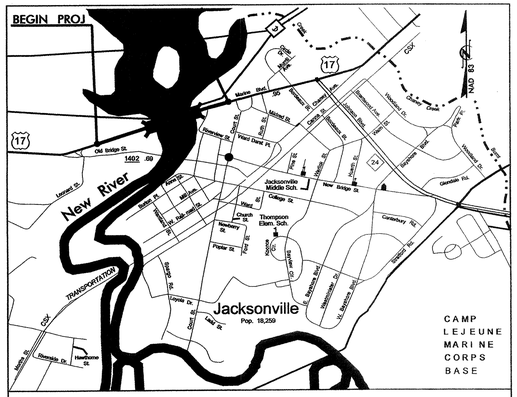
STATE	PROJECT NO.	SHEET NO.
N.C.	B-4214	Sig. 1
F. A. PROJ. NO.		
PROJECT ID. NO.		

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

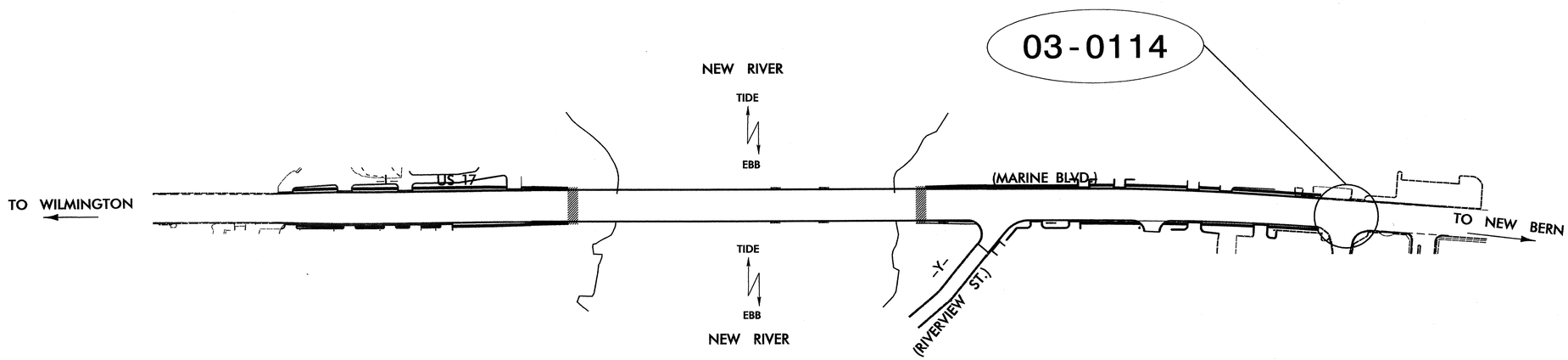
ONSLOW COUNTY

LOCATION: ***BRIDGE NO. 24 OVER NEW RIVER ON US 17 (MARINE BLVD.) IN JACKSONVILLE***

TYPE OF WORK: TRAFFIC SIGNALS



VICINITY MAP



PROJECT: B-4214

INDEX OF PLANS

SHEET NO.	SIGNAL INVENTORY NO.	LOCATION /DESCRIPTION
SIG. 1	N/A	Title Sheet
SIG. 2-7	03-0114 Temp. & Final	US 17/NC 24 (Marine Boulevard) at Murrill Circle
SIG. 8-10	N/A	Inductive Detection Loops Details

LEGEND

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

NCDOT CONTACTS:

INTELLIGENT TRANSPORTATION SYSTEMS & SIGNALS UNIT

Jason P. Galloway, PE – Eastern Region Signals Project Engineer

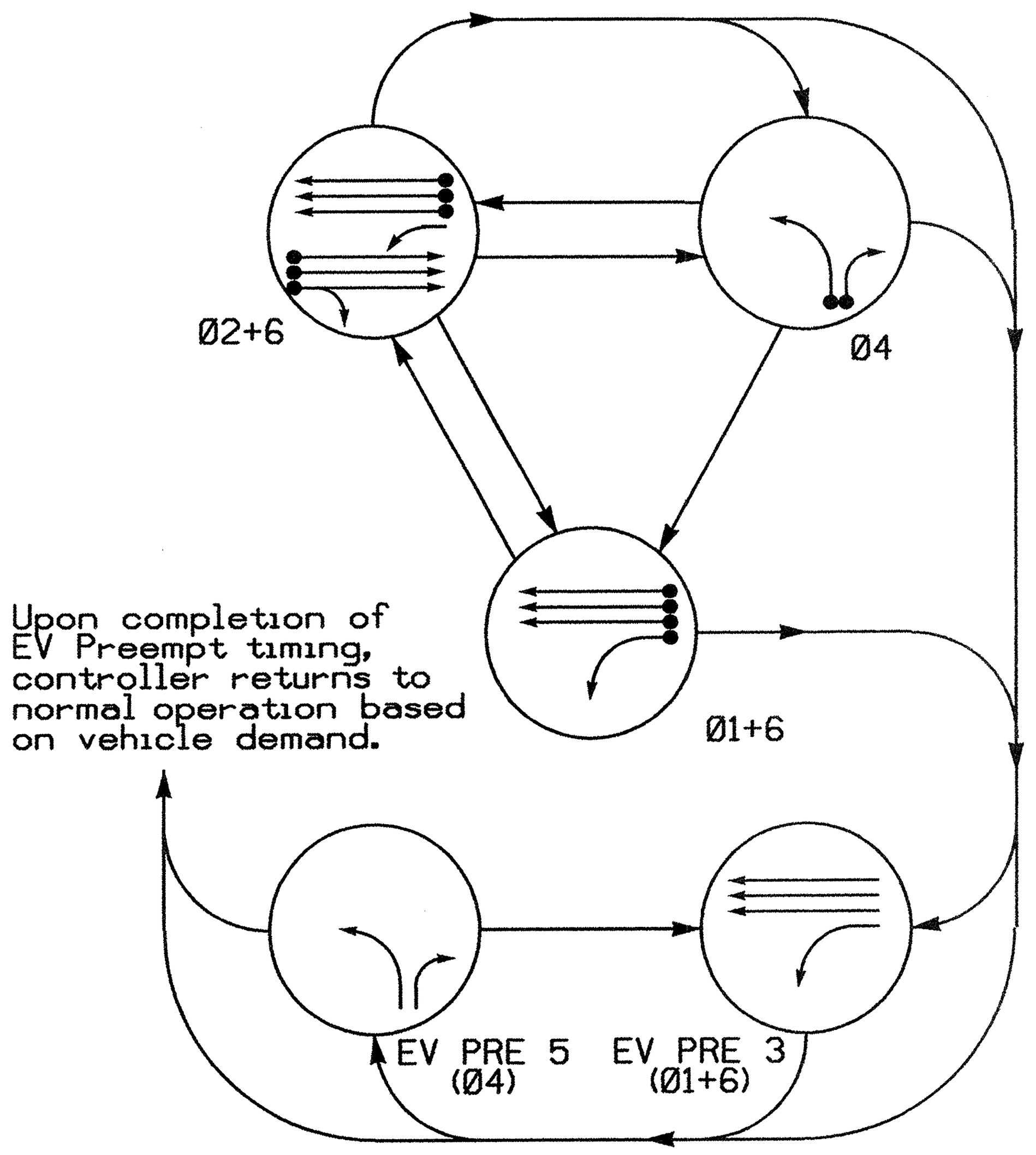
George C. Brown, PE – Signal Equipment Design Engineer

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

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

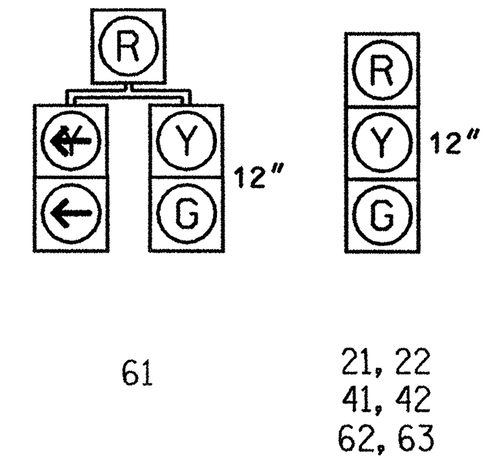
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	Ø1+6	Ø2+6	Ø4	EVP3 Ø1+6	EVP5 Ø4	FLASH
21, 22	R	G	R	R	R	Y
41, 42	R	R	G	R	G	R
61	← G	G	R	← G	R	Y
62, 63	G	G	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



2070L LOOP & DETECTOR INSTALLATION

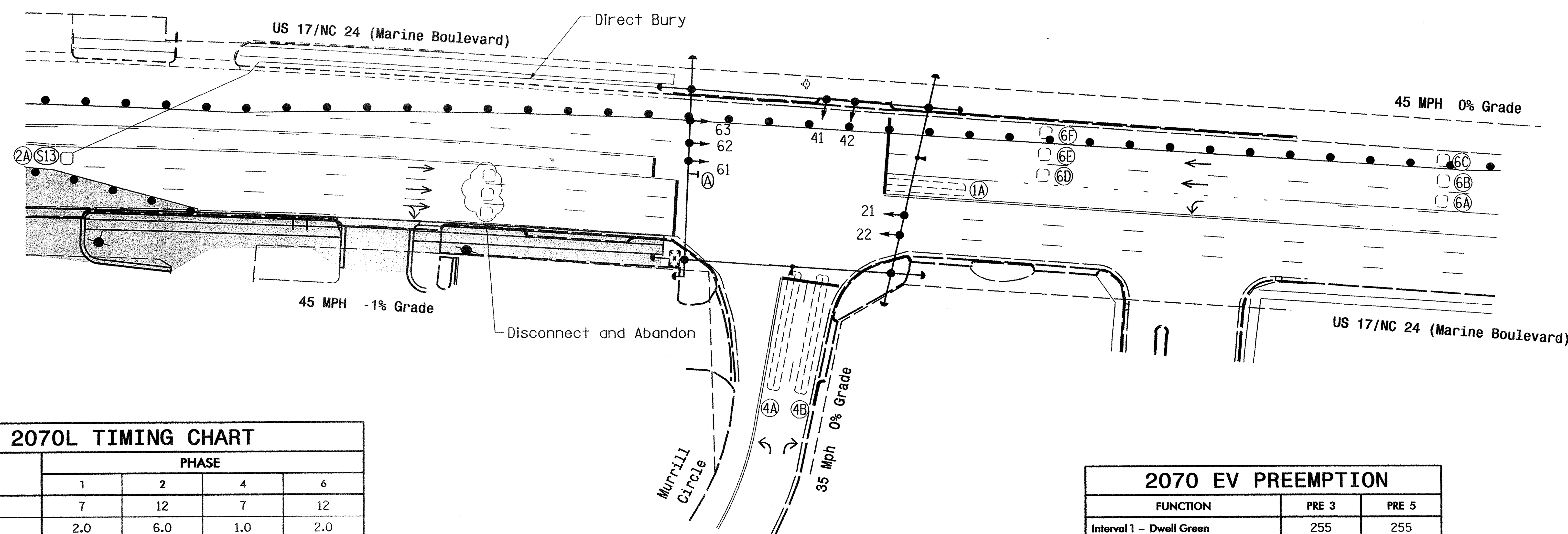
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15	-	-
2A/S13	6X6	300	5	Y	2	Y	Y	-	-	-	Y	-
4A	6X60	+5	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X60	+5	2-4-2	-	4	Y	Y	-	-	15	-	-
6A	6X6	275	*	-	6	Y	Y	-	1.5	-	-	-
6B	6X6	275	*	-	6	Y	Y	-	1.5	-	-	-
6C	6X6	275	*	-	6	Y	Y	-	1.5	-	-	-
6D	6X6	75	*	-	6	Y	Y	-	-	-	-	-
6E	6X6	75	*	-	6	Y	Y	-	-	-	-	-
6F	6X6	75	*	-	6	Y	Y	-	-	-	-	-

* EXISTING

3 Phase w/EV Preempt
Fully Actuated
US 17 (Marine Boulevard) Closed Loop System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Existing "Left Turn Yield on Green" ball sign(s)-(R10-12) may be removed at the discretion of the Regional Traffic Engineer.
6. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
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 #0114.



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	
N/A	Fire Hydrant	
	Optical Detector Unit	
	Construction Drums	
	Construction Zone	
Ⓐ	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	Ⓐ

2070L TIMING CHART

FEATURE	PHASE 1	2	4	6
Min Green 1 *	7	12	7	12
Extension 1 *	2.0	6.0	1.0	2.0
Max Green 1 *	15	90	15	75
Yellow Clearance	3.0	4.6	3.0	4.5
Red Clearance	2.3	1.3	2.4	1.1
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.0	-	-
Max Variable Initial *	-	34	-	-
Time Before Reduction *	-	15	-	-
Time To Reduce *	-	45	-	-
Minimum Gap	-	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.

2070 EV PREEMPTION

FUNCTION	PRE 3	PRE 5
Interval 1 – Dwell Green	255	255
Interval 1 – Dwell Yellow	4.5	3.0
Interval 1 – Dwell Red	2.3	2.4
Interval 5 – Exit Green	0	0
Interval 5 – Yellow	-	-
Interval 5 – Red	-	-
Delay Time	0.0	0.0
Min Green Before Pre	1	1
Ped Clear Before Pre	0	0
Yellow Clear Before Pre	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*
Dwell Min Time	12	7
Enable Backup Protection	N	N
Ped Clear Through Yellow	N	N
Preempt Extend**	2	2

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

Signal Upgrade (Phase II Temp 1)

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 40 1"=40'

US 17/NC 24 (Marine Boulevard) at Murrill Circle

Division 3 Onslow County Jacksonville

PLAN DATE: October 2008	REVIEWED BY: JPG
PREPARED BY: IOU/JPG	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29904 JASON P. GALLOWAY

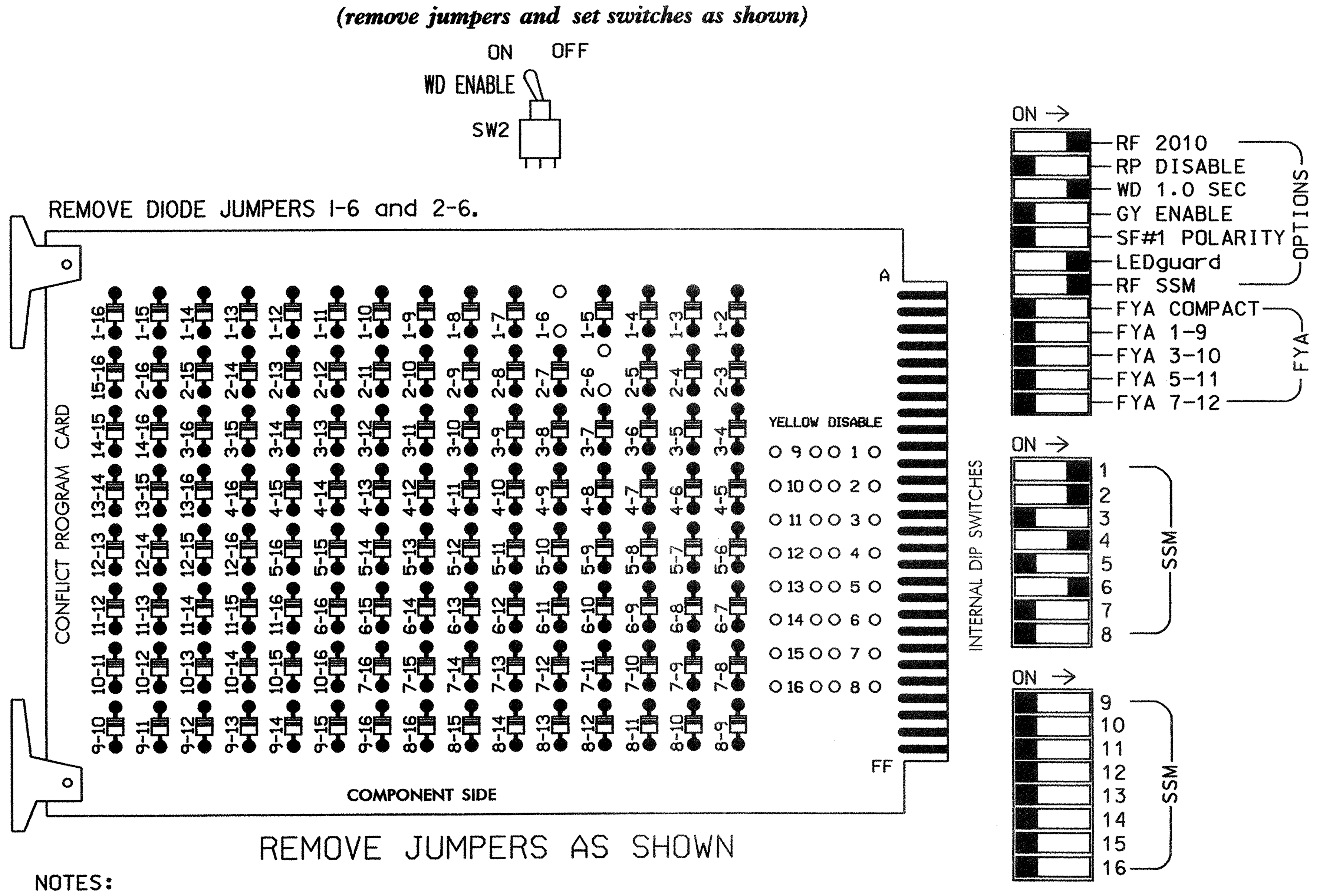
SIGNATURE DATE 10/27/08

SIG. INVENTORY NO. 03-0114T1

24-NOV-2008 12:18
s:*its signals*workgroups*tip projects*b-4214*signals*design*signals*03-0114*030114t_sig_dsn_2008mmdd.dgn
jgalloway

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
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 phase 2, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the US 17 (Marine Blvd.) 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,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, 62,63	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)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	ø 1 1A	ø2/SYS 2A/S13	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
"I"	L	NOT USED	NOT USED				ø 4 4B								ST DC ISOLATOR
"J"	U	SLOT EMPTY	ø 6 6A	ø 6 6C	ø 6 6E	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SEE NOTE BELOW	SLOT EMPTY	SLOT EMPTY
"J"	L		ø 6 6B	ø 6 6D	ø 6 6F								**		

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

FS = FLASH SENSE
ST = STOP TIME

**
OPTICAL DETECTOR TYPICAL WIRE LIST

COLOR	FUNCTION
blue	AC-
bare	AC-
orange	24V DC
yellow	Input File

INTERFACE CARD (2-CHANNEL) OPTICAL DETECTOR

J12- D - PREEMPT 3
J12- J - PREEMPT 5

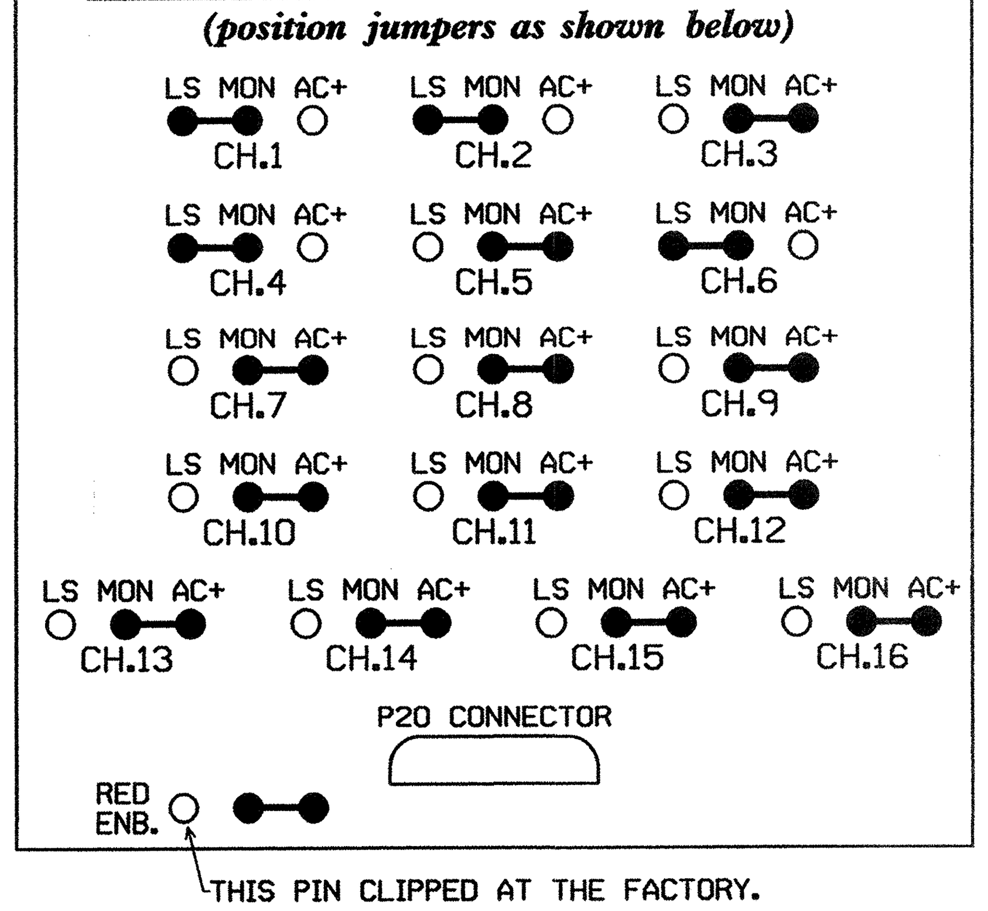
INPUT FILE CONNECTION & PROGRAMMING CHART

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			15
2A/S13	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y		1.5	
6B	TB3-7,8	J2L	44	6	16	6	Y	Y		1.5	
6C	TB3-9,10	J3U	64	26	36	6	Y	Y		1.5	
6D	TB3-11,12	J3L	77	39	46	6	Y	Y			
6E	TB5-1,2	J4U	48	10	26	6	Y	Y			
6F	TB5-3,4	J4L	48	10	26	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

RED MONITOR BOARD PROGRAMMING

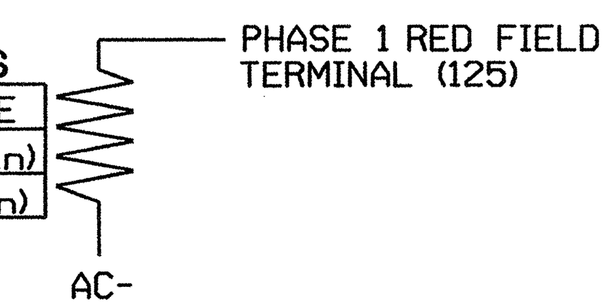
(position jumpers as shown below)



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 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: 03-0114T1
DESIGNED: October 2008
SEALED: 10-27-08
REVISED: N/A

Signal Upgrade - Sheet 1 of 2 (Phase II Temp I)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 17/NC 24 (Marine Boulevard) at Murrill Circle

Division 3 | Onslow County | Jacksonville

PLAN DATE: October 2008 | REVIEWED BY: T. Joyce
PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS | INIT. | DATE

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

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

George C. Brown 12/2/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0114T1

02-DEC-2008 07:49
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
B-4214	Sig. 4

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press the 'Next" key 2-times to advance to Preempt #3.

EVP 3 :

```
   PREEMPTION  #3  SETTINGS (NEXT:1-10)
INTERVAL/TIMING  |  CLEAR/DWELL PHASES
  GRN YEL  RED   |123456789101112131415 16
1 255  4.5  2.3  |X     X
2   0  0.0  0.0  |
3   0  0.0  0.0  |
4   0  0.0  0.0  |
5   0  0.0  0.0  |
EXIT CALLS       |
          OPTIONS
PRIORITY (Y/N TO SELECT) ............MED
DELAY TIMER (0-255 SEC) .............0.0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
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) .........12
DWELL MAX TIMER (0=OFF,1-255MIN) ....0
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:           |
```

PRESS 'NEXT' TWICE

EVP 5 :

```
   PREEMPTION  #5  SETTINGS (NEXT:1-10)
INTERVAL/TIMING  |  CLEAR/DWELL PHASES
  GRN YEL  RED   |123456789101112131415 16
1 255  3.0  2.4  |   X
2   0  0.0  0.0  |
3   0  0.0  0.0  |
4   0  0.0  0.0  |
5   0  0.0  0.0  |
EXIT CALLS       |
          OPTIONS
PRIORITY (Y/N TO SELECT) ............MED
DELAY TIMER (0-255 SEC) .............0.0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
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) .........7
DWELL MAX TIMER (0=OFF,1-255MIN) ....0
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:           |
```

END OF PROGRAMMING

Program extend time on optical detector units for 2.0 sec.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0114T1
DESIGNED: October 2008
SEALED: 10-27-08
REVISED: N/A

Signal Upgrade - Sheet 2 of 2 (Phase II Temp I)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

US 17/NC 24 (Marine Boulevard)
at
Murrill Circle

Division 3 | Onslow County | Jacksonville

PLAN DATE: October 2008 | REVIEWED BY: T. Jaga

PREPARED BY: S. Armstrong | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 12/2/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0114T1

25-NOV-2008 08:26
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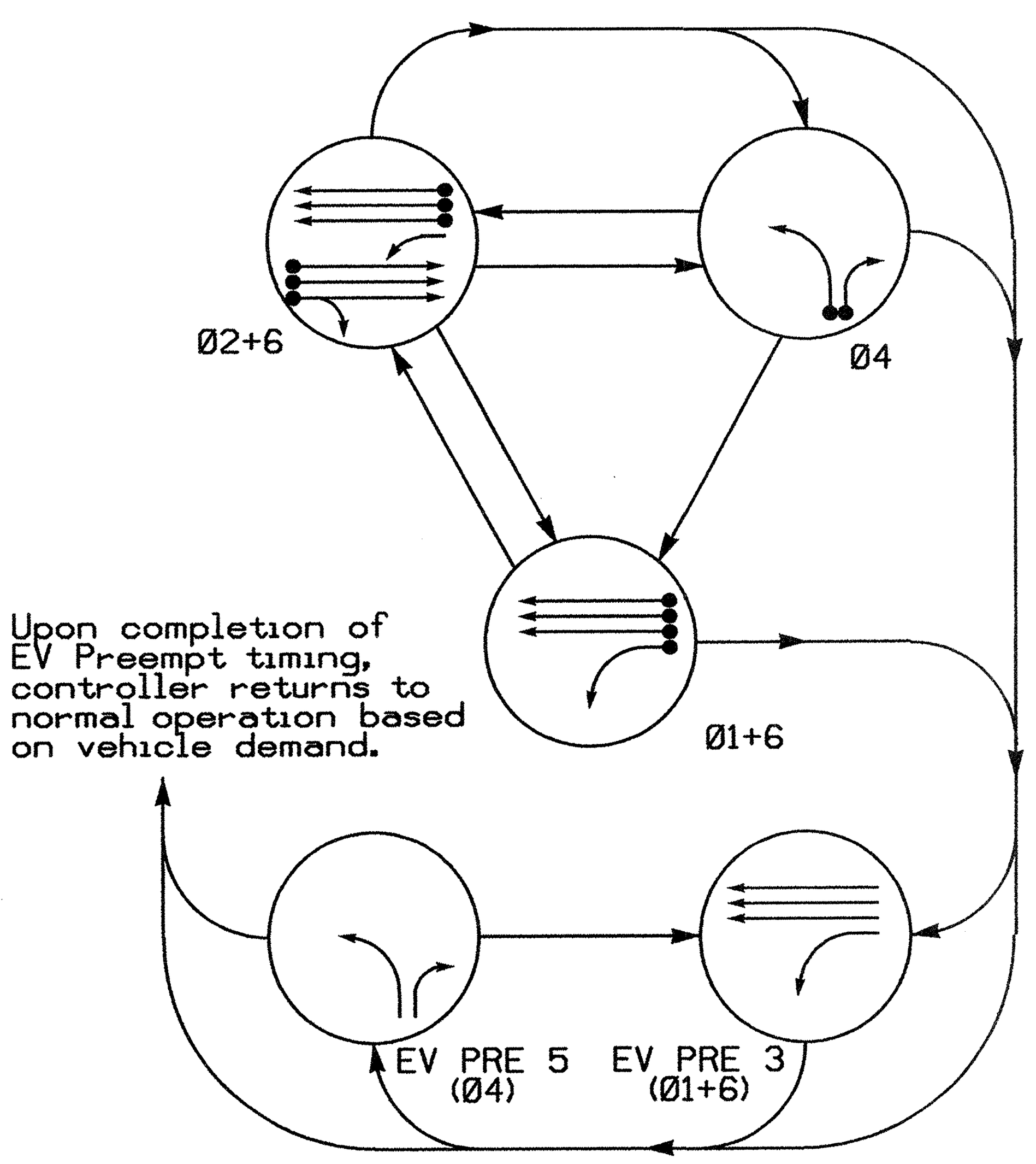
sarmstrong

PROJECT REFERENCE NO.	SHEET NO.
B-4214	Sig. 5

3 Phase w/EV Preempt
Fully Actuated
US 17 (Marine Boulevard) Closed Loop System

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

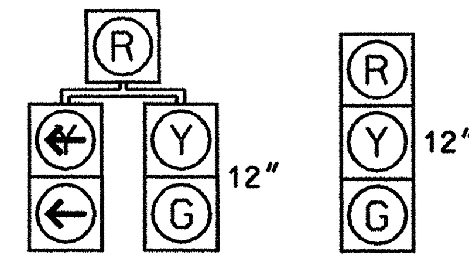
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø4	EVP3 Ø1+6	EVP5 Ø4	FLASH
21, 22	R	G	R	R	R	Y
41, 42	R	R	G	R	G	R
61	← / G	G	R	← / G	R	Y
62, 63	G	G	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

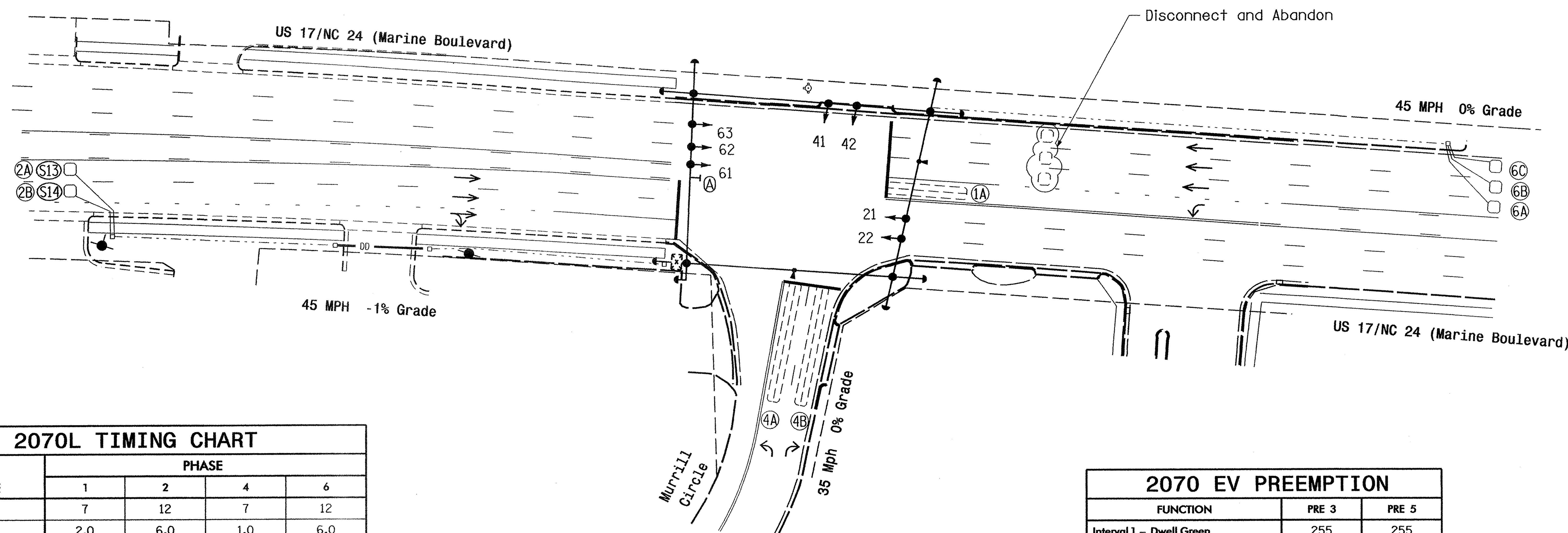


2070L LOOP & DETECTOR INSTALLATION

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	-	1	Y	Y	-	-	15	-	-
2A/S13	6X6	300	5	Y	2	Y	Y	-	-	-	Y	-
2B/S14	6X6	300	5	Y	2	Y	Y	-	-	-	Y	-
4A	6X60	+5	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6X60	+5	2-4-2	-	4	Y	Y	-	-	15	-	-
6A	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
6B	6X6	300	5	Y	6	Y	Y	-	-	-	-	-
6C	6X6	300	5	Y	6	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. Existing "Left Turn Yield on Green" ball sign(s)-(R10-12) may be removed at the discretion of the Regional Traffic Engineer.
6. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
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 #0114.



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	
N/A	Fire Hydrant	
	Optical Detector Unit	
	Directional Drill	N/A
Ⓐ	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	Ⓐ

2070L TIMING CHART

FEATURE	PHASE 1	2	4	6
Min Green 1 *	7	12	7	12
Extension 1 *	2.0	6.0	1.0	6.0
Max Green 1 *	15	90	15	90
Yellow Clearance	3.0	4.6	3.0	4.5
Red Clearance	2.3	1.3	2.4	1.1
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.5	-	1.5
Max Variable Initial *	-	34	-	34
Time Before Reduction *	-	15	-	15
Time To Reduce *	-	45	-	45
Minimum Gap	-	3.0	-	3.0
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
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.

2070 EV PREEMPTION

FUNCTION	PRE 3	PRE 5
Interval 1 - Dwell Green	255	255
Interval 1 - Dwell Yellow	4.5	3.0
Interval 1 - Dwell Red	2.3	2.4
Interval 5 - Exit Green	0	0
Interval 5 - Yellow	-	-
Interval 5 - Red	-	-
Delay Time	0.0	0.0
Min Green Before Pre	1	1
Ped Clear Before Pre	0	0
Yellow Clear Before Pre	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*
Dwell Min Time	12	7
Enable Backup Protection	N	N
Ped Clear Through Yellow	N	N
Preempt Extend**	2	2

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

Signal Upgrade (Final)

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

SCALE 0 40
1"=40'

US 17/NC 24 (Marine Boulevard)
at
Murrill Circle

Division 3	Onslow County	Jacksonville
PLAN DATE: October 2008	REVIEWED BY: JPG	
PREPARED BY: IOU/JPG	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
North Carolina Professional Seal 29904 Engineer Jason P. Galloway
SIGNATURE 10/27/08 DATE

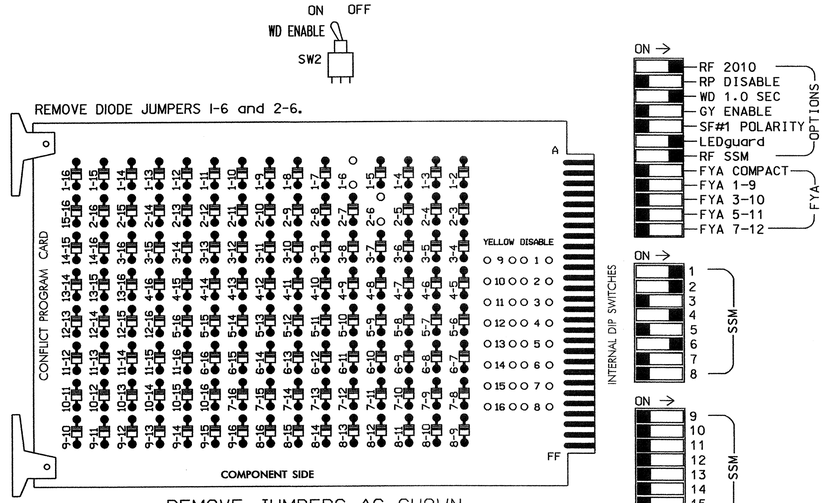
SIG. INVENTORY NO. 03-0114

24-NOV-2008 12:20
s:#its signals#workgroups#itp projects#b-4214#signals#designs#signals#03-0114#030114_sig_dsn_2008mod.dgn
jgalloway

PROJECT REFERENCE NO.	SHEET NO.
B-4214	Sig.6

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. To prevent red failures on unused monitor channels, see Red Monitor Board Programming Detail this sheet.
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 US 17 (Marine Blvd.) 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,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, 62,63	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	ø1 1A	ø2/SYS 2A/S13	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
	L	NOT USED	ø2/SYS 2B/S14				ø4 4B								ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	ø6 6A	ø6 6C	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SEE NOTE BELOW **	SLOT EMPTY	SLOT EMPTY
	L		ø6 6B	NOT USED											

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

FS = FLASH SENSE
ST = STOP TIME

** OPTICAL DETECTOR TYPICAL WIRE LIST

COLOR	FUNCTION
blue	AC-
bare	AC-
orange	24V DC
yellow	Input File

INTERFACE CARD (2-CHANNEL) OPTICAL DETECTOR

J12- D - PREEMPT 3
J12- J - PREEMPT 5

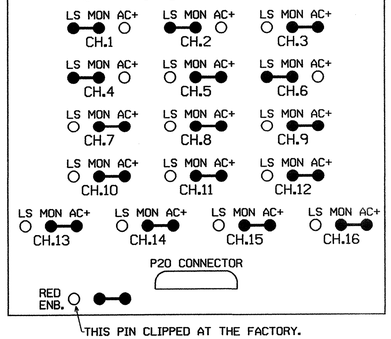
INPUT FILE CONNECTION & PROGRAMMING CHART

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			15
2A/S13	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S14	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
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			

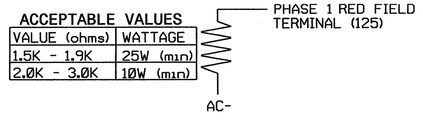
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



LOAD RESISTOR INSTALLATION DETAIL



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: 03-0114
DESIGNED: October 2008
SEALED: 10-27-08
REVISED: N/A

Signal Upgrade - Sheet 1 of 2 (Final)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 17/NC 24 (Marine Boulevard) at Murrill Circle

Division 3 Onslow County Jacksonville

PLAN DATE: October 2008 REVIEWED BY: T. Ugle

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 12/2/08
SIGNATURE DATE
SIG. INVENTORY NO. 03-0114

02-DEC-2008 07:50
S:\Traffic Signals\Workgroups\Sig Maintenance\Armstrong\030114_sample_xxx.dgn
armstrong

PROJECT REFERENCE NO.	SHEET NO.
B-4214	Sig.7

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press the 'Next" key 2-times to advance to Preempt #3.

EVP 3 :

```
   PREEMPTION  #3  SETTINGS (NEXT:1-10)
INTERVAL/TIMING  |  CLEAR/DWELL PHASES
  GRN YEL  RED   |12345678910111213141516
1 255  4.5  2.3  |X     X
2   0  0.0  0.0  |
3   0  0.0  0.0  |
4   0  0.0  0.0  |
5   0  0.0  0.0  |
EXIT CALLS       |
          OPTIONS
PRIORITY (Y/N TO SELECT) .............MED
DELAY TIMER (0-255 SEC) ..............0.0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
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) .........12
DWELL MAX TIMER (0=OFF,1-255MIN) ....0
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:           |
```

PRESS 'NEXT' TWICE

EVP 5 :

```
   PREEMPTION  #5  SETTINGS (NEXT:1-10)
INTERVAL/TIMING  |  CLEAR/DWELL PHASES
  GRN YEL  RED   |12345678910111213141516
1 255  3.0  2.4  |   X
2   0  0.0  0.0  |
3   0  0.0  0.0  |
4   0  0.0  0.0  |
5   0  0.0  0.0  |
EXIT CALLS       |
          OPTIONS
PRIORITY (Y/N TO SELECT) .............MED
DELAY TIMER (0-255 SEC) ..............0.0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
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) .........7
DWELL MAX TIMER (0=OFF,1-255MIN) ....0
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:           |
```

END OF PROGRAMMING

Program extend time on optical detector units for 2.0 sec.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0114
DESIGNED: October 2008
SEALED: 10-27-08
REVISED: N/A

Signal Upgrade - Sheet 2 of 2 (Final)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
NCDEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 17/NC 24 (Marine Boulevard)
at
Murrill Circle

Division 3 | Onslow County | Jacksonville

PLAN DATE:	October 2008	REVIEWED BY:	T. Igla
PREPARED BY:	S. Armstrong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C Brown 12/2/08
SIGNATURE DATE

SIG. INVENTORY NO. 03-0114

25-NOV-2008 07:18
s:\its signals\workgroups\sig mon\armstrong\03011 4_sm_ele_xxx.dgn
armstrong

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

11-08

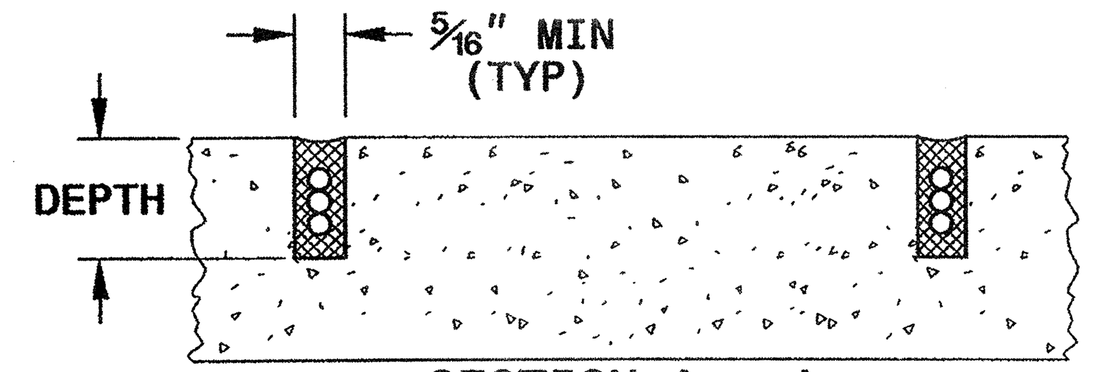
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

CONVENTIONAL 4-SIDED LOOP

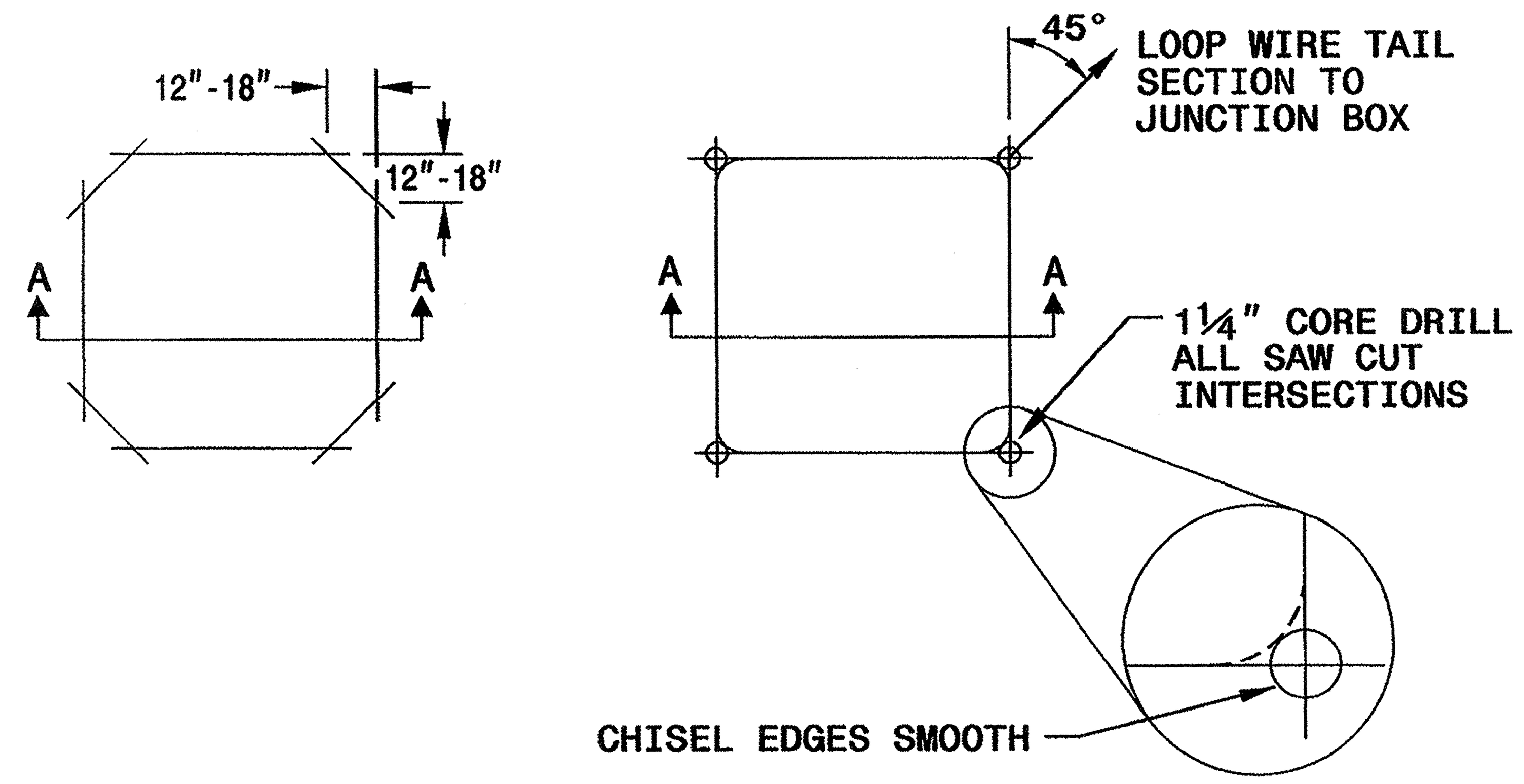
SAW SLOT DEPTH CHART

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

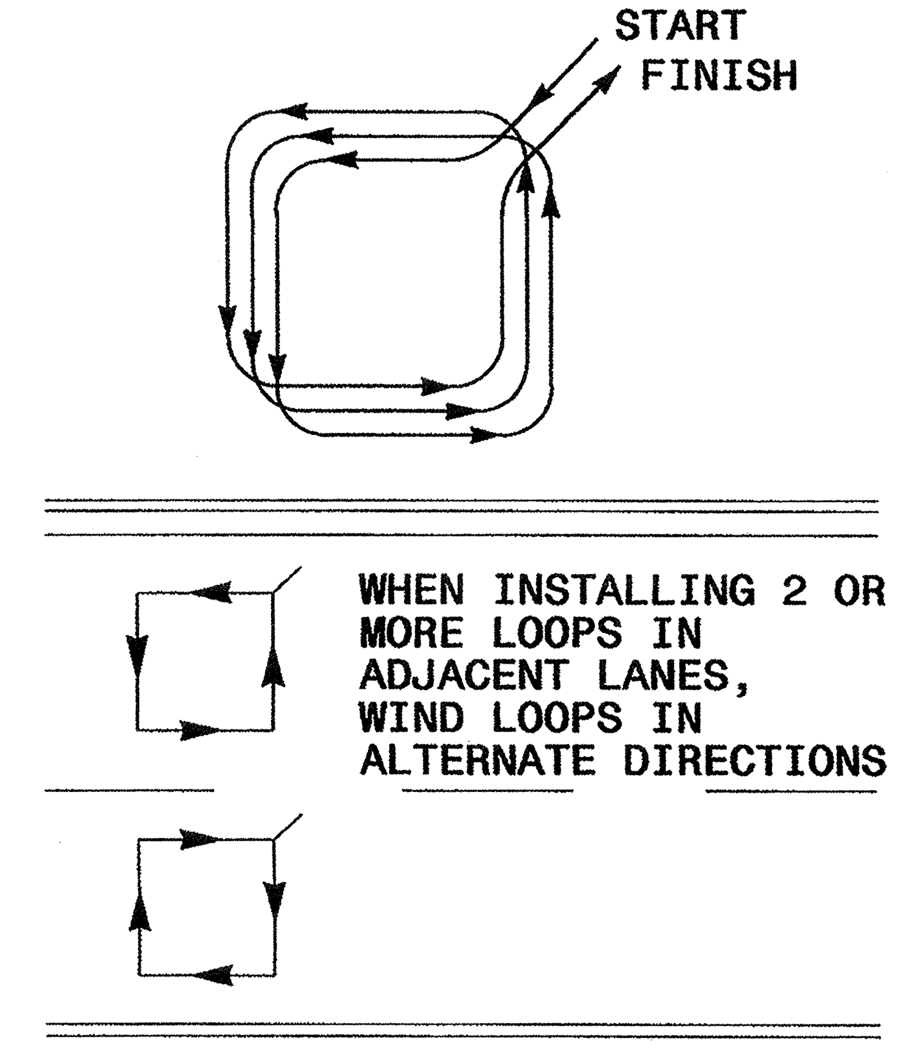


SECTION A - A

SAW CUT OPTIONS

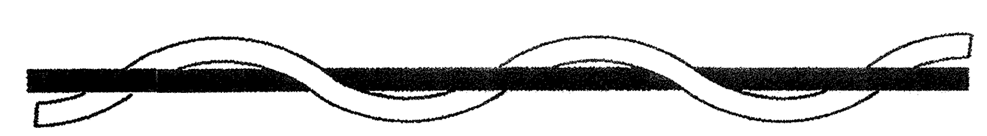


LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE



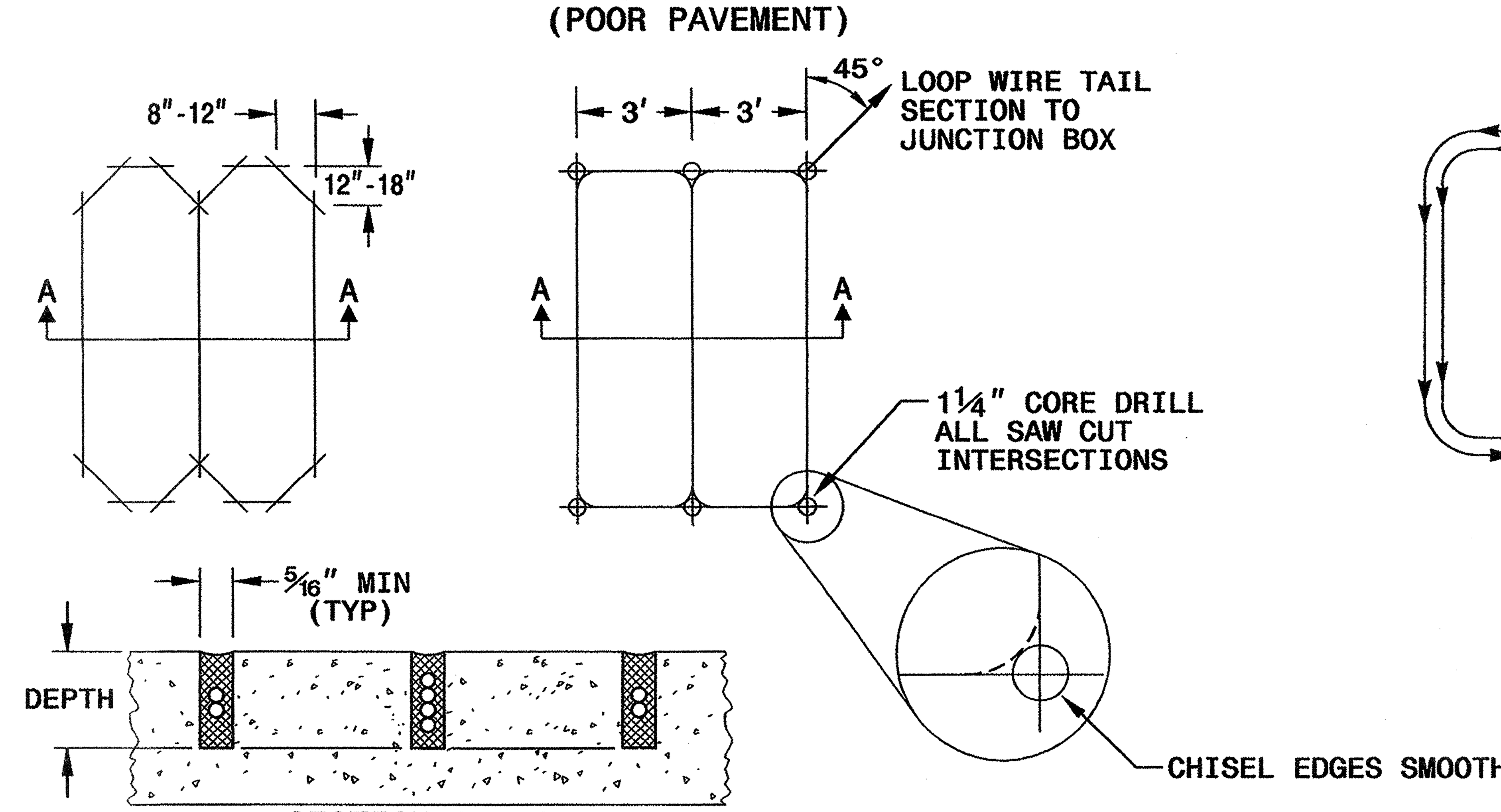
CORRECT WAY TO TWIST WIRE

NOTES

1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

QUADRUPOLE LOOP

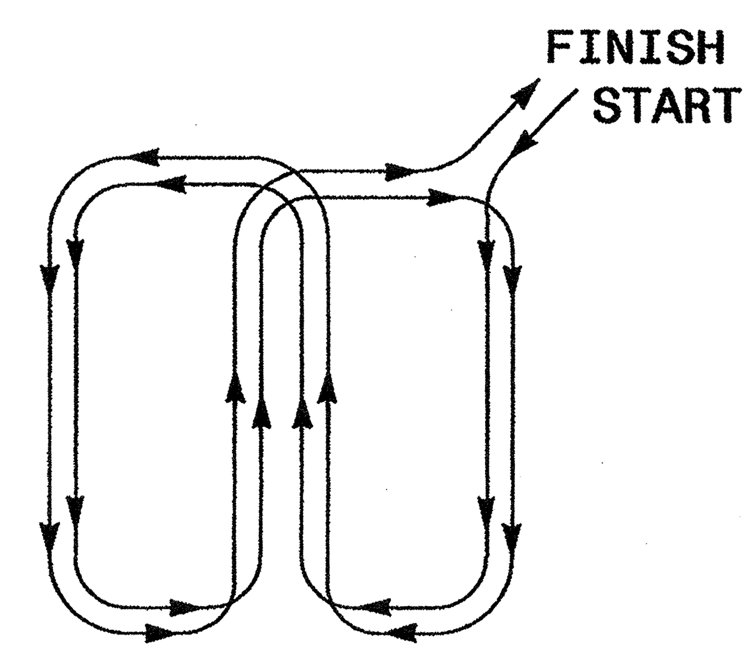
SAW CUT OPTIONS



SECTION A - A

DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

LOOP WINDING METHOD



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

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 16286 MILTON I. DEAN

SIGNATURE 11/24/08 DATE

24-NOV-2008 09:28

PROJECT REFERENCE NO.	SHEET NO.
B-4214	Sig.9

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

11-08

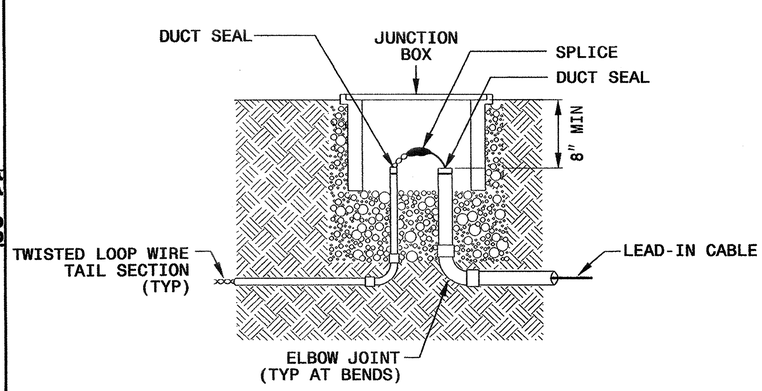
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

SHEET 2 OF 3

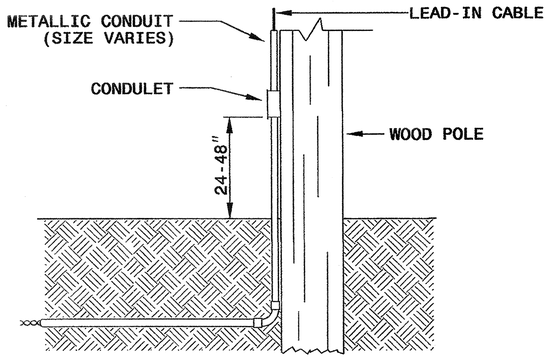
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

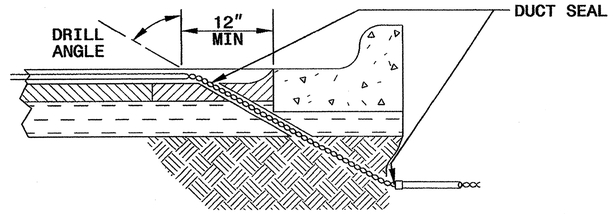


NOTE

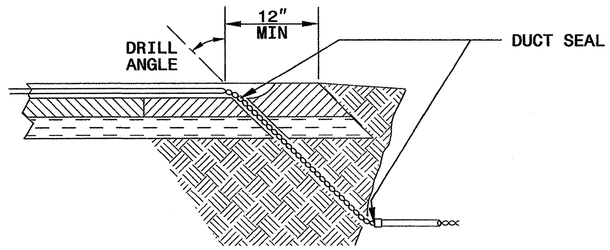
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

1. DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
2. TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
3. BEFORE SEALING LOOPS, INSTALL DUCT SEAL WHERE LOOP WIRE TAIL SECTION LEAVES SAW CUT IN PAVEMENT AND AT ENTRANCE OF CONDUIT TO JUNCTION BOX.

STATE OF NORTH CAROLINA
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RALEIGH, N.C.

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

SHEET 2 OF 3

1725D01

See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 16286 ENGINEER MILTON I DEAN

11/24/08
SIGNATURE DATE

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

11-08

ENGLISH DETAIL DRAWING FOR

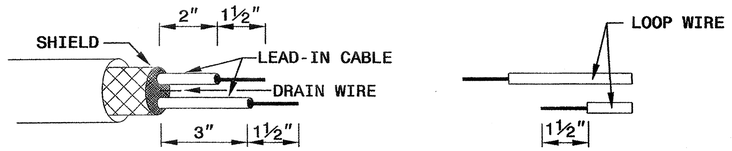
INDUCTIVE DETECTION LOOPS

SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

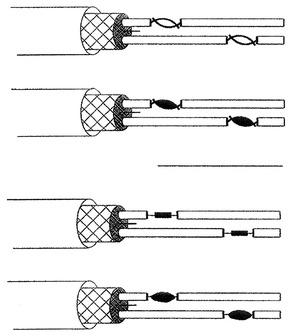
SHEET 3 OF 3

1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE



STEP 2. CONNECT AND SOLDER



TWIST BARE CONDUCTORS TOGETHER AND SOLDER WITH RESIN CORE SOLDER

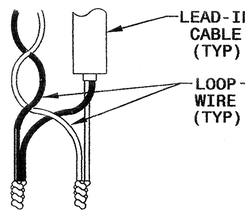
OR

CRIMP BARE CONDUCTORS TOGETHER WITH AN UNINSULATED BUTT CONNECTOR AND SOLDER WITH RESIN CORE SOLDER

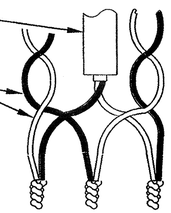
BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS

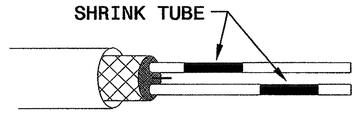
SINGLE CONNECTION



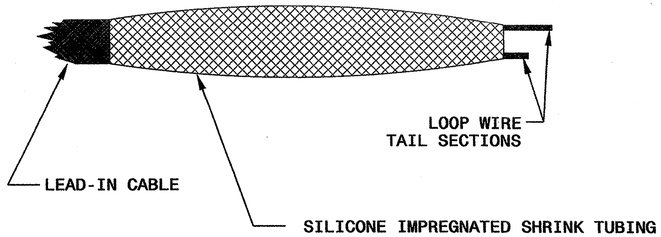
SERIES CONNECTION



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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

11-08

ENGLISH DETAIL DRAWING FOR

INDUCTIVE DETECTION LOOPS

SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3

1725D01

See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
750 N. Greenfield Parkway
Garner, NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 16286 ENGINEER MILTON I. DEAN

Milton I. Dean 11/24/08
SIGNATURE DATE