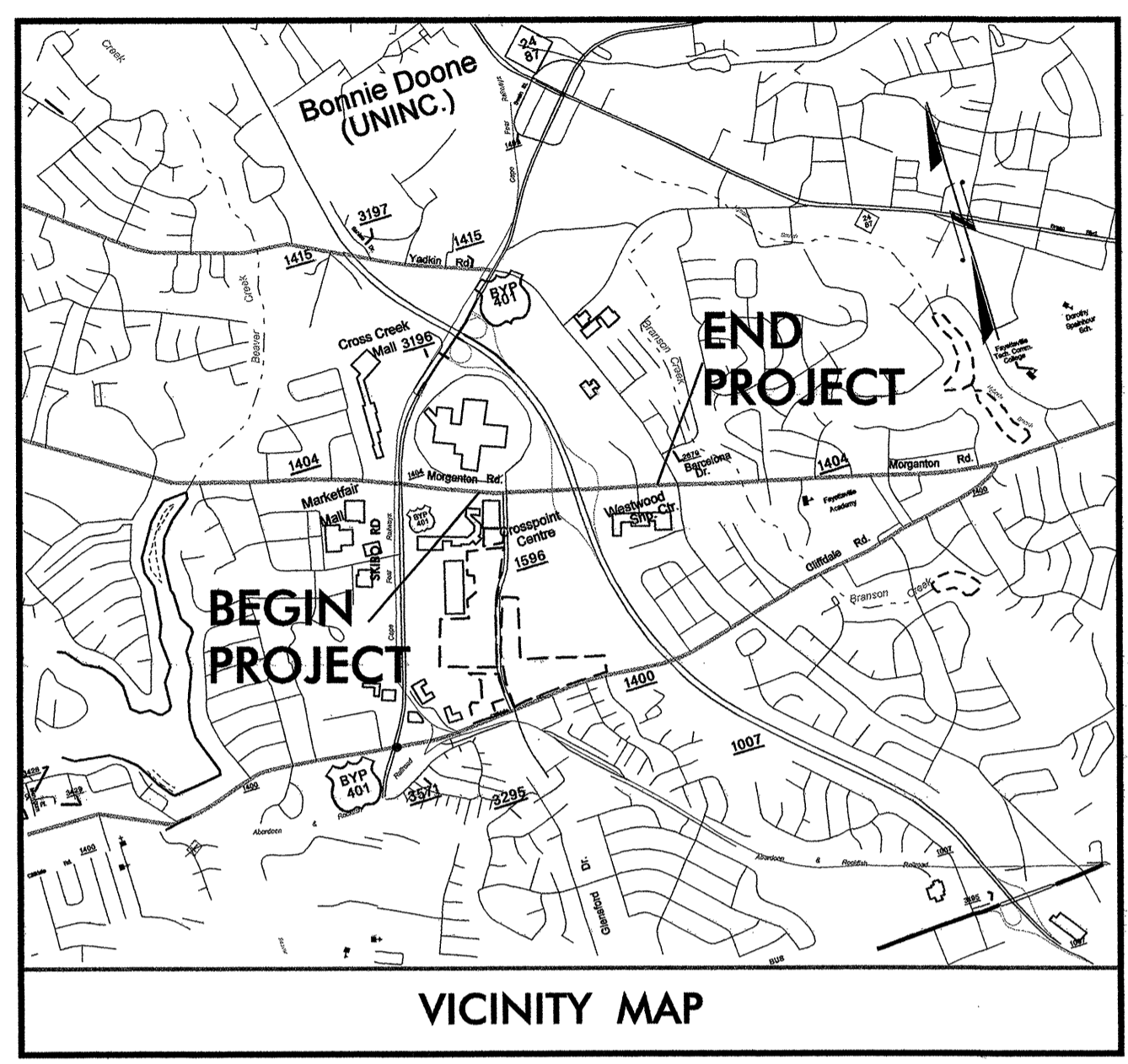
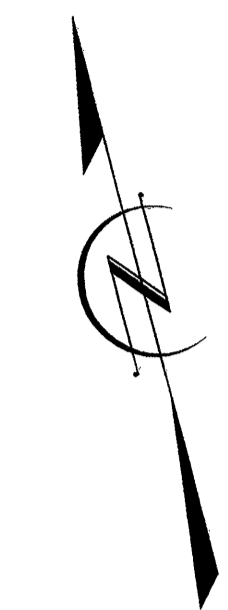


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

LOCATION: Morganton Road from Glensford Drive to Sycamore Dairy Road

TYPE OF WORK: Signals



BEGIN TIP PROJECT U-4756
-L- STA. 27+92.30

TO SKIBO ROAD
(US 401 BYPASS)

06-0346

06-0322

BEGIN CONSTRUCTION
-RPC- STA. 10+00.00

END CONSTRUCTION
-RPD- STA. 10+00.00

BEGIN CONSTRUCTION
-RPB- STA. 10+00.00

06-0319

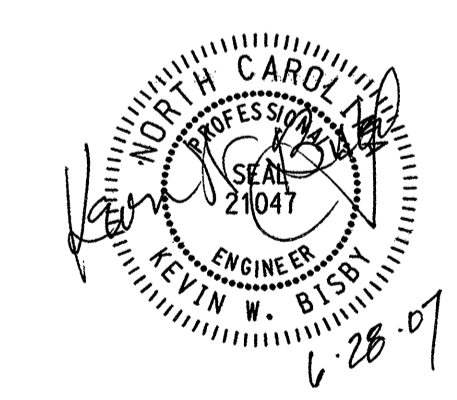
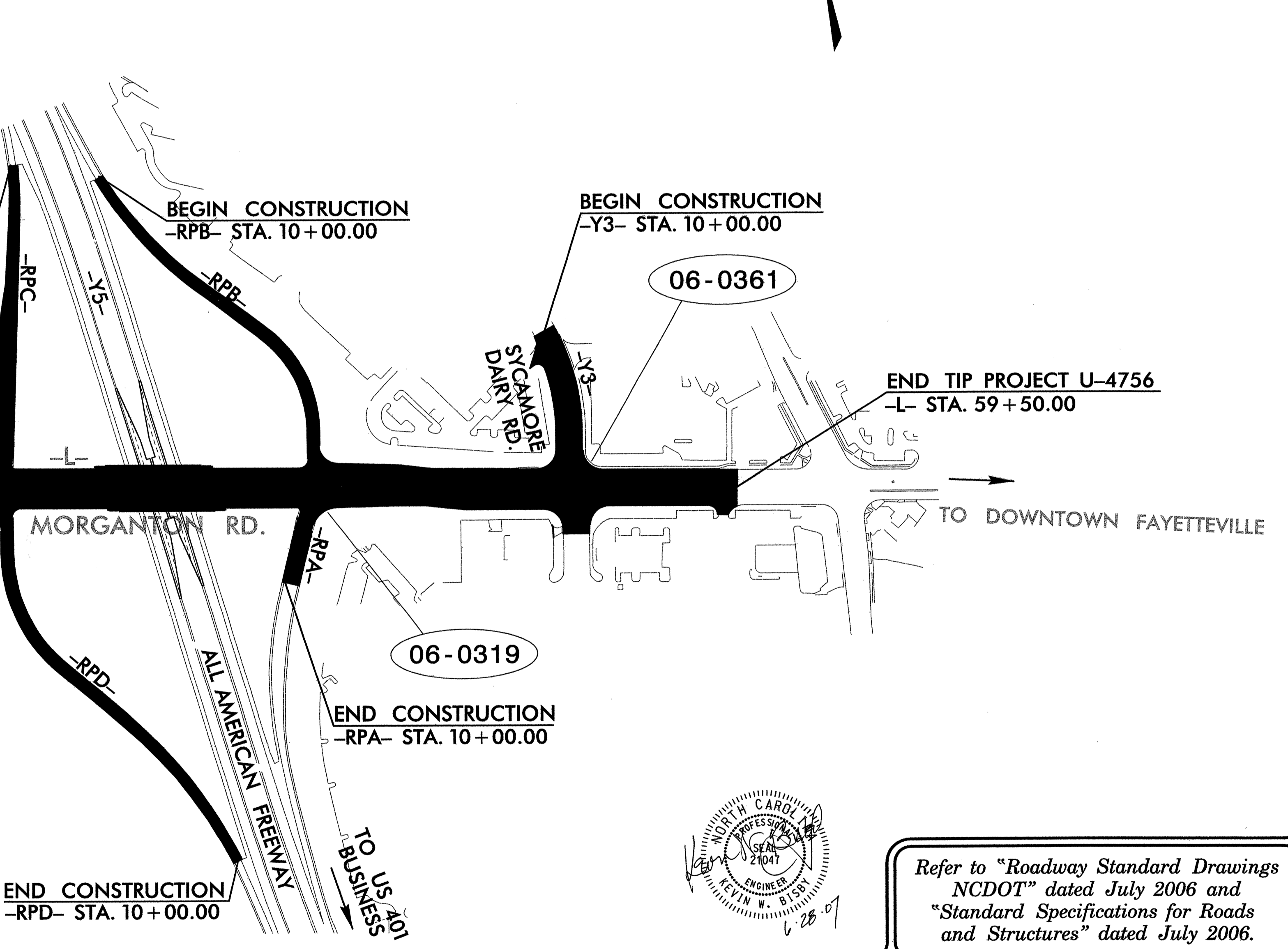
END CONSTRUCTION
-RPA- STA. 10+00.00

BEGIN CONSTRUCTION
-Y3- STA. 10+00.00

06-0361

END TIP PROJECT U-4756
-L- STA. 59+50.00

TO DOWNTOWN FAYETTEVILLE



Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.

Sheet #	Reference #	Location/Description
Sig. 1		Title Sheet
Sig. 2-3	06-0346T	Morganton Rd at Glensford Dr - Temporary Design
Sig. 4-5	06-0346	Morganton Rd at Glensford Dr - Final Design
Sig. 6-7	06-0322	Morganton Rd at All American Freeway SB Ramp
Sig. 8-9	06-0319	Morganton Rd at All American Freeway NB Ramp
Sig. 10-11	06-0361T	Morganton Rd at Sycamore Dairy Rd - Temporary Design
Sig. 12-13	06-0361	Morganton Rd at Sycamore Dairy Rd - Final Design
Sig. 14		Loading diagrams for 06-0346 and 06-0319

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT
Contacts:
Tim Williams, PE - Signals and Geometrics Contracts Engineer
G. C. Brown, PE - Signal Equipment Design Engineer
G. G. Murr, Jr., PE - Intelligent Transportation Systems Engineer

Prepared for:
DIVISION OF HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS
BRANCH

122 N. McDowell St., Raleigh, NC 27603

Project: U-4756

UNIVERSITY MICROFILMS INTERNATIONAL

PHASING DIAGRAM

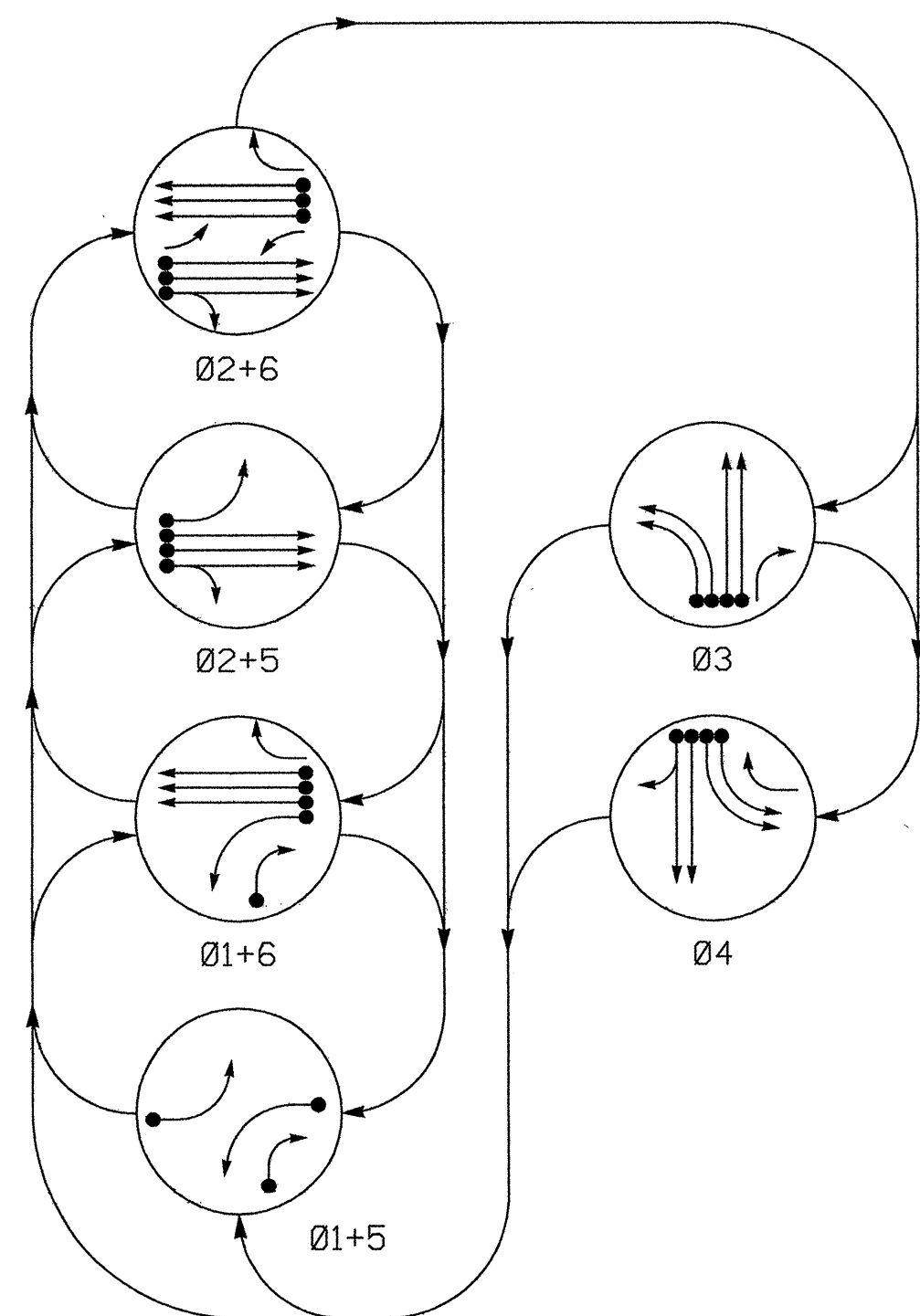


TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	R	G	R	G	R	Y
22, 23	R	R	G	G	R	Y
31, 32	R	R	R	R	G	R
33	R	R	R	R	G	R
34	R	R	R	R	G	R
41, 42	R	R	R	R	R	G
43, 44	R	R	R	R	R	G
51	R	R	G	G	R	Y
61, 62	R	G	R	G	R	Y
63	R	G	R	G	R	Y

2070L LOOP & DETECTOR INSTALLATION

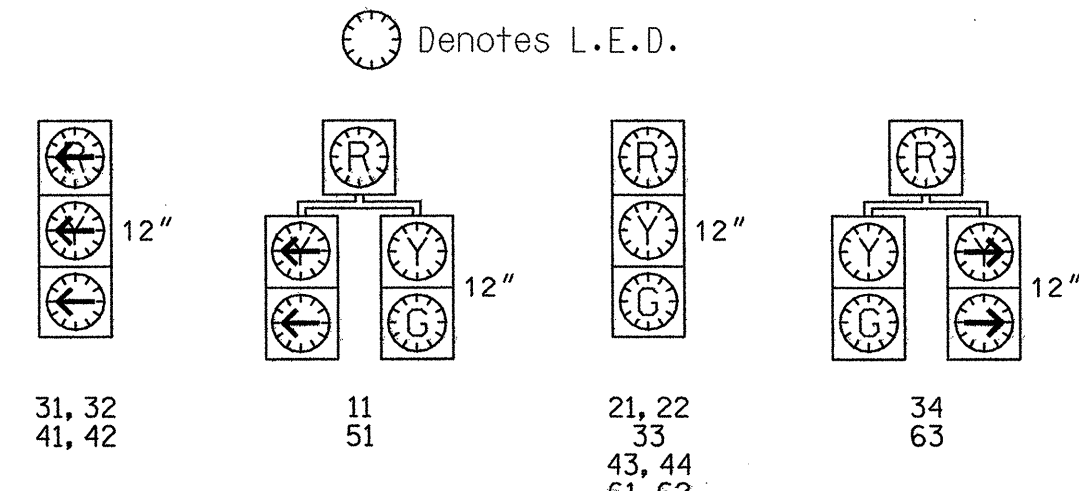
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	*	*	1	Y	Y	-	-	15	-	Y
1B	6X60	0	*	*	1	Y	Y	-	-	15	-	Y
2A,2B,2C	6X60	0	*	*	2	Y	Y	-	-	-	-	Y
3A	6X60	0	*	*	3	Y	Y	-	-	3	-	Y
3B	6X60	0	*	*	3	Y	Y	-	-	-	-	Y
3C	6X60	0	*	*	3	Y	Y	-	-	-	-	Y
3D	6X60	0	*	*	3	Y	Y	-	-	-	-	Y
4A	6X60	0	*	*	4	Y	Y	-	-	-	-	Y
4B	6X60	0	*	*	4	Y	Y	-	-	-	-	Y
4C	6X60	0	*	*	4	Y	Y	-	-	-	-	Y
4D	6X60	0	*	*	4	Y	Y	-	-	10	-	Y
5A	6X60	0	*	*	5	Y	Y	-	-	15	-	Y
					2	Y	Y	-	-	-	-	Y
6A,6B,6C	6X6	0	*	*	6	Y	Y	-	-	-	-	Y

6 Phase Fully Actuated (Fayetteville City Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supercedes these values.

SIGNAL FACE I.D.



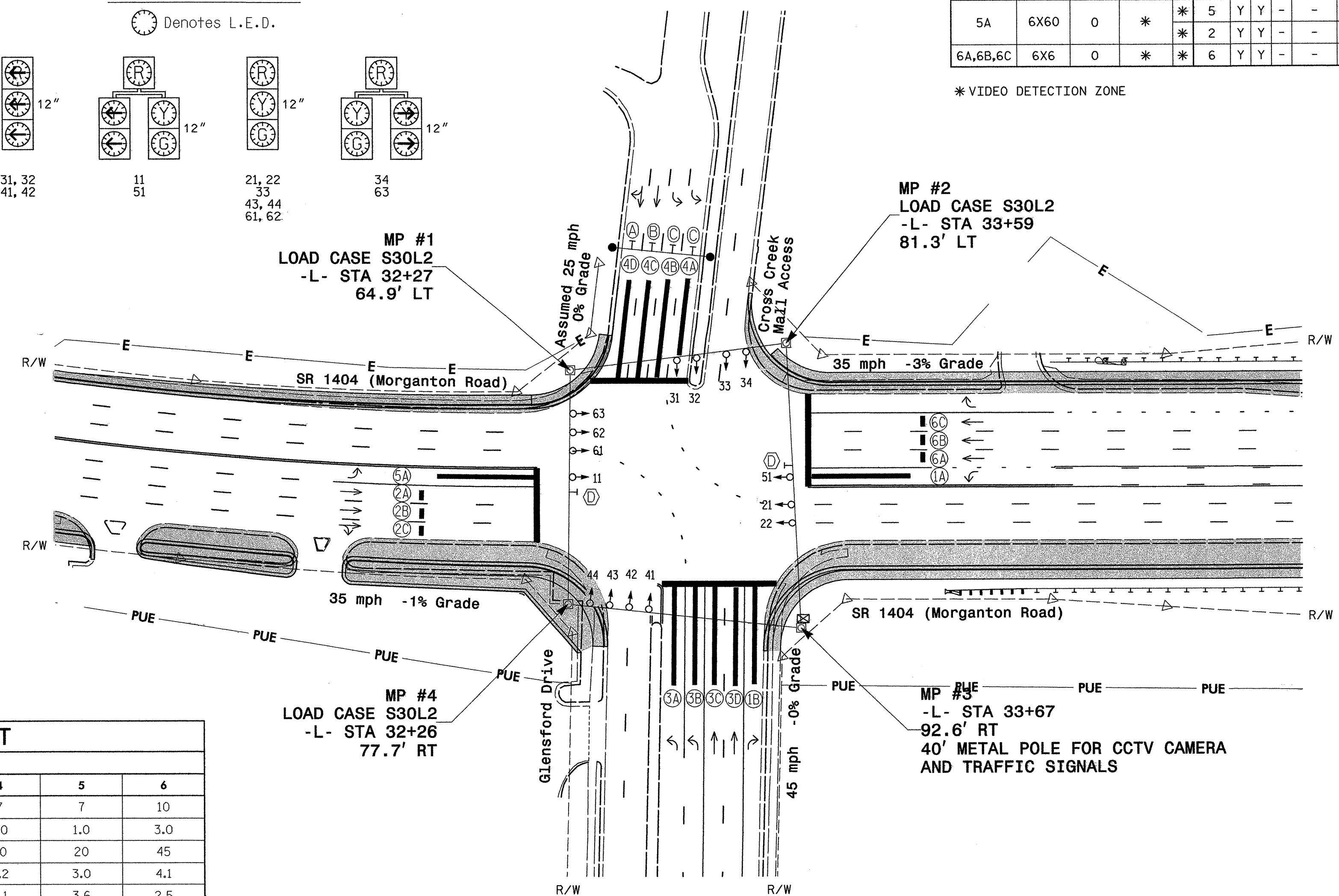
PHASING DIAGRAM DETECTION LEGEND

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

2070L TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	1.0	3.0	1.0	1.0	1.0	3.0
Max Green 1 *	20	45	30	20	20	45
Yellow Clearance	3.0	3.9	4.5	3.2	3.0	4.1
Red Clearance	3.3	2.7	1.8	3.1	3.6	2.5
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	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
Pedestrian Signal Head With Push Button & Sign	Signal Pole with Guy
Signal Pole with Sidewalk Guy	Metal Strain Pole
Inductive Loop Detector	Controller & Cabinet
Junction Box	2-in Underground Conduit
Right of Way	Directional Arrow
Wheelchair Ramp	Construction Zone
Video Detection Zone	Combined Through and Right Arrow Sign (R3-6R)
	Through Arrow "ONLY" Sign (R3-5A)
	Left Arrow "ONLY" Sign (R3-5L)
	"LEFT TURN YIELD ON GREEN" Sign (R10-12)

Signal Upgrade Temporary Design - TCP Phase II

SR 1404 (Morganton Road) at Cross Creek Mall Entrance/ Glensford Drive

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2007 REVIEWED BY: D. Swinton

PREPARED BY: K. Bisby REVIEWED BY: D. Privette

REVISIONS: INIT. DATE

SCALE: 1"=50'

421 Fayetteville Street Suite 1303 Raleigh, North Carolina phone: (919) 755-0583 fax: (919) 832-8798

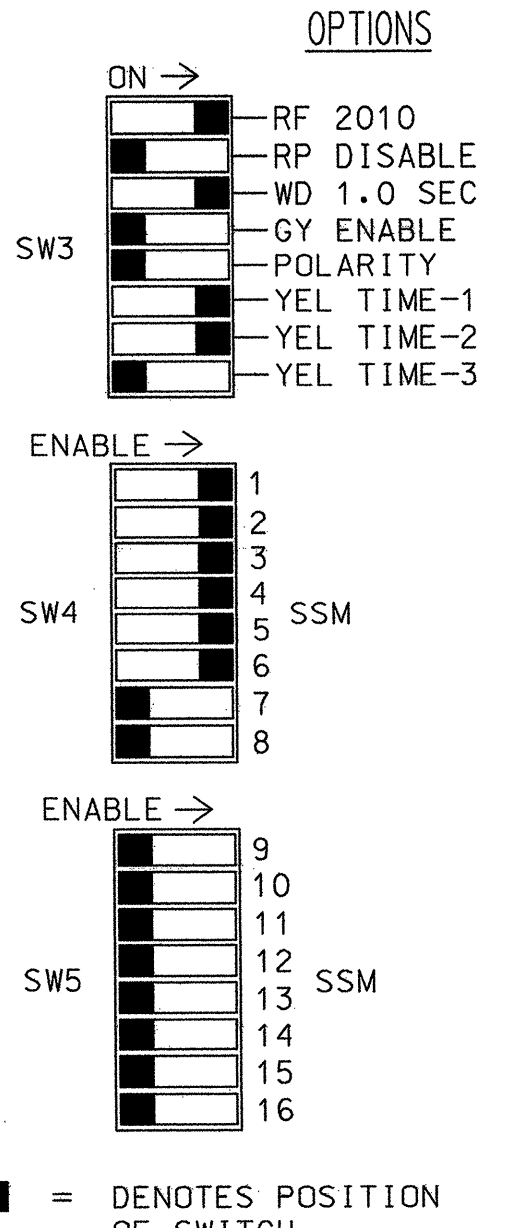
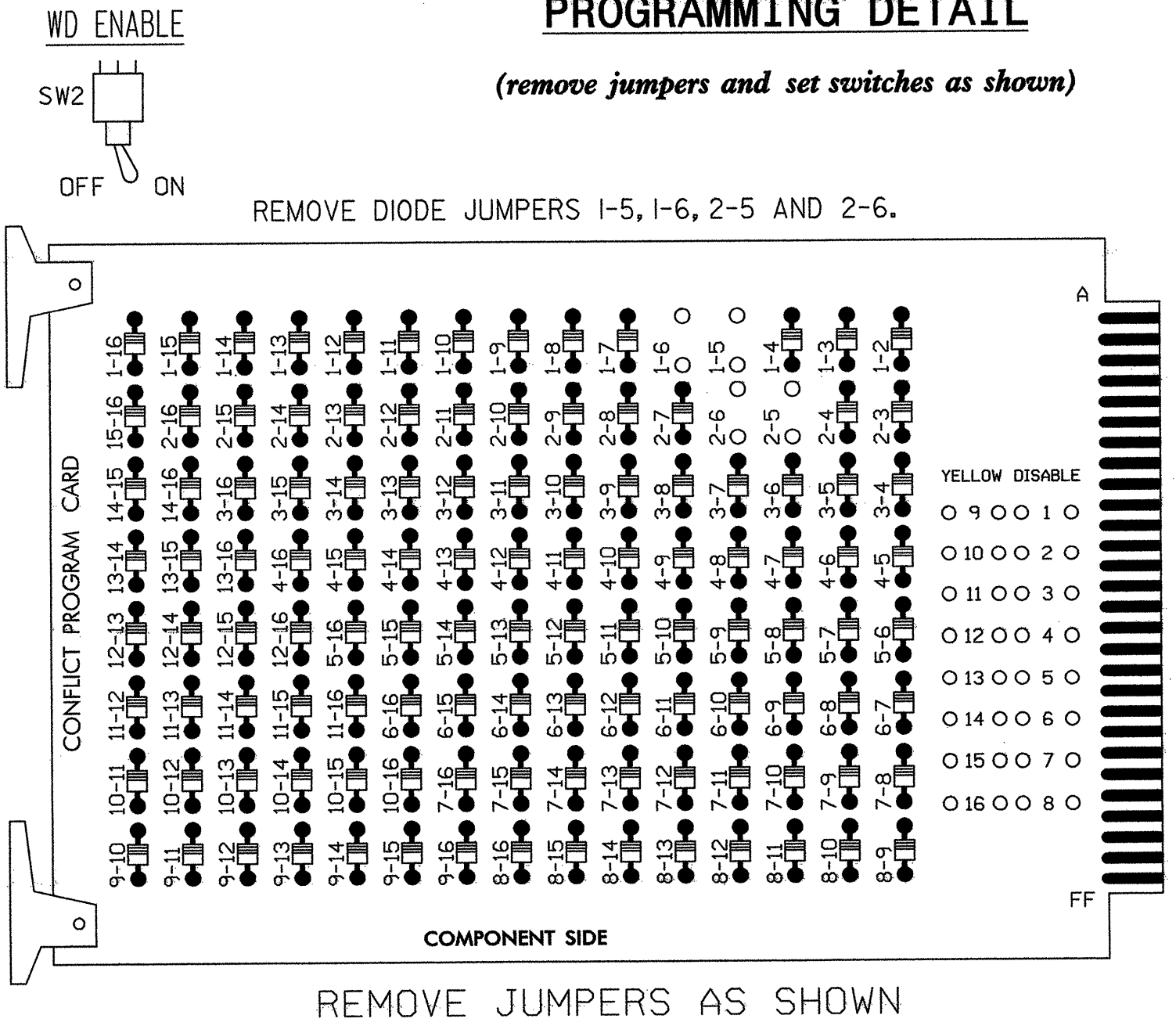
WilburSmith ASSOCIATES

Professional Engineer Seal for Kevin W. Bisby, License No. 21047

EDI MODEL 2010ECL 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 SEL1-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 7,8,9,10,11,& 12 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. The cabinet and controller are part of the Fayetteville City 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.	11,34	21,22	NU	31,32	33,34	41,42	43,44	63	NU	51	61,62,63	NU
RED	*	128		116	101		*	134				
YELLOW		129		117	102			135				
GREEN		130		118	103			136				
RED ARROW				116	101							
YELLOW ARROW	126			117	102	102	132					
GREEN ARROW	127			118	103	103	133					

NU = Not Used

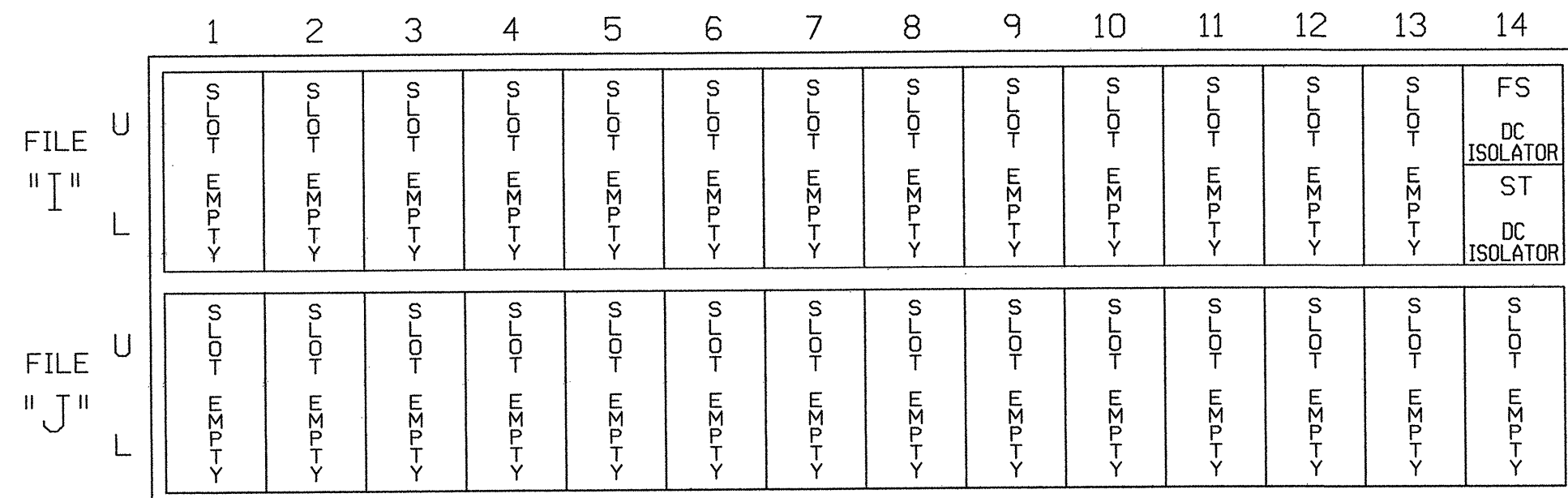
* Denotes install load resistor. See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6
 PHASES USED.....1,2,3,4,5,6
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

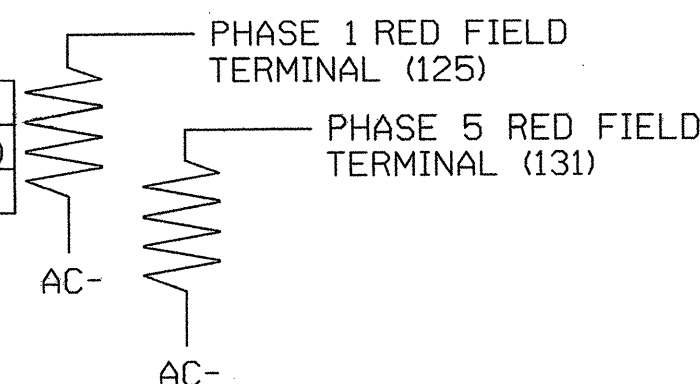


FS = FLASH SENSE
 ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



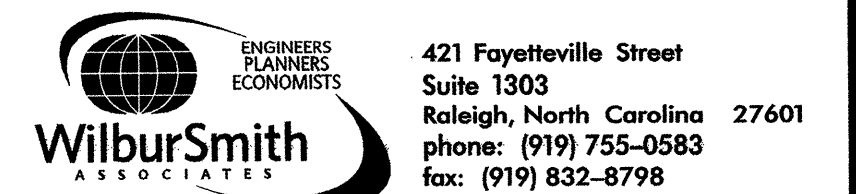
NOTE: The purpose of these resistors is to load the channel red monitor inputs in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE TEMPORARY SIGNAL DESIGN: 06-0346T
 DESIGNED: JUNE 2007
 SEALED: June 28, 2007
 REVISED:

Signal Upgrade Temporary Design



Prepared for the Offices of:
 Traffic, Acoustics and Safety Services, Inc.
 Signal Management Division
 122 N. McDowell St., Raleigh, NC 27603

SR 1404 (Morganton Road) at Cross Creek Mall Entrance/ Glensford Drive
 Division 6 Cumberland County Fayetteville

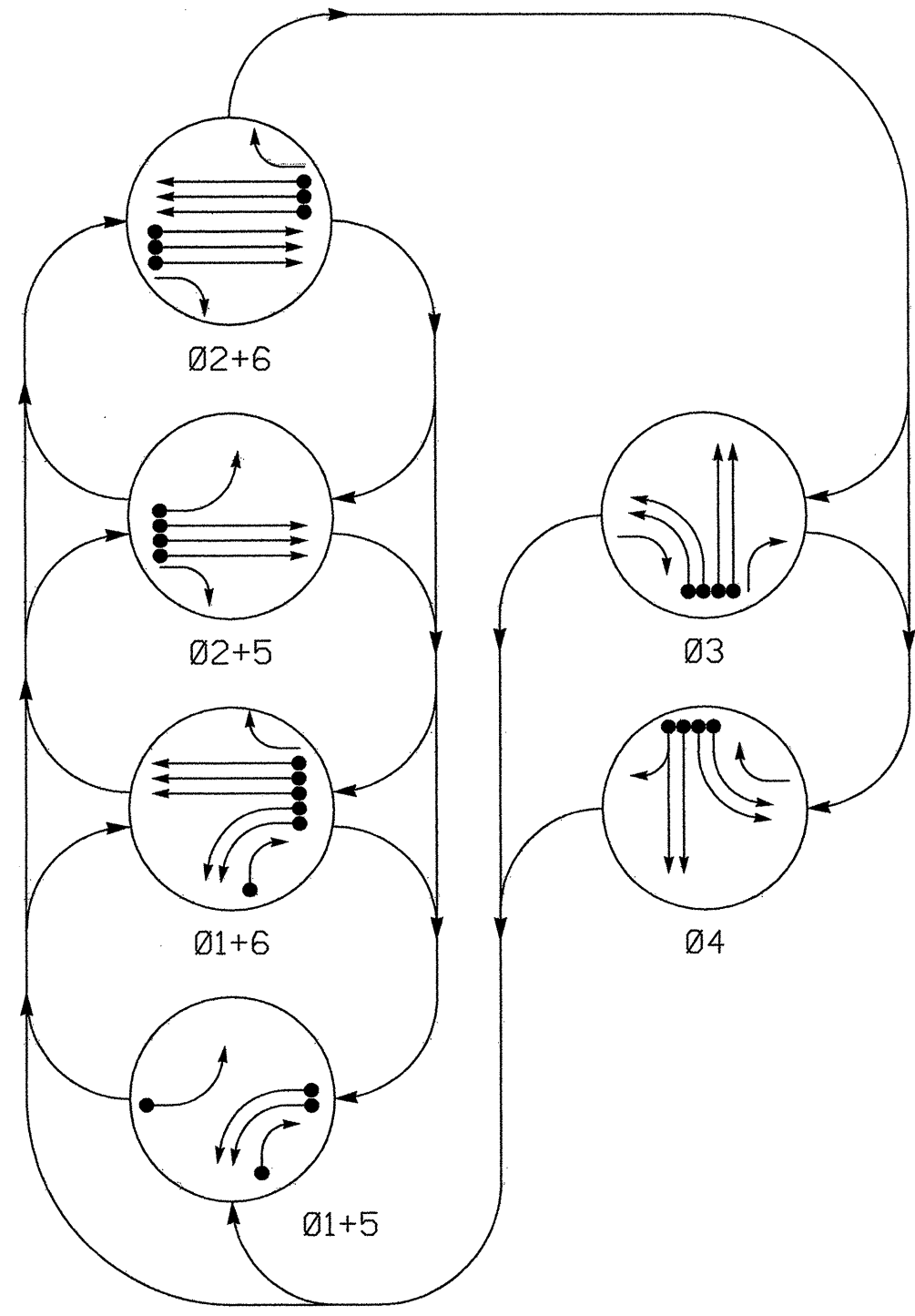
PLAN DATE: June 2007
 PREPARED BY: D. Swinton
 REVIEWED BY: K. Bisby, D. Privette

REVISIONS: INIT. DATE

SIGNATURE: DATE
 SIG. INVENTORY NO. 06-0346T

Professional Engineer Seal: NORTH CAROLINA PROFESSIONAL ENGINEER MEVIN W. BISSONNETTE, License No. 21089, dated 6-28-07.

PHASING DIAGRAM



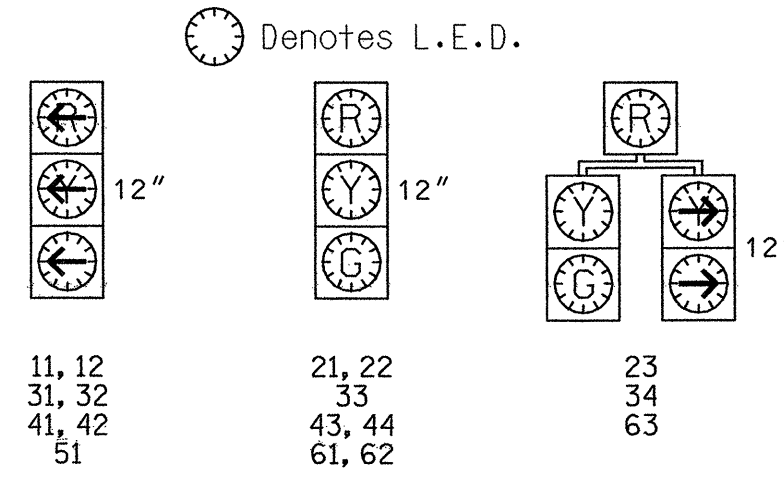
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 3	Ø 4
11, 12	←	←	←	←	←	←
21, 22	R	R	G	G	R	R
23	R	R	G	G	R	R
31, 32	←	←	←	←	←	←
33	R	R	R	R	G	R
34	R	R	R	R	G	R
41, 42	←	←	←	←	←	←
43, 44	R	R	R	R	G	R
51	←	←	←	←	←	←
61, 62	R	G	R	G	R	R
63	R	G	R	G	R	R

SIGNAL FACE I.D.



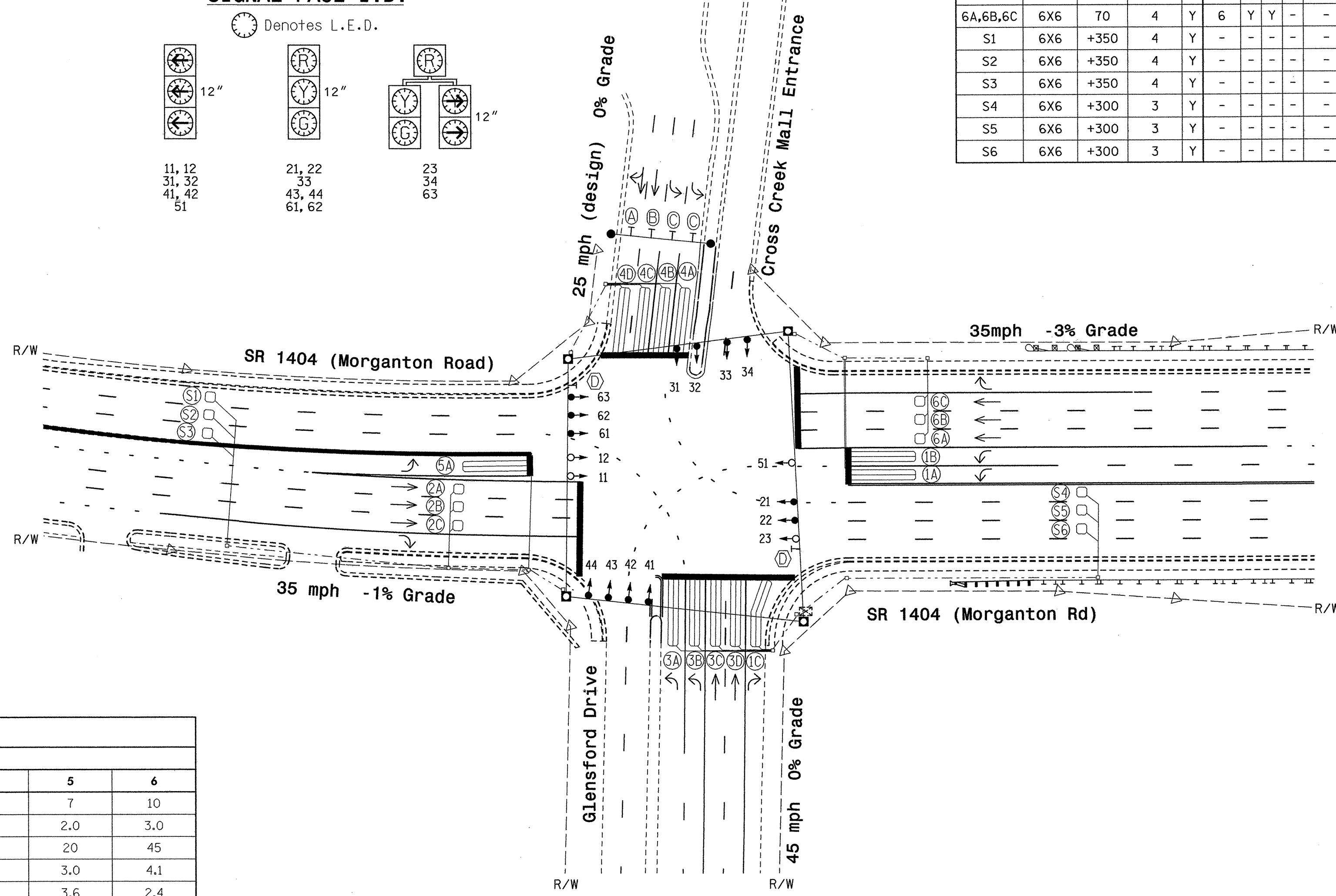
2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING								
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	3	-	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-	-	-
1C	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	15	-	-
2A,2B,2C	6X6	70	4	Y	2	Y	Y	-	-	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	3	-	-
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-	-
3C	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-	-
3D	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-	-
4C	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-	-
4D	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	10	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	-	-
6A,6B,6C	6X6	70	4	Y	6	Y	Y	-	-	-	-	-	-
S1	6X6	+350	4	Y	-	-	-	-	-	-	-	Y	Y
S2	6X6	+350	4	Y	-	-	-	-	-	-	-	Y	Y
S3	6X6	+350	4	Y	-	-	-	-	-	-	-	Y	Y
S4	6X6	+300	3	Y	-	-	-	-	-	-	-	Y	Y
S5	6X6	+300	3	Y	-	-	-	-	-	-	-	Y	Y
S6	6X6	+300	3	Y	-	-	-	-	-	-	-	Y	Y

6 Phase Fully Actuated (Fayetteville City Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or Phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
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. Closed loop system data: Controller Asset #1902



LEGEND

- | PROPOSED | EXISTING |
|----------|----------|
| | |
| | N/A |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| N/A | |
| | |
| | |
| | |
| | |
| | |
| | |

2070L TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0
Max Green 1 *	20	45	30	20	20	45
Yellow Clearance	3.0	3.9	4.5	3.2	3.0	4.1
Red Clearance	4.2	2.6	2.0	3.5	3.6	2.4
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	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

421 Fayetteville Street
Suite 1303
Raleigh, North Carolina 27601
phone: (919) 755-0583
fax: (919) 832-8798

SR 1404 (Morganton Road)
at
**Cross Creek Mall Entrance/
GlenSFord Drive**

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2007 REVIEWED BY: D. Swinton

PREPARED BY: K. Bisby REVIEWED BY: D. Privette

SCALE: 1"=50'

SEAL

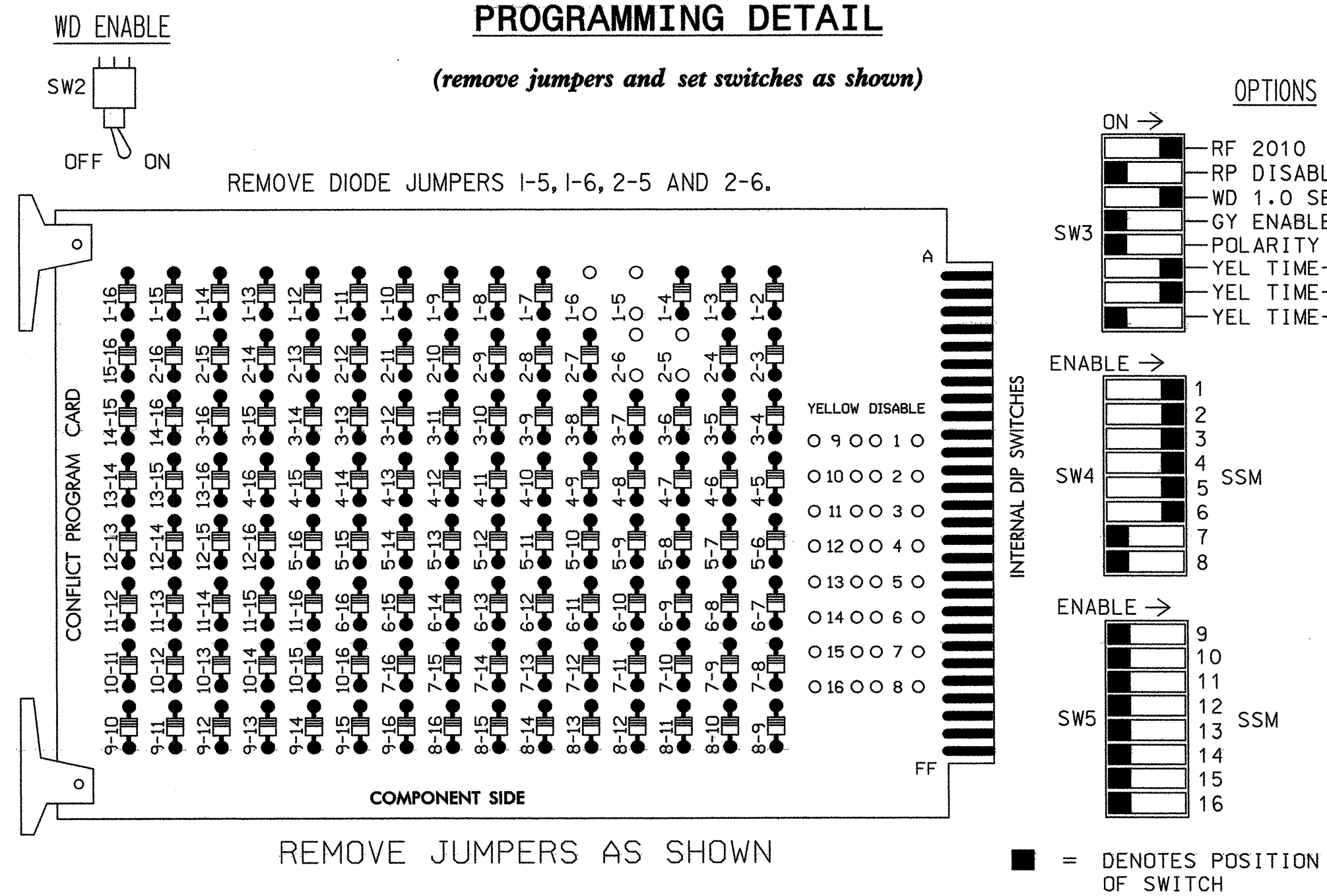
6-28-07

SIGNATURE DATE

SIG. INVENTORY NO. 06-0346

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Make sure jumpers SEL1-SEL5 are present on the monitor board.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 7,8,9,10,11 & 12 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- The cabinet and controller are part of the Fayetteville City Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS..12
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6
 PHASES USED.....1,2,3,4,5,6
 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.	11,12 34	21,22, 23	NU	31,32 33,34 23	41,42 43,44 63	NU	51	61,62, 63	NU	NU	NU	NU
RED		128		116	101			134				
YELLOW		129		117	102			135				
GREEN		130		118	103			136				
RED ARROW	125			116	101		131					
YELLOW ARROW	126	126		117	102	102	132					
GREEN ARROW	127	127		118	103	103	133					
⚠												
🚶												

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 2	S	∅ 3	∅ 3	∅ 4	∅ 4	SYS DET S1	S	S	S	S	FS
L	1C	1A	2A,2B,2C	←-TOXEM	3C	3A	4C	4A	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	DC ISOLATOR
	NOT USED	∅ 1	NOT USED	←-TOXEM	∅ 3	∅ 3	∅ 4	∅ 4	SYS DET S2	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	ST
		1B		←-TOXEM	3D	3B	4D	4B	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	DC ISOLATOR
U	∅ 5	∅ 6	S	S	SYS DET S5	S	SYS DET S3	S	S	S	S	S	S	S
L	5A	6A,6B,6C	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM
	NOT USED	NOT USED	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM	←-TOXEM

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

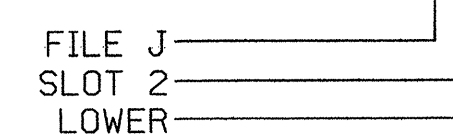
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y			3
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			
1C	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A,2B,2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	Y	Y			3
3B	TB4-11,12	I6L	45	7	14	3	Y	Y			
3C	TB4-5,6	I5U	58	20	3	3	Y	Y			
3D	TB4-7,8	I5L	58	20	3	3	Y	Y			
4A	TB6-5,6	I8U	49	11	24	4	Y	Y			
4B	TB6-7,8	I8L	49	11	24	4	Y	Y			
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			
4D	TB6-3,4	I7L	78	40	44	4	Y	Y			10
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
*S1	TB6-9,10	I9U	60	22	11	SYS					
*S2	TB6-11,12	I9L	62	24	13	SYS					
*S3	TB7-9,10	J9U	59	21	15	SYS					
*S4	TB7-11,12	J9L	61	23	17	SYS					
*S5	TB7-1,2	J7U	66	28	38	SYS					
*S6	TB7-3,4	J7L	79	41	48	SYS					

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

INPUT FILE POSITION LEGEND: J2L



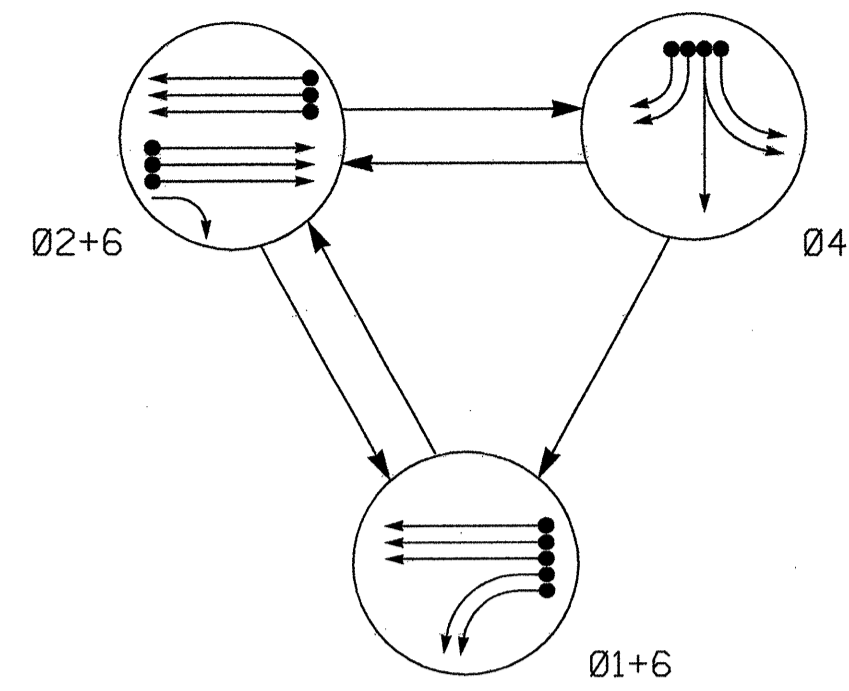
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0346
 DESIGNED: JUNE 2007
 SEALED: June 28, 2007
 REVISED:

Signal Upgrade - Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: Kevin W. Bisby Professional Engineer State of North Carolina License No. 2004	SR 1404 (Morganton Road) at Cross Creek Mall Entrance/ Glensford Drive		SEAL Kevin W. Bisby Professional Engineer State of North Carolina License No. 2004
	Division 6 Cumberland County Fayetteville PLAN DATE: June 2007 REVIEWED BY: K. Bisby PREPARED BY: D. Swinton REVIEWED BY: D. Privette	REVISIONS INIT. DATE	
122 N. McDowell St., Raleigh, NC 27603			SIGNATURE DATE SIG. INVENTORY NO. 06-0346

*****SYTIME*****

PHASING DIAGRAM



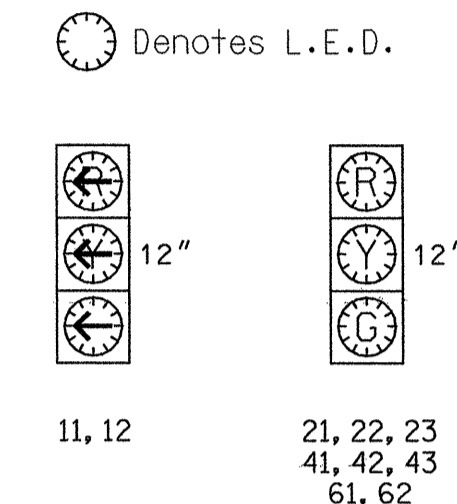
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 4	PEDESTRIAN
11, 12	←	←	←	←
21, 22, 23	R	G	R	Y
41, 42, 43	R	R	G	R
61, 62	G	G	R	Y

SIGNAL FACE I.D.



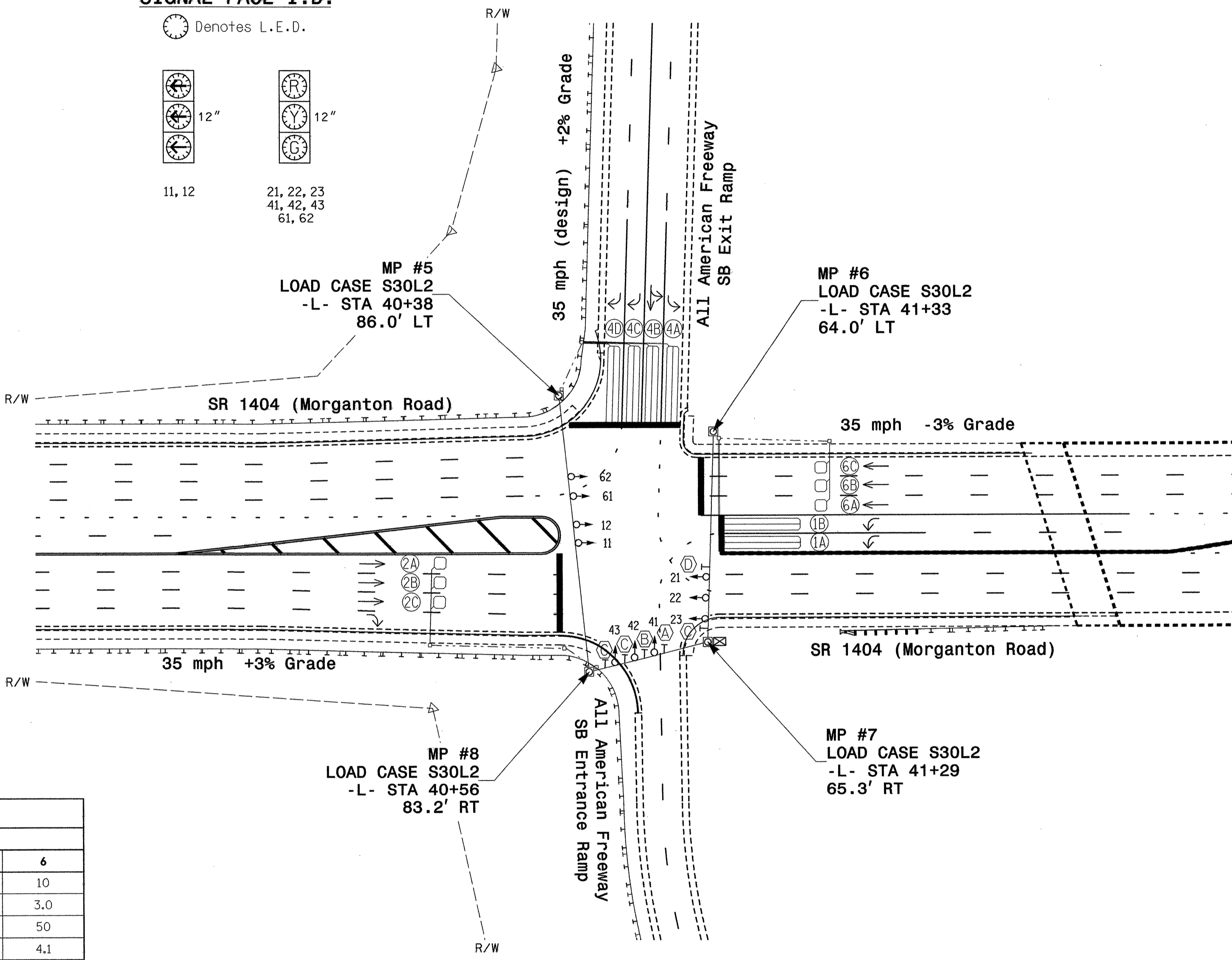
2070L LOOP & DETECTOR INSTALLATION

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

3 Phase Fully Actuated (Fayetteville City Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1903.
- Install a minimum of five conduit stub outs in the cabinet foundation.



2070L TIMING CHART

FEATURE	PHASE			
	1	2	4	6
Min Green 1*	7	10	7	10
Extension 1*	2.0	3.0	2.0	3.0
Max Green 1*	20	50	20	50
Yellow Clearance	3.0	3.7	3.7	4.1
Red Clearance	2.9	1.5	2.6	1.7
Walk 1*	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation*	-	-	-	-
Max Variable Initial*	-	-	-	-
Time Before Reduction*	-	-	-	-
Time To Reduce*	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

PROPOSED	EXISTING
○	○
●	●
⊕	⊕
⊙	⊙
⊞	⊞
⊠	⊠
⊡	⊡
⊢	⊢
⊣	⊣
⊤	⊤
⊥	⊥
⊦	⊦
⊧	⊧
⊨	⊨
⊩	⊩
⊪	⊪
⊫	⊫
⊬	⊬
⊭	⊭
⊮	⊮
⊯	⊯
⊰	⊰
⊱	⊱
⊲	⊲
⊳	⊳
⊴	⊴
⊵	⊵
⊶	⊶
⊷	⊷
⊸	⊸
⊹	⊹
⊺	⊺
⊻	⊻
⊼	⊼
⊽	⊽
⊾	⊾
⊿	⊿

WilburSmith ASSOCIATES
 421 Fayetteville Street
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 Raleigh, North Carolina 27601
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 fax: (919) 832-8798

Signal Upgrade - Final Design

SR 1404 (Morganton Road) at All American Freeway Southbound Ramp

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2007 REVIEWED BY: D. Swinton

PREPARED BY: K. Bisby REVIEWED BY: D. Privette

SCALE: 1"=50'

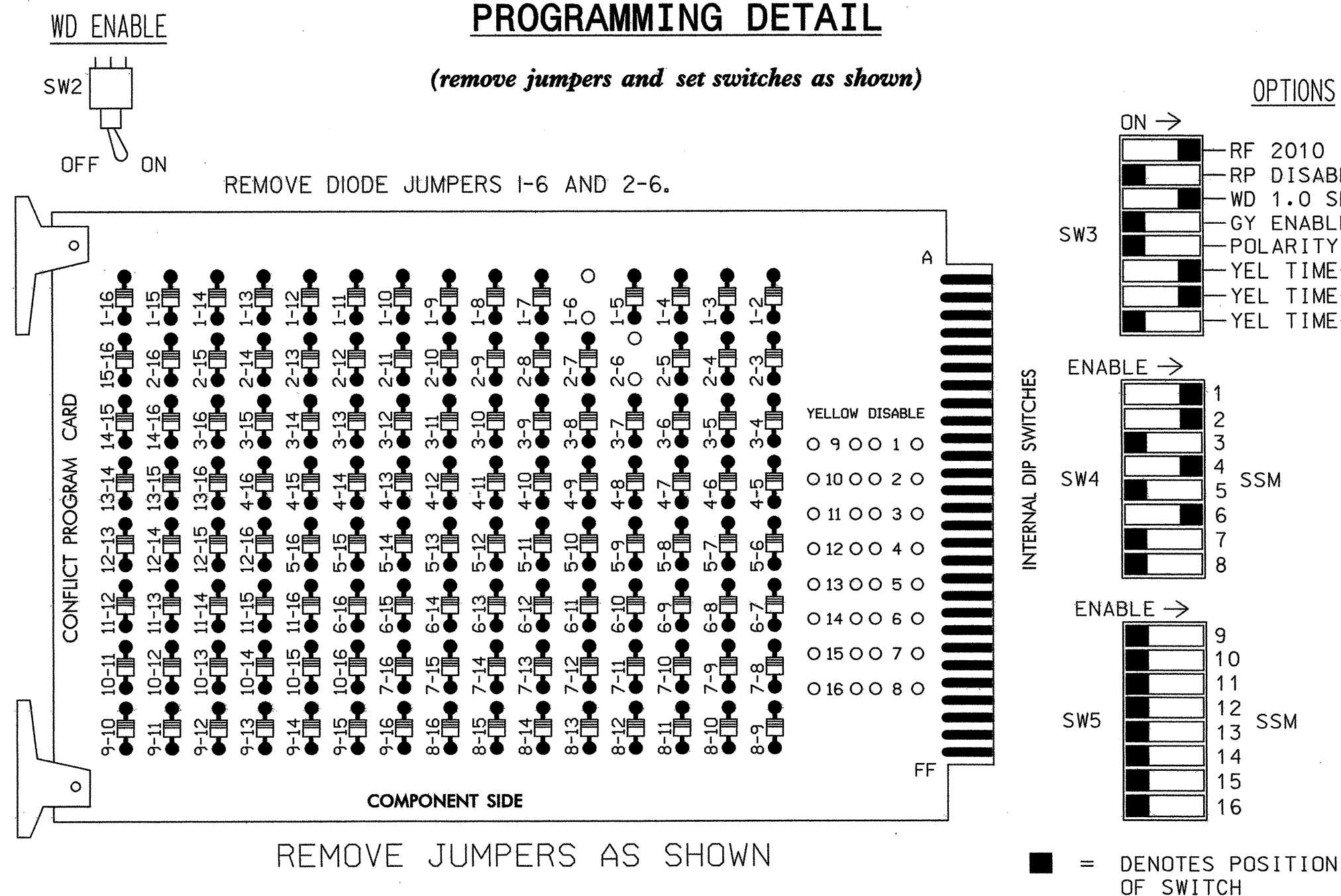
122 N. McDowell St., Raleigh, NC 27603

SEAL: KEVIN W. BISBY, ENGINEER, No. 21047

SIGNATURE: DATE: SIG. INVENTORY NO. 06-0322

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



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 SEL1-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 3,5,7, 8,9,10,11 & 12 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. The cabinet and controller are part of the Fayetteville City 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.	11,12	21,22, 23	NU	NU	41,42, 43	NU	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW	125											
YELLOW ARROW	126											
GREEN ARROW	127											

NU = Not Used

EQUIPMENT INFORMATION

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

INPUT FILE POSITION LAYOUT

(front view)

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

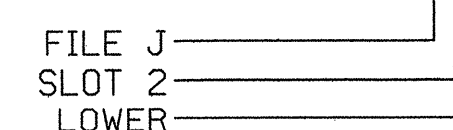
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-3,4	I1L	56	18	1	1	Y	Y			
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			15
4D	TB6-3,4	I7L	78	40	44	4	Y	Y			15
6A,2B,2C	TB3-5,6	J2U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0322
 DESIGNED: JUNE 2007
 SEALED: June 28, 2007
 REVISED:



421 Fayetteville Street
 Suite 1303
 Raleigh, North Carolina 27601
 phone: (919) 755-0583
 fax: (919) 832-8798

Signal Upgrade - Final Design

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1404 (Morganton Road) at All American Freeway Southbound Ramp

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2007 REVIEWED BY: K. Bisby

PREPARED BY: D. Swinton REVIEWED BY: D. Privette

REVISIONS INIT. DATE

SEAL

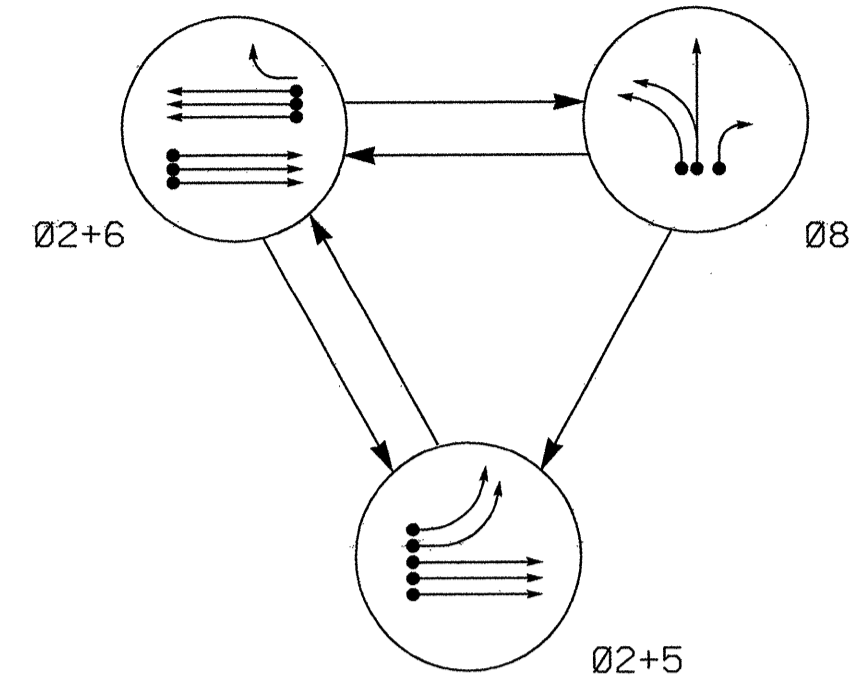
PROFESSIONAL ENGINEER KEVIN W. BISBY 27047

SIGNATURE DATE

SIG. INVENTORY NO. 06-0322

*****SYSTEM TIME*****
 *****JOB NO.*****
 *****USER NAME*****

PHASING DIAGRAM



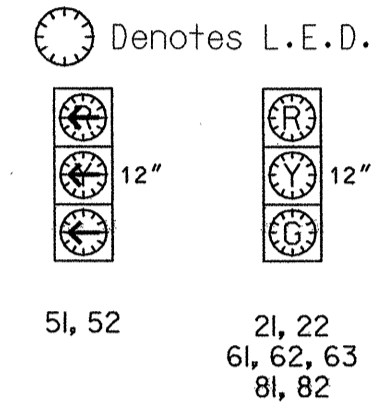
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 2+5	Ø 2+6	Ø 8	FLASH
21, 22	G	G	R	Y
51, 52	+	+	+	+
61, 62, 63	R	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.



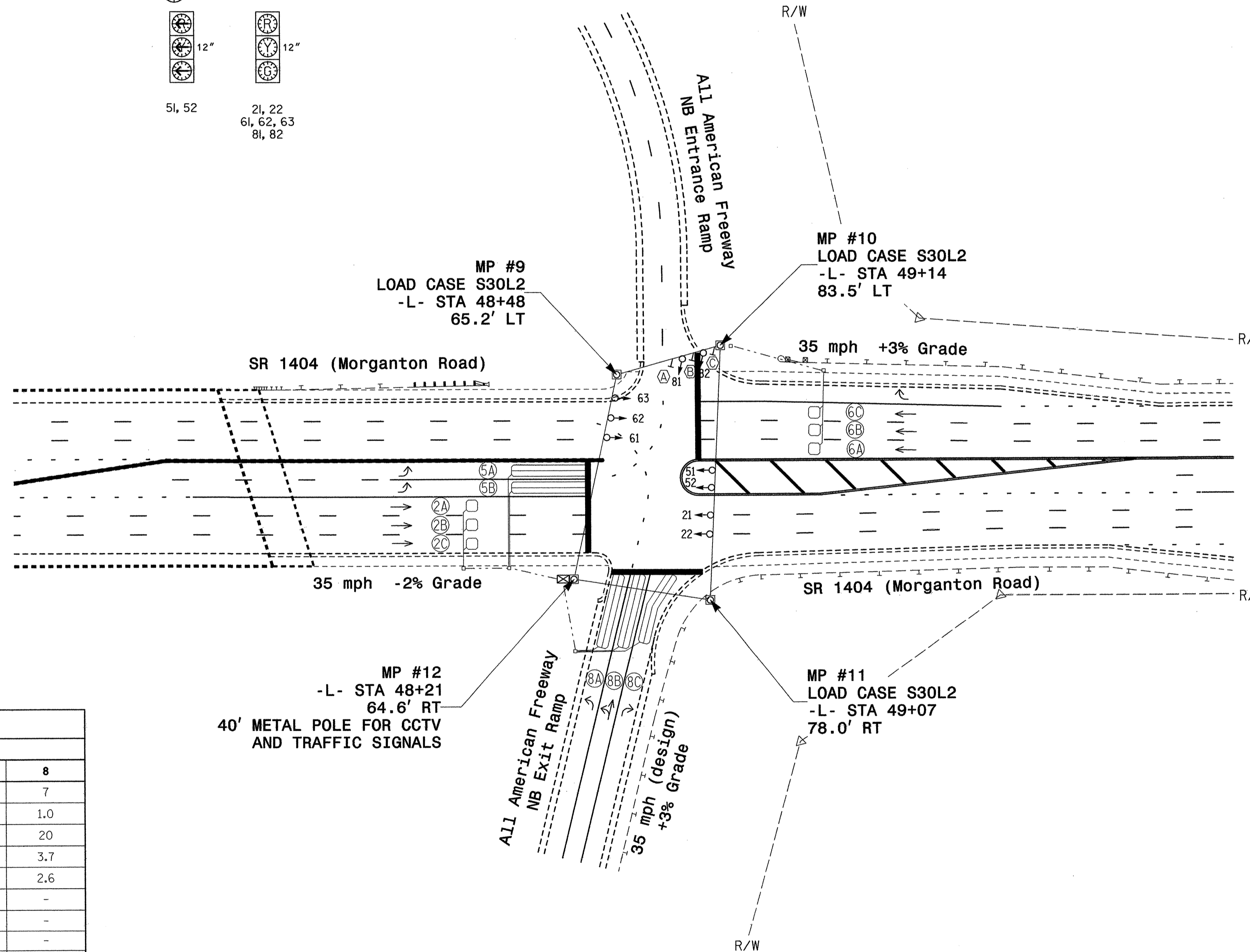
2070L LOOP & DETECTOR INSTALLATION

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

3 PHASE FULLY ACTUATED (FAYETTEVILLE CITY SIGNAL SYSTEM)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1904
- Install a minimum of five conduit stub outs in the cabinet foundation.



FEATURE	PHASE			
	2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	1.0	3.0	1.0
Max Green 1 *	50	20	50	20
Yellow Clearance	4.0	3.0	3.7	3.7
Red Clearance	1.5	2.9	1.0	2.6
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

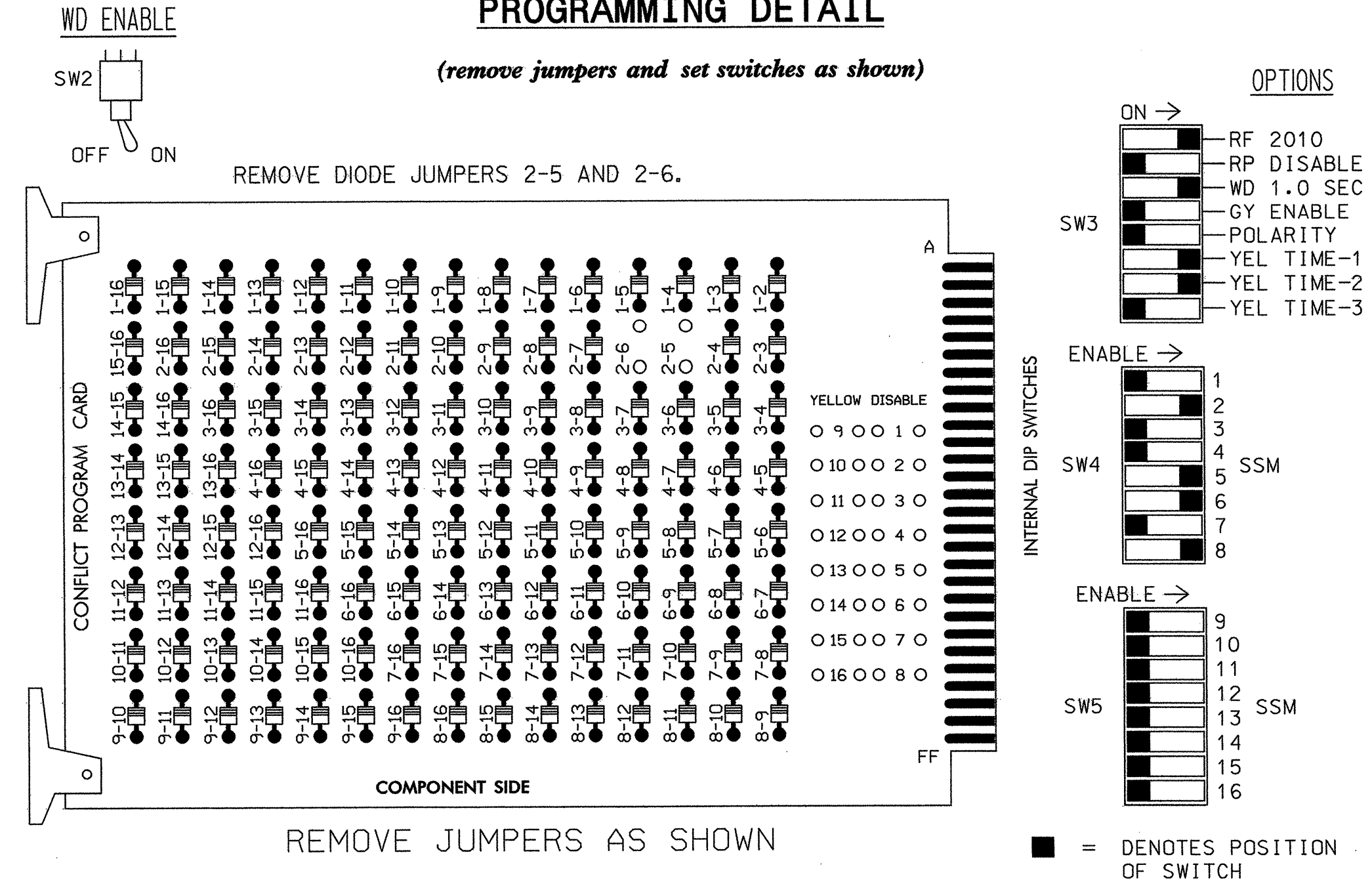
- | PROPOSED | EXISTING |
|--|--|
| ○→ Traffic Signal Head | ●→ Traffic Signal Head |
| ○→ Modified Signal Head | N/A |
| ⊥ Sign | ⊥ Sign |
| ○ Signal Pole with Guy | ● Signal Pole with Guy |
| ○ Signal Pole with Sidewalk Guy | ● Signal Pole with Sidewalk Guy |
| □ Metal Strain Pole | □ Metal Strain Pole |
| ⊠ Inductive Loop Detector | ⊠ Inductive Loop Detector |
| ⊠ Controller & Cabinet | ⊠ Controller & Cabinet |
| □ Junction Box | □ Junction Box |
| - - - 2-in Underground Conduit | - - - 2-in Underground Conduit |
| N/A Right of Way | - - - Right of Way |
| → Directional Arrow | → Directional Arrow |
| Ⓐ Left Arrow "Only" Sign (R3-5L) | Ⓐ Left Arrow "Only" Sign (R3-5L) |
| Ⓑ Combined Through and Left Arrow Sign (R3-6L) | Ⓑ Combined Through and Left Arrow Sign (R3-6L) |
| Ⓒ Right Arrow "Only" Sign | Ⓒ Right Arrow "Only" Sign |

Signal Upgrade - Final Design

	<p>SR 1404 (Morganton Road) at All American Freeway NB Exit and Entrance Ramps</p>		<p>SEAL</p>
	<p>Division 6 Cumberland County Fayetteville</p> <p>PLAN DATE: June 2007 REVIEWED BY: K. Bisby</p> <p>PREPARED BY: D. Swinton REVIEWED BY: D. Privette</p>	<p>SCALE 0 50</p>	
<p>421 Fayetteville Street Suite 1303 Raleigh, North Carolina 27601 phone: (919) 755-0583 fax: (919) 832-8798</p>		<p>122 N. McDowell St., Raleigh, NC 27603</p>	

EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Make sure jumpers SEL1-SEL5 are present on the monitor board.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4,7,9, 10,11 & 12 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- The cabinet and controller are part of the Fayetteville City Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332
 SOFTWARE.....ECONOLITE OASIS
 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	NU	NU	NU	NU	51,52	61,62, 63	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW								131				
YELLOW ARROW								132				
GREEN ARROW								133				
Hand icon												
Person icon												

NU = Not Used

INPUT FILE POSITION LAYOUT

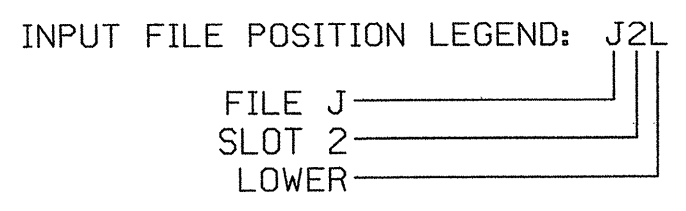
(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 2	2A,2B,2C	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	FS
L	NOT USED													DC ISOLATOR
U	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	DC ISOLATOR
L	5A	6A,6B,6C					8A	8C						
U	∅ 5	NOT USED	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	
L	5B						8B	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.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B,2C	TB2-5,6	I2U	39	1	2	2	Y	Y			
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-3,4	J1L	55	17	5	5	Y	Y			
6A,6B,6C	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0319
 DESIGNED: JUNE 2007
 SEALED: June 28, 2007
 REVISED:

Signal Upgrade - Final Design

Electrical and Programming Details for: SR 1404 (Morganton Road) at All American Freeway NB Exit and Entrance Ramps

Division 6 Cumberland County Fayetteville

Plan Date: June 2007 Reviewed By: K. Bisby

Prepared By: D. Swinton Reviewed By: D. Privette

Revisions: _____ Init. _____ Date _____

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21047 STEVEN W. BISBY

Signature: _____ Date: 6-28-07

Sig. Inventory No. 06-0319

WilburSmith ASSOCIATES
 421 Fayetteville Street Suite 1303 Raleigh, North Carolina 27601 phone: (919) 755-0583 fax: (919) 832-8798

*****SYSTEMS*****
 *****CONTRACTOR*****

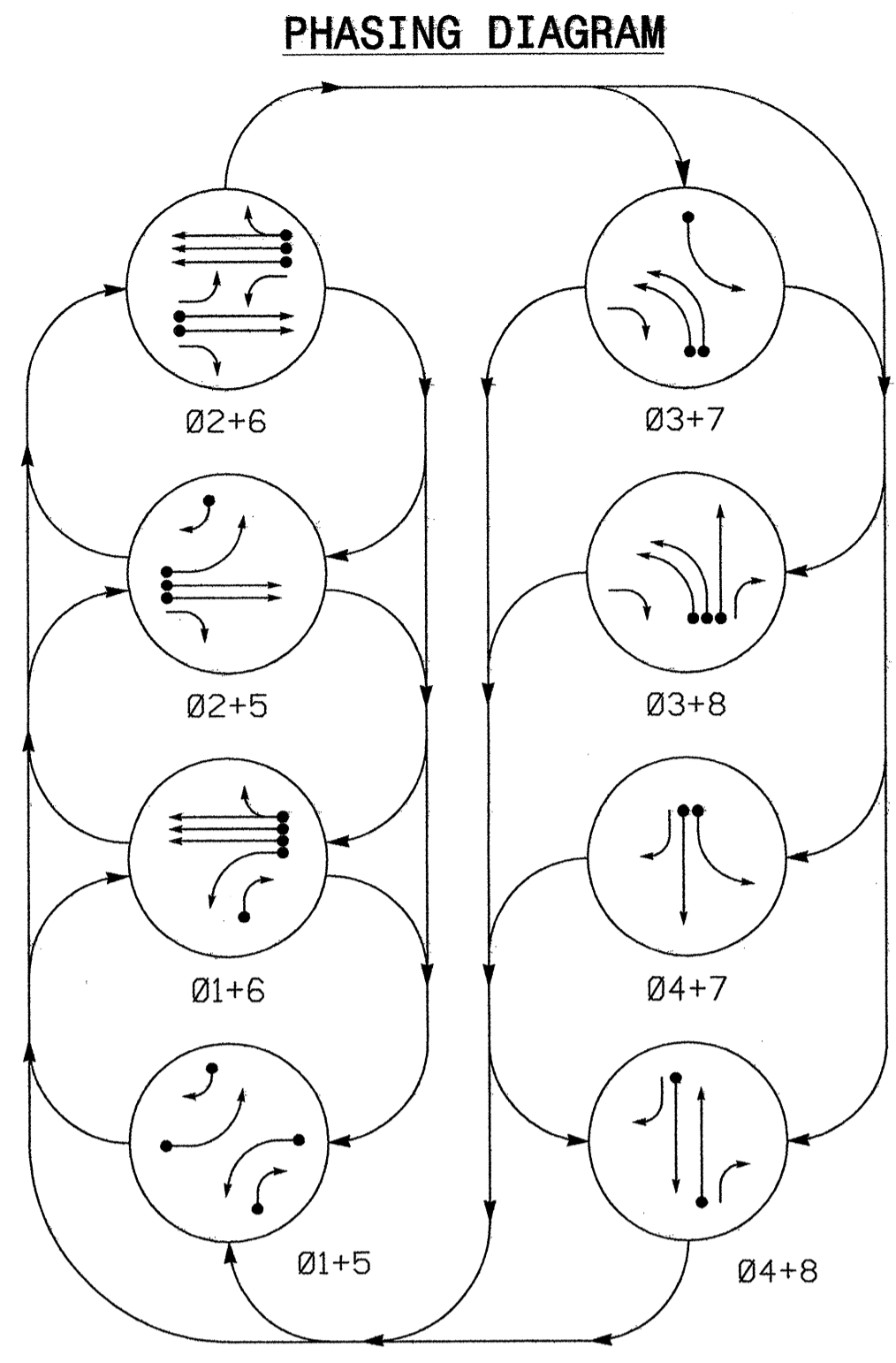


TABLE OF OPERATION

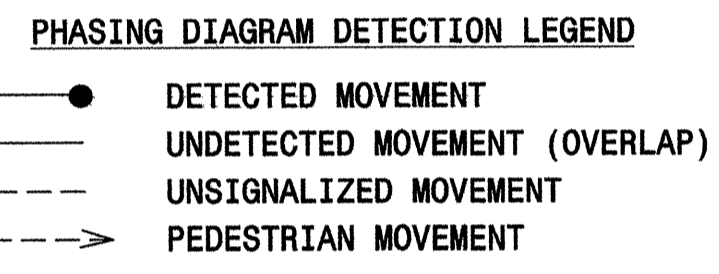
SIGNAL FACE	PHASE								FLASH
	Ø 1+5	Ø 1+6	Ø 2+6	Ø 3+7	Ø 3+8	Ø 4+7	Ø 4+8	FLASH	
11	R	G	R	R	R	R	R	Y	
21	R	R	G	G	R	R	R	Y	
22	R	R	G	G	R	R	R	Y	
31, 32	R	R	R	R	R	R	R		
41	R	R	R	R	R	R	G	R	
42	R	R	R	R	R	G	G	R	
51	R	R	G	G	R	R	R	Y	
61, 62	R	G	R	G	R	R	R	Y	
71	R	R	R	R	R	R	R		
81	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R

2070L LOOP & DETECTOR INSTALLATION

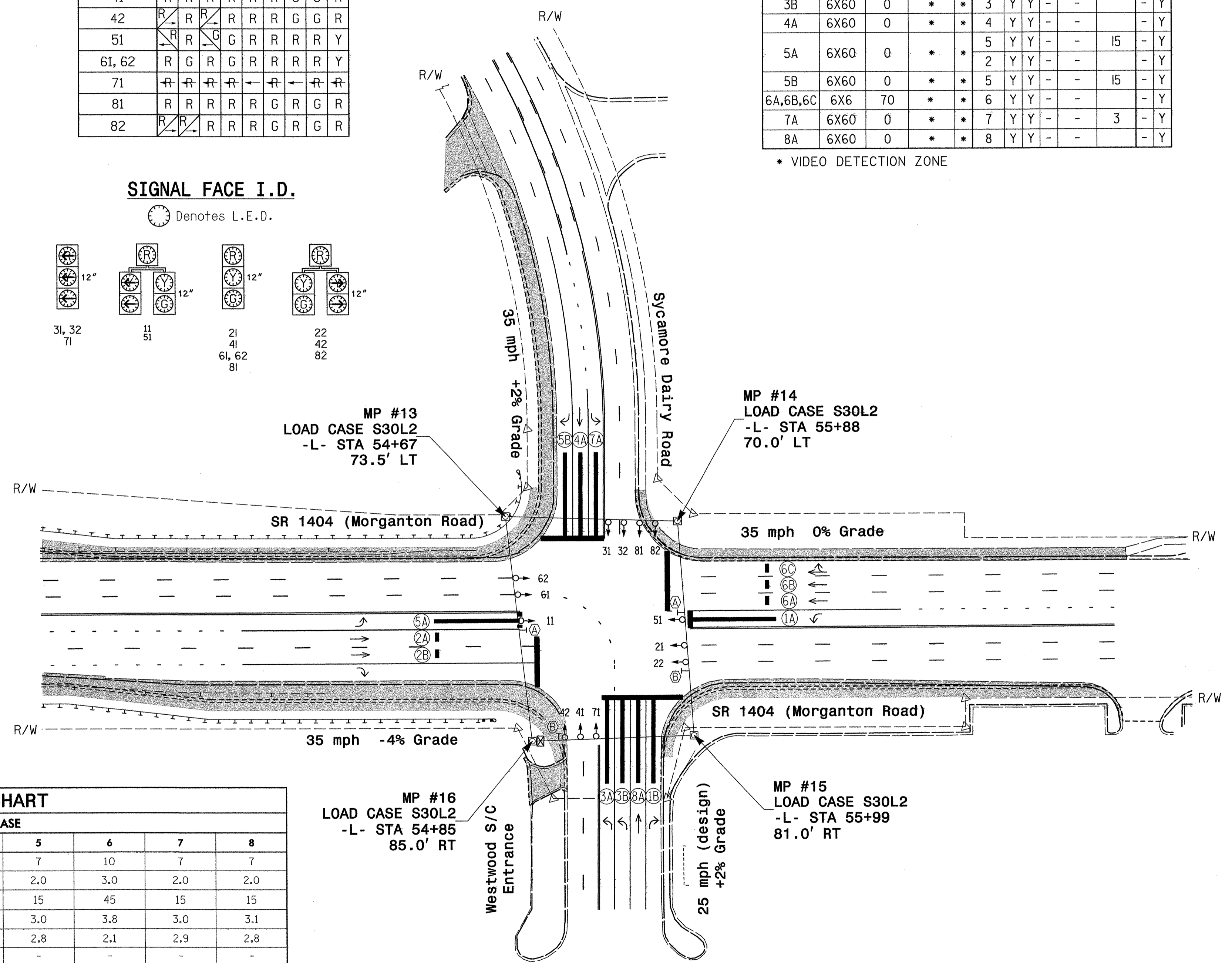
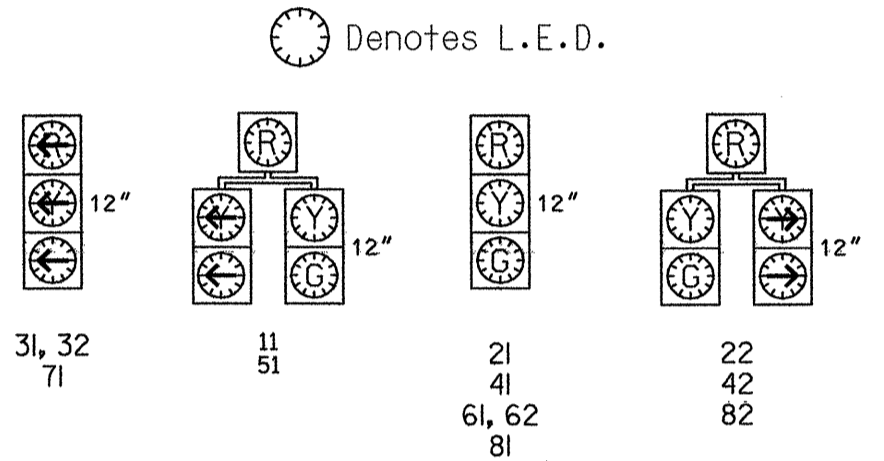
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	STRETCH TIME			DELAY TIME
1A	6X60	0	*	*	1	Y	Y	-	15	-	Y
1B	6X60	0	*	*	6	Y	Y	-	-	-	Y
2A,2B	6X6	70	*	*	2	Y	Y	-	-	-	Y
3A	6X60	0	*	*	3	Y	Y	-	-	3	Y
3B	6X60	0	*	*	3	Y	Y	-	-	-	Y
4A	6X60	0	*	*	4	Y	Y	-	-	-	Y
5A	6X60	0	*	*	5	Y	Y	-	-	15	Y
5B	6X60	0	*	*	5	Y	Y	-	-	15	Y
6A,6B,6C	6X6	70	*	*	6	Y	Y	-	-	-	Y
7A	6X60	0	*	*	7	Y	Y	-	-	3	Y
8A	6X60	0	*	*	8	Y	Y	-	-	-	Y

8 PHASE FULLY ACTUATED (FAYETTEVILLE CITY SIGNAL SYSTEM)

- NOTES**
- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
 - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
 - Phase 3 or phase 7 may be lagged.
 - Set all detector units to presence mode.
 - Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
 - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
 - Closed loop system data: Controller Asset # 1701



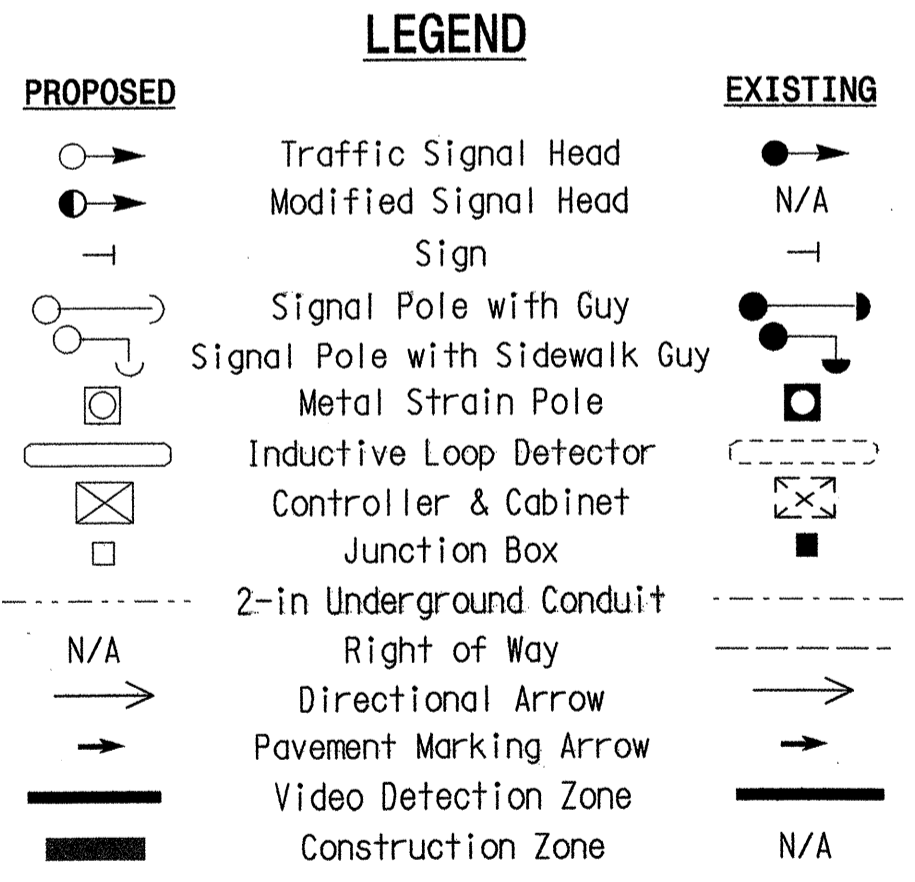
SIGNAL FACE I.D.



2070L TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	7	10	7	7	7	10	7	7
Extension 1*	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1*	15	45	15	15	15	45	15	15
Yellow Clearance	3.0	4.1	3.0	3.7	3.0	3.8	3.0	3.1
Red Clearance	2.9	1.8	3.2	2.1	2.8	2.1	2.9	2.8
Walk 1*	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation*	-	-	-	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-	-	-	-
Time To Reduction*	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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



Signal Upgrade Temporary Design - TCP Phase II

Prepared for the Offices of:

SR 1404 (Morganton Road) at Sycamore Dairy Road and Westwood Shopping Center
 Division 6 Cumberland County Fayetteville
 PLAN DATE: June 2007 REVIEWED BY: K. Bisby
 PREPARED BY: D. Swinton REVIEWED BY: D. Privette
 REVISIONS: INIT. DATE
 SCALE: 0 50
 SIGNATURE: DATE
 SIG. INVENTORY NO. 06-0361T

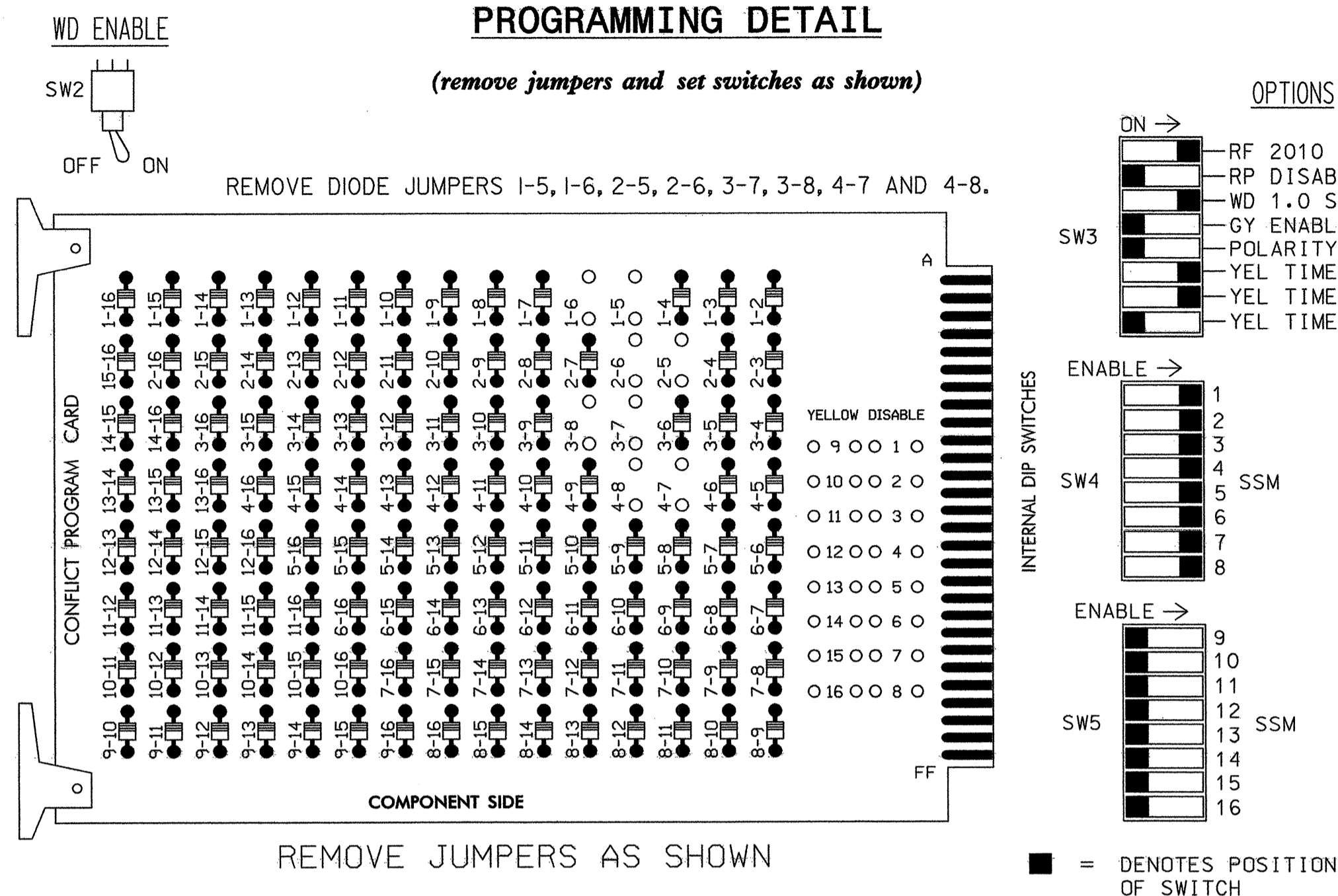
WilburSmith ASSOCIATES
 ENGINEERS PLANNERS ECONOMISTS
 421 Fayetteville Street Suite 1303
 Raleigh, North Carolina 27603
 phone: (919) 755-0583 fax: (919) 832-8798

*****571.DWG*****
 *****PLOT*****
 *****DATE*****

EDI MODEL 2010ECL 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 SEL1-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 9,10,11 & 12 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. The cabinet and controller are part of the Fayetteville City Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11,82	21,22	NU	22	31,32	41,42	NU	42,51	61,62	NU	71	81,82	NU	NU	NU	NU	NU	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						

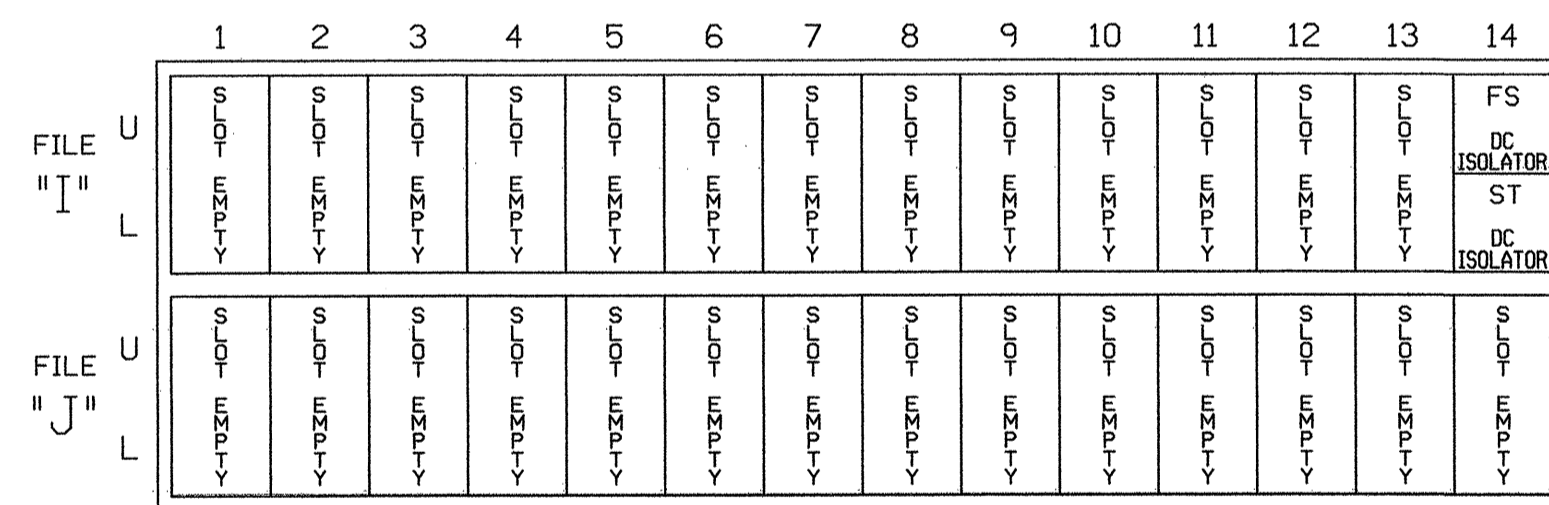
NU = Not Used
 * Denotes install load resistor.
 See load resistor installation detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 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 LAYOUT

(front view)

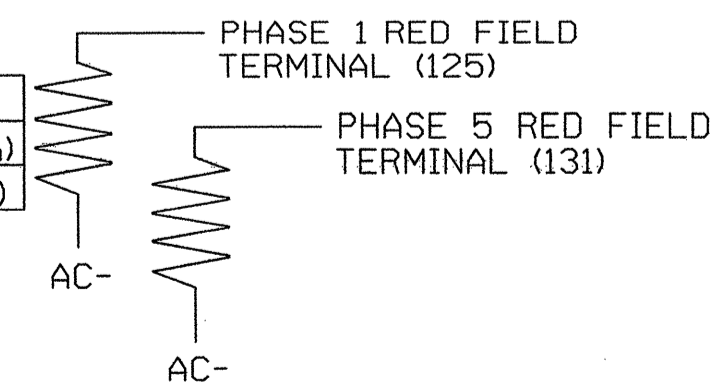


FS = FLASH SENSE
 ST = STOP TIME

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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE TEMPORARY SIGNAL DESIGN: 06-0361T
 DESIGNED: JUNE 2007
 SEALED: June 28, 2007
 REVISED:

Signal Upgrade
 Temporary Design



421 Fayetteville Street
 Suite 1303
 Raleigh, North Carolina 27601
 phone: (919) 755-0583
 fax: (919) 832-8798

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1404 (Morganton Road)

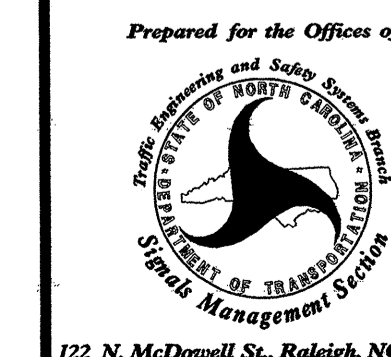
at
 Sycamore Dairy Road and
 Westwood Shopping Center

Division 6 Cumberland County Fayetteville

PLAN DATE: June 2007 REVIEWED BY: K. Bisby

PREPARED BY: D. Swinton REVIEWED BY: D. Privette

REVISIONS INIT. DATE

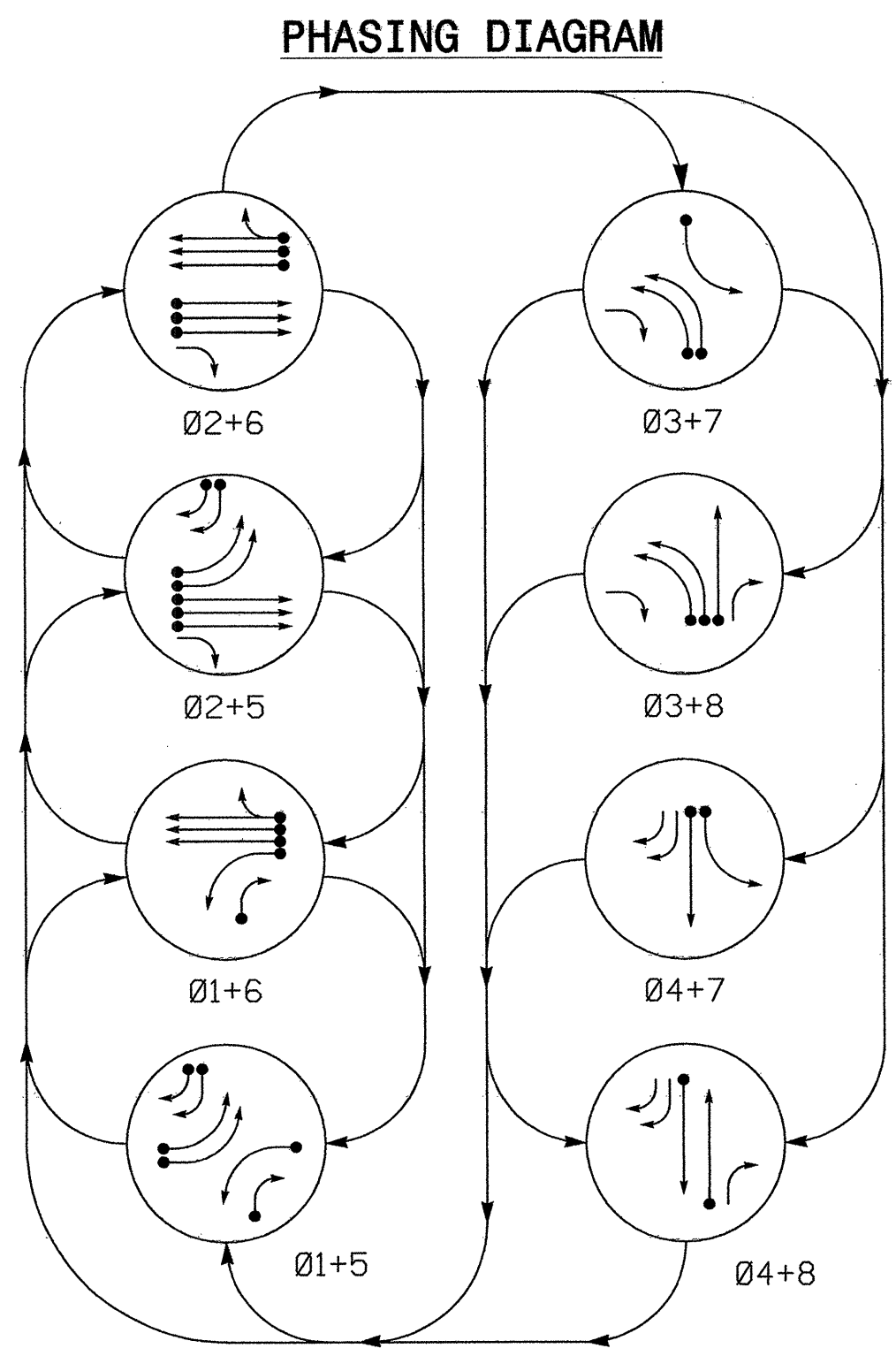


122 N. McDowell St., Raleigh, NC 27603

SEAL
 STATE OF NORTH CAROLINA
 PROFESSIONAL ENGINEER
 KEVIN W. BISBY
 LICENSE NO. 22004
 DATE: 6-28-07

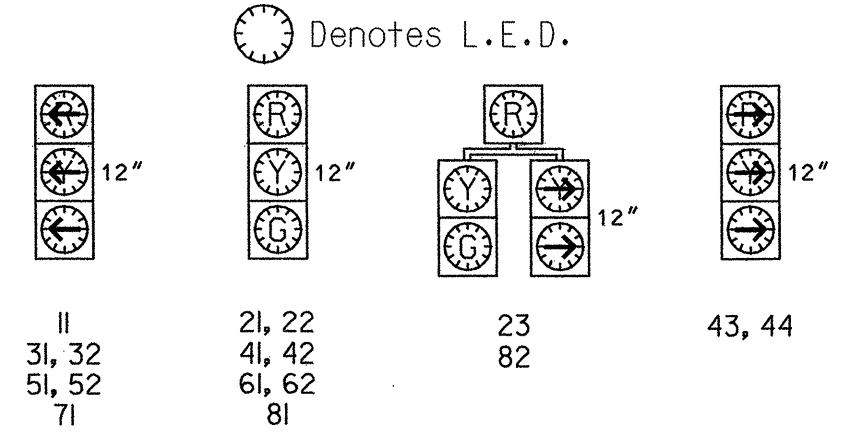
SIGNATURE DATE

SIG. INVENTORY NO. 06-0361T



SIGNAL FACE	PHASE							
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 3 + 7	Ø 3 + 8	Ø 4 + 7	Ø 4 + 8
II	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	R	Y
23	R	R	G	G	R	R	R	Y
31, 32	←	←	←	←	←	←	←	←
41, 42	R	R	R	R	R	G	G	R
43, 44	←	←	←	←	←	←	←	←
51, 52	←	←	←	←	←	←	←	←
61, 62	R	G	R	G	R	R	R	Y
71	←	←	←	←	←	←	←	←
81	R	R	R	R	R	G	R	G
82	←	←	←	←	←	←	←	←

SIGNAL FACE I.D.



2070L LOOP & DETECTOR INSTALLATION											
INDUCTIVE LOOPS				DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP NEW CARD
IA	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-
IB	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-
2A,2B,2C	6X6	70	4	Y	2	Y	Y	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	3	-
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	3	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-
5C	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-
5D	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-
6A,6B,6C	6X6	70	5	Y	6	Y	Y	-	-	-	-
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	3	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-

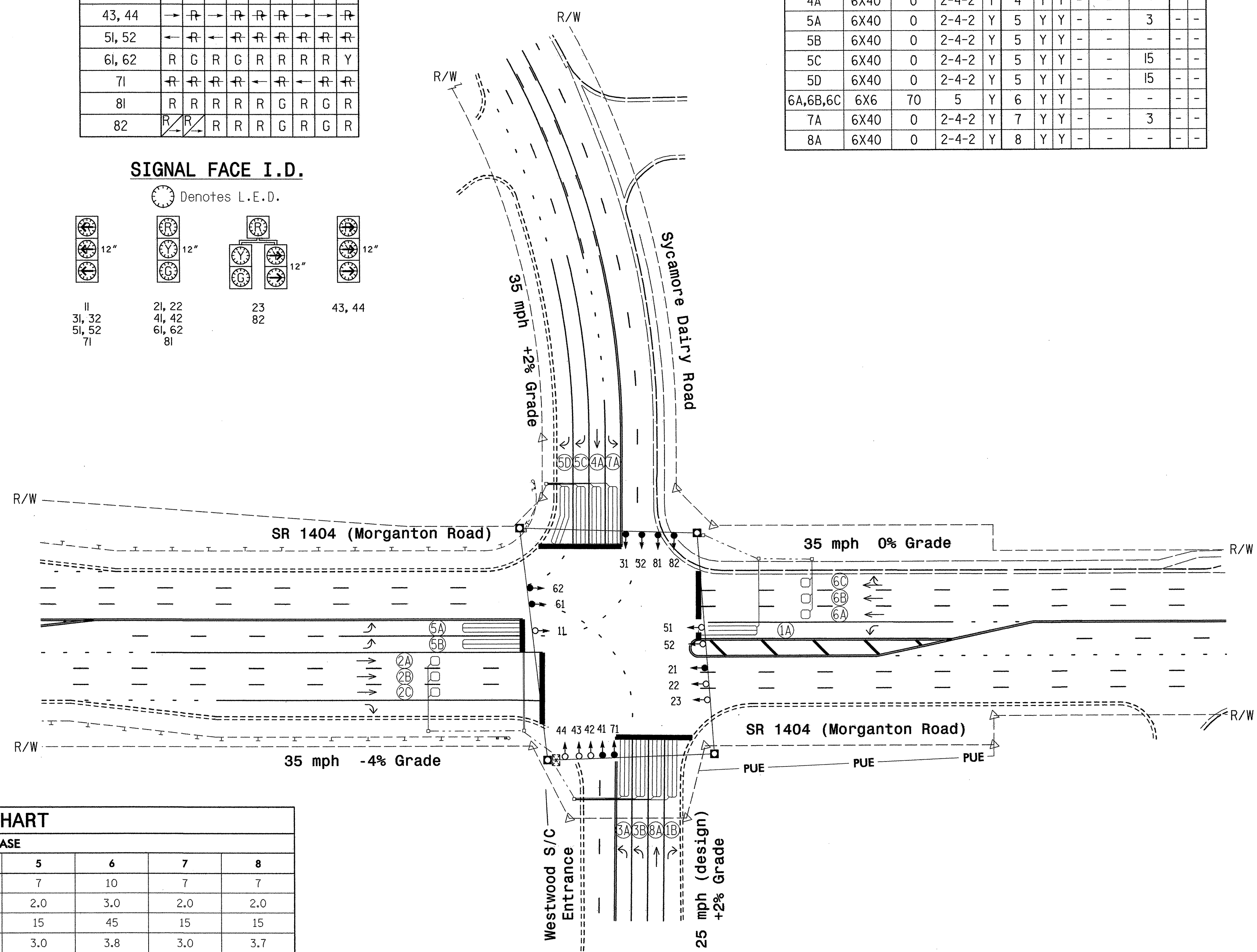
8 PHASE FULLY ACTUATED (FAYETTEVILLE CITY SIGNAL SYSTEM)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- Phase 3 or phase 7 may be lagged.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset # 1701

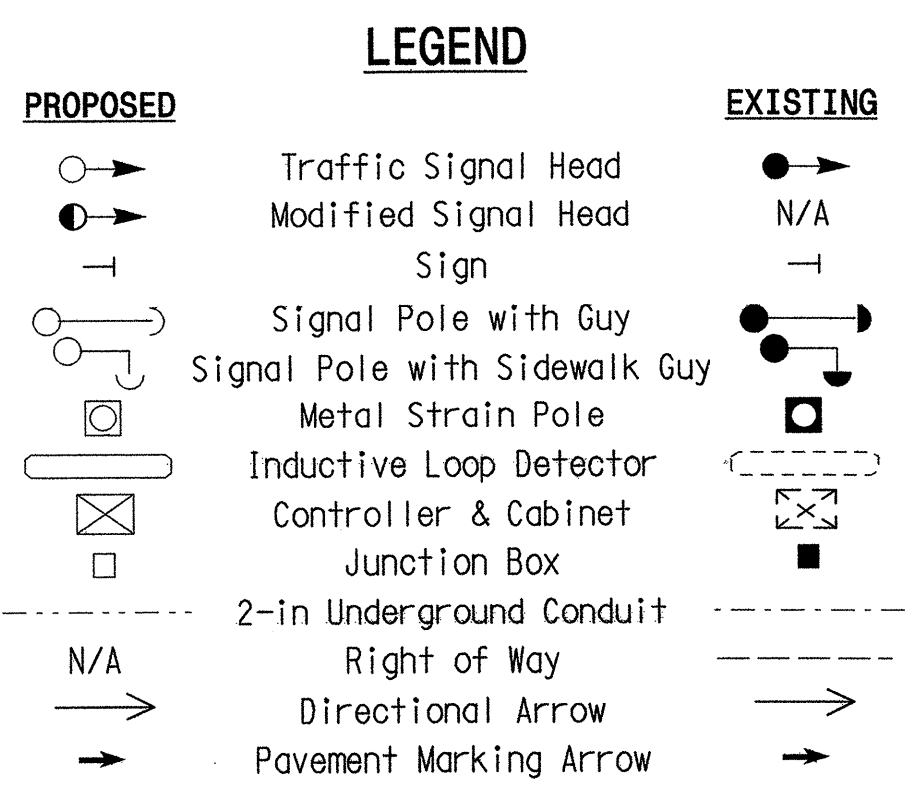
PHASING DIAGRAM DETECTION LEGEND

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



2070L TIMING CHART								
FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	7	10	7	7	7	10	7	7
Extension 1*	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1*	15	45	15	15	15	45	15	15
Yellow Clearance	3.0	4.1	3.0	3.7	3.0	3.8	3.0	3.7
Red Clearance	3.3	2.1	3.8	2.5	3.3	2.2	3.4	2.3
Walk 1*	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation*	-	-	-	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-	-	-	-
Time To Reduction*	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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



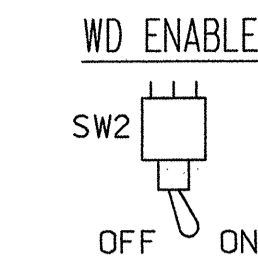
Signal Upgrade - Final Design

<p>421 Fayetteville Street Suite 1303 Raleigh, North Carolina 27601 phone: (919) 755-0583 fax: (919) 832-8798</p>	<p>SR 1404 (Morganton Road) at Sycamore Dairy Road and Westwood Shopping Center</p> <p>Division 6 Cumberland County Fayetteville</p> <p>PLAN DATE: June 2007 REVIEWED BY: K. Bisby</p> <p>PREPARED BY: D. Swinton REVIEWED BY: D. Privette</p>									
	<p>0 SCALE 50</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		NO.	DATE	INIT.	DATE			
NO.	DATE	INIT.	DATE							

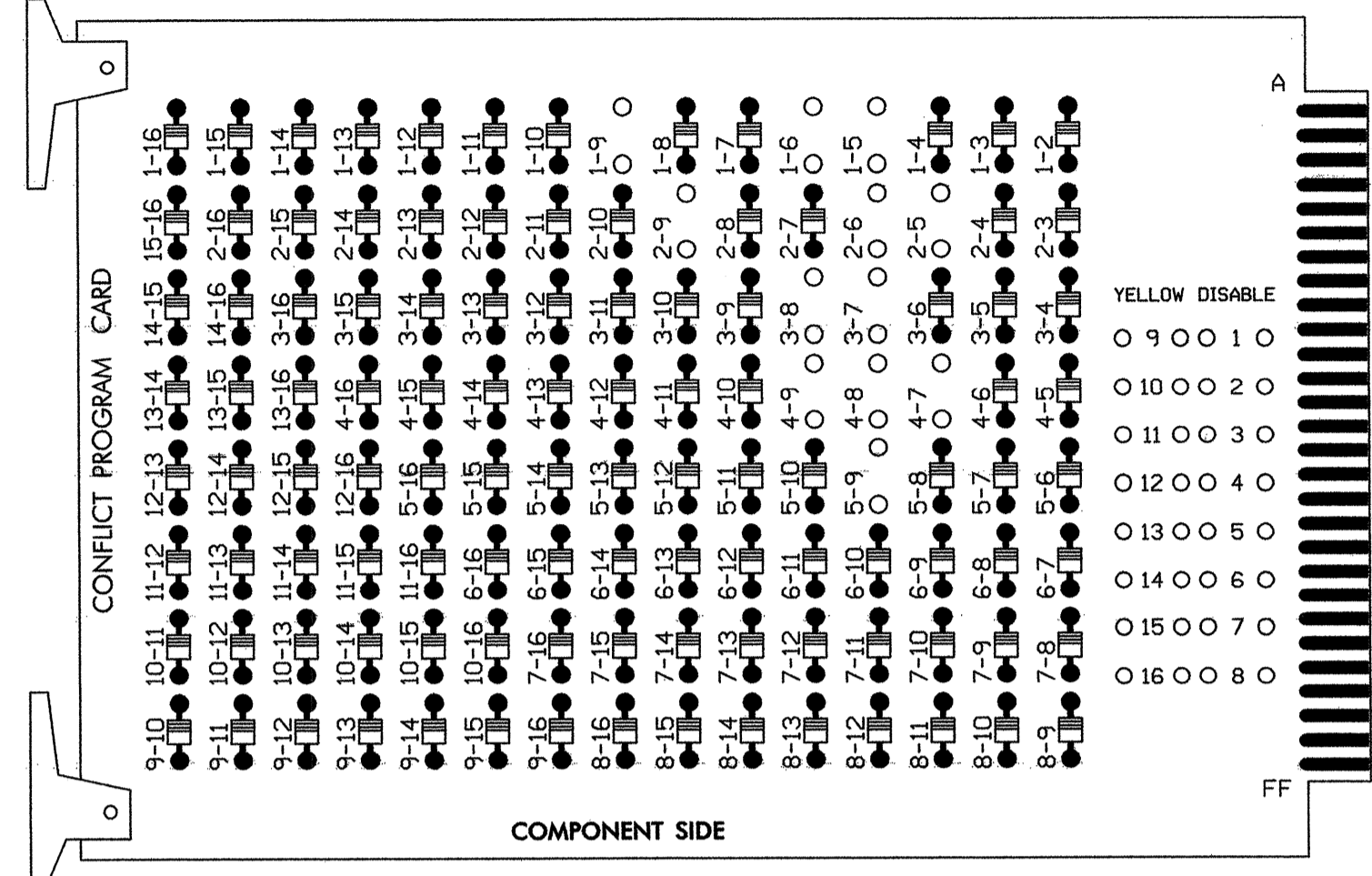
EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL

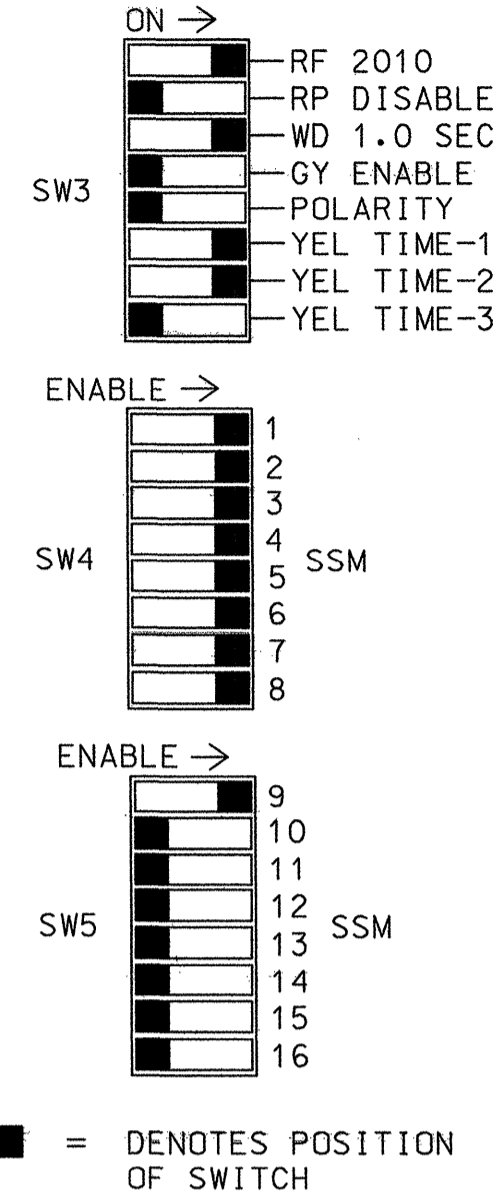
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 2-5, 2-6, 2-9, 3-7, 3-8, 4-7, 4-8, 4-9 AND 5-9.



OPTIONS



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Make sure jumpers SEL1-SEL5 are present on the monitor board.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 10,11 & 12 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- The cabinet and controller are part of the Fayetteville City Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	82	21,22,23	NU	31,32	23	41,42	NU	43,44,51,52	61,62	NU	71	81,82	NU	43,44	NU	NU	NU
RED		128			101			134			107		A121					
YELLOW		129			102			135			108		A122					
GREEN		130			103			136			109		A123					
RED ARROW	125			116				131		122								
YELLOW ARROW	126	126		117	117			132		123								
GREEN ARROW	127	127		118	118			133		124								

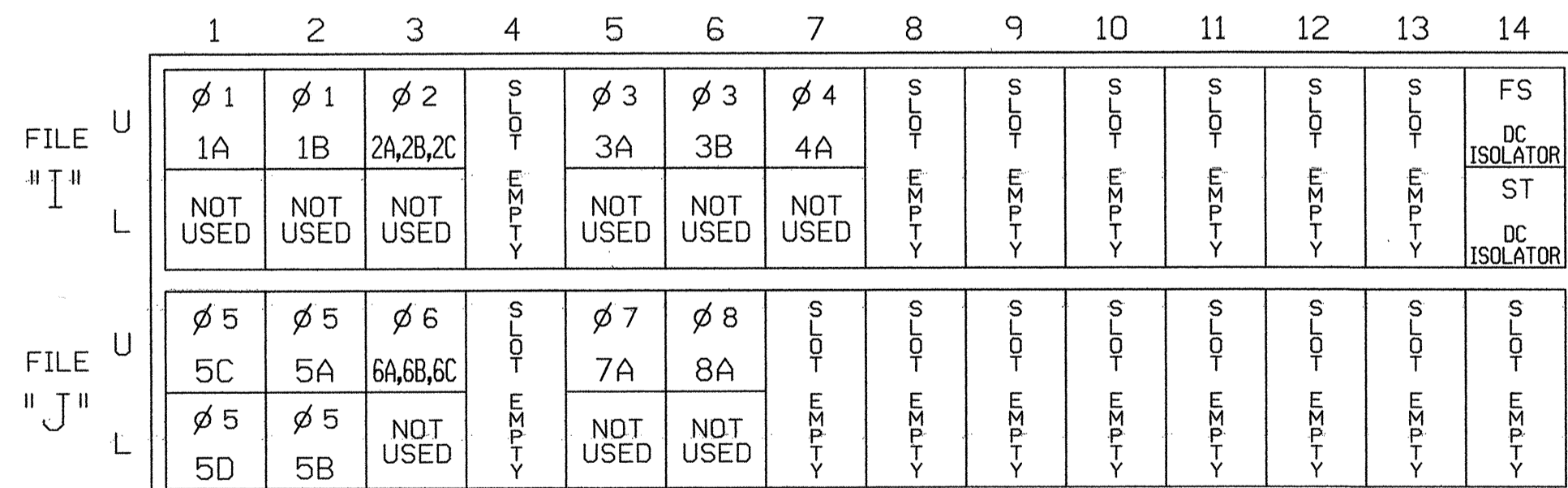
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAPS.....4+5

INPUT FILE POSITION LAYOUT

(front view)



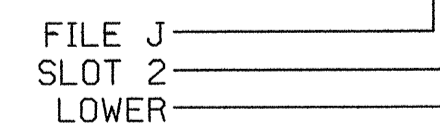
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A,2B,2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
3B	TB4-9,10	I6U	41	3	4	3	Y	Y			
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			3
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			
5C	TB3-1,2	J1U	55	17	5	5	Y	Y			15
5D	TB3-3,4	J1L	55	17	5	5	Y	Y			15
6A,6B,6C	TB3-9,10	J3U	64	26	36	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

INPUT FILE POSITION LEGEND: J2L



OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

OVERLAP PROGRAMMING COMPLETE

Signal Upgrade - Final Design



421 Fayetteville Street
 Suite 1303
 Raleigh, North Carolina 27601
 phone: (919) 755-0583
 fax: (919) 832-8798

Electrical and Programming Details for: SR 1404 (Morganton Road) at Sycamore Dairy Road and Westwood Shopping Center, Division 6, Cumberland County, Fayetteville.

Plan Date: June 2007, Prepared by: D. Swinton, Reviewed by: D. Privette.

Signature: [Signature], Date: [Date]

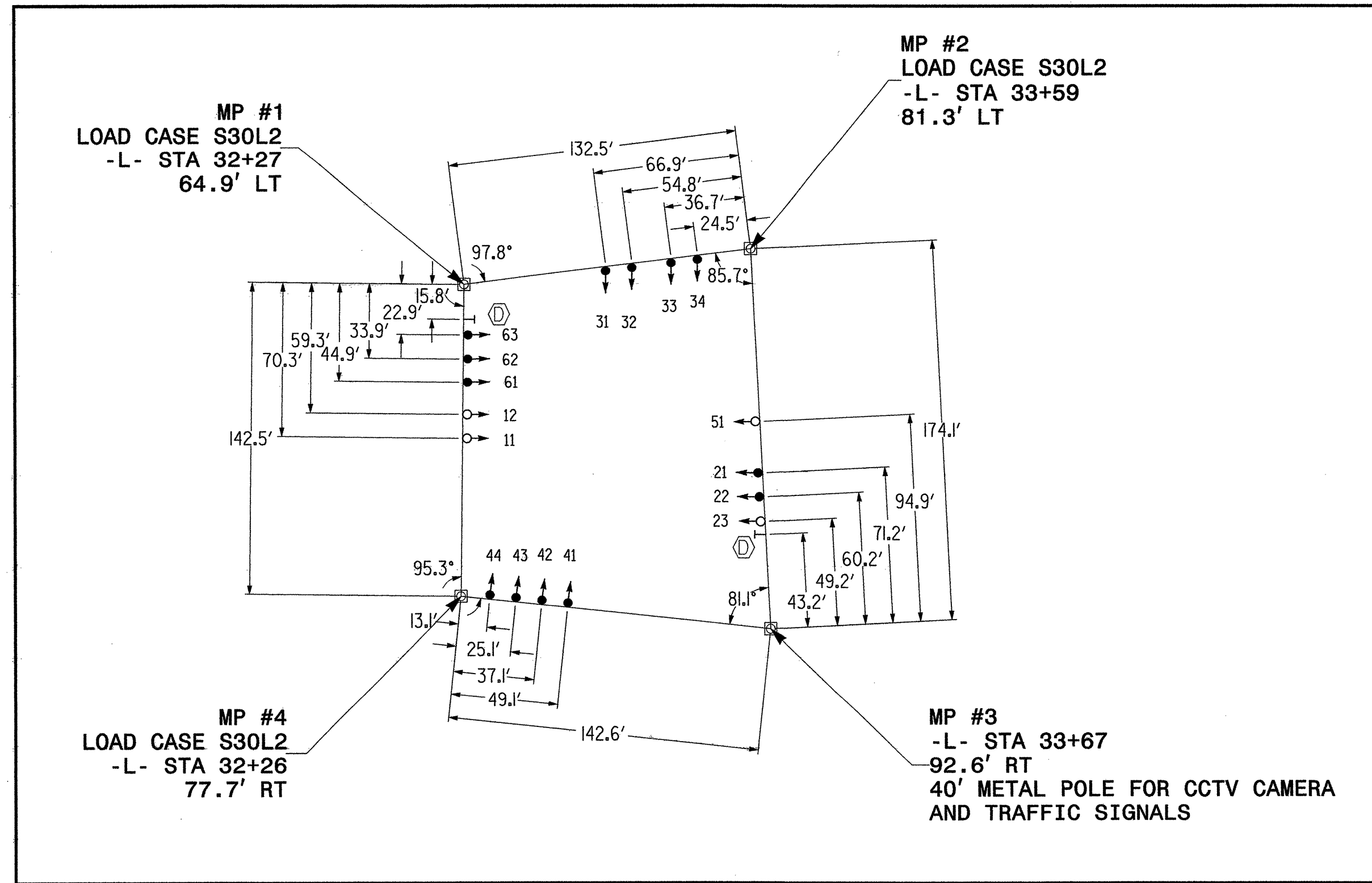
Seal: [Professional Engineer Seal for Martin W. Bisby]

Inventory No: 06-0361

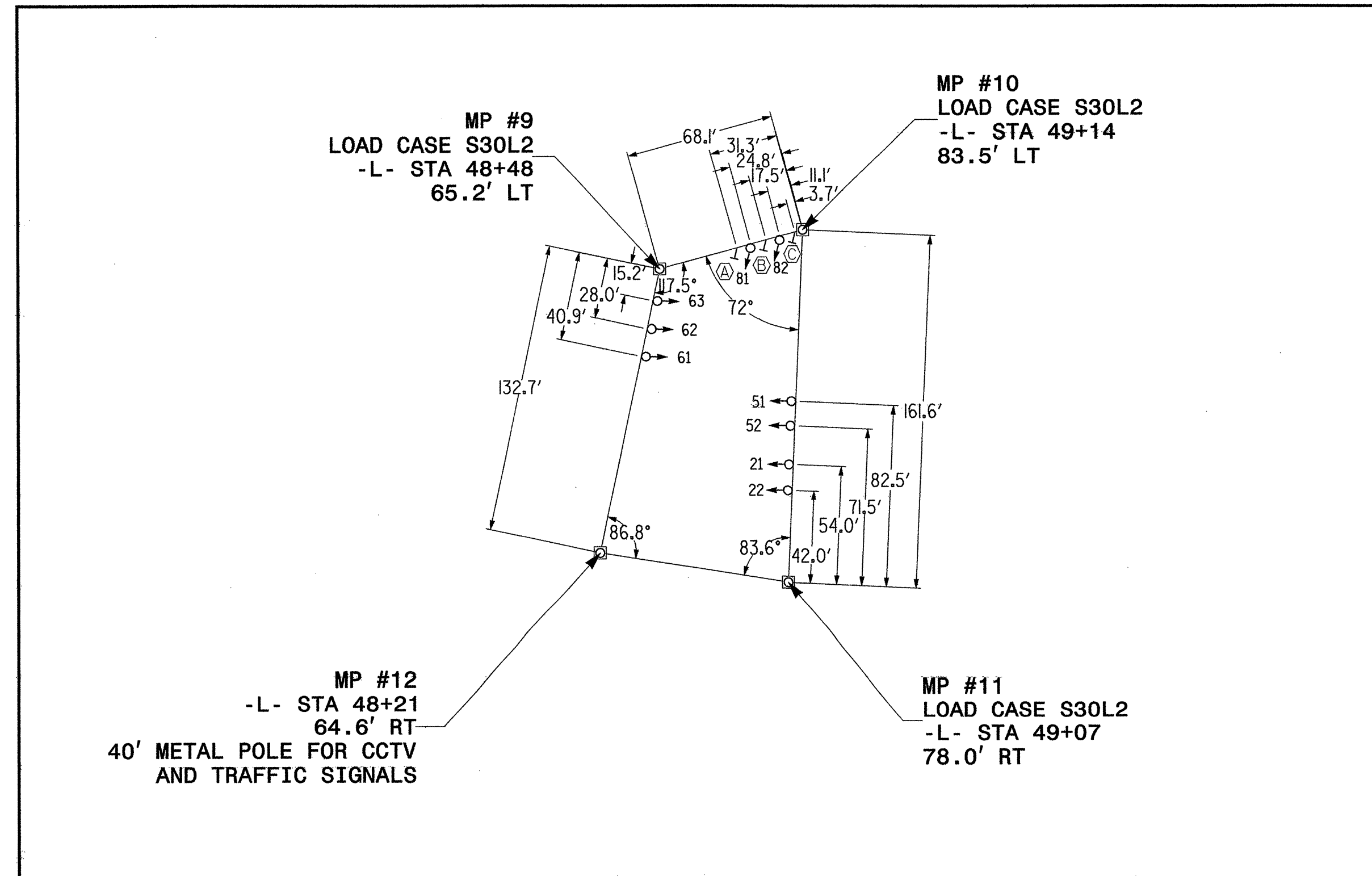
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0361
 DESIGNED: JUNE 2007
 SEALED: June 28, 2007
 REVISED:

*****SYSTEM TIME*****
 *****DATE*****
 *****BY*****
 *****REVISION*****

LOADING DIAGRAMS



MORGANTON RD AT GLENSFORD DR 06-0346



MORGANTON RD AT ALL AMERICAN FREEWAY NB RAMP 06-0319

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 66 inch anchor bolts.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

122 N. McDowell St., Raleigh, NC 27603

	Metal Pole Loading Diagrams		SEAL	
	Division 6 Cumberland County Fayetteville			
	PLAN DATE: June 2007	REVIEWED BY: D. Privette		
PREPARED BY: K. Bisby	REVISIONS	INIT.	DATE	
SCALE: 0 to 50	SIGNATURE DATE			
SIG. INVENTORY NO.				