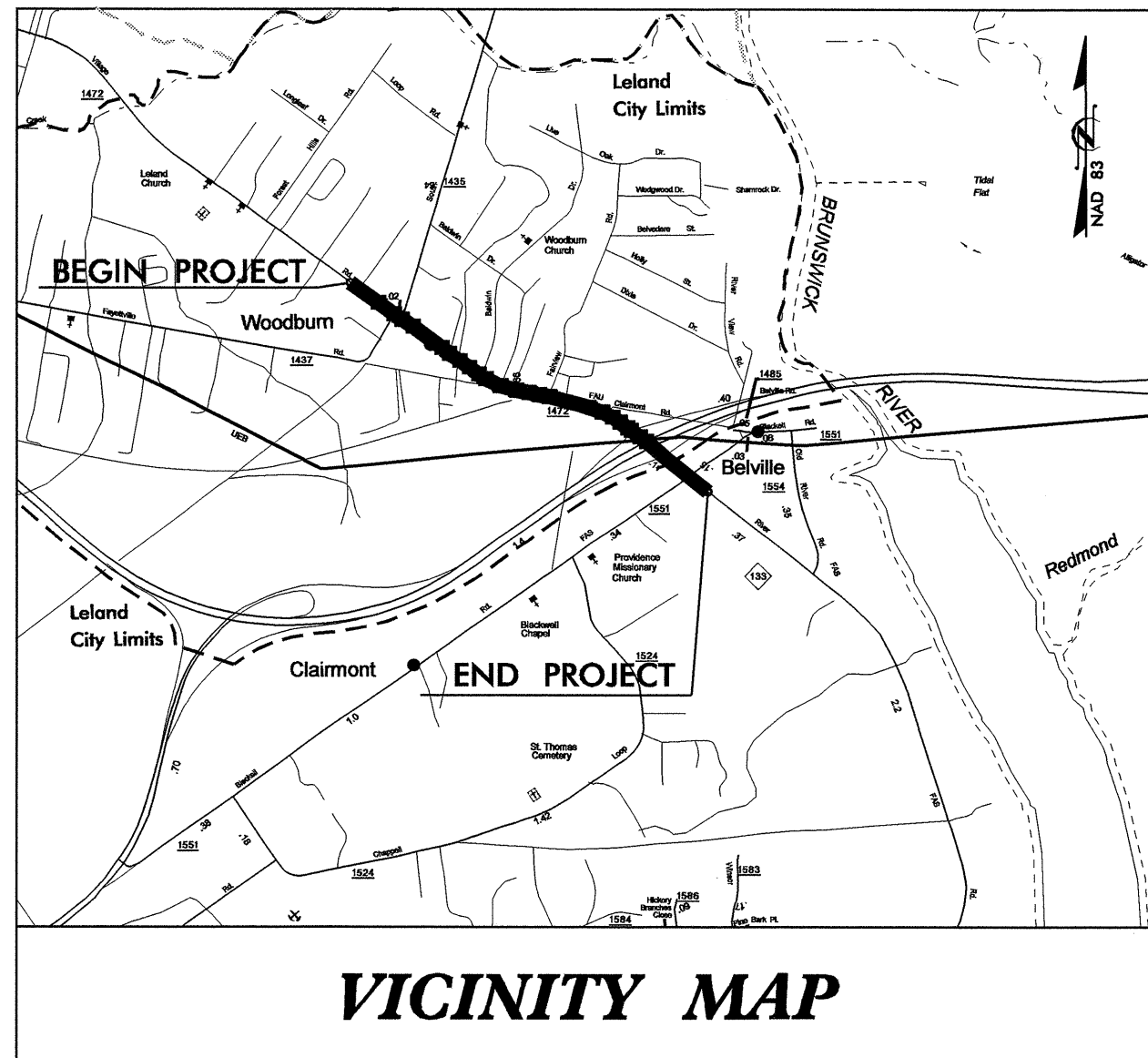


PROJECT: R-4002

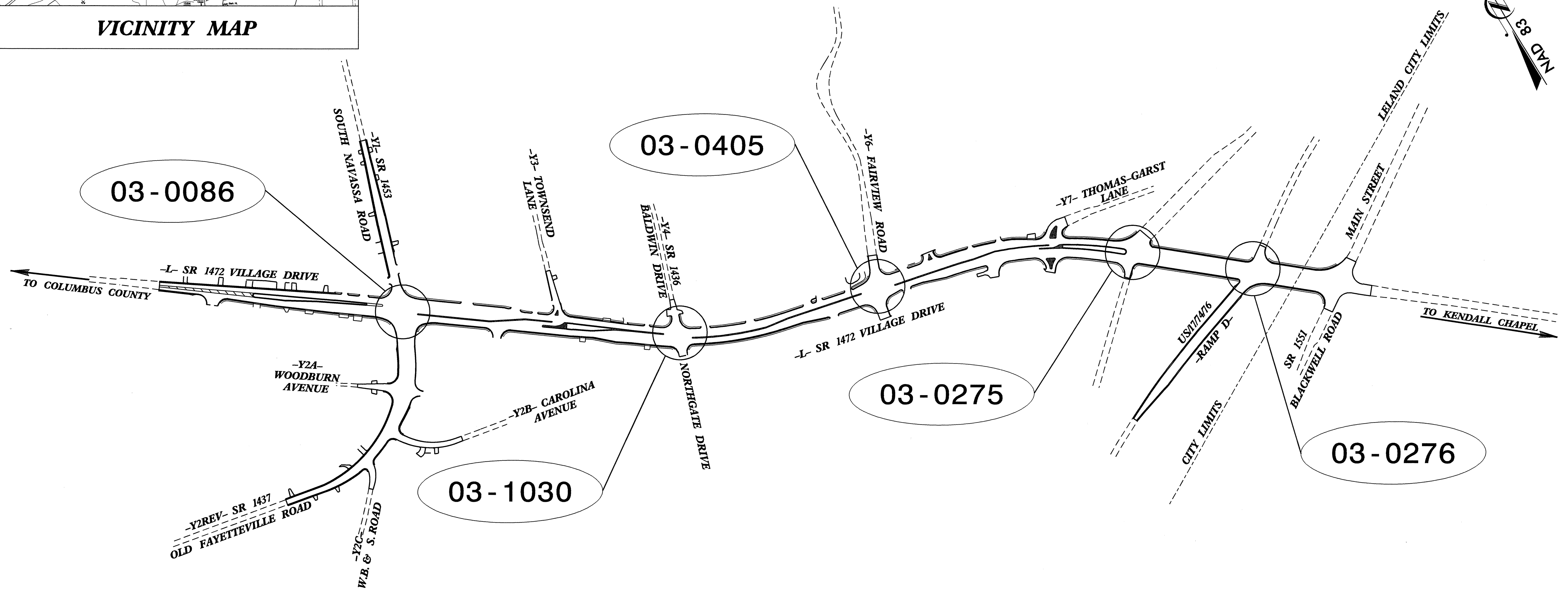


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BRUNSWICK COUNTY

LOCATION: LELAND-SR 1472 (VILLAGE DRIVE) WIDENING FROM WEST OF SR 1437 (OLD FAYETTEVILLE ROAD) /SR 1435 (NAVASSA ROAD) TO THE US 17 NORTHBOUND INTERCHANGE RAMPS
TYPE OF WORK: TRAFFIC SIGNALS

STATE N.C.	PROJECT NO. R-4002	SHEET NO. Sig. 1
P.A. PROJ. NO. PROJECT ID. NO.		



INDEX OF PLANS

SHEET NO.	SIGNAL INVENTORY NO.	LOCATION /DESCRIPTION
SIG. 1	N/A	Title Sheet
SIG. 2-13	03-0086 TI, T2 & Final	SR 1472 (Village Drive) at SR 1435 (South Navassa Road)/SR 1437 (Old Fayetteville Road)
SIG. 14-17	03-1030	SR 1472 (Village Drive) at SR 1436 (Baldwin Drive)/Northgate Drive
SIG. 18-26	03-0405 Temp. & Final	SR 1472 (Village Drive) at Fairview Road and North Brunswick Shopping Center
SIG. 27-34	03-0275 Temp. & Final	NC 133/SR 1472 (Village Drive) at US 17 SB 74-76 WB Ramp
SIG. 35-41	03-0276 Temp. & Final	NC 133/SR 1472 (Village Drive) at US 17 NB 74-76 EB Ramp
SIG. 42-46	N/A	Standard Drawings for Metal Poles
SIG. 47-51	N/A	Wireless Communications Plans
SIG. 52-54	N/A	Inductive Detection Loops Details

LEGEND

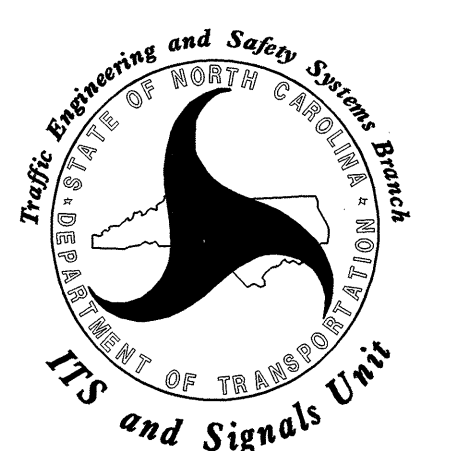
##-#### SIGNAL INVENTORY NUMBER

NCDOT CONTACTS:

INTELLIGENT TRANSPORTATION SYSTEMS & SIGNALS UNIT

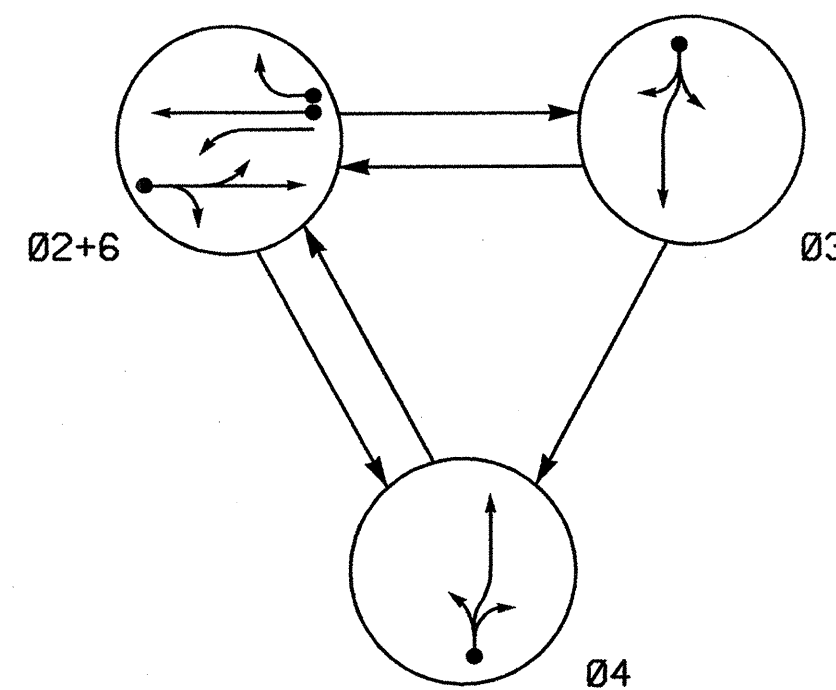
Jason P. Galloway, PE - Eastern Region Signals Project Engineer
George C. Brown, PE - Signal Equipment Design Engineer
G. G. Murr, Jr., PE - ITS Engineer

Prepared in the Offices of:



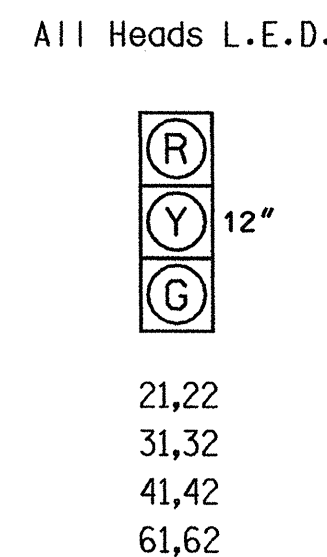
750 N. Greenfield Parkway, Garner, NC 27529

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	02+6	03	04	F L S H
21,22	G	R	R	Y
31,32	R	G	R	R
41,42	R	R	G	R
61,62	G	R	R	Y

SIGNAL FACE I.D.



2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	STRETCH TIME			DELAY TIME
2A	*	300	*	*	2	Y	Y	-	-	-	Y
3A	*	0	*	*	3	Y	Y	-	-	3	Y
4A	*	0	*	*	4	Y	Y	-	-	3	Y
6A	*	300	*	*	6	Y	Y	-	-	-	Y

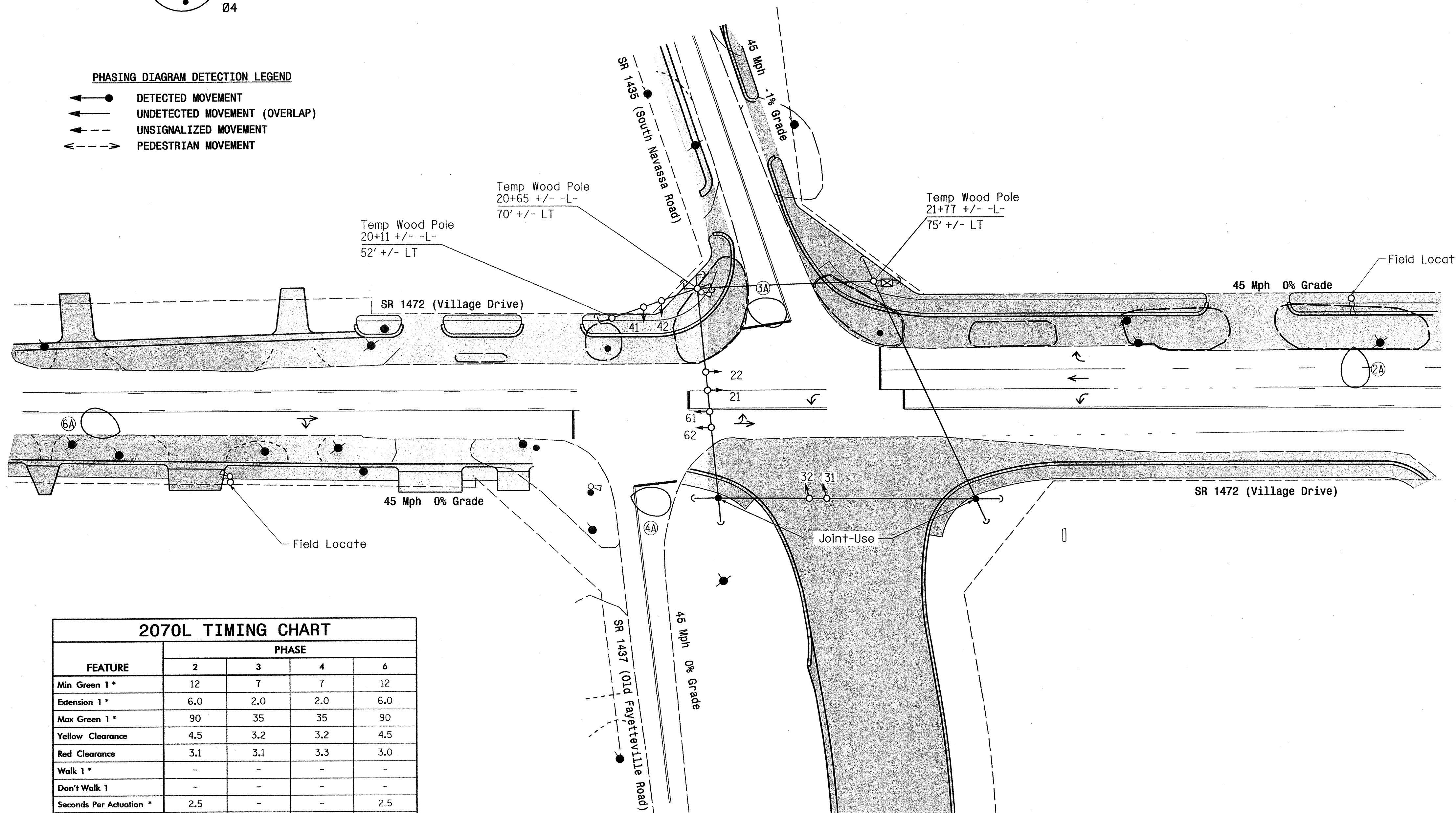
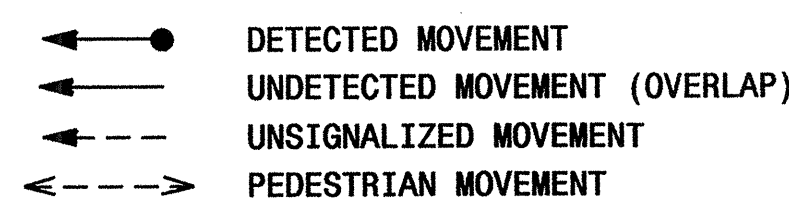
*Microwave Detection Zone

3 Phase Fully Actuated Isolated

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. The order of phase 3 and phase 4 may be reversed.
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.

PHASING DIAGRAM DETECTION LEGEND

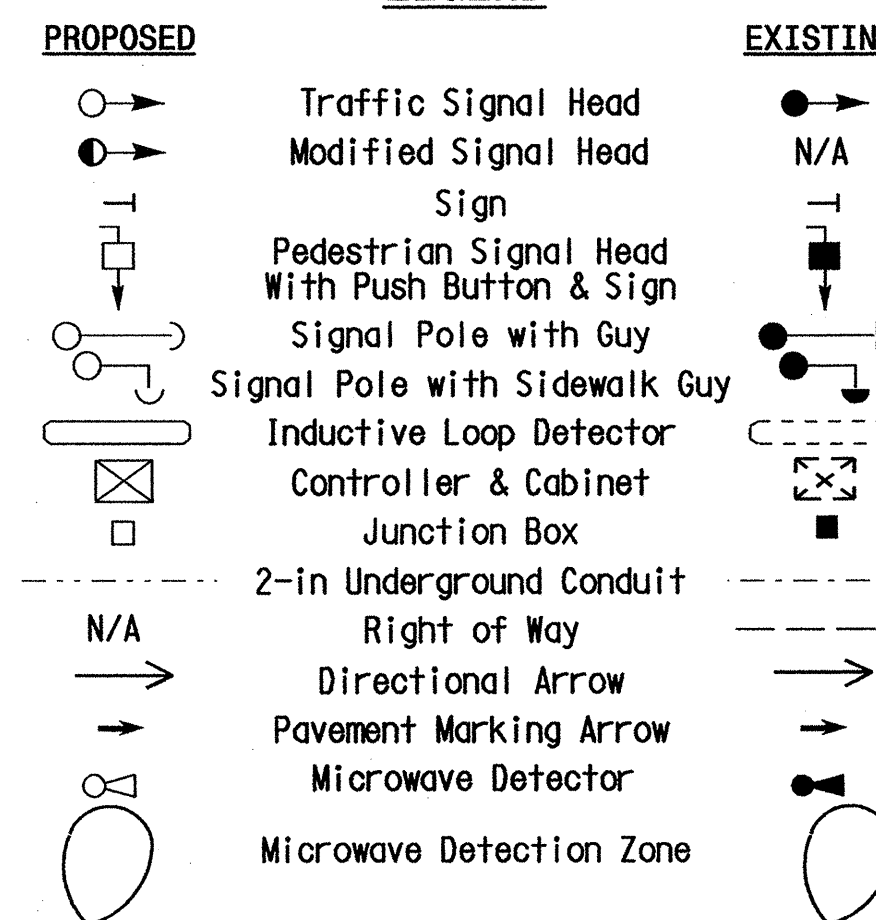


2070L TIMING CHART

FEATURE	PHASE			
	2	3	4	6
Min Green 1 *	12	7	7	12
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	90	35	35	90
Yellow Clearance	4.5	3.2	3.2	4.5
Red Clearance	3.1	3.1	3.3	3.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.5	-	-	2.5
Max Variable Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
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.

LEGEND



Signal Upgrade Phase 1 Temp 1

Prepared in the Offices of:
Traffic Engineering and Safety Consulting
BRUNSWICK COUNTY
DIVISION 3
750 N. Greenfield Place, Garner, NC 27529

SR 1472 (Village Drive)
At
SR 1435 (South Navassa Road) /
SR 1437 (Old Fayetteville Road)
Division 3 Brunswick County Leland

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

REVISIONS: INIT. DATE

SCALE: 1"=40'

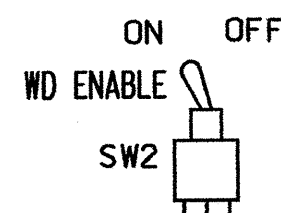
750 N. Greenfield Place, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
JASON P. GALLOWAY
29904

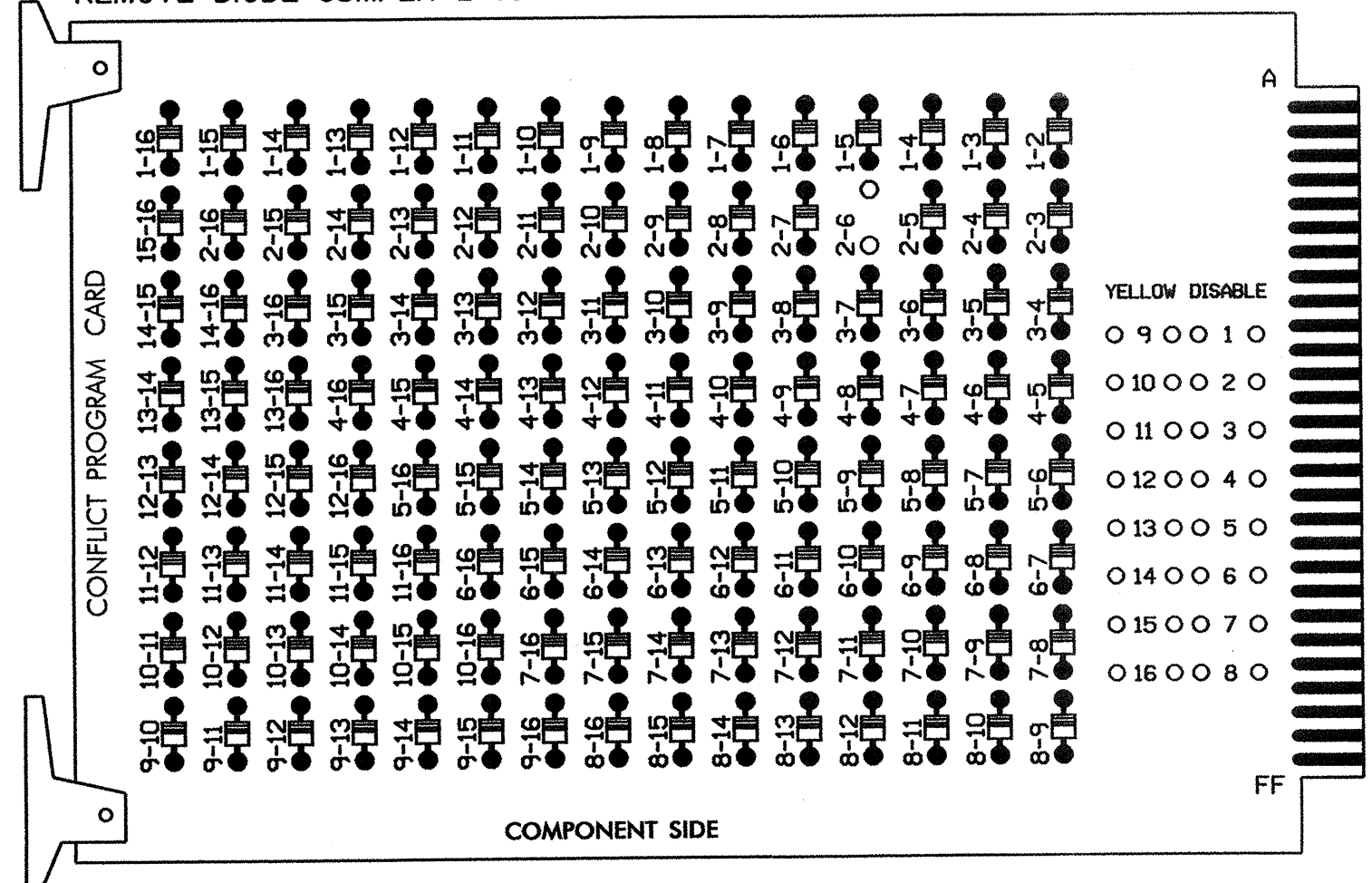
SIGNATURE: [Signature] DATE: 11/3/08
SIG. INVENTORY NO. 03-0086T1

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



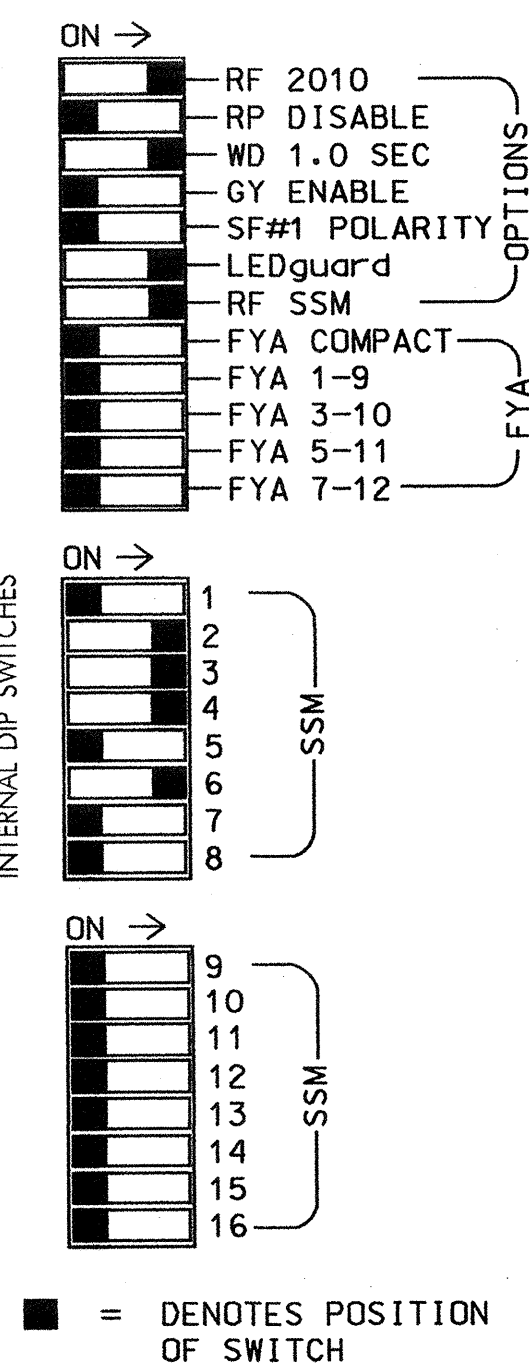
REMOVE DIODE JUMPER 2-6.



REMOVE JUMPER AS SHOWN

NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,5,7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S3,S4,S6
 PHASES USED.....2,3,4,6
 OVERLAPS.....NONE

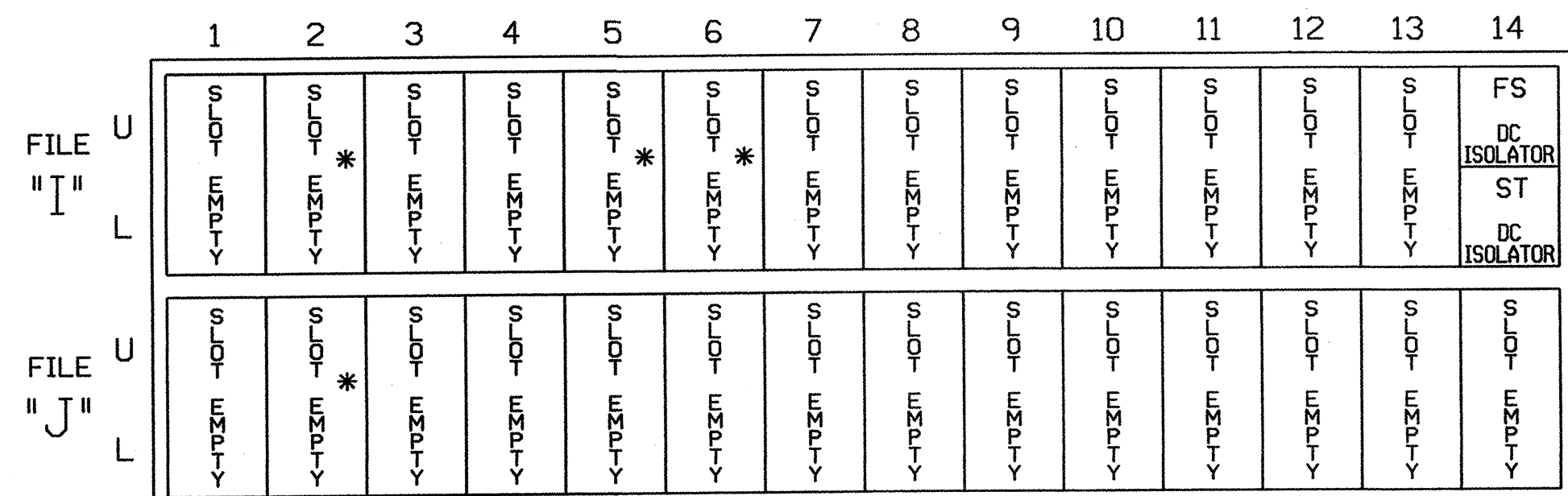
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	31,32	41,42	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128		116	101			134										
YELLOW		129		117	102			135										
GREEN		130		118	103			136										
RED ARROW																		
YELLOW ARROW																		
FLASHING YELLOW ARROW																		
GREEN ARROW																		

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

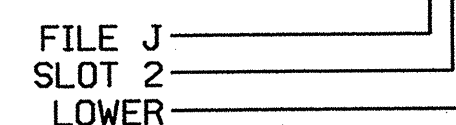
* Microwave Detector - Do not populate slot with detector card. See Accuwave Detector Panel Wiring Detail on sheet 2 of this electrical detail.

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	*	I2U	39	1	2	2	Y	Y			
3A	*	I5U	58	20	3	3	Y	Y			3
4A	*	I6U	41	3	4	4	Y	Y			3
6A	*	J2U	40	2	6	6	Y	Y			

* Microwave Detector - see Accuwave Detector Panel Wiring Detail on sheet 2 of this electrical detail.

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0086T1
 DESIGNED: October 2008
 SEALED: 11-03-08
 REVISED: N/A

Signal Upgrade Phase 1 Temp 1 Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1472 (Village Drive) at SR 1435 (South Navassa Road) / SR 1437 (Old Fayetteville Road)

Division 3 Brunswick County Leland

PLAN DATE: November 2008 REVIEWED BY: T. Vign

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: INT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

Signature: [Signature] DATE: 12/2/08

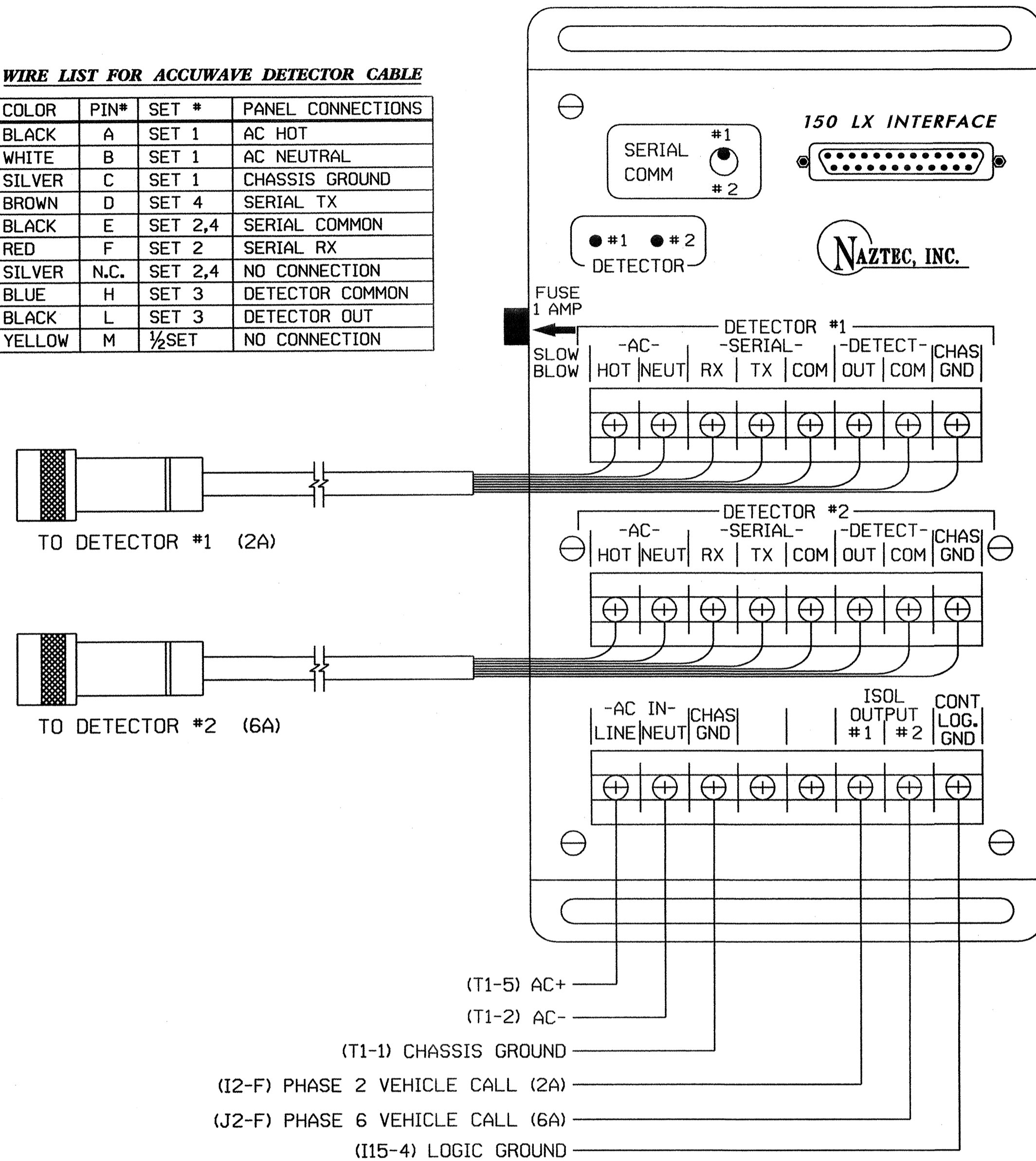
SIG. INVENTORY NO. 03-0086T1

ACCUWAVE DETECTOR PANEL #1 WIRING DETAIL FOR 2A AND 6A

(wire as shown)

WIRE LIST FOR ACCUWAVE DETECTOR CABLE

COLOR	PIN#	SET #	PANEL CONNECTIONS
BLACK	A	SET 1	AC HOT
WHITE	B	SET 1	AC NEUTRAL
SILVER	C	SET 1	CHASSIS GROUND
BROWN	D	SET 4	SERIAL TX
BLACK	E	SET 2,4	SERIAL COMMON
RED	F	SET 2	SERIAL RX
SILVER	N.C.	SET 2,4	NO CONNECTION
BLUE	H	SET 3	DETECTOR COMMON
BLACK	L	SET 3	DETECTOR OUT
YELLOW	M	1/2SET	NO CONNECTION

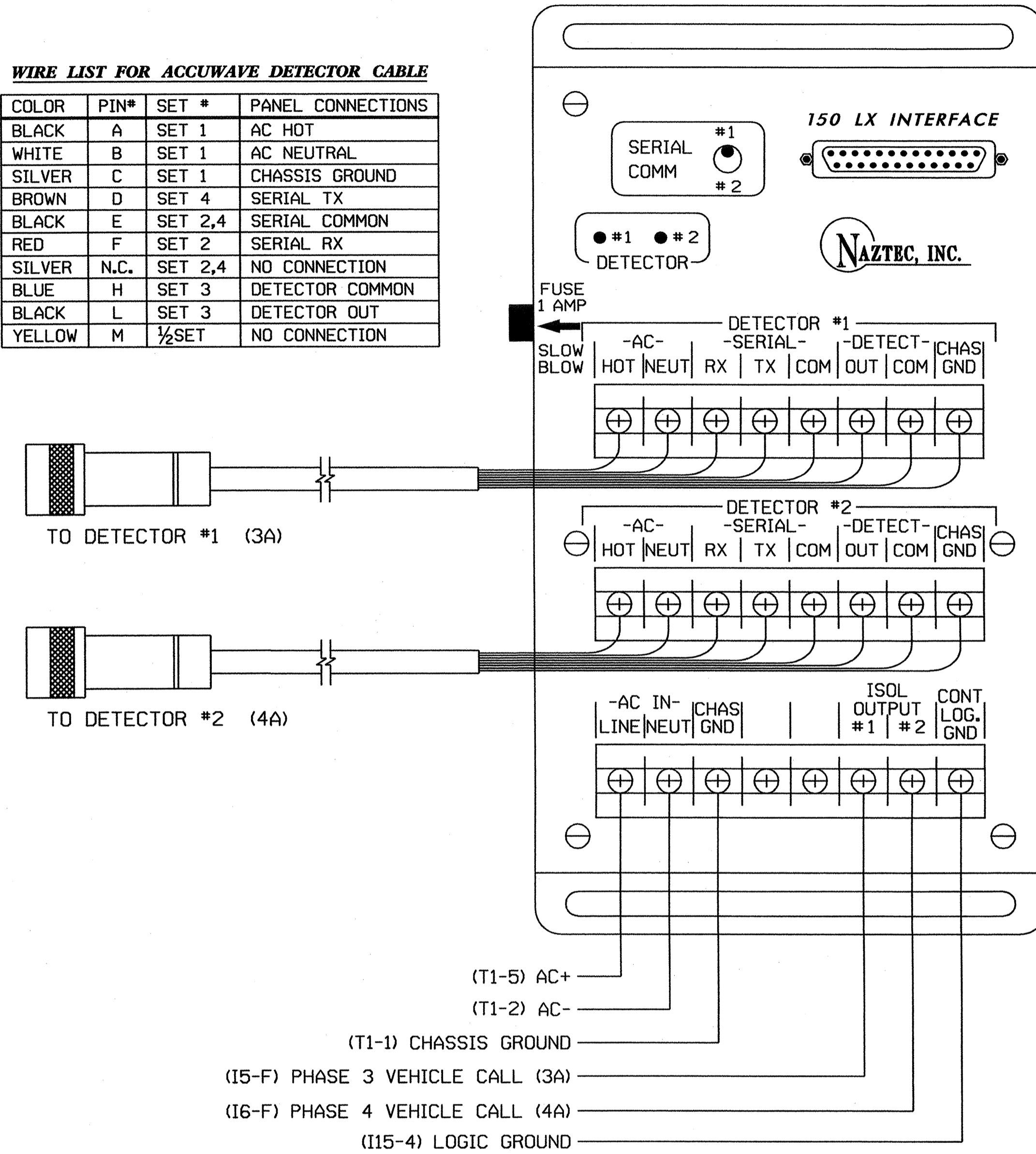


ACCUWAVE DETECTOR PANEL #2 WIRING DETAIL FOR 3A AND 4A

(wire as shown)

WIRE LIST FOR ACCUWAVE DETECTOR CABLE

COLOR	PIN#	SET #	PANEL CONNECTIONS
BLACK	A	SET 1	AC HOT
WHITE	B	SET 1	AC NEUTRAL
SILVER	C	SET 1	CHASSIS GROUND
BROWN	D	SET 4	SERIAL TX
BLACK	E	SET 2,4	SERIAL COMMON
RED	F	SET 2	SERIAL RX
SILVER	N.C.	SET 2,4	NO CONNECTION
BLUE	H	SET 3	DETECTOR COMMON
BLACK	L	SET 3	DETECTOR OUT
YELLOW	M	1/2SET	NO CONNECTION



NOTES:

1. Detectors are Accuwave Model 150LX presence detectors.
2. Information in the detector cable wire list chart is for cable purchased from Naztec and may vary if purchased from another source.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0086T1
 DESIGNED: October 2008
 SEALED: 11-03-08
 REVISED: N/A

Signal Upgrade Phase 1 Temp 1 Sheet 2 of 2

	ELECTRICAL AND PROGRAMMING DETAILS FOR:		SR 1472 (Village Drive) at		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Prepared in the Offices of:		SR 1435 (South Navassa Road) / SR 1437 (Old Fayetteville Road)		
Division 3 Brunswick County Leland		PLAN DATE: November 2008	REVIEWED BY: T. J. J.	SIGNATURE: George C. Brown 12/2/08	
PREPARED BY: S. Armstrong		REVIEWED BY:	REVISIONS	INIT.	DATE
750 N. Greenfield Pkwy, Garner, NC 27529		SIG. INVENTORY NO. 03-0086T1		DATE	

PHASING DIAGRAM

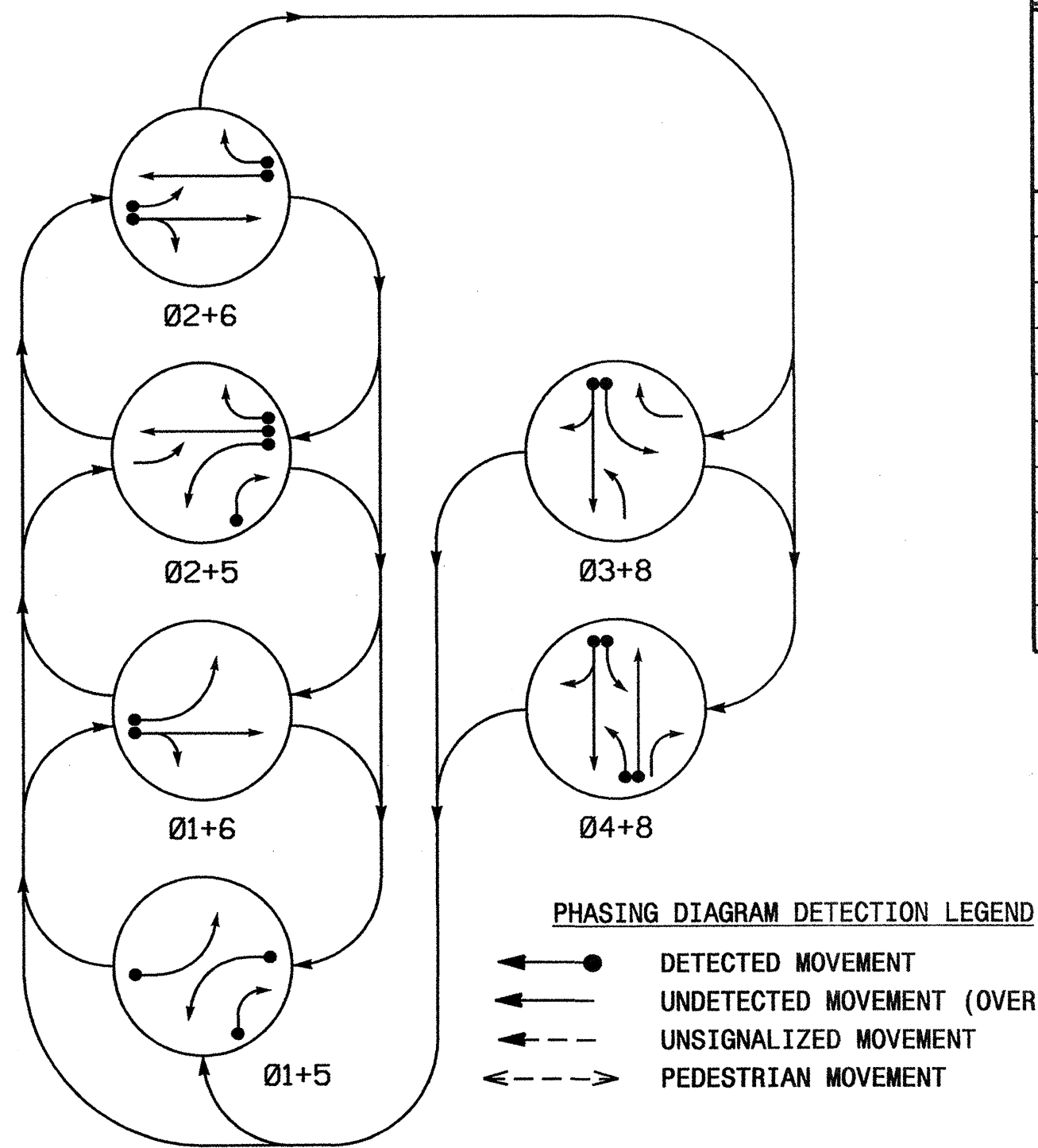
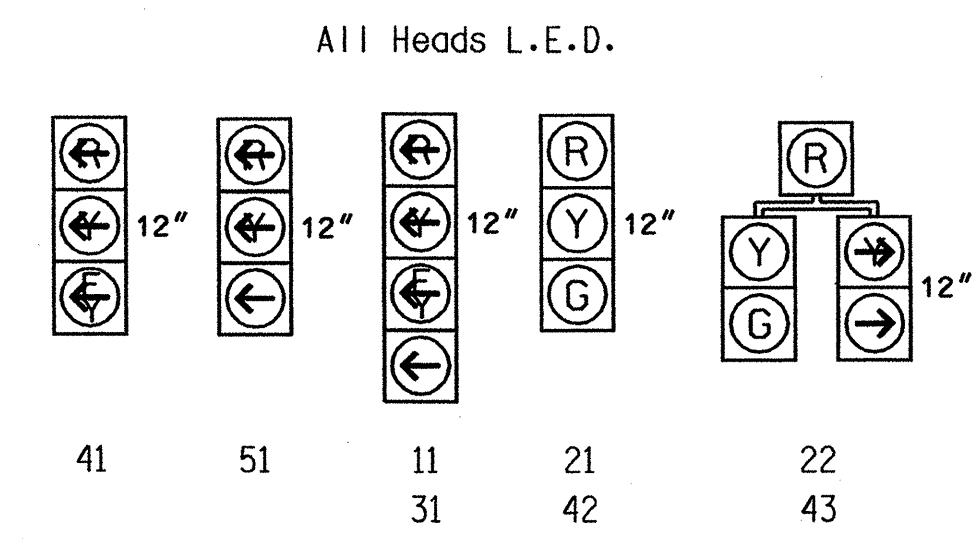


TABLE OF OPERATION

SIGNAL FACE	PHASE							
	01+5	02+5	02+6	03+8	04+8	01+6	01+5	F
11	-	-	-	-	-	-	-	-
21	R	R	G	G	R	R	Y	
22	R	R	G	G	R	R	Y	
31	R	R	G	G	R	R	Y	
41	R	R	G	G	R	R	Y	
42	R	R	R	R	R	G	R	
43	R	R	R	R	R	G	R	
51	R	R	R	R	R	R	Y	
61,62	R	G	R	G	R	R	Y	
81,82	R	R	R	R	G	G	R	

SIGNAL FACE I.D.



2070L LOOP & DETECTOR INSTALLATION

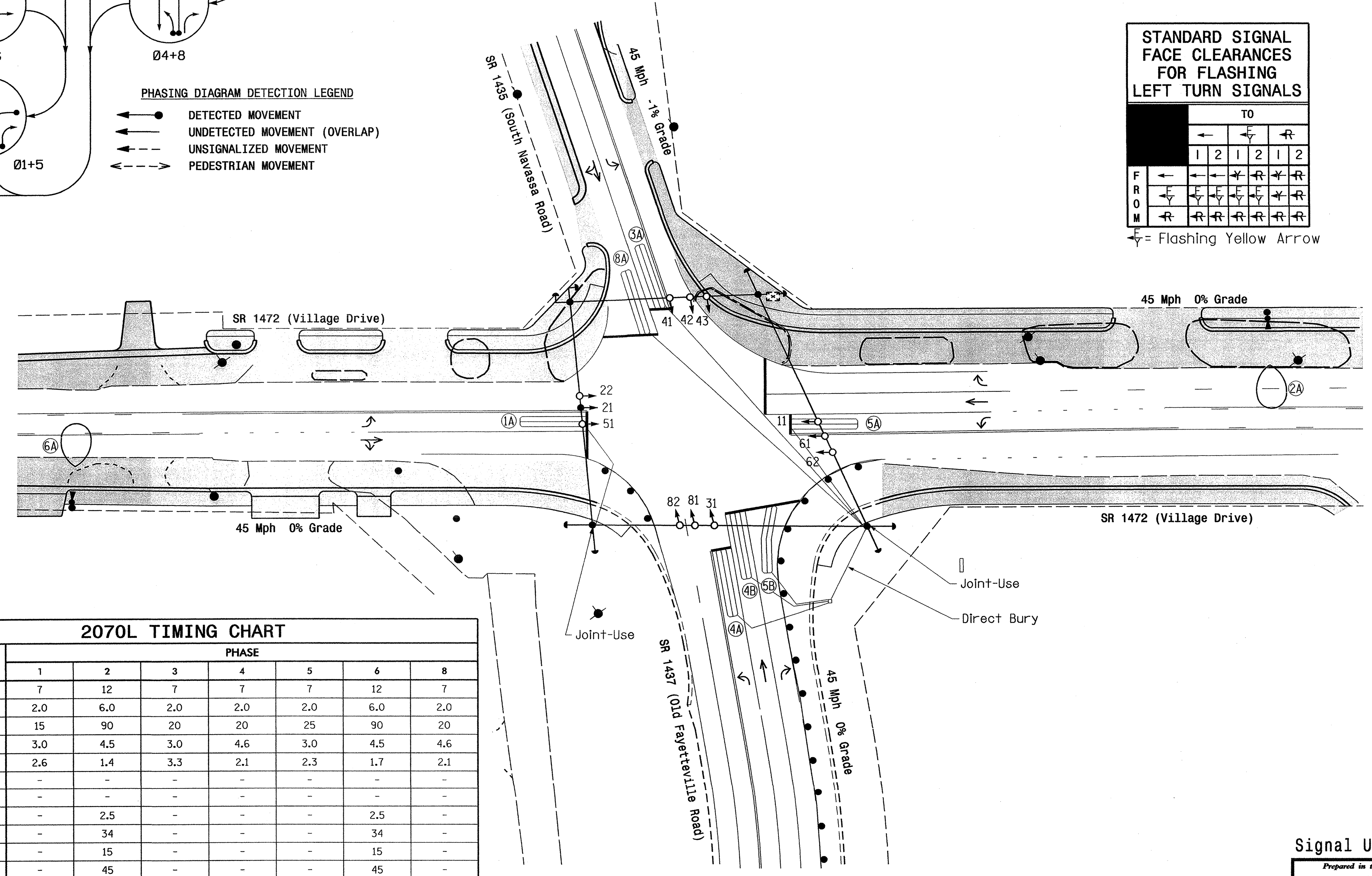
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	STRETCH TIME			DELAY TIME
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15	-	Y
2A	*	300	*	*	2	Y	Y	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	15	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	3	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	Y
5B	6X40	0	2-4-2	Y	5	Y	Y	-	15	-	Y
6A	*	300	*	*	6	Y	Y	-	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	10	-	Y

* Microwave Detection Zone

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNALS

FROM	TO					
	1	2	1	2	1	2
F	←	←	←	←	←	←
R	←	←	←	←	←	←
O	←	←	←	←	←	←

← = Flashing Yellow Arrow



LEGEND

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

2070L TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	8	
Min Green 1 *	7	12	7	7	7	12	7	
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	
Max Green 1 *	15	90	20	20	25	90	20	
Yellow Clearance	3.0	4.5	3.0	4.6	3.0	4.5	4.6	
Red Clearance	2.6	1.4	3.3	2.1	2.3	1.7	2.1	
Walk 1 *	-	-	-	-	-	-	-	
Don't Walk 1	-	-	-	-	-	-	-	
Seconds Per Actuation *	-	2.5	-	-	-	2.5	-	
Max Variable Initial *	-	34	-	-	-	34	-	
Time Before Reduction *	-	15	-	-	-	15	-	
Time To Reduce *	-	45	-	-	-	45	-	
Minimum Gap	-	3.0	-	-	-	3.0	-	
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	
Dual Entry	-	-	-	ON	-	-	ON	
Simultaneous Gap	ON	ON	ON	ON	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 Phase I, II & III Temp 2

SR 1472 (Village Drive)
At
SR 1435 (South Navassa Road) /
SR 1437 (Old Fayetteville Road)

Division 3 Brunswick County Leland

PREPARED BY: JPG/IOU REVISIONS: DATE: INIT. DATE: REVIEWED BY: DATE: SIGNATURE: DATE: 11/3/08

750 N. Greenfield Pkwy, Garner, NC 27529

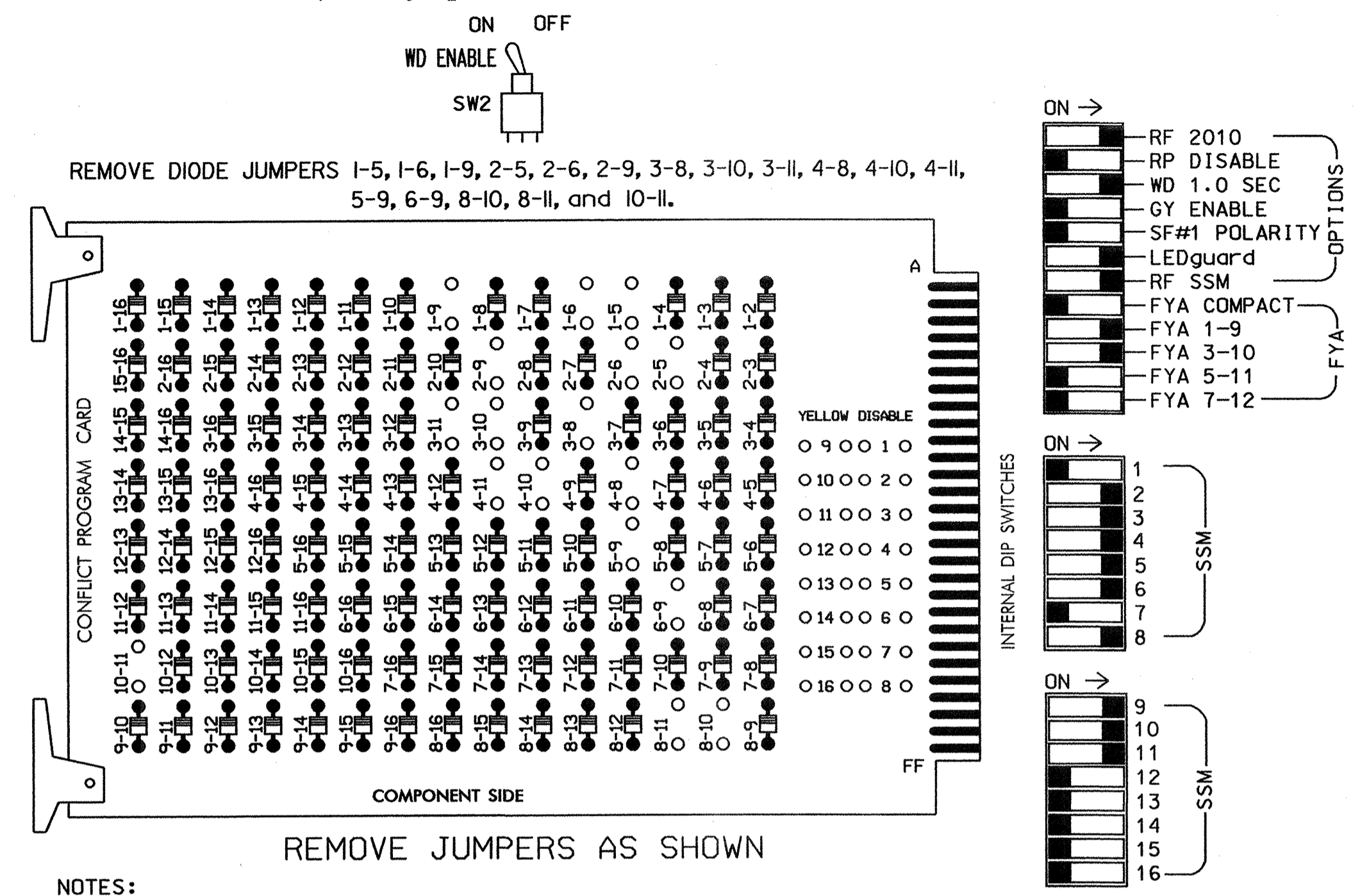
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SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
J. SPAN P. GALLAWAY
29904
SIG. INVENTORY NO. 03-0086T2

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EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

NOTES

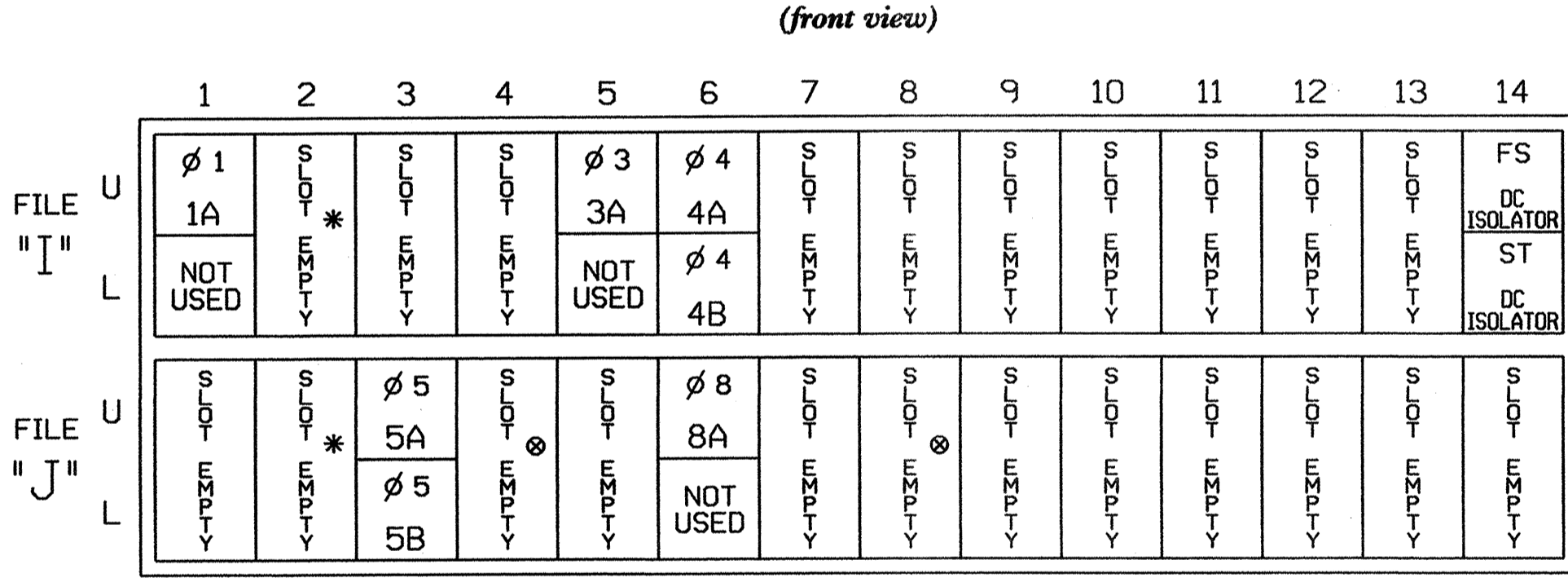
- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,7, 12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11	21,22	NU	22	31	42,43	NU	43	51	61,62	NU	NU	81,82	NU	11	31	NU	41	NU
RED		128		*	101				134			107							
YELLOW	*	129			102				135			108							
GREEN		130			103				136			109							
RED ARROW									131					A121	A124			A114	
YELLOW ARROW				117				132	132					A122	A125			A115	
FLASHING YELLOW ARROW														A123	A126			A116	
GREEN ARROW	127			118	118			133	133										
Hand																			
Person																			

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail below.
 Flash note: for proper flash operation, see Flasher Circuit Modification Detail on sheet 2.

INPUT FILE POSITION LAYOUT

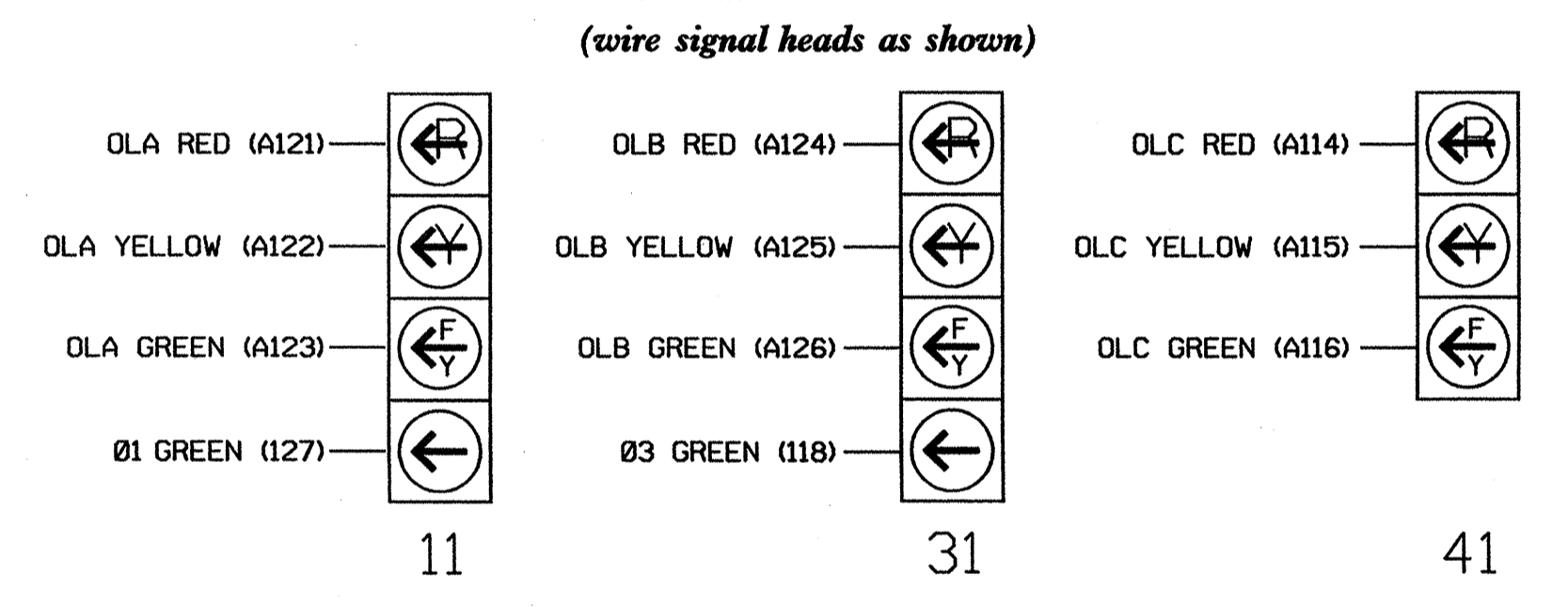


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 * Wired Input - Do not populate slot with detector card
 * Microwave Detector - Do not populate slot with detector card. See Accuwave Detector Panel Wiring Detail on sheet 3 of this electrical detail.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S8,S9,S10,S12
 PHASES USED.....1,2,3,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....3+4
 OVERLAP "D".....NOT USED

3 & 4 SECTION FYA PPLT SIGNAL WIRING DETAIL



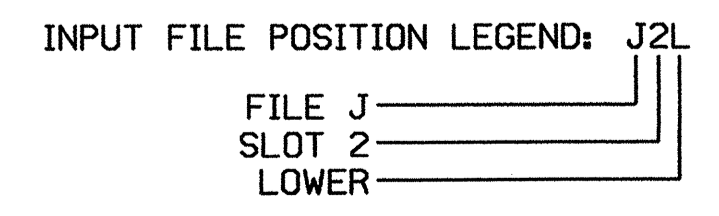
NOTE
 1. The sequence display for heads 11 and 31 requires special logic programming. See sheet 2 for programming instructions.

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	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
2A	*	I2U	39	1	2	2	Y	Y			
3A ²	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	J8U	50	12	28	8	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A	TB3-9,10	J3U	64	26	36	5	Y	Y			
5B	TB3-11,12	J3L	77	39	46	5	Y	Y			15
6A	*	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			10

- Add jumper from I1-W to J4-W, on rear of input file.
- Add jumper from I5-W to J8-W, on rear of input file.

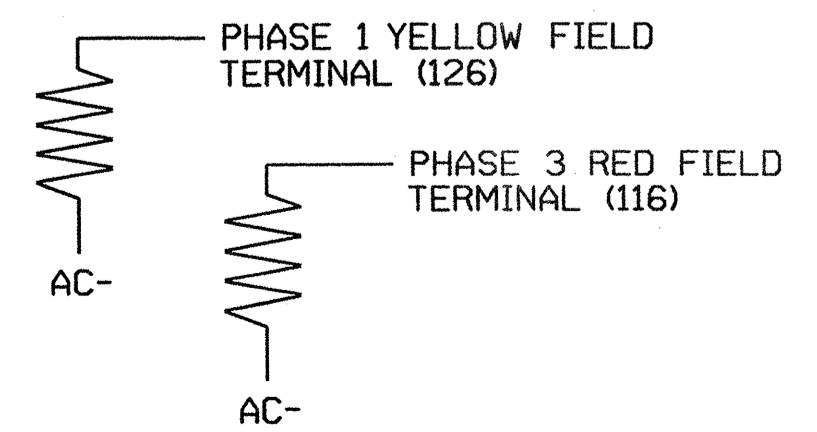
* Microwave Detector - see Accuwave Detector Panel Wiring Detail on sheet 3 of this electrical detail.



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0086T2
 DESIGNED: October 2008
 SEALED: 11-03-08
 REVISED: N/A

Signal Upgrade Phase I, II, & III Temp 2 Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1472 (Village Drive) at SR 1435 (South Navassa Road) / SR 1437 (Old Fayetteville Road)

Division 3 Brunswick County Leland

PLAN DATE: November 2008 REVIEWED BY: T. J. J. J.

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: _____ INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

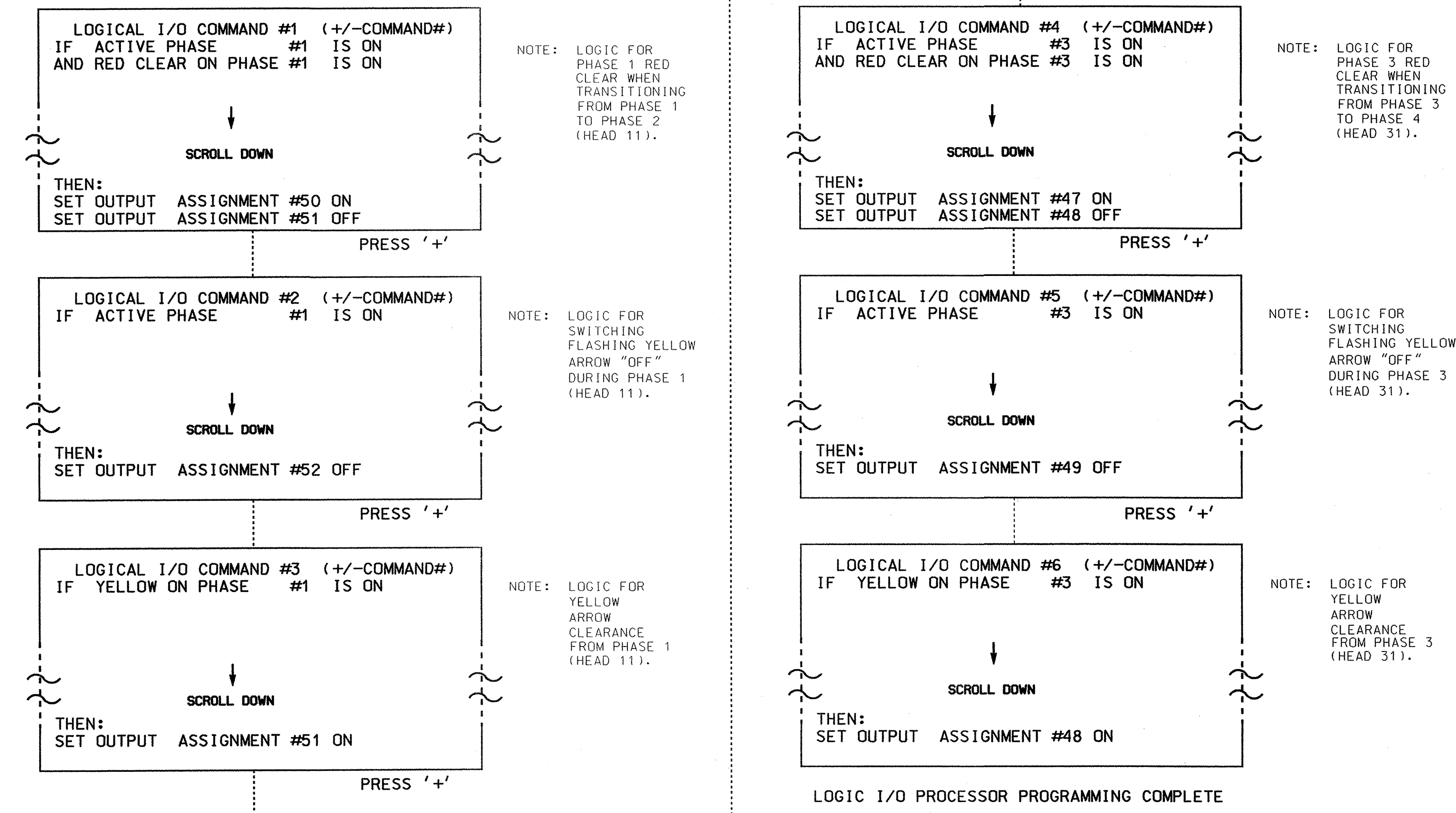
Professional Engineer Seal for George C. Brown, License No. 022013, State of North Carolina.

Sig. Inventory No. 03-0086T2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

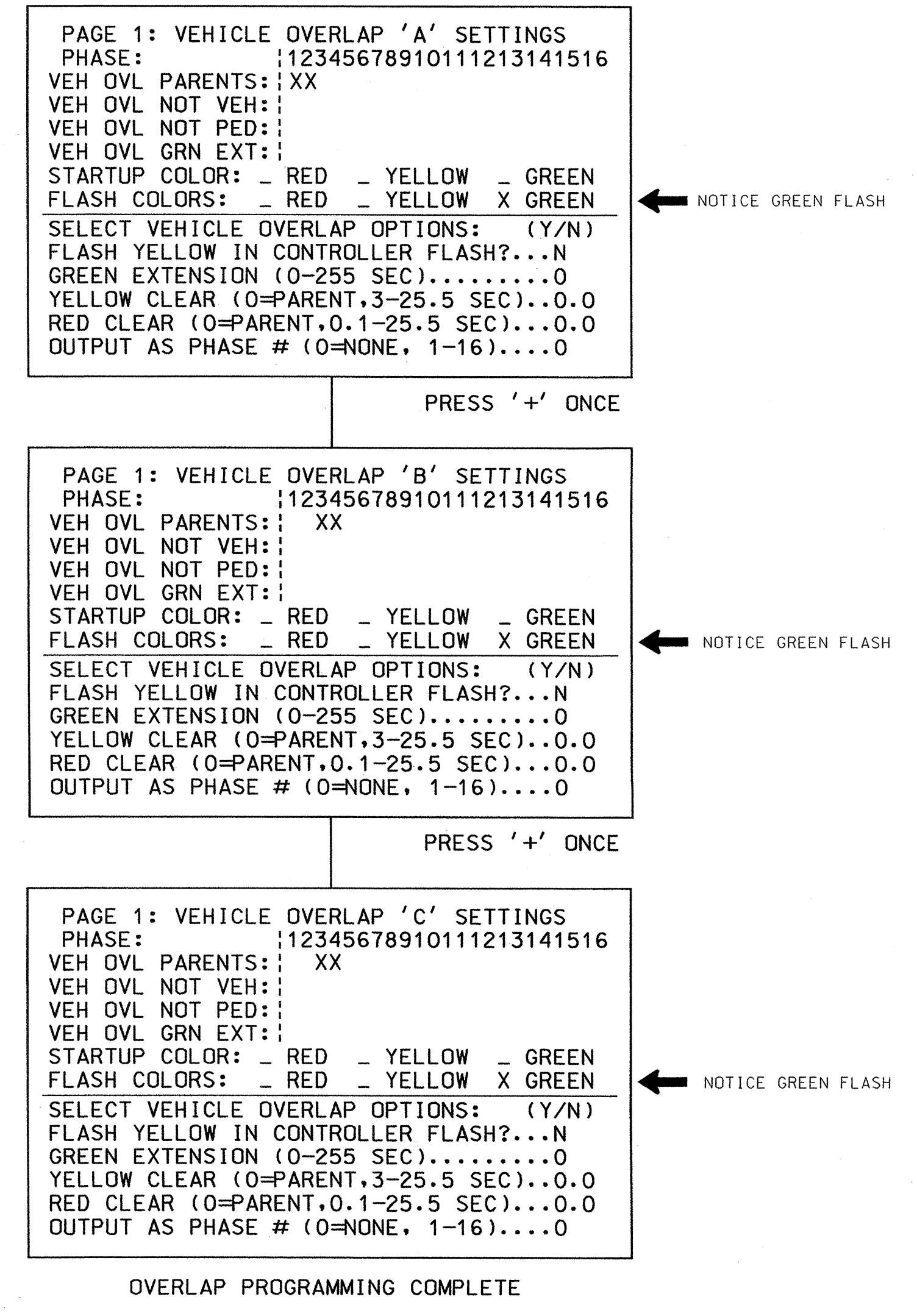


OUTPUT REFERENCE SCHEDULE
OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0086T2
DESIGNED: October 2008
SEALED: 11-03-08
REVISED: N/A

FLASHER CIRCUIT MODIFICATION DETAIL

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

- ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
 - ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
 - REMOVE FLASHER UNIT 2.
- THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

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Signal Upgrade Phase I, II, & III Temp 2 Sheet 2 of 3

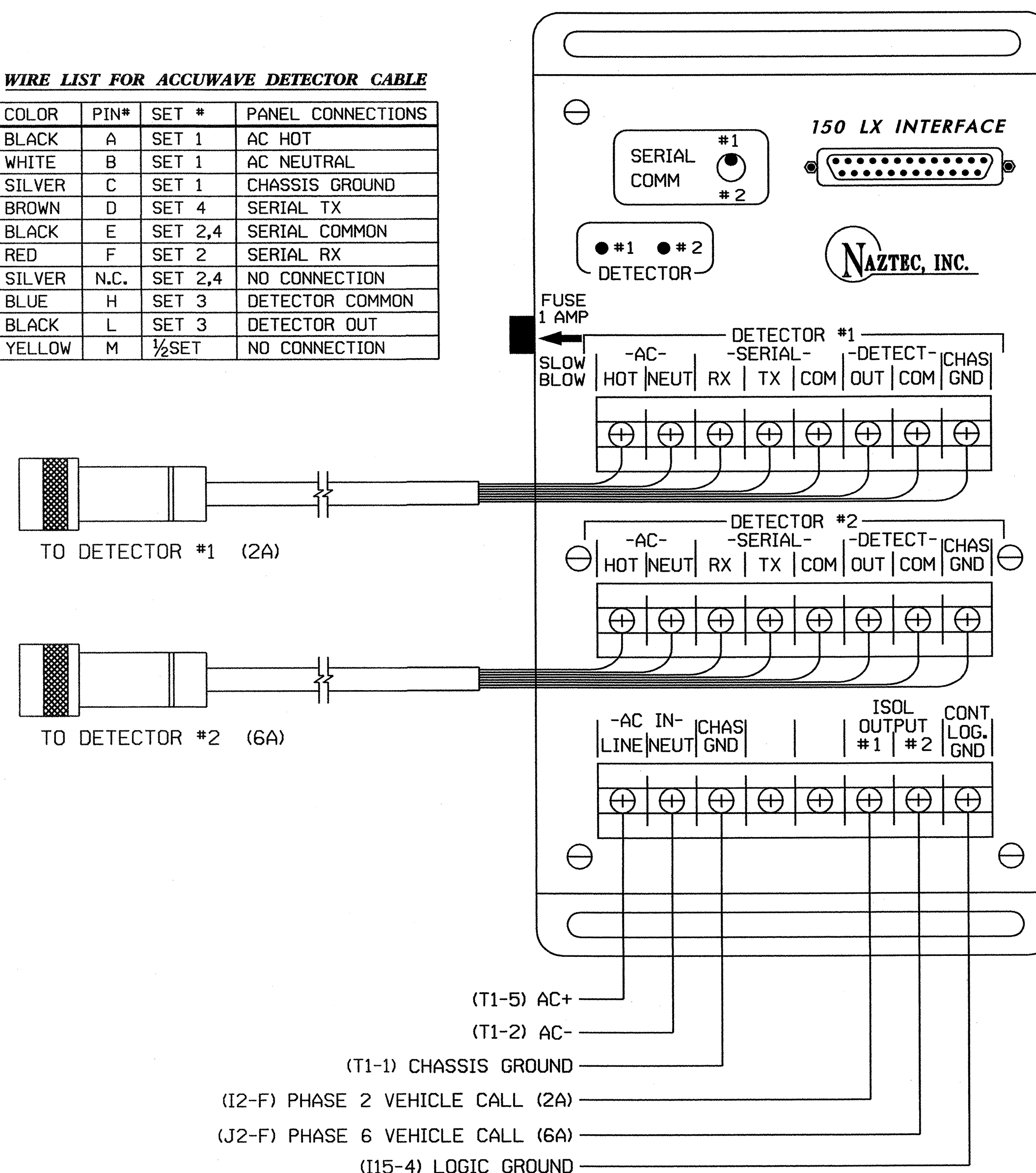
	SR 1472 (Village Drive)		
	at		
	SR 1435 (South Navassa Road) / SR 1437 (Old Fayetteville Road)		
	Division 3 Brunswick County Leland		
ELECTRICAL AND PROGRAMMING DETAILS FOR:	Prepared in the Offices of:	PLAN DATE: November 2008	REVIEWED BY: T. J. J...
750 N. Greenfield Pkwy, Garner, NC 27529	S. Armstrong	REVISIONS	DATE
		INIT.	DATE
		Signature: <i>George C. Brown</i> 12/3/08 DATE:	
S16. INVENTORY NO. 03-0086T2			

ACCUWAVE DETECTOR PANEL WIRING DETAIL FOR 2A AND 6A

(wire as shown)

WIRE LIST FOR ACCUWAVE DETECTOR CABLE

COLOR	PIN#	SET #	PANEL CONNECTIONS
BLACK	A	SET 1	AC HOT
WHITE	B	SET 1	AC NEUTRAL
SILVER	C	SET 1	CHASSIS GROUND
BROWN	D	SET 4	SERIAL TX
BLACK	E	SET 2,4	SERIAL COMMON
RED	F	SET 2	SERIAL RX
SILVER	N.C.	SET 2,4	NO CONNECTION
BLUE	H	SET 3	DETECTOR COMMON
BLACK	L	SET 3	DETECTOR OUT
YELLOW	M	1/2 SET	NO CONNECTION




THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-0086T2
 DESIGNED: October 2008
 SEALED: 11-03-08
 REVISED: N/A

NOTES:

1. Detector is Accuwave Model 150LX presence detector.
2. Information in the detector cable wire list chart is for cable purchased from Naztec and may vary if purchased from another source.

Signal Upgrade Phase I, II, & III Temp 2 Sheet 3 of 3

02-DEC-2008 12:24 s:\pdm\smc\kgr\cupss\10 man\mms\tr\030086T2.sil.e.lxxx.dgn

Prepared in the Offices of:  750 N. Greenfield Place, Garner, NC 27529	SR 1472 (Village Drive) at SR 1435 (South Navassa Road) / SR 1437 (Old Fayetteville Road)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Division 3 Brunswick County Leland	PLAN DATE: November 2008 REVIEWED BY: <i>T. J. J...</i>
	PREPARED BY: S. Armstrong REVIEWED BY:	REVISIONS: _____ INIT: _____ DATE: _____
	SIGNATURE: <i>S. Armstrong</i> DATE: _____	SIG. INVENTORY NO. 03-0086T2

PHASING DIAGRAM

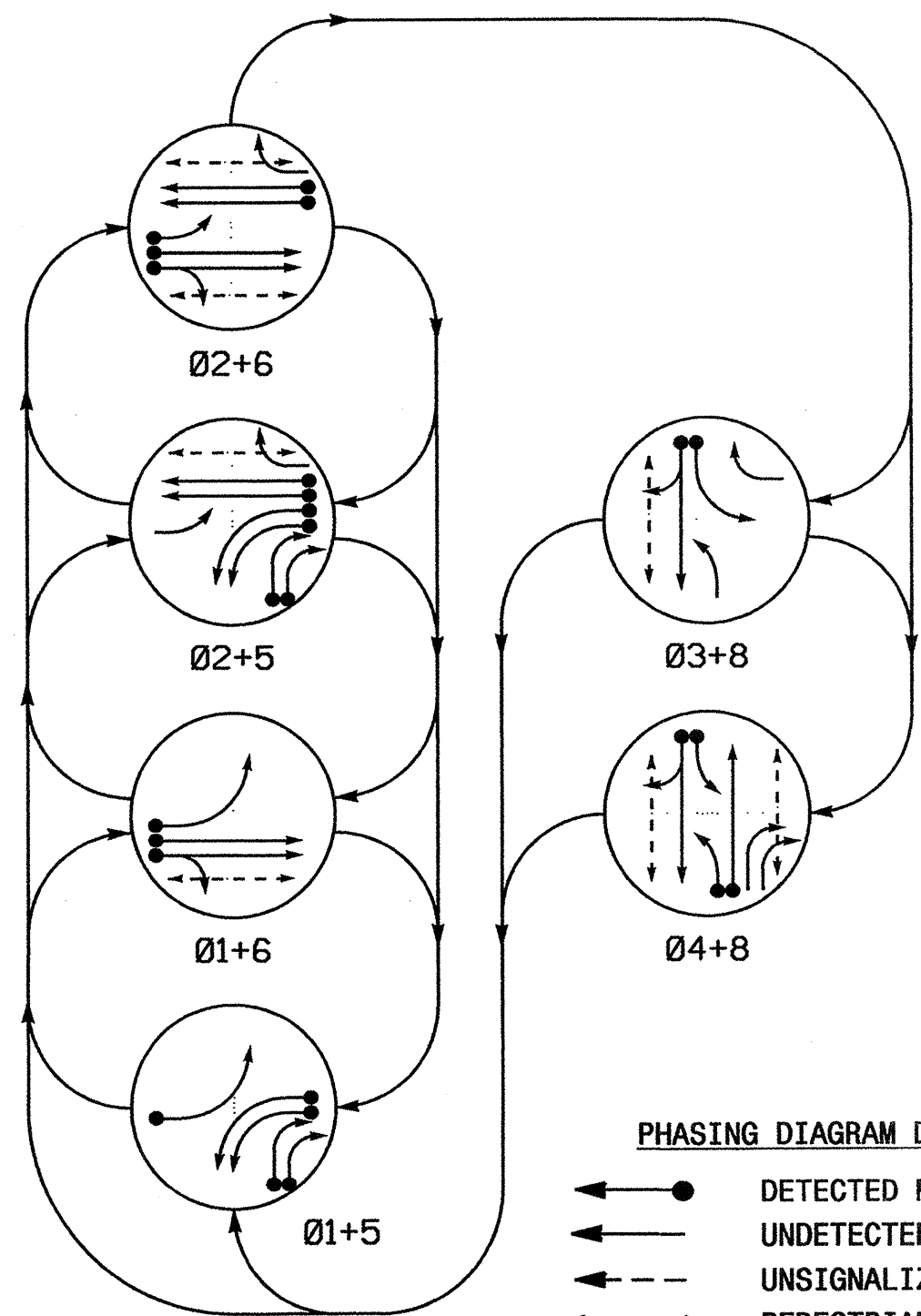


TABLE OF OPERATION

SIGNAL FACE	PHASE							
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	Ø 3+8	Ø 4+8	Ø 1+5	Ø 1+6
11	-	-	-	-	-	-	-	-
21	R	R	G	G	R	R	R	Y
22	R	R	G	G	R	R	R	Y
31	R	R	R	R	-	-	-	-
41	R	R	R	R	-	-	-	-
42	R	R	R	R	G	R	R	R
43,44	R	R	R	R	R	G	R	R
51,52	-	-	-	-	-	-	-	-
61,62	R	G	R	G	R	R	R	Y
81,82	R	R	R	R	G	G	R	R
P21,P22	DW	DW	W	W	DW	DW	DRK	DRK
P41,P42	DW	DW	DW	DW	DW	W	DRK	DRK
P61,P62	DW	W	DW	W	DW	DW	DRK	DRK
P81,P82	DW	DW	DW	DW	W	W	DRK	DRK

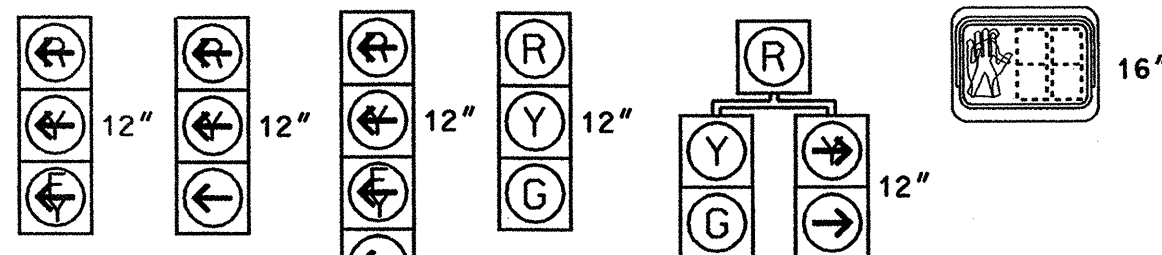
W - Walk
DW - Don't Walk
DRK - Dark

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNALS

TO	FROM					
	1	2	1	2	1	2
←	←	←	←	←	←	←
→	→	→	→	→	→	→
↔	↔	↔	↔	↔	↔	↔
↔	↔	↔	↔	↔	↔	↔
↔	↔	↔	↔	↔	↔	↔
↔	↔	↔	↔	↔	↔	↔

↔ = Flashing Yellow Arrow

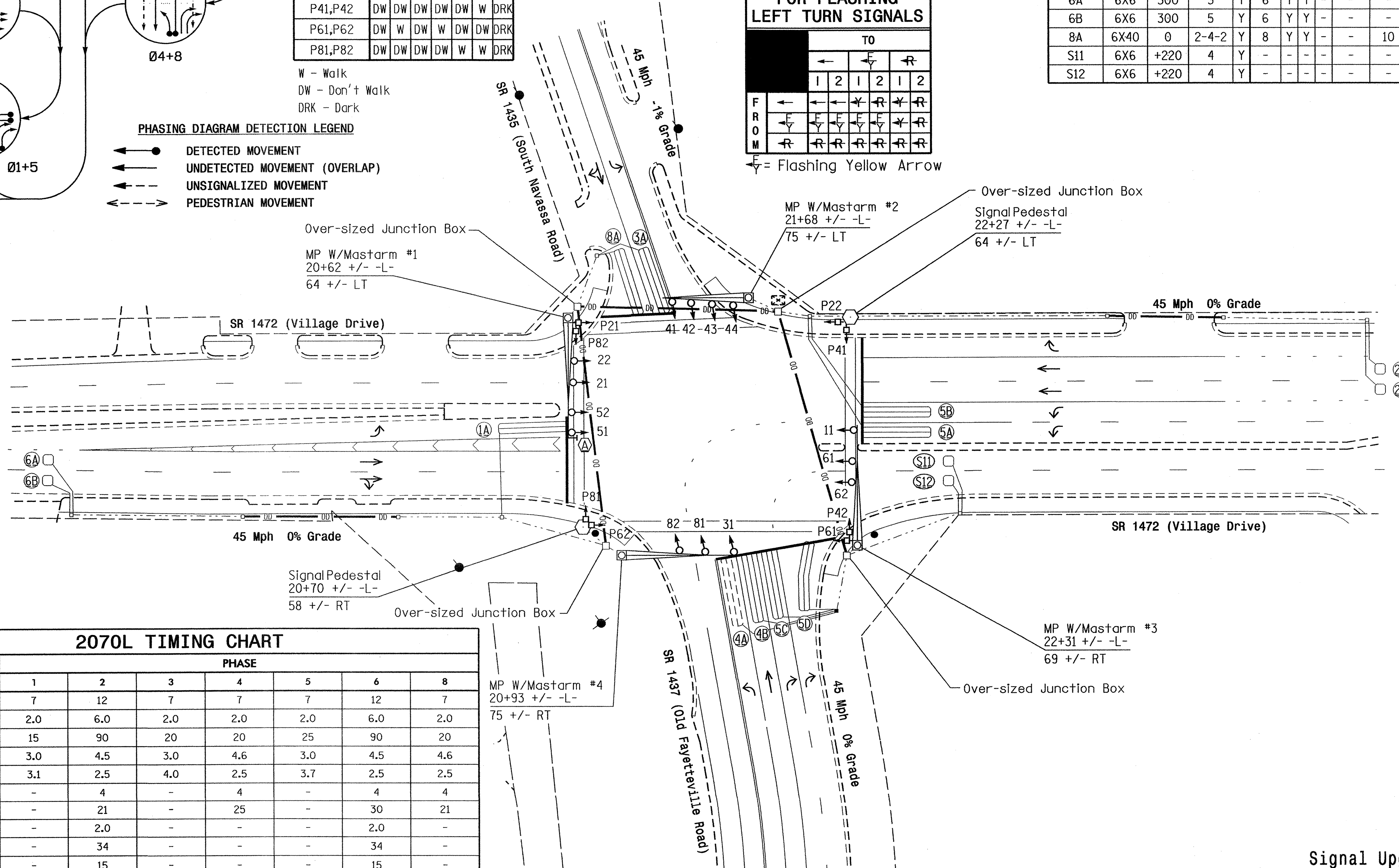
2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME		
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15	-	-
2A	6X6	300	4	Y	2	Y	Y	-	-	-	Y
2B	6X6	300	4	Y	2	Y	Y	-	-	-	Y
3A	6X40	0	2-4-2	Y	3	Y	Y	-	15	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	3	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-
5C	6X40	0	2-4-2	Y	5	Y	Y	-	15	-	Y
5D	6X40	0	2-4-2	Y	5	Y	Y	-	15	-	Y
6A	6X6	300	5	Y	6	Y	Y	-	-	-	Y
6B	6X6	300	5	Y	6	Y	Y	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	10	-	-
S11	6X6	+220	4	Y	-	-	-	-	-	Y	Y
S12	6X6	+220	4	Y	-	-	-	-	-	Y	Y

6 Phase Fully Actuated
NC 133/SR 1472 (Village Drive) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- Phase 3 may be lagged.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #0086.



2070L TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	8	
Min Green 1 *	7	12	7	4	7	12	7	
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	
Max Green 1 *	15	90	20	20	25	90	20	
Yellow Clearance	3.0	4.5	3.0	4.6	3.0	4.5	4.6	
Red Clearance	3.1	2.5	4.0	2.5	3.7	2.5	2.5	
Walk 1 *	-	4	-	4	-	4	4	
Don't Walk 1	-	21	-	25	-	30	21	
Seconds Per Actuation *	-	2.0	-	-	-	2.0	-	
Max Variable Initial *	-	34	-	-	-	34	-	
Time Before Reduction *	-	15	-	-	-	15	-	
Time To Reduce *	-	45	-	-	-	45	-	
Minimum Gap	-	3.0	-	-	-	3.0	-	
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	
Dual Entry	-	-	-	ON	-	-	ON	
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	

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

LEGEND

- | PROPOSED | EXISTING |
|--|----------|
| ○ → Traffic Signal Head | ● → N/A |
| ○ → Modified Signal Head | ○ → N/A |
| ○ → Sign | ○ → N/A |
| ○ → Pedestrian Signal Head With Push Button & Sign | ○ → N/A |
| ○ → Signal Pole with Guy | ○ → N/A |
| ○ → Signal Pole with Sidewalk Guy | ○ → N/A |
| ○ → Inductive Loop Detector | ○ → N/A |
| ○ → Controller & Cabinet | ○ → N/A |
| ○ → Junction Box | ○ → N/A |
| ○ → 2-in Underground Conduit | ○ → N/A |
| ○ → Right of Way | ○ → N/A |
| ○ → Directional Arrow | ○ → N/A |
| ○ → Pavement Marking Arrow | ○ → N/A |
| ○ → Metal Pole with Mastarm | ○ → N/A |
| ○ → Directional Drill | ○ → N/A |
| ○ → 3-2" Conduit | ○ → N/A |
| ○ → "U-TURN YIELD TO RIGHT TURN" Sign (R10-16) | ○ → N/A |

Signal Upgrade Final

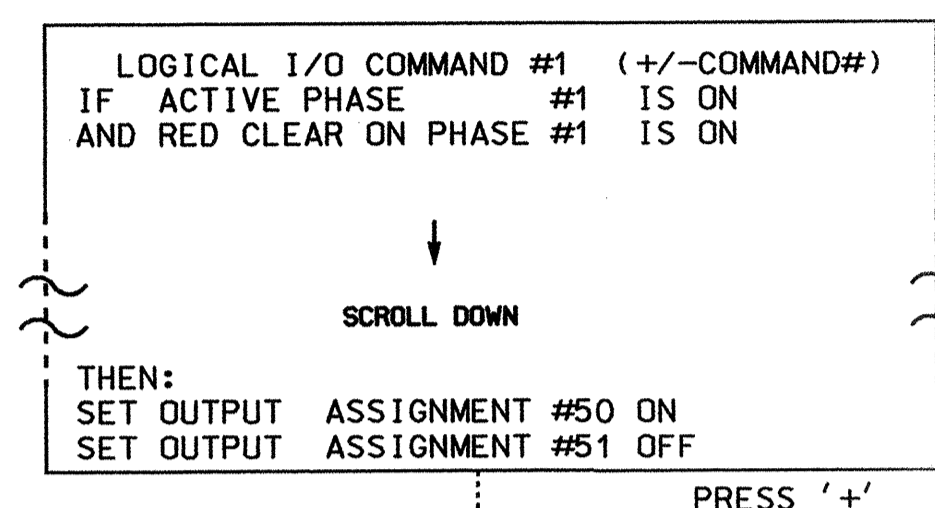
Prepared in the Offices of:
SR 1472 (Village Drive)
At
SR 1435 (South Navassa Road) / SR 1437 (Old Fayetteville Road)
 Division 3 Brunswick County Leland
 PLAN DATE: October 2008
 PREPARED BY: JPG/IOU
 REVISIONS: _____ INIT. DATE: _____
 REVIEWED BY: _____
 SCALE: 1" = 40'
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER JASON P. GALBRAITH 29904
 DATE: 11/3/08
 SIG. INVENTORY NO. 03-0086

03-DEC-2008 09:40 55#15 5190015awr-kp-0086-10 prc\jct\sr-4002\sig\03-0086\030086-11.g.dgn, 2008mdd.dgn

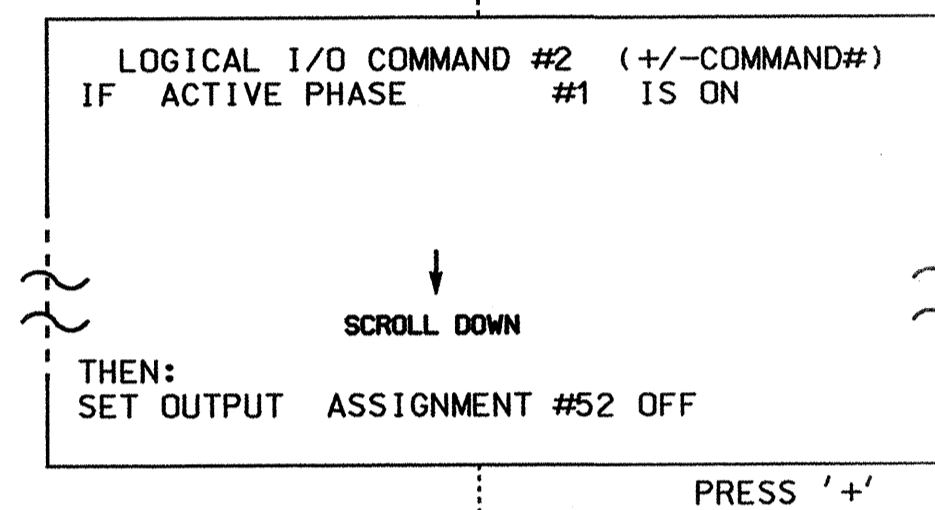
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

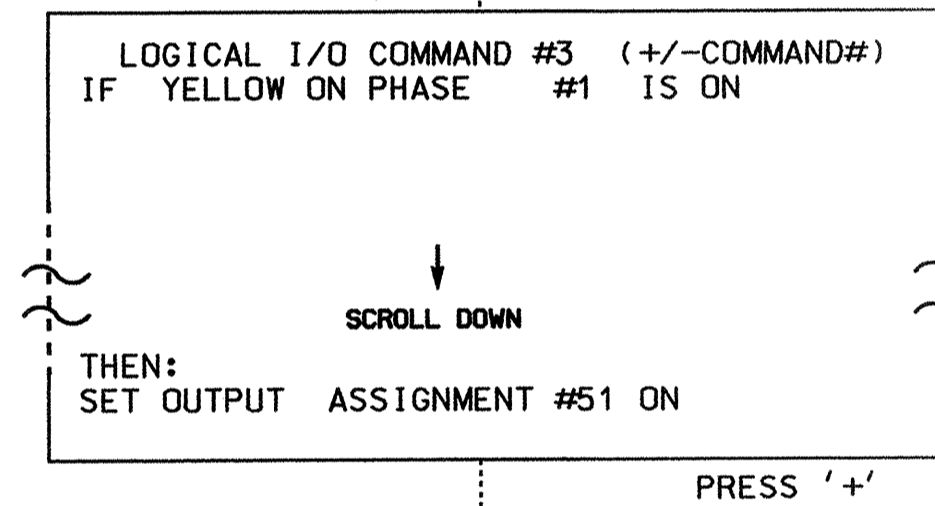
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



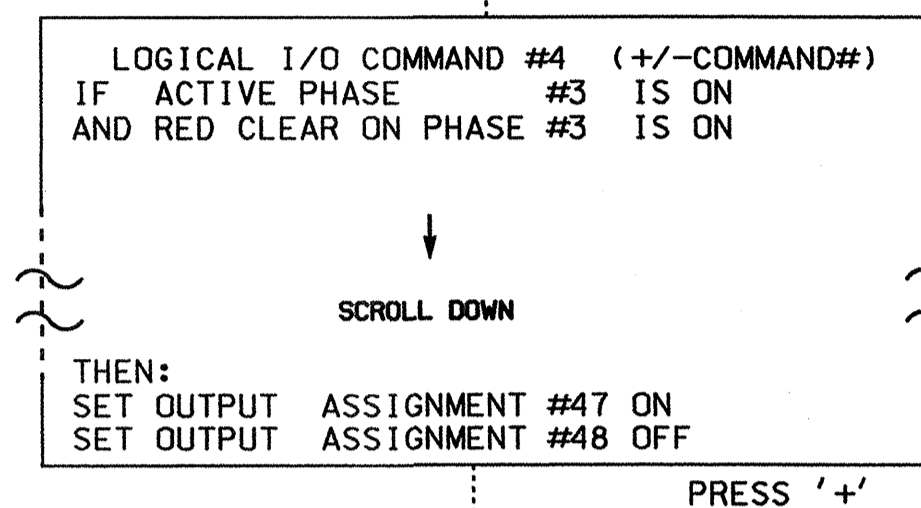
NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).



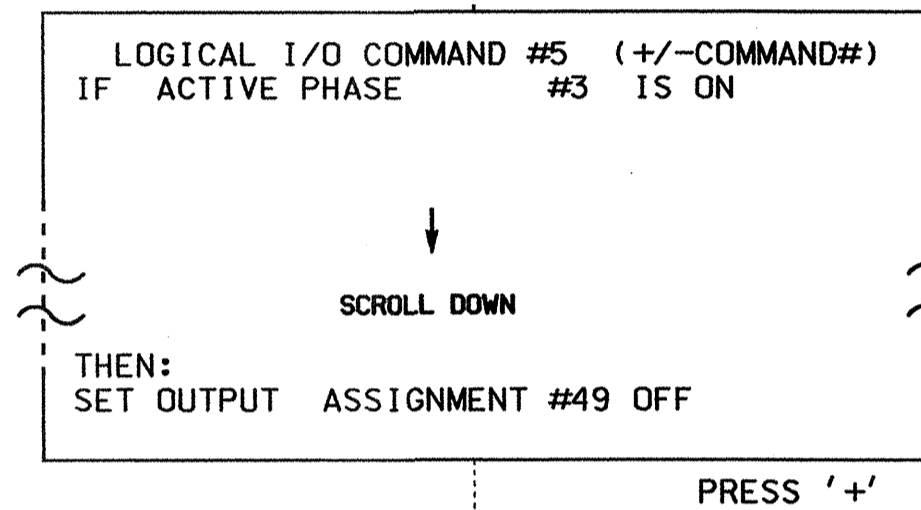
NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).



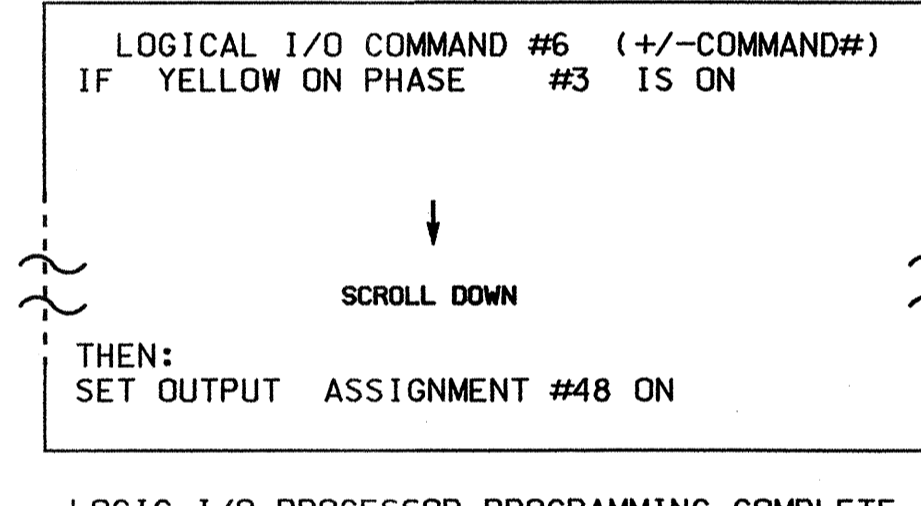
NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).



NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

PRESS '+' ONCE

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

PRESS '+' ONCE

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

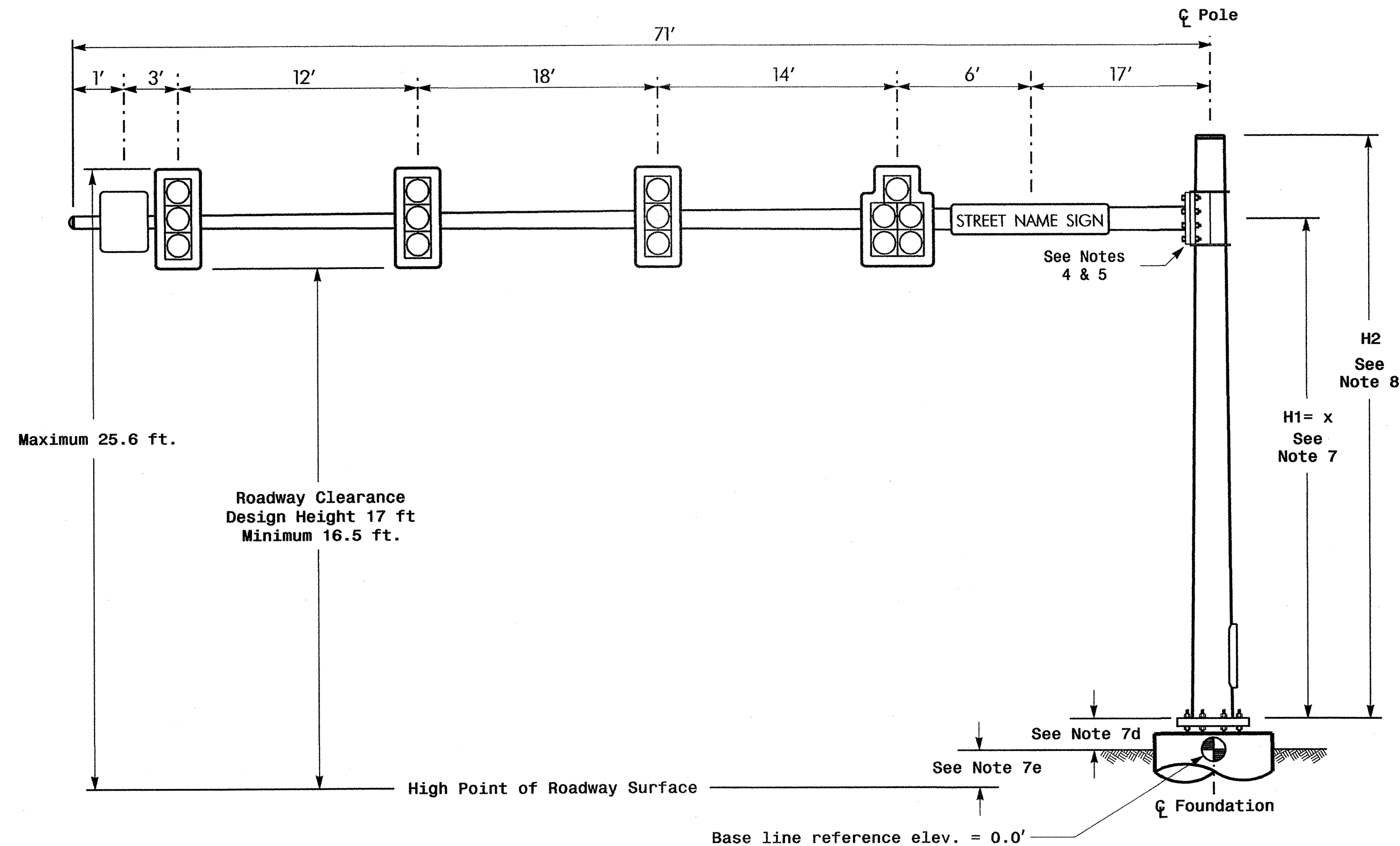
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0086
DESIGNED: October 2008
SEALED: 11-03-08
REVISED: N/A

Signal Upgrade Final Sheet 2 of 2

	SR 1472 (Village Drive) at SR 1435 (South Navassa Road) / SR 1437 (Old Fayetteville Road)	
	Division 3 Brunswick County Leland PLAN DATE: November 2008 REVIEWED BY: T. J. J. PREPARED BY: S. Armstrong REVIEWED BY:	
REVISIONS _____ _____ _____	INIT. _____ _____ _____	DATE _____ _____ _____
750 N. Greenfield Pkwy, Garner, NC 27529		SIGNATURE: DATE: 12/3/08 SIG. INVENTORY NO. 03-0086

Design Loading for METAL POLE NO. 1



Elevation View

SPECIAL NOTE

The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+ 1.3 ft.	+ 0.6 ft.
Elevation difference at Edge of travelway or face of curb	n/a	n/a

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

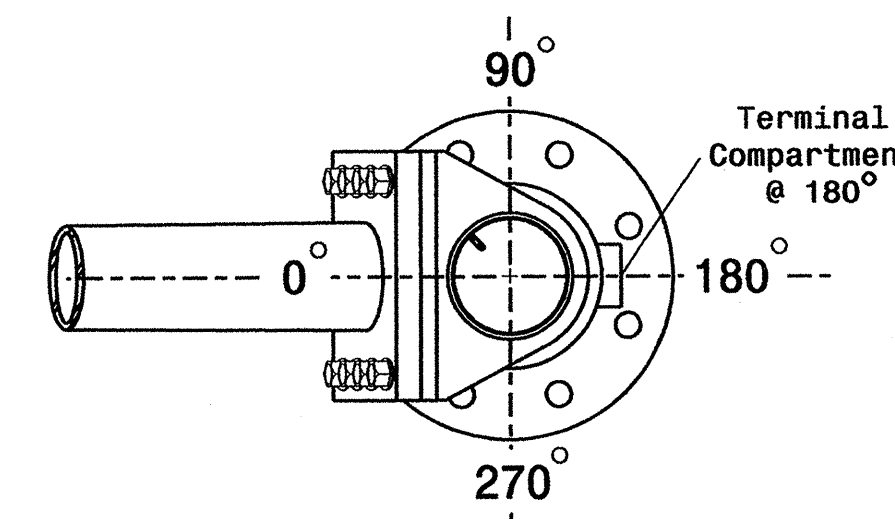
NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.

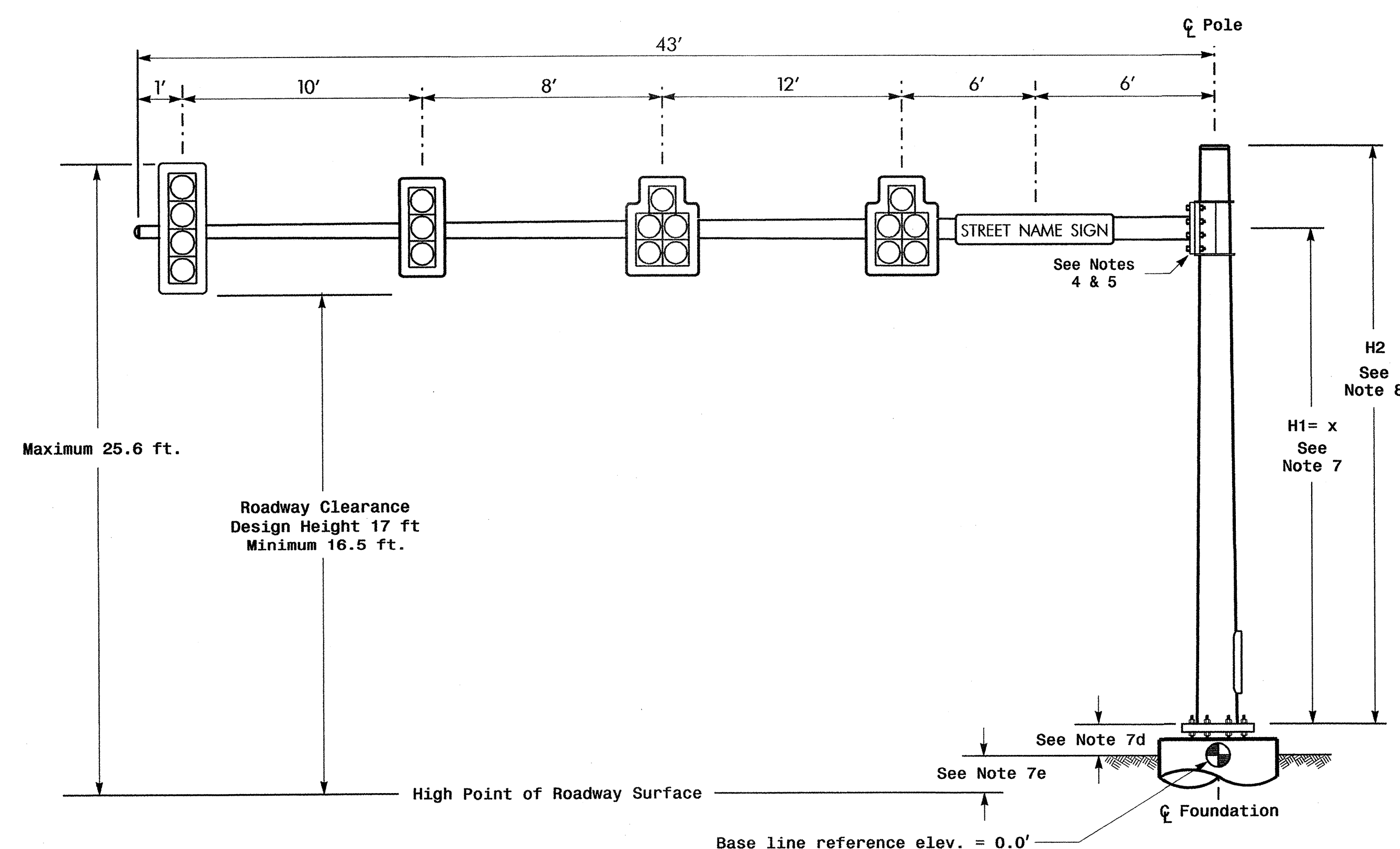
Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

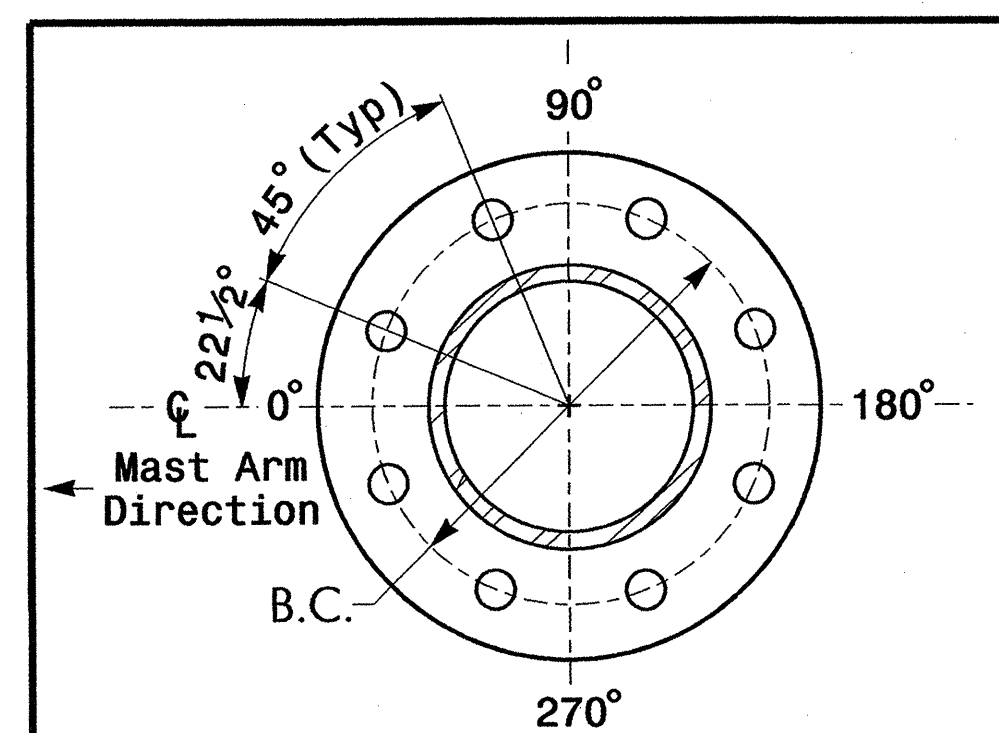


POLE RADIAL ORIENTATION

Design Loading for METAL POLE NO. 2

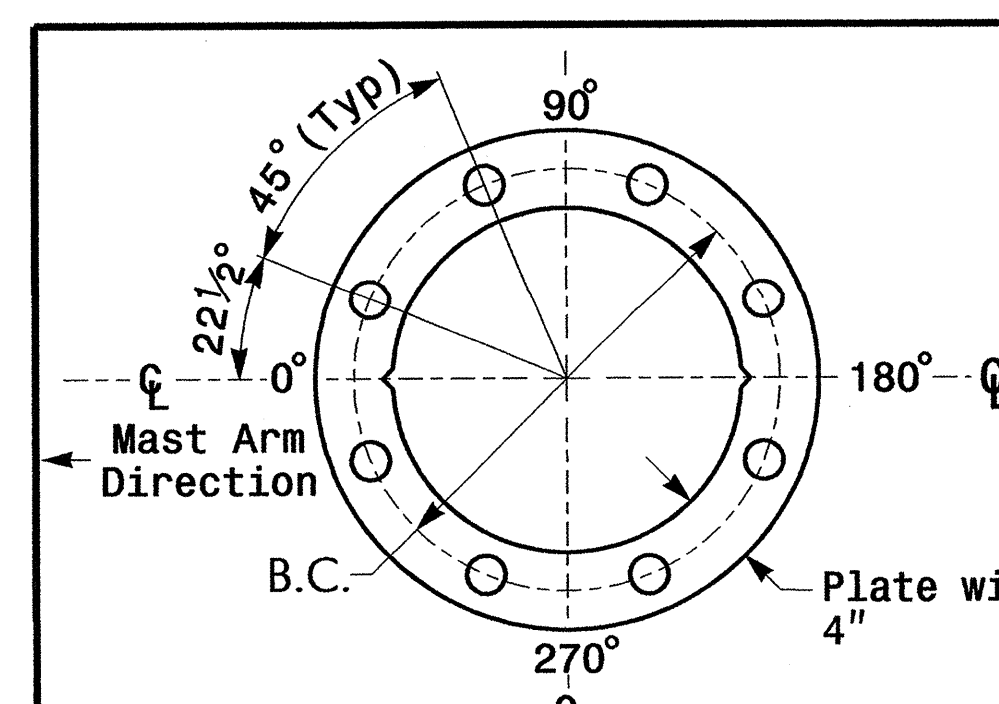


Elevation View



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

NCDOT Wind Zone 2 (130 mph)

Prepared in the Offices of:

SR 1472 (Village Drive)
At
SR 1435 (South Navassa Road) /
SR 1437 (Old Fayetteville Road)
Brunswick County Leland

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

SCALE: 0 N/A

REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

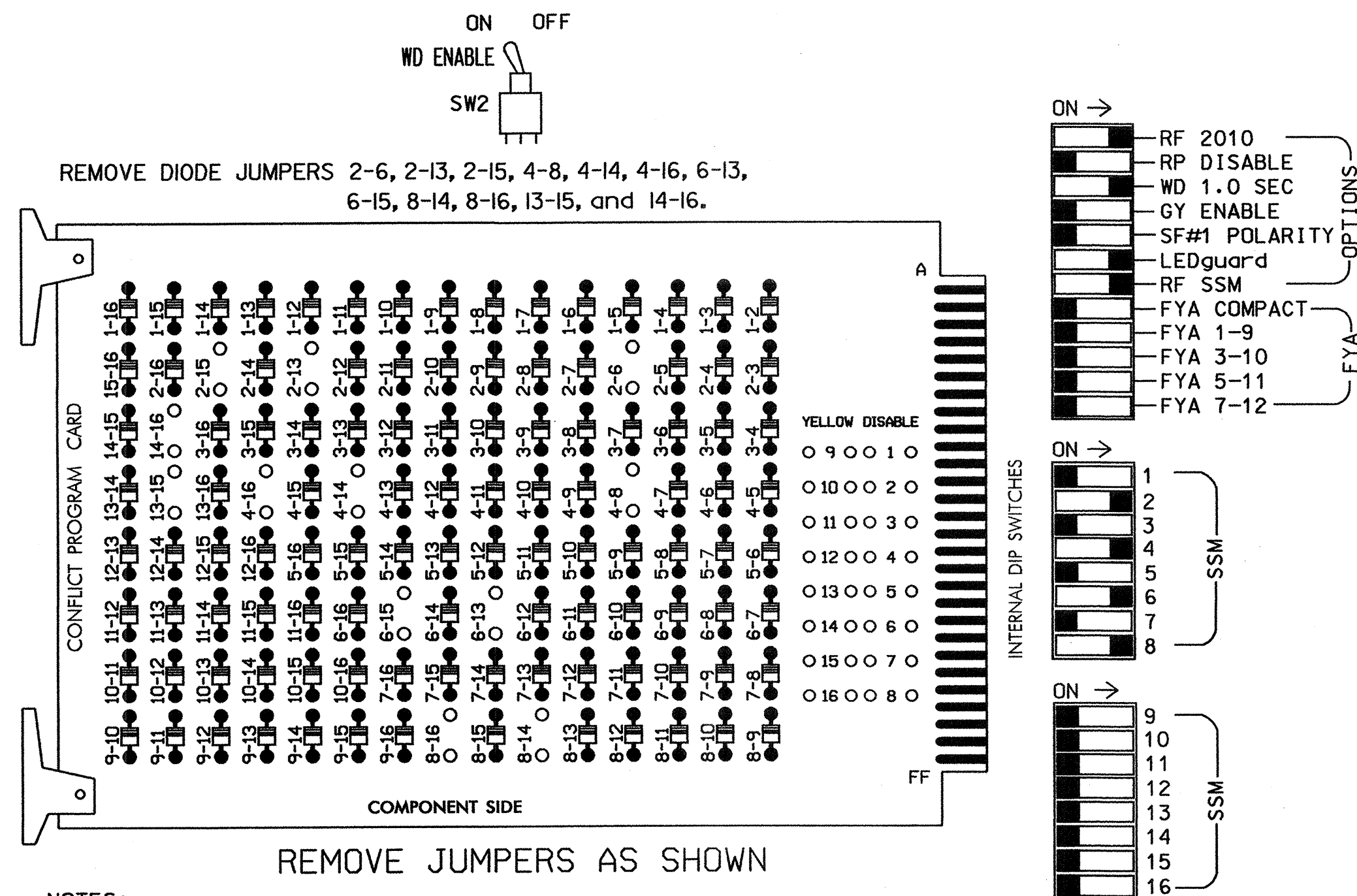
12/1/2008

SIG. INVENTORY NO. 03-0086

01-DEC-2008 16:36
C:\Users\jgallows\Documents\Projects\4002\sig\03-0086.dgn
12/1/2008 1:10

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5,7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the NC 133/SR 1472 (Village Drive) Closed Loop 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,S2P,S4,S4P,S6,S6P,S8,S8P
 PHASES USED.....2,2 PED,4,4 PED,6,6 PED,8,8 PED
 OVERLAPS.....NONE

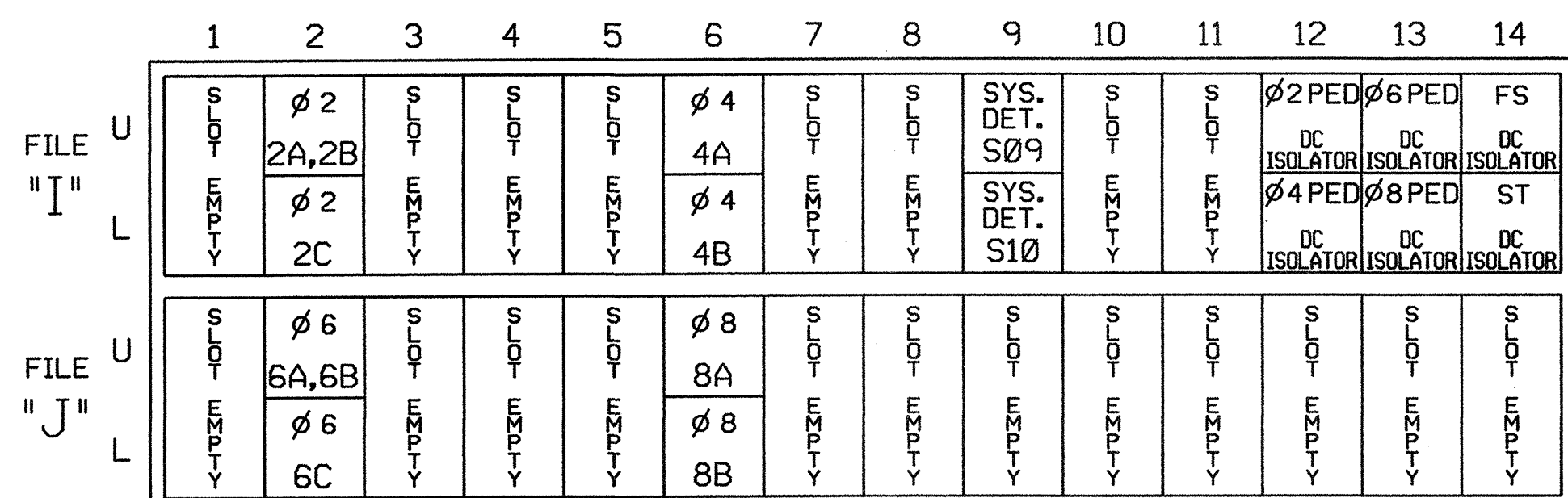
SIGNAL HEAD HOOK-UP CHART

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	P21, P22	NU	41,42	P41, P42	NU	61,62, 63	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon			113			104			119			110
Walking person icon			115			106			121			112

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

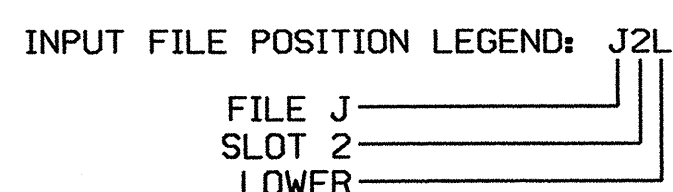
FS = FLASH SENSE
ST = STOP TIME

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
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
2C	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
6C	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
*S09	TB6-9,10	I9U	60	22	11	SYS					
*S10	TB6-11,12	I9L	62	24	13	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29		PED 2					
P41,P42	TB8-5,6	I12L	69	31		PED 4					
P61,P62	TB8-7,9	I13U	68	30		PED 6					
P81,P82	TB8-8,9	I13L	70	32		PED 8					

NOTE:
INSTALL DC ISOLATORS
IN INPUT FILE SLOTS
I12 AND I13.

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



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

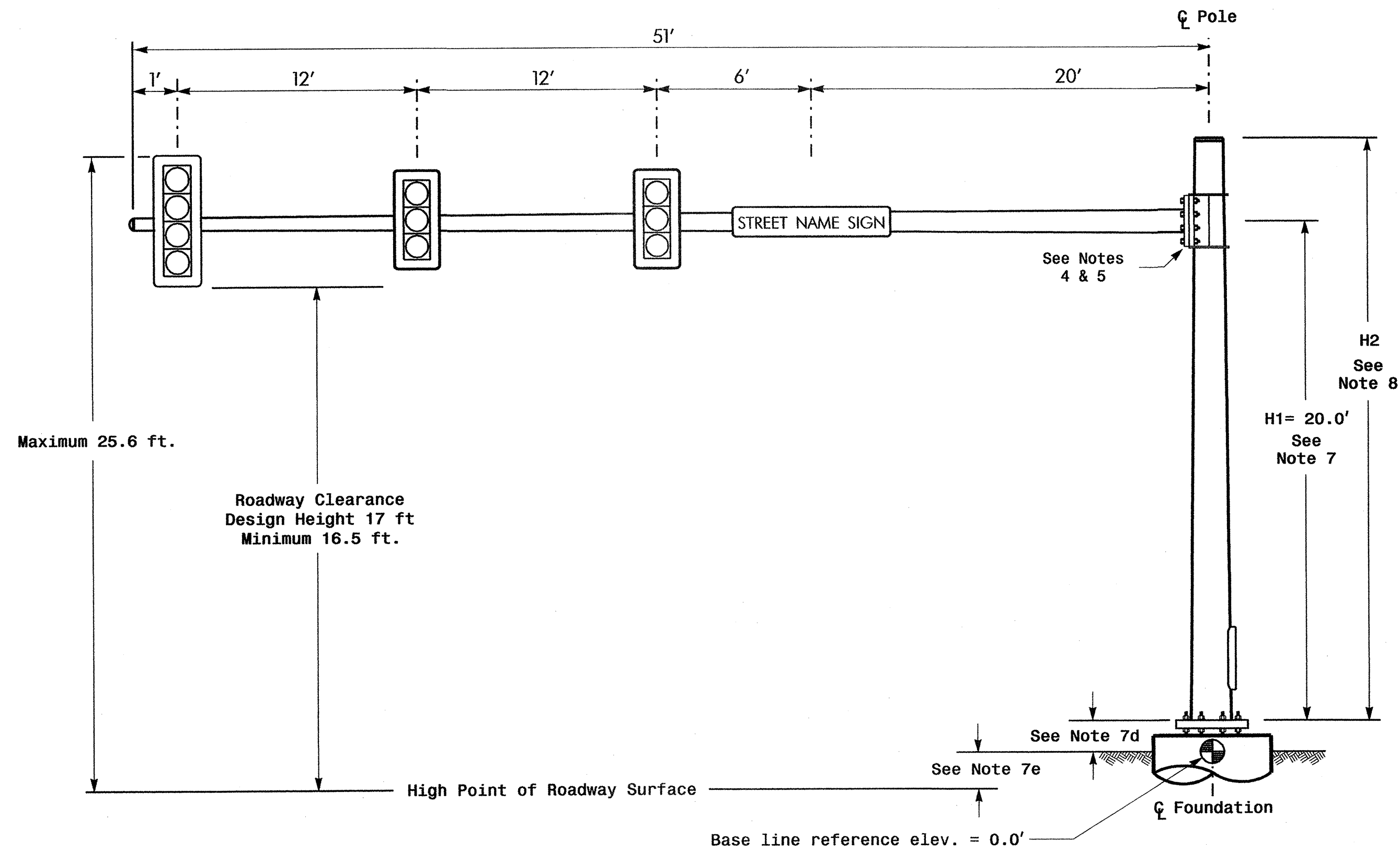
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1030
DESIGNED: September 2008
SEALED: 11-03-08
REVISED: N/A

New Installation

	ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1472 (Village Drive) at SR 1436 (Baldwin Drive)/ Northgate Drive		
	Division 3 PLAN DATE: November 2008 PREPARED BY: S. Armstrong	Brunswick County Leland REVIEWED BY: T. Vogel REVIEWED BY:	
REVISIONS: _____ INIT.: _____ DATE: _____ _____ INIT.: _____ DATE: _____ _____ INIT.: _____ DATE: _____			Sig. Inventory No. 03-1030

Design Loading for METAL POLE NO. 5



Elevation View

SPECIAL NOTE

The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 5	Pole 6
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+ 1.0 ft.	+ 0.7 ft.
Elevation difference at Edge of travelway or face of curb	n/a	n/a

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

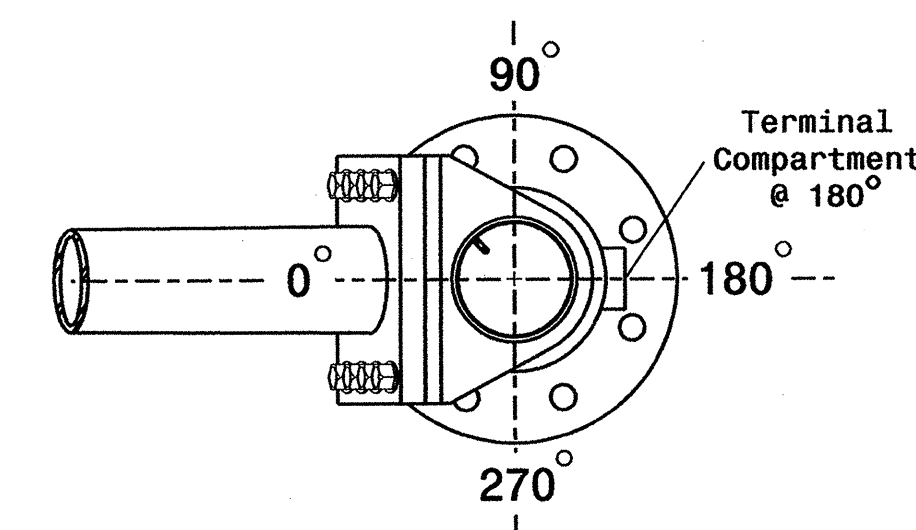
NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.

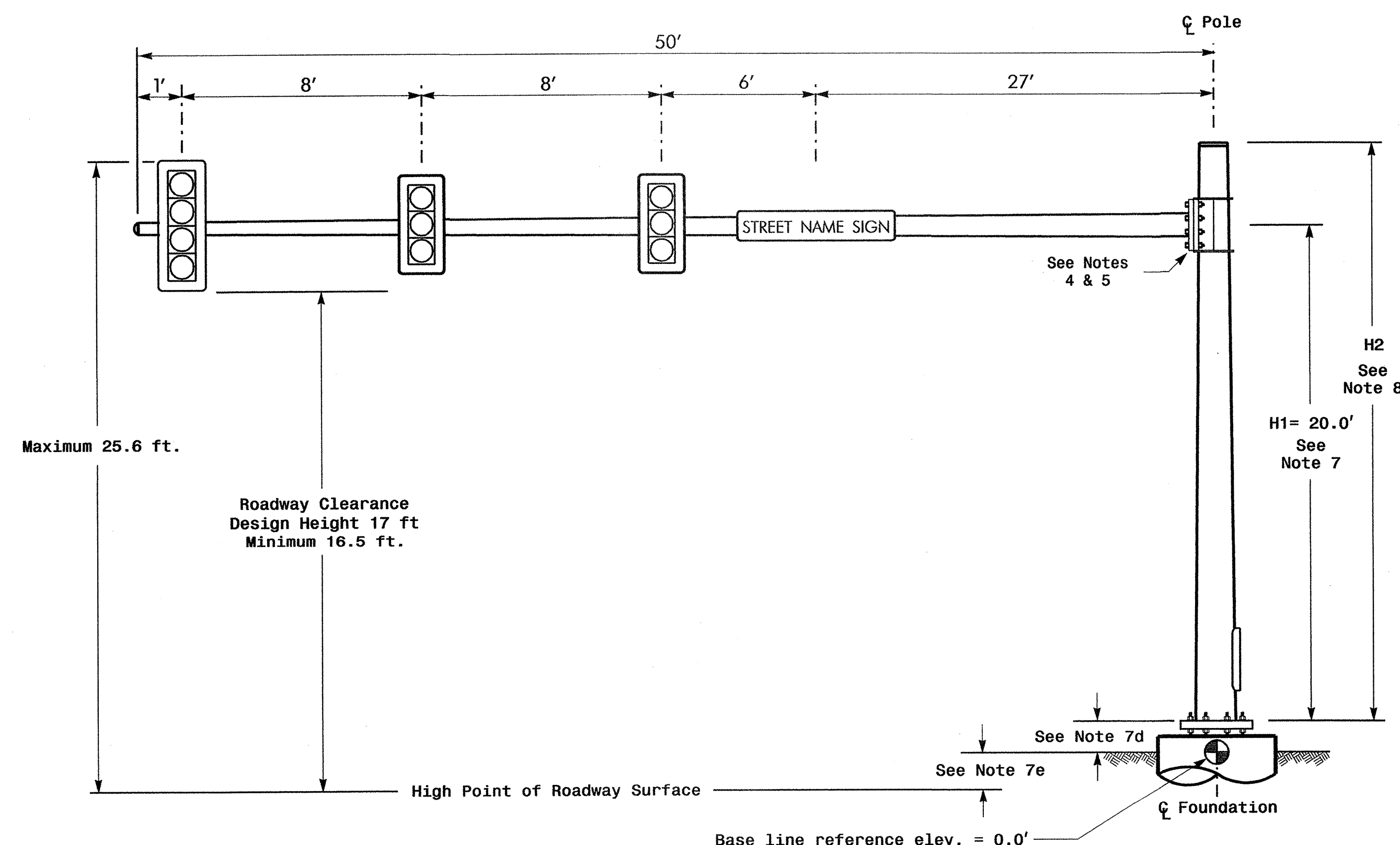
Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

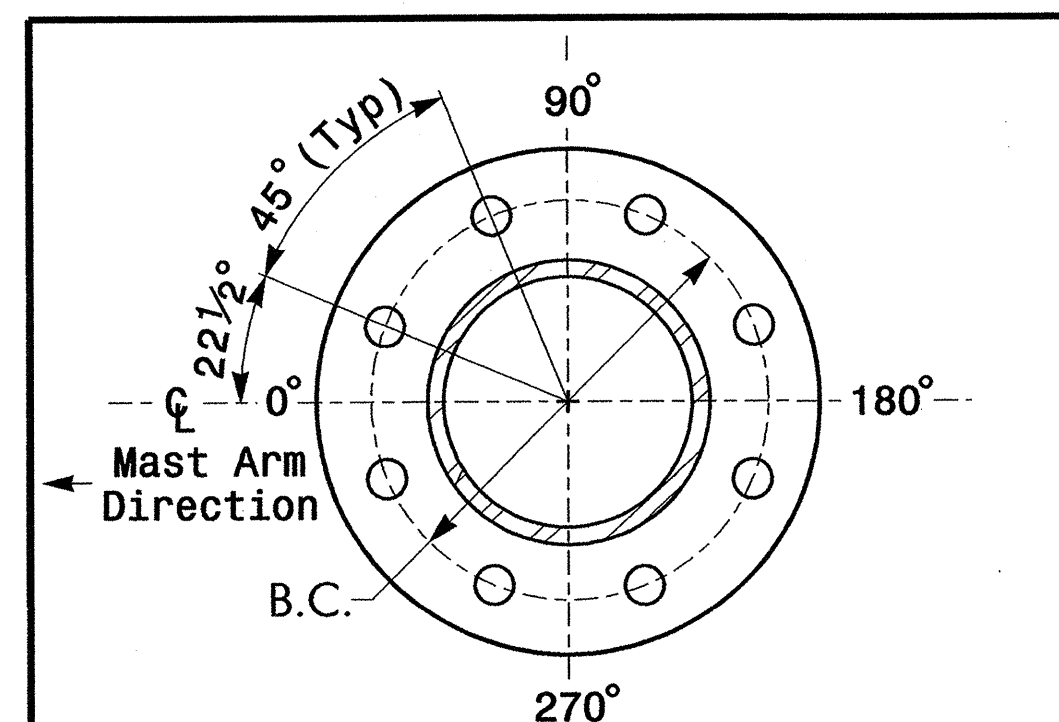


POLE RADIAL ORIENTATION

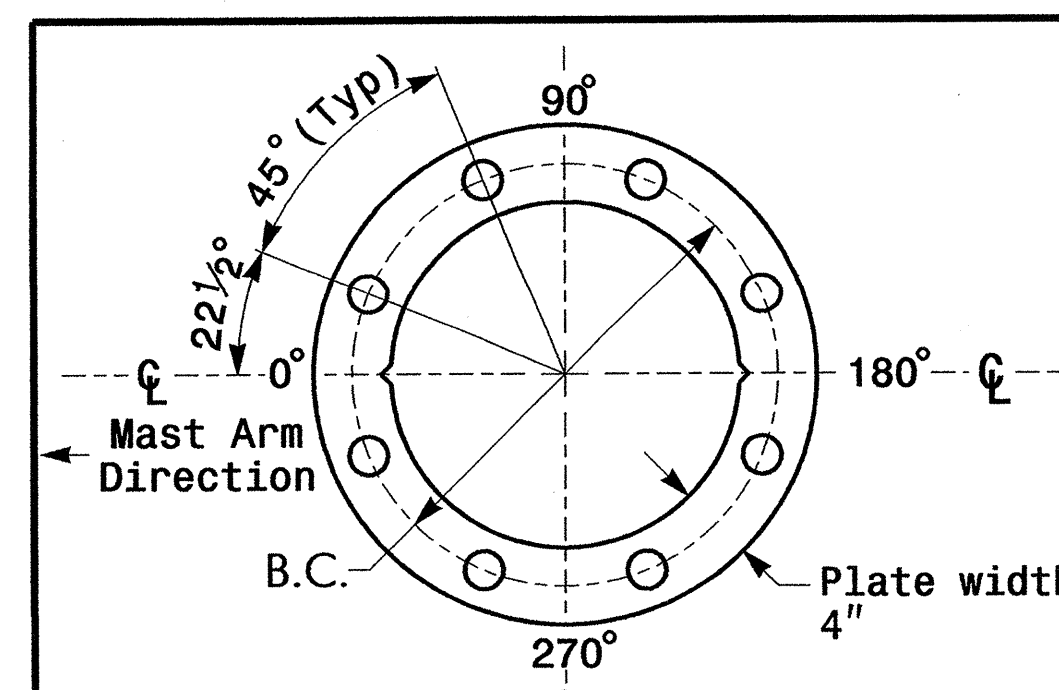
Design Loading for METAL POLE NO. 6



Elevation View



8 BOLT BASE PLATE DETAIL
See Note 6

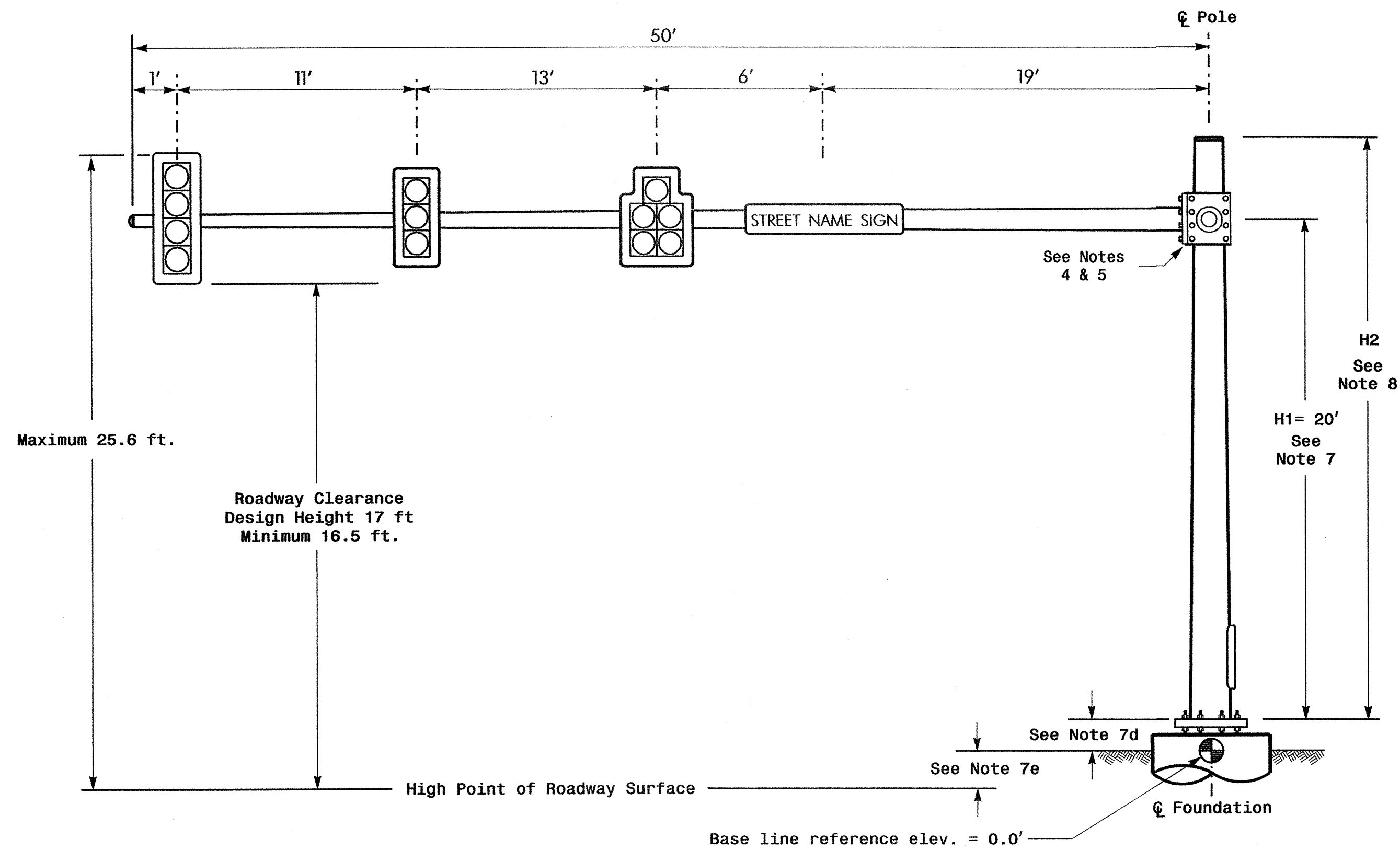


BASE PLATE TEMPLATE & ANCHOR BOLT
LOCK PLATE DETAIL
For 8 Bolt Base Plate

NCDOT Wind Zone 2 (130 mph)

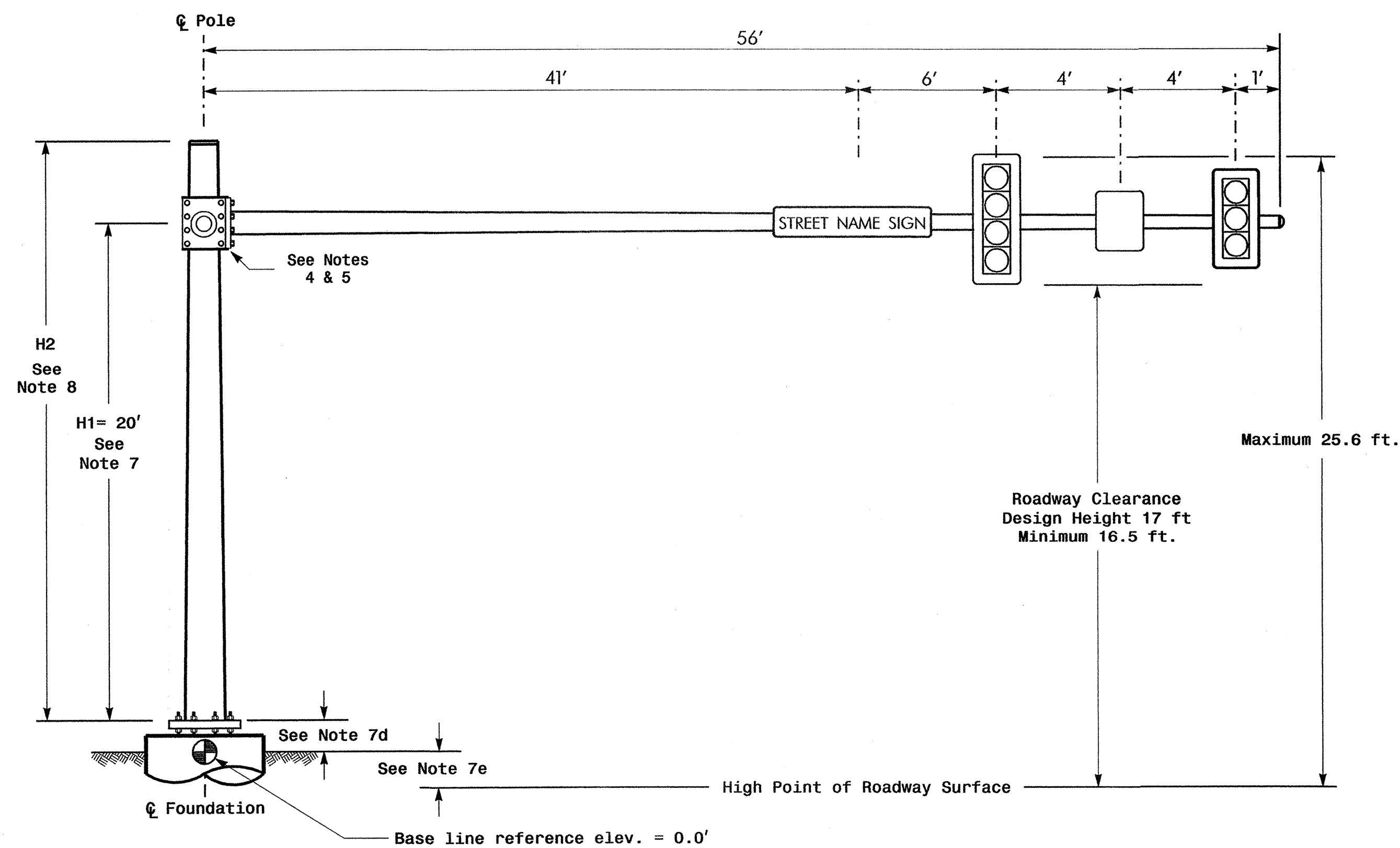
	SR 1472 (Village Drive) At SR 1436 (Baldwin Drive)/ Northgate Drive		
	Division 3 Brunswick County Leland	PLAN DATE: October 2008 REVIEWED BY: JPG	
PREPARED BY: JPG/IOU	REVISIONS	REVIEWED BY:	SCALE: N/A
0 N/A N/A		DATE: 12-2-08	SIG. INVENTORY NO. 08-1030

Design Loading for METAL POLE NO. 7, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 7, MAST ARM B



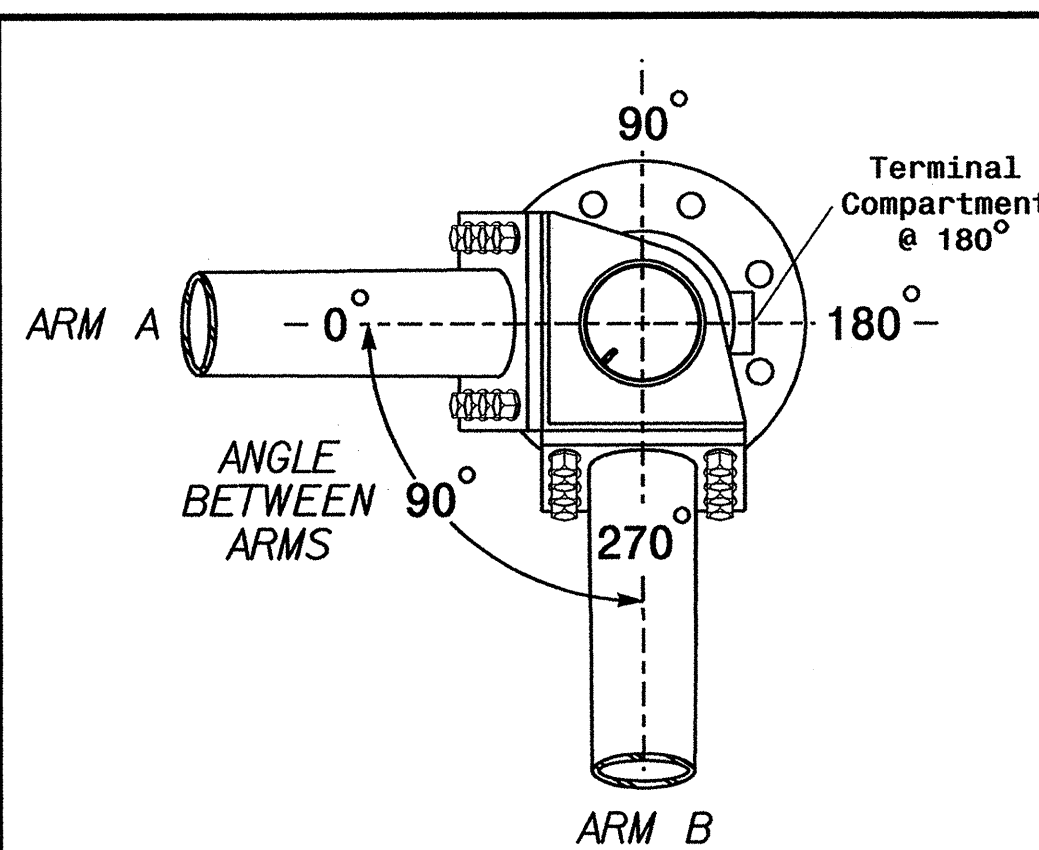
Elevation View @ 0°

SPECIAL NOTE

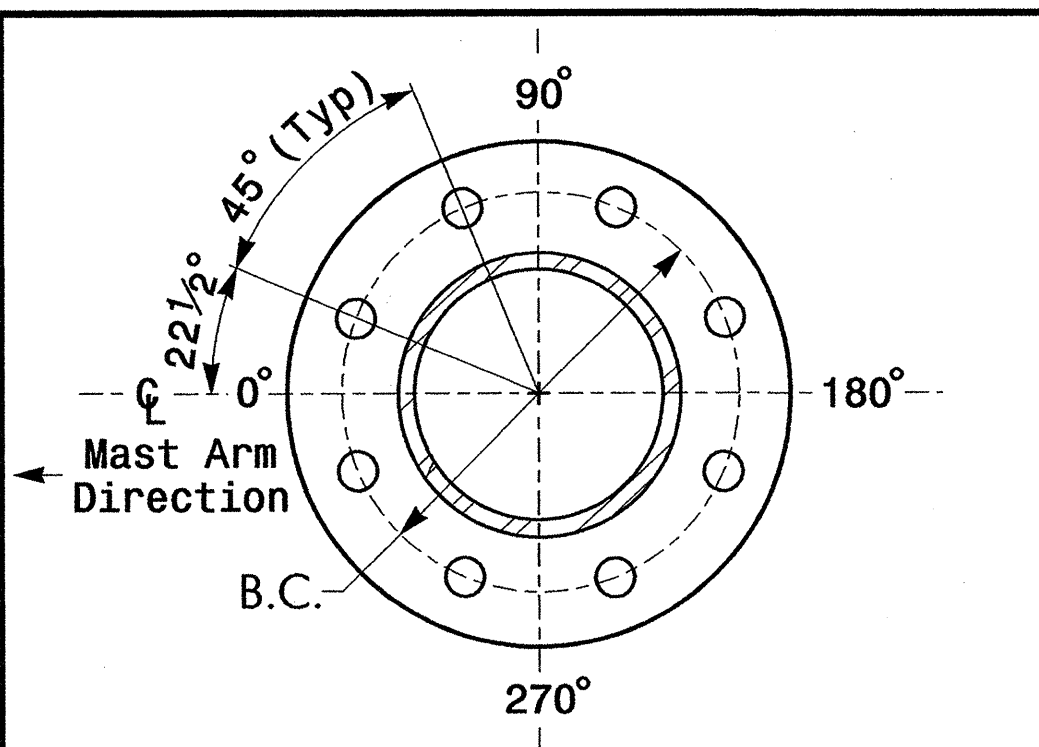
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

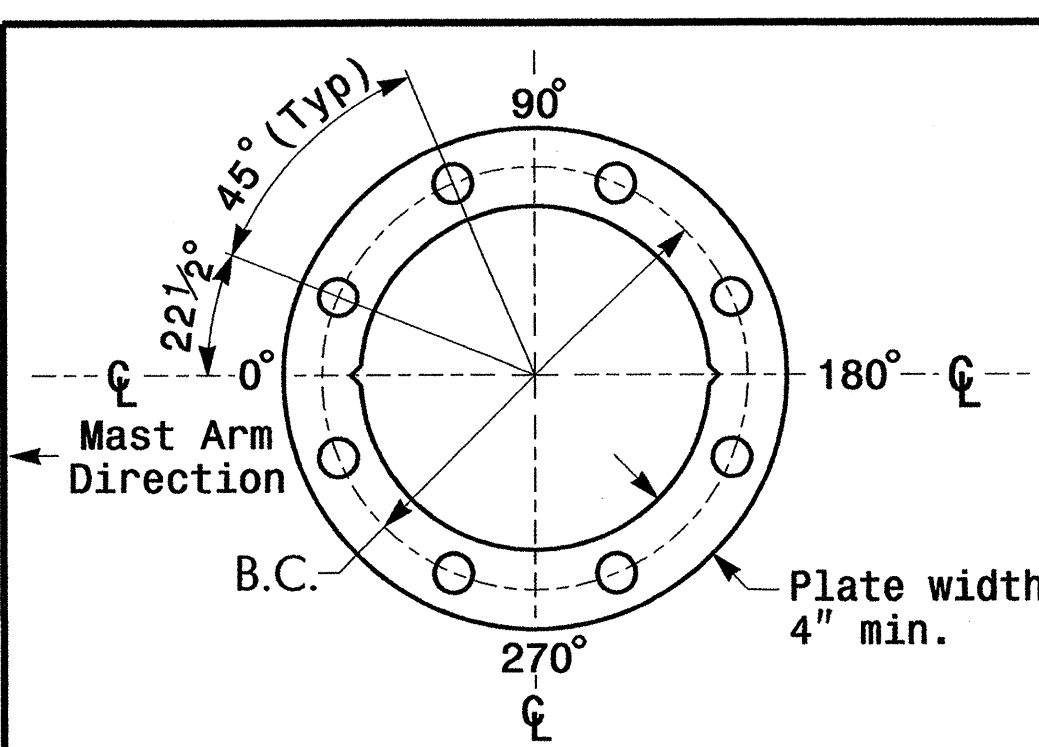
Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.6 ft.	+0.9 ft.
Elevation difference at Edge of travelway or face of curb	n/a	n/a



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

METAL POLE No. 7

PROJECT REFERENCE NO.	SHEET NO.
R-4002	Fig. 17

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.

Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of the pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

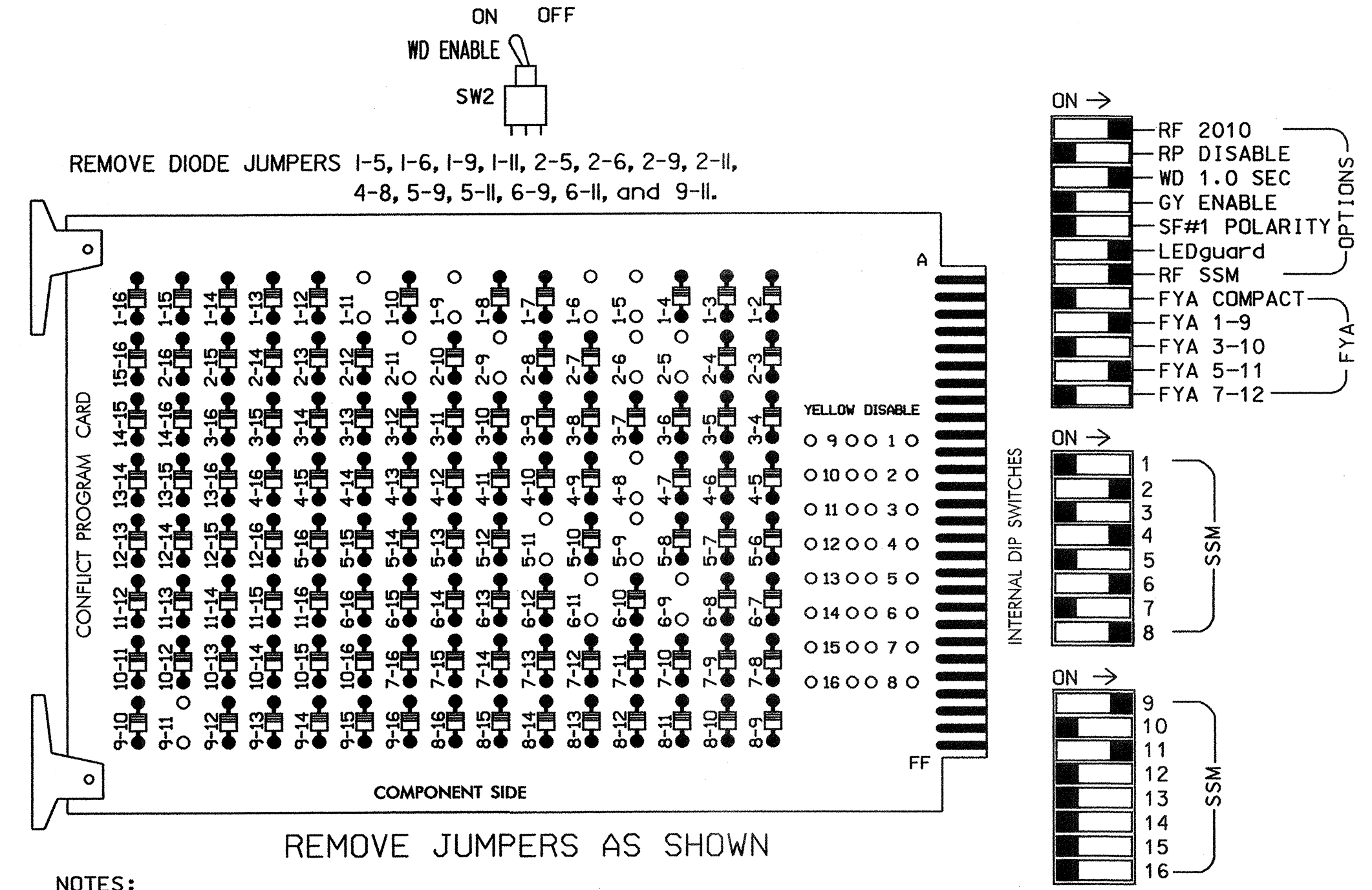
NCDOT Wind Zone 2 (130 mph)

	SR 1472 (Village Drive) At SR 1436 (Baldwin Drive)/ Northgate Drive Division 3 Brunswick County Leland	SEAL J. P. G. ENGINEER NORTH CAROLINA 12-2-2008					
	PLAN DATE: October 2008 PREPARED BY: JPG/IOU SCALE: N/A		REVIEWED BY: JPG REVISIONS: <table border="1"> <tr> <th>NO.</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	INIT.	DATE	
NO.	INIT.	DATE					
NCDOT Wind Zone 2 (130 mph)							
SIG. INVENTORY NO. 03-1030							

01-DEC-2008 16:41
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EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5,7, 10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- The cabinet and controller are part of the NC 133/SR 1472 (Village Drive) Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1★	2	2 PED	3	4	4 PED	5★	6	6 PED	7	8	8 PED	OLA★	OLB	SPARE	OLC★	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	51	61,62	NU	NU	81,82	NU	11	NU	NU	51	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW																A121		A114
YELLOW ARROW																A122		A115
FLASHING YELLOW ARROW																A123		A116
GREEN ARROW	127							133										

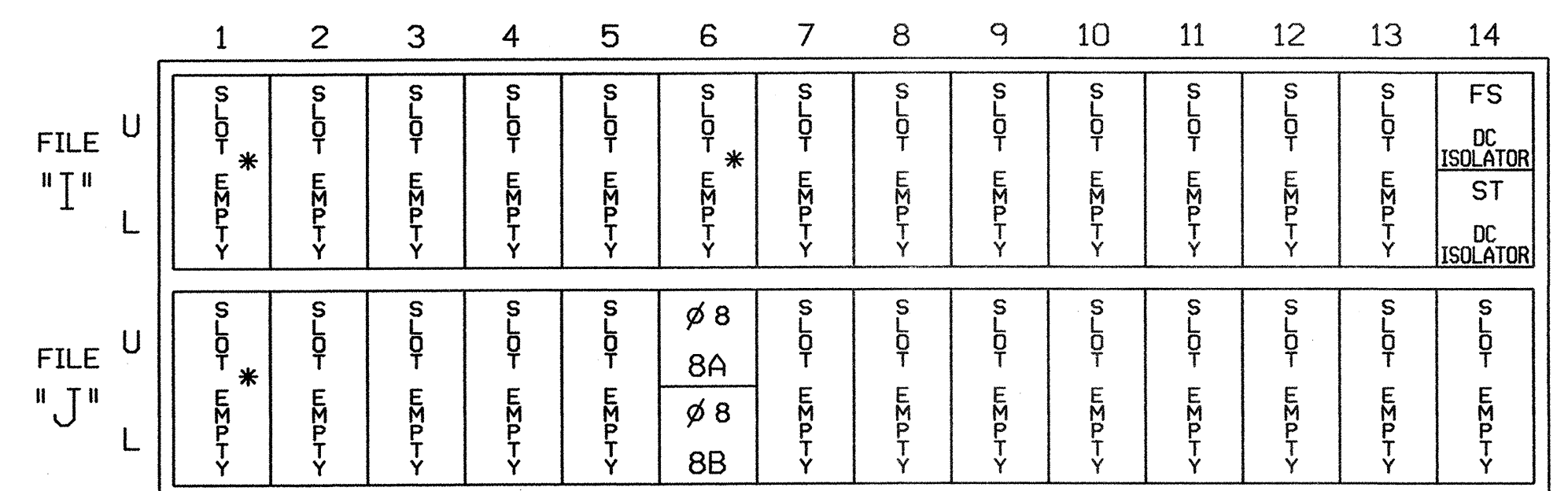
NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8,S9,S12
 PHASES USED.....1,2,4,5,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

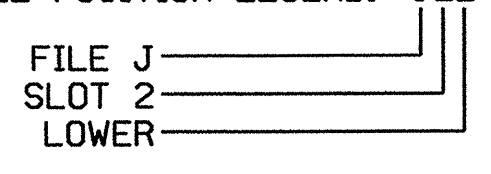
* Microwave Detector - do not populate slot with detector card. See Accuwave Detector Panel Wiring Detail on sheet 3 of this electrical detail.

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	*	I1U	56	18	1	1	Y	Y			15
4A	*	I6U	41	3	4	4	Y	Y			5
5A	*	J1U	55	17	5	5	Y	Y			15
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

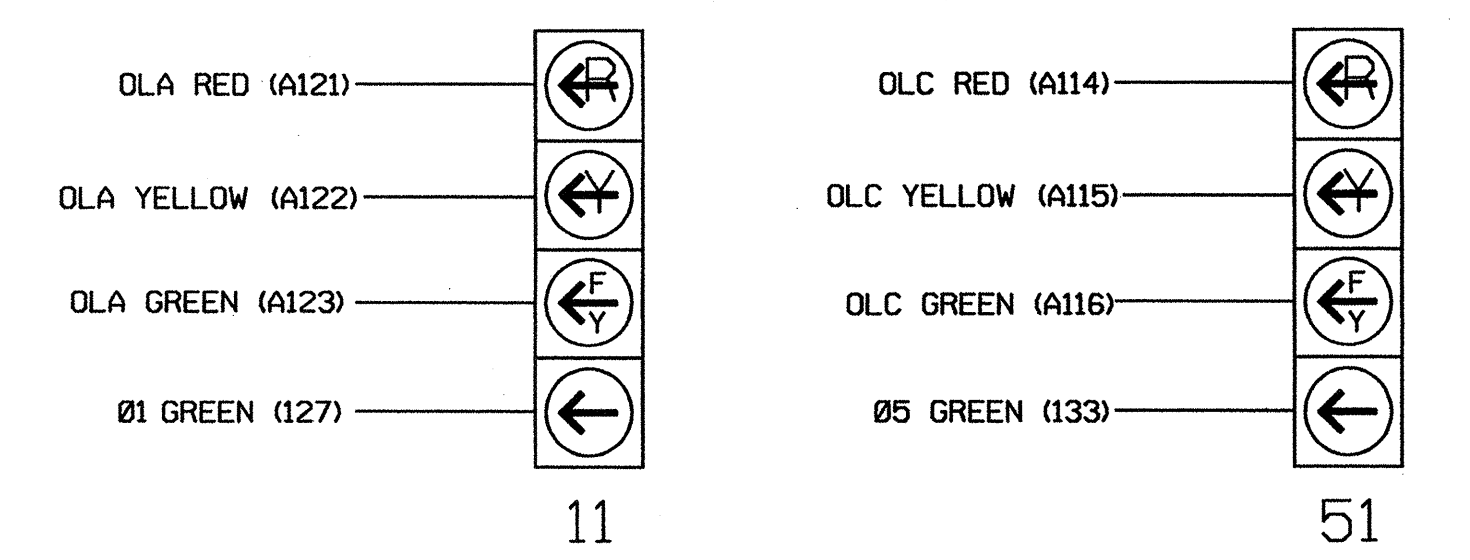
* Microwave Detector - see Accuwave Detector Panel Wiring Detail on sheet 3 of this electrical detail.

INPUT FILE POSITION LEGEND: J2L



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

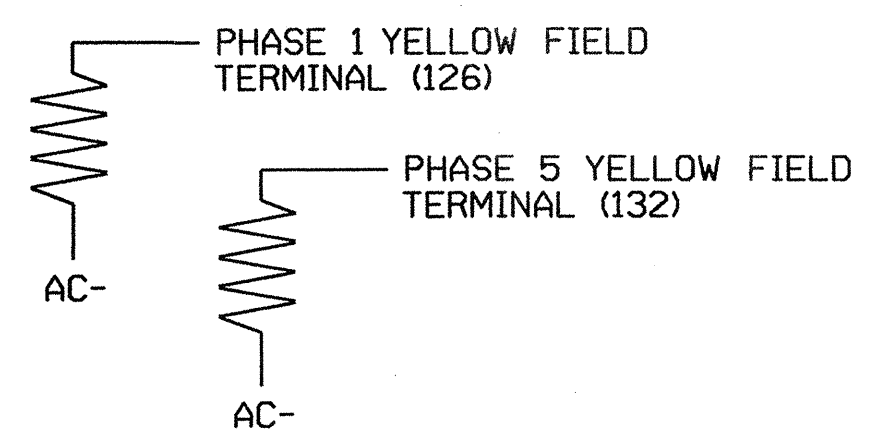
- The sequence display for heads 11 and 51 requires special logic programming. See sheet 2 of 3 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0405T
 DESIGNED: October 2008
 SEALED: 11-17-08
 REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



Signal Upgrade Temp (Phase I, II, & III) Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1472 (Village Drive) at Fairview Road and North Brunswick Shopping Center

Division 3 Brunswick County Leland

PLAN DATE: November 2008 REVIEWED BY: T. J. G. A.

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Place, Garner, NC 27529

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

SIGNATURE: George C. Brown 12/1/08 DATE

SIG. INVENTORY NO. 03-0405T

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

      ↓
    SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF
  
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

```

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

      ↓
    SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF
  
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

```

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

      ↓
    SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON
  
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

```

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

      ↓
    SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF
  
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

```

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

      ↓
    SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF
  
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

```

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

      ↓
    SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON
  
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
 OUTPUT 43 = Overlap C Yellow
 OUTPUT 44 = Overlap C Green
 OUTPUT 50 = Overlap A Red
 OUTPUT 51 = Overlap A Yellow
 OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

```

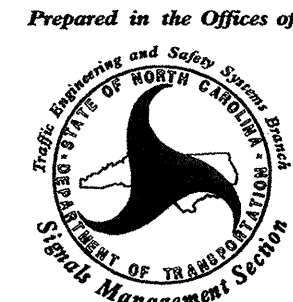
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:      12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS:  _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-0405T
 DESIGNED: October 2008
 SEALED: 11-17-08
 REVISED: N/A

Signal Upgrade Temp (Phase I, II, & III) Sheet 2 of 3

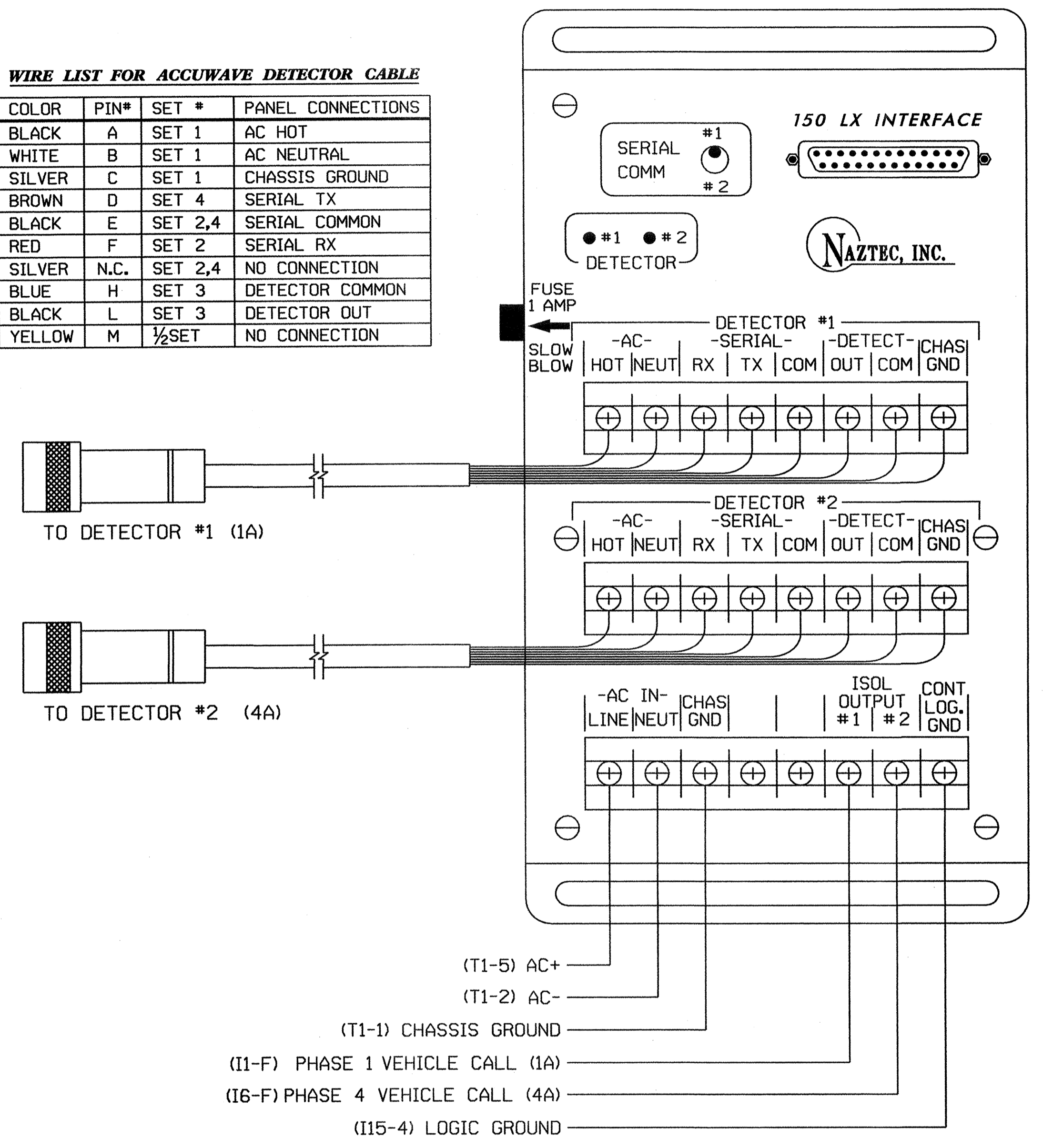
Prepared in the Offices of:  Traffic Engineering and Signal Control Division DEPARTMENT OF TRANSPORTATION Signal Management Section 750 N. Greenfield Place, Garner, NC 27529	SR 1472 (Village Drive) at Fairview Road and North Brunswick Shopping Center	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Division 3 Brunswick County Leland PLAN DATE: November 2008 REVIEWED BY: T. J. J... PREPARED BY: S. Armstrong REVIEWED BY:	
REVISIONS _____ INT. DATE _____		SIGNATURE: <i>George C. Brown</i> DATE: 11/17/08 SIG. INVENTORY NO. 03-0405T

ACCUWAVE DETECTOR PANEL WIRING DETAIL FOR 1A & 4A

(wire as shown)

WIRE LIST FOR ACCUWAVE DETECTOR CABLE

COLOR	PIN#	SET #	PANEL CONNECTIONS
BLACK	A	SET 1	AC HOT
WHITE	B	SET 1	AC NEUTRAL
SILVER	C	SET 1	CHASSIS GROUND
BROWN	D	SET 4	SERIAL TX
BLACK	E	SET 2,4	SERIAL COMMON
RED	F	SET 2	SERIAL RX
SILVER	N.C.	SET 2,4	NO CONNECTION
BLUE	H	SET 3	DETECTOR COMMON
BLACK	L	SET 3	DETECTOR OUT
YELLOW	M	1/2SET	NO CONNECTION

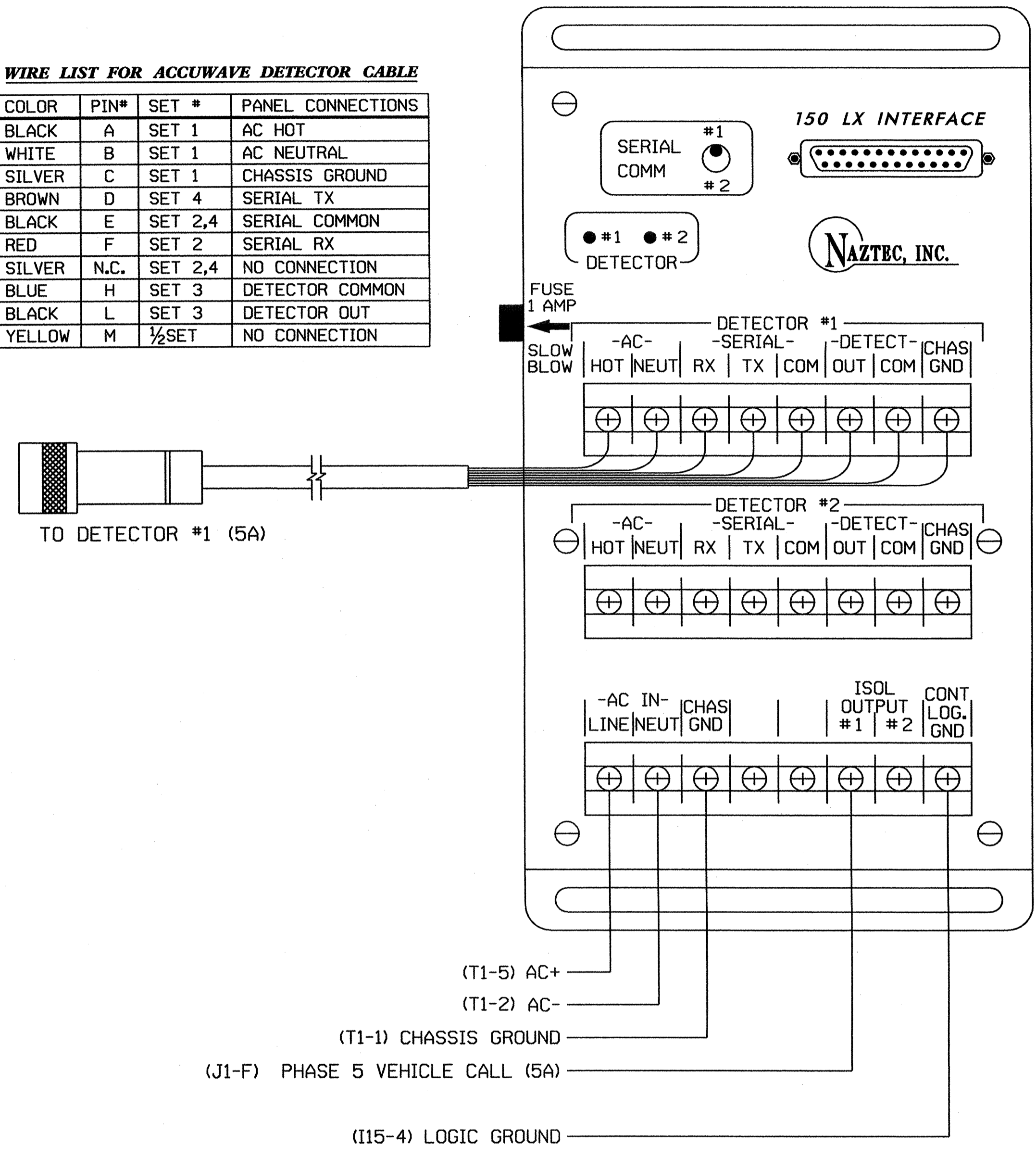


ACCUWAVE DETECTOR PANEL WIRING DETAIL FOR 5A

(wire as shown)

WIRE LIST FOR ACCUWAVE DETECTOR CABLE

COLOR	PIN#	SET #	PANEL CONNECTIONS
BLACK	A	SET 1	AC HOT
WHITE	B	SET 1	AC NEUTRAL
SILVER	C	SET 1	CHASSIS GROUND
BROWN	D	SET 4	SERIAL TX
BLACK	E	SET 2,4	SERIAL COMMON
RED	F	SET 2	SERIAL RX
SILVER	N.C.	SET 2,4	NO CONNECTION
BLUE	H	SET 3	DETECTOR COMMON
BLACK	L	SET 3	DETECTOR OUT
YELLOW	M	1/2SET	NO CONNECTION



NOTES:

1. Detectors are Accuwave Model 150LX presence detectors.
2. Information in the detector cable wire list chart is for cable purchased from Naztec and may vary if purchased from another source.

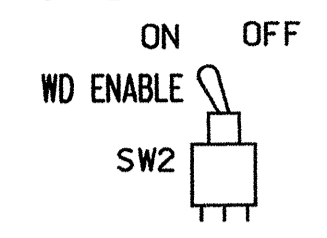
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0405T
 DESIGNED: October 2008
 SEALED: 11-17-08
 REVISED: N/A

02-DEC-2008 13:15 s:\p01\shar\kgr\cas\sig\mamestr\trng\030405t_she.016_xxx.dgn

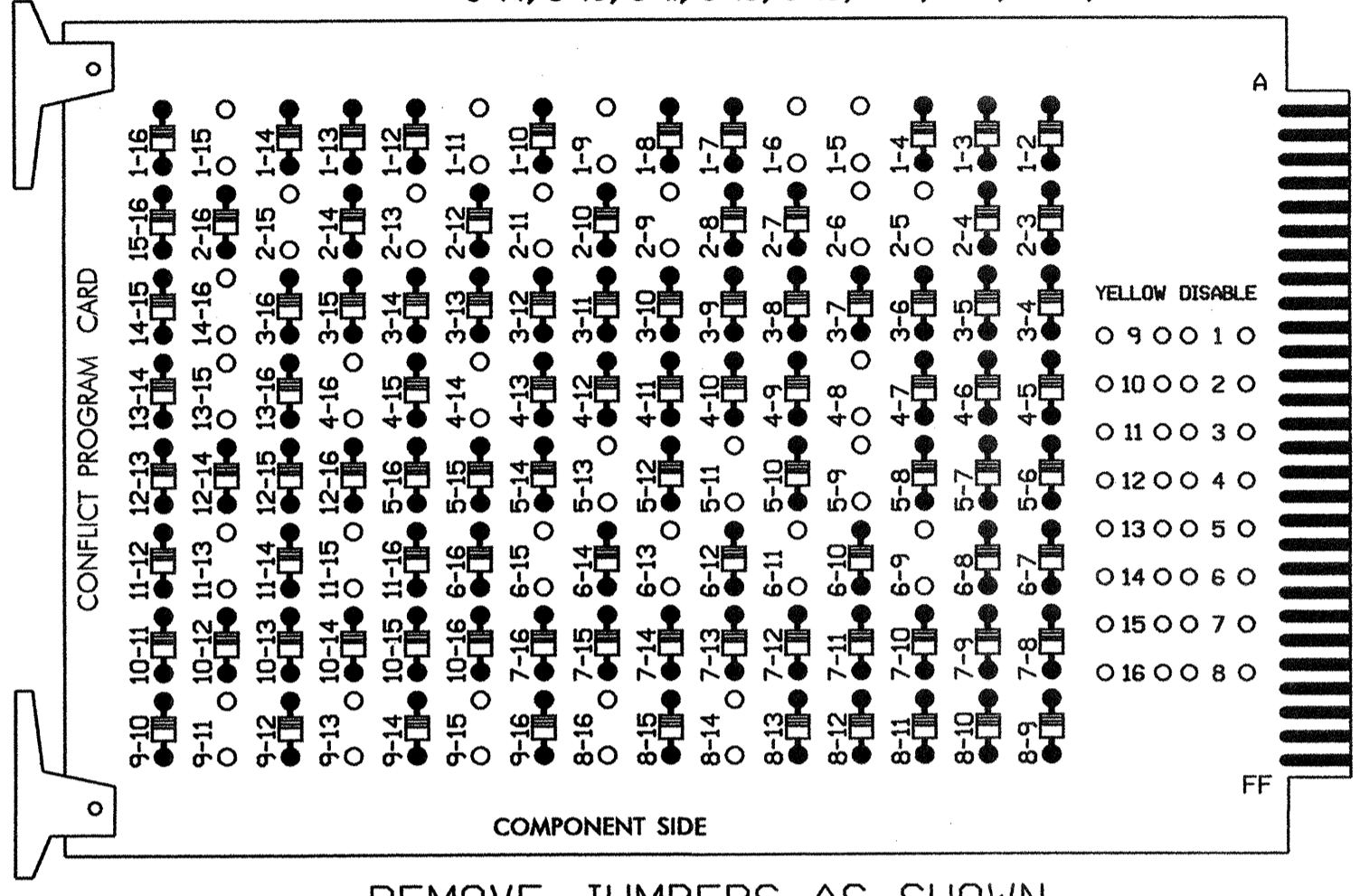
<p>Prepared in the Offices of:</p> <p>750 N. Greenfield Place, Garner, NC 27529</p>	<p>SR 1472 (Village Drive) at Fairview Road and North Brunswick Shopping Center</p>		<p>SEAL</p>							
	<p>Division 3 Brunswick County Leland</p>									
	<p>PLAN DATE: November 2008</p>	<p>REVIEWED BY: T. Upton</p>								
	<p>PREPARED BY: S. Armstrong</p>	<p>REVIEWED BY:</p>								
<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		NO.	DESCRIPTION	INIT.	DATE					<p>DATE</p>
NO.	DESCRIPTION	INIT.	DATE							
<p>SIG. INVENTORY NO. 03-0405T</p>		<p>DATE</p>								

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



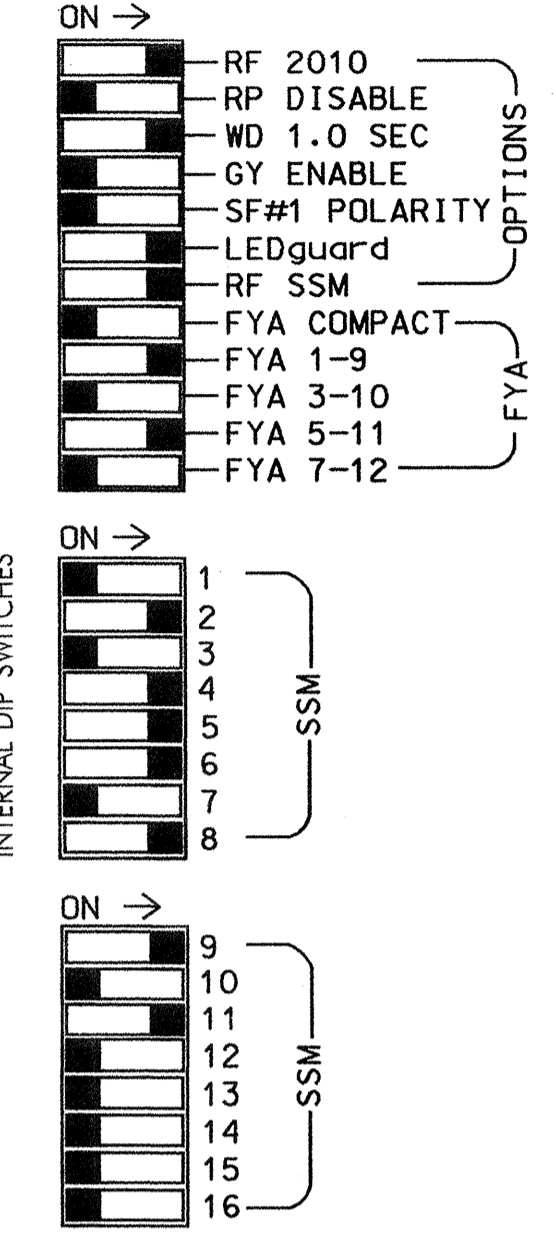
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 4-8, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15, and 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,7, 10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4 and 8, on the controller unit, for Dual Entry.
- Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the NC 133/SR 1472 (Village Drive) Closed Loop System.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S2P,S4,S4P,S5,S6,S6P,S8,S8P,S9,S12
 PHASES USED.....1,2,2 PED,4,4 PED,5,6,6 PED,8,8 PED
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1*	2	2 PED	3	4	4 PED	5*	6	6 PED	7	8	8 PED	OLA*	OLB	SPARE	OLC*	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	P21, P22	NU	41,42	P41, P42	42	51	61,62	P61, P62	NU	81,82	P81, P82	11	NU	51	NU	NU
RED		128			101		*		134			107						
YELLOW	*	129			102				135			108						
GREEN		130			103				136			109						
RED ARROW																A121		A114
YELLOW ARROW							132									A122		A115
FLASHING YELLOW ARROW																A123		A116
GREEN ARROW	127						133	133										
Hand							113											
Person							115											

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT (front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	φ 1	φ 2	φ 3	φ 4	φ 5	φ 6	φ 7	φ 8	φ 9	φ 10	φ 11	φ 12	φ 13	φ 14
L	NOT USED	NOT USED	φ 3	φ 4	φ 5	φ 6	φ 7	φ 8	φ 9	φ 10	φ 11	φ 12	φ 13	φ 14
FILE "J" <td>5A</td> <td>5B</td> <td>6A,6B</td> <td>8A</td> <td>8B</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	5A	5B	6A,6B	8A	8B									
L	NOT USED	φ 6	φ 6	φ 8	φ 8									

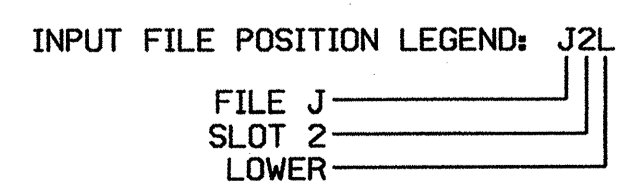
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 * Wired Input - Do not populate slot with detector card

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	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			15
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A,6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
*S07	TB6-9,10	I9U	60	22	11	SYS					
*S08	TB6-11,12	I9L	62	24	13	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

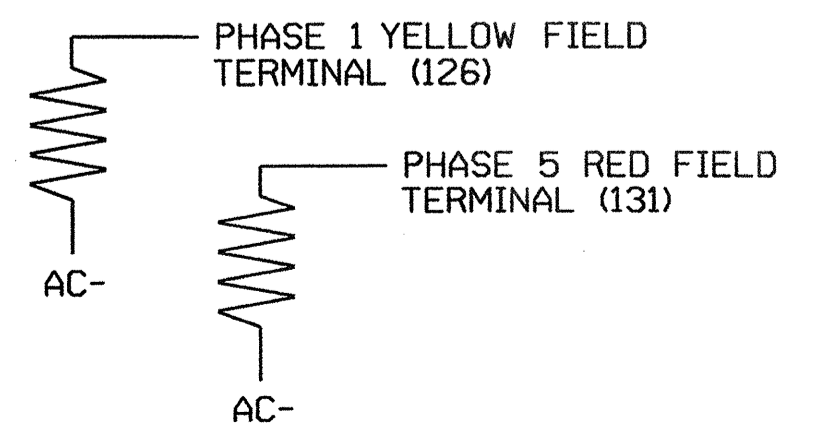
- Add jumper from I1-W to J4-W, on rear of input file.
 - Add jumper from J1-W to I4-W, on rear of input file.
- * System detector only. Remove the vehicle phase assigned to this detector in the default programming.



LOAD RESISTOR INSTALLATION DETAIL

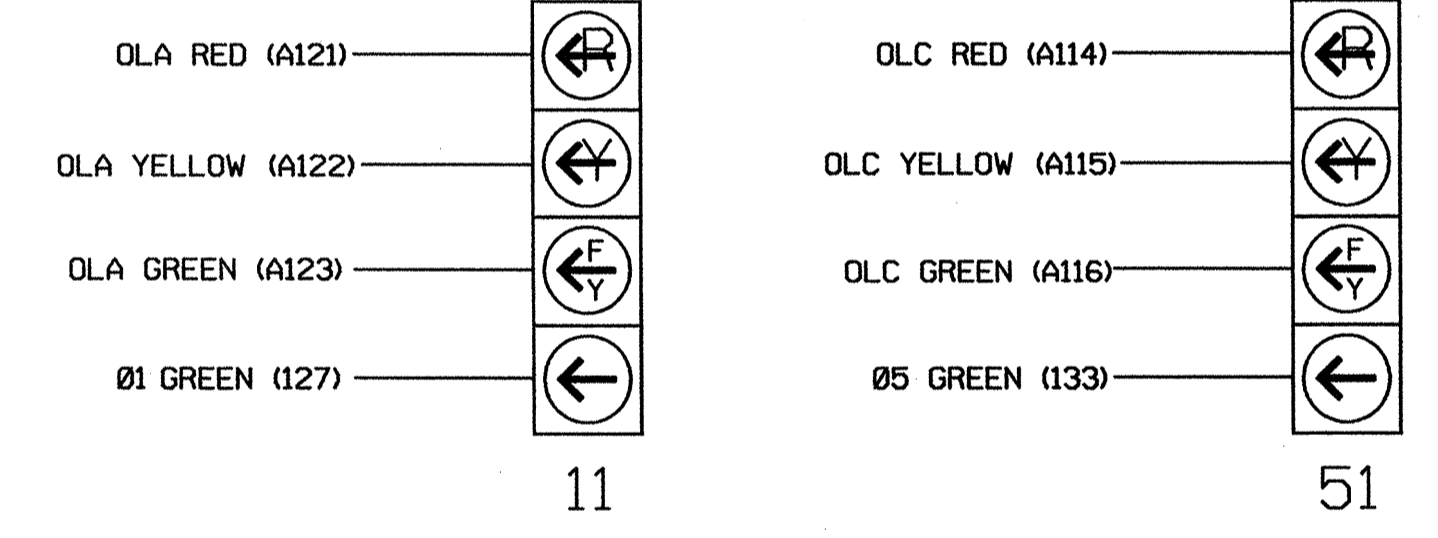
(install resistors as shown below)

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



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

- The sequence display for heads 11 and 51 requires special logic programming. See sheet 2 of 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0405
 DESIGNED: October 2008
 SEALED: 11-17-08
 REVISED: N/A

Signal Upgrade Final Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

SR 1472 (Village Drive) at Fairview Road and North Brunswick Shopping Center

Division 3 Brunswick County Leland

PLAN DATE: November 2008 REVIEWED BY: T. J. J...

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

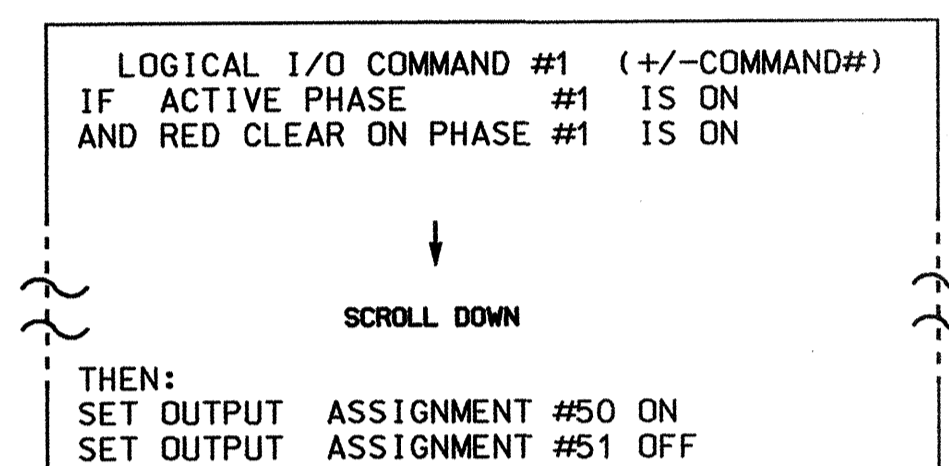
SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER GEORGE C. BROWN

SIG. INVENTORY NO. 03-0405

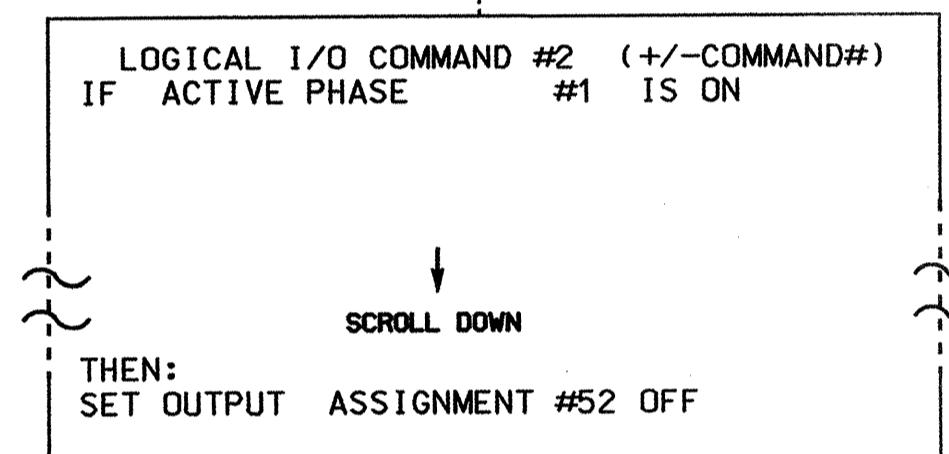
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

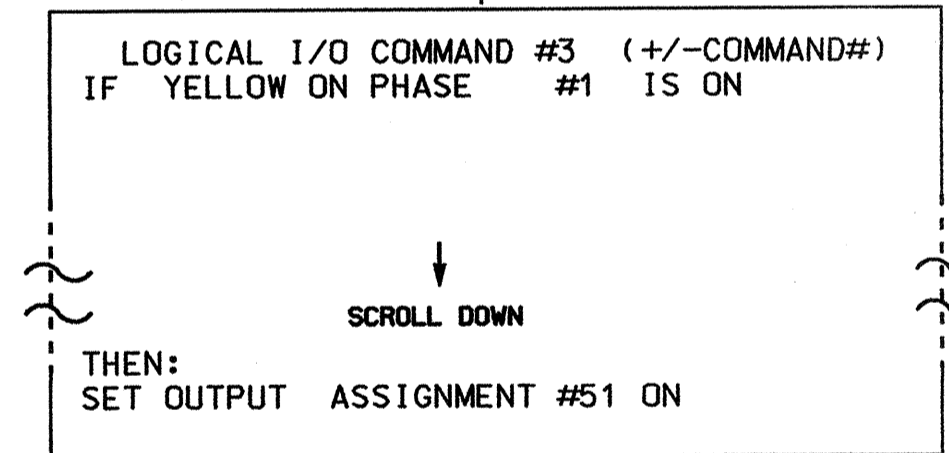
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



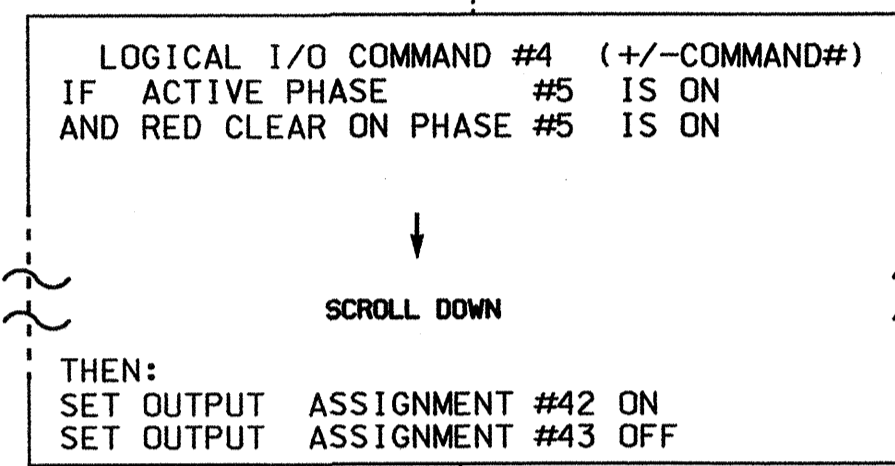
NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).



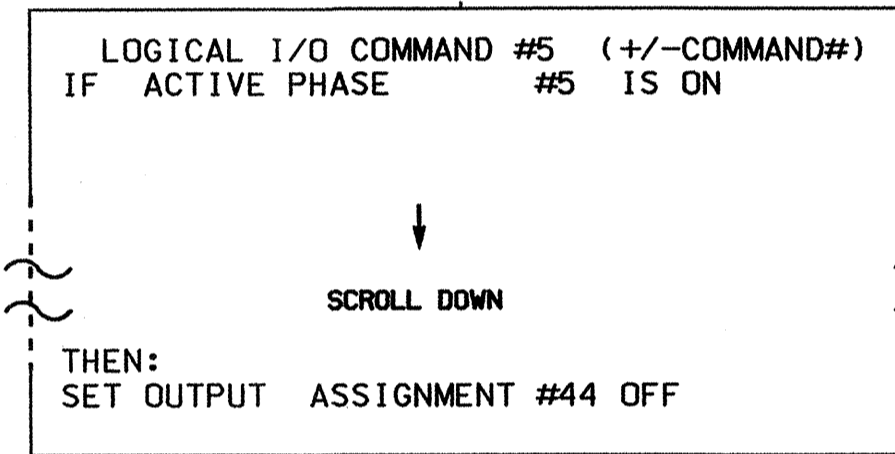
NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).



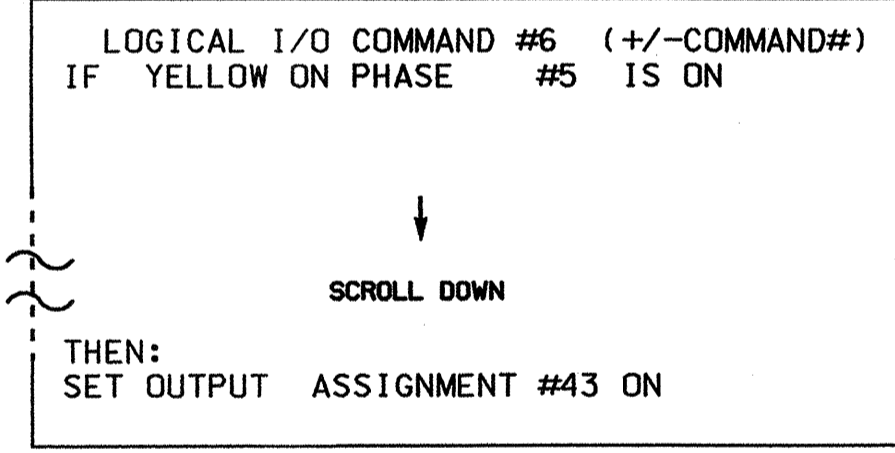
NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).



NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).



NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).



NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

← NOTICE GREEN FLASH

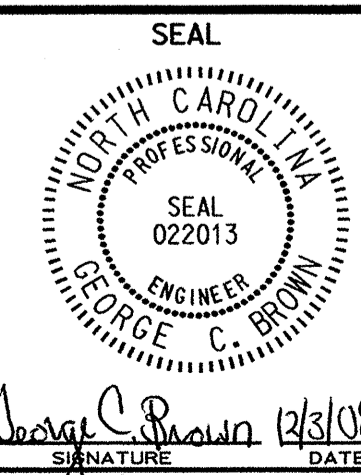
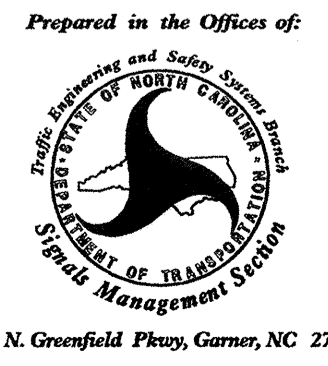
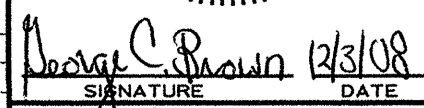
PRESS '+' TWICE

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

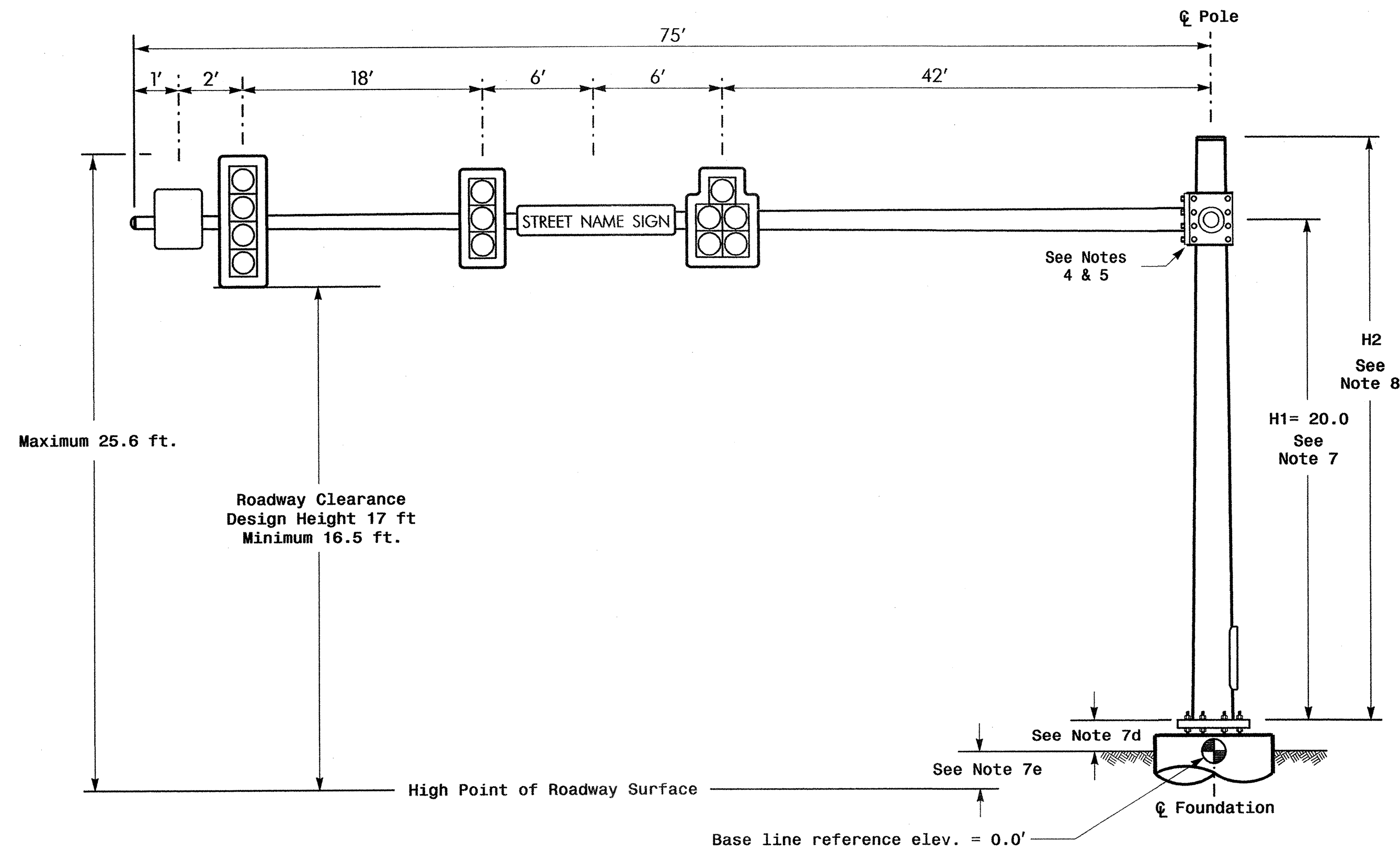
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0405
DESIGNED: October 2008
SEALED: 11-17-08
REVISED: N/A

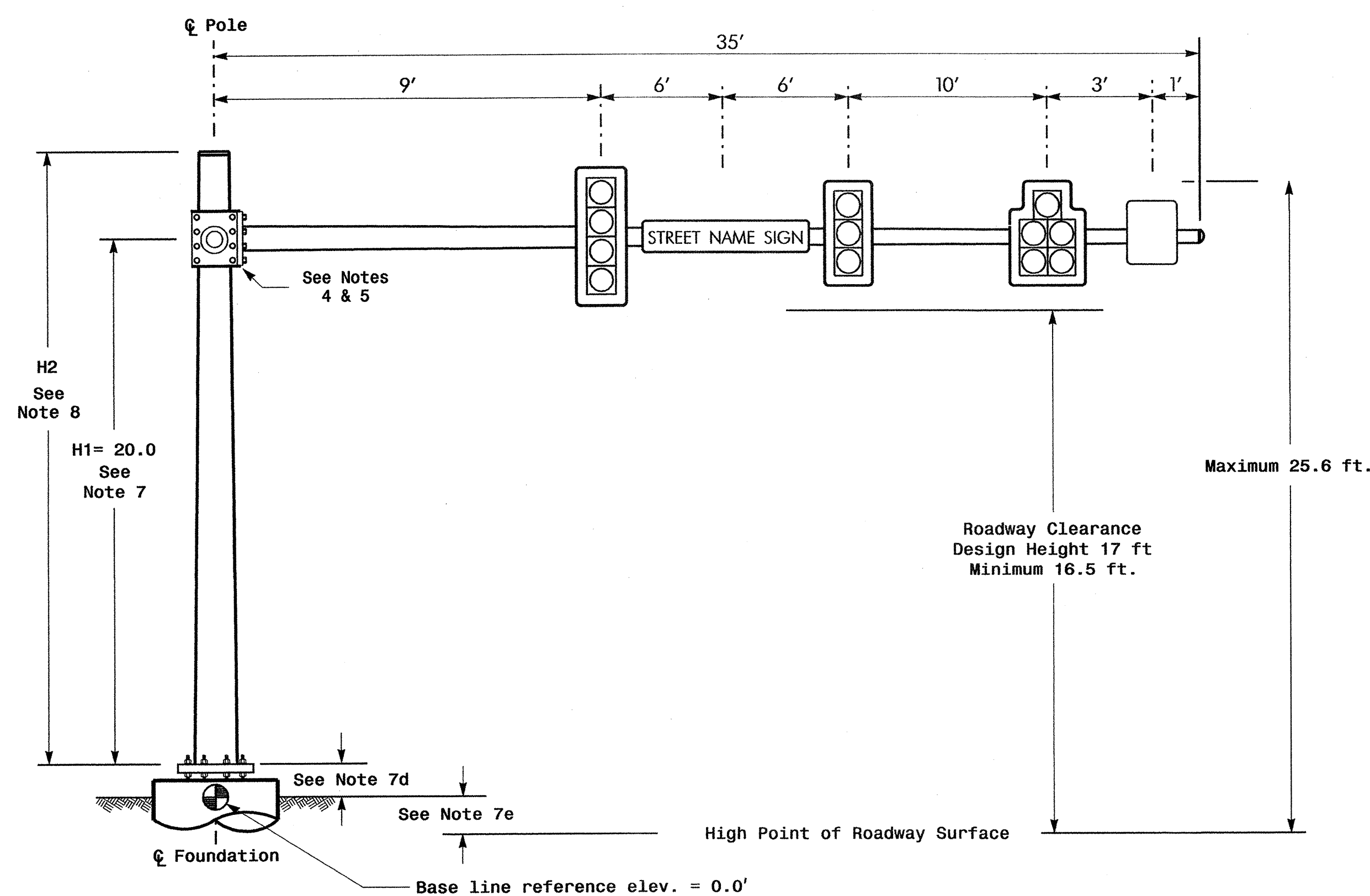
Signal Upgrade Final Sheet 2 of 2		SEAL	
ELECTRICAL AND PROGRAMMING DETAILS FOR:		SR 1472 (Village Drive) at Fairview Road and North Brunswick Shopping Center	
Prepared in the Offices of:		Division 3 Brunswick County Leland	
PLAN DATE: November 2008		REVIEWED BY: <i>T. J. J.</i>	
PREPARED BY: S. Armstrong		REVIEWED BY:	
REVISIONS		INIT. DATE	
750 N. Greenfield Plaza, Garner, NC 27529			
			
SIG. INVENTORY NO. 03-0405			

Design Loading for METAL POLE NO. 8, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 8, MAST ARM B



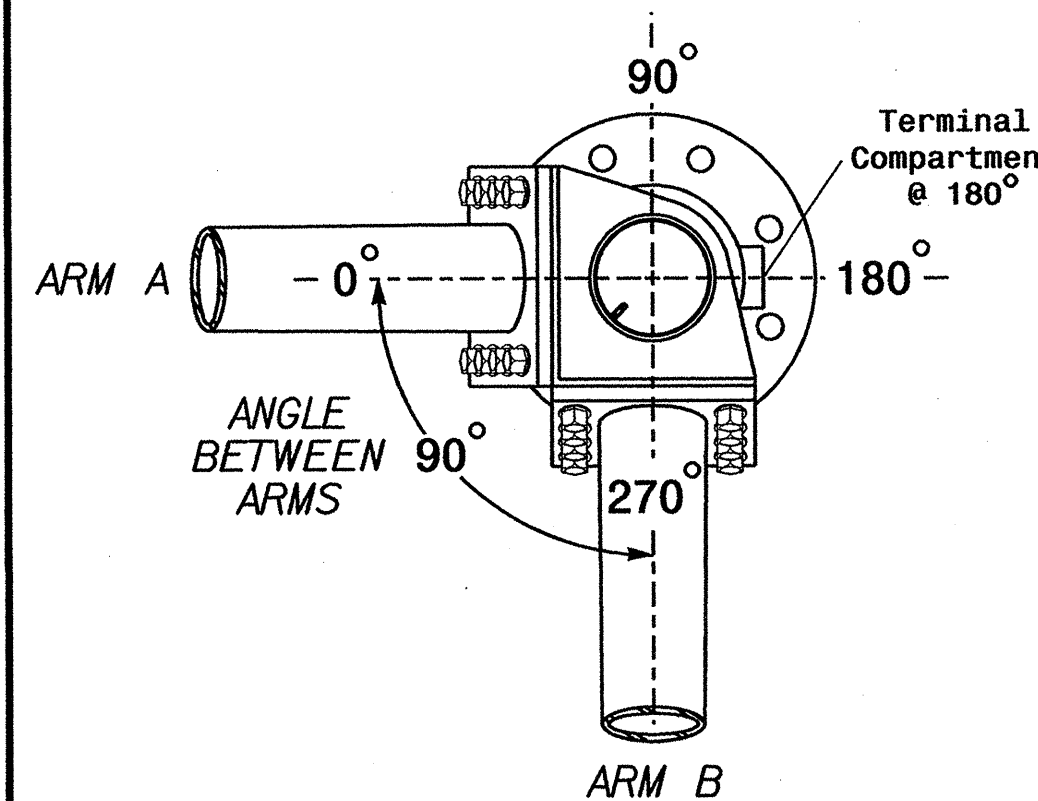
Elevation View @ 0°

SPECIAL NOTE

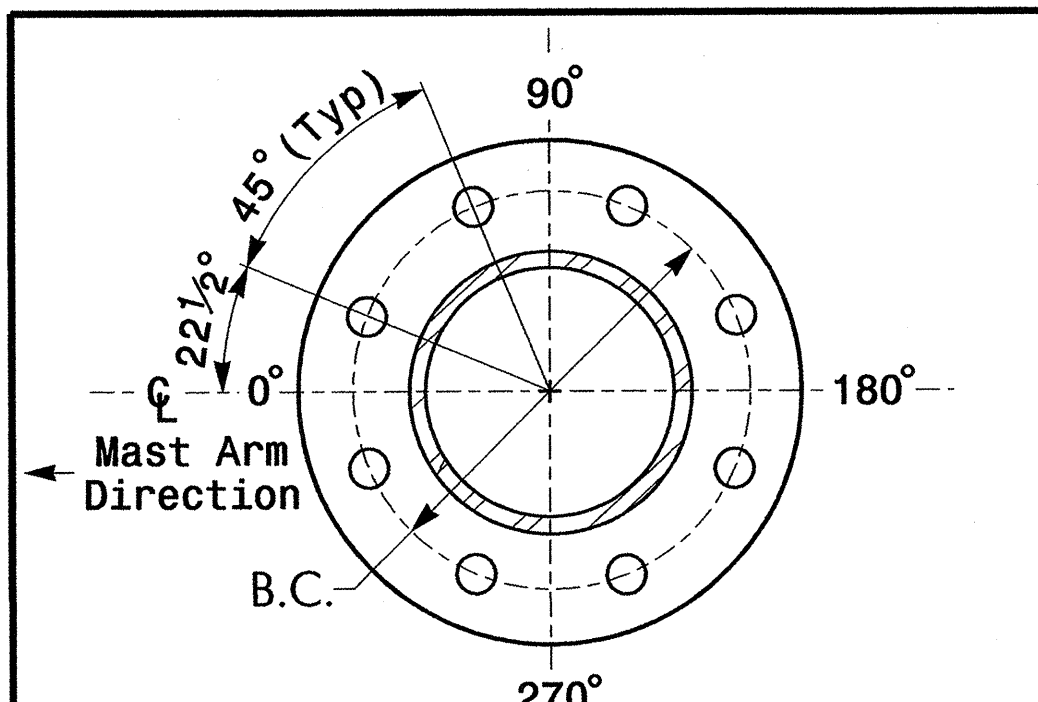
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	1.0 ft.	1.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

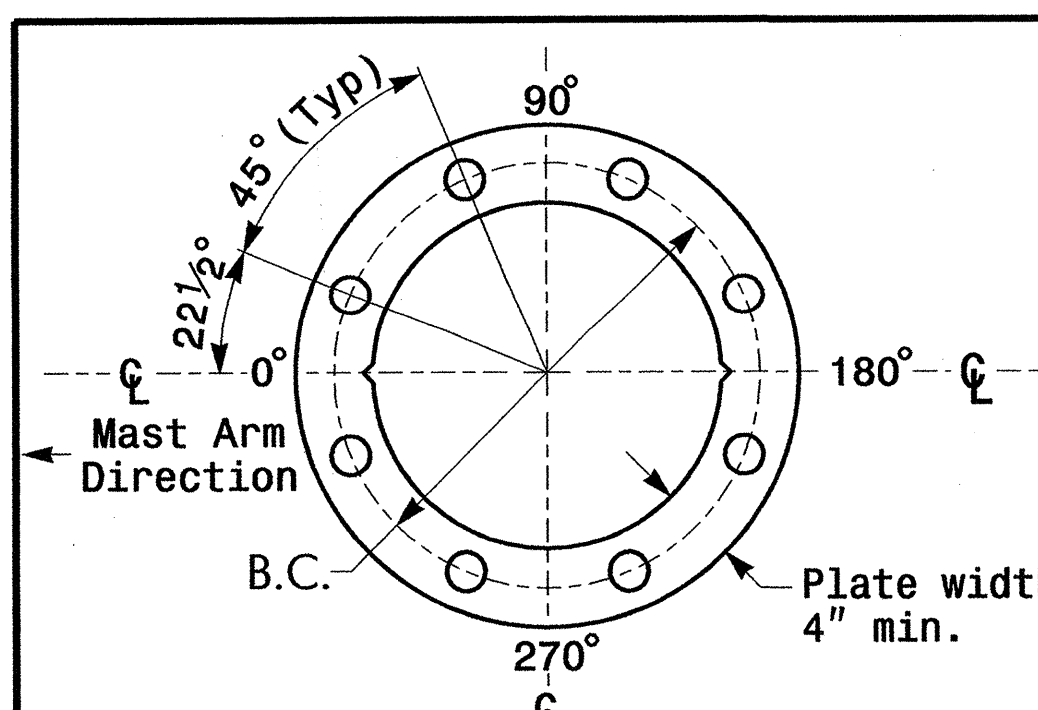


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.

Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of the pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

	SR 1472 (Village Drive) at Fairview Road and North Brunswick Shopping Center Brunswick County Leland	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER 29904 J. P. GALLOWAY 12/1/08
	Division 3 PLAN DATE: October 2008 PREPARED BY: I. O. Umozurike REVIEWED BY: J. P. Galloway	
SCALE 0 N/A N/A		SIG. INVENTORY NO. 03-0405

26-100-2008-17112
 I:\Projects\2008\17112\Drawings\0405\03-0405.dwg
 12/1/08
 I. O. Umozurike

PHASING DIAGRAM

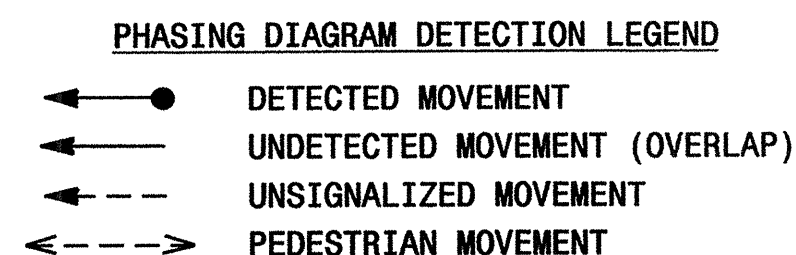
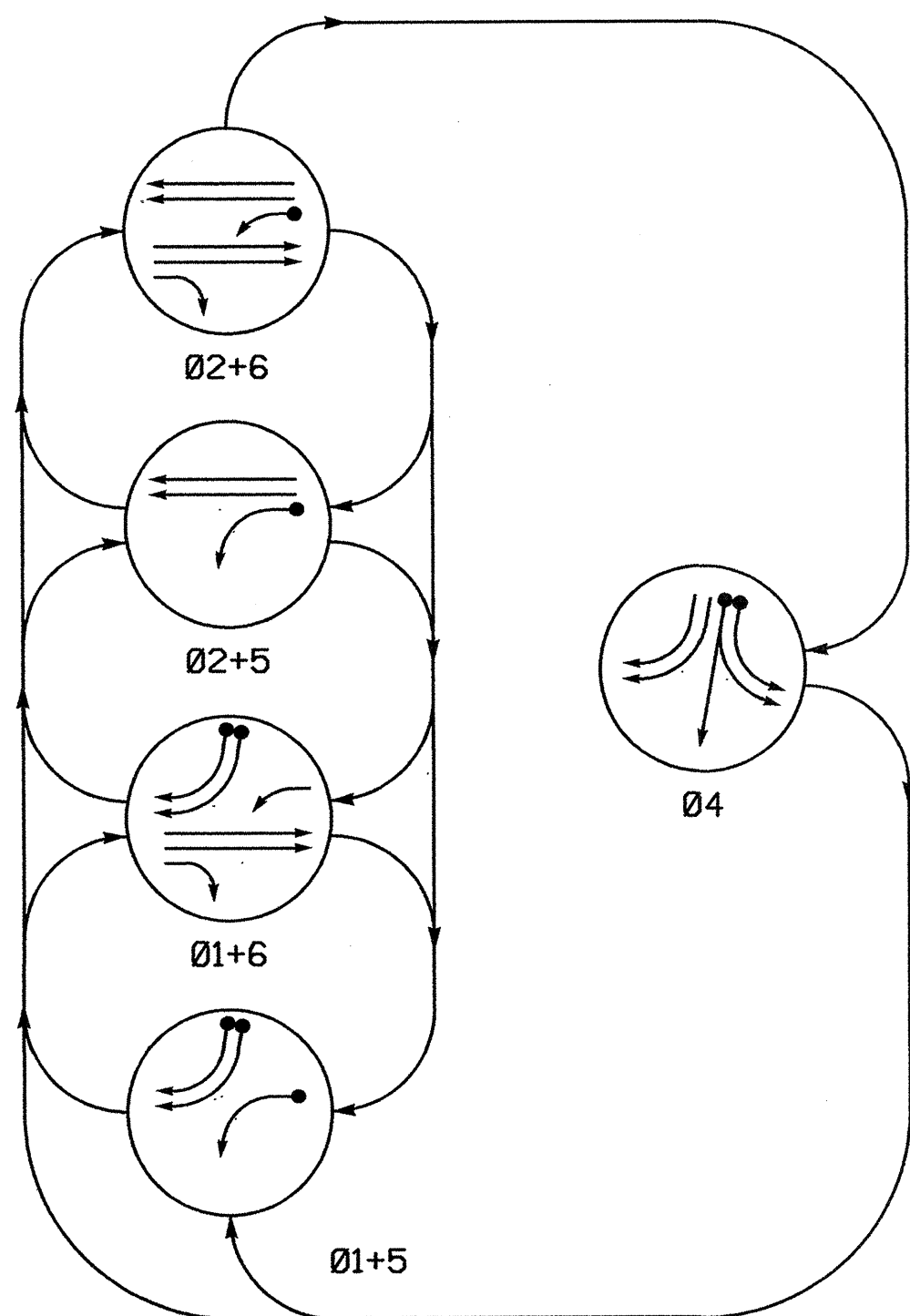
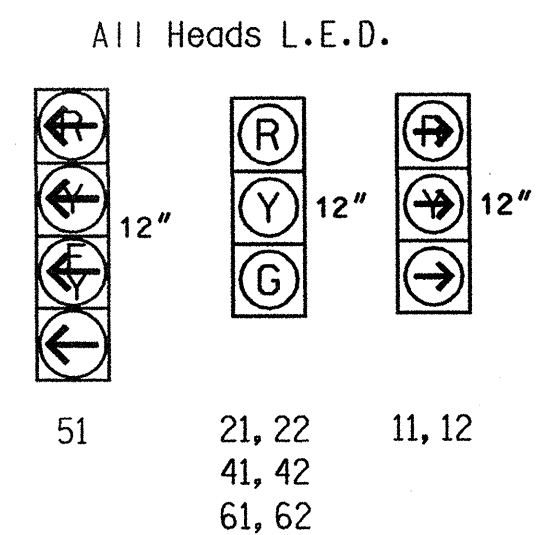


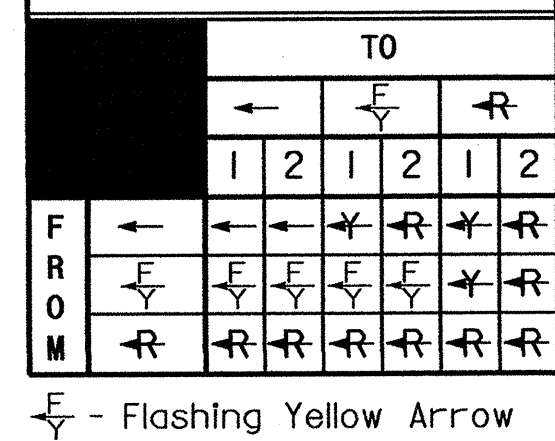
TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	Ø4
11,12	→	→	→	→	→	→
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	→	→	→	→	→	→
61,62	R	G	R	G	R	Y

SIGNAL FACE I.D.



STANDARD SIGNAL FACE CLEARANCES FOR 4 SECTION LEFT TURN SIGNAL



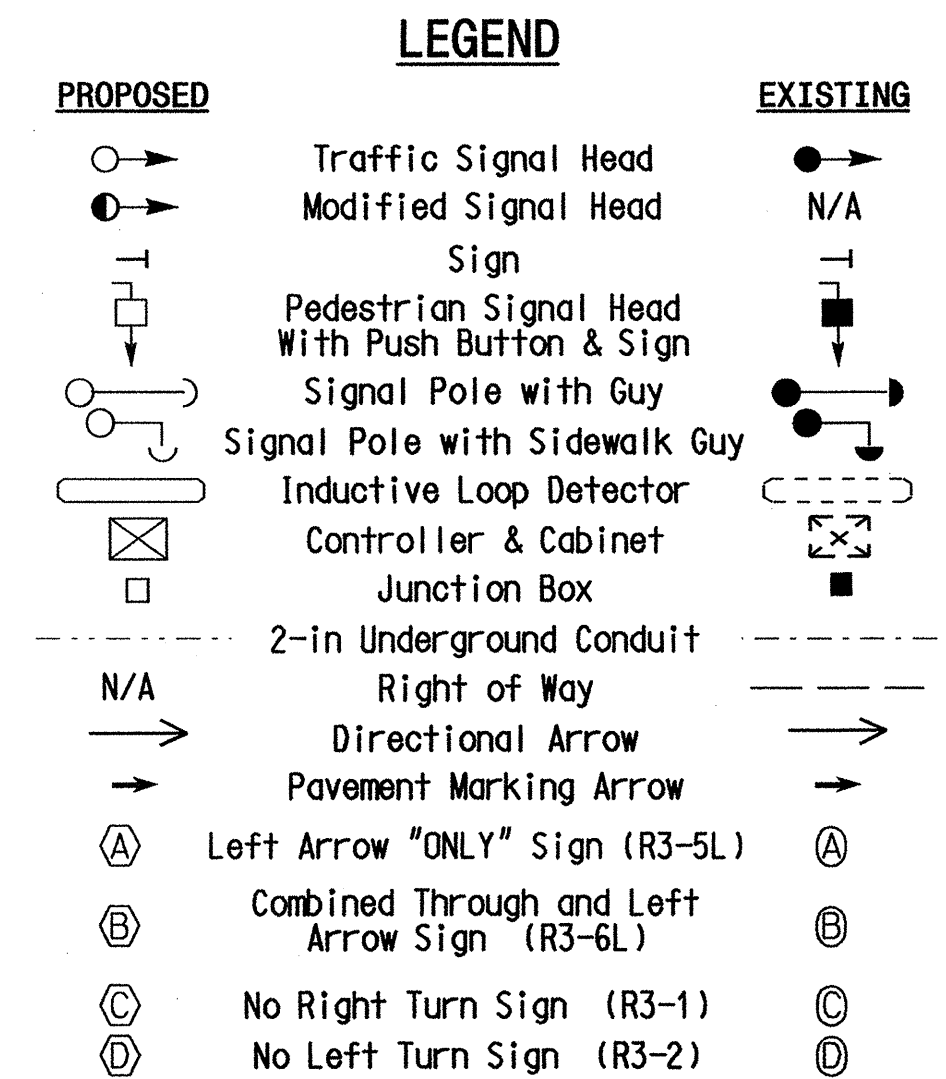
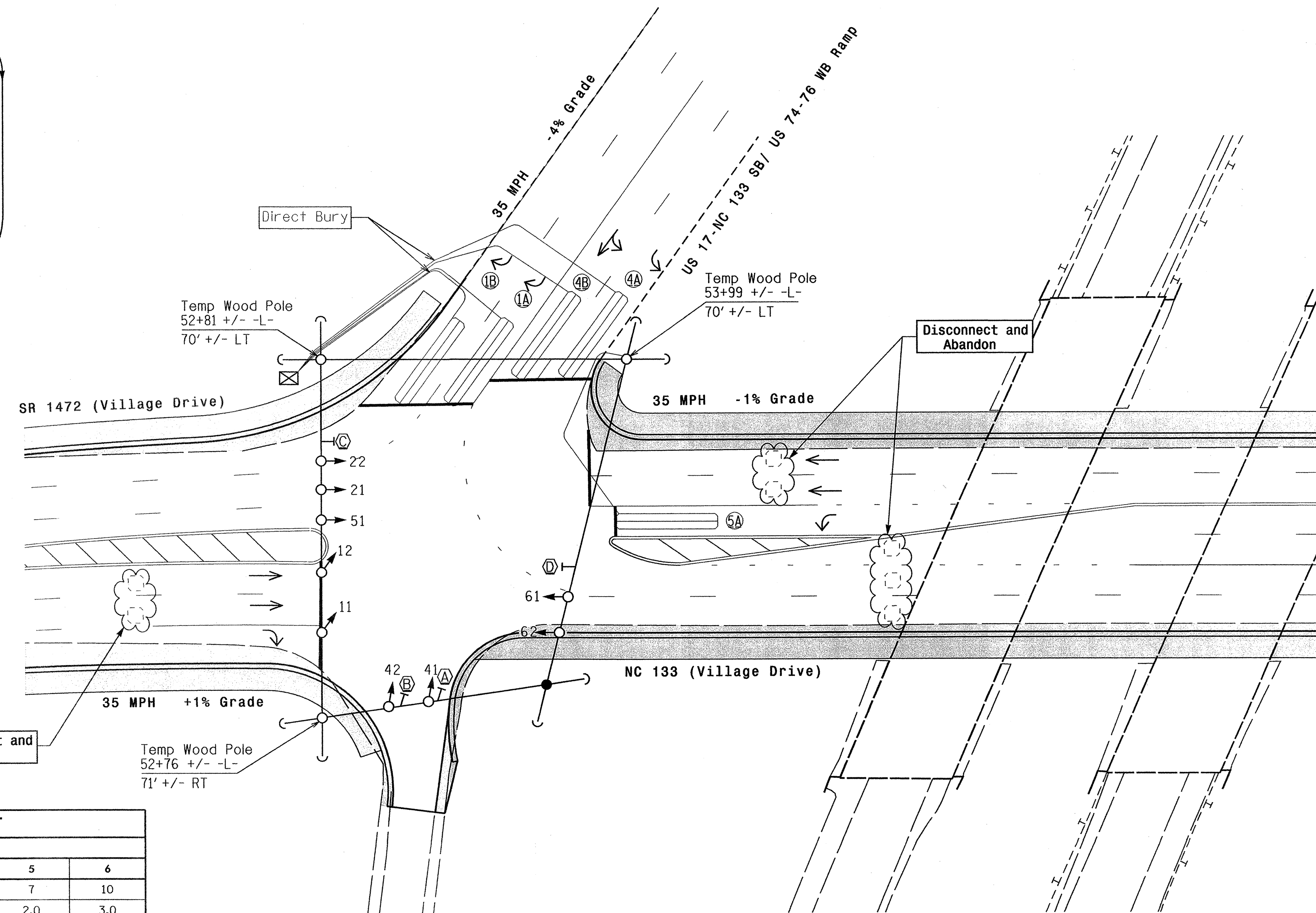
2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING							
				NEW LOOP	PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
IA	6X40	0	2-4-2	Y	1	Y	Y	—	15	—	Y
IB	6X40	0	2-4-2	Y	1	Y	Y	—	15	—	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	—	—	—	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	—	—	—	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	—	20	—	Y

5 Phase Semi-Actuated NC 133/SR 1472 (Village Drive) 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 or phase 5 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 #0275.



2070L TIMING CHART

FEATURE	PHASE					
	1	2	4	5	6	
Min Green 1 *	7	10	7	7	10	
Extension 1 *	2.0	3.0	2.0	2.0	3.0	
Max Green 1 *	30	30	20	15	30	
Yellow Clearance	3.0	3.9	4.1	3.0	3.8	
Red Clearance	2.1	2.7	2.3	3.6	2.8	
Walk 1 *	-	-	-	-	-	
Don't Walk 1	-	-	-	-	-	
Seconds Per Actuation *	-	-	-	-	-	
Max Variable Initial *	-	-	-	-	-	
Time Before Reduction *	-	-	-	-	-	
Time To Reduction *	-	-	-	-	-	
Minimum Gap	-	-	-	-	-	
Recall Mode	-	MAX RECALL	-	-	MAX RECALL	
Vehicle Call Memory	-	-	-	-	-	
Dual Entry	-	-	-	-	-	
Simultaneous Gap	ON	ON	ON	ON	ON	

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

Signal Upgrade Temp. (Phase I, II & III)

Prepared in the Offices of:

NC 133/SR 1472 (Village Drive) at US 17 SB/US 74-76 WB Ramp

Division 3 Brunswick County Leland
 PLAN DATE: October 2008 REVIEWED BY: J. P. Galloway
 PREPARED BY: I. O. Umzurike

750 N. Greenfield Place, Garner, NC 27529
 SCALE: 0 30
 1"=30'

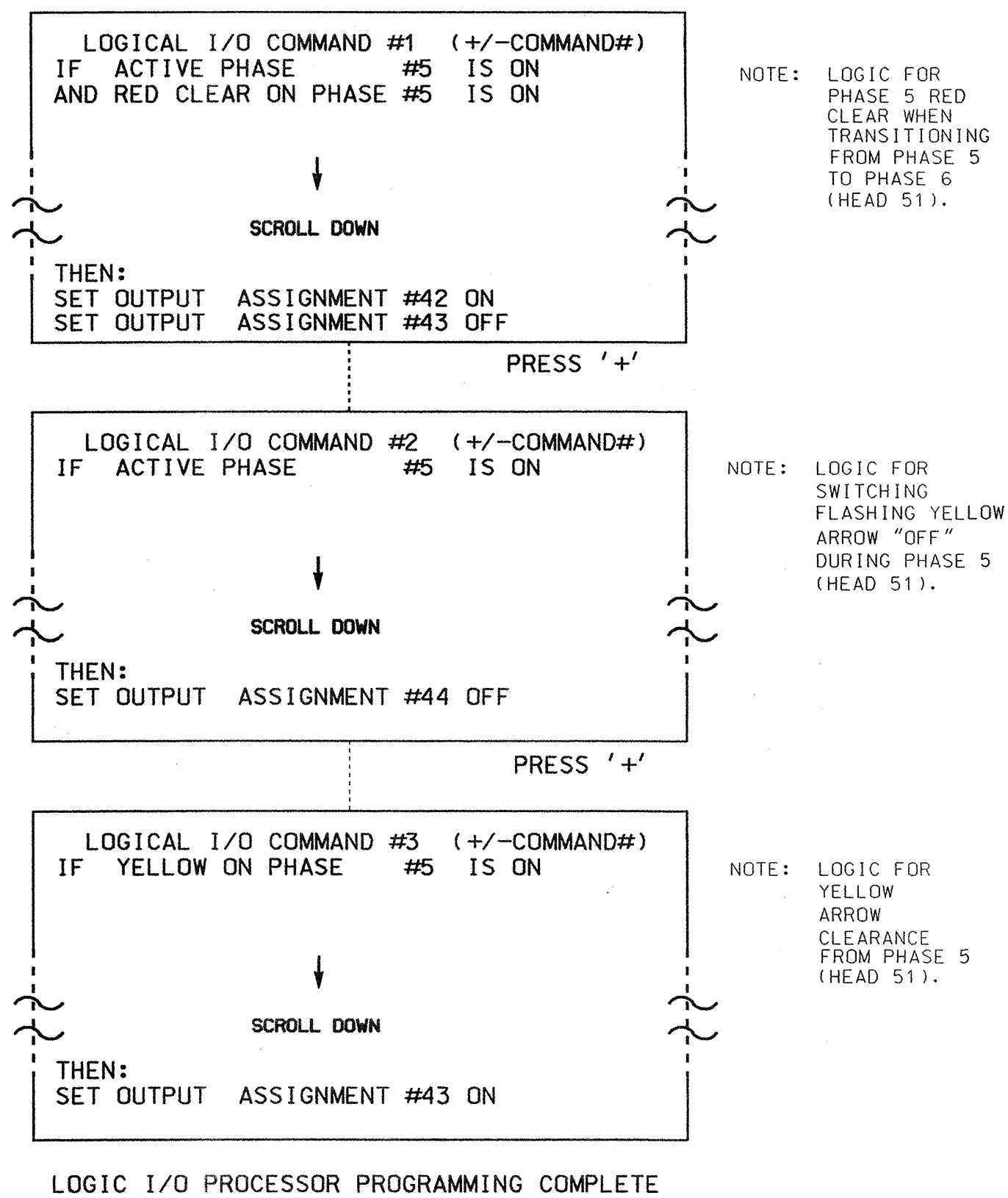
REVISIONS: _____ INIT. DATE _____
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 SIG. INVENTORY NO. 03-0275T

02-DEC-2008 07:46 I:\work\2008\11\08\20081108\1108275T\1108275T.dgn

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
 PHASE: :12345678910111213141516
 VEH OVL PARENTS: :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)....0

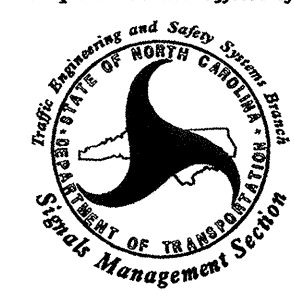

PRESS '+' TWICE

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE: :12345678910111213141516
 VEH OVL PARENTS: :XX
 VEH OVL NOT VEH: :
 VEH OVL NOT PED: :
 VEH OVL GRN EXT: :
 STARTUP COLOR: - RED - YELLOW - GREEN
 FLASH COLORS: - RED - YELLOW X GREEN ← NOTICE GREEN FLASH
 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)....0

OVERLAP PROGRAMMING COMPLETE

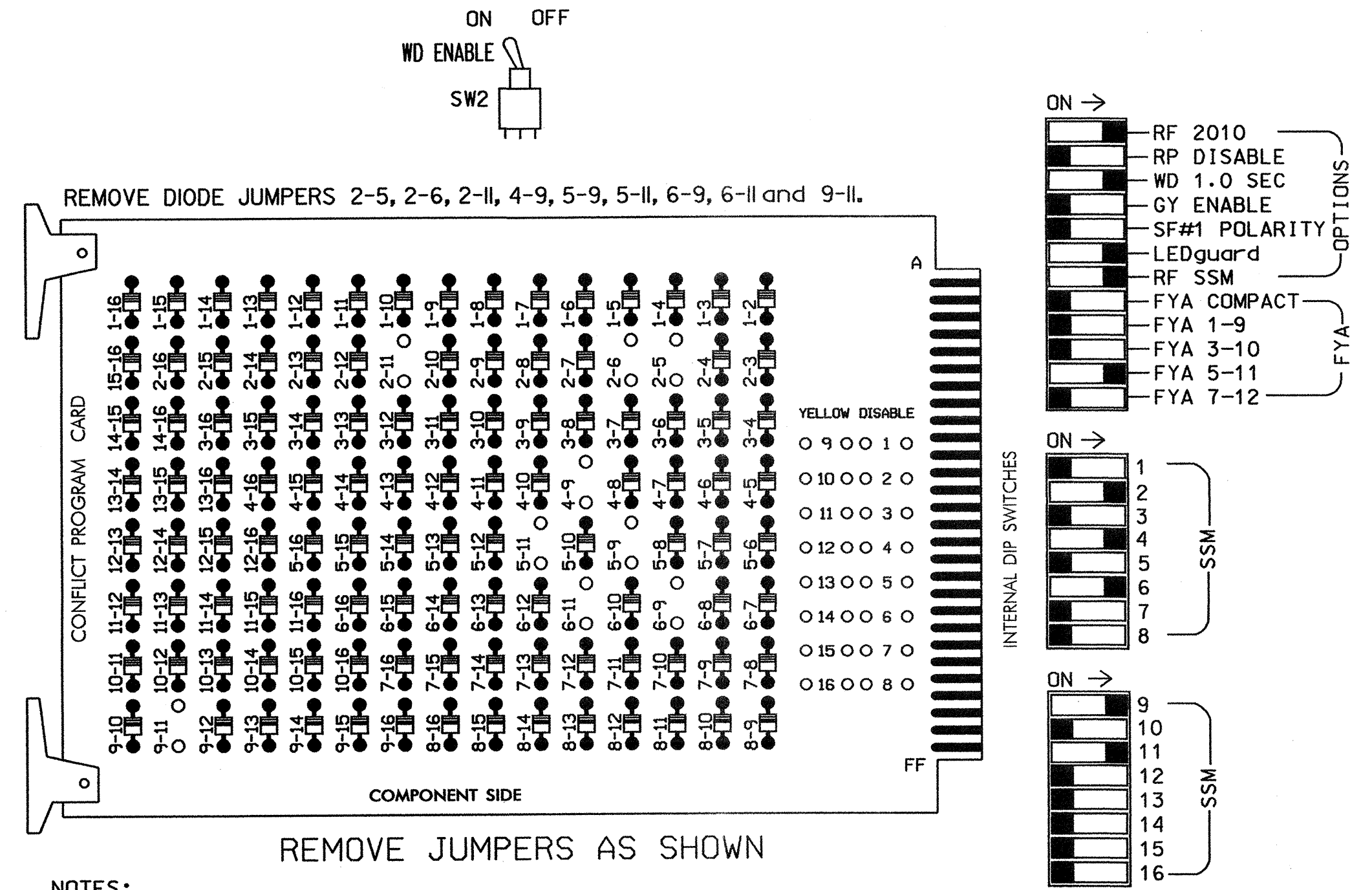
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-0275T
 DESIGNED: October 2008
 SEALED: 11-17-08
 REVISED: N/A

Signal Upgrade Temp (Phase I, II, & III) Sheet 2 of 2

<p>ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: small;">Prepared in the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>NC 133/SR 1472 (Village Drive) at US 17 SB/US 74-76 WB Ramp</p> <p>Division 3 Brunswick County Leland</p> <p>PLAN DATE: November 2008 REVIEWED BY: <i>T. Smith</i></p> <p>PREPARED BY: S. Armstrong REVIEWED BY:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE				<p>SEAL</p>  <p>ENGINEER GEORGE C. BROWN</p> <p><i>George C. Brown</i> 12/1/09 DATE</p> <p>SIG. INVENTORY NO. 03-0275T</p>
REVISIONS	INIT.	DATE						

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5,7,8,10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- The cabinet and controller are part of the NC 133/SR 1472 (Village Drive) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
 CABINET.....CONTRACTOR SUPPLIED 332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S4,S5,S6,S9,S12.
 PHASES USED.....1,2,4,5,6.
 OVERLAP "A".....1+4
 OVERLAP "B".....NOT USED
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NC	21,22	NU	NU	41,42	NU	51*	61,62	NU	NU	NU	NU	11,12	NU	NU	51*	NU	NU
RED		128			101			134										
YELLOW		129			102		*	135										
GREEN		130			103			136										
RED ARROW																A121		A114
YELLOW ARROW																A122		A115
FLASHING YELLOW ARROW																		A116
GREEN ARROW								133								A123		

NU = Not Used
 NC = No Connection, phase used for timing purposes.
 * Denotes install load resistor. See load resistor installation detail this sheet.
 * See pictorial of head wiring in detail below.
 Flash Note: for proper flash operation, see Flasher Circuit Modification Detail this sheet.

INPUT FILE POSITION LAYOUT (from view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	1A	2A,2B				4A			SYS. DET. S03					FS DC ISOLATOR
L	1B	NOT USED			4B				SYS. DET. S04					DC ISOLATOR
U	5A	6A,6B							SYS. DET. S05					S
L	NOT USED	NOT USED							SYS. DET. S06					Y

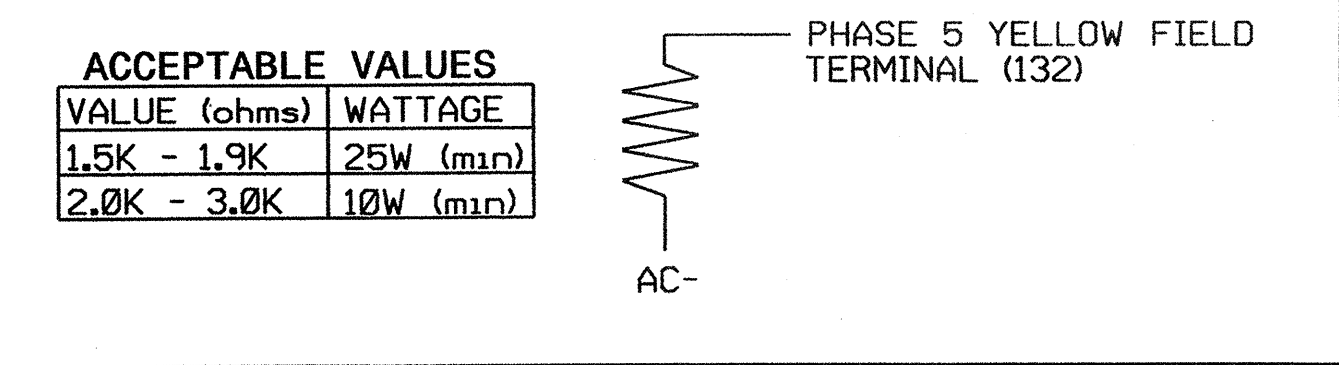
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

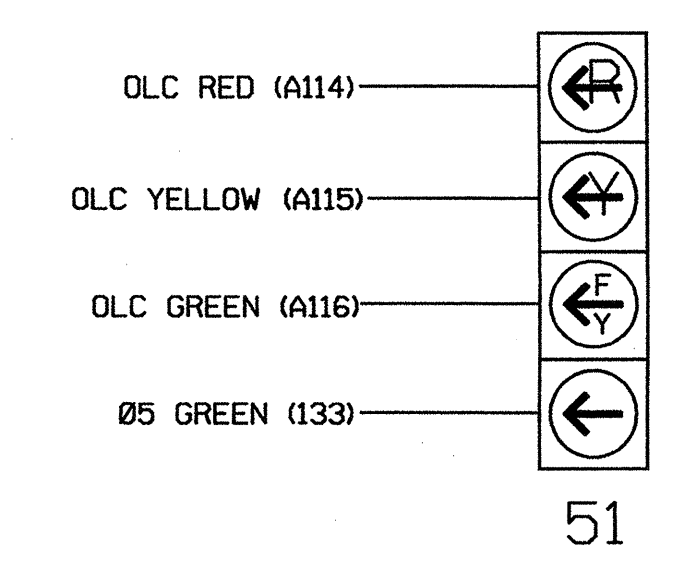
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y			15
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			15
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			20
		I4U	47	9	22	2	Y	Y			
6A,6B	TB3-5,6	J2U	40	2	6	6	Y	Y			
*S03	TB6-9,10	I9U	60	22	11	SYS					
*S04	TB6-11,12	I9L	62	24	13	SYS					
*S05	TB7-9,10	J9U	59	21	15	SYS					
*S06	TB7-11,12	J9L	61	23	17	SYS					

¹Add jumper from J1-W to I4-W, on rear of input file.
 * System detector only. Remove the vehicle phase assigned to this detector in the default programming.

LOAD RESISTOR INSTALLATION DETAIL (install resistors as shown below)



4 SECTION FYA PPLT SIGNAL WIRING DETAIL (wire signal head as shown)



NOTE
 1. The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0275
 DESIGNED: October 2008
 SEALED: 11-17-08
 REVISED: N/A

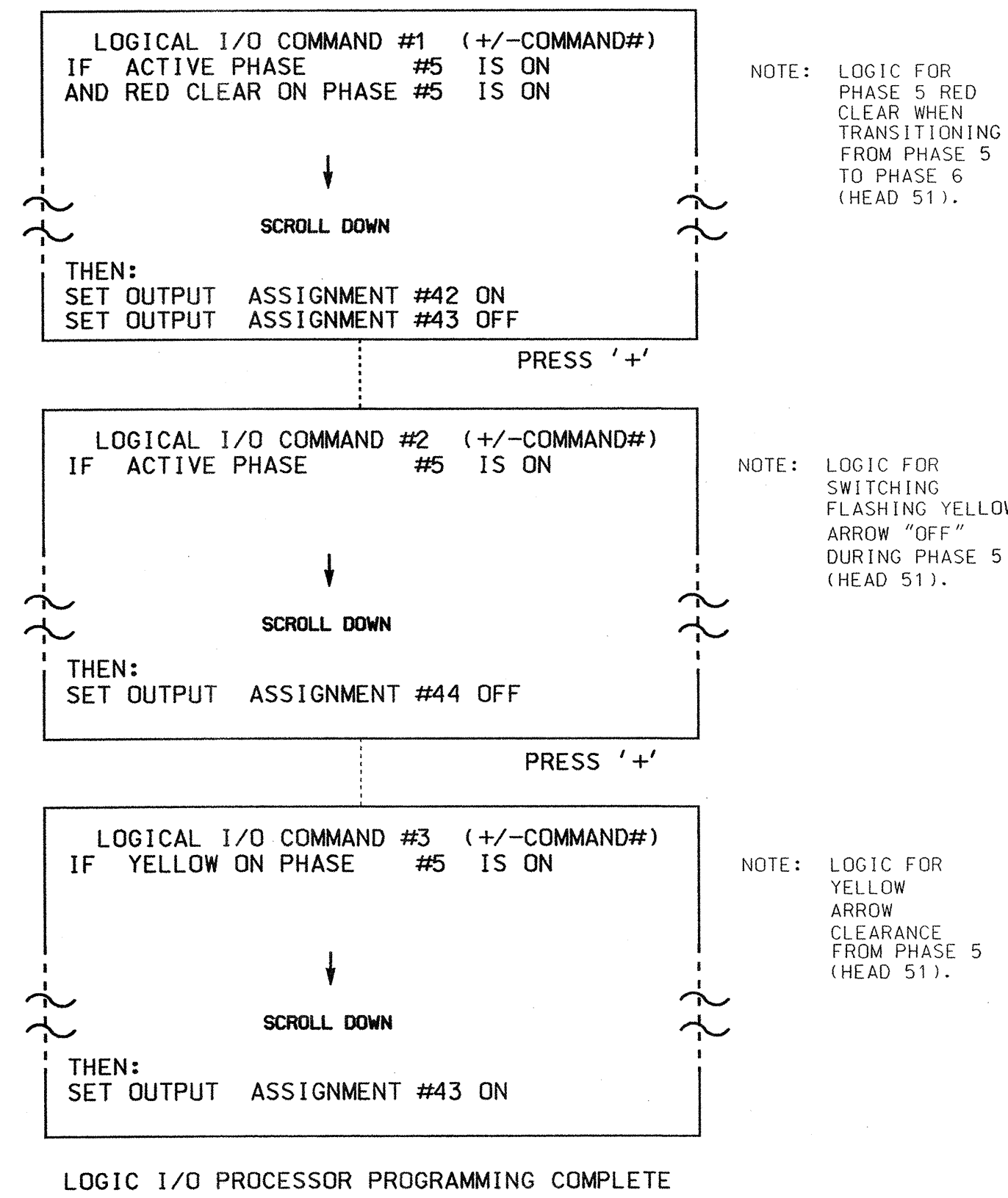
Signal Upgrade (Final) Sheet 1 of 2

	NC 133/SR 1472 (Village Drive) at US 17 SB/US 74-76 WB Ramp Division 3 Brunswick County Leland
	PLAN DATE: November 2008 PREPARED BY: S. Armstrong
	REVIEWED BY: T. J. J... REVISIONS: _____ INIT. DATE
	SIGNATURE: _____ DATE: _____ SIG. INVENTORY NO. 03-0275

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(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 ACT LOGIC COMMANDS 1, 2, AND 3.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

```

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:      :12345678910111213141516
VEH OVL PARENTS: 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)...0.0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0
    
```

PRESS '+' TWICE

```


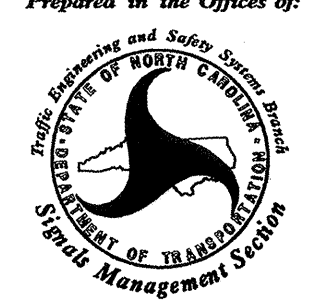
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PHASE:      :12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

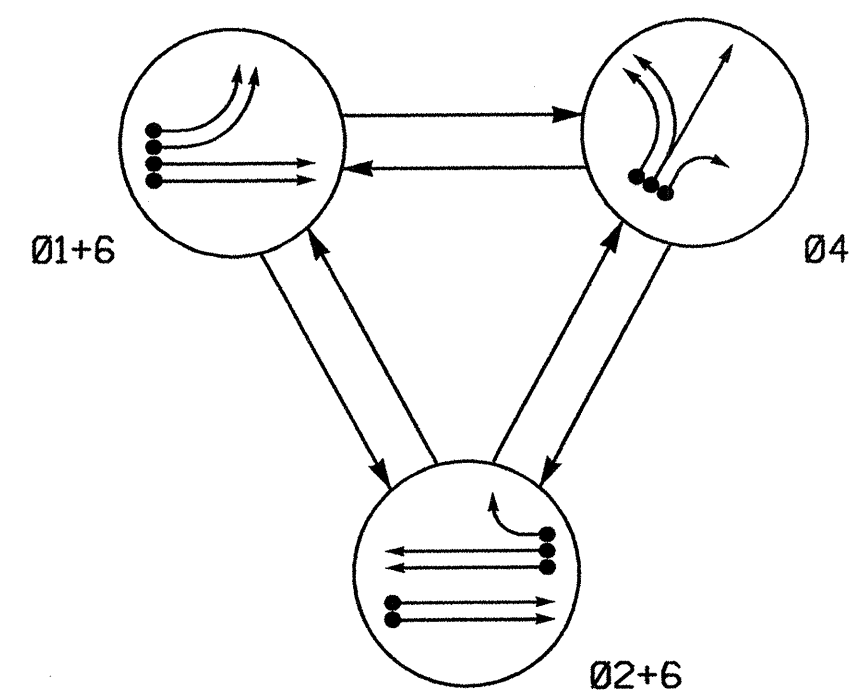
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0275
DESIGNED: October 2008
SEALED: 11-17-08
REVISED: N/A

Signal Upgrade (Final) Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 133/SR 1472 (Village Drive) at US 17 SB/US 74-76 WB Ramp	SEAL 
Prepared in the Offices of: 	Division 3 Brunswick County Leland PLAN DATE: November 2008 REVIEWED BY: T. Spivey PREPARED BY: S. Armstrong REVIEWED BY:	SIGNATURE: <i>George C. Brown</i> DATE: 12/4/08
750 N. Greenfield Plaza, Garner, NC 27529	REVISIONS INIT. DATE	SIG. INVENTORY NO. 03-0275

03-DEC-2008 14:16 C:\pwworking\signalmanagement\proj\030275_sml.e.dwg...xxx.dgn

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

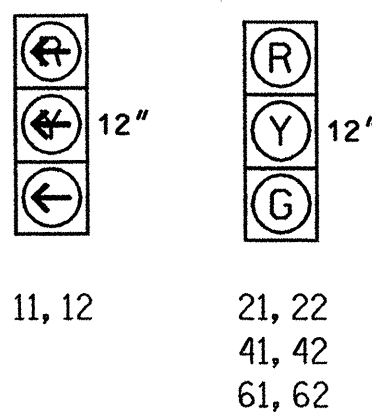
- ← DETECTED MOVEMENT
- ← UNDETECTED MOVEMENT (OVERLAP)
- - - ← UNSIGNALIZED MOVEMENT
- ← ← PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	01+6	02+6	04	FLASH
11, 12	-	R	R	R
21, 22	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y

SIGNAL FACE I.D.

ALL HEADS L.E.D.



2070L LOOP & DETECTOR INSTALLATION

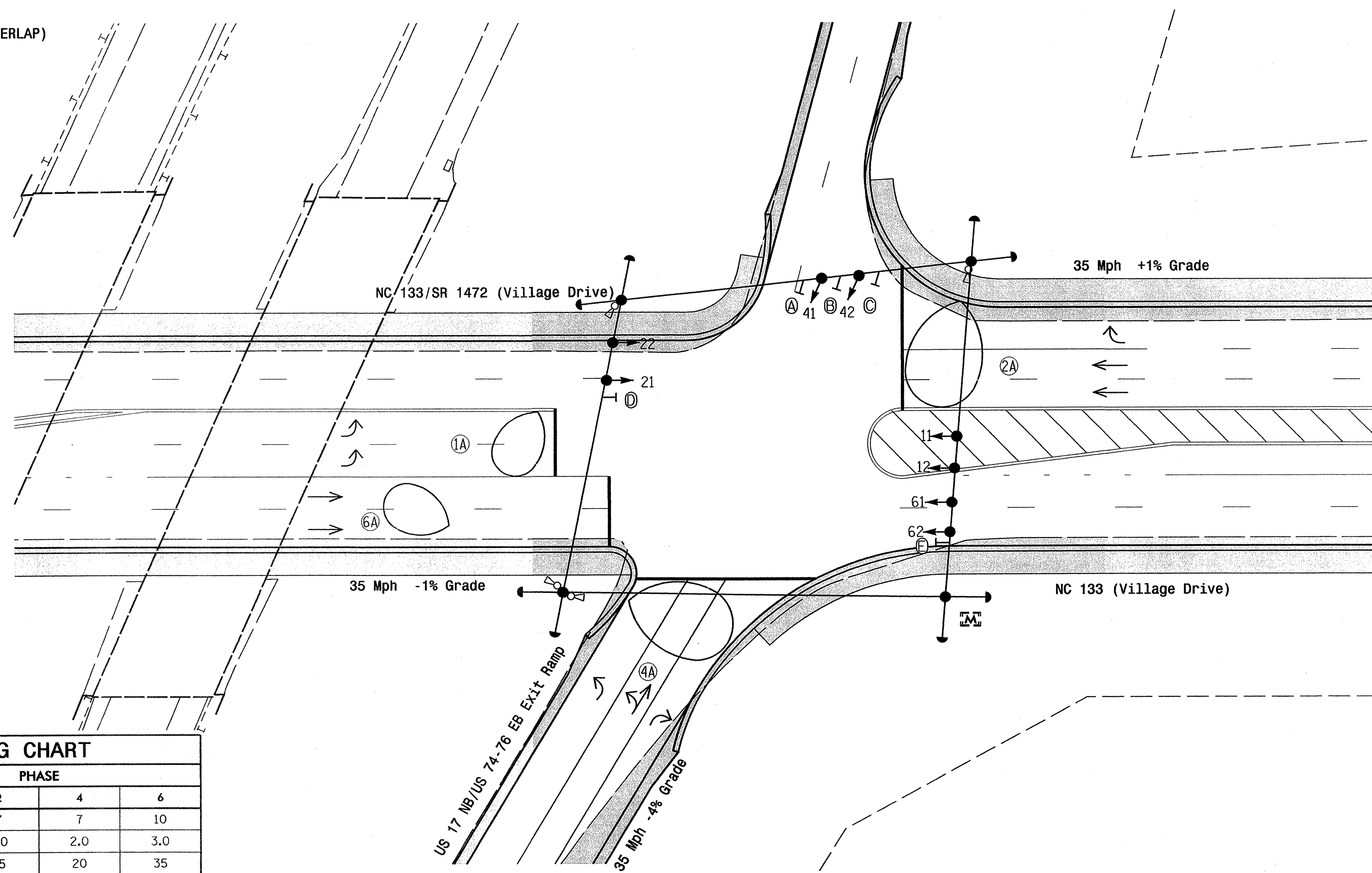
LOOP	INDUCTIVE LOOPS			DETECTOR PROGRAMMING						SYSTEM LOOP	NEW CARD	
	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME			DELAY TIME
1A	*	0	*	*	1	Y	Y	-	-	3	-	Y
2A	*	0	*	*	2	Y	Y	-	-	-	-	Y
4A	*	0	*	*	4	Y	Y	-	-	-	-	Y
6A	*	0	*	*	6	Y	Y	-	-	-	-	Y

* Microwave Detection Zone

3 Phase Fully Actuated NC 133/SR 1472 (Village Drive) 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 lead.
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 #10304, Controller Asset #0276.



2070L TIMING CHART

FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	10	7	7	10
Extension 1 *	2.0	2.0	2.0	3.0
Max Green 1 *	35	25	20	35
Yellow Clearance	3.0	3.8	4.1	3.9
Red Clearance	3.2	2.1	1.9	1.6
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	-	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

- | PROPOSED | EXISTING |
|--|-----------|
| ○ → Traffic Signal Head | ● → N/A |
| ○ → Modified Signal Head | ○ → N/A |
| ○ → Sign | ○ → N/A |
| ○ → Pedestrian Signal Head With Push Button & Sign | ○ → N/A |
| ○ → Signal Pole with Guy | ○ → N/A |
| ○ → Signal Pole with Sidewalk Guy | ○ → N/A |
| ○ → Inductive Loop Detector | ○ → N/A |
| ○ → Controller & Cabinet | ○ → N/A |
| ○ → Junction Box | ○ → N/A |
| ○ → 2-in Underground Conduit | ○ → N/A |
| N/A → Right of Way | N/A → N/A |
| → → Directional Arrow | → → N/A |
| → → Pavement Marking Arrow | → → N/A |
| → → Construction Zone | → → N/A |
| ○ → Microwave Detector | ○ → N/A |
| ○ → Microwave Detection Zone | ○ → N/A |
-
- | | |
|--|-----|
| (A) Left Arrow "ONLY" Sign (R3-5L) | (A) |
| (B) Combined Through and Left Arrow Sign (R3-6L) | (B) |
| (C) Right Arrow "ONLY" Sign (R3-SR) | (C) |
| (D) No Left Turn Sign (R3-2) | (D) |
| (E) No Right Turn Sign (R3-1) | (E) |

Signal Upgrade Temp. (Phase I, II & III)

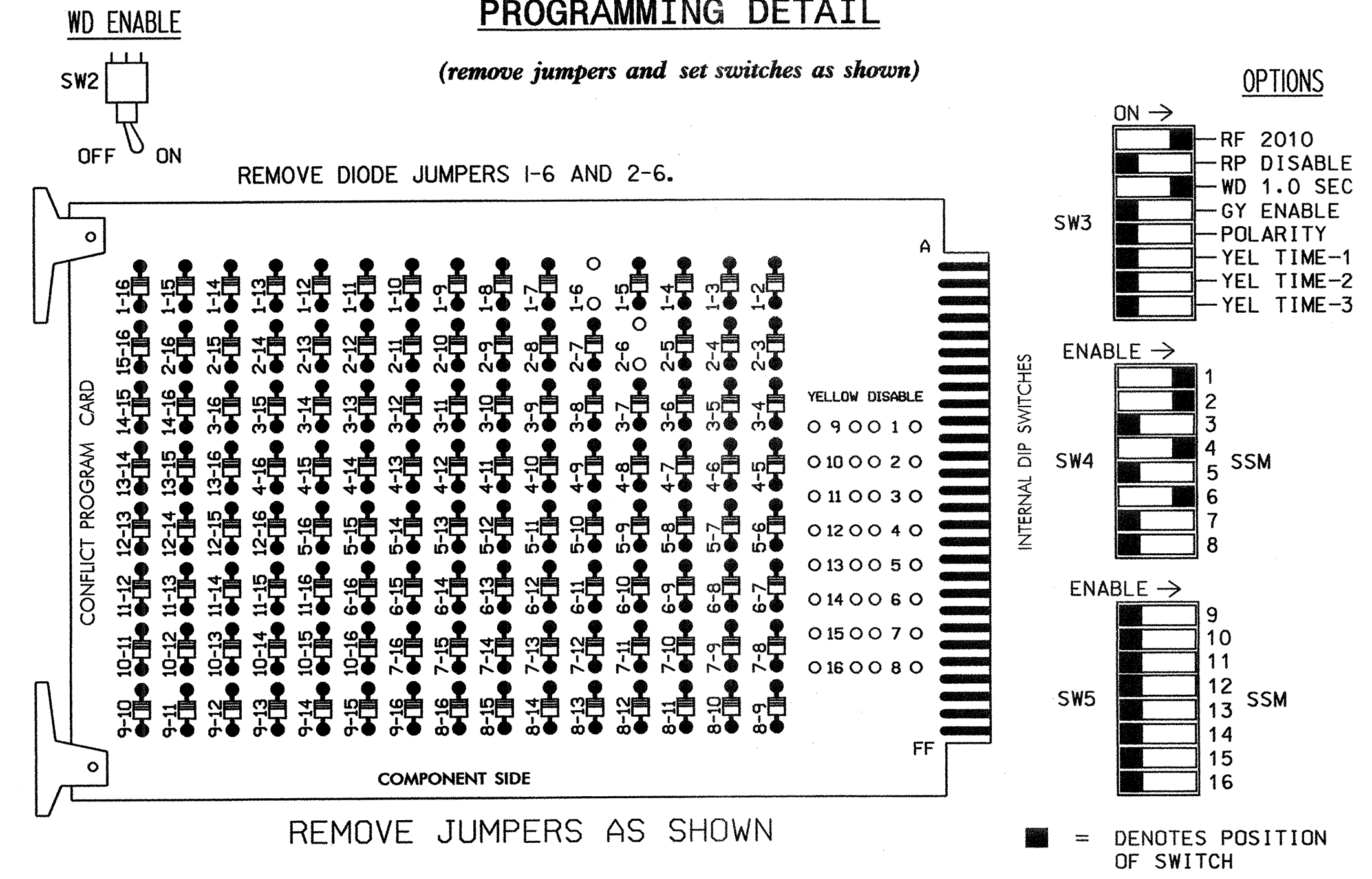
	<p>NC 133/SR 1472 (Village Drive) at US 17 NB/US 74-76 EB Ramp</p>	
	<p>Division 3 Brunswick County Leland</p>	
	<p>PLAN DATE: October 2008</p>	<p>REVIEWED BY: J. P. Galloway</p>
	<p>PREPARED BY: I. O. Umozurike</p>	<p>REVIEWED BY:</p>
<p>SCALE: 1"=30'</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>
<p>0 30</p>	<p>1"=30'</p>	<p>DATE: 11-17-08</p>

SIG. INVENTORY NO. 03-0276T

02-DEC-2008 15:148
 s:\1118 s1\p1\15\work\p1\p1.dwg
 02-DEC-2008 15:148
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EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



- REMOVE DIODE JUMPERS 1-6 AND 2-6.
- REMOVE JUMPERS AS SHOWN
- NOTES:
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
 - Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5,7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- The cabinet and controller are part of the NC 133/SR 1472 (Village Drive) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....EXISTING 2070L
 CABINET.....EXISTING 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

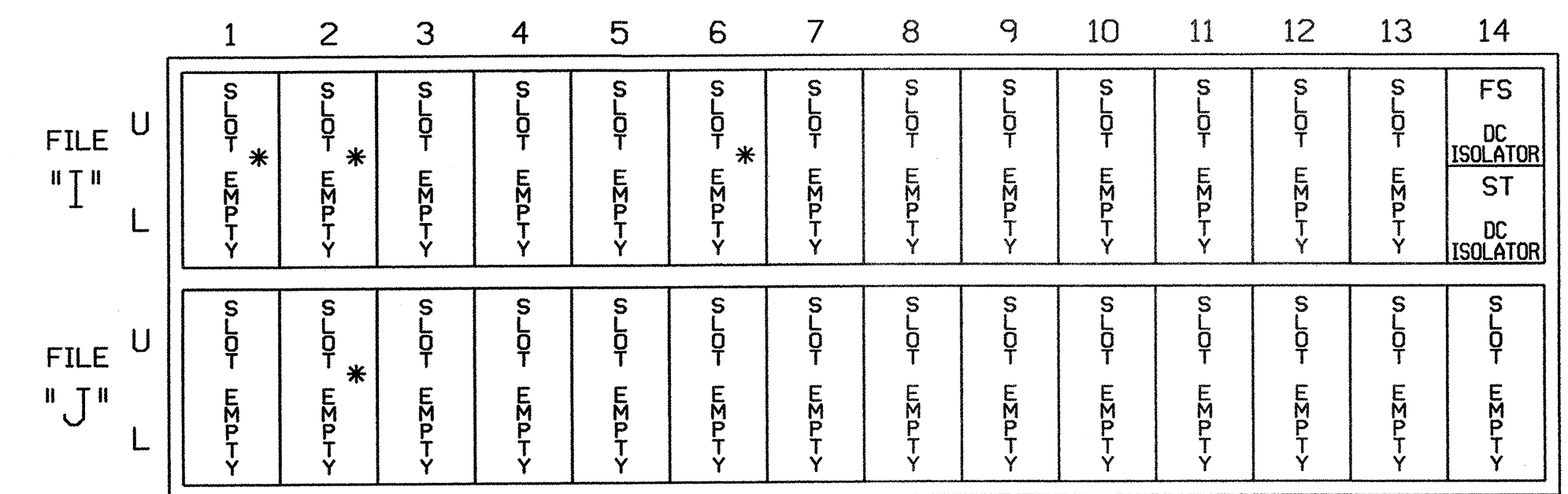
SIGNAL HEAD HOOK-UP CHART

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	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)



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

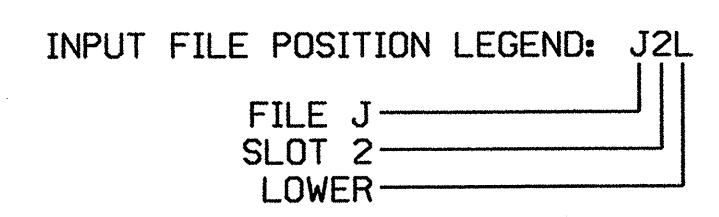
FS = FLASH SENSE
 ST = STOP TIME

* Microwave Detector - do not populate slot with detector card. See Accuwave Detector Panel Wiring Detail on sheet 2 of this electrical detail.

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	*	I1U	56	18	1	1	Y	Y			3
2A	*	I2U	39	1	2	2	Y	Y			
4A	*	I6U	41	3	4	4	Y	Y			
6A	*	J2U	40	2	6	6	Y	Y			

* Microwave Detector - see Accuwave Detector Panel Wiring Detail on sheet 2 of this electrical detail.



PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1 NEXT: PAGES)						
RNG	LEAD	BARRIER 1	X-LAG	LEAD	BARRIER 2	X-LAG
1	:0	2	1	0	4	0
2	:0	6	0	:0	0	0
3	:0	0	0	:0	0	0
4	:0	0	0	:0	0	0

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-0276T
 DESIGNED: October 2008
 SEALED: 11-17-08
 REVISED: N/A

Signal Upgrade Temp (Phase I, II, & III) Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: **NC 133/SR 1472 (Village Drive) at US 17 NB/US 74-76 EB Ramp**

Prepared in the Offices of:

Division 3 Brunswick County Leland

PLAN DATE: November 2008 REVIEWED BY: T. Joyce

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL:

SIGNATURE: DATE: 12/3/08

SIG. INVENTORY NO. 03-0276T

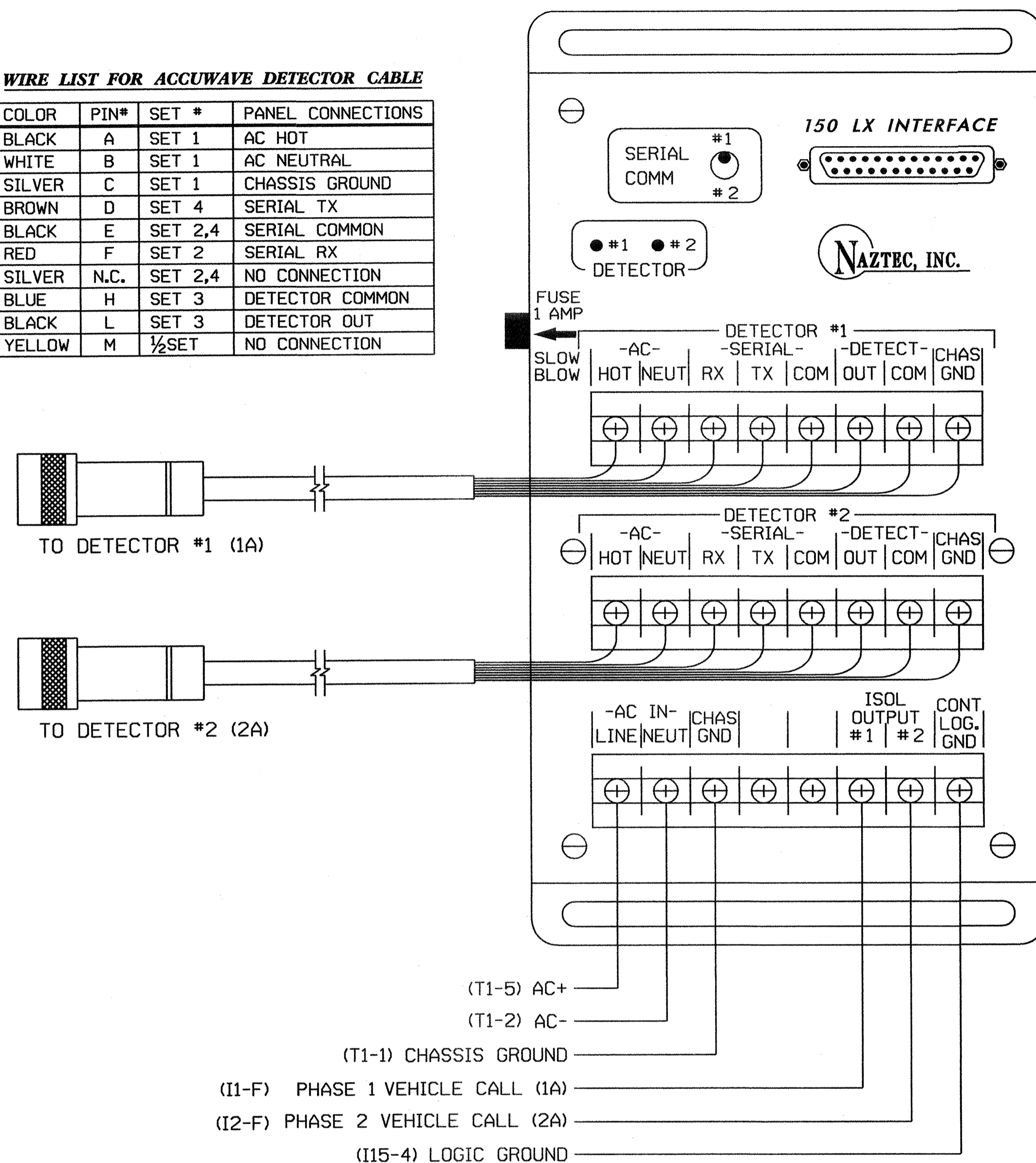
02-DEC-2008 15:41
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ACCUWAVE DETECTOR PANEL WIRING DETAIL FOR 1A & 2A

(wire as shown)

WIRE LIST FOR ACCUWAVE DETECTOR CABLE

COLOR	PIN*	SET #	PANEL CONNECTIONS
BLACK	A	SET 1	AC HOT
WHITE	B	SET 1	AC NEUTRAL
SILVER	C	SET 1	CHASSIS GROUND
BROWN	D	SET 4	SERIAL TX
BLACK	E	SET 2,4	SERIAL COMMON
RED	F	SET 2	SERIAL RX
SILVER	N.C.	SET 2,4	NO CONNECTION
BLUE	H	SET 3	DETECTOR COMMON
BLACK	L	SET 3	DETECTOR OUT
YELLOW	M	1/2SET	NO CONNECTION

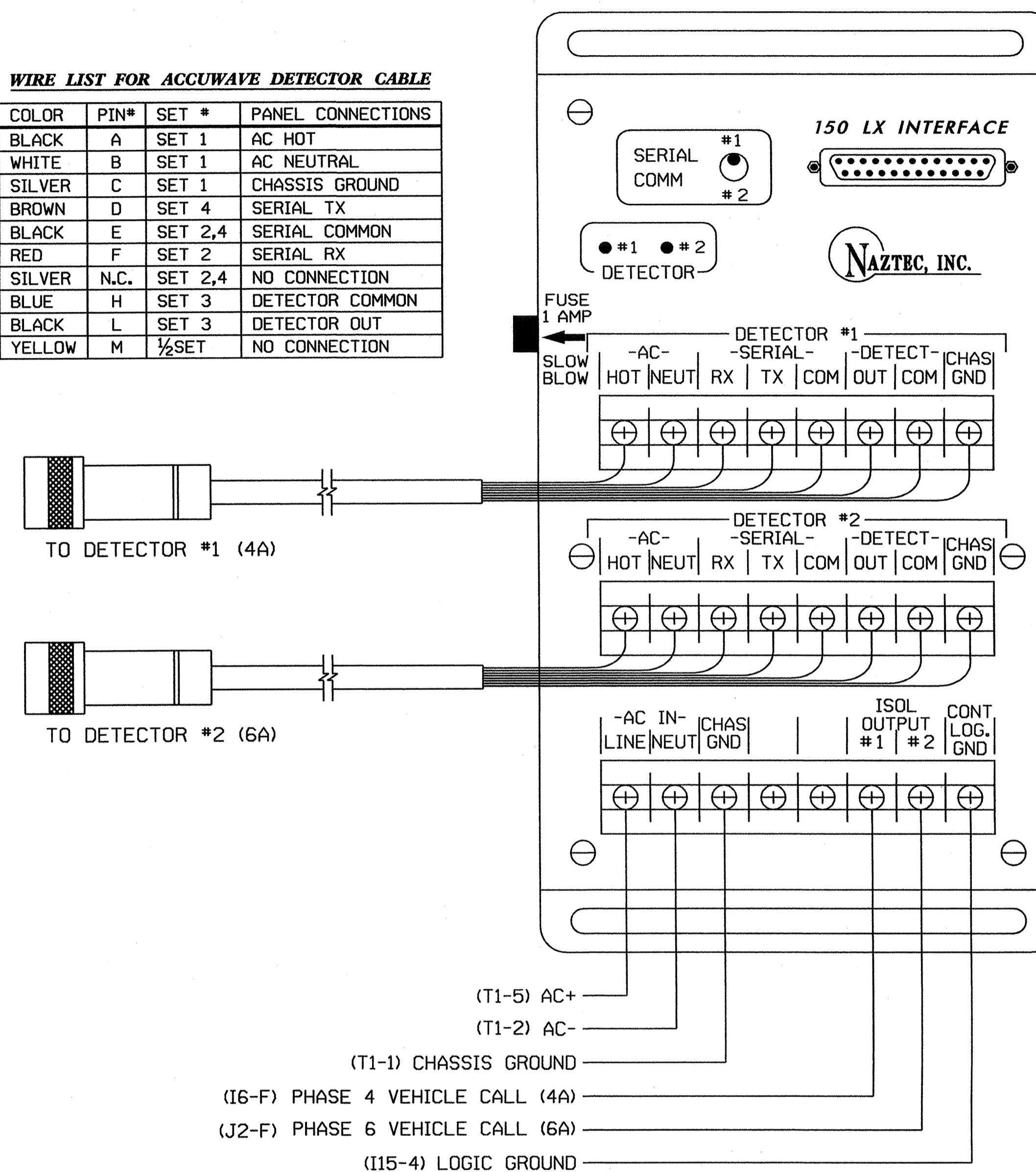


ACCUWAVE DETECTOR PANEL WIRING DETAIL FOR 4A & 6A

(wire as shown)

WIRE LIST FOR ACCUWAVE DETECTOR CABLE

COLOR	PIN*	SET #	PANEL CONNECTIONS
BLACK	A	SET 1	AC HOT
WHITE	B	SET 1	AC NEUTRAL
SILVER	C	SET 1	CHASSIS GROUND
BROWN	D	SET 4	SERIAL TX
BLACK	E	SET 2,4	SERIAL COMMON
RED	F	SET 2	SERIAL RX
SILVER	N.C.	SET 2,4	NO CONNECTION
BLUE	H	SET 3	DETECTOR COMMON
BLACK	L	SET 3	DETECTOR OUT
YELLOW	M	1/2SET	NO CONNECTION



NOTES:

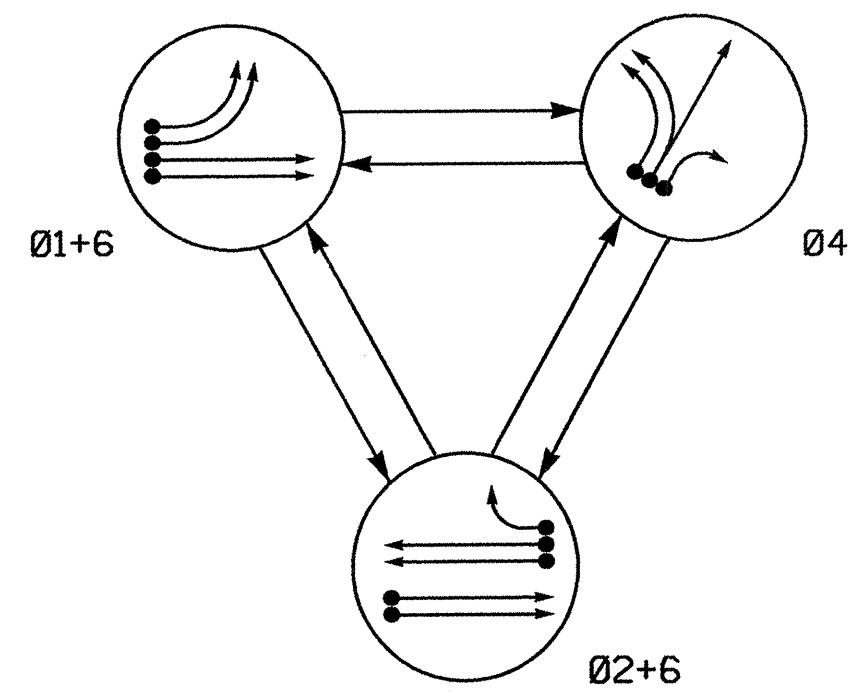
1. Detectors are Accuwave Model 150LX presence detectors.
2. Information in the detector cable wire list chart is for cable purchased from Naztec and may vary if purchased from another source.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0276T
DESIGNED: October 2008
SEALED: 11-17-08
REVISED: N/A

Signal Upgrade Temp (Phase I, II, & III) Sheet 2 of 2

	ELECTRICAL AND PROGRAMMING DETAILS FOR: NC 133/SR 1472 (Village Drive)	
	at US 17 NB/US 74-76 EB Ramp	
Division 3	Brunswick County	Leland
PLAN DATE: November 2008	REVIEWED BY: <i>T. J. J.</i>	
PREPARED BY: S. Armstrong	REVIEWED BY:	
REVISIONS	INIT.	DATE
SIG. INVENTORY NO. 03-0276T		

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

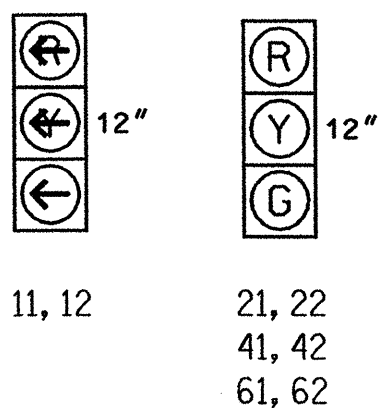
- DETECTED MOVEMENT
- ◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄-- UNSIGNALIZED MOVEMENT
- ◄--- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 4	FLIGHTS
11, 12	-	R	R	R
21, 22	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y

SIGNAL FACE I.D.

ALL HEADS L.E.D.



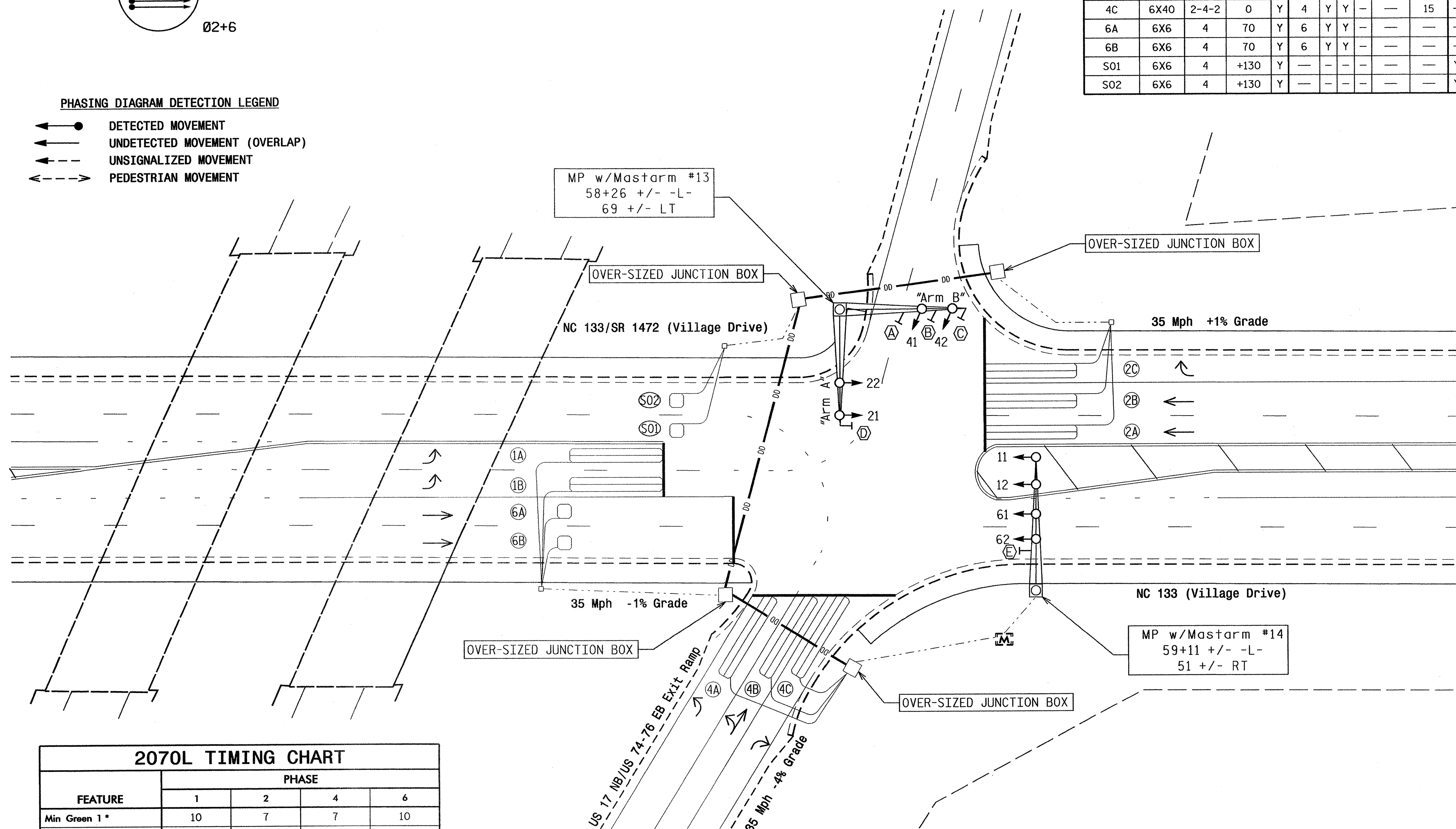
2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME		
1A	6X40	2-4-2	0	Y	1	Y	Y	-	-	-	-
1B	6X40	2-4-2	0	Y	1	Y	Y	-	-	-	-
2A	6X40	2-4-2	0	Y	2	Y	Y	-	-	-	-
2B	6X40	2-4-2	0	Y	2	Y	Y	-	-	-	-
2C	6X40	2-4-2	0	Y	2	Y	Y	-	-	15	-
4A	6X40	2-4-2	0	Y	4	Y	Y	-	-	-	-
4B	6X40	2-4-2	0	Y	4	Y	Y	-	-	-	-
4C	6X40	2-4-2	0	Y	4	Y	Y	-	-	15	-
6A	6X6	4	70	Y	6	Y	Y	-	-	-	-
6B	6X6	4	70	Y	6	Y	Y	-	-	-	-
S01	6X6	4	+130	Y	-	-	-	-	-	-	Y
S02	6X6	4	+130	Y	-	-	-	-	-	-	Y

3 Phase Fully Actuated NC 133/SR 1472 (Village Drive) Closed Loop System

NOTES

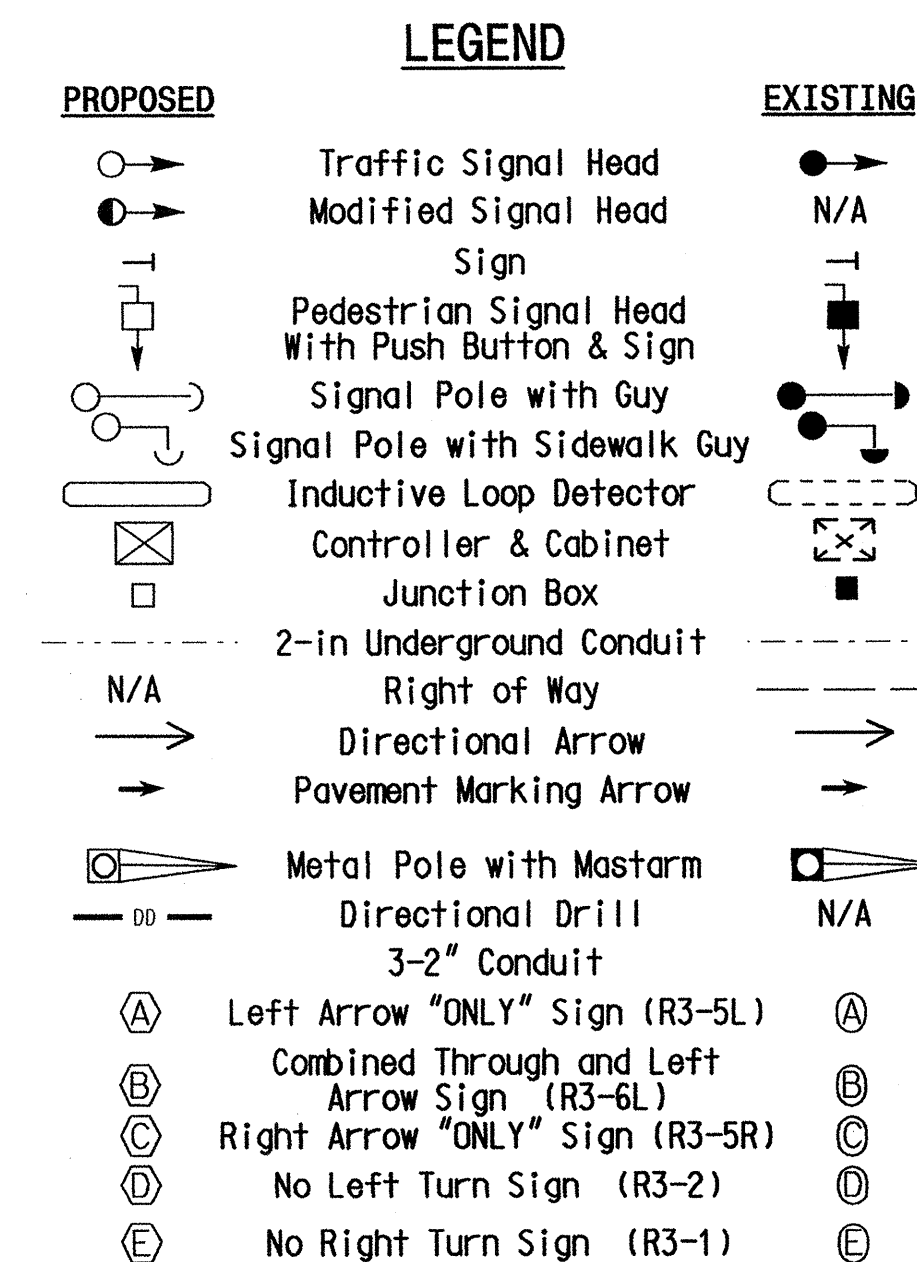
- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may lead.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Master Asset #10304, Controller Asset #0276.



2070L TIMING CHART

FEATURE	PHASE			
	1	2	4	6
Min Green 1*	10	7	7	10
Extension 1*	2.0	2.0	2.0	3.0
Max Green 1*	35	25	20	35
Yellow Clearance	3.0	3.8	4.1	3.9
Red Clearance	3.4	2.1	2.3	1.8
Walk 1*	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation*	-	-	-	-
Max Variable Initial*	-	-	-	-
Time Before Reduction*	-	-	-	-
Time To Reduce*	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	SOFT RECALL	-	-	SOFT RECALL
Vehicle Call Memory	-	-	-	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.



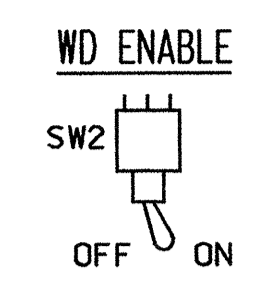
Signal Upgrade - Final

	<p>NC 133/SR 1472 (Village Drive) at US 17 NB/US 74-76 EB Ramp</p>		<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER I. O. UMZURIKE 29904</p>
	<p>Division 3 Brunswick County Leland</p>	<p>PLAN DATE: October 2008</p>	
<p>PREPARED BY: I. O. Umzurike</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>DATE: 11/17/08</p>
<p>SCALE: 1"=30'</p>	<p>SIG. INVENTORY NO. 03-0276</p>		

02-DEC-2008 15:47
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 I:\umzurike

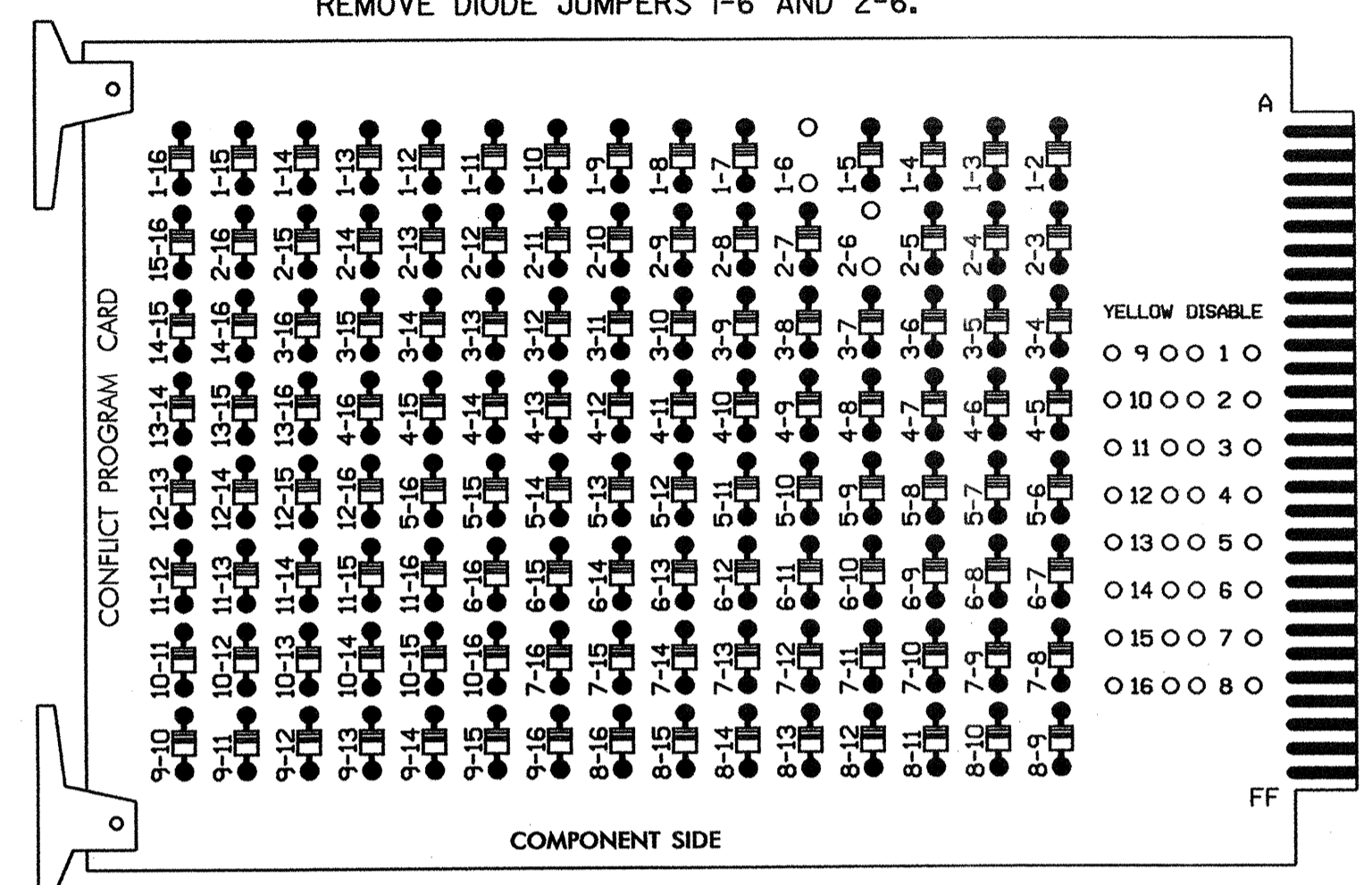
EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL

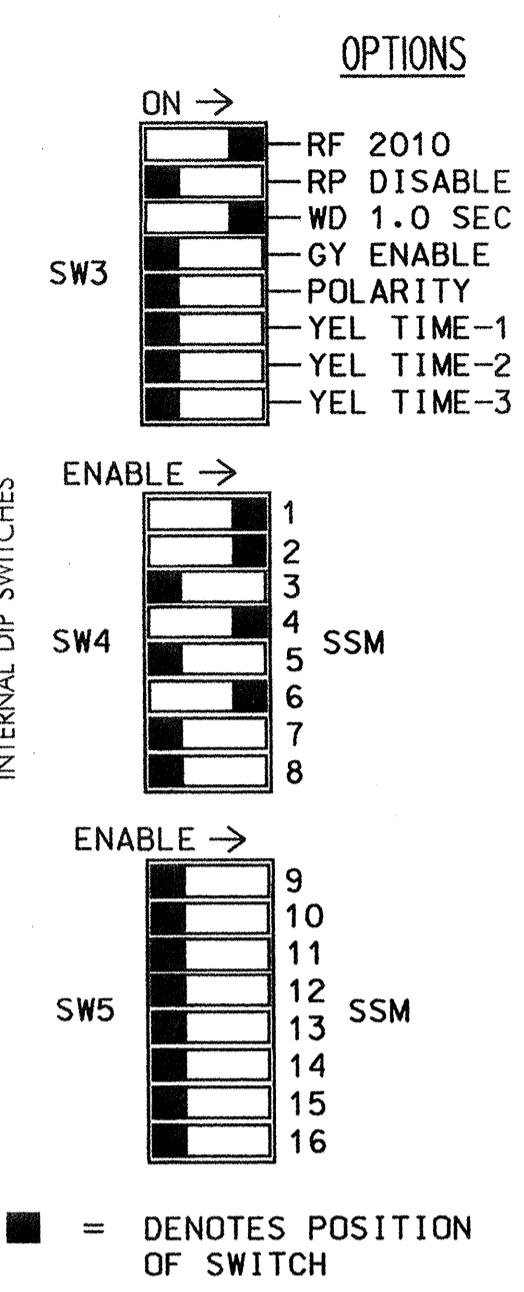


(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6 AND 2-6.



REMOVE JUMPERS AS SHOWN



NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5, 7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 2 and 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- The cabinet and controller are part of the NC 133/SR 1472 (Village Drive) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....EXISTING 2070L
 CABINET.....EXISTING 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

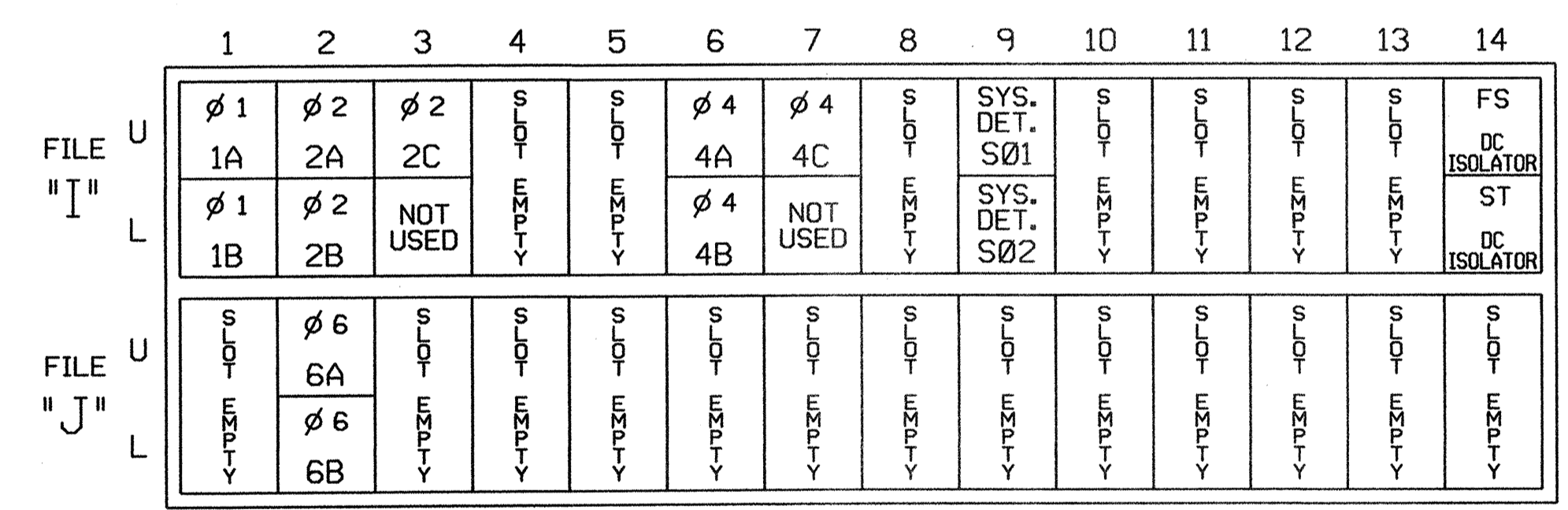
SIGNAL HEAD HOOK-UP CHART

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	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)



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

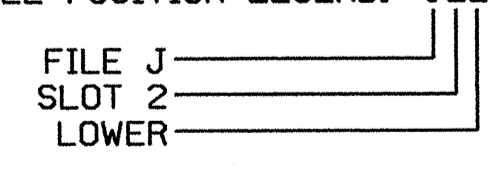
FS = FLASH SENSE
 ST = STOP TIME

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			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			15
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
4C	TB6-1,2	I7U	65	27	34	4	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
*S01	TB6-9,10	I9U	60	22	11	SYS					
*S02	TB6-11,12	I9L	62	24	13	SYS					

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

INPUT FILE POSITION LEGEND: J2L



PHASE SEQUENCE PROGRAMMING DETAIL

(program controller as shown below)

FROM OASIS LOCAL CONTROLLER MAIN MENU
 SELECT: 4 PHASE SEQUENCE

PHASE SEQUENCE: PAGE 1		NEXT: PAGES)			
RNG:LEAD	BARRIER 1	X-LAG:LEAD	BARRIER 2	X-LAG	
1 : 0	2	1	0	0	0
2 : 0	6	0	0	0	0
3 : 0	0	0	0	0	0
4 : 0	0	0	0	0	0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0276
 DESIGNED: October 2008
 SEALED: 11-17-08
 REVISED: N/A

Signal Upgrade - Final

ELECTRICAL AND PROGRAMMING DETAILS FOR: **NC 133/SR 1472 (Village Drive) at US 17 NB/US 74-76 EB Ramp**

Prepared in the Offices of:

Division 3 Brunswick County Leland
 PLAN DATE: November 2008 REVIEWED BY: T. Ng
 PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS: INIT. DATE

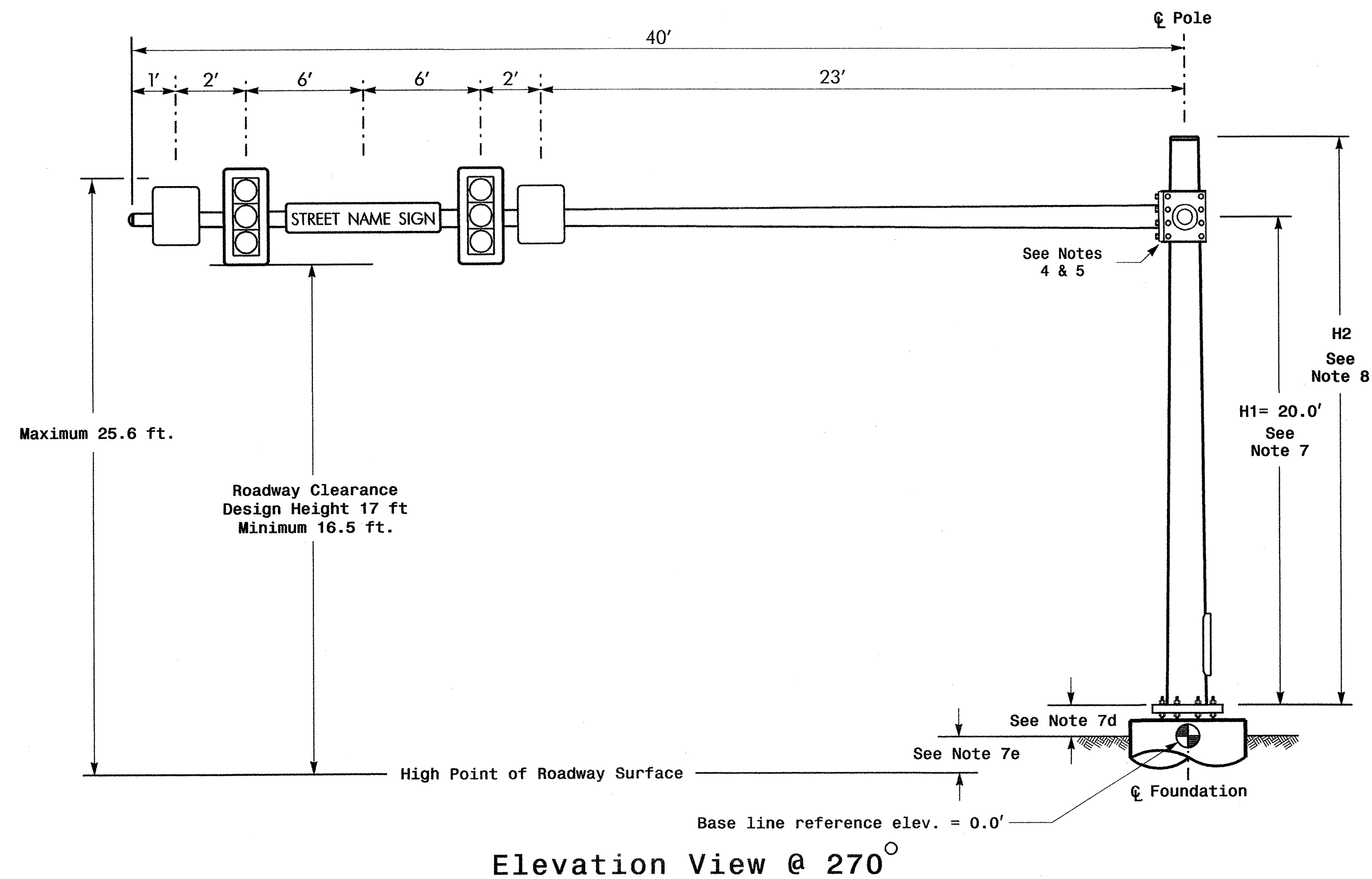
750 N. Greenfield Pkwy, Garner, NC 27529

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

SIG. INVENTORY NO. 03-0276

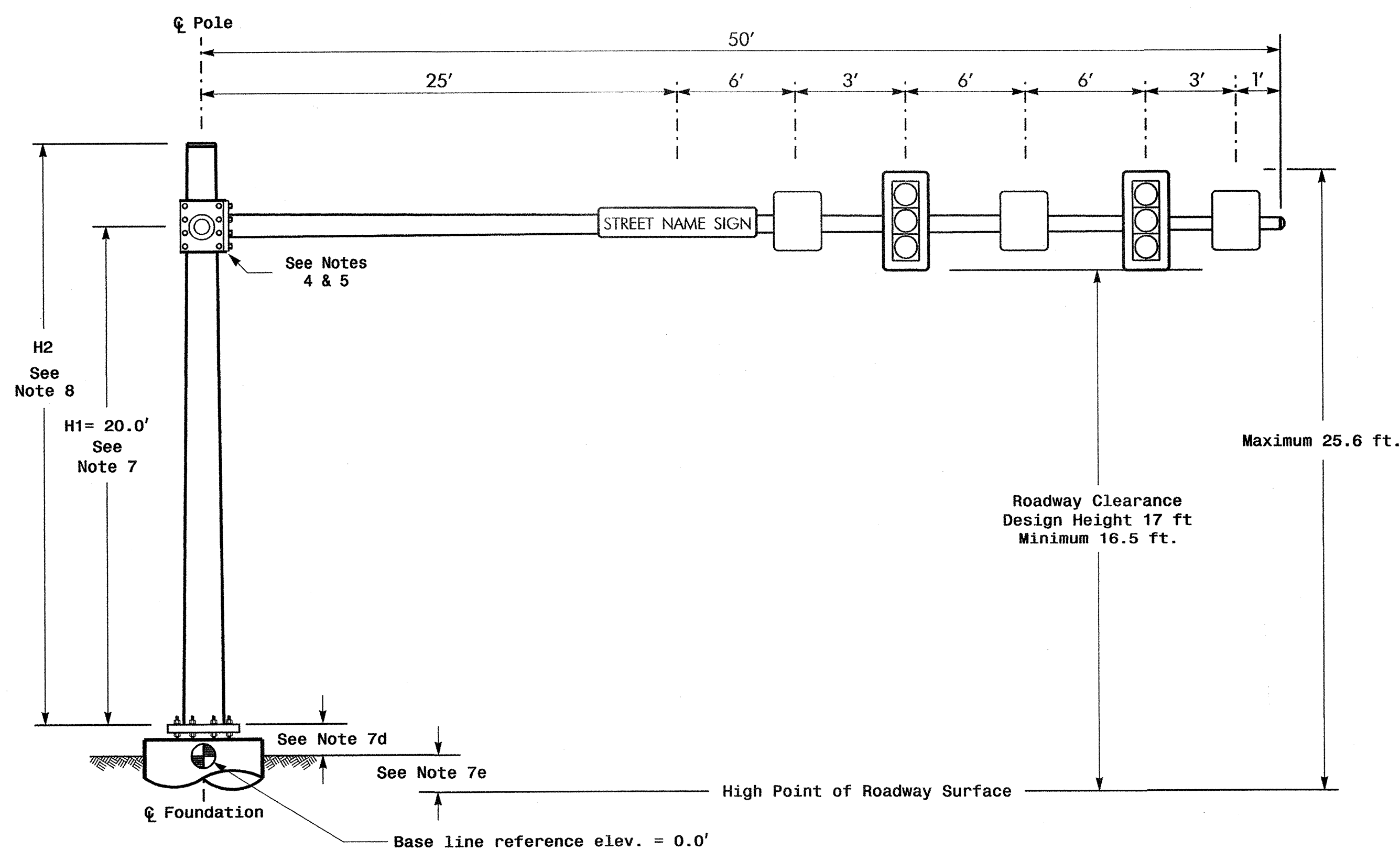
02-DEC-2008 15:41 s:\118 51\p01\sewcr\grcoust\g_mankar\strong\030276_sht.dwg

Design Loading for METAL POLE NO. 13, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 13, MAST ARM B



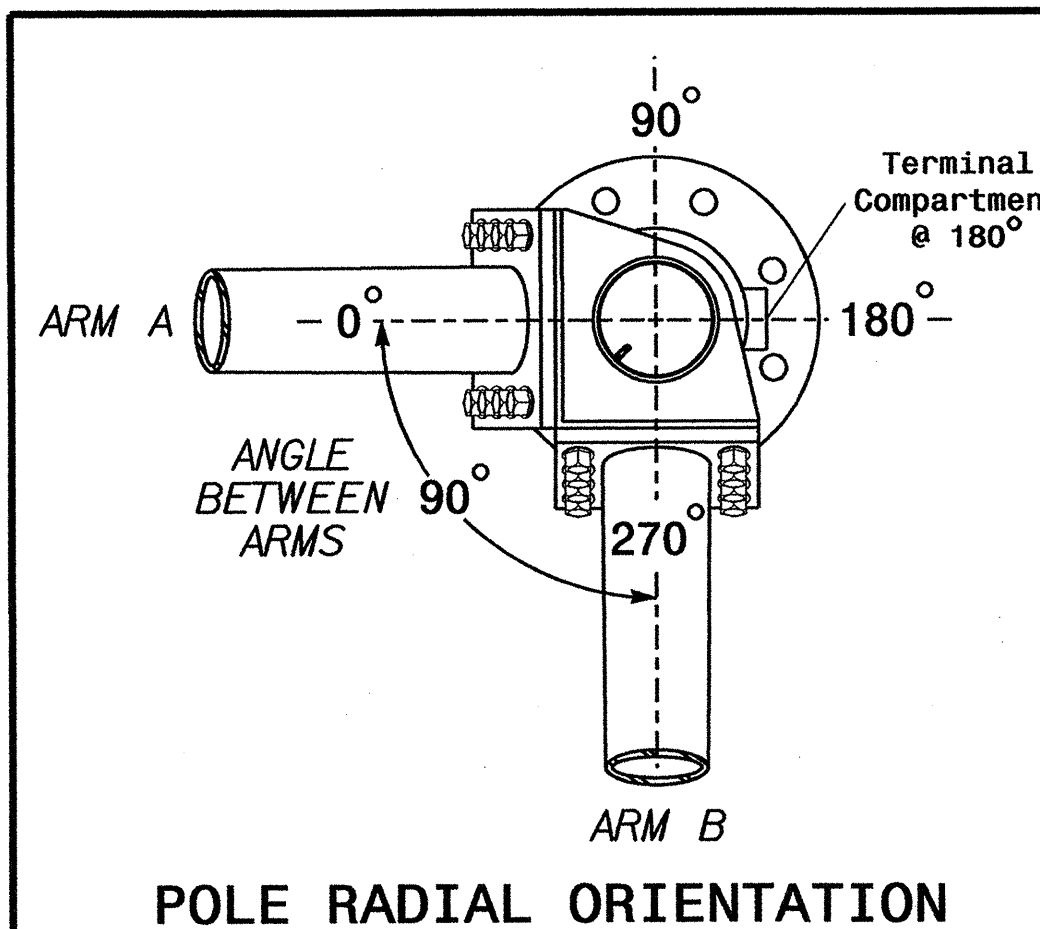
Elevation View @ 0°

SPECIAL NOTE

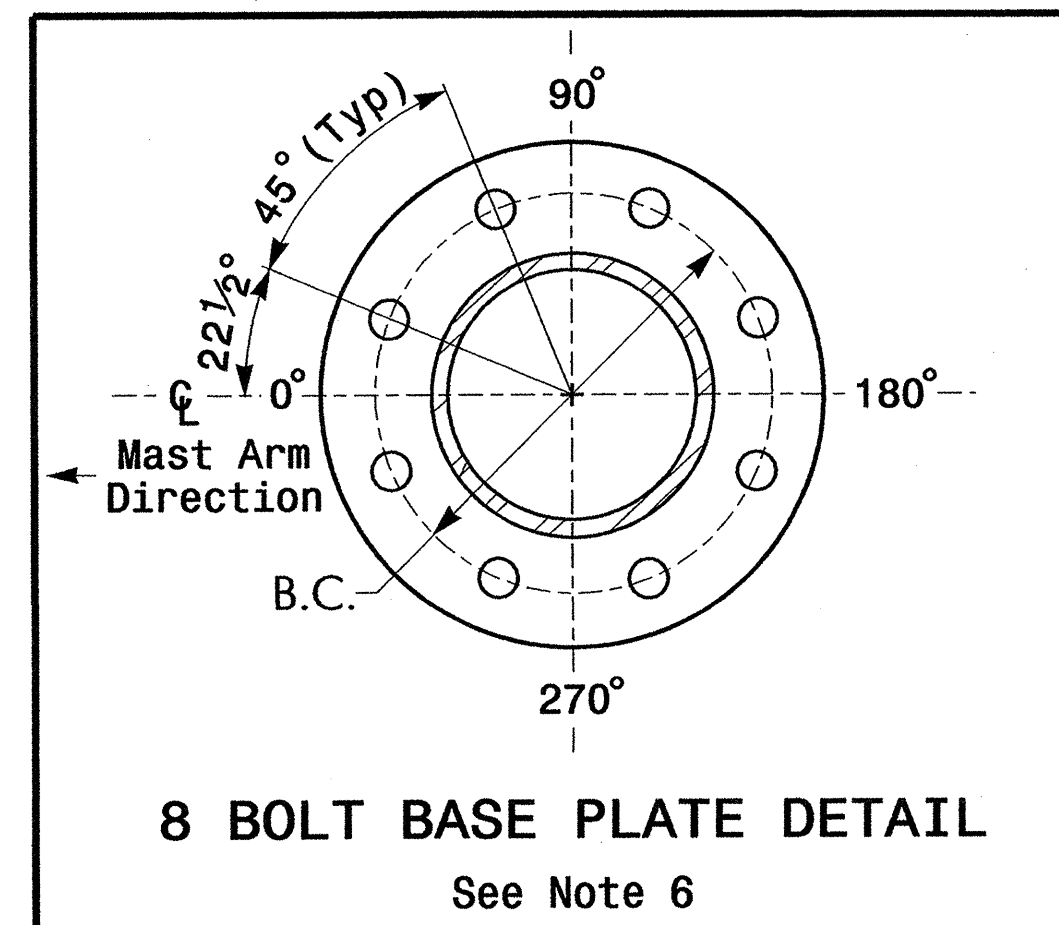
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

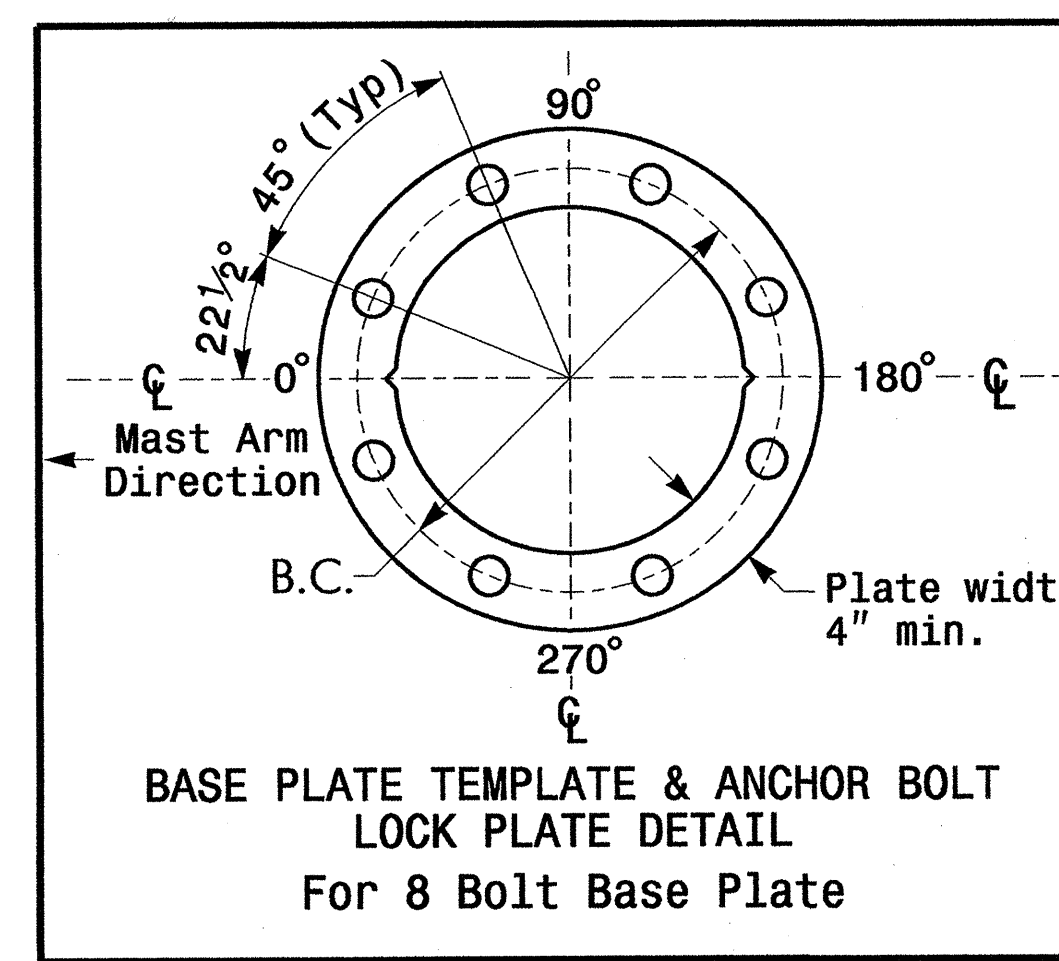
Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	1.0 ft.	1.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.

Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of the pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

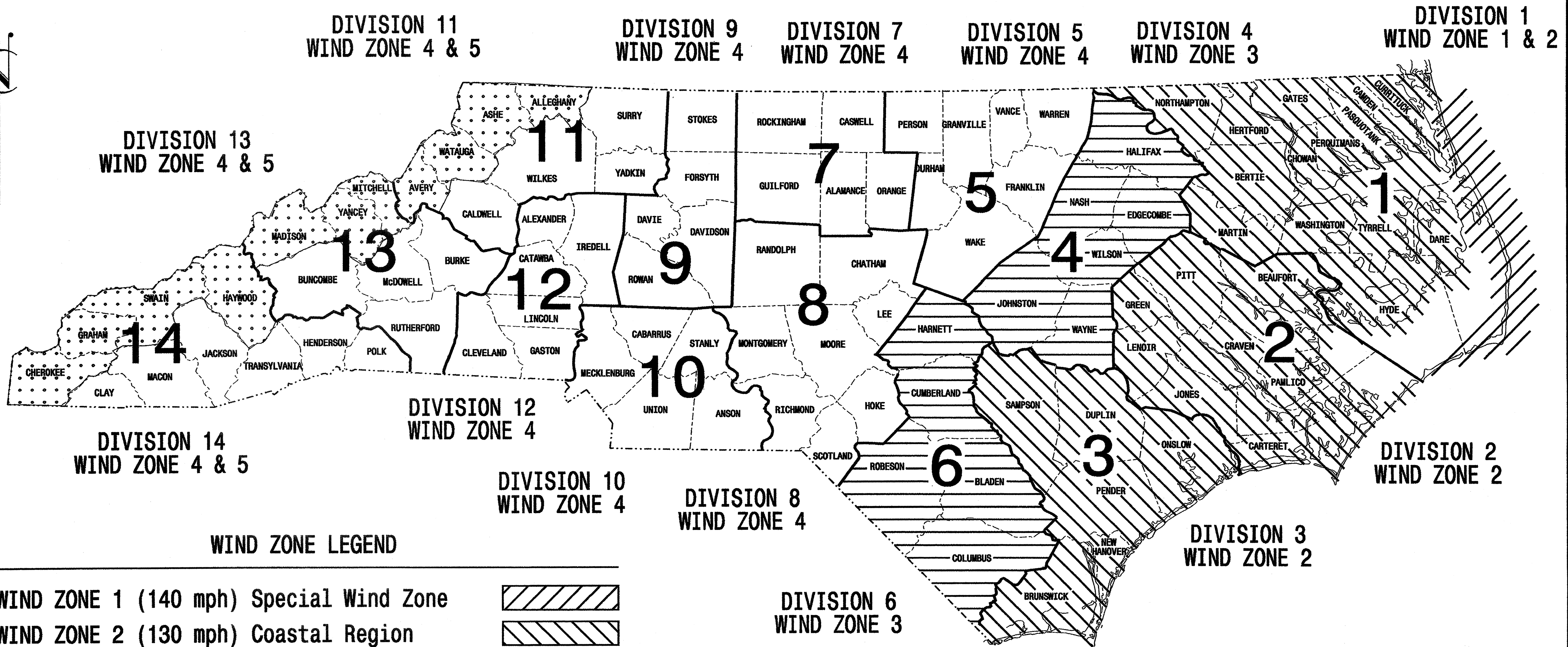
NCDOT Wind Zone 2 (130 mph)

	NC 133/SR 1472 (Village Drive) at US 17 NB US 74-76 EB Ramp		
	Division 3 Brunswick County Leland	PLAN DATE: October 2008 REVIEWED BY: J. P. Galloway	
PREPARED BY: I. O. Umzurike	REVISIONS	REVIEWED BY:	SIGNATURE DATE
SCALE N/A	N/A	N/A	12/08
SIG. INVENTORY NO. 03-0276			DATE

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	R-4002	Sig. 42
F. A. PROJ. NO.	M 1	
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES



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:

DEPARTMENT OF TRANSPORTATION
Traffic Engineering and Safety Systems Branch

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, Luminaires, and Traffic Signals

INDEX OF PLANS

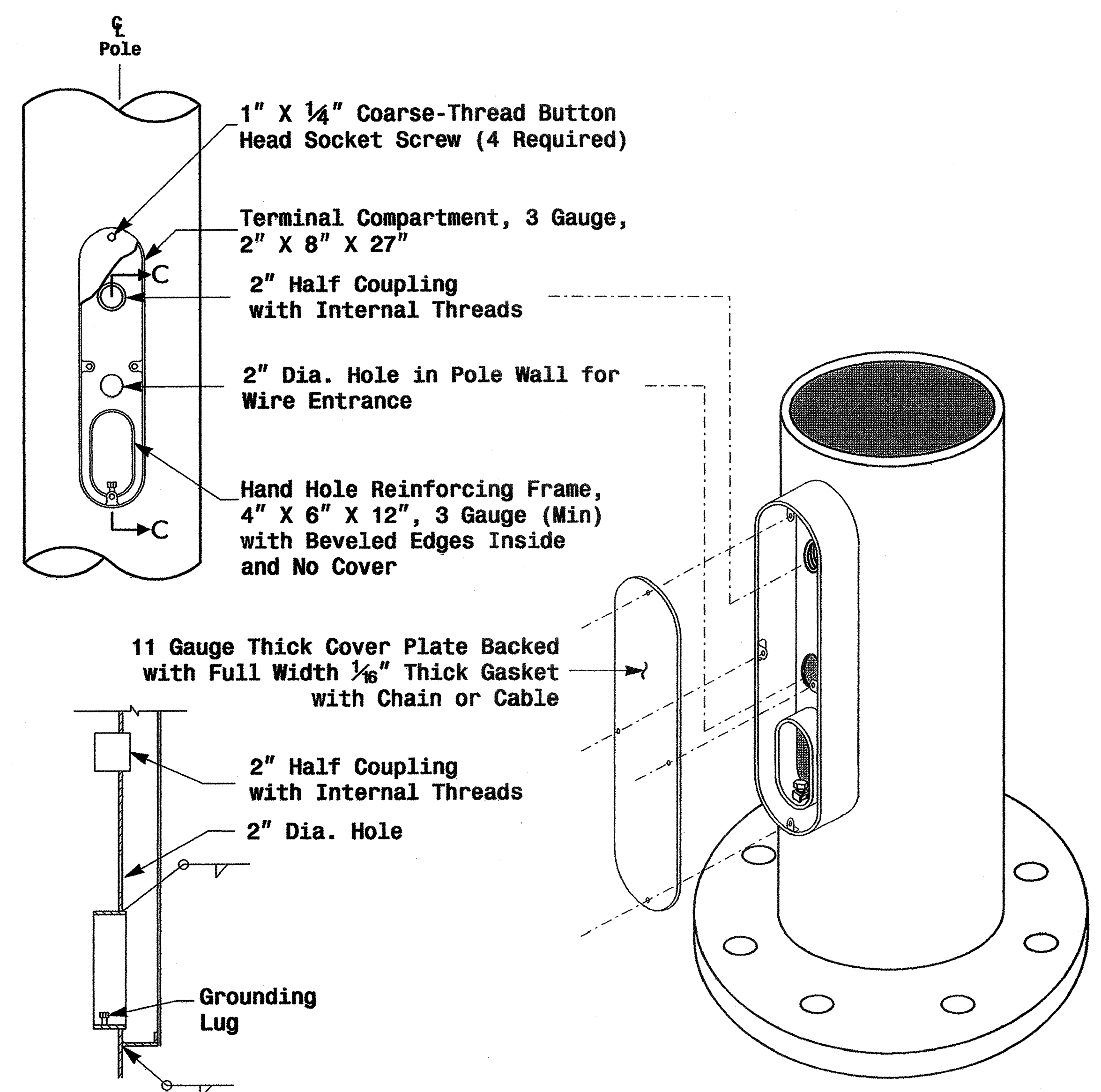
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

NC DOT 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

SIGNATURE 9.2.2005
 DATE



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

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 _____	

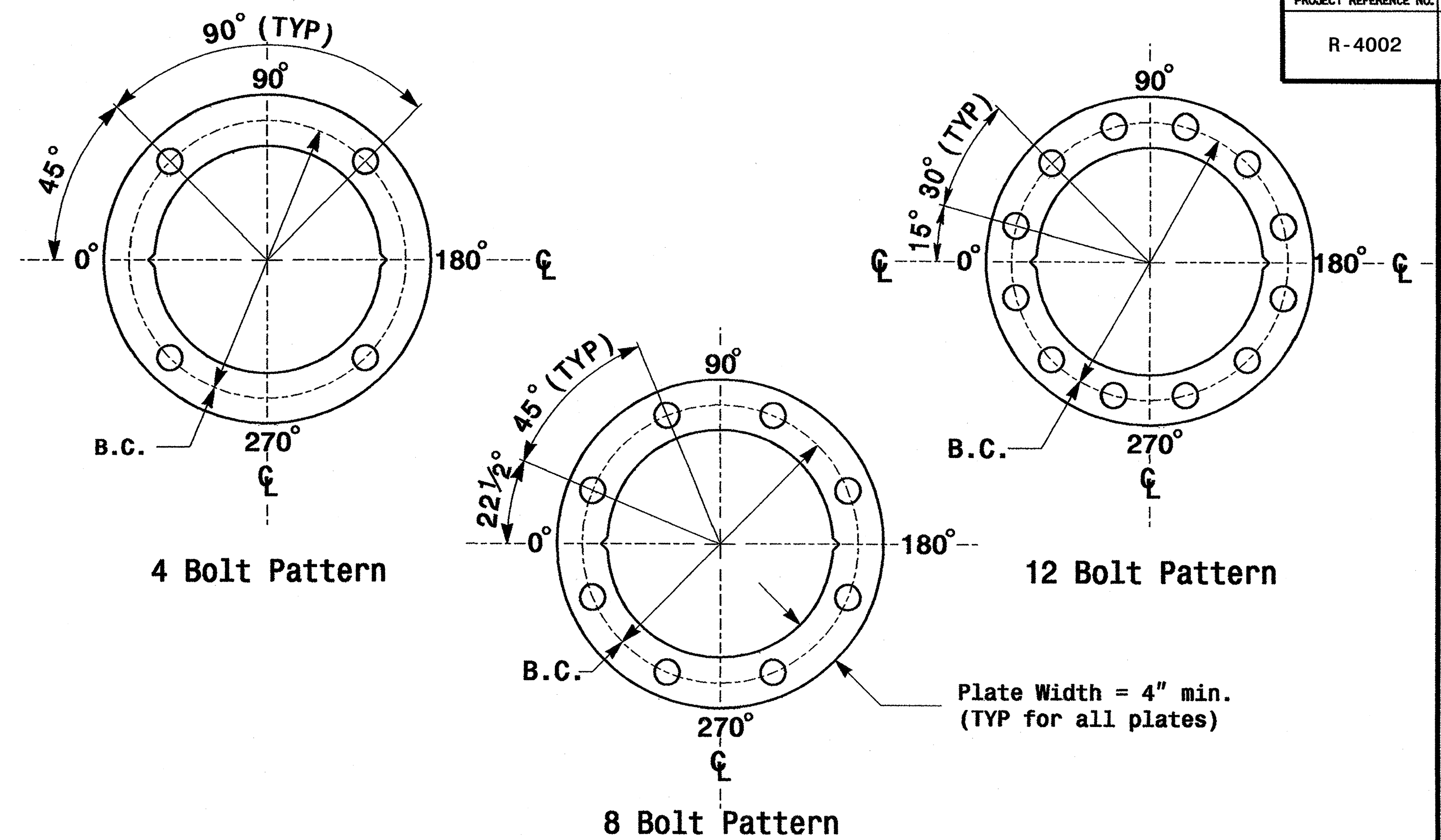
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	
NCDOT STANDARD _____	

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

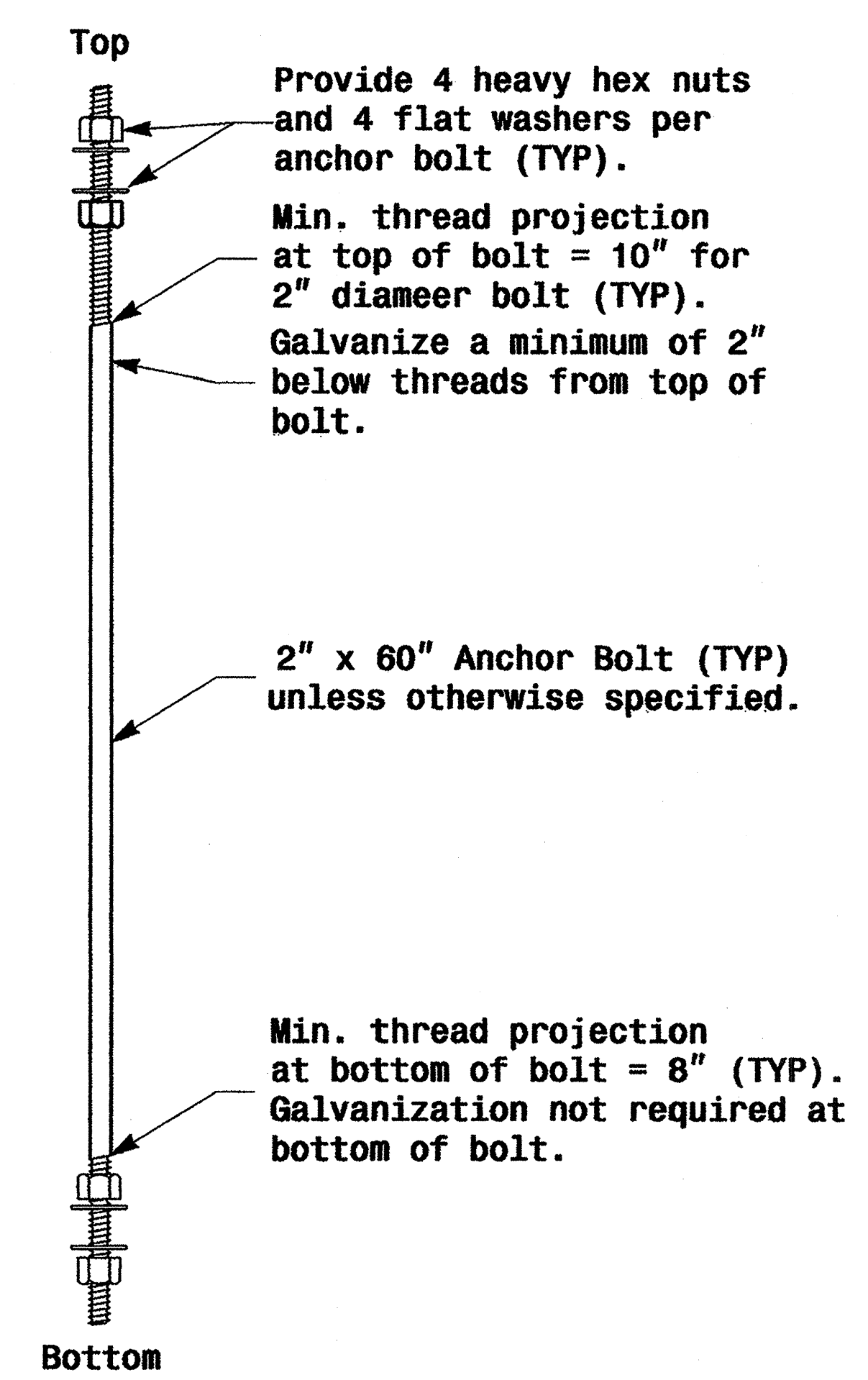
Shaft I.D. Tag (Provide on Strain Poles and Mast Arm Poles)

- 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.

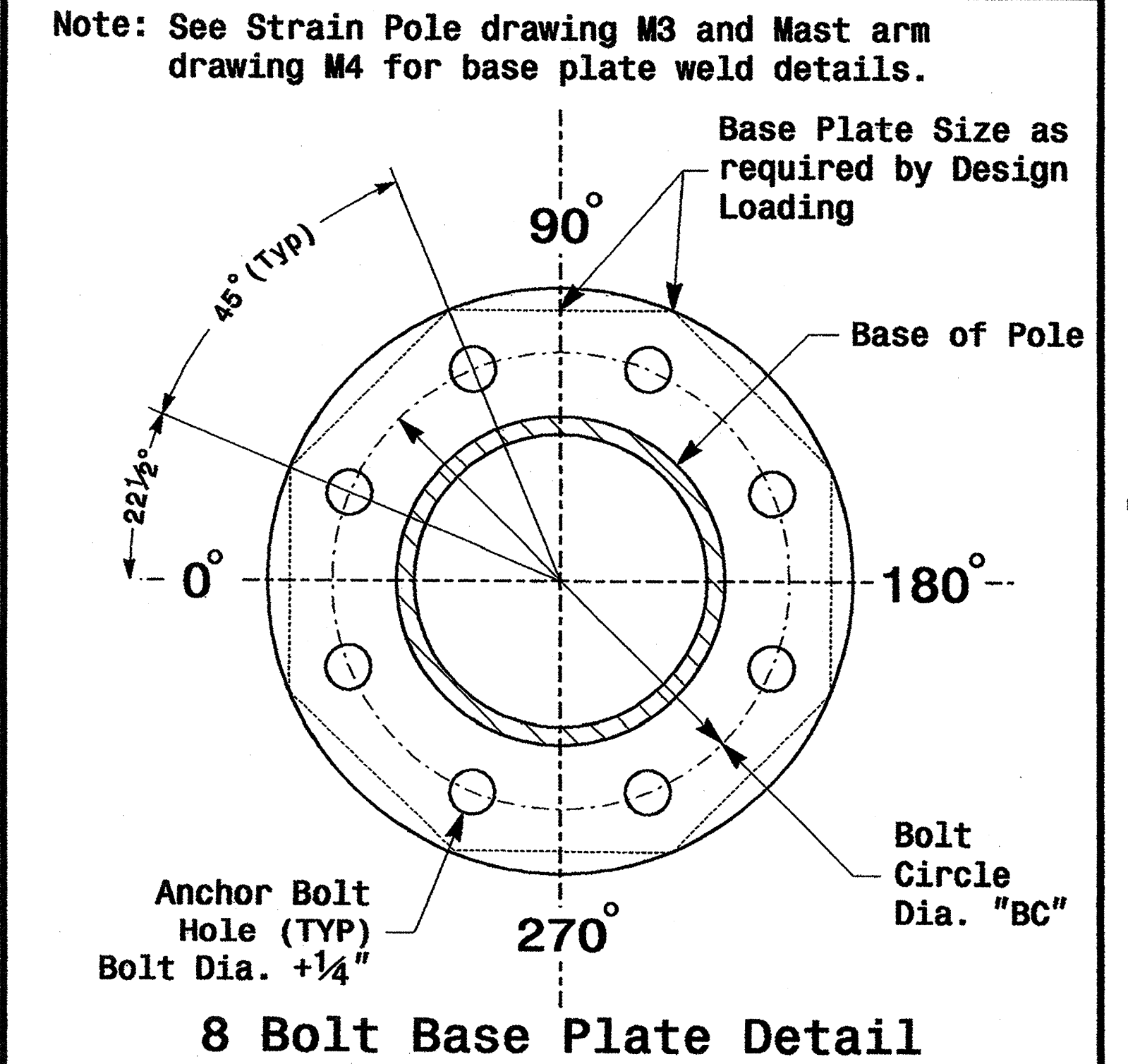
Identification Tag Details



Base Plate Template and Anchor Bolt Lock Plate Details



Anchor Bolt Detail

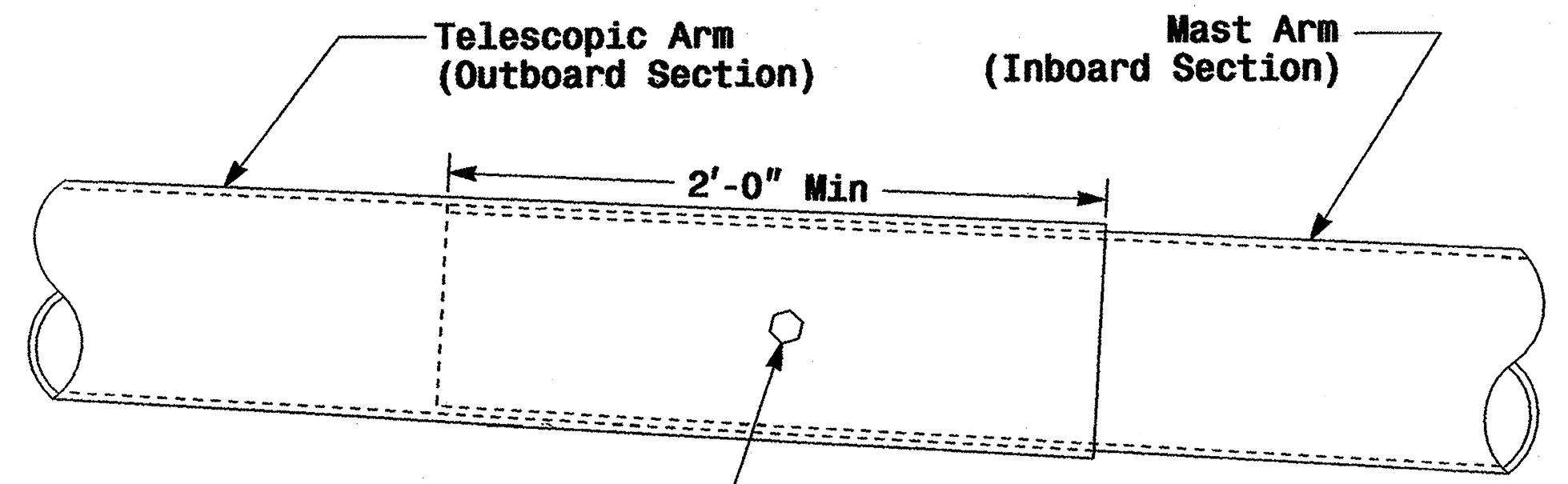
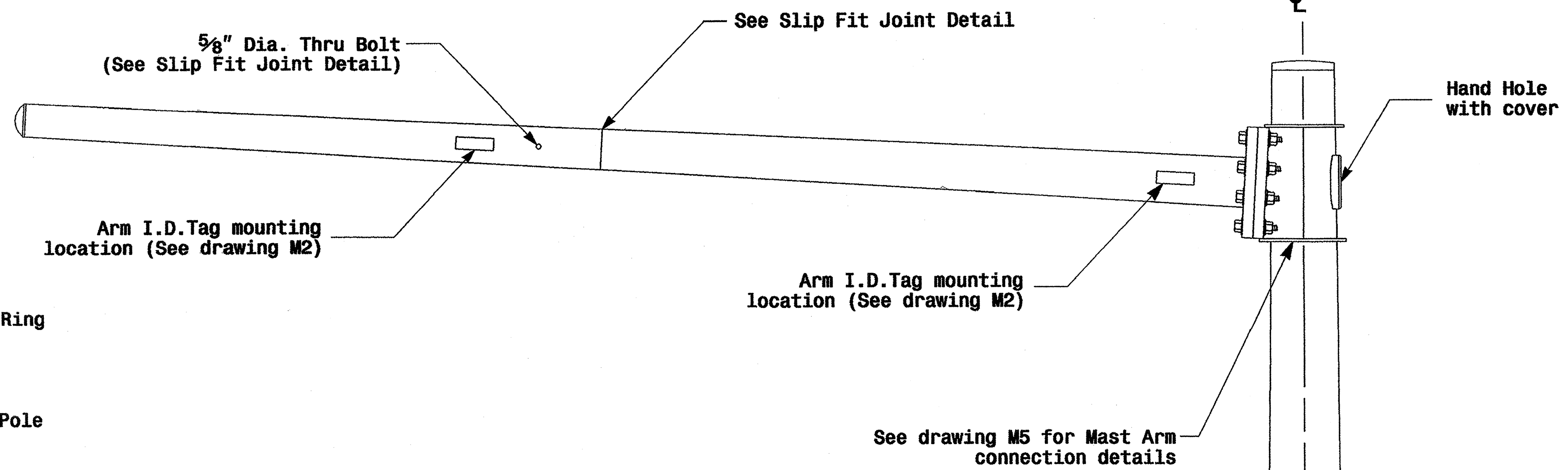
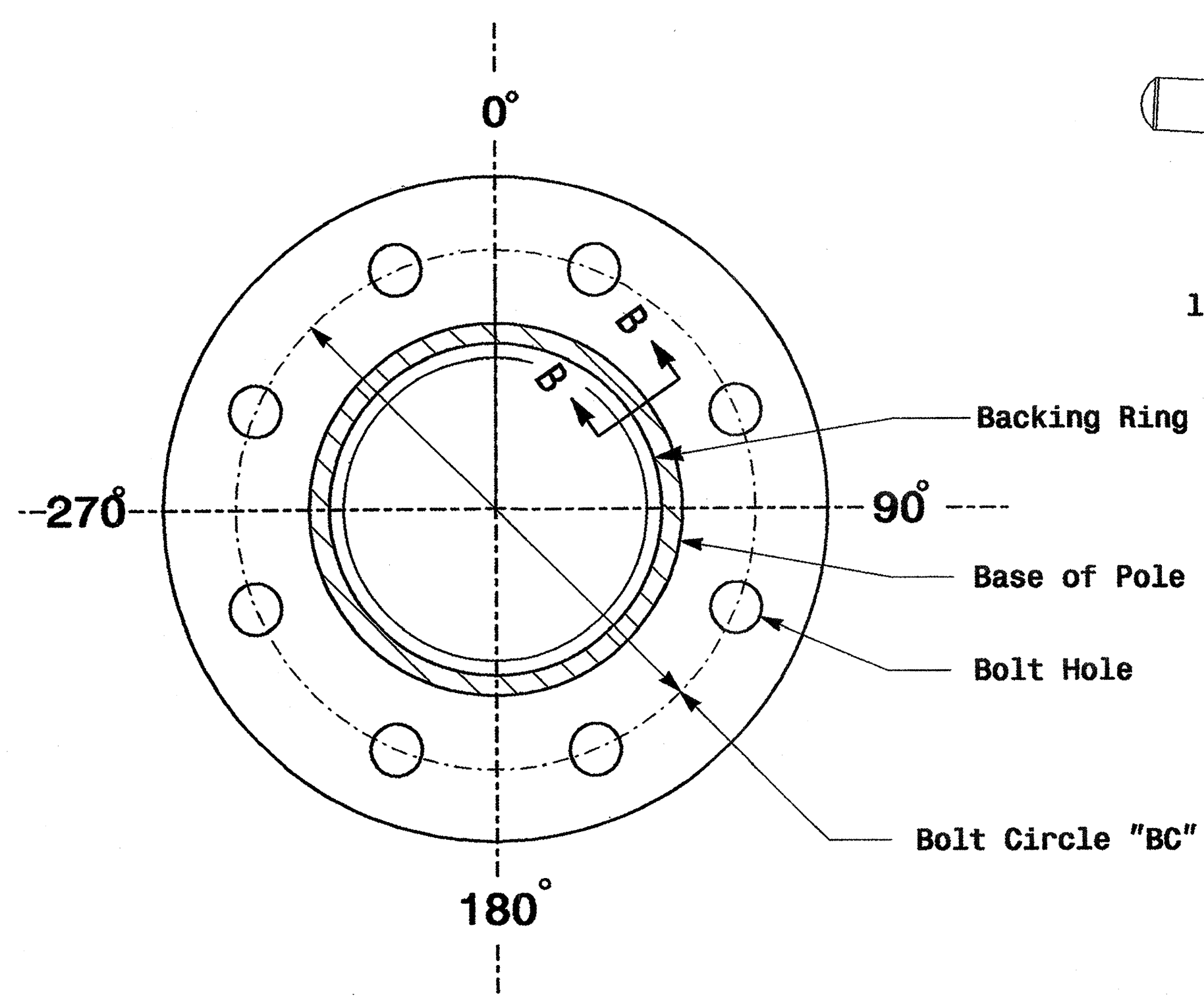


8 Bolt Base Plate Detail

Fabrication Details - All Poles

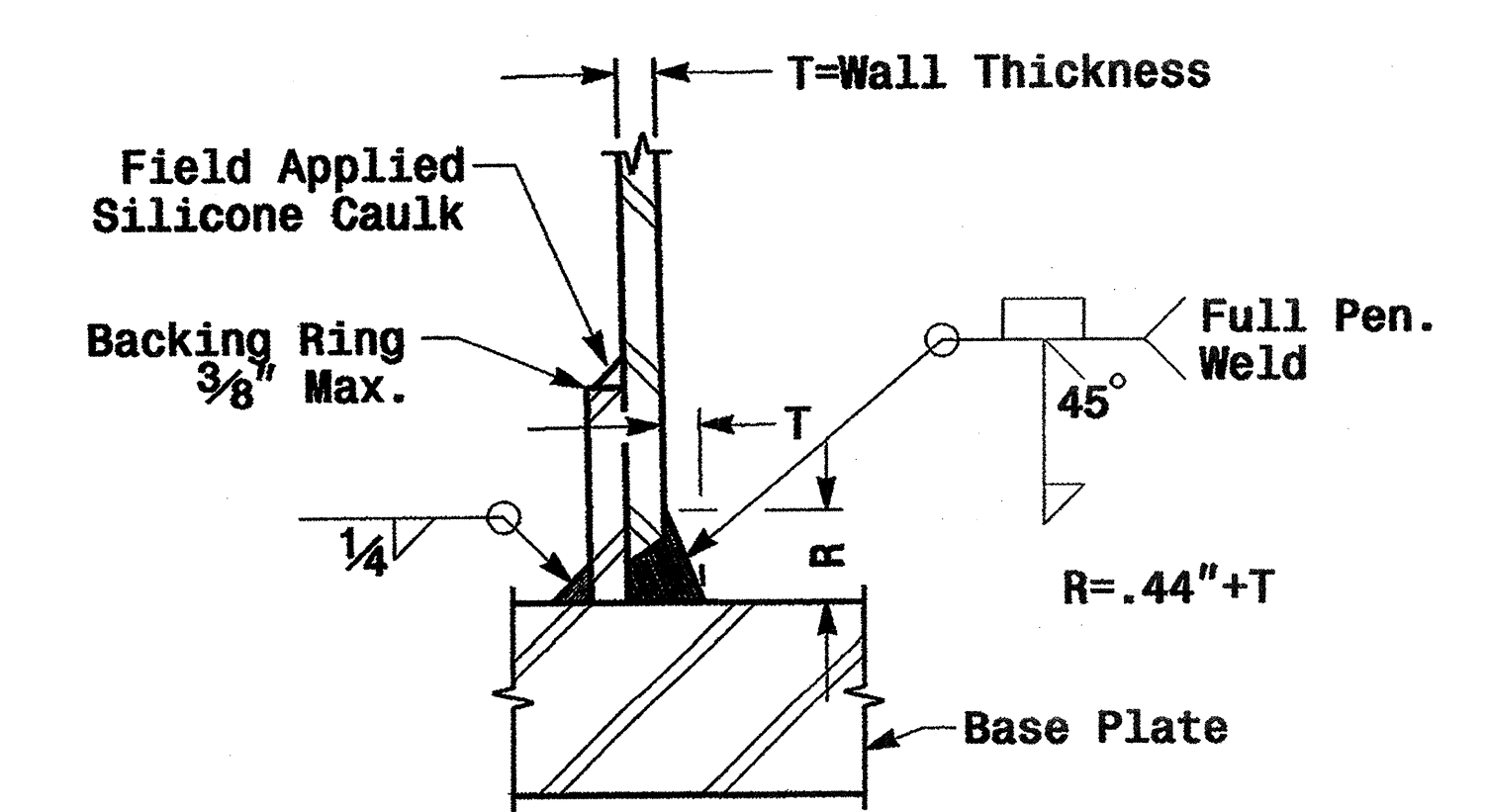
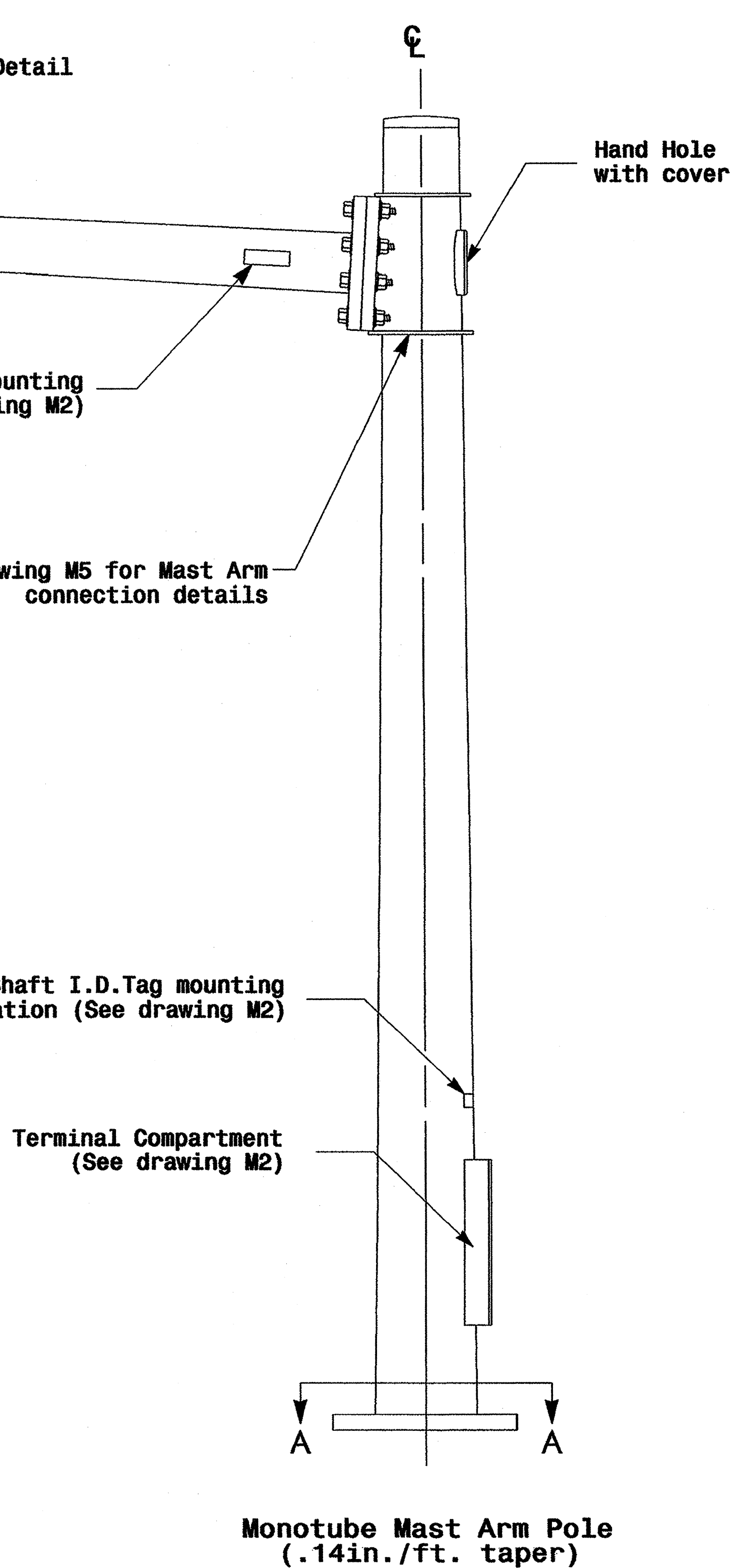
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	<p>Typical Fabrication Details Common To All Metal Poles</p>		
	<p>PLAN DATE: May 2005</p>	<p>REVIEWED BY: C.F. Andrews</p>	
<p>122 N. McDowell St., Raleigh, NC 27609</p>	<p>PREPARED BY: P.L. Alexander</p>	<p>REVIEWED BY: A.W. Esposito</p>	<p>SIGNATURE: <i>D. Sankar</i> DATE: 9.2.2005</p>
<p>REVISIONS</p>		<p>INIT. DATE</p>	<p>SIG. INVENTORY NO.</p>

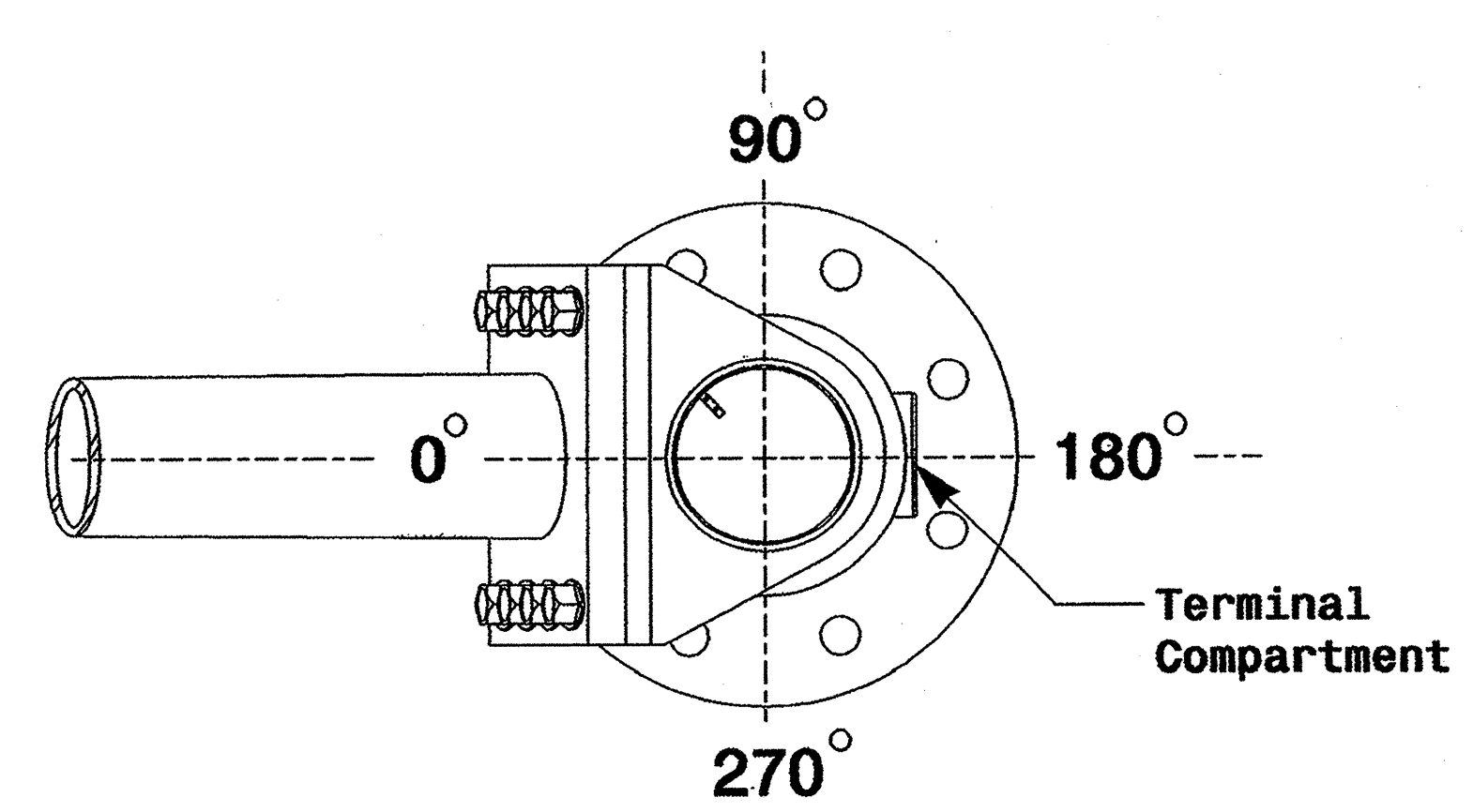


3/4" Factory Drilled Hole in Outboard Tube.
Field Drill Inboard Tube.
5/8" Galvanized Thru Stud with (2) Hex. Locknuts Ea.

Slip Fit Joint Detail for Mast Arm



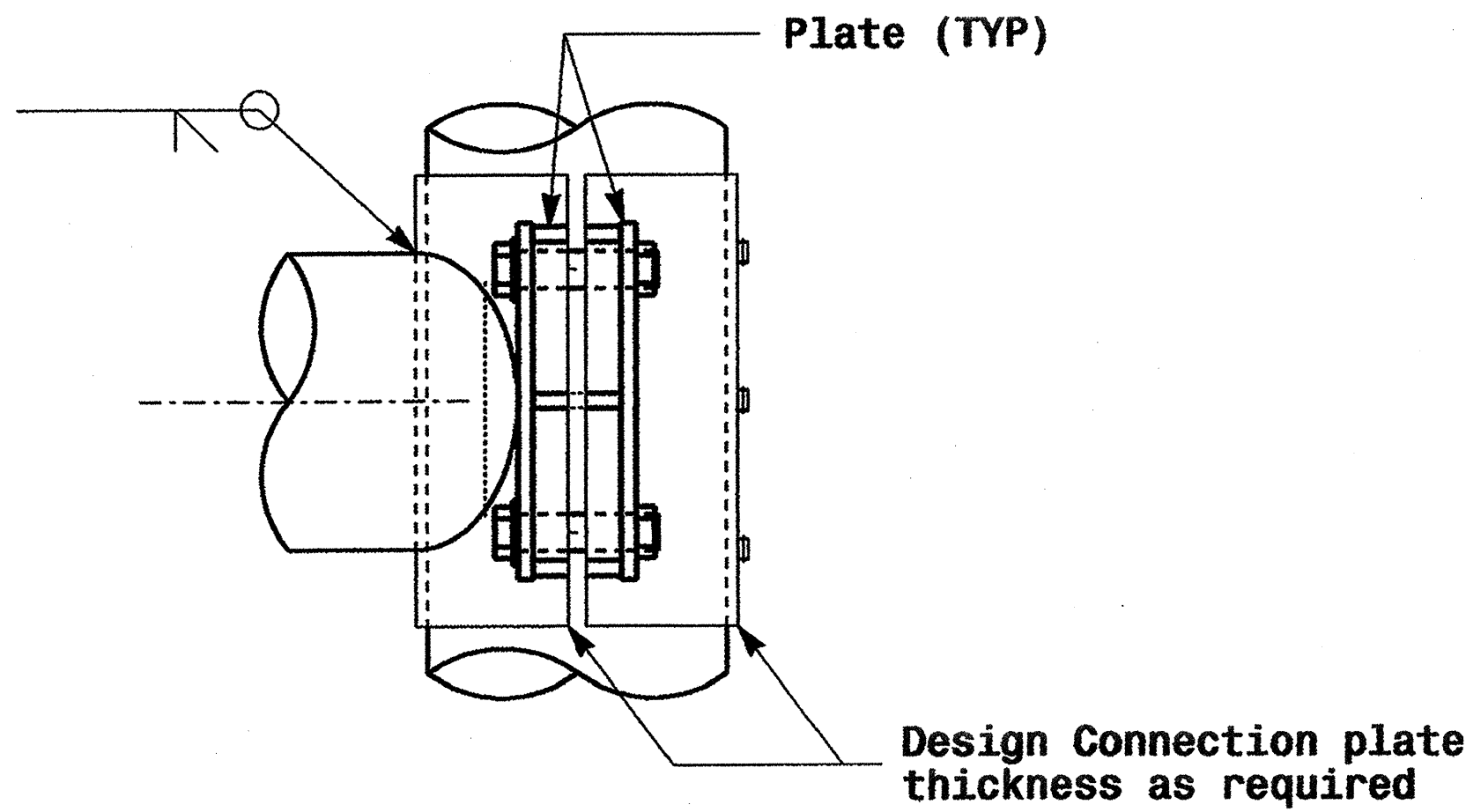
Full-Penetration Groove Weld Detail



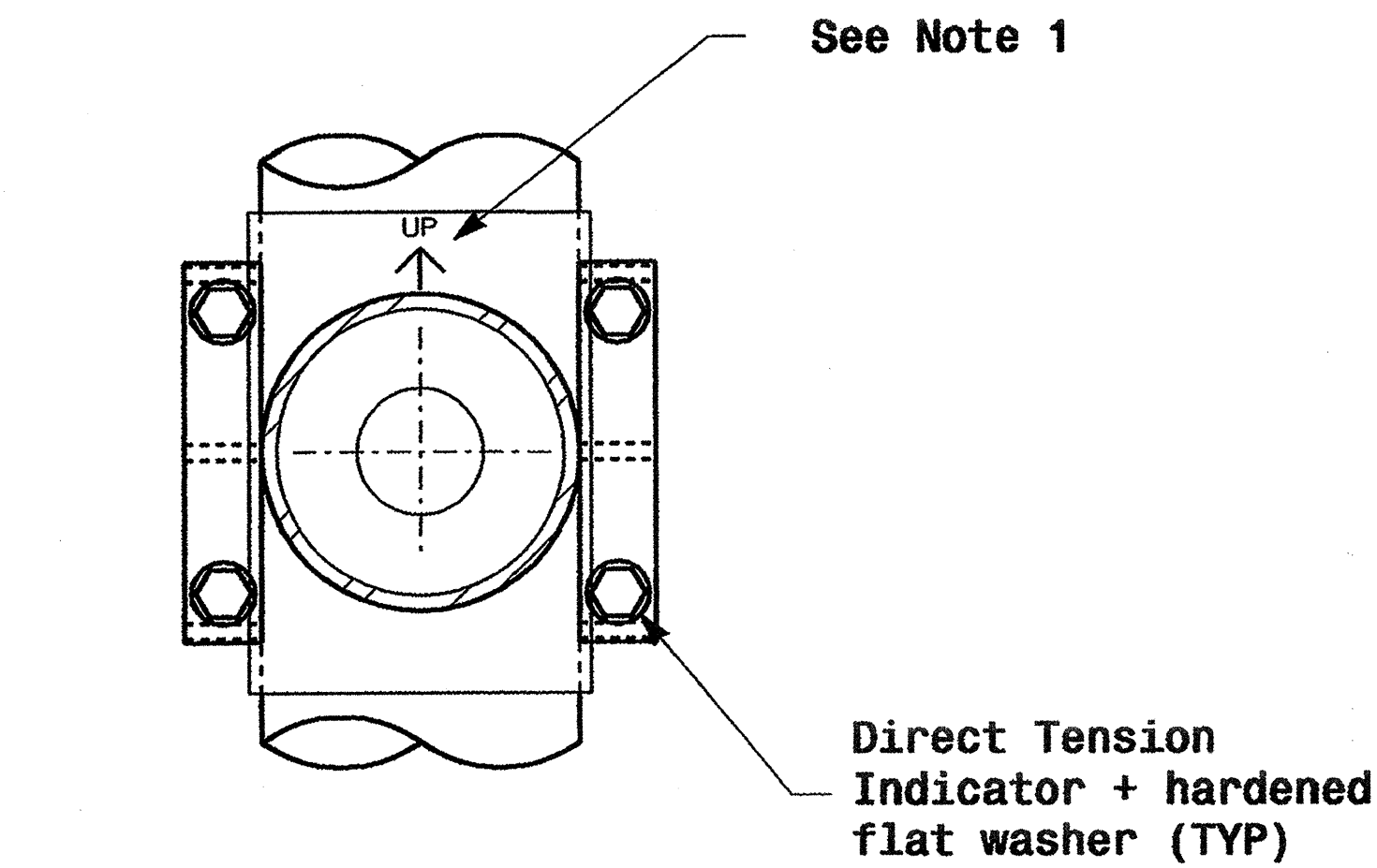
	Typical Fabrication Details for Mast Arm Poles			
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito		SCALE: NA NONE
	REVISIONS: _____ INIT.: _____ DATE: _____	SIGNATURE: <i>P.L. Alexander</i> DATE: 9.2.2005		SEAL INVENTORY NO. _____

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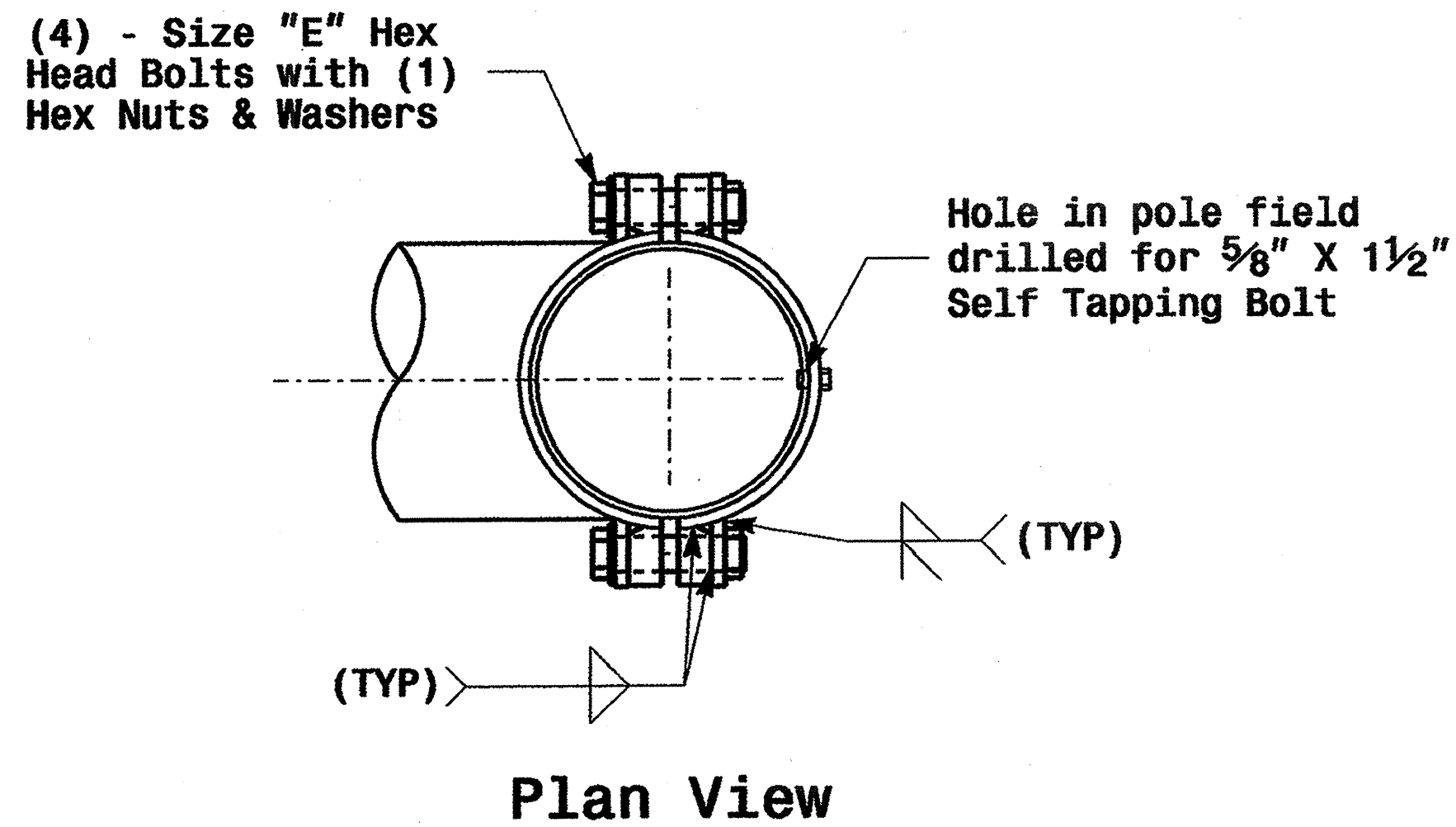
Adjustable Clamp Type Bolted Mast Arm Connection



Side Elevation View

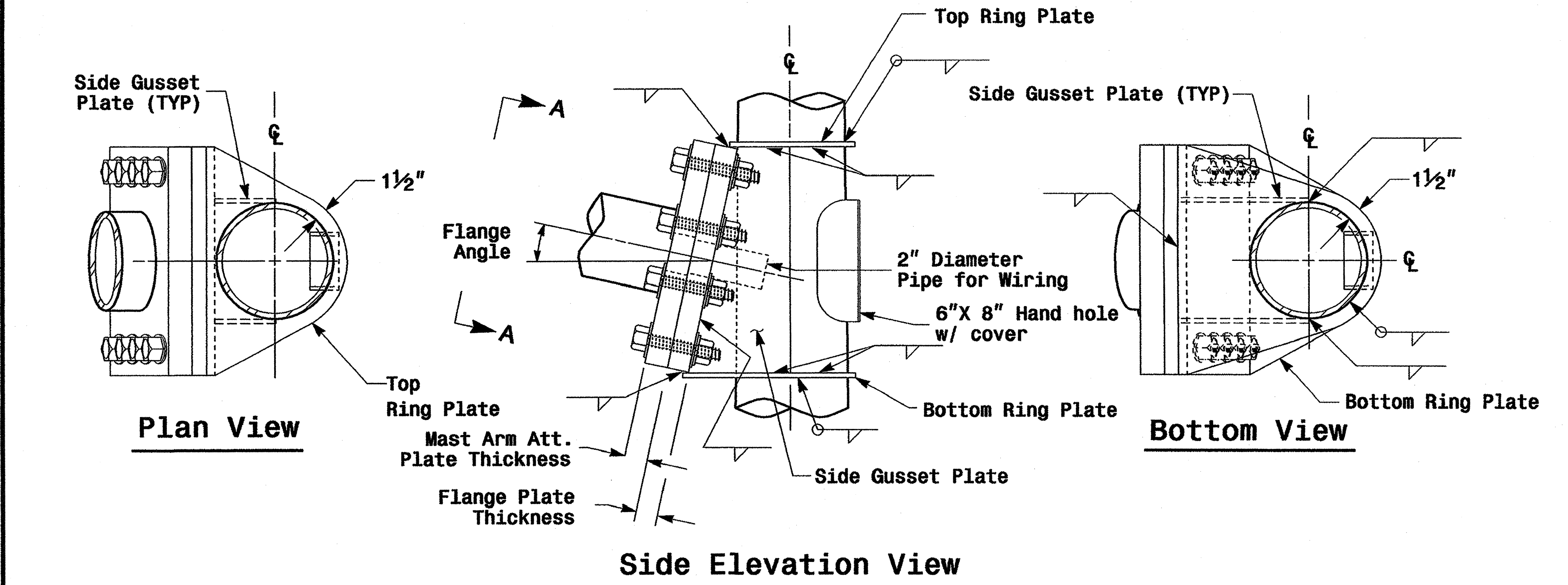


Front Elevation View

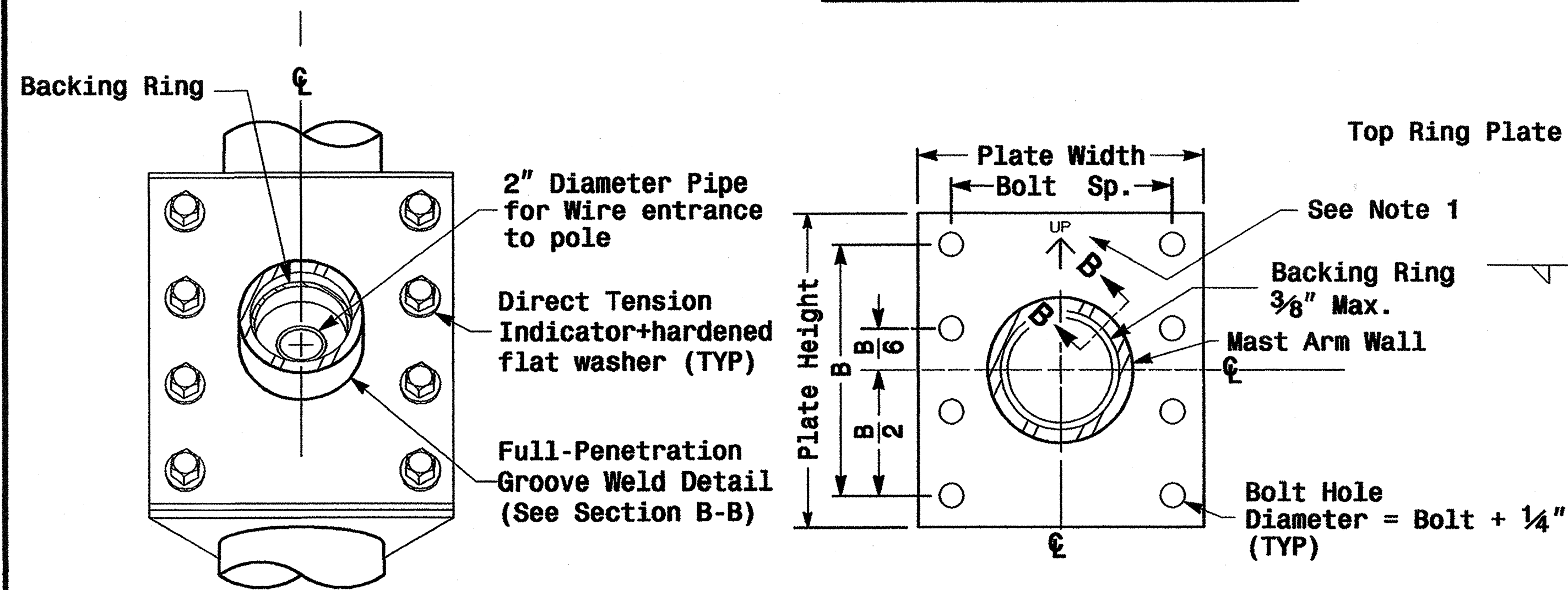


Plan View

Welded Ring Stiffened Mast Arm Connection

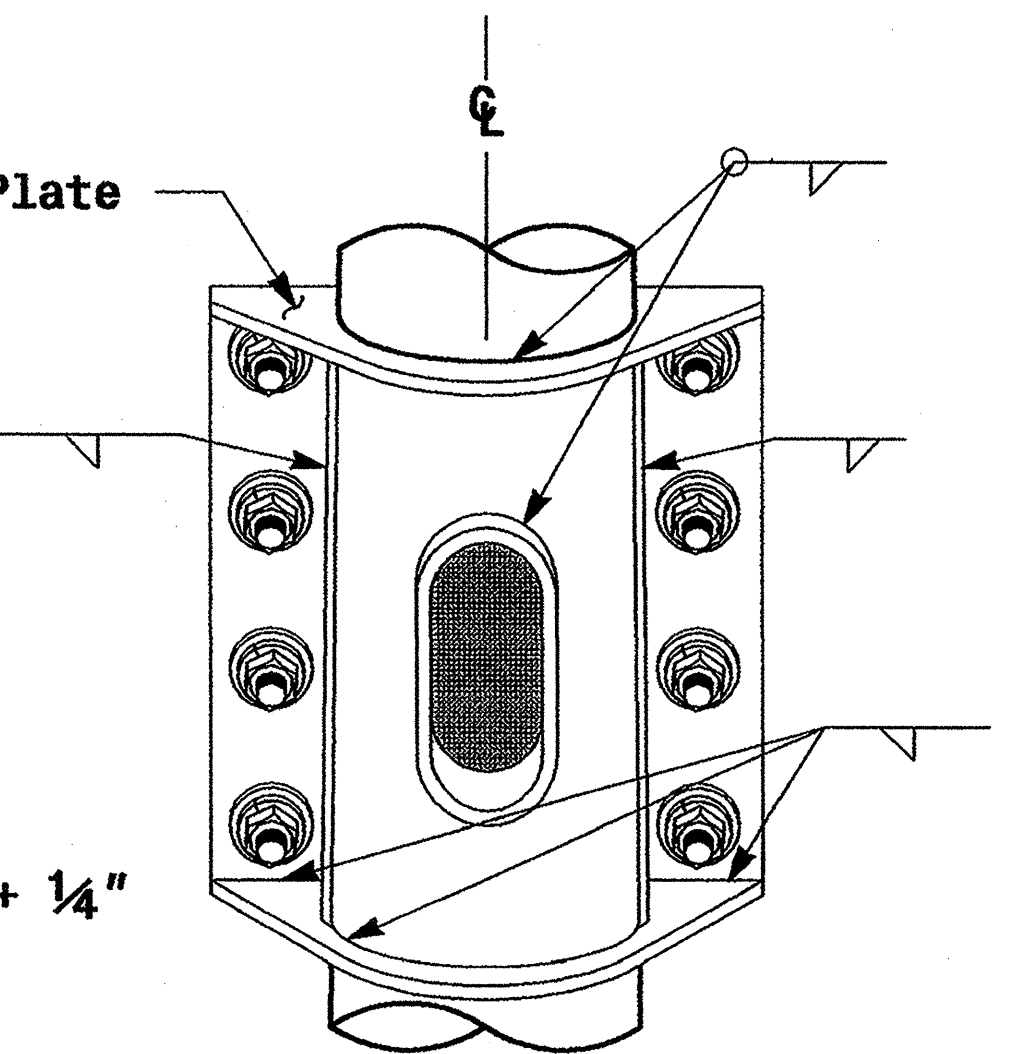


Side Elevation View

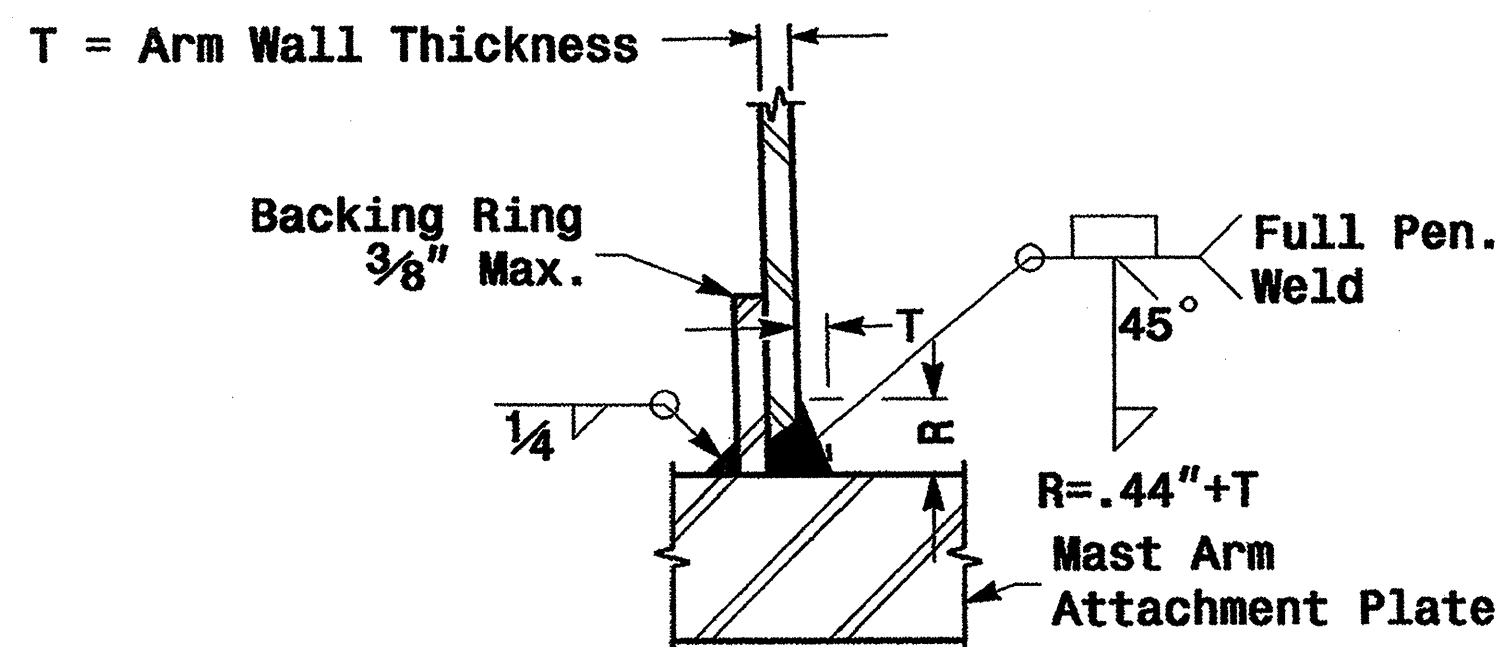


Front Elevation View

Section View A-A Mast Arm Attachment Plate



Back Elevation View



Section B-B Full-Penetration Groove Weld Detail

Notes:

1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Designer is responsible for providing appropriate drainage points.

	Fabrication Details For Mast Arm Connection To Pole		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito	
REVISIONS:		INIT. DATE	DATE: 9.2.2005 SIG. INVENTORY NO.

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 pallexander

Fabrication Details - Mast Arm Poles

- 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

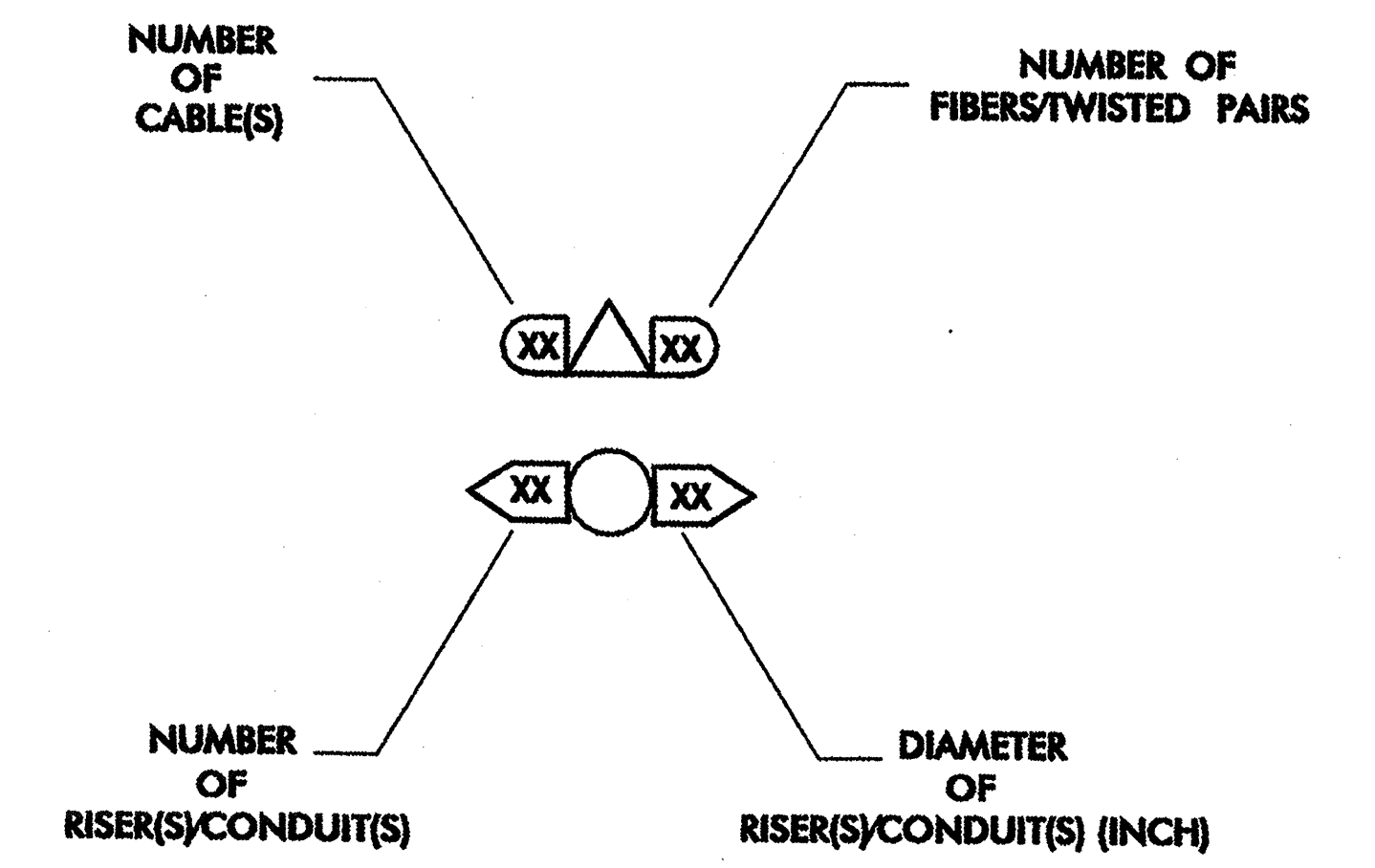
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL 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

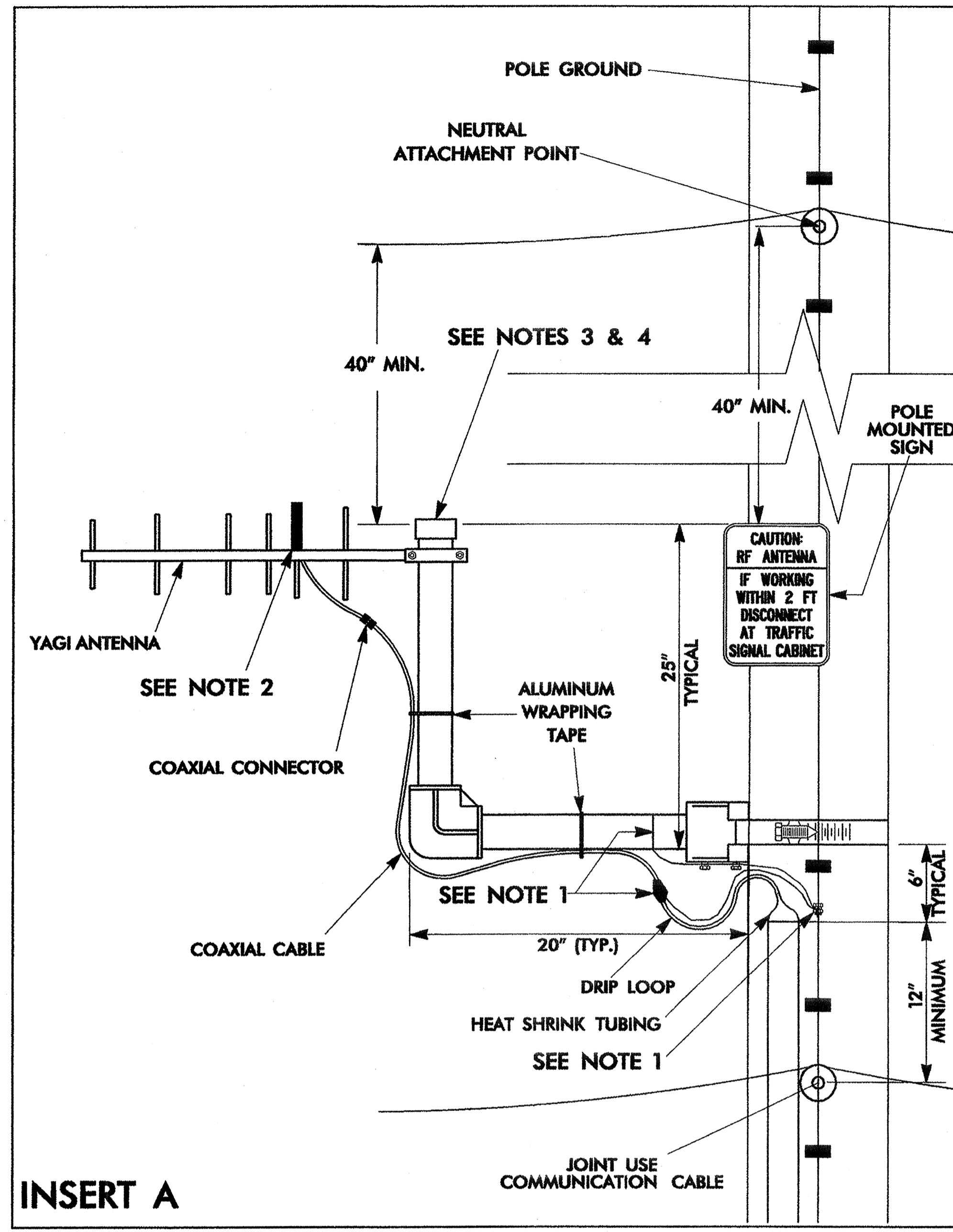
- FO NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI EXISTING COMMUNICATIONS CABLE
- REM EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD NEW DIRECTIONAL DRILLED CONDUIT
- B&J NEW BORED AND JACKED CONDUIT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



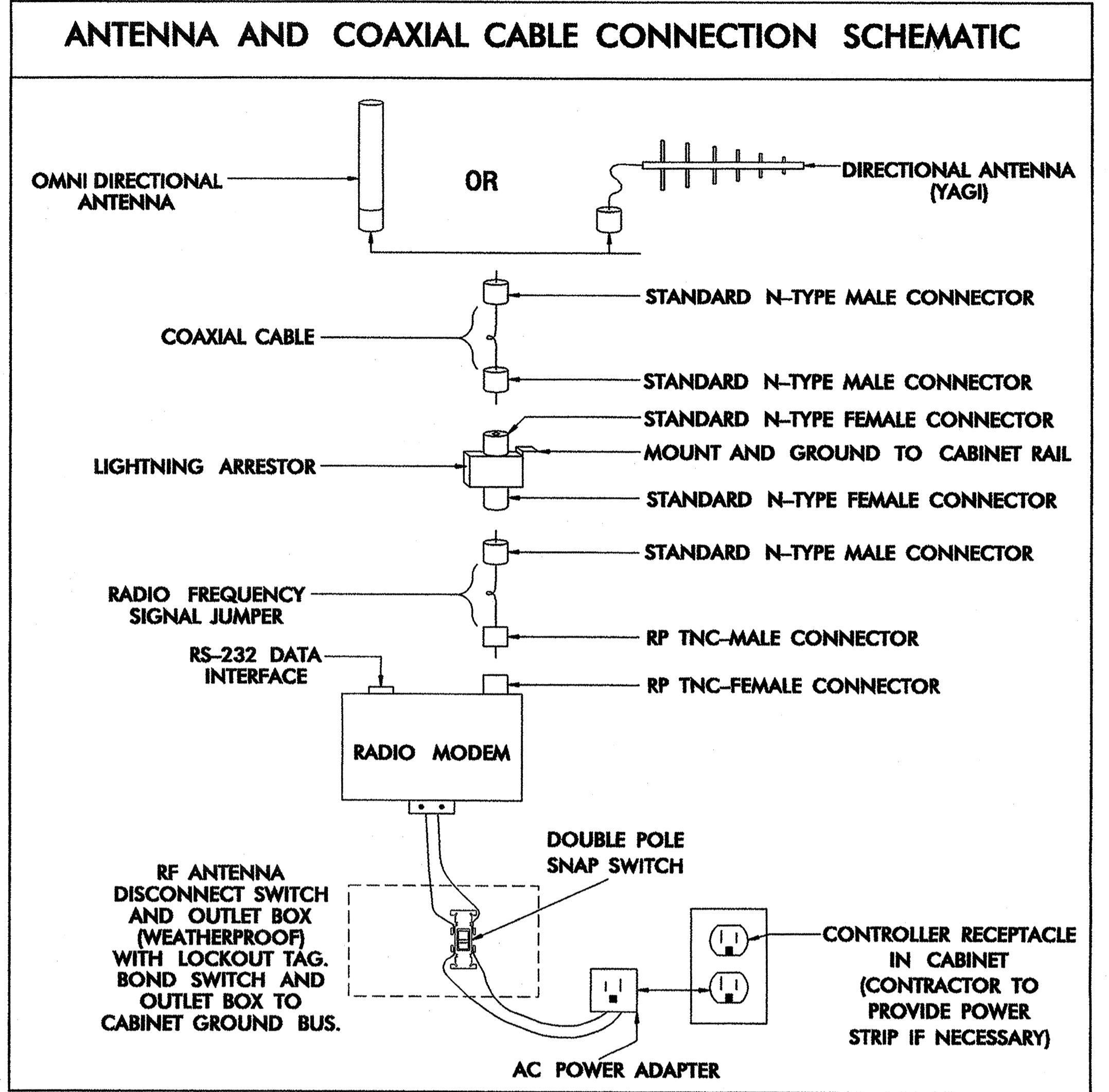
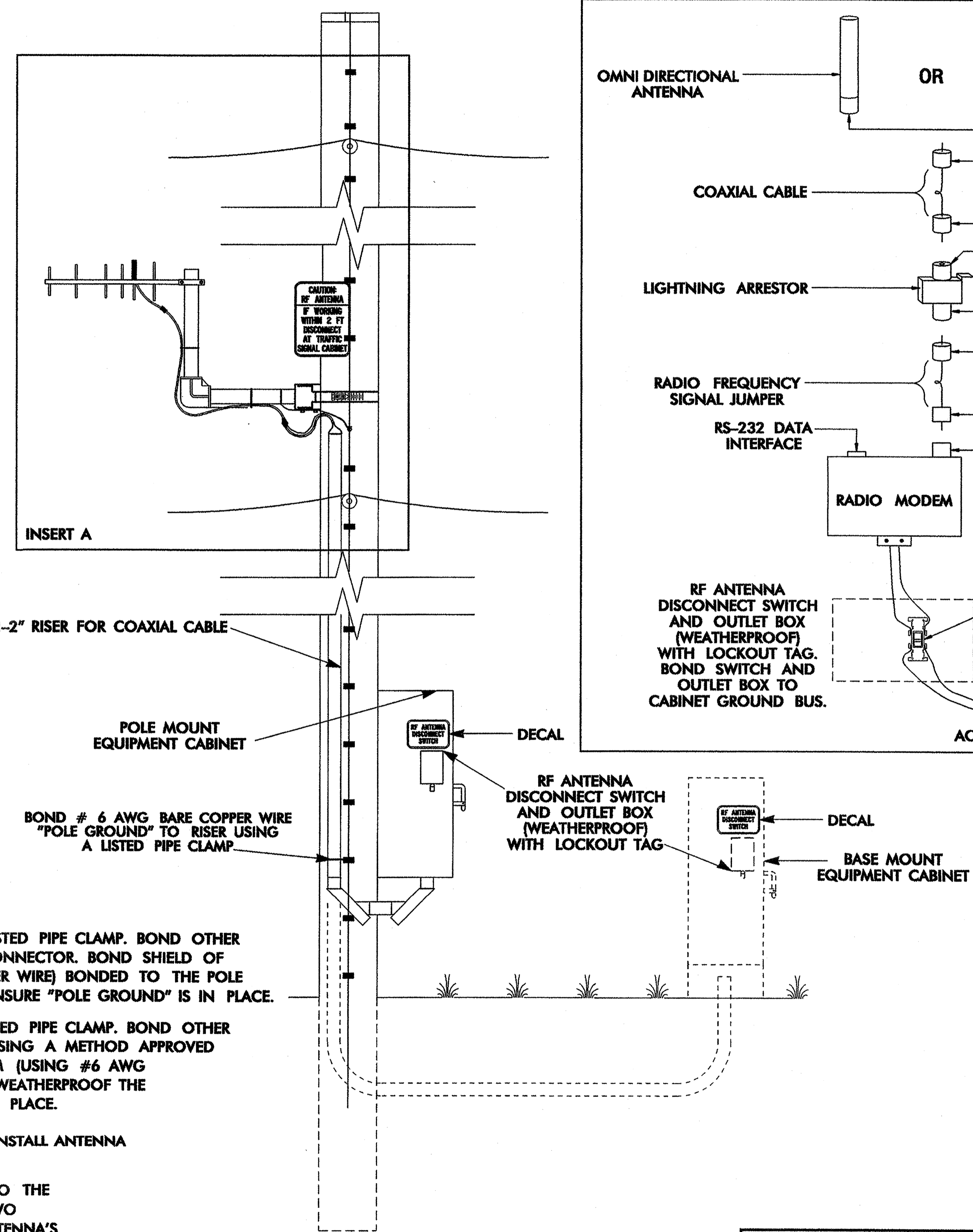
	CONSTRUCTION NOTES		
	PLAN DATE: _____ PREPARED BY: _____ SCALE: _____	REVIEWED BY: G. A. FULLER REVISIONS: _____ INIT. DATE: _____	




NOTES

- 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.
- YAGI ANTENNA SHOWN IN VERTICAL POLARIZATION POSITION FOR CLARIFICATION. TYPICALLY INSTALL ANTENNA IN HORIZONTAL POLARIZATION POSITION.
- 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)
 - ROTATE THE VERTICAL SUPPORT ARM 90 DEGREES SUCH THAT THE ANTENNA IS AT THE SAME HEIGHT AS THE HORIZONTAL SUPPORT ARM.
 - ELIMINATE THE VERTICAL SUPPORT ARM AND MOUNT THE ANTENNA TO THE HORIZONTAL SUPPORT ARM.
 - ANTENNA, ANTENNA SUPPORT ARM, AND SIGN TO MAINTAIN A 40" SEPARATION FROM NEUTRAL /POWER AND 12" FROM OTHER UTILITIES.
- INSTALL AN END CAP TO SEAL THE EXPOSED END OF THE MOUNTING PIPE.

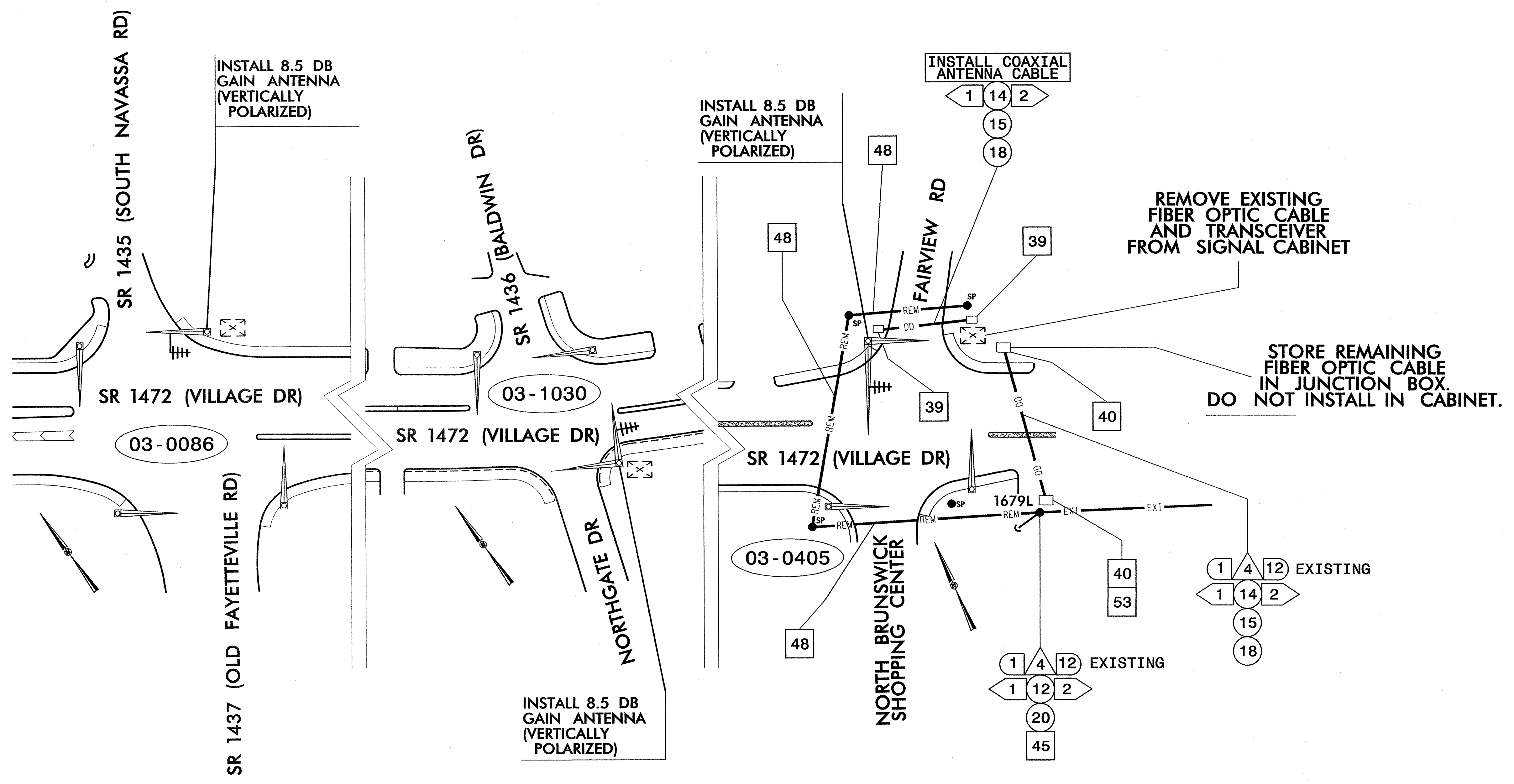


Prepared in the Office of:

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:
 UPDATE GROUNDING - COAXIAL CABLE SHIELD
 DATE: 4/13/05
 SIGNATURE: [Signature]
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER GREGORY A. FULLER
 CADD File Name: [Name]

NOTE: EXISTING FIBER OPTIC CABLE WILL BE RE-USED. REMOVE CAREFULLY AND CAP ENDS IN JUNCTION BOX.

LEGEND

YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
 YAGI ANTENNA (SINGLE)
 OMNI ANTENNA



NOTES:

- INSTALL COAXIAL CABLE
 - ON WOOD POLES, INSTALL A 2" RISER WITH HEAT SHRINK TUBING TO ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL 1/2" HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
 - 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.
 - 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".
- IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
- INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER.
- MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
- INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET. (NOTE: RF ANTENNA DISCONNECT SWITCH NOT REQUIRED ON NCDOT-OWNED POLE.)
- REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

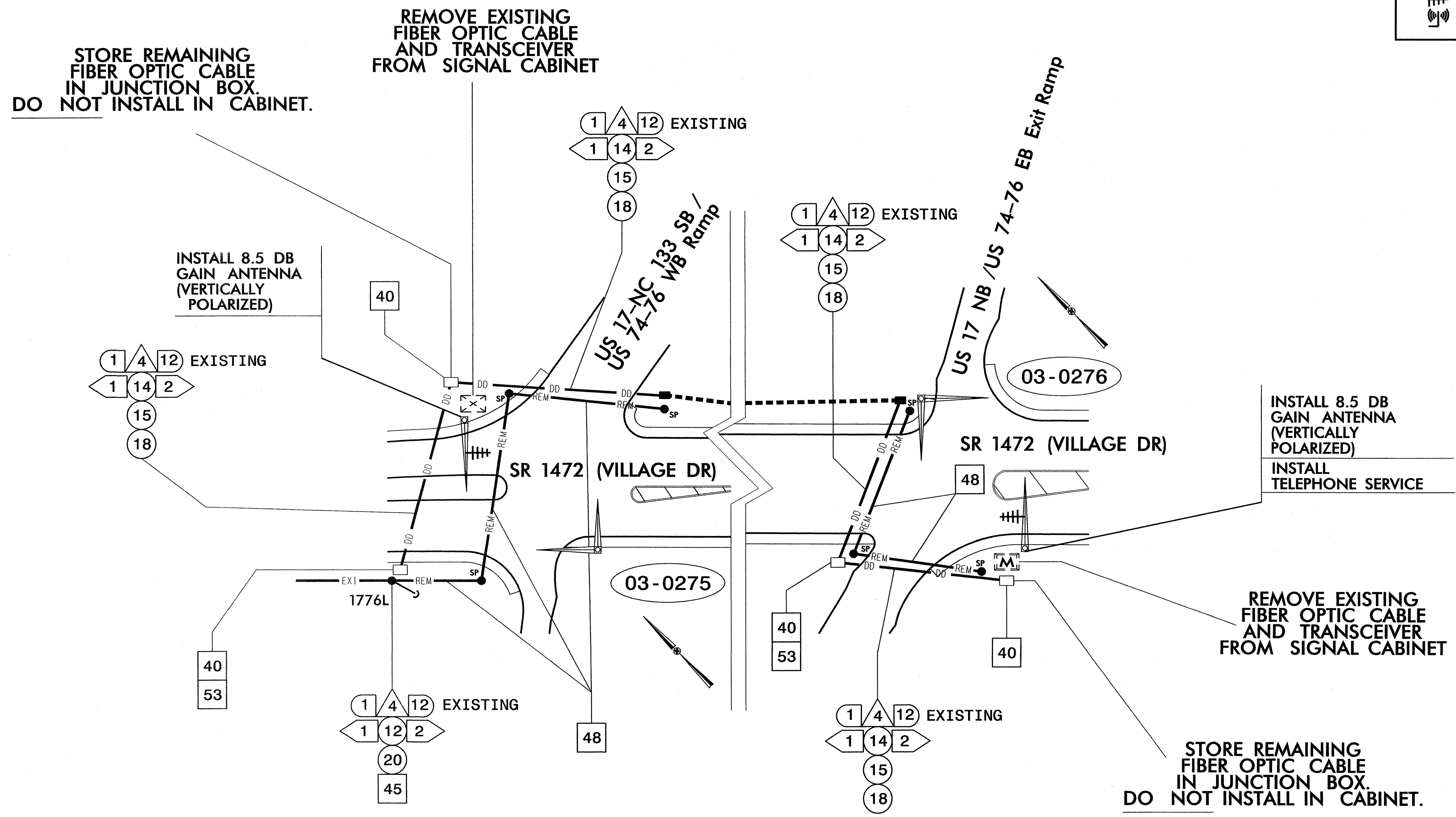
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	DIVISION 03 BRUNSWICK CO. LELAND PLAN DATE: DECEMBER 2008 REVIEWED BY: I.N. AVERY PREPARED BY: S.C. WARDLE REVIEWED BY: G.A. FULLER	SCALE 		REVISIONS <table border="1"> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DESCRIPTION	INIT.	DATE		
NO.	DESCRIPTION	INIT.	DATE							

Signature: *Gregory A. Fuller* 12/1/08
 DATE: 12/1/08
 CADD File Name:

NOTE: EXISTING FIBER OPTIC CABLE WILL BE RE-USED. REMOVE CAREFULLY AND CAP ENDS IN JUNCTION BOX.

LEGEND

YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
 YAGI ANTENNA (SINGLE)
 OMNI ANTENNA



NOTES:

- INSTALL COAXIAL CABLE
 - ON WOOD POLES, INSTALL A 2" RISER WITH HEAT SHRINK TUBING TO ROUTE THE COAXIAL CABLE TO THE ANTENNA.
 - ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL 1/2" HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
 - 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.
 - 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".
- IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
- INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER.
- MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
- INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET. (NOTE: RF ANTENNA DISCONNECT SWITCH NOT REQUIRED ON NCDOT-OWNED POLE.)
- REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."

	WIRELESS COMMUNICATION PLANS		
	SR 1472 (VILLAGE DRIVE)		
DIVISION 03 BRUNSWICK CO. LELAND		PLAN DATE: DECEMBER 2008	REVIEWED BY: I.N. AVERY
PREPARED BY: S.C. WARDLE		REVIEWED BY: G.A. FULLER	
SCALE	REVISIONS	INIT.	DATE
0			
		12/1/08 SIGNATURE DATE CADD File name:	

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

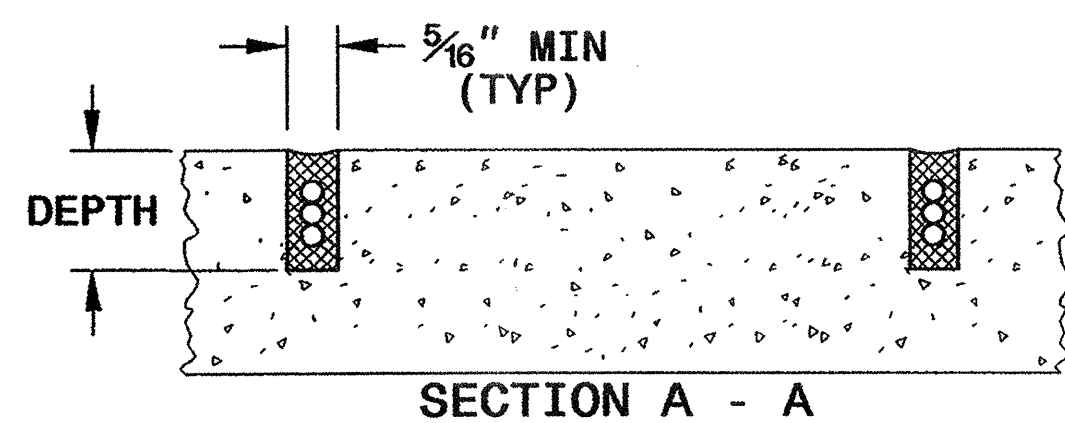
11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

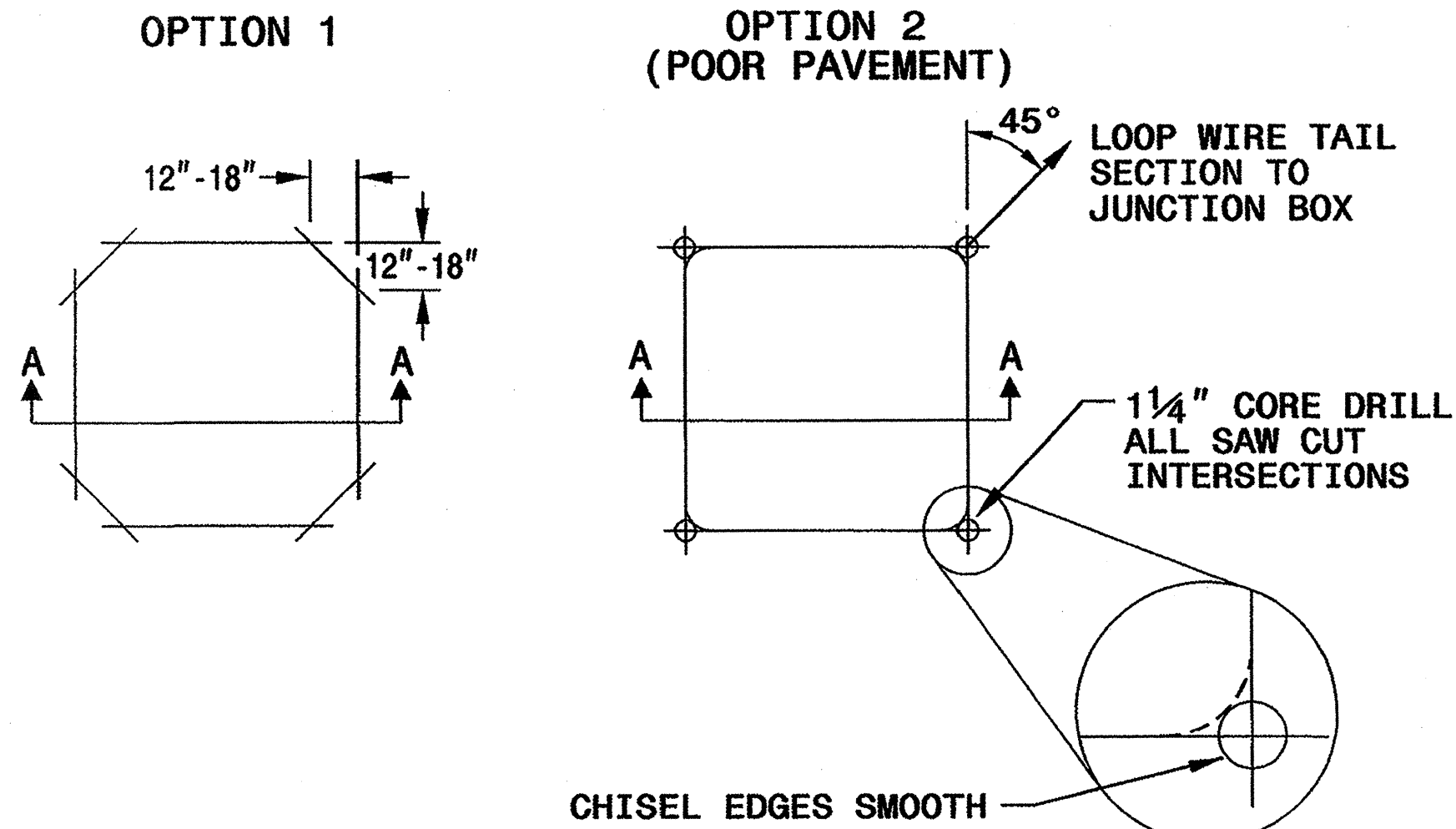
SAW SLOT DEPTH CHART

DEPTH (IN)	NO. OF WIRE TURNS				
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ASPHALT	2.0	2.5	3.0	3.0	3.0

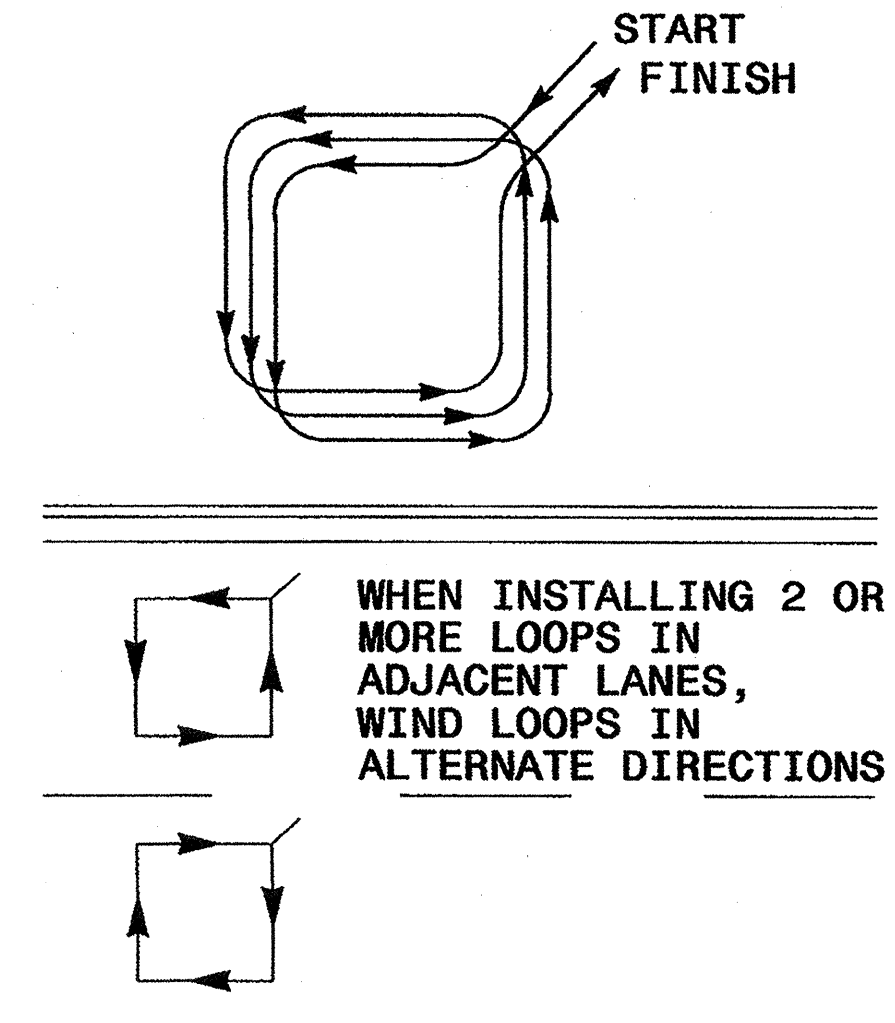


CONVENTIONAL 4-SIDED LOOP

SAW CUT OPTIONS



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE



CORRECT WAY TO TWIST WIRE

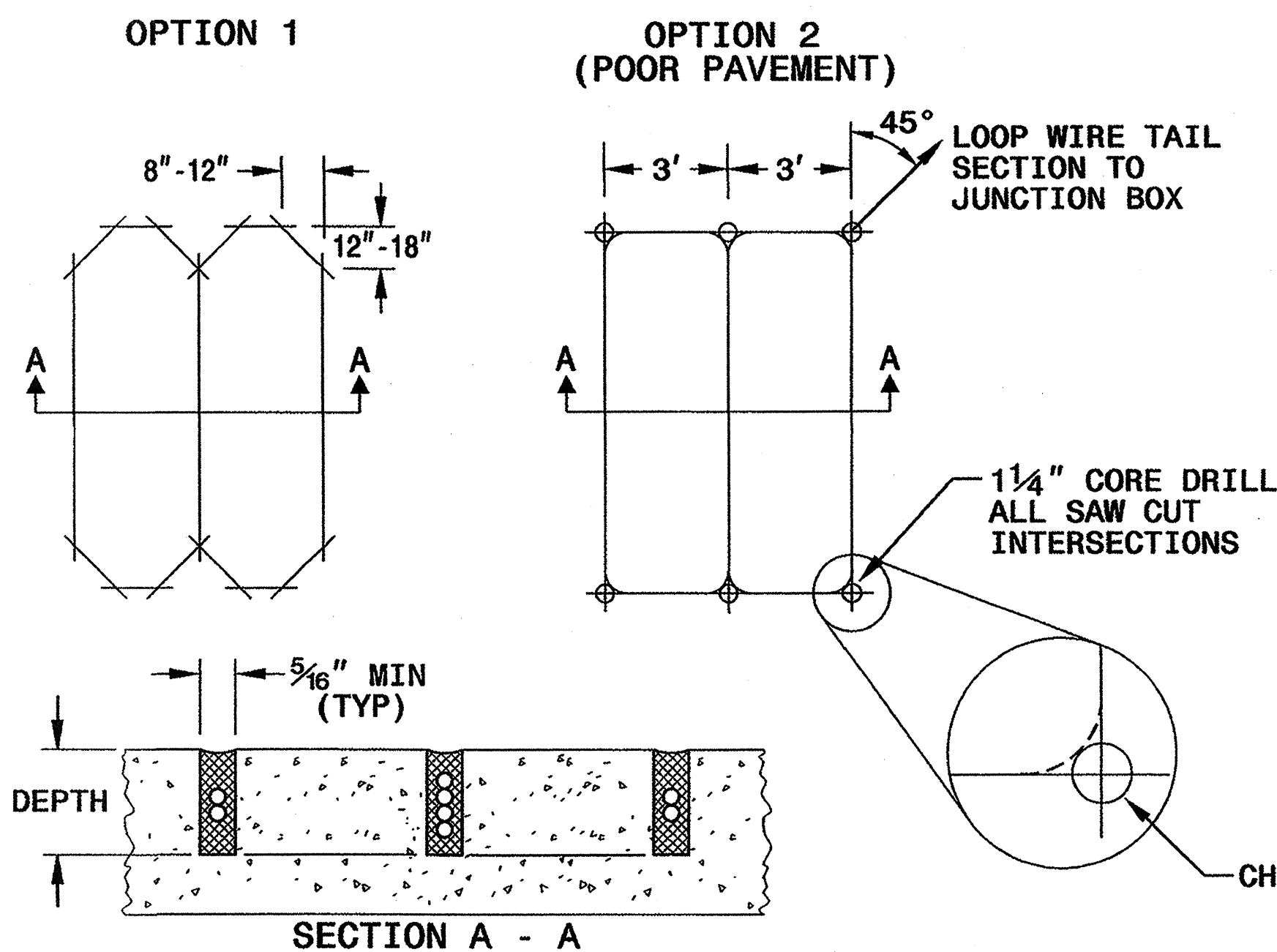


NOTES

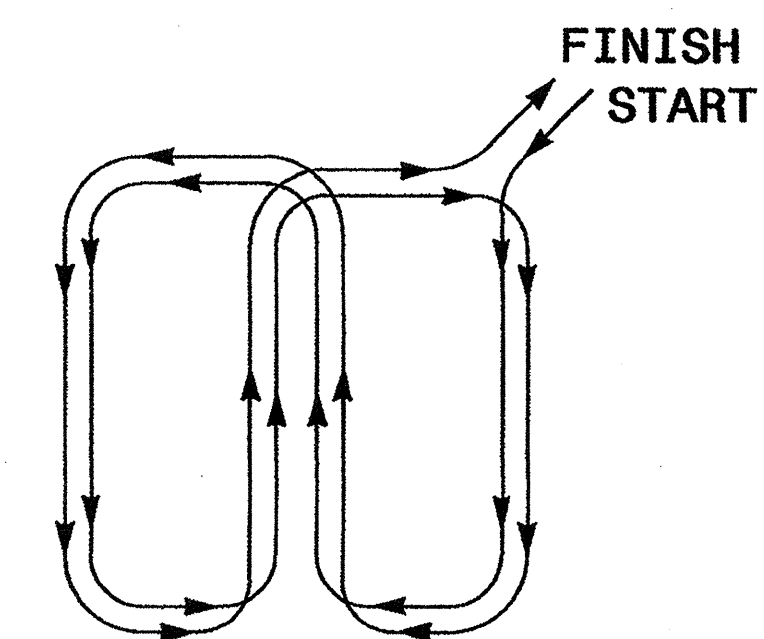
- OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
- MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
- WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
- LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

QUADRUPOLE LOOP

SAW CUT OPTIONS



LOOP WINDING METHOD



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

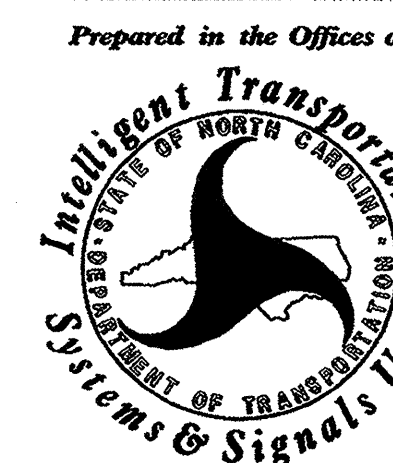
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ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

See Plate for Title



750 N. Greenfield Parkway
Garner, NC 27529



Milton Dean 11/24/08
SIGNATURE DATE

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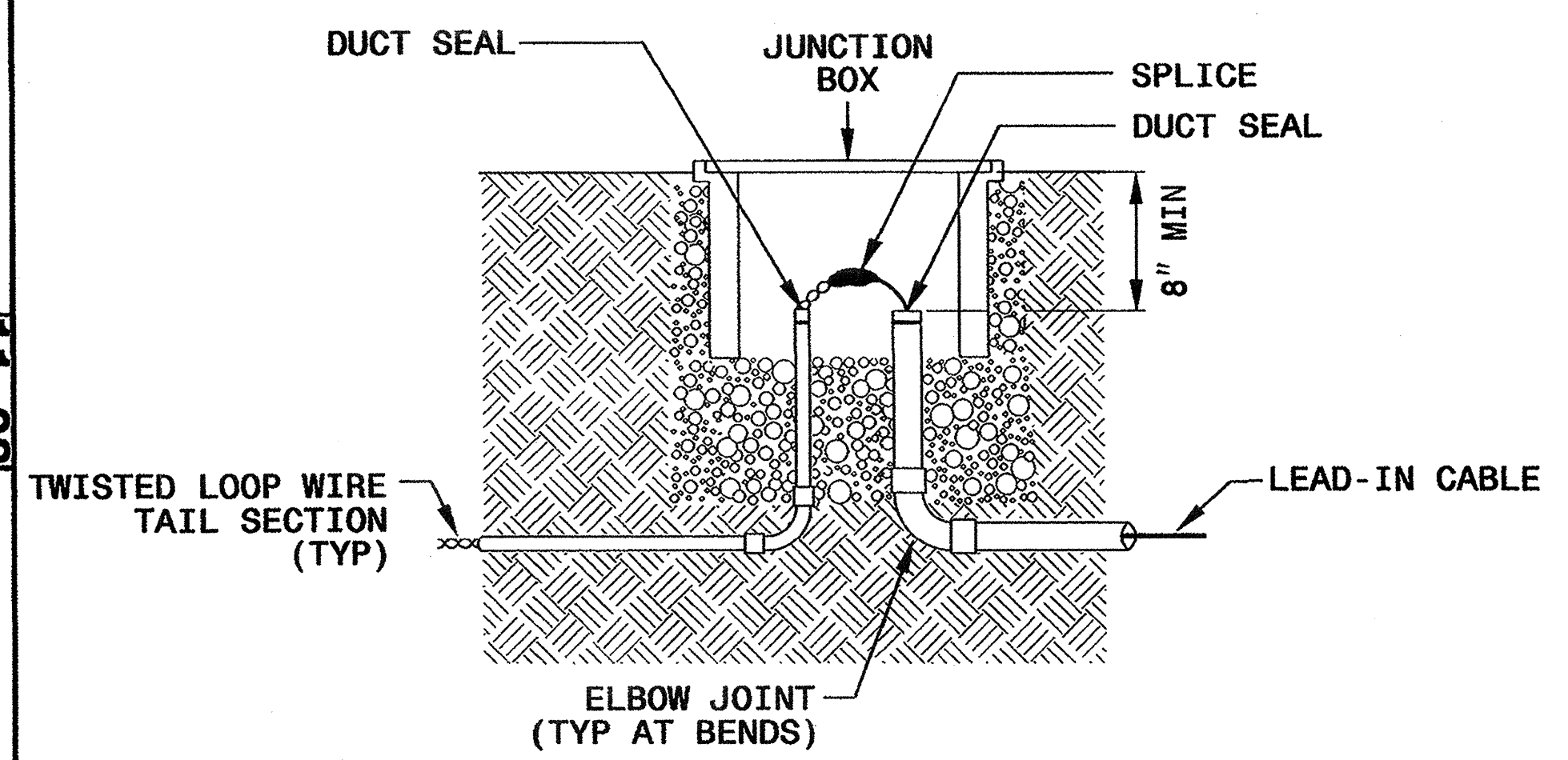
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ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

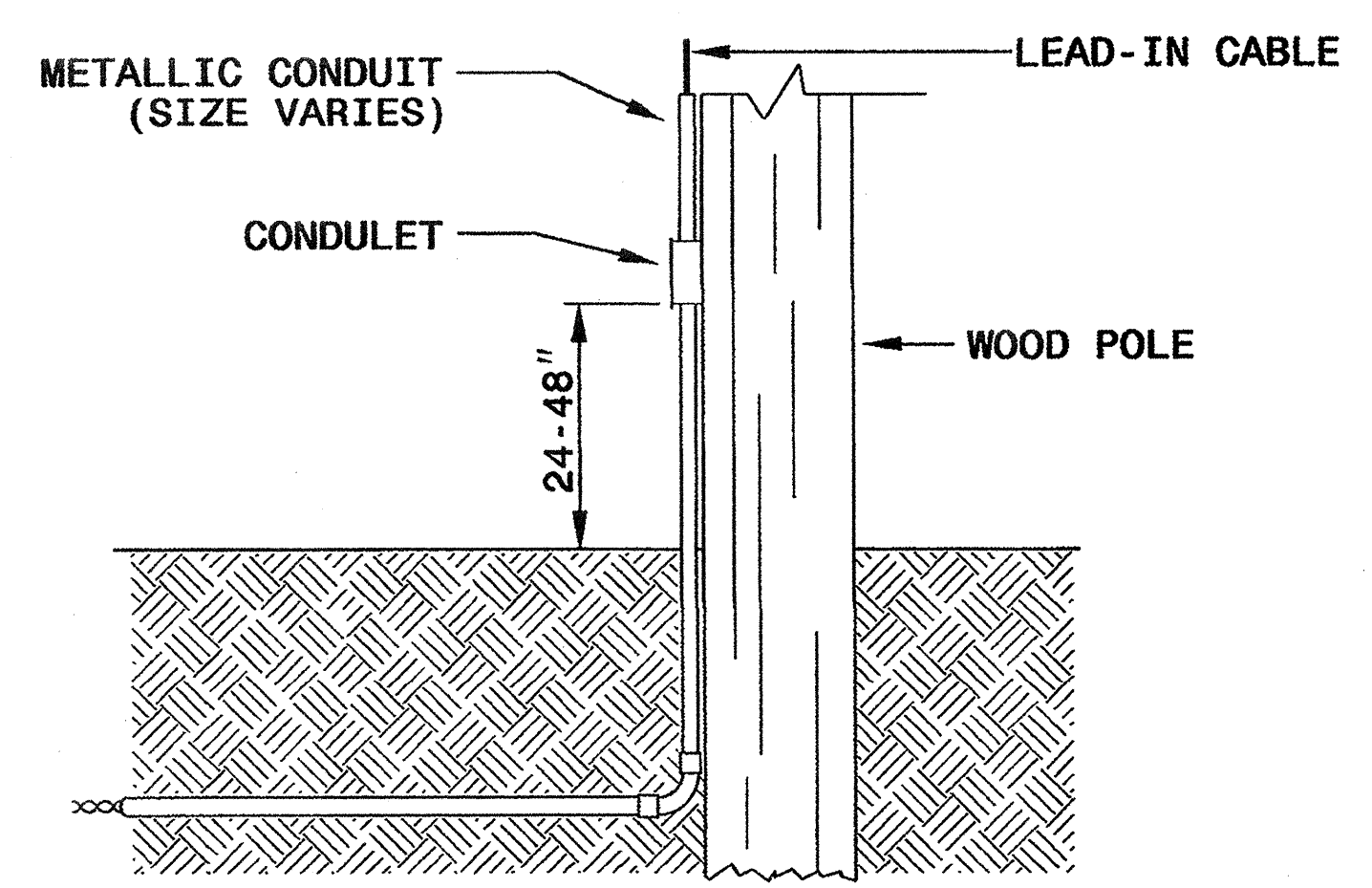
SHEET 2 OF 3
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LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

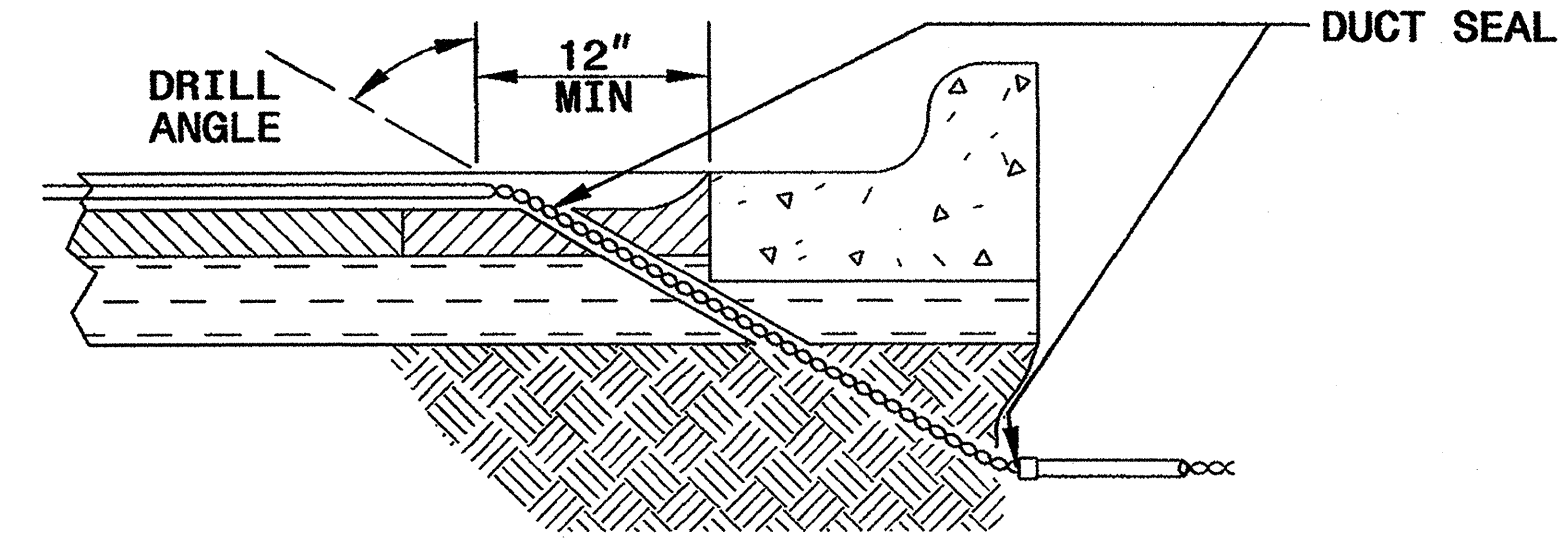


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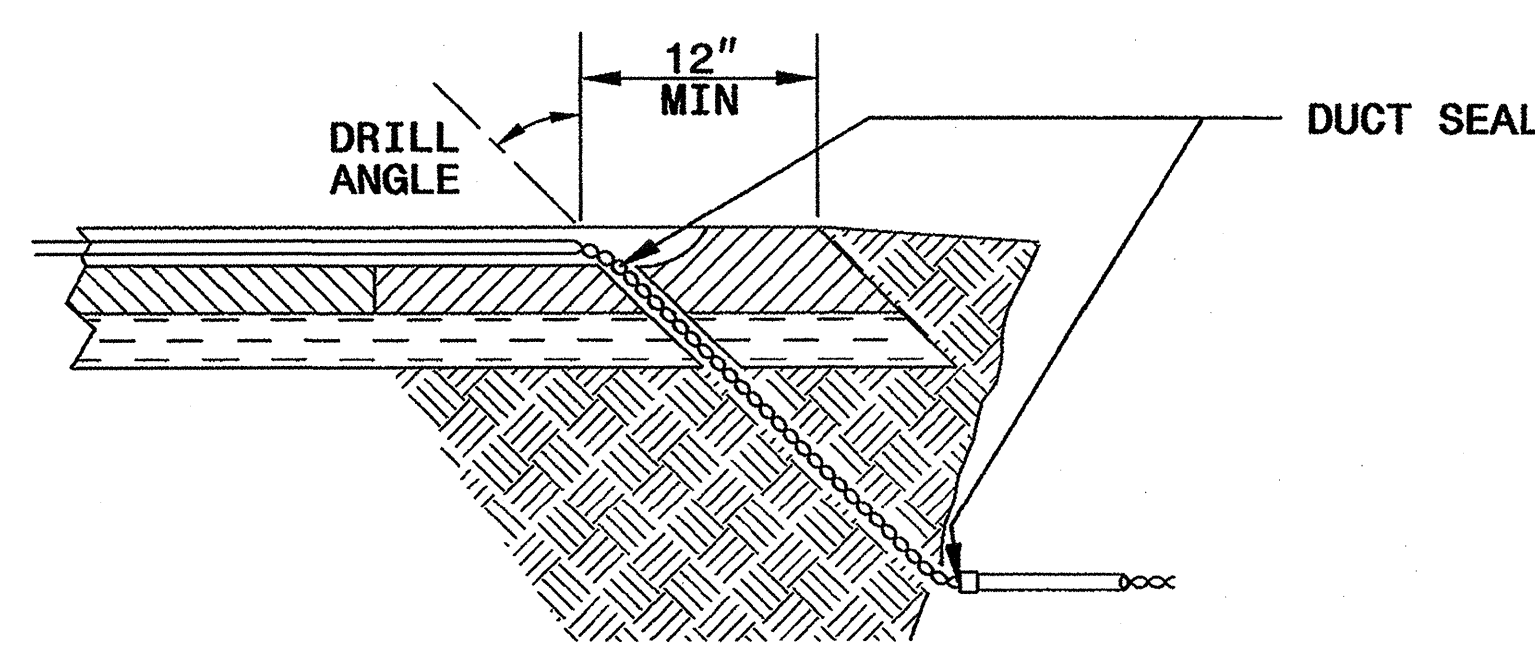
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

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.

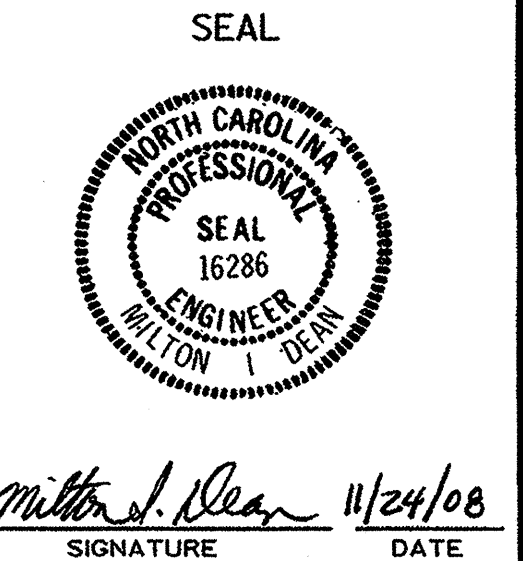
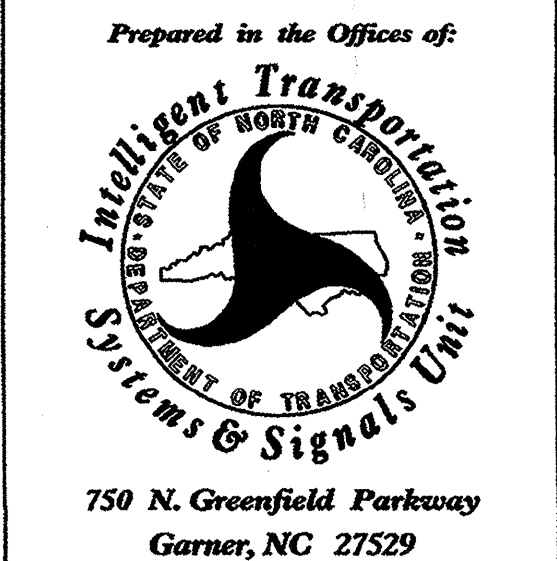
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ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

SHEET 2 OF 3
1725D01

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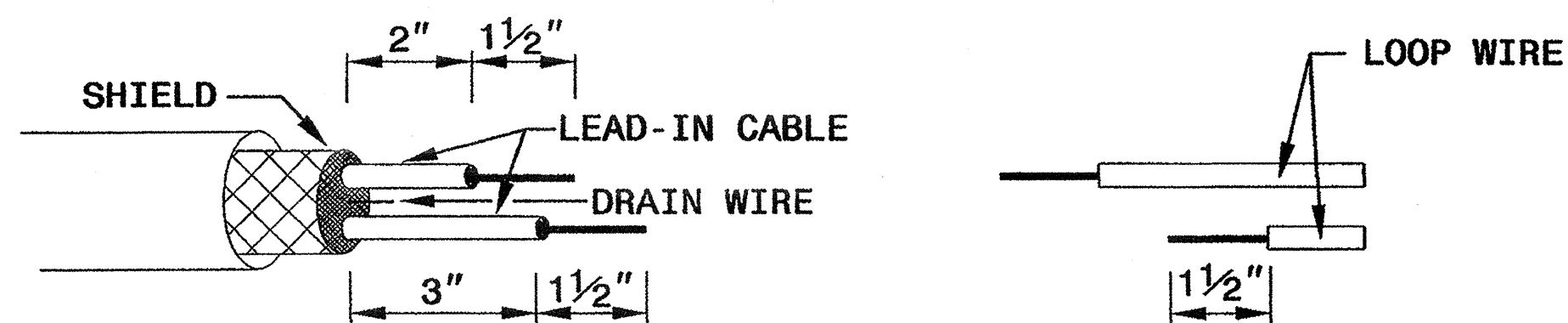
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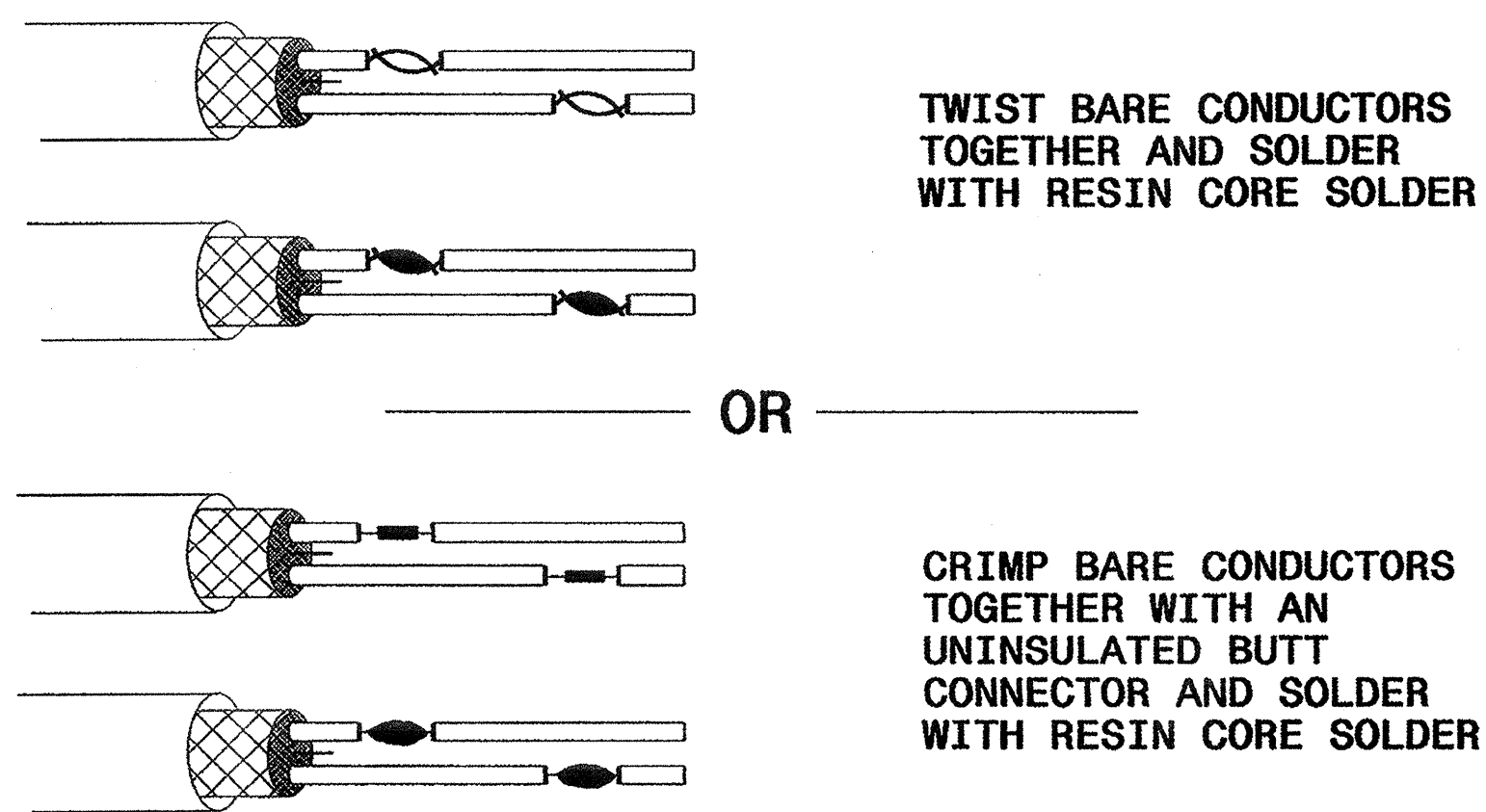
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE

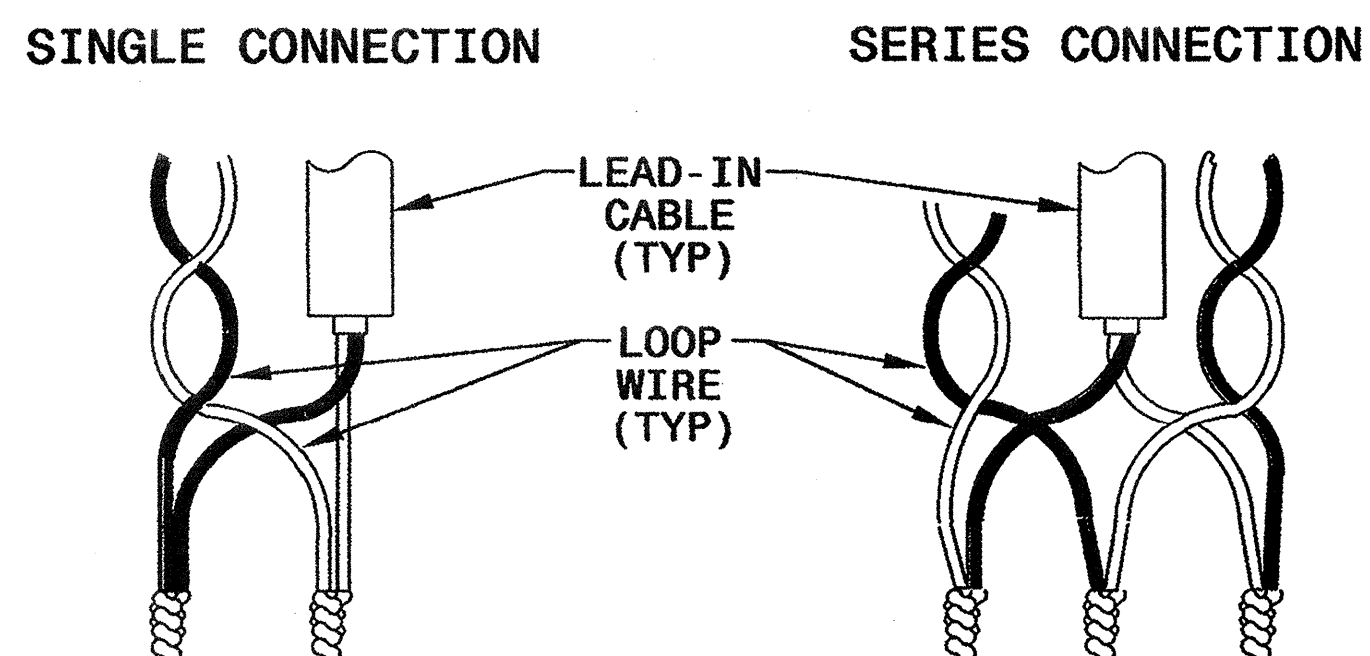


STEP 2. CONNECT AND SOLDER

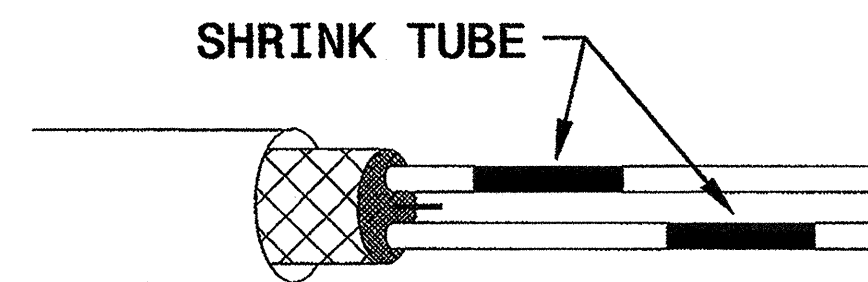


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

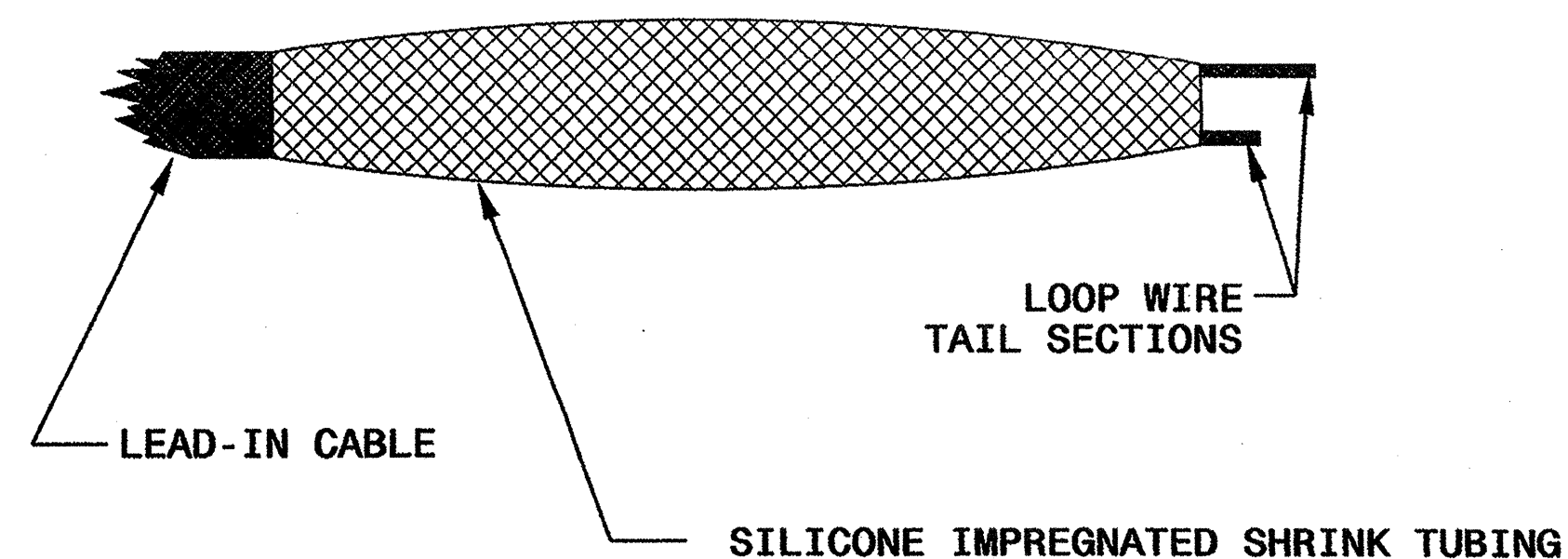
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
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