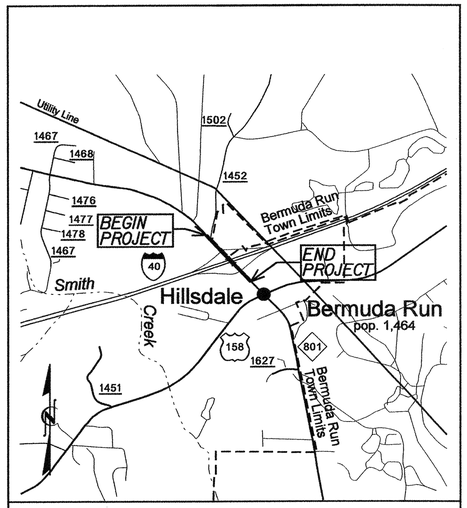
STATE	PROJECT NO.	SHEET NO.
N.C.	B-3637	Sig. 1
F. A. PROJ. NO.		
PROJECT ID. NO.		

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

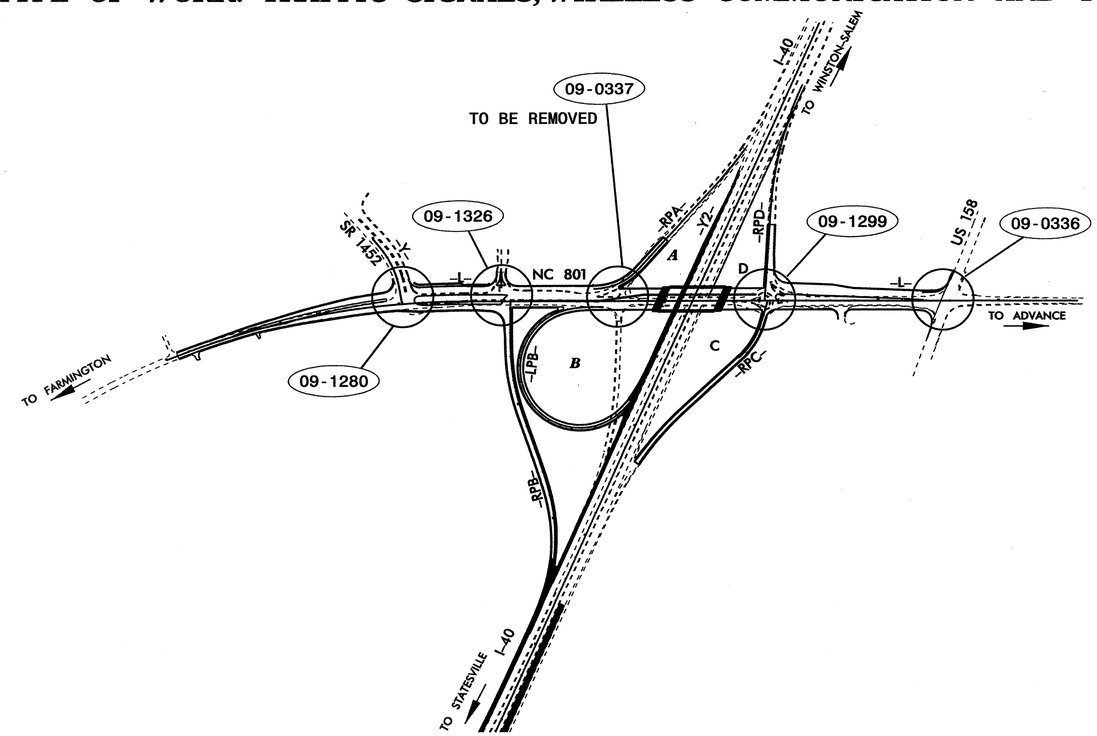
DAVIE COUNTY

LOCATION: BRIDGE NO. 37 OVER I-40 ON NC 801

TYPE OF WORK: TRAFFIC SIGNALS, WIRELESS COMMUNICATION AND FIBER OPTIC COMMUNICATIONS



VICINITY MAP



PROJECT: B-3637

INDEX OF PLANS

SHEET NO.	SIGNAL INVENTORY NO.	LOCATION /DESCRIPTION
SIG. 1	N/A	Title Sheet
SIG. 2-9	09-1280	NC 801 at SR 1452 (Yadkin Valley Road)
SIG. 10-17	09-1326	NC 801 at I-40 WB Ramps
SIG. 18-25	09-0337	NC 801 at I-40 WB Ramps
SIG. 26-33	09-1299	NC 801 at I-40 EB Ramps
SIG. 34-39	09-0336	US 158 at NC 801
SIG. 40-45	N/A	Standard Drawings for Metal Poles
SIG. 46-50	N/A	Wireless Communications Plans
SIG. 51-53	N/A	Communications Cable and Conduit Routing Plans

LEGEND

(##-####) *SIGNAL INVENTORY NUMBER*

NCDOT CONTACTS:

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

Timothy J. Williams, PE - S&G Contracts & PEF Support Engineer

John T. Rowe Jr., PE - Signal Equipment Design Engineer

G. G. Murr, Jr., PE - ITS Engineer

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · ITS and Signals Unit

750 N. Greenfield Parkway, Garner, NC 27529

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.2

PHASING DIAGRAM

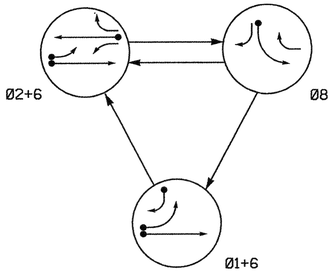


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 08	FLASH
21	R	G	R	Y
22	R	G	R/	Y
61	/G	G	R	Y
62	G	G	R	Y
81	R	R	G	R
82	R/	R	G	R

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
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
					6	Y	Y	Y	-	3	-	Y
1B	6X60	0	2-4-2	-	1	Y	Y	-	-	15	-	Y
2A	6X6	355	4	-	2	Y	Y	-	-	-	-	Y
6A	6X6	355	4	-	6	Y	Y	-	-	-	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
S02	6X6	+125	4	-	-	Y	Y	-	-	-	Y	Y

3 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

NOTES

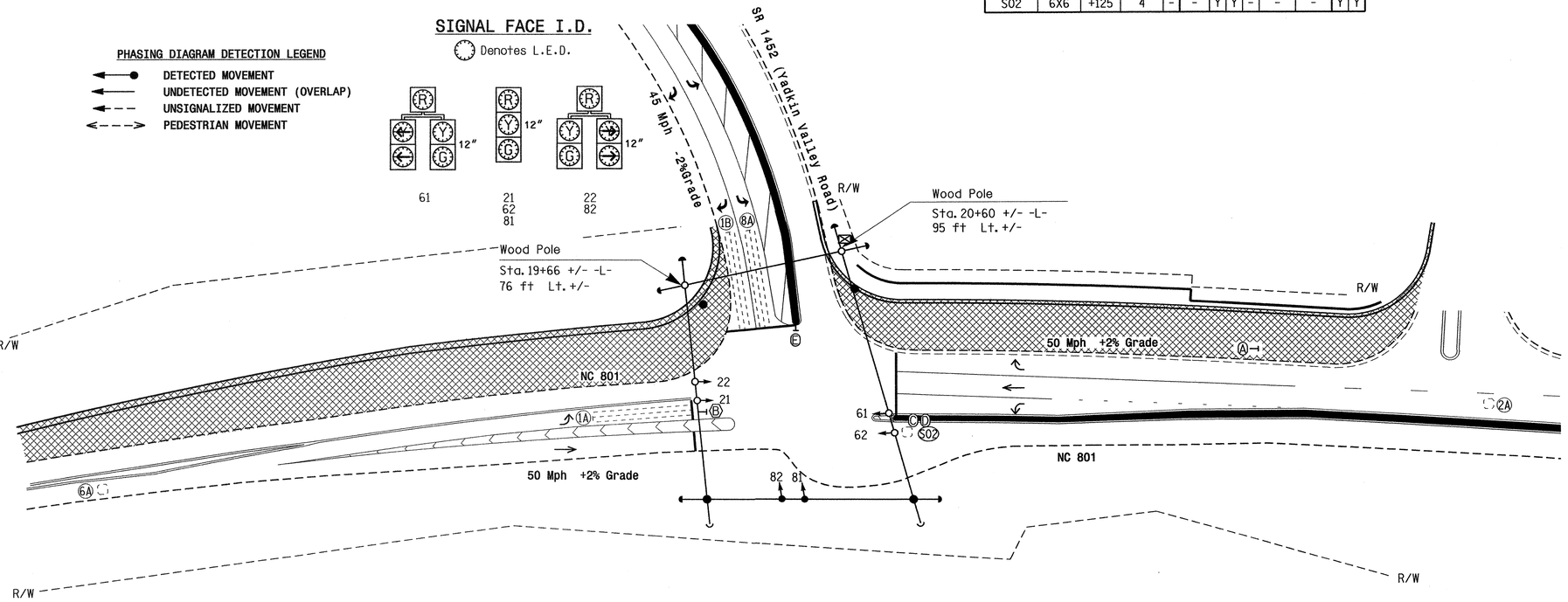
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 1 during phase 2 on.
4. Program controller to clear from phase 2+6 to phase 1+6 by progressing through phase 8 (see Electrical Details).
5. Set all detector units to presence mode.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Closed loop system data: Controller Asset #1280.

PHASING DIAGRAM DETECTION LEGEND

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

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	
	Directional Arrow	
	Pavement Marking Arrow	
Ⓐ	Right Arrow "ONLY" Sign (R3-5R)	Ⓐ
Ⓑ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	TRUCKS	Ⓓ

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	14	14	7
Extension 1 *	1.0	6.0	6.0	1.0
Max Green 1 *	15	90	90	20
Yellow Clearance	3.0	4.6	4.6	3.0
Red Clearance	2.8	2.4	1.3	2.6
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	2.5	2.5	-
Max Variable Initial *	-	40	40	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	YELLOW	-
Dual Entry	-	-	-	-
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-TCP Phase I)

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

SCALE 0 40 1"=40'

NC 801
At
SR 1452 (Yadkin Valley Road)

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: I.O. Umozurike
PREPARED BY: Umozurike/Luhr REVIEWED BY:

REVISIONS	INIT.	DATE

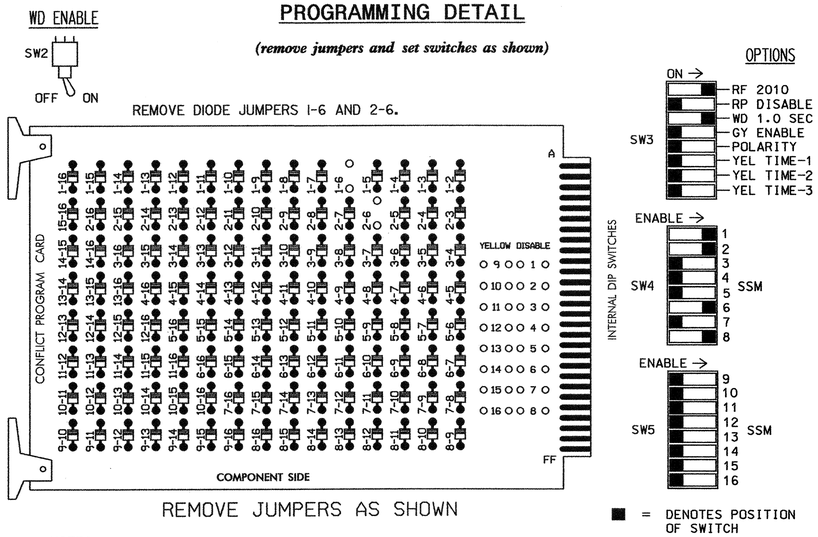
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
T.J. Williams 6/7/07.
SIGNATURE DATE
SIG. INVENTORY NO. 09-1280 T1

06-JUN-2007 10:51
s:\traffic\signals\workgroups\trip projects\b-3637\signal files\09-1280\09-1280_sig_dsn_2007nmdd.dgn
launcze1ke

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.3

EDI MODEL 2010ECL 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 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 3,4,5, 7,9,10,11,12,13,14,15 & 16 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. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the NC 801 Closed Loop Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8		S8P
PHASE	61,82	2	2 PED	3	4	4 PED	5	6	6 PED	7	8		8 PED
SIGNAL HEAD NO.	61,82	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU
RED	*	128						134				107	
YELLOW		129						135				108	
GREEN		130						136				109	
RED ARROW													
YELLOW ARROW	126										108		
GREEN ARROW	127										109		

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,S6,S8
PHASES USED.....1,2,6,8
OVERLAPS.....NONE

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

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

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
                 OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦ X
OMIT PHASES     ¦X
CALL PHASES     ¦       X
```

BACKUP PROTECTION 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	Ø1 1B	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ2	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø6 1A	NOT USED						NOT USED					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		NOT USED				NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

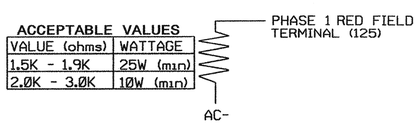
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y	Y		3
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
*SØ2	TB6-9,10	I9U	60	22	11	SYS					
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: Ø9-1280 T1
DESIGNED: May 2007
SEALED: Ø6-08-07
REVISED: N/A

Signal Upgrade - Temp 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
SR 1452 (Yadkin Valley Road)

Division 9 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE DATE 6-26-07
SIG. INVENTORY NO. 09-1280 T1

22-JUN-2007 09:49
s:\#ts\signals\workgroups\sig management\09128Ø_smalle_xx.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.4

PHASING DIAGRAM

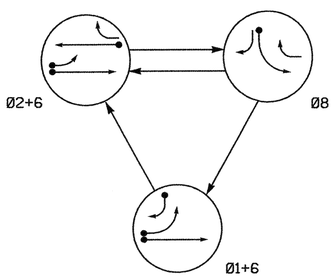


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	FLASH
21	R	G	R	Y
22	R	G	R/G	Y
61	G/R	G	R	Y
62	G	G	R	Y
81	R	R	G	R
82	R/G	R	G	R

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
1A	6X40	0	2-4-2	X	1	Y	Y	-	-	15	-	-
					6	Y	Y	Y	-	3	-	-
1B	6X40	0	2-4-2	X	1	Y	Y	-	-	15	-	-
2A	6X6	355	4	X	2	Y	Y	-	-	-	-	-
6A	6X6	355	4	X	6	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	X	8	Y	Y	-	-	-	-	-

3 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

NOTES

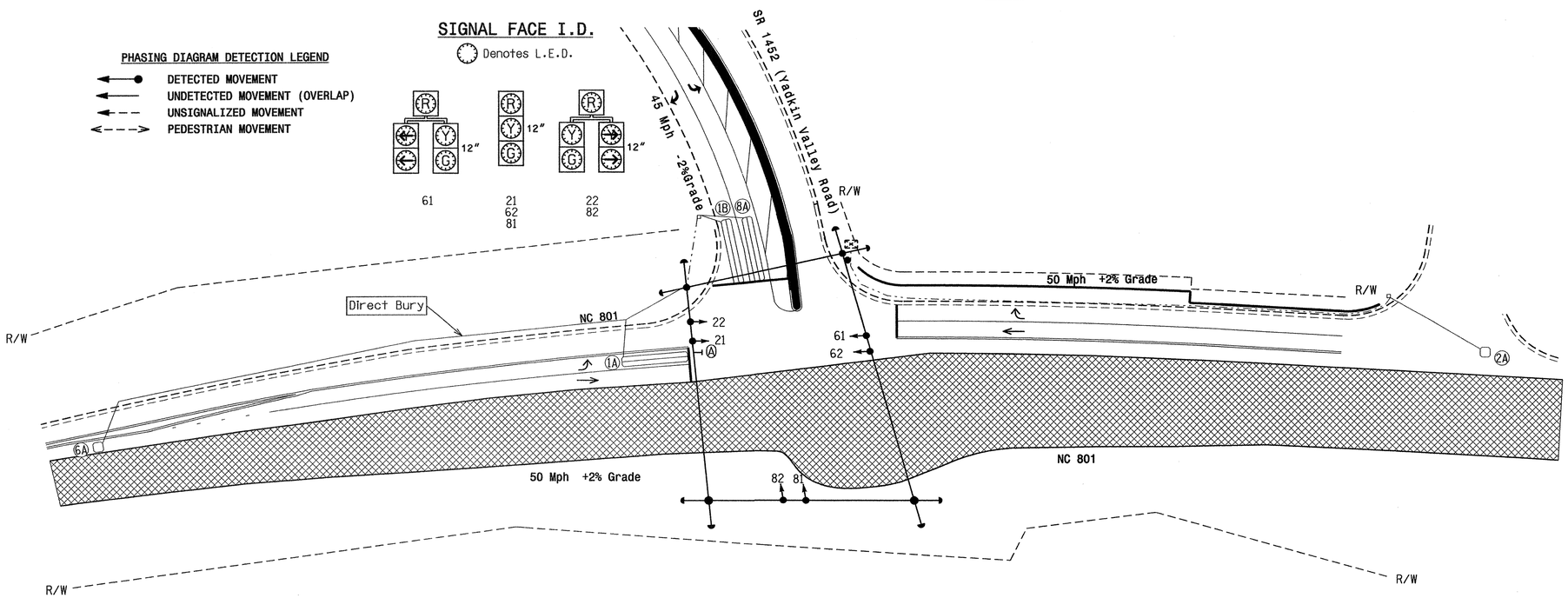
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 1 during phase 2 on.
4. Program controller to clear from phase 2+6 to phase 1+6 by progressing through phase 8 (see Electrical Details).
5. Reposition existing signal heads numbered 21, 22, 61 and 62.
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. Closed loop system data: Controller Asset #1280.

PHASING DIAGRAM DETECTION LEGEND

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

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	
	Directional Arrow	
	Pavement Marking Arrow	
	No U-Turn Sign (R3-4)	
	Construction Zone	

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	14	14	7
Extension 1 *	2.0	6.0	6.0	2.0
Max Green 1 *	15	90	90	20
Yellow Clearance	3.0	4.6	4.6	3.0
Red Clearance	2.6	1.4	1.3	2.3
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	2.5	2.5	-
Max Variable Initial *	-	40	40	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	YELLOW	-
Dual Entry	-	-	-	-
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 #2-TCP Phase II)

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

NC 801
At
SR 1452 (Yadkin Valley Road)

Division 09 Davie County Hillsdale

PLAN DATE:	May 2007	REVIEWED BY:	I.O. Umozurike
PREPARED BY:	Umozurike	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY W. WILLIAMS
SIGNATURE T. Williams DATE 6/13/07
SIG. INVENTORY NO. 09-1280 T2

27-JUN-2007 07:59
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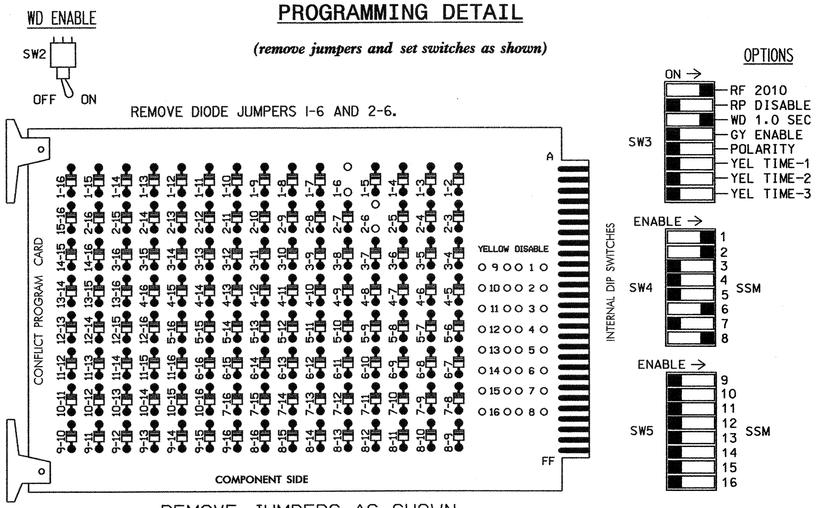
rdumozurike

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.5

EDI MODEL 2010ECL 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 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 3,4,5, 7,9,10,11,12,13,14,15 & 16 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. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the NC 801 Closed Loop Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8		S8P
PHASE	61,82	2	2 PED	3	4	4 PED	5	6	6 PED	7	8		8 PED
SIGNAL HEAD NO.	61,82	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU
RED	✱	128						134				107	
YELLOW		129						135				108	
GREEN		130						136				109	
RED ARROW													
YELLOW ARROW	126										108		
GREEN ARROW	127										109		

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,S6,S8
PHASES USED.....1,2,6,8
OVERLAPS.....NONE

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

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

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
          OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR      PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦ X
OMIT PHASES     ¦X
CALL PHASES     ¦       X
```

BACKUP PROTECTION 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	Ø1 1B	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø6 1A	NOT USED											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		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.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y	Y		3
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

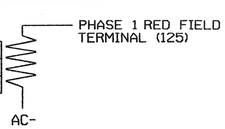
[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1280 T2
DESIGNED: May 2007
SEALED: 06-13-07
REVISED: N/A

Signal Upgrade - Temp 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
SR 1452 (Yadkin Valley Road)

Division 9 Davie County Hillsdale

PLAN DATE: May 2007	REVIEWED BY: JTR		
PREPARED BY: James Peterson	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE DATE 6-26-07
SIG. INVENTORY NO. 09-1280 T2

22-JUN-2007 10:30
s:\ts_signals\work\groups\sig mandpeterson\09128Ø_sml_ele_xx.dgn
jpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.6

PHASING DIAGRAM

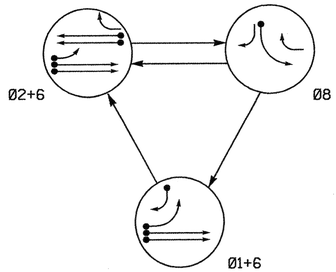


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	FLASH
21	R	G	R	Y
22	R	G	R/	Y
61	/G	G	R	Y
62	G	G	R	Y
81	R	R	G	R
82	R/	R	G	R

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
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
					6	Y	Y	Y	-	3	-	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	-
2A	6X6	300	4	Y	2	Y	Y	-	-	-	-	-
2B	6X6	300	4	Y	2	Y	Y	-	-	-	-	-
6A	6X6	355	6	Y	6	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	-	-	-

3 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

NOTES

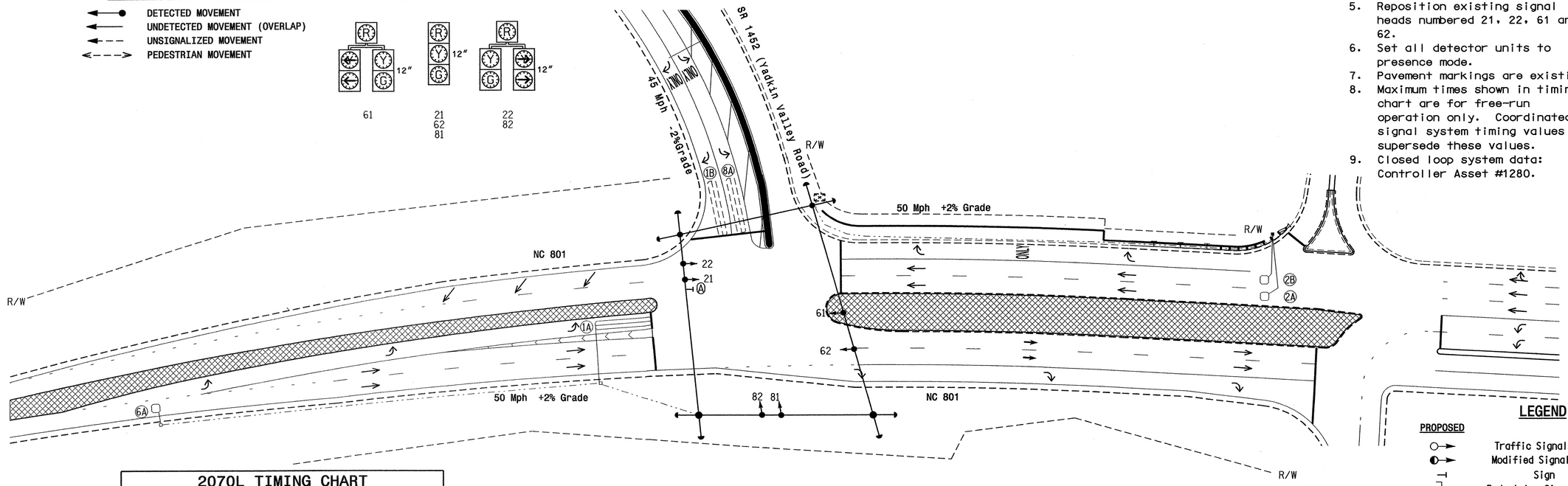
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 1 during phase 2 on.
4. Program controller to clear from phase 2+6 to phase 1+6 by progressing through phase 8 (see Electrical Details).
5. Reposition existing signal heads numbered 21, 22, 61 and 62.
6. Set all detector units to presence mode.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Closed loop system data: Controller Asset #1280.

PHASING DIAGRAM DETECTION LEGEND

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

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	
	Directional Arrow	
	Pavement Marking Arrow	
	No U-Turn Sign (R3-4)	
	Construction Zone	

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	14	14	7
Extension 1 *	2.0	6.0	6.0	2.0
Max Green 1 *	15	90	90	20
Yellow Clearance	3.0	4.6	4.6	3.0
Red Clearance	3.3	1.3	1.7	2.9
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.5	2.5	-
Max Variable Initial *	-	34	40	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	YELLOW	-
Dual Entry	-	-	-	-
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#3-TCP Phase III)

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

SCALE 0 40 1"=40'

NC 801
At
SR 1452 (Yadkin Valley Road)

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: I.O. Umozurike
PREPARED BY: Umozurike REVIEWED BY:

REVISIONS	INIT.	DATE

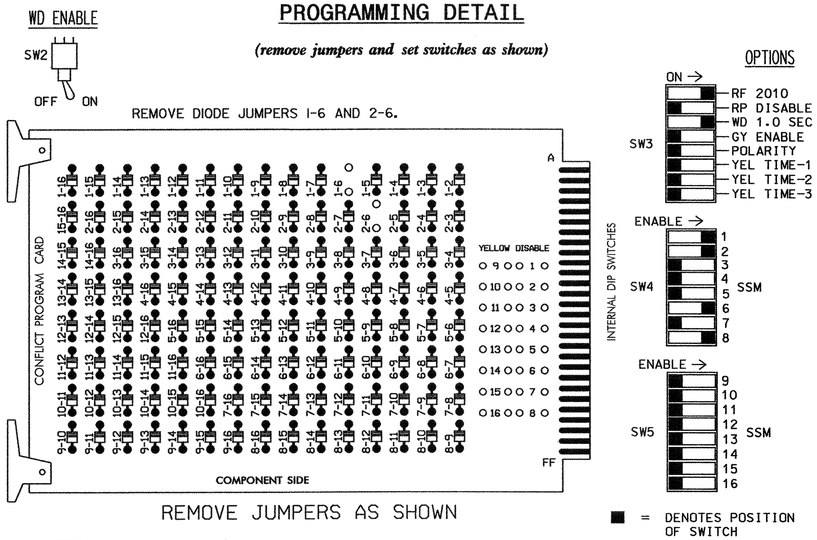
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY A. WILLIAMS
SIGNATURE 6/13/07 DATE
SIG. INVENTORY NO. 09-1280 T3

25-JUN-2007 08:02
S:\ITS Signals\workgroups\tip projects\B-3637\signal files\B03-1280\B03-1280_sig_dsn_2007mmdd.dgn
dsadzzz\fee

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig. 7

EDI MODEL 2010ECL 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 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 3,4,5, 7,9,10,11,12,13,14,15 & 16 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. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the NC 801 Closed Loop Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8		S8P
PHASE	61,82	2	2 PED	3	4	4 PED	5	6	6 PED	7	8		8 PED
SIGNAL HEAD NO.	61,82	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU
RED	✳	128						134				107	
YELLOW		129						135				108	
GREEN		130						136				109	
RED ARROW													
YELLOW ARROW	126										108		
GREEN ARROW	127										109		

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,S6,S8
PHASES USED.....1,2,6,8
OVERLAPS.....NONE

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

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

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
                    OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR        PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦ X
OMIT PHASES     ¦X
CALL PHASES     ¦       X
```

BACKUP PROTECTION 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	Ø1 1B	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø6 1A	Ø2 2B											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		NOT USED				NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

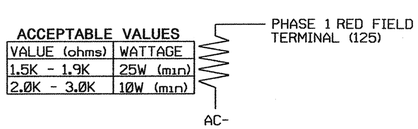
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y	Y		3
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1280 T3
DESIGNED: May 2007
SEALED: 06-13-07
REVISED: N/A

Signal Upgrade - Temp 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
SR 1452 (Yadkin Valley Road)

Division 9 | Davie County | Hillsdale

PLAN DATE: May 2007 | REVIEWED BY: JTR
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 6-26-07
SIG. INVENTORY NO. 09-1280 T3

22-JUN-2007 10:02
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jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.8

PHASING DIAGRAM

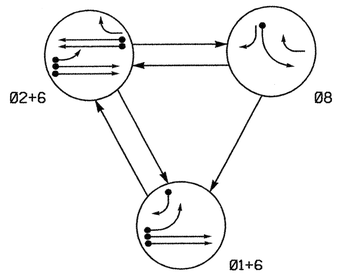


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	FLASH
21	R	G	R	Y
22	R	G	R/→	Y
61	↖G	G	R	Y
62	G	G	R	Y
81	R	R	G	R
82	R/→	R	G	R

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
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	-
					6	Y	Y	Y	-	3	-	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	-
2A/S02	6X6	300	4	Y	2	Y	Y	-	-	-	Y	-
2B/S03	6X6	300	4	Y	2	Y	Y	-	-	-	Y	-
6A/S01	6X6	355	6	Y	6	Y	Y	-	-	-	Y	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	-

3 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

NOTES

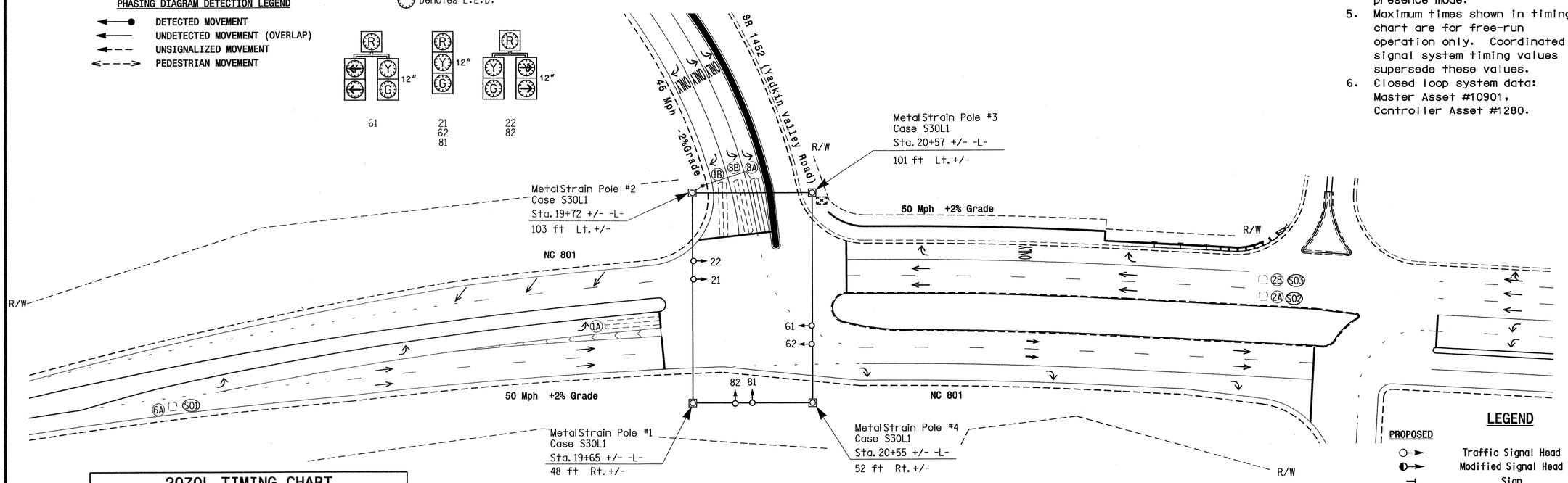
1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Closed loop system data: Master Asset #10901, Controller Asset #1280.

PHASING DIAGRAM DETECTION LEGEND

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

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	
	Directional Arrow	
	Pavement Marking Arrow	
	Metal Strain Pole	

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green 1 *	7	14	14	7
Extension 1 *	2.0	6.0	6.0	2.0
Max Green 1 *	15	90	90	20
Yellow Clearance	3.0	4.6	4.6	3.0
Red Clearance	3.3	1.3	1.7	3.2
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.5	2.5	-
Max Variable Initial *	-	34	40	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	45	45	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	YELLOW	-
Dual Entry	-	-	-	-
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

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

NC 801
At
SR 1452 (Yadkin Valley Road)

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: I.O. Umozurike
PREPARED BY: Umozurike/Luhr REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

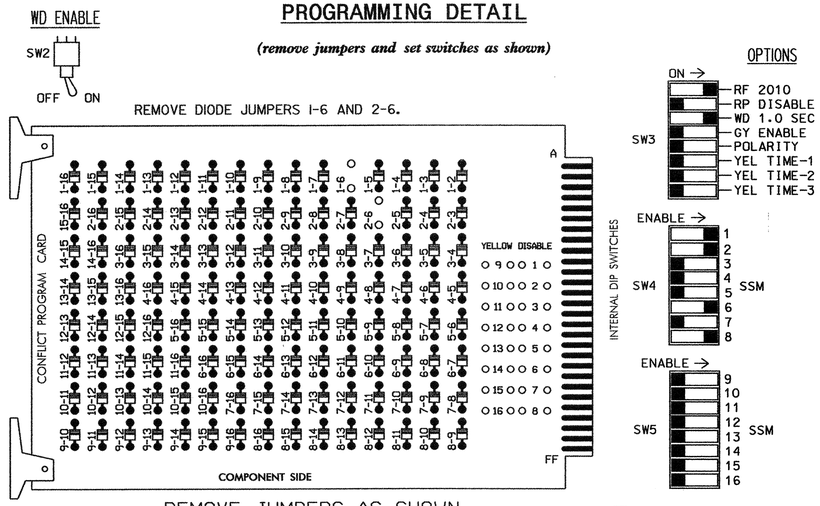
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE 6/8/07. DATE
SIG. INVENTORY NO. 09-1280

20-JUN-2007 15:16
c:\#its signal\work\groups\#tip projects\#b-3637\#signal files\#09-1280\#09-1280_sig_dsn_2007mdd.dgn
lourazurike

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.9

EDI MODEL 2010ECL 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 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 3,4,5, 7,9,10,11,12,13,14,15 & 16 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. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the NC 801 Closed Loop 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,S6,S8
PHASES USED.....1,2,6,8
OVERLAPS.....NONE

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8		S8P
PHASE	61,82	2	2 PED	3	4	4 PED	5	6	6 PED	7	8		8 PED
SIGNAL HEAD NO.	61,82	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU
RED	*	128						134				107	
YELLOW		129						135				108	
GREEN		130						136				109	
RED ARROW													
YELLOW ARROW	126										108		
GREEN ARROW	127										109		

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	Ø 1 1B	Ø 1 1A	Ø2/SYS 2A/SØ2	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø 6 1A	Ø2/SYS 2B/SØ3											ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6/SYS 6A/SØ1	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		NOT USED				Ø 8 8B								

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1B	TB2-1,2	I1U	56	18	1	1	Y	Y			15
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y	Y		3
2A/SØ2	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y			
2B/SØ3	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y			
6A/SØ1	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.

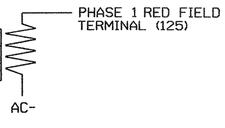
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: Ø9-128Ø
DESIGNED: May 2007
SEALED: Ø6-Ø8-07
REVISED: N/A

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

Signal Upgrade - Final

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
SR 1452 (Yadkin Valley Road)

Division 9 Davie County Hillsdale

PLAN DATE: May 2007	REVIEWED BY: JTR
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

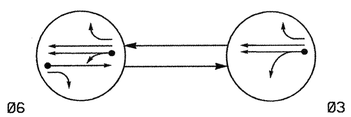
SIGNATURE DATE 6-26-07

SIG. INVENTORY NO. 09-1280

22-JUN-2007 03:06
c:\pw_pro\sdwork\groupsmig mcmpeterson#091280_smlele_xx.dgn
$$$$user

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.10

PHASING DIAGRAM



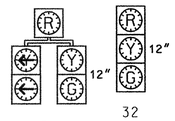
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE		
	Ø3	Ø6	FLASH
31	G	G	Y
32	G	G	Y
61, 62	R	G	Y

SIGNAL FACE I.D.

Denotes L.E.D.



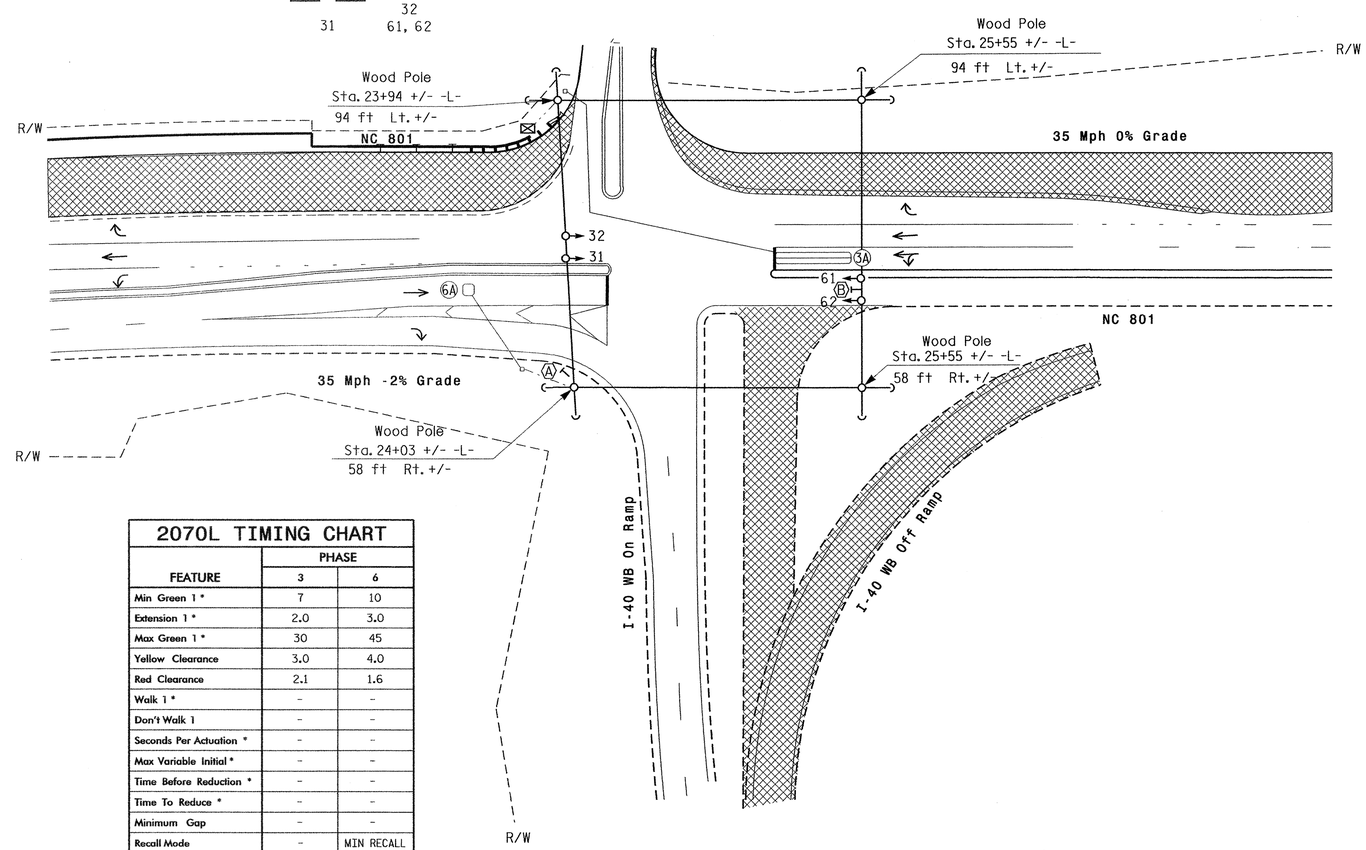
31 32 61, 62

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
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	15	-	Y
6A	6X6	70	4	Y	6	Y	Y	-	-	-	-	Y

2 Phase
Fully Actuated
(NC 801 Closed Loop 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. 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. Closed loop system data: Controller Asset #1326.



2070L TIMING CHART		
FEATURE	PHASE 3	PHASE 6
Min Green 1 *	7	10
Extension 1 *	2.0	3.0
Max Green 1 *	30	45
Yellow Clearance	3.0	4.0
Red Clearance	2.1	1.6
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	-
Max Variable Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	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	
	Directional Arrow	
	Pavement Marking Arrow	
	Construction Zone	
A	"YIELD" Sign (R1-2)	A
B	No Left Turn Sign (R3-2)	B

New Installation (TCP - Phase I)

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

NC 801
At
I-40 WB Ramps

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY:
PREPARED BY: I. O. Umozurike REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
T.J. Williams 6/29/07.
SIGNATURE DATE

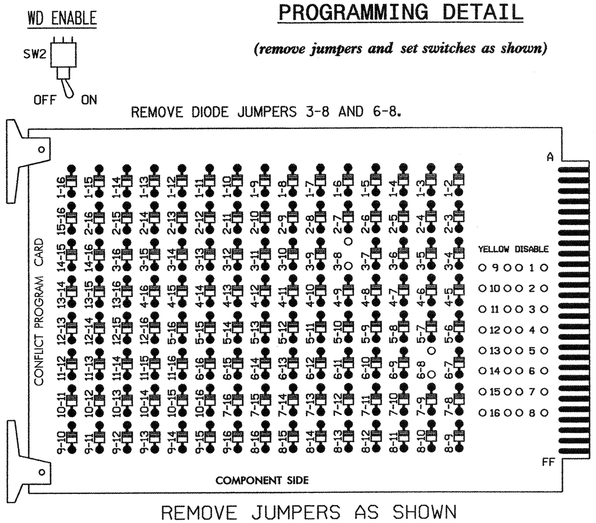
SIG. INVENTORY NO. 09-1326 T1

29-JUN-2007 12:53
s:\ats signals\workgroups\tip projects\b-3637\signal files\09-1326\09132 6_sig_dsn_2007mmdd.dgn

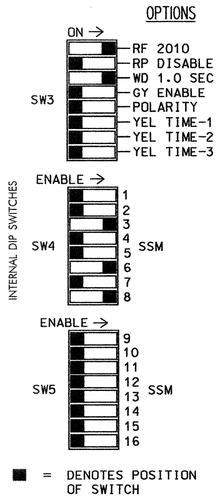
PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.11

EDI MODEL 2010ECL 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 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 1,2,4, 5,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 NC 801 Closed Loop 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.....S3,S6,S8
PHASES USED.....3,6
OVERLAP A:.....3+6
OVERLAP B:.....NOT USED
OVERLAP C:.....NOT USED
OVERLAP D:.....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	NU	NU	31	NU	NU	NU	61,62	NU	NU	OLA/31,32	NU
RED				*				134			107	
YELLOW								135			108	
GREEN								136			109	
RED ARROW												
YELLOW ARROW				117								
GREEN ARROW				118								

NU = Not Used

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

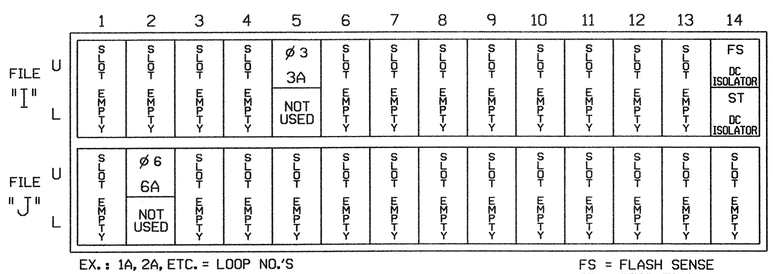
FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:              ¦123456789101112131415 16
VEH OVL PARENTS:¦   X  X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED   _ YELLOW   _ GREEN
FLASH COLORS:  _ RED   _ YELLOW   _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....8
```

OVERLAP PROGRAMMING COMPLETE

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

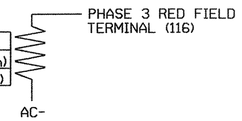
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1326 T1
DESIGNED: May 2007
SEALED: 06/29/07
REVISED: N/A

New Installation - Temp 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
I-40 WB Ramps

Division 09 | Davie County | Hillsdale

PLAN DATE: July 2007 | REVIEWED BY:
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

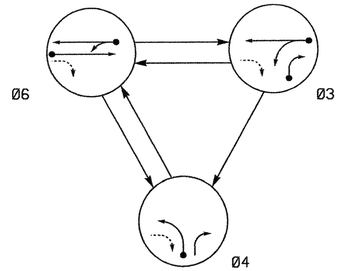
John T. Rowe Jr. 7-5-07
SIGNATURE DATE

SIG. INVENTORY NO. 09-1326 T1

05-JUL-2007 10:48
S:\ws_traffic\signal\workgroups\design monkey\petersonw\09-1326.sm.elt.20070626.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.12

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

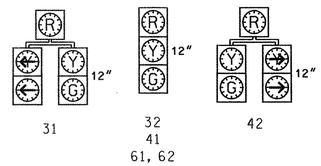
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø4	PHASE Ø6	FLASH
31	G	R	G	Y
32	G	R	G	Y
41	R	G	R	R
42	R	G	R	R
61, 62	R	R	G	Y

SIGNAL FACE I.D.

Denotes L.E.D.



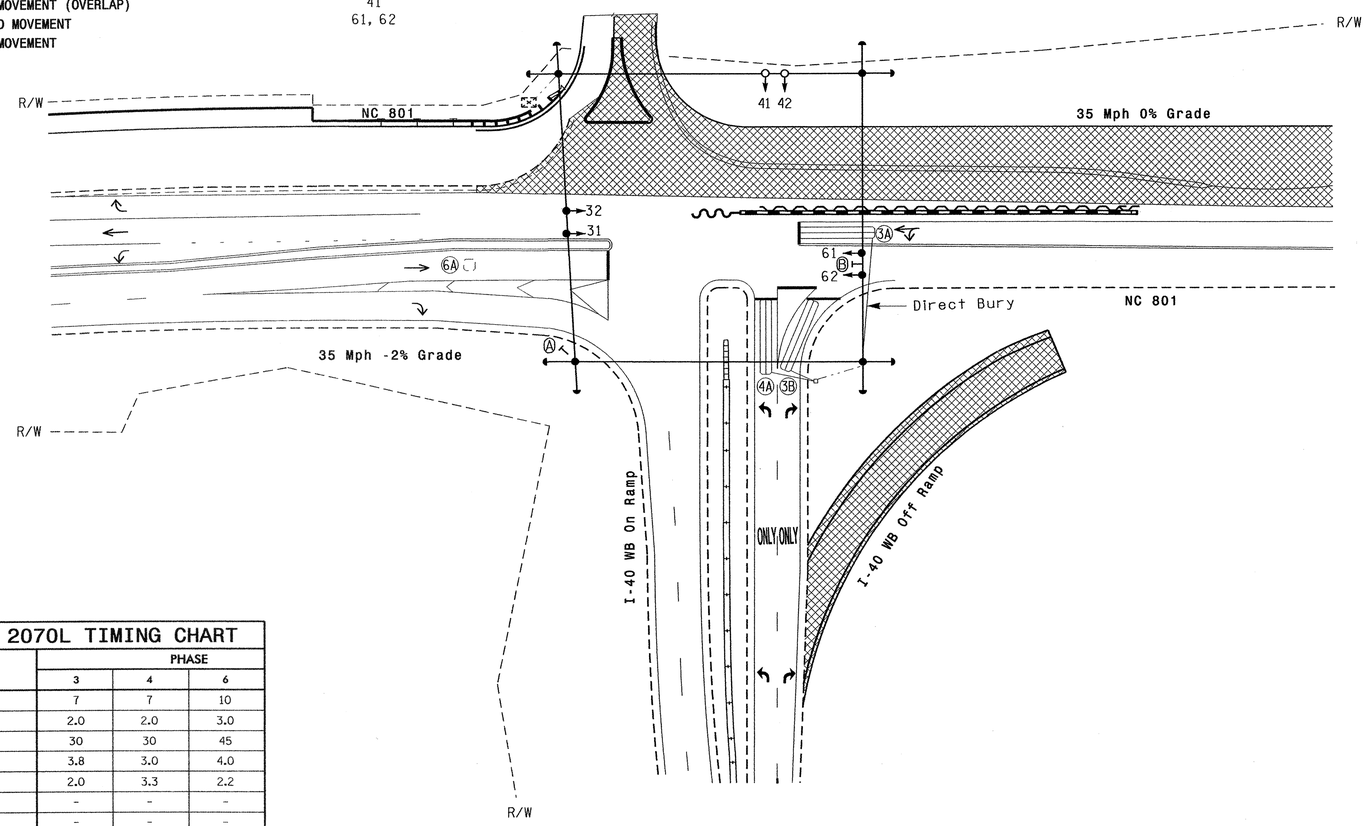
2070L LOOP & DETECTOR INSTALLATION

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
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	5	-	-
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	5	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
6A	6X6	70	4	-	6	Y	Y	-	-	-	-	-

3 Phase
Fully Actuated
(NC 801 Closed Loop 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. Set all detector units to presence mode.
4. Reposition existing signal heads numbered 31 and 32.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Closed loop system data: Controller Asset #1326.



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	
	Pavement Marking Arrow	
	Construction Zone	
A	"YIELD" Sign (R1-2)	A
B	No Left Turn Sign (R3-2)	B

2070L TIMING CHART

FEATURE	PHASE 3	PHASE 4	PHASE 6
Min Green 1 *	7	7	10
Extension 1 *	2.0	2.0	3.0
Max Green 1 *	30	30	45
Yellow Clearance	3.8	3.0	4.0
Red Clearance	2.0	3.3	2.2
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	-	MIN RECALL
Vehicle Call Memory	-	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	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 (TCP - Phase I - Step 4&5)

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
At
I-40 WB Ramps

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY:
PREPARED BY: I. O. Umozurike REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

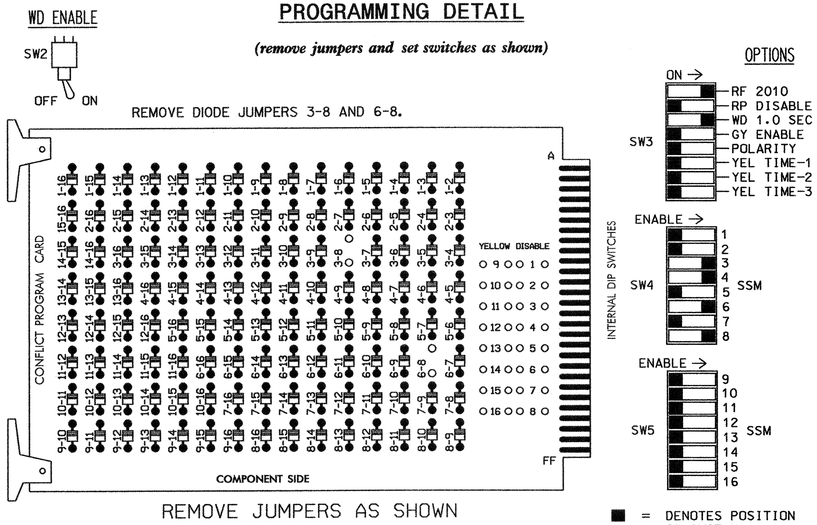
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE T.J. Williams DATE 6/29/07.
SIG. INVENTORY NO. 09-1326 T2

29-JUN-2007 12:53
S:\Traffic Signal Design\Groups*tip projects\B-3637*signal files\09-1326\09i326_sig_dsn_2007mdd.dgn
jluhr

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.13

EDI MODEL 2010ECL 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 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 1,2,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 NC 801 Closed Loop 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.....S3,S4,S6,S8
PHASES USED.....3,4,6
OVERLAP A:.....3+6
OVERLAP B:.....NOT USED
OVERLAP C:.....NOT USED
OVERLAP D:.....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	NU	NU	31,42	41,42	NU	NU	61,62	NU	NU	OLA/31,32	NU
RED				*	101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW				117								
GREEN ARROW				118								

NU = Not Used

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

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:            ¦123456789101112131415 16
VEH OVL PARENTS:¦  X  X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....8
```

OVERLAP 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	SLOT	SLOT	Ø3 3B	Ø3 3A	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	EMPTY	EMPTY	NOT USED	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

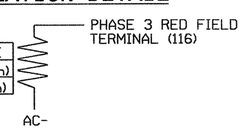
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3B	TB4-1,2	I4U	47	9	22	3	Y	Y			5
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			5
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1326 T2
DESIGNED: May 2007
SEALED: 06-29-07
REVISED: N/A

New Installation - Temp 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Management Section

122 N. McDowell St., Raleigh, NC 27603

NC 801 at I-40 WB Ramps

Division 09 | Davie County | Hillsdale

PLAN DATE: May 2007 | REVIEWED BY:
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

John T. Rowe, Jr. 7-5-07
SIGNATURE DATE

SIG. INVENTORY NO. 09-1326 T2

05-JUL-2007 13:11
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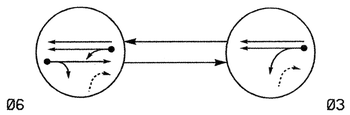
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.14

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

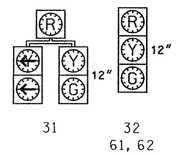
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø6	FLASH
31	G	G	Y
32	G	G	Y
61, 62	R	G	Y

SIGNAL FACE I.D.

Denotes L.E.D.



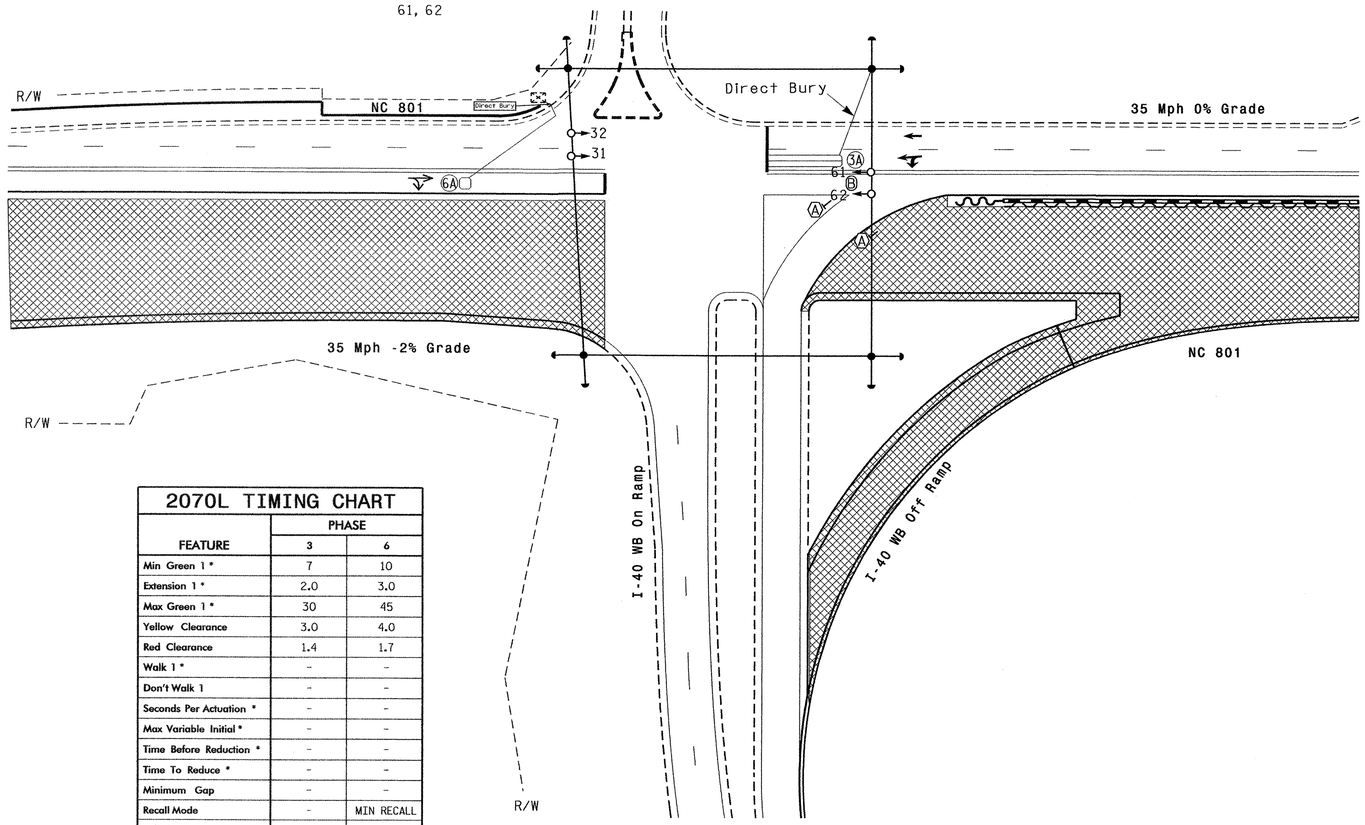
2070L LOOP & DETECTOR INSTALLATION

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
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	15	-	-
6A	6X6	70	4	Y	6	Y	Y	-	-	-	-	-

2 Phase
Fully Actuated
(NC 801 Closed Loop 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. Set all detector units to presence mode.
4. Reposition existing signal heads numbered 31, 32, 61, and 62.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Closed loop system data: Controller Asset #1326.



2070L TIMING CHART

FEATURE	PHASE 3	PHASE 6
Min Green 1 *	7	10
Extension 1 *	2.0	3.0
Max Green 1 *	30	45
Yellow Clearance	3.0	4.0
Red Clearance	1.4	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
Vehicle Call Memory	-	YELLOW
Dual Entry	-	-
Simultaneous Gap	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	
	Directional Arrow	
	Pavement Marking Arrow	
	Construction Zone	
A	"YIELD" Sign (R1-2)	A
B	No Left Turn Sign (R3-2)	B

New Installation (TCP - Phase II)

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

NC 801
At
I-40 WB Ramps

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY:
PREPARED BY: I. O. Umozurike REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

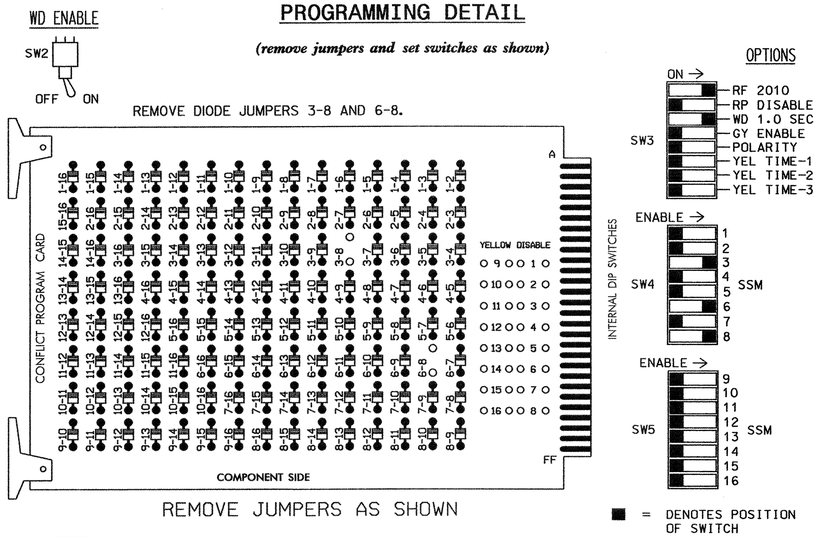
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE 6/29/07. DATE
SIG. INVENTORY NO. 09-1326 T3

29-JUN-2007 13:01
s:\its signals\workgroups\tip projects\b-3637\signal files\09-1326\091326_sig_dsn_2007mdd.dgn
ilubr

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.15

EDI MODEL 2010ECL 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 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 1,2,4, 5,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 NC 801 Closed Loop 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.....S3,S6,S8
PHASES USED.....3,6
OVERLAP A:.....3+6
OVERLAP B:.....NOT USED
OVERLAP C:.....NOT USED
OVERLAP D:.....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	NU	NU	31	NU	NU	NU	61,62	NU	NU	OLA/31,32	NU
RED				*				134			107	
YELLOW								135			108	
GREEN								136			109	
RED ARROW												
YELLOW ARROW				117								
GREEN ARROW				118								

NU = Not Used

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

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:              ¦123456789101112131415 16
VEH OVL PARENTS:¦   X  X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED   _ YELLOW   _ GREEN
FLASH COLORS:  _ RED   _ YELLOW   _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....8
```

OVERLAP 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	SLOT EMPTY	SLOT EMPTY	ø3 3A	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	SLOT EMPTY	ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	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 CONNECTION & PROGRAMMING CHART

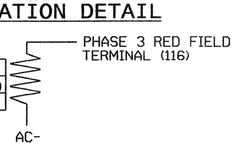
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1326 T3
DESIGNED: May 2007
SEALED: 06/29/07
REVISED: N/A

New Installation - Temp 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
I-40 WB Ramps

Division 09 | Davie County | Hillsdale

PLAN DATE: July 2007 | REVIEWED BY:
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 7-5-07
SIG. INVENTORY NO. 09-1326 T3

05-JUL-2007 10:51
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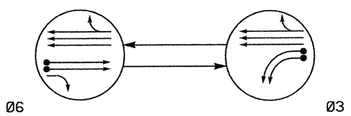
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.16

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

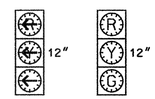
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø3	PHASE Ø6	FLASH
31,32	~~G~~	~~R~~	~~R~~
61, 62	R	G	Y

SIGNAL FACE I.D.

Denotes L.E.D.



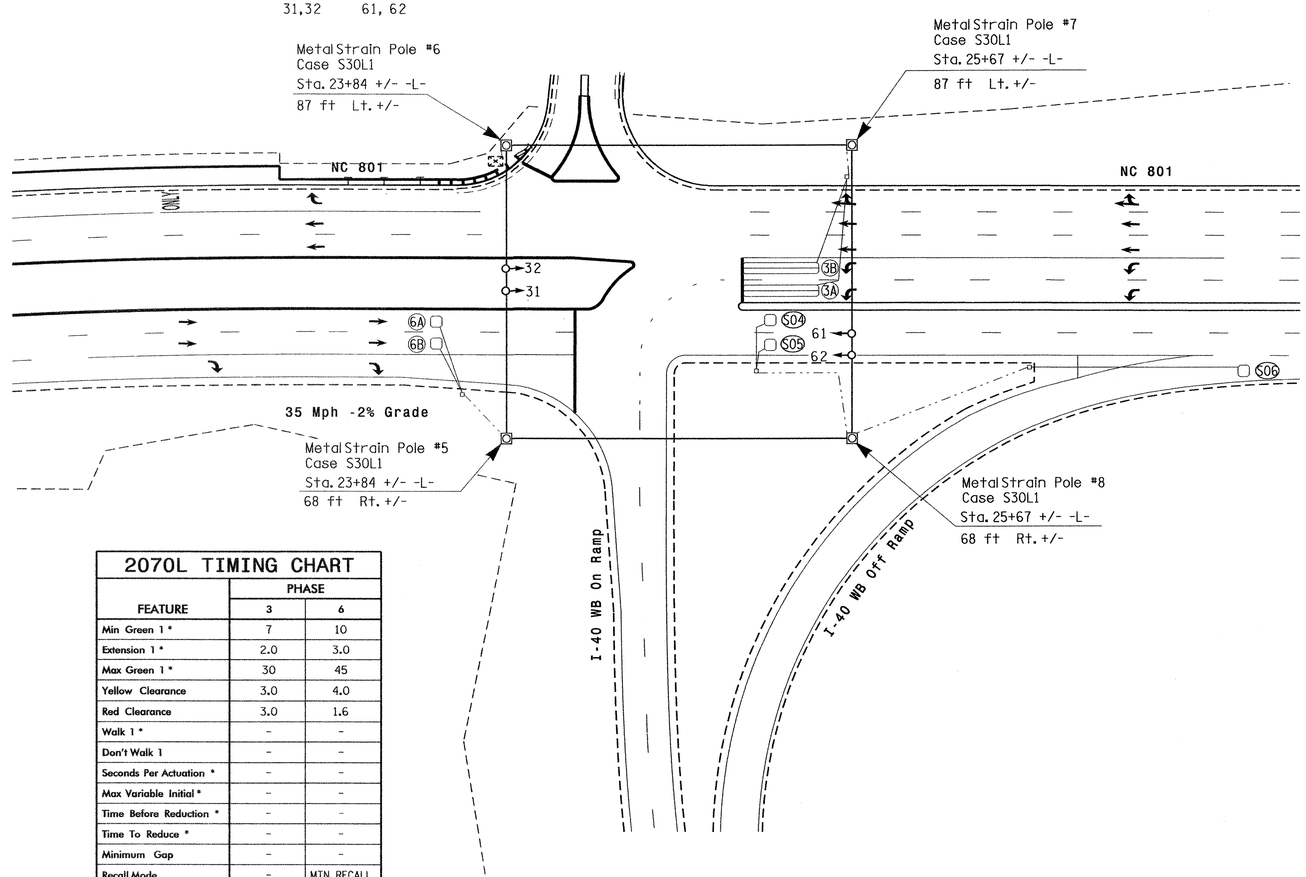
2070L LOOP & DETECTOR INSTALLATION

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
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-
6A	6X6	70	4	Y	6	Y	Y	-	-	-	-	-
6B	6X6	70	4	Y	6	Y	Y	-	-	-	-	-
S04	6X6	+100	4	Y	-	-	-	-	-	-	Y	Y
S05	6X6	+100	4	Y	-	-	-	-	-	-	Y	Y
S06	6X6	+350	5	Y	-	-	-	-	-	-	Y	Y

2 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
5. Closed loop system data: Controller Asset #1326.



2070L TIMING CHART

FEATURE	PHASE 3	PHASE 6
Min Green 1 *	7	10
Extension 1 *	2.0	3.0
Max Green 1 *	30	45
Yellow Clearance	3.0	4.0
Red Clearance	3.0	1.6
Walk 1 *	-	-
Don't Walk 1	-	-
Seconds Per Actuation *	-	-
Max Variable Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Recall Mode	-	MIN RECALL
Vehicle Call Memory	-	YELLOW
Dual Entry	-	
Simultaneous Gap	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	
	Directional Arrow	
	Pavement Marking Arrow	
	Metal Strain Pole	

Signal Upgrade - Final

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

SCALE 0 40 1"=40'

NC 801
At
I-40 WB Ramps

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY:
PREPARED BY: I. O. Umozurike REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE 6/29/07 DATE
SIG. INVENTORY NO. 09-1326

26-JUN-2007 13:11
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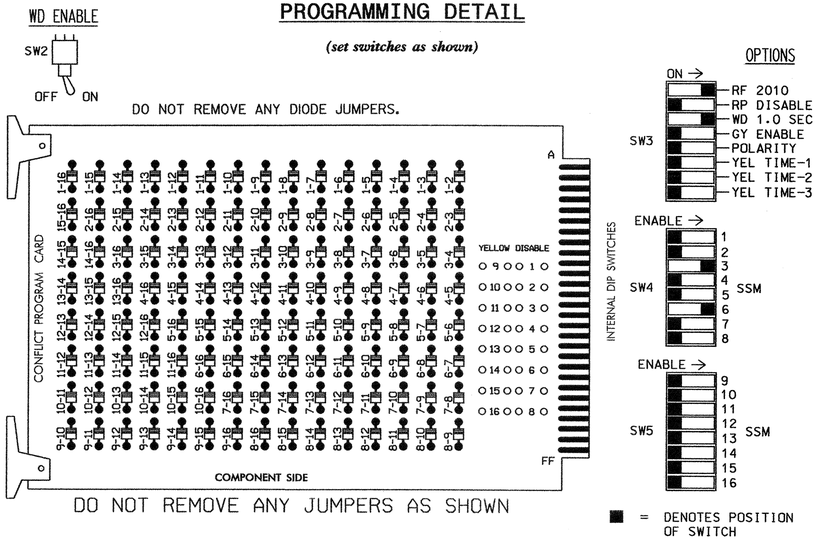
PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig. 17

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(set switches as shown)



DO NOT REMOVE ANY 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 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 1,2,4,5, 7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 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 NC 801 Closed Loop 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.....S3,S6
PHASES USED.....3,6
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.	NU	NU	NU	31,32	NU	NU	NU	61,62	NU	NU	NU	NU
RED								134				
YELLOW								135				
GREEN								136				
RED ARROW				116								
YELLOW ARROW				117								
GREEN ARROW				118								

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	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 3 3A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ4	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L					Ø 3 3B				SYS. DET. SØ5					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ6	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 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
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-7,8	I5L	58	20	3	3	Y	Y			
*SØ4	TB6-9,10	I9U	60	22	11	SYS					
*SØ5	TB6-11,12	I9L	62	24	13	SYS					
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
*SØ6	TB7-9,10	J9U	59	21	15	SYS					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: Ø9-1326
DESIGNED: May 2ØØ7
SEALED: Ø6-29-Ø7
REVISED: N/A

New Installation

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
I-40 WB Ramps

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY:
PREPARED BY: James Peterson REVIEWED BY:

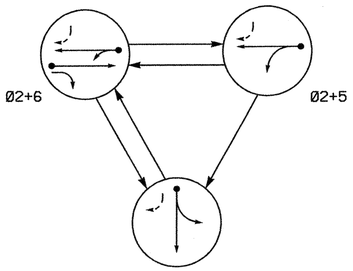
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 7-5-07 DATE
SIG. INVENTORY NO. 09-1326

05-JUL-2007 10:53
s:\ts signals\workgroups\sig management\ts\09\1326_smlele.20070626.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.18

PHASING DIAGRAM



Ø4+Low Priority Preempt
(Queue Backup Clear)

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

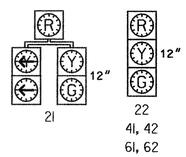
SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21	G	G	R	Y
22	G	G	R	Y
41, 42	R	R	G	R
61, 62	R	G	R	Y

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
2A	6X6	70	Existing	-	2	Y	Y	-	—	—	-	-
4A	6X15	600	Existing	-	QB CLEAR	Y	Y	-	—	25	-	-
4B	6X25	+5	Existing	-	4	Y	Y	-	—	—	-	-
4C	6X25	30	Existing	-	4	Y	Y	-	—	—	-	-
4D	6X25	65	Existing	-	4	Y	Y	-	—	—	-	-
5A	6X60	+10	2-4-2	-	5	Y	Y	-	—	15	-	-
					2	Y	Y	Y	—	3	-	-
6A	6X6	355	Existing	-	6	Y	Y	-	2.0	—	-	-
6B	6X6	100	Existing	-	6	Y	Y	-	—	—	-	-
S3	6X6	+125	Existing	-	-	-	-	-	—	—	Y	-
S4	6X6	+125	Existing	-	-	-	-	-	—	—	Y	-

SIGNAL FACE I.D.

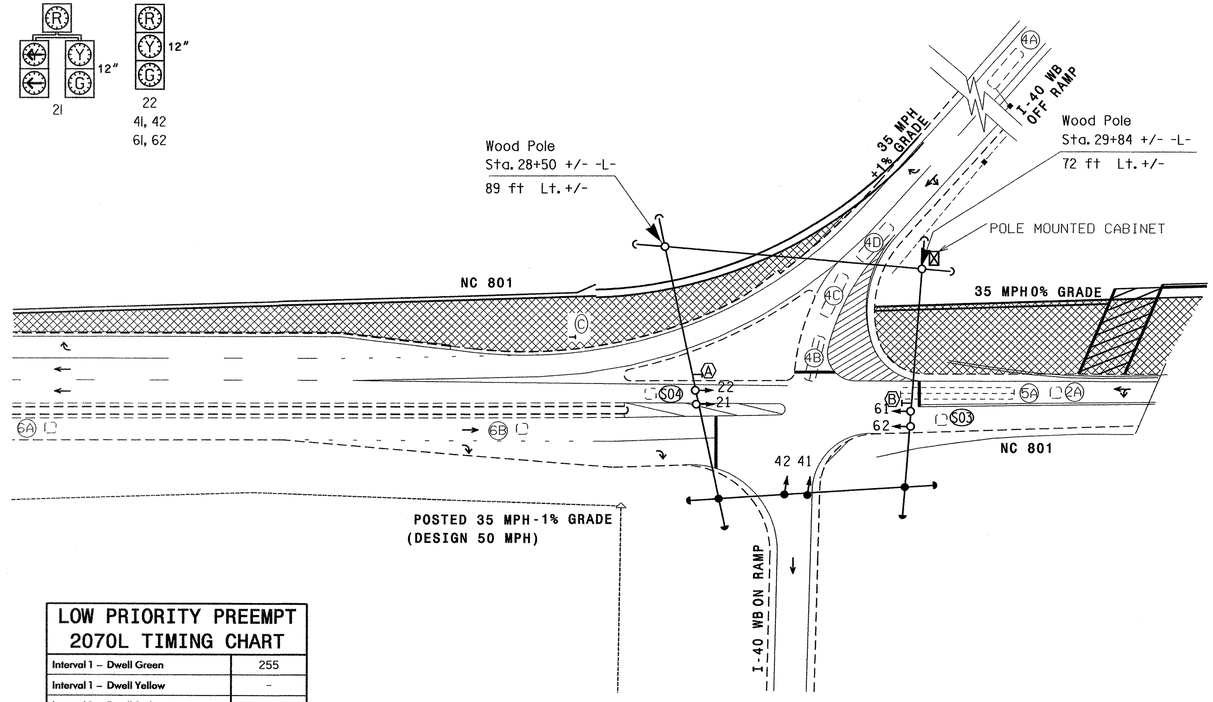
Denotes L.E.D.



3 Phase
Fully Actuated
With Low Priority Preempt
(NC 801 Hillsdale CLS)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
6. Loop 4A serves as a queue backup detector. After 25 seconds of constant actuation, the detector unit places a call to the controller to preempt normal operation to clear I-40 WB Off Ramp.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Closed loop system data: Controller Asset #0337.



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	
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No Left Turn Sign (R3-2)	Ⓑ
Ⓒ	Added Lane Sign (W4-3)	Ⓒ
	Construction Zone	

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	10	7	7	14
Extension 1 *	3.0	1.0	1.0	2.0
Max Green 1 *	45	30	20	45
Yellow Clearance	3.8	3.8	3.0	4.9
Red Clearance	1.4	1.3	2.1	1.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LOW PRIORITY PREEMPT 2070L TIMING CHART

Interval 1 – Dwell Green	255
Interval 1 – Dwell Yellow	-
Interval 1 – Dwell Red	-
Interval 5 – Exit Green	1
Interval 5 – Exit Yellow	0.0*
Interval 5 – Exit Red	0.0*
Delay Time	0
Min Green Before Preempt	7
Ped Clear Before Preempt	-
Yellow Clear Before Preempt	3.9*
Red Clear Before Preempt	2.1*
Dwell Min Time	60
Dwell Max Time	1
Enable Backup Protection	N
PED Clear Through Yellow	N

* Time defaults to time used for phase during normal operation.

Signal Upgrade Temp. (TCP- Phase I)

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

SCALE 0 40 1"=40'

NC 801
At
I-40 WB Ramp

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY:
PREPARED BY: I. O. Umozurike REVIEWED BY:

REVISIONS	INIT.	DATE

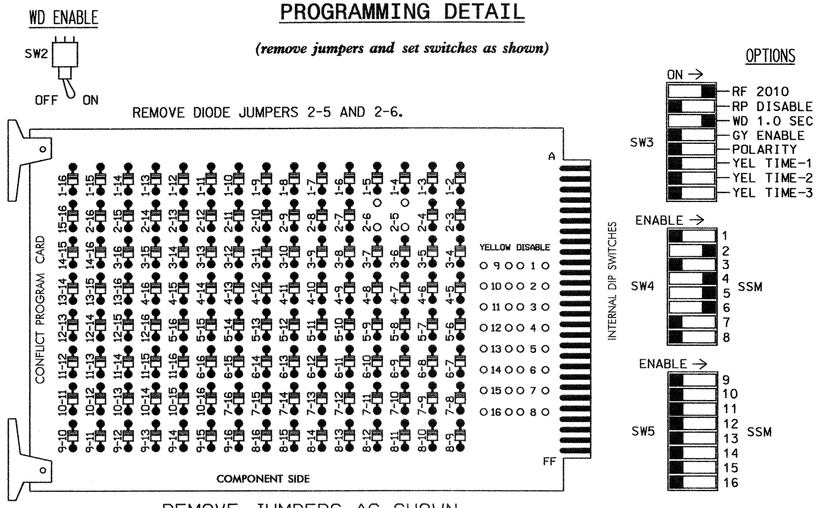
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE 6/8/07. DATE
SIG. INVENTORY NO. 09-0337 T1

06-JUL-2007 08:12
s:\ts\signals\workgroups\trb projects\b-3637\signal files\09-0337\090337_sig_dsn_2007mod.dgn
2007.1.18

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.19

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 1,3,7, 8,9,10,11,12,13,14,15 & 16 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 NC 801 Closed Loop Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S2P*,S4,S5,S6
PHASES USED.....2,4,5,6
OVERLAPS.....NONE

*USED FOR QUEUE PREEMPT.

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	21	61,62	NU	NU	NU	NU
RED		128			101		*	134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					

NU = Not Used

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

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	Ø2 2A	Ø4 4C	Ø4 4A	Ø5 5A	Ø6 6A	SLOT EMPTY	SYS. DET. S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L		NOT USED	Ø4 4D	Ø4 4B	Ø2 5A	Ø6 6B		SYS. DET. S4						ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
4C	TB21-5,6	I3U	58	20	3	4	Y	Y			
4D	TB23-5,6	I3L	49	11	24	4	Y	Y			
4A	TB21-7,8	I4U	41	3	**4	QB CLR					25
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			
5A[1]	TB21-9,10	I5U	55	17	5	5	Y	Y			15
	TB23-9,10	I5L	48	10	26	2	Y	Y	Y		3
6A	TB21-11,12	I6U	40	2	6	6	Y	Y		2.0	
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			
* S3	TB22-1,2	I8U	42	4	8	SYS	Y	Y			
* S4	TB24-1,2	I8L	46	8	18	SYS	Y	Y			

[1] Add jumpers from TB21-9 to TB23-9, and from TB21-10 to TB23-10.

** See vehicle detector programming detail on sheet 2.

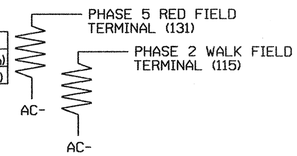
* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0337T
DESIGNED: May 2007
SEALED: 06-08-07
REVISED: N/A

Signal Upgrade - Temp - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
I-40 WB Ramp

Division 9 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWELL, JR.
SIGNATURE DATE 6-28-07
SIG. INVENTORY NO. 09-0337 T1

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jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.20

QUEUE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 'A' (PREEMPTION), THEN '1' (STANDARD PREEMPTIONS). PRESS 'NEXT' UNTIL PREEMPTION #2 IS REACHED.

```
   PREEMPTION  #2  SETTINGS (NEXT:1-10)
INTERVAL/TIMING ¦  CLEAR/DWELL PHASES
  GRN YEL  RED  ¦123456789101112131415 16
1 255  0.0  0.0 ¦   X
2   0  0.0  0.0 ¦
3   0  0.0  0.0 ¦
4   0  0.0  0.0 ¦
5   1  0.0  0.0 ¦ X   X
EXIT CALLS      ¦
            OPTIONS
PRIORITY (Y/N TO SELECT) ............MED
DELAY TIMER (0-255 SEC) .............0.0
MIN GREEN BEFORE PRE (0= DEFAULT)....7
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).3.9
RED CLEAR BEFORE PRE (0= DEFAULT)....2.1
DWELL MIN TIMER (0-255 SEC) .........60
DWELL MAX TIMER (0=OFF,1-255MIN) ....1
DWELL HOLD-OVER TIMER (0-255) .......0
LATCH CALL? .........................N
LINK TO NEXT PREEMPT? ...............N
ENABLE BACKUP PROTECTION? ...........N
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES? ......N
PED CLEARANCE THROUGH YELLOW? .......N
INHIBIT OVERLAP GREEN EXTENSION? ....N
SERVICE DURING SOFTWARE FLASH? ......N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL? ...............N
ALLOW PEDS IN DWELL INTERVAL? .......N
RE-TIME DWELL INTERVAL? .............N
OVERLAPS:                ¦ ABCDEFGHIJKLMNOP
DWELL INT FLASH YELLOW   ¦
OMIT OVERLAPS:           ¦
```

VEHICLE DETECTOR #4 SETTINGS FOR QUEUE PREEMPT

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN '1' (VEHICLE DETECTOR ASSIGNMENTS). PRESS '+' UNTIL DETECTOR #4 IS REACHED.

```
VEHICLE DETECTOR #4   SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................N
EXTENSION DETECTOR..................N
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#          ¦123456789101112131415 16
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............0
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....25
QUEUE GAP RESET TIME (0-25.5).......0.1
PREEMPTION INDEX FOR QUEUE (0-10)...2
```

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0337T
DESIGNED: May 2007
SEALED: 06-08-07
REVISED: N/A

Signal Upgrade - Temp - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

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

122 N. McDowell St., Raleigh, NC 27603

NC 801
at
I-40 WB Ramp

Division 9 Davie County Hillsdale

PLAN DATE:	May 2007	REVIEWED BY:	JTR
PREPARED BY:	James Peterson	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

John T. Rowe Jr. 6-26-07
SIGNATURE DATE

SIG. INVENTORY NO. 09-0337 T1

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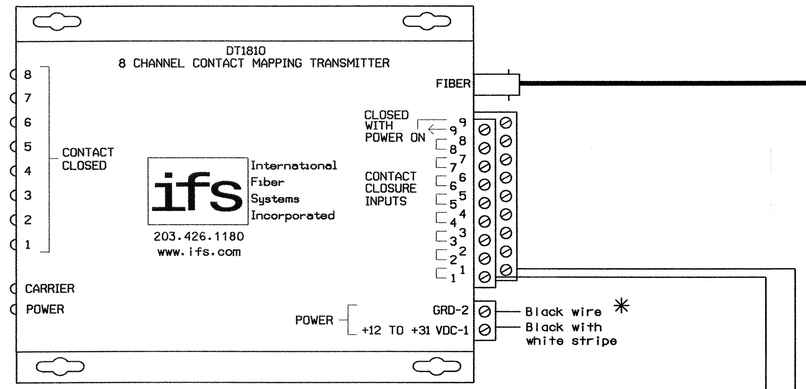
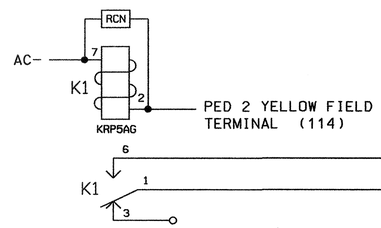
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.21

FIBER OPTIC TRANSMITTER WIRING FOR 09-0337





NOTES

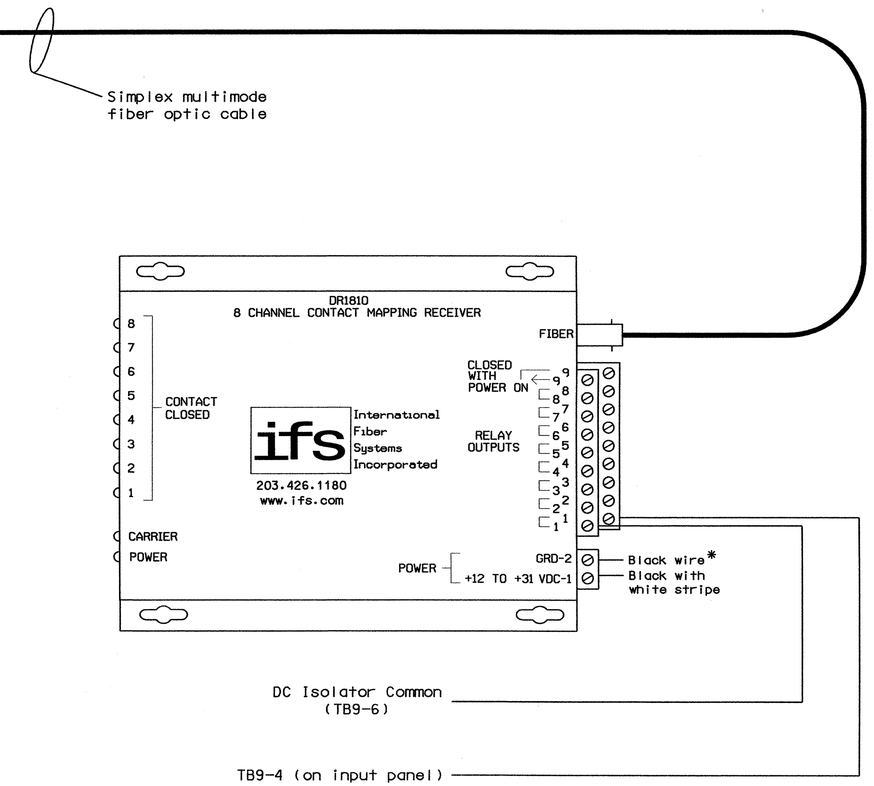
1. The International Fiber Systems DT1810 is an 8-channel contact mapping transmitter capable of transmitting up to eight contact closures over one optical fiber.
2. * Power connections are with the supplied 12 Volt DC Plug-in Power Supply.
3. Relay 'K1' is a DPST with a 120VAC coil. (DOT Material No. 625028600) (P&B# KRP5AG)
4. RCN is valued at .1 microFarad, 100 Ohm. (DOT Material No. 106018075)

PROGRAMMING NOTES FOR 09-0337

In order for the queue preempt call to be relayed to 09-0336, make the following programming changes to Output No. 33 in the controller for 09-0337:

1. Change the function of C1 pin 35 to be an output for the queue preempt. This is accomplished by the following:
   - A) From Main Menu select '6' (Outputs). Then select '1' (Output Assignments).
   - B) Scroll to C1 pin 35, Output No. 33. You will see that it is not enabled.
   - C) Scroll down to Preempt and input 'YES'. You will then be asked for a preempt number. Enter the controller preempt number used for the queue preempt here.
   - D) The output is now assigned for Queue Peempt Active output.
2. If field terminal 114 has a conflict monitor wire attached, remove, tape, and label wire.
3. To prevent a 'phantom' (or false) conflict, install a load resistor on field terminal 115 (Ped 2 Walk).
4. Install a loadswitch in Output File Slot S2P.

FIBER OPTIC RECEIVER WIRING FOR 09-0336



NOTES

1. The International Fiber Systems DR1810 is an 8-channel contact mapping receiver capable of sensing contact closures from a DT1810 transmitter over fiber optic cable up to 2.5 miles away.
2. * Power connections are with the supplied 12 Volt DC Plug-in Power Supply.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0337T
DESIGNED: May 2007
SEALED: 06-08-07
REVISED: N/A

Signal Upgrade - Temp - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
State Engineering and Safety Services Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
I-40 WB Ramp

Division 9 | Davie County | Hillsdale

PLAN DATE: May 2007		REVIEWED BY: JTR	
PREPARED BY: James Peterson		REVIEWED BY:	
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
John T. Rowe Jr. 6-26-07
SIGNATURE DATE
SIG. INVENTORY NO. 09-0337 T1

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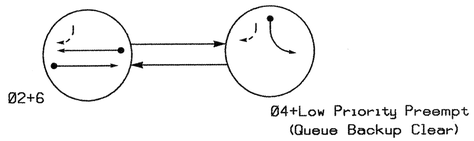
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.22

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

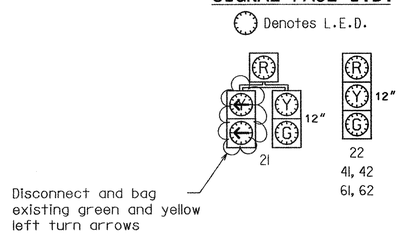
TABLE OF OPERATION

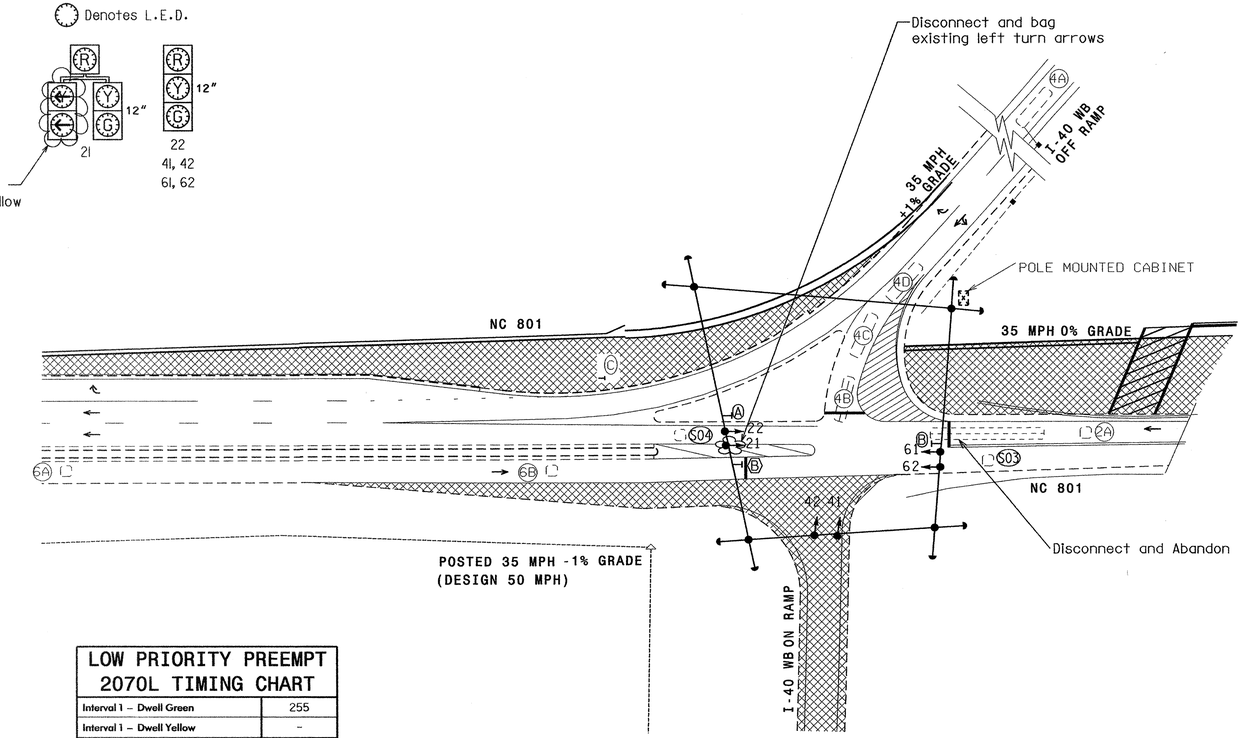
SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y

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
2A	6X6	70	Existing	-	2	Y	Y	-	——	——	-	-
4A	6X25	600	Existing	-	QB CLEAR	Y	Y	-	——	25	-	-
4B	6X25	+5	Existing	-	4	Y	Y	-	——	——	-	-
4C	6X25	30	Existing	-	4	Y	Y	-	——	——	-	-
4D	6X25	65	Existing	-	4	Y	Y	-	——	——	-	-
6A	6X6	355	Existing	-	6	Y	Y	-	2.0	——	-	-
6B	6X6	100	Existing	-	6	Y	Y	-	——	——	-	-
S3	6X6	+125	Existing	-	-	-	-	-	——	——	Y	-
S4	6X6	+125	Existing	-	-	-	-	-	——	——	Y	-

SIGNAL FACE I.D.





2 Phase Fully Actuated With Low Priority Preempt (NC 801 Hillsdale CLS)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Loop 4A serves as a queue backup detector. After 25 seconds of constant actuation, the detector unit places a call to the controller to preempt normal operation to clear I-40 WB Off Ramp.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Closed loop system data: Controller Asset #0337.

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	10	7	14
Extension 1 *	3.0	1.0	2.0
Max Green 1 *	45	30	45
Yellow Clearance	3.8	3.8	4.9
Red Clearance	1.4	1.3	1.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* 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.

LOW PRIORITY PREEMPT 2070L TIMING CHART

Interval 1 – Dwell Green	255
Interval 1 – Dwell Yellow	-
Interval 1 – Dwell Red	-
Interval 5 – Exit Green	1
Interval 5 – Exit Yellow	0.0*
Interval 5 – Exit Red	0.0*
Delay Time	0
Min Green Before Preempt	7
Ped Clear Before Preempt	-
Yellow Clear Before Preempt	0.0*
Red Clear Before Preempt	0.0*
Dwell Min Time	60
Dwell Max Time	1
Enable Backup Protection	N
PED Clear Through Yellow	N

* Time defaults to time used for phase during normal operation.

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	
	Pavement Marking Arrow	
Ⓐ	No Right Turn Sign (R3-1)	Ⓐ
Ⓑ	No Left Turn Sign (R3-2)	Ⓑ
Ⓒ	Added Lane Sign (W4-3)	Ⓒ
	Construction Zone	N/A

Signal Upgrade Temp. (TCP- Phase I, Step 3)

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
DEPARTMENT OF TRANSPORTATION
Signal and Geometric Section
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 40 1"=40'

NC 801
At
I-40 WB Ramp

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: Zack M. Little
PREPARED BY: I. O. Umozurike REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE T. J. Williams DATE 7/6/07.
SIG. INVENTORY NO. 09-0337 T2

05-JUL-2007 18:47
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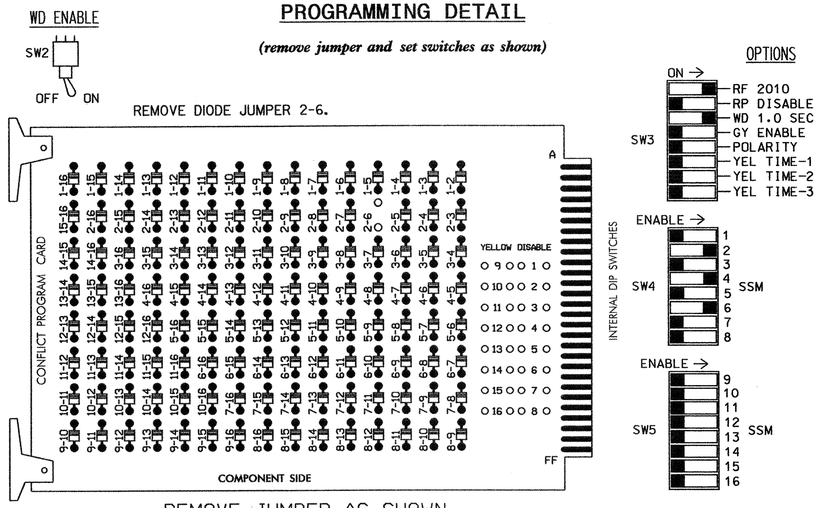
EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 1,3,5,7, 8,9,10,11,12,13,14,15 & 16 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 NC 801 Closed Loop Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S2P*,S4,S6
PHASES USED.....2,4,6
OVERLAPS.....NONE

*USED FOR QUEUE PREEMPT.

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	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

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	SLOT	Ø2 2A	Ø4 4C	Ø4 4A	SLOT	Ø6 6A	SLOT	SYS. DET. S3	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
L	EMPTY	NOT USED	Ø4 4D	Ø4 4B	EMPTY	Ø6 6B	EMPTY	SYS. DET. S4	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB21-3,4	I2U	39	1	2	2	Y	Y			
4C	TB21-5,6	I3U	58	20	3	4	Y	Y			
4D	TB23-5,6	I3L	49	11	24	4	Y	Y			
4A	TB21-7,8	I4U	41	3	**4	QB CLR					25
4B	TB23-7,8	I4L	45	7	14	4	Y	Y			
6A	TB21-11,12	I6U	40	2	6	6	Y	Y		2.0	
6B	TB23-11,12	I6L	44	6	16	6	Y	Y			
* S3	TB22-1,2	I8U	42	4	8	SYS					
* S4	TB24-1,2	I8L	46	8	18	SYS					

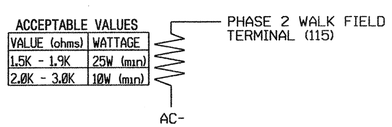
** See vehicle detector programming detail on sheet 2.

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0337 T2
DESIGNED: May 2007
SEALED: 07-06-07
REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL



Signal Upgrade - Temp - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
I-40 WB Ramp

Division 9 | Davie County | Hillsdale

PLAN DATE: May 2007	REVIEWED BY: JTR		
PREPARED BY: James Peterson	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE | DATE 7-9-07
SIG. INVENTORY NO. 09-0337 T2

09-JUL-2007 10:20
$:**ts_signal$\workgroups\ess\g mon\peterscm\090337 t_smu.ele.20070626.dgn
jtpeterscm

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.24

QUEUE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 'A' (PREEMPTION), THEN '1' (STANDARD PREEMPTIONS). PRESS 'NEXT' UNTIL PREEMPTION #2 IS REACHED.

```
   PREEMPTION  #2  SETTINGS (NEXT:1-10)
INTERVAL/TIMING ¦  CLEAR/DWELL PHASES
  GRN YEL  RED  ¦123456789101112131415 16
1 255  0.0  0.0 ¦   X
2   0  0.0  0.0 ¦
3   0  0.0  0.0 ¦
4   0  0.0  0.0 ¦
5   1  0.0  0.0 ¦ X   X
EXIT CALLS      ¦
              OPTIONS
PRIORITY (Y/N TO SELECT) ............MED
DELAY TIMER (0-255 SEC) .............0.0
MIN GREEN BEFORE PRE (0= DEFAULT)....7
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0
DWELL MIN TIMER (0-255 SEC) .........60
DWELL MAX TIMER (0=OFF,1-255MIN) ....1
DWELL HOLD-OVER TIMER (0-255) .......0
LATCH CALL? .........................N
LINK TO NEXT PREEMPT? ...............N
ENABLE BACKUP PROTECTION? ...........N
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES? ......N
PED CLEARANCE THROUGH YELLOW? .......N
INHIBIT OVERLAP GREEN EXTENSION? ....N
SERVICE DURING SOFTWARE FLASH? ......N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL? ...............N
ALLOW PEDS IN DWELL INTERVAL? .......N
RE-TIME DWELL INTERVAL? .............N
OVERLAPS:                ¦ ABCDEFGHIJKLMNOP
DWELL INT FLASH YELLOW   ¦
OMIT OVERLAPS:           ¦
```

VEHICLE DETECTOR #4 SETTINGS FOR QUEUE PREEMPT

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN '1' (VEHICLE DETECTOR ASSIGNMENTS). PRESS '+' UNTIL DETECTOR #4 IS REACHED.

```
VEHICLE DETECTOR #4   SETTINGS (+-,1-64)
SETTING:                            (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................N
ENABLE DIAGNOSTICS..................N
SPEED TRAP..........................N
CALL DETECTOR.......................N
EXTENSION DETECTOR..................N
MODE 2 STOP BAR.....................N
SWITCHING DETECTOR..................N
DUPLICATING DETECTOR................N
ENABLE FULL TIME DELAY..............N
IF FAILED, SET MIN RECALL?..........N
IF FAILED, SET MAX1 RECALL?.........N
IF FAILED, SET MAX2 RECALL?.........N
PHASE#           ¦123456789101112131415 16
PHASES ASSIGNED  ¦
SWITCH/DUPLICATE ¦
LOOP SIZE (0-255 FT)................6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............0
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....25
QUEUE GAP RESET TIME (0-25.5).......0.1
PREEMPTION INDEX FOR QUEUE (0-10)...2
```

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0337 T2
DESIGNED: May 2007
SEALED: 07-06-07
REVISED: N/A

Signal Upgrade - Temp - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section

122 N. McDowell St., Raleigh, NC 27603

NC 801
at
I-40 WB Ramp

Division 9 | Davie County | Hillsdale

PLAN DATE: May 2007 | REVIEWED BY:

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

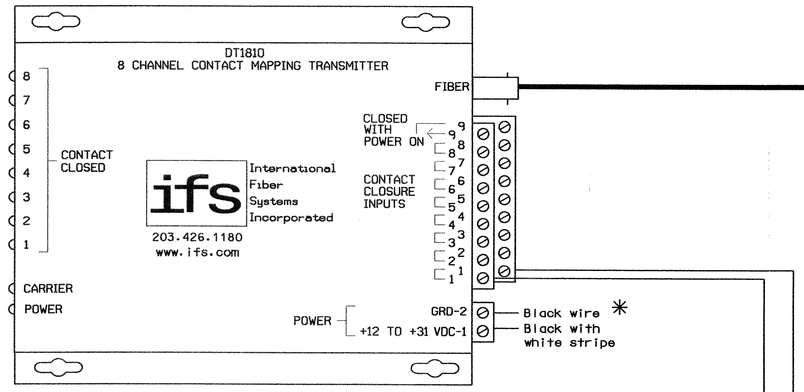
John T. Rowe Jr. 7-9-07
SIGNATURE DATE

SIG. INVENTORY NO. 09-0337 T2

09-JUL-2007 10:21
s:\traffic\Signal\Working\caseksig manke\peterson\B0337 t_sm_ele_20070626.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.25

FIBER OPTIC TRANSMITTER WIRING FOR 09-0337



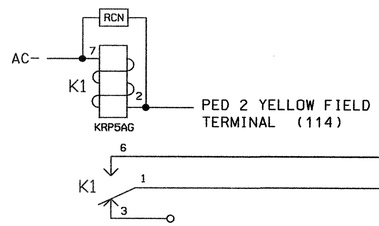
NOTES

1. The International Fiber Systems DT1810 is an 8-channel contact mapping transmitter capable of transmitting up to eight contact closures over one optical fiber.

✳ 2. Power connections are with the supplied 12 Volt DC Plug-in Power Supply.

3. Relay 'K1' is a DPST with a 120VAC coil. (DOT Material No. 625028600) (P&B# KRP5AG)

4. RCN is valued at .1 microFarad, 100 Ohm. (DOT Material No. 106018075)



PROGRAMMING NOTES FOR 09-0337

In order for the queue preempt call to be relayed to 09-0336, make the following programming changes to Output No. 33 in the controller for 09-0337:

1. Change the function of C1 pin 35 to be an output for the queue preempt. This is accomplished by the following:

   A) From Main Menu select '6' (Outputs). Then select '1' (Output Assignments).

   B) Scroll to C1 pin 35, Output No. 33. You will see that it is not enabled.

   C) Scroll down to Preempt and input 'YES'. You will then be asked for a preempt number. Enter the controller preempt number used for the queue preempt here.

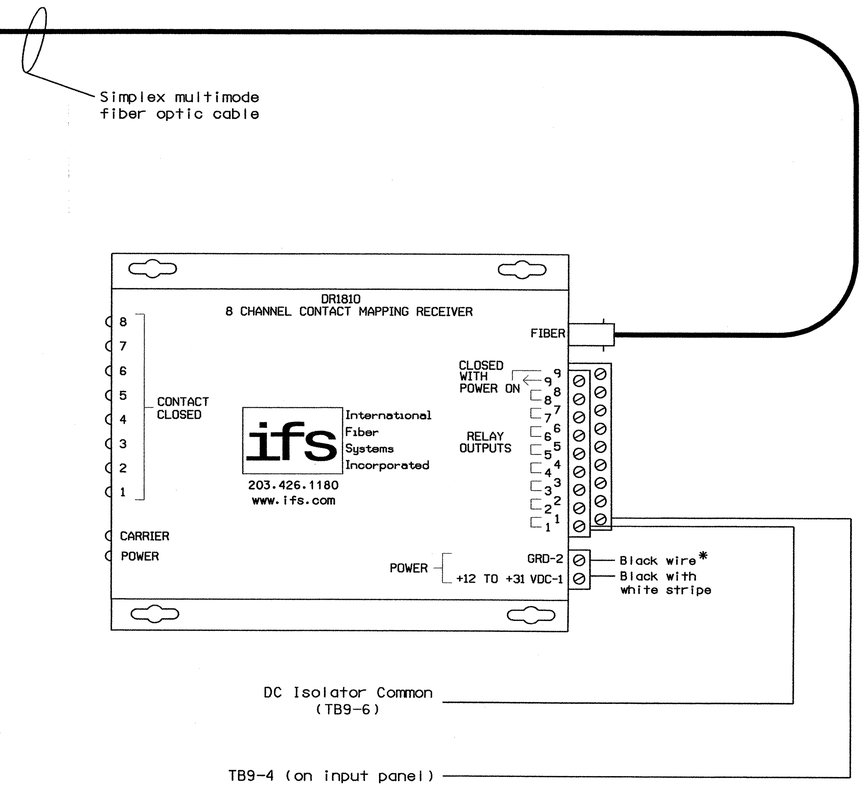
   D) The output is now assigned for Queue Peempt Active output.

2. If field terminal 114 has a conflict monitor wire attached, remove, tape, and label wire.

3. To prevent a 'phantom' (or false) conflict, install a load resistor on field terminal 115 (Ped 2 Walk).

4. Install a loadswitch in Output File Slot S2P.

FIBER OPTIC RECEIVER WIRING FOR 09-0336



NOTES

1. The International Fiber Systems DR1810 is an 8-channel contact mapping receiver capable of sensing contact closures from a DT1810 transmitter over fiber optic cable up to 2.5 miles away.

✳ 2. Power connections are with the supplied 12 Volt DC Plug-in Power Supply.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0337 T2
DESIGNED: May 2007
SEALED: 07-06-07
REVISED: N/A

Signal Upgrade - Temp - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

NC 801
at
I-40 WB Ramp

Division 9 | Davie County | Hillsdale

PLAN DATE: May 2007	REVIEWED BY:		
PREPARED BY: James Peterson	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

John T. Rowe Jr. 7-9-07
SIGNATURE DATE

SIG. INVENTORY NO. 09-0337 T2

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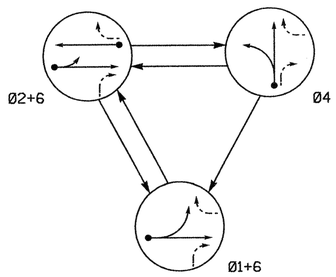
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.26

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	R	G	R	Y
41,42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.

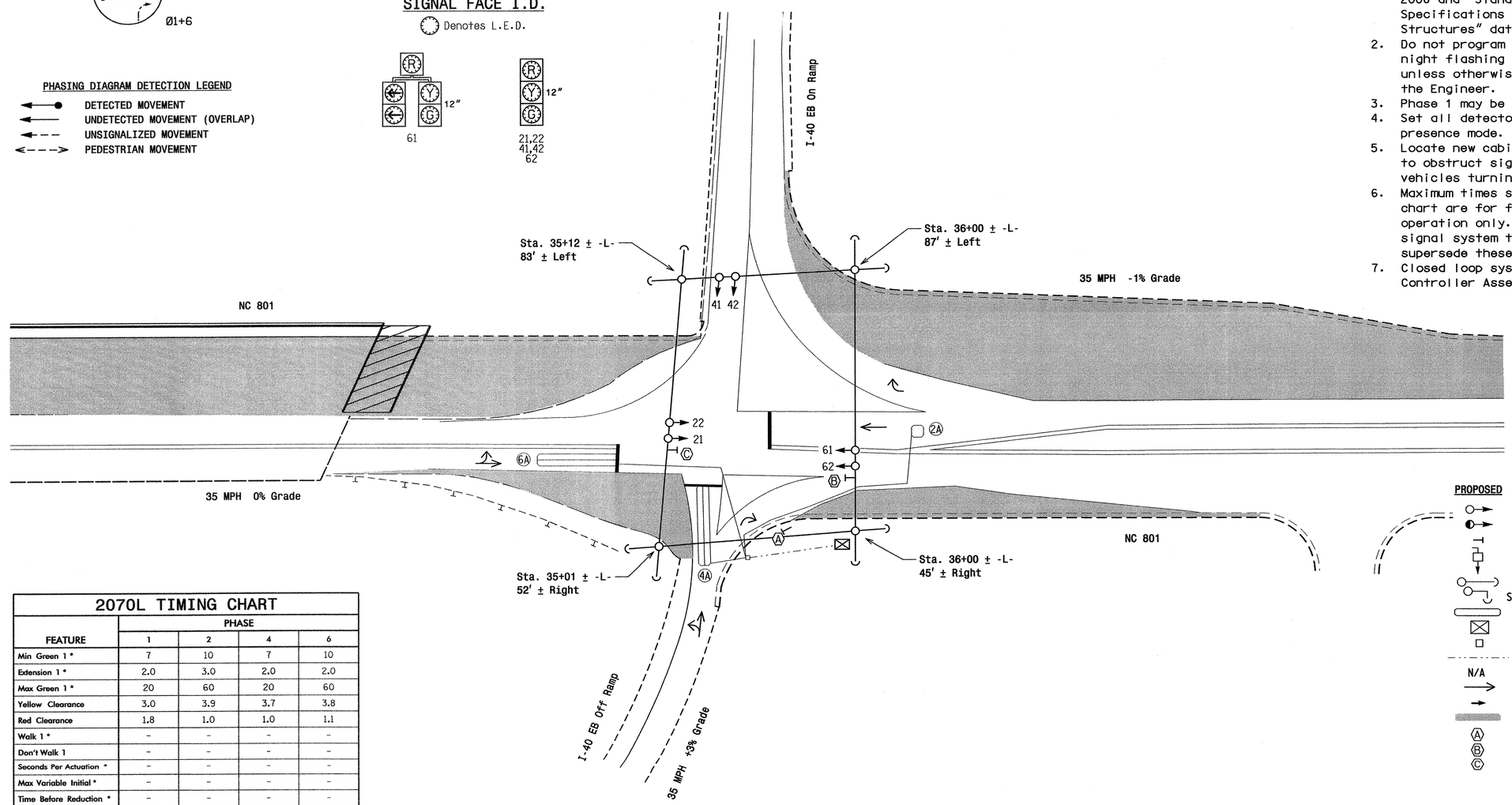
2070L LOOP & DETECTOR INSTALLATION

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
2A	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	5	-	Y
6A	6X40	0	2-4-2	Y	1	Y	Y	-	-	5	-	Y
					6	Y	Y	-	-	-	-	Y

3 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

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 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
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 #1299.



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	
	Pavement Marking Arrow	
	Construction Zone	N/A
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No Right Turn Sign (R3-1)	Ⓑ
Ⓒ	No Left Turn Sign (R3-2)	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	2.0
Max Green 1 *	20	60	20	60
Yellow Clearance	3.0	3.9	3.7	3.8
Red Clearance	1.8	1.0	1.0	1.1
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.

New Installation (TCP - Phase I - Step 4 & 5)

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

SCALE 0 30 1"=30'

NC 801
at
I-40 EB Ramps

Division 9 Davie County Hillsdale

PLAN DATE: June 2007 REVIEWED BY: T.J. Williams
PREPARED BY: Z.W. Little REVIEWED BY:

REVISIONS	INIT.	DATE

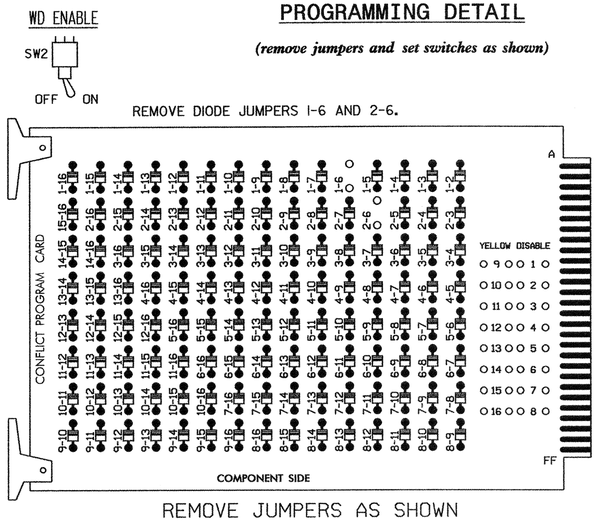
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE 6/29/07. DATE
SIG. INVENTORY NO. 09-1299 T1

29-JUN-2007 09:41
s:\traffic\signals\workgroups\ktp projects\b-3637\signal files\b09-1299\09129911_sig_dsn_2007mdd.dgn
zmlittle

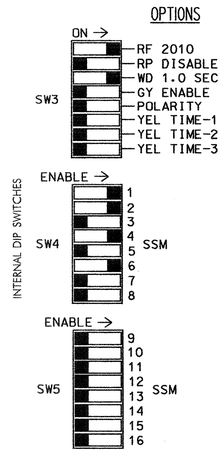
PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.27

EDI MODEL 2010ECL 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 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, 8,9,10,11,12,13,14,15 & 16 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 NC 801 Hillsdale Closed Loop 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,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	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											

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	ø 2 2A	SLOT	SLOT	SLOT	ø 4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	ø 1 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	ø 6 6A	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
6A[1]	TB3-5,6	J2U	40	2	6	1	Y	Y			5
	TB3-7,8	J2L	44	6	16	6	Y	Y			

[1] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

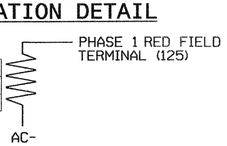
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1299 T1
DESIGNED: June 2007
SEALED: 06/29/07
REVISED: N/A

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

New Installation - Temp 1

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Pacific Engineering and Safety Services, Inc.
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

NC 801
at
I-40 EB Ramp

Division 09 Davie County Hillsdale

PLAN DATE: July 2007	REVIEWED BY:
PREPARED BY: James Peterson	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE DATE 7-5-07
SIG. INVENTORY NO. 09-1299 T1

05-JUL-2007 10:36
s:\traffic\signals\work\groups\sig mandpeterson\09\1299_sm.ele_20070626.dgn
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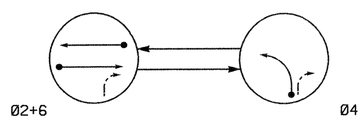
PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.28

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	PHASE FLASH
21,22	G	R	Y
41,42	R	G	R
61	G	R	Y
62	G	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.

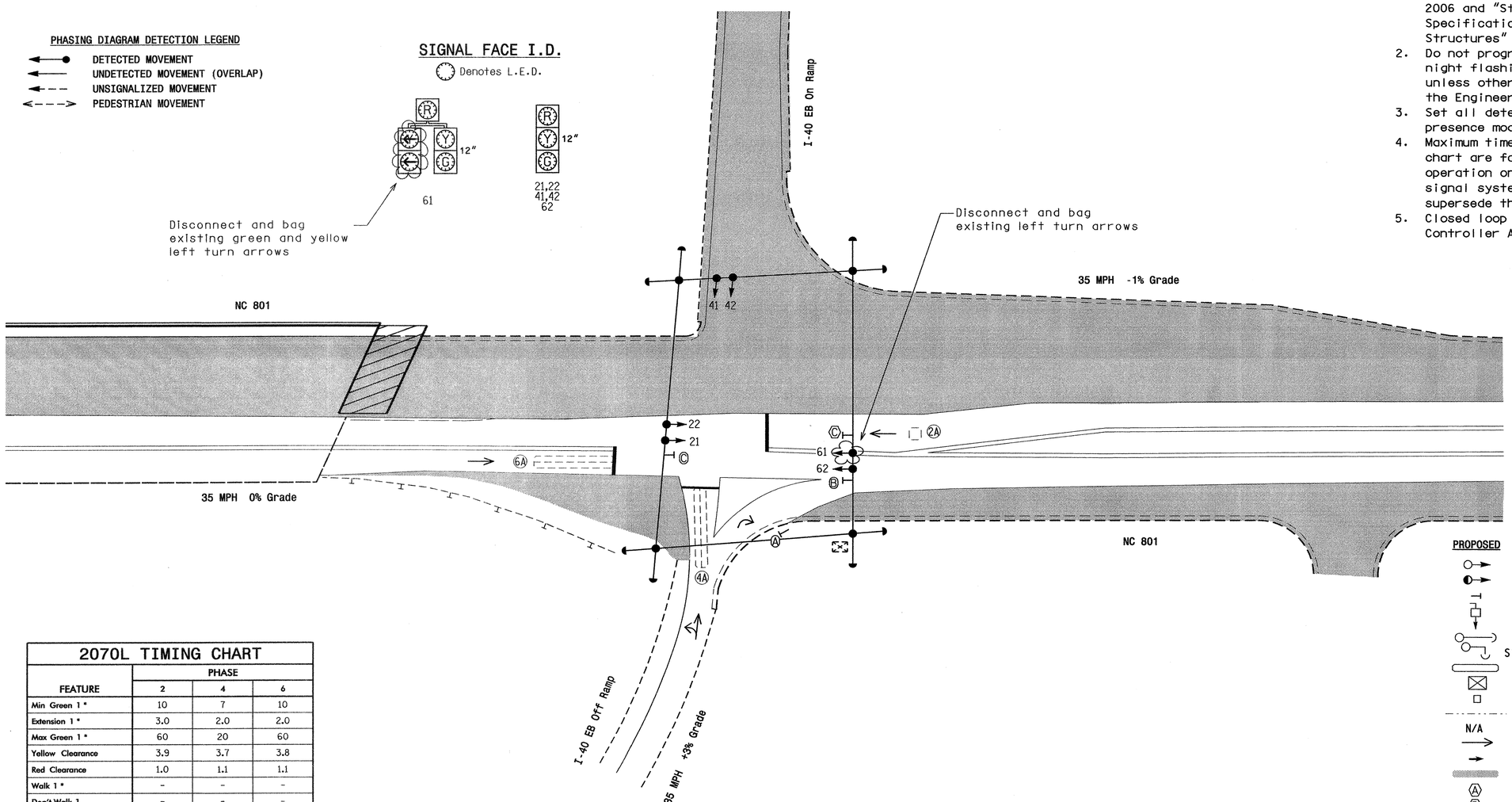
2070L LOOP & DETECTOR INSTALLATION

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
2A	6X6	70	4	-	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	5	-	-
6A	6X40	0	2-4-2	-	6	Y	Y	-	-	-	-	-

2 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
5. Closed loop system data: Controller Asset #1299.



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	
	Pavement Marking Arrow	
	Construction Zone	N/A
A	"YIELD" Sign (R1-2)	A
B	No Right Turn Sign (R3-1)	B
C	No Left Turn Sign (R3-2)	C

2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	10	7	10
Extension 1 *	3.0	2.0	2.0
Max Green 1 *	60	20	60
Yellow Clearance	3.9	3.7	3.8
Red Clearance	1.0	1.1	1.1
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

* 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 (TCP - Phase I - Step 6)

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

NC 801
at
I-40 EB Ramps

Division 9 Davie County Hillsdale

PLAN DATE:	June 2007	REVIEWED BY:	T.J. Williams
PREPARED BY:	Z.M. Little	REVIEWED BY:	

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE 6/29/07. DATE

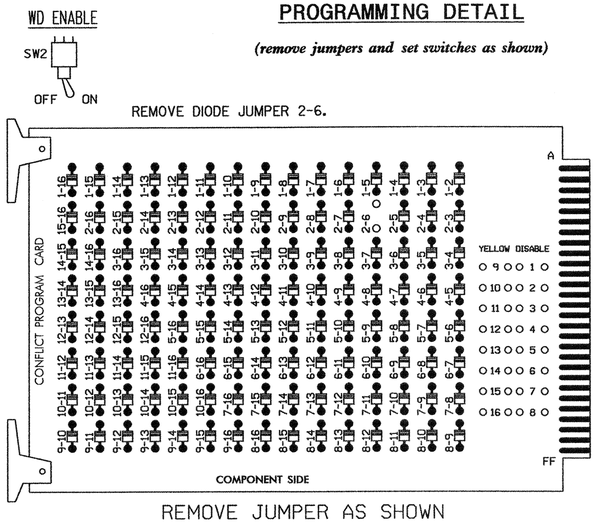
SIG. INVENTORY NO. 09-1299 T2

29-JUN-2007 09:37
s:\its_signals\workgroups\tip projects\b-3637\signal files\#09-1299\09129912_sig_dsn_2007mmdd.dgn
zmlittle

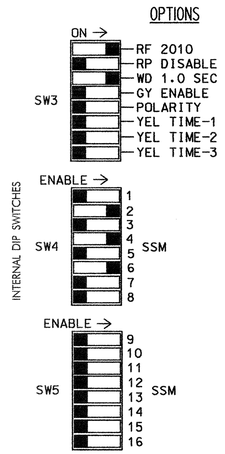
PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.29

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPER 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 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 1,3,5,7, 8,9,10,11,12,13,14,15 & 16 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 NC 801 Hillsdale Closed Loop 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,S4,S6
PHASES USED.....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.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

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	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
FILE "I" L		NOT USED				NOT USED								ST DC ISOLATOR
FILE "J" U	SLOT EMPTY	ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY		SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
FILE "J" L		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	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			5
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

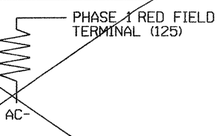
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1299 T2
DESIGNED: June 2007
SEALED: 06/29/07
REVISED: N/A

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

New Installation - Temp 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section

750 N. Greenfield Pwky, Garner, NC 27529

NC 801
at
I-40 EB Ramp

Division 09 Davie County Hillsdale

PLAN DATE: July 2007 REVIEWED BY:
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

John T. Rowe, Jr. 7-5-07
SIGNATURE DATE

SIG. INVENTORY NO. 09-1299 T2

05-JUL-2007 10:39
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jpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.30

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

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

SIGNAL FACE I.D.

Denotes L.E.D.

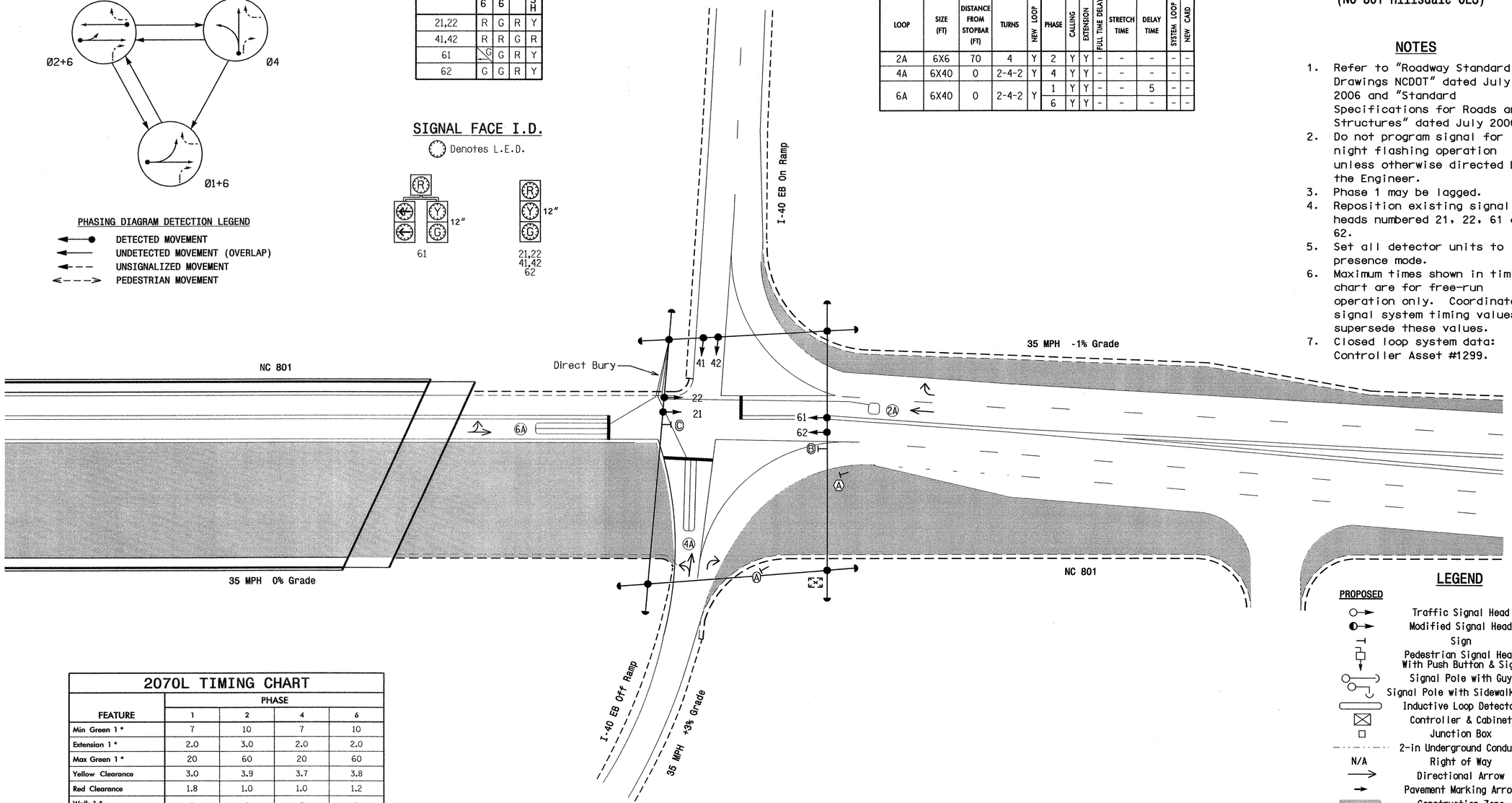
2070L LOOP & DETECTOR INSTALLATION

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
2A	6X6	70	4	Y	2	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-
6A	6X40	0	2-4-2	Y	1	Y	Y	-	-	5	-	-
					6	Y	Y	-	-	-	-	-

3 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

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 may be lagged.
4. Reposition existing signal heads numbered 21, 22, 61 and 62.
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 #1299.



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	
	Pavement Marking Arrow	
	Construction Zone	N/A
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No Right Turn Sign (R3-1)	Ⓑ
Ⓒ	No Left Turn Sign (R3-2)	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	2.0
Max Green 1 *	20	60	20	60
Yellow Clearance	3.0	3.9	3.7	3.8
Red Clearance	1.8	1.0	1.0	1.2
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.

New Installation (TCP - Phase II)

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

SCALE 0 30 1"=30'

NC 801
at
I-40 EB Ramps

Division 9 Davie County Hillsdale

PLAN DATE:	June 2007	REVIEWED BY:	T.J. Williams
PREPARED BY:	Z.W. Little	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE Z.W. Little DATE 6/29/07
SIG. INVENTORY NO. 09-1299 T3

29-JUN-2007 08:42
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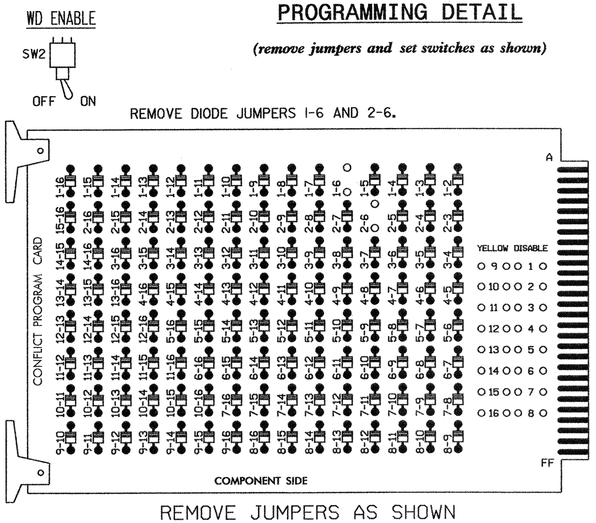
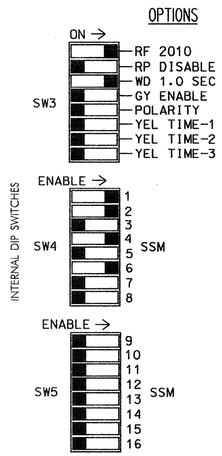
zmi:tile

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.31

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 3,5,7, 8,9,10,11,12,13,14,15 & 16 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 NC 801 Hillsdale Closed Loop 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,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	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											

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	ø 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø 4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				NOT USED								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	ø 1 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		ø 6 6A												

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
6A[1]	TB3-5,6	J2U	40	2	6	1	Y	Y			5
	TB3-7,8	J2L	44	6	16	6	Y	Y			

[1] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.

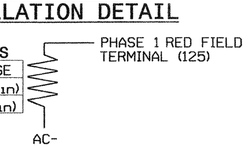
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-1299 T3
DESIGNED: June 2007
SEALED: 06/29/07
REVISED: N/A

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

New Installation - Temp 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

NC 801
at
I-40 EB Ramp

Division 09 | Davie County | Hillsdale

PLAN DATE: July 2007 | REVIEWED BY:
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
John T. Rowe Jr. 7-5-07
SIGNATURE DATE
SIG. INVENTORY NO. 09-1299 T3

05-JUL-2007 10:40
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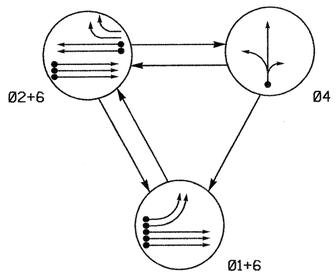
jpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.32

3 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

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
11, 12	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y

SIGNAL FACE I.D.

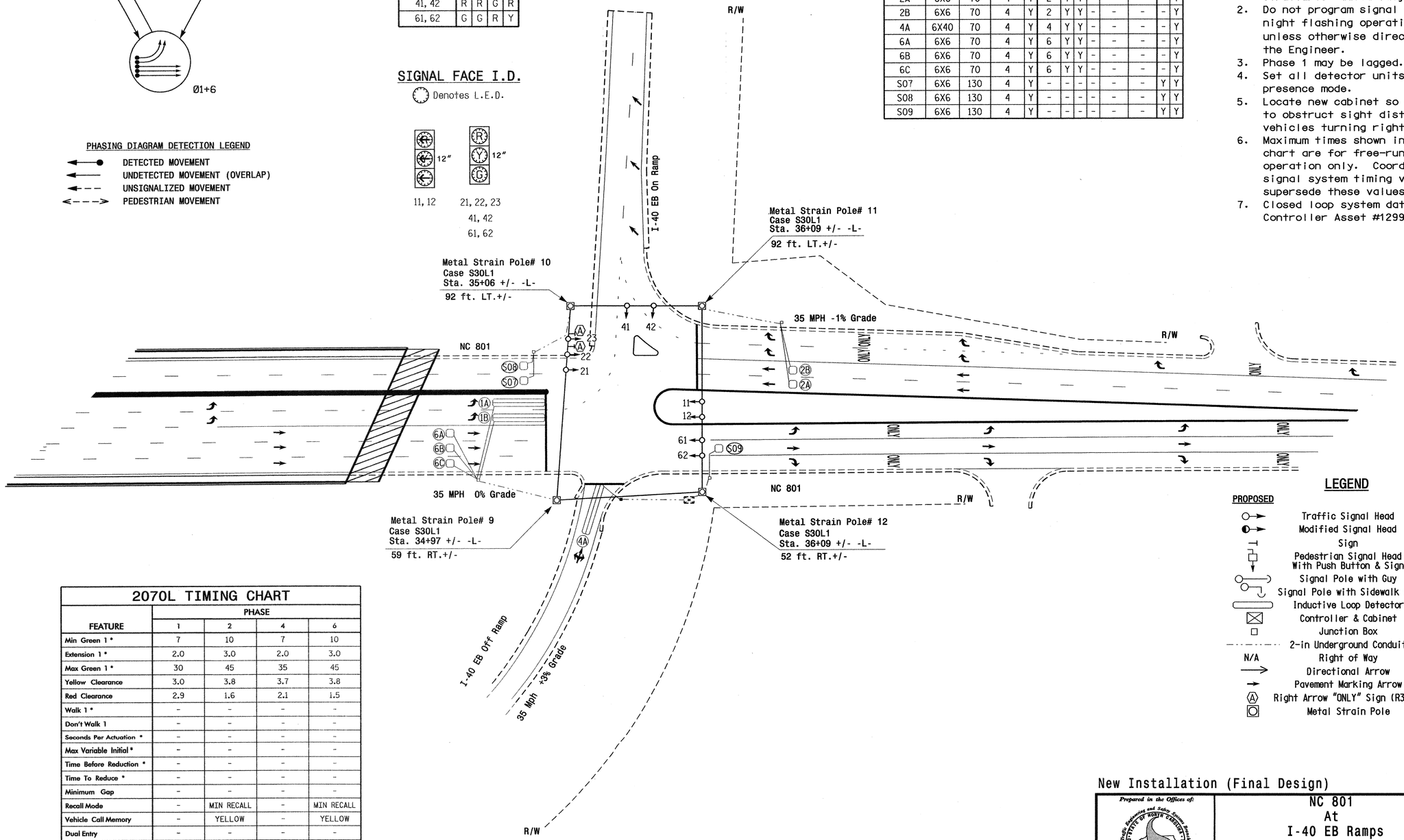
Denotes L.E.D.

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
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-	Y
1B	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-	Y
2A	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
2B	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	70	4	Y	4	Y	Y	-	-	-	-	Y
6A	6X6	70	4	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	70	4	Y	6	Y	Y	-	-	-	-	Y
6C	6X6	70	4	Y	6	Y	Y	-	-	-	-	Y
S07	6X6	130	4	Y	-	-	-	-	-	-	Y	Y
S08	6X6	130	4	Y	-	-	-	-	-	-	Y	Y
S09	6X6	130	4	Y	-	-	-	-	-	-	Y	Y

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 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
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 #1299.



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	
	Pavement Marking Arrow	
	Right Arrow "ONLY" Sign (R3-5R)	
	Metal Strain Pole	

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	30	45	35	45
Yellow Clearance	3.0	3.8	3.7	3.8
Red Clearance	2.9	1.6	2.1	1.5
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

* 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 (Final Design)

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

SCALE 0 40 1"=40'

NC 801
At
I-40 EB Ramps

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY:
PREPARED BY: I. O. Umozurike REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE 6/29/07 DATE
SIG. INVENTORY NO. 09-1299

29-JUN-2007 08:27
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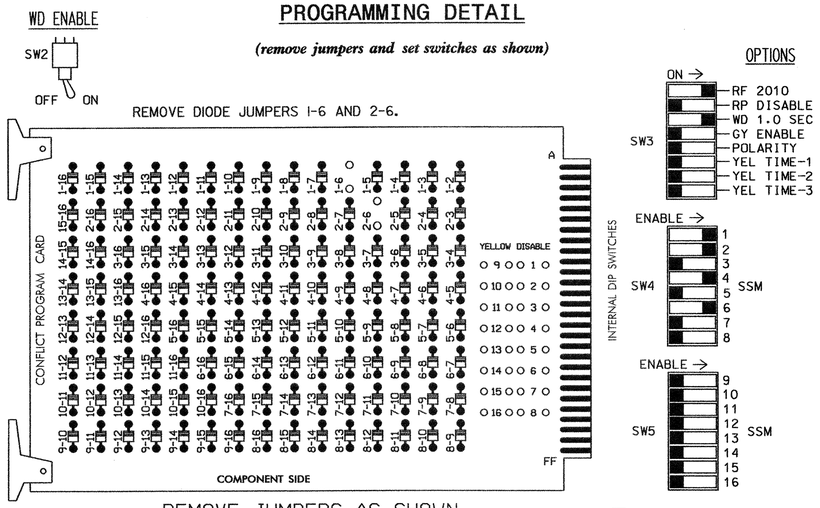
zmittle

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.33

EDI MODEL 2010ECL 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 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, 8,9,10,11,12,13,14,15 & 16 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 NC 801 Hillsdale Closed Loop 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,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.	11,12	21, 22,23	NU	NU	41,42	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

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	Ø 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ7	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	Ø 1 1B	Ø 2 2B				NOT USED			SYS. DET. SØ8					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø 6 6A	Ø 6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. SØ9	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		Ø 6 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.	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	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
*SØ7	TB6-9,10	I9U	60	22	11	SYS					
*SØ8	TB6-11,12	I9L	62	24	13	SYS					
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			
*SØ9	TB7-9,10	J9U	59	21	15	SYS					

* 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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: Ø9-1299
DESIGNED: May 2007
SEALED: Ø6/29/07
REVISED: N/A

New Installation - Final

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals Management Section
750 N. Greenfield Pwky, Garner, NC 27529

NC 801 at I-40 EB Ramp

Division 09 Davie County Hillsdale

PLAN DATE: July 2007 REVIEWED BY:
PREPARED BY: James Peterson REVIEWED BY:

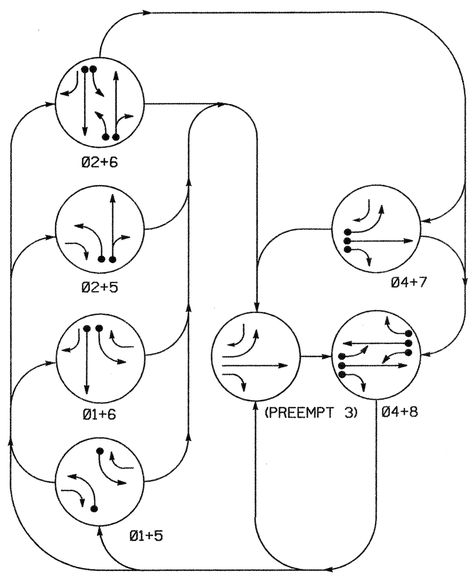
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 7-5-07 DATE
SIG. INVENTORY NO. 09-1299

05-JUL-2007 10:41
users/prod/bkwchkgroups/sig management/jtpeterson
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.34

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

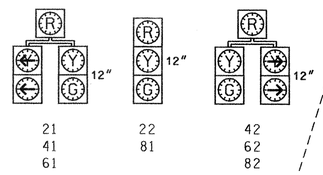
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

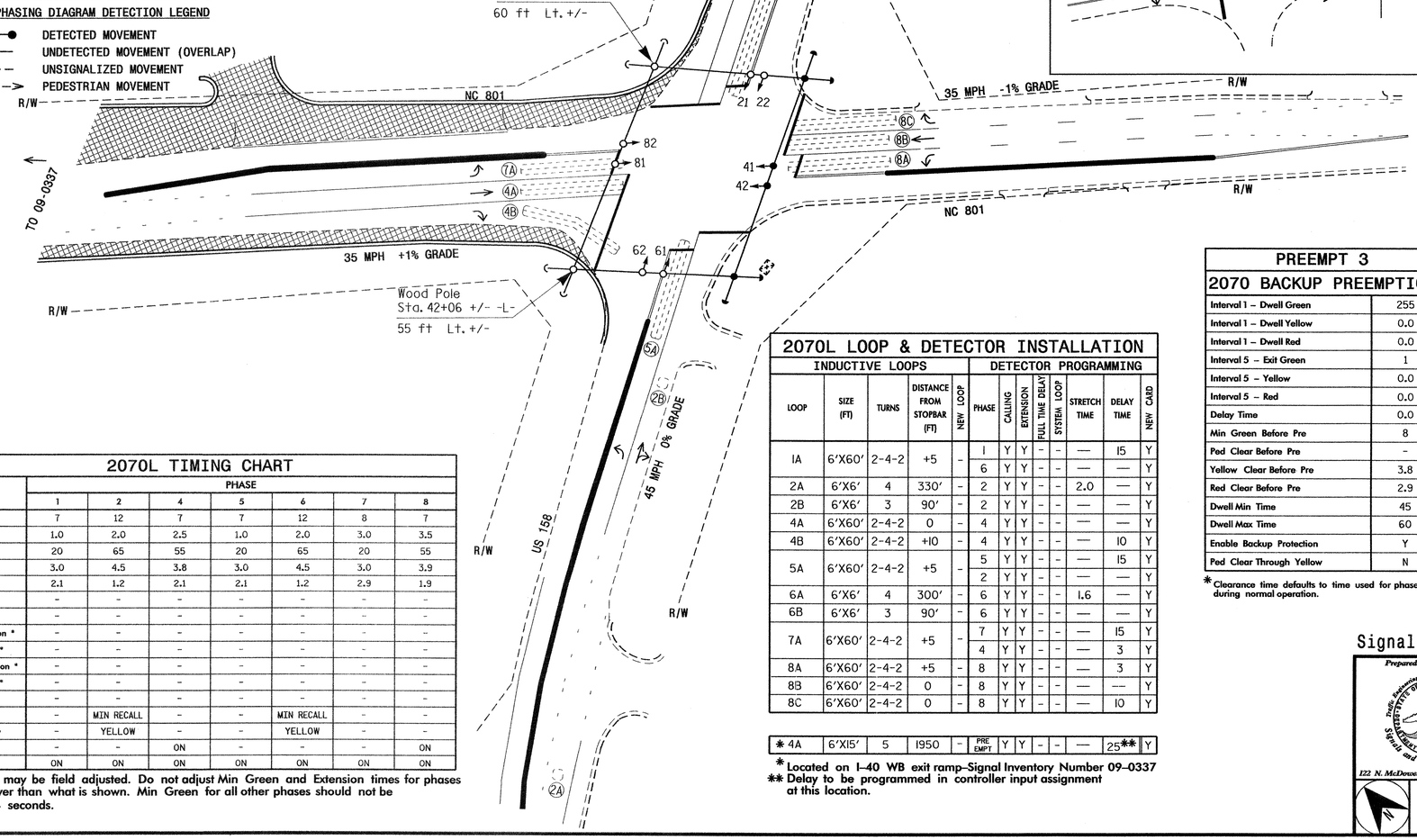
TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+7	04+8	PRE 3	FLASH
21	R	R	G	G	R	R	R	Y
22	R	R	G	G	R	R	R	Y
41	R	R	R	R	G	G	G	R
42	R	R	R	R	G	G	G	R
61	R	G	R	G	R	R	R	Y
62	R	G	R	G	R	R	R	Y
81	R	R	R	R	R	G	R	R
82	R	R	R	R	R	G	R	R

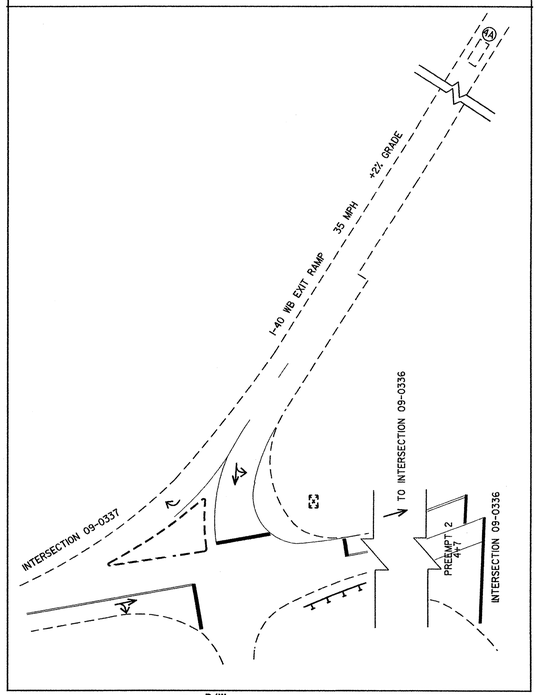
SIGNAL FACE I.D.

Denotes L.E.D.





NC 801 AT I-40 WEST BOUND EXIT RAMP (09-0337)



6 Phase with Backup Preemption Fully Actuated (NC 801 Hillsdale CLS)

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. Omit phase 1 during phase 2 on.
4. Omit phase 5 during phase 6 on.
5. Omit phase 7 during phase 8 on.
6. Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (see Electrical Details).
7. This location is interconnected with 09-0337. I-40 West Bound Ramps and NC 801. Backup Preemption at that location, when activated, will simultaneously activated both preempts at each location.
8. Set all detector units to presence mode.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Program Signal Heads Numbered 41 and 42 to clear to all red before going into preemption.
12. Closed loop system data: Controller Asset #0336.

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	
	Pavement Marking Arrow	
	Construction Zone	

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	7	8
Min Green 1 *	7	12	7	7	12	8	7
Extension 1 *	1.0	2.0	2.5	1.0	2.0	3.0	3.5
Max Green 1 *	20	65	55	20	65	20	55
Yellow Clearance	3.0	4.5	3.8	3.0	4.5	3.0	3.9
Red Clearance	2.1	1.2	2.1	2.1	1.2	2.9	1.9
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	-	-	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.

2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
1A	6'X60'	2-4-2	+5	-	1	Y	Y	-	-	—	15	Y
					6	Y	Y	-	-	—	—	Y
2A	6'X6'	4	330'	-	2	Y	Y	-	-	2.0	—	Y
2B	6'X6'	3	90'	-	2	Y	Y	-	-	—	—	Y
4A	6'X60'	2-4-2	0	-	4	Y	Y	-	-	—	—	Y
4B	6'X60'	2-4-2	+10	-	4	Y	Y	-	-	—	10	Y
5A	6'X60'	2-4-2	+5	-	5	Y	Y	-	-	—	15	Y
					2	Y	Y	-	-	—	—	Y
6A	6'X6'	4	300'	-	6	Y	Y	-	-	1.6	—	Y
6B	6'X6'	3	90'	-	6	Y	Y	-	-	—	—	Y
7A	6'X60'	2-4-2	+5	-	7	Y	Y	-	-	—	15	Y
					4	Y	Y	-	-	—	3	Y
8A	6'X60'	2-4-2	+5	-	8	Y	Y	-	-	—	3	Y
8B	6'X60'	2-4-2	0	-	8	Y	Y	-	-	—	—	Y
8C	6'X60'	2-4-2	0	-	8	Y	Y	-	-	—	10	Y
* 4A	6'X15'	5	1950	-	PRE EMPT	Y	Y	-	-	—	25**	Y

* Located on I-40 WB exit ramp-Signal Inventory Number 09-0337
** Delay to be programmed in controller input assignment at this location.

PREEMPT 3

2070 BACKUP PREEMPTION	
Interval 1 – Dwell Green	255
Interval 1 – Dwell Yellow	0.0 *
Interval 1 – Dwell Red	0.0 *
Interval 5 – Exit Green	1
Interval 5 – Yellow	0.0
Interval 5 – Red	0.0
Delay Time	0.0
Min Green Before Pre	8
Ped Clear Before Pre	-
Yellow Clear Before Pre	3.8
Red Clear Before Pre	2.9
Dwell Min Time	45
Dwell Max Time	60
Enable Backup Protection	Y
Ped Clear Through Yellow	N

* Clearance time defaults to time used for phase during normal operation.

Signal Upgrade - Temp (TCP - Phase I)

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 40 1"=40'

US 158
At
NC 801

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: I.O. Umozurike
PREPARED BY: Umozurike/Luhr REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY A. WILLIAMS

SIGNATURE 6/8/07 DATE

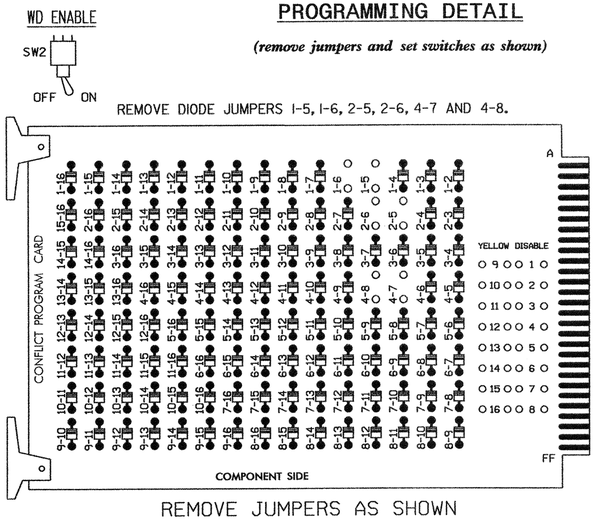
SIG. INVENTORY NO. 09-0336 T

25-JUN-2007 11:17
s:\traffic\signals\workgroups\ptp projects\b-3637\es(gnal files\09-0336\09-0336_sig_dsn_2007mmdd.dgn
jcoscarelle

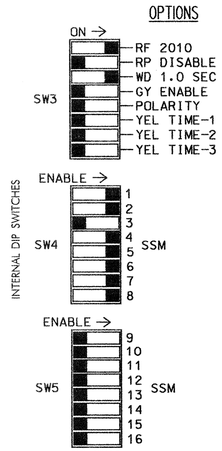
PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig. 35

EDI MODEL 2010ECL 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 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. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
3. Program controller to start up in phases 2 and 6 green.
4. Enable Simultaneous Gap-Out, on the 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 NC 801 Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....EAGLE TYPE 2070L
CABINET.....McCAIN/CONTROL TECHNOLOGIES
(DWG.NO.9500-332-NCDOT)
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S7,S8
PHASES USED.....1,2,4,5,6,7,8
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.	61,82	21,22	NU	NU	41,42	NU	21,42	61,62	NU	41,62	81,82	NU
RED	*	128			101		*	134		*	107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132			123		
GREEN ARROW	127						133			124		

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	Ø1	Ø2	SLOT	SLOT	Ø4	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
			1A	2A			4A								DC ISOLATOR
	L	EMPTY	Ø6	Ø2	EMPTY	EMPTY	Ø4	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST
			1A	2B			4B								DC ISOLATOR
FILE "J"	U	SLOT	Ø5	Ø6	SLOT	SLOT	Ø7	Ø8	Ø8	SLOT	SLOT	SLOT	PRE3	SLOT	SLOT
			5A	6A			7A	8A	8C				DC ISOLATOR		
	L	EMPTY	Ø2	Ø6	EMPTY	EMPTY	Ø4	Ø8	NOT USED	EMPTY	EMPTY	EMPTY	NOT USED	EMPTY	EMPTY
			5A	6B			7A	8B							

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

FS = FLASH SENSE
ST = STOP TIME
PRE3 = QUEUE PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A	TB2-9,10	I3U	63	25	32	2	Y	Y		20	
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
6A	TB3-9,10	J3U	64	26	36	6	Y	Y		16	
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A[3]	TB5-9,10	J6U	42	4	8	7	Y	Y			15
	TB5-11,12	J6L	46	8	18	4	Y	Y			3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			3
8B	TB7-3,4	J7L	79	41	48	8	Y	Y			
8C	TB7-5,6	J8U	50	12	28	8	Y	Y			10

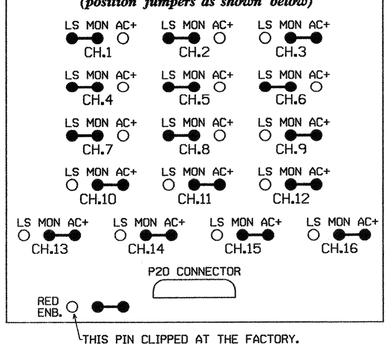
[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.
[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.
[3] Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0336 T
DESIGNED: May 2007
SEALED: 06-08-07
REVISED: N/A

RED MONITOR BOARD PROGRAMMING

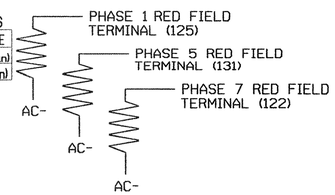
(position jumpers as shown below)



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.

Signal Upgrade - Temp - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Transportation Mobility and Safety Division
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

US 158
at
NC 801

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE DATE 6-26-07
SIG. INVENTORY NO. 09-0336 T

25-JUN-2007 14:29
s:\ts\traffic\signals\design\groups\sig mon\peterson\m090336_smu\ele_xxx.dgn
JTPETERSON

QUEUE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' until Preemption #3 is reached.

```
   PREEMPTION  #3  SETTINGS (NEXT:1-10)
INTERVAL/TIMING ¦  CLEAR/DWELL PHASES
  GRN YEL  RED  ¦123456789101112131415 16
1 255  0.0  0.0 ¦   X  X
2   0  0.0  0.0 ¦
3   0  0.0  0.0 ¦
4   0  0.0  0.0 ¦
5   1  0.0  0.0 ¦   X   X
EXIT CALLS      ¦
              OPTIONS
PRIORITY (Y/N TO SELECT) ............LOW
DELAY TIMER (0-255 SEC) .............0
MIN GREEN BEFORE PRE (0= DEFAULT)....8
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).3.8
RED CLEAR BEFORE PRE (0= DEFAULT)....2.9
DWELL MIN TIMER (0-255 SEC) .........45
DWELL MAX TIMER (0=OFF,1-255MIN) ....1
DWELL HOLD-OVER TIMER (0-255) .......0
LATCH CALL? .........................N
LINK TO NEXT PREEMPT? ...............N
ENABLE BACKUP PROTECTION? ...........Y
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES? ......N
PED CLEARANCE THROUGH YELLOW? .......N
INHIBIT OVERLAP GREEN EXTENSION? ....N
SERVICE DURING SOFTWARE FLASH? ......N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL? ...............N
ALLOW PEDS IN DWELL INTERVAL? .......N
RE-TIME DWELL INTERVAL? .............N
OVERLAPS:           ¦ ABCDEFGHIJKLMNOP
DWELL INT FLASH YELLOW ¦
OMIT OVERLAPS:      ¦
```

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Functions 1, 2 and 3.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
                 OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR       PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦ X
OMIT PHASES     ¦X
CALL PHASES     ¦   X
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
                 OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR       PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦     X
OMIT PHASES     ¦    X
CALL PHASES     ¦   X
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #03
                 OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR       PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦       X
OMIT PHASES     ¦      X
CALL PHASES     ¦
```

BACKUP PROTECTION PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0336 T
DESIGNED: May 2007
SEALED: 06-08-07
REVISED: N/A

Signal Upgrade - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Transportation Mobility and Safety Division
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

US 158
at
NC 801

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: JTR
PREPARED BY: James Peterson REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

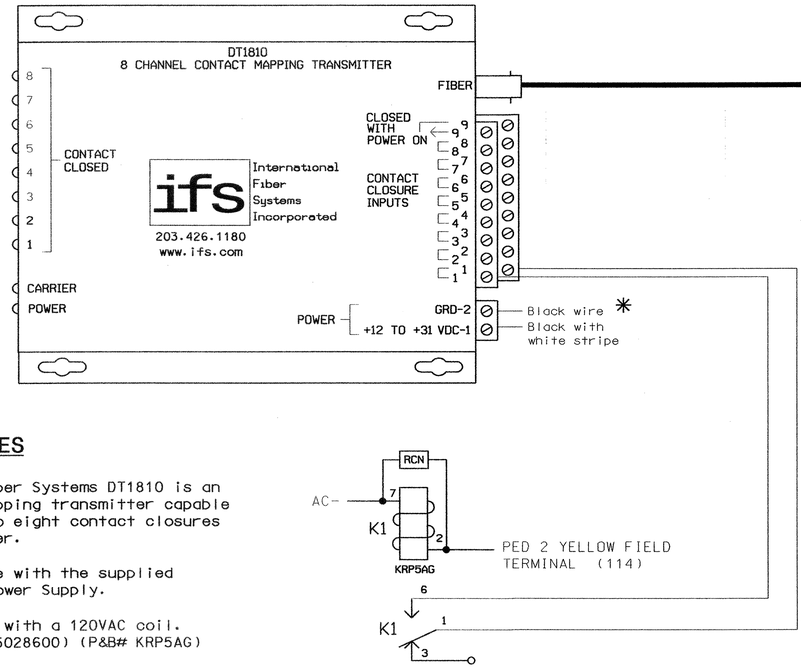
John T. Rowe, Jr. 6-6-07
SIGNATURE DATE

SIG. INVENTORY NO. 09-0336 T

26-JUN-2007 13:34
$wdgn$ $cnfg$ $level$ $workspaces$ $owner$ $dgnfile$.dgn
jtpeterson

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.37

FIBER OPTIC TRANSMITTER WIRING FOR 09-0337



NOTES

1. The International Fiber Systems DT1810 is an 8-channel contact mapping transmitter capable of transmitting up to eight contact closures over one optical fiber.

* 2. Power connections are with the supplied 12 Volt DC Plug-in Power Supply.

3. Relay 'K1' is a DPST with a 120VAC coil. (DOT Material No. 625028600) (P&B# KRP5AG)

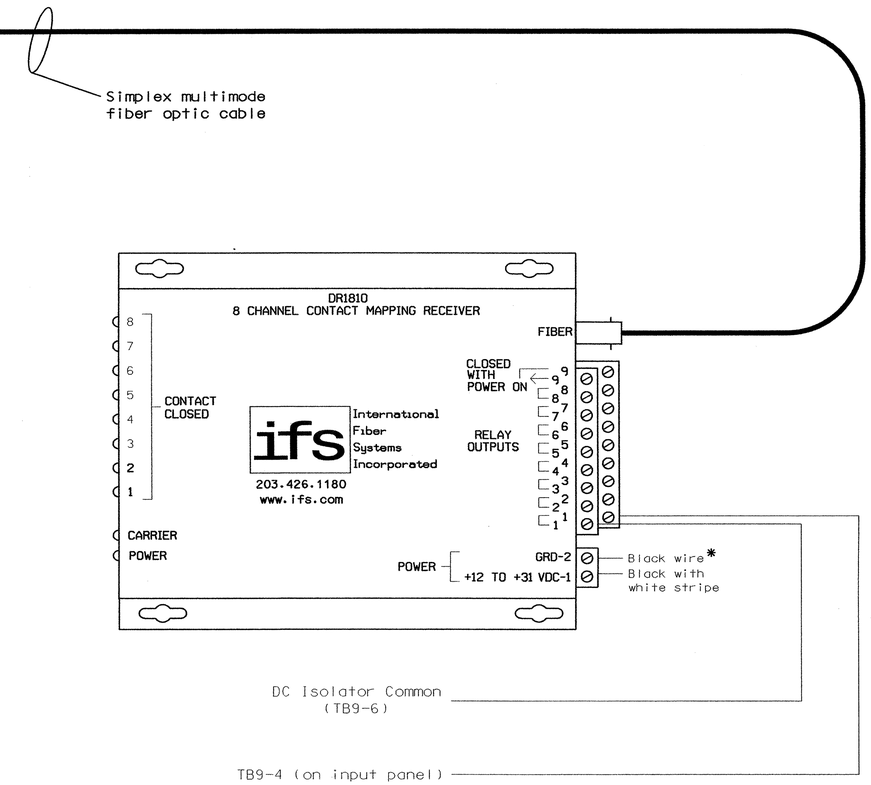
4. RCN is valued at .1 microFarad, 100 Ohm. (DOT Material No. 106018075)

PROGRAMMING NOTES FOR 09-0337

In order for the queue preempt call to be relayed to 09-0336, make the following programming changes to Output No. 33 in the controller for 09-0337:

1. Change the function of C1 pin 35 to be an output for the queue preempt. This is accomplished by the following:
   - A) From Main Menu select '6' (Outputs). Then select '1' (Output Assignments).
   - B) Scroll to C1 pin 35, Output No. 33. You will see that it is not enabled.
   - C) Scroll down to Preempt and input 'YES'. You will then be asked for a preempt number. Enter the controller preempt number used for the queue preempt here.
   - D) The output is now assigned for Queue Peempt Active output.
2. If field terminal 114 has a conflict monitor wire attached, remove, tape, and label wire.
3. To prevent a 'phantom' (or false) conflict, install a load resistor on field terminal 115 (Ped 2 Walk).
4. Install a loadswitch in Output File Slot S2P.

FIBER OPTIC RECEIVER WIRING FOR 09-0336



NOTES

1. The International Fiber Systems DR1810 is an 8-channel contact mapping receiver capable of sensing contact closures from a DT1810 transmitter over fiber optic cable up to 2.5 miles away.

* 2. Power connections are with the supplied 12 Volt DC Plug-in Power Supply.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 09-0336 T
DESIGNED: May 2007
SEALED: 06-08-07
REVISED: N/A

Signal Upgrade - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

US 158 at NC 801

Division 09 | Davie County | Hillsdale

PLAN DATE: MAY 2006 | REVIEWED BY: JTR
PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
John T. Rowe, Jr. 6-26-07
SIGNATURE DATE
SIG. INVENTORY NO. 09-0336 T

25-JUN-2007 14:39
s:\its signals\workgroups\sig man\peterson\090336_sm_ele_xxx.dgn
JTPETERSON

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.38

PHASING DIAGRAM

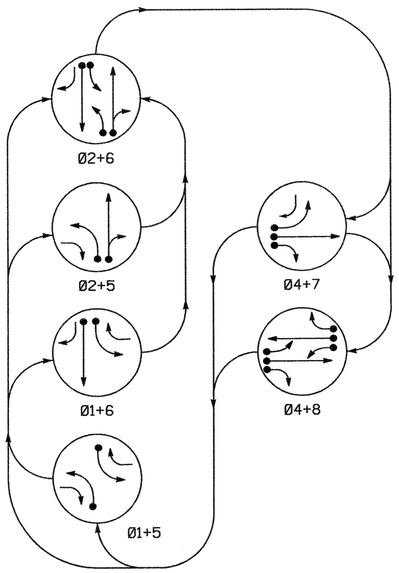


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+7	04+8	FLASH
21	↘R	R	↘G	G	R	R	Y
22	R	R	G	G	R	R	Y
41	R	R	R	R	↘G	G	R
42	R↗	R	R↗	R	G	G	R
61	↘R	↘G	R	G	R	R	Y
62	R	G	R	G	R↗	R	Y
81	R	R	R	R	R	G	R
82	R↗	R↗	R	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.

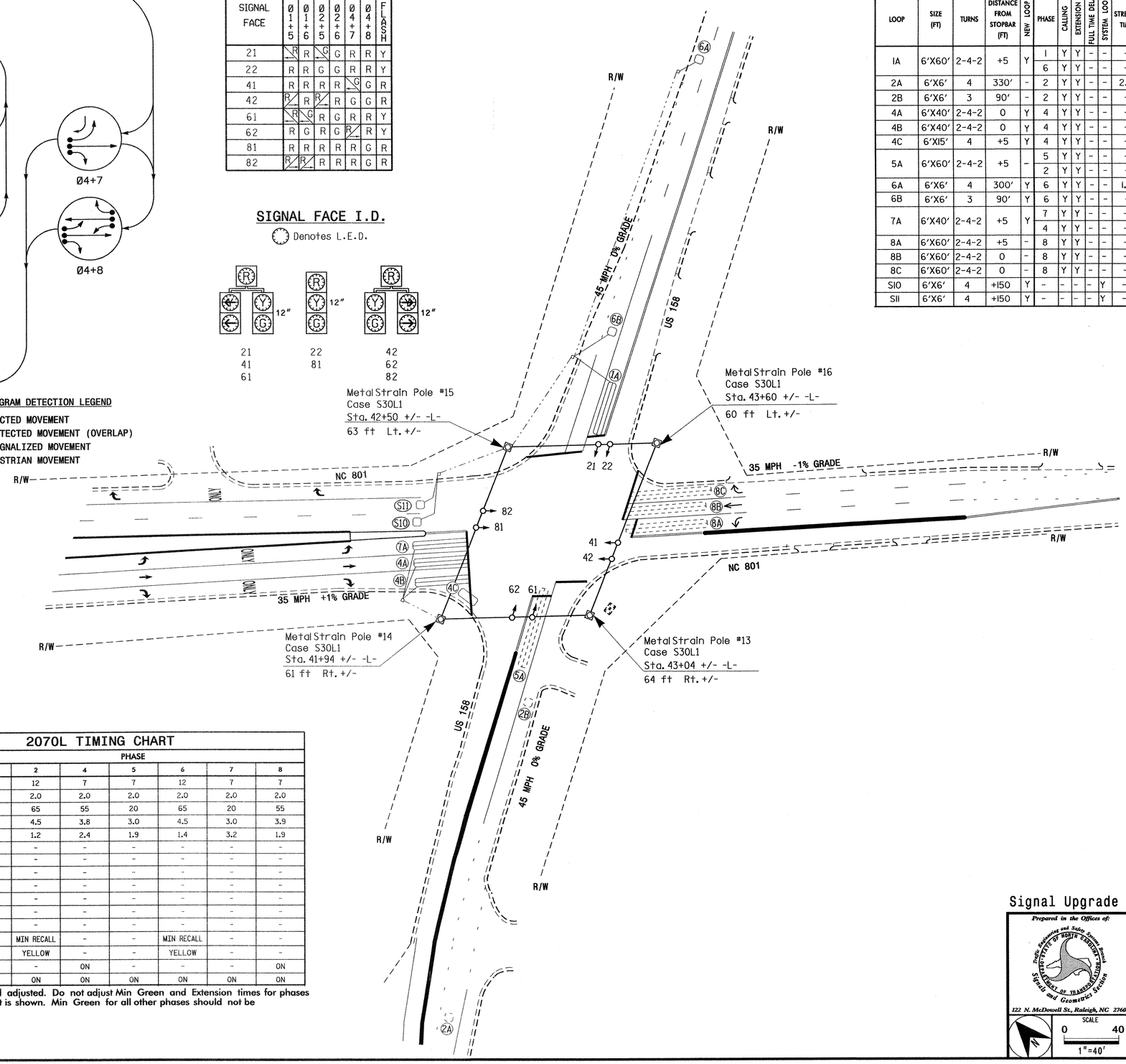
2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
IA	6'X60'	2-4-2	+5	Y	1	Y	Y	-	-	-	15	-
					6	Y	Y	-	-	-	-	-
2A	6'X6'	4	330'	-	2	Y	Y	-	-	2.0	-	-
2B	6'X6'	3	90'	-	2	Y	Y	-	-	-	-	-
4A	6'X40'	2-4-2	0	Y	4	Y	Y	-	-	-	-	-
4B	6'X40'	2-4-2	0	Y	4	Y	Y	-	-	-	15	-
4C	6'X15'	4	+5	Y	4	Y	Y	-	-	-	20	Y
5A	6'X60'	2-4-2	+5	-	5	Y	Y	-	-	-	15	-
					2	Y	Y	-	-	-	-	-
6A	6'X6'	4	300'	Y	6	Y	Y	-	-	1.6	-	-
6B	6'X6'	3	90'	Y	6	Y	Y	-	-	-	-	-
7A	6'X40'	2-4-2	+5	Y	7	Y	Y	-	-	-	15	-
					4	Y	Y	-	-	-	3	-
8A	6'X60'	2-4-2	+5	-	8	Y	Y	-	-	-	3	-
8B	6'X60'	2-4-2	0	-	8	Y	Y	-	-	-	-	-
8C	6'X60'	2-4-2	0	-	8	Y	Y	-	-	-	15	-
S10	6'X6'	4	+150	Y	-	-	-	-	Y	-	-	Y
S11	6'X6'	4	+150	Y	-	-	-	-	Y	-	-	Y

6 Phase
Fully Actuated
(NC 801 Hillsdale CLS)

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. Omit phase 1 during phase 2 on.
4. Omit phase 5 during phase 6 on.
5. Omit phase 7 during phase 8 on.
6. Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (see Electrical Details).
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. Closed loop system data: Controller Asset #0336.



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	
	Directional Arrow	
	Pavement Marking Arrow	
	Metal Strain Pole	

2070L TIMING CHART

FEATURE	PHASE 1	2	4	5	6	7	8
Min Green 1 *	7	12	7	7	12	7	7
Extension 1 *	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Max Green 1 *	20	65	55	20	65	20	55
Yellow Clearance	3.0	4.5	3.8	3.0	4.5	3.0	3.9
Red Clearance	2.6	1.2	2.4	1.9	1.4	3.2	1.9
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	-	-	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 - Final

Prepared in the Offices of:
Traffic Safety Systems Branch
Signal and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 40 1"=40'

US 158
At
NC 801

Division 09 Davie County Hillsdale

PLAN DATE: May 2007 REVIEWED BY: I.O. Umozurike
PREPARED BY: Umozurike/Luhr REVIEWED BY:

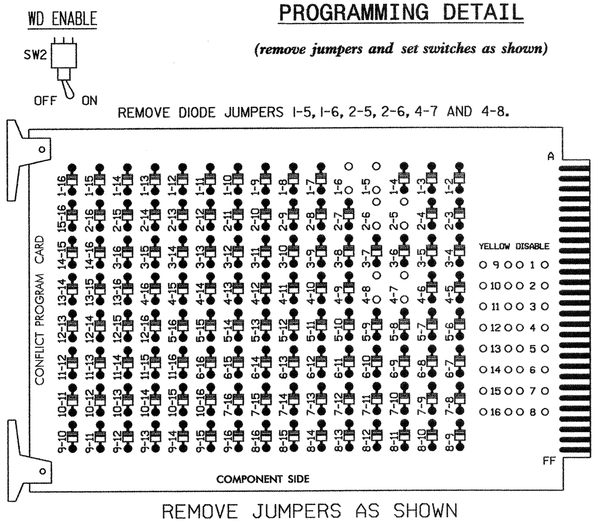
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY J. WILLIAMS
SIGNATURE 6/8/07. DATE
SIG. INVENTORY NO. 09-0336

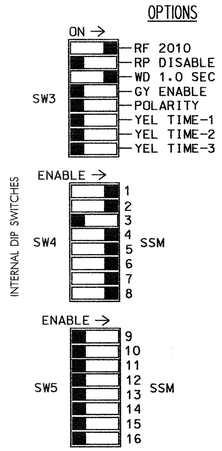
09-JUN-2007 16:29
s:\traffic\signals\workgroups\tip projects\b-3637\signal files\09-0336\09-0336_sig_dsn_2007mod1.dgn
tcumozurike

EDI MODEL 2010ECL 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 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. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
3. Program controller to start up in phases 2 and 6 green.
4. Enable Simultaneous Gap-Out, on the 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 NC 801 Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....EAGLE TYPE 2070L
CABINET.....McCAIN/CONTROL TECHNOLOGIES
(DWG.NO.9500-332-NCDOT)
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S7,S8
PHASES USED.....1,2,4,5,6,7,8
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.	61,82	21,22	NU	NU	41,42	NU	21,42	61,62	NU	41,62	81,82	NU
RED	*	128			101		*	134		*	107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126						132			123		
GREEN ARROW	127						133			124		

NU = Not Used

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

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

1. From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Functions 1, 2 and 3.
2. From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

```
DYNAMIC/BACKUP CONTROL FUNCTION #01
          OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR       PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦ X
OMIT PHASES     ¦X
CALL PHASES     ¦   X
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #02
          OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR       PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦     X
OMIT PHASES     ¦    X
CALL PHASES     ¦   X
```

PRESS 'NEXT'

```
DYNAMIC/BACKUP CONTROL FUNCTION #03
          OVERLAPS:¦ABCDEFGHIJKLMNOP
IF OVERLAPS ARE ACTIVE ¦
OR       PHASES:¦123456789101112131415 16
IF PHASES ARE ON¦       X
OMIT PHASES     ¦      X
CALL PHASES     ¦
```

BACKUP PROTECTION 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	Ø1	Ø2	SLOT	SLOT	Ø4	Ø4	SLOT	SYS. DET. S1Ø	SLOT	SLOT	SLOT	SLOT	FS
		EMPTY	1A	2A	EMPTY	EMPTY	4A	4C	EMPTY		EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR
	L		Ø6	Ø2			Ø4	NOT USED		SYS. DET. S11					ST
			1A	2B			4B								DC ISOLATOR
FILE "J"	U	SLOT	Ø5	Ø6	SLOT	SLOT	Ø7	Ø8	Ø8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
		EMPTY	5A	6A	EMPTY	EMPTY	7A	8A	8C	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY
	L		Ø2	Ø6			Ø4	Ø8	NOT USED						
			5A	6B			7A	8B							

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

FS = FLASH SENSE
ST = STOP TIME
PRE3 = QUEUE PREEMPT

INPUT FILE CONNECTION & PROGRAMMING CHART

INPUT FILE CONNECTION & PROGRAMMING CHART

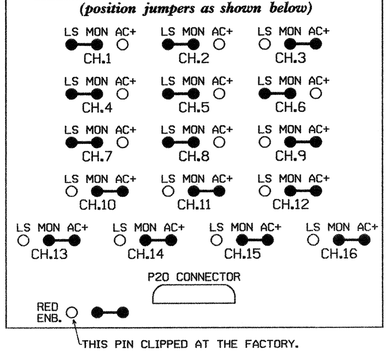
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-5,6	I2U	39	1	2	1	Y	Y			15
	TB2-7,8	I2L	43	5	12	6	Y	Y			
2A	TB2-9,10	I3U	63	25	32	2	Y	Y		2.0	
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			20
* S10	TB6-9,10	I9U	60	22	11	SYS					
* S11	TB6-11,12	I9L	62	24	13	SYS					
5A[2]	TB3-5,6	J2U	40	2	6	5	Y	Y			15
	TB3-7,8	J2L	44	6	16	2	Y	Y			
6A	TB3-9,10	J3U	64	26	36	6	Y	Y		1.6	
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A[3]	TB5-9,10	J6U	42	4	8	7	Y	Y			15
	TB5-11,12	J6L	46	8	18	4	Y	Y			3
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			3
8B	TB7-3,4	J7L	79	41	48	8	Y	Y			
8C	TB7-5,6	J8U	50	12	28	8	Y	Y			15

[1] Add jumpers from TB2-5 to TB2-7, and from TB2-6 to TB2-8.
[2] Add jumpers from TB3-5 to TB3-7, and from TB3-6 to TB3-8.
[3] Add jumpers from TB5-9 to TB5-11, and from TB5-10 to TB5-12.
* 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

RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)

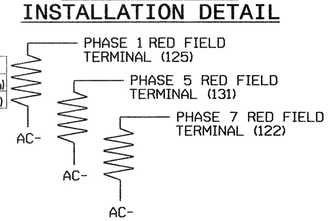


THIS PIN CLIPPED AT THE FACTORY.

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 09-0336
DESIGNED: May 2007
SEALED: 06-08-07
REVISED: N/A

Signal Upgrade - Final

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

US 158
at
NC 801

Division 09 Davie County Hillsdale

PLAN DATE: May 2007	REVIEWED BY: JTR		
PREPARED BY: James Peterson	REVIEWED BY:		
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 6-26-07 DATE
SIG. INVENTORY NO. 09-0336

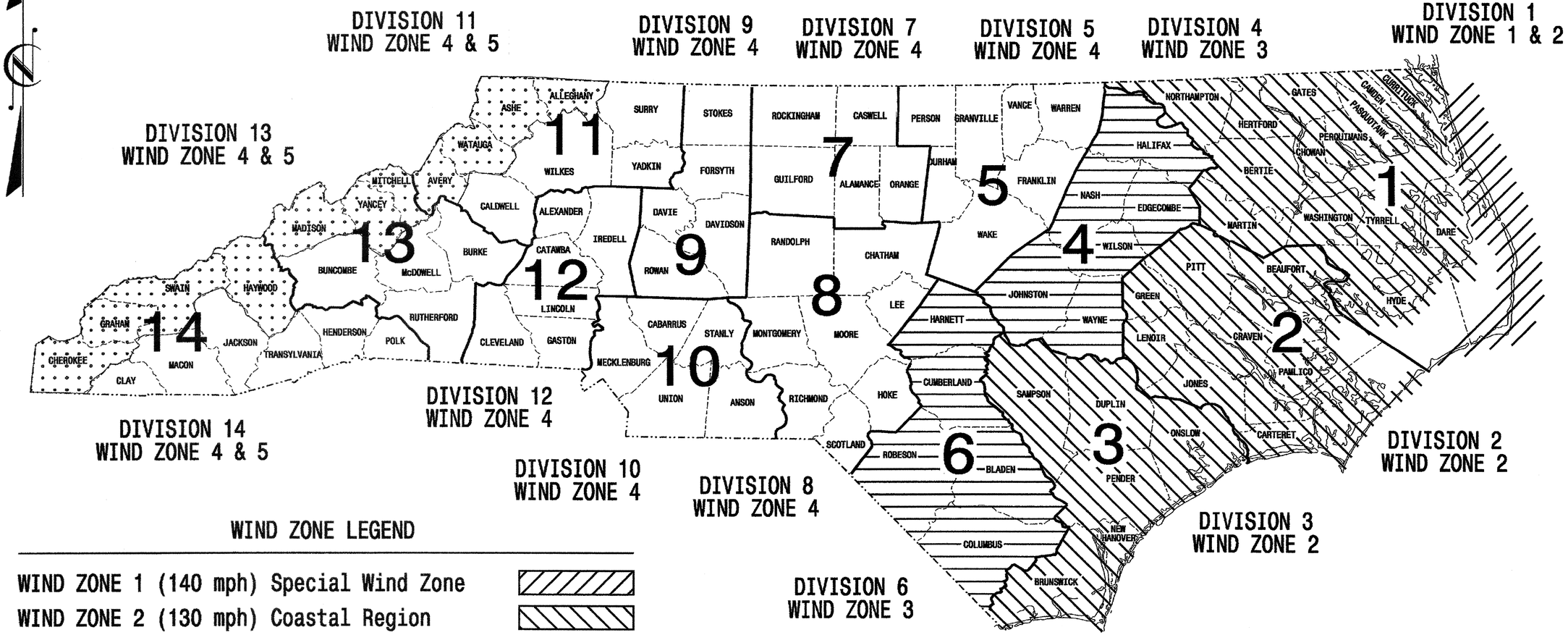
20-JUN-2007 12:01
s:\traffic\signalsworkgroups\sig mon\petersonM09336_smlele_xxxx.dgn
jtpeterson

STATE	PROJECT NO.	SHEET NO.
N.C.	B-3637	Sig. 40
F. A. PROJ. NO.		M 1
PROJECT ID. NO.		

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR METAL POLES

NCDOT METAL POLE STANDARDS



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:

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

G. A. Fuller, P.E. – State ITS and Signals Engineer
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

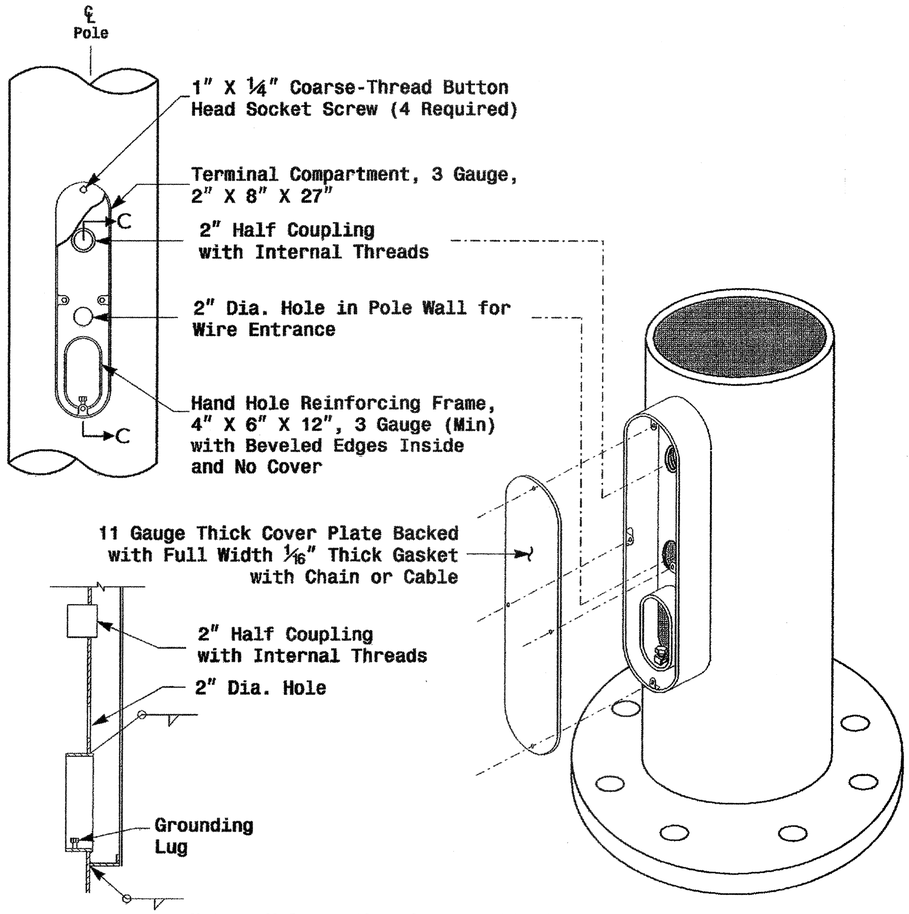
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

PROJECT REFERENCE NO. B-3637 | SHEET NO. Sig. 41 M 2

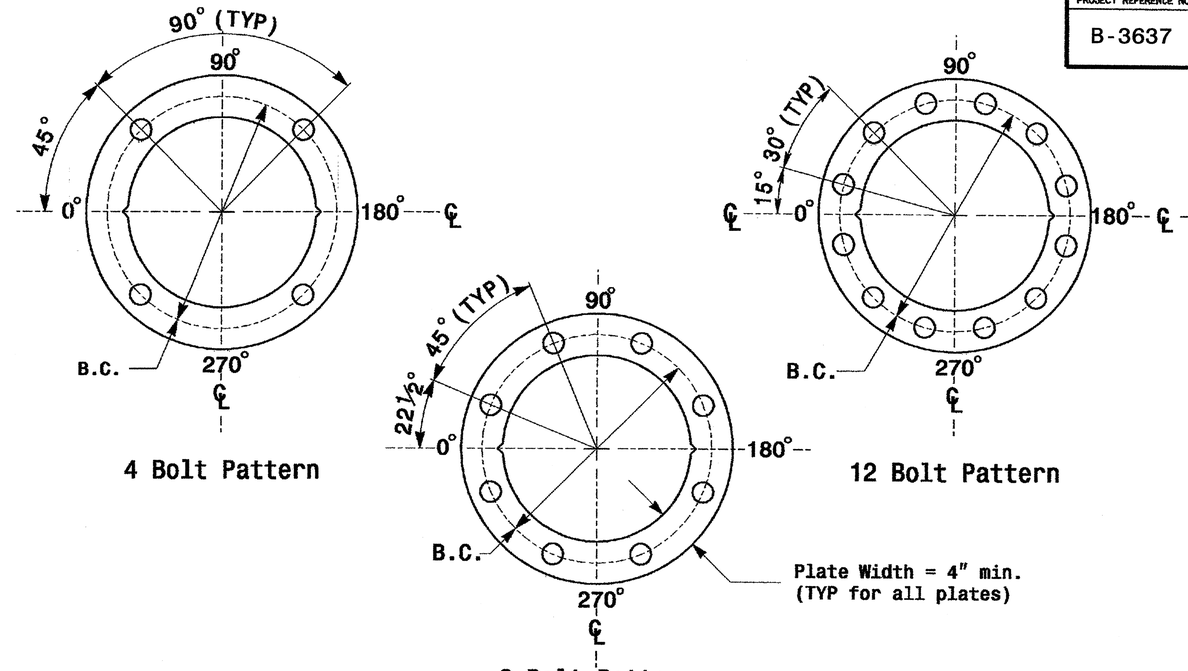
Fabrication Details – All Poles



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



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

Base Plate Template and Anchor Bolt Lock Plate Details

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 _____

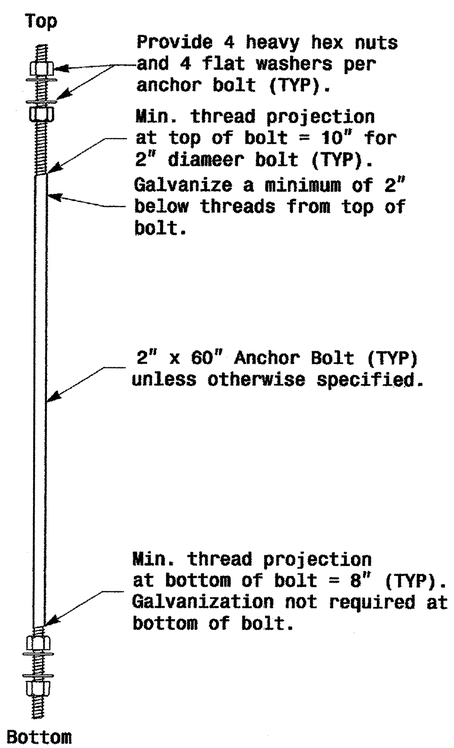
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

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)

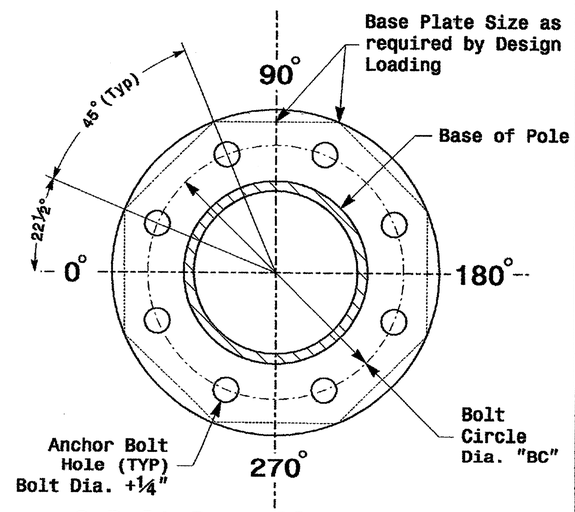
Notes:
1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
2) A.B. = Anchor Bolt
3) B.C. = Bolt Circle of Anchor Bolts
4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
5) See drawing M4 for mounting positions of I.D. tags.

Identification Tag Details



Anchor Bolt Detail

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



8 Bolt Base Plate Detail

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

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.M. Esposito

SCALE 0 NA NONE

REVISIONS	INIT.	DATE

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

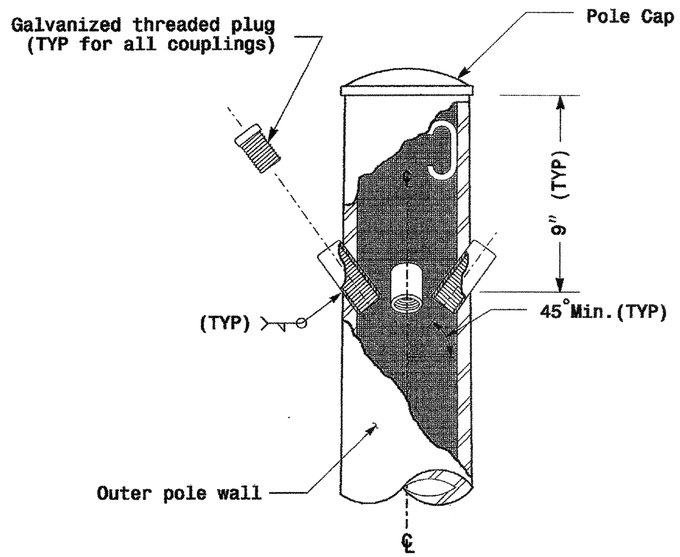
D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

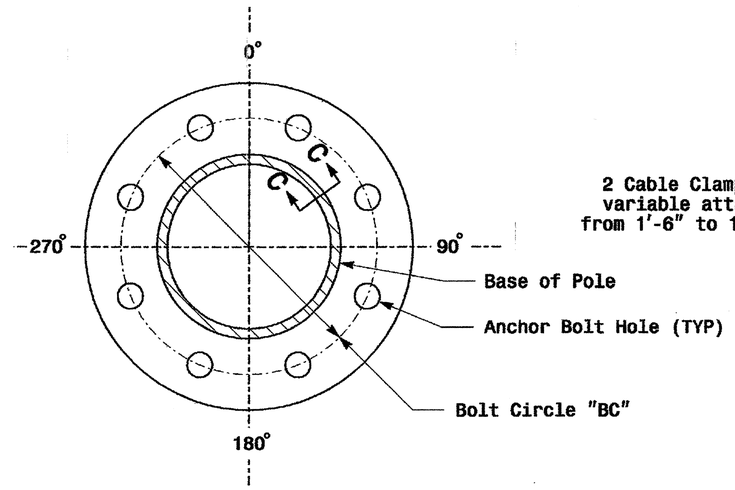
01-SEP-2005 18:22
D:*2004 Metal Pole Standards*2004 m2 thru m5.dgn
candrews

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.42 M 3

Fabrication Details – Strain Poles



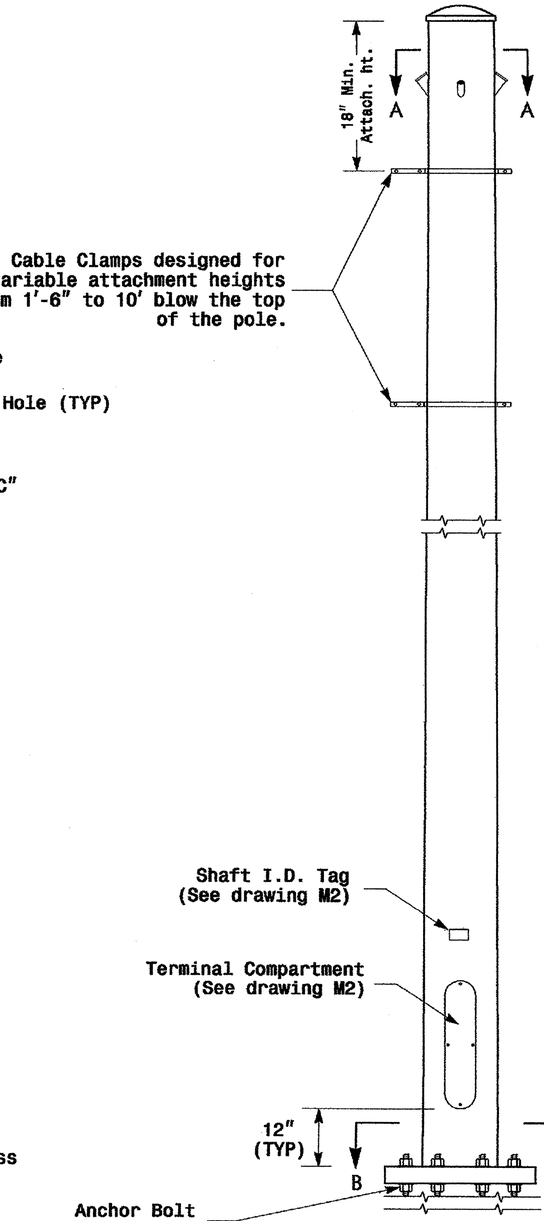
Cable Entrances at Top of Pole



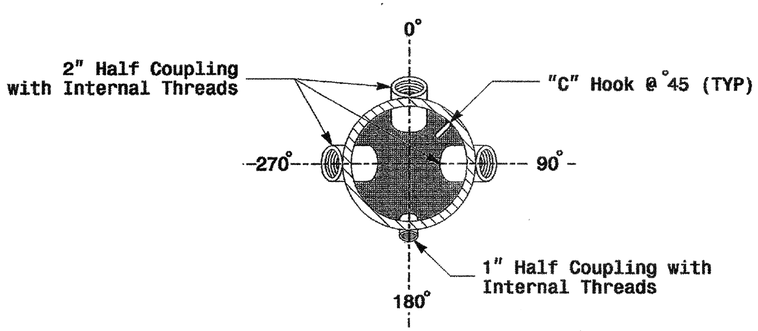
Section B-B

(See drawing M2)

Pole Base Plate

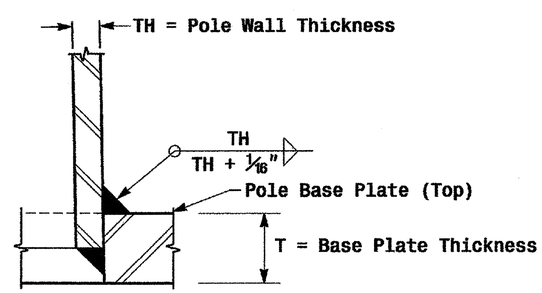


Monotube Strain Pole
(.14"/Foot Taper)



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:
Traffic Engineering and Safety Systems Branch
Transportation Mobility and Safety Division
Department of Transportation
Traffic Engineering and Safety Systems Branch
122 N. McDonald St., Raleigh, NC 27603

SCALE: 0 NA — NONE

Typical Fabrication Details For Strain Poles

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

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

01-SEP-2005 14:07
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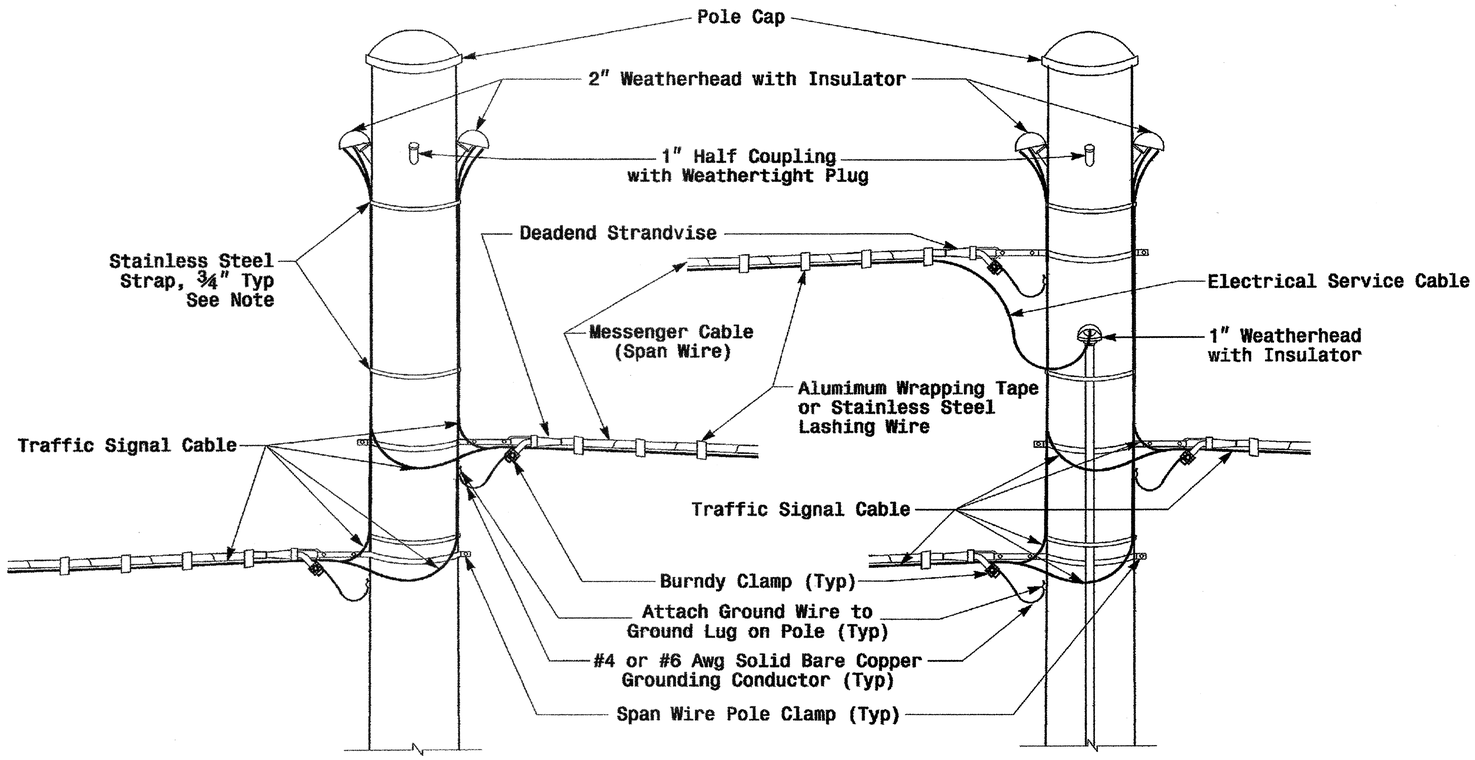
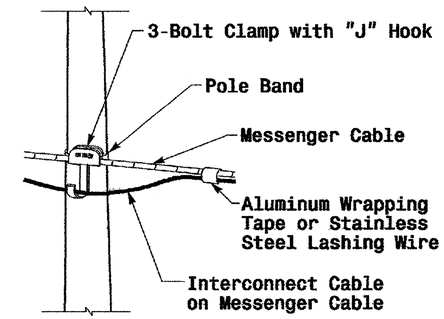
pl alexander

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.43 M 6

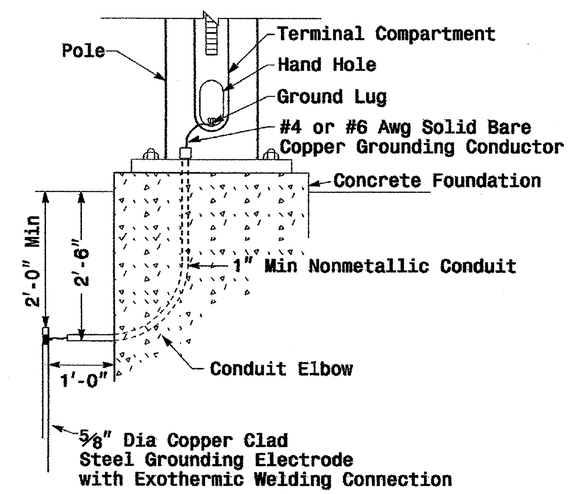


Note: Strap all signal cables to the side of the pole with ¾" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail

Construction Details – Strain Poles

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

SCALE 0 NA NONE

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

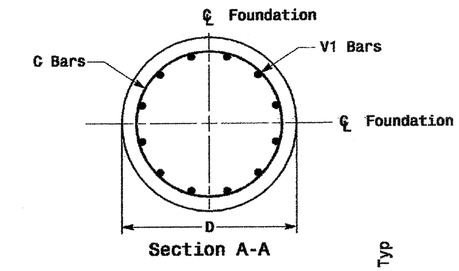
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 016286 ENGINEER MILTON L. DEAN
Milton L. Dean 9-1-05
SIGNATURE DATE
SIG. INVENTORY NO.

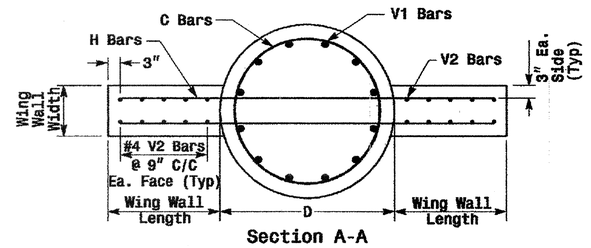
01-SEP-2005 16:33
w:\peoples-unit\workgroups\2004 metal pole standards\2004 m6.dgn
palexander

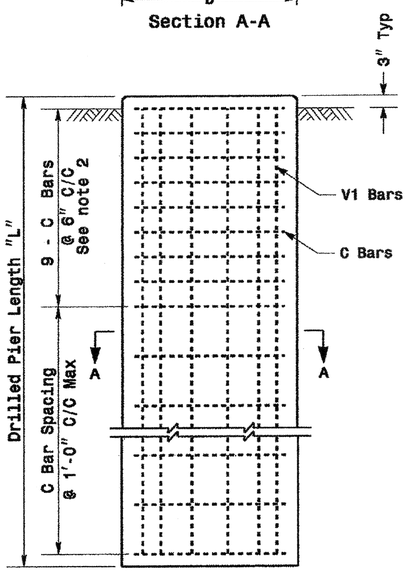
PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.44 M 7

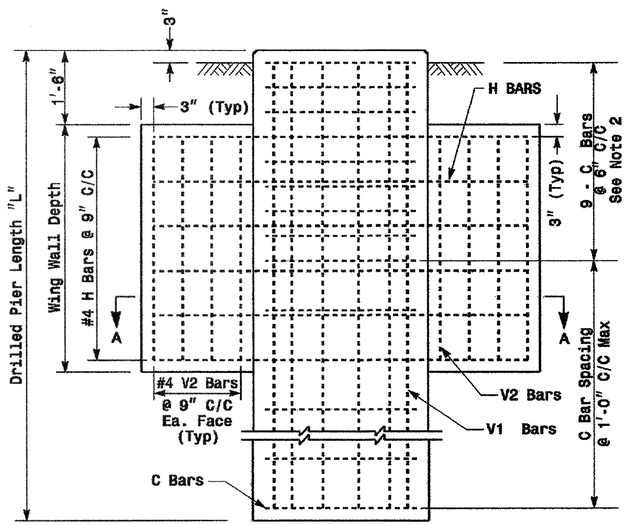
Construction Details – Foundations

Reinforcing Steel Bars







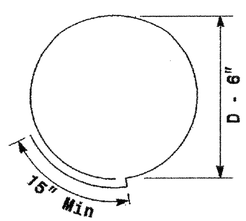


REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (42" & 48" DIAMETER)						
Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* 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



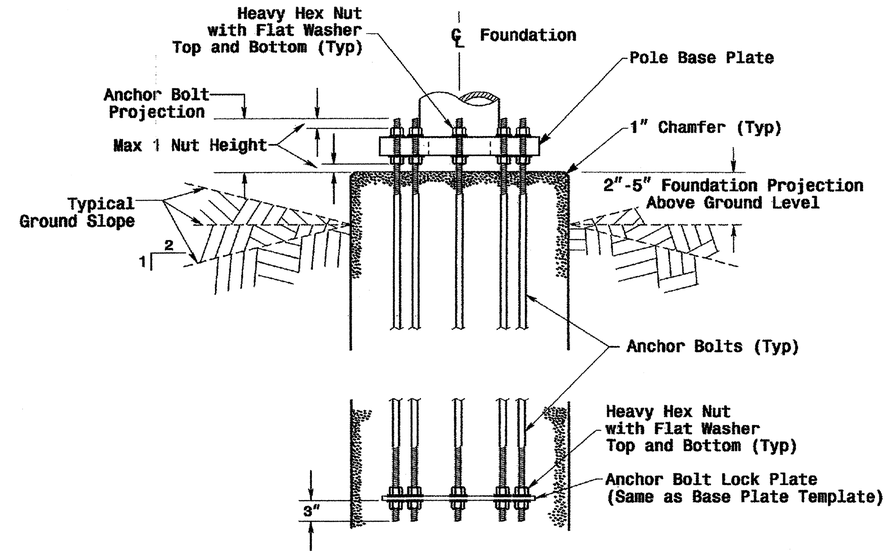
Typical "C" Bars

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

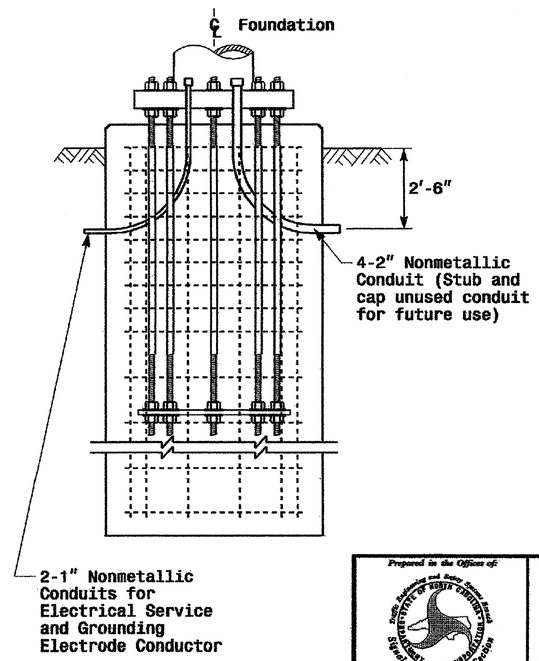
See Note No. 4

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: Structure and Safety Evaluation Section, Structures Management Unit, Division of Highways, Department of Transportation, State of North Carolina
122 N. McDowell St., Raleigh, NC 27603

Construction Details Foundations

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

SIG. INVENTORY NO.

01-SEP-2005 17:48
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palexander

PROJECT REFERENCE NO.	SHEET NO.
B-3637	Sig.45 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 Safety Evaluation Unit, Geotechnical Section, Division of Highways, Department of Transportation
122 N. McDowell St., Raleigh, NC 27603

SCALE: 0 NA — None

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

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

D. Sarkar 9.2.2005
SIGNATURE DATE

02-SEP-2005 12:42
v:\pseplas-unit\workgroups\2004 metal pole standards\2004 ms std strain pole.dgn
$$$$USERNAME$

PROJECT REFERENCE NO.	SHEET NO.
B-3637	S16.46

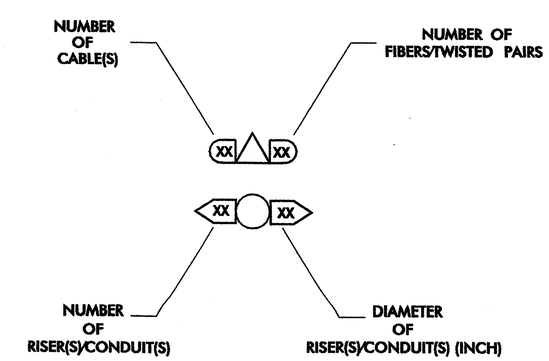
1. INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2. INSTALL REA, PE – 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
3. INSTALL REA, PE – 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP 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 STUB-OUTS
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 AND MESSENGER CABLE
49. REMOVE EXISTING MESSENGER 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

- FO — NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR — NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI — EXISTING COMMUNICATIONS CABLE
- REM — EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD — NEW DIRECTIONAL DRILLED CONDUIT
- B&J — NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- 8 — AERIAL SPLICE ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV 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)



Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

CONSTRUCTION NOTES

PLAN DATE:	REVIEWED BY:
PREPARED BY:	REVIEWED BY: G. A. FULLER

SCALE: 0

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

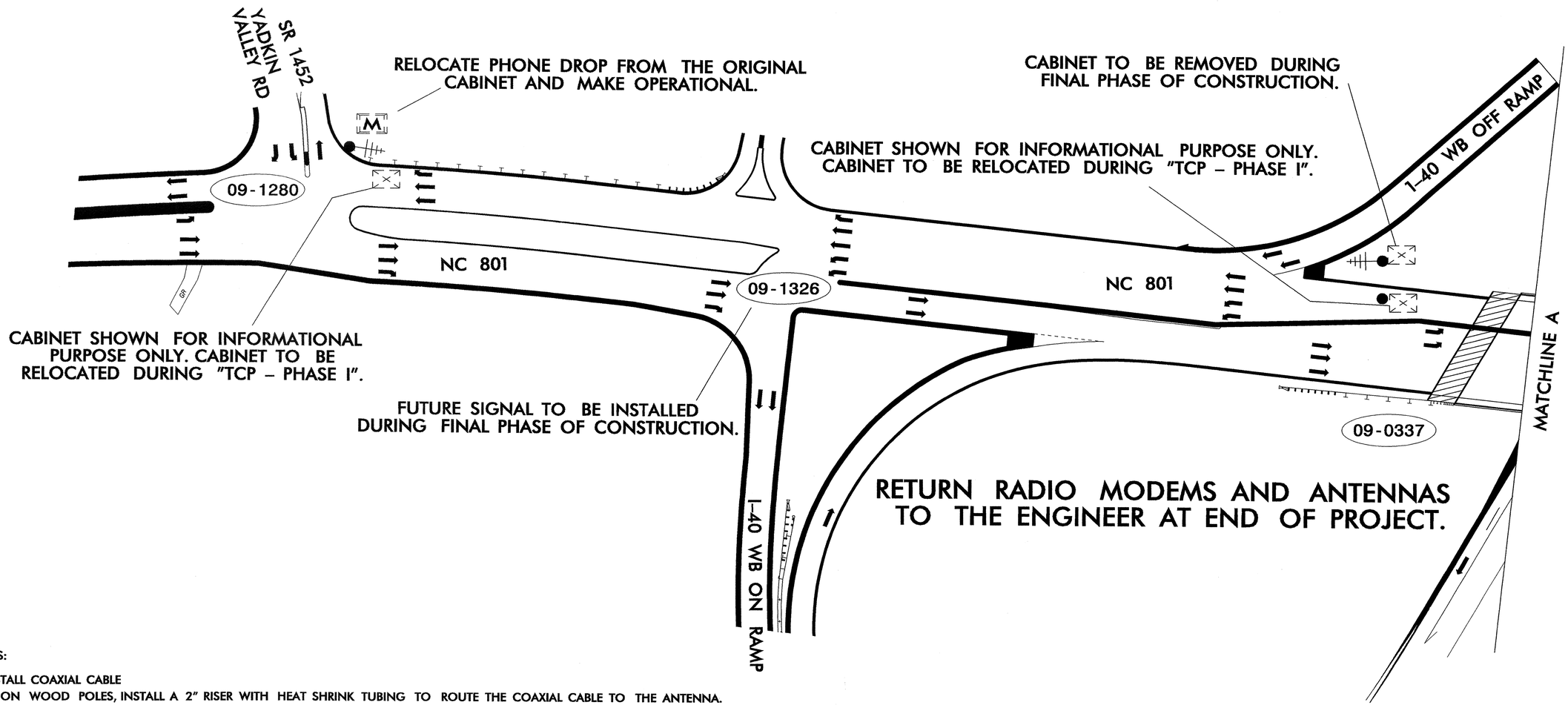
Gregory A. Fuller 10/31/02
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
B-3637	SIG. 47

NOTE TO CONTRACTOR:

1) DURING "TCP – PHASE I" AFTER THE CABINETS ARE RELOCATED, INSTALL THE RADIO SYSTEM TO ESTABLISH COMMUNICATIONS DURING PROJECT CONSTRUCTION.
2) REMOVE EXISTING FIBER OPTIC COMMUNICATIONS CABLE DURING THIS PHASE OF CONSTRUCTION AS INDICATED IN THE FINAL PLANS.



NOTES:

1. INSTALL COAXIAL CABLE
   A. ON WOOD POLES, INSTALL A 2" RISER WITH HEAT SHRINK TUBING TO ROUTE THE COAXIAL CABLE TO THE ANTENNA.
   B. ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
   C. ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND REPLACE THE WEATHERHEAD WITH HEAT SHRINK TUBING AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
   D. BETWEEN THE POINT OF EXITING THE METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
2. IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
3. INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER.
4. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES AS PER THE NESC.
5. INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET.
6. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

"TCP – PHASE I"

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

WIRELESS COMMUNICATION PLANS ALONG NC 801

DIVISION 09 DAVIE CO. HILLSDALE

PLAN DATE:	MAY 2007	REVIEWED BY:	
PREPARED BY:	I. N. AVERY	REVIEWED BY:	S. WARDLE

SCALE 0

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

SIGNATURE 6-5-07 DATE

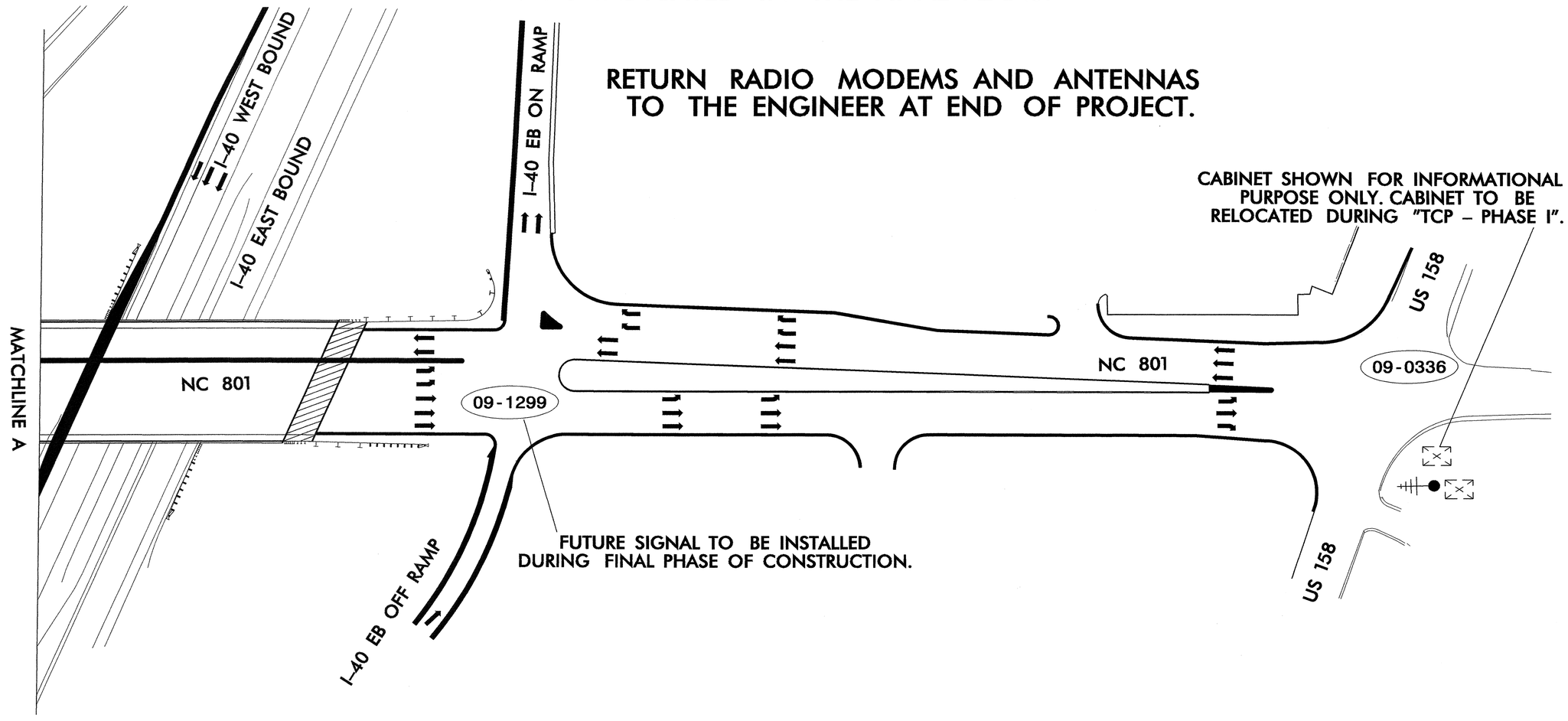
CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
B-3637	S16.48

NOTE TO CONTRACTOR:

1) DURING "TCP – PHASE I" AFTER THE CABINETS ARE RELOCATED, INSTALL THE RADIO SYSTEM TO ESTABLISH COMMUNICATIONS DURING PROJECT CONSTRUCTION.

2) REMOVE EXISTING FIBER OPTIC COMMUNICATIONS CABLE DURING THIS PHASE OF CONSTRUCTION AS INDICATED IN THE FINAL PLANS.



NOTES:

1. INSTALL COAXIAL CABLE
   A. ON WOOD POLES, INSTALL A 2" RISER WITH HEAT SHRINK TUBING TO ROUTE THE COAXIAL CABLE TO THE ANTENNA.
   B. ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
   C. ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND REPLACE THE WEATHERHEAD WITH HEAT SHRINK TUBING AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
   D. BETWEEN THE POINT OF EXITING THE METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
2. IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
3. INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER.
4. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES AS PER THE NESC.
5. INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET.
6. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

"TCP – PHASE I"

Prepared in the Offices of:
State Engineering and Safety Services Unit
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

WIRELESS COMMUNICATION PLANS ALONG NC 801

DIVISION 09 DAVIE CO. HILLSDALE

PLAN DATE:	MAY 2007	REVIEWED BY:	
PREPARED BY:	I. N. AVERY	REVIEWED BY:	S. WARDLE

SCALE 0

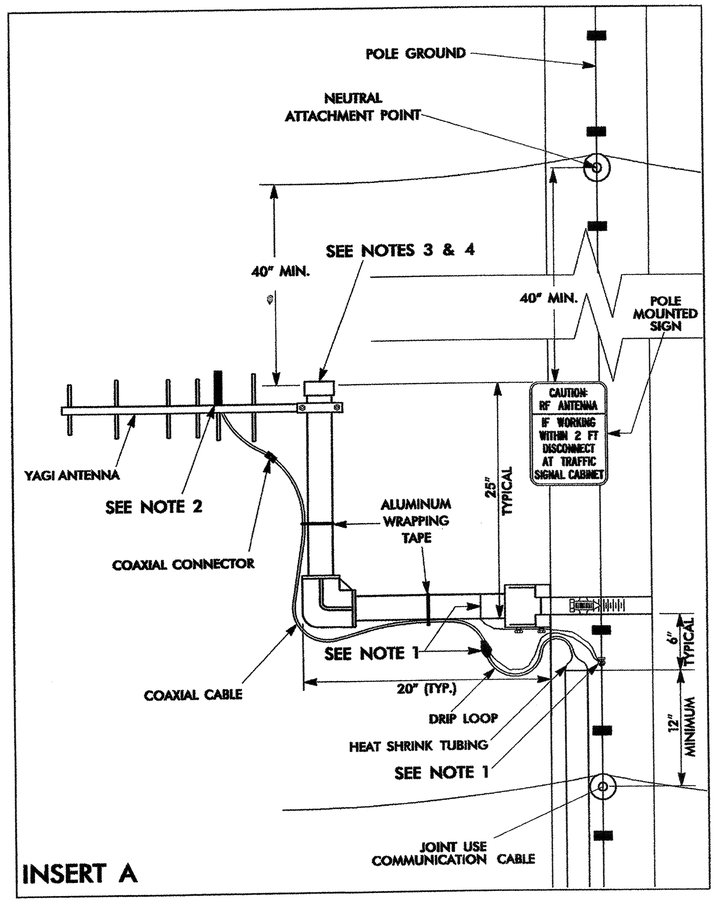
REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MUNN, JR.

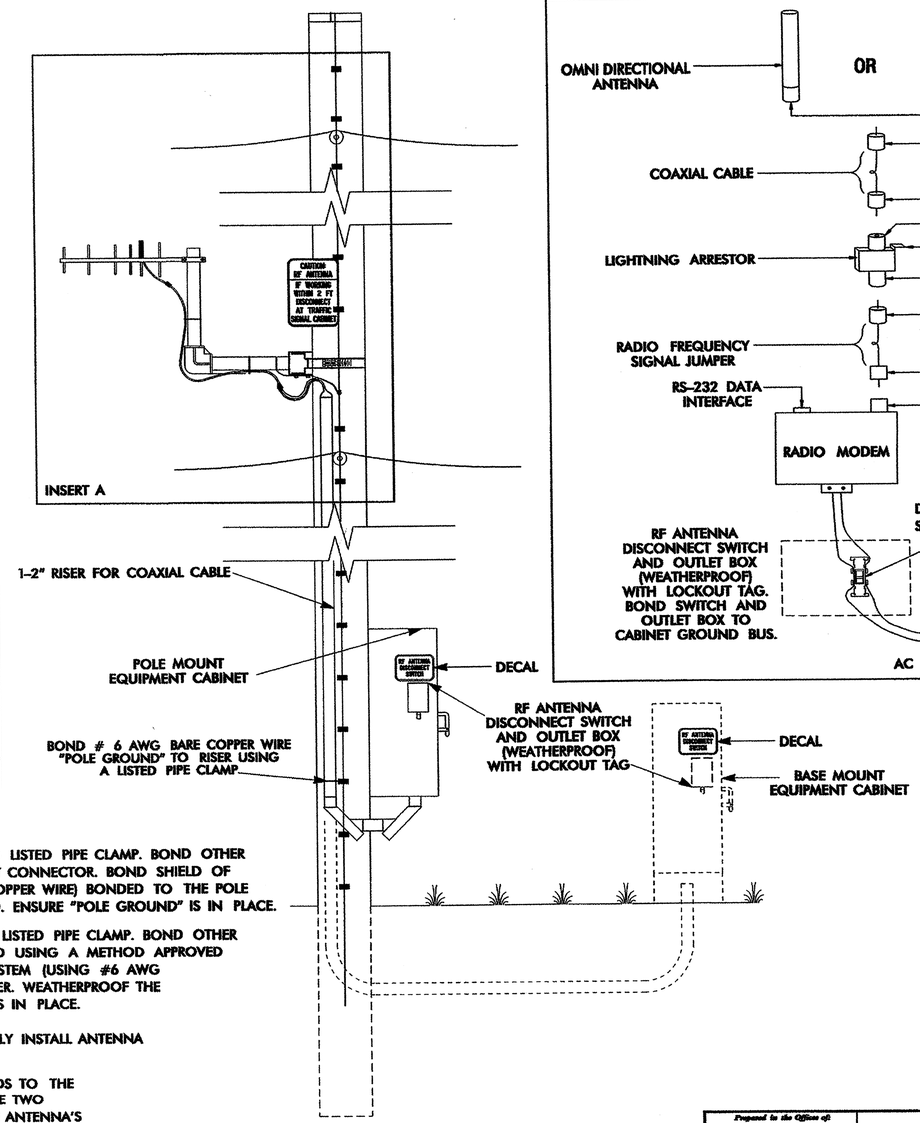
SIGNATURE 6-5-07 DATE

CADD Filename:

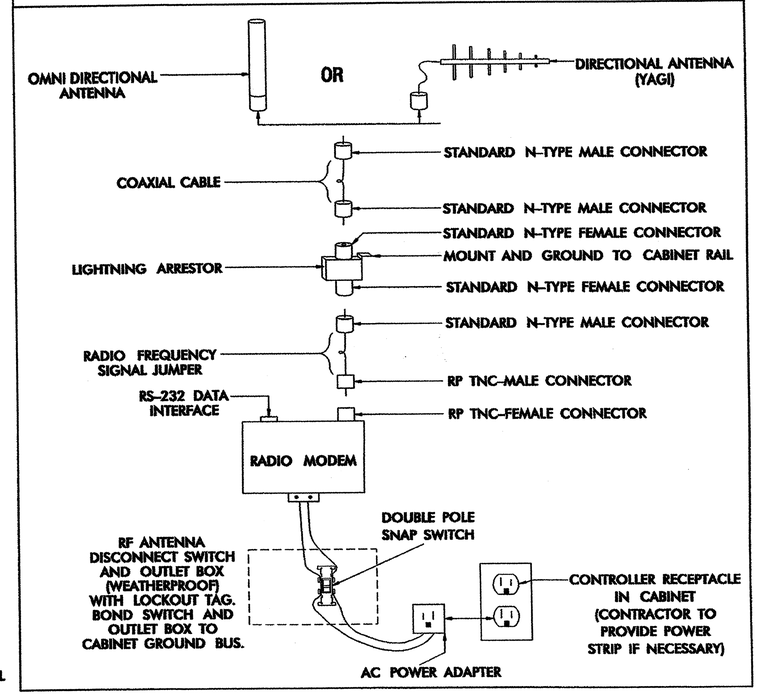
PROJECT REFERENCE NO.	SHEET NO.
B-3637	SIG.49



INSERT A



ANTENNA AND COAXIAL CABLE CONNECTION SCHEMATIC



NOTES

1. WOOD POLE — BOND # 6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF # 6 AWG SOLID BARE COPPER WIRE TO THE POLE GROUND USING A SPLIT BOLT CONNECTOR. BOND SHIELD OF COAXIAL CABLE WITH AN APPROVED GROUNDING SYSTEM (USING #6 AWG STRANDED COPPER WIRE) BONDED TO THE POLE GROUND. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "POLE GROUND" IS IN PLACE.

   METAL POLE — BOND # 6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF # 6 AWG SOLID BARE COPPER WIRE TO THE POLE OR EXISTING SYSTEM GROUND USING A METHOD APPROVED BY THE ENGINEER. BOND SHIELD OF COAXIAL CABLE WITH AN APPROVED GROUNDING SYSTEM (USING #6 AWG STRANDED COPPER WIRE) BONDED TO THE POLE BY A METHOD APPROVED BY THE ENGINEER. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "SYSTEM GROUND" IS IN PLACE.

2. YAGI ANTENNA SHOWN IN VERTICAL POLARIZATION POSITION FOR CLARIFICATION. TYPICALLY INSTALL ANTENNA IN HORIZONTAL POLARIZATION POSITION.

3. TO CONSERVE VERTICAL SPACING ON THE POLE (JOINT-USE OR SIGNAL POLE) WITH REGARDS TO THE SURROUNDING UTILITIES, INSTALL THE ANTENNA MOUNTING HARDWARE USING ONE OF THE TWO METHODS LISTED BELOW: (ENSURE THAT THE MOUNTING METHOD DOES NOT DEGRADE THE ANTENNA'S SIGNAL INTEGRITY)
   - A) ROTATE THE VERTICAL SUPPORT ARM 90 DEGREES SUCH THAT THE ANTENNA IS AT THE SAME HEIGHT AS THE HORIZONTAL SUPPORT ARM.
   - B) ELIMINATE THE VERTICAL SUPPORT ARM AND MOUNT THE ANTENNA TO THE HORIZONTAL SUPPORT ARM.
   - C) ANTENNA, ANTENNA SUPPORT ARM, AND SIGN TO MAINTAIN A 40" SEPARATION FROM NEUTRAL /POWER AND 12" FROM OTHER UTILITIES.

4. INSTALL AN END CAP TO SEAL THE EXPOSED END OF THE MOUNTING PIPE.

Prepared in the Office of: Traffic Management Systems, Traffic Engineering and Safety Systems Branch, Transportation Mobility and Safety Division, N.C. Department of Transportation, 122 N. McDowell St., Raleigh, NC 27603

WIRELESS RADIO ANTENNA TYPICAL DETAILS

PLAN DATE:	JULY 2005	REVIEWED BY:	I. N. AVERY
PREPARED BY:	A. CREECH	REVIEWED BY:	A. T. FAULKNER

SCALE: 0

REVISIONS	INIT.	DATE
UPDATE GROUNDING - COAXIAL CABLE SHIELD	DAG	4/13/06

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

SIGNATURE: Gregory A. Fuller DATE: 9/12/05

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
B-3637	SIG. 50

DECAL

SIGN NUMBER: SP05224
TYPE: DECAL
QUANTITY:

SIGN WIDTH: 0'-9"
HEIGHT: 0'-6"
TOTAL AREA: 0.4 Sq.Ft.

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 0.25"
RADII: 1"

NO. Z BARS:
LENGTH:

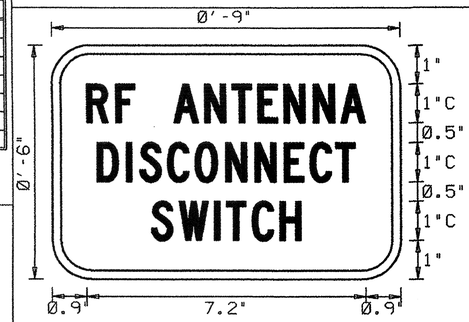
BACKG COLOR: Yellow
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.063" (1.6 mm) ALUMINUM

DESIGN BY: S PIOTROWSKI DATE: Jul 18,2005 CHECKED BY: SUSAN B. KUNZ
PROJECT ID: ID DIV:INTELLIGENT TRANSPORTATION SYSTEM

USE NOTES: 2, 4
1. Legend and border shall be direct applied Type III reflective sheeting.
2. Legend and border shall be direct applied non-reflective sheeting.
3. Shields shall be Type III reflective sheeting on 0.032" (0.8mm) aluminum and demountable.
4. Background shall be Type III reflective sheeting.
5. Background shall be Type I reflective sheeting.
6. Center arrow(s) vertically on sign.
7. Bottom panel shall be yellow Type III sheeting. Legend shall be direct applied black non-reflective sheeting. Yellow panel is:



BORDER
R=1"
TH=Ø.25"

NOTE: THIS SIGN SHALL BE PRODUCED AS A DECAL

LETTER POSITIONS

Letter spacings are to start of next letter

																															Series/Size Text Length
	R	F		A	N	T	E	N	N	A																					C1
0.9	0.6	0.5	1	0.6	0.7	0.7	0.7	0.6	0.7	0.6	0.9																				7.2
	D	I	S	C	O	N	N	E	C	T																					C1
1.2	0.6	0.3	0.7	0.7	0.6	0.6	0.6	0.7	0.7	0.5	1.2																				6.7
	S	W	I	T	C	H																									C1
2.6	0.7	0.9	0.3	0.7	0.7	0.5	2.6																								3.9

Spacing Factor is 1 unless specified otherwise

POLE MOUNTED SIGN

SIGN NUMBER: SP05223
TYPE: D
QUANTITY:

SIGN WIDTH: 0'-9"
HEIGHT: 1'-0"
TOTAL AREA: 0.8 Sq.Ft.

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 0.2"
RADII: 1"

NO. Z BARS:
LENGTH:

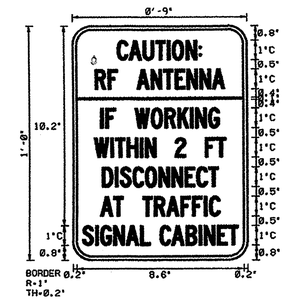
BACKG COLOR: Yellow
COPY COLOR: Black

SYMBOL	X	Y	WID	HT
BAR	0.2	8.2	8.6	1.0

MAT'L: 0.063" (1.6 mm) ALUMINUM

DESIGN BY: S PIOTROWSKI DATE: Jul 18,2005 CHECKED BY: SUSAN KUNZ
PROJECT ID: DIV: INTELLIGNET TRANSPORTATION SYSTEMS

USE NOTES: 2, 4
1. Legend and border shall be direct applied Type III reflective sheeting.
2. Legend and border shall be direct applied non-reflective sheeting.
3. Shields shall be Type III reflective sheeting on 0.032" (0.8mm) aluminum and demountable.
4. Background shall be Type III reflective sheeting.
5. Background shall be Type I reflective sheeting.
6. Center arrow(s) vertically on sign.
7. Bottom panel shall be yellow Type III sheeting. Legend shall be direct applied black non-reflective sheeting. Yellow panel is:



0.60 SPACING FACTOR

LETTER POSITIONS

Letter spacings are to start of next letter

																															Series/Size Text Length
	C	A	U	T	I	O	N	:																							C1
2.3	0.6	0.7	0.6	0.6	0.3	0.7	0.7	0.1	2.3																						4.4
	R	F		A	N	T	E	N	N	A																					C1
1.1	0.7	0.5	1	0.7	0.6	0.6	0.6	0.7	0.6	0.6	1.1																				6.7
	I	F		W	O	R	K	I	N	G																					C1
1.4	0.3	0.5	1	0.6	0.7	0.7	0.6	0.3	0.7	0.5	1.4																				6.1
	W	I	T	H	I	N		2		F	T																				C1
1.1	0.9	0.2	0.6	0.7	0.3	0.5	1	0.5	1	0.6	0.5	1.1																			6.8
	D	I	S	C	O	N	N	E	C	T																					C1
1.5	0.7	0.3	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.5	1.5																				8
	A	T		T	R	A	F	F	I	C																					C1
1.4	0.7	0.5	1	0.6	0.6	0.7	0.6	0.6	0.3	0.6	1.4																				6.2
	S	I	G	N	A	L																									C1
0.5	0.7	0.3	0.7	0.6	0.7	0.5	5																								3.5
	C	A	B	I	N	E	T																								C1
4.5	0.6	0.7	0.7	0.3	0.7	0.6	0.5	0.5																							4

Spacing Factor is 1 unless specified otherwise

Prepared in the Office of:
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

SCALE
0

WIRELESS
RADIO ANTENNA
TYPICAL DETAILS

PLAN DATE:	JULY 2005	REVIEWED BY:	I. N. AVERY
PREPARED BY:	A. CREECH	REVIEWED BY:	A. T. FAULKNER

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

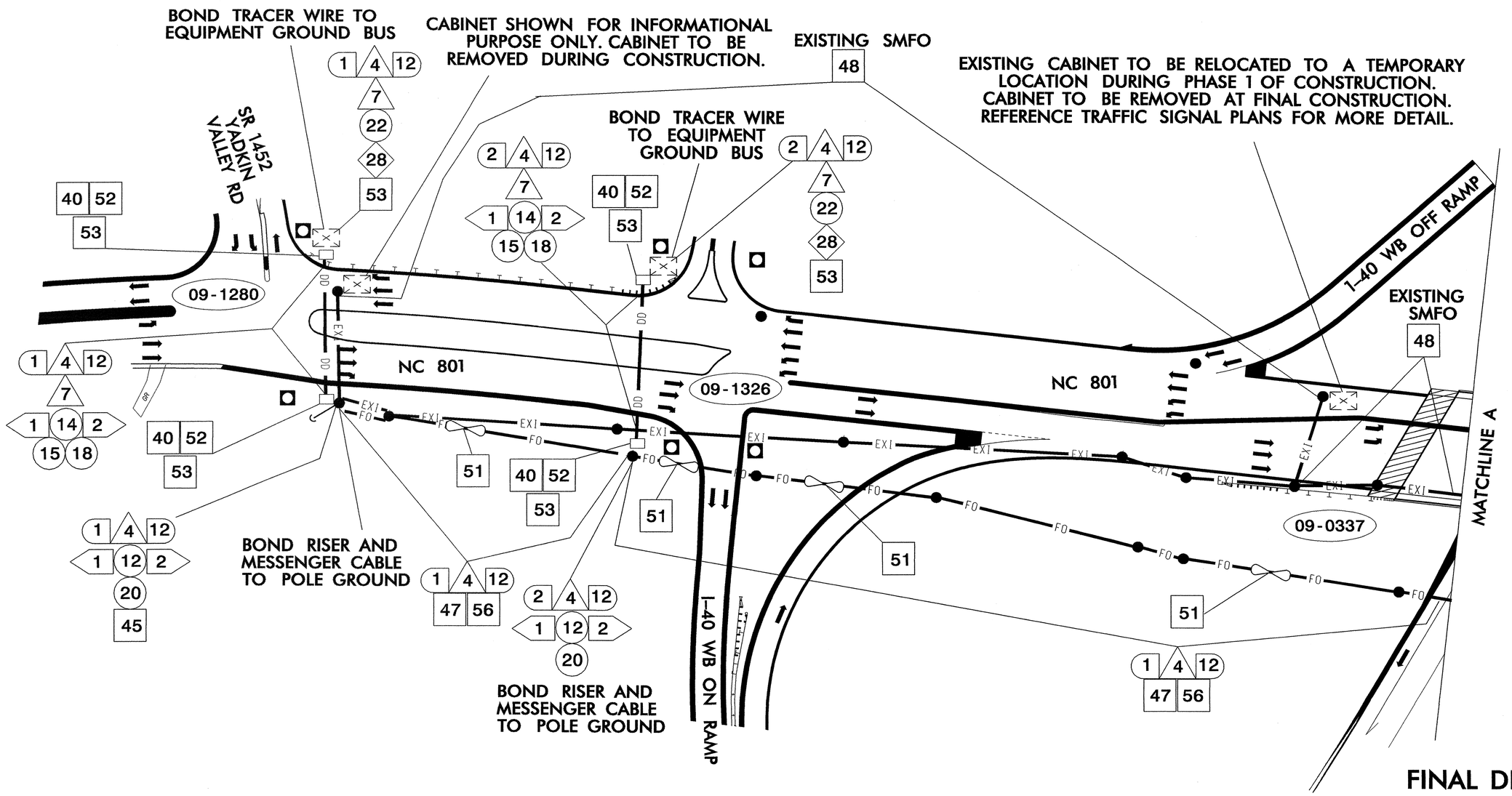
SIGNATURE Gregory A. Fuller DATE 9/12/05

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
B-3637	SIG.5.1

NOTE TO CONTRACTOR:

1) AFTER RADIO/ANTENNAS ARE OPERATIONAL IN "TCP – PHASE I" AND AT THE DIRECTION OF THE ENGINEER, REMOVE THE EXISTING FIBER OPTIC CABLE AND MESSENGER CABLE FROM THE EXISTING POLE LINE.
2) AT THE DIRECTION OF the ENGINEER, INSTALL NEW MESSENGER CABLE TO RESERVE AN ATTACHMENT LOCATION ON THE NEW POLE LINE.



NOTES:

ALL CABLE ATTACHMENT POINTS ARE 40 INCHES BELOW POWER, FRONT SIDE OF POLES, UNLESS OTHERWISE NOTED.

Prepared in the Offices of:
Traffic Management System
122 N. McDowell St., Raleigh, NC 27603

COMMUNICATIONS CABLE ROUTING ALONG NC 801

DIVISION 09 DAVIE CO. HILLSDALE

PLAN DATE: MAY 2007 REVIEWED BY:
PREPARED BY: I. N. AVERY REVIEWED BY: S. WARDLE

SCALE 0

REVISIONS	INIT.	DATE

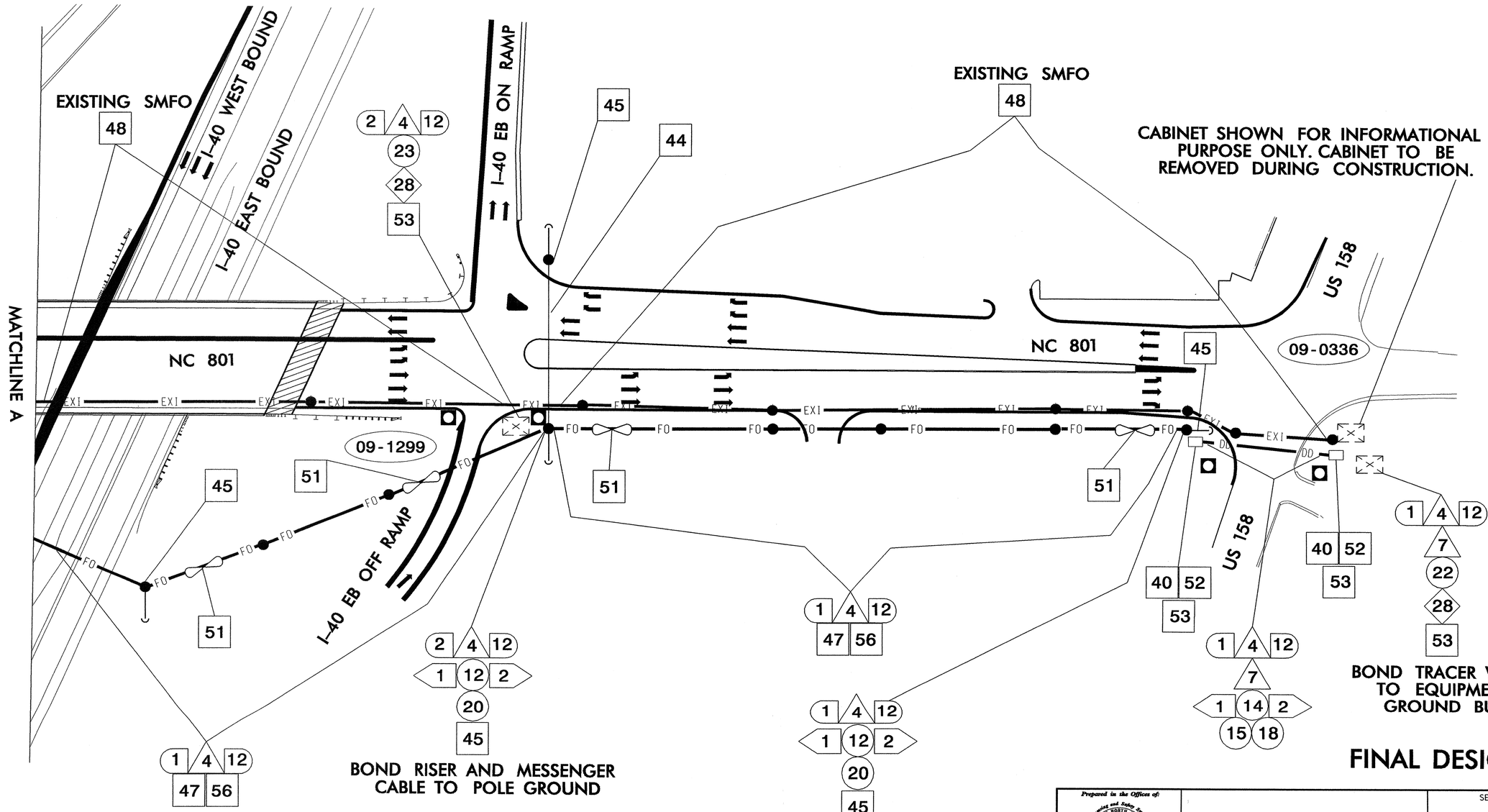
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
SIGNATURE 6-5-07 DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
B-3637	SIG. 52

NOTE TO CONTRACTOR:

1) AFTER RADIO/ANTENNAS ARE OPERATIONAL IN "TCP – PHASE I" AND AT THE DIRECTION OF THE ENGINEER, REMOVE THE EXISTING FIBER OPTIC CABLE AND MESSENGER CABLE FROM THE EXISTING POLE LINE.
2) AT THE DIRECTION OF THE ENGINEER, INSTALL NEW MESSENGER CABLE TO RESERVE AN ATTACHMENT LOCATION ON THE NEW POLE LINE.



NOTES:

ALL CABLE ATTACHMENT POINTS ARE 40 INCHES BELOW POWER, FRONT SIDE OF POLES, UNLESS OTHERWISE NOTED.

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Traffic Management Systems
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
122 N. McDowell St., Raleigh, NC 27603

COMMUNICATIONS CABLE ROUTING ALONG NC 801

DIVISION 09 DAVIE CO. HILLSDALE

PLAN DATE: MAY 2007 REVIEWED BY:

PREPARED BY: I. N. AVERY REVIEWED BY: S. WARDLE

REVISIONS	INIT.	DATE

SCALE 0

N

SEAL

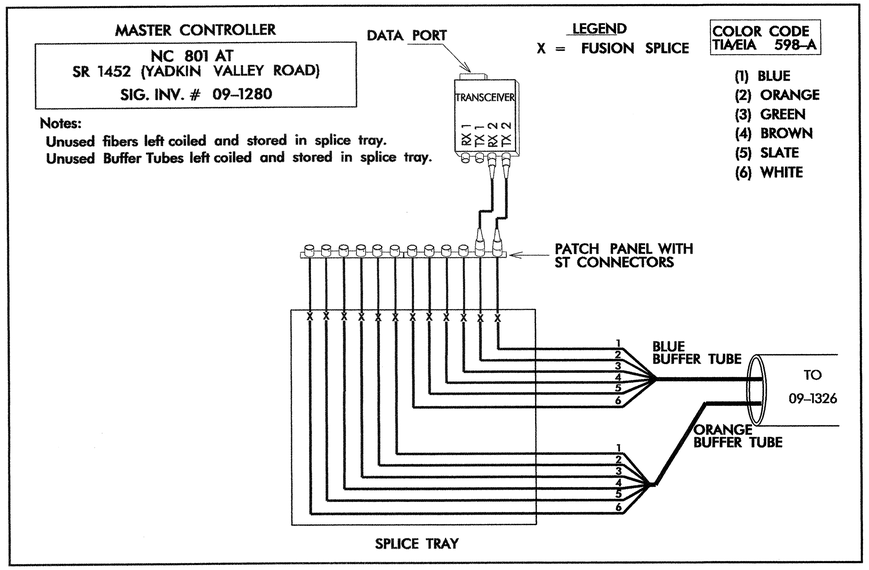
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

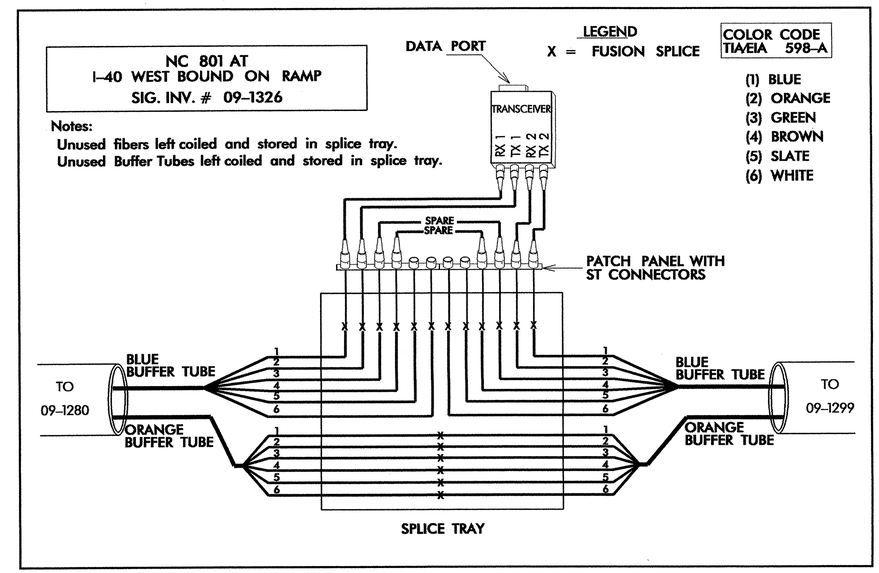
SIGNATURE 6-5-07 DATE

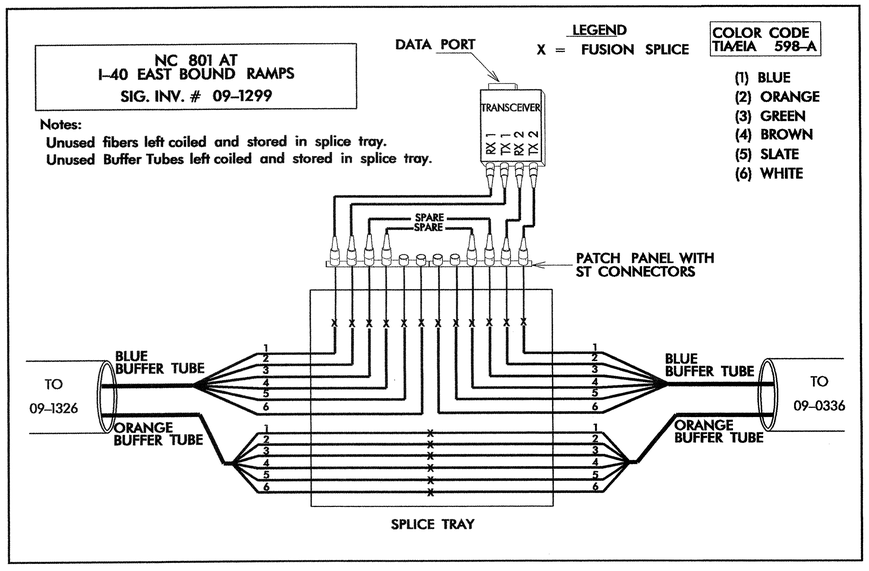
CADD Filename:

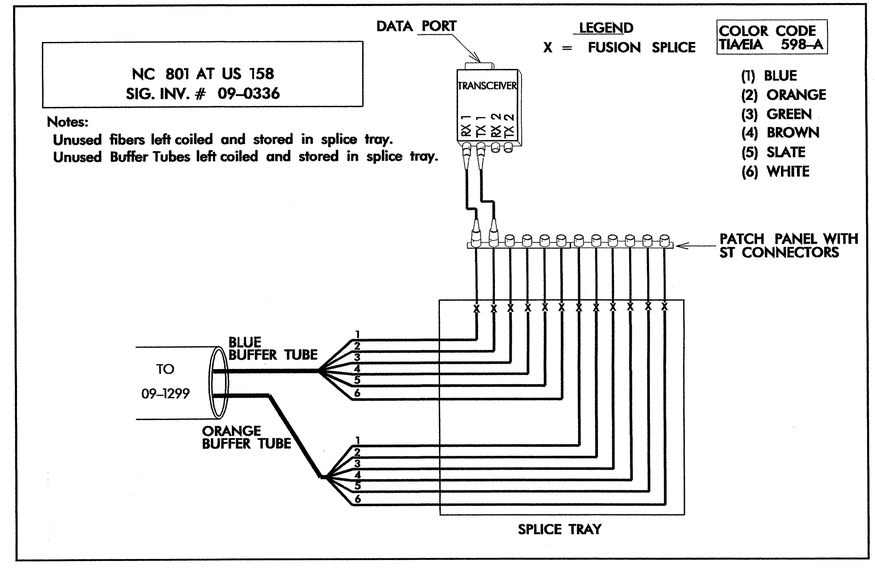
PROJECT REFERENCE NO.	SHEET NO.
B-3637	SIG.53

FIBER OPTIC CABLE









NOTES

RETURN ALL EXISTING TRANSCEIVERS TO THE ENGINEER.

TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

SCALE 0

SPLICE DETAILS ALONG NC 801

DIVISION: 09 DAVIE COUNTY NEAR HILLSDALE

PLAN DATE: MAY 2007 REVIEWED BY: S. WARDLE

PREPARED BY: I. N. AVERY REVIEWED BY: G. G. MURR, JR.

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
SIGNATURE 8-5-07 DATE

CADD Filename: