02/29/08

WBS: 34911.1.1 U-3303

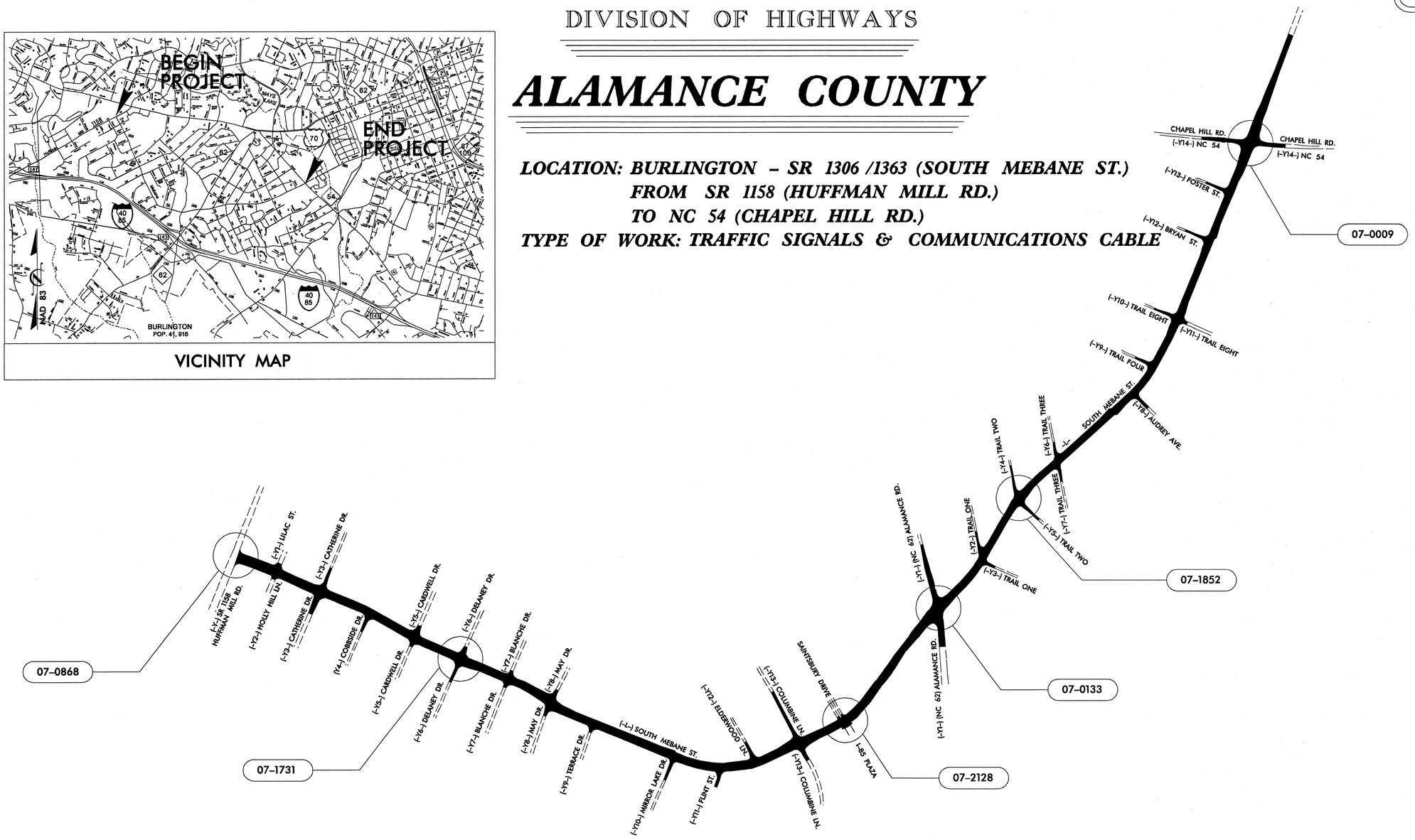
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig.1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ALAMANCE COUNTY

LOCATION: BURLINGTON – SR 1306 /1363 (SOUTH MEBANE ST.)
FROM SR 1158 (HUFFMAN MILL RD.)
TO NC 54 (CHAPEL HILL RD.)
TYPE OF WORK: TRAFFIC SIGNALS & COMMUNICATIONS CABLE

VICINITY MAP



PLANS PREPARED BY:

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

JEFFREY P. HOCHANADEL, P.E. - PROJECT ENGINEER
LINDA M. EDDINS - DESIGN ENGINEER
CHAD J. NEILSON, E.I. - DESIGN ENGINEER

INDEX OF PLANS

SHEET NUMBER	SIGNAL INV. NUMBER	LOCATION / DESCRIPTION
1	-	TITLE SHEET
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10 - 17	07-1731	SR 1306 (MEBANE ST) AT DELANEY DR
18 - 19	07-2128	SR 1306 (MEBANE ST) AT 85 PLAZA
20 - 27	07-0133	NC 62 (ALAMANCE RD) AT SR 1306/1363 (MEBANE ST)
28 - 31	07-1852	SR 1303/1363 (MEBANE ST) AT TRAIL TWO
32 - 41	07-0009	NC 54 (CHAPEL HILL RD) AT SR 1303/1363 (MEBANE ST)
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60	-	SPLICE DETAILS
61 - 63	-	INDUCTIVE DETECTION LOOPS DETAIL

LEGEND

##-#### SIGNAL INVENTORY NUMBER

PLANS PREPARED FOR:

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
BONIFACE A. MADUABUCHUKWU, P.E. - CENTRAL REGION SIGNALS ENGINEER
ROBERT J. ZIEMBA, P.E. - CENTRAL REGION SIGNALS PROJECT ENGINEER
GEORGE C. BROWN, P.E. - SIGNAL EQUIPMENT DESIGN ENGINEER
I. NEIL AVERY - SIGNAL COMMUNICATIONS PROJECT ENGINEER

ENGLISH

ALL DIMENSIONS IN THESE PLANS ARE IN FEET UNLESS OTHERWISE NOTED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

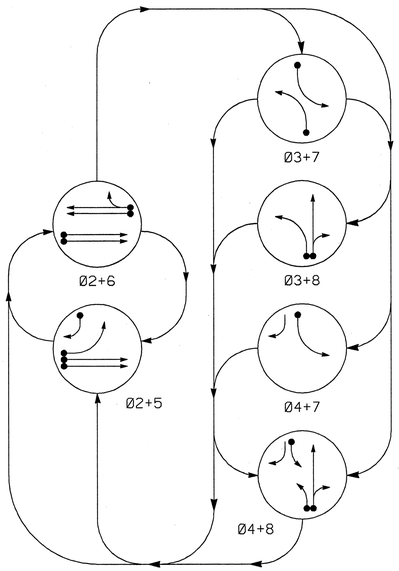
SIGNATURE 11/19/08 DATE

$$$$SYSTIME$$$$ $$$$DGN$$$$ $$$$USERNAME$$$$

U-3303 Title.dgn 11/18/2008 3:00:01 PM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

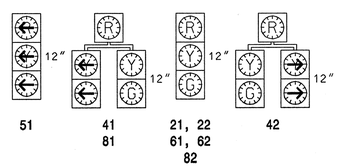
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+05	02+06	03+07	03+08	04+07	04+08	FLASH
21,22	G	G	R	R	R	R	Y
41	R	R	R	R	G	G	R
42	R	R	R	R	G	G	R
51	←	R	R	R	R	R	R
61,62	R	G	R	R	R	R	Y
81	R	R	R	G	R	G	R
82	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



LOOP & DETECTOR UNIT INSTALLATION CHART

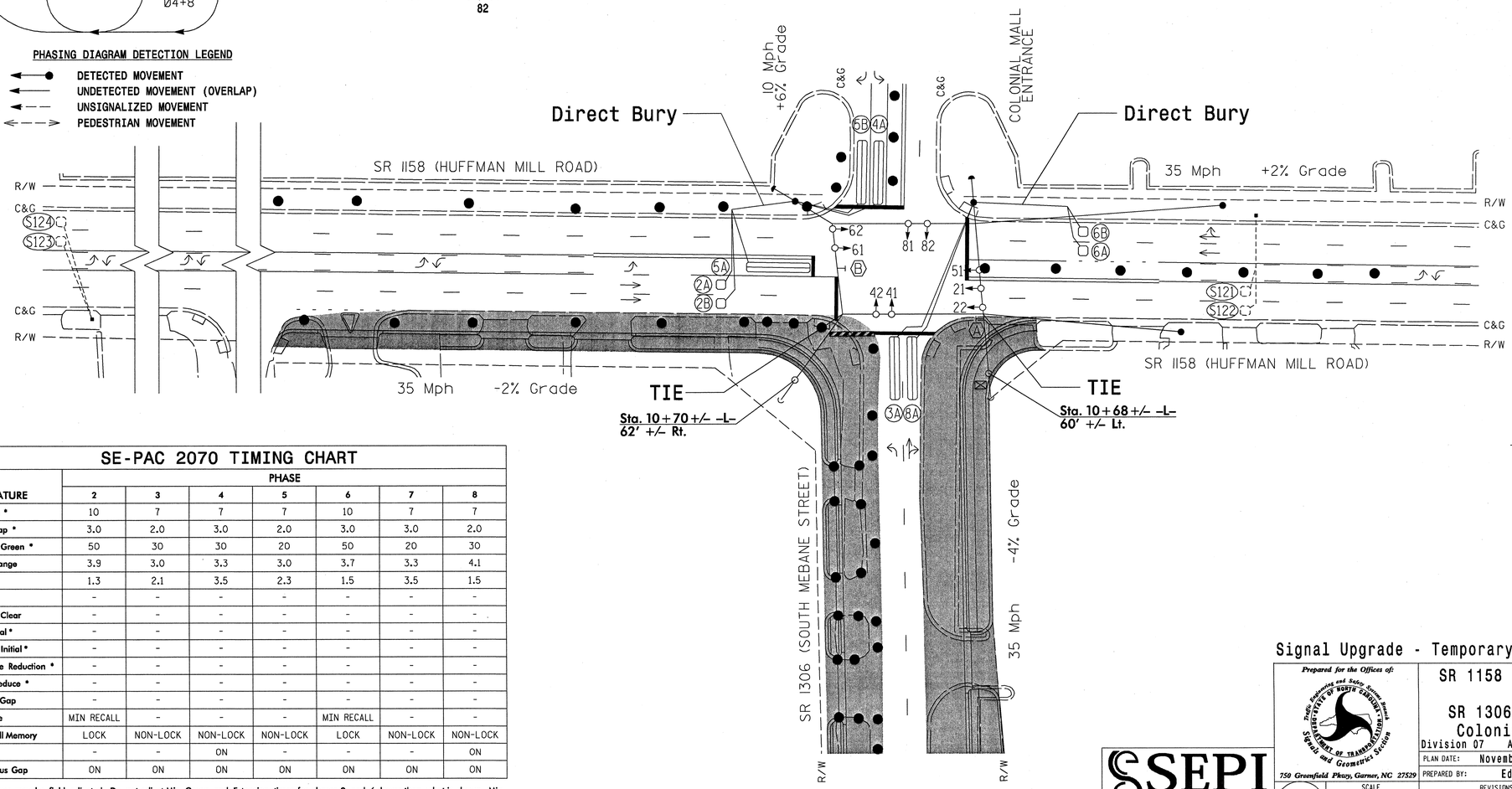
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE										STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROT/PER LEFT	6 PROT/PER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2B	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
3A	6X40	2-4-2	0	X	-	3	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
						8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	X	-	7	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
						4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	X	-	5	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
S121	6X6	EXISTING	+255	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	X	-
S122	6X6	EXISTING	+255	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	X	-
S123	6X6	EXISTING	+1030	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	X	-
S124	6X6	EXISTING	+1030	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	X	-

6 Phase
Fully Actuated
(Burlington-Graham Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Phase 5 may be lagged.
4. Omit phase 3 during phase 4 on.
5. Omit phase 7 during phase 8 on.
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Thirty days after implementation of the revised signal operation, orange flags may be removed at the discretion of the Regional Traffic Engineer.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Intersection Zone #12 - Channel/Port #1 - System Address #1.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
	Wheelchair Ramp	
	No Right Turn Sign With Orange Warning Flags (R3-1)	
	No Left Turn Sign With Orange Warning Flags (R3-2)	
	Construction Drum	N/A
	Construction Barrier	N/A
	Construction Zone	N/A

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 2	3	4	5	6	7	8
Min Green *	10	7	7	7	10	7	7
Passage Gap *	3.0	2.0	3.0	2.0	3.0	3.0	2.0
Maximum Green *	50	30	30	20	50	20	30
Yellow Change	3.9	3.0	3.3	3.0	3.7	3.3	4.1
Red Clear	1.3	2.1	3.5	2.3	1.5	3.5	1.5
Walk *	-	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-	-
Added Initial *	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
Dual Entry	-	-	ON	-	-	-	ON
Simultaneous Gap	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.

$$$$$$SYSTIME$$$$$$
$$$$$$SYSDATE$$$$$$
$$$$$$SYSDOW$$$$$$
$$$$$$USERNAME$$$$$$

Signal Upgrade - Temporary Signal Design 1 - TCP Phase 1

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Department of Transportation, State of North Carolina
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

SR 1158 (Huffman Mill Road) at SR 1306 (Mebane Street) / Colonial Mall Entrance

Division 07 Alamance County Burlington

PLAN DATE:	November 2008	REVIEWED BY:	Hochanadel
PREPARED BY:	Eddins	REVIEWED BY:	Asefnia

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE DATE 11/25/08

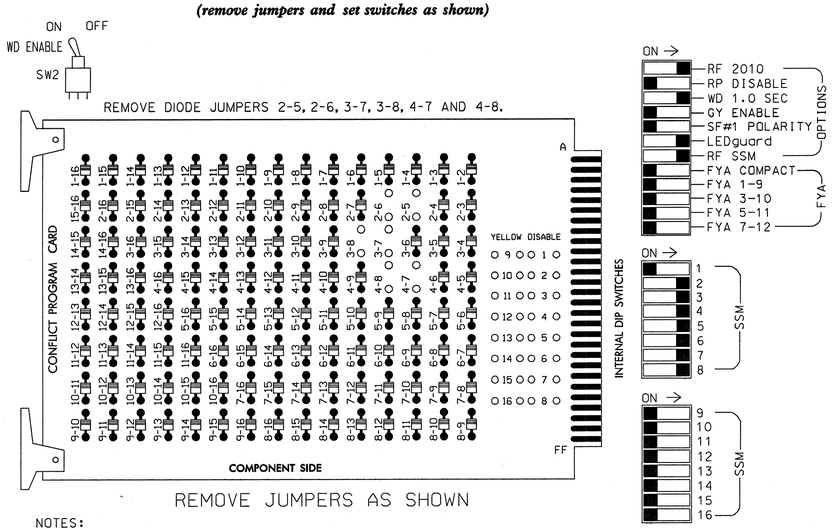
SIG. INVENTORY NO. 07-0868T1

07-0868T1.dgn 12/5/2008 7:48:48 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 3

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on 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 1,9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S3,S4,S5,S6,S7,S8
PHASES USED.....2,3,4,5,6,7,8
OVERLAPS.....NONE

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	NU	81	41,42	NU	42	51	61,62	NU	41	81,82	NU
RED		128		*	101				134		*	107	
YELLOW		129			102				135			108	
GREEN		130			103				136			109	
RED ARROW								131					
YELLOW ARROW				117			132	132			123		
GREEN ARROW				118			133	133			124		
✋													
🚶													

NU = Not Used

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

BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

```
SE-PAC PHASE DATA          PRESS # DESIRED

 1-VEHICLE TIMES           6-N.LOCK & MISC
 2-DENSITY TIMES           7-SPEC. SEQUENCE
 3-PEDEST. TIMES           8-SPEC. DETECTOR
 4-INIT & N.A. RESP        9-PHASE COPY
 5-V & P RECALLS           0-MISC PED OPTIONS

                           F-PRIOR MENU
```

```
PHASE......1...2...3...4...5...6...7...8
  OMIT     0   0   4   0   0   0   8   0
  -YEL     0   0   0   0   0   0   0   0
  OCAL     0   0   0   0   0   0   0   0

  OMIT:## PHS ON OMITS THIS PHASE
   -YEL:## PHS YEL OMITS THIS PHS YEL
   OCAL: WHEN OMIT, DETS CALL## PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Special Sequence programming complete.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	Ø2 2A	SLOT EMPTY	Ø3 3A	SLOT EMPTY	SYS S121	WIRED INPUT ⊗	SYS S123	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L			Ø2 2B		NOT USED		SYS S122		SYS S124					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø5 5A	Ø6 6A	SLOT EMPTY	Ø7 4A	Ø8 8A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø5 5B	Ø6 6B		NOT USED	NOT USED								

⊗ Wired Input - Do not populate slot with input card

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
2A	TB2-9,10	I3U	63	5	2		
2B	TB2-11,12	I3L	76	6	2		
3A[1]	TB4-5,6	I5U	58	9	3	10	
	-	J8U	50	35	8		
* S121	TB6-1,2	I7U	65	13	SYS		
* S122	TB6-3,4	I7L	78	14	SYS		
* S123	TB6-9,10	I9U	60	17	SYS		
* S124	TB6-11,12	I9L	62	18	SYS		
5A	TB3-5,6	J2U	40	21	5	3	
5B	TB3-7,8	J2L	44	22	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
4A[2]	TB5-5,6	J5U	57	29	7	10	
	-	I8U	49	15	4		
8A	TB5-9,10	J6U	42	31	8	10	

[1] Add jumper from I5W to J8W on rear of the input file.

[2] Add jumper from I8W to J5W on rear of the input file.

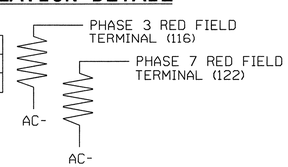
* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0868T1
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 1 - TCP Phase 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1158 (Huffman Mill Road) at SR 1306 (Mebane Street)/ Colonial Mall Entrance

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, State of North Carolina Department of Transportation, Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
12/5/08

SIGNATURE DATE
SIG. INVENTORY NO. 07-0868T1

$$$$$$SETINC$$$$$$
$$$$$$SELECTION$$$$$$
$$$$$$USERNAME$$$$

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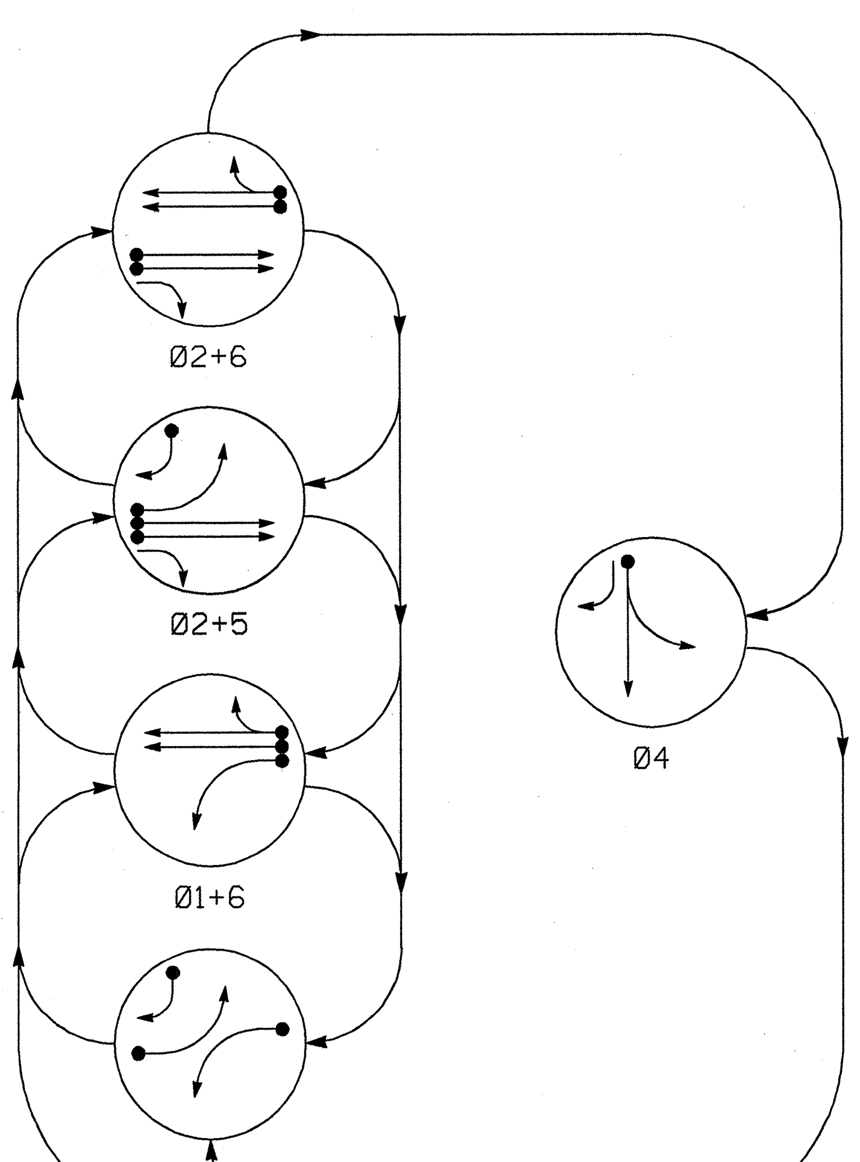
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

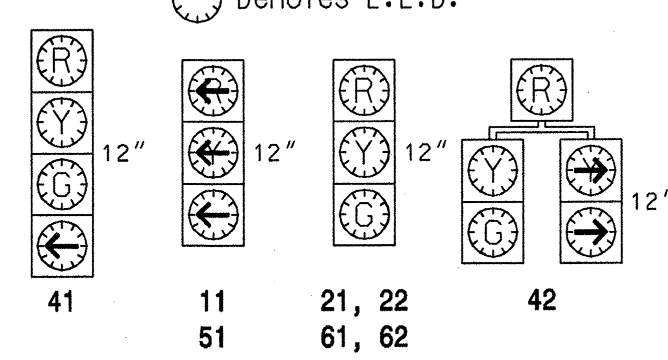
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	FLASH
11	←	←	←R	←R	←R	←R
21,22	R	R	G	G	R	Y
41	R	R	R	R	G←	R
42	R / →	R	R / →	R	G	R
51	←	←R	←	←R	←R	←R
61,62	R	G	R	G	R	Y

SIGNAL FACE I.D.

◯ Denotes L.E.D.



LOOP & DETECTOR UNIT INSTALLATION CHART

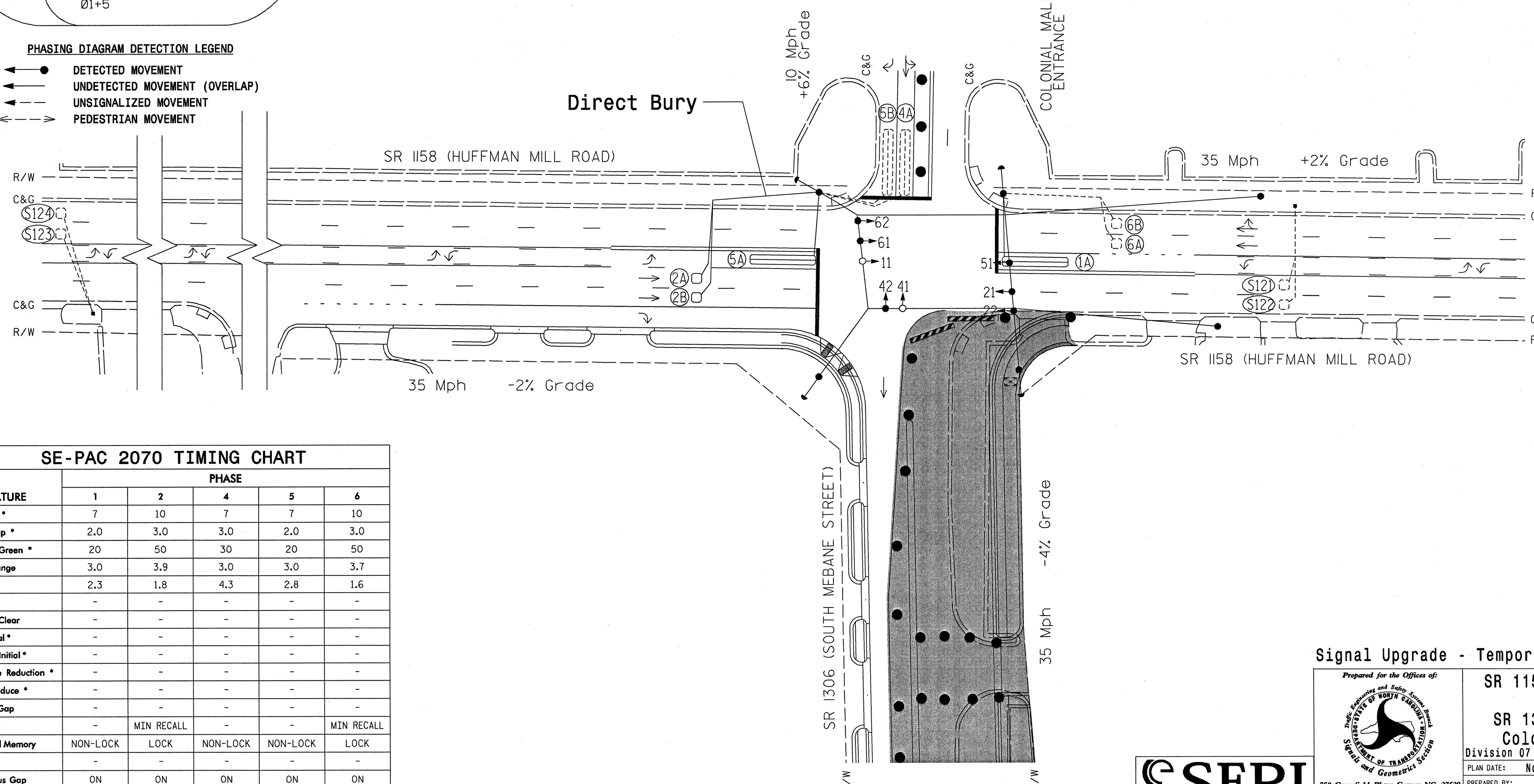
SE-PAC 2070 CONTROLLER WITH 170 CABINET

LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROT/PER LEFT	6 PROT/PER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	STATUS NEW	STATUS EXISTING
1A	6X40	2-4-2	0	X	-	1	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2B	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4A	6X40	2-4-2	0	-	X	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5A	6X40	2-4-2	0	X	-	5	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5B	6X40	2-4-2	0	-	X	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6A	6X6	4	70	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6B	6X6	4	70	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
S121	6X6	EXISTING	+255	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-	X
S122	6X6	EXISTING	+255	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-	X
S123	6X6	EXISTING	+1030	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-	X
S124	6X6	EXISTING	+1030	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-	X

5 Phase
Fully Actuated
(Burlington-Graham Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Reposition existing signal heads numbered 21 & 22.
4. Phase 1 or phase 5 may be lagged.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Intersection Zone #12 - Channel/Port #1 - System Address #1.
8. Remove signal heads 81 and 82 for this phase of construction. Do not leave the heads bagged on the span.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
	Wheelchair Ramp	
	Construction Drum	N/A
	Construction Zone	N/A
	Construction Barricade	N/A

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green *	7	10	7	7	10
Passage Gap *	2.0	3.0	3.0	2.0	3.0
Maximum Green *	20	50	30	20	50
Yellow Change	3.0	3.9	3.0	3.0	3.7
Red Clear	2.3	1.8	4.3	2.8	1.6
Walk *	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	LOCK
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

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

Signal Upgrade - Temporary Signal Design 2 - TCP Phase 2

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SCALE 0 40
1"=40'

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SR 1158 (Huffman Mill Road)
at
SR 1306 (Mebane Street) /
Colonial Mall Entrance

Division 07	Alamance County	Burlington	
PLAN DATE:	November 2008	REVIEWED BY:	Hochanadel
PREPARED BY:	Eddins	REVIEWED BY:	Asefnia

REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE DATE 11/25/08

SIG. INVENTORY NO. 07-0868T2

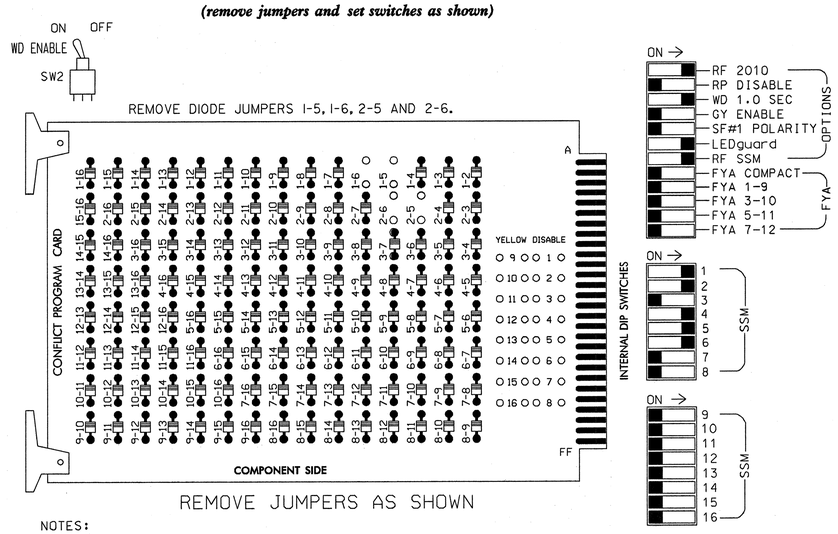
$$$$SYSTIME$$$$
$$$$USERNAME$$$$

07-0868T2.dgn 11/21/2008 3:18:43 PM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 5

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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 3,7, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. The cabinet and controller are part of the Burlington-Graham 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.	11	21,22	NU	NU	41	42	NU	42	51	61,62	NU	NU	NU	NU
RED		128			101	101				134				
YELLOW		129			102	102				135				
GREEN		130			103	103				136				
RED ARROW	125								131					
YELLOW ARROW	126							132	132					
GREEN ARROW	127				103			133	133					

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 / 1A	SLOT EMPTY	Ø 2 / 2A	SLOT EMPTY	SLOT EMPTY	NOT USED	SYS / S121	SLOT EMPTY	SYS / S123	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS / DC ISOLATOR
	L	NOT USED		Ø 2 / 2B			Ø 4 / 4A	SYS / S122		SYS / S124					ST / DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 5 / 5A	Ø 6 / 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 5 / 5B	Ø 6 / 6B											

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1	3	
2A	TB2-9,10	I3U	63	5	2		
2B	TB2-11,12	I3L	76	6	2		
4A	TB4-11,12	I6L	45	12	4		
✳ S121	TB6-1,2	I7U	65	13	SYS		
✳ S122	TB6-3,4	I7L	78	14	SYS		
✳ S123	TB6-9,10	I9U	60	17	SYS		
✳ S124	TB6-11,12	I9L	62	18	SYS		
5A	TB3-5,6	J2U	40	21	5		
5B	TB3-7,8	J2L	44	22	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6
PHASES USED.....1,2,4,5,6
OVERLAPS.....NONE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0868T2
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 2 - TCP Phase 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1158 (Huffman Mill Road)
at
SR 1306 (Mebane Street)/
Colonial Mall Entrance

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

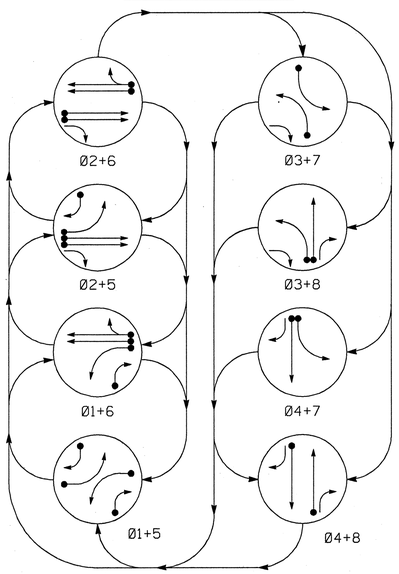
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/25/08
SIGNATURE DATE
SIG. INVENTORY NO. 07-0868T2

$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$USERNAME$$$$

07-0868t2e-01-098.dgn 11/25/2008 8:38:35 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 6

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

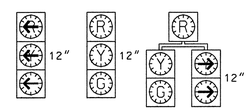
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 + 5	0 1 + 6	0 2 + 5	0 2 + 6	0 3 + 7	0 3 + 8	0 4 + 7	0 4 + 8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R/	R/	R	R	Y
22	R	R	G	G	R/	R/	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41	R	R	R	R	R	R	G	G	R
42	R/	R	R/	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/	R/	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



11
31
51
71

21
41
61, 62
81

22
42
82

LOOP & DETECTOR UNIT INSTALLATION CHART

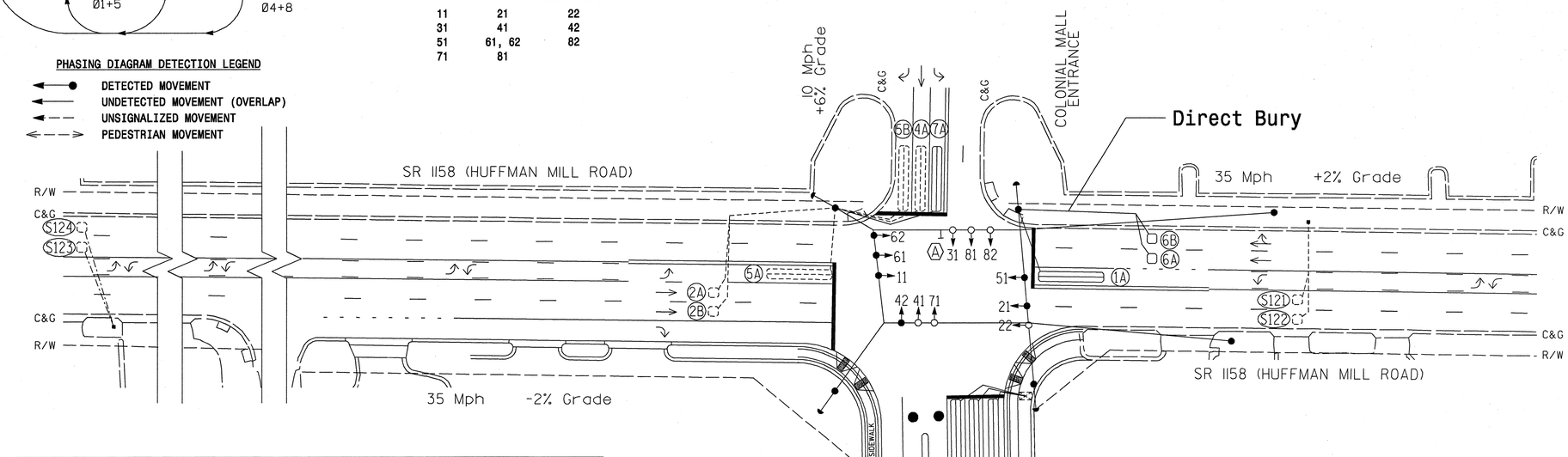
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE									STATUS	
									0	1	2	3	4	5	6	7			
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	1 CALL	STOP A	STOP B	PROTECTED LEFT	PROTECTED THROUGH	AND	SWITCH	SYSTEM LOOPS NEW	SYSTEM LOOPS EXISTING
1A	6X40	2-4-2	0	X	-	1	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
1B	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
2A	6X6	4	70	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
2B	6X6	4	70	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	-	X	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
5A	6X40	2-4-2	0	-	X	5	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
5B	6X40	2-4-2	0	-	X	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
S121	6X6	EXISTING	+255	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	X
S122	6X6	EXISTING	+255	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	X
S123	6X6	EXISTING	+1030	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	X
S124	6X6	EXISTING	+1030	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	X

8 Phase
Fully Actuated
(Burlington-Graham Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Intersection Zone #12 - Channel/Port #1 - System Address #1.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
	Wheelchair Ramp	
	Construction Drum	N/A
	"U-Turn Yield To Right Turn" Sign (R10-16)	

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	10	7	7	7	10	7	7
Passage Gap *	2.0	3.0	2.0	3.0	2.0	3.0	3.0	2.0
Maximum Green *	20	50	30	30	20	50	20	30
Yellow Change	3.0	3.9	3.0	3.0	3.0	3.7	3.0	4.1
Red Clear	2.9	2.1	3.3	4.3	2.8	1.6	3.8	2.1
Walk *	-	-	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-	-	-
Added Initial *	-	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
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.

$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
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$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$USERNAME$$$$$

Signal Upgrade - Temporary Signal Design 3 - TCP Phase 3

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

SR 1158 (Huffman Mill Road)
at
SR 1306 (Mebane Street) /
Colonial Mall Entrance

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: Hochanadel
PREPARED BY: Eddins	REVIEWED BY: Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 11/25/08 DATE

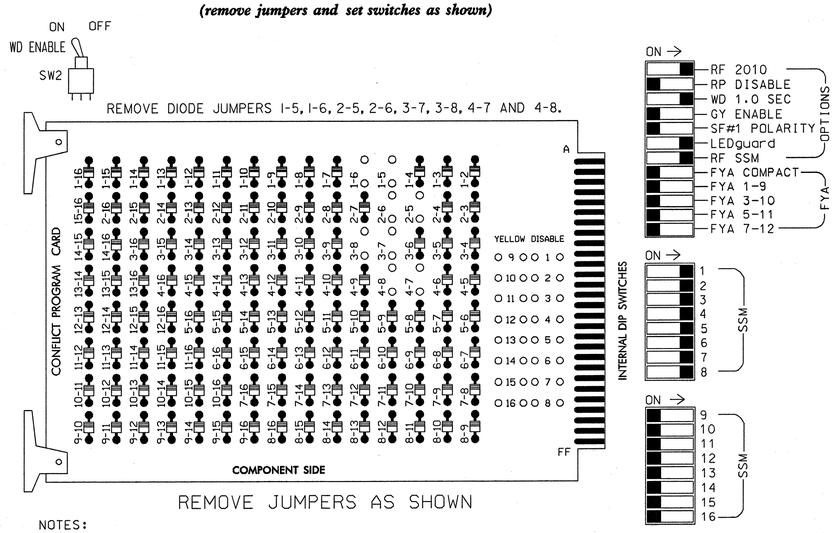
SIG. INVENTORY NO. 07-0868T3

07-0868T3.dgn 11/21/2008 3:17:18 PM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 7

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. The cabinet and controller are part of the Burlington-Graham 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.	11	82	21,22	NU	22	31	41,42	NU	42	51	61,62	NU	71	81,82	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	117			132	132			123		
GREEN ARROW	127	127			118	118			133	133			124		
✋															
🚶															

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	SLOT EMPTY	Ø3 3A	NOT USED	SYS S121	SLOT EMPTY	SYS S123	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2B		NOT USED	Ø4 4A	SYS S122		SYS S124					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø5 5A	Ø6 6A	SLOT EMPTY	Ø7 7A	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø5 5B	Ø6 6B		NOT USED	NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1	3	
1B	TB2-5,6	I2U	39	3	1	15	
2A	TB2-9,10	I3U	63	5	2		
2B	TB2-11,12	I3L	76	6	2		
3A	TB4-5,6	I5U	58	9	3		
4A	TB4-11,12	I6L	45	12	4		
✱ S121	TB6-1,2	I7U	65	13	SYS		
✱ S122	TB6-3,4	I7L	78	14	SYS		
✱ S123	TB6-9,10	I9U	60	17	SYS		
✱ S124	TB6-11,12	I9L	62	18	SYS		
5A	TB3-5,6	J2U	40	21	5	3	
5B	TB3-7,8	J2L	44	22	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
7A	TB5-5,6	J5U	57	29	7	3	
8A	TB5-9,10	J6U	42	31	8		

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0868T3
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 3 - TCP Phase 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1158 (Huffman Mill Road)
at
SR 1306 (Mebane Street)/
Colonial Mall Entrance

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9917 FAX: 789-9591

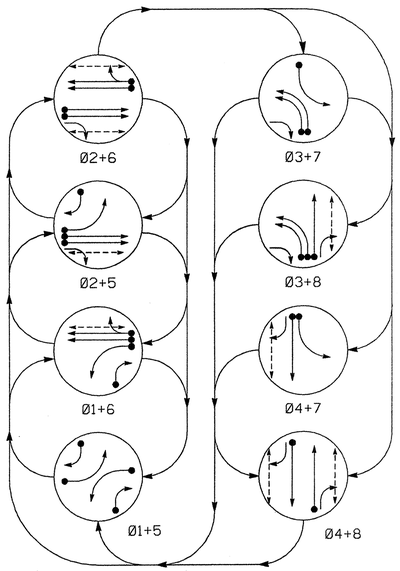
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/25/08
SIGNATURE DATE
SIG. INVENTORY NO. 07-0868T3

$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 8

8 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R→	R→	R	R	Y
31,32	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41	R	R	R	R	R	R	G	G	R
42	R/	R	R/	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/	R/	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

W - WALK
DW - DON'T WALK
DRK - DARK

LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

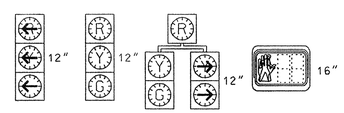
INDUCTIVE LOOPS						DETECTOR PROGRAMMING													
							TIMING		OPERATION MODE								STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER LEFT	6 PROTPER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	0	X	-	1	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
1B	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2B	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3B	6X40	2-4-2	0	X	-	3	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5A	6X40	2-4-2	0	X	-	5	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
S121	6X6	4	+255	X	-	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	X
S122	6X6	4	+255	X	-	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	X
S123	6X6	EXISTING	+1030	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	X
S124	6X6	EXISTING	+1030	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	-
S125	6X6	4	+220	X	-	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	X	-
S126	6X6	4	+220	X	-	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	X	-

NOTES

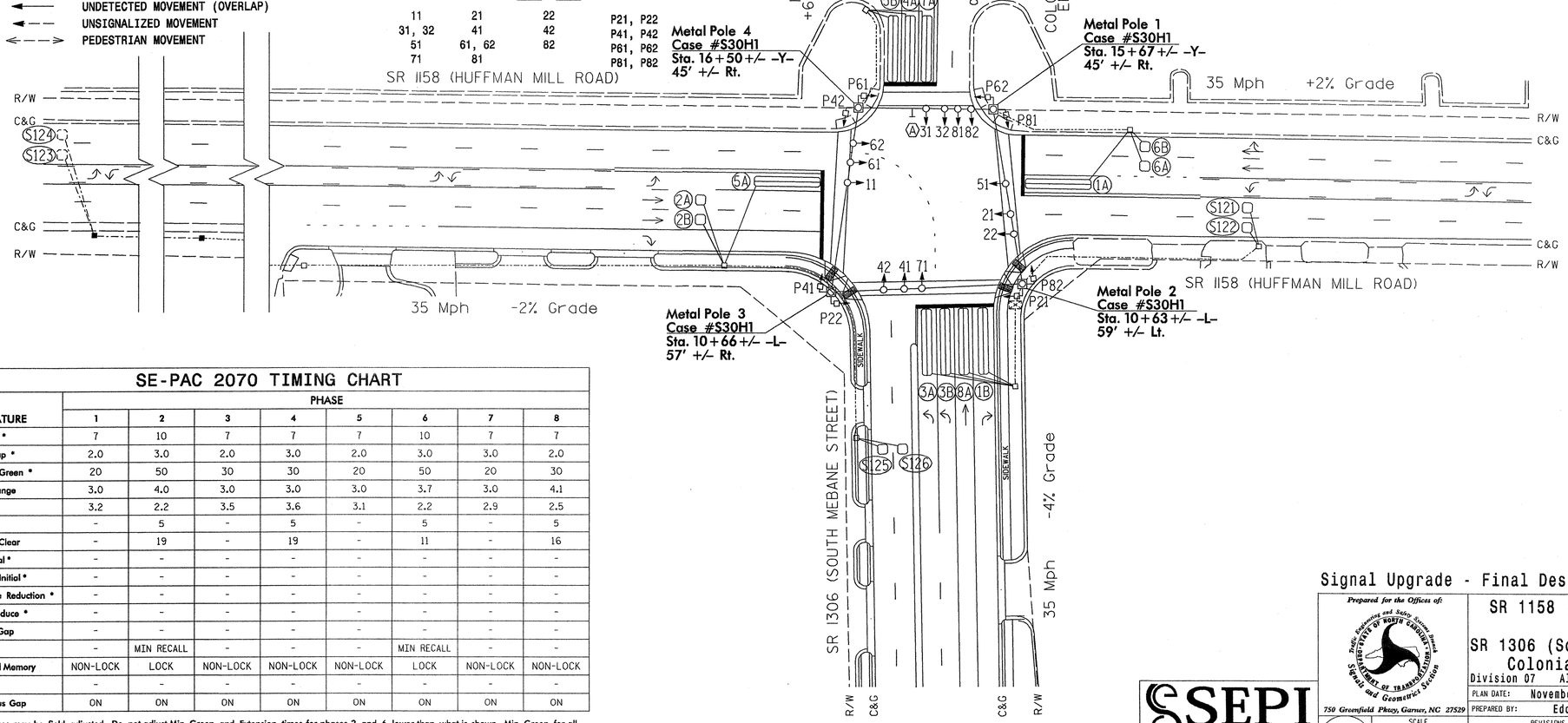
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Intersection Zone #12 - Channel/Port #1 - System Address #1.

SIGNAL FACE I.D.

Denotes L.E.D.



11, 31, 32, 51, 71 — 21, 41, 61, 62, 81 — 22, 42, 82 — P21, P22, P41, P42, P61, P62, P81, P82



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
	Metal Strain Pole	
	Wheelchair Ramp	
	"U-Turn Yield To Right Turn" Sign (R10-16)	

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	10	7	7	7	10	7	7
Passage Gap *	2.0	3.0	2.0	3.0	2.0	3.0	3.0	2.0
Maximum Green *	20	50	30	30	20	50	20	30
Yellow Change	3.0	4.0	3.0	3.0	3.0	3.7	3.0	4.1
Red Clear	3.2	2.2	3.5	3.6	3.1	2.2	2.9	2.5
Walk *	-	5	-	5	-	5	-	5
Pedestrian Clear	-	19	-	19	-	11	-	16
Added Initial *	-	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
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 - Final Design

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Division of Highways, State of North Carolina, Department of Transportation, 750 Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SCALE 1"=40' (0 – 40)

SR 1158 (Huffman Mill Road) at SR 1306 (South Mebane Street) / Colonial Mall Entrance

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: Hochanadel
PREPARED BY: Eddins	REVIEWED BY: Asefnia

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 11/19/08 DATE

SIG. INVENTORY NO. 07-0868

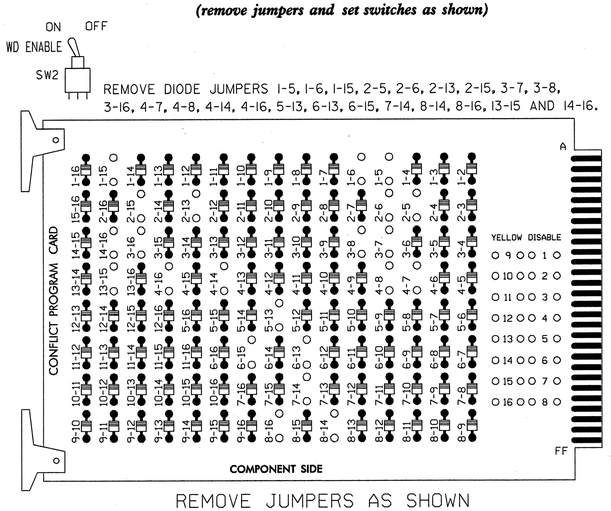
$$$$$SYSTIME$$$$$
$$$$$USERNAME$$$$$
$$$$$DGNNAME$$$$$

07-0868.dgn 11/18/2008 2:27:14 PM

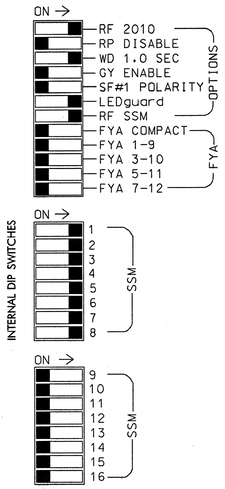
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 9

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. The cabinet and controller are part of the Burlington-Graham 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.	11	82	21,22	P21, P22	22	31,32	41,42	P41, P42	42	51	61,62	P61, P62	71	81,82	P81, P82
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	117			132	132			123		
GREEN ARROW	127	127			118	118			133	133			124		
✋				113				104				119			110
🚶				115				106				121			112

NU = Not Used

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	SLOT EMPTY	Ø3 3A	Ø3 3B	SYS S121	SLOT EMPTY	SYS S123	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2B		NOT USED	Ø4 4A	SYS S122		SYS S124			Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø5 5A	Ø6 6A	SLOT EMPTY	Ø7 7A	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SYS S125	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø5 5B	Ø6 6B		NOT USED	NOT USED			SYS S126					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A	TB2-1,2	I1U	56	1	1	3	
1B	TB2-5,6	I2U	39	3	1	15	
2A	TB2-9,10	I3U	63	5	2		
2B	TB2-11,12	I3L	76	6	2		
3A	TB4-5,6	I5U	58	9	3	3	
3B	TB4-9,10	I6U	41	11	3		
4A	TB4-11,12	I6L	45	12	4		
* S121	TB6-1,2	I7U	65	13	SYS		
* S122	TB6-3,4	I7L	78	14	SYS		
* S123	TB6-9,10	I9U	60	17	SYS		
* S124	TB6-11,12	I9L	62	18	SYS		
5A	TB3-5,6	J2U	40	21	5	3	
5B	TB3-7,8	J2L	44	22	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
7A	TB5-5,6	J5U	57	29	7	3	
8A	TB5-9,10	J6U	42	31	8		
* S125	TB7-9,10	J9U	59	37	SYS		
* S126	TB7-11,12	J9L	61	38	SYS		
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		
P81,P82	TB8-8,9	I13L	70	PED 8	8 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.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S7,S8,S8P
PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED,7,8,8PED
OVERLAPS.....NONE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0868
DESIGNED: November 2008
SEALED: November 19, 2008
REVISED: TBD

Signal Upgrade - Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1158 (Huffman Mill Road) at SR 1306 (South Mebane Street)/ Colonial Mall Entrance

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

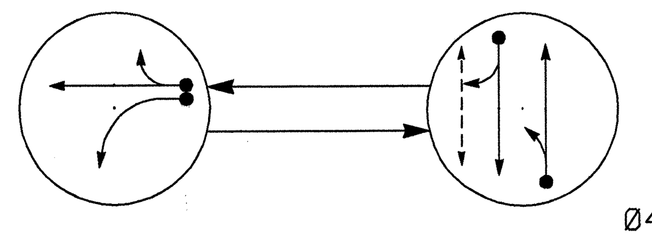
SIGNATURE DATE
SIG. INVENTORY NO. 07-0868

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
Transportation Mobility and Safety Division
Department of Transportation
Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

2 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

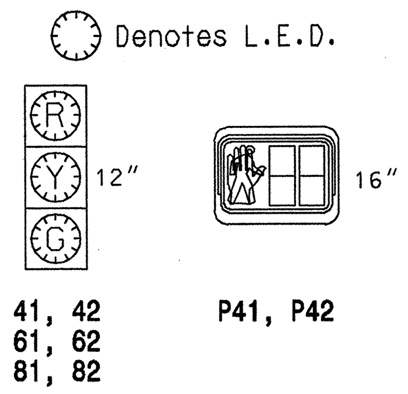
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø4+8	PHASE FLASH
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R
P41,P42	DW	W	DRK

W - WALK
DW - DON'T WALK
DRK - DARK

SIGNAL FACE I.D.

Denotes L.E.D.

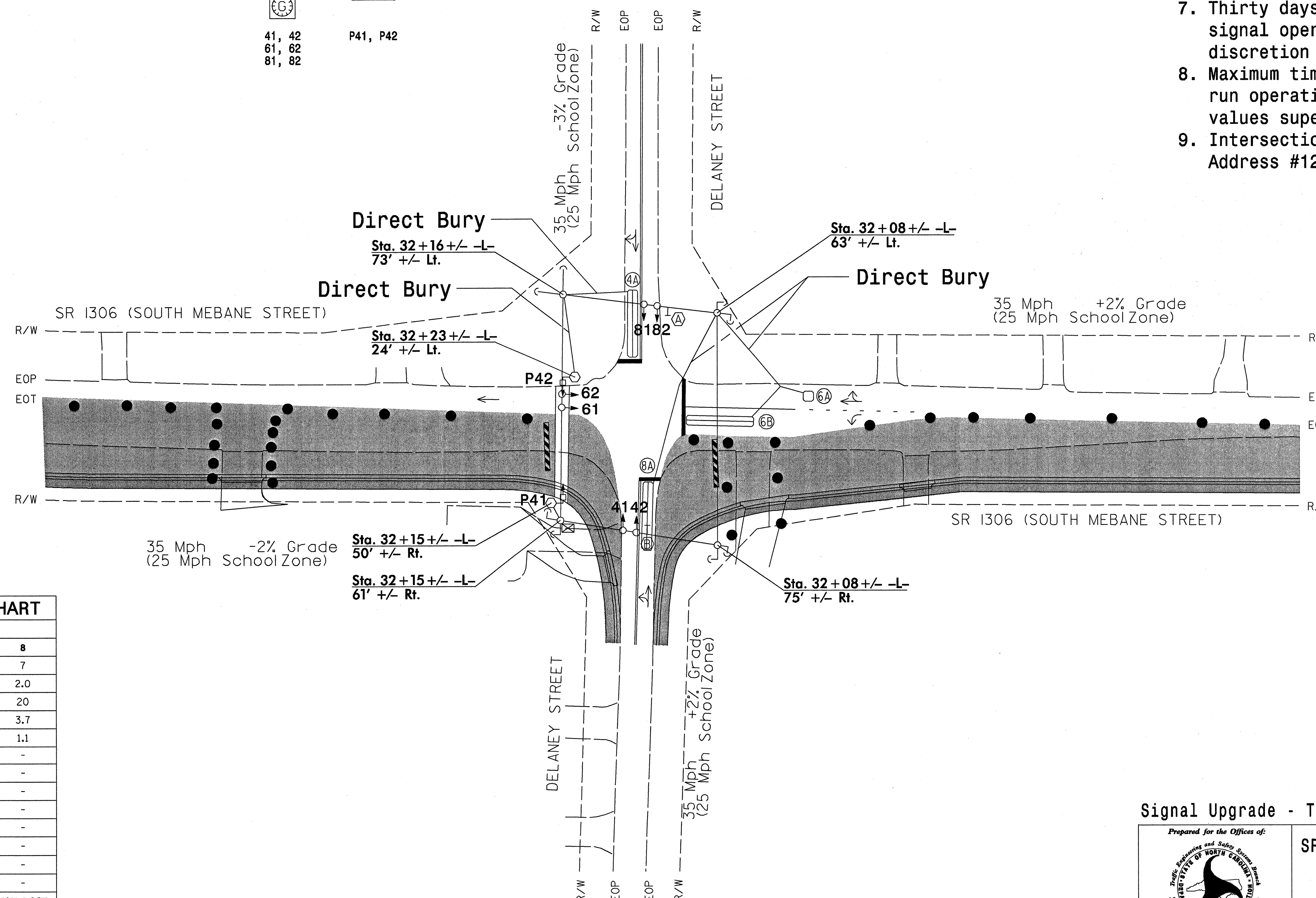


LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE										STATUS	
									0	1	2	3	4	5	6	7				
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	VEHICLE	PEDESTRIAN	1 CALL	STOP A	STOP B	PROT/PER LEFT	PROT/PER THROUGH	AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
4A	6X40	2-4-2	0	X	-	4	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X40	2-4-2	0	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Thirty days after implementation of the revised signal operation, orange flags may be removed at the discretion of the Regional Traffic Engineer.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Intersection Zone #10 - Channel/Port #4 - System Address #12.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pedestrian Signal Pedestal	
A	No Right Turn Sign With With Orange Warning Flags (R3-1)	A
B	No Left Turn Sign With With Orange Warning Flags (R3-2)	B
	Construction Drum	N/A
	Construction Zone	N/A
	Construction Barrier	N/A

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 4	PHASE 6	PHASE 8
Min Green *	7	10	7
Passage Gap *	2.0	3.0	2.0
Maximum Green *	20	45	20
Yellow Change	4.1	3.7	3.7
Red Clear	1.0	1.4	1.1
Walk *	5	-	-
Pedestrian Clear	15	-	-
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	MIN RECALL	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK
Dual Entry	ON	-	ON
Simultaneous Gap	ON	ON	ON

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

Signal Upgrade - Temporary Signal Design 1 - TCP Phase 1

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40
1"=40'

SR 1306 (South Mebane Street) at Delaney Street

Division 07	Alamance County		Burlington
PLAN DATE:	November 2008	REVIEWED BY:	Hochanadel
PREPARED BY:	Eddins	REVIEWED BY:	Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 11/25/08 DATE

SIG. INVENTORY NO. 07-1731T1

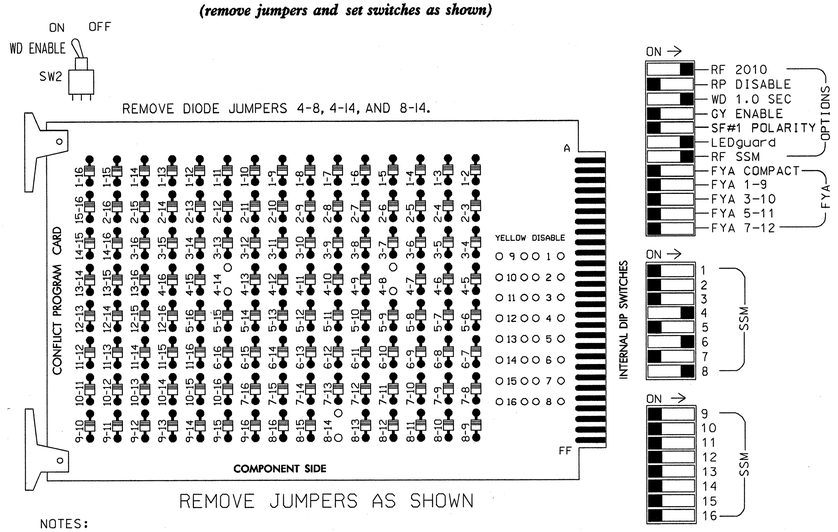
$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$DGN$$$$$$$$$
$$$$$USERNAME$$$$

07-1731T1.dgn 11/21/2008 3:16:28 PM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 11

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
4A	TB4-9,10	I6U	41	11	4	10	
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
8A	TB5-9,10	J6U	42	31	8	10	
PED PUSH BUTTONS							
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		

NOTE:
Install DC isolators in input file slot I12.

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 1,2,3,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phase 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S4,S4P,S6,S8
PHASES USED.....4,4PED,6,8
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.

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	NU	NU	NU	41,42	P41, P42	NU	61,62	NU	NU	81,82	NU
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋						104						
🚶						106						

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1731T1
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 1 - TCP Phase 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1306 (South Mebane Street)
at
Delaney Street

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

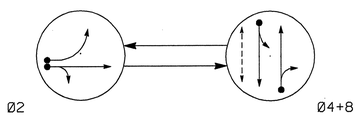
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/25/08
SIGNATURE DATE
SIG. INVENTORY NO. 07-1731T1

$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 12

2 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4+8	PHASE FLASH
21,22	G	R	Y
41,42	R	G	R
81,82	R	G	R
P41,P42	DW	W	DRK

W - WALK
DW - DON'T WALK
DRK - DARK

SIGNAL FACE I.D.

Denotes L.E.D.

21, 22
41, 42
81, 82

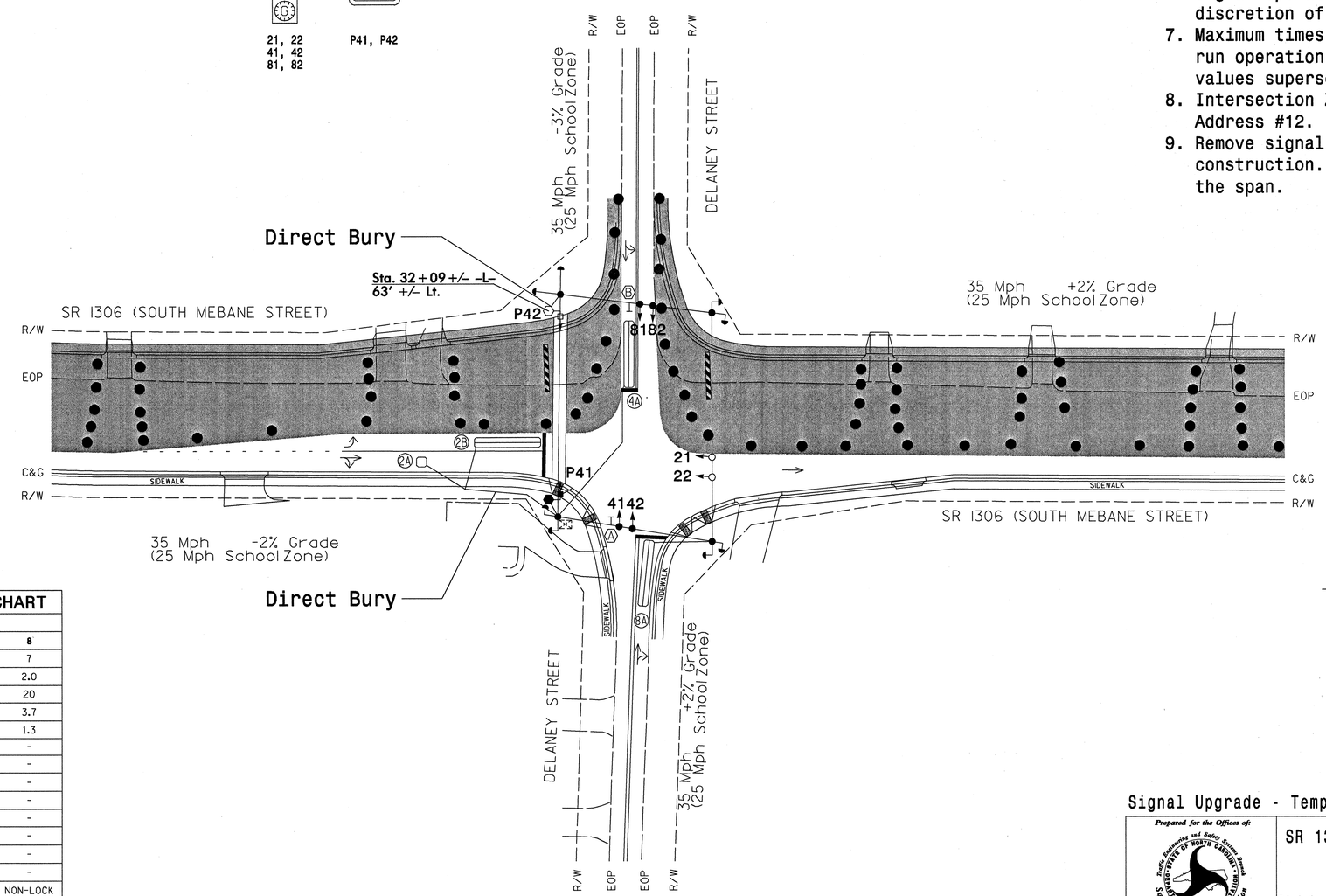
P41, P42

LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING															
							TIMING		OPERATION MODE										STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PRO/PER LEFT	6 PRO/PER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2B	6X40	2-4-2	0	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	X	-	4	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
6. Thirty days after implementation of the revised signal operation, orange flags may be removed at the discretion of the Regional Traffic Engineer.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Intersection Zone #10 - Channel/Port #4 - System Address #12.
9. Remove signal heads 61 and 62 for this phase of construction. Do not leave the heads bagged on the span.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pedestrian Signal Pedestal	
A	No Right Turn Sign With With Orange Warning Flags (R3-1)	A
B	No Left Turn Sign With With Orange Warning Flags (R3-2)	B
	Construction Drum	N/A
	Construction Zone	N/A
	Construction Barrier	N/A

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 8
Min Green *	10	7	7
Passage Gap *	3.0	2.0	2.0
Maximum Green *	45	20	20
Yellow Change	4.0	4.1	3.7
Red Clear	1.5	1.0	1.3
Walk *	-	5	-
Pedestrian Clear	-	14	-
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	-	-
Vehicle Call Memory	LOCK	NON-LOCK	NON-LOCK
Dual Entry	-	ON	ON
Simultaneous Gap	ON	ON	ON

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

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

Signal Upgrade - Temporary Signal Design 2 - TCP Phase 2

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

SR 1306 (South Mebane Street) at Delaney Street

Division 07 Alamance County Burlington

PLAN DATE:	November 2008	REVIEWED BY:	Hochanadel
PREPARED BY:	Eddins	REVIEWED BY:	Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 11/25/08 DATE

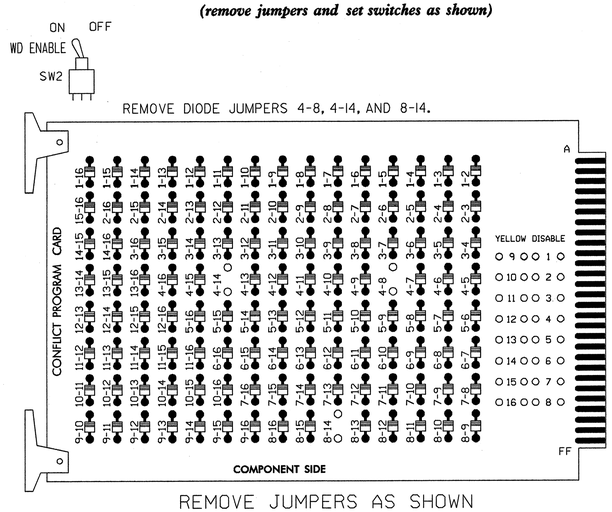
SIG. INVENTORY NO. 07-1731T2

07-1731T2.dgn 11/21/2008 3:15:50 PM

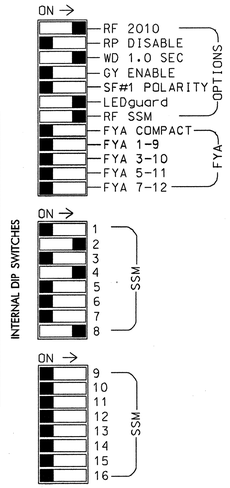
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 13

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on 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 1,3,5,6, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phase 2 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham 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	NU	NU	41,42	P41, P42	NU	NU	NU	NU	81,82	NU
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋						104						
🚶						106						

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2B				NOT USED						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L						NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
4A	TB4-9,10	I6U	41	11	4	10	
8A	TB5-9,10	J6U	42	31	8	10	
PED PUSH BUTTONS							
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		

NOTE:
Install DC isolators in input file slot I12.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S4P,S8
PHASES USED.....2,4,4PED,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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1731T2
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 2 - TCP Phase 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1306 (South Mebane Street) at Delaney Street

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signal Management Section, Department of Transportation, State of North Carolina
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/25/08
SIGNATURE DATE
SIG. INVENTORY NO. 07-1731T2

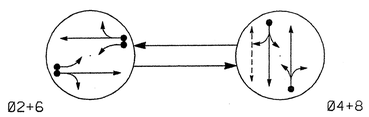
$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$DGNSPEC$$$$$$$$$$$$$$$$$$
$$$$$USERNAME$$$$$

07-1731t2e-01-098.dgn 11/25/2008 8:36:46 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 14

2 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+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

W - WALK
DW - DON'T WALK
DRK - DARK

SIGNAL FACE I.D.

Denotes L.E.D.

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

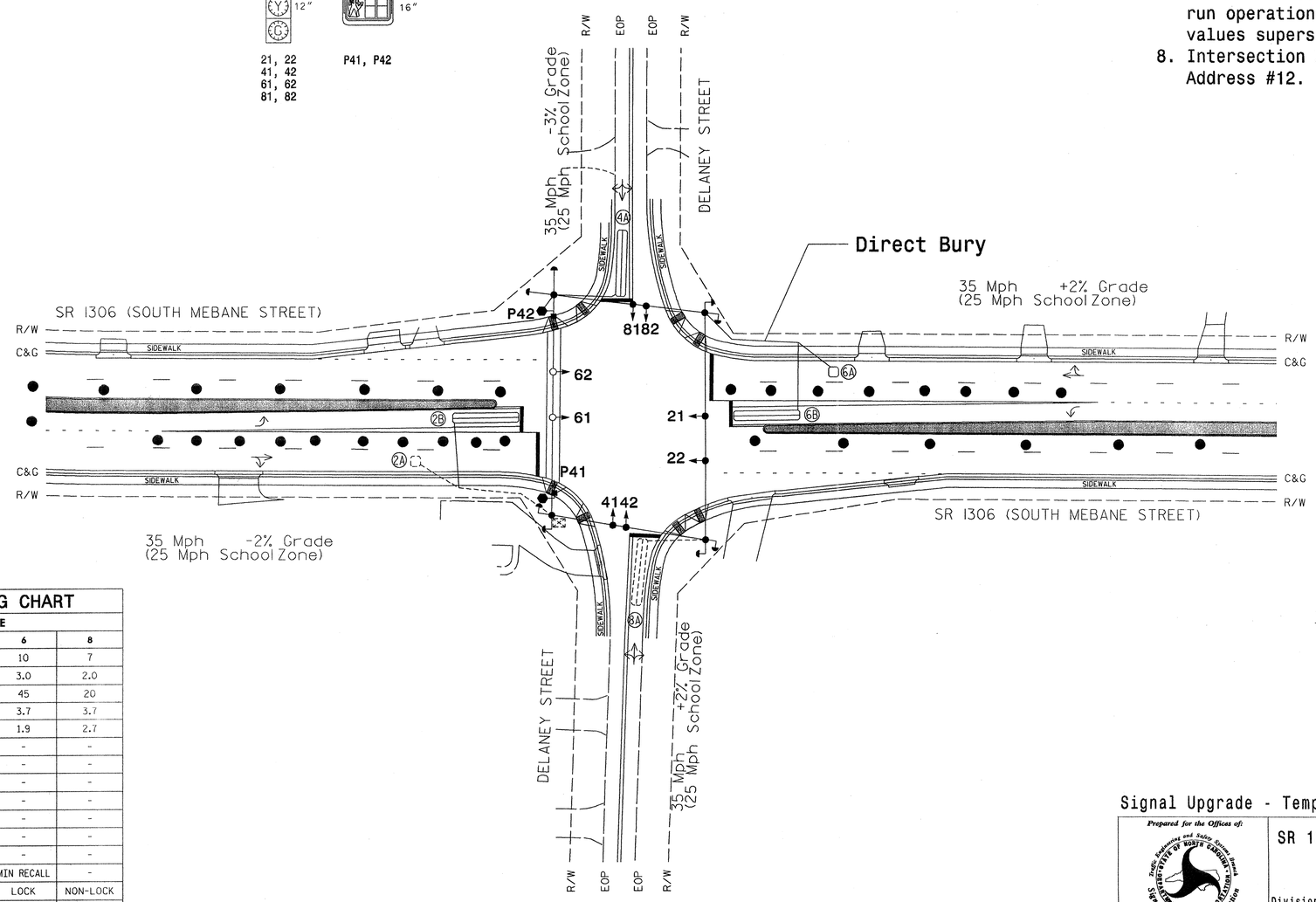
P41, P42

LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING															
							TIMING		OPERATION MODE									STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER LIFT	6 PROTPER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
2A	6X6	4	70	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2B	6X40	2-4-2	0	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X40	2-4-2	0	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	-	X	8	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Reposition existing signal heads numbered 21 & 22.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Intersection Zone #10 - Channel/Port #4 - System Address #12.



LEGEND

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

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	10	7	10	7
Passage Gap *	3.0	2.0	3.0	2.0
Maximum Green *	45	20	45	20
Yellow Change	4.0	4.1	3.7	3.7
Red Clear	1.8	2.1	1.9	2.7
Walk *	-	5	-	-
Pedestrian Clear	-	20	-	-
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	LOCK	NON-LOCK	LOCK	NON-LOCK
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

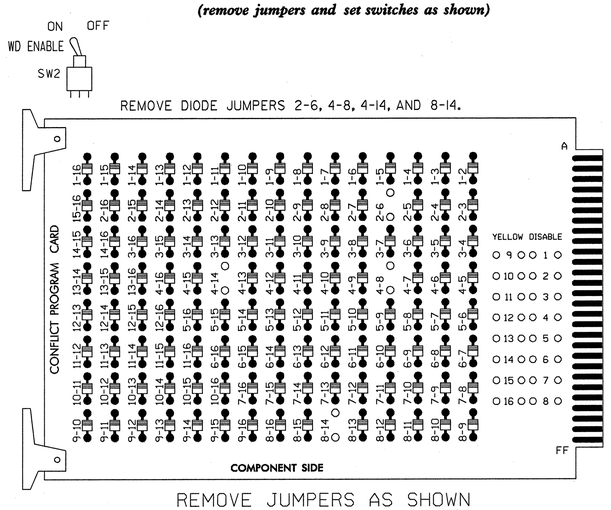
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

$$$

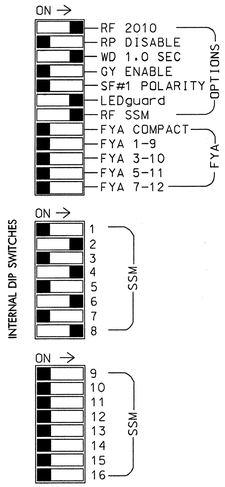
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig.15

EDI MODEL 2010ECL-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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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 1,3,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham 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	NU	NU	41,42	P41, P42	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋						104						
🚶						106						

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2 2B				NOT USED						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø6 6B				NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
- FILE J
- SLOT 2
- LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
4A	TB4-9,10	I6U	41	11	4	5	
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
8A	TB5-9,10	J6U	42	31	8	5	
PED PUSH BUTTONS							
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		

NOTE:
Install DC isolators in input file slot I12.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S4P,S6,S8
PHASES USED.....2,4,4PED,6,8
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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1731T3
DESIGNED: November 2008
SEALED: November 19, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 3 - TCP Phase 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1306 (South Mebane Street)
at
Delaney Street

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signal Management Section, Division of Highways, Department of Transportation, State of North Carolina
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/25/08
SIGNATURE DATE
SIG. INVENTORY NO. 07-1731T3

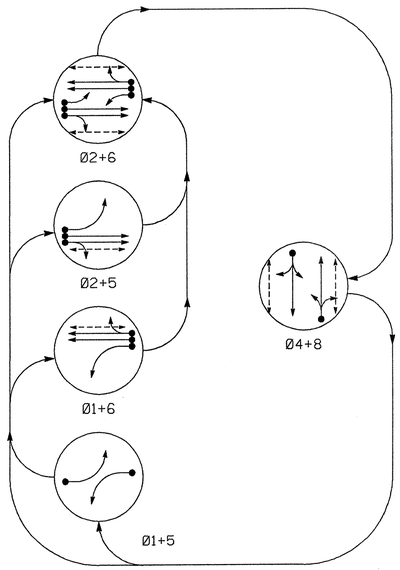
$$$$$SYSTIME$$$$$
$$$$$SYSDATE$$$$$
$$$$$SYSDRIVE$$$$$
$$$$$SYSDESIGN$$$$$

07-1731t3e-01-098.dgn 11/25/2008 10:00:24 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 16

5 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
61	R	G	R	G	R	Y
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

W - WALK
DW - DON'T WALK
DRK - DARK

SIGNAL FACE I.D.

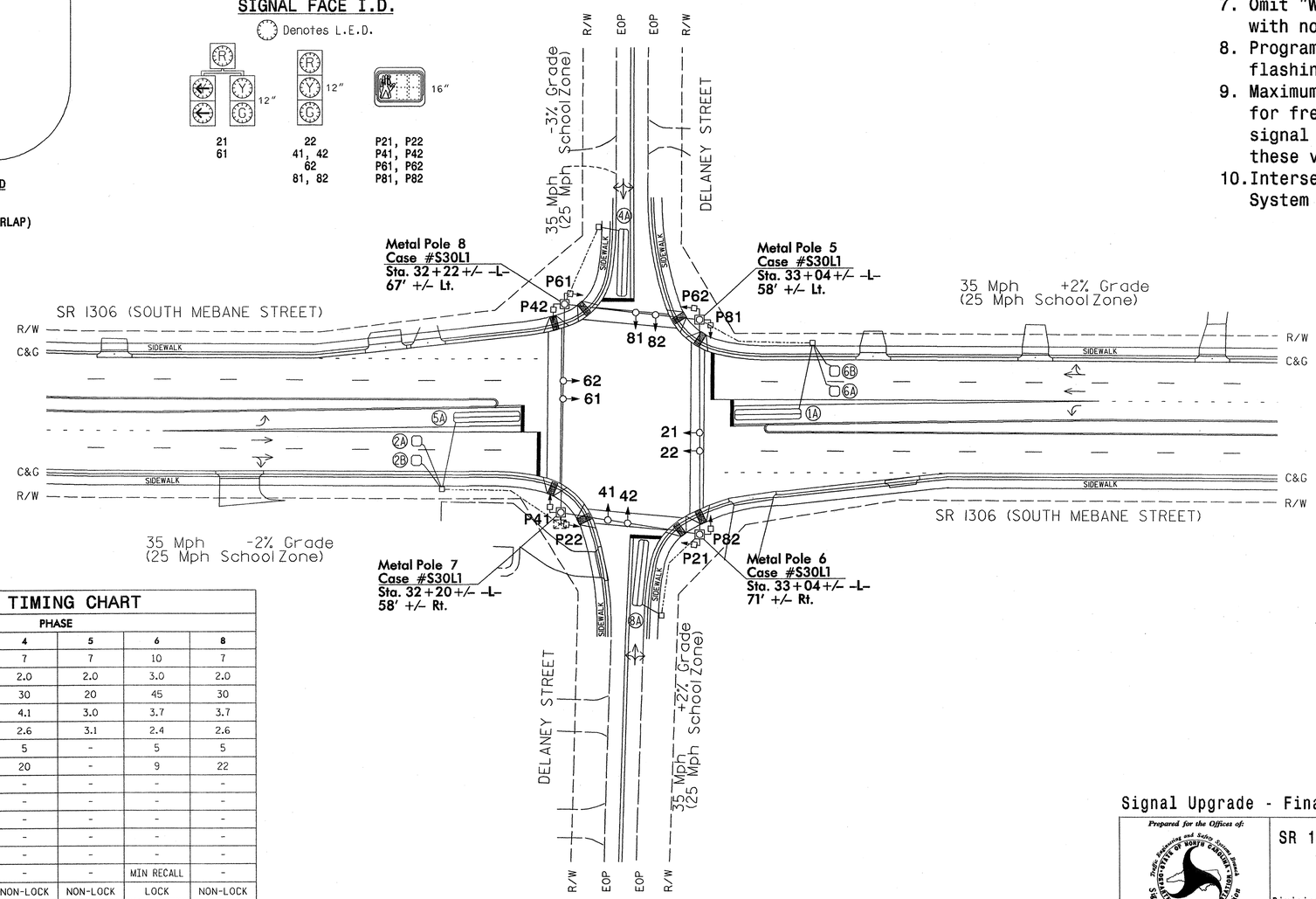
Denotes L.E.D.

LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING																
							TIMING		OPERATION MODE											STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PASS/PER	6 LEFT PASS/PER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
						6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2A	6X6	3	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2B	6X6	3	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5A	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
						2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Omit phase 1 during phase 2 on.
4. Omit phase 5 during phase 6 on.
5. Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (see Electrical Details).
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Intersection Zone #10 - Channel/Port #4 - System Address #12.



LEGEND

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

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	10	7	7	10	7
Passage Gap *	2.0	3.0	2.0	2.0	3.0	2.0
Maximum Green *	20	45	30	20	45	30
Yellow Change	3.0	4.0	4.1	3.0	3.7	3.7
Red Clear	3.1	2.1	2.6	3.1	2.4	2.6
Walk *	-	5	5	-	5	5
Pedestrian Clear	-	9	20	-	9	22
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK
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.

Signal Upgrade - Final Design

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Division of Highways, State of North Carolina, Department of Transportation, 750 Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SCALE 0 40 1"=40'

SR 1306 (South Mebane Street) at Delaney Street

Division 07 Alamance County Burlington

PLAN DATE:	November 2008	REVIEWED BY:	Hochanadel
PREPARED BY:	Eddins	REVIEWED BY:	Asefnia

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE DATE 11/18/08

SIG. INVENTORY NO. 07-1731

$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$

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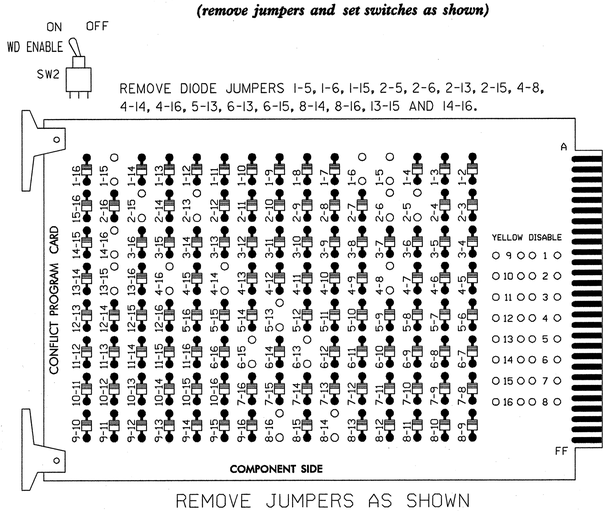
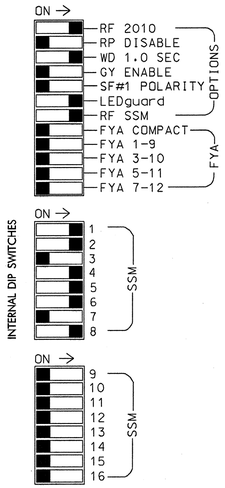
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 17

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø2 2B				NOT USED						Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B				NOT USED								

⊗ Wired Input - Do not populate slot with input card

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A [1]	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
4A	TB4-9,10	I6U	41	11	4	5	
5A [2]	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
8A	TB5-9,10	J6U	42	31	8	5	
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED		

NOTE: Install DC isolators in input file slots I12 and I13.

[1] Add jumper from I1W to J4W on rear of the input file.

[2] Add jumper from I4W to J1W on rear of the input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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 3,7,9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S5,S6,S6P,S8,S8P
PHASES USED.....1,2,2PED,4,4PED,5,6,6PED,8,8PED
OVERLAPS.....NONE

BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

```
SE-PAC PHASE DATA        PRESS # DESIRED

 1-VEHICLE TIMES         6-N.LOCK & MISC
 2-DENSITY TIMES         7-SPEC. SEQUENCE
 3-PEDEST. TIMES         8-SPEC. DETECTOR
 4-INIT & N.A. RESP      9-PHASE COPY
 5-V & P RECALLS         0-MISC PED OPTIONS

                          F-PRIOR MENU
```

```
PHASE......1...2...3...4...5...6...7...8
  OMIT     2   0   0   0   6   0   0   0
  -YEL     0   0   0   0   0   0   0   0
  OCAL     4   0   0   0   4   0   0   0
  OMIT:### PHS ON OMITS THIS PHASE
   -YEL:### PHS YEL OMITS THIS PHS YEL
   OCAL: WHEN OMIT, DETS CALL## PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Special Sequence programming complete.

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.	61	21,22	P21, P22	NU	41,42	P41, P42	21	61,62	P61, P62	NU	81,82	P81, P82
RED	✳	128			101		✳	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					
✋			113			104			119			110
🚶			115			106			121			112

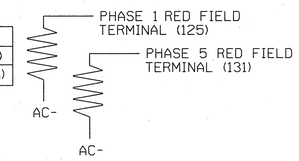
NU = Not Used

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

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

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: 07-1731
DESIGNED: November 2008
SEALED: November 19, 2008
REVISED: TBD

Signal Upgrade - Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1306 (South Mebane Street) at Delaney Street

Division 07 | Alamance County | Burlington

PLAN DATE: November 2008 | REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Transportation Mobility and Safety Division, Department of Transportation, State of North Carolina, Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/19/08
SIGNATURE | DATE
SIG. INVENTORY NO. 07-1731

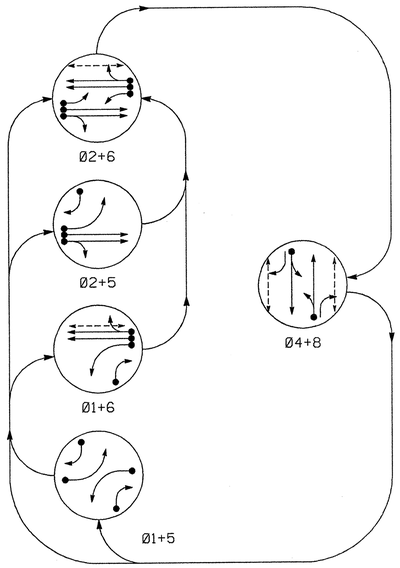
$$$$$SYSTIME$$$$$
$$$$$SYSTEM$$$$$
$$$$$USERNAME$$$$$

07-1731e-02-098.dgn 11/25/2008 9:59:38 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 18

5 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R	R	R	R	G	R
P41,P42	DW	DW	DW	DW	W	DRK
P61,P62	DW	W	DW	W	DW	DRK
P81,P82	DW	DW	DW	DW	W	DRK

W - WALK
DW - DON'T WALK
DRK - DARK

LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE									STATUS		
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER LEFTS	6 PROTPER THROUGH	7 AND	SWITCH SYSTEM LOOPS	NEW	EXISTING
IA	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
						6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
IB	6X15	3	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
2B	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
						2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
6A	6X6	3	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
6B	6X6	3	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
8A	6X15	3	0	X	-	8	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-

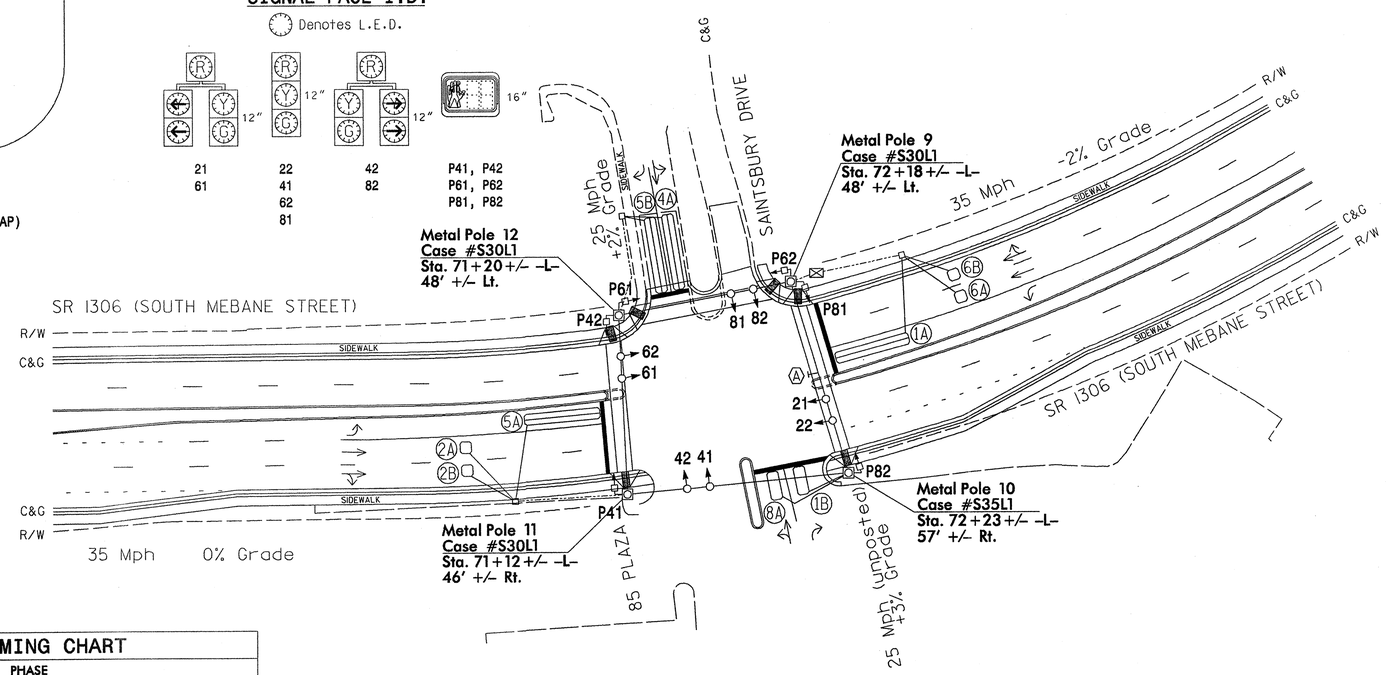
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Omit phase 1 during phase 2 on.
4. Omit phase 5 during phase 6 on.
5. Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (see Electrical Details).
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Intersection Zone #10 - Channel/Port #4 - System Address #11.

SIGNAL FACE I.D.

Denotes L.E.D.

21, 61 | 22, 41, 62, 81 | 42, 82 | P41, P42, P61, P62, P81, P82



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Wheelchair Ramp	N/A
	Metal Strain Pole	
	"U-Turn Yield To Right Turn" Sign (R10-16)	

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	10	7	7	10	7
Passage Gap *	2.0	3.0	2.0	2.0	3.0	3.0
Maximum Green *	20	45	30	20	45	30
Yellow Change	3.0	3.8	3.1	3.0	4.0	3.1
Red Clear	2.6	2.4	3.0	2.9	2.2	2.8
Walk *	-	-	5	-	5	5
Pedestrian Clear	-	-	15	-	13	17
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK
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.

New Installation

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Signal Design and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 1"=40' (0 – 40)

SR 1306 (South Mebane Street)
at
85 Plaza and Saintsbury Drive
Division 07 Alamance County Burlington

PLAN DATE:	November 2008	REVIEWED BY:	Hochanadel
PREPARED BY:	Eddins	REVIEWED BY:	Asefnia

REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL
SIGNATURE 11/19/08 DATE
SIG. INVENTORY NO. 07-2128

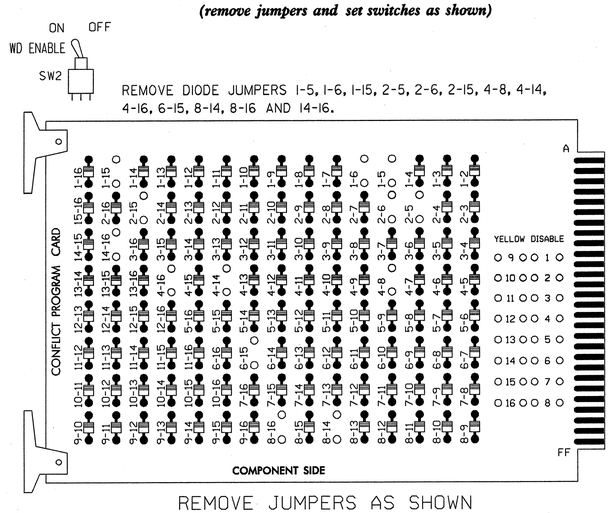
$$$$SYSTIME$$$$
$$$$SYSTIME$$$$
$$$$SIGNONE$$$$
$$$$SIGNONE$$$$
$$$$SCENNAME$$$$

07-2128.dgn 11/18/2008 2:17:27 PM

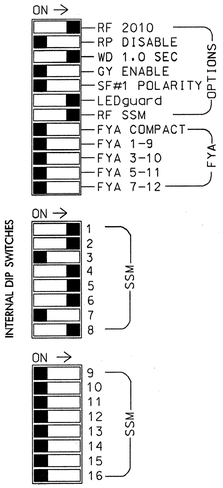
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 19

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2 2A	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2 2B			NOT USED						Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	WIRED INPUT ⊗	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6 6B			NOT USED								

⊗ Wired Input - Do not populate slot with input card

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A [1]	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
1B	TB2-5,6	I2U	39	3	1	15	
2A	TB2-9,10	I3U	63	5	2		
2B	TB2-11,12	I3L	76	6	2		
4A	TB4-9,10	I6U	41	11	4		
5A [2]	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
8A	TB5-9,10	J6U	42	31	8	3	
PED PUSH BUTTONS							
P41,P62	TB8-5,6	I12L	69	PED 4	4 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED		

NOTE:
Install DC isolators in input file slots I12 and I13.

[1] Add jumper from I1W to J4W on rear of the input file.

[2] Add jumper from I4W to J1W on rear of the input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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 3,7,9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S4P,S5,S6,S6P,S8,S8P
PHASES USED.....1,2,4,4PED,5,6,6PED,8,8PED
OVERLAPS.....NONE

BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

```
SE-PAC PHASE DATA        PRESS # DESIRED

 1-VEHICLE TIMES         6-N.LOCK & MISC
 2-DENSITY TIMES         [7-SPEC. SEQUENCE]
 3-PEDEST. TIMES         8-SPEC. DETECTOR
 4-INIT & N.A. RESP      9-PHASE COPY
 5-V & P RECALLS         0-MISC PED OPTIONS

                         F-PRIOR MENU
```

```
PHASE......1...2...3...4...5...6...7...8
  OMIT     2   0   0   0   6   0   0   0
  -YEL     0   0   0   0   0   0   0   0
  OCAL     4   0   0   0   4   0   0   0

  OMIT:## PHS ON OMITS THIS PHASE
   -YEL:## PHS YEL OMITS THIS PHS YEL
   OCAL: WHEN OMIT, DETS CALL## PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Special Sequence programming complete.

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.	61,82	21,22	NU	NU	41,42	P41, P42	21,42	61,62	P61, P62	NU	81,82	P81, P82
RED	✳	128			101		✳	134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					
✋						104			119			110
🚶						106			121			112

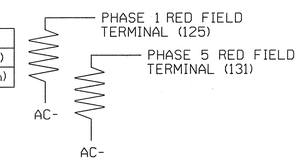
NU = Not Used

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

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

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: 07-2128
DESIGNED: November 2008
SEALED: November 19, 2008
REVISED: TBD

New Installation

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1306 (South Mebane Street) at 85 Plaza and Saintsbury Drive

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton

PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, State of North Carolina, Department of Transportation, Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/25/08

SIGNATURE DATE
SIG. INVENTORY NO. 07-2128

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGNFS$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

07-2128e-02-098.dgn 11/25/2008 9:59:00 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 20

3 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM

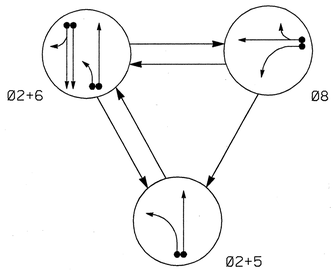


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5 NEW	PHASE Ø2+5 EXISTING	PHASE Ø2+6	PHASE Ø8	FLASH
21		G	G	R	Y
22,23		G	G	R	Y
61,62,63		R	G	R	Y
81		R	R	G	R
82		R	R	G	R

LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE									STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER LEFT	6 PROTPER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
						2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8B	6X40	2-4-2	0	X	-	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

NOTES

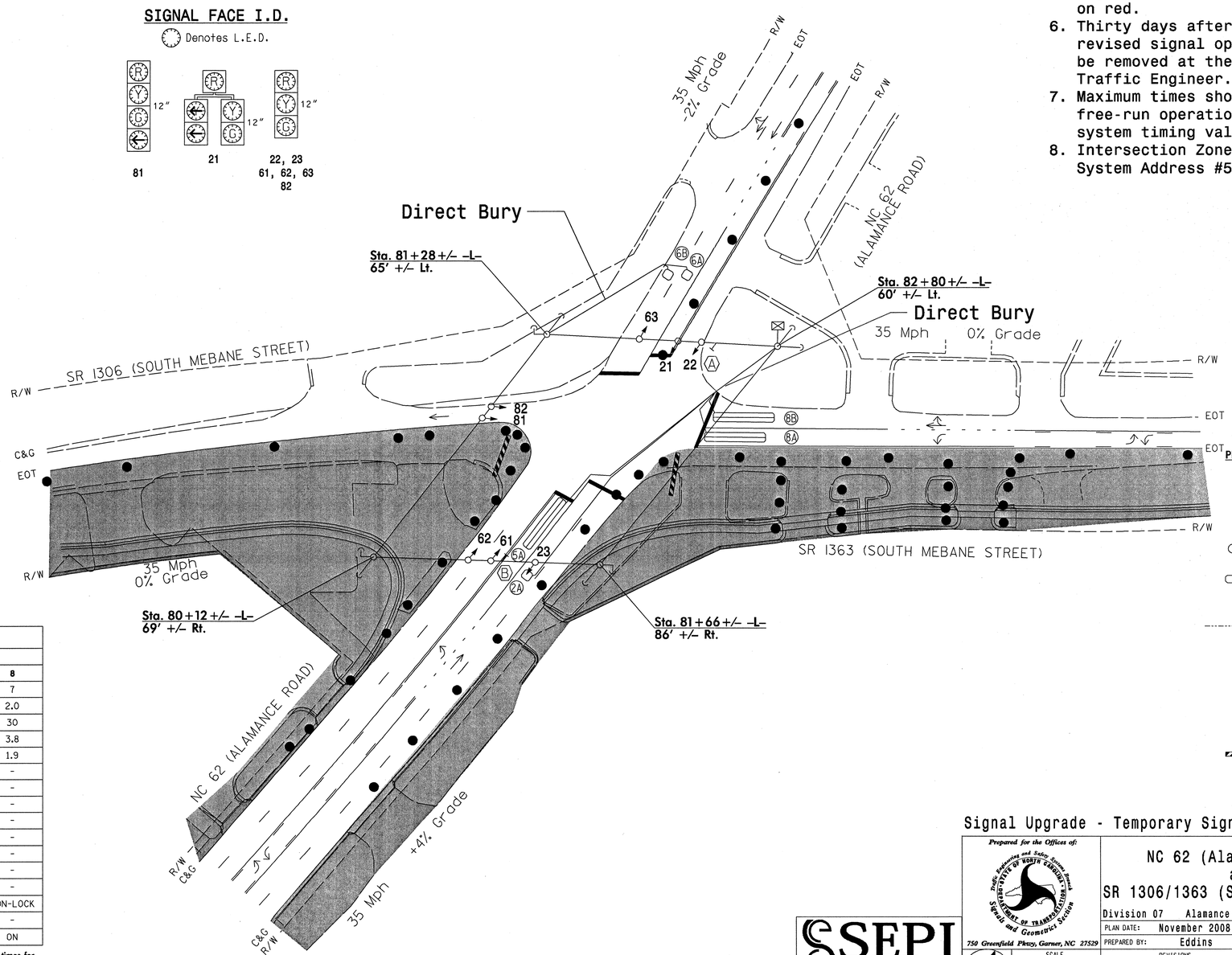
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distances of vehicles turning right on red.
6. Thirty days after implementation of the revised signal operation, orange flags may be removed at the discretion of the Regional Traffic Engineer.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Intersection Zone #10 - Channel / Port #4 - System Address #5.

SIGNAL FACE I.D.

Denotes L.E.D.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
Ⓐ	No Right Turn Sign With With Orange Warning Flags (R3-1)	Ⓐ
Ⓑ	No Left Turn Sign With With Orange Warning Flags (R3-2)	Ⓑ
	Construction Drum	N/A
	Construction Barricade	N/A
	Construction Zone	N/A

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Min Green *	10	7	10	7
Passage Gap *	3.0	2.0	3.0	2.0
Maximum Green *	50	20	50	30
Yellow Change	3.6	3.0	4.0	3.8
Red Clear	1.4	1.9	1.2	1.9
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	LOCK	NON-LOCK	LOCK	NON-LOCK
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

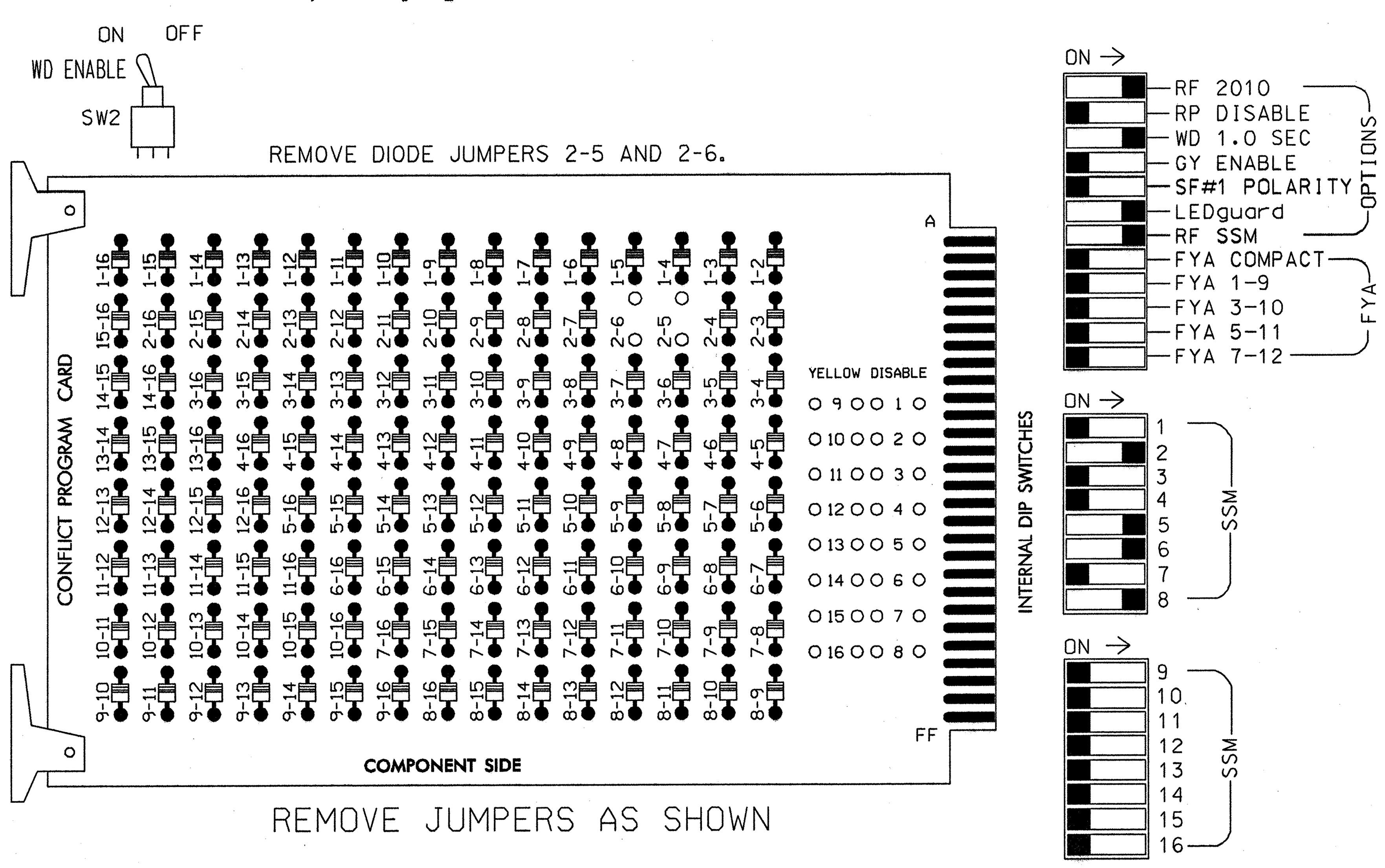
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 21

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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 1,3,4,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER..............CONTRACTOR SUPPLIED EAGLE 2070
CABINET ....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S5,S6,S8
PHASES USED.............2,5,6,8
OVERLAPS................NONE

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	NU	NU	21	61,62, 63	NU	NU	81	82	NU
RED		128					✳	134			107	107	
YELLOW		129						135			108	108	
GREEN		130						136			109	109	
RED ARROW													
YELLOW ARROW							132						
GREEN ARROW							133				109		
(Don't Walk symbol)													
(Walk symbol)													

NU = Not Used

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED												ST DC ISOLATOR
FILE "J"	U	ø5 5A	SLOT EMPTY	ø6 6A	SLOT EMPTY	SLOT EMPTY	ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED		ø6 6B			ø8 8B								

⊗ Wired Input - Do not populate slot with input card

FS = FLASH SENSE
ST = STOP TIME

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

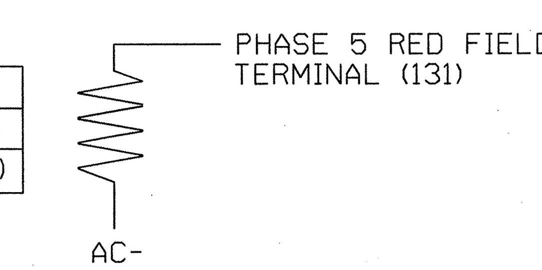
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
2A	TB2-5,6	I2U	39	3	2		
5A [1]	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
8A	TB5-9,10	J6U	42	31	8		
8B	TB5-11,12	J6L	46	32	8	10	

[1] Add jumper from I4W to J1W on rear of the input file.

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0133T1
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 1 - TCP Phase 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

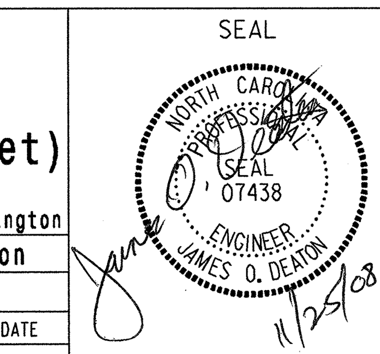
750 N. Greenfield Pkwy, Garner, NC 27529

NC 62 (Alamance Road)
at
SR 1306/1363 (S. Mebane Street)

Division 07 Alamance County Burlington
PLAN DATE: November 2008 REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

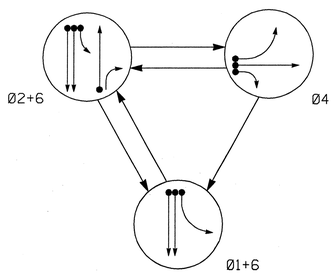


SIGNATURE DATE
SIG. INVENTORY NO. 07-0133T1

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 22

3 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

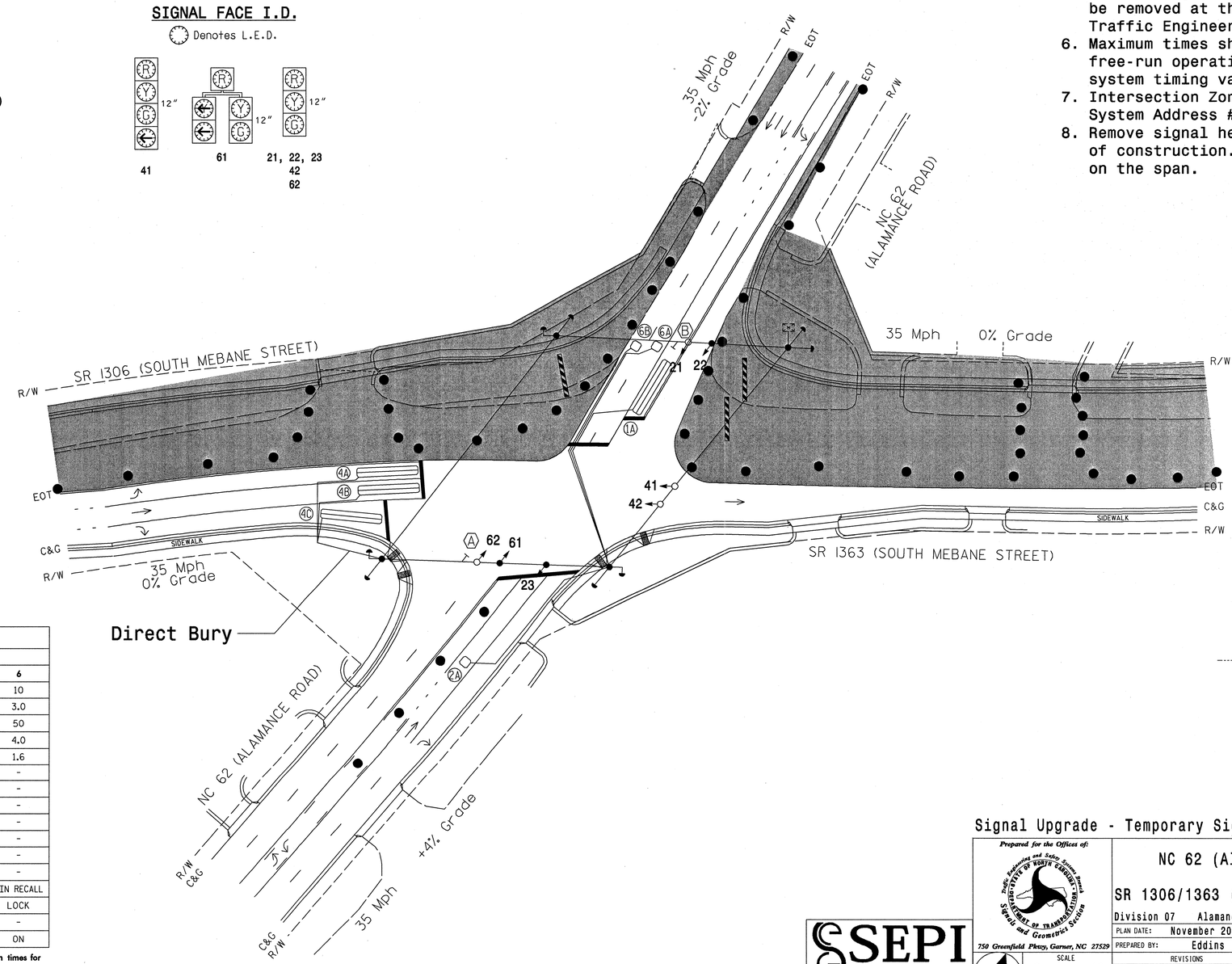
SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø4	FLASH
21,22,23	R	G	R	Y
41	R	R	G	R
42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.

LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE									STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER LEFTS	6 PROTPER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
						6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4B	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4C	6X40	2-4-2	0	X	-	4	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Thirty days after implementation of the revised signal operation, orange flags may be removed at the discretion of the Regional Traffic Engineer.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Intersection Zone #10 - Channel / Port #4 - System Address #5.
8. Remove signal heads 81 and 82 for this phase of construction. Do not leave the heads bagged on the span.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
N/A	Wheelchair Ramp	
	No Right Turn Sign With With Orange Warning Flags (R3-1)	
	No Left Turn Sign With With Orange Warning Flags (R3-2)	
	Construction Drum	N/A
	Construction Barricade	N/A
	Construction Zone	N/A

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green *	7	10	7	10
Passage Gap *	2.0	3.0	2.0	3.0
Maximum Green *	20	50	30	50
Yellow Change	3.0	3.6	3.8	4.0
Red Clear	1.6	2.0	3.0	1.6
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	LOCK
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 Signal Design 2 - TCP Phase 2

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Department of Transportation, State of North Carolina
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

NC 62 (Alamance Road)
at
SR 1306/1363 (S. Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: Hochanadel
PREPARED BY: Eddins	REVIEWED BY: Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY R. HOCHANADEL

SIGNATURE 11/25/08 DATE

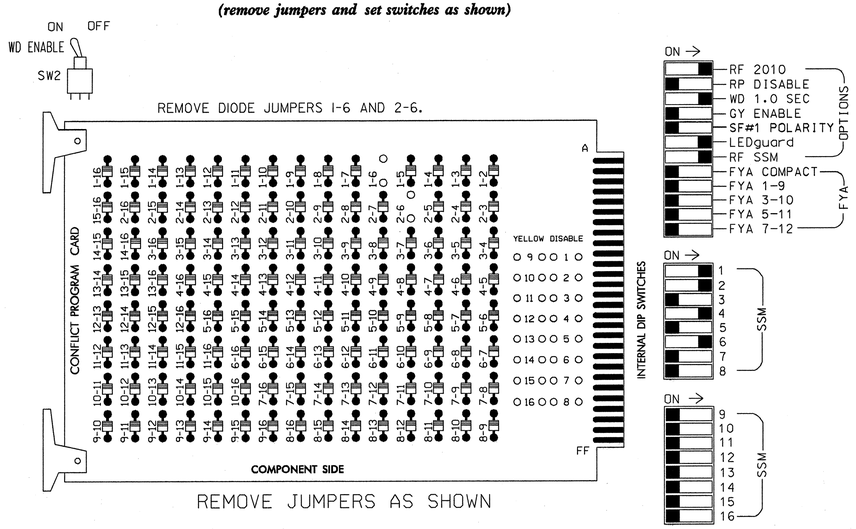
SIG. INVENTORY NO. 07-0133T2

$$$$$$$SYSTIME$$$$$$
$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 23

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S6
PHASES USED.....1,2,4,6
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

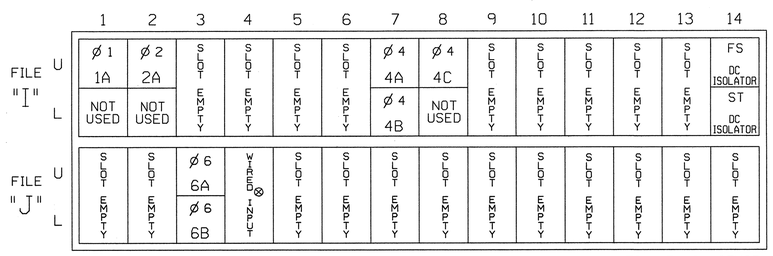
LOAD SWITCH NO.	S1	S2	S2P	S3	S4		S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4		4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22, 23	NU	NU	41	42	NU	NU	61,62	NU	NU	NU	NU
RED	*	128			101	101			134				
YELLOW		129			102	102			135				
GREEN		130			103	103			136				
RED ARROW													
YELLOW ARROW	126												
GREEN ARROW	127				103								
✋													
🚶													

NU = Not Used

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

INPUT FILE POSITION LAYOUT

(front view)



⊗ Wired Input - Do not populate slot with input card

FS = FLASH SENSE
ST = STOP TIME

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

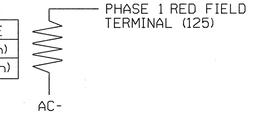
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A[1]	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
2A	TB2-5,6	I2U	39	3	2		
4A	TB6-1,2	I7U	65	13	4		
4B	TB6-3,4	I7L	78	14	4		
4C	TB6-5,6	I8U	49	15	4	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		

[1] Add jumper from I1W to J4W on rear of the input file.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0133T2
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 2 - TCP Phase 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 62 (Alamance Road) at SR 1306/1363 (S. Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY:	J O Deaton	
PREPARED BY: M W Yalch	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/25/08
SIGNATURE DATE
SIG. INVENTORY NO. 07-0133T2

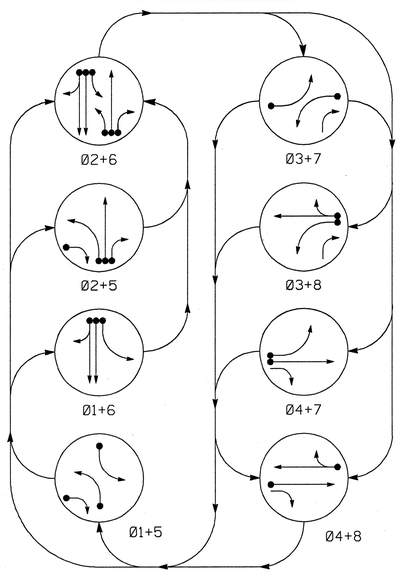
SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$$$DGNNAME$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 24

8 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
21	↖R	R	↖G	G	R	R	R	R	Y
22	R	R	G	G	R↗	R↗	R	R	Y
23	R	R	G	G	R	R	R	R	Y
31	←R	←R	←R	←R	←	←	←R	←R	←R
41	R	R	R	R	R	R	G	G	R
42	R↗	R	R↗	R	R	R	G	G	R
61	↖R	←G		R	G	R	R	R	Y
62, 63	R	G	R	G	R	R	R	R	Y
71	←R	←R	←R	←R	←	←R	←	←R	←R
81,82	R	R	R	R	R	G	R	G	R

LOOP & DETECTOR UNIT INSTALLATION CHART

SE-PAC 2070 CONTROLLER WITH 170 CABINET

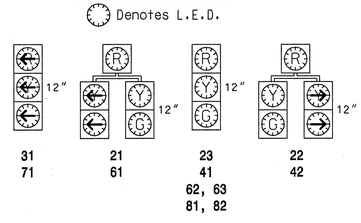
INDUCTIVE LOOPS						DETECTOR PROGRAMMING															
							TIMING		OPERATION MODE										STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROV/PER	6 LEFT PERM/PER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
						6	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2A	6X6	4	70	-	X	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3B	6X40	2-4-2	0	X	-	3	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5A	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
						2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8B	6X40	2-4-2	0	X	-	8	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

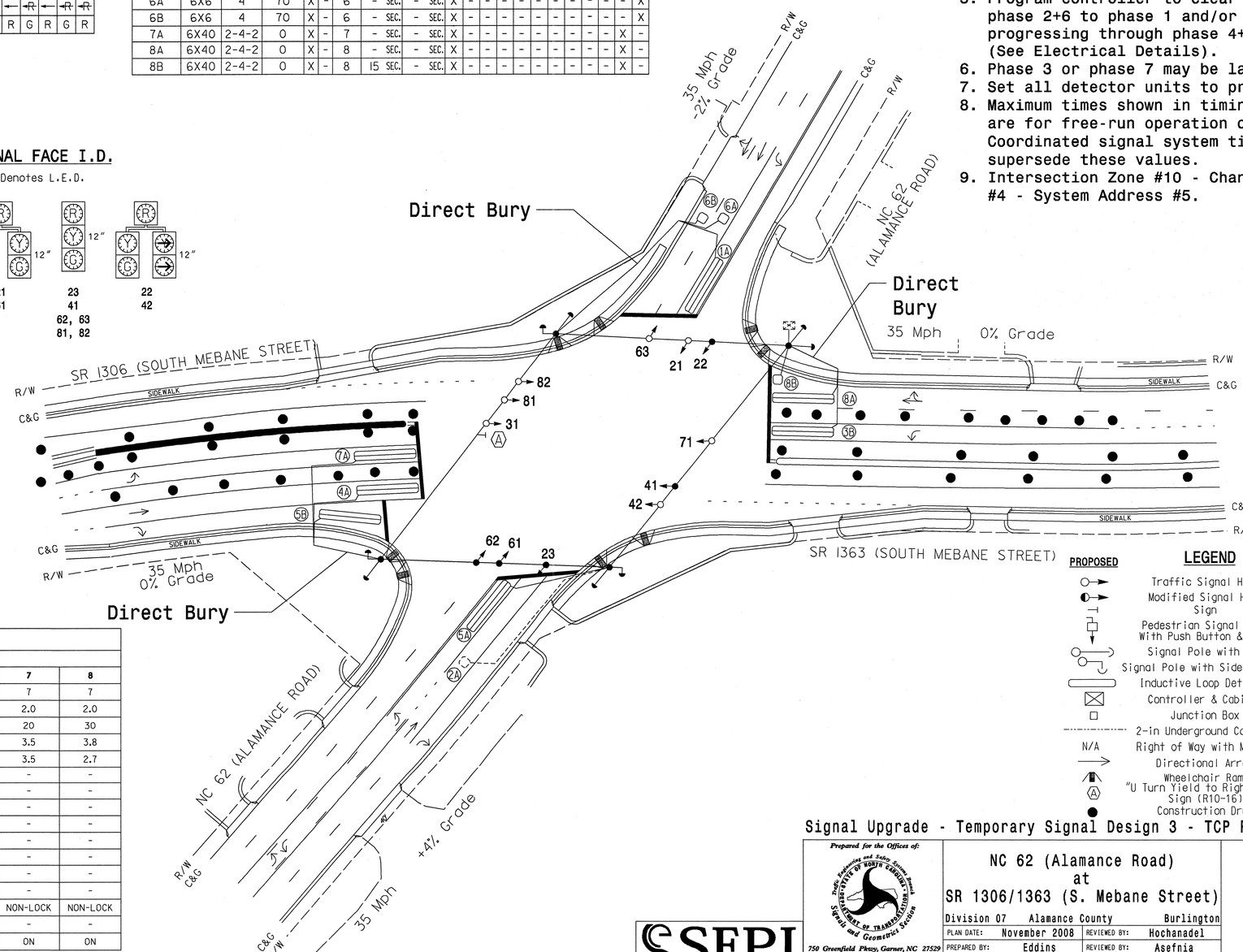
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Omit phase 1 during phase 2 on.
4. Omit phase 5 during phase 6 on.
5. Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (See Electrical Details).
6. Phase 3 or phase 7 may be lagged.
7. Set all detector units to presence mode.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Intersection Zone #10 - Channel/Port #4 - System Address #5.

SIGNAL FACE I.D.

Denotes L.E.D.





LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
	Wheelchair Ramp	N/A
	"U Turn Yield to Right Turn" Sign (R10-16)	
	Construction Drum	N/A

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	10	7	7	7	10	7	7
Passage Gap *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Maximum Green *	20	50	20	30	20	50	20	30
Yellow Change	3.0	3.6	3.5	3.8	3.1	4.0	3.5	3.8
Red Clear	3.4	3.1	3.5	2.8	3.5	3.2	3.5	2.7
Walk *	-	-	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-	-	-
Added Initial *	-	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
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 Signal Design 3 - TCP Phase 3

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Department of Transportation, State of North Carolina
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

NC 62 (Alamance Road)
at
SR 1306/1363 (S. Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE:	November 2008	REVIEWED BY:	Hochanadel
PREPARED BY:	Eddins	REVIEWED BY:	Asefnia

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 11/19/08 DATE

SIG. INVENTORY NO. 07-0133T3

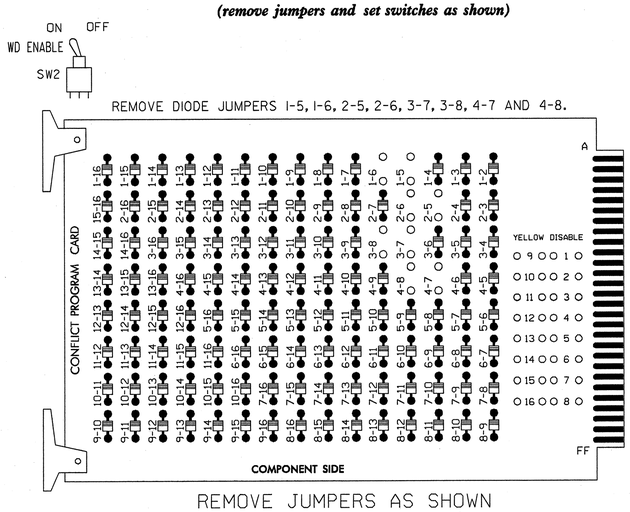
$$$$$$SYSTIME$$$$$$
$$$$$$SYSDATE$$$$$$
$$$$$$USERNAME$$$$$$

07-0133T3.dgn 11/18/2008 2:28:21 PM

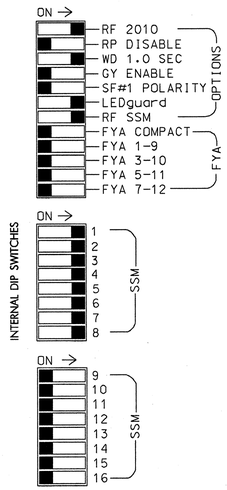
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 25

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAPS.....NONE

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.	61	21,22, 23	NU	22	31	41,42	NU	21,42	61,62, 63	NU	71	81,82	NU
RED	✳	128				101		✳	134			107	
YELLOW		129				102			135			108	
GREEN		130				103			136			109	
RED ARROW					116						122		
YELLOW ARROW	126			117	117			132			123		
GREEN ARROW	127			118	118			133			124		
✋													
🚶													

NU = Not Used

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

BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

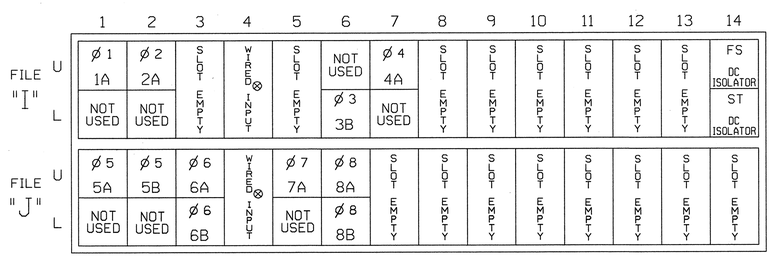
```
SE-PAC PHASE DATA          PRESS # DESIRED

 1-VEHICLE TIMES            6-N.LOCK & MISC
 2-DENSITY TIMES            7-SPEC. SEQUENCE
 3-PEDEST. TIMES            8-SPEC. DETECTOR
 4-INIT & N.A. RESP         9-PHASE COPY
 5-V & P RECALLS            0-MISC PED OPTIONS

                                F-PRIOR MENU
```

```
PHASE......1...2...3...4...5...6...7...8
  OMIT     2   0   0   0   6   0   0   0
  -YEL     0   0   0   0   0   0   0   0
  OCAL     4   0   0   0   4   0   0   0

  OMIT:## PHS ON OMITS THIS PHASE
   -YEL:## PHS YEL OMITS THIS PHS YEL
   OCAL: WHEN OMIT, DETS CALL## PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Special Sequence programming complete.

INPUT FILE POSITION LAYOUT

(front view)



⊗ Wired Input - Do not populate slot with input card

FS = FLASH SENSE
ST = STOP TIME

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A[1]	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6	3	
2A	TB2-5,6	I2U	39	3	2		
3B	TB4-11,12	I6L	45	12	3		
4A	TB6-1,2	I7U	65	13	4		
5A[2]	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
7A	TB5-5,6	J5U	57	29	7		
8A	TB5-9,10	J6U	42	31	8		
8B	TB5-11,12	J6L	46	32	8	15	

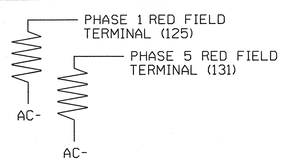
[1] Add jumper from I1W to J4W on rear of the input file.

[2] Add jumper from I4W to J1W on rear of the input file.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0133T3
DESIGNED: November 2008
SEALED: November 19, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 3 - TCP Phase 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 62 (Alamance Road) at SR 1306/1363 (S. Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of: State of North Carolina Department of Transportation Traffic Engineering and Safety Systems Branch Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
12/19/08

SIGNATURE DATE
SIG. INVENTORY NO. 07-0133T3

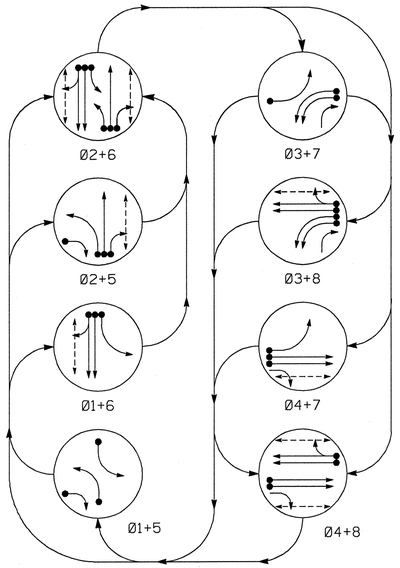
$$$$$$SYSTIME$$$$$$
$$$$$$SYSTIME$$$$$$
$$$$$$USERNAME$$$$$$

07-0133t3e-01-098.dgn 12/9/2008 1:52:41 PM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 26

8 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

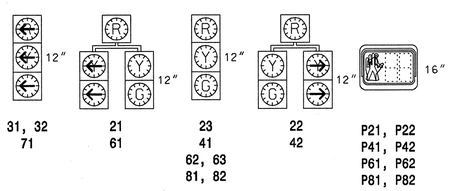
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
23	R	R	G	G	R	R	R	R	Y
31,32	R	R	R	R	←	←	R	R	R
41	R	R	R	R	R	R	G	G	R
42	R	R	R	R	R	R	G	G	R
61	R	R	G	R	G	R	R	R	Y
62,63	R	G	R	G	R	R	R	R	Y
71	R	R	R	R	←	R	←	R	R
81,82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

W - WALK
DW - DON'T WALK
DRK - DARK

SIGNAL FACE I.D.

Denotes L.E.D.



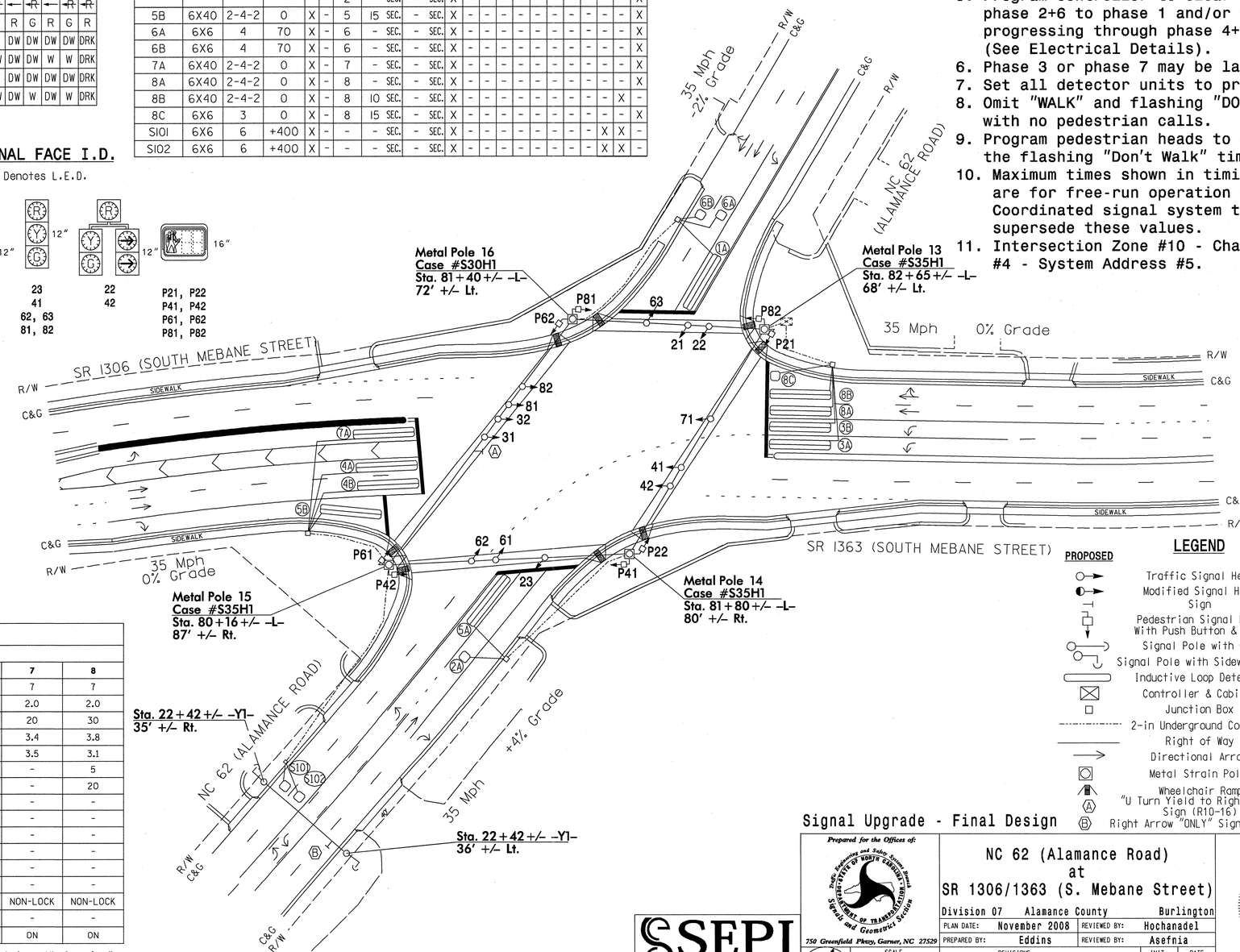
LOOP & DETECTOR UNIT INSTALLATION CHART

SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING															
							TIMING		OPERATION MODE										STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROT/PERM LEFT	6 PROT/PERM THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
						6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3B	6X40	2-4-2	0	X	-	3	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4B	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-	-
5A	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
						2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
8B	6X40	2-4-2	0	X	-	8	10 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-	
8C	6X6	3	0	X	-	8	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
S101	6X6	6	+400	X	-	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	X	-
S102	6X6	6	+400	X	-	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	X	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Omit phase 1 during phase 2 on.
4. Omit phase 5 during phase 6 on.
5. Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (See Electrical Details).
6. Phase 3 or phase 7 may be lagged.
7. Set all detector units to presence mode.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Intersection Zone #10 - Channel/Port #4 - System Address #5.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
	Wheelchair Ramp	N/A
A	"U Turn Yield to Right Turn" Sign (R10-16)	A
B	Right Arrow "ONLY" Sign (R3-5R)	B

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	10	7	7	7	10	7	7
Passage Gap *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Maximum Green *	20	50	20	30	20	50	20	30
Yellow Change	3.0	3.6	4.0	3.8	3.0	4.0	3.4	3.8
Red Clear	3.2	3.4	3.5	3.4	3.3	3.4	3.5	3.1
Walk *	-	5	-	5	-	5	-	5
Pedestrian Clear	-	32	-	28	-	39	-	20
Added Initial *	-	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
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 - Final Design

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometric Section, Department of Transportation, State of North Carolina
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

NC 62 (Alamance Road) at SR 1306/1363 (S. Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: Hochanadel
PREPARED BY: Eddins	REVIEWED BY: Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL
SIGNATURE 11/19/08 DATE
SIG. INVENTORY NO. 07-0133

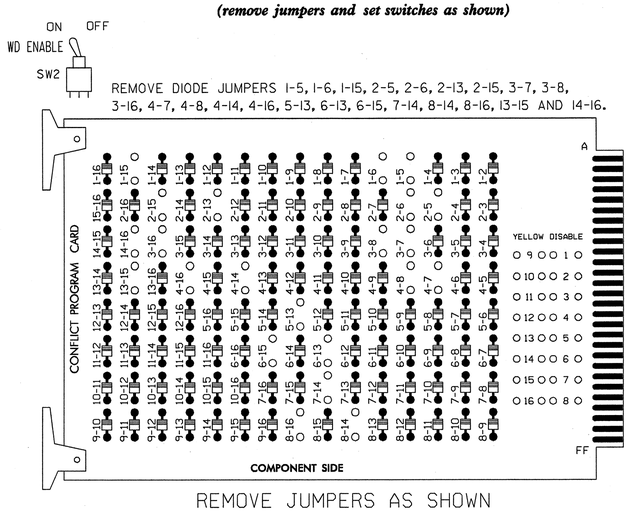
$$$$$$SYSTIME$$$$$$
$$$$$$SYSTIME$$$$$$
$$$$$$SYSTIME$$$$$$
$$$$$$USERNAME$$$$$$

07-0133.dgn 11/18/2008 2:12:06 PM

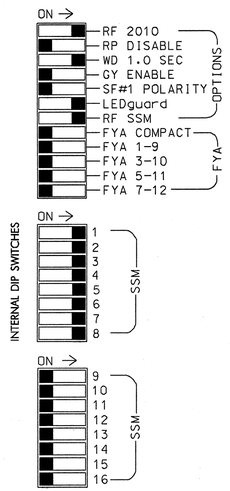
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 27

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S7,S8,S8P
PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED,7,8,8PED
OVERLAPS.....NONE

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.	61	21,22, 23	P21, P22	22	31,32	41,42	P41, P42	21,42	61,62, 63	P61, P62	71	81,82	P81, P82
RED	✳	128				101		✳	134			107	
YELLOW		129				102			135			108	
GREEN		130				103			136			109	
RED ARROW					116						122		
YELLOW ARROW	126			117	117			132			123		
GREEN ARROW	127			118	118			133			124		
✋			113				104			119			110
🚶			115				106			121			112

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SYS S1Ø1	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	NOT USED				Ø3 3B	Ø4 4B		SYS S1Ø2			Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	WIRED INPUT ⊗	Ø7 7A	Ø8 8A	Ø8 8C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6 6B		NOT USED	Ø8 8B	NOT USED							

⊗ Wired Input - Do not populate slot with input card

FS = FLASH SENSE
ST = STOP TIME

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

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 CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A[1]	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
2A	TB2-5,6	I2U	39	3	2		
3A	TB4-9,10	I6U	41	11	3		
3B	TB4-11,12	I6L	45	12	3		
4A	TB6-1,2	I7U	65	13	4		
4B	TB6-3,4	I7L	78	14	4		
✳ S1Ø1	TB6-9,10	I9U	60	17	SYS		
✳ S1Ø2	TB6-11,12	I9L	62	18	SYS		
5A[2]	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-9,10	J3U	64	23	6		
6B	TB3-11,12	J3L	77	24	6		
7A	TB5-5,6	J5U	57	29	7		
8A	TB5-9,10	J6U	42	31	8		
8B	TB5-11,12	J6L	46	32	8	10	
8C	TB7-1,2	J7U	66	33	8	15	
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED		

NOTE: Install DC isolators in input file slots I12 and I13.

[1] Add jumper from I1W to J4W on rear of the input file.

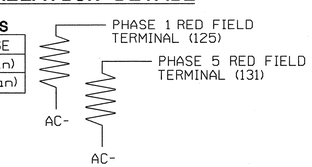
[2] Add jumper from I4W to J1W on rear of the input file.

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

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

```
SE-PAC PHASE DATA          PRESS # DESIRED

 1-VEHICLE TIMES           6-N.LOCK & MISC
 2-DENSITY TIMES           7-SPEC. SEQUENCE
 3-PEDEST. TIMES           8-SPEC. DETECTOR
 4-INIT & N.A. RESP        9-PHASE COPY
 5-V & P RECALLS           0-MISC PED OPTIONS

                           F-PRIOR MENU
```

```
PHASE......1...2...3...4...5...6...7...8
  OMIT     2   0   0   0   6   0   0   0
  -YEL     0   0   0   0   0   0   0   0
  OCAL     4   0   0   0   4   0   0   0

  OMIT:## PHS ON OMITS THIS PHASE
   -YEL:## PHS YEL OMITS THIS PHS YEL
   OCAL: WHEN OMIT, DETS CALL## PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

Special Sequence programming complete.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0133
DESIGNED: November 2008
SEALED: November 19, 2008
REVISED: TBD

Signal Upgrade - Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signal Management Section, Department of Transportation, State of North Carolina

750 N. Greenfield Pkwy, Garner, NC 27529

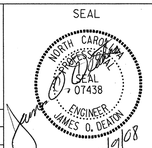
NC 62 (Alamance Road) at SR 1306/1363 (S. Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL



12/9/08

SIGNATURE DATE

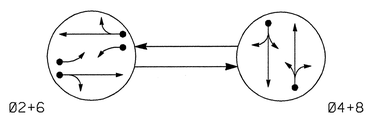
SIG. INVENTORY NO. 07-0133

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

$$$$$SYSTIME$$$$$
$$$$$SESSION$$$$$
$$$$$SENAME$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 28

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

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

LOOP & DETECTOR UNIT INSTALLATION CHART

SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING															
							TIMING		OPERATION MODE										STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER LEFT	6 PROTPER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
2B	6X6	4	80	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2C	6X40	2-4-2	0	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4A	6X40	2-4-2	0	X	-	4	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6C	6X40	2-4-2	0	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-

2 Phase
Fully Actuated
(Burlington-Graham Signal System)

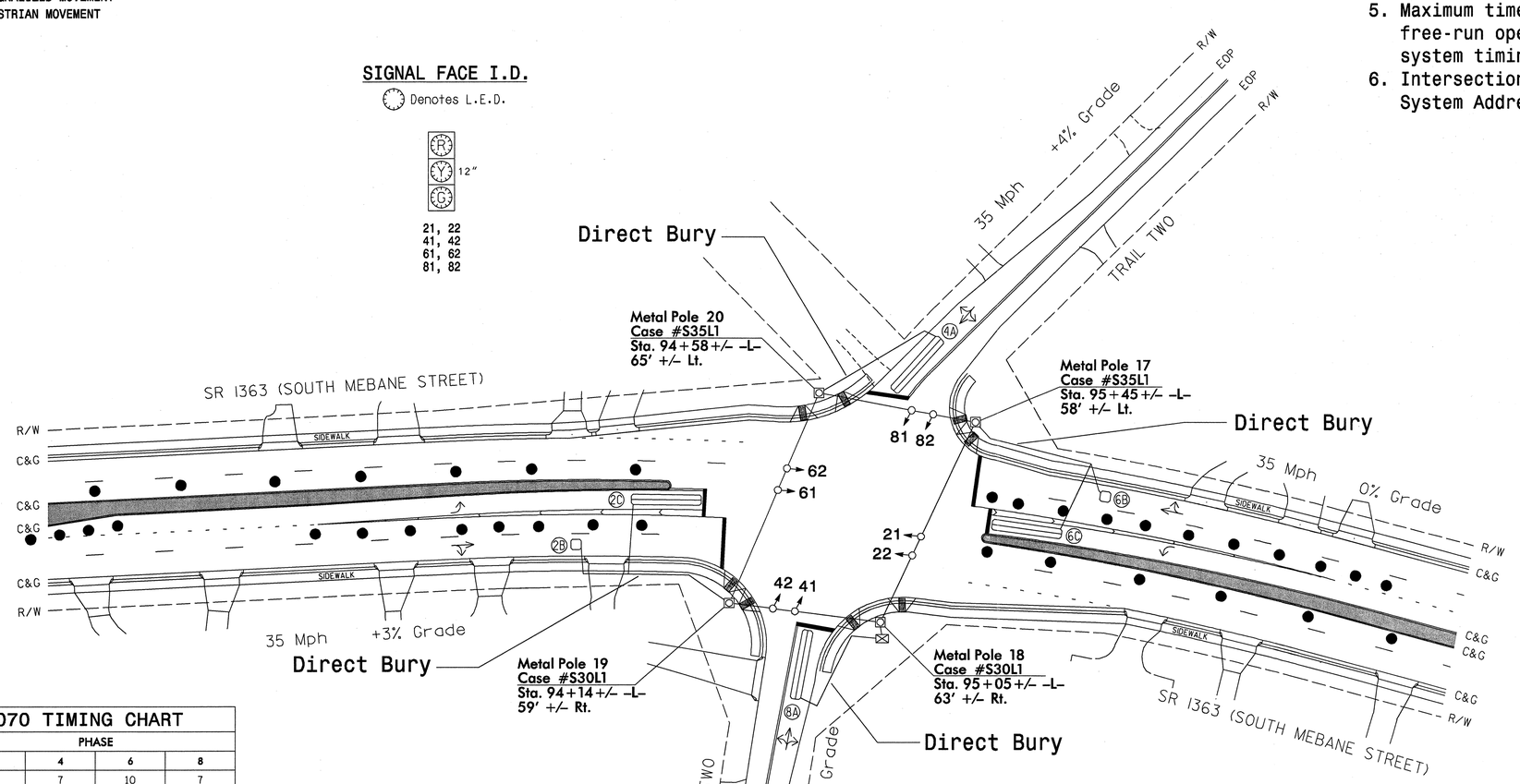
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Intersection Zone #10 - Channel/Port #4 - System Address #4.

SIGNAL FACE I.D.

Denotes L.E.D.

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



LEGEND

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

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	10	7	10	7
Passage Gap *	3.0	2.0	3.0	2.0
Maximum Green *	90	25	90	25
Yellow Change	3.7	3.6	3.8	4.1
Red Clear	2.6	2.3	2.7	2.3
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	LOCK	NON-LOCK	LOCK	NON-LOCK
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

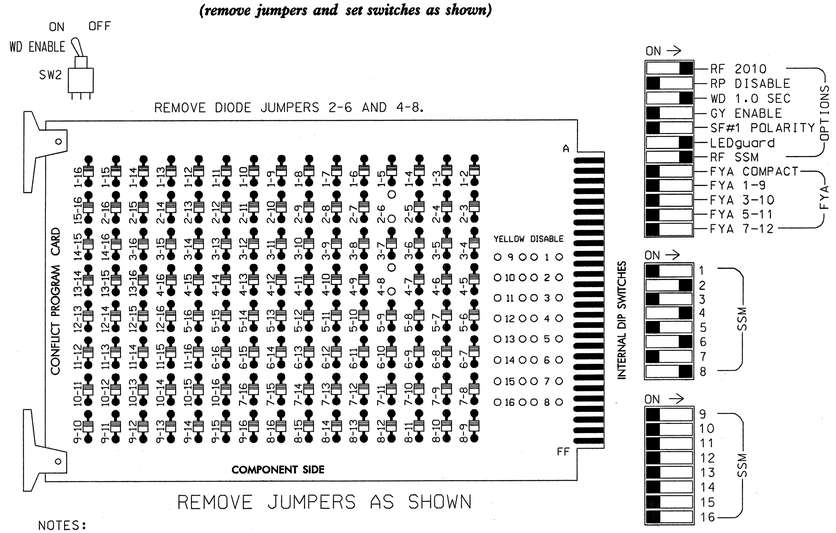
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

$$$$$$$$SYSTIME$$$$$
$$$$$$$$SYSDATE$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 29

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on 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 1,3,5,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham 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	NU	NU	41,42	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S6,S8
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
2B	TB2-7,8	I2L	43	4	2		
2C	TB2-9,10	I3U	63	5	2		
4A	TB4-9,10	I6U	41	11	4	5	
6B	TB3-7,8	J2L	44	22	6		
6C	TB3-9,10	J3U	64	23	6		
8A	TB5-9,10	J6U	42	31	8	5	

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1852T1
DESIGNED: November 2008
SEALED: November 19, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 1 - TCP Phase 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1363 (South Mebane Street) at Trail Two

Division 07 Alamance County Burlington

PLAN DATE: November 2008		REVIEWED BY: J O Deaton	
PREPARED BY: M W Yalch		REVIEWED BY:	
REVISIONS		INIT.	DATE

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

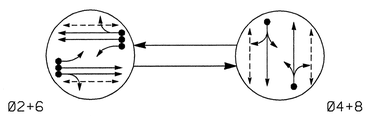
SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/25/08
SIGNATURE DATE
SIG. INVENTORY NO. 07-1852T1

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGNON$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 30

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
81, 82	R	G	R
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK
P61, P62	W	DW	DRK
P81, P82	DW	W	DRK

W - WALK
DW - DON'T WALK
DRK - DARK

SIGNAL FACE I.D.

Denotes L.E.D.

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

P21, P22
P41, P42
P61, P62
P81, P82

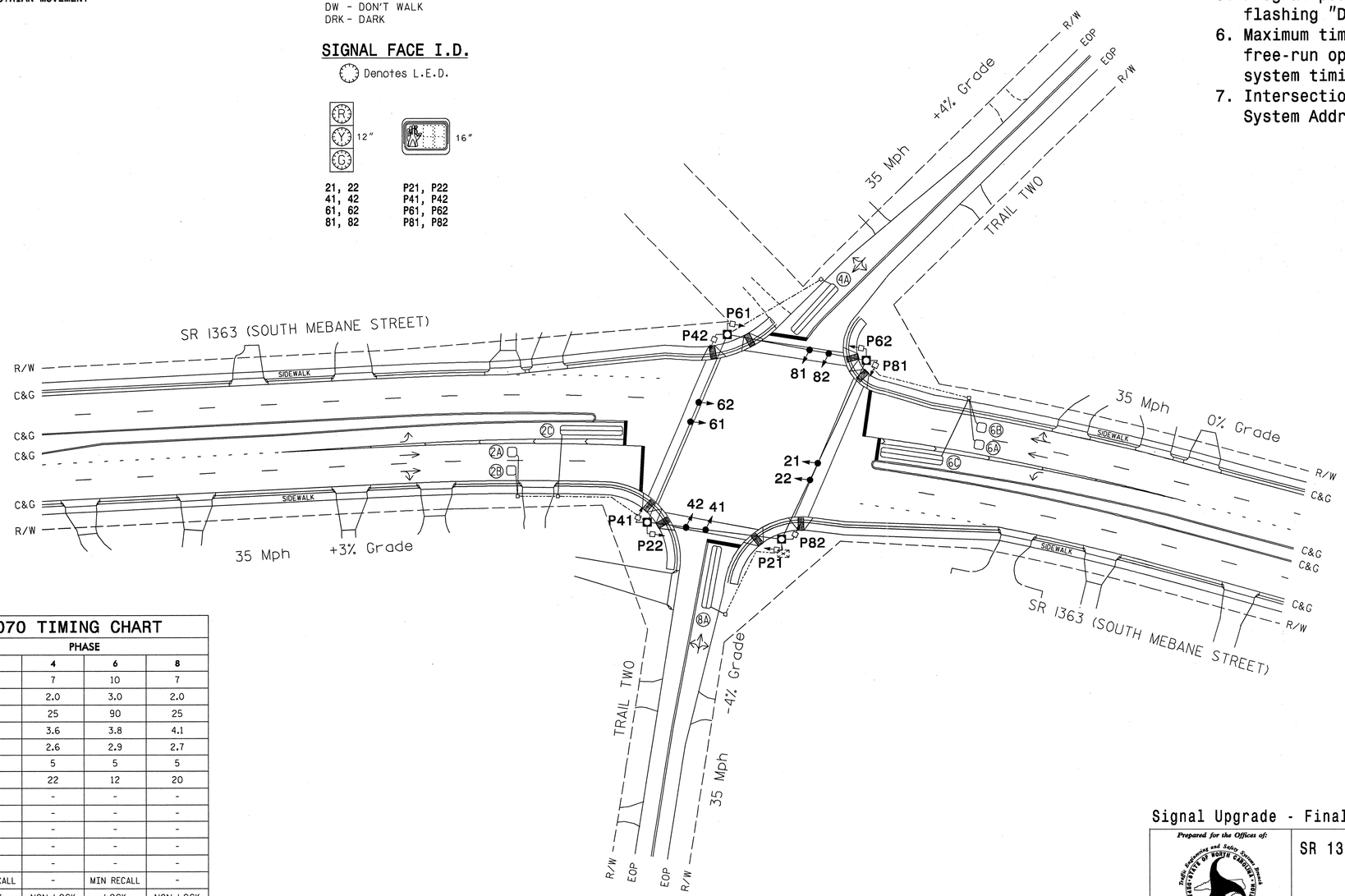
LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING															
							TIMING		OPERATION MODE									STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER LEFT	6 PROTPER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
2A	6X6	4	80	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2B	6X6	4	80	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
2C	6X40	2-4-2	0	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
6B	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6C	6X40	2-4-2	0	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	5 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X

2 Phase
Fully Actuated
(Burlington-Graham Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Intersection Zone #10 - Channel/Port #4 - System Address #4.



LEGEND

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

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	10	7	10	7
Passage Gap *	3.0	2.0	3.0	2.0
Maximum Green *	90	25	90	25
Yellow Change	3.7	3.6	3.8	4.1
Red Clear	2.9	2.6	2.9	2.7
Walk *	5	5	5	5
Pedestrian Clear	11	22	12	20
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	LOCK	NON-LOCK	LOCK	NON-LOCK
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 - Final Design

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

SR 1363 (South Mebane Street)
at
Trail Two

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: Hochanadel
PREPARED BY: Eddins	REVIEWED BY: Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 11/19/08 DATE
SIG. INVENTORY NO. 07-1852

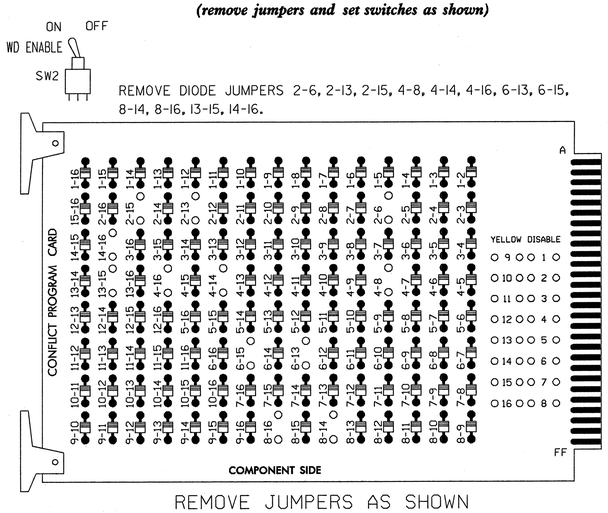
$$$$$$SYSTIME$$$$
$$$$$$SESSIONNAME$$$$
$$$$USERNAME$$$$

07-1852.dgn 11/18/2008 2:10:50 PM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 31

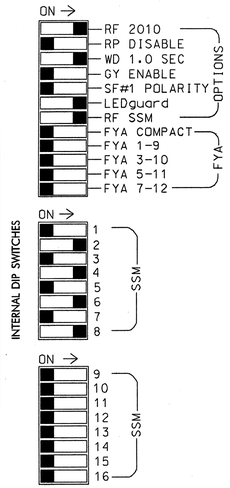
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on 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 1,3,5,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham 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	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋			113			104			119			110
🚶			115			106			121			112

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S2P,S4,S4P,S6,S6P,S8,S8P
PHASES USED.....2,2PED,4,4PED,6,6PED,8,8PED
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	Ø2 2A	Ø2 2C	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	EMPTY	Ø2 2B	NOT USED	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A	Ø6 6C	SLOT	SLOT	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	Ø6 6B	NOT USED	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
2A	TB2-5,6	I2U	39	3	2		
2B	TB2-7,8	I2L	43	4	2		
2C	TB2-9,10	I3U	63	5	2		
4A	TB4-9,10	I6U	41	11	4	5	
6A	TB3-5,6	J2U	40	21	6		
6B	TB3-7,8	J2L	44	22	6		
6C	TB3-9,10	J3U	64	23	6		
8A	TB5-9,10	J6U	42	31	8	5	
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		
P81,P82	TB8-8,9	I13L	70	PED 8	8 PED		

NOTE:
Install DC isolators in input file slots I12 and I13.

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: 07-1852
DESIGNED: November 2008
SEALED: November 19, 2008
REVISED: TBD

Signal Upgrade - Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1363 (South Mebane Street) at Trail Two

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton

PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, State of North Carolina Department of Transportation, Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
11/25/08

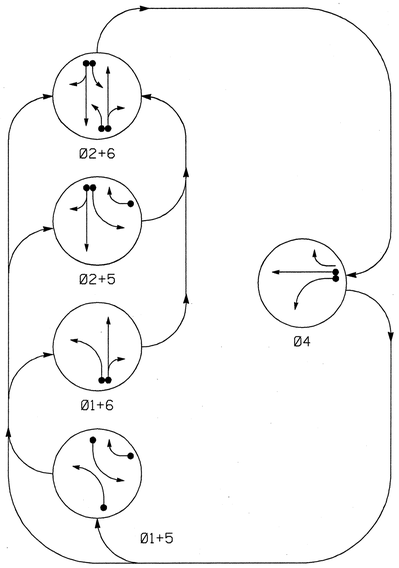
SIGNATURE DATE
SIG. INVENTORY NO. 07-1852

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

07-1852Fe-02-098.dgn 11/25/2008 9:57:03 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 32

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04	FLASH
21	R	R	G	G	R	Y
22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R	R	R	R	G	R
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.

LOOP & DETECTOR UNIT INSTALLATION CHART

SE-PAC 2070 CONTROLLER WITH 170 CABINET

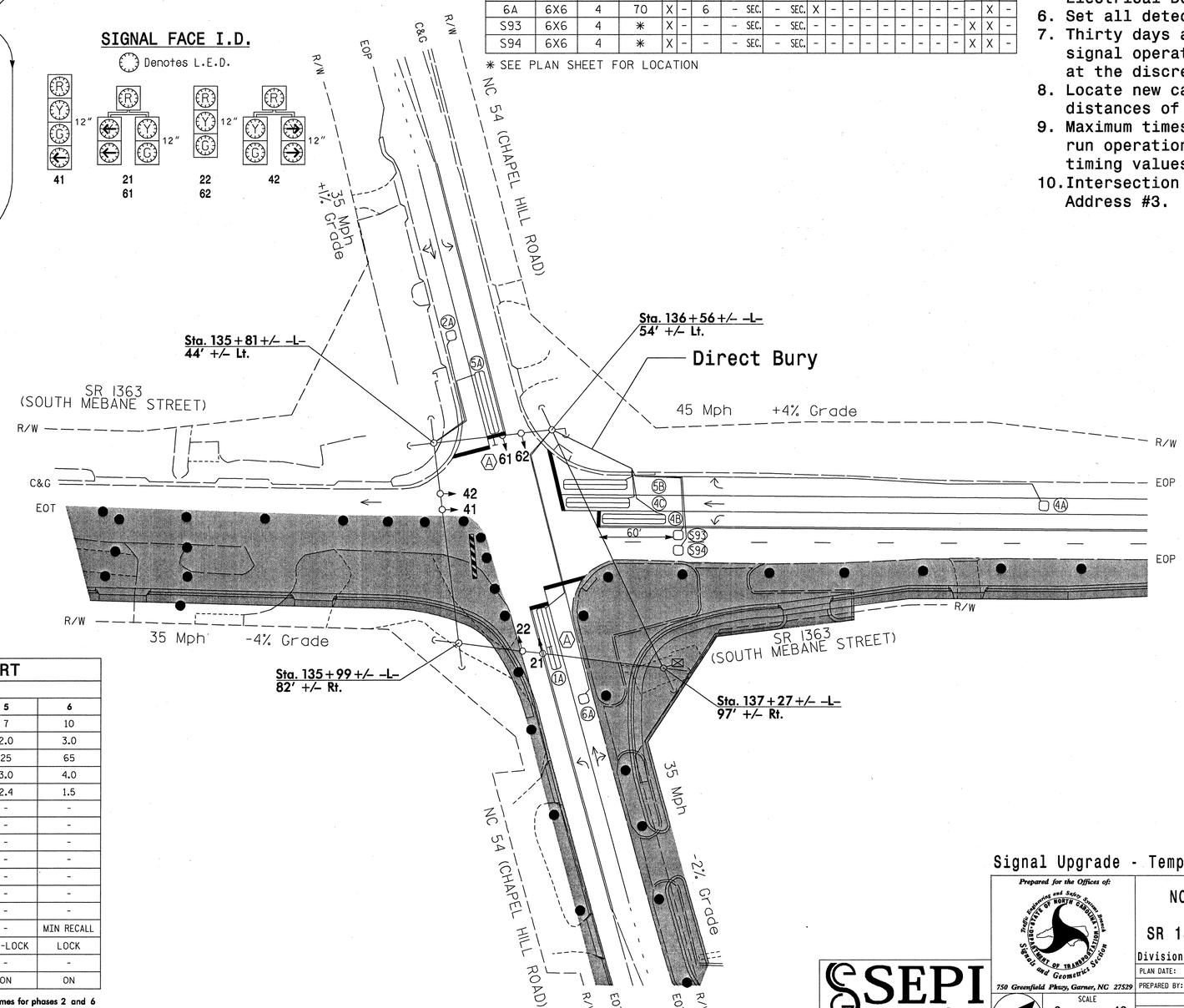
INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE									STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER LEFT	6 PROTPER THROUGH	7 AND	SWITCH SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
						6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
4A	6X6	5	300	X	-	4	100 SEC.	3.4 SEC.	X	-	-	-	-	-	-	-	-	X	-
4B	6X40	2-4-2	0	X	-	4	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
4C	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
						2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
S93	6X6	4	*	X	-	-	- SEC.	- SEC.	-	-	-	-	-	-	-	-	X	X	-
S94	6X6	4	*	X	-	-	- SEC.	- SEC.	-	-	-	-	-	-	-	-	X	X	-

* SEE PLAN SHEET FOR LOCATION

5 Phase
Fully Actuated
(Burlington-Graham Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Omit phase 1 during phase 2 on.
4. Omit phase 5 during phase 6 on.
5. Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4 (see Electrical Details).
6. Set all detector units to presence mode.
7. Thirty days after implementation of the revised signal operation, orange flags may be removed at the discretion of the Regional Traffic Engineer.
8. Locate new cabinet so as not to obstruct sight distances of vehicles turning right on red.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Intersection Zone #9 - Channel/Port #4 - System Address #3.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
	"LEFT TURN YIELD ON GREEN" Sign With Orange Warning Flags (R10-12)	
	Construction Barrier	N/A
	Construction Drum	N/A
	Construction Zone	N/A

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green *	7	10	7	7	10
Passage Gap *	2.0	3.0	2.0	2.0	3.0
Maximum Green *	30	65	60	25	65
Yellow Change	3.0	3.8	4.2	3.0	4.0
Red Clear	2.4	1.6	1.0	2.4	1.5
Walk *	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	LOCK
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

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

$$$$$$SYSTIME$$$$$$
$$$$$$SYSTIME$$$$$$
$$$$$$SERNAME$$$$$$

Signal Upgrade - Temporary Signal Design 1 - TCP Phase 1

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Department of Transportation, State of North Carolina
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

NC 54 (Chapel Hill Road)
at
SR 1363 (South Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: Hochanadel
PREPARED BY: Eddins	REVIEWED BY: Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 11/25/08 DATE

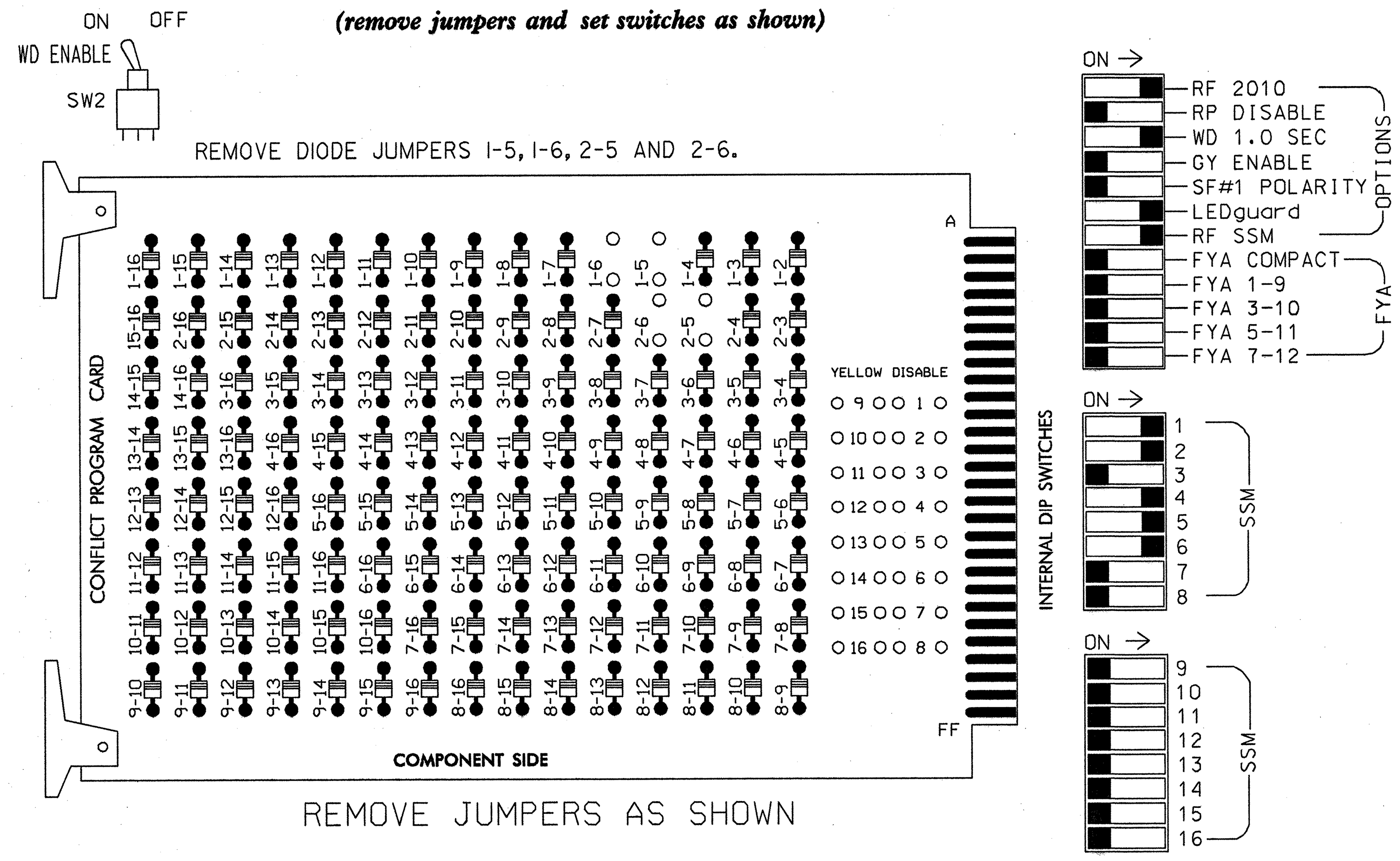
SIG. INVENTORY NO. 07-0009T1

07-0009T1.dgn 12/5/2008 7:48:13 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 33

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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 3,7,8,9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.............CONTRACTOR SUPPLIED EAGLE 2070
CABINET ....CONTRACTOR SUPPLIED 332 w/ AUX FILE
SOFTWARE SE-PAC2070
CABINET MOUNT..........BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED......S1,S2,S4,S5,S6
PHASES USED............1,2,4,5,6
OVERLAPS...............NONE

FIELD CONNECTION 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.	61	21,22	NU	NU	41	42	NU	21,42	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED	*	128			101	101		*	134										
YELLOW		129			102	102			135										
GREEN		130			103	103			136										
RED ARROW																			
YELLOW ARROW	126							132											
GREEN ARROW	127				103			133											
(hand)																			
(walk)																			

NU = Not Used

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	NOT USED	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	Ø4 4C	SLOT EMPTY	SYS S93	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2A				Ø4 4B	NOT USED		SYS S94					ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6A												

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with input card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A[1]	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
2A	TB2-7,8	I2L	43	4	2		
4A	TB4-9,10	I6U	41	11	4	100	3.4
4B	TB4-11,12	I6L	45	12	4	3	
4C	TB6-1,2	I7U	65	13	4		
* S93	TB6-9,10	I9U	60	17	SYS		
* S94	TB6-11,12	I9L	62	18	SYS		
5A[2]	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-7,8	J2L	44	22	6		

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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

[1] Add jumper from I1W to J4W on rear of the input file.

[2] Add jumper from I4W to J1W on rear of the input file.

BACK-UP PROTECTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu, press '3' (Phase Data)

```
SE-PAC PHASE DATA        PRESS # DESIRED

1-VEHICLE TIMES          6-N.LOCK & MISC
2-DENSITY TIMES          7-SPEC. SEQUENCE
3-PEDEST. TIMES          8-SPEC. DETECTOR
4-INIT & N.A. RESP       9-PHASE COPY
5-V & P RECALLS          0-MISC PED OPTIONS

                         F-PRIOR MENU
```

```
PHASE......1...2...3...4...5...6...7...8
 OMIT      2   0   0   0   6   0   0   0
 -YEL      0   0   0   0   0   0   0   0
 OCAL      4   0   0   0   4   0   0   0
 OMIT:## PHS ON OMITS THIS PHASE
  -YEL:## PHS YEL OMITS THIS PHS YEL
  OCAL: WHEN OMIT, DETS CALL## PHS

A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

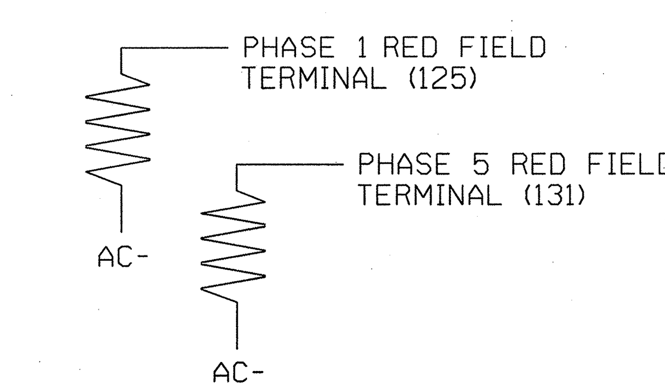
Special Sequence programming complete.

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)



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0009T1
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 1 - TCP Phase 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (Chapel Hill Road)
at
SR 1363 (South Mebane Street)

Division 07 Alamance County Burlington

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch, Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

PLAN DATE: November 2008	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

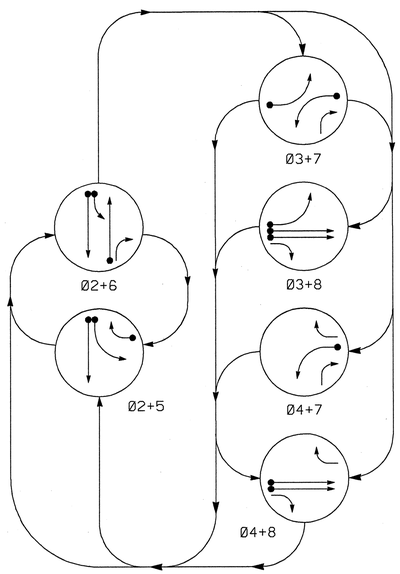
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
12/5/08
SIGNATURE DATE

SIG. INVENTORY NO. 07-0009T1

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 34

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 2 + 5	0 2 + 6	0 3 + 7	0 3 + 8	0 4 + 7	0 4 + 8	FLASH
21	G	G	R	R	R	R	Y
22	G	G	R	R	R	R	Y
31	R	R	←	R	R	R	
41	R	R	←	R	←	R	R
42	→	R	R	R	→	→	R
61	R	G	R	R	R	R	Y
62	R	G	R	R	R	R	Y
81,82	R	R	R	G	R	G	R

LOOP & DETECTOR UNIT INSTALLATION CHART
SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING															
							TIMING			OPERATION MODE										STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER	6 PROTPER LEFT THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	X	-	2	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
						5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8B	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
S93	6X6	4	+200	X	-	-	- SEC.	- SEC.	-	-	-	-	-	-	-	-	-	X	-	X
S94	6X6	4	+200	X	-	-	- SEC.	- SEC.	-	-	-	-	-	-	-	-	-	X	-	X

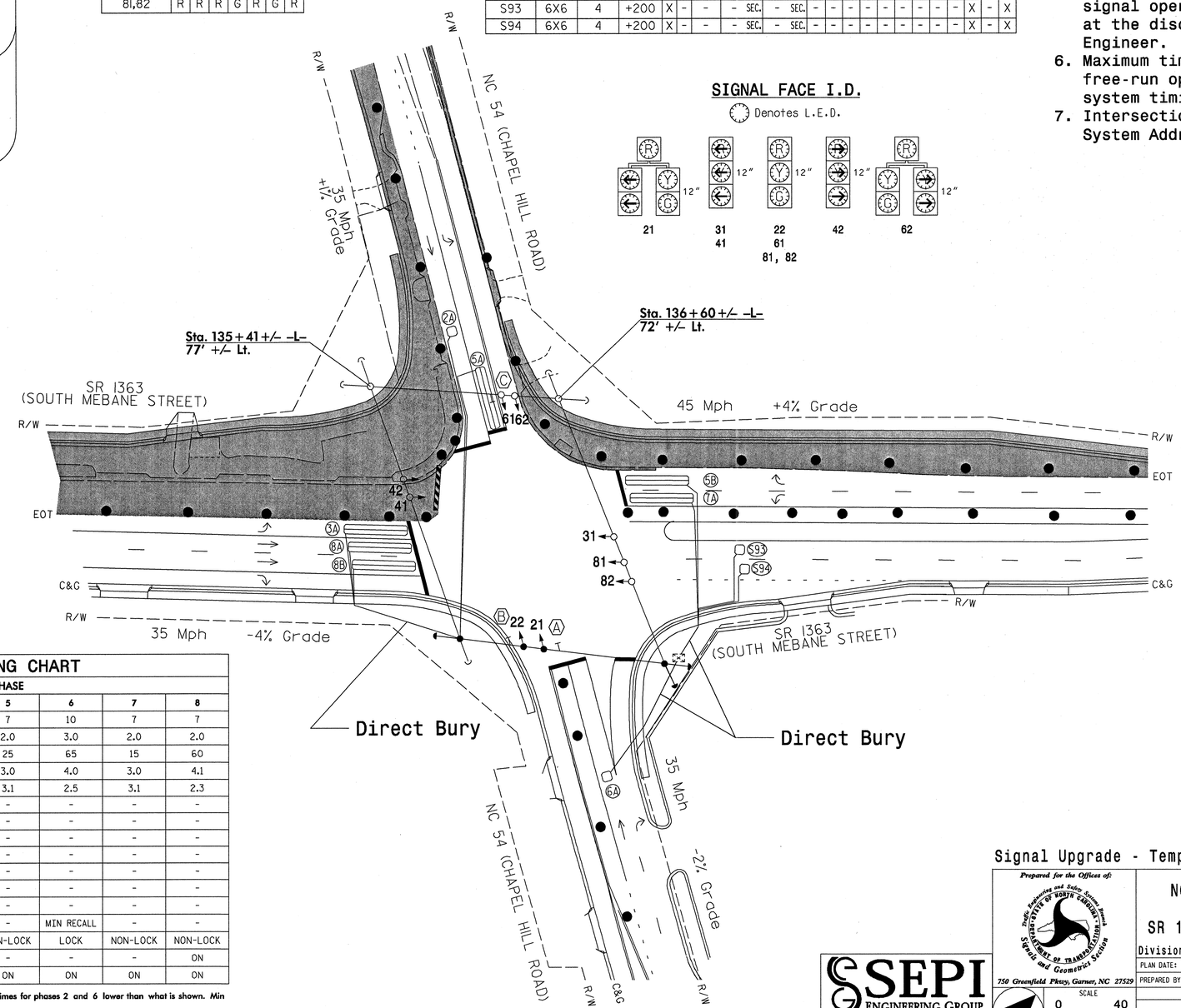
4 Phase
Fully Actuated
(Burlington-Graham Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Thirty days after implementation of the revised signal operation, orange flags may be removed at the discretion of the Regional Traffic Engineer.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Intersection Zone #9 - Channel/Port #4 - System Address #3.

SIGNAL FACE I.D.

Denotes L.E.D.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
Ⓐ	"LEFT TURN YIELD ON GREEN" Sign With Orange Warning Flags (R10-12)	Ⓐ
Ⓑ	No Right Turn Sign With With Orange Warning Flags (R3-1)	Ⓑ
Ⓒ	No Left Turn Sign With With Orange Warning Flags (R3-2)	Ⓒ
	Construction Barrier	N/A
	Construction Drum	N/A
	Construction Zone	N/A

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 2	3	4	5	6	7	8
Min Green *	10	7	7	7	10	7	7
Passage Gap *	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Maximum Green *	65	25	60	25	65	15	60
Yellow Change	3.8	3.0	3.0	3.0	4.0	3.0	4.1
Red Clear	2.3	2.8	3.1	3.1	2.5	3.1	2.3
Walk *	-	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-	-
Added Initial *	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
Dual Entry	-	-	ON	-	-	-	ON
Simultaneous Gap	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 Signal Design 2 - TCP Phase 2

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometric Section, Division of Highways, State of North Carolina, Department of Transportation
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

NC 54 (Chapel Hill Road)
at
SR 1363 (South Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: Hochanadel
PREPARED BY: Eddins	REVIEWED BY: Asefnia

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 11/25/08 DATE

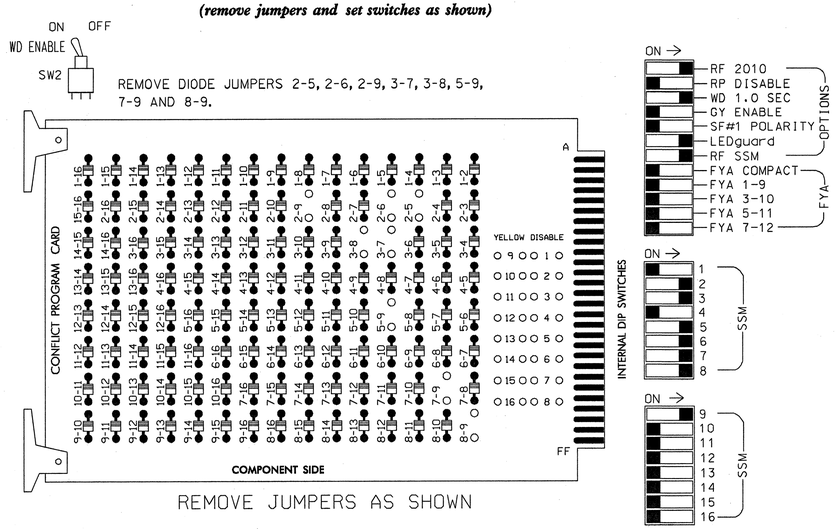
SIG. INVENTORY NO. 07-0009T2

$$$$$$SYSTIME$$$$
$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 35

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

■ = DENOTES POSITION OF SWITCH

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 1,4,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET .....CONTRACTOR SUPPLIED 332 w/ AUX FILE
SOFTWARE SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S3,S4,S5,S6,S7,S8,S9
PHASES USED.....2,3,4,5,6,7,8
OVERLAPS.....OLA=4+5

FIELD CONNECTION HOOK-UP CHART

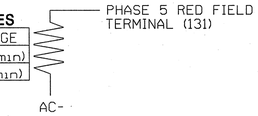
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7		S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7		8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	31	NC	NU	21	61,62	NU	41	62	81,82	NU	42	NU	NU	NU	NU	NU
RED		128					✳	134				107							
YELLOW		129						135				108							
GREEN		130						136				109							
RED ARROW				116						122				A121					
YELLOW ARROW				117			132			123	123			A122					
GREEN ARROW				118			133			124	124			A123					
✋																			
🚶																			

NC = Not Connected
NU = Not Used
✳ Denotes install load resistor. See load resistor installation detail this sheet.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	NOT USED	SLOT	WIRED INPUT ⊗	Ø3 3A	SLOT	SLOT	SLOT	SYS S93	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	Ø2 2A	EMPTY		NOT USED	EMPTY	EMPTY	EMPTY	SYS S94	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	SLOT	SLOT	Ø7 7A	Ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	Ø6 6A	EMPTY	EMPTY	NOT USED	Ø8 8B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
2A	TB2-7,8	I2L	43	4	2		
3A	TB4-5,6	I5U	58	9	3		
✳ S93	TB6-9,10	I9U	60	17	SYS		
✳ S94	TB6-11,12	I9L	62	18	SYS		
5A[1]	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2	3	
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-7,8	J2L	44	22	6		
7A	TB5-5,6	J5U	57	29	7		
8A	TB5-9,10	J6U	42	31	8		
8B	TB5-11,12	J6L	46	32	8		

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

[1] Add jumper from I4W to J1W on rear of the input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SE-PAC2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC         6-ALT SEQUENCES
 2-REMOTE FLASH           7-PORT 1/ITS DATA
 3-OVERLAP STANDARD       8-I/O MISC
 4-OVERLAP SPECIAL        9-SIG DRV OUT
 5-RING STRUCTURE         A-224E STATUS
                          F-PRIOR MENU
```

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

 OVL PHASES:  000110000 0000000
    PHS/CHN:  123456789 0123456789 01234
 OVL CHN(S):  000000000 0001000000 00000


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

OVERLAP PROGRAMMING COMPLETE

PRESS 'F' TO RETURN TO 'UNIT DATA'

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0009T2
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 2 - TCP Phase 2

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signal Management Section, STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 (Chapel Hill Road) at SR 1363 (South Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON
12/5/08
SIGNATURE DATE
SIG. INVENTORY NO. 07-0009T2

$$$$$$$$SYTIME$$$$$$
$$$$$$$$SYDATE$$$$$$
$$$$$$$$SYDIRNAME$$$$$$
$$$$$$$$USERNAME$$$$$$

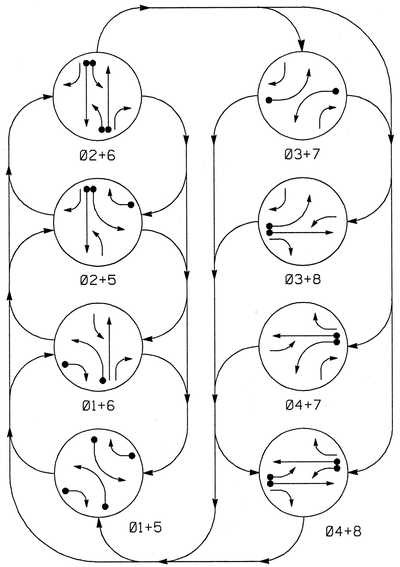
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 36

8 Phase
Fully Actuated
(Burlington-Graham Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Reposition existing signal heads numbered: 21, 61, 62, and 81.
6. Set all detector units to presence mode.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Intersection Zone #9 - Channel/Port #4 - System Address #3.

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←	←	F	F	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/	/R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	F	F	~~R~~
41	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~~	~~R~~
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/	R	R/	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	F	←	F	~~R~~
81	R	R	R	R	R	G	R	G	R
82	R/	R/	R	R	R	G	R	G	R

F = FLASHING YELLOW ARROW

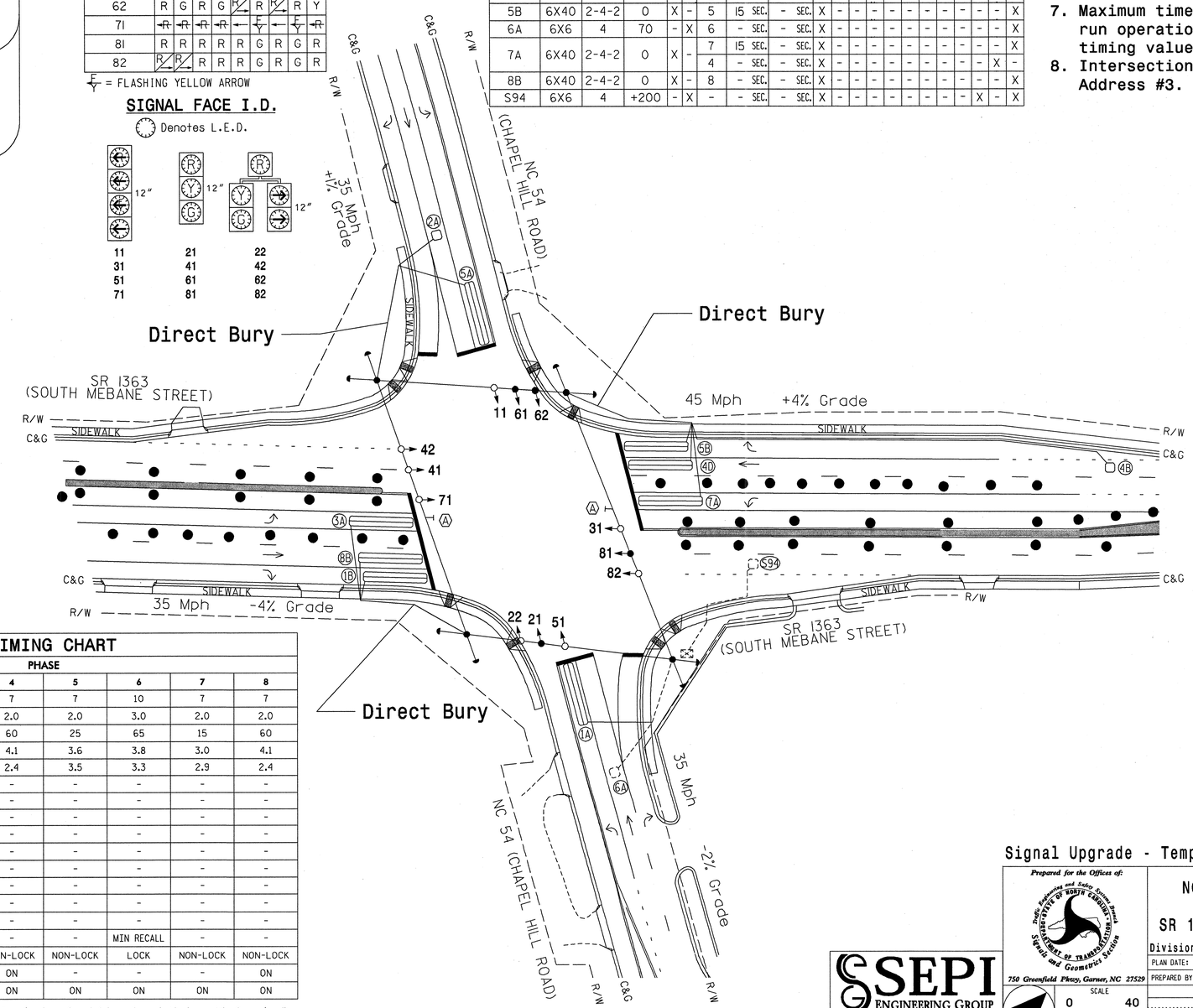
SIGNAL FACE I.D.

Denotes L.E.D.

LOOP & DETECTOR UNIT INSTALLATION CHART

SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE									STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTER LEFT	6 PROTER THROUGH	7 AND	SWITCH	SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
						6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
1B	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
						8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
4B	6X6	5	300	X	-	4	100 SEC.	3.4 SEC.	X	-	-	-	-	-	-	-	-	-	X	-
4D	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
5A	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
						2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
6A	6X6	4	70	-	X	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
						4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X	-
8B	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	-	X
S94	6X6	4	+200	-	X	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	-	X



STANDARD SIGNAL FACE CLEARANCES FOR 4 SECTION LEFT TURN SIGNAL

FROM	TO ← 1	TO ← 2	TO F 1	TO F 2	TO ~~R~~ 1	TO ~~R~~ 2
←	←	←	Y	R	Y	R
F	F	F	F	F	Y	R
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

F = FLASHING YELLOW ARROW

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
	Construction Barrier	N/A
	Construction Drum	N/A
	Construction Zone	N/A
	"U Turn Yield to Right Turn" Sign (R10-16)	

SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	10	7	7	7	10	7	7
Passage Gap *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Maximum Green *	30	65	25	60	25	65	15	60
Yellow Change	3.4	3.8	3.0	4.1	3.6	3.8	3.0	4.1
Red Clear	3.5	3.3	3.1	2.4	3.5	3.3	2.9	2.4
Walk *	-	-	-	-	-	-	-	-
Pedestrian Clear	-	-	-	-	-	-	-	-
Dynamic MaxMax3	-	-	-	-	-	-	-	-
Dynamic Max Adjust	-	-	-	-	-	-	-	-
Added Initial *	-	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

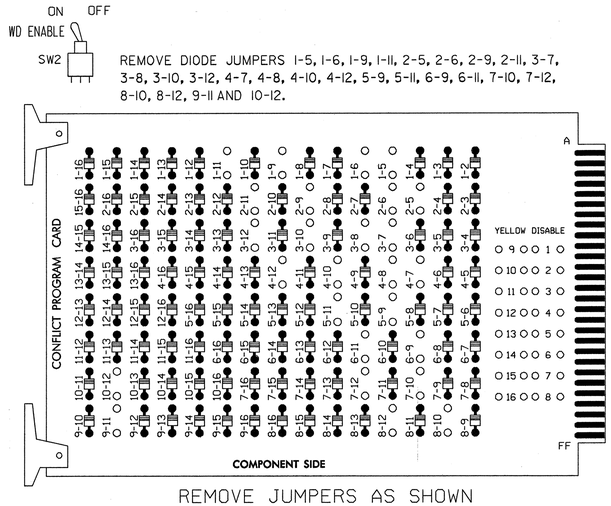
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

$$$$$$SYSTIME$$$$
$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 37

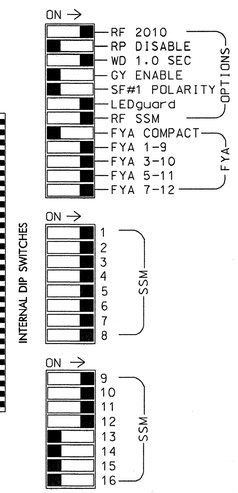
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(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



■ = DENOTES POSITION OF SWITCH

NOTES:

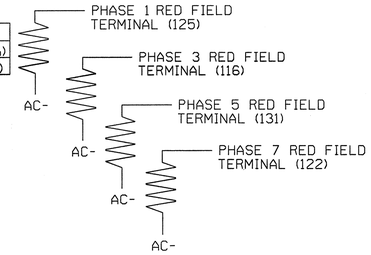
1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

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)



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

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	82 ★	21,22	NU	22	31 ★	41,42	NU	42	51 ★	61,62	NU	62	71 ★	81,82	NU	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				123				A122	A125		A115	A102	
FLASHING YELLOW ARROW																	A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133	133			124	124								
✋																						
🚶																						

NU = Not Used

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

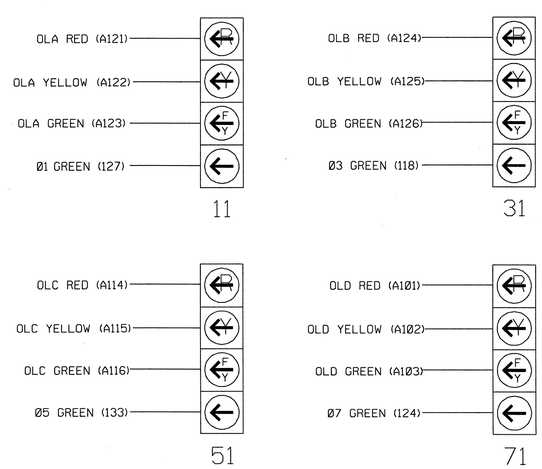
★ See pictorial of head wiring in detail this sheet.

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 13,14, 15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham Signal System.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
SOFTWARE.....SE-PAC2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S12,S13
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0009T3
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Temporary Signal Design 3 - TCP Phase 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (Chapel Hill Road) at SR 1363 (South Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton

PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of: Traffic, Engineering and Safety Systems Branch, Signal Management Section, Division of Highways, State of North Carolina, Department of Transportation

750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

12/5/08

SIGNATURE DATE

SIG. INVENTORY NO. 07-0009T3

$$$$$$SIGNATURE$$$$$$
$$$$$$SIGNATURE$$$$$$
$$$$$$USERNAME$$$$$$

SE-PAC2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC         6-ALT SEQUENCES
 2-REMOTE FLASH           7-PORT 1/ITS DATA
 3-OVERLAP STANDARD       8-I/O MISC
 4-OVERLAP SPECIAL        9-SIG DRV OUT
 5-RING STRUCTURE         A-224E STATUS
                                F-PRIOR MENU
```

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

 OVL PHASES:   000000000 0000000
    PHS/CHN:   123456789 0123456789 01234
 OVL CHN(S):   000000000 0001000000 00000

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

PRESS DOWN ARROW KEY

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

 OVL PHASES:   000000000 0000000
    PHS/CHN:   123456789 0123456789 01234
 OVL CHN(S):   000000000 0000100000 00000

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

PRESS DOWN ARROW KEY

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

 OVL PHASES:   000000000 0000000
    PHS/CHN:   123456789 0123456789 01234
 OVL CHN(S):   000000000 0000010000 00000

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

PRESS DOWN ARROW KEY

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

 OVL PHASES:   000000000 0000000
    PHS/CHN:   123456789 0123456789 01234
 OVL CHN(S):   000000000 0000001000 00000

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

PRESS "F" FOR PRIOR MENU

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC         6-ALT SEQUENCES
 2-REMOTE FLASH           7-PORT 1 DATA
 3-OVERLAP STANDARD       8-I/O MISC
 4-OVERLAP SPECIAL        9-SIG DRV OUT
 5-RING STRUCTURE         A-224E STATUS
                                F-PRIOR MENU
```

```
SE-PAC OVLP.A...B...C...D...E...F...G...H.
   TR GRN   00  00  00  00  00  00  00  00
   YEL/10   40  40  40  40  40  40  40  40
   RED/10   20  20  20  20  20  20  20  20
   -G/Y      1   3   5   7   0   0   0   0
   +GRN      2   4   6   8   0   0   0   0
(-) #-PH G/Y KILLS OVLP= (=) #-PH G STRT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0009T3
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	SLOT EMPTY	WIRED INPUT ⊗	Ø3 3A	NOT USED	NOT USED	WIRED INPUT ⊗	NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2A			NOT USED	Ø4 4B	Ø4 4D		SYS S94					ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	SLOT EMPTY	WIRED INPUT ⊗	Ø7 7A	NOT USED	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6A			NOT USED	Ø8 8B								

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with input card

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A[1]	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
1B	TB2-5,6	I2U	39	3	1	15	
2A	TB2-7,8	I2L	43	4	2		
3A[2]	TB4-5,6	I5U	58	9	3	15	
	-	J8U	50	35	8		
4B	TB4-11,12	I6L	45	12	4	100	3.4
4D	TB6-3,4	I7L	78	14	4		
* S94	TB6-11,12	I9L	62	18	SYS		
5A[3]	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-7,8	J2L	44	22	6		
7A[4]	TB5-5,6	J5U	57	29	7	15	
	-	I8U	49	15	4		
8B	TB5-11,12	J6L	46	32	8		

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

[1] Add jumper from I1W to J4W on rear of the input file.

[2] Add jumper from I5W to J8W on rear of the input file.

[3] Add jumper from I4W to J1W on rear of the input file.

[4] Add jumper from I8W to J5W on rear of the input file.

Signal Upgrade - Temporary Signal Design 3 - TCP Phase 3

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: State of North Carolina Department of Transportation Traffic Engineering and Safety Systems Branch Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 (Chapel Hill Road)
at
SR 1363 (South Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton
PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

12/5/08

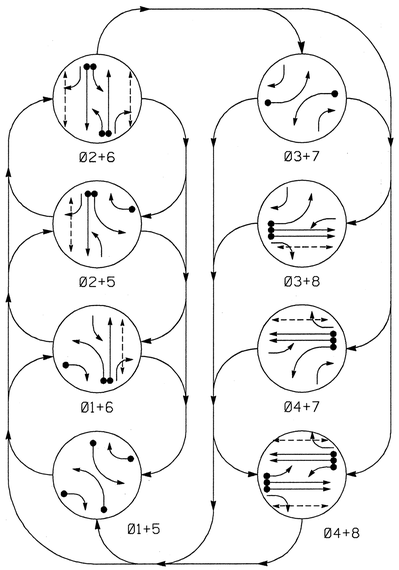
SIGNATURE DATE

SIG. INVENTORY NO. 07-0009T3

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 39

8 Phase
Fully Actuated
(Burlington-Graham Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←(G)	←(G)	F↓(Y)	F↓(Y)	~~←(R)~~	~~←(R)~~	~~←(R)~~	~~←(R)~~	~~←(R)~~
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R↗	R↗	R	R	Y
31	~~←(R)~~	~~←(R)~~	~~←(R)~~	~~←(R)~~	←(G)	←(G)	F↓(Y)	F↓(Y)	~~←(R)~~
41	R	R	R	R	R	R	G	G	R
42	R↗	R	R↗	R	R	R	G	G	R
51	←(G)	F↓(Y)	←(G)	F↓(Y)	~~←(R)~~	~~←(R)~~	~~←(R)~~	~~←(R)~~	~~←(R)~~
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R↗	R	R↗	R	Y
71	~~←(R)~~	~~←(R)~~	~~←(R)~~	~~←(R)~~	←(G)	F↓(Y)	←(G)	F↓(Y)	~~←(R)~~
81	R	R	R	R	R	G	R	G	R
82	R↗	R↗	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

F↓(Y) = FLASHING YELLOW ARROW

W - WALK
DW - DON'T WALK
DRK - DARK

LOOP & DETECTOR UNIT INSTALLATION CHART

SE-PAC 2070 CONTROLLER WITH 170 CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		OPERATION MODE									STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	ASSIGNED PHASE	DELAY	EXTEND (STRETCH)	0 VEHICLE	1 PEDESTRIAN	2 1 CALL	3 STOP A	4 STOP B	5 PROTPER LEFT	6 PROTPER THROUGH	7 AND	SWITCH SYSTEM LOOPS	NEW	EXISTING
1A	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
						6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
1B	6X40	2-4-2	0	X	-	1	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
						8	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
4A	6X6	5	300	X	-	4	100 SEC.	3.4 SEC.	X	-	-	-	-	-	-	-	-	X	-
4B	6X6	5	300	X	-	4	100 SEC.	3.4 SEC.	X	-	-	-	-	-	-	-	-	-	X
4C	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
4D	6X40	2-4-2	0	X	-	4	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
5A	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
						2	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
5B	6X40	2-4-2	0	X	-	5	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
6A	6X6	3	70	X	-	6	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	15 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
						4	3 SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	X	-
8B	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	X	-	-	-	-	-	-	-	-	-	X
S93	6X6	3	+200	X	-	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	X
S94	6X6	3	+200	X	-	-	- SEC.	- SEC.	X	-	-	-	-	-	-	-	X	-	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 "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. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Intersection Zone #9 - Channel/Port #4 - System Address #3

STANDARD SIGNAL FACE CLEARANCES FOR 4 SECTION LEFT TURN SIGNAL

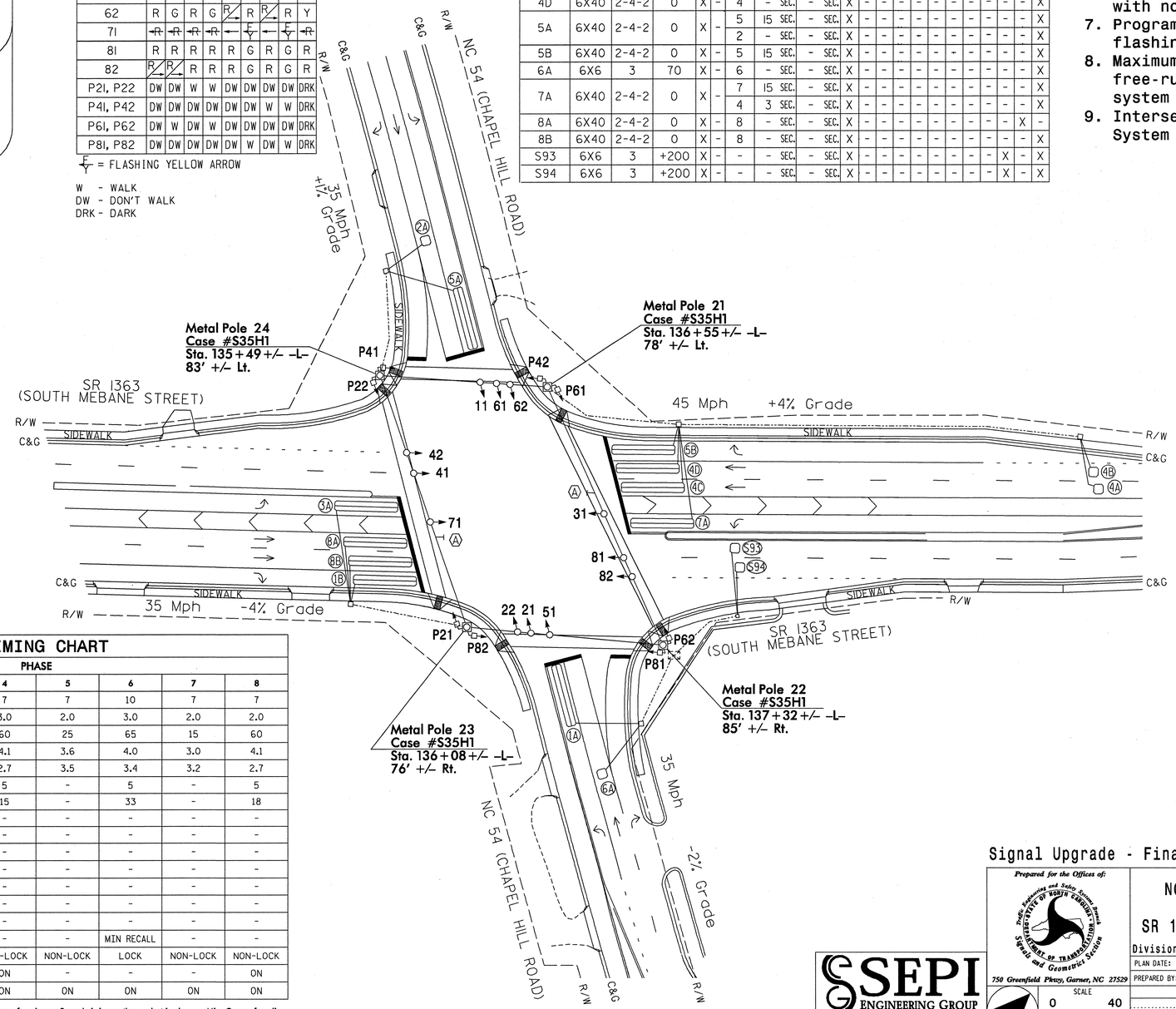
FROM	TO ← (1)	TO ← (2)	TO F↓ (1)	TO F↓ (2)	TO ~~←~~ (1)	TO ~~←~~ (2)
←	←	←	~~Y~~	~~R~~	~~Y~~	~~R~~
F↓	F↓	F↓	F↓	F↓	~~Y~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

F↓ = FLASHING YELLOW ARROW

SIGNAL FACE I.D.

Denotes L.E.D.

11	21	22	P21, P22
31	41	42	P41, P42
51	61	62	P61, P62
71	81	82	P81, P82



SE-PAC 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	10	7	7	7	10	7	7
Passage Gap *	2.0	3.0	2.0	3.0	2.0	3.0	2.0	2.0
Maximum Green *	30	65	25	60	25	65	15	60
Yellow Change	3.4	4.0	3.0	4.1	3.6	4.0	3.0	4.1
Red Clear	3.5	3.4	3.3	2.7	3.5	3.4	3.2	2.7
Walk *	-	5	-	5	-	5	-	5
Pedestrian Clear	-	29	-	15	-	33	-	18
Dynamic Max/Max3	-	-	-	-	-	-	-	-
Dynamic Max Adjust	-	-	-	-	-	-	-	-
Added Initial *	-	-	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
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.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way with Marker	
	Directional Arrow	
	Metal Strain Pole	
	Wheelchair Ramp	N/A
	"U Turn Yield to Right Turn" Sign (R10-16)	

Signal Upgrade - Final Design

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40 1"=40'

NC 54 (Chapel Hill Road)
at
SR 1363 (South Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008	REVIEWED BY: Hochanadel
PREPARED BY: Eddins	REVIEWED BY: Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE DATE 11/21/08

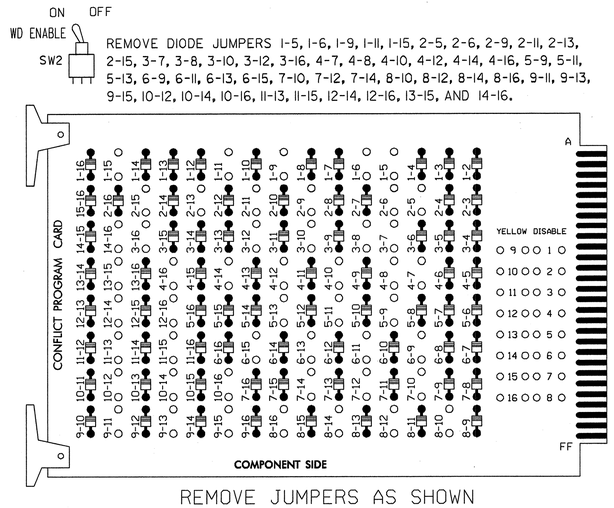
SIG. INVENTORY NO. 07-0009

07-0009.dgn 11/21/2008 3:33:13 PM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 40

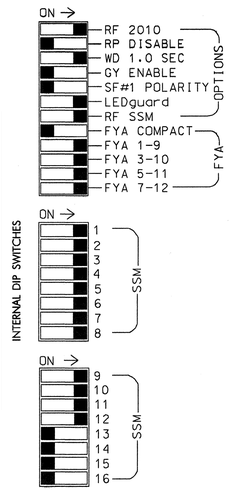
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-7, 3-8, 3-10, 3-12, 3-16, 4-7, 4-8, 4-10, 4-12, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 7-10, 7-12, 7-14, 8-10, 8-12, 8-14, 8-16, 9-11, 9-13, 9-15, 10-12, 10-14, 10-16, 11-13, 11-15, 12-14, 12-16, 13-15, AND 14-16.

REMOVE JUMPERS AS SHOWN



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

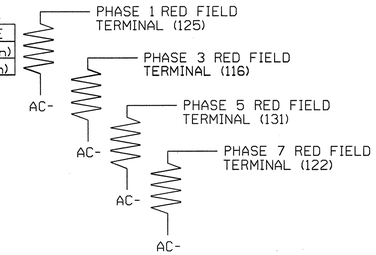
■ = DENOTES POSITION OF SWITCH

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)



NOTE: The purpose of these resistors is to load the channel red monitor inputs 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.

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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	82 ★	21,22	P21, P22	22	31 ★	41,42	P41, P42	42	51 ★	61,62	P61, P62	62	71 ★	81,82	P81, P82	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				123				A122	A125		A115	A102	
FLASHING YELLOW ARROW																	A123	A126		A116	A103	
GREEN ARROW	127	127			118	118			133	133			124	124								
✋				113				104				119				110						
🚶				115				106				121				112						

NU = Not Used

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

★ See pictorial of head wiring in detail this page.

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 13,14, 15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program controller to start up in phases 2 and 6 green.
4. Enable simultaneous gap-out feature, on controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for dual entry.
6. The cabinet and controller are part of the Burlington-Graham Signal System.

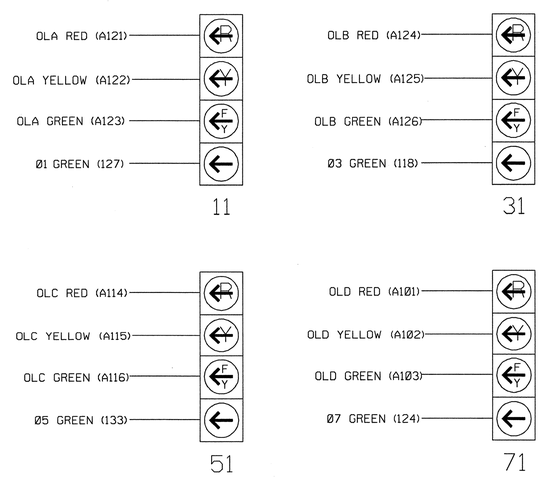
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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.

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

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED EAGLE 2070
CABINET.....CONTRACTOR SUPPLIED 332 W/AUX
SOFTWARE.....SE-PAC2070
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,S8P,S9,S10,S12,S13
PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED,7, 8,8PED
OVERLAP "A".....1+2
OVERLAP "B".....3+4
OVERLAP "C".....5+6
OVERLAP "D".....7+8

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0009
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

Signal Upgrade - Final Design

Electrical Detail Page 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54 (Chapel Hill Road) at SR 1363 (South Mebane Street)

Division 07 Alamance County Burlington

PLAN DATE: November 2008 REVIEWED BY: J O Deaton

PREPARED BY: M W Yalch REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, Signal Management Section, Department of Transportation, State of North Carolina

750 N. Greenfield Pkwy, Garner, NC 27529

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

12/5/08

SIGNATURE DATE

SIG. INVENTORY NO. 07-0009

$$$$USERNAME$$$$ $$$$SYSTIME$$$$ $$$$SYSDATE$$$$

07-0009Fe-02-098.dgn 12/5/2008 8:00:18 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 41

SE-PAC2070 OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 4 (UNIT DATA)

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC         6-ALT SEQUENCES
 2-REMOTE FLASH           7-PORT 1/ITS DATA
 3-OVERLAP STANDARD       8-I/O MISC
 4-OVERLAP SPECIAL        9-SIG DRV OUT
 5-RING STRUCTURE         A-224E STATUS
                                F-PRIOR MENU
```

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

 OVL PHASES:   000000000 0000000
    PHS/CHN:   123456789 0123456789 01234
 OVL CHN(S):   000000000 0001000000 00000


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

PRESS DOWN ARROW KEY

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

 OVL PHASES:   000000000 0000000
    PHS/CHN:   123456789 0123456789 01234
 OVL CHN(S):   000000000 0000100000 00000


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

PRESS DOWN ARROW KEY

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

 OVL PHASES:   000000000 0000000
    PHS/CHN:   123456789 0123456789 01234
 OVL CHN(S):   000000000 0000010000 00000


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

PRESS DOWN ARROW KEY

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

 OVL PHASES:   000000000 0000000
    PHS/CHN:   123456789 0123456789 01234
 OVL CHN(S):   000000000 0000001000 00000


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

PRESS "F" FOR PRIOR MENU

```
SE-PAC UNIT DATA          PRESS # DESIRED

 1-STARTUP & MISC         6-ALT SEQUENCES
 2-REMOTE FLASH           7-PORT 1 DATA
 3-OVERLAP STANDARD       8-I/O MISC
 4-OVERLAP SPECIAL        9-SIG DRV OUT
 5-RING STRUCTURE         A-224E STATUS
                                F-PRIOR MENU
```

```
SE-PAC OVLP.A...B...C...D...E...F...G...H.
   TR GRN  00  00  00  00  00  00  00  00
   YEL/10  40  40  40  40  40  40  40  40
   RED/10  20  20  20  20  20  20  20  20
 -G/Y       1   3   5   7   0   0   0   0
 +GRN       2   4   6   8   0   0   0   0
(-) #-PH G/Y KILLS OVLP= (=) #-PH G STRT
A-UP B-DN C-LT D-RT E-ENTER F-PRIOR MENU
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0009
DESIGNED: November 2008
SEALED: November 25, 2008
REVISED: TBD

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	SLOT EMPTY	WIRED INPUT ⊗	Ø3 3A	Ø4 4A	Ø4 4C	WIRED INPUT ⊗	SYS S93	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø2 2A			NOT USED	Ø4 4B	Ø4 4D		SYS S94			Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	SLOT EMPTY	WIRED INPUT ⊗	Ø7 7A	Ø8 8A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6A			NOT USED	Ø8 8B								

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with input card

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	DELAY TIME	EXTEND (STRETCH) TIME
1A[1]	TB2-1,2	I1U	56	1	1	15	
	-	J4U	48	25	6		
1B	TB2-5,6	I2U	39	3	1	15	
2A	TB2-7,8	I2L	43	4	2		
3A[2]	TB4-5,6	I5U	58	9	3	15	
	-	J8U	50	35	8	3	
4A	TB4-9,10	I6U	41	11	4	100	3.4
4B	TB4-11,12	I6L	45	12	4	100	3.4
4C	TB6-1,2	I7U	65	13	4		
4D	TB6-3,4	I7L	78	14	4		
* S93	TB6-9,10	I9U	60	17	SYS		
* S94	TB6-11,12	I9L	62	18	SYS		
5A[3]	TB3-1,2	J1U	55	19	5	15	
	-	I4U	47	7	2		
5B	TB3-5,6	J2U	40	21	5	15	
6A	TB3-7,8	J2L	44	22	6		
7A[4]	TB5-5,6	J5U	57	29	7	15	
	-	I8U	49	15	4	3	
8A	TB5-9,10	J6U	42	31	8		
8B	TB5-11,12	J6L	46	32	8		
PED PUSH BUTTONS							
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED		
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED		
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED		
P81,P82	TB8-8,9	I13L	70	PED 8	8 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.

[1] Add jumper from I1W to J4W on rear of the input file.

[2] Add jumper from I5W to J8W on rear of the input file.

[3] Add jumper from I4W to J1W on rear of the input file.

[4] Add jumper from I8W to J5W on rear of the input file.

Signal Upgrade - Final Design

Electrical Detail Page 2 of 2

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: Traffic Engineering and Safety Systems Branch, State of North Carolina, Department of Transportation, Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

NC 54 (Chapel Hill Road)
at
SR 1363 (South Mebane Street)

Division 07 | Alamance County | Burlington

PLAN DATE: November 2008	REVIEWED BY: J O Deaton		
PREPARED BY: M W Yalch	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 07438 ENGINEER JAMES O. DEATON

12/5/08

SIGNATURE | DATE

SIG. INVENTORY NO. 07-0009

$$$$$$SYSTIME$$$$
$$$$$$SYSDATE$$$$
$$$$$$SYSDGN$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$SIGENAME$$$$

07-0009Fe-02-098.dgn 12/5/2008 7:59:44 AM

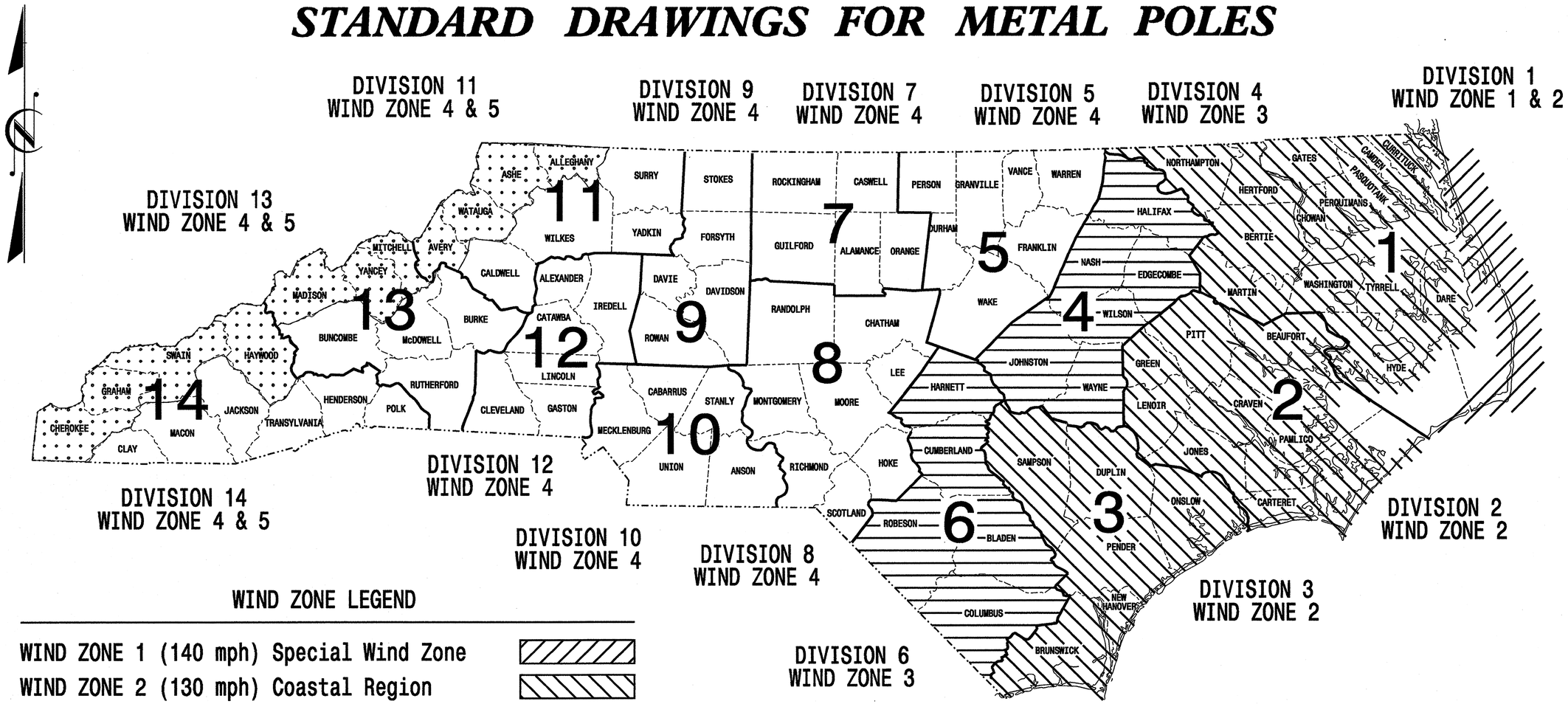
STATE	PROJECT NO.	SHEET NO.
N.C.	U-3303	Sig. 42
F. A. PROJ. NO.		M 1
PROJECT ID. NO.		

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR METAL POLES

POLE STANDARDS

NCDOT METAL



WIND ZONE LEGEND

- WIND ZONE 1 (140 mph) Special Wind Zone
- WIND ZONE 2 (130 mph) Coastal Region
- WIND ZONE 3 (110 mph) Eastern Region
- WIND ZONE 4 (90 mph) Central & Mtn. Region
- WIND ZONE 5 (120 mph) Special Wind Zone

http://www.ncdot.org/doh/preconstruct/traffic/tmssu/ws/default.htm

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section

122 N. McDowell St., Raleigh, NC 27603

Designed in conformance with the 2002 Interim to the 4th Edition 2001

AASHTO

Standard Specifications for Structural Supports for Highway Signs, Luminares, and Traffic Signals

INDEX OF PLANS

DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details – All Poles
M 3	Fabrication Details – Strain Poles
M 4,5	Fabrication Details – Mast Arm Poles
M 6	Construction Details – Strain Poles
M 7	Construction Details – Foundations
M 8	Standard Strain Poles

NCDOT CONTACTS:

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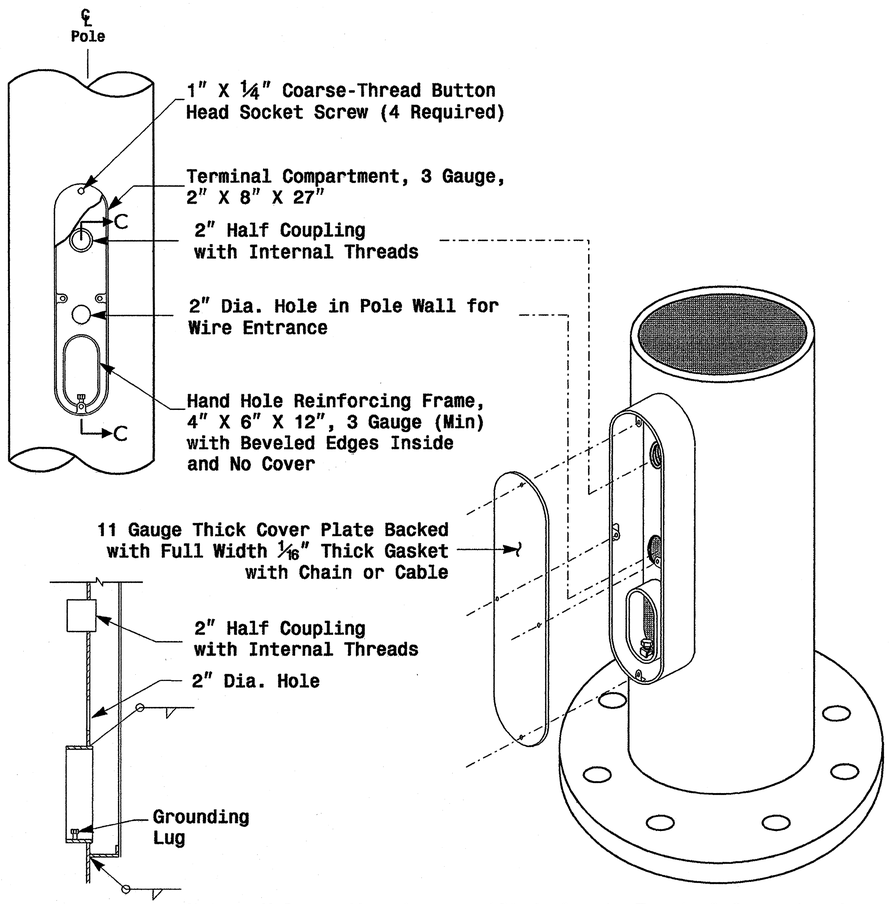
R. E. Mullinax, P.E. – Signals and Geometrics Engineer
P. L. Alexander, P.E. – Signals and Geometrics Special Projects Engineer
D. C. Sarkar, P.E. – Signals and Geometrics Structural Engineer
A. M. Esposito, P.E. – Signals and Geometrics Project Engineer
C. F. Andrews, Jr. – Signals and Geometrics Project Engineer

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026094 ENGINEER DEBESH C. SARKAR

D. Sarkar — SIGNATURE
9.2.2005 — DATE

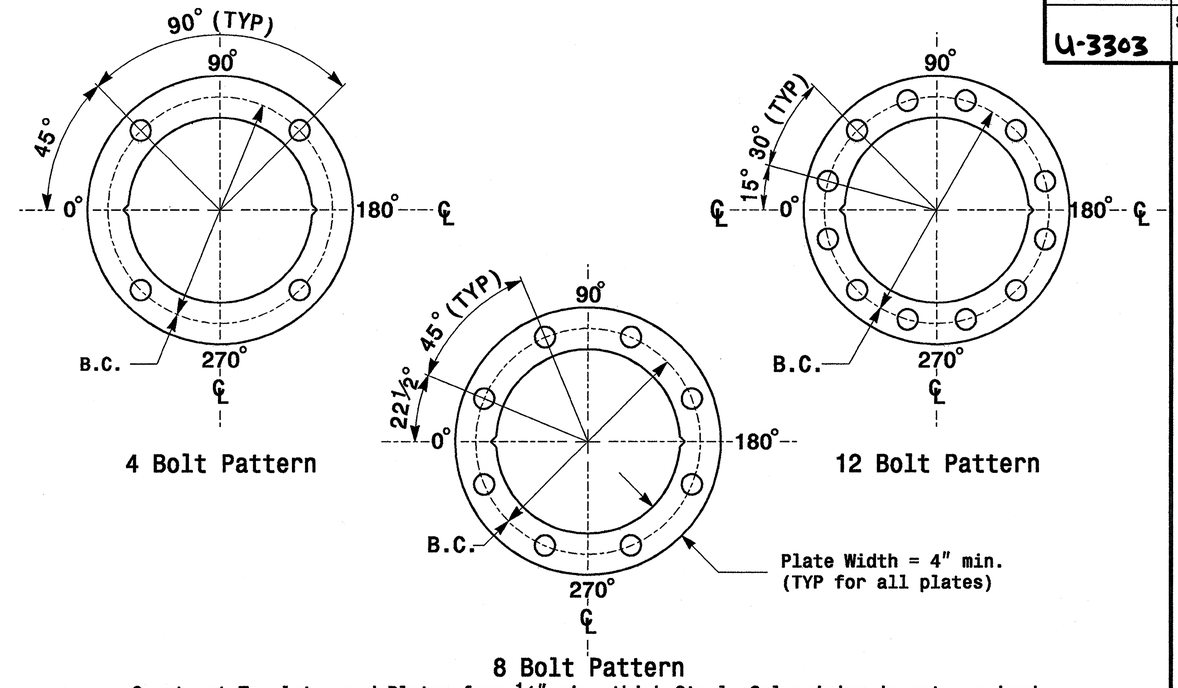
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 43 M 2



Section C-C

Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail



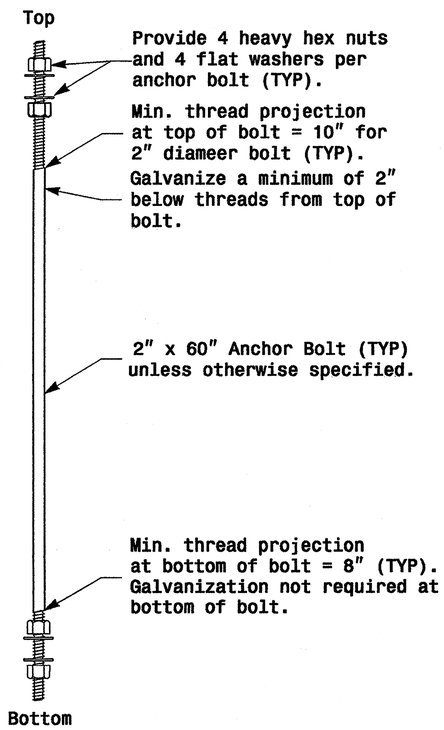
4 Bolt Pattern

12 Bolt Pattern

8 Bolt Pattern

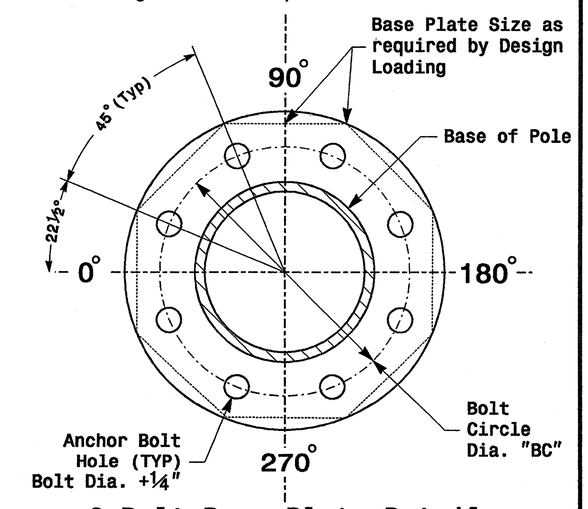
Construct Templates and Plates from ¼" min. thick Steel. Galvanizing is not required.

Base Plate Template and Anchor Bolt Lock Plate Details



Anchor Bolt Detail

Note: See Strain Pole drawing M3 and Mast arm drawing M4 for base plate weld details.



8 Bolt Base Plate Detail

MFG _____ MFG. DATE: MM/YY
SHAFT D/T/L/Y ----/----/----/----
ARM-A D/T/L/Y ----/----/----/----
----/----/----/----
ARM-B D/T/L/Y ----/----/----/----
----/----/----/----
A.B. DIA./B.C./L/Y ----/----/----/----
NCDOT STANDARD ----------

Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

MFG _____ MFG. DATE: MM/YY
SECTION D/T/L/Y ----/----/----/----
NCDOT STANDARD ----------

Arm I.D. Tag
(Provide on each section of a multi-section mast arm)

Notes:
1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
2) A.B. = Anchor Bolt
3) B.C. = Bolt Circle of Anchor Bolts
4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
5) See drawing M4 for mounting positions of I.D. tags.

Identification Tag Details

Fabrication Details – All Poles

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Traffic Management Unit, Department of Transportation, State of North Carolina, Signals and Geometrics Section, 122 N. McDowell St., Raleigh, NC 27603

Typical Fabrication Details Common To All Metal Poles

PLAN DATE: May 2005	REVIEWED BY: C.F. Andrews
PREPARED BY: P.L. Alexander	REVIEWED BY: A.W. Esposito

SCALE: 0 NA — NONE

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DIBESH C. SARKAR

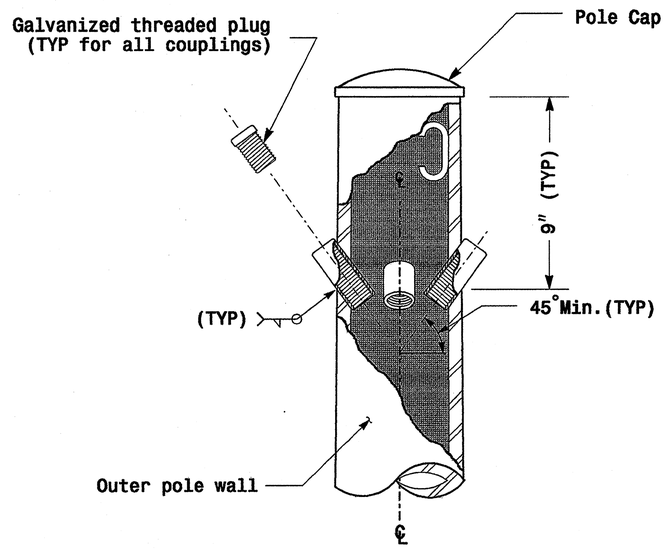
D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

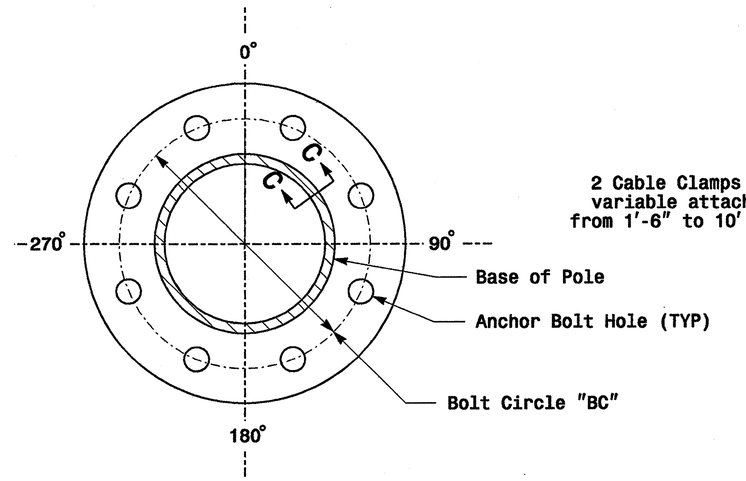
01-SEP-2005 18:22
D:\e3004_sig\m3_Pole Standards\e3004 m2 thru m5.dgn
candrews

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 44 M 3

Fabrication Details – Strain Poles



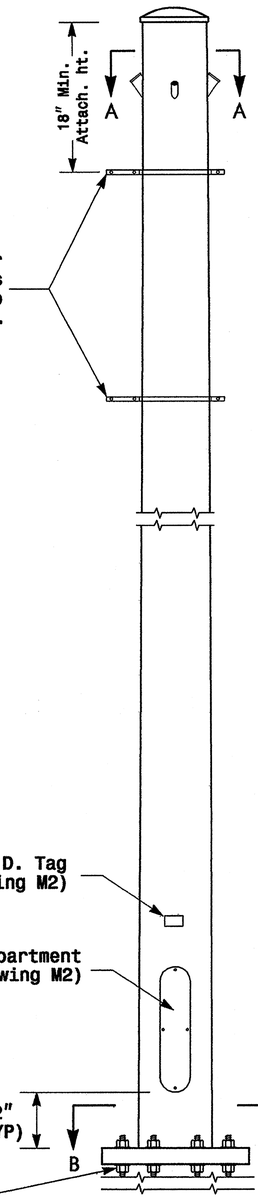
Cable Entrances at Top of Pole



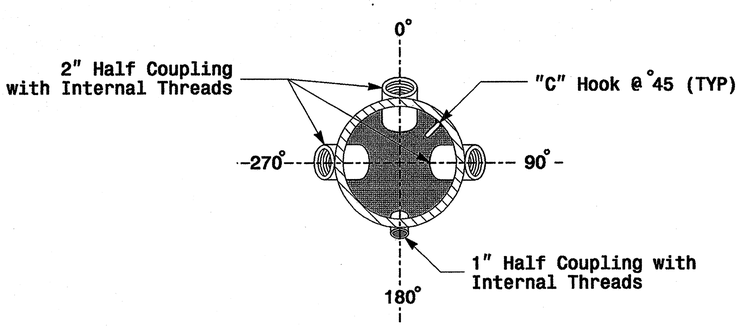
Section B-B

(See drawing M2)

Pole Base Plate

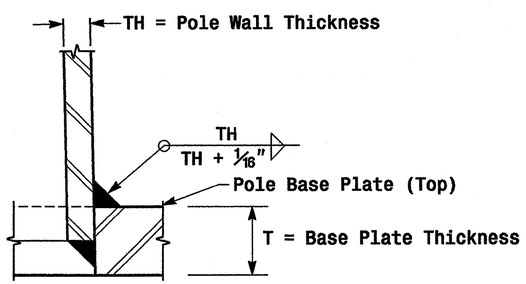


Monotube Strain Pole
(.14"/Foot Taper)



Section A-A

Radial Orientation for Factory Installed Accessories at Top of Pole



Section C-C

Socket Connection Weld Detail

Prepared in the Offices of:
Structures Management Unit
Structure and Safety Engineering Section
Department of Transportation
Geotechnical Section
1122 N. McDowell St., Raleigh, NC 27603

Typical Fabrication Details
For Strain Poles

PLAN DATE:	May 2005	REVIEWED BY:	C.F. Andrews
PREPARED BY:	P.L. Alexander	REVIEWED BY:	A.W. Esposito

REVISIONS	INIT.	DATE

SCALE: 0 NA — NONE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBDESH C. SARKAR

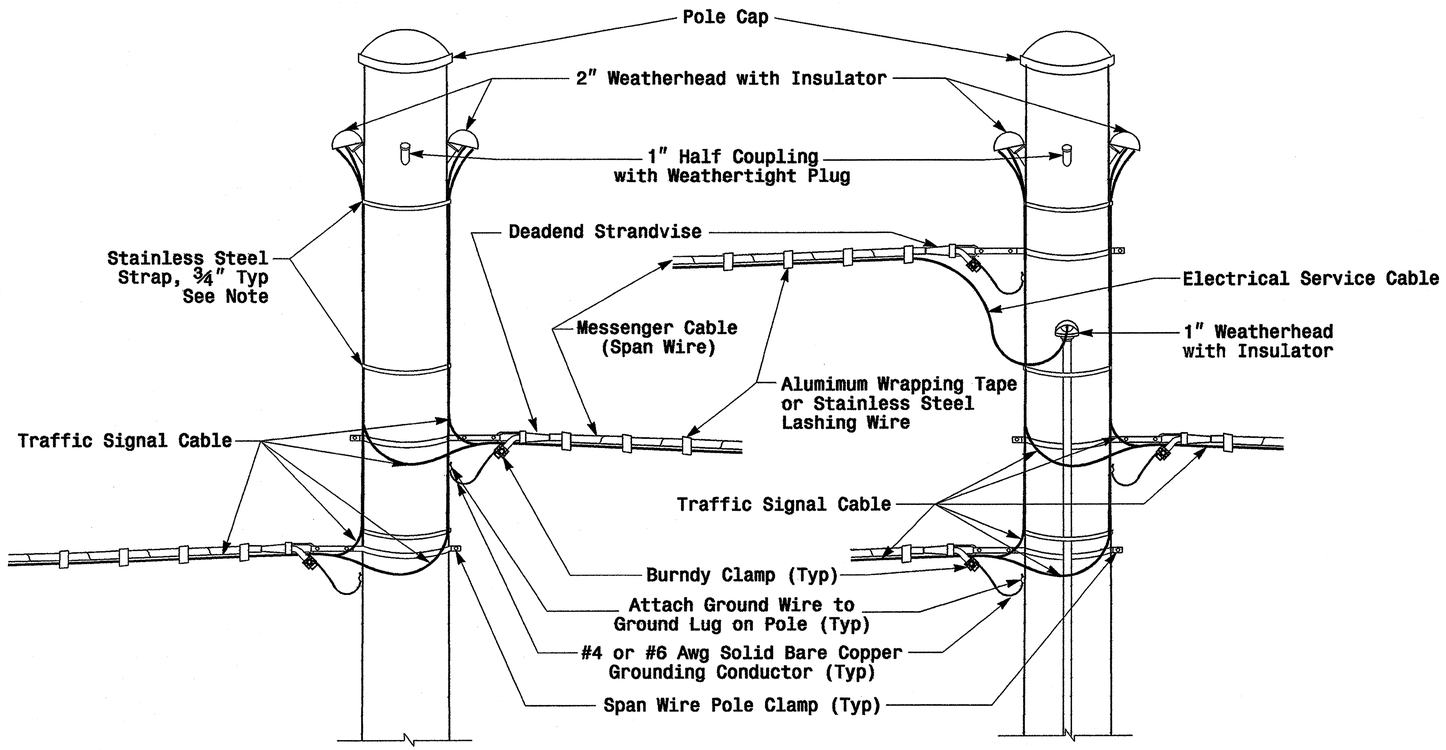
D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

01-SEP-2005 14:07
w:\pseudles-unit\workgroups\2004 metal pole standards\2004 m3.dgn
pslaxander

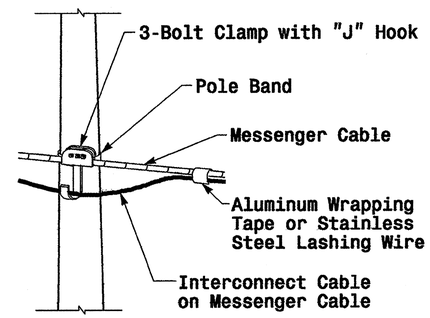
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 45 M 6

Construction Details — Strain Poles

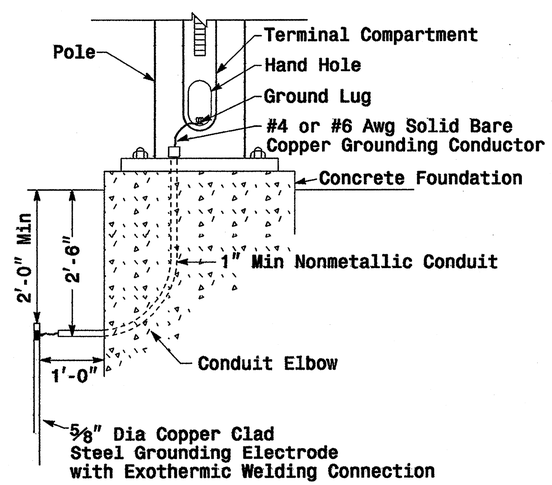


Note: Strap all signal cables to the side of the pole with ¾" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, Division of Highways, State of North Carolina, Department of Transportation, 122 N. McDowell St., Raleigh, NC 27603

Construction Details
Strain Poles

PLAN DATE: May 2005	REVIEWED BY: P.L. ALEXANDER
PREPARED BY: C.F. ANDREWS	REVIEWED BY: D.C. SARKAR

REVISIONS	INIT.	DATE

SCALE: 0 NA — NONE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 016286 ENGINEER MILTON L. DEAN

SIGNATURE: Milton L. Dean DATE: 9-1-05

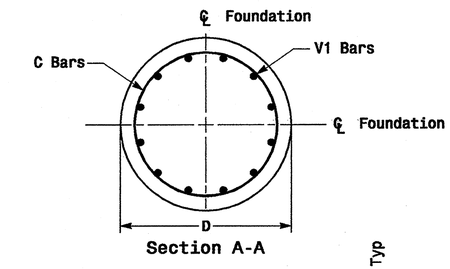
SIG. INVENTORY NO.

01-SEP-2005 16:33
w:\signals-unit\workgroups\2004 metal pole standards\2004 ms.dgn
palexander

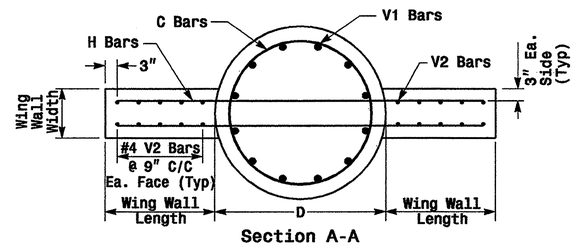
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig.46 M 7

Construction Details – Foundations

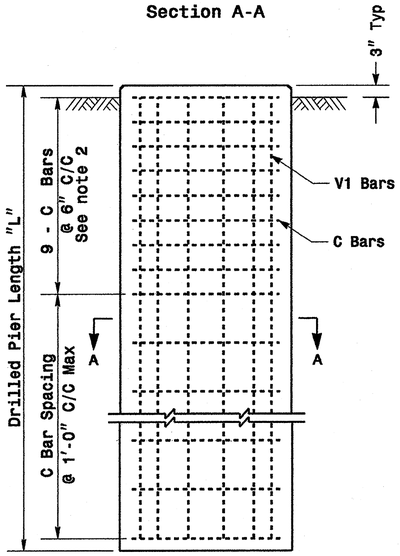
Reinforcing Steel Bars

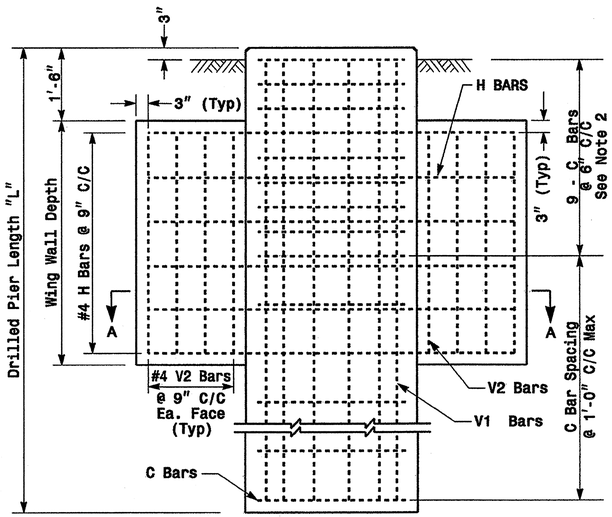


Section A-A



Section A-A



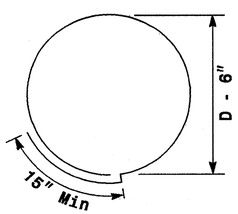


REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (42" & 48" DIAMETER)						
Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* See Note No. 1
** See Note No. 3

REINFORCING STEEL TABLE FOR STANDARD 42" and 48" DRILL PIER SHAFT WITH TYPE 1 AND TYPE 2 WING WALLS						
Wing Wall Type	Drill Pier Shaft Dia. (in.)	Reinforcing Steel				
		Bar Name	No.	Size	Type	Length
TYPE 1	42"	V1	9	#8	STR.	**
		V2	12	#4	STR.	2'-6"
		H	8	#4	STR.	6'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	42"	V1	9	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	48"	V1	12	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-6"
		C	*	#4	CIR.	12'-6"

* See Note No. 1
** See Note No. 3



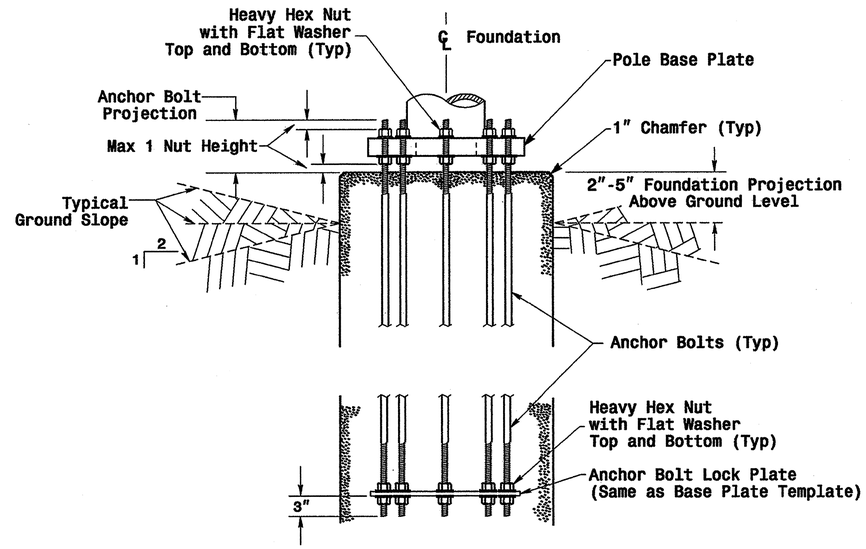
Typical "C" Bars

WING WALL DETAILS				
Wing Wall Type	Wing Wall Length (Ft.)	Wing Wall Width (Ft.)	Wing Wall Depth (Ft.)	Concrete Volume (Cu. Yds.)
TYPE 1	1'-6"	1'-0"	3'-0"	.4
TYPE 2	3'-0"	1'-0"	5'-0"	1.2

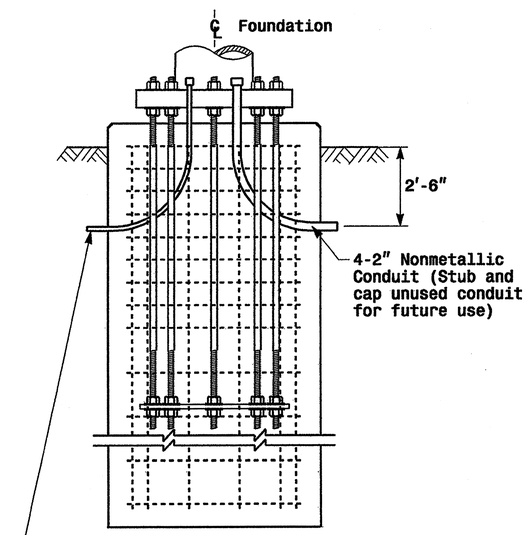
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



Notes

1. The number of C-bars is based on foundation depth. For standard foundations, see sheet M 8.
2. Circular tie reinforcing rings may be vertically adjusted by +/- 3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
3. The length of V1-bars is based on foundation depth. For standard foundations, see sheet M 8.
4. The quantities for steel and concrete shown in the Wing Wall Details Chart reflect the amount of material for 1 pair of wing walls (2 wing walls per drilled pier shaft.)

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signal and Geometrics Section, Department of Transportation, State of North Carolina, 122 N. McDowell St., Raleigh, NC 27603

SCALE: 0 NA — NONE

Construction Details
Foundations

PLAN DATE:	May 2005	REVIEWED BY:	P.L. ALEXANDER
PREPARED BY:	C.F. ANDREWS	REVIEWED BY:	A.W. ESPOSITO

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBASH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

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palexander

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig.47 M 8

Standard Strain Poles

		STANDARD STRAIN POLES				STANDARD FOUNDATIONS 42" Diameter Drilled Pier Length (L) – Feet						
						Clay				Sand		
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Moment at the Pole Base (ft-kp)	Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30
WIND ZONE 1	LIGHT	S26L3	26	25	280	20.5	14.0	11.5	9.5	18.0	16.0	14.0
		S30L3	30	25	310	21.0	14.5	11.5	9.5	18.5	16.5	14.5
		S35L3	35	25	350	22.5	15.0	12.0	10.0	19.5	17.5	15.5
	HEAVY	S30H3	30	29	450	25.5	16.5	13.0	11.0	21.0	18.5	16.5
		S35H3	35	29	540	26.0	17.0	13.5	11.5	22.0	19.5	17.0
WIND ZONE 2	LIGHT	S26L2	26	23	250	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S30L2	30	23	290	20.0	14.0	11.5	9.5	18.5	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	9.5	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	24.5	16.0	13.0	10.5	21.0	18.5	16.0
		S35H2	35	29	485	25.5	16.5	13.5	11.0	21.5	19.0	16.5
WIND ZONE 3	LIGHT	S26L2	26	23	250	18.5	13.0	10.5	9.0	17.5	15.0	13.5
		S30L2	30	23	290	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S35L2	35	23	315	20.0	14.0	11.5	9.5	18.5	16.0	14.5
	HEAVY	S30H2	30	29	415	23.0	15.5	12.5	10.0	20.5	17.5	16.0
		S35H2	35	29	485	24.0	16.0	13.0	10.5	21.0	18.0	16.5
WIND ZONE 4	LIGHT	S26L1	26	22	195	18.0	13.0	10.5	9.0	16.5	14.5	13.0
		S30L1	30	22	225	18.5	13.0	10.5	9.0	17.0	15.0	13.5
		S35L1	35	22	255	19.0	13.5	11.0	9.0	17.5	15.5	14.0
	HEAVY	S30H1	30	25	330	22.0	15.0	12.0	9.5	19.5	17.0	15.0
		S35H1	35	25	385	23.0	15.5	12.5	10.0	20.0	17.5	15.5
WIND ZONE 5	LIGHT	S26L2	26	23	250	19.0	13.5	10.5	9.0	17.5	15.5	13.5
		S30L2	30	23	290	20.0	14.0	11.0	9.5	18.0	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	10.0	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	23.5	15.5	12.5	10.5	21.0	18.0	16.0
		S35H2	35	29	485	25.0	16.5	13.0	11.0	21.5	18.5	16.5

Concrete Volume (cubic yards)=.356 X L

Fabrication Design Notes:

1. Values shown in "Moment at the Pole Base" column represents the minimum acceptable capacity allowable for design using a design CSR of 1.
2. Base plate thickness (T) is 2.0 inches.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from sheet M 1.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate pole case load number from the plans or from the Engineer.
5. Select the appropriate column in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case. The foundation depth is the value where the column and the row intersect.

Prepared in the Offices of:
Structure and Bridge Design Unit
Roadway Design Section
Geotechnical Unit
1122 N. McDowell St., Raleigh, NC 27603

Standard Strain Poles
and
Standard Foundations

PLAN DATE: May 2005	REVIEWED BY: C.F. Andrews
PREPARED BY: P.L. Alexander	REVIEWED BY: A.W. Esposito

REVISIONS	INIT.	DATE

SCALE: 0 NA — None

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

02-SEP-2005 12:42
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palexander

02/29/08

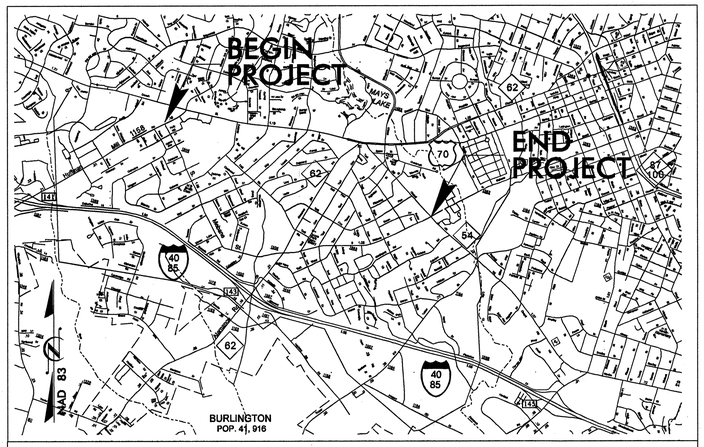
WBS: 34911.1.1 U-3303

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 48

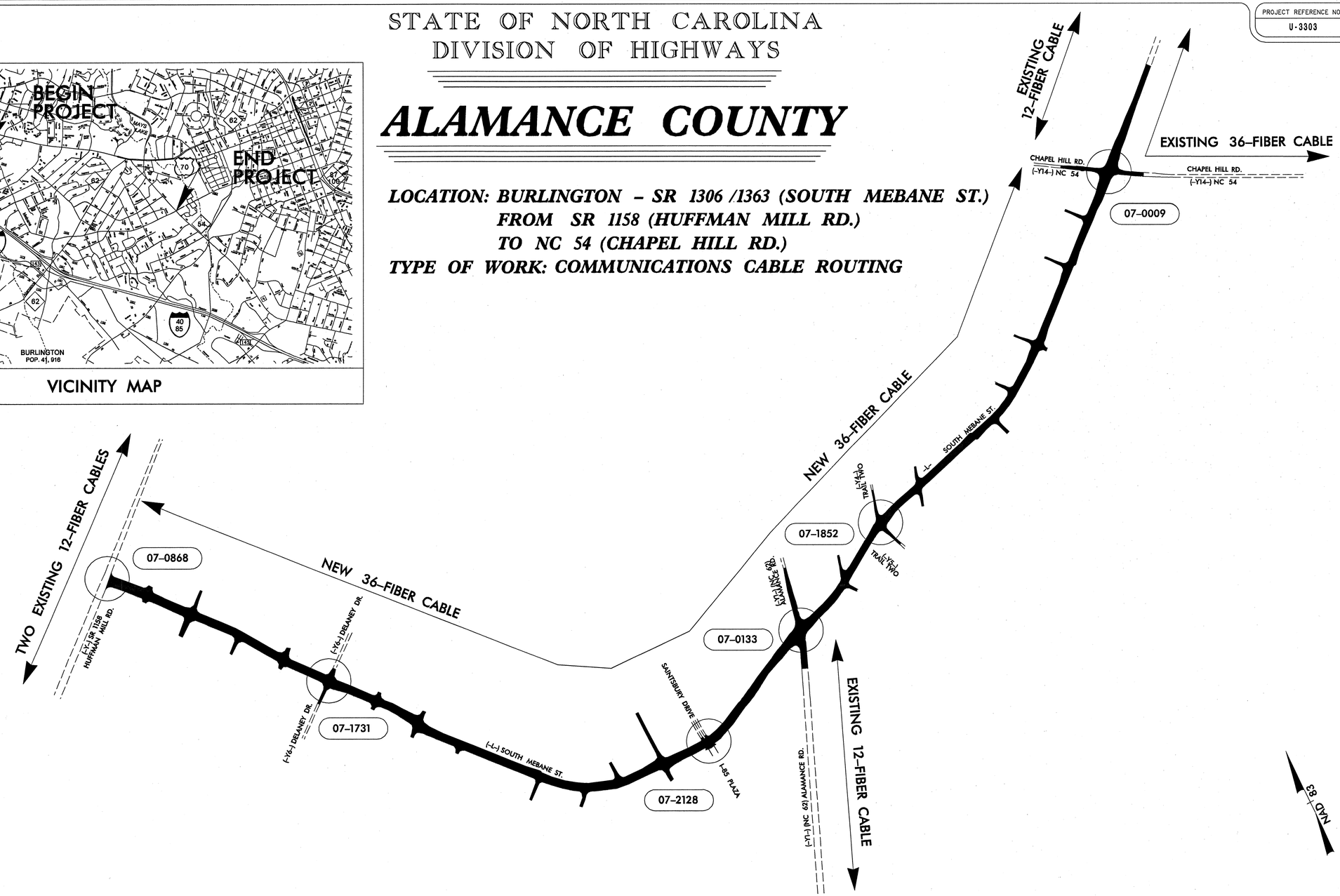
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ALAMANCE COUNTY

LOCATION: BURLINGTON – SR 1306 /1363 (SOUTH MEBANE ST.)
FROM SR 1158 (HUFFMAN MILL RD.)
TO NC 54 (CHAPEL HILL RD.)
TYPE OF WORK: COMMUNICATIONS CABLE ROUTING



VICINITY MAP



PLANS PREPARED BY:

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

JEFFREY P. HOCHANADEL, P.E. - PROJECT ENGINEER
LINDA M. EDDINS - DESIGN ENGINEER
CHAD J. NEILSON, E.I. - DESIGN ENGINEER

INDEX OF PLANS

SHEET NUMBER	SIGNAL INV. NUMBER	LOCATION / DESCRIPTION
1	-	TITLE SHEET
2 - 9	07-0868	SR 1158 (HUFFMAN MILL RD) AT SR 1306 (MEBANE ST)
10 - 17	07-1731	SR 1306 (MEBANE ST) AT DELANEY DR
18 - 19	07-2128	SR 1306 (MEBANE ST) AT 85 PLAZA
20 - 27	07-0133	NC 62 (ALAMANCE RD) AT SR 1306/1363 (MEBANE ST)
28 - 31	07-1852	SR 1303/1363 (MEBANE ST) AT TRAIL TWO
32 - 41	07-0009	NC 54 (CHAPEL HILL RD) AT SR 1303/1363 (MEBANE ST)
42 - 47	-	STANDARD METAL STRAIN POLE DESIGN PLANS
48 - 59	-	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS
60	-	SPLICE DETAILS
61 - 63	-	INDUCTIVE DETECTION LOOPS DETAIL

LEGEND

##-#### SIGNAL INVENTORY NUMBER

PLANS PREPARED FOR:

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
BONIFACE A. MADUABUCHUKWU, P.E. - CENTRAL REGION SIGNALS ENGINEER
ROBERT J. ZIEMBA, P.E. - CENTRAL REGION SIGNALS PROJECT ENGINEER
GEORGE C. BROWN, P.E. - SIGNAL EQUIPMENT DESIGN ENGINEER
I. NEIL AVERY - SIGNAL COMMUNICATIONS PROJECT ENGINEER

ENGLISH

ALL DIMENSIONS IN THESE PLANS ARE IN FEET UNLESS OTHERWISE NOTED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL
SIGNATURE 12/2/08 DATE

$$$$$$$$USERNAME$$$$ $$$$$$$$$$SYSTIME$$$$$ $$$$$$$$$$DGN$$$$$

Cable Routing Overview.dgn 12/2/2008 8:23:06 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 49

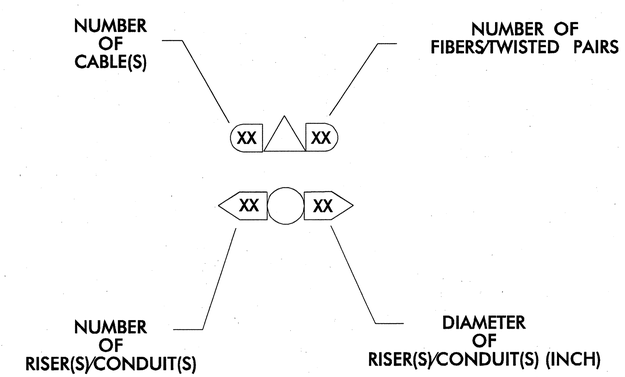
1. INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2. INSTALL REA, PE – 38, (FIGURE – 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
3. INSTALL REA, PE – 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13. INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
14. INSTALL POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER
20. INSTALL CABLE(S) IN NEW RISER
21. INSTALL CABLE(S) IN EXISTING CONDUIT STUBOUTS
22. INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
23. INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26. TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
27. INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. INSTALL POLE MOUNTED SPLICE CABINET
32. INSTALL BASE MOUNTED SPLICE CABINET
33. REMOVE EXISTING SPLICE CABINET
34. INSTALL CABINET FOUNDATION
35. REMOVE EXISTING CABINET FOUNDATION
36. INSTALL CCTV CAMERA ASSEMBLY
37. INSTALL CCTV CAMERA WOOD POLE
38. INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39. INSTALL JUNCTION BOX
40. INSTALL OVERSIZED JUNCTION BOX
41. REMOVE EXISTING JUNCTION BOX
42. INSTALL WOOD POLE
43. REMOVE EXISTING WOOD POLE
44. INSTALL AERIAL GUY ASSEMBLY
45. INSTALL STANDARD GUY ASSEMBLY
46. INSTALL SIDEWALK GUY ASSEMBLY
47. INSTALL MESSENGER CABLE
48. REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
49. REMOVE EXISTING COMMUNICATIONS CABLE
50. INSTALL TELEPHONE SERVICE
51. INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52. INSTALL DELINEATOR MARKER
53. STORE 20 FEET OF COMMUNICATIONS CABLE
54. LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55. LASH CABLE(S) TO EXISTING MESSENGER CABLE
56. LASH CABLE(S) TO NEW MESSENGER CABLE
57. MODIFY EXISTING ELECTRICAL SERVICE
58. INSTALL NEW ELECTRICAL SERVICE

LEGEND

- F. O. — NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST. PR. — NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXIST. — EXISTING COMMUNICATIONS CABLE
- REM. — EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- D D — NEW DIRECTIONAL DRILLED CONDUIT
- B & J — NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- S — NEW AERIAL SPLICE ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV CAMERA ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CONTROLLER AND CABINET
- S — EXISTING SPLICE CABINET
- S — NEW SPLICE CABINET
- SP — SIGNAL POLE
- XX–XXXX — SIGNAL INVENTORY NUMBER

CONSTRUCTION NOTE SYMBOLOGY KEY

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



SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
DEPARTMENT OF TRANSPORTATION
STATE OF NORTH CAROLINA
750 Greenfield Pkwy, Garner, NC 27529

SCALE: 0 — N/A

CONSTRUCTION NOTES

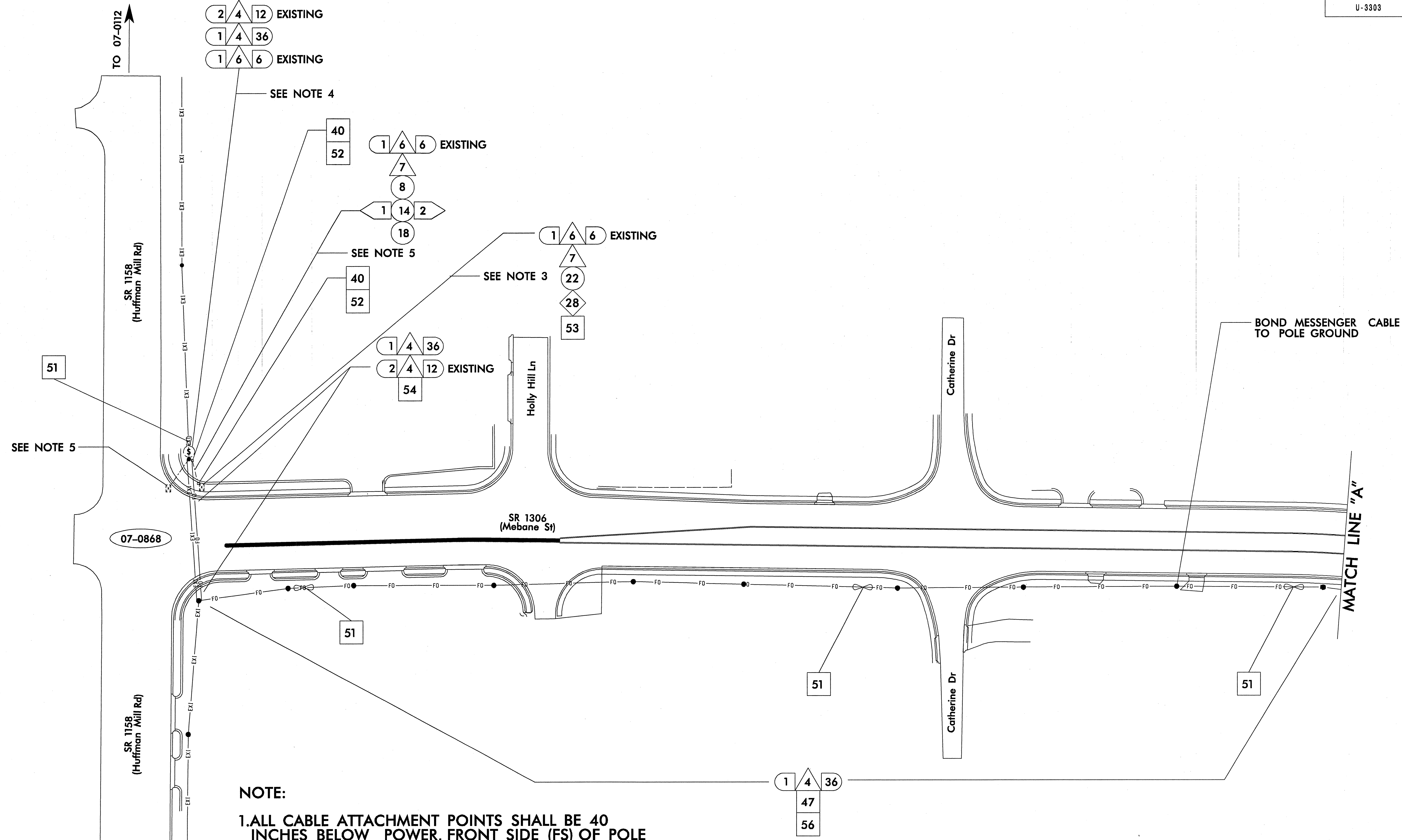
Division 07 Alamance County Burlington

PLAN DATE: December 2008	REVIEWED BY: S S Asefnia		
PREPARED BY: J P Hochanadel	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 12/2/08 DATE

CADD FILE NAME



NOTE:

1. ALL CABLE ATTACHMENT POINTS SHALL BE 40 INCHES BELOW POWER, FRONT SIDE (FS) OF POLE UNLESS OTHERWISE NOTED.
2. BOND MESSENGER CABLE AND RISER TO POLE GROUND.
3. BOND TRACER WIRE TO EQUIPMENT GROUND BUS.
4. TERMINATE PROPOSED 36 FIBER COMMUNICATIONS CABLE IN EXISTING OVERHEAD SPLICE ENCLOSURE.
5. REMOVE DROP CABLE FROM EXISTING CONDUIT AND CABINET AND INSTALL IN NEW CONDUIT TO NEW CABINET.

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Traffic Engineering and Safety Systems Branch, State of North Carolina Department of Transportation, Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 50
1"=50'

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLAN

Division 07 Alamance County Burlington

PLAN DATE: December 2008	REVIEWED BY: L.M. Eddins
PREPARED BY: J.P. Hochanadel	REVIEWED BY: S.S Asefnia

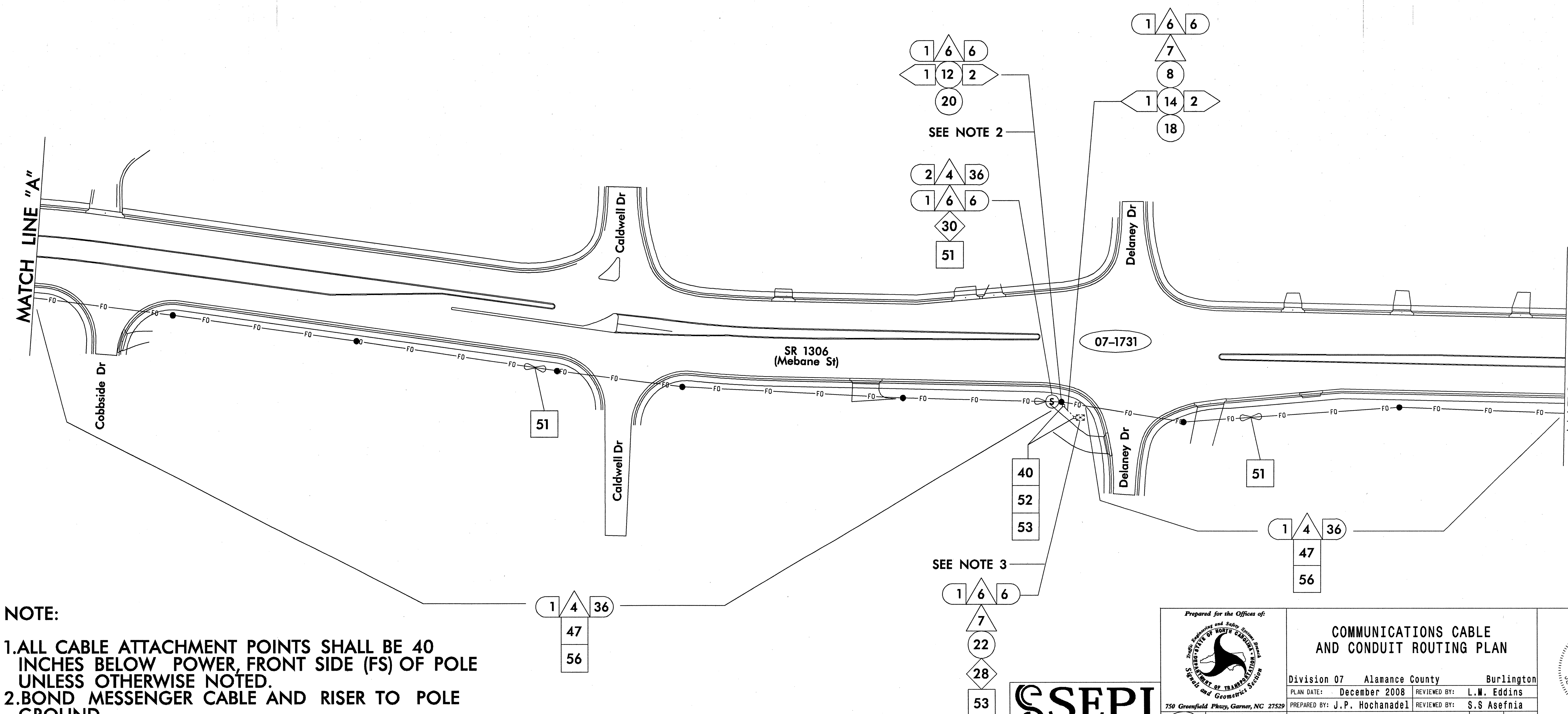
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 12/2/08 DATE

SIG. INVENTORY NO.

$$$$$$SYSTIME$$$$$
$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$



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1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of:
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 50
1"=50'

COMMUNICATIONS CABLE
AND CONDUIT ROUTING PLAN

Division 07	Alamance County		Burlington
PLAN DATE:	December 2008	REVIEWED BY:	L.W. Eddins
PREPARED BY:	J.P. Hochanadel	REVIEWED BY:	S.S Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28430 JEFFREY P. HOCHANADEL

12/2/08
SIGNATURE DATE
SIG. INVENTORY NO.

$$$$SYSTIME$$$$
$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

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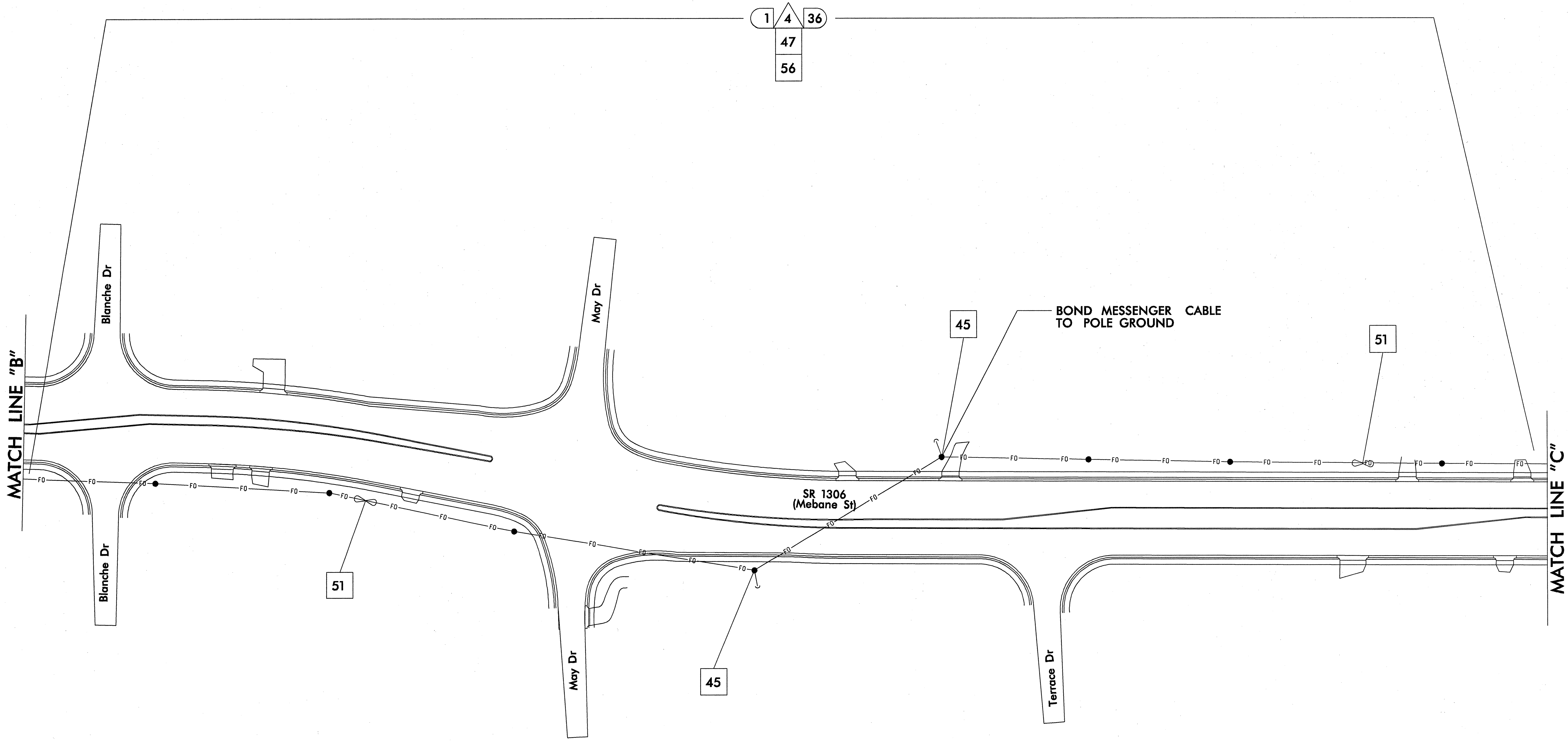
U-3303	Sig. 52



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SEPI ENGINEERING GROUP
1025 WADE AVENUE
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Prepared for the Offices of:
State of North Carolina Department of Transportation
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE
0 50
1"=50'

COMMUNICATIONS CABLE
AND CONDUIT ROUTING PLAN

Division 07	Alamance County		Burlington
PLAN DATE: December 2008		REVIEWED BY: L.M. Eddins	
PREPARED BY: J.P. Hochanadel		REVIEWED BY: S.S Asefnia	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

12/2/08
SIGNATURE DATE
SIG. INVENTORY NO.

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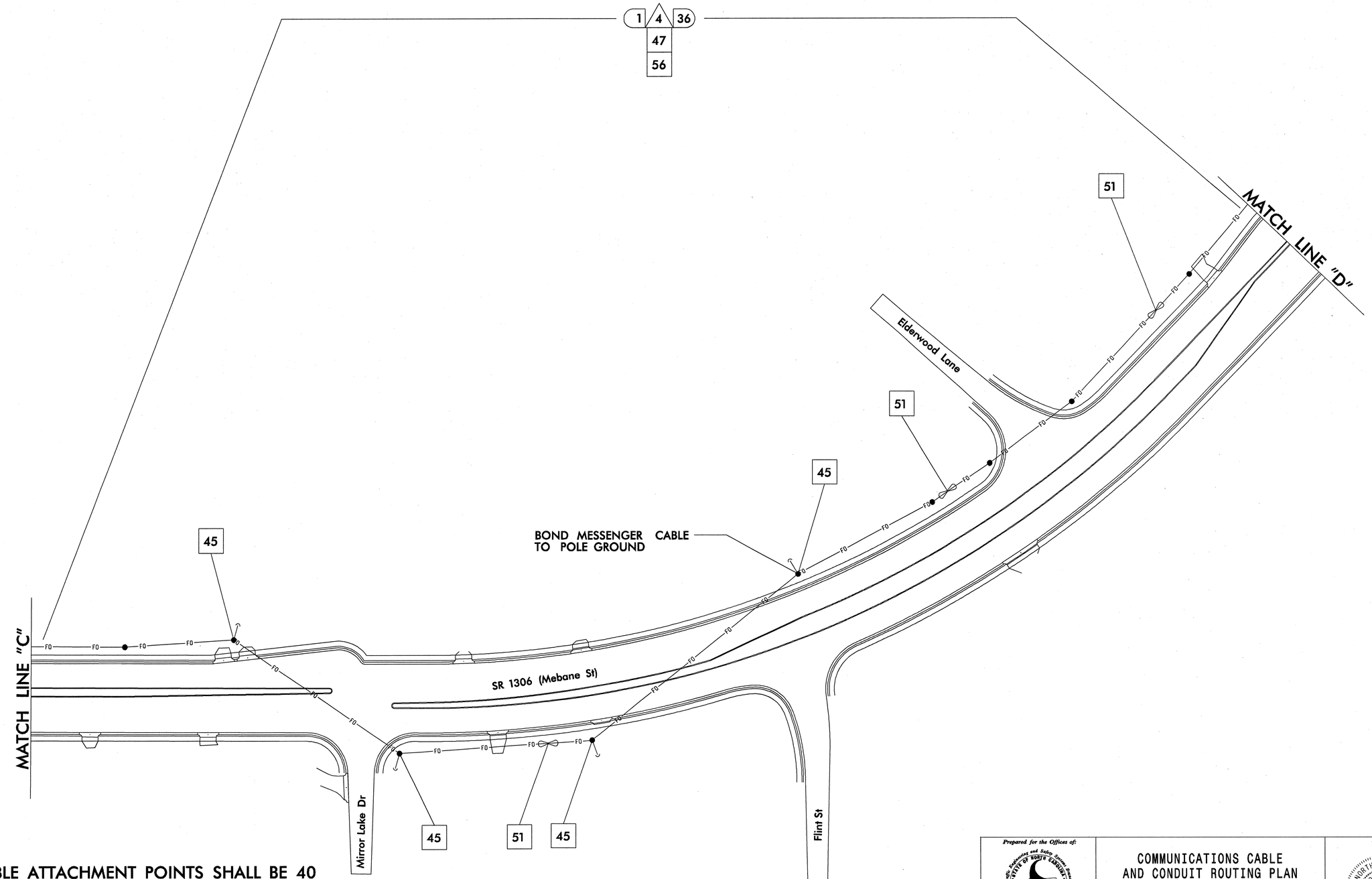
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 53



NOTE:

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2. BOND MESSENGER CABLE AND RISER TO POLE GROUND.
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TEL: 919-789-9977 FAX: 789-9591

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 50
1"=50'

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLAN

Division 07 Alamance County Burlington

PLAN DATE:	December 2008	REVIEWED BY:	L.W. Eddins
PREPARED BY:	J.P. Hochanadel	REVIEWED BY:	S.S Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 12/2/08 DATE

SIG. INVENTORY NO.

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

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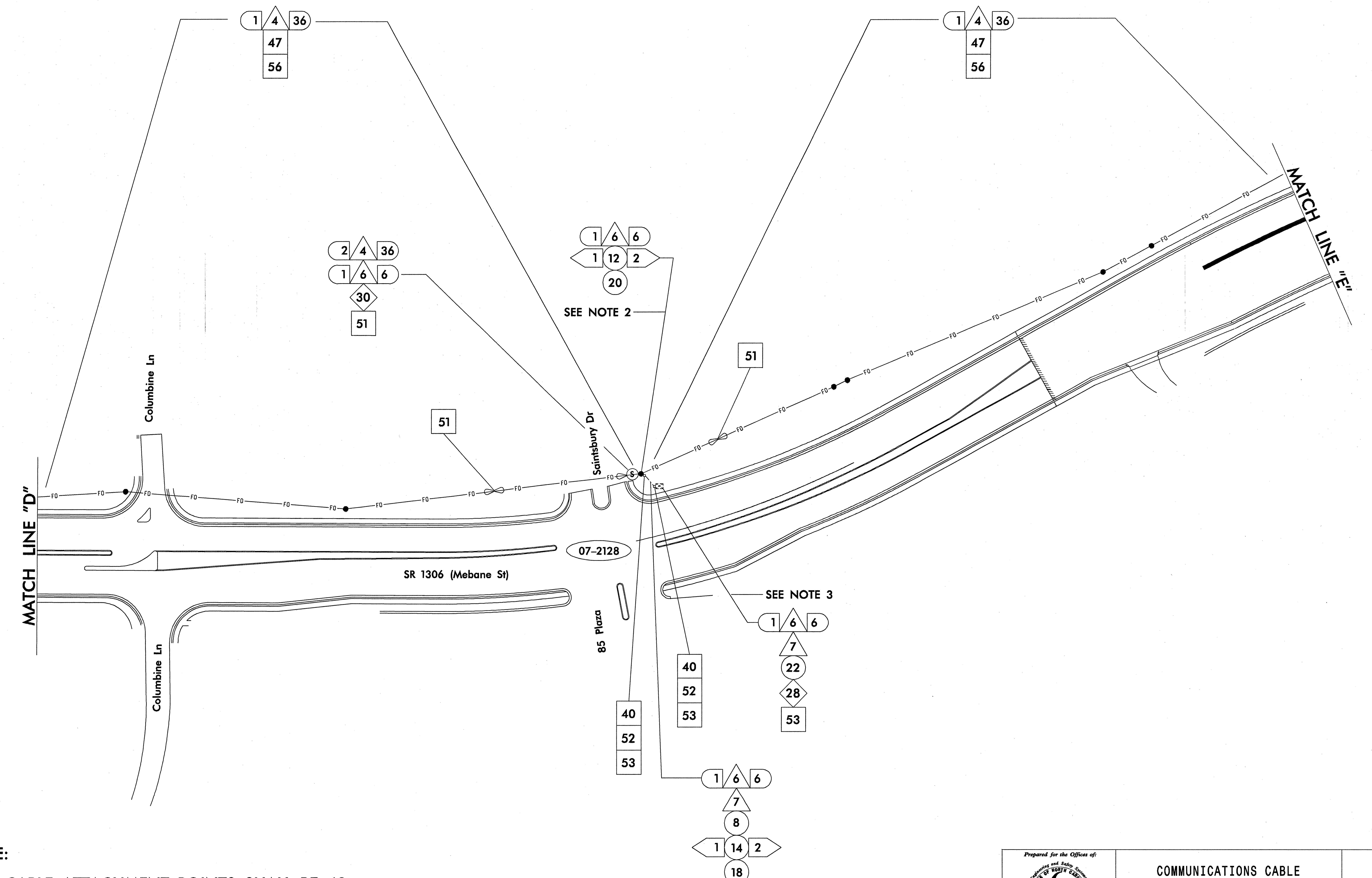

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Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 50
1"=50'

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLAN

Division 07 Alamance County Burlington

PLAN DATE:	December 2008	REVIEWED BY:	L.M. Eddins
PREPARED BY:	J.P. Hochanadel	REVIEWED BY:	S.S Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

12/2/08
SIGNATURE DATE
SIG. INVENTORY NO.

CR-5.dgn 12/2/2008 8:26:39 AM

PROJECT REFERENCE NO.	SHEET NO.
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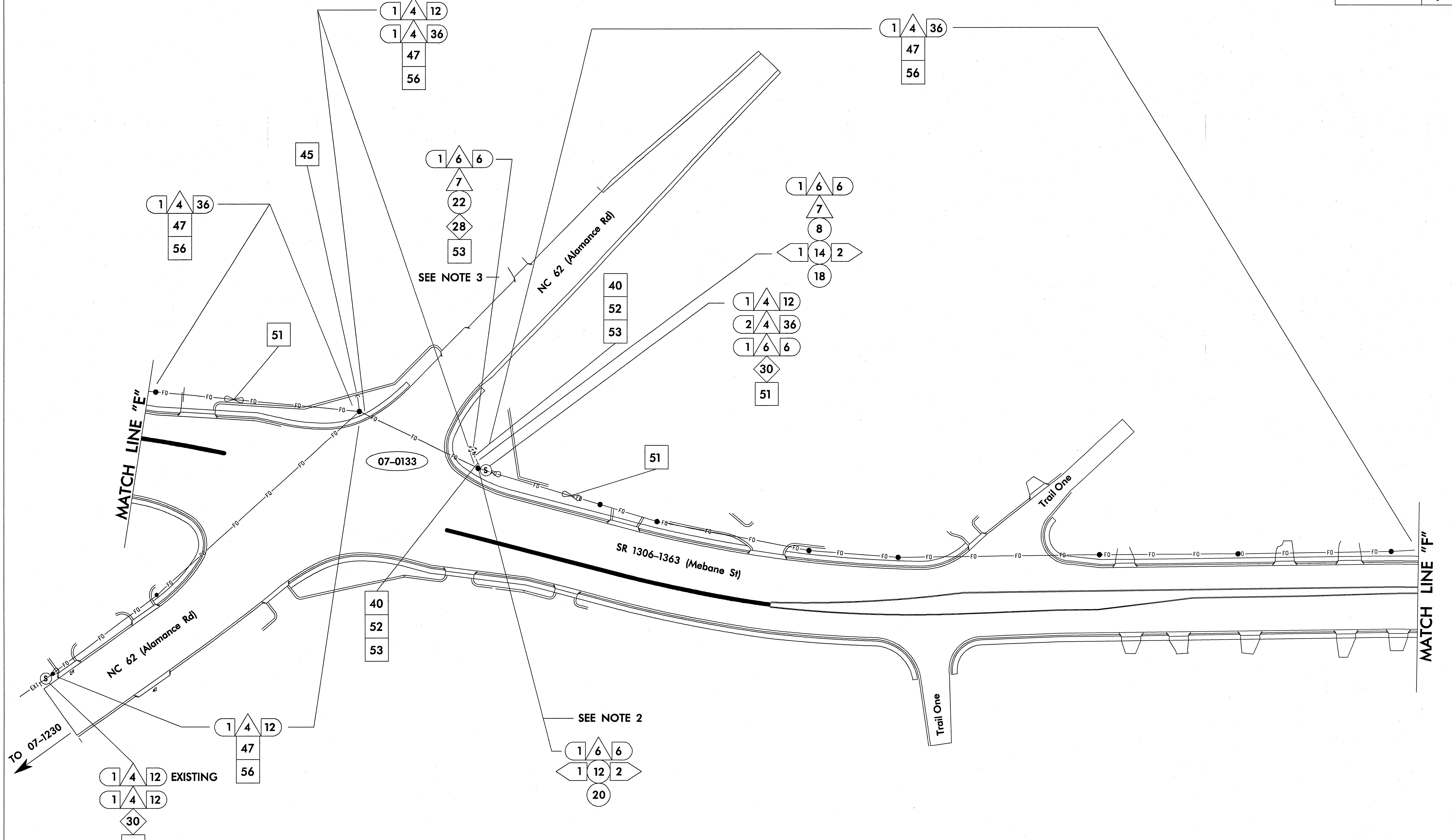

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Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 50
1"=50'

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLAN

Division 07 Alamance County Burlington

PLAN DATE:	December 2008	REVIEWED BY:	L.M. Eddins
PREPARED BY:	J.P. Hochanadel	REVIEWED BY:	S.S Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 12/2/08 DATE

SIG. INVENTORY NO.

$$$$SYSTIME$$$$ $$$$$$$$$DGN$$$$$$$$$$$$$$$$ $$$$USERNAME$$$$

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PROJECT REFERENCE NO.	SHEET NO.
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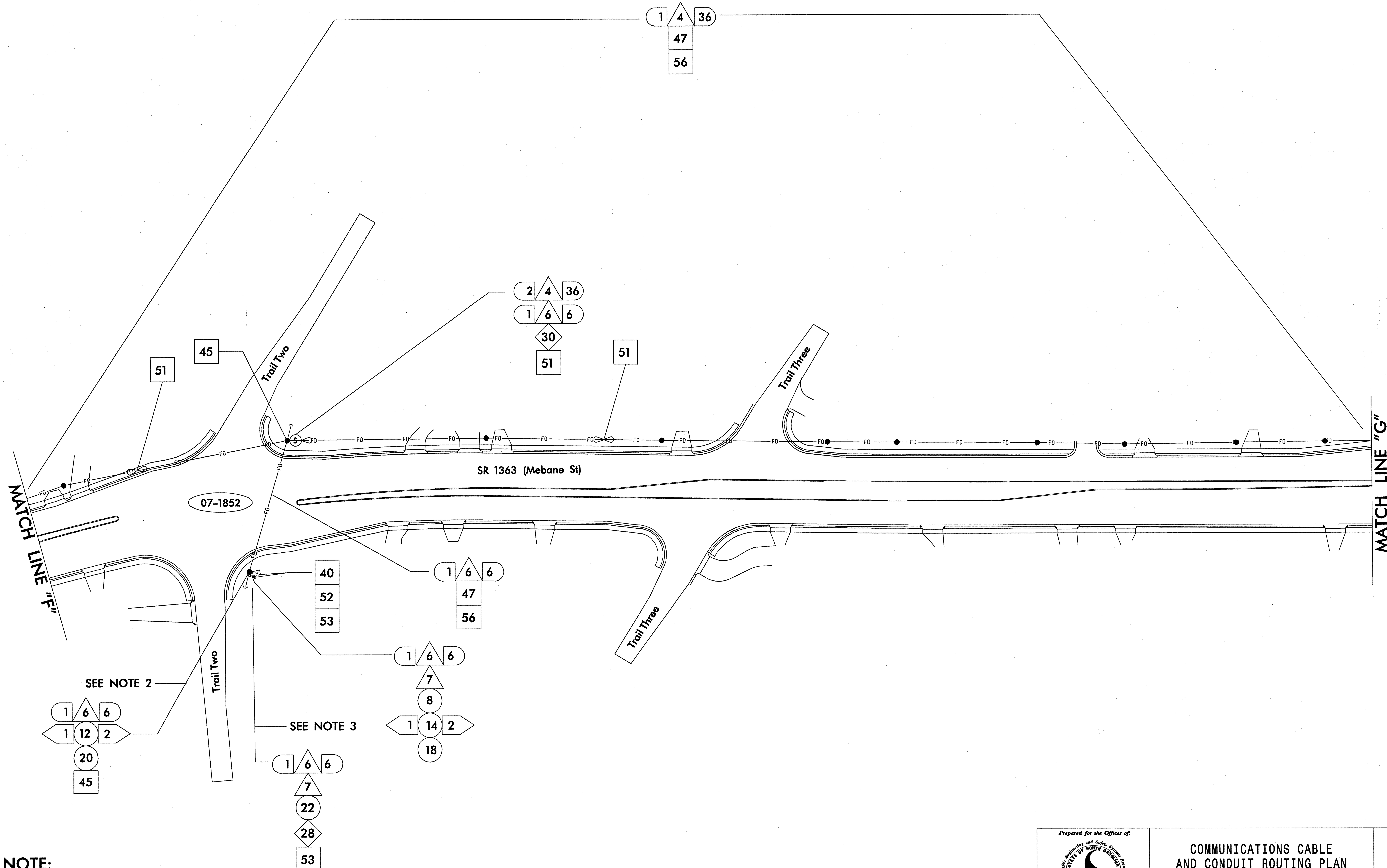

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RALEIGH, NC 27605
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Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch, State of North Carolina Department of Transportation, Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 50
1"=50'

COMMUNICATIONS CABLE
AND CONDUIT ROUTING PLAN

Division 07 Alamance County Burlington

PLAN DATE: December 2008	REVIEWED BY: L.W. Eddins
PREPARED BY: J.P. Hochanadel	REVIEWED BY: S.S Asefnia

REVISIONS	INIT.	DATE

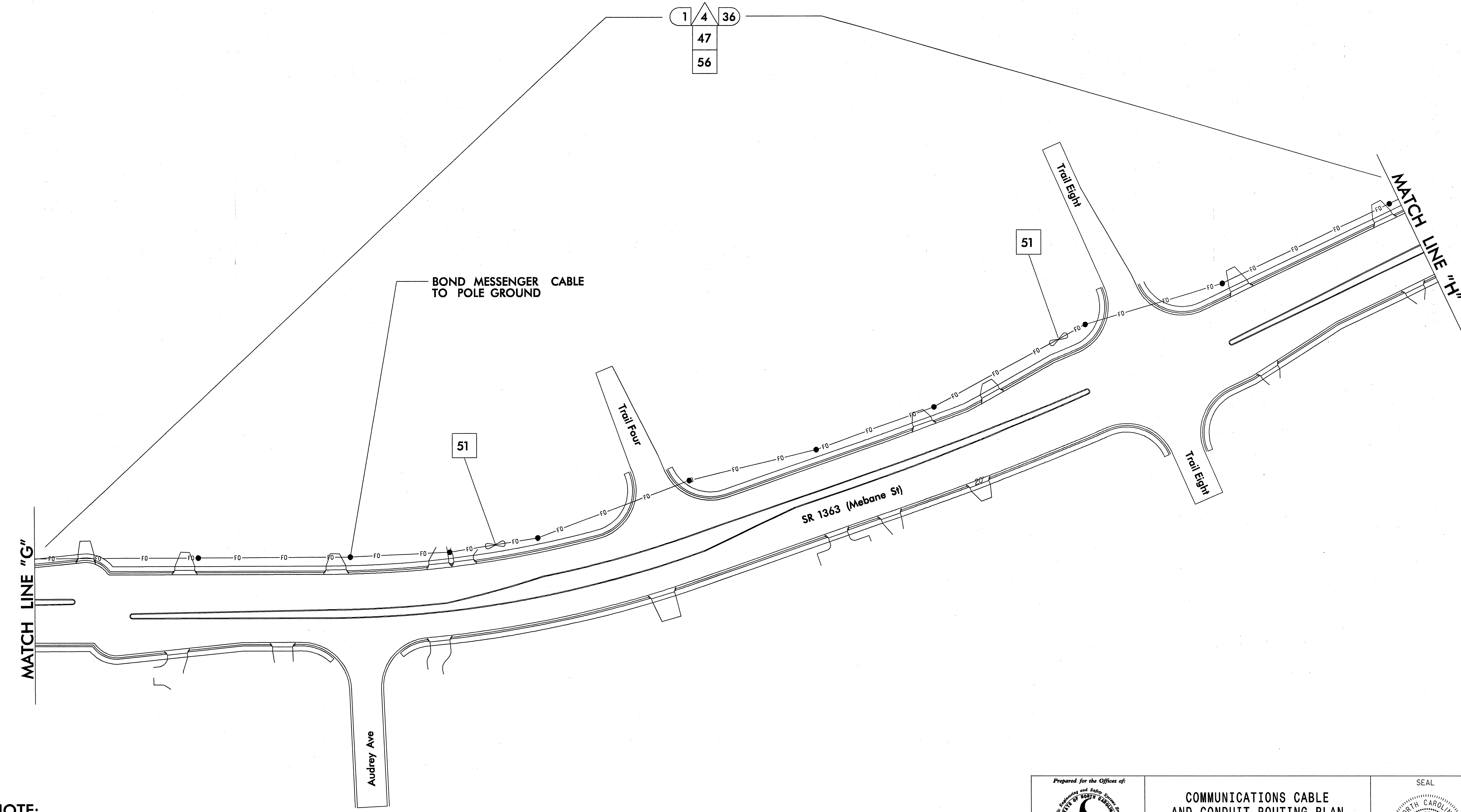
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28430 JEFFREY P. HOCHANADEL

SIGNATURE 12/2/08 DATE

SIG. INVENTORY NO.

CR-7.dgn 12/2/2008 8:25:58 AM

PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 57



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Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE
0 50
1"=50'

COMMUNICATIONS CABLE
AND CONDUIT ROUTING PLAN

Division 07 Alamance County Burlington

PLAN DATE:	December 2008	REVIEWED BY:	L.M. Eddins
PREPARED BY:	J.P. Hochanadel	REVIEWED BY:	S.S Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 12/2/08 DATE

SIG. INVENTORY NO.

CR-8.dgn 12/2/2008 8:25:36 AM

PROJECT REFERENCE NO.	SHEET NO.
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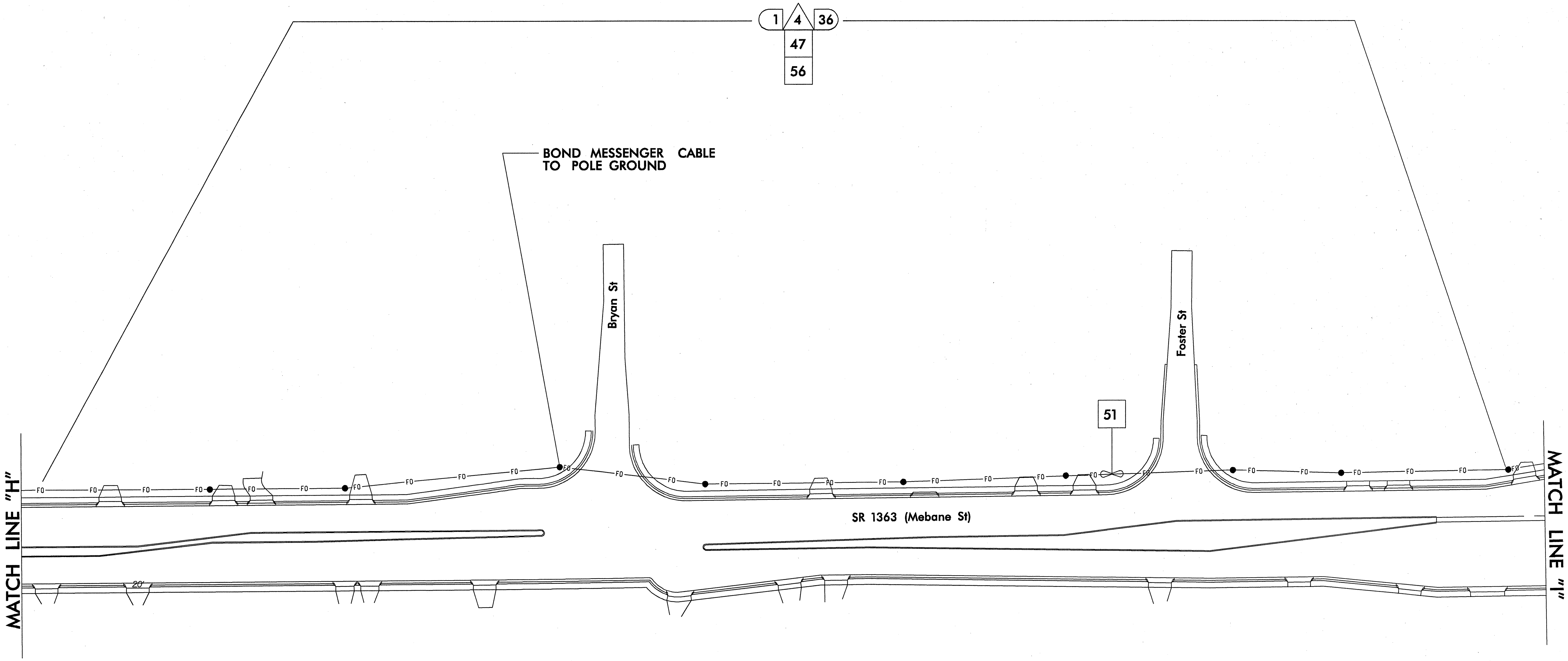

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Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 50 1"=50'

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLAN

Division 07 Alamance County Burlington

PLAN DATE:	December 2008	REVIEWED BY:	L.W. Eddins
PREPARED BY:	J.P. Hochanadel	REVIEWED BY:	S.S Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

12/2/08
SIGNATURE DATE
SIG. INVENTORY NO.

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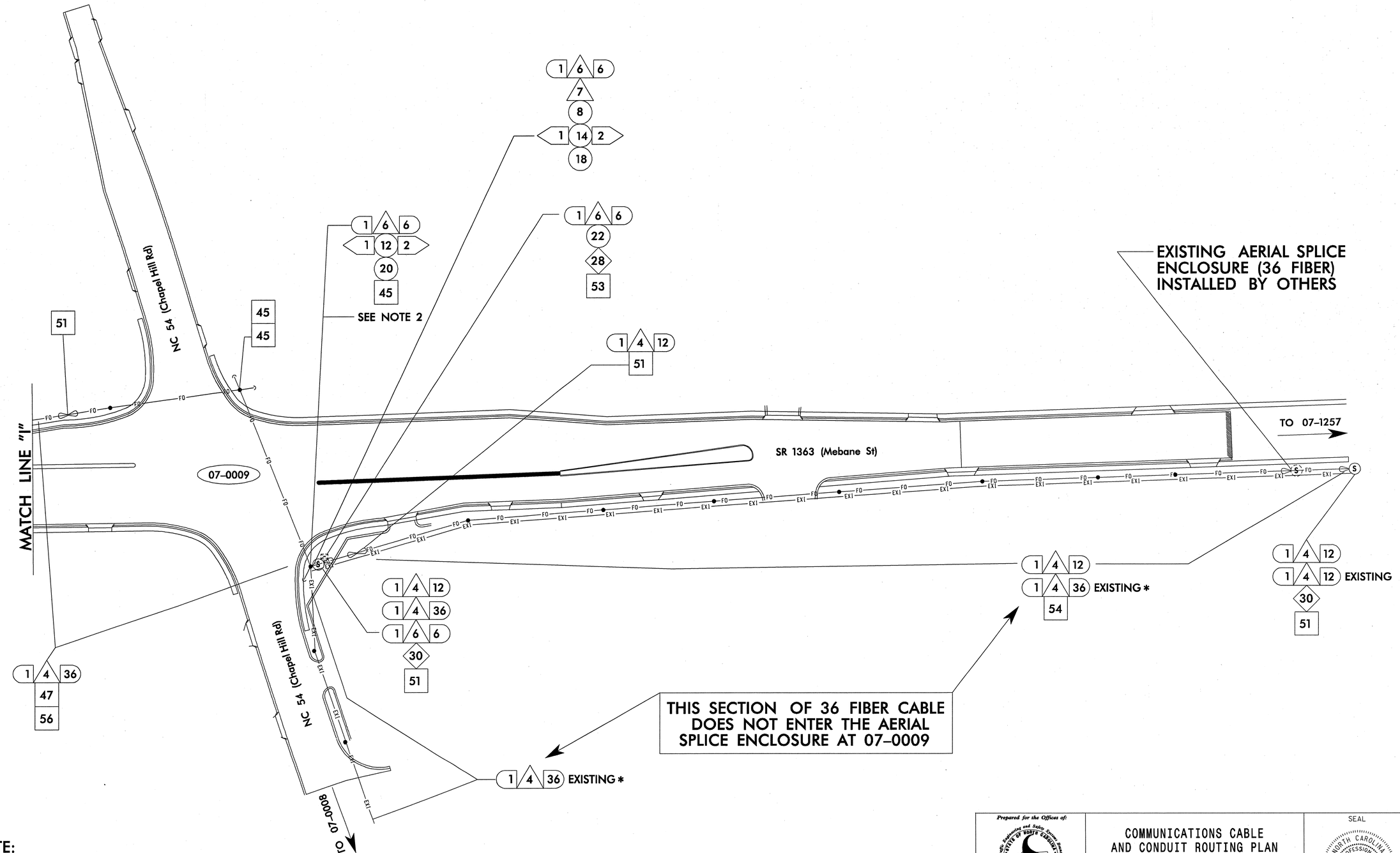
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 59



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Prepared for the Offices of:
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Signals and Geometrics Section
DEPARTMENT OF TRANSPORTATION
STATE OF NORTH CAROLINA
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 50 1"=50'

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLAN

Division 07 Alamance County Burlington

PLAN DATE:	December 2008	REVIEWED BY:	L.W. Eddins
PREPARED BY:	J.P. Hochanadel	REVIEWED BY:	S.S Asefnia

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 12/2/08 DATE

SIG. INVENTORY NO.

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$$$$LEVELS$$$$
$$$$DATE$$$$

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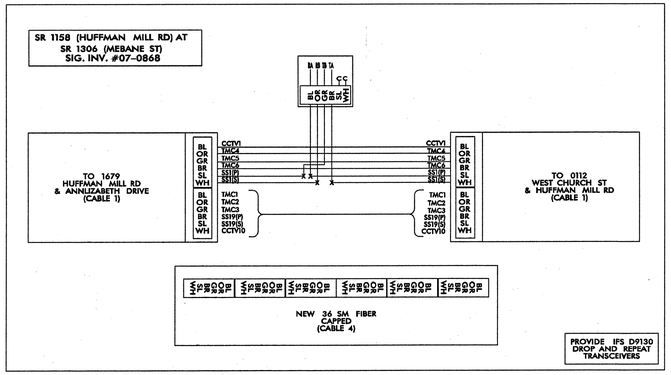
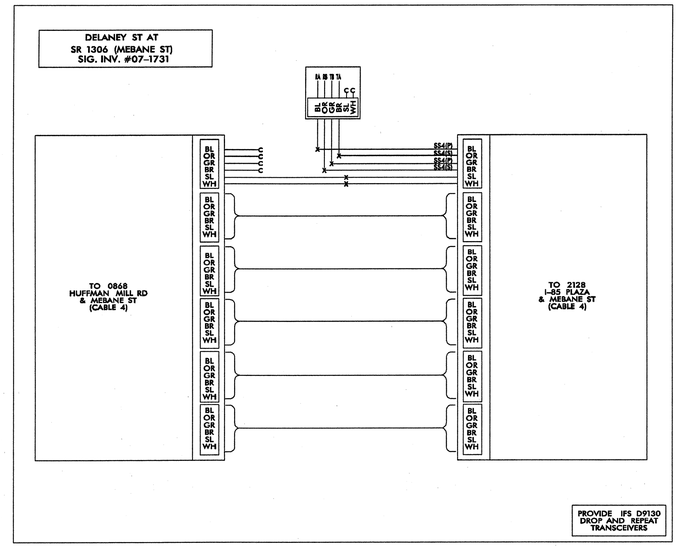
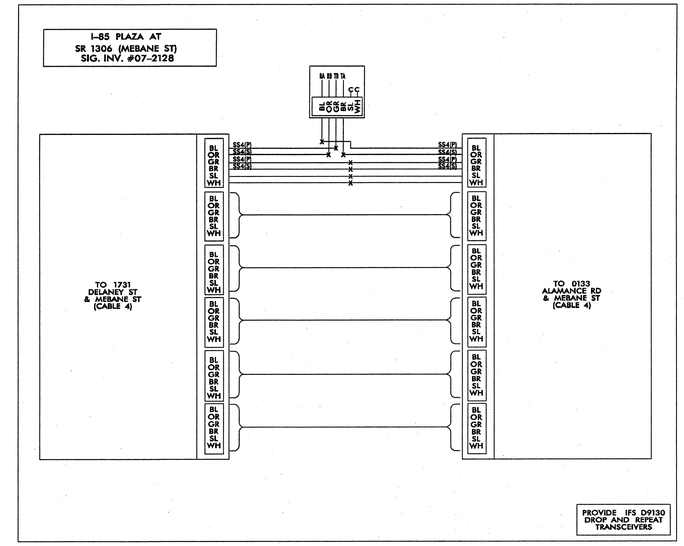
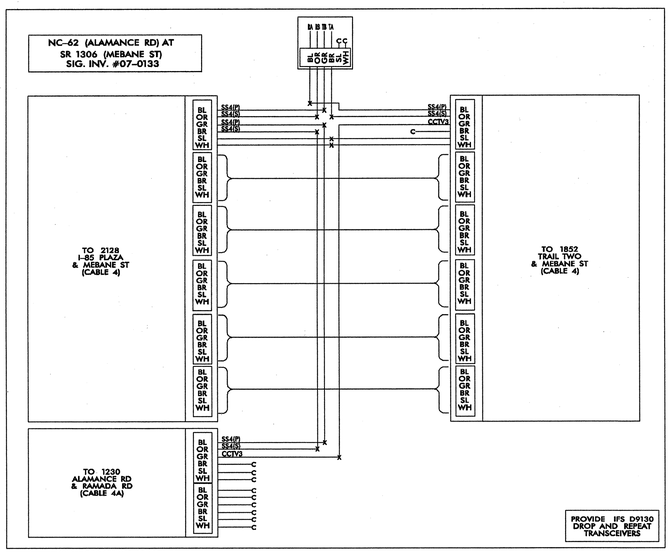
PROJECT REFERENCE NO.	SHEET NO.
U-3303	Sig. 60

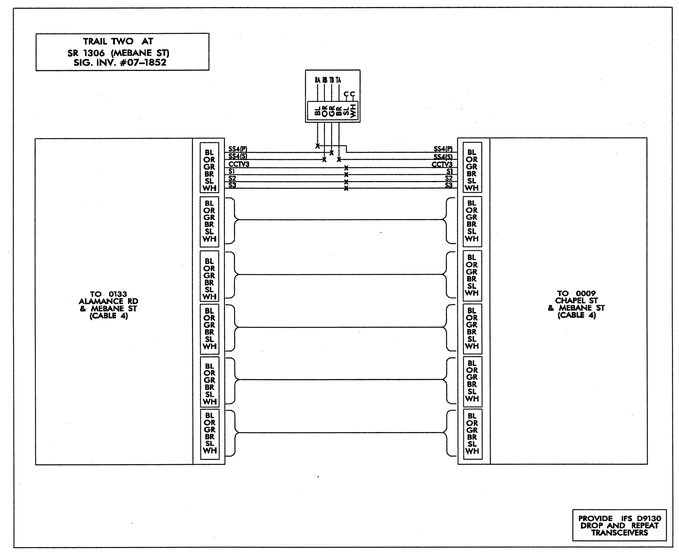
FIBER OPTIC SPLICING

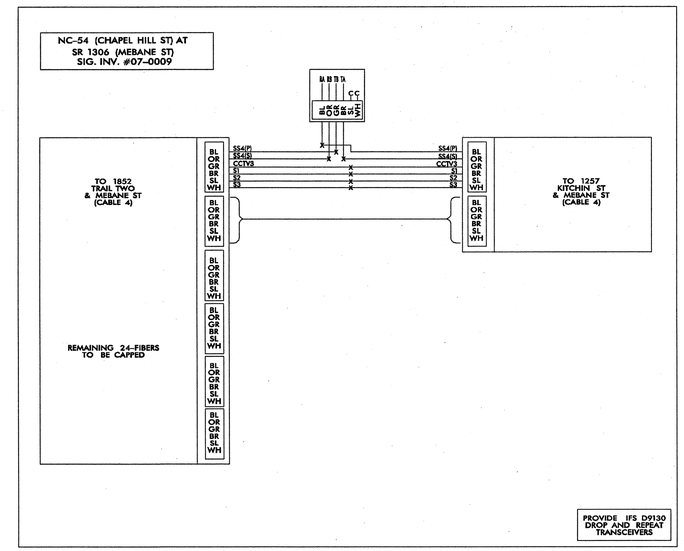












ALL FIBER OPTIC SPLICING DESIGNS AND INFORMATION PROVIDED BY THE CITY OF BURLINGTON, NC

Prepared for the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 Greenfield Pkwy, Garner, NC 27529

FIBER OPTIC SPLICE DETAILS

Division 7 Alamance County Burlington

PLAN DATE: December 2008 REVIEWED BY: J P Hochanadel

PREPARED BY: C J Neilson REVIEWED BY:

SCALE: NTS

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 28430 ENGINEER JEFFREY P. HOCHANADEL

SIGNATURE 12/2/08 DATE

CADD FILE NAME

FO Splice.dgn 12/2/2008 8:23:48 AM

U-3303 Sig.61

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

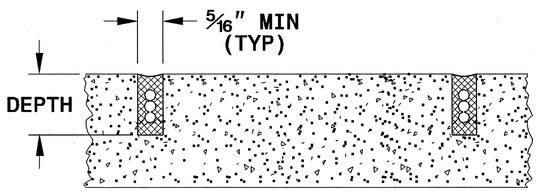
7-06

ENGLISH STANDARD DRAWING FOR
INDUCTIVE DETECTION LOOPS

CONVENTIONAL 4-SIDED LOOP

SAW SLOT DEPTH CHART

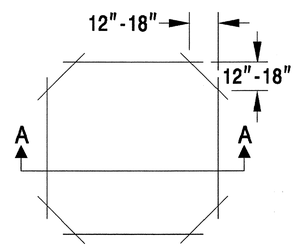
DEPTH (IN)	NO. OF WIRE LAYERS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0



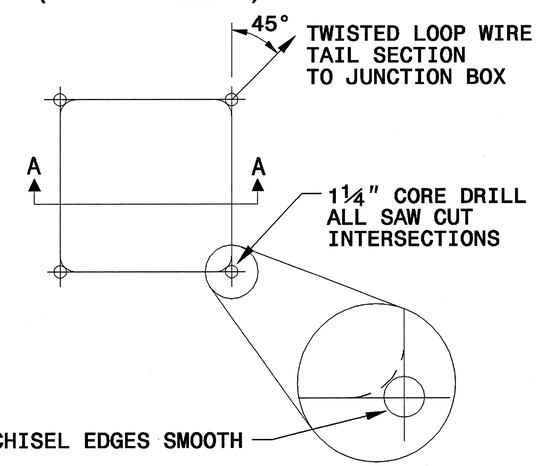
SECTION A - A

SAW CUT OPTIONS

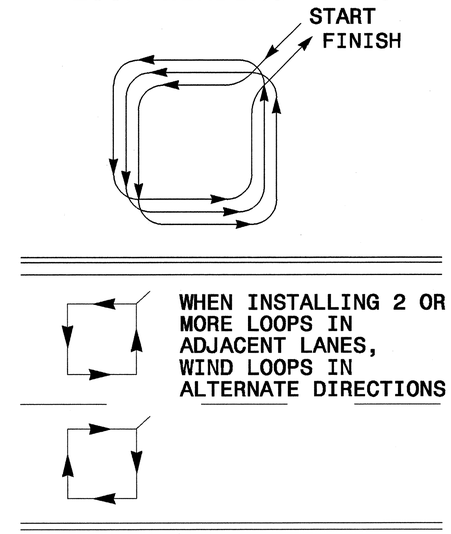
OPTION 1



OPTION 2
(POOR PAVEMENT)



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE

CORRECT WAY TO TWIST WIRE

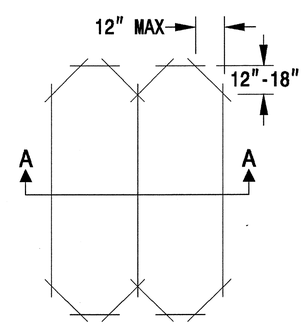
NOTES

1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. PROVIDE 5/8" MINIMUM SLOT FROM EDGE OF LOOP TO EDGE OF PAVEMENT FOR TWISTED LOOP WIRE TAIL SECTIONS.
3. MAINTAIN 12" SPACING BETWEEN TWISTED LOOP WIRE TAIL SECTIONS.
4. WIRE LOOPS CONNECTED TO THE SAME DETECTOR IN SERIES.
5. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS.

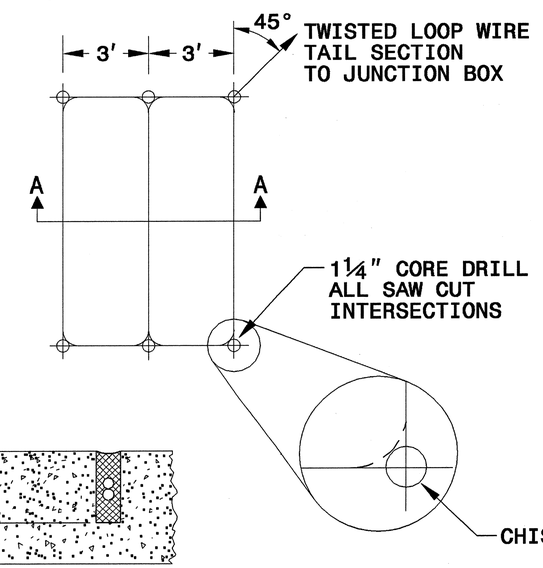
QUADRUPOLE LOOP

SAW CUT OPTIONS

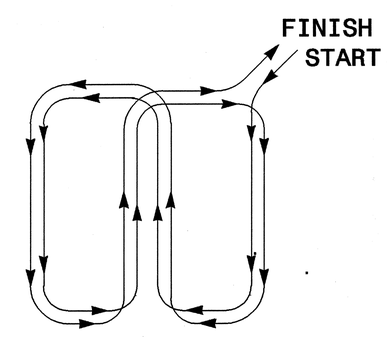
OPTION 1

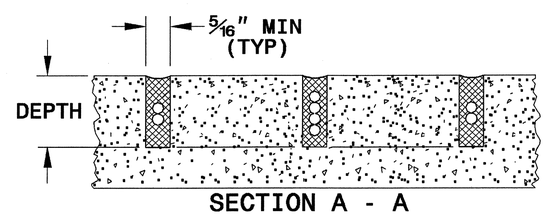


OPTION 2
(POOR PAVEMENT)



LOOP WINDING METHOD





SECTION A - A

DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH STANDARD DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725.01

U-3303 Sig62

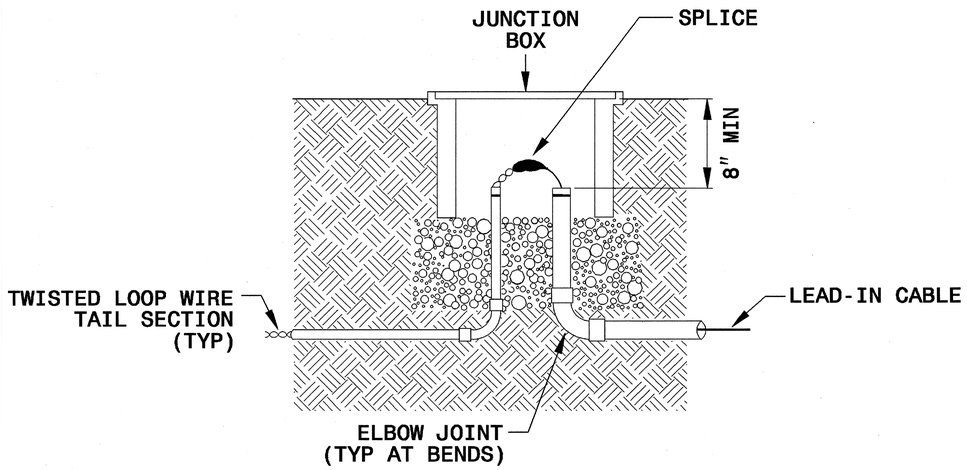
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

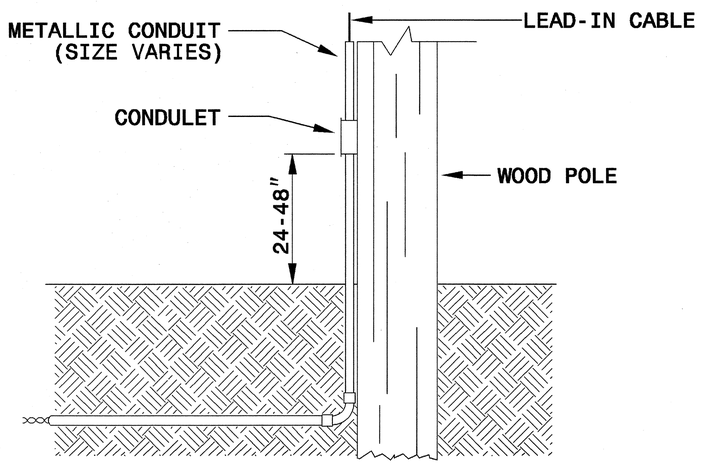
ENGLISH STANDARD DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

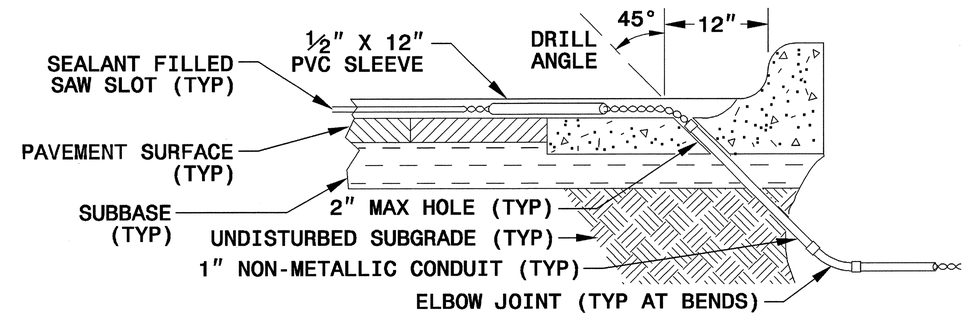


NOTE

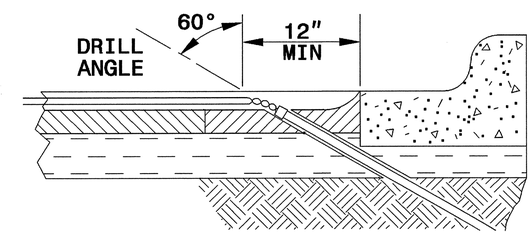
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

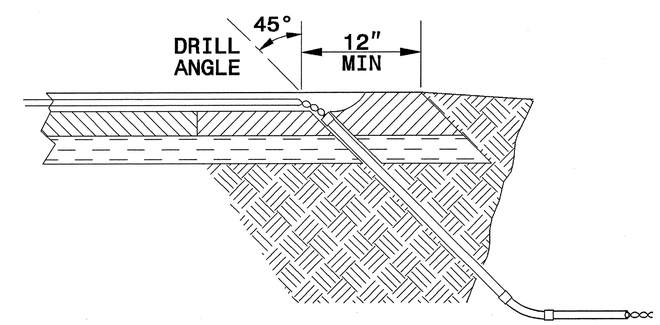
LOOP WIRE AT 2' 6" CURB & GUTTER SECTION



LOOP WIRE AT 18 INCH CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

1. DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
2. INSTALL TWISTED LOOP WIRE TAIL SECTIONS THROUGH CONDUIT.
3. BEFORE SEALING LOOPS, PLUG CONDUIT TO PROVIDE A WATER PROOF BARRIER AND PREVENT LOOP SEALANT FROM ENTERING CONDUIT WHERE LOOP WIRE LEAVES PAVEMENT SURFACE.

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ENGLISH STANDARD DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

SHEET 2 OF 3
1725.01

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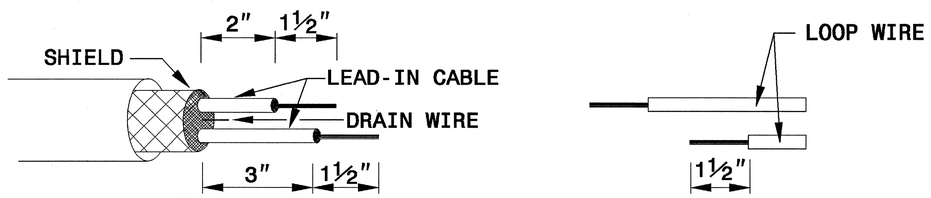
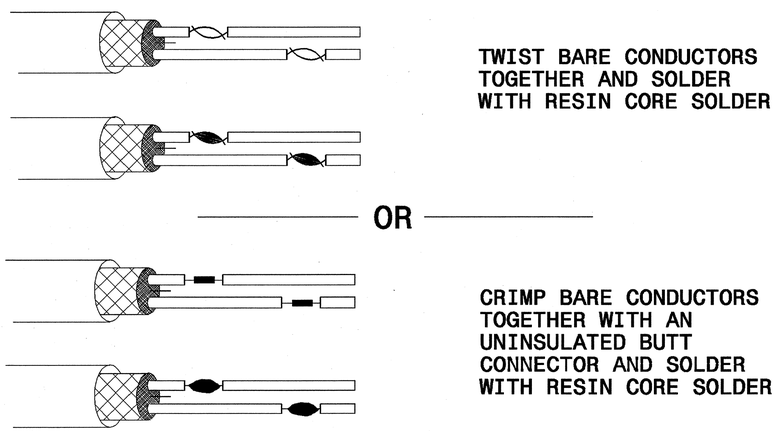
ENGLISH STANDARD DRAWING FOR
INDUCTION DETECTION LOOPS
SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE



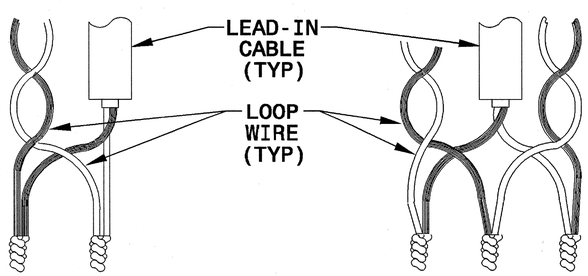
STEP 2. CONNECT AND SOLDER



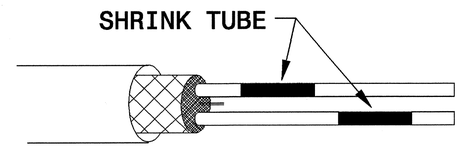
BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS

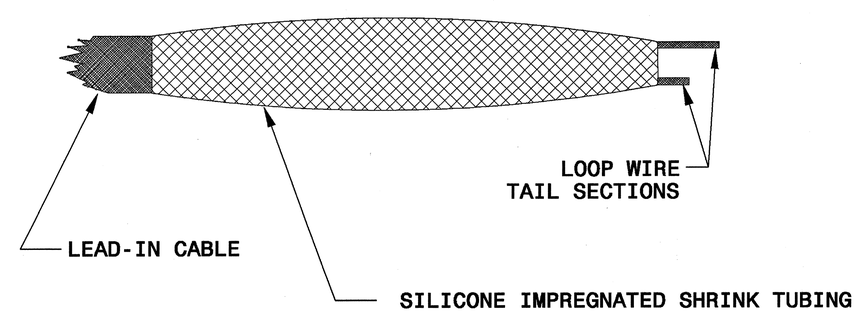
SINGLE CONNECTION SERIES CONNECTION



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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ENGLISH STANDARD DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725.01

SHEET 3 OF 3
1725.01