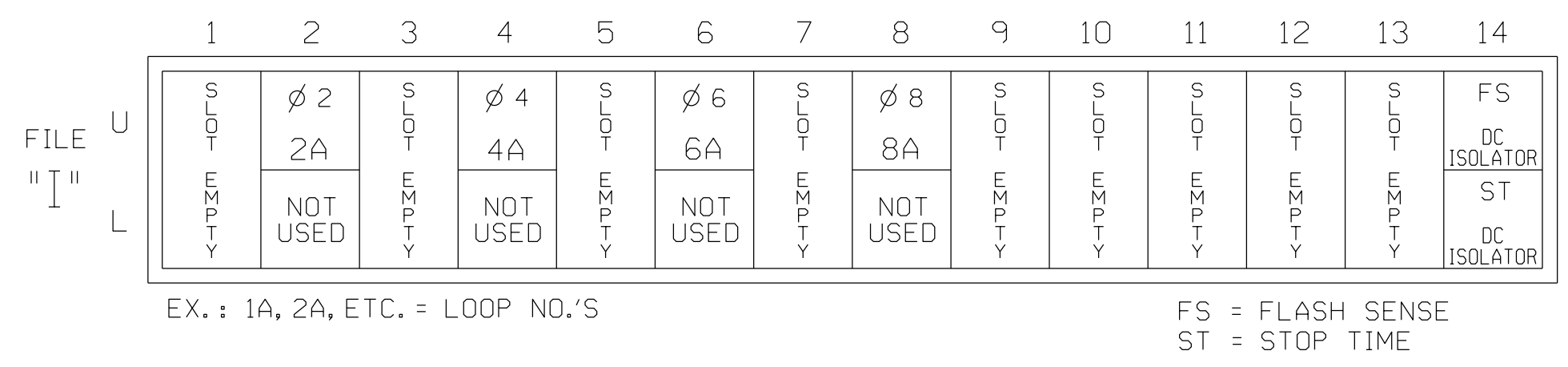
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONDLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S8,S11
 PHASES USED.....2,4,6,8
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

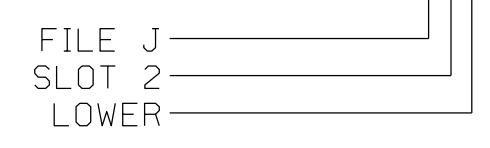
(front view)



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	TB21-3,4	I2U	39	2	2	YES				S
4A	TB21-7,8	I4U	41	4	4	YES		5		S
6A	TB21-11,12	I6U	40	6	6	YES				S
8A	TB22-1,2	I8U	42	8	8	YES		5		S

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0047
 DESIGNED: SEPT-2017
 SEALED: 06-13-2018
 REVISED: N/A

13-UNA-2018-18-26
 R:\66015\17\off\ek\signo\sig\design\w\ir\img\07-0047e.dgn
 C:\dwg\at\car-rlawton-w7

Plans Prepared By:

DRMP, Inc.
 8000 Regency Parkway, Suite 175
 Cary, NC 27518
 NC License No. C-2213 (919) 650-1038

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022516
 LISA M. MOON

Division 7 Alamance County Burlington

PLAN DATE: September 2017 REVIEWED BY: LM Moon

PREPARED BY: AJ Davis REVIEWED BY:

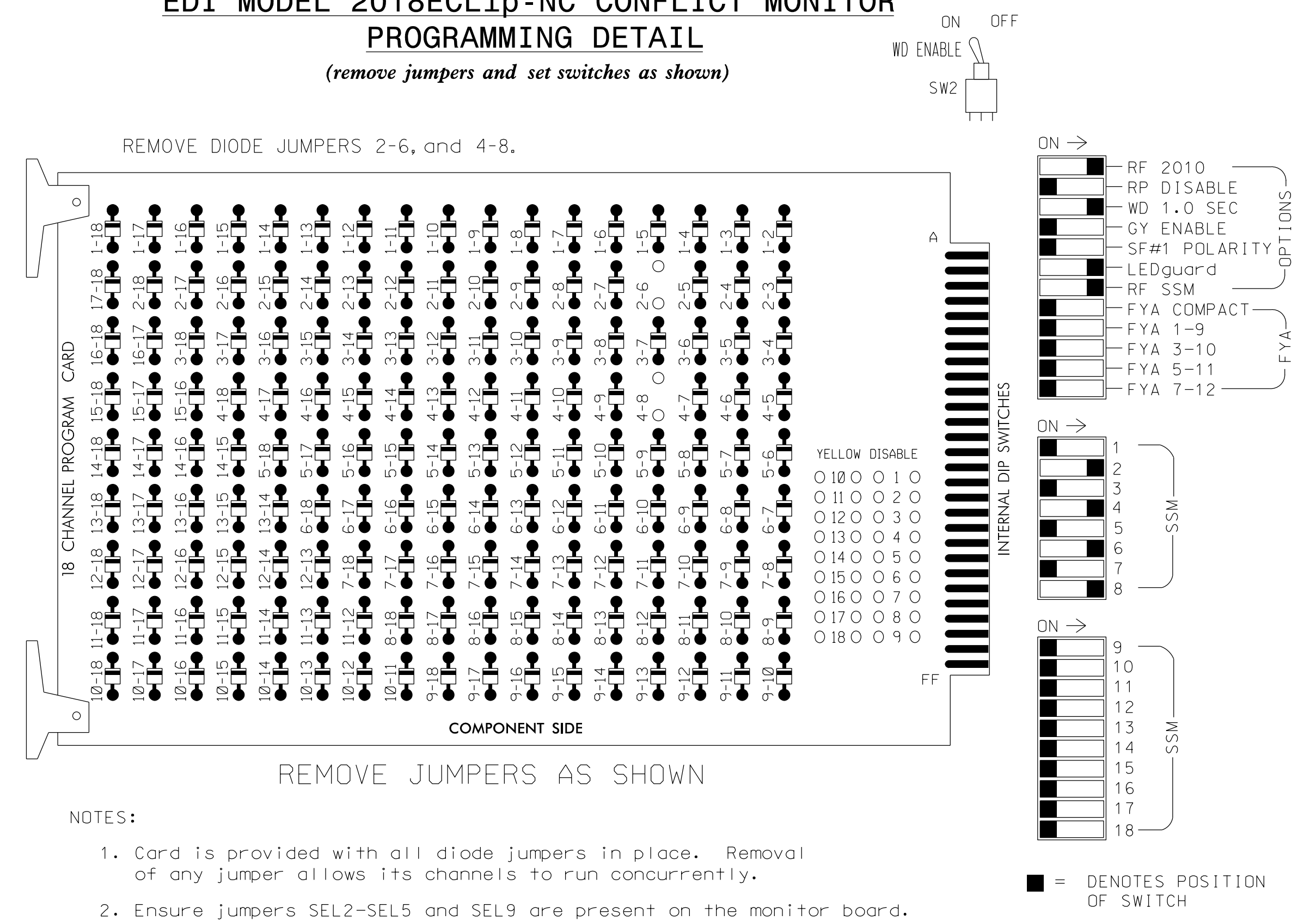
REVISIONS INIT. DATE

DocuSigned by:
 Lisa M. Moon 6/13/2018

SIG. INVENTORY NO. 07-0047

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
 - Ensure that Red Enable is active at all times during normal operation.
 - 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 phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

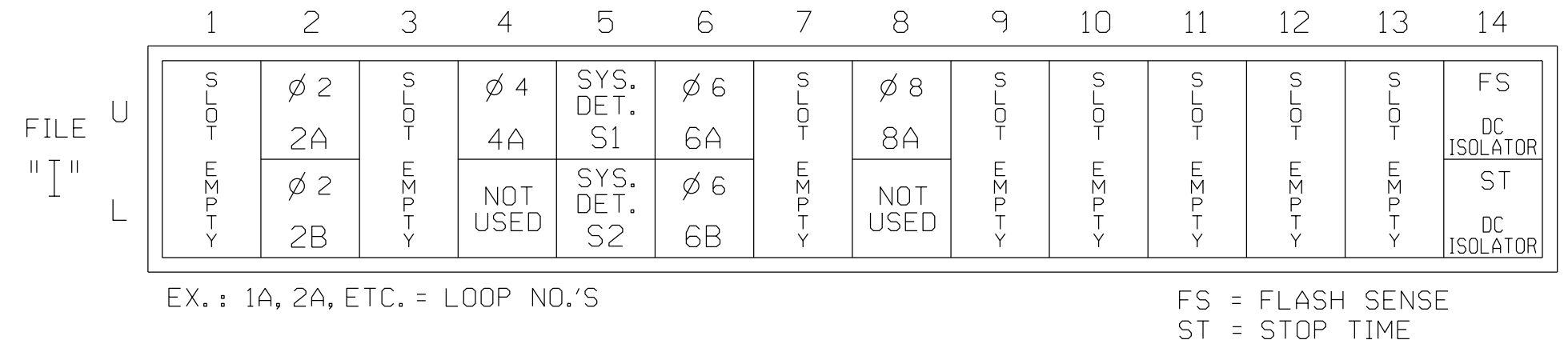
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONDLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S8,S11
 PHASES USED.....2,4,6,8
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

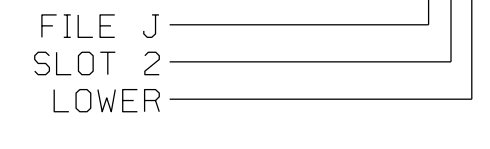


INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB21-3,4	I2U	39	2	2	YES				S
2B	TB23-3,4	I2L	43	12	2	YES				S
4A	TB21-7,8	I4U	41	4	4	YES		5		S
* S1	TB21-9,10	I5U	55	5	SYS	NO				N
* S2	TB22-1,2	I5L	48	26	SYS	NO				N
6A	TB21-11,12	I6U	40	6	6	YES				S
6B	T23-11,12	I6L	44	16	8	YES				S
8A	TB22-1,2	I8U	42	8	8	YES		5		S

* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0048
 DESIGNED: SEPT-2017
 SEALED: 06-13-2018
 REVISED: N/A

13-JUN-2018 17:58
 R:\66015\17\off\c\signal\design\w\ir\img\07-0048e.dgn
 C:\dwg\ AT CAR-RLANTON-W7

Plans Prepared By:

DRMP, Inc.
 8000 Regency Parkway, Suite 175
 Cary, NC 27518
 NC License No. C-2213 (919) 650-1038

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Maple Avenue
 at
 SR 1154 (Tucker Street)

Division 7 Alamance County Burlington

PLAN DATE: September 2017 REVIEWED BY: LM Moon

PREPARED BY: AJ Davis REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

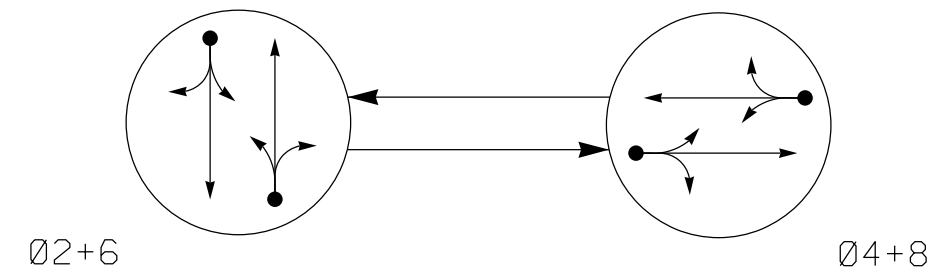
SEAL

SEAL 022516
 ENGINEER
 LISA M. MOON

DocuSigned by:
 Lisa M. Moon 6/13/2018

SIG. INVENTORY NO. 07-0048

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

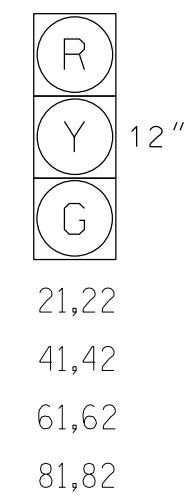
- ← DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- ← UNSIGNALIZED MOVEMENT
- ← → PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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

SIGNAL FACE I.D.

All Heads L.E.D.

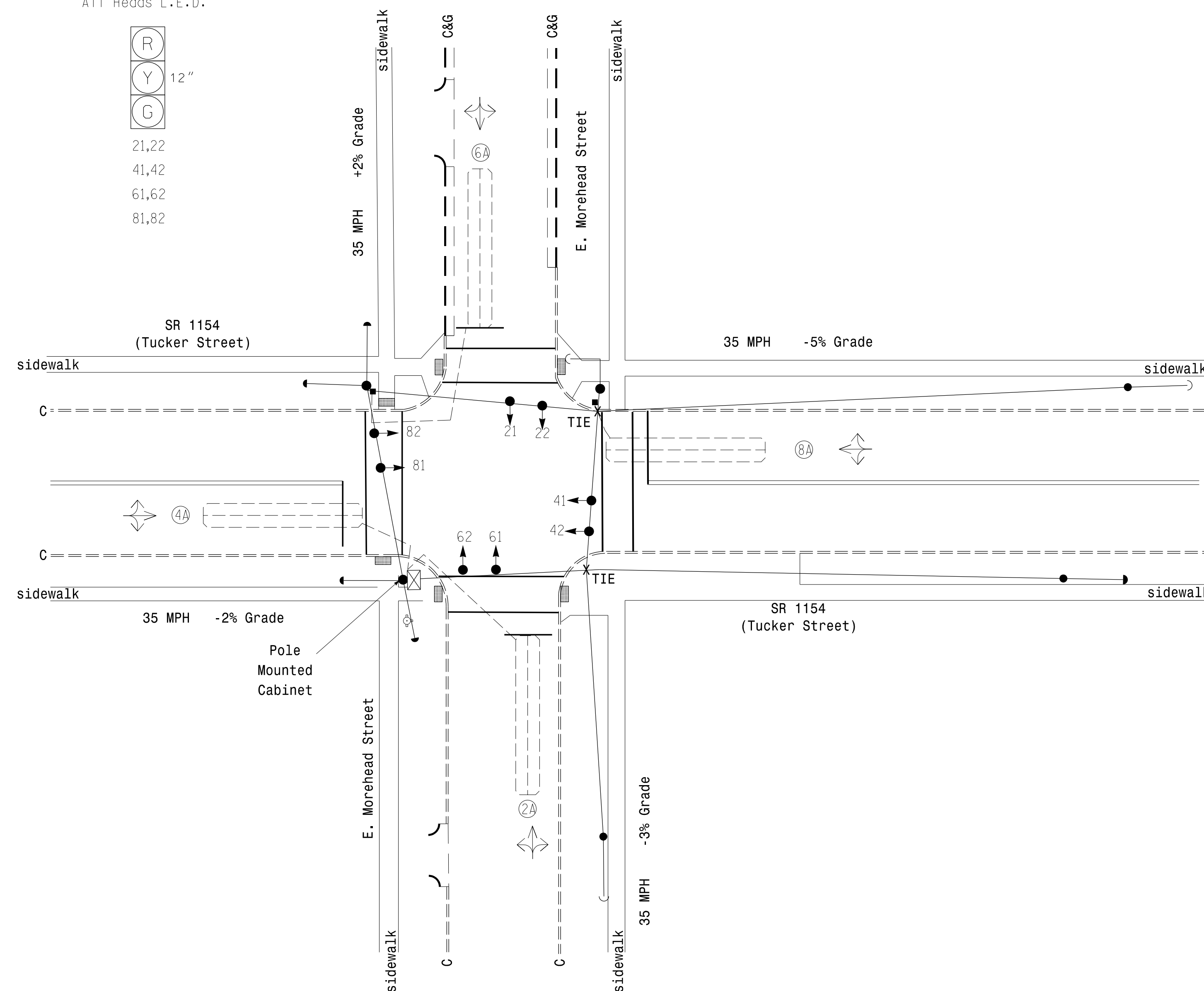


ASC/3 DETECTOR INSTALLATION CHART												
DETECTOR				PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP SYSTEM	NEW CARD
2A	6x40	0	2-4-2	-	2	Yes	-	-	-	S	-	X
4A	6x40	+5	2-4-2	-	4	Yes	-	5	-	S	-	X
6A	6x40	0	2-4-2	-	6	Yes	-	-	-	S	-	X
8A	6x40	+10	2-4-2	-	8	Yes	-	5	-	S	-	X

2 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



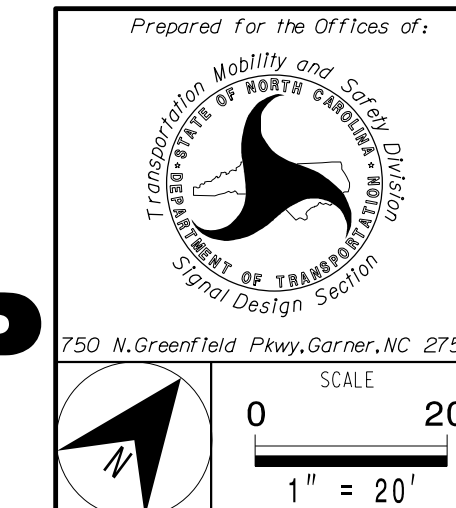
FEATURE	PHASE			
	2	4	6	8
Min Green *	10	7	10	7
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	2.0	2.0	2.0	2.0
Max 1 *	25	25	25	25
Yellow	4.1	4.0	3.7	4.2
Red Clear	1.3	1.4	1.3	1.3
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	-	-	-
Recall Position	VEH. RECALL	-	VEH. RECALL	-
Dual Entry	-	X	-	X
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.

LEGEND	
PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
○ → Modified Signal Head	N/A
— → Sign	— → Sign
○ → Pedestrian Signal Head With Push Button & Sign	○ → Pedestrian Signal Head With Push Button & Sign
○ → 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
→ Directional Arrow	→ Directional Arrow
N/A	⊙ → Fire Hydrant

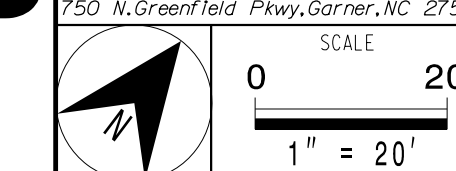
Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



E. Morehead Street at SR 1154 (Tucker Street)	
Division 7	Alamance County
PLANNED BY: Sept 2017	REVIEWED BY: AJ Davis
PREPARED BY: RD Lawton	REVIEWED BY: LM Moon
REVISIONS	INIT. DATE

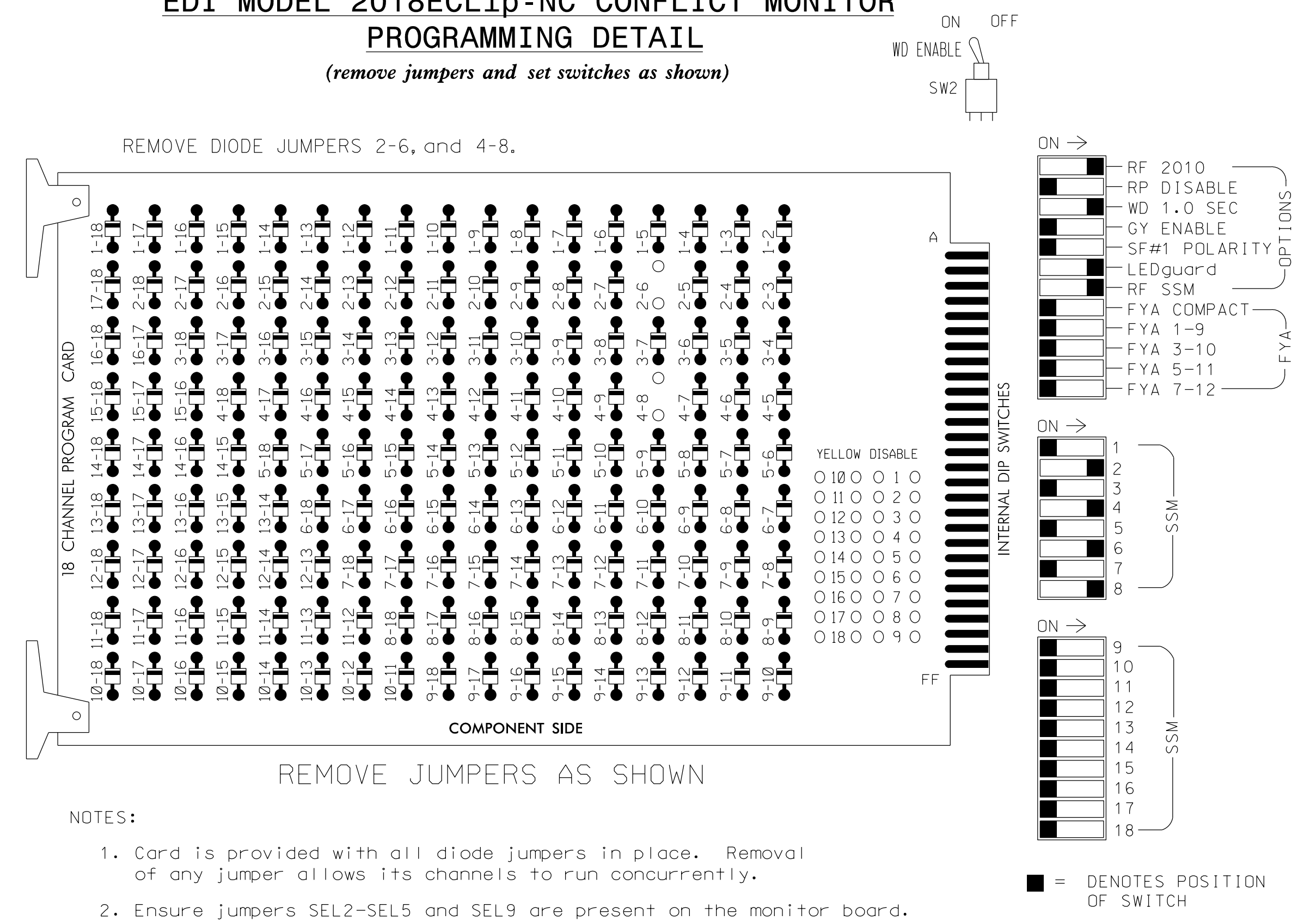
DocuSigned by:
Lisa M. Moon
6/14/2018
SIG. INVENTORY NO. 07-0049



14-JUN-2018 11:32 R:\66015\17\off\csl\gms\signal\gms\07-0049.dgn dwhite AT CAR-DWHITE-LTW

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

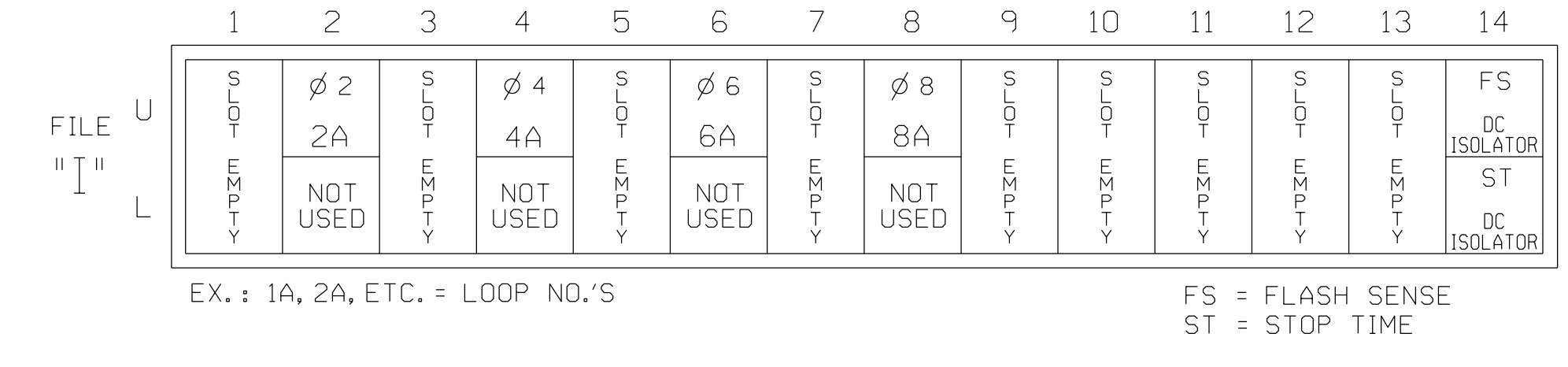
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONDLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S8,S11
 PHASES USED.....2,4,6,8
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

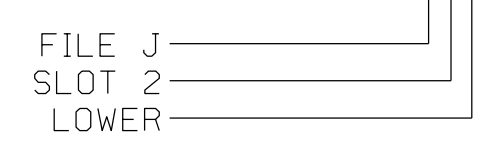
(front view)



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	TB21-3,4	I2U	39	2	2	YES				S
4A	TB21-7,8	I4U	41	4	4	YES		5		S
6A	TB21-11,12	I6U	40	6	6	YES				S
8A	TB22-1,2	I8U	42	8	8	YES		5		S

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0049
 DESIGNED: SEPT-2017
 SEALED: 06-13-2018
 REVISED: N/A

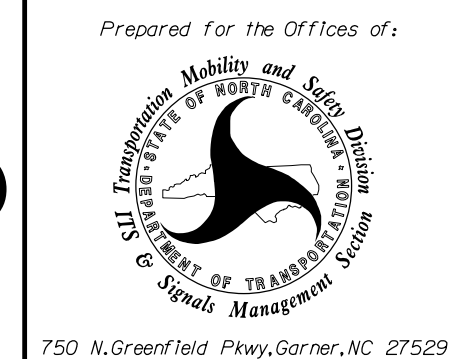
14-JUN-2018 11:32 R:\6605\work\offices\signal\design\wiring\ing\07-0049e.dgn DWI:TE AT CAR-DWH:TE-LTW

Plans Prepared By:

DRMP, Inc.
8000 Regency Parkway, Suite 175
Cary, NC 27518
NC License No. C-2213 (919) 650-1038

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:



E. Morehead Street
at
SR 1154 (Tucker Street)

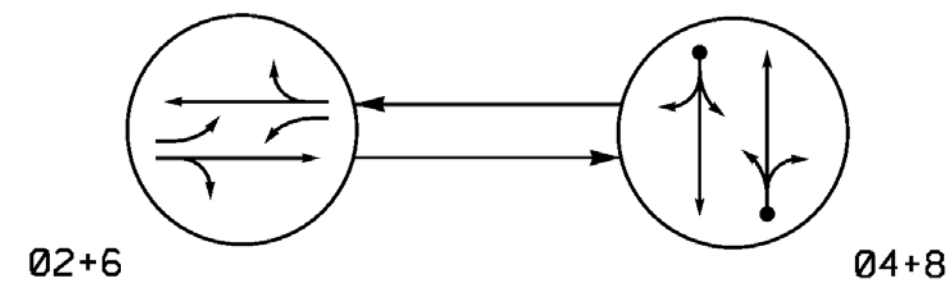
Division 7	Alamance County	Burlington
PLAN DATE: September 2017	REVIEWED BY: LM Moon	
PREPARED BY: AJ Davis	REVIEWED BY:	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
Lisa M. Moon
6/14/2018
DATE

SIG. INVENTORY NO. 07-0049

PHASING DIAGRAM

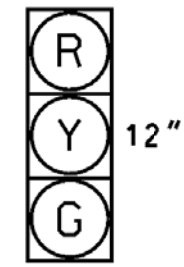


PHASING DIAGRAM DETECTION LEGEND
 ● ← DETECTED MOVEMENT
 ○ ← UNDETECTED MOVEMENT (OVERLAP)
 - - - ← UNSIGNALIZED MOVEMENT
 - - - ← PEDESTRIAN MOVEMENT

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

SIGNAL FACE I.D.

All Heads L.E.D.



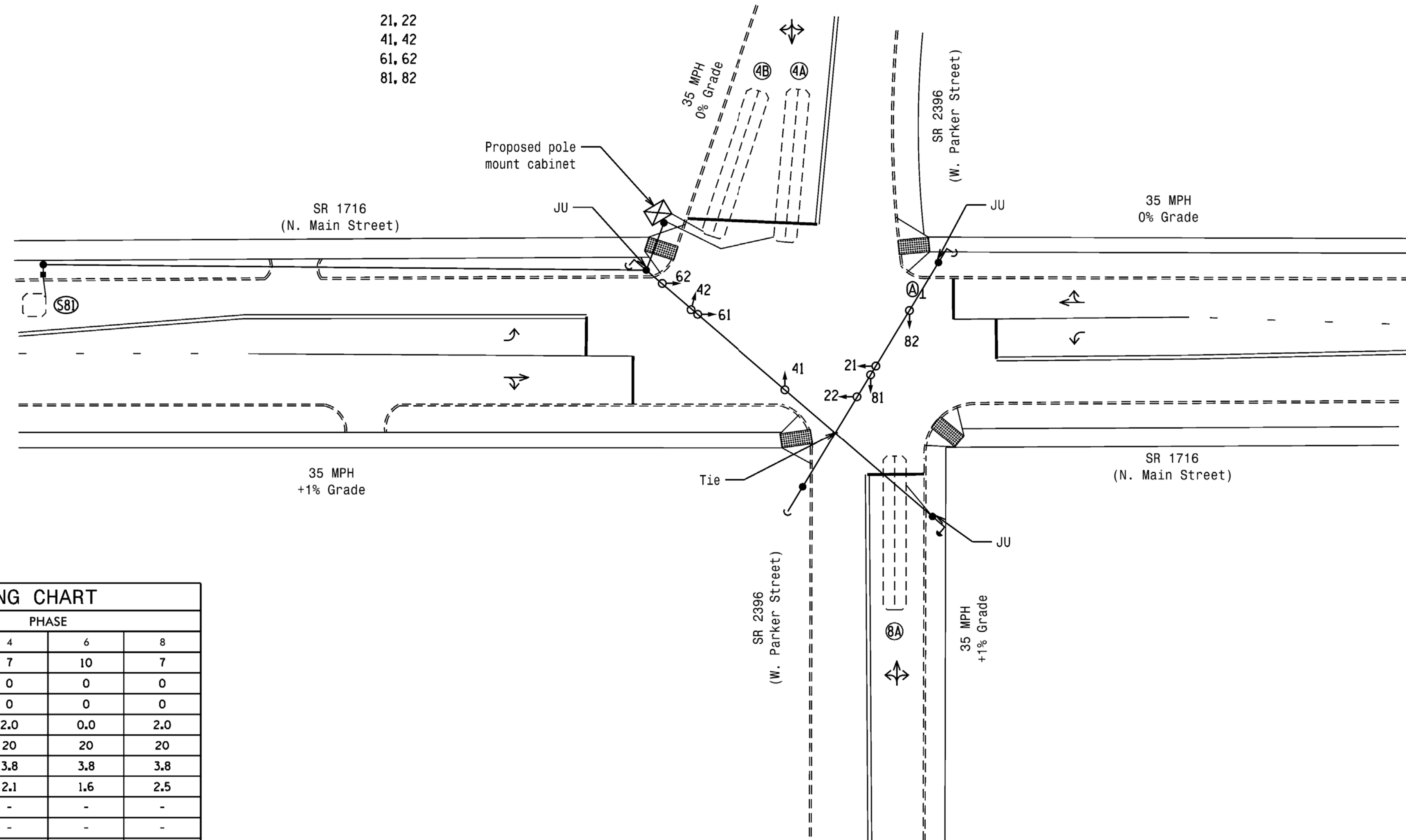
21, 22
41, 42
61, 62
81, 82

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
4A	6x40	+5	2-4-2	-	4	Yes	-	3	-	S	-	X
4B	6x40	+5	2-4-2	-	4	Yes	-	15	-	S	-	X
8A	6x40	+5	2-4-2	-	8	Yes	-	3	-	S	-	X
S81	6x6	+240	3	-	SYS	No	-	-	-	N	X	X

2 Phase
Semi-Actuated
(Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Raise signal span to achieve proper clearance over N. Main Street and W. Parker Street.



FEATURE	PHASE			
	2	4	6	8
Min Green *	10	7	10	7
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	0.0	2.0	0.0	2.0
Max I *	20	20	20	20
Yellow	3.8	3.8	3.8	3.8
Red Clear	1.5	2.1	1.6	2.5
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	-	-	-
Recall Position	MAX RECALL	-	MAX RECALL	-
Dual Entry	-	X	-	X
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.

LEGEND	
PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	○ → Sign
⊥ Pedestrian Signal Head	⊥ Signal Pole with Guy
⊥ With Push Button & Sign	⊥ Signal Pole with Sidewalk Guy
⊥ Signal Pole with Guy	⊥ Inductive Loop Detector
⊥ Signal Pole with Sidewalk Guy	⊥ Controller & Cabinet
⊥ Inductive Loop Detector	⊥ Junction Box
⊥ Controller & Cabinet	⊥ 2-in Underground Conduit
⊥ Junction Box	⊥ Right of Way
⊥ 2-in Underground Conduit	→ Directional Arrow
⊥ Right of Way	⊙ "NO TURN ON RED" Sign (R10-11a)
→ Directional Arrow	⊥ Curb Ramp
⊙ "NO TURN ON RED" Sign (R10-11a)	
⊥ Curb Ramp	

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12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

Signal Upgrade

Prepared for the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529
 SCALE: 0 20
1"=20'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 1716 (N. Main Street)
at
SR 2396 (W. Parker Street)

Division 7 Alamance County Graham

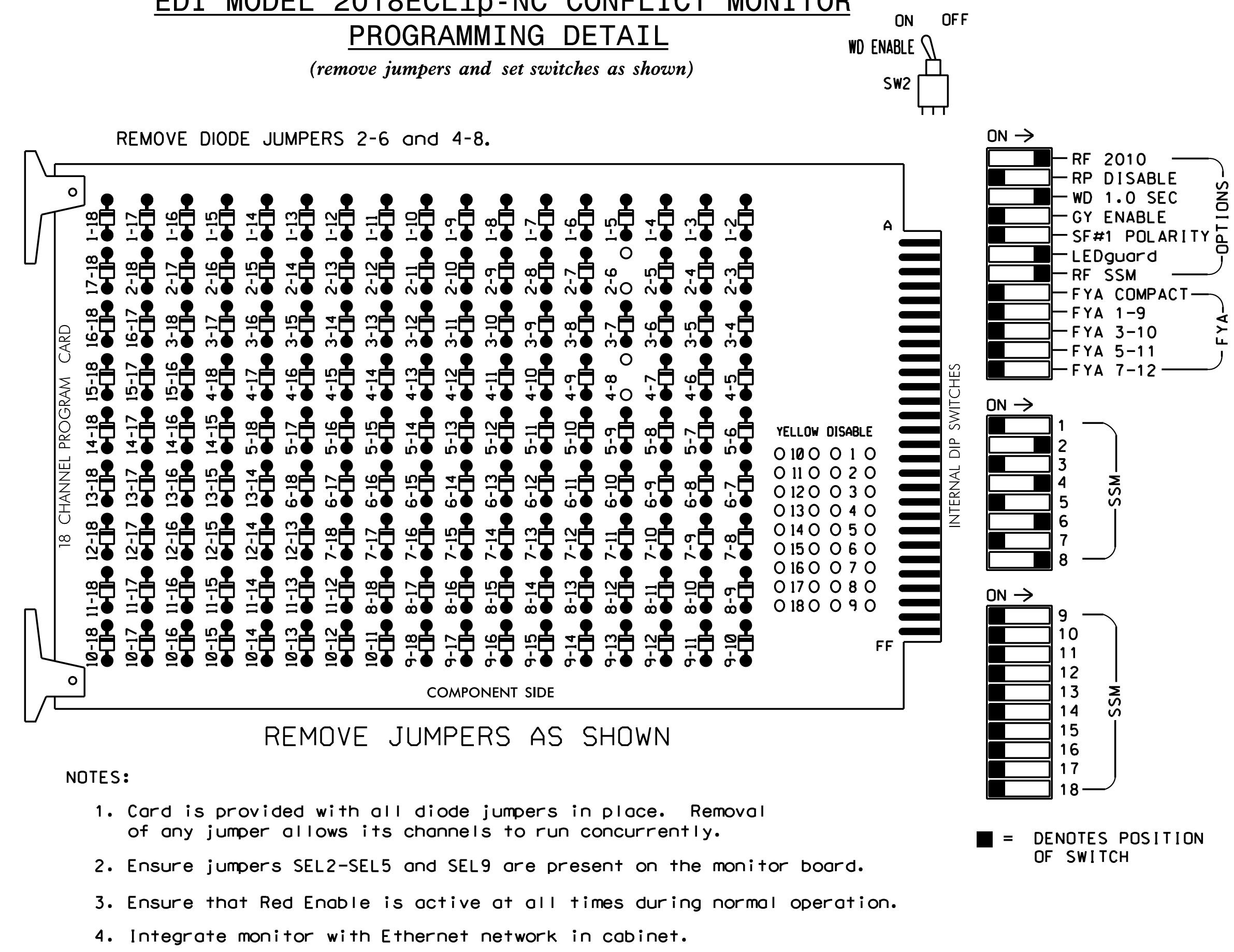
PLAN DATE: December 2017 REVIEWED BY: JB Voso
PREPARED BY: SE Greene REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
JAMES B. VOSO
6/13/2018
James Voso
SIGNATURE DATE
SIG. INVENTORY NO. 07-0059

*****SYTIME*****
*****USERNAME*****

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



- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
 - Ensure that Red Enable is active at all times during normal operation.
 - 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 phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

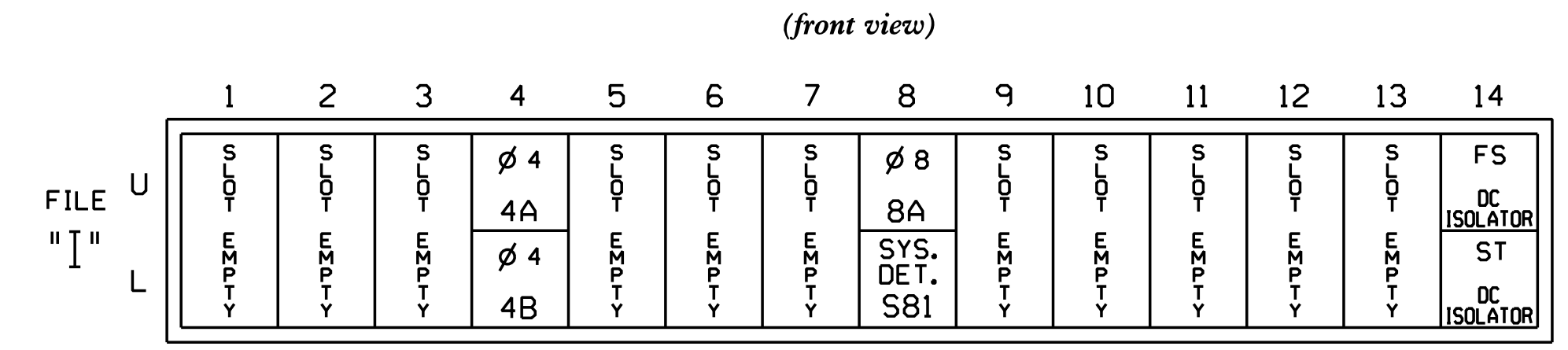
CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S8,S11
 PHASES USED.....2,4,6,8
 OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT
(front view)



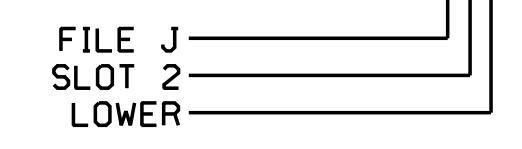
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
4A	TB21-7,8	I4U	41	4	4	YES		3		S
4B	TB23-7,8	I4L	45	14	4	YES		15		S
8A	TB22-1,2	I8U	42	8	8	YES		3		S
S81*	TB24-1,2	I8L	46	18	SYS	NO				N

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0059
 DESIGNED: December 2017
 SEALED: 6/13/2018
 REVISED: NA

2:35:05 PM 11/13/18 - Burlington-Graham Signal System06 Working Folders with NCDOT File Structure if Working on NCDOT Project: Mwg or DgnW07-00594070059-sm.ele-20140501.dgn Local User



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 FAX (828) 254-4562
 NC LIC. NO. C-1154

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

Division 7 Alamance County Graham

PLAN DATE: December 2017 REVIEWED BY: JB Voso

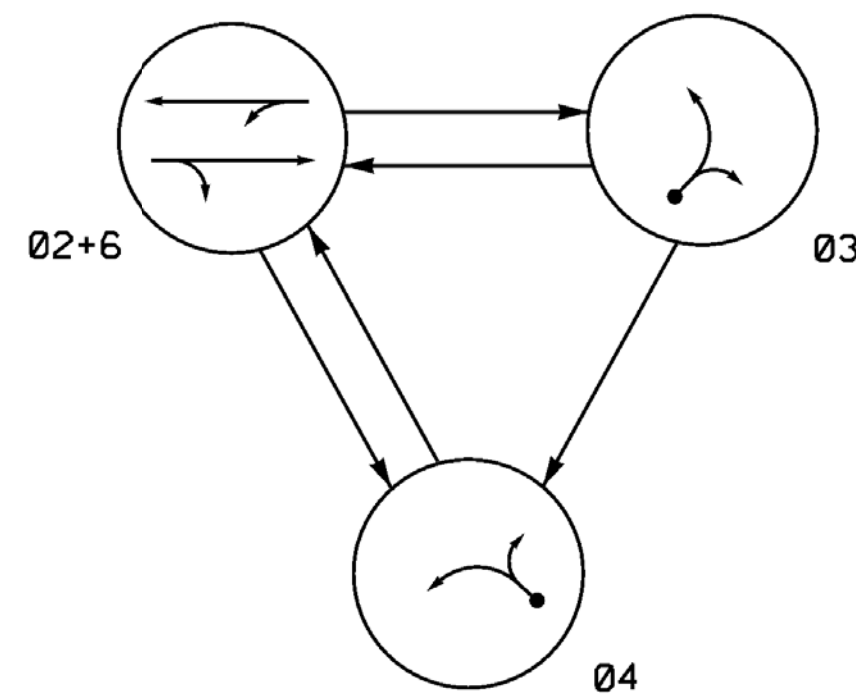
PREPARED BY: SE Greene REVIEWED BY:

REVISIONS INIT. DATE

James Voso 6/13/2018

SIG. INVENTORY NO. 07-0059

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	0 2 + 6	0 3	0 4	FLASH
21, 22	G	R	R	Y
31, 32	R	G	R	R
41, 42	R	R	G	R
61, 62	G	R	R	Y

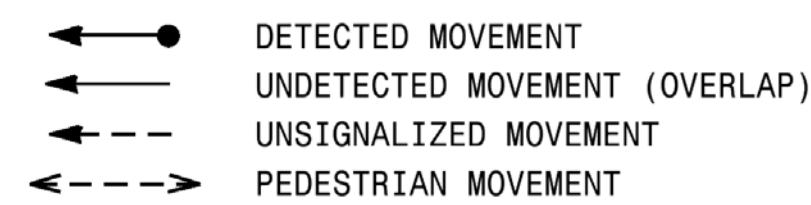
ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR						PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP
3A	6x40	+5	2-4-2	-	3	Yes	-	3	-	S	- X
4A	6x60	+5	2-4-2	-	4	Yes	-	5	-	S	- X

3 Phase Semi-Actuated (Burlington-Graham Signal System)

NOTES

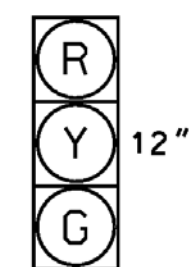
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. The order of phase 3 and phase 4 may be reversed.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

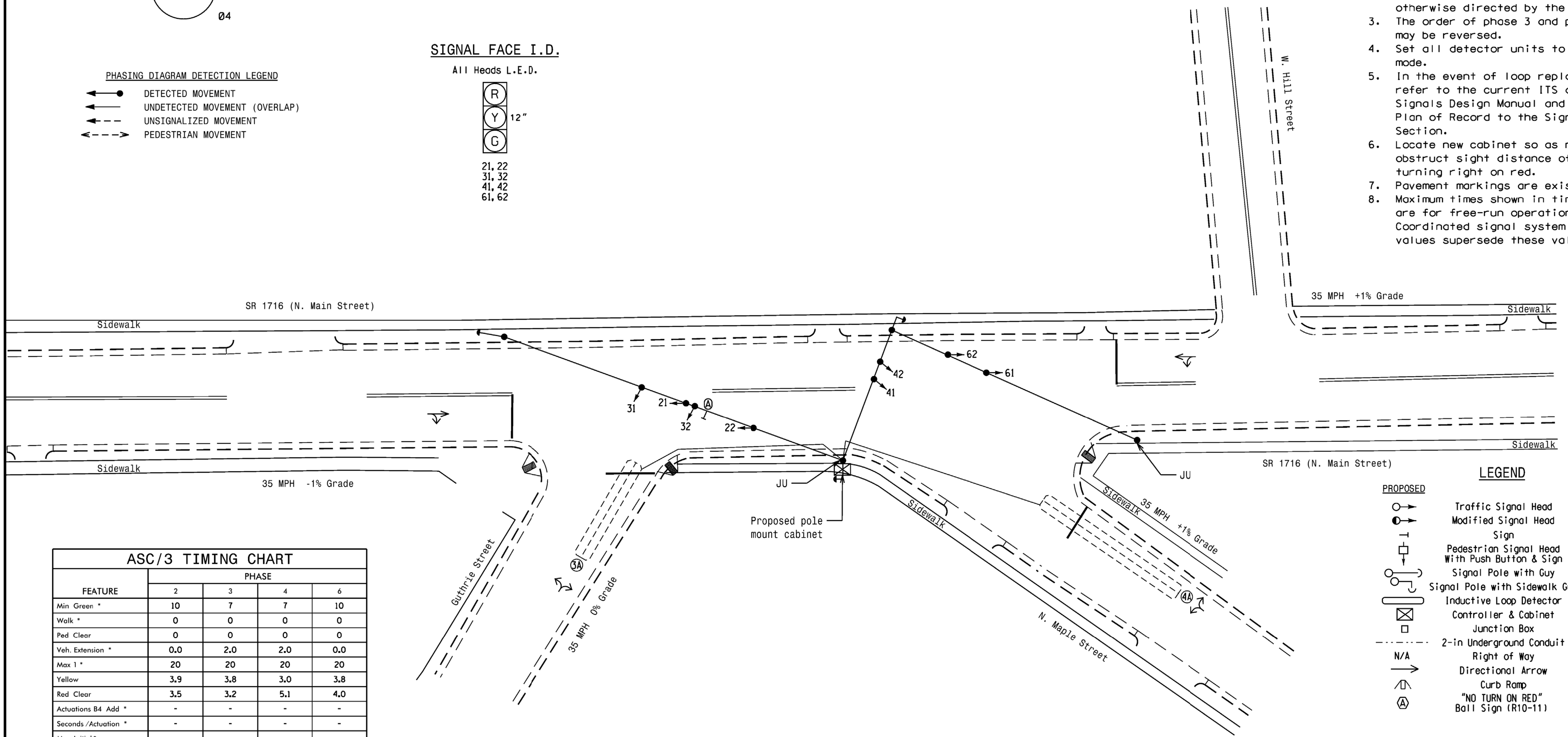


SIGNAL FACE I.D.

All Heads L.E.D.



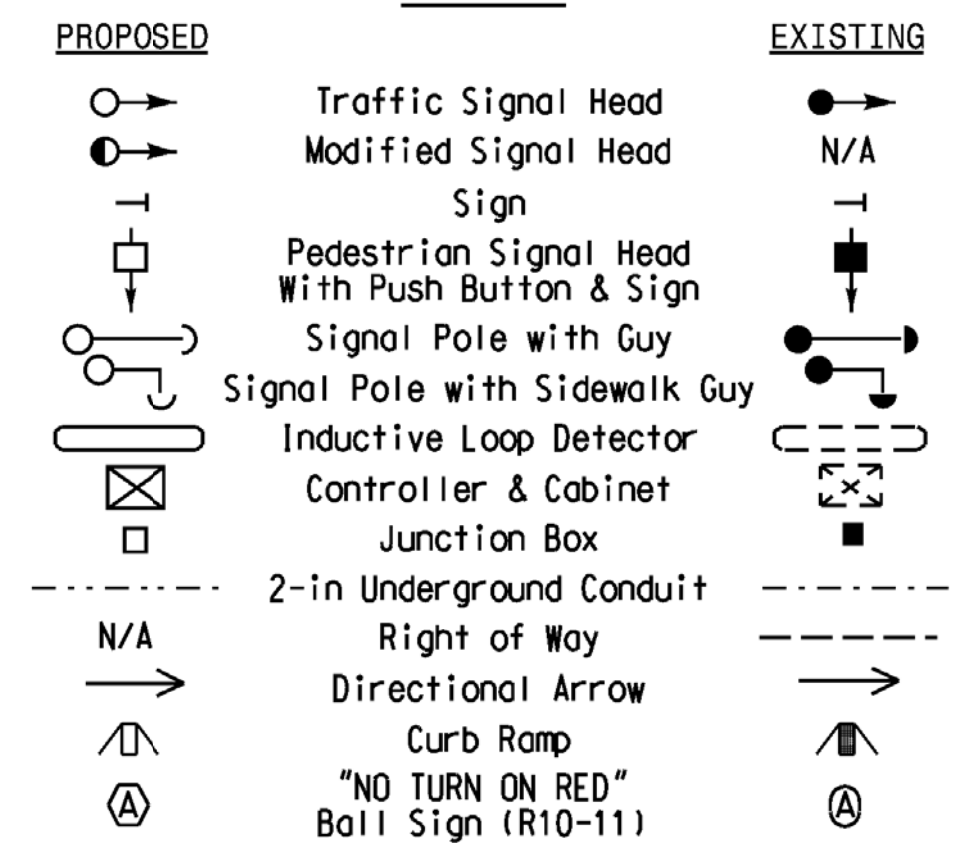
21, 22
31, 32
41, 42
61, 62



FEATURE	PHASE			
	2	3	4	6
Min Green *	10	7	7	10
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	0.0	2.0	2.0	0.0
Max I *	20	20	20	20
Yellow	3.9	3.8	3.0	3.8
Red Clear	3.5	3.2	5.1	4.0
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	-	-	-
Recall Position	MAX RECALL	-	-	MAX 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.

LEGEND



ASC/3 TIMING CHART

Signal Upgrade

Mattern & Craig
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NC LIC. NO. C-1154

Prepared for the Offices of:
TRANSPORTATION MOBILITY AND SAFETY DIVISION
DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N. Greenfield Pkwy, Garner, NC 27529

SR 1716 (N. Main Street) at N. Maple Street/Guthrie Street

Division 7 Alamance County Graham

PLAN DATE: December 2017 REVIEWED BY: JB Voso

PREPARED BY: SE Greene REVIEWED BY:

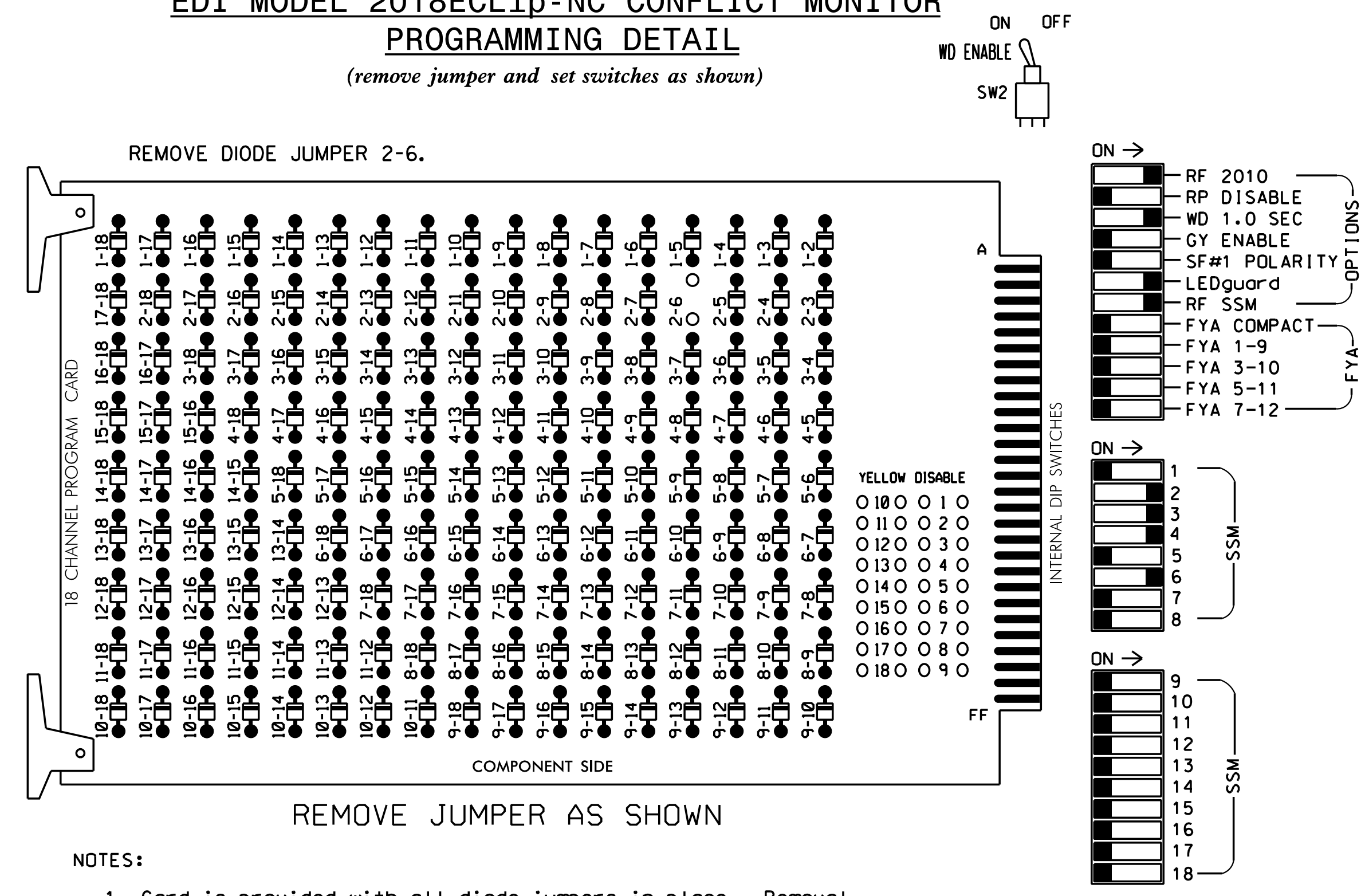
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
JAMES B. VOSO
022599
6/13/2018
SIG. INVENTORY NO. 07-0060

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches 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. Integrate monitor with Ethernet network in cabinet.

NOTES

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	31,32	41,42	NU	NU	61,62	NU	NU	NU	NU
RED		128		116	101			134				
YELLOW		129		117	102			135				
GREEN		130		118	103			136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

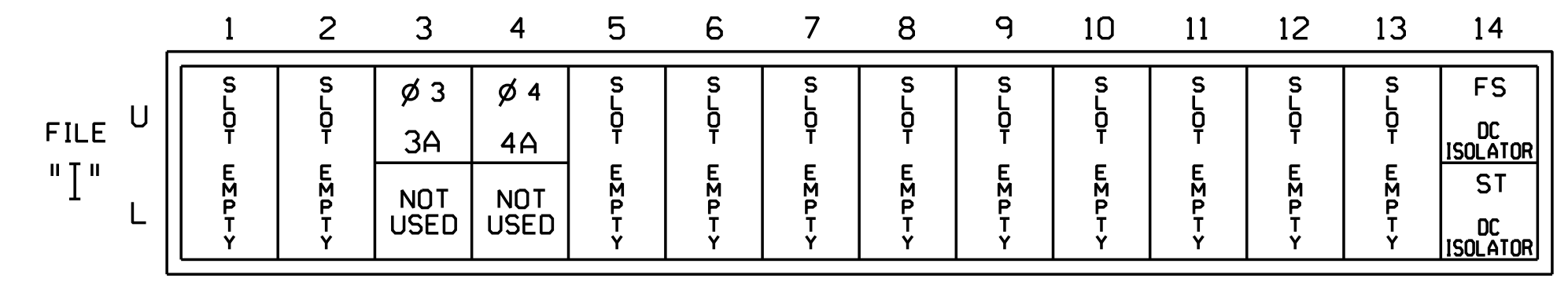
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S4,S5,S8
 PHASES USED.....2,3,4,6
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)



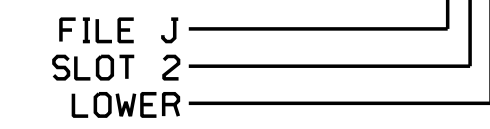
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
3A	TB21-5,6	13U	58	3	3	YES		3		S
4A	TB21-7,8	14U	41	4	4	YES		5		S

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0060
 DESIGNED: December 2017
 SEALED: 6/13/2018
 REVISED: NA

44-22158 PM 11:43:59 - Burlington-Graham Signal System06 Working Folders with NCDOT File Structure if Working on NCDOT Project: Mdwg or Dgnw07-0060\070060.sm.ele_20150211.dgn



12 BROAD STREET
 ASHEVILLE, NORTH CAROLINA 28801
 (828) 254-2201
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 NC LIC. NO. C-1154

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR:



SR 1716 (N. Main Street)
 at
 N. Maple Street/Guthrie Street

Division 7 Alamance County Graham

PLAN DATE: December 2017 REVIEWED BY: JB Voso

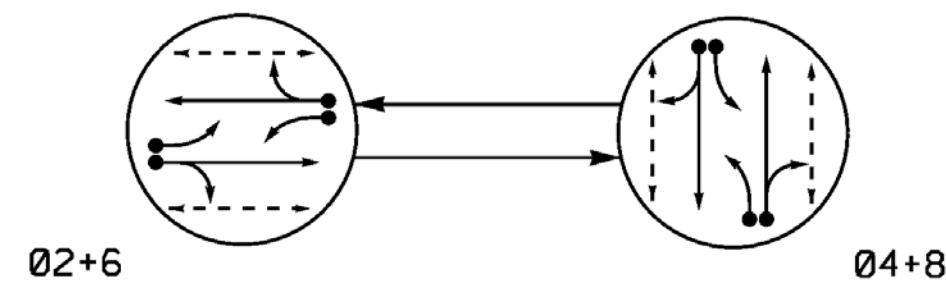
PREPARED BY: SE Greene REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 JAMES B. VOSO
 License No. 022599
 6/13/2018
 DATE
 SIG. INVENTORY NO. 07-0060

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

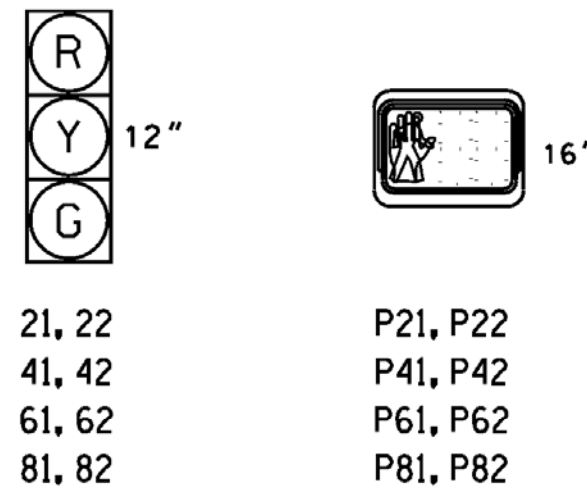
- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←---→ UNSIGNALIZED MOVEMENT
- ←- - -> PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

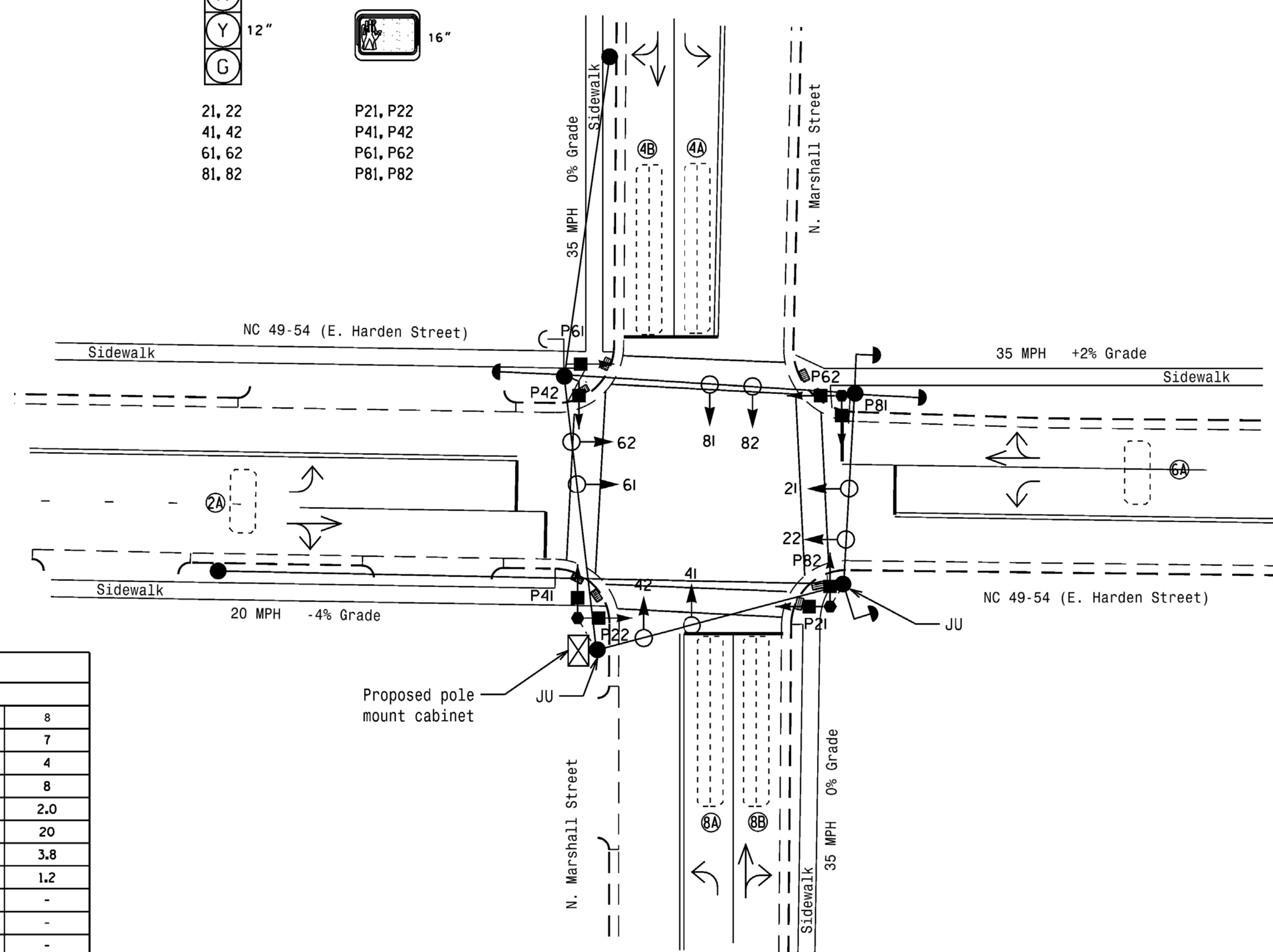


ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR						PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	NEW CARD
2A	6x15	70	EXIST.	-	2	Yes	-	-	-	S	X
4A	6x40	0	2-4-2	-	4	Yes	-	3	-	S	X
4B	6x40	0	2-4-2	-	4	Yes	-	10	-	S	X
6A	6x15	70	EXIST.	-	6	Yes	-	-	-	S	X
8A	6x40	0	2-4-2	-	8	Yes	-	3	-	S	X
8B	6x40	0	2-4-2	-	8	Yes	-	10	-	S	X

2 Phase Fully Actuated (Burlington-Graham 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. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
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.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Provide minimum of 15' clearance from high point in roadway to bottom of signal heads.



ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	10	7	10	7
Walk *	4	4	4	4
Ped Clear	10	8	10	8
Veh. Extension *	3.0	2.0	3.0	2.0
Max I *	45	20	45	20
Yellow	3.0	3.8	3.7	3.8
Red Clear	2.1	1.2	1.4	1.2
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	-	X	-	X
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.

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 | ⊥ |
| ⊥ Junction Box | ⊥ |
| ⊥ 2-in Underground Conduit | ⊥ |
| N/A Right of Way | --- |
| → Directional Arrow | → |
| ○ Type II Signal Pedestal | ● |
| △ Curb Ramp | △ |

*****SYSTEM*****
 *****USER*****
 *****SERIAL*****

Mattern & Craig
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12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:

 NC 49-54 (E. Harden Street) at N. Marshall Street

Division 7 Alamance County Graham

PLAN DATE: December 2017 REVIEWED BY: JB Voso
 PREPARED BY: SE Greene REVIEWED BY:

REVISIONS: _____ INIT: _____ DATE: _____

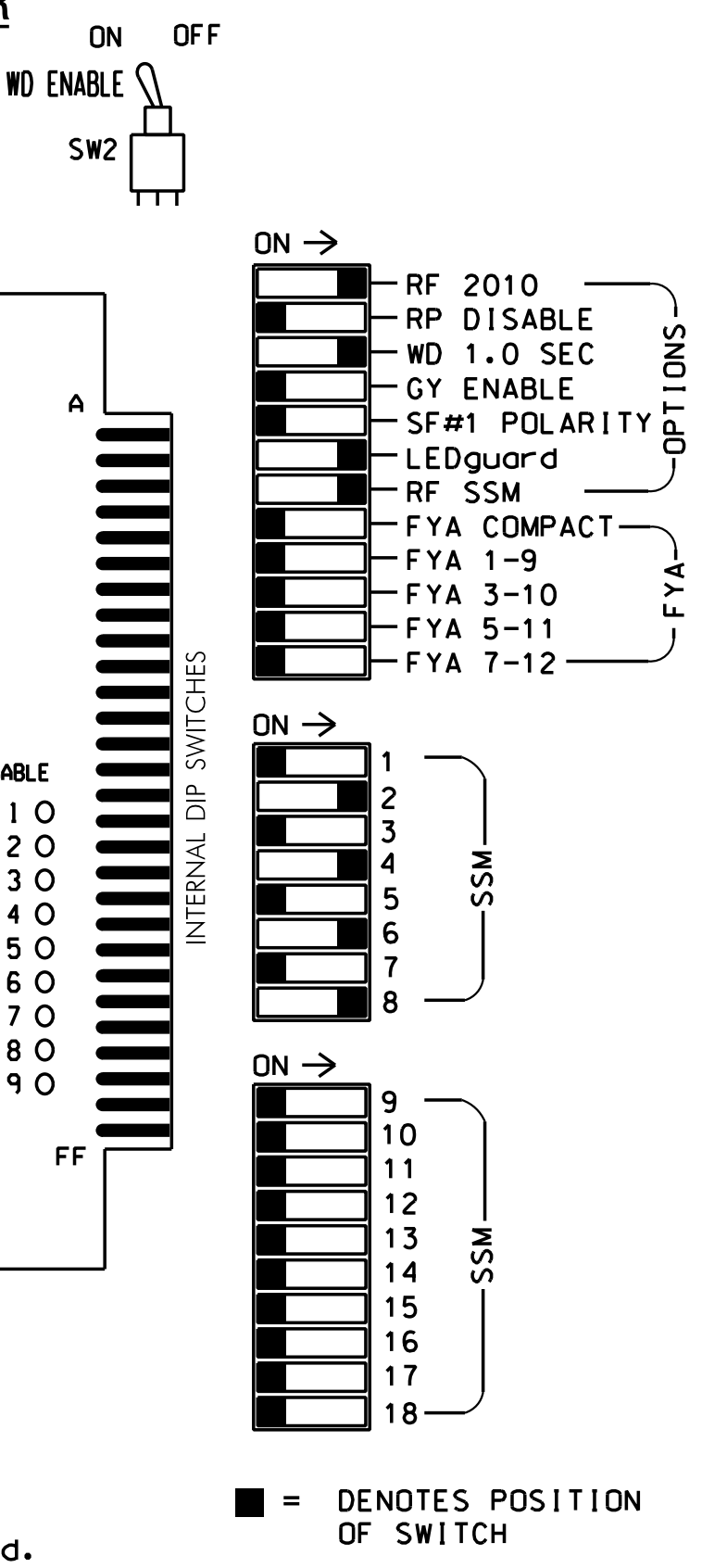
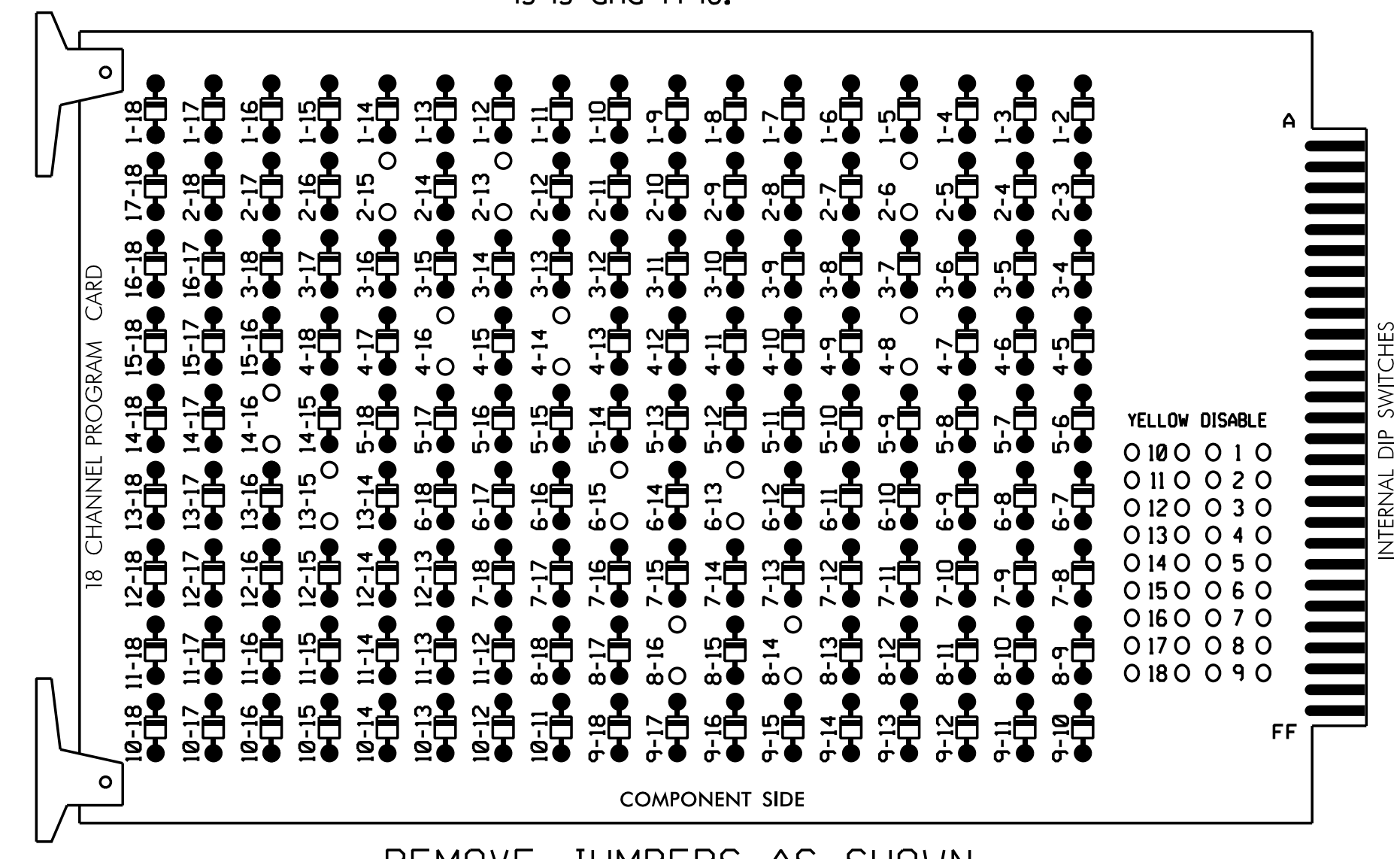
SCALE: 1"=20'

6/13/2018
 James B. Voso
 SEAL 022599
 ENGINEER
 STATE OF NORTH CAROLINA
 JAMES B. VOSO
 SEAL 022599
 ENGINEER
 STATE OF NORTH CAROLINA

SIG. INVENTORY NO. 07-0062

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

REMOVE DIODE JUMPERS 2-6, 2-13, 2-15, 4-8, 4-14, 4-16, 6-13, 6-15, 8-14, 8-16, 13-15 and 14-16.



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. Integrate monitor with Ethernet network in cabinet.

NOTES

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

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S3,S5,S6,S8,S9,S11,S12
 PHASES USED.....2,2PED,4,4PED,6,6PED,8,8PED
 OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

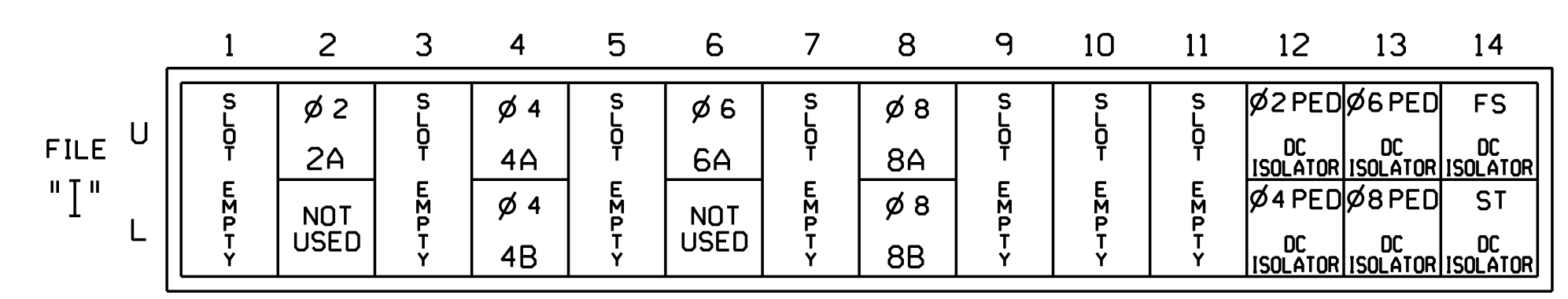
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134				107
YELLOW		129			102			135				108
GREEN		130			103			136				109
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
				113		104			119			110
				115		106			121			112

NU = Not Used

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)



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	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB21-3,4	I2U	39	2	2	YES				S
4A	TB21-7,8	I4U	41	4	4	YES		3		S
4B	TB23-7,8	I4L	45	14	4	YES		10		S
6A	TB21-11,12	I6U	40	6	6	YES				S
8A	TB22-1,2	I8U	42	8	8	YES		3		S
8B	TB24-1,2	I8L	46	18	8	YES		10		S
PED PUSH BUTTONS										
P21,P22	TB22-9,10	I12U	67	PED 2	2 PED					
P41,P42	TB24-9,10	I12L	69	PED 4	4 PED					
P61,P62	TB22-11,12	I13U	68	PED 6	6 PED					
P81,P82	TB24-11,12	I13L	70	PED 8	8 PED					

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0062
 DESIGNED: December 2017
 SEALED: 6/13/2018
 REVISED: NA

3:10:33 PM 11-13-15 - Burlington-Graham Signal System06 Working Folders with NCDOT File Structure if Working on NCDOT Project:Wing or DgnW07-00624070062_sml.ele-20161102.dgn



12 BROAD STREET
 ASHEVILLE, NORTH CAROLINA 28801
 (828) 254-2201
 FAX (828) 254-4562
 NC LIC. NO. C-1154

Electrical Detail

Electrical and Programming Details For: NC 49-54 (E. Harden Street) at N. Marshall Street

Prepared for the Offices of:

Division 7 Alamance County Graham

PLAN DATE: December 2017 REVIEWED BY: JB Voso

PREPARED BY: SE Greene REVIEWED BY:

REVISIONS: INIT. DATE

James Voso 6/13/2018

750 N. Greenfield Pkwy, Corner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER JAMES B. VOSO

SIG. INVENTORY NO. 07-0062

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL
(program controller as shown)

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

```

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


LAG GRN 0.0 YEL 0.0 RED 0.0 ADV GRN 0.0

END PROGRAMMING

```


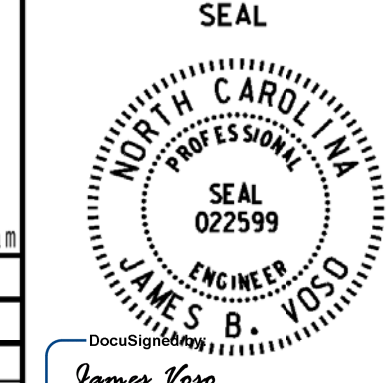
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-0063
 DESIGNED: January 2018
 SEALED: 6/13/2018
 REVISED: NA

*****SYSTEM*****
 *****USER*****



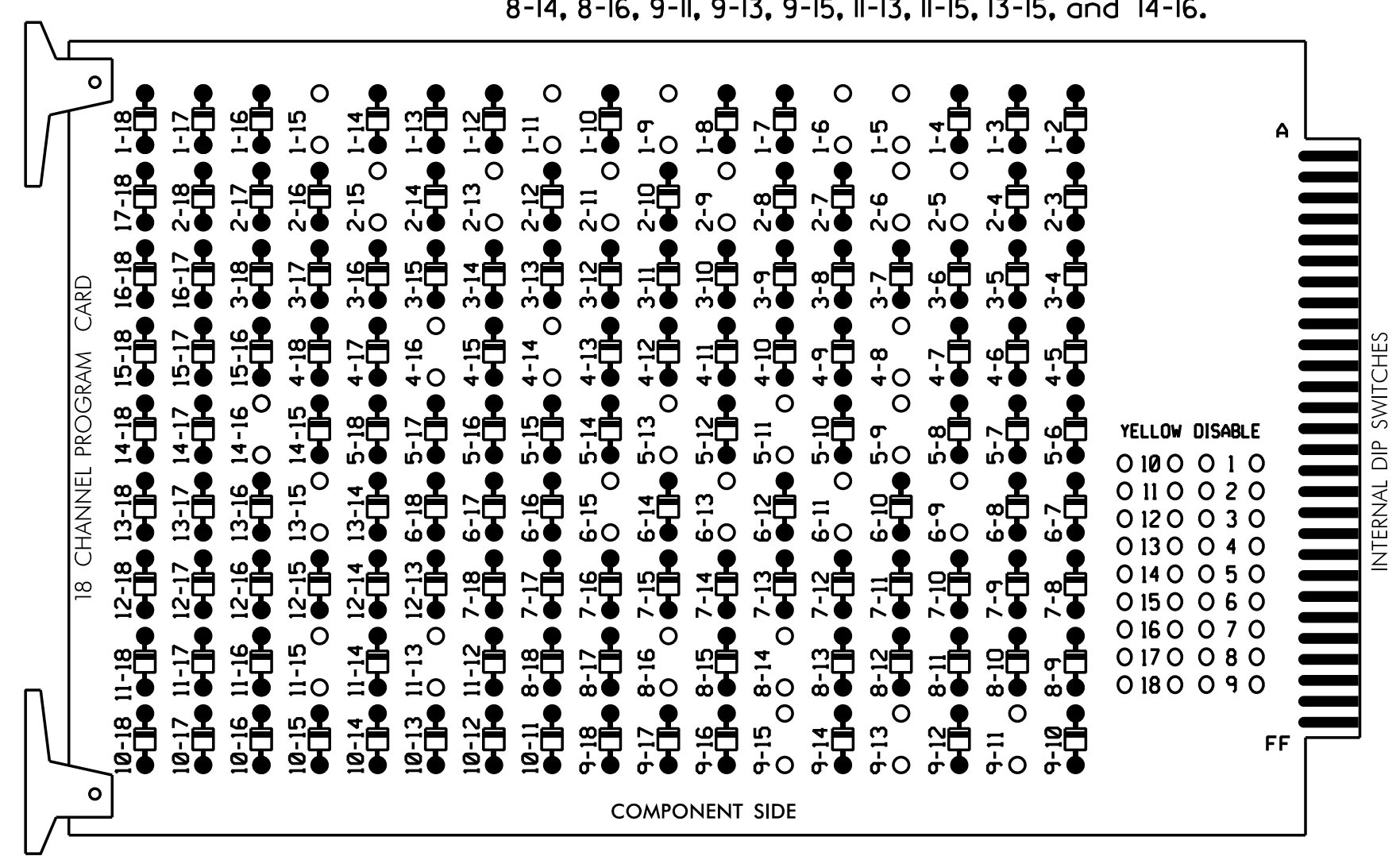
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 ENGINEERS • SURVEYORS
 12 BROAD STREET
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 (828) 254-2201
 FAX (828) 254-4562
 NC LIC. NO. C-1154

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	NC 49 (East Elm Street) at NC 54 (Harden Street)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Division 7 Alamance County Graham PLAN DATE: January 2018 PREPARED BY: SE Greene	REVIEWED BY: JB Voso REVIEWED BY:	SEAL  James Voso 6/13/2018
REVISIONS _____ _____ _____	INIT. DATE _____ _____ _____	DATE _____ _____ _____	SIG. INVENTORY NO. 07-0063

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)
 REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15, and 14-16.



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.
 - Integrate monitor with Ethernet network in cabinet.

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Walk and 6 Walk.
- The cabinet and controller are part of the Burlington-Graham 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 AUX S1,AUX S4
 LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S7,S8,S9,S11,S12.
 PHASES USED.....1,2,2PED,4,4PED,5,6,6PED,8,8PED
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	41,42	P41, P42	51	61,62	P61, P62	NU	81,82	P81, P82	11	NU	NU	51	NU	NU
RED	128			101			134			107								
YELLOW	*	129		102		*	135			108								
GREEN		130		103			136			109								
RED ARROW													A121				A114	
YELLOW ARROW													A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW	127						133											
Hand			113			104			119				110					
Foot						106			121				112					

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)

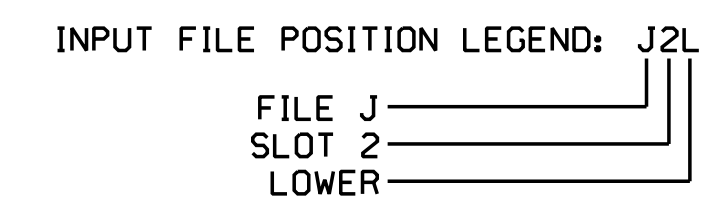
FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ S	∅ S	∅ S	∅ S	∅ 4	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S
I	1A	∅ S	∅ S	∅ S	∅ S	4A	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	FS
L	NOT USED	∅ S	∅ S	∅ S	∅ S	4A	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	DC ISOLATOR
U	∅ 5	∅ S	∅ S	∅ S	∅ S	∅ 8	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S
I	5A	∅ S	∅ S	∅ S	∅ S	8A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

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

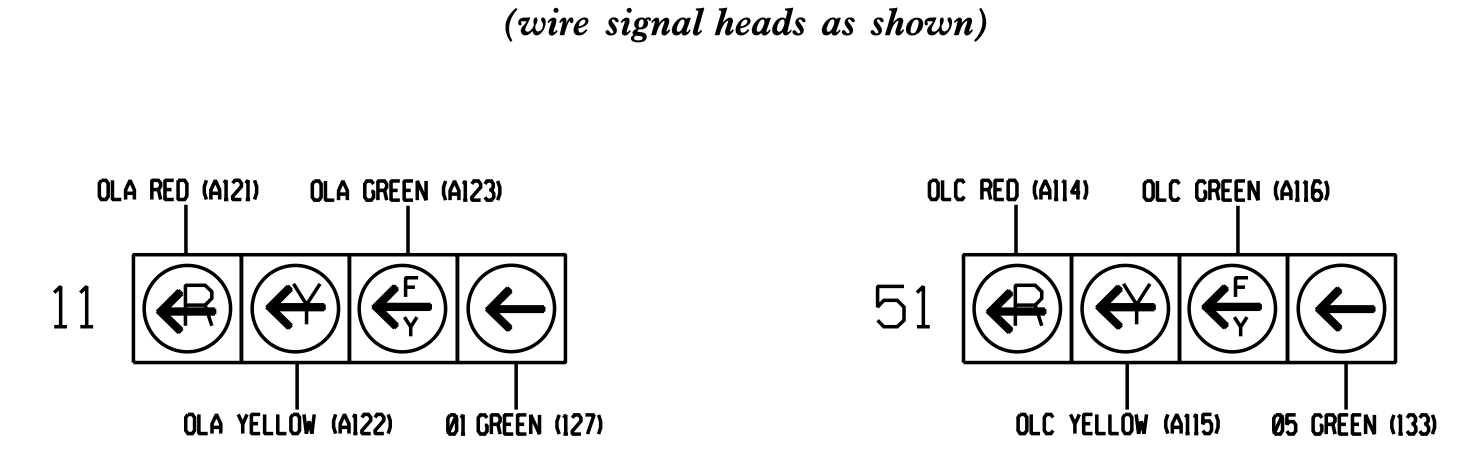
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES		15		S
4A	TB4-9,10	I6U	41	4	4	YES		3		S
4B	TB4-11,12	I6L	45	14	4	YES		10		S
5A	TB3-1,2	J1U	55	5	5	YES		15		S
8A	TB5-9,10	J6U	42	8	8	YES		3		S
8B	TB5-11,12	J6L	46	18	8	YES		10		S
PED PUSH BUTTONS										
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED					
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED					

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.



FYA SIGNAL WIRING DETAIL

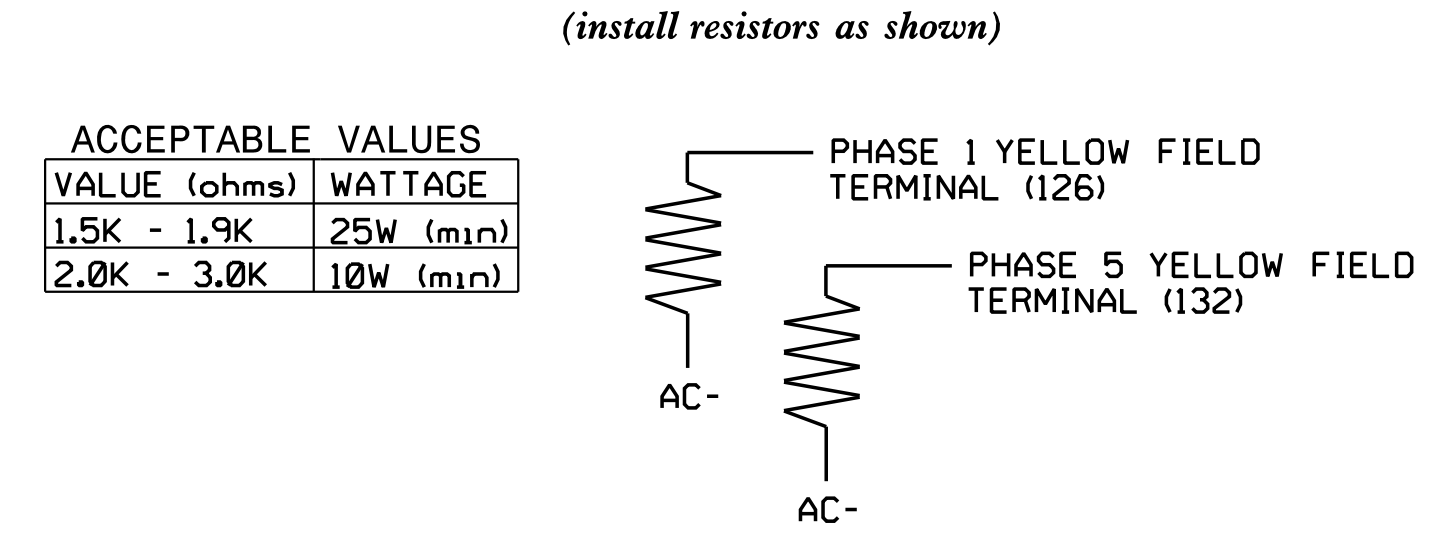


COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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: 07-0064
 DESIGNED: December 2017
 SEALED: 6/13/2018
 REVISED: NA

LOAD RESISTOR INSTALLATION DETAIL



3:51:54 PM 11/13/18 - Burlington-Graham Signal System06 Working Folders with NCDOT File Structure if Working on NCDOT Project:Wing or DgnW07-0644070064.sm.ele-20140110.dgn

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Electrical Detail - Sheet 1 of 2

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SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 JAMES B. VOSS
 022599

Division 7 Alamance County Graham

PLAN DATE: December 2017 REVIEWED BY: JB Vosso

PREPARED BY: SE Greene REVIEWED BY:

REVISIONS

INIT. DATE

6/13/2018

SIG. INVENTORY NO. 07-0064

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

OVERLAP A

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

```

TMG VEH OVLP...[A] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... PHASE 1
OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT....CH9 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0
    
```

Toggle Twice

OVERLAP C

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

```

TMG VEH OVLP...[C] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... PHASE 5
OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT....CH11 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0
    
```

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-0064
 DESIGNED: December 2017
 SEALED: 6/13/2018
 REVISED: NA

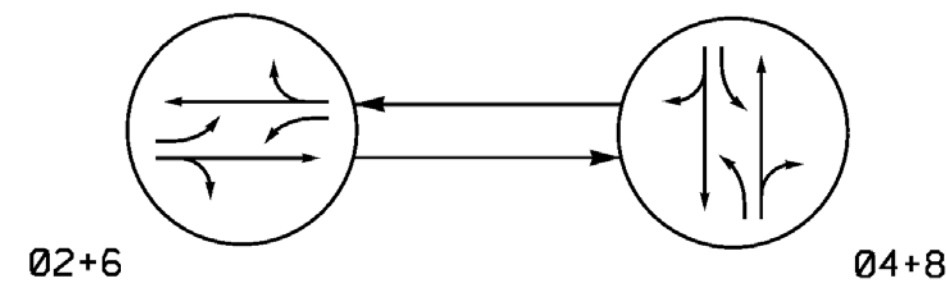
3:53:53 PM - Burlington-Graham Signal System06 Working Folders (Replace Sub-folders with NCDOT File Structure if Working on NCDOT Project) M:\wg or Dgn\07-064\070064.sm.ele_20140110.dgn
 C:\kku



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Electrical Detail - Sheet 2 of 2		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED										
ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 87/SR 1716 (Main Street) at NC49/54/87 (Harden Street)											
Prepared for the Offices of: STATE OF NORTH CAROLINA Department of Transportation Signal Management Section 750 N. Greenfield Pkwy, Corner, NC 27529	Division 7 Alamance County Graham	SEAL JAMES B. VOSO ENGINEER 6/13/2018 DATE	Division 7 Alamance County Graham PREPARED BY: SE Greene REVIEWED BY: JB Voso REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;">REVISIONS</th> <th style="width: 10%;">INIT.</th> <th style="width: 10%;">DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE						
REVISIONS	INIT.	DATE										
		James Voso 6/13/2018 DATE	SIG. INVENTORY NO. 07-0064									

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

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

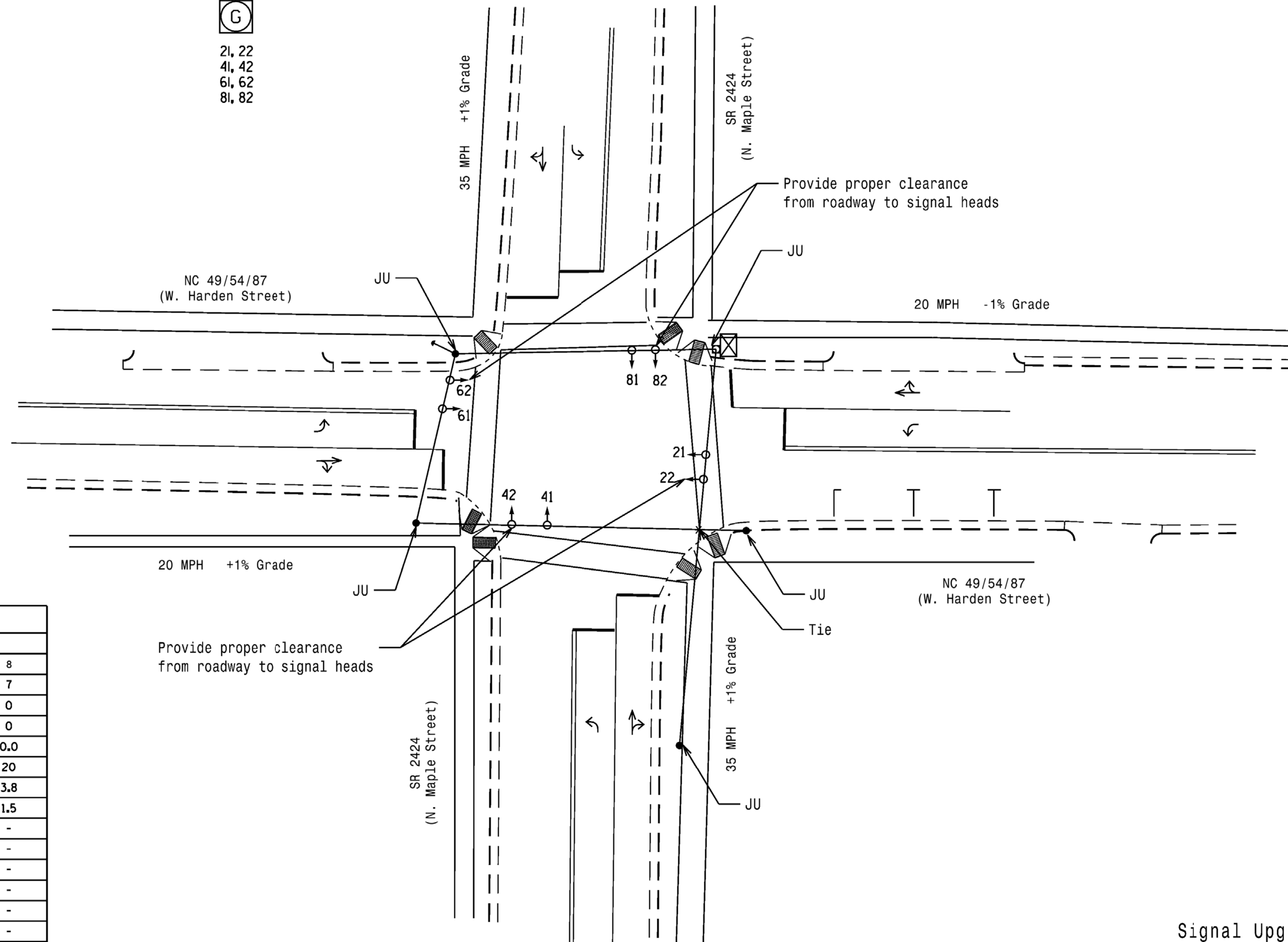
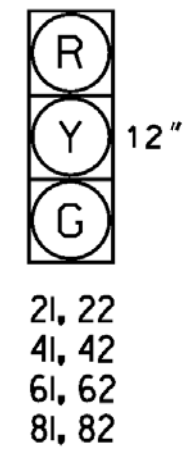
2 Phase
Pre-Timed
(Burlington-Graham Signal System)

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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Pavement markings are existing.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	10	7	10	7
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	0.0	0.0	0.0	0.0
Max I *	49	20	49	20
Yellow	3.0	3.8	3.0	3.8
Red Clear	2.3	1.3	2.3	1.5
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	-	-	-
Recall Position	MAX RECALL	MAX RECALL	MAX RECALL	MAX 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.

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 | ⊥ |
| ⊥ | Junction Box | ⊥ |
| ⊥ | 2-in Underground Conduit | ⊥ |
| N/A | Right of Way | --- |
| → | Directional Arrow | → |
| ⊠ | Metal Strain Pole | ⊠ |
| ⊠ | Curb Ramp | ⊠ |

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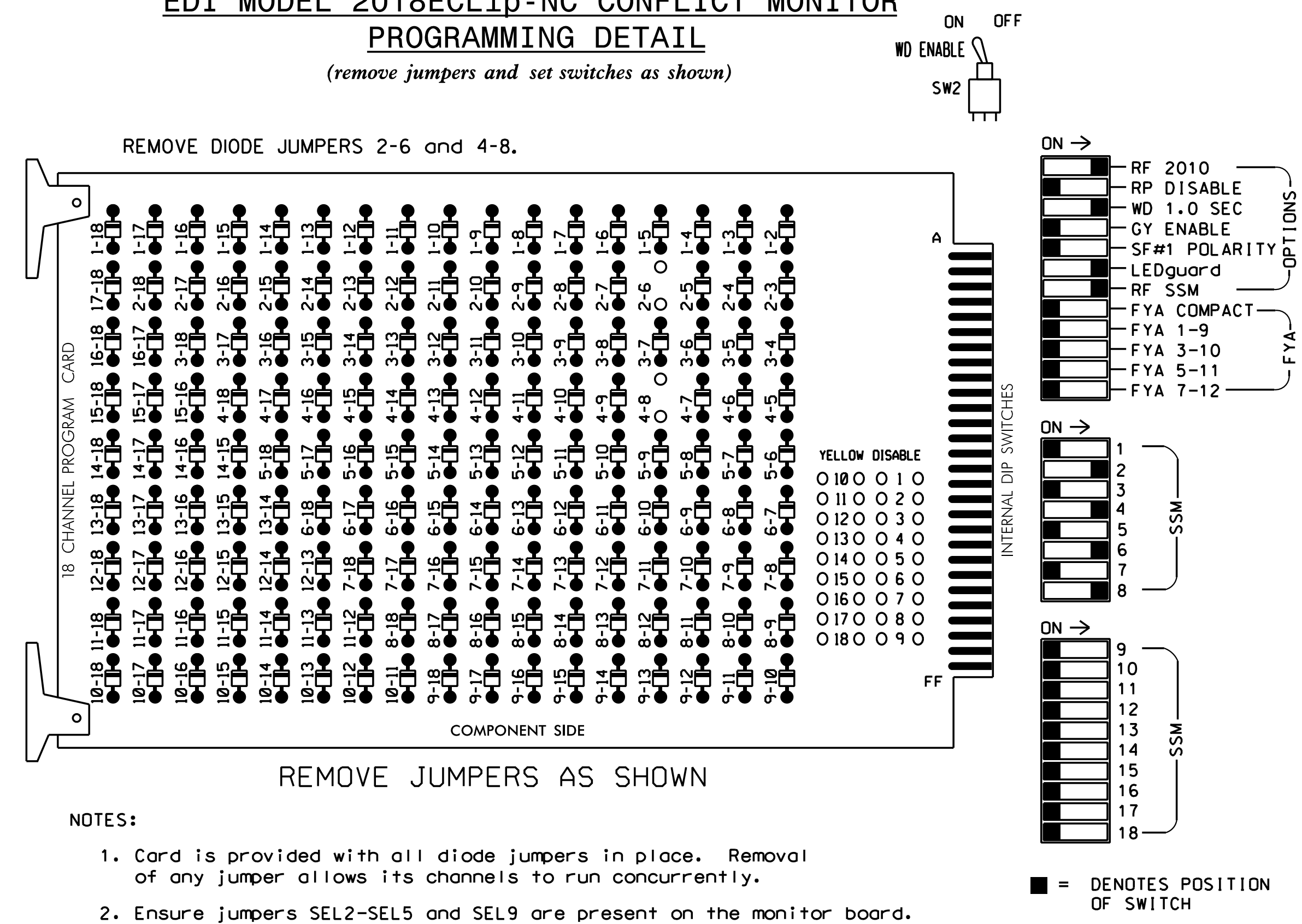
12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

Signal Upgrade

	Prepared for the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Design Section		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
	NC 49/54/87 (W. Harden Street) at SR 2424 (N. Maple Street)		Division 7 Alamance County Graham	
PLAN DATE: December 2017		REVIEWED BY: JB Voso		PREPARED BY: SE Greene
REVISIONS		REVIEWED BY:		
SCALE: 1"=20'		INIT. DATE		DATE: 6/13/2018
SIG. INVENTORY NO. 07-0065		SIGNATURE: James B. Voso		

*****SYTIME*****
*****BUSRNAME*****

EDI MODEL 2018ECLip-NC CONFLICT MONITOR
PROGRAMMING DETAIL
(remove jumpers and set switches 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. Integrate monitor with Ethernet network in cabinet.

NOTES

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

EQUIPMENT INFORMATION

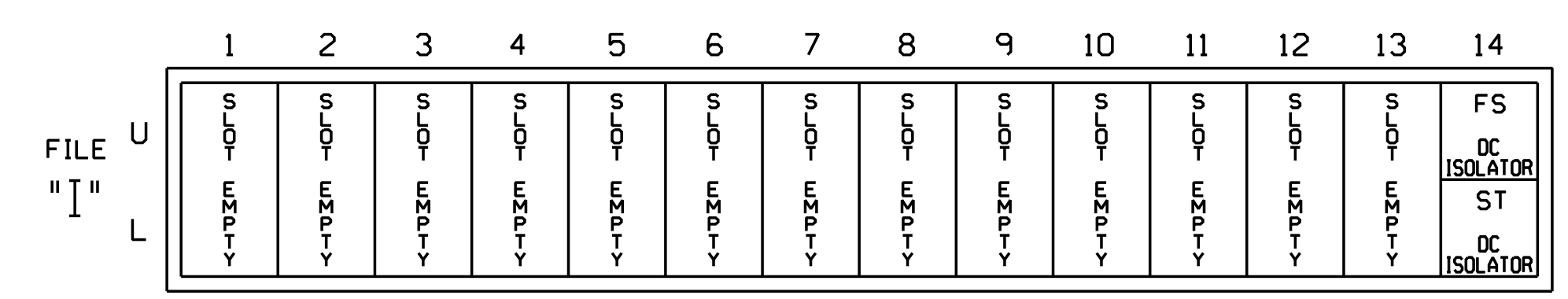
CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S8,S11
 PHASES USED.....2,4,6,8
 OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT
(front view)



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0065
 DESIGNED: December 2017
 SEALED: 6/13/2018
 REVISED: NA

2:42:05 PM 11/13/18 - Burlington-Graham Signal System06 Working Folders with NCDOT File Structure if Working on NCDOT Project!Ming or DgnW07-0065-070065-sm.eie-20161108.dgn Local User

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 (828) 254-2201
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 NC LIC. NO. C-1154

Electrical Detail

ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 49/54/87 (W. Harden Street) at SR 2424 (N. Maple Street)

Prepared for the Offices of:
 Division 7 Alamance County Graham

PLAN DATE: December 2017 REVIEWED BY: JB Voso
 PREPARED BY: SE Greene REVIEWED BY:

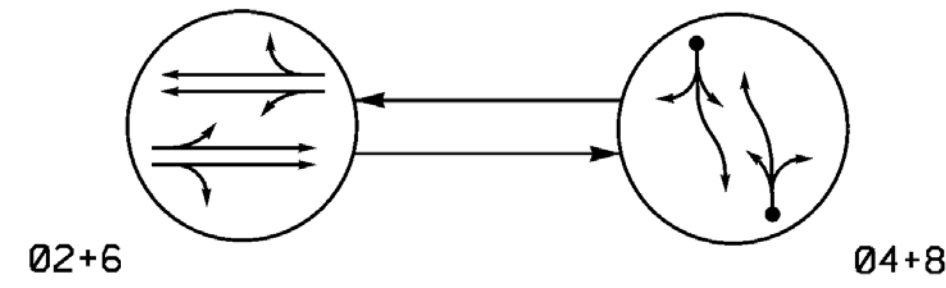
REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Corner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022599
 JAMES B. VOSO
 James Voso 6/13/2018
 DATE
 SIG. INVENTORY NO. 07-0065

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←- - - UN SIGNALIZED MOVEMENT
- ←- - - PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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

SIGNAL FACE I.D.

All Heads L.E.D.

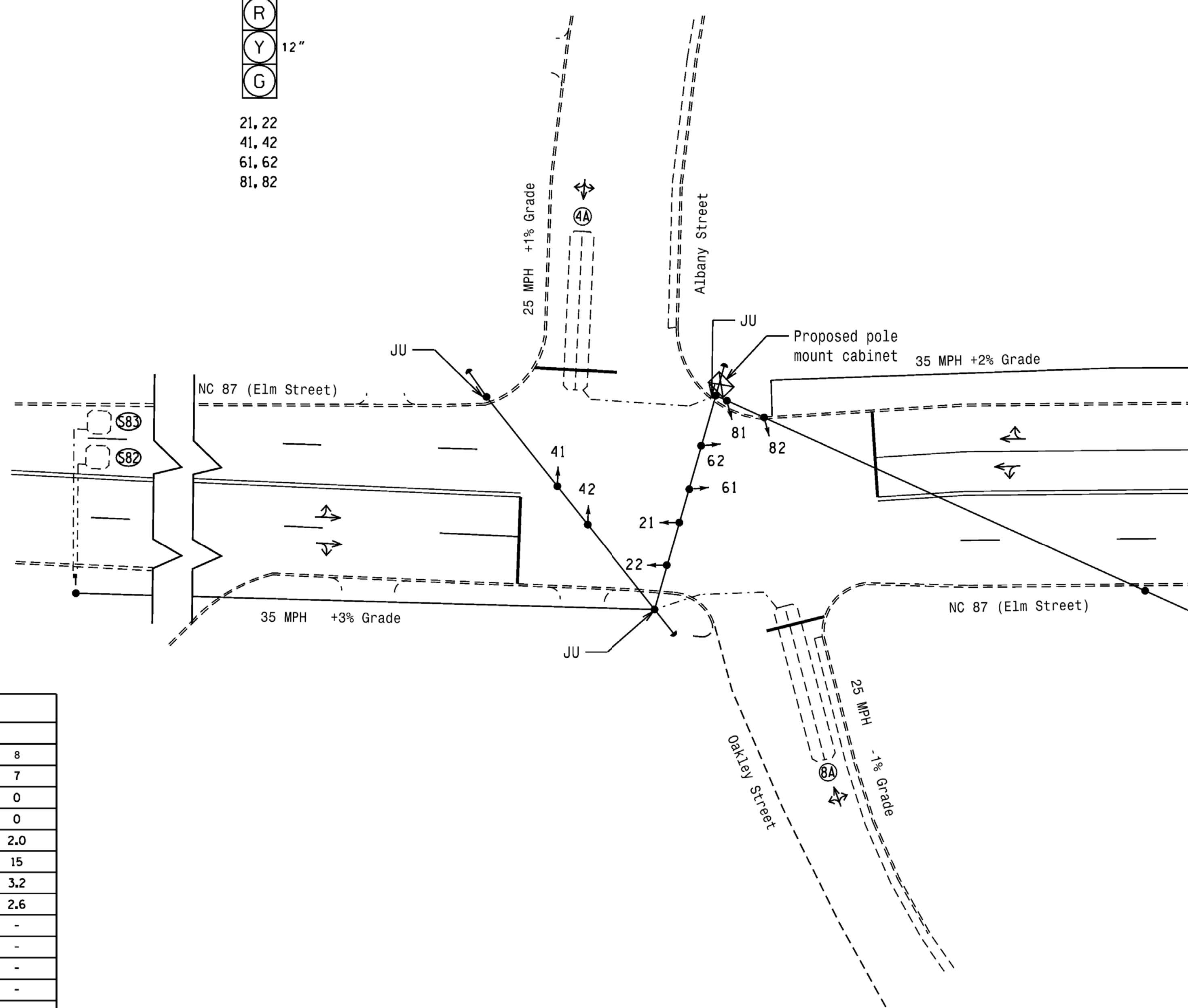


ASC/3 DETECTOR INSTALLATION CHART												
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	PROGRAMMING						
						CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP SYSTEM	NEW CARD
4A	6x40	+5	2-4-2	-	4	Yes	-	5	-	S	-	X
8A	6x40	+5	2-4-2	-	8	Yes	-	5	-	S	-	X
S82	6x6	+320	EXIST.	-	SYS	No	-	-	-	N	X	X
S83	6x6	+320	EXIST.	-	SYS	No	-	-	-	N	X	X

2 Phase Semi-Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- 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	6	8
Min Green *	10	7	10	7
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	0.0	2.0	0.0	2.0
Max I *	35	15	35	15
Yellow	3.7	3.1	3.7	3.2
Red Clear	1.4	2.3	1.7	2.6
Actuations B4 Add *	-	-	-	-
Seconds / Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	-	-	-
Recall Position	MAX RECALL	-	MAX RECALL	-
Dual Entry	-	X	-	X
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.

LEGEND

- | PROPOSED | EXISTING |
|---------------------------------|---------------------------------|
| ○→ Traffic Signal Head | ●→ N/A |
| ●→ Modified Signal Head | - Sign |
| ⊥ Pedestrian Signal Head | ⊥ Sign |
| ⊥ With Push Button & Sign | ⊥ Sign |
| ○ 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 |
| → | → Directional Arrow |

*****SYTIME*****
 *****USERNAME*****

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ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

Signal Upgrade

Prepared for the Offices of:

 NC 87 (Elm Street) at Albany Street/Oakley Street

Division 7 Alamance County Graham

PLAN DATE: December 2017 REVIEWED BY: JB Voso
 PREPARED BY: SE Greene REVIEWED BY:

SCALE 0 20
1"=20'

REVISIONS

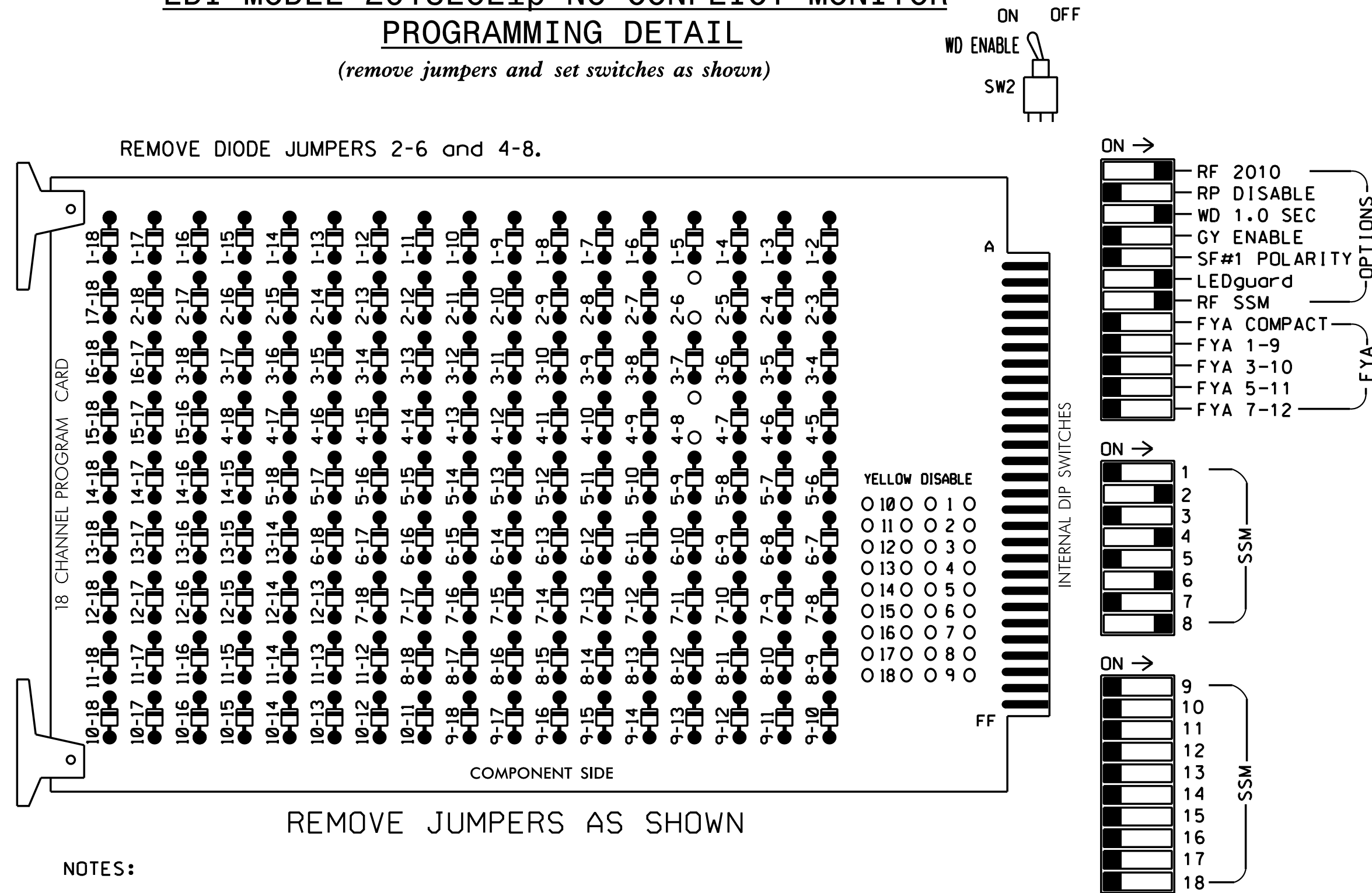
INIT. DATE

SEAL
 STATE OF NORTH CAROLINA
 PROFESSIONAL ENGINEER
 JAMES B. VOSO
 022599
 6/13/2018
 SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
 SIG. INVENTORY NO. 07-0066

EDI MODEL 2018ECLip-NC CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches 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. Integrate monitor with Ethernet network in cabinet.

NOTES

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

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

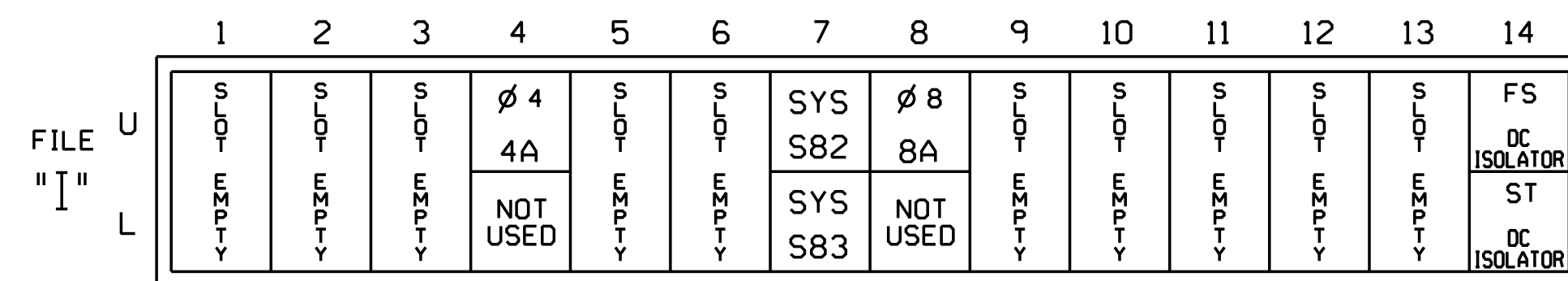
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S8,S11
 PHASES USED.....2,4,6,8
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)



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

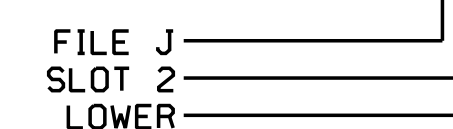
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
4A	TB21-7,8	14U	41	4	4	YES		5		S
S82*	TB21-13,14	17U	57	7	SYS	NO				N
S83*	TB23-13,14	17L	50	28	SYS	NO				N
8A	TB22-1,2	18U	42	8	8	YES		5		S

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L

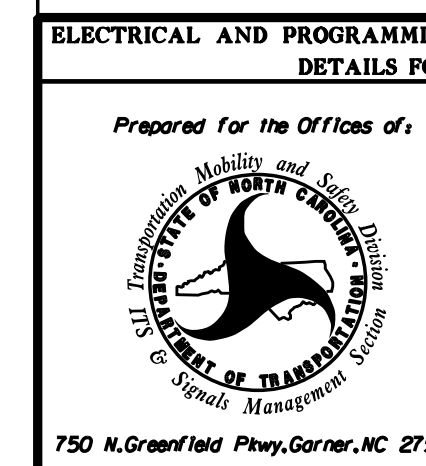


THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0066
 DESIGNED: December 2017
 SEALED: 6/13/2018
 REVISED: NA

Electrical Detail



12 BROAD STREET
 ASHEVILLE, NORTH CAROLINA 28801
 (828) 254-2201
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 NC LIC. NO. C-1154

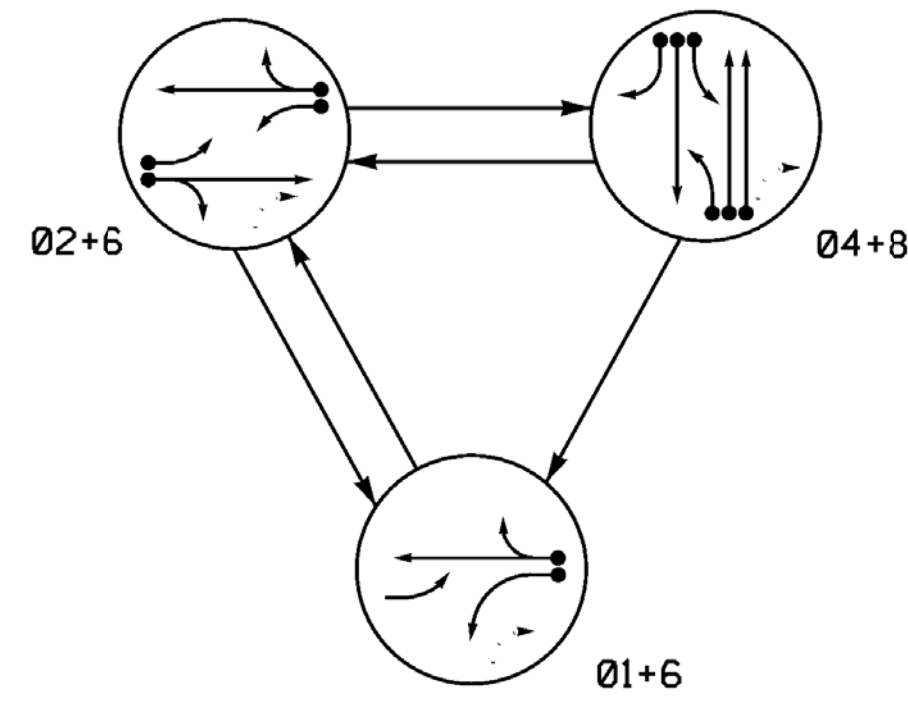


ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 87 (Elm Street) at Albany Street/Oakley Street	
Prepared for the Offices of:	Division 7	Alamance County	Graham
PLAN DATE: December 2017	REVIEWED BY: JB Voso		
PREPARED BY: SE Greene	REVIEWED BY:		
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL	DATE
James Voso	6/13/2018
SIG. INVENTORY NO. 07-0066	

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	01+6	02+6	04+8	FLASH
11	-	F	R	Y
21, 22	R	G	R	Y
23	F	F	R	Y
41, 42	R	R	G	R
43	R	R	F	R
61, 62	G	G	R	Y
81, 82	R	R	G	R
83	R	R	F	R

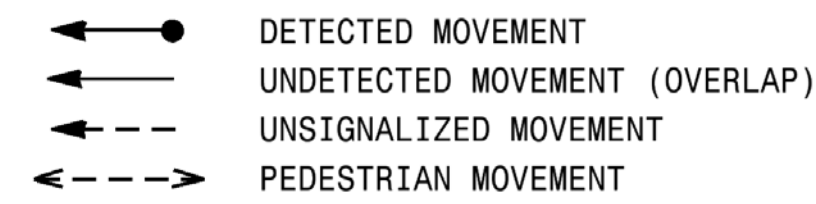
ASC/3 DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6x40	0	2-4-2	-	1	Yes	-	15	-	S	-	X
					6	Yes	-	-	-	S	-	X
2A	6x15	70	EXIST.	-	2	Yes	-	-	-	S	-	X
4A	6x60	+5	2-4-2	-	4	Yes	-	3	-	S	-	X
4B	6x60	+5	2-4-2	-	4	Yes	-	-	-	S	-	X
4C	6x60	0	2-4-2	-	4	Yes	-	15	-	S	-	X
6A	6x15	70	EXIST.	-	6	Yes	-	-	-	S	-	X
8A	6x60	+5	2-4-2	-	8	Yes	-	3	-	S	-	X
8B	6x60	+5	2-4-2	-	8	Yes	-	-	-	S	-	X
8C	6x60	+5	2-4-2	-	8	Yes	-	-	-	S	-	X

3 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

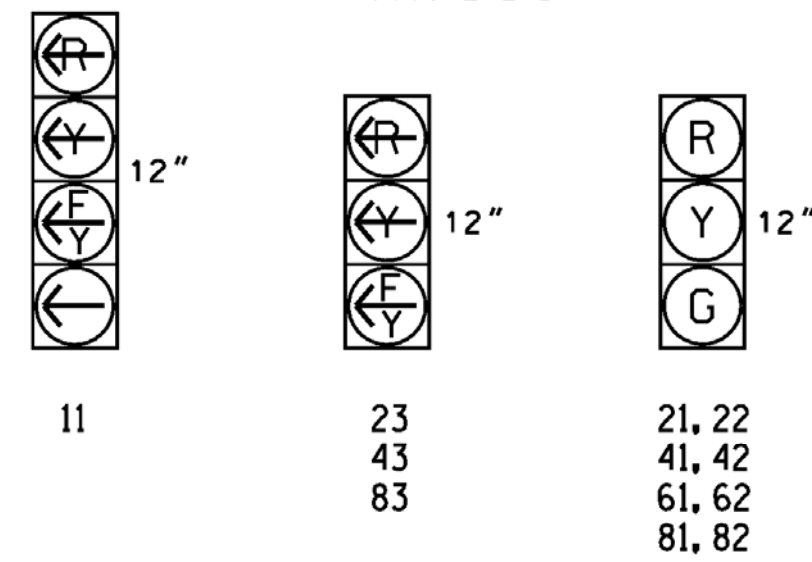
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Reposition existing signal heads as shown.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Remove existing Left Arrow "ONLY" (R3-5L), Through Arrow "ONLY" (R3-5A) and "LEFT TURN YIELD ON GREEN" Ball (R10-12) signs (4 signs).
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

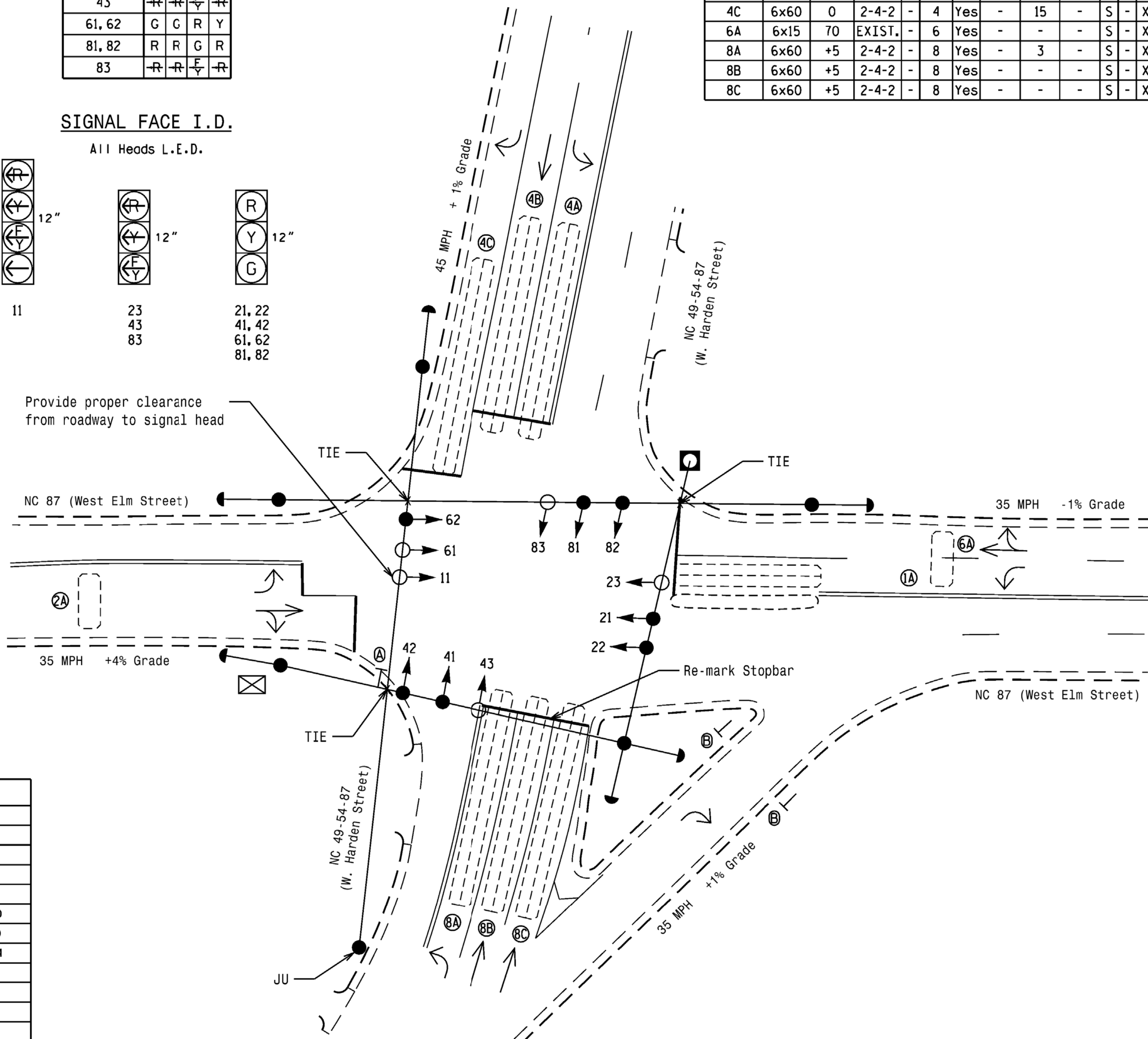


SIGNAL FACE I.D.

All Heads L.E.D.



Provide proper clearance from roadway to signal head

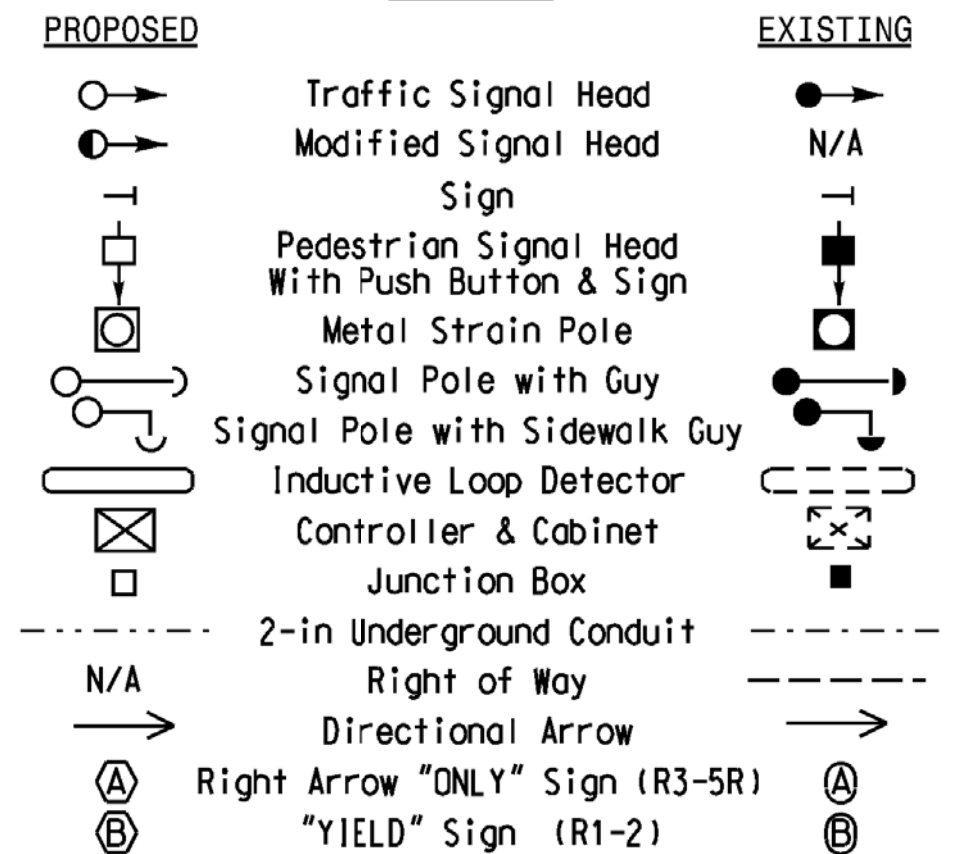


ASC/3 TIMING CHART

FEATURE	PHASE				
	1	2	4	6	8
Min Green *	7	10	7	10	7
Walk *	0	0	0	0	0
Ped Clear	0	0	0	0	0
Veh. Extension *	2.0	3.0	1.0	3.0	1.0
Max 1 *	15	40	20	40	20
Yellow	3.0	3.9	4.4	3.9	4.4
Red Clear	2.1	1.8	1.1	1.8	1.1
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	-	-	X	-	X
Simultaneous Gap	X	X	X	X	X

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

LEGEND



*****SYSTEM*****
*****BUSINESS*****

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(828) 254-2201
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NC LIC. NO. C-1154

Signal Upgrade

Prepared for the Offices of:

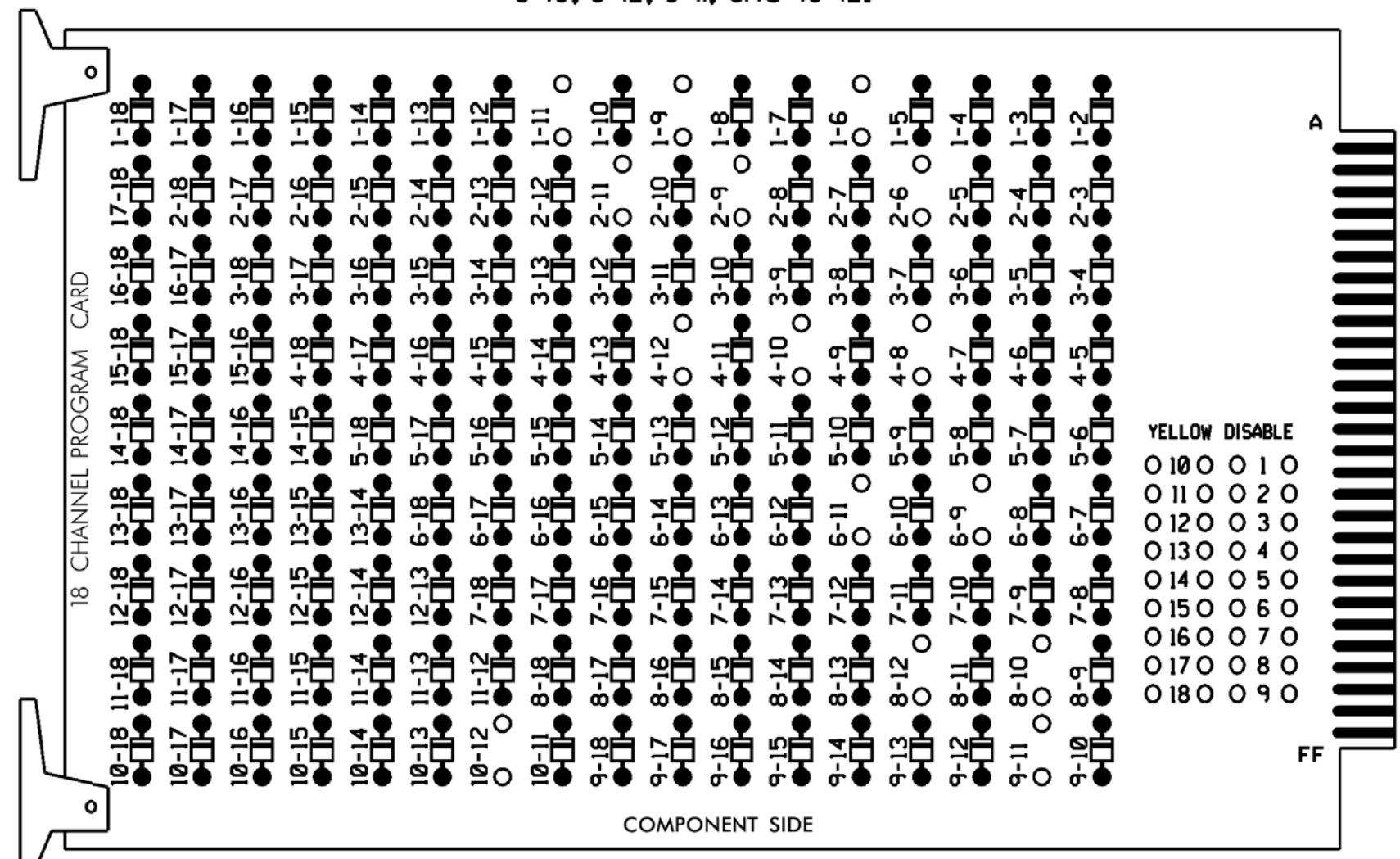
 NC 87 (West Elm Street) at NC 49-54-87 (West Harden Street)
 Division 7 Alamance County Graham
 PLAN DATE: January 2018 REVIEWED BY: JB Voso
 PREPARED BY: SE Greene REVIEWED BY:
 REVISIONS: INIT. DATE
 SCALE: 1"=20'
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
 SEAL

 James B. Voso
 6/13/2018
 DATE
 SIG. INVENTORY NO. 07-0067

EDI MODEL 2018ECLip-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, 4-8, 4-10, 4-12, 6-9, 6-11, 8-10, 8-12, 9-11, and 10-12.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- 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 phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham 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.S5.S8.S11.AUX S1.AUX S2.
 AUX S4.AUX S5
 PHASES USED.....1,2,4,6,8
 OVERLAP "A".....*
 OVERLAP "B".....*
 OVERLAP "C".....*
 OVERLAP "D".....*
 * See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU	11	83	NU	23	43	NU
RED	128				101			134			107							
YELLOW	*	129			102			135			108							
GREEN		130			103			136			109							
RED ARROW														A121	A124		A114	A101
YELLOW ARROW														A122	A125		A115	A102
FLASHING YELLOW ARROW														A123	A126		A116	A103
GREEN ARROW	127																	

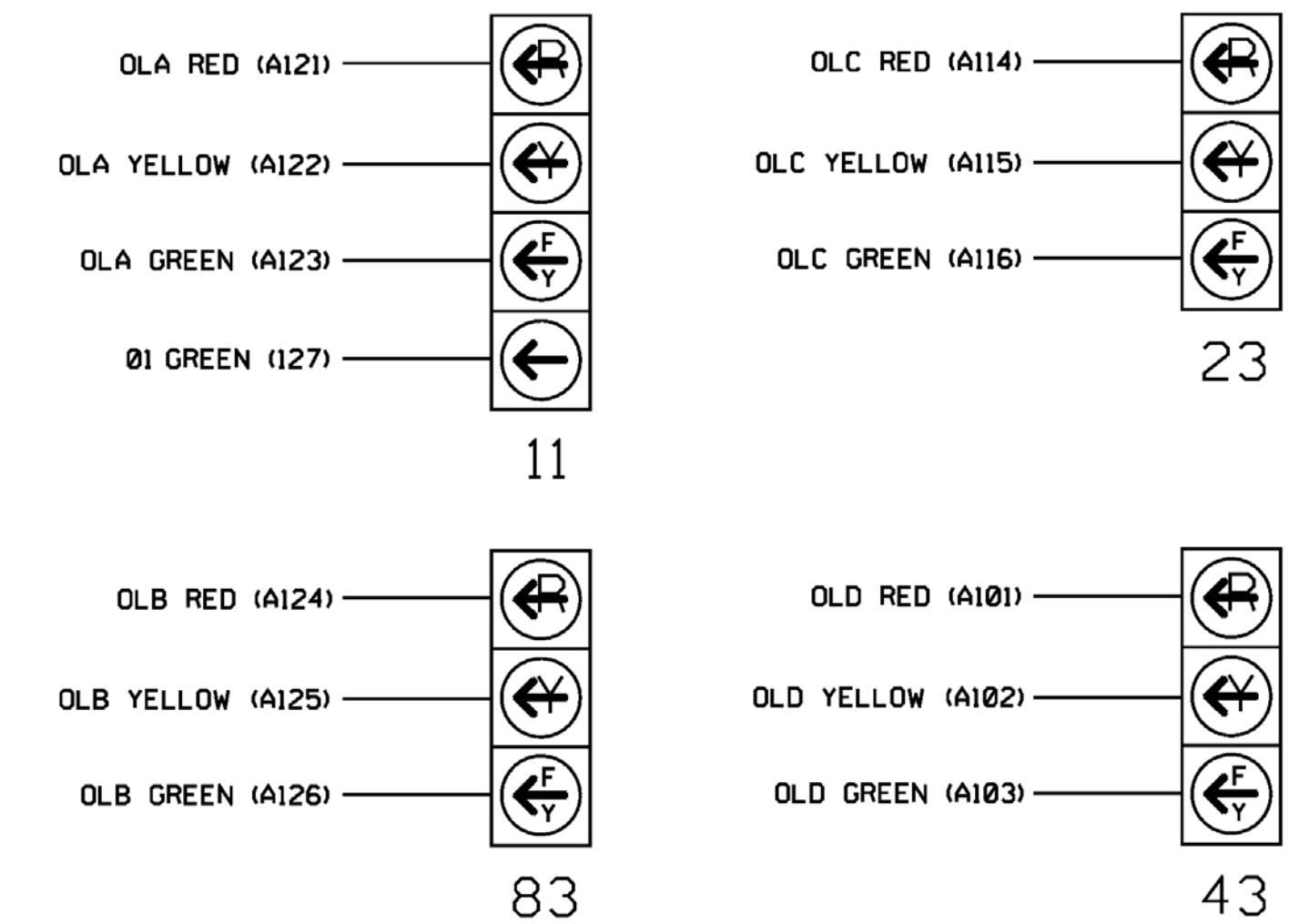
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

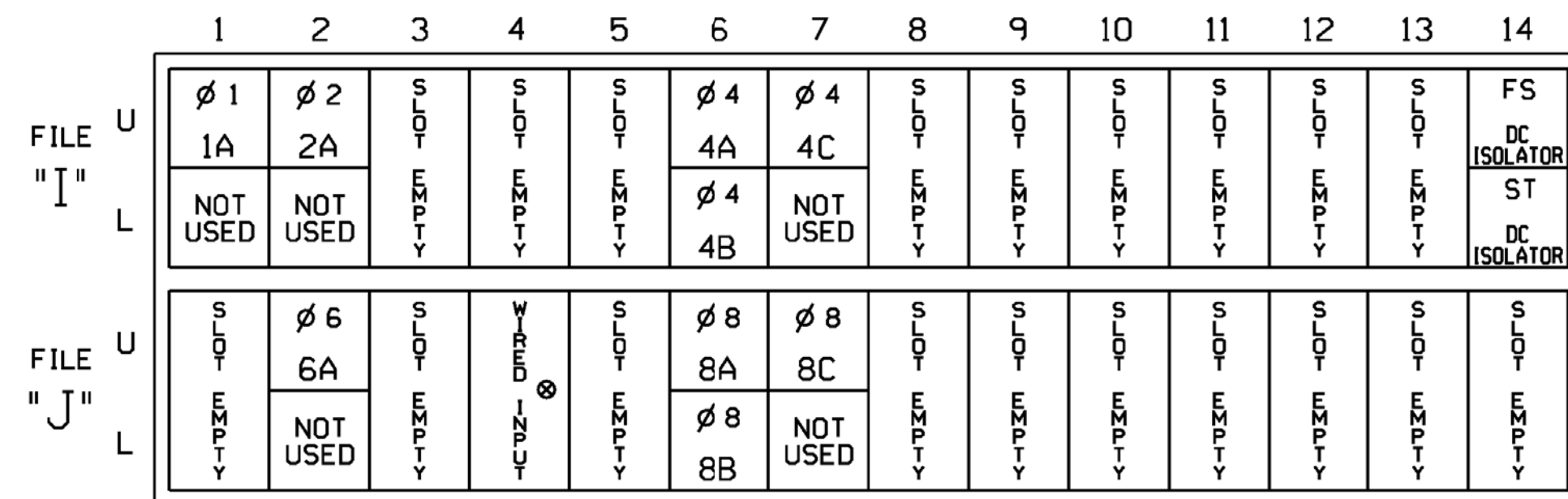
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



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

⊗ Wired Input - Do not populate slot with detector card

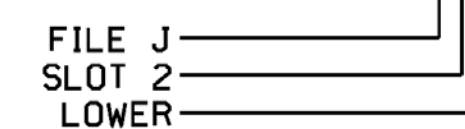
FS = FLASH SENSE
 ST = STOP TIME

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'	TB2-1,2	I1U	56	1	1	YES		15		S
	---	J4U	48	26	6	YES				S
2A	TB2-5,6	I2U	39	2	2	YES				S
4A	TB4-9,10	I6U	41	4	4	YES		3		S
4B	TB4-11,12	I6L	45	14	4	YES				S
4C	TB6-1,2	I7U	65	34	4	YES		15		S
6A	TB3-5,6	J2U	40	6	6	YES				S
8A	TB5-9,10	J6U	42	8	8	YES		3		S
8B	TB5-11,12	J6L	46	18	8	YES				S
8C	TB7-1,2	J7U	66	38	8	YES				S

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

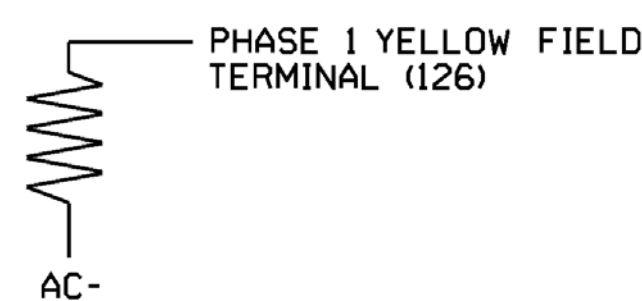
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



Electrical Detail - Sheet 1 of 2



12 BROAD STREET
 ASHEVILLE, NORTH CAROLINA 28801
 (828) 254-2201
 FAX (828) 254-4562
 NC LIC. NO. C-1154

Electrical and Programming Details For: NC 87 (West Elm Street) at NC 49-54-87 (West Harden Street)

Division 7 Alamance County Graham

PLAN DATE: January 2018 REVIEWED BY: JB Voso

PREPARED BY: SE Greene REVIEWED BY:

REVISIONS: _____ INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER JAMES B. VOSO SEAL 022599

6/13/2018

SIG. INVENTORY NO. 07-0067

*****SYTIME*****
 *****D*****
 *****USER*****

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

OVERLAP A

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

```

TMG VEH OVLP...[A] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... PHASE 1
OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT.....CH9 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0
    
```

Toggle Once

OVERLAP B

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

```

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

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

Toggle Once

OVERLAP C

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

```

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

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

Toggle Once

OVERLAP D

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

```

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

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

END PROGRAMMING

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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



12 BROAD STREET
ASHEVILLE, NORTH CAROLINA 28801
(828) 254-2201
FAX (828) 254-4562
NC LIC. NO. C-1154

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0067
DESIGNED: January 2018
SEALED: 6/13/2018
REVISED: NA

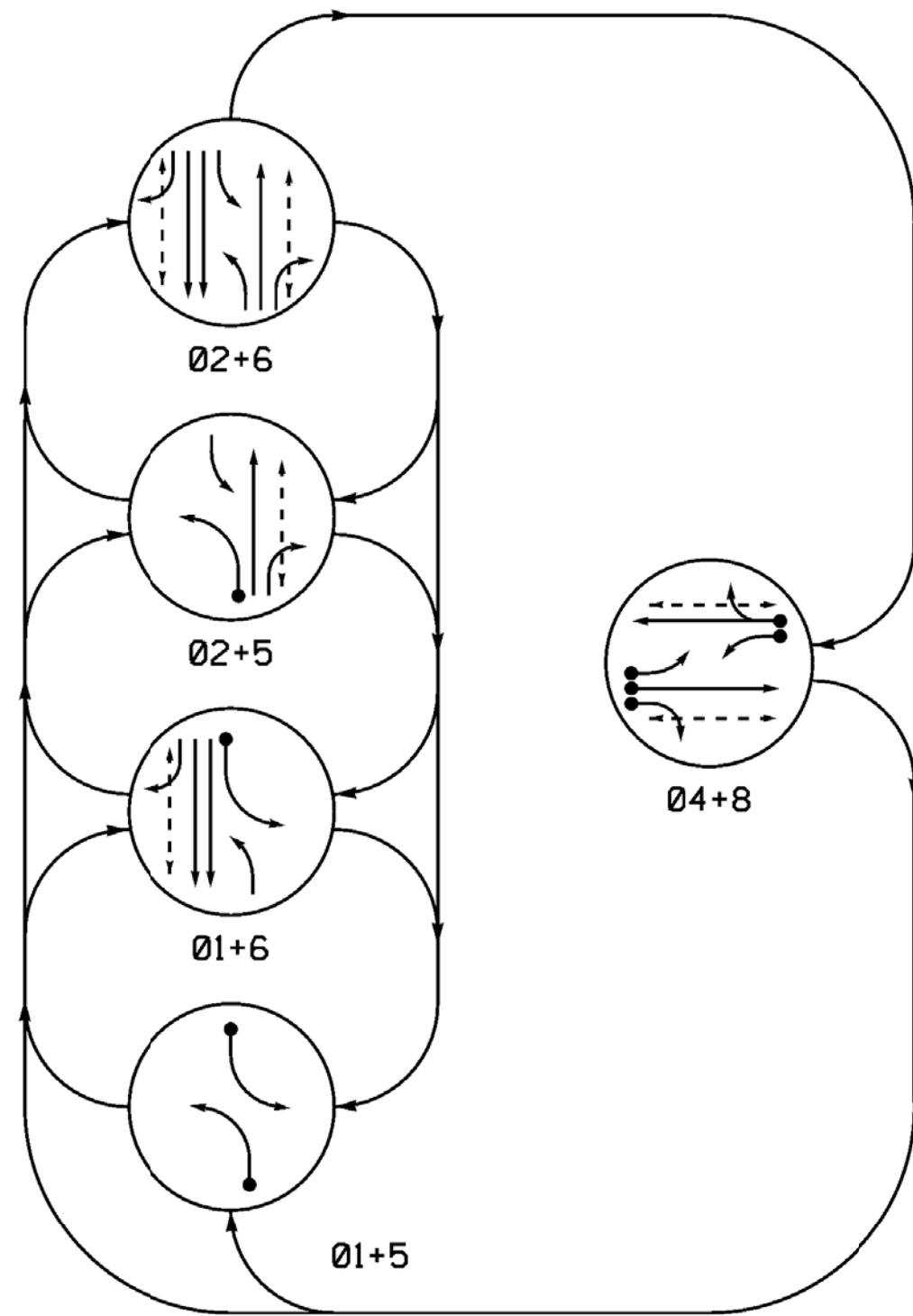
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small;">Prepared for the Offices of:</p> <p style="font-size: x-small;">750 N. Greenfield Pkwy, Corner, NC 27529</p>	<p style="font-size: x-small;">NC 87 (West Elm Street) at NC 49-54-87 (West Harden Street)</p> <p style="font-size: x-small;">Division 7 Alamance County Graham</p> <p style="font-size: x-small;">PLAN DATE: January 2018 REVIEWED BY: JB Voso</p> <p style="font-size: x-small;">PREPARED BY: SE Greene REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="font-size: x-small;">REVISIONS</th> <th style="font-size: x-small;">INIT.</th> <th style="font-size: x-small;">DATE</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"> </td> <td> </td> <td> </td> </tr> <tr> <td style="height: 20px;"> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE							<p style="font-size: x-small;">SEAL</p> <p style="font-size: x-small;">James Voso 6/13/2018 DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-0067</p>
REVISIONS	INIT.	DATE									

*****SYSTEMS*****
*****DION*****
*****USERNAME*****

PHASING DIAGRAM



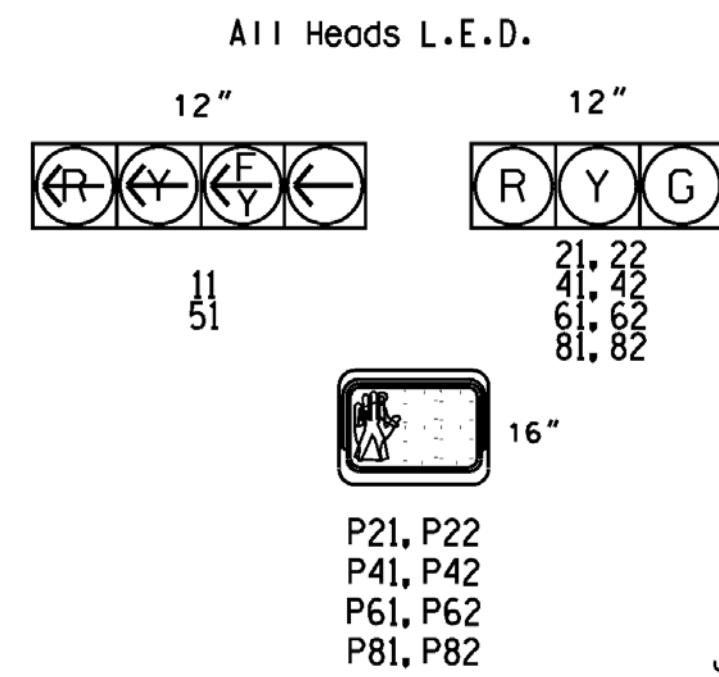
PHASING DIAGRAM DETECTION LEGEND

- ◄●► DETECTED MOVEMENT
- ◄◄◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄◄◄ UNSIGNALIZED MOVEMENT
- ◄◄◄ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	02+5	02+6	04+8	FL	HL
11	—	—	—	—	—	—
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	—	—	—	—	—	—
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK
P81, P82	DW	DW	DW	W	DRK	

SIGNAL FACE I.D.



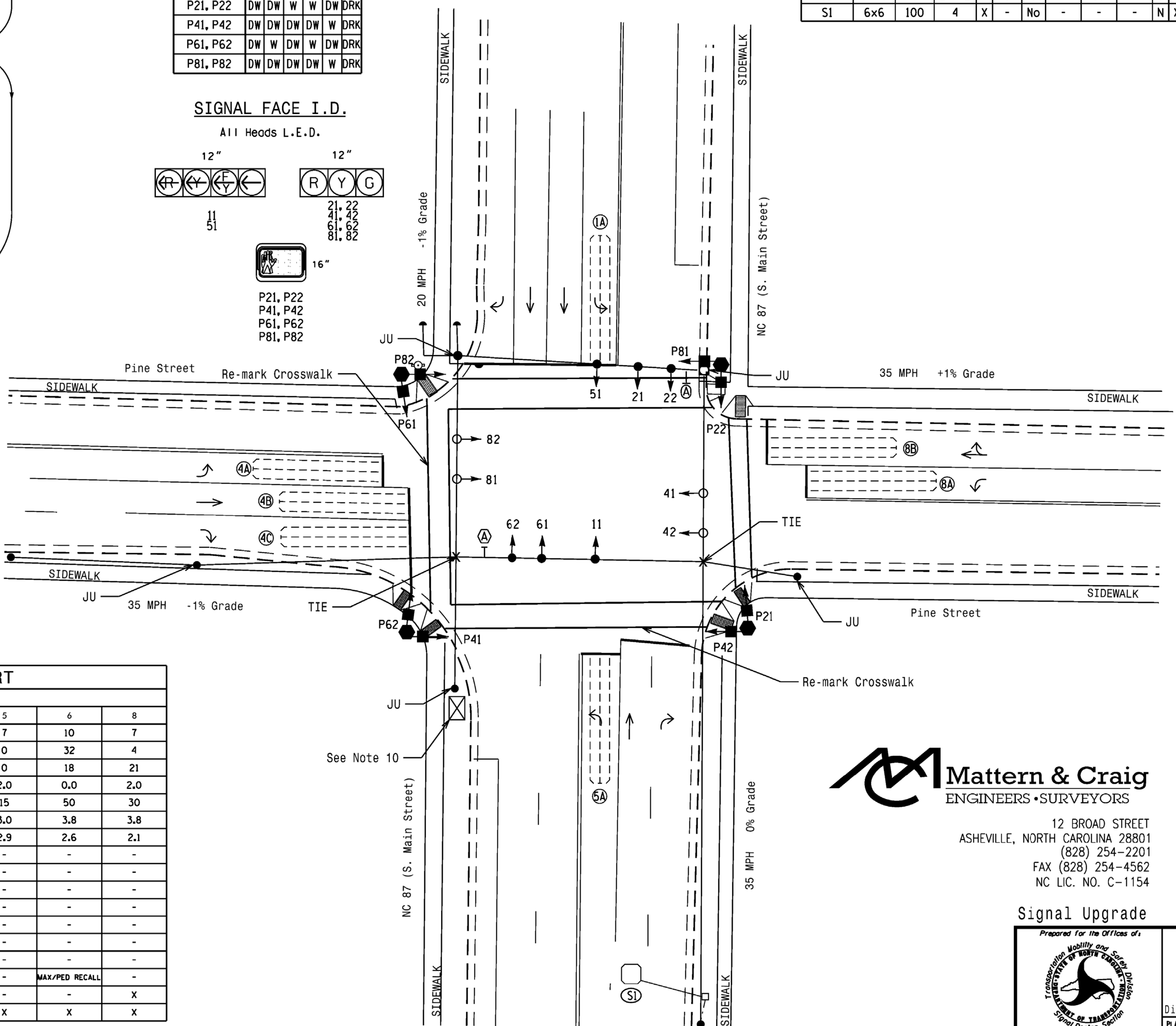
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP	NEW CARD
1A	6x40	0	2-4-2	-	1	Yes	-	15	-	S	-	X
4A	6x40	0	2-4-2	-	4	Yes	-	3	-	S	-	X
4B	6x40	0	2-4-2	-	4	Yes	-	-	-	S	-	X
4C	6x40	0	2-4-2	-	4	Yes	-	15	-	S	-	X
5A	6x40	0	2-4-2	-	5	Yes	-	15	-	S	-	X
8A	6x40	0	2-4-2	-	8	Yes	-	3	-	S	-	X
8B	6x40	0	2-4-2	-	8	Yes	-	10	-	S	-	X
S1	6x6	100	4	X	-	No	-	-	-	N	X	

5 Phase Semi-Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls on phases 4 and 8.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Locate new base mounted cabinet on existing cabinet foundation.



LEGEND

- | PROPOSED | EXISTING |
|----------|----------|
| ○ | ● |
| ◐ | ◑ |
| ◓ | ◔ |
| ◕ | ◖ |
| ◗ | ◘ |
| ◙ | ◚ |
| ◛ | ◜ |
| ◝ | ◞ |
| ◟ | ◠ |
| ◡ | ◢ |
| ◣ | ◤ |
| ◥ | ◦ |
| ◧ | ◨ |
| ◩ | ◪ |
| ◫ | ◬ |
| ◭ | ◮ |
| ◯ | ◰ |
| ◱ | ◲ |
| ◳ | ◴ |
| ◵ | ◶ |
| ◷ | ◸ |
| ◹ | ◺ |
| ◻ | ◼ |
| ◽ | ◾ |
| ◿ | ◿ |
| ⬆ | ⬆ |
| ⬆ | ⬆ |
| ⬆ | ⬆ |
| ⬆ | ⬆ |
| ⬆ | ⬆ |

ASC/3 TIMING CHART

FEATURE	PHASE					
	1	2	4	5	6	8
Min Green *	7	10	7	7	10	7
Walk *	0	38	4	0	32	4
Ped Clear	0	12	22	0	18	21
Veh. Extension *	2.0	0.0	2.0	2.0	0.0	2.0
Max 1 *	15	50	30	15	50	30
Yellow	3.0	3.8	3.9	3.0	3.8	3.8
Red Clear	2.3	2.6	2.1	2.9	2.6	2.1
Actuations B4 Add *	-	-	-	-	-	-
Seconds / Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Locking Detector	-	-	-	-	-	-
Recall Position	-	MAX/PED RECALL	-	-	MAX/PED RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X	X

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

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NC LIC. NO. C-1154

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

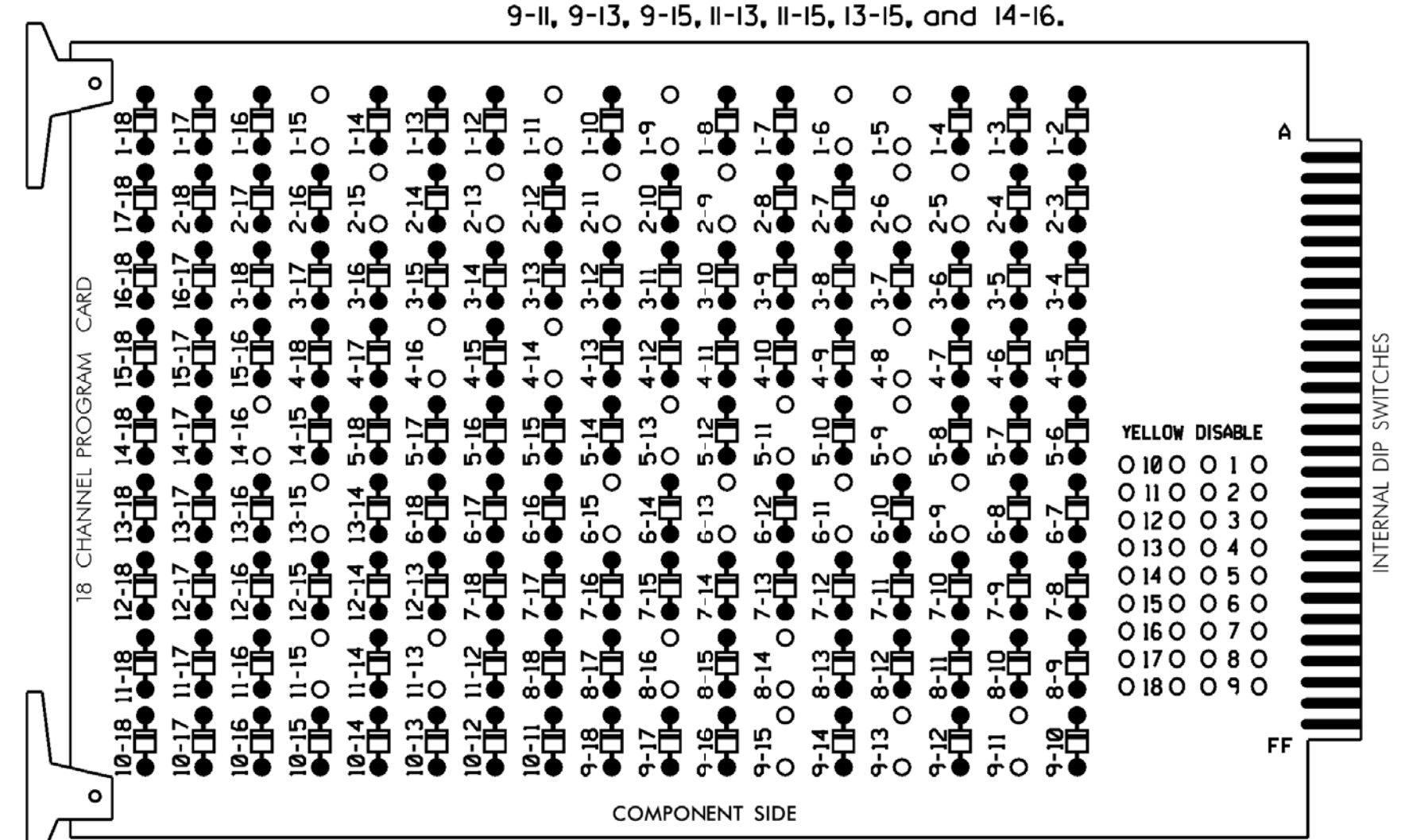
Prepared for the Offices of:

NC 87 (South Main Street) at Pine Street
 Division 7 Alamance County Graham
 PLAN DATE: January 2018 REVIEWED BY: JB Voso
 PREPARED BY: SE Greene REVIEWED BY: JAMES B. VOSO
 SCALE: 1"=20'
 DATE: 6/13/2018
 SIGNATURE: JAMES B. VOSO
 SIG. INVENTORY NO. 07-0068

*****SYSTEM*****
*****BUSINESS*****

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)
 REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15, and 14-16.



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.
 - Integrate monitor with Ethernet network in cabinet.

■ = DENOTES POSITION OF SWITCH

NOTES

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

EQUIPMENT INFORMATION

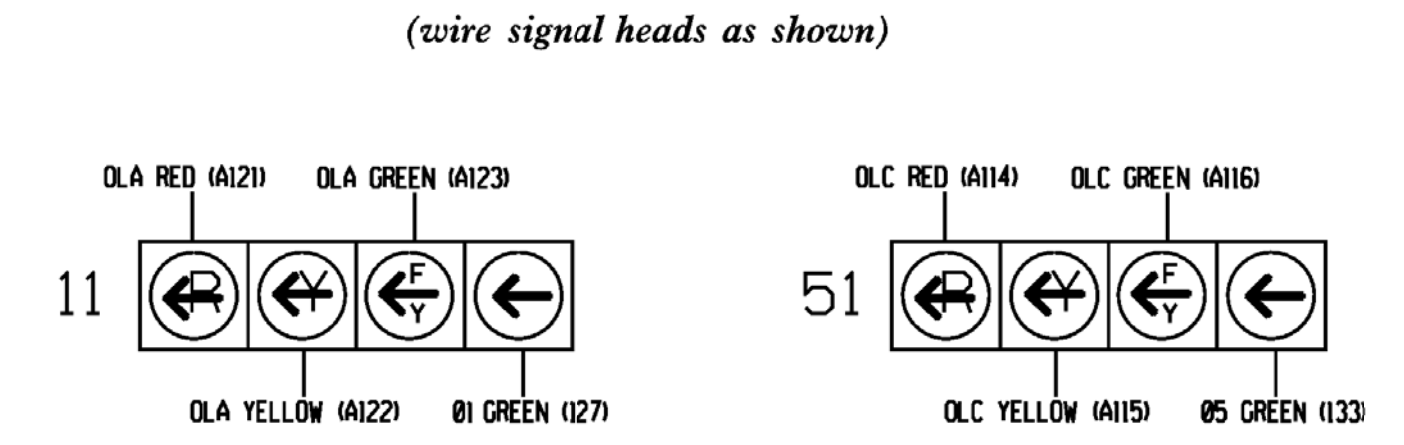
CONTROLLER.....2070LX
 CABINET.....332 W/AUX
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S3,S5,S6,S7,S8,S9,S11,S12,
 AUX S1,AUX S4
 PHASES USED.....1,2,2PED,4,4PED,5,6,6PED,8,8PED
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	41,42	P41, P42	51	61,62	P61, P62	NU	81,82	P81, P82	11	NU	NU	51	NU	NU
RED	128			101				134			107							
YELLOW	*	129		102		*	135			108								
GREEN		130		103			136			109								
RED ARROW													A121				A114	
YELLOW ARROW													A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW	127						133											
Hand			113			104			119			110						
Foot				115		106			121			112						

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

FYA SIGNAL WIRING DETAIL



INPUT FILE POSITION LAYOUT

(front view)

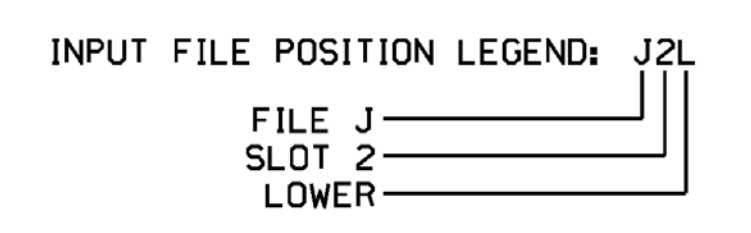
FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ S	∅ S	∅ S	∅ S	∅ 4	∅ 4	∅ S	SYS. DET. S1	∅ S	∅ S	NOT USED	NOT USED	FS
L	1A	∅ S	∅ S	∅ S	∅ S	4A	4C	∅ S		∅ S	∅ S	∅ 4 PED	∅ 8 PED	DC ISOLATOR
U	NOT USED	∅ S	∅ S	∅ S	∅ S	∅ 4	NOT USED	∅ S	NOT USED	∅ S	∅ S	∅ S	∅ S	DC ISOLATOR
L		∅ S	∅ S	∅ S	∅ S	4B		∅ S		∅ S	∅ S	∅ S	∅ S	DC ISOLATOR
U	∅ 5	∅ S	∅ S	∅ S	∅ S	∅ 8	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S
L	5A	∅ S	∅ S	∅ S	∅ S	8A	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S
U	NOT USED	∅ S	∅ S	∅ S	∅ S	∅ 8	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S
L		∅ S	∅ S	∅ S	∅ S	8B	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S	∅ S

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	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A	TB2-1,2	11U	56	1	1	YES		15		S
4A	TB4-9,10	16U	41	4	4	YES		3		S
4B	TB4-11,12	16L	45	14	4	YES				S
4C	TB6-1,2	17U	65	34	4	YES		15		S
5A	TB3-1,2	J1U	55	5	5	YES		15		S
8A	TB5-9,10	J6U	42	8	8	YES		3		S
8B	TB5-11,12	J6L	46	18	8	YES		10		S
* S1	TB6-9,10	19U	60	11	SYS	NO				N
PED PUSH BUTTONS										
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED					
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED					

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.
 * System detector only. Remove any assigned vehicle phase.

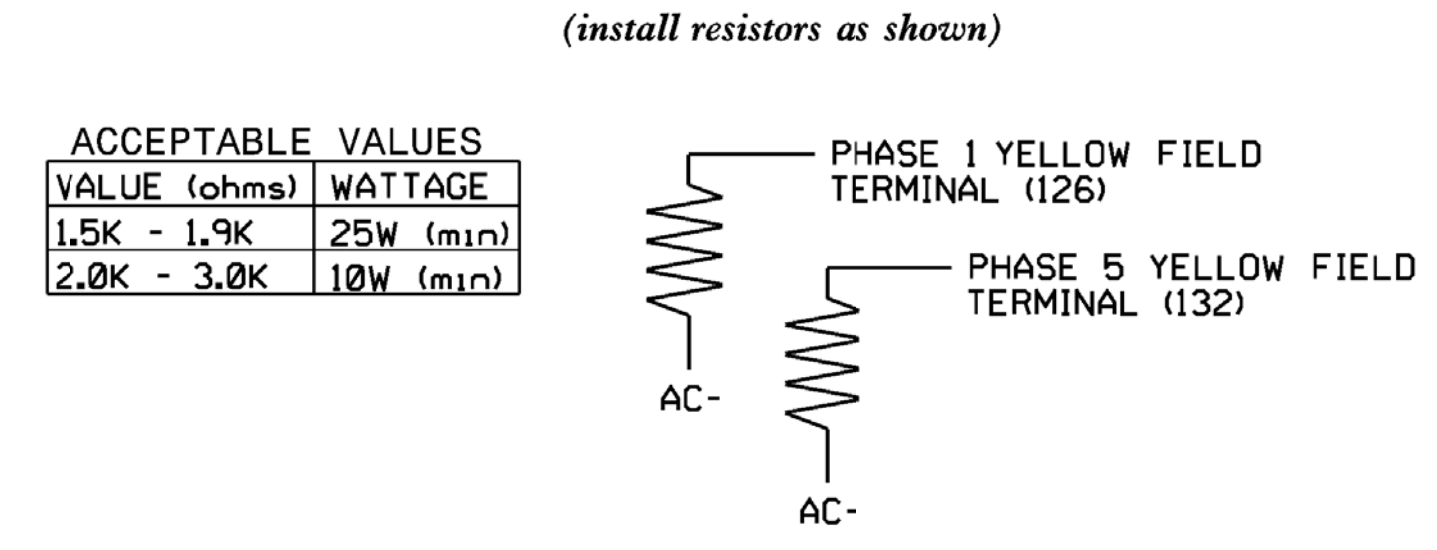


COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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: 07-0068
 DESIGNED: January 2018
 SEALED: 6/13/2018
 REVISED: NA

LOAD RESISTOR INSTALLATION DETAIL



Electrical Detail - Sheet 1 of 2

Mattern & Craig
 ENGINEERS • SURVEYORS
 12 BROAD STREET
 ASHEVILLE, NORTH CAROLINA 28801
 (828) 254-2201
 FAX (828) 254-4562
 NC LIC. NO. C-1154

Prepared for the Offices of:
 Division 7 Alamance County Graham
 NC 87 (South Main Street) at Pine Street
 PLAN DATE: January 2018 REVIEWED BY: JB Voso
 PREPARED BY: SE Greene REVIEWED BY:
 REVISIONS: INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022599
 JAMES B. VOSO
 6/13/2018
 DATE
 SIG. INVENTORY NO. 07-0068

*****SYTIME*****
 *****D*****
 *****USER*****

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

OVERLAP A

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

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

Toggle Twice

OVERLAP C

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

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

END PROGRAMMING

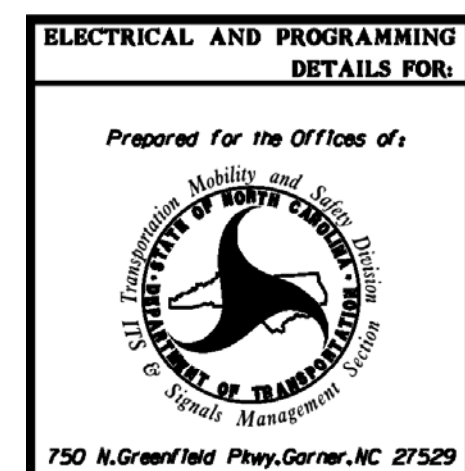
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-0068
 DESIGNED: January 2018
 SEALED: 6/13/2018
 REVISED: NA

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



12 BROAD STREET
 ASHEVILLE, NORTH CAROLINA 28801
 (828) 254-2201
 FAX (828) 254-4562
 NC LIC. NO. C-1154



NC 87 (South Main Street)
 at
 Pine Street

Division 7 Alamance County Graham

PLAN DATE: January 2018	REVIEWED BY: JB Voso
PREPARED BY: SE Greene	REVIEWED BY:

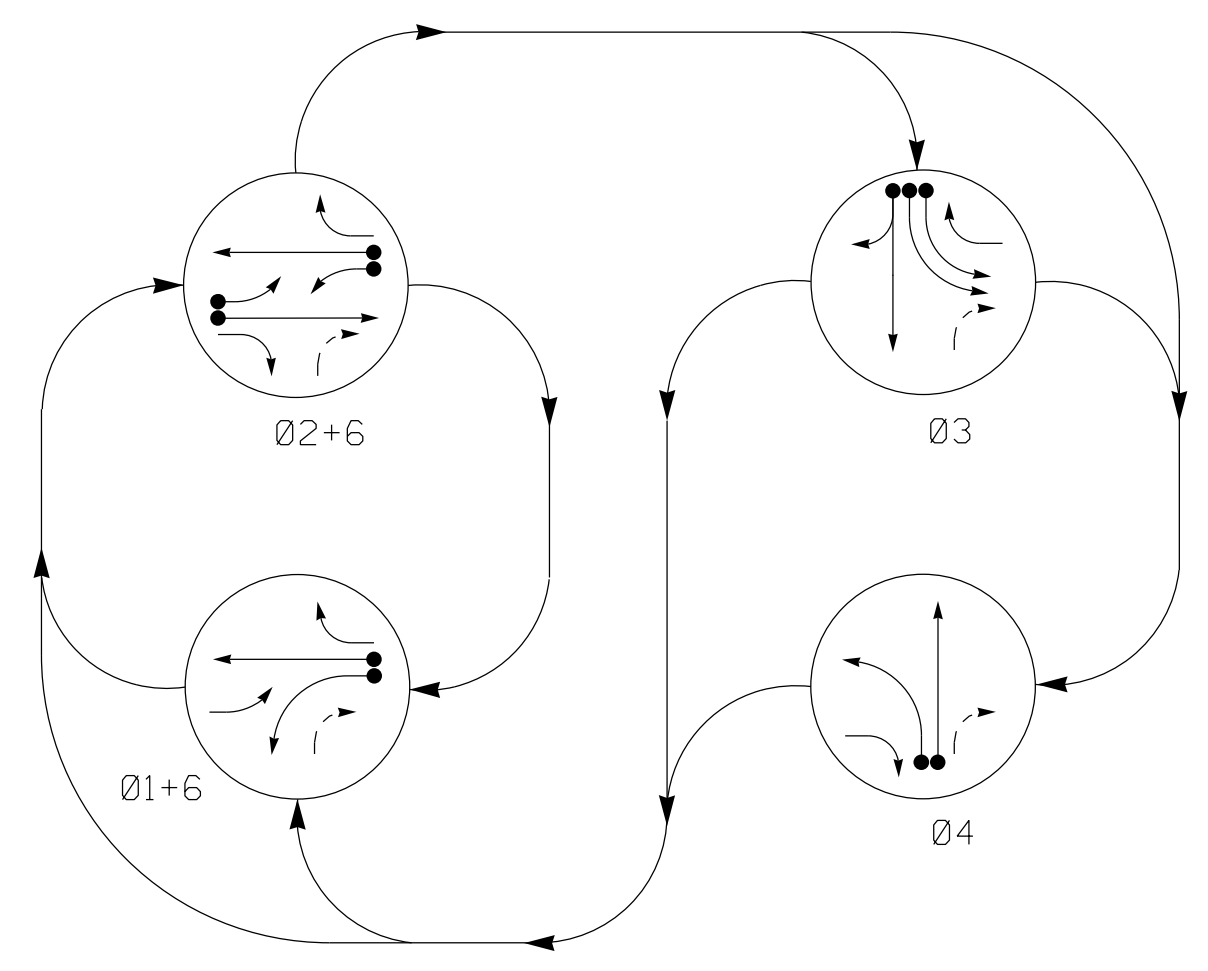
REVISIONS	INIT.	DATE

SEAL
 NORTH CAROLINA
 PROFESSIONAL ENGINEER
 SEAL 022599
 JAMES B. VOSO
 6/13/2018
 DATE

SIG. INVENTORY NO. 07-0068

*****SYSTEMS*****
 *****SERIALS*****
 *****USERNAME*****

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

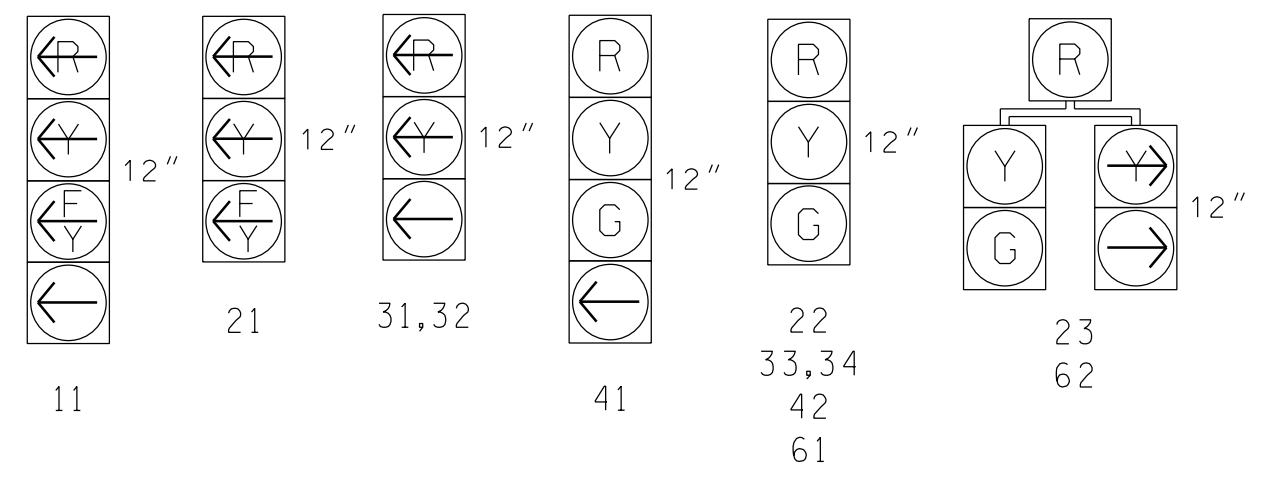
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE				FLASH
	Ø 1 + 6	Ø 2 + 6	Ø 3	Ø 4	
11					Y
21					Y
22	R	G	R	R	Y
23	R	G	R		Y
31,32					
33,34	R	R	G	R	R
41	R	R	R		R
42	R	R	R	G	R
61	G	G	R	R	Y
62	G	G		R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



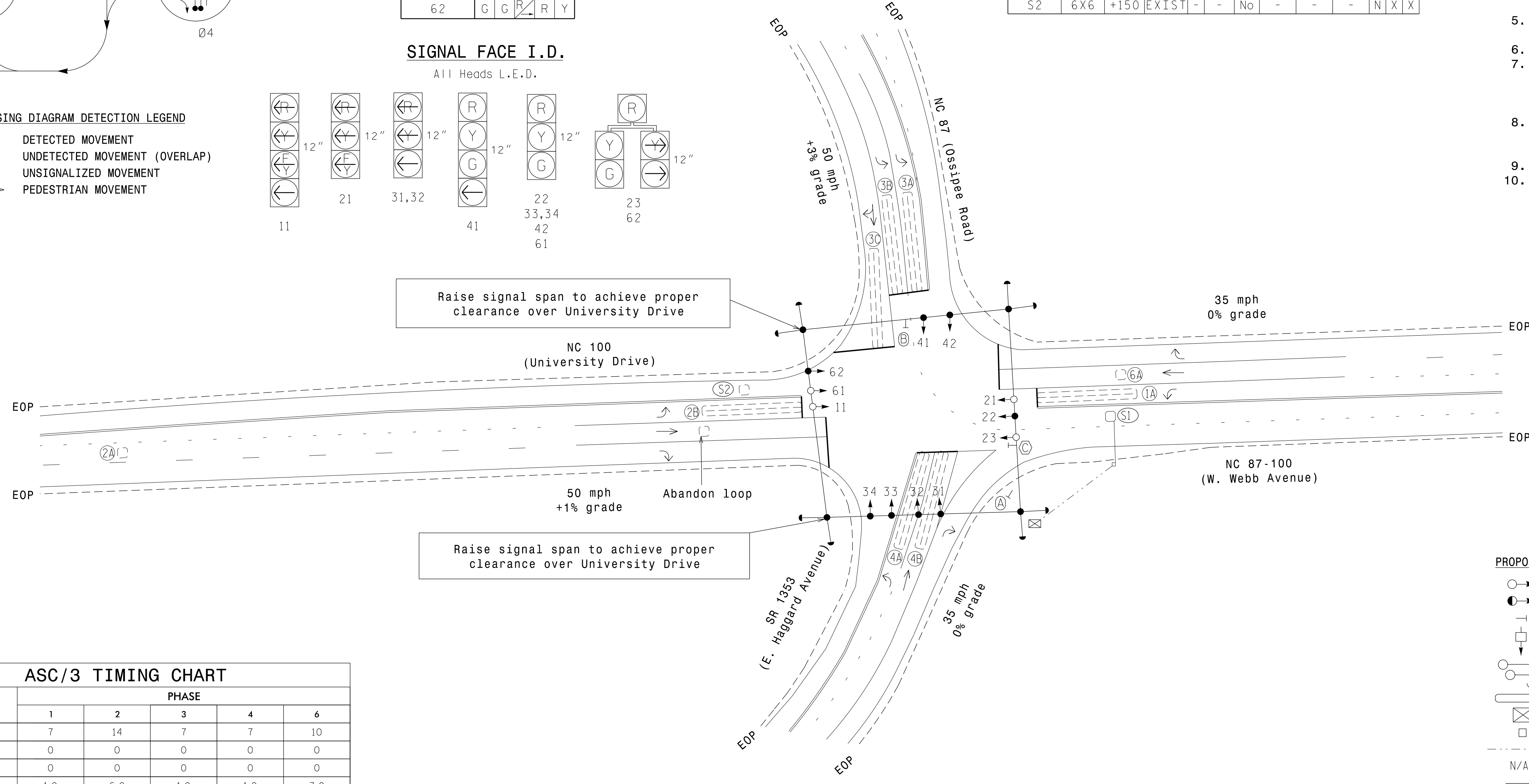
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	LOOP	NEW CARD
1A	6X60	0	2-4-2		1	Yes	-	15	-	S	-	X
					6	Yes	-	-	-	S	-	X
2A	6X6	420	EXIST	-	2	Yes	0.9	-	X	N	-	X
2B	6x60	0	2-4-2	-	2	Yes	-	3	-	G	-	X
3A, 3B	6X60	0	2-4-2	-	3	Yes	-	3	-	S	-	X
3C	6X60	0	2-4-2	-	3	Yes	-	10	-	S	-	X
4A	6X60	0	2-4-2	-	4	Yes	-	3	-	S	-	X
4B	6X60	0	2-4-2	-	4	Yes	-	-	-	S	-	X
6A	6X6	70	EXIST	-	6	Yes	-	-	-	S	-	X
S1	6X6	+170	3	X	-	No	-	-	-	N	X	X
S2	6X6	+150	EXIST	-	-	No	-	-	-	N	X	X

4 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

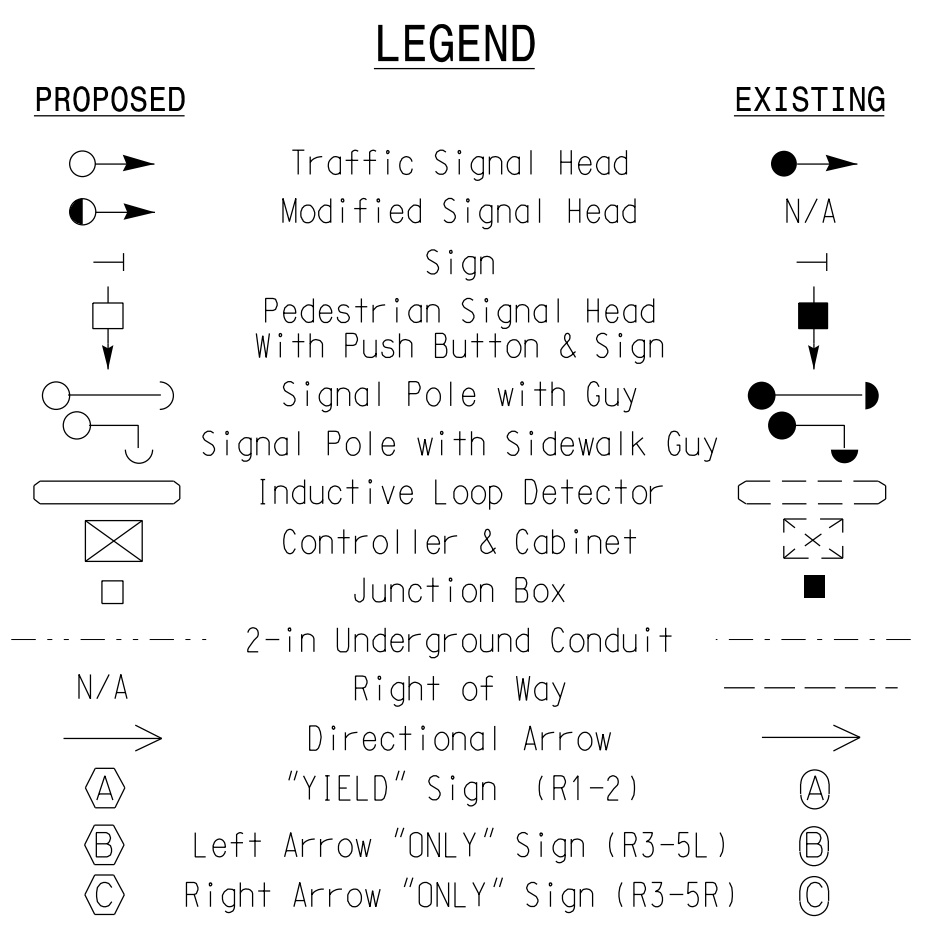
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by Engineer.
3. Phase 1 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal heads numbered 22 and 62.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
8. Locate new cabinet so as not to obstruct sight distances of vehicles turning right on red.
9. Pavement markings are existing.
10. 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	3	4	6
Min Green *	7	14	7	7	10
Walk *	0	0	0	0	0
Ped Clear	0	0	0	0	0
Veh. Extension *	1.0	6.0	1.0	1.0	3.0
Max 1 *	25	90	35	35	60
Yellow	3.0	5.1	4.6	3.8	5.1
Red Clear	2.9	2.1	1.6	1.3	2.1
Actuations B4 Add *	-	0	-	-	-
Seconds / Actuation *	-	2.5	-	-	-
Max Initial *	-	46	-	-	-
Time Before Reduction *	-	15	-	-	-
Time To Reduce *	-	30	-	-	-
Minimum Gap	-	3.2	-	-	-
Locking Detector	-	X	-	-	X
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL
Dual Entry	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X

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



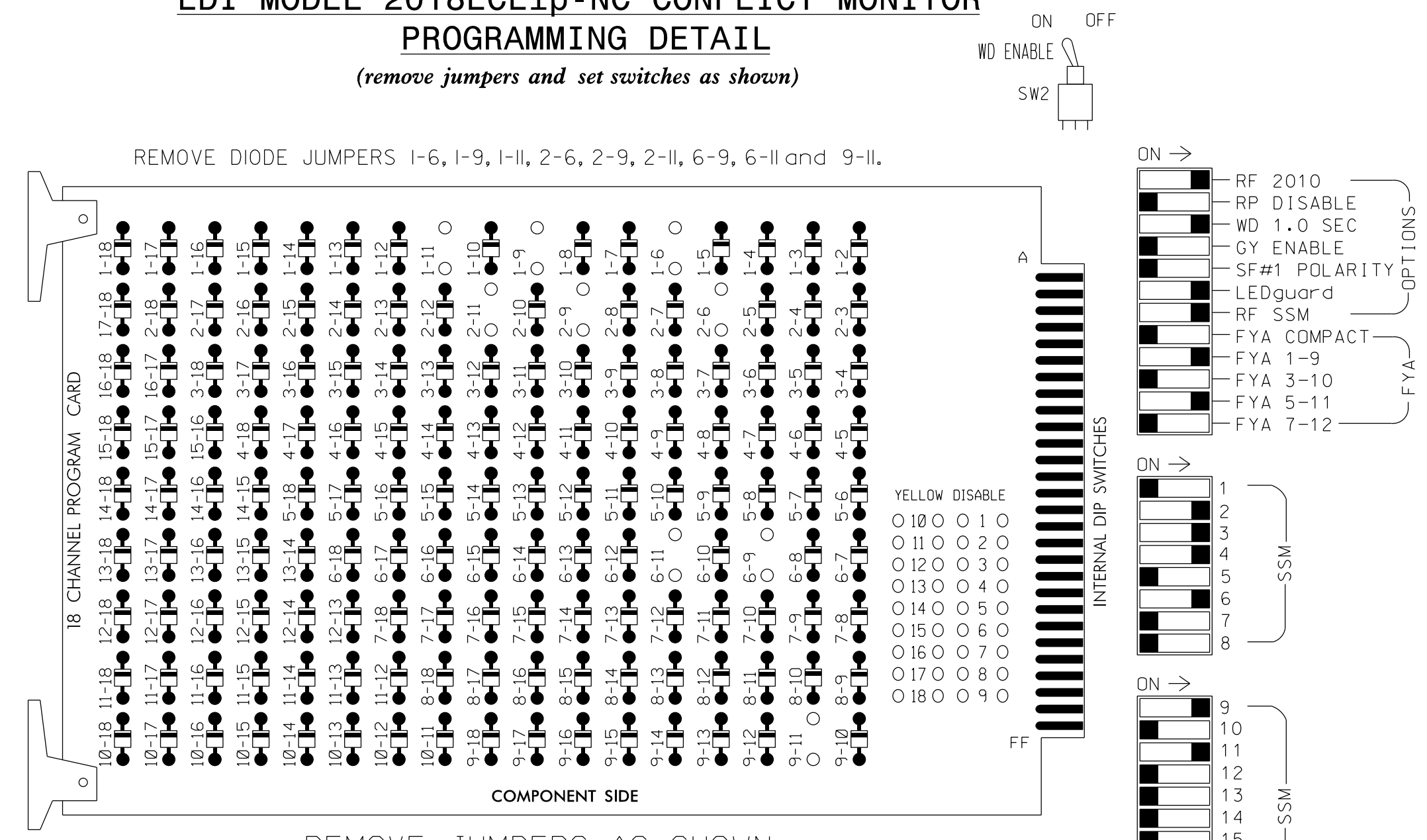
Signal Upgrade

	NC 87-100 (W. Webb Avenue) / NC 100 (University Drive) / at NC 87 (Ossipee Road) / SR 1353 (E. Haggard Avenue)		
	Division 7 Alamance County Burlington		
	PLAN DATE: January 2018	REVIEWED BY: AM Encarnacion	
	PREPARED BY: NA Ptkak	REVIEWED BY: PL Alexander	
REVISIONS	INIT. DATE	Signature: Pamela Alexander Date: 6/8/2018	
SCALE: 1"=40'		SIG. INVENTORY NO. 07-0106	

08-JUN-2018 13:55
 O:\MTC\aspor\atf\m\traff\c\Curr*100056469 U-6015 B-G Sig Sys*task 05_11_Signal.sxd\des\gn#07-0106.dgn
 ALEX3361 AT LUS340649

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
 - Ensure that Red Enable is active at all times during normal operation.
 - 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 phase 2 Green and 6 Green.
- The cabinet and controller are part of the Burlington-Graham Signal System.

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	NU	31,32 33,34	62	23	41	42	NU	NU	61,62	NU	NU	NU	11	NU	NU	21
RED		128		116		101	101			134								
YELLOW	*	129		117		102	102			135								
GREEN		130		118		103	103			136								
RED ARROW				116									A121				A114	
YELLOW ARROW				117		117	102						A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW	127			118	118	103	103											

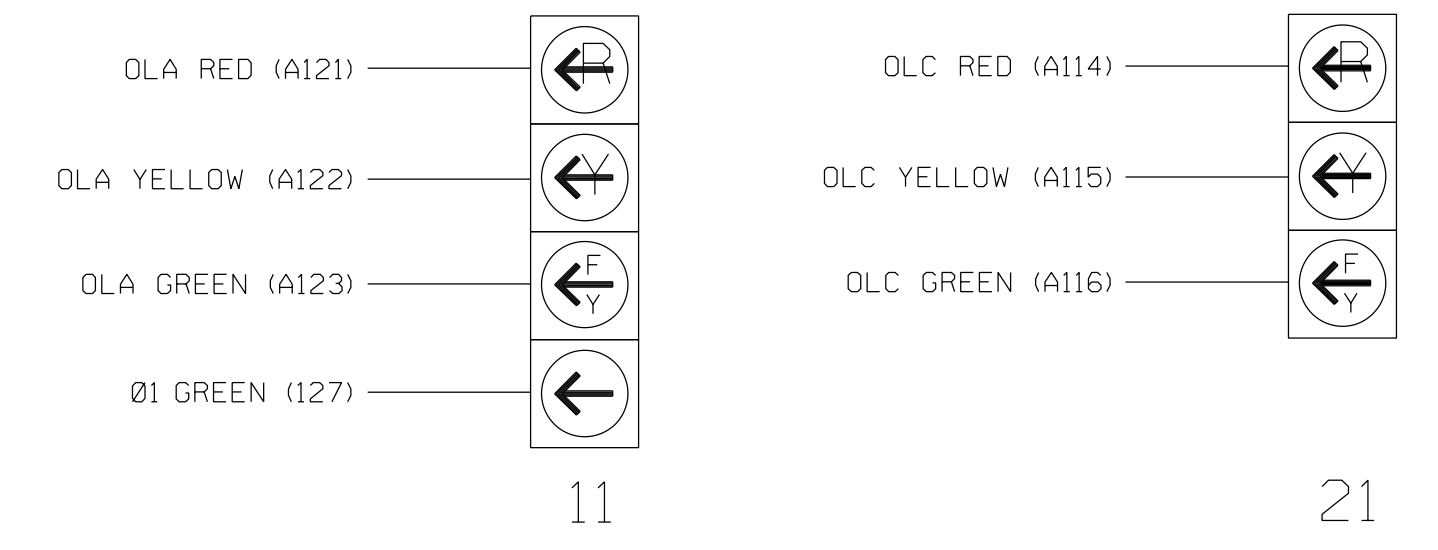
NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail this sheet.

EQUIPMENT INFORMATION

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

FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

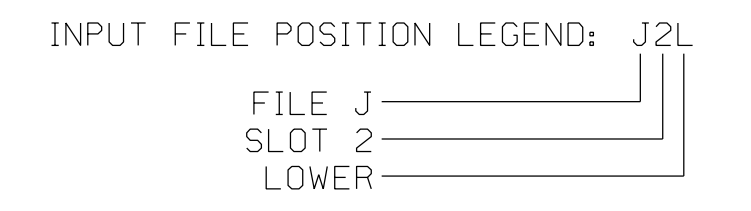
FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1 1A	∅ 2 2A	∅ 3 3A,3B	∅ 3 3C	∅ 4 4A	∅ 4 4B	SYS. DET. S1	S	S	S	S	S	S	FS DC ISOLATOR
L	NOT USED	∅ 2 2B	∅ 3 3A,3B	∅ 3 3C	∅ 4 4A	∅ 4 4B	SYS. DET. S2	S	S	S	S	S	S	ST DC ISOLATOR
U	S	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A
L	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A	∅ 6 6A

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

INPUT FILE CONNECTION & PROGRAMMING CHART

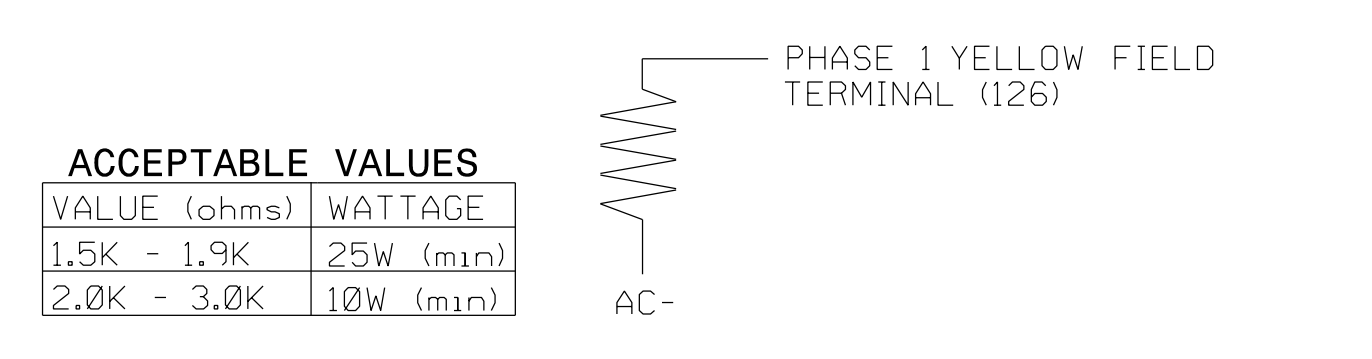
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1 ★	1	YES		15		S
	-	J4U	48	26 ★	6	YES				S
2A	TB2-5,6	I2U	39	2	2	YES	0.9		X	N
2B	TB2-7,8	I2L	43	12	2	YES		3		G
3A, 3B	TB4-5,6	I5U	58	3	3	YES		3		S
3C	TB4-9,10	I6U	41	4	3	YES		10		S
4A	TB6-1,2	I7U	65	34	4	YES		3		S
4B	TB6-3,4	I7L	78	44	4	YES				S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
* S2	TB6-11,12	I9L	62	13	SYS	NO				N
6A	TB3-5,6	J2U	40	6	6	YES				S

- 1 Add jumper from I1-W to J4-W, on rear of input file.
 * System detector only. Remove any assigned vehicle phase.



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)



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: 07-0106
 DESIGNED: January 2018
 SEALED: 6/8/2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details for:
 NC 87-100 (W. Webb Avenue) /
 NC 100 (University Drive) /
 at NC 87 (Ossipee Road) /
 SR 1353 (E. Haggard Avenue)

Division 7 Alamance County Burlington
 PLAN DATE: January 2018 REVIEWED BY: AM Encarnacion
 PREPARED BY: NA Ptak REVIEWED BY: PL Alexander

Sealed by: PAMELA L. ALEXANDER, PROFESSIONAL ENGINEER, N.C. 023489

6/9/2018

SIG. INVENTORY NO. 07-0106

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown)

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

```

OVERLAP A
Select TMG VEH OVLP [A] and 'PPLT FYA'
TMG VEH OVLP...[A] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... PHASE 1
OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT.....CH9 ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0
ACTION PLAN SF BIT DISABLE..... 0
  
```

↓ Toggle Twice

```

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

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

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0106
DESIGNED: January 2018
SEALED: 6/8/2018
REVISED: N/A

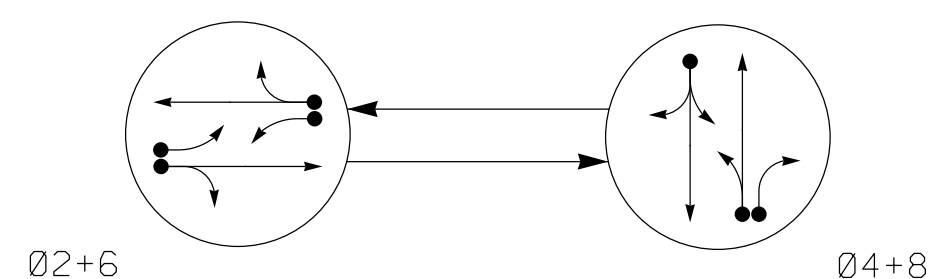
09-JUN-2018 13:15
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ALEX3361 AT LUS33069

Electrical Detail - Sheet 2 of 2		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED													
<p style="font-size: x-small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small; text-align: center;">Prepared for the Offices of:</p> <p style="font-size: x-small; text-align: center;">750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p style="font-weight: bold;">NC 87-100 (W. Webb Avenue) / NC 100 (University Drive) at NC 87 (Ossipee Road) / SR 1353 (E. Haggard Avenue)</p> <p style="font-size: x-small;">Division 7 Alamance County Burlington</p> <table style="width: 100%; font-size: x-small;"> <tr> <td>PLAN DATE: January 2018</td> <td>REVIEWED BY: AM Encarnacion</td> </tr> <tr> <td>PREPARED BY: NA Ptak</td> <td>REVIEWED BY: PL Alexander</td> </tr> </table> <table style="width: 100%; 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> </tbody> </table>	PLAN DATE: January 2018	REVIEWED BY: AM Encarnacion	PREPARED BY: NA Ptak	REVIEWED BY: PL Alexander	REVISIONS	INIT.	DATE							<p style="font-size: x-small;">Designed by <i>Pamela Alexander</i> 6/9/2018</p> <p style="font-size: x-small;">DATE</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 07-0106</p>
PLAN DATE: January 2018	REVIEWED BY: AM Encarnacion														
PREPARED BY: NA Ptak	REVIEWED BY: PL Alexander														
REVISIONS	INIT.	DATE													

ATKINS

1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

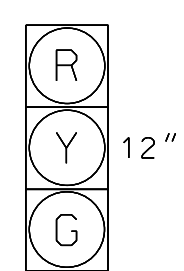
- ◄● DETECTED MOVEMENT
- ◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄----- UNSIGNALIZED MOVEMENT
- ◄-----> PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø2+6	Ø4+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21,22
41,42
61,62
81,82

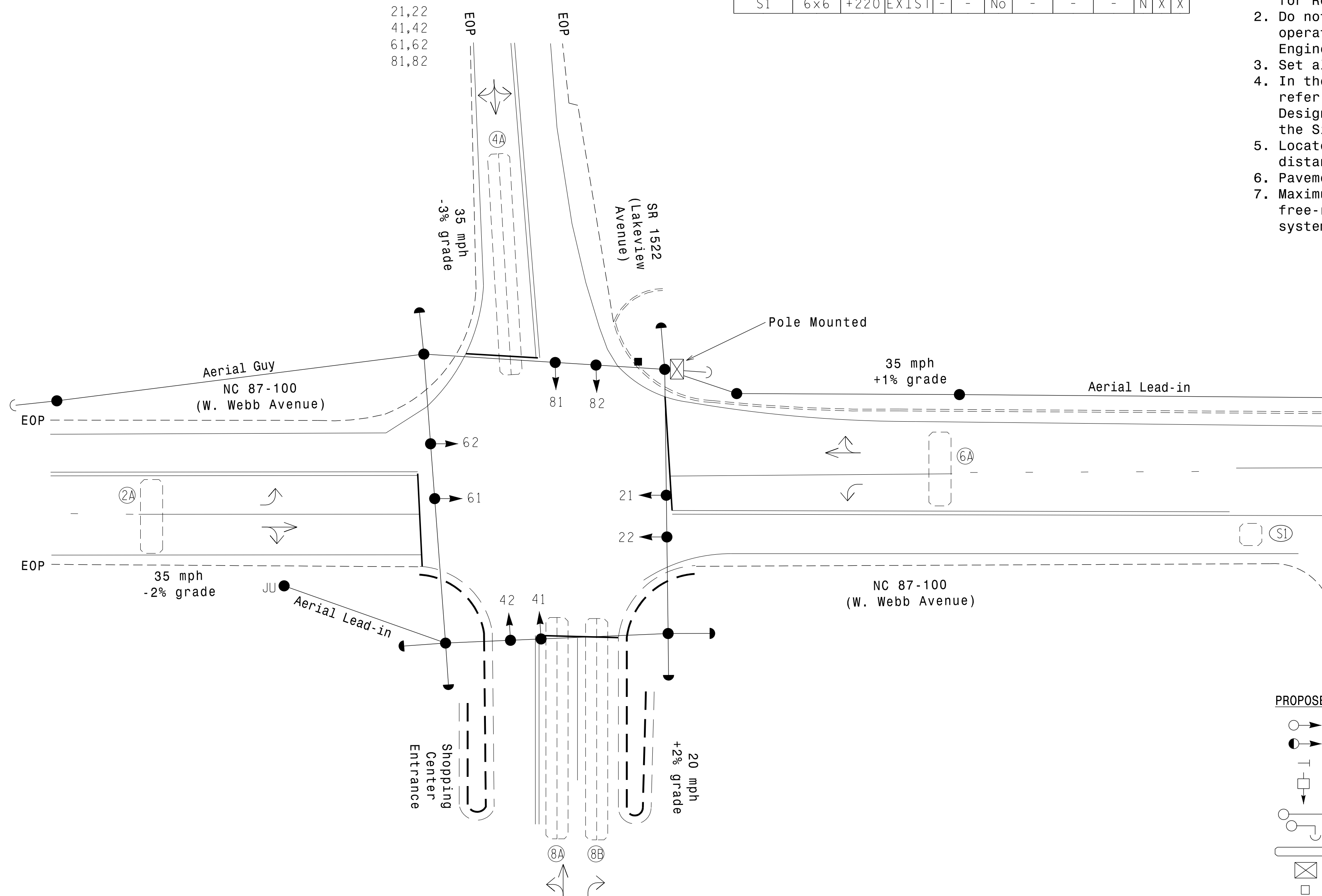
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6x20	70	EXIST	-	2	Yes	-	-	-	S	-	X
4A	6x60	+5	2-4-2	-	4	Yes	-	5	-	S	-	X
6A	6x20	70	EXIST	-	6	Yes	-	-	-	S	-	X
8A	6x60	+5	2-4-2	-	8	Yes	-	3	-	S	-	X
8B	6x60	+5	2-4-2	-	8	Yes	-	15	-	S	-	X
S1	6x6	+220	EXIST	-	-	No	-	-	-	N	X	X

2 Phase Fully Actuated
(Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by Engineer.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

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

ASC/3 TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green *	10	7	10	7
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	4.0	2.0	4.0	2.0
Max 1 *	45	30	45	30
Yellow	4.0	4.1	3.8	3.0
Red Clear	1.1	1.2	1.0	2.1
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	-	X	-	X
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.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

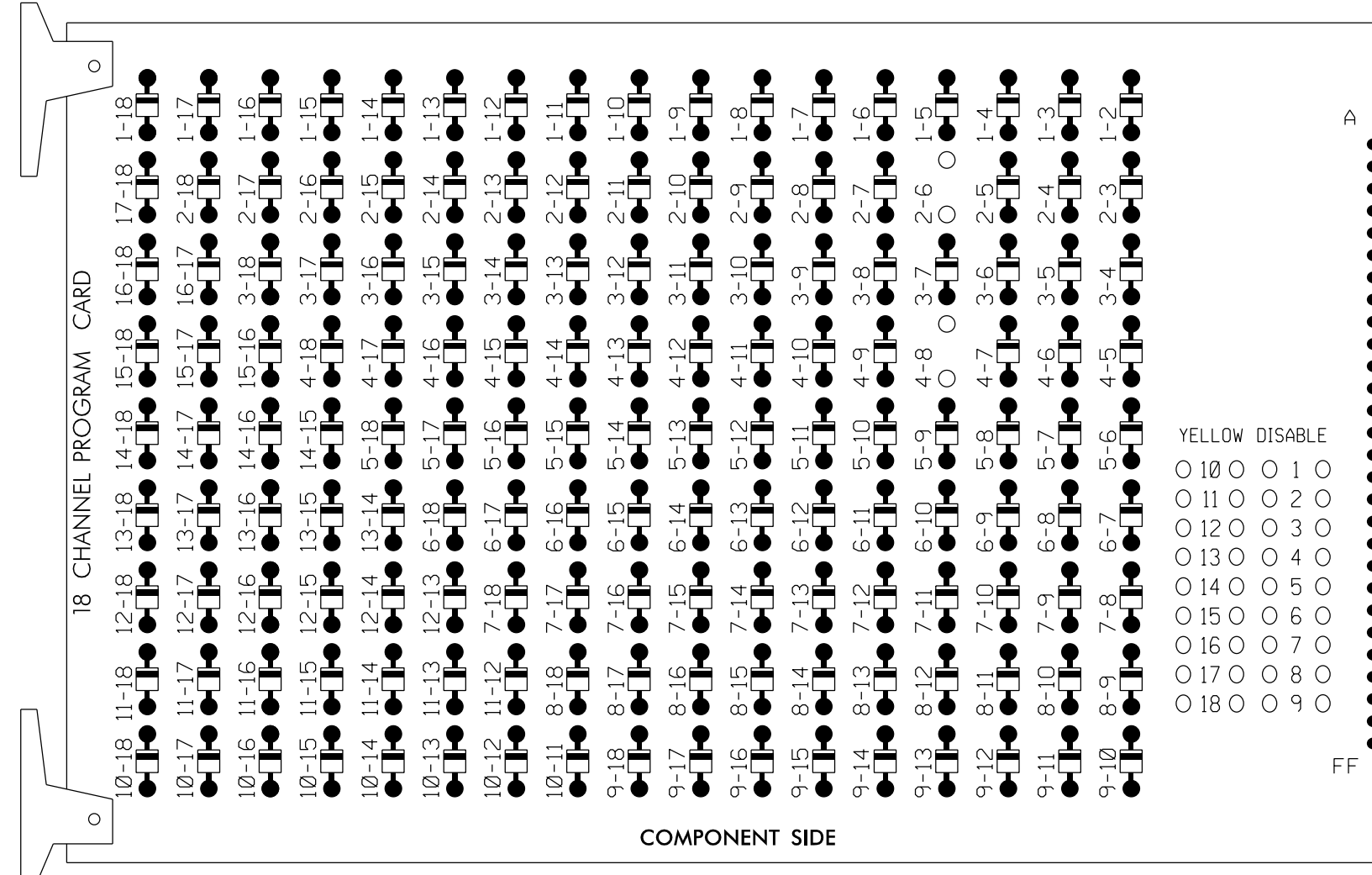
	<p>NC 87-100 (W. Webb Avenue) at SR 1522 (Lakeview Avenue)/ Shopping Center Entrance</p>		
	<p>Division 7 Alamance County Burlington</p>		
	<p>PLAN DATE: January 2018</p>	<p>REVIEWED BY: AM Encarnacion</p>	
	<p>PREPARED BY: NA Ptak</p>	<p>REVIEWED BY: PL Alexander</p>	
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>		<p>SCALE: 0 20 1"=20'</p>	<p>REVISIONS</p>
<p>1616 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBES #F-0326</p>		<p>INIT. DATE</p>	<p>6/7/2018</p>
<p>ATKINS</p>		<p>Signature: Pamela Alexander</p>	<p>DATE: 6/7/2018</p>
<p>SIG. INVENTORY NO. 07-0107</p>			

07-JUN-2018 11:10
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 ALEX3361 AT LUS340649

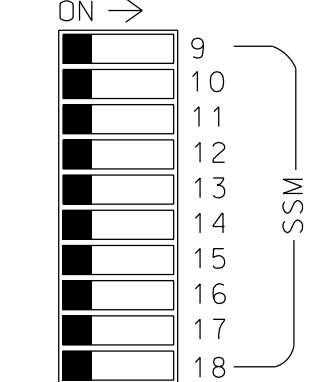
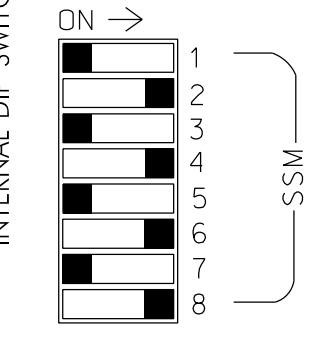
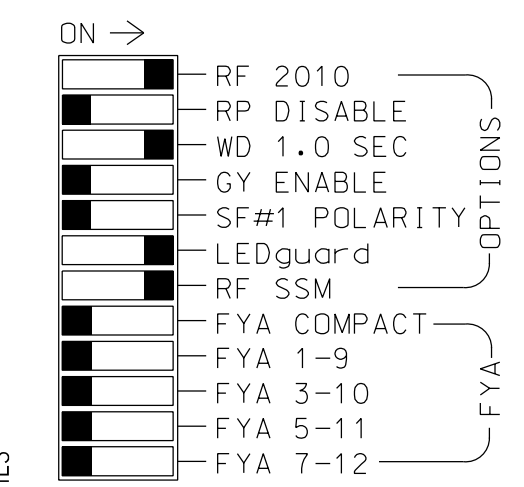
EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)

REMOVE DIODE JUMPERS 2-6 AND 4-8.



ON OFF
WD ENABLE SW2



■ = DENOTES POSITION OF SWITCH

YELLOW DISABLE
 10
 11
 12
 13
 14
 15
 16
 17
 18

REMOVE JUMPER 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. Integrate monitor with Ethernet network in cabinet.

NOTES

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

EQUIPMENT INFORMATION

CONTROLLER.....2070LX
 CABINET.....336
 SOFTWARE.....ECONOLITE ASC/3-2070
 CABINET MOUNT.....POLE MOUNTED
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S8,S11
 PHASES USED.....2,4,6,8
 OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I" L	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	S	∅ 2	SYS. DET. S1	∅ 4	S	∅ 6	S	∅ 8	S	S	S	S	S	FS
	2A	NOT USED	NOT USED	4A	6A	8A	8B							DC ISOLATOR
														ST
														DC ISOLATOR

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

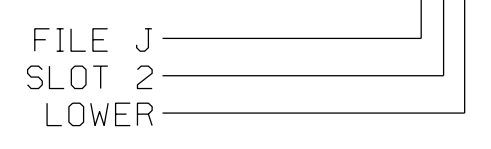
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
2A	TB21-3,4	I2U	39	2	2	YES				S
* S1	TB21-5,6	I3U	58	3	SYS	NO				N
4A	TB21-7,8	I4U	41	4	4	YES		5		S
6A	TB21-11,12	I6U	40	6	6	YES				S
8A	TB22-1,2	I8U	42	8	8	YES		3		S
8B	TB24-1,2	I8L	46	18	8	YES		15		S

* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0107
 DESIGNED: January 2018
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Detail

Prepared for the Offices of:

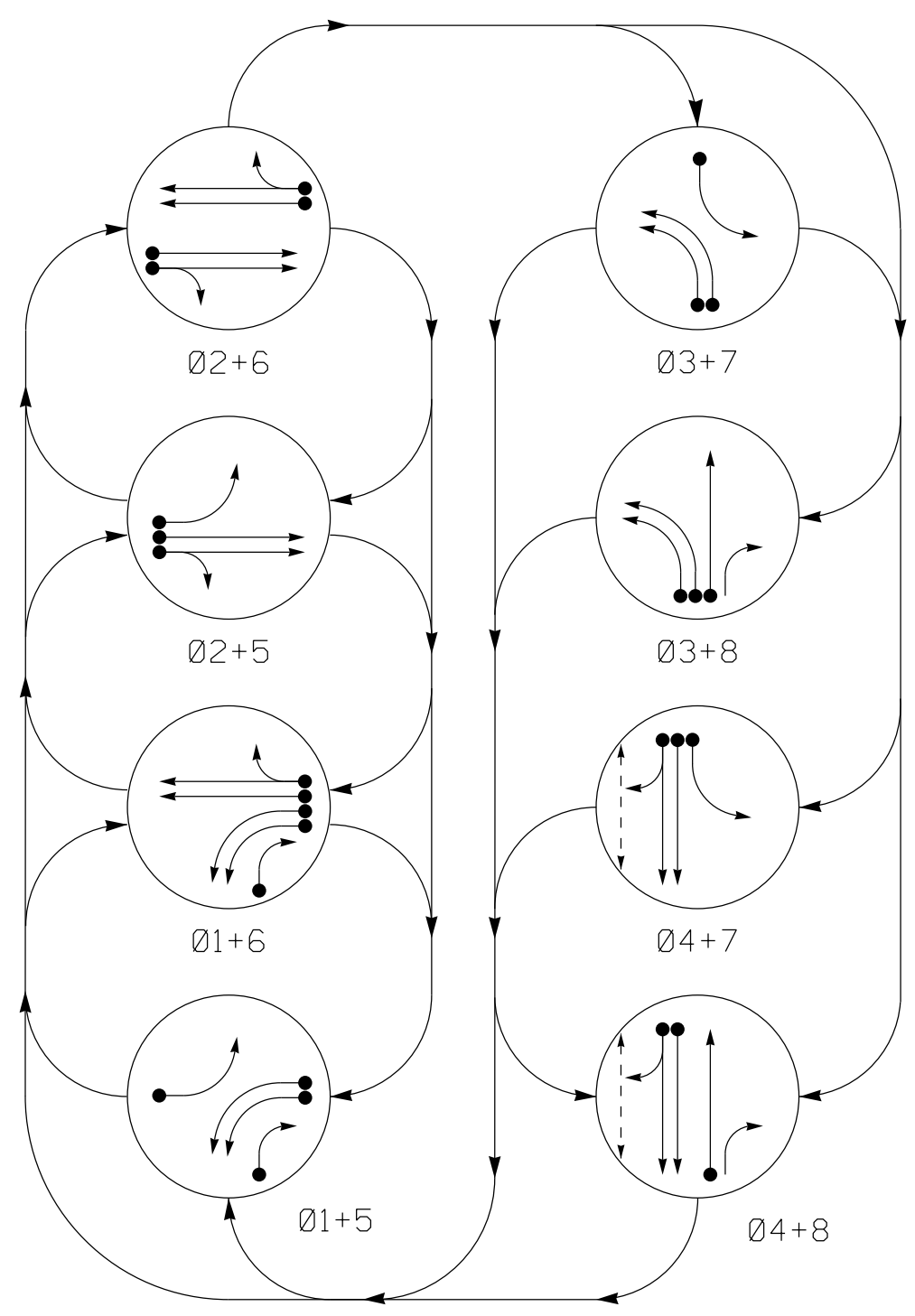
 Department of Transportation and Safety
 State of North Carolina

ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 87-100 (W. Webb Avenue) at SR 1522 (Lakeview Avenue)/ Shopping Center Entrance	
Division 7	Alamance County	Burlington	
PLAN DATE: January 2018	REVIEWED BY: AM Encarnacion		
PREPARED BY: NA Ptak	REVIEWED BY: PL Alexander		
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 PAMELA L. ALEXANDER
 SEAL 023489
 DATE 6/9/2018
 Signature: Pamela Alexander

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

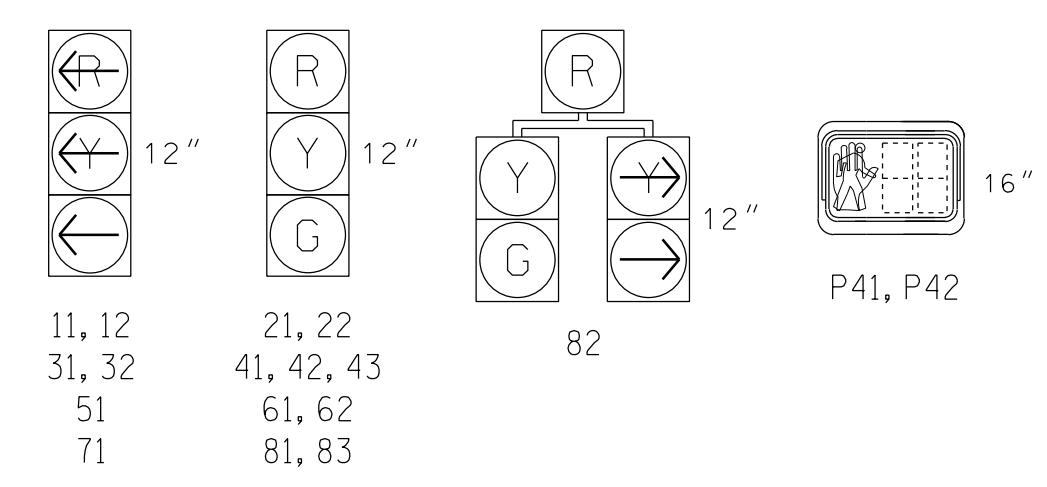
- ◄● DETECTED MOVEMENT
- ◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄ UNSIGNALIZED MOVEMENT
- ◄ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE							
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 3+7	Ø 3+8	Ø 4+7	Ø 4+8
11, 12	←	←	→	→	→	→	→	→
21, 22	R	R	G	G	R	R	R	Y
31, 32	←	←	→	→	→	→	→	→
41, 42, 43	R	R	R	R	R	R	G	G
51	←	←	→	→	→	→	→	→
61, 62	R	G	R	G	R	R	R	Y
71	←	←	→	→	→	→	→	→
81, 83	R	R	R	R	R	G	R	G
82	←	←	→	→	→	→	→	→
P41, P42	DW	DW	DW	DW	DW	W	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



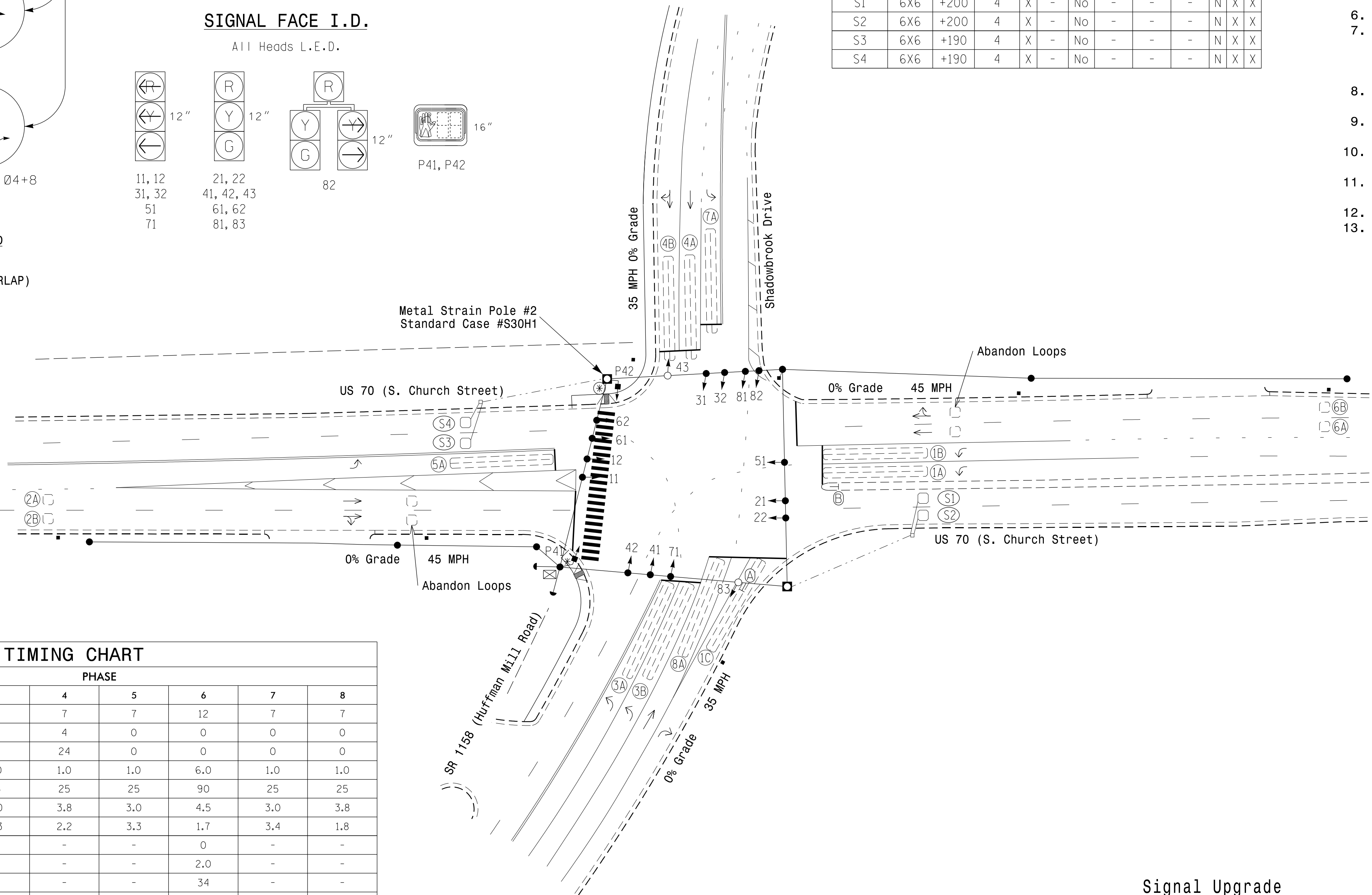
ASC/3 DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A,1B	6X60	0	2-4-2	-	1	Yes	-	-	-	S	-	X
1C	6X60	0	2-4-2	-	1	Yes	-	15	-	S	-	X
2A, 2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
3A	6X60	0	2-4-2	-	3	Yes	-	3	-	S	-	X
3B	6X60	0	2-4-2	-	3	Yes	-	-	-	S	-	X
4A	6X60	+5	2-4-2	-	4	Yes	-	-	-	S	-	X
4B	6X60	+5	2-4-2	-	4	Yes	-	10	-	S	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	3	-	S	-	X
6A, 6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
7A	6X60	+5	2-4-2	-	7	Yes	-	3	-	S	-	X
8A	6X60	0	2-4-2	-	8	Yes	-	-	-	S	-	X
S1	6X6	+200	4	X	-	No	-	-	-	N	X	X
S2	6X6	+200	4	X	-	No	-	-	-	N	X	X
S3	6X6	+190	4	X	-	No	-	-	-	N	X	X
S4	6X6	+190	4	X	-	No	-	-	-	N	X	X

8 Phase Fully Actuated Burlington-Graham Signal System

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Reposition existing signal heads numbered 41 and 42.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The cabinet should be designed to include an Auxiliary Output File for future use.
- 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.
- 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	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	0	0	0	4	0	0	0	0
Ped Clear	0	0	0	24	0	0	0	0
Veh. Extension *	1.0	6.0	1.0	1.0	1.0	6.0	1.0	1.0
Max 1 *	25	90	25	25	25	90	25	25
Yellow	3.0	4.5	3.0	3.8	3.0	4.5	3.0	3.8
Red Clear	3.4	1.9	3.3	2.2	3.3	1.7	3.4	1.8
Actuations B4 Add *	-	0	-	-	-	0	-	-
Seconds / Actuation *	-	2.0	-	-	-	2.0	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH. RECALL	-	-	-	VEH. RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

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

LEGEND

- | PROPOSED | EXISTING |
|--|----------|
| ○ Traffic Signal Head | ● N/A |
| ◐ Modified Signal Head | ◑ N/A |
| ◒ Sign | ◓ N/A |
| ◒ Pedestrian Signal Head | ◓ N/A |
| ◒ Pedestrian Push Button & Sign | ◓ * |
| N/A 2" Pedestrian Post with Ped Push Button & Sign | ◓ * |
| ◒ Signal Pole with Guy | ◓ ● |
| ◒ Signal Pole with Sidewalk Guy | ◓ ● |
| ◒ Inductive Loop Detector | ◓ ◒ |
| ◒ Controller & Cabinet | ◓ ◒ |
| ◒ Junction Box | ◓ ◒ |
| ◒ 2-in Underground Conduit | ◓ ◒ |
| N/A Right of Way | ◓ ◒ |
| ◒ Directional Arrow | ◓ ◒ |
| ◒ Metal Strain Pole | ◓ ◒ |
| N/A Curb Ramp | ◓ ◒ |
| ◒ Right Arrow "ONLY" Sign (R3-5R) | ◓ ◒ |
| ◒ No U-Turn Sign (R3-4) | ◓ ◒ |

Signal Upgrade

1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

US 70 (S. Church Street)
at
SR 1158 (Huffman Mill Road) / Shadowbrook Drive

Division 7 Alamance County Burlington

PLAN DATE: February 2018 REVIEWED BY: MB Toth

PREPARED BY: PL Alexander REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
023489
Pamela Alexander
6/7/2018

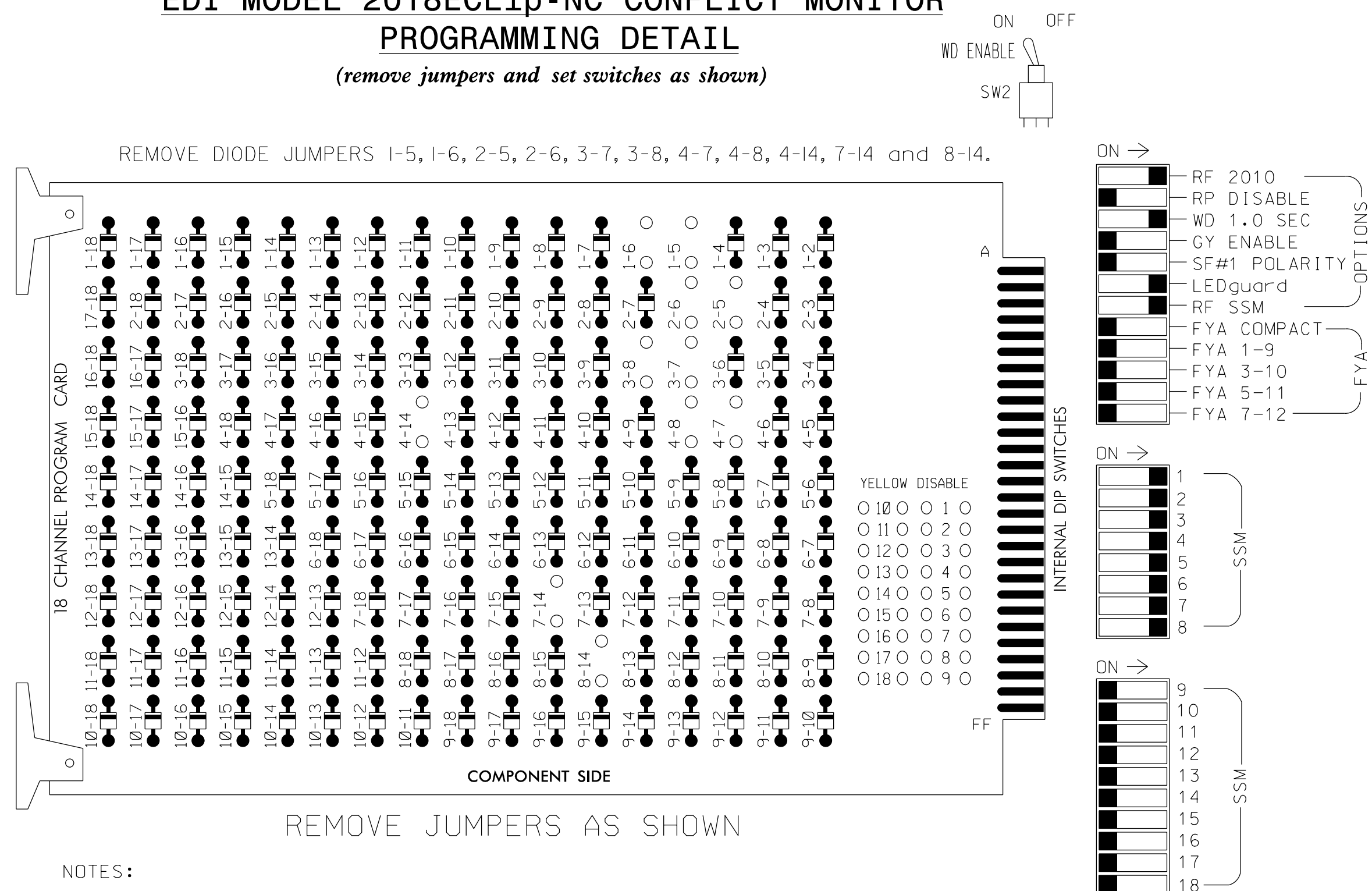
REVISIONS: _____ INIT. _____ DATE _____

SCALE: 1"=40'

07-JUN-2018 11:11
 SIGNALING DESIGN SECTION
 U-6015 B-0 Sigsig task 05.11.15 signal is 00056469
 AT LUS520849

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program controller to start up in phase 2 Green and 6 Green.
3. The cabinet and controller are part of the Burlington-Graham 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,S4,S5,S6,S7,S8,S10,S11
 PHASES USED.....1,2,3,4,4PED,5,6,7,8
 OVERLAPS.....NONE

PROJECT REFERENCE NO.	SHEET NO.
U-6015	Sig. 52.1

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.	11,12	82	21,22	NU	31,32	41,42 43	P41, P42	51	61,62	NU	71	81,82 83	NU	NU	NU	NU	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125				116			131			122							
YELLOW ARROW	126	126			117			132			123							
GREEN ARROW	127	127			118			133			124							
Hand icon								104										
Walking person icon								106										

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 2	S	∅ 3	∅ 3	∅ 4	S	SYS. DET. S1	S	S	NOT USED	S	FS
L	1A,1B	1C	2A,2B	∅ 3	3A	3B	4A	∅ 3	SYS. DET. S2	∅ 4	∅ 4	∅ 4 PED	∅ 4	DC ISOLATOR
U	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	4B	NOT USED	SYS. DET. S3	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR
L	∅ 5	∅ 6	∅ 6	∅ 7	∅ 8	∅ 8	∅ 8	∅ 8	SYS. DET. S4	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8
U	5A	6A,6B	6A,6B	7A	8A	8A	8A	8A	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8
L	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8

EX. : 1A, 2A, ETC. = LOOP NO.*

FS = FLASH SENSE
 ST = STOP TIME

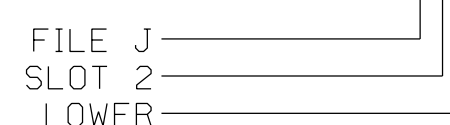
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A, 1B	TB2-1,2	I1U	56	1	1	YES				S
1C	TB2-5,6	I2U	39	2	1	YES		15		S
2A, 2B	TB2-9,10	I3U	63	32	2	YES			X	N
3A	TB4-5,6	I5U	58	3	3	YES		3		S
3B	TB4-9,10	I6U	41	4	3	YES				S
4A	TB6-1,2	I7U	65	34	4	YES				S
4B	TB6-3,4	I7L	78	44	4	YES		10		S
* S1	TB6-9,10	I9U	60	11	SYS	NO				N
* S2	TB6-11,12	I9L	62	13	SYS	NO				N
5A	TB3-1,2	J1U	55	5	5	YES		3		S
6A, 6B	TB3-5,6	J2U	40	6	6	YES			X	N
7A	TB5-5,6	J5U	57	7	7	YES		3		S
8A	TB5-9,10	J6U	42	8	8	YES				S
* S3	TB7-9,10	J9U	59	15	SYS	NO				N
* S4	TB7-11,12	J9L	61	17	SYS	NO				N

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOT 112.

* System detector only. Remove any assigned vehicle phase.

INPUT FILE POSITION LEGEND: J2L



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: 07-0112
 DESIGNED: February 2018
 SEALED: 6/7/2018
 REVISED: N/A

Electrical Detail

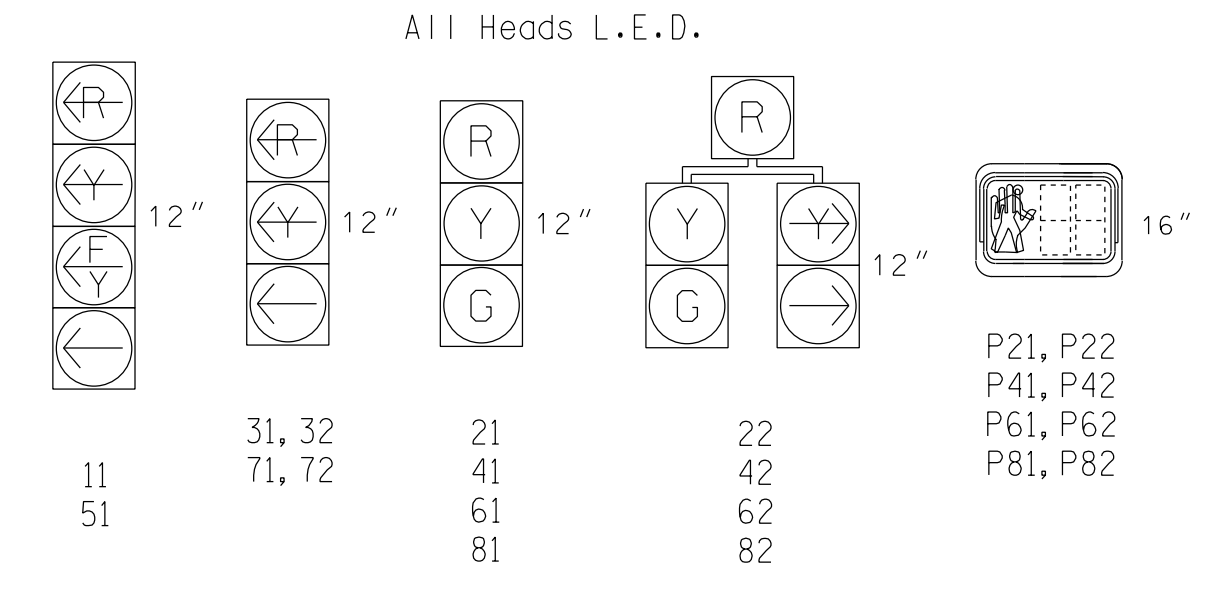
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 	US 70 (S. Church Street) at SR 1158 (Huffman Mill Road) Shadowbrook Drive		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Division 7 PLAN DATE: February 2018 PREPARED BY: PL Alexander	Alamance County REVIEWED BY: MB Toth REVIEWED BY:		Burlington DATE:
REVISIONS INIT. DATE	INIT. DATE	DATE	SEAL DATE: 6/9/2018 Pamela Alexander DATE:

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBEE #F-0326

750 N. Greenfield Pkwy, Garner, NC 27529

8 Phase Fully Actuated (Burlington-Graham Signal System)

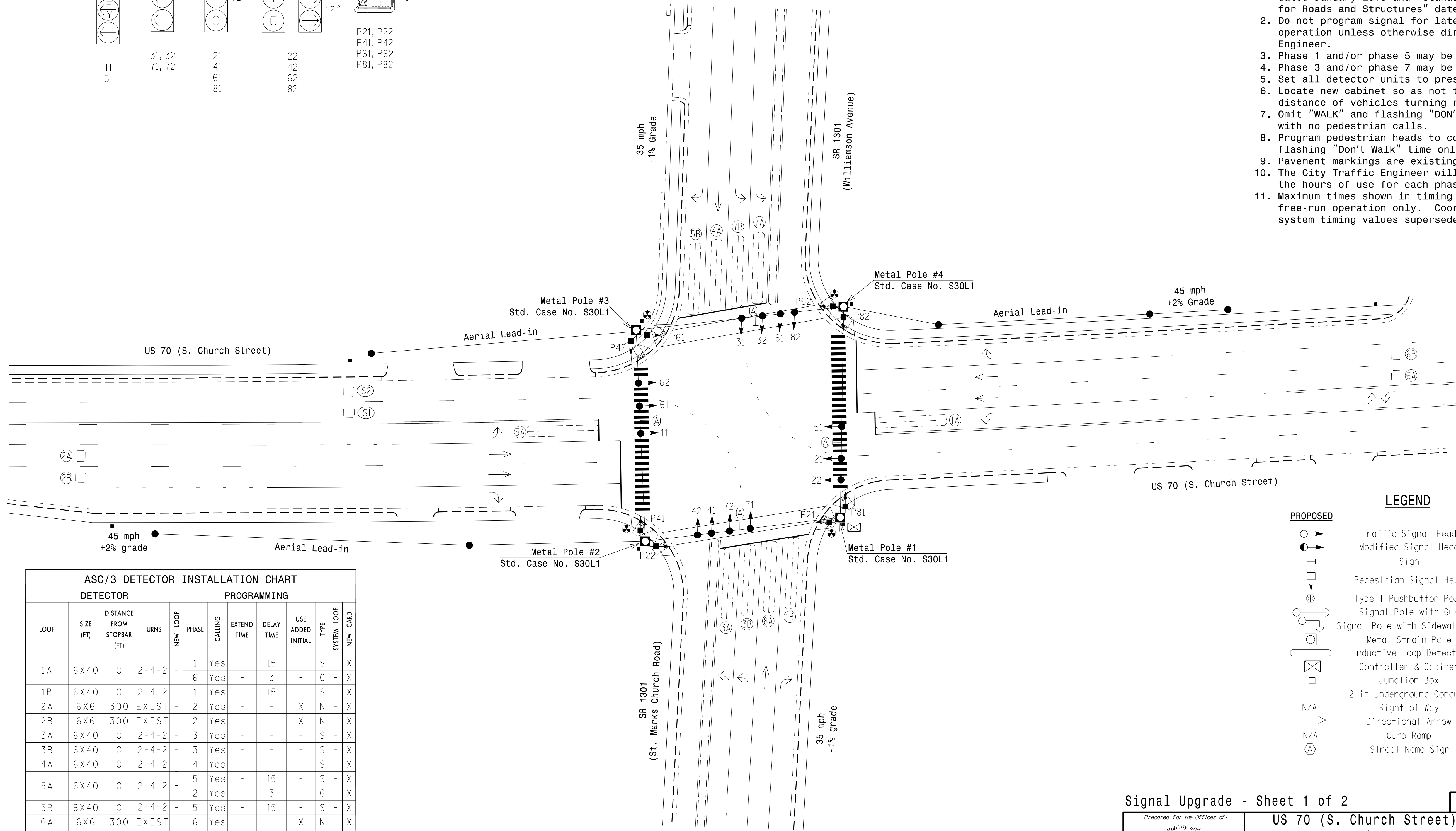
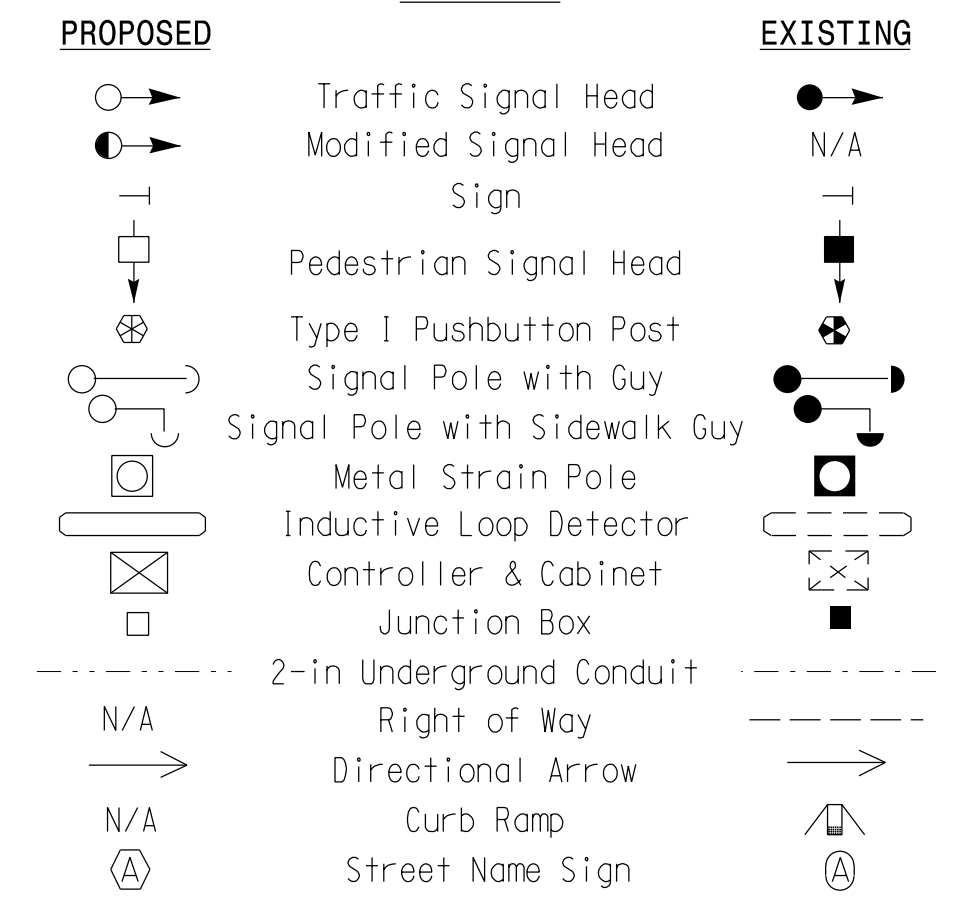
SIGNAL FACE I.D.



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 Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. The City Traffic Engineer will determine the hours of use for each phasing plan.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND



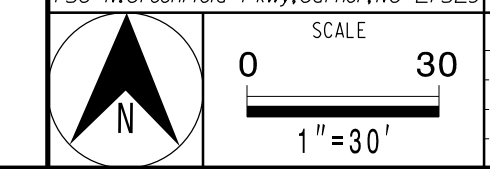
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	15	-	S	-	X
1B	6X40	0	2-4-2	-	6	Yes	-	3	-	G	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
3A	6X40	0	2-4-2	-	3	Yes	-	-	-	S	-	X
3B	6X40	0	2-4-2	-	3	Yes	-	-	-	S	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	S	-	X
5A	6X40	0	2-4-2	-	5	Yes	-	15	-	S	-	X
5B	6X40	0	2-4-2	-	2	Yes	-	3	-	G	-	X
5B	6X40	0	2-4-2	-	5	Yes	-	15	-	S	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
7A	6X40	0	2-4-2	-	7	Yes	-	-	-	S	-	X
7B	6X40	0	2-4-2	-	7	Yes	-	-	-	S	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	S	-	X
S1	6X6	+280	EXIST	-	-	No	-	-	-	N	X	X
S2	6X6	+280	EXIST	-	-	No	-	-	-	N	X	X

Signal Upgrade - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

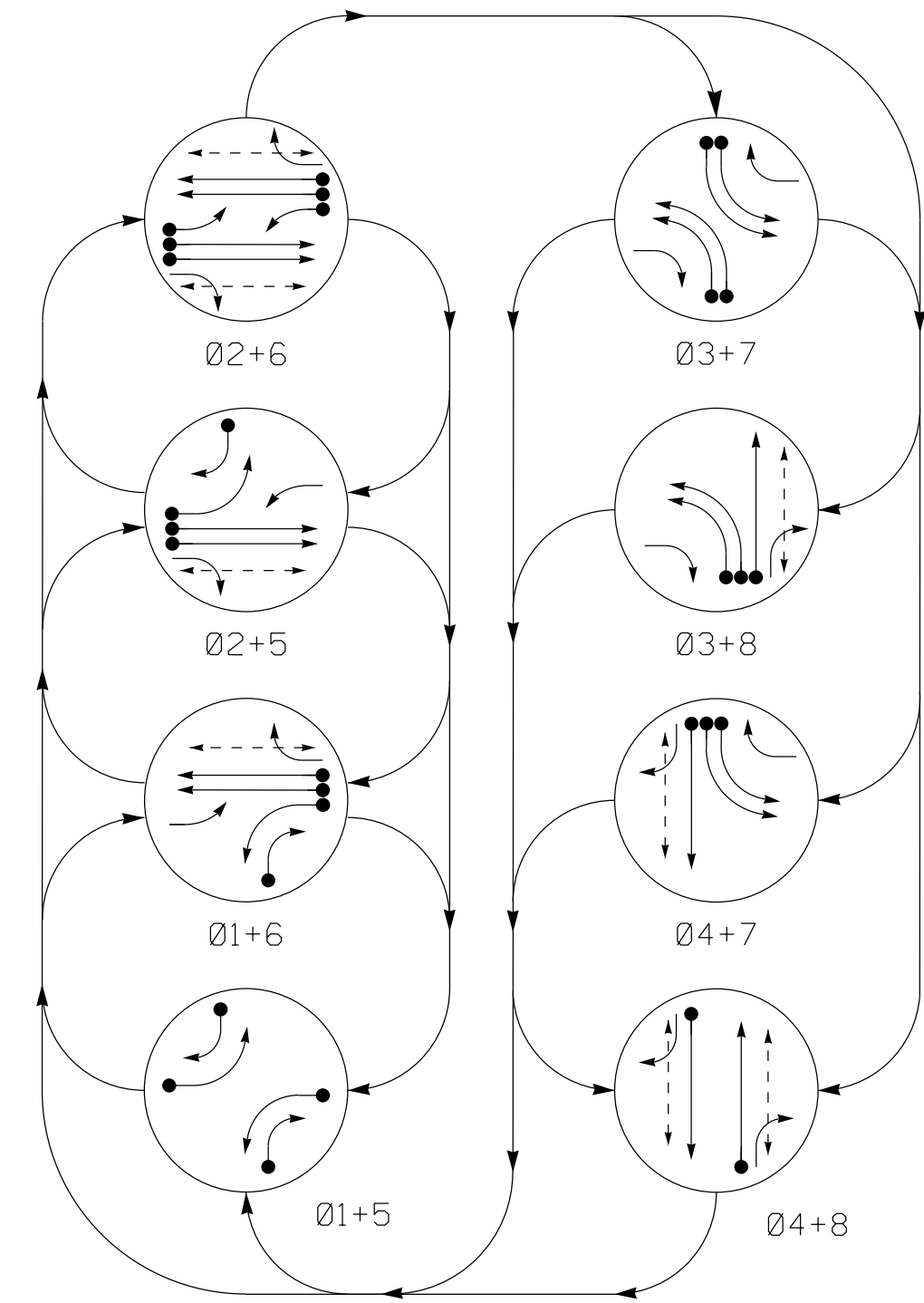
	Prepared for the Offices of: US 70 (S. Church Street) at SR 1301 (S. Williamson Avenue/ St. Marks Church Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER 023489 PAMELA L. ALEXANDER
	Division 7 Alamance County Burlington		PLAN DATE: April 2018 REVIEWED BY: PL Alexander
	PREPARED BY: JA Wiles		REVIEWED BY:
	REVISIONS	INIT.	DATE

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBES #F-0326

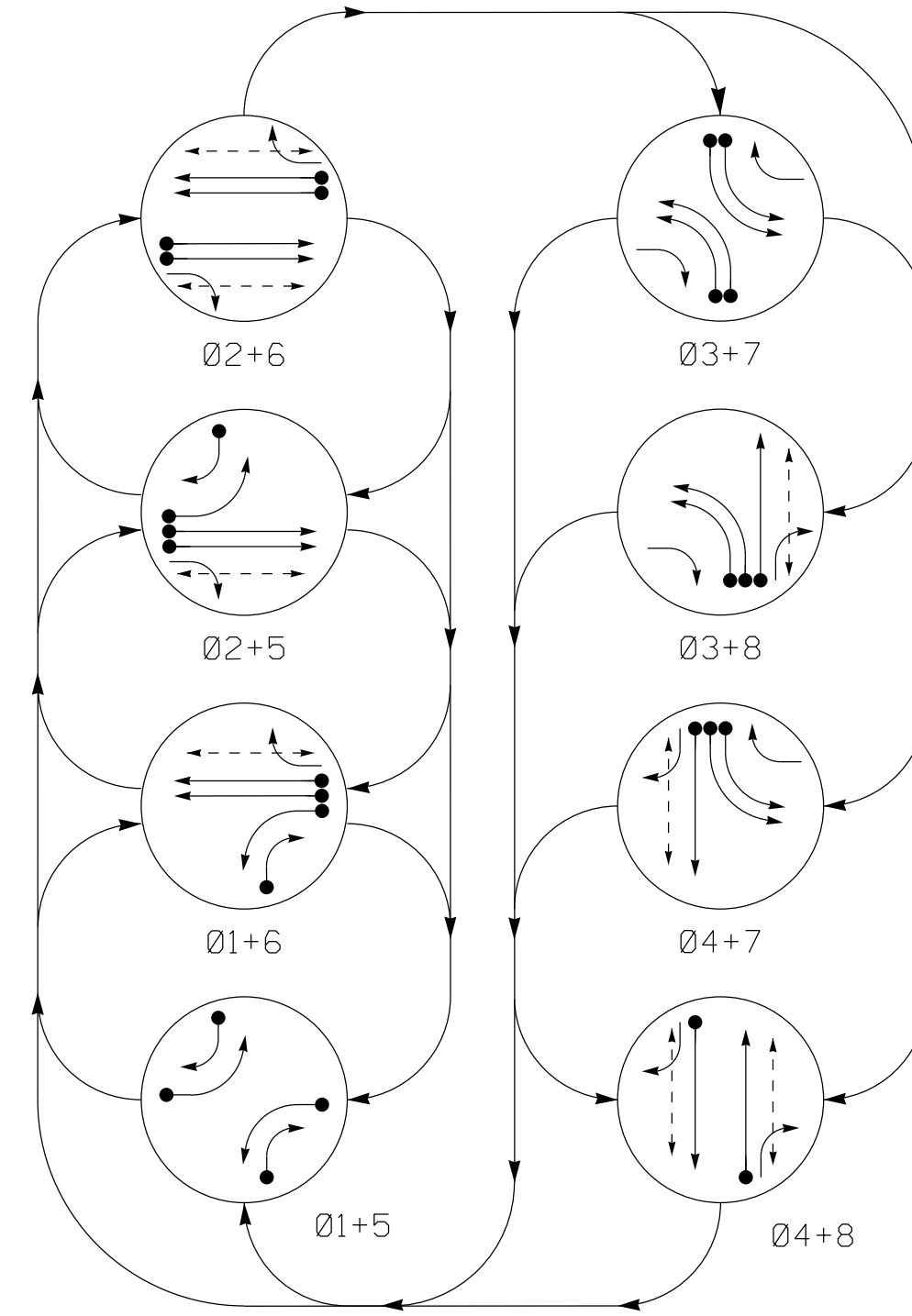


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 ALEX3361 AT LUS340649

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- ◀ UNDETECTED MOVEMENT (OVERLAP)
- ⋯ UNSIGNALIZED MOVEMENT
- ▶ PEDESTRIAN MOVEMENT

DEFAULT TABLE OF OPERATION

SIGNAL FACE	PHASE							
	0 1 + 5	0 1 + 6	0 2 + 5	0 2 + 6	0 3 + 7	0 3 + 8	0 4 + 7	0 4 + 8
11	←	←	←	←	←	←	←	←
21	R	R	G	G	R	R	R	Y
22	R	R	G	G	$\frac{R}{Y}$	$\frac{R}{Y}$	R	Y
31, 32	←	←	←	←	←	←	←	←
41	R	R	R	R	R	R	G	R
42	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	G	R
51	←	←	←	←	←	←	←	←
61	R	G	R	G	R	R	R	Y
62	R	G	R	G	$\frac{R}{Y}$	$\frac{R}{Y}$	R	Y
71, 72	←	←	←	←	←	←	←	←
81	R	R	R	R	R	G	R	R
82	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	W	DW	W	DRK

ALTERNATE TABLE OF OPERATION

SIGNAL FACE	PHASE							
	0 1 + 5	0 1 + 6	0 2 + 5	0 2 + 6	0 3 + 7	0 3 + 8	0 4 + 7	0 4 + 8
11	←	←	←	←	←	←	←	←
21	R	R	G	G	R	R	R	Y
22	R	R	G	G	$\frac{R}{Y}$	$\frac{R}{Y}$	R	Y
31	←	←	←	←	←	←	←	←
41	R	R	R	R	R	R	G	R
42	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	G	R
51	←	←	←	←	←	←	←	←
61	R	G	R	G	R	R	R	Y
62	R	G	R	G	$\frac{R}{Y}$	$\frac{R}{Y}$	R	Y
71, 72	←	←	←	←	←	←	←	←
81	R	R	R	R	R	G	R	R
82	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	$\frac{R}{Y}$	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	W	DW	W	DRK

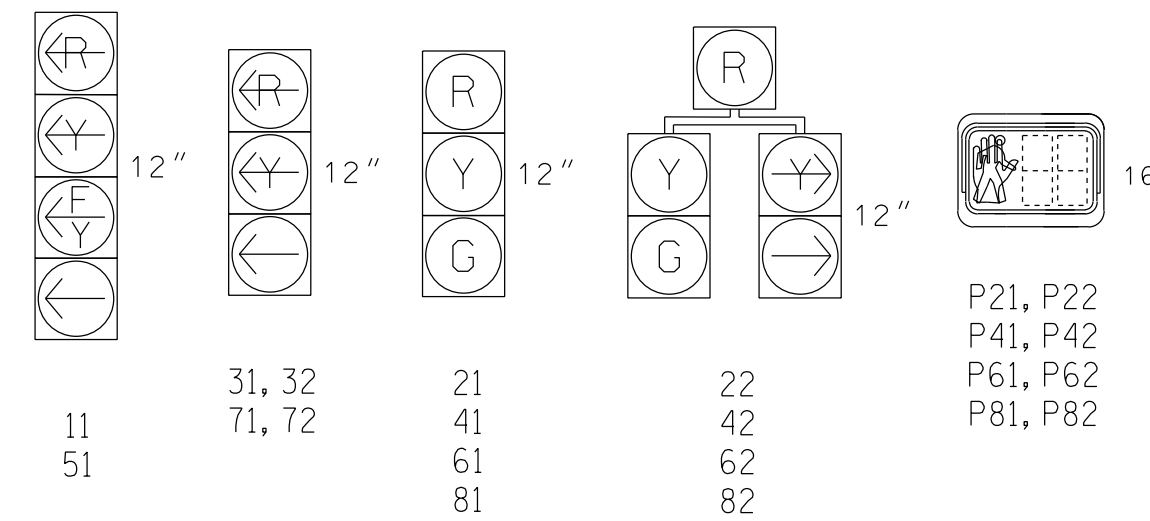
8 Phase Fully Actuated (Burlington-Graham Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- 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.
- The 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.

SIGNAL FACE I.D.

All Heads L.E.D.



ASC/3 TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	0	4	0	4	0	4	0	4
Ped Clear	0	21	0	22	0	22	0	23
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	20	90	20	30	20	90	30	30
Yellow	3.0	4.3	3.0	3.9	3.0	4.3	3.0	3.9
Red Clear	3.5	2.3	3.2	2.4	3.6	2.3	3.2	2.4
Actuations B4 Add *	-	0	-	-	-	0	-	-
Seconds /Actuation *	-	1.8	-	-	-	1.8	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	VEH RECALL	-	-	-	VEH RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	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.

Signal Upgrade - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	Prepared for the Offices of: US 70 (S. Church Street) at SR 1301 (S. Williamson Avenue/ St. Marks Church Road)		
	Division 7 Alamance County Burlington		
	PLAN DATE: April 2018 PREPARED BY: JA Wiles	REVIEWED BY: PL Alexander REVIEWED BY:	

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 160
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBEEES #F-0326

750 N. Greenfield Pkwy, Garner, NC 27529
 SCALE
 NTS

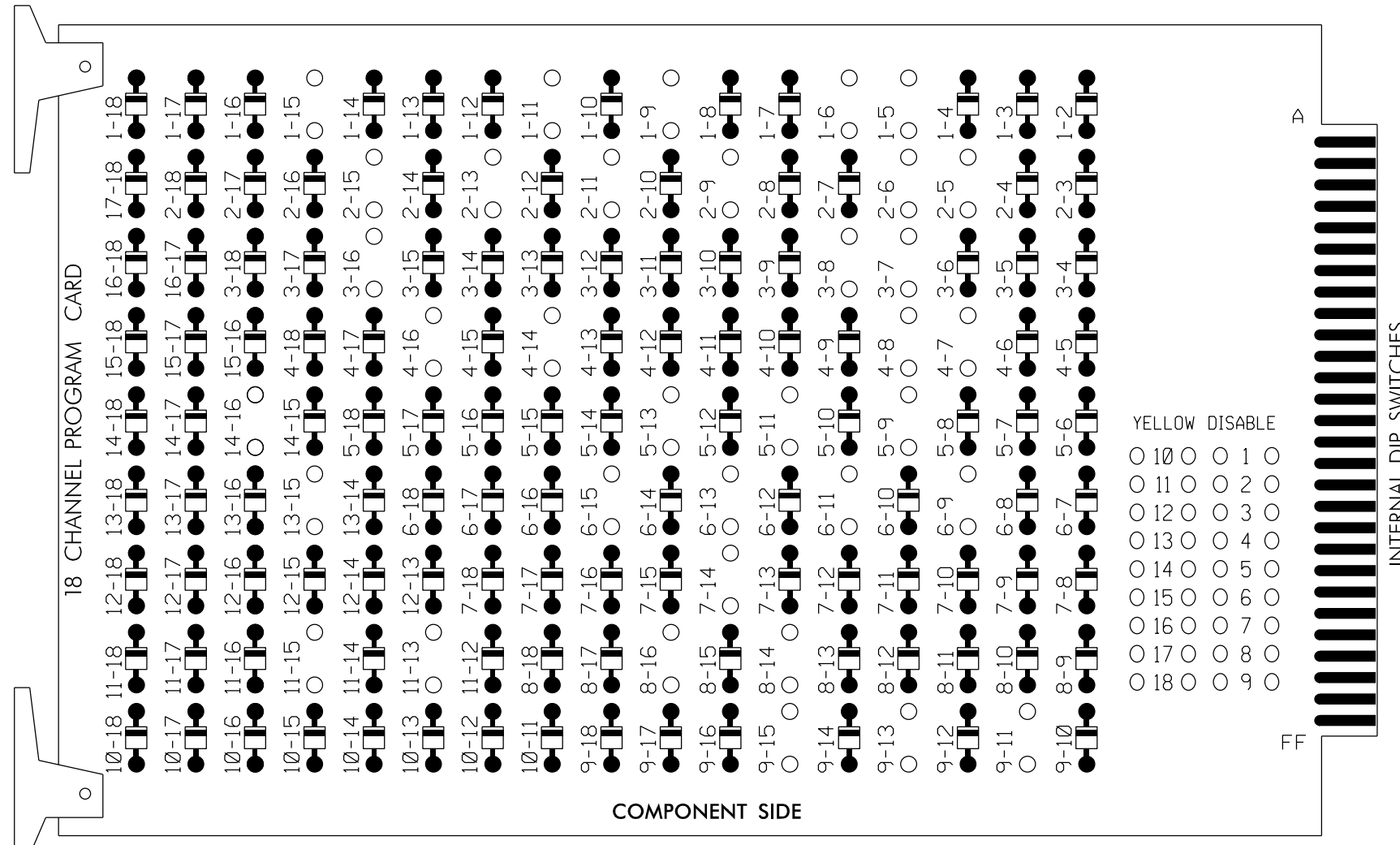
REVISIONS _____ _____ _____	INIT. DATE _____
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 ALEX3361 AT LUS340649

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

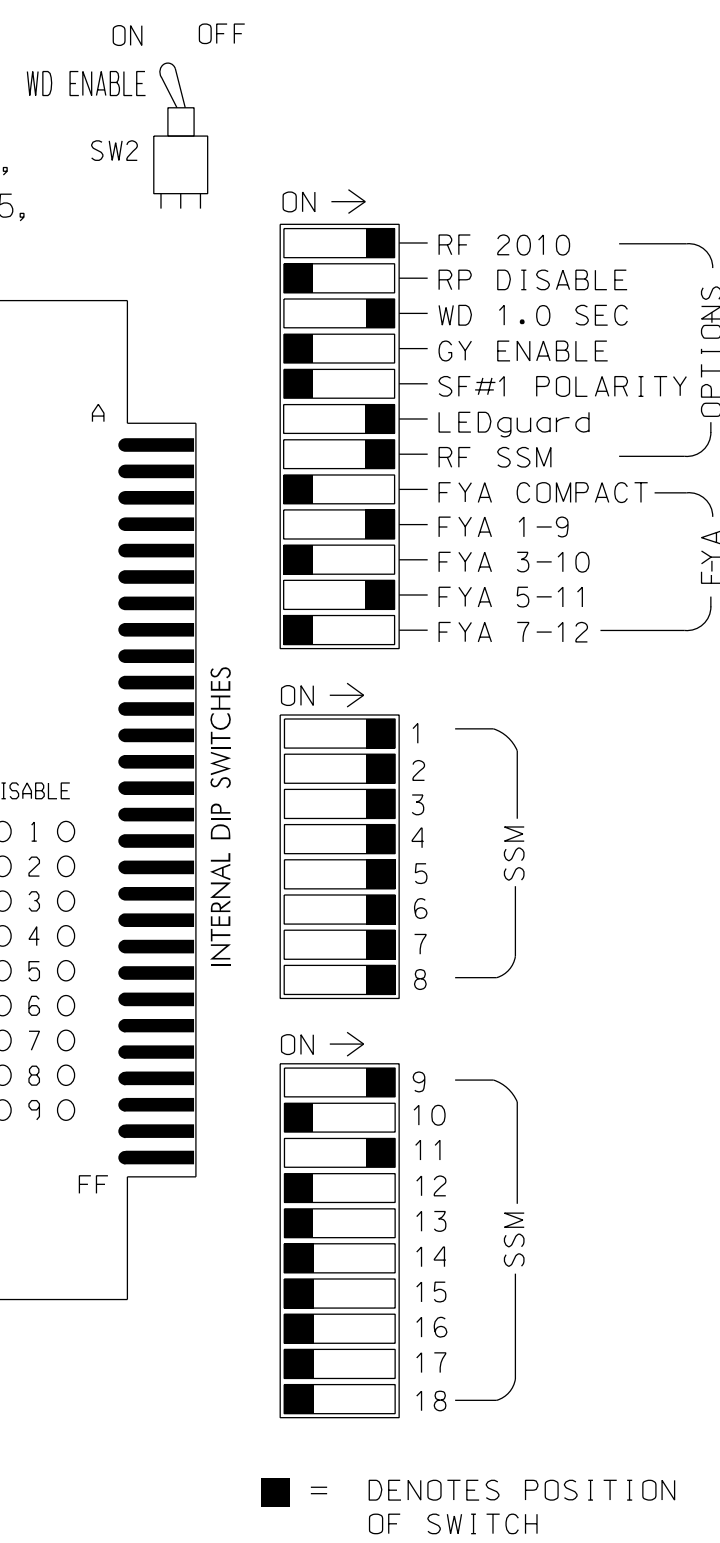
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-7, 3-8, 3-16, 4-7, 4-8, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 7-14, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15 and 14-16.



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.
- 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 phase 2 Walk and 6 Walk.
- The cabinet and controller are part of the Burlington-Graham 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 S10,S11,S12,AUX S1,AUX S4
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,
 S10,S11,S12,AUX S1,AUX S4
 PHASES USED.....1,2,3,4,5,6,7,8,2PED,4PED,
 6PED,8PED
 OVERLAP "A".....*
 OVERLAP "B".....NOT USED
 OVERLAP "C".....*
 OVERLAP "D".....NOT USED
 * See overlap programming detail on sheet 2

PROJECT REFERENCE NO.	SHEET NO.
U-6015	Sig. 53.2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22	P21, P22	22	31,32	41,42	P41, P42	42	51	61,62	P61, P62	62	71,72	81,82	P81, P82	11	NU
RED	*	128			101			*	134		107							
YELLOW		129			102				135		108							
GREEN		130			103				136		109							
RED ARROW				116						122		A121				A114		
YELLOW ARROW	126			117	117			132		123	123	A122				A115		
FLASHING YELLOW ARROW												A123				A116		
GREEN ARROW	127	127		118	118			133	133	124	124							
Hand				113				104				119				110		
Walking				115				106				121				112		

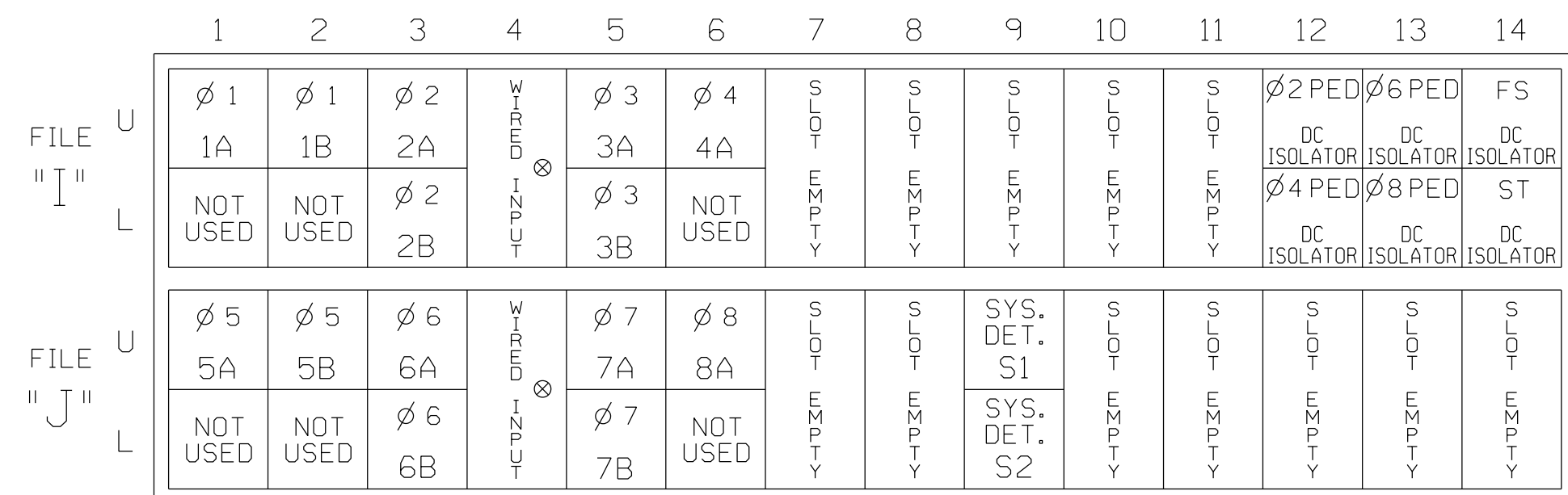
NU = Not Used

* 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

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	ADDED INITIAL	DETECTOR TYPE
1A ¹	TB2-1,2	I1U	56	1 ★	1	YES		15		S
	-	J4U	48	26 ★	6	YES		3		G
1B	TB2-5,6	I2U	39	2	1	YES		15		S
	2A	TB2-9,10	I3U	63	2	YES			X	N
2B	TB2-11,12	I3L	76	42	2	YES			X	N
	3A	TB4-5,6	I5U	58	3	YES				S
3B	TB4-7,8	I5L	58	3	3	YES				S
	4A	TB4-9,10	I6U	41	4	YES				S
5A ²	TB3-1,2	J1U	55	5 ★	5	YES		15		S
	-	I4U	47	22 ★	2	YES		3		G
5B	TB3-5,6	J2U	40	6	5	YES		15		S
	6A	TB3-9,10	J3U	64	36	6	YES		X	N
6B	TB3-11,12	J3L	77	46	6	YES			X	N
	7A	TB5-5,6	J5U	57	7	YES				S
7B	TB5-7,8	J5L	57	7	7	YES				S
	8A	TB5-9,10	J6U	42	8	YES				S
* S1	TB7-9,10	J9U	59	15	SYS	NO				N
* S2	TB7-11,12	J9L	61	17	SYS	NO				N

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

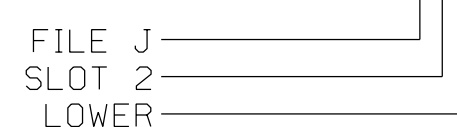
* System detector only. Remove any assigned vehicle phase.

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

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

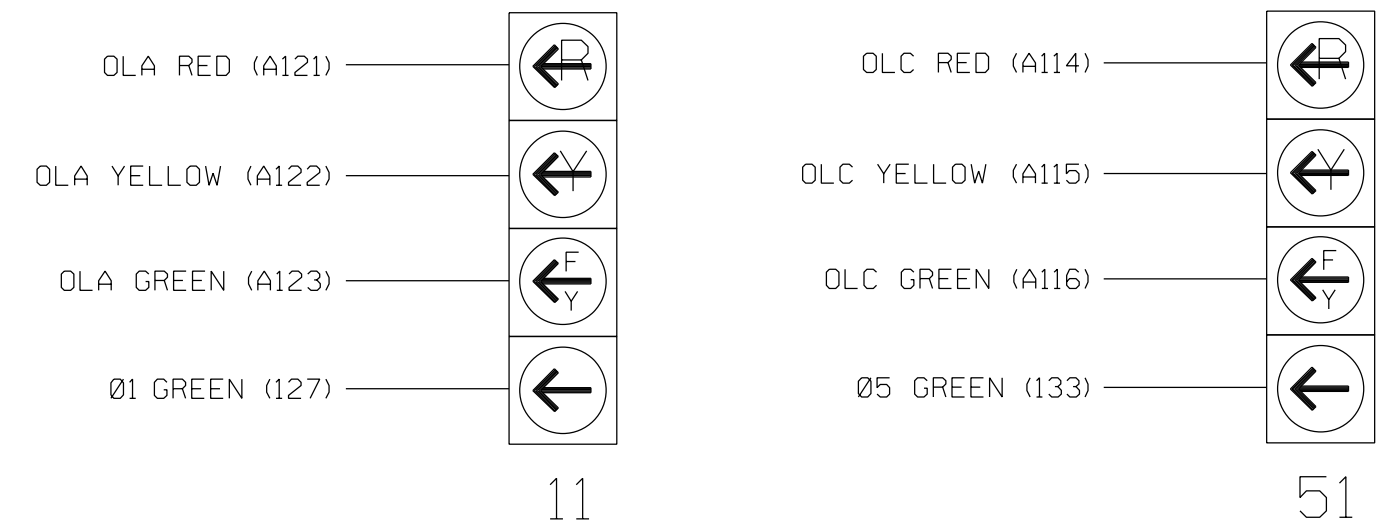
★ See the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L



FYA PPLT 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.

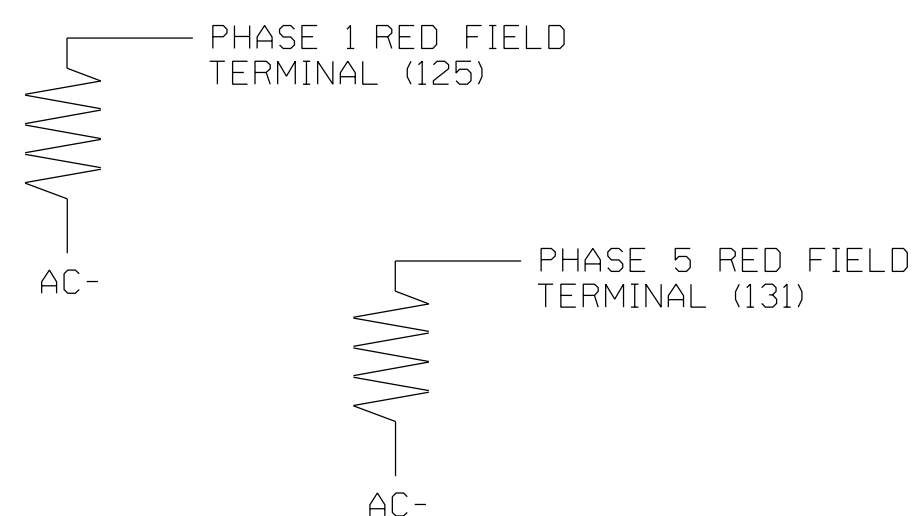
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0115
 DESIGNED: April 2018
 SEALED: 6/7/2018
 REVISED: N/A

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)



Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 	US 70 (S. Church Street) at SR 1301 (S. Williamson Avenue/ St. Marks Church Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER PAMELA L. ALEXANDER SEAL 023489
	Division 7 PLAN DATE: April 2018 PREPARED BY: JA Wiles	Alamance County REVIEWED BY: PL Alexander REVIEWED BY:	
REVISIONS INIT. DATE			SIG. INVENTORY NO. 07-0115

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