

2 Phase
Fully Actuated
(Chapel Hill - Carrboro Signal System)

PHASING DIAGRAM

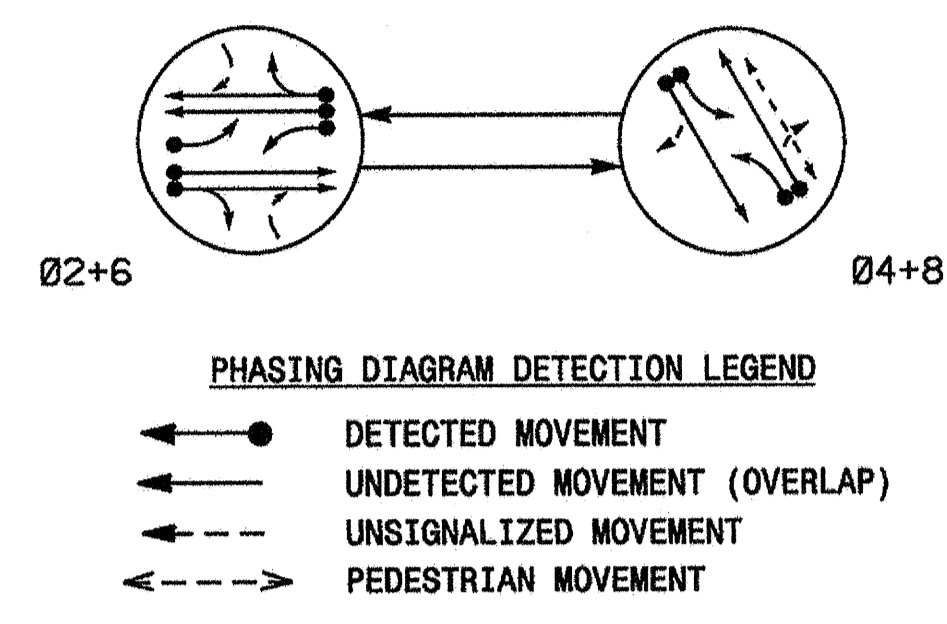


TABLE OF OPERATION

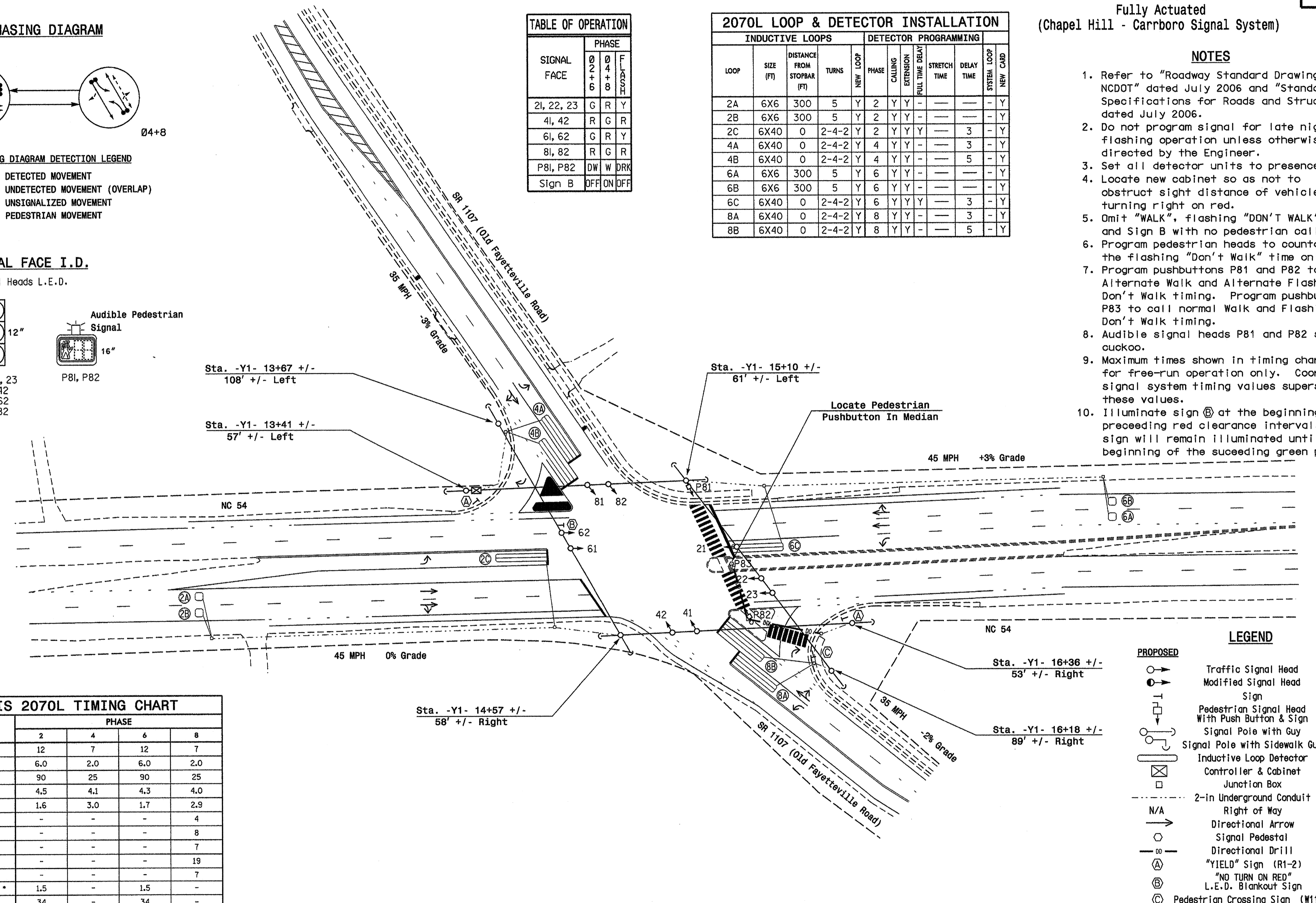
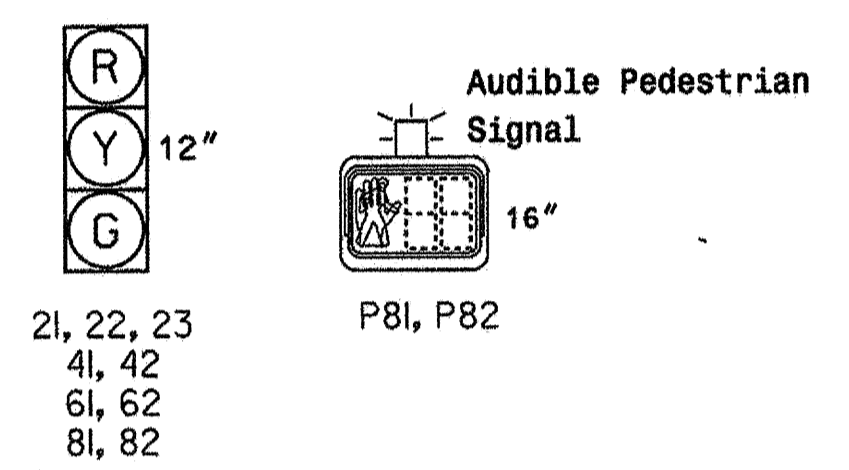
SIGNAL FACE	PHASE		
	Ø 2+6	Ø 4+8	F LEGEND
2l, 22, 23	G	R	Y
4l, 42	R	G	R
6l, 62	G	R	Y
8l, 82	R	G	R
P8l, P82	DW	W	DRK
Sign B	OFF	ON	OFF

2070L LOOP & DETECTOR INSTALLATION

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

SIGNAL FACE I.D.

All Heads L.E.D.

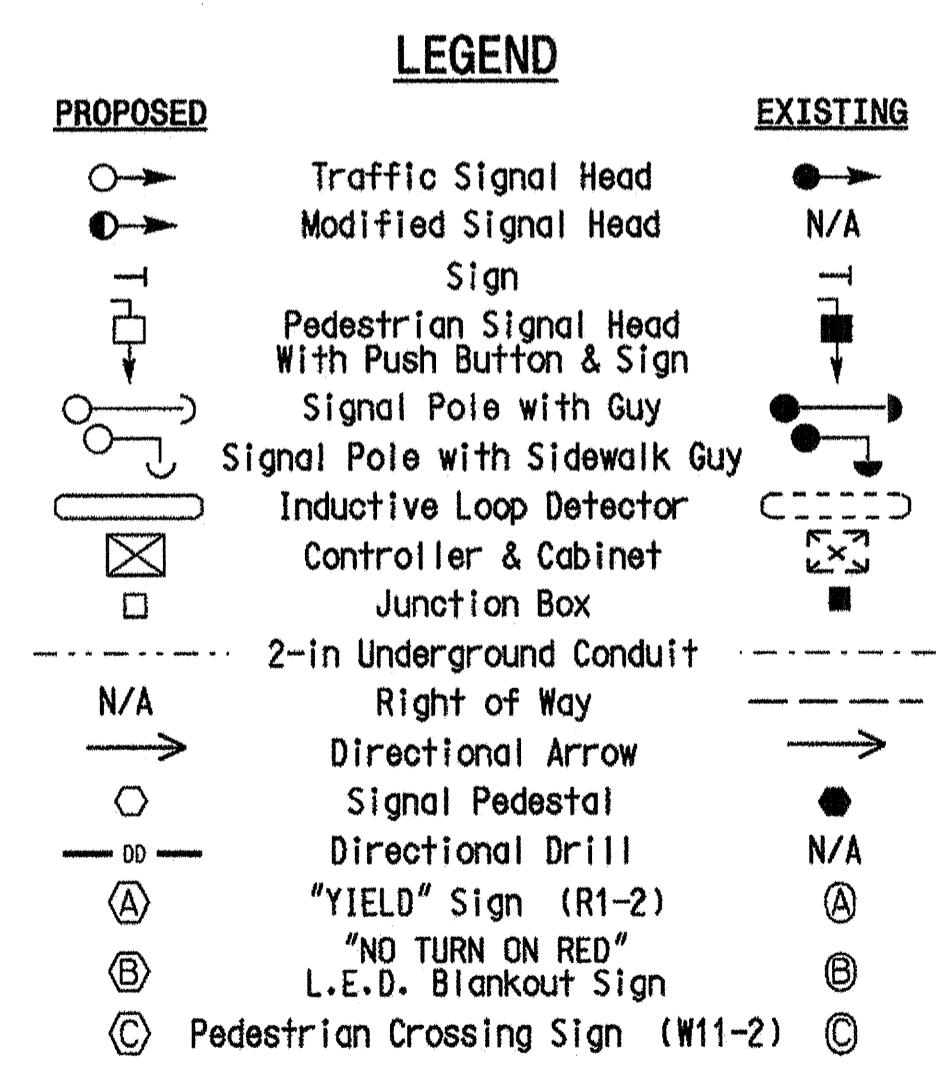


- NOTES
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
 3. Set all detector units to presence mode.
 4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
 5. Omit "WALK", flashing "DON'T WALK", and Sign B with no pedestrian calls.
 6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
 7. Program pushbuttons P81 and P82 to call Alternate Walk and Alternate Flashing Don't Walk timing. Program pushbutton P83 to call normal Walk and Flashing Don't Walk timing.
 8. Audible signal heads P81 and P82 shall cuckoo.
 9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
 10. Illuminate sign Ⓞ at the beginning of the preceding red clearance interval. This sign will remain illuminated until the beginning of the succeeding green phase.

OASIS 2070L TIMING CHART

FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	12	7	12	7
Extension 1 *	6.0	2.0	6.0	2.0
Max Green 1 *	90	25	90	25
Yellow Clearance	4.5	4.1	4.3	4.0
Red Clearance	1.6	3.0	1.7	2.9
Walk 1 *	-	-	-	4
Don't Walk 1	-	-	-	8
Alternate Walk	-	-	-	7
Alternate Don't Walk	-	-	-	19
Alternate Min Green	-	-	-	7
Seconds Per Actuation *	1.5	-	1.5	-
Max Variable Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	45	-	45	-
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.



Signal Upgrade

Prepared in the Office of
Transportation Mobility and South Eastern
Division of the North Carolina
Department of Transportation
Original Design Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 54
at
SR 1107 (Old Fayetteville Rd.)

Division 7 Orange County Carrboro

PLAN DATE: May 2009 REVIEWED BY:

PREPARED BY: OG Williams REVIEWED BY:

REVISIONS

SCALE 1" = 40'

SEAL

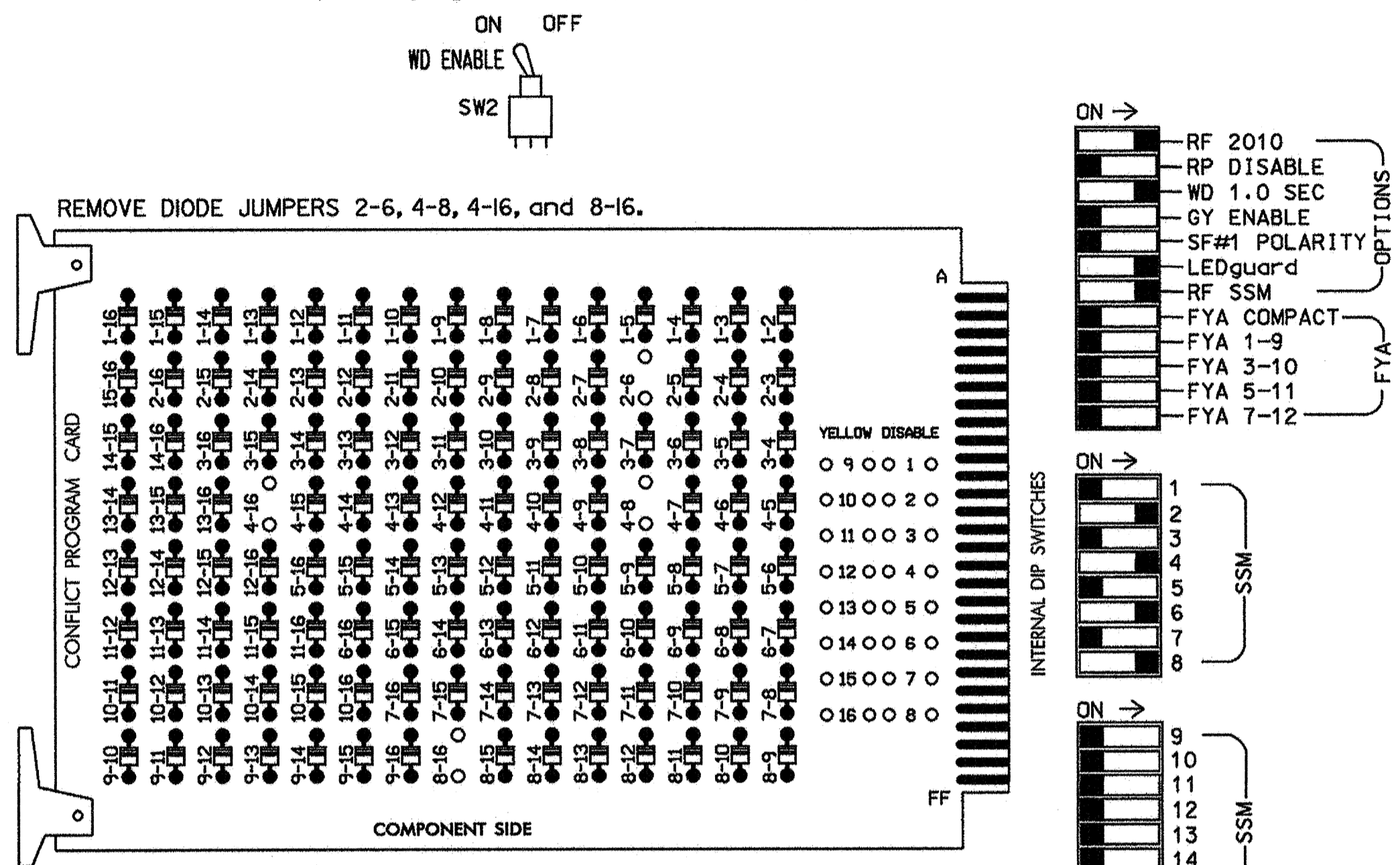
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL 026486
ROBERT J. ZEMBA
ENGINEER

SIG. INVENTORY NO. 07-1160

01-1160-2009 12:20
S:\1160\SIG\1160\SIG\1160\SIG.dgn, 20090601.dgn
7/2/2009

EDI MODEL 2010ECL-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.
 - Make sure jumpers SEL2-SEL5 are present on 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 1,3,5,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
- Program phase 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22 23	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
												110
												112

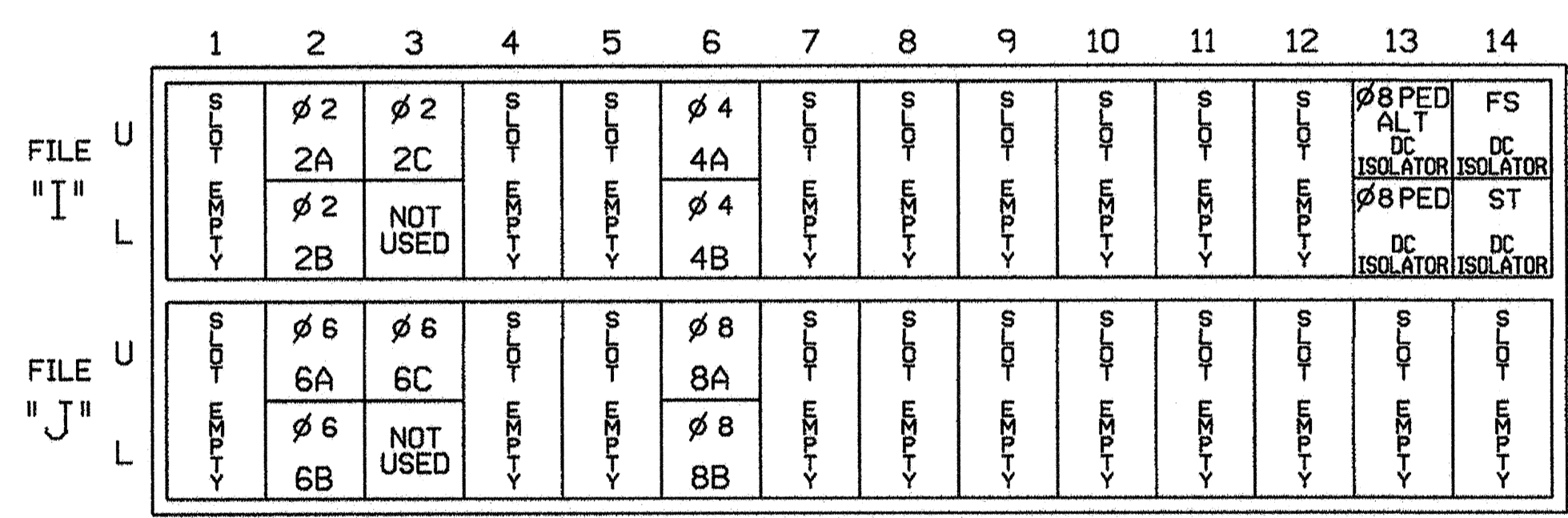
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S4,S6,S8,S8P
 PHASES USED.....2,4,6,8,8 PED
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)



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

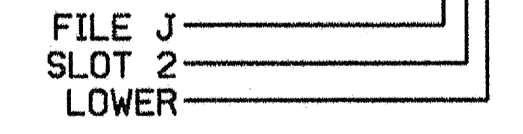
FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PTN 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	Y		3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			5
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	Y		3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			5
PED PUSH BUTTONS											
P81,P82	TB8-7,9	I13U	68	30	PED 6	8 PED ALT					
P83	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT 113.

INPUT FILE POSITION LEGEND: J2L



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1160
 DESIGNED: May 2009
 SEALED: 06-01-09
 REVISED: N/A

NOTE: PEDESTRIAN PUSHBUTTONS P81 & P82 CALL ALTERNATE MIN/PEDESTRIAN TIMING, AND PEDESTRIAN PUSHBUTTON P83 CALLS NORMAL PEDESTRIAN TIMING. SEE THE INPUT ASSIGNMENT PROGRAMMING DETAIL ON SHEET 2.

Signal Upgrade - Sheet 1 of 2

Electrical and Programming Details For:

NC 54 at SR 1107 (Old Fayetteville Rd.)

Division 07 Orange County Carrboro

PLAN DATE: May 2009 REVIEWED BY: T. J. J.

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

6/2/09

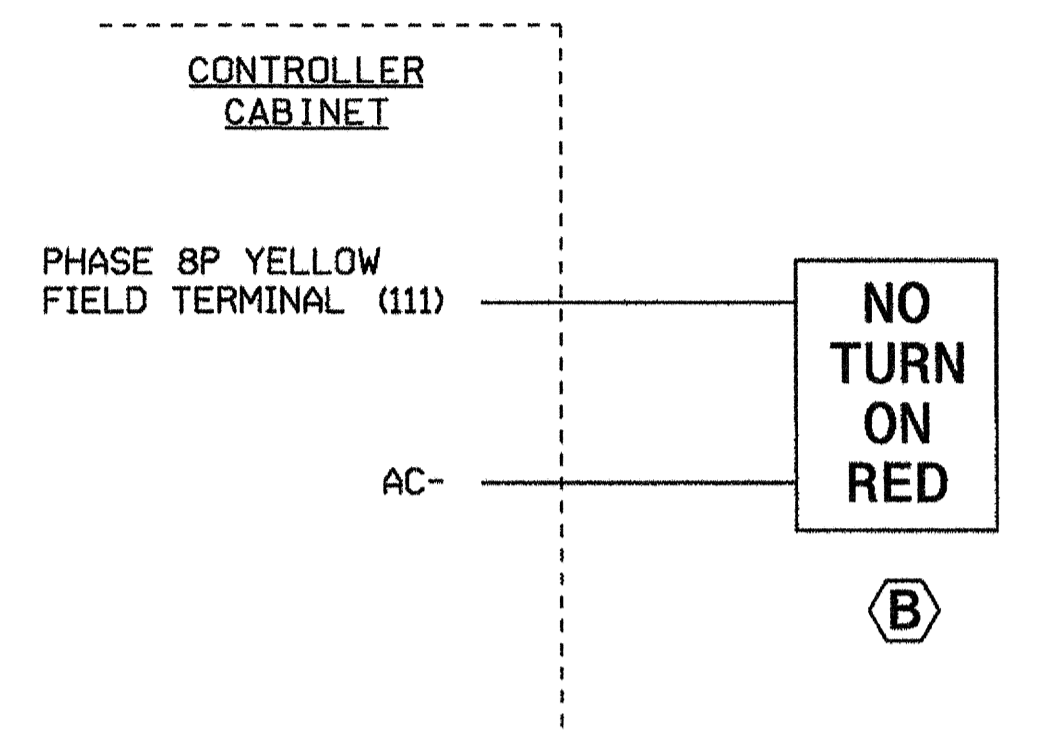
Seal: NORTH CAROLINA PROFESSIONAL ENGINEER GEORGE C. BRUNN

Sig. Inventory No. 07-1160

01-jun-2009 13:08 s:\its\signal\nc\cupss\g\mon\ncmstrong\071160_san.e\e_000.dgn semstrong

BLANKOUT SIGN (B) WIRING DETAIL

(wire sign as shown)



NOTE: IF FIELD TERMINAL 111 HAS A CONFLICT MONITOR WIRE CONNECTED, REMOVE, TAPE AND LABEL WIRE.

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL FOR BLANKOUT SIGN (B) CONTROL

(program controller as shown below)

If a pedestrian call is present, the following programming uses the 8P YELLOW driver to turn the blankout sign ON at the beginning of the preceding red clearance interval, and leaves the blankout sign turned ON until the beginning of the succeeding green phase.

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 and 2.
2. From Main Menu press '6' (OUTPUTS), then '3' (LOGICAL I/O PROCESSOR).

```

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF RED CLEAR ON PHASE #6 IS ON
AND PED CALL ON PHASE #8 IS ON
↓
SCROLL DOWN
THEN:
SET OUTPUT ASSIGNMENT #36 ON
    
```

NOTE: BLANKOUT SIGN "ON"

PRESS '+'

```

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF GREEN ON PHASE #6 IS ON
↓
SCROLL DOWN
THEN:
SET OUTPUT ASSIGNMENT #36 OFF
    
```

NOTE: BLANKOUT SIGN "OFF"

LOGICAL I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 36 = PHASE 8 PED YELLOW

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1160
 DESIGNED: May 2009
 SEALED: 06-01-09
 REVISED: N/A

INPUT ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown below)

THE FOLLOWING PROGRAMMING REASSIGNS THE PHASE 6 'PEDESTRIAN DETECTOR' INPUT TO FUNCTION AS THE 'ALTERNATE MIN/PED TIMING DET' INPUT FOR PHASE 8 (8 PED ALT). THIS INPUT IS ACTIVATED BY PEDESTRIAN PUSHBUTTONS P81 & P82 (SEE INPUT FILE CONNECTION AND PROGRAMMING CHART FOR WIRING DETAILS).

FROM MAIN MENU PRESS '5' (INPUTS), THEN '+' UNTIL PIN 68 (INPUT 30) IS REACHED.

```

PAGE: 1 C1 PIN:68 PEDESTRIAN DETECTOR
INPUT ASSIGNMENT #.....30
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).....
PEDESTRIAN DETECTOR (1-16).....6
ALTERNATE MIN/PED TIMING DET (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)..
    
```

PAGE:1 C1 PIN:68 PEDESTRIAN DETECTOR
 ALTERNATE MIN/PED TIMING DET (1-16).8

ENTER '8' FOR 'ALTERNATE MIN/PED TIMING DET' AND PRESS THE 'ENT' KEY. THE SCREEN SHOWN TO THE RIGHT WILL APPEAR.

```

PAGE: 1 C1 PIN:68 ALTERNATE MIN/PED TIM
INPUT ASSIGNMENT #.....30
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).....
PEDESTRIAN DETECTOR (1-16).....
ALTERNATE MIN/PED TIMING DET (1-16).8
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)..
    
```

Signal Upgrade - Sheet 2 of 2

	NC 54 at SR 1107 (Old Fayetteville Rd.)			
	Division 07	Orange County		Carrboro
	PLAN DATE: May 2009	REVIEWED BY: T. J. J.		
	PREPARED BY: S. Armstrong	REVIEWED BY:		
REVISIONS: _____ INIT. DATE _____ _____ INIT. DATE _____ _____ INIT. DATE _____		SIGNATURE: <i>George C. Brown</i> DATE: 6/2/09 SIG. INVENTORY NO. 07-1160		