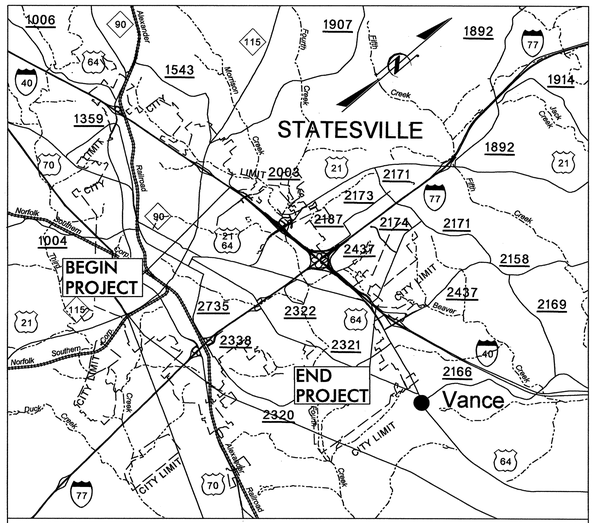
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I–3819A	SIG-1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

TIP PROJECT: I–3819A



VICINITY MAP

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF STATESVILLE

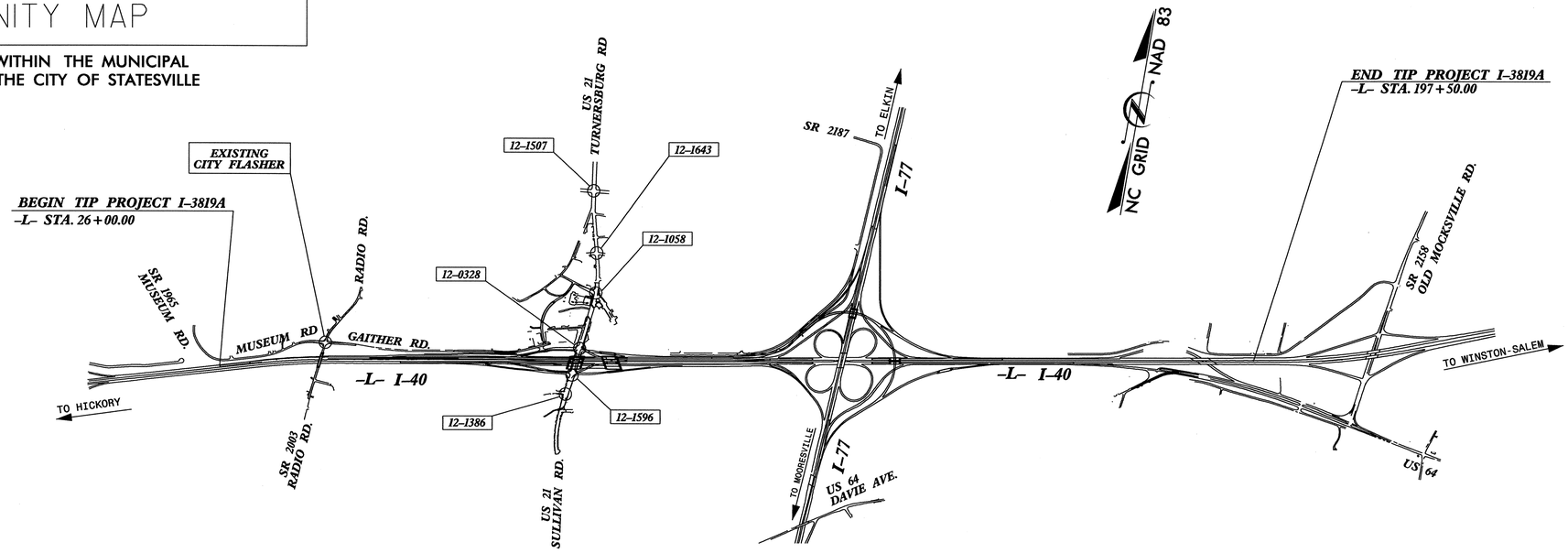
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

LOCATION: I–40/I–77 INTERCHANGE INCLUDING I–40 FROM WEST OF SR 2003 (Radio Road) TO WEST OF SR 2158 (Old Mocksville Road) & I–77 FROM SOUTH OF I–40 TO SOUTH OF SR 2171 (Jane Sower Road)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, RETAINING WALLS, NOISE WALLS, TRAFFIC CONTROL AND SIGNALS

TRAFFIC SIGNAL DESIGN PLANS



INDEX OF PLANS

SHEET NO.	SIN	LOCATION /DESCRIPTION
SIG–1		TITLE SHEET
SIG–2 to 7	12–1386	US 21 & CAROLINA AVENUE
SIG–8 to 19	12–1596	US 21 & I–40 EB RAMP
SIG–20 to 29	12–0328	US 21 & I–40 WB RAMP
SIG–30 to 34	12–1058	US 21 & SUNSET HILL RD/GLENWAY DR
SIG–35 to 37	12–1643	US 21 & CVS PHARMACY
SIG–38 to 40	12–1507	US 21 & N. POINTE BOULEVARD
SIG–41	CITY	RADIO ROAD & GAITHER ROAD
SIG–42 to 45	N/A	WIRELESS RADIO COMMUNICATIONS
SIG–46 to 51	N/A	METAL POLE STANDARDS

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

Prepared for the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS and Signals Unit

750 N.Greenfield Pkwy.Garner.NC 27529

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TIM WILLIAMS, P.E., WESTERN REGION SIGNALS ENGINEER
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NEIL AVERY, SIGNAL COMM. PROJECT ENGINEER

TRAFFIC SIGNAL PLANS PREPARED BY:

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Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0588

LEGEND

I2–#### *SIGNAL INVENTORY NUMBER (SIN)*

NOT TO SCALE

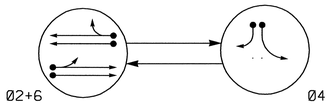
2012 STANDARD SPECIFICATIONS

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY

11-02-11
SIGNATURE DATE

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-2

PHASING DIAGRAM



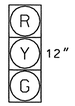
PHASING DIAGRAM DETECTION LEGEND

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

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

SIGNAL FACE I.D.

All Heads L.E.D.

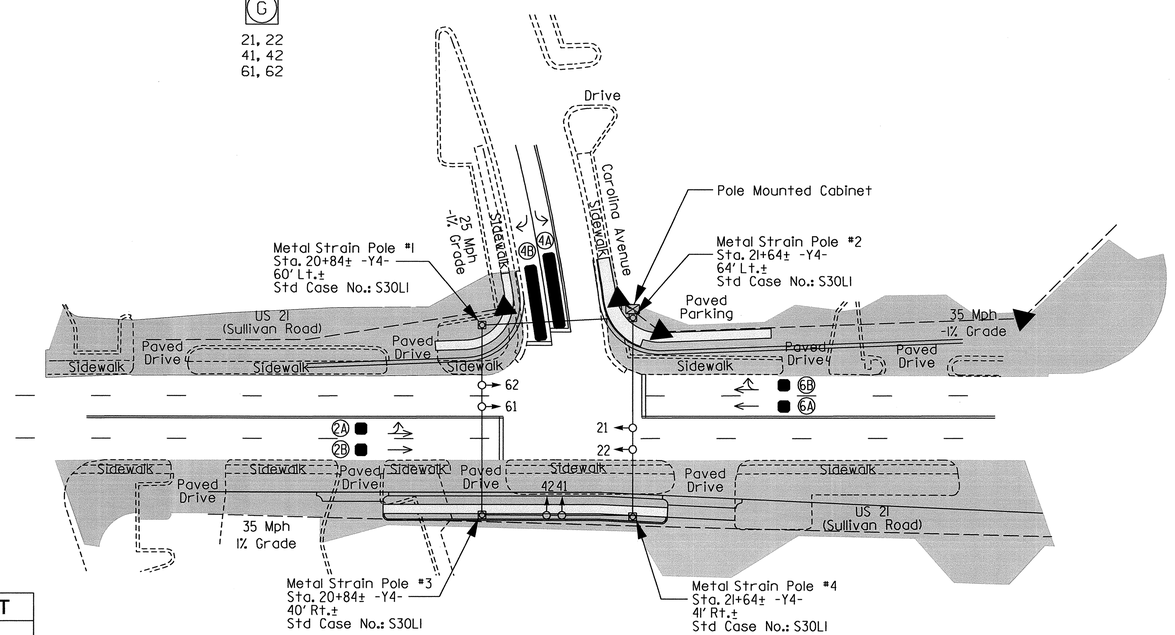


21, 22
41, 42
61, 62

OASIS 2070L LOOP & DETECTOR INSTALLATION

DETECTION ZONES					DETECTOR PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	70	*	Y	2	Y	Y	–	—	—	–	*
2B	6X6	70	*	Y	2	Y	Y	–	—	—	–	*
4A	6X40	0	*	Y	4	Y	Y	–	—	3	–	*
4B	6X40	0	*	Y	4	Y	Y	–	—	15	–	*
6A	6X6	70	*	Y	6	Y	Y	–	—	—	–	*
6B	6X6	70	*	Y	6	Y	Y	–	—	—	–	*

* Video Detection Zone



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	10	7	10
Extension 1 *	3.0	2.0	3.0
Max Green 1 *	60	20	60
Yellow Clearance	3.8	3.0	3.9
Red Clearance	1.2	2.1	1.2
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

* 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.

2 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to install and maintain 900 Mhz Wireless Radio Signal System.
10. Closed Loop System Data: Controller Asset # 1386.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⛶
□	Junction Box	■
····	2-in Underground Conduit	····
—▲—	Right of Way	—△—
→	Directional Arrow	→
→	Pavement Marking Arrow	→
▬	Video Detection Zone	▬
▬	Construction Zone	▬

Signal Revision - Temporary Signal 1 - TCP Phase IV

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Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Sullivan Road) at Carolina Avenue

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19713 DONALD J. DARITY
11-02-11

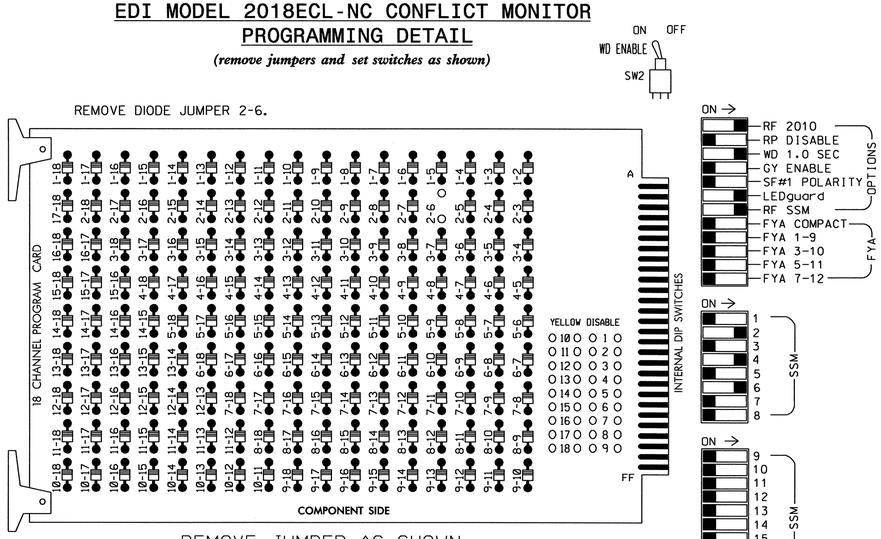
SIGNATURE DATE

SIG. INVENTORY NO. 12-1386T1

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-3

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
✋												
🚶												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8
PHASES USED.....2,4,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
L														ST DC ISOLATOR

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1386T1
DESIGNED: Sept 2011
SEALED: 11-2-2011
REVISED:

Signal Revision - Temporary Signal 1 - TCP Phase IV

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NCDOT Traffic Engineering Branch
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Sullivan Road)
at
Carolina Avenue

Division 12 Iredell County Statesville

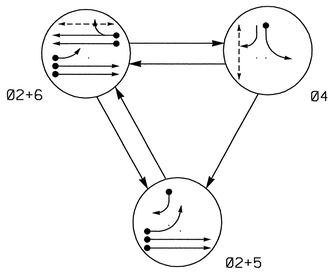
PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-1386T1

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R/←	R	G	R
51	←	F.Y.	~~R~~	~~Y~~
61, 62	R	G	R	Y
P41, P42	DW	DW	W	DRK
P61, P62	DW	W	DW	DRK

F.Y. = Flashing Yellow Arrow
W-Walk
DW-Don't Walk
DRK-Dark

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM \ TO	←	F.Y.	~~R~~
	1 2	1 2	1 2
←	← ←	~~R~~ ~~R~~	~~R~~ ~~R~~
F.Y.	F.Y. F.Y.	F.Y. F.Y.	~~Y~~ ~~R~~
~~R~~	~~R~~ ~~R~~	~~R~~ ~~R~~	~~R~~ ~~R~~

F.Y. = Flashing Yellow Arrow

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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/S1	6X6	70	4	Y	2	Y	Y	-	-	-	Y	Y
2B/S2	6X6	70	4	Y	2	Y	Y	-	-	-	Y	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
					2	Y	Y	-	-	-	-	Y
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A/S3	6X6	70	3	Y	6	Y	Y	-	-	-	Y	Y
6B/S4	6X6	70	3	Y	6	Y	Y	-	-	-	Y	Y

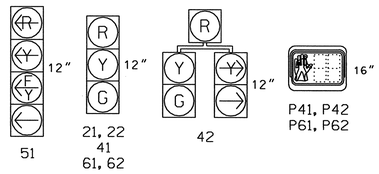
3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

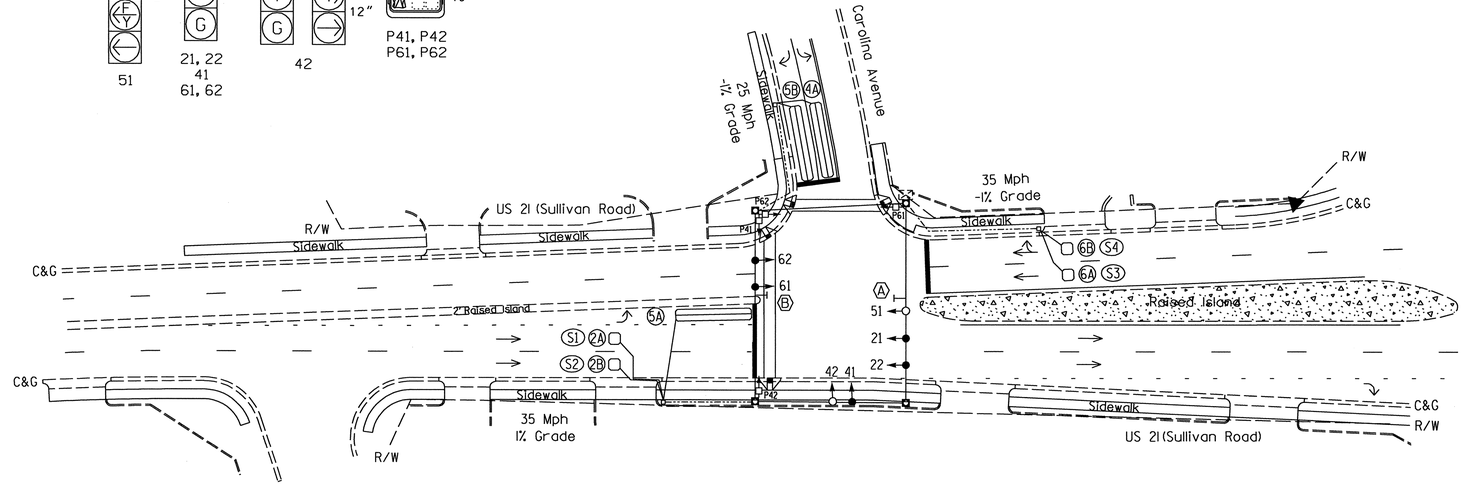
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads numbered 21, 22, 41, 61 and 62.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Closed Loop System Data: Controller Asset #1386.

SIGNAL FACE I.D.

All Heads L.E.D.





LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊓↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○⤵	Signal Pole with Sidewalk Guy	●⤵
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	—△—
→	Directional Arrow	→
→	Pavement Marking Arrow	→
N/A	Wheelchair Ramp	◢
◎	Metal Strain Pole	◘
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	No U-TURN Sign (R3-4)	Ⓑ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green 1 *	10	7	7	10
Extension 1 *	3.0	2.0	2.0	3.0
Max Green 1 *	50	35	15	50
Yellow Clearance	3.9	3.0	3.0	3.9
Red Clearance	2.0	2.8	2.8	2.0
Walk 1 *	-	7	-	7
Don't Walk 1	-	23	-	11
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision - Final Signal - TCP Final Phase

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Prepared for the Offices of:
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Signal Design Section
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US 21 (Sullivan Road)
at
Carolina Avenue

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

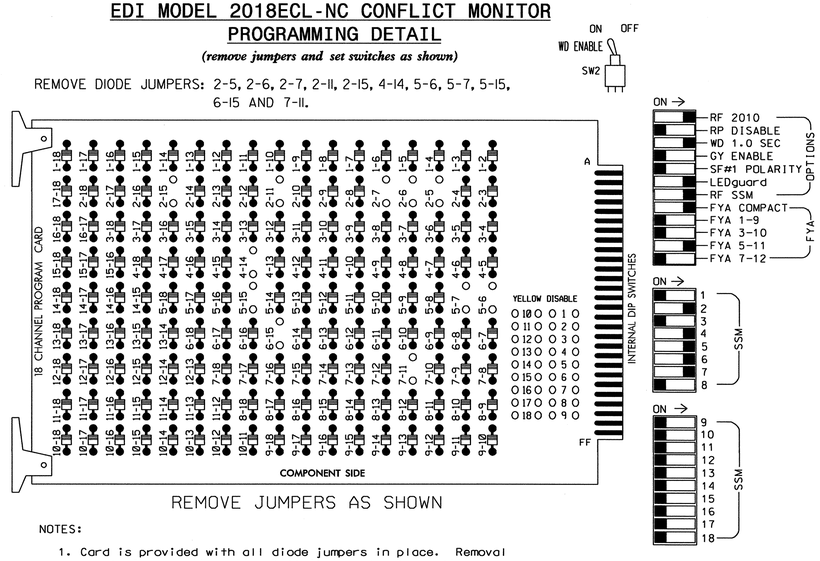
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-1386

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-5

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS: 2-5, 2-6, 2-7, 2-11, 2-15, 4-14, 5-6, 5-7, 5-15, 6-15 AND 7-11.



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.
5. Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.

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 1,3,8,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 4 and 6 for 'STARTUP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash.
7. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....336
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....POLE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S6,S7,S8,S9,S10
PHASES USED.....2,4,4PED,5,6,6PED
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED
OVERLAP "E".....5

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9		S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	11	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	OLC	6	5 GRN	6 PED	OLE	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	P41, P42	51★	61,62	51★	P61, P62	42	NU	NU
RED		128			101			134			✳		
YELLOW		129			102			135					
GREEN		130			103			136					
RED ARROW							131						
YELLOW ARROW							132				123		
FLASHING YELLOW ARROW							133						
✋						104				119			
GREEN ARROW									120		124		
🚶						106				121			

NU = Not Used

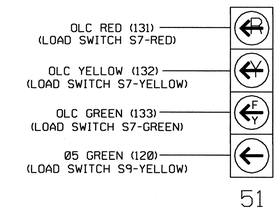
✳ Denotes install load resistor. See Load Resistor Installation Detail this sheet.

★ See pictorial of head wiring in detail below.

NOTE: Load Switches S7 and S9 require output remapping. See sheet 3 of this electrical detail for instructions.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



NOTE

1. The sequence display for this signal requires special logic and output remapping. See sheet 2 of 3 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	SLOT EMPTY	Ø2/SYS 2A/S1	SLOT EMPTY	Ø 4 4A	Ø 5 5A	Ø6/SYS 6A/S3	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
L		Ø2/SYS 2B/S2		Ø 5 5B	⊗ WIRED INPUT	Ø6/SYS 6B/S4						Ø4 PED DC ISOLATOR	NOT USED	ST DC ISOLATOR

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

⊗ DISABLE CHANNEL 2

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/S1	TB21-3,4	I2U	39	1	2	2/SYS	Y	Y			
2B/S2	TB23-3,4	I2L	43	5	12	2/SYS	Y	Y			
4A	TB21-7,8	I4U	41	3	4	4	Y	Y			3
5A [1]	TB21-9,10	I5U	55	17	5	5	Y	Y			15
	-	I5L	48	10	26	2	Y	Y			
5B	TB23-7,8	I4L	45	7	14	5	Y	Y			15
6A/S3	TB21-11,12	I6U	40	2	6	6/SYS	Y	Y			
6B/S4	TB23-11,12	I6L	44	6	16	6/SYS	Y	Y			
PED PUSH BUTTON											
P41,P42	TB24-9,10	I12L	69	31	PED 4	4 PED					
P61,P62	TB22-11,12	I13U	68	30	PED 6	6 PED					

Note: Install DC Isolator in input file slot I12 and I13.

[1] Add jumper from I5-F to I5-W, on rear of input file.

INPUT FILE POSITION LEGEND: I2L
I = FILE
2 = SLOT
L = LOWER

PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode on the 2018ECL-NC Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 6 PY (field term. 120) to chan. 10 green (monitor pin R).

Follow the instructions below to make the appropriate connections:

STEP 1: Fold down rear panel of output file.

STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).

STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

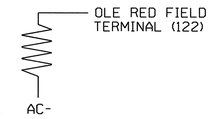
CMU-R ——————— 6PY (term. 120)

NOTE: Some cabinet manufacturers use a molex plug to accomplish this wiring configuration. If connectors are used, simply plug the two connectors together that are labeled with the pin-out as shown above.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



Signal Revision - Final Signal - TCP Final Phase

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1386
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

ELECTRICAL DETAIL SHEET 1 OF 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Sullivan Road)
at
Carolina Avenue

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-1386

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-6

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

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #30 ON
 SET OUTPUT  ASSIGNMENT #31 OFF
```

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

PRESS '+'

```
  LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #32 OFF
```

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

PRESS '+'

```
  LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

            SCROLL DOWN

 THEN:
 SET OUTPUT  ASSIGNMENT #31 ON
```

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 30 = Overlap C Red
OUTPUT 31 = Overlap C Yellow
OUTPUT 32 = Overlap C Green
OUTPUT 34 = Phase 5 Green

Note: All outputs shown above have been remapped. See sheet 3 of this electrical detail.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
 PAGE 1: VEHICLE OVERLAP 'E' SETTINGS
 PHASE:          |123456789101112131415 16
VEH OVL PARENTS: |    X
VEH OVL NOT VEH: |
VEH OVL NOT PED: |
VEH OVL GRN EXT: |
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....7
```

OVERLAP PROGRAMMING COMPLETE

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 Revision - Final Signal - TCP Final Phase

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1386
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

ELECTRICAL DETAIL SHEET 2 OF 3

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PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY

11-02-11

SIGNATURE | DATE

SIG. INVENTORY NO. 12-1386

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-7

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL
FOR SIGNAL HEAD 51

(program controller as shown below)

STEP 1

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "30"

```
PAGE:1  C1 PIN:32  VEHICLE PHASE
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

THE OUPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:32  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN32  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....30
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

PRESS "+" KEY FOR OUTPUT 31

STEP 2

```
PAGE:1  C1 PIN:33  VEHICLE PHASE
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

THE OUPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:33  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN).....1
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:33  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....31
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

PRESS "+" KEY FOR OUTPUT 32

STEP 3

```
PAGE:1  C1 PIN:34  VEHICLE PHASE
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

THE OUPUT IS SET AS A VEHICLE PHASE BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:34  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...3
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE OVERLAP' THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE OVERLAP' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:34  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....32
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

PRESS "+" TWICE TO REACH OUTPUT 34.

STEP 4

```
PAGE:1  C1 PIN:36  NOT ENABLED
OUTPUT ASSIGNMENT #.....34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

THE OUPUT IS SET AS "NOT ENABLED" BY DEFAULT. THIS "Y" WILL REMAIN UNTIL THE OUTPUT IS CHANGED.

ENTER A "Y" FOR VEHICLE PHASE.

```
PAGE:1  C1 PIN:36  NOT ENABLED
SELECT VEHICLE PHASE (1-16).....5
SELECT COLOR(0=RED,1=YEL,2=GRN).....2
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE' THE SCREEN SHOWN ABOVE WILL APPEAR.
ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER INPUTING DATA.
THEN 'ESC'.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS 'VEHICLE PHASE' AS SHOWN BELOW.

```
PAGE:1  C1 PIN:36  VEHICLE PHASE
OUTPUT ASSIGNMENT #.....34
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
```

OUTPUT PROGRAMMING FOR HEAD 51 COMPLETE

Signal Revision - Final Signal - TCP Final Phase

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1386
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

ELECTRICAL DETAIL SHEET 3 OF 3

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PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
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REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY

11-02-11

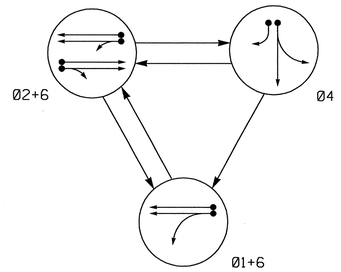
SIGNATURE | DATE

SIG. INVENTORY NO. 12-1386

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-8

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

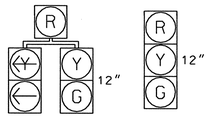
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø4	FLASH
21, 22	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



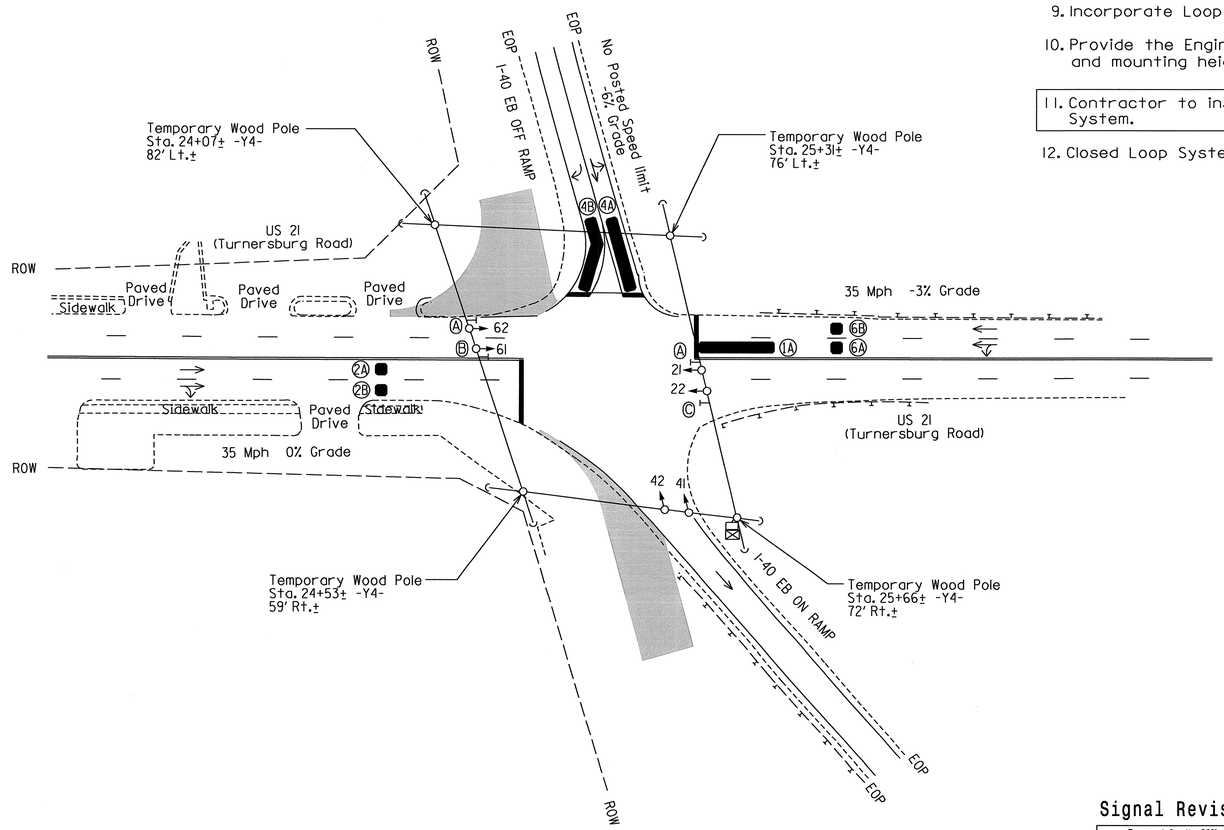
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Abandon existing loops 2A, 2B, 2C, 2D, 2E, 3A, and 3B.
4. Set all detector zones to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Phase 1 may be lagged.
7. Relocate existing signs A, B and C as shown.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Incorporate Loop Emulator Detection System for Vehicle Detection.
10. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
11. Contractor to install and maintain 900 Mhz Wireless Radio Signal System.
12. Closed Loop System Data: Controller Asset # 1596.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	Oversized Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
	Video Detection Zone	
	Construction Zone	
	Stop Bar	
	Guard Rail	
Ⓐ	Through Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	Combined Through and Left Turn Arrow Sign (R3-6L)	Ⓑ
Ⓒ	Combined Through and Right Turn Arrow Sign (R3-6R)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	20	60	20	60
Yellow Clearance	3.0	3.8	3.5	4.1
Red Clearance	1.9	1.6	1.7	1.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision - Temporary Signal 1 - TCP Phase I Step 2

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NC License No: C-3496

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 Eastbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

SCALE: 0 40, 1"=40'

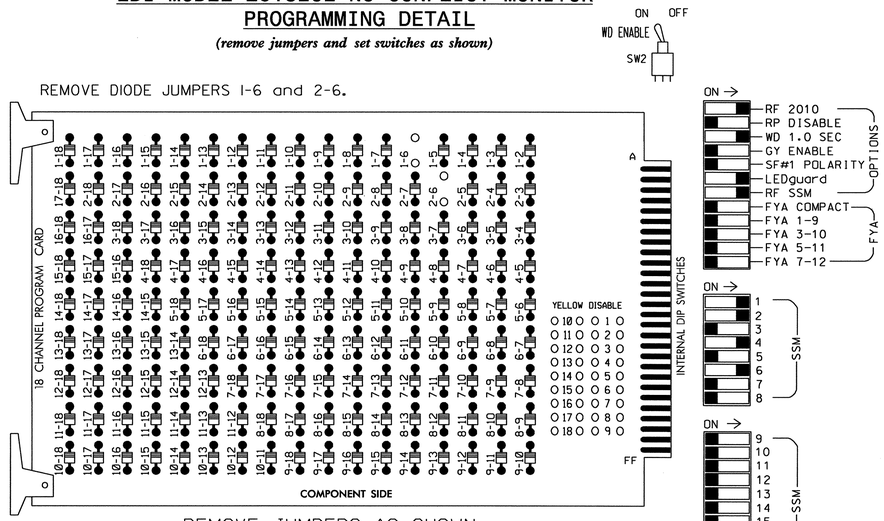
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19713 DONALD J. DARITY
11-02-11
SIGNATURE | DATE
SIG. INVENTORY NO. 12-1596T1

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-9

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5,7,8,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
✋												
🚶												

NU = Not Used

* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S8
PHASES USED.....1,2,4,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

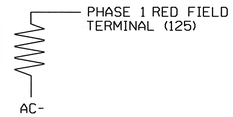
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of 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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1596T1
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 1 - TCP Phase I Step 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

NCDOT Traffic Engineering Branch — Signals Management Section

750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road) at I-40 Eastbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY

11-02-11

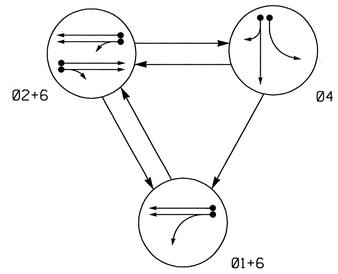
SIGNATURE DATE

SIG. INVENTORY NO. 12-1596T1

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-10

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

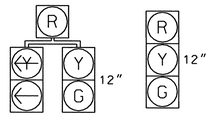
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø4	FLASH
21, 22	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



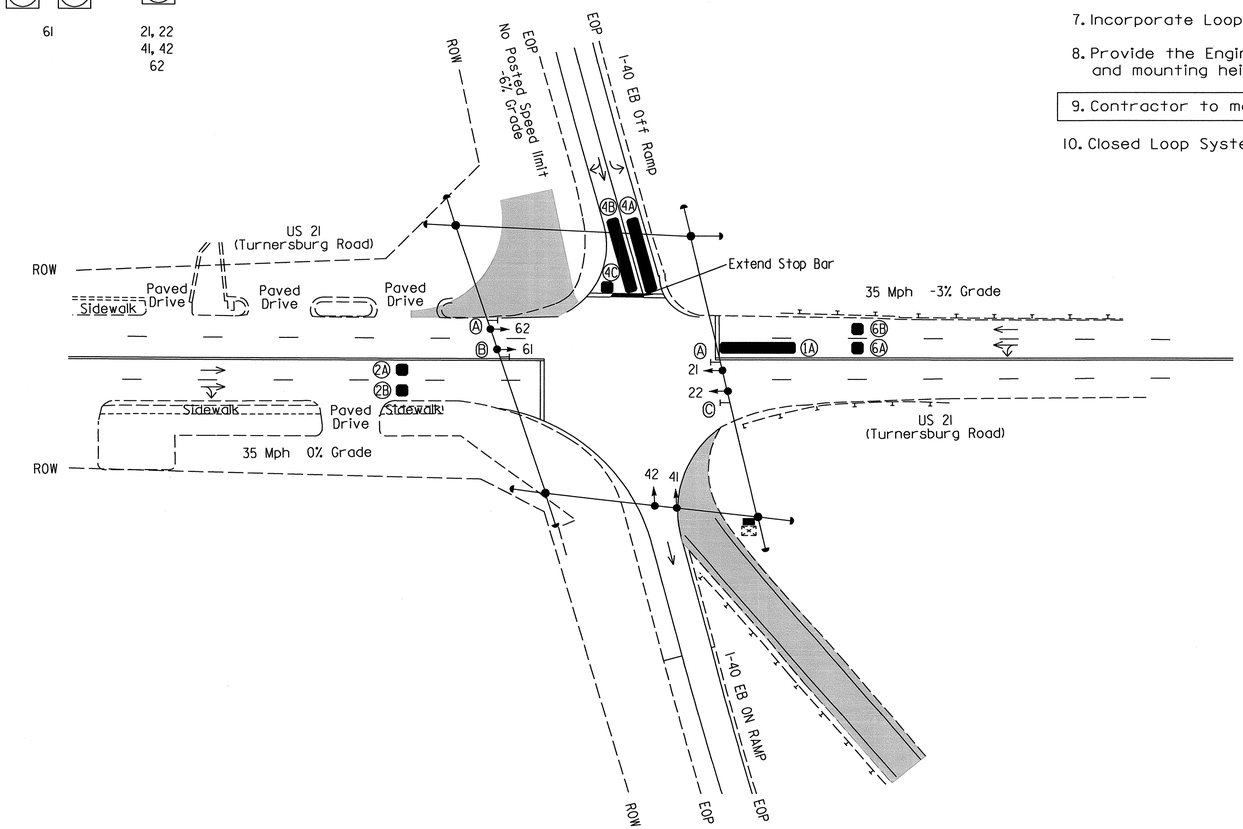
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Phase 1 may be lagged.
5. Reposition existing signal heads numbered 41 and 42.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to maintain 900 Mhz Wireless Radio Signal System.
10. Closed Loop System Data: Controller Asset # 1596.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	Oversized Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
	Video Detection Zone	
	Construction Zone	
	Stop Bar	
	Guard Rail	
Ⓐ	Through Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	Combined Through and Left Turn Arrow Sign (R3-6L)	Ⓑ
Ⓒ	Combined Through and Right Turn Arrow Sign (R3-6R)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	20	60	20	60
Yellow Clearance	3.0	3.8	3.5	4.1
Red Clearance	1.9	1.3	1.5	1.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision - Temporary Signal 2 - TCP Phase I, Step 3

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Prepared for the Offices of:
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 Eastbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

SCALE: 0 40, 1"=40'

REVISIONS	INIT.	DATE

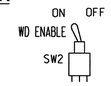
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE | DATE

SIG. INVENTORY NO. 12-1596T2

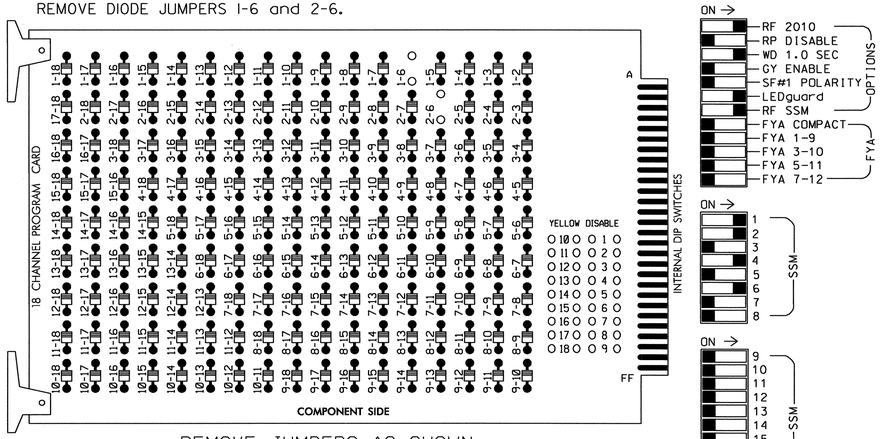
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-11

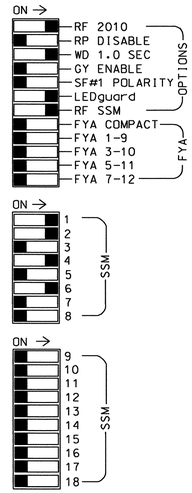
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-6 and 2-6.





REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5,7,8,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
✋												
🚶												

NU = Not Used

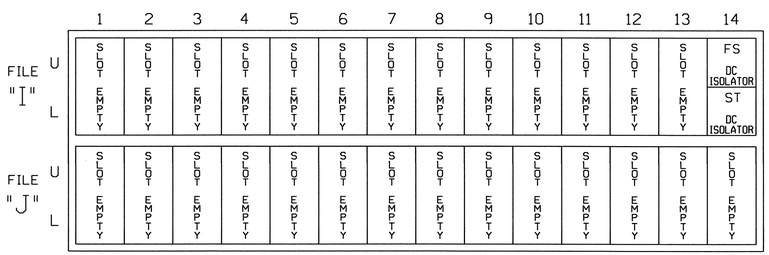
* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S8
PHASES USED.....1,2,4,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

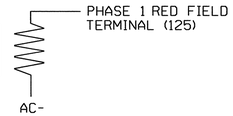


EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of 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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1596T2
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 2 - TCP Phase I, Step 3

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Safety and Safety Division
Signal Management Section
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Eastbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Wa	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11

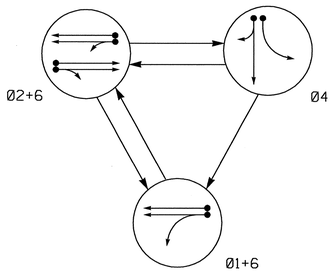
SIGNATURE DATE

SIG. INVENTORY NO. 12-1596T2

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-12

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

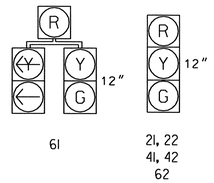
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21, 22	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



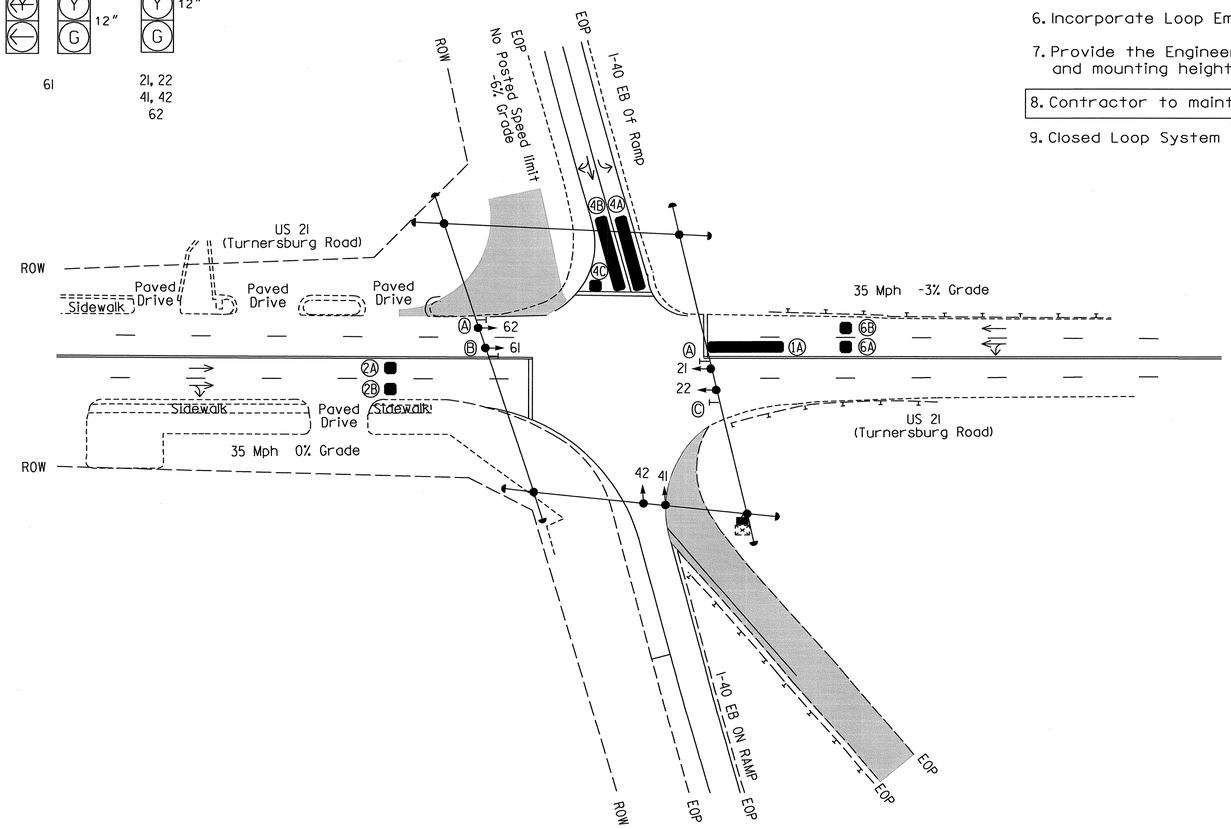
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Phase 1 may be lagged.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Incorporate Loop Emulator Detection System for Vehicle Detection.
7. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
8. Contractor to maintain 900 Mhz Wireless Radio Signal System.
9. Closed Loop System Data: Controller Asset #1596.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	Oversized Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
	Video Detection Zone	
	Construction Zone	
	Stop Bar	
	Guard Rail	
A	Through Arrow "ONLY" Sign (R3-5a)	A
B	Combined Through and Left Turn Arrow Sign (R3-6L)	B
C	Combined Through and Right Turn Arrow Sign (R3-6R)	C

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	20	60	20	60
Yellow Clearance	3.0	3.8	3.5	4.1
Red Clearance	1.9	1.3	1.5	1.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision - Temporary Signal 3 - TCP Phase I, Step 4

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US 21 (Turnersburg Road)
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Division 12 | Iredell County | Statesville

PLAN DATE: Sept 2011 | REVIEWED BY: D.J. Darity
PREPARED BY: J. Ma | MAB PROJ. NO.: 2008068.04

REVISIONS	INIT.	DATE

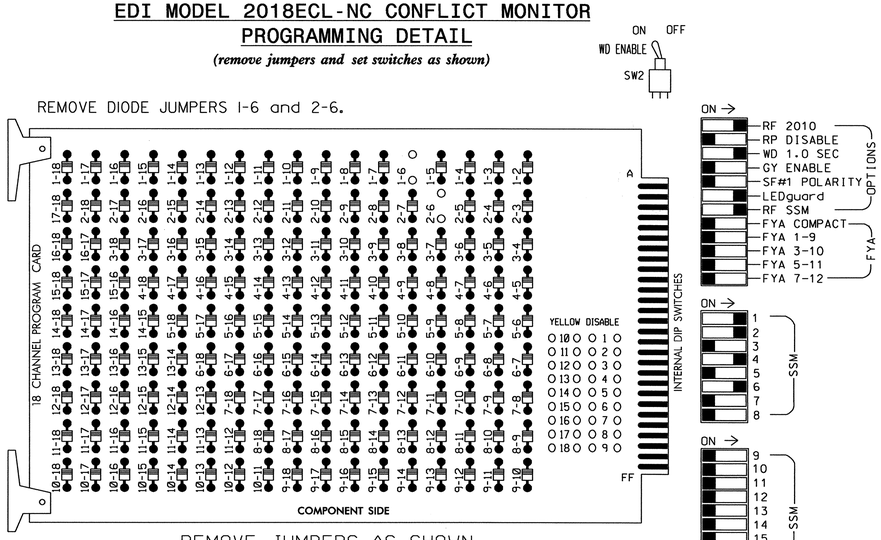
SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE | DATE
SIG. INVENTORY NO. 12-1596T3

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-13

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5,7,8,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
✋												
🚶												

NU = Not Used

* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S8
PHASES USED.....1,2,4,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

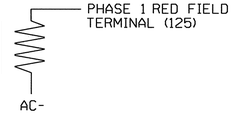
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of 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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1596T3
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 3 - TCP Phase I, Step 4

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Traffic Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Eastbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

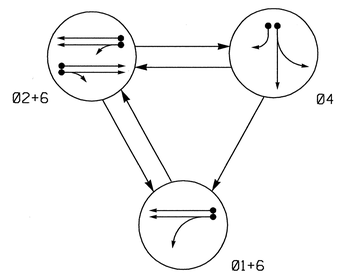
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19713 DONALD J. DARITY
11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-1596T3

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-14

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

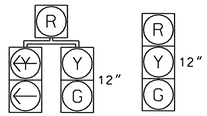
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø4	FLASH
21, 22	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y

SIGNAL FACE I.D.

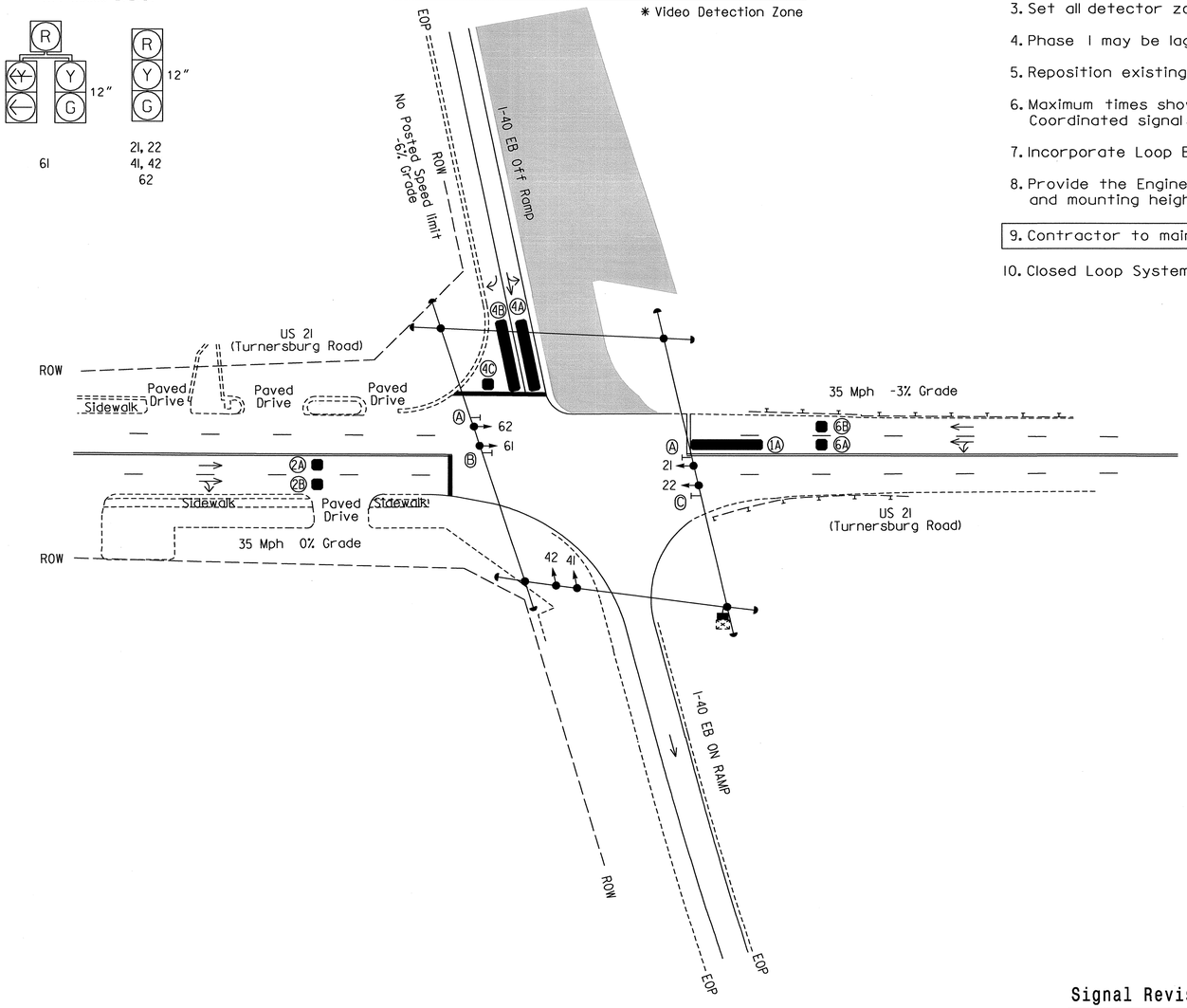
All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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

* Video Detection Zone



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Phase 1 may be lagged.
5. Reposition existing signal heads numbered 41 and 42.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to maintain 900 Mhz Wireless Radio Signal System.
10. Closed Loop System Data: Controller Asset # 1596.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊣□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○—	Signal Pole with Guy	●—
○↓	Signal Pole with Sidewalk Guy	●↓
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⛶
□	Junction Box	■
▭	Oversized Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	—△—
→	Directional Arrow	→
→	Pavement Marking Arrow	→
▬	Video Detection Zone	▬
▭	Construction Zone	▭
▬	Stop Bar	▭
I I I	Guard Rail	I—I—I
Ⓐ	Through Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	Combined Through and Left Turn Arrow Sign (R3-6L)	Ⓑ
Ⓒ	Combined Through and Right Turn Arrow Sign (R3-6R)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	4	6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	20	60	20	60
Yellow Clearance	3.0	3.8	3.5	4.1
Red Clearance	2.8	1.6	1.7	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision - Temporary Signal 4 - TCP Phase I, Step 5

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Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 Eastbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

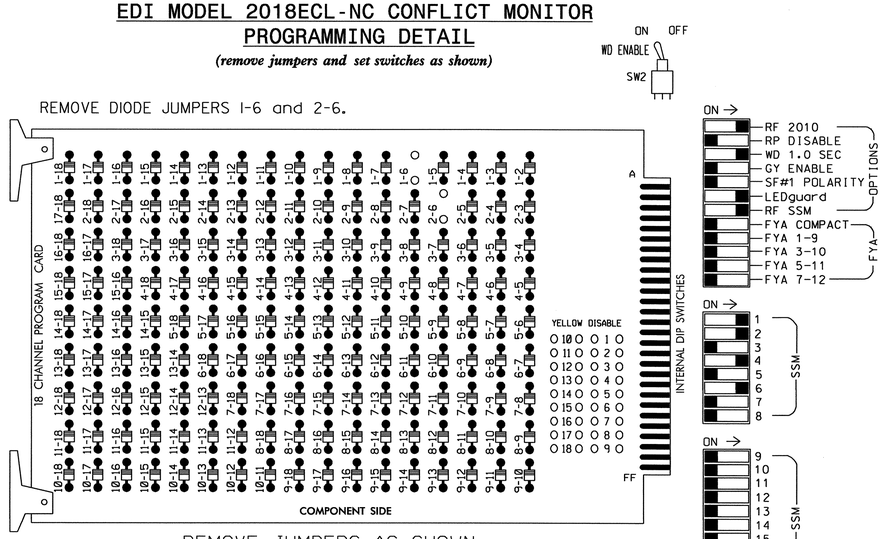
SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-1596T4

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-15

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5,7,8,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
✋												
🚶												

NU = Not Used

* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S8
PHASES USED.....1,2,4,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

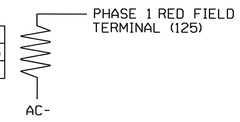
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of 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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1596T4
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 4 - TCP Phase I, Step 5

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Traffic Safety and Safety Services
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Eastbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008088.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY

11-02-11

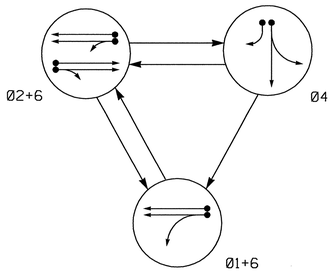
SIGNATURE DATE

SIG. INVENTORY NO. 12-1596T4

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-16

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

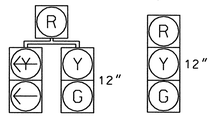
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø4	FLASH
21, 22	R	G	R	Y
41, 42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



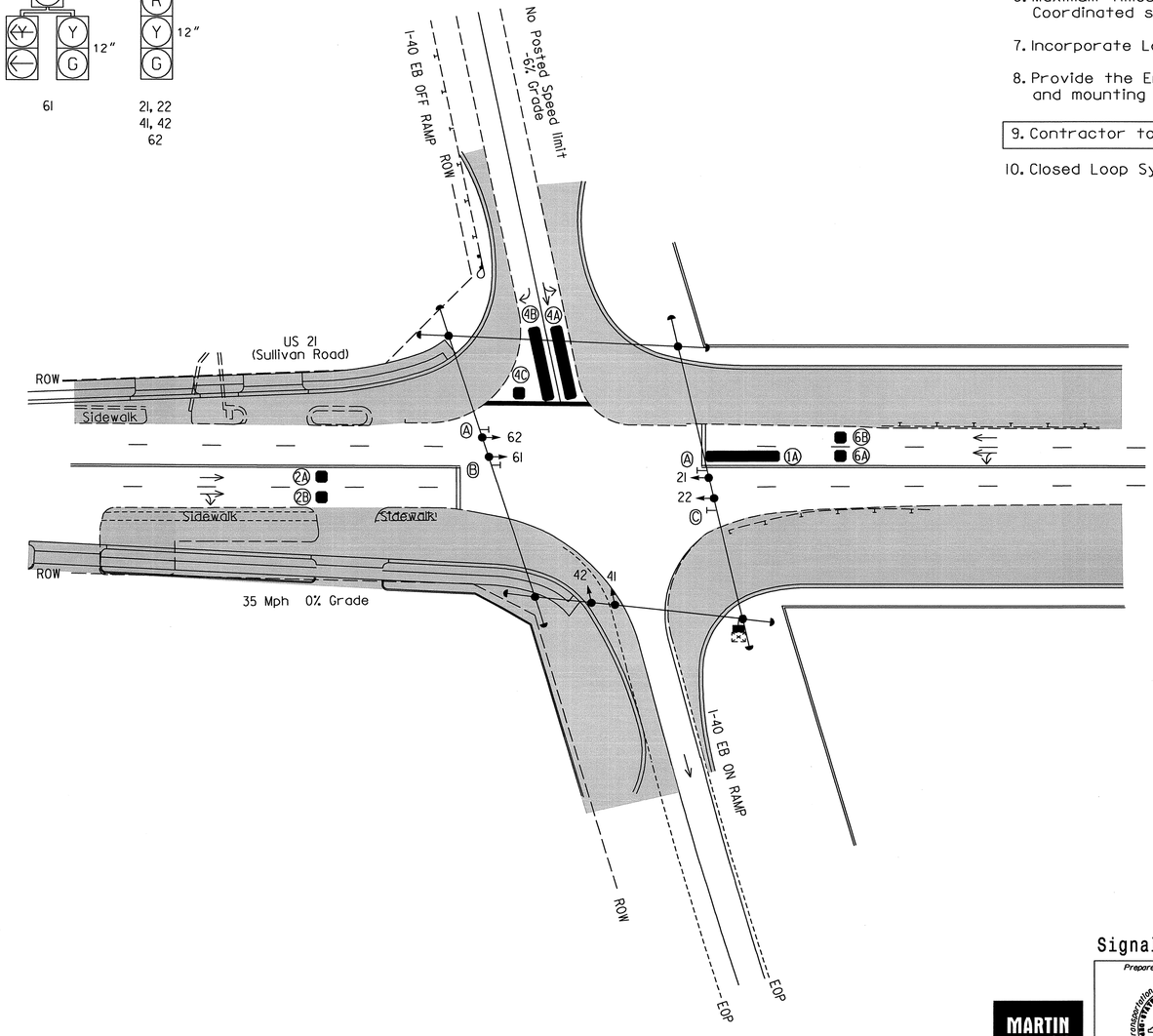
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Phase 1 may be lagged.
5. Reposition existing signal heads numbered 41 and 42.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to maintain 900 Mhz Wireless Radio Signal System.
10. Closed Loop System Data: Controller Asset #1596.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊣□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○↓	Signal Pole with Sidewalk Guy	●↓
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
▭	Oversized Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	—△—
→	Directional Arrow	→
→	Pavement Marking Arrow	→
▬	Video Detection Zone	▬
▒	Construction Zone	▒
▬	Stop Bar	▭
T T T	Guard Rail	—T—T—
Ⓐ	Through Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	Combined Through and Left Turn Arrow Sign (R3-6L)	Ⓑ
Ⓒ	Combined Through and Right Turn Arrow Sign (R3-6R)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	20	60	20	60
Yellow Clearance	3.0	3.8	3.5	4.1
Red Clearance	2.4	1.8	1.7	1.7
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision-Temp Signal 5-TCP Phase I, Step 6 - Phase IV

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North Carolina Department of Transportation
Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 Eastbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE: Sept 2011 | REVIEWED BY: D.J. Darity

PREPARED BY: J. Ma | MAB PROJ. NO.: 2008068.04

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

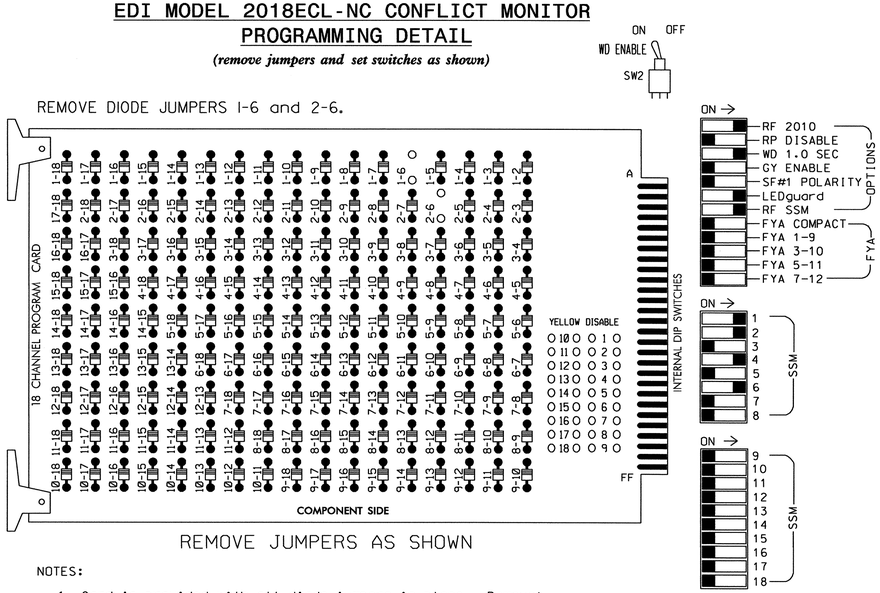
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-1596T5

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-17

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5,7,8,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED	*	128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
✋												
🚶												

NU = Not Used

* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S8
PHASES USED.....1,2,4,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

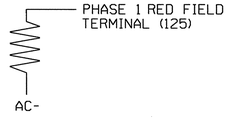
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of 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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1596T5
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision-Temp Signal 5-TCP Phase I, Step 6 - Phase IV

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NCDOT Traffic Engineering and Safety Systems Branch
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Eastbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

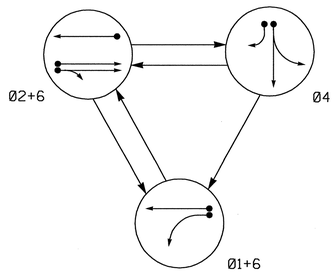
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-1596T5

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-17.1

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø4	FLASH
11	←	~~R~~	~~R~~	~~R~~
21, 22	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

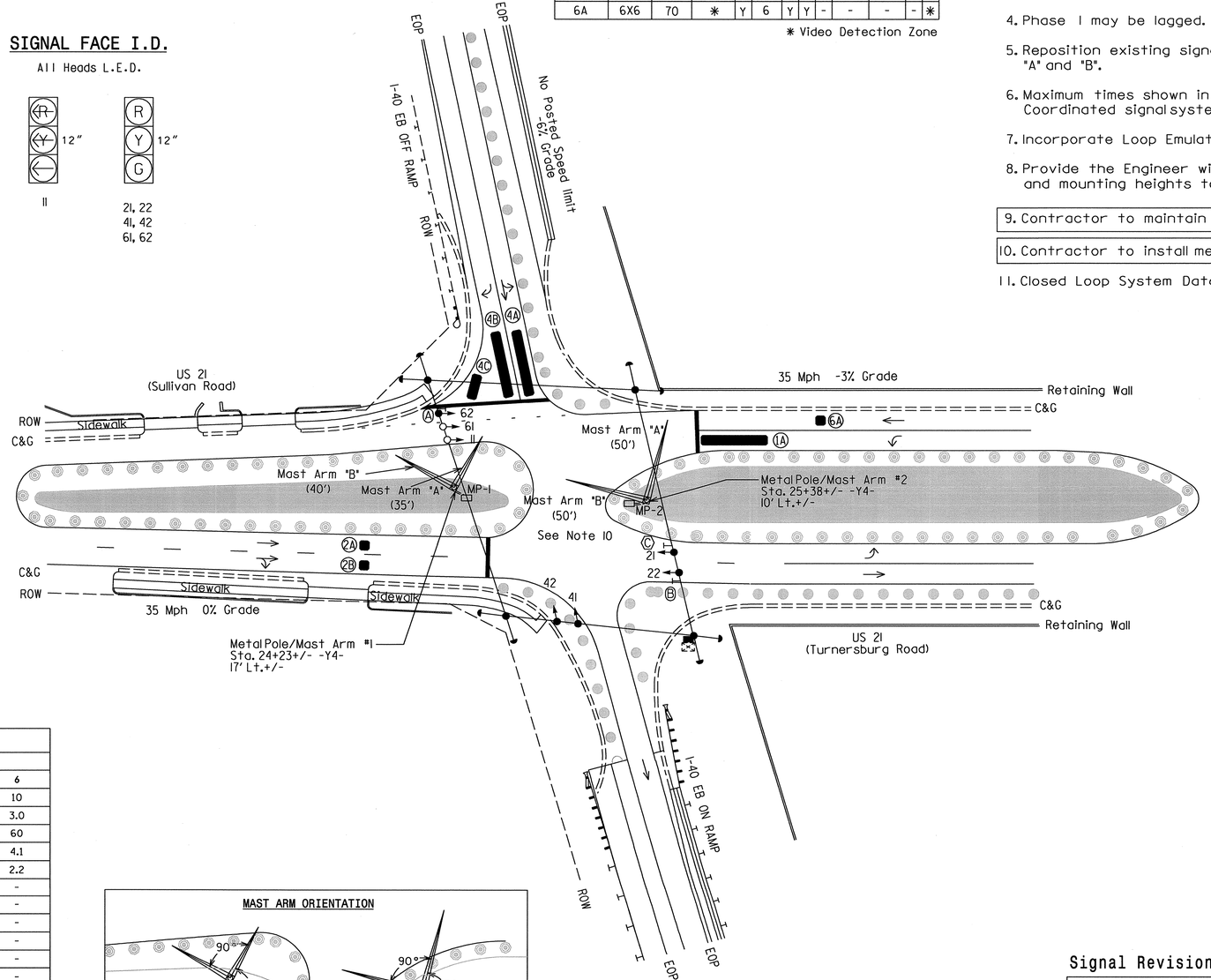
11

21, 22
41, 42
61, 62

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

DETECTION ZONES					DETECTOR PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	Y	1	Y	Y	-	-	-	-	*
2A	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
2B	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
4A	6X40	0	*	Y	4	Y	Y	-	-	-	-	*
4B	6X40	0	*	Y	4	Y	Y	-	-	15	-	*
4C	6X15	0	*	Y	4	Y	Y	-	-	15	-	*
6A	6X6	70	*	Y	6	Y	Y	-	-	-	-	*

* Video Detection Zone



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊓	Pedestrian Signal Head With Push Button & Sign	■
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊡
□	Junction Box	■
▭	Oversized Junction Box	■
----	2-in Underground Conduit	----
N/A	Right of Way	— △ —
→	Directional Arrow	→
→	Pavement Marking Arrow	→
▬	Video Detection Zone	▬
▒	Construction Zone	▒
▬	Stop Bar	▭
● ● ●	Traffic Control Drums	● ● ●
○ ○ ○	Traffic Control Skinny Drums	○ ○ ○
Ⓐ	Through Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	Combined Through and Right Turn Arrow Sign (R3-6R)	Ⓑ
Ⓒ	No Left Turn Sign (R3-2)	Ⓒ

NOTES

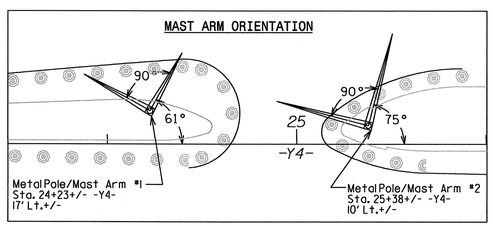
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Phase 1 may be lagged.
5. Reposition existing signal heads numbered 21, 22, 41, 42, 62 and signs "A" and "B".
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to maintain 900 Mhz Wireless Radio Signal System.
10. Contractor to install metal pole and mast arms during this construction phase.
11. Closed Loop System Data: Controller Asset # 1596.

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	10	7	10
Extension 1 *	2.0	3.0	2.0	3.0
Max Green 1 *	20	60	20	60
Yellow Clearance	3.0	3.8	3.5	4.1
Red Clearance	4.0	1.3	3.1	2.2
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

MAST ARM ORIENTATION



Signal Revision - Temporary Signal 6 - TCP Phase IV

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Prepared for the Offices of:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 Eastbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

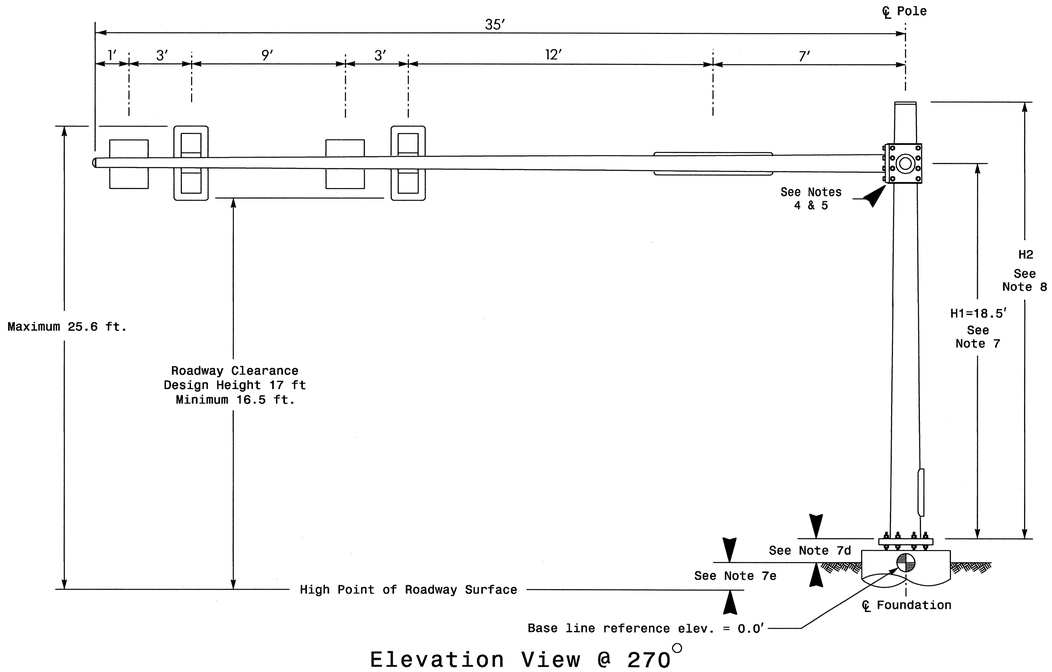
REVISIONS	INIT.	DATE

SCALE: 0 40 — 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE | DATE

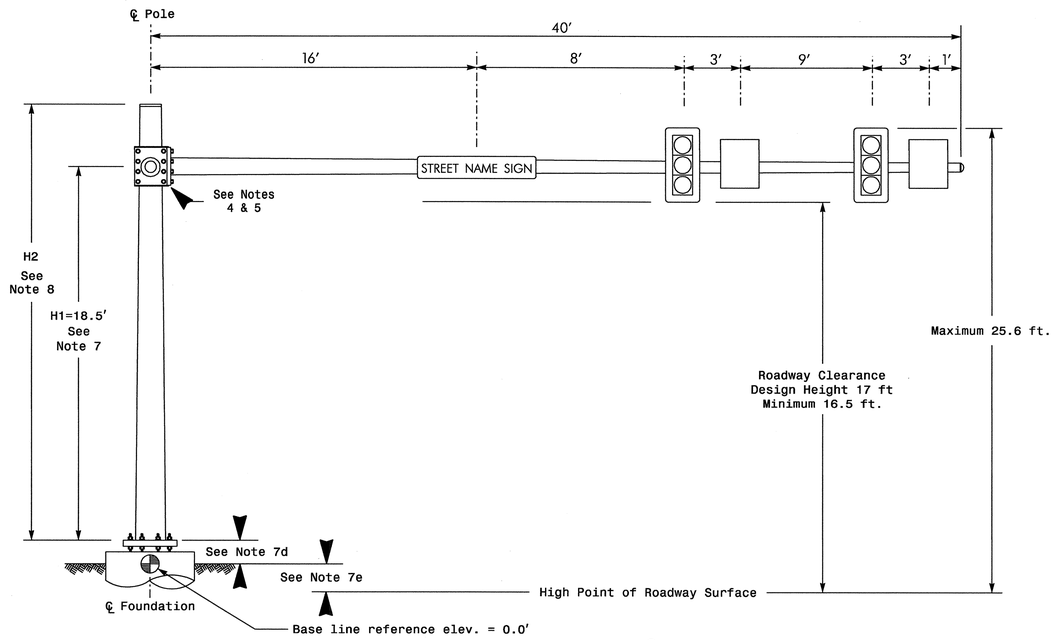
SIG. INVENTORY NO. 12-1596T6

Design Loading for METAL POLE NO. 1, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 1, MAST ARM B



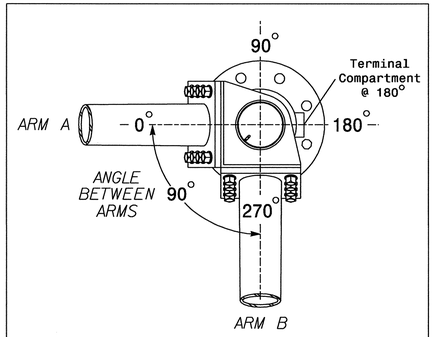
Elevation View @ 0°

SPECIAL NOTE

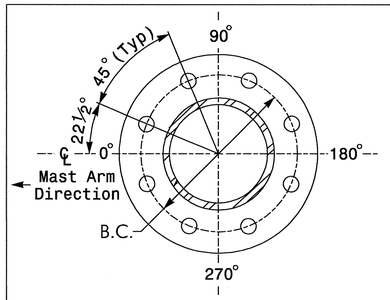
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-0.5 ft.	-0.5 ft.
Elevation difference at Edge of travelway or face of curb	-0.3 ft.	-0.3 ft.

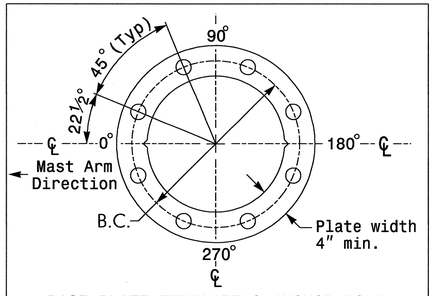


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-17.2

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
STREET NAME SIGN	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5" W X 17.0" L	21 LBS

NOTES

Design Reference Material

1. Design the traffic signal structure and foundation in accordance with:
   - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
   - The 2012 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.

Design Requirements

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is .75 feet above the ground elevation.
   e. Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
8. The pole manufacturer will determine the total height (H2) of the pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus ½ of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)

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Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE: 0 N/A N/A

US 21 (Turnersburg Road) at I-40 Eastbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE: Sept 2011 | REVIEWED BY: D.J. Darity

PREPARED BY: D.J. Darity | MAB PROJ NO: 2008068.04

REVISIONS	INIT.	DATE

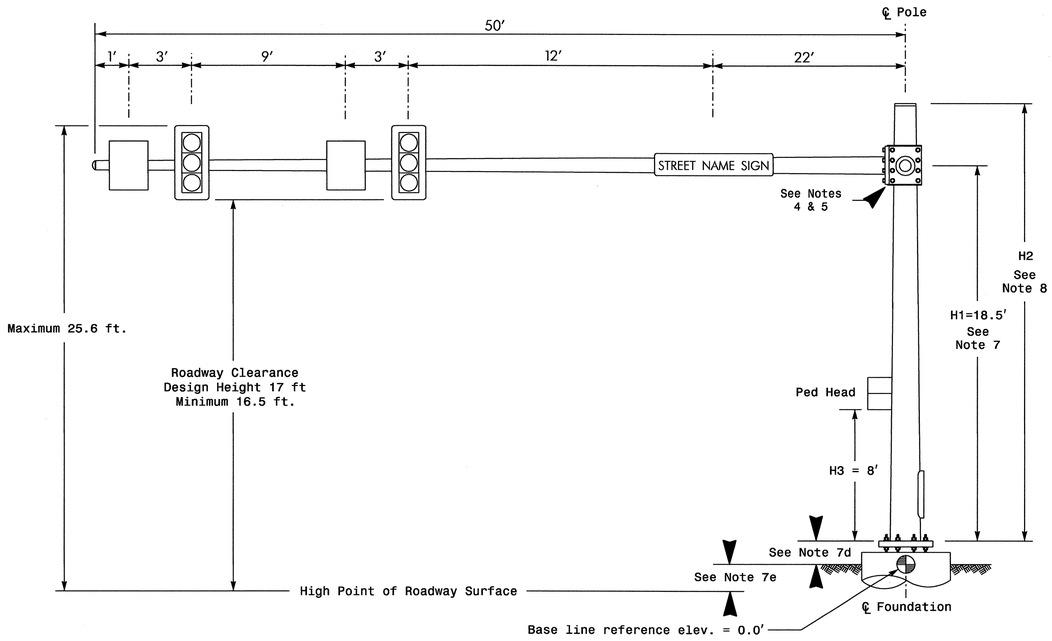
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19713 DONALD J. DARITY
11-02-11
SIGNATURE | DATE

SIG. INVENTORY NO. 12-1596T6

METAL POLE No. 2

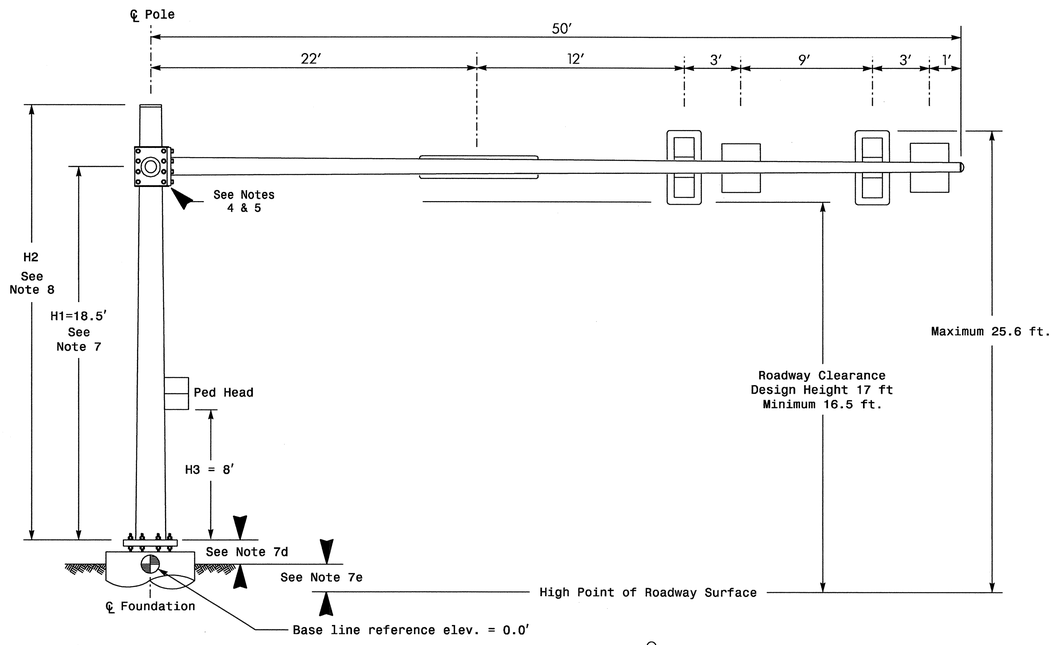
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-17.3

Design Loading for METAL POLE NO. 2, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 2, MAST ARM B



Elevation View @ 0°

SPECIAL NOTE

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

Elevation Data for Mast Arm Attachment (H1)

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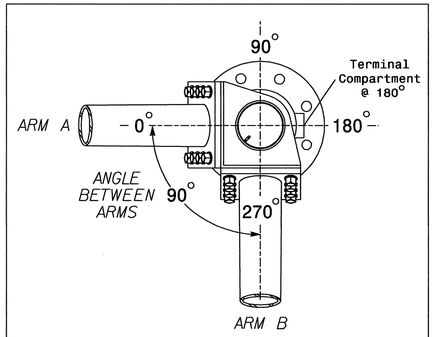
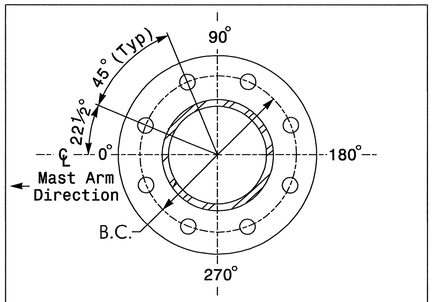
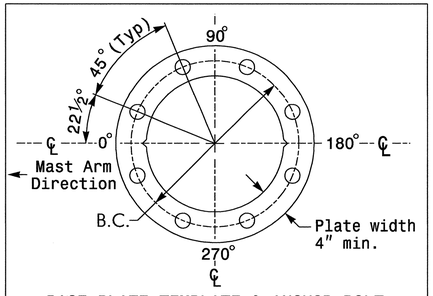


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

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NCDOT Wind Zone 4 (90 mph)

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Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE: 0 N/A N/A

US 21 (Turnersburg Road) at I-40 Eastbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	D.J. Darity	MAB PROJ NO:	2008068.04

REVISIONS	INIT.	DATE

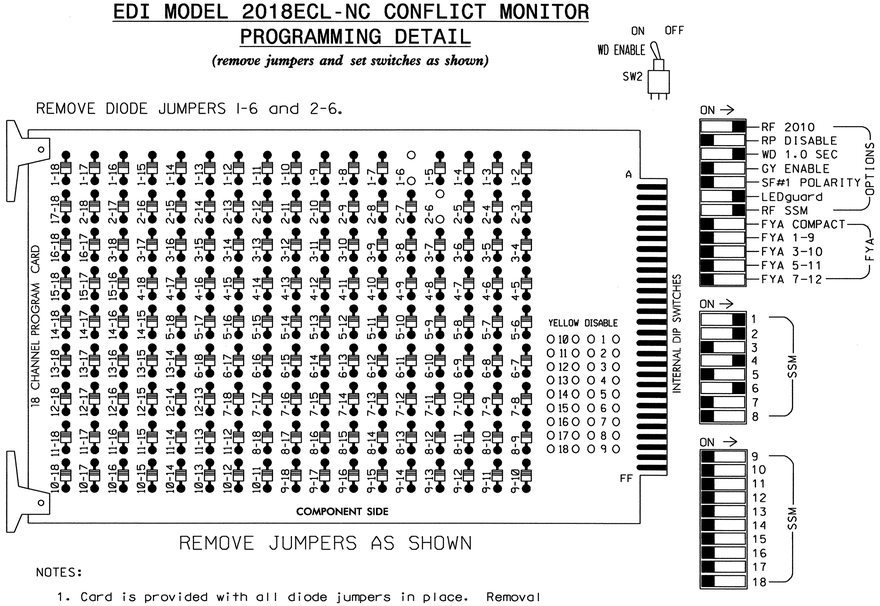
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19713 DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-1596T6

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-17.4

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5,7,8,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW	125											
YELLOW ARROW	126											
GREEN ARROW	127											
✋												
🚶												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S5,S8
PHASES USED.....1,2,4,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

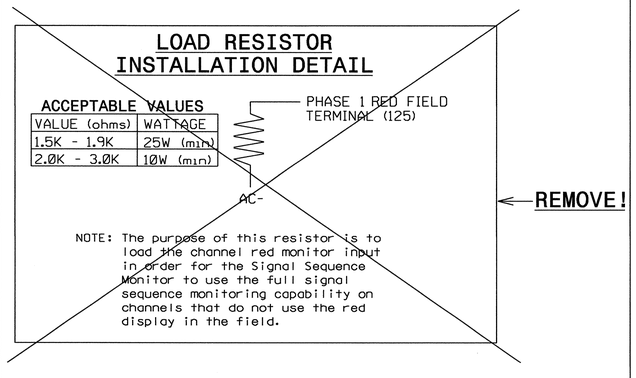
(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1596T6
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 6 - TCP Phase IV

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NCDOT Traffic Engineering Branch
Systems Management Section
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Eastbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

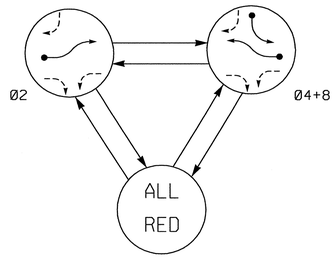
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-1596T6

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-17.5

2 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4+8	PHASE FLASH
21, 22	↑	R	R
23	↖	R	R
41, 42, 43	R	↖	R
81, 82	R	↑	R
83	R	↗	R

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

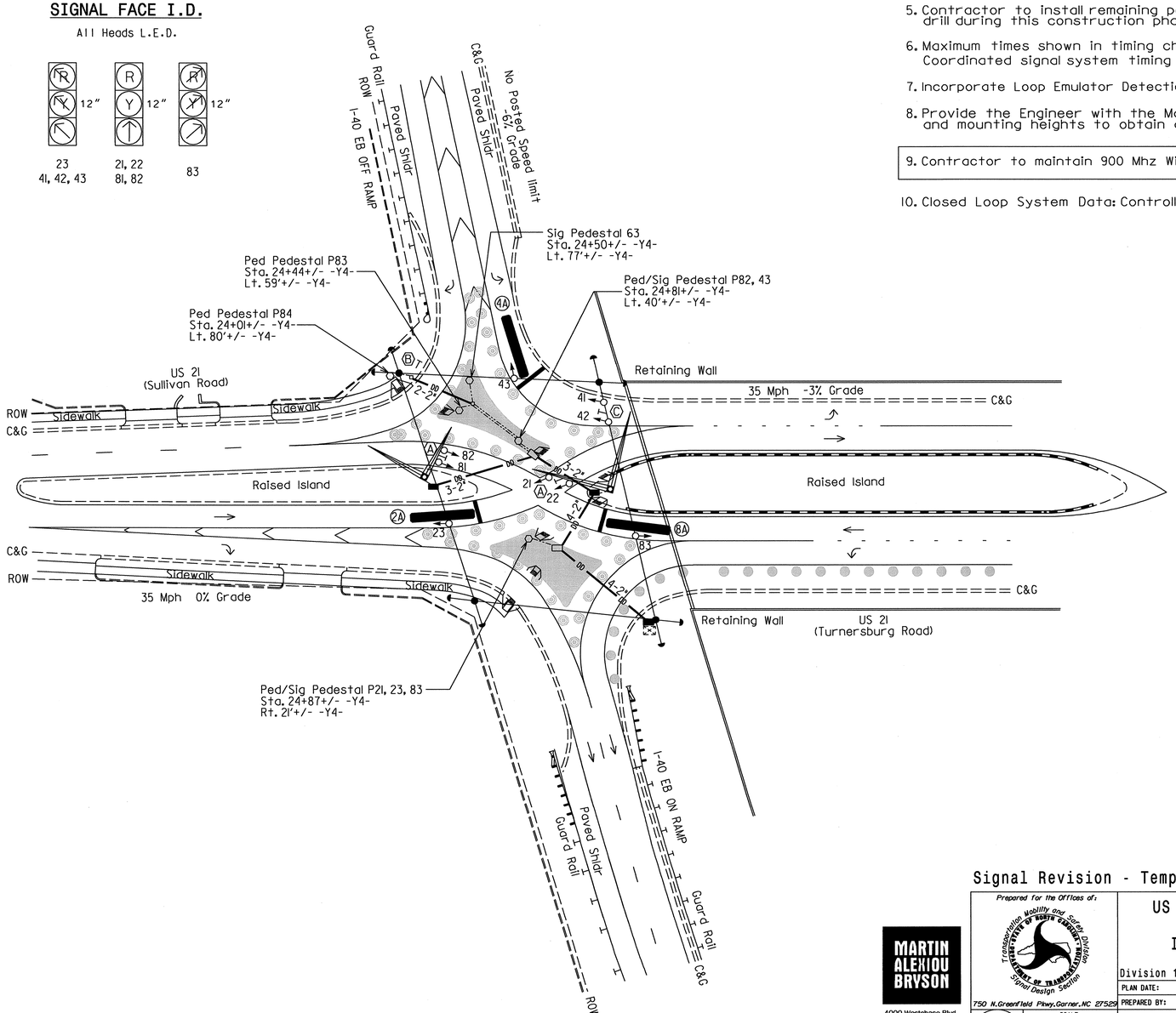
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

DETECTION ZONES					DETECTOR PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	*	Y	2	Y	Y	-	-	-	-	*
4A	6X40	0	*	Y	4	Y	Y	-	-	-	-	*
8A	6X40	0	*	Y	8	Y	Y	-	-	-	-	*

* Video Detection Zone

SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊓	Pedestrian Signal Head With Push Button & Sign	■
▱	Metal Pole with Mastarm	▱
⬡	Signal Pedestal	⬢
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
▭	Oversized Junction Box	■
	2-in Underground Conduit	
—DD—	Directional Drill	N/A
→	Directional Arrow	→
→	Pavement Marking Arrow	→
N/A	Right of Way	
N/A	Wheelchair Ramp	
▬	Stop Bar	▭
	Guard Rail	
● ● ● ●	Traffic Control Drums	● ● ● ●
◎ ◎ ◎ ◎	Traffic Control Skinny Drums	◎ ◎ ◎ ◎
Ⓐ	Through Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	No Right Turn Sign (R3-1)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 8
Min Green 1 *	10	10	10
Extension 1 *	3.0	2.0	3.0
Max Green 1 *	45	45	45
Yellow Clearance	3.8	3.1	4.1
Red Clearance	1.2	3.4	1.3
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	-	-
Vehicle Call Memory	-	-	-
Dual Entry	-	ON	ON
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.

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Controller shall rest in ALL RED.
4. Set all detector units to presence mode.
5. Contractor to install remaining pedestal mounted hardware and directional drill during this construction phase.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to maintain 900 Mhz Wireless Radio Signal System.
10. Closed Loop System Data: Controller Asset # 1596.

Signal Revision - Temporary Signal 7 - TCP Phase V

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Prepared for the Offices of:
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road)
at
I-40 Eastbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

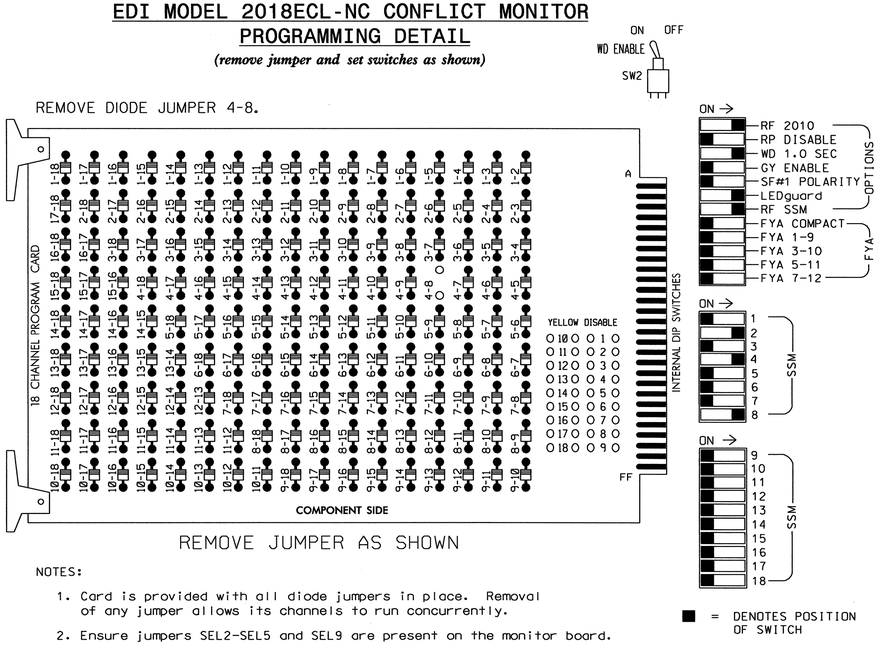
SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-1596T7

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-17.6

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 1,3,5,6,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2, 4 and 8 for Red Rest.
6. Program phase 2 for "STARTUP RED CLR".
7. Program phase 2 as "FIRST PHASES".
8. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2		S3	S4	S5	S6	S7	S8	S9	S10	S11		S12
CMU CHANNEL NO.	1	2		13	3	4	14	5	6	15	7	8		16
PHASE	1	2		2 PED	3	4	4 PED	5	6	6 PED	7	8		8 PED
SIGNAL HEAD NO.	NU	21,22	23	NU	NU	41,42 43	NU	NU	NU	NU	NU	81,82	83	NU
RED		128										107		
YELLOW		129										108		
GREEN														
RED ARROW			128			101							107	
YELLOW ARROW			129			102							108	
GREEN ARROW		130	130			103						109	109	
✋														
🚶														

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S11
PHASES USED.....2,4,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1596T7
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 7 - TCP Phase V

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Signal Management Section
750 Greenfield Parkway, Garner, NC 27529

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 21 (Turnersburg Road)
at
I-40 Eastbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Wa	MAB PROJ. NO.:	2008068.04

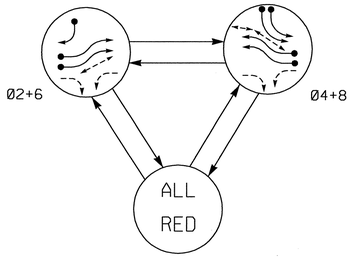
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE | DATE
SIG. INVENTORY NO. 12-1596T7

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-18

2 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.

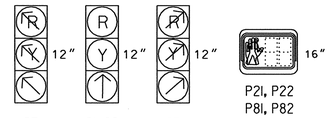


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	↑	R	R
23	↖	R	R
41, 42, 43	R	↖	R
61, 62, 63	↗	R	R
81, 82	R	↑	R
83	R	↗	R
P21, P22	W	DW	DRK
P81, P82	DW	W	DRK
P83, P84	DW	W	DRK

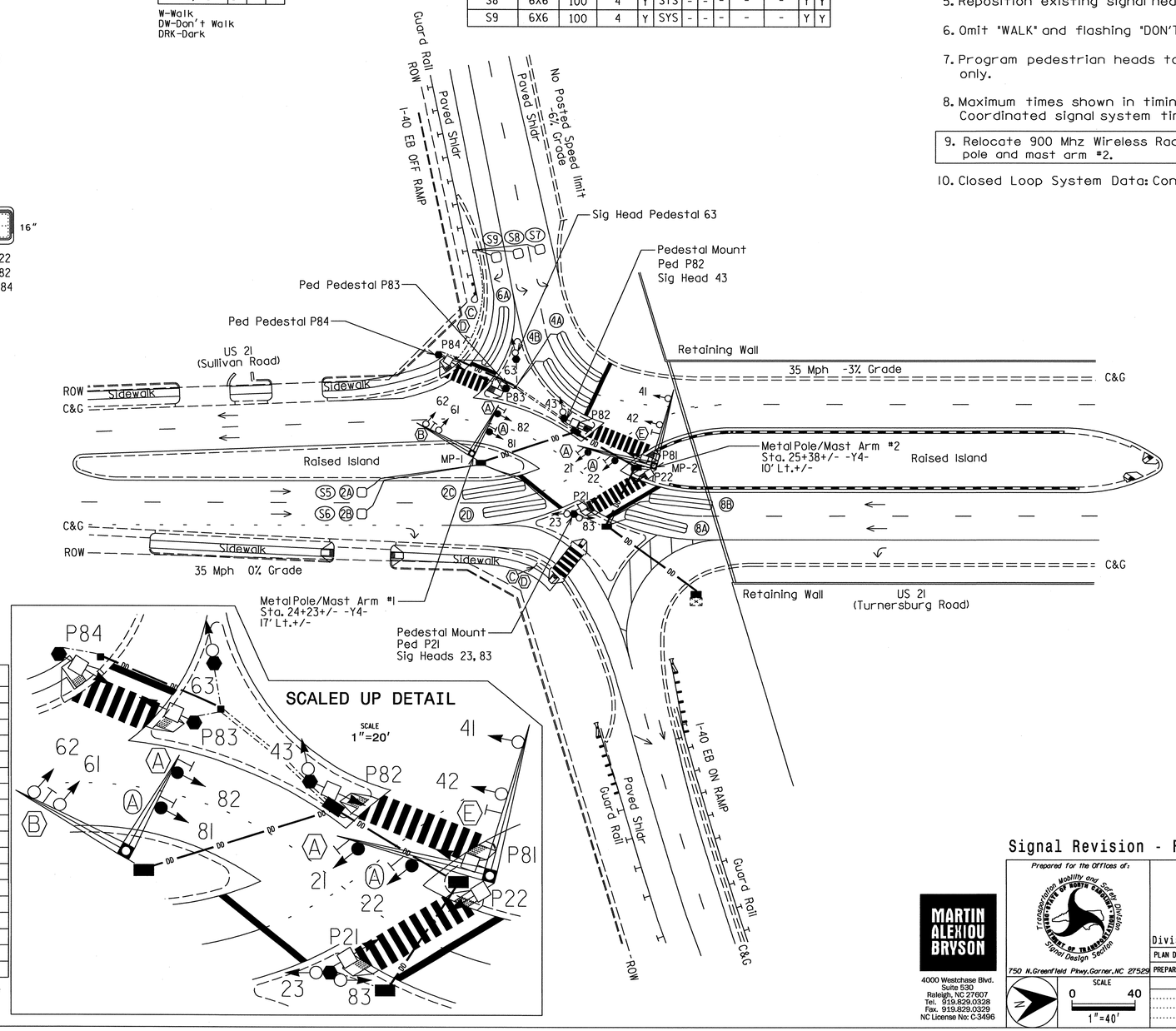
W-Walk
DW-Don't Walk
DRK-Dark

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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/S5	6X6	100	4	Y	2	-	Y	-	-	-	Y	Y
2B/S6	6X6	100	4	Y	2	-	Y	-	-	-	Y	Y
2C	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
2D	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
6A	6X40	0	2-4-2	Y	6	Y	Y	-	-	15	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	Y
S7	6X6	100	4	Y	SYS	-	-	-	-	-	Y	Y
S8	6X6	100	4	Y	SYS	-	-	-	-	-	Y	Y
S9	6X6	100	4	Y	SYS	-	-	-	-	-	Y	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Controller shall rest in Red.
4. Set all detector units to presence mode.
5. Reposition existing signal heads numbered 21, 22, 81, 82 and signs "A".
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Relocate 900 Mhz Wireless Radio Signal System to metal pole and mast arm #2.
10. Closed Loop System Data: Controller Asset # 1596.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head With Push Button & Sign	■↓
▭◁	Metal Pole with Mastarm	▭◁
○	Signal Pedestal	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
▭	Oversized Junction Box	▬
----	2-in Underground Conduit	-·-·-
—DD—	Directional Drill	N/A
→	Directional Arrow	→
→	Pavement Marking Arrow	→
N/A	Right of Way	—△—
N/A	Wheelchair Ramp	◢◣
▬	Stop Bar	▭
T T T	Guard Rail	T—T—T
Ⓐ	Through Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	Pedestrian Crossing Sign (W11-2)	Ⓒ
Ⓓ	Diagonal Downward Arrow (Plaque) (W16-7P)	Ⓓ
Ⓔ	No Right Turn Sign (R3-1)	Ⓔ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	10	10	10	10
Extension 1 *	3.0	2.0	2.0	3.0
Max Green 1 *	45	45	45	45
Yellow Clearance	3.8	3.1	3.1	4.1
Red Clearance	1.1	2.3	1.6	1.1
Walk 1 *	7	-	-	7
Don't Walk 1	7	-	-	6
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	-	-	-
Vehicle Call Memory	-	-	-	-
Dual Entry	ON	ON	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.

Signal Revision - Final Signal - TCP Final Phase

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US 21 (Turnersburg Road) at I-40 Eastbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE: Sept 2011 | REVIEWED BY: D.J. Darity
PREPARED BY: J. Ma | MAB PROJ. NO.: 2008068.04

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY

11-02-11

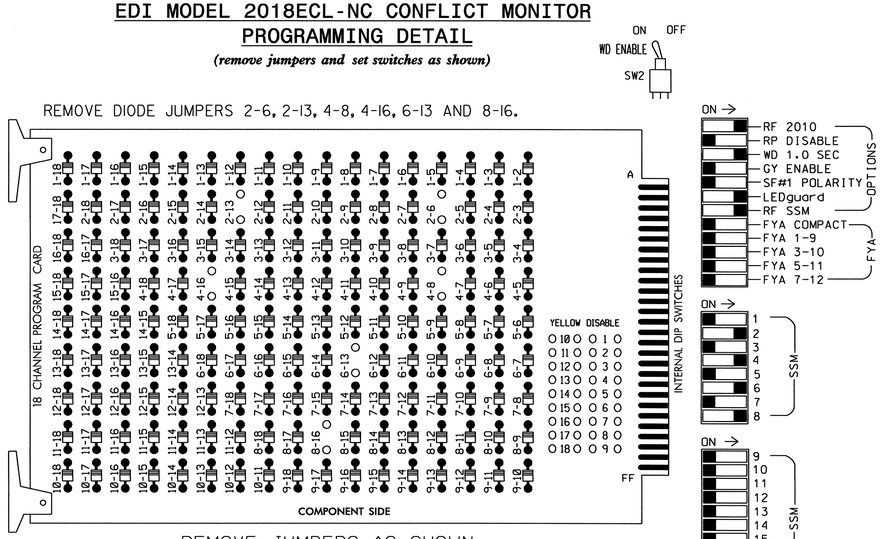
SIGNATURE | DATE

SIG. INVENTORY NO. 12-1596

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-19

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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, 4, 6 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2, 4, 6 and 8 for Red Rest.
6. Program phases 2 and 6 for "STARTUP RED CLR".
7. Program phases 2 and 6 as "FIRST PHASES".
8. Program phases 2 and 8 for 'STARTUP PED CALL'.
9. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2		S3	S4	S5	S6	S7	S8	S9	S10	S11		S12
CMU CHANNEL NO.	1	2		13	3	4	14	5	6	15	7	8		16
PHASE	1	2		2 PED	3	4	4 PED	5	6	6 PED	7	8		8 PED
SIGNAL HEAD NO.	NU	21,22	23	P21, P22	NU	41,42 43	NU	NU	61,62 63	NU	NU	81,82	83	P81,P82 P83,P84
RED		128										107		
YELLOW		129										108		
GREEN														
RED ARROW			128			101			134				107	
YELLOW ARROW			129			102			135				108	
GREEN ARROW		130	130			103			136			109	109	
✋				113										110
🚶				115										112

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S3,S5,S8,S11,S12
PHASES USED.....2,2PED,4,6,8,8PED
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2/SYS 2A/S5	Ø2 2C	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S7	SLOT EMPTY	SLOT EMPTY	Ø2PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L		Ø2/SYS 2B/S6	Ø2 2D			Ø4 4B			SYS. DET. S8			NOT USED	Ø8PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S9	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED				Ø8 8B			NOT USED					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A/S5	TB2-5,6	I2U	39	1	2	2/SYS		Y			
2B/S6	TB2-7,8	I2L	43	5	12	2/SYS		Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
2D	TB2-11,12	I3L	76	38	42	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			15
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
•S7	TB6-9,10	I9U	60	22	11	SYS					
•S8	TB6-11,12	I9L	62	24	13	SYS					
•S9	TB7-9,10	J9U	59	21	15	SYS					
PED PUSH BUTTON											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					
P83,P84											

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.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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: 12-1596
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Final Signal - TCP Final Phase

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
NCDOT Traffic Mobility and Safety Division
Signals Management Section

750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Eastbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11

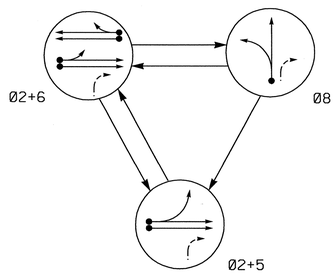
SIGNATURE DATE

SIG. INVENTORY NO. 12-1596

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-20

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø8	FLASH
21	G	G	R	Y
22	G	G	R	Y
61, 62	R	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

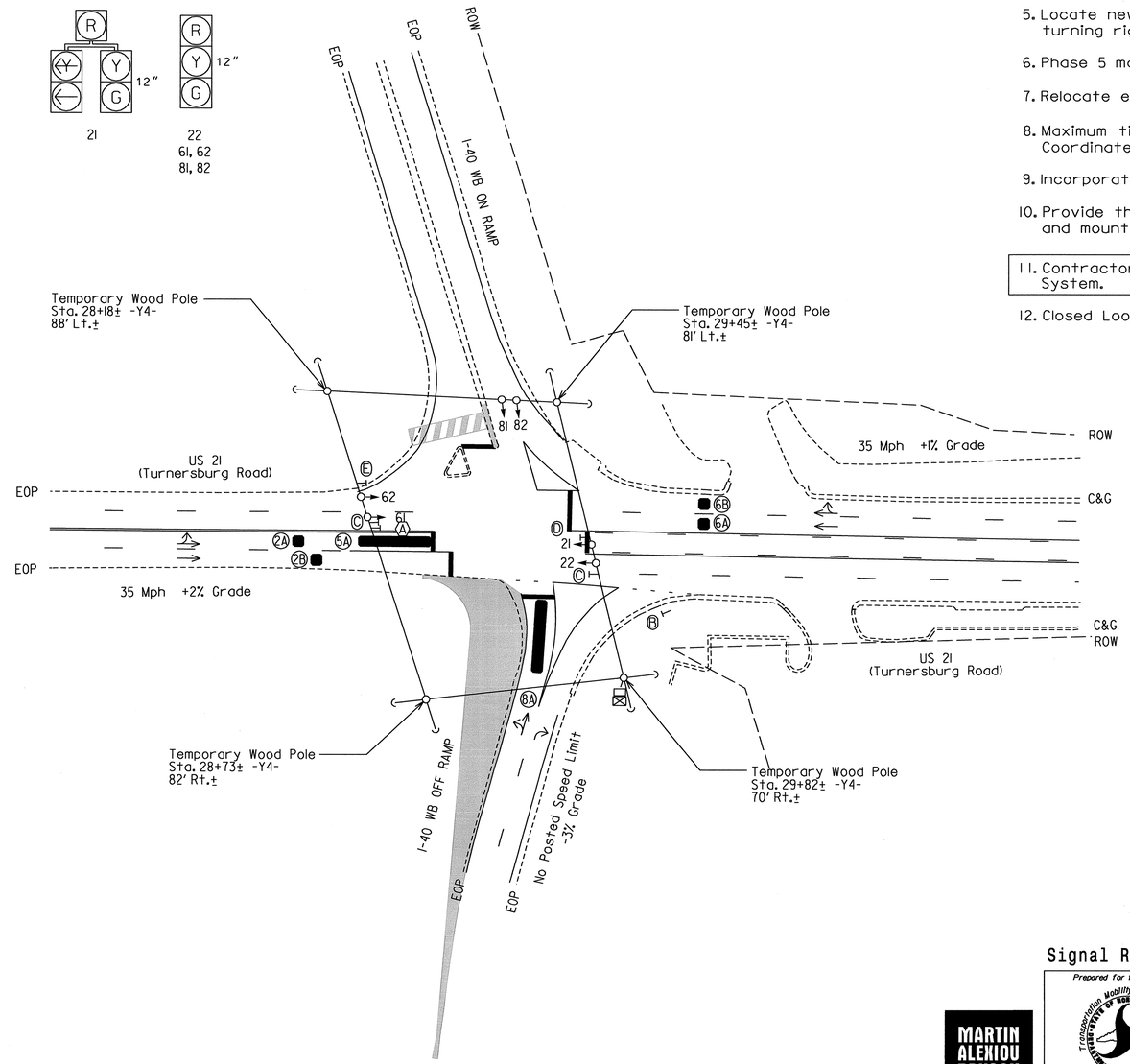
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Abandon existing loops 2A, 2B, 2C, 2D, 2E, 3A, 3B, and 3C.
4. Set all detector zones to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Phase 5 may be lagged.
7. Relocate existing signs C, D and E as shown.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Incorporate Loop Emulator Detection System for Vehicle Detection.
10. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
11. Contractor to install and maintain 900 Mhz Wireless Radio Signal System.
12. Closed Loop System Data: Controller Asset #0328.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	Oversized Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
	Video Detection Zone	
	Construction Zone	
	Stop Bar	
(A)	No Left Turn Sign (R3-2)	(A)
(B)	"YIELD" Sign (R1-2)	(B)
(C)	Through Arrow "ONLY" Sign (R3-5a)	(C)
(D)	Combined Through and Left Turn Arrow Sign (R3-6L)	(D)
(E)	Combined Through and Right Turn Arrow Sign (R3-6R)	(E)

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	20	60	20
Yellow Clearance	3.7	3.0	3.8	3.3
Red Clearance	1.2	1.9	1.0	1.7
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision - Temporary Signal 1 - TCP Phase III, Step 1

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Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 Westbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SCALE: 0 40 — 1"=40'

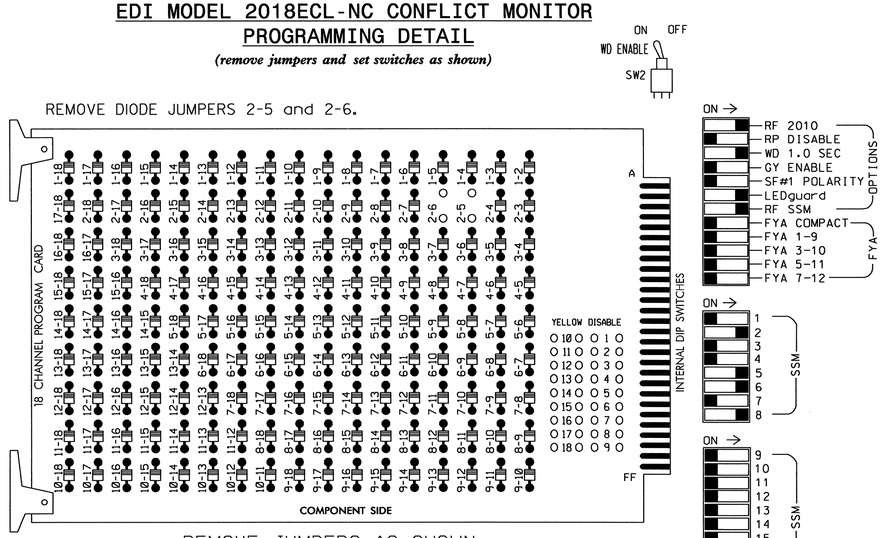
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-0328T1

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-21

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 1,3,4,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	21	61,62	NU	NU	81,82	NU
RED		128					*	134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					
✋												
🚶												

NU = Not Used

* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S7,S8,S11
PHASES USED.....2,5,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

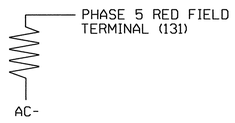
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of 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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0328T1
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 1 - TCP Phase III, Step 1

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

NCDOT Traffic Engineering Branch – Signals Management Section
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11

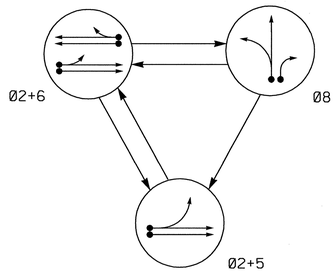
SIGNATURE | DATE

SIG. INVENTORY NO. 12-0328T1

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-22

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø8	FLASH
21	G	G	R	Y
22	G	G	R	Y
61, 62	R	G	R	Y
81, 82	R	R	G	R

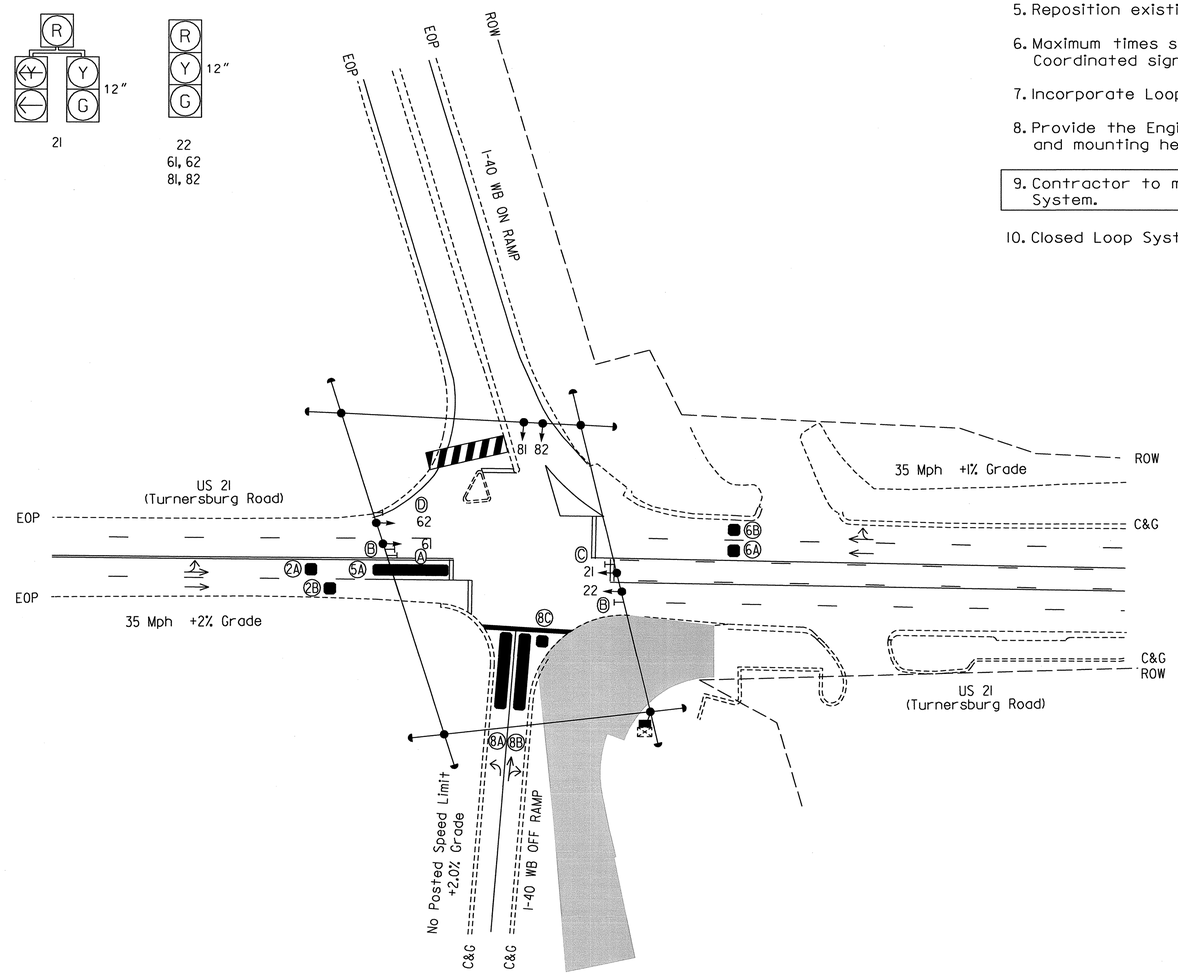
SIGNAL FACE I.D.

All Heads L.E.D.

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

DETECTION ZONES					DETECTOR PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
2B	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
5A	6X40	0	*	Y	5	Y	Y	-	-	-	-	*
					2	Y	Y	-	-	-	-	*
6A	6X6	70	*	Y	6	Y	Y	-	-	-	-	*
6B	6X6	70	*	Y	6	Y	Y	-	-	-	-	*
8A	6X40	0	*	Y	8	Y	Y	-	-	-	-	*
8B	6X40	0	*	Y	8	Y	Y	-	-	10	-	*
8C	6X6	0	*	Y	8	Y	Y	-	-	15	-	*

* Video Detection Zone



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Phase 5 may be lagged.
5. Reposition existing signal heads numbered 81 and 82.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to maintain 900 Mhz Wireless Radio Signal System.
10. Closed Loop System Data: Controller Asset #0328.

LEGEND

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

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	20	60	20
Yellow Clearance	3.7	3.0	3.8	3.1
Red Clearance	1.2	1.9	1.1	1.7
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision - Temporary Signal 2 - TCP Phase III, Step 2

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Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 Westbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SCALE: 0 40, 1"=40'

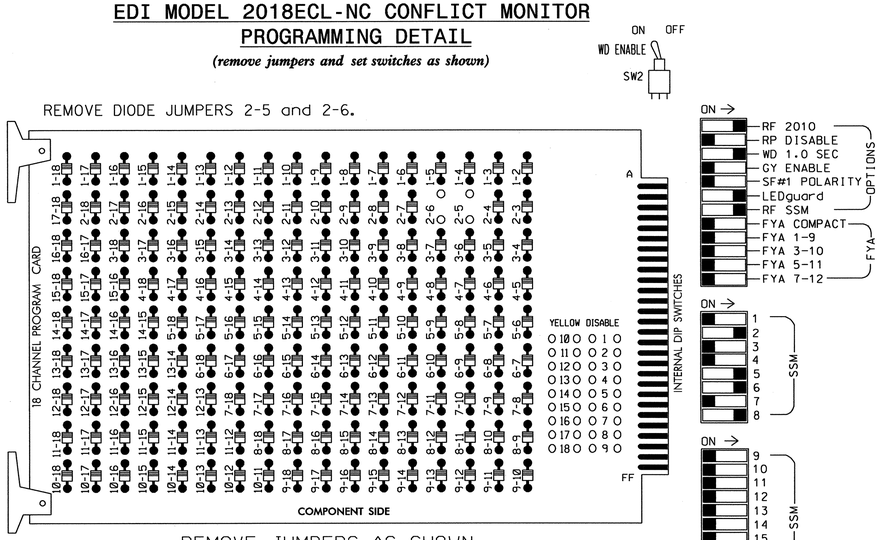
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-0328T2

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-23

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 1,3,4,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	21	61,62	NU	NU	81,82	NU
RED		128					*	134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					
✋												
🚶												

NU = Not Used

* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S7,S8,S11
PHASES USED.....2,5,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

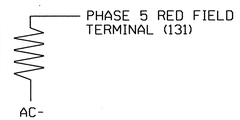
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

ACCEPTABLE VALUES

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



NOTE: The purpose of 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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0328T2
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 2 - TCP Phase III, Step 2

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering and Safety Systems Branch
Signals Management Section
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

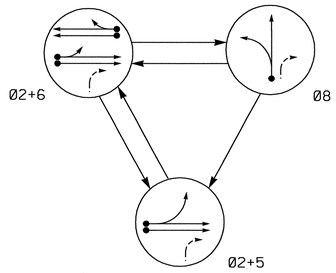
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-0328T2

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-24

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø8	FLASH
21	G	G	R	Y
22	G	G	R	Y
61, 62	R	G	R	Y
81, 82	R	R	G	R

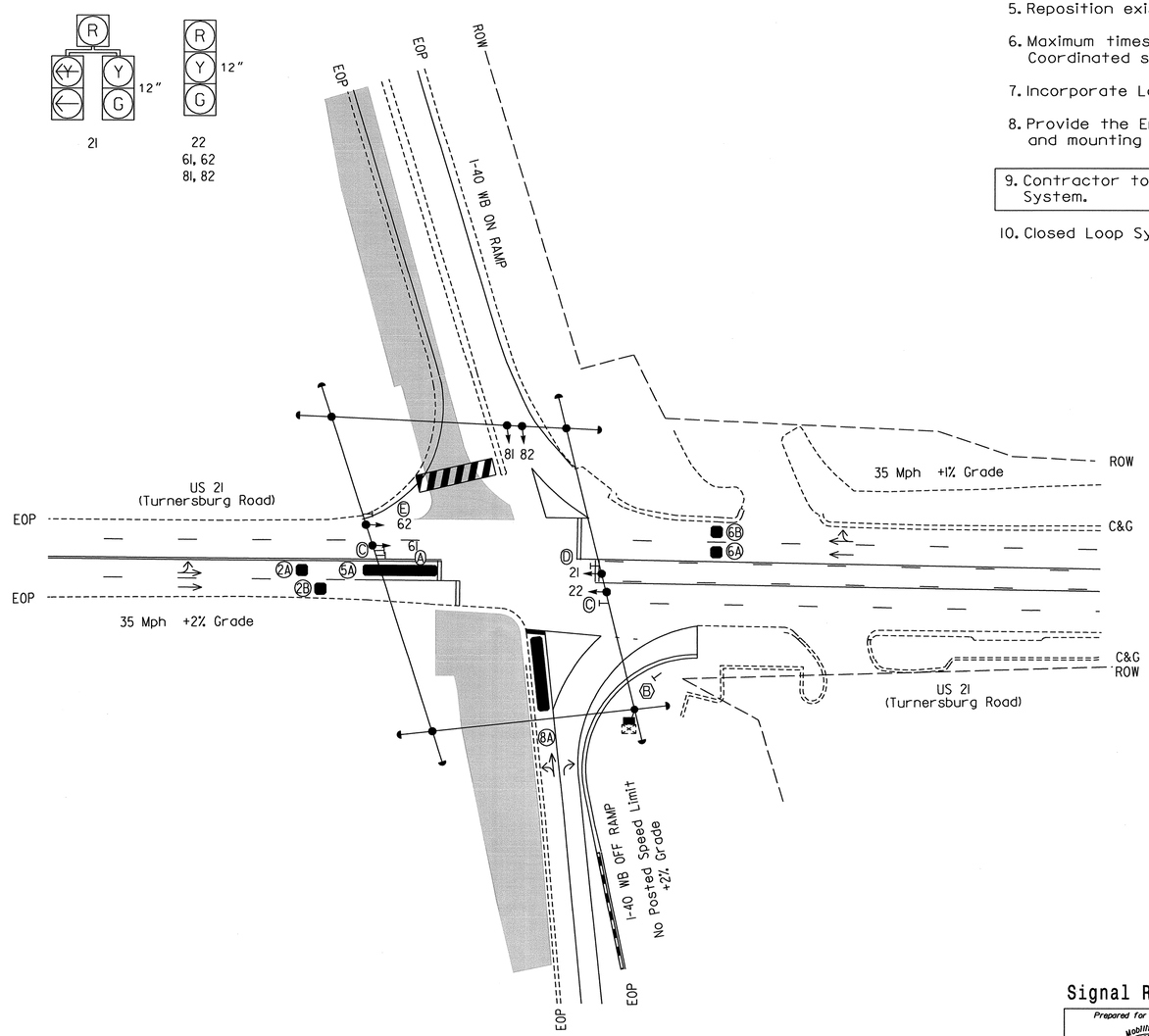
SIGNAL FACE I.D.

All Heads L.E.D.

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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

* Video Detection Zone



NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Phase 5 may be lagged.
5. Reposition existing signal heads numbered 81 and 82.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to maintain 900 Mhz Wireless Radio Signal System.
10. Closed Loop System Data: Controller Asset #0328.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	Oversized Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
	Video Detection Zone	
	Construction Zone	
	Stop Bar	
(A)	No Left Turn Sign (R3-2)	(A)
(B)	"YIELD" Sign (R1-2)	(B)
(C)	Through Arrow "ONLY" Sign (R3-5a)	(C)
(D)	Combined Through and Left Turn Arrow Sign (R3-6L)	(D)
(E)	Combined Through and Right Turn Arrow Sign (R3-6R)	(E)

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	20	60	20
Yellow Clearance	3.7	3.0	3.8	3.1
Red Clearance	1.2	1.9	1.0	1.8
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision - Temporary Signal 3 - TCP Phase III, Step 3

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Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 Westbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE: Sept 2011 | REVIEWED BY: D.J. Darity
PREPARED BY: J. Ma | MAB PROJ. NO.: 2008068.04

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY

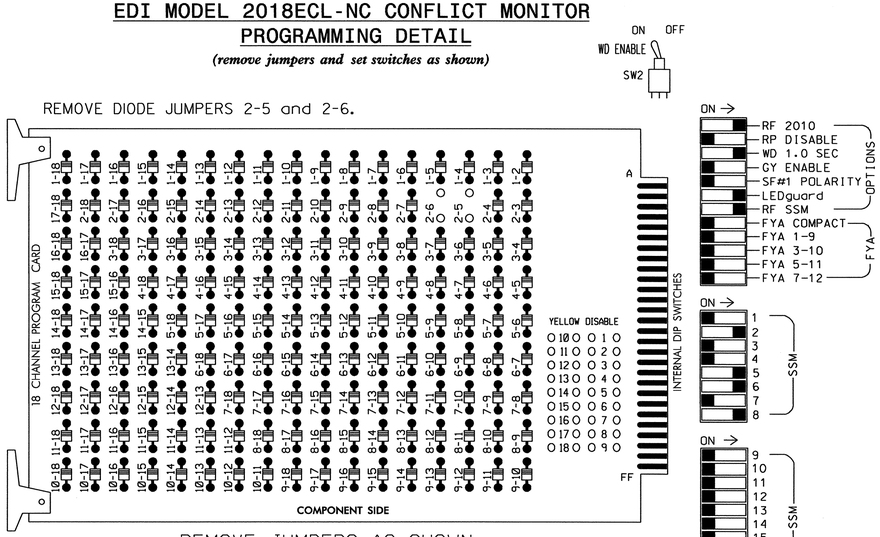
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-0328T3

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-25

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	21	61,62	NU	NU	81,82	NU
RED		128					*	134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					
✋												
🚶												

NU = Not Used

* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S7,S8,S11
PHASES USED.....2,5,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

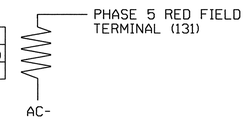
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of 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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0328T3
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 3 - TCP Phase III, Step 3

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NC DEPARTMENT OF TRANSPORTATION
Traffic Engineering and Safety Systems
Signals Management Section
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

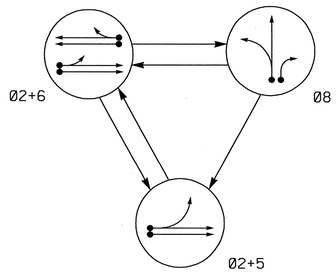
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-0328T3

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-26

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

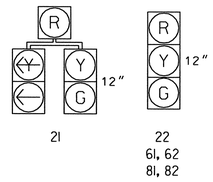
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø8	FLASH
21	G	G	R	Y
22	G	G	R	Y
61, 62	R	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21

22
61, 62
81, 82

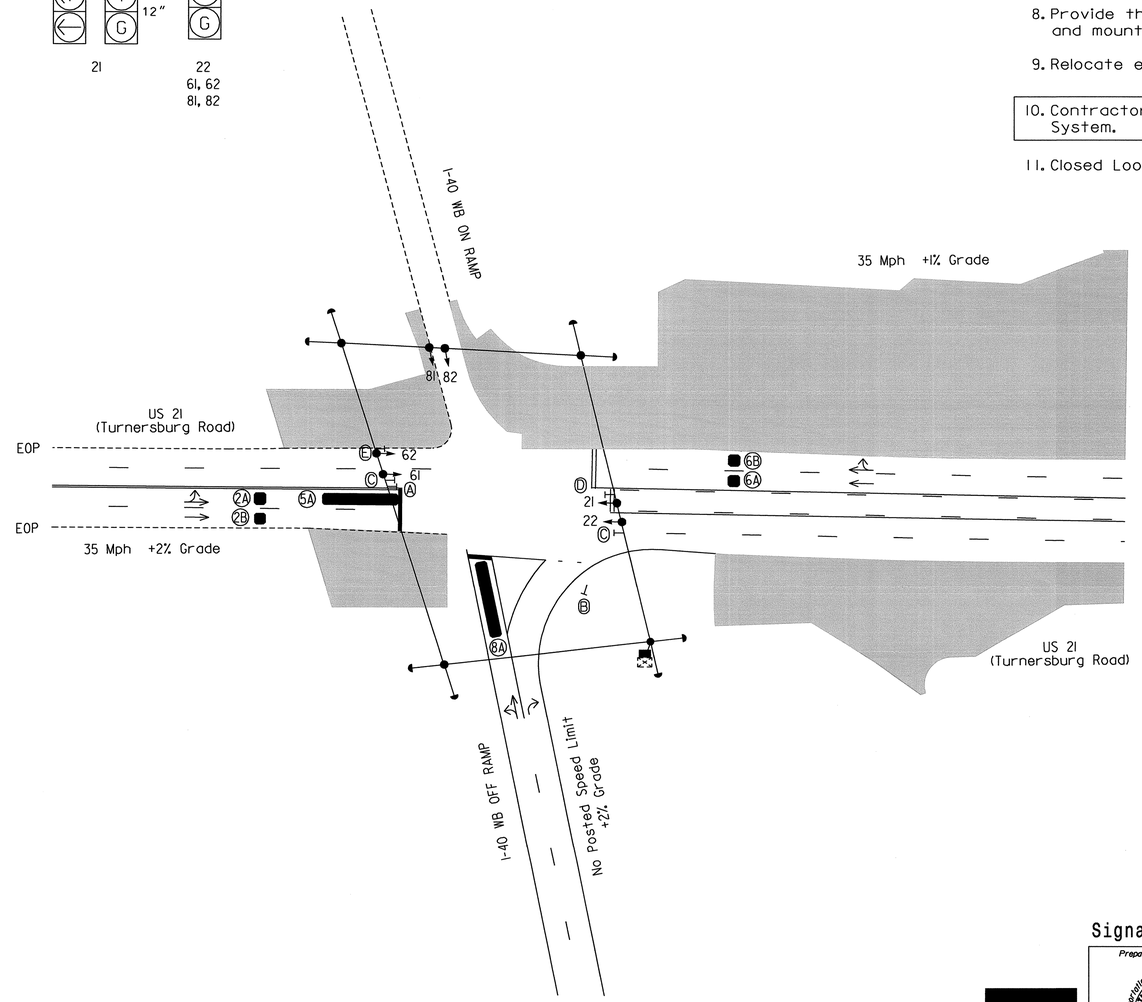
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Phase 5 may be lagged.
5. Reposition existing signal heads numbered 81 and 82.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Relocate existing "YIELD" sign.
10. Contractor to maintain 900 Mhz Wireless Radio Signal System.
11. Closed Loop System Data: Controller Asset #0328.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	Oversized Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
	Video Detection Zone	
	Construction Zone	
	Stop Bar	
Ⓐ	No Left Turn Sign (R3-2)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	Through Arrow "ONLY" Sign (R3-5a)	Ⓒ
Ⓓ	Combined Through and Left Turn Arrow Sign (R3-6L)	Ⓓ
Ⓔ	Combined Through and Right Turn Arrow Sign (R3-6R)	Ⓔ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	5	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	20	60	20
Yellow Clearance	3.7	3.0	3.8	3.1
Red Clearance	1.4	2.1	1.5	1.7
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

Signal Revision - Temporary Signal 4 - TCP Phase IV

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US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

SCALE: 0 40 — 1"=40'

REVISIONS	INIT.	DATE

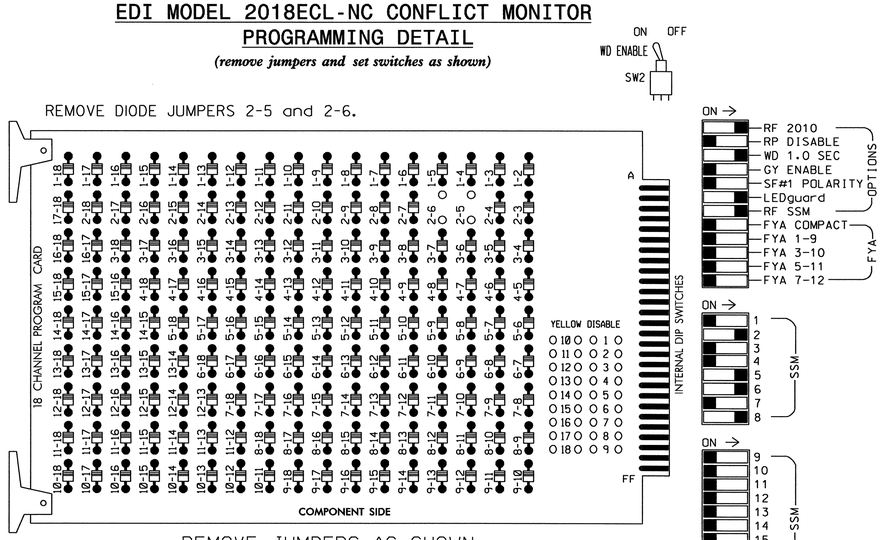
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE | DATE

SIG. INVENTORY NO. 12-0328T4

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-27

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 1,3,4,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	21	61,62	NU	NU	81,82	NU
RED		128					*	134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW												
YELLOW ARROW							132					
GREEN ARROW							133					
✋												
🚶												

NU = Not Used

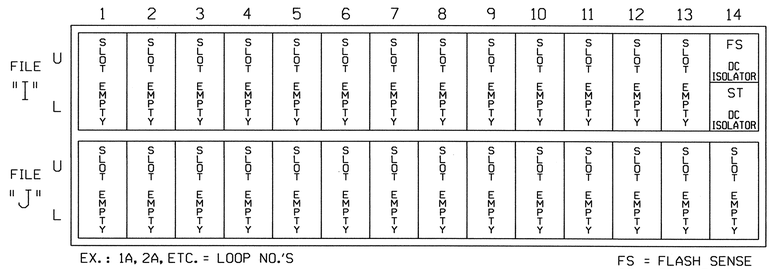
* Denotes install load resistor. See Load Resistor Installation Detail this page.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S7,S8,S11
PHASES USED.....2,5,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

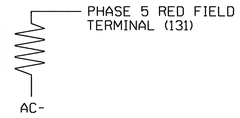


EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

LOAD RESISTOR INSTALLATION DETAIL

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



NOTE: The purpose of 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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-0328T4
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 4 - TCP Phase IV

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
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North Carolina Department of Transportation
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

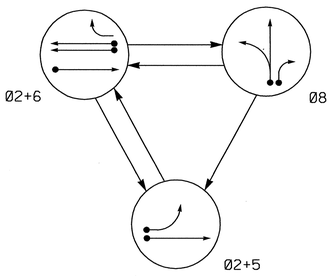
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-0328T4

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-27.1

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



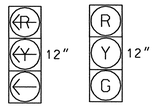
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION				
SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø8	FLASH
51	~~←~~	~~R~~	~~R~~	~~R~~
21, 22	G	G	R	Y
61, 62	R	G	R	Y
81, 82	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

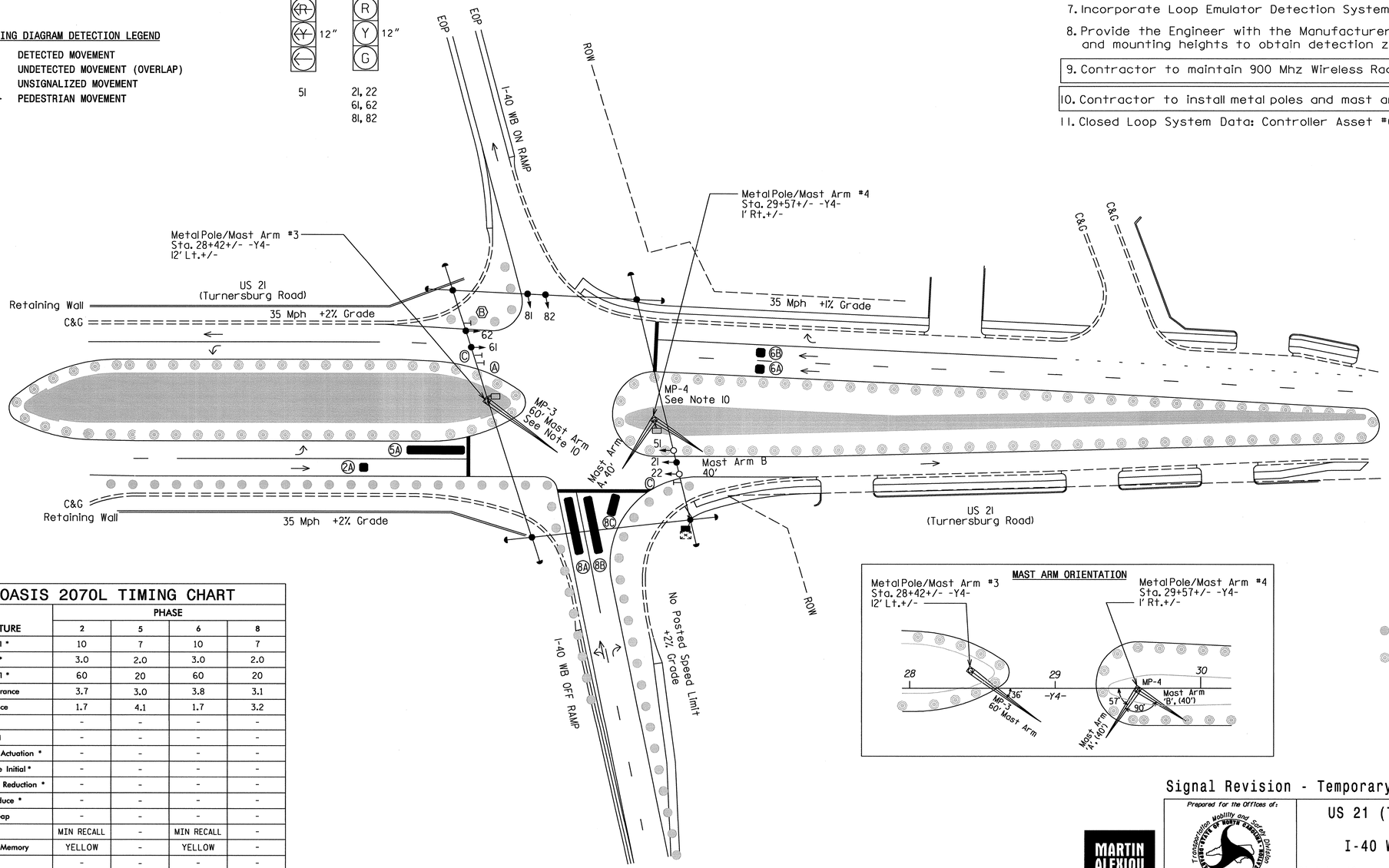


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART												
DETECTION ZONES					DETECTOR PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
5A	6X40	0	*	Y	5	Y	Y	-	-	-	-	*
6A	6X6	70	*	Y	6	Y	Y	-	-	-	-	*
6B	6X6	70	*	Y	6	Y	Y	-	-	-	-	*
8A	6X40	0	*	Y	8	Y	Y	-	-	-	-	*
8B	6X40	0	*	Y	8	Y	Y	-	-	15	-	*
8C	6X15	0	*	Y	8	Y	Y	-	-	15	-	*

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector zones to presence mode.
4. Phase 5 may be lagged.
5. Reposition existing signal heads numbered 21, 61, 62, 81 and 82, and signs A and C.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to maintain 900 Mhz Wireless Radio Signal system.
10. Contractor to install metal poles and mast arms during this construction phase.
11. Closed Loop System Data: Controller Asset #0328.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 5	PHASE 6	PHASE 8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	60	20	60	20
Yellow Clearance	3.7	3.0	3.8	3.1
Red Clearance	1.7	4.1	1.7	3.2
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

MAST ARM ORIENTATION

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊣↓	Pedestrian Signal Head With Push Button & Sign	⊣↓
○	Signal Pole with Guy	●
○~	Signal Pole with Sidewalk Guy	●~
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
▭	Oversized Junction Box	■
----	2-in Underground Conduit	----
N/A	Right of Way	———
→	Directional Arrow	→
→	Pavement Marking Arrow	→
▬	Video Detection Zone	▬
▭	Construction Zone	▭
▬	Stop Bar	▬
● ● ●	Traffic Control Drums	● ● ●
● ● ●	Traffic Control Skinny Drums	● ● ●
Ⓐ	No Left Turn Sign (R3-2)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	Through Arrow "ONLY" Sign (R3-5a)	Ⓒ

Signal Revision - Temporary Signal 5 - TCP Phase IV

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Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 Westbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

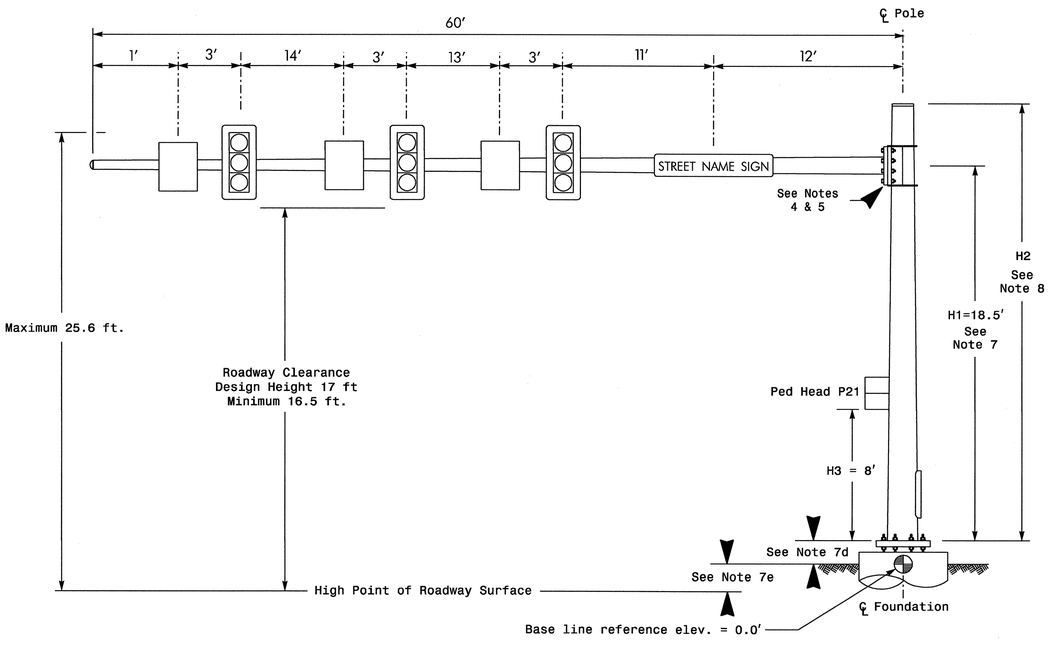
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE | DATE

SIG. INVENTORY NO. 12-0328T5

METAL POLE No. 3

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-27.2

Design Loading for METAL POLE NO. 3



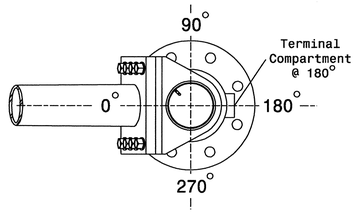
Elevation View @ 270°

SPECIAL NOTE

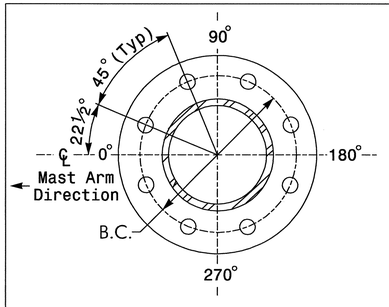
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 3
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	-0.5 ft.
Elevation difference at Edge of travelway or face of curb	-0.3 ft.

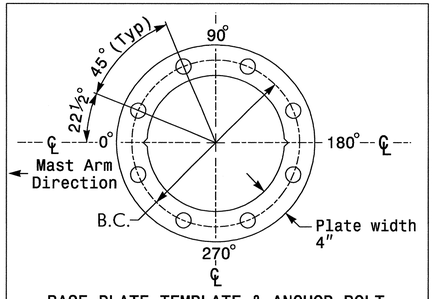


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12″-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5″ W X 52.5″ L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0″ W X 30.0″ L	11 LBS
STREET NAME SIGN	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0″ W X 96.0″ L	27 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5″ W X 17.0″ L	21 LBS

NOTES

Design Reference Material

1. Design the traffic signal structure and foundation in accordance with:
   - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
   - The 2012 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.

Design Requirements

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is .75 feet above the ground elevation.
   e. Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus ½ of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)

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Prepared for the Offices of:
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE: 0 N/A N/A

US 21 (Turnersburg Road) at I-40 West Ramps

Division 12 | Iredell County | Statesville

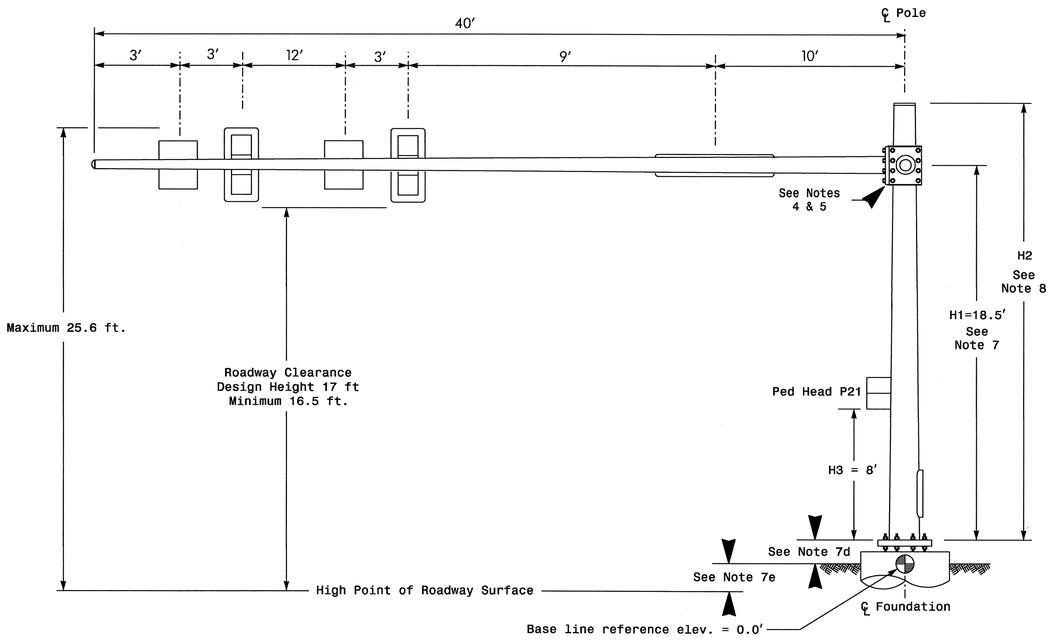
PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	D.J. Darity	MAB PROJ NO:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE | DATE

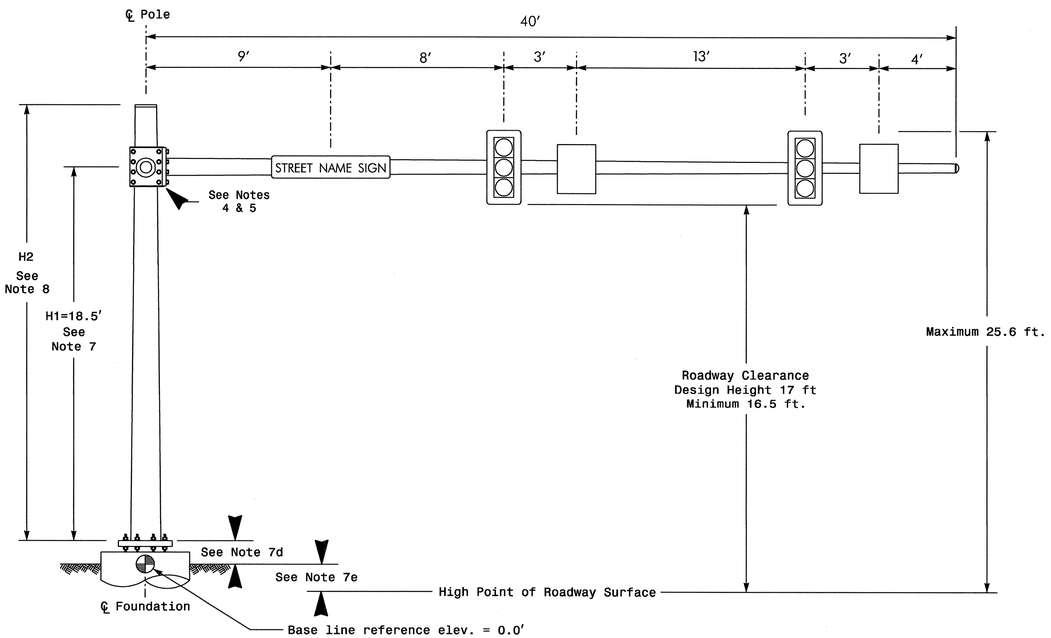
SIG. INVENTORY NO. 12-0328T5

Design Loading for METAL POLE NO. 4, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 4, MAST ARM B



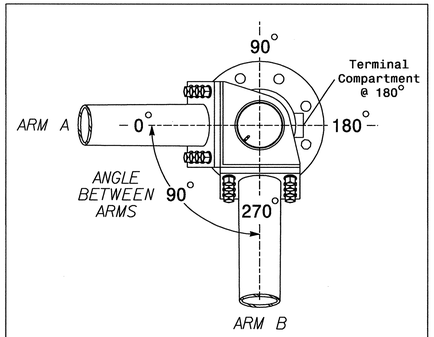
Elevation View @ 0°

SPECIAL NOTE

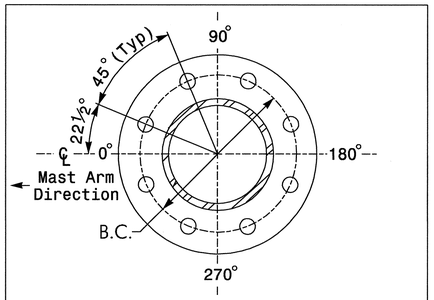
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-0.5 ft.	-0.5 ft.
Elevation difference at Edge of travelway or face of curb	-0.3 ft.	-0.3 ft.

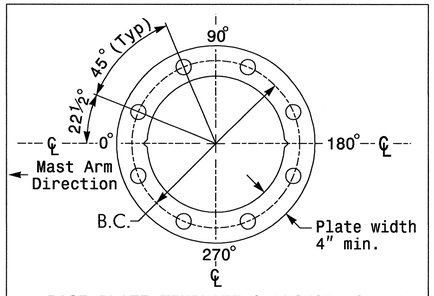


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
STREET NAME SIGN	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5" W X 17.0" L	21 LBS

NOTES

Design Reference Material

1. Design the traffic signal structure and foundation in accordance with:
   - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
   - The 2012 NCDOT Roadway Standard Drawings.
   - The traffic signal project plans and special provisions.

Design Requirements

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is .75 feet above the ground elevation.
   e. Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
8. The pole manufacturer will determine the total height (H2) of the pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus ½ of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)

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Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road) at I-40 West Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	D.J. Darity	MAB PROJ NO:	2008068.04

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J DARITY

11-02-11

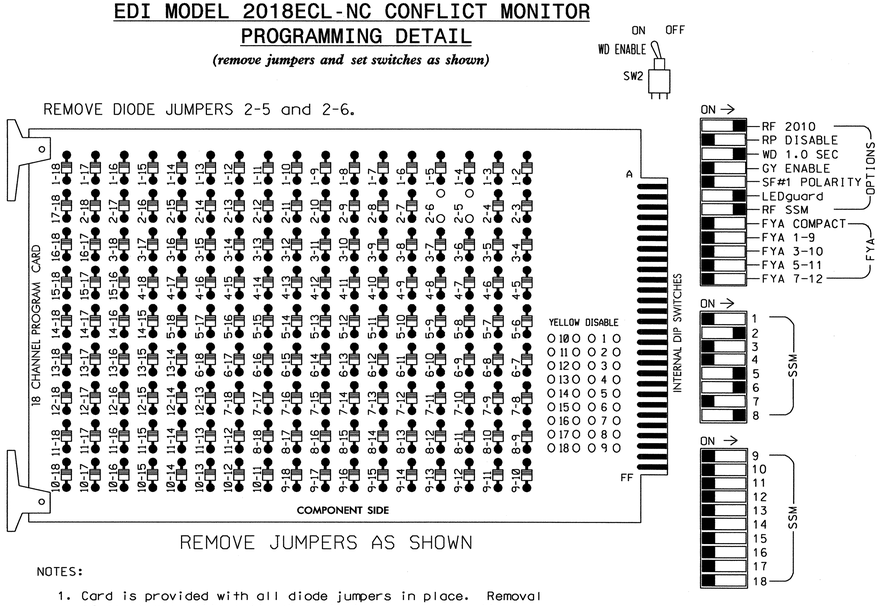
SIGNATURE DATE

SIG. INVENTORY NO. 12-0328T5

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-27.4

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 1,3,4,7,9, 10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	51	61,62	NU	NU	81,82	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW							131					
YELLOW ARROW							132					
GREEN ARROW							133					
✋												
🚶												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S7,S8,S11
PHASES USED.....2,5,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

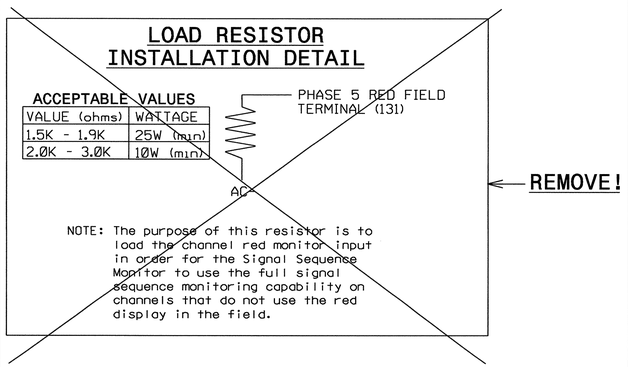
(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

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.

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0328T5
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 5 - TCP Phase IV

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE | DATE

SIG. INVENTORY NO. 12-0328T5

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-27.5

2 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM

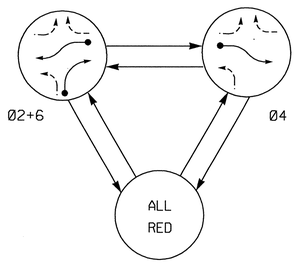
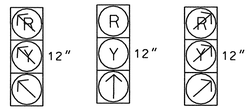


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21, 22, 23	⟋	⛒	⛒
41, 42	R	↑	R
43	⛒	⟋	⛒
61, 62	↑	R	R
63	⟍	⛒	⛒

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

DETECTION ZONES					DETECTOR PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X40	0	✳	Y	2	Y	Y	-	-	15	-	✳
4A	6X40	0	✳	Y	4	Y	Y	-	-	-	-	✳
6A	6X40	0	✳	Y	6	Y	Y	-	-	-	-	✳

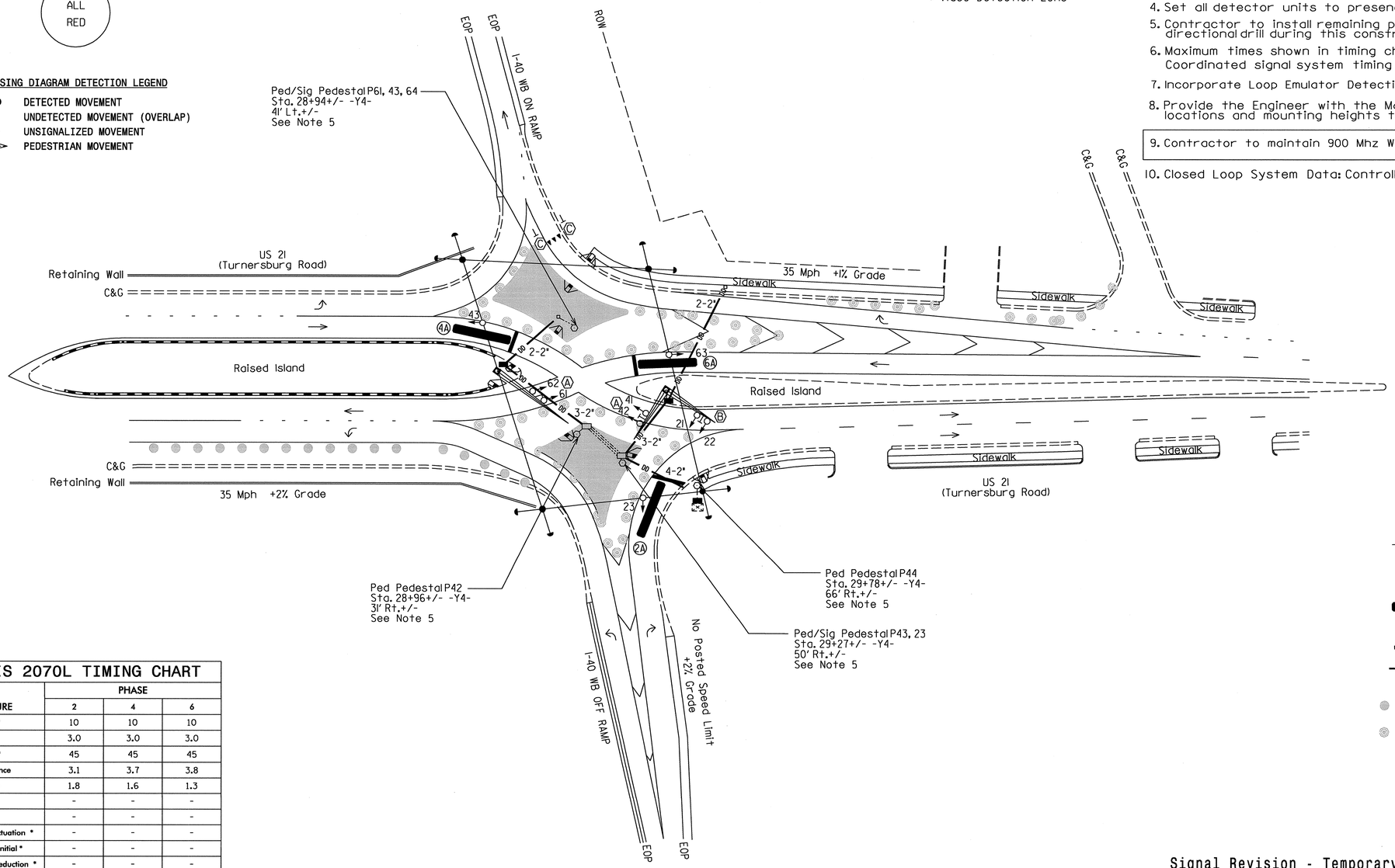
✳ Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Controller shall rest in Red.
4. Set all detector units to presence mode.
5. Contractor to install remaining pedestal mounted hardware and directional drill during this construction phase.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Incorporate Loop Emulator Detection System for Vehicle Detection.
8. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
9. Contractor to maintain 900 Mhz Wireless Radio Signal System.
10. Closed Loop System Data: Controller Asset #0328.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▯↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
▭	Oversized Junction Box	■
----------	2-in Underground Conduit	-·-·-·-
N/A	Right of Way	—△—
→	Directional Arrow	→
→	Pavement Marking Arrow	→
▬	Video Detection Zone	▬
▒	Construction Zone	▒
▬	Stop Bar	▭
— DD —	Directional Drill Conduit	N/A
N/A	Right of Way	— — — —
● ● ● ●	Traffic Control Drums	● ● ● ●
◎ ◎ ◎ ◎	Traffic Control Skinny Drums	◎ ◎ ◎ ◎
Ⓐ	Through Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	10	10	10
Extension 1 *	3.0	3.0	3.0
Max Green 1 *	45	45	45
Yellow Clearance	3.1	3.7	3.8
Red Clearance	1.8	1.6	1.3
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	-	-
Vehicle Call Memory	-	-	-
Dual Entry	ON	-	ON
Simultaneous Gap	ON	ON	ON

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

Signal Revision - Temporary Signal 6 - TCP Phase V

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Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE 0 40 1"=40'

US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 | Iredell County | Statesville

PLAN DATE: Sept 2011 | REVIEWED BY: D.J. Darity
PREPARED BY: J. Ma | MAB PROJ. NO.: 2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY

11-02-11

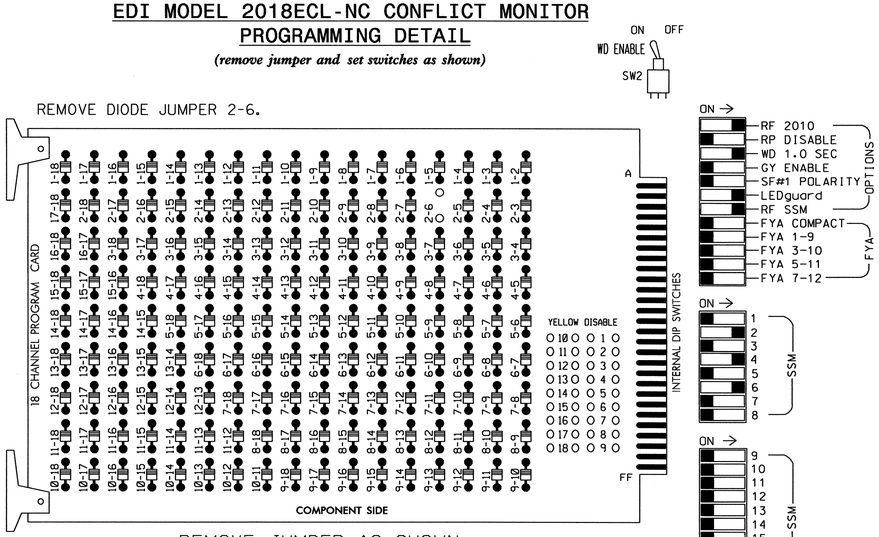
SIGNATURE | DATE

SIG. INVENTORY NO. 12-0328T6

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-27.6

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2, 4 and 6 for Red Rest.
6. Program phases 2 and 6 for "STARTUP RED CLR".
7. Program phases 2 and 6 as "FIRST PHASES".
8. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7	S8		S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4		14	5	6		15	7	8	16
PHASE	1	2	2 PED	3	4		4 PED	5	6		6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22 23	NU	NU	41,42	43	NU	NU	61,62	63	NU	NU	NU	NU
RED					101				134					
YELLOW					102				135					
GREEN														
RED ARROW		128				101				134				
YELLOW ARROW		129				102				135				
GREEN ARROW		130			103	103			136	136				
✋														
🚶														

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S5,S8
PHASES USED.....2,4,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-0328T6
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 6 - TCP Phase V

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Traffic Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

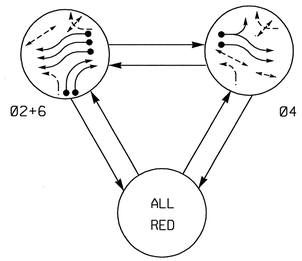
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-0328T6

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-28

2 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

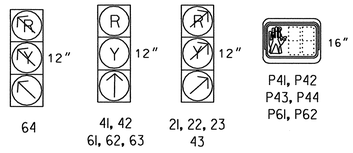
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21, 22, 23	/	R	R
41, 42	R	↑	R
43	R	/	R
61, 62, 63	↑	R	R
64	\	R	R
P41, P42	DW	W	DRK
P43, P44	DW	W	DRK
P61, P62	W	DW	DRK

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

SIGNAL FACE I.D.

All Heads L.E.D.

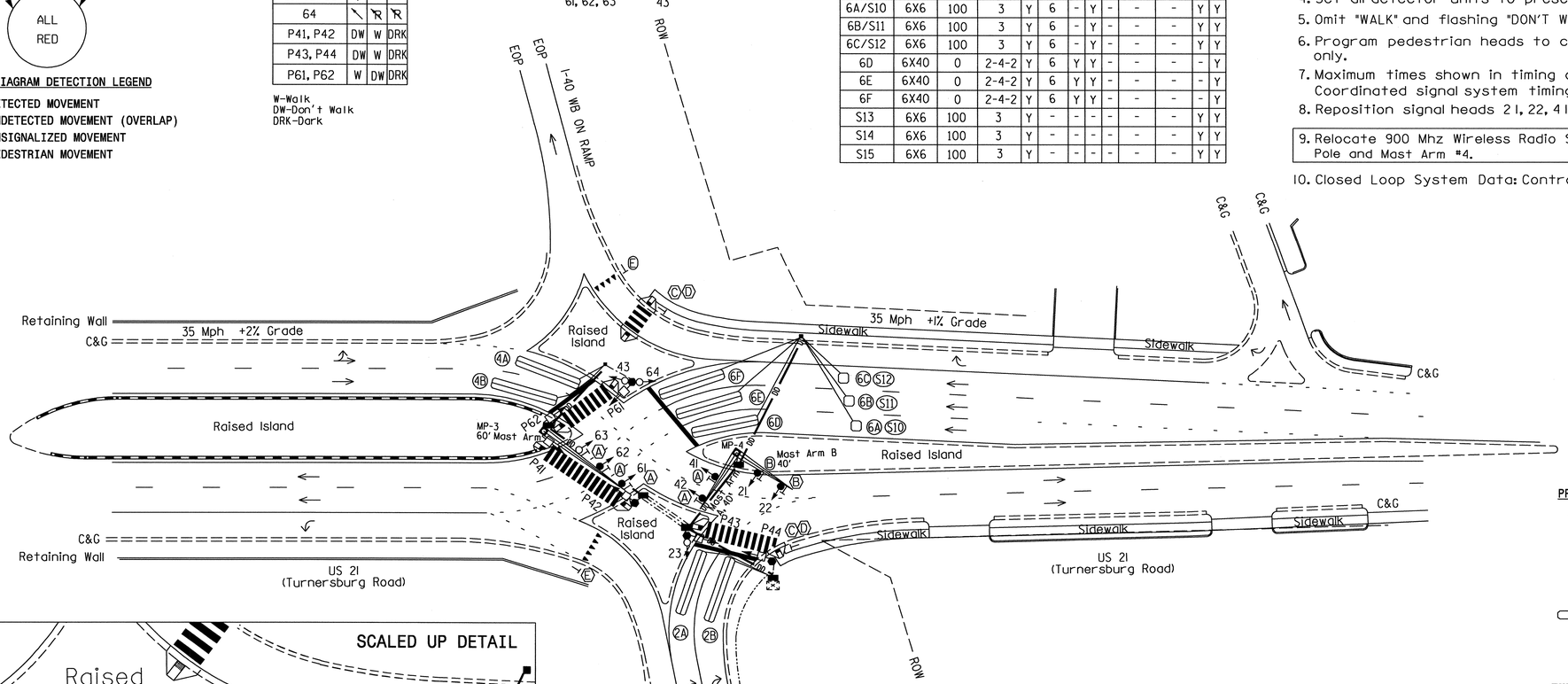


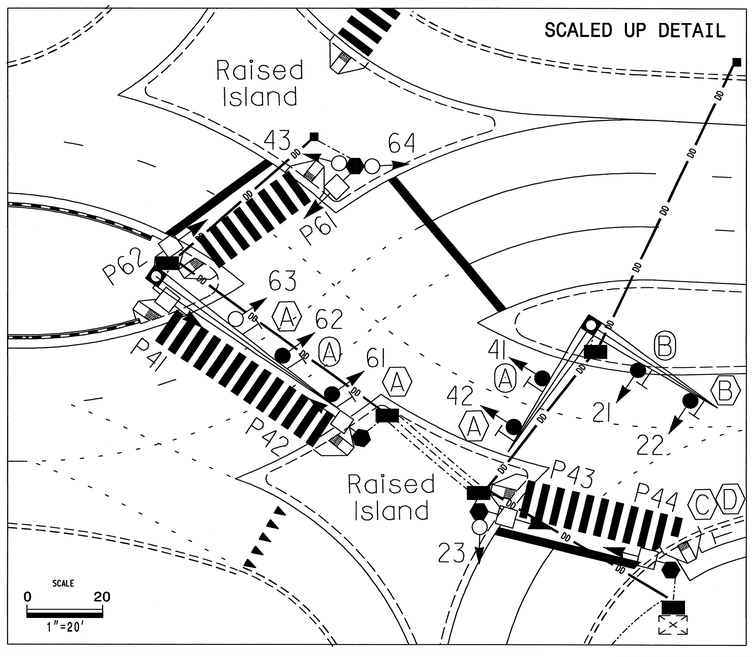
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

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	6X40	0	2-4-2	Y	2	Y	Y	-	-	15	-	Y
2B	6X40	0	2-4-2	Y	2	Y	Y	-	-	15	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	Y
6A/S10	6X6	100	3	Y	6	-	Y	-	-	-	Y	Y
6B/S11	6X6	100	3	Y	6	-	Y	-	-	-	Y	Y
6C/S12	6X6	100	3	Y	6	-	Y	-	-	-	Y	Y
6D	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
6E	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
6F	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	-	Y
S13	6X6	100	3	Y	-	-	-	-	-	-	Y	Y
S14	6X6	100	3	Y	-	-	-	-	-	-	Y	Y
S15	6X6	100	3	Y	-	-	-	-	-	-	Y	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Controller shall rest in Red.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Reposition signal heads 21, 22, 41, 42, 61, and 62, and signs A, B, and E.
9. Relocate 900 Mhz Wireless Radio Signal System to Metal Pole and Mast Arm #4.
10. Closed Loop System Data: Controller Asset #0328.





OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	10	10	10
Extension 1 *	2.0	3.0	3.0
Max Green 1 *	45	45	45
Yellow Clearance	3.1	3.7	3.8
Red Clearance	2.0	1.5	1.2
Walk 1 *	-	7	7
Don't Walk 1	-	14	8
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	-	-	-
Vehicle Call Memory	-	-	-
Dual Entry	ON	-	ON
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.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
◎	Metal Strain Pole	■
⬡	Signal Pedestal	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
▭	Oversized Junction Box	■
----------	2-in Underground Conduit	----------
DD ———	Directional Drill Conduit	N/A
→	Directional Arrow	→
N/A	Right of Way	—△—
N/A	Wheelchair Ramp	◢◣
▬	Stop Bar	▭
Ⓐ	Through Arrow "ONLY" Sign (R3-5a)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	Pedestrian Crossing Sign (W11-2)	Ⓒ
Ⓓ	Diagonal Downward Arrow (Plaque) (W16-7P)	Ⓓ
Ⓔ	"YIELD" Sign (R1-2)	Ⓔ

Signal Revision - Final Signal - TCP Final Phase

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North Carolina Department of Transportation
Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19713 DONALD J. DARITY
11-02-11

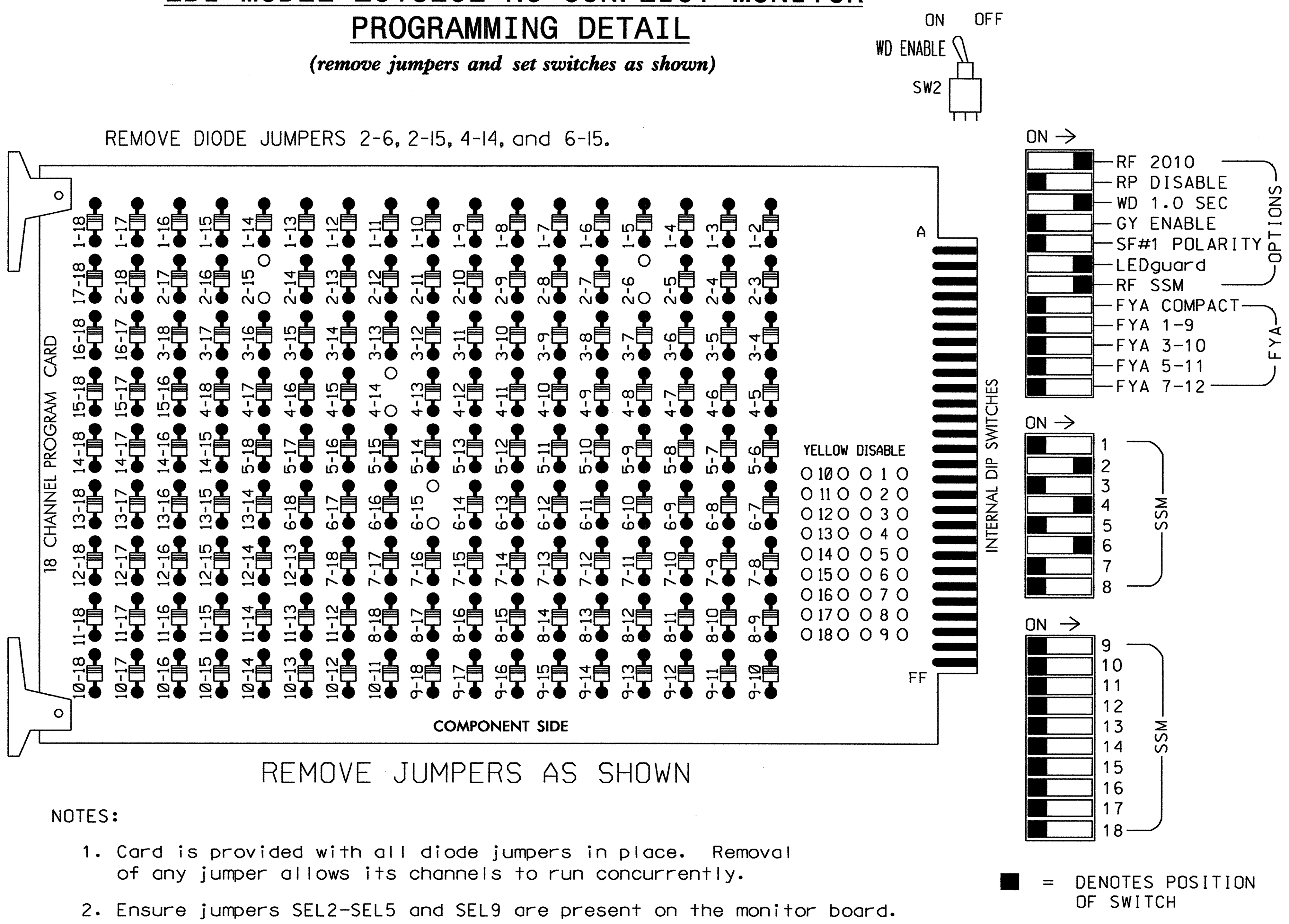
SIGNATURE DATE
SIG. INVENTORY NO. 12-0328

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-29

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-15, 4-14, and 6-15.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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 the 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 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2, 4 and 6 for Red Rest.
6. Program phases 2 and 6 for "STARTUP RED CLR".
7. Program phases 2 and 6 as "FIRST PHASES".
8. Program phases 4 and 6 for 'STARTUP PED CALL'.
9. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7	S8		S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4		14	5	6		15	7	8	16
PHASE	1	2	2 PED	3	4		4 PED	5	6		6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22 23	NU	NU	41,42	43	P41,P42 P43,P44	NU	61,62 63	64	P61, P62	NU	NU	NU
RED					101				134					
YELLOW					102				135					
GREEN														
RED ARROW		128				101				134				
YELLOW ARROW		129				102				135				
GREEN ARROW		130			103	103			136	136				
(hand symbol)							104				119			
(pedestrian symbol)							106				121			

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER..............2070L
CABINET.................332
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S5,S6,S8,S9
PHASES USED.............2,4,4PED,6,6PED
OVERLAPS................NONE

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I"	U	SLOT EMPTY	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S13	SLOT EMPTY	SLOT EMPTY	NOT USED	Ø6PED DC ISOLATOR	FS DC ISOLATOR
"I"	L		Ø2 2B				Ø4 4B			SYS. DET. S14			Ø4PED DC ISOLATOR	NOT USED	ST DC ISOLATOR
"J"	U	SLOT EMPTY	Ø6/SYS 6A/S10	Ø6/SYS 6C/S12	Ø6 6E	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SYS. DET. S15	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
"J"	L		Ø6/SYS 6B/S11	Ø6 6D	Ø6 6F					NOT USED					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			15
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			15
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
6A/S10	TB3-5,6	J2U	40	2	6	6/SYS		Y			
6B/S11	TB3-7,8	J2L	44	6	16	6/SYS		Y			
6C/S12	TB3-9,10	J3U	64	26	36	6/SYS		Y			
6D	TB3-11,12	J3L	77	39	46	6	Y	Y			
6E	TB5-1,2	J4U	48	10	26	6	Y	Y			
6F	TB5-3,4	J4L	48	10	26	6	Y	Y			
S13	TB6-9,10	I9U	60	22	11	SYS					
S14	TB6-11,12	I9L	62	24	13	SYS					
S15	TB7-9,10	J9U	59	21	15	SYS					
PED PUSH BUTTON											
P41,P42 P43,P44	TB8-5,6	I12L	69	31	PED 4	4 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 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.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

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: 12-0328
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

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4000 Westchase Blvd. Suite 530 Raleigh, NC 27607 Tel. 919.829.0328 Fax. 919.829.0329 NC License No: C-3496

Signal Revision - Final Signal - TCP Final Phase

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of: Signals Management Section

750 Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
I-40 Westbound Ramps

Division 12 Iredell County Statesville

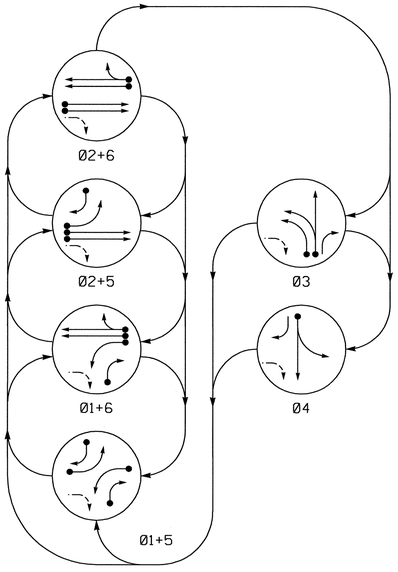
PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-0328

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-30

6 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

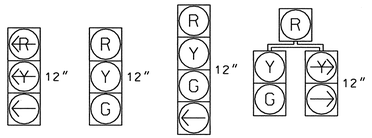
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE							
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~R~~	~~R~~
32	R	R	R	R	G	R	R
33	R/→	R/→	R	R	G	R	R
41	R	R	R	R	R	G	R
42	R/→	R	R/→	R	R	G	R
51	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



11
31
51

21, 22
61, 62

32
41

33
42

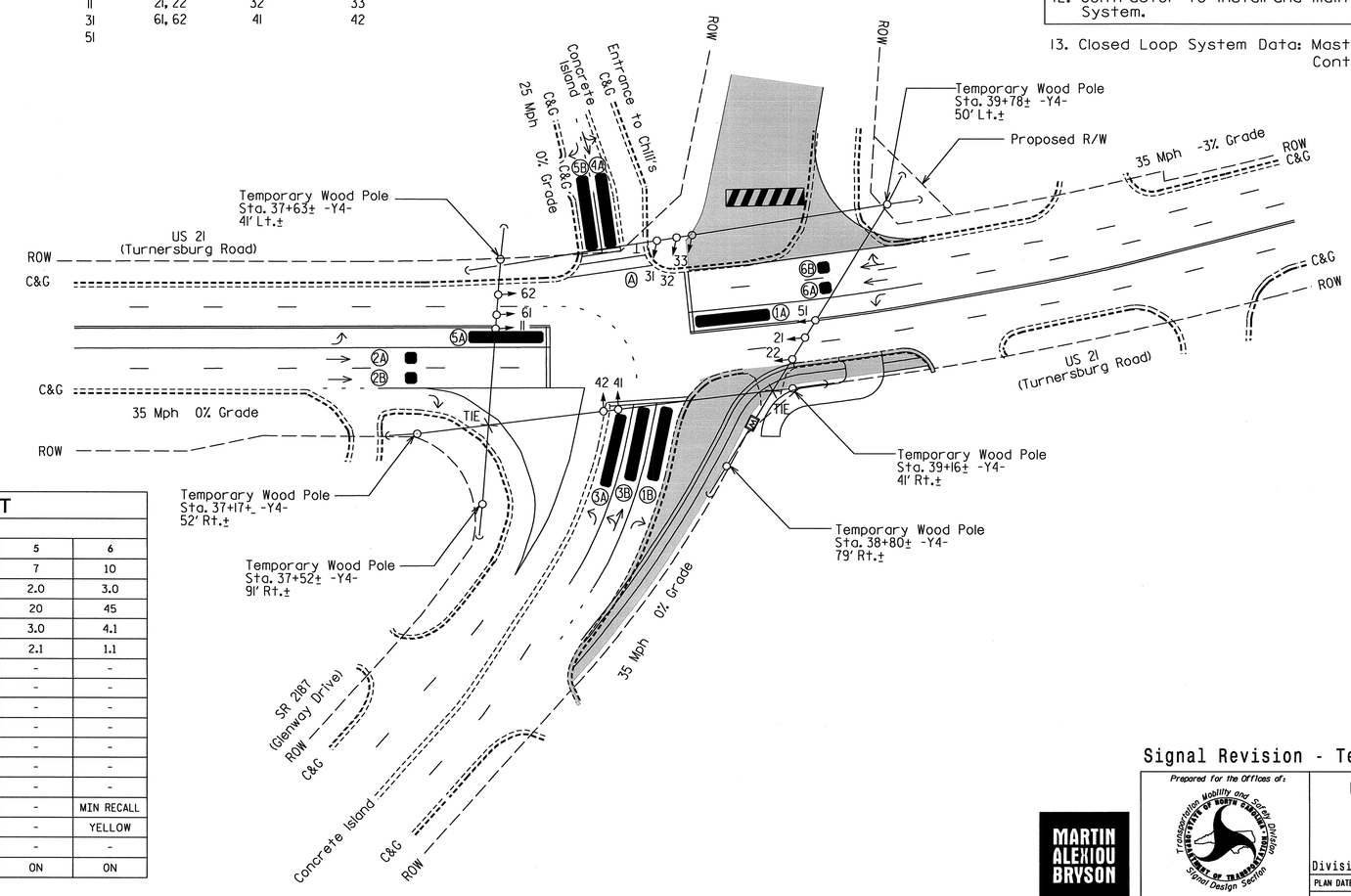
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

DETECTION ZONE					DETECTOR PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	*	Y	1	Y	Y	-	-	3	-	*
1B	6X40	0	*	Y	1	Y	Y	-	-	15	-	*
2A	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
2B	6X6	70	*	Y	2	Y	Y	-	-	-	-	*
3A	6X40	0	*	Y	3	Y	Y	-	-	-	-	*
3B	6X40	0	*	Y	3	Y	Y	-	-	-	-	*
4A	6X40	0	*	Y	4	Y	Y	-	-	-	-	*
5A	6X40	0	*	Y	5	Y	Y	-	-	3	-	*
5B	6X40	0	*	Y	5	Y	Y	-	-	15	-	*
6A	6X6	70	*	Y	6	Y	Y	-	-	-	-	*
6B	6X6	70	*	Y	6	Y	Y	-	-	-	-	*

* Video Detection Zone

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Abandon existing loops 1A, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 5A, 6A and 6B.
4. Set all detector zones to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. The order of phase 3 and phase 4 may be reversed.
8. Relocate existing sign A as shown.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Incorporate Loop Emulator Detection System for Vehicle Detection.
11. Provide the Engineer with the Manufacturer's approved camera locations and mounting heights to obtain detection zones as shown.
12. Contractor to install and maintain 900 Mhz Wireless Radio Signal System.
13. Closed Loop System Data: Master Asset #11221, Controller Asset #1058.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head With Push Button & Sign	■↓
○→	Signal Pole with Guy	●→
○⤵	Signal Pole with Sidewalk Guy	●⤵
▭	Inductive Loop Detector	▭
M	Master Controller & Cabinet	M
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	—△—
→	Directional Arrow	→
→	Pavement Marking Arrow	→
▬	Video Detection Zone	▬
▒	Construction Zone	▒
▬	Stop Bar	▭
Ⓐ	"DO NOT BLOCK INTERSECTION" Sign (R10-7)	Ⓐ

OASIS 2070L TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0
Max Green 1 *	20	45	40	20	20	45
Yellow Clearance	3.0	3.8	3.8	3.2	3.0	4.1
Red Clearance	2.1	1.1	1.5	2.1	2.1	1.1
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

Signal Revision - Temporary Signal 1 - TCP Phase II

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Prepared for the Offices of:
North Carolina Department of Transportation
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road)
at
SR 2187 (Glenway Drive)

Division 12 Iredell County Statesville

PLAN DATE:	Sept. 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

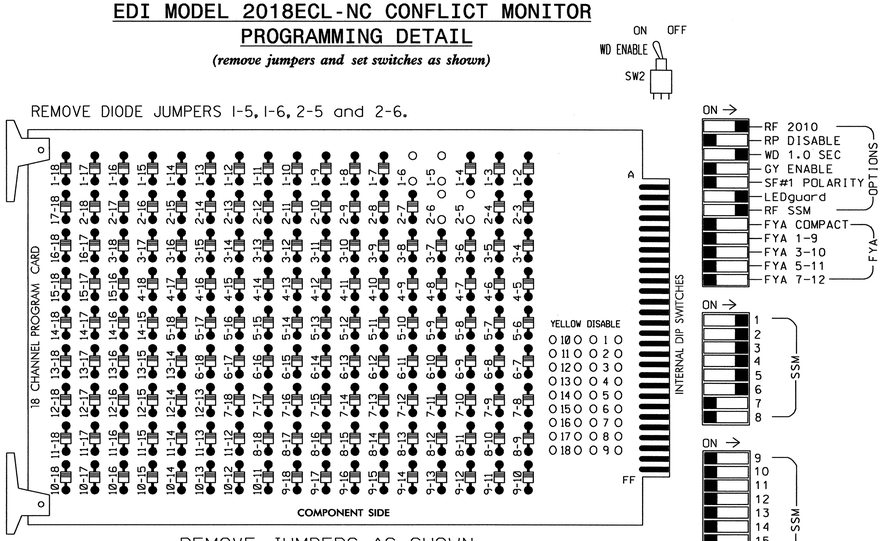
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-1058T1

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-31

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

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. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4			S5		S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3			4		14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3			4		4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	33	21,22	NU	31	32	33	41	42	NU	42	51	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED			128			116	116	101	101				134										
YELLOW			129			117	117	102	102				135										
GREEN			130			118	118	103	103				136										
RED ARROW	125				116							131											
YELLOW ARROW	126	126			117						132	132											
GREEN ARROW	127	127			118	118		103			133	133											

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8
PHASES USED.....1,2,3,4,5,6
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1058T1
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Signal Revision - Temporary Signal 1 - TCP Phase II

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section

750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road)
at
SR 2187 (Glenway Drive)

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept. 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY

11-02-11

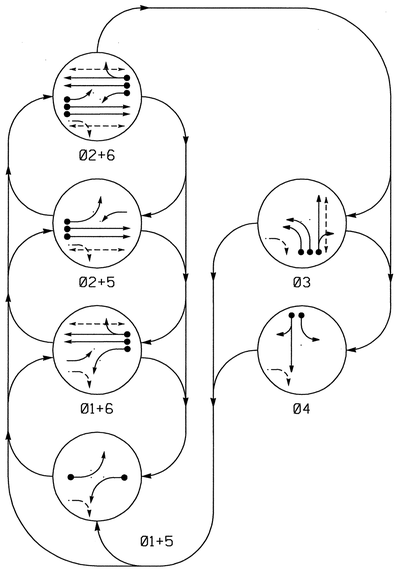
SIGNATURE | DATE

SIG. INVENTORY NO. 12-1058T1

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-32

6 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03	04	FLASH
11	←	←	←Y	←Y	←R	←R	←Y
21, 22	R	R	G	G	R	R	Y
31, 32	←R	←R	←R	←R	←	←R	←R
33, 34	R	R	R	R	G	R	R
41	R	R	R	R	G ←	R	R
42	R	R	R	R	G	R	R
51	←	←Y	←	←Y	←R	←R	←Y
61, 62	R	G	R	G	R	R	Y
P21, P22	DW	DW	W	W	DW	DW	DRK
P31, P32	DW	DW	DW	DW	W	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK

←Y - FLASHING YELLOW ARROW
W-Walk
DW-Don't Walk
DRK-Dark

STANDARD SIGNAL FACE CLEARANCES FOR 4 SECTION LEFT TURN SIGNAL

FROM \ TO	← 1	← 2	←Y 1	←Y 2	←R 1	←R 2
←	←	←	←R	←R	←R	←R
←Y	←Y	←Y	←Y	←Y	←R	←R
←R	←R	←R	←R	←R	←R	←R

←Y - FLASHING YELLOW ARROW

OASIS 2070L LOOP & DETECTOR INSTALLATION

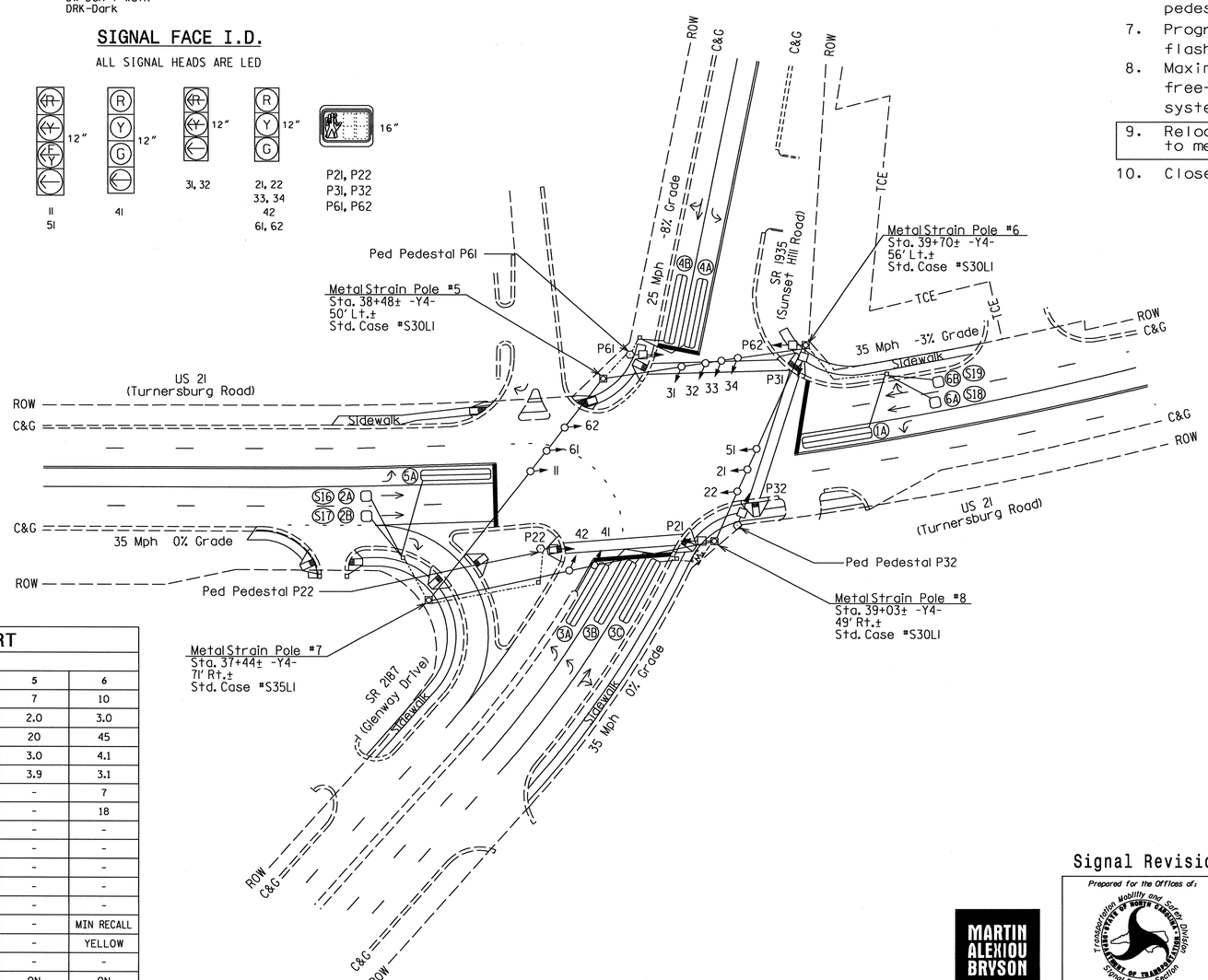
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	—	—	15	—	Y
					6	Y	Y	—	—	—	—	Y
2A/SI6	6X6	70	4	Y	2	Y	Y	—	—	—	Y	Y
2B/SI7	6X6	70	4	Y	2	Y	Y	—	—	—	Y	Y
3A	6X40	0	2-4-2	Y	3	Y	Y	—	—	—	—	Y
3B	6X40	0	2-4-2	Y	3	Y	Y	—	—	—	—	Y
3C	6X40	0	2-4-2	Y	3	Y	Y	—	—	10	—	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	—	—	—	—	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	—	—	10	—	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	—	—	15	—	Y
					2	Y	Y	—	—	—	—	Y
6A/SI8	6X6	70	4	Y	6	Y	Y	—	—	—	Y	Y
6B/SI9	6X6	70	4	Y	6	Y	Y	—	—	—	Y	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Relocate 900 Mhz Wireless Radio Signal System to metal strain pole.
10. Closed loop system data: Master Asset #11221, Controller Asset #1058.

SIGNAL FACE I.D.

ALL SIGNAL HEADS ARE LED



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Metal Strain Pole	⬢
⬡	Signal Pedestal	●
▭	Inductive Loop Detector	▭
M	Master Controller & Cabinet	M
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
→	Directional Arrow	→
→	Pavement Marking Arrow	→
N/A	Right of Way	—△—
N/A	Wheelchair Ramp	◢◣
▬	Stop Bar	▭

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0
Max Green 1 *	20	45	40	20	20	45
Yellow Clearance	3.0	4.1	3.8	3.7	3.0	4.1
Red Clearance	3.7	3.1	2.3	3.2	3.9	3.1
Walk 1 *	-	7	7	-	-	7
Don't Walk 1	-	15	18	-	-	18
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

Signal Revision - Final Signal - TCP Final Phase

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Signal Design Section
750 N. Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road)
at
SR 2187 (Glenway Drive)/
SR 1935 (Sunset Hill Road)

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. MA	MAB PROJ. NO.:	2008068.04

SCALE 0 40' 1"=40'

REVISIONS	INIT.	DATE

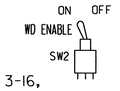
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

SIG. INVENTORY NO. 12-1058

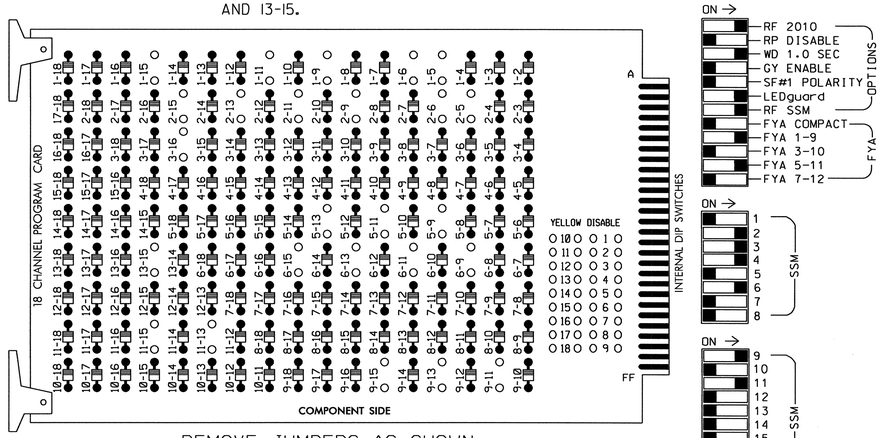
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-33

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 9-11, 9-13, 9-15, 11-13, 11-15 AND 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,5,7,8, 10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2, 3 and 6 for 'START UP PED CALL'.
6. Program phases 2 and 6 for Yellow Flash and overlap 1 as WAG Overlap.
7. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	3 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22	P21, P22	31,32	33,34	41	42	NU	51★	61,62	P61, P62	NU	NU	P31, P32	11★	NU	NU	51★	NU	NU
RED		128			116	101	101			134										
YELLOW	✳	129			117	102	102		✳	135										
GREEN		130			118	103	103			136										
RED ARROW				116											A121			A114		
YELLOW ARROW				117											A122			A115		
FLASHING YELLOW ARROW															A123			A116		
GREEN ARROW	127			118		103			133											
✋			113								119			110						
🚶			115								121			112						

NU = NOT USED

✳ Denotes install load resistor. See Load Resistor Installation Detail this page.

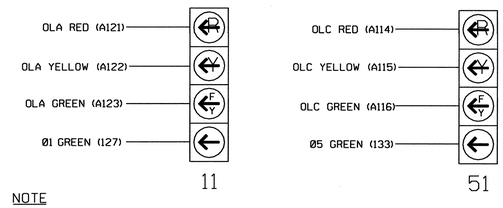
★ Denotes see pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S7,S8,S9,S12,AUXS1,AUXS4
PHASES USED.....1,2,2PED,3,3PED,4,5,6,6PED
OVERLAP "A".....1+2
OVERLAP "B".....NONE
OVERLAP "C".....5+6
OVERLAP "D".....NONE

4 SECTION PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1	Ø2/SYS	SLOT EMPTY	WIRED INPUT ⊗	Ø 3	Ø 3	Ø 4	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø2PED DC ISOLATOR	Ø6PED DC ISOLATOR	FS DC ISOLATOR
		1A	2A/S16			3A	3C	4A							
	L	NOT USED	Ø2/SYS			Ø 3	NOT USED	Ø 4					NOT USED	Ø 3PED DC ISOLATOR	ST DC ISOLATOR
			2B/S17			3B		4B							
FILE "J"	U	Ø 5	Ø6/SYS	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
		5A	6A/S18												
	L	NOT USED	Ø6/SYS												
			6B/S19												

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A/S16	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S17	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-7,8	I5L	58	20	3	3	Y	Y			
3C	TB4-9,10	I6U	41	3	4	3	Y	Y			10
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
4B	TB6-3,4	I7L	78	40	44	4	Y	Y			10
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A/S18	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S19	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
PED PUSH BUTTON											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P31,P32	TB8-8,9	I13L	70	32	PED 8	3 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

Note: Install DC Isolators in input file slots I12 and I13.

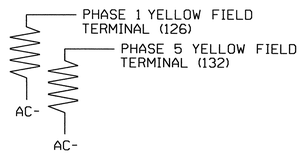
[1] Add jumper from I1W to J4W, on rear of input file.

[2] Add jumper from J1W to I4W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

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



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: 12-1058
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Electrical Detail Sheet 1 of 2

Signal Revision - Final Signal - TCP Final Phase

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 21 (Turnersburg Road)
at
SR 2187 (Glenway Drive)/
SR 1935 (Sunset Hill Road)

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11

SIGNATURE	DATE
SIG. INVENTORY NO.	12-1058

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-34

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL

TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

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

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

SCROLL DOWN

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

PRESS '+'

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

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

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

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

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

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

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

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

SCROLL DOWN

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

PRESS '+'

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

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

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

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

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

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1058
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

PRESS '+' TWICE

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

OVERLAP PROGRAMMING COMPLETE

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 #.
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 #.
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

Electrical Detail Sheet 2 of 2

Signal Revision - Final Signal - TCP Final Phase

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 21 (Turnersburg Road)
at
SR 2187 (Glenway Drive)/
SR 1935 (Sunset Hill Road)

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

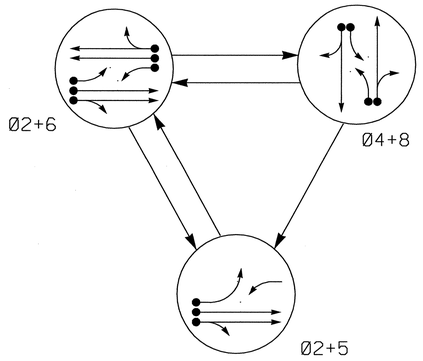
REVISIONS	INIT.	DATE

Prepared for the Offices of:
North Carolina Department of Transportation — Traffic Engineering Branch — Mobility and Safety Division — Signals Management Section
750 N.Greenfield Pkwy.Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-1058

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-35

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4+8	PHASE FLASH
21, 22	G	G	R	Y
41, 42	R	R	G	R
51	←	~~FY~~	~~R~~	~~←~~
61	~~FY~~	~~FY~~	~~R~~	~~←~~
62, 63	R	G	R	Y
81, 82	R	R	G	R

~~FY~~ - FLASHING YELLOW ARROW

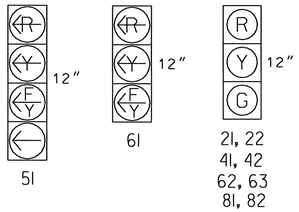
STANDARD SIGNAL FACE CLEARANCES FOR 4 SECTION LEFT TURN SIGNAL

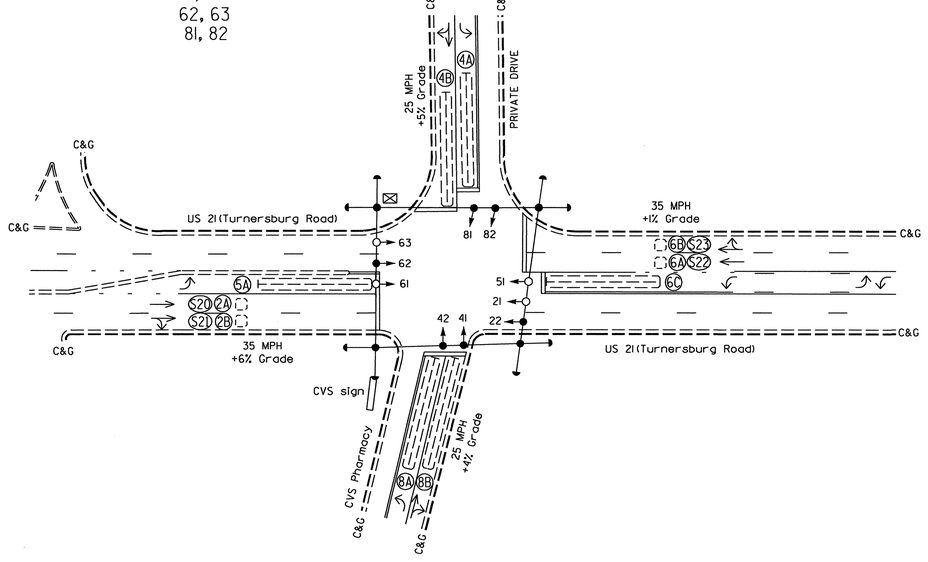
FROM \ TO	← 1	← 2	~~FY~~ 1	~~FY~~ 2	~~R~~ 1	~~R~~ 2
←	←	←	~~←~~	~~R~~	~~←~~	~~R~~
~~FY~~	~~FY~~	~~FY~~	~~FY~~	~~FY~~	~~←~~	~~R~~
~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~

~~FY~~ - FLASHING YELLOW ARROW

SIGNAL FACE I.D.

All Heads L.E.D.





OASIS 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/S20	6X6	70	4	–	2	Y	Y	–	—	—	Y	Y
2B/S21	6X6	70	4	–	2	Y	Y	–	—	—	Y	Y
4A	6X60	0	2-4-2	–	4	Y	Y	–	—	3	–	Y
4B	6X60	0	2-4-2	–	4	Y	Y	–	—	10	–	Y
5A	6X60	0	2-4-2	–	5	Y	Y	–	—	15	–	Y
					2	Y	Y	–	—	—	–	Y
6A/S22	6X6	70	4	–	6	Y	Y	–	—	—	Y	Y
6B/S23	6X6	70	4	–	6	Y	Y	–	—	—	Y	Y
6C	6X60	0	2-4-2	–	6	Y	Y	–	—	—	–	Y
8A	6X60	0	2-4-2	–	8	Y	Y	–	—	3	–	Y
8B	6X60	0	2-4-2	–	8	Y	Y	–	—	10	–	Y

3 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Road and Structures" dated January 2012.
2. Do not program signal for late night flash unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads numbered 22 and 62.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current Signals Design Section Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Closed loop system data: Controller Asset #1643.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○ ○↓	Signal Pole with Guy	●●↓
○ ○↓	Signal Pole with Sidewalk Guy	●●↓
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Pull Box	■
·-·-·	2-in Underground Conduit	·-·-·
—▲—	Right of Way with Marker	—△—
→	Directional Arrow	→
→	Pavement Marking Arrow	→

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	4	5	6	8
Min Green 1 *	10	7	7	10	7
Extension 1 *	3.0	1.0	1.0	3.0	1.0
Max Green 1 *	45	15	15	45	15
Yellow Clearance	3.8	3.0	3.0	3.8	3.0
Red Clearance	1.9	2.3	2.4	1.9	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

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

Signal Upgrade

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US 21 (Turnersburg Road) at CVS Pharmacy

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D J Darity
PREPARED BY:	J Ma	MAB PROJECT NO.	2008068.04

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

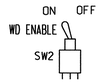
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J DARITY
11-02-11

SIGNATURE DATE
SIG. INVENTORY NO. 12-1643

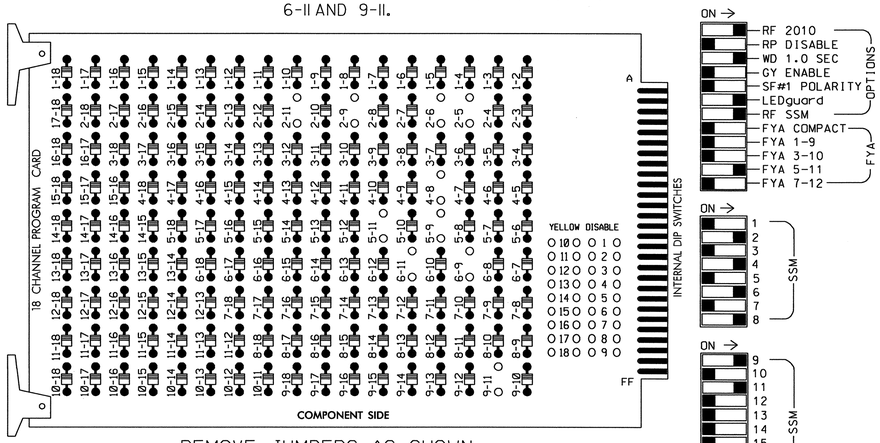
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-36

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11 AND 9-11.



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	Ø2/SYS 2A/S20	SLOT EMPTY	WIRED ⊗ INPUT	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		Ø2/SYS 2B/S21				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6/SYS 6A/S22	Ø6 6C	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6/SYS 6B/S23	NOT USED			Ø8 8B								

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

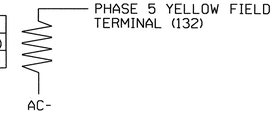
FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



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, 10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8 for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 for WAG Overlap.
7. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S7,S8,S11,AUXS1,AUXS4
PHASES USED.....2,4,5,6,8
OVERLAP "A".....2
OVERLAP "B".....NONE
OVERLAP "C".....5+6
OVERLAP "D".....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
2A/S20	TB2-5,6	I2U	39	1	2	2/SYS	Y	Y			
2B/S21	TB2-7,8	I2L	43	5	12	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			10
5A [1]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A/S22	TB3-5,6	J2U	40	2	6	6/SYS	Y	Y			
6B/S23	TB3-7,8	J2L	44	6	16	6/SYS	Y	Y			
6C	TB3-9,10	J3U	64	26	36	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10

[1] Add jumper from J1W to I4W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

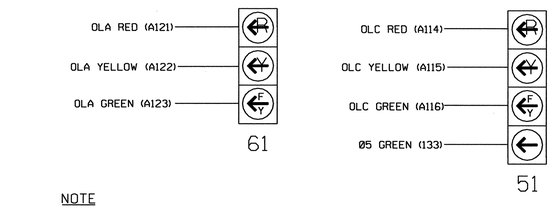
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51 ★	62,63	NU	NU	81,82	NU	61 ★	NU	NU	51 ★	NU	NU
RED		128			101			134			107							
YELLOW		129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW							133											
✋																		
🚶																		

NU = NOT USED
* Denotes install load resistor. See Load Resistor Installation Detail this page.
★ Denotes see pictorial of head wiring in detail below.

3 AND 4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The display sequence for signal head 51 requires special logic programming. See sheet 2 of 2 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1643
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Electrical Detail Sheet 1 of 2

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Signal Upgrade

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Prepared for the Offices of:
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11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-1643

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-37

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

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
  LOGICAL I/O COMMAND #1   (+/-COMMAND#)
IF   ACTIVE PHASE        #5   IS ON
AND RED CLEAR ON PHASE #5   IS ON

                SCROLL DOWN

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

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

PRESS '+'

```
  LOGICAL I/O COMMAND #2   (+/-COMMAND#)
IF   ACTIVE PHASE        #5   IS ON

                SCROLL DOWN

THEN:
SET OUTPUT   ASSIGNMENT #44 OFF
```

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

PRESS '+'

```
  LOGICAL I/O COMMAND #3   (+/-COMMAND#)
IF   YELLOW ON PHASE     #5   IS ON

                SCROLL DOWN

THEN:
SET OUTPUT   ASSIGNMENT #43 ON
```

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1643
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Electrical Detail Sheet 2 of 2

Signal Upgrade

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NC License No: C-3496

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 21 (Turnersburg Road)
at
CVS Pharmacy

Division 12 | Iredell County | Statesville

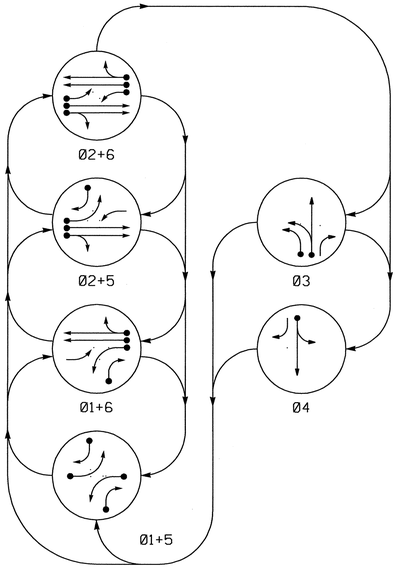
PLAN DATE:	Sept 2011	REVIEWED BY:	D J Darity
PREPARED BY:	J Ma	RKA PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J DARITY
11-02-11
SIGNATURE | DATE
SIG. INVENTORY NO. 12-1643

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-38

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	←Y	←Y	←R	←R	←Y
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	G ←	R	R
32	R/←	R/←	R	R	G	R	R
41	R	R	R	R	G ←	R	R
42	R/←	R	R/←	R	R	G	R
51	←	←Y	←	←Y	←R	←R	←Y
61, 62	R	G	R	G	R	R	Y

←Y - FLASHING YELLOW ARROW

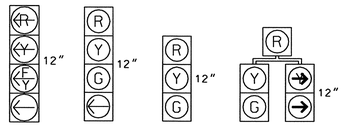
STANDARD SIGNAL FACE CLEARANCES FOR 4 SECTION LEFT TURN SIGNAL

FROM \ TO	← 1	← 2	←Y 1	←Y 2	←R 1	←R 2
←			←Y	←Y	←R	←R
←Y	←Y	←Y	←Y	←Y	←R	←R
←R	←R	←R	←R	←R	←R	←R

←Y - FLASHING YELLOW ARROW

SIGNAL FACE I.D.

ALL SIGNAL HEADS ARE LED



11 51 | 31 41 | 21, 22 61, 62 | 32 42

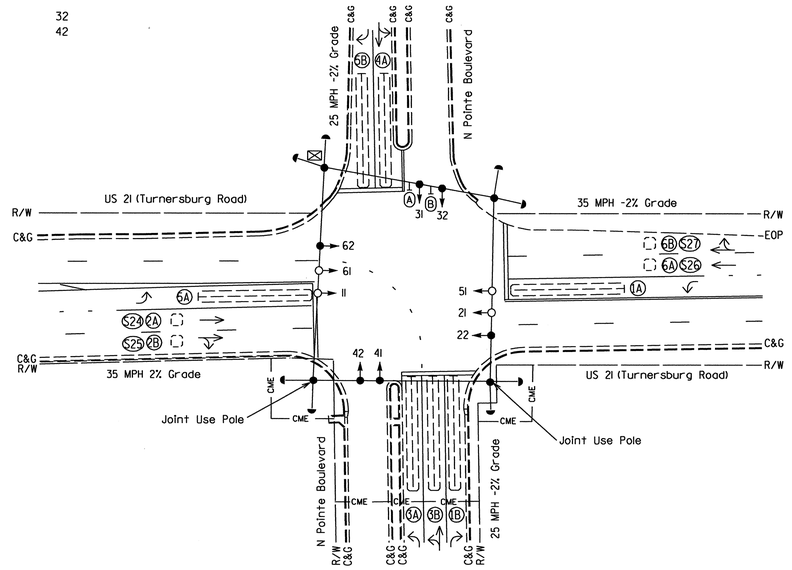
OASIS 2070L LOOP & DETECTOR INSTALLATION

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	CARD NEW
1A	6X60	0	2-4-2	—	1	Y	Y	—	—	15	—	Y
					6	Y	Y	—	—	—	—	Y
1B	6X60	0	2-4-2	—	1	Y	Y	—	—	15	—	Y
2A/S24	6X6	70	4	—	2	Y	Y	—	—	—	Y	Y
2B/S25	6X6	70	4	—	2	Y	Y	—	—	—	Y	Y
3A	6X60	0	2-4-2	—	3	Y	Y	—	—	—	—	Y
3B	6X60	0	2-4-2	—	3	Y	Y	—	—	—	—	Y
4A	6X60	0	2-4-2	—	4	Y	Y	—	—	3	—	Y
5A	6X60	0	2-4-2	—	5	Y	Y	—	—	15	—	Y
					2	Y	Y	—	—	—	—	Y
5B	6X60	0	2-4-2	—	5	Y	Y	—	—	15	—	Y
6A/S26	6X6	70	4	—	6	Y	Y	—	—	—	Y	Y
6B/S27	6X6	70	4	—	6	Y	Y	—	—	—	Y	Y

6 Phase
Fully Actuated
(US 21 Statesville Closed Loop System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal heads numbered 22 and 62.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
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. Closed loop system data: Controller Asset #1507.



OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green 1 *	7	10	7	7	7	10
Extension 1 *	1.0	3.0	1.0	1.0	1.0	3.0
Max Green 1 *	15	45	20	20	20	45
Yellow Clearance	3.0	4.0	3.3	3.3	3.0	4.0
Red Clearance	2.6	2.0	2.3	2.4	2.3	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○↓	Signal Pole with Sidewalk Guy	●↓
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Pull Box	■
----	2-in Underground Conduit	----
—▲—	Right of Way with Marker	—△—
→	Directional Arrow	→
→	Pavement Marking Arrow	→
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)	Ⓑ

Signal Upgrade

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Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N. Greenfield Parkway, Garner, NC 27529

US 21 (Turnersburg Road) at N Pointe Boulevard

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. MA	MAB PROJ. NO.:	2008068.04

SCALE 0 40' 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

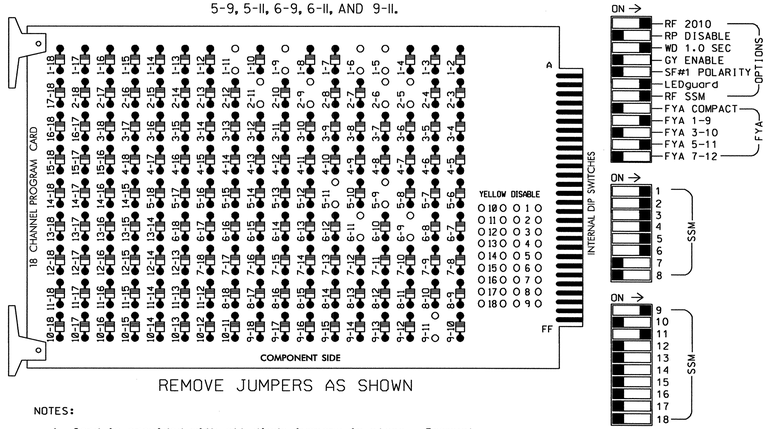
SIG. INVENTORY NO. 12-1507

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-39

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS I-5, I-6, I-9, I-11, 2-5, 2-6, 2-9, 2-11, 5-9, 5-11, 6-9, 6-11, AND 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. 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, 10,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash, and overlap 1 for WAG Overlap.
6. The cabinet and controller are part of the US 21 Statesville Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S4,S5,S7,S8,AUXS1,AUXS4
PHASES USED.....1,2,3,4,5,6.
OVERLAP "A".....1+2
OVERLAP "B".....NONE
OVERLAP "C".....5+6
OVERLAP "D".....NONE

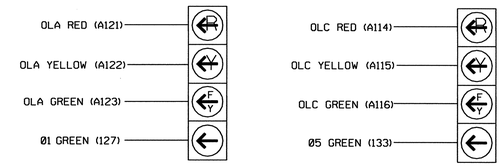
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5		S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4		14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4		4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	32	21,22	NU	31	32	41	42	NU	51★	42	61,62	NU	NU	NU	NU	11★	NU	NU	51★	NU	NU
RED	✱		128		116	116	101	101		✱		134										
YELLOW			129		117	117	102	102				135										
GREEN			130		118	118	103	103				136										
RED ARROW																	A121			A114		
YELLOW ARROW		126									132						A122			A115		
FLASHING YELLOW ARROW																	A123			A116		
GREEN ARROW	127	127			118		103			133	133											

NU = NOT USED
✱ Denotes install load resistor. See Load Resistor Installation Detail this page.
★ Denotes see pictorial of head wiring in detail below.

4 SECTION PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

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

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø1 1B	Ø2/SYS 2A/S24	WIRED INPUT ⊗	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED	Ø2/SYS 2B/S25		Ø3 3B	NOT USED								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6/SYS 6A/S26	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED	Ø6/SYS 6B/S27											

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

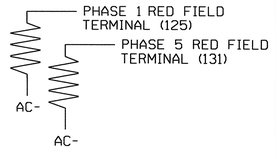
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A/S24	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y			
2B/S25	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-7,8	I5L	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A/S26	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y			
6B/S27	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y			

[1] Add jumper from I1W to J4W, on rear of input file.
[2] Add jumper from J1W to I4W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1507
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Electrical Detail Sheet 1 of 2

Signal Upgrade

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11-02-11
SIGNATURE DATE
SIG. INVENTORY NO. 12-1507

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-40

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

(program controller as shown below)

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

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

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

            SCROLL DOWN

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

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

PRESS '+'

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

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

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

PRESS '+'

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

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

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

PRESS '+'

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

            SCROLL DOWN

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

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

PRESS '+'

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

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

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

PRESS '+'

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

            SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

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

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

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

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

← NOTICE GREEN FLASH

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1507
DESIGNED: Sept 2011
SEALED: 11-02-2011
REVISED:

Electrical Detail Sheet 2 of 2

Signal Upgrade

MARTIN ALEXIOU BRYSON
4000 Westchase Blvd.
Suite 530
Raleigh, NC 27607
Tel. 919.829.0328
Fax. 919.829.0329
NC License No: C-3496

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
750 N.Greenfield Pkwy.Garner, NC 27529

US 21 (Turnersburg Road)
at
N Point Boulevard

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11

SIGNATURE | DATE

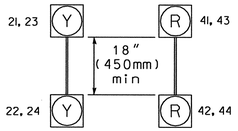
SIG. INVENTORY NO. 12-1507

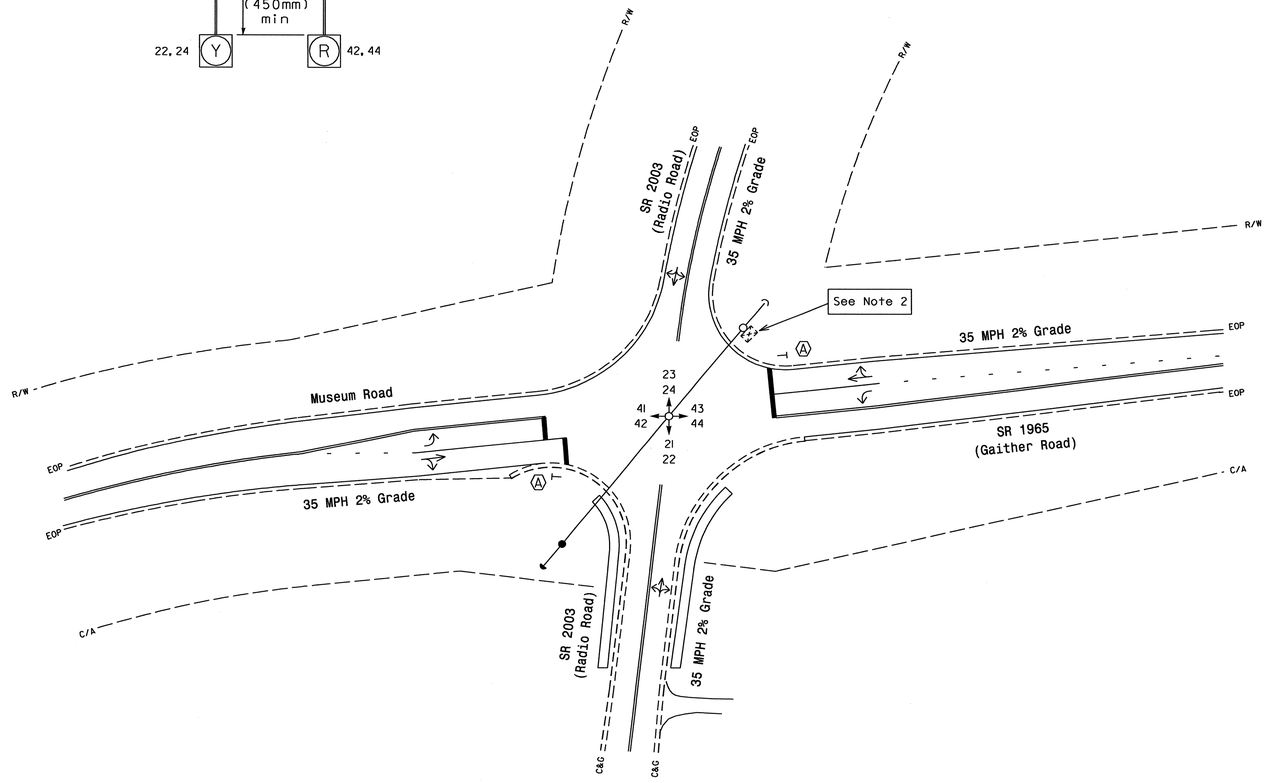
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-41

TABLE OF OPERATION		
SIGNAL FACE	INTERVAL 1	INTERVAL 2
21, 23	ON	OFF
22, 24	OFF	ON
41, 43	ON	OFF
42, 44	OFF	ON

SIGNAL FACE I.D.

All Heads L.E.D.





2-Circuit
Flashing Beacon
(Non-Actuated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
2. Contractor to relocate existing pole mounted controller and cabinet to new pole location as shown.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Stop Sign (R1-1)	A

Signal Upgrade

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Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 2003 (Radio Road)
at
SR 1965 (Gaither Road)/
Museum Road

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.02

REVISIONS	INIT.	DATE

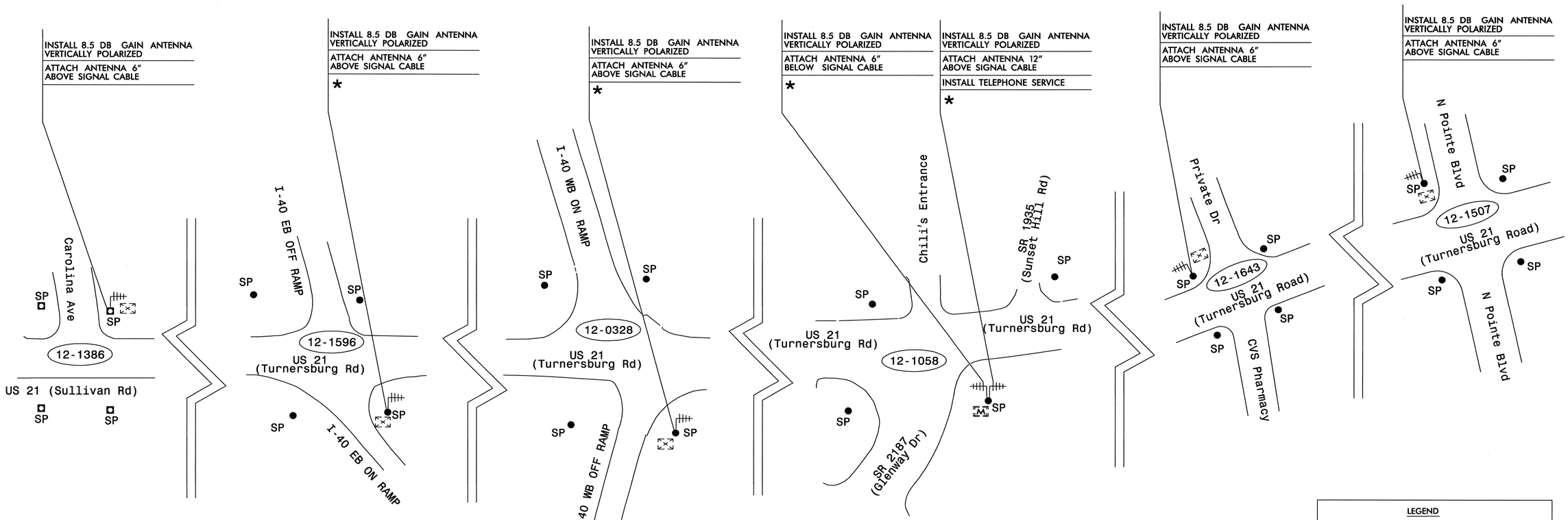
SCALE: 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE | DATE

SIG. INVENTORY NO. City Owned

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-42

★ Coil extra Coaxial Cable for future relocation/transfer of Antenna and Antenna pole mounting hardware to a new pole.



LEGEND

- YAGI ANTENNA (DOUBLE) FOR REPEATOR OPERATION
- YAGI ANTENNA (SINGLE)
- OMNI ANTENNA
- EXISTING CONTROLLER AND CABINET
- EXISTING MASTER CONTROLLER AND CABINET
- XX-XXXX SIGNAL INVENTORY NUMBER
- EXISTING METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- EXISTING METAL POLE
- SP SIGNAL POLE
- EXISTING OVERSIZED JUNCTION BOX
- NEW OVERSIZED JUNCTION BOX
- EXISTING CONDUIT
- EXI EXISTING COMMUNICATIONS CABLE

NOTES:

1. INSTALL COAXIAL CABLE
   - A. ON WOOD POLES REQUIRING A NEW RISER, INSTALL A 2" RISER WITH WEATHERHEAD TO ROUTE THE COAXIAL CABLE TO THE ANTENNA. ON POLES WITH EXISTING RISERS WITH WEATHERHEADS, REUSE THE RISER ASSEMBLY.
   - B. ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL 1/2" HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
   - C. ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND REPLACE THE WEATHERHEAD WITH HEAT SHRINK TUBING AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
   - D. BETWEEN THE POINT OF EXITING THE METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
2. IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
3. INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER. (NOTE: RF WARNING SIGN NOT REQUIRED ON NCDOT-OWNED POLE.)
4. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
5. INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET. (NOTE: RF ANTENNA DISCONNECT SWITCH NOT REQUIRED ON NCDOT-OWNED POLE.)
6. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."
7. CONDUITS AND RISERS FOR COAXIAL CABLE ARE NOT TO BE SHARED WITH ANY OTHER CABLES.

TEMPORARY

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Prepared for the Offices of: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION — Transportation Mobility and Safety Division, Integrated Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

US 21 (Turnersburg Road)
TEMPORARY
WIRELESS COMMUNICATION PLANS

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

SCALE: 0 60, 1"=60'

REVISIONS	INIT.	DATE

SEAL — NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-43

(9) INSTALL POLYETHYLENE CONDUIT

(15) DIRECTIONAL DRILL CONDUIT

(18) INSTALL CABLE(S) IN NEW CONDUIT

[39] INSTALL JUNCTION BOX (STD SIZE)

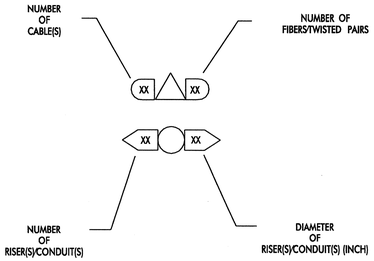
CONSTRUCTION NOTE SYMBOLOGY KEY

(XX) INDICATES NUMBER OF CABLES, LOOPS, ETC.

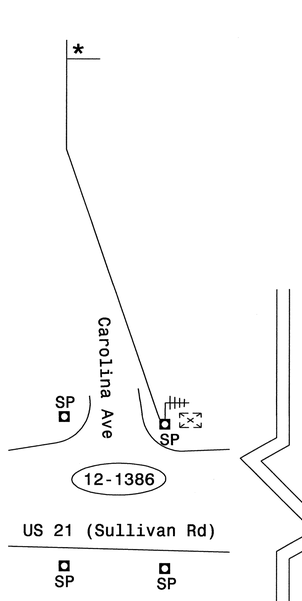
[XX] INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.

<XX INDICATES NUMBER OF RISER(S)/CONDUIT(S)

XX> INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)

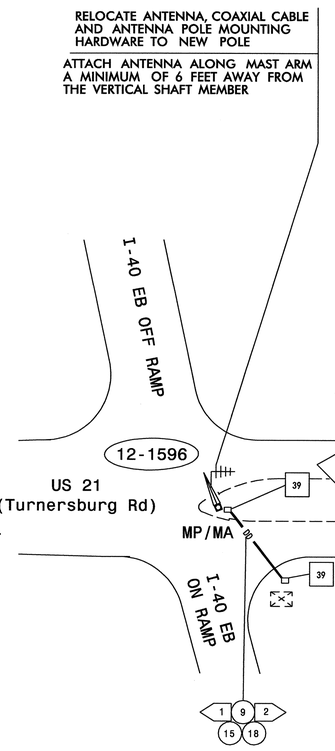


* No work required.
Shown for informational purposes only.



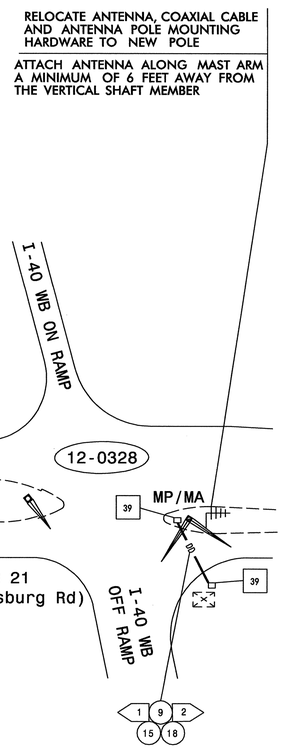
RELOCATE ANTENNA, COAXIAL CABLE AND ANTENNA POLE MOUNTING HARDWARE TO NEW POLE

ATTACH ANTENNA ALONG MAST ARM A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL SHAFT MEMBER



RELOCATE ANTENNA, COAXIAL CABLE AND ANTENNA POLE MOUNTING HARDWARE TO NEW POLE

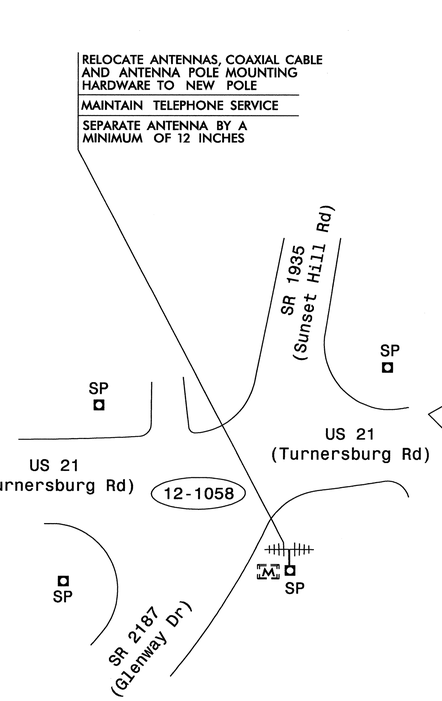
ATTACH ANTENNA ALONG MAST ARM A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL SHAFT MEMBER

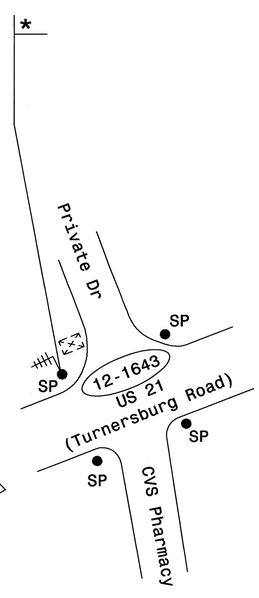


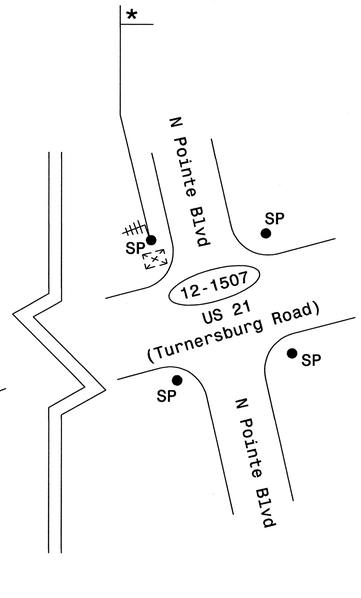
RELOCATE ANTENNAS, COAXIAL CABLE AND ANTENNA POLE MOUNTING HARDWARE TO NEW POLE

MAINTAIN TELEPHONE SERVICE

SEPARATE ANTENNA BY A MINIMUM OF 12 INCHES







LEGEND

- YAGI ANTENNA (DOUBLE) FOR REPEATOR OPERATION
- YAGI ANTENNA (SINGLE)
- OMNI ANTENNA
- EXISTING CONTROLLER AND CABINET
- EXISTING MASTER CONTROLLER AND CABINET
- (XX-XXXX) SIGNAL INVENTORY NUMBER
- EXISTING METAL POLE W/MAST ARM
- EXISTING WOOD POLE
- EXISTING METAL POLE
- SP SIGNAL POLE
- EXISTING OVERSIZED JUNCTION BOX
- NEW OVERSIZED JUNCTION BOX
- NEW CONDUIT
- FO NEW FIBER OPTIC COMMUNICATIONS CABLE
- DD NEW DIRECTIONAL DRILL CONDUIT
- REM REMOVE EXISTING COMMUNICATIONS CABLE
- EXISTING CONDUIT
- EXI EXISTING COMMUNICATIONS CABLE

NOTES:

1. INSTALL COAXIAL CABLE
   A. ON WOOD POLES REQUIRING A NEW RISER, INSTALL A 2" RISER WITH WEATHERHEAD TO ROUTE THE COAXIAL CABLE TO THE ANTENNA. ON POLES WITH EXISTING RISERS WITH WEATHERHEADS, REUSE THE RISER ASSEMBLY.
   B. ON METAL POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND OUT THE MAST ARM; FIELD DRILL 1/2" HOLE WITH GROMMET THROUGH BOTTOM OF MAST ARM FOR INSTALLATION OF THE COAXIAL CABLE TO THE ANTENNA.
   C. ON METAL STRAIN POLES, RUN COAXIAL CABLE UP THROUGH THE POLE AND REPLACE THE WEATHERHEAD WITH HEAT SHRINK TUBING AND ROUTE THE COAXIAL CABLE TO THE ANTENNA.
   D. BETWEEN THE POINT OF EXITING THE METAL POLE OR MAST ARM AND THE ANTENNA, SECURE THE COAXIAL CABLE TO THE STRUCTURE USING 3/4" STAINLESS STEEL STRAPS EVERY 12".
2. IF EXISTING SPARE RISER IS AVAILABLE, REMOVE WEATHERHEAD AND INSTALL COAXIAL CABLES. RESEAL WITH HEAT SHRINK TUBING.
3. INSTALL WIRELESS ANTENNA ON POLE WITH RF WARNING SIGN AND AIM TOWARDS MASTER. (NOTE: RF WARNING SIGN NOT REQUIRED ON NCDOT-OWNED POLE.)
4. MAINTAIN PROPER CLEARANCE FROM ALL UTILITIES PER THE NATIONAL ELECTRICAL SAFETY CODE.
5. INSTALL WIRELESS SERIAL RADIO MODEM WITH EXTERIOR DISCONNECT SWITCH LOCATED ON CABINET. (NOTE: RF ANTENNA DISCONNECT SWITCH NOT REQUIRED ON NCDOT-OWNED POLE.)
6. REFERENCE "WIRELESS RADIO ANTENNA TYPICAL DETAILS."
7. CONDUITS AND RISERS FOR COAXIAL CABLE ARE NOT TO BE SHARED WITH ANY OTHER CABLES.

FINAL

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intelligent Transportation Systems
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 60 1"=60'

FINAL
WIRELESS COMMUNICATION PLANS
US 21 (Turnersburg Road)

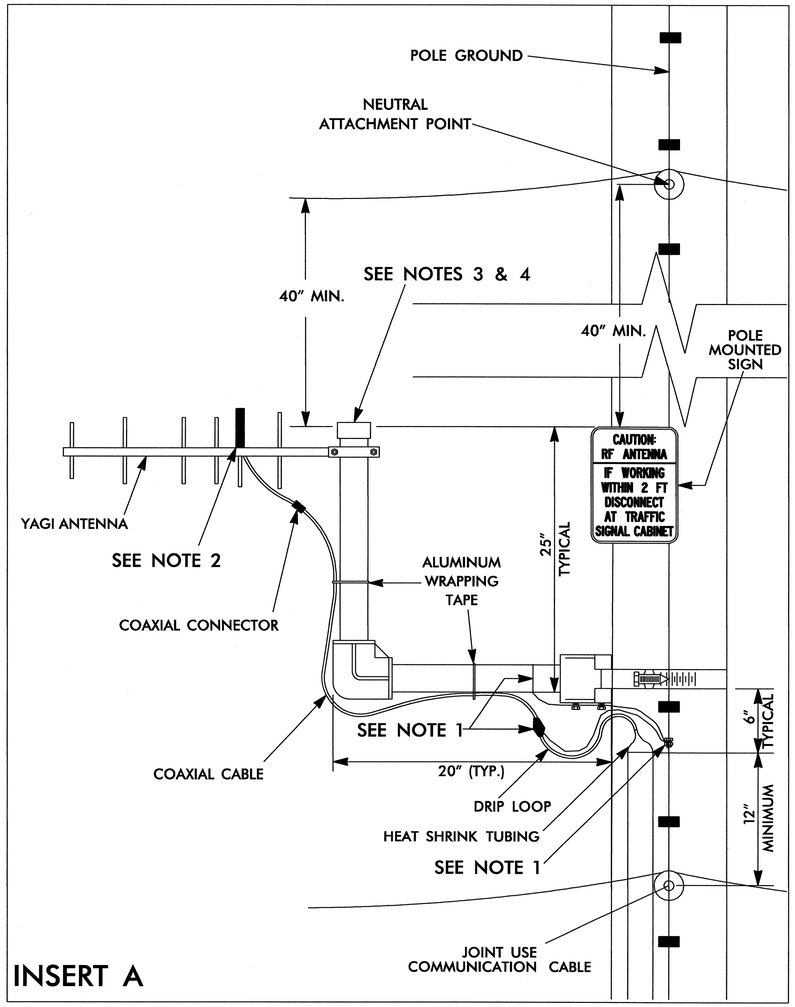
Division 12 Iredell County Statesville

PLAN DATE:	Sept 2011	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJ. NO.:	2008068.04

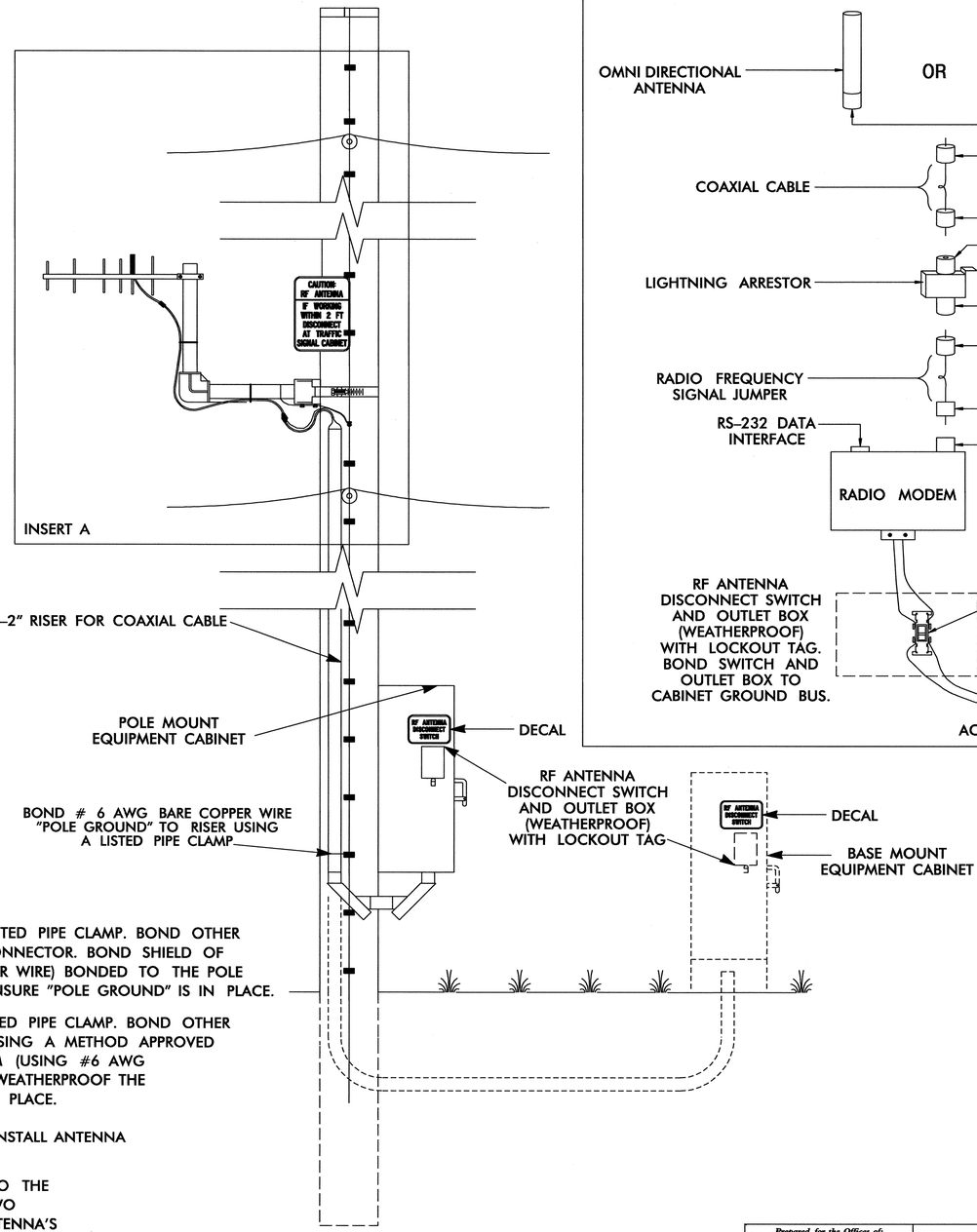
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE
CADD Filename:

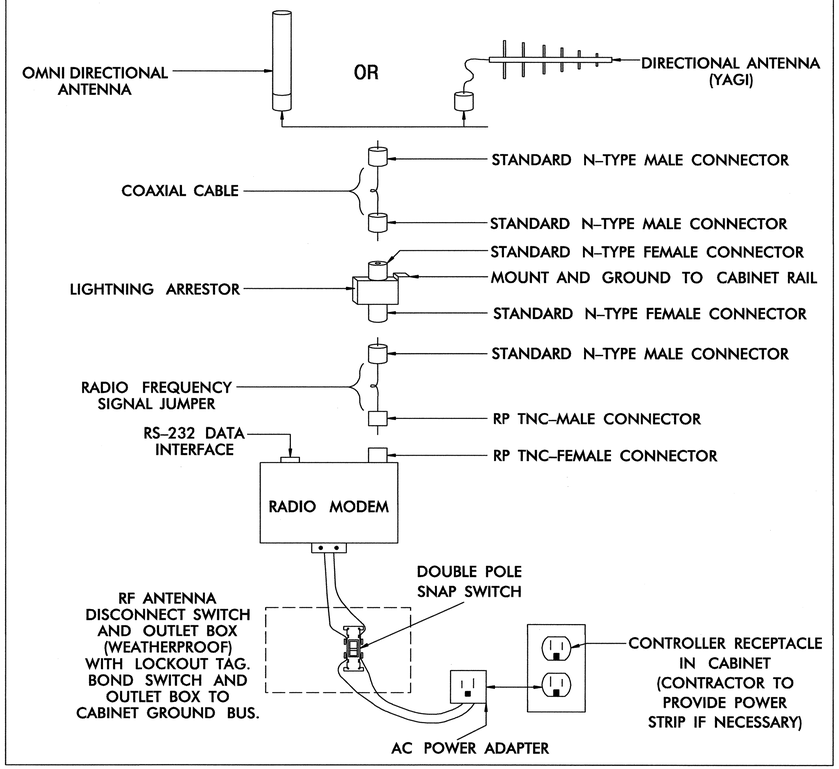
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-44



INSERT A



ANTENNA AND COAXIAL CABLE CONNECTION SCHEMATIC



NOTES

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

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

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

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

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

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Prepared for the Offices of:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intelligent Transportation Systems
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 N/A N/A

Wireless Radio Antenna Typical Details

Division 12 | Iredell County | Statesville

PLAN DATE:	Sept 2010	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJECT NO.:	2008068.02

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig-45

DECAL

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

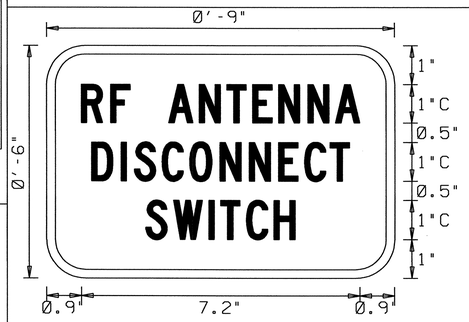
BACKG COLOR: Yellow
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.063" (1.6 mm) ALUMINUM

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

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



BORDER
R=1"
TH=0.25"

NOTE: THIS SIGN SHALL BE PRODUCED AS A DECAL

LETTER POSITIONS

Letter spacings are to start of next letter

																														Series/Size Text Length
		R	F		A	N	T	E	N	N	A																			C1
	0.9	0.8	0.5	1	0.8	0.7	0.7	0.7	0.8	0.7	0.6	0.9																		7.2
		D	I	S	C	O	N	N	E	C	T																			C1
	1.2	0.8	0.3	0.7	0.7	0.8	0.8	0.8	0.7	0.7	0.5	1.2																		6.7
		S	W	I	T	C	H																							C1
	2.6	0.7	0.9	0.3	0.7	0.7	0.5	2.6																						3.9

Spacing Factor is 1 unless specified otherwise

POLE MOUNTED SIGN

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

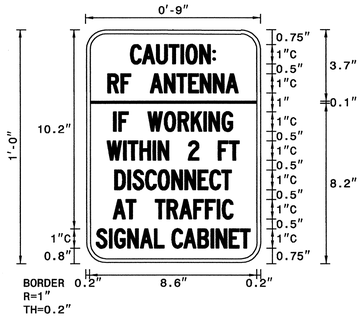
BACKG COLOR: Yellow
COPY COLOR: Black

SYMBOL	X	Y	WID	HT
BAR	0.2	8.2	8.6	1.0

MAT'L: 0.063" (1.6 mm) ALUMINUM

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

DESIGN BY: M. TRACEY DATE: Oct 25, 2007 CHECKED BY: SUSAN KUNZ
PROJECT ID: DIV: INTELLIGENT TRANSPORTATION SYSTEMS



0.60 SPACING FACTOR

LETTER POSITIONS

Letter spacings are to start of next letter

																														Series/Size Text Length
		C	A	U	T	I	O	N	:																					C
	2.3	0.6	0.7	0.6	0.6	0.3	0.7	0.7	0.1	2.3																				4.4
		R	F		A	N	T	E	N	N	A																				C
	1.2	0.7	0.5	1	0.7	0.6	0.6	0.6	0.7	0.6	0.6	1.2																		6.7
		I	F		W	O	R	K	I	N	G																			C
	1.4	0.3	0.5	1	0.8	0.7	0.7	0.6	0.3	0.7	0.5	1.4																		6.1
		W	I	T	H	I	N		2		F	T																		C
	1.1	0.8	0.2	0.6	0.7	0.3	0.5	1	0.5	1	0.6	0.5	1.1																	6.8
		D	I	S	C	O	N	N	E	C	T																			C
	1.5	0.7	0.3	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.5	1.5																		6
		A	T		T	R	A	F	F	I	C																			C
	1.4	0.7	0.5	1	0.6	0.6	0.7	0.6	0.6	0.3	0.5	1.4																		6.2
		S	I	G	N	A	L		C	A	B	I	N	E	T															C
	0.5	0.7	0.3	0.7	0.6	0.7	0.5	0.4	0.6	0.7	0.7	0.3	0.7	0.6	0.5	0.5														7.9

Spacing Factor is 1 unless specified otherwise

NORTH CAROLINA D.O.T. SIGN DETAIL

MARTIN ALEXIOU BRYSON
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Fax. 919.829.0329
NC License No: C-3496

Prepared for the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0 N/A
N/A

Wireless Radio Antenna Typical Details

Division 12 Iredell County Statesville

PLAN DATE:	Sept 2010	REVIEWED BY:	D.J. Darity
PREPARED BY:	J. Ma	MAB PROJECT NO.:	2008068.02

REVISIONS	INIT.	DATE

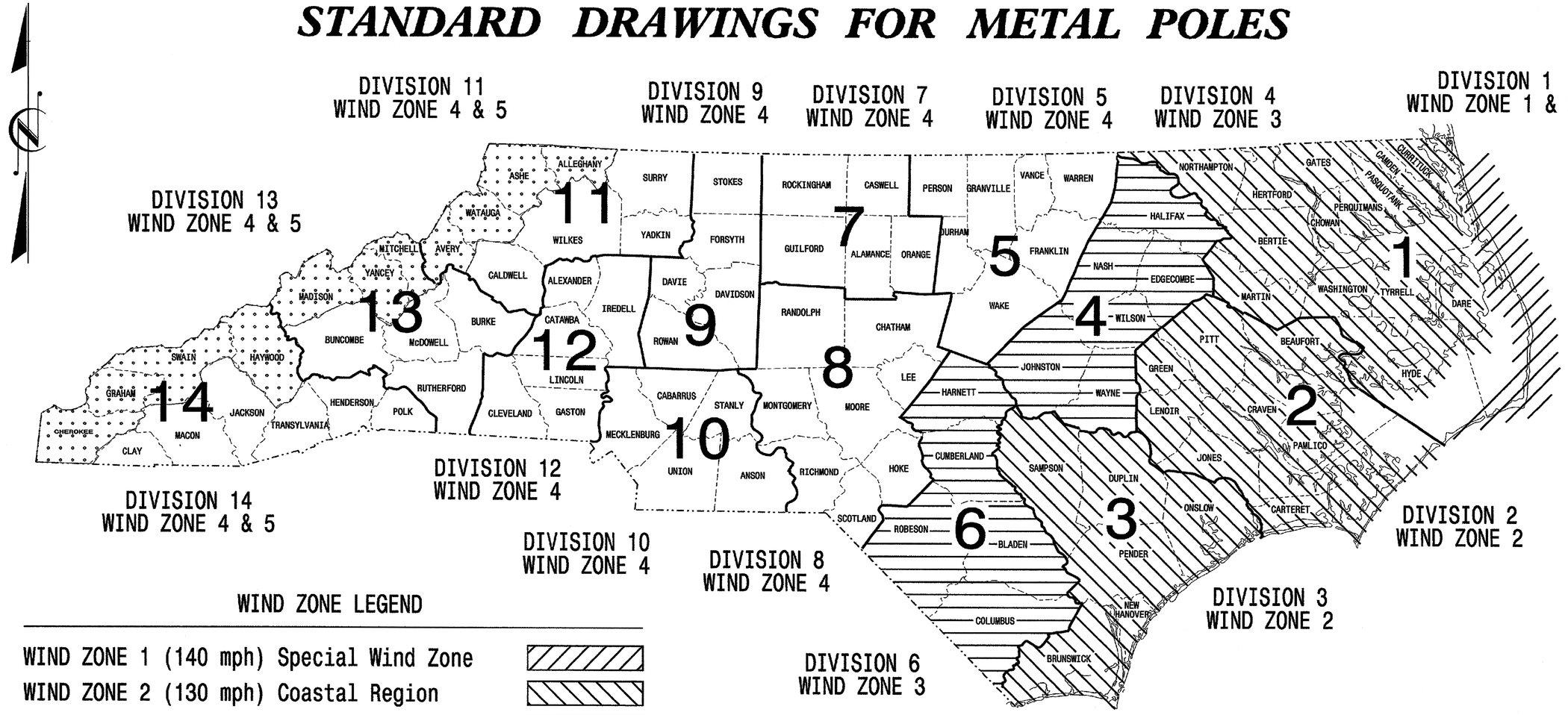
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 19713 ENGINEER DONALD J. DARITY
11-02-11
SIGNATURE DATE

NCDOT METAL POLE STANDARDS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	I-3819A	Sig. 46
F. A. PROJ. NO.		M 1
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES



WIND ZONE LEGEND

WIND ZONE 1 (140 mph) Special Wind Zone	
WIND ZONE 2 (130 mph) Coastal Region	
WIND ZONE 3 (110 mph) Eastern Region	
WIND ZONE 4 (90 mph) Central & Mtn. Region	
WIND ZONE 5 (120 mph) Special Wind Zone	

http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html

Prepared In the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section

750 N.Greenfield Pkwy.Garner,NC 27529

Designed in conformance with the 2002 Interim to the 4th Edition 2001

AASHTO

Standard Specifications for Structural Supports for Highway Signs, Luminares, and Traffic Signals

INDEX OF PLANS

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION – ITS and SIGNALS UNIT

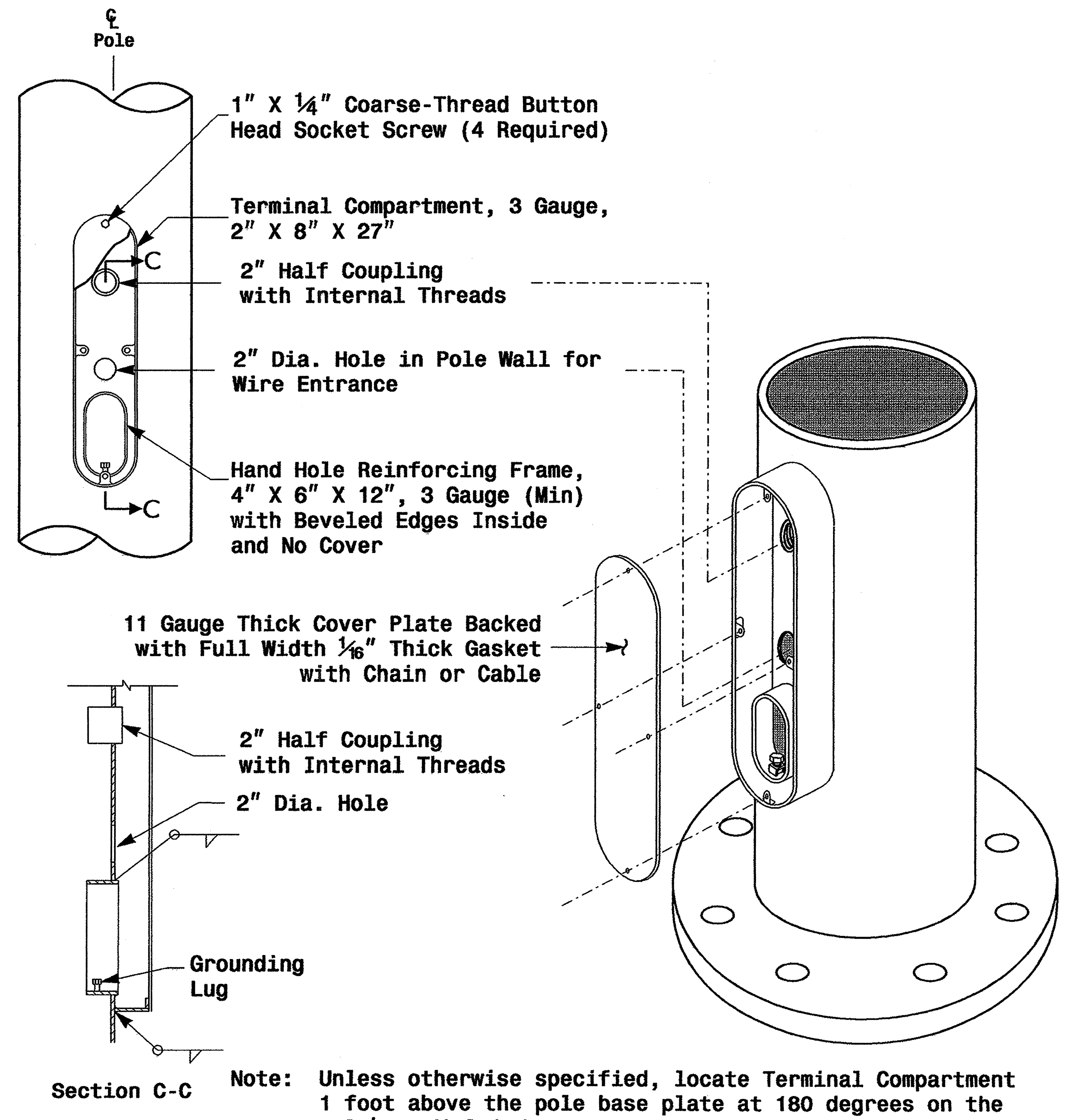
G. A. Fuller, P.E. – State ITS and Signals Engineer
G. G. Murr, Jr., P.E. – State Signals Engineer
D. C. Sarkar, P.E. – ITS and Signals Senior Structural Engineer
C. F. Andrews, Jr. – ITS and Signals Structural Project Engineer
M. Aslam – ITS and Signals Structural Project Engineer
N. Bitting, P.E. – ITS and Signals Structural Project Engineer

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

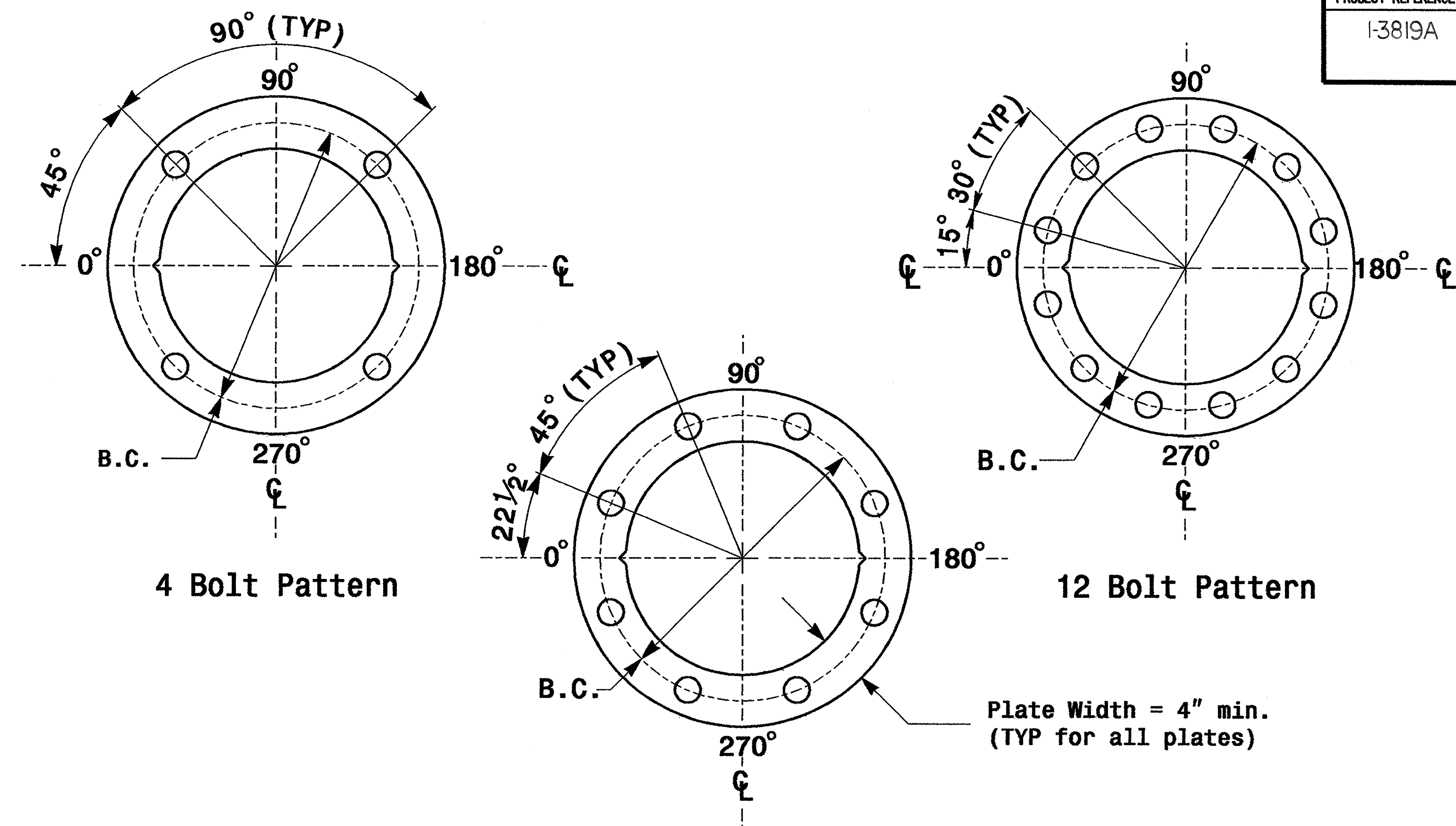
D. Sarkar 7.21.2009
SIGNATURE DATE

Fabrication Details – All Poles



Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail

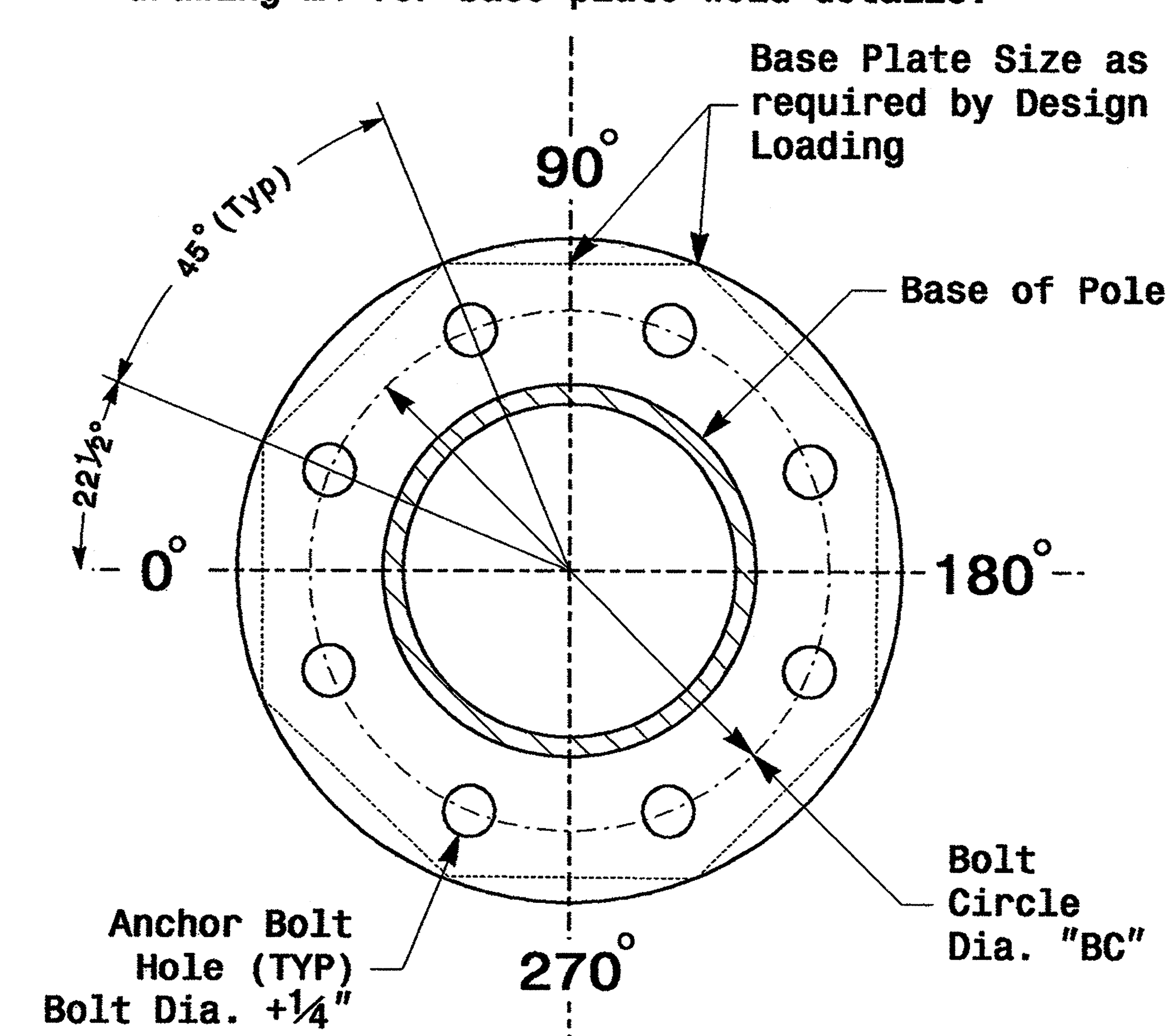


Construct Templates and Plates from 1/4" min. thick Steel. Galvanizing is not required.

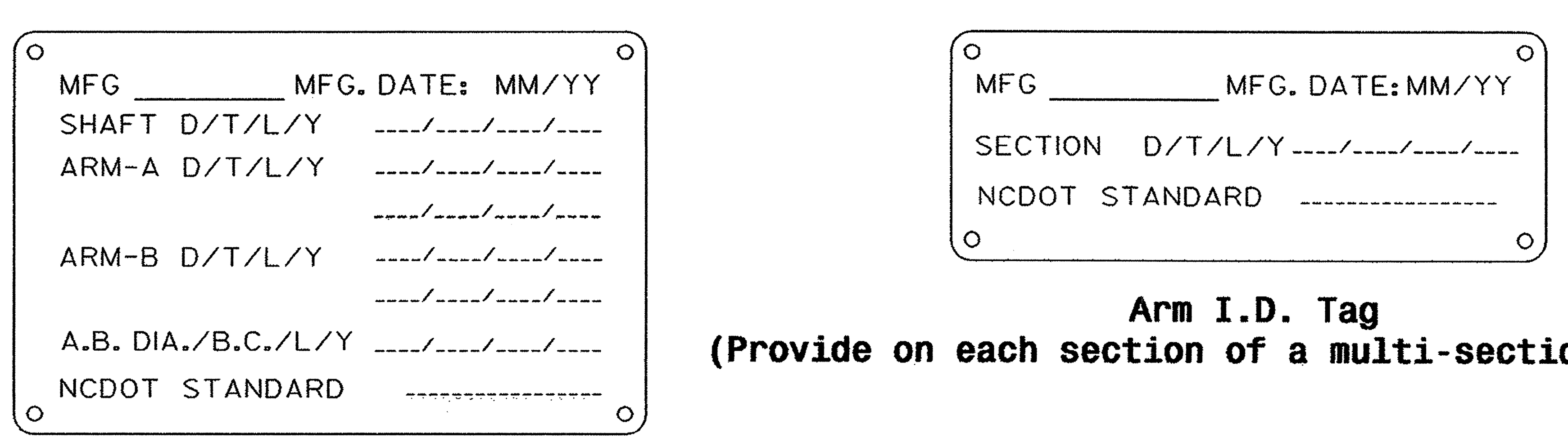
Base Plate Template and Anchor Bolt Lock Plate Details

Anchor Bolt Detail

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



8 Bolt Base Plate Detail



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

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

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

Identification Tag Details

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

Typical Fabrication Details Common To All Metal Poles

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

SCALE: 0 NA — NONE

REVISIONS | INIT. | DATE

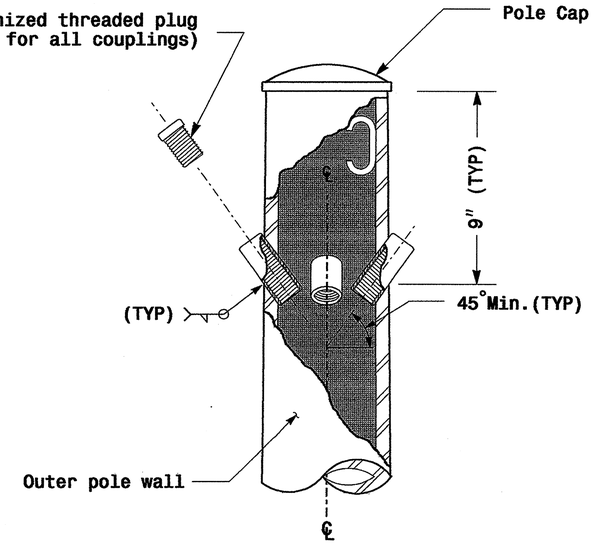
SEAL: North Carolina Professional Engineer Seal 028094 Debesh C. Sarkar

D. Sarkar 9.2.2005
SIGNATURE | DATE

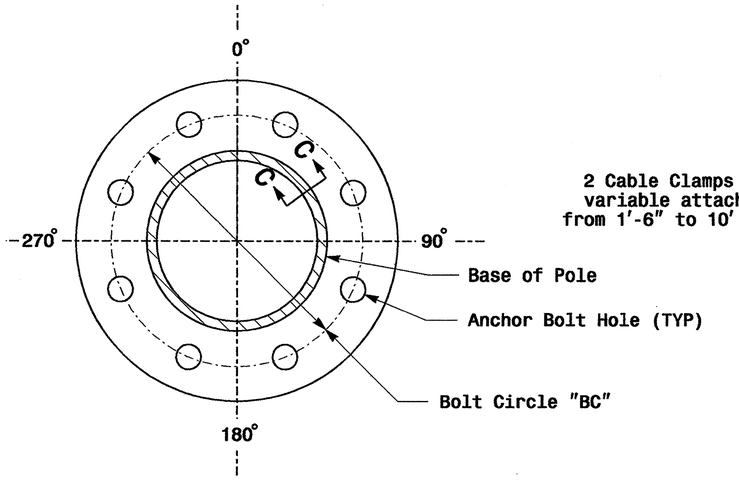
SIG. INVENTORY NO.

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig. 48 M 3

Fabrication Details – Strain Poles



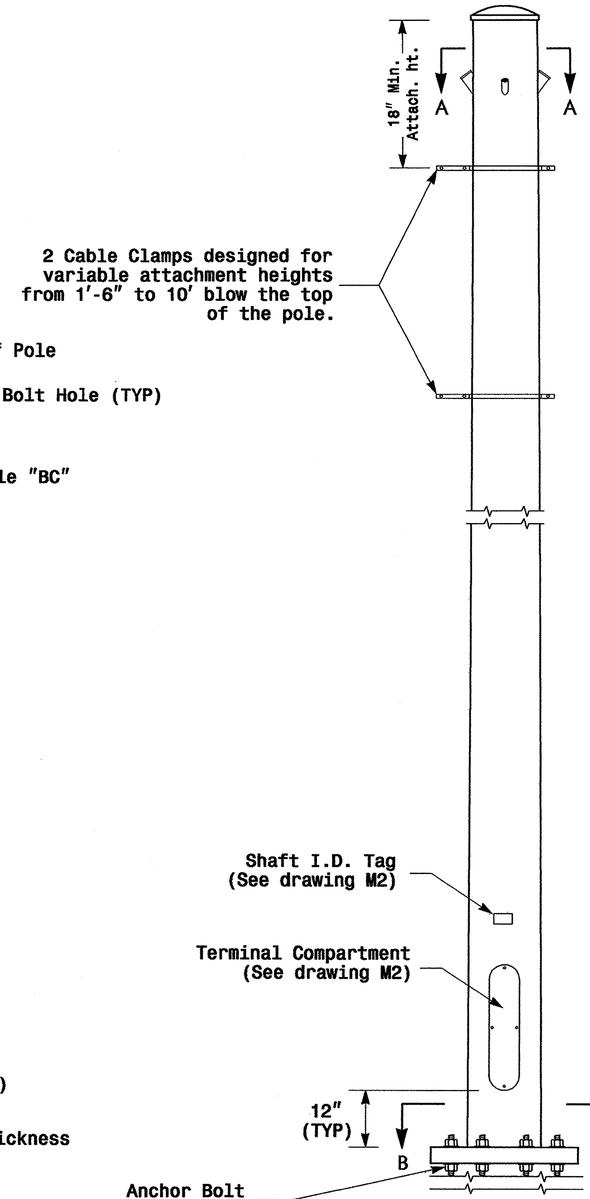
Cable Entrances at Top of Pole



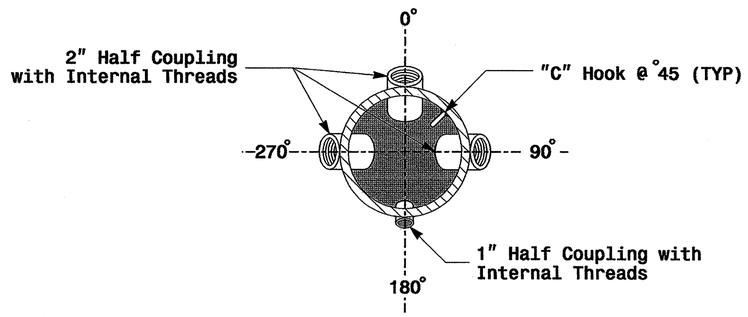
Section B-B

(See drawing M2)

Pole Base Plate

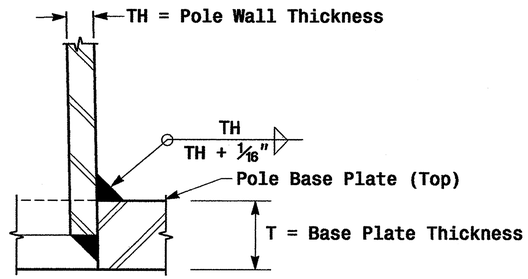


Monotube Strain Pole (.14"/Foot Taper)



Section A-A

Radial Orientation for Factory Installed Accessories at Top of Pole



Section C-C

Socket Connection Weld Detail

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation
Signals and Geometrics Section
322 N. McDowell St., Raleigh, NC 27603

Typical Fabrication Details For Strain Poles

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

REVISIONS	INIT.	DATE

SCALE: 0 NA — NONE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

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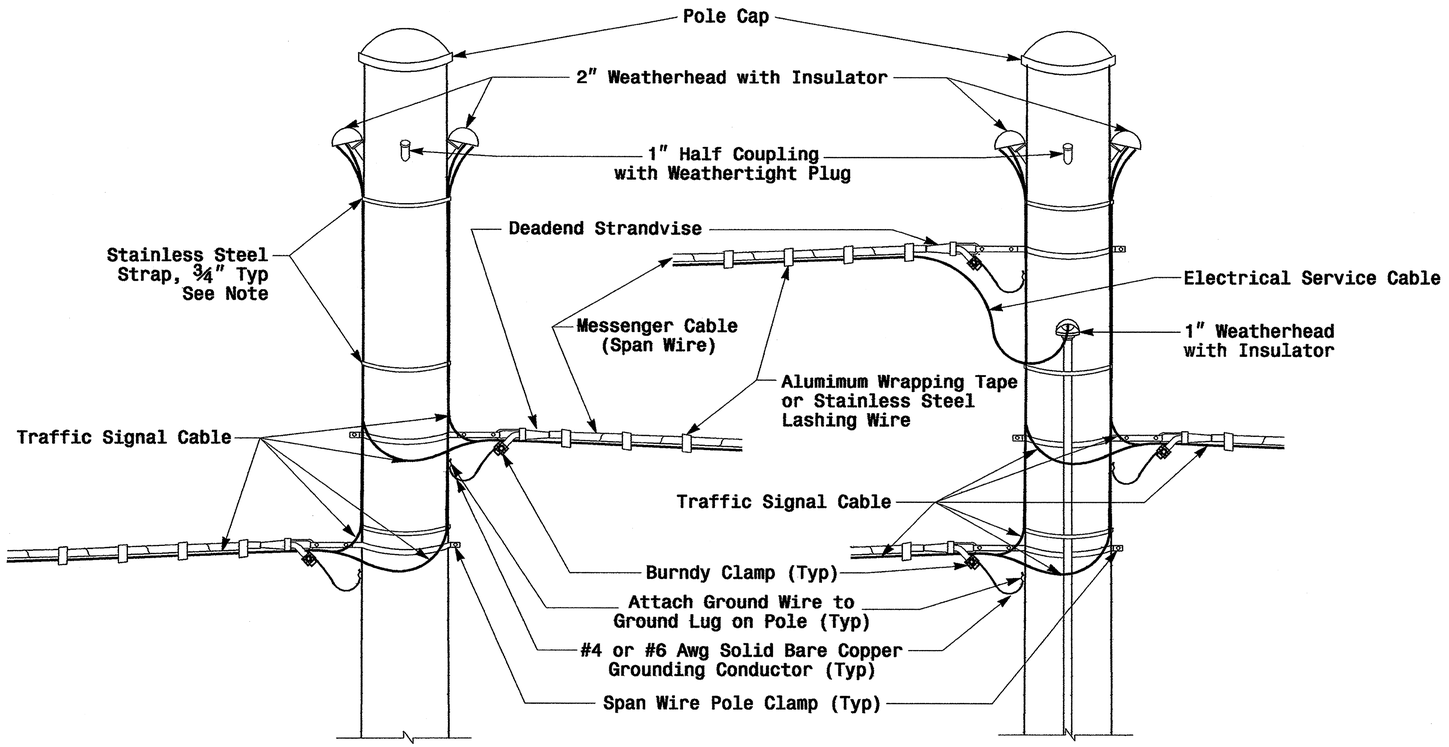
polexander

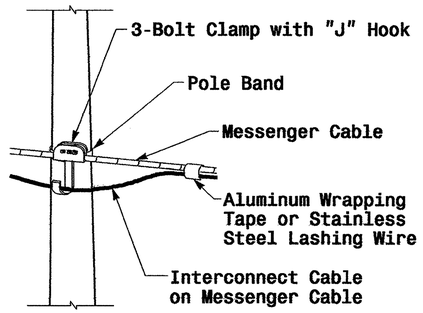
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig. 49 M 6

Construction Details – Strain Poles

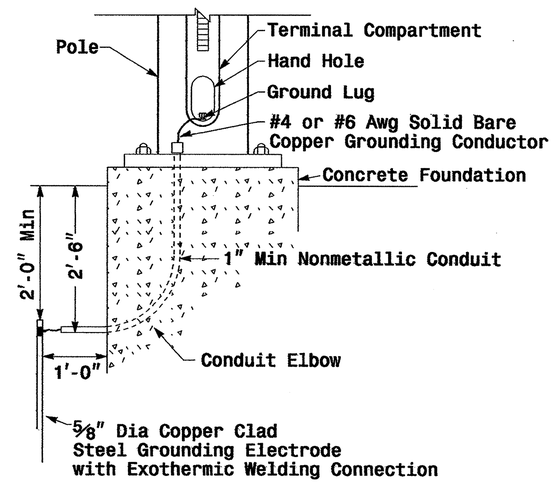


Note: Strap all signal cables to the side of the pole with ¾" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
1722 N. McDowell St., Raleigh, NC 27603

Construction Details Strain Poles

PLAN DATE:	May 2005	REVIEWED BY:	P.L. ALEXANDER
PREPARED BY:	C.F. ANDREWS	REVIEWED BY:	D.C. SARKAR

SCALE: 0 NA — NONE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 016286 ENGINEER MILTON L. DEAN
SIGNATURE
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DATE
SIG. INVENTORY NO.

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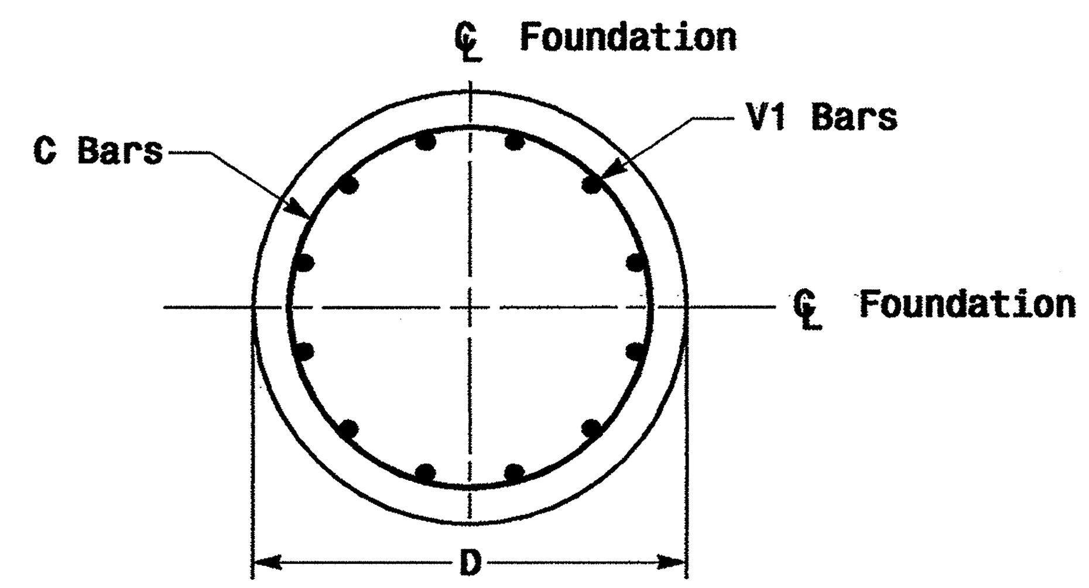
palexander

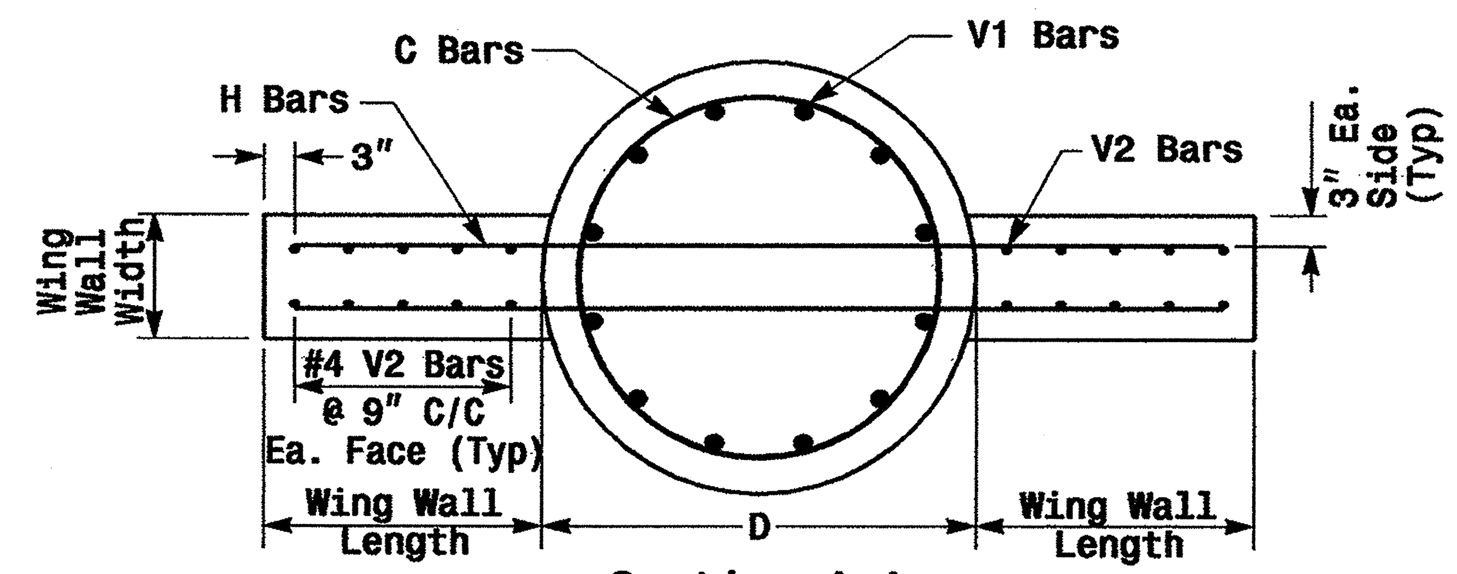
PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig. 50 M 7

Construction Details - Foundations

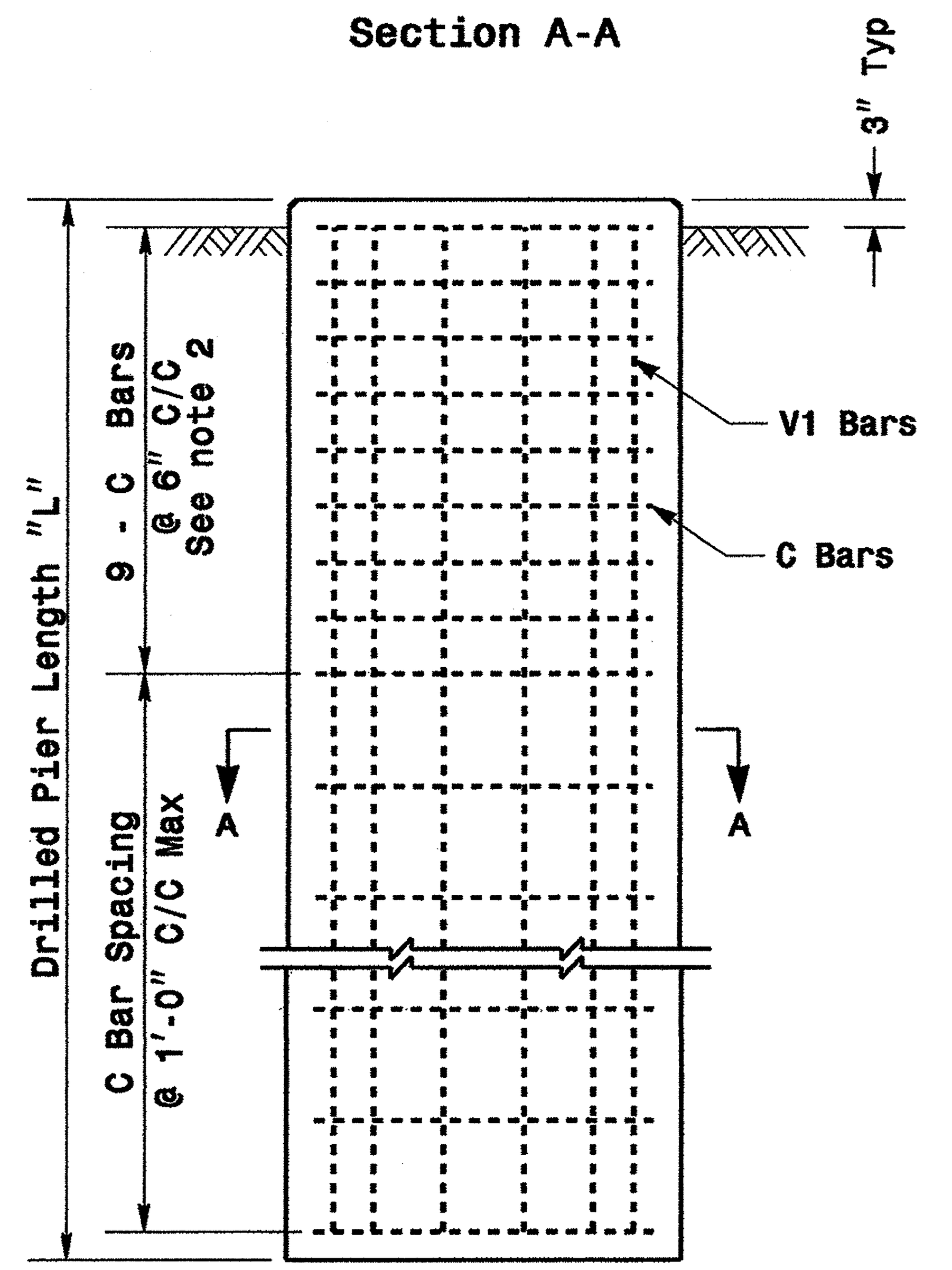
Reinforcing Steel Bars

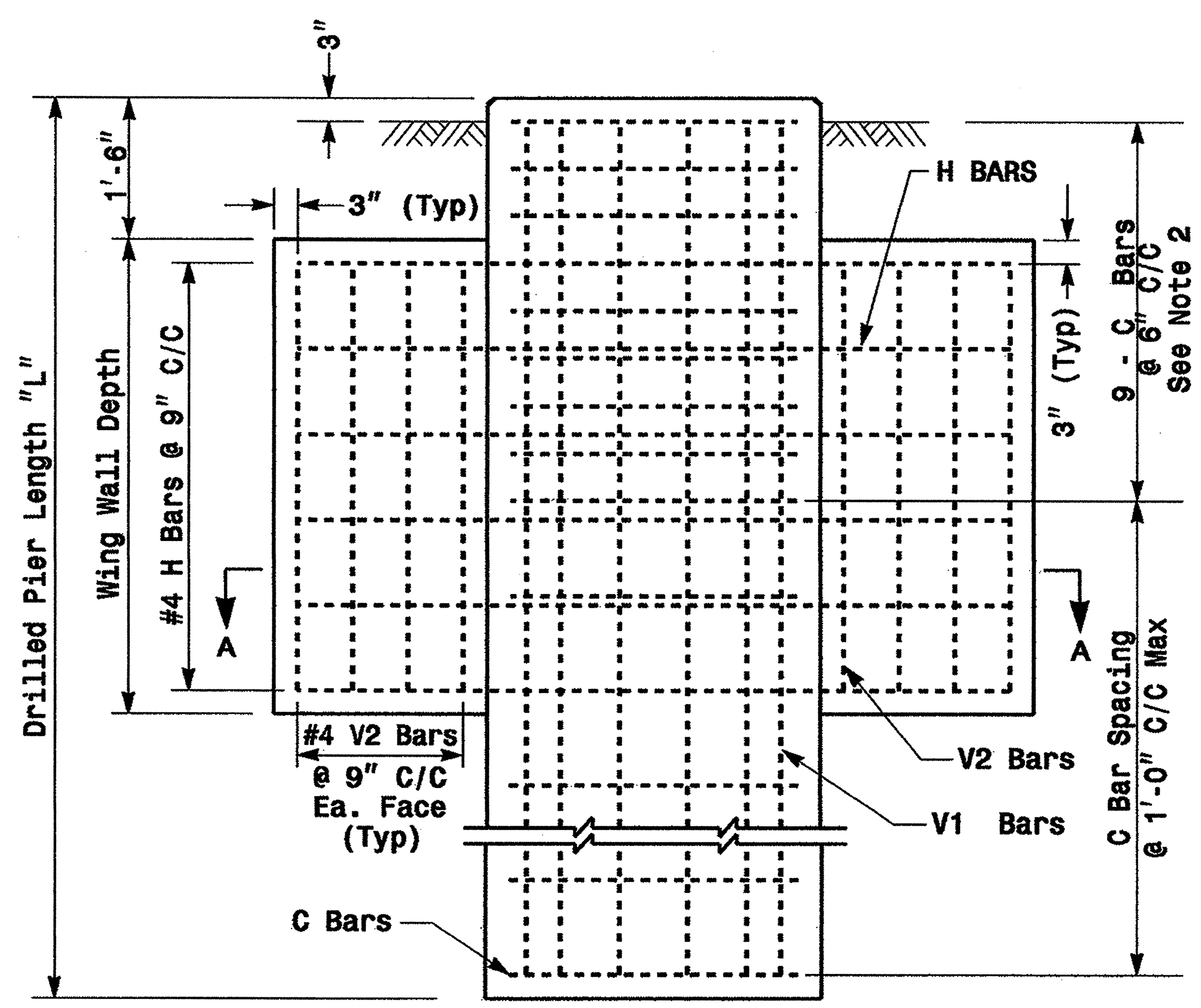


Section A-A



Section A-A



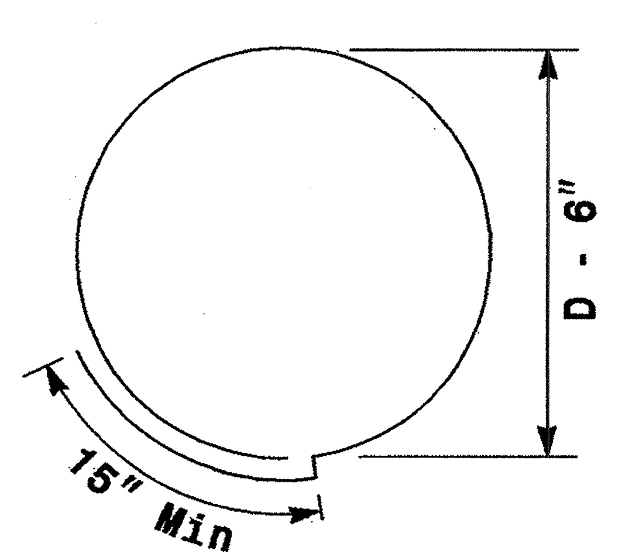


REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (42" & 48" DIAMETER)						
Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* See Note No. 1
** See Note No. 3

REINFORCING STEEL TABLE FOR STANDARD 42" and 48" DRILL PIER SHAFT WITH TYPE 1 AND TYPE 2 WING WALLS						
Wing Wall Type	Drill Pier Shaft Dia. (in.)	Reinforcing Steel				
		Bar Name	No.	Size	Type	Length
TYPE 1	42"	V1	9	#8	STR.	**
		V2	12	#4	STR.	2'-6"
		H	8	#4	STR.	6'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	42"	V1	9	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	48"	V1	12	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-0"
		C	*	#4	CIR.	12'-6"

* See Note No. 1
** See Note No. 3



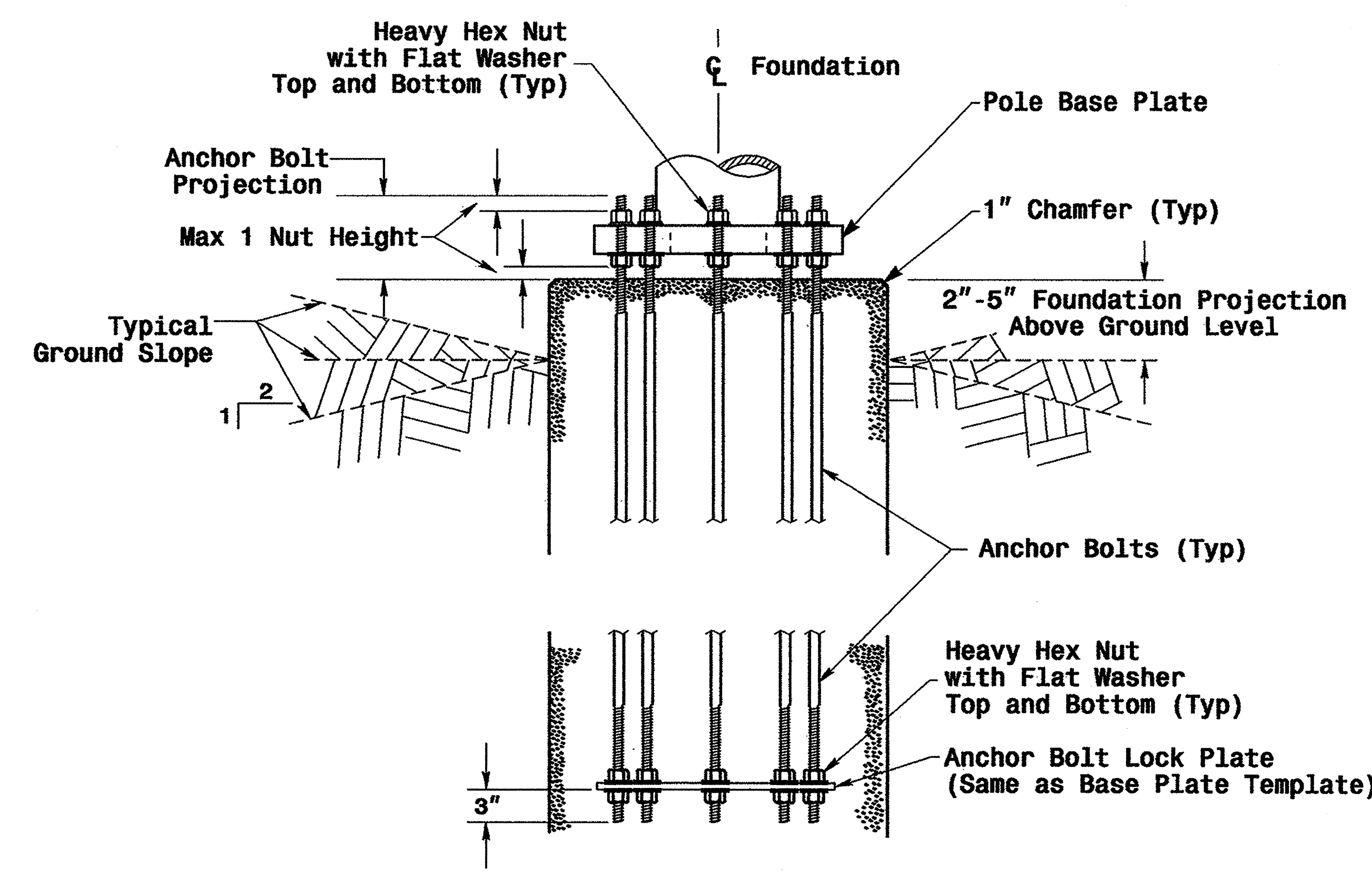
Typical "C" Bars

WING WALL DETAILS				
Wing Wall Type	Wing Wall Length (Ft.)	Wing Wall Width (Ft.)	Wing Wall Depth (Ft.)	Concrete Volume (Cu. Yds.)
TYPE 1	1'-6"	1'-0"	3'-0"	.4
TYPE 2	3'-0"	1'-0"	5'-0"	1.2

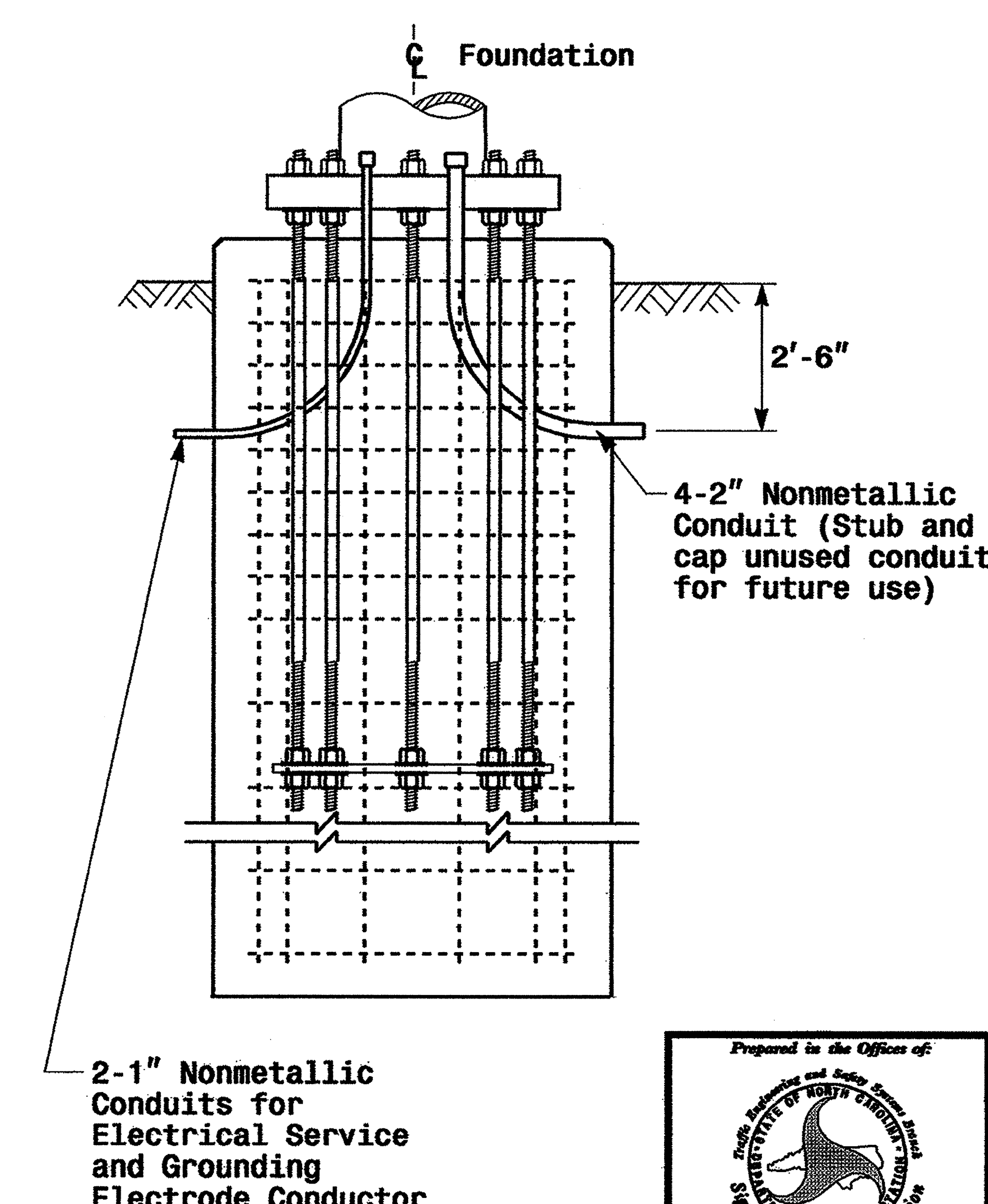
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



Notes

1. The number of C-bars is based on foundation depth. For standard foundations, see sheet M 8.
2. Circular tie reinforcing rings may be vertically adjusted by +/- 3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
3. The length of V1-bars is based on foundation depth. For standard foundations, see sheet M 8.
4. The quantities for steel and concrete shown in the Wing Wall Details Chart reflect the amount of material for 1 pair of wing walls (2 wing walls per drilled pier shaft.)

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

Construction Details
Foundations

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

SCALE 0 NA
NONE

SEAL
North Carolina Professional Engineer Seal 028094 Debesh C. Sarkar
D. Sarkar 9.2.2005
SIGNATURE DATE
SIG. INVENTORY NO.

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palexander

PROJECT REFERENCE NO.	SHEET NO.
I-3819A	Sig. 51 M 8

Standard Strain Poles

		STANDARD STRAIN POLES				STANDARD FOUNDATIONS 42" Diameter Drilled Pier Length (L) – Feet						
						Clay				Sand		
Wind Zone	Type	Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Moment at the Pole Base (ft-kp)	Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30
WIND ZONE 1	LIGHT	S26L3	26	25	280	20.5	14.0	11.5	9.5	18.0	16.0	14.0
		S30L3	30	25	310	21.0	14.5	11.5	9.5	18.5	16.5	14.5
		S35L3	35	25	350	22.5	15.0	12.0	10.0	19.5	17.5	15.5
	HEAVY	S30H3	30	29	450	25.5	16.5	13.0	11.0	21.0	18.5	16.5
		S35H3	35	29	540	26.0	17.0	13.5	11.5	22.0	19.5	17.0
WIND ZONE 2	LIGHT	S26L2	26	23	250	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S30L2	30	23	290	20.0	14.0	11.5	9.5	18.5	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	9.5	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	24.5	16.0	13.0	10.5	21.0	18.5	16.0
		S35H2	35	29	485	25.5	16.5	13.5	11.0	21.5	19.0	16.5
WIND ZONE 3	LIGHT	S26L2	26	23	250	18.5	13.0	10.5	9.0	17.5	15.0	13.5
		S30L2	30	23	290	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S35L2	35	23	315	20.0	14.0	11.5	9.5	18.5	16.0	14.5
	HEAVY	S30H2	30	29	415	23.0	15.5	12.5	10.0	20.5	17.5	16.0
		S35H2	35	29	485	24.0	16.0	13.0	10.5	21.0	18.0	16.5
WIND ZONE 4	LIGHT	S26L1	26	22	195	18.0	13.0	10.5	9.0	16.5	14.5	13.0
		S30L1	30	22	225	18.5	13.0	10.5	9.0	17.0	15.0	13.5
		S35L1	35	22	255	19.0	13.5	11.0	9.0	17.5	15.5	14.0
	HEAVY	S30H1	30	25	330	22.0	15.0	12.0	9.5	19.5	17.0	15.0
		S35H1	35	25	385	23.0	15.5	12.5	10.0	20.0	17.5	15.5
WIND ZONE 5	LIGHT	S26L2	26	23	250	19.0	13.5	10.5	9.0	17.5	15.5	13.5
		S30L2	30	23	290	20.0	14.0	11.0	9.5	18.0	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	10.0	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	23.5	15.5	12.5	10.5	21.0	18.0	16.0
		S35H2	35	29	485	25.0	16.5	13.0	11.0	21.5	18.5	16.5

Concrete Volume (cubic yards)=.356 X L

Fabrication Design Notes:

1. Values shown in "Moment at the Pole Base" column represents the minimum acceptable capacity allowable for design using a design CSR of 1.

2. Base plate thickness (T) is 2.0 inches.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.

2. Select the appropriate wind zone from sheet M 1.

3. Select the soil type (Clay or Sand) that best describes the soil characteristics.

4. Get the appropriate pole case load number from the plans or from the Engineer.

5. Select the appropriate column in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case. The foundation depth is the value where the column and the row intersect.

Prepared in the Offices of: Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

Standard Strain Poles and Standard Foundations

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

REVISIONS | INIT. | DATE

SCALE 0 NA None

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

02-SEP-2005 12:42
polexander