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Project: I-5714 / U-5114

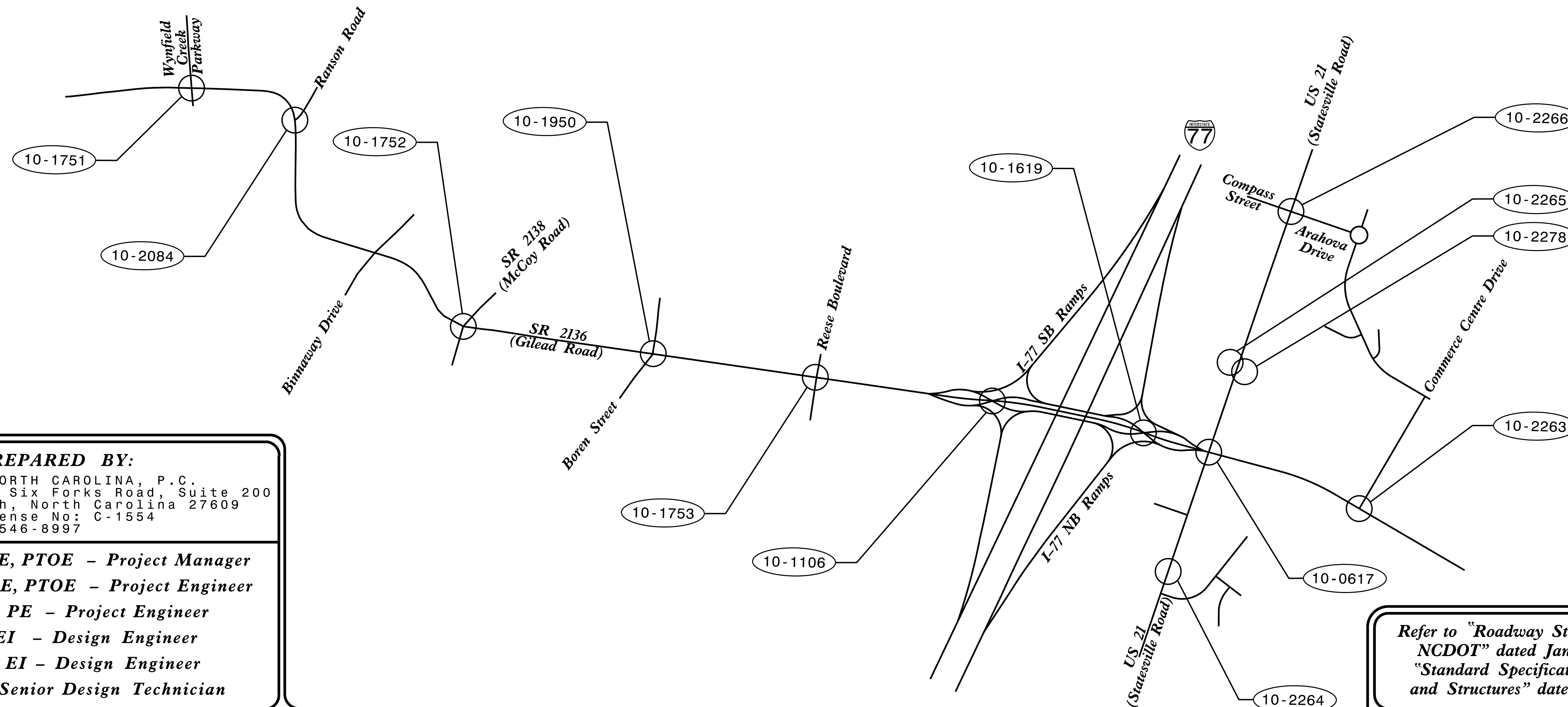
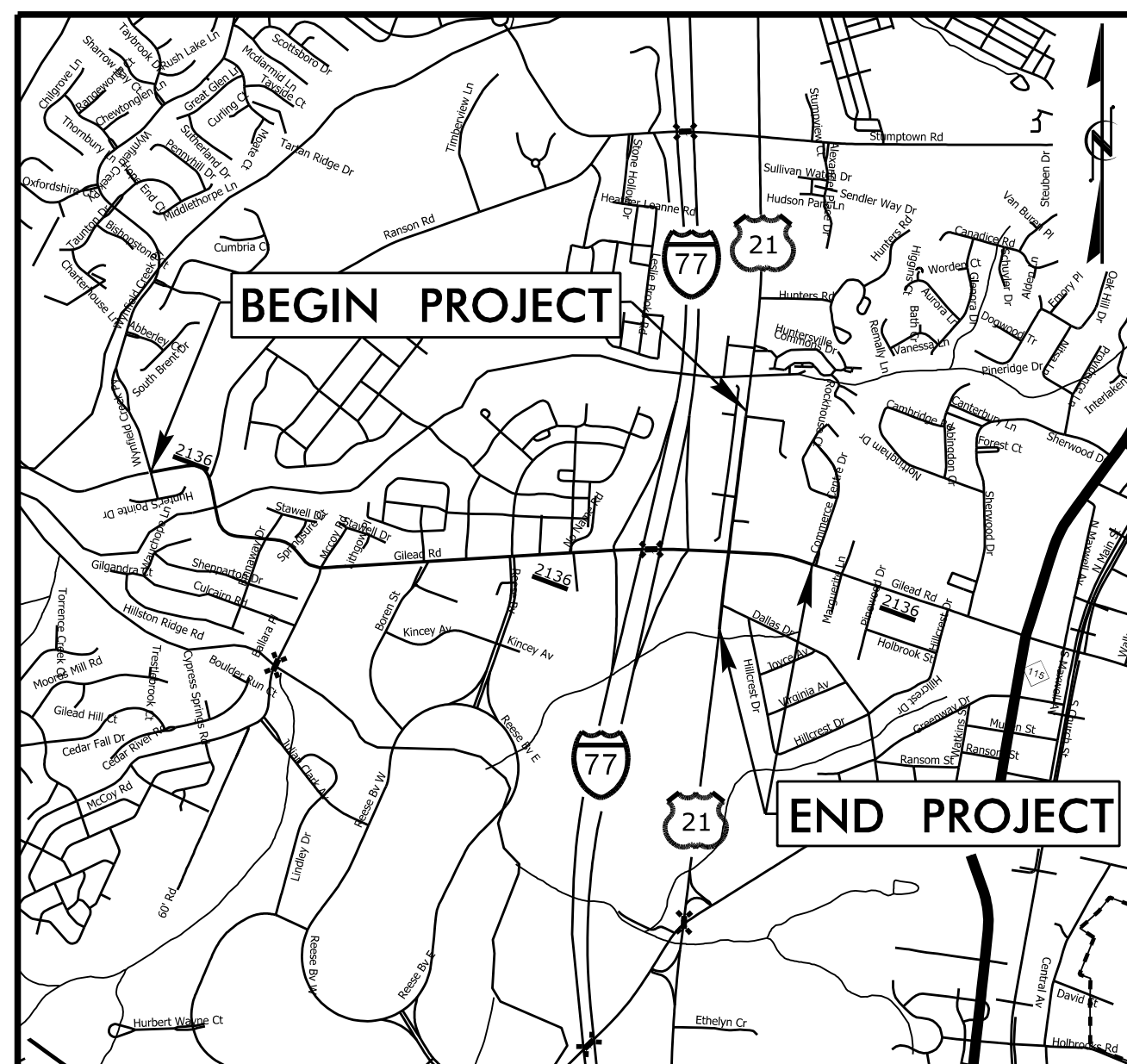
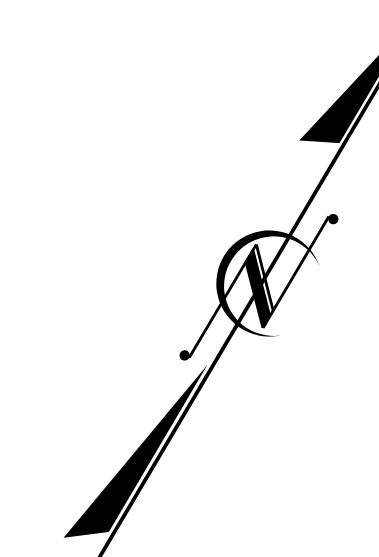
Contract: C204104

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MECKLENBURG COUNTY

**LOCATION: I-77 AT SR 2136 (GILEAD RD) INTERCHANGE,
US 21 (STATESVILLE RD) AND SR 2136 (GILEAD RD)**

**TYPE OF WORK: TRAFFIC SIGNALS, CCTV CAMERAS, FIBER OPTIC CABLE
AND WIRELESS COMMUNICATION PLANS**



PLANS PREPARED BY:

HNTB
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343 E. Six Forks Road, Suite 200
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Andrew D. Klinksiek, PE, PTOE - Project Engineer
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John A. Wagner, EI - Design Engineer
James T. Thibault, EI - Design Engineer
Tracey R. Terrell - Senior Design Technician

Sheet #	Reference #	Index of Plans	Location/Description
Sig. 1.0	-----	Title Sheet	
Sig. 2.0-2.1	10-1751	SR 2136 (Gilead Road) at Wynfield Creek Parkway	
Sig. 3.0-3.4	10-2084	SR 2136 (Gilead Road) at Ranson Road	
Sig. 4.0-4.2	10-1752	SR 2136 (Gilead Road) at SR 2138 (McCoy Road)	
Sig. 5.0-5.1	10-1950	SR 2136 (Gilead Road) at Boren Street	
Sig. 6.0-9.2	10-1753	SR 2136 (Gilead Road) at Reese Boulevard	
Sig. 10.0-14.4	10-1106	SR 2136 (Gilead Road) at I-77 SB Ramps	
Sig. 15.0-19.4	10-1619	SR 2136 (Gilead Road) at I-77 NB Ramps	
Sig. 20.0-24.1	10-0617	SR 2136 (Gilead Road) at US 21 (Statesville Road)	
Sig. 25.0	-----	Standard Drawings for Electrical Service Grounding and Wood Poles	
Sig. 26.0	-----	Standard Drawings for Pedestals	
Sig. M1-M8	-----	Standard Drawings for Metal Poles	
SCP. 1-24	-----	Signal Communication Plans	

LEGEND

##-###
SIGNAL INVENTORY NUMBER

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

Tim Williams, PE - Western Region Signals Engineer
Todd Joyce, PE - Signal Equipment Design Engineer
Neil Avery - Signal Communications Project Engineer

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SEAL

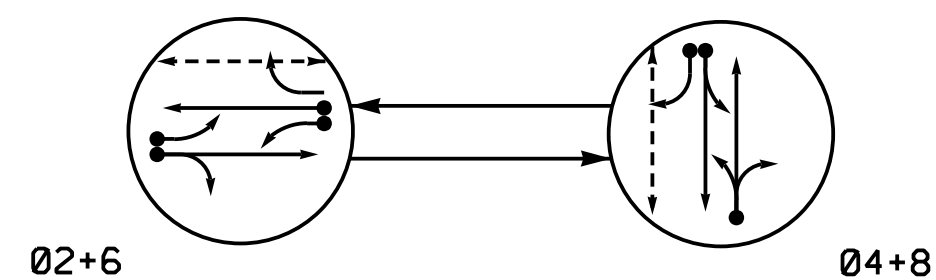
DocuSigned by:
Natasha R. Simmons 4/23/2018
SIGNATURE DATE

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

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

750 N. Greenfield Parkway, Garner, NC 27529

PHASING DIAGRAM



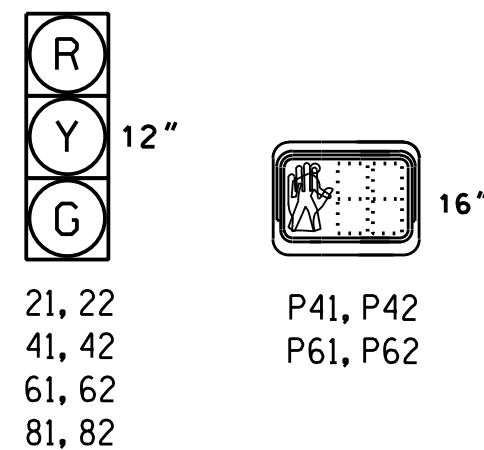
PHASING DIAGRAM DETECTION LEGEND

- ←●→ 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
P41, P42	DW	W	DRK
P61, P62	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

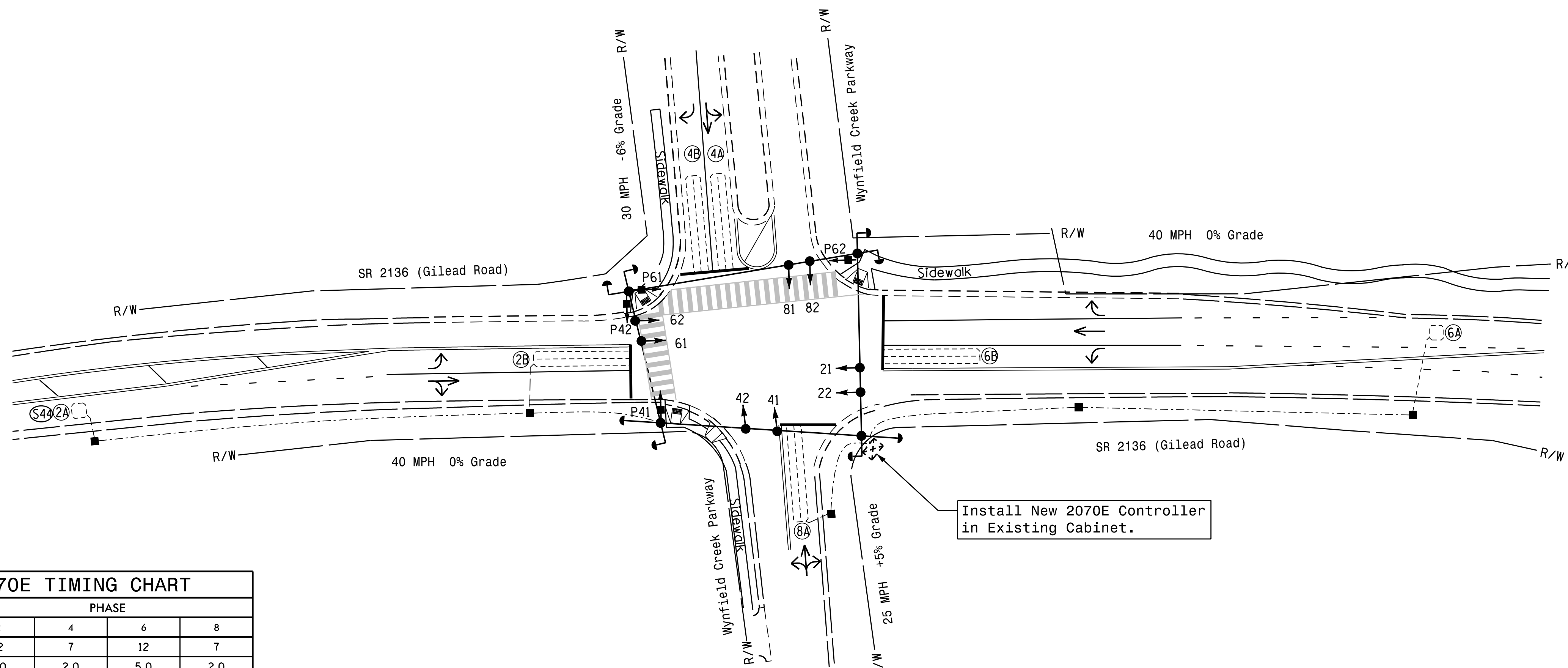


LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A/S44	6X6	225	4	-	2	Y	Y	-	-	-	Y	-
2B	6X40	0	2-4-2	-	2	Y	Y	Y	-	5	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X40	0	2-4-2	-	4	Y	Y	-	-	15	-	-
6A	6X6	225	4	-	6	Y	Y	-	-	-	-	-
6B	6X40	0	2-4-2	-	6	Y	Y	Y	-	5	-	-
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	-

2 Phase Fully Actuated Gilead Road Closed Loop 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.
- 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.
- Closed loop system data: Controller Asset #1751.

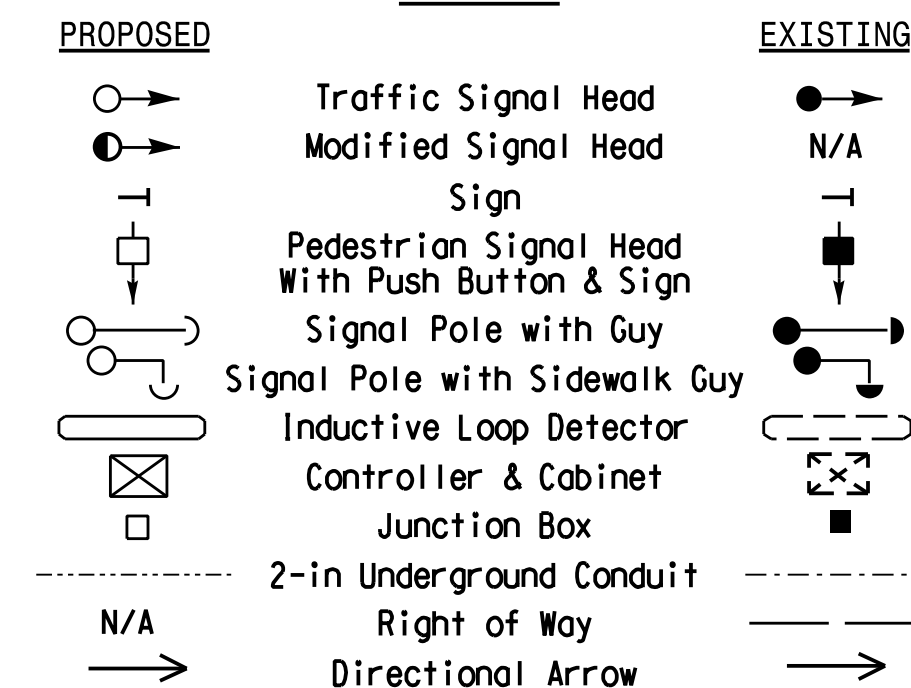


Install New 2070E Controller in Existing Cabinet.

FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	12	7	12	7
Extension 1 *	5.0	2.0	5.0	2.0
Max Green 1 *	90	30	90	30
Yellow Clearance	4.2	3.9	4.2	3.0
Red Clearance	1.4	1.3	1.6	2.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	7	7	-
Don't Walk 1	-	8	20	-
Seconds Per Actuation *	2.5	-	2.5	-
Max Variable Initial *	27	-	27	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND



Signal Upgrade

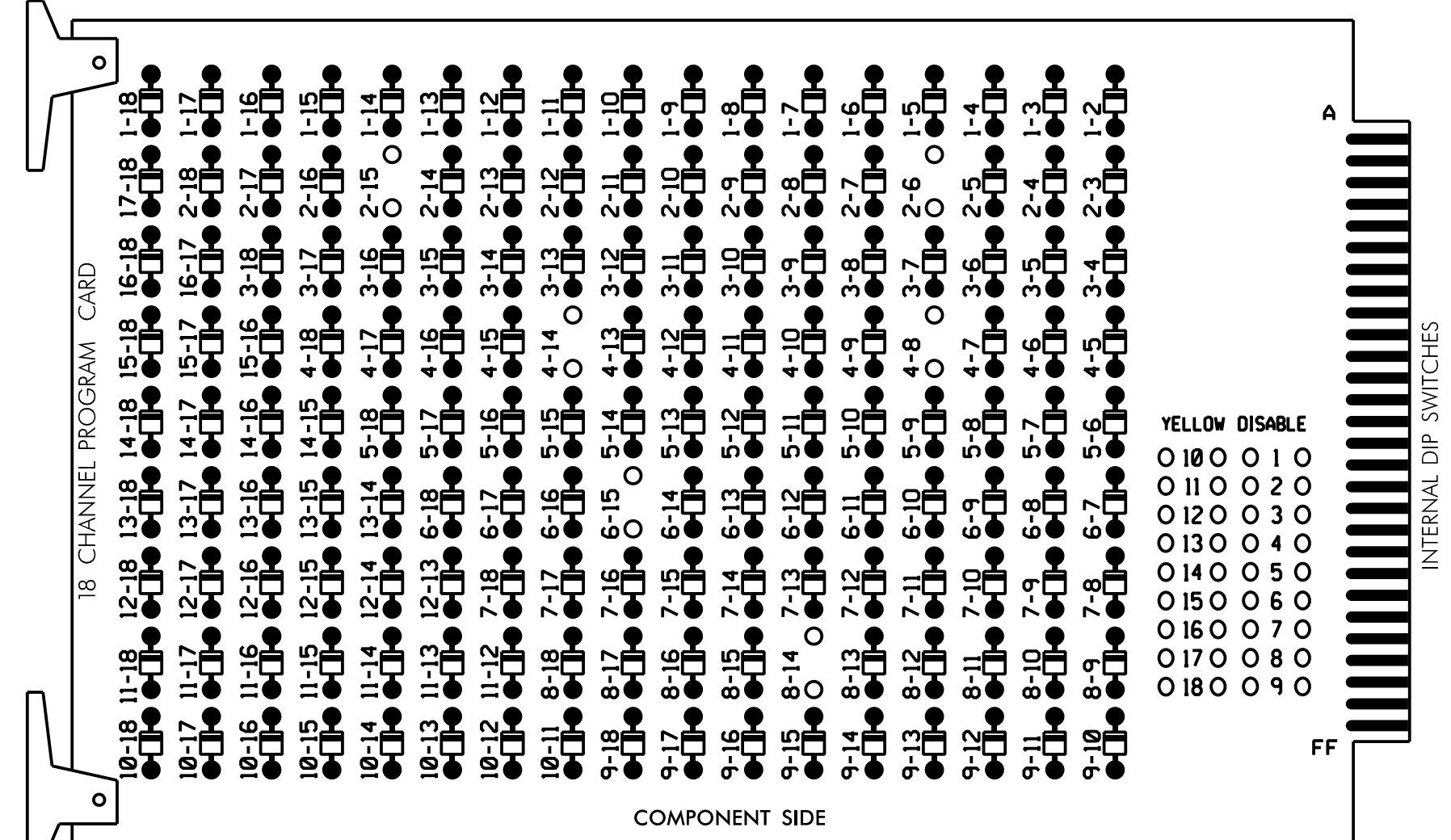
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at Wynfield Creek Parkway		
	Division 10 Mecklenburg Co., Huntersville PLAN DATE: December 2017 PREPARED BY: J.T. Thibault	REVIEWED BY: A.D. Klinsky REVIEWED BY: N.R. Simmons	
750 N. Greenfield Pkwy, Corner, NC 27528 HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	SCALE 0 30 1"=30'		REVISIONS INIT. DATE 4/23/2018 Signature: Natasha R. Simmons DATE: _____ SIG. INVENTORY NO. 10-1751

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

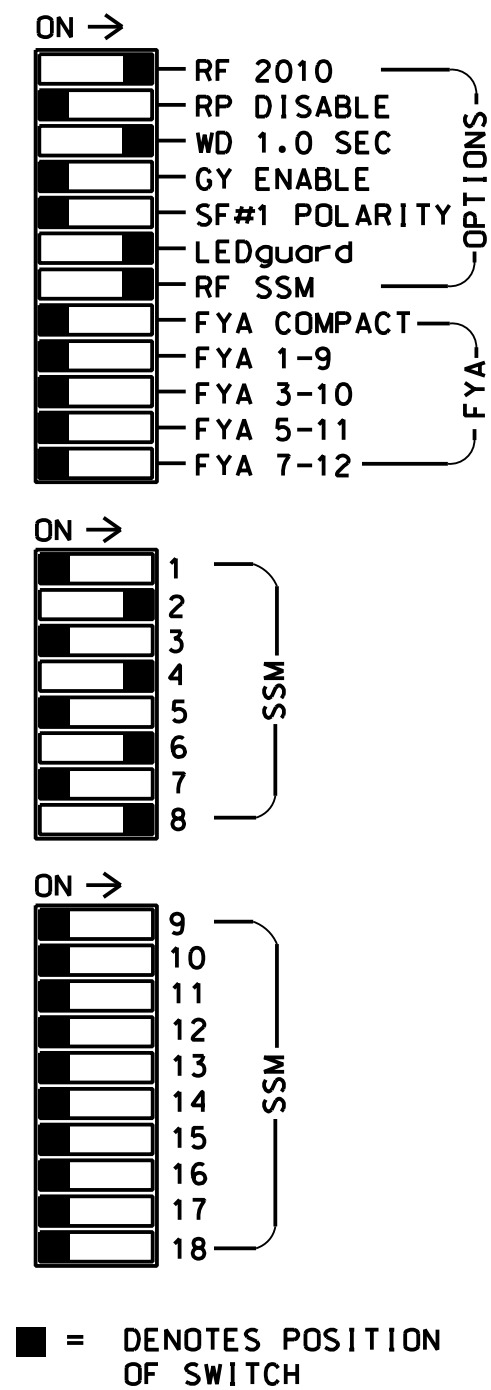
REMOVE DIODE JUMPERS 2-6, 2-15, 4-8, 4-14, 6-15 and 8-14.



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.



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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 4 and 6 for Startup Ped Call.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Gilead Road Closed Loop 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	P41, P42	NU	61,62	P61, P62	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
FLASHING YELLOW ARROW												
GREEN ARROW												
Hand icon							104		119			
Walking person icon							106		121			

NU = Not Used

EQUIPMENT INFORMATION

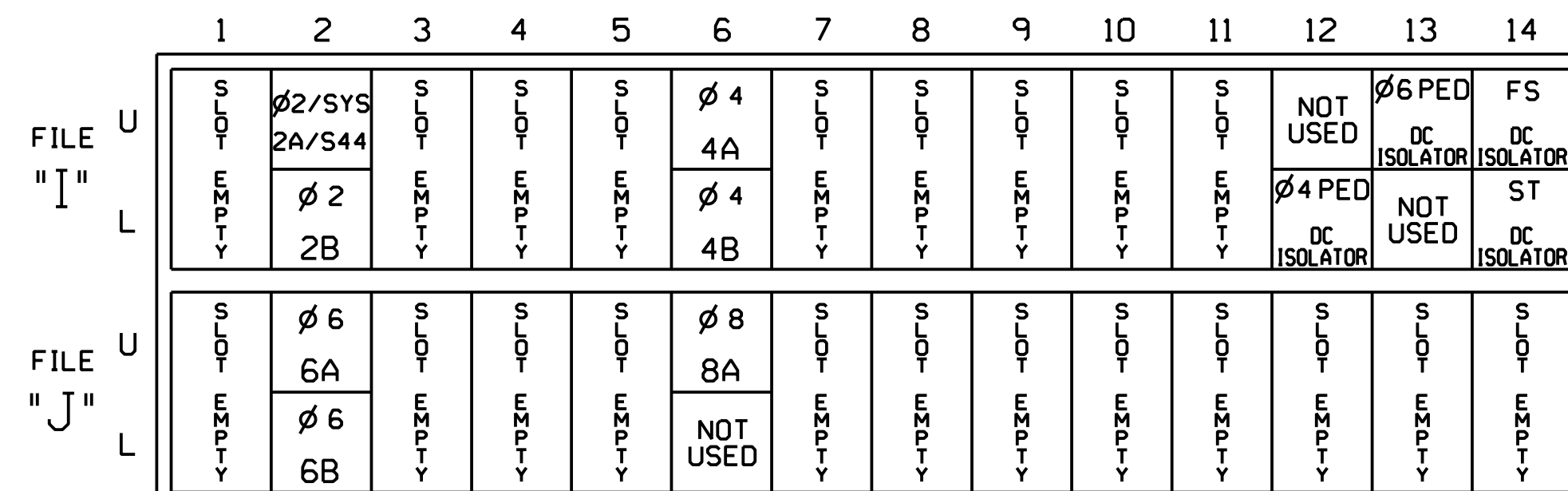
CONTROLLER.....2070E
 CABINET.....EXISTING 332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S6,S8,S9,S11
 PHASES USED.....2,4,4 PED,6,6 PED,8
 OVERLAPS.....NONE

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

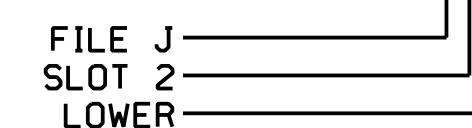
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S44	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y	Y		5
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y	Y		5
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31		PED 4	4 PED				
P61,P62	TB8-7,9	I13U	68	30		PED 6	6 PED				

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

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1751
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:

HNTB

SR 2136 (Gilead Road)
 at
 Wynfield Creek Parkway

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
 PREPARED BY: J.T. Thibault REVIEWED BY: N.R. Simmons

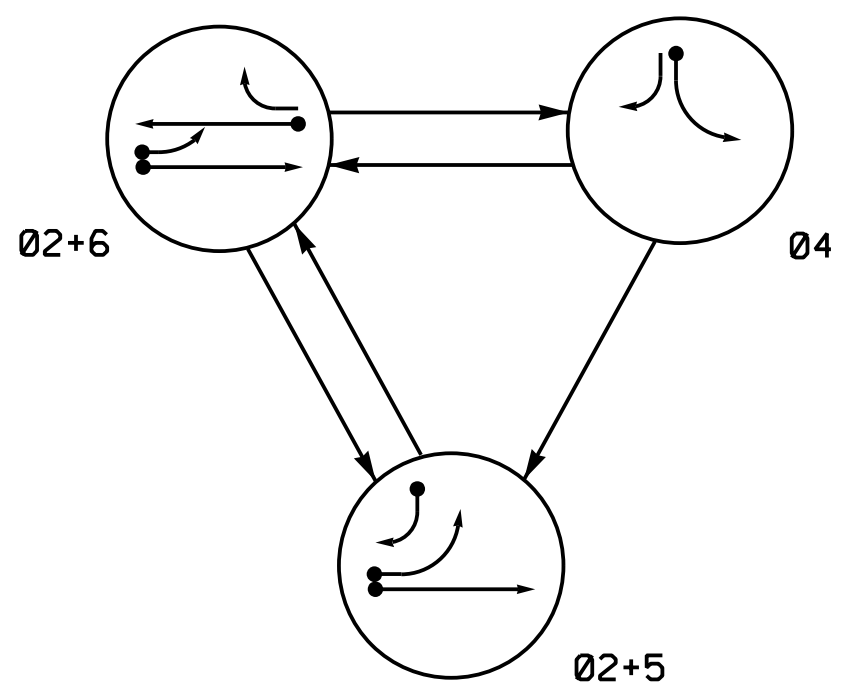
REVISIONS	INIT.	DATE

SEAL

DocuSigned by:
 Natasha R. Simmons
 DATE: 4/23/2018
 SIGNATURE
 DATE
 SIG. INVENTORY NO. 10-1751

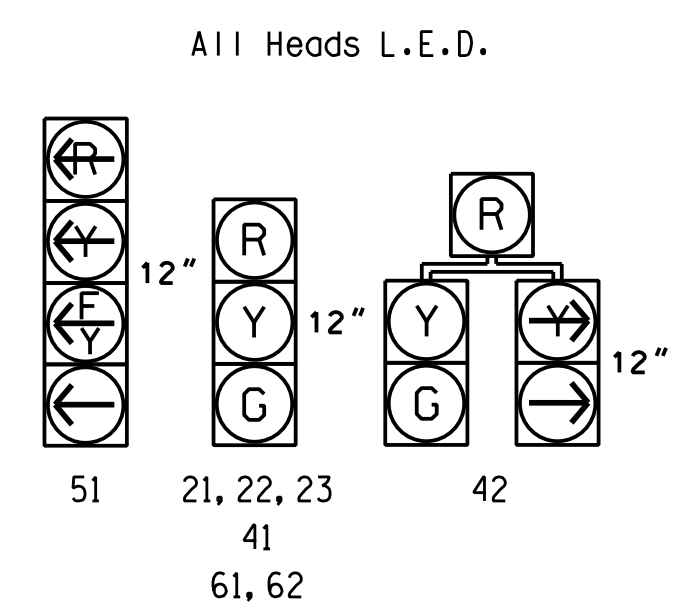
HNTB HNTB NORTH CAROLINA, P.C.
 343 E. Six Forks Road, Suite 200
 Raleigh, North Carolina 27609
 NC License No: C-1554
 (919) 546-8997

DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02+5	02+6	04	F-L-STOP
21, 22, 23	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	-	Y	FR	Y
61, 62	R	G	R	Y

SIGNAL FACE I.D.



INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A/S42	6X6	250	4	-	2	Y	Y	-	-	-	Y	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15*	-	-
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	25	-	-
6A/S43	6X6	220	4	-	6	Y	Y	-	-	-	Y	-

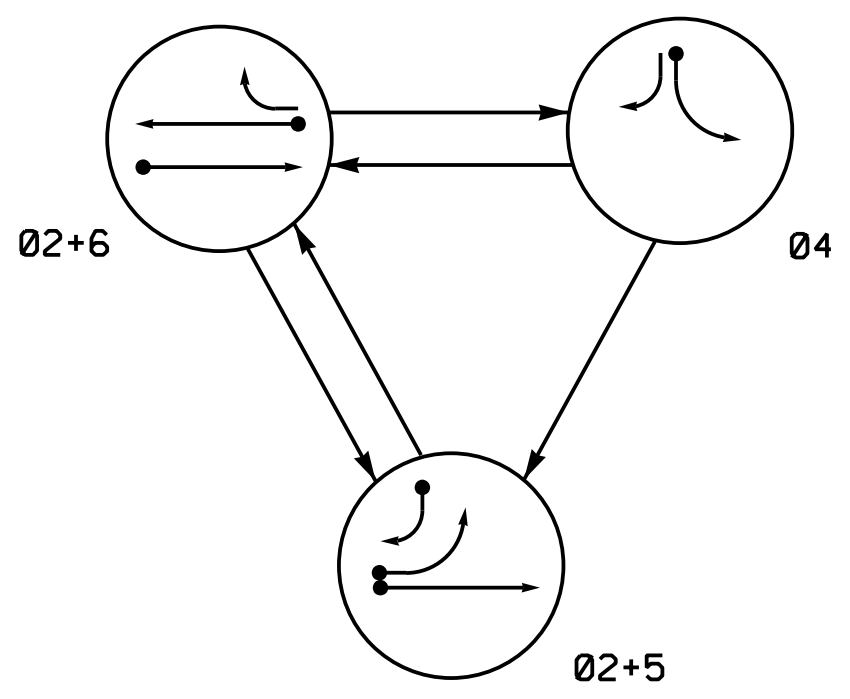
* Program Phase 5 Delay Time To 3 Seconds During Alternate Phasing Operation.
 ** Disable Phase 2 Call During Alternate Phasing Operation.

3 Phase Fully Actuated Gilead Road Closed Loop 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 5 may be lagged.
4. Set all detector units to presence mode.
5. The Division Traffic Engineer will determine the hours of use for each phasing plan.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data: Controller Asset #2084.

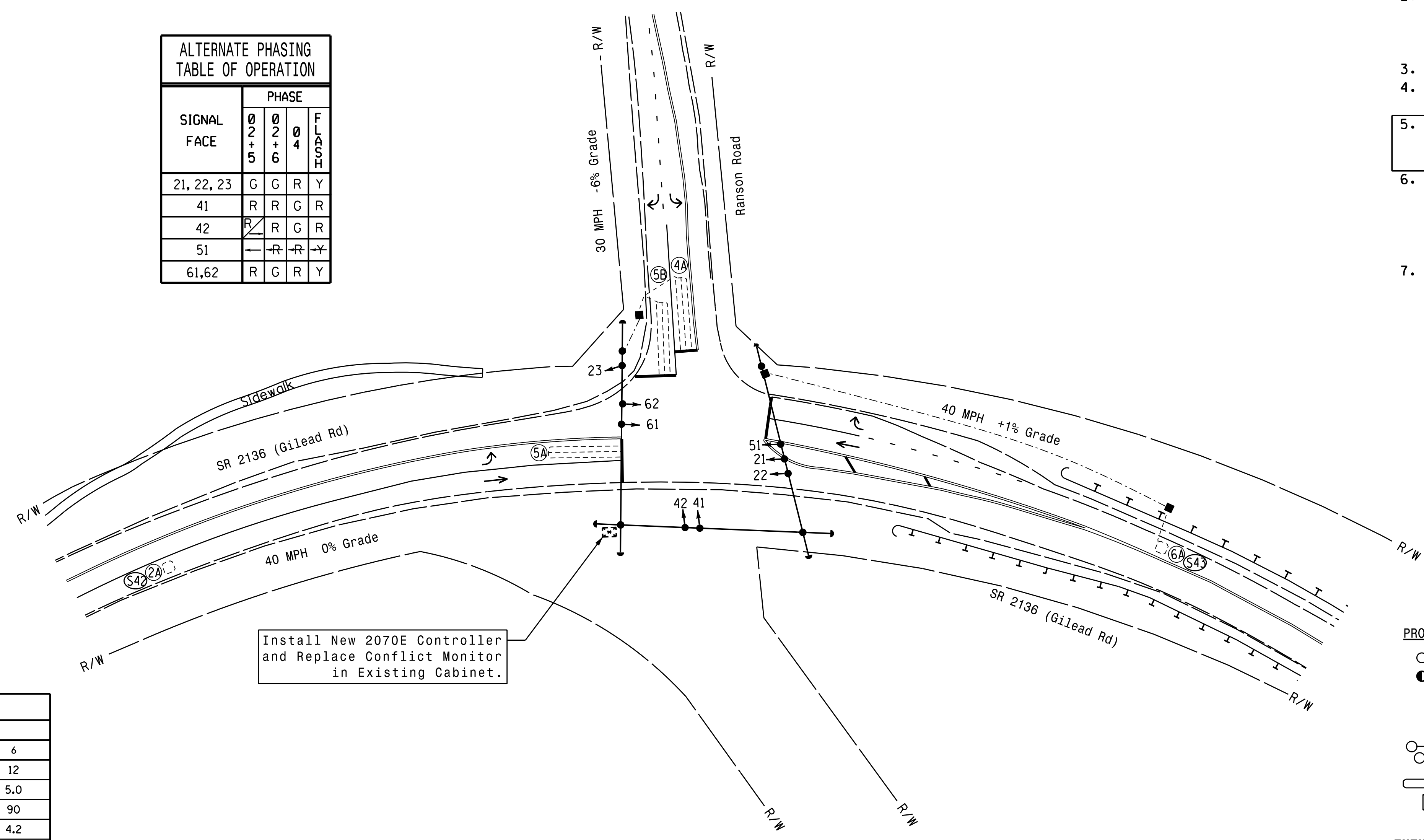
ALTERNATE PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02+5	02+6	04	F-L-STOP
21, 22, 23	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	-	FR	FR	Y
61, 62	R	G	R	Y

PHASING DIAGRAM DETECTION LEGEND

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



Install New 2070E Controller and Replace Conflict Monitor in Existing Cabinet.

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	12	7	7	12
Extension 1 *	5.0	2.0	2.0	5.0
Max Green 1 *	90	30	25	90
Yellow Clearance	4.2	3.1	3.0	4.2
Red Clearance	1.2	2.3	2.1	1.2
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5
Max Variable Initial *	29	-	-	26
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

PROPOSED		EXISTING	
○	Traffic Signal Head	●	N/A
○	Modified Signal Head	-	N/A
⊥	Sign	⊥	N/A
⊥	Pedestrian Signal Head With Push Button & Sign	⊥	N/A
⊥	Signal Pole with Guy	⊥	N/A
⊥	Signal Pole with Sidewalk Guy	⊥	N/A
⊥	Inductive Loop Detector	⊥	N/A
⊥	Controller & Cabinet	⊥	N/A
⊥	Junction Box	⊥	N/A
⊥	2-in Underground Conduit	⊥	N/A
- - -	Right of Way	- - -	N/A
→	Directional Arrow	→	N/A
- - -	Guardrail	- - -	N/A

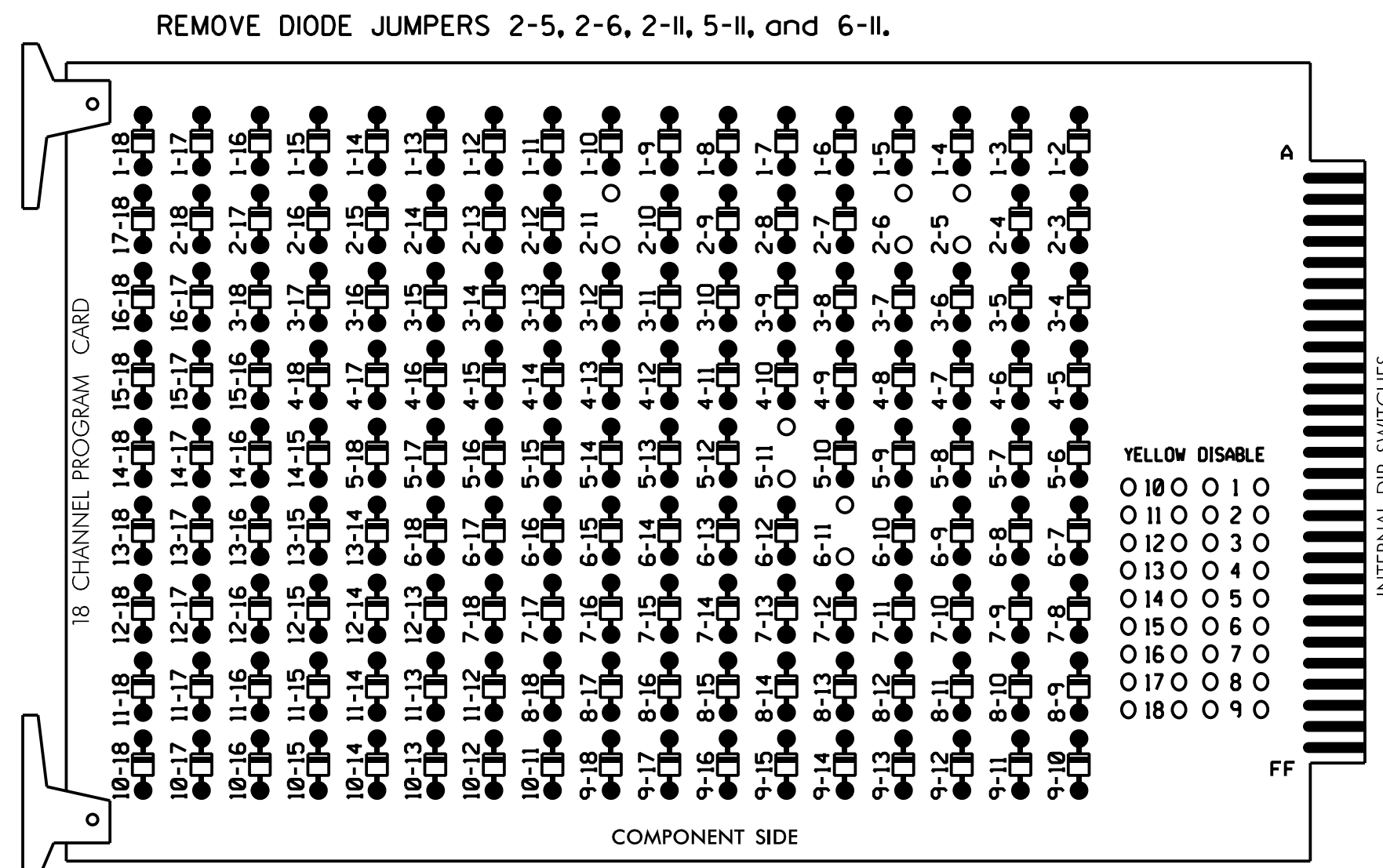
Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at Ranson Road		
	Division 10 Mecklenburg Co., Huntersville PLAN DATE: December 2017 PREPARED BY: J.T. Thibault	REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons	
HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	SCALE 0 40 1"=40'	REVISIONS INIT. DATE	Documented by: 4/23/2018 Signature: _____ DATE: _____ SIG. INVENTORY NO. 10-2084

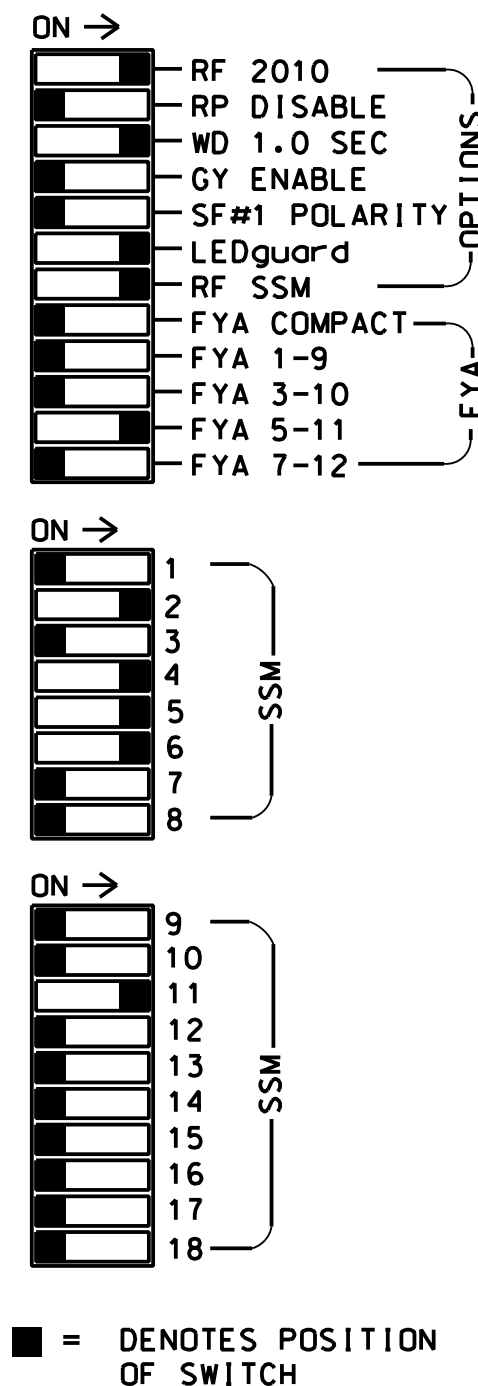
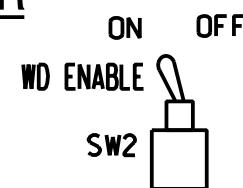
EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(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 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Ensure that jumper SEL9 is removed from the monitor board.



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.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1, 3, 7, 8, 9, 10, 12, 13, 14, 15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....EXISTING 332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S4,S5,S6,S12
 PHASES USED.....2,4,5,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	41,42	NU	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																		
Person icon																		

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 "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	S	∅2/SYS	S	S	S	∅4	S	S	S	S	S	S	S	FS
L	NOT USED	2A/S42	NOT USED	NOT USED	NOT USED	4A	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR
U	∅5	∅6/SYS	S	S	S	S	S	S	S	S	S	S	S	S
L	NOT USED	5A	6A/S43	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	DC ISOLATOR
		5B	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

⊗ Wired Input - Do not populate slot with detector card

FS = FLASH SENSE
 ST = STOP TIME

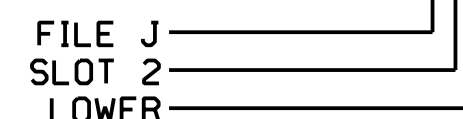
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S42	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9★	22	2	Y	Y	Y		3
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			25
6A/S43	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			

¹ Add jumper from J1-W to 14-W, on rear of input file.

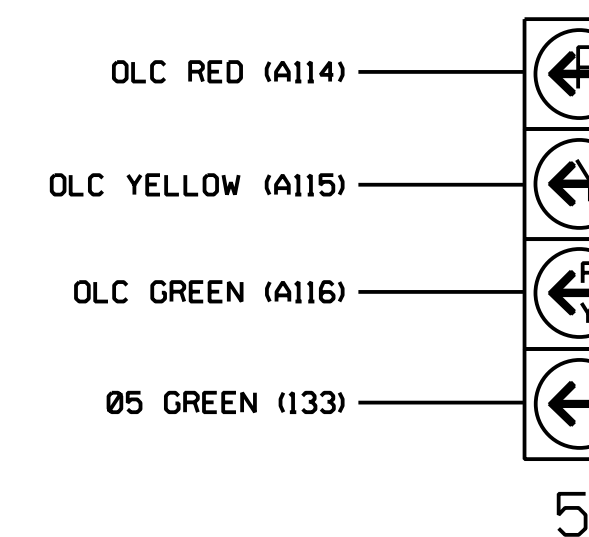
★ See Input Page Assignment programming details on sheet 3.

INPUT FILE POSITION LEGEND: J2L



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



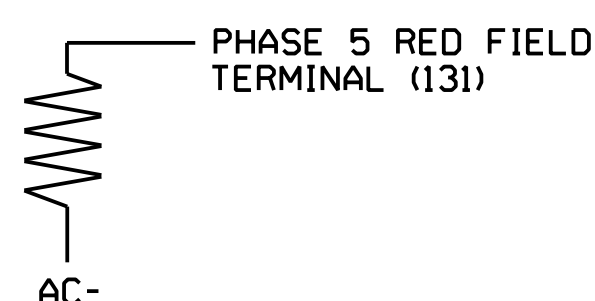
NOTE

The sequence display for this signal requires special logic programming. See sheet 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

Electrical Detail - Sheet 1 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:
 Prepared in the Offices of:

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

SR 2136 (Gilead Road) at Ranson Road	
Division 10	Mecklenburg Co. Huntersville
PLAN DATE: December 2017	REVIEWED BY: A.D. Klinksiek
PREPARED BY: J.T. Thibault	REVIEWED BY: N.R. Simmons
REVISIONS	INIT. DATE

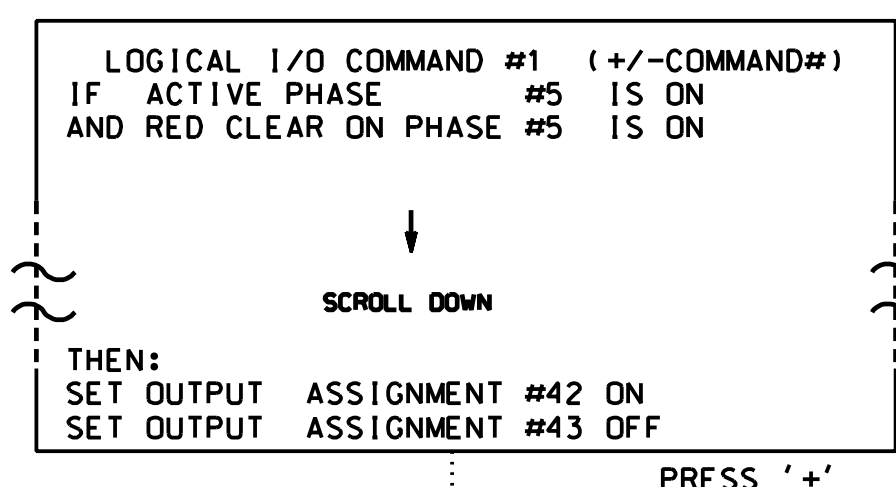
SEAL

 SEAL 031464
 NATASHA R. SIMMONS
 ENGINEER

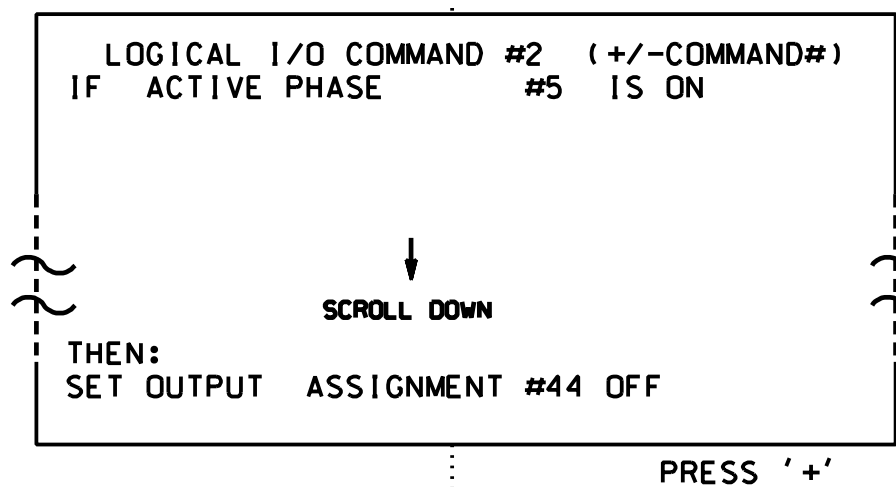
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

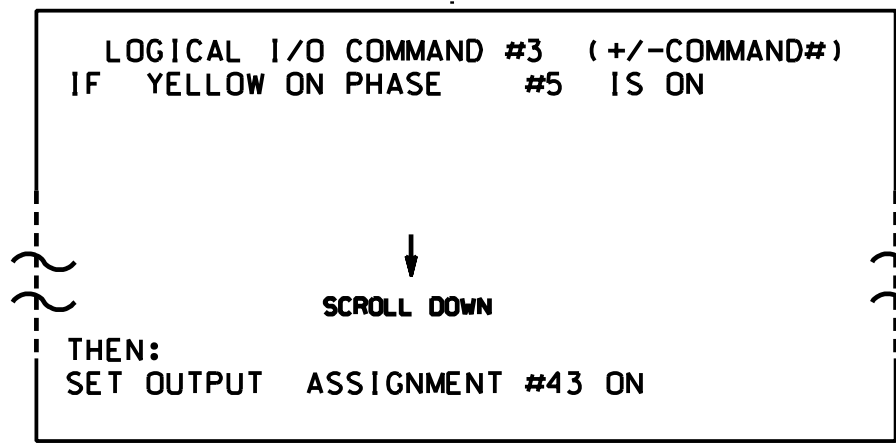
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS), SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 5 (HEAD 51).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING - PAGE 1

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' TWICE

```

    PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
    PHASE:      12345678910111213141516
    VEH OVL PARENTS: XX
    VEH OVL NOT VEH:
    VEH OVL NOT PED:
    VEH OVL GRN EXT:
    STARTUP COLOR: _ RED _ YELLOW _ GREEN
    FLASH COLORS:  _ RED _ YELLOW X GREEN
    SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
    FLASH YELLOW IN CONTROLLER FLASH?...Y
    GREEN EXTENSION (0-255 SEC)...0
    YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
    RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
    OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING - PAGE 2

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

PRESS '+' TWICE

```

    PAGE 2: VEHICLE OVERLAP 'C' SETTINGS
    PHASE:      12345678910111213141516
    VEH OVL PARENTS: X
    VEH OVL NOT VEH:
    VEH OVL NOT PED:
    VEH OVL GRN EXT:
    STARTUP COLOR: _ RED _ YELLOW _ GREEN
    FLASH COLORS:  _ RED _ YELLOW _ GREEN
    SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
    FLASH YELLOW IN CONTROLLER FLASH?...Y
    GREEN EXTENSION (0-255 SEC)...0
    YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
    RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
    OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

NOTICE PAGE 2 →

OVERLAP PROGRAMMING COMPLETE

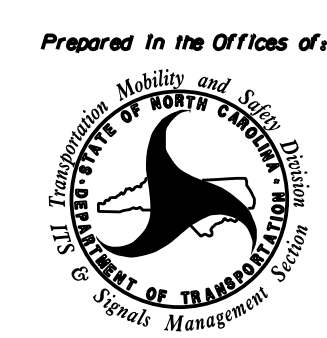
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2084
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 2 of 4

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:


Prepared in the Offices of:



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

SR 2136 (Gilead Road) at Ranson Road	
Division 10 Mecklenburg Co. Huntersville	
PLAN DATE: December 2017	REVIEWED BY: A.D. Klinksiek
PREPARED BY: J.T. Thibault	REVIEWED BY: N.R. Simmons
REVISIONS	INIT. DATE

SEAL



DocuSigned by:
Natasha R. Simmons
4/23/2018

SIGNATURE DATE

SIG. INVENTORY NO. 10-2084

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A

(program controller as shown below)

- NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.
2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #9 (DETECTOR 22) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 2 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 55 TO INPUT #17 SO THAT THE DELAY ON LOOP 5A CAN BE REDUCED FROM 15 SECONDS TO 3 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 9 IS REACHED.

```

PAGE: 2 C1 PIN:47 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....9
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....Y
VEHICLE DETECTOR (1-64).....22
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)... OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)...
    
```

ENTER A 'Y' FOR NOT ENABLED

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 5A - PHASE 2)

```

PAGE: 2 C1 PIN:47 NOT ENABLED
INPUT ASSIGNMENT #.....9
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....Y
VEHICLE DETECTOR (1-64).....
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)... OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)...
    
```

PRESS '+' TO ADVANCE TO INPUT 17

```

PAGE: 2 C1 PIN:55 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....17
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....5
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)... OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)...
    
```

ENTER '55' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 5A - PHASE 5)

```

PAGE: 2 C1 PIN:55 VEHICLE DETECTOR
INPUT ASSIGNMENT #.....17
DEBOUNCE TIME (0-25.5 SEC).....0.5
DELAY TIME (0-25.5 SEC).....0.0
HOLD-OVER TIME (0-25.5 SEC).....0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N).....
VEHICLE DETECTOR (1-64).....55
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE PED DETECTOR (1-16).....
PREEMPT (1-10).....
INVERTED PREEMPT (1-10).....
STOP TIME (Y/N).....
FLASH SENSE (Y/N).....
DOOR OPEN (Y/N).....
MANUAL CONTROL ENABLE (Y/N).....
MANUAL CONTROL ADVANCE (Y/N).....
SPECIAL FUNCTION ALARM (1-8).....
TOD HOUR SYNCHRONIZATION (0-23).....
FORCE OFF RING (1-4).....
HOLD PHASES (1-16).....
PLAN (65=FLSH,66=FREE)... OFFSET#...
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4).....
CHANGE INPUT PAGE (1-4).....
CHANGE OUTPUT PAGE (1-4).....
OVERRIDE PHASE CONTROL FUNCTION (Y)...
    
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 5A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #55.

```

VEHICLE DETECTOR #55 SETTINGS (+,-,1-64)
SETTING: (Y/N)
ENABLE DETECTOR.....N
ENABLE LOGGING.....N
ENABLE DIAGNOSTICS.....N
SPEED TRAP.....N
CALL DETECTOR.....Y
EXTENSION DETECTOR.....Y
MODE 2 STOP BAR.....N
SWITCHING DETECTOR.....N
DUPLICATING DETECTOR.....N
ENABLE FULL TIME DELAY.....N
IF FAILED, SET MIN RECALL?.....N
IF FAILED, SET MAX1 RECALL?.....N
IF FAILED, SET MAX2 RECALL?.....N
PHASE# :12345678910111213141516
PHASES ASSIGNED :
SWITCH/DUPLICATE:
LOOP SIZE (0-255 FT).....6
SPEED TRAP DISTANCE (0-255 FT).....0
STOP BAR TIME (0-255 SEC).....0
STRETCH (0-25.5 SEC).....0.0
DELAY (0-255 SEC).....0.0
MAX CALLS/MIN (0-255).....255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).....0
MAX OCCUPANCY (0-100%).....100
EXTENSION DISABLE TIME (0-255 SEC).....0
QUEUE MAX OCCUPANCY TIME (0-255).....0
QUEUE GAP RESET TIME (0-25.5).....0.0
PREEMPTION INDEX FOR QUEUE (0-10).....0
    
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '5' FOR PHASES ASSIGNED

ENSURE DELAY IS '3'

```

VEHICLE DETECTOR #55 SETTINGS (+,-,1-64)
SETTING: (Y/N)
ENABLE DETECTOR.....Y
ENABLE LOGGING.....N
ENABLE DIAGNOSTICS.....N
SPEED TRAP.....N
CALL DETECTOR.....Y
EXTENSION DETECTOR.....Y
MODE 2 STOP BAR.....N
SWITCHING DETECTOR.....N
DUPLICATING DETECTOR.....N
ENABLE FULL TIME DELAY.....N
IF FAILED, SET MIN RECALL?.....N
IF FAILED, SET MAX1 RECALL?.....N
IF FAILED, SET MAX2 RECALL?.....N
PHASE# :12345678910111213141516
PHASES ASSIGNED : X
SWITCH/DUPLICATE:
LOOP SIZE (0-255 FT).....6
SPEED TRAP DISTANCE (0-255 FT).....0
STOP BAR TIME (0-255 SEC).....0
STRETCH (0-25.5 SEC).....0.0
DELAY (0-255 SEC).....3
MAX CALLS/MIN (0-255).....255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).....0
MAX OCCUPANCY (0-100%).....100
EXTENSION DISABLE TIME (0-255 SEC).....0
QUEUE MAX OCCUPANCY TIME (0-255).....0
QUEUE GAP RESET TIME (0-25.5).....0.0
PREEMPTION INDEX FOR QUEUE (0-10).....0
    
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2084
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 3 of 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:		SR 2136 (Gilead Road) at Ranson Road		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 M. TASHA R. SIMMONS	
Prepared in the Offices of: HNTB 750 N. Greenfield Pkwy, Corner, NC 27529		Division 10 Mecklenburg Co., Huntersville		DocuSigned by: M. Tasha R. Simmons 4/23/2018	
PLAN DATE: December 2017	REVIEWED BY: A.D. Klinksiek	PREPARED BY: J.T. Thibault	REVIEWED BY: N.R. Simmons	SIGNATURE DATE	
REVISIONS		INIT.		DATE	
				SIG. INVENTORY NO. 10-2084	

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

<u>PHASING</u>	<u>INPUTS PAGE</u>	<u>OVERLAPS PAGE</u>
ACTIVE PAGES REQUIRED TO RUN <u>DEFAULT PHASING</u>	1	1
ACTIVE PAGES REQUIRED TO RUN <u>ALTERNATE PHASING</u>	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

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

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for head 51 to run protected turns only.

INPUTS PAGE 2: Disables phase 2 call on loop 5A and modifies delay time.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-2084
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

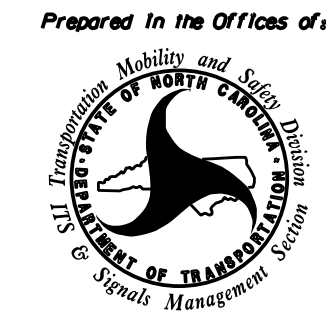
Electrical Detail - Sheet 4 of 4

**DOCUMENT NOT CONSIDERED FINAL
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HNTB HNTB NORTH CAROLINA, P.C.
 343 E. Six Forks Road, Suite 200
 Raleigh, North Carolina 27609
 NC license No: C-1554
 (919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:



750 N. Greenfield Pkwy, Corner, NC 27529


SR 2136 (Gilead Road)
at
Ranson Road

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
 PREPARED BY: J.T. Thibault REVIEWED BY: N.R. Simmons

REVISIONS	INIT.	DATE

SEAL

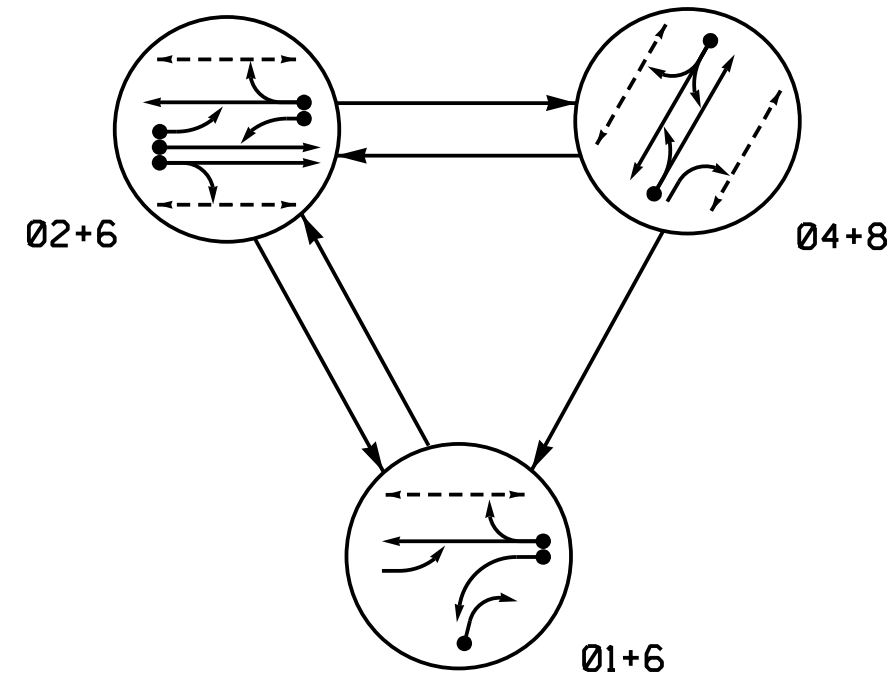


NATASHA R. SIMMONS

DocuSigned by:
 Natasha R. Simmons 4/23/2018

SIG. INVENTORY NO. 10-2084

PHASING DIAGRAM



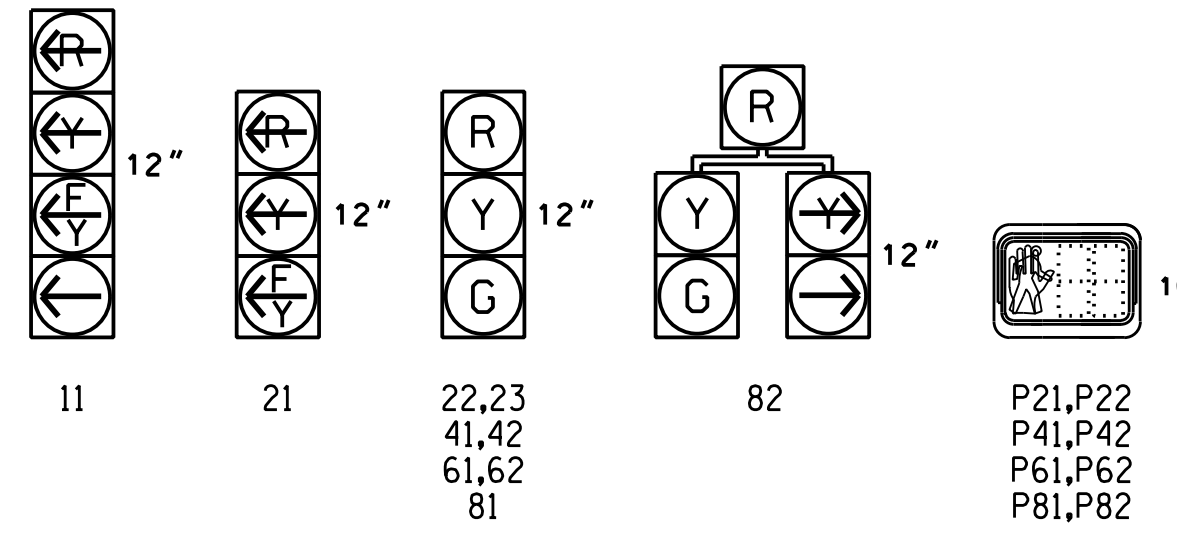
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	01+6	02+6	04+8	FLASH
11	Y	R	Y	Y
21	Y	R	Y	Y
22,23	R	G	R	Y
41,42	R	R	G	R
61,62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R
P21,P22	DW	W	DW	DRK
P41,P42	DW	DW	W	DRK
P61,P62	W	W	DW	DRK
P81,P82	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY		
1A	6X60	0	EXIST	-	1	Y	Y	-	15	-
1B	6X60	+5	EXIST	-	1	Y	Y	-	15	-
2A	6X6	70	3	-	2	Y	Y	-	-	-
2B	6X6	70	3	-	2	Y	Y	-	-	-
2C	6X40	0	2-4-2	Y	2	Y	Y	-	-	Y
4A	6X60	0	EXIST	-	4	Y	Y	-	5	-
6A	6X6	70	EXIST	-	6	Y	Y	-	-	-
8A	6X60	+10	EXIST	-	8	Y	Y	-	3	-
S39*	6X6	+200	3	-	-	-	-	-	-	Y
S40*	6X6	+200	EXIST	-	-	-	-	-	-	Y
S41*	6X6	+200	3	-	-	-	-	-	-	Y

*Could not field verify.

3 Phase Fully Actuated Gilead Road Closed Loop System

NOTES

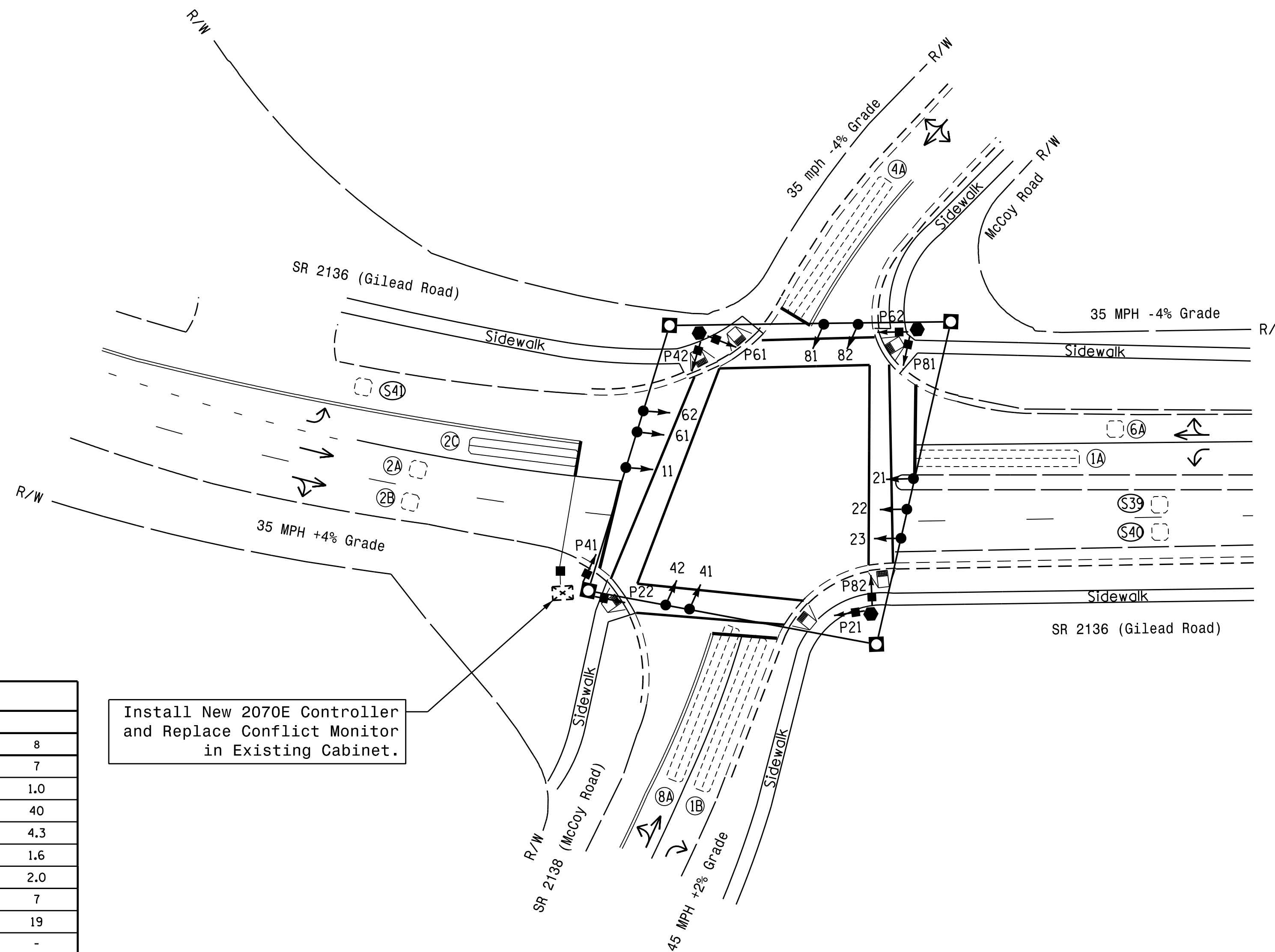
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Set all detector units to presence 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.
- 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.
- Closed loop system data: Controller Asset #1752.

LEGEND

- | | | | |
|--|---|--|------------------------------|
| | PROPOSED Traffic Signal Head | | EXISTING Traffic Signal Head |
| | PROPOSED Modified Signal Head | | EXISTING N/A |
| | PROPOSED Sign | | EXISTING N/A |
| | PROPOSED Pedestrian Signal Head With Push Button & Sign | | EXISTING N/A |
| | PROPOSED Signal Pole with Guy | | EXISTING N/A |
| | PROPOSED Signal Pole with Sidewalk Guy | | EXISTING N/A |
| | PROPOSED Inductive Loop Detector | | EXISTING N/A |
| | PROPOSED Controller & Cabinet | | EXISTING N/A |
| | PROPOSED Junction Box | | EXISTING N/A |
| | PROPOSED 2-in Underground Conduit | | EXISTING N/A |
| | PROPOSED Right of Way | | EXISTING N/A |
| | PROPOSED Directional Arrow | | EXISTING N/A |
| | PROPOSED Metal Strain Pole | | EXISTING N/A |
| | PROPOSED Type II Signal Pedestal | | EXISTING N/A |
| | PROPOSED Wheelchair Ramp | | EXISTING N/A |

FEATURE	PHASE				
	1	2	4	6	8
Min Green 1 *	7	10	7	10	7
Extension 1 *	1.0	3.0	1.0	3.0	1.0
Max Green 1 *	30	60	40	60	40
Yellow Clearance	3.0	4.1	4.1	4.1	4.3
Red Clearance	3.1	2.5	2.2	2.5	1.6
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	7	7	7
Don't Walk 1	-	16	22	12	19
Second Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	YELLOW	-
Dual Entry	-	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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



Install New 2070E Controller and Replace Conflict Monitor in Existing Cabinet.

Signal Upgrade

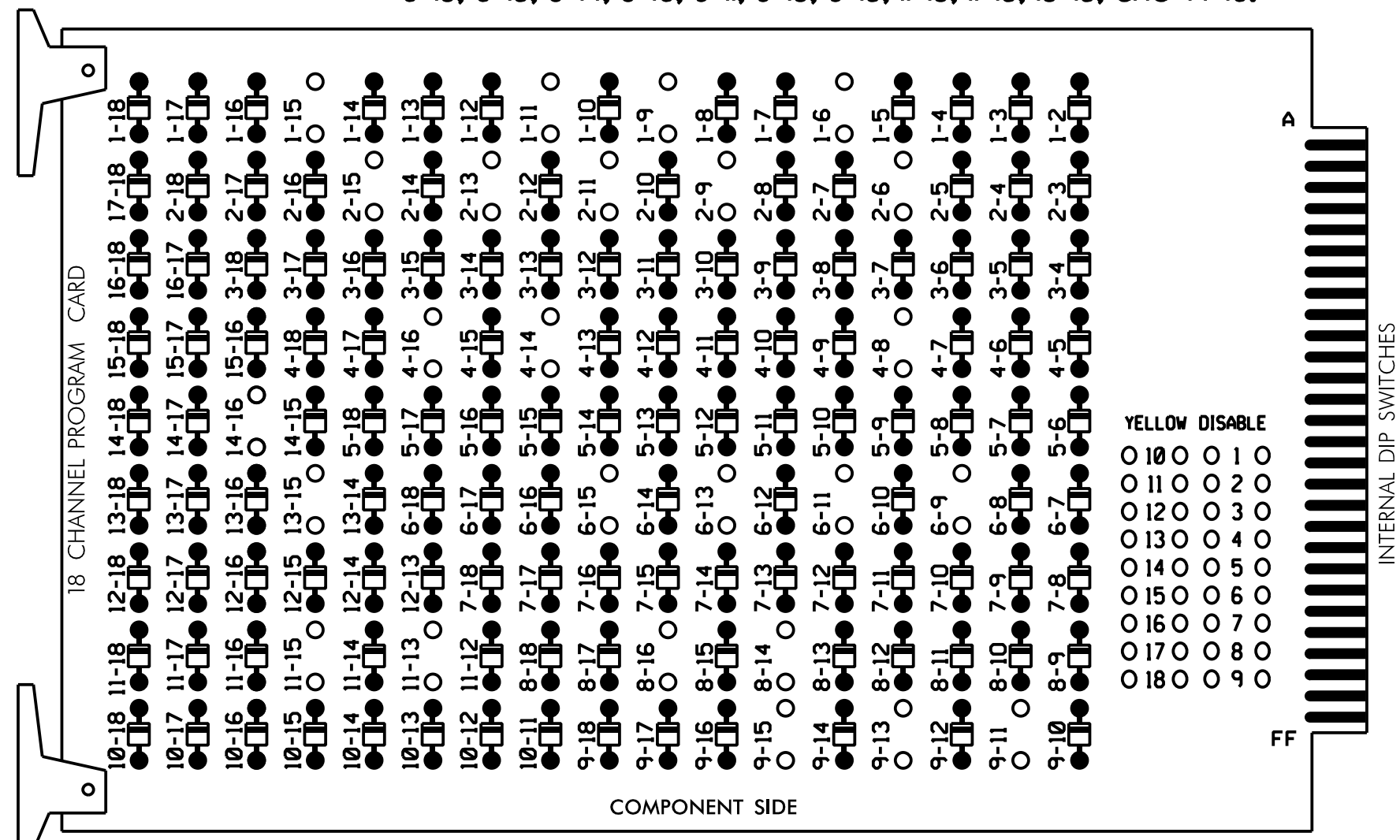
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at SR 2138 (McCoy Road)		
	Division 10 Mecklenburg Co., Huntersville PLAN DATE: December 2017 PREPARED BY: J.T. Thibault	REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons	
HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	SCALE 0 30 1"=30'	REVISIONS INIT. DATE	DocuSigned by: Natasha R. Simmons DATE 4/23/2018 SIGNATURE DATE SIG. INVENTORY NO. 10-1752

EDI MODEL 2018ECLip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 1-15, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-14, 4-16, 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:

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 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Ensure that jumper SEL9 is removed from the monitor board.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3.5, 7.10, 12, 13, 14, 15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all Phases.
5. Program phases 2 and 6 for Startup In Green.
6. Program phases 2, 4, 6 and 8 for Startup Ped Call.
7. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
8. The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....EXISTING 332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S6,S6P,S8,S8P,S9,S12
 PHASES USED.....1,2,2 PED,4,4 PED,6,6 PED,8,8 PED
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	9	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	22,23	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82	11	NU	NU	21	NU	NU
RED	*	128			101			134			107								
YELLOW		129			102			135			108								
GREEN		130			103			136			109								
RED ARROW														A121			A114		
YELLOW ARROW		126												A122			A115		
FLASHING YELLOW ARROW														A123			A116		
GREEN ARROW	127	127																	
Hand					113		104		119		110								
Person					115		105		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 "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 2	∅ 2	S	∅ 4	S	S	SYS. DET. S39	S	S	∅ 2 PED	∅ 6 PED	FS
L	NOT USED	NOT USED	∅ 2	NOT USED	Y	NOT USED	Y	Y	SYS. DET. S40	Y	Y	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
U	S	∅ 6	S	W	S	∅ 8	S	S	SYS. DET. S41	S	S	S	S	S
L	Y	NOT USED	Y	Y	Y	NOT USED	Y	Y	NOT USED	Y	Y	Y	Y	Y

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

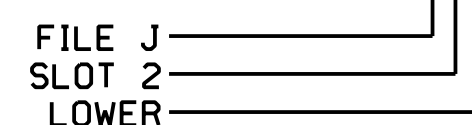
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
		J4U	48	10	26	6	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
2C	TB4-1,2	I4U	47	9	22	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
* S39	TB6-9,10	I9U	60	22	11	SYS					
* S40	TB6-11,12	I9L	62	24	13	SYS					
* S41	TB7-9,10	J9U	59	21	15	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

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

* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

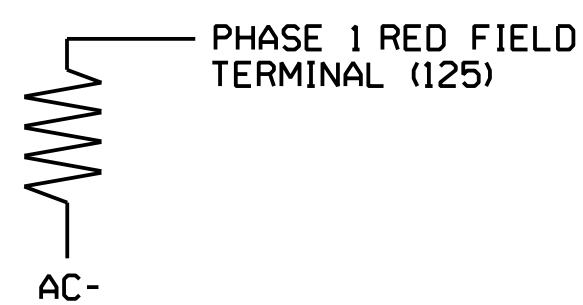
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

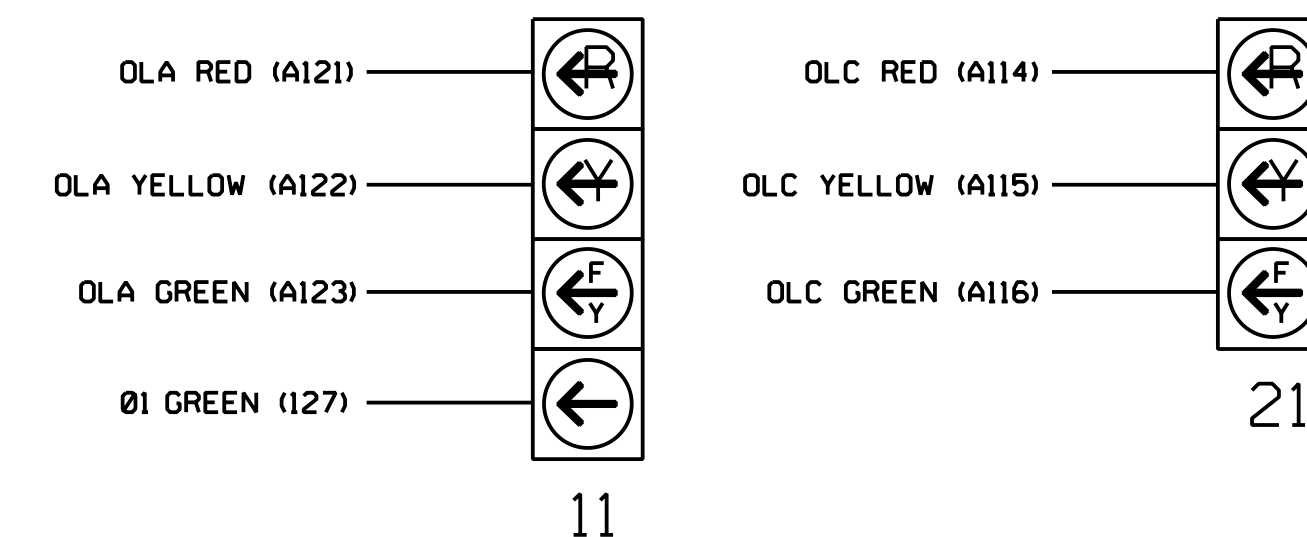
(install resistors as shown below)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal head 11 requires special logic programming. See sheet 2 for programming instructions.

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: 10-1752
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at SR 2138 (McCoy Road)								
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 PREPARED BY: J.T. Thibault	REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons		SEAL 031464 ENGINEER NATASHA R. SIMMONS					
Revisions Table: <table border="1"> <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				DocuSigned by: Natasha R. Simmons DATE: 4/23/2018 SIGNATURE: _____ DATE: _____ SIG. INVENTORY NO. 10-1752	
REVISIONS	INIT.	DATE							

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

          ↓
        SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF
    
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

```

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

          ↓
        SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF
    
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 1 (HEAD 11).

```

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

          ↓
        SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON
    
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:      |12345678910111213141516
VEH OVL PARENTS: |XX
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR:  - RED  - YELLOW  - GREEN
FLASH COLORS:   - RED  - YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:      |12345678910111213141516
VEH OVL PARENTS: |X
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR:  - RED  - YELLOW  - GREEN
FLASH COLORS:   - RED  - YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

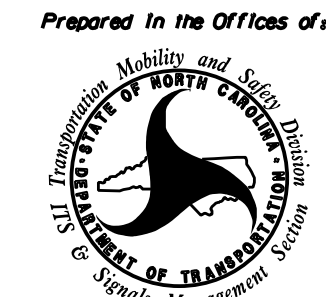
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1752
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 2 of 2

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:


Prepared in the Offices of:



750 N. Greenfield Pkwy, Corner, NC 27529

SR 2136 (Gilead Road) at SR 2138 (McCoy Road)	
Division 10	Mecklenburg Co., Huntersville
PLAN DATE: December 2017	REVIEWED BY: A.D. Klinksiek
PREPARED BY: J.T. Thibault	REVIEWED BY: N.R. Simmons
REVISIONS	INIT. DATE

SEAL

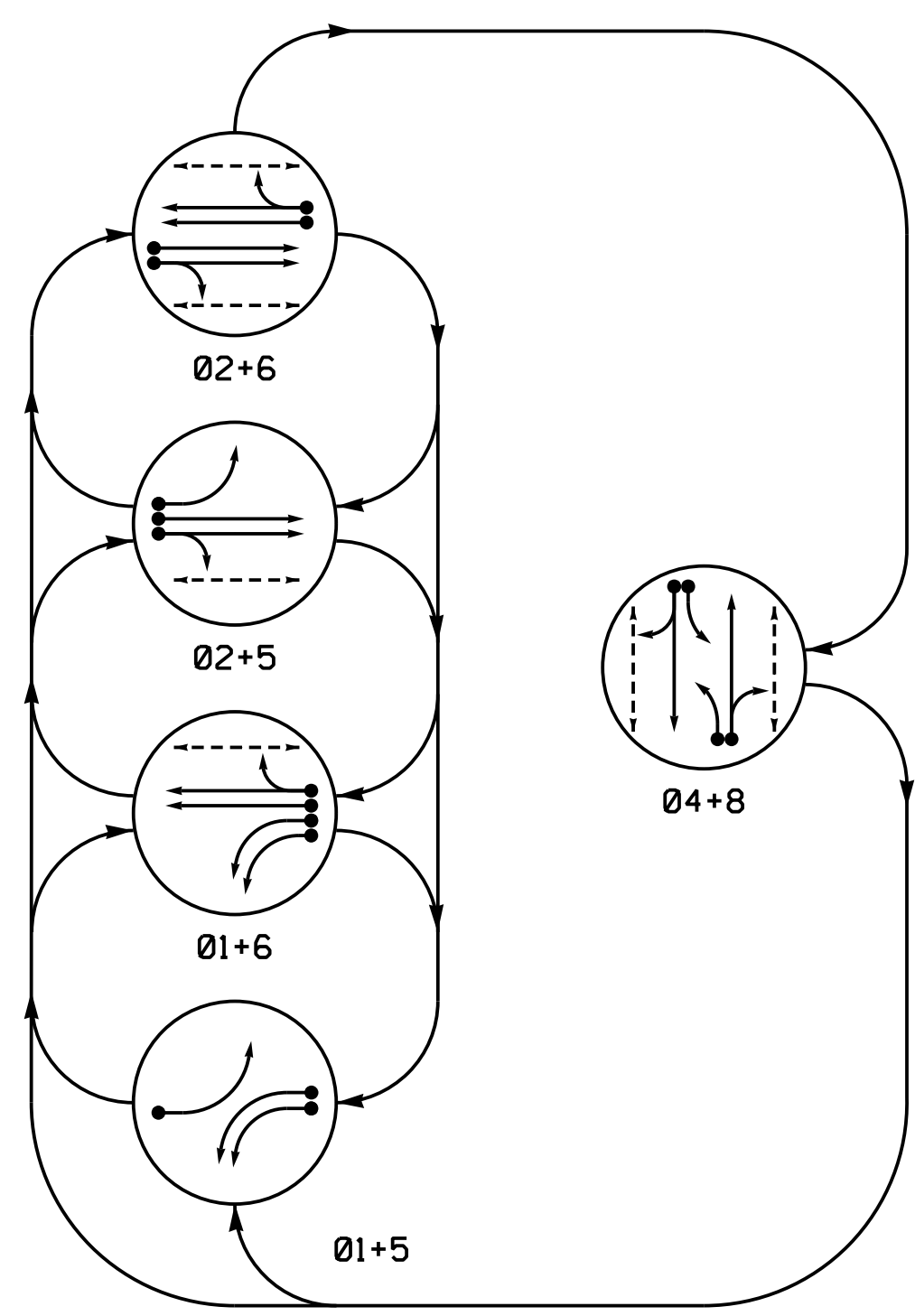


DocuSigned by:
Natasha R. Simmons
4/23/2018

SIG. INVENTORY NO. 10-1752

HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1584
(919) 546-8997

PHASING DIAGRAM

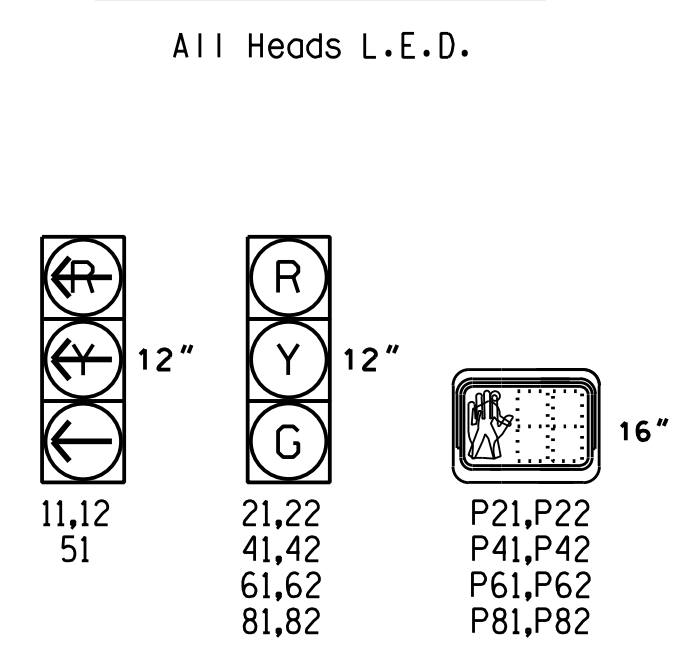


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE					FLASH
	01+5	01+6	02+5	02+6	04+8	
11,12	---	---	---	---	---	---
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	DW	W	DRK

SIGNAL FACE I.D.

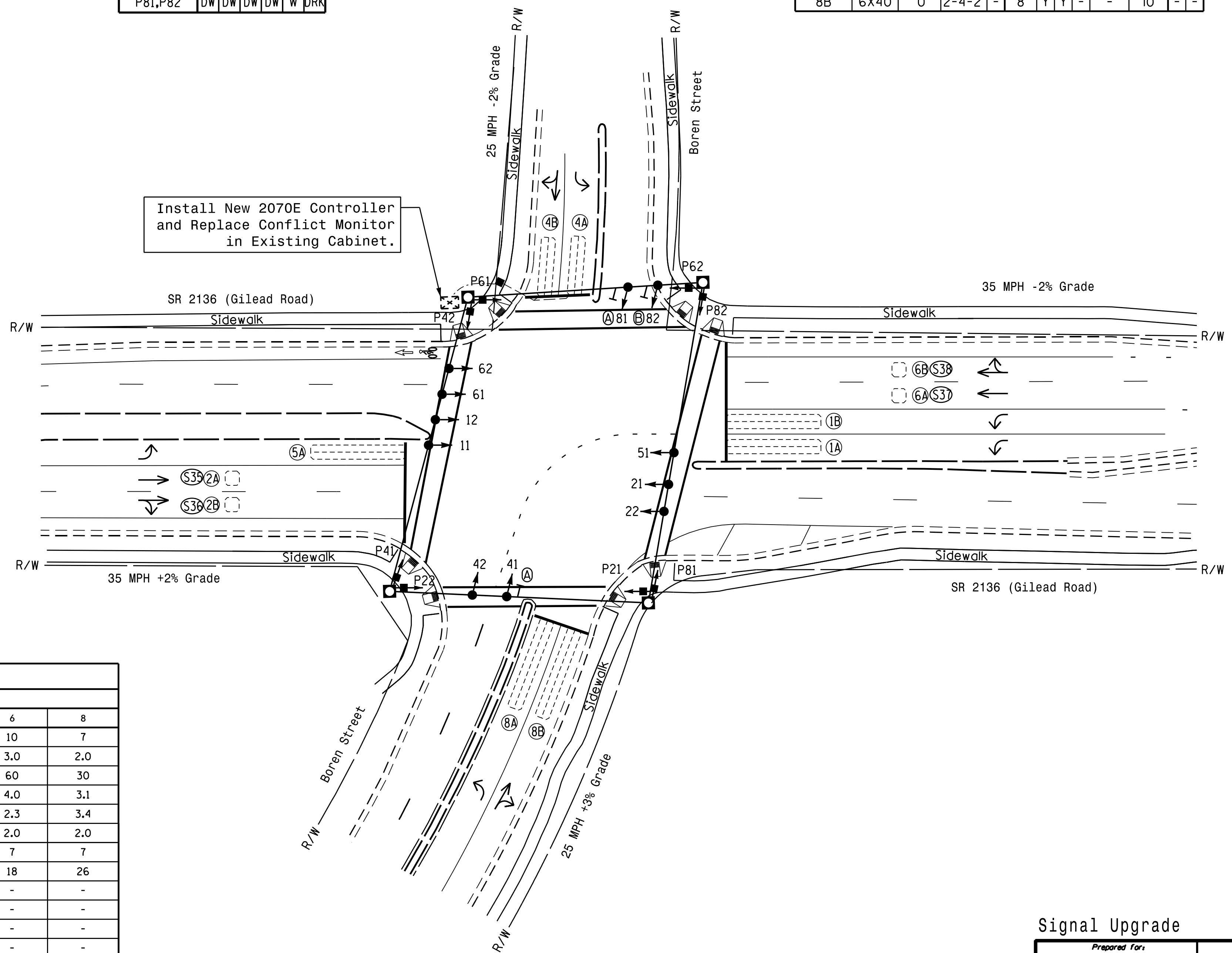


INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	-
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	-
2A/S35	6X6	70	5	-	2	Y	Y	-	-	-	-	Y
2B/S36	6X6	70	5	-	2	Y	Y	-	-	-	-	Y
4A	6X25	0	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X25	0	2-4-2	-	4	Y	Y	-	-	10	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	-
6A/S37	6X6	70	5	-	6	Y	Y	-	-	-	-	Y
6B/S38	6X6	70	5	-	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	-
8B	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	-

5 Phase Fully Actuated
Gilead Road Closed Loop 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.
- 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.
- Closed loop system data: Controller Asset #1950.



Install New 2070E Controller and Replace Conflict Monitor in Existing Cabinet.

FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1 *	7	10	7	7	10	7
Extension 1 *	2.0	3.0	3.0	2.0	3.0	2.0
Max Green 1 *	20	60	30	20	60	30
Yellow Clearance	3.0	3.7	3.3	3.0	4.0	3.1
Red Clearance	3.7	2.2	3.3	3.3	2.3	3.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	7	-	7	7
Don't Walk 1	-	17	25	-	18	26
Second Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

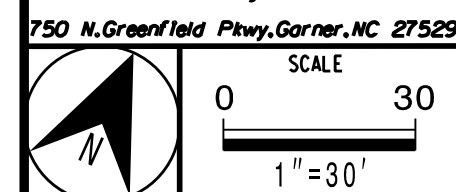
PROPOSED		EXISTING	
○→	Traffic Signal Head	●→	N/A
○→	Modified Signal Head	○→	N/A
○→	Sign	○→	N/A
○→	Pedestrian Signal Head With Push Button & Sign	○→	N/A
○→	Signal Pole with Guy	○→	N/A
○→	Signal Pole with Sidewalk Guy	○→	N/A
○→	Inductive Loop Detector	○→	N/A
○→	Controller & Cabinet	○→	N/A
○→	Junction Box	○→	N/A
○→	2-in Underground Conduit	○→	N/A
○→	Right of Way	○→	N/A
○→	Directional Arrow	○→	N/A
○→	Metal Strain Pole	○→	N/A
○→	Wheelchair Ramp	○→	N/A
○→	Left Arrow "ONLY" Sign (R3-5L)	○→	N/A
○→	Combined Through and Right Arrow Sign (R3-6R)	○→	N/A

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at Boren Street		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 M. TASHA R. SIMMONS
	Division 10 Mecklenburg Co., Huntersville PLAN DATE: December 2017 PREPARED BY: J.T. Thibault	REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons	

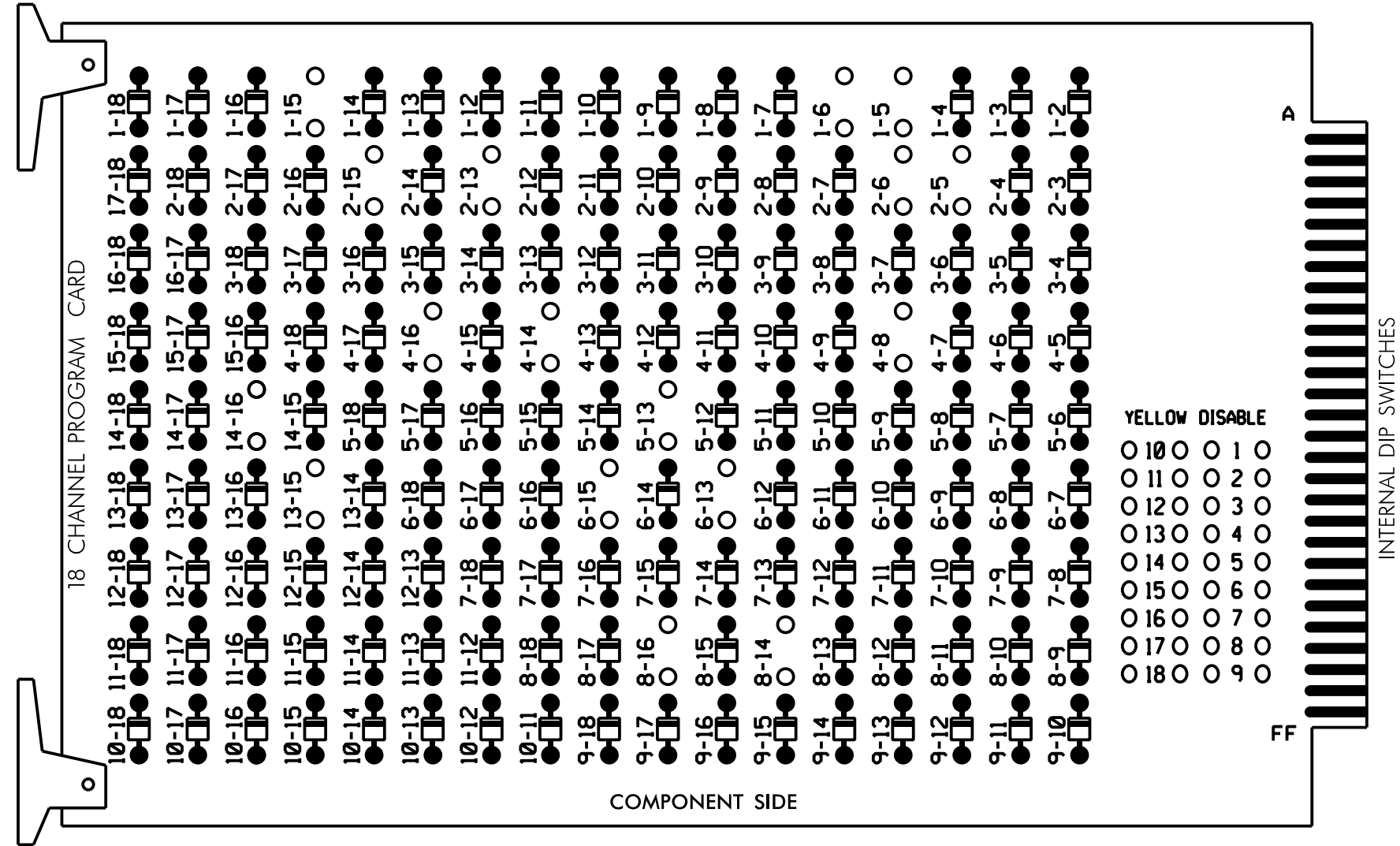
HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997



EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 4-8, 4-14, 4-16, 5-13, 6-13, 6-15, 8-14, 8-16, 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 are present on the monitor board.
- Ensure that Red Enable is active at all times during normal operation.
- Ensure that jumper SEL9 is removed from the monitor board.

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.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2, 4, 6 and 8 for Startup Ped Call.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Gilead Road Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	21,22	P21, P22	NU	41,42	P41, P42	51	61,62	P61, P62	NU	81,82	P81, P82	NU	NU	NU	NU	NU	NU
RED	128			101				134			107							
YELLOW	129			102				135			108							
GREEN	130			103				136			109							
RED ARROW	125							131										
YELLOW ARROW	126							132										
GREEN ARROW	127							133										
Hand icon				113		104		119			110							
Person icon				115		105		121			112							

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....EXISTING 332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S5,S6,S6P,S8,S8P
 PHASES USED.....1,2,2 PED,4,4 PED,5,6,6 PED,8,8 PED
 OVERLAPS.....NONE

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)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 2/SYS	S	S	∅ 4	S	S	S	S	S	∅ 2 PED	∅ 6 PED	FS
L	1A	1B	2A/S35	-	-	4A	-	-	-	-	-	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
	NOT USED	NOT USED	∅ 2/SYS	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4	∅ 4
			2B/S36	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B
U	∅ 5	∅ 6/SYS	S	S	S	∅ 8	S	S	S	S	S	S	S	S
L	5A	6A/S37	-	-	-	8A	-	-	-	-	-	-	-	-
	NOT USED	∅ 6/SYS	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8
		6B/S38	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B

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

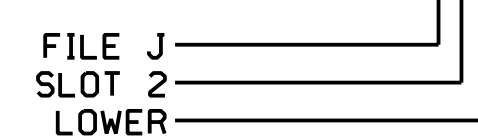
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			
2A/S35	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y			
2B/S36	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A/S37	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S38	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29		PED 2					
P41,P42	TB8-5,6	I12L	69	31		PED 4					
P61,P62	TB8-7,9	I13U	68	30		PED 6					
P81,P82	TB8-8,9	I13L	70	32		PED 8					

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

INPUT FILE POSITION LEGEND: J2L



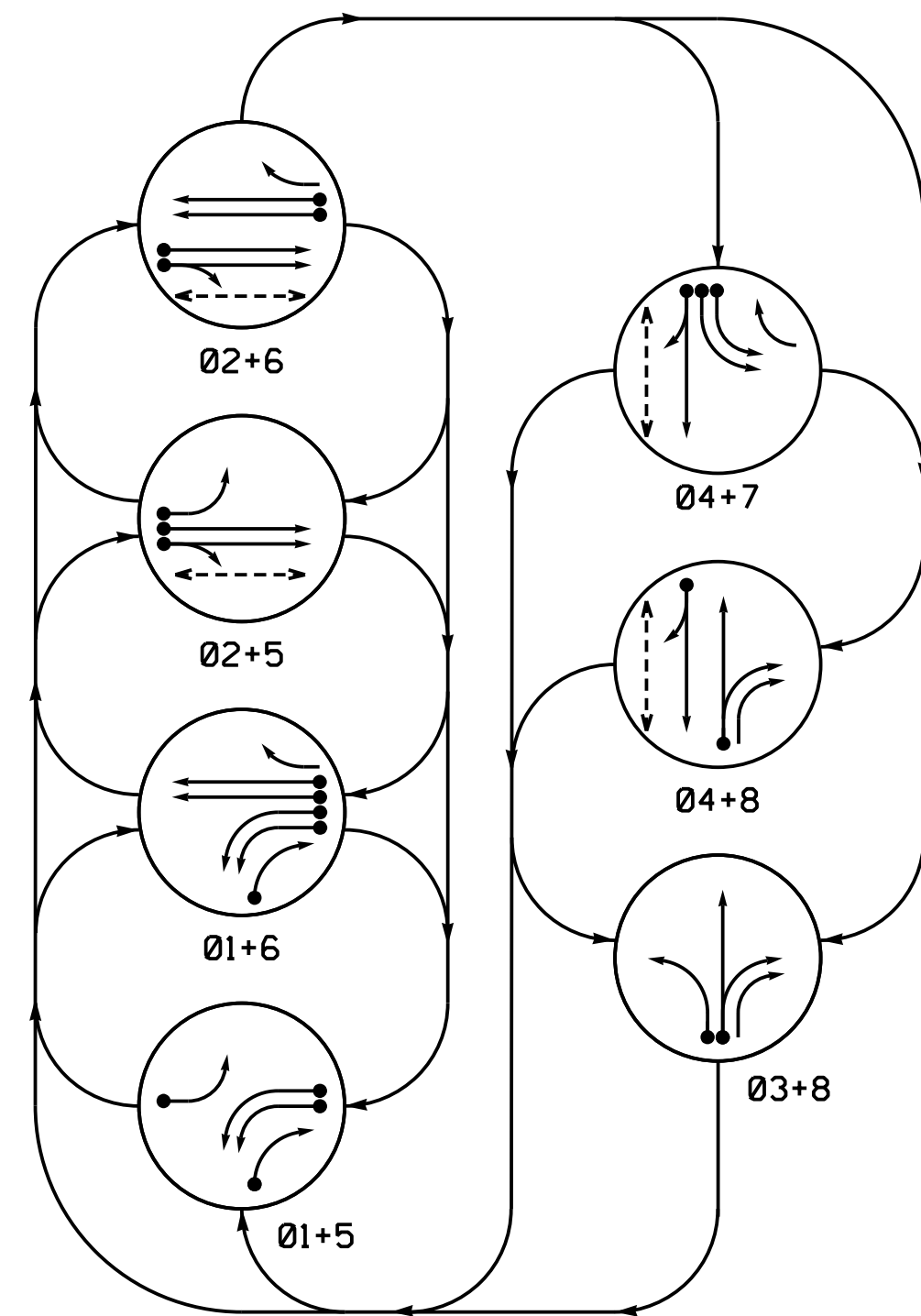
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1950
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at Boren Street		
	Division 10 Mecklenburg Co. Huntersville	Prepared in the Offices of: 	
PLAN DATE: December 2017 PREPARED BY: J.T. Thibault	REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons	REVISIONS	INIT. DATE
HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997		DocuSigned by: Natasha R. Simmons DATE: 4/23/2018 SIGNATURE DATE SIG. INVENTORY NO. 10-1950	

PHASING DIAGRAM



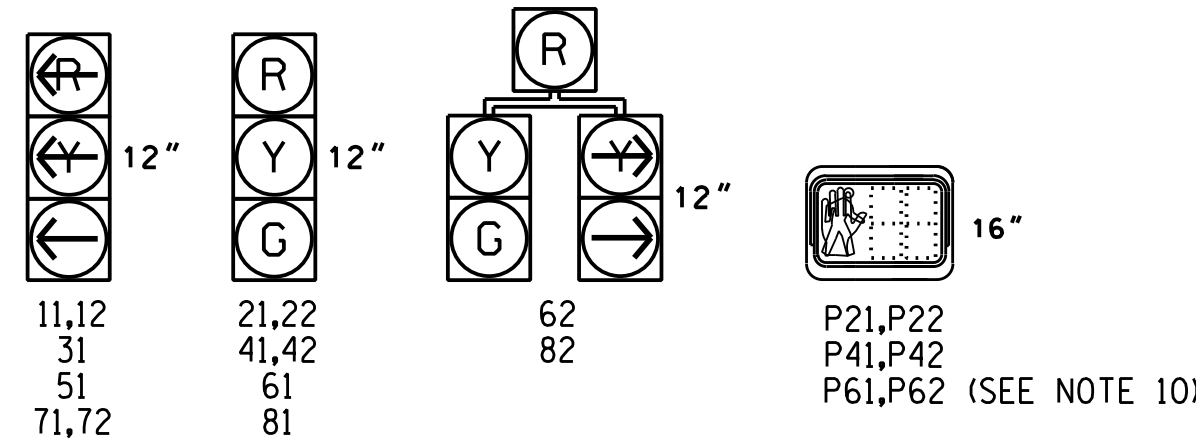
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+8	04+7	04+8	F
11,12	---	---	---	---	---	---	---	---
21,22	R	R	G	G	R	R	R	Y
31	---	---	---	---	---	---	---	---
41,42	R	R	R	R	G	G	R	R
51	---	---	---	---	---	---	---	---
61	R	G	R	G	R	R	R	Y
62	R	G	R	G	R	R	R	Y
71,72	---	---	---	---	---	---	---	---
81	R	R	R	R	R	G	G	R
82	---	---	---	---	---	---	---	---
P21,P22	DW	DW	W	W	DW	DW	DRK	DRK
P41,P42	DW	DW	DW	DW	W	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



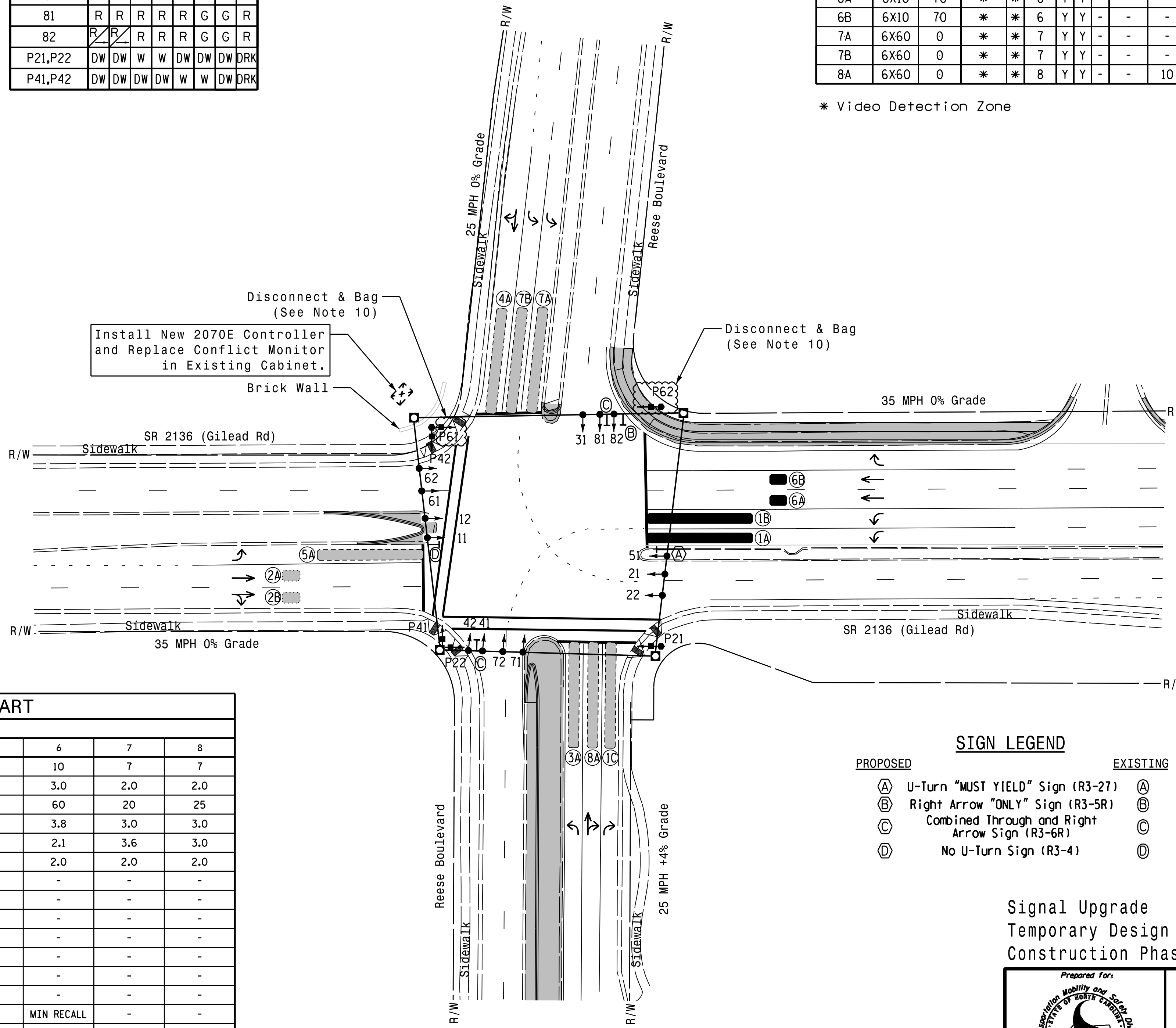
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			
1A	6X60	0	*	*	1	Y	Y	-	-	-	*
1B	6X60	0	*	*	1	Y	Y	-	-	-	*
1C	6X60	0	*	*	1	Y	Y	-	-	-	*
2A	6X10	70	*	*	2	Y	Y	-	-	15	*
2B	6X10	70	*	*	2	Y	Y	-	-	-	*
3A	6X60	0	*	*	3	Y	Y	-	-	-	*
4A	6X60	0	*	*	4	Y	Y	-	-	10	*
5A	6X60	0	*	*	5	Y	Y	-	-	-	*
6A	6X10	70	*	*	6	Y	Y	-	-	-	*
6B	6X10	70	*	*	6	Y	Y	-	-	-	*
7A	6X60	0	*	*	7	Y	Y	-	-	-	*
7B	6X60	0	*	*	7	Y	Y	-	-	-	*
8A	6X60	0	*	*	8	Y	Y	-	-	10	*

* Video Detection Zone

7 Phase Fully Actuated Gilead Road Closed Loop 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 5 may be lagged.
- The order of phase 3 and phase 7 may be reversed.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Bag existing pedestrian signal heads numbered P61 and P62.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1753



FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	4	5	7	10	7
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	30	60	15	25	15	60	20	25
Yellow Clearance	3.0	3.8	3.0	3.2	3.0	3.8	3.0	3.0
Red Clearance	3.3	2.3	3.3	3.1	3.3	2.1	3.6	3.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	7	-	-	-	-
Don't Walk 1	-	33	-	31	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

SIGN LEGEND

- | | |
|---|----------|
| PROPOSED | EXISTING |
| (A) U-Turn "MUST YIELD" Sign (R3-27) | (A) |
| (B) Right Arrow "ONLY" Sign (R3-SR) | (B) |
| (C) Combined Through and Right Arrow Sign (R3-6R) | (C) |
| (D) No U-Turn Sign (R3-4) | (D) |

LEGEND

- | | |
|--|--|
| PROPOSED | EXISTING |
| ○ Traffic Signal Head | ● Traffic Signal Head |
| □ Pedestrian Signal Head With Push Button & Sign | ■ Pedestrian Signal Head With Push Button & Sign |
| ⊠ Controller & Cabinet | ⊠ Controller & Cabinet |
| □ Junction Box | ■ Junction Box |
| N/A Right of Way | — Right of Way |
| → Directional Arrow | → Directional Arrow |
| ▬ Video Detection Zone | ▬ Video Detection Zone |
| — Directional Drill | N/A Directional Drill |
| ○ Metal Strain Pole | ○ Metal Strain Pole |
| ○ Type II Signal Pedestal | ○ Type II Signal Pedestal |
| ▬ Wheelchair Ramp | ▬ Wheelchair Ramp |
| ▬ Construction Zone | N/A Construction Zone |

Signal Upgrade
Temporary Design 1
Construction Phase I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

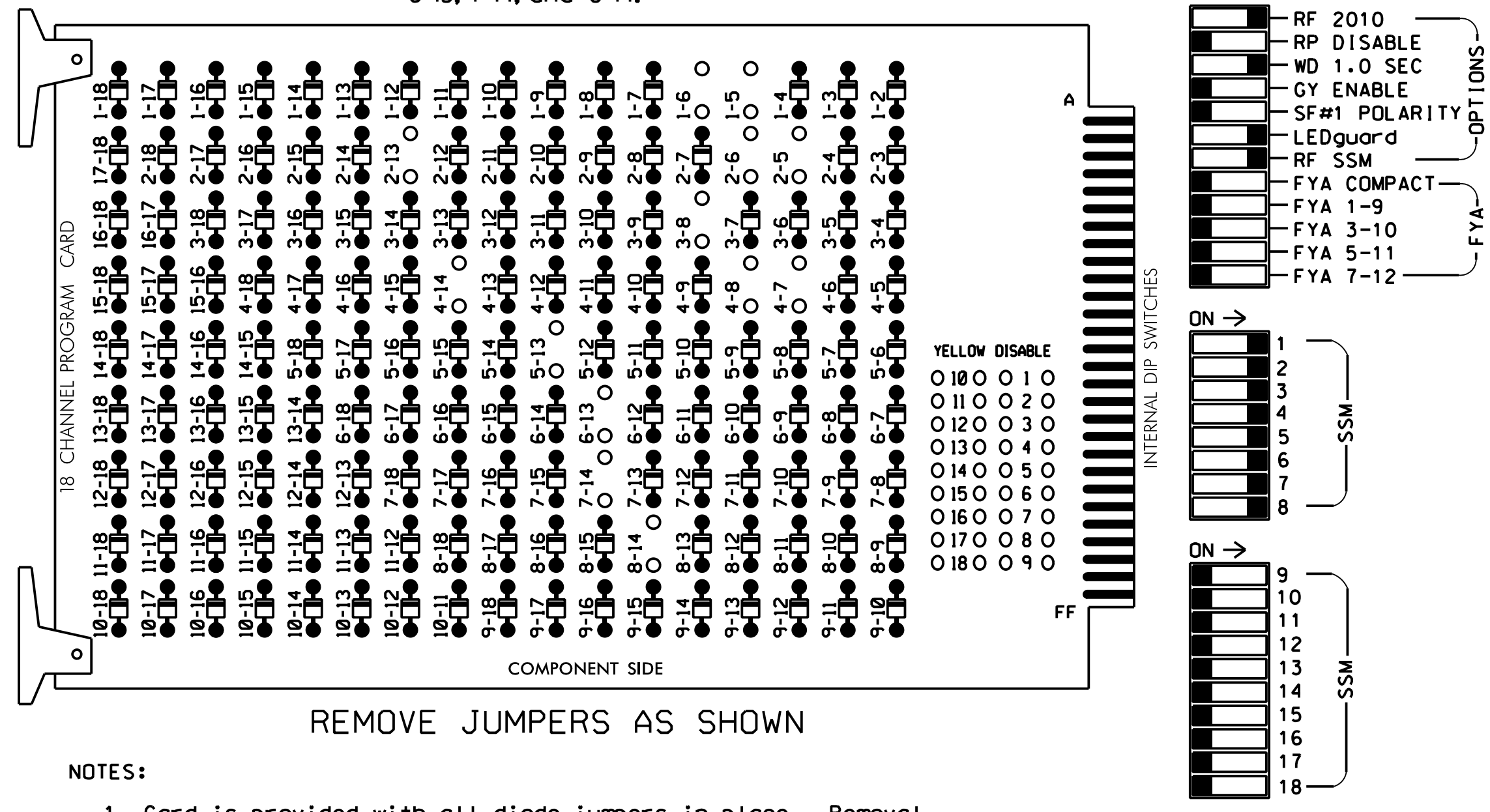
	SR 2136 (Gilead Road) at Reese Boulevard		
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinskiesik	PREPARED BY: A.H. Thornsburg REVIEWED BY: N.R. Simmons	
SCALE 0 40 1"=40'	REVISIONS INIT. DATE	DocuSigned by: Natasha R. Simmons SIGNATURE DATE	4/23/2018 SIG. INVENTORY NO. 10-1753 T1

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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, 2-13, 3-8, 4-7, 4-8, 4-14, 5-13, 6-13, 7-14, and 8-14.



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 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Ensure that jumper SEL9 is removed from the monitor board.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2 and 4 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Gilead Road Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	P21, P22	31	41,42	P41, P42	51	61,62	NU	62	71,72	81,82	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	123						
GREEN ARROW	127	127			118			133			124	124						
Hand icon					113			104										
Walking person icon					115			106										

NU = Not Used

EQUIPMENT INFORMATION

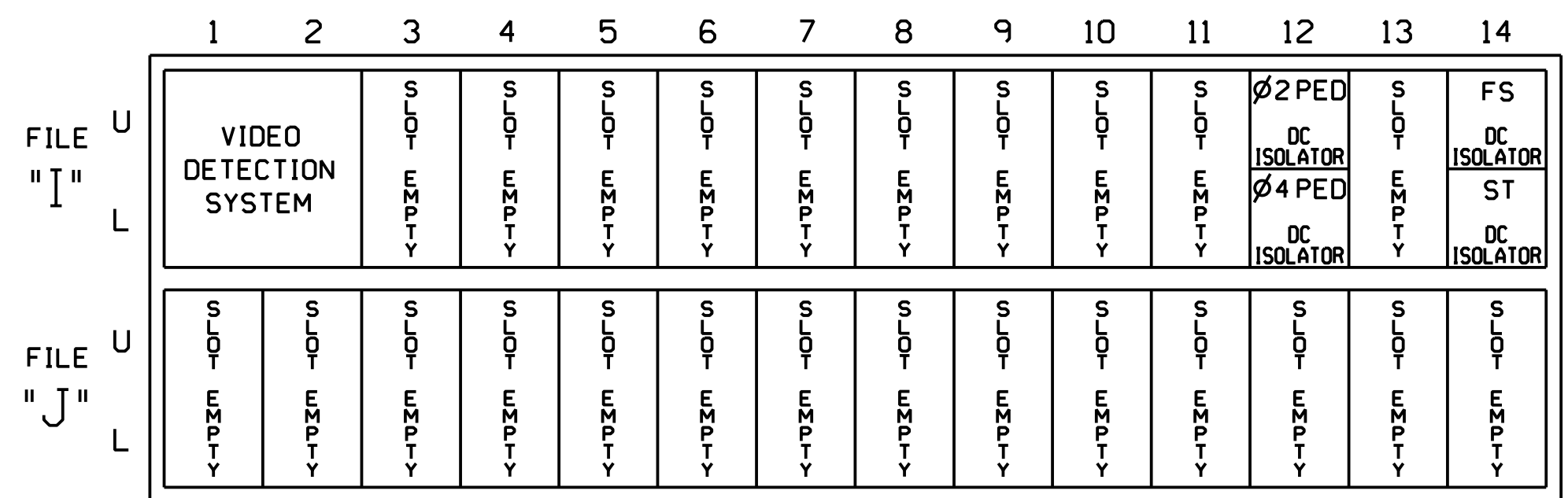
CONTROLLER.....2070E
 CABINET.....EXISTING 332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S7,S8
 PHASES USED.....1,2,2 PED,3,4,4 PED,5,6,7,8
 OVERLAPS.....NONE

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

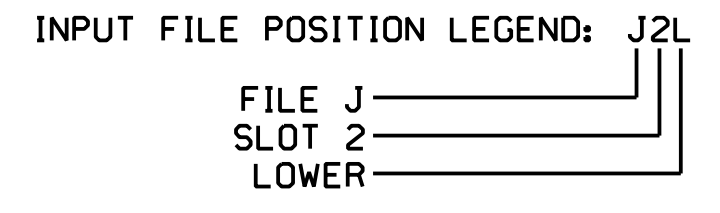
SPECIAL DETECTOR NOTE

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
PED PUSH BUTTONS											
P21,P22	T88-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	T88-5,6	I12L	69	31	PED 4	4 PED					

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.



PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1	NEXT: PAGES)						
1 1	2	0	0	0	4	0	3
2 5	6	0	0	7	8	0	0
3 0	0	0	0	0	0	0	0
4 0	0	0	0	0	0	0	0

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THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1753 T1
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 1
 Signal Upgrade
 Temporary Design 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 2136 (Gilead Road) at Reese Boulevard

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek

PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

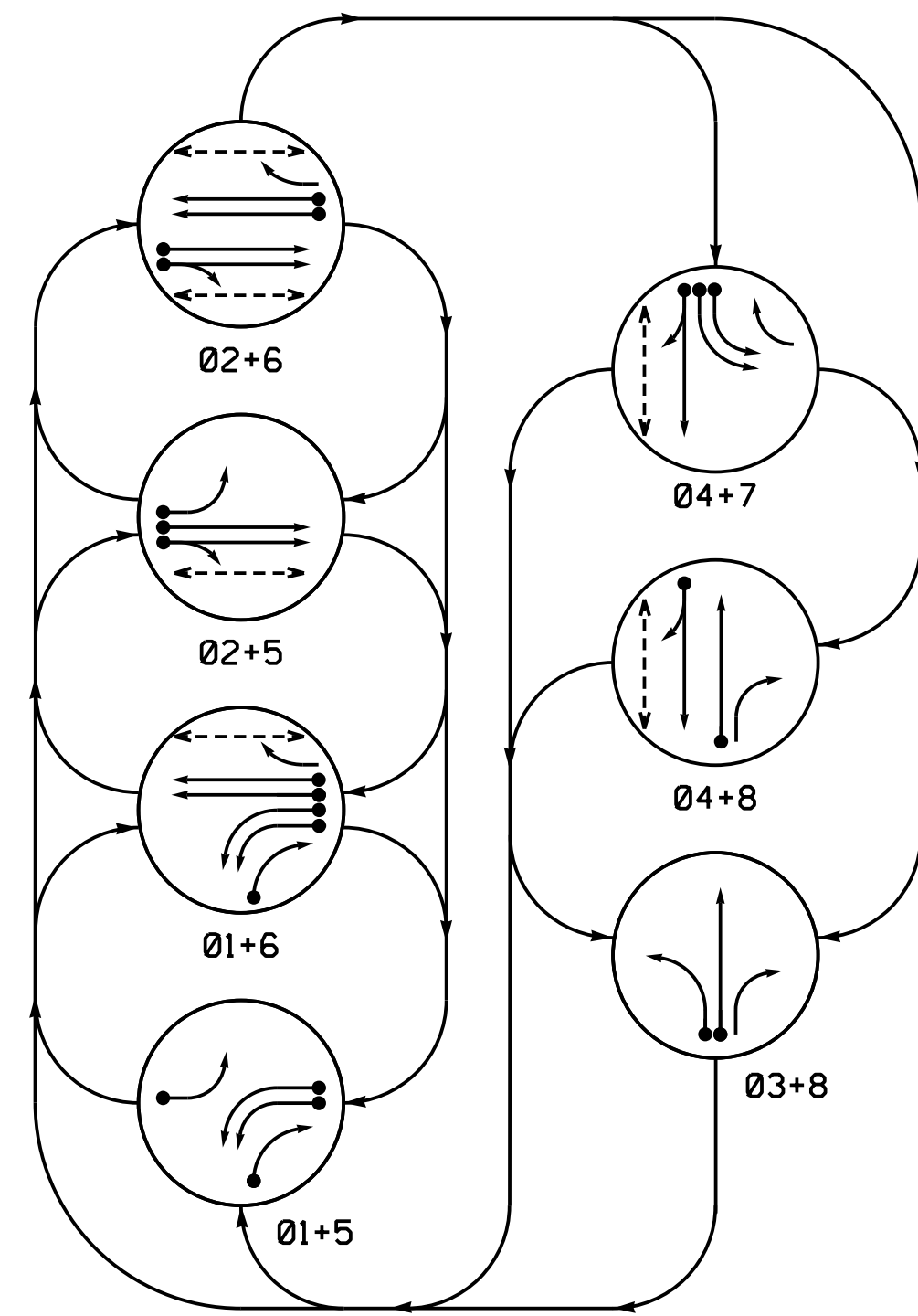
REVISIONS INIT. DATE

Seal: NORTH CAROLINA PROFESSIONAL SEAL 031464 ENGINEER NATASHA R. SIMMONS

DocuSigned by: Natasha R. Simmons 4/23/2018

SIG. INVENTORY NO. 10-1753 T1

PHASING DIAGRAM



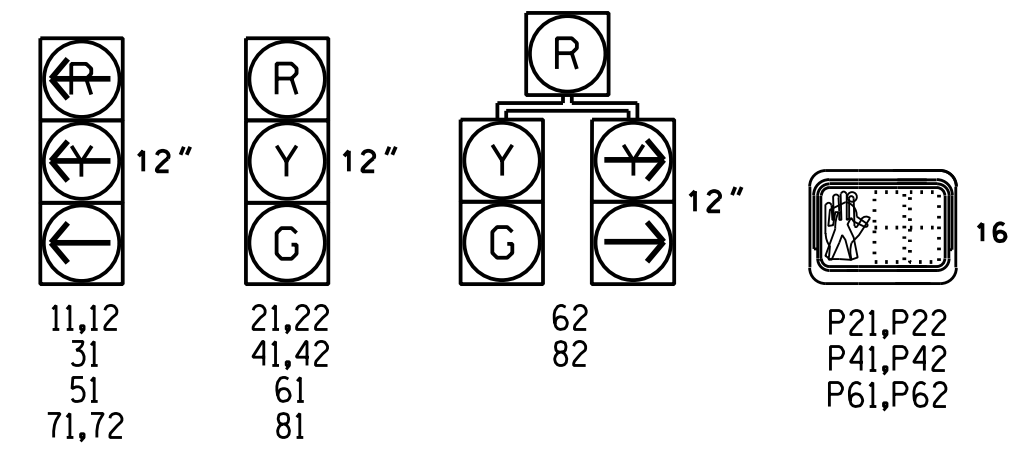
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	04+7	04+8	03+8	FLASH
11,12								
21,22	R	R	G	G	R	R	Y	
31								
41,42	R	R	R	R	G	G	R	
51								
61	R	G	R	G	R	R	Y	
62	R	G	R	G	R	R	Y	
71,72								
81	R	R	R	R	R	G	G	R
82	R	R	R	R	R	G	G	R
P21,P22	DW	DW	W	W	DW	DW	DRK	
P41,P42	DW	DW	DW	DW	W	W	DRK	
P61,P62	DW	W	DW	W	DW	DW	DRK	

SIGNAL FACE I.D.

All Heads L.E.D.



LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	*	*	1	Y	Y	-	-	-	-	*
1B	6X60	0	*	*	1	Y	Y	-	-	-	-	*
1C	6X60	0	*	*	1	Y	Y	-	-	-	-	*
2A	6X10	70	*	*	2	Y	Y	-	-	-	15	*
2B	6X10	70	*	*	2	Y	Y	-	-	-	-	*
3A	6X60	0	*	*	3	Y	Y	-	-	-	-	*
4A	6X60	0	*	*	4	Y	Y	-	-	-	10	*
5A	6X60	0	*	*	5	Y	Y	-	-	-	-	*
6A	6X10	70	*	*	6	Y	Y	-	-	-	-	*
6B	6X10	70	*	*	6	Y	Y	-	-	-	-	*
7A	6X60	0	*	*	7	Y	Y	-	-	-	-	*
7B	6X60	0	*	*	7	Y	Y	-	-	-	-	*
8A	6X60	0	*	*	8	Y	Y	-	-	-	-	*

* Video Detection Zone

7 Phase Fully Actuated Gilead Road Closed Loop 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 5 may be lagged.
- The order of phase 3 and phase 7 may be reversed.
- Reposition existing signal heads numbered 31,81,82, and sign 8.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1753

LEGEND

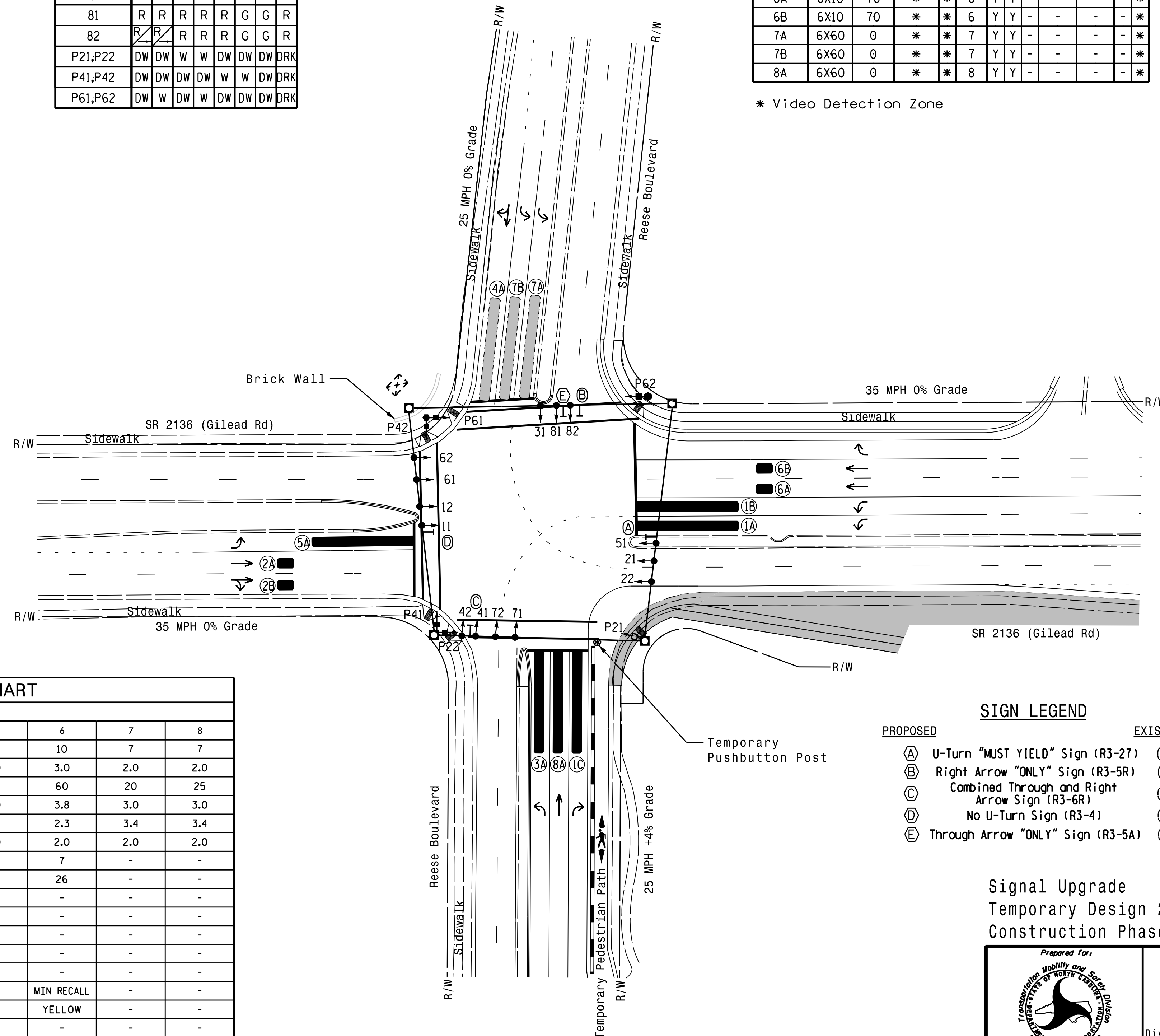
- | | |
|---|---|
| PROPOSED | EXISTING |
| ○→ Traffic Signal Head | ●→ Traffic Signal Head |
| □→ Pedestrian Signal Head With Push Button & Sign | □→ Pedestrian Signal Head With Push Button & Sign |
| ⊠→ Controller & Cabinet | ⊠→ Controller & Cabinet |
| □→ Junction Box | □→ Junction Box |
| N/A→ Right of Way | N/A→ Right of Way |
| →→ Directional Arrow | →→ Directional Arrow |
| ▬→ Video Detection Zone | ▬→ Video Detection Zone |
| ○→ Metal Strain Pole | ○→ Metal Strain Pole |
| ⊕→ Type I Pushbutton Post | ⊕→ Type I Pushbutton Post |
| ○→ Type II Signal Pedestal | ○→ Type II Signal Pedestal |
| ▲→ Wheelchair Ramp | ▲→ Wheelchair Ramp |
| ▬→ Construction Zone | N/A |

SIGN LEGEND

- | | |
|---|---|
| PROPOSED | EXISTING |
| (A) U-Turn "MUST YIELD" Sign (R3-27) | (A) U-Turn "MUST YIELD" Sign (R3-27) |
| (B) Right Arrow "ONLY" Sign (R3-5R) | (B) Right Arrow "ONLY" Sign (R3-5R) |
| (C) Combined Through and Right Arrow Sign (R3-6R) | (C) Combined Through and Right Arrow Sign (R3-6R) |
| (D) No U-Turn Sign (R3-4) | (D) No U-Turn Sign (R3-4) |
| (E) Through Arrow "ONLY" Sign (R3-5A) | (E) Through Arrow "ONLY" Sign (R3-5A) |

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	30	60	15	25	15	60	20	25
Yellow Clearance	3.0	3.8	3.0	3.2	3.0	3.8	3.0	3.0
Red Clearance	3.4	2.1	3.4	3.3	3.4	2.3	3.4	3.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	7	-	7	-	-
Don't Walk 1	-	19	-	25	-	26	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

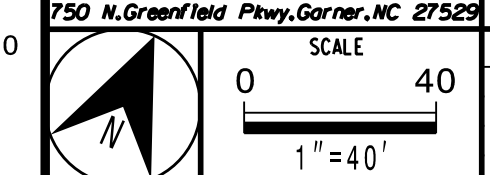


Signal Upgrade
Temporary Design 2
Construction Phases II,III

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	SR 2136 (Gilead Road) at Reese Boulevard		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 M. TASHA R. SIMMONS
	Division 10 Mecklenburg Co., Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	REVISIONS: _____ INITI. _____ DATE _____ Documented by: <i>M. Tasha R. Simmons</i> 4/23/2018 DATE _____ SIGNATURE _____ SIG. INVENTORY NO. 10-1753 T2	

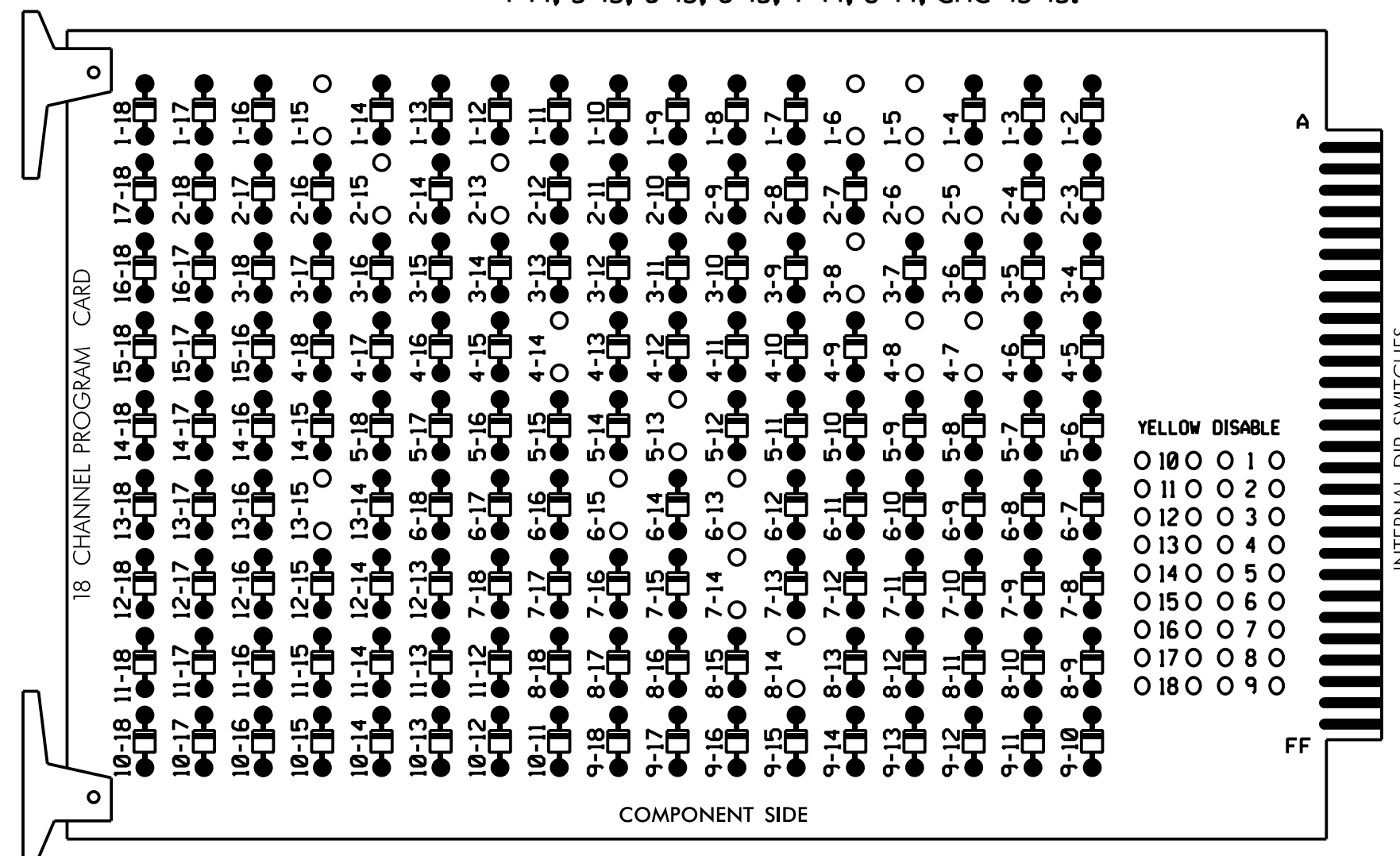
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NC License No: C-1554
(919) 546-8997



EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



REMOVE JUMPERS AS SHOWN

NOTES:

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

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.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2, 4, and 6 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Gilead Road Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	P21, P22	31	41,42	P41, P42	51	61,62	P61, P62	62	71,72	81,82	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	123						
GREEN ARROW	127	127			118			133			124	124						
Hand icon					113			104			119							
Walking person icon					115			106			121							

NU = Not Used

EQUIPMENT INFORMATION

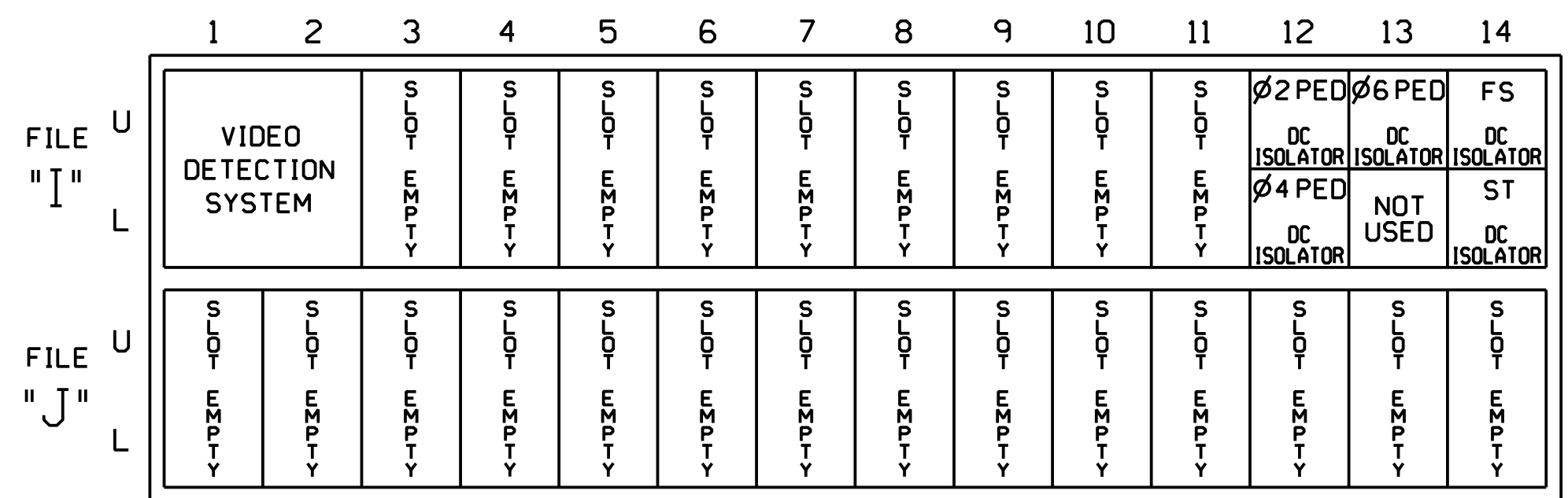
CONTROLLER.....2070E
 CABINET.....EXISTING 332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S7,S8
 PHASES USED.....1,2,2 PED,3,4,4 PED,5,6,6 PED,7,8
 OVERLAPS.....NONE

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

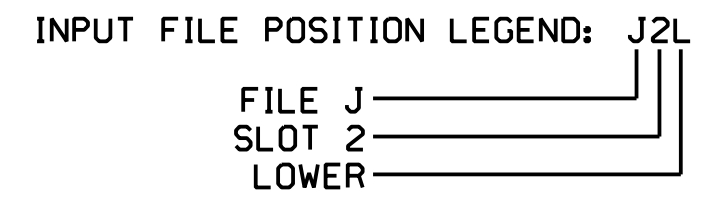
SPECIAL DETECTOR NOTE

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
PED PUSH BUTTONS											
P21,P22	T88-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	T88-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	T88-7,9	I13U	68	30	PED 6	6 PED					

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1753 T2
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1	NEXT: PAGES)						
1 1	2	0	0	0	4	0	3
2 5	6	0	0	7	8	0	0
3 0	0	0	0	0	0	0	0
4 0	0	0	0	0	0	0	0

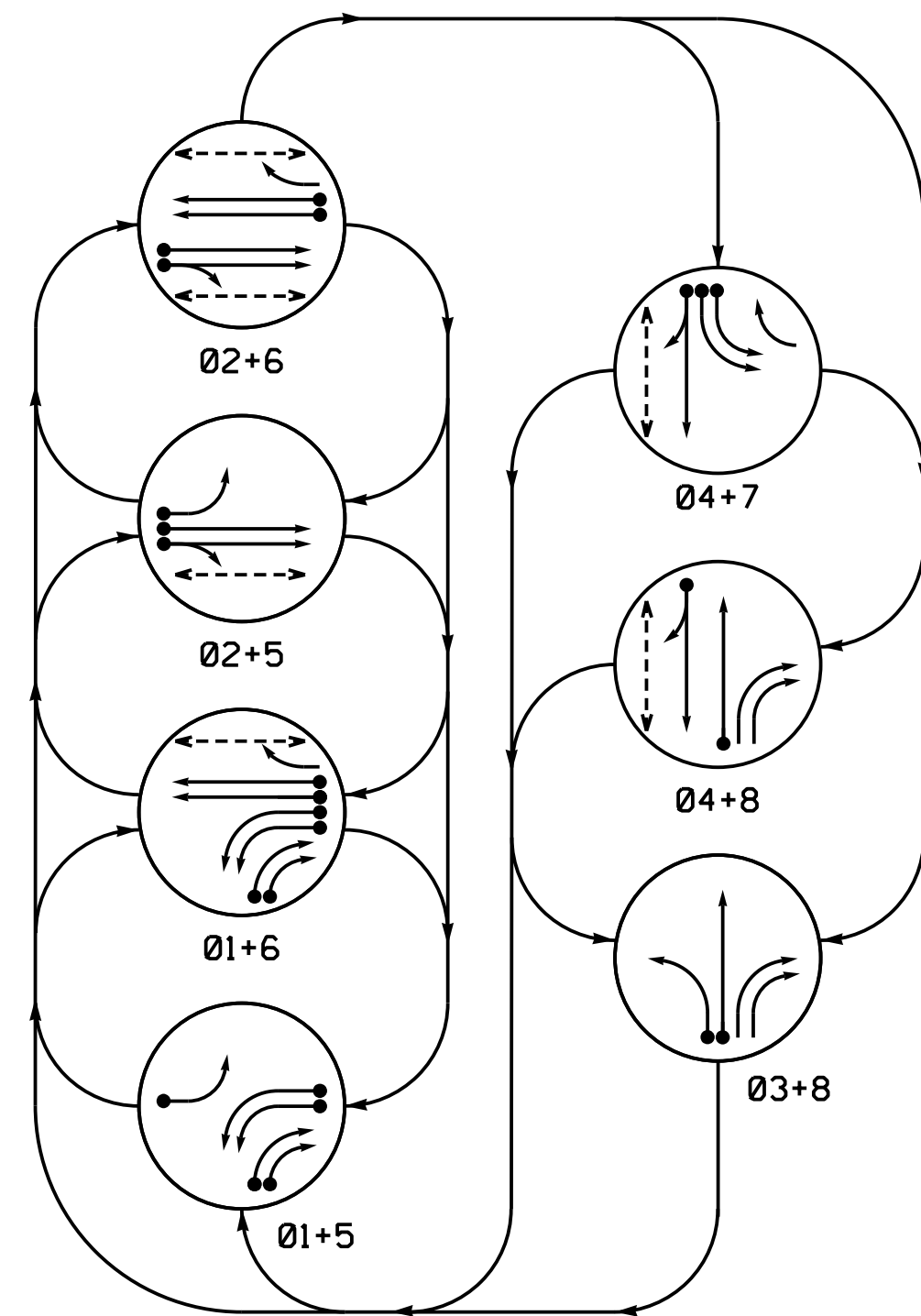
HNTB HNTB NORTH CAROLINA, P.C.
 343 E. Six Forks Road, Suite 200
 Raleigh, North Carolina 27609
 NC License No: C-1554
 (919) 546-8997

Electrical Detail - Sheet 1 of 1
 Signal Upgrade
 Temporary Design 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at Reese Boulevard		
	Division 10 Mecklenburg Co. Huntersville	PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek	
REVISIONS	INIT.	DATE	DocuSigned by: Natasha R. Simmons SIGNATURE DATE 4/23/2018

PHASING DIAGRAM



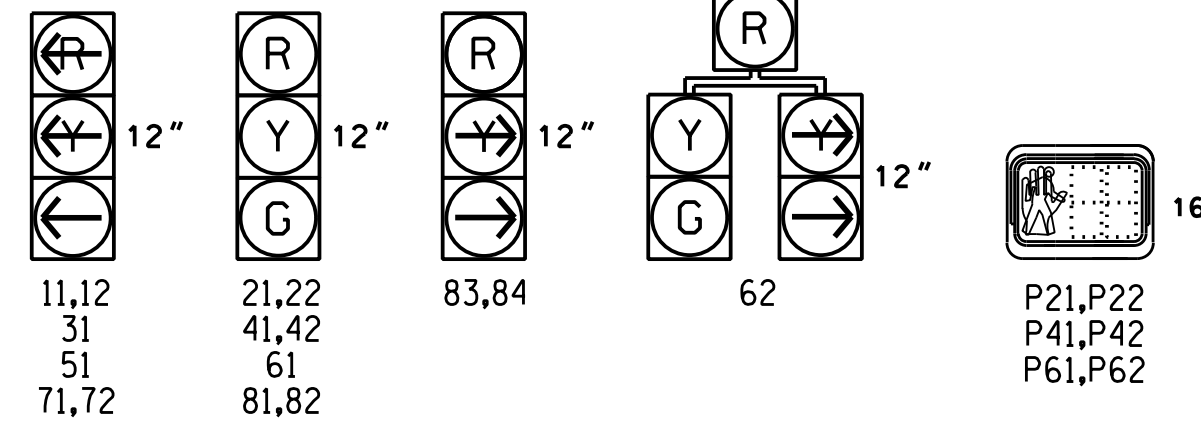
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+8	04+7	04+8	Foot
11,12	-	-	R	R	R	R	R	R
21,22	R	R	G	G	R	R	R	Y
31	R	R	R	R	R	R	-	R
41,42	R	R	R	R	G	G	R	R
51	-	-	R	R	R	R	R	R
61	R	G	R	G	R	R	R	Y
62	R	G	R	G	R	R	R	Y
71,72	R	R	R	R	-	R	R	R
81,82	R	R	R	R	R	G	G	R
83,84	-	-	R	R	R	-	-	R
P21,P22	DW	DW	W	W	DW	DW	DRK	
P41,P42	DW	DW	DW	DW	W	W	DW	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK	

SIGNAL FACE I.D.

All Heads L.E.D.



LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			
1A	6X60	0	*	*	1	Y	Y	-	-	-	*
1B	6X60	0	*	*	1	Y	Y	-	-	-	*
1C	6X60	0	*	*	1	Y	Y	-	-	-	*
1D	6X60	0	*	*	1	Y	Y	-	-	15	*
2A	6X10	70	*	*	2	Y	Y	-	-	-	*
2B	6X10	70	*	*	2	Y	Y	-	-	-	*
3A	6X60	0	*	*	3	Y	Y	-	-	-	*
4A	6X60	0	*	*	4	Y	Y	-	-	10	*
5A	6X60	0	*	*	5	Y	Y	-	-	-	*
6A	6X10	70	*	*	6	Y	Y	-	-	-	*
6B	6X10	70	*	*	6	Y	Y	-	-	-	*
7A	6X60	0	*	*	7	Y	Y	-	-	-	*
7B	6X60	0	*	*	7	Y	Y	-	-	-	*
8A	6X60	0	*	*	8	Y	Y	-	-	-	*

* Video Detection Zone

7 Phase Fully Actuated Gilead Road Closed Loop 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 5 may be lagged.
- The order of phase 3 and phase 7 may be reversed.
- Reposition existing signal head numbered 21,22, and 81.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1753

LEGEND

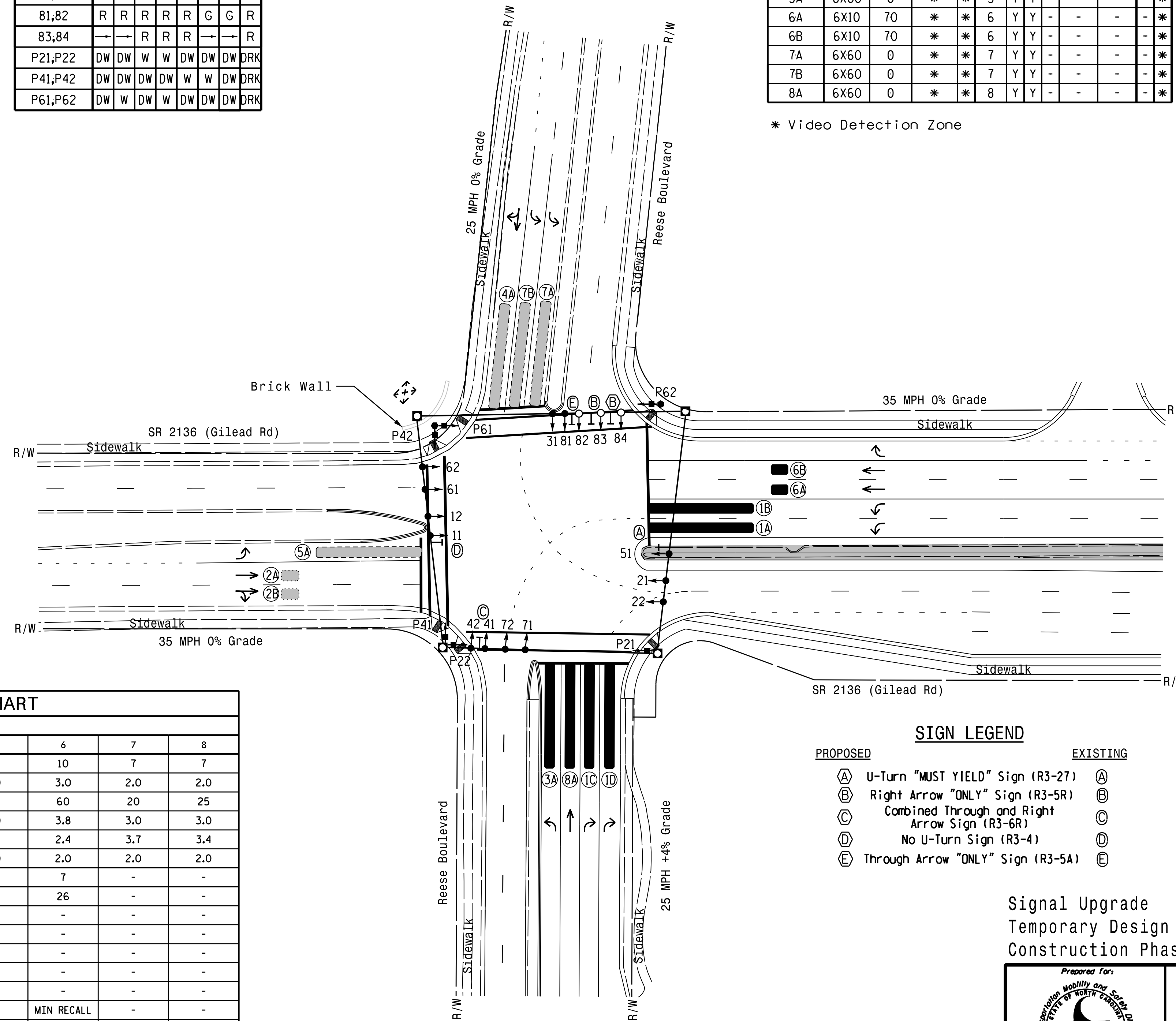
- | PROPOSED | EXISTING |
|----------|----------|
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| | |

SIGN LEGEND

- | PROPOSED | EXISTING |
|---|----------|
| (A) U-Turn "MUST YIELD" Sign (R3-27) | (A) |
| (B) Right Arrow "ONLY" Sign (R3-5R) | (B) |
| (C) Combined Through and Right Arrow Sign (R3-6R) | (C) |
| (D) No U-Turn Sign (R3-4) | (D) |
| (E) Through Arrow "ONLY" Sign (R3-5A) | (E) |

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	30	60	15	25	15	60	20	25
Yellow Clearance	3.0	3.8	3.0	3.2	3.0	3.8	3.0	3.0
Red Clearance	3.5	2.4	3.4	3.3	3.4	2.4	3.7	3.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	7	-	7	-	-
Don't Walk 1	-	26	-	25	-	26	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

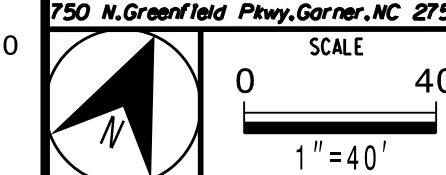
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



Signal Upgrade
Temporary Design 3
Construction Phases IV,V

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

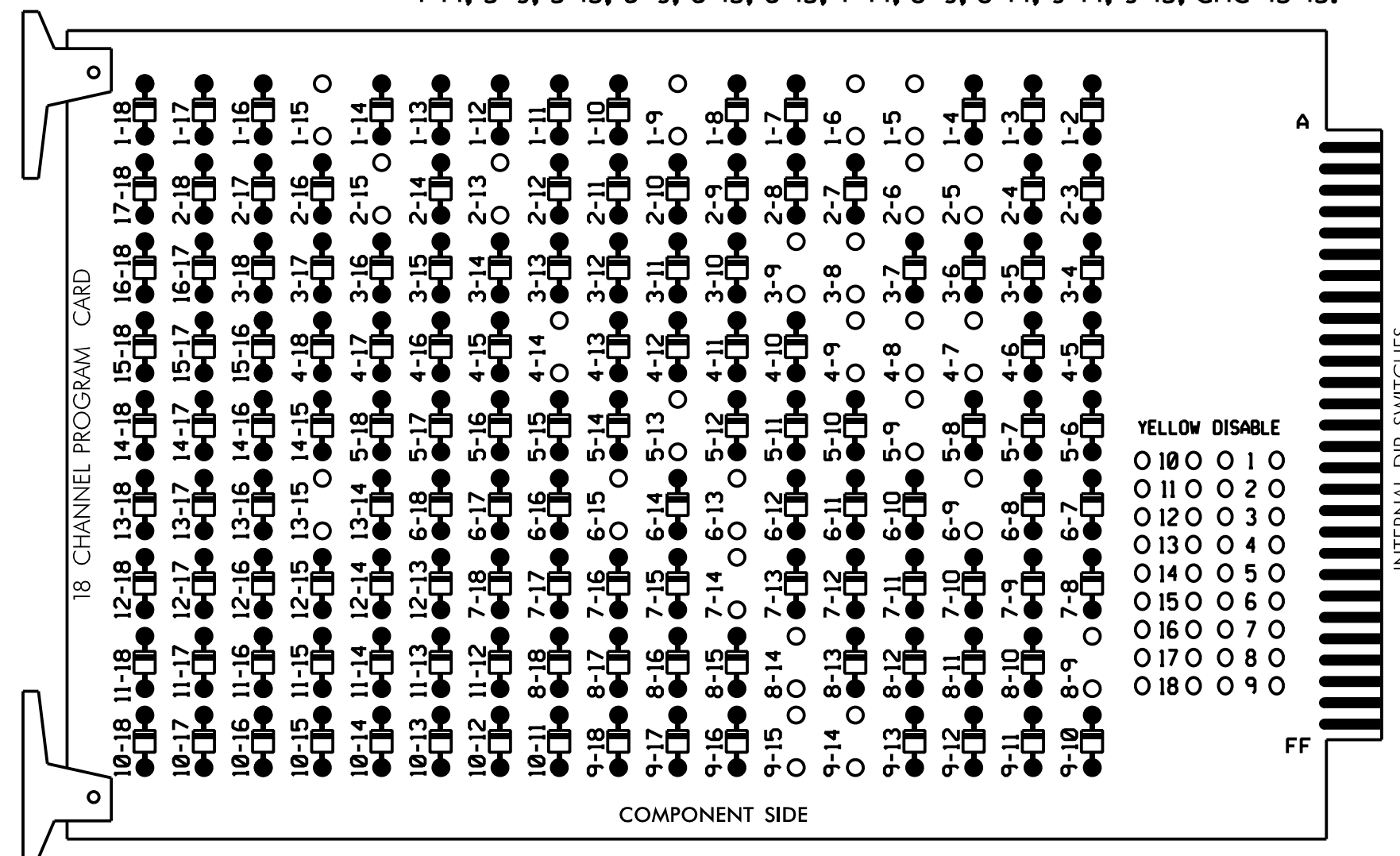
 Prepared For: Transportation Mobility and Safety Group FEDERAL HIGHWAY ADMINISTRATION SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529	SR 2136 (Gilead Road) at Reese Boulevard		SEAL W. TASHA R. SIMONS ENGINEER 031464
	Division 10 Mecklenburg Co., Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simons	REVISIONS INIT. DATE _____ _____	



EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



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 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Ensure that jumper SEL9 is removed from the monitor board.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 10,11, 12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2, 4, and 6 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
7. The cabinet and controller are part of the Gilead Road Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	21,22	P21, P22	31	41,42	P41, P42	51	61,62	P61, P62	62	71,72	81,82	NU	83,84	NU	NU	NU	NU
RED		128			101			134			107		A121					
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125				116			131			122							
YELLOW ARROW	126				117			132			123	123					A122	
GREEN ARROW	127				118			133			124	124					A123	
Hand			113			104			119									
Walking Person			115			106			121									

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....EXISTING 332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S7,S8,S9
 PHASES USED.....1,2,2 PED,3,4,4 PED,5,6,6 PED,7,8
 OVERLAP "A".....1+8
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....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.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```

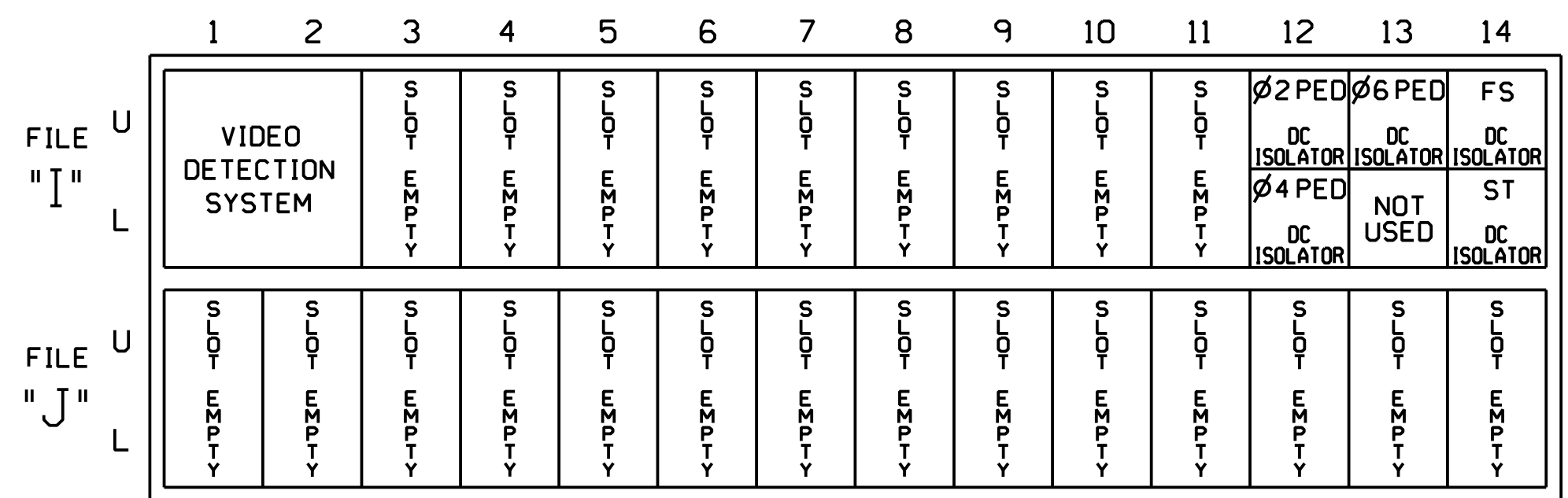
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X X
VEH OVL NOT VEH: X
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-25.5 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0.0
    
```

← NOTICE "N"

OVERLAP PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)



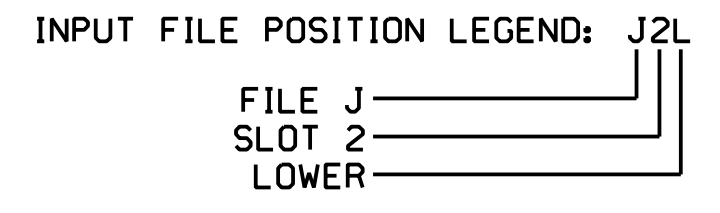
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
PED PUSH BUTTONS											
P21,P22	T88-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	T88-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	T88-7,9	I13U	68	30	PED 6	6 PED					

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



PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1	NEXT: PAGES					
RNG:LEAD	BARRIER 1	X-LAG:LEAD	BARRIER 2	X-LAG		
1 : 1	2 0	0 : 0	4 0	3 0		
2 : 5	6 0	0 : 7	8 0	0 0		
3 : 0	0 0	0 : 0	0 0	0 0		
4 : 0	0 0	0 : 0	0 0	0 0		

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1753 T3
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 2
 Signal Upgrade
 Temporary Design 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:

 SR 2136 (Gilead Road) at Reese Boulevard
 Division 10 Mecklenburg Co. Huntersville
 PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
 PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons
 Revisions table with columns for REVISIONS, INITI., and DATE.
 Signature of Natasha R. Simmons, dated 4/23/2018.
 SIG. INVENTORY NO. 10-1753 T3

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 10-1753 T3
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A


Electrical Detail - Sheet 2 of 2
 Signal Upgrade
 Temporary Design 3

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

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

ELECTRICAL AND PROGRAMMING
 DETAILS FOR:

Prepared in the Offices of:



750 N. Greenfield Pkwy, Corner, NC 27529

SR 2136 (Gilead Road)
 at
 Reese Boulevard

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek

PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

REVISIONS	INIT.	DATE

SEAL
 NORTH CAROLINA
 PROFESSIONAL
 SEAL
 031464
 ENGINEER
 NATASHA R. SIMMONS

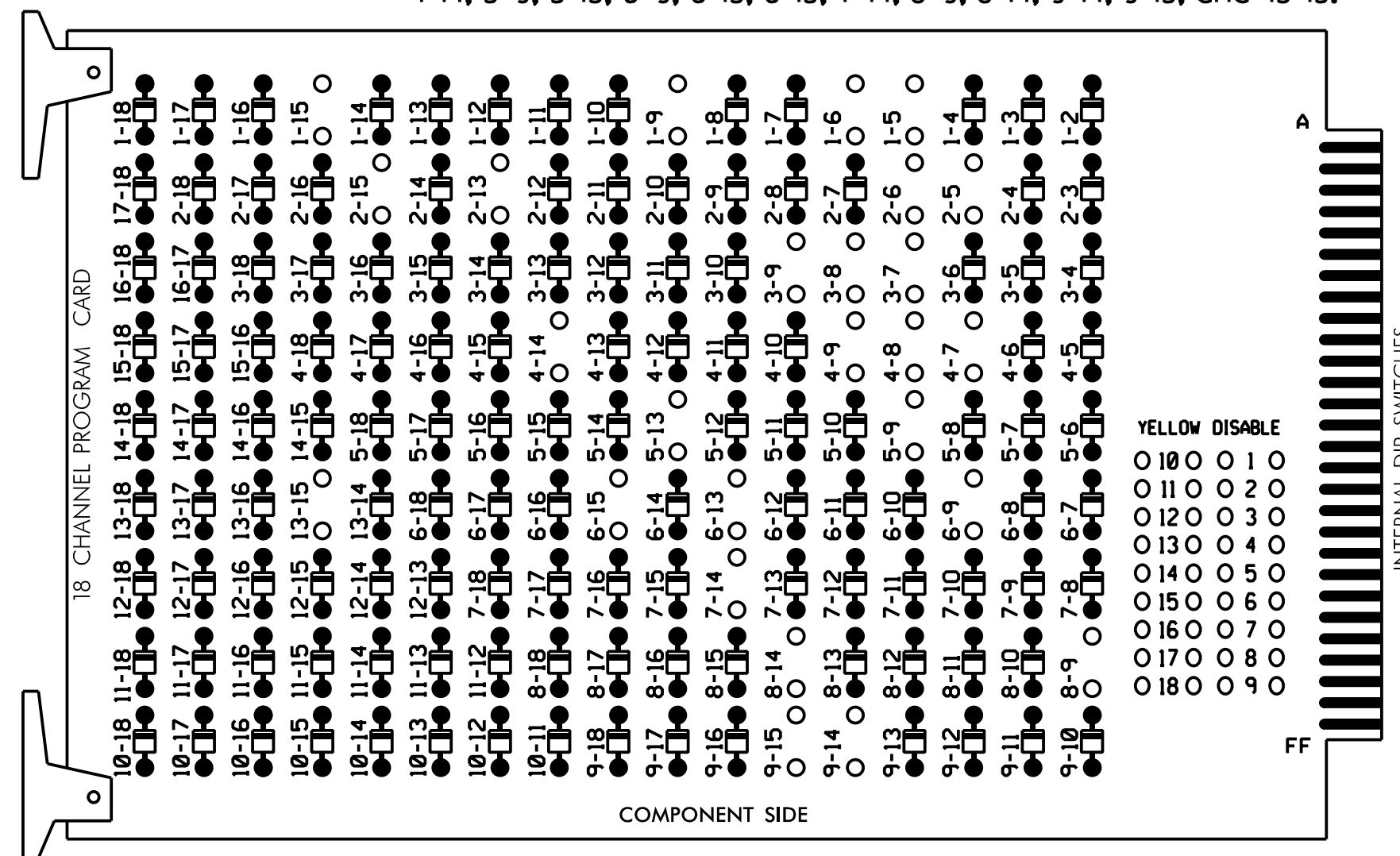
DocuSigned by:
 Natasha R. Simmons
 SIGNATURE DATE 4/23/2018

SIG. INVENTORY NO. 10-1753 T3

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

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



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 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Ensure that jumper SEL9 is removed from the monitor board.

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. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 10,11, 12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2, 4, and 6 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
7. The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....EXISTING 332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S7,S8,S9
 PHASES USED.....1,2,2 PED,3,4,4 PED,5,6,6 PED,7,8
 OVERLAP "A".....1+8
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
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	21,22	P21, P22	31	41,42	P41, P42	51	61,62	P61, P62	62	71,72	81,82	NU	83,84	NU	NU	NU	NU
RED		128			101			134			107		A121					
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW	125				116			131			122							
YELLOW ARROW	126				117			132			123	123		A122				
GREEN ARROW	127				118			133			124	124		A123				
Hand icon					113			104			119							
Walking person icon					115			106			121							

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.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

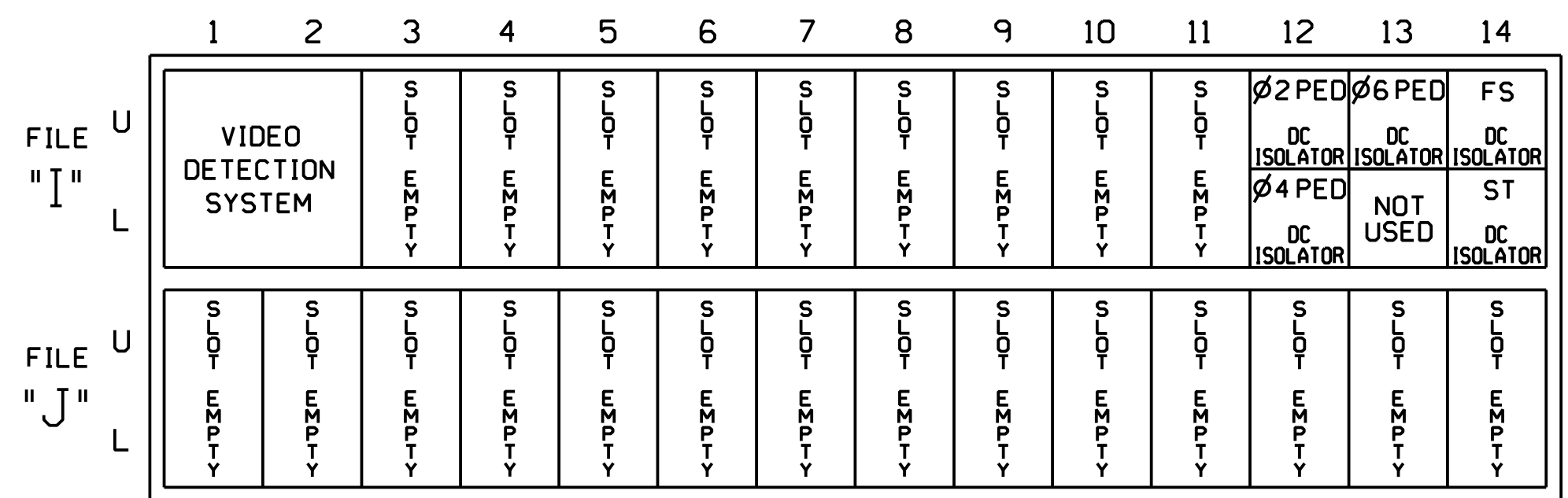
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
 PHASE: 12345678910111213141516
 VEH OVL PARENTS: X X
 VEH OVL NOT VEH: X
 VEH OVL NOT PED: X
 VEH OVL GRN EXT: X
 STARTUP COLOR: - RED - YELLOW - GREEN
 FLASH COLORS: - RED - YELLOW - GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?..N
 GREEN EXTENSION (0-25.5 SEC).....0
 YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
 RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
 OUTPUT AS PHASE # (0=NONE, 1-16).....0

← NOTICE "N"

OVERLAP PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

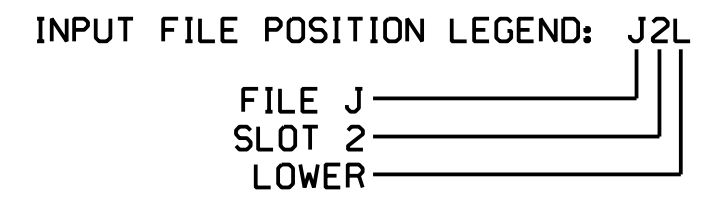
SPECIAL DETECTOR NOTE

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
PED PUSH BUTTONS											
P21,P22	T88-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	T88-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	T88-7,9	I13U	68	30	PED 6	6 PED					

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



! IMPORTANT: RESTORE TO FACTORY DEFAULT !

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1	NEXT: PAGES
RNG:LEAD	BARRIER 1 X-LAG:LEAD BARRIER 2 X-LAG
1 1 2 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0
2 5 6 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0
3 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0
4 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0

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 NC license No: C-1554
 (919) 546-8997

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1753
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 2
Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 2136 (Gilead Road) at Reese Boulevard

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek

PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

REVISIONS: INITI. DATE

DocuSigned by: *Notasha R. Simmons* 4/23/2018

SIGNATURE DATE

SIG. INVENTORY NO. 10-1753

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 10-1753
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

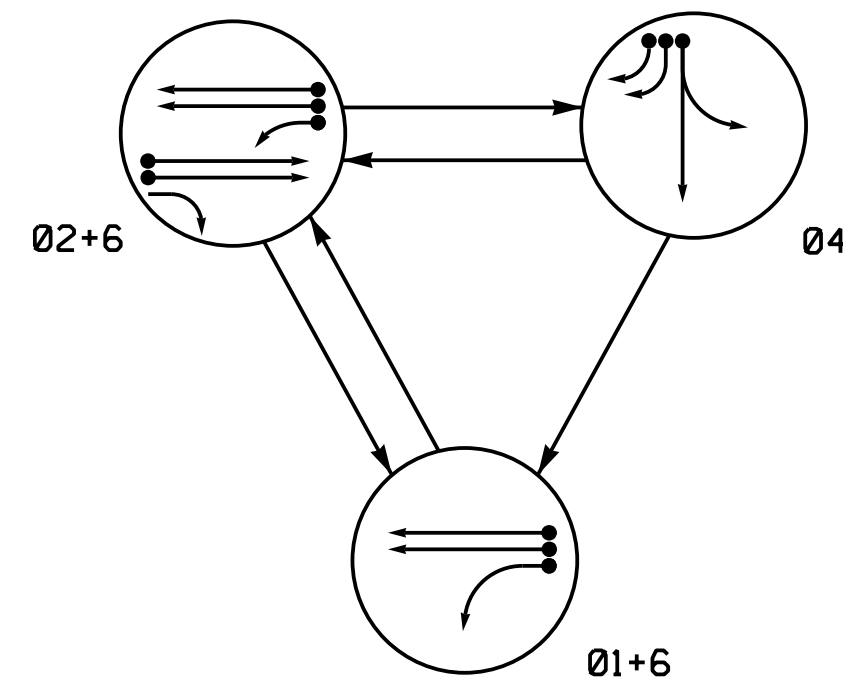
Electrical Detail - Sheet 2 of 2
 Final Design

**DOCUMENT NOT CONSIDERED FINAL
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<p style="font-size: small;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: x-small; text-align: center;">Prepared in the Offices of:</p> <p style="font-size: x-small; text-align: center;">750 N. Greenfield Pkwy, Corner, NC 27529</p>	<p>SR 2136 (Gilead Road) at Reese Boulevard</p> <p style="font-size: x-small;">Division 10 Mecklenburg Co. Huntersville</p> <p style="font-size: x-small;">PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek</p> <p style="font-size: x-small;">PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons</p>	<p style="font-size: x-small;">SEAL</p> <p style="font-size: x-small;">SEAL 031464 NATASHA R. SIMMONS</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> <tr> <td style="height: 20px;"> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE										<p style="font-size: x-small;">DocuSigned by: DATE: 4/23/2018</p> <p style="font-size: x-small;">SIG. INVENTORY NO. 10-1753</p>
REVISIONS	INIT.	DATE												

PHASING DIAGRAM

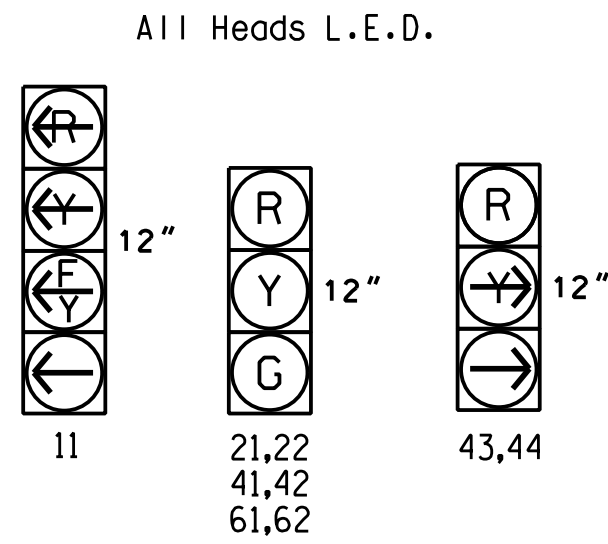


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	01+6	02+6	04	FLASH
11	—	Y	R	Y
21,22	R	G	R	Y
41,42	R	R	G	R
43,44	R	R	—	R
61,62	G	G	R	Y

SIGNAL FACE I.D.



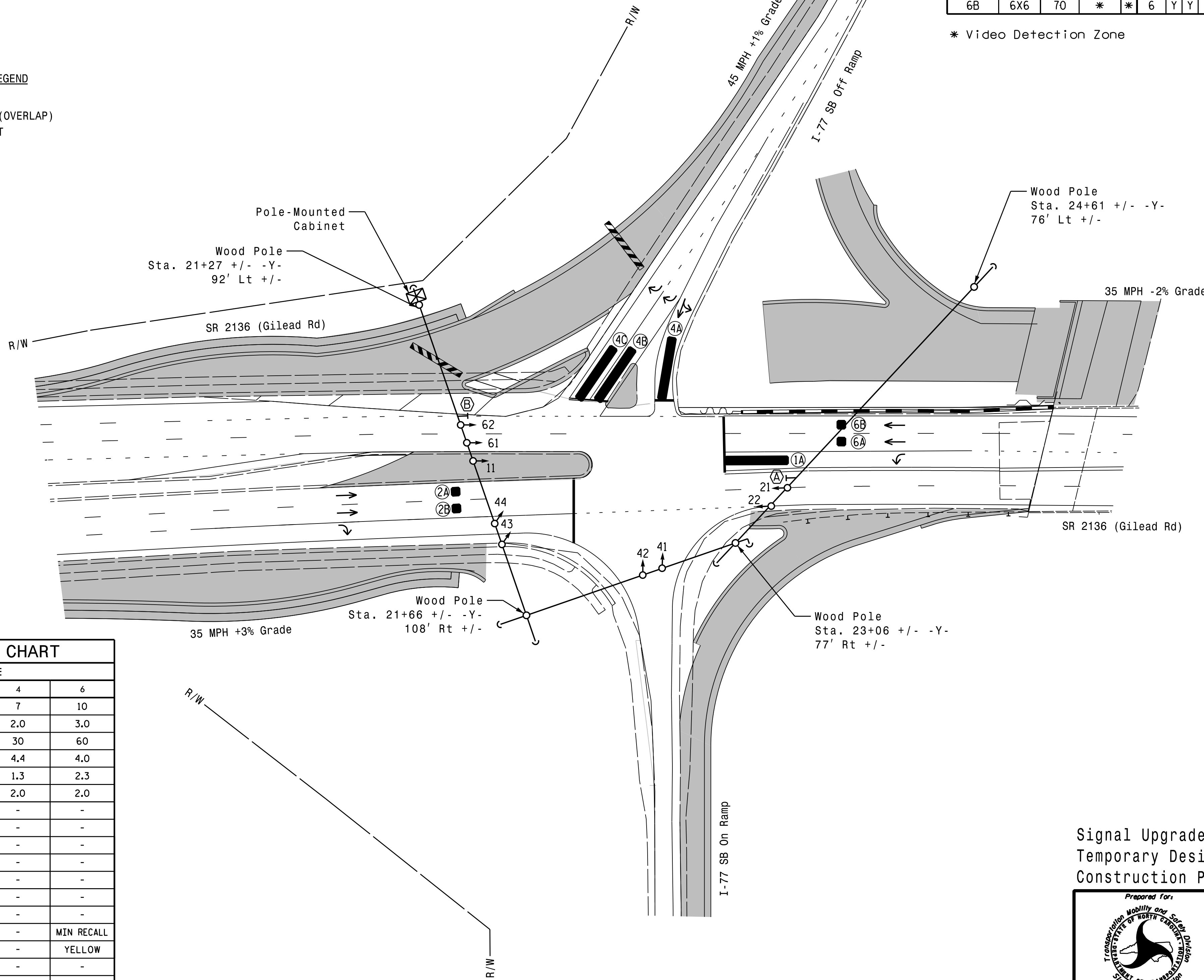
INDUCTIVE LOOPS				DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	PHASE	CALLING	EXTENSION	STRETCH TIME		
1A	6X40	0	*	1	Y	Y	-	15	-
2A	6X6	70	*	2	Y	Y	-	-	-
2B	6X6	70	*	2	Y	Y	-	-	-
4A	6X40	0	*	4	Y	Y	-	-	-
4B	6X40	0	*	4	Y	Y	-	15	-
4C	6X40	0	*	4	Y	Y	-	15	-
6A	6X6	70	*	6	Y	Y	-	-	-
6B	6X6	70	*	6	Y	Y	-	-	-

* Video Detection Zone

3 Phase Fully Actuated Gilead Road Closed Loop 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.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1106



FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	25	60	30	60
Yellow Clearance	3.0	4.0	4.4	4.0
Red Clearance	2.1	2.3	1.3	2.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

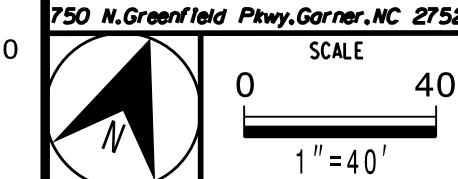
PROPOSED		EXISTING	
○ →	Traffic Signal Head	● →	N/A
○ →	Modified Signal Head	—	N/A
□ →	Sign	—	N/A
○ →	Pedestrian Signal Head With Push Button & Sign	—	N/A
○ →	Signal Pole with Guy	—	N/A
○ →	Signal Pole with Sidewalk Guy	—	N/A
□	Inductive Loop Detector	□	N/A
□	Controller & Cabinet	□	N/A
□	Junction Box	□	N/A
—	2-in Underground Conduit	—	N/A
N/A	Right of Way	—	N/A
→	Directional Arrow	→	N/A
—	Video Detection Zone	—	N/A
—	Directional Drill	—	N/A
▲	Wheelchair Ramp	▲	N/A
■	Construction Zone	■	N/A
■	Construction Barrier	■	N/A
ⓐ	No U-Turn/No Left Turn Sign (R3-18)	ⓐ	N/A
ⓑ	No Right Turn Sign (R3-11)	ⓑ	N/A

Signal Upgrade Temporary Design 1 Construction Phase I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at I-77 SB Ramps		
	Division 10 Mecklenburg Co., Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	REVISIONS: _____ INITI. _____ DATE _____ DocuSigned by: <i>Natasha R. Simmons</i> 4/23/2018 SIGNATURE DATE SIG. INVENTORY NO. 10-1106 T1	

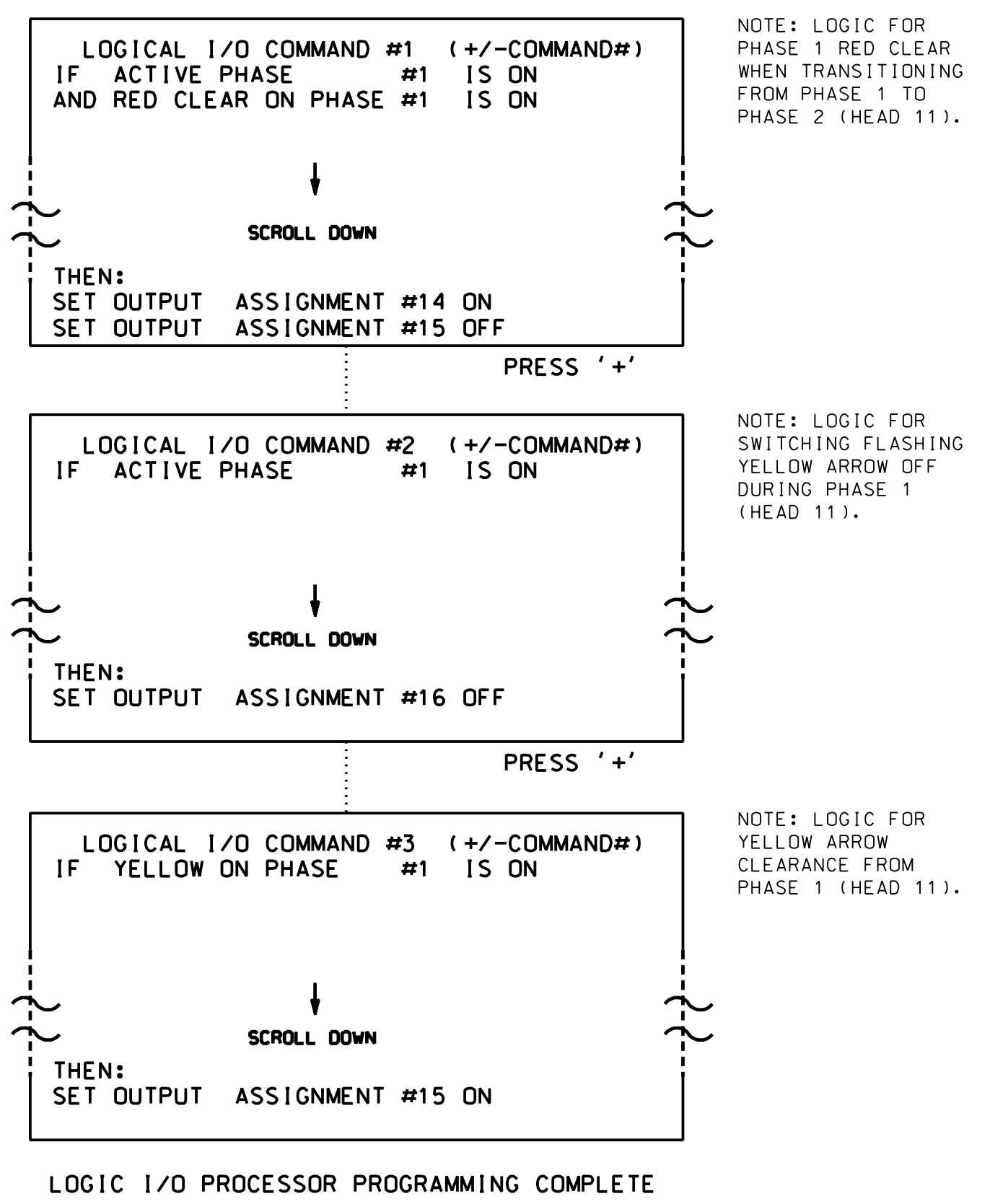
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LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, and 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



<u>OUTPUT REFERENCE SCHEDULE</u>
OUTPUT 14 = Overlap A Red
OUTPUT 15 = Overlap A Yellow
OUTPUT 16 = Overlap A Green

Note: All outputs shown above have been remapped. See sheet 3 of this electrical detail.

OVERLAP PROGRAMMING DETAIL (program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:      |12345678910111213141516
VEH OVL PARENTS:|XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS:  - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1106T1
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 2 of 3
Signal Upgrade
Temporary Design 1

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ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2136 (Gilead Road) at I-77 SB Ramps	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATASHA R. SIMMONS
Prepared in the Offices of: 	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	DocuSigned by: DATE: 4/23/2018
1750 N. Greenfield Pkwy, Corner, NC 27529	REVISIONS INIT. DATE	SIG. INVENTORY NO. 10-1106 T1

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR LOADSWITCHES S1 & S3 (SIGNAL HEAD 11)

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS),
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "14"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:16 VEHICLE PHASE.....14
OUTPUT ASSIGNMENT #.....0.0
FREQUENCY (0=DEFAULT) (0-25.5 HZ).....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%).....0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

Overlap A Red

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:16 VEHICLE PHASE.....14
SELECT VEHICLE OVERLAP (A=1,P=16).....1
SELECT COLOR(0=RED,1=YEL,2=GRN).....0

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA.
THEN 'ESC'.

```

PAGE:1 C1 PIN:16 VEHICLE OVERLAP.....14
OUTPUT ASSIGNMENT #.....0.0
FREQUENCY (0=DEFAULT) (0-25.5 HZ).....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%).....0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS "+" KEY FOR OUTPUT 15

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:17 VEHICLE PHASE.....15
OUTPUT ASSIGNMENT #.....0.0
FREQUENCY (0=DEFAULT) (0-25.5 HZ).....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%).....0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

Overlap A Yellow

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:17 VEHICLE PHASE.....15
SELECT VEHICLE OVERLAP (A=1,P=16).....1
SELECT COLOR(0=RED,1=YEL,2=GRN).....1

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA.
THEN 'ESC'.

```

PAGE:1 C1 PIN:17 VEHICLE OVERLAP.....15
OUTPUT ASSIGNMENT #.....0.0
FREQUENCY (0=DEFAULT) (0-25.5 HZ).....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%).....0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS "+" KEY FOR OUTPUT 16

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:18 VEHICLE PHASE.....16
OUTPUT ASSIGNMENT #.....0.0
FREQUENCY (0=DEFAULT) (0-25.5 HZ).....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%).....0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

Overlap A Green

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:18 VEHICLE PHASE.....16
SELECT VEHICLE OVERLAP (A=1,P=16).....1
SELECT COLOR(0=RED,1=YEL,2=GRN).....2

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA.
THEN 'ESC'.

```

PAGE:1 C1 PIN:18 VEHICLE OVERLAP.....16
OUTPUT ASSIGNMENT #.....0.0
FREQUENCY (0=DEFAULT) (0-25.5 HZ).....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%).....0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS "+" UNTIL OUTPUT 33
IS REACHED.

```

PAGE:1 C1 PIN:35 NOT ENABLED.....33
OUTPUT ASSIGNMENT #.....0.0
FREQUENCY (0=DEFAULT) (0-25.5 HZ).....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%).....0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

Phase 1 Green

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT. THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE PHASE.

```

PAGE:1 C1 PIN:35 NOT ENABLED.....33
SELECT VEHICLE PHASE (1-16).....1
SELECT COLOR(0=RED,1=YEL,2=GRN).....2

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:35 VEHICLE PHASE.....33
OUTPUT ASSIGNMENT #.....0.0
FREQUENCY (0=DEFAULT) (0-25.5 HZ).....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%).....0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

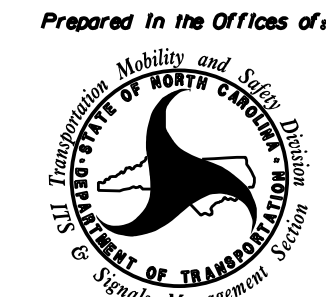
OUTPUT PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1106T1
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 3 of 3
Signal Upgrade
Temporary Design 1

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ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared in the Office of:

 Department of Transportation
 Division of Signal Management

750 N. Greenfield Pkwy, Corner, NC 27529

SR 2136 (Gilead Road) at I-77 SB Ramps	
Division 10	Mecklenburg Co. Huntersville
PLAN DATE: December 2017	REVIEWED BY: A.D. Klinsky
PREPARED BY: A.H. Thornburg	REVIEWED BY: N.R. Simmons
REVISIONS	INIT. DATE

SEAL



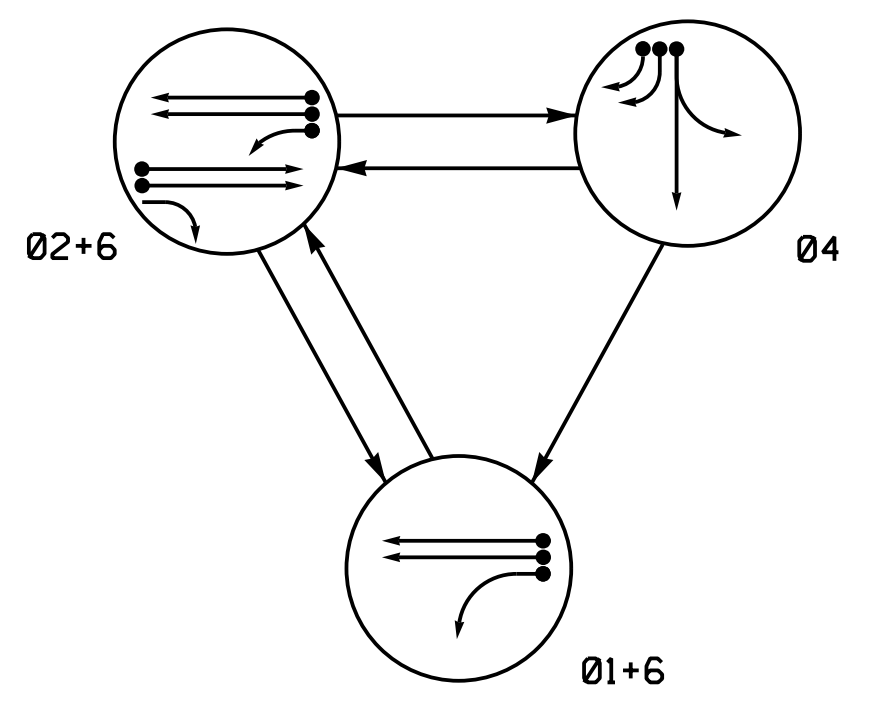
DocuSigned by:
 Natasha R. Simmons
 DATE: 4/23/2018

SIG. INVENTORY NO. 10-1106 T1

HNTB

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 343 E. Six Forks Road, Suite 200
 Raleigh, North Carolina 27609
 NC License No: C-1554
 (919) 546-8997

PHASING DIAGRAM

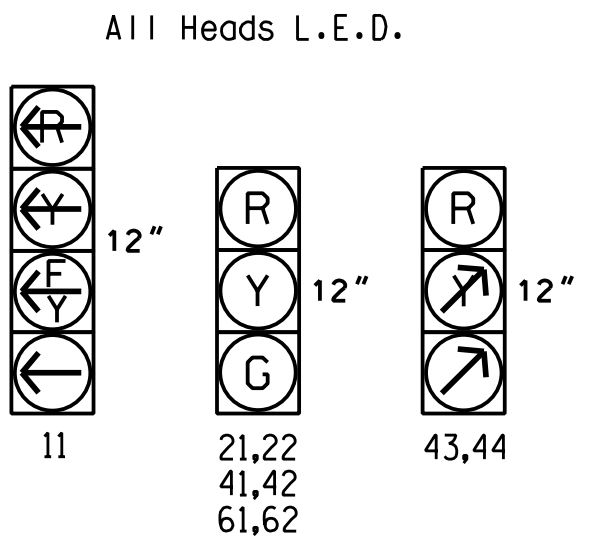


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	01+6	02+6	03+6	04
11	—	—	—	—
21,22	R	G	R	Y
41,42	R	R	G	R
43,44	R	R	—	R
61,62	G	G	R	Y

SIGNAL FACE I.D.



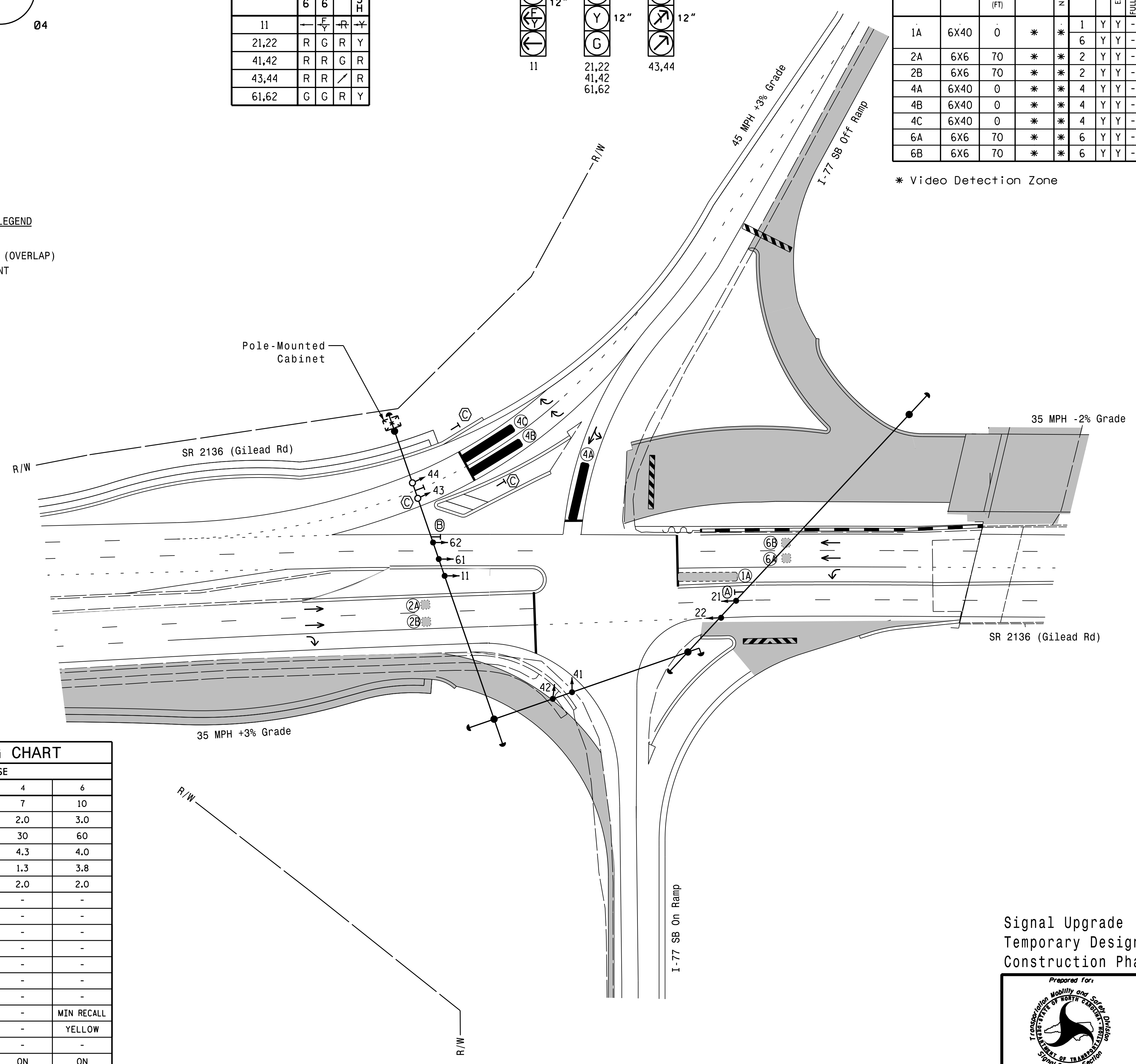
OASIS 2070E LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	*	1	Y	Y	-	-	15	-	*
2A	6X6	70	*	*	2	Y	Y	-	-	-	-	*
2B	6X6	70	*	*	2	Y	Y	-	-	-	-	*
4A	6X40	0	*	*	4	Y	Y	-	-	-	-	*
4B	6X40	0	*	*	4	Y	Y	-	-	-	-	*
4C	6X40	0	*	*	4	Y	Y	-	-	-	-	*
6A	6X6	70	*	*	6	Y	Y	-	-	-	-	*
6B	6X6	70	*	*	6	Y	Y	-	-	-	-	*

* Video Detection Zone

3 Phase Fully Actuated Gilead Road Closed Loop 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.
- Set all detector units to presence mode.
- Reposition existing signal heads numbered 41 and 42.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1106



OASIS 2070E TIMING CHART				
FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	25	60	30	60
Yellow Clearance	3.0	4.0	4.3	4.0
Red Clearance	1.9	3.8	1.3	3.8
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

PROPOSED		EXISTING	
○	Traffic Signal Head	●	N/A
○	Modified Signal Head	○	N/A
—	Sign	—	N/A
—	Pedestrian Signal Head With Push Button & Sign	—	N/A
—	Signal Pole with Guy	—	N/A
—	Signal Pole with Sidewalk Guy	—	N/A
—	Inductive Loop Detector	—	N/A
—	Controller & Cabinet	—	N/A
—	Junction Box	—	N/A
—	2-in Underground Conduit	—	N/A
—	Right of Way	—	N/A
→	Directional Arrow	→	N/A
—	Video Detection Zone	—	N/A
—	Directional Drill	—	N/A
—	Wheelchair Ramp	—	N/A
—	Construction Zone	—	N/A
—	Construction Barrier	—	N/A
(A)	No U-Turn/No Left Turn Sign (R3-18)	(A)	N/A
(B)	No Right Turn Sign (R3-1)	(B)	N/A
(C)	"NO TURN ON RED" Sign (R10-11)	(C)	N/A

Signal Upgrade
Temporary Design 2
Construction Phases II,III

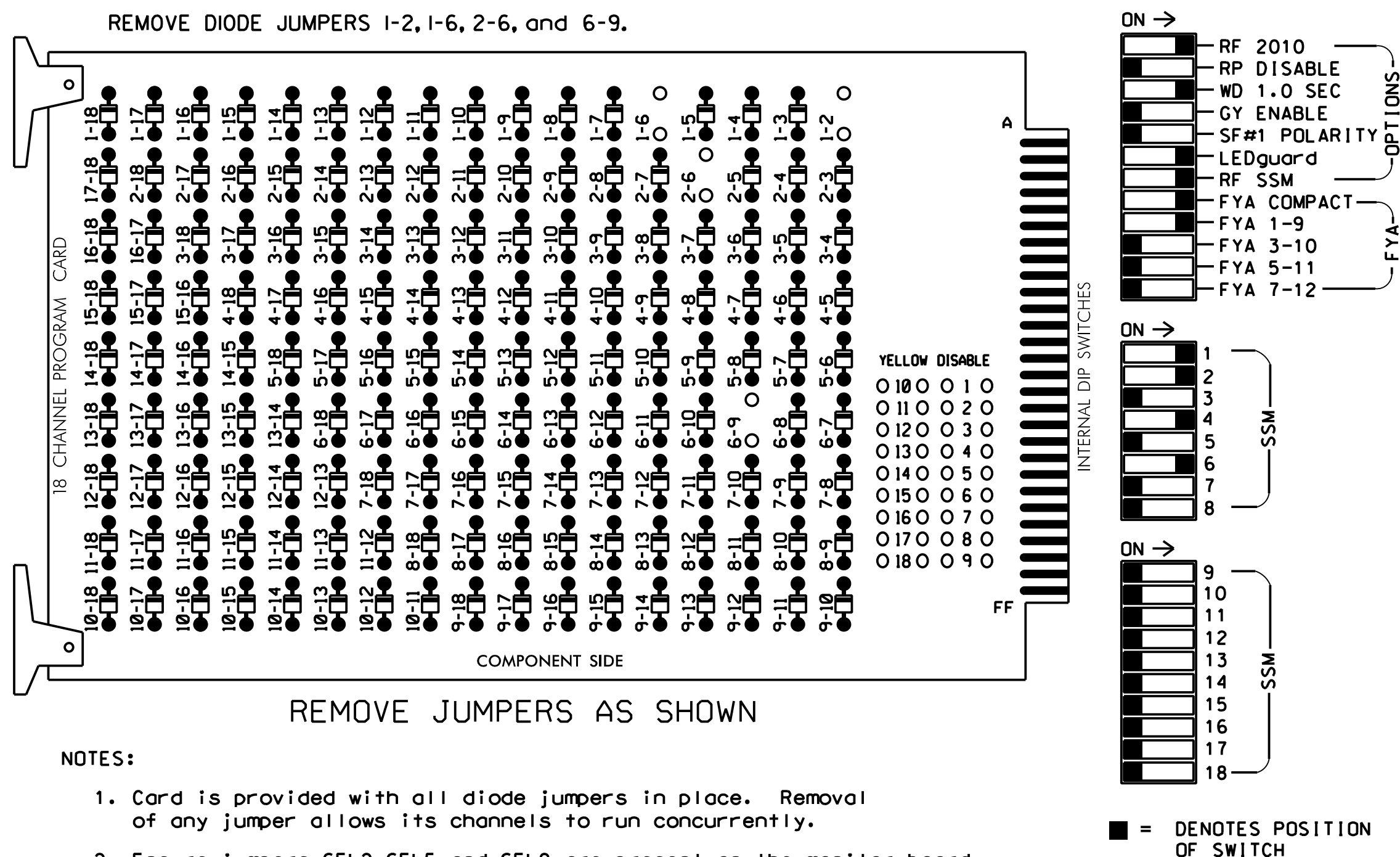
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at I-77 SB Ramps		
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	SCALE 0 40 1"=40'	

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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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
- The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S3,S5,S8
 PHASES USED.....1,2,4,6
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

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	9	13	3	4	14	5	6	15	7	8
PHASE	OLA	2	1 GRN	2 PED	3	4	4 PED	5	6	6 PED	7	8
SIGNAL HEAD NO.	11	21,22	11	NU	NU	41,42	43,44	NU	NU	61,62	NU	NU
RED		128			101	101				134		
YELLOW		129			102					135		
GREEN		130			103					136		
RED ARROW	125											
YELLOW ARROW	126				102							
FLASHING YELLOW ARROW	127											
GREEN ARROW			114		103							
Hand icon				*								

NU = Not Used

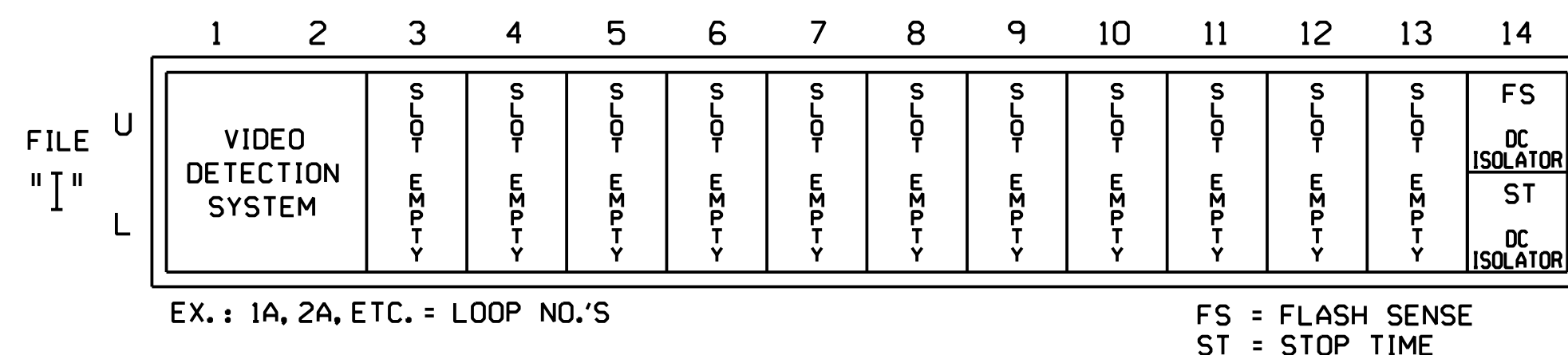
* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail this sheet.

NOTE: Load switches S1 and S3 require output remapping. See Sheet 3 of this electrical detail for instructions.

INPUT FILE POSITION LAYOUT

(front view)



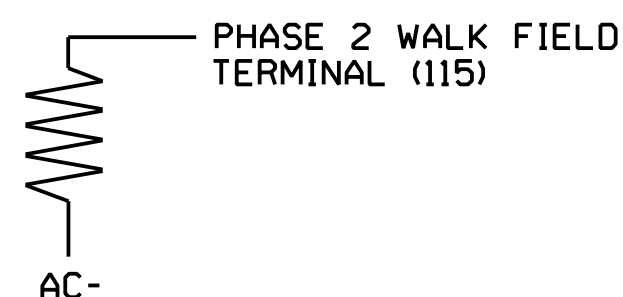
SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

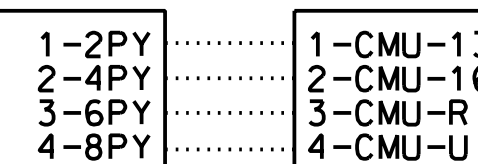
In order to use FYA COMPACT mode with the 2018ECLIP-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 2 PY (field term, 114) to chan. 9 green (monitor pin 13).

Follow the instructions below to make the appropriate connections:
 STEP 1: Fold down rear panel of output file.
 STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).

STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

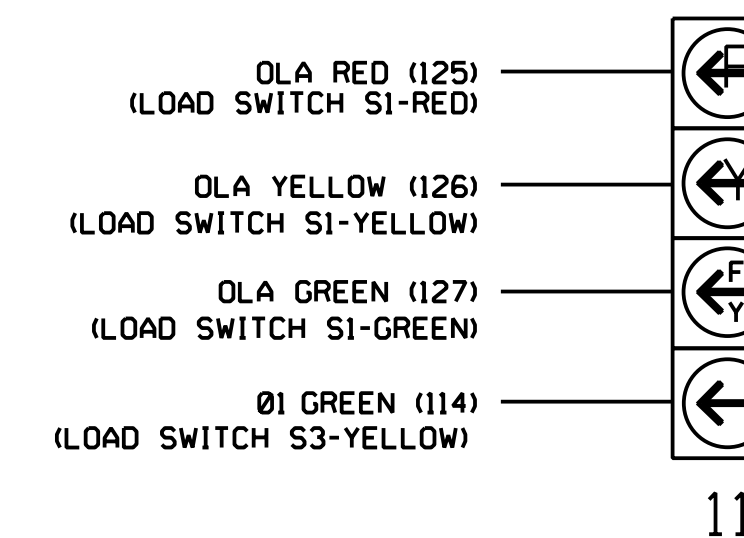
CMU-13 _____ 2PY (term. 114)

NOTE: Some cabinet manufacturers use keyed connectors to accomplish this wiring configuration. If connectors are used, fold down the rear panel of the output file and find the set of 3 keyed connectors and connect them as shown below:



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal head 11 requires special logic and output remapping. See sheets 2-3 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1106T2
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 3
 Signal Upgrade
 Temporary Design 2

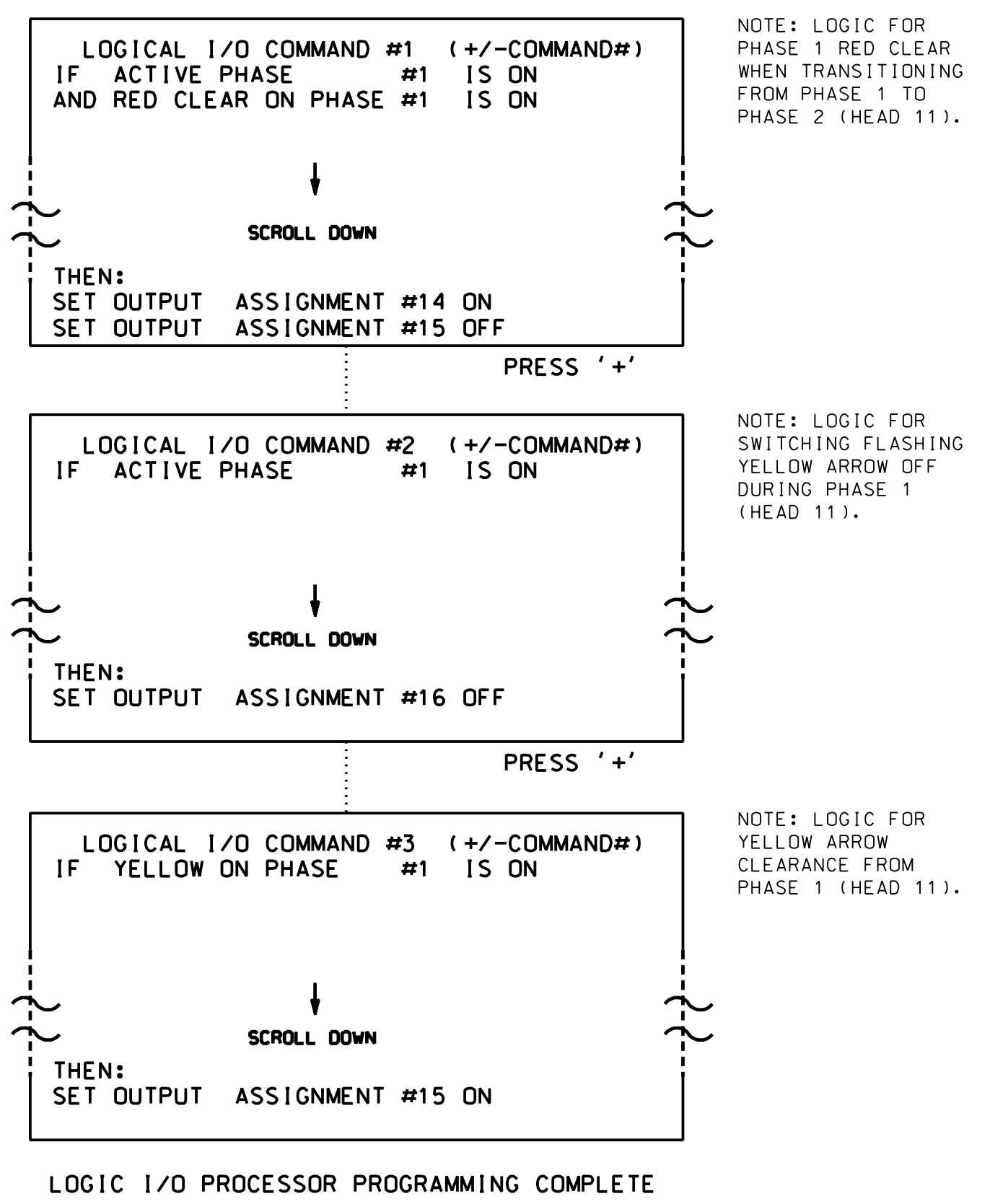
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<p>HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997</p>	SR 2136 (Gilead Road) at I-77 SB Ramps Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	SEAL SEAL 031464 NATASHA R. SIMMONS ENGINEER
	Revisions table with columns: REVISIONS, INITI., DATE.	Date: 4/23/2018 Signature: Natasha R. Simmons Date: _____ Signature: _____ Date: _____

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, and 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



<u>OUTPUT REFERENCE SCHEDULE</u>
OUTPUT 14 = Overlap A Red
OUTPUT 15 = Overlap A Yellow
OUTPUT 16 = Overlap A Green

Note: All outputs shown above have been remapped. See sheet 3 of this electrical detail.

OVERLAP PROGRAMMING DETAIL *(program controller as shown below)*

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:      |12345678910111213141516
VEH OVL PARENTS:|XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS:  - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1106T2
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 2 of 3
Signal Upgrade
Temporary Design 2

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(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2136 (Gilead Road) at I-77 SB Ramps	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATASHA R. SIMMONS
Prepared in the Offices of: Division of Signal Management	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	DocuSigned by: NATASHA R. SIMMONS
750 N. Greenfield Pkwy, Corner, NC 27529	REVISIONS INIT. DATE	4/23/2018 DATE SIG. INVENTORY NO. 10-1106 T2

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR LOADSWITCHES S1 & S3 (SIGNAL HEAD 11)

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS), WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "14"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1 C1 PIN:16 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

Overlap A Red

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1 C1 PIN:16 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN)....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA.
THEN 'ESC'.

```
PAGE:1 C1 PIN:16 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

PRESS "+" KEY FOR OUTPUT 15

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1 C1 PIN:17 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

Overlap A Yellow

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1 C1 PIN:17 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN)....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA.
THEN 'ESC'.

```
PAGE:1 C1 PIN:17 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....15
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

PRESS "+" KEY FOR OUTPUT 16

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1 C1 PIN:18 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

Overlap A Green

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1 C1 PIN:18 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN)....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA.
THEN 'ESC'.

```
PAGE:1 C1 PIN:18 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....16
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

PRESS "+" UNTIL OUTPUT 33 IS REACHED.

```
PAGE:1 C1 PIN:35 NOT ENABLED
OUTPUT ASSIGNMENT #.....33
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

Phase 1 Green

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE PHASE.

```
PAGE:1 C1 PIN:35 NOT ENABLED
SELECT VEHICLE PHASE (1-16).....1
SELECT COLOR(0=RED,1=YEL,2=GRN)....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE' THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

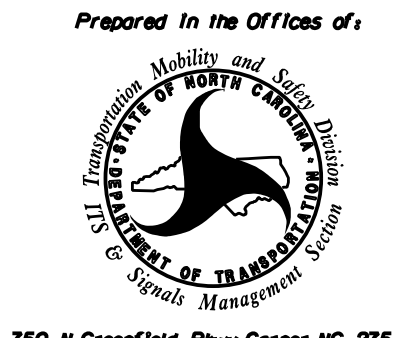
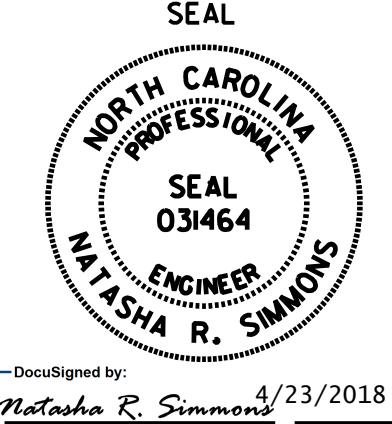
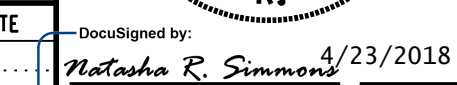
```
PAGE:1 C1 PIN:35 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....33
FREQUENCY (0=DEFAULT) (0-25.5 HZ)....0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

OUTPUT PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1106T2
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

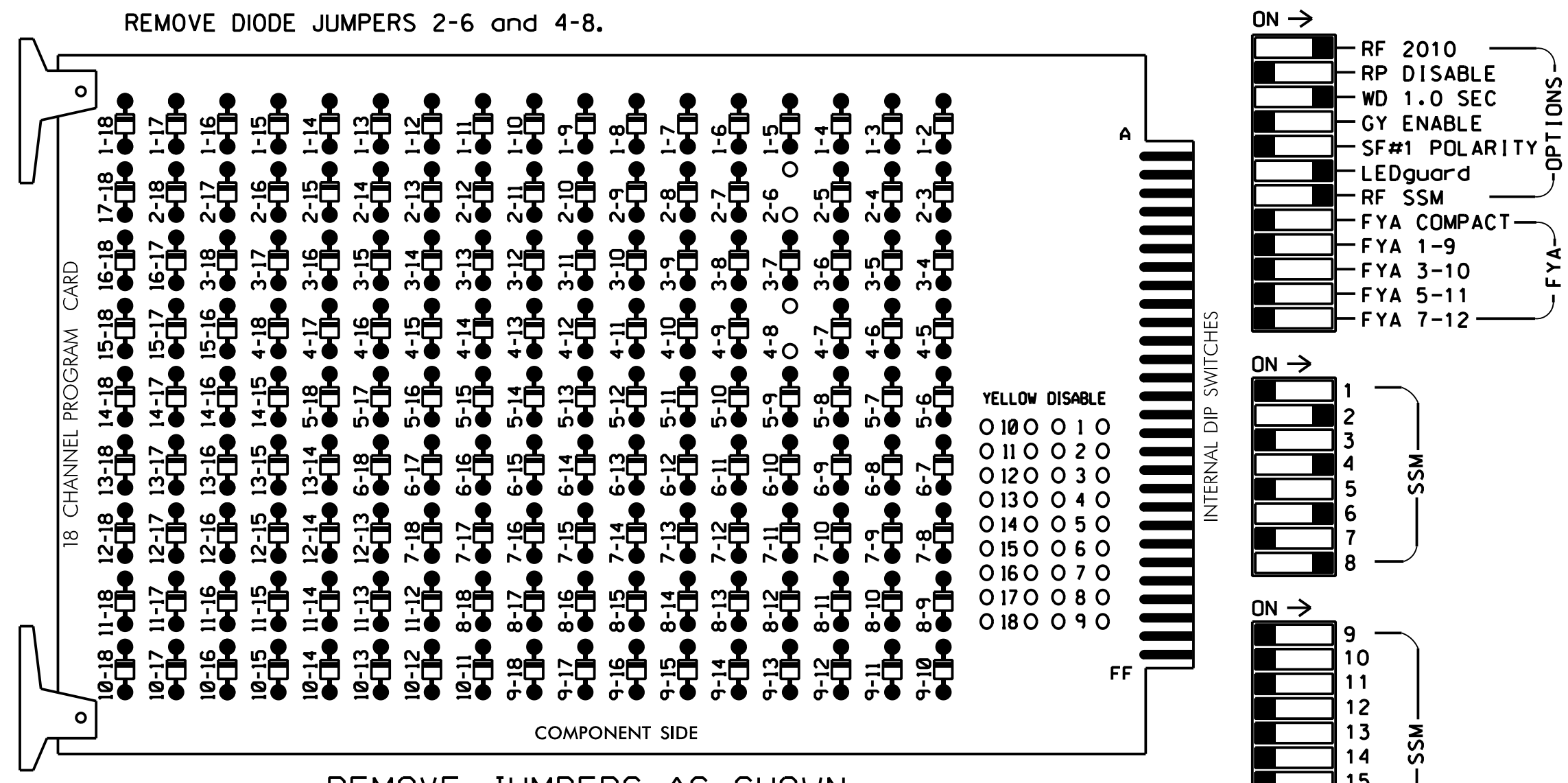
Electrical Detail - Sheet 3 of 3
Signal Upgrade
Temporary Design 2

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

	SR 2136 (Gilead Road) at I-77 SB Ramps								
	Division 10 Mecklenburg Co. Huntersville	PLAN DATE: December 2017 REVIEWED BY: A.D. Klinskyk PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons							
Revisions Table: <table border="1"> <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				DocuSigned by:  DATE: 4/23/2018 SIGNATURE DATE	
REVISIONS	INIT.	DATE							
HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997		SIG. INVENTORY NO. 10-1106 T2							

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.

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. Restore controller to factory defaults before programming per this electrical detail.
3. Program phases 2, 3, 4, 6, and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all Phases.
5. Program phases 2 and 6 for Startup In Green.
6. Program phases 2, 3, 4, 6, and 8 for Red Rest.
7. The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S5,S8,S11
 PHASES USED.....2,*3,4,6,8
 OVERLAPS.....NONE
 * PHASE USED FOR TIMING PURPOSES ONLY

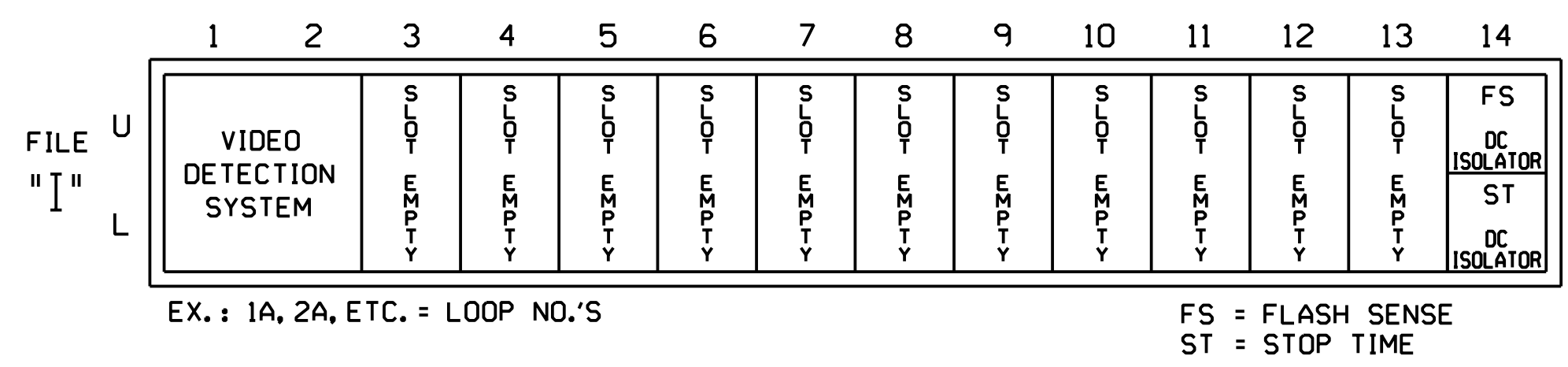
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
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	NC	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129									108	
GREEN												
RED ARROW					101							
YELLOW ARROW					102			135				
GREEN ARROW		130			103			136			109	
Hand icon												
Person icon												

NU = Not Used
 NC = Not Connected

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1	NEXT: PAGES					
RNG:LEAD	BARRIER 1	X-LAG:LEAD	BARRIER 2	X-LAG		
1 :0 2	0 0	13 4	0 0	0 0		
2 :0 6	0 0	:0 8	0 0	0 0		
3 :0 0	0 0	:0 0	0 0	0 0		
4 :0 0	0 0	:0 0	0 0	0 0		

DYNAMIC OMIT CONTROL PROGRAMMING

(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```

DYNAMIC/BACKUP CONTROL FUNCTION #01
OVERLAPS: ABCDEFGHIJKLMNPO
IF OVERLAPS ARE ACTIVE :
OR PHASES: 12345678910111213141516
IF PHASES ARE ON: X X
OMIT PHASES: X
CALL PHASES: X
    
```

PRESS 'NEXT'

```

DYNAMIC/BACKUP CONTROL FUNCTION #02
OVERLAPS: ABCDEFGHIJKLMNPO
IF OVERLAPS ARE ACTIVE :
OR PHASES: 12345678910111213141516
IF PHASES ARE ON: X
OMIT PHASES: X
CALL PHASES: X
    
```

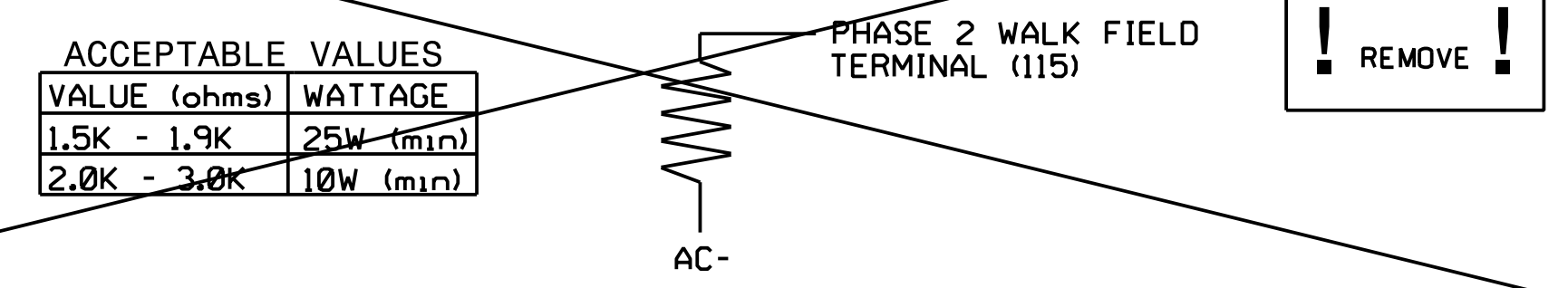
DYNAMIC OMIT PROGRAMMING COMPLETE

NOTE: THIS PROGRAMMING ENSURES THAT PHASE 3 WILL BE SERVED PRIOR TO PHASE 4 WHEN CONTROLLER IS ADVANCING FROM 2+6.

PHASE 3 IS USED TO PROVIDE EXTENDED RED CLEARANCE BEFORE SERVING PHASE 4.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1106T3-T4
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

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Electrical Detail
 Signal Upgrade
 Temporary Designs 3,4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 2136 (Gilead Road)
 at
 I-77 SB Ramps

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
 PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

REVISIONS: INITI. DATE

DocuSigned by: *Notasha R. Simmons* 4/23/2018
 SIGNATURE DATE
 SIG. INVENTORY NO. 10-1106T3-T4

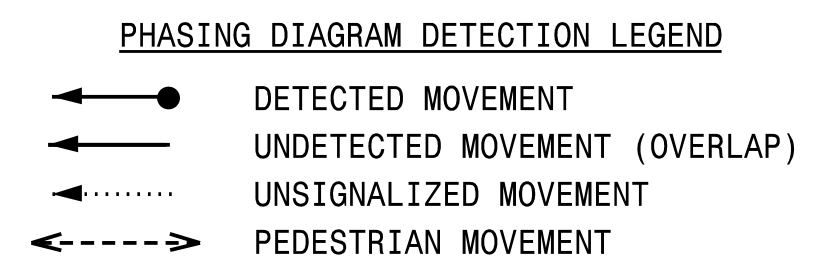
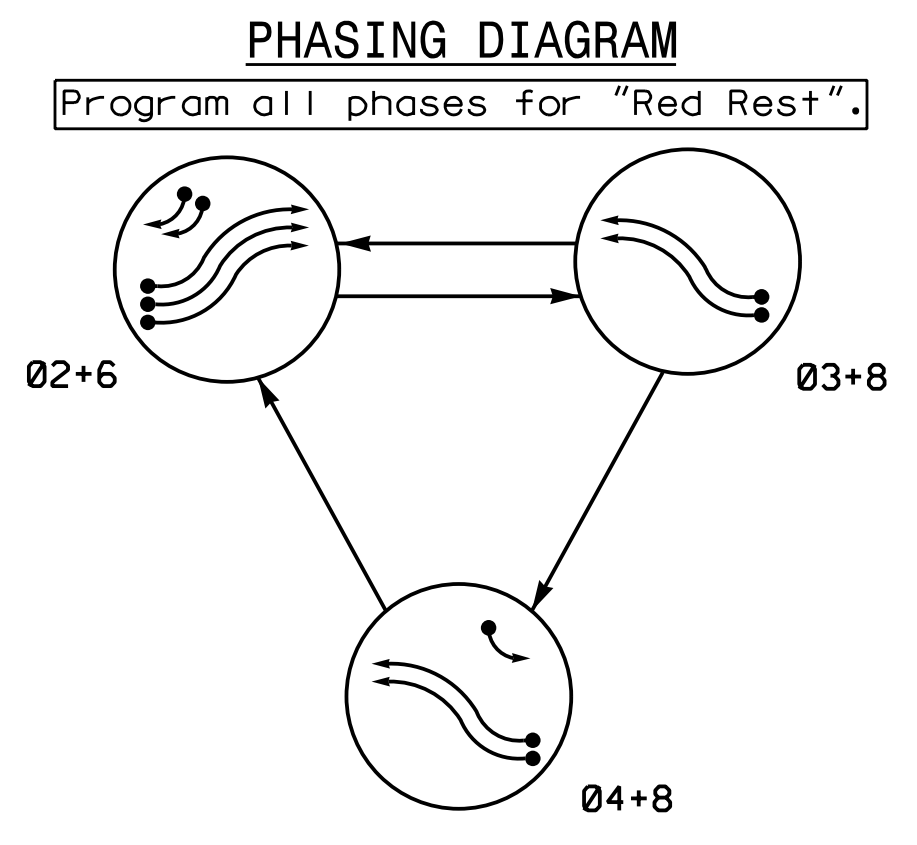
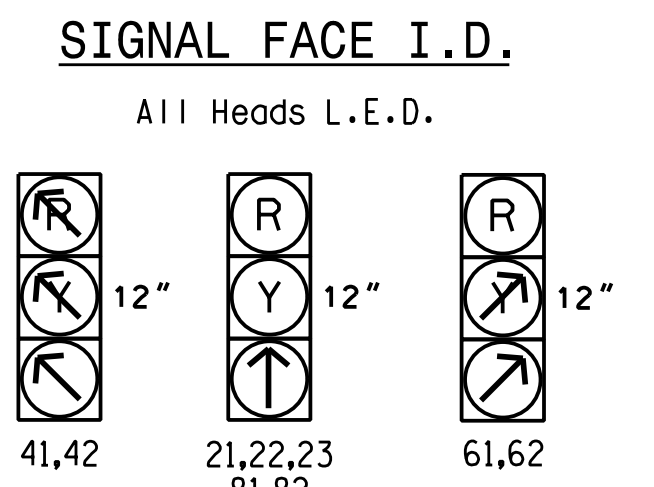


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+6	03+8	04+8	FLASH
21,22,23		R	R	R
41,42	R	R	R	R
61,62	/	R	R	R
81,82	R			R

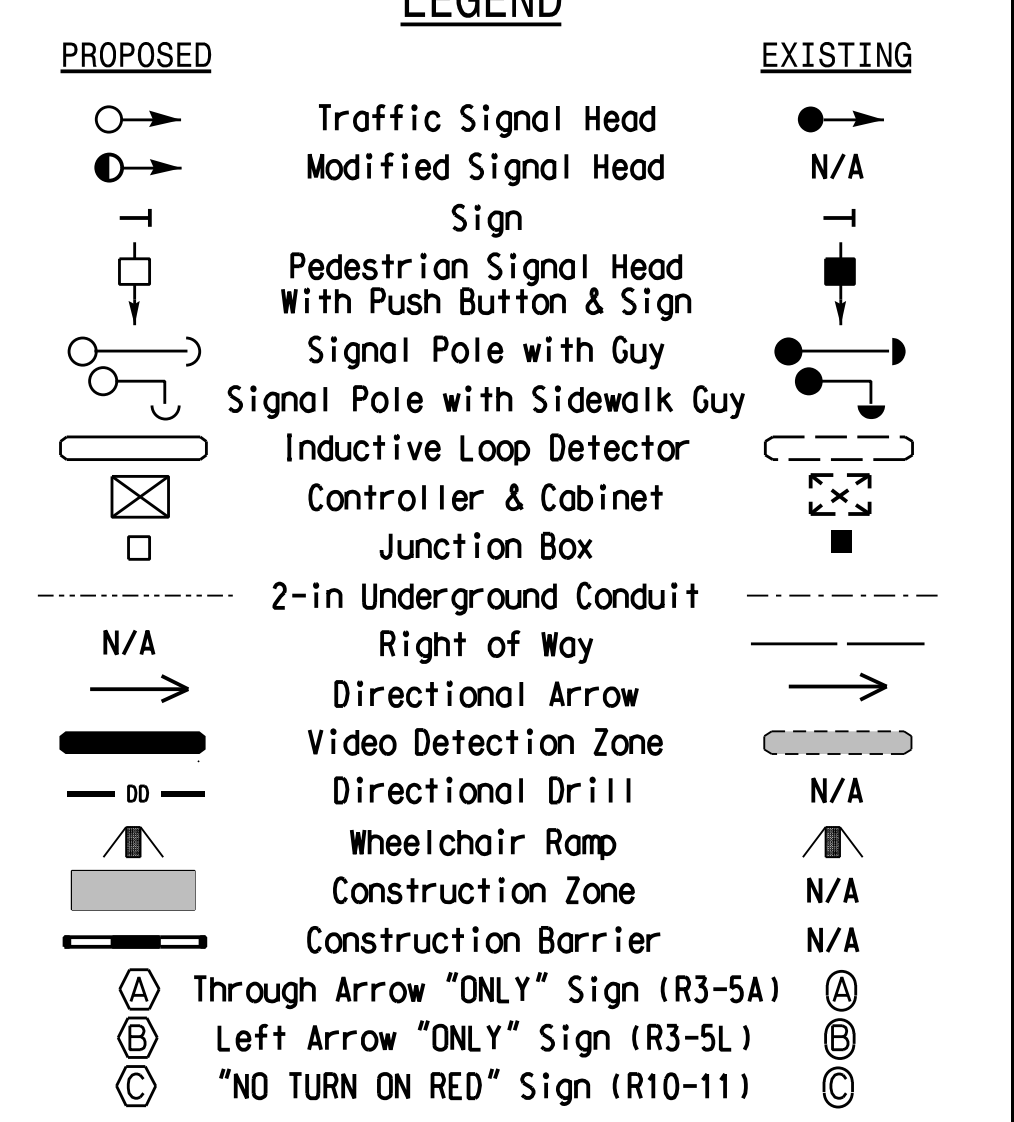


OASIS 2070E LOOP & DETECTOR INSTALLATION CHART

LOOP	INDUCTIVE LOOPS			DETECTOR PROGRAMMING								
	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	*	*	2	Y	Y	-	-	-	-	*
2B	6X40	0	*	*	2	Y	Y	-	-	-	-	*
2C	6X40	0	*	*	2	Y	Y	-	-	-	-	*
4A	6X40	0	*	*	3/4	Y	Y	-	-	-	-	*
6A	6X6	300	*	*	6	-	Y	-	2.4	-	-	*
6B	6X6	300	*	*	6	-	Y	-	2.4	-	-	*
6C	6X40	0	*	*	6	Y	Y	-	-	-	-	*
6D	6X40	0	*	*	6	Y	Y	-	-	-	-	*
8A	6X40	0	*	*	8	Y	Y	-	-	-	-	*
8B	6X40	0	*	*	8	Y	Y	-	-	-	-	*

* Video Detection Zone

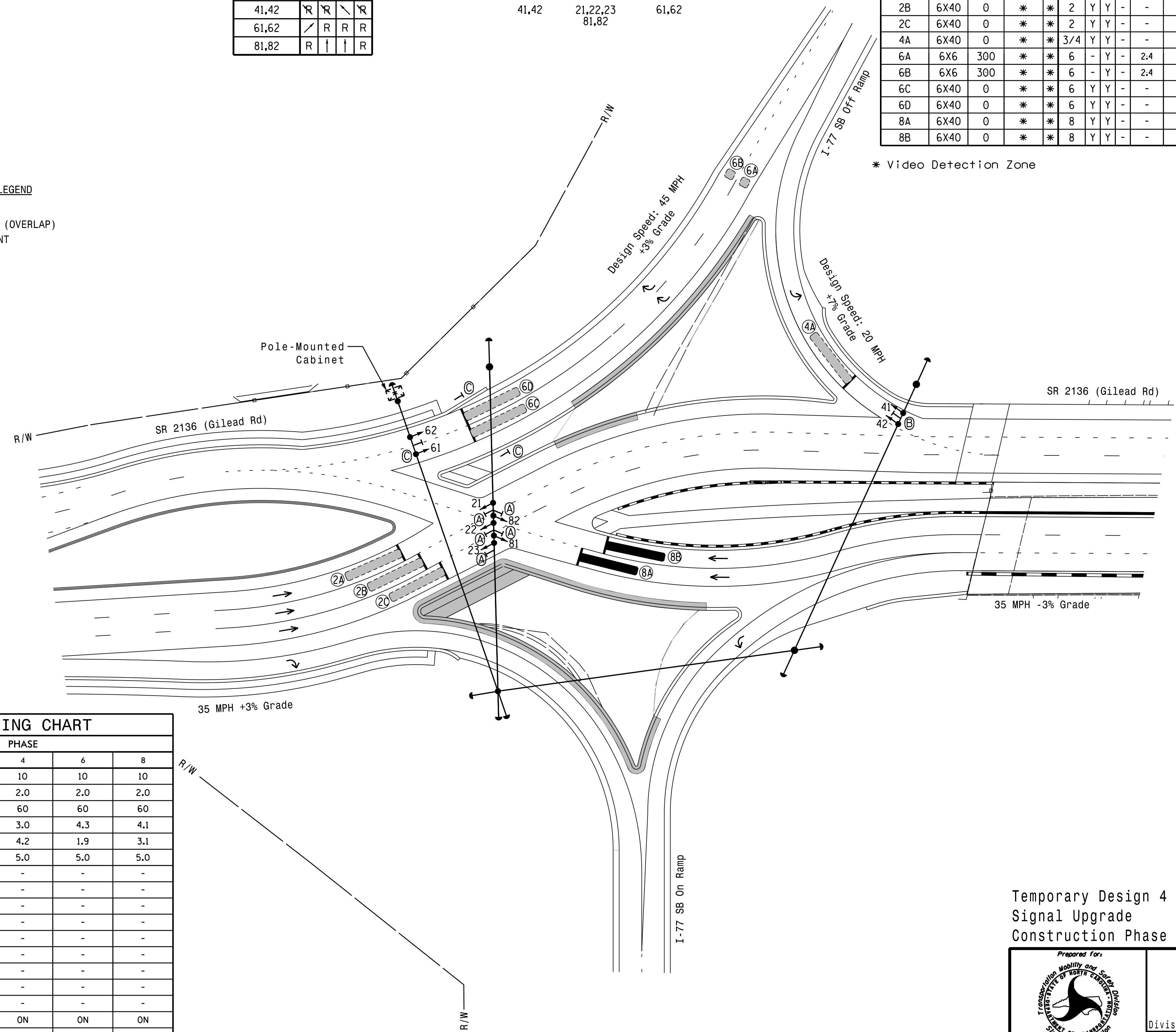
- ### 3 Phase Fully Actuated Gilead Road Closed Loop System
- #### NOTES
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
 - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
 - Omit phase 4 during phase 2+6 on.
 - Program controller to clear from phase 2+6 to phase 4 by progressing through phase 3.
 - Omit phase 3 during phase 4 on.
 - Phase 3 provides red clearance time for vehicles traveling Eastbound on Gilead Rd.
 - Set all detector units to presence mode.
 - Reposition existing signal heads numbered 81 and 82 and sign (A).
 - Program all phases for "Red Rest".
 - Incorporate Video Detection system for vehicle detection.
 - Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
 - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
 - Closed loop system data: Controller Asset #1106



OASIS 2070E TIMING CHART

FEATURE	PHASE				
	2	3 (DUMMY)	4	6	8
Min Green 1 *	10	1	10	10	10
Extension 1 *	2.0	0.0	2.0	2.0	2.0
Max Green 1 *	60	1	60	60	60
Yellow Clearance	3.7	3.0	3.0	4.3	4.1
Red Clearance	1.6	3.8	4.2	1.9	3.1
Red Revert	5.0	5.0	5.0	5.0	5.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	-	-	-	-
Vehicle Call Memory	-	-	-	-	-
Dual Entry	ON	ON	ON	ON	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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

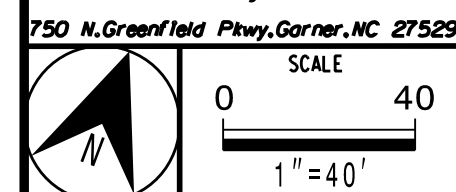


Temporary Design 4
Signal Upgrade
Construction Phase V

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at I-77 SB Ramps		
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	REVISIONS: _____ INITI: _____ DATE: _____ _____ _____ _____	

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DocuSigned by:
Natasha R. Simmons
4/23/2018
DATE
SIG. INVENTORY NO. 10-1106 14

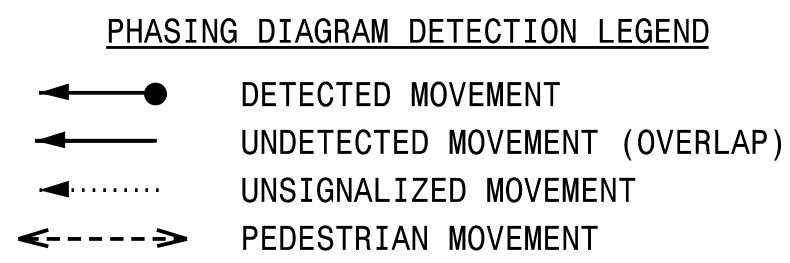
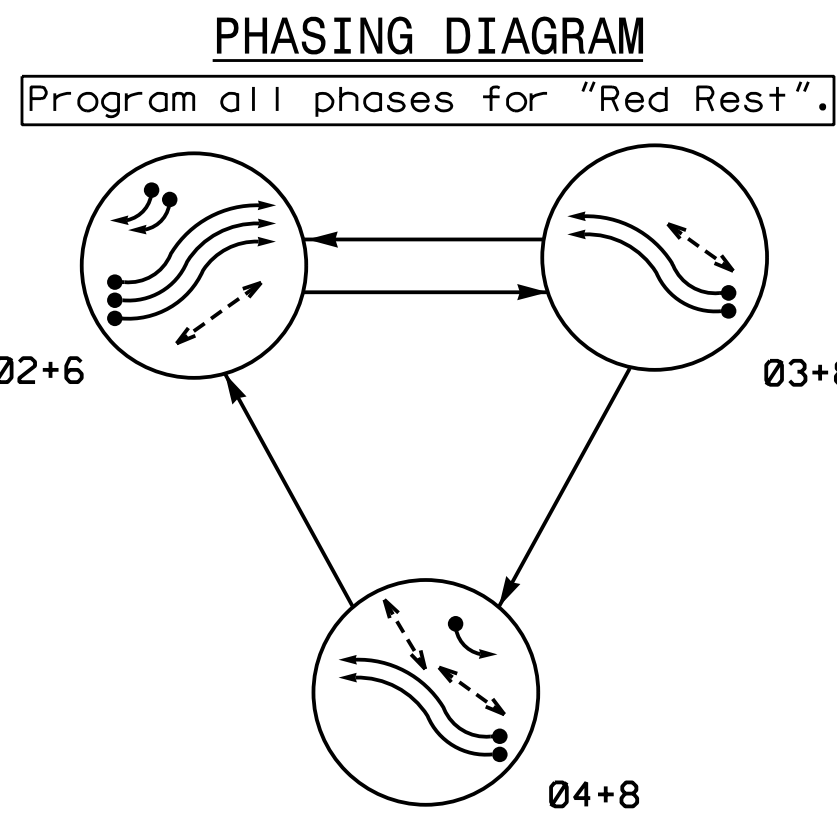
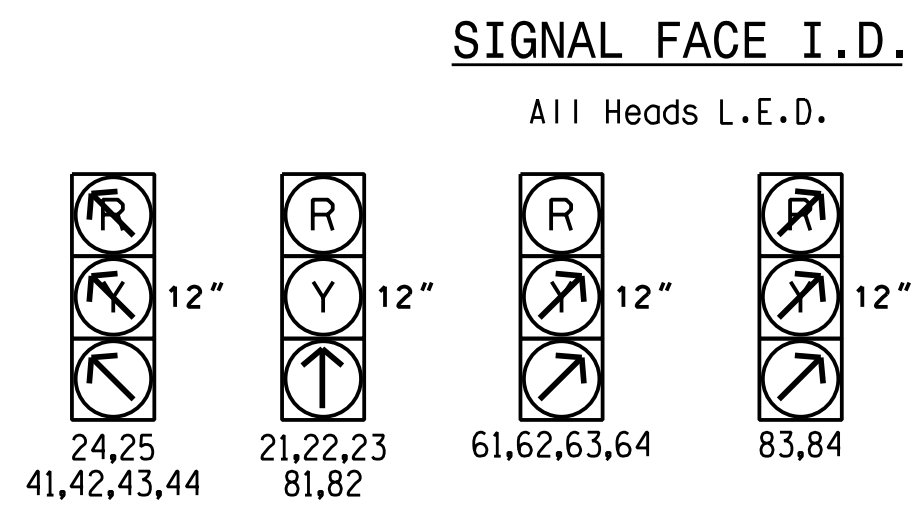


TABLE OF OPERATION

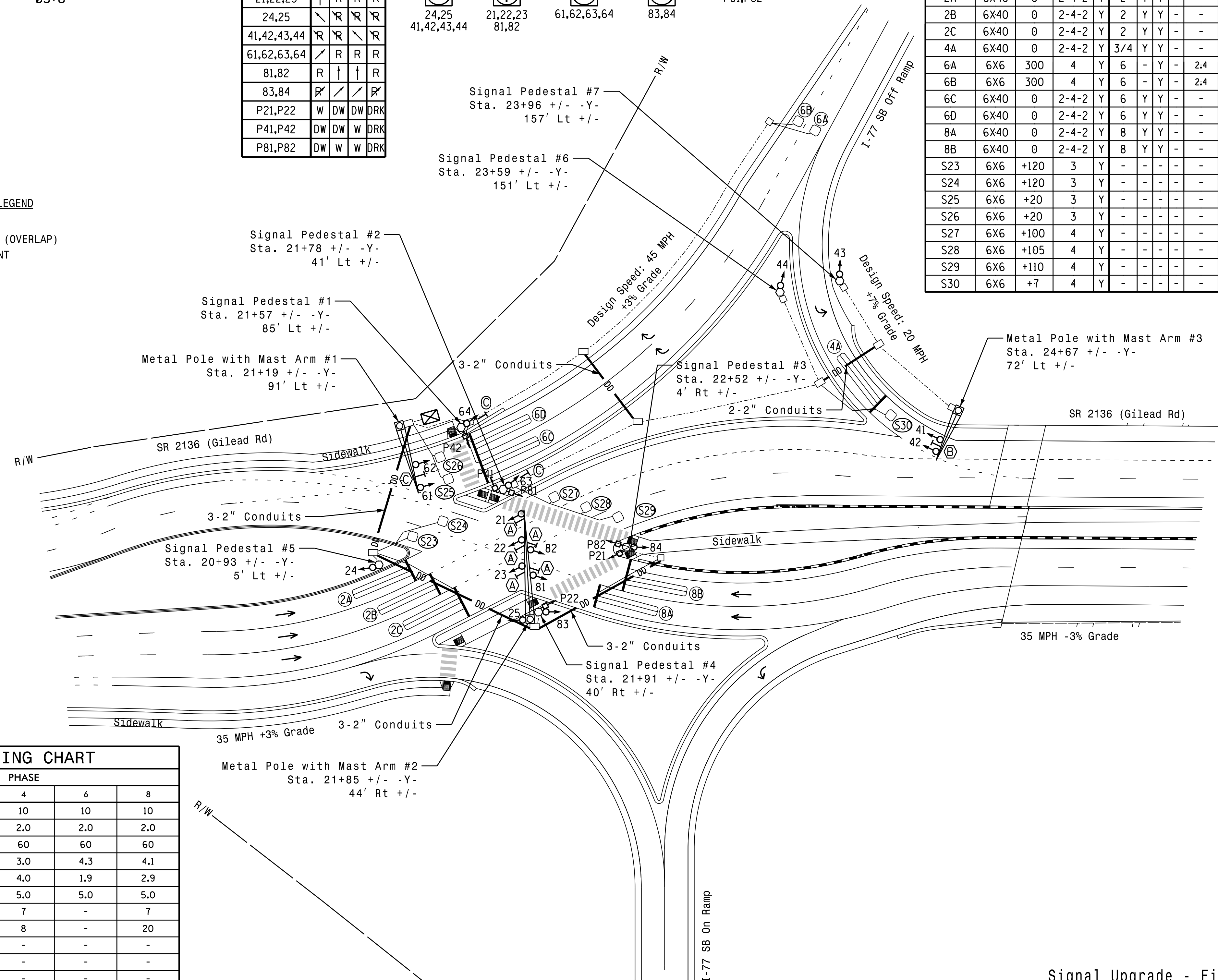
SIGNAL FACE	PHASE			
	02+6	03+8	04+8	FLASH
21,22,23		R	R	R
24,25	↘	R	R	R
41,42,43,44	↘	↘	↘	↘
61,62,63,64	↘	R	R	R
81,82	R			R
83,84	↘	↘	↘	↘
P21,P22	W	DW	DW	DRK
P41,P42	DW	DW	W	DRK
P81,P82	DW	W	W	DRK



OASIS 2070E LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
2B	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
2C	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	3/4	Y	Y	-	-	-	-	Y
6A	6X6	300	4	Y	6	-	Y	-	2.4	-	-	Y
6B	6X6	300	4	Y	6	-	Y	-	2.4	-	-	Y
6C	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
6D	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
S23	6X6	+120	3	Y	-	-	-	-	-	-	-	Y
S24	6X6	+120	3	Y	-	-	-	-	-	-	-	Y
S25	6X6	+20	3	Y	-	-	-	-	-	-	-	Y
S26	6X6	+20	3	Y	-	-	-	-	-	-	-	Y
S27	6X6	+100	4	Y	-	-	-	-	-	-	-	Y
S28	6X6	+105	4	Y	-	-	-	-	-	-	-	Y
S29	6X6	+110	4	Y	-	-	-	-	-	-	-	Y
S30	6X6	+7	4	Y	-	-	-	-	-	-	-	Y

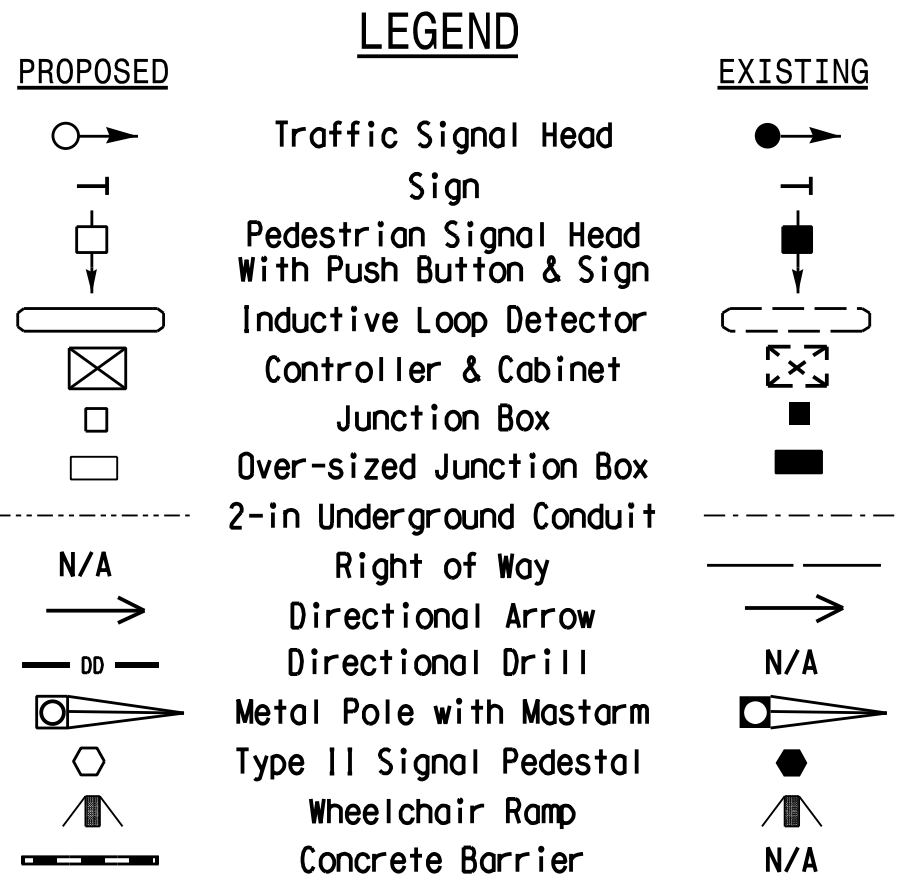
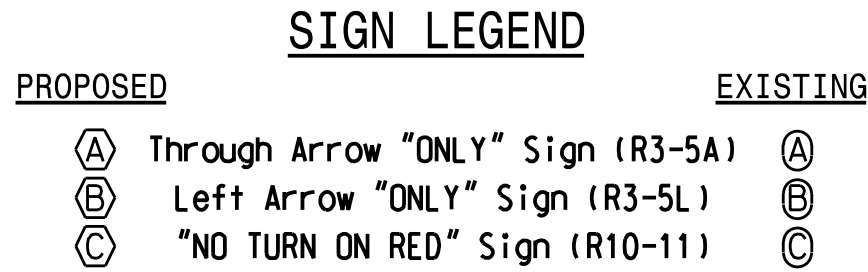
- ### 3 Phase Fully Actuated Gilead Road Closed Loop System
- #### NOTES
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
 - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
 - Omit phase 4 during phase 2+6 on.
 - Program controller to clear from phase 2+6 to phase 4 by progressing through phase 3.
 - Omit phase 3 during phase 4 on.
 - Phase 3 provides red clearance time for vehicles traveling Eastbound on Gilead Rd.
 - Set all detector units to presence mode.
 - Program all phases for "Red Rest".
 - Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
 - The cabinet should be designed to include 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.
 - All pedestrian pushbuttons shall be located in the field by the Division Traffic Engineer before installation.
 - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
 - Closed loop system data: Controller Asset #1106



OASIS 2070E TIMING CHART

FEATURE	PHASE				
	2	3 (DUMMY)	4	6	8
Min Green 1 *	10	1	10	10	10
Extension 1 *	2.0	0.0	2.0	2.0	2.0
Max Green 1 *	60	1	60	60	60
Yellow Clearance	3.7	3.0	3.0	4.3	4.1
Red Clearance	1.9	3.4	4.0	1.9	2.9
Red Revert	5.0	5.0	5.0	5.0	5.0
Walk 1 *	7	-	7	-	7
Don't Walk 1	14	-	8	-	20
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	-	-	-	-
Vehicle Call Memory	-	-	-	-	-
Dual Entry	ON	ON	ON	ON	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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



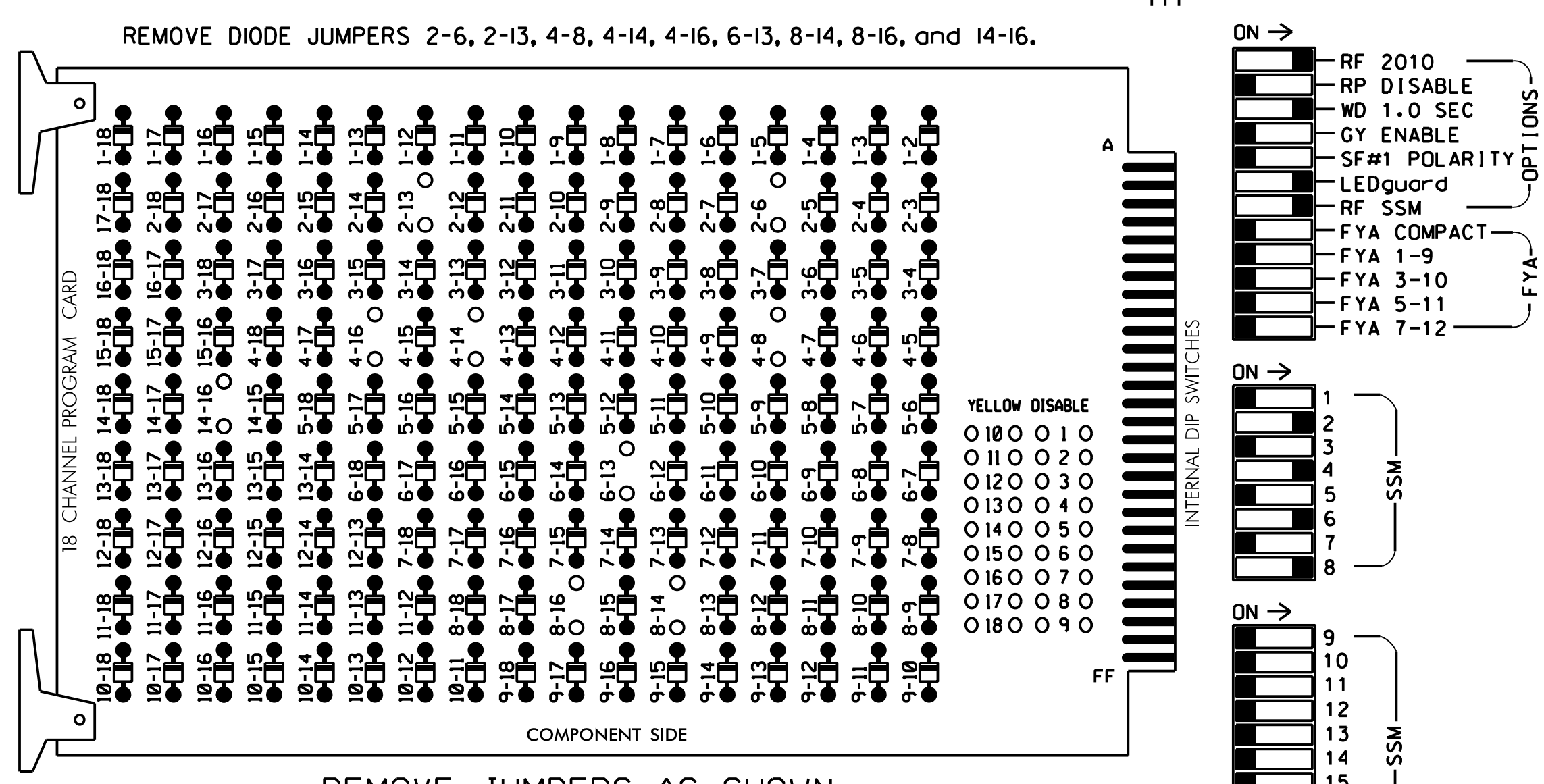
Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<p>HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997</p>	<p>SR 2136 (Gilead Road) at I-77 SB Ramps</p> <p>Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons</p>	<p>SEAL</p> <p>DocuSigned by: N. R. Simmons DATE: 4/23/2018 SIG. INVENTORY NO. 10-1106</p>												
	<p>SCALE: 0 40 1"=40'</p>	<p>REVISIONS</p> <table border="1"> <tr><th>NO.</th><th>INIT.</th><th>DATE</th></tr> <tr><td> </td><td> </td><td> </td></tr> </table>	NO.	INIT.	DATE				<p>REVISIONS</p> <table border="1"> <tr><th>NO.</th><th>INIT.</th><th>DATE</th></tr> <tr><td> </td><td> </td><td> </td></tr> </table>	NO.	INIT.	DATE		
NO.	INIT.	DATE												
NO.	INIT.	DATE												

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

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 2, 3, 4, 6, and 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2, 4, and 8 for 'STARTUP PED CALL'.
6. Program phases 2, 3, 4, 6, and 8 for Red Rest.
7. The cabinet and controller are part of the Gilead Road Closed Loop 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.	NU	21,22,23	24,25	P21, P22	NC	41,42,43,44	P41, P42	NU	61,62,63,64	NU	81,82	83,84	P81, P82	NU	NU	NU	NU	NU
RED		128							134		107							
YELLOW		129									108							
GREEN																		
RED ARROW		128			101						107							
YELLOW ARROW		129			102			135			108							
GREEN ARROW	130	130			103			136			109	109						
Hand					113			104					110					
Walker					115			106						112				

NU = Not Used
NC = Not Connected

EQUIPMENT INFORMATION

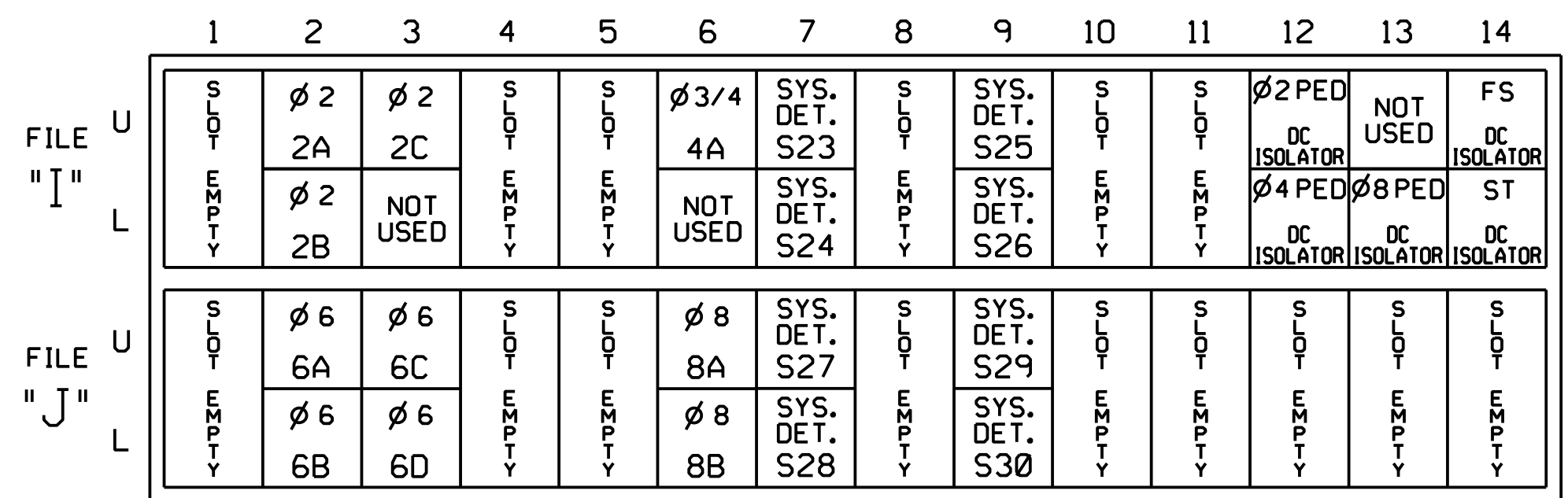
CONTROLLER.....2070E
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S3,S5,S6,S8,S11,S12
 PHASES USED.....2,2 PED,*3,4,4 PED,6,8,8 PED
 OVERLAPS.....NONE
 * PHASE USED FOR TIMING PURPOSES ONLY

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

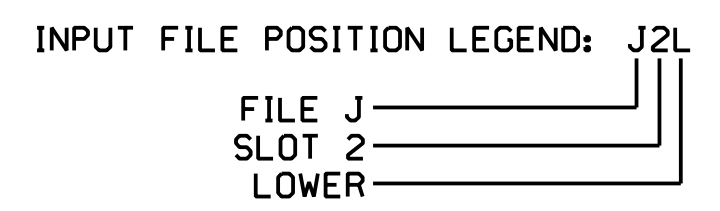
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	3/4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6		Y		2.4	
6B	TB3-7,8	J2L	44	6	16	6		Y		2.4	
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			
6D	TB3-11,12	J3L	77	39	46	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
*S23	TB6-1,2	I7U	65	27	34	SYS					
*S24	TB6-3,4	I7L	78	40	44	SYS					
*S25	TB6-9,10	I9U	60	22	11	SYS					
*S26	TB6-11,12	I9L	62	24	13	SYS					
*S27	TB7-1,2	J7U	66	28	38	SYS					
*S28	TB7-3,4	J7L	79	41	48	SYS					
*S29	TB7-9,10	J9U	59	21	15	SYS					
*S30	TB7-11,12	J9L	61	23	17	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	4	4 PED					
P81,P82	TB8-8,9	I13L	70	32	8	8 PED					

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

* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1106
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 2
Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 2136 (Gilead Road) at I-77 SB Ramps

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek

PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

Revisions table with columns for REVISIONS, INIT., and DATE.

Signature block for A.H. Thornburg, dated 4/23/2018.

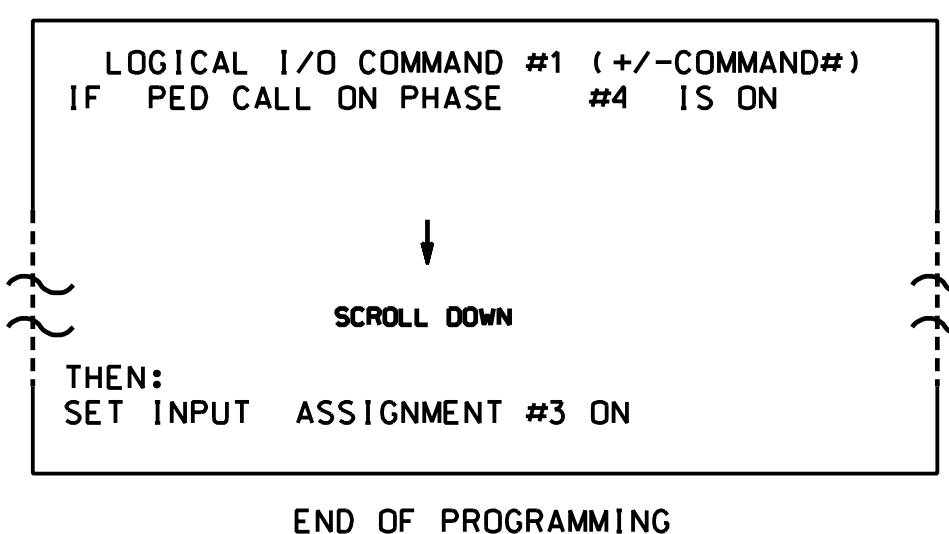
Professional Engineer Seal for Natasha R. Simmons, License No. 031464.

Inventory No. 10-1106

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO APPLY PHASE 4 VEH. CALL WITH PHASE 4 PED CALL

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMAND 1.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



NOTE: THIS LOGIC ENSURES THAT WHENEVER A PHASE 4 PED CALL EXISTS, A PHASE 4 VEH. CALL WILL ALSO BE PLACED.

THIS IS NECESSARY SO THAT THE "DYNAMIC" PROGRAMMING OPERATES PROPERLY WHEN ONLY A PED CALL EXISTS IN THE FIELD ON PHASE 4.

INPUT REFERENCE
 INPUT 3 = VEH. DET. 4

DYNAMIC OMIT CONTROL PROGRAMMING

(program controller as shown below)

- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Functions 1 and 2.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```

    DYNAMIC/BACKUP CONTROL FUNCTION #01
    OVERLAPS: ABCDEFGHIJKLMNPO
    IF OVERLAPS ARE ACTIVE:
    OR PHASES: 12345678910111213141516
    IF PHASES ARE ON: X X
    OMIT PHASES: X
    CALL PHASES: X
    
```

PRESS 'NEXT'

```

    DYNAMIC/BACKUP CONTROL FUNCTION #02
    OVERLAPS: ABCDEFGHIJKLMNPO
    IF OVERLAPS ARE ACTIVE:
    OR PHASES: 12345678910111213141516
    IF PHASES ARE ON: X
    OMIT PHASES: X
    CALL PHASES:
    
```

DYNAMIC OMIT PROGRAMMING COMPLETE

NOTE: THIS PROGRAMMING ENSURES THAT PHASE 3 WILL BE SERVED PRIOR TO PHASE 4 WHEN CONTROLLER IS ADVANCING FROM 2+6.

PHASE 3 IS USED TO PROVIDE EXTENDED RED CLEARANCE BEFORE SERVING PHASE 4.

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM DASH LOCAL CONTROLLER MAIN MENU
 SELECT: 4 PHASE SEQUENCE

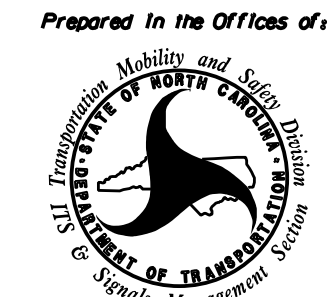
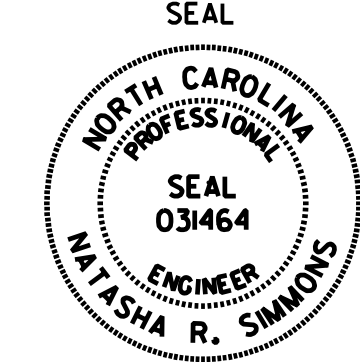
PHASE SEQUENCE: PAGE 1		NEXT: PAGES)					
RNG	LEAD	BARRIER 1	X-LAG	LEAD	BARRIER 2	X-LAG	
1	:0	2	0	0	:3	4	0
2	:0	6	0	0	:0	8	0
3	:0	0	0	0	:0	0	0
4	:0	0	0	0	:0	0	0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1106
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 2 of 2
 Final Design

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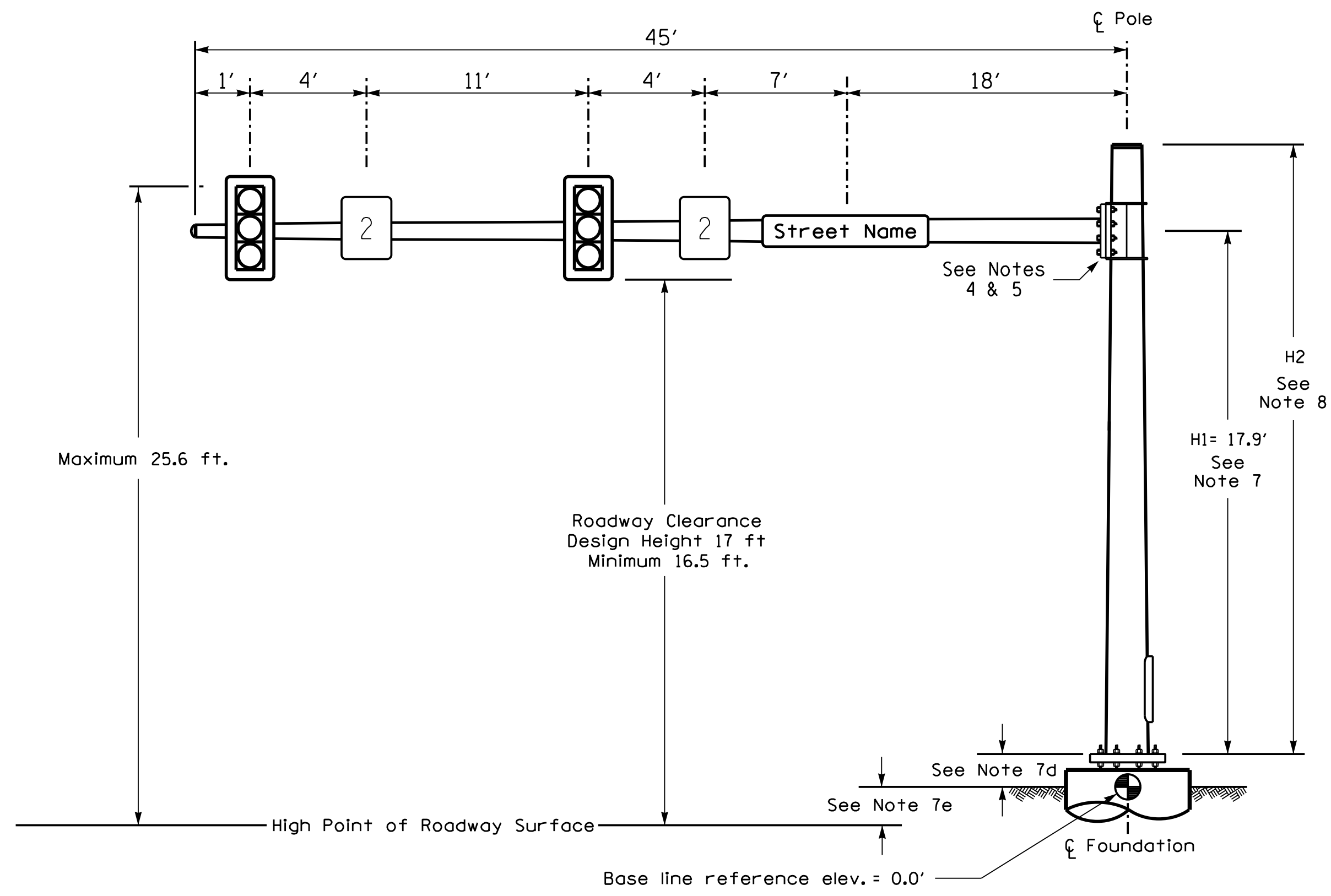
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Offices of:  750 N. Greenfield Pkwy, Corner, NC 27529	SR 2136 (Gilead Road) at I-77 SB Ramps	SEAL  SEAL 031464 NATASHA R. SIMMONS
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	

DocuSigned by:

 SIGNATURE DATE

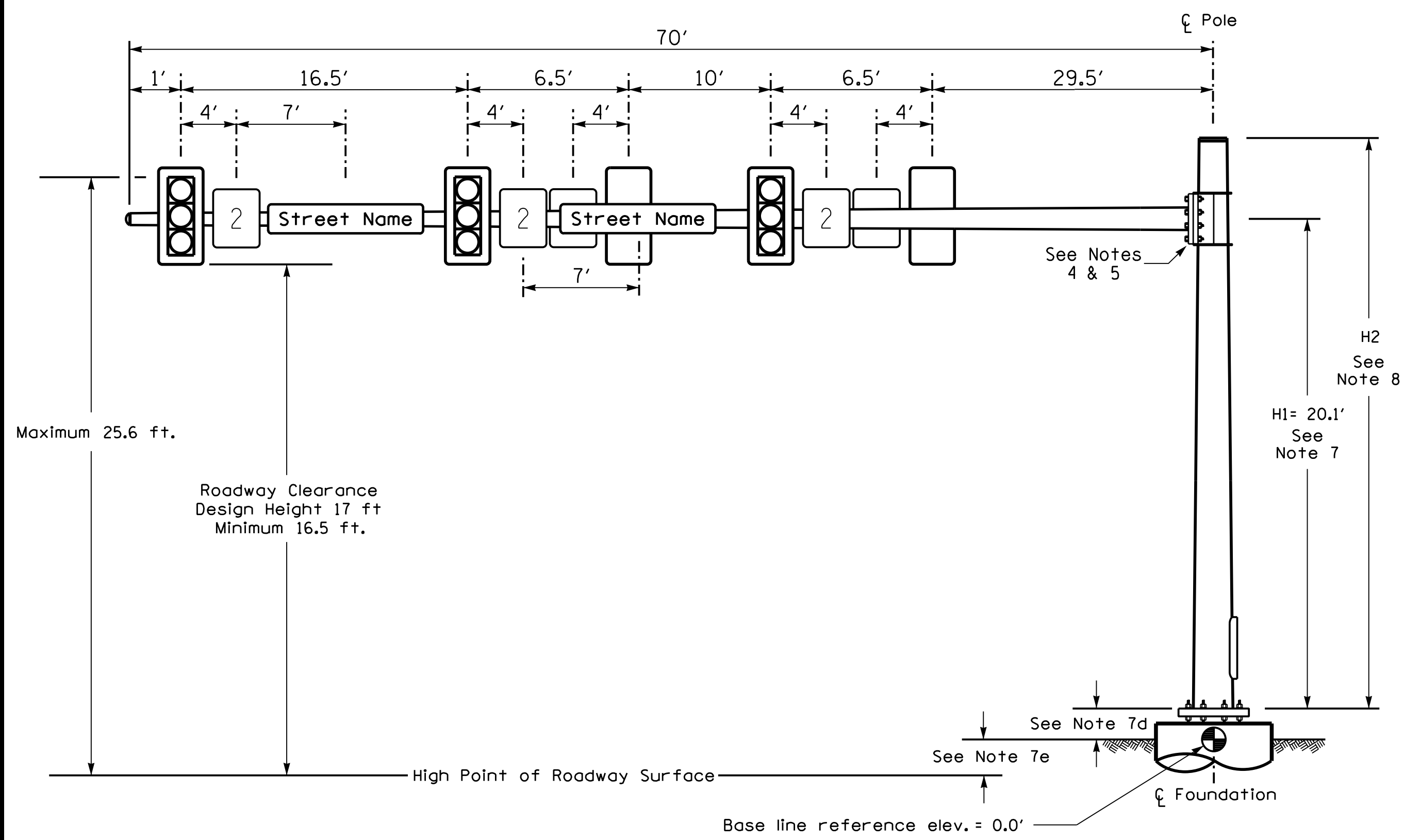
 4/23/2018
 SIG. INVENTORY NO. 10-1106

Design Loading for METAL POLE NO. 1



Elevation View

Design Loading for METAL POLE NO. 2



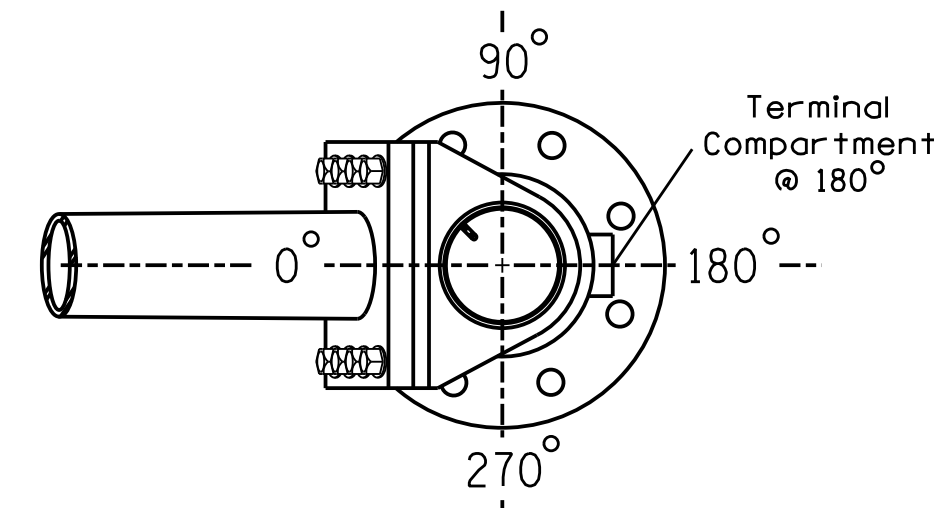
Elevation View

SPECIAL NOTE

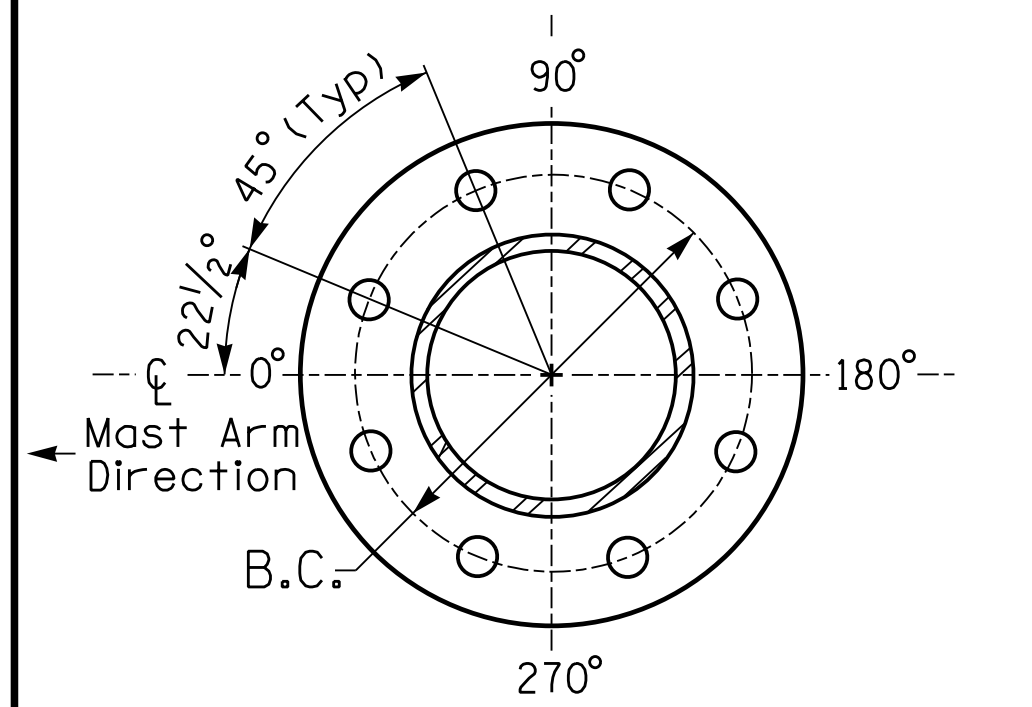
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

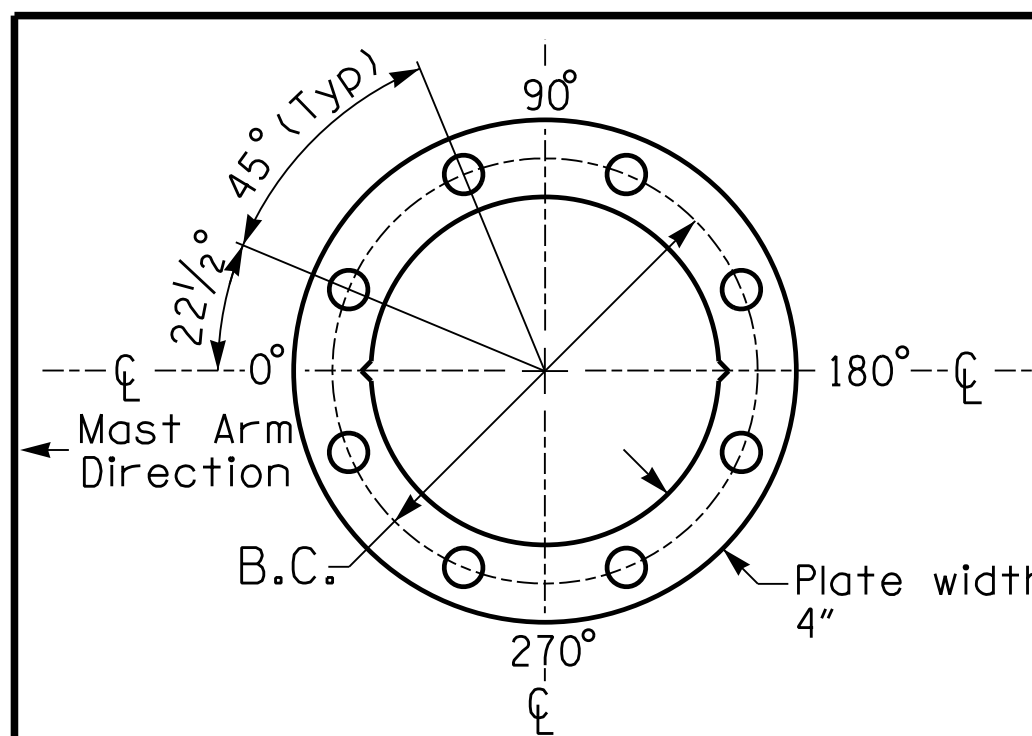
Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at \odot Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-0.54 ft.	+1.63 ft.
Elevation difference at Edge of travelway or face of curb	-0.77 ft.	-0.66 ft.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



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

METAL POLE No. 1,2

PROJECT REFERENCE NO.	SHEET NO.
I-5714 / U-5114	Fig. 14.3

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

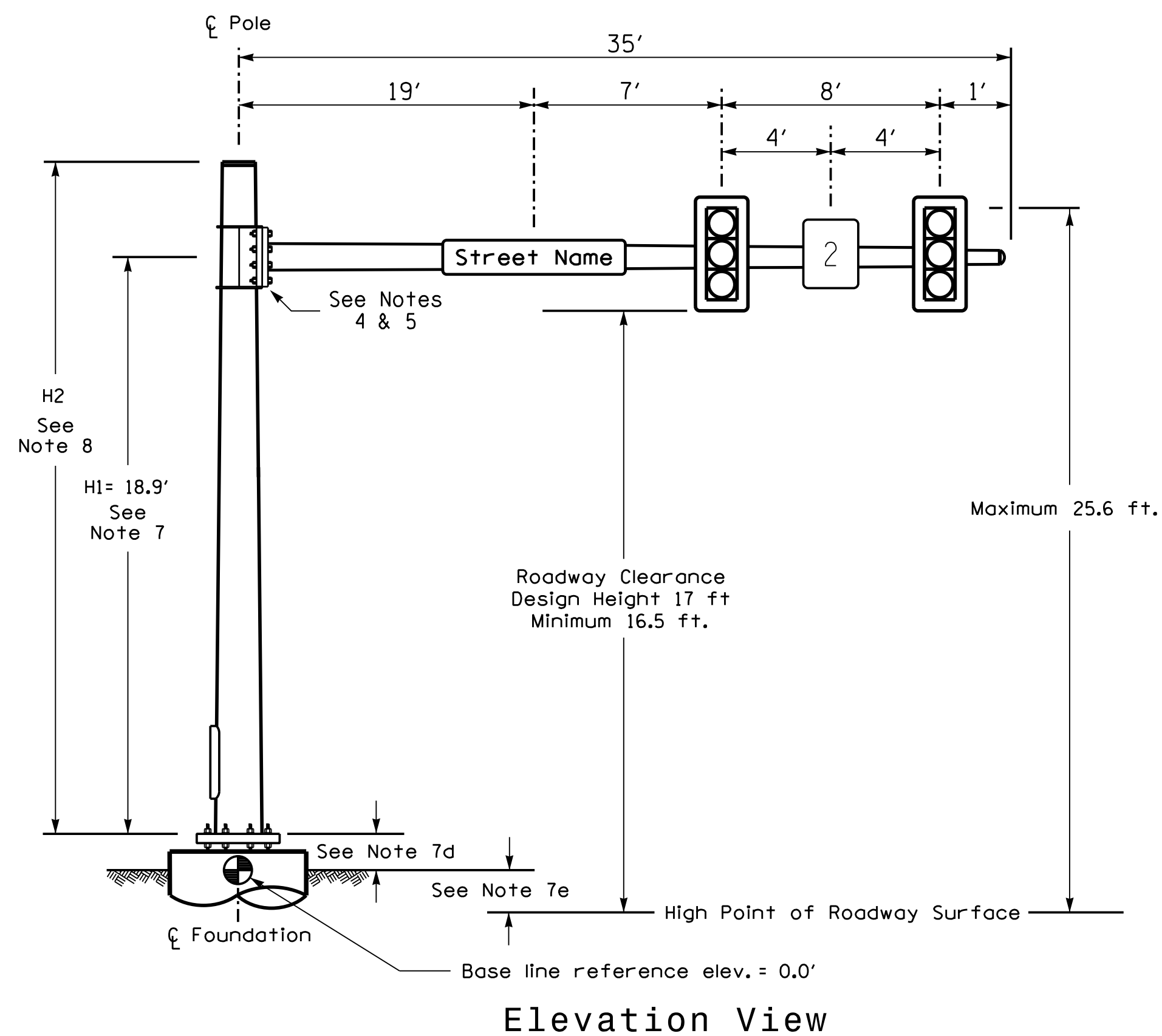
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the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

NCDOT Wind Zone 4 (90 mph)

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	SR 2136 (Gilead Road) at I-77 SB Ramps		
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinskiak PREPARED BY: J.T. Thibault REVIEWED BY: N.R. Simmons	REVISIONS INIT. DATE DocuSigned by: Natasha R. Simmons SIGNATURE DATE 4/23/2018	
SCALE 0 N/A N/A	HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997		SIG. INVENTORY NO. 10-1106

Design Loading for METAL POLE NO. 3

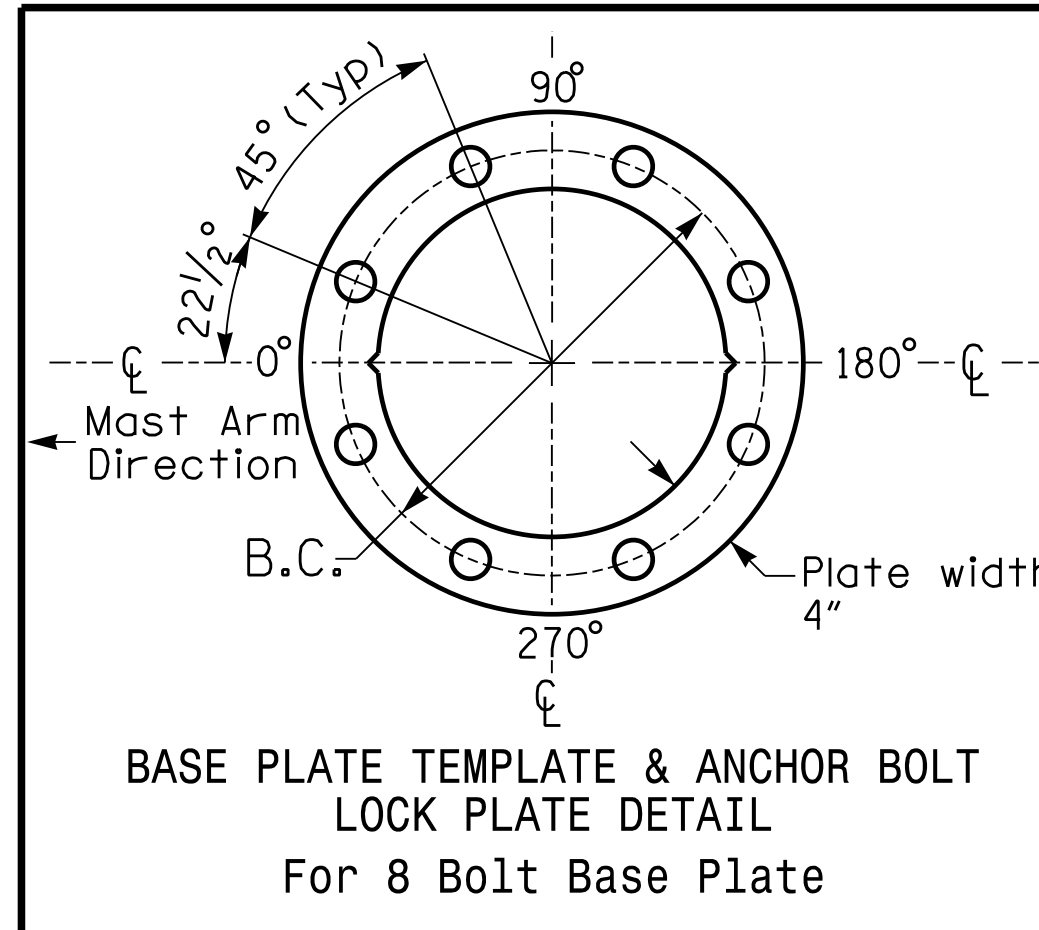
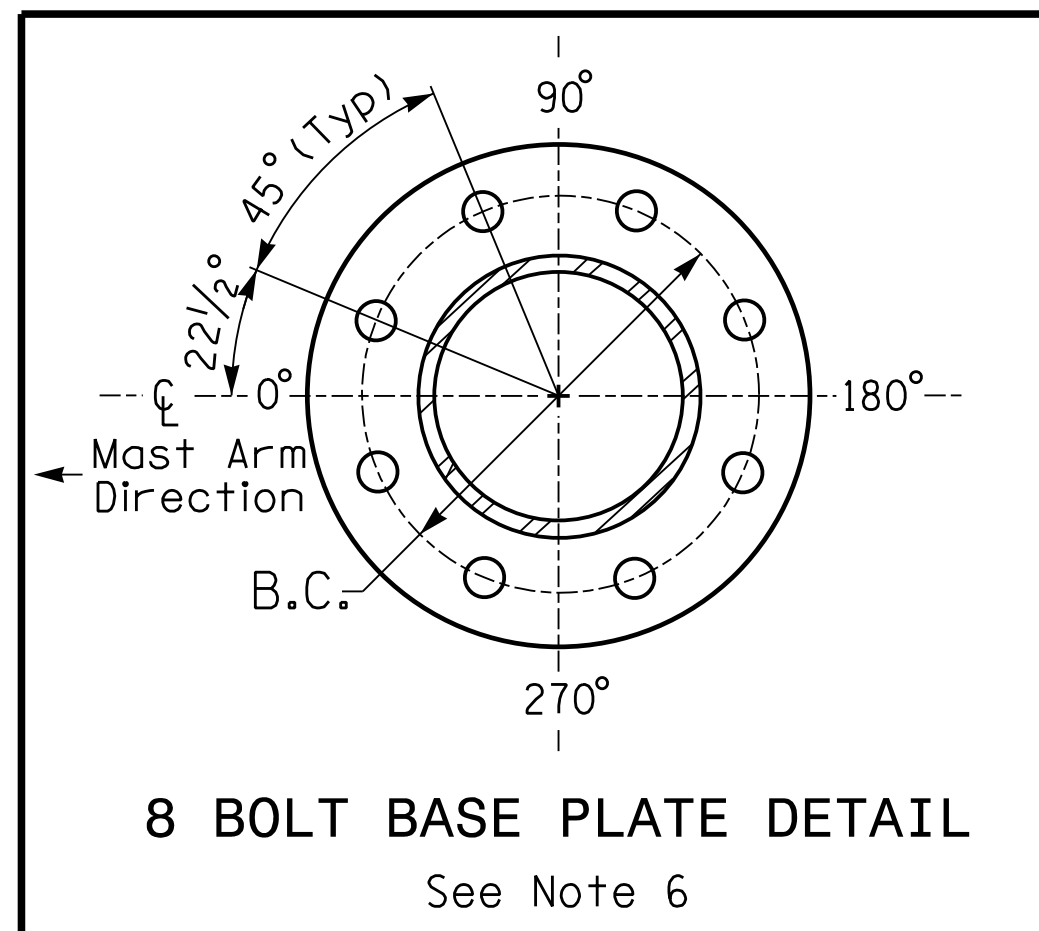
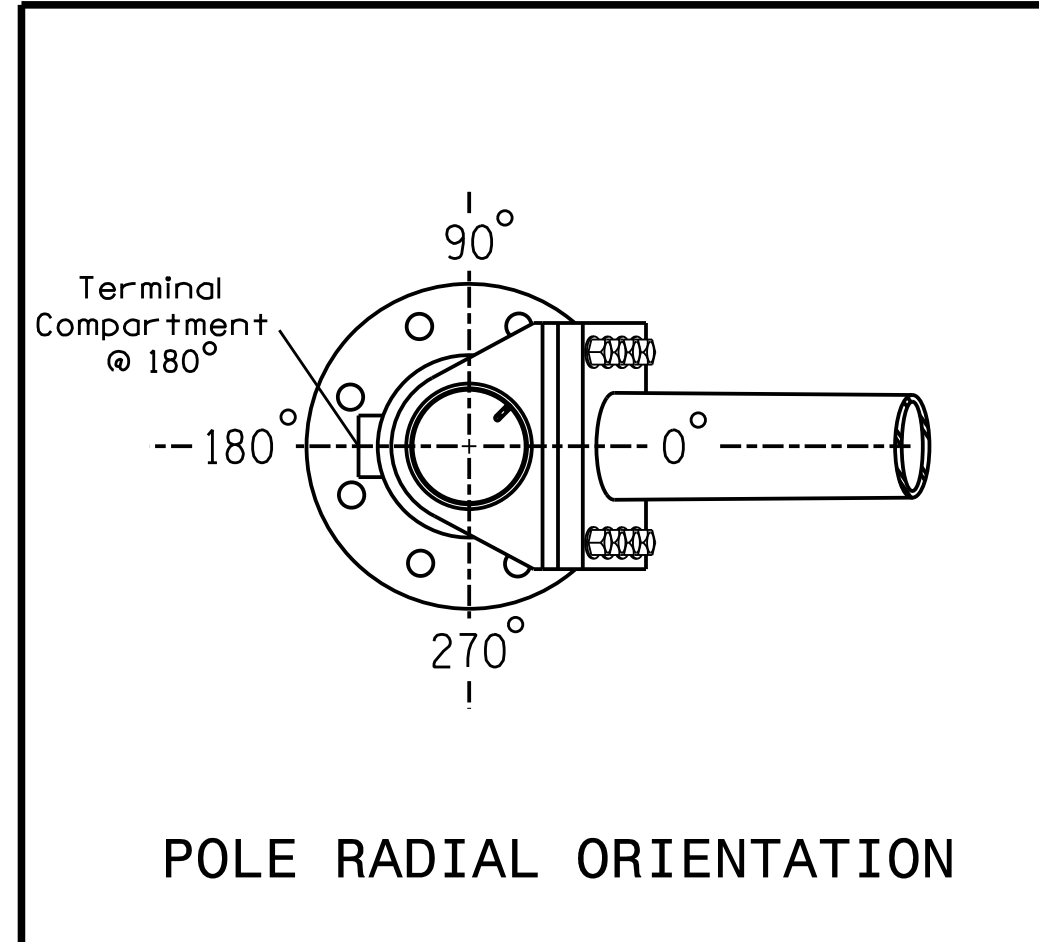


SPECIAL NOTE

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Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 3	
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+0.44 ft.	
Elevation difference at Edge of travelway or face of curb	-0.68 ft.	



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METAL POLE No. 3

PROJECT REFERENCE NO.	SHEET NO.
I-5714 / U-5114	Fig. 14.4

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS
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- Design the traffic signal structure and foundation in accordance with:
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DESIGN REQUIREMENTS

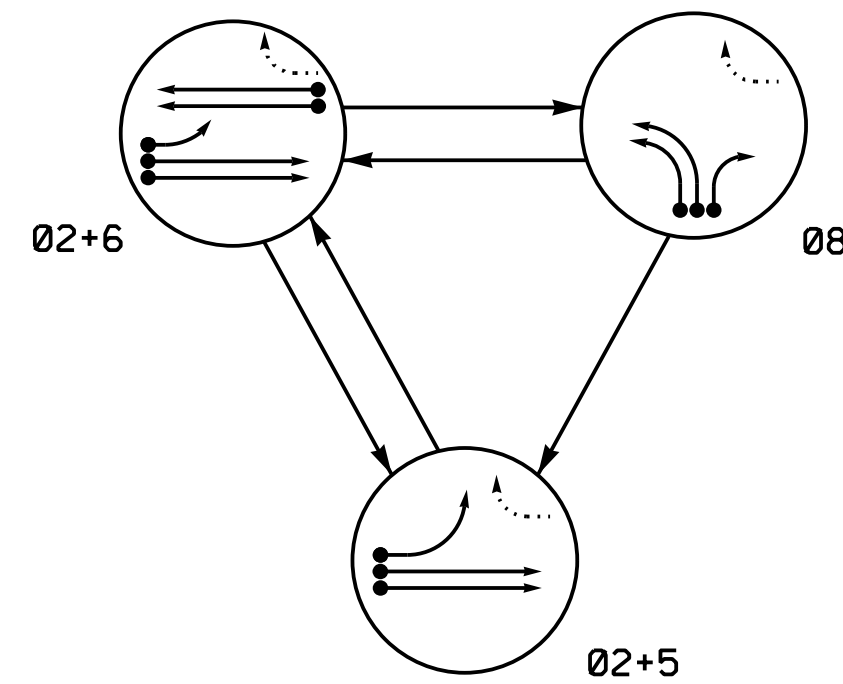
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
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- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
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- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)

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	SR 2136 (Gilead Road) at I-77 SB Ramps		
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinsky PREPARED BY: J.T. Thibault REVIEWED BY: N.R. Simmons	REVISIONS: _____ INITI: _____ DATE: _____ _____ _____ _____	
SCALE: 0 N/A N/A		DocuSigned by: 4/23/2018 SIGNATURE DATE SIG. INVENTORY NO. 10-1106	

PHASING DIAGRAM

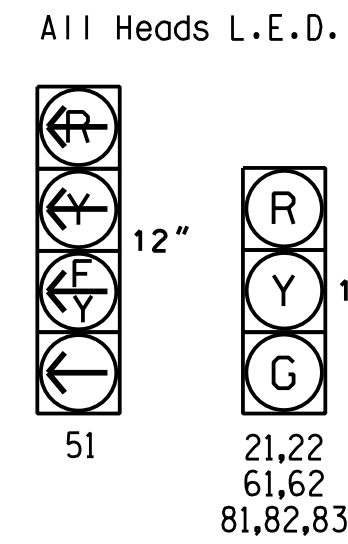


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	02+5	02+6	08	FLASHER
21,22	G	G	R	Y
51	-	F	R	Y
61,62	R	G	R	Y
81,82,83	R	R	G	R

SIGNAL FACE I.D.



LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME			DELAY TIME
2A	6X6	70	*	*	2	Y	Y	-	-	-	-	*
2B	6X6	70	*	*	2	Y	Y	-	-	-	-	*
5A	6X40	0	*	*	5	Y	Y	-	-	15	-	*
6A	6X6	70	*	*	6	Y	Y	-	-	-	-	*
6B	6X6	70	*	*	6	Y	Y	-	-	-	-	*
8A	6X40	0	*	*	8	Y	Y	-	-	-	-	*
8B	6X40	0	*	*	8	Y	Y	-	-	-	-	*
8C	6X40	0	*	*	8	Y	Y	-	-	15	-	*

* Video Detection Zone

3 Phase Fully Actuated Gilead Road Closed Loop System

NOTES

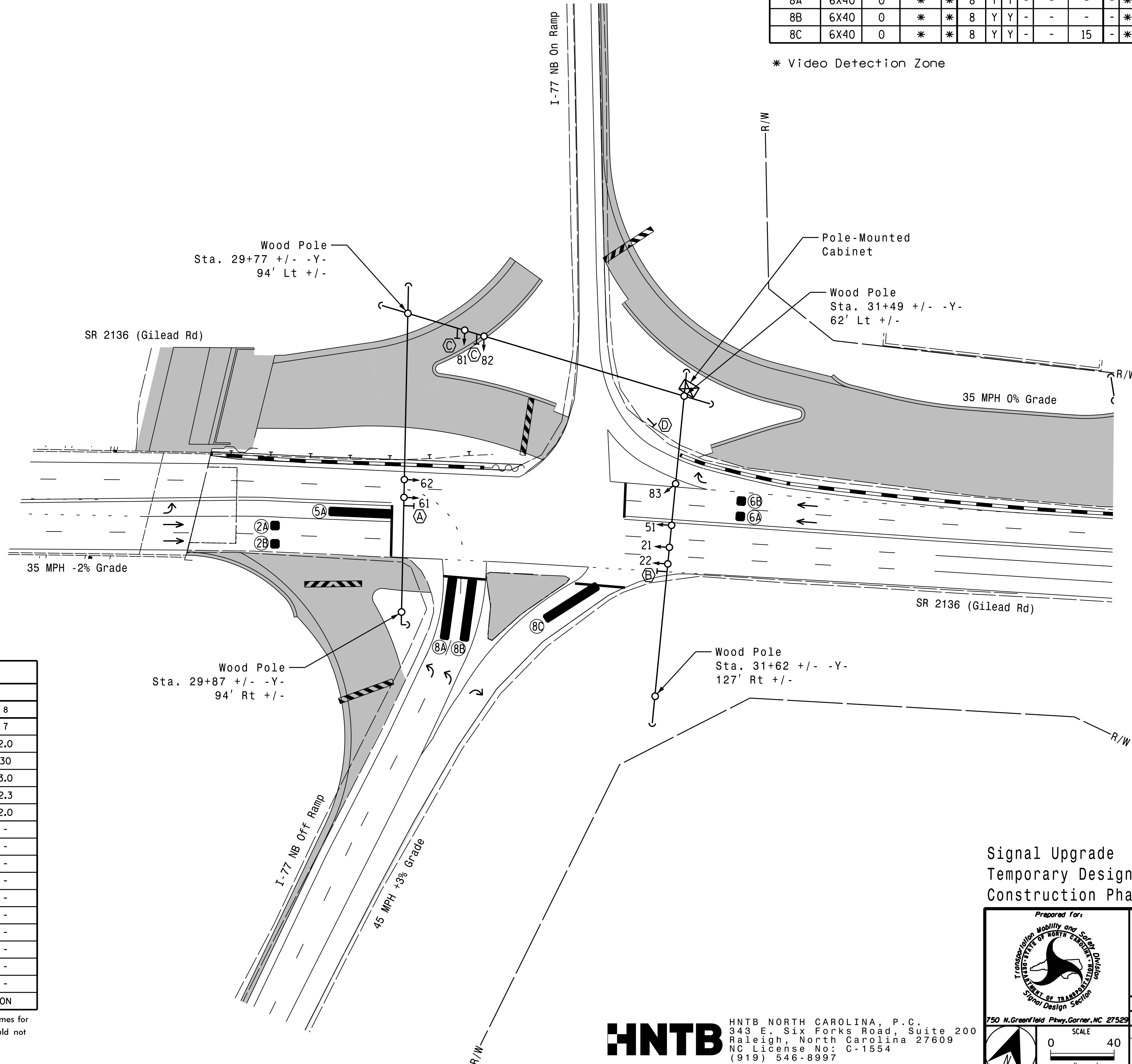
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1619

LEGEND

- | PROPOSED | EXISTING |
|---|----------|
| ○→ Traffic Signal Head | ●→ N/A |
| ○→ Modified Signal Head | ○→ N/A |
| ○→ Pedestrian Signal Head With Push Button & Sign | ○→ N/A |
| ○→ Signal Pole with Guy | ○→ N/A |
| ○→ Signal Pole with Sidewalk Guy | ○→ N/A |
| □→ Inductive Loop Detector | □→ N/A |
| □→ Junction Box | □→ N/A |
| □→ 2-in Underground Conduit | □→ N/A |
| → N/A Right of Way | → N/A |
| → Directional Arrow | → N/A |
| → Video Detection Zone | → N/A |
| → Directional Drill | → N/A |
| → Wheelchair Ramp | → N/A |
| → Construction Zone | → N/A |
| → Construction Barrier | → N/A |
| Ⓐ No U-Turn/No Left Turn Sign (R3-18) | Ⓐ |
| Ⓑ No Right Turn Sign (R3-1) | Ⓑ |
| Ⓒ Left Arrow "ONLY" Sign (R3-5L) | Ⓒ |
| Ⓓ "YIELD" Sign (R1-2) | Ⓓ |

FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	25	60	30
Yellow Clearance	4.0	3.0	4.0	3.0
Red Clearance	3.0	3.6	3.0	2.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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



Signal Upgrade
Temporary Design 1
Construction Phase I

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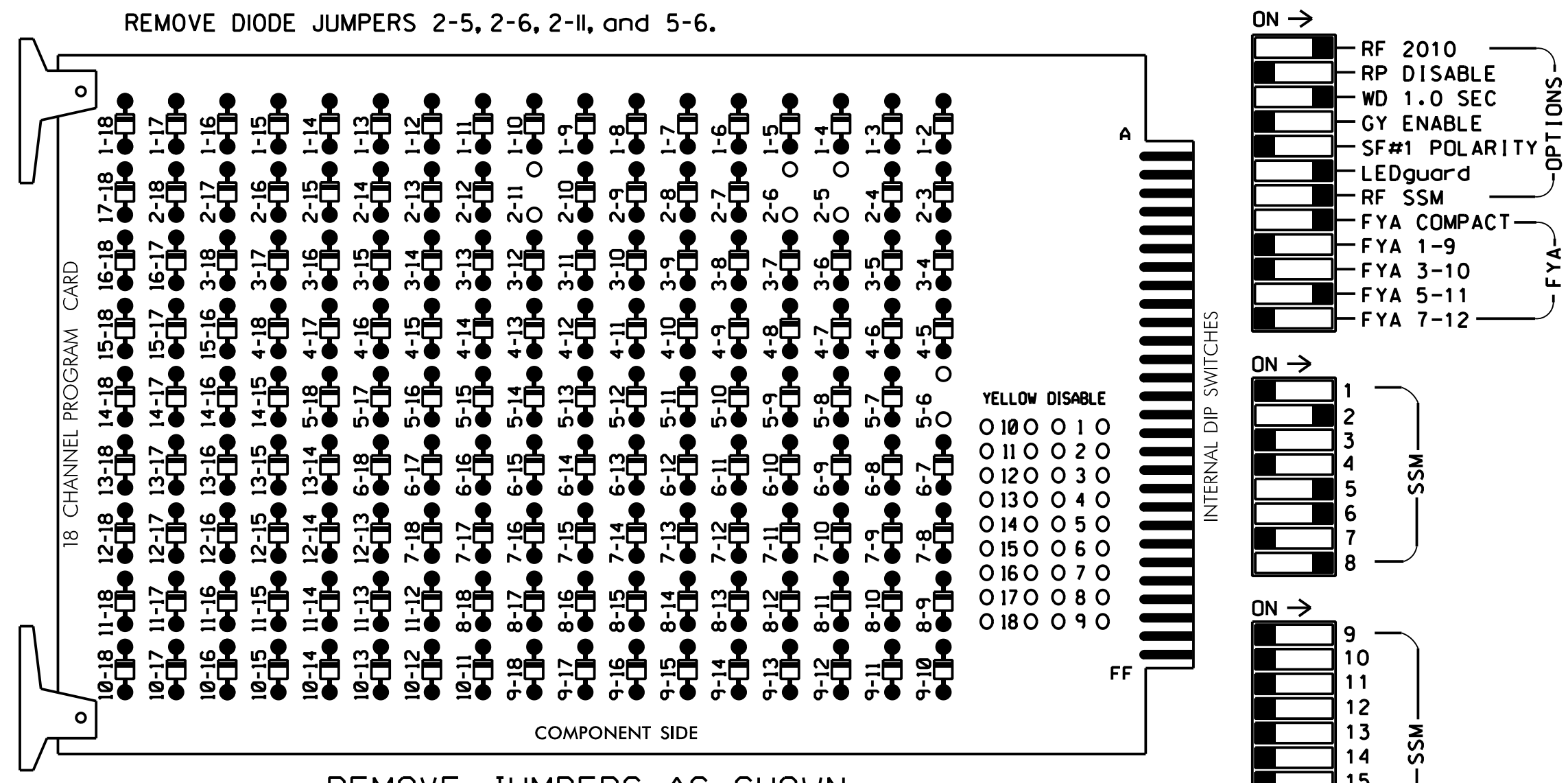
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	SR 2136 (Gilead Road) at I-77 NB Ramps		
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	REVISIONS: _____ INITI: _____ DATE: _____ _____ _____ _____	

DocuSigned by:
Natasha R. Simmons
4/23/2018
DATE
SIG. INVENTORY NO. 10-1619 T1

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.
- Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S7,S8,S9,S11
 PHASES USED.....2,5,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

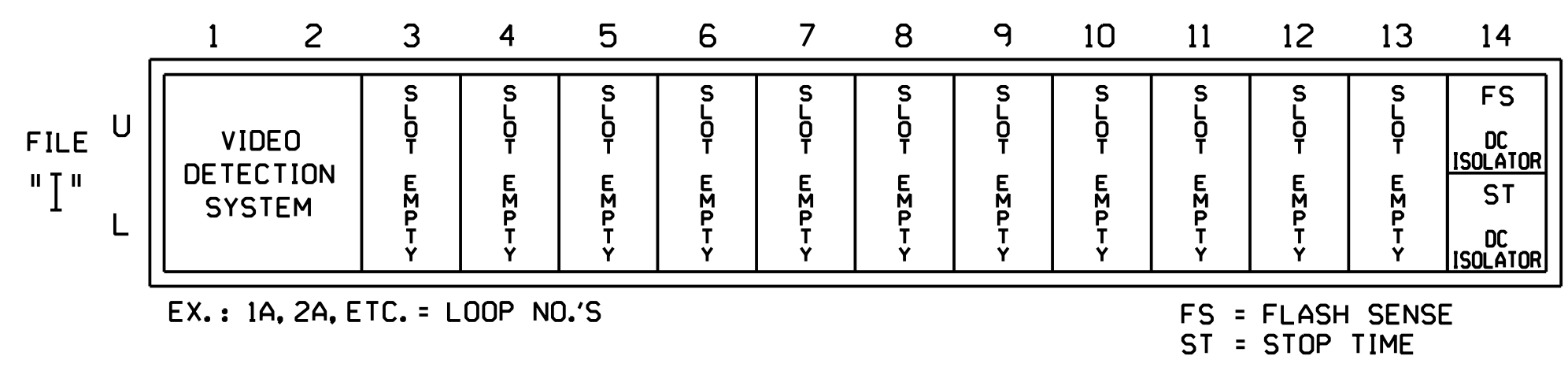
SIGNAL HEAD HOOK-UP CHART

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	11	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	OLC	6	5 GRN	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	51*	61,62	51*	NU	NU	81,82,83	NU
RED		128						134				107	
YELLOW		129						135				108	
GREEN		130						136				109	
RED ARROW								131					
YELLOW ARROW								132					
FLASHING YELLOW ARROW								133					
GREEN ARROW									120				
										*			

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail this sheet.
 NOTE: Load switches S7 and S9 require output remapping. See Sheet 3 of this electrical detail for instructions.

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

PED YELLOW CONFLICT MONITOR WIRING DETAIL

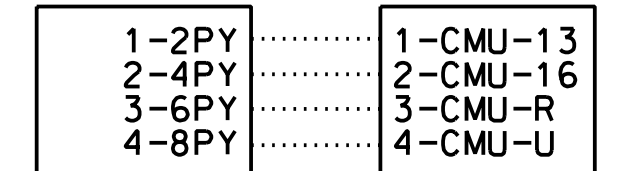
(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode with the 2018ECLIP-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 6 PY (field term, 120) to chan. 10 green (monitor pin R).

- Follow the instructions below to make the appropriate connections:
- STEP 1: Fold down rear panel of output file.
 - STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).
 - STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

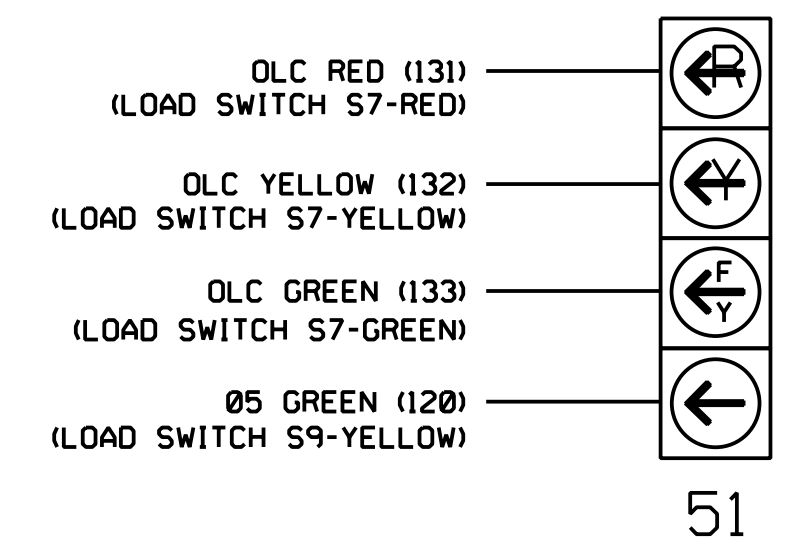
CMU-R _____ 6PY (term. 120)

NOTE: Some cabinet manufacturers use keyed connectors to accomplish this wiring configuration. If connectors are used, fold down the rear panel of the output file and find the set of 3 keyed connectors and connect them as shown below:



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



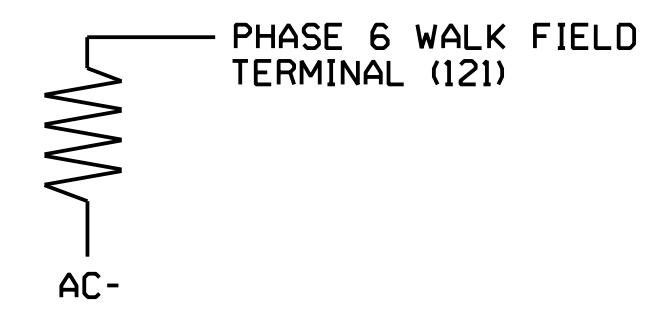
NOTE: The sequence display for signal head 51 requires special logic and output remapping. See sheets 2-3 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1619T1
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



Electrical Detail - Sheet 1 of 3
 Signal Upgrade
 Temporary Design 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For: SR 2136 (Gilead Road) at I-77 NB Ramps

Division 10 Mecklenburg Co. Huntersville

Prepared in the Office of:

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
 PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

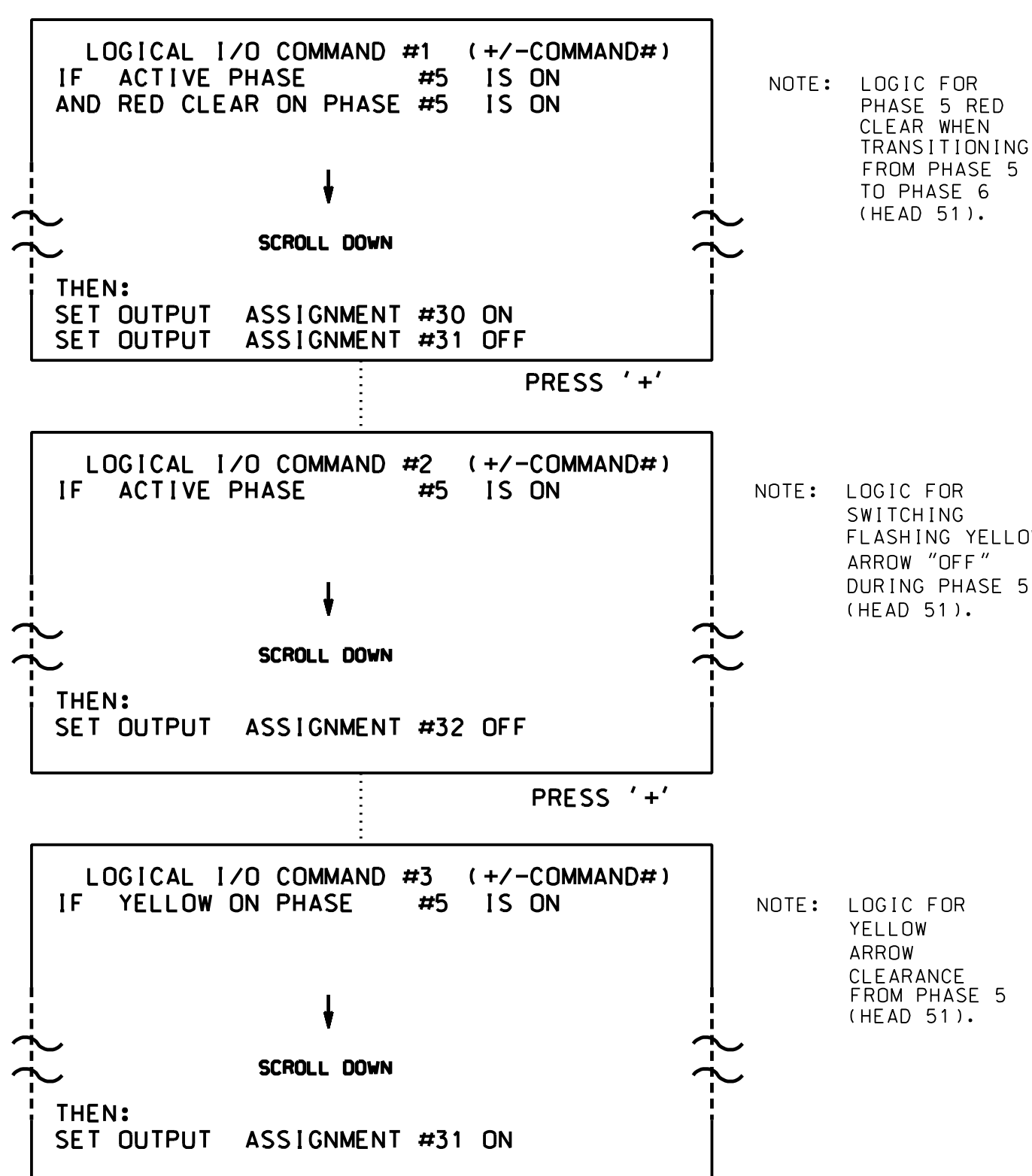
Revisions table with columns for Revisions, Init., and Date.

DocuSigned by: 4/23/2018
 SEAL: NORTH CAROLINA PROFESSIONAL SEAL 031464
 SIGNATURE: NATASHA R. SIMMONS
 DATE: _____
 SIG. INVENTORY NO. 10-1619 T1

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, and 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

<u>OUTPUT REFERENCE SCHEDULE</u>
OUTPUT 30 = Overlap C Red OUTPUT 31 = Overlap C Yellow OUTPUT 32 = Overlap C Green

Note: All outputs shown above have been remapped. See sheet 3 of this electrical detail.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' TWICE

```

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: |12345678910111213141516
VEH OVL PARENTS: | XX
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1619T1
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 2 of 3
Signal Upgrade
Temporary Design 1

DOCUMENT NOT CONSIDERED FINAL
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HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Office of:

750 N. Greenfield Pkwy, Corner, NC 27529

SR 2136 (Gilead Road) at I-77 NB Ramps	
Division 10 Mecklenburg Co. Huntersville	
PLAN DATE: December 2017	REVIEWED BY: A.D. Klinksiek
PREPARED BY: A.H. Thornburg	REVIEWED BY: N.R. Simmons
REVISIONS	INIT. DATE

SEAL

DocuSigned by:
Natasha R. Simmons
SIGNATURE DATE 4/23/2018

SIG. INVENTORY NO. 10-1619 T1

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR LOADSWITCHES S7 & S9 (SIGNAL HEAD 51)

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN
'1' (OUTPUT ASSIGNMENTS),
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

```
PAGE:1 C1 PIN:32 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

Overlap C Red

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1 C1 PIN:32 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA,
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1 C1 PIN:32 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

PRESS "+" KEY FOR OUTPUT 31

```
PAGE:1 C1 PIN:33 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

Overlap C Yellow

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1 C1 PIN:33 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA,
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1 C1 PIN:33 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

PRESS "+" KEY FOR OUTPUT 32

```
PAGE:1 C1 PIN:34 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

Overlap C Green

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1 C1 PIN:34 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA,
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1 C1 PIN:34 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

PRESS "+" TWICE TO
REACH OUTPUT 34.

```
PAGE:1 C1 PIN:36 NOT ENABLED
OUTPUT ASSIGNMENT #.....34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

Phase 5 Green

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT, THIS
"Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.
ENTER A "Y" FOR VEHICLE PHASE.

```
PAGE:1 C1 PIN:36 NOT ENABLED
SELECT VEHICLE PHASE (1-16).....5
SELECT COLOR(0=RED,1=YEL,2=GRN)...2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE'
THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.
PRESS THE 'ENT' KEY AFTER ENTERING DATA,
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT
ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

```
PAGE:1 C1 PIN:36 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

OUTPUT PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1619T1
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 3 of 3
Signal Upgrade
Temporary Design 1

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING
DETAILS FOR:
Prepared in the Office of:
North Carolina Department of Transportation
Division of Signal Management
750 N. Greenfield Pkwy, Corner, NC 27529

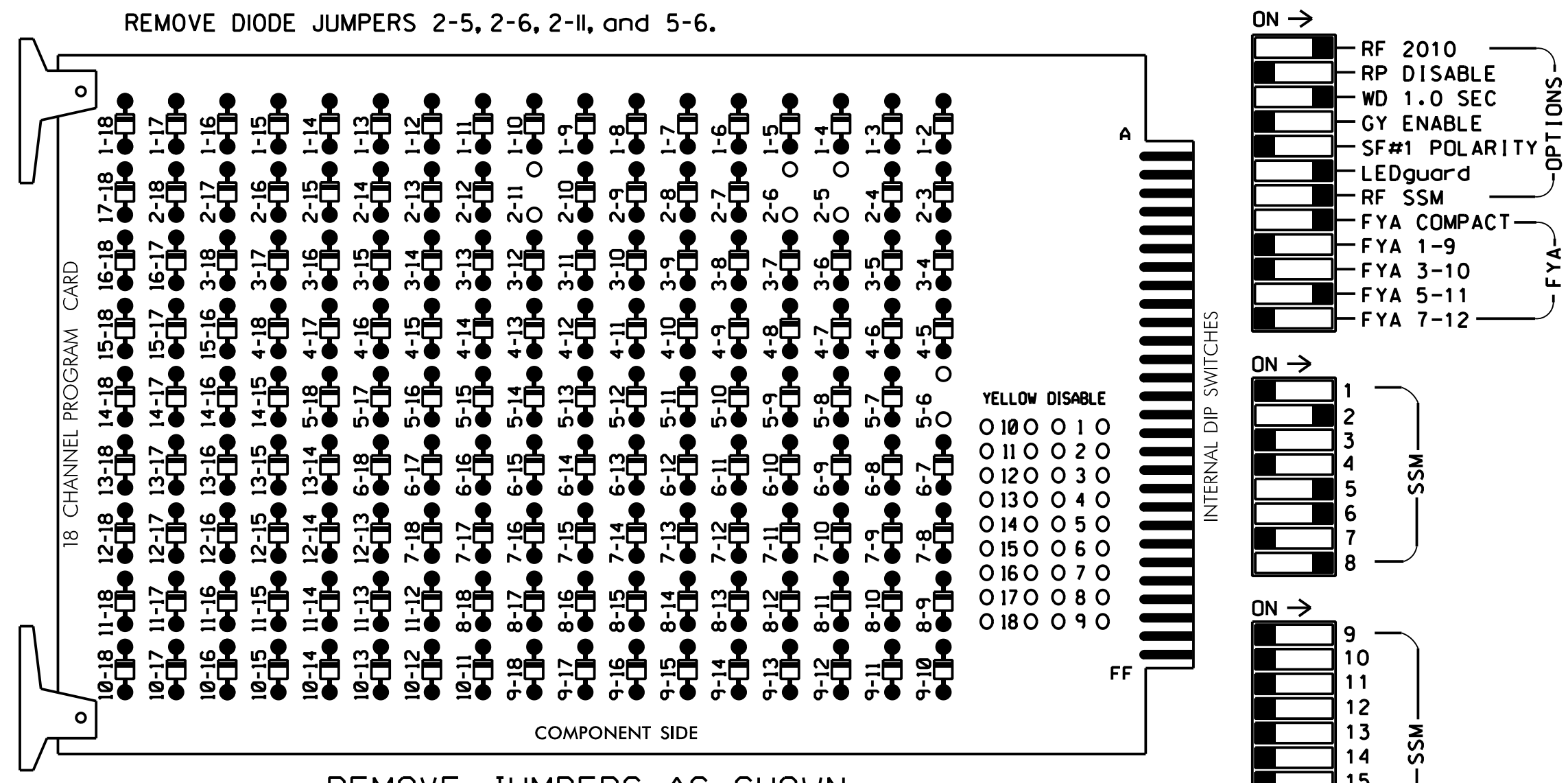
SR 2136 (Gilead Road)
at
I-77 NB Ramps
Division 10 Mecklenburg Co. Huntersville
PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
031464
NATASHA R. SIMMONS
DocuSigned by:
NATASHA R. SIMMONS
4/23/2018
SIGNATURE DATE
SIG. INVENTORY NO. 10-1619 T1

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

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.
- Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash.
- The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S7,S8,S9,S11
 PHASES USED.....2,5,6,8
 OVERLAP "A".....NOT USED
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

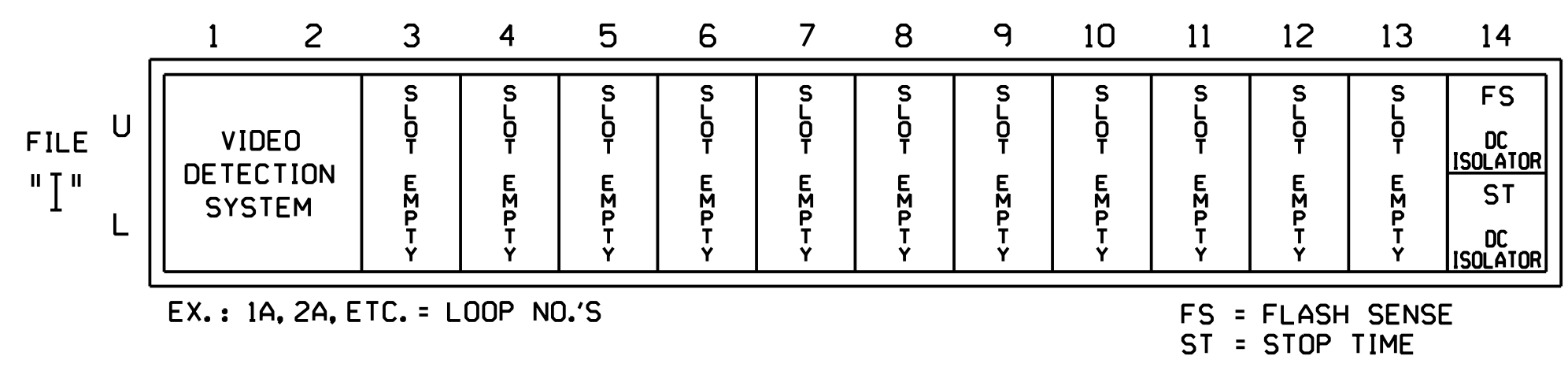
SIGNAL HEAD HOOK-UP CHART

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	11	15	7	8
PHASE	1	2	2 PED	3	4	4 PED	OLC	6	5 GRN	6 PED	7	8
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	51	61,62	51	NU	NU	81,82, 83
RED		128						134				107
YELLOW		129						135				108
GREEN		130						136				109
RED ARROW								131				
YELLOW ARROW								132				
FLASHING YELLOW ARROW								133				
GREEN ARROW									120			
										*		

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail this sheet.
 NOTE: Load switches S7 and S9 require output remapping. See Sheet 3 of this electrical detail for instructions.

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

PED YELLOW CONFLICT MONITOR WIRING DETAIL

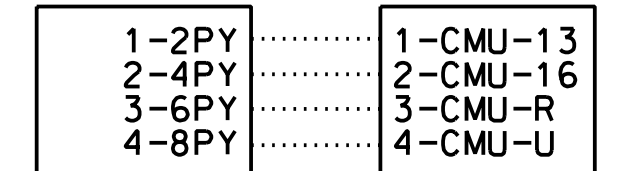
(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode with the 2018ECLIP-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 6 PY (field term, 120) to chan. 10 green (monitor pin R).

- Follow the instructions below to make the appropriate connections:
- STEP 1: Fold down rear panel of output file.
 - STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).
 - STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

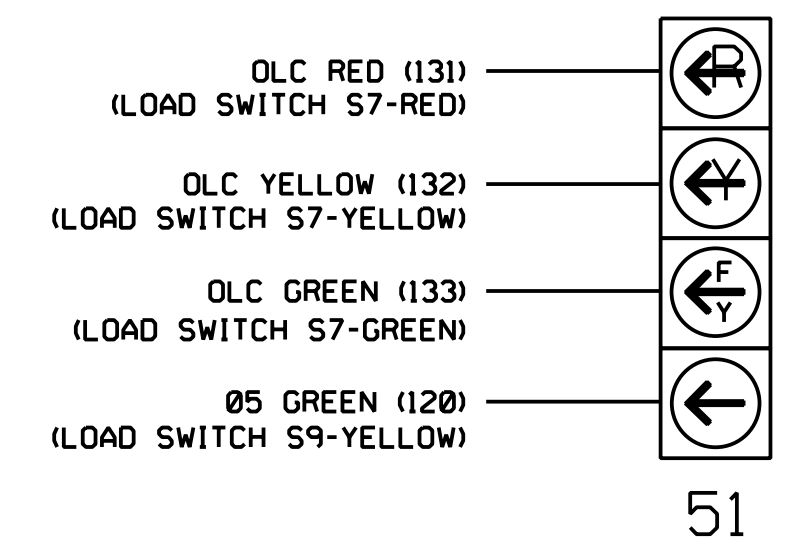
CMU-R _____ 6PY (term. 120)

NOTE: Some cabinet manufacturers use keyed connectors to accomplish this wiring configuration. If connectors are used, fold down the rear panel of the output file and find the set of 3 keyed connectors and connect them as shown below:



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



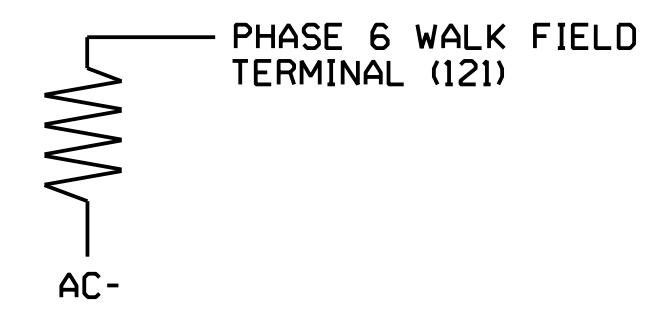
NOTE: The sequence display for signal head 51 requires special logic and output remapping. See sheets 2-3 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1619T2
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



Electrical Detail - Sheet 1 of 3
 Signal Upgrade
 Temporary Design 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details for: SR 2136 (Gilead Road) at I-77 NB Ramps

Division 10 Mecklenburg Co. Huntersville

Prepared in the Office of:

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
 PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

Revisions table with columns for Revisions, Init., and Date.

Signature: DATE: 4/23/2018
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATASHA R. SIMMONS

DocuSigned by: 4/23/2018
 HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997

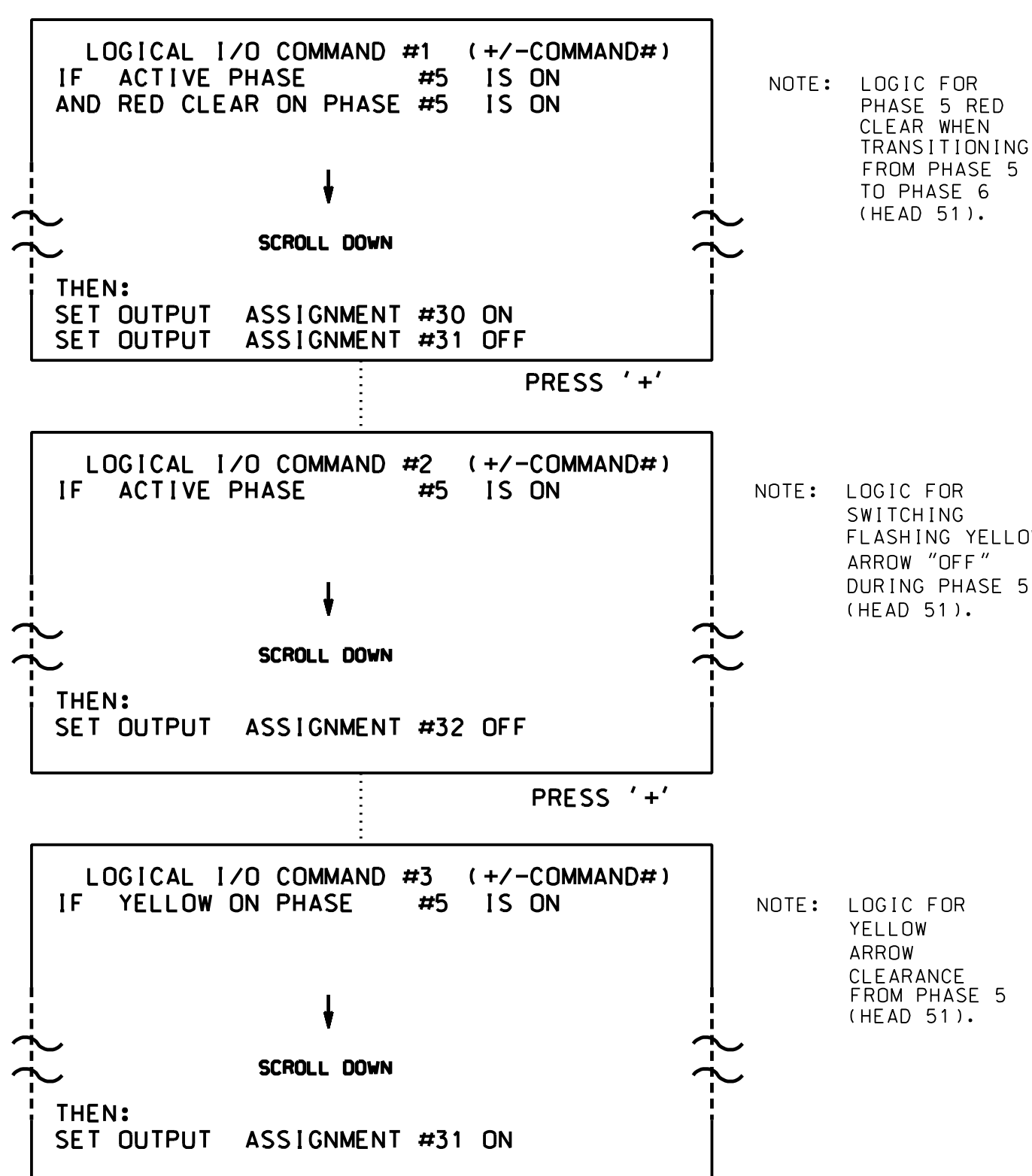
750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. 10-1619 T2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, and 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

<u>OUTPUT REFERENCE SCHEDULE</u>
OUTPUT 30 = Overlap C Red OUTPUT 31 = Overlap C Yellow OUTPUT 32 = Overlap C Green

Note: All outputs shown above have been remapped. See sheet 3 of this electrical detail.

OVERLAP PROGRAMMING DETAIL *(program controller as shown below)*

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).
PRESS '+' TWICE

```

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: |12345678910111213141516
VEH OVL PARENTS: | XX
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1619T2 DESIGNED: December 2017 SEALED: 04-23-2018 REVISED: N/A

Electrical Detail - Sheet 2 of 3
Signal Upgrade
Temporary Design 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
(919) 546-8997

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Office of: 1750 N. Greenfield Pkwy, Corner, NC 27529	SR 2136 (Gilead Road) at I-77 NB Ramps Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	SEAL SEAL 031464 NATASHA R. SIMMONS ENGINEER						
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REVISIONS	INIT.	DATE						

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR LOADSWITCHES S7 & S9 (SIGNAL HEAD 51)

(program controller as shown below)

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS), WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

Overlap C Red

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:32 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...0

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' KEY AFTER ENTERING DATA, THEN 'ESC'.

```

PAGE:1 C1 PIN:32 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS "+" KEY FOR OUTPUT 31

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

Overlap C Yellow

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:33 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...1

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' KEY AFTER ENTERING DATA, THEN 'ESC'.

```

PAGE:1 C1 PIN:33 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS "+" KEY FOR OUTPUT 32

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

Overlap C Green

THE OUTPUT IS SET AS A VEHICLE PHASE BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE OVERLAP.

```

PAGE:1 C1 PIN:34 VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN)...2

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' KEY AFTER ENTERING DATA, THEN 'ESC'.

```

PAGE:1 C1 PIN:34 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

PRESS "+" TWICE TO REACH OUTPUT 34.

```

PAGE:1 C1 PIN:36 NOT ENABLED
OUTPUT ASSIGNMENT #.....34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

```

Phase 5 Green

THE OUTPUT IS SET AS "NOT ENABLED" BY DEFAULT, THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED. ENTER A "Y" FOR VEHICLE PHASE.

```

PAGE:1 C1 PIN:36 NOT ENABLED
SELECT VEHICLE PHASE (1-16)...5
SELECT COLOR(0=RED,1=YEL,2=GRN)...2

```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS THE 'ENT' KEY AFTER ENTERING DATA, THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

```

PAGE:1 C1 PIN:36 VEHICLE PHASE
OUTPUT ASSIGNMENT #.....34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)...0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....

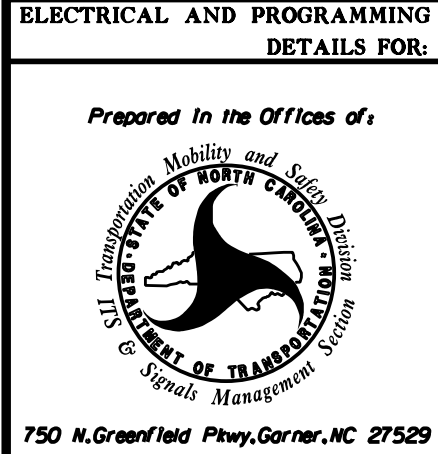
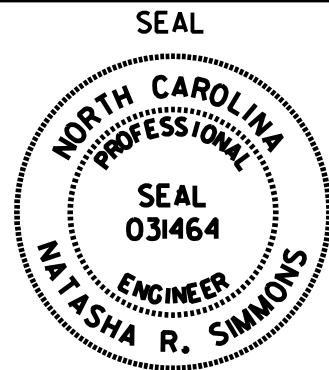
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OUTPUT PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1619T2
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

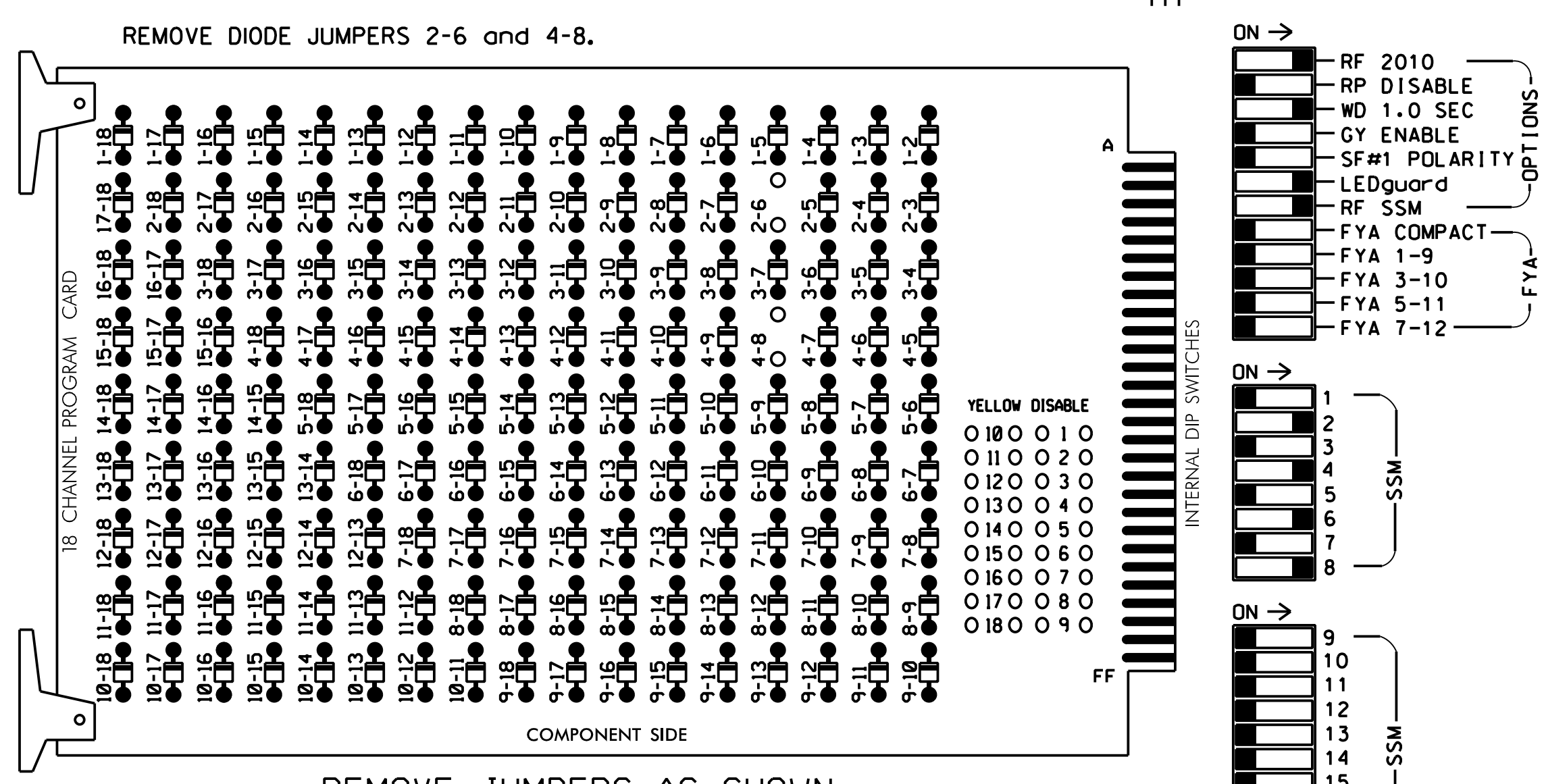
Electrical Detail - Sheet 3 of 3
Signal Upgrade
Temporary Design 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at I-77 NB Ramps		
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	REVISIONS INIT. DATE _____ _____	
HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997		Documented by: 4/23/2018 _____ SIGNATURE DATE _____ _____ SIG. INVENTORY NO. 10-1619 T2	

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.

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. Restore controller to factory defaults before programming per this electrical detail.
3. Program phases 2, 4, 6, 7, and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all Phases.
5. Program phases 2 and 6 for Startup In Green.
6. Program phases 2, 4, 6, 7, and 8 for Red Rest.
7. The cabinet and controller are part of the Gilead Road Closed Loop 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	61,62,63	NU	NC	81,82	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130										
RED ARROW												107
YELLOW ARROW												108
GREEN ARROW												109
Hand icon												
Person icon												

NU = Not Used
NC = Not Connected

EQUIPMENT INFORMATION

CONTROLLER.....2070E
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8,S11
PHASES USED.....2,4,6,*7,8
OVERLAPS.....NONE
* PHASE USED FOR TIMING PURPOSES ONLY

DYNAMIC OMIT CONTROL PROGRAMMING

(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Functions 1 and 2.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```

DYNAMIC/BACKUP CONTROL FUNCTION #01
OVERLAPS:;ABCDEFGHIJKLMNPO
IF OVERLAPS ARE ACTIVE :
OR PHASES:;12345678910111213141516
IF PHASES ARE ON: X X
OMIT PHASES :
CALL PHASES : X
    
```

PRESS 'NEXT'

```

DYNAMIC/BACKUP CONTROL FUNCTION #02
OVERLAPS:;ABCDEFGHIJKLMNPO
IF OVERLAPS ARE ACTIVE :
OR PHASES:;12345678910111213141516
IF PHASES ARE ON: X
OMIT PHASES : X
CALL PHASES :
    
```

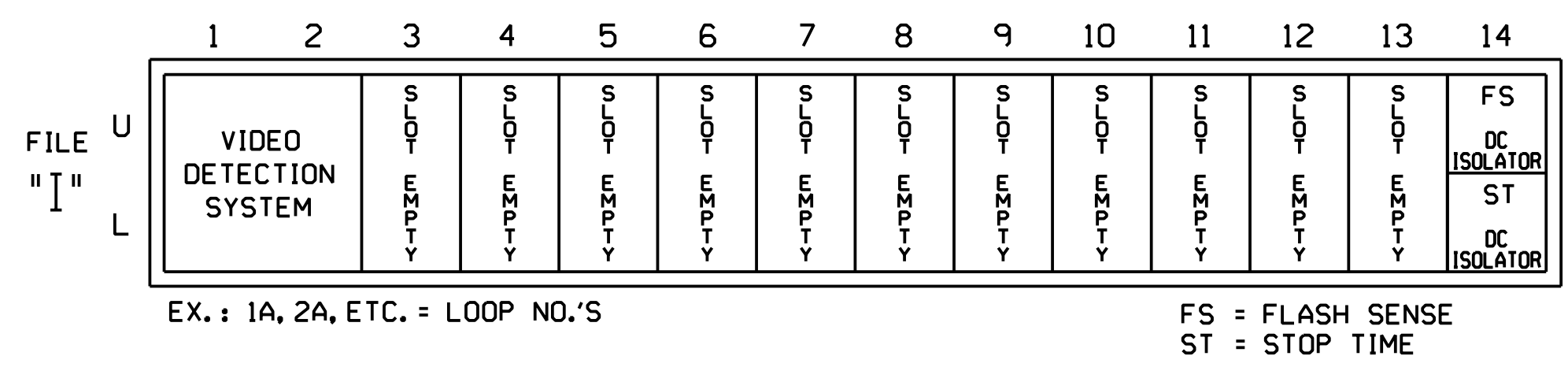
DYNAMIC OMIT PROGRAMMING COMPLETE

NOTE: THIS PROGRAMMING ENSURES THAT PHASE 7 WILL BE SERVED PRIOR TO PHASE 8 WHEN CONTROLLER IS ADVANCING FROM 2+6.

PHASE 7 IS USED TO PROVIDE EXTENDED RED CLEARANCE BEFORE SERVING PHASE 8.

INPUT FILE POSITION LAYOUT

(front view)

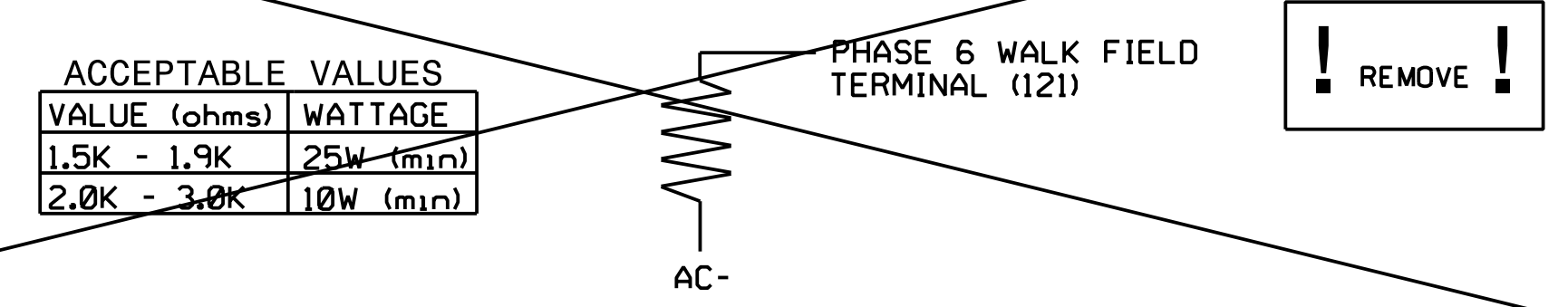


SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

```

PHASE SEQUENCE: PAGE 1 NEXT: PAGES)
RNG:LEAD BARRIER 1 X-LAG:LEAD BARRIER 2 X-LAG
1 :0 2 0 0 :0 4 0 0
2 :0 6 0 0 :0 7 8 0 0
3 :0 0 0 0 :0 0 0 0
4 :0 0 0 0 :0 0 0 0
    
```

Electrical Detail
Signal Upgrade
Temporary Designs 3,4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1619T3-T4
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

HNTB
HNTB NORTH CAROLINA, P.C.
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(919) 546-8997

Prepared in the Office of:

SR 2136 (Gilead Road) at I-77 NB Ramps

Division 10 Mecklenburg Co. Huntersville

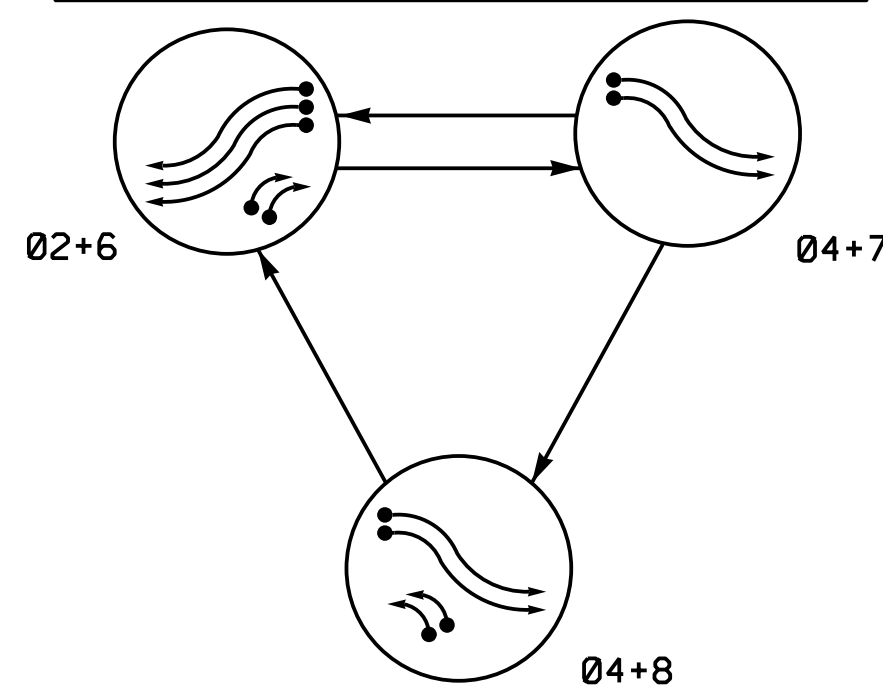
PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

REVISIONS: INIT. DATE

DocuSigned by:
4/23/2018
SIGNATURE DATE
SIG. INVENTORY NO. 10-1619T3-T4

PHASING DIAGRAM

Program all phases for "Red Rest".



PHASING DIAGRAM DETECTION LEGEND

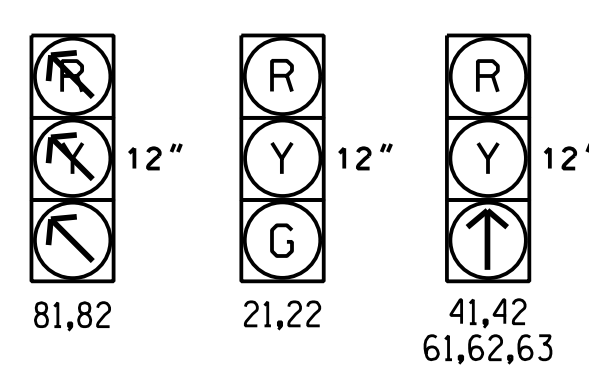
- → DETECTED MOVEMENT
- → UNDETECTED MOVEMENT (OVERLAP)
- ⋯ → UNSIGNALIZED MOVEMENT
- ⚡ → PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+6	04+7	04+8	FLASH
21,22	G	R	R	R
41,42	R	↑	↑	R
61,62,63	↑	R	R	R
81,82	R	R	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



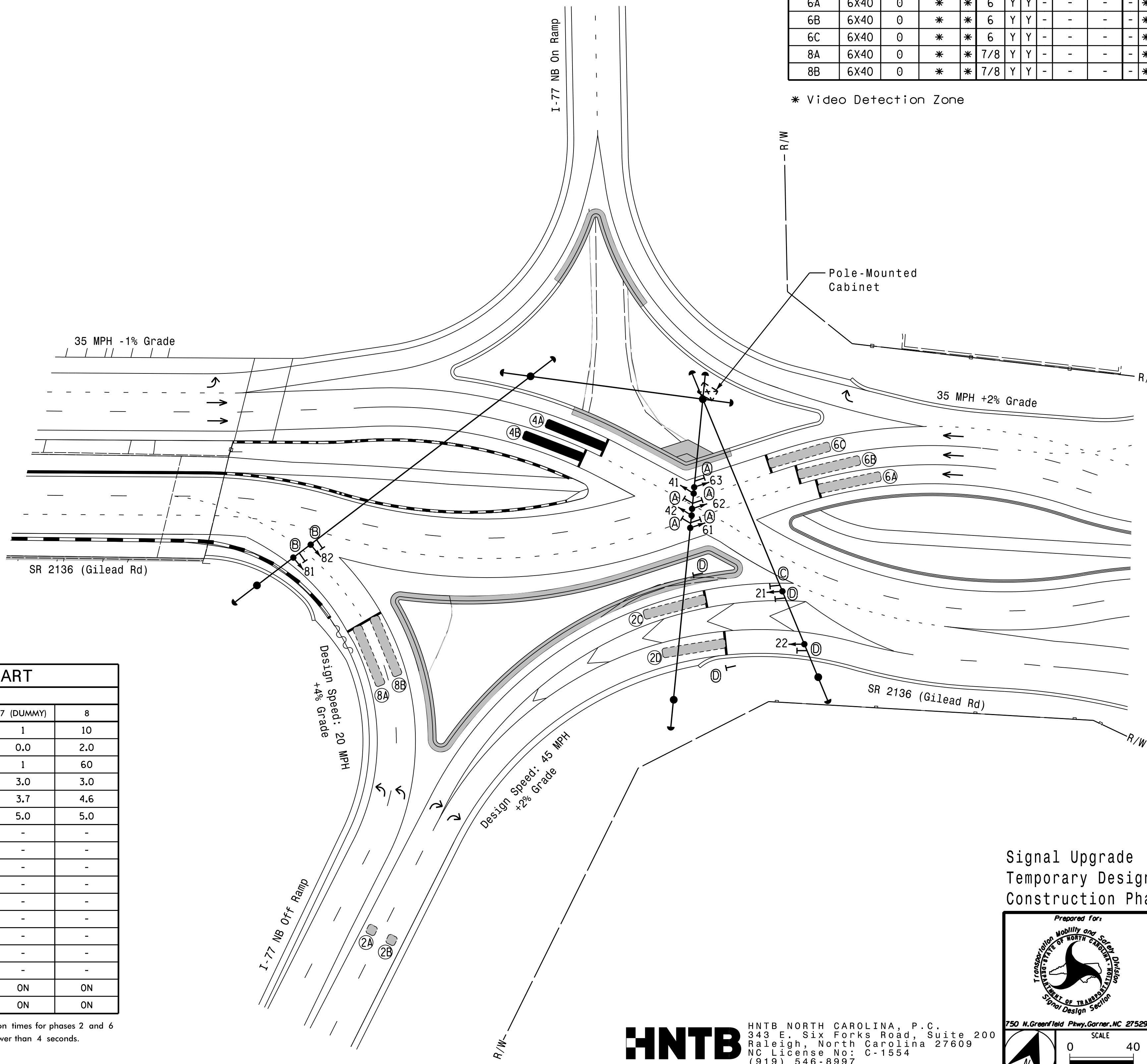
OASIS 2070E LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	300	*	*	2	-	Y	-	2.4	-	-	*
2B	6X6	300	*	*	2	-	Y	-	2.4	-	-	*
2C	6X40	0	*	*	2	Y	Y	-	-	-	-	*
2D	6X40	0	*	*	2	Y	Y	-	-	-	-	*
4A	6X40	0	*	*	4	Y	Y	-	-	-	-	*
4B	6X40	0	*	*	4	Y	Y	-	-	-	-	*
6A	6X40	0	*	*	6	Y	Y	-	-	-	-	*
6B	6X40	0	*	*	6	Y	Y	-	-	-	-	*
6C	6X40	0	*	*	6	Y	Y	-	-	-	-	*
8A	6X40	0	*	*	7/8	Y	Y	-	-	-	-	*
8B	6X40	0	*	*	7/8	Y	Y	-	-	-	-	*

* Video Detection Zone

3 Phase Fully Actuated Gilead Road Closed Loop 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.
- Omit phase 8 during phase 2+6 on.
- Program controller to clear from phase 2+6 to phase 8 by progressing through phase 7.
- Omit phase 7 during phase 8 on.
- Phase 7 provides red clearance time for vehicles traveling Westbound on Gilead Rd.
- Set all detector units to presence mode.
- Reposition existing signal heads numbered 41 and 42 and sign (A).
- Program all phases for "Red Rest".
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1619



OASIS 2070E TIMING CHART

FEATURE	PHASE				
	2	4	6	7 (DUMMY)	8
Min Green 1 *	10	10	10	1	10
Extension 1 *	2.0	2.0	2.0	0.0	2.0
Max Green 1 *	60	60	60	1	60
Yellow Clearance	4.3	3.9	3.7	3.0	3.0
Red Clearance	1.6	3.7	1.7	3.7	4.6
Red Revert	5.0	5.0	5.0	5.0	5.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	-	-	-	-
Vehicle Call Memory	-	-	-	-	-
Dual Entry	ON	ON	ON	ON	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
○ → Modified Signal Head	N/A
⊥ Sign	⊥ Sign
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ Pedestrian Signal Head
○ → Signal Pole with Guy	○ → Signal Pole with Guy
○ → Signal Pole with Sidewalk Guy	○ → Signal Pole with Sidewalk Guy
⊠ Inductive Loop Detector	⊠ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Controller & Cabinet
⊠ Junction Box	⊠ Junction Box
— 2-in Underground Conduit	— 2-in Underground Conduit
N/A Right of Way	— Right of Way
→ Directional Arrow	→ Directional Arrow
▬ Video Detection Zone	▬ Video Detection Zone
— Directional Drill	N/A
♯ Wheelchair Ramp	♯ Wheelchair Ramp
▬ Construction Barrier	N/A
▬ Construction Barrier	N/A
(A) Through Arrow "ONLY" Sign (R3-5A)	(A) Through Arrow "ONLY" Sign (R3-5A)
(B) Left Arrow "ONLY" Sign (R3-5L)	(B) Left Arrow "ONLY" Sign (R3-5L)
(C) No Left Turn Sign (R3-2)	(C) No Left Turn Sign (R3-2)
(D) "NO TURN ON RED" Sign (R10-11)	(D) "NO TURN ON RED" Sign (R10-11)

Signal Upgrade
Temporary Design 4
Construction Phase V

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
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(919) 546-8997

	SR 2136 (Gilead Road) at I-77 NB Ramps		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER N. R. SIMMONS 031464
	Division 10 Mecklenburg Co., Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	SCALE 0 40 1"=40'	

PHASING DIAGRAM
Program all phases for "Red Rest".

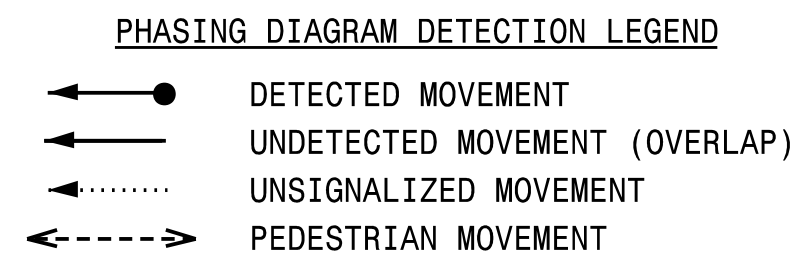
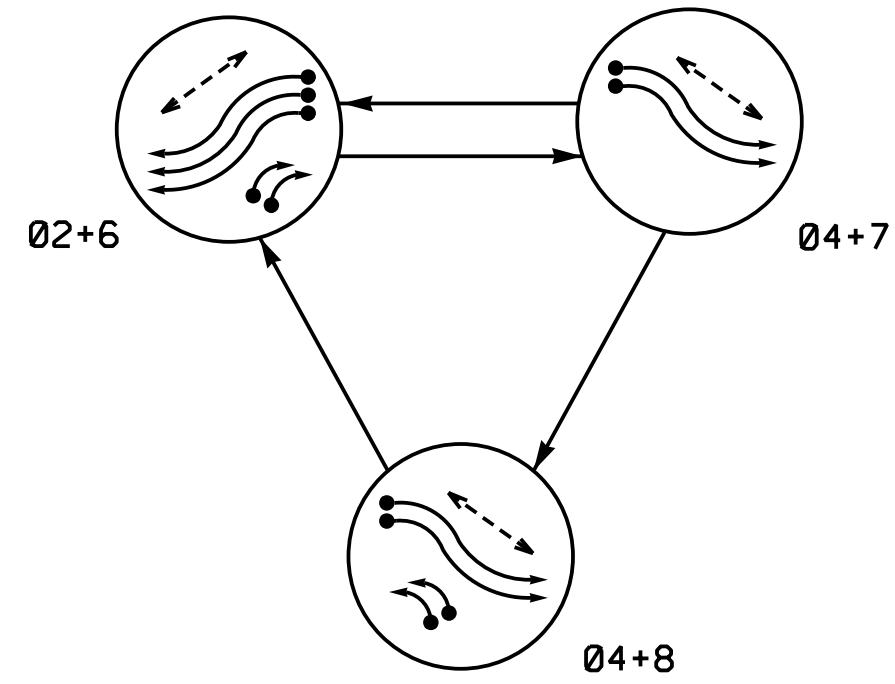
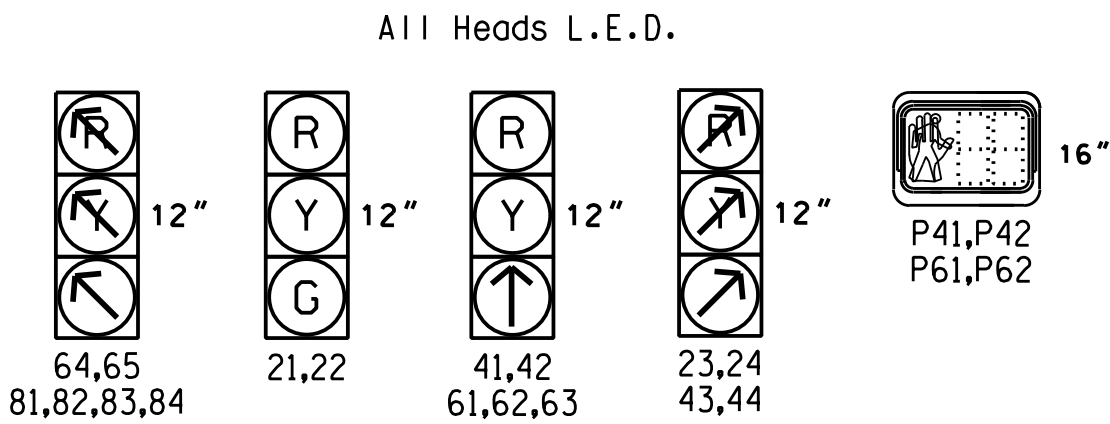


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+6	04+7	04+8	FLASH
21,22	G	R	R	R
23,24	/	/	/	/
41,42	R			R
43,44	/	/	/	/
61,62,63		R	R	R
64,65	/	R	R	R
81,82,83,84	R	R	/	R
P41,P42	DW	W	W	DRK
P61,P62	W	DW	DW	DRK

SIGNAL FACE I.D.

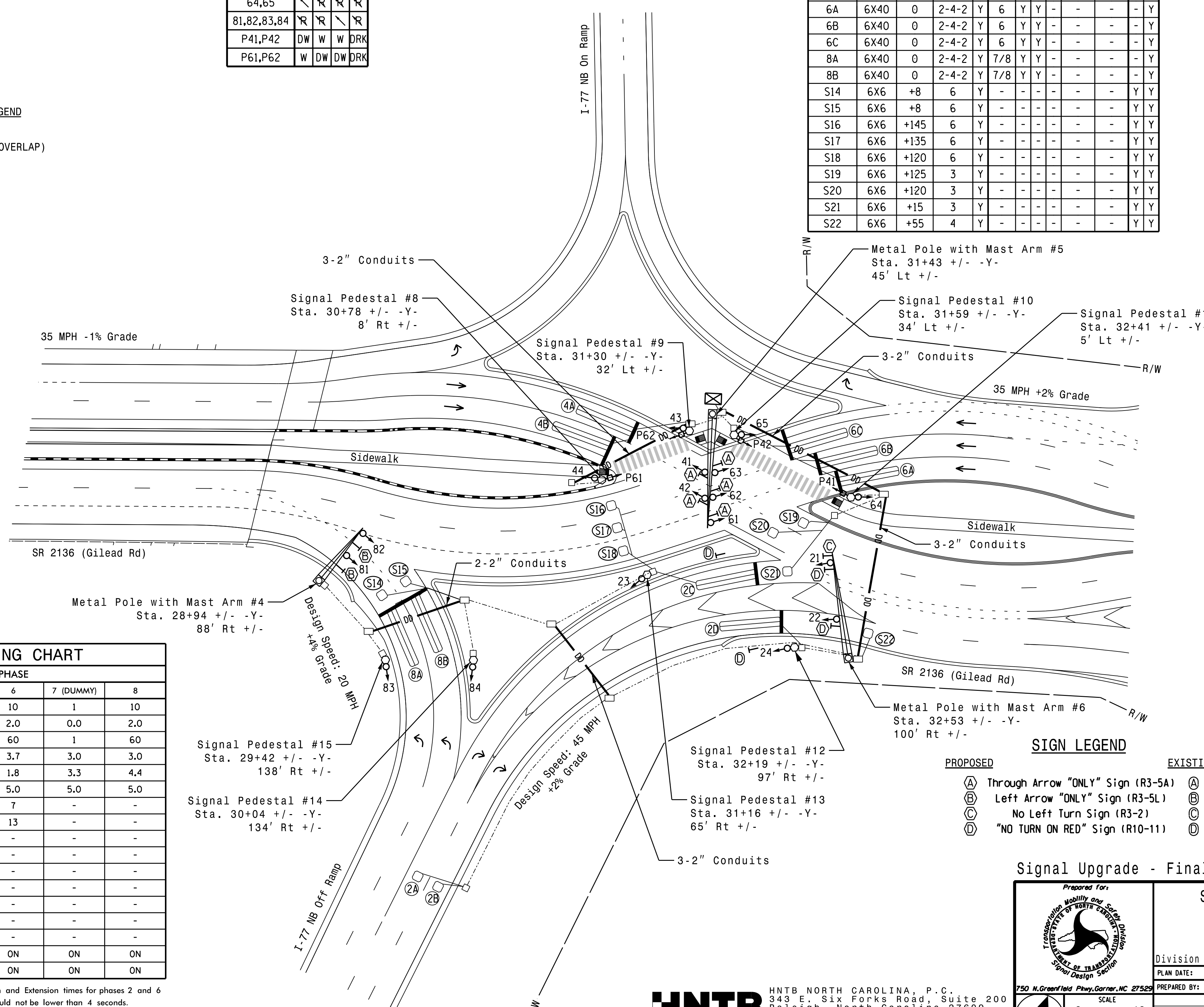


OASIS 2070E LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
2A	6X6	300	6	Y	2	-	Y	-	2.4	-	-	Y
2B	6X6	300	6	Y	2	-	Y	-	2.4	-	-	Y
2C	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
2D	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
6A	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
6B	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
6C	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	Y	7/8	Y	Y	-	-	-	-	Y
8B	6X40	0	2-4-2	Y	7/8	Y	Y	-	-	-	-	Y
S14	6X6	+8	6	Y	-	-	-	-	-	-	-	Y
S15	6X6	+8	6	Y	-	-	-	-	-	-	-	Y
S16	6X6	+145	6	Y	-	-	-	-	-	-	-	Y
S17	6X6	+135	6	Y	-	-	-	-	-	-	-	Y
S18	6X6	+120	6	Y	-	-	-	-	-	-	-	Y
S19	6X6	+125	3	Y	-	-	-	-	-	-	-	Y
S20	6X6	+120	3	Y	-	-	-	-	-	-	-	Y
S21	6X6	+15	3	Y	-	-	-	-	-	-	-	Y
S22	6X6	+55	4	Y	-	-	-	-	-	-	-	Y

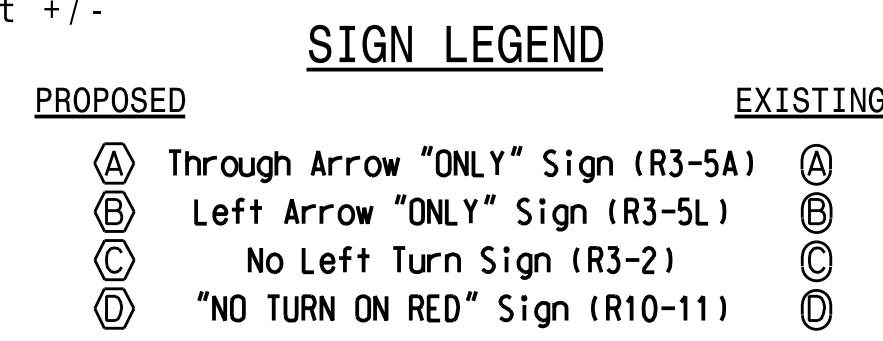
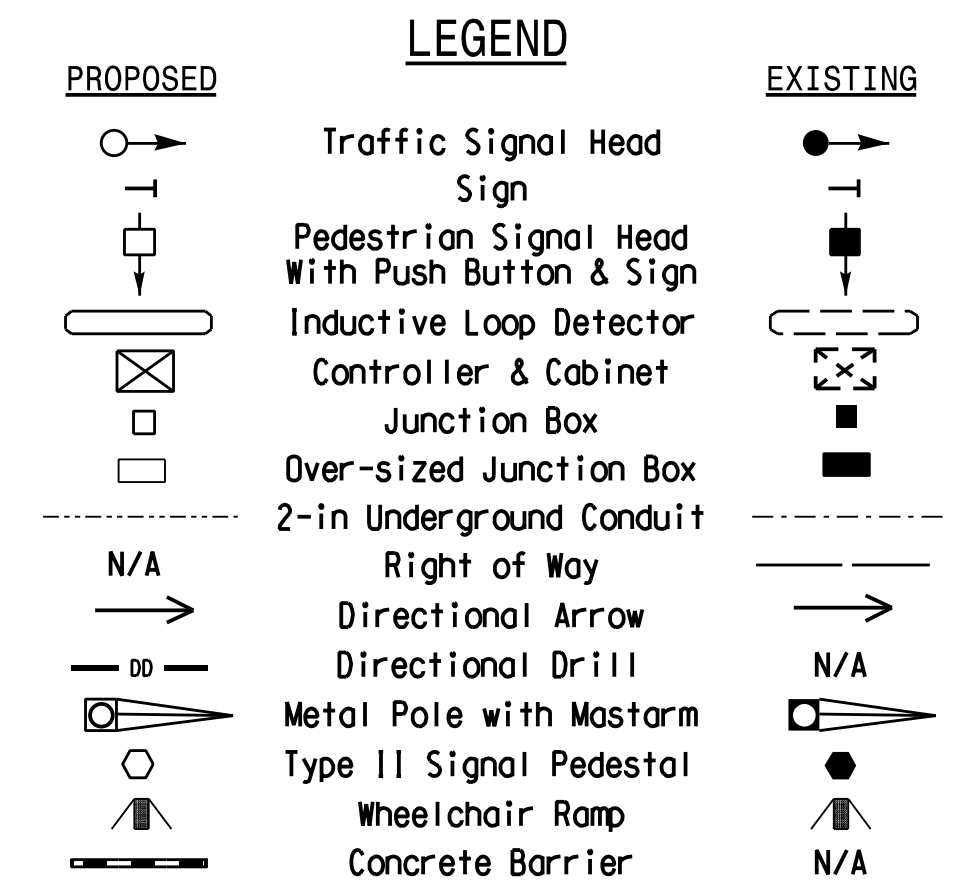
3 Phase Fully Actuated Gilead Road Closed Loop System

- 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.
 - Omit phase 8 during phase 2+6 on.
 - Program controller to clear from phase 2+6 to phase 8 by progressing through phase 7.
 - Omit phase 7 during phase 8 on.
 - Phase 7 provides red clearance time for vehicles traveling Westbound on Gilead Rd.
 - Set all detector units to presence mode.
 - Program all phases for "Red Rest".
 - Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
 - The cabinet should be designed to include 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.
 - All pedestrian pushbuttons shall be located in the field by the Division Traffic Engineer before installation.
 - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
 - Closed loop system data: Controller Asset #1619



OASIS 2070E TIMING CHART

FEATURE	PHASE				
	2	4	6	7 (DUMMY)	8
Min Green 1*	10	10	10	1	10
Extension 1*	2.0	2.0	2.0	0.0	2.0
Max Green 1*	60	60	60	1	60
Yellow Clearance	4.3	3.9	3.7	3.0	3.0
Red Clearance	1.0	3.5	1.8	3.3	4.4
Red Revert	5.0	5.0	5.0	5.0	5.0
Walk 1*	-	7	7	-	-
Don't Walk 1	-	18	13	-	-
Seconds Per Actuation*	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-
Time To Reduce*	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	-	-	-	-
Vehicle Call Memory	-	-	-	-	-
Dual Entry	ON	ON	ON	ON	ON
Simultaneous Gap	ON	ON	ON	ON	ON



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

Signal Upgrade - Final Design

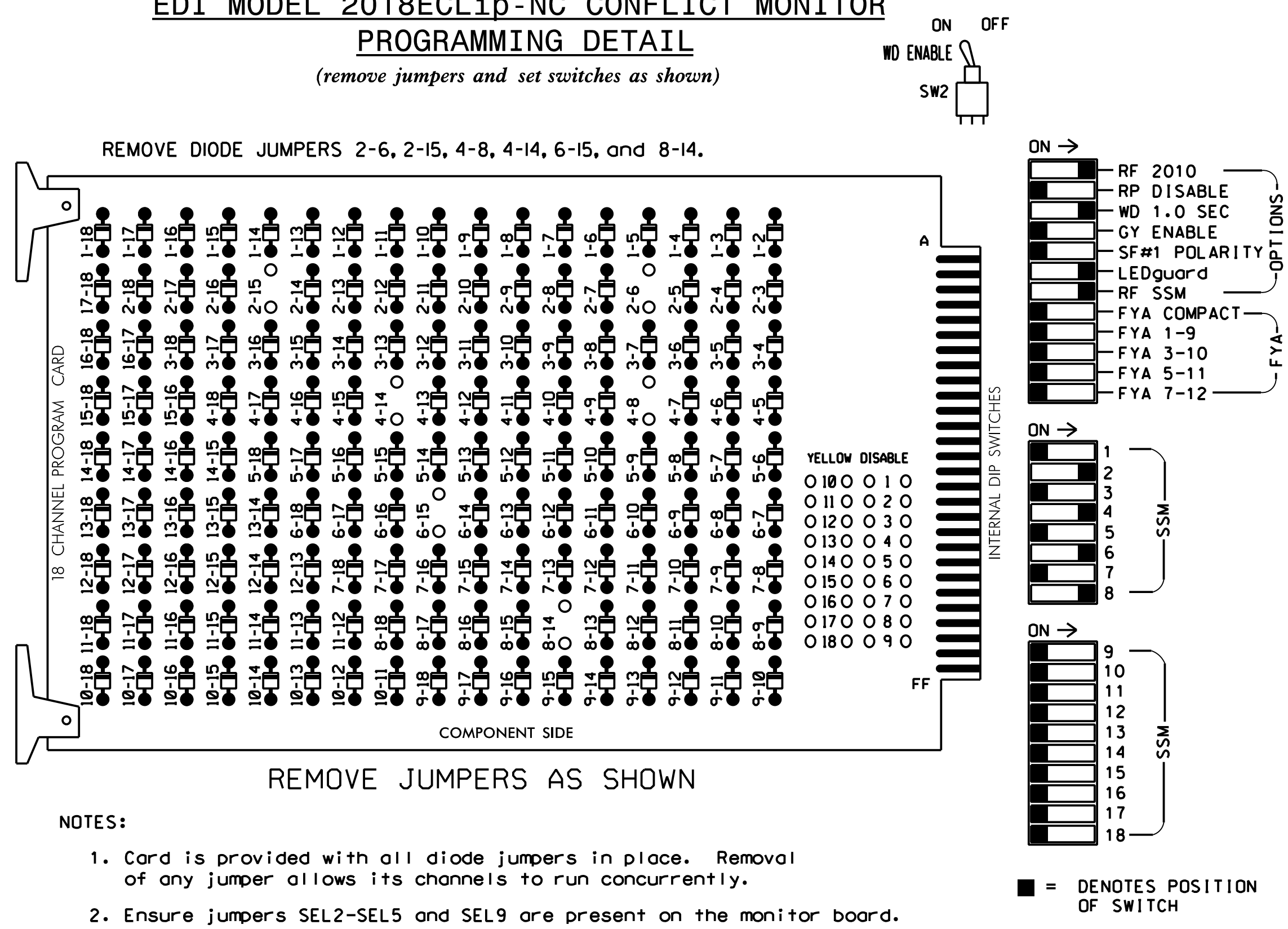
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at I-77 NB Ramps		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 M. TASHA R. SIMMONS
	Division 10 Mecklenburg Co., Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek	PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	

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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 2, 4, 6, 7, and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 4 and 6 for 'STARTUP PED CALL'.
- Program phases 2, 4, 6, 7, and 8 for Red Rest.
- The cabinet and controller are part of the Gilead Road Closed Loop 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.	NU	21,22	23,24	NU	41,42	43,44	P41, P42	NU	61,62, 63	64,65	P61, P62	NC	81,82, 83,84	NU	NU	NU	NU	NU
RED	128			101				134										
YELLOW	129			102				135										
GREEN	130																	
RED ARROW		128			101			134			107							
YELLOW ARROW		129			102			135			108							
GREEN ARROW		130			103	103		136	136		109							
Hand icon							104				119							
Person icon							106				121							

NU = Not Used
NC = Not Connected

EQUIPMENT INFORMATION

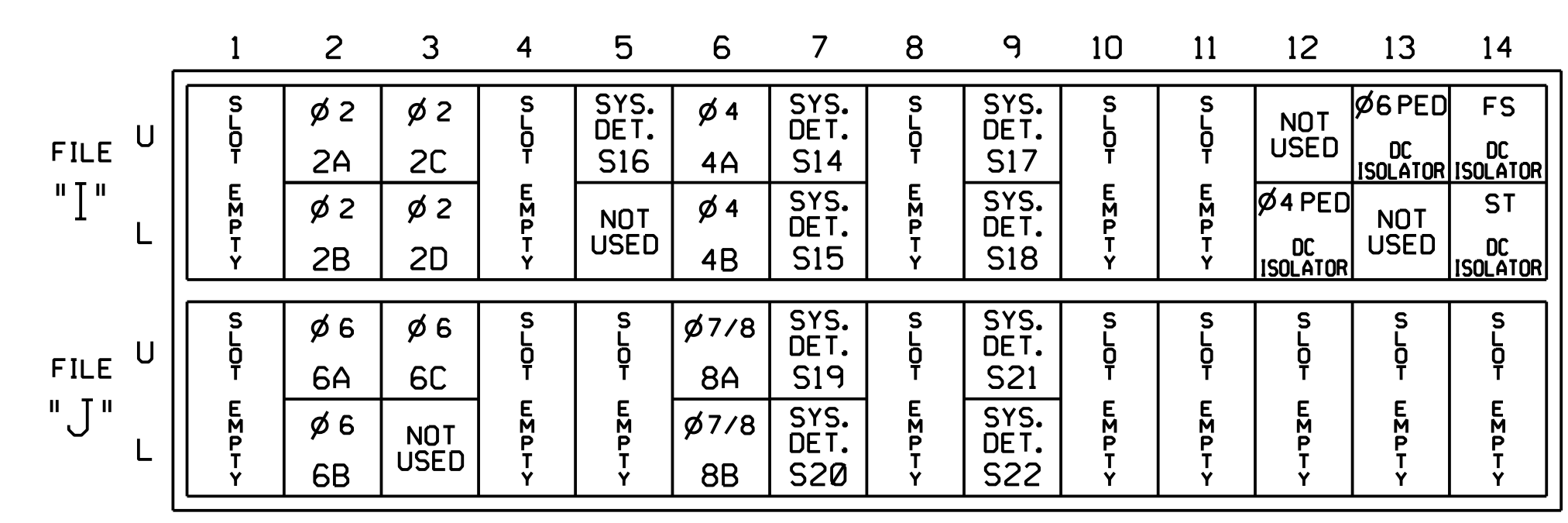
CONTROLLER.....2070E
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S5,S6,S8,S9,S11
 PHASES USED.....2,4,4 PED,6,6 PED,*7,8
 OVERLAPS.....NONE
 * PHASE USED FOR TIMING PURPOSES ONLY

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)

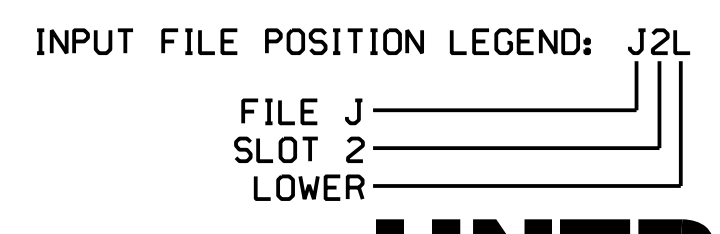


INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2		Y		2,4	
2B	TB2-7,8	I2L	43	5	12	2		Y		2,4	
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
2D	TB2-11,12	I3L	76	38	42	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	7/8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	7/8	Y	Y			
*S14	TB6-1,2	I7U	65	27	34	SYS					
*S15	TB6-3,4	I7L	78	40	44	SYS					
*S16	TB4-5,6	I5U	58	20	3	SYS					
*S17	TB6-9,10	I9U	60	22	11	SYS					
*S18	TB6-11,12	I9L	62	24	13	SYS					
*S19	TB7-1,2	J7U	66	28	38	SYS					
*S20	TB7-3,4	J7L	79	41	48	SYS					
*S21	TB7-9,10	J9U	59	21	15	SYS					
*S22	TB7-11,12	J9L	61	23	17	SYS					
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

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

* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.



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THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1619
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 2
Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 2136 (Gilead Road) at I-77 NB Ramps

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
 PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

REVISIONS: _____ INITI: _____ DATE: _____

DocuSigned by: *Notasha R. Simmons* 4/23/2018
 SIGNATURE DATE
 SIG. INVENTORY NO. 10-1619

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NOTASHA R. SIMMONS

PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM DAVIS LOCAL CONTROLLER MAIN MENU
SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1		NEXT: PAGES)					
RNG	LEAD	BARRIER 1	X-LAG	LEAD	BARRIER 2	X-LAG	
1	:0	2	0	0	:0	4	0
2	:0	6	0	0	:7	8	0
3	:0	0	0	0	:0	0	0
4	:0	0	0	0	:0	0	0

DYNAMIC OMIT CONTROL PROGRAMMING

(program controller as shown below)

- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Functions 1 and 2.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```

DYNAMIC/BACKUP CONTROL FUNCTION #01
OVERLAPS: ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE :
OR PHASES: 12345678910111213141516
IF PHASES ARE ON: X X
OMIT PHASES : X
CALL PHASES : X
    
```

PRESS 'NEXT'

```

DYNAMIC/BACKUP CONTROL FUNCTION #02
OVERLAPS: ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE :
OR PHASES: 12345678910111213141516
IF PHASES ARE ON: X
OMIT PHASES : X
CALL PHASES :
    
```

DYNAMIC OMIT PROGRAMMING COMPLETE

NOTE: THIS PROGRAMMING ENSURES THAT PHASE 7 WILL BE SERVED PRIOR TO PHASE 8 WHEN CONTROLLER IS ADVANCING FROM 2+6.

PHASE 7 IS USED TO PROVIDE EXTENDED RED CLEARANCE BEFORE SERVING PHASE 8.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1619
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

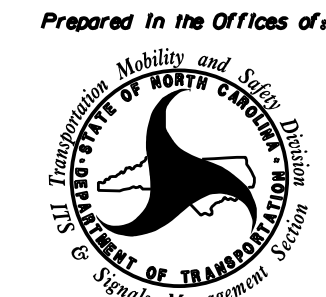
Electrical Detail - Sheet 2 of 2
Final Design

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ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared in the Offices of:



750 N. Greenfield Pkwy, Corner, NC 27529

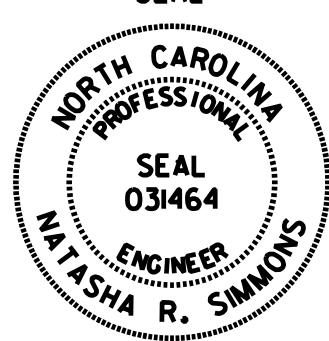
SR 2136 (Gilead Road)
at
I-77 NB Ramps

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

REVISIONS	INIT.	DATE

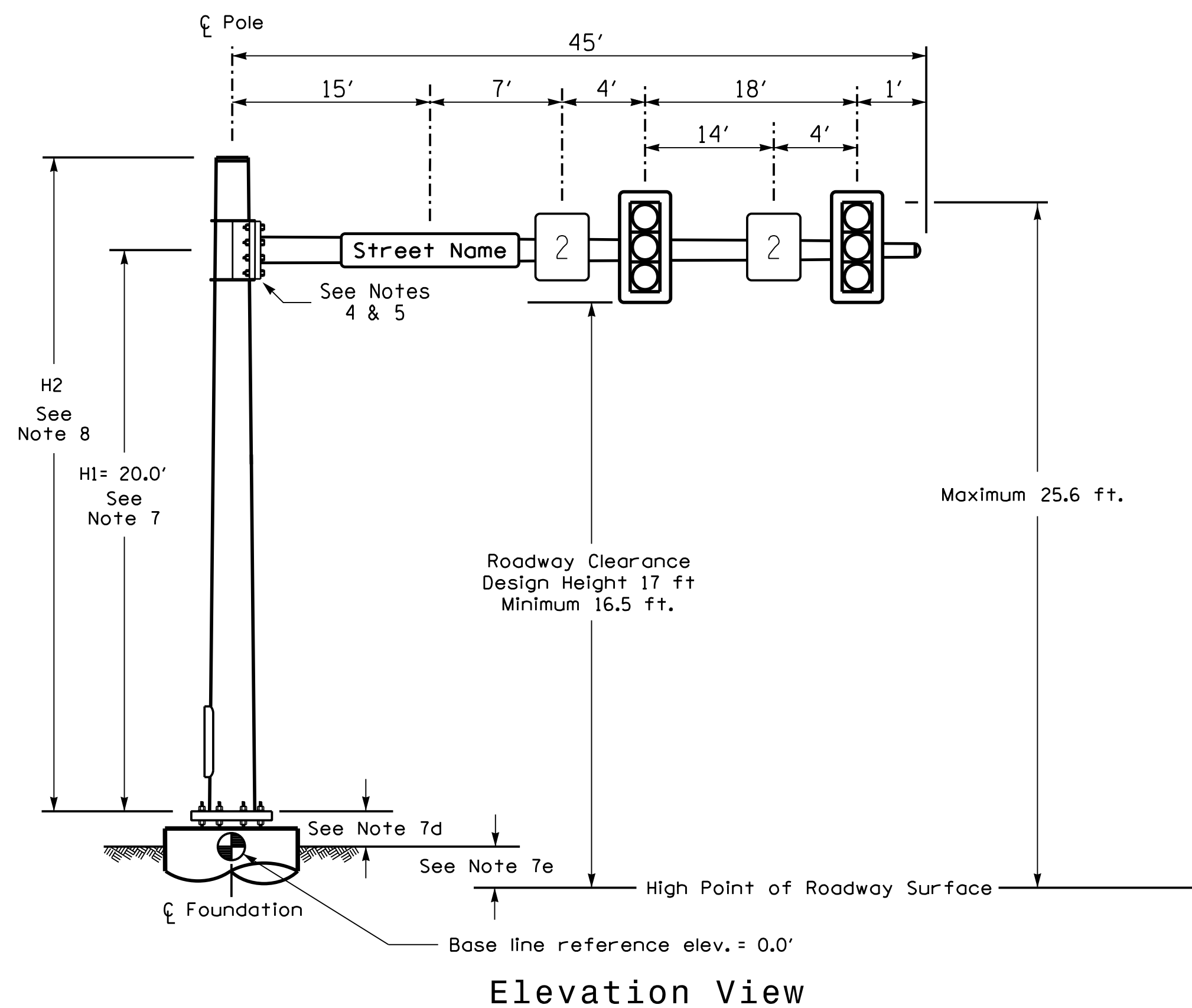
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DocuSigned by:
Natasha R. Simmons
4/23/2018

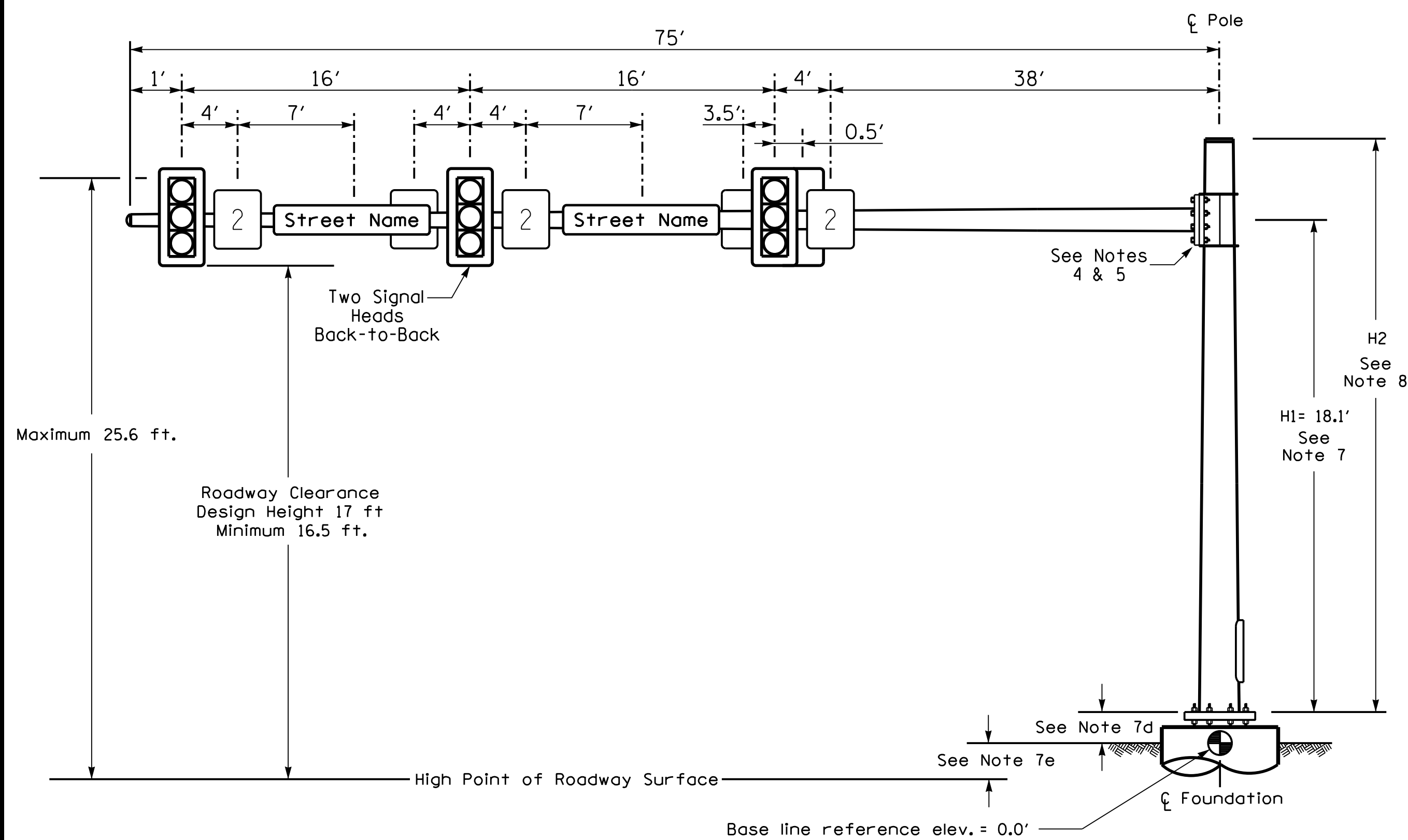
SIGNATURE DATE
SIG. INVENTORY NO. 10-1619

Design Loading for METAL POLE NO. 4



Elevation View

Design Loading for METAL POLE NO. 5

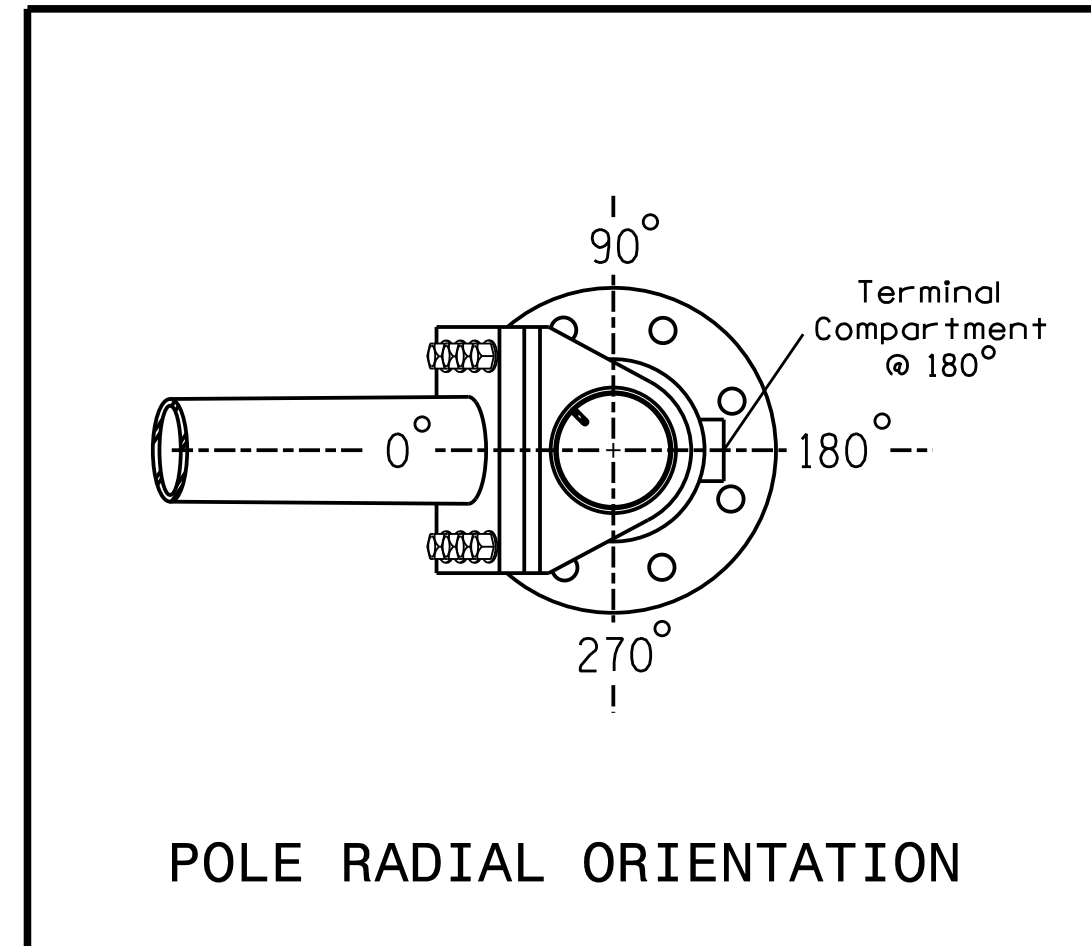


Elevation View

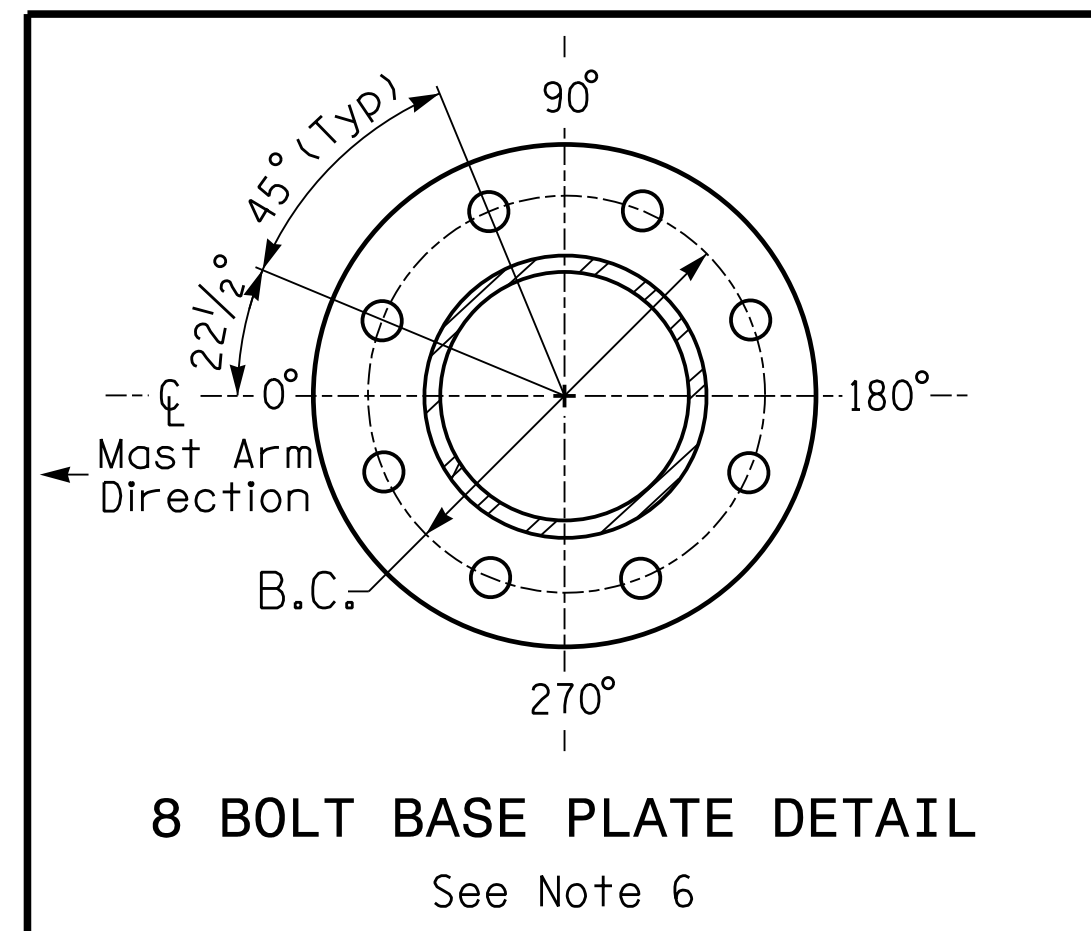
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

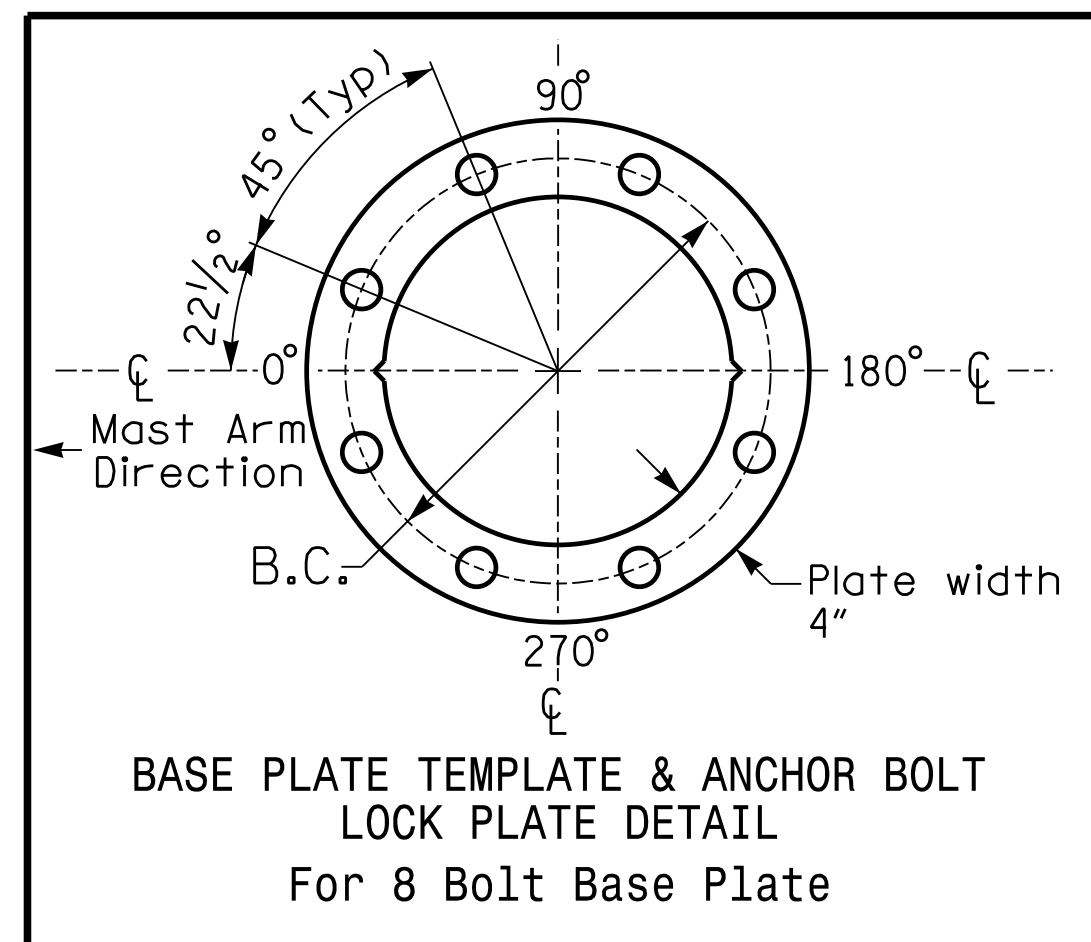
Elevation Differences for:	Pole 4	Pole 5
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.53 ft.	-0.33 ft.
Elevation difference at Edge of travelway or face of curb	+0.22 ft.	-0.36 ft.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0" L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 6th Edition 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2018 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2018 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

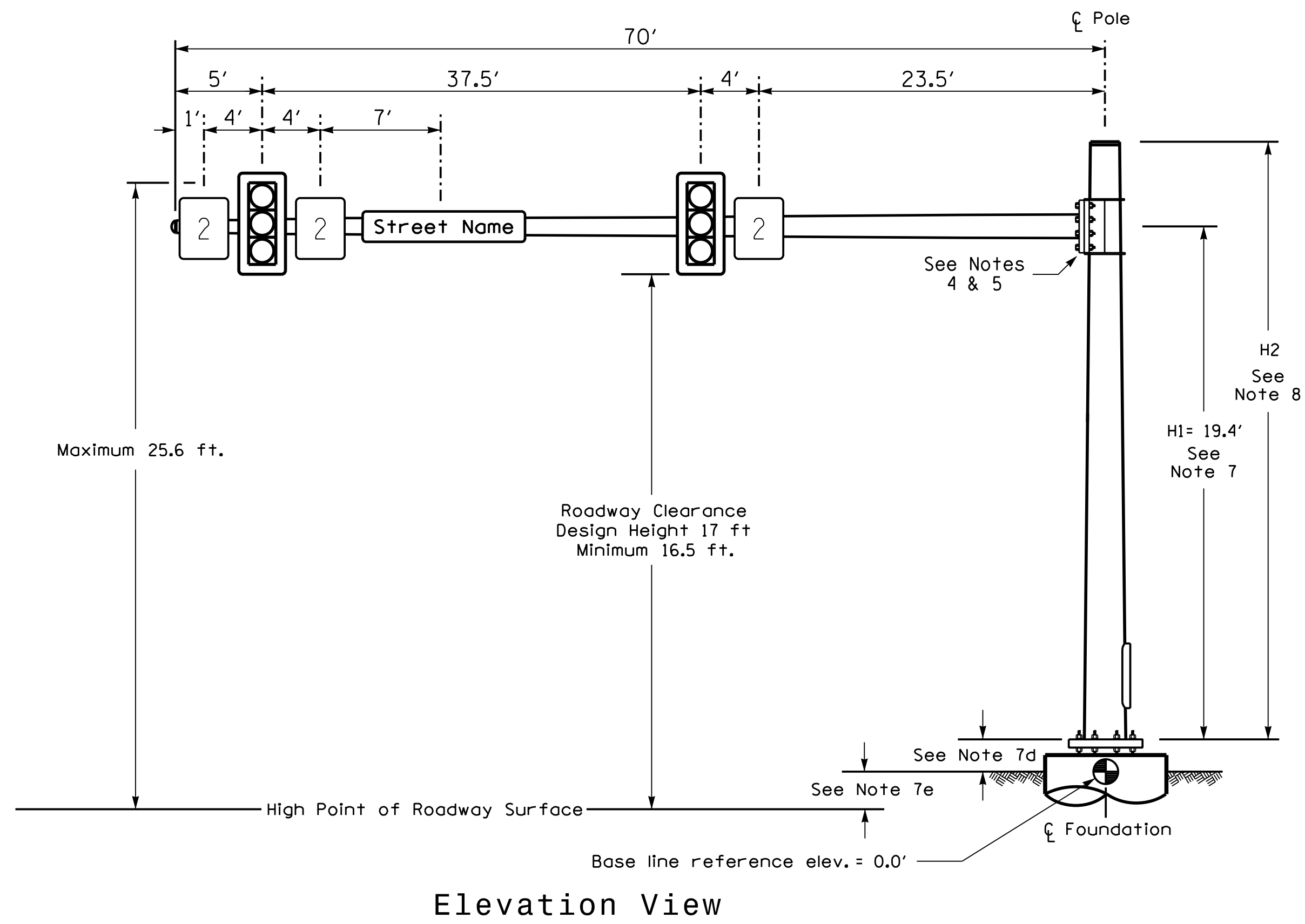
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the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

NCDOT Wind Zone 4 (90 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at I-77 NB Ramps		
	Division 10 Mecklenburg Co. Huntersville	PLAN DATE: December 2017 REVIEWED BY: A.D. Klinsky	
PREPARED BY: J.T. Thibault	REVIEWED BY: N.R. Simmons	SCALE: 0 N/A N/A	REVISIONS: _____ INIT. DATE
HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997			DocuSigned by: Natasha R. Simmons 4/23/2018 DATE SIG. INVENTORY NO. 10-1619

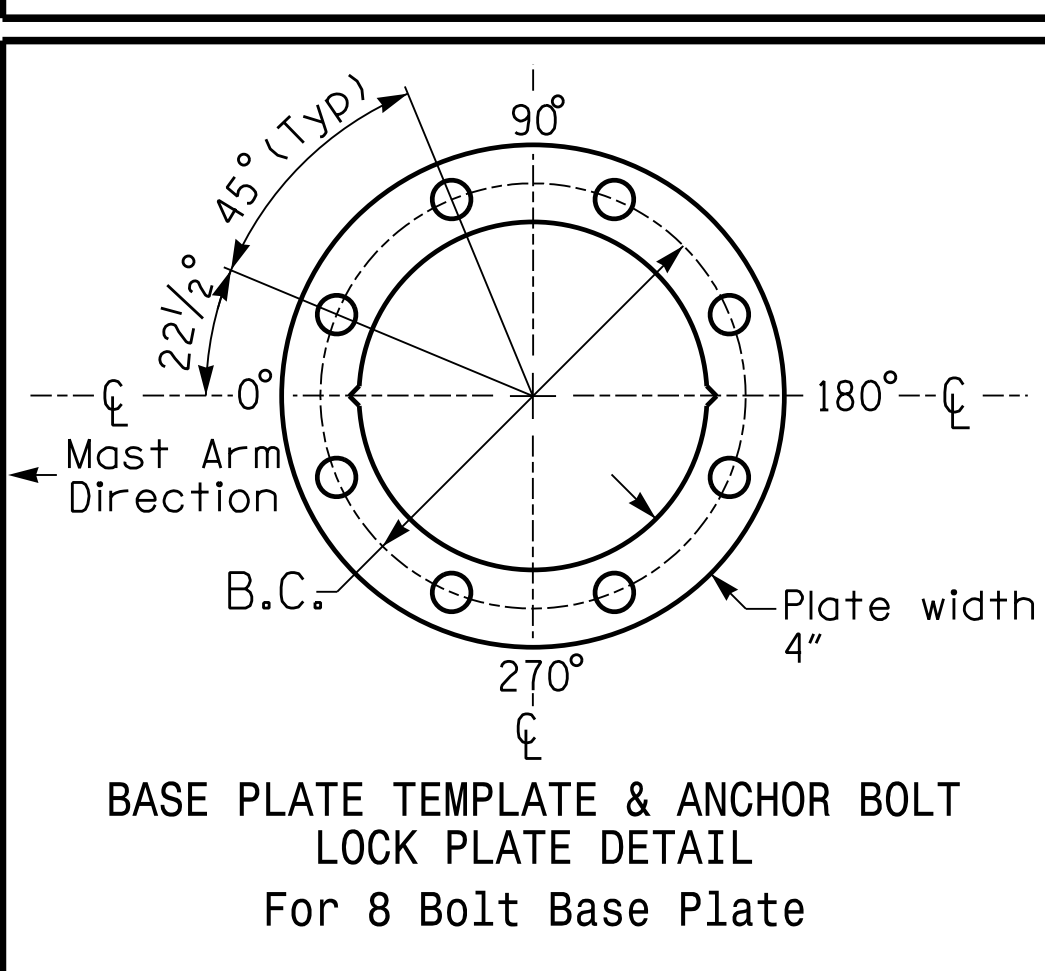
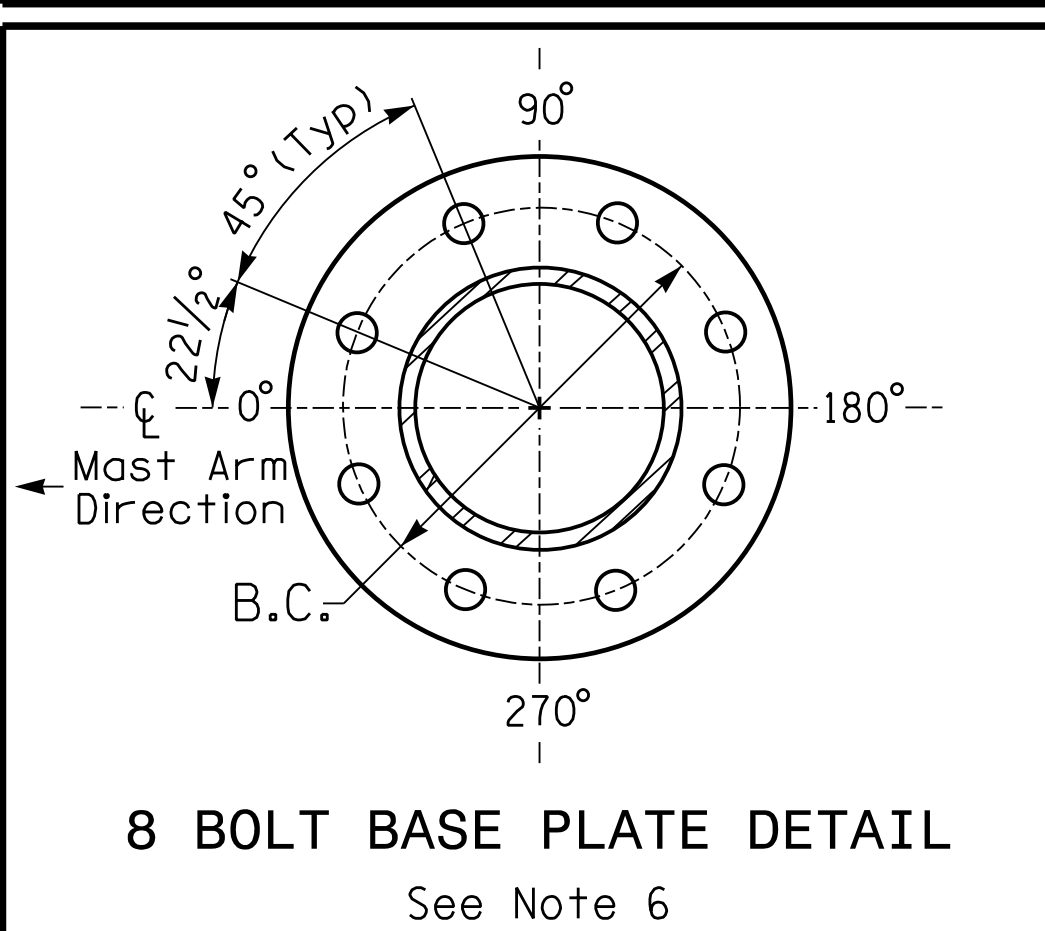
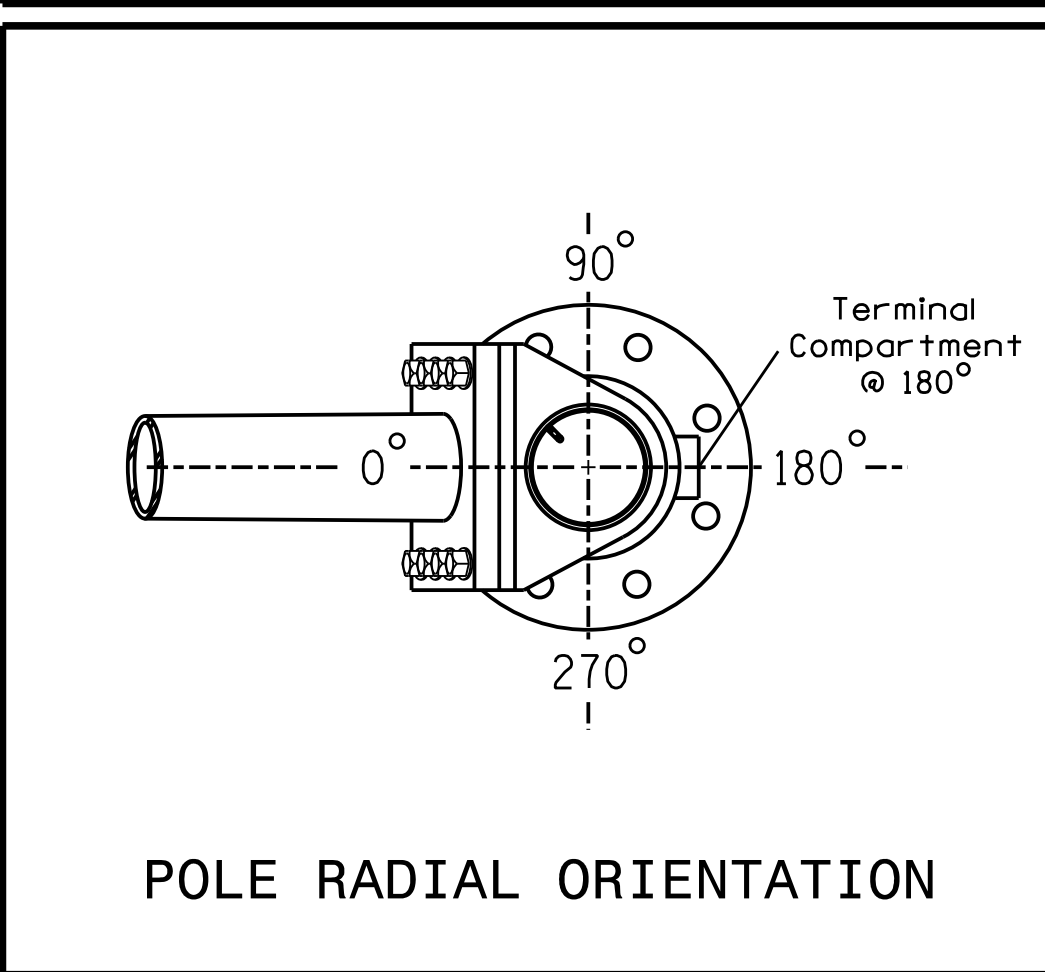
Design Loading for METAL POLE NO. 6



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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 6	
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+0.99 ft.	
Elevation difference at Edge of travelway or face of curb	-0.67 ft.	



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METAL POLE No. 6

PROJECT REFERENCE NO.	SHEET NO.
I-5714 / U-5114	Fig. 19.4

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
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- Design the traffic signal structure and foundation in accordance with:
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DESIGN REQUIREMENTS

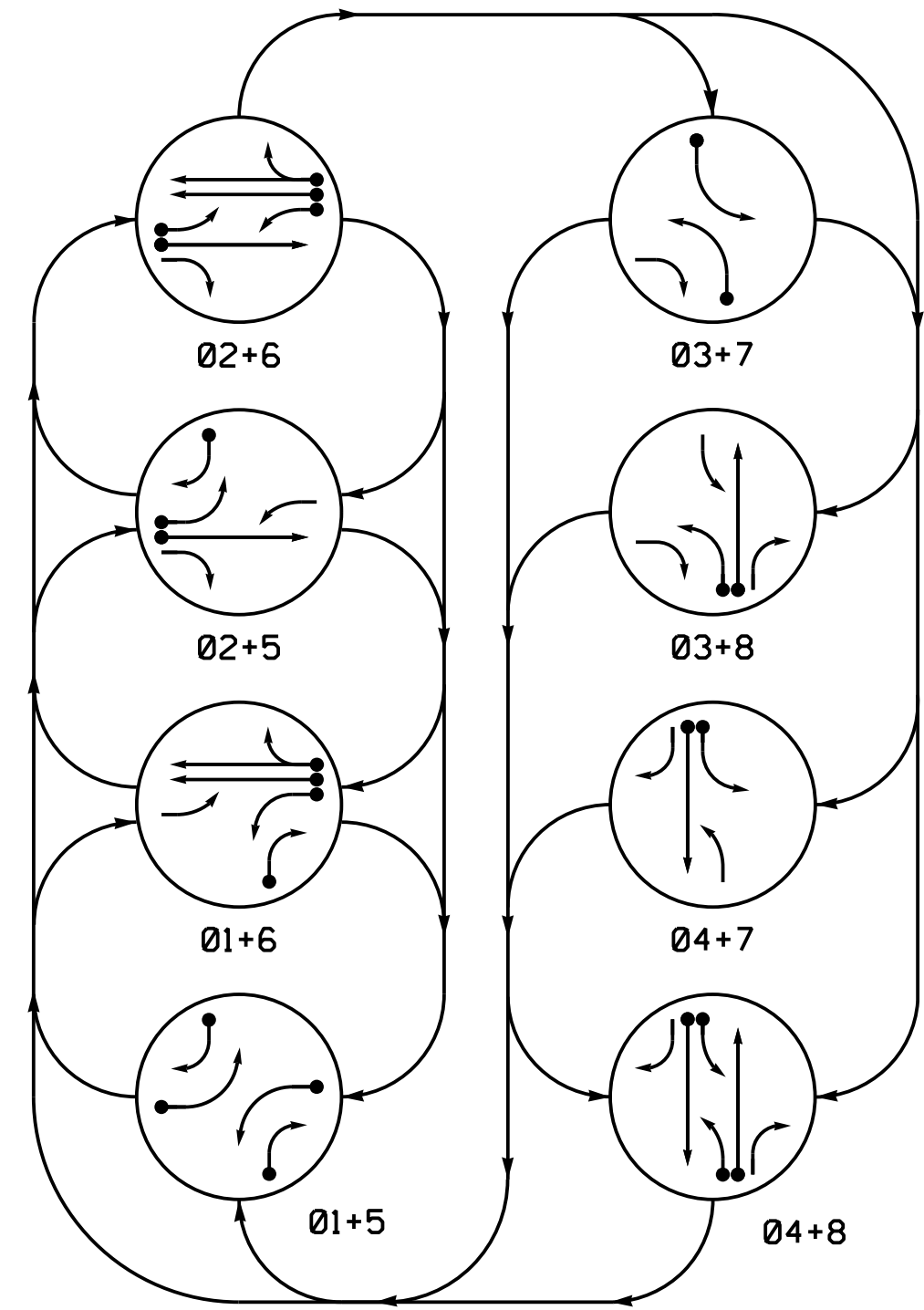
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- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
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- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
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- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)

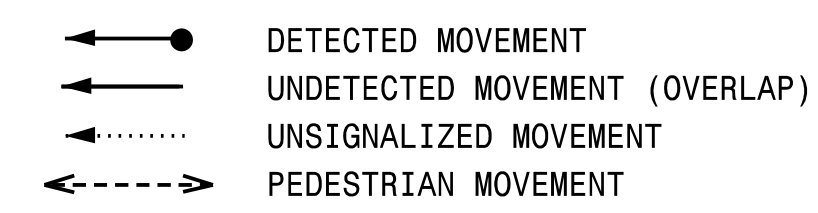
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 Prepared in the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION DEPARTMENT OF TRANSPORTATION SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529	SR 2136 (Gilead Road) at I-77 NB Ramps		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 03464 NATASHA R. SIMMONS
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinsky PREPARED BY: J.T. Thibault REVIEWED BY: N.R. Simmons	REVISIONS INIT. DATE _____ _____	

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

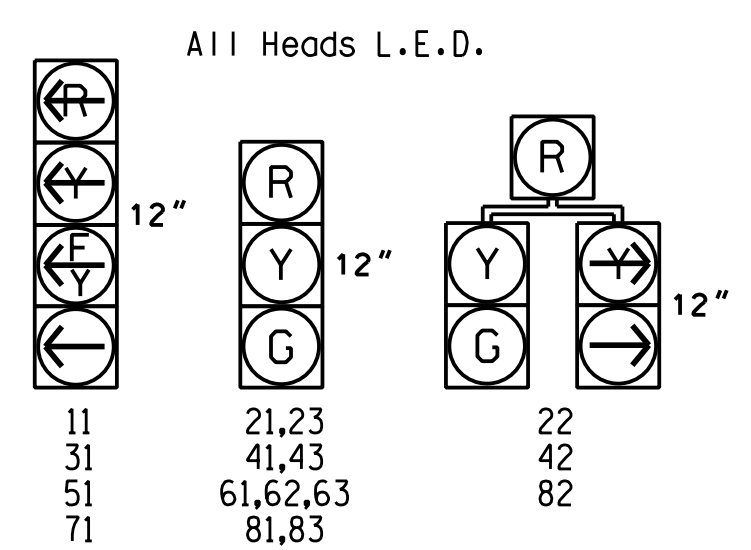


TABLE OF OPERATION

SIGNAL FACE	PHASE								FLASH
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	
11	-	-	F	F	R	R	R	R	Y
21,23	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
31	-	-	F	F	R	R	R	R	Y
41,43	R	R	R	R	R	R	G	G	R
42	R	R	R	R	R	R	G	G	R
51	-	-	F	F	R	R	R	R	Y
61,62,63	R	G	R	G	R	R	R	R	Y
71	-	-	F	F	R	R	R	R	Y
81,83	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R

OASIS 2070E LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			STRETCH TIME
1A	6X40	0	*	*	1	Y	Y	-	15	-	*
1B	6X40	0	*	*	6	Y	Y	-	-	-	*
2A	6X6	70	*	*	2	Y	Y	-	-	15	*
3A	6X40	0	*	*	3	Y	Y	-	-	15	*
4A	6X6	300	*	*	4	-	Y	-	2.4	-	*
4B	6X40	0	*	*	4	Y	Y	-	-	-	*
5A	6X40	0	*	*	5	Y	Y	-	-	15	*
5B	6X40	0	*	*	5	Y	Y	-	-	15	*
6A	6X6	70	*	*	6	Y	Y	-	-	-	*
6B	6X6	70	*	*	6	Y	Y	-	-	-	*
7A	6X40	0	*	*	7	Y	Y	-	-	15	*
8A	6X6	300	*	*	8	-	Y	-	2.4	-	*
8B	6X40	0	*	*	8	Y	Y	-	-	-	*

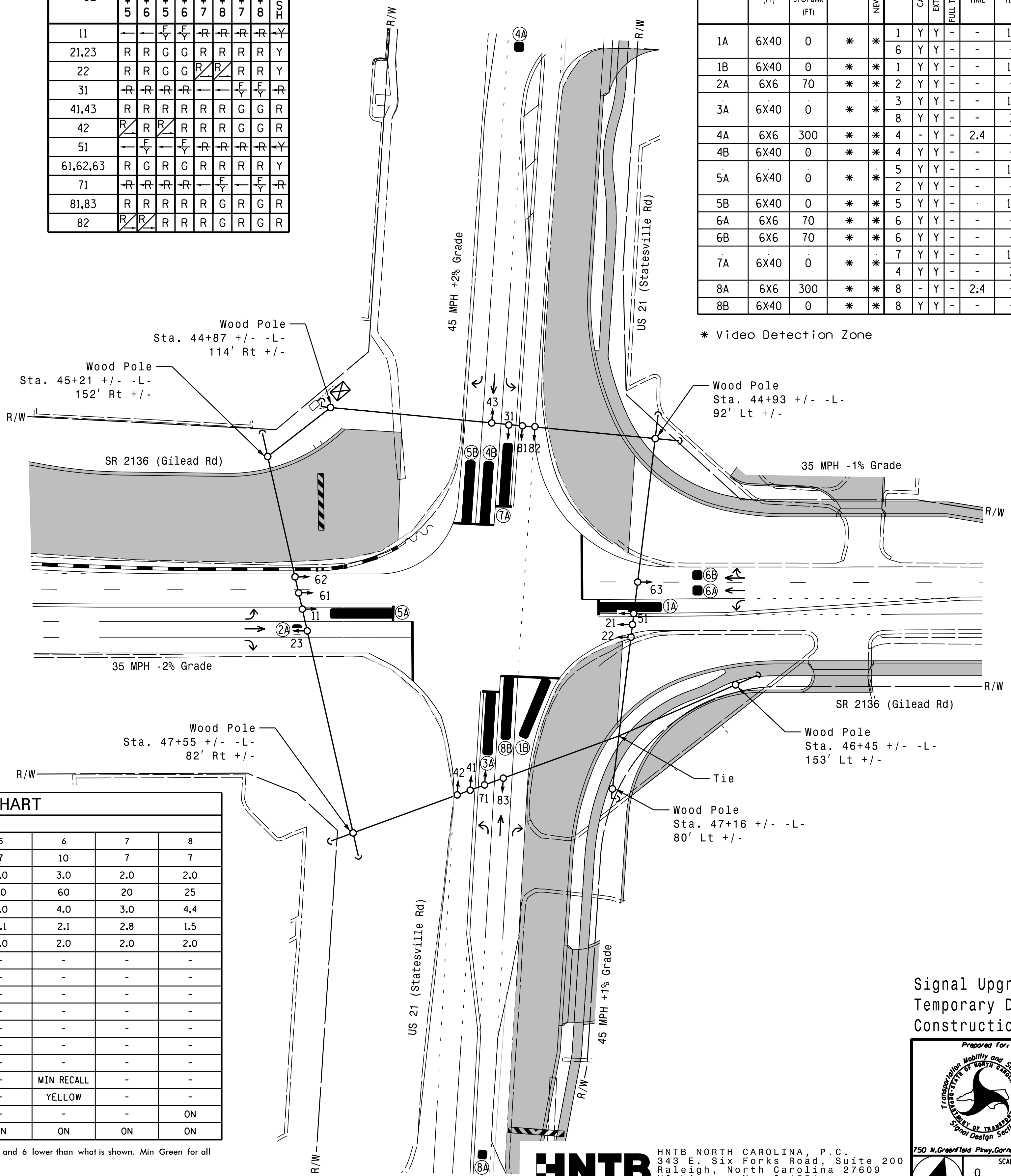
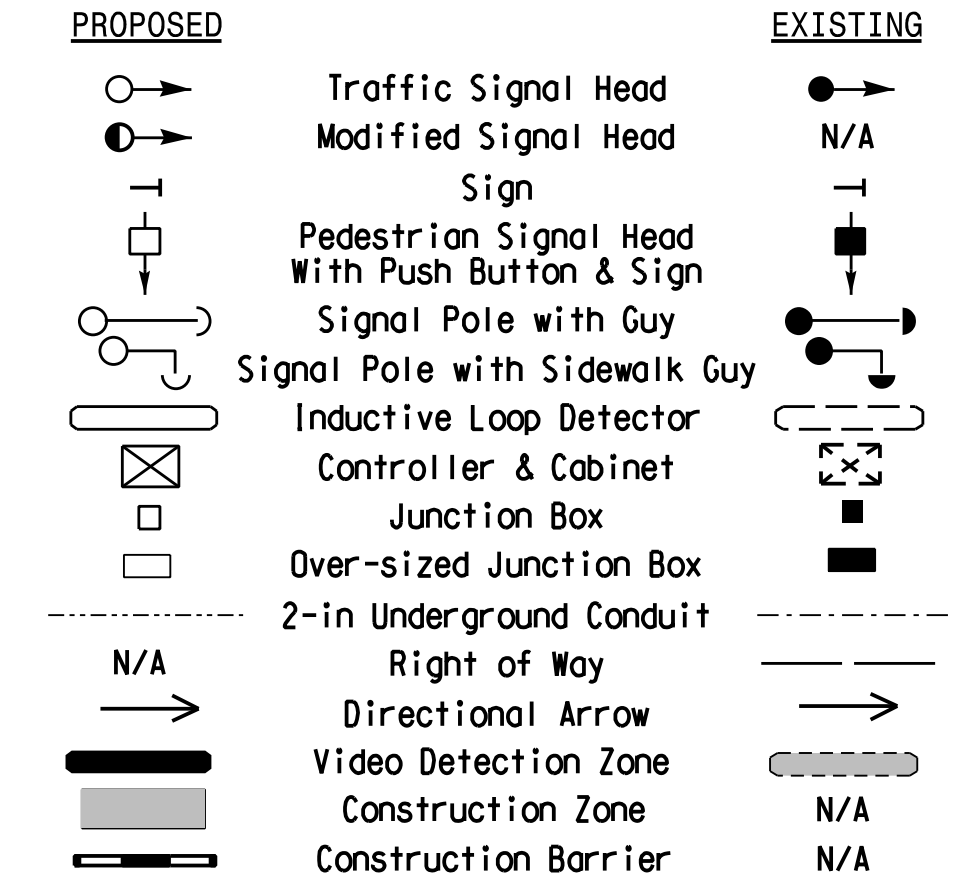
* Video Detection Zone

8 Phase Fully Actuated Gilead Road Closed Loop 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 5 may be lagged.
- Phase 3 and/or 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.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #11042 Controller Asset #0617

LEGEND



OASIS 2070E TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	4	5	7	10	7
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	30	60	20	25	20	60	20	25
Yellow Clearance	3.0	4.0	3.0	4.4	3.0	4.0	3.0	4.4
Red Clearance	2.9	2.1	2.3	1.5	3.1	2.1	2.8	1.5
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

Signal Upgrade
Temporary Design 1
Construction Phase I

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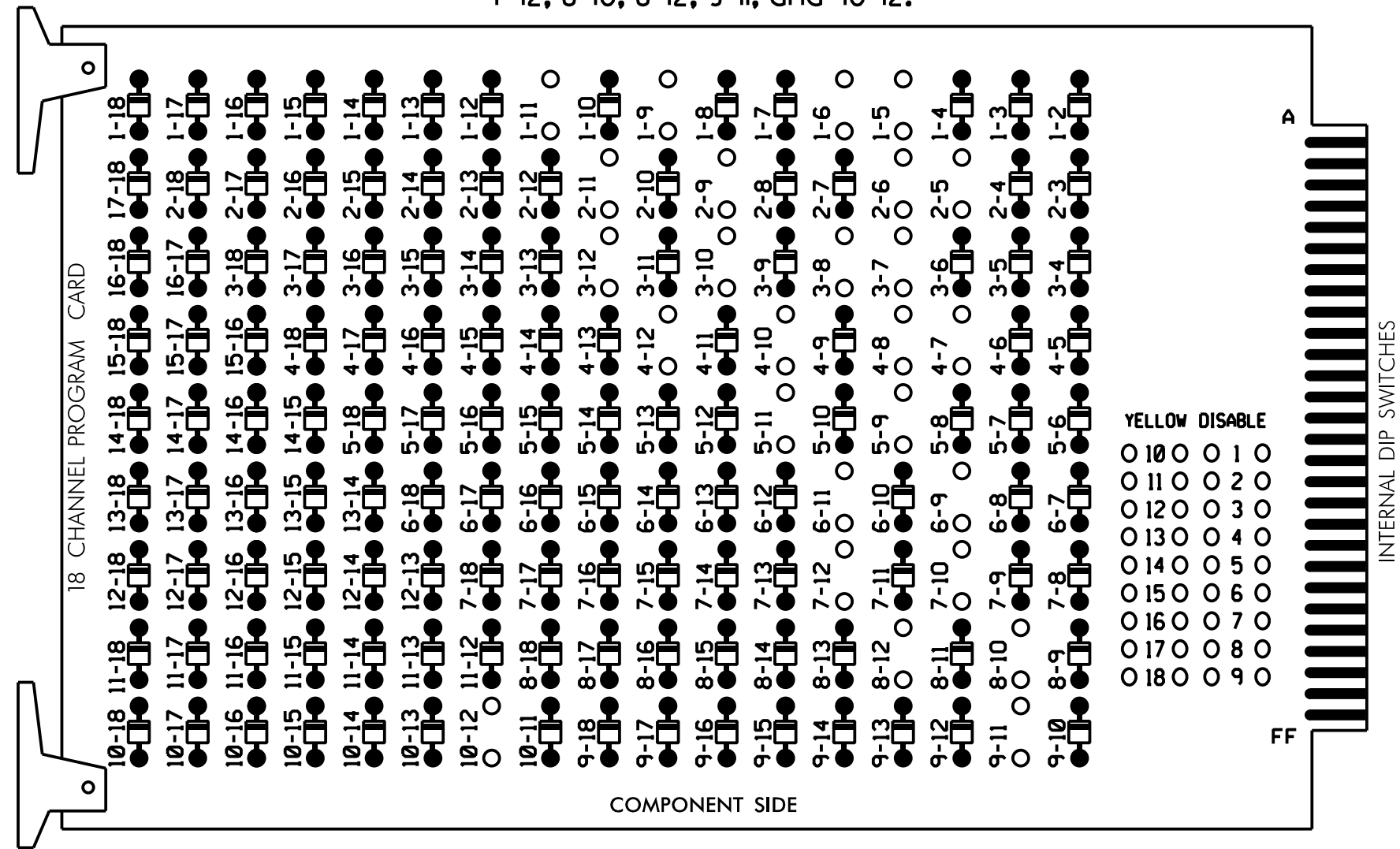
	SR 2136 (Gilead Road) at US 21 (Statesville Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 M. T. SIMMONS R. SIMMONS
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	SCALE 0 40 1"=40'	

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EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

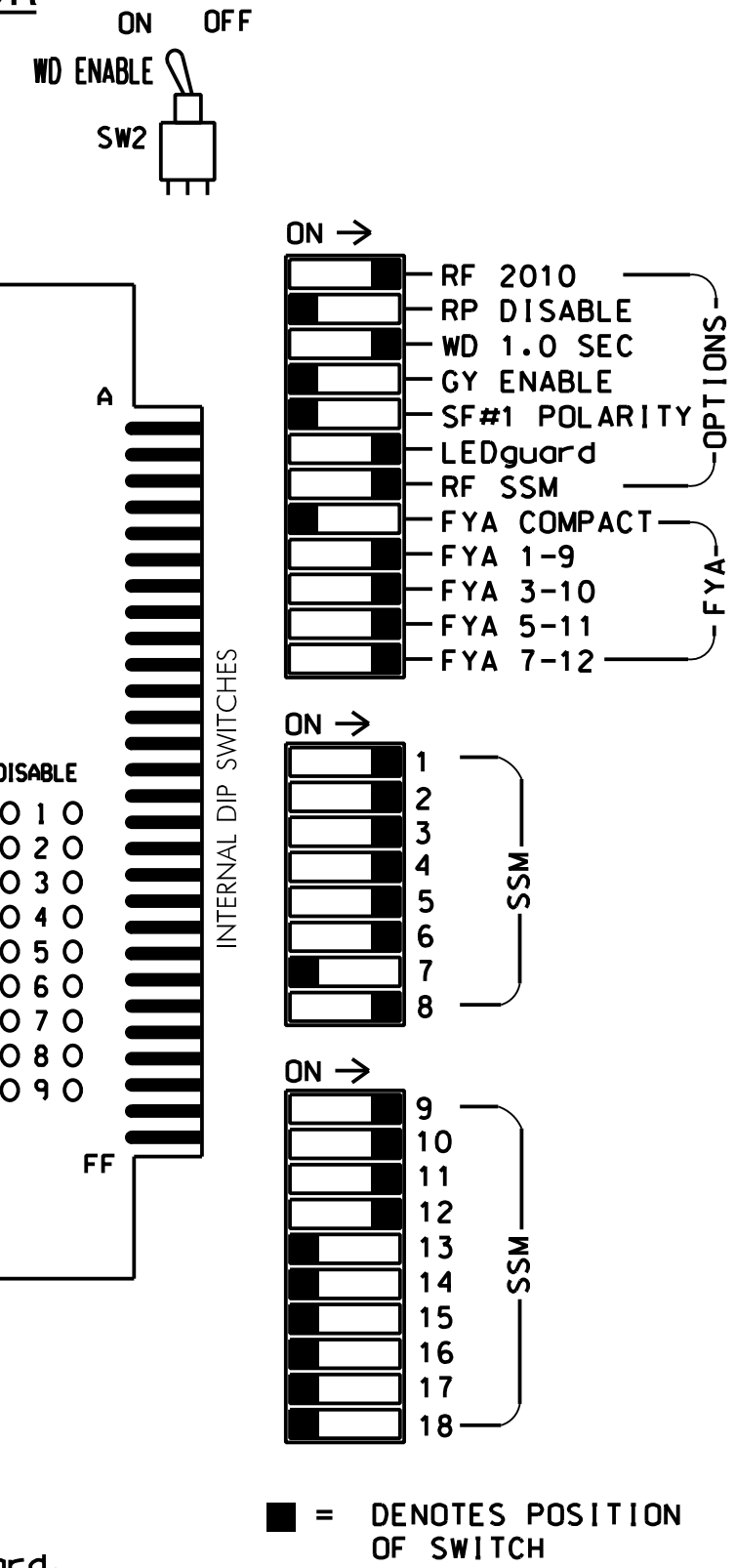
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



REMOVE JUMPERS AS SHOWN

NOTES:

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.



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. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
6. The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 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".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....5+6
 OVERLAP "D".....7+8

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	22	31*	41,42,43	NU	42	51*	61,62,63	NU	71*	81,82,83	NU	31*	51*	71*	NU
RED	*	128		*	101		*	134		107									
YELLOW		129			102			135		* 108									
GREEN		130			103			136		109									
RED ARROW													A121	A124		A114	A101		
YELLOW ARROW	126			117			132						A122	A125		A115	A102		
FLASHING YELLOW ARROW													A123	A126		A116	A103		
GREEN ARROW	127	127		118	118		133	133		124									
Hand																			
Person																			

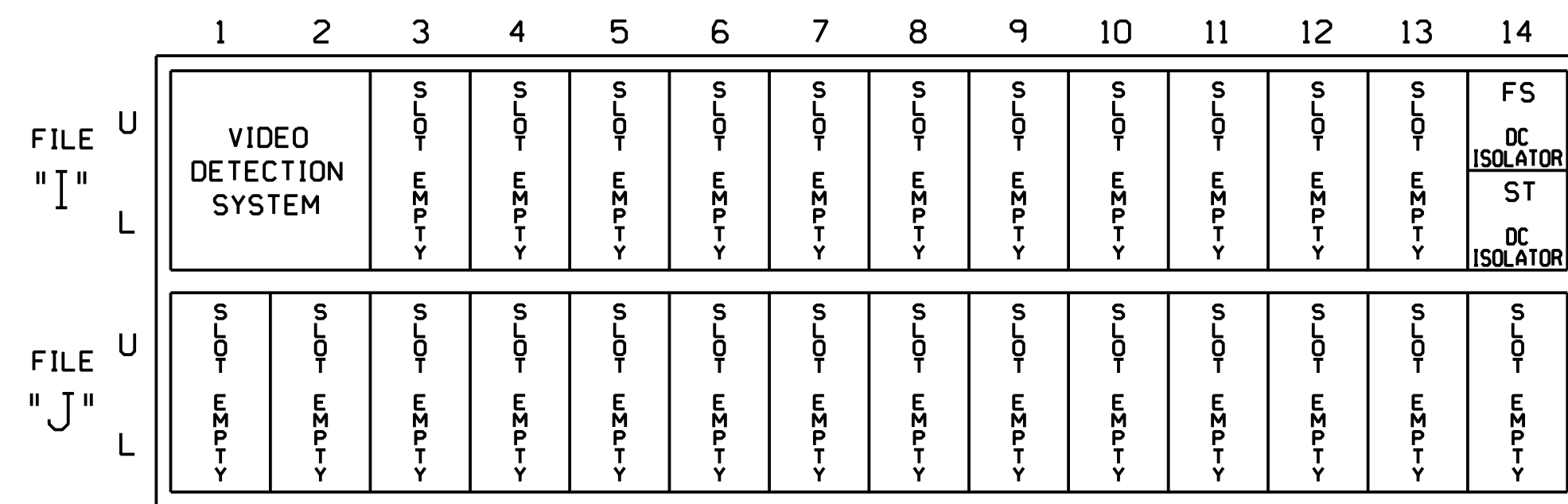
NU = Not Used

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

* See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

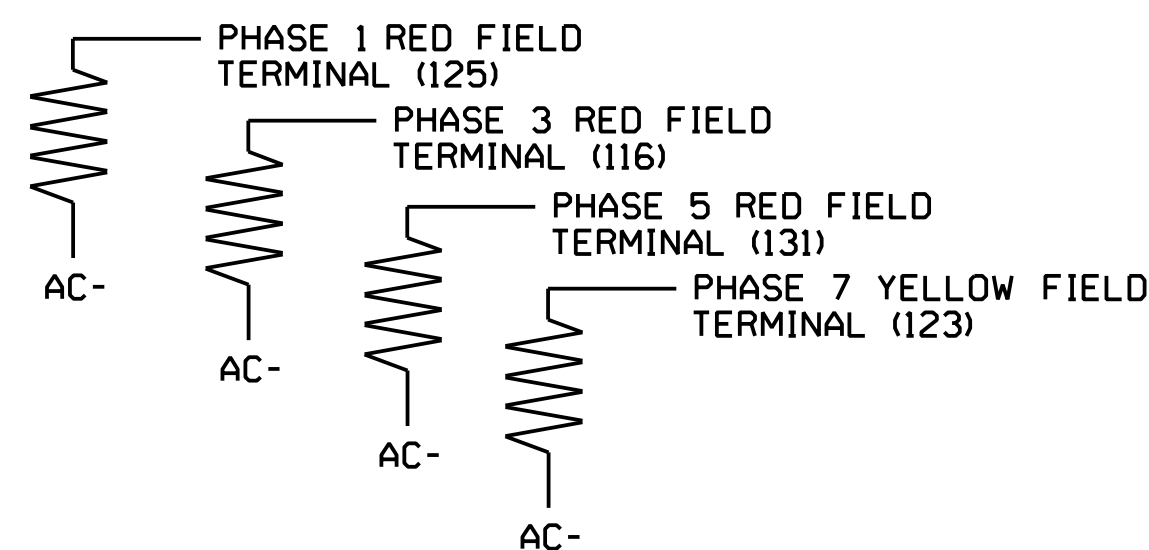
SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



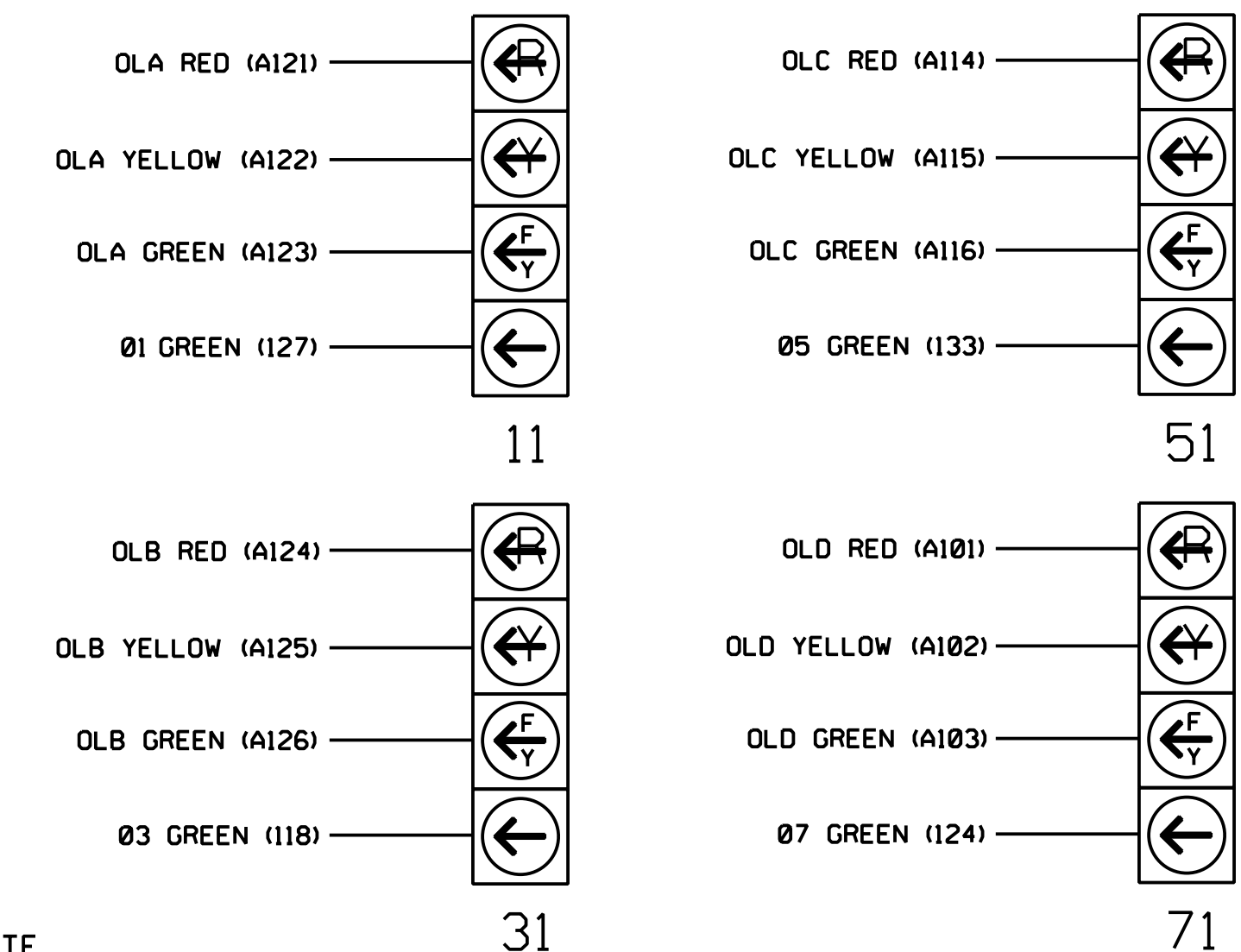
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0617T1
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A



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FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11, 31, 51, and 71 requires special logic programming. See sheet 2 for programming instructions.

Electrical Detail - Sheet 1 of 2
 Signal Upgrade
 Temporary Design 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared in the Office of: DEPARTMENT OF TRANSPORTATION DIVISION OF SIGNALS MANAGEMENT	SR 2136 (Gilead Road) at US 21 (Statesville Road)		SEAL SEAL NATASHA R. SIMMONS
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	REVISIONS INIT. DATE _____ _____ _____	

DocuSigned by:
 Natasha R. Simmons
 SIGNATURE DATE 4/23/2018
 SIG. INVENTORY NO. 10-0617 T1

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, AND 12.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #7 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

LOGICAL I/O COMMAND #8 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #9 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #10 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #11 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 7 (HEAD 71).

LOGICAL I/O COMMAND #12 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

OUTPUT REFERENCE SCHEDULE

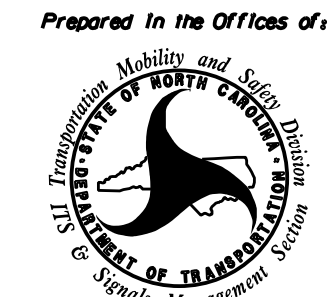
USE TO INTERPRET LOGIC PROCESSOR

- OUTPUT 39 = Overlap D Red
- OUTPUT 40 = Overlap D Yellow
- OUTPUT 41 = Overlap D Green
- OUTPUT 42 = Overlap C Red
- OUTPUT 43 = Overlap C Yellow
- OUTPUT 44 = Overlap C Green
- OUTPUT 47 = Overlap B Red
- OUTPUT 48 = Overlap B Yellow
- OUTPUT 49 = Overlap B Green
- OUTPUT 50 = Overlap A Red
- OUTPUT 51 = Overlap A Yellow
- OUTPUT 52 = Overlap A Green

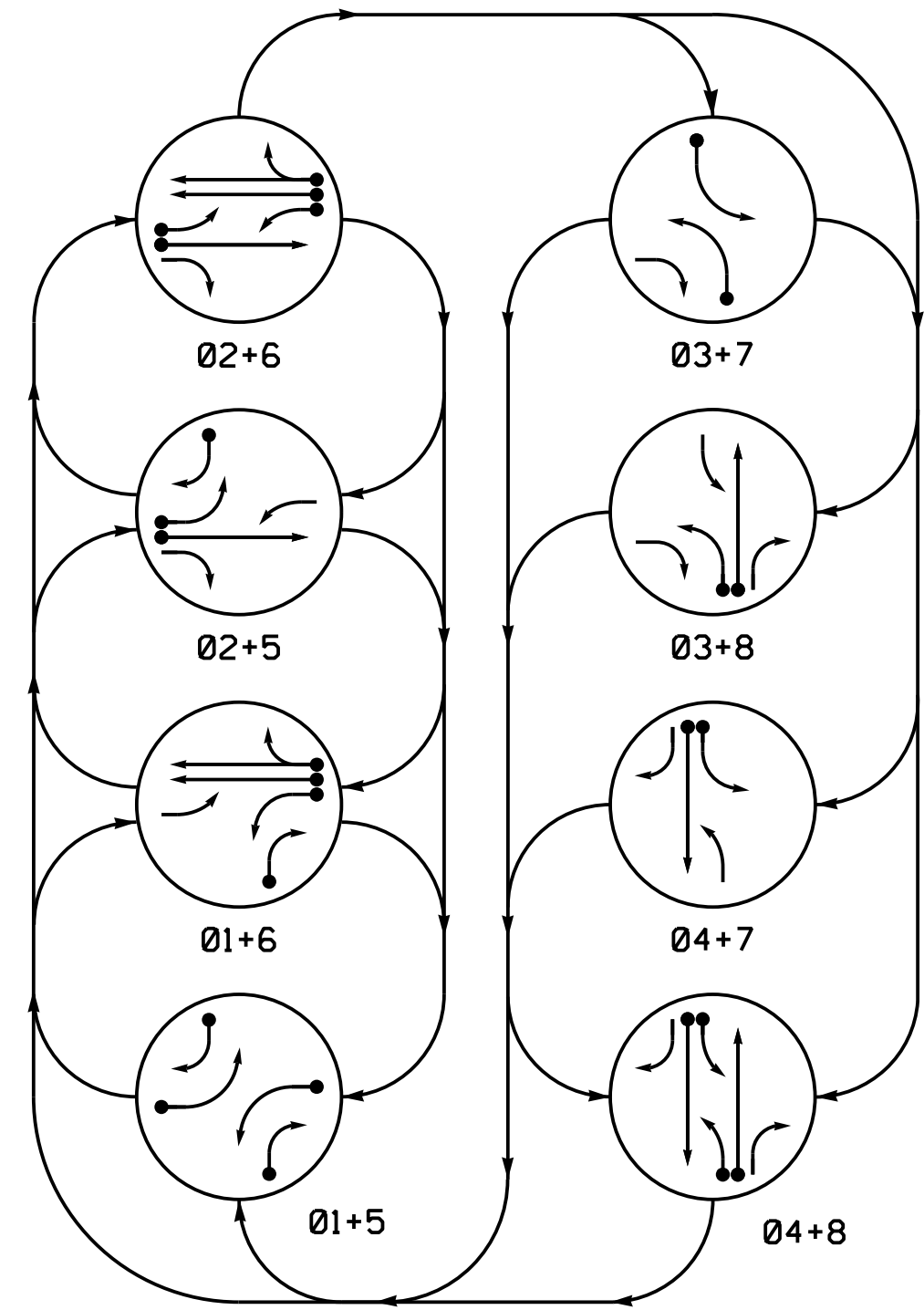
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0617T1
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 2 of 2
Signal Upgrade
Temporary Design 1

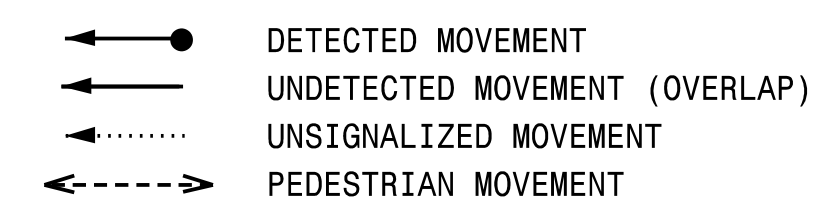
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2136 (Gilead Road) at US 21 (Statesville Road)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 NATASHA R. SIMMONS
Prepared in the Office of: 	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	DocuSigned by: 4/23/2018 SIGNATURE DATE SIG. INVENTORY NO. 10-0617 T1
HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997		

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

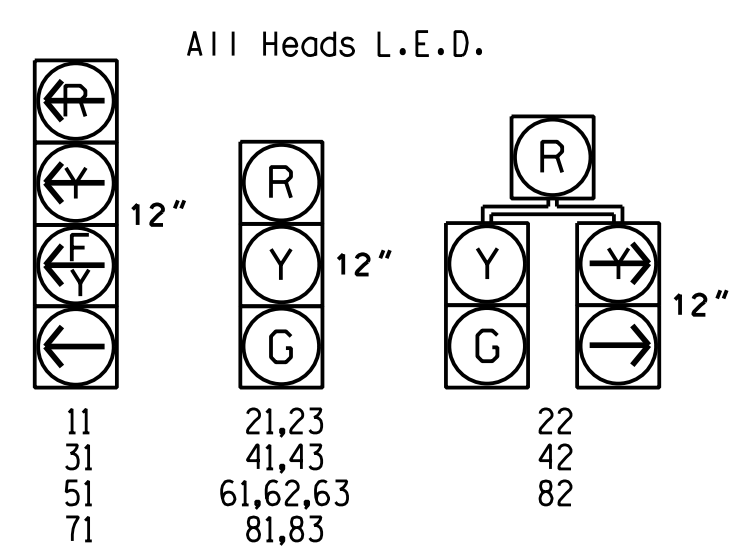


TABLE OF OPERATION

SIGNAL FACE	PHASE								FLASH	
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8		
11	-	-	-	-	-	-	-	-	-	-
21,23	R	R	G	G	R	R	R	R	Y	-
22	R	R	G	G	R	R	R	R	Y	-
31	R	R	R	-	-	-	-	-	-	-
41,43	R	R	R	R	R	R	G	G	R	-
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	-	-	-	-	-	-
81,83	R	R	R	R	G	R	G	R	-	-
82	R	R	R	R	G	R	G	R	-	-

OASIS 2070E LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			STRETCH TIME
1A	6X40	0	*	*	1	Y	Y	-	15	-	*
1B	6X40	0	*	*	6	Y	Y	-	-	-	*
2A	6X6	70	*	*	2	Y	Y	-	-	-	*
3A	6X40	0	*	*	3	Y	Y	-	15	-	*
4A	6X6	300	*	*	4	-	Y	-	2.4	-	*
4B	6X40	0	*	*	4	Y	Y	-	-	-	*
5A	6X40	0	*	*	5	Y	Y	-	15	-	*
5B	6X40	0	*	*	5	Y	Y	-	15	-	*
6A	6X6	70	*	*	6	Y	Y	-	-	-	*
6B	6X6	70	*	*	6	Y	Y	-	-	-	*
7A	6X40	0	*	*	7	Y	Y	-	15	-	*
8A	6X6	300	*	*	8	-	Y	-	2.4	-	*
8B	6X40	0	*	*	8	Y	Y	-	-	-	*

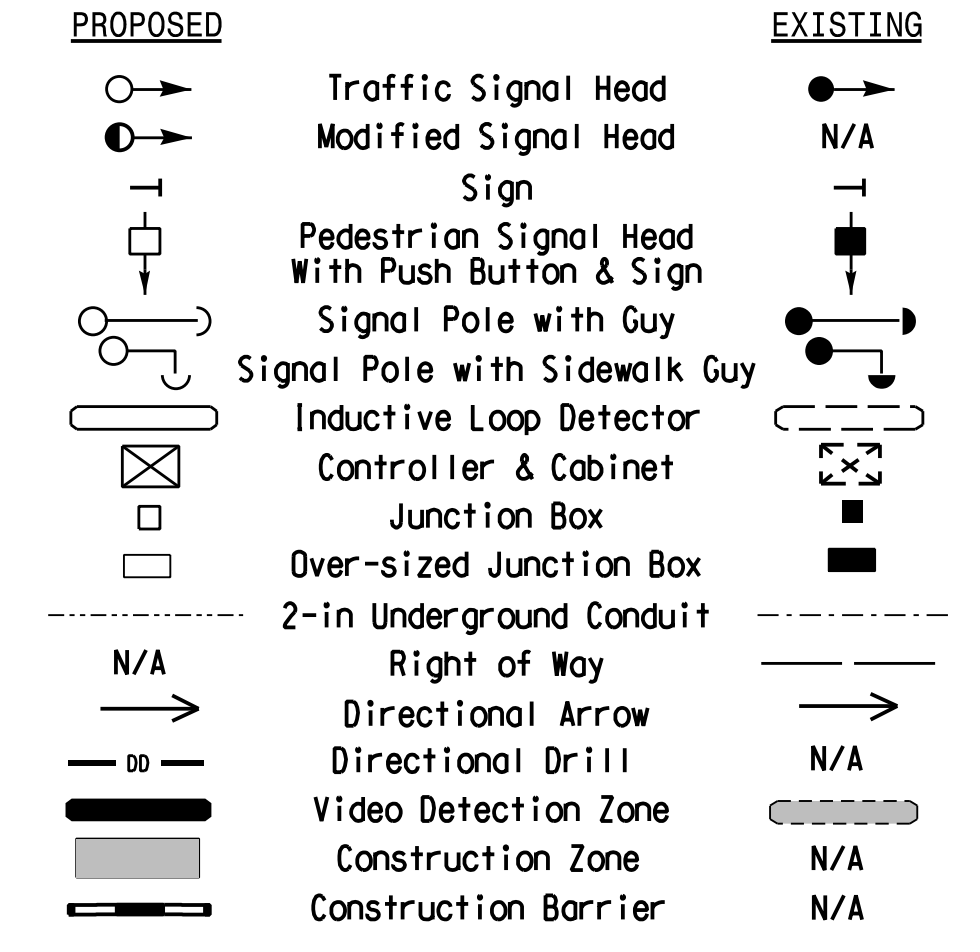
* Video Detection Zone

8 Phase Fully Actuated Gilead Road Closed Loop 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 5 may be lagged.
- Phase 3 and/or 7 may be lagged.
- Set all detector units to presence mode.
- Reposition existing signal heads numbered 21,22,31,41,42,43,51, 63,71,81,82 and 83.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #11042 Controller Asset #0617

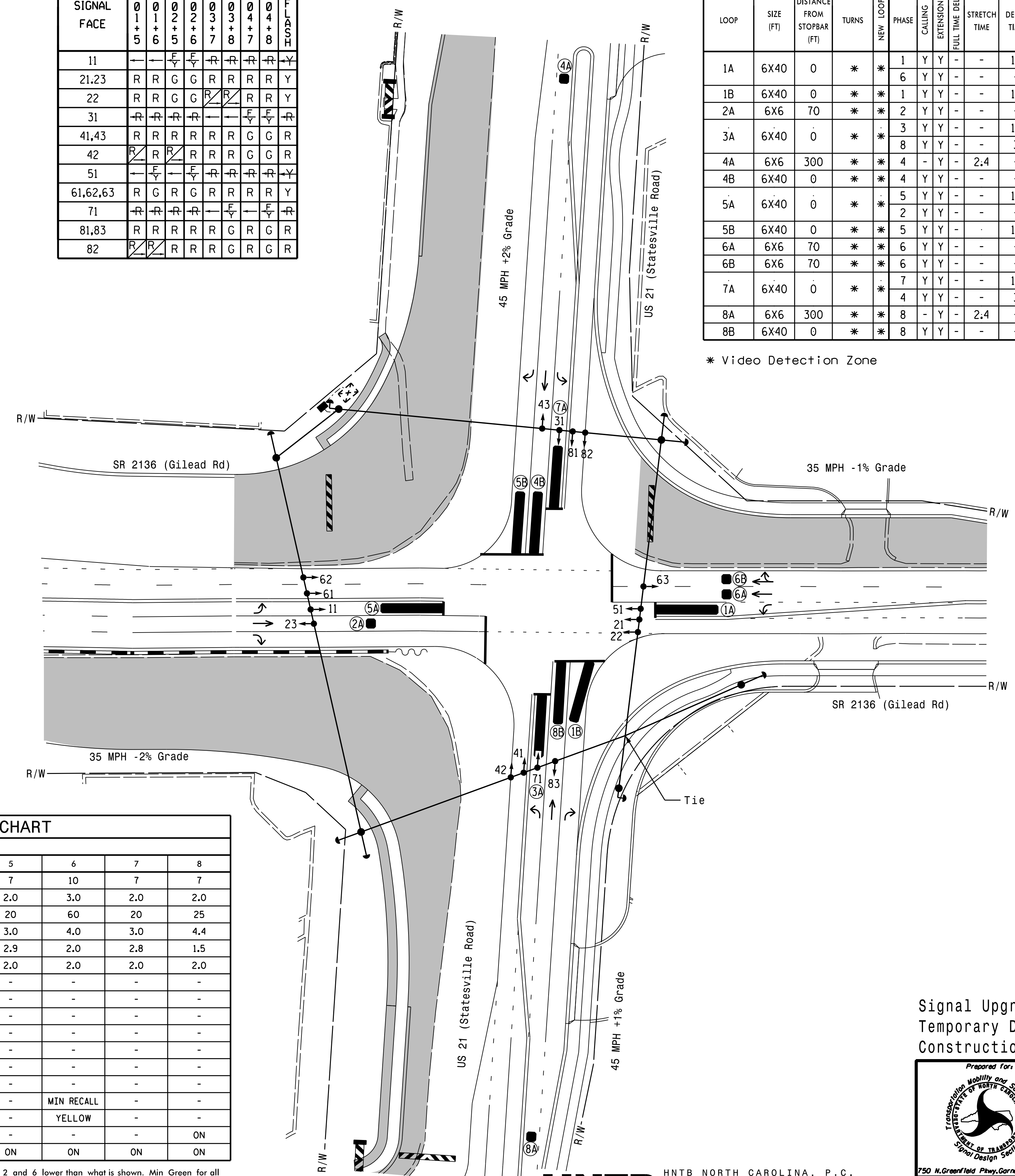
LEGEND



OASIS 2070E TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	30	60	20	25	20	60	20	25
Yellow Clearance	3.0	4.0	3.0	4.4	3.0	4.0	3.0	4.4
Red Clearance	2.9	2.0	2.4	1.5	2.9	2.0	2.8	1.5
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

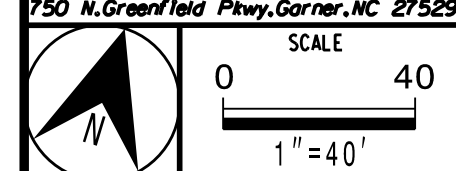
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



Signal Upgrade
Temporary Design 2
Construction Phase II

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

 HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	SR 2136 (Gilead Road) at US 21 (Statesville Road)	SEAL A.H. THORNBURG ENGINEER No. 031464
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	REVISIONS INITI. DATE _____ _____

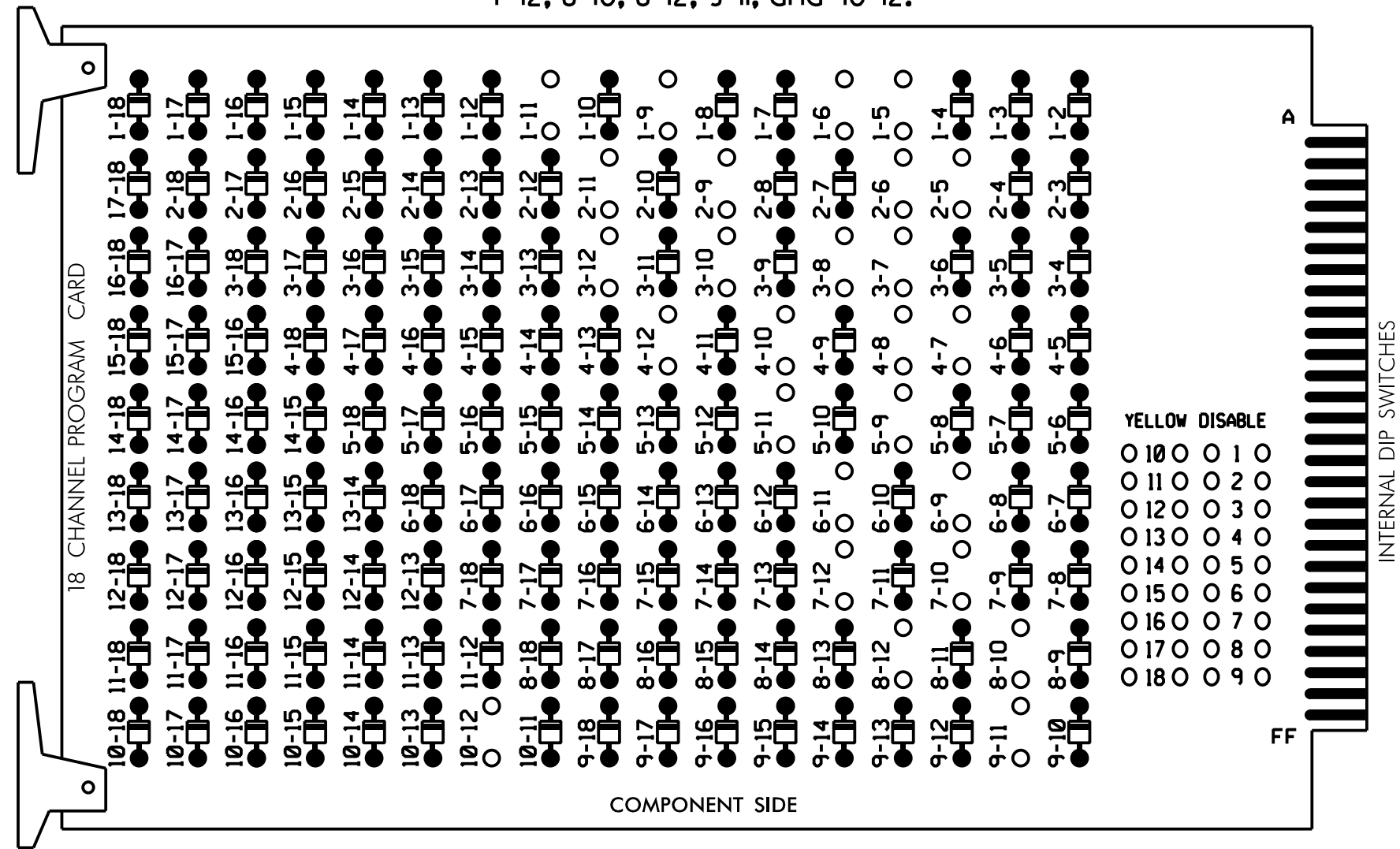


DocuSigned by:
Natasha R. Simmons
4/23/2018
DATE
SIG. INVENTORY NO. 10-0617 T2

EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

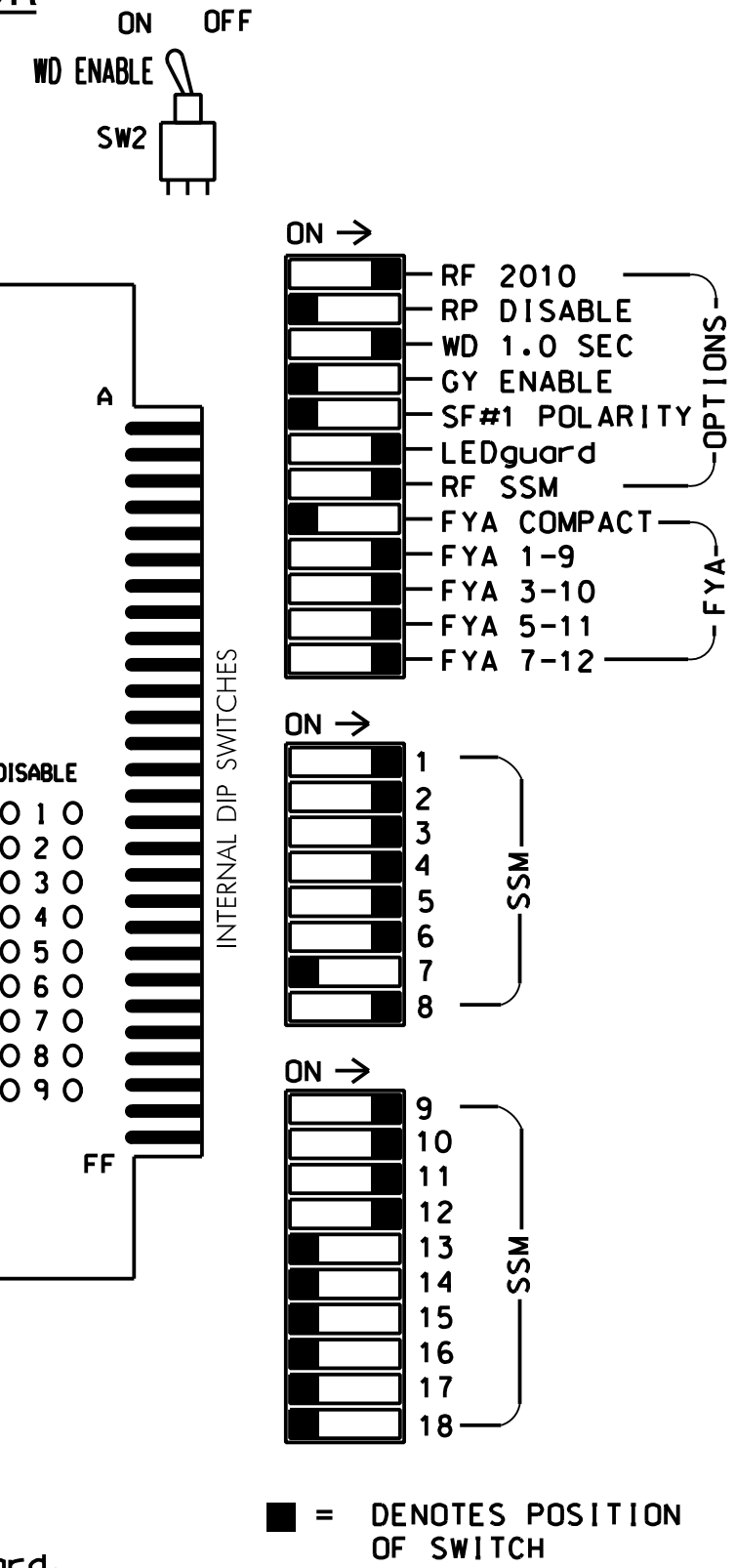
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



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.



■ = 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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
- The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 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".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....5+6
 OVERLAP "D".....7+8

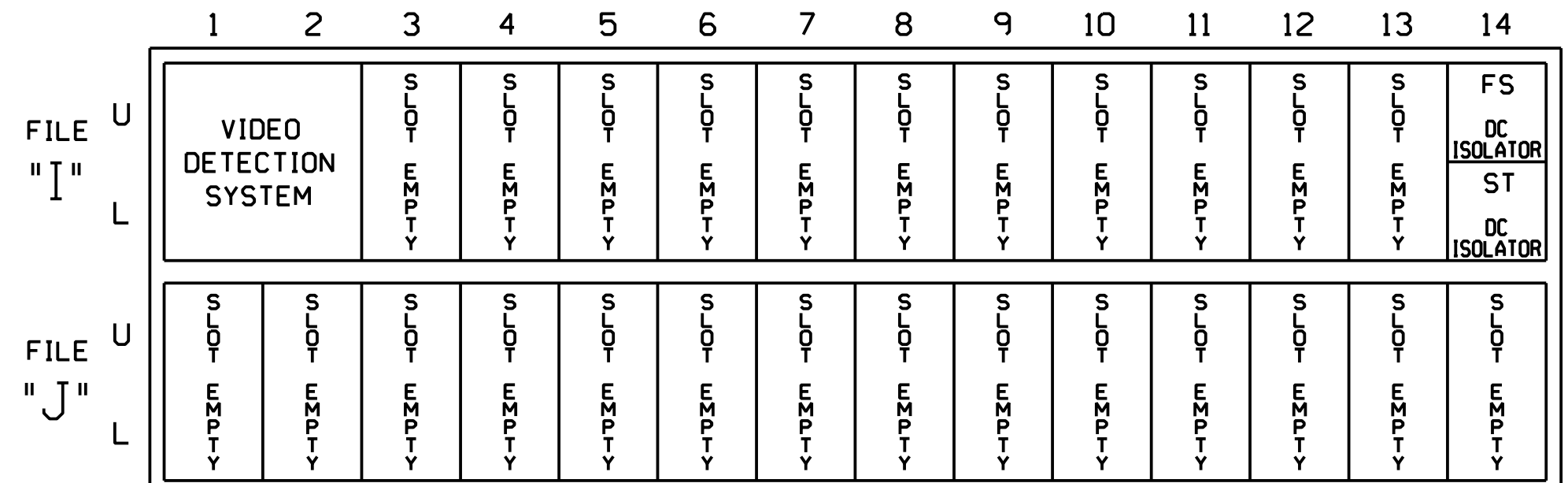
SIGNAL HEAD HOOK-UP CHART

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	22	31*	41,42,43	42	51*	61,62,63	71*	81,82,83	82	11*	31*	NU	51*	71*	NU
RED	*	128		*	101		*	134		107								
YELLOW		129			102			135		* 108								
GREEN		130			103			136		109								
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW	126			117			132						A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127	127		118	118		133	133		124								
Hand icon																		
Person icon																		

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

INPUT FILE POSITION LAYOUT

(front view)



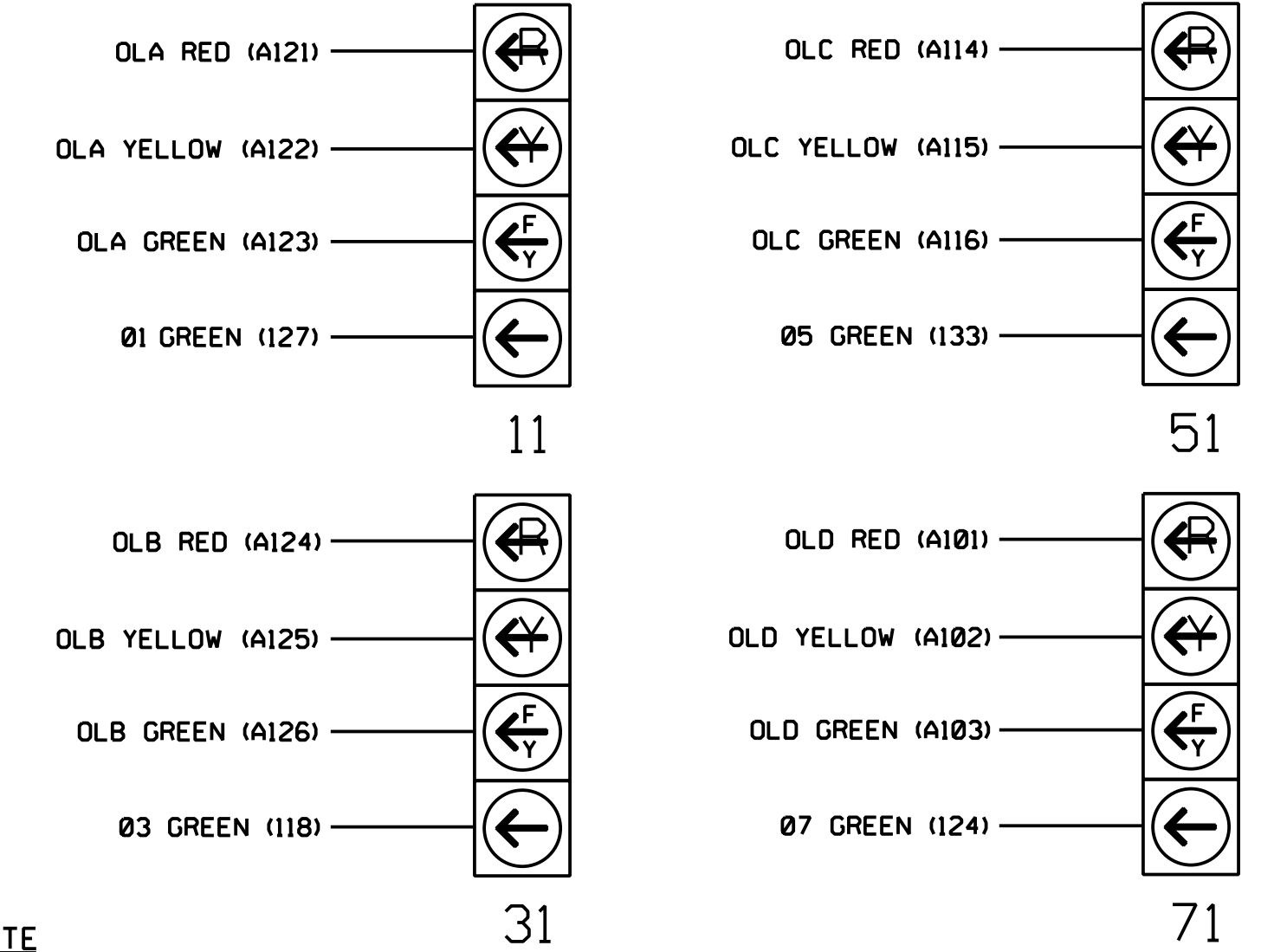
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

SPECIAL DETECTOR NOTE

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



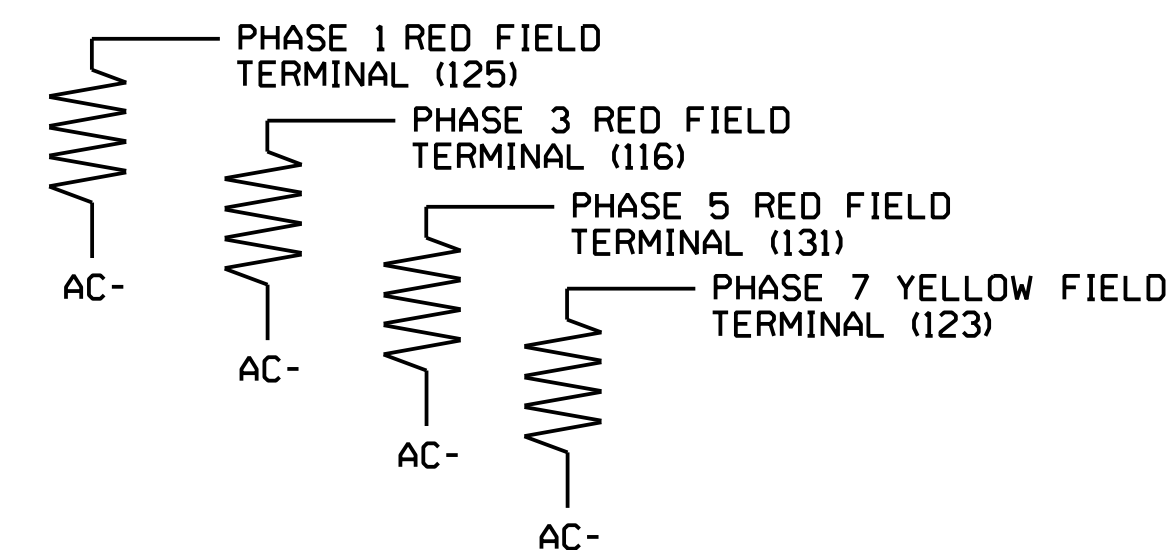
NOTE
 The sequence display for signal heads 11, 31, 51, and 71 requires special logic programming. See sheet 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-06172
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

HNTB
 HNTB NORTH CAROLINA, P.C.
 343 E. Six Forks Road, Suite 200
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 NC License No: C-1554
 (919) 546-8997

Electrical Detail - Sheet 1 of 2
 Signal Upgrade
 Temporary Design 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SR 2136 (Gilead Road) at US 21 (Statesville Road)

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek
 PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

Prepared in the Office of:

 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION

SEAL

 NATASHA R. SIMMONS
 ENGINEER

REVISIONS	INIT.	DATE

DocuSigned by:
 Natasha R. Simmons
 SIGNATURE DATE 4/23/2018
 SIG. INVENTORY NO. 10-0617 T2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, AND 12.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #7 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

LOGICAL I/O COMMAND #8 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #9 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #10 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #11 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 7 (HEAD 71).

LOGICAL I/O COMMAND #12 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

- OUTPUT 39 = Overlap D Red
- OUTPUT 40 = Overlap D Yellow
- OUTPUT 41 = Overlap D Green
- OUTPUT 42 = Overlap C Red
- OUTPUT 43 = Overlap C Yellow
- OUTPUT 44 = Overlap C Green
- OUTPUT 47 = Overlap B Red
- OUTPUT 48 = Overlap B Yellow
- OUTPUT 49 = Overlap B Green
- OUTPUT 50 = Overlap A Red
- OUTPUT 51 = Overlap A Yellow
- OUTPUT 52 = Overlap A Green

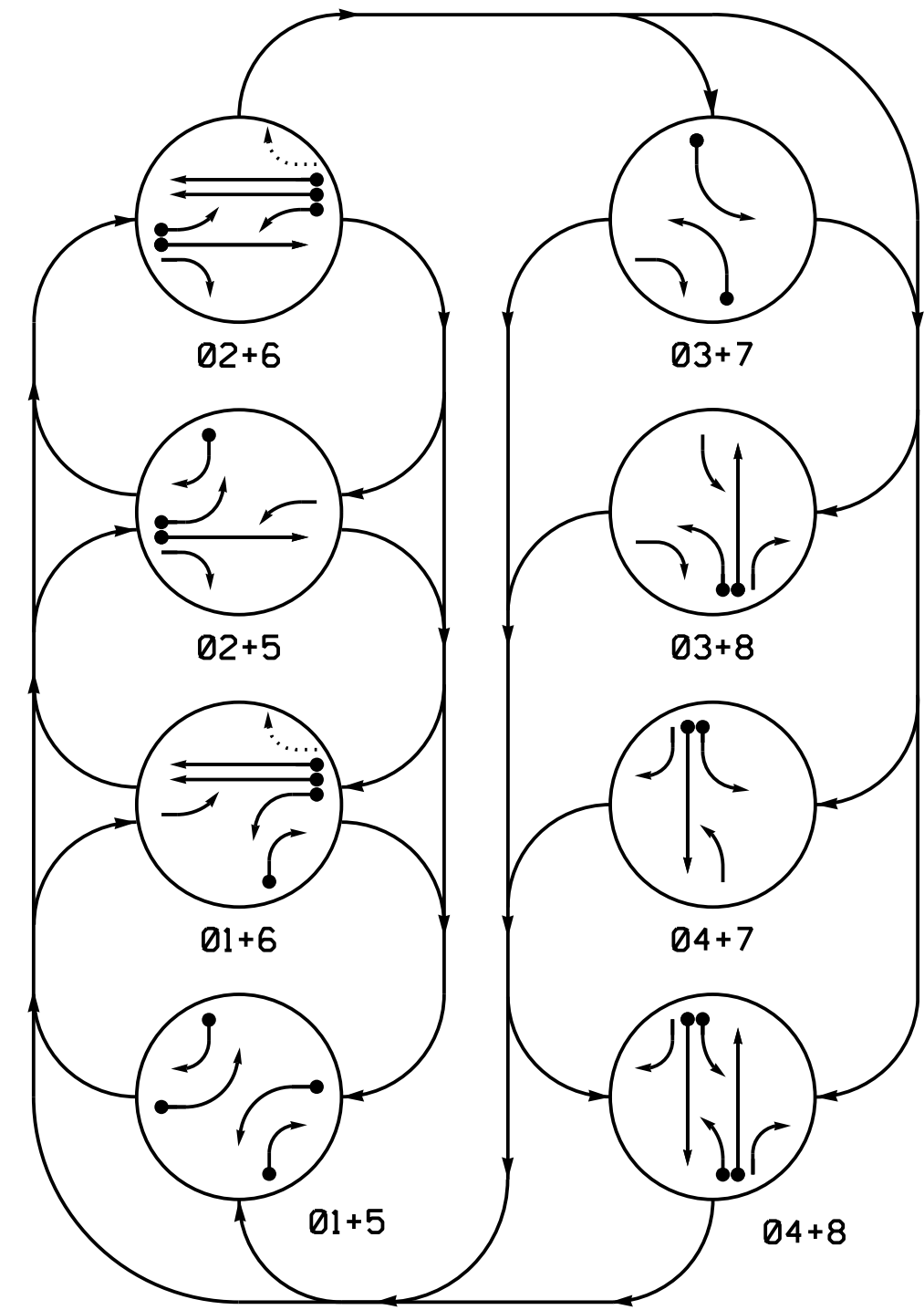
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0617T2
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 2 of 2
Signal Upgrade
Temporary Design 2

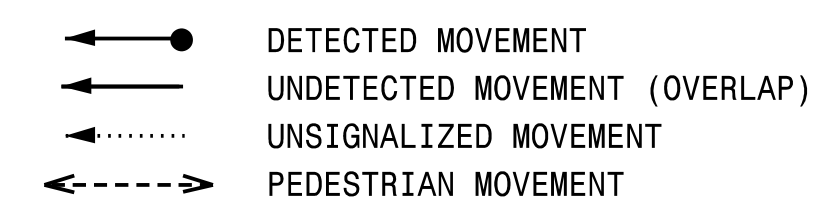
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UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2136 (Gilead Road) at US 21 (Statesville Road)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER NATASHA R. SIMMONS
Prepared in the Office of: 	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons	SEAL 031464 NATASHA R. SIMMONS
HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	750 N. Greenfield Pkwy, Corner, NC 27529	DocuSigned by: Natasha R. Simmons 4/23/2018 SIGNATURE DATE SIG. INVENTORY NO. 10-0617 T2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

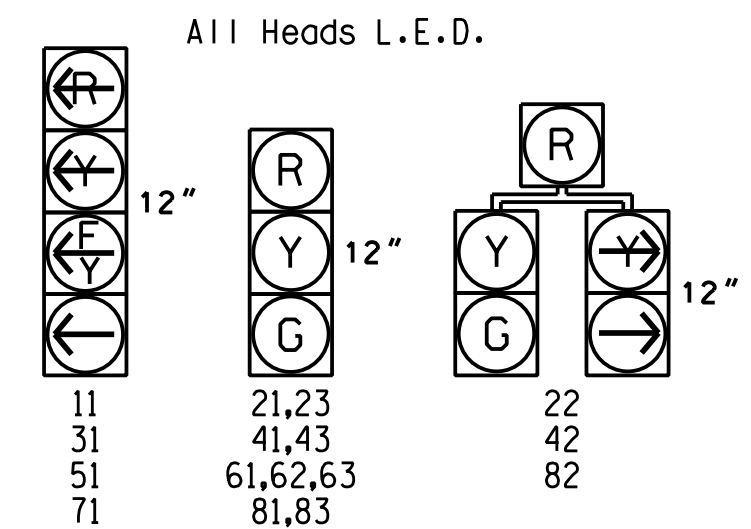


TABLE OF OPERATION

SIGNAL FACE	PHASE								FLASH
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	
11	-	-	F	F	R	R	R	R	Y
21,23	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
31	R	R	R	R	-	-	F	F	Y
41,43	R	R	R	R	R	R	G	G	R
42	R	R	R	R	R	R	G	G	R
51	-	F	-	F	R	R	R	R	Y
61,62,63	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	-	F	F	R	Y
81,83	R	R	R	R	G	R	G	R	
82	R	R	R	R	G	R	G	R	

OASIS 2070E LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			STRETCH TIME
1A	6X40	0	*	*	1	Y	Y	-	15	-	*
1B	6X40	0	*	*	6	Y	Y	-	3	-	*
2A	6X6	70	*	*	2	Y	Y	-	-	-	*
3A	6X40	0	*	*	3	Y	Y	-	15	-	*
4A	6X6	300	*	*	4	-	Y	-	2.4	-	*
4B	6X40	0	*	*	4	Y	Y	-	-	-	*
5A	6X40	0	*	*	5	Y	Y	-	15	-	*
5B	6X40	0	*	*	5	Y	Y	-	15	-	*
6A	6X6	70	*	*	6	Y	Y	-	-	-	*
6B	6X6	70	*	*	6	Y	Y	-	-	-	*
7A	6X40	0	*	*	7	Y	Y	-	15	-	*
8A	6X6	300	*	*	8	-	Y	-	2.4	-	*
8B	6X40	0	*	*	8	Y	Y	-	-	-	*

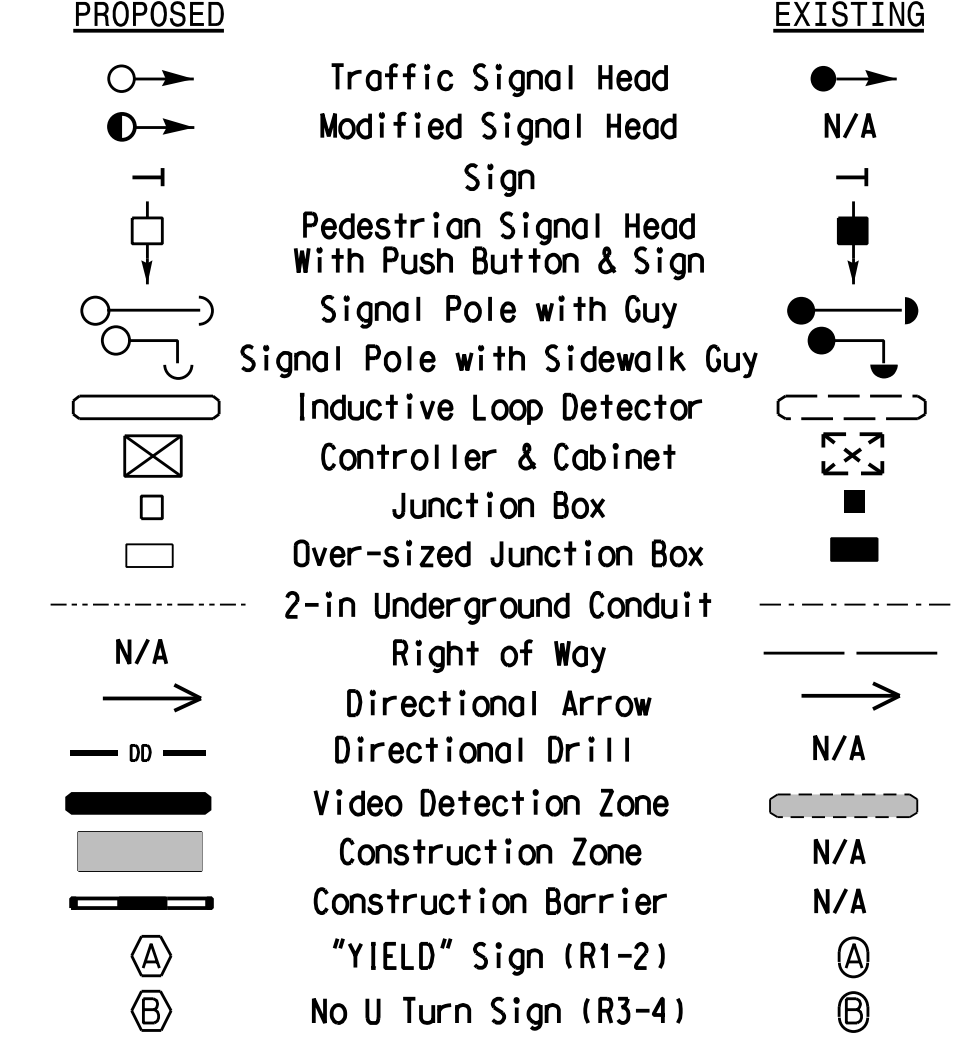
* Video Detection Zone

8 Phase Fully Actuated Gilead Road Closed Loop 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 5 may be lagged.
- Phase 3 and/or 7 may be lagged.
- Set all detector units to presence mode.
- Reposition existing signal heads numbered 11,21,22,41,42,43,51,61, 62,63, and 71.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #11042 Controller Asset #0617

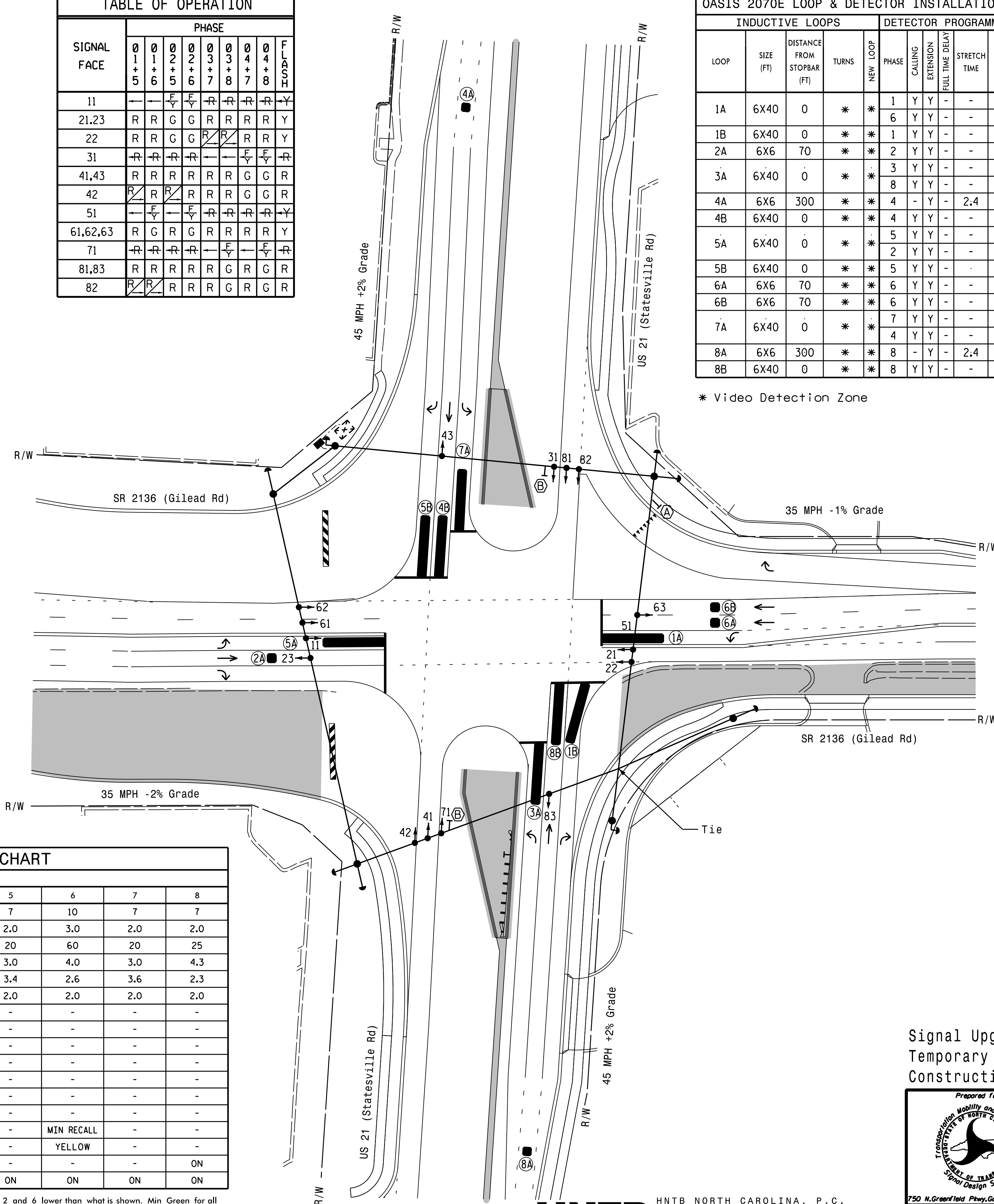
LEGEND



OASIS 2070E TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	30	60	20	25	20	60	20	25
Yellow Clearance	3.0	4.0	3.0	4.3	3.0	4.0	3.0	4.3
Red Clearance	3.3	2.6	3.6	2.3	3.4	2.6	3.6	2.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

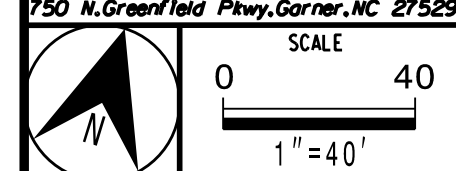


Signal Upgrade
Temporary Design 3
Construction Phase III

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at US 21 (Statesville Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031464 M. T. SHA R. SIMMONS
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: J.T. Thibault REVIEWED BY: N.R. Simmons	REVISIONS INITI. DATE _____ _____	

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HNTB NORTH CAROLINA, P.C.
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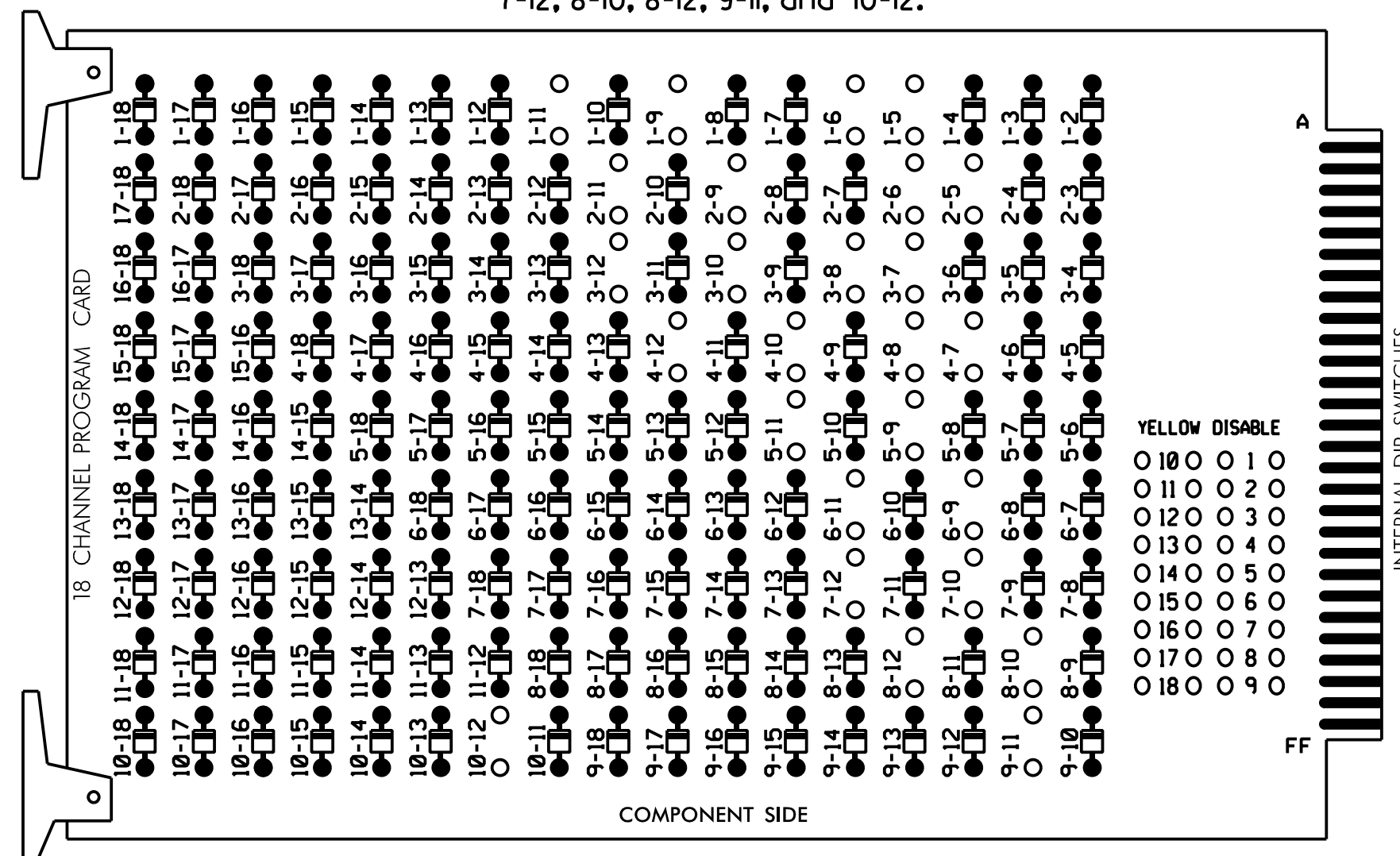


DocuSigned by:
Natalia R. Simmons
4/23/2018
DATE
SIG. INVENTORY NO. 10-0617 T3

EDI MODEL 2018ECLIP-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

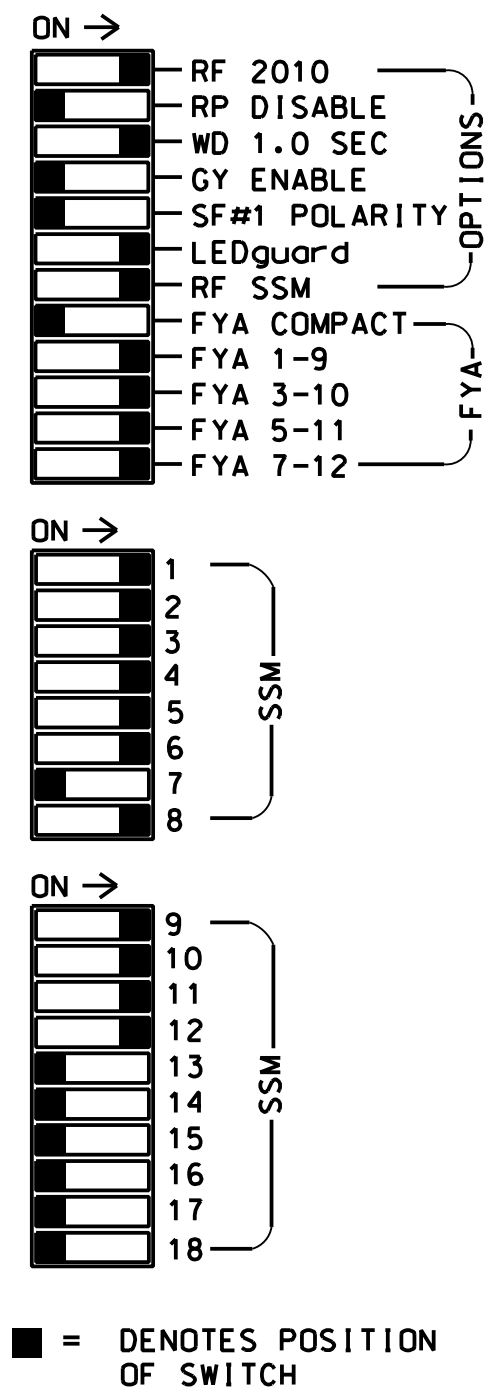
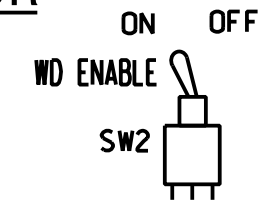
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 4-12, 5-9, 5-11, 6-9, 6-11, 7-10, 7-12, 8-10, 8-12, 9-11, and 10-12.



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.



■ = 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.
- Enable Simultaneous Gap-Out for all Phases.
- Program phases 2 and 6 for Startup In Green.
- Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
- The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 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".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....5+6
 OVERLAP "D".....7+8

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	22	31*	41,42,43	NU	42	51*	61,62,63	NU	71*	81,82,83	NU	31*	51*	71*	NU
RED	*	128		*	101		*	134		107									
YELLOW		129			102			135		* 108									
GREEN		130			103			136		109									
RED ARROW													A121	A124		A114	A101		
YELLOW ARROW	126			117			132						A122	A125		A115	A102		
FLASHING YELLOW ARROW													A123	A126		A116	A103		
GREEN ARROW	127	127		118	118		133	133		124									

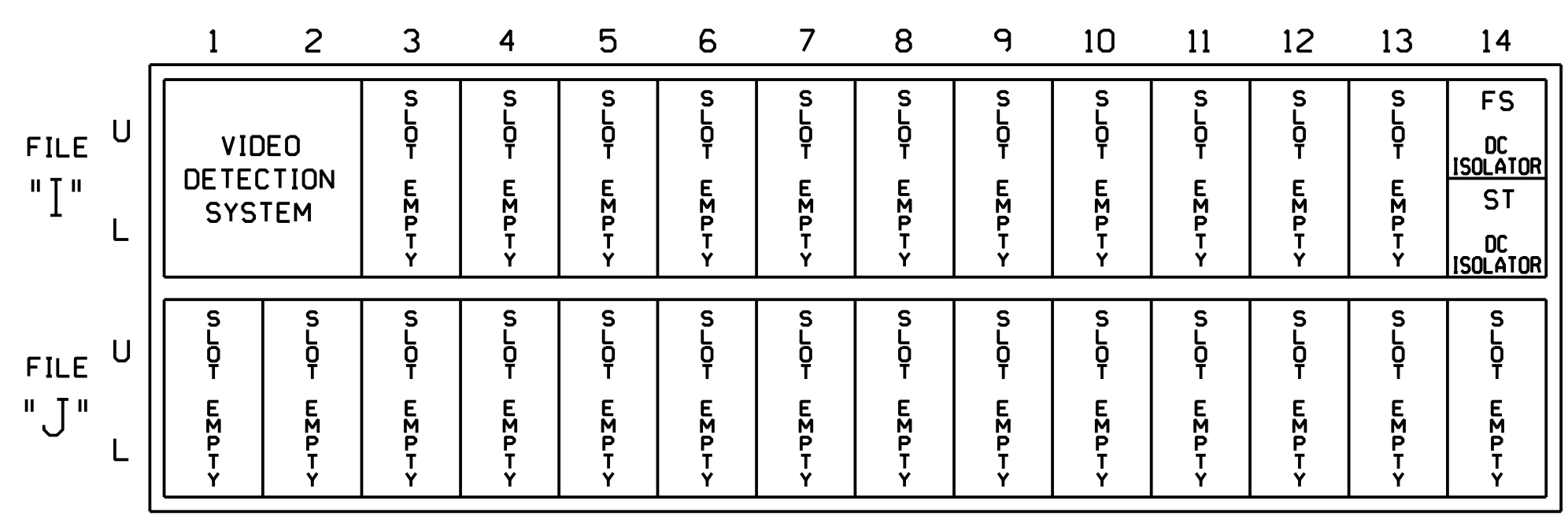
NU = Not Used

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

* See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

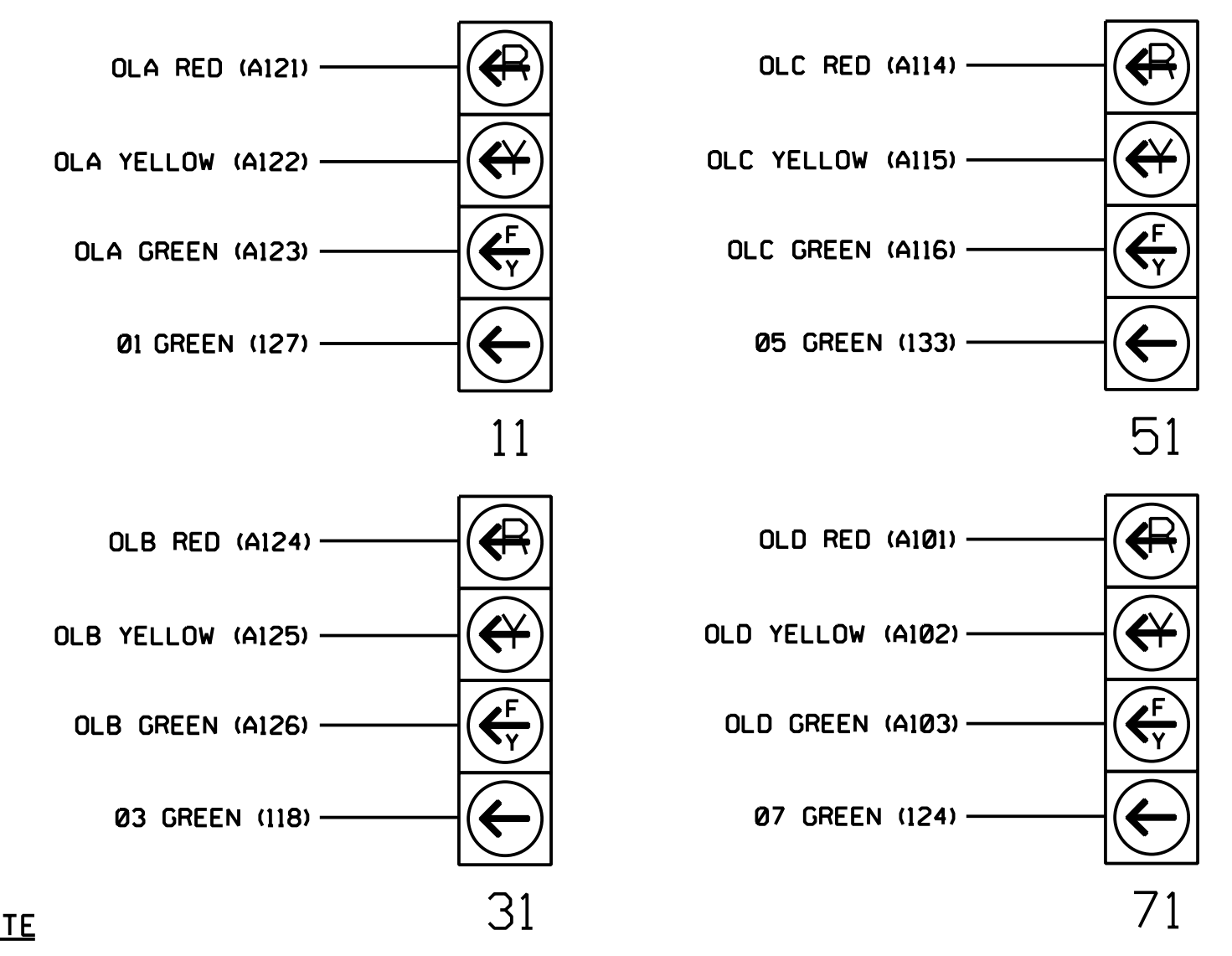
FS = FLASH SENSE
 ST = STOP TIME

SPECIAL DETECTOR NOTE

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



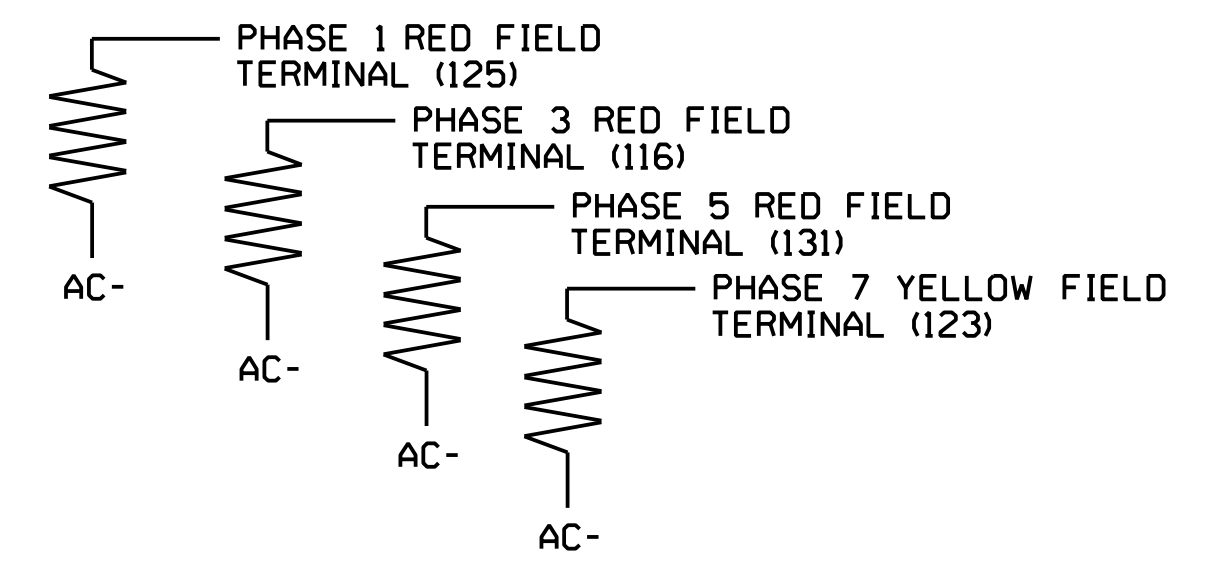
NOTE

The sequence display for signal heads 11, 31, 51, and 71 requires special logic programming. See sheet 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0617T3
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

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Electrical Detail - Sheet 1 of 2
 Signal Upgrade
 Temporary Design 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at US 21 (Statesville Road)	
	Division 10 Mecklenburg Co. Huntersville	SEAL 031464 NATASHA R. SIMMONS
PLAN DATE: December 2017 PREPARED BY: A.H. Thornburg	REVIEWED BY: A.D. Klinksiek REVIEWED BY: N.R. Simmons	Revisions table with columns for REVISIONS, INIT., and DATE.

DocuSigned by:
 Natasha R. Simmons
 DATE: 4/23/2018
 SIGNATURE
 DATE

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, AND 12.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #7 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

LOGICAL I/O COMMAND #8 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #9 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #10 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

LOGICAL I/O COMMAND #11 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW OFF DURING PHASE 7 (HEAD 71).

LOGICAL I/O COMMAND #12 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

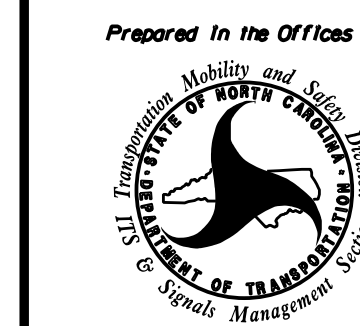
- OUTPUT 39 = Overlap D Red
- OUTPUT 40 = Overlap D Yellow
- OUTPUT 41 = Overlap D Green
- OUTPUT 42 = Overlap C Red
- OUTPUT 43 = Overlap C Yellow
- OUTPUT 44 = Overlap C Green
- OUTPUT 47 = Overlap B Red
- OUTPUT 48 = Overlap B Yellow
- OUTPUT 49 = Overlap B Green
- OUTPUT 50 = Overlap A Red
- OUTPUT 51 = Overlap A Yellow
- OUTPUT 52 = Overlap A Green

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0617T3
DESIGNED: December 2017
SEALED: 04-23-2018
REVISED: N/A

Electrical Detail - Sheet 2 of 2
Signal Upgrade
Temporary Design 3

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:



750 N. Greenfield Pkwy, Corner, NC 27529

SR 2136 (Gilead Road)
at
US 21 (Statesville Road)

Division 10 Mecklenburg Co. Huntersville

PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek

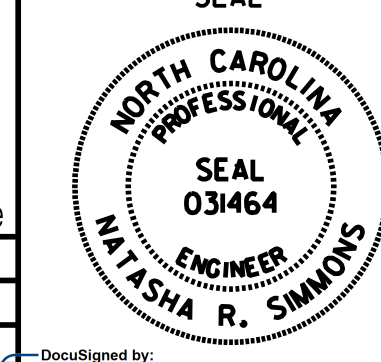
PREPARED BY: A.H. Thornburg REVIEWED BY: N.R. Simmons

REVISIONS	INIT.	DATE

DocuSigned by: *Natasha R. Simmons* 4/23/2018

SIGNATURE DATE

SEAL



SIGNATURE DATE

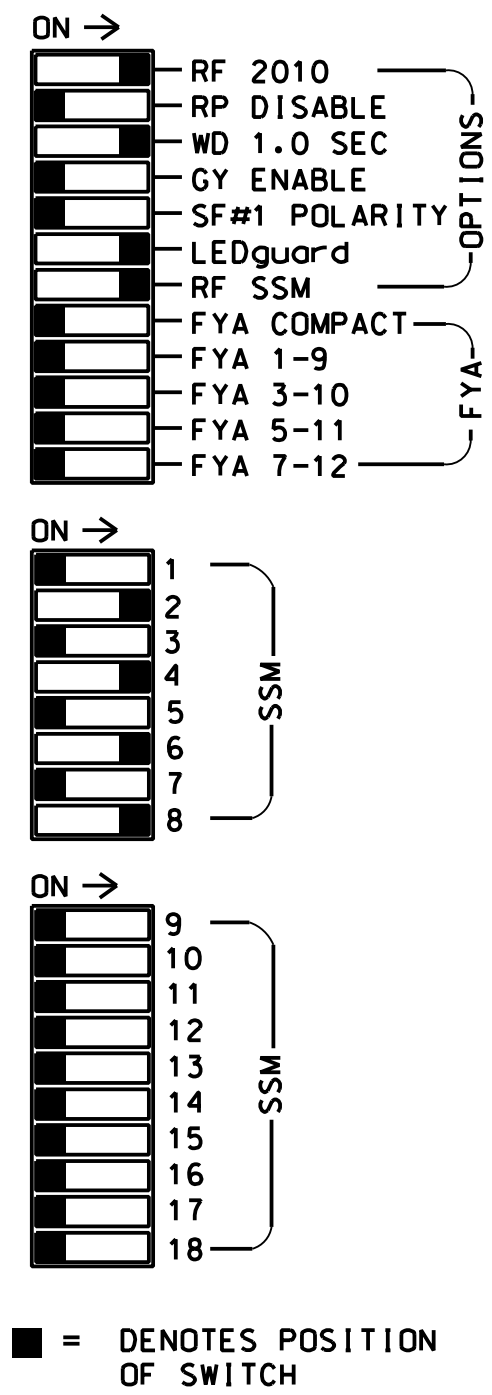
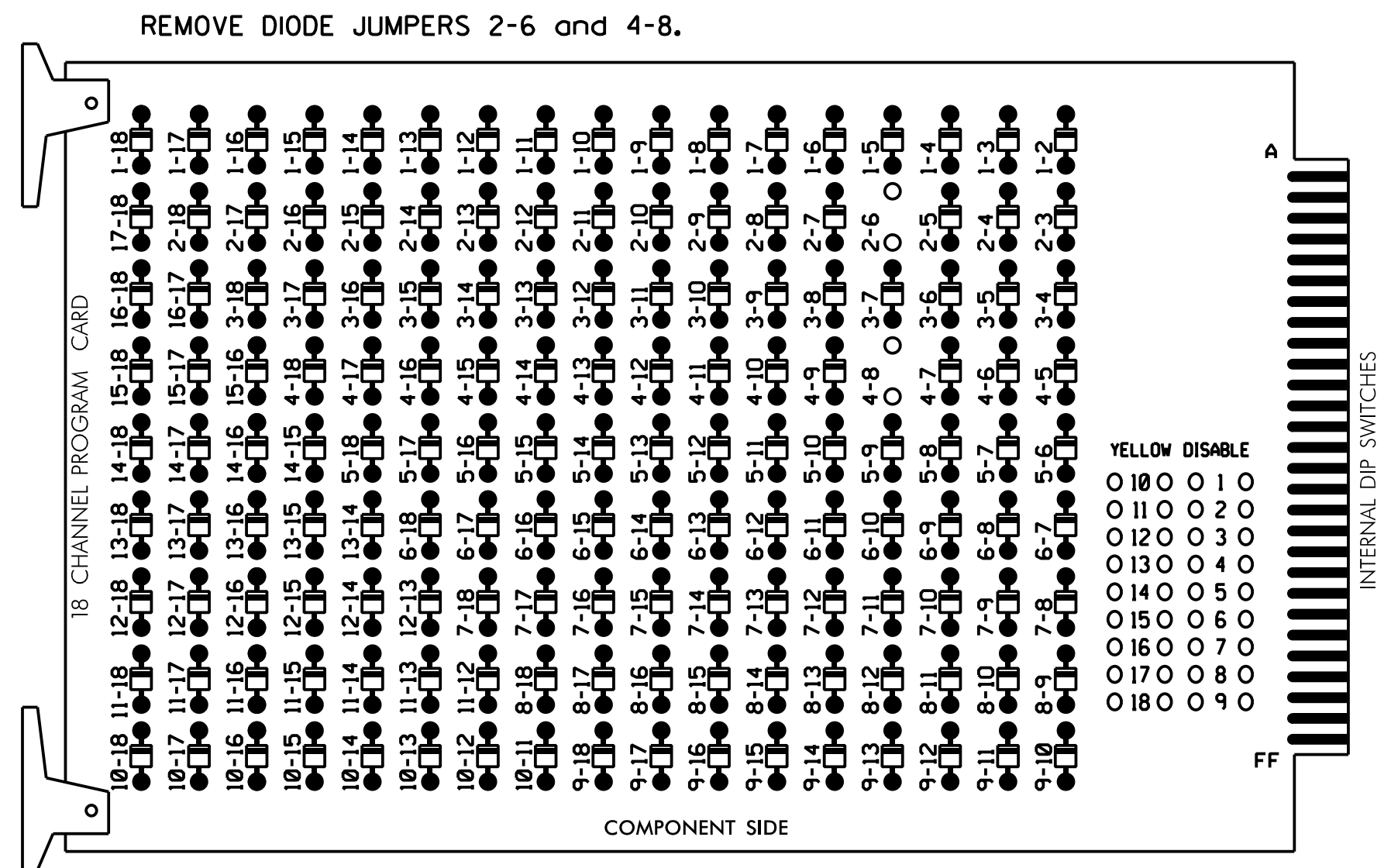
SIG. INVENTORY NO. 10-0617 T3



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343 E. Six Forks Road, Suite 200
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NC License No: C-1554
(919) 546-8997

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.

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. Restore controller to factory defaults before programming per this electrical detail.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all Phases.
5. Program phases 2 and 6 for Startup In Green.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the Gilead Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX, OUTPUT FILE
 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	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, 23	24,25, 26,27	NU	NU	41,42, 43	44,45, 46,47	NU	NU	61,62, 63	NU	81,82, 83	NU	NU	NU	NU	NU	NU
RED		128	128		101	101			134			107						
YELLOW		129			102				135			108						
GREEN		130			103				136			109						
RED ARROW																		
YELLOW ARROW			129			102												
GREEN ARROW			130			103												
Hand																		
Person																		

NU = Not Used

! IMPORTANT: RESTORE FACTORY WIRING FOR FLASHER CIRCUIT !

FLASHER CIRCUIT MODIFICATION DETAIL

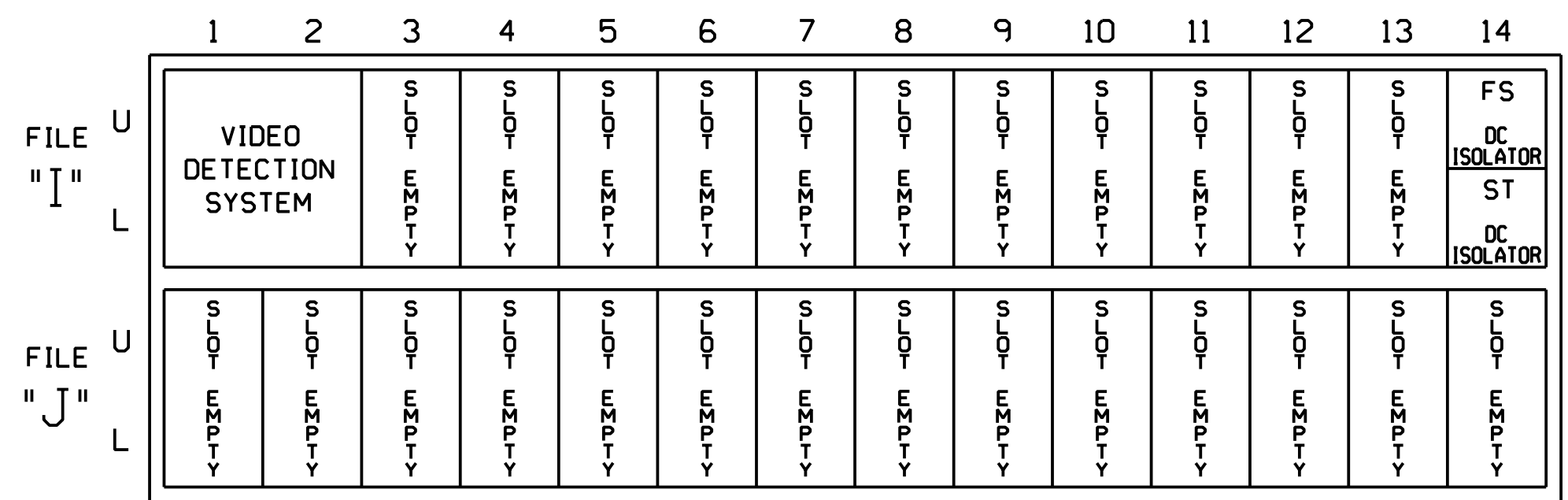
IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

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

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

INPUT FILE POSITION LAYOUT

(front view)



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

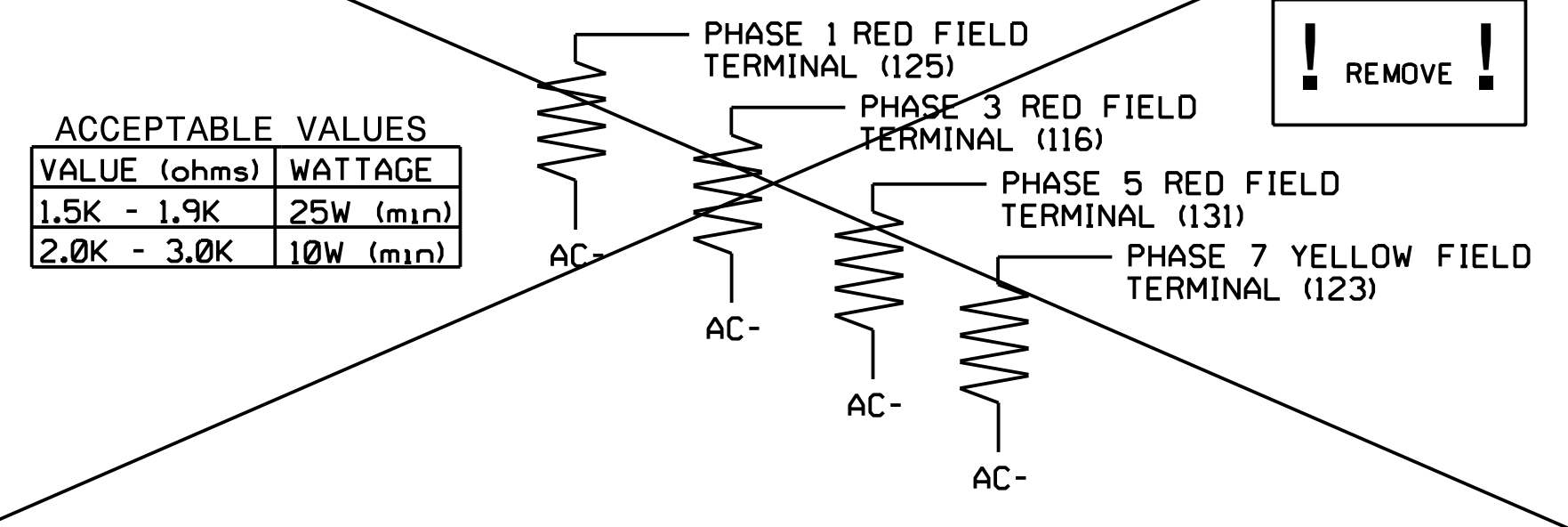
FS = FLASH SENSE
 ST = STOP TIME

SPECIAL DETECTOR NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

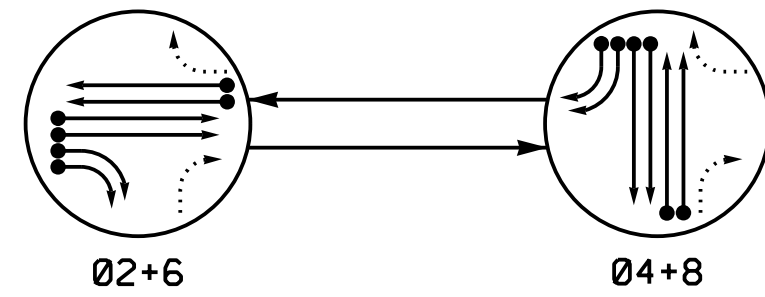


Electrical Detail - Sheet 1 of 1
 Signal Upgrade
 Temporary Design 4

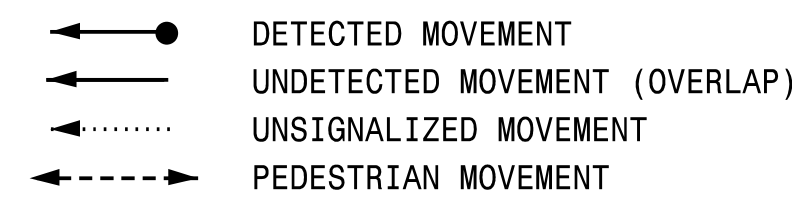
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	SR 2136 (Gilead Road) at US 21 (Statesville Road)		
	Prepared in the Office of: 	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: J.T. Thibault REVIEWED BY: N.R. Simmons	
HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997		REVISIONS INIT. DATE	Documented by: 4/23/2018 Signature: _____ DATE: _____ SIG. INVENTORY NO. 10-0617 T4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

All Heads L.E.D.

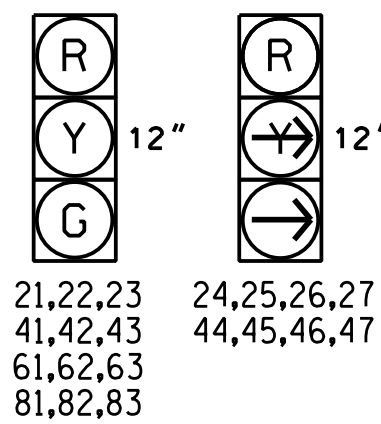


TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02+6	04+8	FLASH
21,22,23	G	R	Y
24,25,26,27	-	R	Y
41,42,43	R	G	R
44,45,46,47	R	-	R
61,62,63	G	R	Y
81,82,83	R	G	R

OASIS 2070E LOOP & DETECTOR INSTALLATION CHART

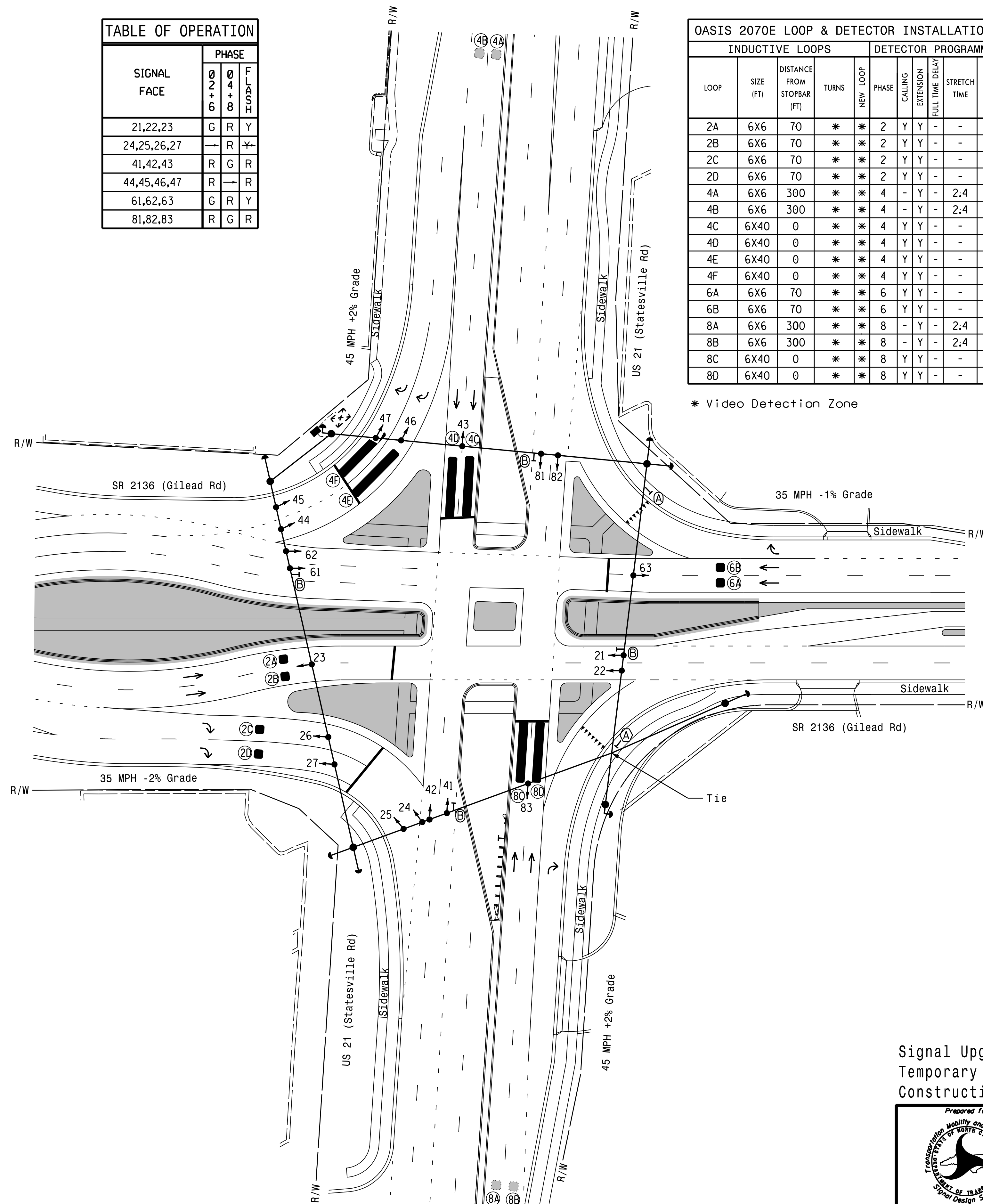
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME		
2A	6X6	70	*	*	2	Y	Y	-	-	-	*
2B	6X6	70	*	*	2	Y	Y	-	-	-	*
2C	6X6	70	*	*	2	Y	Y	-	-	-	*
2D	6X6	70	*	*	2	Y	Y	-	-	-	*
4A	6X6	300	*	*	4	-	Y	-	2.4	-	*
4B	6X6	300	*	*	4	-	Y	-	2.4	-	*
4C	6X40	0	*	*	4	Y	Y	-	-	-	*
4D	6X40	0	*	*	4	Y	Y	-	-	-	*
4E	6X40	0	*	*	4	Y	Y	-	-	15	*
4F	6X40	0	*	*	4	Y	Y	-	-	15	*
6A	6X6	70	*	*	6	Y	Y	-	-	-	*
6B	6X6	70	*	*	6	Y	Y	-	-	-	*
8A	6X6	300	*	*	8	-	Y	-	2.4	-	*
8B	6X6	300	*	*	8	-	Y	-	2.4	-	*
8C	6X40	0	*	*	8	Y	Y	-	-	-	*
8D	6X40	0	*	*	8	Y	Y	-	-	-	*

* Video Detection Zone

2 Phase Fully Actuated Gilead Road Closed Loop 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.
- Reposition existing signal heads numbered 21,22,23,24,25,26,27,44, 45,46,47,61,63,62,81, and 82.
- Incorporate Video Detection system for vehicle detection.
- Provide the Engineer with the Manufacturer's approved Video Detection locations and mounting heights to obtain detection zones as shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #11042 Controller Asset #0617

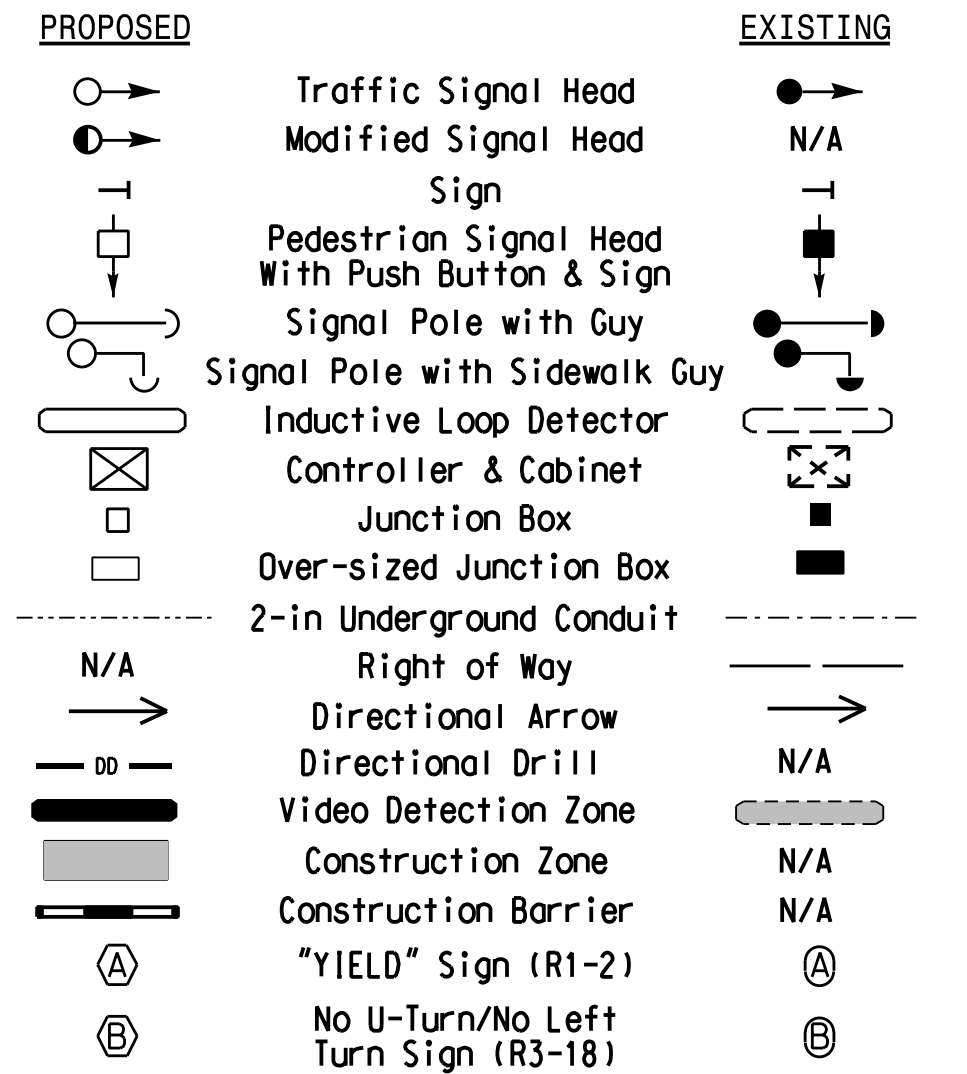


OASIS 2070E TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	30	60	30
Yellow Clearance	4.0	4.3	3.9	4.3
Red Clearance	2.1	2.8	3.6	1.7
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1 *	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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

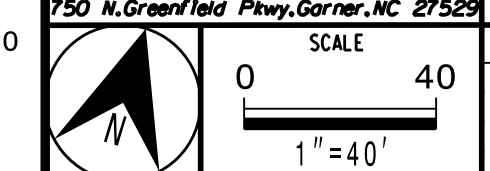
LEGEND



Signal Upgrade
Temporary Design 5
Construction Phases IIIB,IV,V

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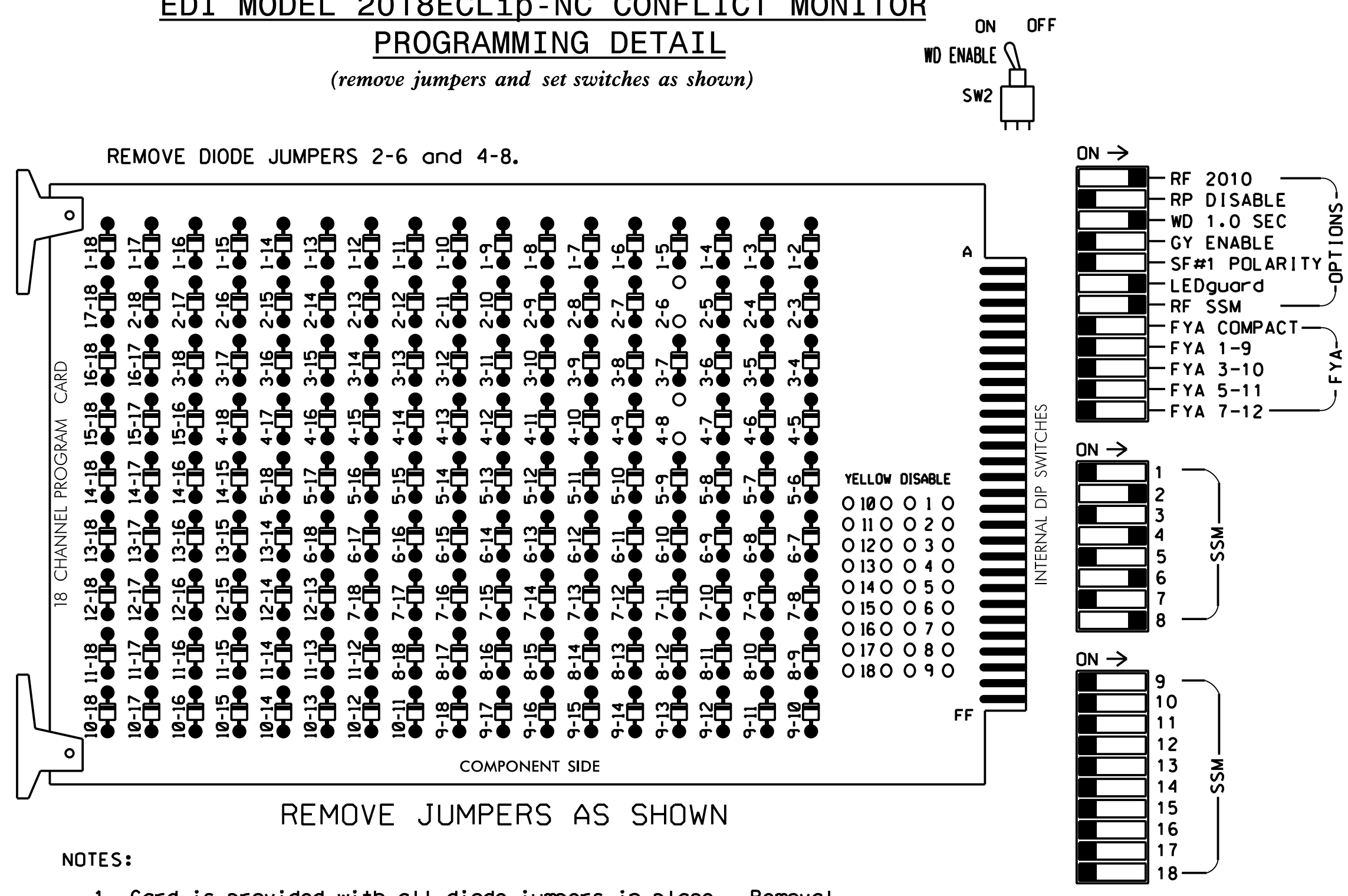
 HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554 (919) 546-8997	SR 2136 (Gilead Road) at US 21 (Statesville Road)	SEAL SEAL NATASHA R. SIMMONS
	Division 10 Mecklenburg Co. Huntersville PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: J.T. Thibault REVIEWED BY: N.R. Simmons	REVISIONS INIT. DATE _____ _____



SIG. INVENTORY NO. 10-0617 T5

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.

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. Enable Simultaneous Gap-Out for all Phases.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the Gilead Road Closed Loop 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.	NU	21,22, 23	24,25, 26,27	NU	NU	41,42, 43	44,45, 46,47	NU	NU	61,62, 63	NU	NU	81,82, 83	NU	NU	NU	NU	NU
RED		128	128		101	101			134			107						
YELLOW		129			102				135			108						
GREEN		130			103				136			109						
RED ARROW																		
YELLOW ARROW			129				102											
GREEN ARROW			130				103											
Hand																		
Person																		

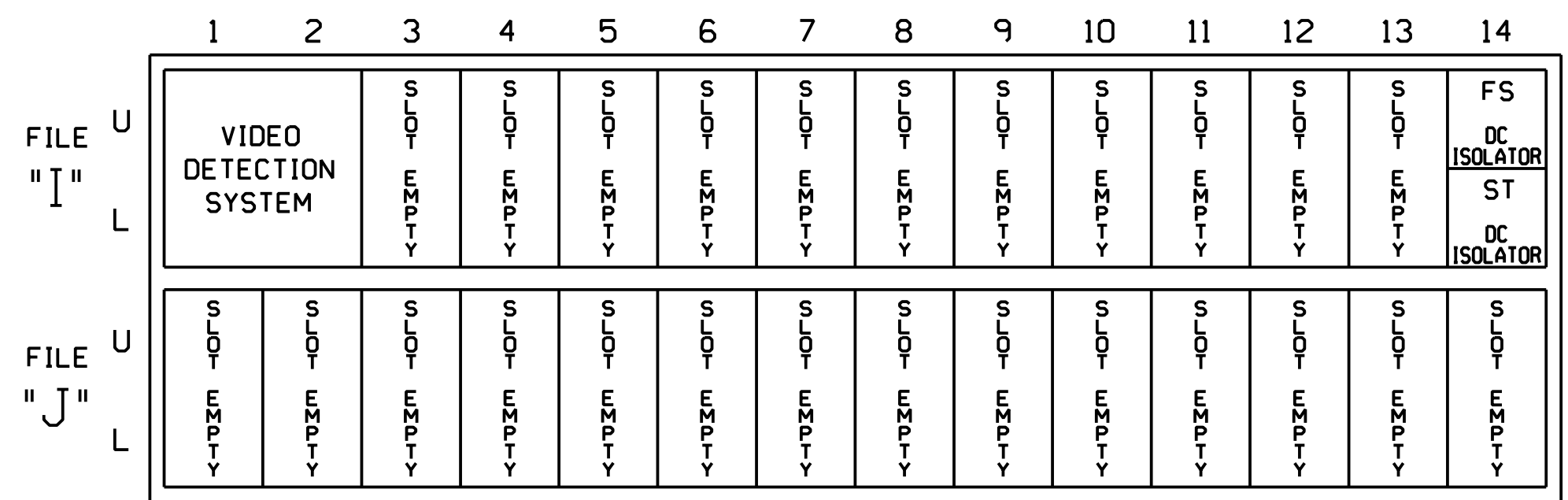
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070E
 CABINET.....332 W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 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

SPECIAL DETECTOR NOTE

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

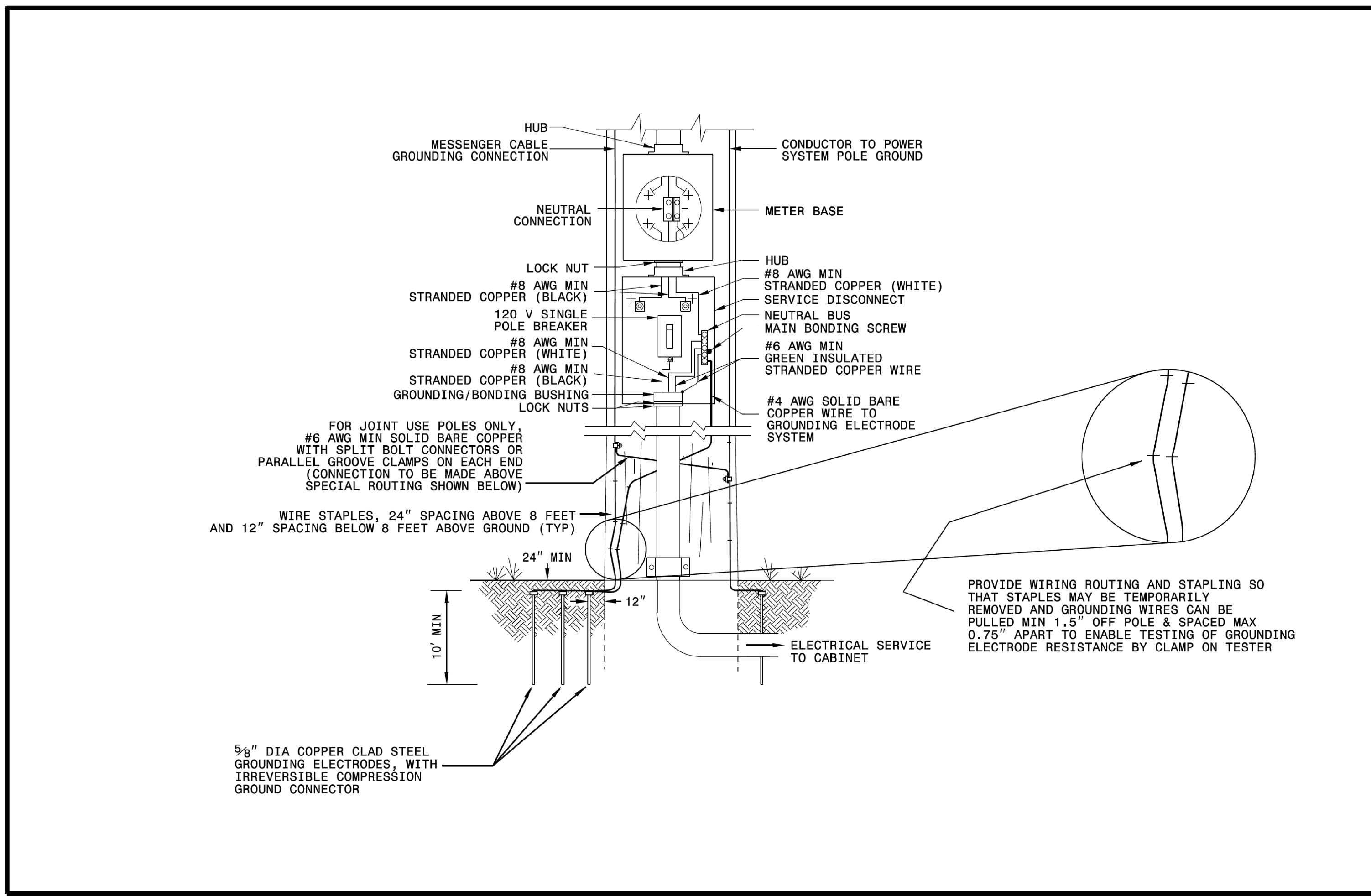
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-0617T5
 DESIGNED: December 2017
 SEALED: 04-23-2018
 REVISED: N/A

Electrical Detail - Sheet 1 of 1
 Signal Upgrade
 Temporary Design 5

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	SR 2136 (Gilead Road) at US 21 (Statesville Road)		
	Division 10 Mecklenburg Co. Huntersville	PLAN DATE: December 2017 REVIEWED BY: A.D. Klinksiek PREPARED BY: J.T. Thibault REVIEWED BY: N.R. Simmons	
Prepared in the Offices of: 	REVISIONS INIT. DATE	DocuSigned by: Natasha R. Simmons SIGNATURE DATE	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER NATASHA R. SIMMONS

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



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

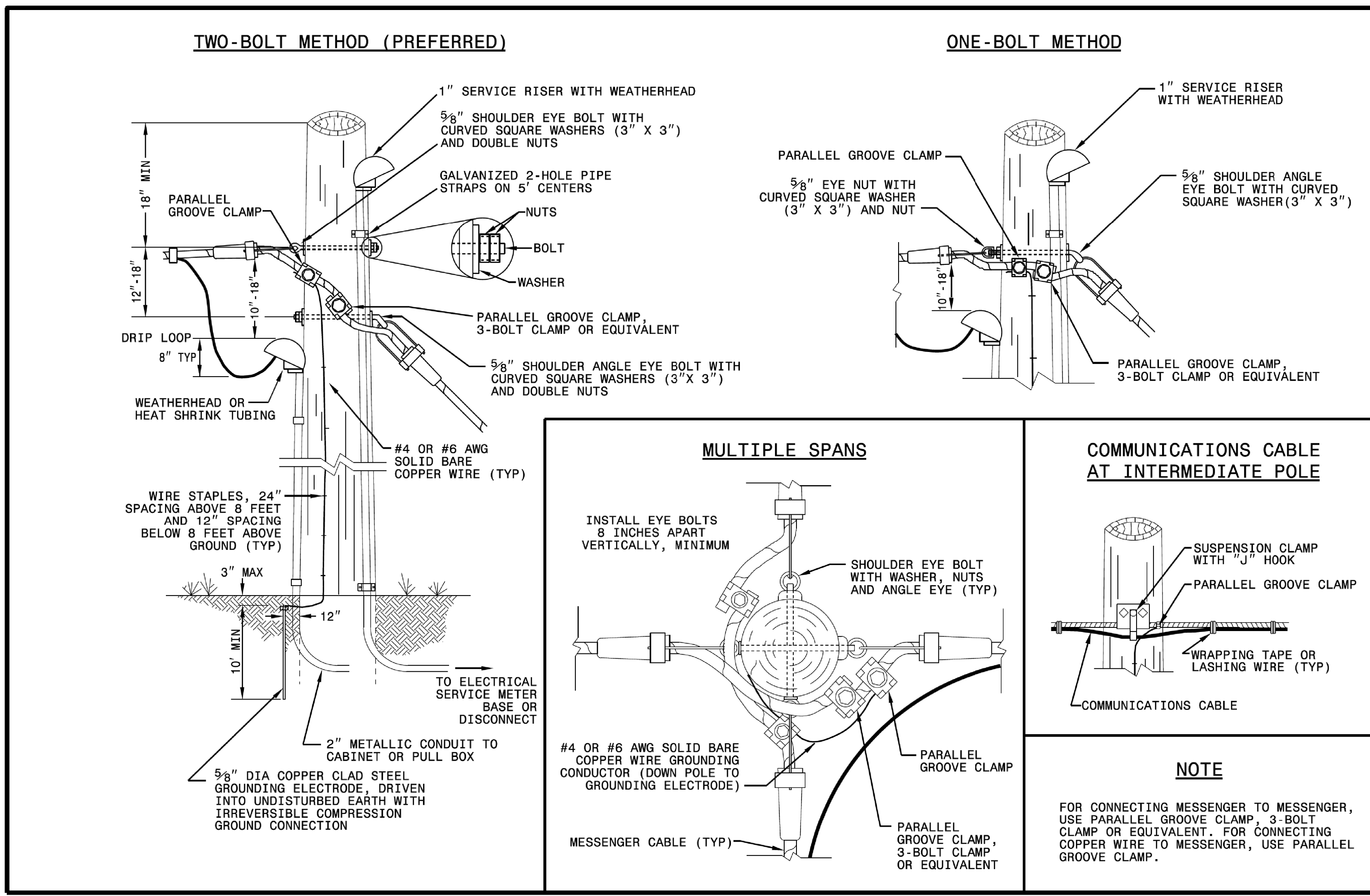
ENGLISH STANDARD DRAWING FOR

ELECTRICAL SERVICE GROUNDING

GROUNDING AND BONDING

SHEET 1 OF 1

1700D01



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

WOOD POLES

METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1

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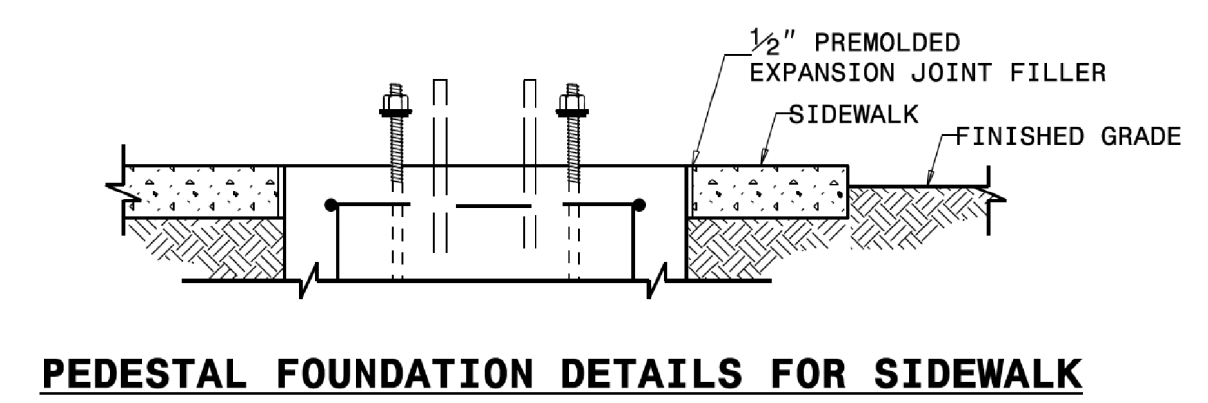
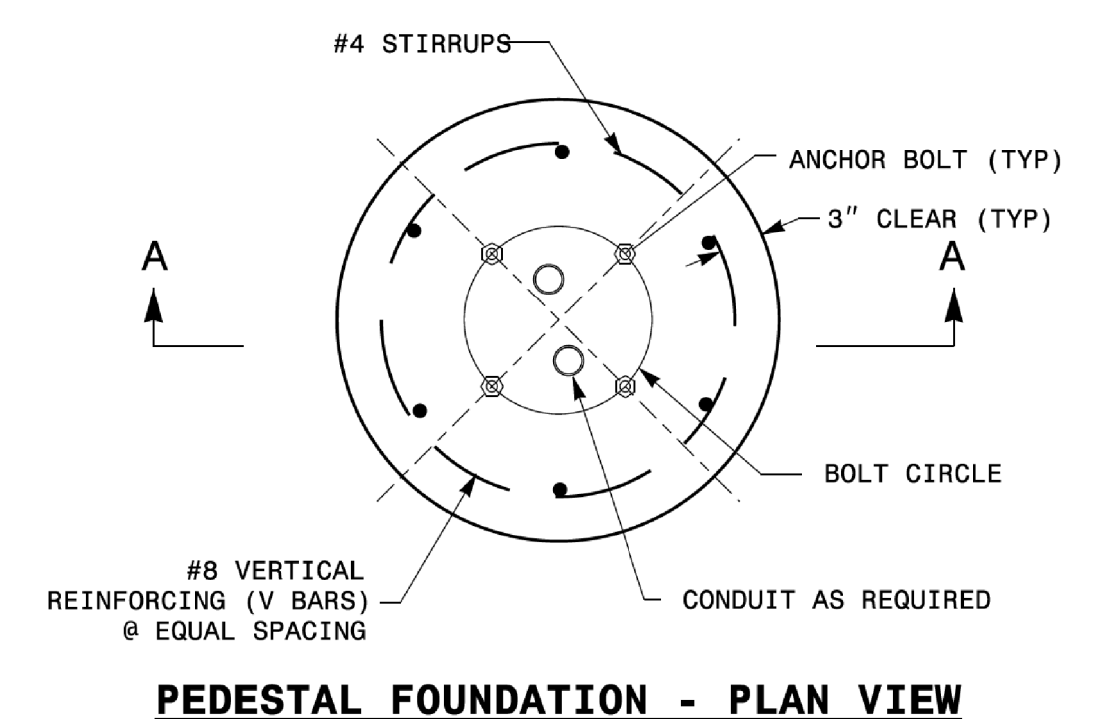
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
Department of Transportation
ITS & Signals Unit

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 032108
MOHD A. ASLAMI

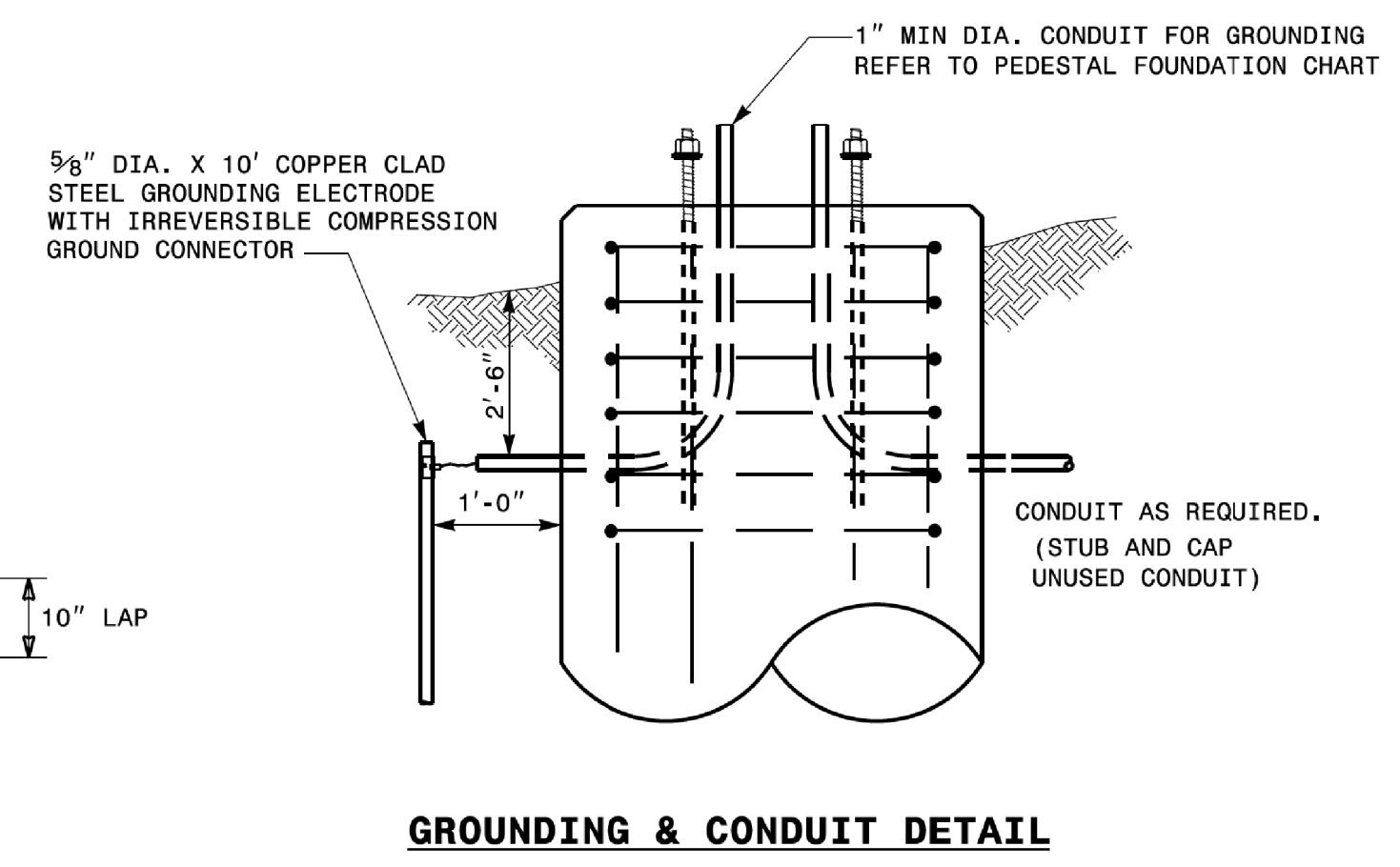
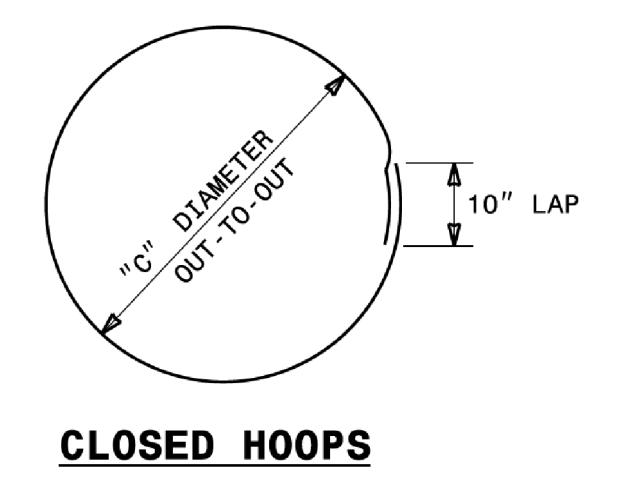
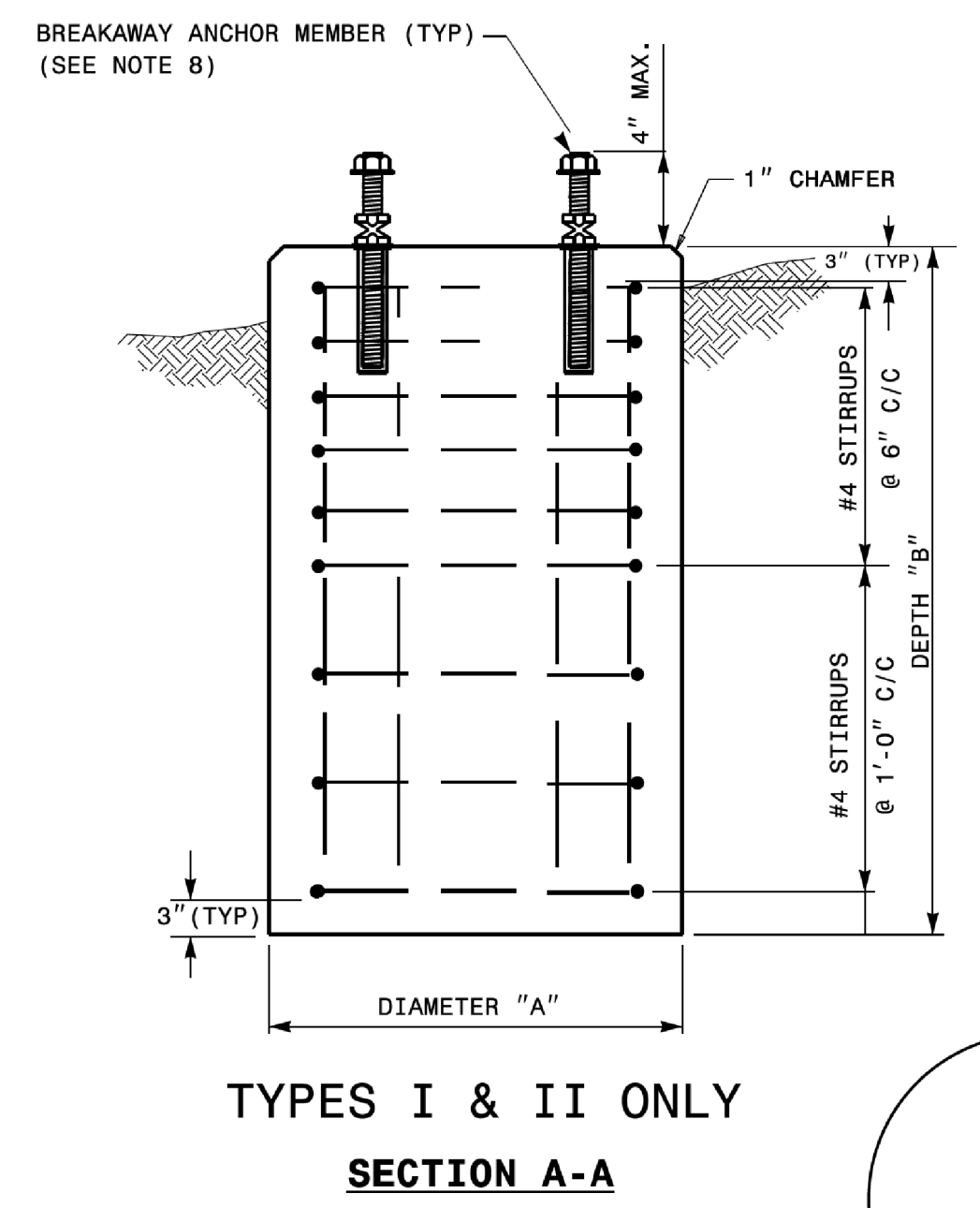
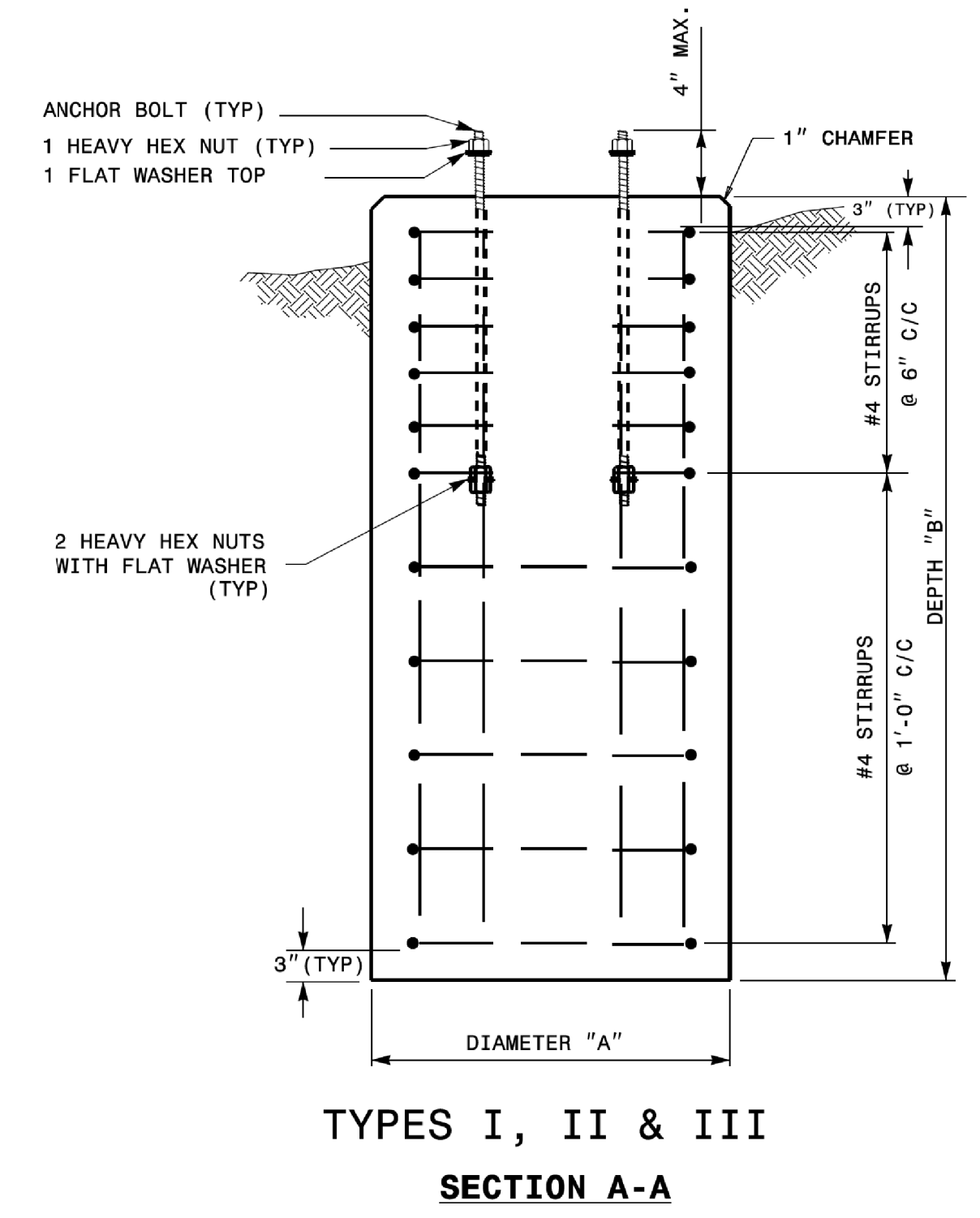
DocuSigned by:
Mohd Aslami

750 N. Greenfield Parkway
Garner, NC 27529

10/11/2017
DATE



- NOTES:**
- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
 - COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
 - USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'_c = 3000$ PSI (MIN.).
 - USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
 - GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
 - A. SANDY TYPE SOIL
 - B. NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
 - C. WIND SPEED NOT TO EXCEED 140 MPH
 IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.
 - MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
 - ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
 - USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4 1/2" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6 5/8". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.



PEDESTAL FOUNDATION TYPE AND SIZE							
TYPE	PEDESTAL DESCRIPTION	SIZE			ANCHOR BOLT		INSTALL GROUNDING SYSTEM (YES/NO)
		DIAMETER "A" FT	DEPTH "B" FT	CONCRETE VOLUME CY	DIAMETER (MIN.) IN	LENGTH FT-IN	
I	PEDESTRIAN PUSHBUTTON	2'-0"	3'-6"	.41	1/2	1'-6"	NO
II	NORMAL-DUTY	2'-0"	5'-0"	.58	3/4	2'-0"	YES
III	HEAVY-DUTY	2'-6"	7'-0"	1.27	1	4'-0"	YES

REINFORCING STEEL SCHEDULE													
TYPE	V-BAR				STIRRUP								
	SIZE #	QTY	LENGTH	WEIGHT LBS	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS	
					ON 6" CENTERS	ON 12" CENTERS	TOTAL						
I	8	6	3'-0"	56	4	4	4	5'-7"	1'-6"	0'-10"	15	71	
II	8	6	4'-6"	86	4	5	3	8	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	11	7'-2"	2'-0"	0'-10"	53	175

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

ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

SHEET 1 OF 1
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