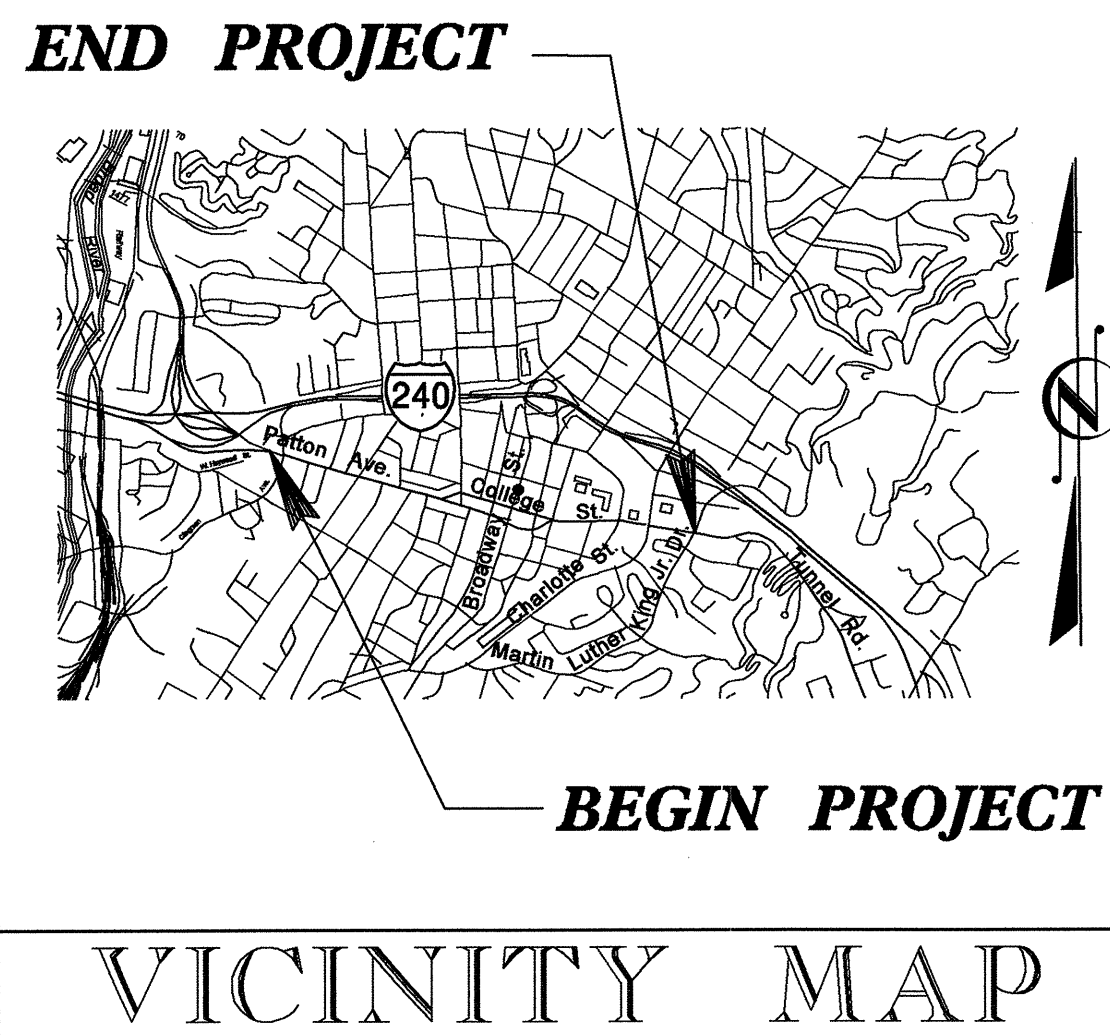


**TIP PROJECT: U-4715AB**  
**CONTRACT: C201476**



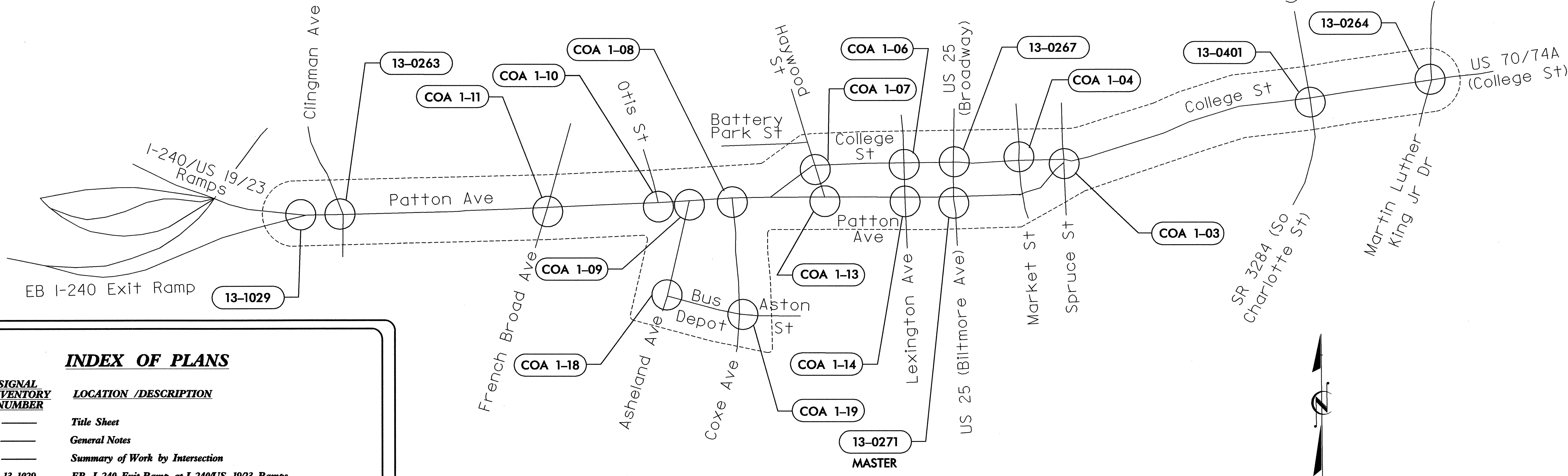
STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

**BUNCOMBE COUNTY**

**LOCATION: COLLEGE ST/PATTON AVE FROM I-240  
 EXIT RAMP TO NC 694 (MARTIN LUTHER  
 KING JR DR) IN DOWNTOWN ASHEVILLE, NC**

**TYPE OF WORK: ASHEVILLE SIGNAL SYSTEM**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4715AB	Sig. 1	55
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
39079.1.1.2	STP-1302(36)	P.E.	
39079.3.2	STP-1302(36)	CONST.	



**INDEX OF PLANS**

SHEET NUMBER	SIGNAL INVENTORY NUMBER	LOCATION /DESCRIPTION
SIG. 1	---	Title Sheet
SIG. 2	---	General Notes
SIG. 3	---	Summary of Work by Intersection
SIG. 4-5	13-1029	EB I-240 Exit Ramp at I-240/US 19/23 Ramps
SIG. 6-7	13-0263	Patton Ave at Clingman Ave
SIG. 8-9	COA 1-11	Patton Ave at French Broad Ave
SIG. 10-12	COA 1-10	Patton Ave at Otis St
SIG. 13-14	COA 1-09	Patton Ave at Asheland Ave
SIG. 15-16	COA 1-08	Patton Ave at Coxe Ave
SIG. 17-18	COA 1-13	Patton Ave at Haywood St
SIG. 19-20	COA 1-14	Patton Ave at Lexington Ave
SIG. 21-22	13-0271	Patton Ave/Pack Square at US 25 (Biltmore Ave/Broadway)
SIG. 23-24	COA 1-18	Asheland Ave at Bus Depot
SIG. 25-26	COA 1-19	Coxe Ave at Bus Depot/Astor St
SIG. 27-28	COA 1-07	College St at Haywood St
SIG. 29-30	COA 1-06	College St at Lexington Ave
SIG. 31-32	13-0267	College St at US 25 (Broadway)
SIG. 33-34	COA 1-04	College St at Market St
SIG. 35-36	COA 1-03	College St/Pack Square at Spruce St
SIG. 37-38	13-0401	US 70/74A (College St) at SR 3284 (So Charlotte St)/US 70/74A (Charlotte St)
SIG. 39-40	13-0264	US 70/74A (College St) at NC 694 (Martin Luther King Jr Dr)
SIG. 41-49	---	Communications Plans
SIG. 50-55	---	Typical Details

**PLANS PREPARED BY:**

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

**HARVEY L. WINSTEAD, P.E. - PROJECT MANAGER**  
**CHARLES A. JOHNSON, P.E. - PROJECT ENGINEER**  
**SPENCER T. FRANKLIN, P.E. - PROJECT ENGINEER**

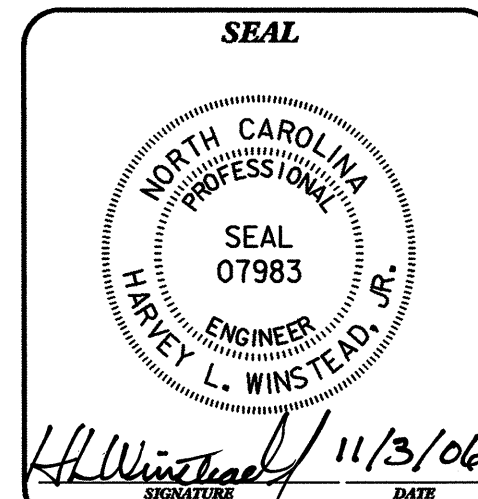
**LEGEND**

- #### NCDOT SIGNAL INVENTORY NUMBER
- COA #### CITY OF ASHEVILLE SIGNAL INVENTORY NUMBER
- ASHEVILLE CLOSED LOOP SYSTEM

**PLANS PREPARED FOR:**  
 TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH  
 G.G. (BUDDY) MURR JR., P.E. - ITS ENGINEER  
 W. MICHAEL BRASWELL - METRO SYSTEMS PROJECT ENGINEER  
 DOUMIT Y. ISHAK - SIGNALS AND GEOMETRICS CONTRACTS ENGINEER



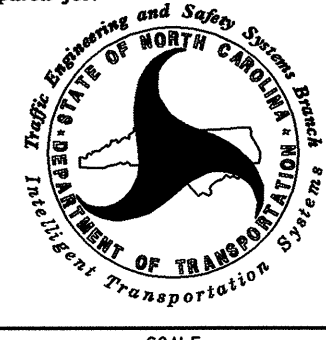

ALL DIMENSIONS IN THESE PLANS ARE IN FEET UNLESS OTHERWISE NOTED



# GENERAL NOTES

1. THE FIELD LOCATION OF ANY ITEM TO BE INSTALLED AS PART OF THIS PROJECT SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
2. NEW TRAFFIC SIGNAL CONTROLLER CABINETS ARE SPECIFIED ON THE SIGNAL DESIGN PLANS; THEREFORE, CONTROLLER CABINETS ON THE COMMUNICATIONS PLANS ARE SHOWN AS EXISTING.
3. BURIED UTILITIES AND STRUCTURES: PIPELINES, STORM SEWERS, POWER CABLES, UTILITY CABLES, BASEMENTS, AND OTHER PUBLICLY AND PRIVATELY OWNED UNDERGROUND OBSTRUCTIONS EXIST ADJACENT TO AND WITHIN THE STREET RIGHT-OF-WAY WITHIN THE CONSTRUCTION LIMITS OF THIS PROJECT. INVESTIGATE THE LOCATION OF SUCH BURIED UTILITIES AND STRUCTURES WITH PUBLIC AND PRIVATE UTILITIES.
4. THE PLAN SHEETS HAVE BEEN DEVELOPED AS CLOSE TO SCALE AS PRACTICAL. ACTUAL FIELD CONDITIONS, HOWEVER, SHALL PROVIDE THE BASIS FOR APPLYING THE WORK SHOWN.
5. THE ROADWAY STANDARD DRAWINGS, THE ROADWAY STANDARD DETAILS OF THIS PLAN SET, AND THE SPECIFIC DETAILS PROVIDED IN THIS PLAN SET SHALL ALL APPLY TO ALL WORK REQUIRED IN THIS PROJECT. WHETHER A PARTICULAR DETAIL IS SPECIFICALLY REFERENCED TO A WORK ITEM OR NOT, IN THE EVENT OF A CONFLICT, THE ORDER OF PRECEDENCE SHALL BE: THE PROJECT SPECIAL PROVISIONS, THE SPECIAL DETAILS, THE STANDARD DETAILS, THE ROADWAY STANDARD DRAWINGS, AND THEN THE STANDARD SPECIFICATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR APPLYING THE PROPER DETAILS.
6. ANY OF THE CONTRACTOR'S WORK ACTIVITIES WHICH IMPACT ANY UTILITY FACILITY OR RAILROAD SHALL BE COORDINATED WITH THE OWNER OF ALL AFFECTED UTILITIES AND RAILROADS. THE CONTRACTOR SHALL FOLLOW ANY AND ALL WORK PROCEDURES THE UTILITY AND RAILROAD OWNERS MAY REQUIRE.
7. ALL WORK SHOWN ON THESE PLANS SHALL BE PERFORMED BY THE CONTRACTOR UNLESS IT IS SPECIFICALLY NOTED THAT THE WORK WILL BE PERFORMED BY OTHERS.
8. LOCATION OF PROPOSED CONCRETE SIDEWALK TO BE DETERMINED IN THE FIELD AS NEEDED.

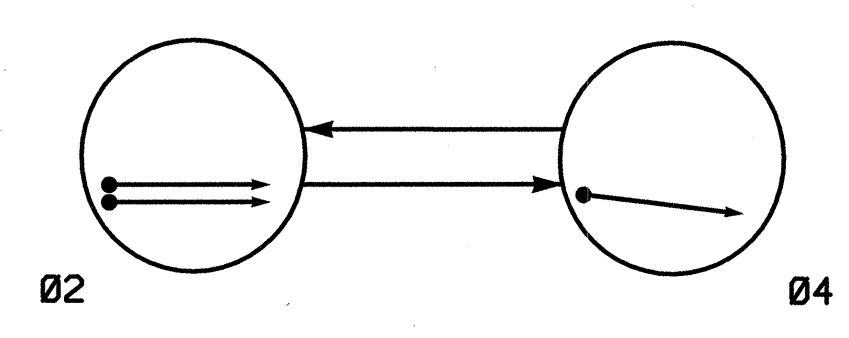
**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

	<p>Asheville Signal System Downtown (College St &amp; Patton Ave) General Notes</p>													
	<p>Division 13    Buncombe County    Asheville</p> <p>PLAN DATE: November 2005    REVIEWED BY: S.T. Franklin</p> <p>PREPARED BY: T.R. Terrell    REVIEWED BY: H.L. Winstead</p>													
<p>SCALE</p> <p>0 _____</p> <p>NONE</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> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE										<p style="text-align: right;">SEAL</p> <p style="text-align: right;">11/3/06</p> <p style="text-align: right;">SIGNATURE    DATE</p> <p style="text-align: right;">CADD FILE NAME: (002) SumQuant.dgn</p>
REVISIONS	INIT.	DATE												



2 Phase  
Semi-Actuated  
(Asheville Signal System)

PHASING DIAGRAM

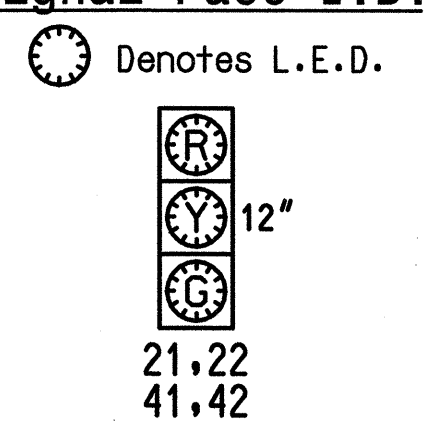


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	02	04	FLUSH
21,22	G	R	Y
41,42	R	G	R

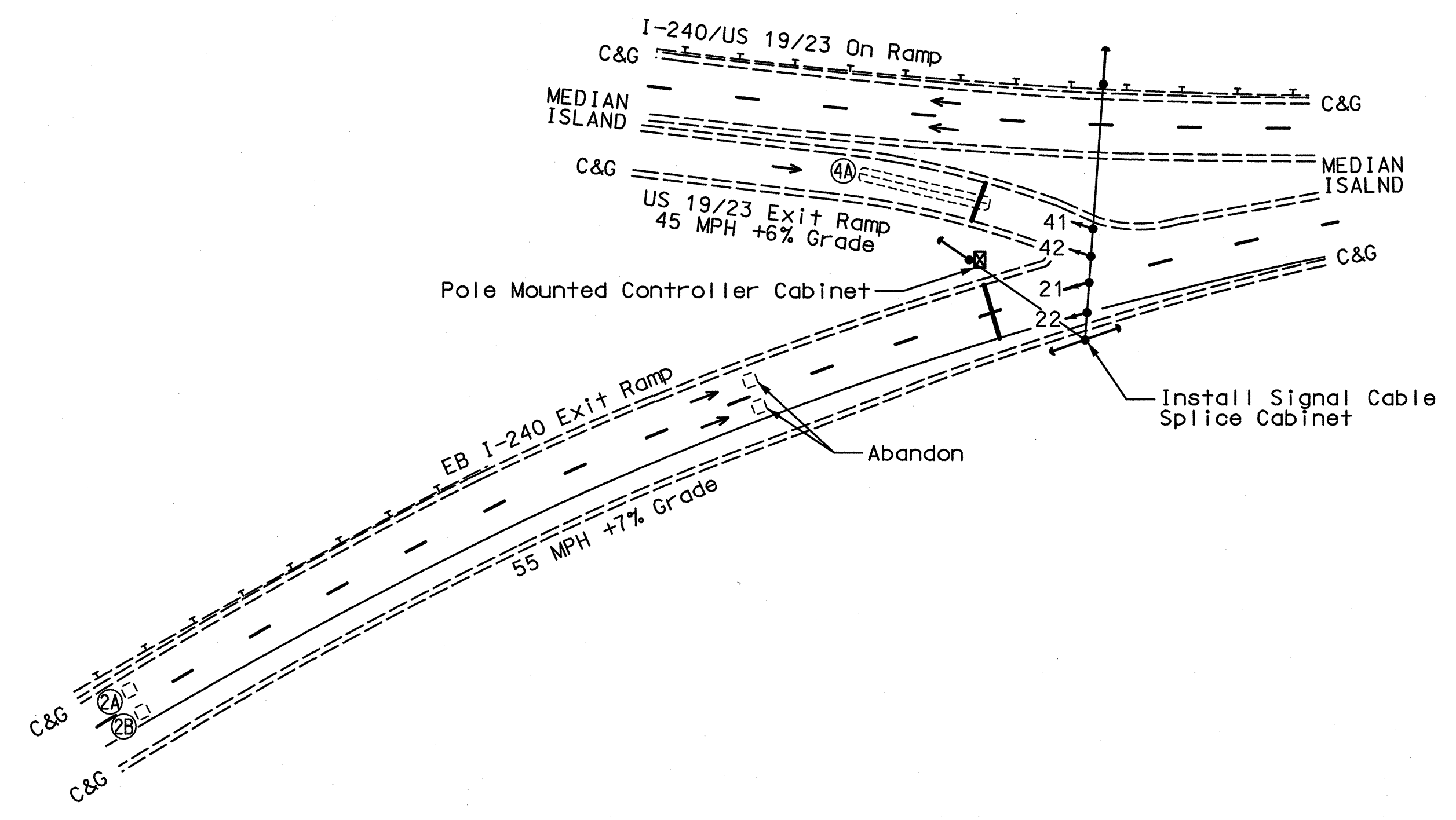
Signal Face I.D.



2070L LOOP & DETECTOR INSTALLATION												
INDUCTIVE LOOPS				DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A,2B	6x6	420	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6x60	+5	EXISTING	-	4	Y	Y	-	-	-	-	Y

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- 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 #1029



FEATURE	PHASE	
	2	4
Min Green 1*	14	7
Extension 1*	3.4	2.0
Max Green 1*	60	30
Yellow Clearance	4.5	4.1
Red Clearance	1.0	1.3
Walk 1*	-	-
Don't Walk 1	-	-
Walk Advance**	-	-
Seconds Per Actuation*	1.5	-
Max Variable Initial*	46	-
Time Before Reduction*	0.0	-
Time To Reduce*	0.0	-
Minimum Gap	3.4	-
Recall Mode	MIN RECALL	-
Vehicle Call Memory	YELLOW	-
Dual Entry	-	-
Simultaneous Gap	ON	ON

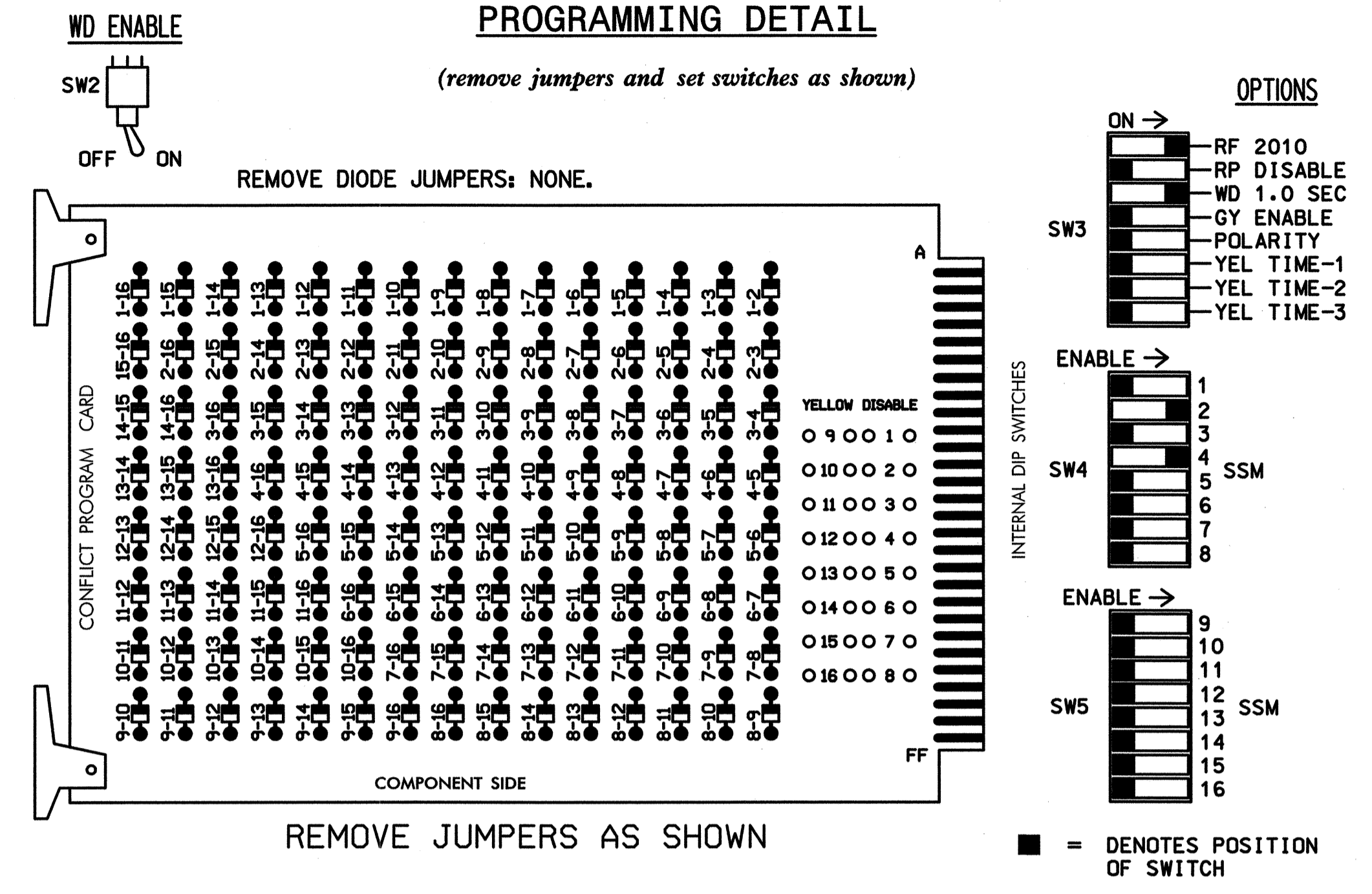
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 2 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Proposed		Existing	
○→	Traffic Signal Head	●→	N/A
●→	Modified Signal Head		
—	Sign	—	
⊥	Pedestrian Signal Head	⊥	
⊥	With Push Button & Sign	⊥	
○—	Signal Pole with Guy	●—	
○—	Signal Pole with Sidewalk Guy	●—	
⊠	Inductive Loop Detector	⊠	
⊠	Controller & Cabinet	⊠	
□	Junction Box	□	
---	2-in underground conduit	---	
N/A	Right of Way with Marker	—△—	
→	Directional Arrow	→	

Signal Upgrade

	EB I-240 Exit Ramp at I-240/US 19/23 Ramps		
	Division 13 Buncombe County Asheville	PLAN DATE: August 2005 REVIEWED BY: T.R. Terrell	
HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609	SCALE 0 50 1"=50'	SIGNATURE DATE 11-3-06	SIG. INVENTORY NO. 13-1029

**EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL**



**NOTES:**

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

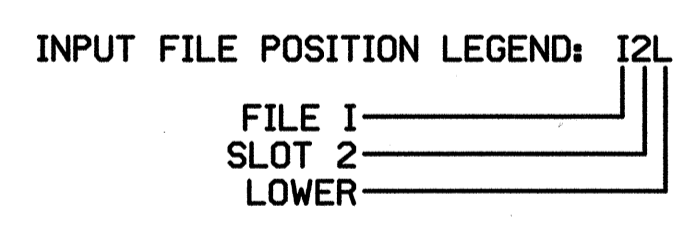
**INPUT FILE POSITION LAYOUT (front view)**

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

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

**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A,2B	TB21-3,4	I2U	39	1	2	2	Y	Y	-	-	-
4A	TB21-7,8	I4U	41	3	4	4	Y	Y	-	-	-



**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, 6,7,8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phase 2 on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phase 2 on the controller unit, for variable initial.
- The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**EQUIPMENT INFORMATION**

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

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	NU	NU	NU	NU	NU
RED		128			101							
YELLOW		129			102							
GREEN		130			103							
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon												
Person icon												

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-1029  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR: EB I-240 Exit Ramp at I-240/US 19/23 Ramps

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick

PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

REVISIONS: INIT. DATE

HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609

122 N. McDowell St., Raleigh, NC 27603

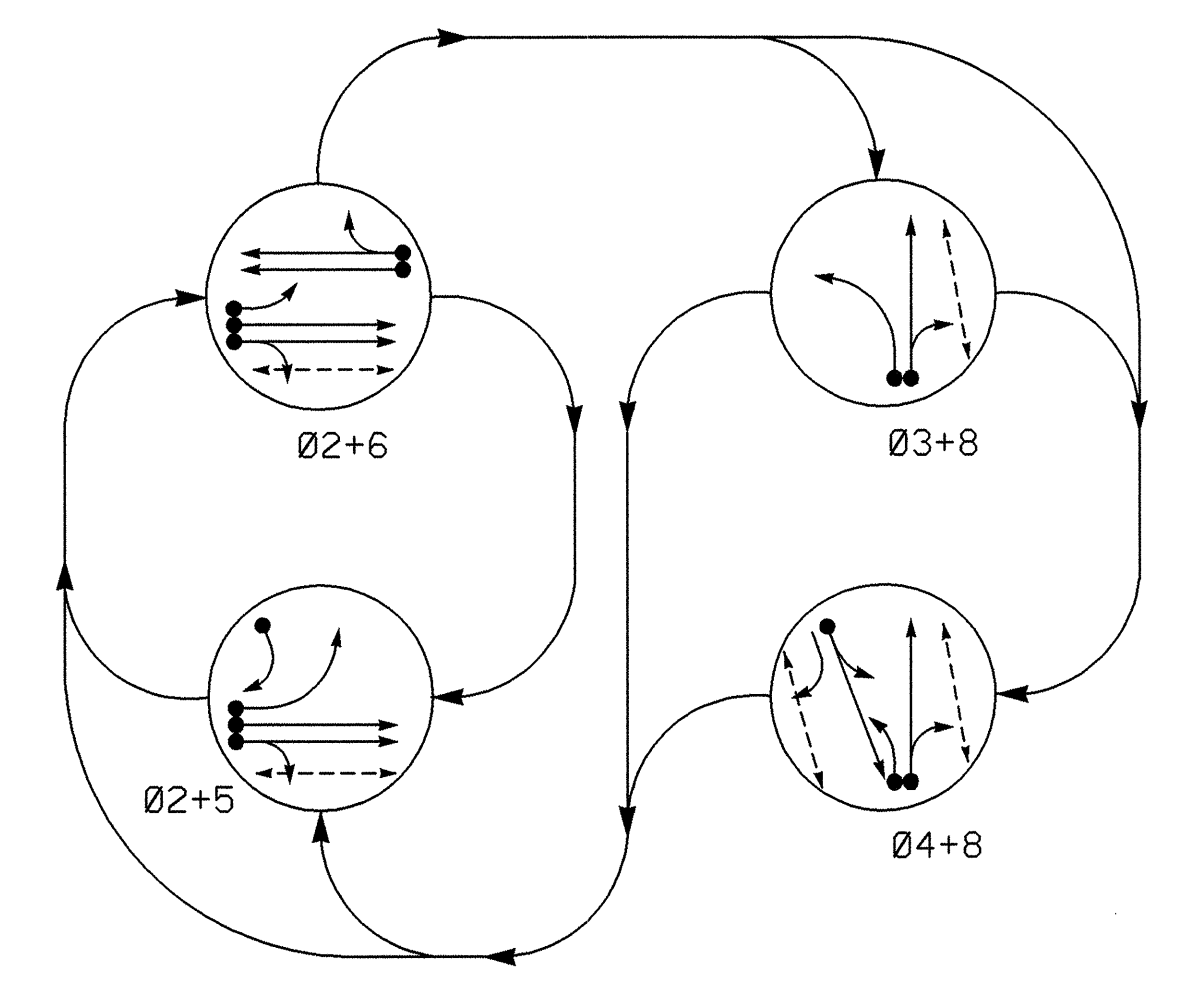
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 07983 HARVEY L. WINSTEAD, INC.

Signature: H. Winstead 11/3/06

SIG. INVENTORY NO. 13-1029

4 Phase Fully Actuated (Asheville Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

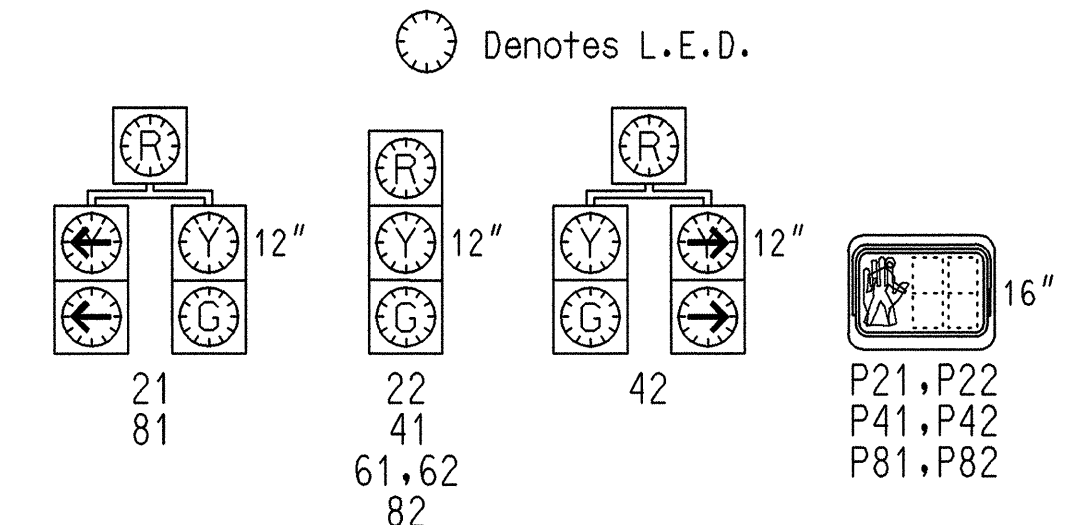
- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←○→ UNSIGNALIZED MOVEMENT
- ←○→ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø 2+5	Ø 2+6	Ø 3+8	Ø 4+8	PEDEST
21	G	R	R	Y	
22	G	R	R	Y	
41	R	R	G	R	
42	R	R	G	R	
61,62	R	G	R	Y	
81	R	R	G	R	
82	R	R	G	R	
P21,P22	W	W	DW	DRK	
P41,P42	DW	DW	W	DRK	
P81,P82	DW	DW	W	DRK	

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

Signal Face I.D.

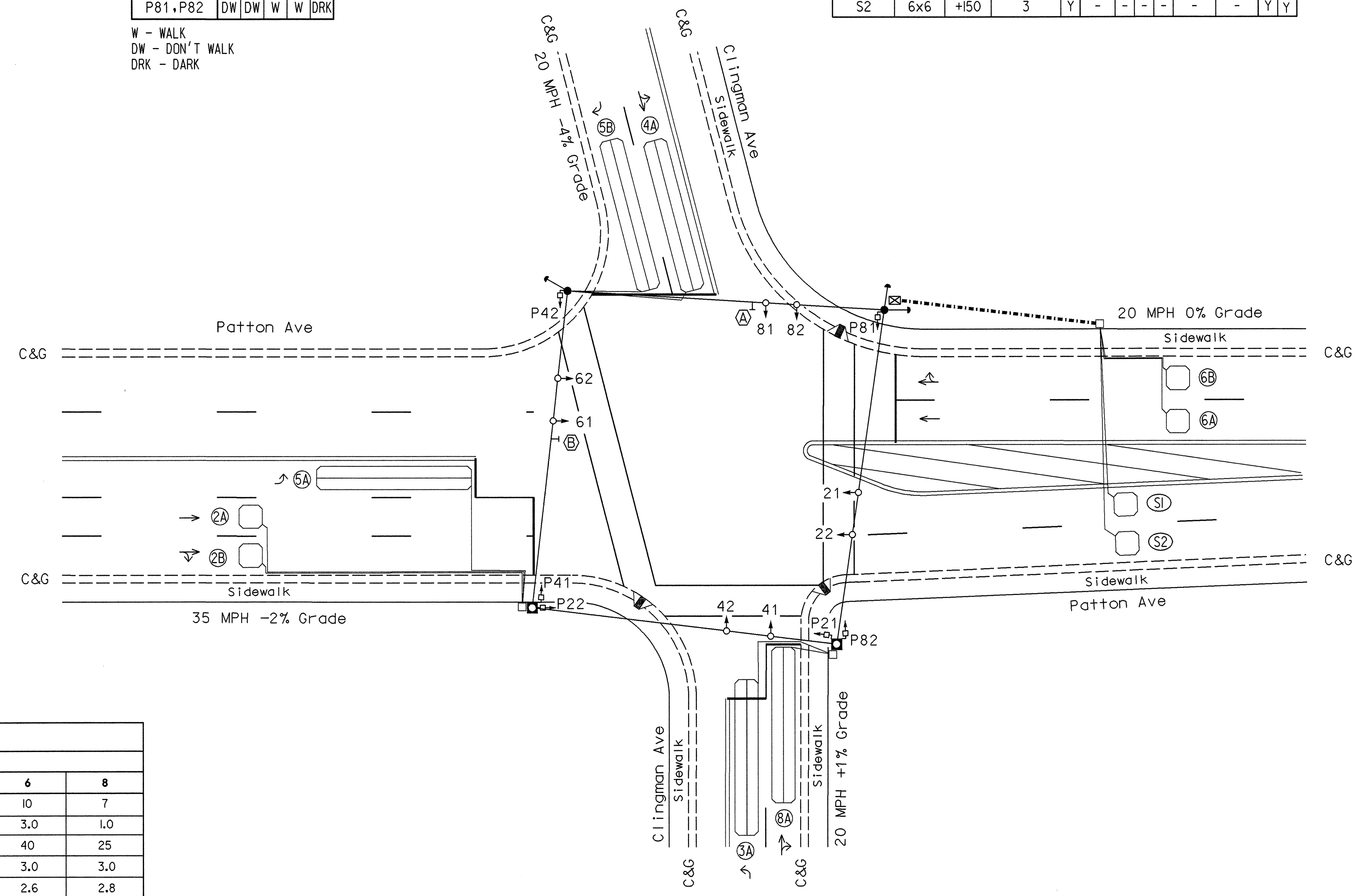


2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A,2B	6x6	70	5	Y	2	Y	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
5A	6x40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
5B	6x40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A,6B	6x6	70	4	Y	6	Y	Y	-	-	-	-	Y
8A	6x40	0	2-4-2	Y	8	Y	Y	-	-	10	-	Y
S1	6x6	+150	3	Y	-	-	-	-	-	-	-	Y
S2	6x6	+150	3	Y	-	-	-	-	-	-	-	Y

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Omit phase 3 during phase 4 on.
- Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 5 by progressing through an all red display.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Program controller to allow an Advance Walk movement before serving the vehicle phase.
- 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 #0263  
Master Asset #11312



Legend

- | Proposed   | Existing   |
|--|--|
| ○→ Traffic Signal Head                           | ●→ Traffic Signal Head                           |
| ○→ Modified Signal Head                          | N/A  |
| — Sign   | — Sign   |
| □ Pedestrian Signal Head With Push Button & Sign | □ Pedestrian Signal Head With Push Button & Sign |
| ○ Signal Pole with Guy                           | ○ Signal Pole with Guy                           |
| ○ Signal Pole with Sidewalk Guy                  | ○ Signal Pole with Sidewalk Guy                  |
| ⊗ Inductive Loop Detector                        | ⊗ Inductive Loop Detector                        |
| □ Controller & Cabinet                           | □ Controller & Cabinet                           |
| □ Junction Box                                   | □ Junction Box                                   |
| ----- 2-in underground conduit                   | ----- 2-in underground conduit                   |
| N/A Right of Way with Marker                     | —△— Right of Way with Marker                     |
| → Directional Arrow                              | → Directional Arrow                              |
| N/A Metal Pole                                   | □ Metal Pole                                     |
| N/A Wheelchair Ramp                              | ▲ Wheelchair Ramp                                |
| Ⓐ "Curved Left Arrow Only" Sign (R3-5L)          | N/A  |
| Ⓑ "No Left Turn" Sign (R3-2)                     | N/A  |

2070L TIMING CHART

FEATURE	PHASE					
	2	3	4	5	6	8
Min Green 1 *	10	7	7	7	10	7
Extension 1 *	3.0	2.0	1.0	2.0	3.0	1.0
Max Green 1 *	40	15	25	15	40	25
Yellow Clearance	4.0	3.0	3.0	3.0	3.0	3.0
Red Clearance	1.6	2.6	2.6	2.6	2.6	2.8
Red Revert	5.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	4	-	4	-	-	4
Don't Walk 1	8	-	16	-	-	14
Walk Advance **	3.0	-	3.0	-	-	3.0
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.  
\*\* See note 11.

Signal Upgrade

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

**Patton Ave at Clingman Ave**

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: T.R. Terrell  
PREPARED BY: N.M. Rodevick REVIEWED BY: S.T. Franklin

REVISIONS: \_\_\_\_\_ INIT. DATE

SCALE: 1"=20'

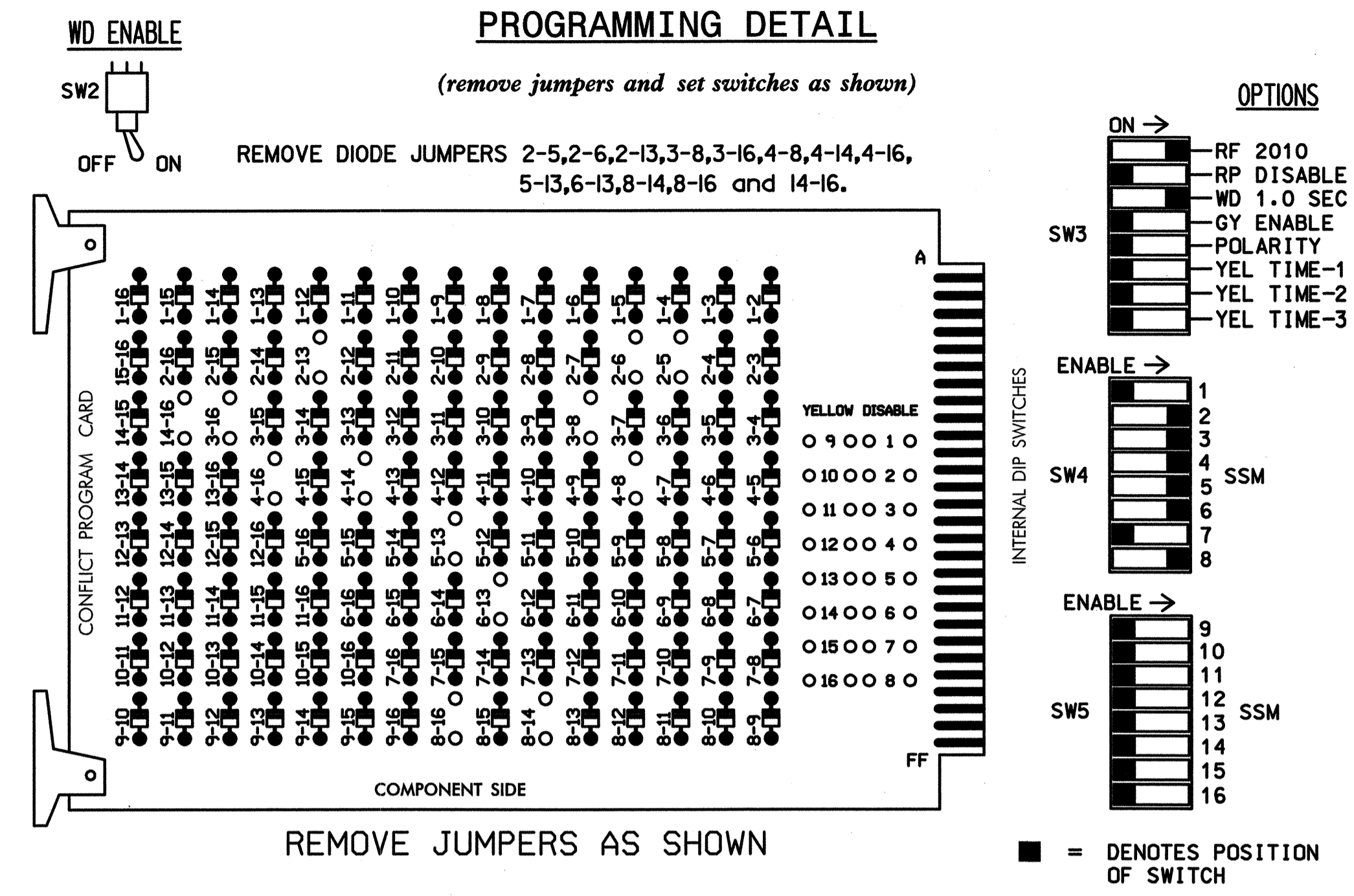
SEAL

SEAL 028657  
ENGINEER T. FRANKLIN

Signature: \_\_\_\_\_ DATE: 4/3/06

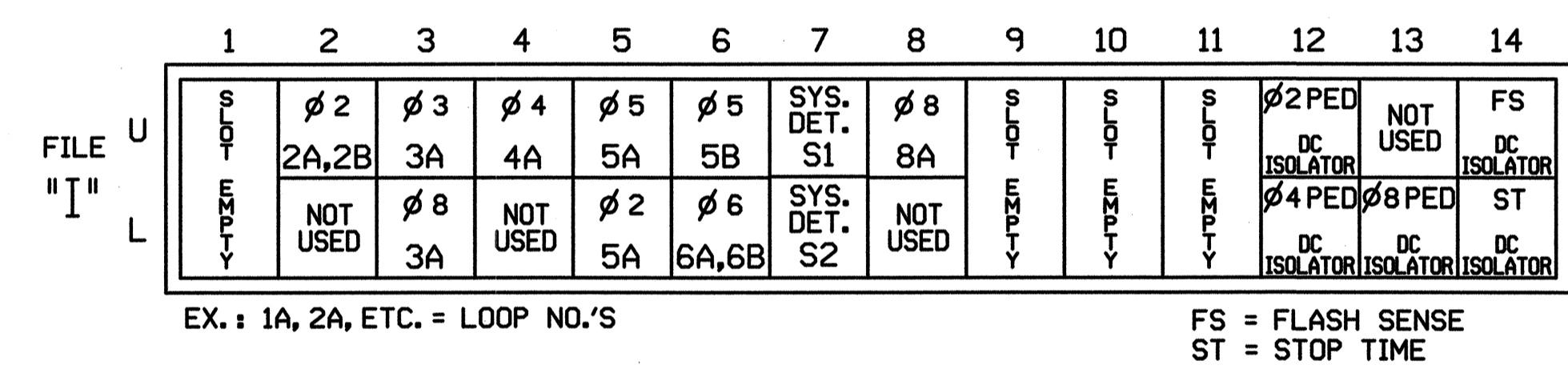
SIG. INVENTORY NO. 13-0263

**EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL**



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

**INPUT FILE POSITION LAYOUT (front view)**

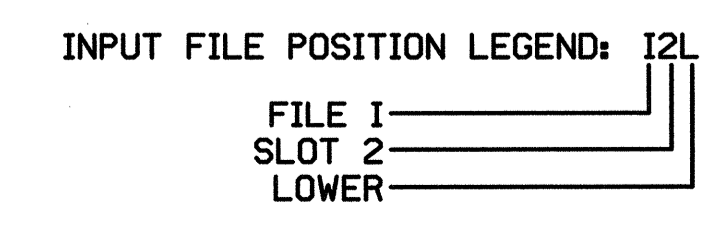


**INPUT FILE CONNECTION & PROGRAMMING CHART**

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	TB21-3,4	I2U	39	1	2	2	Y	Y	-	-	-
3A <sup>1</sup>	TB21-5,6	I3U	58	20	3	3	Y	Y	-	-	15
	TB23-5,6	I3L	49	11	24	8	Y	Y	-	-	-
4A	TB21-7,8	I4U	41	3	4	4	Y	Y	-	-	3
5A <sup>2</sup>	TB21-9,10	I5U	55	17	5	5	Y	Y	-	-	15
	TB23-9,10	I5L	48	10	26	2	Y	Y	-	-	-
5B	TB21-11,12	I6U	40	2	6	5	Y	Y	-	-	15
6A,6B	TB23-11,12	I6L	44	6	16	6	Y	Y	-	-	-
* S1	TB21-13,14	I7U	57	19	7	SYS					
* S2	TB23-13,14	I7L	50	12	28	SYS					
8A	TB22-1,2	I8U	42	4	8	8	Y	Y	-	-	10
PED PUSH BUTTONS											
P21,P22	TB22-9,10	I12U	67	29	PED 2	2 PED					
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					
P81,P82	TB24-11,12	I13L	70	32	PED 8	8 PED					

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

<sup>1</sup>ADD JUMPERS FROM TB21-5 TO TB23-5, AND FROM TB21-6 TO TB23-6.  
<sup>2</sup>ADD JUMPERS FROM TB21-9 TO TB23-9, AND FROM TB21-10 TO TB23-10.  
\* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.



**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 1,7,9,10, 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, and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

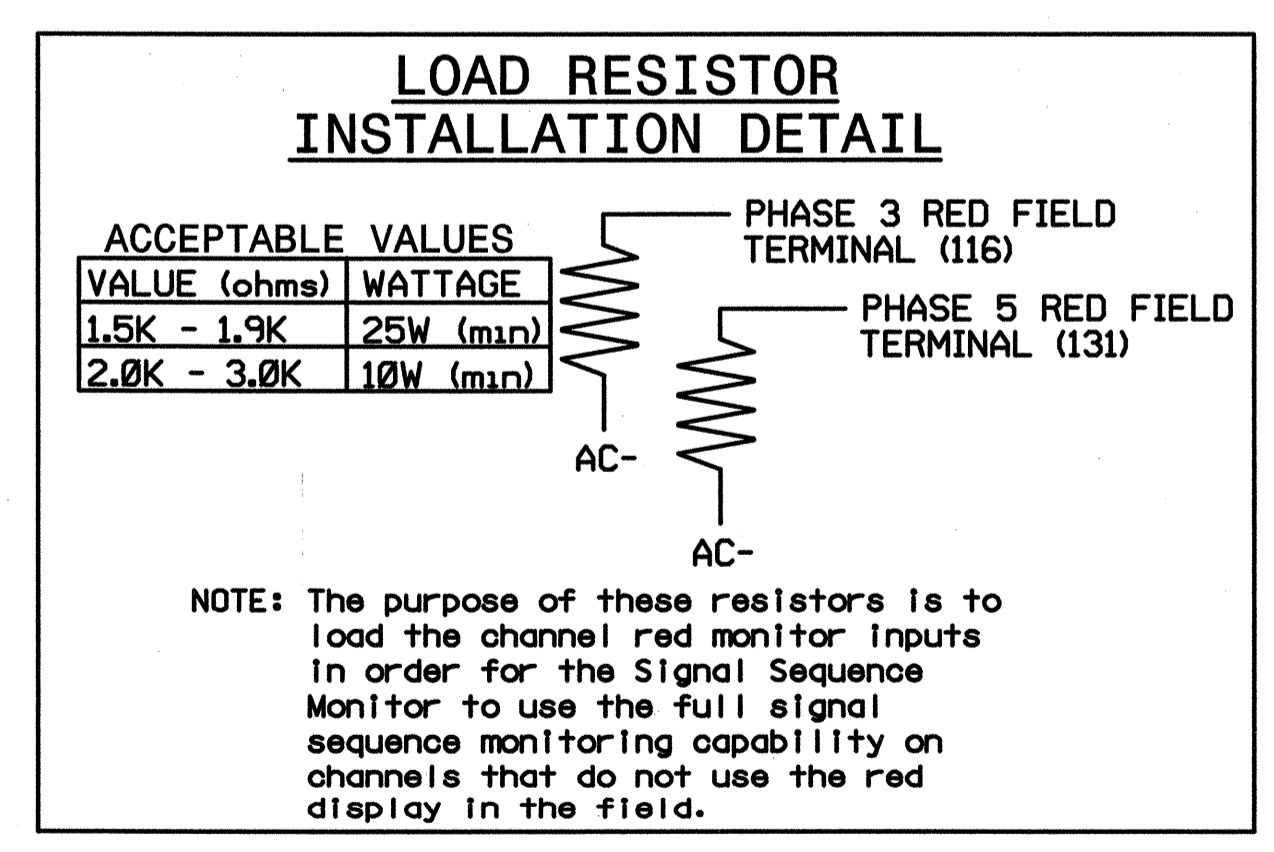
**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
CABINET.....CONTRACTOR SUPPLIED 336  
SOFTWARE.....ECONOLITE OASIS  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...12  
LOAD SWITCHES USED.....S2,S2P,S3,S4,S4P,S5,S6,S8,S8P  
PHASES USED.....2,3,4,5,6,8  
PEDS USED.....2,4,8  
OVERLAPS.....NONE

**BACKUP PROTECTION NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 2 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0263  
DESIGNED: August 2005  
SEALED: 11/03/06  
REVISED:

**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	81	41,42	P41, P42	21	42	61,62	NU	81,82	P81, P82
RED		128		*	101		*		134			107
YELLOW		129			102				135			108
GREEN		130			103				136			109
RED ARROW												
YELLOW ARROW					117		132	132				
GREEN ARROW					118		133	133				
Hand icon					113		104					110
Person icon					115		106					112

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

**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2, 4 and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**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.

**DYNAMIC BACK-UP CONTROL PROGRAMMING**

- (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 Dynamic/Backup Control Function 1.
  - From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

DYNAMIC/BACKUP CONTROL FUNCTION #01  
OVERLAPS: ABCDEFGHIJKLMNP  
IF OVERLAPS ARE ACTIVE  
OR PHASES: 12345678910111213141516  
IF PHASES ARE ON: X  
OMIT PHASES: X  
CALL PHASES: X

BACKUP PROTECTION PROGRAMMING COMPLETE

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Patton Ave  
at  
Clingman Ave

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick  
PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

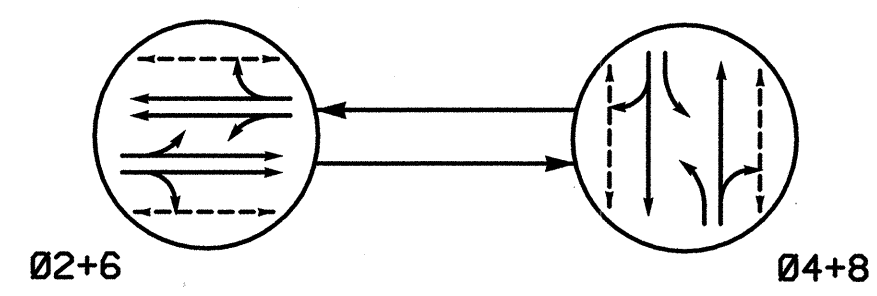
REVISIONS INIT. DATE

11/3/06

SIG. INVENTORY NO. 13-0263

2 Phase  
Pretimed  
(Asheville Signal System)

PHASING DIAGRAM



**PHASING DIAGRAM DETECTION LEGEND**

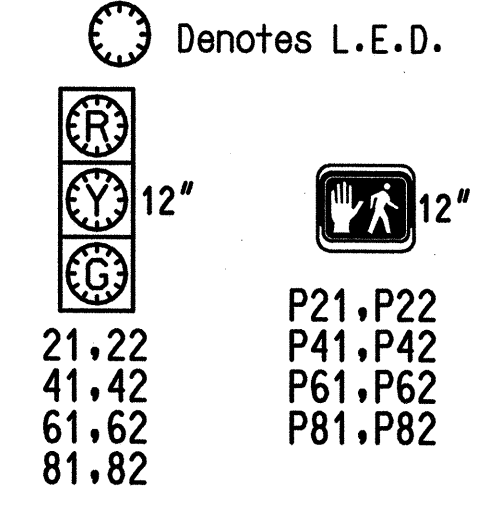
- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←○→ UNSIGNALIZED MOVEMENT
- ←○→ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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

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

Signal Face I.D.

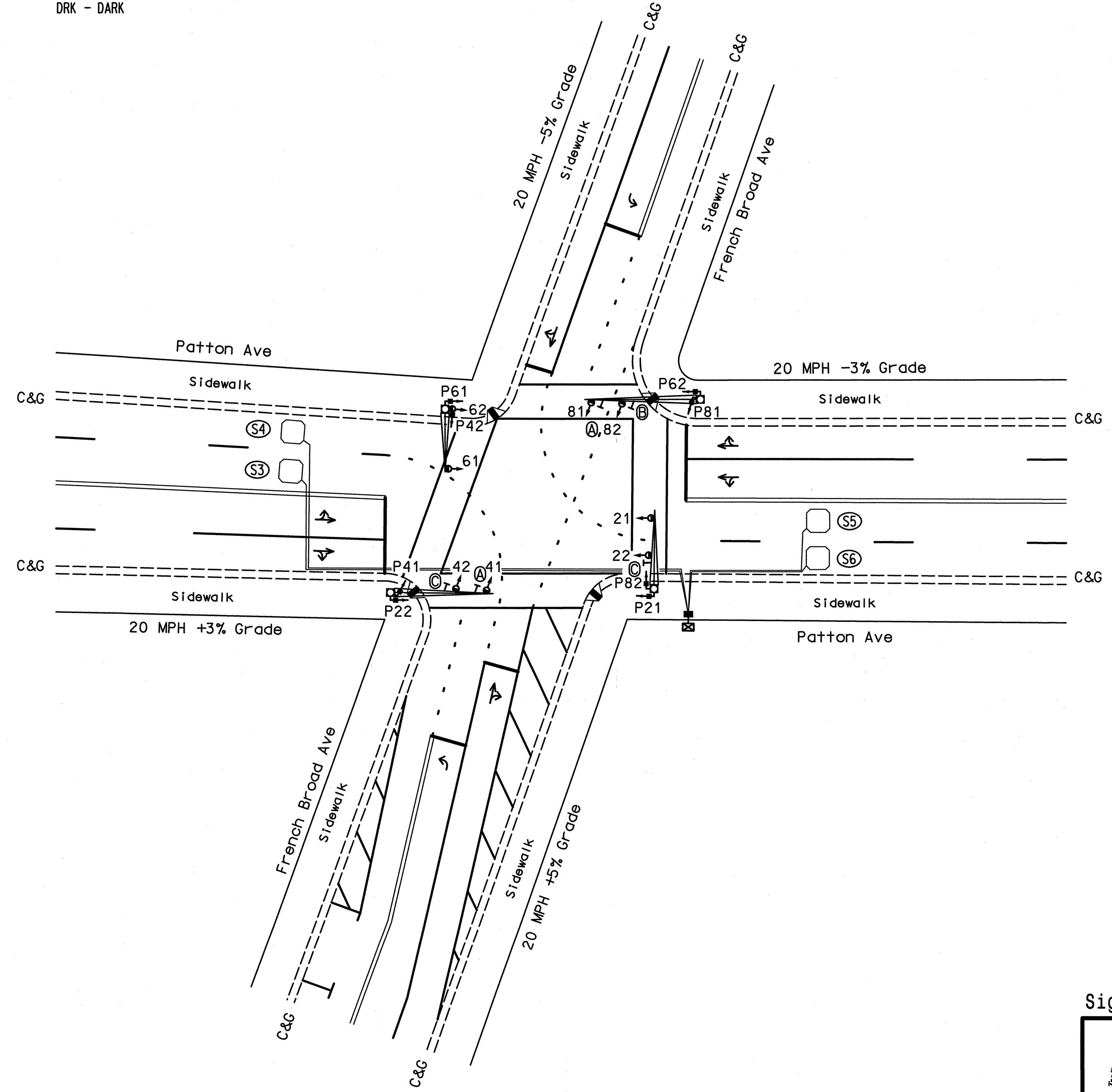


2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	PULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
S3	6x6	+100	4	Y	-	-	-	-	-	-	Y	Y
S4	6x6	+100	4	Y	-	-	-	-	-	-	Y	Y
S5	6x6	+150	3	Y	-	-	-	-	-	-	Y	Y
S6	6x6	+150	3	Y	-	-	-	-	-	-	Y	Y

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Existing "Left Turn Yield on Green" sign(s)-(R10-12) may be removed at the discretion of the City of Asheville Traffic Engineer.
- Pavement markings are existing.
- Program controller to allow an Advance Walk movement before serving the vehicle phase.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the maximum walk duration available within green time.
- Closed loop system data:  
Controller Asset #5111



**2070L TIMING CHART**

FEATURE	PHASE			
	2	4	6	8
Min Green 1*	10	7	10	7
Extension 1*	0.0	0.0	0.0	0.0
Max Green 1*	30	20	30	20
Yellow Clearance	3.0	3.1	3.0	3.0
Red Clearance	2.3	2.4	2.3	2.4
Walk 1*	21	11	24	11
Don't Walk 1	9	9	6	9
Walk Advance**	3.0	3.0	3.0	3.0
Seconds Per Actuation*	-	-	-	-
Max Variable Initial*	-	-	-	-
Time Before Reduction*	-	-	-	-
Time To Reduce*	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX/PED RECALL	MAX/PED RECALL	MAX/PED RECALL	MAX/PED RECALL
Vehicle Call Memory	-	-	-	-
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. Use the maximum walk duration available within the green time.  
\*\* See note 6.

**Legend**

Proposed	Existing
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	○ → N/A
⊥ Sign	⊥
⊥ Pedestrian Signal Head	⊥
○ → Signal Pole with Guy	● →
○ → Signal Pole with Sidewalk Guy	● →
▭ Inductive Loop Detector	▭
⊠ Controller & Cabinet	⊠
□ Junction Box	□
----- 2-in underground conduit	-----
N/A Right of Way with Marker	—△—
→ Directional Arrow	→
N/A Metal Pole with Mast Arm	⊥
N/A Wheelchair Ramp	▲
N/A "LEFT TURN YIELD ON GREEN" Sign (R10-12)	⊙
N/A "NO TURN ON RED" Sign (R10-11a)	⊕
N/A "NO TURN ON RED" Sign (R10-11)	⊙

Signal Upgrade

Patton Ave  
at  
French Broad Ave

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: T.R. Terrell

PREPARED BY: K.H. Ide REVIEWED BY: S.T. Franklin

SEAL

SEAL 028657

SCALE: 0 20  
1"=20'

REVISIONS: \_\_\_\_\_ INIT. DATE

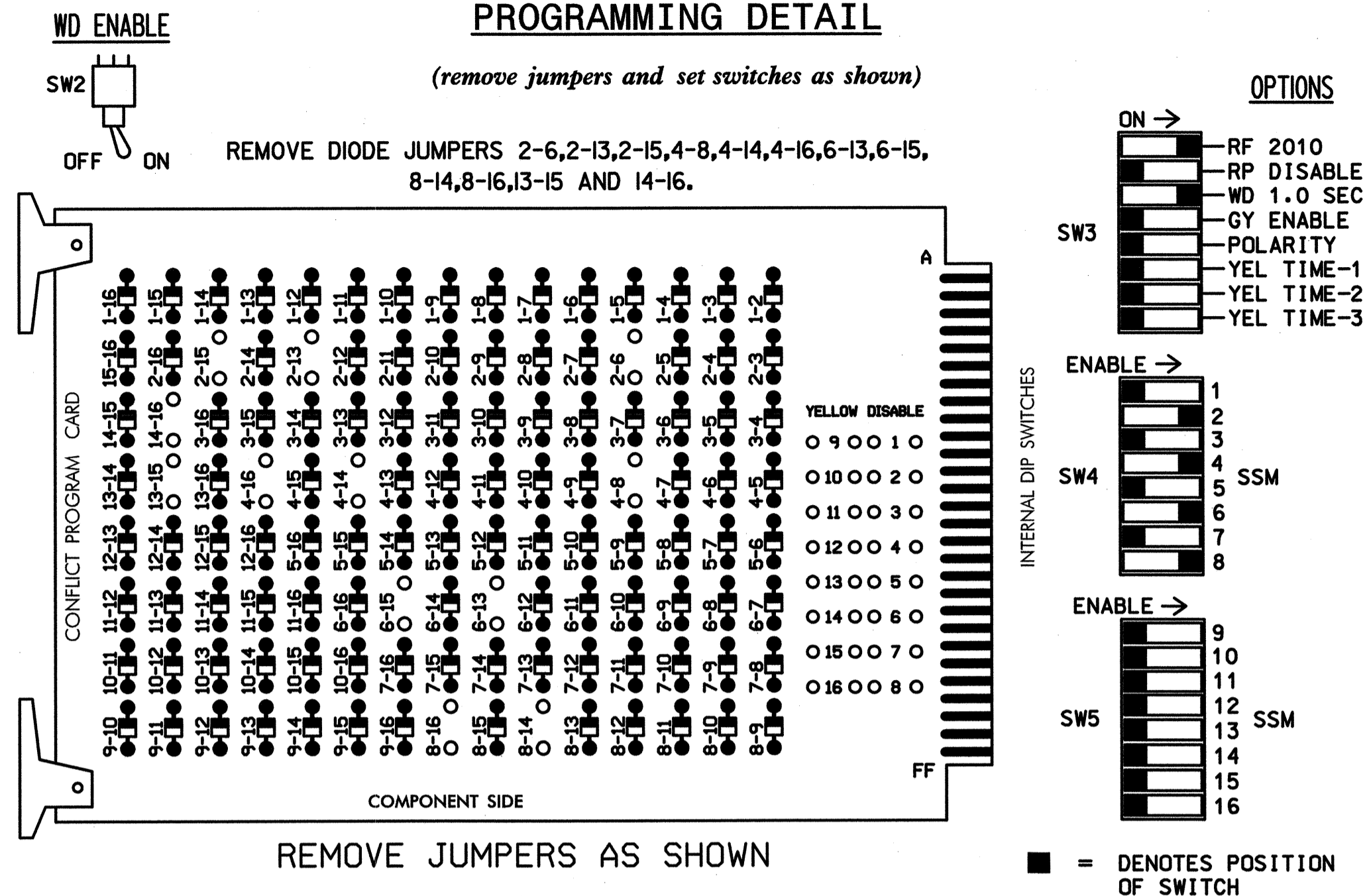
SIGNATURE: \_\_\_\_\_ DATE: 11-3-06

INVENTORY NO. COA 1-11



EDI MODEL 2010ECL CONFLICT MONITOR

PROGRAMMING DETAIL



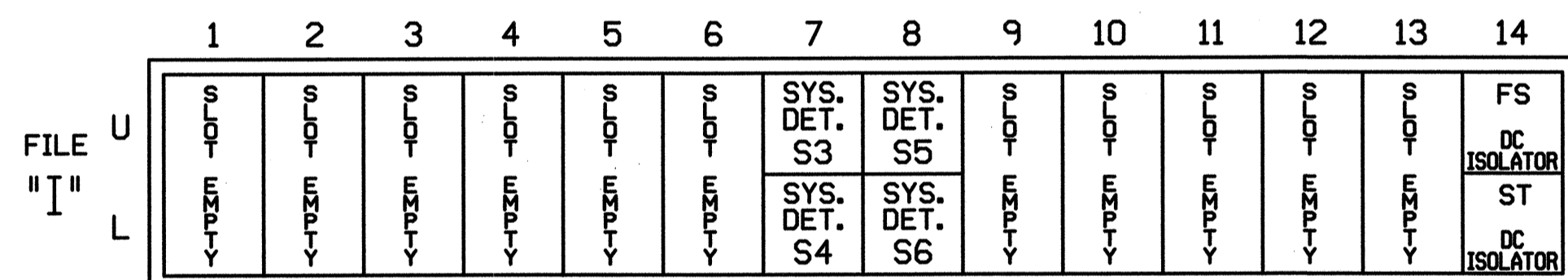
REMOVE JUMPERS AS SHOWN

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE  
ST = STOP TIME

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 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- Program the controller to time the maximum walk duration available during green time.
- The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon			113			104			119			110
Walker icon			115			106			121			112

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
CABINET.....CONTRACTOR SUPPLIED 336  
SOFTWARE.....ECONOLITE OASIS  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...12  
LOAD SWITCHES USED.....S2,S2P,S4,S4P,S6,S6P,S8,S8P  
PHASES USED.....2,4,6,8  
PEDS USED.....2,4,6,8  
OVERLAPS.....NONE

ADVANCED WALK PROGRAMMING NOTE

(program controller as shown below)

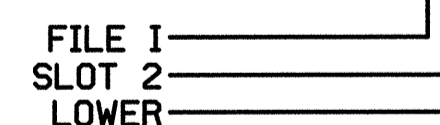
From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2, 4, 6, and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

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
* S3	TB21-13,14	I7U	57	19	7	SYS					
* S4	TB23-13,14	I7L	50	12	28	SYS					
* S5	TB22-1,2	I8U	42	4	8	SYS					
* S6	TB24-1,2	I8L	46	8	18	SYS					

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

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-11  
DESIGNED: August 2005  
SEALED: 11/03/06  
REVISED:

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Patton Ave  
at  
French Broad Ave

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.W. Rodevick

PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

REVISIONS INIT. DATE

122 N. McDowell St., Raleigh, NC 27603

HNTB HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

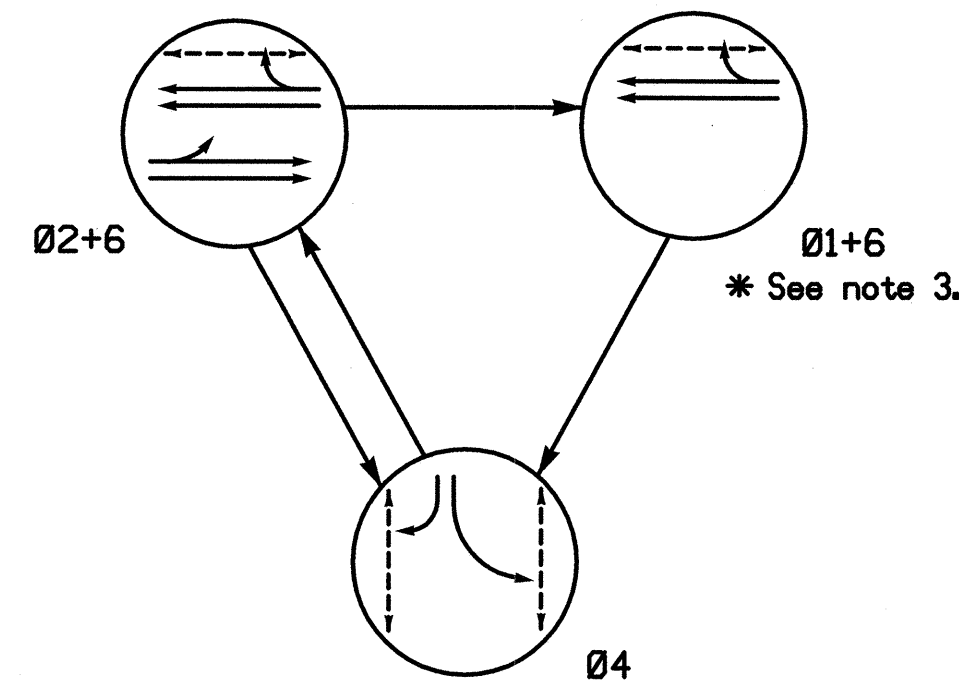
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 07983 HAYLEY L. WINSTEAD, PE

Signature: H. Winstead / 11/3/06

SIG. INVENTORY NO. COA 1-11

3 Phase  
Pretimed  
(Asheville Signal System)

PHASING DIAGRAM



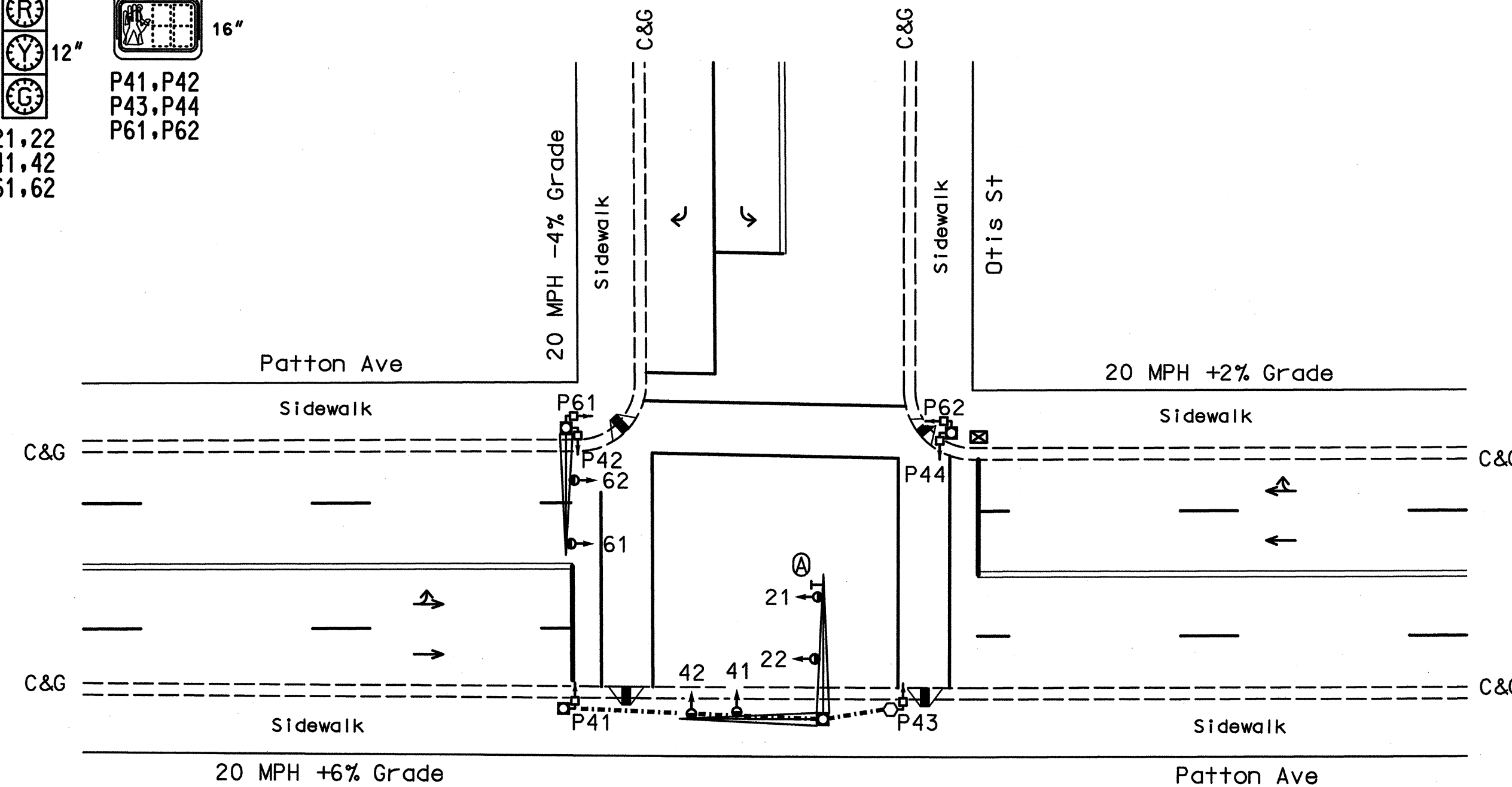
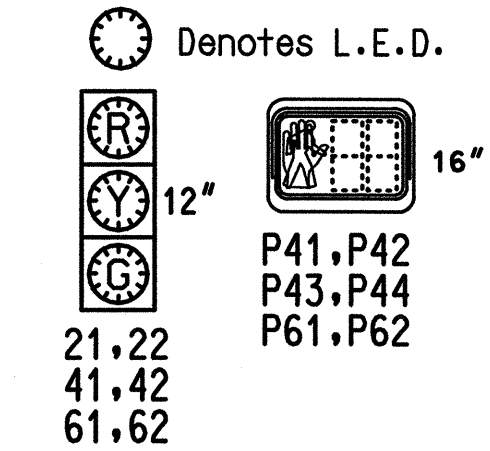
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	Ø 2 + 6	Ø 1 + 6	Ø 4	F L C O U R
21,22	G	R	R	Y
41,42	R	R	G	R
61,62	G	G	R	Y
P41,P42	DW	DW	W	DRK
P43,P44	DW	DW	W	DRK
P61,P62	W	W	DW	DRK
Sign "A"	OFF	ON	OFF	OFF

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

Signal Face I.D.



NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Phase 1 is only allowed during the PM peak period.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Program controller to allow an Advance Walk Movement before serving the vehicle phase.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the maximum walk duration available within green time.
- Closed loop system data:  
Controller Asset #5110

FEATURE	PHASE			
	1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	0.0	0.0	0.0	0.0
Max Green 1 *	15	30	20	30
Yellow Clearance	3.0	3.0	3.0	3.0
Red Clearance	2.1	2.1	2.3	2.1
Walk 1 *	-	-	11	20
Don't Walk 1	-	-	9	10
Walk Advance **	-	-	3.0	3.0
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX RECALL	MAX RECALL	MAX/PED RECALL	MAX/PED RECALL
Vehicle Call Memory	-	-	-	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

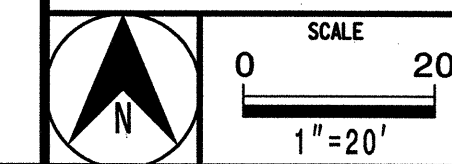
\* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 2 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds. Use the maximum walk duration available within the green time.  
\*\* See note 7.

Proposed	Existing
○ → Traffic Signal Head	● → Modified Signal Head
⊥ Sign	⊥ N/A
⊥ Pedestrian Signal Head	⊥
○ → Signal Pole with Guy	● → Signal Pole with Sidewalk Guy
⊔ Inductive Loop Detector	⊔
⊠ Controller & Cabinet	⊠
□ Junction Box	■
⋯ 2-in underground conduit	⋯
N/A Right of Way with Marker	⊔
→ Directional Arrow	→
N/A Metal Pole with Mast Arm	⊔
N/A Metal Street Light Pole	⊔
N/A Wheelchair Ramp	⊔
○ Pedestrian Signal Pedestal	●
N/A "Oncoming Traffic Has Extended Green" LED Blankout Sign (W25-1)	⊠

Signal Upgrade

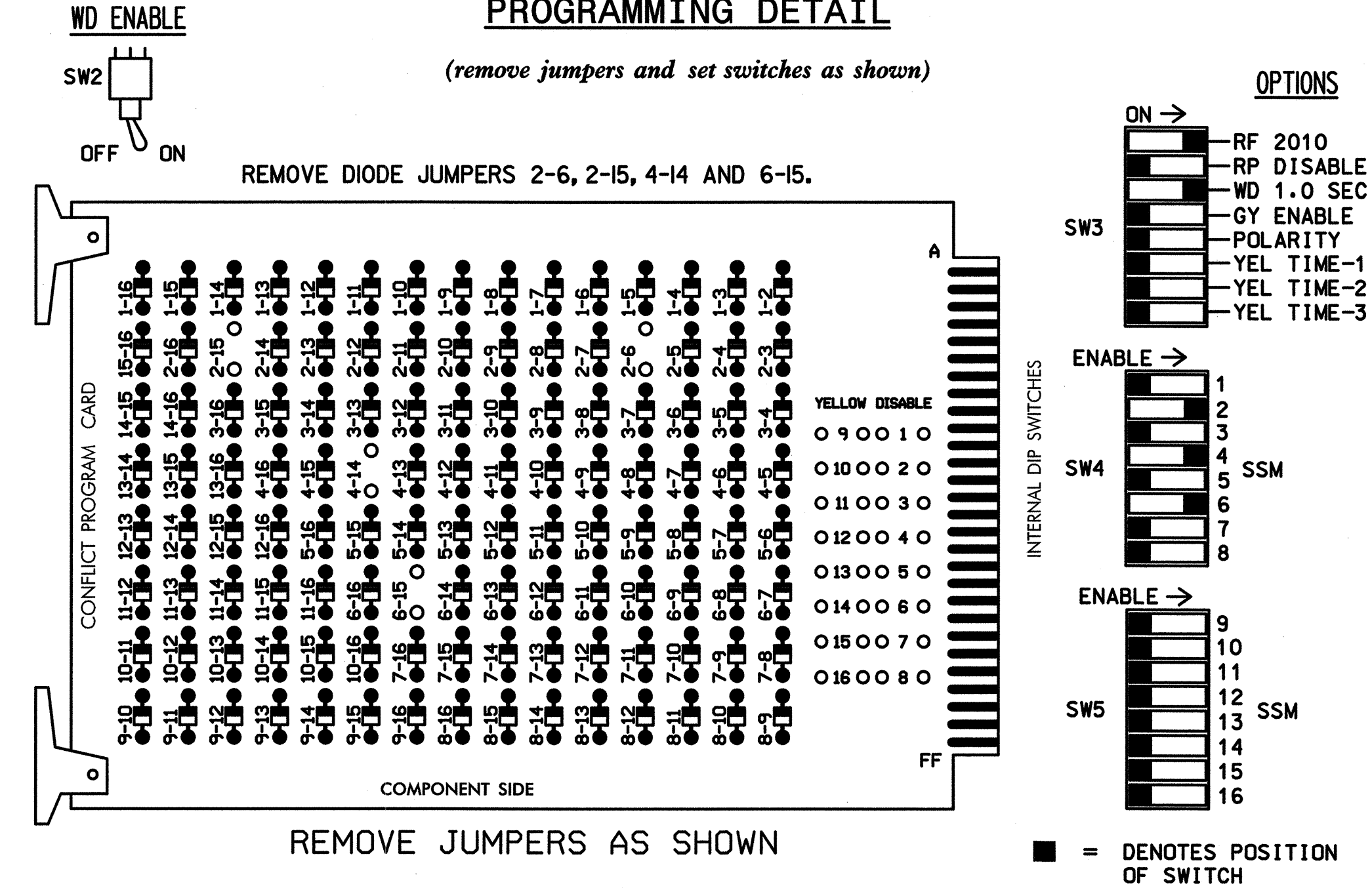
	Patton Ave at Otis St		
	Division 13 Buncombe County Asheville PLAN DATE: August 2005 REVIEWED BY: N.W. Rodevick PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin	REVISIONS: _____ INITI: _____ DATE: _____ SIGNATURE: _____ DATE: _____	

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609



**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**



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

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5,7,8, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 6 for 'STARTUP PED CALL'.
6. Program the controller to time the maximum walk duration available during green time.
7. The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**EQUIPMENT INFORMATION**

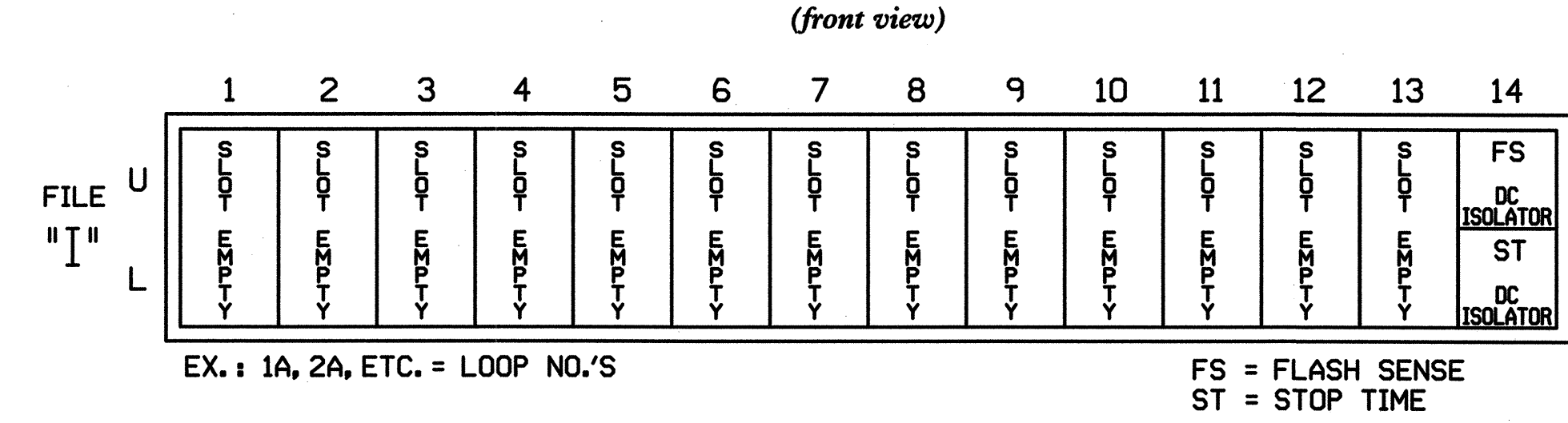
CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES 6PUSED....S2,S4,S4P,S6,S6P  
 PHASES USED.....1,2,4,6  
 PEDS USED.....4,6  
 OVERLAPS.....NONE

**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.	NC	21,22	NU	NU	41,42	P41,P42 P43,P44	NU	61,62	P61, P62	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
						104			119			
						106			121			

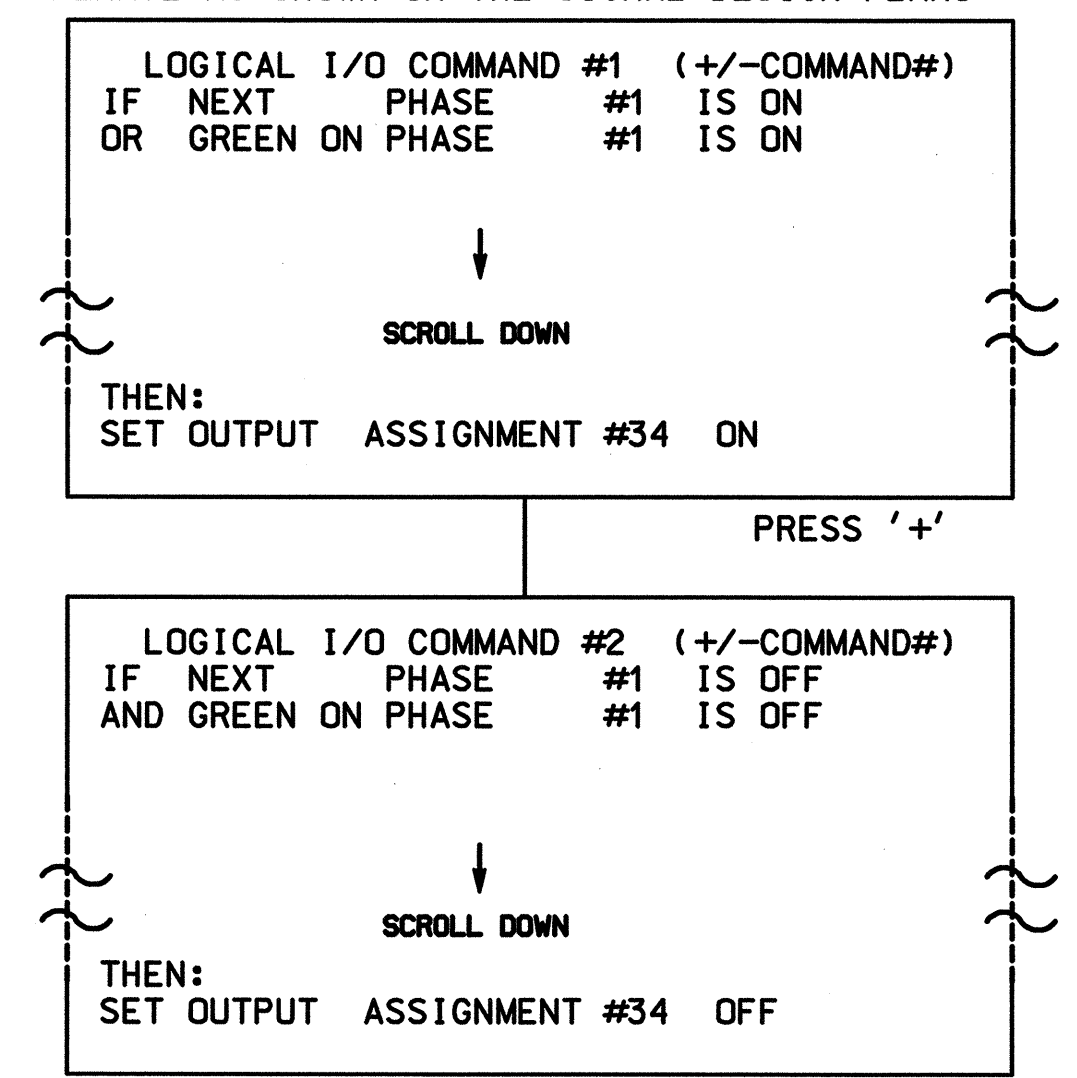
NC = Not Connected. Used for timing purposes only.  
 NU = Not Used

**INPUT FILE POSITION LAYOUT**



**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL FOR BLANKOUT SIGN CONTROL**

- (program controller as shown below)
1. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).
  2. THE PROGRAMMING SHOWN BELOW IS NECESSARY FOR SIGN (A) TO OPERATE AS SHOWN ON THE SIGNAL DESIGN PLANS.



3. FROM MAIN MENU PRESS '2' (PHASE CONTROL) THEN '1' (PHASE CONTROL FUNCTIONS).
4. SCROLL DOWN TO (ACT LOGIC 1-16) AND ENABLE 1,2. (programming complete)

**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)  
 From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 4 and 6 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**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: COA 1-10  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**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	0	0	0	0
2	0	0	0	0	0	0
4	0	0	0	0	0	0

Signal Upgrade (Sheet 1 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Patton Ave  
 at  
 Otis St

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick  
 PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

REVISIONS: INIT. DATE

HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

122 N. McDowell St., Raleigh, NC 27603

11/3/06  
 H.L. Winstead  
 SIGNATURE DATE

SIG. INVENTORY NO. COA 1-10

**EVENT SCHEDULING PROGRAMMING DETAIL**

*(program controller as shown below)*

**\*\* THE TIMES MAY BE MODIFIED BY THE CITY OF ASHEVILLE.**

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO OMIT PHASE AND SELECT PHASE 1.
2. BACKUP TO MAIN MENU BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
3. FROM MAIN MENU PRESS 'B' (SCHEDULING).

```

SCHEDULE EVENT #1      NOT ASSIGNED *
START DATE (MM/DD).....01/01
END DATE (MM/DD).....12/31
START TIME (HH:MM).....16:00
STOP TIME (HH:MM).....18:00
DOW   |SUN MON TUE WED THU FRI SAT
ENABLED | X  X  X  X  X  X
EVENT GROUPS |12345678910111213141516
ASSIGNED
DELETE EVENT WHEN COMPLETED?.....N
CONTINUOUS EVENT?.....N
INVERT EVENT?.....Y
SELECT 1 EVENT TYPE:
EVENT GROUP (1-16).....
PLAN (65=FLSH,66=FREE)... OFFSET#....
PLAN PRIORITY:  LOW_  MED_  HIGH_
CHANGE PHASE SEQUENCE PAGE (1-12)....
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)....
.
.
.
OVERRIDE PHASE CONTROL FUNCTION?....Y
  
```

THIS WILL INVERT/ DISABLE THE PHASE #1 OMIT SELECTED BELOW. IN EFFECT THE PHASE OMIT IS OVERRIDEN DURING THE HOURS/ DAYS SELECTED.

WHEN A 'Y' IS ENTERED FOR 'OVERRIDE PHASE CONTROL FUNCTION?' YOU WILL BE PROMPTED TO 'SELECT PHASES FROM 1 CONTROL FUNCTION.' SELECT PHASE #1 FOR OMIT PHASE.


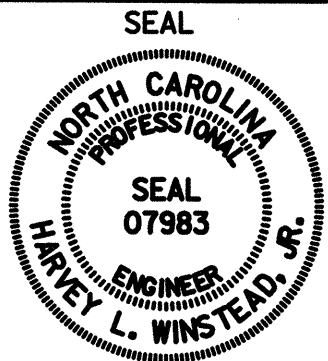
EVENT SCHEDULING PROGRAMMING COMPLETE

\* AFTER PROGRAMMING THIS SPACE WILL READ 'OMIT PHASE.'

THIS ELECTRICAL DETAIL IS FOR  
 THE SIGNAL DESIGN: COA 1-10  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

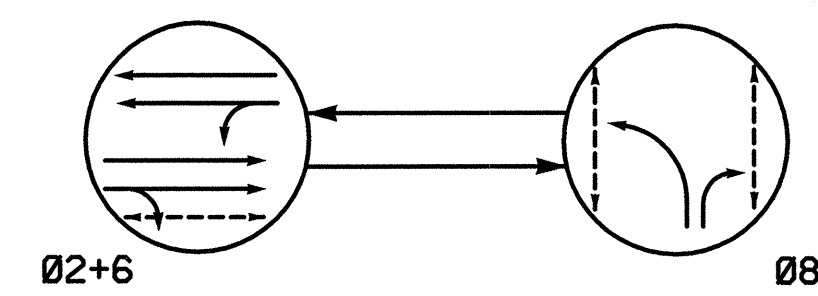
Signal Upgrade (Sheet 2 of 2)

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

 122 N. McDowell St., Raleigh, NC 27603	Patton Ave at Otis St Asheville, NC		
	Division 13 Buncombe County	Asheville	
PREPARED BY: T.R. Terrell	REVIEWED BY: H.L. Winstead	REVIEWED BY: H.L. Winstead	REVIEWED BY: H.L. Winstead
REVISIONS	INIT.	DATE	SIGNATURE
_____	_____	_____	H.L. Winstead 11/3/06
_____	_____	_____	DATE
_____	_____	_____	SIG. INVENTORY NO. COA 1-10

2 Phase  
Pretimed  
(Asheville Signal System)

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

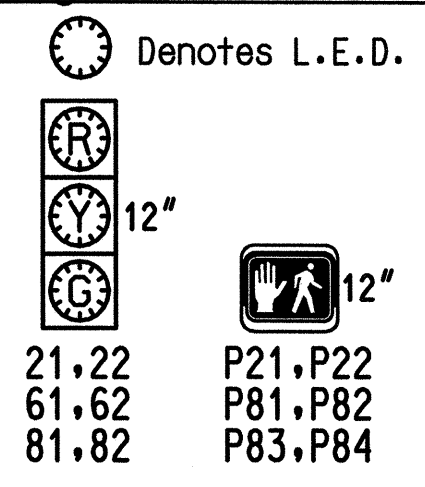
- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- ←- - -> PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

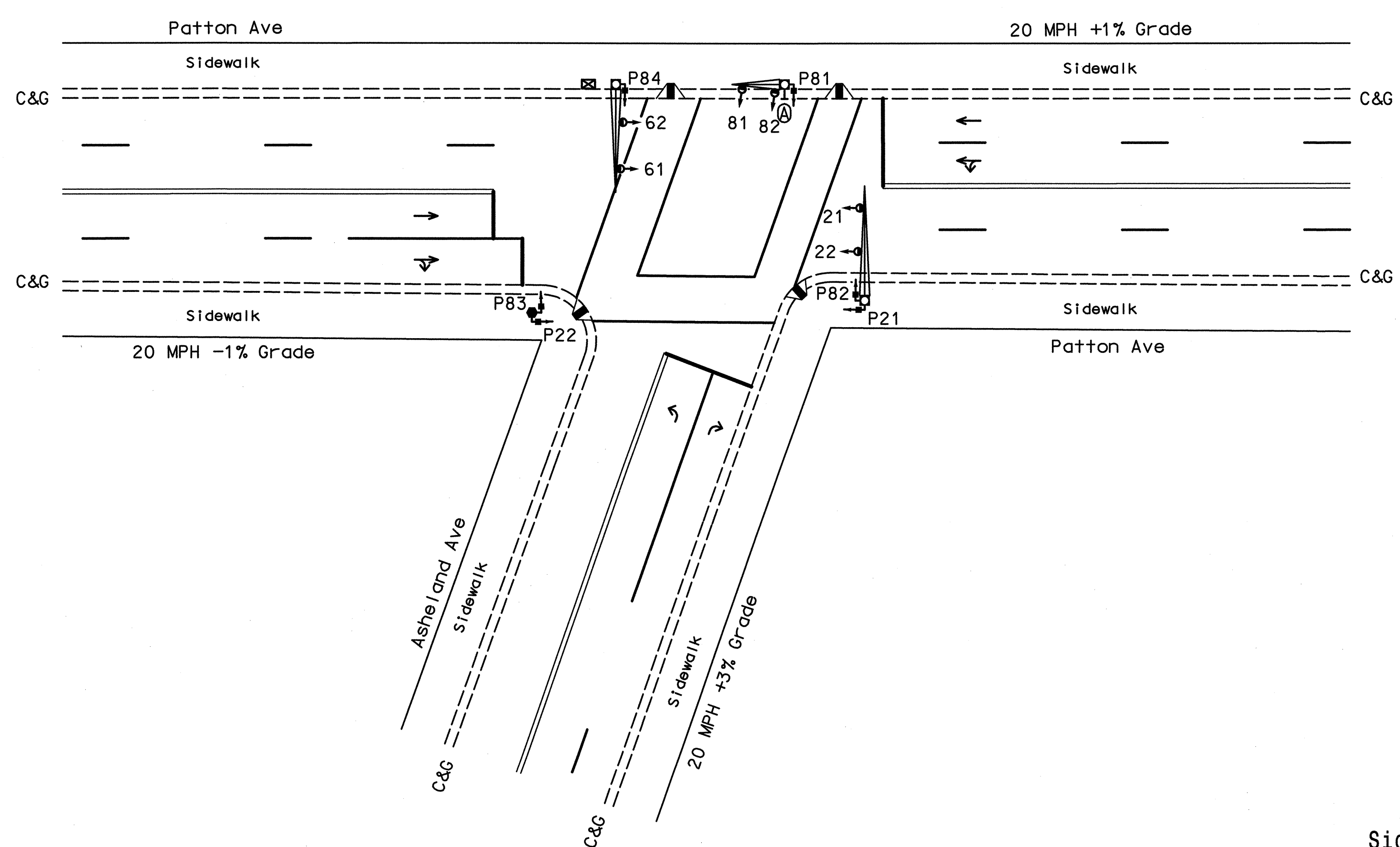
SIGNAL FACE	PHASE		
	Ø2+6	Ø8	Ø12
21,22	G	R	Y
61,62	G	R	Y
81,82	R	G	R
P21,P22	W	DW	DRK
P81,P82	DW	W	DRK
P83,P84	DW	W	DRK

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

**Signal Face I.D.**



- NOTES**
- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
  - Do not program signal for late night flashing operation unless otherwise directed by the engineer.
  - Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
  - Pavement markings are existing.
  - Program controller to allow an Advance Walk Movement before serving the vehicle phase.
  - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the maximum walk duration available within green time.
  - Closed loop system data:  
Controller Asset #5109



**2070L TIMING CHART**

FEATURE	PHASE		
	2	6	8
Min Green 1 *	10	10	7
Extension 1 *	0.0	0.0	0.0
Max Green 1 *	30	30	20
Yellow Clearance	3.0	3.0	3.0
Red Clearance	2.3	1.8	1.6
Walk 1 *	21	-	13
Don't Walk 1	9	-	7
Walk Advance **	3.0	0.0	3.0
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MAX/PED RECALL	MAX RECALL	MAX/PED RECALL
Vehicle Call Memory	-	-	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds. Use the maximum walk duration available within the green time.  
\*\* See note 5.

**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	● Signal Pole with Guy
○ Signal Pole with Sidewalk Guy	● Signal Pole with Sidewalk Guy
⊃ Inductive Loop Detector	⊃ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Controller & Cabinet
□ Junction Box	□ Junction Box
----- 2-in underground conduit	----- 2-in underground conduit
N/A Right of Way with Marker	△ Right of Way with Marker
→ Directional Arrow	→ Directional Arrow
N/A Pedestrian Signal Pedestal	● Pedestrian Signal Pedestal
N/A Wheelchair Ramp	▲ Wheelchair Ramp
N/A Metal Pole with Mast Arm	⊃ Metal Pole with Mast Arm
N/A Yield To When Turning Sign	⊙ Yield To When Turning Sign

**Signal Upgrade**

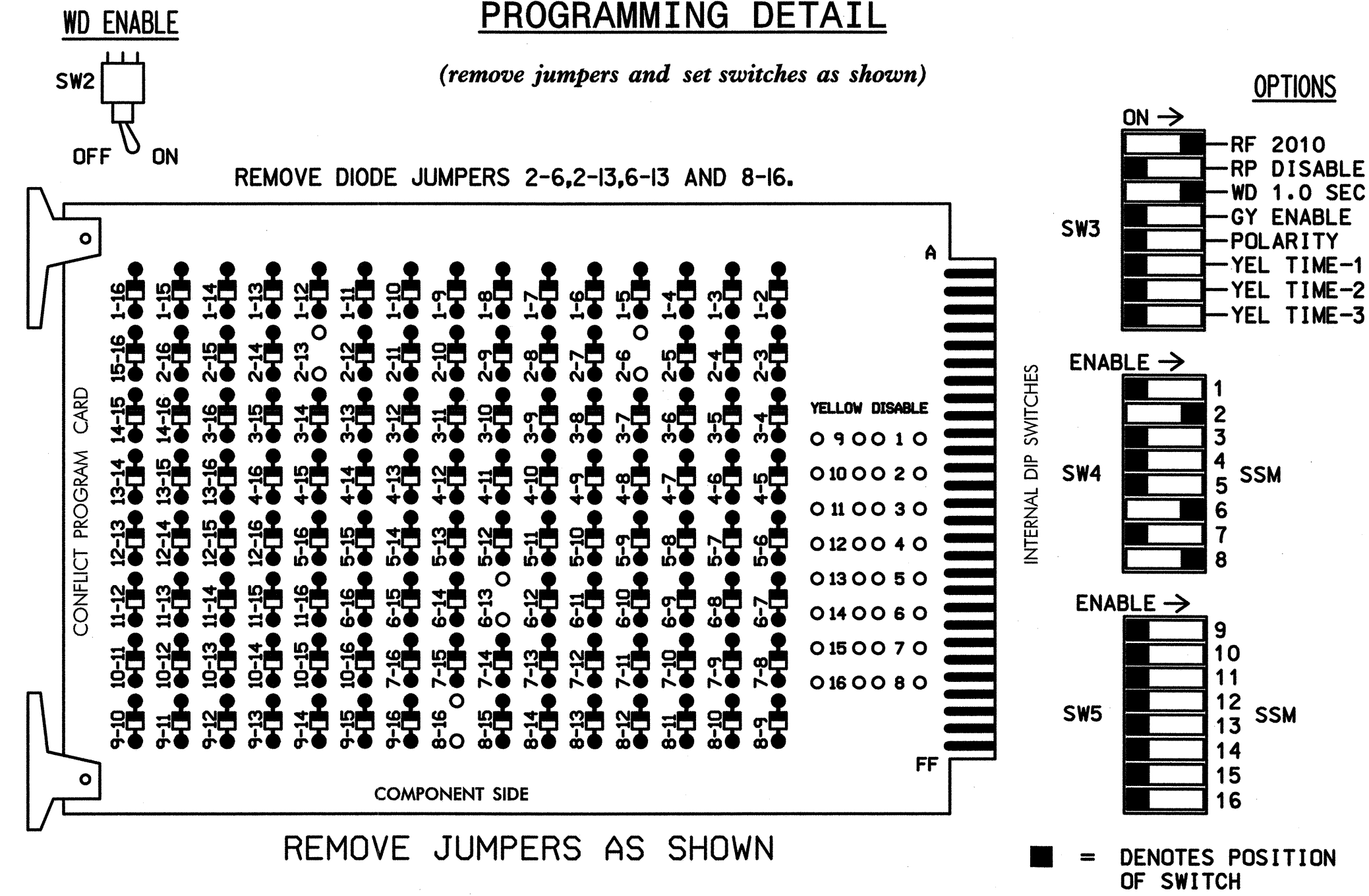
	<b>Patton Ave at Asheland Ave</b>		
	Division 13    Buncombe County    Asheville	PLAN DATE: August 2005    REVIEWED BY: T.R. Terrell	
PREPARED BY: J.M. Bryan		REVIEWED BY: S.T. Franklin	
REVISIONS	INIT.	DATE	SIGNATURE: <i>Spencer T. Franklin</i> 11-3-06
SCALE: 1" = 20'			SIG. INVENTORY NO. COA 1-09

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)

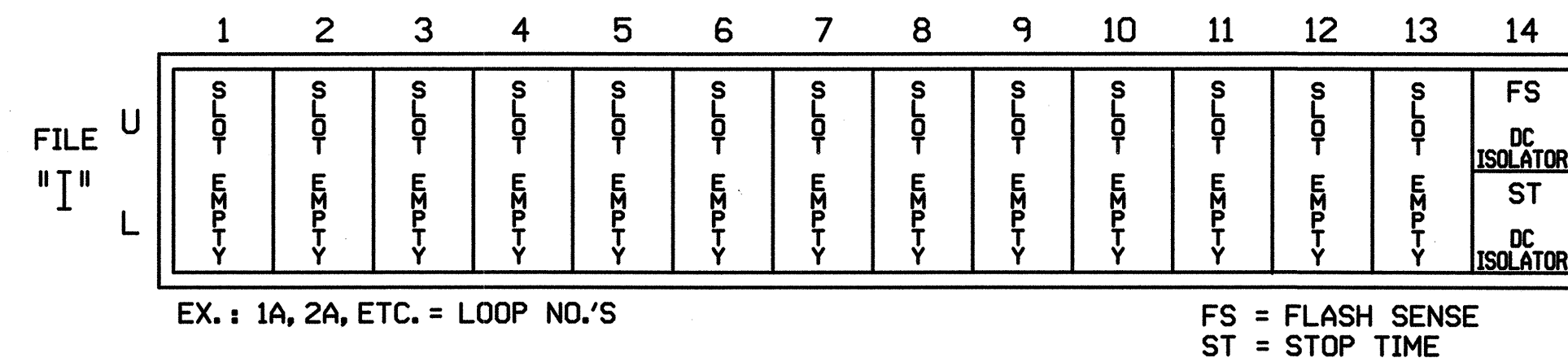


**NOTES:**

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

**INPUT FILE POSITION LAYOUT**

(front view)



**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2 and 8 for 'STARTUP PED CALL'.
6. Program the controller to time the maximum walk duration available during green time.
7. The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S2P,S6,S8,S8P  
 PHASES USED.....2,6,8  
 PEDS USED.....2,8  
 OVERLAPS.....NONE

**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**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	NU	NU	NU	61,62	NU	NU	81,82	P81,P82 P83,P84
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon			113									110
Walking person icon			115									112

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-09  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Patton Ave  
at  
Asheland Ave

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick  
 PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

REVISIONS	INIT.	DATE

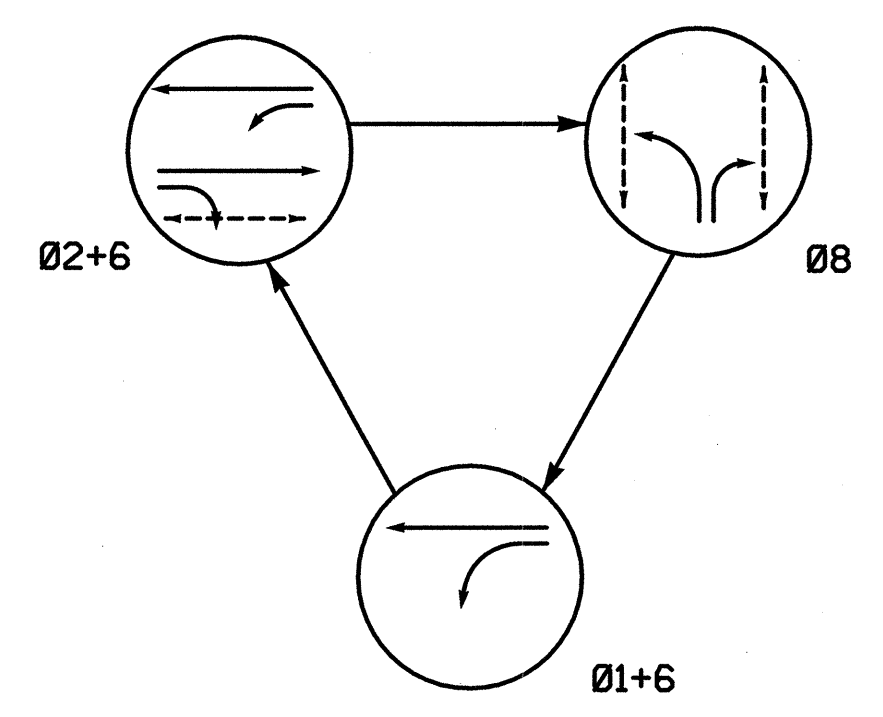
122 N. McDowell St., Raleigh, NC 27603

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 07983  
 HAWKEYE L. WINSTEAD, P.E.

11/3/06  
 SIGNATURE DATE  
 SIG. INVENTORY NO. COA 1-09

**PHASING DIAGRAM**



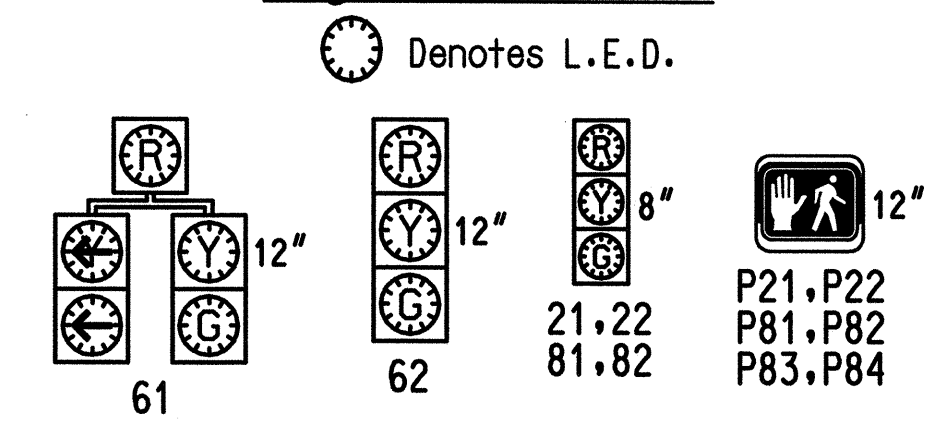
**PHASING DIAGRAM DETECTION LEGEND**

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

SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 8	F L S H
21,22	R	G	R	Y
61	G	G	R	Y
62	G	G	R	Y
81,82	R	R	G	R
P21,P22	DW	W	DW	DRK
P81,P82	DW	DW	W	DRK
P83,P84	DW	DW	W	DRK

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

**Signal Face I.D.**



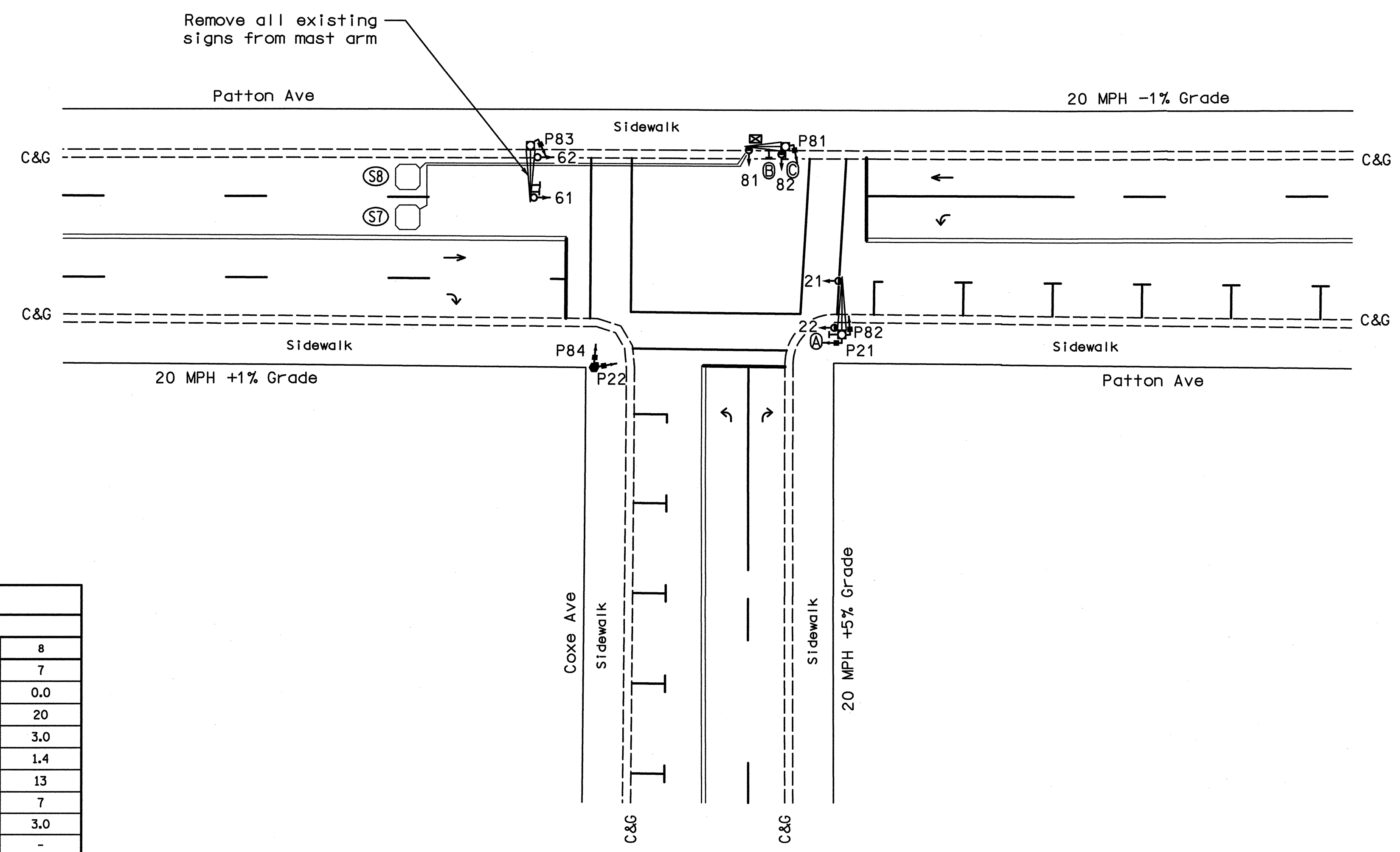
**2070L LOOP & DETECTOR INSTALLATION**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
S7	6x6	+110	3	Y	-	-	-	-	-	-	Y	Y
S8	6x6	+110	3	Y	-	-	-	-	-	-	Y	Y

3 Phase  
Pretimed  
(Asheville Signal System)

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Program controller to allow an Advance Walk movement before serving the vehicle phase.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the Maximum Walk Duration available during green time.
- Closed loop system data:  
Controller Asset #5108



FEATURE	PHASE			
	1	2	6	8
Min Green 1 *	7	10	10	7
Extension 1 *	0.0	0.0	0.0	0.0
Max Green 1 *	15	30	30	20
Yellow Clearance	3.0	3.0	3.0	3.0
Red Clearance	1.8	2.1	2.1	1.4
Walk 1 *	-	23	-	13
Don't Walk 1	-	7	-	7
Walk Advance **	0.0	0.0	0.0	3.0
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX RECALL	MAX/PED RECALL	MAX RECALL	MAX/PED RECALL
Vehicle Call Memory	-	-	-	-
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.  
\*\* See note 5.

Proposed	Legend	Existing
○	Traffic Signal Head	●
○→	Modified Signal Head	N/A
⊥	Sign	⊥
⊥	Pedestrian Signal Head	⊥
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
⊠	Inductive Loop Detector	⊠
⊠	Controller & Cabinet	⊠
□	Junction Box	□
---	2-in underground conduit	---
N/A	Right of Way with Marker	△
→	Directional Arrow	→
N/A	Metal Pole with Mast Arm	⊠
N/A	Pedestrian Signal Pedestal	●
N/A	Wheelchair Ramp	▲
N/A	"NO TURN ON RED" Sign (R10-11)	⊙
N/A	"NO TURN ON RED" Sign (R10-11)	⊙
N/A	"YIELD TO WHEN TURNING" Sign	⊙

**Signal Upgrade**

Division 13  
Buncombe County  
Asheville

PLAN DATE: August 2005  
REVIEWED BY: T.R. Terrell

PREPARED BY: J.M. Bryan  
REVIEWED BY: S.T. Franklin

Patton Ave  
at  
Coxe Ave

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

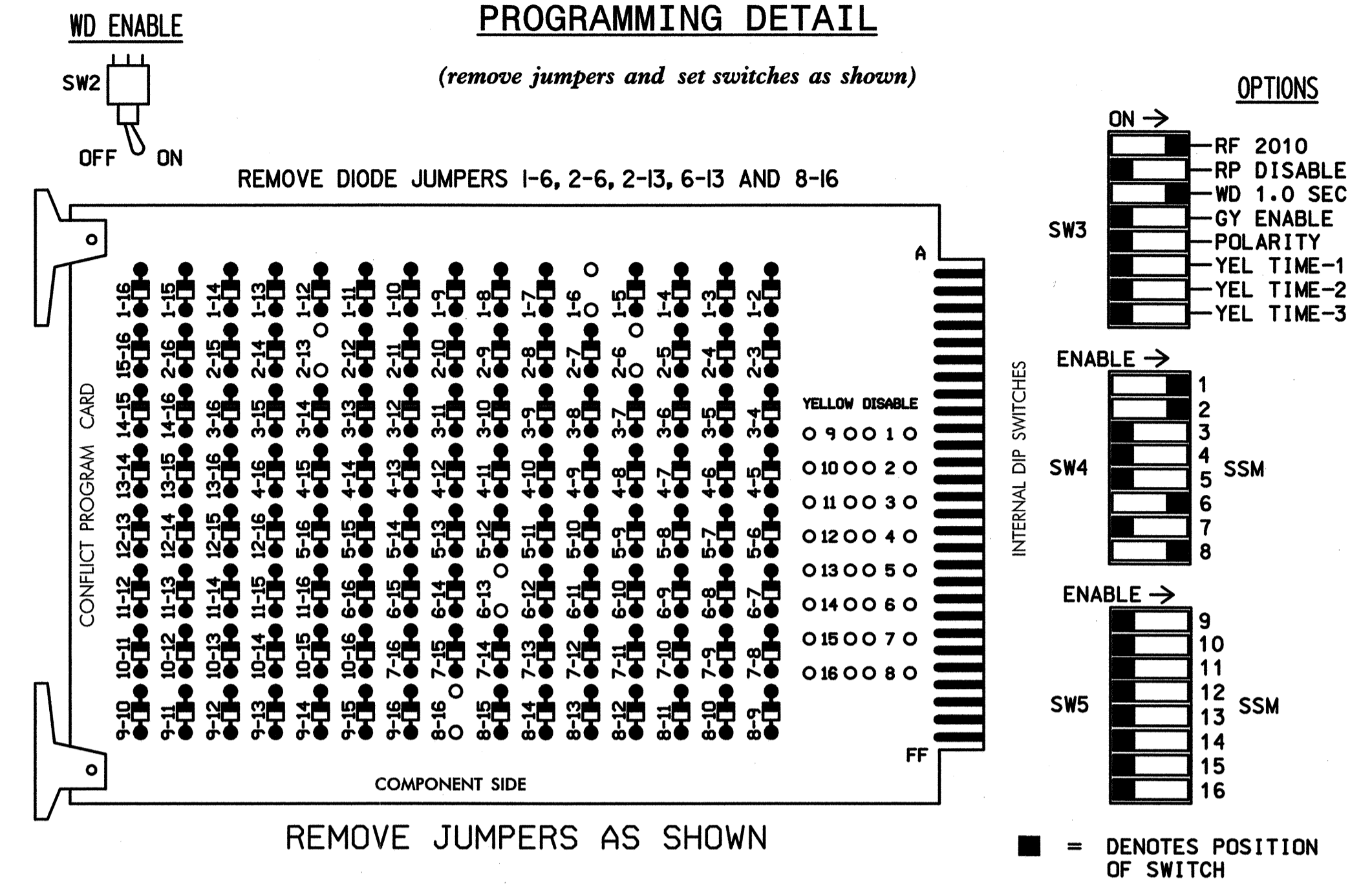
SCALE  
0 20  
1"=20'

REVISIONS

NO.	DATE	INIT.	DATE

**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**



**NOTES:**

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

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,4,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2 and 8 for 'STARTUP PED CALL'.
6. Program the controller to time the maximum walk duration available during green time.
7. The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	P21, P22	NU	NU	NU	NU	61,62	NU	NU	81,82	P81,P82 P83,P84
RED	*	128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
			113									110
			115									112

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

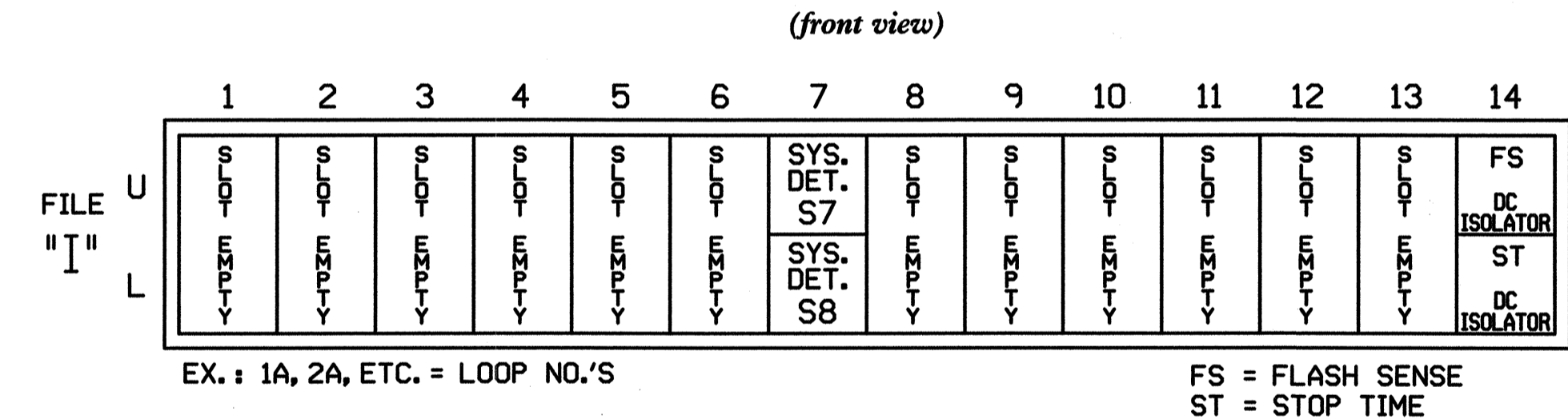
**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
CABINET.....CONTRACTOR SUPPLIED 336  
SOFTWARE.....ECONOLITE OASIS  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...12  
LOAD SWITCHES USED.....S1,S2,S2P,S6,S8,S8P  
PHASES USED.....1,2,6,8  
PEDS USED.....2,8  
OVERLAPS.....NONE

**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)  
From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phase 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**INPUT FILE POSITION LAYOUT**

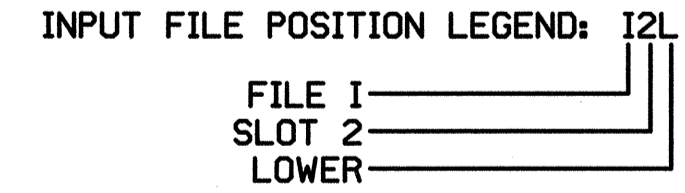
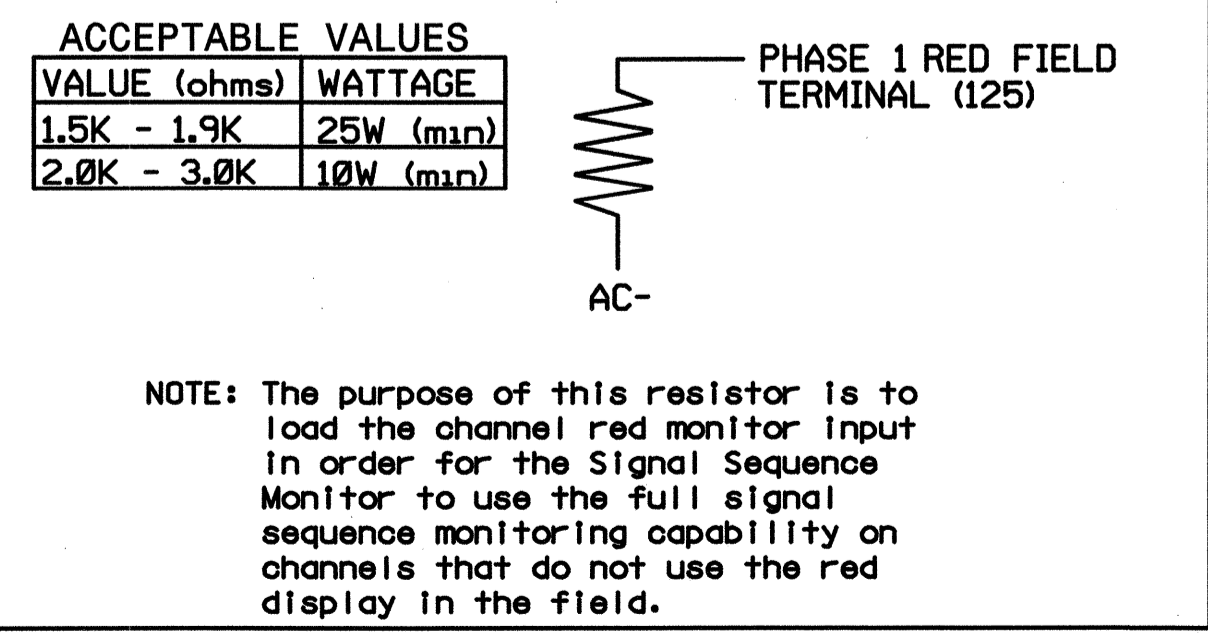


**INPUT FILE CONNECTION & PROGRAMMING CHART**

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
* S7	TB21-13,14	I7U	57	19	7	SYS					
* S8	TB23-13,14	I7L	50	12	28	SYS					

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

**LOAD RESISTOR INSTALLATION DETAIL**



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-08  
DESIGNED: August 2005  
SEALED: 11/03/06  
REVISED:

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Patton Ave  
at  
Coxe Ave

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.W. Rodevick  
PREPARED BY: J.M. Bryan REVIEWED BY: H.L. Winstead

122 N. McDowell St., Raleigh, NC 27603

HNTB HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

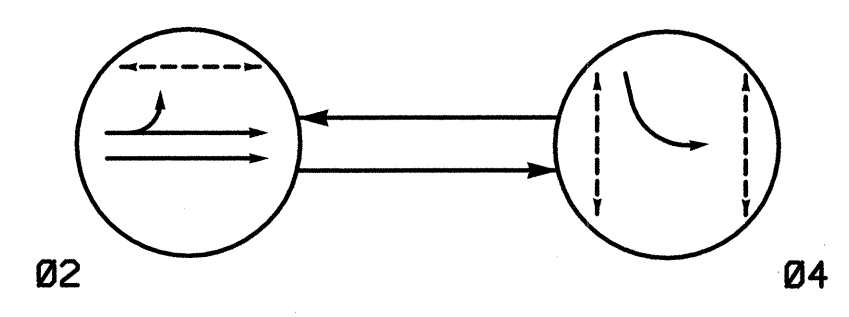
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 07983 H.L. WINSTEAD, PE

Signature: H.L. Winstead 11/3/06  
Date: 11/3/06  
SIG. INVENTORY NO. COA 1-08



2 Phase  
Pretimed  
(Asheville Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

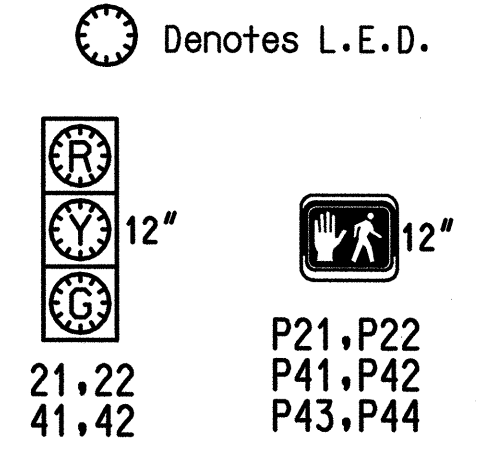
- ←●→ DETECTED MOVEMENT
- ←→ UNDETECTED MOVEMENT (OVERLAP)
- ←- - -→ UNSIGNALIZED MOVEMENT
- ←- - -> PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	02	04	F L C S H
21,22	G	R	Y
41,42	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK
P43,P44	DW	W	DRK

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

Signal Face I.D.

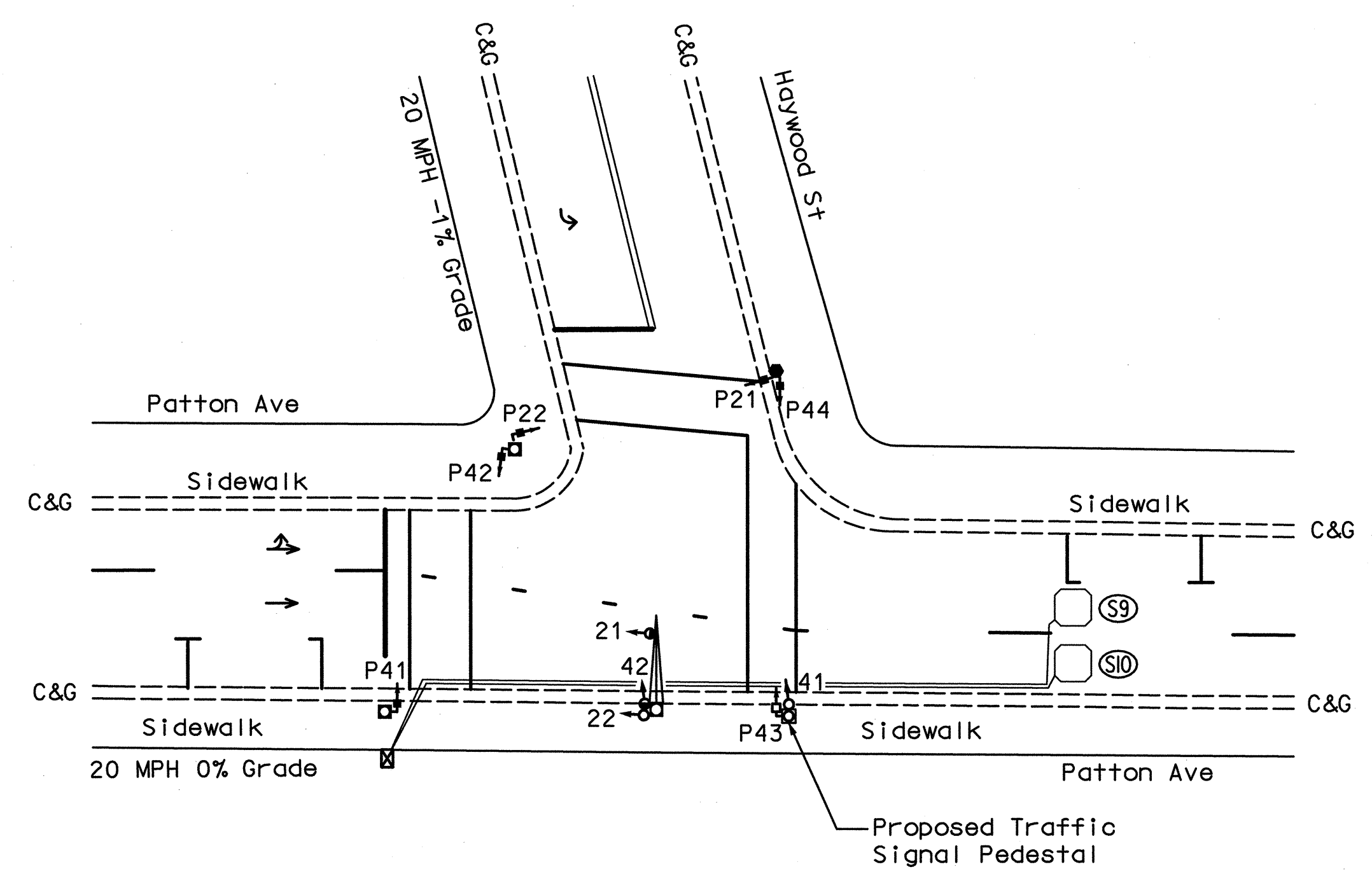


2070L LOOP & DETECTOR INSTALLATION

LOOP	INDUCTIVE LOOPS			DETECTOR PROGRAMMING								
	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
S9	6x6	+110	3	Y	-	-	-	-	-	-	Y	Y
S10	6x6	+110	3	Y	-	-	-	-	-	-	Y	Y

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Program controller to allow an Advance Walk Movement before serving the vehicle phase.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the maximum walk duration available within green time.
- Closed loop system data:  
Controller Asset #5113



2070L TIMING CHART

FEATURE	PHASE	
	2	4
Min Green 1*	10	7
Extension 1*	0.0	0.0
Max Green 1*	30	20
Yellow Clearance	3.0	3.0
Red Clearance	1.8	2.1
Walk 1*	23	15
Don't Walk 1	7	5
Walk Advance**	3.0	3.0
Seconds Per Actuation*	-	-
Max Variable Initial*	-	-
Time Before Reduction*	-	-
Time To Reduce*	-	-
Minimum Gap	-	-
Recall Mode	MAX/PED RECALL	MAX/PED RECALL
Vehicle Call Memory	-	-
Dual Entry	-	-
Simultaneous Gap	ON	ON

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 2 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds. Use the maximum walk duration available within the green time.  
\*\* See note 5.

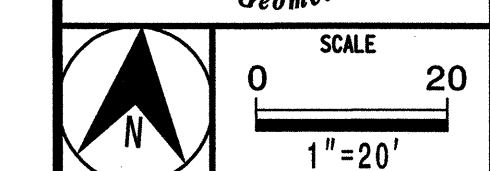
Legend

Proposed	Existing
○→ Traffic Signal Head	●→ N/A
●→ Modified Signal Head	+
+	+
⊥ Pedestrian Signal Head	⊥
○→ Signal Pole with Guy	●→
○→ Signal Pole with Sidewalk Guy	●→
▭ Inductive Loop Detector	▭
⊠ Controller & Cabinet	⊠
□ Junction Box	□
----- 2-in underground conduit	-----
N/A Right of Way with Marker	---△---
→ Directional Arrow	→
N/A Metal Pole with Mast Arm	⊥
N/A Metal Street Light Pole	⊥
N/A Wheelchair Ramp	▲
N/A Pedestrian Signal Pedestal	●
⊠ Traffic Signal Pedestal	N/A

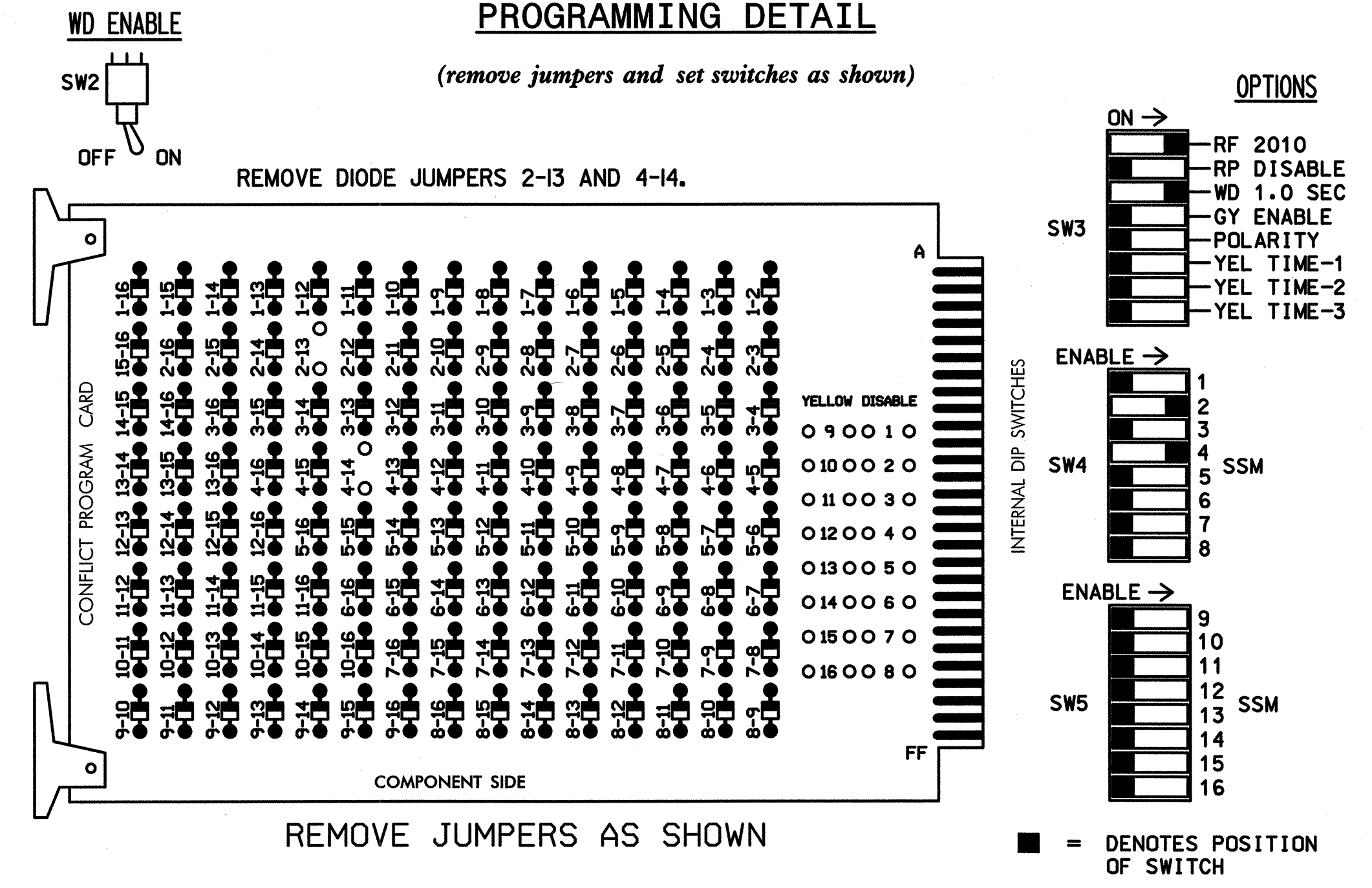
Signal Upgrade

	<p>Patton Ave at Haywood St</p>		<p>SEAL</p>							
	<p>Division 13 Buncombe County Asheville</p> <p>PLAN DATE: August 2005 REVIEWED BY: T.R. Terrell</p> <p>PREPARED BY: J.M. Bryan REVIEWED BY: S.T. Franklin</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		NO.	DATE	INIT.	DATE			
NO.	DATE	INIT.	DATE							

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609



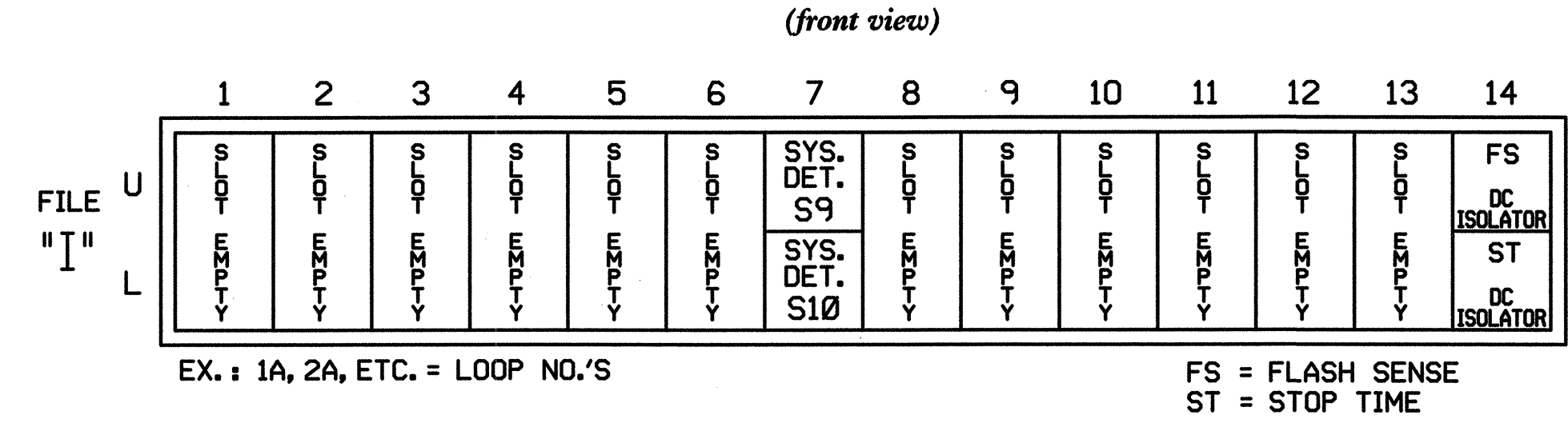
**EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL**



**NOTES:**

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

**INPUT FILE POSITION LAYOUT**



**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5,6,7, 8,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phase 2 on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2 and 4 for 'STARTUP PED CALL'.
6. Program the controller to time the maximum walk duration available during green time.
7. The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	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 P43,P44	NU	NU	NU	NU	NU	NU
RED		128			101							
YELLOW		129			102							
GREEN		130			103							
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
					113				104			
					115				106			

NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S2P,S4,S4P  
 PHASES USED.....2,4  
 PEDS USED.....2,4  
 OVERLAPS.....NONE

**ADVANCED WALK PROGRAMMING NOTE**

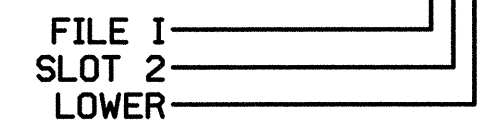
(program controller as shown below)  
 From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 4 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**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
* S9	TB21-13,14	I7U	57	19	7	SYS					
* S10	TB23-13,14	I7L	50	12	28	SYS					

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

**INPUT FILE POSITION LEGEND: I2L**



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-13  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Patton Ave at Haywood St

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick  
 PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

REVISIONS: \_\_\_\_\_ INIT. DATE \_\_\_\_\_

122 N. McDowell St., Raleigh, NC 27603

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

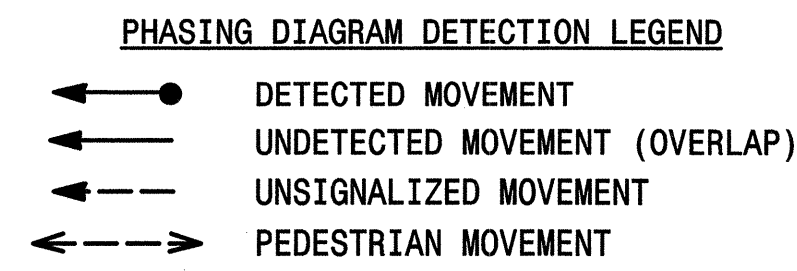
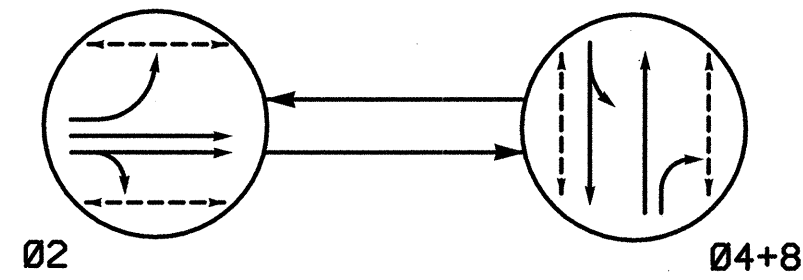
SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 07983  
 HARRY L. WINSTEAD, P.E.

SIGNATURE: DATE: 11/3/06

SIG. INVENTORY NO. COA 1-13

2 Phase  
Pretimed  
(Asheville Signal System)

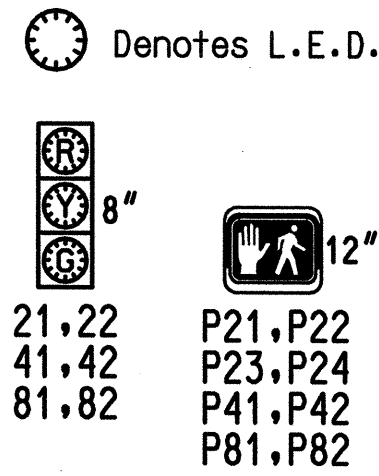
PHASING DIAGRAM



SIGNAL FACE	PHASE		
	Ø 2	Ø 4+8	F
21,22	G	R	Y
41,42	R	G	R
81,82	R	G	R
P21,P22	W	DW	DRK
P23,P24	W	DW	DRK
P41,P42	DW	W	DRK
P81,P82	DW	W	DRK

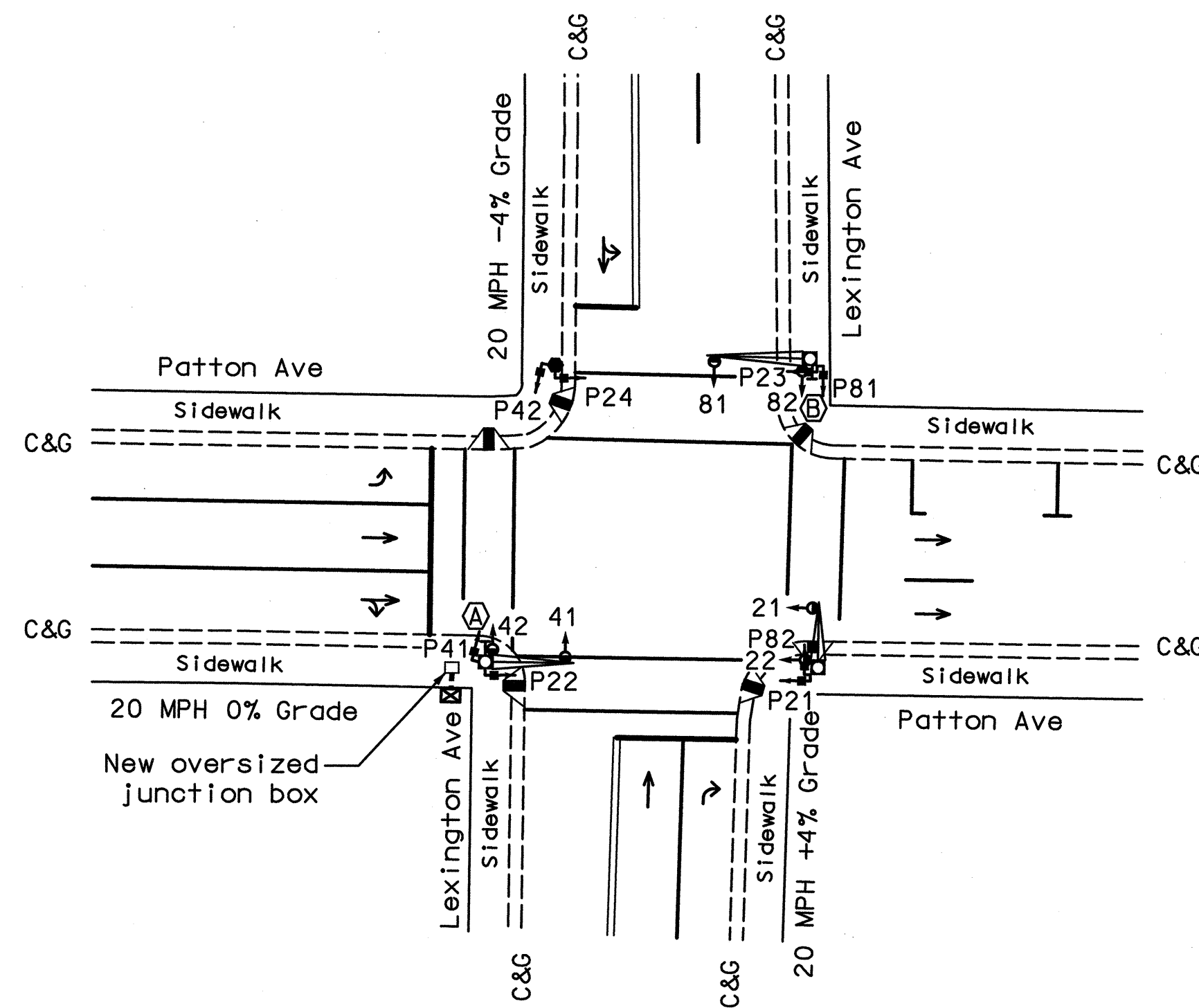
W - WALK  
DW - DON'T WALK  
DRK - DARK

Signal Face I.D.



NOTES

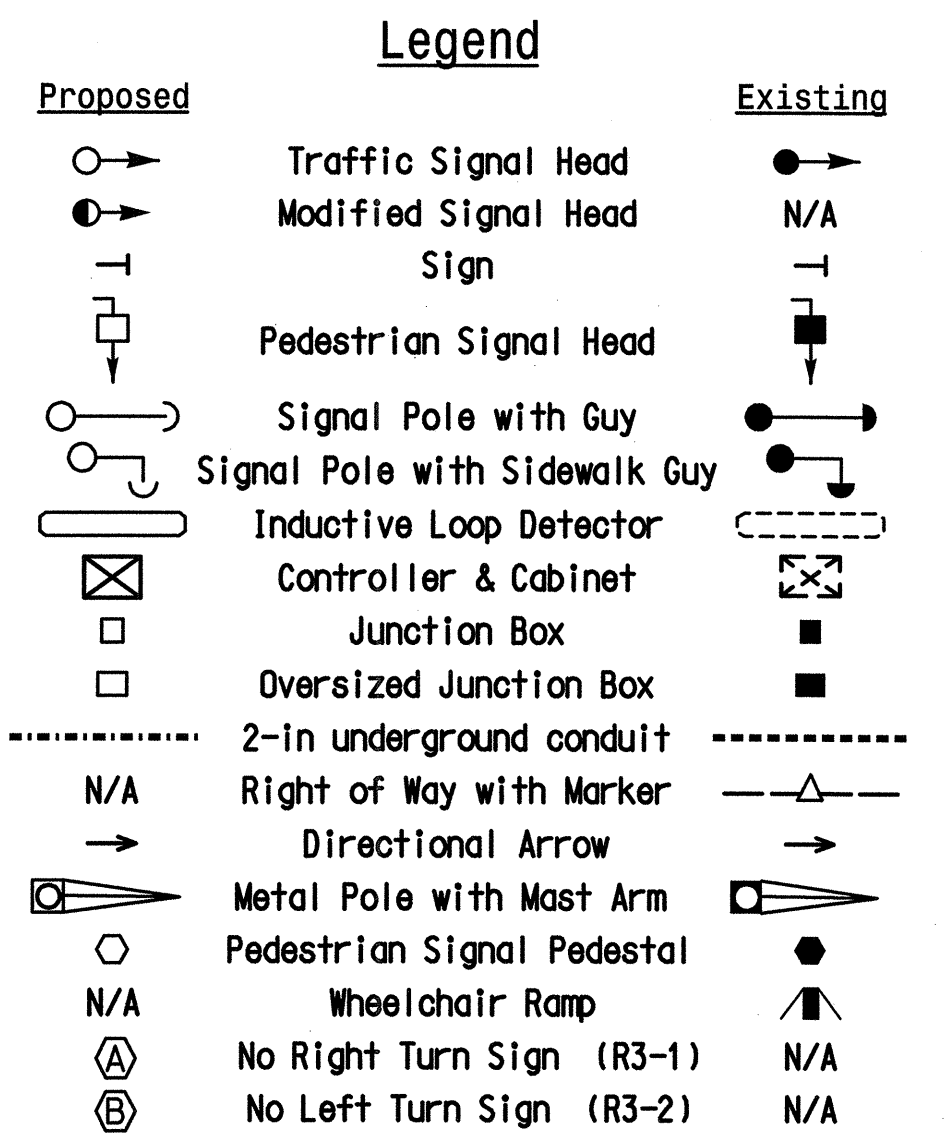
- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.
- Program controller to allow an Advance Walk movement before serving the vehicle phase.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the Maximum Walk duration available during green time.
- Closed loop system data:  
Controller Asset #5114



FEATURE	PHASE		
	2	4	8
Min Green 1*	10	7	7
Extension 1*	0.0	0.0	0.0
Max Green 1*	30	20	20
Yellow Clearance	3.0	3.0	3.0
Red Clearance	1.9	1.9	1.6
Walk 1*	24	15	15
Don't Walk 1	6	5	5
Walk Advance**	3.0	3.0	3.0
Seconds Per Actuation*	-	-	-
Max Variable Initial*	-	-	-
Time Before Reduction*	-	-	-
Time To Reduce*	-	-	-
Minimum Gap	-	-	-
Recall Mode	MAX/PED RECALL	MAX/PED RECALL	MAX/PED RECALL
Vehicle Call Memory	-	-	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

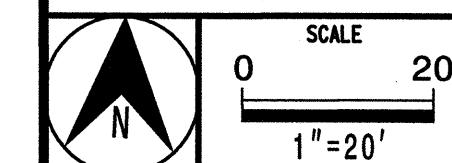
\*\* See note 5.



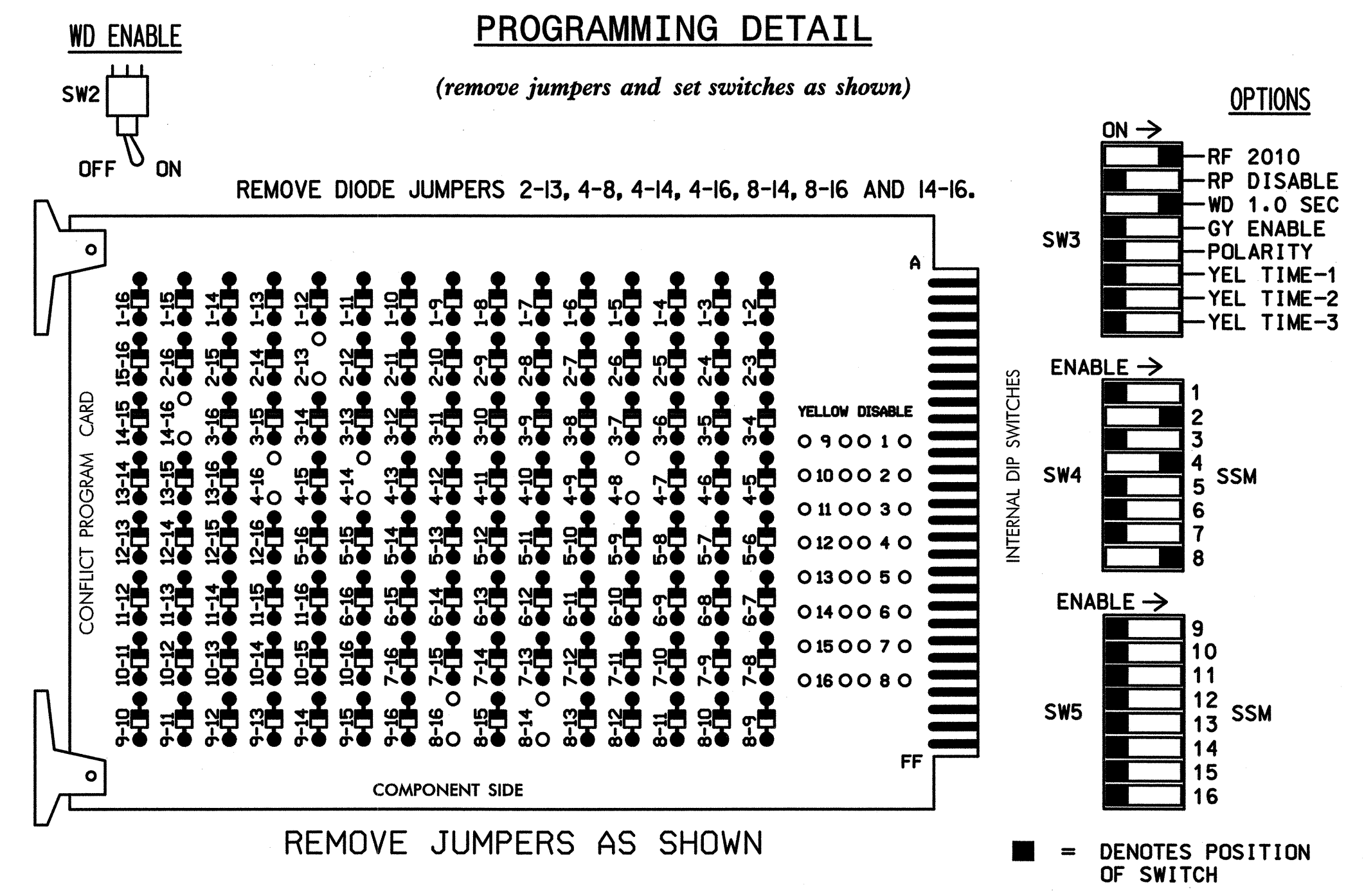
Signal Upgrade

	<p>Patton Ave at Lexington Ave</p>									
	<p>Division 13 Buncombe County Asheville</p> <p>PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick</p> <p>PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		NO.	DATE	INIT.	DATE			
NO.	DATE	INIT.	DATE							

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

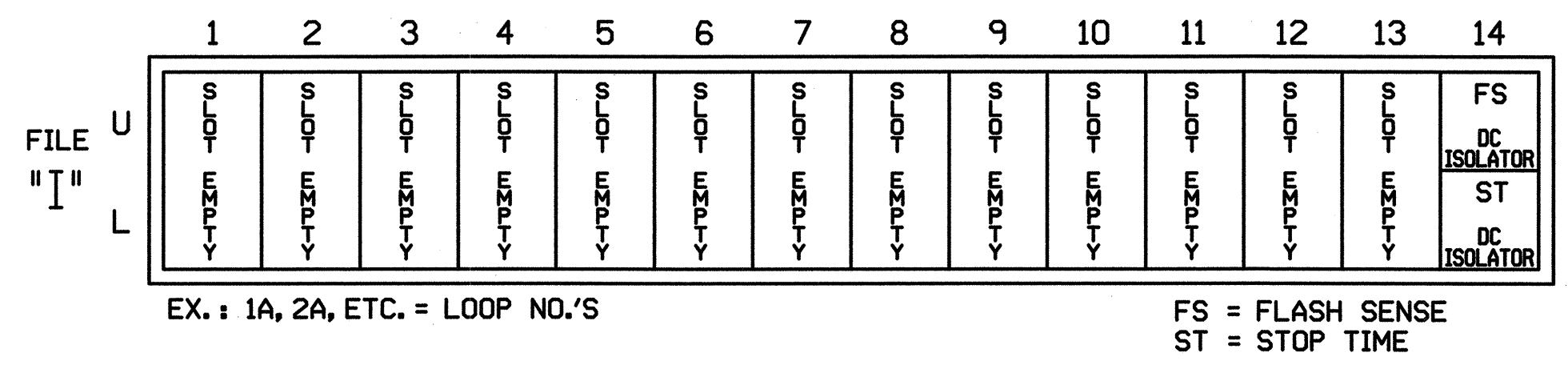


**EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL**



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

**INPUT FILE POSITION LAYOUT (front view)**



**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 1,3,5,6, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phase 2 on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 2, 4 and 8 for 'STARTUP PED CALL'.
- Program the controller to time the maximum walk duration available during green time.
- The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S2P,S4,S4P,S8,S8P  
 PHASES USED.....2,4,8  
 PEDS USED.....2,4,8  
 OVERLAPS.....NONE

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21,P22 P23,P24	NU	41,42	P41, P42	NU	NU	NU	NU	81,82	P81, P82
RED		128			101						107	
YELLOW		129			102						108	
GREEN		130			103						109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon			113			104						110
Walking person icon			115			106						112

NU = Not Used

**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2, 4 and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-14  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Patton Ave at Lexington Ave

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick  
 PREPARED BY: J.M. Bryan REVIEWED BY: H.L. Winstead

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 07983 HARVEY L. WINSTEAD

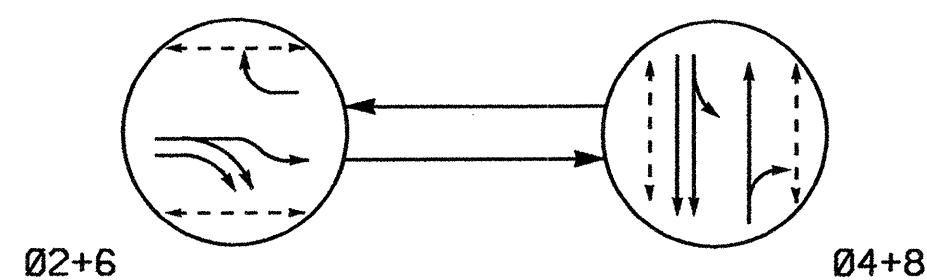
122 N. McDowell St., Raleigh, NC 27603

HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609

11/3/06

SIG. INVENTORY NO. COA 1-14

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

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

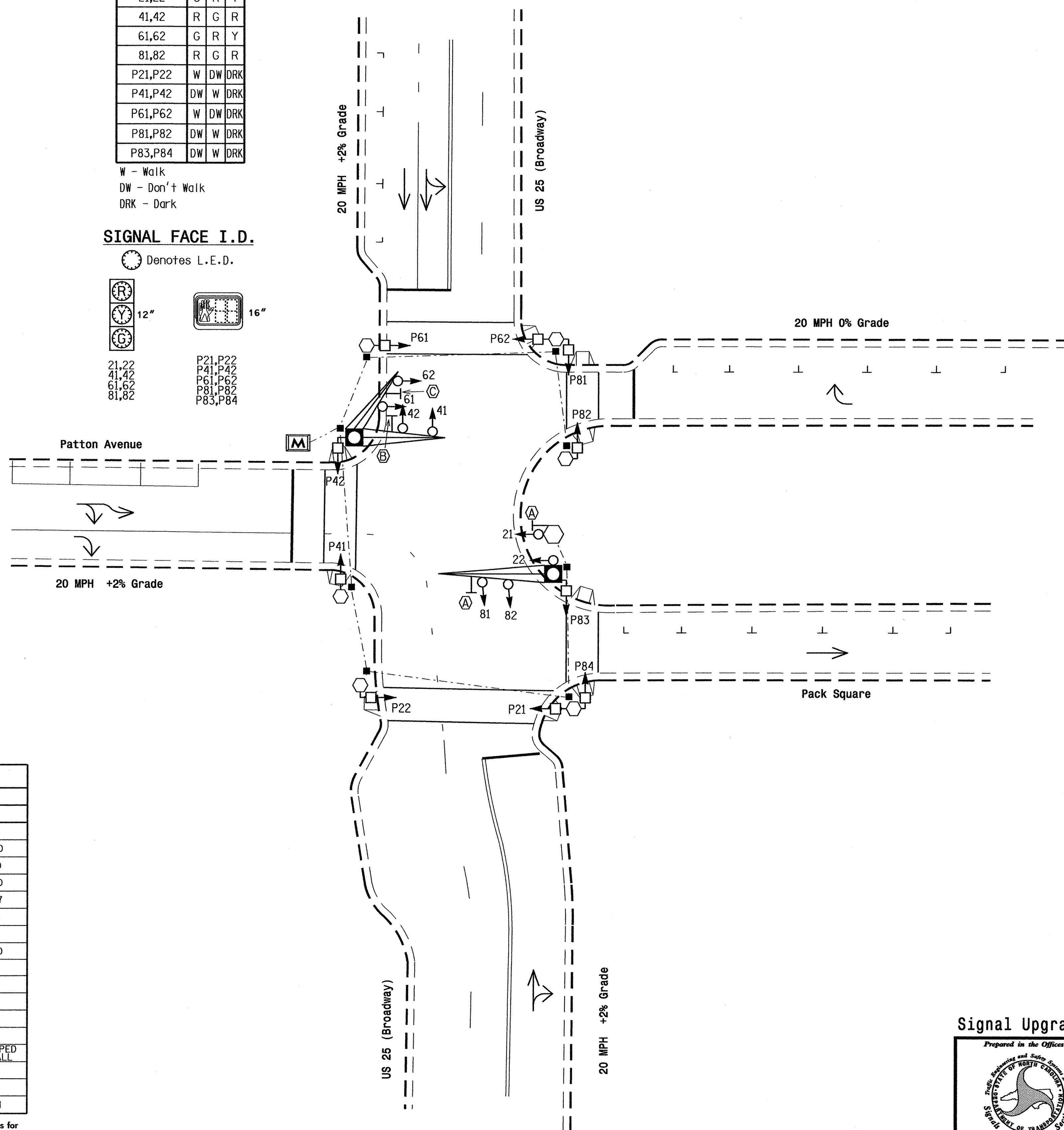
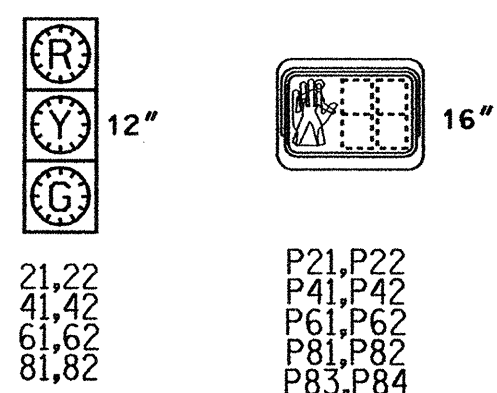
**TABLE OF OPERATION**

SIGNAL FACE	PHASE		
	Q	R	F
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK
P83,P84	DW	W	DRK

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

**SIGNAL FACE I.D.**

○ Denotes L.E.D.



**2 Phase Pre-Timed (City of Asheville Signal System)**

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Program controller to allow an Advance Walk movement before serving the vehicle phase.
- Pavement markings are existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the Maximum Walk duration available during green time.
- Closed loop system data: Controller Asset #0271.

FEATURE	PHASE			
	2	4	6	8
Min Green 1*	10	7	10	7
Extension 1*	0.0	0.0	0.0	0.0
Max Green 1*	30	20	30	20
Yellow Clearance	3.0	3.0	3.0	3.0
Red Clearance	3.2	3.7	1.9	3.7
Walk 1*	19	15	21	16
Don't Walk 1	11	5	9	4
Walk Advance**	3.0	3.0	3.0	3.0
Seconds Per Actuation*	-	-	-	-
Max Variable Initial*	-	-	-	-
Time Before Reduction*	-	-	-	-
Time To Reduce*	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX/PED RECALL	MAX/PED RECALL	MAX/PED RECALL	MAX/PED RECALL
Vehicle Call Memory	-	-	-	-
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.

\*\* See Note 5.

**LEGEND**

- | PROPOSED   | EXISTING   |
|--|--|
| ○ → Traffic Signal Head                          | ● → Traffic Signal Head                          |
| ● → Modified Signal Head                         | N/A  |
| ⊥ Sign   | ⊥ Sign   |
| ⊥ Pedestrian Signal Head With Push Button & Sign | ⊥ Pedestrian Signal Head With Push Button & Sign |
| ⊥ Signal Pole with Guy                           | ⊥ Signal Pole with Guy                           |
| ⊥ Signal Pole with Sidewalk Guy                  | ⊥ Signal Pole with Sidewalk Guy                  |
| ⊥ Inductive Loop Detector                        | ⊥ Inductive Loop Detector                        |
| ⊥ Controller & Cabinet Junction Box              | ⊥ Controller & Cabinet Junction Box              |
| ⊥ 2-in Underground Conduit                       | ⊥ 2-in Underground Conduit                       |
| N/A Right of Way                                 | → Right of Way                                   |
| → Directional Arrow                              | → Directional Arrow                              |
| → Pavement Marking Arrow                         | → Pavement Marking Arrow                         |
| ⊥ Master Controller & Cabinet                    | ⊥ Master Controller & Cabinet                    |
| ○ Pedestrian Signal Pedestal                     | ○ Pedestrian Signal Pedestal                     |
| ⊙ No Left Turn Sign (R3-2)                       | ⊙ No Left Turn Sign (R3-2)                       |
| ⊙ No Right Turn Sign (R3-1)                      | ⊙ No Right Turn Sign (R3-1)                      |
| ⊙ Right Arrow "ONLY" Sign (R3-5R)                | ⊙ Right Arrow "ONLY" Sign (R3-5R)                |

**Signal Upgrade**

122 N. McDowell St., Raleigh, NC 27603

**Patton Avenue / Pack Square at US 25 (Broadway)**

Division 13 Buncombe County Asheville

PLAN DATE: November 2006 REVIEWED BY: D.Y. Ishak

PREPARED BY: Z.M. Little REVIEWED BY:

SEAL

SCALE 1"=20'

REVISIONS	INIT.	DATE

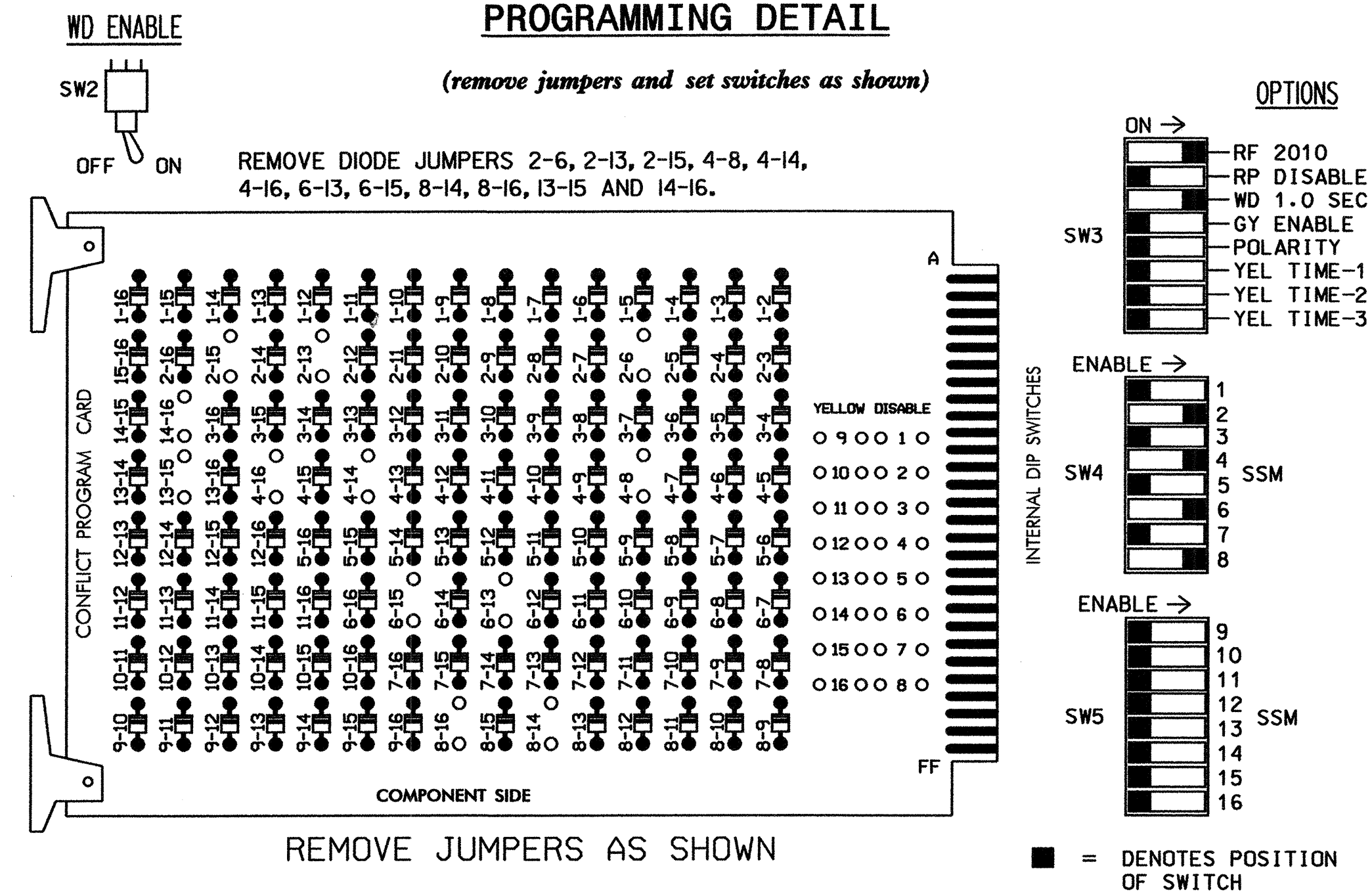
SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

SIG. INVENTORY NO. 13-0271

08-MOV-2006-14104  
 08-MOV-2006-14104  
 08-MOV-2006-14104  
 08-MOV-2006-14104

**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**



REMOVE JUMPERS AS SHOWN

**NOTES:**

- CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
- MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 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 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Asheville Signal System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81,P82, P83,P84
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

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336  
 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

**COUNTDOWN PEDESTRIAN SIGNAL OPERATION**

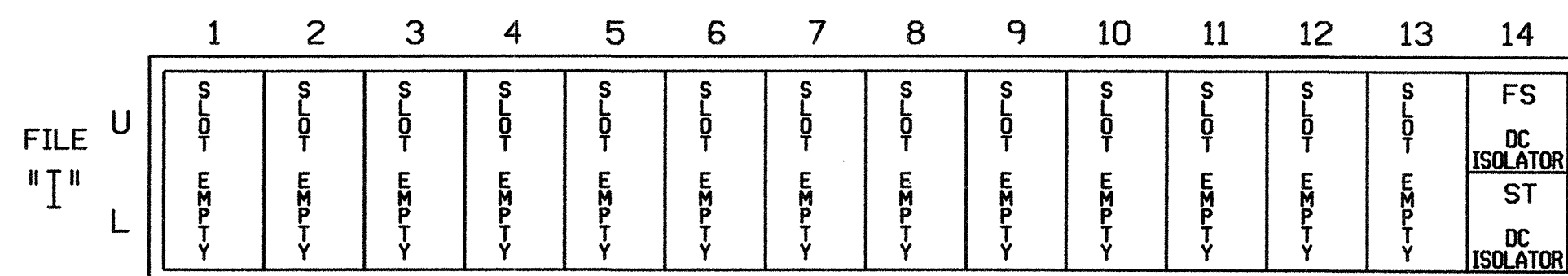
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)  
 From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2, 4, 6, and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**INPUT FILE POSITION LAYOUT**

(front view)



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

FS = FLASH SENSE  
 ST = STOP TIME

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0271  
 DESIGNED: November 2006  
 SEALED: 11/27/06  
 REVISED: N/A

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

Patton Avenue / Pack Square at US 25 (Broadway)

Division 13 Buncombe County Asheville

PLAN DATE: November 2006 REVIEWED BY: J. Peterson  
 PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 022013  
 GEORGE C. BROWN  
 SIGNATURE DATE 11/29/06  
 SIG. INVENTORY NO. 13-0271

3 Phase Semi-Actuated (Asheville Signal System)

PHASING DIAGRAM

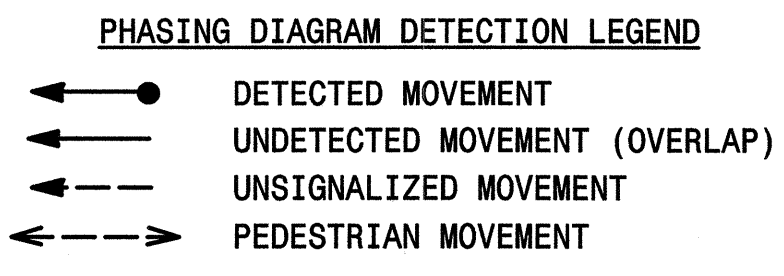
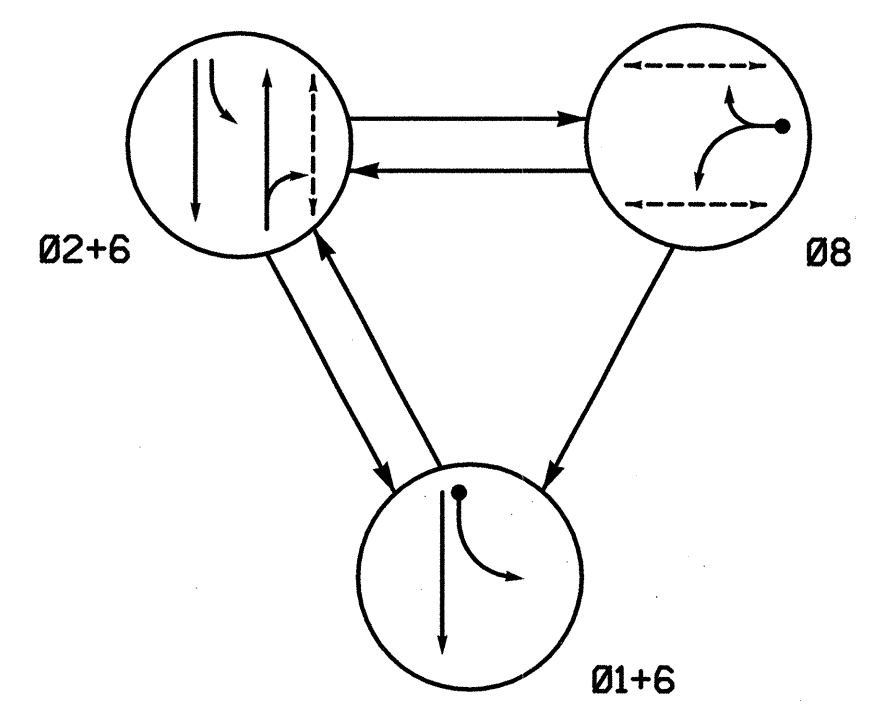
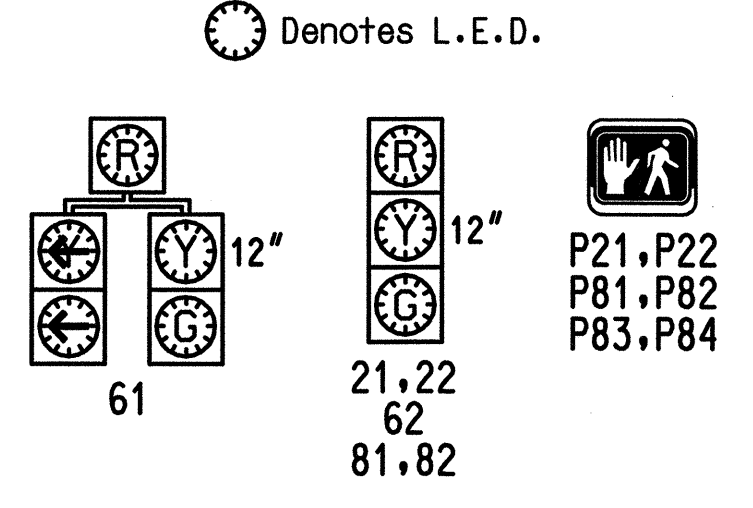


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 1+6	Ø 2+6	Ø 8	F L
21,22	R	G	R	Y
61	G	G	R	Y
62	G	G	R	Y
81,82	R	R	G	R
P21,P22	DW	W	DW	DRK
P81,P82	DW	DW	W	DRK
P83,P84	DW	DW	W	DRK

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

SIGNAL FACE I.D.



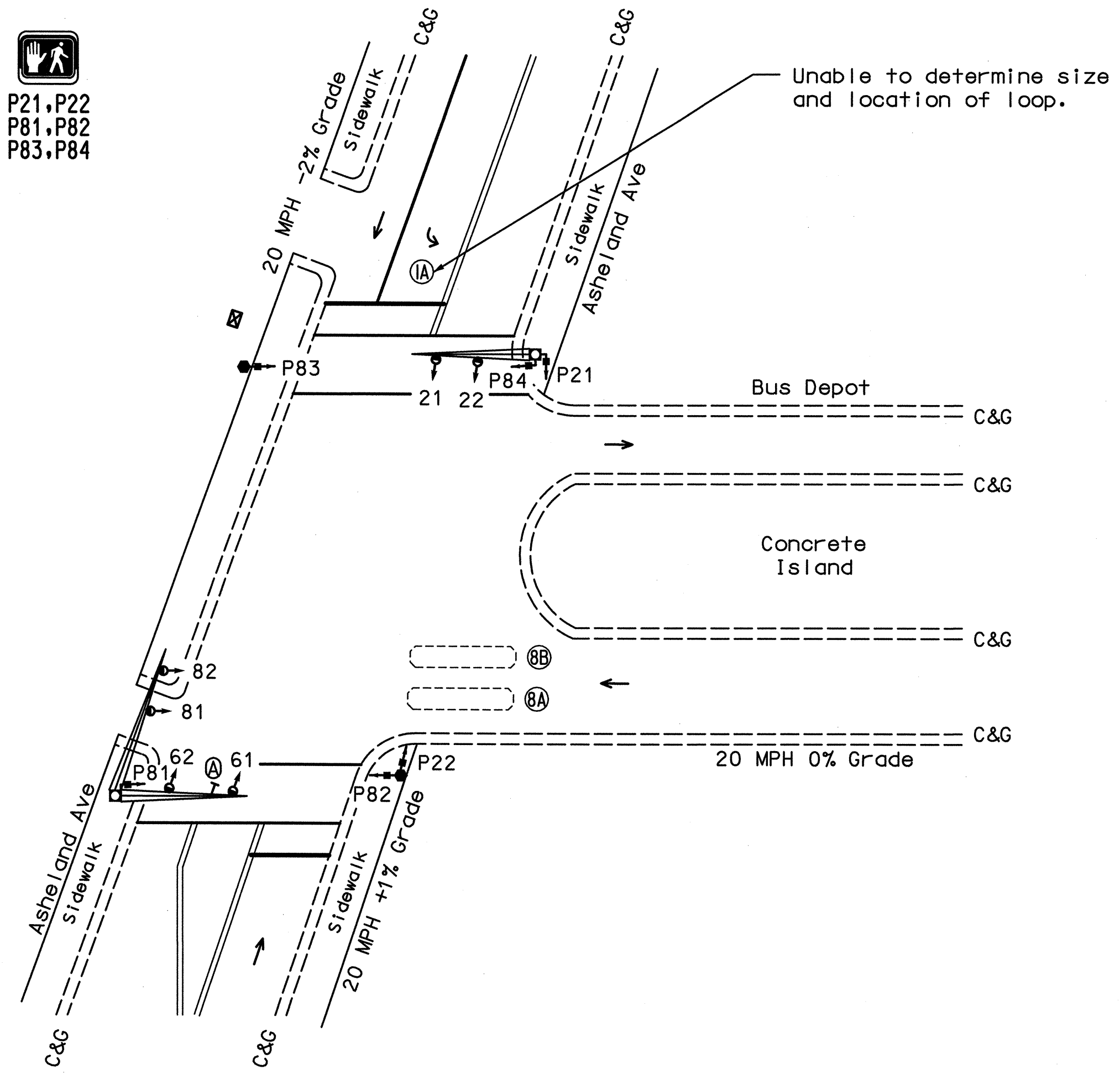
2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING						
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
IA	*	*	EXISTING	-	1	Y	Y	-	5	-	Y
8A,8B	2x20	*	EXISTING	-	8	Y	Y	-	-	-	Y

\* UNABLE TO FIELD VERIFY

NOTES

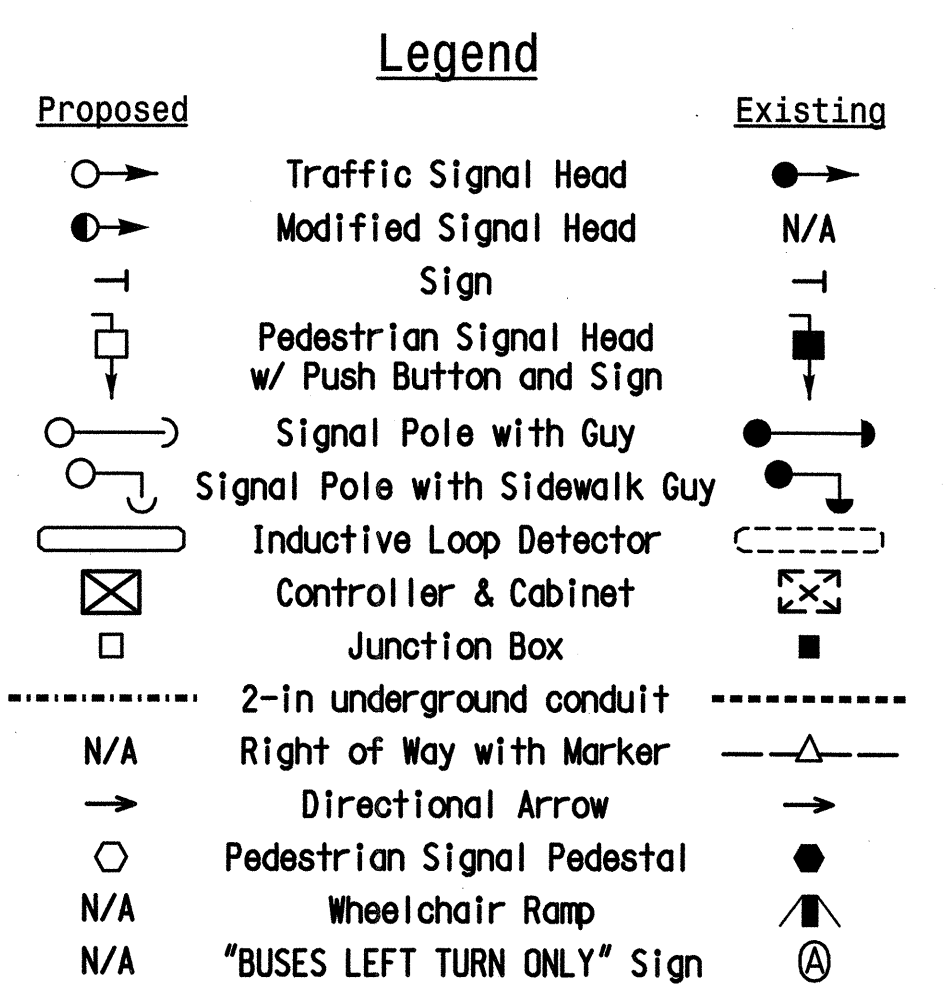
- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Pavement markings are existing.
- Program controller to allow an Advance Walk Movement before serving the vehicle phase.
- 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 #5118



2070L TIMING CHART

FEATURE	PHASE			
	1	2	6	8
Min Green 1 *	7	10	10	7
Extension 1 *	3.0	0.0	0.0	3.0
Max Green 1 *	15	30	30	20
Yellow Clearance	3.0	3.0	3.0	3.0
Red Clearance	1.1	3.1	3.1	1.8
Walk 1 *	-	16	-	4
Don't Walk 1	-	14	-	7
Walk Advance **	-	3.0	-	3.0
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MAX/PED RECALL	MAX RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

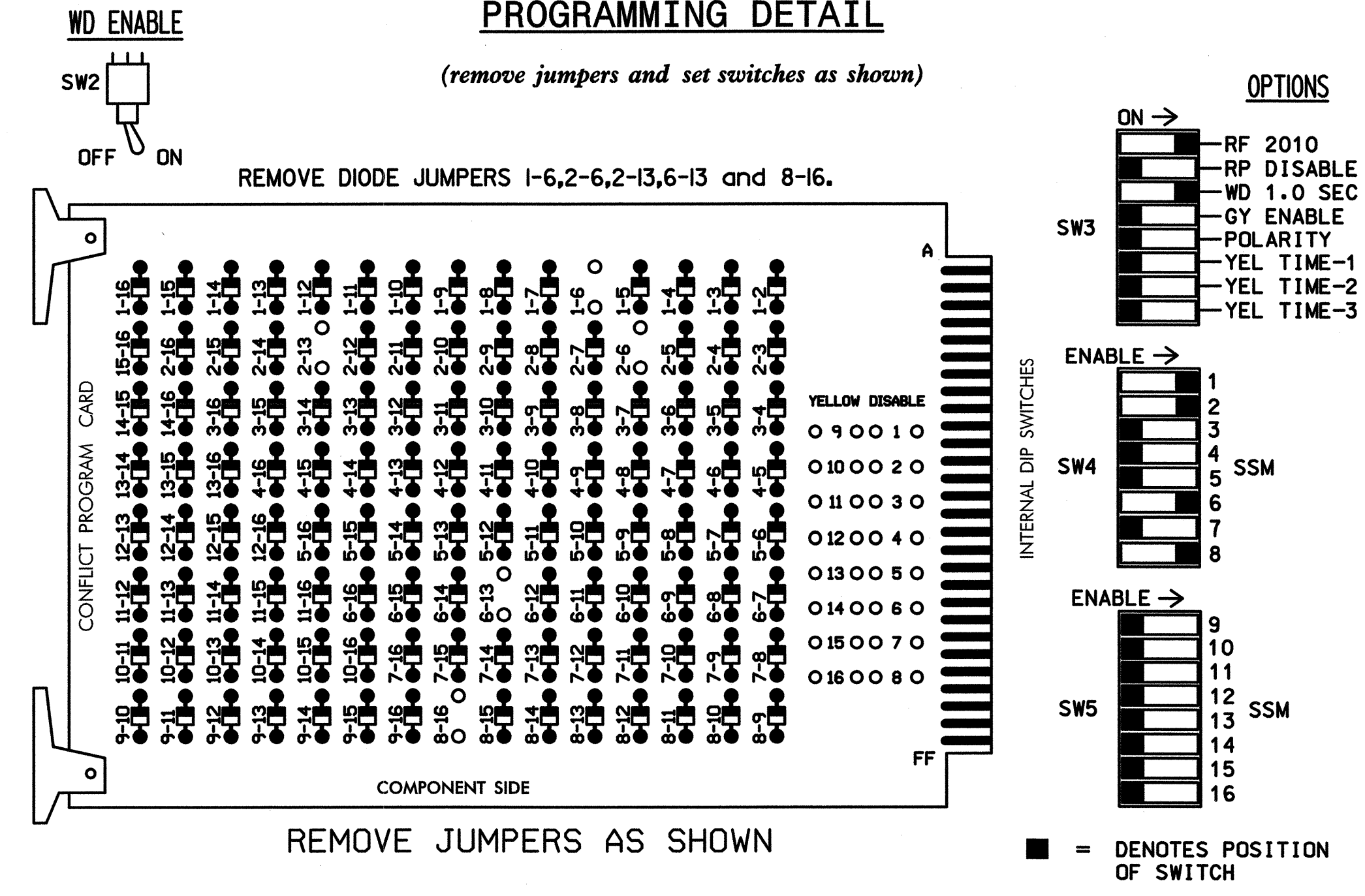


Signal Upgrade

	<p>Asheiland Ave at Bus Depot</p>		
	<p>Division 13 Buncombe County Asheville</p> <p>PLAN DATE: August 2005 REVIEWED BY: T.R. Terrell</p> <p>PREPARED BY: J.M. BRYAN REVIEWED BY: S.T. Franklin</p>	<p>REVISIONS</p> <p>INIT. DATE</p>	
<p>HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609</p>			<p>SIGNATURE DATE</p> <p>SIG. INVENTORY NO. COA 1-18</p>

### EDI MODEL 2010ECL CONFLICT MONITOR

#### PROGRAMMING DETAIL

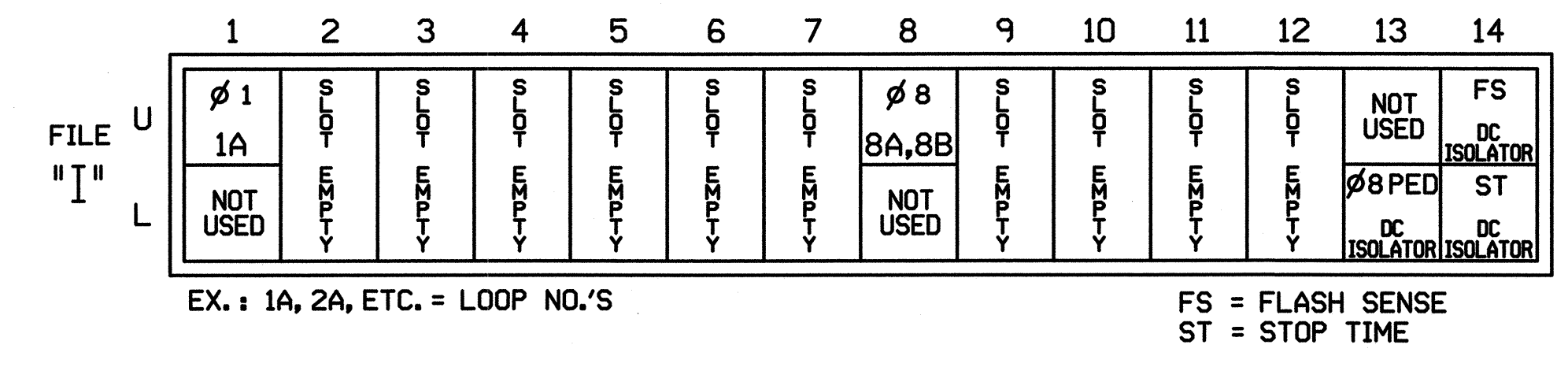


NOTES:

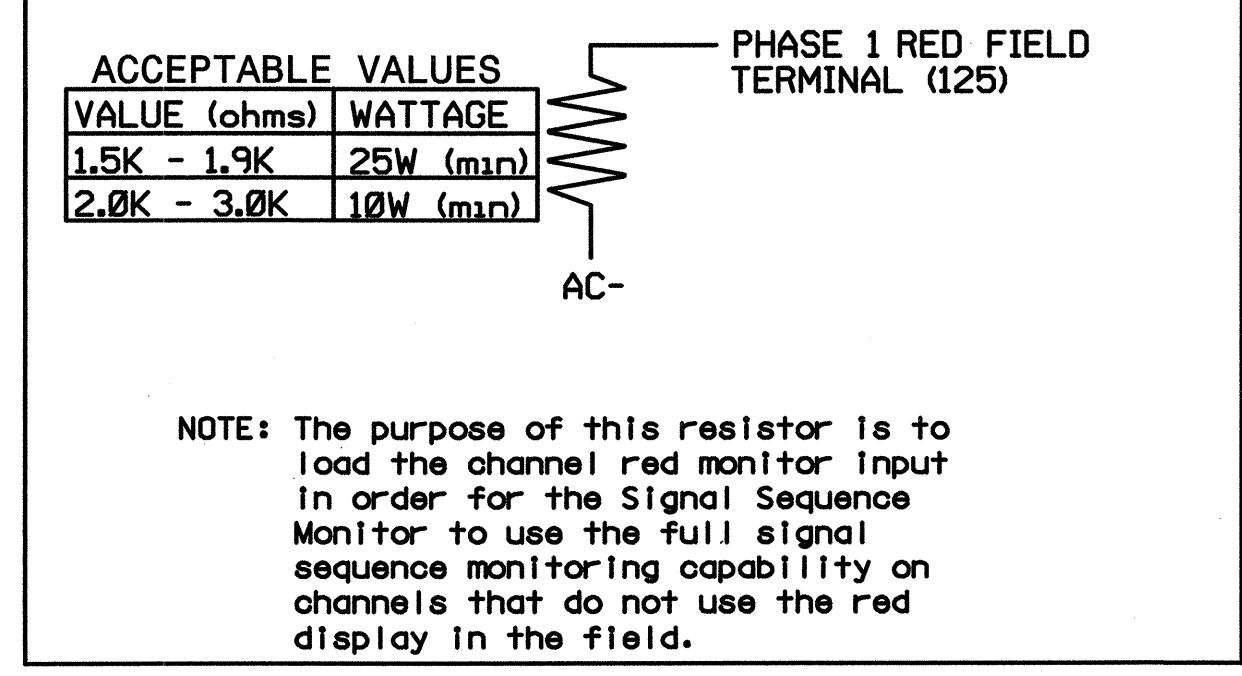
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Make sure jumpers SEL1-SEL5 are present on the monitor board.

#### INPUT FILE POSITION LAYOUT

(front view)



#### LOAD RESISTOR INSTALLATION DETAIL



#### 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 3,4,5,7,9,10, 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 2 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

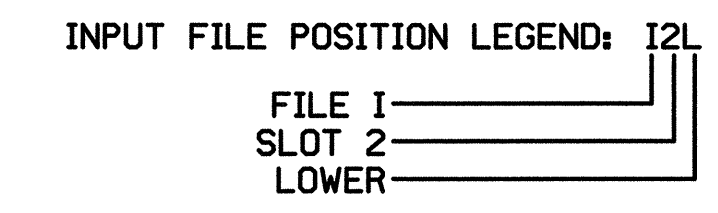
#### EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
CABINET.....CONTRACTOR SUPPLIED 336  
SOFTWARE.....ECONOLITE OASIS  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...12  
LOAD SWITCHES USED.....S1,S2,S2P,S6,S8,S8P  
PHASES USED.....1,2,6,8  
PEDS USED.....2,8  
OVERLAPS.....NONE

#### 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	TB21-1,2	I1U	56	18	1	1	Y	Y	-	-	5
8A,8B	TB22-1,2	I8U	42	4	8	8	Y	Y	-	-	-
PED PUSH BUTTONS											
P81,P82 P83,P84	TB24-11,12	I13L	70	32	PED 8	8 PED					

NOTE:  
INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.



#### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	P21, P22	NU	NU	NU	NU	61,62	NU	NU	81,82	P81,P82 P83,P84
RED	*	128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
Hand icon			113									110
Person icon			115									112

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

#### ADVANCED WALK PROGRAMMING NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-18  
DESIGNED: August 2005  
SEALED: 11/03/06  
REVISED:

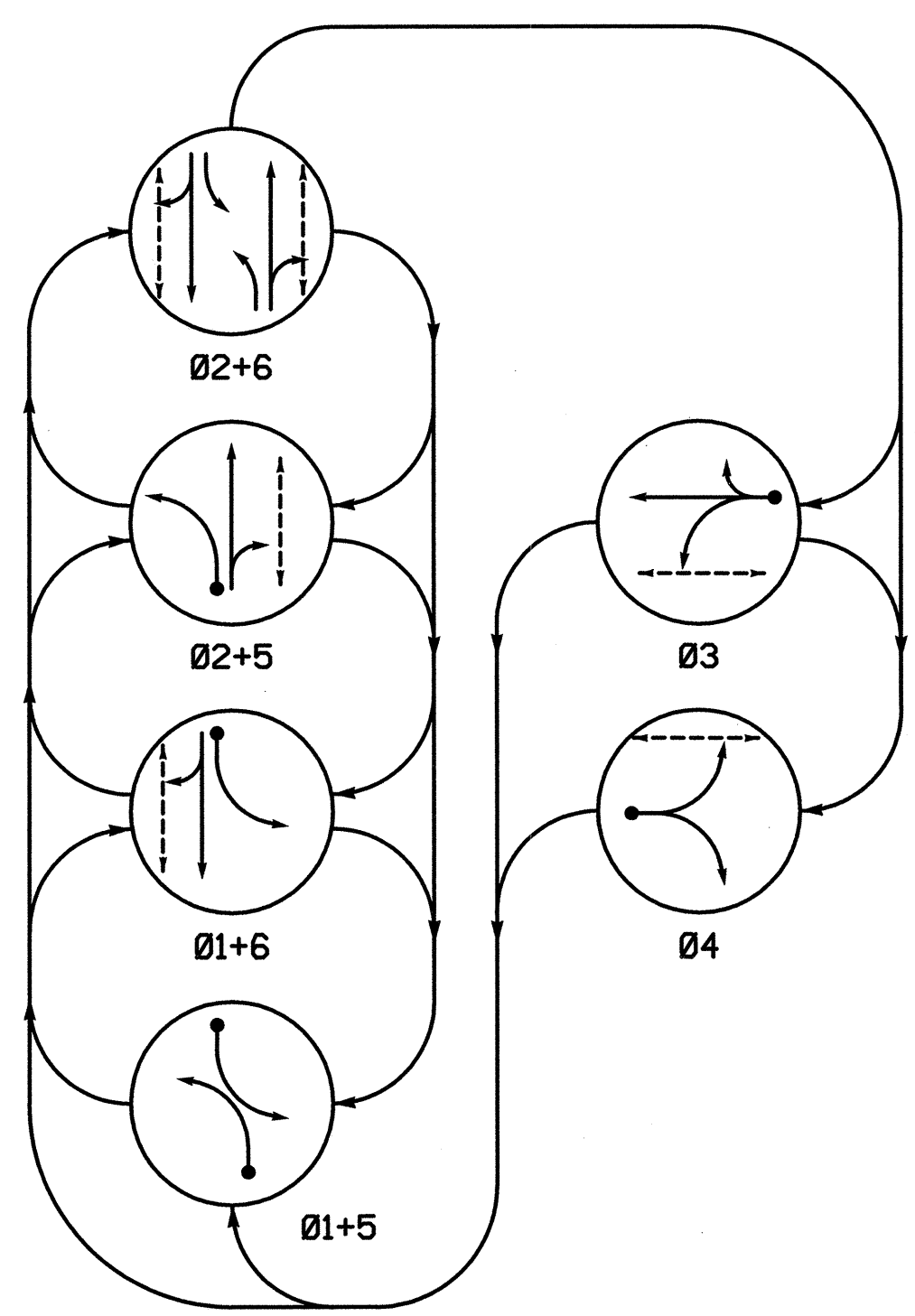
#### Signal Upgrade

	Ashland Ave at Bus Depot		
	Division 13 Buncombe County Asheville	PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead	
ELECTRICAL AND PROGRAMMING DETAILS FOR:	PLAN DATE: August 2005 REVISIONS:	REVIEWED BY: N.M. Rodevick INIT.:	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 07983 H.L. WINSTEAD, P.E. DATE: 11/3/06
122 N. McDowell St., Raleigh, NC 27603	HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609	DATE:	DATE:



6 Phase Semi-Actuated (Asheville Signal System)

PHASING DIAGRAM

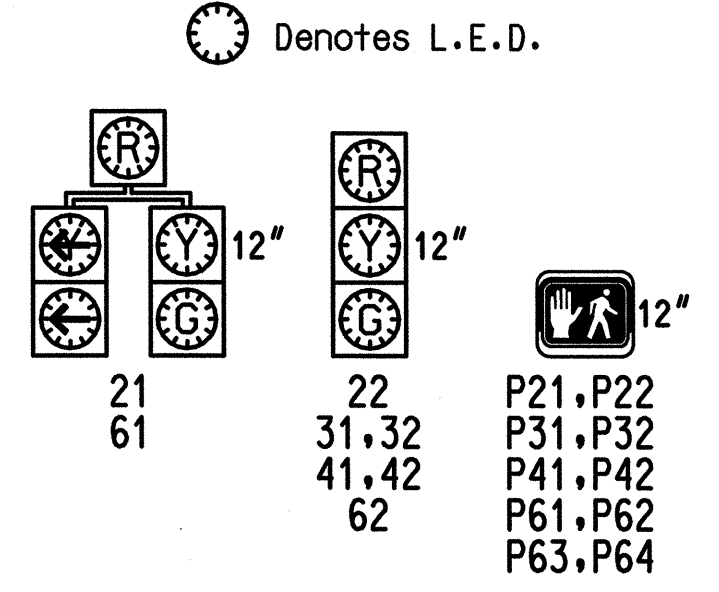


PHASING DIAGRAM DETECTION LEGEND  
 ←●→ DETECTED MOVEMENT  
 ←○→ UNDETECTED MOVEMENT (OVERLAP)  
 - - - UNSIGNALIZED MOVEMENT  
 ←→ PEDESTRIAN MOVEMENT

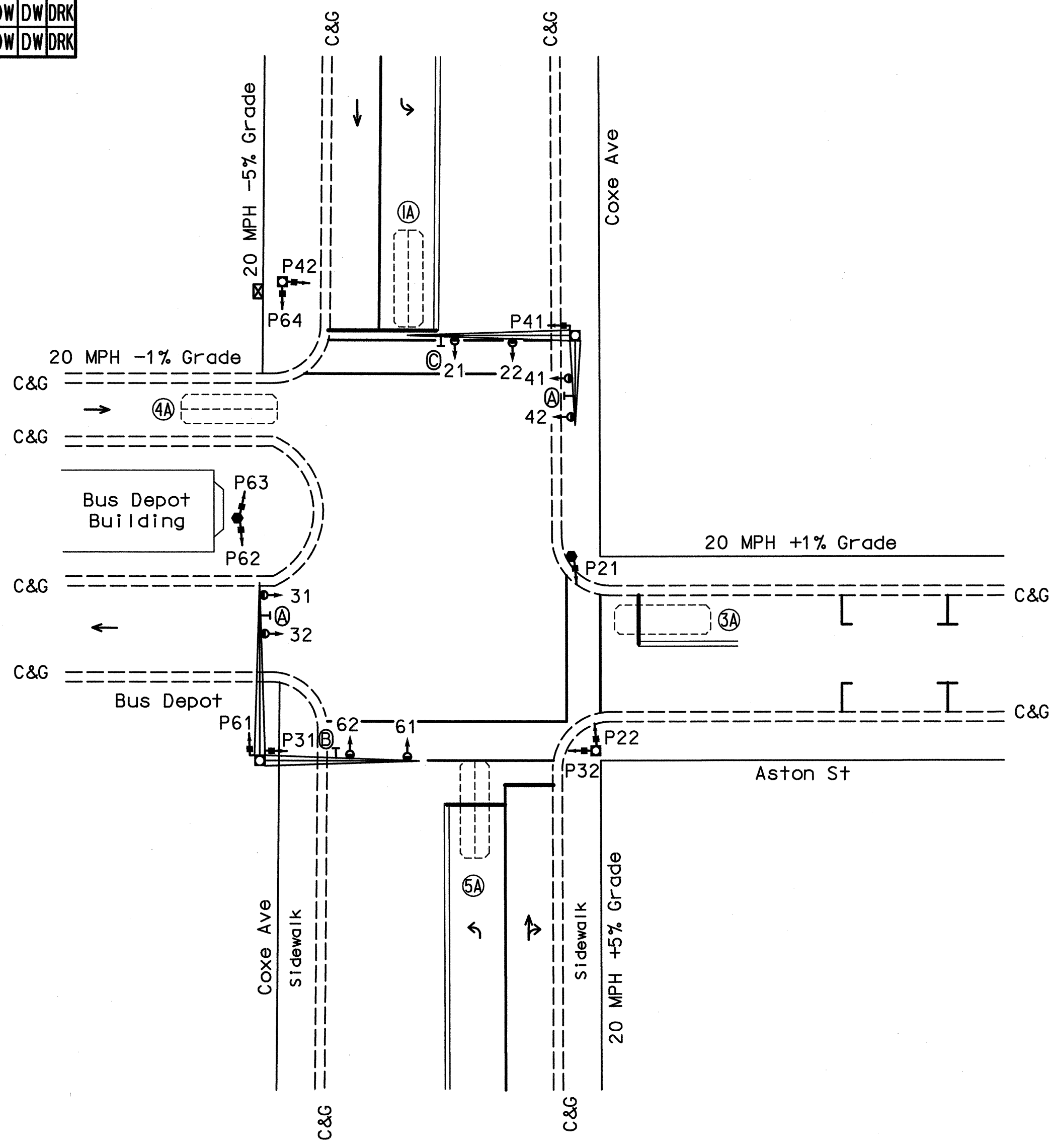
SIGNAL FACE	PHASE						F L C S D
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	
21	R	R	G	G	R	R	Y
22	R	R	G	G	R	R	Y
31,32	R	R	R	R	G	R	R
41,42	R	R	R	R	G	R	R
61	R	G	R	G	R	R	Y
62	R	G	R	G	R	R	Y
P21,P22	DW	DW	W	W	DW	DRK	
P31,P32	DW	DW	DW	DW	W	DRK	
P41,P42	DW	DW	DW	DW	W	DRK	
P61,P62	DW	W	DW	W	DW	DRK	
P63,P64	DW	W	DW	W	DW	DRK	

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

Signal Face I.D.



LOOP	INDUCTIVE LOOPS			DETECTOR PROGRAMMING								
	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	PULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6x20	0	EXISTING	-	1	Y	Y	-	-	15	-	Y
3A	6x20	+6	EXISTING	-	3	Y	Y	-	-	3	-	Y
4A	6x20	0	EXISTING	-	4	Y	Y	-	-	-	-	Y
5A	6x20	+8	EXISTING	-	5	Y	Y	-	-	15	-	Y



FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1*	7	10	7	7	7	10
Extension 1*	1.0	0.0	1.0	2.0	1.0	0.0
Max Green 1*	15	40	20	20	15	40
Yellow Clearance	3.1	3.0	3.0	3.0	3.0	3.1
Red Clearance	2.6	2.9	2.9	2.3	1.6	2.8
Red Revert	2.0	5.0	2.0	2.0	2.0	5.0
Walk 1*	-	36	4	4	-	36
Don't Walk 1	-	4	9	10	-	4
Walk Advance**	-	3.0	3.0	3.0	-	3.0
Seconds Per Actuation*	-	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-	-
Time To Reduce*	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MAX/PED RECALL	-	-	-	MAX/PED RECALL
Vehicle Call Memory	-	-	-	-	-	-
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.  
 \*\* See note 9.

- NOTES
- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
  - Do not program signal for late night flashing operation unless otherwise directed by the engineer.
  - Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1 by progressing through an all red display.
  - Enable Backup Protect for phase 2 to allow the controller to clear from phase 2+6 to phase 5 by progressing through an all red display.
  - Set all detector units to presence mode.
  - Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
  - Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
  - Pavement markings are existing.
  - Program controller to allow an Advance Walk Movement before serving the vehicle phase.
  - 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 #5119

Legend	
Proposed	Existing
○→ Traffic Signal Head	●→ N/A
●→ Modified Signal Head	- Sign
↓ Pedestrian Signal Head With Push Button & Sign	↓ Sign
○ Signal Pole with Guy	● Signal Pole with Guy
○ Signal Pole with Sidewalk Guy	● Signal Pole with Sidewalk Guy
⊠ Inductive Loop Detector	⊠ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Junction Box
--- 2-in underground conduit	--- 2-in underground conduit
N/A Right of Way with Marker	△ Right of Way with Marker
→ Directional Arrow	→ Directional Arrow
○ Pedestrian Signal Pedestal	● Pedestrian Signal Pedestal
N/A Wheelchair Ramp	▲ Wheelchair Ramp
N/A Metal Street Light Pole	□ Metal Street Light Pole
N/A Metal Pole with Mast Arm	⊠ Metal Pole with Mast Arm
N/A "NO TURN ON RED" Sign	ⓐ "NO TURN ON RED" Sign
N/A "RIGHT TURN BUSES ONLY" Sign	ⓑ "RIGHT TURN BUSES ONLY" Sign
N/A "LEFT TURN BUSES ONLY" Sign	ⓒ "LEFT TURN BUSES ONLY" Sign

Signal Upgrade

**HNTB**

HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

**Seal**

**NORTH CAROLINA PROFESSIONAL ENGINEER**

SEAL 028657

PREPARED BY: J.M. Bryan REVIEWED BY: S.T. Franklin

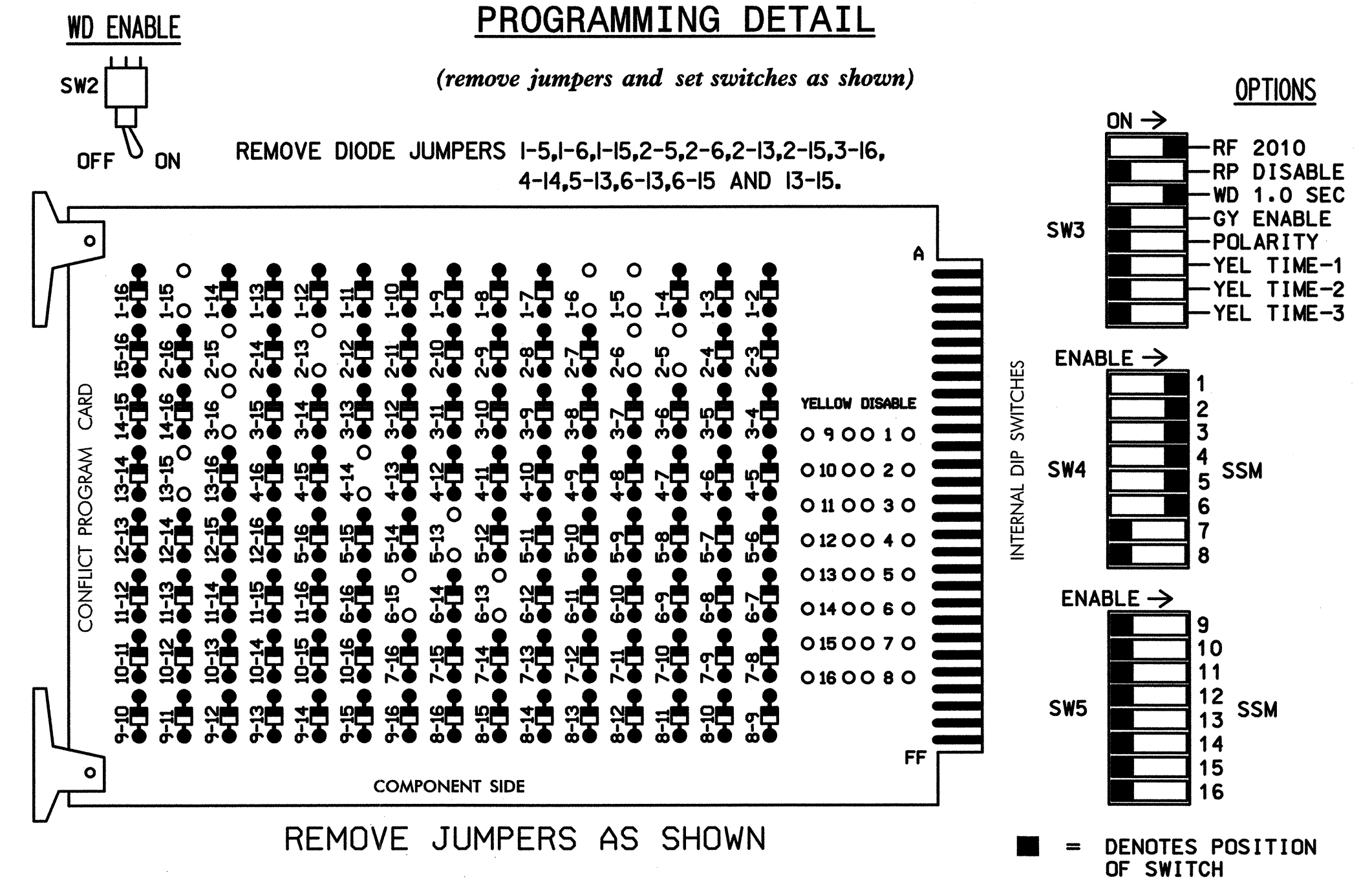
11-3-06

SIGNATURE DATE

SIG. INVENTORY NO. COA 1-19

**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**



**NOTES:**

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

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 7,8,9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2, 3, 4, and 6 for 'STARTUP PED CALL'.
6. The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 207OL  
 CABINET.....CONTRACTOR SUPPLIED 336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S8P  
 PHASES USED.....1,2,3,4,5,6  
 PEDS USED.....2,4,6,8 (Switched to 3)  
 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	3 PED
SIGNAL HEAD NO.	61	21,22	P21, P22	31,32	41,42	P41, P42	21	61,62	P61,P62 P63,P64	NU	NU	P31, P32
RED	*	128		116	101		*	134				
YELLOW		129		117	102			135				
GREEN		130		118	103			136				
RED ARROW												
YELLOW ARROW	126						132					
GREEN ARROW	127						133					
Hand icon			113			104			119			110
Walking person icon			115			106			121			112

NU = Not Used  
 \* Denotes install load resistor. See load resistor installation detail this sheet.  
 \*\* Re-program phase assignment of load switch S8P from default of '8PED' to '3PED'. See 'PED 3 PROGRAMMING DETAIL' below.

**PED 3 PROGRAMMING DETAIL**

(program controller as shown below)

**CHANGING OUTPUT ASSIGNMENTS**

1. FROM MAIN MENU SELECT '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS)
2. ENTER 17 (PHASE 8 DW) FOR OUTPUT ASSIGNMENT # (C1 PIN: 19)
3. SCROLL DOWN TO 'PEDESTRIAN PHASE' AND ENTER 'Y' **REGARDLESS OF DEFAULT PROGRAMMING**
4. ENTER '3' FOR 'SELECT PEDESTRIAN PHASE'. NO CHANGE NEEDED FOR 'SELECT COLOR'
5. BACKUP TO 'OUTPUT ASSIGNMENTS AND SETTINGS MENU:' BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
6. SELECT '1' (OUTPUT ASSIGNMENTS)
7. ENTER 18 (PHASE 8 W) FOR OUTPUT ASSIGNMENT # (C1 PIN 20)
8. REPEAT STEPS # 3 AND # 4.

**CHANGING INPUT ASSIGNMENTS**

1. FROM MAIN MENU SELECT '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
2. CYCLE TO PED DETECTOR #8 BY REPEATEDLY DEPRESSING '+' KEY
3. MODIFY PHASE ASSIGNED TO PED DETECTOR # 8 FROM PHASE 8 TO PHASE 3

PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-19  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**INPUT FILE POSITION LAYOUT**

(front view)

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

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

FS = FLASH SENSE  
 ST = STOP TIME

**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2, 3, 4, and 6 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**BACKUP PROTECTION NOTE**

(program controller as shown below)

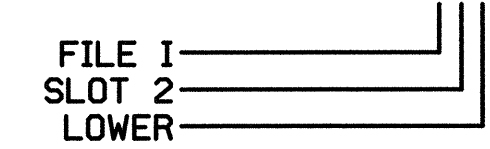
From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2 and 6 for 'Backup Protect'. Make sure the Red Revert times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**INPUT FILE CONNECTION & PROGRAMMING CHART**

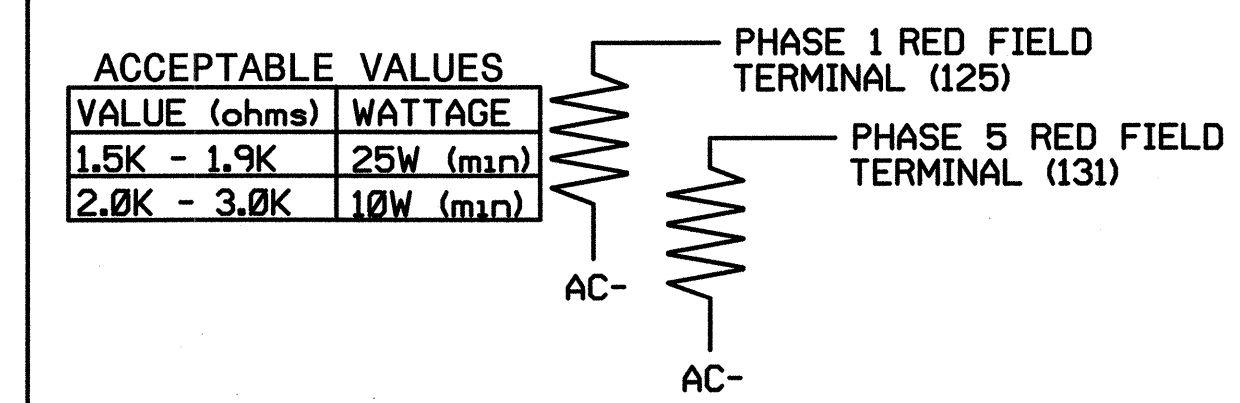
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB21-1,2	I1U	56	18	1	1	Y	Y	-	-	15
3A	TB21-5,6	I3U	58	20	3	3	Y	Y	-	-	3
4A	TB21-7,8	I4U	41	3	4	4	Y	Y	-	-	-
5A	TB21-9,10	I5U	55	17	5	5	Y	Y	-	-	15
PED PUSH BUTTONS											
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					
P31,P32	TB24-11,12	I13L	70	32	PED 8	3 PED					

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

INPUT FILE POSITION LEGEND: I2L



**LOAD RESISTOR INSTALLATION DETAIL**



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

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Coxe Ave at Bus Depot/Aston St

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick

PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

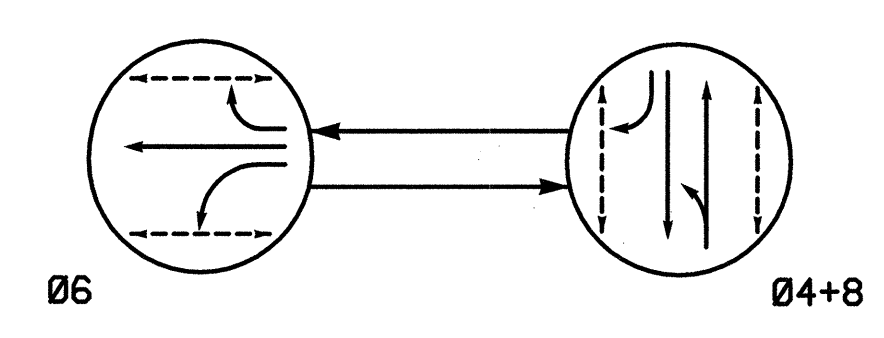
REVISIONS: INIT. DATE

Signature: H. Winstead 11/3/06

SIG. INVENTORY NO. COA 1-19

2 Phase  
Pretimed  
(Asheville Signal System)

PHASING DIAGRAM



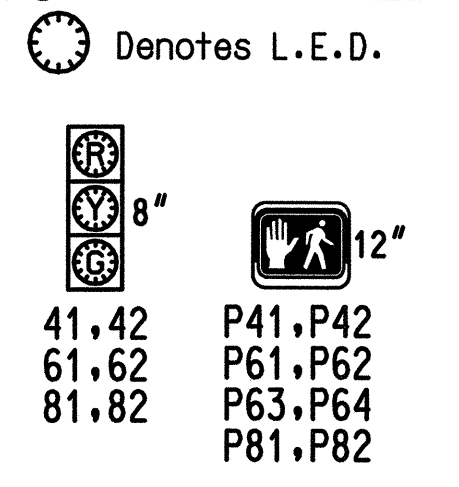
**PHASING DIAGRAM DETECTION LEGEND**

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

SIGNAL FACE	PHASE		
	Ø6	Ø4+8	F
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R
P41,P42	DW	W	DRK
P61,P62	W	DW	DRK
P63,P64	W	DW	DRK
P81,P82	DW	W	DRK

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

Signal Face I.D.

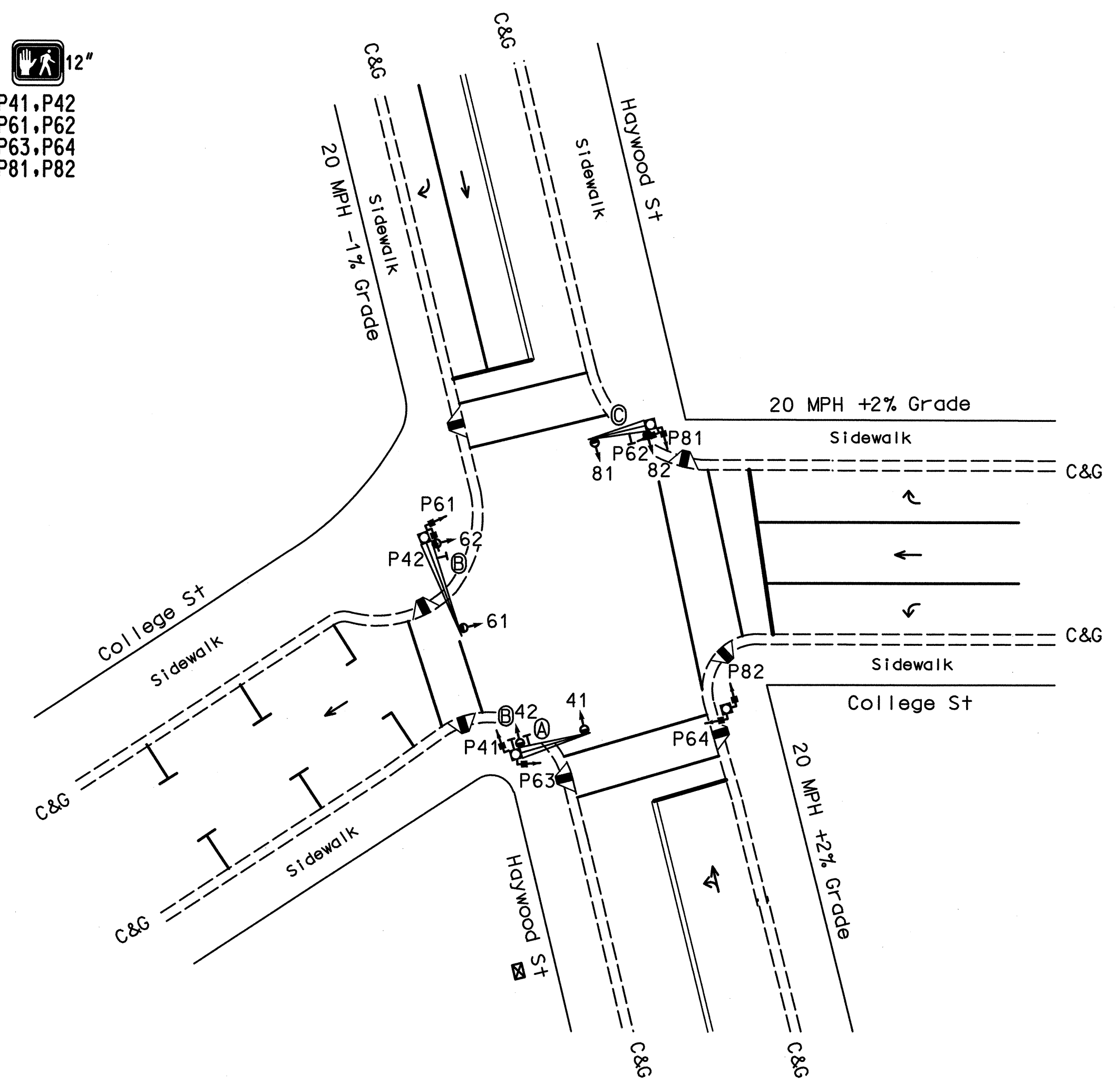


NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the engineer.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Pavement markings are existing.
5. Program controller to allow an Advance Walk Movement before serving the vehicle phase.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the maximum walk duration available within green time.
7. Closed loop system data: Controller Asset #5107

FEATURE	PHASE		
	4	6	8
Min Green 1*	7	10	7
Extension 1*	0.0	0.0	0.0
Max Green 1*	20	30	20
Yellow Clearance	3.0	3.0	3.0
Red Clearance	2.8	2.3	2.8
Walk 1*	16	25	13
Don't Walk 1	4	5	7
Walk Advance**	3.0	3.0	3.0
Seconds Per Actuation*	-	-	-
Max Variable Initial*	-	-	-
Time Before Reduction*	-	-	-
Time To Reduce*	-	-	-
Minimum Gap	-	-	-
Recall Mode	MAX/PED RECALL	MAX/PED RECALL	MAX/PED RECALL
Vehicle Call Memory	-	-	-
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.  
\*\* See note 5.



Proposed		Existing	
○	Traffic Signal Head	●	N/A
○	Modified Signal Head		
⊥	Sign	⊥	
⊥	Pedestrian Signal Head	⊥	
○	Signal Pole with Guy	●	
○	Signal Pole with Sidewalk Guy	●	
□	Inductive Loop Detector	□	
□	Controller & Cabinet	□	
□	Junction Box	□	
---	2-in underground conduit	---	
N/A	Right of Way with Marker	△	
→	Directional Arrow	→	
N/A	Metal Pole with Mast Arm	⊥	
N/A	Metal Street Light Pole	□	
N/A	Wheelchair Ramp	▲	
N/A	No Left Turn Sign (R3-2)	⊙	
N/A	"NO TURN ON RED" Sign (R10-11)	⊙	
N/A	No Right Turn Sign (R3-1)	⊙	

Signal Upgrade

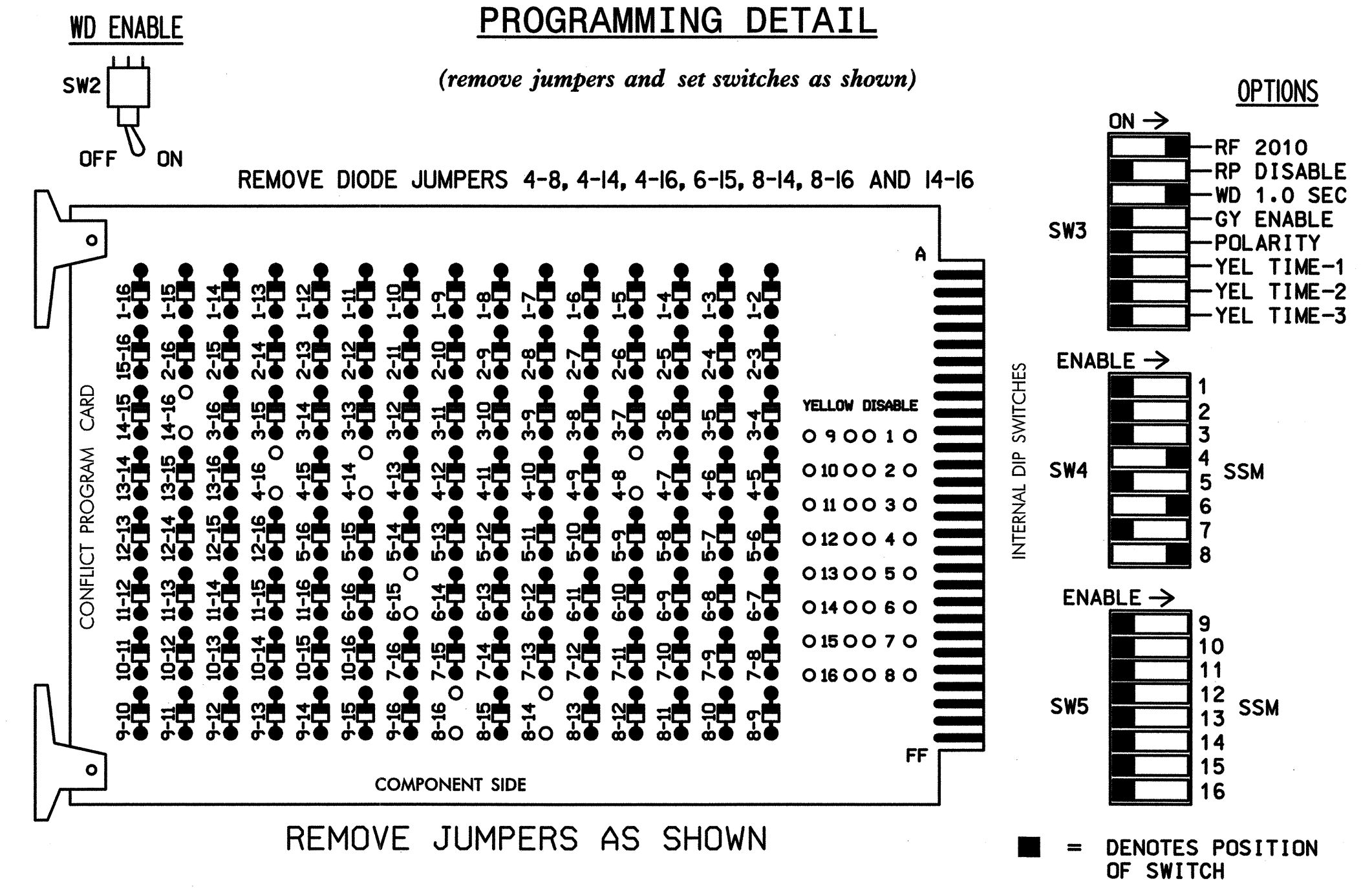
	<b>College St at Haywood St</b>	
	Division 13 Buncombe County Asheville PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin	REVISIONS      INIT.      DATE
	SIGNATURE: <i>Spencer T. Franklin</i> DATE: 11-3-06	
SIG. INVENTORY NO. COA 1-07		

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609



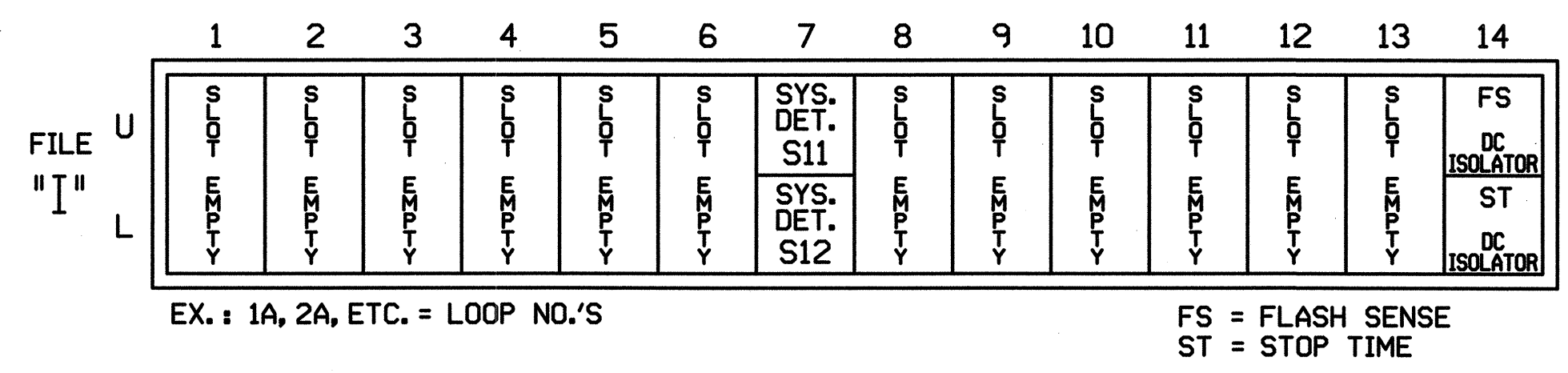


**EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL**



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

**INPUT FILE POSITION LAYOUT (front view)**



**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 1,2,3,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phase 6 on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4, 6 and 8 for 'STARTUP PED CALL'.
- Program the controller to time the maximum walk duration available during green time.
- The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

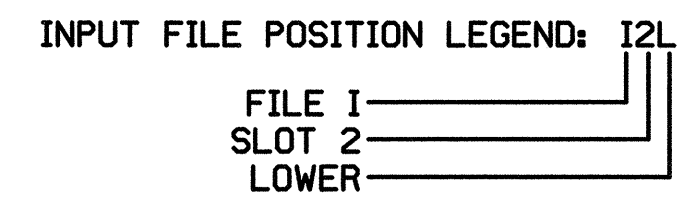
**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S4,S4P,S6,S6P,S8,S8P  
 PHASES USED.....4,6,8  
 PEDS USED.....4,6,8  
 OVERLAPS.....NONE

**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
* S11	TB21-13,14	I7U	57	19	7	SYS					
* S12	TB23-13,14	I7L	50	12	28	SYS					

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



**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	NU	NU	NU	41,42	P41, P42	NU	61,62	P61,P62 P63,P64	NU	81,82	P81, P82
RED					101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon						104			119			110
Walker icon						106			121			112

NU = Not Used

**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 4, 6 and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-06  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

College St at Lexington Ave

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick

PREPARED BY: J.W. Bryan REVIEWED BY: H.L. Winstead

REVISIONS INIT. DATE

122 N. McDowell St., Raleigh, NC 27603

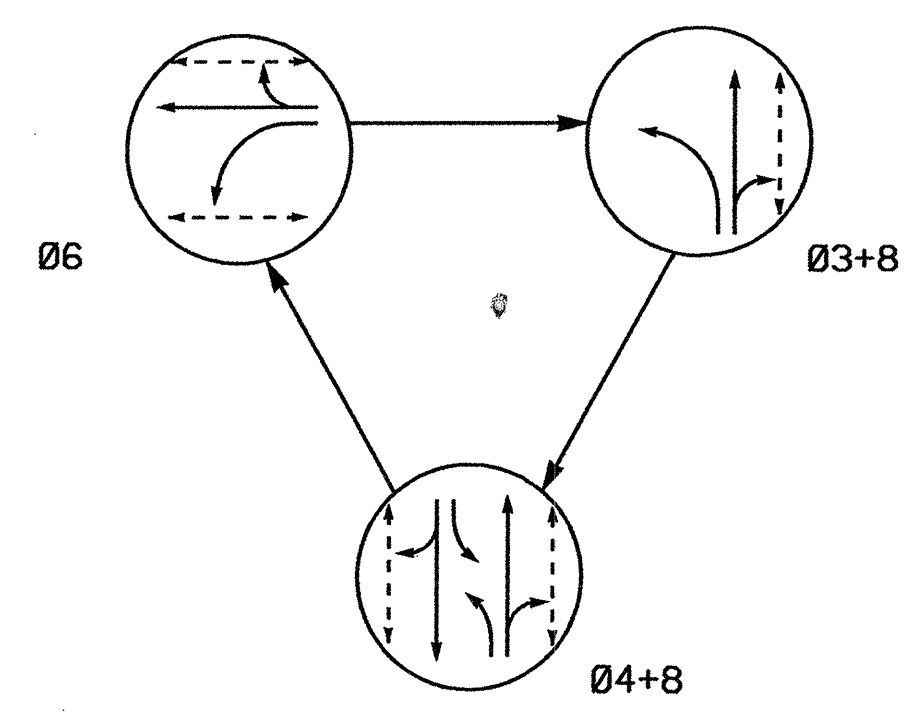
HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 07983 HARVEY L. WINSTEAD, JR.

11/3/06

SIG. INVENTORY NO. COA 1-06

**PHASING DIAGRAM**



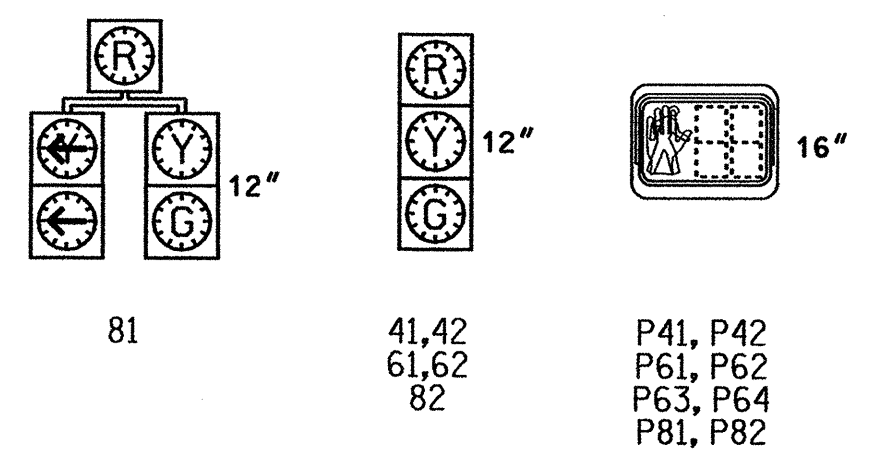
**TABLE OF OPERATION**

SIGNAL FACE	PHASE			
	06	03+8	04+8	F L S H
41,42	R	R	G	R
61,62	G	R	R	Y
81	R	G	G	R
82	R	G	G	R
P41,P42	DW	DW	W	DRK
P61,P62	W	DW	DW	DRK
P63,P64	W	DW	DW	DRK
P81,P82	DW	W	W	DRK

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

**SIGNAL FACE I.D.**

Denotes L.E.D.



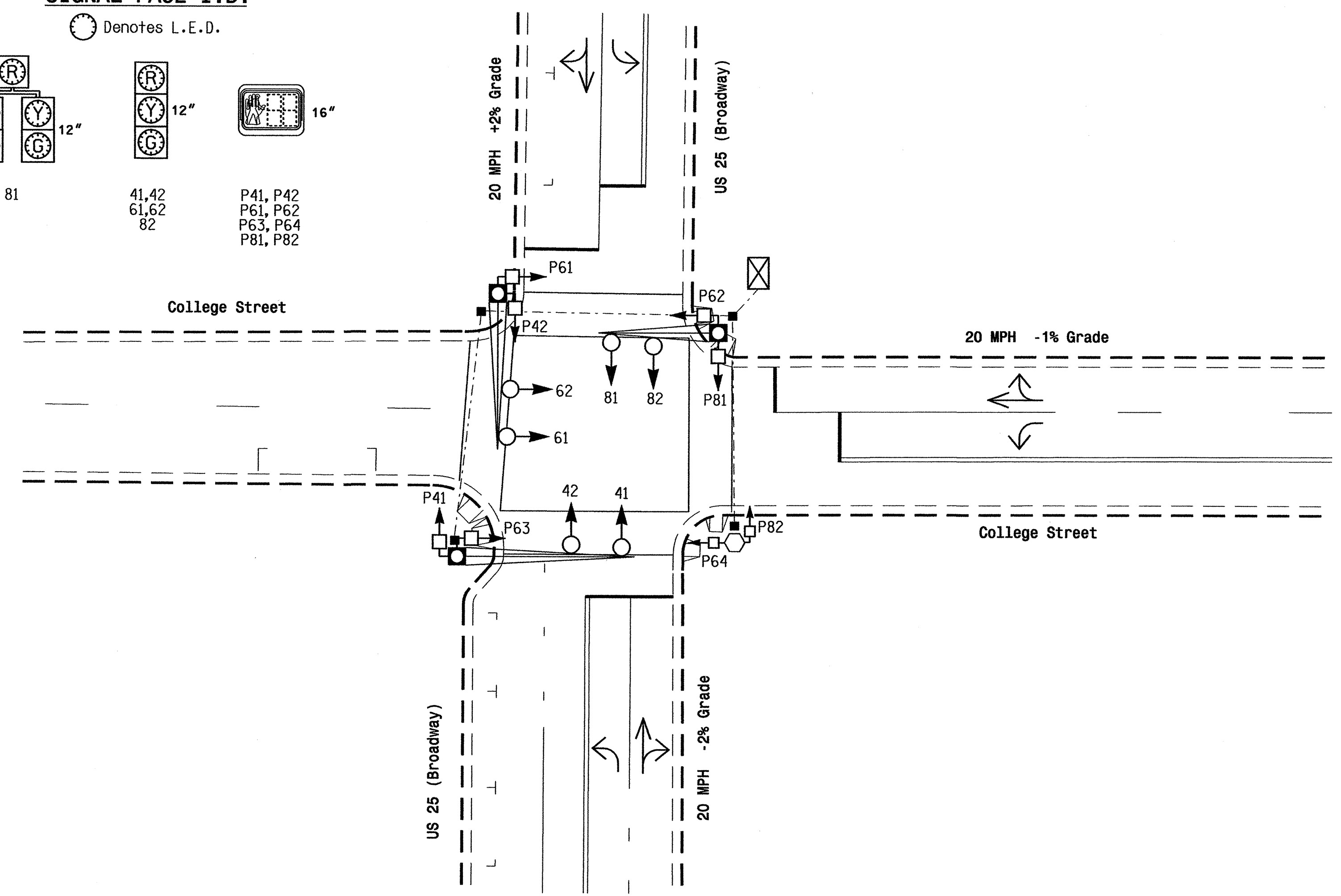
**PHASING DIAGRAM DETECTION LEGEND**

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

**3 Phase Pre-Timed (City of Asheville Signal System)**

**NOTES**

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
5. Program controller to allow an Advance Walk movement before serving the vehicle phase.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the Maximum Walk duration available during green time.
8. Closed loop system data: Controller Asset #0267.



**2070L TIMING CHART**

FEATURE	PHASE			
	3	4	6	8
Min Green 1 *	7	7	10	7
Extension 1 *	0.0	0.0	0.0	0.0
Max Green 1 *	15	20	30	20
Yellow Clearance	3.0	3.0	3.0	3.0
Red Clearance	1.9	2.4	2.3	2.3
Walk 1 *	-	13	21	13
Don't Walk 1	-	7	9	7
Walk Advance **	-	-	3.0	3.0
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX Recall	MAX/PED Recall	MAX/PED Recall	MAX/PED Recall
Vehicle Call Memory	-	-	-	-
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.  
 \*\* See Note 5.

**LEGEND**

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	□ → 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 Right of Way
→ Directional Arrow	→ Directional Arrow
→ Pavement Marking Arrow	→ Pavement Marking Arrow
○ Pedestrian Signal Pedestal	○ Pedestrian Signal Pedestal
○ Metal Pole with Mastarm	○ Metal Pole with Mastarm

**Signal Upgrade**

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

**College Street at US 25 (Broadway)**

Division 13 Buncombe County Asheville

PLAN DATE: November 2006 REVIEWED BY: D.V. Ishak

PREPARED BY: Z.M. Little REVIEWED BY:

SEAL  
  
 E. MULLINS  
 26 November 06

SCALE  
 0 20  
 1"=20'

REVISIONS

NO.	DESCRIPTION	INIT.	DATE

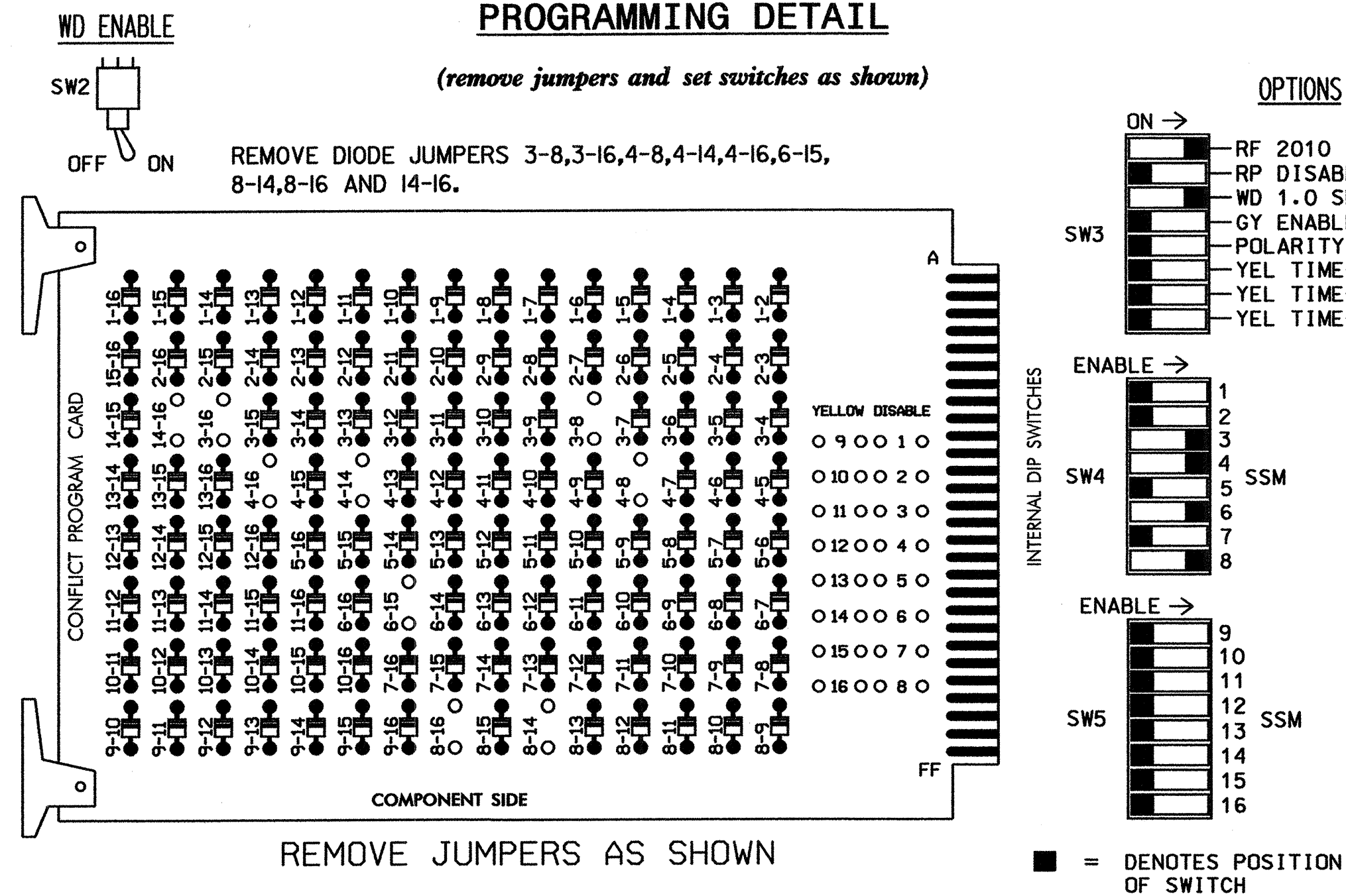
SIGNATURE DATE

SIG. INVENTORY NO. 13-0267

20-Nov-2006 11:20  
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 zmlittle

**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**

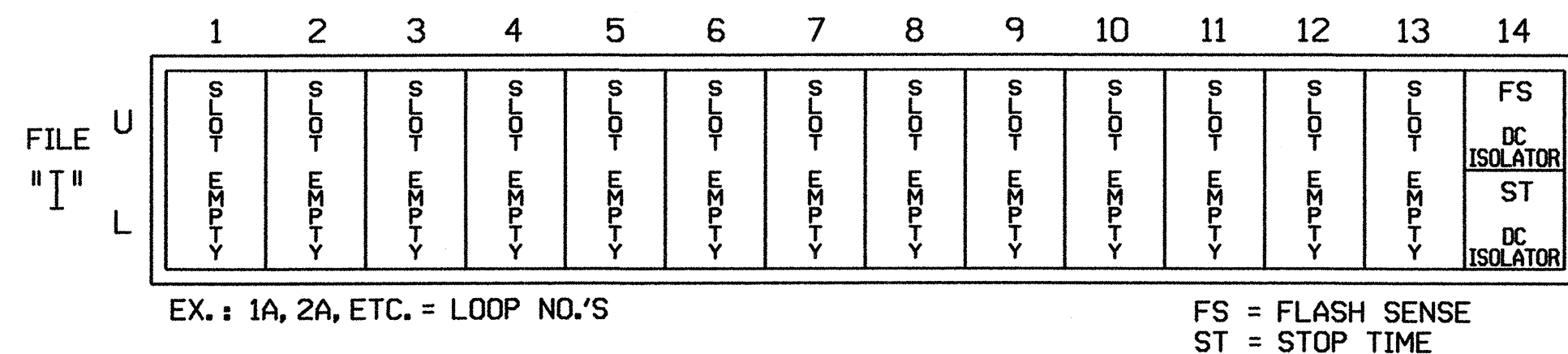


NOTES:

- CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
- MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

**INPUT FILE POSITION LAYOUT**

(front view)



**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 1,2,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phase 6, on the controller unit, for Start Up In Green.
- Enable Simultaneous Gap-Out, on the controller unit, for all phases.
- Program phases 4, 6 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Asheville Signal System.

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
CABINET.....CONTRACTOR SUPPLIED 336  
SOFTWARE.....ECONOLITE OASIS  
CABINET MOUNT.....BASE  
OUTPUT FILE POSITIONS...12  
LOAD SWITCHES USED.....S3,S4,S4P,S6,S6P,S8,S8P  
PHASES USED.....3,4,4 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	NU	NU	81	41,42	P41, P42	NU	61,62	P61,P62 P63,P64	NU	81,82	P81, P82
RED				*	101			134			107	
YELLOW					102			135			108	
GREEN					103			136			109	
RED ARROW												
YELLOW ARROW					117							
GREEN ARROW					118							
↓									104		119	
↓									106		121	

NU = Not Used

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

**COUNTDOWN PEDESTRIAN SIGNAL OPERATION**

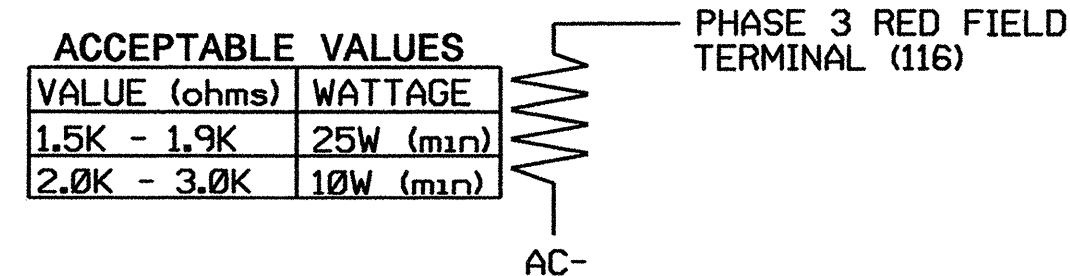
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 6 and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

**LOAD RESISTOR INSTALLATION DETAIL**



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0267  
DESIGNED: November 2006  
SEALED: 11/26/06  
REVISED: N/A

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:

122 N. McDowell St., Raleigh, NC 27603

College Street at US 25 (Broadway)

Division 13 Buncombe County Asheville

PLAN DATE: November 2006 REVIEWED BY: [Signature]

PREPARED BY: C. Strickland REVIEWED BY: [Signature]

REVISIONS	INIT.	DATE

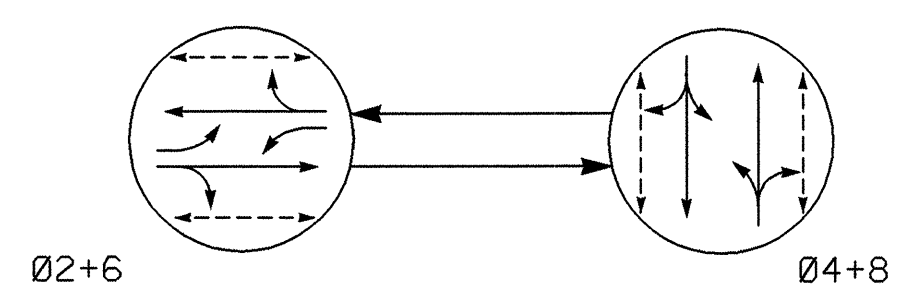
George C. Brown 11/29/06

SIG. INVENTORY NO. 13-0267



2 Phase  
Pretimed  
(Asheville Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

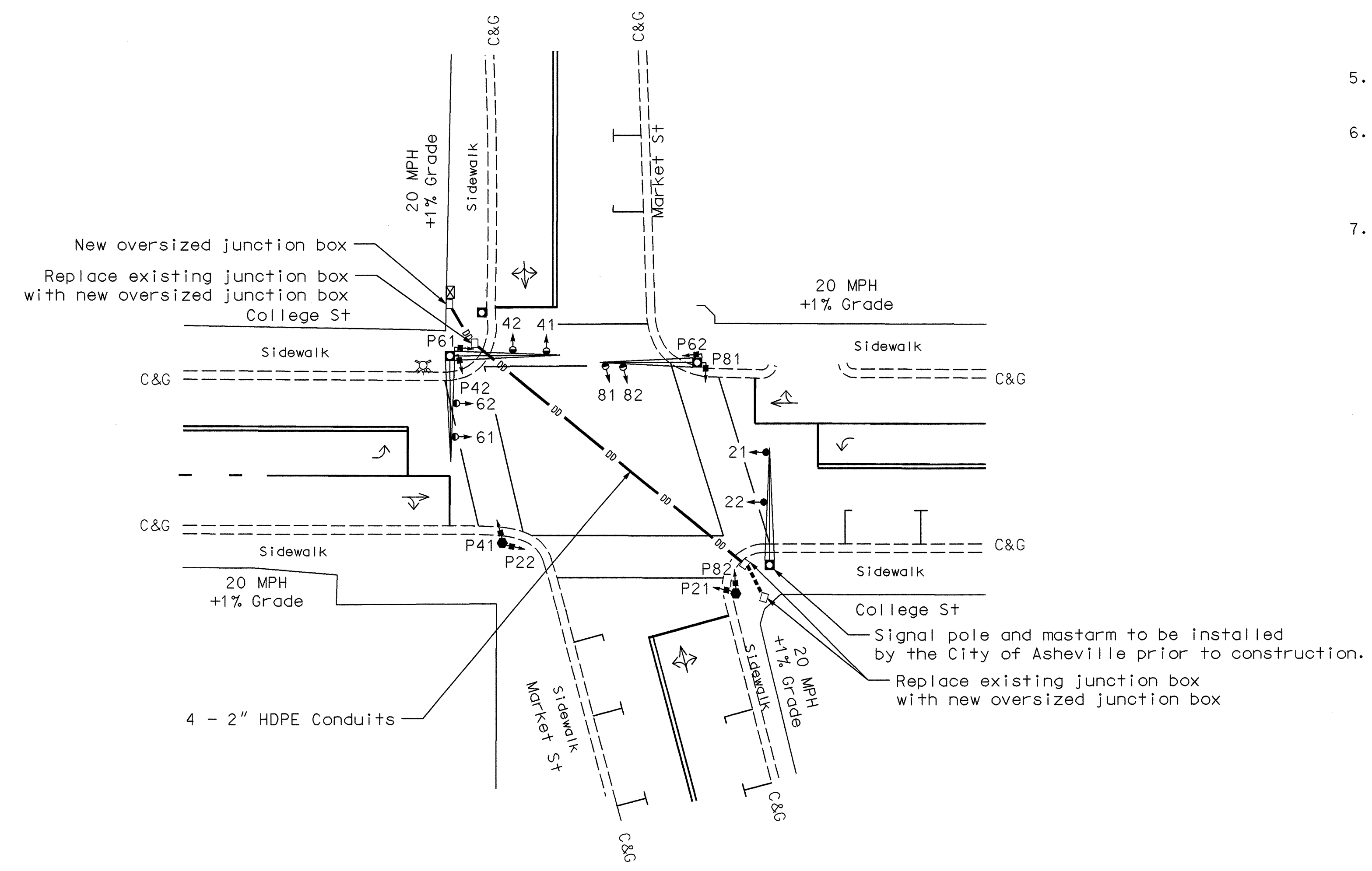
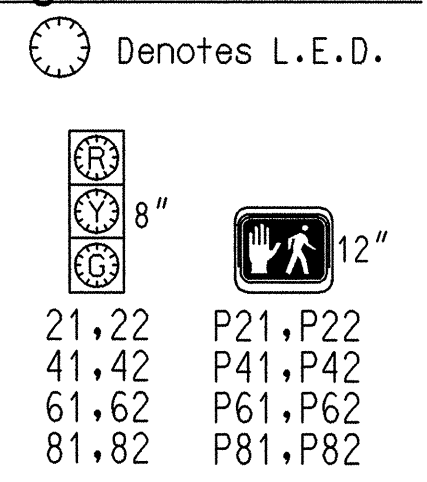
- ←●→ DETECTED MOVEMENT
- ←○→ UNDETECTED MOVEMENT (OVERLAP)
- ←---→ UNSIGNALIZED MOVEMENT
- ←- - -> PEDESTRIAN MOVEMENT

TABLE OF OPERATION

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

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

Signal Face I.D.



NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Revise pavement markings as shown. All pavement markings and raised reflective markings shown are a representation of actual placement criteria. Refer to NCDOT Roadway Standard Drawings for actual placement.
- Program controller to allow an Advance Walk movement before serving the vehicle phase.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the Maximum Walk Duration available during green time.
- Closed loop system data: Controller Asset #5104

FEATURE	PHASE			
	2	4	6	8
Min Green 1*	10	7	10	7
Extension 1*	0.0	0.0	0.0	0.0
Max Green 1*	30	20	30	20
Yellow Clearance	3.0	3.0	3.0	3.0
Red Clearance	2.4	2.3	2.3	2.4
Walk 1*	21	13	23	11
Don't Walk 1	9	7	7	9
Walk Advance**	3.0	3.0	3.0	3.0
Seconds Per Actuation*	-	-	-	-
Max Variable Initial*	-	-	-	-
Time Before Reduction*	-	-	-	-
Time To Reduce*	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAXPED RECALL	MAXPED RECALL	MAXPED RECALL	MAXPED RECALL
Vehicle Call Memory	-	-	-	-
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. Use the maximum walk duration available within the green time.  
\*\* See note 5.

Proposed	Existing
○→ Traffic Signal Head	●→ Traffic Signal Head
●→ Modified Signal Head	N/A
⊥ Sign	⊥ Sign
⊥ Pedestrian Signal Head	⊥ Pedestrian Signal Head
○ Signal Pole with Guy	● Signal Pole with Guy
○ Signal Pole with Sidewalk Guy	● Signal Pole with Sidewalk Guy
□ Inductive Loop Detector	□ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Controller & Cabinet
□ Junction Box	□ Junction Box
□ Oversized Junction Box	■ Oversized Junction Box
--- 2-in underground conduit	--- 2-in underground conduit
N/A Right of Way with Marker	△ Right of Way with Marker
→ Directional Arrow	→ Directional Arrow
∞ Directional Drill	N/A
N/A Metal Pole with Mast Arm	⊥ Metal Pole with Mast Arm
N/A Metal Street Light Pole	⊠ Metal Street Light Pole
○ Pedestrian Signal Pedestal	● Pedestrian Signal Pedestal
N/A Wheelchair Ramp	▤ Wheelchair Ramp

Signal Upgrade

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

**College St at Market St**

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick  
PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin

REVISIONS: \_\_\_\_\_ INIT. DATE

SCALE: 1"=20'

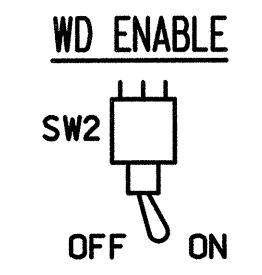
SEAL

SEAL 028657  
ENGINEER T. FRANKLIN

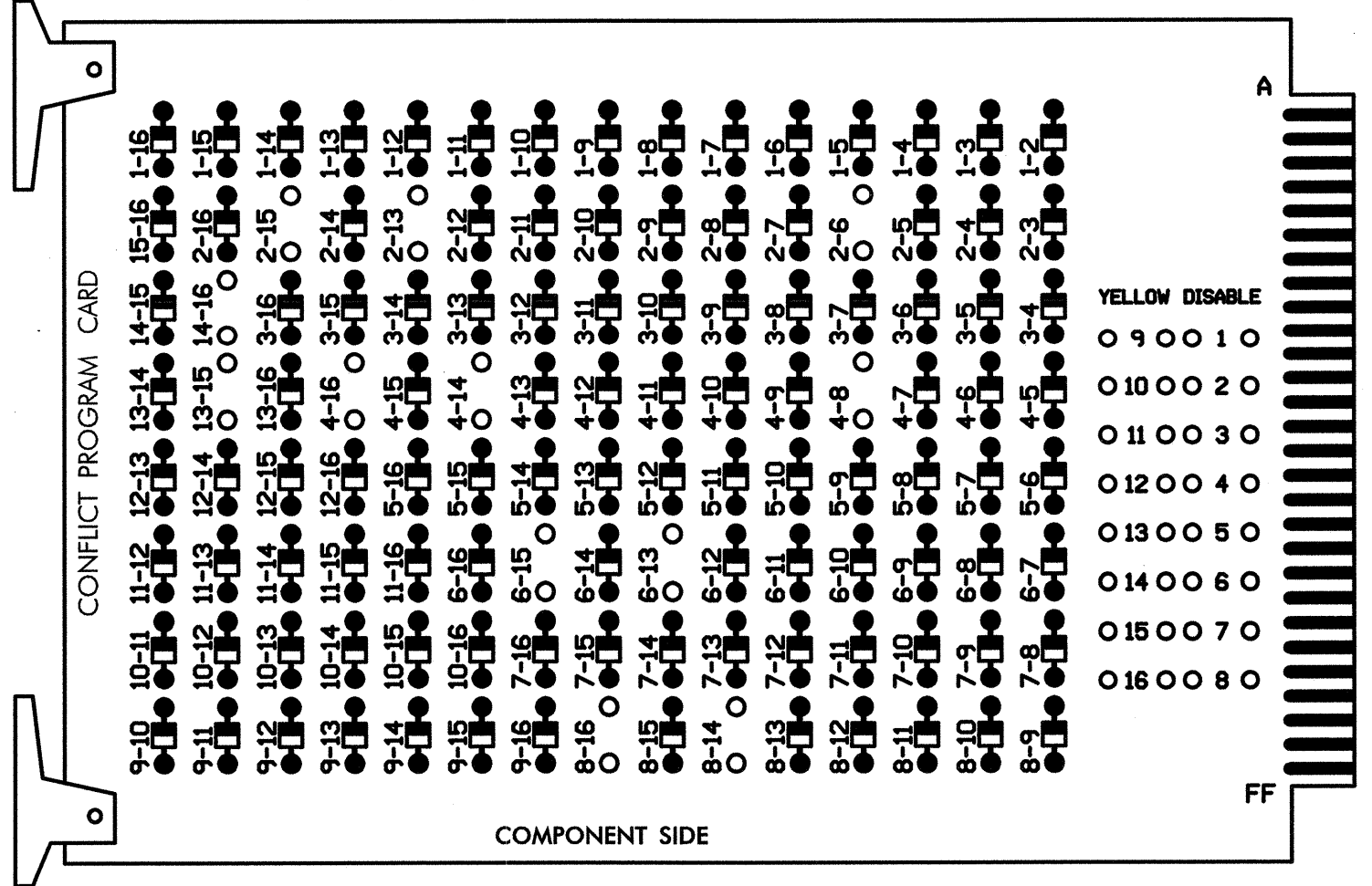
SIGNATURE: \_\_\_\_\_ DATE: 4/26/06  
SIG. INVENTORY NO. COA 1-04

### EDI MODEL 2010ECL CONFLICT MONITOR

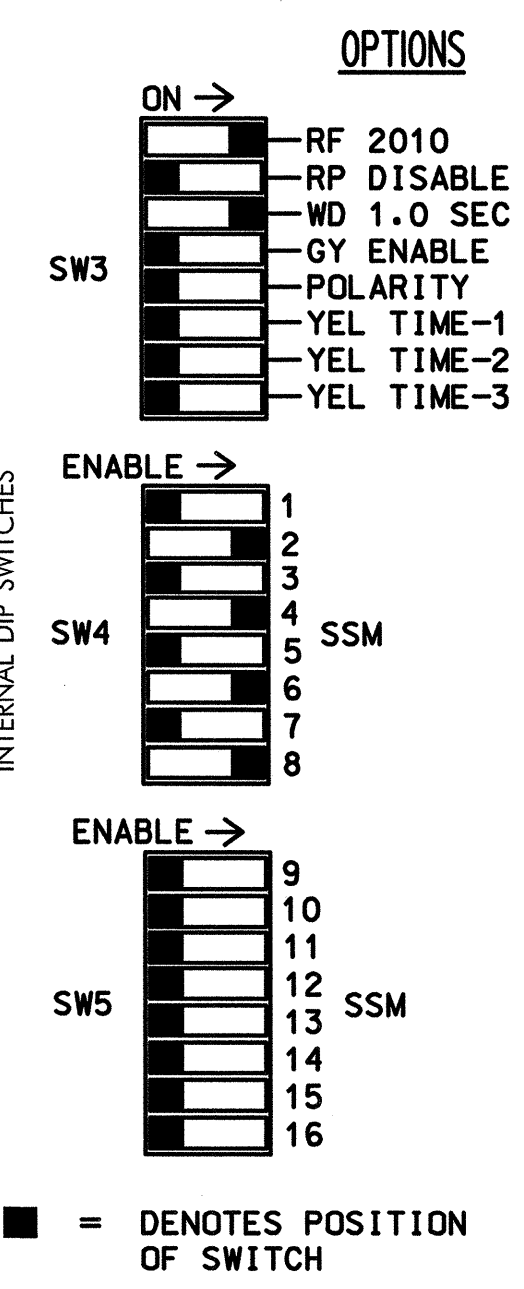
#### PROGRAMMING DETAIL



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



REMOVE JUMPERS AS SHOWN

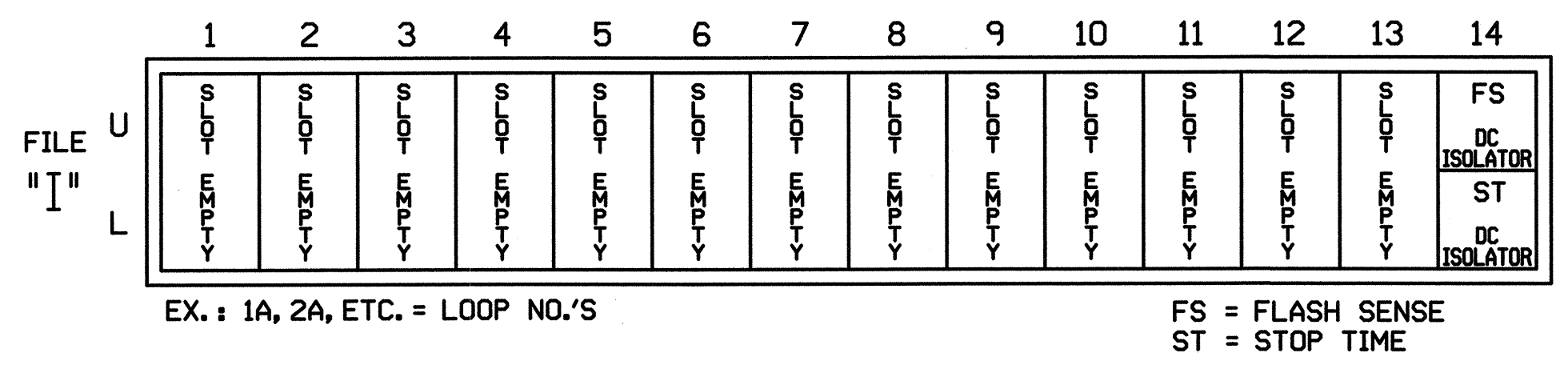


**NOTES:**

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

#### INPUT FILE POSITION LAYOUT

(front view)



#### 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 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- Program the controller to time the maximum walk duration available during green time.
- The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

#### EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S2P,S4,S4P,S6,S6P,S8,S8P  
 PHASES USED.....2,4,6,8  
 PEDS USED.....2,4,6,8  
 OVERLAPS.....NONE

#### SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
			113			104			119			110
			115			106			121			112

NU = Not Used

#### ADVANCED WALK PROGRAMMING NOTE

(program controller as shown below)

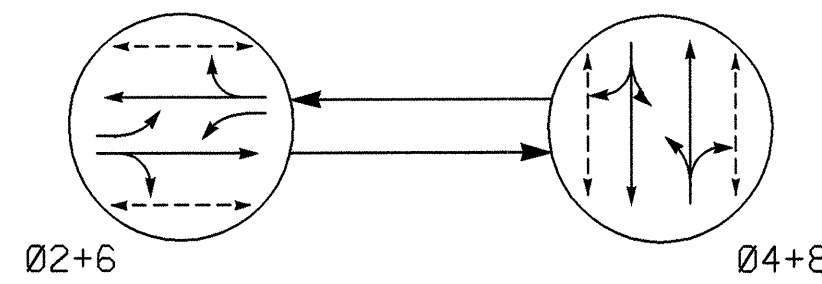
From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2, 4, 6, and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-04  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

#### Signal Upgrade

	College St at Market St		
	Division 13 Buncombe County Asheville		
ELECTRICAL AND PROGRAMMING DETAILS FOR:	PLAN DATE: August 2005 PREPARED BY: T.R. Terrell	REVIEWED BY: N.M. Rodevick REVIEWED BY: H.L. Winstead	SEAL
	REVISIONS	INIT. DATE	SIGNATURE DATE
122 N. McDowell St., Raleigh, NC 27603	HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609	H.L. Winstead 11/3/06	SIG. INVENTORY NO. COA 1-04

**PHASING DIAGRAM**



**PHASING DIAGRAM DETECTION LEGEND**

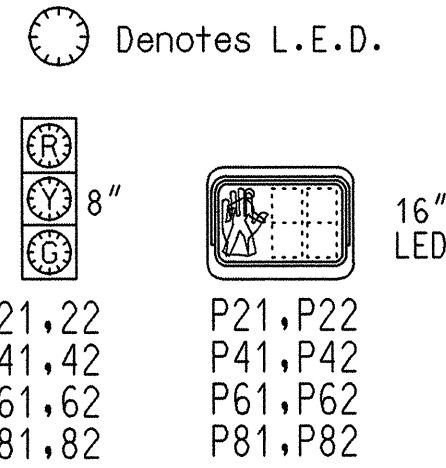
- ◄●► DETECTED MOVEMENT
- ◄◄◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄◄◄ UNSIGNALIZED MOVEMENT
- ◄◄◄ PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

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

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

**Signal Face I.D.**



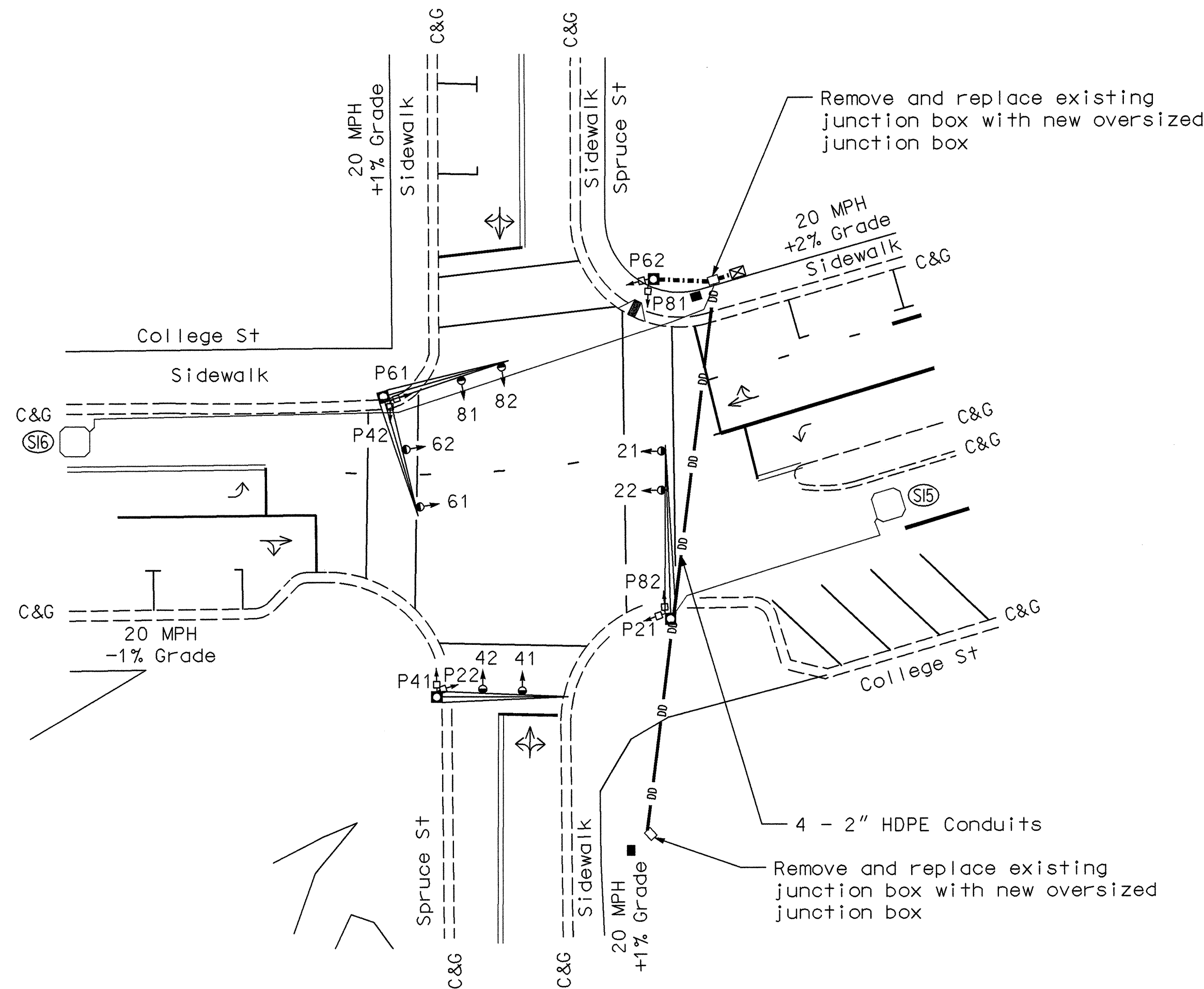
**2070L LOOP & DETECTOR INSTALLATION**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING							
				NEW LOOP	PHASE	CALLING EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CAB
SI5	6x6	+125	3	Y	-	-	-	-	-	Y	Y
SI6	6x6	+110	3	Y	-	-	-	-	-	Y	Y

**2 Phase Pretimed (Asheville Signal System)**

**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pavement markings are existing.
- Program controller to allow an Advance Walk movement before serving the vehicle phase.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. Use the Maximum Walk Duration available during green time.
- Closed loop system data: Controller Asset #5103



**2070L TIMING CHART**

FEATURE	PHASE			
	2	4	6	8
Min Green 1*	10	7	10	7
Extension 1*	0.0	0.0	0.0	0.0
Max Green 1*	30	20	30	20
Yellow Clearance	3.0	3.0	3.0	3.0
Red Clearance	2.3	2.8	2.3	2.8
Walk 1*	26	13	24	9
Don't Walk 1	4	7	6	11
Walk Advance**	3.0	3.0	3.0	3.0
Seconds Per Actuation*	-	-	-	-
Max Variable Initial*	-	-	-	-
Time Before Reduction*	-	-	-	-
Time To Reduce*	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX/PED RECALL	MAX/PED RECALL	MAX/PED RECALL	MAX/PED RECALL
Vehicle Call Memory	-	-	-	-
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. Use the maximum walk duration available within the green time.  
\*\* See note 6.

**Legend**

- | Proposed                         | Existing                     |
|----------------------------------|------------------------------|
| ○→ Traffic Signal Head           | ●→                           |
| ◐→ Modified Signal Head          | N/A                          |
| ◑→ Sign                          | +                            |
| ◓→ Pedestrian Signal Head        | ◓→                           |
| ○→ Signal Pole with Guy          | ●→                           |
| ○→ Signal Pole with Sidewalk Guy | ●→                           |
| ▭→ Inductive Loop Detector       | ▭→                           |
| ▭→ Controller & Cabinet          | ▭→                           |
| ▭→ Junction Box                  | ▭→                           |
| ▭→ Oversized Junction Box        | ▭→                           |
| --- 2-in underground conduit     | --- 2-in underground conduit |
| N/A Right of Way with Marker     | △→                           |
| N/A Directional Arrow            | →                            |
| N/A Metal Pole with Mast Arm     | ◑→                           |
| N/A Metal Street Light Pole      | ◑→                           |
| N/A Wheelchair Ramp              | ▭→                           |

**Signal Upgrade**

**College St/Pack Square at Spruce St**

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick  
PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin

SCALE: 1"=20'

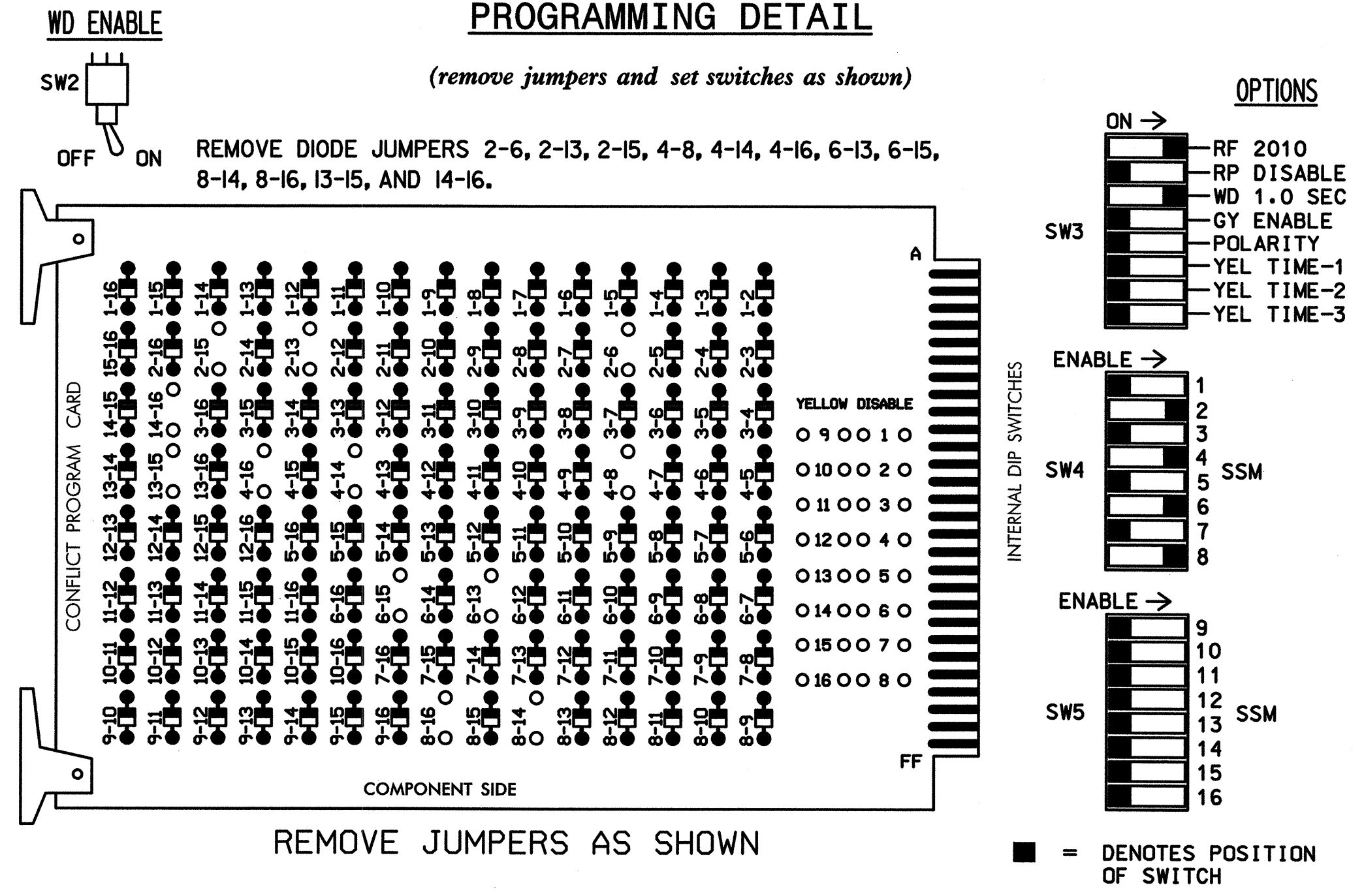
SEAL  
NORTH CAROLINA PROFESSIONAL ENGINEER  
S.T. FRANKLIN  
028657

11/3/06  
SIGNATURE DATE

SIG. INVENTORY NO. COA 1-03

**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**



REMOVE JUMPERS AS SHOWN

**NOTES:**

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

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 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 2, 4, 6 and 8 for 'STARTUP PED CALL'.
- Program the controller to time the maximum walk duration available during green time.
- The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon			113			104			119			110
Walking person icon			115			106			121			112

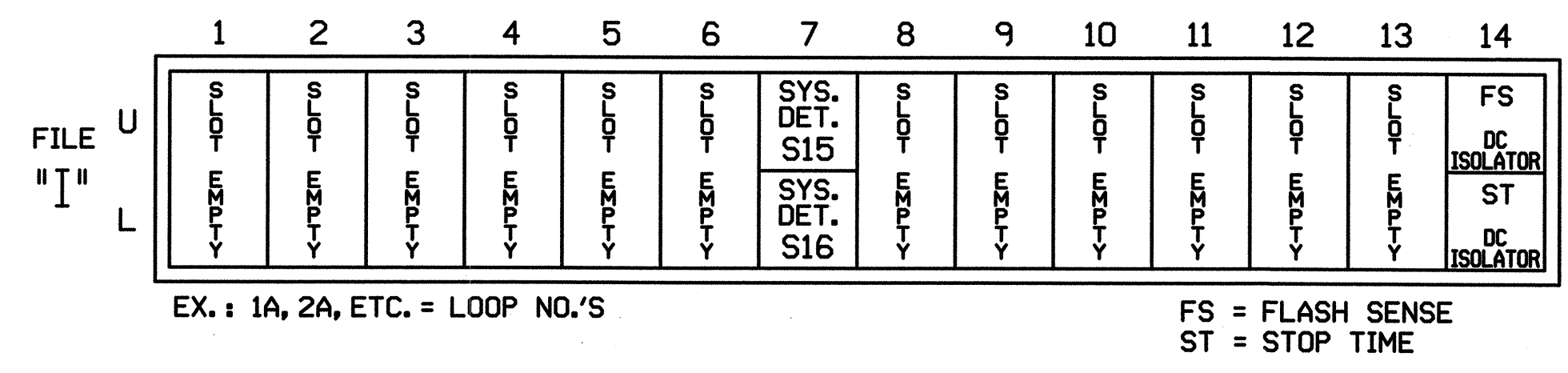
NU = Not Used

**EQUIPMENT INFORMATION**

CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....BASE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S2P,S4,S4P,S6,S6P,S8,S8P  
 PHASES USED.....2,4,6,8  
 PEDS USED.....2,4,6,8  
 OVERLAPS.....NONE

**INPUT FILE POSITION LAYOUT**

(front view)



**ADVANCED WALK PROGRAMMING NOTE**

(program controller as shown below)

From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Program phases 2, 4, 6 and 8 for 'Advanced Walk'. Make sure the Walk Advance times shown on the Signal Design Plans are programmed in the 'Phase Timing' menu.

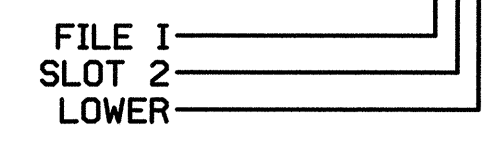
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: COA 1-03  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**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
* S15	TB21-13,14	I7U	57	19	7	SYS					
* S16	TB23-13,14	I7L	50	12	28	SYS					

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

**INPUT FILE POSITION LEGEND: I2L**



**COUNTDOWN PEDESTRIAN SIGNAL OPERATION**

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

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

College St/Pack Square at Spruce St

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick

PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

REVISIONS INIT. DATE

122 N. McDowell St., Raleigh, NC 27603

HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609

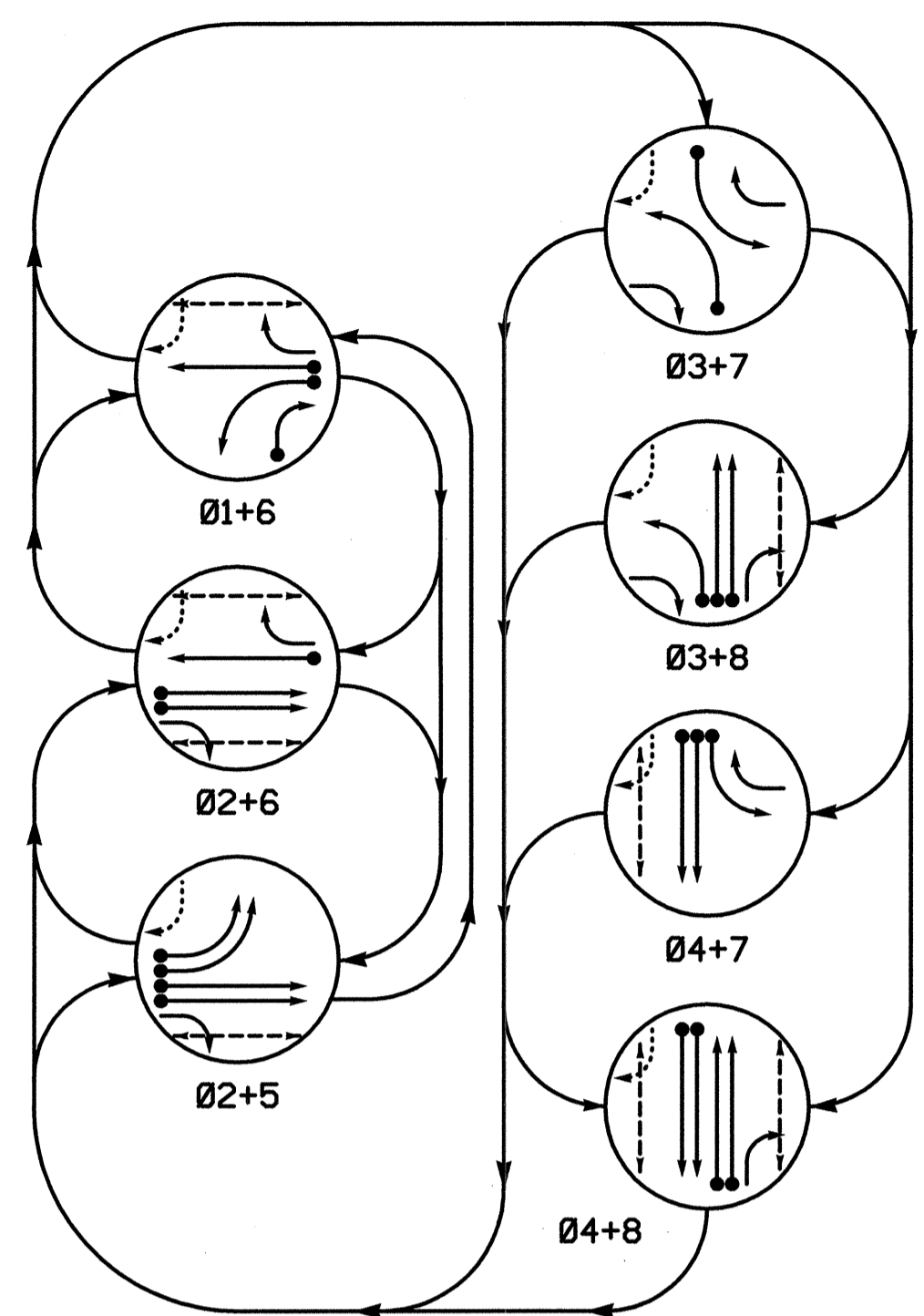
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 07983 HAYLEY L. WINSTEAD, EIT

SIGNATURE DATE 11/13/06

SIG. INVENTORY NO. COA 1-03

7 Phase Fully Actuated (Asheville Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

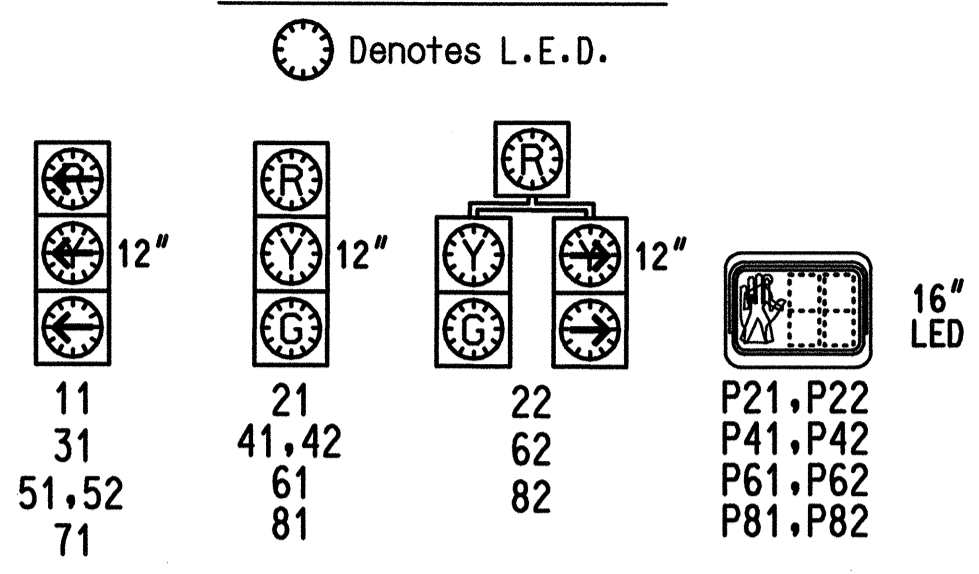
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE							
	Ø2+5	Ø2+6	Ø1+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	PEDEST
11	R	R		R	R	R	R	Y
21	G	G	R	R	R	R	R	Y
22	G	G	R	R	R	R	R	Y
31	R	R	R		R	R	R	Y
41,42	R	R	R	R	R	G	G	R
51,52		R	R	R	R	R	R	Y
61	R	G	G	R	R	R	R	Y
62	R	G	G	R	R	R	R	Y
71	R	R	R		R	R	R	Y
81	R	R	R	R	G	G	R	
82	R	R	R	R	G	G	R	
P21,P22	W	W	DW	DW	DW	DW	DRK	
P41,P42	DW	DW	DW	DW	DW	W	DRK	
P61,P62	DW	W	W	DW	DW	DW	DRK	
P81,P82	DW	DW	DW	DW	W	DW	W	DRK

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

SIGNAL FACE I.D.

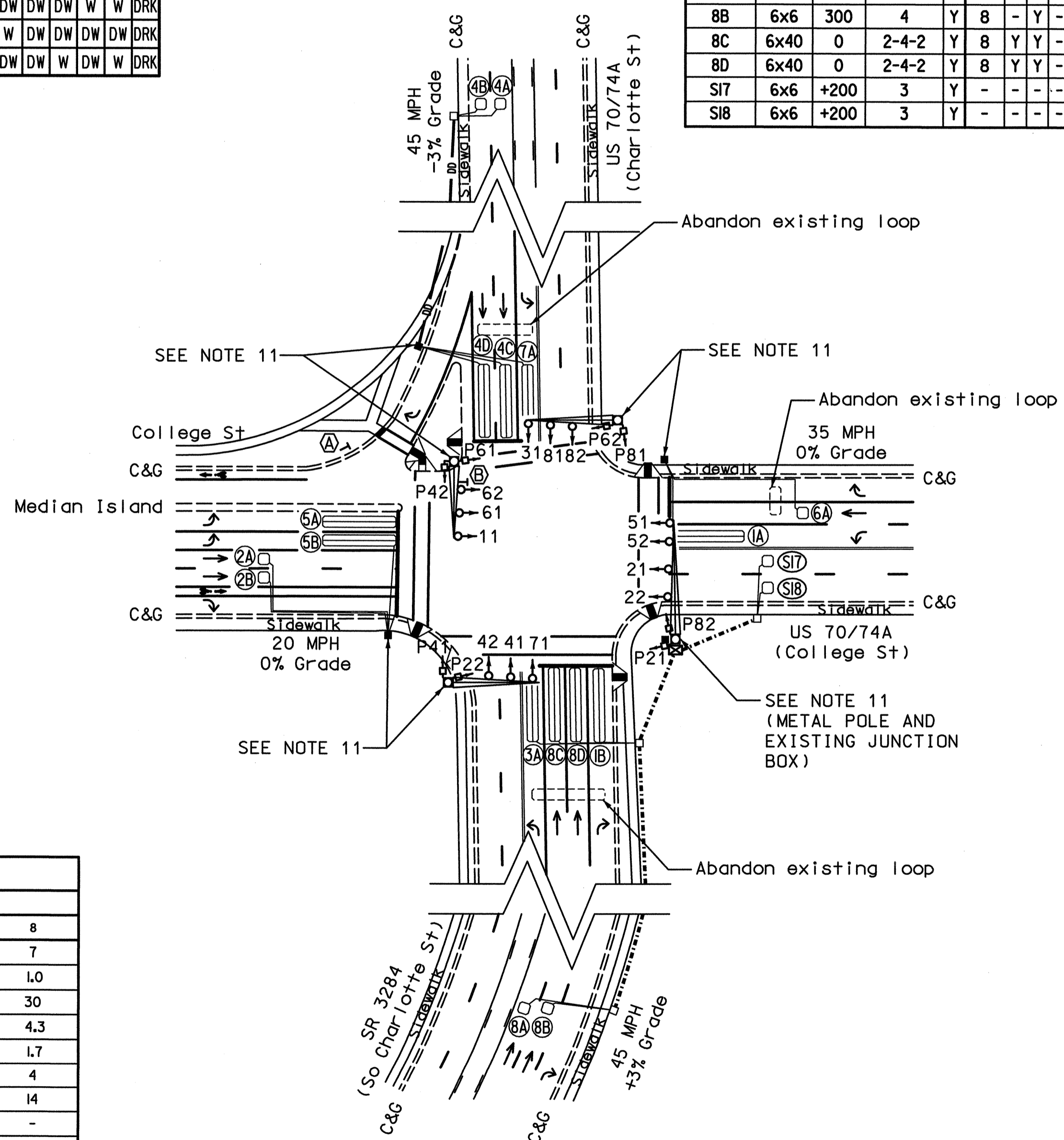


2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
IA	6x40	0	2-4-2	Y	1	Y	Y	-	-	3	-	Y
IB	6x40	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
2A	6x6	70	4	Y	2	Y	Y	-	-	-	-	Y
2B	6x6	70	4	Y	2	Y	Y	-	-	-	-	Y
3A	6x40	0	2-4-2	Y	3	Y	Y	-	-	3	-	Y
4A	6x6	300	5	Y	4	-	Y	-	3.4	-	-	Y
4B	6x6	300	5	Y	4	-	Y	-	3.4	-	-	Y
4C	6x40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
4D	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	-	-	-	-	Y
6A	6x6	70	4	Y	6	Y	Y	-	-	-	-	Y
7A	6x40	0	2-4-2	Y	7	Y	Y	-	-	3	-	Y
8A	6x6	300	4	Y	8	-	Y	-	3.4	-	-	Y
8B	6x6	300	4	Y	8	-	Y	-	3.4	-	-	Y
8C	6x40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
8D	6x40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
SI7	6x6	+200	3	Y	-	-	-	-	-	-	Y	Y
SI8	6x6	+200	3	Y	-	-	-	-	-	-	Y	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2006 and "Standard Specifications for Roads and Structures" dated January 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the engineer.
3. Phase 1 or phase 5 may lead. Phase 1 and 5 shall not run simultaneously.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Run signal cable and/or lead-in cable in existing underground conduit to be installed by others prior to construction.
12. Closed loop system data: Controller Asset #0401



2070L TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	7	10	7	7	7	10	7	7
Extension 1*	2.0	3.0	2.0	1.0	2.0	3.0	2.0	1.0
Max Green 1*	20	40	20	30	20	40	20	30
Yellow Clearance	3.0	3.0	3.0	4.8	3.0	3.8	3.0	4.3
Red Clearance	3.3	3.8	3.3	1.6	3.3	2.6	3.1	1.7
Walk 1*	-	4	-	4	-	4	-	4
Don't Walk 1	-	20	-	16	-	17	-	14
Seconds Per Actuation*	-	-	-	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-	-	-	-
Time To Reduce*	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	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	● → Existing
● → Modified Signal Head	N/A
— Sign	— Existing
□ → Pedestrian Signal Head With Push Button & Sign	□ → Existing
○ → Signal Pole with Guy	● → Existing
○ → Signal Pole with Sidewalk Guy	● → Existing
□ → Inductive Loop Detector Controller & Cabinet	□ → Existing
□ → Junction Box	□ → Existing
--- 2-in underground conduit	--- Existing
N/A Right of Way with Marker	— Existing
→ Directional Arrow	→ Existing
→ Directional Drill	N/A
N/A Metal Pole with Mast Arm	→ Existing
N/A Wheelchair Ramp	→ Existing
⊙ "YIELD" Sign (R1-2)	N/A
⊙ Right Arrow "ONLY" Sign (R3-5R)	N/A

Signal Upgrade

US 70/74A (College St)  
at  
SR 3284 (So Charlotte St) /  
US 70/74A (Charlotte St)

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick

PREPARED BY: T.R. Terrell REVIEWED BY: S.T. Franklin

SEAL

HNTB HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

SCALE 0 50  
1"=50'

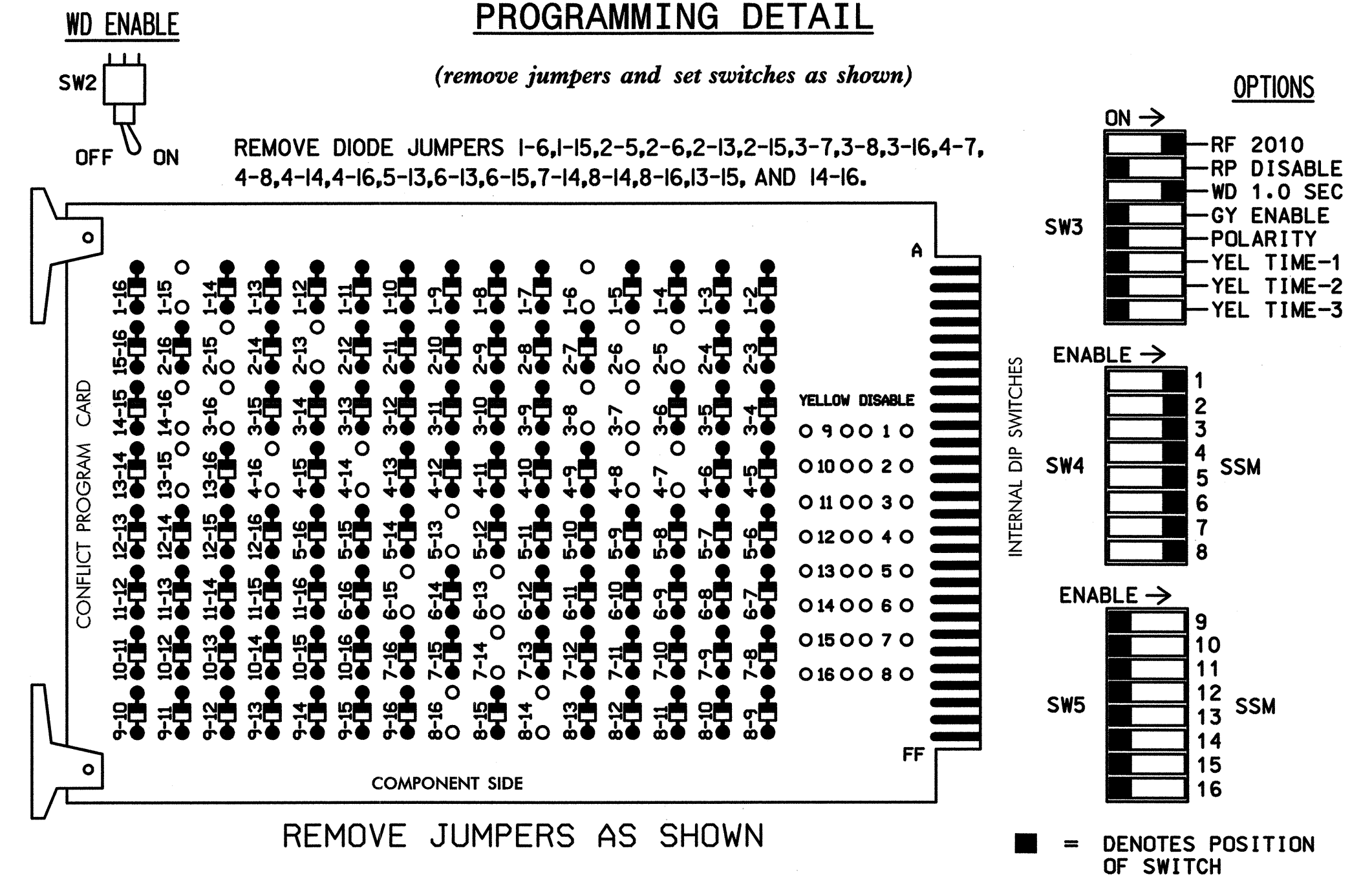
REVISIONS

INIT.	DATE

SIGNATURE DATE  
11-3-06  
SIG. INVENTORY NO. 13-0401

**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**



**NOTES:**

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

**NOTES**

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 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, 4, 6 and 8 for 'STARTUP PED CALL'.
- The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**EQUIPMENT INFORMATION**

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

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P			
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED			
SIGNAL HEAD NO.	11	82	21,22	P21, P22	31	22	41,42	P41, P42	51,52	61,62	P61, P62	71	62	81,82	P81, P82
RED			128			101			134					107	
YELLOW			129			102			135					108	
GREEN			130			103			136					109	
RED ARROW	125				116			131			122				
YELLOW ARROW	126	126			117	117		132			123	123			
GREEN ARROW	127	127			118	118		133			124	124			
Hand icon					113			104			119				110
Walking person icon					115			106			121				112

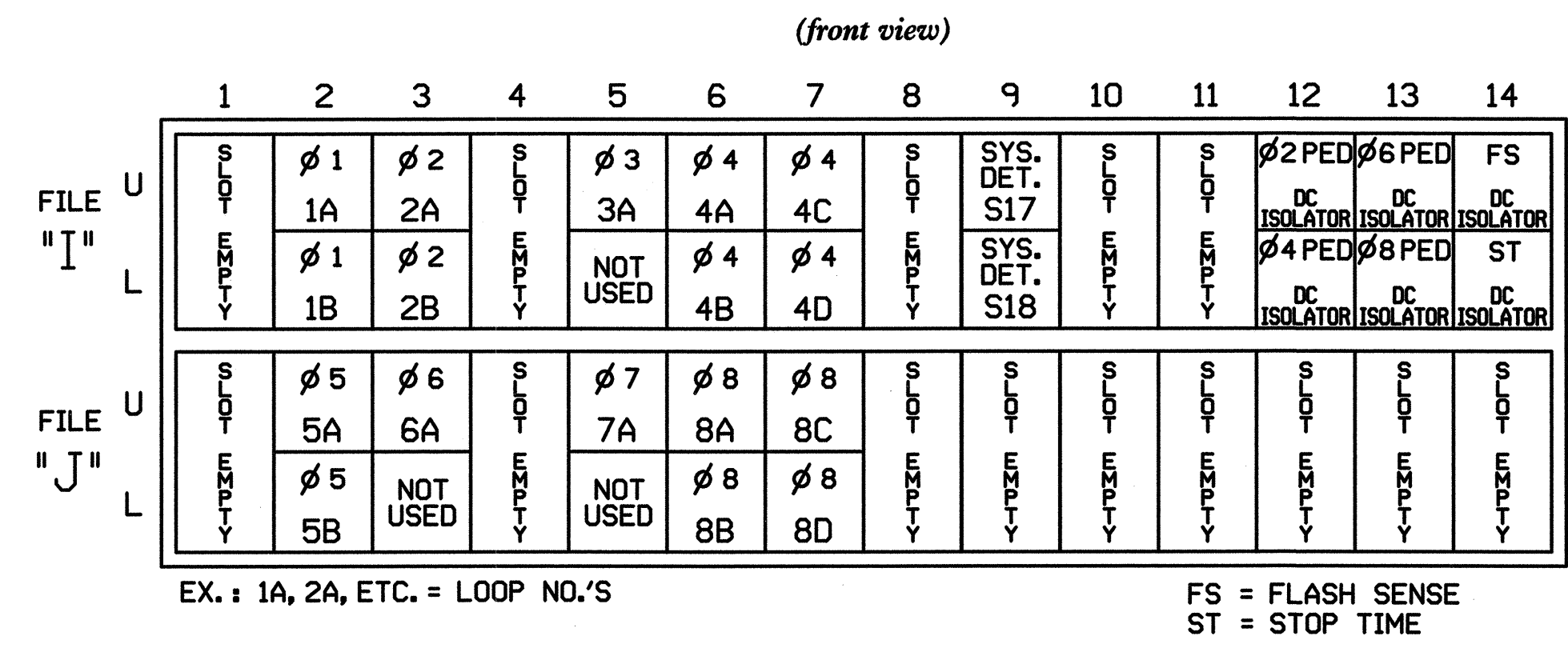
**PHASE SEQUENCE PROGRAMMING DETAIL**

(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	0	1	3	4
2	5	6	0	0	7	8
3	0	0	0	0	0	0
4	0	0	0	0	0	0

**INPUT FILE POSITION LAYOUT**

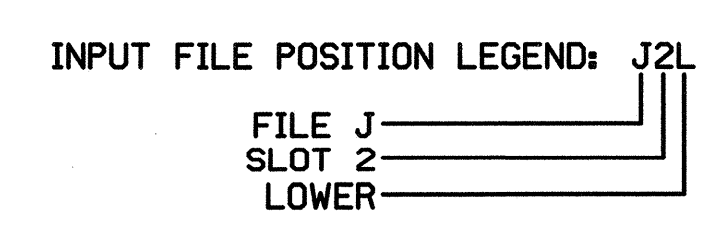


**INPUT FILE CONNECTION & PROGRAMMING CHART**

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y	-	-	3
1B	TB2-7,8	I2L	43	5	12	1	Y	Y	-	-	15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y	-	-	-
2B	TB2-11,12	I3L	76	38	42	2	Y	Y	-	-	-
3A	TB4-5,6	I5U	58	20	3	3	Y	Y	-	-	3
4A	TB4-9,10	I6U	41	3	4	4	-	Y	-	-	3.4
4B	TB4-11,12	I6L	45	7	14	4	-	Y	-	-	3.4
4C	TB6-1,2	I7U	65	27	34	4	Y	Y	-	-	-
4D	TB6-3,4	I7L	78	40	44	4	Y	Y	-	-	-
* S17	TB6-9,10	I9U	60	22	11	SYS					
* S18	TB6-11,12	I9L	62	24	13	SYS					
5A	TB3-5,6	J2U	40	2	6	5	Y	Y	-	-	-
5B	TB3-7,8	J2L	44	6	16	5	Y	Y	-	-	-
6A	TB3-9,10	J3U	64	26	36	6	Y	Y	-	-	-
7A	TB5-5,6	J5U	57	19	7	7	Y	Y	-	-	3
8A	TB5-9,10	J6U	42	4	8	8	-	Y	-	-	3.4
8B	TB5-11,12	J6L	46	8	18	8	-	Y	-	-	3.4
8C	TB7-1,2	J7U	66	28	38	8	Y	Y	-	-	-
8D	TB7-3,4	J7L	79	41	48	8	Y	Y	-	-	-
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.

\* 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: 13-0401  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 70/74A (College St) at SR 3284 (So Charlotte St)/US 70/74A (Charlotte St)  
 Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick  
 PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

REVISIONS: \_\_\_\_\_ IMIT. \_\_\_\_\_ DATE \_\_\_\_\_

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 07983 HALEY L. WINSTEAD, P.E.

122 N. McDowell St., Raleigh, NC 27603

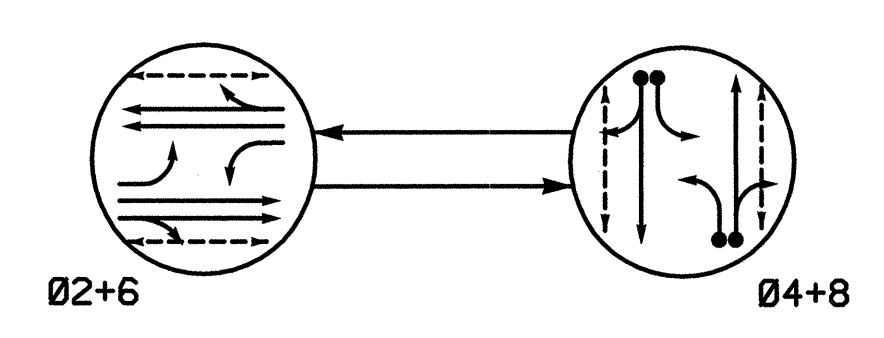
HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609

11/3/06

SIG. INVENTORY NO. 13-0401

2 Phase Semi-Actuated (Asheville Signal System)

PHASING DIAGRAM



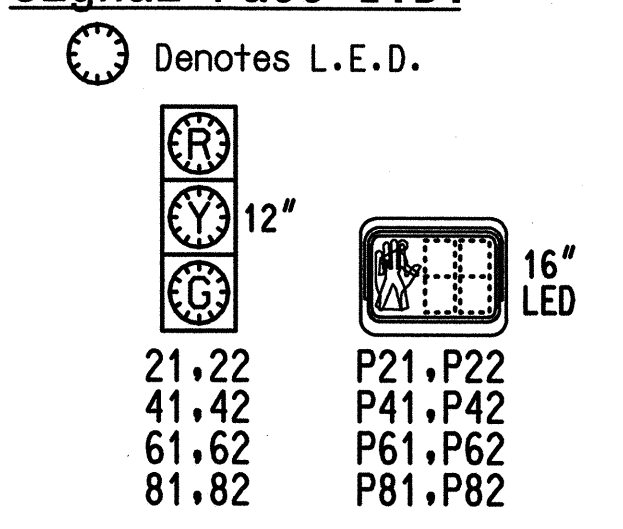
**PHASING DIAGRAM DETECTION LEGEND**

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

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

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

Signal Face I.D.

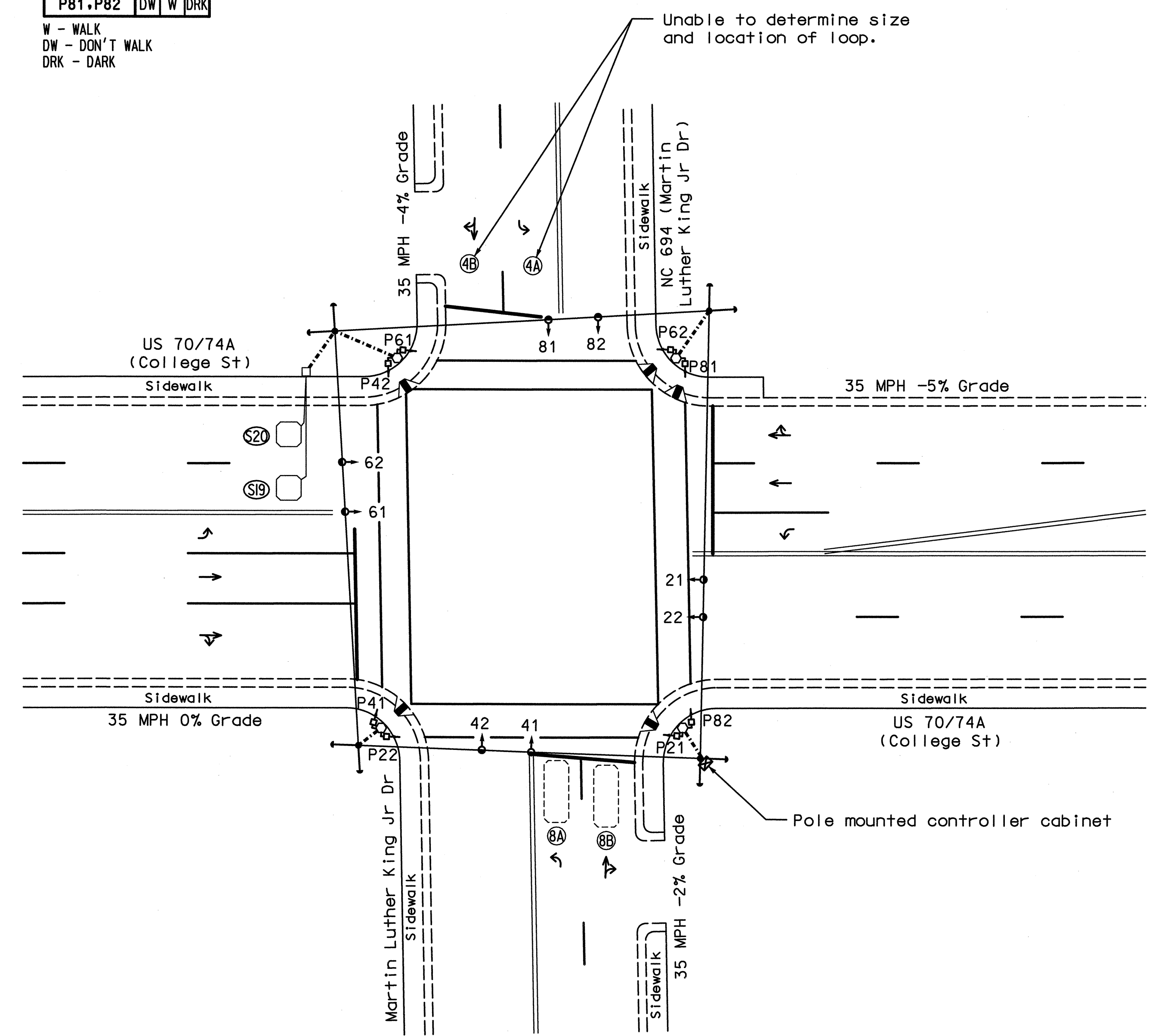
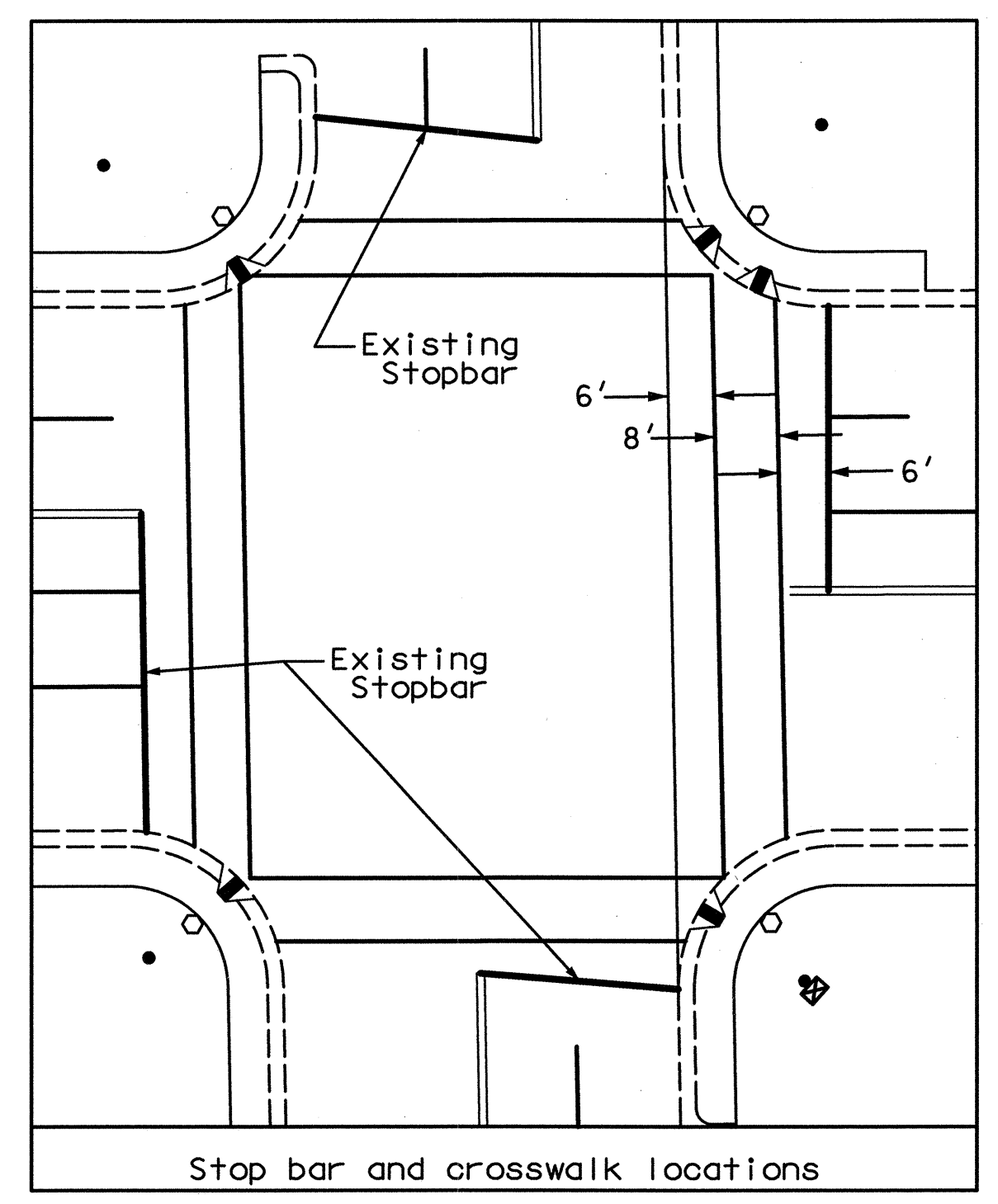


2070L LOOP & DETECTOR INSTALLATION												
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
4A,4B	*	*	EXISTING	-	4	Y	Y	-	-	5	-	Y
8A,8B	6x15	0	EXISTING	-	8	Y	Y	-	-	5	-	Y
S19	6x6	+100	3	Y	-	-	-	-	-	-	-	Y
S20	6x6	+100	3	Y	-	-	-	-	-	-	-	Y

\* Unable to field verify

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
- Do not program signal for late night flashing operation unless otherwise directed by the engineer.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- 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 #0264



FEATURE	PHASE			
	2	4	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	0.0	2.0	0.0	2.0
Max Green 1 *	30	20	30	20
Yellow Clearance	3.8	4.1	4.2	4.0
Red Clearance	1.5	1.9	1.5	1.8
Walk 1 *	20	4	21	4
Don't Walk 1	10	14	9	14
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MAX/PED RECALL	-	MAX/PED RECALL	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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

Legend	
Proposed	Existing
○→ Traffic Signal Head	●→ Traffic Signal Head
●→ Modified Signal Head	N/A
⊥ Sign	⊥ Sign
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ Pedestrian Signal Head
○ Signal Pole with Guy	● Signal Pole with Guy
○ Signal Pole with Sidewalk Guy	● Signal Pole with Sidewalk Guy
⊠ Inductive Loop Detector	⊠ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Controller & Cabinet
□ Junction Box	□ Junction Box
--- 2-in underground conduit	--- 2-in underground conduit
N/A Right of Way with Marker	--- Right of Way with Marker
→ Directional Arrow	→ Directional Arrow
N/A Metal Pole with Mast Arm	⊠ Metal Pole with Mast Arm
N/A Metal Street Light Pole	⊠ Metal Street Light Pole
N/A Wheelchair Ramp	⊠ Wheelchair Ramp
○ Pedestrian Signal Pedestal	● Pedestrian Signal Pedestal

Signal Upgrade

**HNTB**

HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

US 70/74A (College St)  
at  
NC 694 (Martin Luther King Jr Dr)

Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: T.R. Terrell

PREPARED BY: J.M. Bryan REVIEWED BY: S.T. Franklin

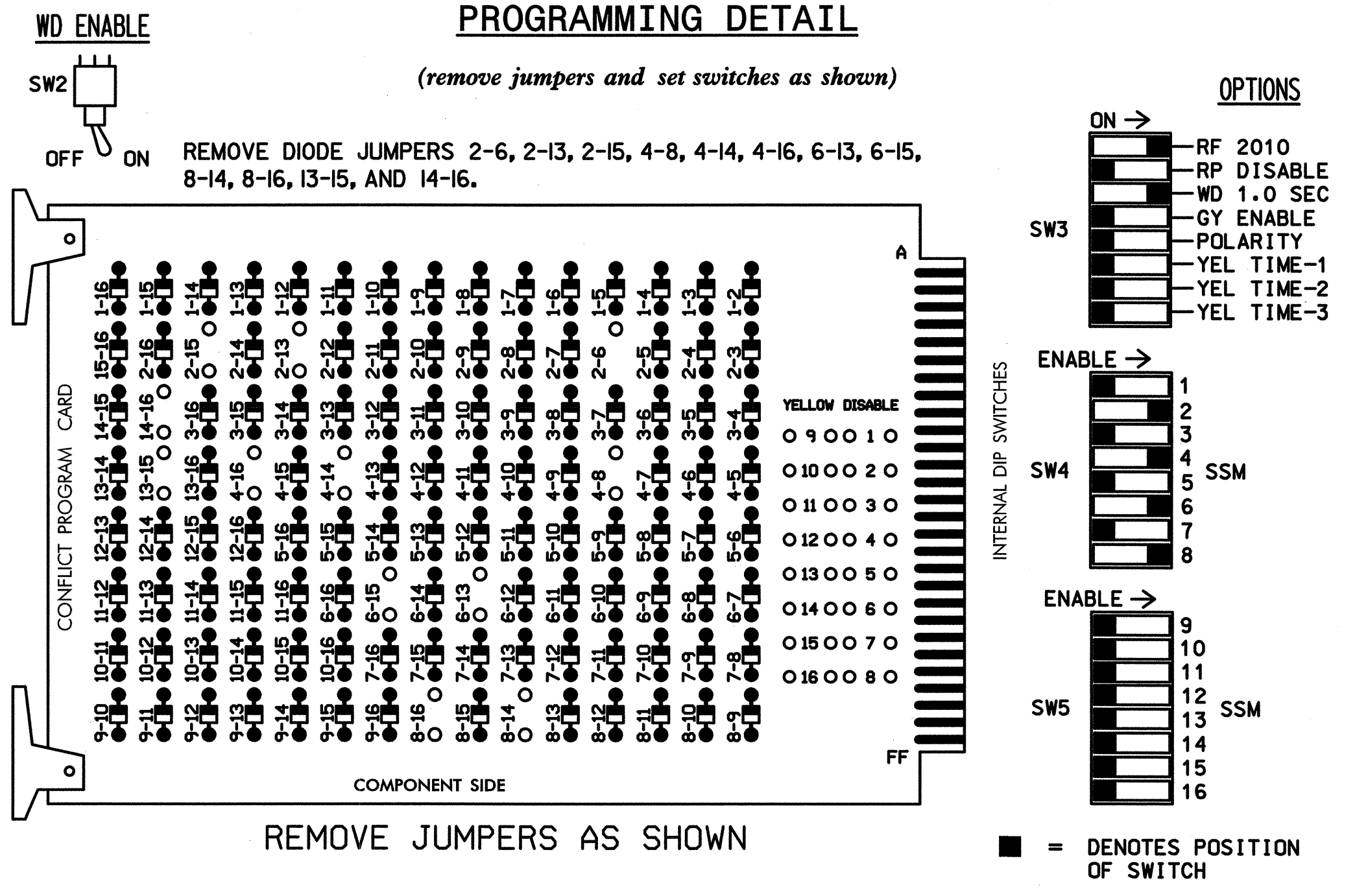
SCALE: 1"=20'

SEAL  
NORTH CAROLINA  
PROFESSIONAL ENGINEER  
SPENCER T. FRANKLIN  
028657

11-3-06

**EDI MODEL 2010ECL CONFLICT MONITOR**

**PROGRAMMING DETAIL**



**NOTES:**

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

**NOTES**

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 7,9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 4 and 8, on the controller unit, for Dual Entry.
6. Program phases 2, 4, 6 and 8 for 'STARTUP PED CALL'.
7. The cabinet and controller are part of the Asheville (Downtown) Closed Loop Signal System.

**SIGNAL HEAD HOOK-UP CHART**

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	P21, P22	NU	41,42	P41, P42	NU	61,62	P61, P62	NU	81,82	P81, P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
Hand icon			113			104			119			110
Walking person icon			115			106			121			112

NU = Not Used

**EQUIPMENT INFORMATION**

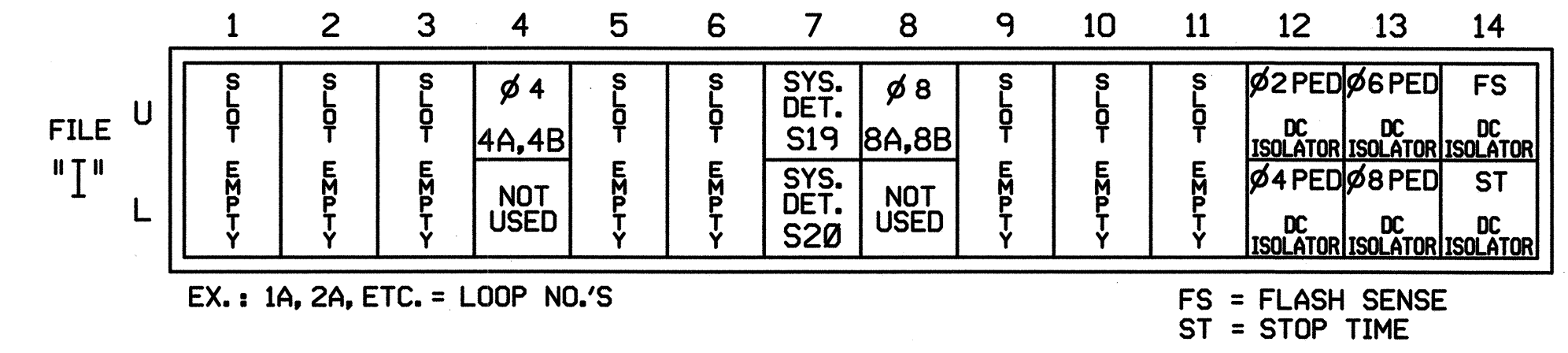
CONTROLLER.....CONTRACTOR SUPPLIED 2070L  
 CABINET.....CONTRACTOR SUPPLIED 336  
 SOFTWARE.....ECONOLITE OASIS  
 CABINET MOUNT.....POLE  
 OUTPUT FILE POSITIONS...12  
 LOAD SWITCHES USED.....S2,S2P,S4,S4P,S6,S6P,S8,S8P  
 PHASES USED.....2,4,6,8  
 PEDS USED.....2,4,6,8  
 OVERLAPS.....NONE

**COUNTDOWN PEDESTRIAN SIGNAL OPERATION**

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

**INPUT FILE POSITION LAYOUT**

(front view)

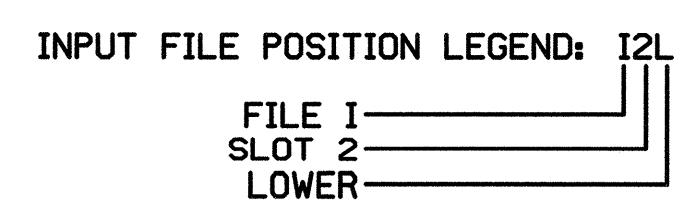


**INPUT FILE CONNECTION & PROGRAMMING CHART**

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
4A,4B	TB21-7,8	I4U	41	3	4	4	Y	Y	-	-	5
*S19	TB21-13,14	I7U	57	19	7	SYS					
*S20	TB23-13,14	I7L	50	12	28	SYS					
8A,8B	TB22-1,2	I8U	42	4	8	8	Y	Y	-	-	5
PED PUSH BUTTONS											
P21,P22	TB22-9,10	I12U	67	29	PED 2	2 PED					
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					
P61,P62	TB22-11,12	I13U	68	30	PED 6	6 PED					
P81,P82	TB24-11,12	I13L	70	32	PED 8	8 PED					

NOTE:  
 INSTALL DC ISOLATORS IN INPUT FILE SLOTS 112 AND 113.

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 13-0264  
 DESIGNED: August 2005  
 SEALED: 11/03/06  
 REVISED:

**Signal Upgrade**

ELECTRICAL AND PROGRAMMING DETAILS FOR:

**US 70/74A (College St) at NC 694 (Martin Luther King Jr Dr)**  
 Division 13 Buncombe County Asheville

PLAN DATE: August 2005 REVIEWED BY: N.M. Rodevick  
 PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead

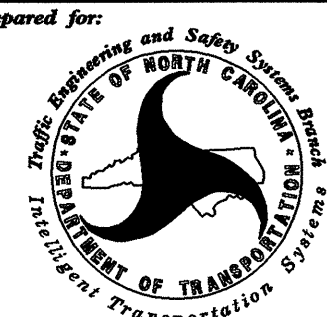
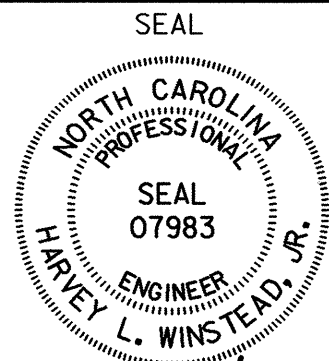


REVISIONS: \_\_\_\_\_ INIT. DATE \_\_\_\_\_

Signature: *H. Winstead* 11/13/06  
 DATE: 11/13/06  
 SIG. INVENTORY NO. 13-0264



### LEGEND

—FO—	NEW FIBER OPTIC COMMUNICATIONS CABLE
—TWIST PR—	NEW TWISTED PAIR COMMUNICATIONS CABLE
—EXT—	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
— COAX —	NEW COAXIAL CABLE
□	NEW JUNCTION BOX
■	EXISTING JUNCTION BOX
□	NEW OVERSIZED JUNCTION BOX
■	EXISTING OVERSIZED JUNCTION BOX
○	NEW WOOD POLE
●	EXISTING WOOD POLE
⊙	NEW AERIAL SPLICE ENCLOSURE AND STORAGE RACK
⊠	NEW STEEL POLE
⊠	EXISTING STEEL POLE
⊠	EXISTING STEEL POLE WITH MAST ARM
●	EXISTING PEDESTRAIN SIGNAL PEDESTAL
— )	NEW STANDARD GUY ASSEMBLY
— )	EXISTING STANDARD GUY ASSEMBLY
— )	NEW SIDEWALK GUY ASSEMBLY
— )	EXISTING SIDEWALK GUY ASSEMBLY
⊥	NEW WIRELESS YAGI ANTENNA
⊙	NEW OMNI DIRECTIONAL ANTENNA
⊔	NEW CABLE STORAGE RACKS (SNOW SHOES)
⊠	EXISTING CONTROLLER AND CABINET
⊠	EXISTING MASTER CONTROLLER AND CABINET
⊠	EXISTING SPLICE CABINET
⊠	NEW SPLICE CABINET
SP	SIGNAL POLE
##-###	NCDOT SIGNAL INVENTORY NUMBER
COA #-##	CITY OF ASHEVILLE SIGNAL INVENTORY NUMBER

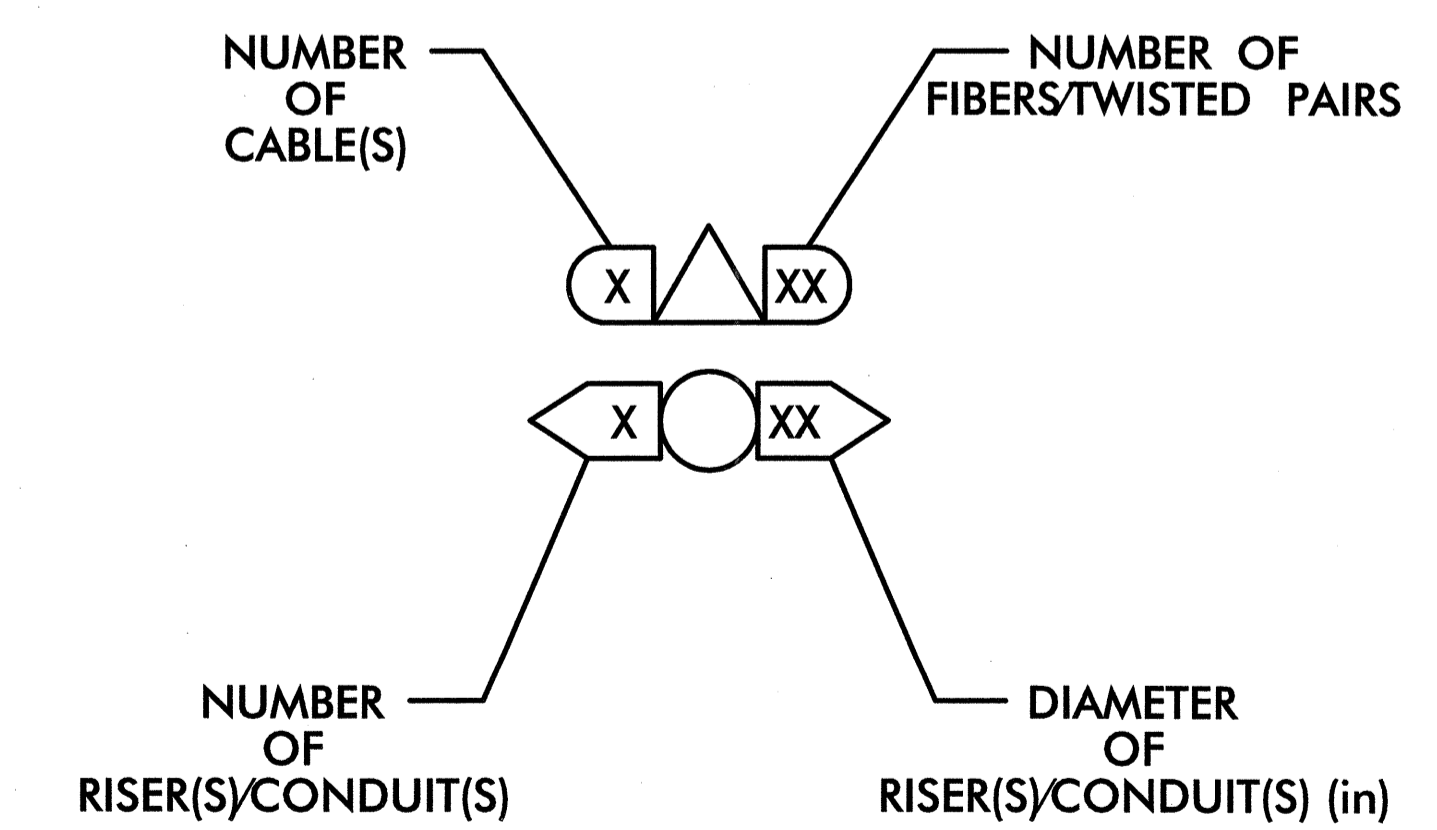
	<b>Asheville Signal System Downtown (College St &amp; Patton Ave) Legend</b>		
	Division 13    Buncombe County    Asheville		
SCALE 	PLAN DATE: August 2005 PREPARED BY: T.R. Terrell	REVIEWED BY: S.T. Franklin REVIEWED BY: H.L. Winstead	REVISIONS INIT.    DATE _____ _____
CADD FILE NAME(041)DwnL4gNotes.dgn			SIGNATURE    DATE  11/3/06

- 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
- 6A INSTALL COAXIAL 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 (USE EXISTING CONDUIT IN STEEL POLE, SEE SPECIAL PROVISIONS)
- 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
- 13 INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
- 14 INSTALL POLYETHYLENE CONDUIT
- 15 DIRECTIONAL DRILL CONDUIT
- 16 BORE AND JACK CONDUIT
- 17 INSTALL CABLE(S) IN EXISTING CONDUIT
- 18 INSTALL CABLE(S) IN NEW CONDUIT
- 19 INSTALL CABLE(S) IN EXISTING RISER
- 20 INSTALL CABLE(S) IN NEW RISER
- 21 INSTALL CABLE(S) IN EXISTING CONDUIT STUBOUTS
- 22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23A INSTALL NEW RISER(S) INTO EXISTING CABINET BASE
- 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
- 28A INSTALL SPREAD SPECTRUM WIRELESS RADIO
- 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
- 34A INSTALL FRONT AND REAR TECHNICIAN PADS TO EXISTING FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48 REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
- 49 REMOVE EXISTING COMMUNICATIONS CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 20 FEET OF COMMUNICATIONS CABLE
- 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56 LASH CABLE(S) TO NEW MESSENGER CABLE
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE
- 59 INSTALL NEW WIRELESS ANTENNA
- 60 INSTALL CLAMPS AND GROUNDING CONDUCTORS ON EXISTING METAL JUNCTION BOXES
- 61 INSTALL LUMINAIRE ARM FOR ANTENNA

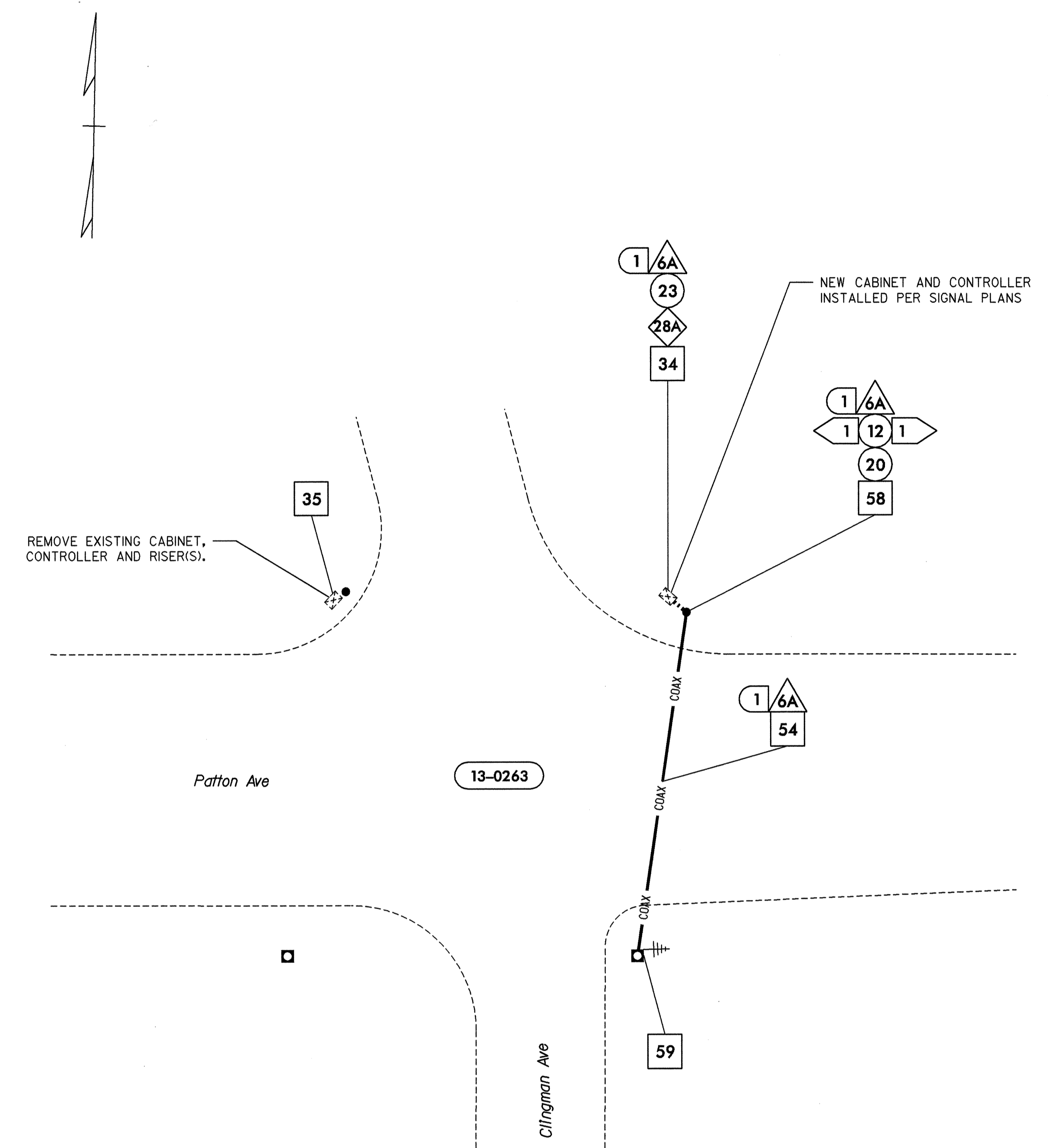
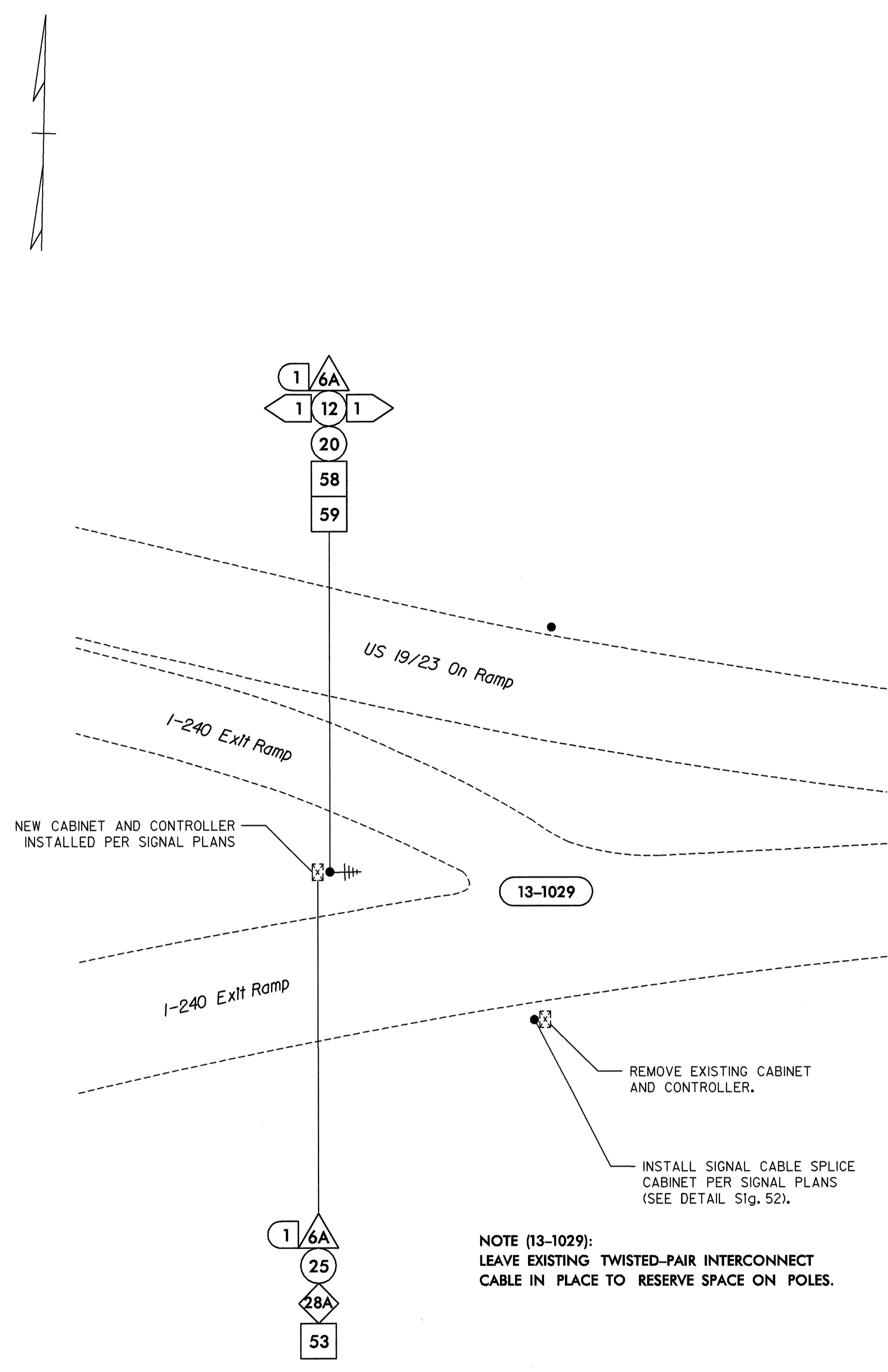
**CONSTRUCTION NOTE SYMBOLOGY KEY**

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



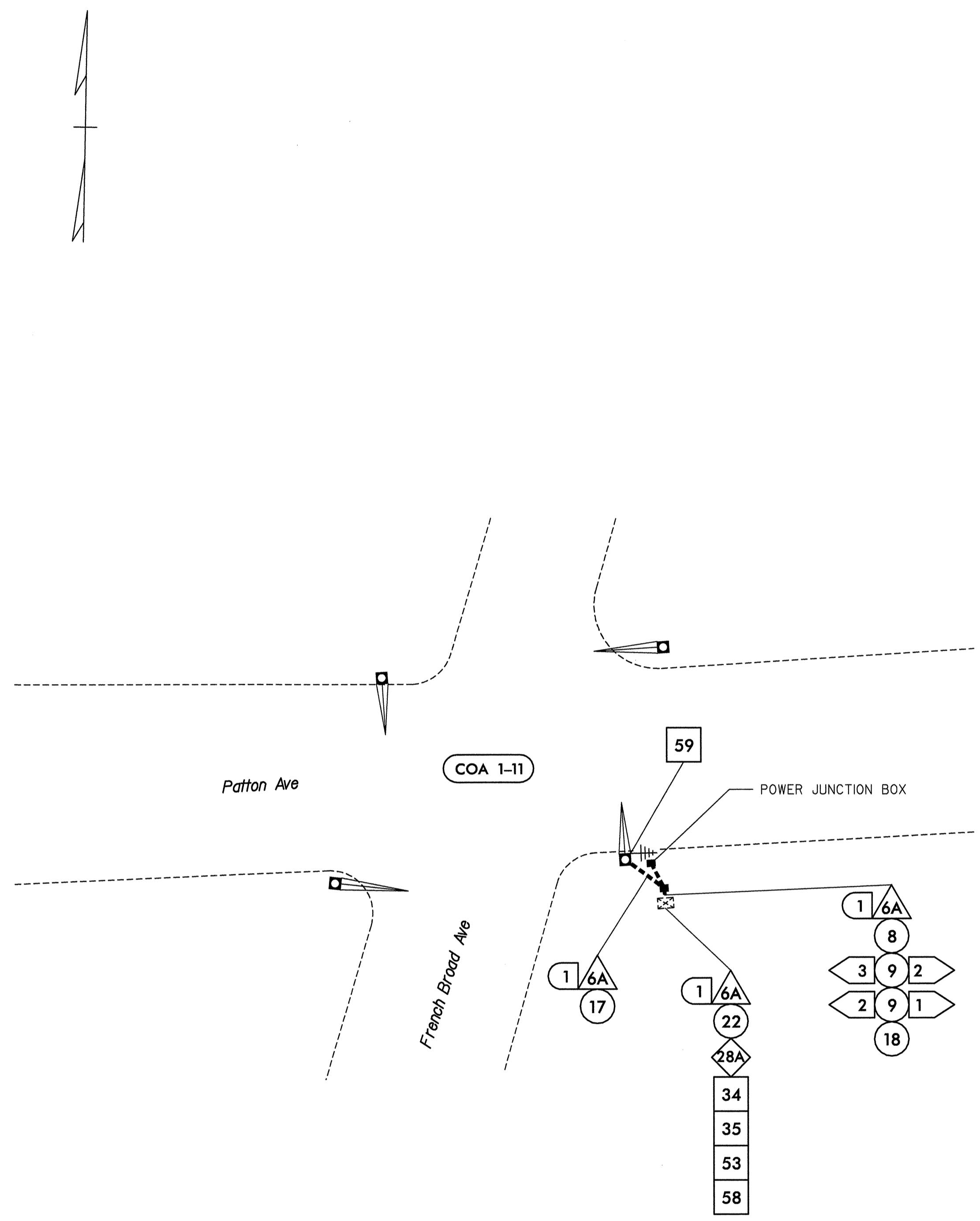
**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

	Asheville Signal System Downtown (College St & Patton Ave) Construction Notes		
	Division 13 Buncombe County Asheville	PLAN DATE: July 2005	
SCALE: NONE	PREPARED BY: T.R. Terrell	REVIEWED BY: H.L. Winstead	SIGNATURE: <i>H.L. Winstead</i> / 11/3/06 DATE:
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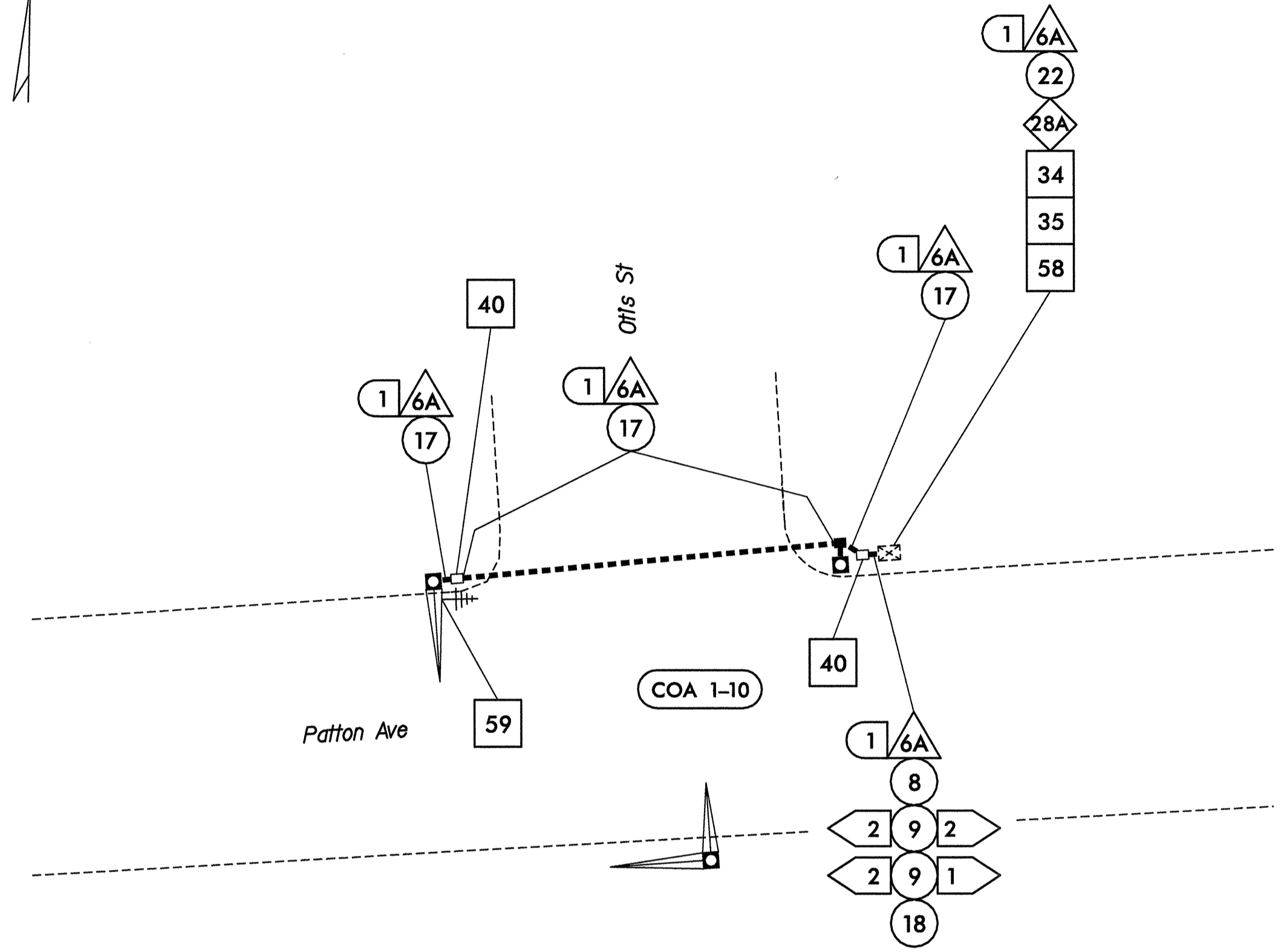


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343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

	<b>Downtown (College St &amp; Patton Ave) Communications Plans</b>		
	Division 13 Buncombe County Asheville		
PLAN DATE: November 2005		REVIEWED BY: N.M. Rodevick	
PREPARED BY: T.R. Terrell		REVIEWED BY: H.L. Winstead	
SCALE 5 0 20 1" = 20'		REVISIONS INIT. DATE	
		SIGNATURE: <i>H. Winstead</i> DATE: 11/28/06	
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 07983 HARVEY L. WINSTEAD, P.E.			
CADD FILE NAME (043-049)ConnPlans.dgn			



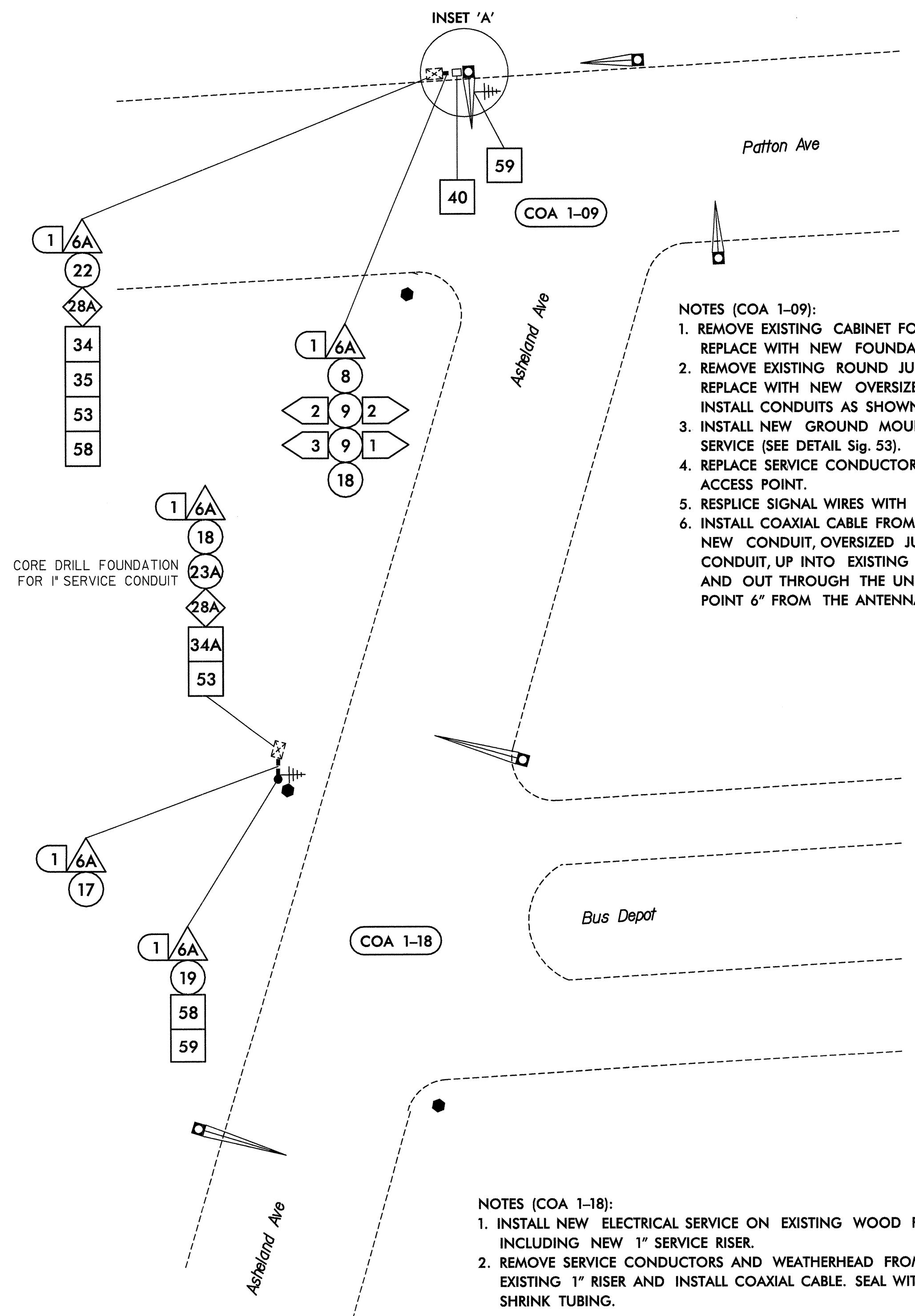
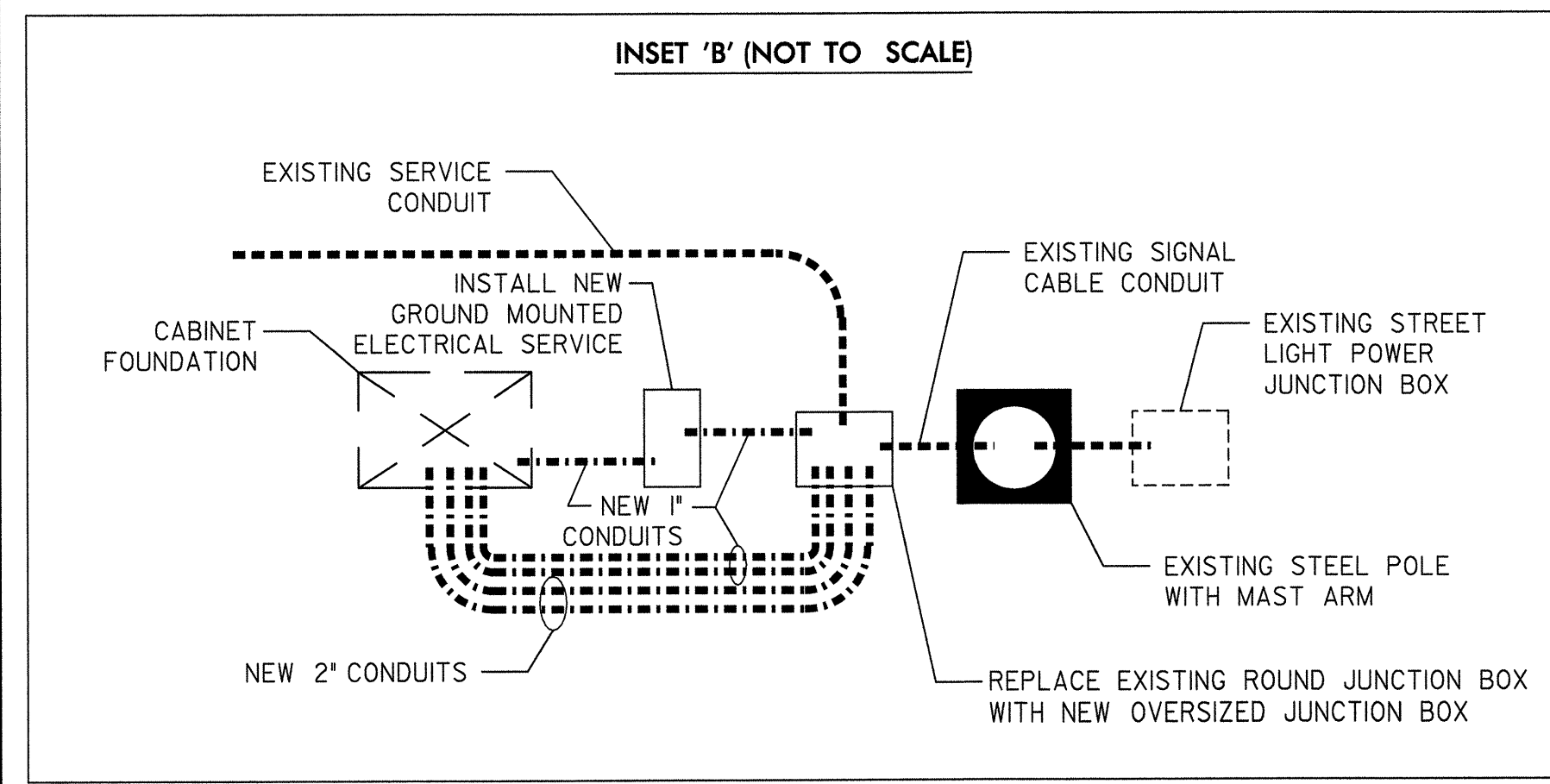
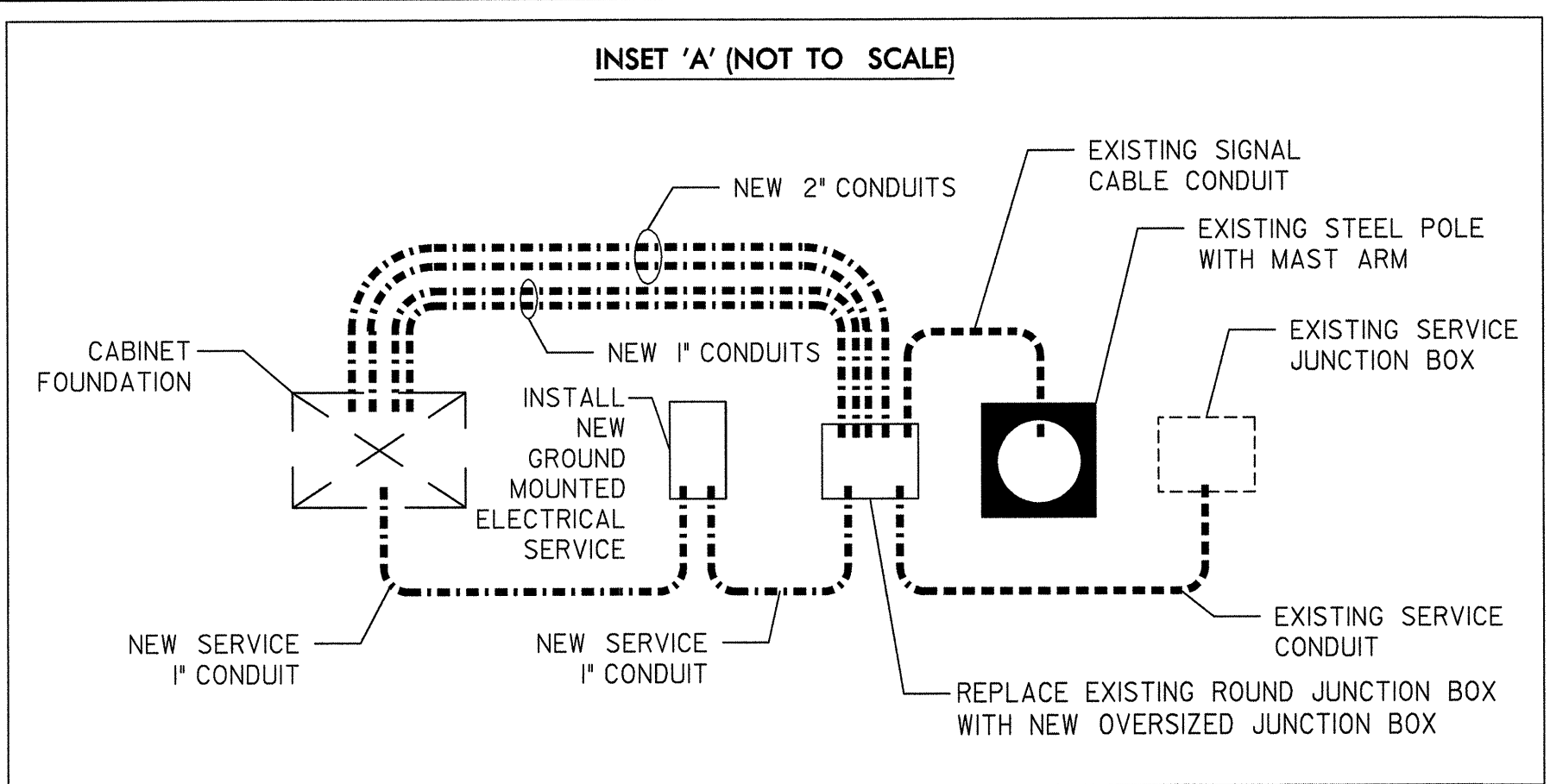
- NOTES (COA 1-11):
1. REPLACE SERVICE CONDUCTORS BACK TO POWER JUNCTION BOX.
  2. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  3. CUT BACK SERVICE CONDUIT IN EXISTING POWER JUNCTION BOX. ATTACH REDUCER AND INSTALL FLEX CONDUIT TO NEW GROUND MOUNTED SERVICE. CUT THE SERVICE CONDUIT BACK SUFFICIENTLY TO ATTACH THE REDUCER AND FLEX CONDUIT, WITHOUT THEM CONTACTING THE JUNCTION BOX LID WHEN INSTALLED.
  4. INSTALL 2 SPARE 2" PVC STUB-OUTS FROM NEW CABINET FOUNDATION.
  5. INSTALL COAXIAL CABLE FROM CABINET INTO EXISTING JUNCTION BOX, THROUGH EXISTING CONDUIT, UP INTO EXISTING STEEL POLE AND OUT AT A POINT 6" BELOW ANTENNA MOUNTING HARDWARE.



- NOTES (COA 1-10):
1. REMOVE AND REPLACE ENTIRE SECTIONS OF SIDEWALK AS NECESSARY.
  2. REMOVE EXISTING CABINET FOUNDATION. INSTALL NEW OVERSIZED JUNCTION BOX AND NEW CABINET FOUNDATION. INTERCEPT EXISTING CONDUIT(S) WITH NEW OVERSIZED JUNCTION BOX ON NE CORNER.
  3. INSTALL TWO 2" AND TWO 1" CONDUITS BETWEEN OVERSIZED JUNCTION BOX AND CABINET FOUNDATION.
  4. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  5. INSTALL NEW OVERSIZED JUNCTION BOX TO INTERCEPT EXISTING 3" CONDUIT ON NW CORNER.
  6. INSTALL COAXIAL CABLE FROM CABINET OUT THROUGH NEW CONDUITS, OVERSIZED JUNCTION BOX, EXISTING JUNCTION BOX, EXISTING CONDUIT, NEW JUNCTION BOX UP INTO EXISTING STEEL POLE AND OUT AT A POINT 6" BELOW ANTENNA MOUNTING HARDWARE.

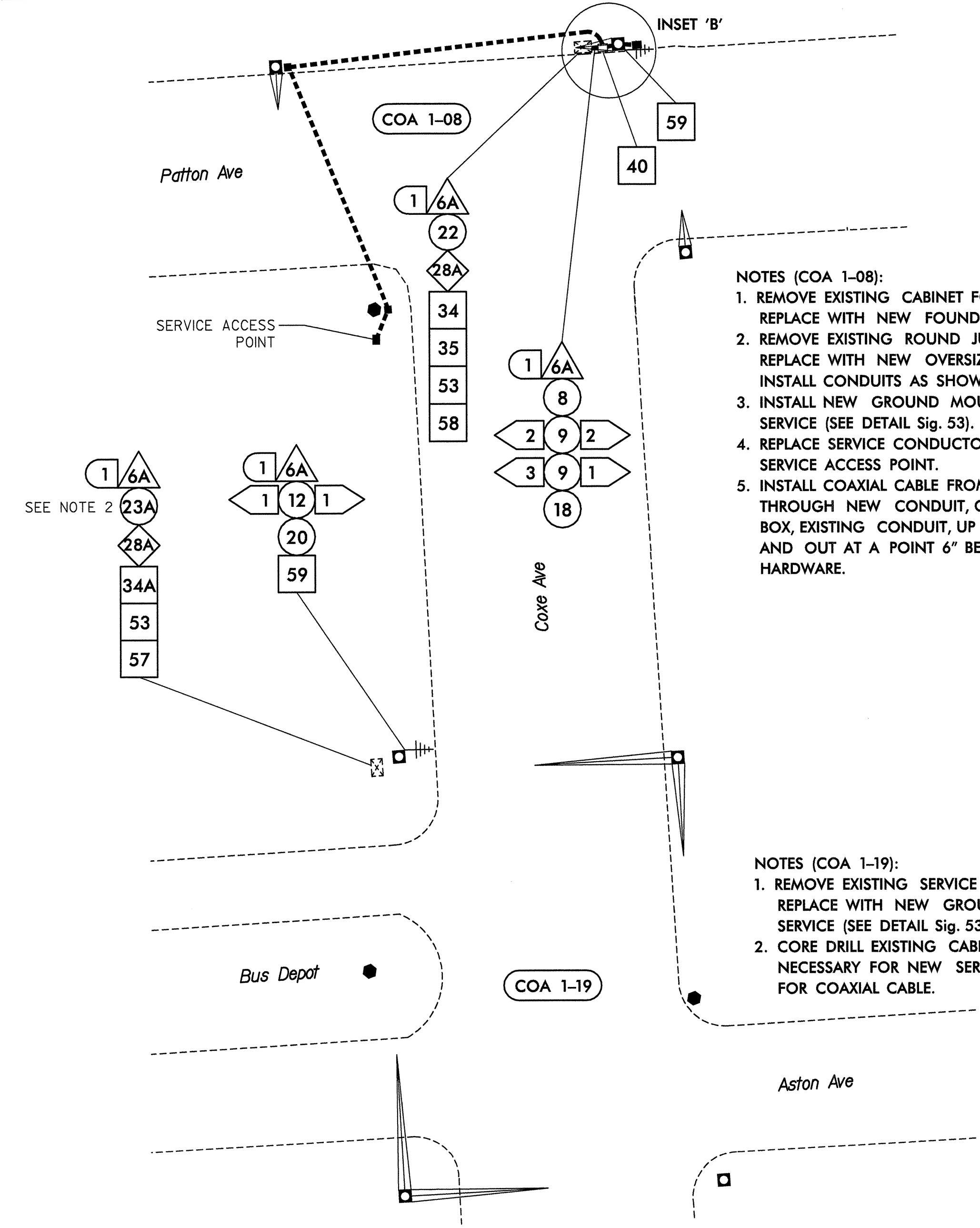
**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

	<p>Prepared for:  <b>Downtown (College St &amp; Patton Ave)          Communications Plans</b></p>														
	<p>Division 13 Buncombe County Asheville          PLAN DATE: November 2005 REVIEWED BY: N.M. Rodevick          PREPARED BY: T.R. Terrell REVIEWED BY: H.L. Winstead</p>														
<p>SCALE          5 0 20          1"=20'</p>	<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE										<p>SEAL          NORTH CAROLINA          PROFESSIONAL ENGINEER          H. L. WINSTEAD, JR.          07983          11/28/06          DATE</p>
REVISIONS	INIT.	DATE													



- NOTES (COA 1-09):**
1. REMOVE EXISTING CABINET FOUNDATION AND REPLACE WITH NEW FOUNDATION IN SAME PLACE.
  2. REMOVE EXISTING ROUND JUNCTION BOX AND REPLACE WITH NEW OVERSIZED JUNCTION BOX. INSTALL CONDUITS AS SHOWN.
  3. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  4. REPLACE SERVICE CONDUCTORS BACK TO SERVICE ACCESS POINT.
  5. RESPLICE SIGNAL WIRES WITH WATER PROOF SPLICE.
  6. INSTALL COAXIAL CABLE FROM CABINET OUT THROUGH NEW CONDUIT, OVERSIZED JUNCTION BOX, EXISTING CONDUIT, UP INTO EXISTING POLE, INSIDE THE MAST ARM AND OUT THROUGH THE UNDER SIDE OF THE ARM AT A POINT 6" FROM THE ANTENNA MOUNTING HARDWARE.

- NOTES (COA 1-18):**
1. INSTALL NEW ELECTRICAL SERVICE ON EXISTING WOOD POLE, INCLUDING NEW 1" SERVICE RISER.
  2. REMOVE SERVICE CONDUCTORS AND WEATHERHEAD FROM EXISTING 1" RISER AND INSTALL COAXIAL CABLE. SEAL WITH HEAT SHRINK TUBING.



- NOTES (COA 1-08):**
1. REMOVE EXISTING CABINET FOUNDATION AND REPLACE WITH NEW FOUNDATION IN SAME PLACE.
  2. REMOVE EXISTING ROUND JUNCTION BOX AND REPLACE WITH NEW OVERSIZED JUNCTION BOX. INSTALL CONDUITS AS SHOWN.
  3. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  4. REPLACE SERVICE CONDUCTORS BACK TO SERVICE ACCESS POINT.
  5. INSTALL COAXIAL CABLE FROM CABINET OUT THROUGH NEW CONDUIT, OVERSIZED JUNCTION BOX, EXISTING CONDUIT, UP INTO EXISTING POLE AND OUT AT A POINT 6" BELOW ANTENNA MOUNTING HARDWARE.

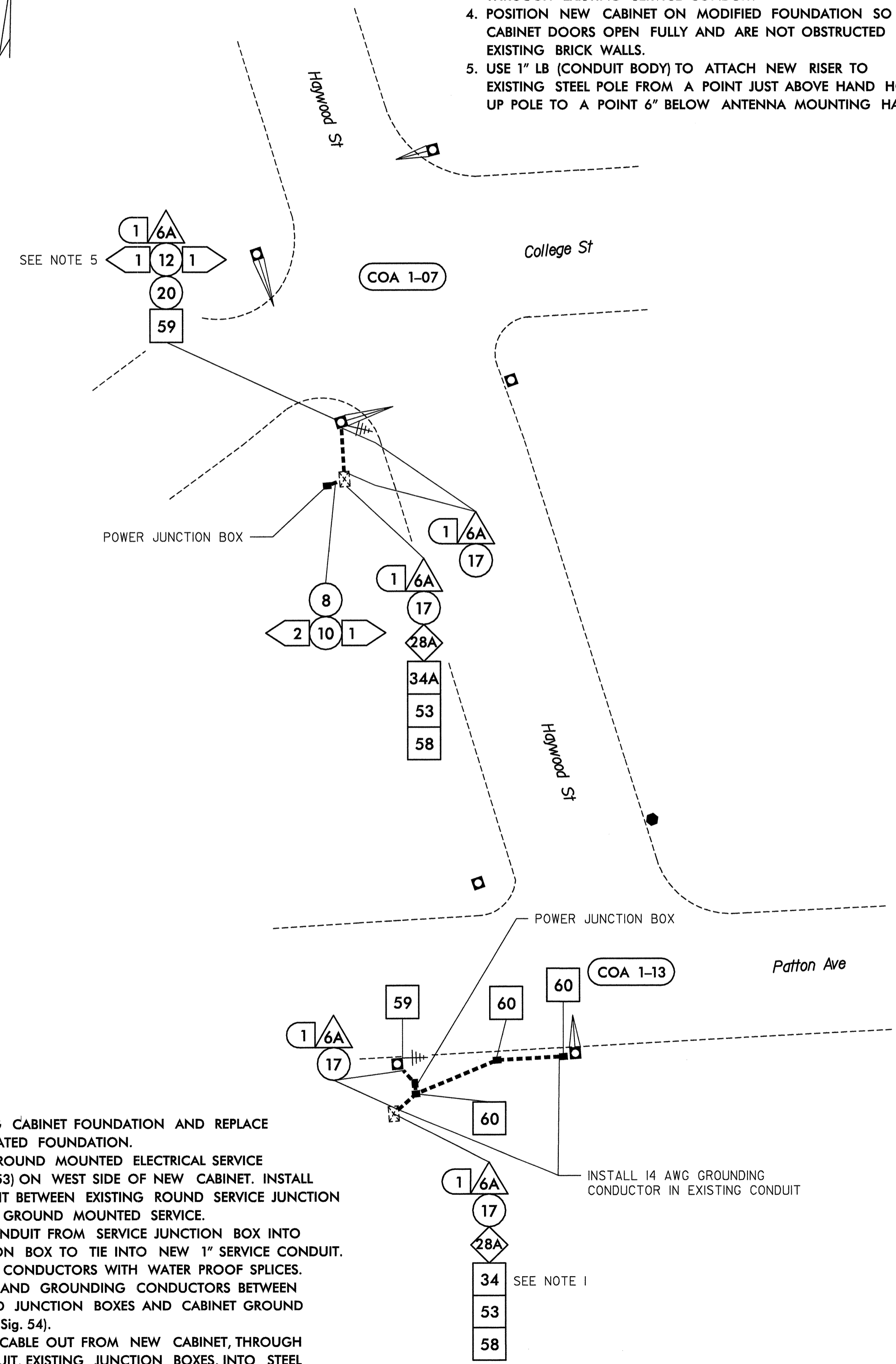
- NOTES (COA 1-19):**
1. REMOVE EXISTING SERVICE FROM CABINET AND REPLACE WITH NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  2. CORE DRILL EXISTING CABINET FOUNDATION AS NECESSARY FOR NEW SERVICE AND NEW RISER FOR COAXIAL CABLE.

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

	<p><b>Downtown (College St &amp; Patton Ave)</b> Communications Plans</p>		<p>Division 13 Buncombe County Asheville</p>
	<p>PLAN DATE: November 2005</p>	<p>REVIEWED BY: N.M. Rodevick</p>	
<p>SCALE: 1"=20'</p>	<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>
<p>SIGNATURE: <i>H.L. Winstead</i> 11/28/06</p>		<p>DATE</p>	

CADD FILE NAME (043-049)CommPlans.dgn

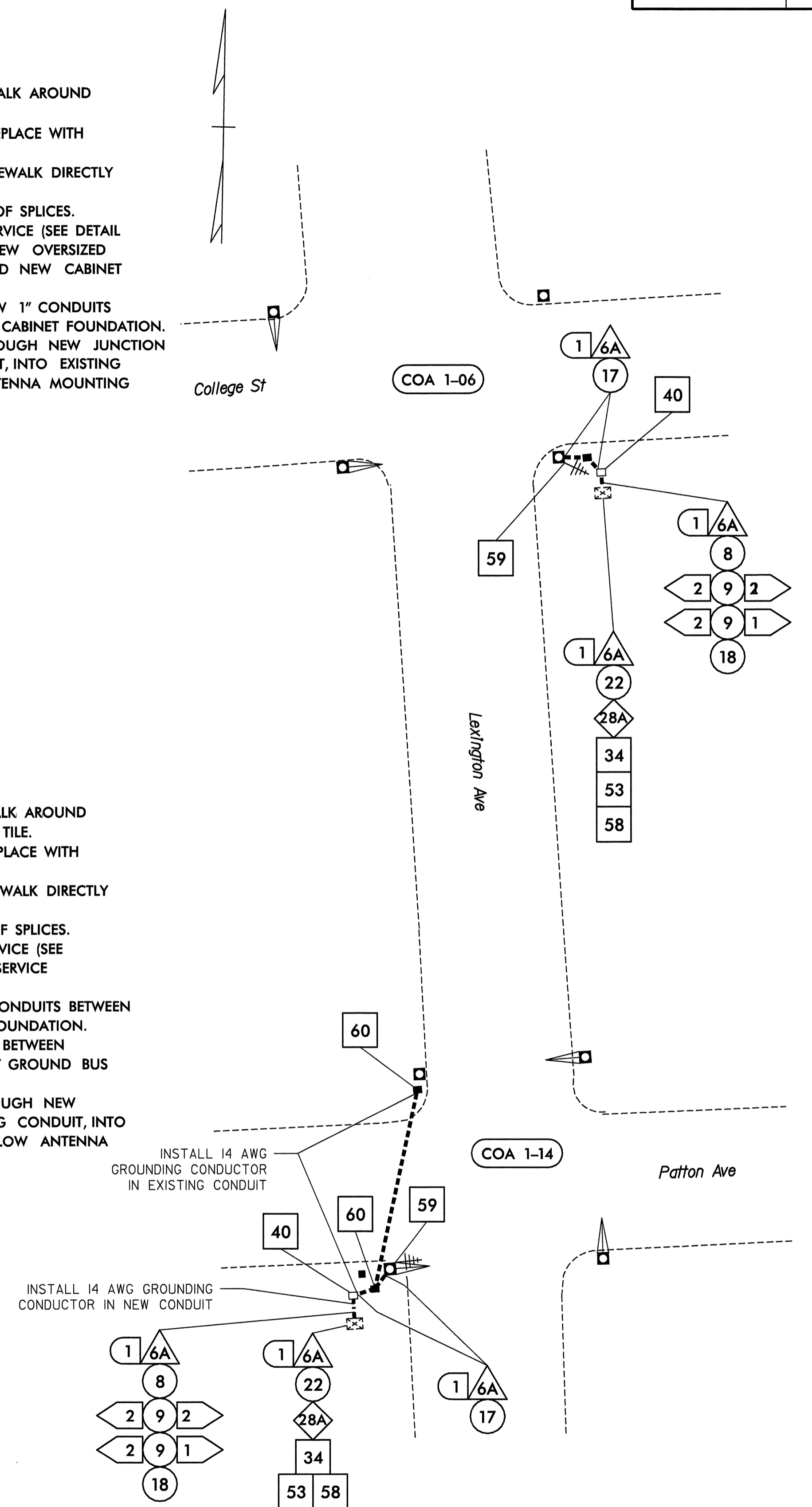
- NOTES (COA 1-07):
1. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  2. INSTALL TWO 1" CONDUITS BETWEEN EXISTING JUNCTION BOX AND NEW GROUND MOUNTED SERVICE.
  3. ROUTE SERVICE CONDUCTORS FROM EXISTING POWER JUNCTION BOX TO NEW GROUND MOUNTED SERVICE, BACK TO EXISTING POWER JUNCTION BOX AND INTO CABINET THROUGH EXISTING SERVICE CONDUIT.
  4. POSITION NEW CABINET ON MODIFIED FOUNDATION SO THAT CABINET DOORS OPEN FULLY AND ARE NOT OBSTRUCTED BY EXISTING BRICK WALLS.
  5. USE 1" LB (CONDUIT BODY) TO ATTACH NEW RISER TO EXISTING STEEL POLE FROM A POINT JUST ABOVE HAND HOLE, UP POLE TO A POINT 6" BELOW ANTENNA MOUNTING HARDWARE.



- NOTES (COA 1-13):
1. REMOVE EXISTING CABINET FOUNDATION AND REPLACE WITH PREFABRICATED FOUNDATION.
  2. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53) ON WEST SIDE OF NEW CABINET. INSTALL NEW 1" CONDUIT BETWEEN EXISTING ROUND SERVICE JUNCTION BOX AND NEW GROUND MOUNTED SERVICE.
  3. INSTALL FLEX CONDUIT FROM SERVICE JUNCTION BOX INTO ROUND JUNCTION BOX TO TIE INTO NEW 1" SERVICE CONDUIT.
  4. RESPLICE SIGNAL CONDUCTORS WITH WATER PROOF SPLICES.
  5. INSTALL CLAMPS AND GROUNDING CONDUCTORS BETWEEN EXISTING ROUND JUNCTION BOXES AND CABINET GROUND BUS (SEE DETAIL Sig. 54).
  6. ROUTE COAXIAL CABLE OUT FROM NEW CABINET, THROUGH EXISTING CONDUIT, EXISTING JUNCTION BOXES, INTO STEEL POLE AND OUT AT A POINT 6" BELOW ANTENNA MOUNTING HARDWARE.

- NOTES (COA 1-06):
1. REMOVE AND REPLACE ENTIRE SECTION OF SIDEWALK AROUND EXISTING CABINET.
  2. REMOVE EXISTING CABINET FOUNDATION AND REPLACE WITH OVERSIZED JUNCTION BOX PER SIGNAL PLAN.
  3. INSTALL NEW CABINET FOUNDATION BEHIND SIDEWALK DIRECTLY BACK FROM EXISTING FOUNDATION.
  4. RESPLICE SIGNAL CONDUCTORS WITH WATER PROOF SPLICES.
  5. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53). INSTALL A NEW 1" CONDUIT BETWEEN NEW OVERSIZED JUNCTION BOX AND BETWEEN NEW SERVICE AND NEW CABINET FOUNDATION.
  6. INSTALL TWO NEW 2" CONDUITS AND TWO NEW 1" CONDUITS BETWEEN OVERSIZED JUNCTION BOX AND NEW CABINET FOUNDATION.
  7. ROUTE COAXIAL CABLE FROM NEW CABINET, THROUGH NEW JUNCTION BOX, EXISTING JUNCTION BOX, EXISTING CONDUIT, INTO EXISTING STEEL POLE AND OUT AT A POINT 6" BELOW ANTENNA MOUNTING HARDWARE.

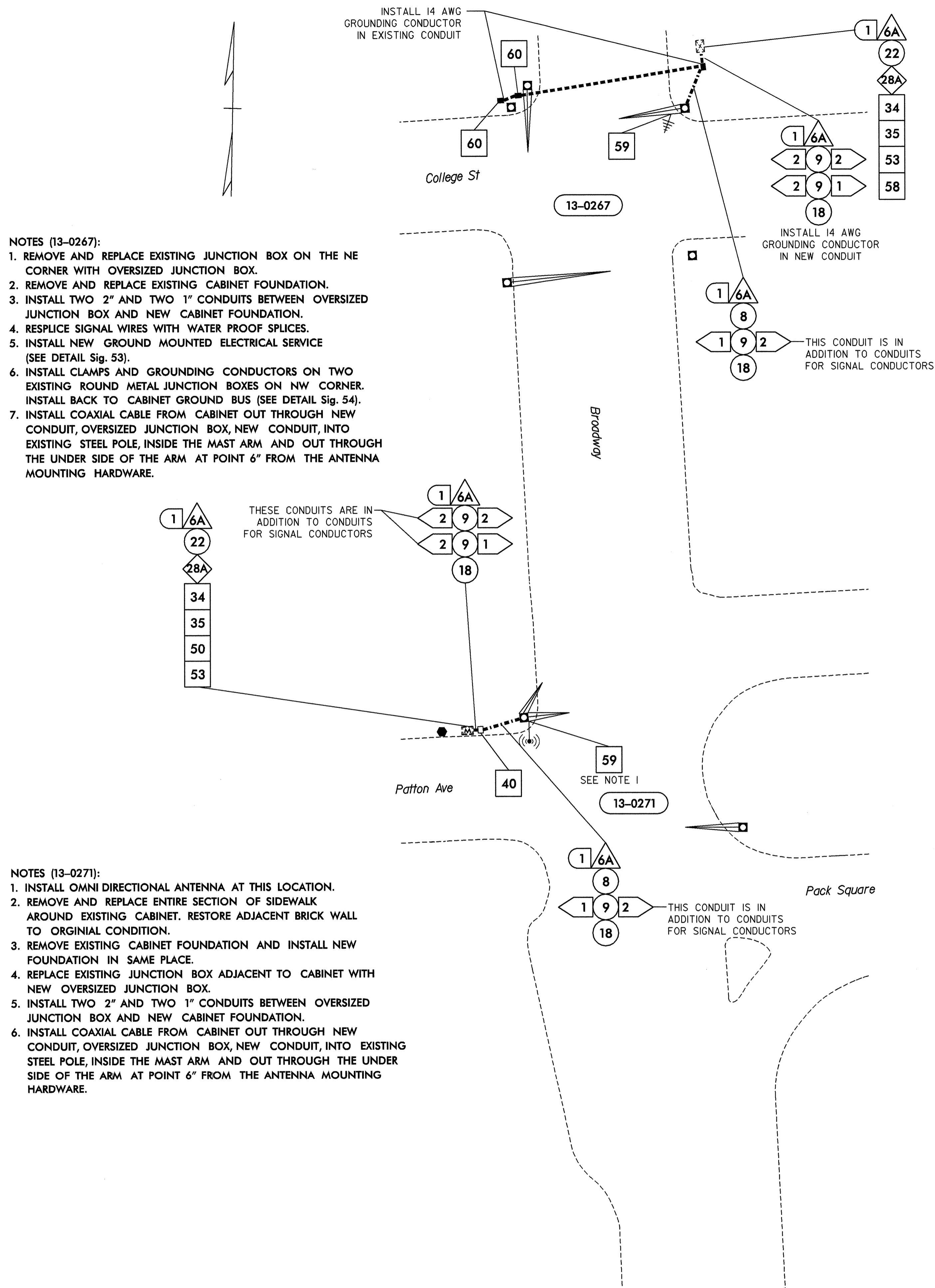
- NOTES (COA 1-14):
1. REMOVE AND REPLACE ENTIRE SECTION OF SIDEWALK AROUND EXISTING CABINET. REPLACE EXISTING DECORATIVE TILE.
  2. REMOVE EXISTING CABINET FOUNDATION AND REPLACE WITH OVERSIZED JUNCTION BOX PER SIGNAL PLAN.
  3. INSTALL NEW CABINET FOUNDATION BEHIND SIDEWALK DIRECTLY SOUTH OF EXISTING FOUNDATION.
  4. RESPLICE SIGNAL CONDUCTORS WITH WATER PROOF SPLICES.
  5. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53). OBTAIN SERVICE FROM EXISTING SERVICE CABINET IN PARK AREA.
  6. INSTALL TWO NEW 2" CONDUITS AND TWO 1" CONDUITS BETWEEN OVERSIZED JUNCTION BOX AND NEW CABINET FOUNDATION.
  7. INSTALL CLAMPS AND GROUNDING CONDUCTORS BETWEEN EXISTING ROUND JUNCTION BOXES AND CABINET GROUND BUS (SEE DETAIL Sig. 54).
  8. ROUTE COAXIAL CABLE FROM NEW CABINET, THROUGH NEW JUNCTION BOX, EXISTING JUNCTION BOX, EXISTING CONDUIT, INTO EXISTING STEEL POLE AND OUT AT A POINT 6" BELOW ANTENNA MOUNTING HARDWARE.



**HNTB** HNTB NORTH CAROLINA, P.C.  
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Raleigh, North Carolina 27609

	<b>Downtown (College St &amp; Patton Ave)</b> <b>Communications Plans</b>		
	Division 13    Buncombe County    Asheville	PREPARED BY: T.R. Terrell    REVIEWED BY: N.M. Rodevick PREPARED BY: T.R. Terrell    REVIEWED BY: H.L. Winstead	
SCALE 5 0 20 1"=20'	REVISIONS INIT.    DATE	DATE 11/28/06	SEAL H. L. WINSTEAD, JR. ENGINEER

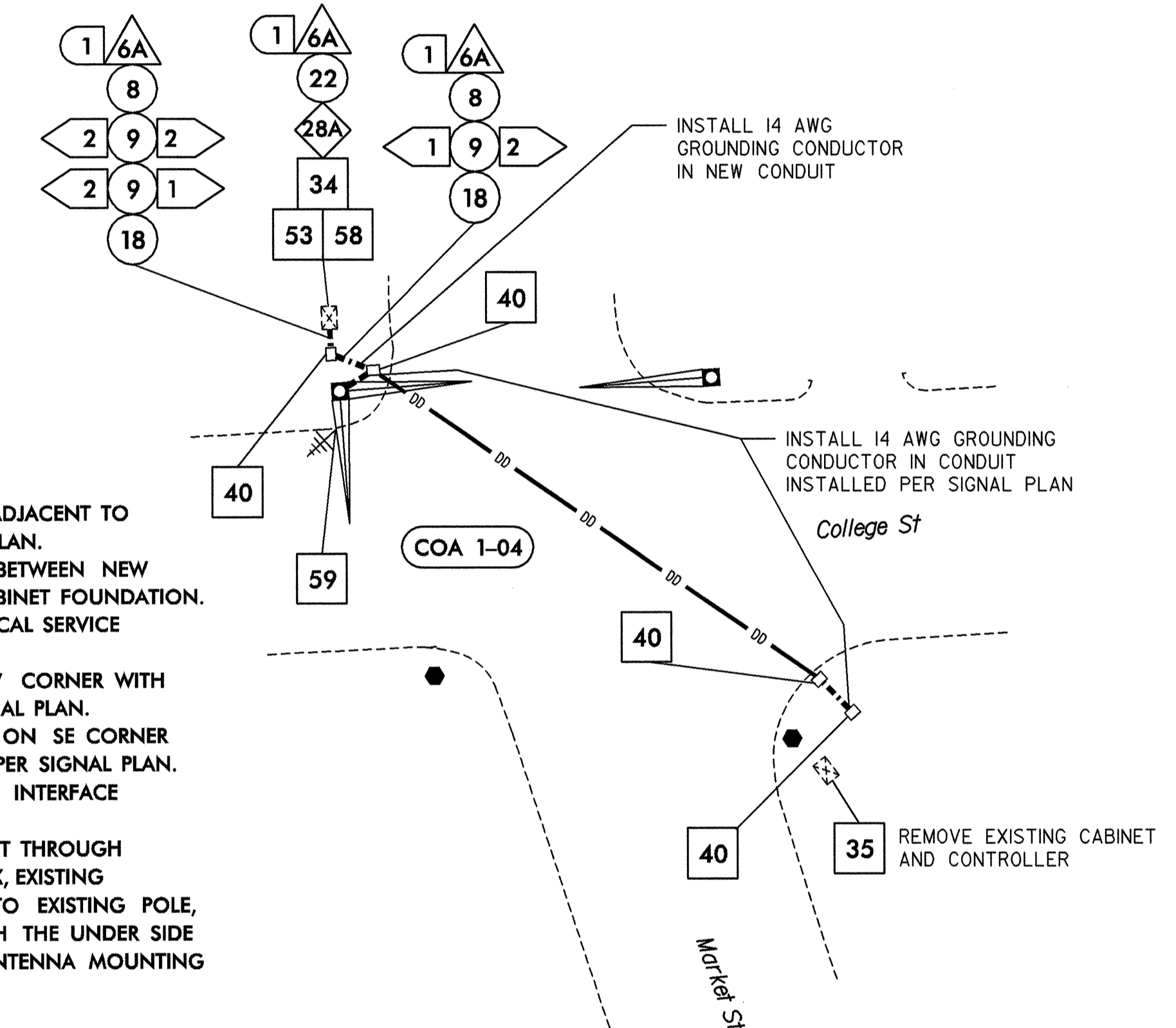
CADD FILE NAME (045-049)CommPlans.dgn



- NOTES (13-0267):
1. REMOVE AND REPLACE EXISTING JUNCTION BOX ON THE NE CORNER WITH OVERSIZED JUNCTION BOX.
  2. REMOVE AND REPLACE EXISTING CABINET FOUNDATION.
  3. INSTALL TWO 2" AND TWO 1" CONDUITS BETWEEN OVERSIZED JUNCTION BOX AND NEW CABINET FOUNDATION.
  4. RESPLICE SIGNAL WIRES WITH WATER PROOF SPLICES.
  5. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  6. INSTALL CLAMPS AND GROUNDING CONDUCTORS ON TWO EXISTING ROUND METAL JUNCTION BOXES ON NW CORNER. INSTALL BACK TO CABINET GROUND BUS (SEE DETAIL Sig. 54).
  7. INSTALL COAXIAL CABLE FROM CABINET OUT THROUGH NEW CONDUIT, OVERSIZED JUNCTION BOX, NEW CONDUIT, INTO EXISTING STEEL POLE, INSIDE THE MAST ARM AND OUT THROUGH THE UNDER SIDE OF THE ARM AT POINT 6" FROM THE ANTENNA MOUNTING HARDWARE.

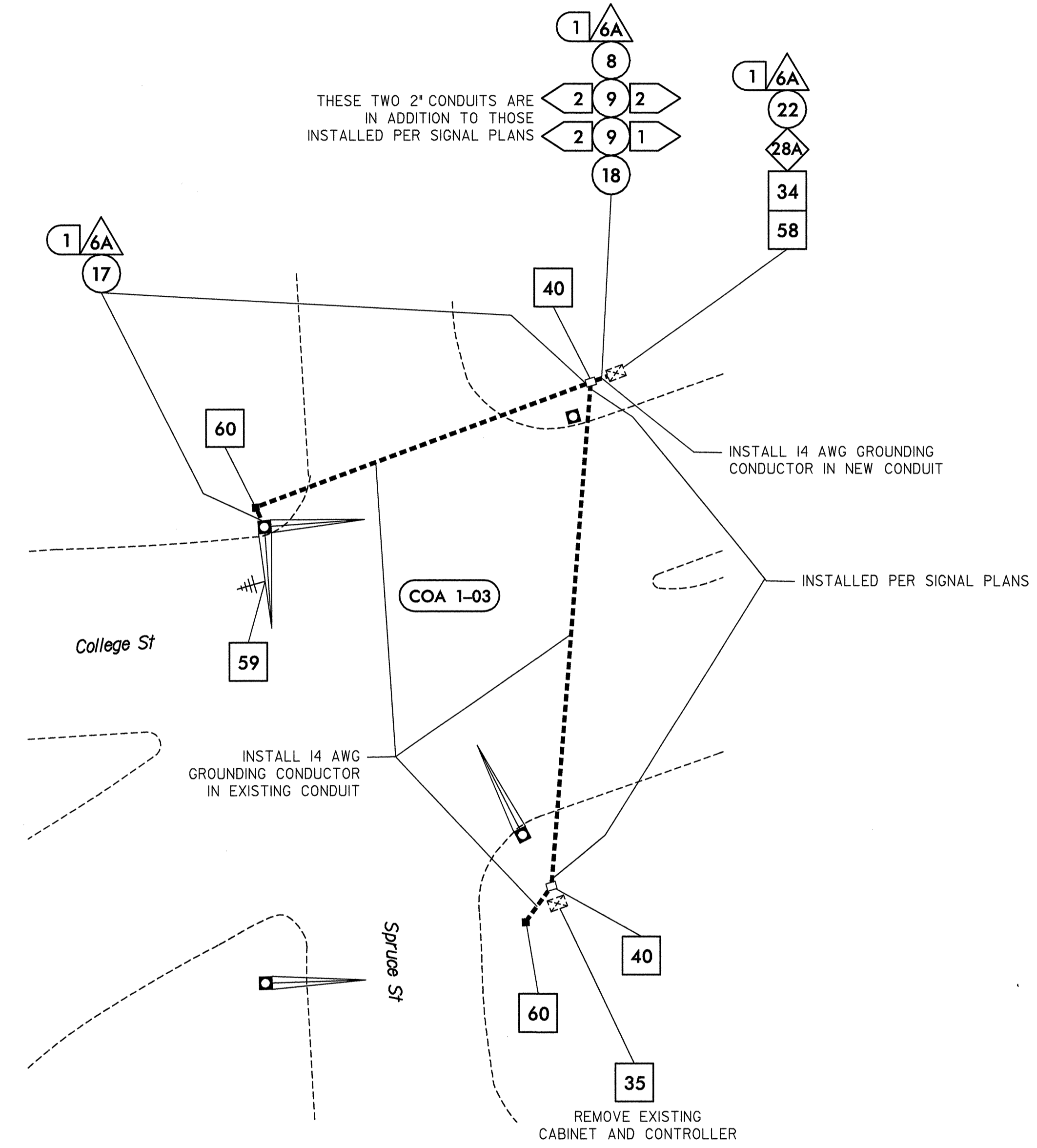
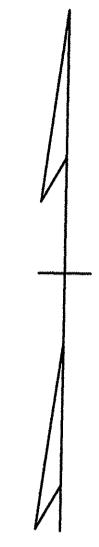
- NOTES (13-0271):
1. INSTALL OMNI DIRECTIONAL ANTENNA AT THIS LOCATION.
  2. REMOVE AND REPLACE ENTIRE SECTION OF SIDEWALK AROUND EXISTING CABINET. RESTORE ADJACENT BRICK WALL TO ORIGINAL CONDITION.
  3. REMOVE EXISTING CABINET FOUNDATION AND INSTALL NEW FOUNDATION IN SAME PLACE.
  4. REPLACE EXISTING JUNCTION BOX ADJACENT TO CABINET WITH NEW OVERSIZED JUNCTION BOX.
  5. INSTALL TWO 2" AND TWO 1" CONDUITS BETWEEN OVERSIZED JUNCTION BOX AND NEW CABINET FOUNDATION.
  6. INSTALL COAXIAL CABLE FROM CABINET OUT THROUGH NEW CONDUIT, OVERSIZED JUNCTION BOX, NEW CONDUIT, INTO EXISTING STEEL POLE, INSIDE THE MAST ARM AND OUT THROUGH THE UNDER SIDE OF THE ARM AT POINT 6" FROM THE ANTENNA MOUNTING HARDWARE.

- NOTES (COA 1-04):
1. INSTALL NEW OVERSIZED JUNCTION BOX ADJACENT TO NEW CABINET FOUNDATION PER SIGNAL PLAN.
  2. INSTALL TWO 2" AND TWO 1" CONDUITS BETWEEN NEW OVERSIZED JUNCTION BOX AND NEW CABINET FOUNDATION.
  3. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  4. REPLACE EXISTING JUNCTION BOX ON NW CORNER WITH NEW OVERSIZED JUNCTION BOX PER SIGNAL PLAN.
  5. REPLACE TWO EXISTING JUNCTION BOXES ON SE CORNER WITH NEW OVERSIZED JUNCTION BOXES PER SIGNAL PLAN.
  6. REMOVE EXISTING TELEPHONE SERVICE AND INTERFACE PEDESTAL.
  7. INSTALL COAXIAL CABLE FROM CABINET OUT THROUGH NEW CONDUIT, OVERSIZED JUNCTION BOX, EXISTING JUNCTION BOX, EXISTING CONDUIT, UP INTO EXISTING POLE, INSIDE THE MAST ARM AND OUT THROUGH THE UNDER SIDE OF THE ARM AT A POINT 6" FROM THE ANTENNA MOUNTING HARDWARE.

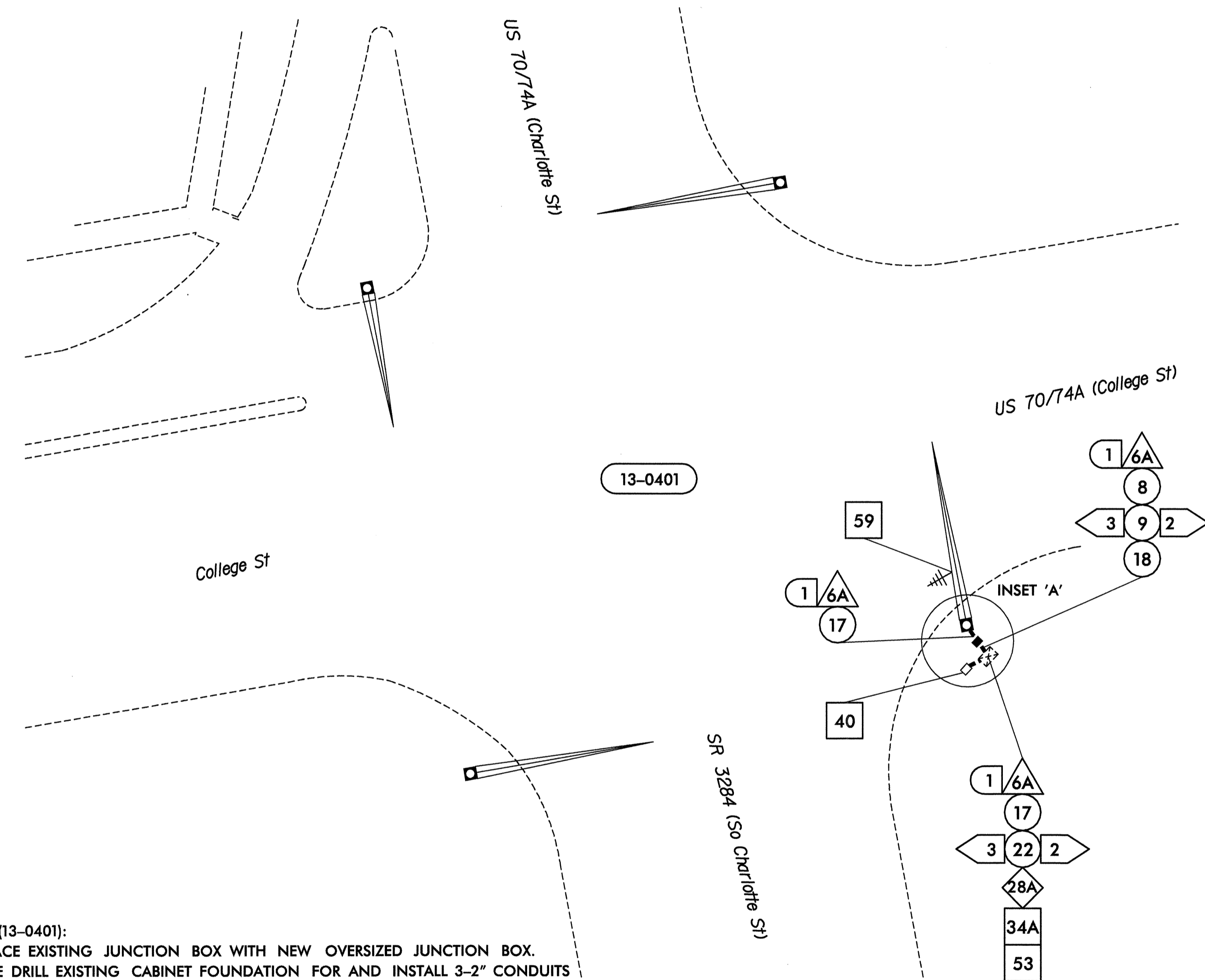
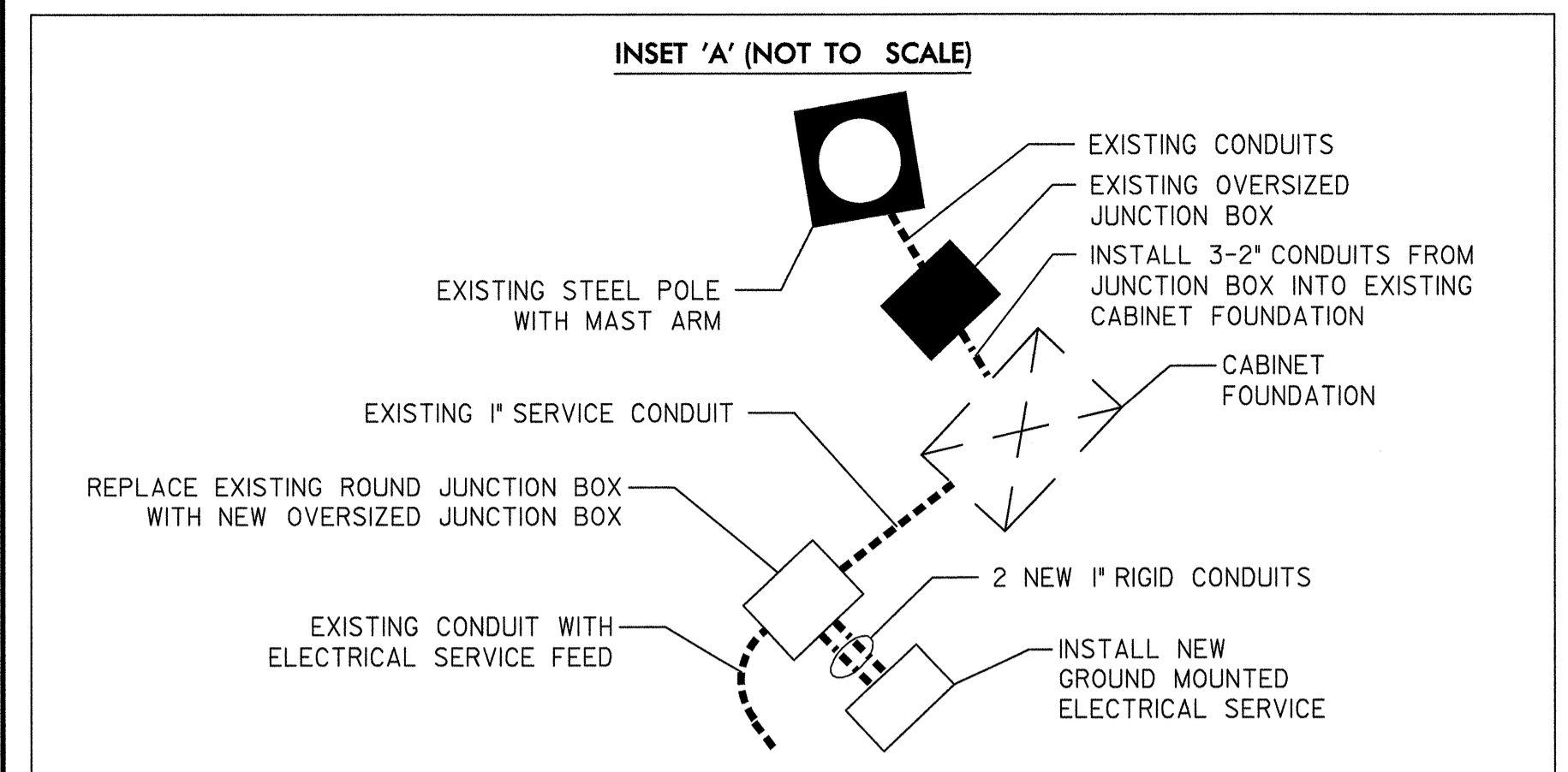


**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

	<b>Downtown (College St &amp; Patton Ave) Communications Plans</b>		
	Division 13    Buncombe County    Asheville		
PLAN DATE: November 2005    REVIEWED BY: N.M. Rodevick			11/28/06
PREPARED BY: T.R. Terrell    REVIEWED BY: H.L. Winstead			
SCALE 5 0 20 1"=20'	REVISIONS INIT.    DATE		
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER H. L. WINSTEAD, JR. 07983 SIGNATURE    DATE CADD FILE NAME (043-048)ConnPlans.dgn			



- NOTES (COA 1-03):
1. REPLACE EXISTING JUNCTION BOXES ON NE AND SE CORNERS WITH NEW OVERSIZED JUNCTION BOXES AS SHOWN ON SIGNAL PLANS.
  2. INSTALL CLAMPS AND GROUNDING CONDUCTORS ON TWO EXISTING ROUND METAL JUNCTION BOX LIDS. INSTALL GROUNDING CONDUCTORS BACK TO CABINET GROUND BUS (SEE DETAIL Sig. 54).
  3. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  4. INSTALL COAXIAL CABLE FROM CABINET OUT THROUGH NEW CONDUIT, OVERSIZED JUNCTION BOX, EXISTING CONDUIT, EXISTING JUNCTION BOX, UP INTO EXISTING POLE, INSIDE THE MAST ARM AND OUT THROUGH THE UNDER SIDE OF THE ARM AT A POINT 6" FROM THE ANTENNA MOUNTING HARDWARE.

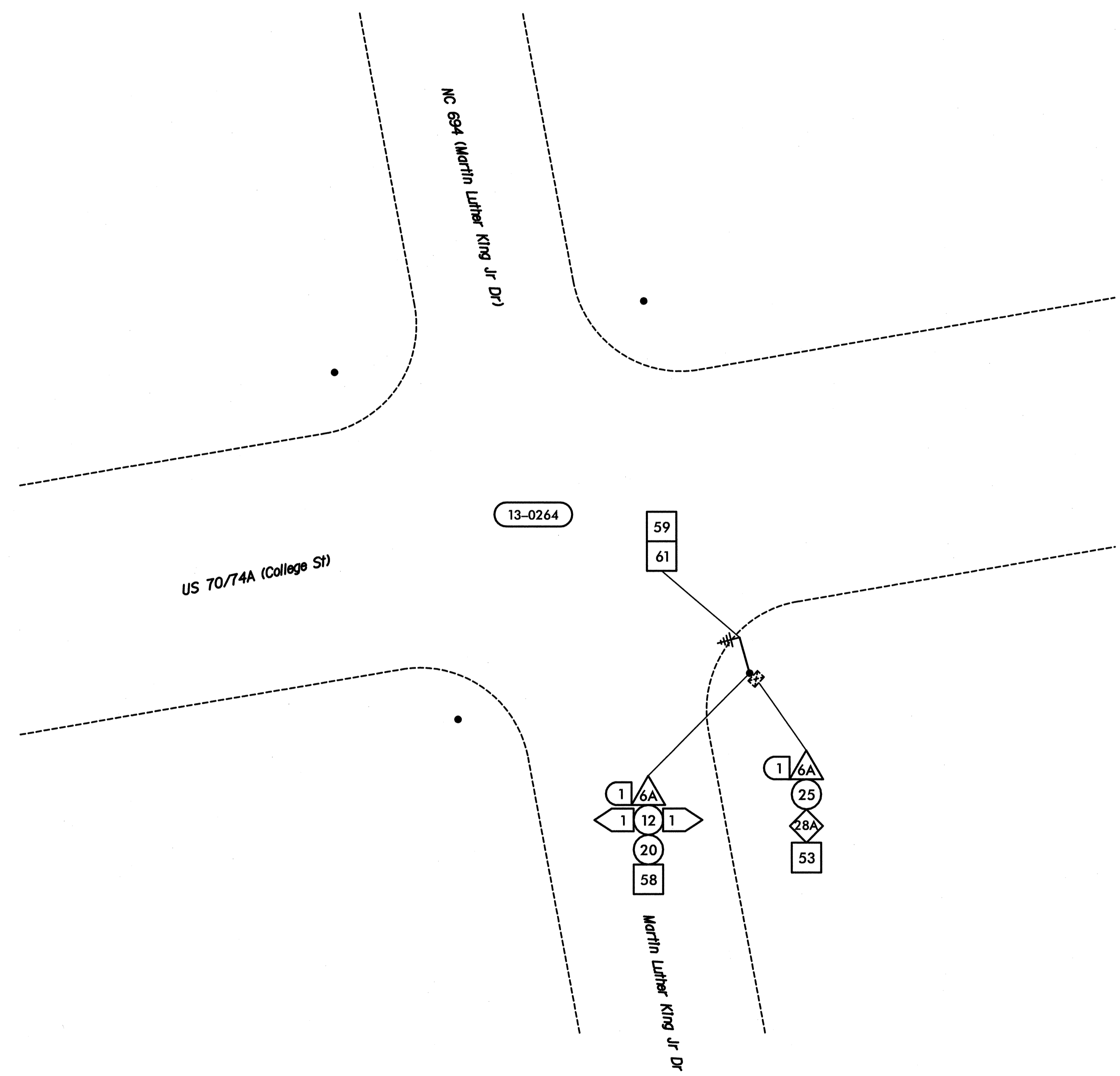
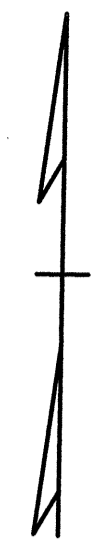


- NOTES (13-0401):
1. REPLACE EXISTING JUNCTION BOX WITH NEW OVERSIZED JUNCTION BOX.
  2. CORE DRILL EXISTING CABINET FOUNDATION FOR AND INSTALL 3-2" CONDUITS FROM EXISTING JUNCTION BOX INTO EXISTING CABINET FOUNDATION.
  3. INSTALL NEW GROUND MOUNTED ELECTRICAL SERVICE (SEE DETAIL Sig. 53).
  4. INSTALL COAXIAL CABLE FROM CABINET OUT THROUGH EXISTING CONDUIT, UP INTO EXISTING STEEL POLE, INTO THE MAST ARM AND OUT THROUGH THE UNDER SIDE OF THE ARM AT A POINT 6" BELOW THE ANTENNA MOUNTING HARDWARE.

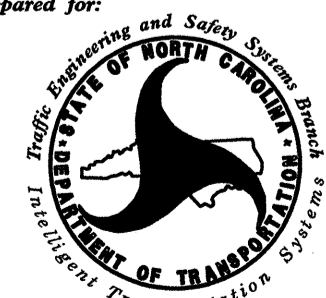
**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

	<b>Downtown (College St &amp; Patton Ave)          Communications Plans</b>		
	Division 13 Buncombe County Asheville PLAN DATE: November 2005 PREPARED BY: T.R. Terrell	REVIEWED BY: N.M. Rodevick REVIEWED BY: H.L. Winstead	
SCALE 5 0 20 1"=20'	REVISIONS INIT. DATE		CAD FILE NAME (043-049) CommPlans.dgn




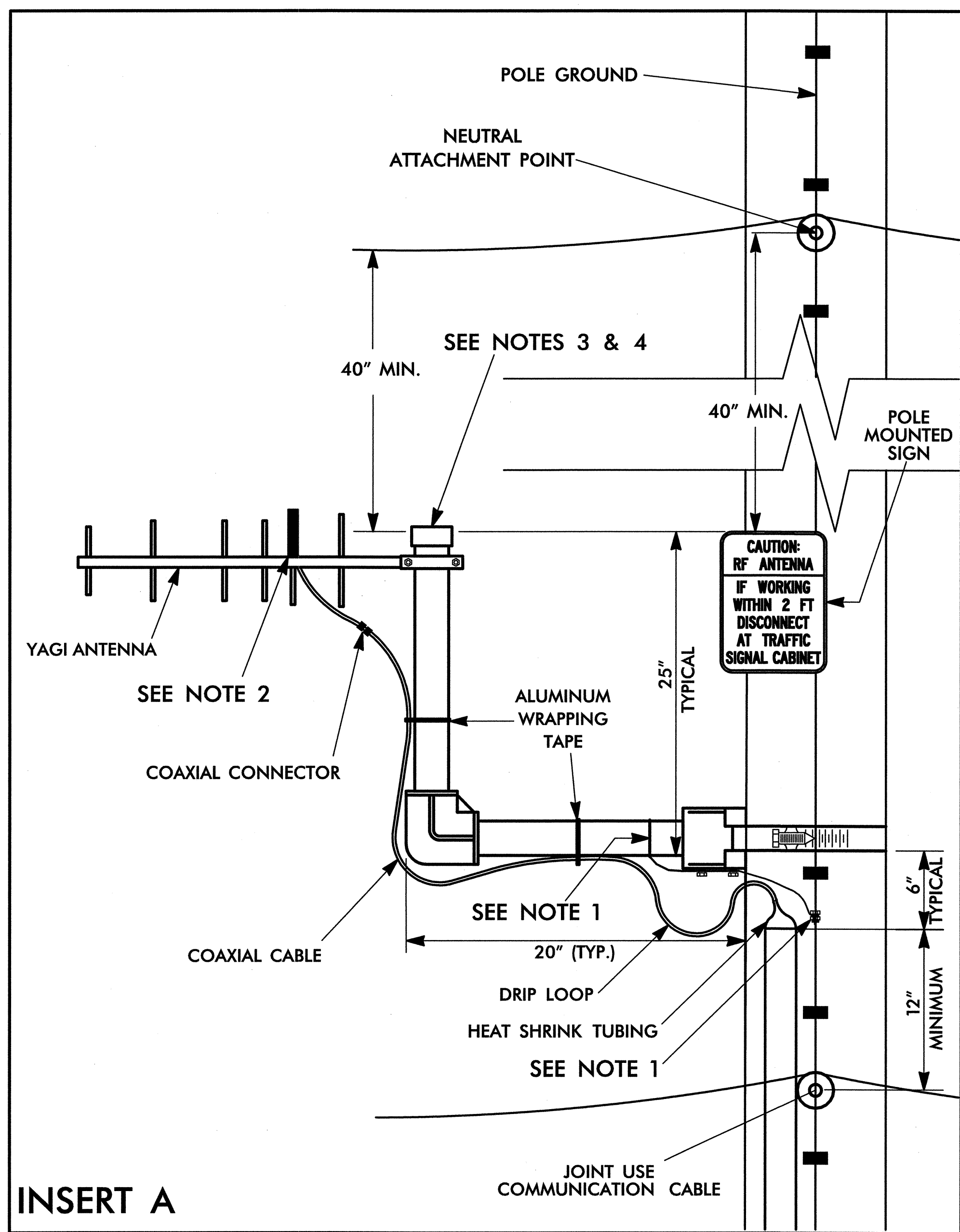


**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

Prepared for:  
  
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 5 0 20  
 1"=20'

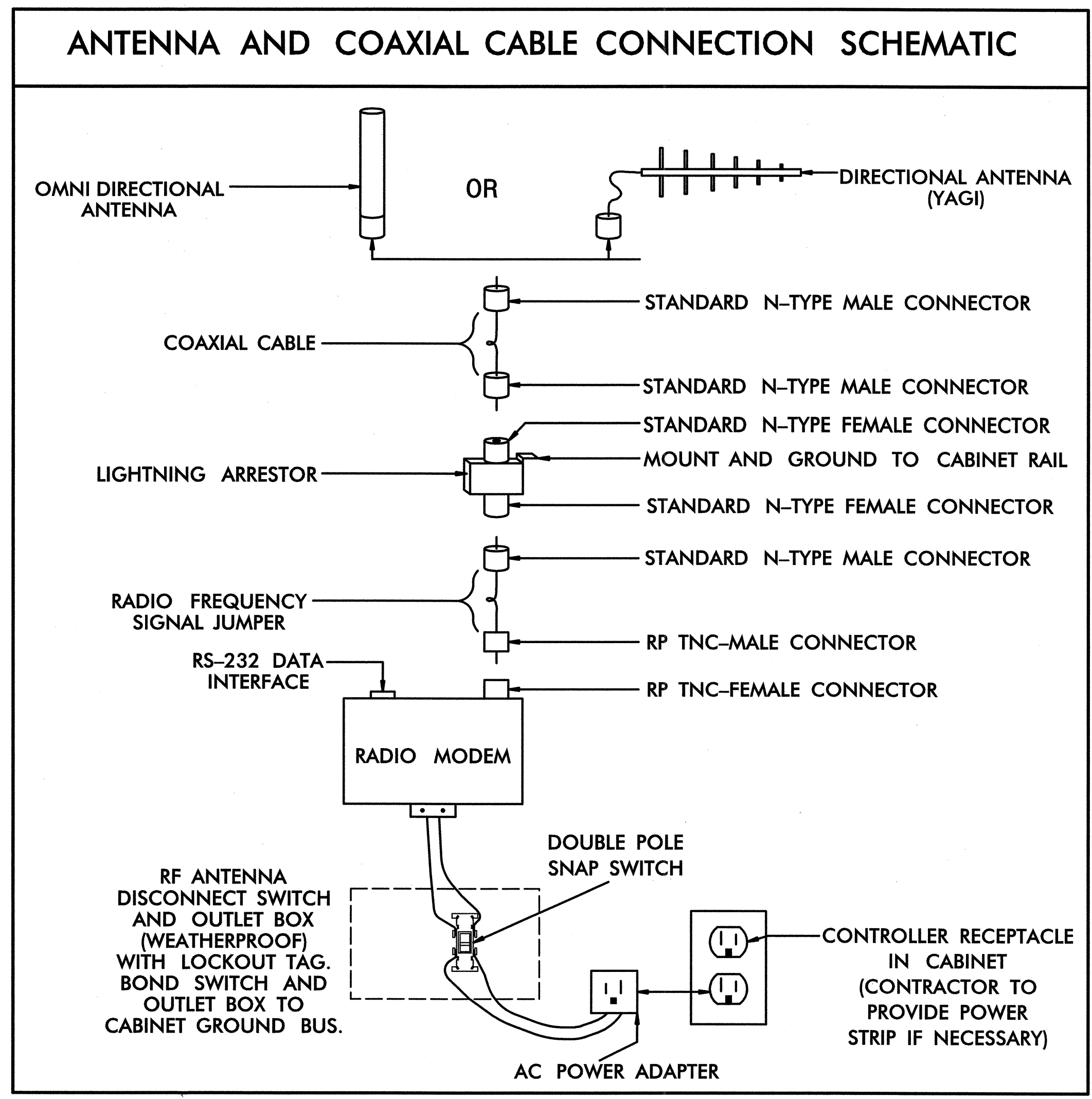
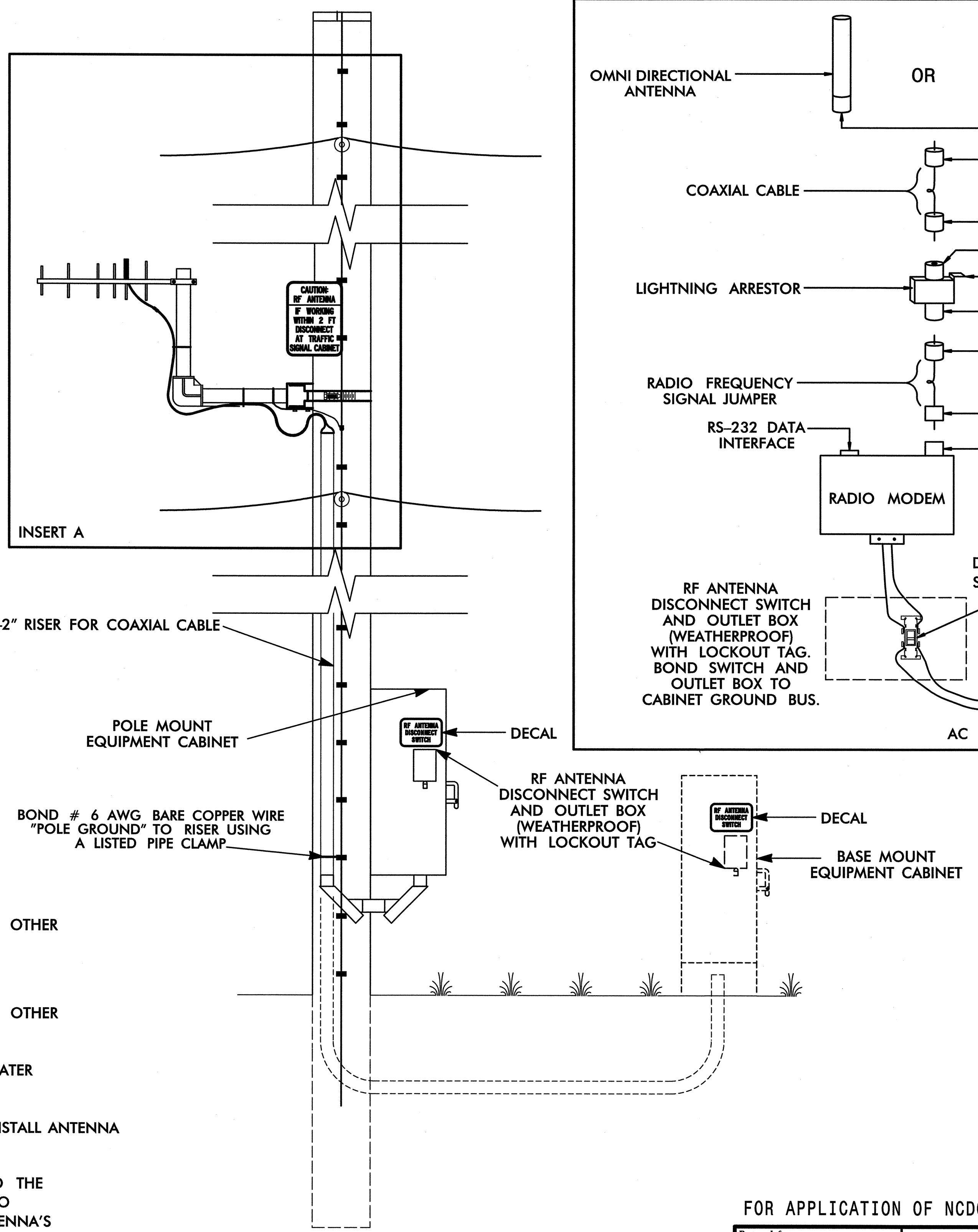
Downtown (College St & Patton Ave) Communications Plans		
Division 13	Buncombe County	Asheville
PLAN DATE: November 2005	REVIEWED BY: N.M. Rodevick	
PREPARED BY: T.R. Terrell	REVIEWED BY: H.L. Winstead	
REVISIONS	INIT.	DATE

SEAL  
  
 H.L. WINSTEAD  
 ENGINEER  
 SIGNATURE DATE 11/3/06  
 CADD FILE NAME (043-049)ConnPlans.dgn



INSERT A

- NOTES**
- WOOD POLE  
BOND # 6 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. ENSURE "POLE GROUND" IS IN PLACE.  
  
METAL POLE/MAST ARM  
BOND # 6 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. ENSURE "SYSTEM GROUND" IS IN PLACE. INSTALL PROPERLY SIZED NEOPRENE GROMMET IN EXIT HOLE FOR COAXIAL CABLE TO MAKE A WATER TIGHT SEAL.
  - 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 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.



FOR APPLICATION OF NCDOT TYPICAL DETAIL

	<b>WIRELESS RADIO ANTENNA TYPICAL DETAILS</b>		
	Division 13 Buncombe County Asheville	ASHEVILLE	
PLAN DATE: July 2005 PREPARED BY: T.R. Terrell	REVIEWED BY: N.M. Rodevick REVIEWED BY: H.L. Winstead		SCALE: 0
REVISIONS INIT. DATE	SIGNATURE: <i>H. Winstead</i> 11/3/06 DATE		CAD: F:\enr\0504051\wireless\typical.dwg

# DECAL

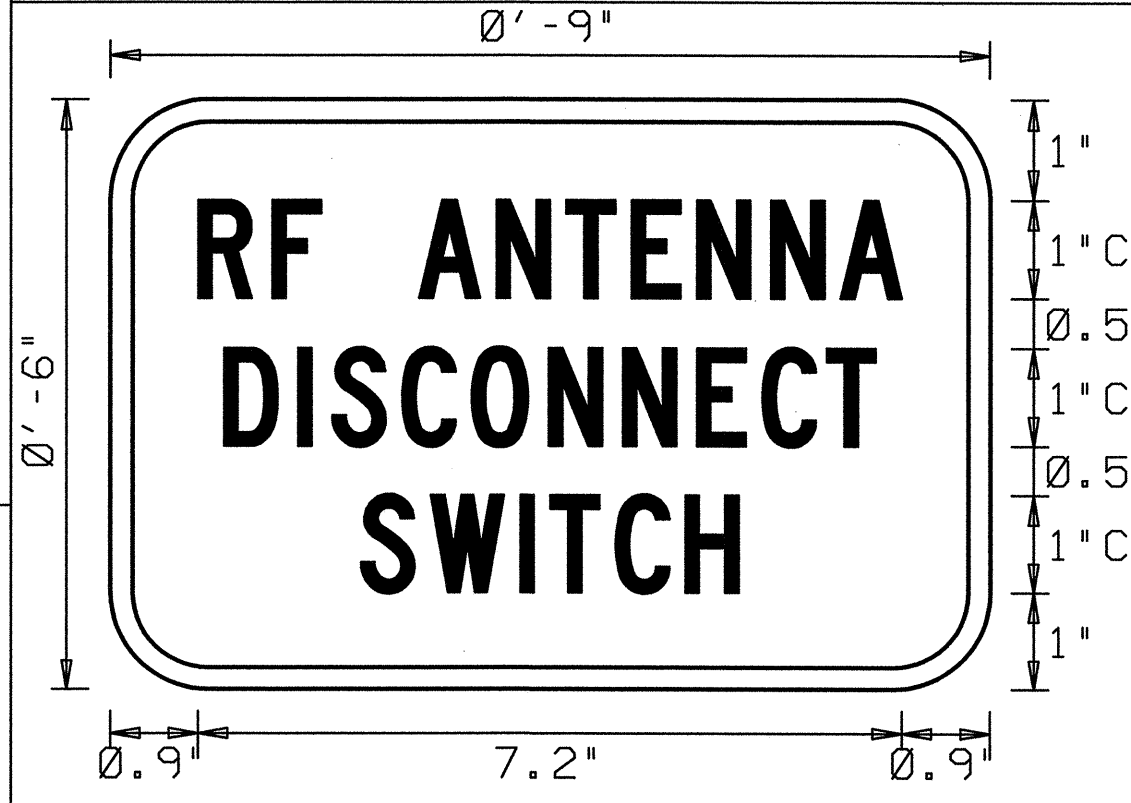
# POLE MOUNTED SIGN

SIGN NUMBER: SP05224  
 TYPE: DECAL  
 QUANTITY:  
 SIGN WIDTH: 0'-9"  
 HEIGHT: 0'-6"  
 TOTAL AREA: 0.4 Sq.Ft.  
 BORDER TYPE: FLUSH  
 RECESS: 0"  
 WIDTH: 0.25"  
 RADII: 1"  
 NO. Z BARS:  
 LENGTH:

SYMBOL	X	Y	WID	HT

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

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



NOTE:  
 THIS SIGN SHALL BE PRODUCED AS A DECAL

BORDER R=1" TH=0.25"

LETTER POSITIONS

Letter spacings are to start of next letter

Letter	R	F	A	N	T	E	N	N	A	Series/Size Text Length				
RF ANTENNA DISCONNECT SWITCH	0.9	0.8	0.5	1	0.8	0.7	0.7	0.7	0.8	0.7	0.6	0.9	C1	7.2
DISCONNECT SWITCH	1.2	0.8	0.3	0.7	0.7	0.8	0.8	0.8	0.7	0.7	0.5	1.2	C1	6.7
SWITCH	2.6	0.7	0.9	0.3	0.7	0.7	0.5	2.6					C1	3.9

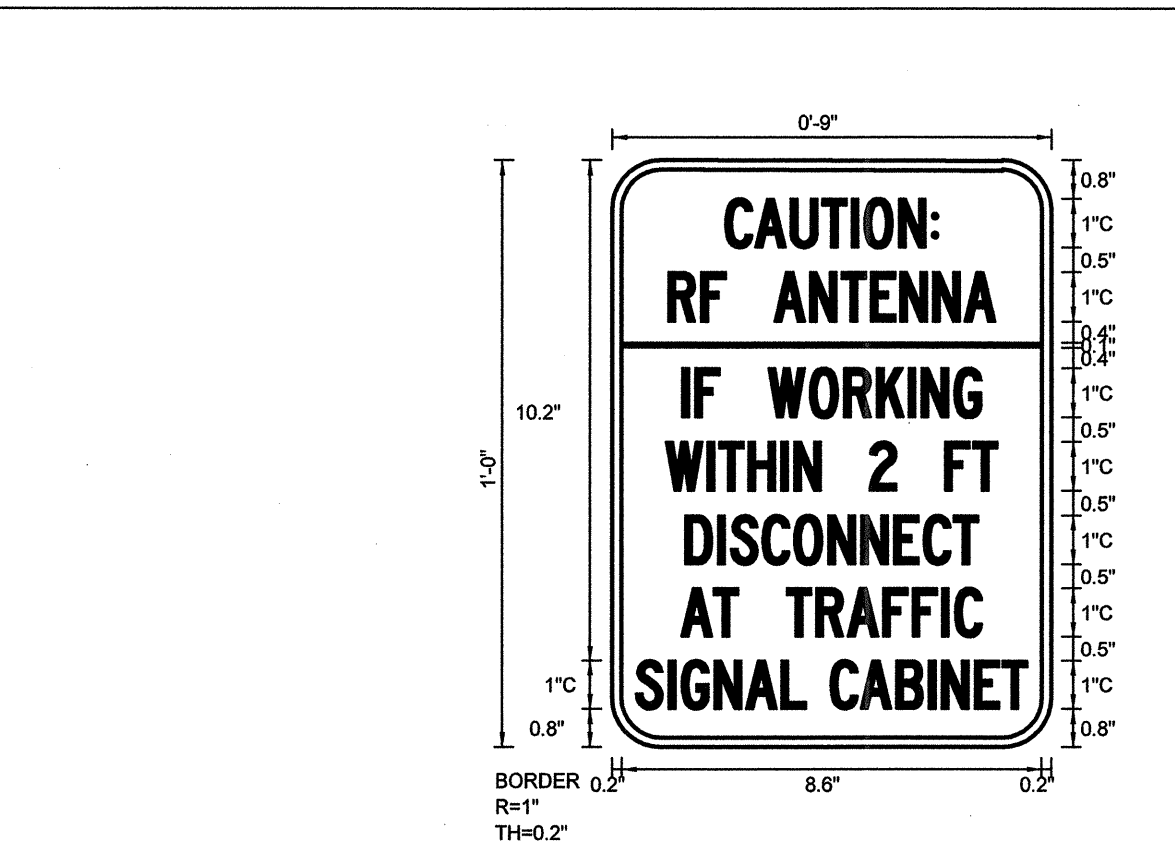
Spacing Factor is 1 unless specified otherwise

SIGN NUMBER: SP05223  
 TYPE: D  
 QUANTITY:  
 SIGN WIDTH: 0'-9"  
 HEIGHT: 1'-0"  
 TOTAL AREA: 0.8 Sq.Ft.  
 BORDER TYPE: FLUSH  
 RECESS: 0"  
 WIDTH: 0.2"  
 RADII: 1"  
 NO. Z BARS:  
 LENGTH:

SYMBOL	X	Y	WID	HT
BAR	0.2	8.2	8.6	1.0

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

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



0.60 SPACING FACTOR

LETTER POSITIONS

Letter spacings are to start of next letter

Letter	C	A	U	T	I	O	N	:	Series/Size Text Length						
CAUTION: RF ANTENNA IF WORKING WITHIN 2 FT DISCONNECT AT TRAFFIC SIGNAL CABINET	2.3	0.6	0.7	0.6	0.6	0.3	0.7	0.7	0.1	2.3	C1	4.4			
RF ANTENNA	1.1	0.7	0.5	1	0.7	0.6	0.6	0.6	0.7	0.6	0.6	1.1	C1	6.7	
IF WORKING WITHIN 2 FT	1.4	0.3	0.5	1	0.8	0.7	0.7	0.6	0.3	0.7	0.5	1.4	C1	6.1	
DISCONNECT AT TRAFFIC	1.1	0.9	0.2	0.6	0.7	0.3	0.5	1	0.5	1	0.6	0.5	1.1	C1	6.8
SIGNAL CABINET	1.5	0.7	0.3	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.5	1.5	C1	6	
DISCONNECT AT TRAFFIC SIGNAL CABINET	1.4	0.7	0.5	1	0.6	0.6	0.7	0.6	0.6	0.3	0.6	1.4	C1	6.2	
SIGNAL CABINET	0.5	0.7	0.3	0.7	0.6	0.7	0.5	5					C1	3.5	
DISCONNECT AT TRAFFIC SIGNAL CABINET	4.5	0.6	0.7	0.7	0.3	0.7	0.6	0.5	0.5				C1	4	

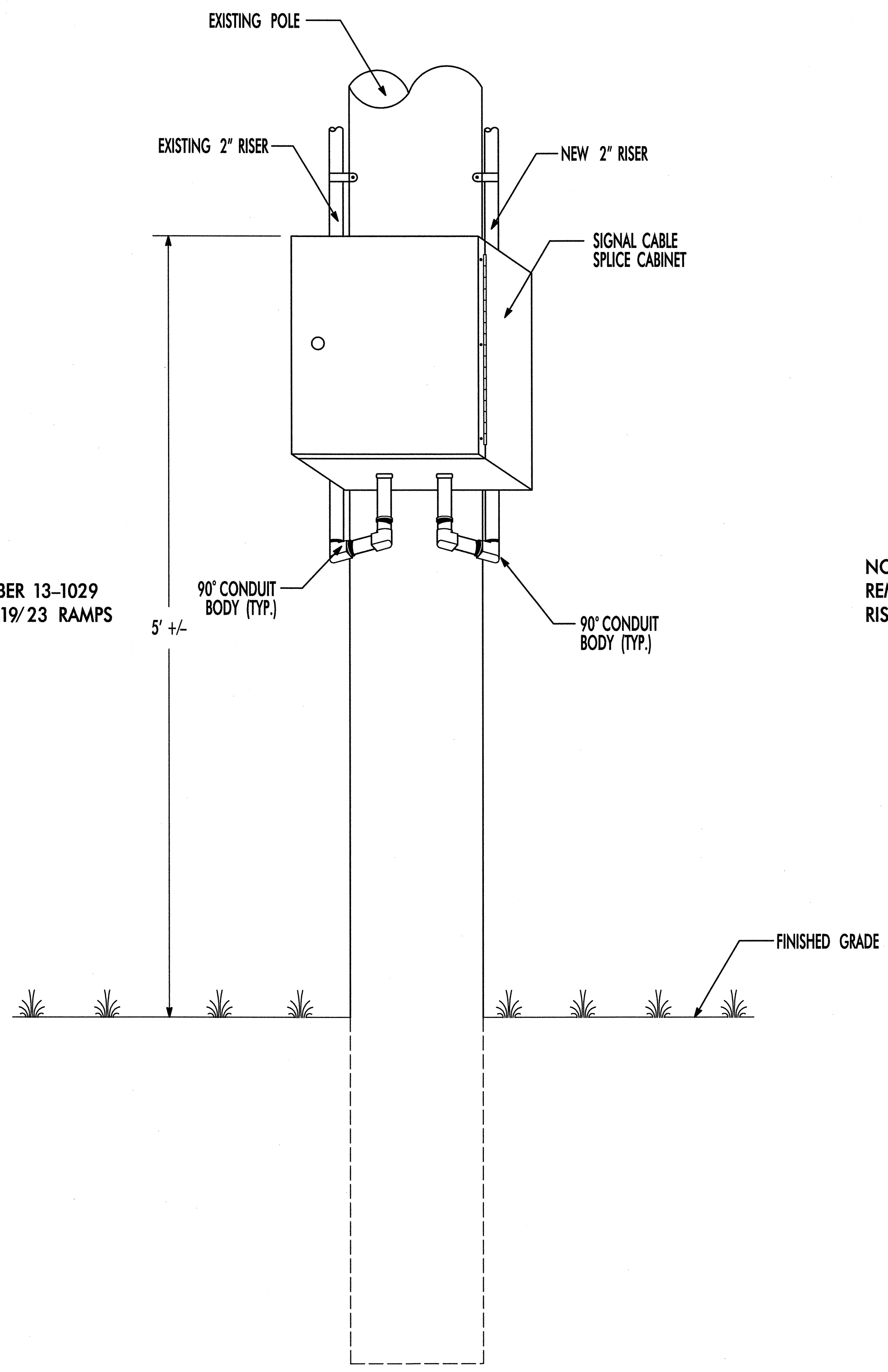
Spacing Factor is 1 unless specified otherwise

FOR APPLICATION OF NCDOT TYPICAL DETAIL

<p>122 N. McDowell St., Raleigh, NC 27603</p>	<p>WIRELESS RADIO ANTENNA TYPICAL DETAILS</p> <p>Division 13 Buncombe County Asheville</p> <p>PLAN DATE: JULY 2005 REVIEWED BY: I. N. AVERY</p> <p>PREPARED BY: A. CREECH REVIEWED BY: A. T. FAULKNER</p>		<p>SEAL</p> <p>HAARVEY L. WINSTEAD, P.E.</p>								
	<p>SCALE</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		NO.	DATE	INIT.	DATE				
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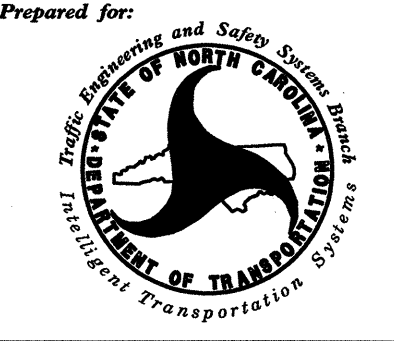

## SIGNAL CABLE SPLICE CABINET DETAIL



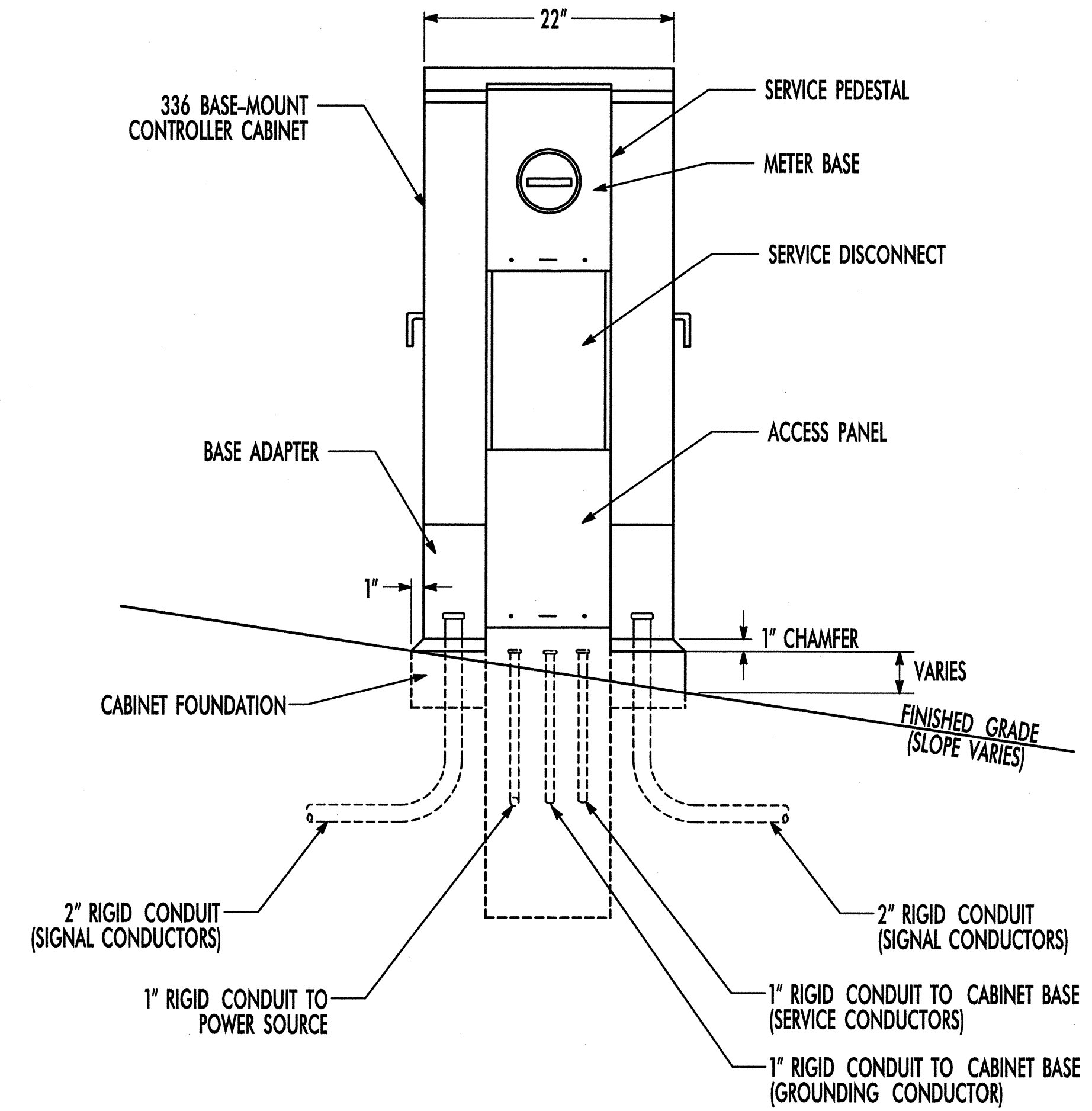
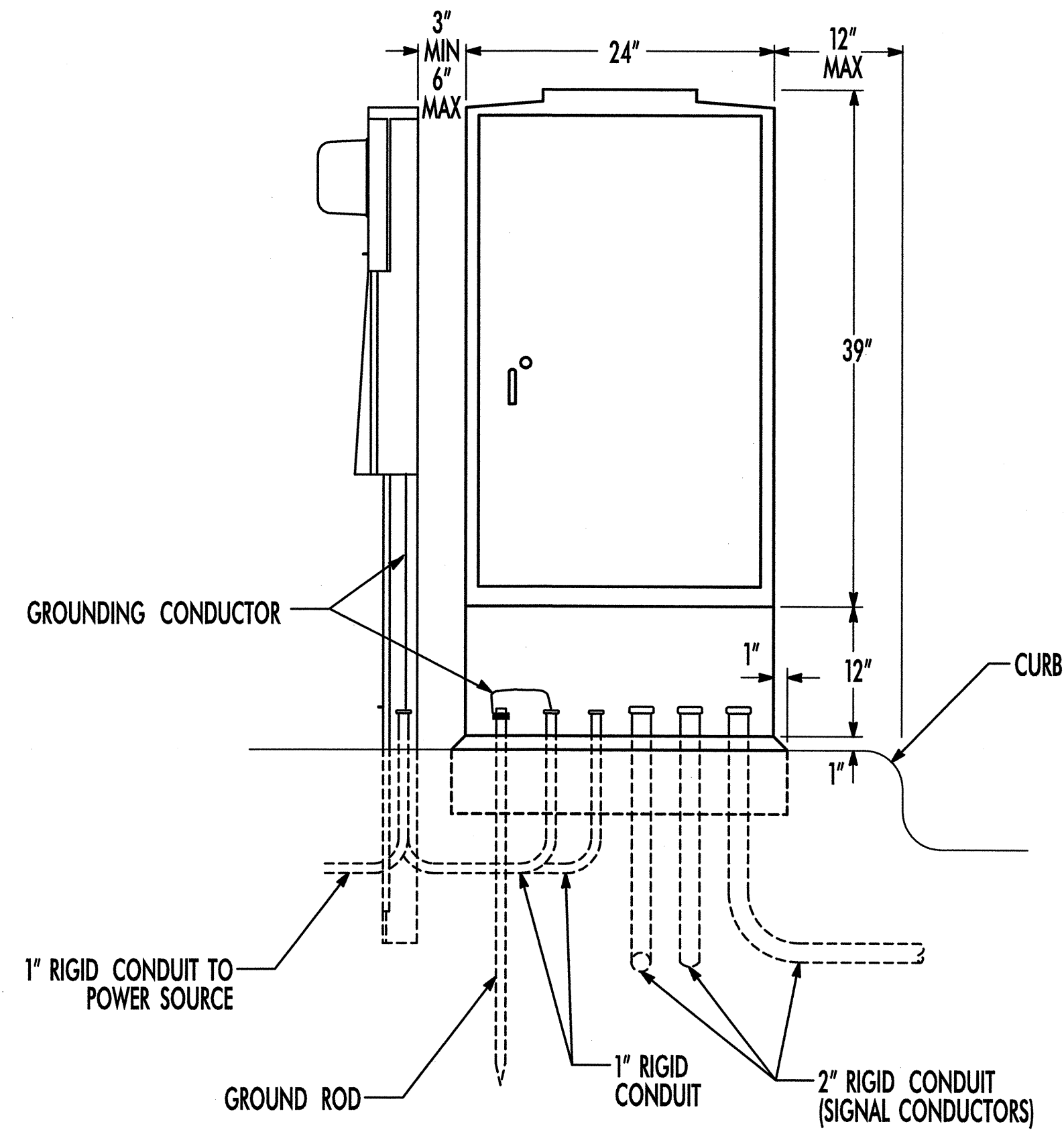
**LOCATION**  
 NCDOT SIGNAL INVENTORY NUMBER 13-1029  
 EB I-240 EXIT RAMP AT I-240/US 19/23 RAMPS

**NOTE:**  
 REMOVE EXISTING 1" ELECTRICAL SERVICE  
 RISER AND CONDUCTORS.

**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609

	<b>Asheville Signal System</b> Downtown (College St & Patton Ave) Signal Cable Splice Cabinet Detail											
	Division 13    Buncombe County    Asheville											
SCALE 0 _____ NONE	PLAN DATE: July 2005    REVIEWED BY: N.M. Rodevick	PREPARED BY: T.R. Terrell    REVIEWED BY: H.L. Winstead	<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> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE						
REVISIONS	INIT.	DATE										
SIGNATURE: <i>H. Winstead</i> DATE: 11/3/06		CADD FILE NAME: I:\05215p1\loc\cab\net\Detail1.dwg										

## BASE MOUNTED CABINET & ELECTRICAL SERVICE DETAIL



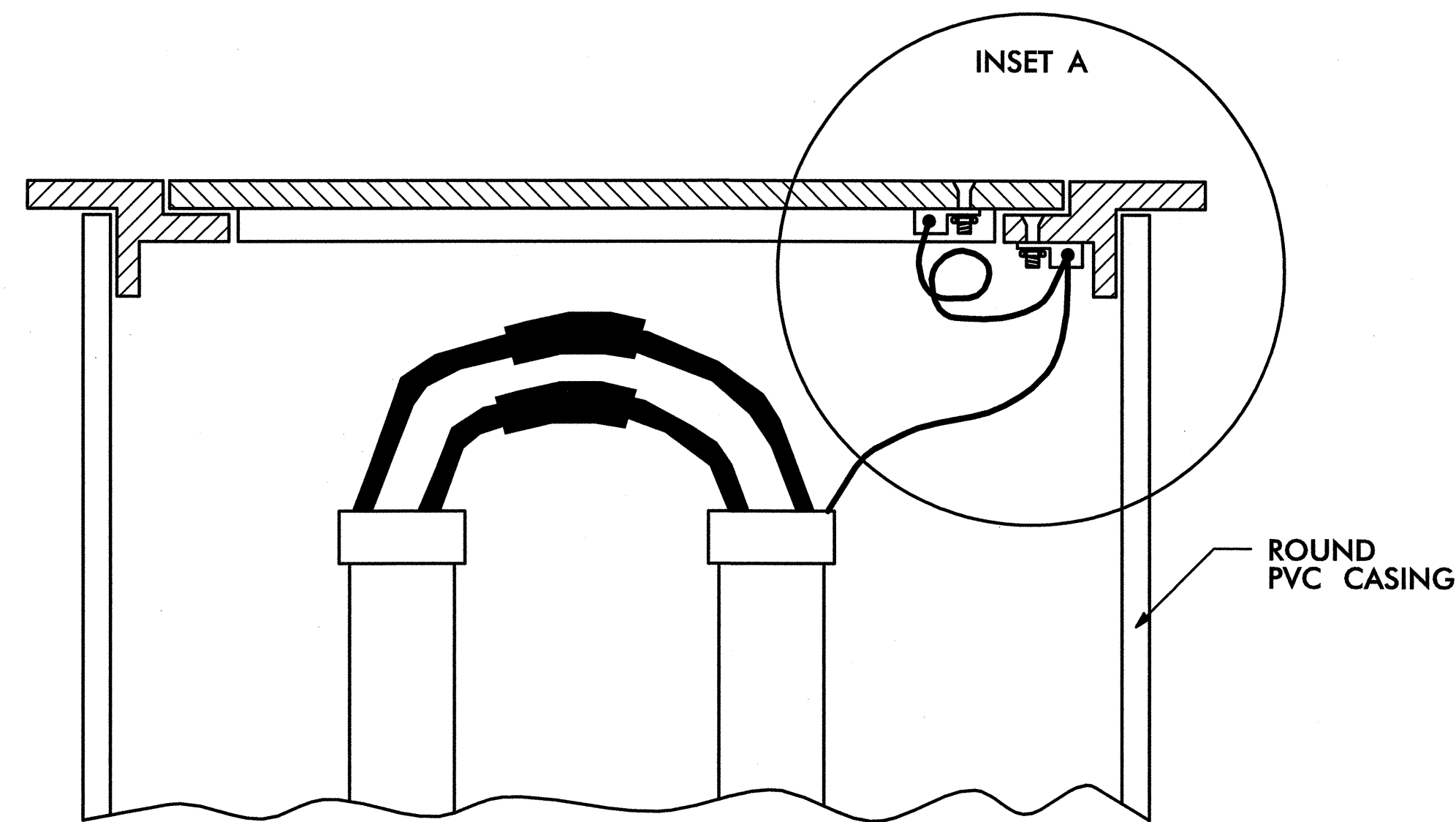
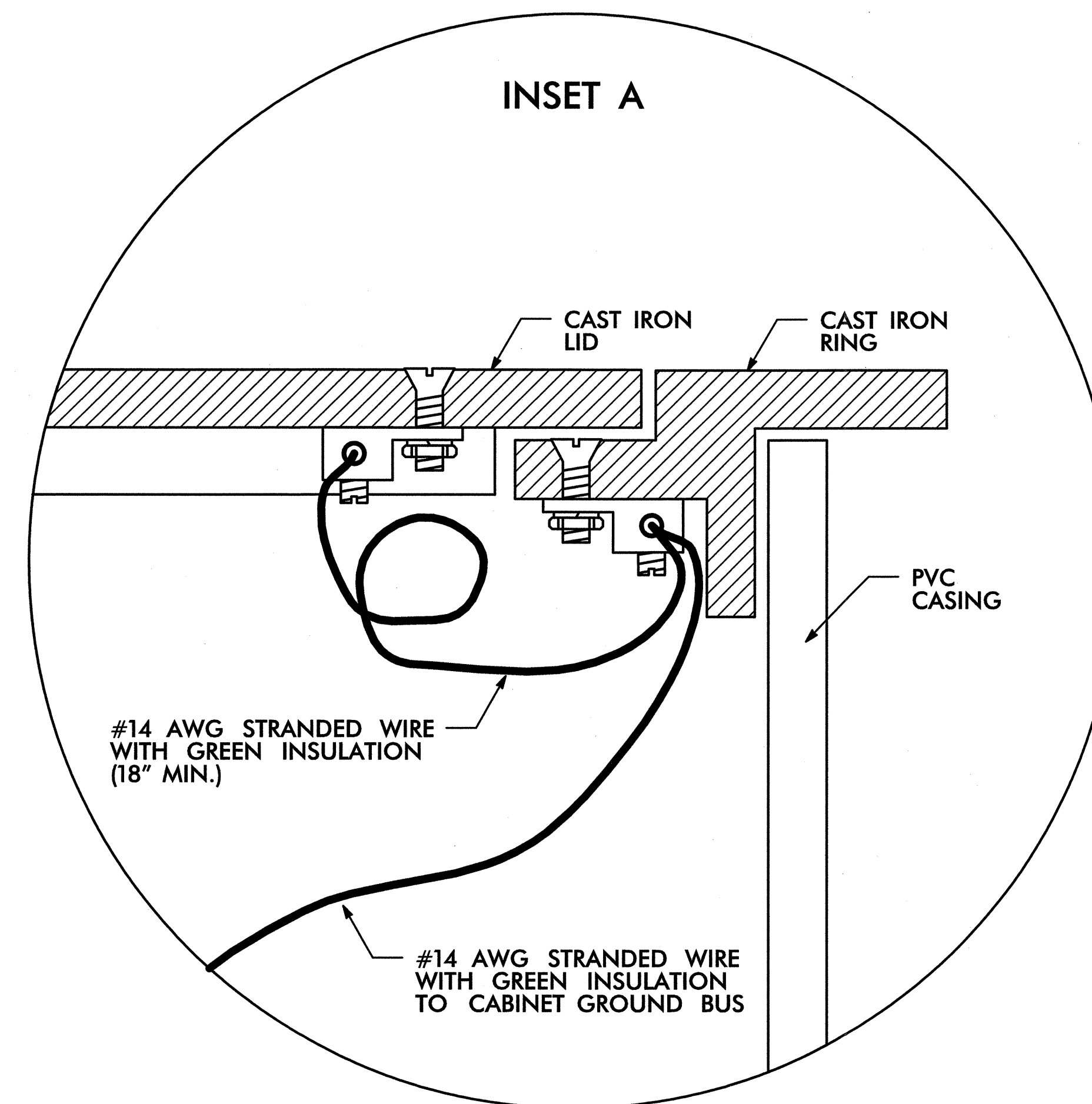
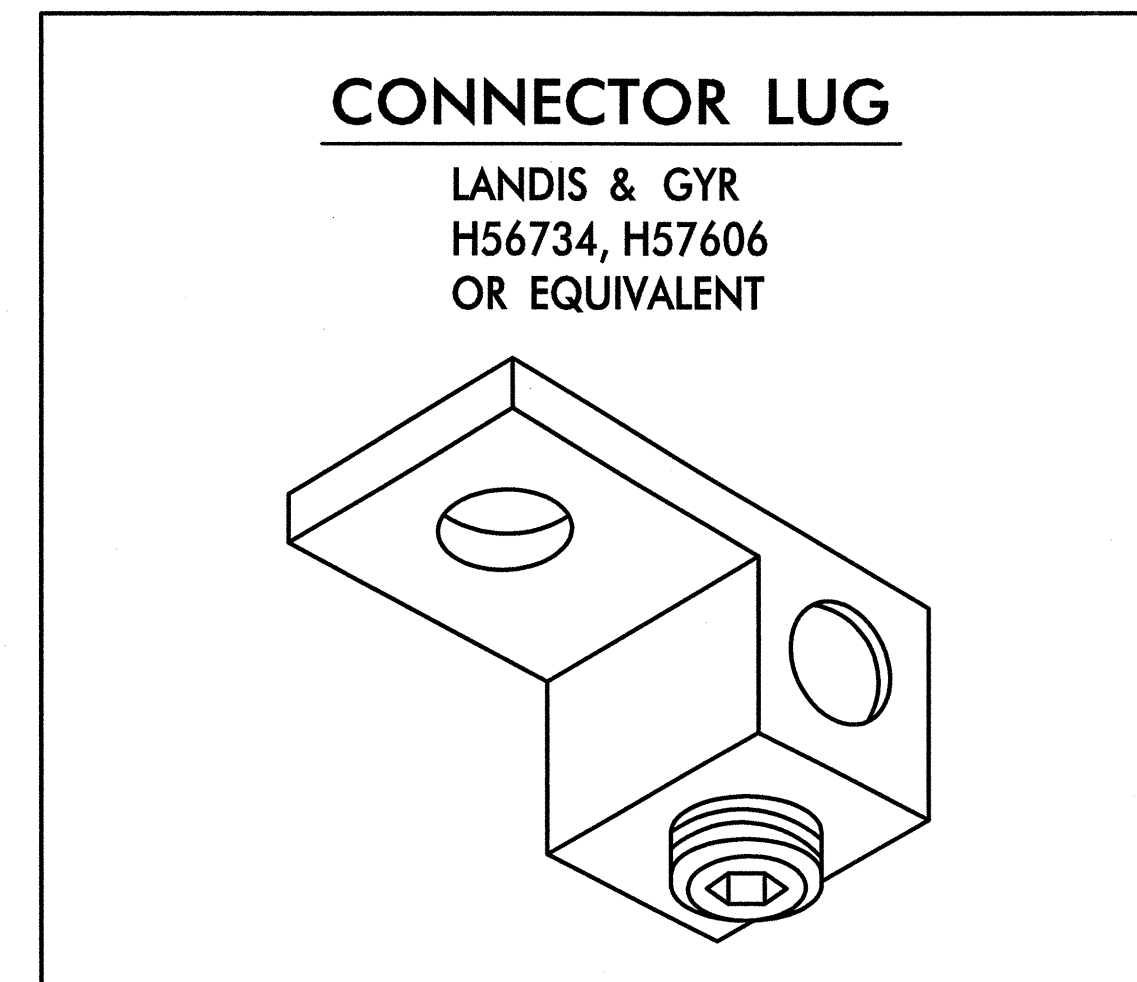
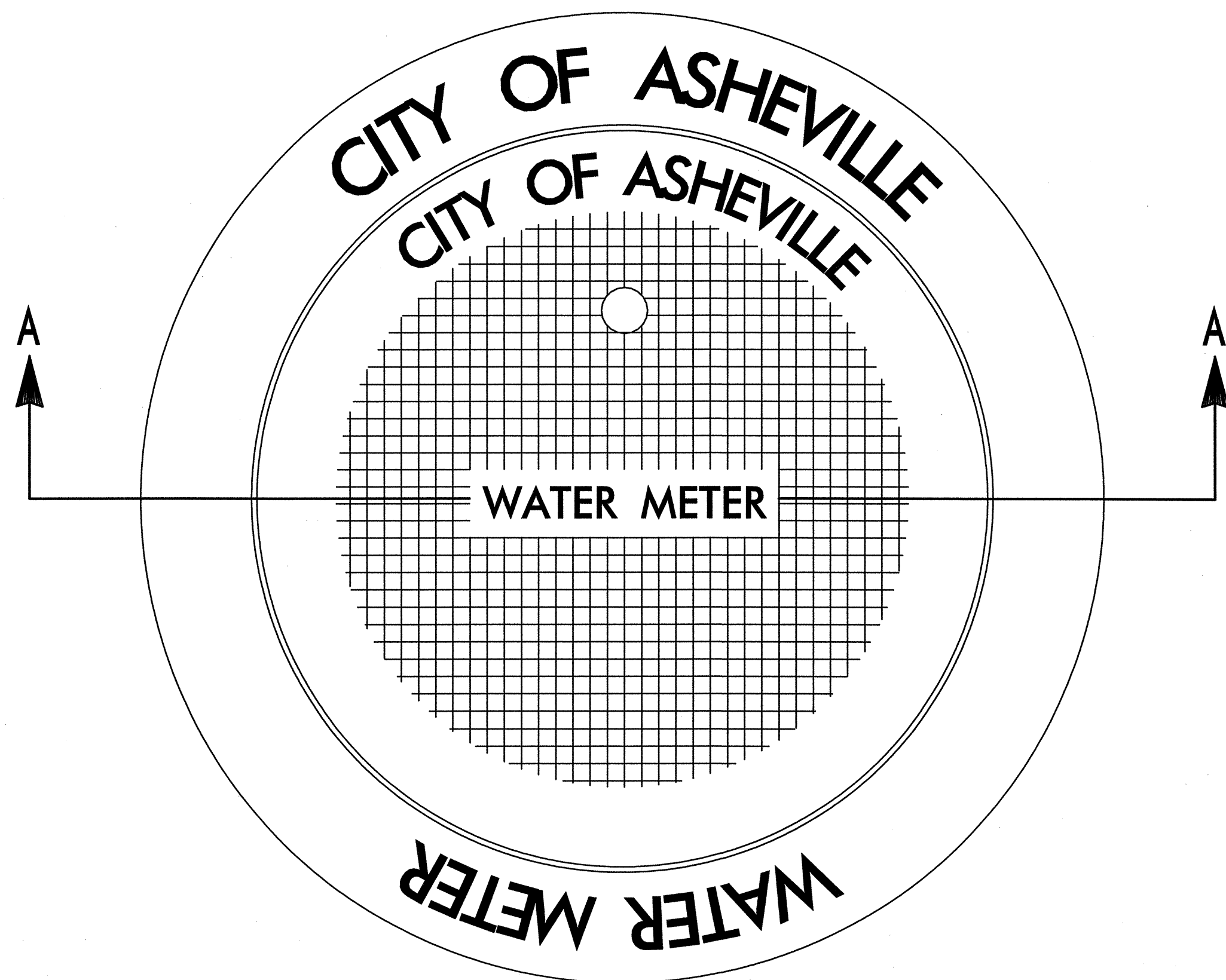
### NOTES

1. TEST GROUNDING SYSTEM USING AN APPROVED METHOD IN ACCORDANCE WITH SPECIAL PROVISIONS. INSTALL GROUND RODS AS DIRECTED BY THE ENGINEER TO MEET THIS REQUIREMENT.
2. REMOVE BONDING JUMPER IN EQUIPMENT CABINET IF INSTALLED BETWEEN AC NEUTRAL AND EQUIPMENT GROUND.
3. BOND ALL RIGID GALVANIZED STEEL CONDUITS ENTERING THE CABINET TO "EQUIPMENT GROUND".
4. INSTALL RIGID GALVANIZED STEEL CONDUIT (MINIMUM 1") BETWEEN DISCONNECT AND CABINET.
5. SERVICE DISCONNECT GROUND BUS BAR SHALL PROVIDE FOR 2 #4 AWG CONNECTIONS.
6. IF CONDITIONS REQUIRE SERVICE PEDESTAL TO BE INSTALLED IN FRONT OR REAR OF CABINET, MAINTAIN SUFFICIENT CLEARANCE FOR DOOR TO FULLY OPEN.

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

	<b>Asheville Signal System</b> Downtown (College St & Patton Ave) Ground Mounted Service Detail		SEAL 
	Division 13 Buncombe County Asheville		
PLAN DATE: July 2005	REVIEWED BY: T.R. Terrell		H. L. Winstead / 11/23/06 SIGNATURE DATE
PREPARED BY: K.H. Ide	REVIEWED BY: H.L. Winstead		
SCALE 0 NONE	REVISIONS	INIT.	DATE
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## CAST IRON JUNCTION BOX GROUNDING DETAILS

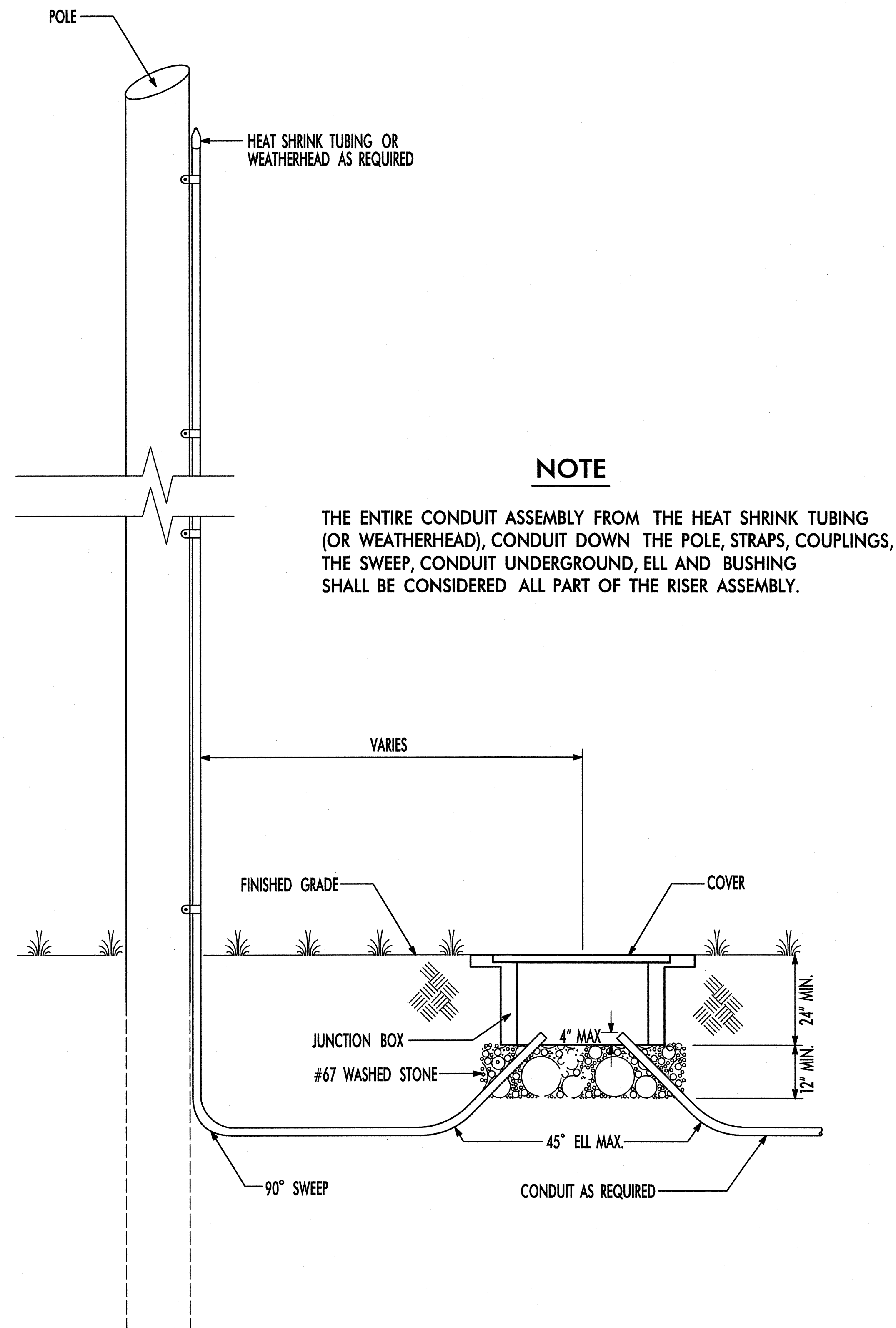


"SECTION A"

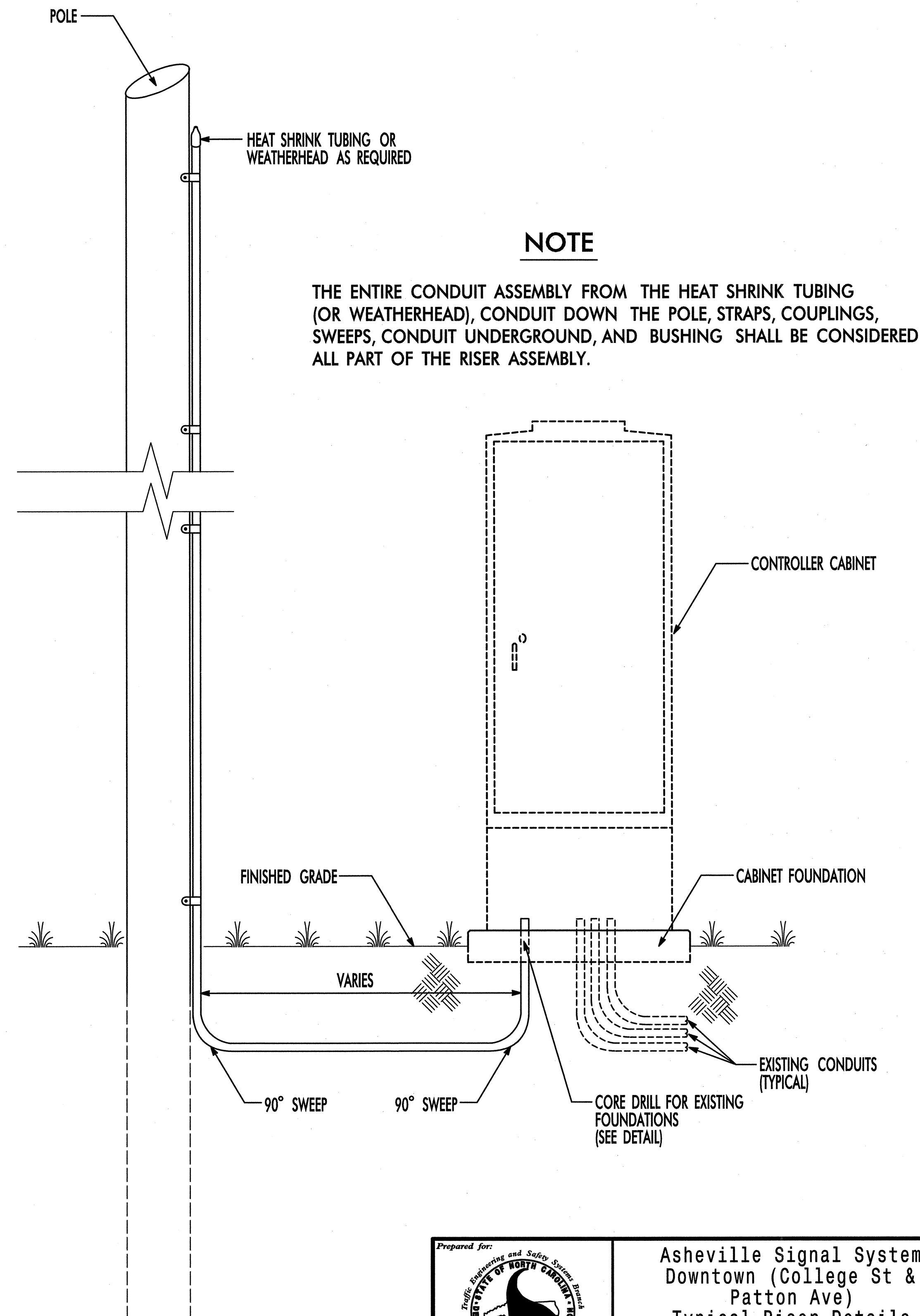
	<b>Asheville Signal System</b> Downtown (College St & Patton Ave) <b>Manhole Grounding Details</b>	SEAL 								
	Division 13    Buncombe County    Asheville PLAN DATE: August 2005    REVIEWED BY: S.T. Franklin PREPARED BY: T.R. Terrell    REVIEWED BY: H.L. Winstead	<table border="1" style="width: 100%; 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> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE					
REVISIONS	INIT.	DATE								
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## TYPICAL RISER DETAILS

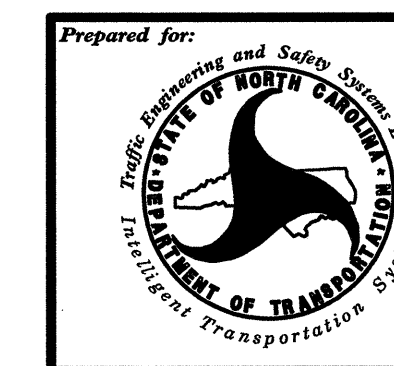
### RISER TO JUNCTION BOX ASSEMBLY



### RISER TO CABINET FOUNDATION ASSEMBLY



**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609

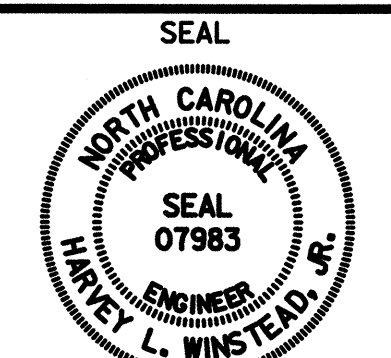


Asheville Signal System  
Downtown (College St & Patton Ave)  
Typical Riser Details  
Division 13 Buncombe County Asheville

PLAN DATE: July 2005	REVIEWED BY: T.R. Terrell
PREPARED BY: K.H. Ide	REVIEWED BY: H.L. Winstead

SCALE  
0  
NONE

REVISIONS	INIT.	DATE



H.L. Winstead 11/3/06  
SIGNATURE DATE

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